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1. Introduction

In traditional Microsoft Windows workstation and laptop environments, IT administrators and end-users are faced with problems such as slow logons, profile corruptions and loss of user settings on a daily basis. These problems are steadily increasing with the introduction of new application delivery methods such as server based computing and virtual desktop infrastructure; today, many organizations use at least two different delivery methods.

Usually, these problems are the result of poorly designed user settings management. If only administrators had the skills and time to redesign their user settings management, so it would be suitable for multiple application delivery methods instead of just one. And if only they had the right tools to do this.

All end-users in your environment need to have the same user settings within their workspace; whether their desktop is VDI or server-based, streamed or traditionally managed, and whether they use streamed, published or standard applications. This is why a central approach to user settings management is necessary to support all platform and application types.

This white paper provides you with solid grounds for the new way of user settings management. Not based on scripts and policies for each application delivery method, but based on market standard software for all application delivery methods. RES PowerFuse 2008 achieves this through technologies such as User Preferences, Custom Resources, Home Directory Maintenance and PowerLaunch.

Related documentation

The following white papers provide further information that you may find interesting:

1. "The Architecture of RES PowerFuse 2008".
2. "How to increase the Manageability of Your RES PowerFuse Environment".
3. "Configuring Global RES PowerFuse Settings for Specific Users".
4. "The RES PowerFuse Replication Model".

You can download these white papers from the download section of the RES Software website: <http://www.ressoftware.com/downloads>.

2. Technologies Involved

Below you will find a brief overview of the technologies that RES PowerFuse uses to manage user settings.

For detailed information about configuration options, please refer to the RES PowerFuse Help, which is available from any part of the RES PowerFuse Management Console by pressing F1. Additional information is available at the RES website, <http://www.ressoftware.com>.

User Preferences

User Preferences can store registry values, keys, registry trees, folders and files from the user's local profile on the user's homedrive. These settings and files will be saved when the user logs off and restored the next time the user logs on.

User Preferences are particularly useful when you use mandatory profiles, because it allows you to enjoy the performance advantage of mandatory profiles while maintaining the ability to save specific user preferences.

User Preferences can also be useful when you use roaming profiles in combination with passthrough applications in a Citrix environment. User Preferences preserves any changes made to the user's profile in the passthrough session on the user's home drive.

Custom Resources

Custom Resources are resources that are referenced by other parts of RES PowerFuse, but which cannot easily be placed on a centrally available fileserver, or which must also be available on a laptop when it is not connected to the network. Custom Resources are stored in the RES PowerFuse Datastore and cached locally on all computers running RES PowerFuse. Examples are Instant Mail Outlook signatures, scripts used in external tasks in PowerLaunch, etc.

Home Directory Maintenance

Directory Maintenance allows you to store specific files and folders in the user's home directory, *e.g.* a new normal.dot template for Microsoft Word with the new company logo.

PowerLaunch

PowerLaunch allows you to configure many settings related to the user environment, such as environment variables, drive mappings, registry settings, external tasks, etc. These settings will be implemented when the user logs on.

3. User Profile Management

User profile management is part of user settings management and is the most commonly used term when setting up a user environment.

Microsoft provides several technologies to support user settings management:

- User Profiles
- Folder Redirection

User Profiles

Microsoft Windows provides the following user profile types:

- **Local User Profile:** this profile is created the first time a user logs on to a computer and is stored on the computer's local hard disk. Any changes made to the local user profile are specific to the computer on which the changes are made.
- **Roaming User Profile:** this profile is a copy of the local user profile and is stored on a server share. It is downloaded each time a user logs on to a computer on the network. Any changes made to a roaming user profile are synchronized with the server copy when the user logs off.
- **Mandatory User Profile:** this profile contains particular settings for users. Only administrators can make changes to mandatory user profiles. Any changes made by the user to desktop settings are lost when the user logs off.
- **Temporary User Profile:** this profile is issued each time an error condition prevents the user profile from being loaded. Temporary profiles are deleted at the end of each user session. Any changes made by the user to their desktop settings and files are lost when the user logs off.

