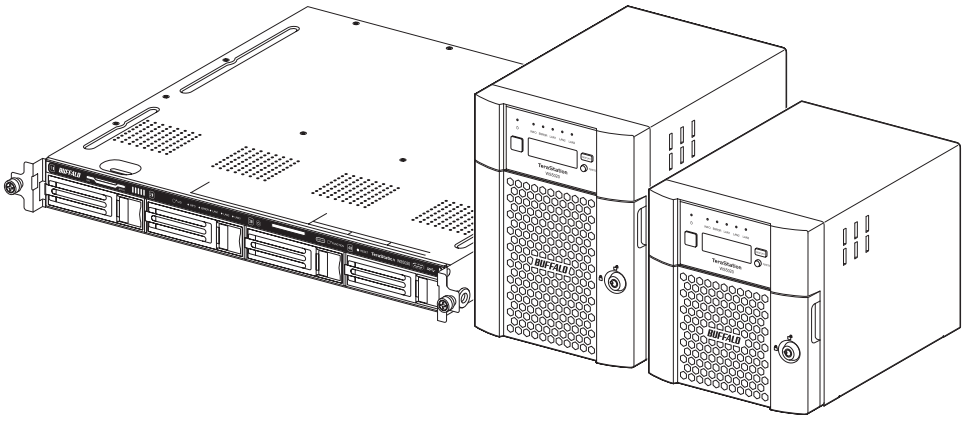
BUFFALO™

Network Attached Storage

TeraStation

User Manual



Please make sure to read this manual before using and follow the procedures. If you have any inquiries about the product, contact the number on the warranty statement or the packing box. Do not discard this manual, the warranty statement, or the packing box.

www.buffaloamericas.com

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July 2025

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Chapter 1 Notice

Regulatory Compliance Information

For Customers in the United States

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning Symbols and Graphical Icons on the Product

Warning symbols are used on the product for safety operation and prevention of injury to you and damage to the unit. The following explains the meanings of symbols used on the product.

Icon	Meaning
	This symbol indicates important warnings or cautions for operation and maintenance. Additional information will follow this symbol.
	This symbol indicates the presence of an alternating current.
	This symbol indicates that the rack-mounted equipment should not be used for a shelf or a work space.
	This symbol indicates that the equipment may carry risk of electric shock.
	This symbol indicates a protective earthing terminal.
	This symbol indicates that the protective conductor should be connected first to the protective earthing terminal.

Safety Precautions

Before using your device, basic safety instructions should always be followed.
(1) Read these instructions.
(2) Keep these instructions.
(3) Heed all warnings and follow all instructions.
(4) The socket-outlet shall be installed near the equipment and shall be easily accessible.

(5) Only use the cables and accessories that are included in the package. Don't use other accessories or cables unless specifically instructed to in the documentation.

(6) Do not ingest battery in case of a chemical burn hazard. This product contains a coin/button cell battery. If the battery is swallowed, it can cause severe internal burns within 2 hours and may lead to death. If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

(7) 

High touch current. Connect to earth before connecting to supply.

(8)  **Caution:** Do not remove the cover.

(9)  **Caution:** Slide/rail mounted equipment is not to be used as a shelf or a work space.

(10)  **Caution:** Do not replace the battery. There is risk of explosion if the battery is replaced with one that is an incorrect type.

Legal Notice

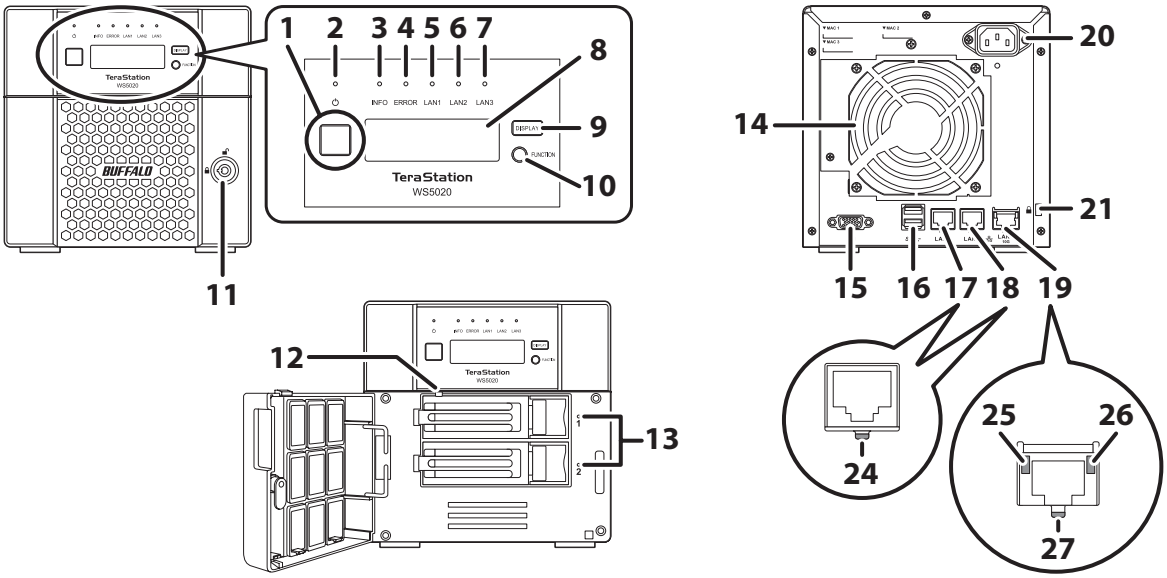
Windows Server® is a registered trademark of Microsoft Corporation.

Chapter 2 Getting Started

Diagrams

Depending on the number or type of drives in the unit, the model name will be different. Check the sticker on the packing box for your unit's model name.

