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Ivanti® Environment Manager

ROAMING AN OUTLOOK CACHE IN A NON-PERSISTENT VDI/RDSH ENVIRONMENT

Contents

Purpose of this Document

This document demonstrates how Ivanti Environment Manager can successfully roam a user's Outlook cache between user sessions in a non-persistent VDI/RDSH setup. The associated configuration setup assumes an intermediate level of Windows expertise and familiarity with Virtualization technologies. Our approach to cache roaming can be further extended to persist similar application folders such as Java Cache, OneDrive, and Skype.

Challenges with Outlook 365 in Non-Persistent VDI/RDSH Environments

Organizations are migrating to Office 365 at an ever-increasing rate, with a 43 percent year-on-year jump (June 2016 - June 2017), but as always, user acceptance is key to a successful migration project. Ivanti Environment Manager already provides industry-leading technology to help with migrating your users' Settings and Files to new Office versions to retain consistent look and feel. However, a substantial barrier to user acceptance of Outlook 365 in VDI/RDSH environments is the application performance and experience. This issue is directly linked to one of the methods by which VDI/RDSH sessions are configured to interact with 365 Mailboxes:

- **Exchange Online Mode** – Utilizes a direct connection to a 365 Mailbox, which is prone to lagging application performance and poor search capabilities, and is susceptible to network latency.

- **Cached Exchange Mode** – Works predominantly from a local copy of the mailbox. It resolves network and performance issues but requires a resident local mailbox within the user profile.

Cached Exchange Mode is the preferred approach, but typically in virtual sessions the user profile is rebuilt at each logon, which results in each user's OST mailbox file having to be downloaded for every session, resulting in high network utilization and poor application performance during the session.

> **Although Microsoft provides an Outlook ADMX Template to enable redirection of the OST Cache file to a network share, this approach can corrupt the file and introduce performance latency in comparison to the VHD/Container approach described in this white paper. Further reading** here **indicates limited support for this ADMX method.**

Learn how you can resolve the Cached Exchange mode challenge with Environment Manager by attaching a container to the user's virtual desktop or session and redirecting the user's local mailbox folder(s) within the user profile into this container. Customers of Environment Manager 8.6 and above can leverage this configuration, which enables the Outlook cache to effortlessly roam between sessions and provide users with a 'native' Outlook experience.

A Unique, Extensible, and Context-Aware Approach

By employing Environment Manager to solve this common problem, you can further leverage its Policy Condition engine to provision remote server cache storage on a per-user/group basis. For example, in a multi-datacenter scenario, a user can be directed to storage that's physically located within the datacenter that the session is running in. Another example is splitting users between remote servers based on an I.P. range for the session. This would lessen the load and dependency on an indvidual remote server. It also allows for a hybrid mode where some users can remain in online Exchange mode and others in cached Exchange mode. The key or hybrid mode is that the users' mail profile will always utilize the default location to prevent any compatibility issues when moving between endpoints.

The supplied config also contains the required Outlook settings to set the Exchange mailbox in cached exchange mode and suppress the End User License Agreement warning.

We also recommend that the disk is set to expand to the anticipated cache size. We do not recommend changing the core custom actions within the supplied Environment Manager configurations without due consideration.

Pre-requisites

- In Windows 7 and Windows Server 2008 R2 environments, the following patch from Microsoft must be applied **https://support.microsoft.com/en-us/kb/2614892**

- PowerShell v4 **https://social.technet.microsoft.com/wiki/contents/articles/21016.how-to-install-windows-powershell-4-0.aspx**

Product Versions Tested

- Ivanti Environment Manager 8.6, 10.0 & 10.1

- Microsoft Office 2013 & 2016

- Microsoft Windows 7 & 10

- Microsoft Windows Server 2008 R2*, 2012 R2 & 2016

- Citrix XenApp/XenDesktop 7.12

*Note that the method used to create VHD's will fail to complete correctly if executed from a 2008 R2 Server. You can work around this issue by pre-creating the VHDs for you users from another Server OS using the creation scripts provided.

