

# Ivanti User Workspace Manager

## Best Practice Guide

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### Introduction

This guide provides detailed instructions for configuring Ivanti products. It contains best practices for those new to Ivanti solutions to help them properly configure the products for optimal results. With a clear understanding of how to properly configure Ivanti products, customers can experience the full benefits of their Ivanti solution.

*Note: The term “Best Practices”, while an industry standard, can be misleading. As it pertains to Ivanti products and this document, “Best Practices” means a practice or set of practices that are recommended by Ivanti, either in general, or given specific design considerations or desired functionality. There is seldom a single “best way” of configuring the software.*

The Ivanti User Workspace Manager (UWM) suite of products includes:

- Management Center
- Environment Manager
- Application Control
- Performance Manager
- File Director

## Document Revision History

Date	Author	Revision	Change Reference
7/18/2017	Chris Burbank	1.0	Initial Release - rebranded from AppSense DesktopNow to Ivanti UWM
5/21/2022	Randy Barger	1.1	Reformatted and updated to current recommended practices
9/5/2022	Randy Barger	1.11	Add section on VMware Linked/Instant Clones
11/10/2022	Sean Yin / Randy Barger	1.12	Add sections on cache roaming and custom scripting
12/5/2022	Randy Barger	1.13	Add Logging and Deployment Tools sections/info to General
12/16/2022	Randy Barger	1.14	Add section to Personalization regarding membership rules and performance
6/1/2023	Randy Barger	1.15	Removed Browser Manager section, added information regarding Windows Store personalization and Modern Authentication personalization.
9/22/2023	Randy Barger	1.2	Updated document format.

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## Infrastructure / Administrative / General

Topic / Feature	Description
Process / Anti-Virus Exclusions	<p>Improper or missing exclusions are one of the largest causes of performance and functionality issues with UWM products. Ensure that security products such as anti-virus and data loss prevention exclude Ivanti UWM processes, and also ensure that Ivanti UWM products are configured to exclude those security products.</p> <p>Additional information regarding UWM exclusions can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Recommended-Anti-Virus-and-AppSense-Exclusions">https://forums.ivanti.com/s/article/Recommended-Anti-Virus-and-AppSense-Exclusions</a></li> </ul> <p><b>Note:</b> <i>The exclusion list should be kept to a list of no more than 100-150 processes. In some environments, exceeding this can cause the agent to become overtaxed and create performance issues (Where applicable, folder exclusions perform better than process name exclusions.)</i></p>
Process / Citrix Exclusions	<p>As with security/anti-virus products, Citrix products hook into applications in a similar fashion. This can interfere with Ivanti UWM product performance and functionality.</p> <p>Additional information regarding Citrix Hooks exclusions can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Best-Known-Method-UWM-Exclusions-for-Citrix-Hooks">https://forums.ivanti.com/s/article/Best-Known-Method-UWM-Exclusions-for-Citrix-Hooks</a></li> </ul>
Sizing / Scaling (MC & EMPS)	<p>Proper scaling of the infrastructure is important to ensure that there are enough resources to process endpoints and concurrent users appropriately. Recommended sizing is described below.</p> <ul style="list-style-type: none"> <li>• MC and EMPS scales best horizontally by the addition of more servers in a load balanced set versus adding additional resources to any given server.</li> <li>• Individual MC/EMPS servers should be configured with a minimum of two vCPUs and 4GB RAM. Barring any major misconfigurations, a server with these specifications should support approximately:             <ul style="list-style-type: none"> <li>○ 10,000 endpoints per MC server</li> <li>○ 10,000 concurrent users per EMPS server</li> <li>○ A dual-role server (hosting both MC and EMPS instances) can support a combined total of 10,000 concurrent users and endpoints</li> </ul> </li> <li>• An N+1 configuration of servers is recommended for failover purposes.</li> <li>• When additional servers are necessary to handle the load, load balancing should be implemented (see load balancing below).</li> </ul>

Topic / Feature	Description
Sizing / Scaling (FD)	<p>Information regarding sizing/scaling FD can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/File-Director-Planning-the-number-of-appliances-required">https://forums.ivanti.com/s/article/File-Director-Planning-the-number-of-appliances-required</a></li> <li>• When additional servers are necessary to handle the load, load balancing should be implemented (see load balancing below).</li> </ul>
Load Balancing	<p>Information regarding load balancing best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/BP01-Load-Balancing-Best-Practice-Guide">https://forums.ivanti.com/s/article/BP01-Load-Balancing-Best-Practice-Guide</a></li> <li>• <a href="https://forums.ivanti.com/s/article/Recommendations-for-load-balancing-File-Director-appliances">https://forums.ivanti.com/s/article/Recommendations-for-load-balancing-File-Director-appliances</a></li> </ul>
Reporting / Auditing	<p>Local/policy auditing is available for most products. Enterprise auditing can also be configured via MC. Information regarding auditing best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/BP22-Event-Auditing-Troubleshooting-Guide">https://forums.ivanti.com/s/article/BP22-Event-Auditing-Troubleshooting-Guide</a></li> </ul> <p>Additional reporting capabilities are available via Ivanti Xtraction. The configuration guide for Xtraction for UWM can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Ivanti-Xtraction-for-UWM-Installation-Guide">https://forums.ivanti.com/s/article/Ivanti-Xtraction-for-UWM-Installation-Guide</a></li> </ul>
SQL Database Maintenance	<p>Database maintenance should be scheduled based on Microsoft best practices. These would include managing data and transaction log sizes, eliminating index fragmentation, ensuring up-to-date statistics, and establishing an effective backup strategy. More information can be found from Microsoft here:</p> <ul style="list-style-type: none"> <li>• <a href="https://docs.microsoft.com/en-us/previous-versions/technet-magazine/cc671165(v=msdn.10)">https://docs.microsoft.com/en-us/previous-versions/technet-magazine/cc671165(v=msdn.10)</a></li> </ul>