WS5220DN5



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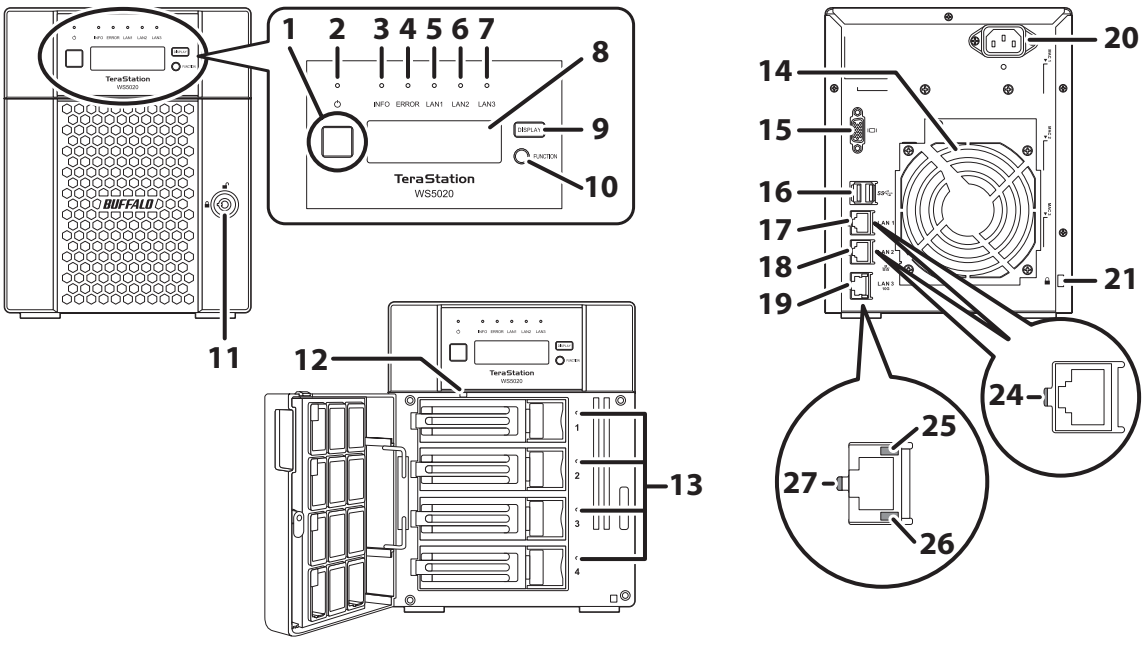

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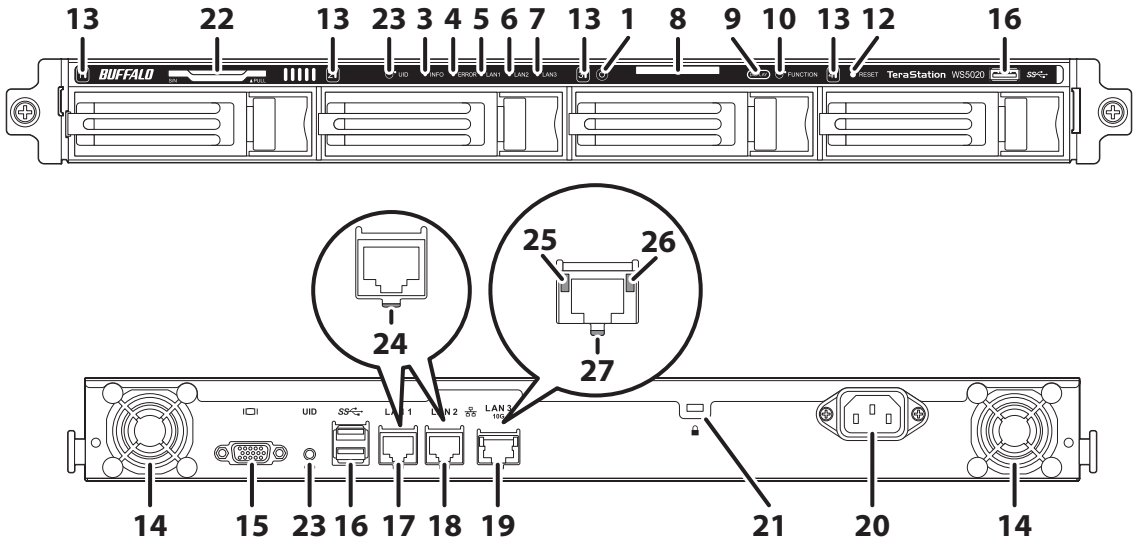


1 Power Button

Press this button to power on and off the TeraStation.

2 Power LED

Glows green when the TeraStation is on.

3 Info LED

If there is a status message, the info LED will glow amber. Check the LCD panel to see the status message.

4 Error LED

If there is an error, the error LED will glow red. Check the LCD panel to see the error message.

5 LAN1 LED

When LAN port 1 is connected, this LED glows green and blinks when the connection is experiencing activity.

6 LAN2 LED

When LAN port 2 is connected, this LED glows green and blinks when the connection is experiencing activity.

7 LAN3 LED

When LAN port 3 is connected or the connection is experiencing activity, this LED glows blue.

8 LCD Panel

This display shows the status of many TeraStation settings. It also displays errors and messages when available.

9 Display Button

Press to switch between the different display modes. Also, if the TeraStation is beeping, press this button to stop it.

10 Function Button

Use this button for performing recovery or stopping the TeraStation's beeping.

11 Drive Lock

Open the front panel with the key to replace drives or access the reset button.

12 Reset Button

Press and hold down this button to shut down and reboot the TeraStation.

13 Status LED

Normally, the LED blinks green when a drive is accessed. If a drive fails, its LED will turn red.

14 Fan

Spins to prevent overheating inside. Do not block the fan.

15 VGA Port

You can connect a VGA monitor to this port. Connecting a monitor directly to the TeraStation is only supported for monitoring the progress of Windows Update.

16 USB Port

Compatible USB drives, USB memory devices, and USB UPS devices can be connected. USB hubs are not supported.

17 LAN Port 1 (1GbE)

Connect an Ethernet cable to use this port for your network. It is available for communicating at max. 1000 Mbps.