Each profile consists of two parts:

- **A registry hive:** The registry is a database that stores computer- and user-specific settings. Parts of the registry can be saved as files (hives) and can be reloaded when necessary. User profiles use registry hives to provide roaming profile functionality. The user profile registry hive is the NTuser.dat in file form. It is mapped to the HKEY_CURRENT_USER portion of the registry when the user logs on. The NTuser.dat hive maintains the user's environment preferences when the user is logged on. It stores those settings that maintain network connections, Control Panel configurations that are unique to the user (such as the desktop color and mouse settings), and application-specific settings.
- **A set of profile folders stored in the file system:** User profile files are stored in the file system in the Profiles directory in a separate folder for each user. The user profile folder is a container for applications and other operating system components to populate with subfolders and user data, such as shortcut links, desktop icons, startup applications, documents, configuration files and so on. Windows Explorer uses the user profile folders extensively for special folders, such as the user desktop, Start Menu and My Documents folder.

Folder Redirection

Folder Redirection allows an administrator to redirect the location of certain folders in the user profile to a network location. When these redirected folders are accessed by the operating system or by applications, the operating system automatically redirects to the location on a network share as specified by the administrator. From a user perspective, this is similar to the roaming user profiles, because users have the same settings regardless of the computer they log on to.



Note:

You can find more information about User Settings Management on the Microsoft Website <http://technet.microsoft.com/en-us/library/bb490855.aspx>.

4. Design Requirements for User Settings

In the previous chapter, we discussed different types of profiles. In this white paper, all examples are based on a mandatory profile. However, you can also use roaming profiles or local profiles instead; RES PowerFuse supports all types of Microsoft user profiles.

Before you start building your user settings based on User Preferences, you should ask yourself the following questions:

Do users need to save their settings?

User requirements and expectations play an important role in deciding whether user settings need to be saved. If users can change application settings, these settings should be saved.

Which settings do users need to save?

If you decide to save user settings, you need to determine which settings should be saved and based on what criteria. Are these global settings, or are they connected to an application - or even to a specific workspace?

Do applications store settings in the registry or in the user profile?

If you decide to save settings for a specific application, you need to determine which settings should be saved and where. Most applications store their settings in HKCU\Software\<Application> and in %userprofile%\Application Data\<Application>. You can find out more information about the correct location of these settings on various websites on the Internet.

Do you want to save user specific printer settings?

If printers are made available through user workspace management, you also need to determine whether changes to the default settings are preserved for the user. If so, you only need to enable this option in RES PowerFuse. RES PowerFuse will handle the technical rules to preserve the correct printer settings for the user.

It is often a business requirement to preserve the user settings of almost all applications. In addition to application settings, there are also settings such as Internet Favorites, Recent Documents, etc. These settings are often global.

5. Technical Challenges

When you save user settings outside the user profile, there are a few issues to take into consideration when you reload these settings into the mandatory profile. The main issues are:

- Profile State Emulation
- Control Panel Settings

Profile State Emulation

When you use a mandatory profile, it is not possible to import certificates. An unsupported workaround is to "emulate" a roaming profile when the user logs on and change the state back to mandatory when the user logs off.

Control Panel Settings

Certain Windows appearance settings for the user may not apply as expected when using registry actions. This is due to the way the Windows operating system functions; certain keys are only loaded at the startup of a computer, and therefore it requires a reboot for them to take effect.

With User Preferences, you do not have to worry about these issues. RES PowerFuse deals with them in the background, so that you as an IT Administrator or Consultant can focus on the content of the user settings.