Topic / Feature	Description
Versions / Upgrades	<p>It is recommended to stay as current as possible regarding version releases to take advantage of new features as well as fixes to known issues. Testing should be conducted for all policies and configurations before attempting a production move to a new version of the software. A small-scale parallel environment with restored copies of the production database can be a great test of the upgrade process, timing and functionality after the upgrade.</p> <p>If you are uncomfortable with this process, please contact your partner or sales representative for assistance in conducting an upgrade.</p> <p>Additional information regarding software maintenance and upgrades can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Ivanti-User-Workspace-Management-formerly-AppSense-Version-Compatibility-and-Upgrades">https://forums.ivanti.com/s/article/Ivanti-User-Workspace-Management-formerly-AppSense-Version-Compatibility-and-Upgrades</a></li> <li>• <a href="https://help.ivanti.com/ap/help/en_US/dtn/2022/Content/Install%20and%20Configure/Product%20Upgrade.htm">https://help.ivanti.com/ap/help/en_US/dtn/2022/Content/Install%20and%20Configure/Product%20Upgrade.htm</a></li> <li>• <a href="https://forums.ivanti.com/s/article/BP02-DesktopNow-Advanced-Upgrade-Guide">https://forums.ivanti.com/s/article/BP02-DesktopNow-Advanced-Upgrade-Guide</a></li> <li>• <a href="https://forums.ivanti.com/s/article/User-Workspace-Management-formerly-known-as-DesktopNow-End-of-Maintenance-Policy">https://forums.ivanti.com/s/article/User-Workspace-Management-formerly-known-as-DesktopNow-End-of-Maintenance-Policy</a></li> </ul>
SSL Certificates	<p>Information regarding SSL Certificate best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Installing-SSL-certificates-for-Ivanti-UWM-products">https://forums.ivanti.com/s/article/Installing-SSL-certificates-for-Ivanti-UWM-products</a></li> </ul>
Logging / Troubleshooting	<p>A complete guide for logging and troubleshooting the various products and features of the UWM suite can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Ivanti-UWM-Logging-Guide">https://forums.ivanti.com/s/article/Ivanti-UWM-Logging-Guide</a></li> </ul>
Deployment Tools	<p>Management Center is the recommended deployment tool for the UWM suite. Its major advantages over other products, such as Ivanti Endpoint Manager or Microsoft SCCM, include:</p> <ul style="list-style-type: none"> <li>• Event Management and Reporting (<i>this is especially critical for Application Control whitelisting deployments</i>)</li> <li>• Seamless license management and deployment</li> <li>• Policy configuration versioning and rollback</li> <li>• Seamless upgrade of agents without the need to create complex uninstall/install bundles</li> </ul> <p>However, some customers may wish to bypass Management Center altogether, or create a mixed deployment strategy. The recommended methodology for utilizing a separate deployment tool is outlined here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Deploying-UWM-Products-via-EPM">https://forums.ivanti.com/s/article/Deploying-UWM-Products-via-EPM</a></li> </ul>

## Management Center

Topic / Feature	Description
Maintenance / Events	<p>Refer to the “Reporting / Auditing” section under Infrastructure / Administrative / General for configuring Enterprise Auditing.</p> <p>A large build-up of events in the database can have a negative impact on MC performance. Performance issues may be experienced with as few as a million events. In these cases, it is recommended to set a retention period for live events and that all older events are deleted. This can be configured in the Maintenance node of the MC console.</p>
Maintenance / Computers	<p>As endpoints are removed from the UWM environment, or removed from production altogether, they should be removed from the MC database. This makes management and reporting on deployment groups significantly easier and more accurate. Recommend setting a retention period for offline endpoints so that all older endpoints are deleted. This can be configured in the Maintenance node of the MC console.</p> <p><i>Note: Deleting an endpoint will delete all events associated with that endpoint. If retention periods for events are important to the organization, then the endpoint retention period should match event retention.</i></p>
Maintenance / Packages	<p>Minimize the number of configuration policies in the environment. This can be done by utilizing conditioning/targeting within the configuration policies, rather than separating out configuration policies by deployment group. Consolidating configurations will reduce redundancy, making it less likely to “miss” something when making changes in the environment.</p> <p>Unassigned packages (agents and configuration policies) should be removed from the package library when they are no longer needed. This will reduce complexity and database bloat.</p> <p><i>Note: If packages are needed for historical tracking purposes, they can always be exported and saved externally to the database.</i></p>
Deployment Groups / Creation	<p>In general, care should be taken to not create too many Deployment Groups, as it can create difficulties ensuring that the most up to date and relevant configurations are deployed. A common practice is to only break deployment groups out when there are different installation or configuration needs.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Production vs. Test: Different revisions of configuration policies and different poll times</li> <li>• Persistent vs. Non-Persistent: Different agent installation requirements</li> <li>• Physical vs. VDI: Different PM configuration policies</li> </ul>

