

IBM Cloud and NetApp bring SAP solutions to enterprise-class customers

Highlights

- Bring NetApp performance and durability to your SAP workloads on IBM Cloud
 - IBM and NetApp provide an enterprise foundation for SAP solutions
 - Deploy S4 HANA workloads while scaling up the storage platform on-demand
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Leverage the most powerful bare metal solutions for SAP with the flexibility, performance, and availability of NetApp services—all on IBM Cloud.

SAP solutions demand performance. They demand scale. They demand availability. And they are moving to cloud at an increasing pace. Without a capable enterprise cloud provider, the ability to deliver SAP services to the customer becomes a moot point. The key to success is the foundational function of compute and storage.

IBM Cloud is uniquely positioned with the most performant and capable certified SAP-certified bare metal solutions of any cloud provider. And with NetApp as IBM Cloud's storage provider for SAP, customers know they're getting an industry proven storage solution at scale on IBM Cloud.

As more enterprises move their critical applications to the cloud, they are looking for the right balance of control with ease of management. Building upon their years of industry partnership, IBM and NetApp have continued their innovation to deliver these needs of enterprise SAP customers in the IBM Cloud.

- Bare metal servers scaling up to 12TB of physical RAM and 224 CPU cores can tackle some of the most rigorous of S4 HANA databases.
- Cloud-based file and block storage services from NetApp capable of delivering as much as 180,000 IOPs exceeding the needs of such SAP functions as Business Warehouse.

- Deployment and management services from IBM Services to deliver the control and management specific to each enterprise.

When it comes to cloud implementations, SAP places strict requirements on the infrastructure. Not only must an SAP deployment have solid performance, it must meet availability KPIs (key performance indicators) as well. Depending on the deployed SAP modules, HANA in particular, there are two key components of the infrastructure, compute and storage, to meet KPIs. While network always plays an important component for moving data in and out of SAP nodes, the ability to manage a large in-memory database structure such as S4 HANA requires a critically large compute capability. In addition, the ability to take that database structure and move data between memory and storage efficiently is another primary requirement.

When deploying SAP solutions on IBM Cloud, enterprises should have the ability to build, operate and maintain control as they would on premises. In addition, these enterprise customers need to rely on IBM and NetApp to deliver cloud compute and data management services for maximum performance, scalability and availability while avoiding the day to day operation of cloud infrastructure.

Enterprise class hardware at scale

For the deployment of SAP solutions, IBM Cloud offers enterprises a broad range of industry leading infrastructure choices. Bare metal systems are certified for SAP workloads and provide the flexibility to deploy a small-scale system running as little as 4 CPU cores and 32GB of RAM for such capabilities as dev/test workloads. By contrast, IBM Cloud also offers the ability to deploy production capable systems as large as 224 CPU cores with 12TB of memory to address the largest of SAP HANA requirements.

For attached storage implementations, scale and performance can expand to 180,000 IOPS and 18TB for an individual storage mount **. This storage is built on NetApp enterprise class all-flash arrays delivering unmatched durability and scale. For the breadth of SAP workload types, customers can right size their storage footprint, growing and expanding for IOPs and size without service interruption.

SAP solutions on IBM Cloud can also be deployed on VMware's vSphere hypervisor platform. This platform is SAP certified specifically to run on IBM Cloud's NetApp file-based storage. Customers building SAP solutions can take advantage of VMware's high availability features and functions built into the platform.

** Allow list required for highest tier of storage scale and performance to ensure availability.

Storage Durability and Performance

As IBM Cloud's partner in delivering world-class storage at cloud scale, NetApp is known for its performance, consistency and reliability. IBM Cloud utilizes NetApp flash-backed enterprise class arrays to store, manage and maintain customer data for maximum durability. Utilizing file and block attached storage, enterprises on IBM Cloud can scale up and out on the platform as their SAP workload demand dictates. The NetApp storage platform is managed by IBM Cloud, including functions as QOS (quality of service), security and networking, allowing the customer to focus on managing the SAP application stack.

In addition to the workload demands of SAP, enterprise customers demand resiliency built into the storage systems. Since IBM Cloud storage is built on enterprise class NetApp storage, timely and consistent backups are a critical function that customers can rely on for any SAP deployment. IBM Cloud storage, powered by NetApp, offers customers the functionality of point in time snapshots to maintain data copies as needed. In addition, replication of snapshot data to another IBM Cloud zone ensures data can meet availability and recovery requirements.

