Solution Briefs

NetApp solutions for SAP

NetApp
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Solution Briefs

SB-3978: Lifecycle Management for SAP HANA

NetApp is addressing the challenges of the slow implementation of features, a lack of automation, and a loss of productivity by providing a lifecycle management solution that is fully integrated into the tools that SAP administrators use for day-to-day operations, such as SAP Landscape Management (SAP LaMa). The goal is to simplify the provisioning workflow from preprocessing to postprocessing, including all the software and storage layer tasks needed to create a copy of the production system. With this solution, administrators can create a development and test environment in a couple of mouse clicks, which results in improved lifecycle management.

https://www.netapp.com/pdf.html?item=/media/6996-sb-3978pdf.pdf

SB-3965: Backup and Recovery for SAP HANA

The challenge

With SAP HANA backup and restore operations, your organization faces the following challenges:
• Long backup operations with performance degradation on production SAP systems
• Unacceptable system downtime due to long restore and recovery operations
• Shrinking backup windows because of the criticality of the applications
• The need for a flexible solution to mitigate logical corruption

The Solution

With NetApp® storage solutions that run NetApp ONTAP® data management software, in combination with NetApp SnapCenter® data protection software, you can meet all those challenges. And with the NetApp Snapshot™ technology that is included in ONTAP software, you can create backups or execute restore operations of any size dataset in a matter of seconds. SAP HANA supports the use of storage-based Snapshot copies as a valid backup operation.

https://www.netapp.com/pdf.html?item=/media/6997-sb-3965pdf.pdf

SB-3968: Disaster Recovery for SAP HANA

The challenge

Business continuity is essential in IT organizations. They must be able to provide high availability services for the mission-critical applications that their customers require to run their businesses. Otherwise, their customers will face productivity decrease, and eCommerce organizations could face a direct impact on their revenue.

The Solution

NetApp has developed a full portfolio of technologies and tools to help IT organizations build or adapt their disaster recovery plans to respond to all business demands:

https://www.netapp.com/pdf.html?item=/media/6998-sb-3968pdf.pdf

SB-4292: SAP automation with Ansible

This document focuses on integrating NetApp® storage systems—whether they are operated on
premises, in a public cloud infrastructure-as-a-service (IaaS) environment, or in hybrid cloud—into SAP
Landscape Management (LaMa) by using Ansible Playbooks and custom scripts.

Solution overview

SAP systems are very complex. But for the companies that use SAP, these systems are central to their business processes. By automating recurring daily operational tasks, SAP system administrators can manage more systems with less effort, produce repeatable results, and reducing human error.

This document focuses on integrating NetApp® storage systems—whether they are operated on premises, in a public cloud infrastructure-as-a-service (IaaS) environment, or in hybrid cloud—into SAP Landscape Management (LaMa) by using Ansible Playbooks and custom scripts. This integration enables SAP administrators to speed up SAP system refresh tasks by using NetApp Snapshot™ and NetApp FlexClone® technology.

Target audience

This document is targeted to SAP system administrators who haven't had much (or any) experience with Ansible automation. It should help you get started with Ansible, run your first playbooks, and configure and run your first SAP LaMa-based system refresh operation.

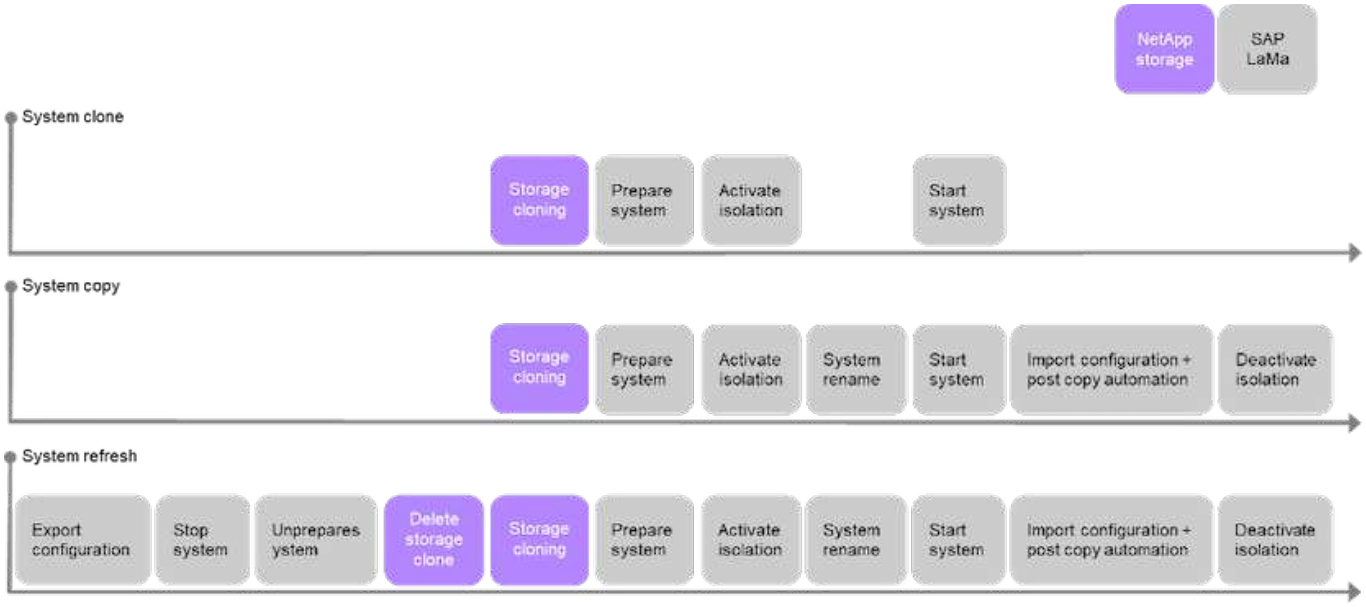
SAP system clone, copy, and refresh scenarios

The term SAP system copy is often used as a synonym for three different processes: SAP system clone, SAP system copy, and SAP system refresh. It is important to distinguish between the different operations, because the workflows and use cases differ.