Scripts and Environment Manager Configuration

This white paper is accompanied by an associated OutlookOSTVHD_v1.0.zip that contains the files required for deployment:

- Environment Manager Policy Configurations for versions 8.6, 10.0, and 10.1

- DiskCreation.ps1 – Script to assist with the provisioning of VHD's for your users (not mandatory)

- UserListCreation.ps1 – Script to output a list of required users, to be used in conjunction with DiskCreation.ps1

Guidance

This setup is for a very specific use case—to allow a user's complete Outlook cache to roam between their user sessions in a non-persistent VDI/RDSH setup. This means that a user does not need to be in 'Exchange Online Mode' in a non-persistent VDI/RDSH setup. They can be in 'Cached Exchange mode'—allowing them to cache their entire mailbox and persist it between sessions. Cached Exchange Mode provides a better experience for users with this use case.

This setup is suitable for supported VDI infrastructures in a virtual desktop environment (e.g. XenDesktop) or RDSH scenario (e.g. XenApp).

The Setup is a three-phase process:

- Set up and configure the permissions of the remote server share(s) to store the cache(s).
- Reconfigure the supplied Environment Manager configuration for the environment and configure user personalization.
- Deploy the Environment Manger configuration to the VDIs.

Powershell scripts are provided but not mandatory for the setup; they are designed to help with the setup and onboarding procedure.

Enable Exchange Cached mode so the entire mailbox is cached. In addition, set the entire mailbox to sync.

# Environment Manager Personalization and Configuration

Windows Setting Groups within personalization can be used to persist a user's Outlook-based application settings between sessions. This ensures that the user's mail profile, signatures, layout, and preferences are consistently available to the user without any reconfiguration. In addition, the Environment Manager configuration can be used to enforce policy settings for the user to ensure correct setup. As an example, in the supplied configuration, the setting to cache the user's full mailbox is set using the corresponding policy settings.

Do not personalize the folder to be redirected in this case C:\Users\<username>\AppData\Local\Microsoft\Outlook) using Environment Manager personalization. Since the folder will be managed by the Cache Roaming approach, there's no need for personalization to capture the folder. If you do personalize the redirected folder, Environment Manager personalization will attempt to capture the folder (following disk detachment) at user logoff and issues will occur. This advice also applies to any additional redirections you utilize with Cache Roaming.

Below outlines the updates required to the OOB Office 2016 Personalization settings.

Office 2016 Personalization Application Group

Within the standard 'Out-of-box' Windows Personalization Template (Office 2016 / 365). **Remove** {CSIDL_LOCAL_APPDATA}\Microsoft\Outlook\RoamCache from the folder includes list. And **Add** {CSIDL_LOCAL_APPDATA}\Microsoft\Outlook the folder excludes list.
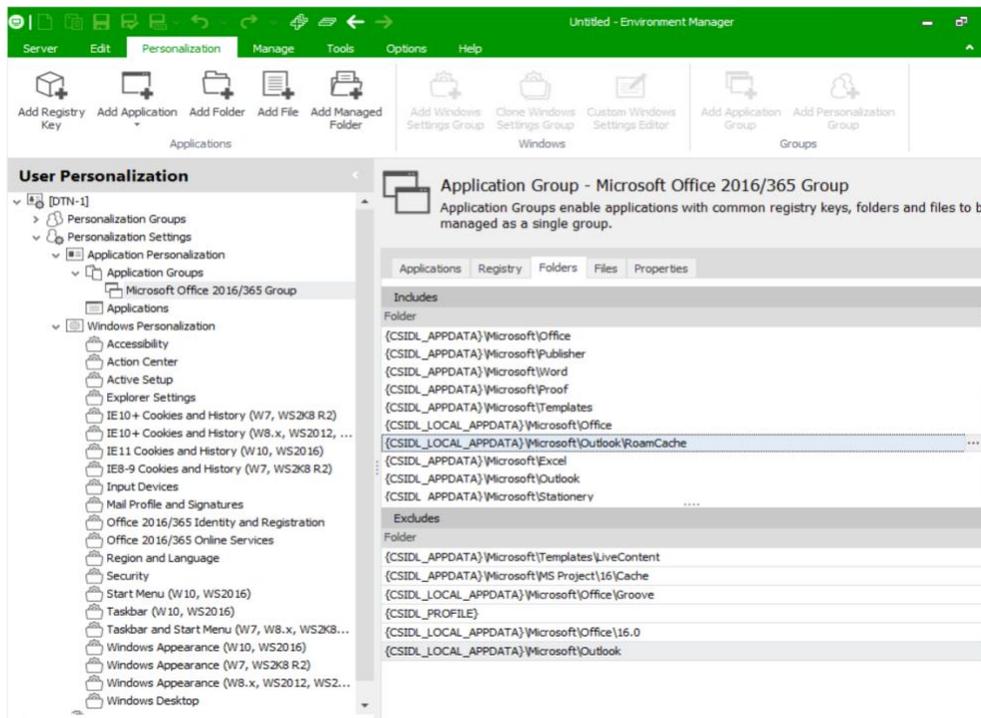
Global Includes/Excludes

