PHILIPS

BeComm corporation

Multimedia Framework
Project Proposal
January 20, 2003

INTRODUCTION

Enclosed is a two stage proposal for enabling the advanced multimedia capabilities demonstrated to Philips at CES 2003. The two stage approach is designed to provide Philips with the short-term ability to demonstrate the capabilities of BeComm's media framework a Philips iPronto with a longer term goal of providing Philips the most advanced UPnP framework available in the market.

In Stage 1, BeComm will Strings enable an iPronto and develop a Java application written to the Strings Multimedia RADkit. This application will allow the iPronto to serve as a control point for Strings, UPnP and UPnP A/V devices. Philips can use this to demonstrate all the capabilities BeComm showcased at CES 2003.

In Stage 2, BeComm will incorporate UPnP and UPnP A/V capabilities directly into Strings. This will reduce the overall footprint of the media device and also increase media processing performance by eliminating the need for a separate UPnP stack. In addition, by integrating UPnP capabilities directly into Strings, other UPnP devices will be able to leverage the Strings Namespace as a Content Directory Service. Similarly, Strings devices will be able to access content available on UPnP Content Directory Services seamlessly through the Strings Namespace.

The end result of the two stages will be a powerful media platform that at once serves the goal of standards compliance with UPnP while providing Philips with a differentiating capability set through the advanced media management capabilities inherent in Strings.

BeComm has been involved in the research and development of multimedia solutions for over six years. In addition to our flagship product, Strings, we have explored, developed, and commercially deployed solutions spanning processing of audio and video content to the development of distributed content management systems and user-interfaces for accessing content.

Our mission is to deliver solutions to our customers by focusing our wealth of experience and technology capabilities on customer requirements. We are pleased to have the opportunity to demonstrate our capabilities and expertise in the context of this proposal.

Sincerely,

The BeComm Team.

Implicit Exhibit 2042
Sonos v. Implicit, IPR2018-0766, -0767

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Relevant Technology

Strings

Strings is a platform for distributed networking. It provides a framework upon which connected applications can quickly be developed and deployed. The framework is composed of a runtime environment and a series of Rapid Application Development Kits (RADkits) that provide developers with complete tools for building applications.

Strings Namespace

The Strings Namespace is an attribute-based file system for storing, managing, and providing easy access to objects. Unlike a traditional file system, objects in the Strings Namespace are not limited to being files on disk. A variety of objects can be stored in a namespace, such as files on a disk-based file system, records from an SQL database, device implementations such as digital cameras and microphones, and "live" objects such as COM/OLE objects in Windows. The Strings Namespace provides a unified means to organize, view, and access this wide range of different objects.

Rich Attributes

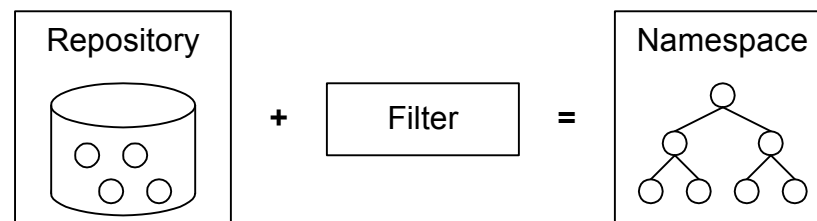The Strings Namespace supports rich attribution of objects. Through this mechanism, users of the namespace have access to attributes such as file size, creation date, and content-type. The namespace also provides read/write access to object-specific attributes such as the artist, genre, and album attributes found in the ID3 tag of an MP3 file. Furthermore, the namespace extends the attribute space to support arbitrary attributes allowing the user to tag a file with any type of attribute such as "this is my favorite song" or "this is workout music".

Flexible Storage

A powerful aspect of the Strings is the *filter* interface Strings provides to the Namespace. Filters allow the user of a namespace to see a customized view of the Namespace. A filter is made up of an attribute-based query and attribute-based organization requirements. This allows the user to express a concept such as "Show me all of my pictures from our Florida vacation, organized by who's in the picture." With this mechanism, the underlying structure of files and objects is irrelevant to the user. Instead, users interact with only the content they are interested in, in a structure that is relevant to their task at hand.