- **SAP system clone**. An SAP system clone is an identical clone of a source SAP system. SAP system clones are typically used to address logical corruption or to test disaster recovery scenarios. With a system clone operation, the hostname, instance number, and secure identifier (SID) remain the same. It is therefore important to establish proper network fencing for the target system to make sure that there is no communication with the production environment.
- **SAP system copy**. An SAP system copy is a setup of a new target SAP system with data from a source SAP system. For example, the new target system could be an additional test system with data from the production system. The hostname, instance number, and SID are different for the source and target systems.
- **SAP system refresh**. An SAP system refresh is a refresh of an existing target SAP system with data from a source SAP system. The target system is typically part of an SAP transport landscape—for example, a quality assurance system—that is refreshed with data from the production system. The hostname, instance

number, and SID are different for the source and target systems.

The following image shows SAP system clone, copy, and refresh LaMa workflow steps that are related to NetApp storage.

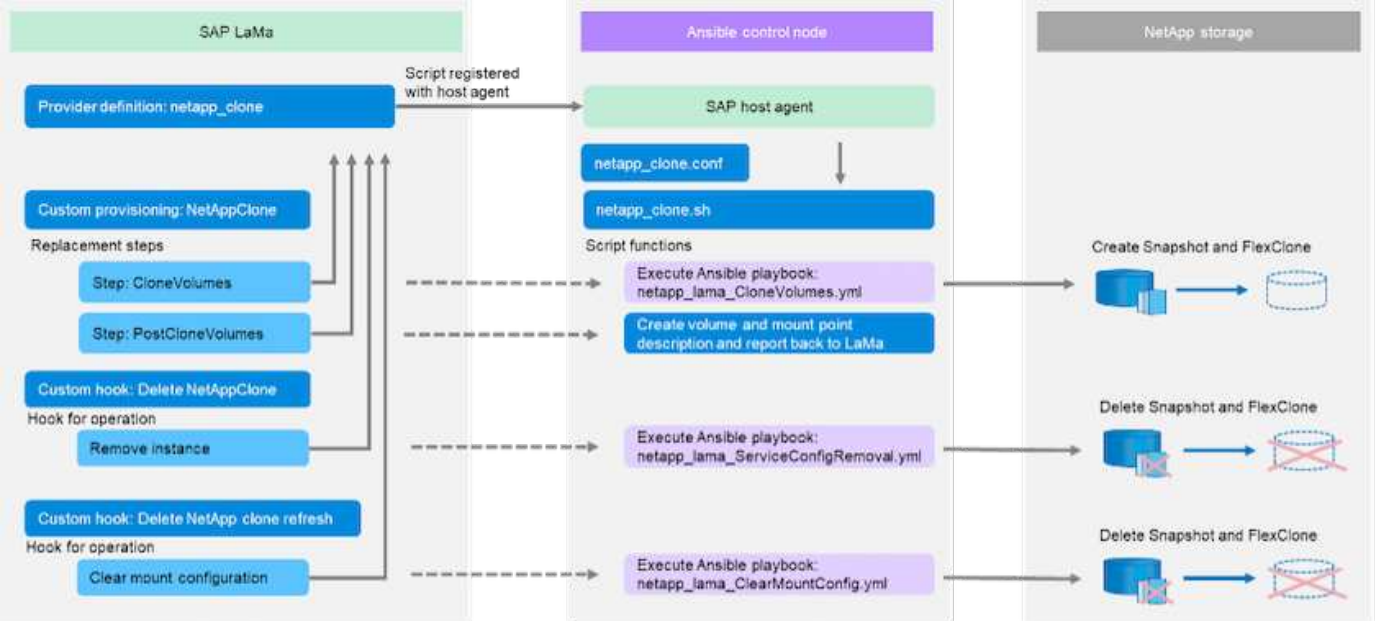


Solution technology

The overall solution consists of these main components:

- SAP LaMa system
- NetApp storage system
- Ansible control node with installed SAP Host Agent. We recommend using Red Hat Ansible Automation Platform, because it provides additional benefits such as:
  - Using AI to generate code recommendations for automation tasks
  - Reducing manual tasks with event-driven automation
  - Being defined, consistent, and portable
  - Scaling automation across environments
  - Accelerating automation with prepackaged content
  - Tracking and managing automation with rich reporting and observability metrics
  - Creating tasks, modules, and playbooks

The following image shows how SAP LaMa and NetApp storage systems integrate through Ansible Playbooks on a dedicated Ansible host, triggered by shell scripts executed from SAP Host Agent.

