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Disaster Recovery Guide for the ETERNUS series with Veeam Backup & Replication

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FUJITSU LIMITED

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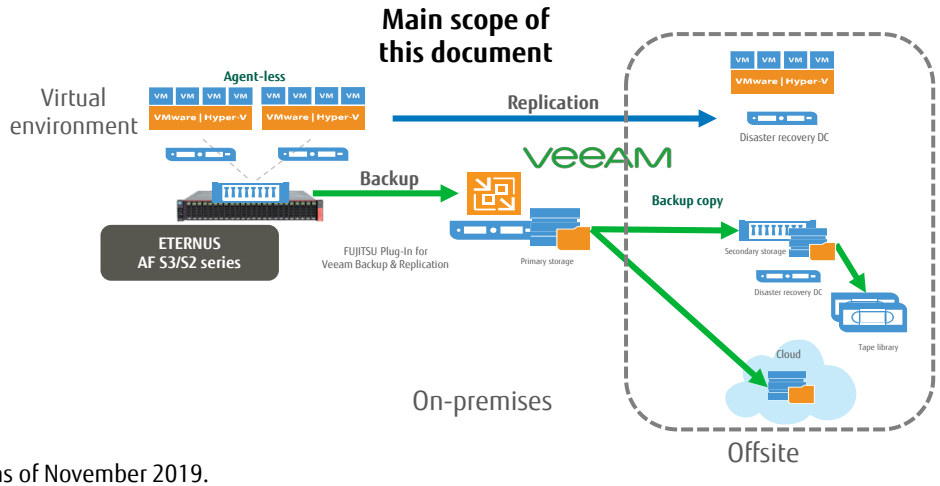
Purpose of this document

In addition to major earthquakes in Japan, various disasters are occurring at an increased rate all around the world. With this knowledge, disaster prevention awareness has increased and natural disasters can no longer be blamed for the loss of data entrusted by customers.

This document is for system administrators who are considering the use of all-flash arrays with Veeam Backup & Replication.
This document also describes disaster recovery examples performed through WAN and their main configuration points.

Main applicable models	
AF series	ETERNUS AF650 S3/S2 (Mid-range)
	ETERNUS AF150 S3, ETERNUS AF250 S3/S2 (Entry)
DX series	ETERNUS DX200 S5/S4 (Entry)



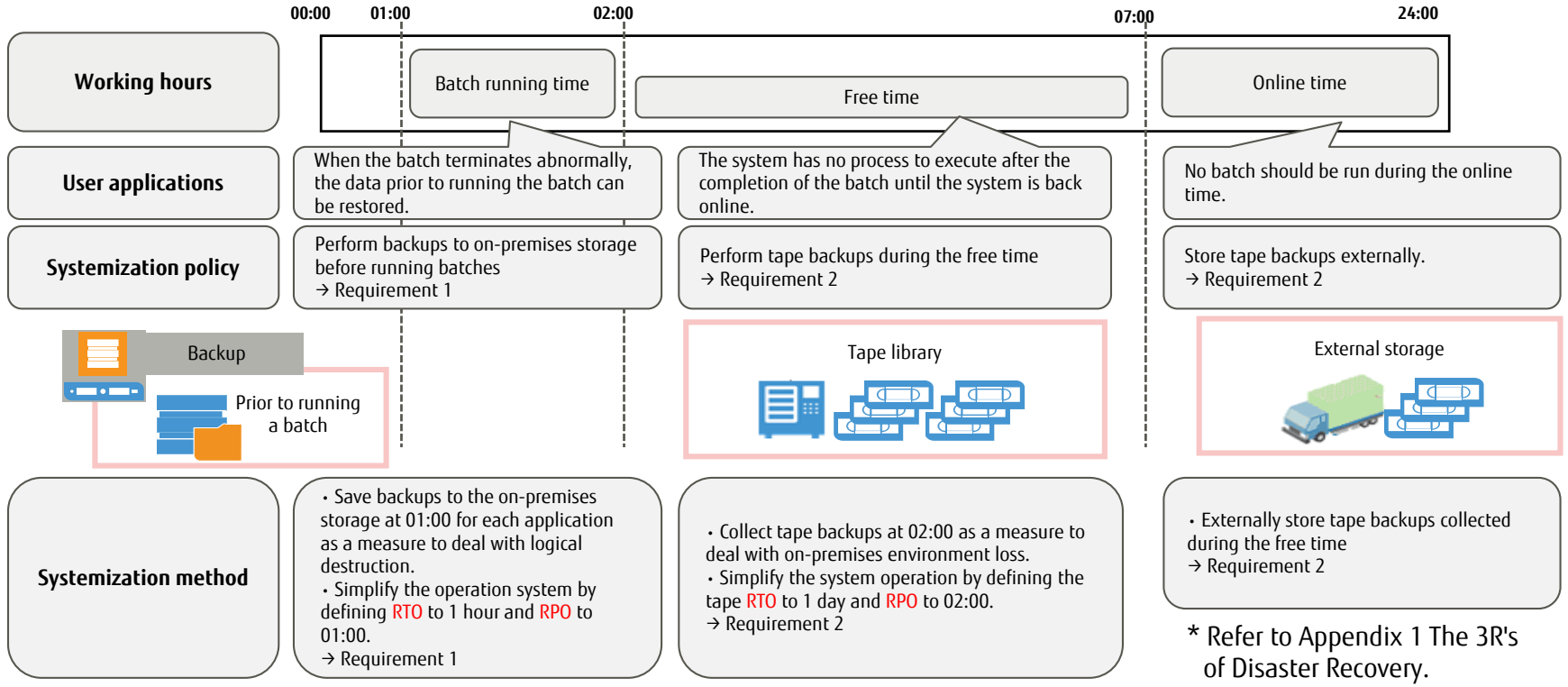
* This document is based on the product lineup and product information as of November 2019.

