

Profile Virtualization

A Guide to understanding profile management with VMware View



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About This Guide

VMware® View is a robust desktop virtualization solution that allows IT organizations to reap the benefits of traditional server based computing without all the user sacrifice and challenges that come with typical server based computing solutions. By leveraging the benefits and advantages of VMware View, IT organizations can take the first steps toward transitioning away from the distributed computing PC era into the era of Cloud Computing and delivering end user desktops as a service.

The purpose of this guide is to help IT decision makers, Architects and Administrators better understand the challenges of user profile management and optimization in mixed environment. This guide will cover traditional approaches to user profiles and cover a new way to approach user profiles in a heterogonous environment while delivering the best overall user experience.

Built on VMware's industry-leading virtualization platform, VMware View 3 is a Universal Client solution that lets you manage operating systems, hardware, applications and users independently of each other, wherever they may reside. VMware View streamlines desktop and application management, reduces costs and increases data security through centralization, resulting in greater user flexibility and IT control. VMware View enables customers to extend the value of VMware Infrastructure and virtual desktop infrastructure (VDI) environments to encompass not only desktops in the datacenter but also applications and the delivery of these environments securely to remote clients, online or off, anywhere.

VMware View integrates with almost every system and infrastructure component of an organizations environment. Implementing a standardized solution drives down the total cost of ownership (TCO) and helps minimize the complexity and unpredictability of a customized solution. By implementing, a standardized solution that integrates with existing established IT processes and procedures requiring minimal change from which IT organizations can build a solid foundation.

Introduction to VMware View

With desktop virtualization, the physical location of data is often separated from where a user's PC or laptop resides. When a user's desktop environment is virtualized, its data contents – including user profiles – are redirected across a network to a multi-platform server location, typically housed behind data center glass walls. With user data no longer being constrained to individual desktops, complete desktop environments can run in virtual machines on data center servers. This flexible, virtual environment allows end users access to their data by using any PC or thin client residing on the corporate network. By allowing a multiplicity of users to utilize data via more centralized servers, wide ranging benefits are achieved including:

- Increased data security
- Improved safety of physical data with centrally located hard disks
- Reduced IT maintenance
- Decreased hardware failures at the workstation level through thin client implementation
- Economical data backup achieved through the centralization of information

A thin-client architecture – which depends primarily on a central server for processing abilities in a client/server environment – provides enhanced enterprise desktop solutions for security, manageability, reliability and work environment uniformity. With great strides in progress today through the advent of VMware View and user profile enhancement technology, administrators can develop and deploy a Unified Client infrastructure and maximize manageability while lowering the total cost of ownership without having to sacrifice crucial end-user requirements such as speed and reliability.

An optimized and properly designed VMware View solution provides superior gains for both end user and IT management alike including centralized desktop computing resources and managed data control, as well as the ability to consolidate physical Personal Computers using virtual machines and maximize resource utilization across the data center. Equally important, users obtain the flexibility of complete desktop environment access from any location.

Managing User Data in an Enterprise VMware View Environment

While VMware View transforms the desktop by leveraging virtualization, VMware Views flexibility helps address a wide array of use cases in a more standardized manner including telecommuting remote workers, mobile users, business process outsourcing, PC replacement and many others. VMware View also helps IT organization improve control and maintenance over computing assets and intellectual property. Even with many of the benefits, major challenges can remain in managing and maximizing user data access to its fullest capacity as VMware View often is integrated into mixed environments.

To present an identical user experience for each virtual desktop, laptop or Terminal Server session that is unique to each user, data and configuration information are stored in user profiles that are referenced by servers when users log on to the network. When this routine process occurs, a Microsoft Windows profile that is unique to each user is assigned. These assigned profiles include information such as pointers to disk drives, local to a specific user, desktop configuration look & feel, as well as specific desktop applications and associated imagery normally included in Windows startup processing.

Historical Note:

Windows NT was engineered for multiple, *sequential users* (i.e. single machine, multiple work shifts). Thus, the profile(s) of each user reside on a single device.