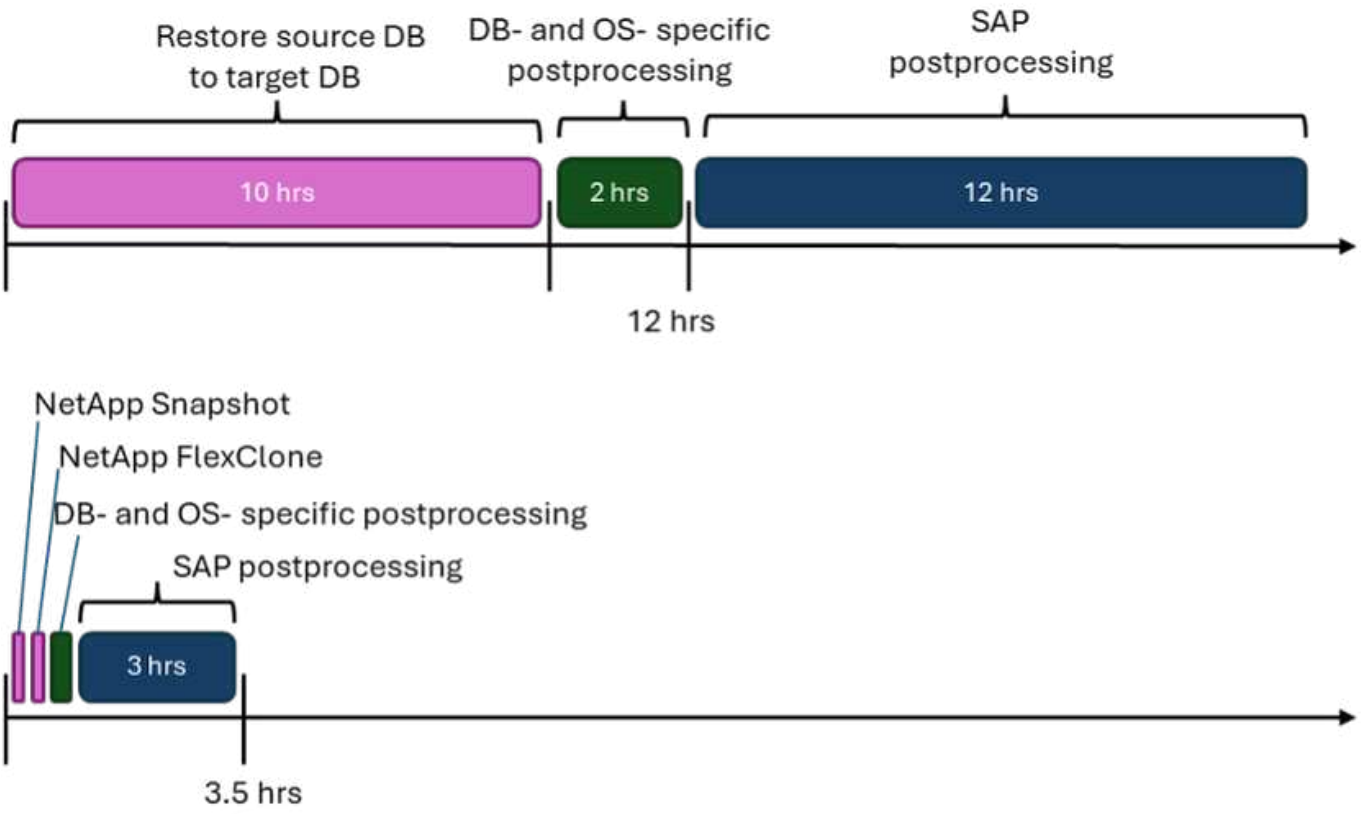


Use case summary

There are several scenarios in which data from a source system must be made available to a target system for testing or training purposes. These test and training systems must be updated regularly with data from the source system to make sure that testing and training are performed with the current dataset. These system refresh operations consist of multiple tasks on the infrastructure, database, and application layers, and they can take several days, depending on the level of automation.

To accelerate and automate the required tasks at the infrastructure and database layers, you can use SAP LaMa and NetApp cloning workflows. Instead of restoring a backup from the source system to the target system, SAP LaMa uses NetApp Snapshot and FlexClone technology so that required tasks to get a database started can be performed in minutes instead of hours, as shown in the following figure. The time needed for the cloning process does not depend on the size of the database; therefore, even very large systems can be created in a couple of minutes. You can further reduce the run time by automating tasks on the operating system and database layer as well as on the SAP postprocessing side.

The following image shows possible operational efficiency improvements when you use automation.



Integrating the different technology components

To integrate SAP LaMa with NetApp storage systems by using Ansible, you need a node on which you can run Ansible Playbooks. We recommend using Ansible Automation Platform. To run shell scripts and Ansible Playbooks on this host, started from SAP LaMa, you need a running SAP Host Agent on this server. SAP Host Agent takes over the bidirectional communication with SAP LaMa and executes shell scripts that will trigger the actual playbooks.

This loosely coupled architecture gives you the freedom to start workflows from SAP LaMa and also outside SAP LaMa. Playbooks and corresponding logic needs to be configured only once and can be used for different scenarios and use cases.

Conclusion

The combination of NetApp, SAP LaMa, and Ansible Automation Platform provides a powerful solution that can dramatically reduce the time and effort needed for the most complex and time-consuming tasks related to SAP system administration. This combination can also help avoid the configuration drift that human error can cause between the systems.

Because system refreshes, copies, clones, and disaster recovery testing are very sensitive procedures implementing such a solution can free up precious administration time. It can also reinforce the trust that the rest of the organization will have in the SAP system administrators: They will see how much easier it is to copy systems for testing or other purposes, and how much troubleshoot time can be saved.

Where to find additional information

To learn more about the information that is described in this document, review the following documents and websites:

- Automating ongoing day 1 and day 2 operations by using Ansible Playbooks for NetApp ONTAP®
- NetApp specific Ansible documentation
- NetApp ONTAP Ansible modules and full documentation
- Red Hat Ansible Automation Platform

Version history

Version	Date	Update summary
Version 0.1	03.2023	1st draft.
Version 0.2	01.2024	Review and some minor corrections
Version 0.3	06.2024	Converted to html format

SB-4293: Automating SAP system copy, refresh, and clone workflows with ALPACA and NetApp SnapCenter