We also recommend that {CSIDL_LOCAL_APPDATA}\Microsoft\Outlook is **excluded** as part of the global exludes list.
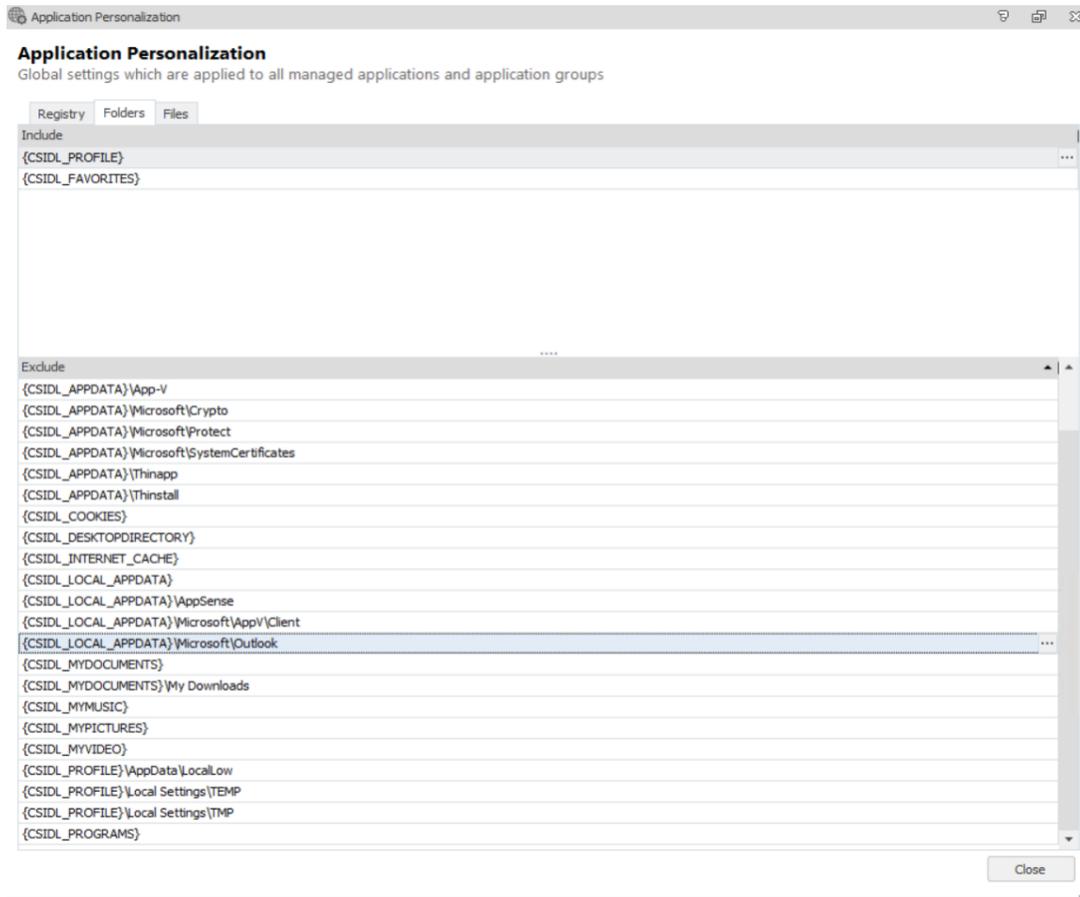
PowerShell Scripts

Powershell scripts have been provided in this document. They can be used to set up the share, and pre-create the disks housing the Outlook cache. The script to pre-create the disks is not absolutely necessary.

The script to create the disks requires a list of users. A separate script has been supplied to create a list of users. The list can be built based on either an entire list of users from Active Directory (AD), AD Group, or Organizational Unit (OU).

If required, the EM configuration will handle the disk creation at logon. However, the creation can add around 15 to 20 seconds to the user's initial logon. This could increase if there are several users logging on at the same time on a RDSH server. Pre-creating the disks helps with the onboarding process. Ignore all format prompts during the creation phase, then bulk-close all of the windows when the script is complete.