Contemporary Microsoft Windows platforms enable multiple, concurrent users, including Windows Terminal Services or Citrix XenApp. VMware View also supports managing user entitlement and access to Microsoft Terminal Services, Blade PCs and Personal Computers in addition to their Virtual Desktop. In this contemporary scenario, a user can log onto multiple devices at once to access a variety of applications on a single desktop. *It is important to note that these contemporary environments require profiles to be simultaneously replicated and managed across multiple servers.*

Profile Management User Requirements, Reliability and Resources

In a VMware View environment, profile management is equally influenced by the individual needs of the user, as well as the overall needs of the entire organization. Users need fast and flexible access to their data while maintaining data integrity. IT groups within organizations must reduce infrastructure costs associated with network bandwidth consumption, server resource demand, and user profile management while increasing data security. However, IT administration has full control as to how a user may access data that is located on company servers. In managing user profiles, several factors come into play and must be addressed including profiles which are defined as mandatory, roaming or hybrid, as well as persistent and non-persistent pools.

As mentioned previously, maintaining user profile integrity is the *primary* concern for end users and IT administrators alike. When managing profiles, the majority of the options available on the market today introduce profile integrity degradation as well as decreased reliability and slow access that are unacceptable by most end user standards. These degradation and reliability issues inherent in today's solution offerings are often accepted in a forced effort to address user flexibility requirements.

To maximize profile management resources, exploit speed and ensure quality and integrity of data, key areas must be addressed to avoid introducing large data transfer requirements that could tax the overall user experience as well as degrade access time and decrease bandwidth to the corporate data center during virtual user sessions.

Performance Management Resource Constraints Inherent in Profiles

Given the inherent importance of managing performance resources in an efficient manner, profile management solutions available in today's market are typically unable to provide adequate resource options for logons. To avoid potentially overtaxing data transfers at logon, various profile solutions have evolved to meet a variety of organizational requirements and to enhance solutions such as VMware View. Available solutions are designed to solve mass customization needs: including roaming profiles, mandatory profiles, flex profiles and third-party approaches. However, performance issues surrounding these solutions often still persist.

Roaming Profiles

Roaming Profiles allow a user with a PC or Virtual Machine joined to a server domain to logon to any computer resource on the same network and access his or her personal file settings. A user profile location is set on the server and can be customized, as required. When a user logs onto a domain, the roaming user profile is downloaded from the server onto the local computer and applied. When the user logs off, the changes made to the profile are transferred back to the domain. In this

configuration, all user profiles are stored on servers or on a SAN (Storage Area Network). With Roaming Profiles, each user receives the same exact profile that he or she last saved on the server to which they logged onto, since the entire file is saved instead of individual changes.

Users gain flexibility by using Roaming Profiles because they save user specific profile changes to a particular server. However, in a virtual environment, there is no inherent mechanism to update user profiles on multiple servers. The potential for profile corruption greatly increases because users access more than one server to store and retrieve data in a virtual environment.

In addition, *each and every time* a user logs onto a workstation, their associated settings and files must be transferred over the network. The end result is an extended and longer logon process than if the user had logged onto the system using a local profile. Delays are particularly inherent if the user profile is large and requires considerable amounts of resources to store specific profile data. As a result, Roaming Profiles require sizable and valuable storage capacity, due to the unique information kept for each user.

Mandatory Profiles

A Mandatory Profile is a special type of preconfigured Roaming User Profile that administrators utilize to specify user settings. It is a read-only profile, meaning that a user can modify the desktop, but any changes made are not saved when the user logs off. During subsequent server logons, the Mandatory Profile set by the administrator is downloaded and any previous changes made to the desktop are lost due to strict management controls.

With Mandatory Profiles, a corporation may prefer to have a static desktop interface presented to the user on a consistent basis to minimize training needs and maximize user efficiency. In this manner, the user receives a reliable and repeatable experience each and every time he or she logs onto the system, but loses the ability to customize the session settings. This approach is often implemented to minimize logon time to the server network.

It is important to note that when implementing Roaming Profiles or Mandatory Profiles, significant strides in improving logon performance are rarely achieved. Further, neither accomplishes real-time change proliferation across multiple servers resulting in user profile corruption.