6. Designing User Settings

Global User Settings

When designing user settings, you first need to define which global user settings should be preserved when a user logs off. This can be different for each organization. A few examples are:

- Certificates
- Recent Documents
- Windows Explorer (browse list)
- Windows Taskbar
- Control Panel (Keyboard, mouse, etc.)
- Desktop (if no documents can be placed on the desktop)

A few Profile items should be redirected based on folder redirection. Common folders are:

- My Documents
- My Pictures
- Desktop (if documents are allowed to be placed on the desktop)

Application User Settings

When you have defined the global user settings, you need to define the application user settings. Almost all applications write information to the user profile. If necessary, you can therefore define user settings for each application. Applications that are commonly used in organizations are:

- Internet Explorer (Favorites, Cookies, History)
- Microsoft Office 2003 and 2007 (Word, Excel, Outlook, PowerPoint)
- Winzip
- Notepad
- Media Player
- Adobe Acrobat Reader 8

7. Retrieving User Settings

In the previous chapters, we discussed the different profile types, the location of user settings and the two ways to enable settings for users: global and application specific.

The settings that are written to the user profile are often not documented by application vendors. However, these settings are necessary to enable User Settings Management. There are a few ways to find out which settings belong to which application and application option:

- User Groups on the Internet
- White Papers of independent consultants
- Tools to monitor file and registry access and changes

The first two ways to collect information are quick wins if you know your way around on the Internet with Google and in User Groups.

In this white paper, we explain how to find the settings yourself, because there is always a setting or an application that is not mentioned on the Internet.

You can find this information using:

- Snapshot
- Monitoring

Snapshot

You take a "Before" snapshot; make the changes to the application; take an "After" snapshot; then create a differential merge between both snapshots.

You can make snapshots with RES PowerFuse, Regshot (free), Active Registry Monitor, etc.

Monitoring

You use a monitoring tool that watches actions on file and registry changes. The most used monitoring tool is Microsoft's Process Monitor. Process Monitor is an advanced monitoring tool for Windows that shows real-time file system, registry and process/thread activity.

You can download Process Monitor at:

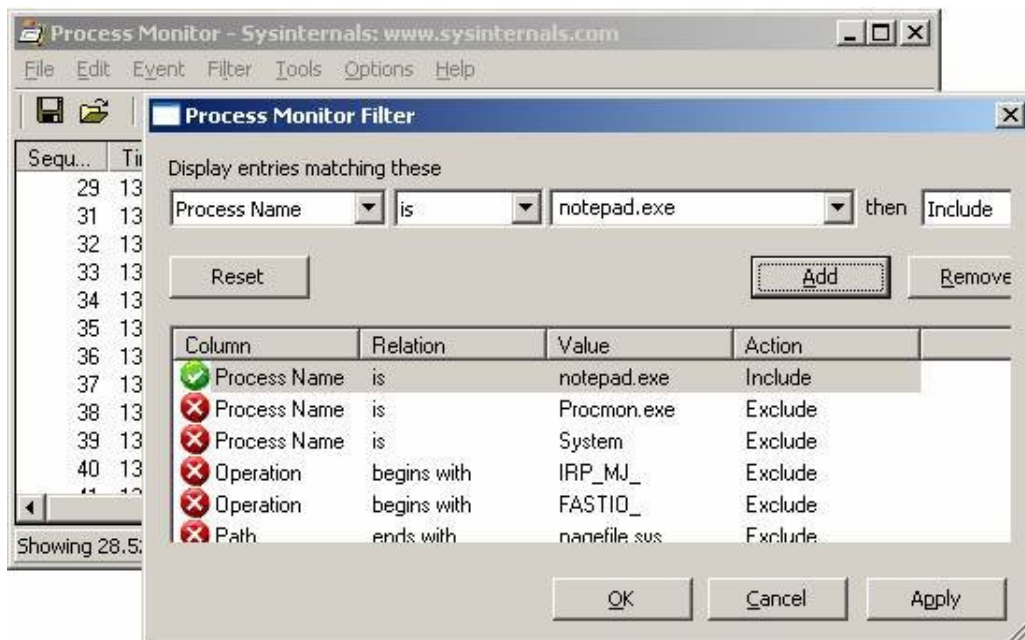
<http://www.microsoft.com/technet/sysinternals/utilities/processmonitor.msp>


7.1 Retrieving User Settings for Notepad

The following is a simple example of how to create a user preference based on Notepad. If you work with more extensive and complex applications such as Microsoft Office, Adobe or even AutoCad, we recommend using a snapshot technology instead, because this will limit the results to changes only.