Remote Share Setup

Step	Action
1	Create a folder share on the remote server to be used. This can be hidden ($). Name the folder and set the share permissions for Everyone to Full Control
2	Go to the Security Tab of the folder, open the Advanced option, disable the inheritance option, and choose to Remove all the inherited permissions from this object.
3	Set up the Advanced NTFS folder permissions of the Cache folder, with at least the following required permissions: • CREATOR OWNER – Full Control (Subfolders and Files Only) • SYSTEM – Full Control (This Folder, Subfolders, and Files) • Administrators – Full Control (This Folder, Subfolders, and Files) • Users – Create Folder/Append Data (This Folder Only) • Users – List Folder/Read Data (This Folder Only) • Users – Read Attributes (This Folder Only) • Users – Traverse Folder/Execute File (This Folder Only) • Authenticated Users – Modify (This Folder Only)

Environment Manager Configuration Setup

The Configuration referred to within this white paper is available via the following article:

- **https://community.ivanti.com/docs/DOC-60824**

For convenience, the zip file within the article has compatible Environment Manager configurations for versions 8.6,10.0, and 10.1. The screenshots in the steps below are from an 8.6 console.

The policy has three distinct operations running under the Logon Pre-Session, Logon Pre-Desktop, and Logoff Triggers. The respective nodes have been annotated within the configuration on the General tab when necessary.

The flow of the user session from logon to logoff is:

- If the disk does not exist, create and attach it to the session, If the disk exists, it will attach to the session.

- The junction point to the attached disk is created (additional redirections could also be added at this point via the **VHD Cache | Add Application example** node).

- The disk is detached when the user logs off.

- The disk will remain connected when the session is in a disconnected state.

Logon

If any actions require an update with specific environment details, see the section below for policy configuration steps.

Pre-Session

Office 2016 | Configure GPO and EULA settings

To assist the Administrator, this node configures basic settings for an Outlook 2016/365 user. You could add more Office 2016 GPO settings at this point if required, and similarly adjust the configured settings within this trigger to control Office Applications as needed in your environment.

	Action		Enabled	Stop sub nodes on fail
1		Set ADMX Policy: Cached Exchange Mode (File | Cached Exchange Mode), Cached Exchange Mode Sync Settings, Disable First Run Movie	✓	☐
2		Set Registry Value: "AcceptAllEulas" in Key HKEY_CURRENT_USER\Software\Microsoft\Office\16.0\Registration	✓	☐

Action	Details
1	• Enable Cached Exchange Mode for the User • Configure the Mail Profile to download full mail items • Synchronize one month's worth of mail locally *Note that we have used the Office 2016 Group Policy Templates in this configuration. For earlier versions of Office you would need to reconfigure accordingly. Further details on using Group Policy within Environment Manager* **here**
2	• Prevent EULA from being prompted to the User at Application launch

Pre-Desktop

VHD Cache | Setup Cache

Before creating a redirection for the Outlook cache, you need to first check if the Network Share and VHD are available. Based on this check, policy can then create/attach a new VHD for the user or simply re-attach to an existing VHD cache.

	Action	Enabled	Stop sub nodes on fail
1	Set the 'vhdSharepath' session variable to the VHD share	✓	✓
2	Check the VHD share exists	✓	✓
3	Set message to Running Cache Actions	✓	☐
4	Set the cache working directory	✓	☐
5	Set the VHD target directory name	✓	☐
6	Set the VHD file name and path	✓	☐
7	Create working directory	RunAs Current User	✓	☐
8	Create the directory for the VHD file	RunAs Current User	✓	☐
9	Create PowerShell script to create and mount the VHD to the system	RunAs Current User	✓	☐
10	Add Computer account permissions to access vhd share	RunAs Current User	✓	☐
11	Run PowerShell script (vhdEMAttach.ps1) to create and mount the VHD to the system	RunAs System	✓	☐
12	Remove Computer account permissions from vhd share and set VHD file ownership	RunAs Current User	✓	☐
13	Delete temporary PowerShell script	✓	☐

| Action	Details
1	• Configure this session variable to set the location of the network share that will be used to store the VHD files. (At this point you could further add policy conditions to set this network share based on the endpoint's location in a multi-datacenter environment).
2	• Check that the configured vhdSharePath exists; if it fails then no further steps will be attempted within this node.
3	• [Optional] Display informational message during logon to indicate that a Cache operation is in progress.

