

Module 1

ONTAP integrated data protection

About this module

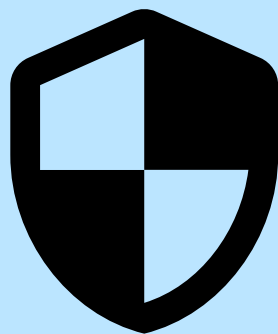
This module focuses on enabling you to do the following:

- Explain the importance of a data protection strategy
- Describe the integrated data protection features in NetApp ONTAP 9 software
- Identify the tools for managing and monitoring ONTAP 9 data protection features



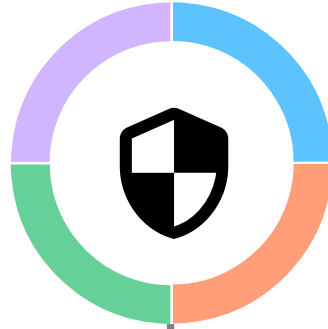
Lesson 1

Data protection overview



Data protection is a set of principles, strategies, and processes that secure the privacy, integrity, and availability of data.

Importance of data protection



A data protection strategy is essential for



Disaster
recovery



Protection against
external threats

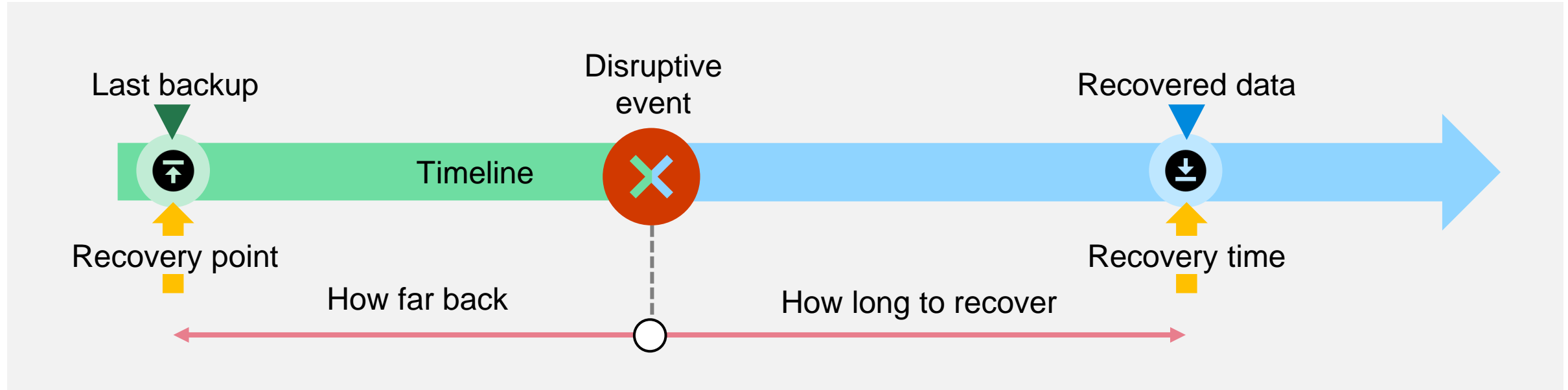


Protection against
internal threats



Regulatory
compliance

Data protection metrics



Recovery point objective (RPO)

The maximum acceptable amount of data that can be lost if a failure occurs

Recovery time objective (RTO)

The maximum acceptable amount of time that can elapse before data is made available after a failure

Data protection requirements

Data availability

Data must remain available if a hardware failure occurs.

Business continuity and disaster recovery

Data must remain available if a disaster occurs and business operations continue during the disaster.

Data recoverability

Data must be quickly and efficiently copied and restored locally and remotely.

Security and compliance

Data must be secured against unauthorized access, modification, and deletion.

You must comply with data retention and security regulations.

Data protection mechanisms



High availability

Data availability is enabled through mechanisms and technologies for nondisruptive operations and fault tolerance.



Business continuity and disaster recovery

Disaster recovery is enabled by replicating data (synchronously or asynchronously) to a disaster recovery site.



Backup and archive

Data restore and long-term data retention are enabled through data backup and archive.



Cloud-based data protection


Data protection is enabled through backup, archive, and replication to the cloud or to a site near the cloud.



