



Fast and Effective Migration from Novell to Windows Active Directory with VMware Mirage

WHITE PAPER

Introduction

This paper describes how GANTECH, a systems integrator specializing in virtualization, used VMware Mirage™ to design and implement a conversion from a Novell environment to a Windows Active Directory (AD) environment for a state agency.

The Vision

The client needed to migrate from Novell to AD to prepare for upcoming mandated environment changes. With 500–600 endpoints scattered across the state, performing every endpoint migration would be difficult within the project’s timeline. Government agencies frequently encounter similar challenges because they must frequently comply with new initiatives. These challenges are compounded when there are thousands of desktops to migrate instead of hundreds. In this situation, user downtime was the primary concern because an after-hours conversion was not possible.

A poorly designed migration causes unpredictable and unsettling results. Remarkably, some major migration efforts overlook a critical item: the proper treatment and configuration of the end-user device. Oftentimes, an extremely thorough migration effort to these devices only target basic scripts or modifications to applications and settings. This creates mixed results because many devices deviate from the standard image or require an intensive repair effort. Even best case scenarios can result in users left with a device that suffers continuous performance issues. Unfortunately, when a device needs to be rebuilt, there is no way to roll it back to a previous working version.

The Approach

GANTECH’s virtualization experts addressed these concerns with VMware Mirage, allowing them to both promise and deliver minimal user downtime and disruption. Mirage enables both hardware and software upgrades on a large scale with very little downtime, in addition to the ability to restore systems to their prior state when needed.

GANTECH’s innovative approach began by using Mirage to eliminate the need to physically visit users’ desktops. The GANTECH team first identified the mix of desktops in use, then deployed the Mirage agent to develop a consistent, manageable OS layer. They used Mirage to migrate this OS layer to existing endpoints while preserving the user data and applications for each endpoint. Users continued to work while the new base layer was being downloaded, pausing only for a reboot to incorporate the new image.

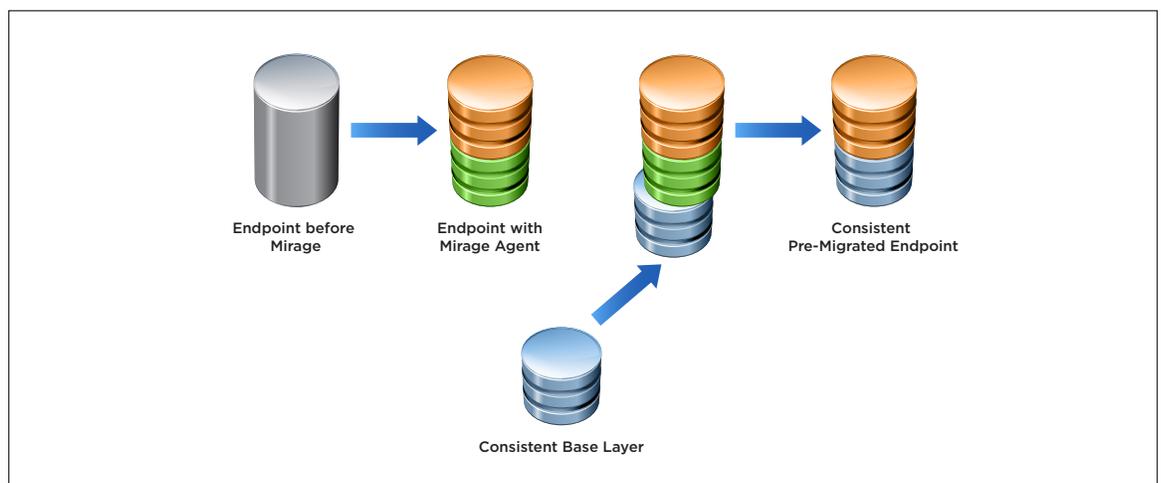


Figure 1: A Mirage Agent on Each Endpoint for a Consistent Base OS Layer—Preparation for an Efficient Migration

With the new base layer downloaded and user settings and applications preserved, the migration proceeded as planned without needing Mirage’s ability to restore any endpoints to their prior state.

Background and Challenges

Although the environment was a heterogeneous mix of Windows XP and Windows 7 (32-bit) with various configurations, multiple application versions, and only some endpoints enabled for remote access, it was made clear that the migration would not be allowed to affect any of the applications users had on their endpoints. In addition, the firewall settings were inconsistent, potentially causing issues in deploying the Mirage agents.