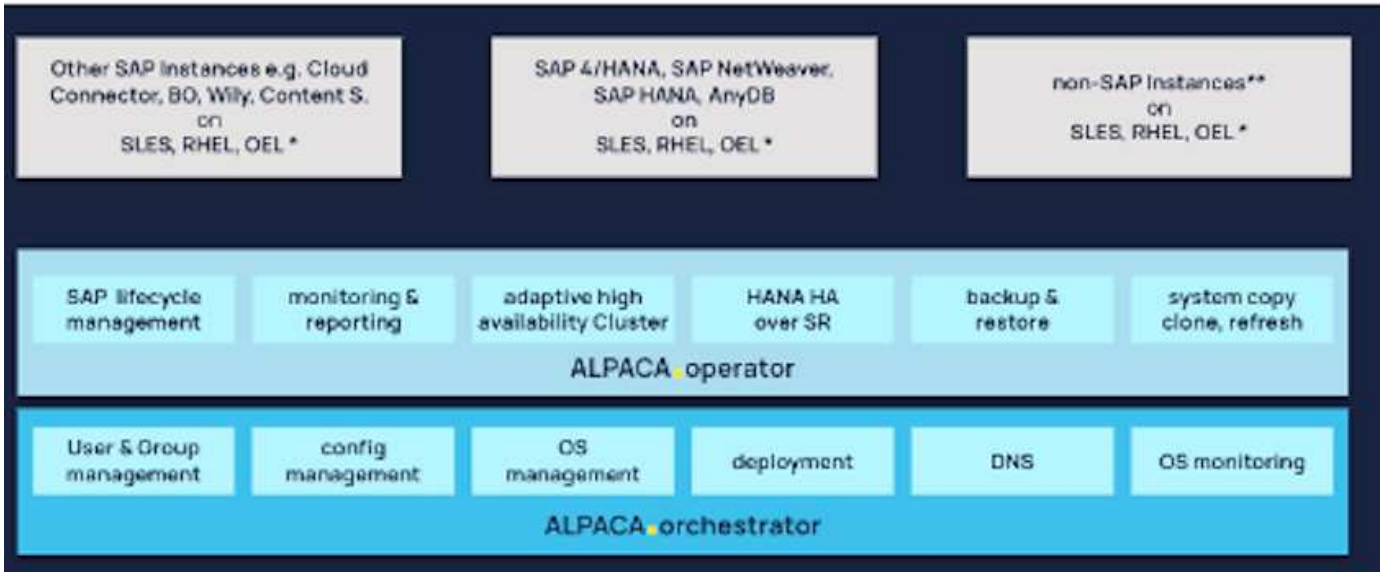
This document focuses on integrating NetApp® Snapshot™ and FlexClone® technologies into ALPACA automation workflows.

Solution overview

SAP systems and solutions operations are very complex. However, for companies that use SAP, the systems and services are central to their business processes. By automating recurring daily operational tasks, like system copy and refresh operations, SAP system administrators can manage more systems with less effort, produce repeatable results, and reduce human error.

This document focuses on integrating NetApp® Snapshot™ and FlexClone® technologies into ALPACA automation workflows.

The Automating Landscapes Proactively—Cloud and Anywhere (ALPACA) suite is a comprehensive management interface that enables detailed oversight and monitoring across your SAP landscapes. ALPACA streamlines and expedites SAP infrastructure operations, ensuring optimal availability and transparency. It provides a comprehensive array of tools for managing the entire landscape, including infrastructure, and proactively notifies about anomalies such as service disruptions, job halts, and congestion. The suite is designed to operate seamlessly in on-premises, hybrid, and all-cloud environments, including multicloud scenarios, ensuring adaptability to any infrastructure. This module-based framework automates standard and regular SAP admin tasks as well as complex scenarios like failover during an outage. administrators/experts, operators, and managers, ALPACA gives these professionals a high degree of control and automation.



This document describes how ALPACA integrates with NetApp SnapCenter®, the tool to orchestrate Snapshot based backups, perform restores, and create FlexClone volumes. This integration allows SAP administrators to significantly accelerate SAP system daily operational tasks. NetApp Snapshot, FlexClone, and SnapRestore® technologies accelerate backup, restore, and clone operations because NetApp's storage technology is pointer-based. This approach is fast, and it also reduces the storage overhead during clone operations, because only new and changed data (not existing data) must be written to the storage medium. This is true regardless of whether it is an on-premises NetApp storage system or a NetApp storage solution at one of the three major cloud providers.

Target audience

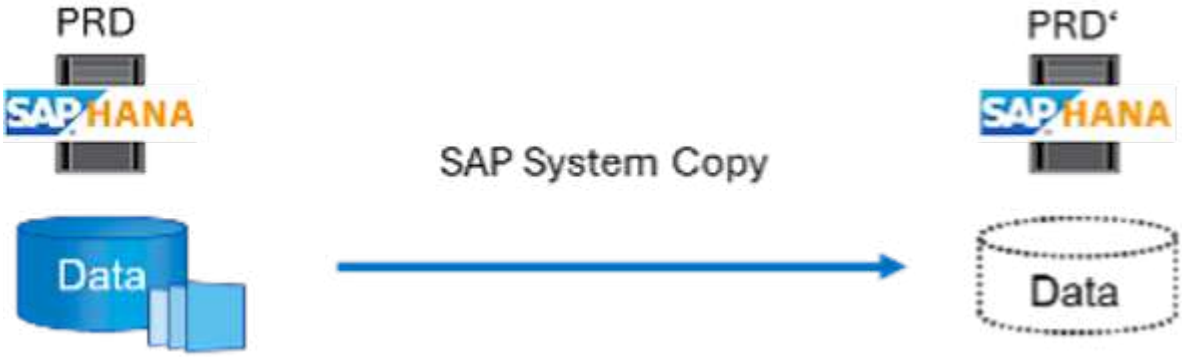
This document is aimed at SAP system administrators who have carried out SAP system copies manually and would like to automate this activity with ALPACA. The intended goal of combining NetApp Snapshot and FlexClone technologies, orchestrated by NetApp SnapCenter, with ALPACA workflows is to reduce the duration of fully automated SAP system copies.

