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White Paper

OS Migration and Legacy Application
Support Using

VMware Virtual Machine Software

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OS Migration and Legacy Application Support Using VMware™ Virtual Machine Software

Executive Summary

Used by 80 percent of the Global 100 and by more than 5,000 enterprise customers worldwide, VMware™ virtual machine software represents one of the most powerful paradigm shifts in software development. VMware software has proved to simplify operating system (OS) migration processes and reduce capital expenses quickly. Companies executing OS migration projects look to VMware software to:

- Lower hardware costs.
- Plan, test, and deploy new applications and operating systems.
- Avoid expensive porting costs.
- Transition applications from Microsoft® Windows NT® as support is retired.

OS migration is the process of changing or upgrading a desktop and server environment to a new operating environment. The challenges of planning and executing a large OS migration while supporting key applications include:

- Applications that can't be ported to the new environment.
- Managing a wide range of installed hardware that may not support the new OS.

Contents

1 The Challenge of OS Migration

2 VMware Virtual Machine Software: The Silver Bullet

3 Case Studies

- Merrill Lynch is using VMware software to manage the risk of migrating from Microsoft® Windows NT® to Windows® XP on 27,000+ trader desktops
- Fleet Bank used VMware software to complete a complex OS migration and legacy application compatibility project on 500+ machines in 18 months.
- Tohoku Power used VMware software to complete a complex OS migration project on 1,450 systems at one-tenth the original budget estimate.

4 Creating a Successful OS Migration Plan

- Determine hardware requirements
- Acquire licensing
- Decide on desktop-based versus server-based deployments
- Determine "best fit" applications
- Assess driver compatibility
- Convert existing environments automatically
- Reduce testing cycles

5 Summary

6 How to Get Started

1. The Challenge of OS Migration

- Supporting legacy systems acquired through acquisitions.
- Realizing reliability and manageability improvements of the new environment.

IT teams are facing a time-bomb of applications on operating systems that are being dropped from major vendors' support matrix. Porting these applications is often prohibitively expensive and time-consuming. Porting the apps may take years, when the app is needed on the new desktops in a matter of months.

To meet the challenges of OS migration, companies need a solution that:

- Extends the lifetime of current apps without porting.
- Runs new operating systems and old applications.
- Enables hardware upgrade and standardization.
- Provides for easy, low-cost deployment and maintenance.
- Reduces OS migration project risk.
- Commands rapid user acceptance and is easy to use.

"In a survey of 375 IT executives conducted by CIO magazine in November, close to one-third of respondents reported that their company will upgrade to Microsoft XP in the next 12 months."

CIO Magazine, January 2003

2. VMware Virtual Machine Software: The Silver Bullet

VMware software creates a uniform platform for managing OS and application updates, enabling the easy migration to new OSes while running legacy applications safely. VMware software allows multiple operating systems and applications to run concurrently in virtual machines on a single Intel-based computer. Since VMware software allows multiple hardware configurations and operating systems to co-exist and be easily updated, you can:

- Run multiple operating systems concurrently on the same computer, including multiple versions of Microsoft Windows®, Linux, and DOS.
- Create suspended virtual machine instances that can be stored and restarted at any time.
- Move between operating system environments without repartitioning or rebooting.
- Develop, test, and deploy new software without adding hardware.

VMware virtual machine software has been deployed in large production IT environments on a wide scale. VMware software helps companies facing the challenges of OS migration and application compatibility by:

- Facilitating smooth desktop transitions in shorter time frames.
- Extending the life of current applications.
- Eliminating the need to port legacy applications.
- Avoiding the costs of hardware acquisition.
- Minimizing user pain during transition.
- Making testing and deployment of new systems easier.

VMware's entire virtual machine product line was designed to meet the challenge of OS migration projects. The VMware product line is comprised of:



VMware™ Workstation **Productivity Tool for Technical Professionals VMware™ Workstation**

Powerful virtual machine software for the desktop, designed for technical professionals to run multiple operating system environments on a single PC



VMware GSX Server **Enterprise-Class Virtual Machines on Intel Servers™**

Virtual machine software for business-critical environments, designed to provide a secure, uniform platform for consolidating and partitioning servers



VMware ESX Server™ **Enterprise-Class Virtual Machines for Your Most Demanding Environments**

Advanced virtual machine software designed for high-performance data center environments that require fine-grain control over server resources

3. Case Studies

The following customer case studies illustrate the tangible benefits of deploying VMware Workstation for OS migration and application compatibility projects.

Merrill Lynch

In November 2002, Merrill Lynch announced one of its biggest IT initiatives to date: the replacement of more than 27,000 workstations used by its retail brokers, or financial advisers, with a new Wealth Management Workstation built by Thomson Financial. The new workstations feature quick and easy access to market data, news and account information; online collaboration with clients and between financial advisers; and CRM and portfolio management tools.