VMware View Manager Overview

VMware® View Manager provides integrated individual and desktop pool management capabilities. Desktops types can be virtual machines, Blade PCs or Personal Computers. Virtual Machines leverage the centralized control provided by VMware® vCenter to provision and manage the virtual desktops instances. VMware View provides the following types of desktops and pools:

- **Individual Desktops** – Virtual machines, Personal Computers or Blade PCs available through VMware View Manager. The pool manager can control the power state of these virtual desktops. Users with the proper entitlements to individual desktops that leverage virtual machines can also check out their virtual desktop for offline desktop use.
- **Automated Desktop Pools** – Automated desktop pools are virtual machine based desktops that are automatically provisioned and customized by VMware View Manager. They can be deployed using two types of persistence, persistent and non-persistent. Advanced settings are also available for Automated Desktop Pools. These settings allow you to create a much more dynamic desktop environment by giving the desktop administrator more granular control over the pool. These settings include:

Minimum – The minimum number of virtual desktops to be created when the pool is first created. The pool manager continues to create virtual desktops until the minimum number has been reached. This process ensures that a pool is appropriately sized when a user population is moved to VDM.

Maximum – The maximum number of virtual desktops that can exist in the pool. Use this parameter to limit the number of virtual desktops in the pool to avoid overusing available resources.

Available – The number of virtual desktops that are available for immediate use. For persistent pools, this parameter relates only to the unassigned virtual desktops. This is used to ensure that the pool manager creates enough virtual desktops in advance to handle demand. The number should be higher for more dynamic environments. When a pool contains too few virtual desktops, the manager provisions new virtual desktops from the designated template. These virtual desktops will also be automatically customized, named and become joined to the Active Directory.

- **Manual Desktop Pools** – Manual desktop pools are pools created from existing Virtual Machines, Physical Computers or Blade PCs. Virtual machines can be managed or unmanaged by VMware vCenter. Properly entitled users may also check out virtual machine their virtual machine based desktop for offline desktop use.
- **Microsoft Terminal Services Desktop Pool** – Using this type of pool Terminal Services sessions can be managed by VMware View Manager and provided to VMware View users.

Desktop Persistence

Automated and Manual desktop pools support two types of desktop persistence. Persistent desktops are assigned to users and the desktop stays assigned to that user until an administrator makes a change. Properly entitled users may also check out their desktop for offline desktop use. This type of pool is used when users need to customize their desktops by installing additional applications and storing local data. Non-persistent desktops are allocated to users and only used for that session. Once the user has logged off, the desktop goes back into the pool and becomes available for the next user. This type of pool should be used where a clean state is desired for each

user session or in highly controlled environments where there is no requirement for customization to be stored on the virtual desktop.

Virtual Disk Management

VMware View introduces a new paradigm for managing virtual disks in VMware View environments. VMware® View Composer provides the capability too rapidly create desktop images from a parent or standard virtual machine image. In addition to providing the capability of rapidly creating desktop images, VMware View Composer also reduces the total amount of storage required to deploy virtual desktop images. By leveraging Linked Clones, VMware View Composer introduces a streamlined process for instantly, upgrading patches across multiple desktops by simply applying the patch to the master image and recomposing the linked clones. VMware View Composer also provides the ability to separate the user data and profile settings in a secondary user data disk (Figure 1) By providing this capability, updates can be applied to the parent image and inherited by the linked clones. After a linked clone has been updated, the user's personal settings from the user data disk are reattached to the updated image as it boots up.