To retrieve information about the registry settings of Notepad, do the following:

1. Log on as Administrator.
2. Download Process Monitor, as described in the chapter "Retrieving User Settings" (on page 8).
3. Copy Procmon.exe and Procmon.chm to the Windows folder on your computer.
4. Start Procmon.exe.
5. In Process Monitor, configure a filter where notepad.exe is specified as the process that should be monitored.



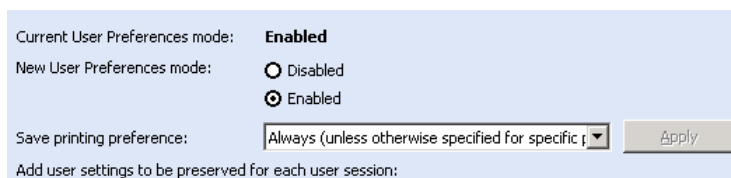
6. Start Notepad.
7. Clear the result of Process Monitor by clicking .
8. In Notepad, go to **Format** and enable Word Wrap.
9. Close Notepad.exe to save the settings.

10. Start Process Monitor and see where Notepad has written this information. This can be RegSetValue or WriteFile Operations. In this example, it is a RegSetValue. Write down the location where Notepad has written the information and determine if you need information about the entire registry tree or only about a specific registry key.

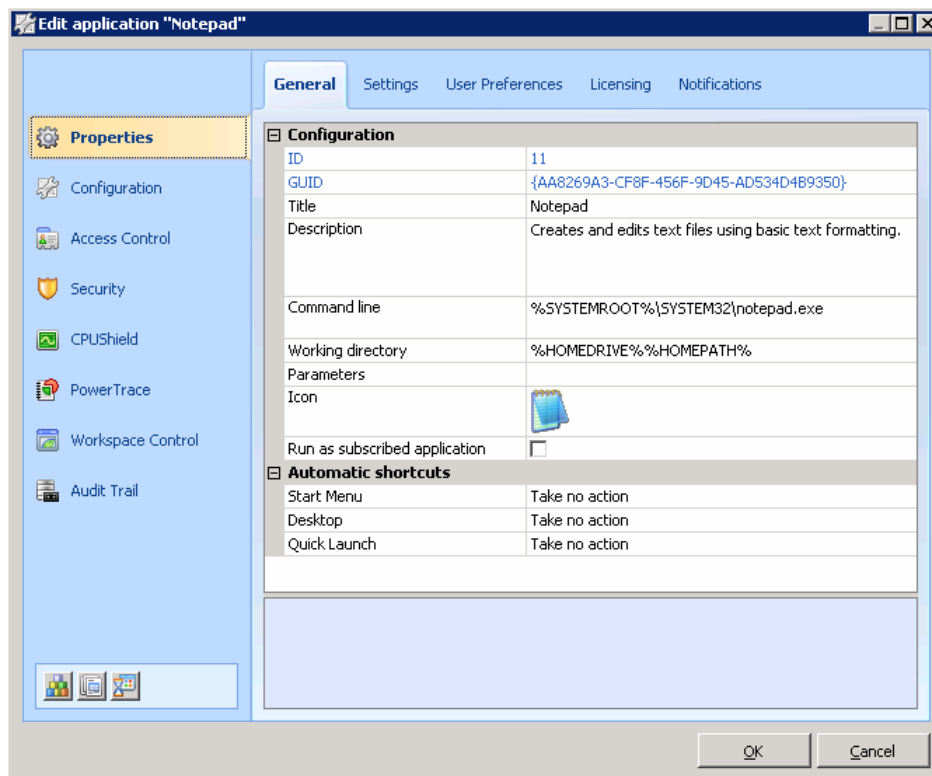
| Process Na... | P... | Operation | Path | Result | Detail |
|---------------|------|-------------|--|---------|---------------------------------------|
| notepad.exe | 988 | RegOpenKey | HKCU\Software\Microsoft\Notepad | SUCCESS | |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfEscapement | SUCCESS | Type: REG_DWORD, Length: 4, Data: 0 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfOrientation | SUCCESS | Type: REG_DWORD, Length: 4, Data: 0 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfWeight | SUCCESS | Type: REG_DWORD, Length: 4, Data: 400 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfItalic | SUCCESS | Type: REG_DWORD, Length: 4, Data: 0 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfUnderline | SUCCESS | Type: REG_DWORD, Length: 4, Data: 0 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfStrikeOut | SUCCESS | Type: REG_DWORD, Length: 4, Data: 0 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfCharSet | SUCCESS | Type: REG_DWORD, Length: 4, Data: 0 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfOutPrecision | SUCCESS | Type: REG_DWORD, Length: 4, Data: 1 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfClipPrecision | SUCCESS | Type: REG_DWORD, Length: 4, Data: 2 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfQuality | SUCCESS | Type: REG_DWORD, Length: 4, Data: 2 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfPitchAndFamily | SUCCESS | Type: REG_DWORD, Length: 4, Data: 49 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfPointSize | SUCCESS | Type: REG_DWORD, Length: 4, Data: 100 |
| notepad.exe | 988 | RegSetValue | HKCU\Software\Microsoft\Notepad\IfWrap | SUCCESS | Type: REG_DWORD, Length: 4, Data: 1 |