Topic / Feature	Description									
<p>Deployment Groups / Poll Times</p>	<p>Computer poll times and upload poll times are used to control how often endpoints check in for new agents/configurations and how often they upload centrally collected event data. More frequent poll times place added stress on MC (and network traffic) and reduces overall scalability numbers. Generally recommended poll times for testing and production deployment groups are outlined in the table below.</p> <table border="1"> <thead> <tr> <th>Deployment Group Type</th> <th>Computer Poll</th> <th>Upload Poll</th> </tr> </thead> <tbody> <tr> <td>Test/Dev Groups (low endpoint count)</td> <td>1-30 minutes</td> <td>1-30 minutes</td> </tr> <tr> <td>Production Groups (high endpoint count)</td> <td>4-8 hours</td> <td>4-24 hours</td> </tr> </tbody> </table> <p>Poll times should be more frequent in a low endpoint and high change volume environment like testing. This allows for rapidly deploying configuration changes as they are being built, modified and tested.</p> <p>Production groups, on the other hand, typically have a high number of endpoints and have change control windows that prevent changing configurations frequently. These should be set to the shortest frequency of a “normal” change control windows or 2-3 times per day for those with extended windows.</p> <p>The Poll Now and Upload Now features are available for immediate changes, although that feature should not be used to force large numbers of endpoints to check in simultaneously.</p>	Deployment Group Type	Computer Poll	Upload Poll	Test/Dev Groups (low endpoint count)	1-30 minutes	1-30 minutes	Production Groups (high endpoint count)	4-8 hours	4-24 hours
Deployment Group Type	Computer Poll	Upload Poll								
Test/Dev Groups (low endpoint count)	1-30 minutes	1-30 minutes								
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<p>Deployment Groups / Installation Settings</p>	<p>Many UWM agent installations require an endpoint reboot due to the kernel mode drivers in use. Because of the reboot requirement, care must be taken to ensure production endpoints are not accidentally rebooted during the middle of the working day. Also, with provisioned images, the reboot and re-provisioning could potentially put endpoints into a continuous reboot loop.</p> <p>General recommendations are as follows:</p> <ul style="list-style-type: none"> <li>• Master (gold) images and test endpoints may be set to immediate (“Automatically restart system and install - at next system poll”)</li> <li>• Non-persistent (provisioned) endpoints should be set to disabled (“Do not install”) to avoid the possibility of reboot loops; agents should be installed into the master image</li> <li>• Persistent production endpoints should be set to next reboot (“At next system restart”), scheduled (“Automatically restart system and install - scheduled”), or immediate with postponement (“Automatically restart system and install - at next client poll” and “Allow user to postpone for up to X hours”)</li> </ul>									

Topic / Feature	Description
Deployment Groups / Agent Permissions	<p>Deployment Agent Permissions should generally be enabled. These permissions are necessary for the CCACMD.EXE process to be executed on endpoints. This command requires local administrative rights to the endpoint, as well as admin permissions to MC, so there is no risk to enabling these settings.</p>
Deployment Groups / Packages	<p>Avoid using “Always Use Latest” on configuration policies in for production groups. Using this setting could result in an unfinished or untested configuration getting deployed to production machines. Test deployment groups should be utilized for testing configuration policy revisions prior to assigning to production groups.</p> <p>Avoid assigning agents without configuration policies. At a minimum, generic configuration policies should be deployed which contain exclusions, as well as disable unnecessary features.</p>
Membership Rules	<p>The use of membership rules can help to ensure that newly provisioned endpoints get placed into the proper deployment group, receive the correct agents and configuration policies, and are installed without impacting production users.</p> <p>Active Directory based membership rules are only evaluated during Discovery, so Discovery must run <i>after</i> the endpoint is added to Active Directory, but <i>before</i> the Deployment Agent is installed. It is recommended to adjust the Discovery schedule to run accordingly.</p> <p>Instant-provisioned endpoints (such as non-persistent VDI pools) will not be properly placed in deployment groups when using Active Directory based membership rules. For these types of endpoints, NetBIOS computer name rules are recommended. These rules are evaluated real-time when the endpoint checks in, regardless of when Discovery was last run.</p>

Topic / Feature	Description
<p>Non-Persistent VDI</p>	<p>VDI master images should have the agents installed at the platform layer. Similar to Windows Sysprep, the Deployment Agent has an Imageprep that must be completed prior to sealing or snapshotting the image.</p> <p>Additional information on best practices for Imageprep can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/HOWTO-Prepare-Management-Center-2018-x-CCA-for-Imaging">https://forums.ivanti.com/s/article/HOWTO-Prepare-Management-Center-2018-x-CCA-for-Imaging</a></li> <li>• <a href="https://forums.ivanti.com/s/article/Duplicate-Computers-in-Management-Center-with-VMware-Horizon-View-Linked-Clones-even-after-performing-CcaCmd-imageprep">https://forums.ivanti.com/s/article/Duplicate-Computers-in-Management-Center-with-VMware-Horizon-View-Linked-Clones-even-after-performing-CcaCmd-imageprep</a></li> </ul> <p>There are special considerations when using VMware Horizon View Linked and Instant Clones. Refer to this article for a full description:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/HOWTO-Implement-Environment-Manager-with-VMware-Horizon-View-Instant-Linked-Clones">https://forums.ivanti.com/s/article/HOWTO-Implement-Environment-Manager-with-VMware-Horizon-View-Instant-Linked-Clones</a></li> </ul>

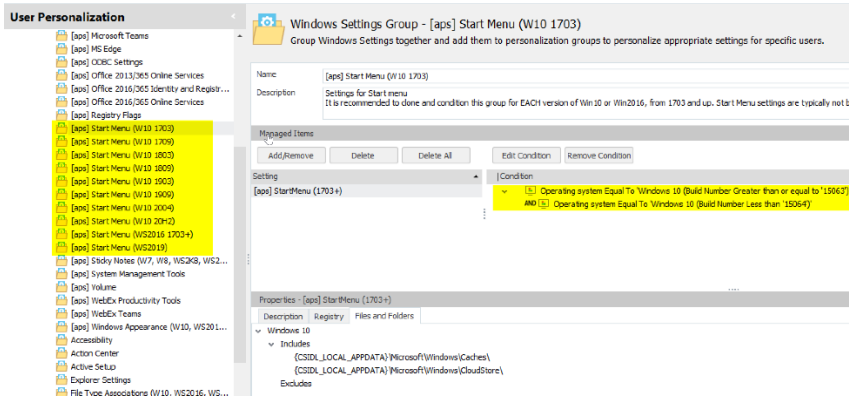
## Environment Manager - Personalization Server

