



# Citrix Software Helps Dell Deliver Applications Worldwide with Lower Bandwidth, Server, and Headcount Costs

## SOLUTION OVERVIEW

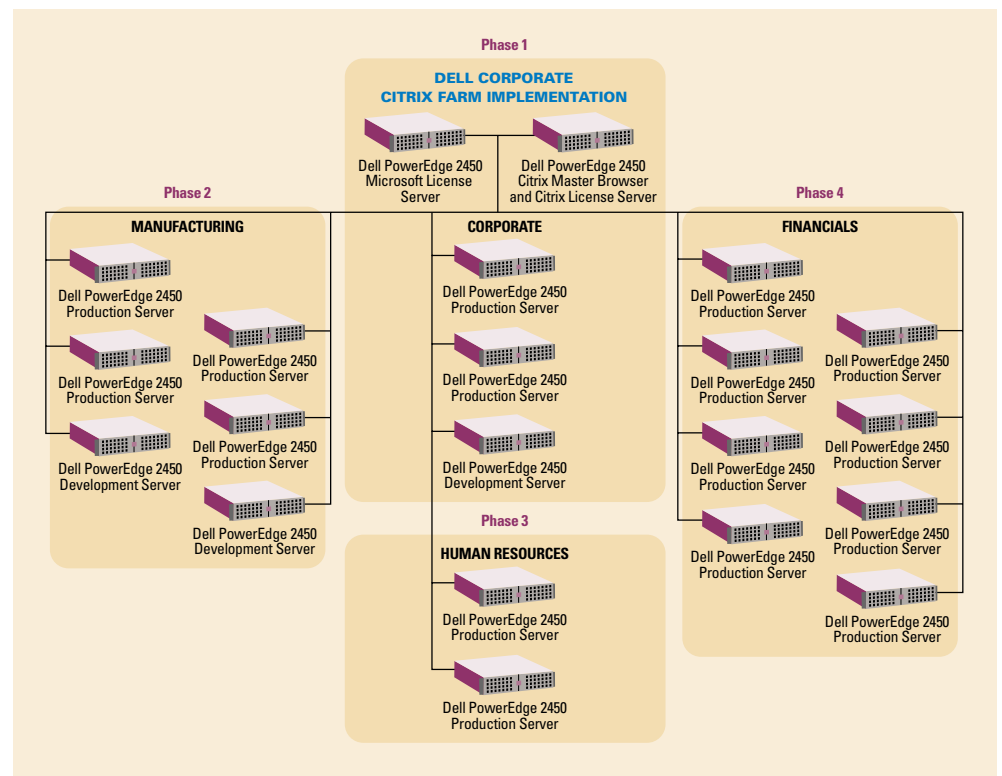
### Challenge

Deliver business-critical applications to Dell™ employees around the globe on a variety of devices with efficient use of communications bandwidth.

### Solution

Deploy Citrix® MetaFrame® software to allow remote users to access corporate applications from a multitude of devices. Citrix MetaFrame also simplifies remote support and server load balancing.

Dell Computer Corporation is a global corporation that requires employees around the world to have access to the same business-critical applications. Citrix MetaFrame application server software allows this to occur. Citrix's MetaFrame software allows Dell employees to access an application from a variety of devices, anywhere in the world, and across multiple connection types. Citrix MetaFrame provides fast connection to key applications, conserves expensive bandwidth and provides helpful features such as load balancing and session shadowing.



One of the challenges of being a worldwide company like Dell Computer Corporation is delivering fast, consistent access to business-critical applications for employees all over the world. Analysts in Dell's international offices need the same access to financial applications as employees in Austin. Putting application servers in every remote Dell office is cost-prohibitive from an administrative standpoint and would compromise employees' ability to access up-to-date information in central databases.



**“Citrix MetaFrame allows us to fulfill our business goal of centralizing corporate applications while keeping our server count, headcount, and network bandwidth down.”**

*Steve Merrill  
Senior Manager, Platform Engineering  
Dell Computer Corporation*

“Dell’s business goal is to become more centralized, publishing business-critical applications to international locations from a central site,” explains Steve Merrill, senior manager, Platform Engineering at Dell. Some of these applications are big and bandwidth-hungry, so moving massive applications and data was cost-prohibitive. In the manufacturing area, workers in the plants using wireless handheld DOS-based tablets needed a way to access the corporate materials-management system. In this case, bandwidth wasn’t the problem; instead, the challenge was attaching non-Windows clients to Windows-based servers, something that Citrix enabled.

### **Citrix MetaFrame Software Does it All**

Citrix MetaFrame software was the application server software Dell found that could connect virtually any client – including wireless appliances – to any server-based application. Citrix MetaFrame software overlays Microsoft® Windows® 2000 Terminal Server and Microsoft Windows NT4 Terminal Server and expands their capabilities with load balancing, advanced session shadowing, superior administrative tools, and more flexible resource management. MetaFrame software gives applications universal client accessibility, fast transmission across varied connection types, and better performance through dynamic load balancing.

