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Enclosed herewith for filing is a patent application, as follows:

Inventor(s): Brandon M. Beck, Shawn A. P. Smith
Title: Consolidation of Product Data Models
Docket No.: T00113
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- X Return Receipt Postcard
- X Check for $810 for Filing Fee and Assignment Fee
- X Transmittal Letter
- 35 page(s) Specification (not including Claims)
- 1 page(s) Claims
- 1 page(s) Abstract
- 13 sheet(s) of Drawings
- 2 page(s) Declaration For Patent Application and Power of Attorney
- 1 page(s) Nonpublication Request
- 1 page(s) Recordation Form Cover Sheet
- 1 page(s) Assignment

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Respectfully submitted,

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NONPUBLICATION REQUEST UNDER 35 U.S.C. 122(b)(2)(B)(i)	First Named Inventor	Brandon M. Beck
	Title	CONSOLIDATION OF PRODUCT DATA MODELS
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I hereby certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing. I hereby request that the attached application not be published under 35 U.S.C. 122(b).

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CONSOLIDATION OF PRODUCT DATA MODELS

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BACKGROUND OF THE INVENTION

Field of the Invention

(1) The present invention relates in general to the field of information processing, and more specifically to a system and method for consolidating data from various product data models.

DESCRIPTION OF THE RELATED ART

(2) A configurable product can be described by a configuration model having a set of configuration rules. A configurable product can be conceptually broken down into sets of selectable families and features of families that make up each product. A family represents a classification of a particular type of feature. Families are typically classified as groups of features with the same functional purpose. Example families for an automobile are "engines," "tires," "seats," and "exterior paint color." Families can also represent other groups such as market areas. For example, a family can include a marketing region such as USA, Canada, Mexico, Europe, or any other region. Families can be represented in terms of the minimum and maximum number of features that must be present in a configuration from a family for the configuration to be valid. A common family minimum and maximum or "(min, max)" is (1, 1). This notation means that exactly one feature from the family must be part of a configuration for the configuration to be valid. Other common (min, max) settings are (0, 1), meaning that either no features or a single feature from the family must be present in a configuration for it to be valid, and (0, -1), meaning that zero or any

positive number of features from the family must be present in a configuration for it to be valid.

(3) A feature represents an option that can be ordered on a product. All features are members of a family. Features are both assigned optionalities and used to qualify other features and the optionalities assigned to them. An example feature from the engine family is a "4.8 liter V8." Features relate to each other via ordering codes or optionalities. Example optionalities include "S", "O", "M", and "N," which translate to standard, optional, mandatory, and not available. A specific example would be "the 4.8 liter V8 engine is standard on the GS trim."

(4) Features relate to each other via configuration rules. A rule can be characterized as generally including a 'left hand side', (LHS), a 'right hand side' (RHS), and a specified relationship between the LHS and RHS. Each LHS feature may be associated with one or more RHS features, which indicates that a single feature in the LHS may be constrained or otherwise qualified by one or more RHS features. The RHS describes when a rule is in effect and what features are particularly affected. For example, a rule with a RHS of "XA, XB" means that the rule is in effect in cases where you have at least XA and XB in a buildable configuration, and XA and XB are features particularly affected by the rule along with the LHS feature. Configuration rules include optionalities that define a relationship between the LHS and RHS. Further exemplary discussion of LHS and RHS rule concepts is described in Gupta et al., U.S. Patent No. 5,825,651 entitled "Method and Apparatus for Maintaining and Configuring Systems."

(5) A configuration rule includes a main feature, an optionality, one or more constraints, and an applicable timeframe. As an example:

Main feature	Optionality	Constraints	Timeframe	
4.8 liter V8	S	XL & US	May-December 2003	Rule 1

(6) Rule 1 means "the 4.8 liter V8 is standard with the XL trim and US market from May to December 2003." The main feature represents the feature that is being affected by the rule. Optionalities can be positive or negative: positive optionalities

state that the main feature can work with the constraints; negative optionalities state the main feature cannot work with the constraints. Constraints qualify the rule and can be an arbitrary Boolean expression of features such as AND, NOT, and OR operators. In the rules below, a "." indicates an AND operation, a "~" indicates a NOT operation, and a "+" indicates an OR operation. The timeframe specifies when the other rule elements are effective.

(7) A buildable configuration describes what features can and can't exist with other features of a product. The example rule above defines a buildable configuration in the following way: "the 4.8 liter V8 is buildable (because it is standard) with the combination of XL and US." If the combination of features, such as of XL and US, is not buildable, the example rule is inactive. Consequently, even though the engine is buildable with that combination, if the combination is not buildable, the three features together are not a buildable configuration. A rule that would make the example rule inactive is the following:

Main feature	Optionality	Constraints	Timeframe	
XL	N	US	Sept. 2002	Rule 2

(8) Rule 2 means "the XL trim main feature is not available with US from September of 2002 onward." Until the XL main feature is made available with the US by changing the optionality from "N" to one that expresses a positive relationship, there will not be a buildable configuration for XL, US, and the 4.8L engine.

(9) Thus, a rule defines a buildable configuration between its main feature and its constraints only. A rule does NOT define a buildable configuration relationship between the members of its constraints. A separate rule must define that buildable configuration. Consequently, all rules together for a product define the complete product buildable configurations. In order to determine if the three features in the example rule (the main feature and the constraints) are a buildable configuration, the rules written on each of those features (i.e. where each feature is the main feature) should to be considered jointly. Inactive rules do not define buildable configurations until they become active.

(10) A "model" refers to a collection of rules that define the buildable configurations of one or more products.

(11) Referring to Figure 2, the families in each model are internally organized in accordance with a directed acyclic graph ("DAG") 200. The DAG contains an edge between a child family and a parent family if there exists a rule with a LHS feature that belongs to the child family and a RHS feature that belongs to the parent family. The DAG organization allows a child family to reference an ancestor but not the other way around. Cyclic references within a model as in Figure 4 can produce ambiguities within the model.

(12) Each model contains variations of the buildable configurations of the product. For example, a company may market a product with a particular set of standard features in one region and market the same product with a different set of standard features in another region. For example, in an automotive context, a V6 engine may be standard for a particular automobile model in one country, and a V8 engine may be standard for the particular automobile model in another country. In a computer context, a power supply with a 110V input may be standard in one country and a power supply with a 220V input may be standard in another country.

(13) Defining and maintaining the configuration space for a large product can often be difficult to do in a single configuration model. In order to limit the complexity and facilitate maintenance the configuration space is often defined in multiple configuration models. Each of these models are then assigned a set of defining constraints that specify which portion of the overall configuration space for the product it is defining. An example breakdown of the configuration space definition for an automotive vehicle could be into 3 separate models. Each model would define the configuration space of the automobile in one of 3 countries: USA, Canada, or Mexico. In this example each configuration model would have as a defining constraint one of the features representing each country. In the USA model the only allowable configurations would all contain the "USA" feature. Although not specifically included in this example, time can also be a defining constraint.

(14) A model may contain labels that describe the time period and space over which the model applies (also referred to as "model defining constraints"). For example, a model which describes the availability of cars in the United States during the years 2004 to 2006 may have defining constraints of "CARS.USA.2004-2006" while a model that describes the availability of all vehicles in North America during 2005 may have defining constraints of "{CARS+TRUCKS}.{USA+CANADA+MEXICO}.2005".

(15) While it is convenient to have this logical separation of the configuration space for maintenance purposes it is often desired to provide a single unified model that represents the configuration space for the entire product. The resulting unified configuration model can then be used to answer any questions that one of the original models could answer and it will give the same result. The set of allowable feature combinations for the unified model should be equivalent to the union of allowable feature combinations for each of the original configuration models.

(16) Thus, despite the differences in various models, it is often desirable to combine the multiple models into a consolidated model having a unified set of rules (also referred to as "stitched rules"). Referring to Figure 5, the conventional consolidation system 500 includes a model 502 that represents a set of three models that may be created and maintained separately. Model 504 is, for example, a configuration model that describes how a particular product may be built and sold for the USA market. Model 506 is a configuration model that describes how the same product may be built and sold for the Canadian market. Model 508 is a configuration model that describes how the same product may be built and sold for the Mexican market. Models 504, 506, and 508 may be combined into a single model 512 by conventional consolidation (also referred to as "stitching") processes 510. The consolidated model 512 will contain stitched rules that represent all the information present in the original three models. However, in many circumstances the conventional consolidations processes 510 produce unspecified configuration buildables in consolidated model 512. "Unspecified configuration buildables" are configuration buildables included in consolidated model 512 that are not defined in any of the source models, i.e. models 504, 506, and 508. An unspecified configuration buildable is, thus, an error that can have significant adverse

consequences. Conventional consolidation processes do not automatically detect unspecified configuration buildables and correct them. Since models can contain thousands, hundreds of thousands, or more rules, a high degree of automation is often a key to success for modeling and model data driven technologies.

(17) Referring to Figure 1, for example, assume models 102 and 104 are two configuration models with the following rules:

- Model 102: model defining constraints = {MKT1}
  - MKT1 O ALL
  - ENG1 S ALL
- Model 104: model defining constraints = {MKT2}
  - MKT2 O ALL
  - ENG1 S ALL
  - ENG2 O ALL

(18) The rules in models 102 and 104 are interpreted as allowing the following buildable configurations:

- Model 102:
  - MKT1.ENG1
- Model 104:
  - MKT2.ENG1
  - MKT2.ENG2

(19) An example conventional consolidation process 510 that simply combined the rules from models 102 and 104 using a simple aggregation process would yield a consolidated model 106 with the following rules:

- Model 106: model defining constraints ("MDC") = {MKT1+MKT2}
  - MKT1 O ALL
  - MKT2 O ALL

- ENG1 S ALL
- ENG2 O ALL

(20) The rules of model 106 are interpreted as allowing the following buildable configurations:

- Model 106:
  - MKT1.ENG1 (corresponds to element 108)
  - MKT1.ENG2 (corresponds to element 112)
  - MKT2.ENG1 (corresponds to element 110)
  - MKT2.ENG2 (corresponds to element 110)

(21) Model 106 includes the model space defined by the model defining constraints 108 of model 102 and the model space defined by the model defining constraints of 110 of model 104. Unfortunately, in addition to representing the stitched rules of models 102 and 104, model 106 also includes an unspecified buildable configuration "MKT1.ENG2" 112. In the embodiment of Figure 1, buildable configurations of model 104 have been extended into the model defining constraints MKT1 space 114. Model defining constraints space MKT2 space 116 accurately contains only the buildable configurations of model 104.

(22) The consolidated model should faithfully represent the buildable configurations of the products represented by models 102 and 104 without including any errors such as the unspecified buildable configurations 112. Conventional consolidation processes attempt to solve this problem by modifying, adding, and removing stitched rules so that rules from each source model do not extend outside of the space defined by their source model's defining constraints.

(23) An example enhanced conventional consolidation process 510 that combined the rules from models 102 and 104, constraining each to their source model's defining constraints, would yield a consolidated model 406 with the following rules:

- Model 406: model defining constraints = {MKT1+MKT2}
  - MKT1 O ALL (source model 102's defining constraints = {MKT1})

- ENG1 S MKT1 (source model 102's defining constraints = {MKT1})
- MKT2 O ALL (source model 104's defining constraints = {MKT2})
- ENG1 S MKT2 (source model 104's defining constraints = {MKT2})
- ENG2 O MKT2 (source model 104's defining constraints = {MKT2})

(24) The rules of model 406 are interpreted as allowing the following buildable configurations:

- Model 406:
  - MKT1.ENG1
  - MKT2.ENG1
  - MKT2.ENG2

(25) The new model 406 accurately combines the intent of source models 102 and 104 without introducing new unspecified buildable combinations.

(26) Although consolidation appears to be the straight forward process of adding all the rules from each model being consolidated and qualifying each rule with the model defining constraint label that indicates the origin of the rule in a consolidated model, the actual conventional process is not that simple due to constraints on the model's representation of families. To avoid creation of ambiguous models, the consolidation process typically must also ensure that the families in the consolidated model 512 can be organized into a DAG as described above. However, the conventional consolidation process 510 violates this constraint.

(27) Following is pseudo code for a conventional consolidation process produced using an appropriately programmed computer and model data. The "//" forward slash symbols represent the start and end of explanatory comments:

```
def performConventionalStitching(rules, mdc, dag):

    // Defines the method "performConventionalStitching" to consolidate one or
    more models using the rules in the models, the model defining constraints
    (mdc), and the DAG of the model.//

  stitchedRules = {}
```

// collects the consolidated rules for the consolidated model. //

for each rule in rules:

// Sequentially process each rule in the models being consolidated. //

stitchedRule = rule.intersect(mdc)

// Intersect the rule being processed with a model qualifier space, i.e. the configurations for which the model applies. Intersection Examples wherein A1, B1, and B2 represent model qualifier spaces:
(X1 S A1) ∩ A1 = X1 S A1
(X1 S A1) ∩ B1 = X1 S A1.B1
(X1 S B2) ∩ B1 = ∅
(B1 S ALL) ∩ B1 = B1 S ALL
(B2 S ALL) ∩ B1 = ∅
(A1 S ALL) ∩ A1.B2 = A1 S B2 //

if(stitchedRule != ∅):

// If the intersection is not empty ... //

stitchedRule = removeDAGCycles(stitchedRule, dag)

// Remove any qualifiers that produce cyclical references within the DAG. //

stitchedRules.add(stitchedRule)

// Add stitched rules to the set of stitchedRules of the consolidated model. //

return stitchedRules

def removeDAGCycles(rule, dag):

// Defines the method "removeDAGCycles" to remove qualifiers of the rule that produce cyclical relationships within the DAG. //

remove qualifiers from the rule that are ancestor families of the main feature (i.e. the LHS of the rule) in the DAG.

(28) The following represents the example application of the conventional model consolidation process. Consider two source models using the following rules:

- Model 602: model defining constraints = {SER1}

- MKT1 O ALL, MKT2 O ALL
- ENG1 S MKT1, ENG2 S MKT2, ENG2 O MKT1
- SER1 S {ENG1+ENG2}

- Model 612: model defining constraints = {SER2}
  - MKT1 O ALL, MKT2 O ALL
  - ENG1 S MKT1, ENG2 S MKT2
  - SER2 S (ENG1+ENG2)

(29) Figure 6 illustrates how the rules for each family combine to yield a set of buildable configurations. In addition, Figure 6 illustrates how conventional stitching combines the buildable combinations of models 602 and 612 to create the consolidated model 622. Shaded portions represent indicated buildable configurations. For clarity, Figure 6 ignores the effects of the optionalities ('S','O', ...) of the rules. Figure 3 illustrates a DAG for models 602 and 612.

- Model 602: model defining constraints = {SER1}
  - The MKT rules restrict the model to buildable combinations 604: all buildable combinations that include MKT1 and MKT2.
  - The ENG rules restrict the model to buildable combinations 606: all buildable combinations that include MKT1.ENG1, MKT1.ENG2, MKT2. ENG2.
  - The SER rule restricts the model to buildable combinations 608: all buildable combinations that include SER2.
  - The intersection of the buildable combinations allowed by MKT (604), ENG (606) and SER (608) are the buildable combinations allowed by the entire model (610): all buildable combinations that include MKT1.ENG1.SER1, MKT1.ENG2.SER1, MKT2.ENG2.SER1.

- Model 612: model defining constraints = {SER2}
  - The MKT rules restrict the model to buildable combinations 614: all buildable combinations that include MKT1 and MKT 2.
  - The ENG rules restrict the model to buildable combinations 616: all buildable combinations that include MKT1.ENG1, MKT2.ENG2.

- The SER rule restricts the model to buildable combinations 618: all buildable combinations that include SER2.

- The intersection of the buildable combinations allowed by MKT (614), ENG (616) and SER (618) are the buildable combinations allowed by the entire model (620): all buildable combinations that include MKT1.ENG1.SER2, MKT2.ENG2.SER2.

(30) Following are the consolidated model rules generated using conventional consolidation process 510 and above pseudo code:

- Model 622: model defining constraints = {SER1+SER2}

  - MKT1 O ALL, MKT2 O ALL
    MKT1 O ALL, MKT2 O ALL (624)

  - ENG1 S MKT1, ENG2 S MKT2, ENG2 O MKT1
    ENG1 S MKT1, ENG2 S MKT2 (626)

  - SER1 S {ENG1+ENG2}
    SER2 S {ENG1+ENG2} (628)

(31) The MKT and ENG rules could not be qualified by the model defining constraints because doing so would have caused a cycle in the family relationship DAG as depicted in Figure 4. Especially, the "ENG2 O MKT1" rule was not qualified by the model defining constraint SER1. The result is that the unspecified buildable configuration "MKT1.ENG2.SER2" 636 was added to the buildable combinations 630 of the combined model 622.

SUMMARY OF THE INVENTION

(32) A model consolidation process combines multiple configuration models into a single unified configuration model that contains the union of the allowable combinations (i.e. combinations that are buildable) from each of the original models. An aspect of at least one embodiment of the model consolidation process is that it allows models to be combined in such a way that any incompatibilities or contradictions between models are detected and automatically resolved where possible. If an incompatibility is detected that cannot be automatically resolved, then the configuration models should not be combined. Instead if this incompatibility case occurs, at least one embodiment of the model consolidation process produces a

description of the problem encountered and report the problem along with the necessary information required for a human to resolve it.

(33) One embodiment of the present invention includes a method of consolidating multiple models, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint. The method includes combining the models into a single, consolidated model that maintains the non-cyclic chain of dependencies among families and features of families.

(34) Another embodiment of the present invention includes a system for consolidating multiple models, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint. The system includes a model consolidation module to combine the models into a single, consolidated model that maintains the non-cyclic chain of dependencies among families and features of families.

BRIEF DESCRIPTION OF THE DRAWINGS

(35) The present invention may be better understood, and its numerous objects, features and advantages made apparent to those skilled in the art by referencing the accompanying drawings. The use of the same reference number throughout the several Figures designates a like or similar element.

(36) Figure 1 (prior art) depicts a combination of models that generates unspecified buildable configurations.

(37) Figure 2 (prior art) depicts a directed acyclic graph ("DAG").

(38) Figure 3 (prior art) depicts a DAG for models depicted in Figure 6.

(39) Figure 4 (prior art) depicts a DAG with a cycle for a model representing the consolidation of models in Figure 6 obtained using a conventional consolidation process.

(40) Figure 5 (prior art) depicts a conventional consolidation system.

(41) Figure 6 (prior art) depicts combining rules of two models into a consolidated model having specified and unspecified buildable configurations.

(42) Figure 7 depicts a model consolidation system.

(43) Figure 8 depicts the model representations used for Figure 6 and the consolidation thereof using an embodiment of the model consolidation system of Figure 6.

(44) Figure 9A depicts combining configuration models into an accurate consolidation model using the model consolidation system of Figure 7.

(45) Figure 9B depicts a graphical representation of the combination of models into consolidated model.

(46) Figure 10 depicts a flowchart of a model consolidation process 1000.

(47) Figure 11 depicts a flowchart for removing unspecified buildable configurations from a consolidated model.

(48) Figure 12 depicts a network of computer systems in which a model consolidation system can be used.

(49) Figure 13 depicts a computer system with which a modeling consolidation system can be implemented.

DETAILED DESCRIPTION

(50) The term "product" is used herein to generically refer to tangible products, such as systems, as well as intangible products, such as services.

(51) Contrary to conventional processes, the rules from individual models should not simply be qualified by the defining constraints for that model and then directly combined together. The first reason for this is because it is possible that one of the original models will make a statement that contradicts a statement in one of the other

models. If two contradicting statements were present in the unified configuration model then an inference procedure run on it would never be able to draw a logical conclusion. Secondly, each configuration model defines a non-cyclic chain of dependencies among its families and features of families. The problem with conventional stitching algorithms can occur, for example, whenever model defining constraints reference families that have DAG ancestors and the DAG ancestors are not referenced by model defining constraints. In this instance, the DAG is a union of all family relationships across all models. Thus, if the defining constraint features are ancestral features and are added to the RHS of every rule in the model as with conventional consolidation processes, a cycle would be introduced into this chain of dependencies. In order to avoid introducing these cycles and still combine the individual models together into a consolidated model, an intelligent algorithm is required.

(52) A model consolidation process, such as model consolidation process 710, represents a process for combining multiple configuration models into a single unified configuration model that contains the union of the allowable combinations (i.e. combinations that are buildable) from each of the original models. An aspect of at least one embodiment of the model consolidation process is that it allows models to be combined in such a way that any incompatibilities or contradictions between models are detected and automatically resolved where possible. If an incompatibility is detected that cannot be automatically resolved, then the configuration models should not be combined. Instead if this incompatibility case occurs, at least one embodiment of the model consolidation process produces a description of the problem encountered and report the problem along with the necessary information required for a human to resolve it.

(53) Referring to Figure 7, the model consolidation system 700 includes model 702, which represents a set of N models that may be created and maintained separately, where N is any integer. Model A 704 is, for example, a configuration model that describes how a particular product may be built and sold for the USA market. Model B 706 is a configuration model that, for example, describes how the same product may be built and sold for the Canadian market. Model N 708 is, for example, a configuration model that describes how the same product may be built and

sold for the Mexican market. Models 704, 706, and 708 may be combined into a single model 712 by the model consolidation (also referred to as "stitching") processes 710. The combined model 712 contains stitched rules that represent all the information present in the original three models without unspecified buildable configurations.

(54) Figures 8 and 9 depicts the model representations used for Figures 6 and 7 and the resulting consolidation of the model representations using an embodiment of model consolidation system 700. For clarity, Figures 8 and 9 ignore the effects of the optionalities ('S','O', ...) of the rules.

(55) There is a conflict between the two models on ENG: MKT1.ENG2 is released in Model 602 but not Model 612. Referring to block 832, because the ENG family is above Model 612's defining constraint family (SER) in the DAG, we may not adjust the ENG family by intersecting its space with Model 612's defining constraint (SER2). Instead, extend the ENG family in Model 612 to be compatible with the release of the ENG family in Model 602. Referring to block 834, the extension is compensated for by restricting the SER family so that it is no longer released in the space we extended the ENG family (MKT1.ENG2.*). Referring to block 836, the result is that the restriction on the SER family interacts with the extension of the ENG family in such a way that the consolidated model 822 does not include unspecified buildable configurations and, thus, faithfully represents the buildable configurations of models 602 and 612.

(56) The desired result of obtaining a complete model is obtained by computing the following set:

- (Complete Model Space for Model 602 intersect Model 602 defining constraints (SER1)) union
- (Complete Model Space for Model 612 intersect Model 612 defining constraints (SER2))

(57) In this example the complete model spaces for both models do not extend outside their defining constraints, so this simplifies to the following expression:

- Complete Model Space for Model 602 union Complete Model Space for Model 612

(58) Figure 9A depicts the accurate results of combining configuration models 602 and 612 using model consolidation system 700. Blocks 924, 926, and 928 respectively represent the union of the MKT families, ENG families, and SER families from configuration models 602 and 612. Consolidated model 930 represents the accurate consolidation of models 602 and 612 having only specified configuration buildables. An embodiment of the consolidation process used to generated consolidated model 930 is described in more detail below.

(59) Figure 9B depicts a graphical representation of the combination of models 602 and 612 into consolidated model 930.

(60) **Inputs**

(61) The input to the model consolidation process 710 is a set of configuration models 702 to be combined into one consolidated model 712 along with a set of defining constraints for each of models 702. The inputted set of configuration models contains compatible relationships such that the union of the models forms a DAG.

(62) **Outputs**

(63) In at least one embodiment, model consolidation process 710 produces one of two primary outputs in the form of consolidated model 712. One of these outputs is generated for each invocation of the model consolidation process 710.

(64) The first possible output is a set of rules, represented by the consolidated model 712, that allows exactly those combinations of features that were allowed by one of the inputted configuration models 702.

(65) The second output is a set of errors that generally cannot be fixed automatically and require human intervention. These errors can be used to direct a human to the set(s) of rules in the input models 702 that are conflicting with each other.

(66) **Data Structures**

(67) At least one embodiment of the model consolidation process 710 uses two key data structures.

1. A directed acyclic graph (DAG). Used to represent the hierarchical relationship between the families in a configuration model or set of rules.

2. A rule.

(68) **Process**

(69) Figure 10 depicts a flowchart of model consolidation process 1000, which represents one embodiment of model consolidation process.

(70) **Step 1 (1001)**: Load and group the rules for each configuration model

(71) The rules from each of configuration models 702 are loaded into model configuration process 710 and grouped by the associated configuration models 702 from which they originated. This provides the ability to enumerate all rules for a particular configuration model as well as the ability to determine which configuration model a specific rule belongs to (i.e. "is associated with").

(72) **Step 2 (1002)**: Construct a DAG from all of the rules across models

(73) A family DAG is then constructed from all of the rules of configuration models 702. This provides the ability to determine the relationships among families in configuration models 702. In particular this allows the ancestors of a family to be determined to prevent cyclic relationships in the DAG of consolidated model 712.

(74) **Step 3 (1003)**: Determine which families cannot be trivially combined together

(75) Non-trivial families are the families that cannot be trivially combined are the families of the defining constraints as well as their ancestors. Trivial families can be combined using a stitching process such as the conventional stitching process 510. The DAG created in Step 2 is utilized to determine the ancestors of each of the defining families. Each set of ancestor families is then combined together along with

the set of defining families. This results in the set of families that cannot be trivially combined.

(76) **Step 4 (1004)**: Create marker rules for the non-trivial families and add them to the mapping of rules

(77) Marker rules are created to define which portions of the overall configuration space for which a configuration model does not provide a buildable configuration (i.e. the "uncovered space"). These marker rules should look like any other rule in a configuration model with the exception of their optionality.

(78) The uncovered space for a particular family in a configuration model can be calculated using a temporary rule. A temporary rule is created with a RHS representing ALL. Both the RHS and LHS of each rule in the family are then subtracted from this temporary rule. This subtraction could result in multiple rules. If this happens, then all remaining rules are subtracted from all temporary rules. Once this subtraction is complete the remaining set of rules describes the uncovered space for the particular family. Each of these remaining rules is processed, and any features on the RHS from the family being processed are moved to the LHS. This modified rule is now a marker rule and is added to the grouping of rules created during Step 1.

(79) **Step 5 (1005)**: For each family, qualify its rules with the defining constraints from the model that it comes from

(80) A preliminary pass is made of the rules to attempt to constrain the statements they make to fall within the space of the defining features of the configuration model they come from. This is done by creating a temporary rule with a RHS that is equivalent to the defining constraint features of the model being processed. All rules from that model are then intersected with this temporary rule and if the result is non-empty the intersection is kept. This intersection adds to the RHS of the rules the defining constraints of the model to which the rule belongs.

(81) **Step 6 (1006)**: Remove the added defining constraint features from the RHS of rules where they cause cycles in the DAG.

(82) When the defining constraint features of each configuration model were added to the rules in Step 5, it is possible that cyclic relationships among the families of the rules were introduced. In order to remedy this, any defining constraint features on the RHS of a rule that introduces a cycle are removed.

(83) For each rule the features of the RHS that belong to defining families are investigated. The ancestors of each RHS feature is computed, and if the family of the LHS feature of the rule is in the ancestor list, then that RHS feature is causing a cyclical relationship in the DAG and is removed from the RHS of the rule. Otherwise, the DAG is updated to include the relationship just encountered. Once this process is completed it is guaranteed that there are no cyclical relationships among the rules.

(84) **Step 7 (1007)**: Optionally, build a DAG from the qualified rules to ensure that no cycles are present.

(85) Now that the rules have been updated with the defining constraint features, and there are no cyclical relationships in them, an updated DAG is created. This DAG is created in the same manner as the one created in Step 2.

(86) **Step 8 (1008)**: Split the rules into those with a LHS feature from a trivial family and those with a LHS feature from a non-trivial family

(87) The rules that have a LHS feature that belong to a trivial family are finished processing, however the rules with a LHS feature that belongs to a non-trivial family still should have more processing. Because of this, the rules are split into two groups, those with a LHS feature from a non-trivial family and those with a LHS feature from a trivial family.

(88) **Step 9 (1009)**: Perform the non-trivial combination algorithm

(89) This step and its associated sub-steps are only run on the rules with LHS features from a non-trivial family. This step updates the rules in such a way that any erroneous allowed feature combinations created by the combination process 1000 are removed. Figure 11 shows a flowchart of process 1100, which depicts a flowchart for removing unspecified buildable configurations from a consolidated model..

(90) **Step 9.1 (1101)**: Group all of the rules together by LHS feature

(91) All of the non-trivial rules are combined together and grouped together by LHS feature. This is done in a similar manner as the grouping performed in Step 1.

(92) **Step 9.2 (1102)**: Determine all possible sets of rules with overlapping RHS features

(93) The rules for each LHS feature are grouped together in all possible overlapping combinations. In one embodiment, this is done by creating a set containing all of the rules for a LHS feature and computing the power set of this set. Each element of the power set is investigated to see if all of the rules the element contains overlap each other, if they do and there are rules from at least two source models, then this set of rules is kept, otherwise it is discarded. Additionally any sets that are a subset of a non-discarded set are also removed. Those of ordinary skill in the art will recognize that many other ways exist to locate overlapping rule sets, such as indexing the rules in a data structure and searching for the overlapping rule sets.

(94) **Step 9.3 (1103)**: Check for optionality overlap

(95) The non-marker rules in each non-discarded set of rules from Step 9.2 are then investigated to see if any of them have different optionalities. If there are rules in the same set with different optionalities that are non-marker rules, then incompatible optionality overlap has been detected. An error message is logged (1107) describing which rules have different optionalities, the space that they overlap, and which configuration models the rules came from.

(96) **Step 9.4 (1104)**: Check for unspecified buildables

(97) Each non-discarded set of rules from Step 9.2 is investigated to see if it contains both marker rules and non-marker rules. If it does, then an unspecified buildable has been detected in this set of rules. If this situation happens, the unspecified buildable can be automatically removed in Step 9.5.

(98) **Step 9.5 (1105)**: Resolve unspecified buildables.

(99) In order to repair the unspecified buildable configuration in a set of rules, a restriction rule preventing the erroneous, unspecified buildable configuration must be written.

(100) The marker rules created in Step 4 are used to determine which restriction rules should be written. A restriction rule will be written for each marker rule in the set. The LHS feature of the restriction rule is the distinguishing constraint of the model from which the marker rule comes. The distinguishing constraint is the model defining constraint feature(s) of a model such that the distinguishing constraint and all of the DAG's ancestors in the MDC are sufficient to distinguish the MDC space of the model from the MDC spaces of the other models. The RHS features of the restriction rule are the set of features that describe where the overlap among this set of rules occurs. In other words it is the intersection of the rules in the set. The resulting restriction rule is then intersected with the same temporary rule from Step 5 for the model that the marker rule came from. If the result is non-empty then it is kept.

(101) This process allows a rule from one model to extend into another at a non-trivial family, but repairs the extension at a family below the non-trivial family. This process is illustrated in elements 616, 826 and 828.

(102) **Step 9.6 (1106)**: Optionally apply restriction rules

(103) If the output of the model consolidation process 710 is desired to not contain any generated restriction rules, then the restriction rules generated in Step 9.5 can be applied to the non-restriction rules in the set they were generated from. The restrictions can be applied by subtracting them from all other rules that have the same LHS features.

(104) **Step 10 (1010)**: Combine rules together removing marker rules

(105) All of the rules whose LHS feature is from a trivial family are combined together with the rules whose LHS features are from non-trivial families.

Additionally all restriction rules that were generated in Step 9.5 are also added if Step 9.6 was not executed to apply them to the non-restriction rules. Finally, all marker rules are removed.

(106) **Example**

(107) The following is an example of the model combination algorithm performed on two configuration models. This example serves to illustrate a case where the two models cannot be combined together using the conventional stitching process and instead the more advanced combination process 1000 is used instead.

(108) Inputs:

Family/Feature definitions:

MKT = {MKT1, MKT2}

ENG = {ENG1, ENG2}

SER = {SER1, SER2}

Configuration model #1: defining constraints = {SER1}

MKT1 O ALL

MKT2 O ALL

ENG1 S MKT1

ENG2 S MKT2

ENG2 O MKT1

SER1 S ENG1+ENG2

Configuration model #2: defining constraints = {SER2}

MKT1 O ALL

MKT2 O ALL

ENG1 S MKT1

ENG2 S MKT2

SER2 S ENG1+ENG2

(109) **Step 1 (1001)**: Load and group the rules for each configuration model

Model #1:

MKT1 O ALL,

MKT2 O ALL,

ENG1 S MKT1,

ENG2 S MKT2,

ENG2 O MKT1,

SER1 S ENG1+ENG2

Model #2:

MKT1 O ALL,

MKT2 O ALL,

ENG1 S MKT1,

ENG2 S MKT2,

SER2 S ENG1+ENG2

(110) **Step 2 (1002)**: Construct a DAG from all of the rules across models

(111) The DAG constructed is presented as an adjacency list. The interpretation is that it is a mapping of a family to its parent families.

(112) The following nomenclature represents a DAG as depicted in Figure 3:

MKT -> []

ENG -> [MKT]

SER -> [ENG]

(113) **Step 3 (1003)**: Determine which families cannot be trivially combined together

(114) In this example there is only one constraint family, SER. Thus it and its ancestors are the set of families that cannot be trivially combined together. This results in {MKT, ENG, SER} as the set of non-trivial families.

(115) **Step 4 (1004)**: Create marker rules for the non-trivial families and add them to the mapping of rules

(116) A temporary rule is constructed for each non-trivial family with ALL as the qualifiers. All other rules in the family are then subtracted from the temporary rules with an optionality of "x" resulting in the rules shown below :

Model #1:

MKT: []

ENG: ALL x ENG1.MKT2

SER: ALL x SER2.(ENG1+ENG2)

Model #2:

MKT: []

ENG: ALL x ENG1.MKT2, ALL x ENG2.MKT1

SER: ALL x SER1.(ENG1+ENG2)

(117) In this example, the optionality N has been chosen for the marker rules. The appropriate RHS feature is moved to the LHS in the temporary rules and the optionality is changed to N. After this, the generated marker rules are as follows:

Model #1:

ENG1 N MKT2

SER2 N ENG1+ENG2

Model #2:

ENG1 N MKT2

ENG2 N MKT1

SER1 N ENG1+ENG2

(118) These marker rules are then added to the grouping of rules from Step 1 to yield the following grouping:

Model #1:

MKT1 O ALL,

MKT2 O ALL,

ENG1 S MKT1,

ENG1 N MKT2,

ENG2 S MKT2,

ENG2 O MKT1,

SER1 S ENG1+ENG2,

SER2 N ENG1+ENG2

Model #2:

MKT1 O ALL,

MKT2 O ALL,

ENG1 S MKT1,

ENG1 N MKT2,

ENG2 N MKT1,

ENG2 S MKT2,

SER1 N ENG1+ENG2,

SER2 S ENG1+ENG2

(119) **Step 5 (1005)**: For each family, qualify its rules with the defining constraints from the model that it comes from

(120) In this example, since SER1 is the defining constraint of Model #1, a temporary rule with SER1 on the RHS will be created and all of the rules from Model #1 are intersected with it. Similarly, Model #2 will have a temporary rule with SER2

on the RHS and all of its rules will be intersected with it. After the rule intersections, the qualified rules will look like:

Model #1:

MKT1 O SER1,

MKT2 O SER1,

ENG1 S MKT1.SER1,

ENG1 N MKT2.SER1,

ENG2 S MKT2.SER1,

ENG2 O MKT1.SER1,

SER1 S (ENG1+ENG2).SER1

Model #2:

MKT1 O SER2,

MKT2 O SER2,

ENG1 S MKT1.SER2,

ENG1 N MKT2.SER2,

ENG2 N MKT1.SER2,

ENG2 S MKT2.SER2,

SER2 S (ENG1+ENG2).SER2

(121) Step 6 (1006): Remove the added defining constraint features from the RHS of rules where they cause cycles in the DAG

(122) Since the SER family is a leaf in the DAG generated during Step 2, it cannot appear on the RHS of any rule without causing there to be a cyclic relationship. Thus all of the additional qualification done in Step 5 will be undone. The rule grouping will be reverted to look like:

Model #1:

MKT1 O ALL,

MKT2 O ALL,

ENG1 S MKT1,

ENG1 N MKT2,

ENG2 S MKT2,

ENG2 O MKT1,

SER1 S ENG1+ENG2

Model #2:

MKT1 O ALL,

MKT2 O ALL,

ENG1 S MKT1,

ENG1 N MKT2,

ENG2 N MKT1,

ENG2 S MKT2

SER2 S ENG1+ENG2

(123) **Step 7 (1007)**: Build a DAG from the qualified rules

(124) Building a DAG from the qualified rules results in the same DAG constructed in Step 2.

MKT -> []

ENG -> [MKT]

SER -> [ENG]

(125) **Step 8 (1008)**: Split the rules into those with a LHS feature from a trivial family and those with a LHS feature from a non-trivial family

(126) Since all of the families in this example are non-trivial families, splitting the rules into two groups yields only one set of rules, the set of rules with a LHS feature from a non-trivial family. All rules must go through the non-trivial combination algorithm.

(127) **Step 9.1 (1101)**: Group all of the rules together by LHS feature

(128) The result of grouping all of the rules by the LHS feature is shown below. In order to keep track of which model a rule originated in, (1) or a (2) is appended to the end of the rule.

MKT1 -> [MKT1 O ALL (1), MKT1 O ALL (2)]

MKT2 -> [MKT2 O ALL (1), MKT2 O ALL (2)]

ENG1 -> [ENG1 S MKT1 (1), ENG1 N MKT2 (1),

ENG1 S MKT1 (2), ENG1 N MKT2 (2)]

ENG2 -> [ENG2 O MKT1 (1), ENG2 S MKT2 (1),

ENG2 N MKT1 (2), ENG2 S MKT2 (2)]

SER1 -> [SER1 S ENG1+ENG2 (1)]

SER2 -> [SER2 S ENG1+ENG2 (2)]

(129) **Step 9.2 (1102)**: Determine all possible sets of rules with overlapping RHS features

(130) Calculating all possible sets of rules with overlapping RHS features results in the following sets for each LHS feature:

[{MKT1 O ALL (1), MKT1 O ALL (2)},

{MKT2 O ALL (1), MKT2 O ALL (2)},

{ENG1 S MKT1 (1), ENG1 S MKT1 (2)},

{ENG1 N MKT2 (1), ENG1 N MKT2 (2)},

{ENG2 O MKT1 (1), ENG2 N MKT1 (2)},

{ENG2 S MKT2 (1), ENG2 S MKT2 (2)}]

(131) **Step 9.3 (1103)**: Check for optionality overlap

(132) Each group of rules is checked for sets of non-marker rules that have different optionalities. In this example there are no rules with optionality overlap.

(133) **Step 9.4 (1104)**: Check for unspecified buildables

(134) In this example, there is one set of rules with unspecified buildables. It is as follows:

{ENG2 O MKT1 (1), ENG2 N MKT1 (2)}

(135) This set has an unspecified buildable because it contains both marker and non-marker rules. This unspecified buildable is illustrated in Element 832. It is the result of adding Elements 606 to 616.

(136) **Step 9.5 (1105)**: Resolve unspecified buildables

(137) This set of rules with an unspecified buildable will generate one restriction rule. The restriction rule generated is:

SER2 R ENG2.MKT1

(138) Next the restriction rule is intersected with a temporary rule with SER2 on the RHS since the marker rule that caused the restriction to be generated came from Model #2 and SER2 is Model #2's distinguishing constraint. The results of the intersection leaves the restriction rule unchanged.

(139) This generated restriction rule repairs the unspecified buildable in Element 832 by preventing it from happening in the SER family. The restriction written adjusts the SER space from Element 618 to Element 828.

(140) **Step 9.6 (1106)**: Optionally apply restriction rules

The restriction generated can be applied to the rules by subtracting it from all rules that have the same LHS feature. In this example the only rule with the same LHS feature is:

SER2 S ENG1+ENG2

(141) After performing the subtraction, the resulting rules with a LHS of SER2 are:

SER2 S ENG1

SER2 S ENG2.MKT2

(142) These SER2 rules cover the space illustrated in Figure 828.

(143) **Step 10 (1010)**: Combine rules together removing duplicate and marker rules

(144) Finally the set of rules that were processed through the non-trivial combination algorithm can be combined with those that were processed through the trivial combination algorithm. In this example there were no trivial families so all rules were processed through the non-trivial algorithm. The resulting set of rules is:

MKT1 O ALL

MKT1 O ALL

MKT2 O ALL

MKT2 O ALL

ENG1 S MKT1

ENG1 S MKT1

ENG2 O MKT1

ENG2 S MKT2

ENG2 S MKT2

SER1 S ENG1+ENG2

SER2 S ENG1

SER2 S ENG2.MKT2

(145) These rules correspond exactly to Figures 924, 926, and 928.