For example, music files could be stored in any directory structure on disk, including a single flat directory, but the user would access them in an organized fashion in the way that is most conducive to their activity at any given time.

Repository + Filter = Namespace

The namespace that results from applying a filter to the repository namespace is a virtual directory structuring of the objects. As such, it is conceivable that a given object may be accessible through multiple directory paths in the namespace. The following diagram illustrates how this might look, with an example of what object attributes might look like:

Synchronization
By using the filter interface to the Strings Namespace, an application can create customized subset views that can be cached on a portable device. The result of a filter operation yields a namespace that can be cached by copying the objects into a matching directory structure in the persistent storage of such a device.
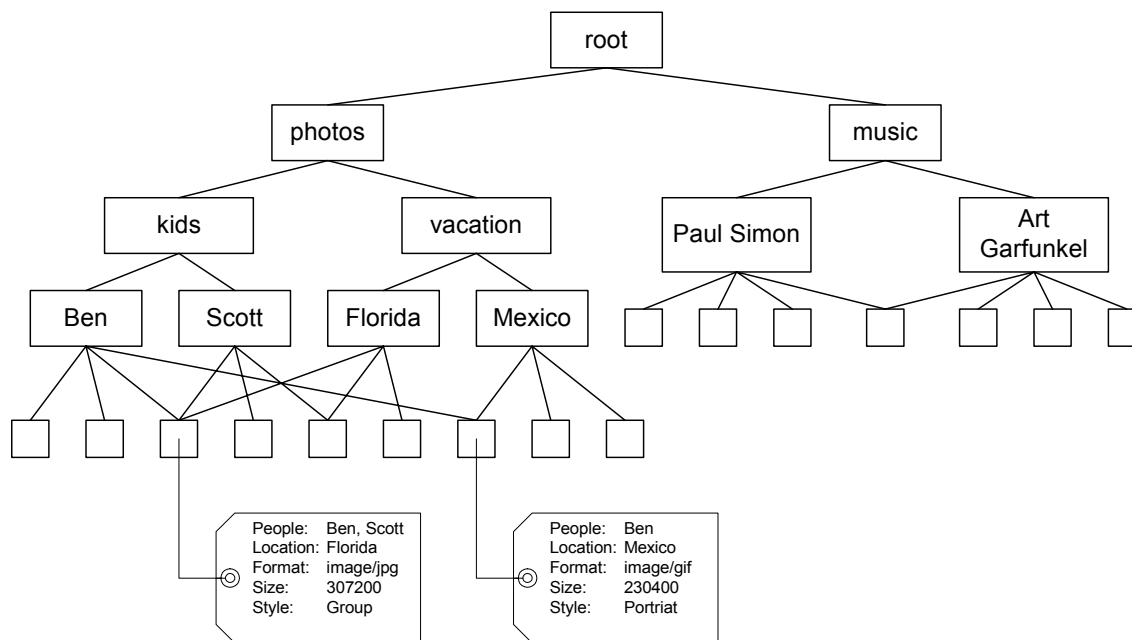
For example, a portable device can filter the main namespace to obtain a set of relevant content, in a relevant structure and cache it locally. Then, when content is added, deleted or modified in either the main namespace or the cached namespace, the two can later be synchronized by comparing the cached namespace to the namespace generated by re-applying the filter to the main namespace. In this way, the portable device can download content based on a specific query, and remain synchronized with the objects in the main repository that match that query, and vice versa.

Distributing The Namespace
The Strings Namespace can also be distributed across a network of multiple devices. This allows a library of files spread across multiple PCs to appear as a single virtual namespace of objects.

For example, an application that applies a filter to the Strings Namespace for all music files by The Beatles would see applicable files as a single namespace even if the actual files reside across multiple PCs or portable devices. This is a powerful feature that allows a content management system to seamlessly provide access to files distributed across a network. It also allows any device in the network to access content on transient plug-n-play devices such as a portable MP3 player that may come and go from the network.

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