SAP system clone, copy, and refresh scenarios

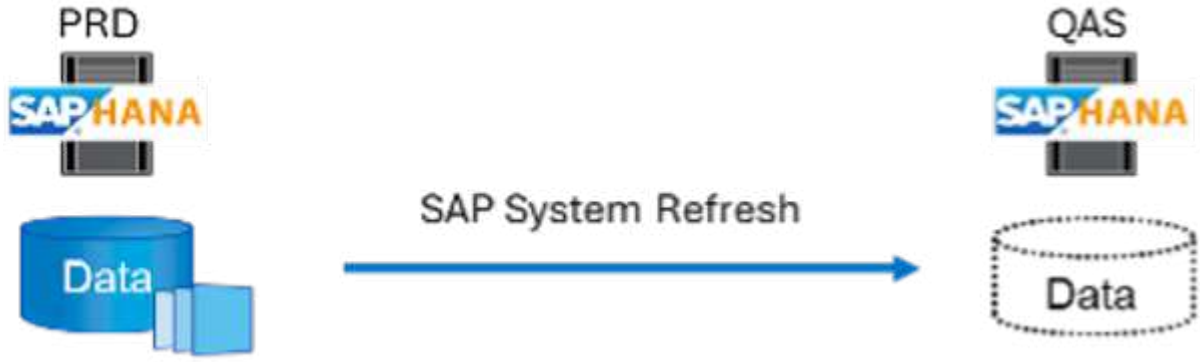
The term SAP system copy is often used as a synonym for three different processes: SAP system clone, SAP system copy, and SAP system refresh. It is important to distinguish between these operations, because the workflows and use cases differ.

- **SAP system clone**. An SAP system clone is an identical clone of a source SAP system. SAP system clones are typically used to address logical corruption or to test disaster recovery scenarios. With a system clone operation, the host name, instance number, and secure identifier (SID) remain the same. It is therefore important to establish proper network fencing for the target system to make sure that thereis no communication with the production environment.

- **SAP system copy**. An SAP system copy is a setup of a new target SAP system with data from a source SAP system. For example, the new target system could be an additional test system with data from the production system. The host name, instance number, and SID are different for the source and target systems.The new system is not isolated from the source system.



- **SAP system refresh**. An SAP system refresh is a refresh of an existing target SAP system with data from a source SAP system. The target system is typically part of an SAP transport landscape—for example, a sandbox system—that is refreshed with data from the production system. The hostname, instance number, and SID are different for the source and target systems.



Even though these are three different use cases, the data management process stays the same. All three uses cases use the same underlying data management technology—NetApp Snapshot and FlexClone.

Solution technology

The overall solution consists of these main components:

- SAP source system with installed SnapCenter agent and SnapCenter database Plug-In

- SAP target system with installed SnapCenter agent and SnapCenter database Plug-In
- ALPACA system with configured SAP source and SAP target system
- NetApp SnapCenter Server
- NetApp storage system:
  - Physical on-premises hardware: AFF-A, AFF-C, ASA-A, ASA-C, or FAS series
  - Software-defined storage on premises: ONTAP® Select
  - NetApp cloud storage:
    - Cloud Volumes ONTAP for AWS, Google Cloud, or Azure
    - Azure NetApp Files
    - Amazon FSx for NetApp ONTAP

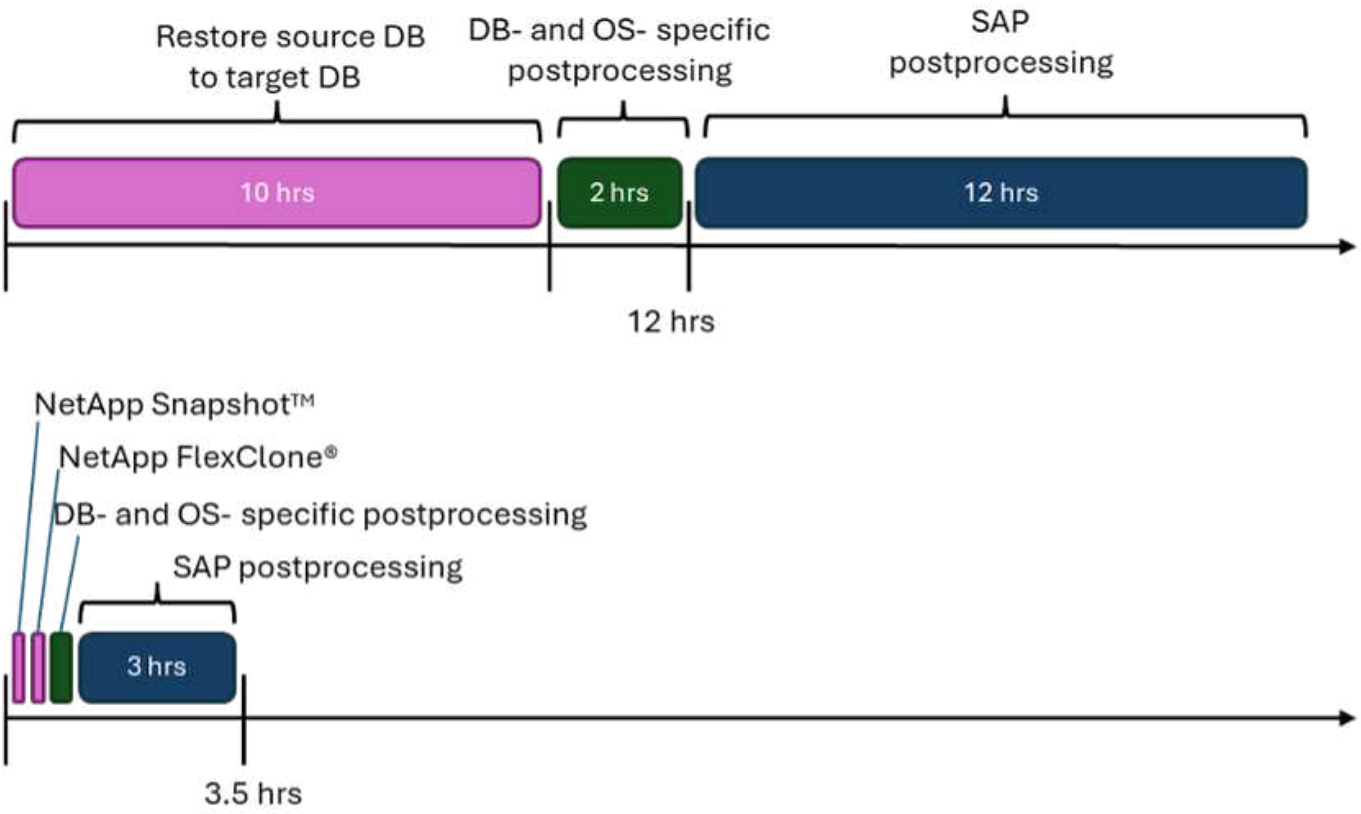
The following image shows the ALPACA server, the NetApp SnapCenter server, the NetApp storage system, the SAP source and SAP target systems, and how everything is integrated. The goal is to make the integration as flexible as possible by using the SnapCenter REST API to ensure maximum reuse of configuration work that has already been done inside exiting components.