(146) Figure 12 is a block diagram illustrating a network environment in which a model consolidation system 700 may be practiced. Network 1202 (e.g. a private wide area network (WAN) or the Internet) includes a number of networked server computer systems 1204(1)-(N) that are accessible by client computer systems 1206(1)-(N), where N is the number of server computer systems connected to the network. Communication between client computer systems 1206(1)-(N) and server computer systems 1204(1)-(N) typically occurs over a network, such as a public switched telephone network over asynchronous digital subscriber line (ADSL) telephone lines or high-bandwidth trunks, for example communications channels providing T1 or OC3 service. Client computer systems 1206(1)-(N) typically access server computer systems 1204(1)-(N) through a service provider, such as an internet service provider ("ISP") by executing application specific software, commonly referred to as a browser, on one of client computer systems 1206(1)-(N).

(147) Client computer systems 1206(1)-(N) and/or server computer systems 1204(1)-(N) may be, for example, computer systems of any appropriate design, including a mainframe, a mini-computer, a personal computer system including notebook computers, a wireless, mobile computing device (including personal digital assistants). These computer systems are typically information handling systems, which are designed to provide computing power to one or more users, either locally or remotely. Such a computer system may also include one or a plurality of input/output ("I/O") devices coupled to the system processor to perform specialized functions. Mass storage devices such as hard disks, compact disk ("CD") drives, digital versatile disk ("DVD") drives, and magneto-optical drives may also be provided, either as an integrated or peripheral device. One such example computer system is shown in detail in Fig. 13.

(148) Embodiments of the model consolidation system 700 can be implemented on a computer system such as a general-purpose computer 1300 illustrated in Figure 13. Input user device(s) 1310, such as a keyboard and/or mouse, are coupled to a bi-directional system bus 1318. The input user device(s) 1310 are for introducing user input to the computer system and communicating that user input to processor 1313. The computer system of Figure 13 generally also includes a video memory 1314, main memory 1315 and mass storage 1309, all coupled to bi-directional system bus 1318 along with input user device(s) 1310 and processor 1313. The mass storage 1309 may include both fixed and removable media, such as other available mass storage technology. Bus 1318 may contain, for example, 32 address lines for addressing video memory 1314 or main memory 1315. The system bus 1318 also includes, for example, an n-bit data bus for transferring DATA between and among the components, such as CPU 1309, main memory 1315, video memory 1314 and mass storage 1309, where "n" is, for example, 32 or 64. Alternatively, multiplex data/address lines may be used instead of separate data and address lines.

(149) I/O device(s) 1319 may provide connections to peripheral devices, such as a printer, and may also provide a direct connection to a remote server computer systems via a telephone link or to the Internet via an ISP. I/O device(s) 1319 may also include a network interface device to provide a direct connection to a remote server computer systems via a direct network link to the Internet via a POP (point of presence). Such connection may be made using, for example, wireless techniques, including digital cellular telephone connection, Cellular Digital Packet Data (CDPD) connection, digital satellite data connection or the like. Examples of I/O devices include modems, sound and video devices, and specialized communication devices such as the aforementioned network interface.

(150) Computer programs and data are generally stored as instructions and data in mass storage 1309 until loaded into main memory 1315 for execution. Computer programs may also be in the form of electronic signals modulated in accordance with the computer program and data communication technology when transferred via a network. The method and functions relating to model consolidation system 700 may be implemented in a computer program alone or in conjunction with model consolidation system 700.

(151) The processor 1313, in one embodiment, is a microprocessor manufactured by Motorola Inc. of Illinois, Intel Corporation of California, or Advanced Micro Devices of California. However, any other suitable single or multiple microprocessors or microcomputers may be utilized. Main memory 1315 is comprised of dynamic random access memory (DRAM). Video memory 1314 is a dual-ported video random access memory. One port of the video memory 1314 is coupled to video amplifier 1316. The video amplifier 1316 is used to drive the display 1317. Video amplifier 1316 is well known in the art and may be implemented by any suitable means. This circuitry converts pixel DATA stored in video memory 1314 to a raster signal suitable for use by display 1317. Display 1317 is a type of monitor suitable for displaying graphic images.

(152) The computer system described above is for purposes of example only. The model consolidation system 700 may be implemented in any type of computer system or programming or processing environment. It is contemplated that the model consolidation system 700 might be run on a stand-alone computer system, such as the one described above. The model consolidation system 700 might also be run from a server computer systems system that can be accessed by a plurality of client computer systems interconnected over an intranet network. Finally, the model consolidation system 700 may be run from a server computer system that is accessible to clients over the Internet.

(153) Many embodiments of the present invention have application to a wide range of industries including the following: computer hardware and software manufacturing and sales, professional services, financial services, automotive sales and manufacturing, telecommunications sales and manufacturing, medical and pharmaceutical sales and manufacturing, and construction industries.

(154) Although the present invention has been described in detail, it should be understood that various changes, substitutions and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1. A method of consolidating multiple models, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint, the method comprising:

combining the models into a single, consolidated model that maintains the non-cyclic chain of dependencies among families and features of families.

2. The method of claim 1 further comprising:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

3. A system for consolidating multiple models, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint, the system comprising:

a model consolidation module to combine the models into a single, consolidated model that maintains the non-cyclic chain of dependencies among families and features of families.

4. A computer program product having instructions encoded therein to consolidate multiple models, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint, the instructions comprising code to:

combine the models into a single, consolidated model that maintains the non-cyclic chain of dependencies among families and features of families.

CONSOLIDATION OF PRODUCT DATA MODELS

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ABSTRACT OF THE DISCLOSURE

A model consolidation process combines multiple configuration models into a single unified configuration model that contains the union of the allowable combinations (i.e. combinations that are buildable) from each of the original models. An aspect of at least one embodiment of the model consolidation process is that it allows models to be combined in such a way that any incompatibilities or contradictions between models are detected and automatically resolved where possible. If an incompatibility is detected that cannot be automatically resolved, then the configuration models should not be combined. Instead if this incompatibility case occurs, at least one embodiment of the model consolidation process produces a description of the problem encountered and report the problem along with the necessary information required for a human to resolve it.

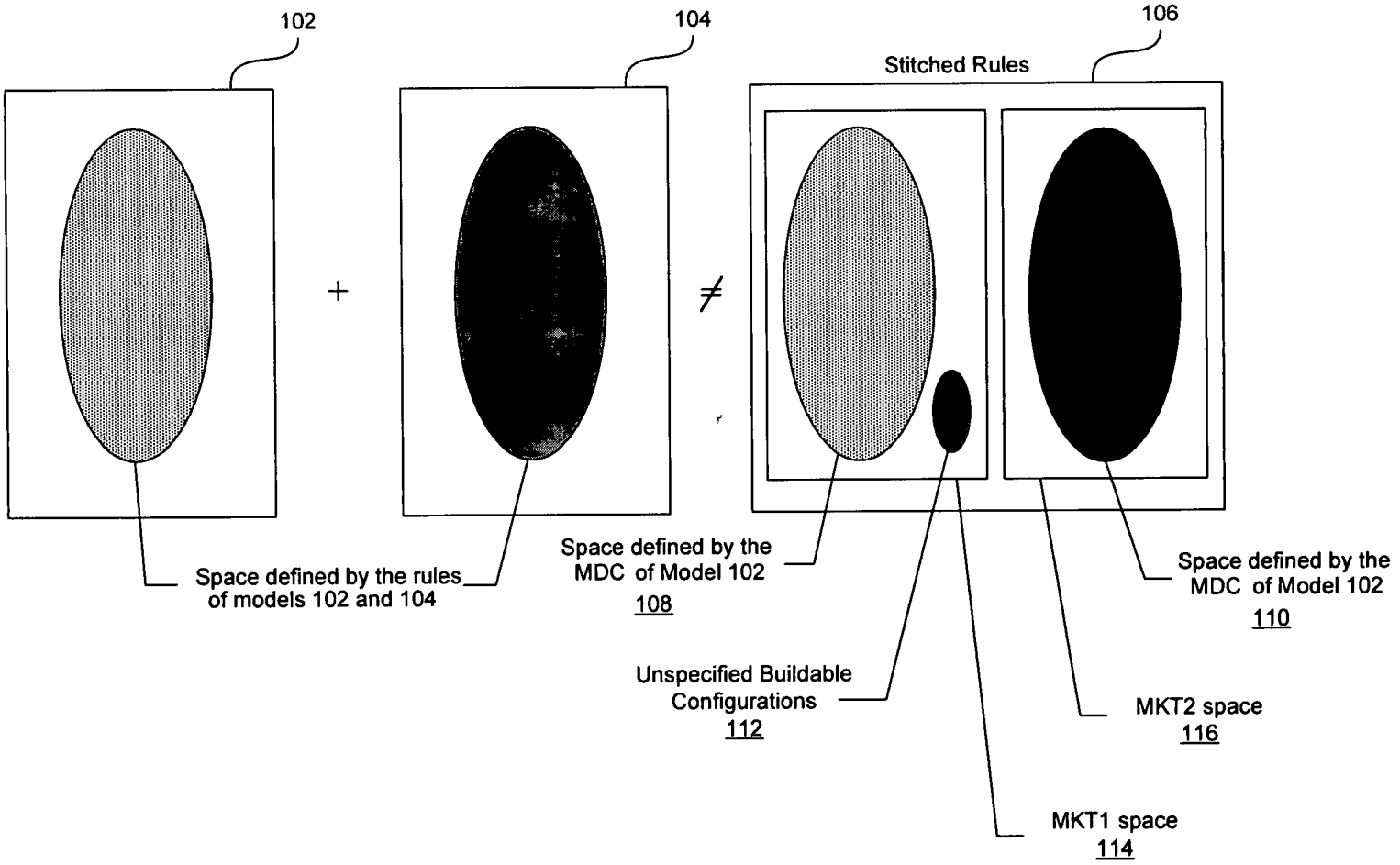

Figure 1 (prior art)

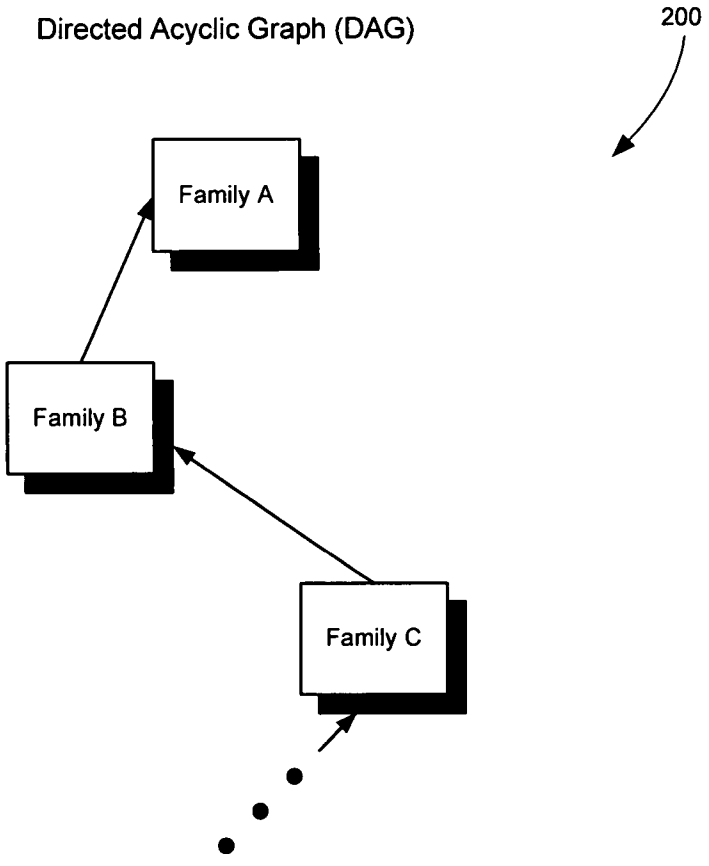

Figure 2

DAG for models 602 and 612

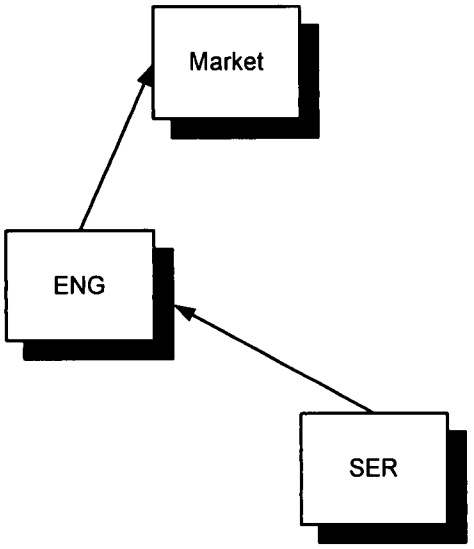

Figure 3 (prior art)

DAG for model 622

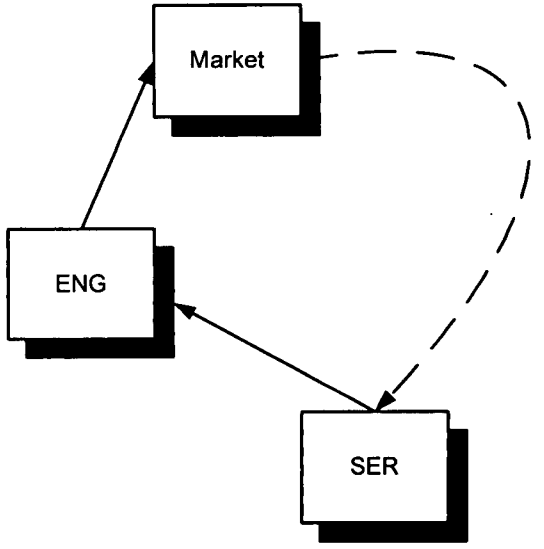

Figure 4 (prior art)

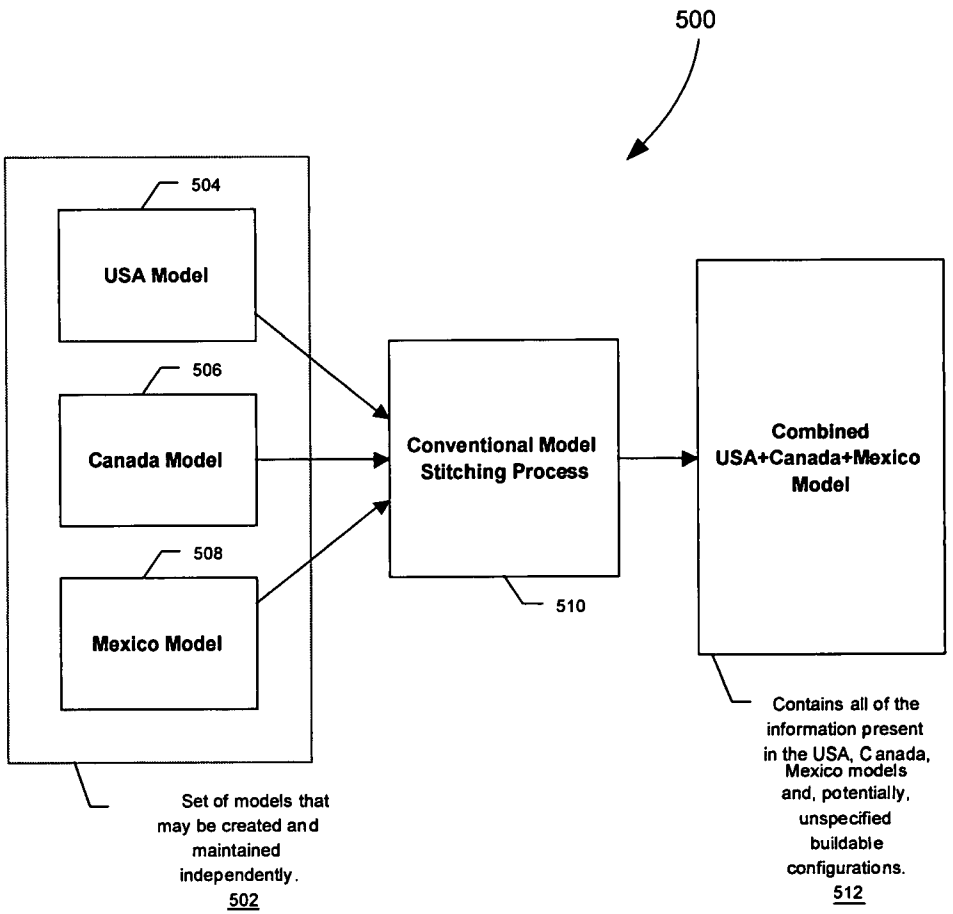

Figure 5 (Prior Art)

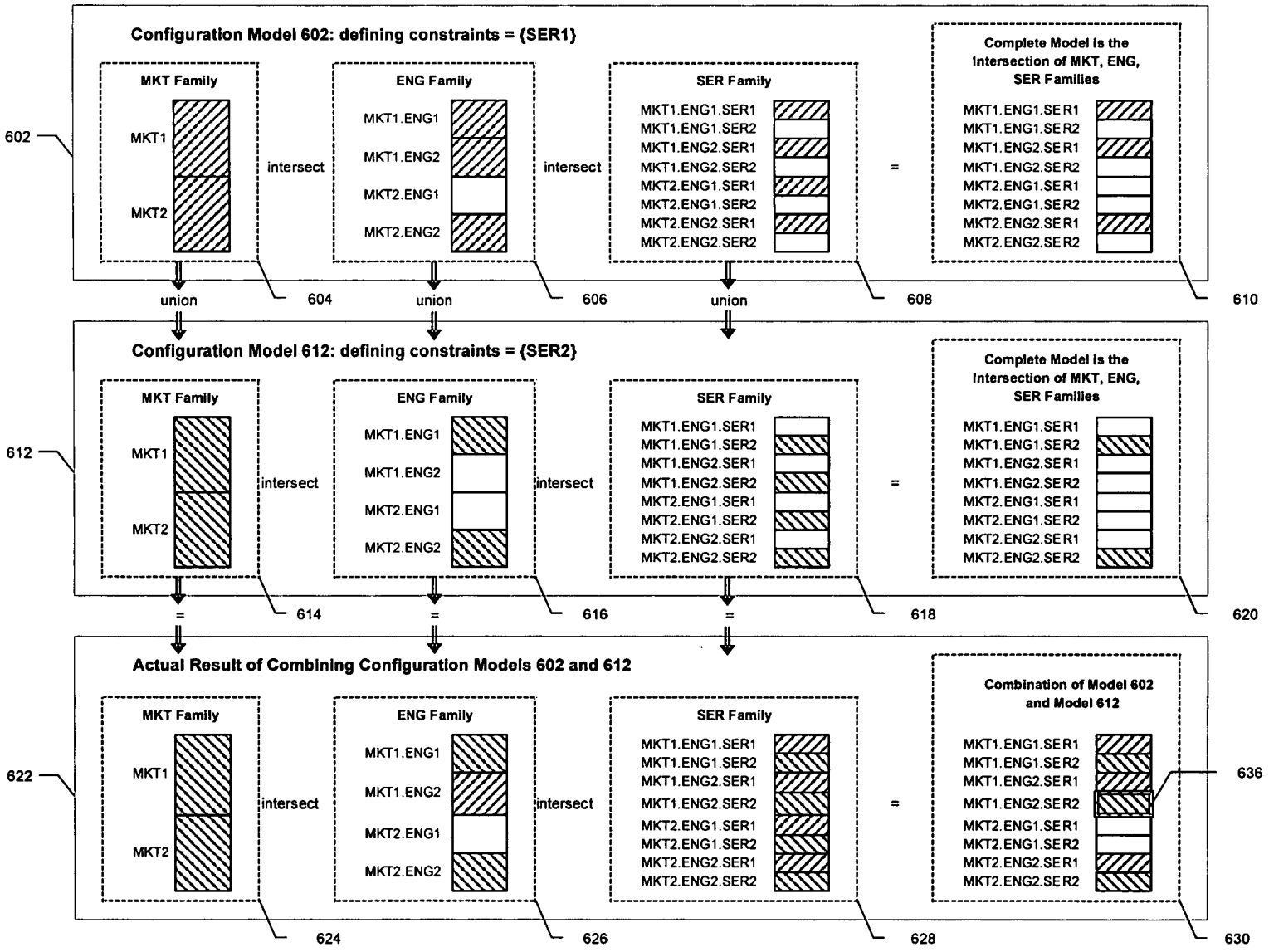

Figure 6 (Prior Art)

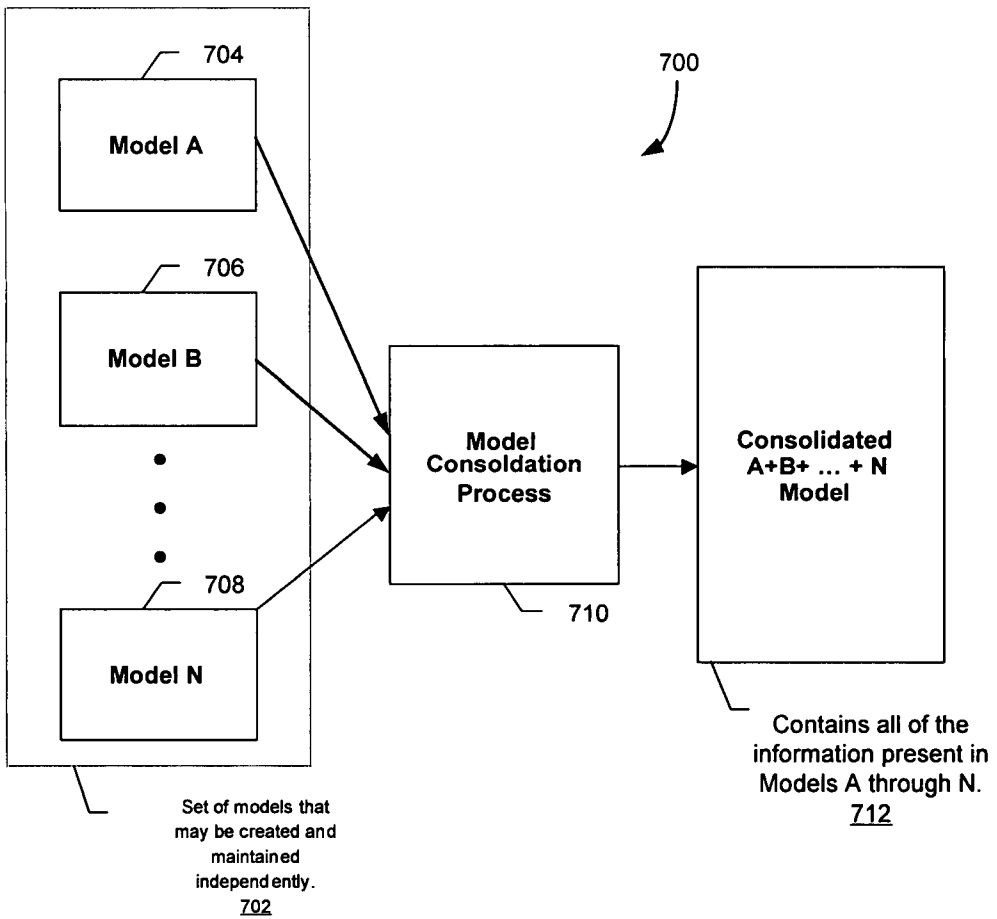
704
700
Model A
706
Model B
Model Consoldation Process
Consolidated A+B+ ... + N Model
708
Model N
710
Contains all of the information present in Models A through N.
712
Set of models that may be created and maintained independently.
702

Figure 7

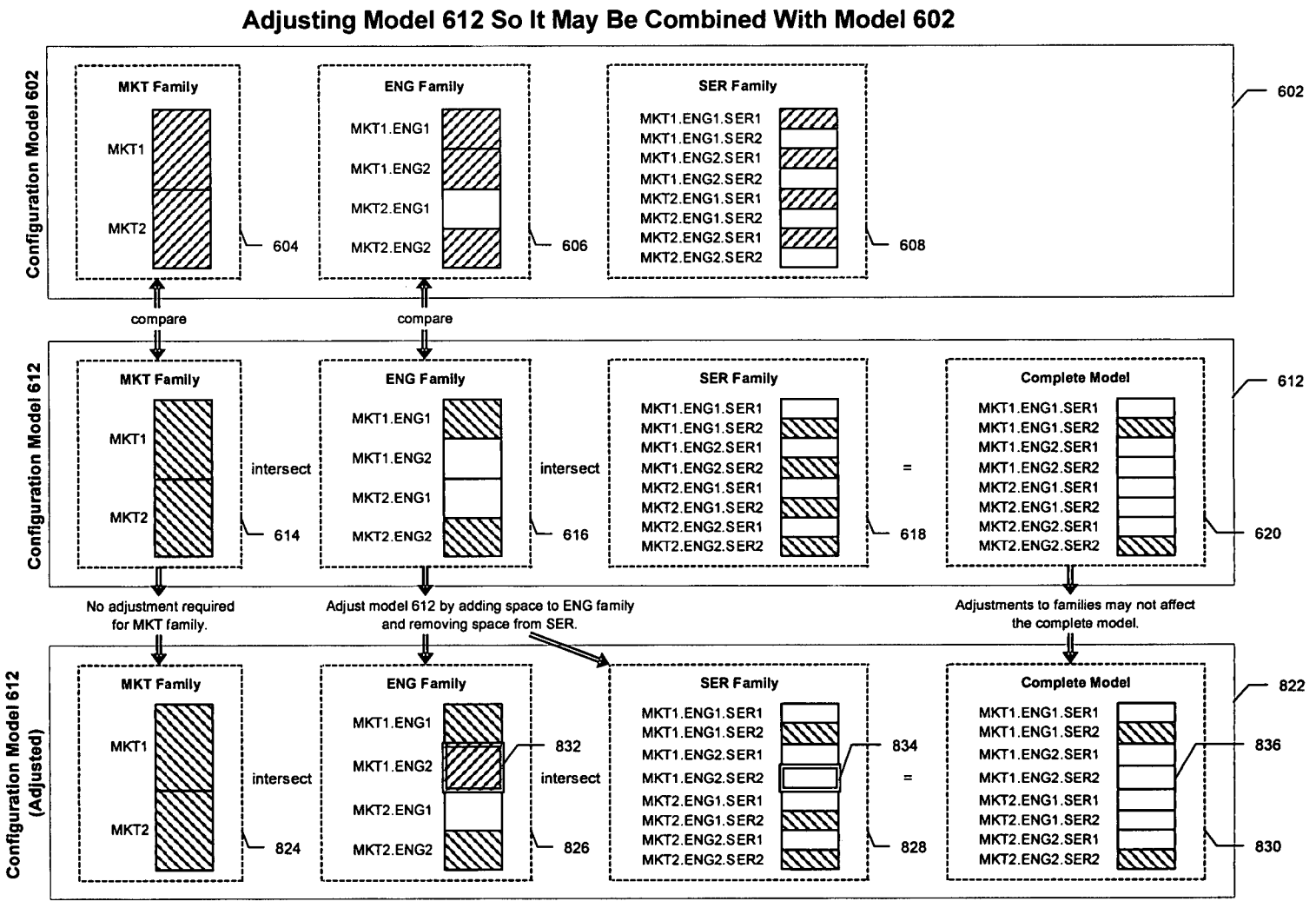
Adjusting Model 612 So It May Be Combined With Model 602
Configuration Model 602
MKT Family
MKT1
MKT2
604
ENG Family
MKT1.ENG1
MKT1.ENG2
MKT2.ENG1
MKT2.ENG2
606
SER Family
MKT1.ENG1.SER1
MKT1.ENG1.SER2
MKT1.ENG2.SER1
MKT1.ENG2.SER2
MKT2.ENG1.SER1
MKT2.ENG1.SER2
MKT2.ENG2.SER1
MKT2.ENG2.SER2
608
602
compare
compare
Configuration Model 612
MKT Family
MKT1
MKT2
intersect
614
ENG Family
MKT1.ENG1
MKT1.ENG2
MKT2.ENG1
MKT2.ENG2
intersect
616
SER Family
MKT1.ENG1.SER1
MKT1.ENG1.SER2
MKT1.ENG2.SER1
MKT1.ENG2.SER2
MKT2.ENG1.SER1
MKT2.ENG1.SER2
MKT2.ENG2.SER1
MKT2.ENG2.SER2
=
618
Complete Model
MKT1.ENG1.SER1
MKT1.ENG1.SER2
MKT1.ENG2.SER1
MKT1.ENG2.SER2
MKT2.ENG1.SER1
MKT2.ENG1.SER2
MKT2.ENG2.SER1
MKT2.ENG2.SER2
620
612
No adjustment required for MKT family.
Adjust model 612 by adding space to ENG family and removing space from SER.
Adjustments to families may not affect the complete model.
Configuration Model 612 (Adjusted)
MKT Family
MKT1
MKT2
intersect
824
ENG Family
MKT1.ENG1
MKT1.ENG2
MKT2.ENG1
MKT2.ENG2
832
intersect
826
SER Family
MKT1.ENG1.SER1
MKT1.ENG1.SER2
MKT1.ENG2.SER1
MKT1.ENG2.SER2
MKT2.ENG1.SER1
MKT2.ENG1.SER2
MKT2.ENG2.SER1
MKT2.ENG2.SER2
834
=
828
Complete Model
MKT1.ENG1.SER1
MKT1.ENG1.SER2
MKT1.ENG2.SER1
MKT1.ENG2.SER2
MKT2.ENG1.SER1
MKT2.ENG1.SER2
MKT2.ENG2.SER1
MKT2.ENG2.SER2
836
830
822

Figure 8

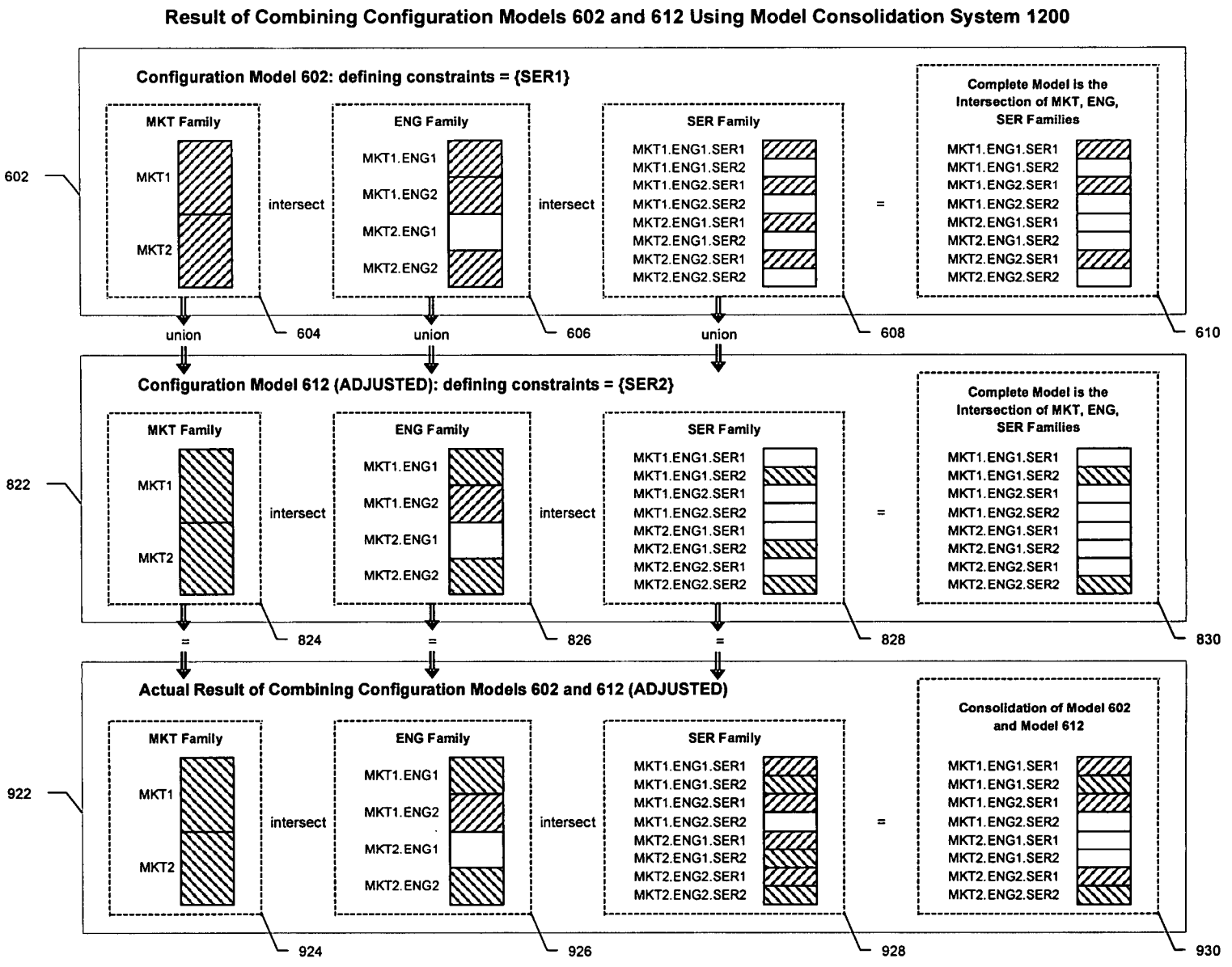
Result of Combining Configuration Models 602 and 612 Using Model Consolidation System 1200
Configuration Model 602: defining constraints = {SER1}
MKT Family
MKT1
MKT2
intersect
ENG Family
MKT1.ENG1
MKT1.ENG2
MKT2.ENG1
MKT2.ENG2
intersect
SER Family
MKT1.ENG1.SER1
MKT1.ENG1.SER2
MKT1.ENG2.SER1
MKT1.ENG2.SER2
MKT2.ENG1.SER1
MKT2.ENG1.SER2
MKT2.ENG2.SER1
MKT2.ENG2.SER2
=
Complete Model is the Intersection of MKT, ENG, SER Families
MKT1.ENG1.SER1
MKT1.ENG1.SER2
MKT1.ENG2.SER1
MKT1.ENG2.SER2
MKT2.ENG1.SER1
MKT2.ENG1.SER2
MKT2.ENG2.SER1
MKT2.ENG2.SER2
602
union
604
union
606
union
608
610
Configuration Model 612 (ADJUSTED): defining constraints = {SER2}
822
824
826
828
830
Actual Result of Combining Configuration Models 602 and 612 (ADJUSTED)
Consolidation of Model 602 and Model 612
922
924
926
928
930

Figure 9A

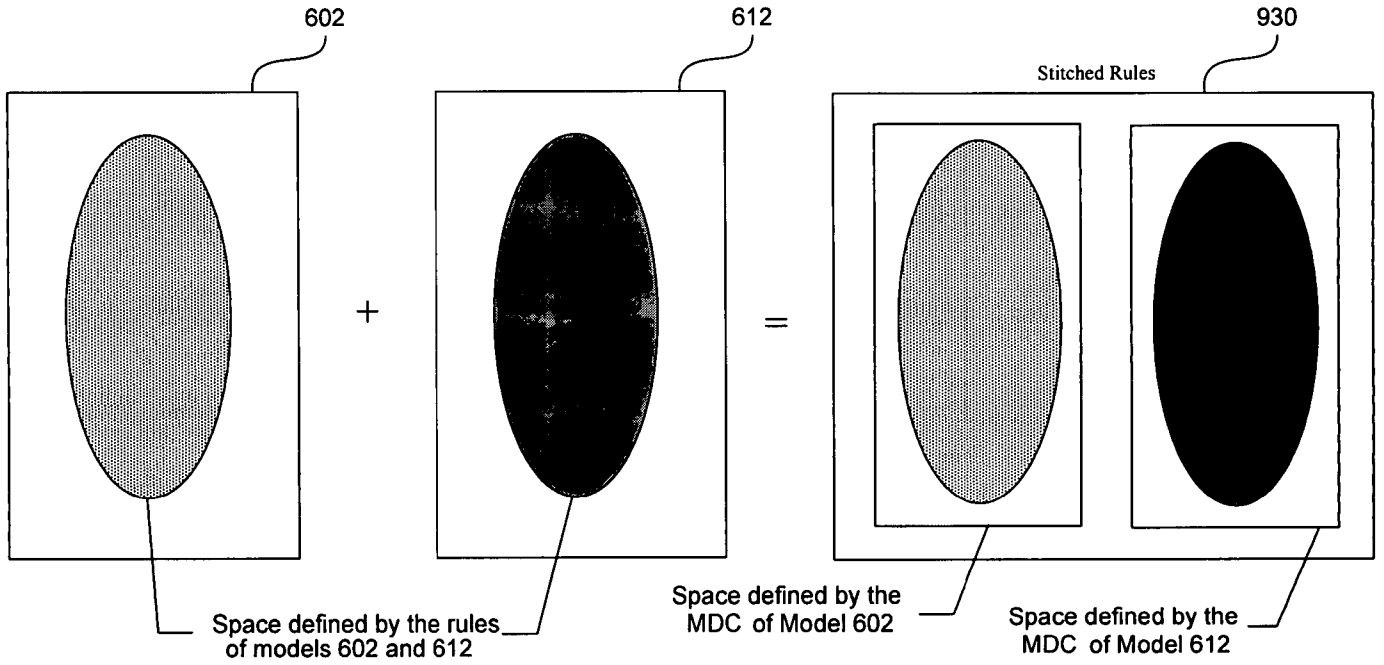
602
612
930
Stitched Rules
+
=
Space defined by the rules of models 602 and 612
Space defined by the MDC of Model 602
Space defined by the MDC of Model 612

Figure 9B

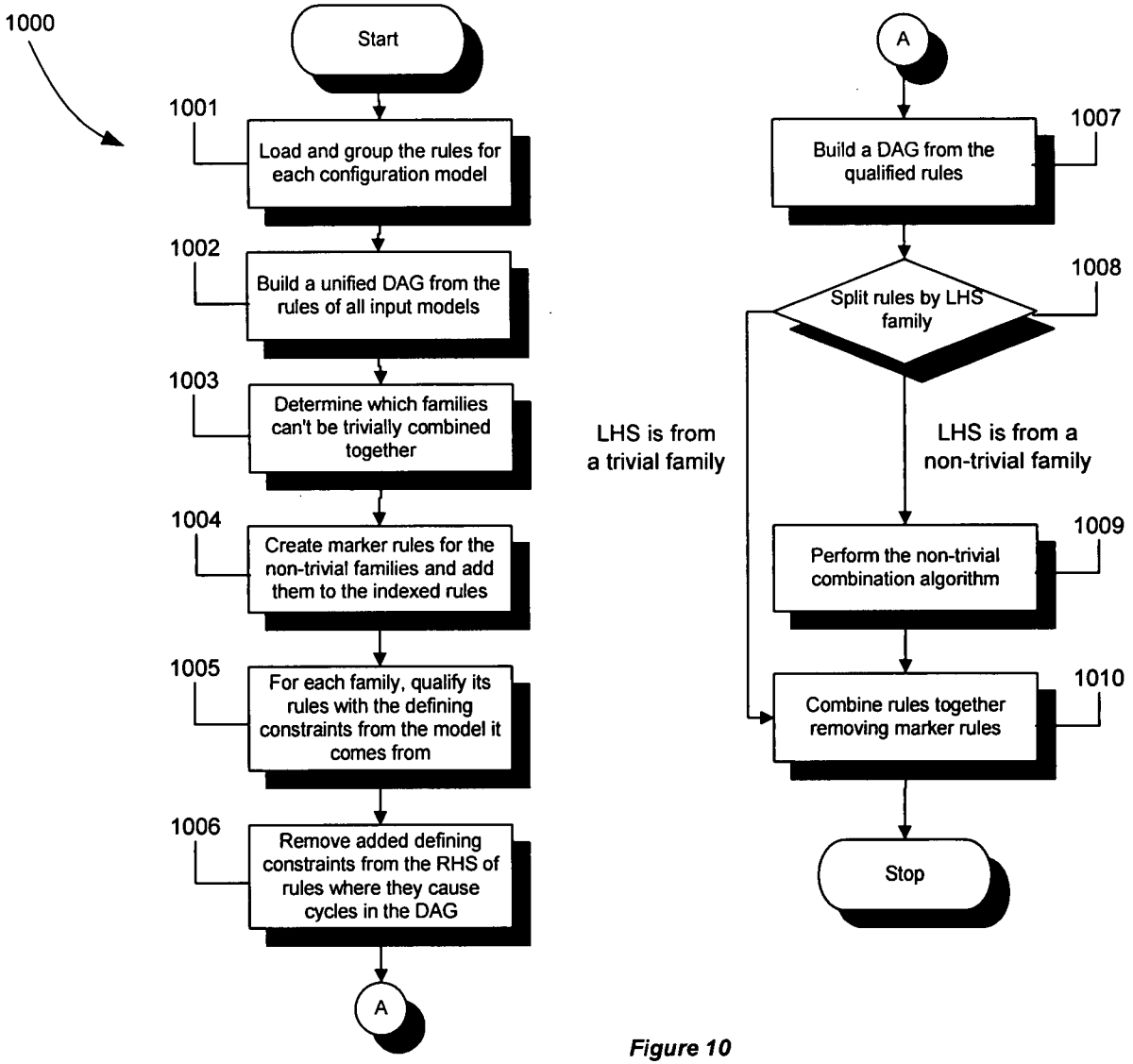
1000
Start
1001
Load and group the rules for each configuration model
1002
Build a unified DAG from the rules of all input models
1003
Determine which families can't be trivially combined together
1004
Create marker rules for the non-trivial families and add them to the indexed rules
1005
For each family, qualify its rules with the defining constraints from the model it comes from
1006
Remove added defining constraints from the RHS of rules where they cause cycles in the DAG
A
A
1007
Build a DAG from the qualified rules
1008
Split rules by LHS family
LHS is from a trivial family
LHS is from a non-trivial family
1009
Perform the non-trivial combination algorithm
1010
Combine rules together removing marker rules
Stop