Based on the Windows XP enterprise computing platform, the new workstations are faster and more reliable than the current ones, which are based on Windows NT and Windows 2000. "The jump from Windows NT to Windows XP is huge in terms of reliability and capability," said John McKinley, chief technology officer at Merrill Lynch.

Using VMware Workstation, Merrill Lynch was able to migrate easily to Windows XP while running mission-critical legacy applications on Windows NT safely. VMware Workstation ensured a smooth OS migration by:

- Enabling migration planning, testing, and deployment on Windows XP.
- Managing risk in the transition phase.
- Reducing the cost and time required to deploy VMware Workstation on 27,000+ workstations.

"Seventy percent of our initial use of VMware Workstation is to support a graceful transition within our retail base," McKinley said.

During the transition, financial advisers are being provided with dual-system access, enabling them to toggle between the older and newer systems. "We're using VMware Workstation to manage risk in transition," said McKinley. "VMware Workstation is running on each financial adviser's desktop."

By creating a stable, uniform platform for managing operating system and application updates, VMware Workstation is projected to save Merrill millions in hardware and software costs.

"VMware Workstation enables us to solve a variety of challenging IT issues in a quick, cost-effective manner," said McKinley. "By embracing virtualization technology and standardizing on VMware software, Merrill Lynch has seen a 40 to 50 percent cost savings," he added.

"We're using VMware Workstation to manage risk in transition."

John McKinley
Chief Technology Officer,
Merrill Lynch

Fleet Bank

Fleet Bank deployed VMware Workstation across 500+ systems at more than 200 branches. Fleet Bank was able to run its proprietary application safely in a Windows 2000 environment by running it in virtual machines. Using VMware Workstation, Fleet Bank was able to:

- Complete a complex OS migration and legacy application compatibility project on 500+ machines in 18 months.
- Avoid spending an estimated \$40 million by maintaining the use of a mission-critical proprietary application.
- Transition smoothly between operating systems prompted by a merger/acquisition.

Fleet Bank evaluated a variety of potential solutions to make its customized DOS-based teller application compatible with a Windows 2000 environment. However, with other solutions, functionality problems with the peripheral devices occurred while running the teller application in Windows 2000. The costs of replacing the systems (an estimated \$40 million), or of installing a new teller app, were prohibitive.

VMware Workstation provides a stable virtual machine platform upon which the teller application, the physical machines, and their peripheral devices all run problem-free. Fleet Bank set out to use VMware Workstation as a solution for running the teller application at all Fleet and Summit locations, but decided to first start with Summit because those branches operated ran on an Ethernet network.

Fleet Bank found that VMware Workstation was an effective solution in an Ethernet environment, and successfully ran the teller application on Summit's Windows NT systems. The advantages of using VMware Workstation for application compatibility in this environment included immediate cost- and time-savings for the conversion and a seamless operational transition during the merger/acquisition.

Tohoku Power

Tohoku Electric Power Company, Inc., supplies electricity to approximately 7.5 million customers in seven prefectures in Japan's Tohoku region. In 2000, Tohoku started making plans to migrate its business systems from Windows 95 to the Windows 2000 operating system to help the company continue to offer its customers the highest level of service. "We looked at ways of migrating these systems to Windows 2000 but could not find a solution that was satisfactory in terms of cost and time," said Yuichiro Akazawa of Tohoku's information communication department.

Tohoku had strict stability and performance requirements for its migration solution since critical systems for managing nuclear, thermal, and hydroelectric power generation, as well as civil engineering tasks, needed to be maintained and protected during migration. Tohoku established about 100 product requirements for this large deployment, including:

- Low numbers of Windows protection faults.
- Networking with Network Address Translation (NAT) so each client system requires only one IP address.
- A minimum of 90 percent of native networking and system performance.

Tohoku worked with VMware and engineers from VMware's Japanese reseller NetWorld, Inc. to test these stringent requirements against VMware Workstation. Not only did the product offer the technical functionality the Tohoku systems needed, additional features such as complete Japanese localization made it a convenient and cost-effective fit. "VMware Workstation succeeded to clear all 100 requirements," said Yuichi Yokota from the infrastructure design department of Tohoku Information Systems. VMware Workstation is now deployed on more than 1,450 Tohoku systems, with many benefits including:

- A stable platform to run mission critical-systems with excellent user and network performance.
- Easy, low-cost deployment and maintenance.
- Rapid user acceptance and ease of use.
- Completion of a large, complex migration project at one-tenth of original budget estimate.

"The main advantage of using VMware Workstation to transfer our business system from Windows 95 to Windows 2000 was cost reduction. We only spent one-tenth of the amount we originally estimated for this migration project," Akazawa concluded.

"We only spent one-tenth of the amount we originally estimated for this migration project."