2. Examining disaster recovery requirements

In anticipation of a disaster, the RPO* (data freshness when resuming operations) and RTO* (time until operations are resumed) change according to the system requirements, the devices to be used, the network configuration, and how the system is operated. Disaster recovery refers to examining and defining these changing RPO and RTO, the system configuration, and the operation. Examine and define the requirements as shown in the following example.

Cost-oriented disaster recovery requirements

Item No	Requirement	Measures to examine
1	**Collect backups that allow restoration as soon as possible**	Measures to deal with logical destruction of user applications
2	**Prevent data loss during a disaster**	Measures assuming wide-area disasters and considering the RPO (data freshness)



* Refer to Appendix 1 The 3R's of Disaster Recovery.

3. Determining disaster recovery measures

When determining disaster recovery measures, the following items must, at the very least, be compared and examined. "Remote storage" stores system backups at remote locations and "operation site switching" replicates systems at a remote site.

Measures	Remote storage	Operation site switching
Overview	Store backups in disaster-free locations	Replicate systems in disaster-free locations
Execution of measures	Achieve recovery by restoring remotely stored backups.	Switch the systems to disaster-free sites.
Site dependence	System operation depends on the operation site equipment.	System operation needs to run independent of the operation site.
Notes	Considered as part of a site recovery. Only specific parts within the system are recovery targets.	Focuses mainly on system continuity (RTO*). Another focal point is operation level (RLO*).

* Refer to Appendix 1 The 3R's of Disaster Recovery.

4. Specifying the 3R's of disaster recovery

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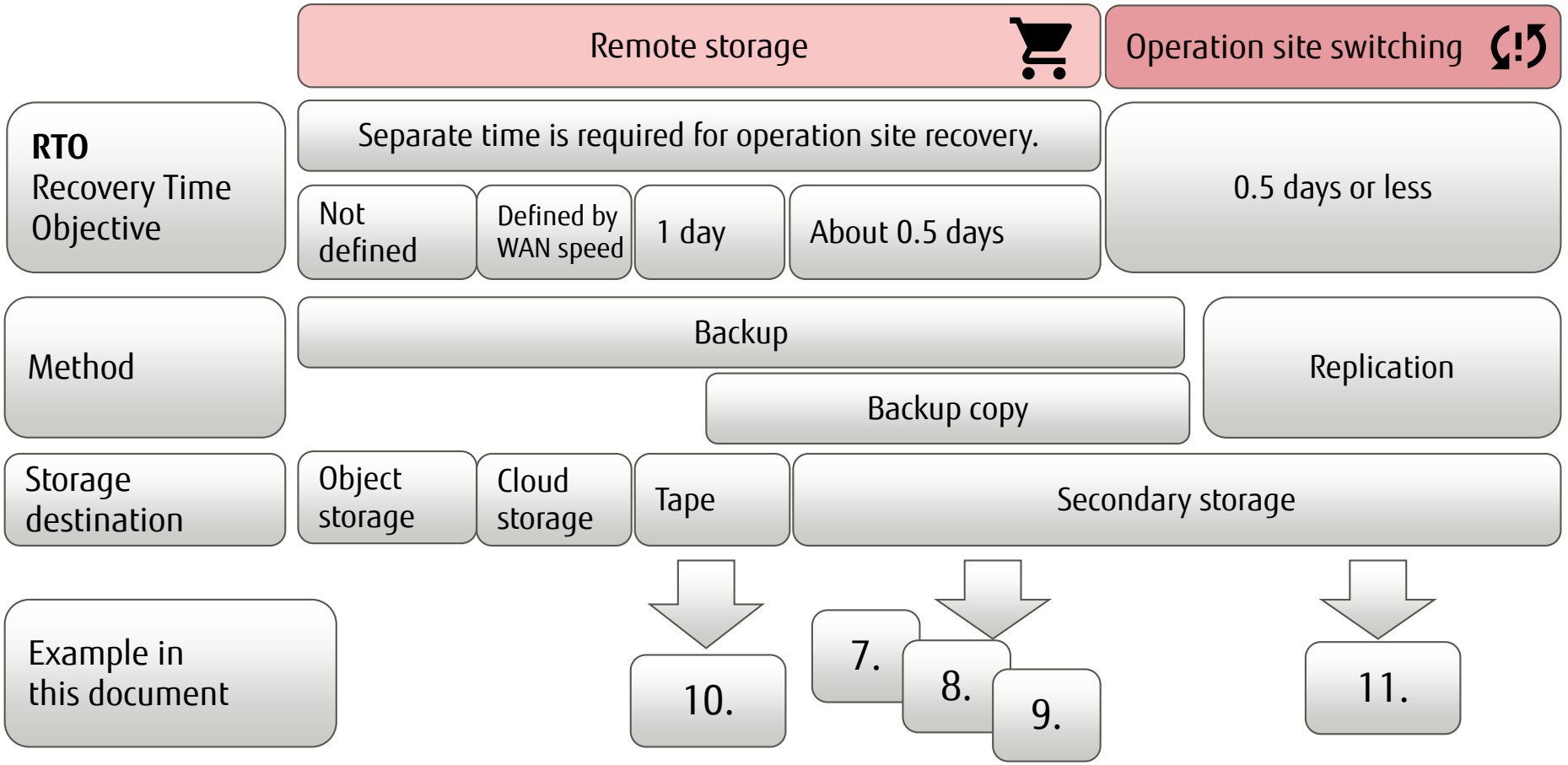
The guidelines for specifying the 3R's* of disaster recovery according to the customer's business are shown below.
There are RLOs that define when to switch operation sites and RTOs that greatly affect costs.