Topic / Feature	Description
Application Groups	<p>Information regarding application personalization best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/BP05-Application-Personalization-Process">https://forums.ivanti.com/s/article/BP05-Application-Personalization-Process</a></li> <li>• <a href="https://forums.ivanti.com/s/article/BP04-Environment-Manager-Personalization-Best-Practice-Guide">https://forums.ivanti.com/s/article/BP04-Environment-Manager-Personalization-Best-Practice-Guide</a></li> <li>• <a href="https://forums.ivanti.com/s/article/HOWTO-Find-Personalization-Templates-for-Environment-Manager">https://forums.ivanti.com/s/article/HOWTO-Find-Personalization-Templates-for-Environment-Manager</a></li> </ul> <p>EM 2021.3 introduced a feature called Non-Virtualized Application Group (NVAG). While the ability to disable virtualization has many advantages, it is vital to understand how Global Includes/Excludes work, and to ensure that they are excluded at the application group. If they are not, tremendous bloat can occur. Additional information about Global Includes/Excludes and how to exclude them can be found in the documents above, as well as here:</p> <ul style="list-style-type: none"> <li>• <a href="https://help.ivanti.com/ap/help/en_US/em/2022/Content/Environment_Manager/Application_Group_Inclusions_and_Exclusions.htm#About_PVC">https://help.ivanti.com/ap/help/en_US/em/2022/Content/Environment_Manager/Application_Group_Inclusions_and_Exclusions.htm#About_PVC</a></li> </ul>
Windows Settings Groups (WSGs)	<p>The following general recommendations apply when configuring WSGs:</p> <ul style="list-style-type: none"> <li>• Use conditions to ensure they are only applied on endpoints they are applicable to. This will keep logon times minimized and avoid incompatibility issues.</li> <li>• If a registry key references a jpg, jpeg, bmp, ico, cur, or ani file, that file is also pulled into personalization. This list is configurable in Advanced Settings. Care needs to be taken when including registry areas that can include things like Recent File lists, as the files referenced would be pulled into the personalization database and can cause database bloat.</li> </ul>

Topic / Feature	Description								
Office 365	<p>Information regarding Office 365 best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Best-Practices-for-Environment-Manager-and-Office">https://forums.ivanti.com/s/article/Best-Practices-for-Environment-Manager-and-Office</a></li> </ul> <p>Modern authentication methods with Office 365 have presented special challenges to non-persistent environments. As of February 2023, Ivanti published an updated Office 365 personalization template, which includes modern authentication information.</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Windows-Personalization-Template-Office-2016-365">https://forums.ivanti.com/s/article/Windows-Personalization-Template-Office-2016-365</a></li> </ul>								
Non-Persistent VDI	<p>Non-persistent endpoints present a special challenge, as each time a user logs in, the endpoint is creating a new profile, and runs “first-run” actions. Specifically, the user sees a “Preparing Windows” message while Windows installs and configures AppX (Windows Store) packages. Ivanti has published a special template for capturing these packages for users and bypassing the first-run actions. This can reduce logon times often by 15-60 seconds.</p> <ul style="list-style-type: none"> <li>• <a href="https://marketplace.ivanticloud.com/packages/WindowsStorePersonalizationTemplate/">https://marketplace.ivanticloud.com/packages/WindowsStorePersonalizationTemplate/</a></li> </ul>								
Global / Advanced Settings	<p>Properly configuring advanced settings can have a big impact on the health of the environment and the size of the database.</p> <table border="1"> <thead> <tr> <th>Setting</th> <th>Recommendation</th> </tr> </thead> <tbody> <tr> <td>AutomaticArchiveStartTime</td> <td>This should generally be an hour or more before SQL backups so the most current archive can be part of the backup.</td> </tr> <tr> <td>InactiveProfileExpiryDays InactiveUserExpiryADCheck InactiveUserExpiryDays ProfileCleanupDelayDays</td> <td> <p>Refer to the following articles for detailed information on these settings:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/How-the-EM-Personalization-Archive-and-Purge-process-works-in-version-10-and-above">https://forums.ivanti.com/s/article/How-the-EM-Personalization-Archive-and-Purge-process-works-in-version-10-and-above</a></li> <li>• <a href="https://forums.ivanti.com/s/article/When-how-does-Personalization-data-get-purged">https://forums.ivanti.com/s/article/When-how-does-Personalization-data-get-purged</a></li> <li>• <a href="https://forums.ivanti.com/s/article/WSG-data-is-lost-when-users-move-between-Personalization-groups">https://forums.ivanti.com/s/article/WSG-data-is-lost-when-users-move-between-Personalization-groups</a></li> </ul> </td> </tr> <tr> <td>UpgradeFbrToHive</td> <td>Any environment that no longer has version 8.x agents should have this set to True. Hive files perform much better than the legacy FBR file format.</td> </tr> </tbody> </table>	Setting	Recommendation	AutomaticArchiveStartTime	This should generally be an hour or more before SQL backups so the most current archive can be part of the backup.	InactiveProfileExpiryDays InactiveUserExpiryADCheck InactiveUserExpiryDays ProfileCleanupDelayDays	<p>Refer to the following articles for detailed information on these settings:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/How-the-EM-Personalization-Archive-and-Purge-process-works-in-version-10-and-above">https://forums.ivanti.com/s/article/How-the-EM-Personalization-Archive-and-Purge-process-works-in-version-10-and-above</a></li> <li>• <a href="https://forums.ivanti.com/s/article/When-how-does-Personalization-data-get-purged">https://forums.ivanti.com/s/article/When-how-does-Personalization-data-get-purged</a></li> <li>• <a href="https://forums.ivanti.com/s/article/WSG-data-is-lost-when-users-move-between-Personalization-groups">https://forums.ivanti.com/s/article/WSG-data-is-lost-when-users-move-between-Personalization-groups</a></li> </ul>	UpgradeFbrToHive	Any environment that no longer has version 8.x agents should have this set to True. Hive files perform much better than the legacy FBR file format.
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GeoSync	<p>Information regarding GeoSync best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Configuring-GeoSync">https://forums.ivanti.com/s/article/Configuring-GeoSync</a></li> </ul>								

Topic / Feature	Description
Personalization Groups / Sync	Windows settings can be synced at Logoff, Session Locked, and Session Disconnect. In environments running EM older than 2021.1, there have been multiple known issues related to syncing at Session Lock or Disconnect, especially in Citrix environments. It is recommended to disable these two sync options unless running 2021.1 or later.