*Yuichiro Akazawa
Tohoku Power
Information Communication Department*

4. Creating a Successful OS Migration Plan

To conduct a successful OS migration project, you need a comprehensive migration plan. This section outlines key checkpoints that can help you plan and implement a successful OS migration project using VMware software. In your OS migration plan, be sure to:

✓**Determine Hardware Requirements.** It is important to plan and budget for hardware that will be able to run both the upgrade operating environment and VMware software. This hardware should have enough CPU power and memory to be able to run legacy applications simultaneously with applications on the new OS. Here are rough guidelines for how much CPU, memory, and disk are needed to run a Windows NT 4 or Windows NT 3.51 operating system and applications under Windows XP with VMware Workstation:

CPU **Minimum:** 700 MHz processor
Ideal: 1.4GHz Pentium 4 or better

MEMORY **Minimum:** 384MB
Ideal: 512MB or above

DISK At least 2GB additional for Windows NT virtual machine

Note: Make sure the drive's free space is not severely fragmented since that will degrade virtual machine performance

✓**Acquire Licensing.** To run legacy applications, you will need full licenses of the host OS that runs inside the VMware virtual machine. For example, if you have existing Windows NT desktops with applications, and you want to run those NT applications inside VMware Workstation, you will need the proper Windows NT license for each virtual machine that can be run. Generally, if you have 100 users who can access the NT application, you need 100 Windows NT licenses.

✓**Decide on Desktop Based vs. Server-Based**

Deployments. For large projects, delivering legacy applications via Terminal Services or Citrix should be considered. Centralizing legacy applications in virtual machines running on VMware ESX Server or VMware GSX Server and delivering those applications via Microsoft Terminal Services and Citrix MetaFrame may be more cost-effective than distributing the applications using VMware Workstation. This is especially true for customers who are already comfortable with server-based computing solutions. Terminal Services- and MetaFrame-based deployments are also good options when the desktop hardware does not meet minimum configuration requirements to support VMware Workstation, or cannot be upgraded easily.

✓**Determine "Best Fit" Applications.** A common question is: "Which applications are hard to transition during an OS migration project?" VMware customers report the applications that are most likely to cause trouble during a migration project include:

- 16 bit applications
- Custom applications
- Applications that show up in the last phase of a migration project (i.e., the apps that you find out about when the migrated users ask, "Well, where's 'App X?'" I can't work without that!")
- Applications with custom DLLs
- Applications that are so old the developers are gone, and there is a knowledge gap
- Applications that are known to be difficult to port with the Windows XP application compatibility toolkit
- VB applications that run well under Windows 9X, but not as well under Windows 2000 or Windows XP

- ✓ **Assess Driver Compatibility.** VMware software supports almost all types of devices commonly used on the desktop, including USB, SCSI, serial, parallel, CD-RW, and DVD. However, some legacy devices may not work with VMware software. For example, VMware software does not support the IEEE-488 interface for lab instrumentation. If you have specific driver requirements, please check the VMware Web site (www.vmware.com) or contact VMware about support capability. Some corporate standard builds may require ACPI hardware support. The VMware knowledge base (www.vmware.com/kb) has documentation on how to handle these requirements, and it's good to be aware of options for handling ACPI.
- ✓ **Convert Existing Environments Automatically.** Part of the OS migration project planning process should account for the time and effort it takes to convert existing applications and operating systems so that they run in virtual machines. VMware software has an automated approach that speeds this process. Download more information on this automated approach at: www.vmware.com/pdf/p2v_datasheet.pdf.
- ✓ **Reduce Testing Cycles.** VMware software has a number of features that make OS migration testing faster and easier than it is on physical servers. For example, the Undoable Disk feature allows administrators to test images and configurations faster and make changes and corrections without re-installing a lot of packages. VMware software should be included in the test plan to accelerate deployment cycles.

5. Summary

Adopted by top companies worldwide, VMware software represents a powerful paradigm shift. VMware software quickly streamlines OS migration and application compatibility processes while reducing hardware and maintenance costs. By deploying VMware software in your organization, you will be able to:

- Complete complex OS migration projects on time and on budget.
- Provide seamless support of applications during the OS migration project.
- Maintain the use of mission-critical proprietary applications.
- Capitalize on investment in hardware, software, institutional knowledge, real estate, and market share.
- Reduce dependency on obsolete technology.

The financial impact of using VMware software for OS migration includes:

- Reducing OS migration project costs and compressing project schedules by 50 to 90 percent.
- The ability to speed time to market for new software.
- A full return on investment in less than six months.

6. How to Get Started

The VMware Sales Team can help you determine how VMware software will realize these benefits in your particular environment. Using ROI tools, case studies, and other tools, VMware will work with you to design and implement specific success criteria so you can evaluate our software effectively. Visit us on the Web at www.vmware.com, email us at sales@vmware.com, or call us at 877-4VMWARE to get started.



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