Figure 10

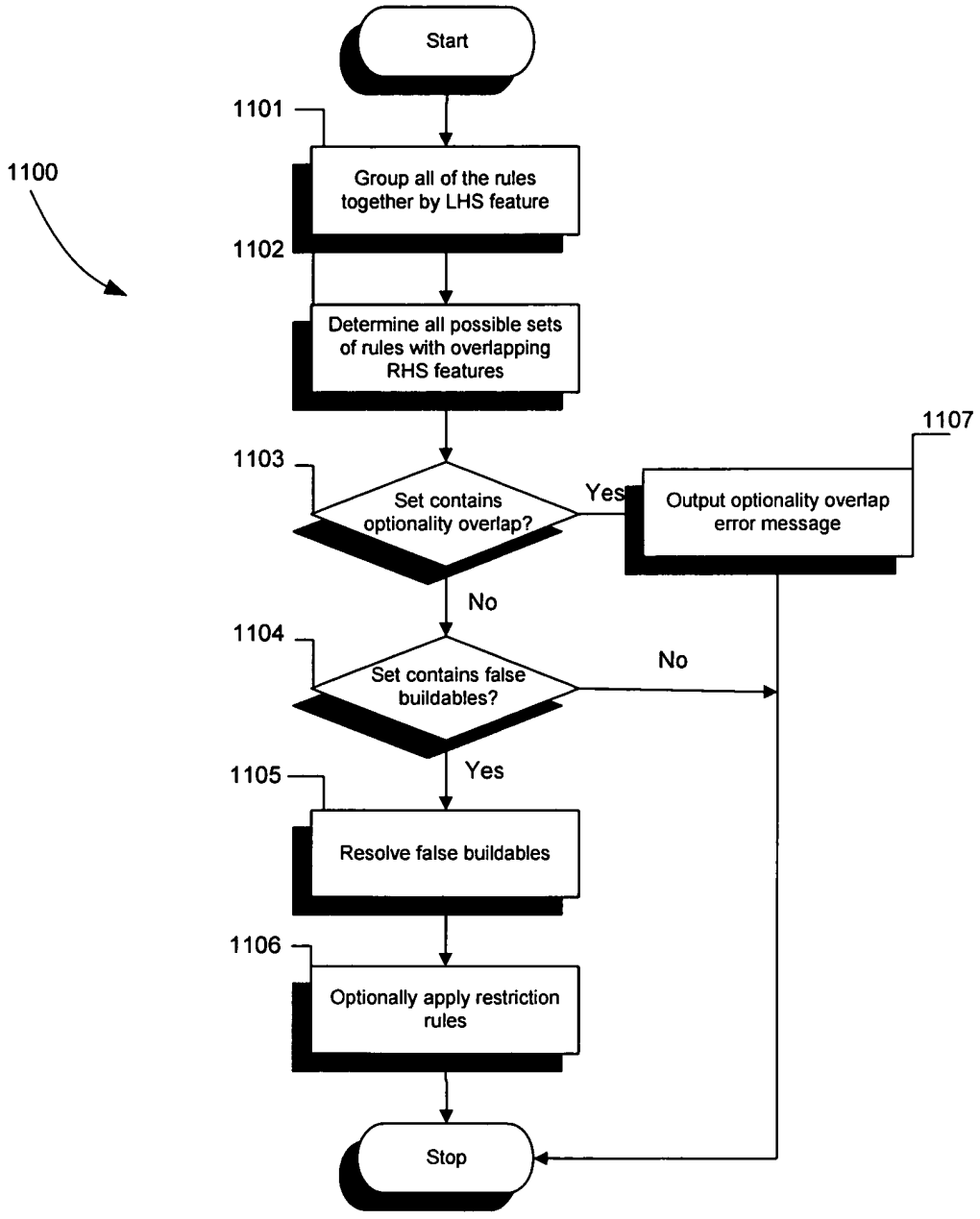
1100
Start
1101
Group all of the rules together by LHS feature
1102
Determine all possible sets of rules with overlapping RHS features
1103
Set contains optionality overlap?
Yes
1107
Output optionality overlap error message
No
1104
Set contains false buildables?
No
Yes
1105
Resolve false buildables
1106
Optionally apply restriction rules
Stop

Figure 11

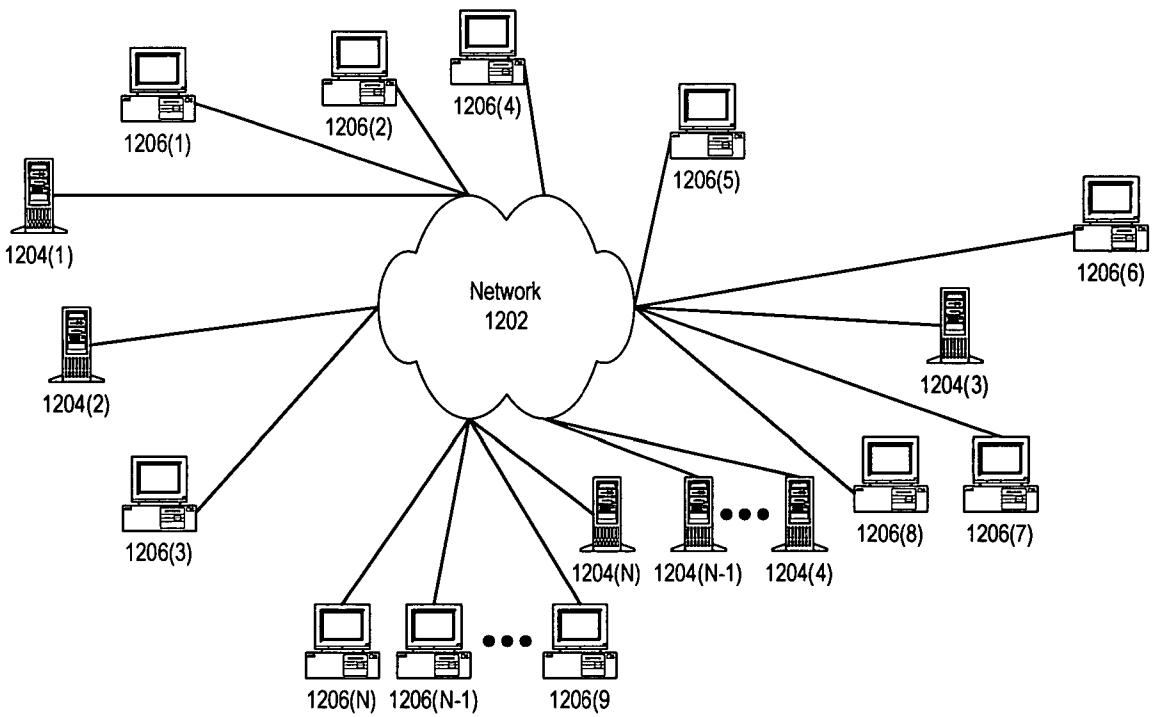
1206(1)
1206(2)
1206(4)
1206(5)
1206(6)
1204(1)
Network
1202
1204(2)
1204(3)
1206(3)
1206(8)
1206(7)
1204(N)
1204(N-1)
1204(4)
1206(N)
1206(N-1)
1206(9

Figure 12

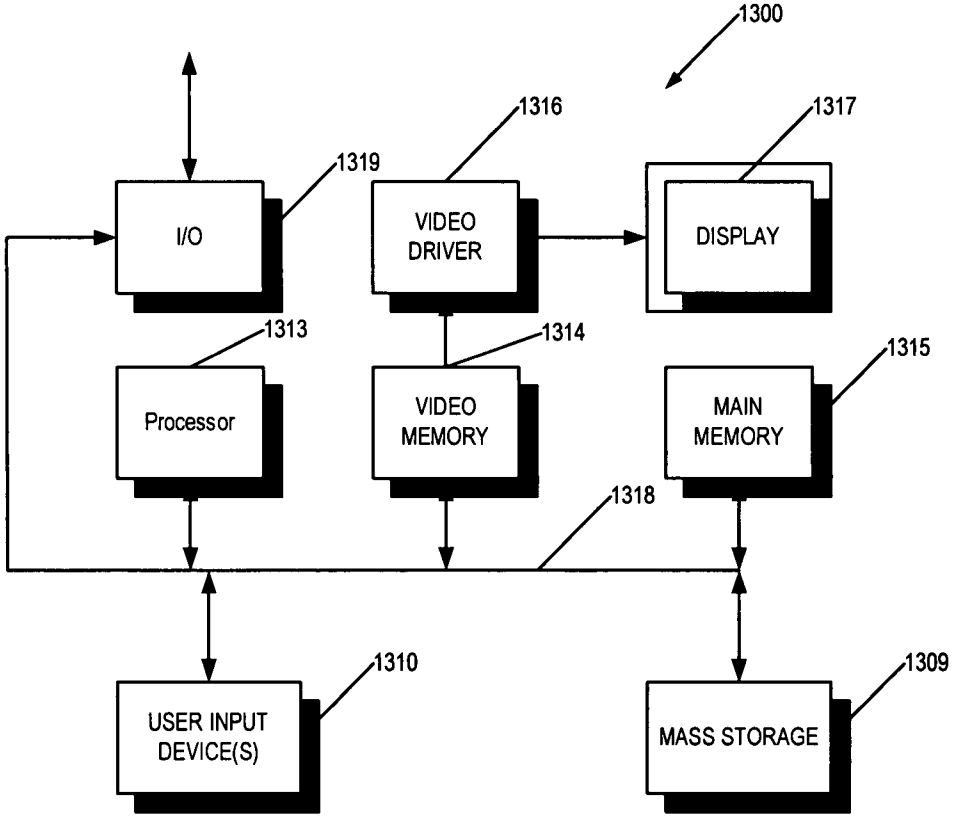
1300
1316
1317
1319
I/O
VIDEO DRIVER
DISPLAY
1313
1314
1315
Processor
VIDEO MEMORY
MAIN MEMORY
1318
1310
1309
USER INPUT DEVICE(S)
MASS STORAGE

Figure 13

Attorney Docket No.: T00113

DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below adjacent to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of subject matter (process, machine, manufacture, or composition of matter, or an improvement thereof) which is claimed and for which a patent is sought by way of the application entitled:

CONSOLIDATION OF PRODUCT DATA MODELS

which (check)
- ☒ is attached hereto.
- ☐ and is amended by the Preliminary Amendment attached hereto.
- ☐ was filed on _____ as Application Serial No. _____.
- ☐ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
Number	Country	Day/Month/Year Filed	Yes	No
N/A			☐	☐

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Provisional Application Number	Filing Date
N/A	

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56, which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Attorney Docket No.: T00113

Application Serial No.	Filing Date	Status (patented, pending, abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith: Stephen A. Terrile (32,946), Gary W. Hamilton (31,834), Robert W. Holland (40,020), Michael Rocco Cannatti (34,791), and Kent B. Chambers (38,839).

Please address all correspondence and telephone calls to:

CUSTOMER NO. 33438

I declare that all statements made herein of my own knowledge are true, all statements made herein on information and belief are believed to be true, and all statements made herein are made with the knowledge that whoever, in any matter within the jurisdiction of the Patent and Trademark Office, knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be subject to the penalties including fine or imprisonment or both as set forth under 18 U.S.C. 1001, and that violations of this paragraph may jeopardize the validity of the application or this document, or the validity or enforceability of any patent, trademark registration, or certificate resulting therefrom.

Full name of first joint inventor: Brandon M. Beck

Inventor's Signature: Brandon M. Beck Date: 4/19/2004

Residence: Austin, Texas

Post Office Address: 3625 Duval Road, Apt. #1226
Austin, Texas 78759

Citizenship: US

Full name of second joint inventor: Shawn A. P. Smith

Inventor's Signature: Date: 4/19/2004

Residence: Austin, Texas

Post Office Address: 7231 Villa Maria Ln.
Austin, Texas 78759

Citizenship: US

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2003

Application or Docket Number: 10827078

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	4	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	4 minus 20=	*
INDEPENDENT CLAIMS	3 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	385.00	OR	BASIC FEE	770.00
XS 9=		OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL		OR	TOTAL	770

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

04/21/2004 SSITHIB1 00000004 10827078

01 FC:1001 770.00 OP

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002 — 489-267/69033

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1837	703/2.ccls.	US-PGPUB; USPAT	OR	OFF	2006/06/23 10:10
S2	11	S1 and DAG	US-PGPUB; USPAT	OR	OFF	2006/06/23 10:50
S3	1049	DAG and Cyclic$4	US-PGPUB; USPAT	OR	OFF	2006/06/23 11:01
S4	1	"5825651".pn.	US-PGPUB; USPAT	OR	OFF	2006/06/23 11:02
S5	220	700/103.ccls.	US-PGPUB; USPAT	OR	OFF	2006/06/23 11:02
S6	38	("4796194" | "5019961" | "5019992" | "5355317" | "5357440" | "5586052" | "5659478").PN. OR ("5825651").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 11:27
S7	132	combin$5 with DAG	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 11:53
S8	817	703/1.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 12:55
S9	1	"5996114".pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 12:40
S10	0	(configration adj rule)	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 12:44
S11	2	US-6003012-$.DID. OR US-6009406-$.DID.	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 12:47
S12	19	("5630025" "6083267" "5515524" "5708798" "5295067" "4847761" "6216109" "5216612" "5960422" "5311424" "5796614" "6314422" "5806069" "5598511" "4939668" "4700317" "6002854" "5329464" "4831546").pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 14:10
S15	1667	combin$4 with product with (model instance)	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 12:55
S16	5	S15 and DAG	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 12:57
S17	26	configurat$4 with (DAG (Directed adj cyclic adj graph))	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 12:59

EAST Search History

S18	66	(join$5 intersect$4 union disjunction) with (DAG (Directed adj cyclic adj graph))	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 13:14
S19	19	(inconsistan$6 error (non adj combina$4) incompatibl$4) with (DAG (Directed adj cyclic adj graph))	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 13:14
S20	5	S18 and S19	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 13:01
S21	6	S19 and (fix$4 correct$4 remed$4 solv$4) with (inconsistan$6 error (non adj combina$4) incompatibl$4)	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 13:07
S22	4	S18 and (fix$4 correct$4 remed$4 solv$4) with (inconsistan$6 error (non adj combina$4) incompatibl$4)	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 13:07
S26	1	(US-20020165701-$).did.	US-PGPUB	OR	OFF	2006/06/23 13:32
S27	389	(consolidat$4 with model$4)	US-PGPUB	OR	OFF	2006/06/23 13:13
S28	81	(join$5 intersect$4 union disjunction) with (DAG (Directed adj acyclic adj graph))	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 14:25
S29	24	(inconsistan$6 error (non adj combina$4) incompatibl$4) with (DAG (Directed adj acyclic adj graph))	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 13:14
S31	1	S26 and (correct$4 fix$4 remed$4)	US-PGPUB	OR	OFF	2006/06/23 13:23
S32	0	S26 and (rule with incompatib$7)	US-PGPUB	OR	OFF	2006/06/23 13:23
S34	0	DAG and (rule with incompatib$7)	US-PGPUB; USPAT	OR	OFF	2006/06/23 13:24
S36	0	DAG and (rule with inconsistant)	US-PGPUB; USPAT	OR	OFF	2006/06/23 13:25
S37	2	DAG and (rule with (incompatib$6 inconsistant))	US-PGPUB; USPAT	OR	ON	2006/06/23 13:26
S38	22054	(detect$4 identify$4) with (rule inquality inconsist$8 incompatib$8)	US-PGPUB; USPAT	OR	ON	2006/06/23 13:29
S39	282	S38 and (DAG (directed with acyclic with graph))	US-PGPUB; USPAT	OR	ON	2006/06/23 13:30
S40	110	(detect$4 identify$4) with (rule) with (inquality inconsist$8 incompatib$8)	US-PGPUB; USPAT	OR	ON	2006/06/23 13:30
S41	1	S40 and (DAG (directed with acyclic with graph))	US-PGPUB; USPAT	OR	ON	2006/06/23 13:30
S42	1	S26 and (inconsist$8 incompatib$8)	US-PGPUB	OR	OFF	2006/06/23 13:34
S43	0	"6009406".pn.	US-PGPUB	OR	OFF	2006/06/23 13:34

EAST Search History

S44	1	"6009406".pn.	US-PGPUB; USPAT	OR	OFF	2006/06/23 13:37
S45	44	(correct$4 with DAG)	US-PGPUB; USPAT	OR	OFF	2006/06/23 13:37
S46	12	US-5515524-$.DID. OR US-5523942-$.DID. OR US-5825651-$.DID. OR US-5873081-$.DID. OR US-5996090-$.DID. OR US-6167383-$.DID. OR US-6192355-$.DID. OR US-6230200-$.DID. OR US-6247128-$.DID. OR US-6300948-$.DID. OR US-6343313-$.DID. OR US-6430531-$.DID.	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 14:20
S47	44	intersecting with rule with set	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 14:25
S48	12	graph with rule with intersect$4	US-PGPUB; USPAT; USOCR	OR	OFF	2006/06/23 14:21
S49	258	(DAG (Directed adj acyclic adj graph)) and (combin$4 with (rule model))	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 14:26
S50	59	(DAG (Directed adj acyclic adj graph)) and (combin$4 adj2 (rule model))	US-PGPUB; USPAT; USOCR	OR	ON	2006/06/23 14:26

PALM INTRANET

Day : Friday
Date: 6/23/2006
Time: 15:46:27

Inventor Name Search Result

Your Search was:

Last Name = BECK
First Name = BRANDON

Application#	Patent#	Status	Date Filed	Title	Inventor Name
10827078	Not Issued	30	04/19/2004	Consolidation of product data models	BECK, BRANDON M.
10957919	Not Issued	30	10/04/2004	Complex configuration processing using configuration sub-models	BECK, BRANDON M.
11034141	Not Issued	30	01/12/2005	Attribute prioritized configuration using a combined configuration-attribute data model	BECK, BRANDON M.
11033915	Not Issued	30	01/12/2005	Steerable sheath	BECK, BRANDON N.
60536588	Not Issued	159	01/15/2004	Steerable sheath	BECK, BRANDON N.
60715613	Not Issued	20.	09/12/2005	Compression staple	BECKENDORF, BRANDON
11381961	Not Issued	20	05/05/2006	Orthodontic Plate and Method	BECKENDORF, BRANDON G.

Inventor Search Completed: No Records to Display.

Search Another: Inventor | Last Name: BECK | First Name: BRANDON | Search

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Day : Friday
Date: 6/23/2006
Time: 15:46:57

Inventor Name Search Result

Your Search was:

Last Name = SMITH
First Name = SHAWN

Application#	Patent#	Status	Date Filed	Title	Inventor Name
09192164	6185707	150	11/13/1998	IC TEST SOFTWARE SYSTEM FOR MAPPING LOGICAL FUNCTIONAL TEST DATA OF LOGIC INTEGRATED CIRCUITS TO PHYSICAL REPRESENTATION	SMITH, SHAWN
10998187	Not Issued	30	11/26/2004	Two-component, rectifying-junction memory element	SMITH, SHAWN
11229440	Not Issued	20	09/07/2005	Pointing device and method of using same	SMITH, SHAWN
60073442	Not Issued	159	02/02/1998	SYSTEM AND METHOD FOR PROVIDING VOICE MESSAGING SERVICE UTILIZING A NETWORK CONNECTION	SMITH, SHAWN
60442812	Not Issued	159	01/28/2003	Add-a-drain	SMITH, SHAWN
60468488	Not Issued	159	05/07/2003	Sealed tank low flush toilet	SMITH, SHAWN
60525056	Not Issued	159	11/25/2003	Simplified, low switching voltage organic-on-inorganic diode memory element utilizing a conductive polymer fuse on a doped Si substrate	SMITH, SHAWN
60652512	Not Issued	159	02/14/2005	Add-a-drain	SMITH, SHAWN
09663095	6428412	150	09/15/2000	GAMING MACHINE WITH INTERLINKED ARRANGEMENTS OF PUZZLE ELEMENTS	SMITH, SHAWN A.
10266308	Not Issued	61	10/08/2002	Configuration representation and modeling using configuration spaces	SMITH, SHAWN A. P.
10798615	Not Issued	30	03/11/2004	Method and system for generating comparison of demand and supply data with high resolution capabilities	SMITH, SHAWN A. P.
10827078	Not Issued	30	04/19/2004	Consolidation of product data models	SMITH, SHAWN A. P.
10404891	Not Issued	41	03/31/2003	Configuration model consistency checking using flexible rule space subsets	SMITH, SHAWN A.P.
10796317	Not Issued	20	03/09/2004	Session-based processing method and system	SMITH, SHAWN A.P.
11276970	Not Issued	19	01/01/0001	Edible Glue Stick for Cats	SMITH, SHAWN B
10194920	6965895	150	07/12/2002	METHOD AND APPARATUS FOR ANALYZING MANUFACTURING DATA	SMITH, SHAWN B.
60305256	Not Issued	159	07/16/2001	Automated method for using unsupervised neural networks for discovering and ranking data correlations in an unknow data set	SMITH, SHAWN B.
60308122	Not Issued	159	07/30/2001	Method for automating data mining in an application service provider (ASP) model	SMITH, SHAWN B.
60308124	Not Issued	159	07/30/2001	System and method for efficient management, reference, and extraction of large quantities of un-structured relational data	SMITH, SHAWN B.

60308125	Not Issued	159	07/30/2001	Central control application for flexible branched data mining and statistical analysis for the purpose of automated exploration of statistical comparisons in unknown data sets	SMITH, SHAWN B.
60309787	Not Issued	159	08/06/2001	Fast statistical scoring and ranking method for correlating numbers to categories or attributes (e.g. Tool Ids).	SMITH, SHAWN B.
60310632	Not Issued	159	08/06/2001	Fast statistical scoring and ranking method for correlating numerical data by treating data distributions as a series of categories based upon a user configurable parameters which determines how much data is placed in each category	SMITH, SHAWN B.
60308121	Not Issued	159	07/30/2001	Method for digitizing and analyzing temporal based operating condition data produced in a manufacturing environment	SMITH, SHAWN B.
60308123	Not Issued	159	07/30/2001	Data translation, SW program, and ranking algorithm use to perform die level defect correlation analysis in unknown data sets	SMITH, SHAWN B.
10286029	Not Issued	30	11/01/2002	Method of ordering pharmaceutical and vaccine products	SMITH, SHAWN C.
60336003	Not Issued	159	11/01/2001	Method of ordering pharmaceutical and vaccine products	SMITH, SHAWN C.
60468473	Not Issued	159	05/06/2003	Consequence management system and method	SMITH, SHAWN D.
07691117	D327536	150	04/25/1991	AIR PURIFYING UNIT FOR REMOVING SMOKE FROM THE INTERIOR OF A CAR	SMITH, SHAWN D.
09568144	6454214	150	05/10/2000	DEVICE AND METHOD FOR CONNECTING TWO PARTS OF A CRAFT	SMITH, SHAWN H.
09518012	6422815	150	03/02/2000	TURBINE AIR SEAL REPLACEMENT RINGS	SMITH, SHAWN K.
10024106	6565314	150	12/18/2001	TURBINE AIR SEAL REPLACEMENT RINGS	SMITH, SHAWN K.
09520304	Not Issued	163	03/07/2000	Method and apparatus for actively auditing computers in a network	SMITH, SHAWN M.
09975378	6678896	150	10/11/2001	SPORTS TOWEL	SMITH, SHAWN M.
60702163	Not Issued	20	07/25/2005	Headwear with integral hydration reservoir	SMITH, SHAWN M.
60510001	Not Issued	159	10/09/2003	Invisivent	SMITH, SHAWN MARTIN
60802201	Not Issued	19	05/18/2006	Ivisivent	SMITH, SHAWN MARTIN
07796528	5223125	250	11/22/1991	OXYGEN SENSOR FOR ALUMINUM KILLED, HIGH SILICON STEEL MELTS	SMITH, SHAWN P.
09177202	6544210	150	10/22/1998	DISPOSABLE LAPAROSCOPIC SMOKE EVACUATION SYSTEM	SMITH, SHAWN P.
10779139	Not Issued	93	02/17/2004	MULTIPURPOSE TOOL	SMITH, SHAWN R.
09130552	Not Issued	161	08/08/1998	SWEETPEA BASS JIG	SMITH, SHAWN R.
60051246	Not Issued	159	06/30/1997	SWEETPEA BASS JIG	SMITH, SHAWN RAYMOND
60055171	Not Issued	159	08/08/1997	SWEETPEA BASS JIG	SMITH, SHAWN RAYMUND
09535147	6265939	250	03/24/2000	Linear power detectors and methods for power amplifiers	SMITH, SHAWN SCOTT

09627956	6862298	150	07/28/2000	ADAPTIVE JITTER BUFFER FOR INTERNET TELEPHONY	SMITH, SHAWN W
09860929	Not Issued	61	05/17/2001	Automatic volume control for voice over internet	SMITH, SHAWN W.
10065951	6996626	150	12/03/2002	CONTINUOUS BANDWIDTH ASSESSMENT AND FEEDBACK FOR VOICE-OVER-INTERNET-PROTOCOL (VOIP) COMPARING PACKET'S VOICE DURATION AND ARRIVAL RATE	SMITH, SHAWN W.
10191904	Not Issued	161	07/08/2002	System and method for providing voice messaging services utilizing a network connection	SMITH, SHAWN W.
10248002	Not Issued	30	12/09/2002	Closed-Loop Voice-Over-Internet-Protocol (VOIP) with Sender-Controlled Bandwidth Adjustments Prior to Onset of Packet Losses	SMITH, SHAWN W.
10604452	Not Issued	30	07/22/2003	Speaker-Buffer Management for Voice-Over-Internet-Protocol (VoIP) Triggered by Microphone-Buffer Arrival	SMITH, SHAWN W.
07806763	5267322	150	12/13/1991	DIGITAL AUTOMATIC GAIN CONTROL WITH LOOKAHEAD, ADAPTIVE NOISE FLOOR SENSING, AND DECAY BOOST INITIALIZATION	SMITH, SHAWN W.

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Terms used **combining graphs** Found **75,474** of **178,880**

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1 Research track paper: On mining cross-graph quasi-cliques
Jian Pei, Daxin Jiang, Aidong Zhang
August 2005 **Proceeding of the eleventh ACM SIGKDD international conference on Knowledge discovery in data mining KDD '05**
Publisher: ACM Press
Full text available: pdf(573.85 KB) Additional Information: full citation, abstract, references, index terms

Joint mining of multiple data sets can often discover interesting, novel, and reliable patterns which cannot be obtained solely from any single source. For example, in cross-market customer segmentation, a group of customers who behave similarly in multiple markets should be considered as a more coherent and more reliable cluster than clusters found in a single market. As another example, in bioinformatics, by joint mining of gene expression data and protein interaction data, we can find cluster ...

Keywords: bioinformatics, graph mining, patterns

2 Session 10A: Approximating the list-chromatic number and the chromatic number in minor-closed and odd-minor-closed classes of graphs
Ken-ichi Kawarabayashi, Bojan Mohar
May 2006 **Proceedings of the thirty-eighth annual ACM symposium on Theory of computing STOC '06**
Publisher: ACM Press
Full text available: pdf(339.51 KB) Additional Information: full citation, abstract, references, index terms

It is well-known (Feige and Kilian [24], Håstad [39]) that approximating the chromatic number within a factor of $n^{1-\epsilon}$ cannot be done in polynomial time for $\epsilon>0$, unless coRP = NP. Computing the list-chromatic number is much harder than determining the chromatic number. It is known that the problem of deciding if the list-chromatic number is k, where $k \geq 3$, is Π_2^p-complete [37].In this paper, we focus on minor-closed and odd-minor-close ...

Keywords: Hadwiger conjecture, graph coloring, graph minor, list coloring, odd-minor

3 A framework for call graph construction algorithms
David Grove, Craig Chambers
November 2001 **ACM Transactions on Programming Languages and Systems (TOPLAS)**, Volume 23 Issue 6
Publisher: ACM Press
Full text available: pdf(1.36 MB) Additional Information: full citation, abstract, references, citings, index terms

A large number of call graph construction algorithms for object-oriented and functional languages have been proposed, each embodying different tradeoffs between analysis cost and call graph precision. In this article we present a unifying framework for understanding call graph construction algorithms and an empirical comparison of a representative set of algorithms. We first present a general parameterized algorithm that encompasses many well-known and novel call graph construction algorithms. W ...

Keywords: Call graph construction, control flow analysis, interprocedural analysis

4 Coloring k-colorable graphs using smaller palettes
Eran Halperin, Ram Nathaniel, Uri Zwick
January 2001 **Proceedings of the twelfth annual ACM-SIAM symposium on Discrete algorithms**
Publisher: Society for Industrial and Applied Mathematics
Full text available: pdf(574.16 KB) Additional Information: full citation, abstract, references, citings, index terms

We obtain the following new coloring results:

- A 3-colorable graph on n vertices with maximum degree &Dgr; can be colored, in polynomial time, using $\&Ogr;((\&Dgr; \log \&Dgr;)^{1/3} \cdot \log n)$ colors. This slightly improves an $\&Ogr;((\&Dgr;^{1/3} \log^{1/2} \&Dgr;) \cdot \log n)$ bound given by Karger, Motwani and Sudan. More generally, k-colorable graphs with maximum degree &Dgr; can be colored, in polynomial ...

5 The power of a pebble: exploring and mapping directed graphs
Michael A. Bender, Antonio Fernández, Dana Ron, Amit Sahai, Salil Vadhan
May 1998 **Proceedings of the thirtieth annual ACM symposium on Theory of computing**
Publisher: ACM Press
Full text available: pdf(1.47 MB) Additional Information: full citation, references, citings, index terms

6 Oral session 2: web searching and applications: Multi-graph enabled active learning for multimodal web image retrieval
Xin-Jing Wang, Wei-Ying Ma, Lei Zhang, Xing Li
November 2005 **Proceedings of the 7th ACM SIGMM international workshop on Multimedia information retrieval MIR '05**
Publisher: ACM Press
Full text available: pdf(371.23 KB) Additional Information: full citation, abstract, references, index terms

In this paper, we propose a multimodal Web image retrieval technique based on multi-graph enabled active learning. The main goal is to leverage the heterogeneous data on the Web to improve retrieval precision. Three graphs are constructed on images' content features, textual annotations and hyperlinks respectively, namely Content-Graph, Text-Graph and Link-Graph, which provide complimentary information on the images. By analyzing the three graphs, a training dataset is automatically created and ...

Keywords: active learning, graph learning, mjultimodal image retrieval

Terms used **correcting DAG** Found **32,010** of **178,880**

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1 The principled design of large-scale recursive neural network architectures--dag-rnns and the protein structure prediction problem
Pierre Baldi, Gianluca Pollastri
December 2003 **The Journal of Machine Learning Research**, Volume 4
Publisher: MIT Press
Full text available: pdf(231.40 KB) Additional Information: full citation, abstract, references, index terms

We describe a general methodology for the design of large-scale recursive neural network architectures (DAG-RNNs) which comprises three fundamental steps: (1) representation of a given domain using suitable directed acyclic graphs (DAGs) to connect visible and hidden node variables; (2) parameterization of the relationship between each variable and its parent variables by feedforward neural networks; and (3) application of weight-sharing within appropriate subsets of DAG connections to capture s ...

2 The weakest failure detector for solving consensus
Tushar Deepak Chandra, Vassos Hadzilacos, Sam Toueg
July 1996 **Journal of the ACM (JACM)**, Volume 43 Issue 4
Publisher: ACM Press
Full text available: pdf(770.03 KB) Additional Information: full citation, abstract, references, citings, index terms

We determine what information about failures is necessary and sufficient to solve Consensus in asynchronous distributed systems subject to crash failures. In Chandra and Toueg [1996], it is shown that W, a failure detector that provides surprisingly little information about which processes have crashed, is sufficient to solve Consensus in asynchronous systems with a majority of correct processes. In this paper, we prove that to solve Consensus, any failure detector has to p ...

Keywords: Byzantine Generals' problem, agreement problem, asynchronous systems, atomic broadcast, commit problem, consensus problem, crash failures, failure detection, fault-tolerance, message passing, partial synchrony, processor failures

3 Symbolic Debugging of Optimized Code
John Hennessy
July 1982 **ACM Transactions on Programming Languages and Systems (TOPLAS)**, Volume 4 Issue 3
Publisher: ACM Press

Full text available: pdf(1.37 MB) Additional Information: full citation, references, citings, index terms

4 Incremental analysis of real programming languages
Tim A. Wagner, Susan L. Graham
May 1997 **ACM SIGPLAN Notices , Proceedings of the ACM SIGPLAN 1997 conference on Programming language design and implementation PLDI '97**, Volume 32 Issue 5
Publisher: ACM Press
Full text available: pdf(1.95 MB) Additional Information: full citation, abstract, references, citings, index terms

A major research goal for compilers and environments is the automatic derivation of tools from formal specifications. However, the formal model of the language is often inadequate; in particular, LR(k) grammars are unable to describe the natural syntax of many languages, such as C++ and Fortran, which are inherently non-deterministic. Designers of batch compilers work around such limitations by combining generated components with ad hoc techniques (for instance, performing part ...

5 Locking Primitives in a Database System
Henry F. Korth
January 1983 **Journal of the ACM (JACM)**, Volume 30 Issue 1
Publisher: ACM Press
Full text available: pdf(1.61 MB) Additional Information: full citation, references, citings, index terms

6 Shrinking the warehouse update Window
Wilburt Juan Labio, Ramana Yerneni, Hector Garcia-Molina
June 1999 **ACM SIGMOD Record , Proceedings of the 1999 ACM SIGMOD international conference on Management of data SIGMOD '99**, Volume 28 Issue 2
Publisher: ACM Press
Full text available: pdf(1.34 MB) Additional Information: full citation, abstract, references, citings, index terms

Warehouse views need to be updated when source data changes. Due to the constantly increasing size of warehouses and the rapid rates of change, there is increasing pressure to reduce the time taken for updating the warehouse views. In this paper we focus on reducing this "update window" by minimizing the work required to compute and install a batch of updates. Various strategies have been proposed in the literature for updating a single warehouse view. These algorithms typically ...

7 Resilience of general interactive tasks
Benny Chor, Lee-Bath Nelson
August 1994 **Proceedings of the thirteenth annual ACM symposium on Principles of distributed computing**
Publisher: ACM Press
Full text available: pdf(977.65 KB) Additional Information: full citation, references, index terms

8 Automatic generation of DAG parallelism
R. Cytron, M. Hind, W. Hsieh
June 1989 **ACM SIGPLAN Notices , Proceedings of the ACM SIGPLAN 1989 Conference on Programming language design and implementation PLDI '89**, Volume 24 Issue 7
Publisher: ACM Press

Terms used **DAG combination** Found **54,583** of **178,880**

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1 Combinational logic synthesis for LUT based field programmable gate arrays
Jason Cong, Yuzheng Ding
April 1996 **ACM Transactions on Design Automation of Electronic Systems (TODAES)**, Volume 1 Issue 2
Publisher: ACM Press
Full text available: pdf(628.91 KB) Additional Information: full citation, abstract, references, citings, index terms, review

The increasing popularity of the field programmable gate-array (FPGA) technology has generated a great deal of interest in the algorithmic study and tool development for FPGA-specific design automation problems. The most widely used FPGAs are LUT based FPGAs, in which the basic logic element is a K-input one-output lookup-table (LUT) that can implement any Boolean function of up to K variables. This unique feature of the LUT has brought new challenges to lo ...

Keywords: FPGA, area minimization, computer-aided design of VLSI, decomposition, delay minimization, delay modeling, logic optimization, power minimization, programmable logic, routing, simplification, synthesis, system design, technology mapping

2 Delay-optimal technology mapping by DAG covering
Yuji Kukimoto, Robert K. Brayton, Prashant Sawkar
May 1998 **Proceedings of the 35th annual conference on Design automation**
Publisher: ACM Press
Full text available: pdf(200.73 KB) Additional Information: full citation, abstract, references, citings, index terms
Publisher Site

We propose an algorithm for minimal-delay technology mapping for library-based designs. We show that subject graphs need not be decomposed into trees for delay minimization; they can be mapped directly as DAGs. Experimental results demonstrate that significant delay improvement is possible by this new approach.

Keywords: congestion, global routing, quadratic placement, relaxed pins, routing models, supply-demand

3 The principled design of large-scale recursive neural network architectures--dag-rnns

and the protein structure prediction problem
Pierre Baldi, Gianluca Pollastri
December 2003 **The Journal of Machine Learning Research**, Volume 4
Publisher: MIT Press
Full text available: pdf(231.40 KB) Additional Information: full citation, abstract, references, index terms

We describe a general methodology for the design of large-scale recursive neural network architectures (DAG-RNNs) which comprises three fundamental steps: (1) representation of a given domain using suitable directed acyclic graphs (DAGs) to connect visible and hidden node variables; (2) parameterization of the relationship between each variable and its parent variables by feedforward neural networks; and (3) application of weight-sharing within appropriate subsets of DAG connections to capture s ...

4 A Method of Test Generation fo Path Delay Faults Using Stuck-at Fault Test Generation Algorithms
Satoshi Ohtake, Kouhei Ohtani, Hideo Fujiwara
March 2003 **Proceedings of the conference on Design, Automation and Test in Europe - Volume 1 DATE '03**
Publisher: IEEE Computer Society
Full text available: pdf(158.22 KB) Additional Information: full citation, abstract, index terms
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In this paper, we propose a test generation method for non-robust path delay faults using stuck-at fault test generation algorithms. In our method, we first transform an original combinational circuit into a circuit called a partial leaf-dag using path-leaf transformation. Then we generate test patterns using a stuck-at fault test generation algorithm for stuck-at faults in the partial leaf-dag. Finally we transform the test patterns into two-pattern tests for path delay faults in the original c ...

5 Research session: XML query processing #4: Structure and content scoring for XML
Sihem Amer-Yahia, Nick Koudas, Amélie Marian, Divesh Srivastava, David Toman
August 2005 **Proceedings of the 31st international conference on Very large data bases VLDB '05**
Publisher: VLDB Endowment
Full text available: pdf(637.09 KB) Additional Information: full citation, abstract, references, index terms

XML repositories are usually queried both on structure and content. Due to structural heterogeneity of XML, queries are often interpreted approximately and their answers are returned ranked by scores. Computing answer scores in XML is an active area of research that oscillates between pure content scoring such as the well-known *tf*idf* and taking structure into account. However, none of the existing proposals *fully accounts for structure* and *combines it with content* to score ...

6 An efficient algorithm for finding the minimal-area FPGA technology mapping
Chi-Chou Kao, Yen-Tai Lai
January 2005 **ACM Transactions on Design Automation of Electronic Systems (TODAES)**, Volume 10 Issue 1
Publisher: ACM Press
Full text available: pdf(231.76 KB) Additional Information: full citation, abstract, references, index terms

Minimum area is one of the important objectives in technology mapping for lookup table-based field-progrmmable gate arrays (FPGAs). Although there is an algorithm that can find an optimal solution in polynomial time for the minimal-area FPGA technology mapping problem without gate duplication, its time complexity can grow exponentially with the number of inputs of the lookup-tables. This article proposes an algorithm with approximate to the area-optimal solution and lower time complexity. The ti ...

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#5 ((directed acyclic graph <in>jn) <or> (dag<in>jn))

#6 ((combining<in>metadata) <and> (dag<in>metadata))

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#4 ((((directed acyclic graph <in>metadata) <or> (dag<in>metadata)))<AND> (union<or>combination<or>combine<or>intersection<in>metadata))

#5 ((directed acyclic graph<in>metadata) <or> (dag<in>metadata))

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10/827,078	04/19/2004	Brandon M. Beck	T00113	1866

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/827,078	BECK ET AL.	
	Examiner	Art Unit	
	Akash Saxena	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-4 have been presented for examination based on the application filed on 19th April 2004.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1-4 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding Claim 1-4

Claims 1-4 recite a abstract idea of combining two models (DAG) which specification describes as represented by Directed Acyclic Graphs (DAG) (Specification: (110, Fig.2). Combining DAG is a mathematical concept. Binary decision diagram (BDD) is a form of DAG and a paper showing the combining BDD[1] is included as prior art. Claims 1-4 do not claim any practical application of the combination.

> **Section 2106 [R-2] (Patentable Subject Matter - Computer-Related Inventions) of the MPEP recites the following:**
> *If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Schrader, 22 F.3d at 294-95, 30 USPQ2d at 1458-59. Thus, a process consisting solely of mathematical operations, i.e., **converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.***
> *"In practical terms, claims define nonstatutory processes if they:*
> *consist solely of mathematical operations without some claimed practical application (i.e., executing a "**mathematical algorithm**"); or - **simply manipulate abstract ideas**, e.g., a bid (Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (Warmerdam, 33 F.3d at 1360, 31USPQ2d at 1759), **without some claimed practical application**."*

[1] Symbolic Model Checking An approach to the state explosion problem; Kenneth L. McMillan, May 1992, Pg. 41-44

Claims 1-4 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. As described through these claims, the claimed invention does not physically transform an article or physical object to a different state or thing, so to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application. That is, it must produce a useful, concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2nd at 160102. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept.