18 LAN Port 2 (1GbE)

Connect an Ethernet cable to use this port for your network. It is available for communicating at max. 1000 Mbps.

19 LAN Port 3 (10GbE)

Connect an Ethernet cable to use this port for your network. It is available for communicating at max. 10 Gbps if using the included Ethernet or category 6A cable.

Note: To communicate at up to 10 Gbps, all connected network devices must be compatible with 10GbE.

20 Power Connector

Use the included power cable to connect to a UPS, surge protector, or outlet.

21 Anti-Theft Security Slot

Use this slot to secure your TeraStation with a cable lock (not included).

22 Serial Number

This sticker shows the TeraStation's serial number.

23 UID Button

Press this button to cycle the blue LED on and off.

24 Link/Act LED

Glows green when the TeraStation is connected to a network. It blinks when the connection is experiencing activity.

25 Link LED

Glows amber when the TeraStation is connected to a network at 10 Gbps.

26 Link LED

Glows green when the TeraStation is connected to a network at 100 Mbps, 1000 Mbps, 2.5 Gbps, or 5 Gbps.

27 Act LED

Blinks blue when the connection is experiencing activity.

Turning the TeraStation On and Off

Press the power button on the TeraStation to turn it on.
To turn off the TeraStation, press the power button. When the power LED turns off, the shutdown process is finished. Don't unplug the power cable without powering the TeraStation off first.

You can also shut down or restart the TeraStation by following the procedure below.

1 Connect Windows Server via remote desktop by referring to the "Opening Windows Server" section below.

2 Click the Start button ( ), then click the power icon ( ).

3 Select *Shut down* or *Restart*.

4 Select the reason for shutting down, then click *Continue*.

5 The process is complete when the power LED is extinguished.

Opening Windows Server

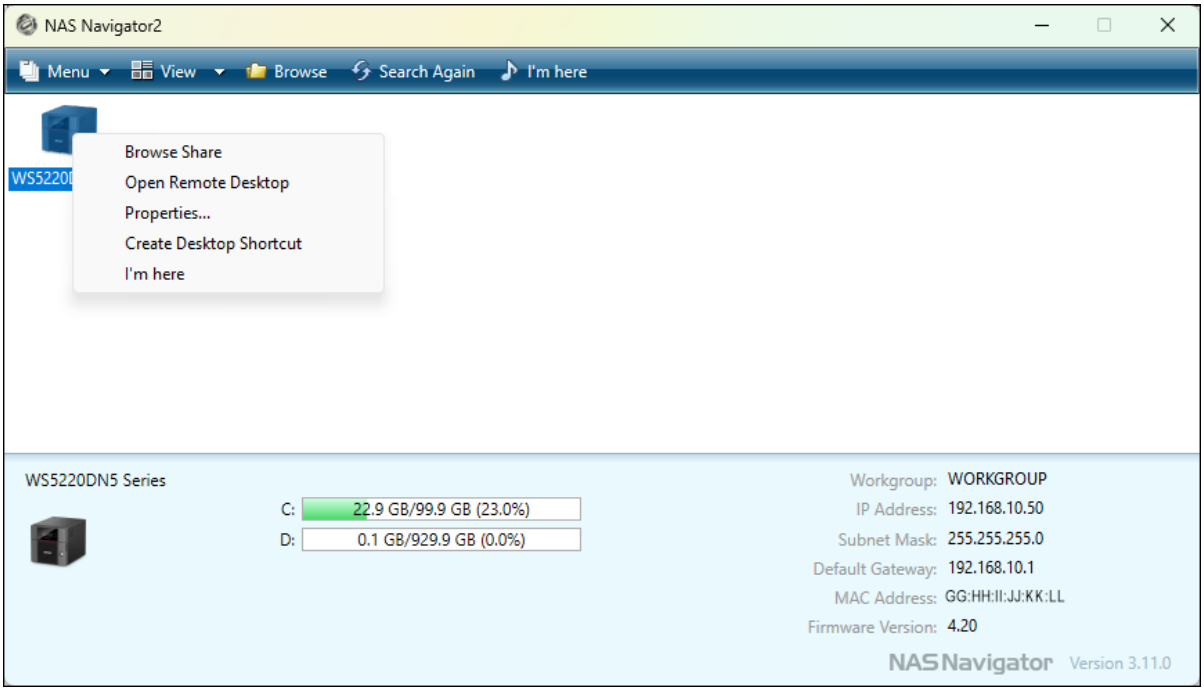
To connect Windows Server, follow the procedure below.

Note: If using macOS, download and install "Microsoft Remote Desktop" from the Mac App Store.

1 Double-click the NAS Navigator2 icon ( ) to start NAS Navigator2.

2 Right-click your TeraStation's icon and select *Open Remote Desktop*. For macOS, select the TeraStation's icon while holding down the control key, then select *Open Remote Desktop*.

If the message "The identity of the remote computer cannot be verified. Do you want to connect anyway?" is displayed, click *Yes* or *Continue*.



3 Enter the admin username and password and press the Enter key. The default username and password are "Administrator" and "password".