RLO Recovery Level Objective	Recovery by restoring to the operation site. Basically the same as the pre-disaster RLO.	"Processing capacity level" and "quality level" must be defined for each system at the switching destination.
RPO Recovery Point Objective	Static The backup point is the RPO.	Dynamic Best effort
RTO Recovery Time Objective	Separate time is required for operation site recovery. Not defined / Defined by line speed / 1 day / About 0.5 days	0.5 days or less
Disaster recovery measures	Remote storage	Operation site switching

* Refer to Appendix 1 The 3R's of Disaster Recovery.

5. Systemization method centered on RTO

For remote storage, RTOs are usually defined in terms of relative time at the site. In this case, operation site recovery is treated separately and recovery of specific parts within the system is defined.
Regardless of whether operation switching is planned, the decision to actually implement it is made during the operation-side meetings. Therefore, a PRO is usually the time for recovery after the decision is made.
From the above point of view, compare "remote storage" and "operation site switching".



6. Disaster recovery plans

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The following table shows disaster recovery plans that use the ETERNUS with Veeam Backup & Replication. Reference this table when considering disaster recovery.

Section No.	Disaster recovery measures	Disaster recovery plan	RPO	RTO (typical)
7.	Remote storage	Direct remote storage with backup	Point where backups are saved to on-premises storage	Time to transfer backups through WAN and then restore (roughly about 0.5 days)
8.	Remote storage	Remote storage with backup copying	Point where backups are saved to on-premises storage	Time to transfer backups through WAN and then restore (roughly about 0.5 days)
 9.	Remote storage	Deduplication appliance linkage	Point where backups are saved to on-premises storage	Time to transfer backups through WAN and then restore (roughly about 0.5 days)
10.	Remote storage	Large-capacity, multi-generational, long-term storage to tape	Point where backups are saved to on-premises storage	Time to extract a backup from tape, transfer it through WAN and then restore (roughly about 1 day)
11.	Operation site switching	Minimizing RPOs	Only data not transferred through WAN	Only data not transferred through WAN

7. Direct remote storage with backup

Remote storage

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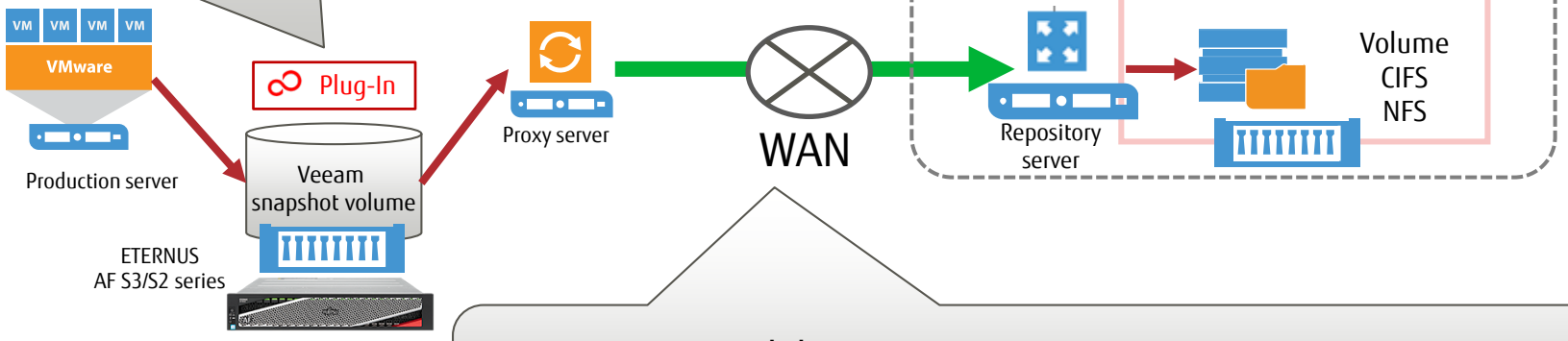
This plan is to keep RPOs separate from on-premises backups for remote storage.
Whether on-premises or off-premises, the RPO is the backup point for each backup, but the faster the restore, the shorter the RTO. Consider RPOs and RTOs carefully before deciding on the operation.

1. A backup is performed with a storage snapshot.
   The load is offloaded to the on-premises storage and the production server VMs are released.