Further, claims 1-4 do not seem to produce a tangible result. The tangible requirement of State Street decision requires that the claims must recite at least one 35 USC 101 judicial exception, in that the process claim must set forth a practical application of the 35 USC 101 judicial exception. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application.").

Claim Rejections - 35 USC § 112¶1st

The following is a quotation of the first paragraph of 35 U.S.C. §112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-4 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific asserted utility or a well established utility.

The claimed invention is an abstract idea as explained in the 35 USC 101 claim rejection above. There may be a specific and substantial utility present in the specification, however it is not claimed.

Claims 1-4 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a -specific and substantial-- asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

4. **Further, Claims 1-4 are rejected under 35 U.S.C. §112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a §101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application.** This is how the MPEP puts it:

> ("The how to use prong of section 112 **incorporates as a matter of law** the requirement of 35 U.S.C. §101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. §101, then the application **also fails as a matter of law** to enable one of ordinary skill in the art to use the invention under 35 U.S.C. §112."); In re Kirk, 376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA 1967) ("Necessarily, compliance with § 112 requires a description of how to use presently useful inventions, **otherwise an applicant would anomalously be required to teach how to use a useless invention.**") See, MPEP 2107.01(IV), quoting In re Kirk (emphasis added).

Therefore, claims 1-4 are rejected on this basis.

Claim Rejections - 35 USC § 112¶2nd

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1-4 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 1-4

Claim 1 discloses the limitation in preamble "rules having a constraint that references a *non-ancestral family* to the constraint" which can be interpreted two different ways. Non-ancestral family could be *child node* (not the ancestor), or *another interpretation* could be a completely *non-related family* (e.g. low suspension in car needs bucket seats in a car, where the bucket seats and suspension nodes are not related). Examiner therefore requests a specific definition for the term "non-ancestral family" and its supported in the specification.

For the reasons mentioned above the claim 1 is indefinite. Claim 2 does not remedy this deficiency and claims 3 & 4 recite the same in preamble, and therefore are rejected likewise.

Further, no patentable weight is given to the limitation presented in the preamble started from the letter wherein as it bears no consequence on the steps of the method. Further, the implied limitation "non-cyclic chain of dependencies among the families and features of the families" is a definition for the directed acyclic graphs (DAG) and is well known in the art.

If the first interpretation for "non-ancestral family" is taken then each node in the DAG references its "non-ancestral" child node in a rule to decide which child note to select.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1-4 rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Publication No. 2002/0165701 by Lichtenberg et al (Lichtenberg hereafter).

Regarding Claim 1

Lichtenberg teaches a method of consolidating multiple models in to a single consolidated model that maintains the non-cyclic dependencies (being a directed acyclic graph) among the families and feature of the families (described as component & associated rules) (Lichtenberg: [0076][0094][0062], Fig.1).

Regarding Claim 2

Lichtenberg teaches detecting any inconsistencies between rules included in the consolidated model (Lichtenberg: [0090]-[0094] – non–compatible products) and attempting to resolve any detected inconsistencies by not allowing the user to select a inconsistent solution (Lichtenberg: [0096]-[0108]).

Regarding Claim 3-4

Limitations presented in claims 3-4 are similar to limitations presented in claim 1 and rejected likewise. Lichtenberg teaches a system (Lichtenberg: [0043]) and a computer program (Lichtenberg: Fig. 2-3, [0272]) for implementing the method of claim 1.

Relevant References

7. "The Combining the DAG: A technique for parallel Data Flow Analysis" by Robert Kramer et al teaches ways to remove the cyclic dependencies involved in combining the DAG. Examiner believes that is the one of the inventive concepts in the instant application, which is taught in this paper. (IEEE1994).

Conclusion

8. All claims are rejected.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. **Examiner's Note:** Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

    In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Akash Saxena whose telephone number is (571) 272-8351. The examiner can normally be reached on 9:30 - 6:00 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini S. Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Akash Saxena
Patent Examiner, GAU 2128
(571) 272-8351
Friday, June 23, 2006

Kamini S. Shah
Supervisory Patent Examiner, GAU 2128
Structural Design, Modeling, Simulation and Emulation

Notice of References Cited	Application/Control No. 10/827,078	Applicant(s)/Patent Under Reexamination BECK ET AL.	
	Examiner Akash Saxena	Art Unit 2128	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,615,341 A	03-1997	Agrawal et al.	705/10
*	B	US-5,873,081 A	02-1999	Harel, Dov	707/3
*	C	US-5,996,114 A	11-1999	Moeller, Gert Lykke	714/699
*	D	US-6,002,854 A	12-1999	Lynch et al.	703/1
*	E	US-6,009,406 A	12-1999	Nick, Sascha	705/10
*	F	US-6,178,502 B1	01-2001	Caswell et al.	713/1
*	G	US-6,216,109 B1	04-2001	Zweben et al.	705/8
*	H	US-6,241,775 B1	06-2001	Blatchford, Brian Stephen	623/27
*	I	US-6,300,948 B1	10-2001	Geller et al.	715/866
*	J	US-6,405,308 B1	06-2002	Gupta et al.	713/1
*	K	US-2002/0165701 A1	11-2002	Lichtenberg et al.	703/7
*	L	US-2004/0002838 A1	01-2004	Oliver et al.	703/2
*	M	US-2006/0106626 A1	05-2006	Jeng et al.	705/001

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
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	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Symbolic Model Checking An approach to the state explosion problem; Kenneth L McMillan; May 1992; Carnegie Mellon University;
	V	UVT: a unification-based tool for knowledge base verification; Polat, F. Guvenir, H.A.; Expert, IEEE; Publication Date: June 1993; Volume: 8 , Issue: 3; On page(s): 69 - 75 ;ISSN: 0885-9000
	W	The combining DAG: a technique for parallel data flow analysis; Kramer, R.; Gupta, R.; Soffa, M.L.; Parallel and Distributed Systems, IEEE Transactions on; Volume 5, Issue 8, Aug. 1994 Page(s):805 - 813
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 10/827,078	Applicant(s)/Patent Under Reexamination BECK ET AL.	
	Examiner Akash Saxena	Art Unit 2128	Page 2 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,802,508 A	09-1998	Morgenstern, Leora	706/55
*	B	US-2003/0069737 A1	04-2003	Koubenski et al.	705/1
*	C	US-2004/0030786 A1	02-2004	Zehavi, Abraham	709/229
*	D	US-6,807,576 B1	10-2004	Jeffries et al.	709/225
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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NON-PATENT DOCUMENTS

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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
10/827,078	BECK ET AL.
Examiner	**Art Unit**
Akash Saxena	2128

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date
Final	Original	6/23/06
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Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/827,078	BECK ET AL.	
	Examiner	Art Unit	
	Akash Saxena	2128	

SEARCHED			
Class	Subclass	Date	Examiner
703	1-2	6/23/2006	AS

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
INventor Search (Attached)	6/23/2006	AS
EAST Search (attached)	6/23/2006	AS
Google Search (Attached)	6/23/2006	AS
IEEE Sarfch (Attached)	6/23/2006	AS
ACM Search (Attached)	6/23/2006	AS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Trilogy Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,978	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

Austin, Texas

ELECTRONICALLY FILED December 29, 2006

RESPONSE TO NON-FINAL OFFICE ACTION

Sir:

This paper is responsive to the Office Action dated July 5, 2006, having a shortened statutory period expiring on October 5, 2006. Accompanying this response is a petition under 37 C.F.R. § 1.136 for extension of time by three (3) months, setting a new time for response of January 5, 2007. Further examination and reconsideration are respectfully requested in view of the amendments and remarks set forth below.

AMENDMENTS TO THE SPECFICATION

Please amend paragraph 16 as follows:

(16) Thus, despite the differences in various models, it is often desirable to combine the multiple models into a consolidated model having a unified set of rules (also referred to as "stitched rules"). Referring to Figure 5, the conventional consolidation system 500 includes a model 502 that represents a set of three models that may be created and maintained separately. Model 504 is, for example, a configuration model that describes how a particular product may be built and sold for the USA market. Model 506 is a configuration model that describes how the same product may be built and sold for the Canadian market. Model 508 is a configuration model that describes how the same product may be built and sold for the Mexican market. Models 504, 506, and 508 may be combined into a single model 512 by conventional consolidation (also referred to as "stitching") processes 510. The consolidated model 512 will contain stitched rules that represent all the information present in the original three models. However, in many circumstances the conventional ~~consolidations~~ consolidation processes 510 produce unspecified configuration buildables in consolidated model 512. "Unspecified configuration buildables" are configuration buildables included in consolidated model 512 that are not defined in any of the source models, i.e. models 504, 506, and 508. An unspecified configuration buildable is, thus, an error that can have significant adverse consequences. Conventional consolidation processes do not automatically detect unspecified configuration buildables and correct them. Since models can contain thousands, hundreds of thousands, or more rules, a high degree of automation is often a key to success for modeling and model data driven technologies.

Please amend paragraph 32 as follows:

(32) A model consolidation process combines multiple configuration models into a single unified configuration model that contains the union of the allowable combinations (i.e. combinations that are buildable) from each of the original models. An aspect of at least one embodiment of the model consolidation process is that it allows models to be combined in such a way that any incompatibilities or contradictions between models are

detected and automatically resolved where possible. If an incompatibility is detected that cannot be automatically resolved, then the configuration models should not be combined. Instead if this incompatibility case occurs, at least one embodiment of the model consolidation process produces a description of the problem encountered and ~~report~~ reports the problem along with the necessary information required for a human to resolve it.

Please amend paragraph 53 as follows:

(53) Referring to Figure 7, the model consolidation system 700 includes model 702, which represents a set of N models that may be created and maintained separately, where N is any integer. Model A 704 is, for example, a configuration model that describes how a particular product may be built and sold for the USA market. Model B 706 is a configuration model that, for example, describes how the same product may be built and sold for the Canadian market. Model N 708 is, for example, a configuration model that describes how the same product may be built and sold for the Mexican market. Models 704, 706, and 708 may be combined into a single model 712 by the model consolidation (also referred to as "stitching") ~~processes~~ process 710. The combined model 712 contains stitched rules that represent all the information present in the original three models without unspecified buildable configurations.

Please amend paragraph 54 as follows:

(54) Figures 8 and 9 ~~depicts~~ depict the model representations used for Figures 6 and 7 and the resulting consolidation of the model representations using an embodiment of model consolidation system 700. For clarity, Figures 8 and 9 ignore the effects of the optionalities ('S','O', …) of the rules.

Please amend paragraph 75 as follows:

(75) Non-trivial families ~~are the families~~ that cannot be trivially combined are the families of the defining constraints as well as their ancestors. Trivial families can be combined using a stitching process such as the conventional stitching process 510. The DAG created in Step 2 is utilized to determine the ancestors of each of the ~~defining~~

~~families~~ families of the defining constraints. Each set of ancestor families is then combined together along with the set of ~~defining families~~ families of the defining constraints. This results in the set of families that cannot be trivially combined.

Please amend paragraph 83 as follows:

(83) For each rule the features of the RHS that belong to defining families are investigated. The ancestors of each RHS feature [[is]] are computed, and if the family of the LHS feature of the rule is in the ancestor list, then that RHS feature is causing a cyclical relationship in the DAG and is removed from the RHS of the rule. Otherwise, the DAG is updated to include the relationship just encountered. Once this process is completed it is guaranteed that there are no cyclical relationships among the rules.

Please amend paragraph 89 as follows:

(89) This step and its associated sub-steps are only run on the rules with LHS features from a non-trivial family. This step updates the rules in such a way that any erroneous allowed feature combinations created by the combination process 1000 are removed. Figure 11 shows a flowchart of process 1100, which depicts a flowchart for removing unspecified buildable configurations from a consolidated model.[[.]]

Please amend paragraph 114 as follows:

(114) In this example there is only one constraint family, SER. Thus, it and its ancestors are the set of families that cannot be trivially combined together. This results in {MKT, ENG, SER} as the set of non-trivial families.

Please amend paragraph 149 as follows:

(149) I/O device(s) 1319 may provide connections to peripheral devices, such as a printer, and may also provide a direct connection to a remote server computer ~~systems~~ system(s) via a telephone link or to the Internet via an ISP. I/O device(s) 1319 may also include a network interface device to provide a direct connection to a remote server computer ~~systems~~ system(s) via a direct network link to the Internet via a POP (point of presence). Such connection may be made using, for example, wireless techniques,

including digital cellular telephone connection, Cellular Digital Packet Data (CDPD) connection, digital satellite data connection or the like. Examples of I/O devices include modems, sound and video devices, and specialized communication devices such as the aforementioned network interface.

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of consolidating using a computer system to consolidate multiple models using an automated process, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint, the method comprising:

combining the models into a single, consolidated model that maintains [[the]] a non-cyclic chain of dependencies among families and features of families, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and at least one model includes a rule that causes a configuration conflict with another model.

2. (Original) The method of claim 1 further comprising:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

3. (Currently amended) A computer system for consolidating multiple models, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint, the system comprising:

a processor; and

a memory, coupled to the processor, having code stored therein and executable by the processor, the code comprising:

a model consolidation module to combine the models into a single, consolidated model that maintains [[the]] a non-cyclic chain of dependencies among families and features of families, wherein

each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and at least one model includes a rule that causes a configuration conflict with another model.

4. (Currently amended) A computer program product having instructions encoded therein to consolidate multiple models, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint, the instructions comprising code to:

combine the models into a single, consolidated model that maintains [[the]] a non-cyclic chain of dependencies among families and features of families, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and at least one model includes a rule that causes a configuration conflict with another model.

5. (New) The method of claim 1 wherein the models represent configuration models of vehicles.

6. (New) The method of claim 1 wherein the consolidated model includes only buildable configurations.

7. (New) The method of claim 1 wherein combining the models into a single, consolidated model further comprises:

extending a rule from one of the models into an ancestor of a family of a defining constraint; and

repairing the extension of the rule in a child of the ancestor of the family of the defining constraint.

8. (New) The method of claim 1 wherein combining the models into a single, consolidated model further comprises:

loading the models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the models;

for each model, determining which portions of an overall configuration space for which the model does not provide a buildable configuration; and

for each model, constraining statements of the rules with in the model to fall within a space of defining features of the model;

9. (New) The method of claim 8 wherein determining which portions of an overall configuration space for which each model does not provide a buildable configuration further comprises:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

10. (New) The system of claim 3 further comprising code to:

detect any inconsistencies between rules included in the consolidated model; and

attempt to resolve any detected inconsistencies.

11. (New) The system of claim 3 wherein the models represent configuration models of vehicles.

12. (New) The system of claim 3 wherein the consolidated model includes only buildable configurations.

13. (New) The system of claim 3 further comprising code to:

extend a rule from one of the models into an ancestor of a family of a defining constraint; and

repair the extension of the rule in a child of the ancestor of the family of the defining constraint.

14. (New) The system of claim 3 further comprising code to:
load the models into a memory of the computer system;
construct a directed acyclic graph of all rules in all the models;
for each model, determine which portions of an overall configuration space for which the model does not provide a buildable configuration; and
for each model, constrain statements of the rules with in the model to fall within a space of defining features of the model;

15. (New) The system of claim 14 further comprising code to:
determine which families are ancestors of families of defining constraints; and
subtract a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

16. (New) The computer program product of claim 4 further comprising code to:
detect any inconsistencies between rules included in the consolidated model; and
attempt to resolve any detected inconsistencies.

17. (New) The computer program product of claim 4 wherein the models represent configuration models of vehicles.

18. (New) The computer program product of claim 4 wherein the consolidated model includes only buildable configurations.

19. (New) The computer program product of claim 4 further comprising code to:
extend a rule from one of the models into an ancestor of a family of a defining constraint; and

repair the extension of the rule in a child of the ancestor of the family of the defining constraint.

20. (New) The computer program product of claim 4 further comprising code to:

load the models into a memory of the computer system;

construct a directed acyclic graph of all rules in all the models;

for each model, determine which portions of an overall configuration space for which the model does not provide a buildable configuration; and

for each model, constrain statements of the rules with in the model to fall within a space of defining features of the model;

21. (New) The computer program product of claim 20 further comprising code to:

determine which families are ancestors of families of defining constraints; and

subtract a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

22. (New) A computer system for performing an automatic consolidation of multiple models of configurable products, the system comprising:

means for combining the models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and at least one model includes a rule that causes a configuration conflict with another model.

REMARKS

Claims 1-4 are pending.

Claims 1-4 stand rejected.

Claims 1, 3, and 4 have been amended.

Claims 5-22 have been added.

The specification has been amended to correct minor informalities. No new matter has been added.

Claim Rejections - 35 U.S.C. § 101

Claims 1-4 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter and as not being supported by either a specific asserted utility of a well established unity.

The July 5, 2006 Office Action (referred to herein as the "Office Action"), citing *State Street Bank & Trust Company v. Signature Financial Group, Inc.*, 149 F.3d 1368 (Fed. Cir. 1998), states that, "the claimed invention does not physically transform an article or physical object to a different state or thing, so to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application." Office Action, p. 3.

Applicants respectfully submit that the Claims 1-4 are directed towards statutory subject matter because, for example, claims 1-4 are directed towards consolidating multiple, physical models into a single, consolidated, physical model. The model is useful because, in at least one embodiment, the model "refers to a collection of rules that define the buildable configurations of one or more products." Present Application, para. 10.

In *State Street Bank*, the District Court rejected claims in the 5,193,056 patent under 35 U.S.C. § 101. The Federal Circuit reversed the District Court. The Federal Circuit stated:

> Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical

calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces "a useful, concrete and tangible result"—a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades. *State Street Bank*, , 149 F.3d 1368 (Fed. Cir. 1998).

Similar to the claims in *State Street Bank*, claim 1 of the present application recites in part:

> A method of using a computer system to consolidate multiple models, the method comprising:
>
> > combining the models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families.

Also similar to the claims in *State Street Bank*, claim 3 of the present application recites in part:

> A computer system for consolidating multiple models, the system comprising:
>
> a processor; and
>
> a memory, coupled to the processor, having code stored therein and executable by the processor, the code comprising:
>
> > a model consolidation module to combine the models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families.

Also similar to the claims in *State Street Bank*, claim 4 of the present application recites in part:

> A computer program product having instructions encoded therein to consolidate multiple models, the instructions comprising code to:
>
> > combine the models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families.

Thus, as in *State Street Bank*, claims 1-4 transform data, i.e. multiple models, into a useful, concrete, and tangible result, i.e. a consolidated model that maintains a non-cyclic chain of dependencies among families and features of families. **Applicants respectfully submit that the present application clearly teaches the practical application of such consolidated model.** For example, in at least one embodiment,

> While it is convenient to have this logical separation of the configuration space for maintenance purposes it is often desired to provide a single unified model that represents the configuration space for the entire product. The resulting unified configuration model can then be used to answer any questions that one of the original models could answer and it will give the same result. Present Application, para. 15.

Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 112

Claims 1-4 stand rejected under 35 U.S.C. § 112, first and second paragraphs. Applicants respectfully traverse the rejections.

I and II.

I. The Office Action states that "since the claimed invention is not supported by either a –specific and substantial – asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention. Office Action p. 4.

II. The Office Action also states that "Applicant has not in fact disclosed the practical application for the invention. *Id.*

Applicants respectfully submit that the present application teaches that a configuration model is clearly useful because, for example, in at least one embodiment a configuration model "refers to a collection of rules that define the buildable configurations of one or more products." Furthermore, the present application specifically discloses that the consolidated model of claims 1-4 is particularly useful and **has practical application** because, for example:

> While it is convenient to have this logical separation of the configuration space for maintenance purposes it is often desired to provide a single unified model that represents the configuration space for the entire product. The resulting unified configuration model can then be used to answer any questions that one of the original models could answer and it will give the same result. Present Application, para. 15.

Applicants also respectfully submit that the practical use of configuration models is well-known to those of ordinary skill in the art and is taught, for example, in U.S. Patent No. 5,825,651 entitled "Method and Apparatus for Maintaining and Configuring Systems", which is cited in para. 4 of the Present Application.

III.

III. Claims 1-4 also rejected under 35 U.S.C. § 112, second paragraph, because "the limitation in the [independent claim] preamble[s] of "rules having a constraint that references a non-ancestral family of the constraint" can be interpreted to different ways. Office Action p. 5. Applicants have amended claims 1-4 to delete reference to "a non-ancestral family of the constraint."

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 112 based rejections.

Claim Rejections - 35 U.S.C. § 102

Claims 1-4 stand rejected under 35 U.S.C. § 102(b), as being anticipated by U.S. Publication No. 2002/0165701 to Lichtenberg et al. (hereinafter "*Lichtenberg*"). Applicants respectfully traverse the rejection.

Applicants respectfully submit that the claims, as amended, are allowable over *Lichtenberg* because, for example, *Lichtenberg* neither teaches nor suggests combining multiple models such that combining "the models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and at least one model includes a rule that causes a **configuration conflict** with another model." Claims 1, 3, and 4. (emphasis added).

Lichtenberg teaches "combining two DAGs". *Lichtenberg*, para. 0076. However, Applicants respectfully submit that Lichtenberg does not teach that one of the DAGs "includes a rule that causes a **configuration conflict** with another model" as required by claims 1, 3, and 4. (emphasis added).

Lichtenberg teaches that, "the step of selecting an alternative may comprise identifying Boolean variables relating to any other alternative(s) of the component and nodes … [and] in the DAG, identifying paths comprising such nodes." *Lichtenberg*, para. 0096. "Such paths then may relate directly to "incompatible products" in that these products are no longer interesting." *Id.* Subsequently, *Lichtenberg* teaches that, "If, during configuration, a selected alternative is not compatible with other, chosen alternatives, the step of checking the DAG may further comprise … ." *Id.*, para. 0102. "In this situation, the user may choose to actually enter or choose/select the selected alternative and then un-choose the or those alternative(s) which is/are not compatible therewith." *Id.*, para. 0105.

Thus, Applicants respectfully submit that Lichtenberg teaches that during configuration a user's particular selection can exclude other possible choices. In other words, selection of a particular component can exclude selection of other components.

First, Applicants respectfully submit that the alternative choices taught by *Lichtenberg* are within a single DAG. Claims 1, 3, and 4 recite "at least one model includes a rule that causes a configuration conflict with another model."

Second, Applicants respectfully submit that providing for alternatives in a single configuration model is significantly different than having "at least one model [that] includes a rule that causes **a configuration conflict** with another model." Claims 1, 3, and 4. A configuration alternative as taught by *Lichtenberg* relates to excluding one or more choices when another choice is made. For example, selection of the color 'red' excludes the selection of blue and any other color. Applicants respectfully submit that excluding alternatives when a configuration selection is made is significantly different than a rule that "**causes a configuration conflict**." Claims 1, 3, and 4. A configuration conflict would exist in this example when one model allows the color 'red' and another model does not. Another example of a configuration conflict between two models is when a first model releases a buildable configuration of ENGINE 2 in MARKET 1, and a second model to be combined with the first model does not release ENGINE 2 in MARKET 1. Present Application, para. 55.

Accordingly, Applicants respectfully submit that *Lichtenberg* fails to teach or suggest that "at least one model includes a rule that causes **a configuration conflict** with another model." Thus, *Lichtenberg* also fails to teach or suggest "combin[ing] the models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families." Claims 1, 3, and 4.

Applicants respectfully request withdrawal of the rejection of claims 1, 3, and 4. Applicants also respectfully request withdrawal of the rejection of claim 2 for at least the same reason as Claim 1.

Applicants respectfully submit that new claims 5-22 are allowable for at least the same reasons as claims 1, 3, and 4.

CONCLUSION

In view of the amendments and remarks set forth herein, Applicant respectfully submits that all pending claims are in condition for allowance. Accordingly, Applicant requests that a Notice of Allowance be issued. Nonetheless, should any issues remain that might be subject to resolution through a telephone interview, the Examiner is requested to telephone the undersigned at 512-338-9100.

ELECTRONICALLY FILED
December 29, 2006

Respectfully submitted,

/Kent B. Chambers/

Kent B. Chambers
Attorney for Applicant(s)
Reg. No. 38,839

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Trilogy Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,978	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

ELECTRONICALLY FILED

Austin, Texas
December 29, 2006

PETITION FOR EXTENSION OF TIME

Dear Sir:

Applicants respectfully petition for a three (3) month extension of time within which to respond to the July 5, 2006 outstanding Office Action, such extension allowing the undersigned until January 5, 2007 to respond.

The Commissioner is authorized to deduct any additional fees which may be required or credit any overpayment to Deposit Account No. 502264.

ELECTRONICALLY FILED ON December 28, 2006.

Respectfully submitted,

/Kent B. Chambers/

Kent B. Chambers
Attorney for Applicant(s)
Reg. No. 38,839

Electronic Patent Application Fee Transmittal

Application Number:	10827078
Filing Date:	19-Apr-2004
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Filer:	Kent Bryan Chambers
Attorney Docket Number:	T00113

Filed as Large Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	1202	2	50	100
Independent claims in excess of 3	1201	1	200	200
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1020	1020
Miscellaneous:				
			Total in USD ($)	**1320**

Electronic Acknowledgement Receipt

EFS ID:	1407004
Application Number:	10827078
International Application Number:	
Confirmation Number:	1866
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Customer Number:	33438
Filer:	Kent Bryan Chambers
Filer Authorized By:	
Attorney Docket Number:	T00113
Receipt Date:	29-DEC-2006
Filing Date:	19-APR-2004
Time Stamp:	13:22:40
Application Type:	Utility

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$1320
RAM confirmation Number	1755
Deposit Account	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)

1	Amendment - After Non-Final Rejection	T00113_ROA_7_5_06.pdf	135589	no	16
Warnings:					
Information:					
2	Extension of Time	T00113_Petition_Extension_Time.pdf	69484	no	1
Warnings:					
Information:					
3	Fee Worksheet (PTO-06)	fee-info.pdf	8409	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	213482		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number: 10827078

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	4	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	4 minus 20=	*
INDEPENDENT CLAIMS	3 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	385.00	OR	BASIC FEE	770.00
XS 9=		OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL		OR	TOTAL	770

12-29-06

CLAIMS AS AMENDED - PART II

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 27	Minus	** 20	= 7
Independent	* 4	Minus	*** 3	= 1
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	~~X$18=~~ 20	110
X43=		OR	~~X86=~~ 20	280
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	390

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"5515524".pn.	US-PGPUB; USPAT	OR	OFF	2007/01/23 20:00
L2	1	"5825651".pn.	US-PGPUB; USPAT	OR	OFF	2007/01/23 20:00
L3	2	(US-5515524-$ or US-5825651-$). did.	USPAT	OR	OFF	2007/01/23 20:10

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,078	04/19/2004	Brandon M. Beck	T00113	1866

33438 7590 01/29/2007
HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720

EXAMINER	
SAXENA, AKASH	
ART UNIT	PAPER NUMBER
2128	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/827,078	BECK ET AL.	
	Examiner	Art Unit	
	Akash Saxena	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☒ Claim(s) *8,14 and 22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claim(s) 1-22 has/have been presented for examination based on amendment filed on 29th December 2006.
2. Correction to specification are noted.
3. Claim(s) 1, 3-4 is/are amended.
4. Claim(s) 5-22 is/are new claim(s) added with this amendment.
5. Claim(s) 8, 14 and 22 are remain Objected to.
6. Claim(s) 1-22 remain rejected under 35 USC § 101.
7. Claim(s) 1-22 remain rejected under 35 USC § 112.
8. Claim(s) 1-22 remain rejected under 35 USC § 102.
9. The arguments submitted by the applicant have been fully considered. Claims 1-22 remain rejected and this action is made FINAL. The examiner's response is as follows.

Response to Applicant's Remarks for 35 U.S.C. § 101

10. **Claims 1-4 were rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

Regarding Claim 1

Applicant has argued the following:

> The July 5, 2006 Office Action (referred to herein as the "Office Action"), citing State Street Bank & Trust Company v. Signature Financial Group, Inc., 149 F.3d 1368 (Fed. Cir. 1998), states that, "the claimed invention does not physically transform an article or physical object to a different state or thing, so to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application." Office Action, p. 3.
>
> Applicants respectfully submit that the Claims 1-4 are directed towards statutory subject matter because, for example, claims 1-4 are directed towards consolidating multiple, physical models into a single, consolidated, physical model. The model is useful because, in at least one embodiment, the model "refers to a collection of rules that define the buildable configurations of one or more products." Present Application, para.10.
>
> In State Street Bank, the District Court rejected claims in the 5,193,056 patent under 35 U.S.C. § 101. The Federal Circuit reversed the District Court. The Federal Circuit stated:
> Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces "a useful, concrete and tangible result"--a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades. State Street Bank,, 149 F.3d 1368 (Fed. Cir. 1998).

The claim as presented does not disclose, "consolidating multiple **physical** models", which is the argument presented above against the practical use. There is data transformation, however there is no specific practical application – e.g. a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades. The model do not represent any physical system, but are have been the center of study in abstract form, as can be seen by K.L. McMillan's publication "symbolic model Checking: An Approach to State Explosion Problem". Applicant has also cited U.S. Patent No. 5,825,651 is directed

towards graphical modeling of a product defined by system. Examiner has also cited U.S. Patent No. 5,515,524, which also performs configuration for a structural model rather an abstract model.

Examiner for reasons given above maintains the rejection.

Response to Applicant's Remarks for 35 U.S.C. § 112¶1st

11. Applicant has argued that current disclosure has claimed practical application. Examiner respectfully disagrees, as there is not claimed practical application of the disclosure. See comments on the cited patents above.

Response to Applicant's Remarks for 35 U.S.C. § 112¶1st

12. The language is "a non-ancestral family of the constraint", has not been removed from the claim as stated. Hence the rejection is maintained.

Response to Applicant's Remarks for 35 U.S.C. § 102

13. **Claims 1-4 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Publication No. 2002/0165701 by Lichtenberg et al (Lichtenberg hereafter).**

Regarding Claim 1

Applicant has argued that newly amended limitation, at least one model includes a rule that causes a configuration conflict with another model", as not being taught by Lichtenberg.

Examiner has provided appropriate rejection in the claim rejection section. However arguments presented are addressed here as well.

Specifically applicant has argued:

> "Thus, Applicants respectfully submit that Lichtenberg teaches that during configuration a user's particular selection can exclude other possible choices. In other words, selection of a particular component can exclude selection of other components.
>
> First, Applicants respectfully submit that the alternative choices taught by Lichtenberg are within a single DAG. Claims 1, 3, and 4 recite "at least one model includes a rule that causes a configuration conflict with another model."

Applicants have themselves addressed the first argument. The fact that Lichtenberg teaches selection of a particular component can exclude selection of other components shows a conflict was detected and a particular configuration path was chosen in the directed acyclical graphs (DAG - which represents a product configuration flow in view of the rules for each feature/component/attribute). Lichtenberg teaches that when the DAG are combined, such conflicts and dependencies are taken care of (Lichtenberg: [0062][0076][0085]).

Applicant has further argued:

> Second, Applicants respectfully submit that providing for alternatives in a single configuration model is significantly different than having "at least one model [that] includes a rule that causes a configuration conflict with another model." Claims 1, 3, and 4. A configuration alternative as taught by Lichtenberg relates to excluding one or more choices when another choice is made. For example, selection of the color 'red' excludes the selection of blue and any other color. Applicants respectfully submit that **excluding alternatives when a configuration selection is made is significantly different than a rule that "causes a configuration conflict."** Claims 1, 3, and 4. A configuration conflict would exist in this example when one model allows the color 'red' and another model does not. Another example of a configuration conflict between two models is when a first model releases a buildable configuration of ENGINE 2 in MARKET 1, and a second model to be combined with the first model does not release ENGINE 2 in MARKET 1. Present Application, Para. 55.

Examiner respectfully disagrees with the applicant and fails to see his point.

Successful combination of two DAGs, possibly representing two different major configurations is well known in the art and taught by Lichtenberg (Lichtenberg: [0062][0076][0085]). When there is DAGs are combined the conflicting configurations would not be present on the same path, thus the first example scenario would not occur as once in the configuration path of “another model”, red would not be present as an option (Lichtenberg: [0092]-[0096]).

Similarly, The incompatible option of second model having “ENGINE 2 in the MARKET 1” would not be encountered if the second model and first model DAGs are combined appropriately (Lichtenberg: [0062]), because that branch would never have been taken – i.e. the incompatible option would not been offered.

Further, even if such a conflict happens, Lichtenberg teaches detecting such a configuration conflict in the combined DAG (Lichtenberg: [0102]-[0105] – emphasis on [0105]). Further, Lichtenberg shows combining the DAGs with compatibility check (Lichtenberg: [0134]-[0150]).

Hence the arguments presented are considered to be unpersuasive.

Claim Objections

14. Claims 8, 14 and 20 do not end in a period, instead end with a semi-colon.

Claim Rejections - 35 USC § 101

(Repeated from Previous Action)

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

15. **Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

Regarding Claim 1-22

Claims 1-22 recite a abstract idea of combining two models (DAG) which specification describes as represented by Directed Acyclic Graphs (DAG) (Specification: (110, Fig.2). Combining DAG is a mathematical concept. Binary decision diagram (BDD) is a form of DAG and a paper showing the combining BDD[1] is included as prior art.

Claims 1-22 do not claim any practical application of the combination.

> **Section 2106 [R-2] (Patentable Subject Matter - Computer-Related Inventions) of the MPEP recites the following:**
> *If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Schrader, 22 F.3d at 294-95, 30 USPQ2d at 1458-59. Thus, a process consisting solely of mathematical operations, i.e., **converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.***
> *"In practical terms, claims define nonstatutory processes if they:*
> *consist solely of mathematical operations without some claimed practical application (i.e., executing a "**mathematical algorithm**"); or - **simply manipulate abstract ideas**, e.g., a bid*

[1] Symbolic Model Checking An approach to the state explosion problem; Kenneth L. McMillan, May 1992, Pg. 41-44

*(Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (Warmerdam, 33 F.3d at 1360, 31USPQ2d at 1759), **without some claimed practical application**."*

Claims 1-4 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. As described through these claims, the claimed invention does not physically transform an article or physical object to a different state or thing, so to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application. That is, it must produce a useful, concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2nd at 160102. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept.

Further, claims 1-4 do not seem to produce a tangible result. The tangible requirement of State Street decision requires that the claims must recite at least one 35 USC 101 judicial exception, in that the process claim must set forth a practical application of the 35 USC 101 judicial exception. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application.").

Claim Rejections - 35 USC § 112¶1st

(Repeated from Previous Action)

The following is a quotation of the first paragraph of 35 U.S.C. §112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

16. **Claims 1-4 (now 1-22) are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific asserted utility or a well established utility.**

The claimed invention is an abstract idea as explained in the 35 USC 101 claim rejection above. There may be a specific and substantial utility present in the specification, however it is not claimed.

Claims 1-4 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a -specific and substantial-- asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

17. **Further, Claims 1-4 (now 1-22) are rejected under 35 U.S.C. §112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a §101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application.** This is how the MPEP puts it:

> ("The how to use prong of section 112 **incorporates as a matter of law** the requirement of 35 U.S.C. §101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. §101, then the application **also fails as a matter of law** to enable one of ordinary skill in the art to use the invention under 35 U.S.C. §112."); In re Kirk, 376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA 1967) ("Necessarily, compliance with § 112 requires a description of how to use presently useful inventions, **otherwise an applicant would anomalously be required to teach how to use a useless invention**.") See, MPEP 2107.01(IV), quoting In re Kirk (emphasis added).

Therefore, claims 1-4 are rejected on this basis.

Claim Rejections - 35 USC § 112¶2nd

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

18. **Claim 1-22 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Regarding Claim 1-4 (Repeated)

Claim 1 discloses the limitation in preamble "rules having a constraint that references a *non-ancestral family* to the constraint" which can be interpreted two different ways. Non-ancestral family could be *child node* (not the ancestor), or *another interpretation* could be a completely *non-related family* (e.g. low suspension in car needs bucket seats in a car, where the bucket seats and suspension nodes are not related). Examiner therefore requests a specific definition for the term "non-ancestral family" and its supported in the specification.

For the reasons mentioned above the claim 1 is indefinite. Claim 2 does not remedy this deficiency and claims 3 & 4 recite the same in preamble, and therefore are rejected likewise.

Further, no patentable weight is given to the limitation presented in the preamble started from the letter wherein as it bears no consequence on the steps of the method. Further, the implied limitation "non-cyclic chain of dependencies among the families and features of the families" is a definition for the directed acyclic graphs (DAG) and is well known in the art.

If the first interpretation for "non-ancestral family" is taken then each node in the DAG references its "non-ancestral" child node in a rule to decide which child note to select.

Regarding Claim 1-22 (New)

Claim 1 discloses "A method of consolidating using a computer system to consolidate multiple models using an automated process".

This claim is indefinite because it is not clear which statutory category the claim should be examined under – i.e. a "method" claim or a "system" claim.

Secondly, applicant has amended the "automated process" in preamble and is not considered to be a limitation fir reasons below. (a) Claim preamble language may not be treated as a limitation where it merely states an intended use of the system and is unnecessary to define the invention, the U.S. Court of Appeals for the Federal Circuit ruled May 8 (Catalina Marketing Int'l Inc. v. Coolsavings. com Inc., Fed. Cir., No. 01-1324, 5/8/02).

(b) Even if "consolidating the models" by an "automated process" is considered to be a limitation, this does not patentably distinguish the limitation from prior art.

MPEP 2144.04 III states:

> In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958) (Appellant argued that claims to a permanent mold casting apparatus for molding trunk pistons were allowable over the prior art because the claimed invention combined "old permanent-mold structures together with a timer and solenoid which automatically actuates the known pressure valve system to release the inner core after a predetermined time has elapsed." The court held that broadly providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art.).

Independent claims 3, 4 and 22 suffer from same deficiency and rejected likewise.

Dependent claims 2 and 5-9 are rejected based on their dependency on rejected claim 1. Dependent claims 1-15 are rejected based on their dependency on rejected claim 3. Dependent claims 16-21 are rejected based on their dependency on rejected claim 4.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

19. Claims 1-22 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Publication No. 2002/0165701 by Lichtenberg et al (Lichtenberg hereafter).

Regarding Claim 1 (Updated)

Lichtenberg teaches a method of consolidating multiple models in to a single consolidated model that maintains the non-cyclic dependencies (being a directed acyclic graph) among the families and feature of the families (described as component & associated rules) (Lichtenberg: [0076][0094][0062], Fig.1).

Lichtenberg teaches wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families (Lichtenberg: [0062]-[0073]) and at least one model includes a rule that causes a configuration conflict with another model (Lichtenberg: [0062], [0090], [0092]-[0094], [0102]-[0105], [0134]-[-0150] – partial DAG representing features and families, [0162], [0191], [0383] – incompatibility between selected model and reconfiguration).

Regarding Claim 2

Lichtenberg teaches detecting any inconsistencies between rules included in the consolidated model (Lichtenberg: [0090]-[0094] – non–compatible products) and

attempting to resolve any detected inconsistencies by not allowing the user to select a inconsistent solution (Lichtenberg: [0096]-[0108]).

Regarding Claim 3-4 (Updated)

Limitations presented in claims 3-4 are similar to limitations presented in claim 1 and rejected likewise. Lichtenberg teaches a system (Lichtenberg: [0043]) and a computer program (Lichtenberg: Fig. 2-3, [0272]) for implementing the method of claim 1. *Lichtenberg teaches wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families (Lichtenberg: [0062]-[0073]) and at least one model includes a rule that causes a configuration conflict with another model (Lichtenberg: [0062], [0090], [0092]-[0094], [0102]-[0105], [0134]-[-0150] – partial DAG representing features and families, [0162], [0191], [0383] – incompatibility between selected model and reconfiguration).*

Regarding Claim 5

Lichtenberg teaches wherein the models represent configuration models of vehicles (Lichtenberg: Fig.1 – Showing a bicycle).

Regarding Claim 6

Lichtenberg teaches wherein the consolidated model includes only buildable configurations (Lichtenberg: [0406]-[0412] – excluding incompatible selections).

Regarding Claim 7

Lichtenberg teaches combining the models into a single, consolidated model further comprises extending a rule from one of the models into an ancestor of a family of a defining constraint (Lichtenberg: [0062], [0076]); and repairing the extension of the

rule in a child of the ancestor of the family of the defining constraint (Lichtenberg: [0133]-[0150]).

Regarding Claim 8

Lichtenberg teaches combining the models into a single, consolidated model further comprises loading the models into a memory of the computer system (Lichtenberg: [0027]-[0034], [0224]-[0233], [0272]-[0274]); constructing a directed acyclic graph of all rules in all the models (Lichtenberg: [0272]-[0274]); for each model, determining which portions of an overall configuration space for which the model does not provide a buildable configuration (Lichtenberg: [0008], [0060] and [0090]); and for each model, constraining statements of the rules with in the model to fall within a space of defining features of the model (Lichtenberg: [0061]-[0062]).