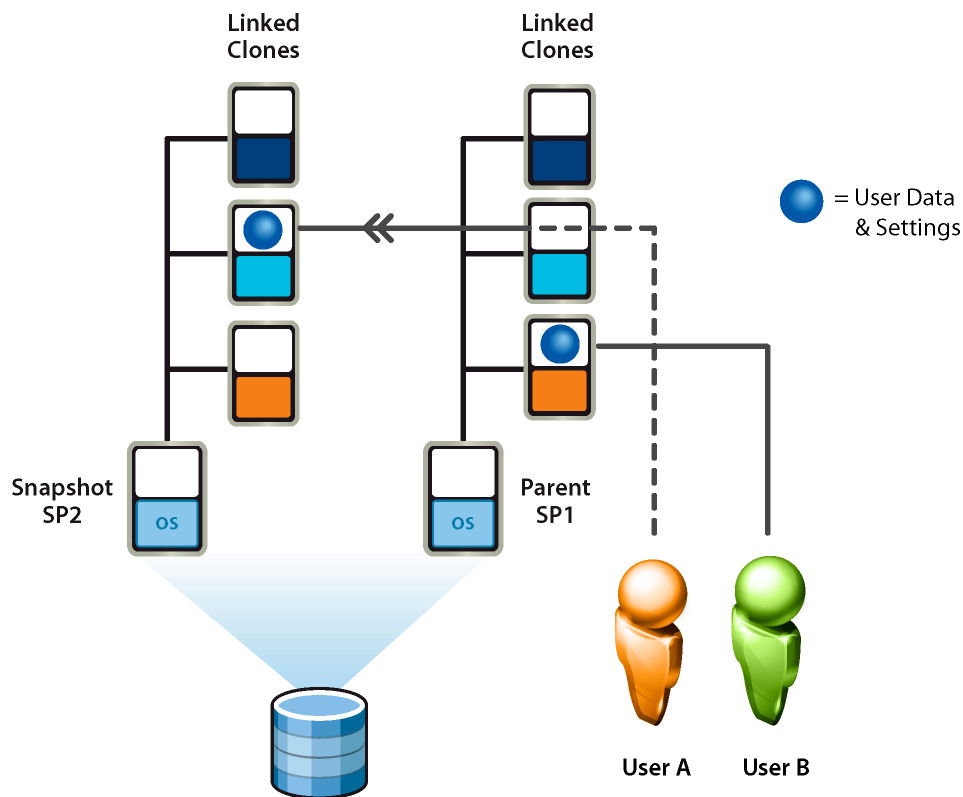


Figure 1: Update and reattach User Data Disk

VMware View composer uses linked clones technology to reduce the total storage space consumed by each individual virtual machine, virtual disk image. Storage reduction ratios can be as high as 70% in larger deployments. This is achieved by creating a master image that serves as the base image for all the virtual desktop instances. Virtual desktops created using the parent as its base are created by linking to the parent. Only the data that is unique to the linked clone is stored in its virtual disk, reducing the overall size. This approach also greatly reduces the time to deploy desktop instances as well because each desktop instance is not fully cloned. When Automated or Manual desktop pools are created, the desktop instances are joined to the domain and available in just a few seconds.

Software and Patches can also be added to VMware View Composer parent images. Any new desktops that are created will automatically inherit the updates. Existing images can be recomposed on an individual basis or all at once, instantly making new updates available to those users. VMware View Composer also supports taking additional snapshots of the parent image before applying new patches or software updates, this provides a fall back mechanism. In case a problem should occur, administrators can instantly redirect users back to the previous working snapshot.

User Data Disk

When leveraging VMware View Composer and Linked Clones for provisioning. Administrators have the option of creating a separate user data disk for each virtual desktop instance. The user data disk redirects the users profile and data to a second virtual disk. Providing this capability ensures each user's personal settings and data are restored during boot time, after a master image has been updated. This approach is similar to having a locally cached profile, as it is not stored centrally and accessible by other systems a user may be entitled to use such as a Personal Computer, Blade PC or Terminal Services session.

Because VMware View Manager supports providing access to variety of backend systems such as Virtual Desktops, Microsoft Terminal Services, Blade PCs and Personal Computers. It is recommended that a robust profile management solution is also implemented such as RTO Virtual Profiles. This type solution can work in place of, or in conjunction with a VMware View Composer user data disk. The addition of a profile management solution will help ensure that each user's personal settings, who are entitled to multiple back end resources, will always be available to them regardless of the system they are accessing.

