

RES Wisdom 2009 Feature Profile

Snapshot Intelligence

In many situations, it can be useful — or even crucial — to revert a computer to a previous state using snapshot technology. However, snapshots have some serious disadvantages:

- On a computer that reverts to a snapshot, certain changes may disappear that should have remained. For example, some files or security patches may have disappeared and will have to be installed again.
- Most change management systems are not snapshot-aware, and so will show out-of-date information for a certain period of time. During that time, the absence of important changes on the reverted computer may go unnoticed. In the case of missing security patches, their sudden absence poses a security risk.
- In environments that use disk virtualization, servers are booted from snapshot. This not only ensures that all servers are identical, it also undoes any planned changes that may have been implemented. These will not remain in place until the snapshot itself has been edited.

This feature profile on Snapshot Intelligence explains how to overcome these disadvantages using RES Wisdom 2009.

OVERCOMING THE DISADVANTAGES OF SNAPSHOTS

RES Wisdom 2009 Snapshot Intelligence is based on two premises:

- **History always matches the actual state of an Agent**
RES Wisdom detects when a RES Wisdom Agent has reverted to a snapshot, and changes all data in the RES Wisdom Management Console to match the Agent's new status. Changes that have disappeared from an Agent, for example, are no longer shown in the Agent's History.
- **Obsolete changes are hidden, but the information remains available and can be used**
RES Wisdom remembers all the changes that it has ever executed on an Agent, even after those changes have disappeared due to a snapshot. RES Wisdom will hide those changes in Job Results and the Agent's History, but the information about them remains available. Obsolete changes are shown on the Agent's **Snapshot Intelligence** tab, and can be re-done if necessary.

Furthermore, there are two ways in which changes can be re-done after they have become obsolete:

- RES Wisdom can be configured to reapply the most recent set of changes automatically each time an Agent reverts to a snapshot. This effectively creates an appendix to the snapshot.
- Alternatively, a set of compatible changes can be selected manually and then scheduled to be reapplied. This makes it possible to switch to several computer states on the basis of a single snapshot.

CONFIGURING SNAPSHOT INTELLIGENCE

No configuration is required to ensure that Job Results and Agent Histories match the actual state of RES Wisdom Agents. This happens automatically.

There are two **Snapshot Intelligence** settings: **When use of snapshot is detected** and **When last change path is reapplied**. These settings relate to the choice whether to reapply a change path automatically or not; and the choice what to exclude from automatically reapplied change paths.

These Snapshot Intelligence settings are available as a Global Setting and as an Agent Setting. The Global Setting determines the default behavior of Agents in your environment. For individual Agents, different behavior can be configured as an Agent setting.

When use of snapshot is detected

This setting determines whether RES Wisdom should reapply a change path automatically when it detects that an Agent has reverted to a snapshot. Available options are:

- **When use of snapshot is detected, do nothing**, which is the default. With this setting, you can either manually select a change path to reapply, or you can ignore the fact that a snapshot was used and just continue as usual. No changes are made automatically (apart from matching history data to the actual Agent state).
- **When use of snapshot is detected, reapply last change path**. With this setting, an Agent's last change path is reapplied to it whenever it reverts to a snapshot.

When last change path is reapplied

If a last change path is reapplied automatically, certain types of Task can be excluded automatically. Available options are:

- **Skip shutdown and reboot Tasks**
- **Skip Tasks that use Connectors**

By default, both options are selected. Either category can be cleared so that these types of Tasks are not skipped.

It might be useful to clear the option **Skip shutdown and reboot Tasks** for Agents on which RES Wisdom has executed Jobs such as installing software packages. A reboot is usually required after such Tasks. If such an Agent reverts to a snapshot and if the last change is going to be reapplied, those Tasks would fail if the reboots were not executed as well. For Agents that boot from a read-only disk, however, this option must always be selected.