4 The process is complete when Windows Server is opened in the remote desktop.

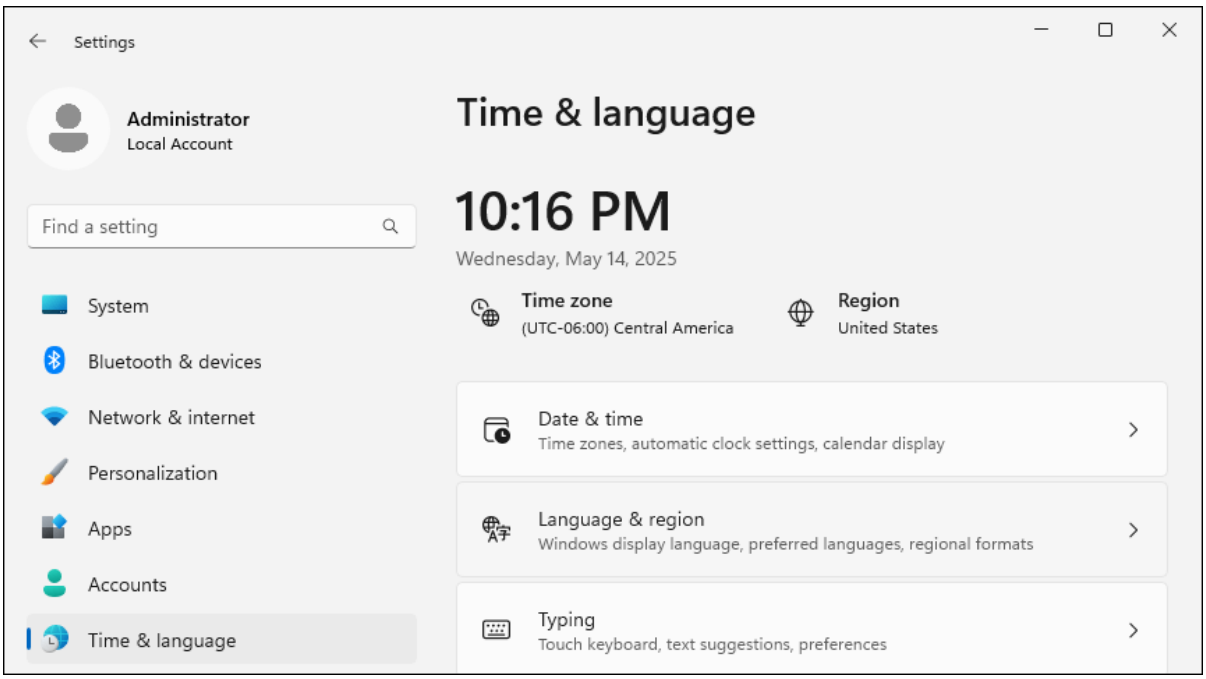
Changing Recommended Settings

This section outlines the recommended settings to adjust after completing initial setup. The following settings assume that the initial setup has been completed using the provided quick setup guide.

