## Ex. 1023

US Patent No. 5,765,205 ("Breslau")



### United States Patent [19]

Breslau et al.

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## [54] METHOD AND SYSTEM FOR ON-DEMAND SOFTWARE DISTRIBUTION

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[21] Appl. No.: 579,541

[22] Filed: Dec. 27, 1995

[51] Int. Cl.<sup>6</sup> ...... G06F 12/08

[52] U.S. Cl. ...... 711/203; 395/200.46

[56]

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[57]

### ABSTRACT

Techniques are presented for efficiently transferring computer code from a source computer to a target computer for execution on the target computer. A virtual memory space for the computer code is created on the target computer. The computer code is linked on the source computer such that addressing of the resulting executable version of the computer code corresponds to the allocated virtual memory space on the target computer. The executable computer code is then stored in the memory of the source computer. As the target computer executes the computer code, page faults result because its allocated virtual memory space is empty. The memory pages required to remediate the page faults are obtained from the source computer on an on-demand basis. Execution accordingly proceeds.

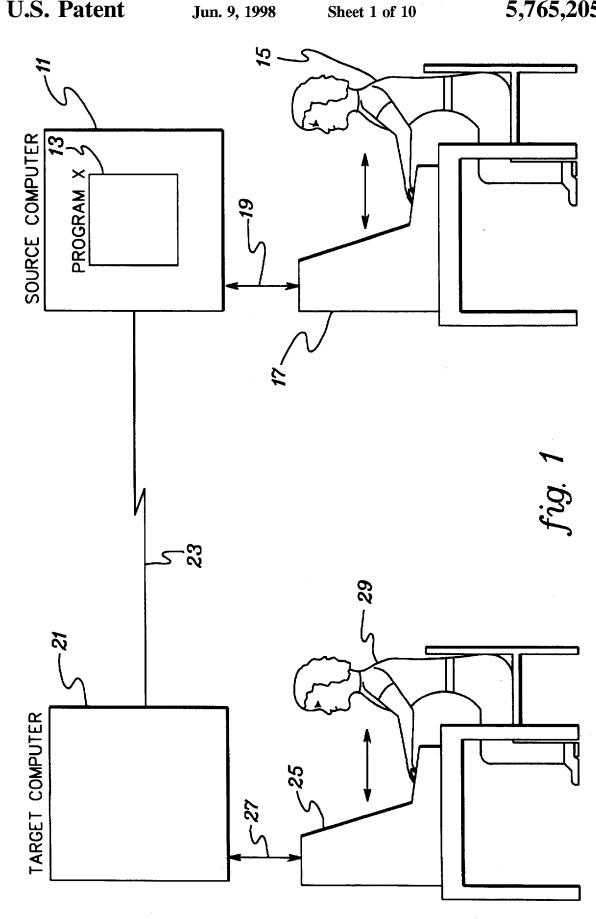
### 38 Claims, 10 Drawing Sheets

TARGET USER	TARGET COMPUTER	SOURCE COMPUTER	SOURCE USER
WANTS TO EXECUTE X		EXECUTING X (41)	
<del></del>	0K (49)	QUERIES PERMISSION FROM SOURCE USER (47)	-
	QUERIES SIZE OF X (51) —	RETURNS SIZE OF X (53)	
	ALLOCATES VIRTUAL STORAGE FOR X (55) SEND ORIGIN OF		
	VIRTUAL STORAGE (57)	CREATE A TARGET-ORIGIN VERSION OF PROGRAM X (59)	
	INFORM VSM THAT X'S PAGES ARE STORED ON SOURCE COMPUTER (63)	— DONE (51)	

TARGET USER	TARGET COMPUTER	SOURCE COMPUTER	SOURCE USER
	BEGIN EXECUTION OF X (65)  PAGE FAULT (67)  REQUEST PAGE (69)	•	
IF NECESS	) <del></del>	<del>_</del>	
SEES GUI (73)	Ĺ		
ELECTS A FUNCTION (7	75)		
SELECTS A FUNCTION (7	PAGE FAULT (77)		
SELECTS A FUNCTION (7  LOOI  F  NECESS	PAGE FAULT (77) REQUEST PAGE (79)		

TARGET USER	TARGET COMPUTER	SOURCE COMPUTER	SOURCE USER
CLOSE X's GUI (85)	DEALLOCATE X (87)		
	INFORM SOURCE COMPUTER OF TERMINATION OF X (89)		
		DEALLOCATE X (91)	
			<u> </u>





TARGET USER	TARGET COMPUTER	SOURCE COMPUTER SOL	SOURCE USER
> C C C C C C C C C C C C C C C C C C C	(43)	EXECUTING X (41)	
MANIS IO EXECUTE, A (43) ISSUES "GET X FROM SOURCE"	(43) DURCE" (45)		
		QUERIES PERMISSION FROM SOURCE USER (47)	<u> </u>
	OK (49) ★		l
	QUERIES SIZE OF X (31)	RETURNS SIZE OF X (53)	
	ALLOCATES VIRTUAL STORAGE FOR X (55)		
	SEND ORIGIN OF VIRTUAL STORAGE (57)	<b>^</b>	
	•	CREATE A TARGET-ORIGIN VERSION OF PROGRAM X (59)	
	V	— DONE (61)	
	INFORM VSM THAT X'S PAGES ARE STORED ON SOURCE COMPUTER (63)		
	fin 94	V	

	TABOUT COMBITTED	SOLIBOE COMPLITER	SOURCE USER
I ARGE I USER	I ANGEL COMPOLEN	SOOKCE COMING FIX	1000
	BEGIN EXECUTION OF X (65)		
	/ PAGE FAULT (67)		
007	P REQUEST PAGE (69)		
IF NECESSARY	SARY RETURN PAGE (71)		
(24)			
3EE3 601 (7.3)			
SELECTS A FUNCTION (75)	75)		
	(PAGE FAULT (77)		
			i
NECESSARY	SARY RETURN PAGE (81)		
	EXECUTE PAGE (83)		
	fia 2B	3	

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