WAN capacity guideline =
(Total amount of data updated per day [MB] / Backup window [Time]) / 3600 × 8
Take compression and deduplication into consideration for this calculation.

Products that configure storage snapshots
- ETERNUS AF S3/S2 series
- FUJITSU Plug-In for Veeam Backup & Replication
- Veeam Backup & Replication

Devices required offsite
- Repository server
- Repository storage (volume, CIFS, NFS)

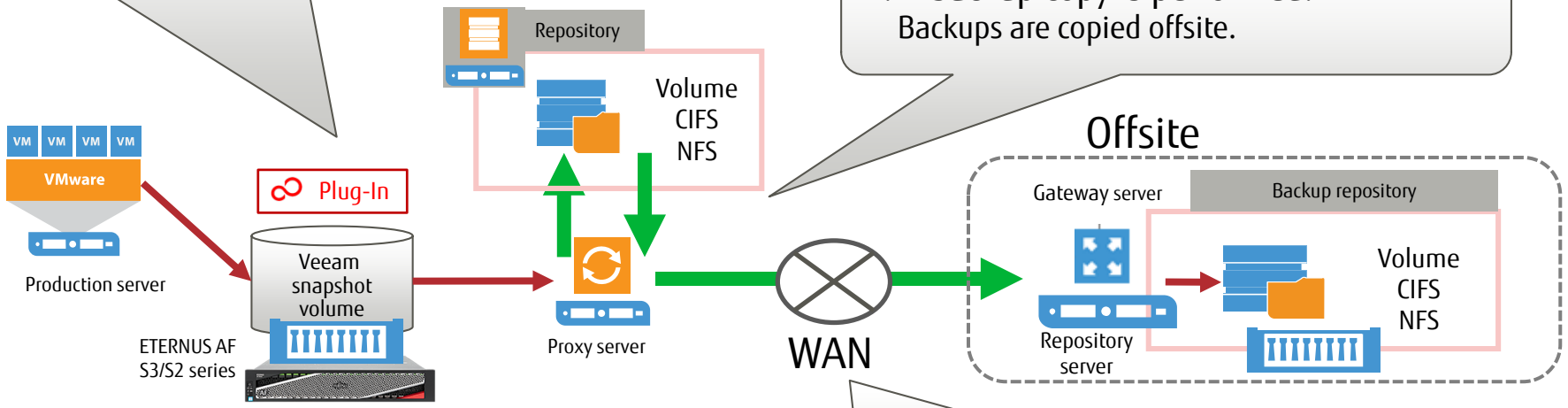
8. Remote storage with backup copying

Remote storage

This plan in its most orthodox form sends the on-premises backups offsite using the backup copy function of Veeam Backup & Replication.
RPOs are backup points where backups are saved to an on-premises storage, offloading the remote storage load from the production servers.

1. A backup is performed with a storage snapshot.
The load is offloaded to the on-premises storage and the production server VMs are released.

2. A backup copy is performed.
Backups are copied offsite.



Same as WAN capacity guideline in
7. Direct remote storage with backup

Products that configure storage snapshots
- ETERNUS AF S3/S2 series
- FUJITSU Plug-In for Veeam Backup & Replication
- Veeam Backup & Replication

Devices required offsite
- Repository server
- Repository storage (volume, CIFS, NFS)

9. Deduplication appliance linkage

Remote storage

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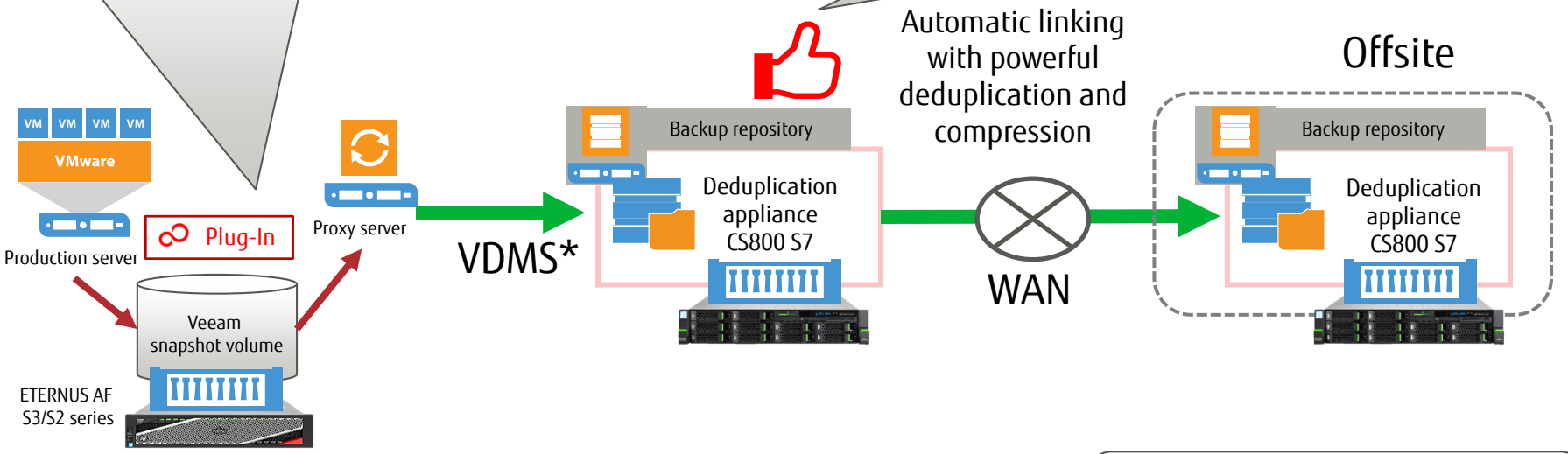
This plan, which is simple yet highly functional for on-premises backups, reduces data volume by 90% or more using the powerful deduplication and compression functions of the ETERNUS CS800 S7 deduplication appliance and automatically links differential data offsite.

