



Design

FlexPod

NetApp
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Design

The architecture of FlexPod for MEDITECH is based on guidance from MEDITECH, Cisco, and NetApp and from partner experience in working with MEDITECH customers of all sizes. The architecture is adaptable and applies best practices for MEDITECH, depending on your data center strategy; the size of your organization; and whether your system is centralized, distributed, or multitenant.

The correct storage architecture can be determined by the overall size with the total IOPS. Performance alone is not the only factor, and you might decide to use a larger node count based on additional customer requirements. The advantage of using NetApp storage is that you can easily and nondisruptively scale up the cluster as your requirements change. You can also nondisruptively remove nodes from the cluster to repurpose equipment or during equipment refreshes.

Here are some of the benefits of the NetApp ONTAP storage architecture:

- **Easy, nondisruptive scale-up and scale-out.** You can upgrade, add, or remove disks and nodes by using ONTAP nondisruptive operations. You can start with four nodes and move to six nodes or upgrade to larger controllers nondisruptively.
- **Storage efficiencies.** Reduce your total capacity requirements with deduplication, NetApp FlexClone, inline compression, inline compaction, thin replication, thin provisioning, and aggregate deduplication. The FlexClone capability enables you to almost instantly create clones to support backup and testing environment refreshes. These clones consume more storage only as changes are made.
- **Disaster recovery shadow database server.** The disaster recovery shadow database server is part of your business continuity strategy (used to support storage read-only functionality and potentially configured to be a storage read/write instance). Therefore, the placement and sizing of the third storage system are usually the same as in your production database storage system.
- **Database consistency (requires some consideration).** If you use NetApp SnapMirror backup copies in relation to business continuity, see [TR-3446: SnapMirror Async Overview and Best Practices Guide](#).

Storage layout

Dedicated aggregates for MEDITECH hosts

The first step toward meeting MEDITECH's high-performance and high-availability requirements is to properly design the storage layout for the MEDITECH environment to isolate the MEDITECH host production workload onto dedicated, high-performance storage.

One dedicated aggregate should be provisioned on each storage controller for storing the program, dictionary, and data files of the MEDITECH hosts. To eliminate the possibility of other workloads using the same disks and affecting performance, no other storage is provisioned from these aggregates.



Storage that you provision for the other MEDITECH servers should not be placed on the dedicated aggregate for the LUNs that are used by the MEDITECH hosts. You should place the storage for other MEDITECH servers on a separate aggregate. Storage requirements for other MEDITECH servers are available in the “Hardware Configuration Proposal” (for new deployments) and “Hardware Evaluation Task” (for existing deployments) documents. You can obtain these documents from MEDITECH through the MEDITECH system integrator or from your MEDITECH Technical Account Manager (TAM). NetApp solutions engineers might consult with the NetApp MEDITECH Independent Software Vendor (ISV) team to facilitate a proper and complete NetApp storage sizing configuration.

Spread MEDITECH host workload evenly across all storage controllers

NetApp FAS and AFF systems are deployed as one or more high-availability pairs. NetApp recommends that you spread the MEDITECH Expanse and 6.x workloads evenly across each storage controller to apply the compute, network, and caching resources on each storage controller.

Use the following guidelines to spread the MEDITECH workloads evenly across each storage controller:

- If you know the IOPS for each MEDITECH host, you can spread the MEDITECH Expanse and 6.x workloads evenly across all storage controllers by confirming that each controller services a similar number of IOPS from the MEDITECH hosts.
- If you do not know the IOPS for each MEDITECH host, you can still spread the MEDITECH Expanse and 6.x workloads evenly across all storage controllers. Complete this task by confirming that the capacity of the aggregates for the MEDITECH hosts is evenly distributed across all storage controllers. By doing so, the number of disks is the same across all data aggregates that are dedicated to the MEDITECH hosts.
- Use similar disk types and identical RAID groups to create the storage aggregates of both controllers for distributing the workloads equally. Before you create the storage aggregate, contact a NetApp Certified Integrator.



According to MEDITECH, two hosts in the MEDITECH system generate higher IOPS than the rest of the hosts. The LUNs for these two hosts should be placed on separate storage controllers. You should identify these two hosts with the assistance of the MEDITECH team before you deploy your system.

Storage Placement

Database storage for MEDITECH hosts

The database storage for a MEDITECH host is presented as a block device (that is, a LUN) from the NetApp FAS or AFF system. The LUN is typically mounted to the Windows operating system as the E drive.

Other storage

The MEDITECH host operating system and the database application normally generate a considerable amount of IOPS on the storage. Storage provisioning for the MEDITECH host VMs and their VMDK files, if necessary, is considered independent from the storage that is required to meet the MEDITECH performance thresholds.

Storage that is provisioned for the other MEDITECH servers should not be placed on the dedicated aggregate for the LUNs that the MEDITECH hosts use. Place the storage for other MEDITECH servers on a separate aggregate.

Storage controller configuration

High availability

To mitigate the effect of controller failure and to enable nondisruptive upgrades of the storage system, you should configure your storage system with controllers in a high-availability pair in the high-availability mode.

With the high-availability controller pair configuration, disk shelves should be connected to controllers by multiple paths. This connection increases storage resiliency by protecting against a single-path failure, and it improves performance consistency if a controller failover occurs.

Storage performance during storage controller failover

For storage systems that are configured with controllers in a high-availability pair, in the unlikely event of a controller failure, the partner controller takes over the failed controller's storage resources and workloads. It is important to consult the customer to determine the performance requirements that must be met if there is a controller failure and to size the system accordingly.

Hardware-assisted takeover

NetApp recommends that you turn on the hardware-assisted takeover feature on both storage controllers.

Hardware-assisted takeover is designed to minimize the storage controller failover time. It enables one controller's Remote LAN Module or Service Processor module to notify its partner about a controller failure faster than a heartbeat timeout trigger can, reducing the time that it takes to failover. The hardware-assisted takeover feature is enabled by default for storage controllers in a high-availability configuration.

For more information about hardware-assisted takeover, see the [ONTAP 9 Documentation Center](#).

Disk type

To support the low read latency requirement of MEDITECH workloads, NetApp recommends that you use a high-performance SSD for aggregates on AFF systems that are dedicated for the MEDITECH hosts.

NetApp AFF

NetApp offers high-performance AFF arrays to address MEDITECH workloads that demand high throughput and that have random data access patterns and low-latency requirements. For MEDITECH workloads, AFF arrays offer performance advantages over systems that are based on HDDs. The combination of flash technology and enterprise data management delivers advantages in three major areas: performance, availability, and storage efficiency.

NetApp Support tools and services

NetApp offers a complete set of support tools and services. The NetApp AutoSupport tool should be enabled and configured on NetApp AFF/FAS systems to call home if there is a hardware failure or system misconfiguration. Calling home alerts the NetApp Support team to remediate any issues in a timely manner. NetApp Active IQ is a web-based application that is based on AutoSupport information from your NetApp systems providing predictive and proactive insight to help improve availability, efficiency, and performance.

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