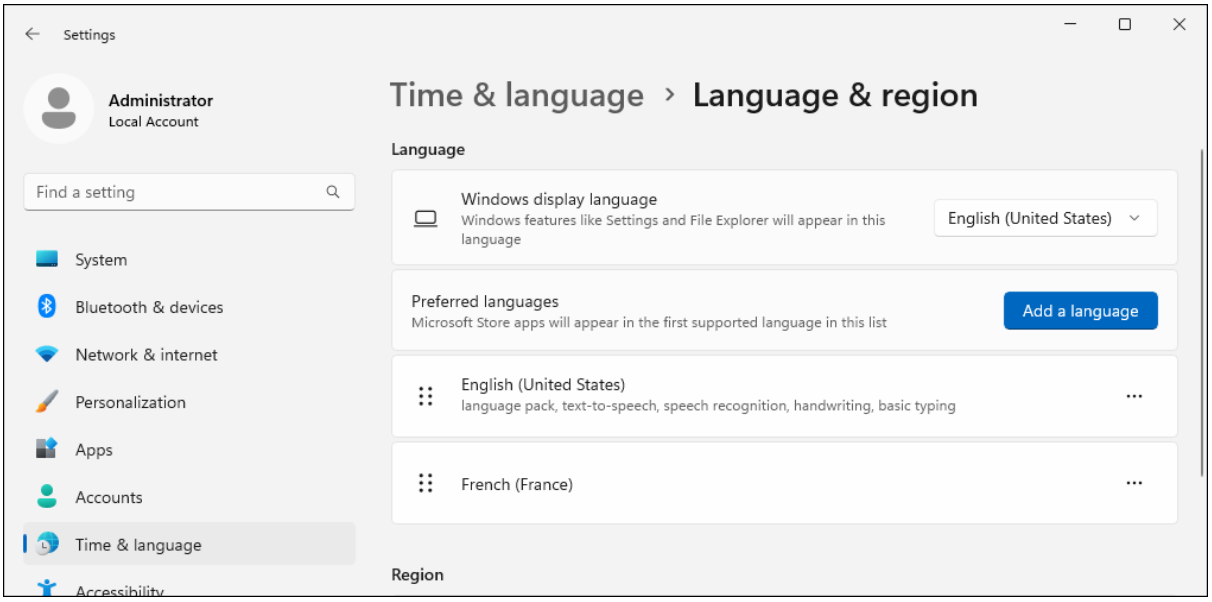
Changing the Display Language

1 Click the Start button ( ), then click *Settings* in the Start menu.

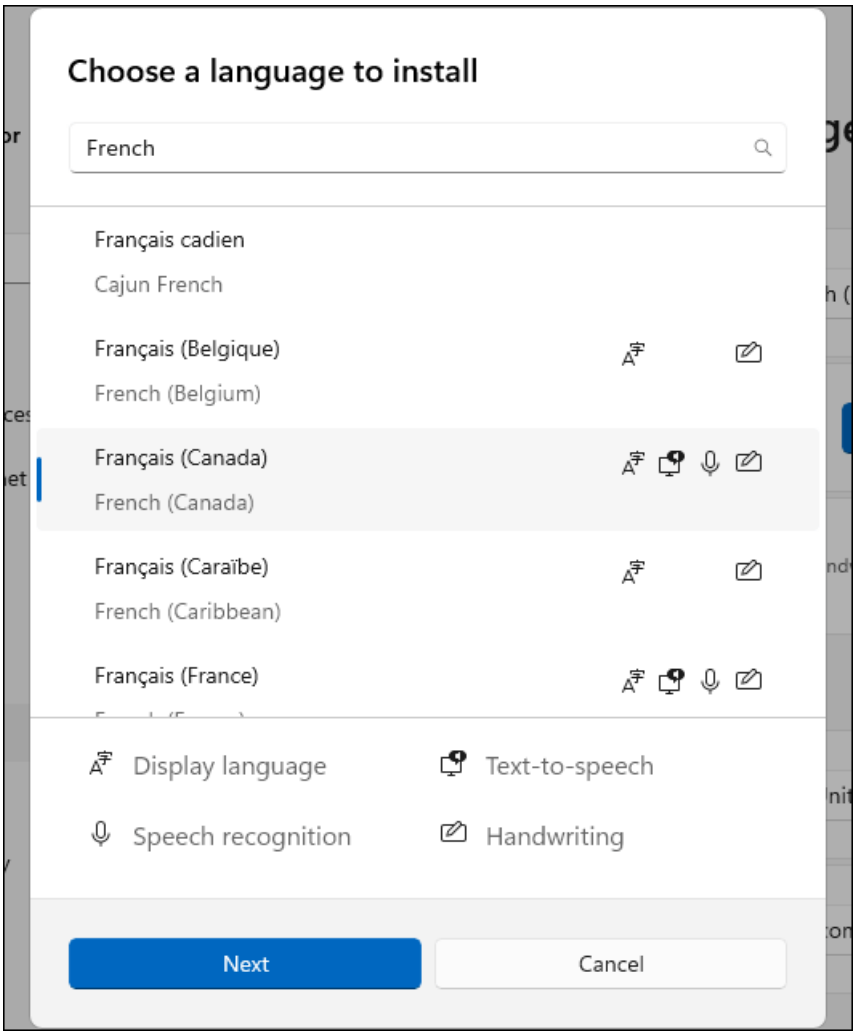
2 Click *Time & language*, then click *Language & region*.



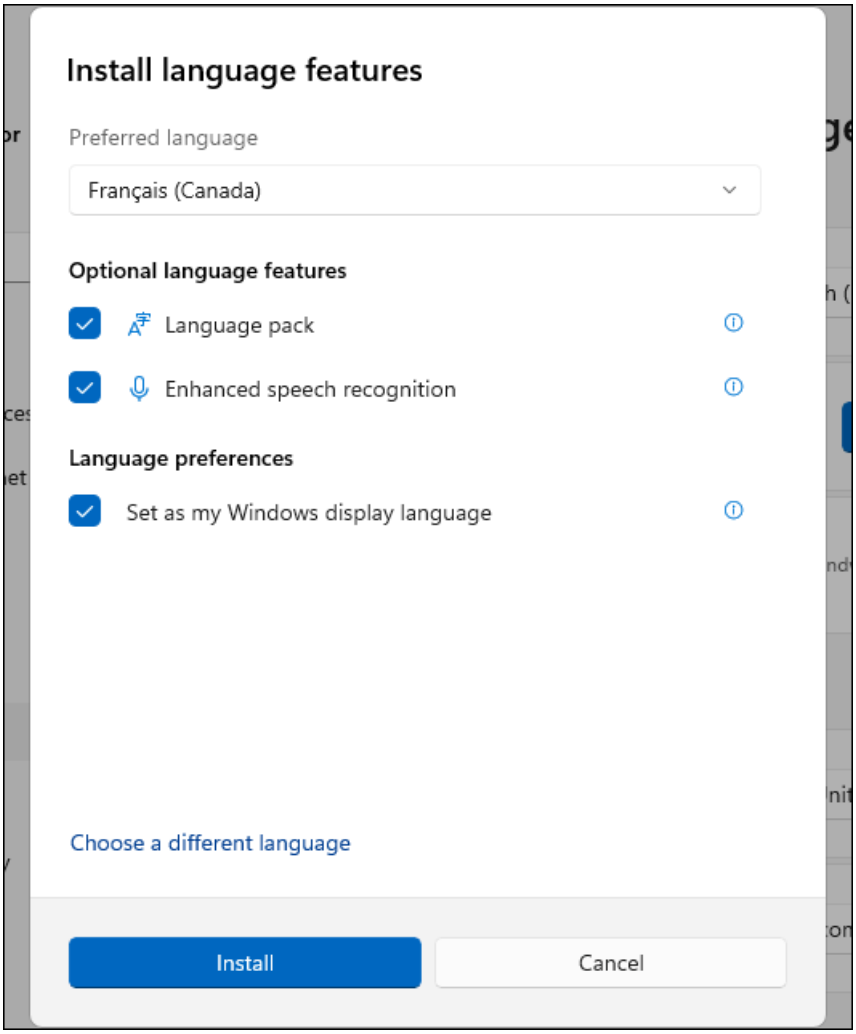
3 Click *Add a language* at the "Preferred languages" field.



4 Select the language from the list or enter the name of the desired language, click the displayed result, then click *Next*. If the language has regional varieties, multiple countries and regions may be displayed. In such a case, click the most preferable one.