1. A backup is performed with a storage snapshot.
The load is offloaded to the on-premises storage and the production server VMs are released.

2. Data is automatically linked offsite by the linkage function of the deduplication appliance.



Products that configure storage snapshots
- ETERNUS AF S3/S2 series
- ETERNUS CS800 S7
- FUJITSU Plug-In for Veeam Backup & Replication
- Veeam Backup & Replication

Devices required offsite
- ETERNUS CS800 S7

* Veeam Data Mover Service
For models other than ETERNUS CS800 S7 flex or higher, an additional server for use as a gateway is required.

10. Large-capacity, multi-generational, long-term storage to tape

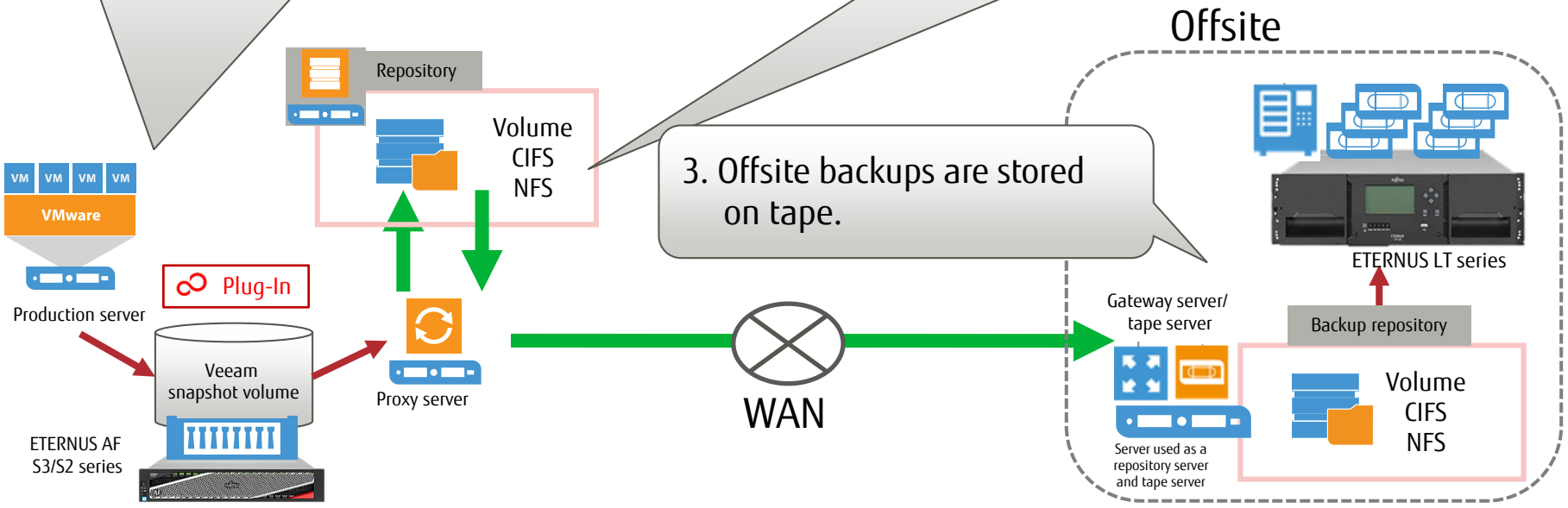
Remote storage

This plan uses a tape library as the storage location when a large backup capacity, multi-generational management, or long-term storage is required.

1. A backup is performed with a storage snapshot.
The load is offloaded to the on-premises storage and the production server VMs are released.

