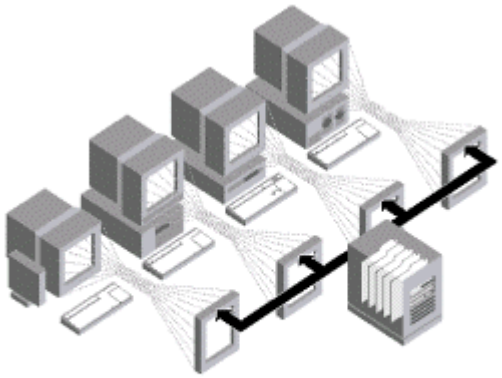
Using ProductVision® in a Citrix® Metaframe™ Server-Based Computing Environment

Introduction

Companies are faced with the difficult challenge of launching and maintaining key applications, like the ProductVision® Product Development System, in the rapidly changing world of computing. The computers you bought yesterday seem obsolete almost from the moment they are unwrapped. Different segments of the company have divergent computing requirements and therefore different hardware and installed applications. And access to these critical applications in a worldwide enterprise can be difficult. Along with these challenges is the requirement to satisfy your users demands in a manner that is cost-effective, utilizing existing computing infrastructure if possible.

One way to accomplish these goals is by utilizing a centralized server-based computing environment using Windows NT® Terminal Server (or Windows 2000 Terminal Services) and Citrix Metaframe™ products. Using Metaframe, ProductVision is deployed, managed, supported, and executed 100% on a centrally located server. Users access ProductVision by attaching to the server through a local network or wide-area network (WAN), a local intranet, or over the Internet. The remote workstation need not even be Windows machine (UNIX, Linux, etc.) or a traditional computer (PDAs, wireless tablets, etc.) And since only keystrokes, mouse-clicks and screen updates are sent over the wire, the application speed is almost independent of connection speed. Each logged user runs a secure, separate session on the centralized server.



In server-based computing, multi-user capabilities allow applications and data to be deployed, managed, supported and executed 100% on the server.

Computing Architectures

The traditional method of implementing ProductVision is as a 2-Tier application. That is, the client machine runs the ProductVision application (screens, calculations, etc) and

accesses information on a second machine that is called the database server. The database server in turn is running the database application software, which may be Oracle or Microsoft SQL Server®.

As a 2-Tier application, a separate copy of ProductVision and the database connectivity software (ODBC drivers) must be installed on each client PC. Because ProductVision performs many complex and data-intensive functions, it requires a relatively fast PC (200 MHz Pentium or greater) with substantial installed memory (64 Mbytes or more). Each client PC has a direct connection to the database server. This is referred to as a "fat client" as the bulk of the processing is performed on the user's PC by a calculation-intensive program (such as ProductVision).

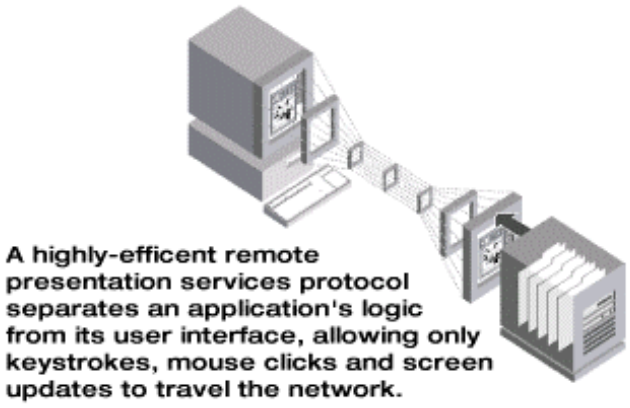
Another architecture used by some applications is the 3-Tier model. Three-tier applications split the application side processing between display and data entry tasks, which are performed on the user's PC, and the business calculations, which are done on a third machine called an application server. In many cases, the user may access the application using a simple browser program that in turn sends messages back and forth to the application server. The user's PC in this scenario would be referred to as a "thin client" because it requires minimal machine resources and it uses a small client software component. A 3-Tier application requires less client machine resources and so can normally be used with less capable machines. Of course, it does this at the expense of requiring a powerful application server. As with a 2-Tier application, you would normally have a separate machine to act as the database server (thus 3-Tier).