RTO Virtual Profiles™ – A Revolutionary Profile Management Solution

The evolving Universal Client market is taking a giant step forward today through the exploitation of enhanced user profile techniques such as Virtual Profiles. Implementing Virtual Profiles ensures the efficiency and security requirements that Fortune 500 corporations have come to appreciate and expect. RTO Software's Virtual Profiles addresses the issues of design, performance, profile integrity, flexibility and implementation throughout the enterprise.

Faster Logons

Today's users are faced with slow logon times as their entire user profile is downloaded at the beginning of each session. Slow logon times undermine user productivity and can foster detrimental alternative behaviors. Users may respond to slow logon times by leaving old sessions open rather than logging off.

With Virtual Profile's Just-in-Time (JIT) file access and retrieval, only the files that a user needs during a specific session are copied from the server to the desktop. Users experience significantly improved logon times since network bandwidth is maximized on a "per user" and "as needed" basis. This "on demand" approach eliminates the need to copy all user files down each time a user logs onto the

system. This approach also encourages users to log off and re-logon as needed rather than maintaining inactive sessions resulting in reduced server resource requirements.

Just-in-Time resource delivery at logon also eliminates the need for folder redirection. In some instances, performance is the primary reason to redirect folders. By eliminating the need for folder redirection, runtime performance is significantly enhanced. Further, the user experience is greatly enhanced since users are working on "local files." This is particularly important for applications that perform a significant number of reads and writes.

Finally, file server stress is significantly reduced since only the files that a user needs during a session are copied from the server ultimately resulting in reduced IT infrastructure costs.

Profile Corruption Eliminated

Using existing profile solutions, the server points to an area outside the user's profile to copy and apply the user's personalized settings. When the user logs off, the server recognizes the changes and copies the changes back to the network location. However, when changes must be tracked from multiple applications, logon times are significantly compromised. Further, file corruption is prominent if a session is not logged off. In these instances, a user may simply forget to log-off a session or could be multi-tasking other non PC tasks. If a session remains open for an extended period of time, the system could crash or a power outage may ensue while a session is in progress. The end result is registry corruption, profile corruption, or both.

Virtual Profiles utilizes "Save-on-Close" technology to save file and registry changes in real-time as they are made, not at the end of a session or during logoff. Conflicts between multiple applications, which have the potential of over-writing each other, or changes lost due to abandoned or failed sessions, are eliminated.

VMware View Integration

RTO Virtual Profiles are fully compatible with a VMware View solution. Virtual Profiles work in conjunction with or independently of VMware View Composer; user data disks and bring enhanced value to fully harnessing the power of VMware View Manager Persistent and Non-Persistent desktops. By also supporting Physical PCs, Blade PCs, and Microsoft Terminal Services RTO Virtual Profiles enable virtual desktop administrators to bridge the end user experience across a variety of systems.

Summary

In order to continue the success of desktop virtualization in the enterprise success, organizations must be able to both meet the needs of its users and its business objectives. IT organizations must reduce infrastructure costs associated with network bandwidth consumption, server resource demand, and user profile management while increasing data security. Users need faster access to their data without corruption problems. RTO Virtual Profiles™ revolutionizes the way user data is managed in a VMware View environment and allows corporations to achieve their goals and meet the needs of their users. RTO Virtual Profiles™ is an invaluable application that completes the virtualization of user data in a virtual desktop environment. By combining the virtual desktop management capabilities of a VMware View solution with the benefits of RTO Virtual Profiles desktop administrators can deliver a better-managed dynamic desktop environment with a consistent predictable user experience.

About the Authors

Warren Ponder is a Sr. Technical Marketing Engineer at VMware. In this role, he works as part of the product marketing team developing alternative approaches to traditional desktop architectures and solutions.

Much of his time is spent speaking, writing, and developing technical content focused on thin client computing, Windows interoperability, and desktop solutions that leverage the benefits of VMware's leading virtualization technologies.

Kevin Goodman is the CEO and Founder of RTO Software. RTO Software provides a variety of tools to discover, monitor and accelerate applications in the enterprise. Goodman has three patents on application scalability and speaks at industry conferences around the globe on ways organizations can increase their IT business value.

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