2. A backup copy is performed.
Backups are copied offsite.

3. Offsite backups are stored on tape.



Products that configure storage snapshots

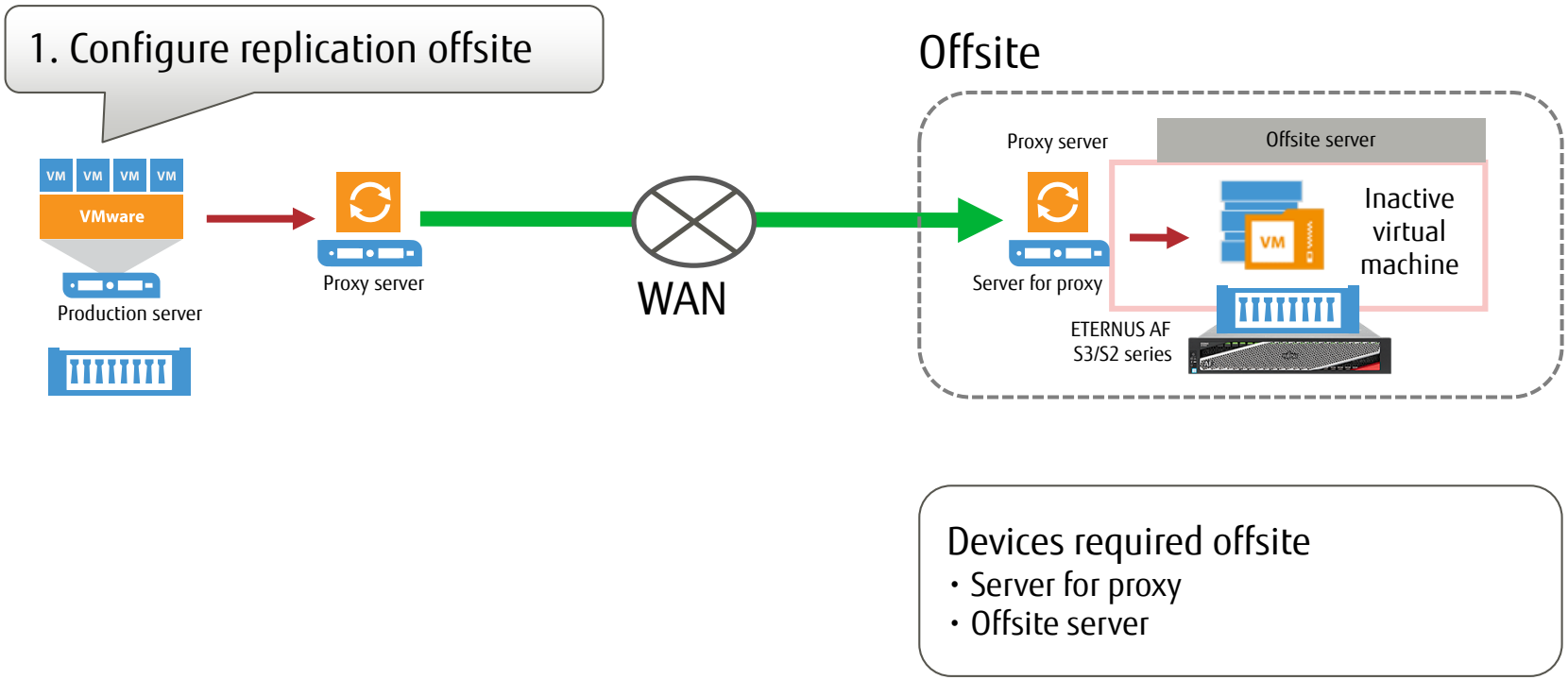
- ETERNUS AF S3/S2 series
- FUJITSU Plug-In for Veeam Backup & Replication
- Veeam Backup & Replication

Devices required offsite

- ETERNUS LT series
- Server used as a repository server and tape server
- Repository storage (volume, CIFS, NFS)

11. Minimizing RPOs

To minimize RPOs, production server VMs are replicated offsite with Veeam Backup & Replication.
Consider using Veeam provided replica mapping and WAN accelerators to increase WAN efficiency.



Devices required offsite
- Server for proxy
- Offsite server

12. Products described in this document

- Details of the products described in this document can be found at the following websites.

  - Veeam Backup & Replication
    https://www.veeam.com/

  - FUJITSU Plug-In for Veeam Backup & Replication download
    https://www.fujitsu.com/global/support/products/computing/storage/download/veeam/index.html
    A Veeam account is required. If you do not have an account, proceed after user registration.

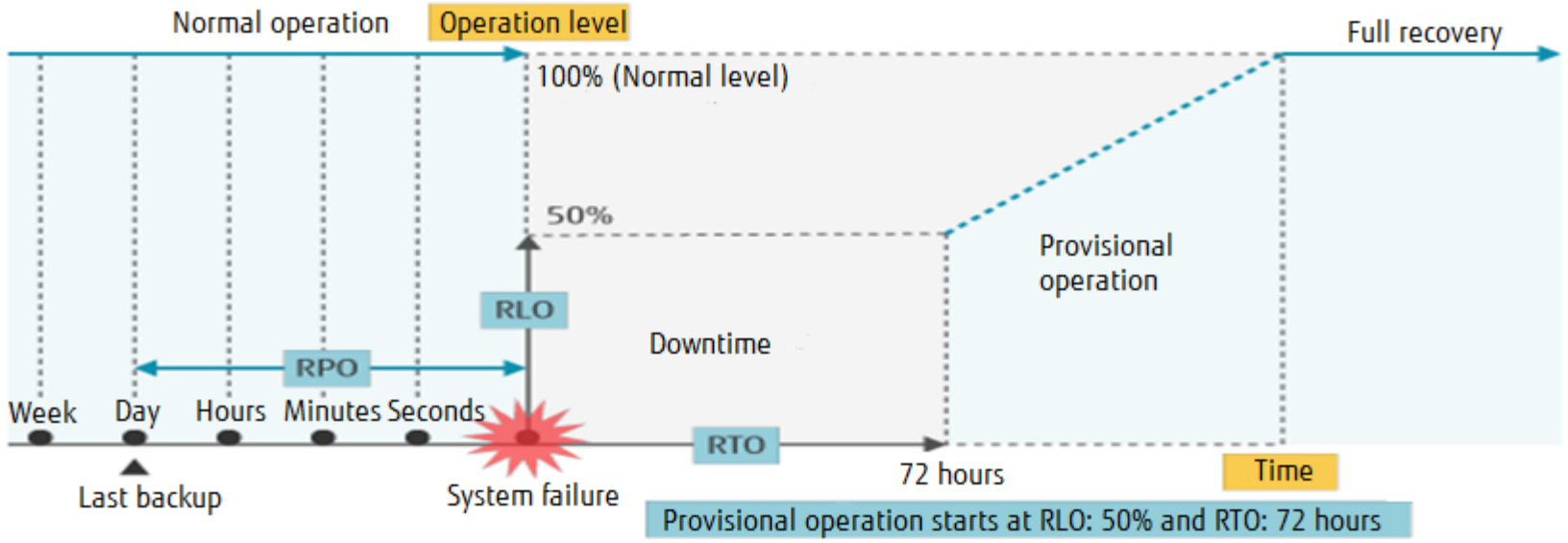
  - FUJITSU Storage ETERNUS series
    https://www.fujitsu.com/global/products/computing/storage/