Native 3-Tier applications utilize browsers on the client machine to communicate to a central applications server. The browser utilizes HTML, Java, and other programming to present the user interface and to communicate to the application server. The client machine is very "thin". That is, very little program code is installed or executed on the client machine. This greatly simplifies administration of a large installation as updates, if necessary, can be executed as part of the normal program processing. This type of architecture excels when simple tasks are performed, such as for data queries and inputting information into "forms". As the application becomes more sophisticated, however, browser-based computing becomes more difficult for the same reason that it is so attractive. The lack of any "footprint" on the client limits the intelligence and interactivity that the program may possess. The program is limited to sending messages back and forth to the application server to request more information. In a sophisticated application where field-level intelligence is required, this additional overhead becomes prohibitive. Therefore, the developer has to reduce the interactive features of the software and provide feedback in more of a batch fashion after the "Save" button is pressed.

Another severe disadvantage of browser-based computing for product development is the lack of capabilities to simultaneously display multiple formulas, raw materials, etc. at the same time. This capability is very important when rapid development is critical. ProductVision allows you to open multiple formulas, raw materials, and other items simultaneously, allowing copying and dragging of information between items. For

example, you may open an existing formula and drag entire sections to a new formula. This is much faster than having to add each component individually and reduces formulation time dramatically.

Systems using Citrix Metaframe operate very much like a native 3-Tier application, except that even less processing is performed on the client PC. Only user inputs such as keystrokes, mouse movements and clicks are transferred to the application server running Metaframe. In kind, the application server performs the necessary calculations and returns the appropriate screen changes. With Metaframe, ProductVision can be accessed by the user through their standard Internet browser (Microsoft Internet Explorer® or Netscape) or from an icon on the user's desktop. Metaframe automatically installs the necessary communication kernel so a new user can start using ProductVision immediately without the need to run any local installation program. All of the features that are available when ProductVision is installed as a 2-Tier application are available when accessed with Metaframe.



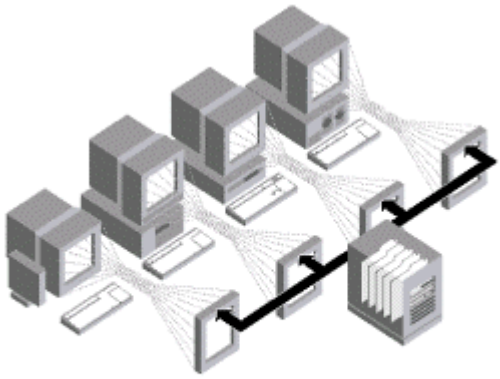
A highly-efficent remote presentation services protocol separates an application's logic from its user interface, allowing only keystrokes, mouse clicks and screen updates to travel the network.

Advantages of Running ProductVision using Metaframe

There are many advantages to using the Metaframe server-based environment with ProductVision, all leading to a lower total cost of implementing and maintaining the application.

Because the ProductVision software is actually only installed on a single machine (or a small number of central servers), administration of updated versions is greatly simplified. When updates to ProductVision, ODBC drivers, Windows NT updates or other software are received, they only need to be installed on the application server running Metaframe. All clients accessing the software are therefore immediately updated with the new applications. This also eliminates the headache of trouble-shooting application issues caused by heterogeneous machine setups and users tinkering with their client side software. And, as an added bonus, rollout of the ProductVision system under Metaframe is almost instantaneous; any user workstation that has Internet (or intranet) access will already have the necessary browser software to run ProductVision.

Central administration results in a more physically secure environment for greater mission-critical reliability. Centralized support is also greatly simplified. This could enable you to outsource housekeeping duties for ProductVision to a third party or to ASD. And it makes application hosting possible, again by a third party or by ASD. Specifically, the Metaframe server and database server (along with their related support requirements) could be completely transferred outside of your company on a turnkey basis. This would reduce staffing requirements in your IS department and reduce computing overhead. From the user point of view, it would not matter whether the application was hosted in the same building or half a world away.