Regarding Claim 9

Lichtenberg teaches

> "determining which portions of an overall configuration space for which each model does not provide a buildable configuration further comprises determining which families are ancestors of families of defining constraints and subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations."

as providing an intersection to provide all compatible (buildable) or incompatible (un-buildable) products (Lichtenberg: [0085]-[0094]).

Regarding Claim 10

System claim 10 discloses similar limitations as claim 2 and is rejected for the same reasons as claim 2.

Regarding Claim 11

System claim 11 discloses similar limitations as claim 5 and is rejected for the same reasons as claim 5.

Regarding Claim 12

System claim 12 discloses similar limitations as claim 6 and is rejected for the same reasons as claim 6.

Regarding Claim 13

System claim 13 discloses similar limitations as claim 7 and is rejected for the same reasons as claim 7.

Regarding Claim 14

System claim 14 discloses similar limitations as claim 8 and is rejected for the same reasons as claim 8.

Regarding Claim 15

System claim 15 discloses similar limitations as claim 9 and is rejected for the same reasons as claim 9.

Regarding Claims 16-21

Computer program product claims 16-21 disclose similar limitations as claim 2, 5-9 and are rejected for the same reasons as claims 2, 5-9 respectively.

Regarding Claim 22

Limitations presented in claim 22 are similar to limitations presented in claim 1 and rejected likewise. No specific support was cited for "means for" language and is this claim is interpreted ordinarily.

Conclusion

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Akash Saxena whose telephone number is (571) 272-8351. The examiner can normally be reached on 9:30 - 6:00 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini S. Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Akash Saxena
Patent Examiner, GAU 2128
(571) 272-8351
Tuesday, January 23, 2007

Kamini S. Shah
Supervisory Patent Examiner, GAU 2128
Structural Design, Modeling, Simulation and Emulation

Notice of References Cited	Application/Control No. 10/827,078	Applicant(s)/Patent Under Reexamination BECK ET AL.	
	Examiner Akash Saxena	Art Unit 2128	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,515,524 A	05-1996	Lynch et al.	703/13
*	B	US-5,825,651 A	10-1998	Gupta et al.	700/103
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination	
10/827,078	BECK ET AL.	
Examiner	**Art Unit**	
Akash Saxena	2128	

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Updated EAST Search (attached)	1/23/2007	AS
Considered art used in current prosecution of prior art of record.	1/23/2007	AS

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
10/827,078	BECK ET AL.
Examiner	**Art Unit**
Akash Saxena	2128

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date								
Final	Original	6/23/06	1/23/07							
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PTO/SB/30EFS (05/07)
Approved for use through 09/30/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	10/827,078	Filing Date	2004-04-19	Docket Number (if applicable)	T00113	Art Unit	2128
First Named Inventor	Brandon M. Beck			Examiner Name	Akash Saxena		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 502264

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

Signature of Registered U.S. Patent Practitioner			
Signature	/Kent B. Chambers/	Date (YYYY-MM-DD)	2007-07-30
Name	Kent B. Chambers	Registration Number	38839

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Patent Application Fee Transmittal

Application Number:	10827078
Filing Date:	19-Apr-2004
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Filer:	Kent Bryan Chambers
Attorney Docket Number:	T00113

Filed as Large Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1020	1020

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	790	790
		Total in USD ($)		**1810**

Electronic Acknowledgement Receipt

EFS ID:	2026665
Application Number:	10827078
International Application Number:	
Confirmation Number:	1866
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Customer Number:	33438
Filer:	Kent Bryan Chambers
Filer Authorized By:	
Attorney Docket Number:	T00113
Receipt Date:	30-JUL-2007
Filing Date:	19-APR-2004
Time Stamp:	17:46:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$1810
RAM confirmation Number	2602
Deposit Account	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)

1	Amendment Submitted/Entered with Filing of CPA/RCE	T00113_RCE_Submission_1_29_07.pdf	124642 34085fb663a42d3c46137fb6f3010aa02118a9a8	no	14
Warnings:					
Information:					
2	Extension of Time	T00113_Extension_7_29_07.pdf	69974 6a2d91f66656dddba8aad9236b6ff0c6cc9c688f	no	1
Warnings:					
Information:					
3	Request for Continued Examination (RCE)	T00113_RCE_transmittal.pdf	37318 f90025bd25d91506de703c74c5a2a8eb7265035d	no	2
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
4	Fee Worksheet (PTO-06)	fee-info.pdf	8282 bae4205e1d9be01b546d1f0358c64d050f3b1722	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	240216		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Versata Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,978	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

Austin, Texas
July 30, 2007

FILED ELECTRONICALLY

37 C.F.R. § 1.114 RCE SUBMISSION

Dear Sir:

This paper is a submission in accordance with 37 C.F.R. § 1.114, which accompanies a request for continued examination in the above referenced patent application. This paper responds to the Office Action dated January 29, 2007, having a shortened statutory period expiring on April 29, 2007. Accompanying this response is a petition under 37 C.F.R. § 1.136 for extension of time by three (3) months, setting a new time for response of July 30, 2007 (July 29, 2007 being a Sunday). Further examination and reconsideration are respectfully requested in view of the amendments and remarks set forth below.

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of consolidating using a computer system to consolidate multiple configuration models using an automated process, ~~wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint,~~ the method comprising:

determining if a conflict exists between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;

extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model;

restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family;

combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions. ~~, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and at least one model includes a rule that causes a configuration conflict with another model.~~

2. (Original) The method of claim 1 further comprising:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

3. (Currently amended) A computer system for consolidating multiple models, ~~wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint,~~ the system comprising:

a processor; and

a memory, coupled to the processor, having code stored therein and executable by the processor~~, the code comprising~~ for:

determining if a conflict exists between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;

extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model;

restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family;

~~a model consolidation module to combine~~ combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.~~, wherein each model comprises only rules that define a non-cyclic chain of~~

~~dependencies among families and features of families and at least one model includes a rule that causes a configuration conflict with another model.~~

4. (Currently amended) A computer program product having instructions encoded therein to consolidate multiple models, ~~wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and include at least one rule having a constraint that references a non-ancestral family to the constraint,~~ the instructions comprising code ~~to~~ for:

determining if a conflict exists between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;

extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model;

restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family;

~~combine~~ combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.~~, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and at least one model includes a rule that causes a configuration conflict with another model.~~

5. (Currently amended) The method of claim 1 wherein the configuration models represent configuration models of vehicles.

6. (Previously Presented) The method of claim 1 wherein the consolidated model includes only buildable configurations.

7. (Currently amended) The method of claim 1 wherein:

~~combining the models into a single, consolidated model~~ extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model further comprises:

extending a rule from ~~one of the models~~ the first conflicting configuration model into [[an]] the ancestor ~~of a~~ family ~~of a defining constraint~~; and

restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family further comprises:

repairing the extension of the rule in ~~a child of the ancestor of the family of the defining constraint~~ the child family.

8. (Currently amended) The method of claim 1 wherein combining the models into a single, consolidated model further comprises:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules ~~with in~~ within the configuration model to fall within a space of defining features of the configuration model[[;]].

9. (Currently amended) The method of claim 8 wherein determining which portions of an overall configuration space for which each configuration model does not provide a buildable configuration further comprises:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

10. (Currently amended) The system of claim 3 further comprising code [[to]] for:

~~detect~~ detecting any inconsistencies between rules included in the consolidated model; and

~~attempt~~ attempting to resolve any detected inconsistencies.

11. (Currently amended) The system of claim 3 wherein the configuration models represent configuration models of vehicles.

12. (Previously Presented) The system of claim 3 wherein the consolidated model includes only buildable configurations.

13. (Currently amended) The system of claim 3 further comprising code [[to]] for:

~~extend~~ extending a rule from ~~one of the models~~ the first conflicting configuration model into [[an]] the ancestor ~~of a~~ family ~~of a defining constraint~~; and

~~repair~~ repairing the extension of the rule in ~~a child of the ancestor of the family of the defining constraint~~ the child family.

14. (Currently amended) The system of claim 3 further comprising code [[to]] for:

~~load~~ loading the configuration models into a memory of the computer system;

~~construct~~ constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, ~~determine~~ determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, ~~constrain~~ constraining statements of the rules ~~with in~~ within the configuration model to fall within a space of defining features of the configuration model[[;]].

15. (Currently amended) The system of claim 14 further comprising code [[to]] for:

~~determine~~ determining which families are ancestors of families of defining constraints; and

~~subtract~~ subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

16. (Currently amended) The computer program product of claim 4 further comprising code [[to]] for:

~~detect~~ detecting any inconsistencies between rules included in the consolidated model; and

~~attempt~~ attempting to resolve any detected inconsistencies.

17. (Previously Presented) The computer program product of claim 4 wherein the models represent configuration models of vehicles.

18. (Currently amended) The computer program product of claim 4 wherein the configuration models represent configuration models of vehicles.

19. (Currently amended) The computer program product of claim 4 further comprising code [[to]] for:

~~extend~~ extending a rule from ~~one of the models~~ the first conflicting configuration model into [[an]] the ancestor ~~of a~~ family ~~of a defining constraint~~; and

~~repair~~ repairing the extension of the rule in ~~a child of the ancestor of the family of the defining constraint~~ the child family.

20. (Currently amended) The computer program product of claim 4 further comprising code [[to]] for:

~~load~~ loading the configuration models into a memory of the computer system;

~~construct~~ constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, ~~determine~~ determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, ~~constrain~~ constraining statements of the rules ~~with in~~ within the configuration model to fall within a space of defining features of the configuration model[[;]].

21. (Currently amended) The computer program product of claim 20 further comprising code [[to]] for:

~~determine~~ determining which families are ancestors of families of defining constraints; and

~~subtract~~ subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

22. (Currently amended) A computer system for performing an automatic consolidation of multiple models of configurable products, the system comprising:

means for determining if a conflict exists between at least two of the configuration models, wherein the configuration models are organized in

accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;

means for extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model;

means for restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family;

means for combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.~~, wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families and at least one model includes a rule that causes a configuration conflict with another model.~~

REMARKS

Claims 1-22 are pending.

Claims 1-22 stand rejected.

Claims 1, 3-5, 7-11, 13-16, and 19-22 have been amended.

Claim Objections

Claims 8, 14 and 20 are objected to for improper punctuation and have been amended to end with a period instead of a semicolon.

Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 101

Claims 1-4 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter and as not being supported by either a specific asserted utility of a well established unity.

Applicants have amended claims 1, 3, and 4 to explicitly recite the practical of application of the consolidated model. More specifically, Applicants have amended claims 1, 3, and 4 to recite "combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions".

Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 112

Claims 1-4 stand rejected under 35 U.S.C. § 112, first and second paragraphs. Applicants respectfully traverse the rejections.

I.

I. Applicants have amended claims 1, 3, and 4 to explicitly recite the practical of application of the consolidated model. More specifically, Applicants have amended claims 1, 3, and 4 to recite "combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions".

Accordingly, Applicants respectfully request withdrawal of the rejection.

II.

II. Claims 1-4 also rejected under 35 U.S.C. § 112, second paragraph, because "the limitation in the [independent claim] preamble[s] of "rules having a constraint that references a non-ancestral family of the constraint" can be interpreted to different ways.

Office Action p. 5. Applicants have amended claims 1-4 to delete reference to "a non-ancestral family of the constraint."

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 112 based rejections.

Claim Rejections - 35 U.S.C. § 102

Claims 1-4 stand rejected under 35 U.S.C. § 102(b), as being anticipated by U.S. Publication No. 2002/0165701 to Lichtenberg et al. (hereinafter "*Lichtenberg*"). Applicants respectfully traverse the rejection.

Applicants respectfully submit that the claims, as amended, are allowable over *Lichtenberg* because, for example, *Lichtenberg* neither teaches nor suggests:

> determining if a conflict exists between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;
>
> extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model; [and]
>
> restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family. Claims 1, 3, and 4.

Lichtenberg teaches "obtaining the number of all possible compatible products comprising at least one chosen alternative for each of the products for which an

alternative is chosen and providing this information to the user." *Lichtenberg*, para. 0062. *Lichtenberg* also teaches "combining two DAGs". *Lichtenberg*, para. 0076. *Lichtenberg* teaches that, "the step of selecting an alternative may comprise identifying Boolean variables relating to any other alternative(s) of the component and nodes … [and] in the DAG, identifying paths comprising such nodes." *Lichtenberg*, para. 0096. "Such paths then may relate directly to "incompatible products" in that these products are no longer interesting." *Id.* Subsequently, *Lichtenberg* teaches that, "If, during configuration, a selected alternative is not compatible with other, chosen alternatives, the step of checking the DAG may further comprise … ." *Id.*, para. 0102. "In this situation, the user may choose to actually enter or choose/select the selected alternative and then un-choose the or those alternative(s) which is/are not compatible therewith." *Id.*, para. 0105.

Thus, Applicants respectfully submit that Lichtenberg teaches that during configuration a user's particular selection can exclude other possible choices. In other words, selection of a particular component can exclude selection of other components.

Applicants respectfully submit that the alternative choices taught by *Lichtenberg* are within a single DAG, whether a combination of other DAGs or not. However, Applicants respectfully submit "obtaining the number of all possible compatible products" and "combining two DAGs" does not teach or suggest "<u>determining if a conflict exists between at least two of the configuration models</u>" as required by claims 1, 3, and 4. (emphasis added).

Applicants respectfully further submit that since *Lichtenberg* does not teach or suggest "<u>determining if a conflict exists between at least two of the configuration models</u>", *Lichtenberg* also does not teach or suggest:

> <u>extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model</u>; [and]

restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family. Claims 1, 3, and 4.

Applicants respectfully request withdrawal of the rejection of claims 1, 3, and 4. Applicants also respectfully request withdrawal of the rejection of claim 2 for at least the same reason as Claim 1.

Applicants respectfully submit that new claims 5-22 are allowable for at least the same reasons as claims 1, 3, and 4.

Regarding the response to Applicants remarks in the previous Office Action, Applicants respectfully disagree with the conclusions drawn in the Office Action. For example, the Office Action on page 5 states that "Applicants have themselves addressed the first argument." "The fact that *Lichtenberg* teaches selection of a particular component can exclude selection of other components shows a conflict was detected and a particular configuration path was chosen in the directed acyclical graphs." *Id.* Applicants respectfully submit that excluding a selection by selecting a particular component in the context of *Lichtenberg* does not indicate a conflict of the rules. It shows the presence of an 'exclude' type rule or the equivalent thereof. A conflict would exist if one rule said to exclude a component and another rule said to include the component. The presence of an 'exclude' type rule does not alone indicate a conflict among rules. Thus, Applicants respectfully submit that finding alternatives that are incompatible with other chosen alternatives, as taught in *Lichtenberg* paras. 0102-0105 is a discussion regarding compatibility of alternatives and not about conflict between rules.

Regarding *Lichtenberg*'s teachings and suggestions regarding combining DAGs, Applicants cannot find any teachings or suggestions in *Lichtenberg* that *Lichtenberg* had (or possibly appreciated) the problems of combining two configuration models when "a first conflicting configuration model [that] comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families." Claims 1, 3, and 4.

CONCLUSION

In view of the amendments and remarks set forth herein, Applicant respectfully submits that all pending claims are in condition for allowance. Accordingly, Applicant requests that a Notice of Allowance be issued. Nonetheless, should any issues remain that might be subject to resolution through a telephone interview, the Examiner is requested to telephone the undersigned at 512-338-9100.

FILED ELECTRONICALLY
July 30, 2007

Respectfully submitted,

/Kent B. Chambers/

Kent B. Chambers
Attorney for Applicant(s)
Reg. No. 38,839

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Versata Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,978	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

Austin, Texas
July 30, 2007

FILED ELECTRONICALLY

PETITION FOR EXTENSION OF TIME

Dear Sir:

Applicants respectfully petition for a three (3) month extension of time within which to respond to the January 29, 2007 outstanding Office Action, such extension allowing the undersigned until July 30, 2007 (July 29, 2007 being a Sunday) to respond.

The extension fee is being paid via the USPTO EFS. The Commissioner is authorized to deduct any additional fees which may be required or credit any overpayment to Deposit Account No. 502264.

FILED ELECTRONICALLY
July 30, 2007

Respectfully submitted,

/Kent B. Chambers/

Kent B. Chambers
Attorney for Applicant(s)
Reg. No. 38,839

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number: 10827078

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	4	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	4 minus 20=	*
INDEPENDENT CLAIMS	3 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	385.00	OR	BASIC FEE	770.00
XS 9=		OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL		OR	TOTAL	770

12-29-06

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 27	Minus	** 20	= 7
Independent	* 2	Minus	*** 3	= 1
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
XS 9=		OR	50 XS18=	1100
X43=		OR	200 X86=	200
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	1300

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 28	Minus	** 22	= 8
Independent	* 4	Minus	*** 4	= 8
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
XS 9=		OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
XS 9=		OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	2	(US-20040133457-$ or US-20060136904-$).did.	US-PGPUB	OR	OFF	2007/09/21 19:27
L3	2	L1 not L2	US-PGPUB; USPAT	OR	OFF	2007/09/21 19:26
L2	19	(US-20030069737-$ or US-20040002838-$ or US-20060106626-$ or US-20020165701-$ or US-20040030786-$).did. or (US-6002854-$ or US-5802508-$ or US-5873081-$ or US-5515524-$ or US-6216109-$ or US-6300948-$ or US-6405308-$ or US-5825651-$ or US-6178502-$ or US-6241775-$ or US-6009406-$ or US-5996114-$ or US-5615341-$ or US-6807576-$). did.	US-PGPUB; USPAT	OR	OFF	2007/09/21 19:26
L1	21	(US-20030069737-$ or US-20040002838-$ or US-20060106626-$ or US-20020165701-$ or US-20040030786-$ or US-20040133457-$ or US-20060136904-$).did. or (US-6002854-$ or US-5802508-$ or US-5873081-$ or US-5515524-$ or US-6216109-$ or US-6300948-$ or US-6405308-$ or US-5825651-$ or US-6178502-$ or US-6241775-$ or US-6009406-$ or US-5996114-$ or US-5615341-$ or US-6807576-$). did.	US-PGPUB; USPAT	OR	OFF	2007/09/21 19:26
S64	2	DAG same (conflict$4 with (merg$4))	US-PGPUB; USPAT	OR	ON	2007/09/21 16:19
S61	26	DAG with conflict$4	US-PGPUB; USPAT	OR	ON	2007/09/21 16:19
S63	0	DAG adj edit	US-PGPUB; USPAT	OR	OFF	2007/09/21 16:15
S62	0	DAG adj edit	USPAT	OR	OFF	2007/09/21 16:15
S60	0	DAG with (conflict$4 incompatible disjoint inconsistent clash$ disagre$6 discord$4 discrepant incongruous inharmonious) with (remov$4 prun$5 chopp$4 cut$5 edit$4)	US-PGPUB; USPAT	OR	ON	2007/09/21 14:31

EAST Search History

S59	1	DAG with (conflict$4 incompatible disjoint inconsistent clash$ disagre$6 discord$4 discrepant incongruous inharmonious) same (remov$4 prun$5 chopp$4 cut$5 edit$4)	US-PGPUB; USPAT	OR	ON	2007/09/21 11:18
S57	16	S56 and (remov$4 prun$5 chopp$4 cut$5 edit$4)	US-PGPUB; USPAT	OR	OFF	2007/09/21 11:15
S58	6	S56 and (remov$4 prun$5 chopp$4 cut$5 edit$4) and conflict$4	US-PGPUB; USPAT	OR	ON	2007/09/21 09:35
S56	19	(US-20030069737-$ or US-20040002838-$ or US-20060106626-$ or US-20020165701-$ or US-20040030786-$).did. or (US-6002854-$ or US-5802508-$ or US-5873081-$ or US-5515524-$ or US-6216109-$ or US-6300948-$ or US-6405308-$ or US-5825651-$ or US-6178502-$ or US-6241775-$ or US-6009406-$ or US-5996114-$ or US-5615341-$ or US-6807576-$). did.	US-PGPUB; USPAT	OR	OFF	2007/09/21 09:32
S55	1746	(configuration) with (conflict$4 incompatible disjoint inconsistent clash$ disagre$6 discord$4 discrepant incongruous inharmonious)	USPAT	OR	OFF	2007/09/15 18:09

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Sep 21, 2007

7:23pm Searched for An Object Model for Evolutionary Configuration Management

7:21pm Searched for Toward SCM / PDM Integration? - Viewed 1 result
- Toward SCM / PDM integration? - imag.fr

4:15pm Searched for merge DAG Edit

4:14pm Searched for DAG Edit - Viewed 2 results
- DAG-Edit Meeting: Save the Date! (fwd) - plantontology.org
- http://www.yeastgenome.org/fungi/fungal_anatomy_ontology/faq....

4:13pm Searched for DAG Edit - Viewed 2 results
- http://genetics.stanford.edu/go-email/email-gofriends/gofrien...
- Software - yeastgenome.org - See 1 more page

4:12pm Searched for DAG Edit - Viewed 3 results
- SourceForge.net: Files - sourceforge.net
- DAG-Edit Documentation - geneontology.org - See 1 more page
- http://amigo.geneontology.org/dev/java/dagedit/docs/downloadi...

4:12pm Searched for merge DAG Edit

4:10pm Searched for merge DAG - Viewed 2 results
- Optimally Work-Competitive Scheduling for Cooperative... - uconn.edu
- go-2004: Re: Does DAG-Edit understand merging correctly? - stanford.edu - See 1 r

4:09pm Searched for repair DAG

9:27am Searched for combining DAG

9:26am Searched for combining DAG - Viewed 1 result
- The Combining DAG - acm.org

9:26am Searched for cobining DAG

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Terms used: **DAG merge** Found **13,333** of **211,032**

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Open results in a new window

Results 1 - 20 of 200 Result page: **1** 2 3 4 5 6 7 8 9 10 next
Best 200 shown Relevance scale

1 Is it a tree, a DAG, or a cyclic graph? A shape analysis for heap-directed pointers in C
Rakesh Ghiya, Laurie J. Hendren
January 1996 **Proceedings of the 23rd ACM SIGPLAN-SIGACT symposium on Principles of programming languages POPL '96**
Publisher: ACM Press
Full text available: pdf(1.51 MB) Additional Information: full citation, references, citings, index terms

2 Compilation: Efficient partitioning of fragment shaders for multiple-output hardware
Tim Foley, Mike Houston, Pat Hanrahan
August 2004 **Proceedings of the ACM SIGGRAPH/EUROGRAPHICS conference on Graphics hardware HWWS '04**
Publisher: ACM Press
Full text available: pdf(183.53 KB) Additional Information: full citation, abstract, references, citings, index terms

Partitioning fragment shaders into multiple rendering passes is an effective technique for virtualizing shading resource limits in graphics hardware. The Recursive Dominator Split (RDS) algorithm is a polynomial-time algorithm for partitioning fragment shaders for real-time rendering that has been shown to generate efficient partitions. RDS does not, however, work for shaders with multiple outputs, and does not optimize for hardware with support for multiple render targets.We present Merging Rec ...

3 An execution model for limited ambiguity rules and its application to derived data update
I.-Min A. Chen, Richard Hull, Dennis McLeod
December 1995 **ACM Transactions on Database Systems (TODS)**, Volume 20 Issue 4
Publisher: ACM Press
Full text available: pdf(3.36 MB) Additional Information: full citation, abstract, references, citings, index terms, review

A novel execution model for rule application in active databases is developed and applied to the problem of updating derived data in a database represented using a semantic, object-based database model. The execution model is based on the use of "limited ambiguity rules" (LARs), which permit disjunction in rule actions. The execution model essentially performs a breadth-first exploration of alternative extensions of a user-requested update. Given an object-based database schema, ...

Keywords: active database systems, deltas on database states, derived data, limited ambiguity rules, semantic data models, update propagation

4 Sorting on a parallel pointer machine with applications to set expression evaluation
Michael T. Goodrich, S. Rao Kosaraju
March 1996 **Journal of the ACM (JACM)**, Volume 43 Issue 2
Publisher: ACM Press
Full text available: pdf(3.04 MB) Additional Information: full citation, abstract, references, citings, index terms, review

We present optimal algorithms for sorting on parallel CREW and EREW versions of the pointer machine model. Intuitively, one can view our methods as being based on a parallel mergesort using linked lists rather than arrays (the usual parallel data structure). We also show how to exploit the "locality" of our approach to solve the set expression evaluation problem, a problem with applications to database querying and logic-programming in O(log n) ...

Keywords: PRAM, cascade merging, expression evaluation, linking automaton, mergesort, parallel algorithms, pointer machine

5 Database concurrency control using data flow graphs
M. H. Eich, David L. Wells
June 1988 **ACM Transactions on Database Systems (TODS)**, Volume 13 Issue 2
Publisher: ACM Press
Full text available: pdf(2.42 MB) Additional Information: full citation, abstract, references, citings, index terms, review

A specialized data flow graph, Database Flow Graph (DBFG) is introduced. DBFGs may be used for scheduling database operations, particularly in an MIMD database machine environment. A DBFG explicitly maintains intertransaction and intratransaction dependencies, and is constructed from the Transaction Flow Graphs (TFG) of active transactions. A TFG, in turn, is the generalization of a query tree used, for example, in DIRECT [15]. All DBFG schedules ...

6 Off-line and on-line algorithms for deducing equalities
Peter Downey, Hanan Samet, Ravi Sethi
January 1978 **Proceedings of the 5th ACM SIGACT-SIGPLAN symposium on Principles of programming languages POPL '78**
Publisher: ACM Press
Full text available: pdf(1.22 MB) Additional Information: full citation, abstract, references, citings

The classical common subexpression problem in program optimization is the detection of identical subexpressions. Suppose we have some extra information and are given pairs of expressions ei1=ei2 which must have the same value, and expressions fj1≠fj2 which must have different values. We ask if as a result, h1=h2, or h1≠h2. This has been called the uniform word problem for finitely presented algebras, an ...

7 Session 4 (brief announcements): Optimally work-competitive scheduling for cooperative computing with merging groups
Chryssis Georgiou, Alexander Russell, Alex A. Shvartsman
July 2002 **Proceedings of the twenty-first annual symposium on Principles of distributed computing PODC '02**
Publisher: ACM Press
Full text available: pdf(125.90 KB) Additional Information: full citation, references, citings

8 Optimizing combinatorial library construction via split synthesis
Barry Cohen, Steven Skiena
April 1999 **Proceedings of the third annual international conference on**

Computational molecular biology RECOMB '99
Publisher: ACM Press
Full text available: pdf(1.21 MB) Additional Information: full citation, references, citings, index terms

9 Pipelining with futures
Guy E. Blelloch, Margaret Reid-Miller
June 1997 **Proceedings of the ninth annual ACM symposium on Parallel algorithms and architectures SPAA '97**
Publisher: ACM Press
Full text available: pdf(1.73 MB) Additional Information: full citation, references, citings, index terms

10 Pipelining in multi-query optimization
Nilesh N. Dalvi, Sumit K. Sanghai, Prasan Roy, S. Sudarshan
May 2001 **Proceedings of the twentieth ACM SIGMOD-SIGACT-SIGART symposium on Principles of database systems PODS '01**
Publisher: ACM Press
Full text available: pdf(282.25 KB) Additional Information: full citation, abstract, references, citings, index terms

Database systems frequently have to execute a set of related queries, which share several common subexpressions. Multi-query optimization exploits this, by finding evaluation plans that share common results. Current approaches to multi-query optimization assume that common subexpressions are materialized. Significant performance benefits can be had if common subexpressions are pipelined to their uses, without being materialized. However, plans with pipelining may not always be realizable with ...

11 Combinational logic synthesis for LUT based field programmable gate arrays
Jason Cong, Yuzheng Ding
April 1996 **ACM Transactions on Design Automation of Electronic Systems (TODAES)**, Volume 1 Issue 2
Publisher: ACM Press
Full text available: pdf(628.91 KB) Additional Information: full citation, abstract, references, citings, index terms, review

The increasing popularity of the field programmable gate-array (FPGA) technology has generated a great deal of interest in the algorithmic study and tool development for FPGA-specific design automation problems. The most widely used FPGAs are LUT based FPGAs, in which the basic logic element is a K-input one-output lookup-table (LUT) that can implement any Boolean function of up to K variables. This unique feature of the LUT has brought new challenges to lo ...

Keywords: FPGA, area minimization, computer-aided design of VLSI, decomposition, delay minimization, delay modeling, logic optimization, power minimization, programmable logic, routing, simplification, synthesis, system design, technology mapping

12 A Complete Axiomatization of Full Join Dependencies
Edward Sciore
April 1982 **Journal of the ACM (JACM)**, Volume 29 Issue 2
Publisher: ACM Press
Full text available: pdf(1.08 MB) Additional Information: full citation, references, citings, index terms

13 Effectiveness of cross-platform optimizations for a java just-in-time compiler

Kazuaki Ishizaki, Mikio Takeuchi, Kiyokuni Kawachiya, Toshio Suganuma, Osamu Gohda, Tatsushi Inagaki, Akira Koseki, Kazunori Ogata, Motohiro Kawahito, Toshiaki Yasue, Takeshi Ogasawara, Tamiya Onodera, Hideaki Komatsu, Toshio Nakatani
October 2003 **ACM SIGPLAN Notices , Proceedings of the 18th annual ACM SIGPLAN conference on Object-oriented programing, systems, languages, and applications OOPSLA '03**, Volume 38 Issue 11
Publisher: ACM Press
Full text available: pdf(405.65 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper describes the system overview of our Java Just-In-Time (JIT) compiler, which is the basis for the latest production version of IBM Java JIT compiler that supports a diversity of processor architectures including both 32-bit and 64-bit modes, CISC, RISC, and VLIW architectures. In particular, we focus on the design and evaluation of the cross-platform optimizations that are common across different architectures. We studied the effectiveness of each optimization by selectively disabling ...

Keywords: Java, just-in-time compiler, optimization

14 Multicore architectures and algorithms: Scheduling threads for constructive cache sharing on CMPs
Shimin Chen, Phillip B. Gibbons, Michael Kozuch, Vasileios Liaskovitis, Anastassia Ailamaki, Guy E. Blelloch, Babak Falsafi, Limor Fix, Nikos Hardavellas, Todd C. Mowry, Chris Wilkerson
June 2007 **Proceedings of the nineteenth annual ACM symposium on Parallel algorithms and architectures SPAA '07**
Publisher: ACM Press
Full text available: pdf(301.59 KB) Additional Information: full citation, abstract, references, index terms

In chip multiprocessors (CMPs), limiting the number of offchip cache misses is crucial for good performance. Many multithreaded programs provide opportunities for *constructive* cache sharing, in which concurrently scheduled threads share a largely overlapping working set. In this paper, we compare the performance of two state-of-the-art schedulers proposed for fine-grained multithreaded programs: Parallel Depth First (PDF), which is specifically designed for constructive cache sharing, ...

Keywords: chip multiprocessors, constructive cache sharing, parallel depth first, scheduling algorithms, thread granularity, work stealing, working set profiling

15 Shading and shaders: Efficient partitioning of fragment shaders for multipass rendering on programmable graphics hardware
Eric Chan, Ren Ng, Pradeep Sen, Kekoa Proudfoot, Pat Hanrahan
September 2002 **Proceedings of the ACM SIGGRAPH/EUROGRAPHICS conference on Graphics hardware HWWS '02**
Publisher: Eurographics Association
Full text available: pdf(337.34 KB) Additional Information: full citation, abstract, references, citings, index terms

Real-time programmable graphics hardware has resource constraints that prevent complex shaders from rendering in a single pass. One way to virtualize these resources is to partition shading computations into multiple passes, each of which satisfies the given constraints. Many such partitions exist for a shader, but it is important to find one that renders efficiently. We present Recursive Dominator Split (RDS), a polynomial-time algorithm that uses a cost model to find near-optimal partitions of ...

Keywords: graph partitioning algorithms, multipass rendering, programmable graphics hardware, shading languages

16 Parallel algorithms for evaluating sequences of set-manipulation operations

Mikhail J. Atallah, Michael T. Goodrich, S. Rao Kosaraju
November 1994 **Journal of the ACM (JACM)**, Volume 41 Issue 6
Publisher: ACM Press
Full text available: pdf(3.00 MB) Additional Information: full citation, abstract, references, index terms

Given an off-line sequence S of n set-manipulation operations, we investigate the parallel complexity of evaluating S (i.e., finding the response to every operation in S and returning the resulting set). We show that the problem of evaluating S is in NC for various combinations of common set-manipulation operations. Once we establish membership in NC (or, if membership in < ...

Keywords: divide-and-conquer, off-line evaluation, parallel computation, parallel data structures

17 Efficient multiple and predicated dispatching

Craig Chambers, Weimin Chen
October 1999 **ACM SIGPLAN Notices , Proceedings of the 14th ACM SIGPLAN conference on Object-oriented programming, systems, languages, and applications OOPSLA '99**, Volume 34 Issue 10
Publisher: ACM Press
Full text available: pdf(2.41 MB) Additional Information: full citation, abstract, references, citings, index terms

The speed of message dispatching is an important issue in the overall performance of object-oriented programs. We have developed an algorithm for constructing efficient dispatch functions that combines novel algorithms for efficient single dispatching, multiple dispatching, and predicate dispatching. Our algorithm first reduces methods written in the general predicate dispatching model (which generalizes single dispatching, multiple dispatching, predicate classes and classifiers, and patter ...

18 Incremental compilation of optimized code

Lori L. Pollock, Mary Lou Soffa
January 1985 **Proceedings of the 12th ACM SIGACT-SIGPLAN symposium on Principles of programming languages POPL '85**
Publisher: ACM Press
Full text available: pdf(1.57 MB) Additional Information: full citation, abstract, citings, index terms

Although optimizing compilers have successfully been used to reduce the size and running times of compiled programs, present incremental compilers only support the incremental update of unoptimized code. In this work, we extend the notion of incremental compilation to include optimized code. Techniques to incrementally compile locally optimized code, given intermediate code modifications are developed using a program representation based on flow graphs and dags. A model is designed to repre ...

19 Characterization and elimination of redundancy in recursive programs

Norman H. Cohen
January 1979 **Proceedings of the 6th ACM SIGACT-SIGPLAN symposium on Principles of programming languages POPL '79**
Publisher: ACM Press
Full text available: pdf(1.41 MB) Additional Information: full citation, abstract, references, citings

Many well-known functions are computed by interpretations of the recursion schemaprocedure f(x) ;if p(x)then return a(x)else return b(x,f(c1(x)),...,f(cn(x)))Some of these interpretations define redundant computations because they lead to multiple calls on f with identical argument values. The existence and nature of the redundancy depend on properties of the functions ci. We explore four sets of assumptions about these functions. We analyze directed acyclic ...

20 Eliminating Redundant Recursive Calls.

Norman H. Cohen

July 1983 **ACM Transactions on Programming Languages and Systems (TOPLAS)**, Volume 5 Issue 3
Publisher: ACM Press
Full text available: pdf(1.74 MB) Additional Information: full citation, references, citings, index terms, review

Results 1 - 20 of 200 Result page: 1 2 3 4 5 6 7 8 9 10 next

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10/827,078	04/19/2004	Brandon M. Beck	T00113	1866

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HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720

EXAMINER	
SAXENA, AKASH	
ART UNIT	PAPER NUMBER
2128	

NOTIFICATION DATE	DELIVERY MODE
10/05/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@hamiltonterrile.com
seaton@hamiltonterrile.com
tmunoz@hamiltonterrile.com

Office Action Summary	Application No.	Applicant(s)	
	10/827,078	BECK ET AL.	
	Examiner	Art Unit	
	Akash Saxena	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claim(s) 1-22 has/have been presented for examination based on amendment filed on 30th July 2007.
2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30th July 2007 has been entered.
3. Claim(s) 1, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15, 16, 18-22 is/are amended.
4. Claim(s) 1-22 remain rejected under 35 USC § 101.
5. Claim(s) 1-22 remain rejected under 35 USC § 112, as new rejection is added and previous ones are updated.
6. Claim(s) 1-22 remain rejected under 35 USC § 102 with updated response.
7. The arguments submitted by the applicant have been fully considered. Claims 1-22 remain rejected and this action is made NON-FINAL. The examiner's response is as follows.

Claim Interpretation

8. Claim 1 is amended to recite the following limitations:

> determining if a conflict exists between at least two of the configuration models **[1]**, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family **[2]**, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families **[3]**;
>
> extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model **[4]**;
>
> restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family **[5]**;
>
> combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.

Determining if a conflict exists as in **[1]** above is understood as identification of non-complaint components/products in configuration.

In **[2]**, the "ancestor configuration" is understood as parent configuration of the "child configuration".

In **[3]**, the "ancestor configuration model family" is the same for the "first conflicting configuration model" and "second conflicting configuration model".

The "child configuration model family" is different for the "first conflicting configuration model" and "second conflicting configuration model".

In **[4]**, the step of extending the ancestor family to the second configuration is understood as identification of the common parent node in the directed acyclic graph (DAG) for both the "first child configuration model family" and "second child configuration model family".

In **[5]**, the step of restricting is understood as removing from the DAG the "first child configuration model family" and adding "second child configuration model family". Overall the process is understood as conflict determination and selection of second conflicting child configurations, removal of the first conflicting child configurations, thereby providing the resolution to the conflict. Further the process involves combining two DAG that are identical till parent nodes (top parts of the DAG as ancestral configurations) of the conflicting children, and then removal of one of the children to publish/release of a suitable combination.

E.g. All the components of a bike, sans the gears, representing ancestral configuration, and 10 speed and 15 speed gears as conflicting child configurations. If the 10-speed gear is the released version, the 15-speed gear is combined with the ancestral configuration with restriction (removal of 10 speed to resolve to a completed configuration) on the 10-speed, for release as a new product – leading to the final step of the claim.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9. Claims 1-22 recite a abstract idea of combining two models (DAG) which specification describes as represented by Directed Acyclic Graphs (DAG) (Specification: (110, Fig.2). Combining DAG is a mathematical concept. Binary decision diagram (BDD) is a form of DAG and a paper showing the combining BDD[1] is included as prior art.

Claims 1-22 do not claim any practical application of the combination.

> **Section 2106 [R-2] (Patentable Subject Matter - Computer-Related Inventions) of the MPEP recites the following:**
> *If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Schrader, 22 F.3d at 294-95, 30 USPQ2d at 1458-59. Thus, a process consisting solely of mathematical operations, i.e.,* ***converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.***
> *"In practical terms, claims define nonstatutory processes if they:*
> *consist solely of mathematical operations without some claimed practical application (i.e., executing a "**mathematical algorithm**"); or - **simply manipulate abstract ideas**, e.g., a bid (Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (Warmerdam, 33 F.3d at 1360, 31USPQ2d at 1759), **without some claimed practical application**."*

Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. As described through these claims, the claimed invention does not physically transform an article or physical object to a different state or thing, so to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application. That is, it must produce a useful,

[1] Symbolic Model Checking An approach to the state explosion problem; Kenneth L. McMillan, May 1992, Pg. 41-44

concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2nd at 160102. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept.

Further, claims 1-22 do not seem to produce a tangible result. The tangible requirement of State Street decision requires that the claims must recite at least one 35 USC 101 judicial exception, in that the process claim must set forth a practical application of the 35 USC 101 judicial exception. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application.").

Applicant has amended the limitation (underlined)

> "combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions."

First "for use in answering configuration questions" does not make the claim statutory as the result of the method step are still not concrete and tangible.

Secondly, the claim still presents an abstract idea not directed towards any claimed specific transformation of physical object and as understood by claim interpretation is limited to mathematical concept of altering a DAG presentation.

Independent claims 1, 3, 4 and 22 all recite the intended use of the combining the DAG in the last step.

MPEP 701 & 2105 states:

> A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed

invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

In this case the intended use does not result in any structural difference and does not add any limitation to the method, system, or program product claims. The rejection is maintained under this statute.

Claim Rejections - 35 USC § 112¶1st

The following is a quotation of the first paragraph of 35 U.S.C. §112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific asserted utility or a well established utility.

The claimed invention is an abstract idea as explained in the 35 USC 101 claim rejection above. There may be a specific and substantial utility present in the specification, however it is not claimed.

Claims 1-22 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a -specific and substantial-- asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

11. **Further, Claims 1-22 are rejected under 35 U.S.C. §112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a §101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application.** This is how the MPEP puts it:

> ("The how to use prong of section 112 **incorporates as a matter of law** the requirement of 35 U.S.C. §101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. §101, then the application **also fails as a matter of law** to enable one of ordinary skill in the art to use the invention under 35 U.S.C. §112."); In re Kirk, 376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA

> 1967) ("Necessarily, compliance with § 112 requires a description of how to use presently useful inventions, **otherwise an applicant would anomalously be required to teach how to use a useless invention**.") See, MPEP 2107.01(IV), quoting In re Kirk (emphasis added).

Therefore, claims 1-22 are rejected on this basis.

12. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the *written description requirement*. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, based on applicant's argument, that step of determining the conflict is not based on the exclude type of rule, examiner is unclear from the disclosure how the conflict is determined. Please see claim interpretation section and Response to Arguments for 35 USC § 102 Rejection.

Claim Rejections - 35 USC § 112¶2nd

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claim 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 1-22

Claim 1 discloses "A method of consolidating using a computer system to consolidate multiple configuration models using an automated process".

This claim is indefinite because it is not clear which statutory category the claim should be examined under – i.e. a "method" claim or a "system" claim.

Secondly, applicant has amended the "automated process" in preamble and is not considered to be a limitation fir reasons below. (a) Claim preamble language may not be treated as a limitation where it merely states an intended use of the system and is unnecessary to define the invention, the U.S. Court of Appeals for the Federal Circuit ruled May 8 (Catalina Marketing Int'l Inc. v. Coolsavings. com Inc., Fed. Cir., No. 01-1324, 5/8/02).

(b) Even if "consolidating the models" by an "automated process" is considered to be a limitation, this does not patentably distinguish the limitation from prior art.

MPEP 2144.04 III states:

> In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958) (Appellant argued that claims to a permanent mold casting apparatus for molding trunk pistons were allowable over the prior art because the claimed invention combined "old permanent-mold structures together with a timer and solenoid which automatically actuates the known pressure valve system to release the inner

> core after a predetermined time has elapsed." The court held that broadly providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art.).

Independent claims 3, 4 and 22 suffer from same deficiency and rejected likewise. Dependent claims 2 and 5-9 are rejected based on their dependency on rejected claim 1. Dependent claims 1-15 are rejected based on their dependency on rejected claim 3. Dependent claims 16-21 are rejected based on their dependency on rejected claim 4.

14. Claim 22 further recites means for language for which no support is indicated in the specification. Therefore it is unclear if the protection under 35 USC 112¶6th paragraph is sought by applicant, making the claim indefinite. Specifically, for example, examiner is unable to interpret how the steps of determining a conflict should be interpreted.

Response to Arguments for 35 USC § 102 Rejection

(Argument 1) Applicant has argued the following:

> Applicants respectfully submit that the alternative choices taught by Lichtenberg are within a single DAG, whether a combination of other DAGs or not. However, Applicants respectfully submit "obtaining the number of all possible compatible products" and "combining two DAGs" does not teach or suggest "determining if a conflict exists between at least two of the configuration models" as required by claims 1, 3, and 4. (emphasis added).

(Response 1) Examiner respectfully traverses applicant's argument. As best understood, the determination of conflict is based on the 'exclude type' rule, as indicated by applicant (Remarks Pg. 13). Hence the two configurations cannot exist in a DAG at the same time for a product to be realizable (two type of gear systems in one bike). Hence the step of determination of conflict is a preliminary/inherent step in elimination of non-compatible components after selection, based on the rule. Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections. Specifically, Applicant seems to be arguing that the conflicting configurations as claimed represent different DAG's, and alleging that Lichtenberg has only one DAG. The claim language indicates to the contrary. For example Claim 1 states:

> determining if a conflict exists between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;
>
> extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model;

> restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family;

There seems to be only one instance of an ancestral family that is common to the both conflicting configurations as seen by the antecedent basis. Examiner finds applicant's position contrary to the claimed limitation and respectfully maintains the rejection.

(Argument 2) Applicant has argued that Lichtenberg does not teach the newly amended limitations.

(Response 2) Examiner respectfully disagrees and presents the updated rejection below.

(Argument 3) Applicant has argued the following:

> Regarding the response to Applicants remarks in the previous Office Action, Applicants respectfully disagree with the conclusions drawn in the Office Action. For example, the Office Action on page 5 states that "Applicants have themselves addressed the first argument." "The fact that Lichtenberg teaches selection of a particular component can exclude selection of other components shows a conflict was detected and a particular configuration path was chosen in the directed acyclical graphs." Id. Applicants respectfully submit that excluding a selection by selecting a particular component in the context of Lichtenberg does not indicate a conflict of the rules. It shows the presence of an 'exclude' type rule or the equivalent thereof. A conflict would exist if one rule said to exclude a component and another rule said to include the component. The presence of an 'exclude' type rule does not alone indicate a conflict among rules. Thus, Applicants respectfully submit that finding alternatives that are incompatible with other chosen alternatives, as taught in Lichtenberg paras. 0102-0105 is a discussion regarding compatibility of alternatives and not about conflict between rules.

(Response 3) In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., type of rules to detect conflict – e.g. exclude type rules) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Secondly, Examiner has presented rationale for detecting conflict between conflicting configurations in Response 1. Although not claimed, applicant has argued against 'an exclude rule' type to detect conflict without providing what rule or mechanism would be used to identify a conflict between the configurations.

(Argument 4) Applicant has argued the following:

> Regarding Lichtenberg's teachings and suggestions regarding combining DAGs, Applicants cannot find any teachings or suggestions in Lichtenberg that Lichtenberg had (or possibly appreciated) the problems of combining two configuration models when "a first conflicting configuration model [that] comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families." Claims 1, 3, and 4.

(Response 4) It is unclear what "release of a product" has to do with combining the DAG. The limitation is at best understood as *intended use* of the combined DAG that does not make add to any limitation/conflict present in the DAG. If the intent is to include some sort of versioning effect in the DAG examiner would appreciate a clarification. A search was conducted based on applicant's remarks and prior art is attached to its effect. Examiner finds applicant's argument unpersuasive.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-22 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Publication No. 2002/0165701 by Lichtenberg et al (Lichtenberg hereafter).

Regarding Claim 1 (Updated 9/21/07)

Lichtenberg teaches a method of consolidating multiple configuration models in to a single consolidated model (being a directed acyclic graph) among the families and feature of the families (described as component & associated rules) (Lichtenberg: [0076][0094][0062], Fig.1).

Lichtenberg teaches:

> determining if a conflict exists between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;

as determining the partial configurations ([0006]) which may be conflicting and only certain configuration out of all the possibilities satisfy the final product requirement ([0007]-[0008]). The ancestral configuration could be understood as configuration for the bike without the 2 possible conflicting gear configuration (as conflicting child configurations).

Lichtenberg teaches:

> extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model;

as combing two DAG where there is ancestral configuration (as node with same configuration) is identified ([0076]-[0084]).

Lichtenberg teaches:

> restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family;

as determining the compatible and non-compatible products where one of the alternatives is selected ([0092]-[0096]).

Lichtenberg teaches:

> combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.

as combing the DAG ([0076]).

Regarding Claim 2

Lichtenberg teaches detecting any inconsistencies between rules included in the consolidated model (Lichtenberg: [0090]-[0094] – non–compatible products) and attempting to resolve any detected inconsistencies by not allowing the user to select a inconsistent solution (Lichtenberg: [0096]-[0108]).

Regarding Claim 3-4 (Updated 9/21/07)

Limitations presented in claims 3-4 are similar to limitations presented in claim 1 and rejected likewise. Lichtenberg teaches a system (Lichtenberg: [0043]) and a computer program (Lichtenberg: Fig. 2-3, [0272]) for implementing the method of claim 1. *Lichtenberg teaches wherein each model comprises only rules that define a*

non-cyclic chain of dependencies among families and features of families (Lichtenberg: [0062]-[0073]) and at least one model includes a rule that causes a configuration conflict with another model (Lichtenberg: [0062], [0090], [0092]-[0094], [0102]-[0105], [0134]-[-0150] – partial DAG representing features and families, [0162], [0191], [0383] – incompatibility between selected model and reconfiguration).

Regarding Claim 5

Lichtenberg teaches wherein the *configuration* models represent configuration models of vehicles (Lichtenberg: Fig.1 – Showing a bicycle).

Regarding Claim 6

Lichtenberg teaches wherein the consolidated model includes only buildable configurations (Lichtenberg: [0406]-[0412] – excluding incompatible selections).

Regarding Claim 7 (Updated 9/21/07)

Lichtenberg teaches *extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model* as combining the DAG's (Lichtenberg: [0076]-[0084]) further comprises extending a rule from *the first conflicting configuration model into the ancestor family and* (Lichtenberg: [0062], [0076]-[0079]); and repairing the extension of the rule in the child family (Lichtenberg: [0133]-[0150]).

Regarding Claim 8 (Updated 9/21/07)

Lichtenberg teaches combining the *configuration* models into a single, consolidated *configuration* model further comprises loading the *configuration* models into a memory of the computer system (Lichtenberg: [0027]-[0034], [0224]-[0233], [0272]-

[0274]); constructing a directed acyclic graph of all rules in all the models (Lichtenberg: [0272]-[0274]); for each *configuration* model, determining which portions of an overall configuration space for which the *configuration* model does not provide a buildable configuration (Lichtenberg: [0008], [0060] and [0090]); and for each *configuration* model, constraining statements of the rules with in the *configuration* model to fall within a space of defining features of the *configuration* model (Lichtenberg: [0061]-[0062]).

Regarding Claim 9

Lichtenberg teaches

> "determining which portions of an overall configuration space for which each *configuration* model does not provide a buildable configuration further comprises determining which families are ancestors of families of defining constraints and subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations."

as providing an intersection to provide all compatible (buildable) or incompatible (un-buildable) products (Lichtenberg: [0085]-[0094]).

Regarding Claim 10 (Updated 9/21/07)

System claim 10 discloses similar limitations as claim 2 and is rejected for the same reasons as claim 2. Claim is amended for grammatical reasons.

Regarding Claim 11 (Updated 9/21/07)

System claim 11 discloses similar limitations as claim 5 and is rejected for the same reasons as claim 5.

Regarding Claim 12

System claim 12 discloses similar limitations as claim 6 and is rejected for the same reasons as claim 6.

Regarding Claim 13 (Updated 9/21/07)

System claim 13 discloses similar limitations as claim 7 and is rejected for the same reasons as claim 7. Further, claim is amended for grammatical reasons.

Regarding Claim 14 (Updated 9/21/07)

System claim 14 discloses similar limitations as claim 8 and is rejected for the same reasons as claim 8. Claim is amended for grammatical reasons.

Regarding Claim 15 (Updated 9/21/07)

System claim 15 discloses similar limitations as claim 9 and is rejected for the same reasons as claim 9. Claim is amended for grammatical reasons.

Regarding Claims 16-21 (Updated 9/21/07)

Computer program product claims 16-21 disclose similar limitations as claim 2, 5-9 and are rejected for the same reasons as claims 2, 5-9 respectively.

Regarding Claim 22

Limitations presented in claim 22 are similar to limitations presented in claim 1 and rejected likewise. No specific support was cited for "means for" language and is this claim is interpreted ordinarily.

Conclusion

16. All claims are rejected.

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

18. **Examiner's Note:** Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Akash Saxena whose telephone number is (571) 272-8351. The examiner can normally be reached on 9:30 - 6:00 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini S. Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Akash Saxena
Patent Examiner, GAU 2128
(571) 272-8351
Friday, September 21, 2007

Kamini S. Shah
Supervisory Patent Examiner, GAU 2128
Structural Design, Modeling, Simulation and Emulation

Notice of References Cited	Application/Control No. 10/827,078	Applicant(s)/Patent Under Reexamination BECK ET AL.	
	Examiner Akash Saxena	Art Unit 2128	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0133457 A1	07-2004	Sadiq et al.	705/007
*	B	US-2006/0136904 A1	06-2006	Weidman et al.	717/172
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	J. Estublier, J. Favre, P. Morat, "Toward SCM/PDM Integration?" Spring-Verag Berlin Heidelberg 1998.
	V	An Object Model for Evolutionary Configuration Management (1993) Hannu Peltonen, Tomi Männistö, Reijo Sulonen, Kari Alho
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
10/827,078	BECK ET AL.
Examiner	**Art Unit**
Akash Saxena	2128

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	9/21/07
	1	√
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Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination	
10/827,078	BECK ET AL.	
Examiner	**Art Unit**	
Akash Saxena	2128	

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Updated EAST Search (Attached)	9/21/2007	AS
Updated Google Search (Attached) Pls see NPL attached as well	9/21/2007	AS

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/827,078	04/19/2004	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY ☐ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 01/15/2008	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 22	Minus	** 22	= 0	X $ =		OR	X $50=	0
Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $ =		OR	X $210=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ANGELA WHITE/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Versata Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,078	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

Austin, Texas
April 7, 2008

FILED ELECTRONICALLY

RESPONSE TO NON-FINAL OFFICE ACTION

Dear Sir:

This paper responds to the Office Action dated October 5, 2007, having a shortened statutory period expiring on January 5, 2008. Accompanying this response is a petition under 37 C.F.R. § 1.136 for extension of time by three (3) months, setting a new time for response of April 7, 2008 (April 5, 2008 being a Saturday). Further examination and reconsideration are respectfully requested in view of the amendments and remarks set forth below.

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of ~~consolidating~~ using a computer system to consolidate multiple configuration models ~~using an automated process~~, the method comprising:

identifying ~~determining if~~ a conflict ~~exists~~ between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration ~~model~~ models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs ~~a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families~~;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space ~~product in the first conflicting configuration model to be compatible with second conflicting configuration model~~;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space ~~restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family~~; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.

2. (Original) The method of claim 1 further comprising:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

3. (Currently Amended) A computer system for consolidating multiple models, the system comprising:

a processor; and

a memory, coupled to the processor, having code stored therein and executable by the processor for:

identifying ~~determining if~~ a conflict ~~exists~~ between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration ~~model~~ models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs ~~a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families~~;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space ~~product in the first conflicting configuration model to be compatible with second conflicting configuration model~~;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space ~~restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family~~; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.

4. (Currently Amended) A computer ~~program product~~ readable medium having instructions encoded therein and executable by a processor to consolidate multiple models, the instructions comprising code for:

identifying ~~determining if~~ a conflict ~~exists~~ between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration ~~model~~ models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration

model to which the child belongs ~~a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families~~;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space ~~product in the first conflicting configuration model to be compatible with second conflicting configuration model~~;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space ~~restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family~~; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.

5. (Previously Presented) The method of claim 1 wherein the configuration models represent configuration models of vehicles.

6. (Previously Presented) The method of claim 1 wherein the consolidated model includes only buildable configurations.

7. (Currently Amended) The method of claim 1 wherein:

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space ~~product in the first conflicting configuration model to be compatible with second conflicting configuration model~~ further comprises:

extending a rule from the first ~~conflicting~~ configuration model into the ancestor configuration model family space; and

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space ~~restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family~~ further comprises:

repairing the extension of the rule in the child family.

8. (Currently Amended) The method of claim 1 wherein combining the first and second models into a single, consolidated model further comprises:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules within the configuration model to fall within a space of defining features of the configuration model.

9. (Previously Presented) The method of claim 8 wherein determining which portions of an overall configuration space for which each configuration model does not provide a buildable configuration further comprises:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

10. (Previously Presented) The system of claim 3 further comprising code for:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

11. (Previously Presented) The system of claim 3 wherein the configuration models represent configuration models of vehicles.

12. (Previously Presented) The system of claim 3 wherein the consolidated model includes only buildable configurations.

13. (Currently Amended) The system of claim 3 ~~further comprising code for~~ wherein:

the code for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space comprises code for extending a rule from the first conflicting configuration model into the ancestor ~~of a~~ family; and

the code for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space comprises code for repairing the extension of the rule in the child family.

14. (Currently Amended) The system of claim 3 ~~further comprising~~ the code for combining the first and second models into a single, consolidated model further comprises code for:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules within the configuration model to fall within a space of defining features of the configuration model.

15. (Currently Amended) The system of claim 14 ~~further comprising~~ wherein the code for determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration further comprises code for:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

16. (Currently Amended) The computer ~~program product~~ readable medium of claim 4 further comprising code for:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

17. (Currently Amended) The computer ~~program product~~ readable medium of claim 4 wherein the models represent configuration models of vehicles.

18. (Currently Amended) The computer ~~program product~~ readable medium of claim 4 wherein the configuration models represent configuration models of vehicles.

19. (Currently amended) The computer ~~program product~~ readable medium of claim 4 ~~further comprising code for~~ wherein:

the code for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space comprises code for extending a rule from the first conflicting configuration model into the ancestor ~~of a~~ family; and

the code for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration

family space comprises code for repairing the extension of the rule in the child family.

20. (Currently Amended) The computer ~~program product~~ readable medium of claim 4 ~~further comprising~~ the code for combining the first and second models into a single, consolidated model further comprises code for:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules within the configuration model to fall within a space of defining features of the configuration model.

21. (Currently Amended) The computer ~~program product~~ readable medium of claim 20 ~~further comprising~~ wherein the code for determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration further comprises code for:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

22. (Currently Amended) A computer system for performing an automatic consolidation of multiple models of configurable products, the system comprising:

means for identifying ~~determining if~~ a conflict ~~exists~~ between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration ~~model~~ models

comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs ~~a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families~~;

means for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space ~~product in the first conflicting configuration model to be compatible with second conflicting configuration model~~;

means for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space ~~restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family~~; and

means for combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in providing an answer to configuration questions.

REMARKS

Claims 1-22 are pending.

Claims 1-22 stand rejected.

Claims 1, 3, 4, 7, 8, and 13-22 have been amended.

Claim Rejections - 35 U.S.C. § 101

Claims 1-22 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter and as not being supported by either a specific asserted utility of a well established unity.

Applicants have amended claims 1, 3, 4, and 22 to recite "combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions." Applicants respectfully submit that the "single, consolidated model" is clearly a useful, tangible, and concrete result. The claims clearly recite that the "single, consolidated model" produces a useful result, i.e. "for use in providing an answer to configuration questions." Claims 1, 3, 4, and 22.

Applicants respectfully submit that the "single, consolidated model" is a real-world result of a practical application. The Manual of Patent Examining Procedure (MPEP §) § 2106 states that, "The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing." "However, the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result." *Id*. Applicants respectfully submit that invention recites a practical application of "combining the first and second configuration models" that produces a real-world result, i.e. "a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions." Claims 1, 3, 4, and 22.

Applicants respectfully submit that result is "concrete". "Another consideration is whether the invention produces a "concrete" result." MPEP § 2106. "Usually, this question arises when a result cannot be assured." *Id.* "In other words, the process must have a result that can be substantially repeatable or the process must substantially produce the same result again." *Id.* "The process must have a result that can be substantially repeatable or the process must substantially produce the same result again." *Id.* Applicants respectfully submit that "combining the first and second configuration models" as set forth in claims 1, 3, 4, and 22 consistently results in "a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families." Claims 1, 3, 4, and 22.

Accordingly, Applicants respectfully submit that the "single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions" clearly represents a useful, tangible, and concrete result.

Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 112

Claims 1-22 stand rejected under 35 U.S.C. § 112, first and second paragraphs. Applicants respectfully traverse the rejections.

A. The 35 U.S.C. § 112, first paragraph rejection is based upon the same rationale as the 35 U.S.C. § 101 rejection. Accordingly, Applicants respectfully request withdrawal of the rejection for the same reasons set forth above with respect to the 35 U.S.C. § 101 rejection.

B. Claims 1-22 are also rejected under 35 U.S.C. § 112, first paragraph for failing to comply with the written description requirement based upon applicant's previous arguments. Applicants respectfully disagree with the rejection. Nevertheless, Applicants have amended claims 1, 3, 4, and 22 to clearly distinguish between the present invention and *Lichtenberg* based upon the language recited in the claims alone.

C. Claims 1-22 are also rejected under 35 U.S.C. § 112, second paragraph because "it is not clear which statutory category the claim should be examined under - i.e. a "method" claim of a "system" claim. Applicants have deleted "using an automated process". Applicants respectfully submit that claim 1 recites a "method", claim3 recites a "computer system", claim 4 recites a "computer readable medium", and claim 22 recites a "computer system". Applicants respectfully submit that all of the claims are recited within single statutory categories. Accordingly, Applicants respectfully request withdrawal of the rejection.

D. Applicants expressly invoke 35 U.S.C. § 112, para. 6 for claim 22. The Office Action states that there is no support indicated in the specification for claim 22 as a means-plus-function claim under 35 U.S.C. §. 112, para. 6. Applicants respectfully refer the Examiner to, for example, Figures 10 and 11 as described in paragraphs 55-152, which set forth an exemplary process executable by, for example, the computer system of Figure 13. Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 102

Claims 1-22 stand rejected under 35 U.S.C. § 102(b), as being anticipated by U.S. Publication No. 2002/0165701 to Lichtenberg et al. (hereinafter "*Lichtenberg*"). Applicants respectfully traverse the rejection.

Initially, Office Action, p. 13, states that "it is noted that the features upon which applicant relies (i.e., type of rules to detect conflict - e.g. exclude type rules) are not recited in the rejected claims." Office Action, p. 13. Applicants respectfully submit that the discussion of "exclude type rules" was a discussion of the teachings of *Lichtenberg* to point out that the *Lichtenberg* is not teaching about a conflict of rules but rather is teaching about the distinct concept of compatibility of alternatives. The discussion was not a characterization of the present invention.

Additionally, the Office Action p. 14 states that "it is unclear what "release of a product" has to do with combining a DAG." Applicants have amended the claims to delete references to release of a product. However, the release of a product is described

in the present application, with respect to products defined by configuration models (e.g. paras. (55)).

"To anticipate [under 35 U.S.C. § 102], every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim." *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001).

Applicants respectfully submit that the claims, as amended, are allowable over *Lichtenberg* because, for example, *Lichtenberg* neither teaches nor suggests, for example:

> identifying a conflict between at least two of the configuration models …;
>
> extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space; [and]
>
> removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space.
>
> Claims 1, 3, 4, and 22.

Lichtenberg teaches "obtaining the number of all possible compatible products comprising at least one chosen alternative for each of the products for which an alternative is chosen and providing this information to the user." *Lichtenberg*, para. 0062. *Lichtenberg* also teaches "combining two DAGs". *Lichtenberg*, para. 0076. *Lichtenberg* teaches that:

> [0076] Providing an ordering facilitates a number of operations on the DAG, such as searching in a DAG and combining two DAGs.
>
> [0077] In order to maintain a suitable DAG, the representing of the rules in the DAG may further comprise the steps of:
>
> [0078] identifying a first and a second node having the same expression and the pointers of which point to the same nodes, and
>
> [0079] having pointers pointing to the first node point to the second node.

[0080] In that situation, two nodes actually representing the same contents are reduced to only one.

Rather than simply reducing two nodes representing the same contents to only one, the present invention recites "identifying a conflict between at least two of the configuration models." Claims 1, 3, 4, and 22. Furthermore, Applicants respectfully submit that foregoing teachings of *Lichtenberg*, thus, neither teach nor suggest:

> extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space; [and]
>
> removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space. Claims 1, 3, 4, and 22.

Since, "To anticipate [under 35 U.S.C. § 102], every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim." *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001), and *Lichtenberg* does not teach or even suggest every element and limitation of the claimed invention, Applicants respectfully request withdrawal of the rejection.

Regarding the response to Applicants remarks in the previous Office Action, Applicants respectfully disagree with the conclusions drawn in the Office Action with respect to claims dependent upon claims 1, 3, and 4. However, since the dependent claims incorporate all of the limitations of the independent claims upon which each indirectly or directly depends, Applicants will forego submitting reasons for the allowability of each dependent claim. Applicants respectfully submit that claims 2 and 5-21 are allowable for at least the same reasons as claims 1, 3, and 4.

CONCLUSION

In view of the amendments and remarks set forth herein, Applicant respectfully submits that all pending claims are in condition for allowance. Accordingly, Applicant

requests that a Notice of Allowance be issued. Nonetheless, should any issues remain that might be subject to resolution through a telephone interview, the Examiner is requested to telephone the undersigned at 512-338-9100.

FILED ELECTRONICALLY
April 7, 2008

Respectfully submitted,

/Kent B. Chambers/

Kent B. Chambers
Attorney for Applicant(s)
Reg. No. 38,839

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Versata Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,978	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

Austin, Texas
FILED ELECTRONICALLY April 7, 2008

PETITION FOR EXTENSION OF TIME

Dear Sir:

Applicants respectfully petition for a three (3) month extension of time within which to respond to the October 5, 2007 outstanding Office Action, such extension allowing the undersigned until April 7, 2008 to respond (April 5, 2008 being a Saturday).

The Commissioner is authorized to deduct any additional fees which may be required or credit any overpayment to Deposit Account No. 502264.

FILED ELECTRONICALLY
April 7, 2008

Respectfully submitted,

/Kent B. Chambers/

Kent B. Chambers
Attorney for Applicant(s)
Reg. No. 38,839

Electronic Patent Application Fee Transmittal

Application Number:	10827078
Filing Date:	19-Apr-2004
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Filer:	Kent Bryan Chambers
Attorney Docket Number:	T00113

Filed as Large Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1050	1050

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**1050**

Electronic Acknowledgement Receipt

EFS ID:	3116704
Application Number:	10827078
International Application Number:	
Confirmation Number:	1866
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Customer Number:	33438
Filer:	Kent Bryan Chambers
Filer Authorized By:	
Attorney Docket Number:	T00113
Receipt Date:	07-APR-2008
Filing Date:	19-APR-2004
Time Stamp:	21:02:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1050
RAM confirmation Number	4135
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part / .zip	Pages (if appl.)

1	Amendment - After Non-Final Rejection	T00113_ROA_10_5_07.pdf	144143 a861e76be6aa813dc260ef8f7f0c78c442430cf9	no	16
Warnings:					
Information:					
2	Extension of Time	T00113_Extension_4_7_08.pdf	80219 b6e865d95a8d6edcdfa04fbc15114995185ec278	no	1
Warnings:					
Information:					
3	Fee Worksheet (PTO-06)	fee-info.pdf	8122 94d8c3bf014cc5409b62b5e73624c52b3d110a38	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	232484	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/827,078	04/19/2004	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
FOR	NUMBER FILED	NUMBER EXTRA					
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/07/2008	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 22	Minus	** 22	= 0	X $ =		OR	X $50=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $ =		OR	X $210=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/CATHERINE d. SMITH/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,078	04/19/2004	Brandon M. Beck	T00113	1866

33438 7590 07/15/2008

HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720

EXAMINER	
SAXENA, AKASH	
ART UNIT	**PAPER NUMBER**
2128	

NOTIFICATION DATE	DELIVERY MODE
07/15/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@hamiltonterrile.com
seaton@hamiltonterrile.com
tmunoz@hamiltonterrile.com

Office Action Summary	Application No.	Applicant(s)	
	10/827,078	BECK ET AL.	
	Examiner	Art Unit	
	AKASH SAXENA	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claim(s) 1-22 has/have been presented for examination based on amendment filed on 7th April 2008.
2. Claim(s) 1, 3, 4, 7, 8, 13-22 is/are amended.
3. Claim(s) 1-22 remain rejected under 35 USC § 101.
4. Claim(s) 1-22 remain rejected under 35 USC § 112.
5. Claim(s) 1-22 is newly rejected under 35 USC § 103 necessitated by amendment.
6. The arguments submitted by the applicant have been fully considered. Claims 1-22 remain rejected and this action is made FINAL. The examiner's response is as follows.

Response to Remarks for Claim Rejections - 35 USC § 101

(Argument 1) Applicant has argued in Remarks Pg.11:

> Applicants have amended claims 1, 3, 4, and 22 to recite "combining the first and second configuration models into a single, consolidated model that maintains a non- cyclic chain of dependencies among families and features of families for use in answering configuration questions." Applicants respectfully submit that the "single, consolidated model" is clearly a useful, tangible, and concrete result. The claims clearly recite that the "single, consolidated model" produces a useful result, i.e. "for use in providing an answer to configuration questions."
>
> … Applicants respectfully submit that invention recites a practical application of "combining the first and second configuration models" that produces a real-world result, i.e. "a single, consolidated model that maintains a non- cyclic chain of dependencies among families and features of families for use in answering configuration questions."

(Response 1) Examiner respectfully disagrees with applicant as answering configuration question and consolidating into a single model do not recite useful concrete and tangible results. The "single consolidated model" does not represent a real world application and is an abstract idea unless it is applied to a particular real world application like specific product configuration. Examiner appreciates pointing

to MPEP, however MPEP stresses "**[A]n application** of a law of nature or **mathematical formula** to a … process may well be deserving of patent protection." Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis added). No *explicit application* is recited in the claim. Examiner finds applicant's arguments unpersuasive.

Response to Remarks for Claim Rejections - 35 USC § 112¶1st

(Argument 2) Applicant has argued in Remarks Pg.12:

> A. The 35 U.S.C. § 112, first paragraph rejection is based upon the same rationale as the 35 U.S.C. § 101 rejection. Accordingly, Applicants respectfully request withdrawal of the rejection for the same reasons set forth above with respect to the 35 U.S.C. § 101 rejection.

(Response 2) Examiner finds argument made as being unpersuasive.

(Argument 3) Applicant has argued in Remarks Pg.12:

> B. Claims 1-22 are also rejected under 35 U.S.C. § 112, first paragraph for failing to comply with the written description requirement based upon applicant's previous arguments. Applicants respectfully disagree with the rejection. Nevertheless, Applicants have amended claims 1, 3, 4, and 22 to clearly distinguish between the present invention and Lichtenberg based upon the language recited in the claims alone.

(Response 3) Applicant has failed to fully address the rejection and future responses in the similar manner would be held non-responsive (37 CFR 1.111).

Response to Remarks for Claim Rejections - 35 USC § 112¶2nd

(Argument 4) Applicant has argued in Remarks Pg.13:

> C. Claims 1-22 are also rejected under 35 U.S.C. § 112, second paragraph because "it is not clear which statutory category the claim should be examined under - i.e. a "method" claim of a "system" claim. Applicants have deleted "using an automated process". Applicants respectfully submit that claim 1 recites a "method", claim3 recites a "computer system", claim 4 recites a "computer readable medium", and claim 22 recites a "computer system". Applicants respectfully submit that all of the claims are recited within single statutory categories. Accordingly, Applicants respectfully request withdrawal of the rejection.
> D. Applicants expressly invoke 35 U.S.C. § 112, para. 6 for claim 22. The Office Action states that there is no support indicated in the specification for claim 22 as a means-plus-function claim under 35 U.S.C. §. 112, para. 6. Applicants respectfully refer the Examiner to, for example, Figures 10 and 11 as described in paragraphs 55-152, which set forth an exemplary process executable by, for example, the computer system of Figure 13. Accordingly, Applicants respectfully request withdrawal of the rejection.

(Response 4) Examiner withdraws the rejection under based on applicant's arguments and amendments to claim.

Response to Remarks for Claim Rejections - 35 USC § 102

7. New grounds of rejection are presented necessitated by amendment rendering arguments presented moot.

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Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 1-22 recite a abstract idea of combining two models (DAG) which specification describes as represented by Directed Acyclic Graphs (DAG) (Specification: (110, Fig.2). Combining DAG is a mathematical concept. Binary decision diagram (BDD) is a form of DAG and a paper showing the combining BDD[1] is included as prior art.

Claims 1-22 do not claim any practical application of the combination.

> **Section 2106 [R-2] (Patentable Subject Matter - Computer-Related Inventions) of the MPEP recites the following:**
> *If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Schrader, 22 F.3d at 294-95, 30 USPQ2d at 1458-59. Thus, a process consisting solely of mathematical operations, i.e.,* ***converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.***
> *"In practical terms, claims define nonstatutory processes if they:*
> *consist solely of mathematical operations without some claimed practical application (i.e., executing a "**mathematical algorithm**"); or - **simply manipulate abstract ideas**, e.g., a bid (Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (Warmerdam, 33 F.3d at 1360, 31USPQ2d at 1759), **without some claimed practical application**."*

Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. As described through these claims, the claimed invention does not physically transform an article or physical object to a different state or thing, so to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application. That is, it must produce a useful,

[1] Symbolic Model Checking An approach to the state explosion problem; Kenneth L. McMillan, May 1992, Pg. 41-44

concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2nd at 160102. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept.

Further, claims 1-22 do not seem to produce a tangible result. The tangible requirement of State Street decision requires that the claims must recite at least one 35 USC 101 judicial exception, in that the process claim must set forth a practical application of the 35 USC 101 judicial exception. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application.").

Applicant has amended the limitation (underlined)

> "combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions."

First "for use in answering configuration questions" does not make the claim statutory as the result of the method step are still not tangible. Secondly, the claim still presents an abstract idea not directed towards any claimed specific transformation of physical object and as understood by claim interpretation is limited to mathematical concept of altering a DAG presentation.

Independent claims 1, 3, 4 and 22 all recite the intended use of the combining the DAG in the last step.

MPEP 701 & 2105 states:

> A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed

> invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

In this case the intended use does not result in any structural difference and does not add any limitation to the method, system, or program product claims. The rejection is maintained under this statute.

Regarding Claim 4, 20-22

Claim 4 discloses computer readable medium, which is not explicitly present in the specification; however since specification (149)-(150) discloses use of electronic signal to store the program, this rejection is made as program stored in energy medium is non-statutory. MPEP 2106.01.

Claims 20-22 also disclose computer readable medium and is rejected similarly.

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Claim Rejections - 35 USC § 112¶1st

The following is a quotation of the first paragraph of 35 U.S.C. §112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. **Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific asserted utility or a well established utility.**

The claimed invention is an abstract idea as explained in the 35 USC 101 claim rejection above. There may be a specific and substantial utility present in the specification, however it is not claimed.

Claims 1-22 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a -specific and substantial-- asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

10. **Further, Claims 1-22 are rejected under 35 U.S.C. §112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a §101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application.** This is how the MPEP puts it:

> ("The how to use prong of section 112 **incorporates as a matter of law** the requirement of 35 U.S.C. §101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. §101, then the application **also fails as a matter of law** to enable one of ordinary skill in the art to use the invention under 35 U.S.C. §112."); In re Kirk, 376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA

> 1967) ("Necessarily, compliance with § 112 requires a description of how to use presently useful inventions, **otherwise an applicant would anomalously be required to teach how to use a useless invention**.")
> See, MPEP 2107.01(IV), quoting In re Kirk (emphasis added).

Therefore, claims 1-22 are rejected on this basis.

11. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the *written description requirement*. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, based on applicant's argument, that step of determining the conflict is not based on the exclude type of rule, examiner is unclear from the disclosure how the conflict is determined. Please see claim interpretation section and Response to Arguments for 35 USC § 102 Rejection.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. **Claim 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over by U.S. Patent Publication No. 2002/0165701 by Lichtenberg et al (Lichtenberg hereafter), in view of IEEE article "The Combining DAG: A Technique for Parallel Data Flow Analysis by Robert Kramer et al (Kramer hereafter).**

Regarding Claim 1 (Updated 9/21/07)

Lichtenberg teaches a method of consolidating multiple configuration models in to a single consolidated model (being a directed acyclic graph) among the families and feature of the families (described as component & associated rules) (Lichtenberg: [0076][0094][0062], Fig.1).

Lichtenberg teaches:

> determining if a conflict exists between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;

as determining the partial configurations ([0006]) which may be conflicting and only certain configuration out of all the possibilities satisfy the final product requirement ([0007]-[0008]). The ancestral configuration could be understood as configuration for the bike without the 2 possible conflicting gear configuration (as conflicting child configurations).

Lichtenberg teaches:

> extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model;

as combing two DAG where there is ancestral configuration (as node with same configuration) is identified ([0076]-[0084]).

Lichtenberg teaches:

> restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family;

as determining the compatible and non-compatible products where one of the alternatives is selected ([0092]-[0096]).

Lichtenberg teaches:

> combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.

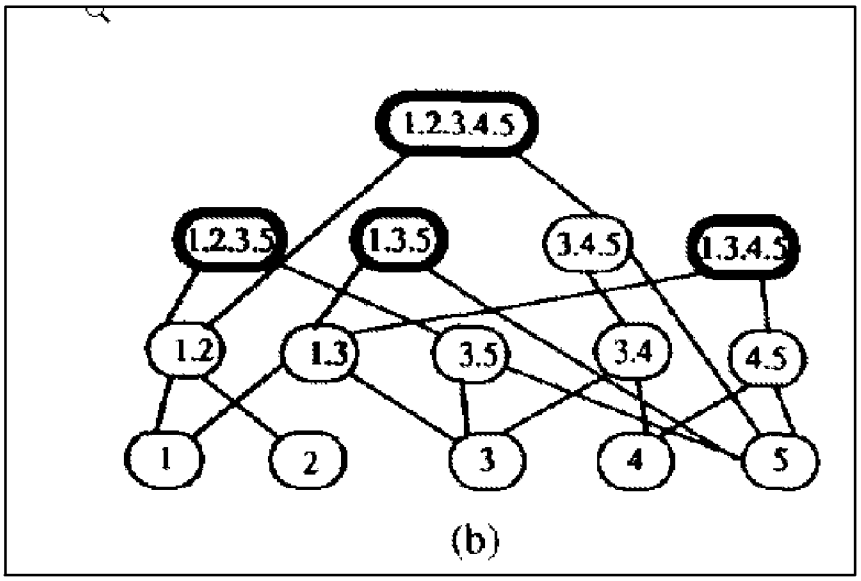
as combing the DAG ([0076]).

Arguendo, even if the amended limitations are not clearly taught by *Lichtenberg, Kramer teaches combining conflicting paths to remove loops to form a DAG and then simplifying and combining the DAGs (See Pg.810 and Fig10).*

Specifically, Kramer teaches the amended limitation:

> "…an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;"

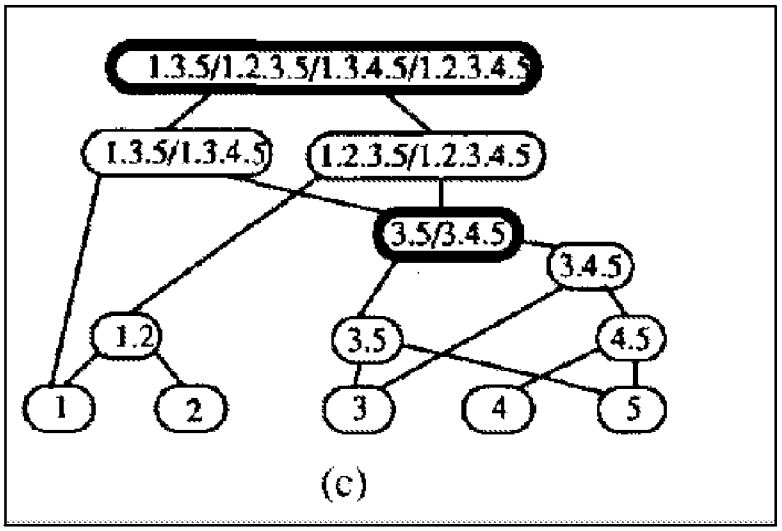
As different ancestral space for the two or more ancestral flows as flows 1.2.3.5, 1.3.5 and 1.3.4.5. The different child flows are shown as 1.2, 1.3, 3.5, 3.4 and 4.5.



Specifically, Kramer teaches the amended limitation:

> extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space

as extending the ancestral configuration model between two conflicting flows so the ancestral models are combined as shown bolded below in Fig.10 b. Please also see



Kramer Section IV. Construction of the DAG from the Control flow Graph. As can also be seen the dependent conflicting child node 1.3 is removed from the child configuration 1.3, 1.3.5 etc. DAG (See comparing Fig.10 (b) and (c)) thereby meeting the amended limitation …

> "…removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space".

And combining the first and second configuration models as 3.5 and 3.4.5 for example in Fig.10(c).

Kramer however fails to teach that the DAGs are for consolidating multiple configuration models and limits the teaching to consolidating multiple control paths in a non-cyclic way as in a DAG.

Lichtenberg cures this deficiency by applying the technique of combining DAGs, in this case product model DAGs for purpose of product model consolidation and configuration (Lichtenberg: Fig.1).

It would have been obvious to one (e.g. a designer) of ordinary skill in the art at the time the invention was made to apply the teachings of Kramer and Lichtenberg to each other. The motivation to combine would have been that Lichtenberg teaches that there are multiple known methodologies to combine the DAG (Lichtenberg: [0076]), however fails to disclose the exact details, which is a deficiency Kramer cures by demonstrating through application (control flow graph DAGs) (Kramer: Fig.10 (b) and (c) and Section IV).

Regarding Claim 2

Lichtenberg teaches detecting any inconsistencies between rules included in the consolidated model (Lichtenberg: [0090]-[0094] – non–compatible products) and attempting to resolve any detected inconsistencies by not allowing the user to select a inconsistent solution (Lichtenberg: [0096]-[0108]).

Regarding Claim 3-4 (Updated 7/2/08)

Limitations presented in claims 3-4 are similar to limitations presented in claim 1 and rejected likewise. Lichtenberg teaches a system (Lichtenberg: [0043]) and a computer program (Lichtenberg: Fig. 2-3, [0272]) for implementing the method of claim 1. *Lichtenberg teaches wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families (Lichtenberg: [0062]-[0073]) and at least one model includes a rule that causes a*

configuration conflict with another model (Lichtenberg: [0062], [0090], [0092]-[0094], [0102]-[0105], [0134]-[-0150] – partial DAG representing features and families, [0162], [0191], [0383] – incompatibility between selected model and reconfiguration).