Appendix 1. The 3R's of Disaster Recovery

RLO, RPO, and RTO, which are important indicators for business continuity and disaster recovery, are explained below.

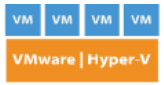
RLO Recovery Level Objective	Target value that specifies the level at which the system is to be recovered, and the operations and services to be resumed
RPO Recovery Point Objective	Target value that specifies the data recovery point
RTO Recovery Time Objective	Target value that specifies the approximate recovery time (by when)

Definition example of the 3 R's



Appendix 2. Veeam Document Icons

The icons used in Veeam documents and their meanings are shown below.

Hardware	Icon	Hardware	Icon
VMware/Hyper-V		Physical server	
Storage (primary, secondary)		Tape	

Veeam component	Icon	Functions
Veeam Backup Server (VM)		A Windows-based VM installed with Veeam Backup & Replication. Coordinates backup, replication, recovery verification, and restore tasks. Controls job scheduling and resource allocation. Used to set up and manage components.
Backup Proxy		A component that processes jobs and delivers backup traffic. Primarily retrieves VM data from storage and then compresses, deduplicates, encrypts, and sends that data to a backup repository or another backup proxy.
Backup Repository		A storage location or network share (CIFS or NFS) that can keep backup files, VM copies, and metadata for replicated VMs.

Appendix 3. Operation Support and Verification Tools

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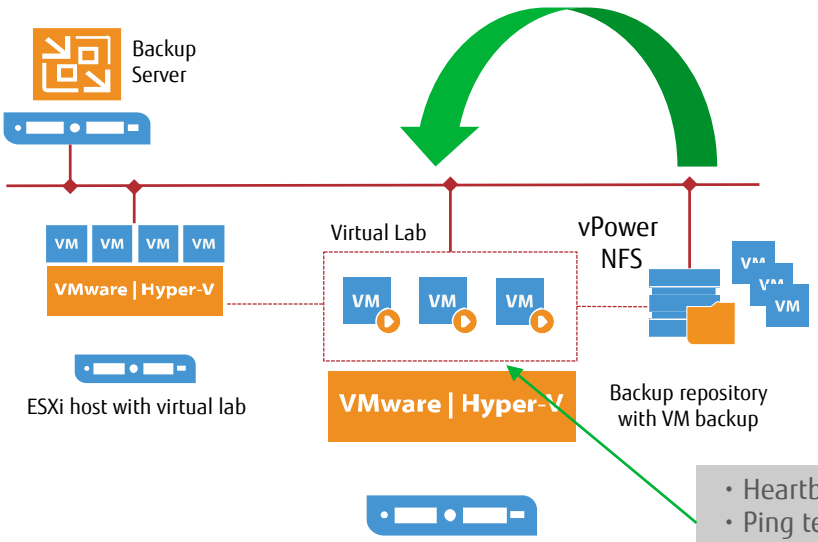
Verification tools are available for backups and replicas collected with Veeam Backup & Replication.
Recovery can be ensured by executing automated recovery verification jobs.