Security and compliance

Data security and compliance are enabled by various mechanisms and technologies that protect data against unauthorized access and change.

Data protection management



Lesson 2

ONTAP data protection solutions

Your data fabric powered by NetApp

Connect data everywhere...

Multicloud
Public cloud



Extend your enterprise
to the cloud.

*Run workloads natively on the
leading public clouds.*



Enterprise IT

Modernize
your environment
more efficiently.

Employ world-leading flash solutions.



Operate like a
cloud on premises.

*Build your private cloud
and connect it everywhere.*



Private cloud

...based on business objectives and priorities.

NetApp unlocks the best of cloud

Discover | Integrate | Automate | Optimize | Protect | Secure

ONTAP data management software

Simplify data management for any application from edge to core to cloud



ORACLE



vmware



ONTAP 9 software



On premises



FAS and AFF



FlexPod
solution



In the cloud



NetApp Cloud Volumes ONTAP



Common data management and services

ONTAP data protection solutions



High availability

NVRAM
High-availability (HA)
pair
RAID
SyncMirror feature



Business continuity and disaster recovery

SnapMirror
Asynchronous

SnapMirror
Synchronous (SM-S)

MetroCluster software

SnapMirror Business
Continuity



Backup and archive

ONTAP Snapshot
technology

NDMP
(SMTape and dump)

NetApp SnapCenter
software



Cloud-based data protection

Cloud Volumes
ONTAP

SnapMirror Cloud

NetApp Cloud
Backup service

NetApp Cloud Sync
service



Encryption and compliance

Data-at-rest
encryption solution
(NSE*, NVE*, and NAE*)

Data-in-flight
encryption solution
(NFS, SMB, and
replication)

SnapLock WORM
storage solution



ONTAP data protection solutions

High availability

Feature	Protection
NVRAM	Sends a write acknowledgment to the host or client before committing the write to the drive
HA pair	Provides data availability if a controller fails <i>NetApp AFF All SAN Array (ASA) provides continuous data availability, as it provides symmetric HA operations.</i>
NetApp RAID DP or RAID-TEC technology	Protects against data loss due to two-drive or three-drive failure
SyncMirror feature	Provides synchronous aggregate-level mirroring for MetroCluster configurations, NetApp ONTAP Select software, and Cloud Volumes ONTAP



ONTAP data protection solutions

Business continuity and disaster recovery

Feature	Protection
SnapMirror Asynchronous	Provides asynchronous data replication at the level of the volume and the storage VM for data movement and disaster recovery
SM-S	Provides synchronous data replication at the level of the volume
SnapMirror Business Continuity	Provides continuous availability for business-critical SAN applications
MetroCluster software	Provides near-zero RTO and RPO disaster recovery



ONTAP data protection solutions

Backup and archive

Feature	Protection
ONTAP Snapshot technology	Point-in-time, volume-level copy
NDMP (SMTape and dump)	Tape backup and restore that uses an NDMP-compliant backup application
SnapCenter software	Centralized data protection and clone management with a single interface across all application environments



ONTAP data protection solutions

Cloud-based data protection

Feature	Protection
Cloud Volumes ONTAP	Mirrors data from on-premises ONTAP systems to public cloud storage resources that Cloud Volumes ONTAP software controls
SnapMirror Cloud	Provides asynchronous Snapshot replication from ONTAP software to object storage endpoints
Cloud Backup service	An add-on service for Cloud Volumes ONTAP and on-premises ONTAP clusters that delivers backup and restore capabilities for protection and long-term archive of data
Cloud Sync service	Easy-to-use cloud replication and synchronization service for transferring NAS data between on-premises and cloud object stores



ONTAP data protection solutions

Security and compliance

Feature	Protection
NSE	Full disk encryption (FDE) that uses self-encrypting disks
NVE	Software-based technology for encrypting data at rest, one volume at a time
NAE	Aggregate-level encryption to encrypt volumes by assigning keys to the containing aggregate
SnapLock compliance software	High-performance data permanence solution to meet external and internal requirements for keeping electronic records unalterable and rapidly accessible