4	•	*vhdWorkingDir* Session variable configured for the folder utilized to store temporary PowerShell scripts created and executed by this configuration. (It is also used as the mount point for the VHD). This variable does not require updating, but if you choose to change the path (default is *%localappdata%\AppSense\EMCache*) then an edit is required in the respective 'Run PowerShell scripts' (*vhdEMAttach.ps1 & vhdEMDetach.ps1*) to create, mount, and detach the VHD to the system's custom action to match the updated location.
5	•	*vhdDirectory* Session variable configured for the name of the vhd file's host directory on the network share. This is set to *$(vhdSharepath)\%username%_$(usersid)* by default.
6	•	*vhdPath* Session variable configured to set the full file path for the VHD Cache; this is *$(vhdDirectory)\%username%_EMcache.vhd*.
7	•	Create the *vhdWorkingDir* directory specified in Step 4.
8	•	Create the *vhdDirectory* specified in Step 5 (this will not overwrite the folder if it already exists).
9	•	This section creates a PowerShell script named *vhdEMAttach.ps1* to be executed in Step 11. The script will be saved in the *vhdWorkingDir* directory. The script is created under the user's context so that the current user's environment variables and session variables are available.
10	•	Temporarily assign the Computer Account (SYSTEM) permissions to the *vhdDirectory* location. This is required for the script executed in Step 11 to complete successfully.
11	•	Execute the *vhdEMAttach.ps1* script which will (if it does not exist) create a VHD cache with associated User Permissions and subsequently attach for the user. If the VHD cache already exists, we will simply re-attach. This script runs under System context.
12	•	Remove the Computer Account permissions from the *vhdDirectory* location that we assigned in Step 10.
13	•	Remove the *vhdEMAttach.ps1* script from the *vhdWorkingDir* directory.

After successful completion, the user will have a mounted VHD cache assigned to him. Our policy can now assign specific profile redirections (in this example the Outlook cache).

To verify success:

- Ensure the disk is created on the configure remote share at first logon.

- Check with Disk Management MMC on the endpoint to verify the disk is present. Alternatively, you could use diskpart (list volumes) from an elevated cmd prompt.
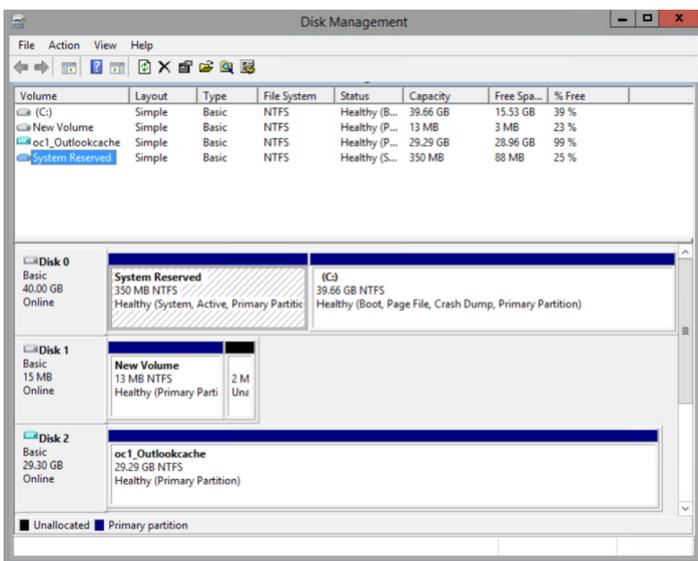
VHD Cache | Add Outlook Redirects

Now that we have a VHD cache available, we can next set up redirection for the Outlook OST cache location during logon. Persisting this cache between sessions greatly improves user experience within a non-persistent world as discussed above. In our configuration, we also consider that the user 'may' have this local folder (and contents) already created. If you find an existing folder, move the contents to the VHD container.