SureBackup and SureReplica

Veeam operation support tools

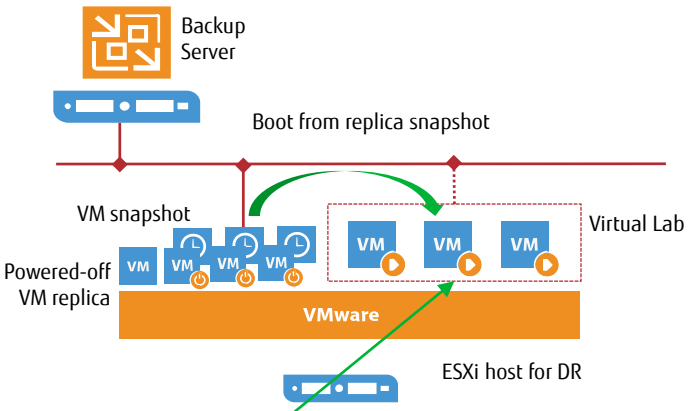
SureBackup

Verifies backups by executing an actual restoration to a closed environment



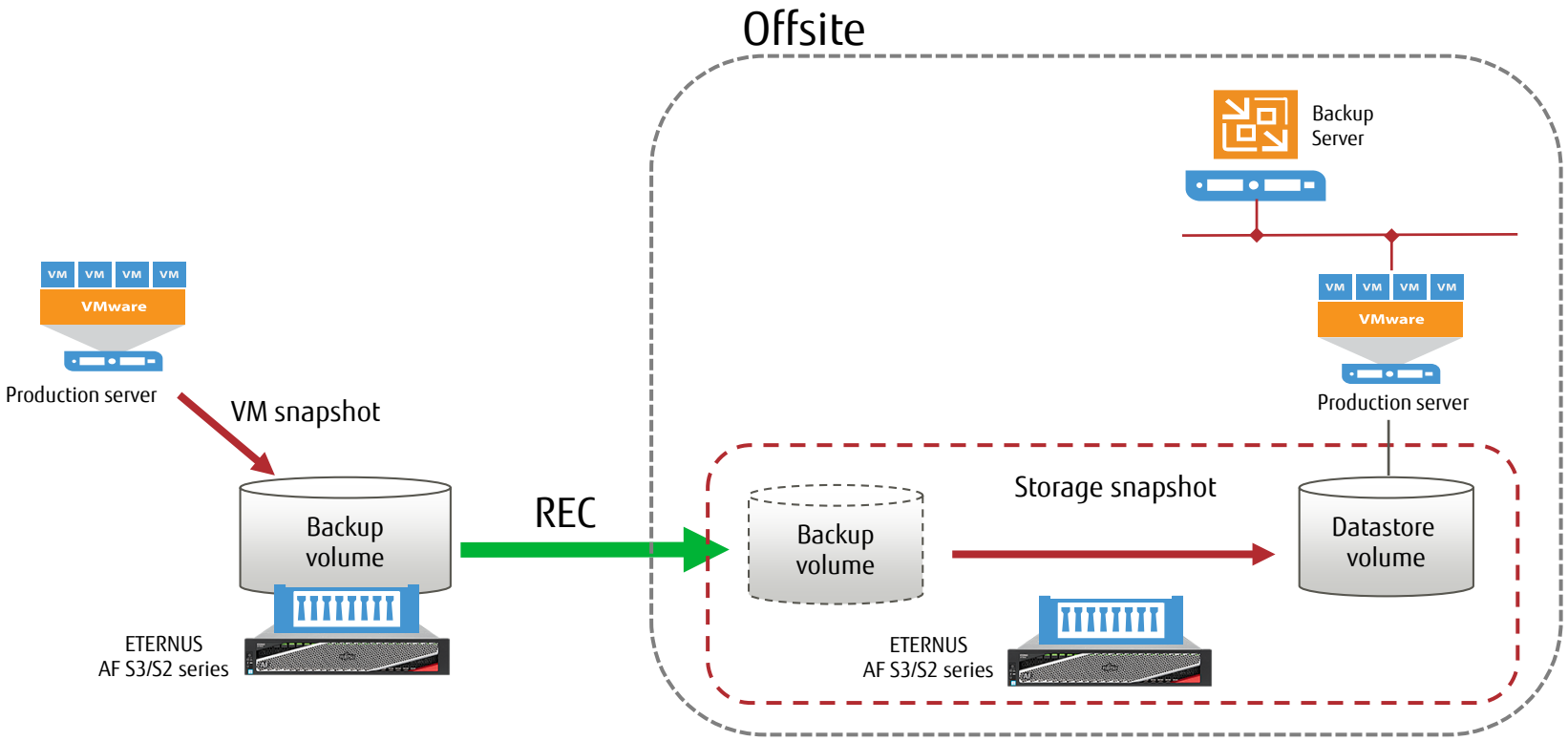
SureReplica (vSphere only)

Verifies replicas by executing an actual failover to a closed environment

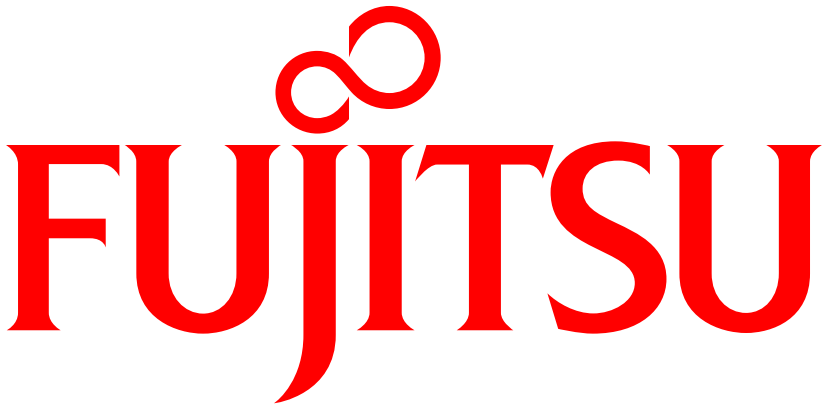


Appendix 4. Veeam Backup & Replication and REC

With Veeam Backup & Replication, production servers can be restored using an offsite backup volume that is equivalent to the local backup volume using REC.



* Remote Equivalent Copy (REC) is a Remote Advanced Copy function that creates equivalent copies between storage systems. An Advanced Copy license is required for this function. To use REC with Veeam Backup & Replication, the firmware version must be V11L20 or later.



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