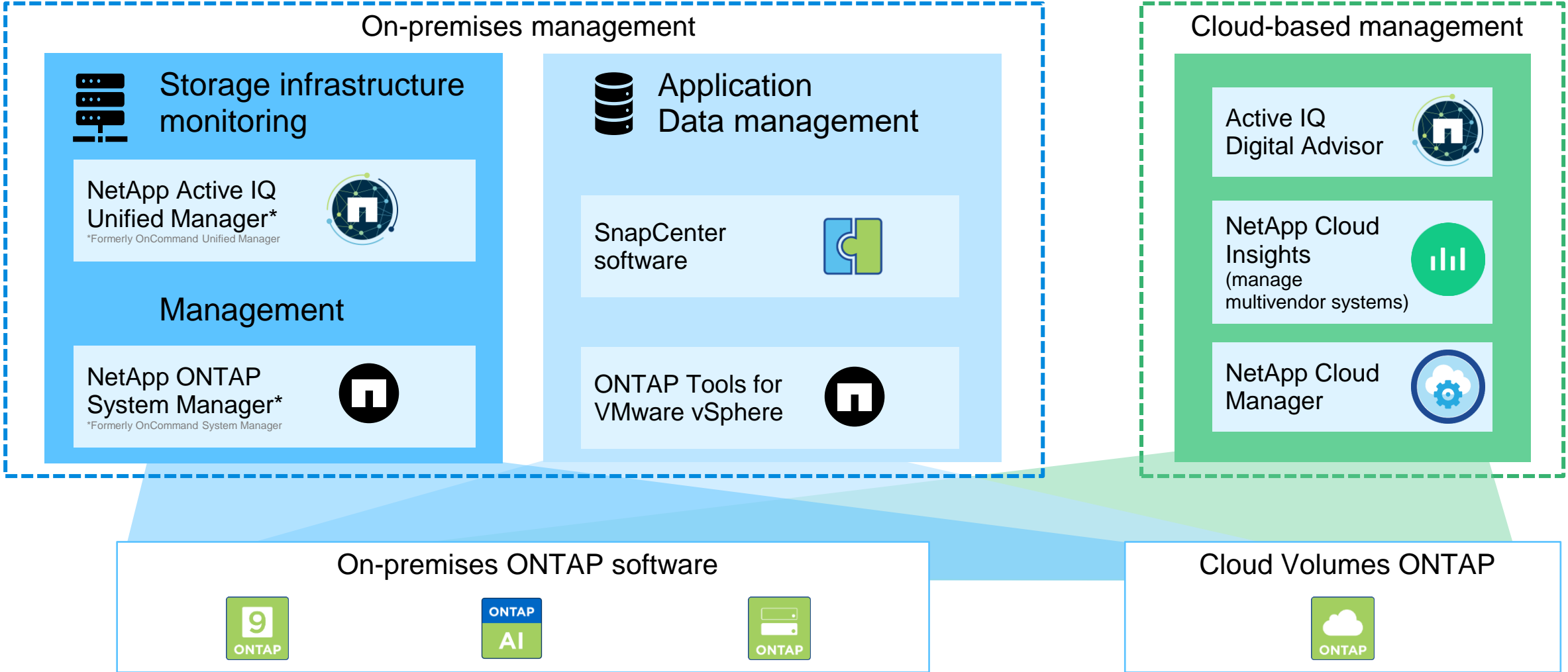


Lesson 3

Data protection management solutions

NetApp management software for hybrid cloud infrastructure

Simplicity and efficiency in data center and cloud operations



ONTAP RESTful API

- Enables automation and simplification of ONTAP system administration:
 - Request and response API transaction
 - Support for create, read, update, and delete (CRUD) operations
 - Object identifiers
 - Synchronous and asynchronous operations
 - Security features
- Manages several ONTAP resources categories



Category	Description
/cluster	Manage cluster, licensing, jobs, nodes, schedules, and software
/storage	Manage drive, aggregates, volumes, LUNs, NetApp Snapshot copies, qtrees, and quotas
/svm	Manage storage VMs and storage VM peering
/snapmirror	Manage the data protection policies and relationships
/snaplock	Manage compliance solutions that use WORM storage