Topic / Feature	Description																																				
Personalization Groups / Membership Rules	<p>Each condition evaluates matches and queries at different speeds providing different response times. These differences could be due to some conditions evaluating against local data and therefore providing rapid response times. Other conditions may require connection to the network thereby increasing response times and relying on connection speeds.</p> <p>The conditions in the tables below have been rated by performance speed for carrying out matches and queries. By creating configurations with these response times in mind, performance can be optimized. For example, if a configuration contains OR conditions, place them in order of response time with the quickest evaluating first. If the first condition matches, the configuration is not held up by the slower response time of the second condition.</p> <table border="1"> <thead> <tr> <th>Condition</th> <th>Match</th> <th>Query</th> </tr> </thead> <tbody> <tr> <td>Site Membership</td> <td>Fast</td> <td>N/A</td> </tr> <tr> <td>Computer OU Membership</td> <td>Slow</td> <td>Slow</td> </tr> <tr> <td>User OU Membership</td> <td>Slow</td> <td>Slow</td> </tr> <tr> <td>Is Administrator</td> <td>Fast</td> <td>N/A</td> </tr> <tr> <td>Username</td> <td>Fast</td> <td>Fast</td> </tr> <tr> <td>User Group</td> <td>Fast</td> <td>Medium</td> </tr> <tr> <td>Computer IP Address</td> <td>Fast</td> <td>Fast</td> </tr> <tr> <td>Computer Domain Membership</td> <td>Fast</td> <td>Fast</td> </tr> <tr> <td>Computer NetBIOS Name</td> <td>Fast</td> <td>Fast</td> </tr> <tr> <td>Computer Group</td> <td>Fast</td> <td>Medium</td> </tr> <tr> <td>Computer Name**</td> <td>Slow*</td> <td>Slow*</td> </tr> </tbody> </table> <p>* <i>Enabling Reverse DNS Lookup on the server increases the performance of the Computer Name condition.</i></p> <p>** <i>When using load balancing and Computer Name rules, consider this known issue: <a href="https://forums.ivanti.com/s/article/Personalization-Group-Computer-Name-rules-do-not-evaluate-correctly">https://forums.ivanti.com/s/article/Personalization-Group-Computer-Name-rules-do-not-evaluate-correctly</a></i></p> <p>Avoid the use of large numbers of membership rules:  <a href="https://forums.ivanti.com/s/article/Delayed-Logons-due-to-a-high-number-of-queries-against-membership-rules">https://forums.ivanti.com/s/article/Delayed-Logons-due-to-a-high-number-of-queries-against-membership-rules</a></p>	Condition	Match	Query	Site Membership	Fast	N/A	Computer OU Membership	Slow	Slow	User OU Membership	Slow	Slow	Is Administrator	Fast	N/A	Username	Fast	Fast	User Group	Fast	Medium	Computer IP Address	Fast	Fast	Computer Domain Membership	Fast	Fast	Computer NetBIOS Name	Fast	Fast	Computer Group	Fast	Medium	Computer Name**	Slow*	Slow*
Condition	Match	Query																																			
Site Membership	Fast	N/A																																			
Computer OU Membership	Slow	Slow																																			
User OU Membership	Slow	Slow																																			
Is Administrator	Fast	N/A																																			
Username	Fast	Fast																																			
User Group	Fast	Medium																																			
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Computer Domain Membership	Fast	Fast																																			
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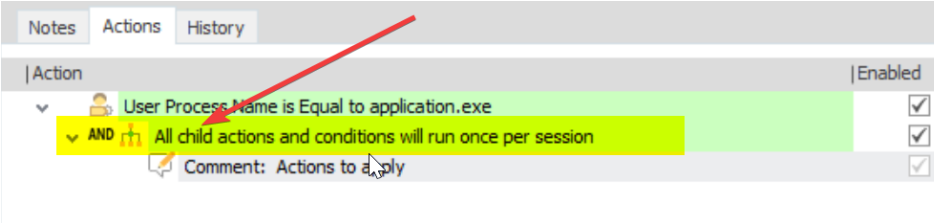
Topic / Feature	Description
<p>Start Menu &amp; Taskbar</p>	<p>Personalizing Start Menu and Taskbar settings presents a number of challenges.</p> <p>Windows 10 (and Server 2016) introduced a completely new style of Start Menu. With most releases (1607, 1703, 1803, etc.), Microsoft changed how the Start Menu was stored in the operating system. Roaming the Start Menu between different versions of Windows 10 will often not be compatible, and can cause the Start Menu to “break”. Symptoms may include broken icons, as well as a slow or unresponsive Start Menu.</p> <p>Also, the Start Menu and Taskbar both feature a “cleanup” function, where pinned icons are evaluated at logon. If the target application of the pinned icon does not exist on the machine, the pinned icon is unpinned/removed from the Start Menu or Taskbar. When users roam from endpoint to endpoint, those icons can get removed, and then will no longer roam back to their original endpoint, forcing the user to re-pin their icons again.</p> <p>The following are general recommendations:</p> <ul style="list-style-type: none"> <li>• Avoid personalizing Start Menu and Taskbar in general, where possible. Instead, use EM policy’s Start Menu Builder feature or group policy actions to present a consistent Start Menu experience to users.             <ul style="list-style-type: none"> <li>○ <a href="https://help.ivanti.com/ap/help/en_US/em/2022/Content/Environment_Manager/Windows10_Start_Menu_Builder.htm">https://help.ivanti.com/ap/help/en_US/em/2022/Content/Environment_Manager/Windows10_Start_Menu_Builder.htm</a></li> <li>○ <a href="https://docs.microsoft.com/en-us/windows/configuration/customize-windows-10-start-screens-by-using-group-policy">https://docs.microsoft.com/en-us/windows/configuration/customize-windows-10-start-screens-by-using-group-policy</a></li> </ul> </li> <li>• When personalizing Start Menu and Taskbar, create separate (cloned) WSGs for each dissimilar group of endpoints. All endpoints in each group should be running the same OS version and have the same applications installed.</li> </ul> 