5 Select the checkboxes for the language as well as "Set as my Windows display language", then click *Install*.



6 After installing the language is finished, sign out from Windows Server.

7 The process is complete once you reconnect to Windows Server via remote desktop.

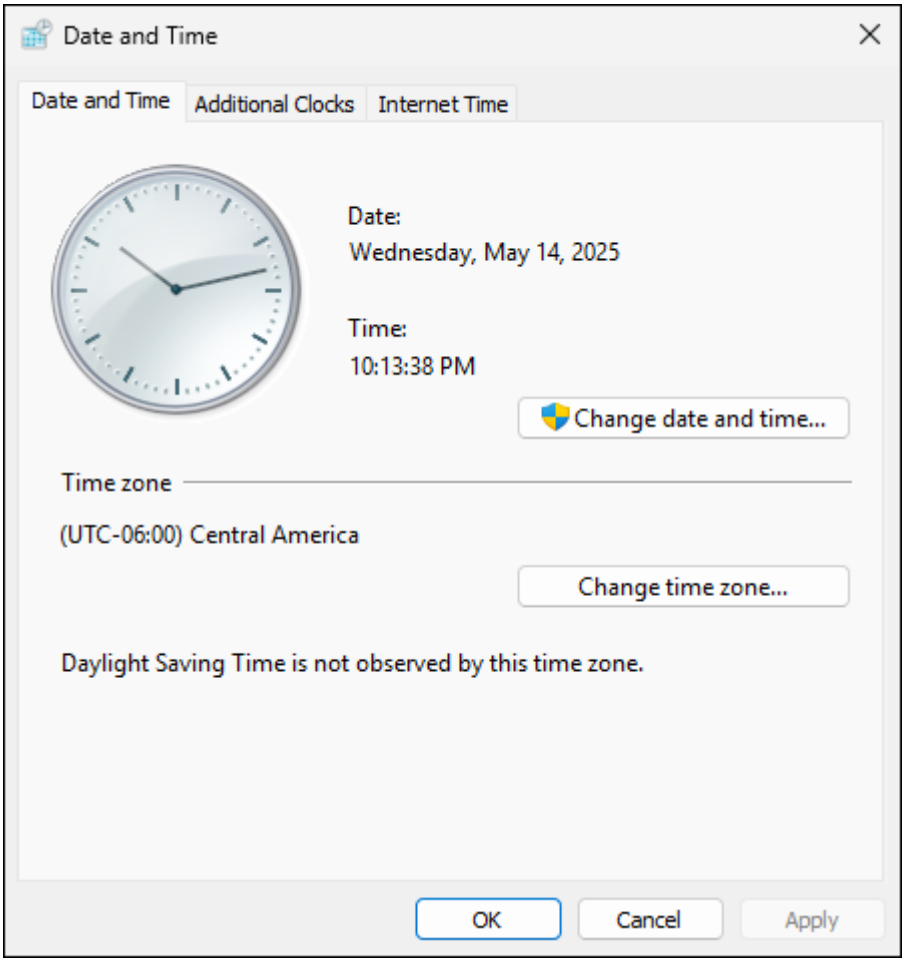
Configuring the Date and Time

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

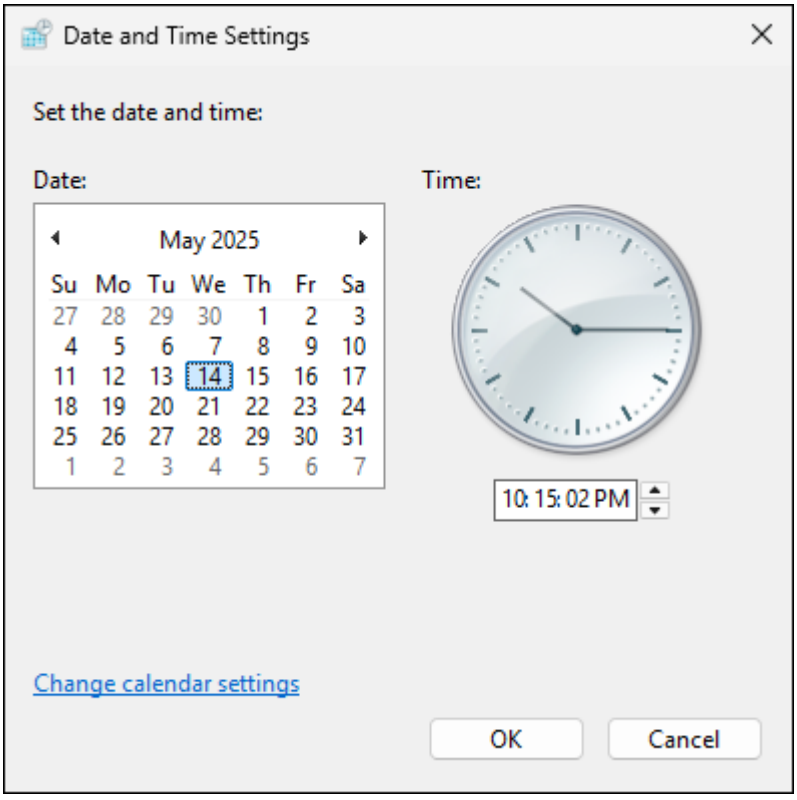
2 Click *Local Server* in the left-side menu.

3 Click the time zone.

4 From the *Date and Time* tab, click *Change date and time*.



5 Configure the current date and time, then click *OK*.



6 The process is complete once the time settings have been adjusted according to your configuration.

Note: To obtain the date and time automatically, click the *Internet Time* tab at step 3, then click *Change settings* and select *Synchronize with an Internet time server*.

Creating a Shared Folder

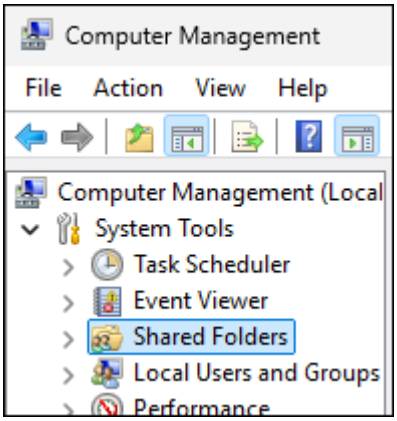
No shared folders are configured by default. Before using the TeraStation, follow the procedure below to create one or more shared folders.
The procedure below is an example to create a shared folder named "Share" that anyone can access on drive D.

Step 1 Creating a New Shared Folder

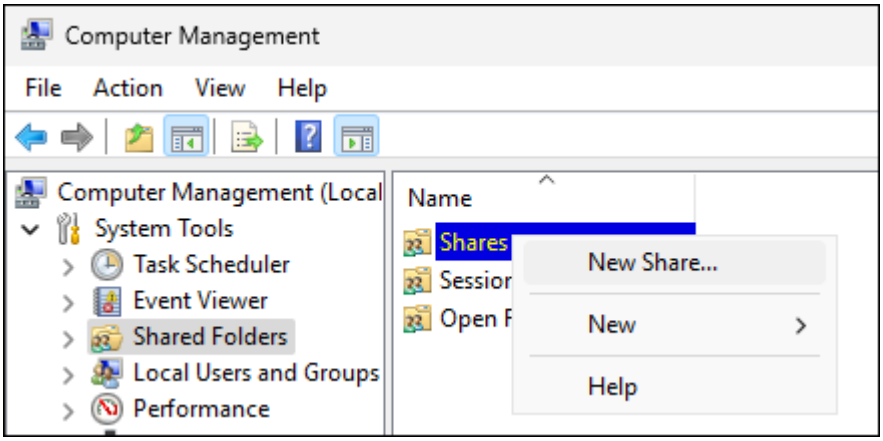
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Click *Shared Folders* in the left-side menu.