In practice, the option **Skip Tasks that use Connectors** should rarely need to be changed. Tasks that use Connectors need to be skipped because these Tasks are not generally executed on the Agent on which they are scheduled. For example, a Module to create an Exchange Mailbox for John Smith can be scheduled on Agent 1, but Agent 1 itself does not create the Exchange Mailbox. It just passes the information about John Smith on to the Exchange server. The Exchange server creates the mailbox. When Agent 1 reverts to a snapshot, this does not affect the Exchange server. John Smith's mailbox is still there. If Agent 1 were to ask the Exchange server to create a mailbox for John Smith again, this Task would fail because that mailbox already exists.

Scenario: Snapshot Intelligence in combination with disk virtualization

In environments using disk virtualization (for example Citrix Provisioning Server), computers boot from a standard, read-only virtualized disk. This can be seen as a snapshot too. In such environments, Snapshot Intelligence can be very useful, because you can append planned changes after the snapshot. This makes it less urgent to edit the snapshot straight away when a planned change is needed. Each time the server boots from the snapshot, the planned changes are automatically executed directly afterwards.

Prerequisites

- Each computer that boots from a read-only virtualized disk must be an Agent.
- All planned changes must be executed as RES Wisdom Jobs on the Agents.

Snapshot Intelligence Configuration

The server Agents must be configured as follows:

- When use of snapshot is detected: reapply last change path.
- Skip shutdown and reboot Tasks. (Without this option, the Agent will enter a loop in which it reverts from snapshot then reapplies the last change path that includes a reboot, so reverts to snapshot, reapplies the change path, etc.)

These settings can be set as the default at Global Settings, so that all Agents will follow this default behaviour. If the Global Settings for Snapshot Intelligence are different, then the necessary settings must be configured as Agent settings for each Agent that boots from snapshot.



Notes

- In this scenario, the option **Skip shutdown and reboot Tasks** is crucial. Without it, Agents that boot from snapshot will enter a loop in which they revert to snapshot, reapply the last change path that includes a reboot, so revert to snapshot again, reapply the change path again, etc.
- For this reason, changes that do require a reboot (such as installing software) must be contained in the standard snapshot itself. Snapshot Intelligence cannot reapply such changes as an appendix after the snapshot.

Scenario: several target states from a single snapshot

In some environments, it can be useful to switch computers between various states. In schools, for example, several applications need to be installed on student computers on regular school days. On exam days, however, only the exam software should be installed, and nothing else. Student computers therefore need to switch between two different states. Similarly, in test and development cycles it can be very useful to switch between different computer states.

With RES Wisdom Snapshot Intelligence, different target states can all be based on a single snapshot. From the snapshot moment, the administrator can select the change set that leads to the desired target state. The change set can be edited to include or exclude specific Tasks before it is reapplied.

Prerequisites

- Each computer that needs to switch between different states must be an Agent.

- All changes must be executed as RES Wisdom Jobs on the Agents.

Snapshot Intelligence configuration

The Agents must be configured as follows:

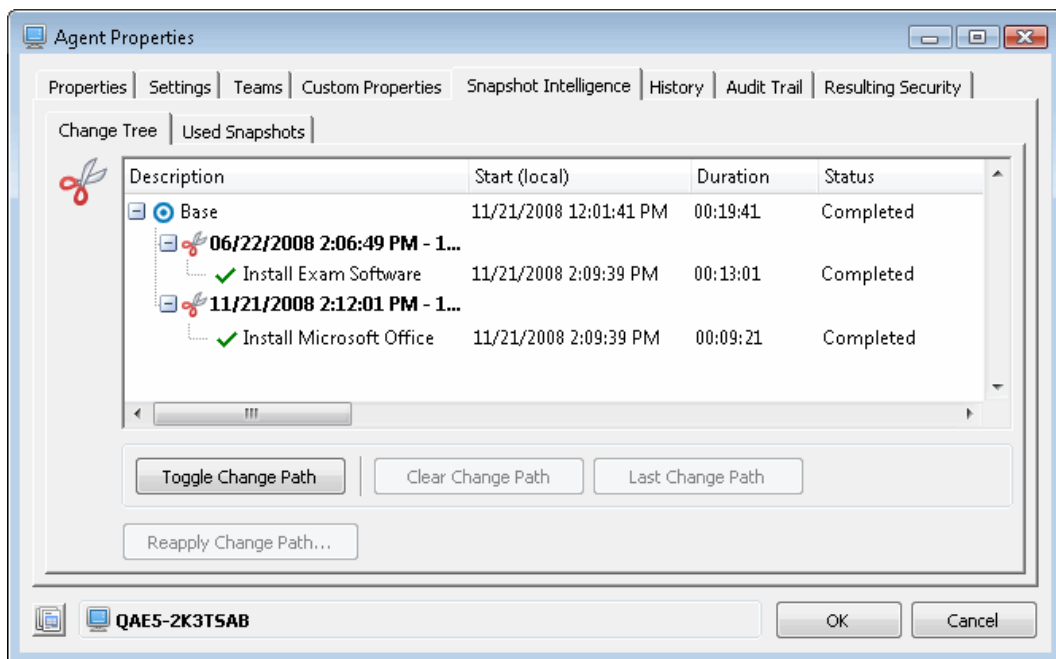
- When use of snapshot is detected: do nothing.
- Optional: Skip shutdown and reboot Tasks.
- Optional, recommended: Skip Tasks that use Connectors.

These settings can be set as the default at Global Settings, so that all Agents will follow this default behavior. If the Global Settings for Snapshot Intelligence are different, then the necessary settings must be configured as Agent settings for each Agent that should switch between different states based on a snapshot.

Selecting and reapplying a change path

Changes that became obsolete when an Agent reverted to a snapshot are presented on that Agent's **Snapshot Intelligence** tab under **Change Tree**. (An overview of all used snapshots is presented on the same tab, under **Used Snapshots**.)


Under **Change Tree**, the current computer state is marked, plus all available change paths. Snapshot moments are marked with a scissors icon, followed by the start and end dates and times.





Use the button **Toggle Change Path** to define the desired change path:


1. To choose the starting point for the change path, click on the first Job that you want to reapply.
2. Click **Toggle Change Path** to see the range of all possible change paths from that starting point. (The area is marked light blue.)
3. Click on the last Job that you want to reapply.
4. Click **Toggle Change Path** once again. The selected change path is now marked bright green.

- a) To change the end point of the change path, click the relevant Job and then click **Toggle Change Path** again.
- b) To clear the selection and start again, click **Clear Change Path**.

 **Notes**

-  marks a change set.
-  marks the current state of the agent.
- Each Job is marked with a symbol indicating the Job status.

When the correct change path is marked, choose **Reapply Change Path**. In the window **Reapply Tasks**, the change path can be edited to include or exclude specific tasks and/or types of Tasks.

 **Tip**

In the window **Reapply Tasks**, the change path can also be saved as a Module for future use, independent from snapshots and Snapshot Intelligence.

SNAPSHOT INFORMATION IN THE RES WISDOM MANAGEMENT CONSOLE

Snapshot Intelligence Settings

The Global Settings for Snapshot Intelligence can be found at **Infrastructure > Datastore > Settings > Global Settings**.

The Agent Settings for Snapshot Intelligence can be found by opening an existing Agent at **Infrastructure > Agents**, then going to the **Settings** tab.

Change paths and use of snapshots

Per Agent, its possible change paths and its use of snapshots can be found by opening the Agent at **Infrastructure > Agents**, then going to the **Snapshot Intelligence** tab. This tab appears the first time that RES Wisdom 2009 detects that that Agent has reverted to a snapshot. A RES Wisdom 2009 Agent that has never reverted to snapshot will not have a **Snapshot Intelligence** tab.

In Job Results

By default, RES Wisdom Job Results, Agent Histories and other data matches the actual states of Agents. However, there is an option **Show Agents that are marked obsolete for this job by Snapshot Intelligence** to show hidden data about obsolete changes in Job Results and query results. Furthermore, the Job Results column "Job Invoker" will indicate when Snapshot Intelligence triggered a Job, so this also shows when snapshots were used.

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