Use case summary

There are several scenarios in which data from a source system must be made available to a target system for testing or training purposes. These test and training systems must be updated regularly with data from the source system to make sure that testing and training are performed with the current dataset. These system refresh operations consist of multiple tasks on the infrastructure, database, and application layers, and they can take several days, depending on the level of automation.

To speed up operations, automate tasks, and eliminate human error at the infrastructure, database, and application levels, you can use ALPACA Workflows. Instead of restoring a backup from the source system to the target system, which is time consuming and involves high resource consumption, this integration uses NetApp Snapshot and FlexClone technologies. All the tasks required to spin up a database are completed in minutes rather than hours. The time required for the cloning process does not depend on the size of the database; therefore, even very large systems can be created in just a few minutes. ALPACA further reduces run time by automating tasks at the operating system and database levels as well as on the SAP postprocessing side.

THe following image shows possible operational efficiency improvements when you use automation.



Integrating the technology components

The actual integration of SnapCenter in an ALPACA workflow consists of using shell scripts to access the NetApp SnapCenter REST API. This REST API-based integration creates a Snapshot copy of the SAP source system, creates a FlexClone volume, and mounts it onto the SAP target system.
Storage and SAP administrators know how to develop scripts that are triggered by SnapCenter and executed by the SnapCenter agent to automate recurring daily operation tasks. This loosely coupled architecture, which triggers SnapCenter tasks via shell scripts, enables them to reuse their existing automation procedures to achieve the desired results faster using ALPACA as a workflow engine for end-to-end automation.

Conclusion

The combination of ALPACA and NetApp data management technology provides a powerful solution that can dramatically reduce the time and effort needed for the most complex and time-consuming tasks related to SAP system administration. This combination can also help avoid the configuration drift that human error can cause between the systems.

Because system refreshes, copies, clones, and disaster recovery testing are very sensitive procedures, implementing such a solution can free up precious administration time. It can also reinforce the trust that the line-of-business staff members have in the SAP system administrators. They will see how much troubleshooting time can be saved and how much easier it is to copy systems for testing or other purposes. This is true regardless of where the source and target systems are operated—on premises, in a public cloud, hybrid cloud, or hybrid multicloud.

Where to find additional information

To learn more about the information contained in this document, review the following documents and websites:

- ALPACA
- Automating SAP HANA System Copy and Clone Operations with SnapCenter
- REST APIs supported for SnapCenter Server and plug-Ins

Version history

Version	Date	Update summary
Version 0.1	04.2024	1st draft.
Version 0.2	06.2024	Converted to html format

SB-4294: Automating SAP system copy, refresh, and clone workflows with Avantra and NetApp SnapCenter

This document describes how Avantra integrates with the NetApp SnapCenter® platform.

Solution overview

The operations of SAP systems and solutions are very complex. However, for companies that use SAP, these systems and services are central to their business processes. By automating recurring daily operational tasks—like system copy and refresh operations—SAP system administrators can manage more systems with less effort, produce repeatable results, and reduce human error.

This document focuses on integrating NetApp® Snapshot™ and FlexClone® technologies into Avantra automation workflows. Avantra is an IT management platform that focuses on automated management of IT operations and services. It provides solutions for monitoring, automating, and managing IT infrastructures to improve the efficiency and reliability of IT systems. Avantra allows businesses to proactively monitor their IT environments, detect issues early, and perform automated actions for troubleshooting or optimizing system performance. The platform typically integrates with other IT management tools and can be deployed in various environments such as cloud, on-premises, and hybrid infrastructures.

This document describes how Avantra integrates with the NetApp SnapCenter® platform. NetApp SnapCenter is the tool for orchestrating Snapshot based backups, performing restores, and creating FlexClone volumes. This integration allows SAP administrators to significantly speed up daily operational tasks for SAP systems by using NetApp techniques. Snapshot, FlexClone, and NetApp SnapRestore® software accelerate backup, restore, and clone operations because NetApp storage technology is pointer based. This approach is fast. It also reduces the storage overhead during clone operations, because only new and changed data is written to the storage medium, regardless of whether it is an on-premises NetApp storage system or a NetApp storage solution at one of the three major cloud providers.

Target audience

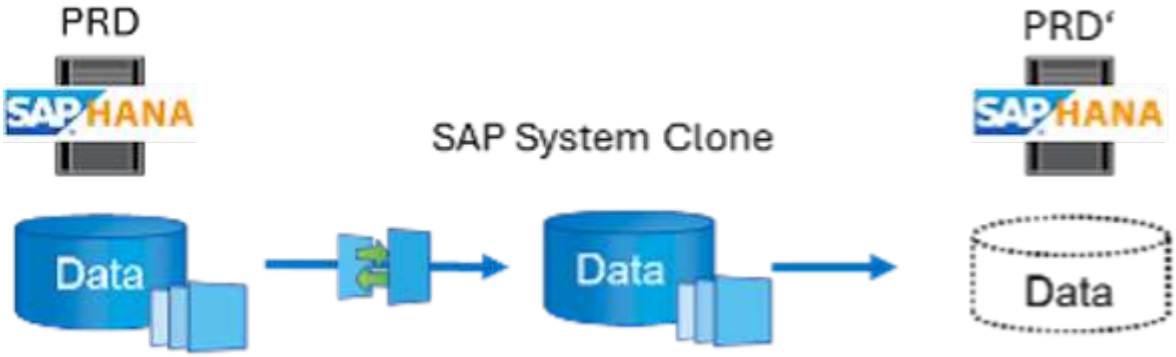
This document is aimed at SAP system administrators who have previously carried out SAP system copies manually and would like to automate this activity with Avantra. The intended goal of combining NetApp Snapshot and FlexClone technology—orchestrated by NetApp SnapCenter—with Avantra workflows is to speed up SAP system copies by fully automating them.