Topic / Feature	Description
<p>File Type Associations (FTAs)</p>	<p>Setting and roaming FTAs is no longer as simple as setting some registry keys, like it was in Window 7 and earlier. Microsoft implemented security features to prevent third-party programs (such as EM) from setting FTAs.</p> <p>Official documentation around EM FTAs can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://help.ivanti.com/ap/help/en_US/em/2022/Content/Environment_Manager/File_Type_Associations_Action.htm">https://help.ivanti.com/ap/help/en_US/em/2022/Content/Environment_Manager/File_Type_Associations_Action.htm</a></li> <li>• <a href="https://forums.ivanti.com/s/article/UWM-Windows-10-File-Type-Association-Roaming-Policy-Personalization">https://forums.ivanti.com/s/article/UWM-Windows-10-File-Type-Association-Roaming-Policy-Personalization</a></li> </ul> <p>However, there are some limitations to the above:</p> <ul style="list-style-type: none"> <li>• Ivanti supports setting FTAs to Windows Store Apps, but this feature currently does not work for all store apps. (See <a href="https://forums.ivanti.com/s/article/Setting-an-FTA-to-open-with-a-modern-UWP-app-fails-to-work-correctly-the-wrong-app-is-used-to-open-the-file-type">https://forums.ivanti.com/s/article/Setting-an-FTA-to-open-with-a-modern-UWP-app-fails-to-work-correctly-the-wrong-app-is-used-to-open-the-file-type</a> for more information.)</li> <li>• The out-of-the-box policy actions and personalization WSGs do not work with default browser, default mail client, or default PDF viewer. However, Ivanti has created special utilities and templates which can be utilized to successfully set and roam these three FTAs:             <ul style="list-style-type: none"> <li>○ <a href="https://marketplace.ivanticloud.com/packages/SetDefaultTools/">https://marketplace.ivanticloud.com/packages/SetDefaultTools/</a></li> <li>○ <a href="https://marketplace.ivanticloud.com/packages/DefaultFTAPersonalizationTemplates/">https://marketplace.ivanticloud.com/packages/DefaultFTAPersonalizationTemplates/</a></li> </ul> </li> </ul> <p><i>Note: The Set Default utilities are supported with Windows 10 and Server 2016, but are currently not consistent in Windows 11 and Server 2019.</i></p>
<p>IIS Upload Limit</p>	<p>The default IIS upload limit is set at 30MB. When personalization settings are captured, the settings are compressed into gzip files and uploaded to the server. If the gzip file is larger than 30MB, the upload will fail, and user settings will not get captured into the database. When personalization is configured optimally and profiles are small, this limit does not present a problem; however, even the most optimally configured environments can experience this issue, and diagnosing the issue is often tedious and time-consuming.</p> <p>It is recommended to configure the upload limit on all personalization servers to a larger value, such as 100MB. Please refer to the following articles for additional information and instructions on configuring the upload limit.</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Personalization-data-fails-to-sync-back-to-the-database">https://forums.ivanti.com/s/article/Personalization-data-fails-to-sync-back-to-the-database</a></li> <li>• <a href="https://forums.ivanti.com/s/article/Personalization-Fails-To-Sync-When-File-Exceeds-Certain-Size">https://forums.ivanti.com/s/article/Personalization-Fails-To-Sync-When-File-Exceeds-Certain-Size</a></li> </ul>

## Environment Manager - Policy

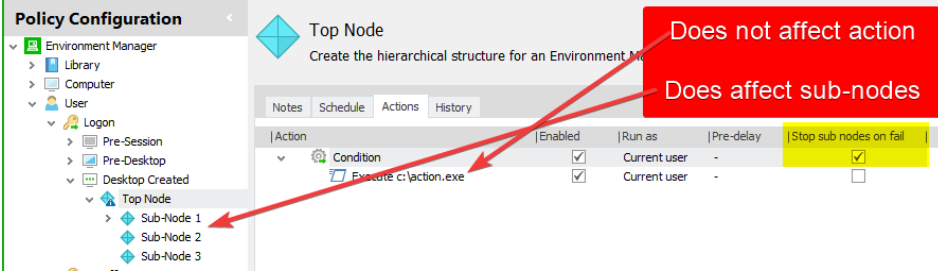
Topic / Feature	Description
Auditing	<p>Information regarding policy auditing best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/BP22-Event-Auditing-Troubleshooting-Guide">https://forums.ivanti.com/s/article/BP22-Event-Auditing-Troubleshooting-Guide</a></li> </ul>
Change Tracking	<p>The Change Tracking feature logs all configuration changes into the configuration, showing which administrator made a change, what the change was, and when the change was performed. This information is quite useful when troubleshooting issues, or in documenting change control activities. Recommend enabling Change Tracking in all configuration policies.</p>
Maintenance	<p>Document configuration policies well, using action/condition descriptions, node notes, or comment objects. While a given condition or action may seem obvious at the time, it may not be so obvious to another or future administrator.</p> <p>Disable and eventually delete conditions, actions, and nodes that are no longer necessary or pertinent to the configuration policy. These settings can always be referenced by opening an earlier revision of the policy, and keeping the configuration policy “clean” will ensure that it’s easy to read, understand, and troubleshoot.</p>
Ellipsis Lookup	<p>Whenever possible, use the ellipsis when doing Active Directory lookups. For items like User Group, this will ensure the user’s local security token is used. When the token is used, “LSA Supported” will appear. Using LSA Supported improves logon times and enables offline lookups.</p>