Action		Enabled	Stop sub nodes on fail
1	Check the VHD share exists	☑	☑
2	Set session variable to enable Outlook cache migration	☑	☐
3	Create the Outlook directory in the VHD ready for mapping into the profile	☑	☑
4	If Else Group - Map VHD with optional migration of existing user data	☑	☐
5	If If Outlook cache already exists and the migration session variable is set to 1	☑	☑
6	Copy Folder > %LOCALAPPDATA%\Microsoft\Outlook	☑	☐
7	Delete current Outlook cache folder ready for mapping into VHD	☑	☐
8	Create mapping between Outlook cache folder and VHD	☑	☐
	Else	☑	☐
9	Delete current Outlook cache folder ready for mapping into VHD	☑	☐
10	Create mapping between Outlook cache folder and VHD	☑	☐

| Action	Details
1	• Ensures that the VHD Share exists before attempting the redirect.
2	• In cases were the user may have data present within the Outlook folder (%LOCALAPPDATA%\Microsoft\Outlook\), set the *MigrateOutlookCache* session variable to 1 otherwise leave as the default.
3	• Create the parent Outlook folder within the VHD, if it does not already exist.
4	• IF ELSE condition to determine whether to Migrate the Outlook folder or not.
5	• This step checks to see if both the Migration variable is set to 1 and %LOCALAPPDATA%\Microsoft\Outlook\ exists. **Steps 6, 7, and 8 will only be attempted if this condition evaluates as True.**
6	• Copy the data within %LOCALAPPDATA%\Microsoft\Outlook to the cache location.
7	• Delete %LOCALAPPDATA%\Microsoft\Outlook. The redirection operation will fail if this folder already exists.
8	• Create the symbolic link for the Outlook cache by executing: *mklink /J %LOCALAPPDATA%\Microsoft\Outlook\, $(vhdWorkingDir)\VHD\Outlook*
9	• As mention in Step 5, if *MigrateOutlookCache* is set to 0, steps 6, 7, and 8 will be bypassed and we will simply remove the *%LOCALAPPDATA%\Microsoft\Outlook* directory if it exists. Ordinarily we would not expect this folder to exist on non-persistent profiles.
10	• As per Step 8, create the symbolic link for the Outlook cache by executing: • *mklink /J %LOCALAPPDATA%\Microsoft\Outlook\, $(vhdWorkingDir)\VHD\Outlook*

VHD Cache | Add Application Example

Within the logon trigger you will also find this node in a disabled state. This allows administrators to add cache redirections for other profile folders for other applications. For example, the Java cache is also a good candidate for persisting between sessions using this functionality.

After successful completion of the above, all logon actions are now complete.

The user will have a mounted VHD cache assigned and their *%LOCALAPPDATA%\Microsoft\Outlook* folder will be utilizing our VHD cache roaming functionality.

You can verify success by navigating to the users *%LOCALAPPDATA%\Microsoft* profile location and checking that the Outlook folder has a 'redirect' icon. The size will match the maximum size of the configured disk. In the case below 30GB.
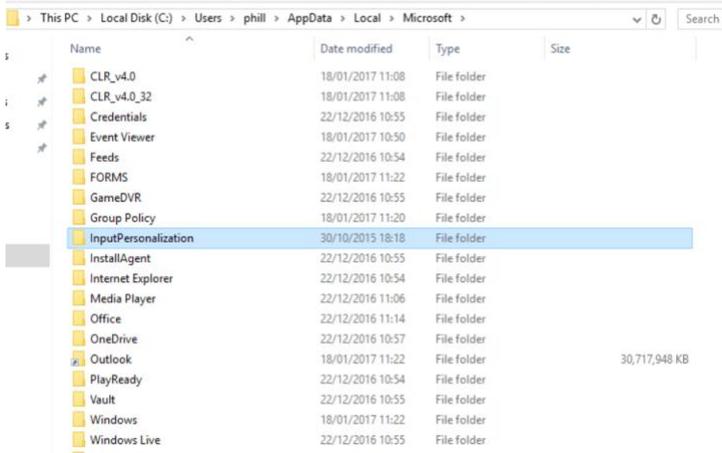
After validation that the above is applying successfully, you can complete the following checks in Outlook to confirm that the cache is being utilized:

- Click File > Account Settings > Account Settings. Click the Exchange account, and then click Change. Under Offline Settings, Use Cached Exchange Mode will be ticked.

- The first launch of Outlook will show the "Updating x of x" in the status bar at the bottom.

- Following the completion of the email sync, "All folders are up to date" will be shown.

- Logging off and back on will reattach the OST file; after a brief update "All folders are up to date" will be shown again.

- Indexes of the mailbox are held in the OST file. Using the Search field should provide you with instant results (limited to the "Cached Exchange Mode Sync Settings" ADMX policy).

- Check the indexing status located under Search Tools to verify that the indexing of all items has finished.