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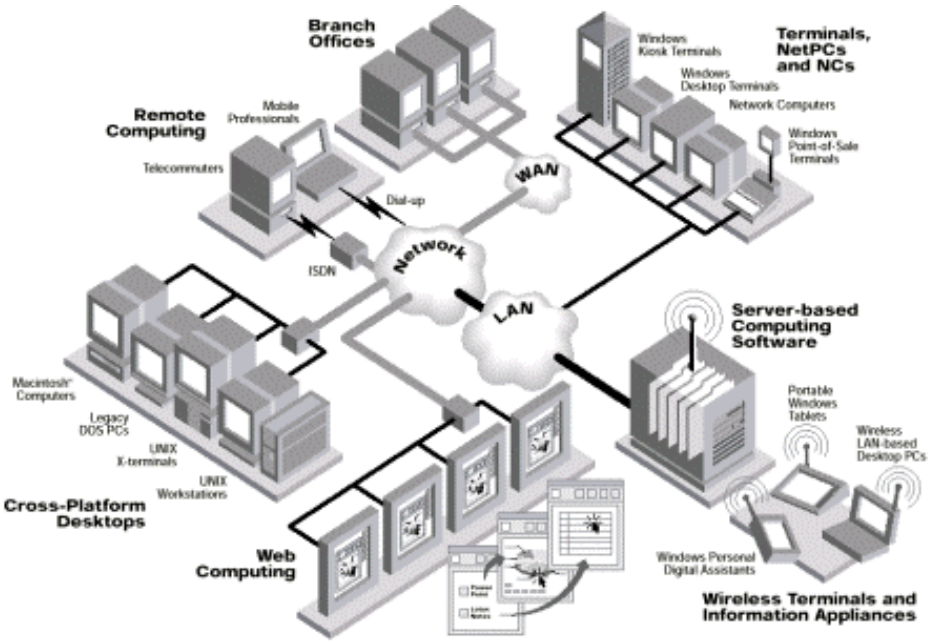
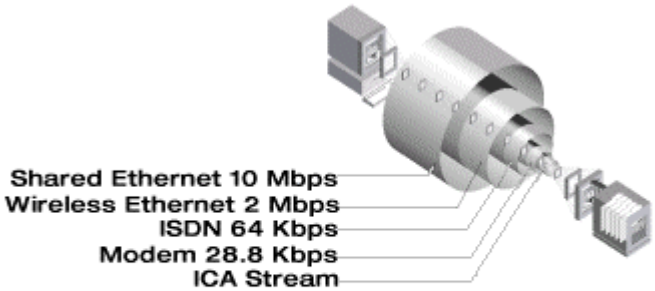
You can utilize much less capable workstations to run ProductVision than you would ordinarily be able to use because all of the computing intensive functions are performed on the Metaframe server. This breathes new life into those 486 and low-end Pentium machines that could not be used for ProductVision before. The client PC only needs to be able to support a connection to the Metaframe server. It does not even have to be a Windows PC. Metaframe will even allow you to run ProductVision using UNIX workstations, Apple Macintoshes, Network Computers, PDAs, or wireless tablets.



Communications between the Metaframe server (and ProductVision) and the client PC could be established via a LAN or WAN, access through a dial-up connection or ISDN connection, or using an intranet or Internet connection (TCP/IP). Because only keystrokes and screen display changes are transmitted over the connection, very little bandwidth is necessary for adequate performance. In most cases, the user will experience performance equal to running ProductVision in the traditional 2-Tier mode.



Server-based computing provides an ideal solution for bandwidth-constrained environments. It offers users LAN-like application performance over virtually any type of connection.

You can be assured of absolute security for the information transmitted between the client PC and the Metaframe server, as the program performs end-to-end RSA RC5 encryption for the data stream. Both North American (128-bit) and international (40-bit) encryption levels are available. This is a much higher level of security then you would find in the normal 3-Tier application.

Implementation of ProductVision in the enterprise can be easily scaled to a larger number of users than could be hosted on a single application server by simply adding additional

Metaframe servers. Citrix can provide an optional Load Balancing Services program which allows you to group multiple servers into scalable "server farms." This service has the capability of dynamically routing users to the least-busy server to deliver the best application performance and server resource utilization.

Citrix Metaframe, Windows NT Terminal Server, and Windows 2000 Terminal Services are reliable, mature technologies that are in everyday use on thousands of machines world-wide. This approach is utilized for mission-critical applications in telecommunications, banking, energy, and manufacturing, among many others. ProductVision users utilizing this technology include ICI, RustOleum, Cadbury Beverages, SC Johnson, and Avon Products.

For more detailed information, stop by Citrix's web-site at www.citrix.com. For an on-line demonstration of running ProductVision over Metaframe, contact ASD at (636)532-6021.