To enable User Preferences and to create a user preference for Notepad, do the following:

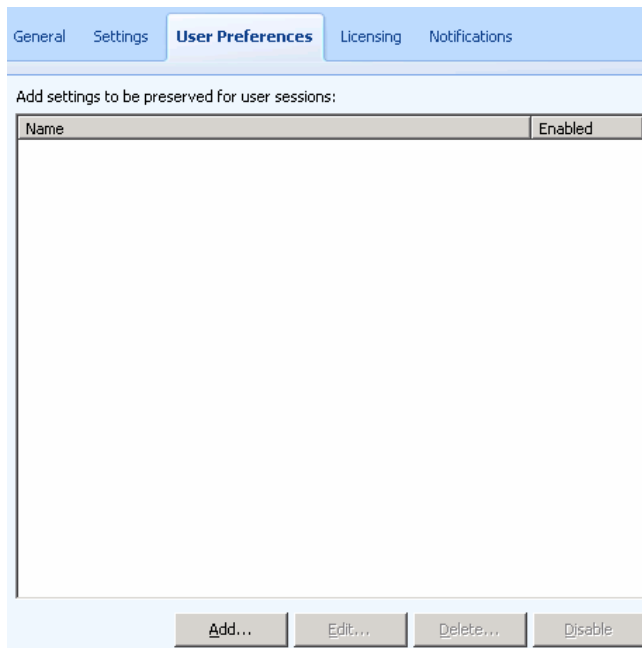
1. Open the RES PowerFuse Management Console.
2. Open the **Desktop Management** node and the **User Preferences** node.
3. Enable User Preferences.