Logoff

At logoff, Environment Manager policy executes actions to ensure that the redirection is unmapped and also that the VHD is detached and available for subsequent sessions. These nodes can be executed in parallel to speed up the logoff process.

VHD Cache | Teardown Cache

Action	Details
1	• Condition that checks if the VHD Share $(vhdSharepath) exists before attempting subsequent actions.
2	• As per the logon actions, we need to create a script to be executed under local system context within Step 7, although this time it will detach the VHD. This script is named *vhdEMDetach.ps1* and will be saved in the *vhdWorkingDir* directory (variable assigned at logon). The script is created under the user's context so that the current user's environment variables and session variables are available.
3	• Temporarily assign the Computer Account (SYSTEM) permissions to the *vhdDirectory* location. This is required for the *vhdEMDetach.ps1* script to complete successfully.
4	• Execute *vhdEMDetach.ps1* script under local SYSTEM context to detach the VHD from the Users session.
5	• For 2008 R2 Servers, an extra step is required to ensure successful detachment. Only endpoints that pass this condition successfully will run Steps 6, 7, and 8.
6	• Re-execute the script in Step 4 to ensure that the VHD has been detached.
7	• After successful detachment, remove the temporary SYSTEM permissions that were added to the *vhdDirectory* location in Step 3.
8	• Delete *vhdEMDetach.ps1* from the *vhdWorkingDir* directory.
9	• For non-2008 R2 Endpoints only, remove the temporary SYSTEM permissions that were added to the *vhdDirectory* location.
10	• For non-2008 R2 Endpoints only, delete *vhdEMDetach.ps1* from the *vhdWorkingDir* directory.

VHD Cache | Remove Outlook Redirects

In parallel to the above node, we will also remove the redirection to the VHD location for the user's %LOCALAPPDATA%\Microsoft\Outlook folder.

Action		Enabled	Stop sub nodes on fail
∨ 1	Check source VHD network share exists	☑	☑
2	Remove Outlook mapping point	☑	☐

Action	Details
1	• Ensure that the $(*vhdSharepath* location exists before attempting to un-map.
2	• To remove the map point, we run a custom execute action to remove the directory *%LOCALAPPDATA%\Microsoft\Outlook* using *rd %LOCALAPPDATA%\Microsoft\Outlook\.*

VHD Cache | Remove Application Redirects Example

You will find this node disabled within the logoff trigger. It should only be activated if you have set up additional redirections by using the *VHD Cache | Add Application example* node within the logon trigger. It will need to be updated with the correct redirection details specified at logon.

FAQs

Can the disk be attached to multiple sessions?

No, the disk can only be attached to one session at a time. We recommend that the user be able to establish only one session at a time.

The disk is failing to attach to the session but I can see it has been created in the remote folder. What to do?

Check to ensure that there is enough disk space available. The initial disk size is around 55mb; it's likely that the disk has only been partially created.

The Outlook folder for the user is not showing as redirected.

This is likely due to the Outlook folder already being present in the session. The junction point cannot be made if the folder exists. When the VDI is re-provisioned, the user will log on with a new profile, the Outlook folder will not be present, and the junction point will be made.

This disk is failing to detach at logoff from a XenApp session.

If you experience this problem please ensure the following engineering key has been applied on the end point:
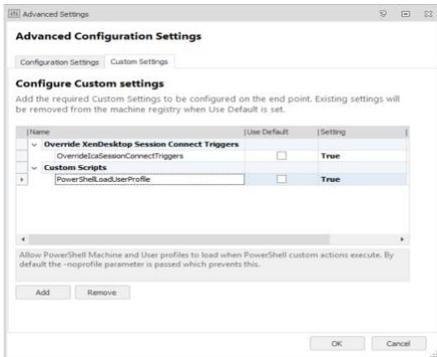
Registry Key	HKLM\Software\AppSense\Environment Manager
Registry Value Name	ForceLogoffExit
Registry Value Type	REG_DWORD
Registry Value Data	1

Will the search database for Outlook roam between sessions?

Yes, it forms part of the local cache that is being roamed.

Can this policy run in conjunction with the Managed Setting *PowershellLoadUserProfile*?

Yes, enabling this setting does allow PS1 scripts to run using the native host which can increase execution times. However, enabling this setting requires that the logged-on user has the correct rights to execute PS1 scripts (further details within the Policy guide).   reboot is required after setting this value.