Application and database backup

SnapCenter software

Application-focused backup management



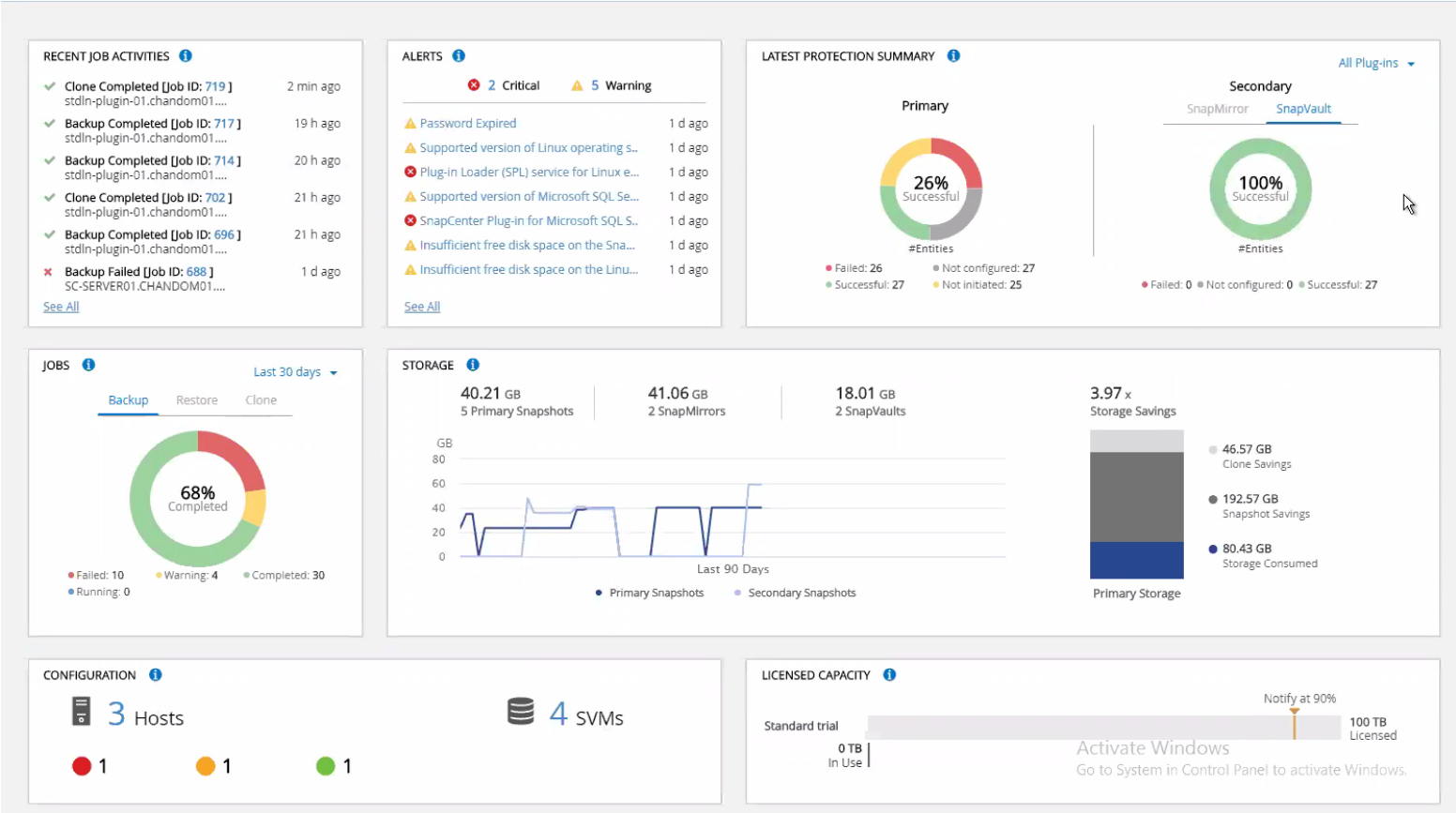
IT generalist or administrator

Integration with third-party solutions



IT generalist or backup administrator

SnapCenter software



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Third-party software

Application-focused backup management



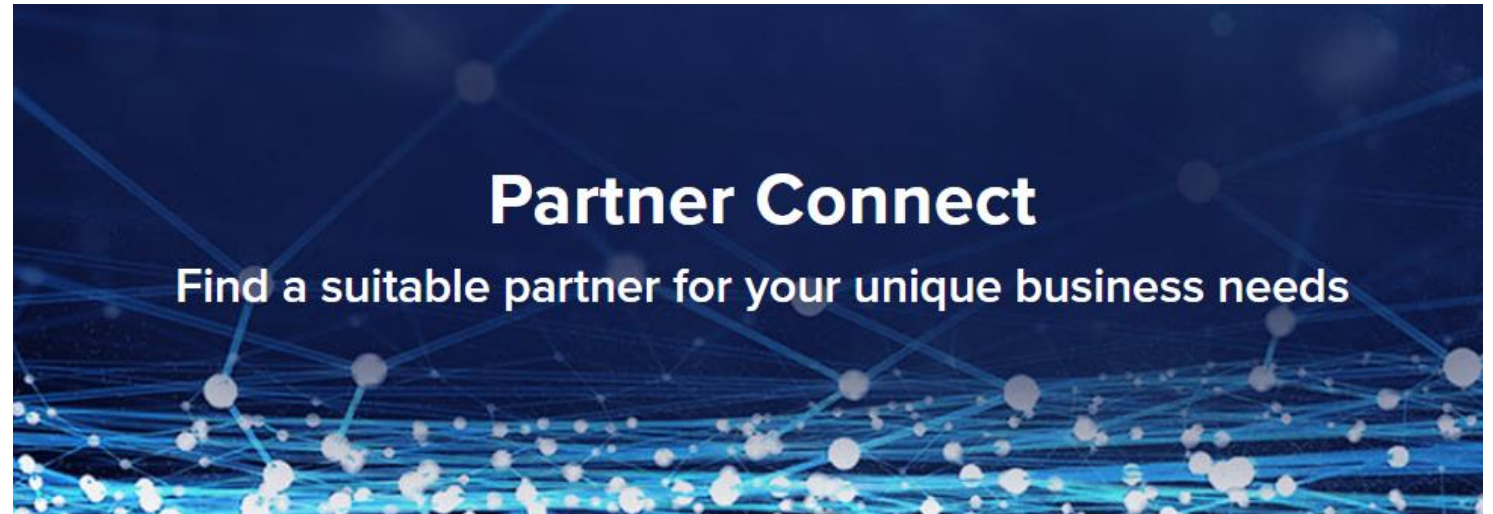
IT generalist or administrator

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IT generalist or backup administrator

For detailed information about partner software, visit partner websites.



COMMVAULT 

VEEAM

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Resources

- NetApp data protection solutions
<https://netapp.com/data-protection>
- NetApp Cloud Central
<https://cloud.netapp.com>
- NetApp product documentation
<https://www.netapp.com/support-and-training/documentation/>
- ONTAP 9 Documentation Center
<https://docs.netapp.com/ontap-9/index.jsp>
- ONTAP release notes
https://library.netapp.com/ecm/ecm_download_file/ECMLP2492508
- ONTAP automation documentation
<https://docs.netapp.com/us-en/ontap-automation/index.html>
- NetApp Interoperability Matrix Tool (IMT)
<https://mysupport.netapp.com/matrix>

Additional learning

- *ONTAP Data Protection Fundamentals* (eLearning)
- *NetApp Public Cloud Services Fundamentals* (eLearning)
- *ONTAP Compliance Solutions Administration* (On Demand Classroom)

Module summary

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An abstract graphic in the top right corner consisting of a grid of teal-colored cubes. The cubes are arranged in a way that creates a sense of depth and perspective, with some cubes appearing to float or be stacked on top of others. The overall effect is a modern, architectural design element.

Knowledge check

Module 1: ONTAP integrated data protection

Knowledge check

Which ONTAP software feature provides volume-level synchronous data replication?

- a. SnapCenter
- b. SnapMirror
- c. SyncMirror
- d. Snapshot

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- a. MetroCluster software
- b. SnapLock software
- c. RAID DP technology
- d. ONTAP Snapshot feature

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- a. SnapLock software
- b. NetApp Storage Encryption
- c. NetApp Volume Encryption
- d. NetApp Aggregate Encryption

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Knowledge check

Which NetApp product provides application-consistent data protection for applications and databases?

- a. SnapLock software
- b. SnapMirror software
- c. SnapCenter software
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