SAP system clone, copy, and refresh scenarios

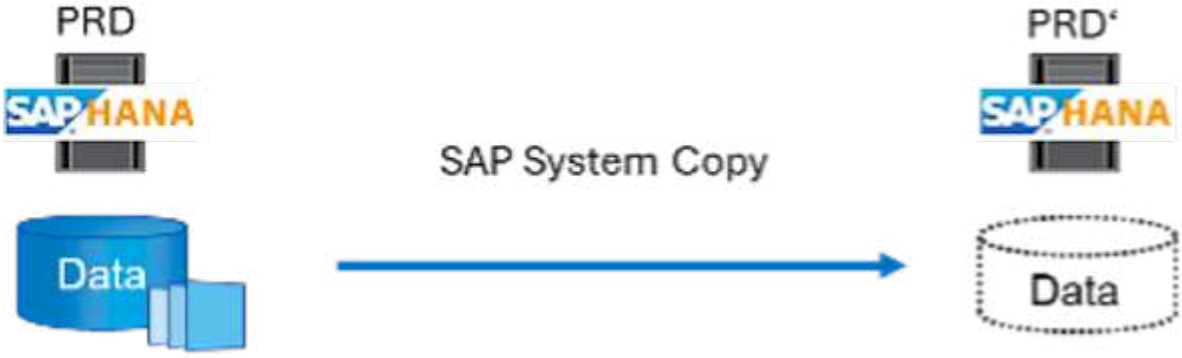
The term SAP system copy is often used as an umbrella term for three different processes: SAP system clone, SAP system copy, and SAP system refresh. It is important to distinguish between the different operations,

because the workflows and use cases differ.

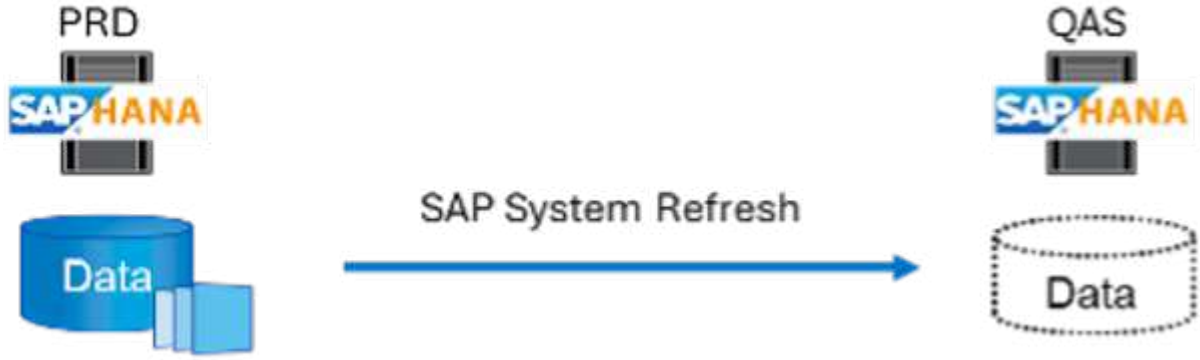
- **SAP system clone**. An SAP system clone is an identical clone of a source SAP system. SAP system clones are typically used to address logical corruption or to test disaster recovery scenarios. With a system clone operation, the host name, instance number, and secure identifier (SID) remain the same. It is therefore important to establish proper network fencing for the target system to make sure that there is no communication with the production environment.



- **SAP system copy**. An SAP system copy is a setup of a new target SAP system with data from a source SAP system. For example, the target system could be an additional test system with data from the production system. The host name, instance number, and SID are different for the source and target systems.The new system is not isolated from the source system.



- **SAP system refresh.** An SAP system refresh is a refresh of an existing target SAP system with data from a source SAP system. The target system is typically part of an SAP transport landscape—for example, a sandbox system—that is refreshed with data from the production system. The host name, instance number, and SID are different for the source and target system.



Even though we have three different use cases, the data management process stays the same. All three uses cases are leveraging the same underlying data management technology: NetApp Snapshot and FlexClone.

Solution technology

The overall solution consists of these main components:

- SAP source system with installed SnapCenter agent and SnapCenter database plug-in
- SAP target system with installed SnapCenter agent and SnapCenter database plug-in
- Avantra system with configured SAP source and SAP target system
- NetApp SnapCenter Server
- NetApp storage system:
  - Physical on-premises hardware: NetApp AFF A-Series, AFF C-Series, ASA A-Series, ASA C-Series, or FAS series
  - Software-defined storage on premises: NetApp ONTAP® Select
  - NetApp cloud storage:
    - NetApp Cloud Volumes ONTAP® in AWS, Google Cloud, or Azure
    - Azure NetApp Files
    - Amazon FSx for NetApp ONTAP (AWS)