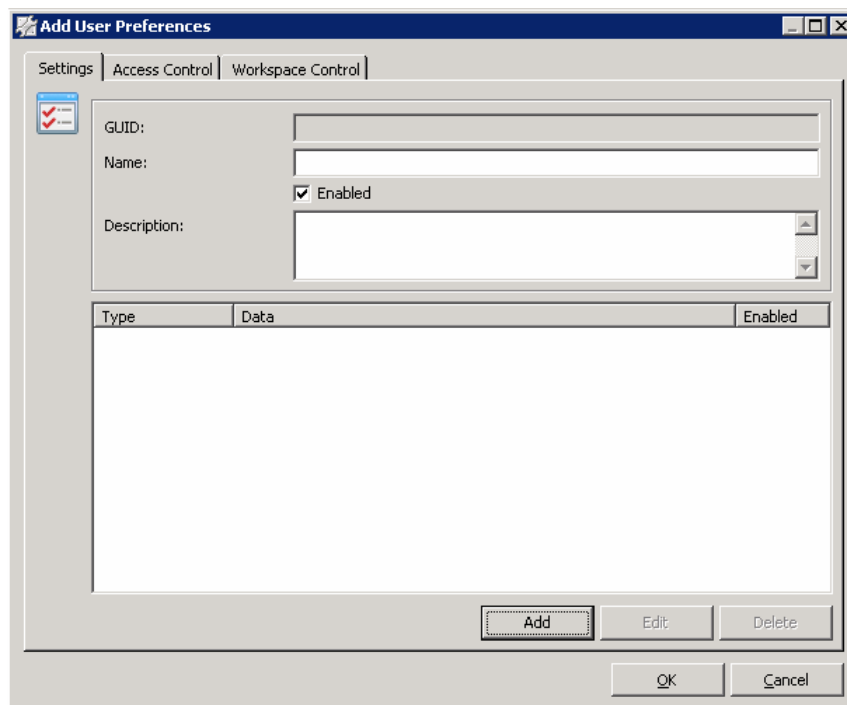
4. Open the **Application Management** node and create an application Notepad (notepad.exe).



5. Click the **User Preferences** tab.

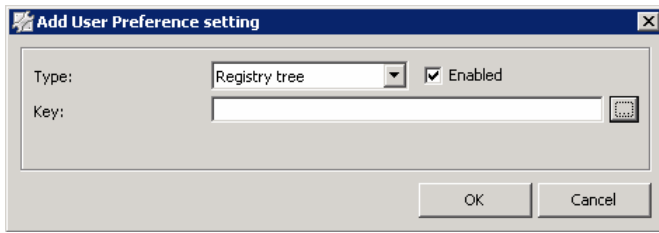



6. Click **Add** to add a new User Preference. This will open the **Add User Preferences** window.

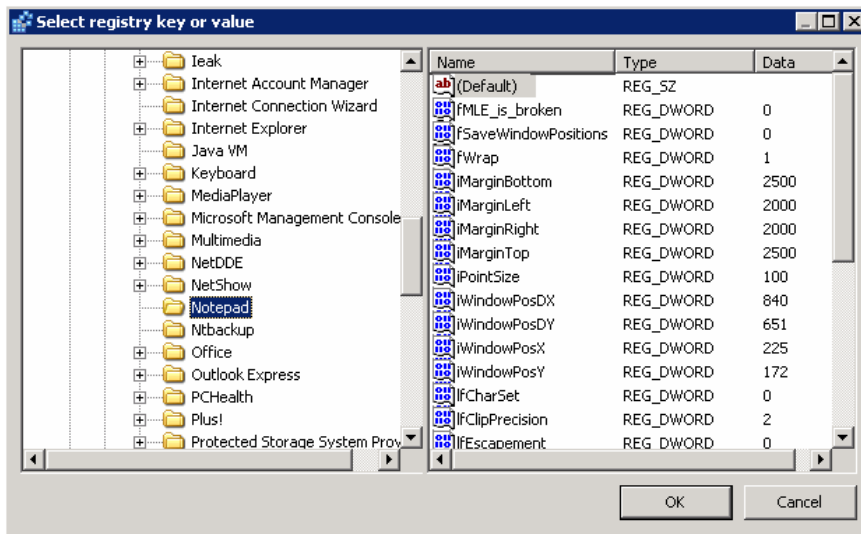


7. Click the **Settings** tab and enter a name for the user preference (e.g. Notepad Word Wrap).

8. Click **Add** to add a new User Preference Entry. This will open the **Add User Preference setting** window.



9. Select **Registry tree** in the **Type** field.
10. Click  to browse to the registry tree.
11. Select the registry tree and click **OK**. If not all registry values need to be saved when a user logs off, you can also select a single registry key.