Topic / Feature	Description
Advanced Settings	<p>Mid-session config changes should be left at the default value of “At logon” instead of “Immediately”. Prior to EM 8.5, the behavior was “Immediately”; configurations upgraded from earlier versions may still be at that setting.</p> <p><i>Note: “Mid-session config change” means that a new configuration policy is installed in the middle of an existing session (user is currently logged on).</i></p> <p>With a mid-session configuration change that is applied immediately, any “non-permanent” actions could become unapplied, and leave users in an unexpected state. This occurs with group policy actions, mapped drives and printers, and folder redirection actions that are either configured to un-apply at configuration change / logoff or group policy logon actions that are not set to apply permanently.</p> <p>While this setting was designed to replace the engineering key <i>PreventUnapplyOnConfigChange</i>, there is a known issue with the setting not applying properly to computer trigger actions:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Computer-Trigger-Actions-are-incorrectly-unapplied-during-a-Users-Session-when-Mid-Session-Config-Changes-are-set-to-At-logon">https://forums.ivanti.com/s/article/Computer-Trigger-Actions-are-incorrectly-unapplied-during-a-Users-Session-when-Mid-Session-Config-Changes-are-set-to-At-logon</a></li> </ul> <p>Therefore, it’s also recommended to configure the <i>PreventUnapplyOnConfigChange</i> engineering key (registry value) in your configuration policies.</p>

Topic / Feature	Description
<p>Process Triggers</p>	<p>Process Started nodes are an excellent method for “just-in-time” settings. Rather than configure settings for all possible applications at logon (therefore extending the logon time), you can apply settings for only the applications being used, as they are being launched. For most processes, the actions desired only need to occur the first time the process is launched during a session, and not every time. Executing actions every time a process is launched can be especially troublesome for multi-process applications, such as web browsers (which launch a new process for every tab or window).</p> <p>Recommended practice is to include a counter condition, to ensure that the action(s) only occur once per session. For example:</p>  <p>The same concept may or may not apply to Process Stopped nodes.</p>
<p>Desktop Created Trigger</p>	<p>Any long running logon actions should be done in the Desktop Created trigger instead of Pre-Desktop to optimize logon performance. Examples of some longer running actions are file/folder copy actions from a network share, drive and printer mappings, migration activities, etc.</p>

Topic / Feature	Description
Reusable Objects	<p>Proper use of variables, reusable conditions, and reusable nodes within a policy can greatly simplify management and can also make a configuration more readable.</p> <p>Variables allow you to set information once and reuse it over and over. A great example of this is a “FolderRedirections” variable that represents the base path where folder redirection actions would link to. This variable will be used several times within the configuration and allows you to change just the variable path if needs or locations change.</p> <p>Reusable conditions can be used in a similar way to environment variables. For example, you may have a condition for your VDI environment that consists of multiple factors, such as Windows 10 <b>and</b> VDI. If you use this condition multiple times in your policy, and then need to add an “or Windows 11” condition, you’ll have to edit it in multiple places. A reusable condition centralizes the condition, allowing simplification of the policy.</p> <p>Another example is in the use of reusable nodes. These nodes are essentially node “templates”, and allow you to define a set of actions and conditions that you can link throughout your policy. As with the above example, changing the definition of the reusable node will change all links simultaneously. A good use for this kind of structure might include a set of policy-based personalization actions that you initially only wanted to run at logoff but then determine that you’d like them to run at Session Lock and Session Disconnect as well. In this case, one reusable node could be made and then linked in all three places.</p> <p><i>Note: Reusable nodes should be used with care. Misuse of these could result in a complex configuration which is difficult to read and interpret, particularly for admins who are new to Environment Manager. Typically, it’s recommended that reusable nodes are used <b>only</b> for actions referenced within two or more triggers.</i></p> <p><i>Also, be very careful using “Stop sub nodes on fail” with reusable nodes. The setting is applied uniformly to each reference of that reusable node in the configuration and cannot be changed for individual references. Remember that nodes <b>can</b> be nested below referenced reusable nodes and since the setting is constant across all references, you must be sure that the setting you choose is appropriate to each reference.</i></p>

Topic / Feature	Description
Run As User vs System	<p>Many actions require administrative privileges. Examples of these items would be setting HKLM registry values, system ODBC connections, or copying files into Program Files or the Windows directory.</p> <p>It's recommended these actions be configured to run at Computer Startup to ensure they apply to all users, and are always configured with the System account. If these actions must be run inside User triggers, they should be configured to run as the System account instead of the current user.</p> <p><i>Note: When running actions as the System account within User triggers, the "context" of the action is in the System account's profile, not the user's. References to user-specific variables such as %USERNAME% would reference the SYSTEM user, not the actual logged-on user.</i></p>
Custom Actions & Conditions	<p>Native (built-in) actions and conditions should always be attempted before creating custom (scripted) actions and conditions, because they are usually much faster.</p> <p>However, custom actions and conditions are very useful and powerful. Information regarding custom condition best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Best-Practice-Custom-Actions-and-Conditions">https://forums.ivanti.com/s/article/Best-Practice-Custom-Actions-and-Conditions</a></li> </ul>
Folder Redirection	<p>Folders should always be redirected to a UNC path instead of a network drive letter.</p> <p>AppData (Roaming) should never be redirected in an EM personalized estate because EM cannot capture/personalize writes to network paths. In addition, redirecting AppData folders is never a good idea; end-user and file share performance will both deteriorate, as this folder has an extremely high number of reads/writes that must traverse the network.</p>
Cache Roaming (VHDx)	<p>Information regarding Cache Roaming best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Best-Practice-Utilizing-VHD-Cache-Roaming-in-Environment-Manager">https://forums.ivanti.com/s/article/Best-Practice-Utilizing-VHD-Cache-Roaming-in-Environment-Manager</a></li> </ul>