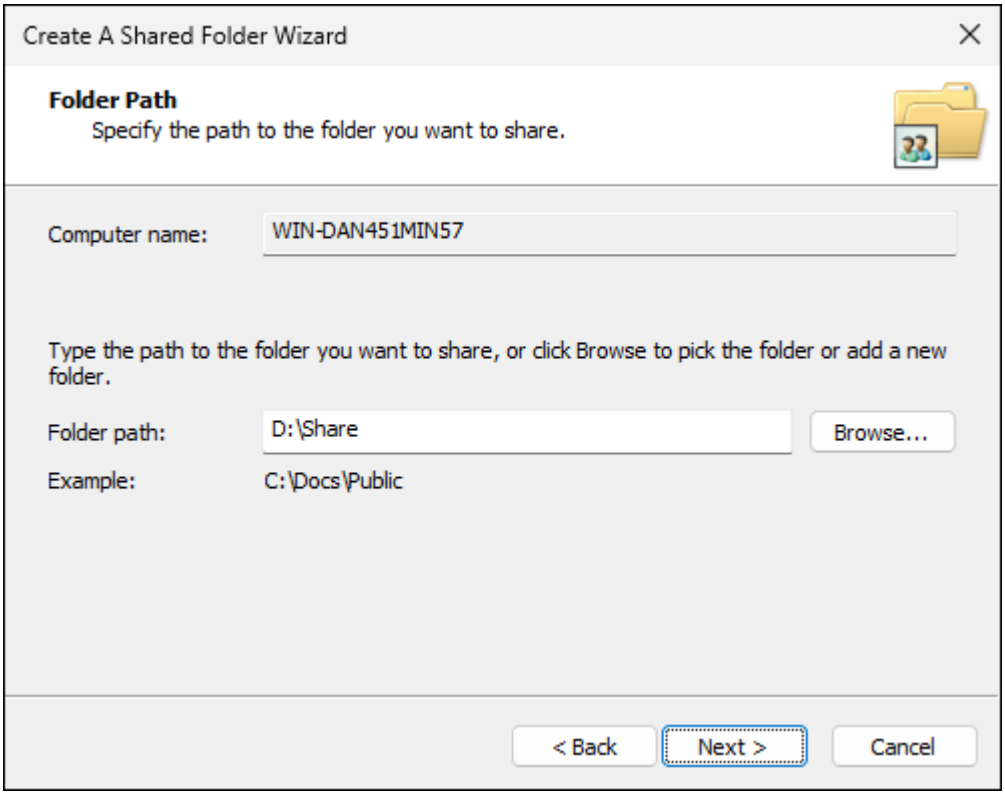


4 Right-click *Shares* in the center menu and click *New Share*.



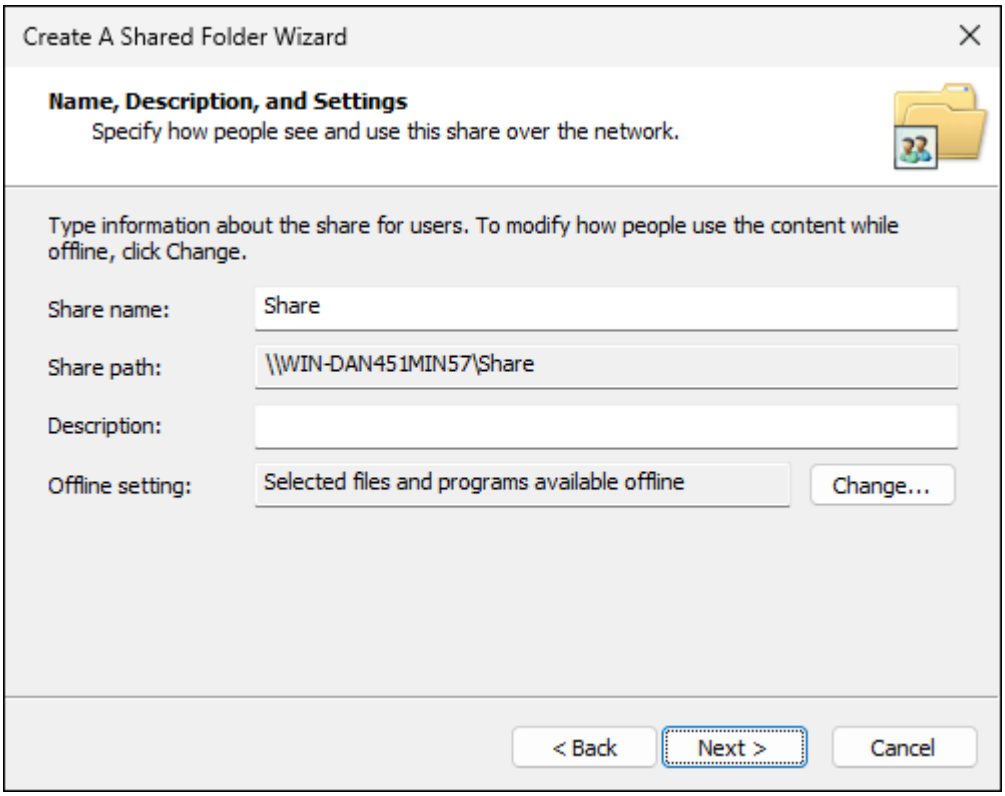
5 Click *Next*.