8. Creating a Mandatory Profile

How to create a mandatory profile

1. Create a template domain account with the same permissions as the user or group that will use the mandatory profile.
2. If you want to apply any registry hacks, temporarily make the template account a member of the administrators group on your local workstation.
3. Log on to the template account on your workstation and configure the desktop, Start Menu, appearance, shortcuts, software, registry hacks, etc.
4. Log off the template account and remove the account from the local administrators group.
5. From your workstation, log on to the domain with an account that is a member of the **Domain Admins** group.
6. Create a share on a network server (**\\ServerName\Mandatory-XP**) to hold the mandatory profile. Grant the users and groups that will use the profile Read & Execute permissions on the folder.
7. Open the Control Panel **System**.
8. Click the **Advanced** tab.
9. In the **User Profiles** area, click **Settings**.
10. Select the template account in the **Profiles stored on this computer** list and click **Copy To**.
11. Enter the network location of the mandatory profile, **\\ServerName\Mandatory-XP**, into the **Copy profile to** field.
12. In the **Permitted to use** area, click **Change** and add the account **Everyone** from the domain.
13. Click **OK** to close the System applet.
14. Locate **\\ServerName\Mandatory-XP\Ntuser.dat** and rename it to **\\ServerName\Mandatory-XP\Ntuser.man**.
15. Repeat steps 2 - 12 for each additional operating system that should work with Mandatory Profiles.

How to assign the mandatory profile

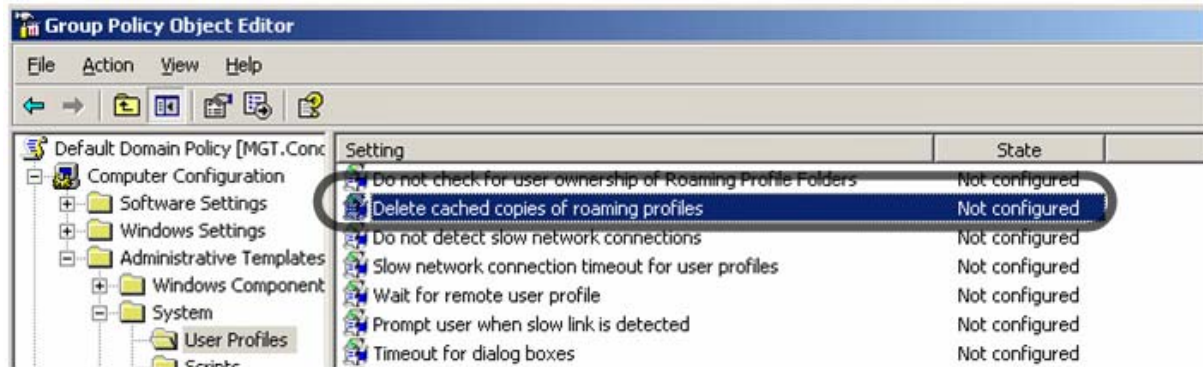
1. Open **Active Directory Users and Computers**.
2. Select a user account that should use the mandatory profile and click **Properties**.
3. Select the **Profile** tab.
4. Enter the profile path, **\\ServerName\Mandatory**, in the **Profile path** box and click **OK**.
5. Repeat steps 2 - 4 for each additional user that should use the mandatory profile.



Note:

A mandatory profile can have a performance impact on your network environment. To reduce network traffic, you can place the mandatory profile on the local device, for example with RES Wisdom. Then set the profile path to a local drive, e.g. C:\Documents and Settings\Mandatory.

When you implement mandatory profiles, you will notice that every device keeps a local cached copy of the profile. To make sure that every profile is cleaned up during logoff, it is recommended that you enable the Group Policy Setting "Delete cached copies of roaming profiles" on the Computer Configuration Policy hive.



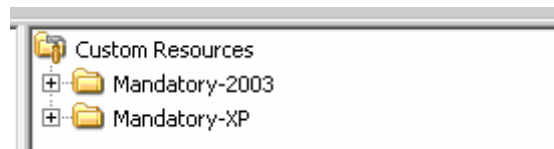
For more information, visit the Microsoft website at <http://support.microsoft.com/kb/274152>

9. Deploying Mandatory Profiles with RES PowerFuse

When you place a mandatory profile on a network share, this creates a performance impact on your network environment. To reduce network traffic, you can place the mandatory profile on the local device. To maintain this locally stored mandatory profile, you need an IT Task automation system such as RES Wisdom to distribute this mandatory profile. A problem with this can be versioning. How do you make sure that the correct mandatory profile is available on every device? RES PowerFuse allows you to make the versioning and distribution of mandatory profiles more reliable and predictable, which will reduce network traffic.