Dell tested the performance in August of 2001 of their HRDirect® Web application (Dell’s Human Resources management system) by allowing remote users direct access to the application as well as access by utilizing the Citrix NFuse® Web application. Citrix NFuse is a Web interface allowing users to access Citrix without the need of a full Citrix client. The application installs a preconfigured thin Citrix client that utilizes the Web interface to access the Citrix Environment). Dell found that the Citrix NFuse used less than half of the bandwidth required for the HRDirect application, due to the amount of data being transmitted by Citrix NFuse. “The latest version of the Citrix ICA client (the 6.01.967 version of the Citrix client) has the ability to pass only changes made to the screen thus eliminating the need to transmit the entire screen contents, which has resulted in improved application performance,” says Al Mercer, Dell Systems Engineer for Citrix servers at Dell. The Web interface, which looks like another browser window on the desktop rather than a remote control client, provides a preconfigured client to the users that is more convenient and less support intensive than the conventional user installed and configured client.

Dell is currently deploying Citrix MetaFrame software to deliver three key applications to users around the world:

**Finance.** Dell uses Citrix MetaFrame software to deliver financial reporting to users worldwide. This reporting application generates complex calculations and massive amounts of traffic between the central database and client machines. MetaFrame software speeds up this transmission, allowing international users to connect to the corporate reporting servers via the wide area network (WAN). “At any point in time, up to 150 concurrent users are accessing Dell’s Hyperion servers for as much as 20 hours a day,” says Mercer. “MetaFrame software utilizes existing network bandwidth while minimizing the amount of data being transmitted resulting in improved application performance.”



**Human Resources.** Dell's global HR solution called HRDirect is used to store large volumes of data. Making this application available anywhere outside of Texas generated an enormous amount of network traffic. Dell now runs HR Direct through Citrix MetaFrame software, which has resulted in improved network traffic utilization. Eventually, all Dell users outside of Austin, Texas will be using the Citrix interface to access the HRDirect system

**Manufacturing.** Mobile workers in Dell's manufacturing plants use hand-held DOS-based tablets to find parts and examine orders. The tablet has a built-in scanner, an 8-inch display, and a full keyboard. To update the materials-management system with new parts data, employees primarily use the tablets to scan new, incoming parts. However, Citrix MetaFrame software allows the tablet to also serve as a portable desktop allowing workers to send email, run standard office applications, and access other corporate systems. "Citrix MetaFrame software enables these DOS-based devices to connect to Windows-based servers accessing corporate applications from various inter-factory locations," says Sean Salak, a Dell Systems Engineer responsible for the manufacturing implementation of Citrix.

**Efficient, Economical Hardware Usage**

Citrix MetaFrame software leverages memory more than processing power, allowing Dell to utilize its PowerEdge™ servers in a variety of configurations based on the needs of the application. The standard Citrix server configuration ranges from the Dell PowerEdge 2450 up to the Dell PowerEdge 6450. "We can get anywhere from 100 to 250 users on each server, which has resulted in a decrease in capital expenditures as well as regional support costs," Merrill says.

Dell currently has a 25-unit MetaFrame server farm in Austin and a 50-unit Citrix MetaFrame server farm in Ireland, mostly devoted to connecting Dell Europe users to Dell's application environments. Citrix MetaFrame's Load Balancing Service balances workloads between Dell servers in the farm. By dynamically routing users to the "least busy" server in the Citrix MetaFrame server farm, the balancing feature promotes the most efficient use of computing resources and also provides a big productivity gain to employees. The load balancing feature makes it easy to take down servers for routine maintenance without experiencing unwanted system downtime.

**Reducing Costs**

By hosting many users per server and balancing processing loads between servers, Citrix MetaFrame software reduces the number of servers necessary for worldwide applications. "Without Citrix MetaFrame software, we would have to deploy and manage servers all over the world," Merrill continues. "More than the cost of the hardware, it's the complexity and work of managing remote servers that is cost-prohibitive. Citrix software allows us to have one small, centralized group of employees managing big corporate applications versus duplicating staff all over the world. It's a great tool to keep operating expenses down in worldwide application deployments."

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*Al Mercer  
Dell Systems Engineer for Citrix servers  
Dell Computer Corporation*



Citrix MetaFrame has reduced Dell's need for additional communications bandwidth usage by creating new opportunities for enhanced application deployment methods. With Citrix MetaFrame, all application processing occurs on the servers, with only mouse clicks and screen updates traveling the network. This enables high-bandwidth applications to run quickly over low-bandwidth connections. "Citrix MetaFrame speeds up our biggest applications, thus freeing up bandwidth that we can use for other projects," Merrill says. "The continuous need to increase network bandwidth has diminished based on our implementation of Citrix MetaFrame."

Another useful Citrix MetaFrame feature is session shadowing – taking remote control of user desktops to resolve problems. Dell uses the Citrix MetaFrame session shadowing feature in both technical support and training. Several users can remotely shadow a teacher in another location, learning how to use a new application from the comfort of their own offices. Support professionals can shadow users having difficulties and troubleshoot PC issues from central support locations. Session shadowing helps Dell deliver consistently great support to European and Asian employees without huge staffing or travel budgets.

"Citrix MetaFrame allows us to fulfill our business goal of centralizing corporate applications and closely managing our operating and capital expenses," Merrill says. "It's a great asset for any company doing business all over the world."



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