Phase 1 – Mirage Server and Agent Deployment

After successfully deploying the Mirage server, GANTECH's next challenge was getting the Mirage agents to the endpoints. First, the inconsistent firewall settings were fixed. Second, because there was no AD in place, deployment with group policies was not an option. By fixing the firewall issues and applying some creative scripting, GANTECH deployed the Mirage agents to the endpoints. Then they began the centralization process.

Centralization backs up each user's endpoint to produce a Centralized Virtual Desktop (CVD). The CVD represents the complete image contents for each endpoint on the Mirage server. The backup runs in the background while the user continues to work, and is paused if the endpoint is either powered off or disconnected from the network, a frequent occurrence for laptops. Centralization for any disconnected endpoint resumes when the endpoint is re-connected to the network.

When the data has been migrated to the Mirage server, the CVD becomes the copy of each endpoint's contents. The administrator uses the CVD to manage, update, patch, back up, troubleshoot, restore, and audit the desktop in the data center, even if the endpoint is not connected to the network. Meanwhile, the Mirage agent monitors user activities and network characteristics to optimize both performance and user experience.

As a safeguard, Mirage stores full endpoint snapshots in the data center, with continual synchronization of IT and end-user initiated changes. This enables partial or full desktop recovery when needed, using CVD images and periodic endpoint snapshots. It also enables self-service file recovery for end users and "follow-me file access" across devices for enhanced productivity. This capability is an important differentiator for Mirage that GANTECH utilized to reassure the agency that neither official data nor user settings would be endangered during the migration.

Phase 2 – Stabilizing the Endpoints

The GANTECH team created base OS layers for both Windows XP and Windows 7. Both base OS layers contained the changes and settings needed for a successful migration to the new AD environment. After the base layers were developed and tested, they were pushed to an initial test group of endpoints without affecting installed applications or user data. As expected, users continued to work while the new OS layers were being downloaded to their endpoints, and a reboot was performed after working hours from the Mirage console to eliminate user down time from the equation. After successful testing, the remaining endpoints were updated in groups to produce a uniform platform and allow migration to proceed smoothly and efficiently.

Phase 3 – Creating App Layers

Mirage application layering is a unique solution for packaging Windows applications and distributing them to endpoints. Other application deployment mechanisms require installation of the applications on each endpoint, with accompanying complications due to network connection issues, variable endpoint configurations, and user interruption of installation. Mirage application layering does not require application installation on endpoints. Instead, application layers are deployed in the background at the file system and registry level, and users can continue working with their existing applications while a new application layer is being deployed.

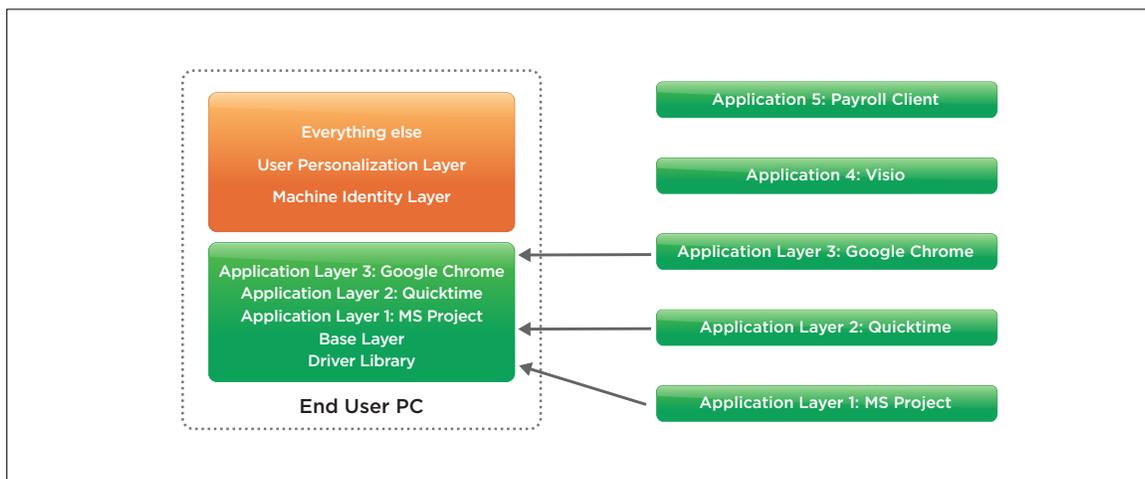


Figure 2. Mirage App Layers Apply the Right Applications to Endpoint Base Layers

The Mirage app layer feature makes it easy to deliver or remove applications from groups of endpoints with maximum convenience and minimum effort. It maintains the desired end-user experience and avoids the registry bloat problems that can result from uninstalling applications from individual endpoints. Using the Mirage console, the administrator assigns app layers to groups of endpoints. When an endpoint is rebooted, the app layer assignment becomes part of the endpoint's image. This applies to any combination of applications added or removed and is not an install or uninstall process, but a true deployment or removal of the application.