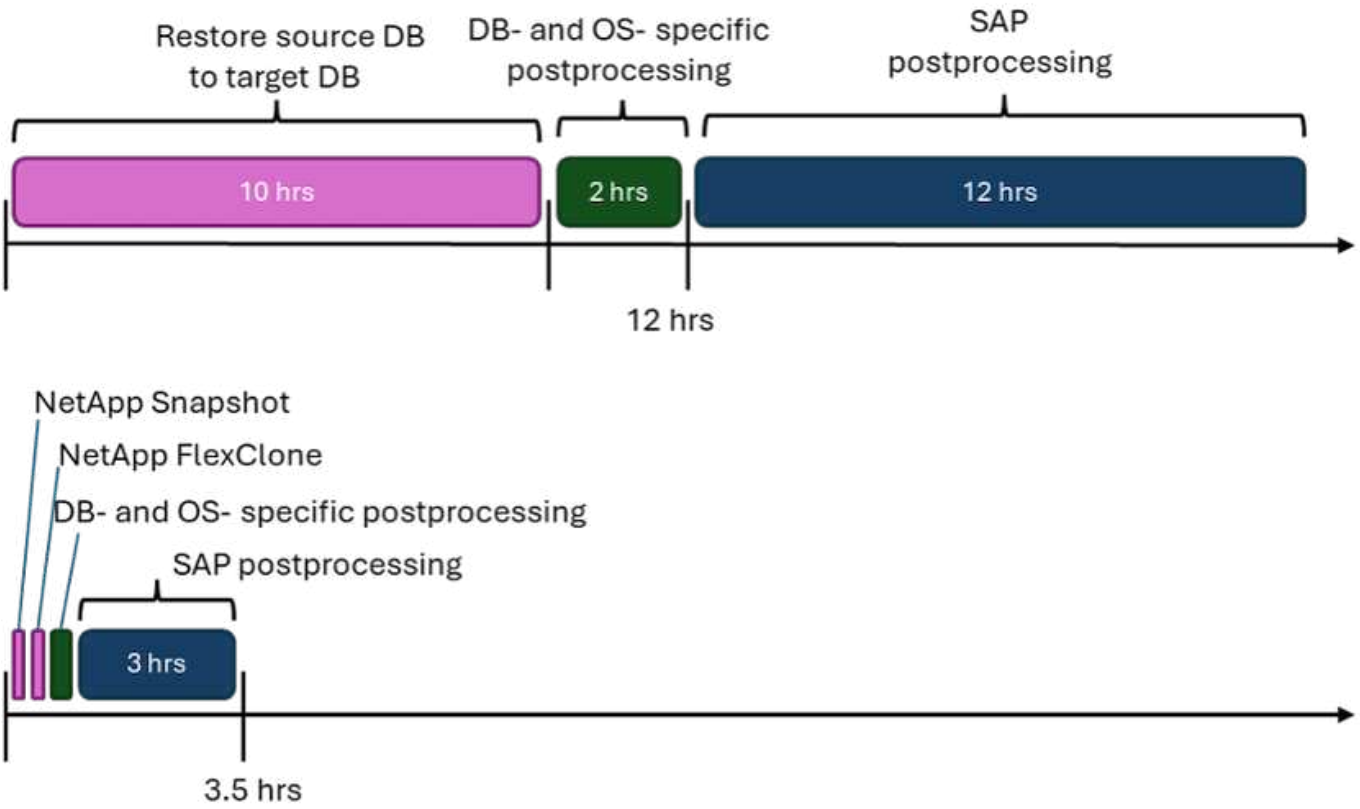
The following image shows the Avantra server, the NetApp SnapCenter Server, the NetApp storage system, the SAP source and SAP target systems, and how everything integrates. The goal was to make the integration as flexible as possible by using the SnapCenter REST API for maximum reuse of configuration work that has already been done inside existing components.

Use case summary

There are several scenarios in which data from a source system must be made available to a target system for testing or training purposes. These test and training systems must be updated regularly with data from the source system to make sure that testing and training are performed with the current dataset. These system refresh operations consist of multiple tasks on the infrastructure, database, and application layers, and they can take several days, depending on the level of automation.

To shorten time, automate operational tasks, and eliminate human error at the infrastructure, database, and application level, you can use Avantra workflows. Instead of restoring a backup from the source system to the target system—which is time consuming and involves high resource consumption—this integration uses NetApp Snapshot and FlexClone technology. All the tasks required to spin up a database are completed in minutes instead of hours. The time required for the cloning process does not depend on the size of the database; therefore, even very large systems can be created in just a few minutes. Avantra further reduces run time by automating tasks at the operating system and database level as well as on the SAP postprocessing side.

The following image shows possible operational efficiency improvements when you use automation.



Integrating the different technology components

The actual integration of SnapCenter in an Avantra workflow consists of using JavaScript to access the NetApp SnapCenter REST API. This REST API–based integration creates a Snapshot copy of the SAP source system, creates a FlexClone volume, and mounts it onto the SAP target system.

Storage and SAP administrators have invested time and know-how to develop scripts that are triggered by SnapCenter and executed by the SnapCenter agent to automate reoccurring daily operation tasks. This loosely coupled architecture—which uses JavaScript to trigger SnapCenter tasks—enables them to reuse their existing automation procedures to achieve the desired results faster using Avantra as a workflow engine for end-to-end automation.

Conclusion

The combination of Avantra and NetApp data management technology provides a powerful solution that can dramatically reduce the time and effort needed for the most complex and time-consuming tasks related to SAP system administration. This combination can also help avoid the configuration drift that human error can cause between the systems.

Because system refreshes, copies, clones, and disaster recovery testing are very sensitive procedures, implementing such a solution can free up precious administration time. It can also reinforce the trust that line-of-business staff members have in SAP system administrators: They will see how much troubleshooting time can be saved and how much easier it is to copy systems for testing or other purposes. The solution offers these advantages regardless of where the source and target systems are operated—on premises, in a public cloud, or in a hybrid or hybrid multicloud environment.

Where to find additional information

To learn more about the information that is described in this document, review the following documents and websites:

- Avantra
- Automating SAP HANA System Copy and Clone Operations with SnapCenter
- REST APIs supported for SnapCenter Server and plug-ins

Version history

Version	Date	Update summary
Version 0.1	03.2024	1st draft.
Version 0.2	03.2024	Integration of feedback from NetApp colleagues.
Version 0.3	04.2024	Integrated requested changes to be NetApp branding compliant
Version 0.4	06.2024	Converted to html format

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