Newly amended limitations are taught by Kramer as well as shown in claim 1 rejection.

Regarding Claim 5

Lichtenberg teaches wherein the configuration models represent configuration models of vehicles (Lichtenberg: Fig.1 – Showing a bicycle).

Regarding Claim 6

Lichtenberg teaches wherein the consolidated model includes only buildable configurations (Lichtenberg: [0406]-[0412] – excluding incompatible selections).

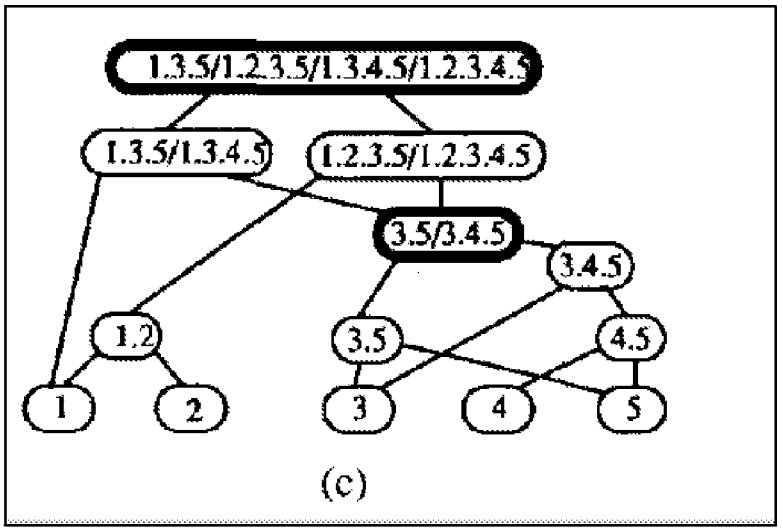
Regarding Claim 7 (Updated 7/2/08)

Lichtenberg teaches *extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model* as combining the DAG's (Lichtenberg: [0076]-[0084]) further comprises extending a rule from *the first conflicting configuration model into the ancestor family and* (Lichtenberg: [0062], [0076]-[0079]); and repairing the extension of the rule in the child family (Lichtenberg: [0133]-[0150]).

Kramer teaches the amended limitation:

> extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space

as extending the ancestral configuration model between two conflicting flows so the ancestral models are combined as shown bolded below in Fig.10 b. Please also see



(c)

Kramer Section IV. Construction of the DAG from the Control flow Graph. As can also be seen the dependent conflicting child node 1.3 is removed from the child configuration 1.3, 1.3.5 etc. DAG (See comparing Fig.10 (b) and (c)) thereby meeting the amended limitation …

> "…removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space".

Regarding Claim 8 (Updated 7/2/08)

Lichtenberg teaches combining the *configuration* models into a single, consolidated *configuration* model further comprises loading the *configuration* models into a memory of the computer system (Lichtenberg: [0027]-[0034], [0224]-[0233], [0272]-[0274]); constructing a directed acyclic graph of all rules in all the models (Lichtenberg: [0272]-[0274]); for each *configuration* model, determining which portions of an overall configuration space for which the *configuration* model does not provide a buildable configuration (Lichtenberg: [0008], [0060] and [0090]); and for each *configuration* model, constraining statements of the rules with in the

configuration model to fall within a space of defining features of the *configuration* model (Lichtenberg: [0061]-[0062]).

Regarding Claim 9

Lichtenberg teaches

> "determining which portions of an overall configuration space for which each *configuration* model does not provide a buildable configuration further comprises determining which families are ancestors of families of defining constraints and subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations."

as providing an intersection to provide all compatible (buildable) or incompatible (un-buildable) products (Lichtenberg: [0085]-[0094]).

Regarding Claim 10

System claim 10 discloses similar limitations as claim 2 and is rejected for the same reasons as claim 2. Claim is amended for grammatical reasons.

Regarding Claim 11

System claim 11 discloses similar limitations as claim 5 and is rejected for the same reasons as claim 5.

Regarding Claim 12

System claim 12 discloses similar limitations as claim 6 and is rejected for the same reasons as claim 6.

Regarding Claim 13 (Updated 7/2/08)

System claim 13 discloses similar limitations as claim 7 and is rejected for the same reasons as claim 7. Further, claim is amended for grammatical reasons.

Regarding Claim 14 (Updated 7/2/08)

System claim 14 discloses similar limitations as claim 8 and is rejected for the same reasons as claim 8. Claim is amended for grammatical reasons.

Regarding Claim 15 (Updated 7/2/08)

System claim 15 discloses similar limitations as claim 9 and is rejected for the same reasons as claim 9. Claim is amended for grammatical reasons.

Regarding Claims 16-21 (Updated 7/2/08)

Computer program product claims 16-21 disclose similar limitations as claim 2, 5-9 and are rejected for the same reasons as claims 2, 5-9 respectively.

Regarding Claim 22 (Updated 7/2/08)

Limitations presented in claim 22 are similar to limitations presented in claim 1 and rejected likewise. No specific support was cited for “means for” language and is this claim is interpreted ordinarily.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AKASH SAXENA whose telephone number is (571)272-8351. The examiner can normally be reached on 9:30 - 6:00 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini S. Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Akash Saxena/
Examiner, Art Unit 2128

/Alexander J Kosowski/
Primary Examiner, Art Unit 2128

Notice of References Cited	Application/Control No. 10/827,078	Applicant(s)/Patent Under Reexamination BECK ET AL.	
	Examiner AKASH SAXENA	Art Unit 2128	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
*	U	The combining DAG: a technique for parallel data flow analysis; Kramer, R.; Gupta, R.; Sofia, M.L.; Parallel and Distributed Systems, IEEE Transactions on; Volume 5, Issue 8, Aug. 1994 Page(s):805 - 813 (this reference is cited and provided with office action dated 7/5/06)
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10827078	BECK ET AL.
	Examiner	Art Unit
	AKASH SAXENA	2128

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	07/02/2008								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
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	17	✓								
	18	✓								
	19	✓								
	20	✓								
	21	✓								
	22	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10827078	BECK ET AL.
	Examiner	Art Unit
	AKASH SAXENA	2128

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
No new search was performed.	7/2/2008	AS
Consulted Alex kosowski on the action	7/2/2008	AS

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

PTO/SB/30EFS (12-08)
Approved for use through 01/31/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	10/827,078	Filing Date	2004-04-19	Docket Number (if applicable)	T00113	Art Unit	2128
First Named Inventor	Brandon M. Beck			Examiner Name	Akash Saxena		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☒ Other Petition for Extension of Time

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 502264

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (12-08)
Approved for use through 01/31/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Signature of Registered U.S. Patent Practitioner			
Signature	/Kent B. Chambers/	Date (YYYY-MM-DD)	2009-01-15
Name	Kent B. Chambers	Registration Number	38839

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Versata Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,078	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

Austin, Texas
January 15, 2009

FILED ELECTRONICALLY

37 C.F.R. § 1.114 RCE SUBMISSION

Dear Sir:

This paper is a submission in accordance with 37 C.F.R. § 1.114, which accompanies a request for continued examination in the above referenced patent application. This paper responds to the Office Action dated July 15, 2008, having a shortened statutory period expiring on October 15, 2008. Accompanying this response is a petition under 37 C.F.R. § 1.136 for extension of time by three (3) months, setting a new time for response of January 15, 2009. Further examination and reconsideration are respectfully requested in view of the amendments and remarks set forth below.

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of using a computer system to consolidate multiple configuration models of a product, the method comprising:

identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions related to the product.

2. (Original) The method of claim 1 further comprising:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

3. (Currently Amended) A computer system configured for consolidating multiple configuration models of a product, the system comprising:

a processor; and

a memory, coupled to the processor, having code stored therein and executable by the processor for:

identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of

dependencies among families and features of families for use in answering configuration questions related to the product.

4. (Currently Amended) A computer readable medium having instructions encoded therein and executable by a processor to consolidate multiple configuration models of a product, the instructions comprising code for:

identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions related to the product.

5. (Previously Presented) The method of claim 1 wherein the configuration models represent configuration models of vehicles.

6. (Previously Presented) The method of claim 1 wherein the consolidated model includes only buildable configurations.

7. (Previously Presented) The method of claim 1 wherein:

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family further comprises:

extending a rule from the first configuration model into the ancestor configuration model family space; and

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space further comprises:

repairing the extension of the rule in the child family.

8. (Previously Presented) The method of claim 1 wherein combining the first and second models into a single, consolidated model further comprises:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules within the configuration model to fall within a space of defining features of the configuration model.

9. (Previously Presented) The method of claim 8 wherein determining which portions of an overall configuration space for which each configuration model does not provide a buildable configuration further comprises:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

10. (Previously Presented) The system of claim 3 further comprising code for:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

11. (Previously Presented) The system of claim 3 wherein the configuration models represent configuration models of vehicles.

12. (Previously Presented) The system of claim 3 wherein the consolidated model includes only buildable configurations.

13. (Previously Presented) The system of claim 3 wherein:

the code for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space comprises code for extending a rule from the first conflicting configuration model into the ancestor family; and

the code for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space comprises code for repairing the extension of the rule in the child family.

14. (Previously Presented) The system of claim 3 the code for combining the first and second models into a single, consolidated model further comprises code for:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules within the configuration model to fall within a space of defining features of the configuration model.

15. (Previously Presented) The system of claim 14 wherein the code for determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration further comprises code for:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

16. (Previously Presented) The computer readable medium of claim 4 further comprising code for:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

17. (Previously Presented) The computer readable medium of claim 4 wherein the models represent configuration models of vehicles.

18. (Previously Presented) The computer readable medium of claim 4 wherein the configuration models represent configuration models of vehicles.

19. (Previously Presented) The computer readable medium of claim 4 wherein:

the code for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting

configuration models represent the same ancestor configuration model family space comprises code for extending a rule from the first conflicting configuration model into the ancestor family; and

the code for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space comprises code for repairing the extension of the rule in the child family.

20. (Previously Presented) The computer readable medium of claim 4 the code for combining the first and second models into a single, consolidated model further comprises code for:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules within the configuration model to fall within a space of defining features of the configuration model.

21. (Previously Presented) The computer readable medium of claim 20 wherein the code for determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration further comprises code for:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

22. (Currently Amended) A computer system for performing an automatic consolidation of multiple configuration models of a configurable ~~products~~ product, the system comprising:

means for identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

means for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

means for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

means for combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in providing an answer to configuration questions related to the product.

REMARKS

Claims 1-22 are pending.

Claims 1-22 stand rejected.

Claims 1, 3, 4, and 22 have been amended for clarity.

Claim Rejections - 35 U.S.C. § 101

Claims 1-22 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter and as not being supported by either a specific asserted utility of a well established unity.

The Federal Circuit recently addressed the subject of subject matter patentability in *In re Bilski*, 545 *F.3d* 943 (Fed. Cir. 2008) (*en banc*). In *In re Bilski*, the court "conclude[ed] that the "useful, concrete and tangible result" inquiry is inadequate and reaffirm[ed] that the machine-or-transformation test outlined by the Supreme Court is the proper test to apply." *Id.* "The machine-or-transformation test is a two-branched inquiry; an applicant may show that a process claim satisfies §101 either by showing that his claim is tied to a particular machine, or by showing that his claim transforms an article." *Id.*

Although the two-branched inquiry is stated in the alternative, Applicants respectfully submit that the method of claim 1 and claims directly or indirectly dependent thereon meet both of the two-branched inquiries set forth in *In re Bilski*.

The method of claim 1 is specifically tied to a particular machine, namely "a computer system". Claim 1. More specifically, claim 1 is a "method of using a computer system." *Id.*

Additionally, the method of claim 1 tranforms an article(s) into a different thing. Claim 1 recites a "method of using a computer system to consolidate multiple configuration models of a product." *Id.* The multiple configuration models represent at least one article, and the article represents a physical object, namely a product. The article(s) is/are transformed into a "consolidated model". *Id.* More specifically, claim 1

recites "combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions related to the product." Additionally, the method of claim 1 clearly recites a practical application of the method, namely that the consolidated model is "for use in answering configuration questions related to the product." *Id.*

The invention embodiment of claim 3, together with claims directly or indirectly dependent thereon, is a particular machine, i.e. a computer system, "configured for consolidating multiple configuration models of a product" Additionally, the computer system of claim 3 is configured to tranform an article(s) into a different thing. The multiple configuration models of claim 3 represent at least one article, and the article represents a physical object, namely a product. The article(s) is/are transformed into a "consolidated model". *Id.* More specifically, claim 3 recites "combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions related to the product." Additionally, claim 3 clearly recites a practical application of the method, namely that the consolidated model is "for use in answering configuration questions related to the product." *Id.*

The invention embodiment of claim 4 is also related to a physical device and includes instructions, namely a "computer readable medium having instructions encoded therein and executable by a processor to consolidate multiple configuration models of a product." After the decision in *In re Bilski*, the USPTO Board of Patent Appeals and Interferences (BPAI) addressed subject matter patentability of a computer usable medium in *ex parte Bo Li*. *Ex parte Bo Li*, Appeal 2008-1213 (USPTO BPAI 2008, November 6, 2008). The BPAI, citing *In re Bilski* and *In re Lowry*, 32 F.3d 1579 (Fed. Cir. 1994), held that a computer program product comprising a computer usable medium having a computer readable program code embodied therein and adapted to be executed to implement a method for generating a report recites patentable subject matter under 35 U.S.C. § 101. Likewise, Applicants respectfully submit that the computer readable

medium of claim 4 and claims directly or indirectly dependent thereon also recite patentable subject matter.

Applicants respectfully submit that claims 1, 3, and 4 meet the requirements of 35 U.S.C. § 101 as construed by, for example, the Federal Circuit in *In re Bilski* and *In re Lowry*, 32 F.3d 1579 (Fed. Cir. 1994).

Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 112

Claims 1-22 stand rejected under 35 U.S.C. § 112, first and second paragraphs. Applicants respectfully traverse the rejections.

A. The 35 U.S.C. § 112, first paragraph rejection is based upon the same rationale as the 35 U.S.C. § 101 rejection. As supported by *In re Bilski*, per the foregoing discussion, claims 1-22 do not recite an abstract idea. Claim 1 and claims dependent thereon recite a method tied to a particular machine and transforms an article(s) to a different state. Claim 3 and claims dependent thereon recite a particular machine. Claim 4 recites a physical device having instructions encoded therein, and this type of device has recently again been held to be patentable by the BPAI in *ex parte Bo Li*. Accordingly, since the 35 U.S.C. § 112, first paragraph rejection is based on the same grounds as the 35 U.S.C. § 101 rejection, and the 35 U.S.C. § 101 rejection should be withdrawn under *In re Bilski*, *In re Lowry*, and *ex parte Bo Li*, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 101.

B. Claims 1-22 are also rejected under 35 U.S.C. § 112, first paragraph, because "current case law (and accordingly, the MPEP) require such a rejection" if the claims do not meet the requirement of 35 U.S.C. § 101. Since, as the foregoing discussion supports, claims 1-22 meet the requirements of 35 U.S.C. § 101, this rejection under 35 U.S.C. § 112, Applicants respectfully submit that this rejection should be withdrawn..

C. Claims 1-22 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Office Action states, "Specifically,

based on applicant's argument, that [the] step of determining the conflict is not based on the exclude type of rule, examiner is unclear from the disclosure how the conflict is determined." Office Action, p. 9. With regard to "the exclude type of rule", Applicants' previous arguments did not characterize an element of claims 1-22. Applicants previously stated that, "the discussion of "exclude type rules" was a discussion of the teachings of *Lichtenberg* to point out that the *Lichtenberg* is not teaching about a conflict of rules but rather is teaching about the distinct concept of compatibility of alternatives." April 7, 2008 Response. "The discussion was not a characterization of the present invention." Thus, Applicants' prior argument with regard to "exclude type rules" is not a characterization of the claimed invention and, thus, is not a limit on the scope of the present invention.

With regard to support for "identifying a conflict between at least two of the configuration models", the Specification of the Present Application includes a "Check for unspecified buildables." Present Application, para. (96). In one embodiment, the presence of an unspecified buildable indicates a conflict between at least two configuration models that triggers allowing a rule from one model to extend into another at a non-trivial family and repair the extension at a family below the non-trivial family. See Present Application, paras. (98)-(101). **Note, the present invention is defined by the claims and not by specific embodiments in the Specification of the Present Application.**

Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 103

Claims 1-22 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over U.S. Publication No. 2002/0165701 to Lichtenberg et al. (hereinafter "*Lichtenberg*") in view of the IEEE article "The Combining DAG: A Technique for Parallel Data Flow Analysis by Robert Kramer et al. (hereinafter "*Kramer*"). Applicants respectfully traverse the rejection.

Applicants respectfully submit that *Lichtenberg* neither teaches nor suggests "consolidate[ing] multiple configuration models of a product." Present Application, claims 1, 3, and 4.

Lichtenberg teaches that a product is represented by a **single** model and does not address "consolidate[ing] multiple configuration models of a product". *Id.* More specifically, "a product model is used to model relevant aspects of the product." *Lichtenberg*, para. 0224. "The product model describes components, attributes for these components, as well as alternatives for each component and values for each attribute." *Id.*, para. 0226. "Furthermore the product model comprises a group of rules relating to compatibilities between components and attributes." *Id.* See also, *Lichtenberg*, paras. 0234-0261 which describe the product model in detail. Notably, *Lichtenberg* no where does *Lichtenberg* discuss "consolidate[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4.

Lichtenberg teaches representing the **single** model as a directed acyclic graph (DAG). *Lichtenberg* teaches that "the product model is encoded as a virtual table[, and] the virtual table is a directed acyclic graph that represents all consistent configurations." *Lichtenberg*, para. 0231. *Lichtenberg* teaches that:

> An important aspect of the invention is the process of transforming **a** product model to a compact and efficient representation. The purpose of the transformation is to first find a way of encoding and finding all solutions to the configuration problem and then tabulate them virtually in a virtual table such that information relating to the configuration problem can be obtained by efficient queries to the virtual table. The encoding involves finding an encoding of the components of the product model and a corresponding encoding of the rules. A DAG will represent all the rules, such that enquiries about valid solutions to the rules can be performed efficiently. *Lichtenberg*, para. 0274.

Thus, the DAG is used to represent all the rules of a **single** product model and is unrelated to "consolidate[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4.

Lichtenberg does teach "combining two DAGs". *Lichtenberg*, para. 0076. However, Applicants respectfully submit that the combining of DAGs taught by

Lichtenberg is not in the context of "consolidate[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4. Specifically, *Lichtenberg* teaches:

> [0077] In order to maintain a suitable DAG, the representing of the rules in the DAG may further comprise the steps of:
>
> [0078] identifying a first and a second node having the same expression and the pointers of which point to the same nodes, and
>
> [0079] having pointers pointing to the first node point to the second node.
>
> [0080] In that situation, two nodes actually representing the same contents are reduced to only one.

Lichtenberg also teaches:

> [0134] It is preferred to modify the DAG by as early as possible removing the "hidden" components. This may be done by:
>
> [0135] for each of the rules, constructing a partial DAG representing the rule,
>
> [0136] identifying at least one of the components to be hidden,
>
> [0137] selecting an ordering of the identified components,
>
> [0138] initially constructing an actual DAG representing no rules and then repeatedly,
>
> [0139] selecting a non-selected component of lowest order,
>
> [0140] repeatedly, until all partial DAGs comprising expressions relating to the selected component have been chosen:
>
> [0141] choosing a partial DAG comprising expressions relating to the selected component,
>
> [0142] combining the actual DAG with the chosen partial DAG into a new actual DAG,
>
> [0143] changing the actual DAG by:
>
> [0144] identifying nodes in the actual DAG comprising expressions relating to the identified component,
>
> [0145] removing these nodes from the actual DAG,

[0146] adding nodes, not comprising expressions relating to the identified component, to the actual DAG so that the compatibilities implied by the identified component are reflected by the actual DAG,

[0147] providing the DAG by combining the actual DAG with all non-chosen partial DAGs.

Accordingly, *Lichtenberg* teaches representing the **single** model as a directed acyclic graph (DAG), and *Lichtenberg*'s teachings regarding combining DAGs does not teach or suggest "combining the first and second configuration models into a single, consolidated model." Claims 1, 3, and 4.

Additionally, Applicants respectfully submit that para. 0006 of *Lichtenberg* is not referring to a conflict between "multiple configuration models of a product" but is rather referring to alternative choices to be made when configuring a product, i.e. "a specific alternative must be selected for each of the components to build the complex product." *Lichtenberg*, para. 0006. Furthermore, Applicants respectfully submit that paras. 0007-0008 do not refer to conflicting models but rather relate to (i) configuring a product by choosing alternatives and (ii) "all combinations of the alternatives will not work." *Id.*, para. 0008. For example, if "the front and the rear wheel must be of the same type" then an alternative type rear wheel would be incompatible with a different type of front wheel. Thus, references to alternatives in *Lichtenberg* and ""all combinations of the alternatives will not work" is not a reference to "combining the first and second configuration models into a single, consolidated model." Claims 1, 3, and 4.

Regarding *Kramer*, the Examiner admits that "*Kramer* however fails to teach that the DAGs are for consolidating multiple configuration models and limits the teaching to consolidating multiple paths in a non-cyclic way as in a DAG." Office Action, p. 13.

Accordingly, since neither *Lichtenberg* nor *Kramer* relate to "consolidate[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4, *Lichtenberg* in view of *Kramer* fail to teach or suggest:

consolidate[ing] multiple configuration models of a product [] comprising[]:

identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions related to the product.

For at least the foregoing reasons, Applicants respectfully request withdrawal of the rejection of claims 1, 3, and 4 and claims directly or indirectly dependent thereon.

CONCLUSION

In view of the amendments and remarks set forth herein, Applicant respectfully submits that all pending claims are in condition for allowance. Accordingly, Applicant requests that a Notice of Allowance be issued. Nonetheless, should any issues remain that might be subject to resolution through a telephone interview, the Examiner is requested to telephone the undersigned at 512-338-9100.

CERTIFICATE OF TRANSMISSION

I hereby certify that on January 15, 2009, this correspondence is being transmitted via the U.S. Patent & Trademark Office's electronic filing system.

/Kent B. Chambers/

Respectfully submitted,

/Kent B. Chambers/

Kent B. Chambers
Attorney for Applicant(s)
Reg. No. 38,839

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Versata Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,978	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

FILED ELECTRONICALLY January 15, 2009

PETITION FOR EXTENSION OF TIME

Dear Sir:

Applicants respectfully petition for a three (3) month extension of time within which to respond to the July 15, 2008, outstanding Office Action, such extension allowing the undersigned until January 15, 2009 to respond.

The Commissioner is authorized to deduct any additional fees which may be required or credit any overpayment to Deposit Account No. 502264.

CERTIFICATE OF TRANSMISSION

I hereby certify that on January 15, 2009, this correspondence is being transmitted via the U.S. Patent & Trademark Office's electronic filing system.

/Kent B. Chambers/

Respectfully submitted,

/Kent B. Chambers/

Kent B. Chambers
Attorney for Applicant(s)
Reg. No. 38,839

Electronic Patent Application Fee Transmittal

Application Number:	10827078
Filing Date:	19-Apr-2004
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Filer:	Kent Bryan Chambers
Attorney Docket Number:	T00113

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**1920**

Electronic Acknowledgement Receipt

EFS ID:	4624642
Application Number:	10827078
International Application Number:	
Confirmation Number:	1866
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Customer Number:	33438
Filer:	Kent Bryan Chambers
Filer Authorized By:	
Attorney Docket Number:	T00113
Receipt Date:	15-JAN-2009
Filing Date:	19-APR-2004
Time Stamp:	20:59:15
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1920
RAM confirmation Number	6659
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / .zip	Pages (if appl.)

1	Request for Continued Examination (RCE)	T00113_RCE_Transmittal_1_15_09.pdf	36260 517f1810967f5e490c4cf33ede9907b465c69297	no	2
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2	Amendment Submitted/Entered with Filing of CPA/RCE	T00113_RCE_Submission_7_15_08.pdf	151007 284e93277943ff4f3e3cc649a49c5c9bdeace6ee	no	18
Warnings:					
Information:					
3	Extension of Time	T00113_Extension_1_15_09.pdf	81568 7790bad4a7d585a2f7fe27c30cad62984b82a0de	no	1
Warnings:					
Information:					
4	Fee Worksheet (PTO-06)	fee-info.pdf	31841 fd2beb5aa39645e6faabdb6d0fd2d60cd7adf5ae	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	300676		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,078	04/19/2004	Brandon M. Beck	T00113	1866

33438 7590 04/02/2009

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EXAMINER	
SAXENA, AKASH	
ART UNIT	**PAPER NUMBER**
2128	

NOTIFICATION DATE	DELIVERY MODE
04/02/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

tmunoz@hamiltonterrile.com

Office Action Summary	Application No.	Applicant(s)	
	10/827,078	BECK ET AL.	
	Examiner	Art Unit	
	AKASH SAXENA	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claim(s) 1-22 has/have been presented for examination based on amendment filed on 01/15/2009.
2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/15/2009 has been entered.
3. Claim(s) 1, 3, 4 and 22 is/are amended.
4. Claim(s) 1-22 remain rejected under 35 USC § 101.
5. Claim(s) 1-22 remain rejected under 35 USC § 112.
6. Claim(s) 1-22 is rejected under 35 USC § 103.
7. The arguments submitted by the applicant have been fully considered. Claims 1-22 remain rejected and this action is made NON-FINAL.

Response to Remarks for Claim Rejections - 35 USC § 101

Regarding Claim 1 & 3

8. Applicant's remarks on "a method using a computer system", as reading on tied to a particular machine in view of In re Bilski are noted, however the inquiry of practical application and abstract idea are separate determination for rejection under 35 USC 101.

9. As for transformation of physical material from one state to another, the claim does not do that as alleged, as merely the model representing the product is transformed not the actual product. Examiner maintains the rejection for this issue.

10. As for the practical application, applicant has added "for use in answering configuration questions related to the product." Id. However this is general application and not specific application, which can be used for any “product”, without specifying which “product” it can be used for. This rejection is maintained for this reason.

Regarding Claim 4

11. Applicant has not clearly disavowed in the claim the use of non-statutory material (program stored on the modulated signal – carrier waves – a form of energy) such as detailed in specification [0149]-[0150] which reads on the computer readable medium. The rejection is therefore maintained.

Response to Remarks for Claim Rejections - 35 USC § 112¶1st

12. Regarding A & B, the rationale for rejection under 35 USC 112 ¶1st is based on the 101 – abstract idea, which is a separate inquiry than the one addressed by In re Bilski. Since the rejection under abstract idea is maintained the rejection under 35 USC 112¶1st is also maintained on the same rationale.

13. Regarding C, applicant has merely pointed to specification [0098]-[0101], without any guidance or specific description how the steps of extending, removing and combining are enabled. Further, even if the cited section may teach the limitation,

the specification cited cannot be imported in to claim. Examiner maintains the rejection.

Response to Remarks for Claim Rejections - 35 USC § 103

(Argument 1) Applicant has argued in Remarks Pg.14-16

> Lichtenberg teaches that a product is represented by a **single model** and does not address "consolidate[ing] multiple configuration models of a product". Id. More specifically, "a product model is used to model relevant aspects of the product." Lichtenberg, para. 0224. "The product model describes components, **attributes for these components, as well as alternatives for each component and values for each attribute."** Id., para. 0226. "Furthermore the product model comprises a group of rules relating to compatibilities between components and attributes." Id. See also, Lichtenberg, paras. 0234-0261 which describe the product model in detail. Notably, Lichtenberg no where does Lichtenberg discuss "consolidate[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4....
>
> **Thus, the DAG is used to represent all the rules of a single product model and is unrelated to "consolidate[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4...**
>
> **Accordingly, Lichtenberg teaches representing the single model as a directed acyclic graph (DAG), and Lichtenberg's teachings regarding combining DAGs does not teach or suggest "combining the first and second configuration models into a single, consolidated model." Claims 1, 3, and 4.**

(Response 1) Applicant has repeatedly alleged that Lichtenburg's single product model with various alternatives to the components with values and rules is not the same as multiple configurations of applicant's product model. However applicant has failed to provide any argument why the multiple configurations are different and cannot be given broadest reasonable interpretation as product comprising alternatives to components making up various configurations. In fact the specification Fig.9A confirms that the variation is due to various engine alternatives in car model. Examiner finds applicant's argument unpersuasive.

(Argument 2) Applicant has argued in Remarks Pg.16:

> Additionally, Applicants respectfully submit that para. 0006 of Lichtenberg is not referring to a conflict between "multiple configuration models of a product" but is rather referring to alternative choices to be made when configuring a product, i.e. "a specific alternative must be selected for

> each of the components to build the complex product." Lichtenberg, para. 0006. Furthermore, Applicants respectfully submit that paras. 0007- 0008 do not refer to conflicting models but rather relate to (i) configuring a product by choosing alternatives and (ii) "all combinations of the alternatives will not work." Id., para. 0008. For example, if"the front and the rear wheel must be of the same type" then an alternative type rear wheel would be incompatible with a different type of front wheel. Thus, references to alternatives in Lichtenberg and .... all combinations of the alternatives will not work" is not a reference to "combining the first and second configuration models into a single, consolidated model." Claims 1, 3, and 4.

(Response 2) Applicant has not claimed what makes the configuration model different and given the broadest reasonable interpretation the multiple configuration model differ due to their alternatives in the components making various configurations.

(Argument 3) Applicant has argued in Remarks Pg.16:

> Regarding Kramer, the Examiner admits that "Kramer however fails to teach that the DAGs are for consolidating multiple configuration models and limits the teaching to consolidating multiple paths in a non-cyclic way as in a DAG." Office Action, p. 13.

(Response 3) In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller,* 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Specifically in this case the limitation is taught by Lichtenburg.

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Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

14. Claims 1-22 recite a abstract idea of combining two models (DAG) which specification describes as represented by Directed Acyclic Graphs (DAG) (Specification: (110, Fig.2). Combining DAG is a mathematical concept. Binary decision diagram (BDD) is a form of DAG and a paper showing the combining BDD[1] is included as prior art.

Claims 1-22 do not claim any practical application of the combination.

> **Section 2106 [R-2] (Patentable Subject Matter - Computer-Related Inventions) of the MPEP recites the following:**
> *If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Schrader, 22 F.3d at 294-95, 30 USPQ2d at 1458-59. Thus, a process consisting solely of mathematical operations, i.e., **converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.***
> *"In practical terms, claims define nonstatutory processes if they:*
> *consist solely of mathematical operations without some claimed practical application (i.e., executing a "**mathematical algorithm**"); or - **simply manipulate abstract ideas**, e.g., a bid (Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (Warmerdam, 33 F.3d at 1360, 31USPQ2d at 1759), **without some claimed practical application**."*

Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. As described through these claims, the claimed invention does not physically transform an article or physical object to a different state or thing, so to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application. That is, it must produce a useful,

[1] Symbolic Model Checking An approach to the state explosion problem; Kenneth L. McMillan, May 1992, Pg. 41-44

concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2nd at 160102. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept.

Independent claims 1, 3, 4 and 22 all recite the intended use of the combining the DAG in the last step.

MPEP 701 & 2105 states:

> A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

In this case the intended use does not result in any structural difference and does not add any limitation to the method, system, or program product claims. The rejection is maintained under this statute.

Regarding Claim 4, 20-21

Claim 4 discloses computer readable medium, which is not explicitly present in the specification; however since specification (149)-(150) discloses use of electronic signal to store the program, this rejection is made as program stored in energy medium is non-statutory. MPEP 2106.01.

Claims 20-21 also disclose computer readable medium and is rejected similarly.

Regarding Claim 22 (New)

System claim 22 is rejected as software per se, as all there is not hardware component disclosed and merely is a collection of algorithmic steps, best interpreted as software per se.

Claim Rejections - 35 USC § 112¶1st

The following is a quotation of the first paragraph of 35 U.S.C. §112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

15. **Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific asserted utility or a well established utility.**

The claimed invention is an abstract idea as explained in the 35 USC 101 claim rejection above. There may be a specific and substantial utility present in the specification, however it is not claimed.

Claims 1-22 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a -specific and substantial-- asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

16. **Further, Claims 1-22 are rejected under 35 U.S.C. §112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a §101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application.** This is how the MPEP puts it:

> ("The how to use prong of section 112 **incorporates as a matter of law** the requirement of 35 U.S.C. §101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. §101, then the application **also fails as a matter of law** to enable one of ordinary skill in the art to use the invention under 35 U.S.C. §112."); In re Kirk, 376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA

> 1967) ("Necessarily, compliance with § 112 requires a description of how to use presently useful inventions, **otherwise an applicant would anomalously be required to teach how to use a useless invention**.") See, MPEP 2107.01(IV), quoting In re Kirk (emphasis added).

Therefore, claims 1-22 are rejected on this basis.

17. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the *written description requirement*. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, based on applicant's argument, that step of determining the conflict is not based on the exclude type of rule, examiner is unclear from the disclosure how the conflict is determined. Please see claim interpretation section and Response to Arguments for 35 USC § 102 Rejection.

18. Claim 22 discloses means for language, however the specification does not disclose specific means for identifying, extending, removing and combining and hence the claim 22 lack written description and enablement as well.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

19. Claim 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over by U.S. Patent Publication No. 2002/0165701 by Lichtenberg et al (Lichtenberg hereafter), in view of IEEE article "The Combining DAG: A Technique for Parallel Data Flow Analysis by Robert Kramer et al (Kramer hereafter).

Regarding Claim 1

Lichtenberg teaches a method of consolidating multiple configuration models *of a product* in to a single consolidated model (being a directed acyclic graph) among the families and feature of the families (described as component & associated rules) (Lichtenberg: [0076][0094][0062], Fig.1).

Lichtenberg teaches:

> determining if a conflict exists between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family and a child configuration model family below the ancestor family, a first conflicting configuration model comprises a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;

as determining the partial configurations ([0006]) which may be conflicting and only certain configuration out of all the possibilities satisfy the final product requirement ([0007]-[0008]). The ancestral configuration could be understood as configuration for the bike without the 2 possible conflicting gear configuration (as conflicting child configurations).

Lichtenberg teaches:

> extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model;

as combing two DAG where there is ancestral configuration (as node with same configuration) is identified ([0076]-[0084]).

Lichtenberg teaches:

> restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family;

as determining the compatible and non-compatible products where one of the alternatives is selected ([0092]-[0096]).

Lichtenberg teaches:

> combining the configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions.

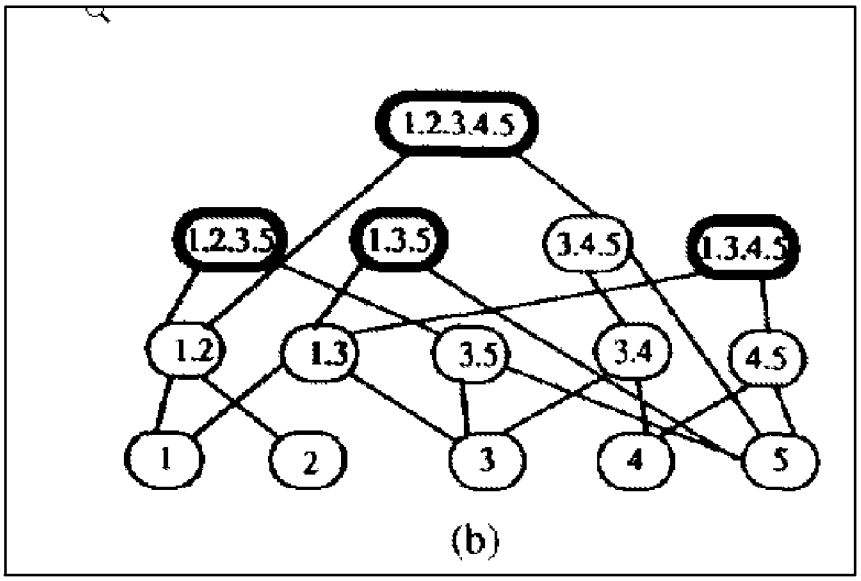
as combing the DAG ([0076]).

Arguendo, even if the amended limitations are not clearly taught by *Lichtenberg, Kramer teaches combining conflicting paths to remove loops to form a DAG and then simplifying and combining the DAGs (See Pg.810 and Fig10).*

Specifically, Kramer teaches the amended limitation:

> "…an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;"

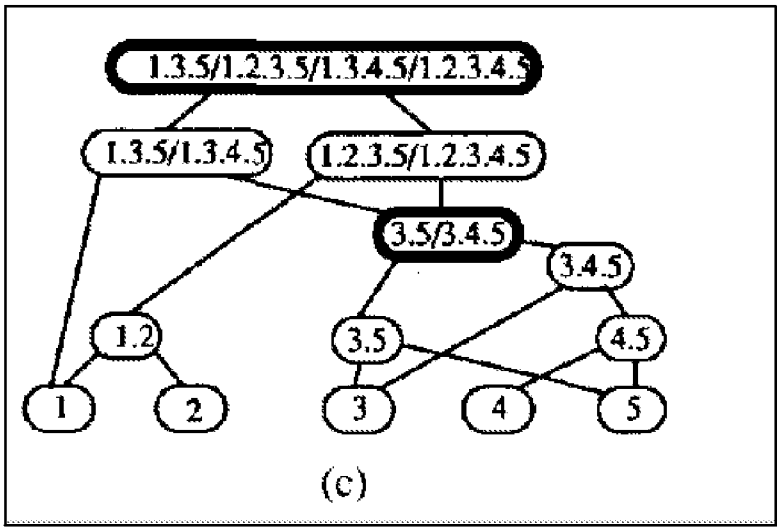
As different ancestral space for the two or more ancestral flows as flows 1.2.3.5, 1.3.5 and 1.3.4.5. The different child flows are shown as 1.2, 1.3, 3.5, 3.4 and 4.5.



Specifically, Kramer teaches the amended limitation:

> extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space

as extending the ancestral configuration model between two conflicting flows so the ancestral models are combined as shown bolded below in Fig.10 b. Please also see



Kramer Section IV. Construction of the DAG from the Control flow Graph. As can also be seen the dependent conflicting child node 1.3 is removed from the child configuration 1.3, 1.3.5 etc. DAG (See comparing Fig.10 (b) and (c)) thereby meeting the amended limitation …

> "…removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space".

And combining the first and second configuration models as 3.5 and 3.4.5 for example in Fig.10(c).

Kramer however fails to teach that the DAGs are for consolidating multiple configuration models and limits the teaching to consolidating multiple control paths in a non-cyclic way as in a DAG.

Lichtenberg cures this deficiency by applying the technique of combining DAGs, in this case product model DAGs for purpose of product model consolidation and configuration *related to the product*. (Lichtenberg: Fig.1).

It would have been obvious to one (e.g. a designer) of ordinary skill in the art at the time the invention was made to apply the teachings of Kramer and Lichtenberg to each other. The motivation to combine would have been that Lichtenberg teaches that there are multiple known methodologies to combine the DAG (Lichtenberg: [0076]), however fails to disclose the exact details, which is a deficiency Kramer cures by demonstrating through application (control flow graph DAGs) (Kramer: Fig.10 (b) and (c) and Section IV).

Regarding Claim 2

Lichtenberg teaches detecting any inconsistencies between rules included in the consolidated model (Lichtenberg: [0090]-[0094] – non–compatible products) and attempting to resolve any detected inconsistencies by not allowing the user to select a inconsistent solution (Lichtenberg: [0096]-[0108]).

Regarding Claim 3-4

Limitations presented in claims 3-4 are similar to limitations presented in claim 1 and rejected likewise. Lichtenberg teaches a system (Lichtenberg: [0043]) and a computer program (Lichtenberg: Fig. 2-3, [0272]) for implementing the method of claim 1. *Lichtenberg teaches wherein each model comprises only rules that define a non-cyclic chain of dependencies among families and features of families (Lichtenberg: [0062]-[0073]) and at least one model includes a rule that causes a*

configuration conflict with another model (Lichtenberg: [0062], [0090], [0092]-[0094], [0102]-[0105], [0134]-[-0150] – partial DAG representing features and families, [0162], [0191], [0383] – incompatibility between selected model and reconfiguration).

Newly amended limitations are taught by Kramer as well as shown in claim 1 rejection.

Regarding Claim 5

Lichtenberg teaches wherein the configuration models represent configuration models of vehicles (Lichtenberg: Fig.1 – Showing a bicycle).

Regarding Claim 6

Lichtenberg teaches wherein the consolidated model includes only buildable configurations (Lichtenberg: [0406]-[0412] – excluding incompatible selections).