Utilizing NetApp storage technology for SAP deployments

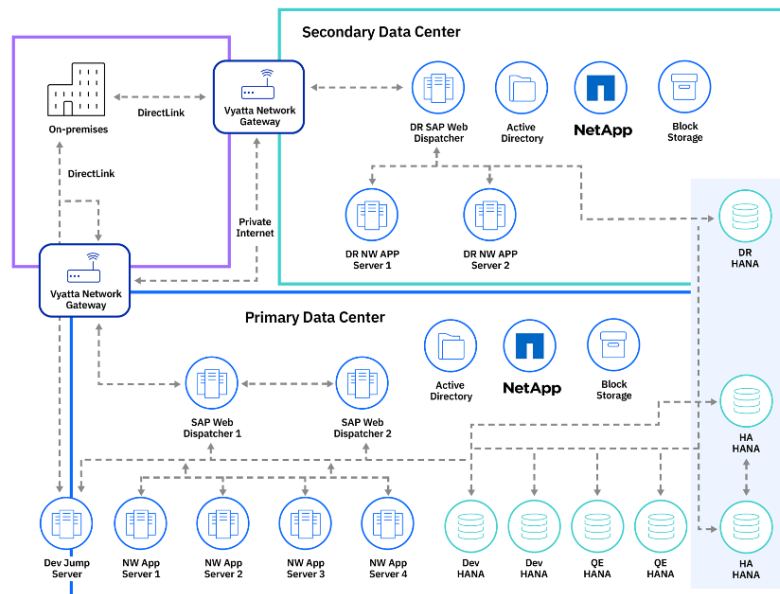
With NetApp technology, IBM Cloud abstracts the management and maintenance of the underlying storage away from the SAP deployments and the ongoing management. However, on the back end, the NetApp storage utilizes a logical abstraction and provides the capability to create storage pools and containers of storage pools. Within those containers of storage pools, QOS can be adjusted for the amount of capacity or the amount of throughput, or both.

Enterprises have the ability to fine tune the container characteristics to meet the requirements for their SAP deployment.

IBM Cloud SAP-certified high availability infrastructure reference architecture

IBM Cloud publishes the below reference architecture as a guide for customers deploying complex SAP infrastructure. This infrastructure has been tested, validated and certified to manage the breadth of SAP applications, notably the extreme demands for S4HANA implementations in a cloud environment. In addition, IBM Cloud, NetApp and SAP completed testing and certification of attached storage with specific configurations to meet enterprise needs.

Below is a high-level example of this reference architecture with NetApp storage within the infrastructure.



Reference architecture

Deployment of this reference architecture will require careful consideration to adhere to the required SAP performance KPI (key performance indicators).

Considerations for attached storage of SAP workloads

In addition to the local storage, customers may require additional external storage to perform functions such as backups or copying data between production, dev and test environments.

For these requirements, customers can order additional NetApp-based file (NFS) or block storage as described in [Storage](#). Since extra block storage and Network File System (NFS) data is transferred through the same physical adapters as all other network traffic, SAP performance characteristics should be kept in mind when moving large volumes of data.

For external storage and backup considerations, calculate the SAP project requirements before deciding on a storage solution. If you need to restore an SAP HANA system, then the IOPS of the storage have a significant influence on the restore window. Backup windows are not as critical with SAP HANA since all backups are online backups no matter how HANA is configured.

For example, using IBM Cloud Block or File Storage, customers can calculate for an approximate 12 TB restore of SAP HANA at maximum speed.

The 12 TB allows you 3x10 IOPS/GB, which is a total of 122,880 IOPS/GB at 16 KB. This gives a restore time of 1.875 GB per second, or a total restore time of below 2 hours. Since the measurement for the IOPS is taken at a 50/50 distribution of read and write, consider the numbers as a lower boundary of restore performance. It is advisable to perform backup and

restore tests to determine an optimal restore window.

Both IBM Cloud Block and File Storage running on NetApp infrastructure can serve as either backup space or as storage for additional software components that are installed on your server.

Considerations for deploying HANA in a multi-node, high availability solution using IBM Cloud storage backed by NetApp

There are specific performance criteria that must be met by the attached Network File System (NFS) volumes (see [Getting started with File Storage](#) for more information).

For /hana/data/ and /hana/log volumes, based on testing, 2 TB Endurance storage with a performance KPI of 10 IOPS/GB is required for each worker node. One additional volume of the same size is required as an SAP HANA /hana/shared/ volume and is shared by all nodes. Based on testing, the /hana/shared/ volume should be a Performance storage volume with 12 IOPS/GB.

For log volumes, one 512 GB volume of Performance storage is required for each node with a performance KPI of 10 K IOPS.

Follow the steps under [Provisioning and Managing Block Storage](#) or [Provisioning and Managing IBM Cloud File Storage](#) to order Endurance and Performance storage.

Follow the guidance in [SAP HANA on NetApp FAS Systems with NFS](#) to configure an SAP HANA multi-node system. Use the following Network File System (NFS) mount options for each volume to mount:

```
rw,bg,hard,timeo=600,intr,noatime,vers=4,minorversion=1,lock,rsize=1048576,wsiz=1048576  
in /etc/fstab.
```

These options have been tested and certified with SAP by NetApp and IBM Cloud.

IBM Cloud, NetApp and SAP continue to expand their partnership bringing performance, availability and flexibility to enterprises at scale. With class-leading options for bare metal and storage, customers have the confidence of IBM Cloud and NetApp to exceed their most demanding of SAP needs.

Why IBM?

With more than 46 years of SAP experience, IBM is a Global Platinum partner and one of SAP's most awarded associates.

IBM Cloud boasts some of the highest performing compute services in the cloud, far eclipsing the competition, holding 4 out of the top 5 SAP benchmark spots.

NetApp provides the high performance, high availability file and block attached services on IBM Cloud to meet certified SAP solution requirements.

For more information

To learn more about NetApp on IBM Cloud, please contact your IBM representative or IBM Business Partner, or visit ibm.com/cloud/netapp

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