How to deploy a mandatory profile with RES PowerFuse

1. Follow the steps 1 - 13 of "How to create a mandatory profile" in the chapter "Creating a Mandatory Profile" (on page 13).
2. Open the RES PowerFuse Management Console.
3. Click the nodes **RES PowerFuse Setup > Datastore > Custom Resources**.
4. Add a Custom Resource and point to the folder where you saved the mandatory profile \\ServerName\Mandatory-XP.
5. Click **OK** to close the applet and add the folder.



The folder will be stored in the RES PowerFuse Datastore and replicated to every RES PowerFuse Local Agent Cache.

How to assign the mandatory profile

1. Open **Active Directory Users and Computers**.
2. Select a user account that will use the mandatory profile and click **Properties**.
3. Click the **Profile** tab.
4. Enter the profile path, **C:\Program Files\Program Files\RES PowerFuse\Data\DBcache\Resources\Custom_Resources\Mandatory -XP**, into the **Profile path** box and click **OK**.
5. Repeat steps 2 - 4 for each additional user that will use the mandatory profile.

How to assign the mandatory profile for Terminal Services

1. Open **Active Directory Users and Computers**.
2. Select a user account that will use the mandatory profile and click **Properties**.
3. Click the **Terminal Services Profile** tab.

4. Enter the profile path, **C:\Program Files\Program Files\RES PowerFuse\Data\DBCACHE\Resources\Custom_Resources\Mandatory - 2003**, into the **Profile path** box and press **OK**.
5. Repeat steps 2 - 4 for each additional user who will use the mandatory profile.

10. Summary

In this white paper, we have described how to streamline user settings in a Windows environment by presenting best practices for the design of user preferences.

User Settings Management is the key to end-user satisfaction in every organization, especially now that more and more technologies to manage user workspaces are coming on to the market.

RES PowerFuse can resolve all user settings management issues that are often encountered in organizations, by using User Preferences in combination with roaming profiles and mandatory profiles. Because existing roaming/mandatory/hybrid and flex profile implementation can be seamlessly migrated to User Preferences in RES PowerFuse, this ensures stability, reliability and flexibility for user settings management and guarantees end-user satisfaction.

User Preferences make user profile corruption a thing of the past, because the process of User Preferences is controlled and monitored by RES PowerFuse itself. Each user gets a desktop with personalized settings, where and when he needs it. This means that IT teams can spend their valuable time on other more pressing projects or initiatives.

You can read more about the implementation of User Preferences in your environment in the RES PowerFuse Help.

11. Resources

On the Microsoft website, you can find more information about how to create Mandatory Profiles or to maintain profiles. Here, you will also find information about registry keys and profile folders.

- Honeycutt, Jerry, *Microsoft Windows XP Registry Guide*, 1st ed. Redmond, WA: Microsoft Press, 2002.
- Marl, Craig, "User Data and Settings Management", at <http://technet.microsoft.com/en-us/library/bb490855.aspx> (accessed: 5 March 2008).
- "Remove Personalized Settings for New Users After Installing Internet Explorer 5", at <http://support.microsoft.com/kb/238441> (accessed: 5 March 2008).
- Russinovich, Mark, and Cogswell, Bryce, "Process Monitor v1.26", at <http://www.microsoft.com/technet/sysinternals/utilities/processmonitor.msp> (accessed: 5 March 2008).
- "Using Group Policy to delete cached copies of roaming profiles", at <http://support.microsoft.com/kb/274152> (accessed: 5 March 2008).
- WinGuides Software, "Windows Registry Guide 2003", at <http://www.pctools.com/guides/software/detail/1/> (accessed: 5 March 2008).