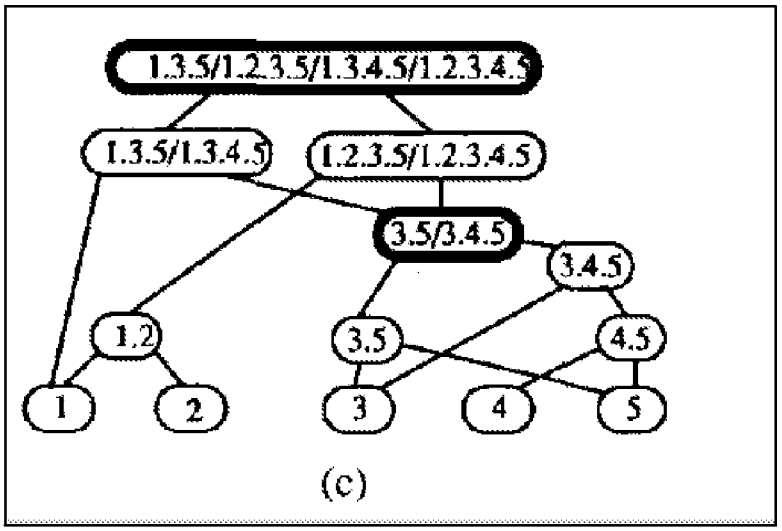
Regarding Claim 7

Lichtenberg teaches *extending the ancestor family of the product in the first conflicting configuration model to be compatible with second conflicting configuration model* as combining the DAG's (Lichtenberg: [0076]-[0084]) further comprises extending a rule from *the first conflicting configuration model into the ancestor family and* (Lichtenberg: [0062], [0076]-[0079]); and repairing the extension of the rule in the child family (Lichtenberg: [0133]-[0150]).

Kramer teaches the amended limitation:

> extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space

as extending the ancestral configuration model between two conflicting flows so the ancestral models are combined as shown bolded below in Fig.10 b. Please also see



Kramer Section IV. Construction of the DAG from the Control flow Graph. As can also be seen the dependent conflicting child node 1.3 is removed from the child configuration 1.3, 1.3.5 etc. DAG (See comparing Fig.10 (b) and (c)) thereby meeting the amended limitation …

> "…removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space".

Regarding Claim 8

Lichtenberg teaches combining the *configuration* models into a single, consolidated *configuration* model further comprises loading the *configuration* models into a memory of the computer system (Lichtenberg: [0027]-[0034], [0224]-[0233], [0272]-[0274]); constructing a directed acyclic graph of all rules in all the models (Lichtenberg: [0272]-[0274]); for each *configuration* model, determining which portions of an overall configuration space for which the *configuration* model does not provide a buildable configuration (Lichtenberg: [0008], [0060] and [0090]); and for each *configuration* model, constraining statements of the rules with in the

configuration model to fall within a space of defining features of the *configuration* model (Lichtenberg: [0061]-[0062]).

Regarding Claim 9

Lichtenberg teaches

> "determining which portions of an overall configuration space for which each *configuration* model does not provide a buildable configuration further comprises determining which families are ancestors of families of defining constraints and subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations."

as providing an intersection to provide all compatible (buildable) or incompatible (un-buildable) products (Lichtenberg: [0085]-[0094]).

Regarding Claim 10

System claim 10 discloses similar limitations as claim 2 and is rejected for the same reasons as claim 2. Claim is amended for grammatical reasons.

Regarding Claim 11

System claim 11 discloses similar limitations as claim 5 and is rejected for the same reasons as claim 5.

Regarding Claim 12

System claim 12 discloses similar limitations as claim 6 and is rejected for the same reasons as claim 6.

Regarding Claim 13

System claim 13 discloses similar limitations as claim 7 and is rejected for the same reasons as claim 7. Further, claim is amended for grammatical reasons.

Regarding Claim 14

System claim 14 discloses similar limitations as claim 8 and is rejected for the same reasons as claim 8. Claim is amended for grammatical reasons.

Regarding Claim 15

System claim 15 discloses similar limitations as claim 9 and is rejected for the same reasons as claim 9. Claim is amended for grammatical reasons.

Regarding Claims 16-21

Computer program product claims 16-21 disclose similar limitations as claim 2, 5-9 and are rejected for the same reasons as claims 2, 5-9 respectively.

Regarding Claim 22

Limitations presented in claim 22 are similar to limitations presented in claim 1 and rejected likewise. No specific support was cited for “means for” language and is this claim is interpreted ordinarily.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AKASH SAXENA whose telephone number is (571)272-8351. The examiner can normally be reached on 8:00- 6:00 PM Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini S. Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Akash Saxena/
Examiner, Art Unit 2128

/Hugh Jones/
Primary Examiner, Art Unit 2128

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10827078	BECK ET AL.
	Examiner	Art Unit
	AKASH SAXENA	2128

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	07/02/2008	03/27/2009							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
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	18	✓	✓							
	19	✓	✓							
	20	✓	✓							
	21	✓	✓							
	22	✓	✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10827078	BECK ET AL.
	Examiner	Art Unit
	AKASH SAXENA	2128

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
No new search was performed.	7/2/2008	AS
Consulted Alex kosowski on the action	7/2/2008	AS
No new search was performed	3/27/2009	AS

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

/A. S./ Examiner.Art Unit 2128	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Versata Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,078	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

October 2, 2009

FILED ELECTRONICALLY

RESPONSE TO OFFICE ACTION

Dear Sir:

This paper responds to the non-Final Office Action dated April 2, 2009, having a shortened statutory period expiring on July 2, 2009. Accompanying this response is a petition under 37 C.F.R. § 1.136 for extension of time by three (3) months, setting a new time for response of October 2, 2009. Further examination and reconsideration are respectfully requested.

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A method of using a computer system to consolidate multiple configuration models of a product, the method comprising:

performing with the computer system:

identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions related to the product.

2. (Original) The method of claim 1 further comprising:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

3. (Previously Presented) A computer system configured for consolidating multiple configuration models of a product, the system comprising:

a processor; and

a memory, coupled to the processor, having code stored therein and executable by the processor for:

identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions related to the product.

4. (Currently Amended) A tangible, computer readable medium having instructions encoded therein and executable by a processor to consolidate multiple configuration models of a product, the instructions comprising code for:

identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families

and features of families for use in answering configuration questions related to the product.

5. (Previously Presented) The method of claim 1 wherein the configuration models represent configuration models of vehicles.

6. (Previously Presented) The method of claim 1 wherein the consolidated model includes only buildable configurations.

7. (Previously Presented) The method of claim 1 wherein:

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family further comprises:

extending a rule from the first configuration model into the ancestor configuration model family space; and

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space further comprises:

repairing the extension of the rule in the child family.

8. (Previously Presented) The method of claim 1 wherein combining the first and second models into a single, consolidated model further comprises:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules within the configuration model to fall within a space of defining features of the configuration model.

9. (Previously Presented) The method of claim 8 wherein determining which portions of an overall configuration space for which each configuration model does not provide a buildable configuration further comprises:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

10. (Previously Presented) The system of claim 3 further comprising code for:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

11. (Previously Presented) The system of claim 3 wherein the configuration models represent configuration models of vehicles.

12. (Previously Presented) The system of claim 3 wherein the consolidated model includes only buildable configurations.

13. (Previously Presented) The system of claim 3 wherein:

the code for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space comprises code for extending a rule from the first conflicting configuration model into the ancestor family; and

the code for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space comprises code for repairing the extension of the rule in the child family.

14. (Previously Presented) The system of claim 3 the code for combining the first and second models into a single, consolidated model further comprises code for:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules within the configuration model to fall within a space of defining features of the configuration model.

15. (Previously Presented) The system of claim 14 wherein the code for determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration further comprises code for:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

16. (Previously Presented) The computer readable medium of claim 4 further comprising code for:

detecting any inconsistencies between rules included in the consolidated model; and

attempting to resolve any detected inconsistencies.

17. (Previously Presented) The computer readable medium of claim 4 wherein the models represent configuration models of vehicles.

18. (Previously Presented) The computer readable medium of claim 4 wherein the configuration models represent configuration models of vehicles.

19. (Previously Presented) The computer readable medium of claim 4 wherein:

the code for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space comprises code for extending a rule from the first conflicting configuration model into the ancestor family; and

the code for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space comprises code for repairing the extension of the rule in the child family.

20. (Previously Presented) The computer readable medium of claim 4 the code for combining the first and second models into a single, consolidated model further comprises code for:

loading the configuration models into a memory of the computer system;

constructing a directed acyclic graph of all rules in all the configuration models;

for each configuration model, determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration; and

for each configuration model, constraining statements of the rules within the configuration model to fall within a space of defining features of the configuration model.

21. (Previously Presented) The computer readable medium of claim 20 wherein the code for determining which portions of an overall configuration space for which the configuration model does not provide a buildable configuration further comprises code for:

determining which families are ancestors of families of defining constraints; and

subtracting a right hand side and a left hand side of each rule of each family that are ancestors of families of defining constraints from a rule representing all buildable configurations.

22. (Previously Presented) A computer system for performing an automatic consolidation of multiple configuration models of a configurable product, the system comprising:

means for identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

means for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

means for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

means for combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in providing an answer to configuration questions related to the product.

REMARKS

Claims 1-22 are pending.

Claims 1-22 stand rejected.

Claims 1 and 4 have been amended.

Claim Rejections - 35 U.S.C. § 101

Claims 1-22 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter and as not being supported by either a specific asserted utility of a well established unity.

The Federal Circuit recently addressed the subject of subject matter patentability in *In re Bilski*, 545 *F.3d* 943 (Fed. Cir. 2008) (*en banc*). In *In re Bilski*, the court "conclude[ed] that the "useful, concrete and tangible result" inquiry is inadequate and reaffirm[ed] that the machine-or-transformation test outlined by the Supreme Court is the proper test to apply." *Id*. "The machine-or-transformation test is a two-branched inquiry; an applicant may show that a process claim satisfies §101 either by showing that his claim is tied to a particular machine, or by showing that his claim transforms an article." *Id*.

The method of claim 1 is specifically tied to a particular machine, namely "a computer system". Claim 1. More specifically, claim 1 is a "method of using a computer system" and the first element of claim 1 recites "performing with the computer system" *Id*. Claim 1 certainly has a practical application of being able to combine first and second configuration models of a product" and "in answering configuration questions relating to the product."

The Office Action states that since the particular product is not specified, claim 1 is directed to a general application not a specific application. However, Applicants respectfully submit that determination of statutory subject matter does not turn on specific application versus general application, particularly in the context of whether the claim recites a "product" or a specific product. The Federal Circuit has stated that "certain types of mathematical subject matter, standing alone, represent nothing more

than abstract ideas until reduced to some type of practical application." *In re Alappat*, 33 F.3d 1526 (Fed. Cir. 1994) (emphasis added). Thus, the inquiry in this instance, the 35 U.S.C. § 101 inquiry is based on whether claim 1 has a practical application not whether the application is general or specific. Since claim 1 is tied to a particular machine and has a practical application, Applicants respectfully submit that claim 1 recites statutory subject matter under 35 U.S.C. § 101.

Claim 3 is a particular machine, namely "A computer system … comprising: a processor; and a memory, coupled to the processor, having code stored therein and executable by the processor for: … ." Claim 1 certainly has a practical application of being able to combine first and second configuration models of a product" and "in answering configuration questions relating to the product." Claim 1 is, thus, patentable under 35 U.S.C. § 101.

Claim 4 has been amended to recite "A tangible, computer readable medium … ." and, thus, excludes signals *per se*.

Applicants respectfully submit that claims 1, 3, and 4 meet the requirements of 35 U.S.C. § 101

Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 112

Claims 1-22 stand rejected under 35 U.S.C. § 112, first and second paragraphs. Applicants respectfully traverse the rejections.

The Examiner states that the rationale for rejection under 35 U.S.C. § 112, 1st paragraph "is based on the 101 - abstract idea, which is a separate inquiry than the one addressed in [*In re Bilski*]." Applicants respectfully submit that the Examiner's basis for rejection is essentially the same basis as the rejection under 35 U.S.C. § 101. *In re Bilski* specifically addressed abstract ideas and their patentability. The Federal Circuit specifically said that, "The true issue before us then is whether Applicants are seeking to

claim a fundamental principle (such as an abstract idea) or a mental process." *In re Bilski*, 545 F.3d 943, 88 U.S.P.Q.2d 1385 (Fed. Cir. 2008) (*en banc*).

Accordingly, for at least the same reasons presented in response to the 35 U.S.C. § 101 rejection, Applicants respectfully request withdrawal of the 35 U.S.C. § 112, 1st paragraph rejection.

The Examiner has maintained a rejection under 35 U.S.C. § 112, 1st paragraph with regard to enablement. The Examiner states that "Applicant has merely pointed to specification [0098]-[0101], without any guidance or specific description how the steps of extending, removing, and combining are enabled." Office Action, p. 3, para. 13.

The burden is on the Examiner to establish a *prima facie* case of noneanblement. Applicants have specifically pointed the Examiner to exemplary, enabling sections. However, the Examiner has dismissed Applicants' response for not providing guidance to enablement. Applicants respectfully submit that the cited sections represent an exemplary guidance to enablement. Applicants have already pointed out that with regard to support for "identifying a conflict between at least two of the configuration models", the Specification of the Present Application includes a "Check for unspecified buildables." Present Application, para. (96). In one embodiment, the presence of an unspecified buildable indicates a conflict between at least two configuration models that triggers allowing a rule from one model to extend into another at a non-trivial family and repair the extension at a family below the non-trivial family. Figure 10 and the Present Application, paras. (68)-(144), provide specific details and an example that meet the enablement requirement. Applicants respectfully request the Examiner to specifically set forth the reasons as to why the cited sections do not enable one of ordinary skill in the art to make and use the aspect of the invention being rejected or withdraw the rejection.

The Office Action also states that, "Further, even if the cited section may teach the limitation, the specification cited cannot be imported in to claim." Office Action, p. 3, para. 13. Applicants respectfully submit that enablement under 35 U.S.C. § 112, 1st para. does not require that the "specification … be imported in to [the] claim" in order to

provide enablement as implied in the Office Action. 35 U.S.C. § 112, 1st paragraph requires that:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Clearly, enablement under 35 U.S.C. § 112, 1st paragraph does not require importation of limitations into the claims to meet the enablement requirement.

The Examiner alleges that the means for identifying, extending, removing, and combining in claim 22 are not disclosed. Referring to Figure 10, operations 1002-1003 represent an exemplary "means for identifying …", operations 1004 and 1105 represent an exemplary "means for extending", operations 1006, 1009, 1010, and Figure 11 represent an exemplary "means for removing", and operation 1010 represents an exemplary "means for combining". The foregoing identify exemplary means to perform the identified functions and are not intended to be an exclusive identification of the means for performing the identified functions. The functions do not necessarily require all parts of the operations identified and other operations may also perform the identified functions.

Note, the present invention is defined by the claims and not by specific embodiments in the Specification of the Present Application.

Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 U.S.C. § 103

Claims 1-22 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over U.S. Publication No. 2002/0165701 to Lichtenberg et al. (hereinafter "*Lichtenberg*") in view of the IEEE article "The Combining DAG: A Technique for Parallel Data Flow Analysis by Robert Kramer et al. (hereinafter "*Kramer*"). Applicants respectfully traverse the rejection.

Applicants respectfully submit that *Lichtenberg* in view of *Kramer* neither teaches nor suggests "consolidat[ing] **multiple** configuration models of a product." Claims 1, 3, and 4.

The Office Action, p. 4, states that:

> Applicant has repeatedly alleged that Lichtenburg's (sic) single product model with various alternatives to the components with values and rules is not the same as multiple configurations **of applicant's product model**. However applicant has failed to provide any argument why the multiple configurations are different and cannot be given broadest reasonable interpretation as product comprising alternatives to component making up various configurations. In fact the specification Fig. 9A confirms that the variations is due to various engine alternatives in car model.

Applicants respectfully submit that the Office Action has mischaracterized the invention of claims 1, 3, and 4, and the statement regarding Fig. 9A cannot be logically sustained.

The invention of claims 1, 3, and 4 relate to consolidating **multiple** configuration models of a product. The Examiner on p. 4 refers to "multiple configurations of applicant's product model." However, an accurate characterization should refer to "**multiple** configuration **models**" not "multiple **configurations** of applicant's product **model**."

This is significant because although claims 1, 3, and 4 refer to "combining the **first and second configuration models** into a single, consolidated model", *Lichtenberg* in view of *Kramer* relates to simplification of a "**single** model" not "combining first and second configuration **models**."

A single model is clearly different than multiple models. Referring to Figure 9A of the Present Application, two distinct configuration models are depicted, i.e. configuration model 602 and 822. **By inspection**, configuration models 602 and 822 are not a single model. On the other hand, *Lichtenberg* repeatedly refers to a **single** product model. For example, "**The** product model", [*Lichtenberg*, para. 0233], "**The** Product Model" [*Id.*, para. 0234], "**the** product model" [*Id.*, para. 0235], "**the** product model" [*Id.*,

para. 0236], "**a** computer product model" [*Id.*, para. 0237], and so on. Thus, *Lichtenberg* itself makes the distinction by continually reciting a **single** model. Applicants respectfully submit that given *Lichtenberg*'s repeated representation of a product model in the singular, the broadest interpretation of *Lichtenberg* cannot include multiple configuration models. Claims 1, 3, and 4 clearly refer to multiple configuration models, and, thus, cannot be construed as a "single product model."

Additionally, given that *Lichtenberg* relates to a **single** model, there is no reason in *Lichtenberg* for "combining the first and second configuration models into a single, consolidated model" as required by claims 1, 3, and 4.

As previously mentioned, Figure 9A of the Present Application depicts two exemplary configuration models 602 and 822. Model 922 is a result of combining the two configuration models. The two models 602 and 822 have a variation relating to the engine models. The variation is not what causes the configuration models to be distinct. They are simply two separate models. However, the variation between models 602 and 612 (Figure 6, from which model 822 is derived) is a clear indication of their distinction as separate models.

It does not logically follow that a model that includes alternate selections teaches two models. Simply because a model provides for alternative feature selections does not necessitate two different models. Configuration model 602 clearly illustrates this point. Engine 1 and Engine 2 are alternative selections in Market 1. However, simply because alternatives exist does not mean that configuration model 602 is more than one model. Thus, having alternative selections does not necessarily mean that the model is the same as two models. Accordingly, multiple configuration models are distinct from a single model regardless of intra-model selection choices or inter-model variations.

Thus, *Lichtenberg* teaches that a product is represented by a **single** model and does not address "consolidate[ing] multiple configuration models of a product". *Id.* More specifically, "a product model is used to model relevant aspects of the product." *Lichtenberg*, para. 0224. "The product model describes components, attributes for these components, as well as alternatives for each component and values for each attribute."

Id., para. 0226. "Furthermore the product model comprises a group of rules relating to compatibilities between components and attributes." *Id.* See also, *Lichtenberg*, paras. 0234-0261 which describe the product model in detail. Notably, *Lichtenberg* no where does *Lichtenberg* discuss "consolidat[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4.

Lichtenberg teaches representing the **single** model as a directed acyclic graph (DAG). *Lichtenberg* teaches that "the product model is encoded as a virtual table[, and] the virtual table is a directed acyclic graph that represents all consistent configurations." *Lichtenberg*, para. 0231. *Lichtenberg* teaches that:

> An important aspect of the invention is the process of transforming **a** product model to a compact and efficient representation. The purpose of the transformation is to first find a way of encoding and finding all solutions to the configuration problem and then tabulate them virtually in a virtual table such that information relating to the configuration problem can be obtained by efficient queries to the virtual table. The encoding involves finding an encoding of the components of the product model and a corresponding encoding of the rules. A DAG will represent all the rules, such that enquiries about valid solutions to the rules can be performed efficiently. *Lichtenberg*, para. 0274.

Thus, the DAG is used to represent all the rules of a **single** product model and is unrelated to "consolidate[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4.

Lichtenberg does teach "combining two DAGs". *Lichtenberg*, para. 0076. However, Applicants respectfully submit that the combining of DAGs taught by *Lichtenberg* is not in the context of "consolidate[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4. Specifically, *Lichtenberg* teaches:

> [0077] In order to maintain a suitable DAG, the representing of the rules in the DAG may further comprise the steps of:
>
> [0078] identifying a first and a second node having the same expression and the pointers of which point to the same nodes, and
>
> [0079] having pointers pointing to the first node point to the second node.

[0080] In that situation, two nodes actually representing the same contents are reduced to only one.

Lichtenberg also teaches:

[0134] It is preferred to modify the DAG by as early as possible removing the "hidden" components. This may be done by:

[0135] for each of the rules, constructing a partial DAG representing the rule,

[0136] identifying at least one of the components to be hidden,

[0137] selecting an ordering of the identified components,

[0138] initially constructing an actual DAG representing no rules and then repeatedly,

[0139] selecting a non-selected component of lowest order,

[0140] repeatedly, until all partial DAGs comprising expressions relating to the selected component have been chosen:

[0141] choosing a partial DAG comprising expressions relating to the selected component,

[0142] combining the actual DAG with the chosen partial DAG into a new actual DAG,

[0143] changing the actual DAG by:

[0144] identifying nodes in the actual DAG comprising expressions relating to the identified component,

[0145] removing these nodes from the actual DAG,

[0146] adding nodes, not comprising expressions relating to the identified component, to the actual DAG so that the compatibilities implied by the identified component are reflected by the actual DAG,

[0147] providing the DAG by combining the actual DAG with all non-chosen partial DAGs.

Accordingly, *Lichtenberg* teaches representing the **single** model as a directed acyclic graph (DAG), and *Lichtenberg*'s teachings regarding combining DAGs does not

teach or suggest "combining the first and second configuration models into a single, consolidated model." Claims 1, 3, and 4.

Additionally, Applicants respectfully submit that para. 0006 of *Lichtenberg* is not referring to a conflict between "multiple configuration models of a product" but is rather referring to alternative choices to be made when configuring a product, i.e. "a specific alternative must be selected for each of the components to build the complex product." *Lichtenberg*, para. 0006. Furthermore, Applicants respectfully submit that paras. 0007-0008 do not refer to conflicting models but rather relate to (i) configuring a product by choosing alternatives and (ii) "all combinations of the alternatives will not work." *Id.*, para. 0008. For example, if "the front and the rear wheel must be of the same type" then an alternative type rear wheel would be incompatible with a different type of front wheel. Thus, references to alternatives in *Lichtenberg* and ""all combinations of the alternatives will not work" is not a reference to "combining the first and second configuration models into a single, consolidated model." Claims 1, 3, and 4.

Regarding *Kramer*, the Examiner admits that "*Kramer* however fails to teach that the DAGs are for consolidating multiple configuration models and limits the teaching to consolidating multiple paths in a non-cyclic way as in a DAG." Office Action, p. 13.

Accordingly, since neither *Lichtenberg* nor *Kramer* relate to "consolidate[ing] multiple configuration models of a product" as recited by claims 1, 3, and 4, *Lichtenberg* in view of *Kramer* fail to teach or suggest:

> consolidate[ing] multiple configuration models of a product [] comprising[]:
>
> > identifying a conflict between at least two of the configuration models, wherein the configuration models are organized in accordance with respective directed acyclic graphs, each configuration model includes at least one ancestor configuration model family space and a child configuration model family space below the ancestor configuration model family space, a first of the conflicting configuration models comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space

constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs;

extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space;

removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and

combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions related to the product.

For at least the foregoing reasons, Applicants respectfully request withdrawal of the rejection of claims 1, 3, and 4 and claims directly or indirectly dependent thereon.

CONCLUSION

Applicant respectfully submits that all pending claims are in condition for allowance. Accordingly, Applicant requests that a Notice of Allowance be issued. Nonetheless, should any issues remain that might be subject to resolution through a telephone interview, the Examiner is requested to telephone the undersigned at 512-338-9100.

CERTIFICATE OF TRANSMISSION

I hereby certify that on October 2, 2009, this correspondence is being transmitted via the U.S. Patent & Trademark Office's electronic filing system.

/Kent B. Chambers/

Respectfully submitted,

/Kent B. Chambers/

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Attorney for Applicant(s)
Reg. No. 38,839

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brandon M. Beck, Shawn A. P. Smith		
Assignee:	Versata Development Group, Inc.		
Title:	Consolidation of Product Data Models		
Serial No.:	10/827,978	Filed:	April 19, 2004
Examiner:	Akash Saxena	Group Art Unit:	2128
Docket No.:	T00113	Customer No.:	33438

FILED ELECTRONICALLY October 2, 2009

PETITION FOR EXTENSION OF TIME

Dear Sir:

Applicants respectfully petition for a three (3) month extension of time within which to respond to the April 2, 2009 outstanding Office Action, such extension allowing the undersigned until October 2, 2009 to respond.

The extension fee is being paid via the USPTO-EFS. The Commissioner is authorized to deduct any additional fees which may be required or credit any overpayment to Deposit Account No. 502264.

CERTIFICATE OF TRANSMISSION

I hereby certify that on October 2, 2009, this correspondence is being transmitted via the U.S. Patent & Trademark Office's electronic filing system.

/Kent B. Chambers/

Respectfully submitted,

/Kent B. Chambers/

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Attorney for Applicant(s)
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Electronic Patent Application Fee Transmittal

Application Number:	10827078
Filing Date:	19-Apr-2004
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Filer:	Kent Bryan Chambers
Attorney Docket Number:	T00113

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**1110**

Electronic Acknowledgement Receipt

EFS ID:	6197748
Application Number:	10827078
International Application Number:	
Confirmation Number:	1866
Title of Invention:	Consolidation of product data models
First Named Inventor/Applicant Name:	Brandon M. Beck
Customer Number:	33438
Filer:	Kent Bryan Chambers
Filer Authorized By:	
Attorney Docket Number:	T00113
Receipt Date:	02-OCT-2009
Filing Date:	19-APR-2004
Time Stamp:	22:20:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1110
RAM confirmation Number	4832
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / .zip	Pages (if appl.)

1	Amendment/Req. Reconsideration-After Non-Final Reject	T00113_ROA_4_2_09.pdf	153562 5c792b9113325676f06e089b7ea236bfb21da50b	no	19
Warnings:					
Information:					
2	Extension of Time	T00113_Extension_10_2_09.pdf	70265 fac48c6c0a05e50faa27588768958f030d917671	no	1
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	29849 83420825e3557485d4c14e6de4468348b8799414	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	253676	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/827,078	04/19/2004	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY ☐ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 10/02/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 22	Minus	** 22	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/NICOLE LOVE-HENSLEY/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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NOTICE OF ALLOWANCE AND FEE(S) DUE

33438 7590 01/27/2010

HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720

EXAMINER	
SAXENA, AKASH	
ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 01/27/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,078	04/19/2004	Brandon M. Beck	T00113	1866

TITLE OF INVENTION: CONSOLIDATION OF PRODUCT DATA MODELS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$0	$0	$1510	04/27/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

33438 7590 01/27/2010

HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,078	04/19/2004	Brandon M. Beck	T00113	1866

TITLE OF INVENTION: CONSOLIDATION OF PRODUCT DATA MODELS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$0	$0	$1510	04/27/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
SAXENA, AKASH	2128	703-008000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,078	04/19/2004	Brandon M. Beck	T00113	1866

33438 7590 01/27/2010

HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720

EXAMINER	
SAXENA, AKASH	
ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 01/27/2010

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/827,078	BECK ET AL.	
	Examiner	Art Unit	
	AKASH SAXENA	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *10/02/2009*.

2. ☒ The allowed claim(s) is/are *1-22*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

1. Claim(s) 1-22 has/have been presented for examination based on amendment filed on 10/02/2009.
2. Claim(s) 1, 4 and 22 is/are amended.
3. Claim rejection under 35 USC § 101 is withdrawn in view of applicant's amendment to claim 1, 4 and 22.
4. Claim rejection under 35 USC § 112 is withdrawn in view of applicant's arguments and specification [0098]-[0101] & Fig.10. For claim 22 the Means for language seems to have support in the operations which are performed by a specific computer programmed to perform the operations as disclosed in Fig.10.
5. Claim(s) 1-22 are now allowable.

Allowable Subject Matter

6. The following is an examiner's statement of reasons for allowance: claims 1-22 are considered allowable since when reading the claims in light of the specification, none of the references of record alone or in combination disclose or suggest the combination of limitations specified in the independent claims, specifically *extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space; removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space; and combining the first and second configuration models into a single,*

consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in answering configuration questions related to the product as disclosed in independent claims 1, 3, 4 and 22 of the instant application (as defined specification [0068]-[0105] and example as presented in [106]-[0144] of the instant application).

7. A practical application for the invention is disclosed on page 1 under field of invention.
8. The Prior art of reference **Lichentenberg** (US PGPUB 2002/0165701) discloses The preferred embodiment of the present invention, Virtual Tabulation, is a method for keeping track of inter-depencies among a large number of parts, to allow for the construction of an efficient and exact configuration program. Such a program allows interactive configuration over networks (e.g., the Internet). Another aspect of the invention, called Smart Search, allows a set of inter-dependencies among parts to be computed from a product database. However as argued Lichentenberg does not teach combining two product configurations, merely navigation between one product configuration and combining of sub configuration (Lichentenberg: [0138]-[0146].
9. The Prior art of reference, NPL, **Kramer** fails to teach teach that the DAGs are for consolidating multiple configuration models and limits the teaching to consolidating multiple control paths in a non-cyclic way as in a DAG.
10. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AKASH SAXENA whose telephone number is (571)272-8351. The examiner can normally be reached on 8:00- 6:00 PM Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini S. Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Akash Saxena/
Examiner, Art Unit 2128

/Kamini S Shah/
Supervisory Patent Examiner, Art Unit 2128

Notice of References Cited	Application/Control No. 10/827,078	Applicant(s)/Patent Under Reexamination BECK ET AL.	
	Examiner AKASH SAXENA	Art Unit 2128	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,515,524 A	05-1996	Lynch et al.	703/13
*	B	US-5,576,965 A	11-1996	Akasaka et al.	700/97
*	C	US-5,615,341 A	03-1997	Agrawal et al.	705/10
*	D	US-5,802,508 A	09-1998	Morgenstern, Leora	706/55
*	E	US-5,825,651 A	10-1998	Gupta et al.	703/6
*	F	US-5,873,081 A	02-1999	Harel, Dov	707/3
*	G	US-5,996,114 A	11-1999	Moeller, Gert Lykke	714/699
*	H	US-6,009,406 A	12-1999	Nick, Sascha	705/10
*	I	US-6,002,854 A	12-1999	Lynch et al.	703/1
*	J	US-6,178,502 B1	01-2001	Caswell et al.	713/1
*	K	US-6,216,109 B1	04-2001	Zweben et al.	705/8
*	L	US-6,241,775 B1	06-2001	Blatchford, Brian Stephen	623/27
*	M	US-6,300,948 B1	10-2001	Geller et al.	715/866

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0013631 A1	01-2002	PARUNAK et al.	700/28
*	B	US-6,405,308 B1	06-2002	Gupta et al.	713/1
*	C	US-2002/0165701 A1	11-2002	Lichtenberg et al.	703/7
*	D	US-2003/0069737 A1	04-2003	Koubenski et al.	705/1
*	E	US-6,584,369 B2	06-2003	Patel et al.	700/100
*	F	US-2004/0002838 A1	01-2004	Oliver et al.	703/2
*	G	US-2004/0030786 A1	02-2004	Zehavi, Abraham	709/229
*	H	US-2004/0133457 A1	07-2004	Sadiq et al.	705/007
*	I	US-6,807,576 B1	10-2004	Jeffries et al.	709/225
*	J	US-6,882,892 B2	04-2005	Farrah et al.	700/97
*	K	US-6,983,187 B2	01-2006	Kern, Thomas	700/97
*	L	US-2006/0106626 A1	05-2006	Jeng et al.	705/001
*	M	US-2006/0136904 A1	06-2006	Weidman et al.	717/172

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 10/827,078	Applicant(s)/Patent Under Reexamination BECK ET AL.	
	Examiner AKASH SAXENA	Art Unit 2128	Page 3 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,171,400 B2	01-2007	Koubenski et al.	707/3
*	B	US-7,188,333 B1	03-2007	LaMotta et al.	717/106
*	C	US-2007/0074180 A1	03-2007	Hinchey et al.	717/136
*	D	US-2008/0147584 A1	06-2008	Buss, Duane	706/47
*	E	US-7,480,597 B2	01-2009	Clark et al.	703/2
*	F	US-7,574,379 B2	08-2009	Flaxer et al.	705/26
*	G	US-7,584,079 B2	09-2009	Lichtenberg et al.	703/2
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BIB DATA SHEET

CONFIRMATION NO. 1866

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/827,078	04/19/2004 RULE	703	2128	T00113

APPLICANTS
Brandon M. Beck, Austin, TX; /AS/
Shawn A. P. Smith, Austin, TX; /AS/

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
06/28/2004

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /AKASH SAXENA/ (Examiner's Signature) ☐ Met after Allowance (Initials)	TX	13	~~4~~ 22	~~3~~ 4

ADDRESS
HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720
UNITED STATES

TITLE
Consolidation of product data models

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
1070	No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10827078	BECK ET AL.
	Examiner	Art Unit
	AKASH SAXENA	2128

SEARCHED

Class	Subclass	Date	Examiner
703	2	1/14/2010	AS
700	95,97	1/14/2010	AS
705	7	1/14/2010	AS
706	47	1/14/2010	AS

SEARCH NOTES

Search Notes	Date	Examiner
No new search was performed.	7/2/2008	AS
Consulted Alex kosowski on the action	7/2/2008	AS
No new search was performed	3/27/2009	AS
Updatde EAST Class and Text Search	1/14/2010	AS

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner
703	2	1/14/2010	AS
700	95,97	1/14/2010	AS
706	47	1/14/2010	AS
705	7	1/14/2010	AS

/A. S./ Examiner.Art Unit 2128	

Issue Classification

Application/Control No.	Applicant(s)/Patent Under Reexamination
10827078	BECK ET AL.
Examiner	**Art Unit**
AKASH SAXENA	2128

ORIGINAL		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
703	2	G 0 6 F 7 / 60 (2006.01.01)	
CROSS REFERENCE(S)		G 0 6 F 19 / 00 (2006.01.01)	
		G 0 6 F 9 / 44 (2006.01.01)	
		G 0 6 N 5 / 02 (2006.01.01)	

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
700	95	97			
705	7				
706	47				

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	17	17												
2	2	18	18												
3	3	19	19												
4	4	20	20												
5	5	21	21												
6	6	22	22												
7	7														
8	8														
9	9														
10	10														
11	11														
12	12														
13	13														
14	14														
15	15														
16	16														

/A. S./ Examiner.Art Unit 2128	01/14/2010	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	22	
/Kamini S Shah/ Supervisory Patent Examiner.Art Unit 2128	01/19/2010	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	101

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10827078	BECK ET AL.
	Examiner	**Art Unit**
	AKASH SAXENA	2128

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	07/02/2008	03/27/2009	01/14/2010						
	1	✓	✓	=						
	2	✓	✓	=						
	3	✓	✓	=						
	4	✓	✓	=						
	5	✓	✓	=						
	6	✓	✓	=						
	7	✓	✓	=						
	8	✓	✓	=						
	9	✓	✓	=						
	10	✓	✓	=						
	11	✓	✓	=						
	12	✓	✓	=						
	13	✓	✓	=						
	14	✓	✓	=						
	15	✓	✓	=						
	16	✓	✓	=						
	17	✓	✓	=						
	18	✓	✓	=						
	19	✓	✓	=						
	20	✓	✓	=						
	21	✓	✓	=						
	22	✓	✓	=						

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L8	1203	706/47.ccls.	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:04
L9	799	700/95.ccls.	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:04
L10	1310	700/97.ccls.	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:05
L11	4375	705/7.ccls.	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:05
L13	1	"20020165701"	USPAT	OR	OFF	2010/01/14 23:06
L14	2183	703/2.ccls.	USPAT	OR	OFF	2010/01/14 23:07
L15	3679	703/2.ccls.	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:07
L16	0	703/2.ccls. and (conflict$4 with (extend$4 expand$4) with (model configuration product hierarchy))	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:08
L17	0	700/95.ccls. and (conflict$4 with (extend$4 expand$4) with (model configuration product hierarchy))	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:08
L18	0	706/47.ccls. and (conflict$4 with (extend$4 expand$4) with (model configuration product hierarchy))	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:08
L19	0	700/97.ccls. and (conflict$4 with (extend$4 expand$4) with (model configuration product hierarchy))	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:08

L20	22	700/97.ccls. and (conflict$4 with (model configuration product hierarchy))	US-PGPUB; USPAT	OR	ON	2010/01/14 23:09
L21	48	703/2.ccls. and (conflict$4 with (model configuration product hierarchy))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/01/14 23:09
L22	224	(700/95,97.ccls. OR 706/47.ccls. OR 705/7.ccls. OR 703/2,1.ccls.) and (conflict$4 with (model configuration product hierarchy))	US-PGPUB; USPAT	OR	ON	2010/01/14 23:12
L23	16	(700/95,97.ccls. OR 706/47.ccls. OR 705/7.ccls. OR 703/2,1.ccls.) and (conflict$4 with (model configuration product hierarchy) same (combin$4 join $4))	US-PGPUB; USPAT	OR	ON	2010/01/14 23:12
L25	3	(700/95,97.ccls. OR 706/47.ccls. OR 705/7.ccls. OR 703/2,1.ccls.) and (conflict$4 with (model configuration product hierarchy) same (combin$4 join $4)).clm.	US-PGPUB; USPAT	OR	ON	2010/01/14 23:13
L26	324	(700/95,97.ccls. OR 706/47.ccls. OR 705/7.ccls. OR 703/2,1.ccls.) and ((product process model configuration) with (consolidat$4))	US-PGPUB; USPAT	OR	ON	2010/01/14 23:15
L27	0	(700/95,97.ccls. OR 706/47.ccls. OR 705/7.ccls. OR 703/2,1.ccls.) and ((product process model configuration) with (consolidat$4) with (DAG (non adj cyclic near5 depend $6)))	US-PGPUB; USPAT	OR	ON	2010/01/14 23:15

L28	4	(700/95,97.ccls. OR 706/47.ccls. OR 705/7.ccls. OR 703/2,1.ccls.) and ((product process model configuration) with (consolidat$4) with (directed acyclic graph))	US-PGPUB; USPAT	OR	ON	2010/01/14 23:16
L29	2	(700/95,97.ccls. OR 706/47.ccls. OR 705/7.ccls. OR 703/2,1.ccls.) and ((product process model configuration) with (consolidat$4) with (directed acyclic graph)).clm.	US-PGPUB; USPAT	OR	ON	2010/01/14 23:17
L30	0	(700/95,97.ccls. OR 706/47.ccls. OR 705/7.ccls. OR 703/2,1.ccls.) and ((product process model configuration) with (consolidat$4) with (directed adj acyclic adj graph)).clm.	US-PGPUB; USPAT	OR	ON	2010/01/14 23:17
L31	0	(700/95,97.ccls. OR 706/47.ccls. OR 705/7.ccls. OR 703/2,1.ccls.) and ((product process model configuration) with (combin$4) with (directed adj acyclic adj graph)).clm.	US-PGPUB; USPAT	OR	ON	2010/01/14 23:17
L32	1	((BRANDON) near2 (BECK)).INV.	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:51
L33	43	((SHAWN) near2 (SMITH)).INV.	US-PGPUB; USPAT	OR	OFF	2010/01/14 23:51

1/14/2010 11:53:55 PM
C:\Documents and Settings\asaxena\My Documents\EAST\Workspaces\10827078.wsp

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

33438 7590 01/27/2010

HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,078	04/19/2004	Brandon M. Beck	T00113	1866

TITLE OF INVENTION: CONSOLIDATION OF PRODUCT DATA MODELS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$0	$0	$1510	04/27/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
SAXENA, AKASH	2128	703-008000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Hamilton & Terrile, LLP
2 Kent B. Chambers
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Versata Development Group, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Austin, Texas

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 502264 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Kent B. Chambers/ Date April 27, 2010

Typed or printed name Kent B. Chambers Registration No. 38,839

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal

Application Number:	10827078
Filing Date:	19-Apr-2004
Title of Invention:	CONSOLIDATION OF PRODUCT DATA MODELS
First Named Inventor/Applicant Name:	Brandon M. Beck
Filer:	Kent Bryan Chambers/Terri Munoz
Attorney Docket Number:	T00113

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1510	1510
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**1510**

Electronic Acknowledgement Receipt

EFS ID:	7496526
Application Number:	10827078
International Application Number:	
Confirmation Number:	1866
Title of Invention:	CONSOLIDATION OF PRODUCT DATA MODELS
First Named Inventor/Applicant Name:	Brandon M. Beck
Customer Number:	33438
Filer:	Kent Bryan Chambers/Terri Munoz
Filer Authorized By:	Kent Bryan Chambers
Attorney Docket Number:	T00113
Receipt Date:	27-APR-2010
Filing Date:	19-APR-2004
Time Stamp:	14:17:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1510
RAM confirmation Number	24983
Deposit Account	502264
Authorized User	CHAMBERS,KENT B

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	T00113_IssueFee.pdf	105922 7a13e70687950c035546d09f83a4983a3abf1227	no	1
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	30241 a0d2fe339ca8c1dc433205e9d7ba229d3d070c34	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	136163		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,078	06/15/2010	7739080	T00113	1866

33438 7590 05/26/2010

HAMILTON & TERRILE, LLP
P.O. BOX 203518
AUSTIN, TX 78720

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 28 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Brandon M. Beck, Austin, TX;
Shawn A. P. Smith, Austin, TX;