Topic / Feature	Description
<p>Stop sub-nodes on fail</p>	<p>Always keep in mind that this option applies only to nodes, not to other actions dependent on it.</p>  <p>While this option is enabled by default for conditions, it should always be disabled unless it is meant to affect execution of sub-nodes. Typically, these conditions will be placed by themselves into a top-level or parent node. For example, the top-node could be conditioned for “VDI” and all sub-nodes contains various settings that should only apply to a VDI environment.</p> <p>Do not enable this option within If Else condition groups because this will prevent sub nodes from running unless the first condition in the statement succeeds.</p> <p><i>Note: This setting is set to enabled by default in all If Else groups.</i></p> <p>Beware when using this selection from Reusable Nodes, as it will apply to all linked locations as set in the library.</p>
<p>Configuring Timeout Values</p>	<p>It is important to understand how default timeout values can impact the execution of policy. Refer to the following for detailed information:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Configuring-node-trigger-and-rule-timeouts">https://forums.ivanti.com/s/article/Configuring-node-trigger-and-rule-timeouts</a></li> <li>• <a href="https://forums.ivanti.com/s/article/Custom-Action-and-Condition-timeout-does-not-alter-reusable-node-timeout">https://forums.ivanti.com/s/article/Custom-Action-and-Condition-timeout-does-not-alter-reusable-node-timeout</a></li> </ul>

## Application Control

Topic / Feature	Description
General Best Practices	<p>The primary source regarding Application Control best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/BP02-Application-Manager-Best-Practice-Guide">https://forums.ivanti.com/s/article/BP02-Application-Manager-Best-Practice-Guide</a></li> <li>• <a href="https://forums.ivanti.com/s/article/Application-Control-Quick-Start-Guide">https://forums.ivanti.com/s/article/Application-Control-Quick-Start-Guide</a></li> </ul>
Auditing	<p>Information regarding policy auditing best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/BP22-Event-Auditing-Troubleshooting-Guide">https://forums.ivanti.com/s/article/BP22-Event-Auditing-Troubleshooting-Guide</a></li> </ul>
Change Tracking	<p>The Change Tracking feature logs all configuration changes into the configuration, showing which administrator made a change, what the change was, and when the change was performed. This information is quite useful when troubleshooting issues, or in documenting change control activities. Recommend enabling Change Tracking in all configuration policies.</p>
Maintenance	<p>Document configuration policies well, using description fields wherever possible. While a given rule may seem obvious at the time, it may not be so obvious to another or future administrator.</p> <p>Delete rules that are no longer necessary or pertinent to the configuration policy. These settings can always be referenced by opening an earlier revision of the policy, and keeping the configuration policy “clean” will ensure that it’s easy to read, understand, and troubleshoot.</p>
Ellipsis Lookup	<p>Whenever possible, use the ellipsis when doing Active Directory lookups. For items like User Group, this will ensure the user’s local security token is used. When the token is used, “LSA Supported” will appear. Using LSA Supported improves logon times and enables offline lookups.</p>
Folder Allow Rules	<p>When implementing a whitelisting configuration policy, avoid creating an Allow rule for any folder where users have write/modify permissions. Users can intentionally or unintentionally place unauthorized software in the folder which would subsequently be allowed to execute. If a folder rule must be used, specify additional metadata so that only processes matching that metadata will be allowed.</p>

Topic / Feature	Description
Java Applications	<p>When running 32-bit Java on a 64-bit operating system, please refer to the following article:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Java-application-fails-to-create-the-Java-Virtual-Machine">https://forums.ivanti.com/s/article/Java-application-fails-to-create-the-Java-Virtual-Machine</a></li> </ul>
Library / Group Management	<p>Create groups in the library whenever multiple processes define a given application. This ensures that they are easily identifiable and not duplicated or missed when creating rules.</p>
DFS Links	<p>When creating rules utilizing DFS namespaces, please refer to the following article:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/DFS-Paths-in-Application-Manager-fail-to-be-honoured-when-checking-paths">https://forums.ivanti.com/s/article/DFS-Paths-in-Application-Manager-fail-to-be-honoured-when-checking-paths</a></li> </ul>
Signature Hash Rules / Optimization	<p>When adding a signature rule within Application Control, the default functionality is to attempt to match every executable file that is launched against the hash stored within the configuration. This has been known to cause performance issues within environments, due to the overhead added by enabling this capability.</p> <p><i>EnableSignatureOptimization</i> is a custom setting, which is enabled by setting the value to 1. This will ensure that the full path to the file matches before attempting to compare the files signature to the hash stored in the configuration.</p> <p>If you are using signature rules within your configuration, you should consider having this setting enabled to minimize the impact caused by having this setting present within the configuration.</p> <p><i>Note: This setting does have limitations. Executables with different file paths cannot be added more than once, because the signature will be the same. In the example where a USB stick is used and an Administrator wants to create a signature rule for E:\Autorun.exe, the check will fail if the user who owns the stick attempts to use it on a machine where its letter is anything other than E:\. In this case, the setting would need to be disabled OR an alternative method chosen for allowing Autorun.exe to launch</i></p>
Custom/Scripted Rules & Conditions	<p>Information regarding custom/scripted rule best practices can be found here:</p> <ul style="list-style-type: none"> <li>• <a href="https://forums.ivanti.com/s/article/Best-Practice-Custom-Actions-and">https://forums.ivanti.com/s/article/Best-Practice-Custom-Actions-and</a></li> </ul>

## Performance Manager

Topic / Feature	Description
General Best Practices	The primary source of information regarding Performance Manager best practices can be found here: <ul style="list-style-type: none"><li>• <a href="https://forums.ivanti.com/s/article/BP12-Creating-a-PM-Configuration">https://forums.ivanti.com/s/article/BP12-Creating-a-PM-Configuration</a></li></ul>

## File Director

Topic / Feature	Description
General Best Practices	<p>The primary source of information regarding File Director best practices can be found here:</p> <ul style="list-style-type: none"><li>• <a href="https://forums.ivanti.com/s/article/File-Director-Deployment-Best-Practices">https://forums.ivanti.com/s/article/File-Director-Deployment-Best-Practices</a></li></ul>

## Additional Information / References

Topic / Feature	Description
Ivanti Product Documentation	<a href="https://www.ivanti.com/support/product-documentation">https://www.ivanti.com/support/product-documentation</a>
Ivanti UWM Landing Page	<a href="https://forums.ivanti.com/s/article/User-Workspace-Management-Landing-Page">https://forums.ivanti.com/s/article/User-Workspace-Management-Landing-Page</a>