Phase 4 – Final Base Layer and AD Domain

The entire AD infrastructure was created during the centralization and base layer provisioning process. When the AD environment was ready, GANTECH created a new base layer to represent the new AD environment. The new base layer was then assigned and deployed to the endpoints. The Mirage console allowed the endpoints to be centrally rebooted, after which the new base layer allowed the endpoints to join the newly-created AD domain.

Benefits

The key benefits of Mirage for this customer include:

Malware and Virus Fixes

Mirage application layers enable endpoint recovery from malware and virus attacks. The combination of the centrally stored CVD images and periodic endpoint snapshots create point-in-time backups with the option to restore only the layer affected. If a user inadvertently installs malware, or if the endpoint gets a virus, the base layer can be restored from a previous snapshot without changing the user's data or user-installed applications. This recovery feature proved useful both before and after the migration.

Application Fixes

Application repairs are both tedious and time-consuming, often requiring desktop support to ask questions, research error messages, and sometimes reinstall a damaged application. With Mirage, the only question to ask is, "When was the last time the application worked properly?" It is then easy to revert the endpoint to an earlier snapshot. Mirage app layer technology allows the application repair to download while the user continues to work on the endpoint. Once the download is complete, the user reboots, and the application is fixed. This saves time and effort for both IT support and the user.

“I got a call from a user who confessed to downloading an Internet Explorer plug-in and then started to get all kinds of pop-ups. I knew the question to ask. When did you do this? I found the Mirage snapshot dated before the problem and within 15 minutes the user was up and running again. This is a great way to fix problems!”

– Desktop Support Manager

File Recovery

Users can take advantage of snapshots stored on the Mirage server to restore a previous version of an existing file, or a deleted file, without the need for IT support to spend time restoring user files and folders. The file restore operation generates an audit event on the Mirage server for management and support purposes. Files are restored with their original Access Control Lists (ACLs).

Recovery from Hardware and Hard Drive Failures

The customer’s aging endpoints also benefit from the protection capabilities of Mirage. The ability to move the CVD to a new endpoint saves time and money.

“We tell our user to make sure all their documents are always saved to the network share. Then I get a call that their computer would not boot and they had important documents on it. After replacing the hard drive we put the user Mirage CVD image back on the desktop and they found all their files. It was nice to have IT as the good guy for once.”

– Desktop Support Manager

Mirage provides three Restore options that showcased its flexibility for the agency.

Full System Restore (Operating System, Applications, User Data and Settings)

This option was used for systems with Windows volume licenses or Windows OEM SLP licenses. The entire CVD is restored to the replacement device, including OS, applications, and user files. Any existing files on the replacement device are lost or overwritten.

Restore Applications, User Data and Settings

This option was used when replacing a device with a different Windows OEM license. In this case, the OS of the replacement device must be the same as that of the CVD. For this option, applications and user data are restored to the replacement device. The OS and applications installed on the replacement device are retained.

Only Restore User Data and Settings

This was the option used most frequently. It is used to migrate users from existing XP or Windows 7 endpoints to new Windows XP or Windows 7 endpoints. Only user data and settings are restored to the replacement device. The OS and applications installed on the replacement device are retained.

Conclusions

The results of this project demonstrate the flexibility of Mirage as well as GANTECH's ability to apply it to the customer's needs accurately and efficiently. The endpoints were converted in a timely matter without requiring physical intervention by IT at the endpoints. The results of the migration created both a new AD environment and a uniform OS for the endpoints. This ensured that the endpoints were up-to-date, with consistent settings across the network.

After centralizing the endpoints, Mirage enabled IT to protect the endpoints and fix many daily problems associated with desktop management. Hardware failures, deleted files, and broken applications were all handled by Mirage in a way that minimized user downtime and provided full image protection of the endpoints.

"We have several older desktops and get plenty of calls when the system finally stops working. Replacing the desktop and reinstalling everything would take at least two days. Then there would be all the complaints about how the system did look or work the same. Now, using Mirage, after a few hours the user has "their" desktop back. This saves so much time and the user is happier after the fact."

— Desktop Support Manager