6 Enter the path of a folder into the folder path field, then click *Next*.



7 If the message "The system cannot find the specified path. Do you want to create it?" is displayed, click *Yes*.

8 Enter a name for the share and a description (optional), then click *Next*.



9 Click *Finish*, then *Finish* again.

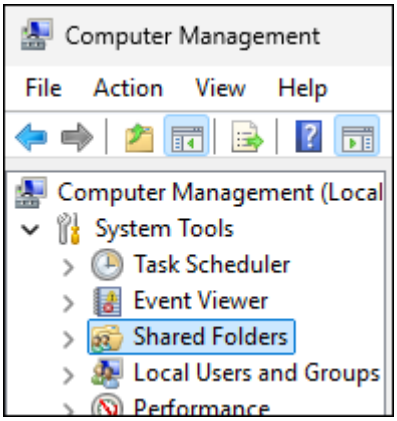
10 The process is complete once you close the window.

Step 2 Configuring Access Permissions for the Created Folder

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

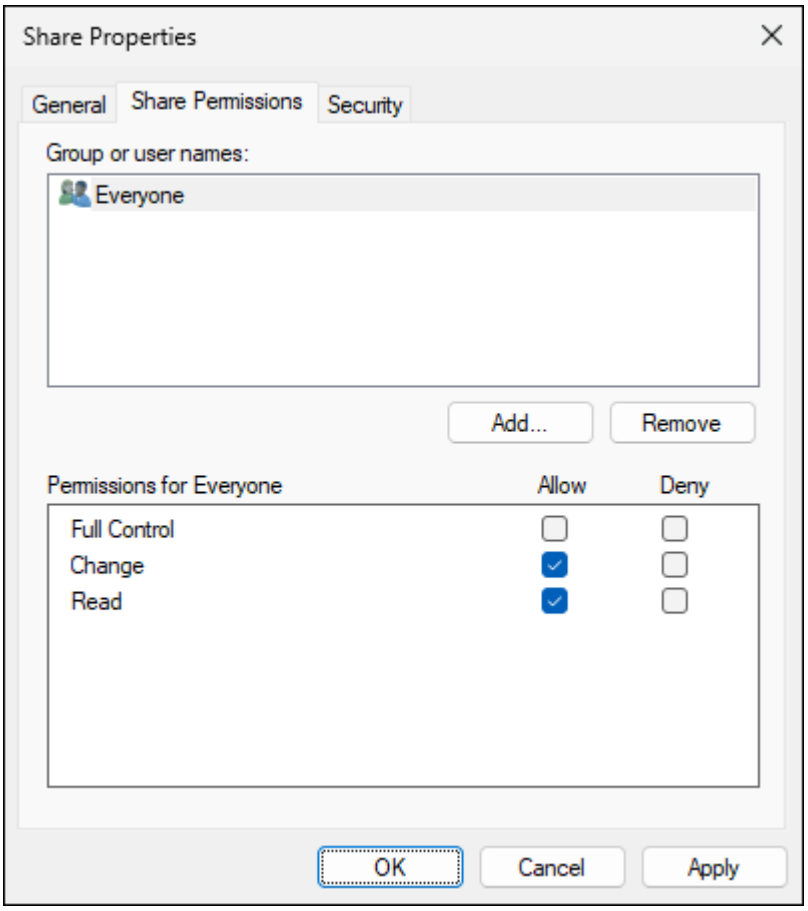
2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Click *Shared Folders* in the left-side menu.

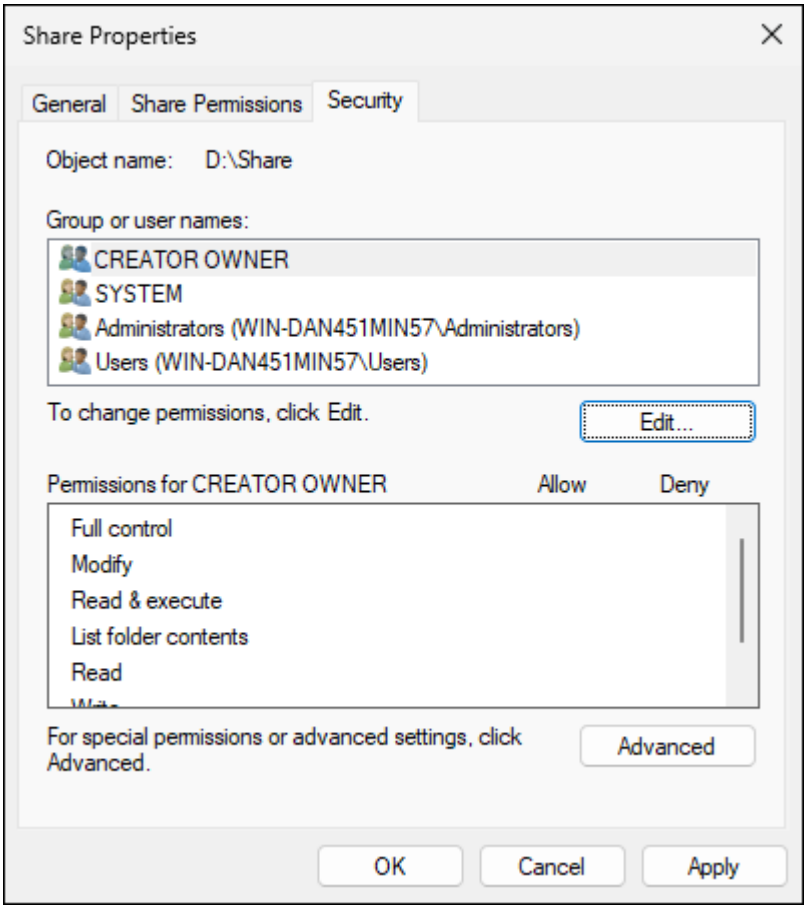


4 Double-click *Shares*, then *"Share"* (name of the created folder) to open the Properties window.

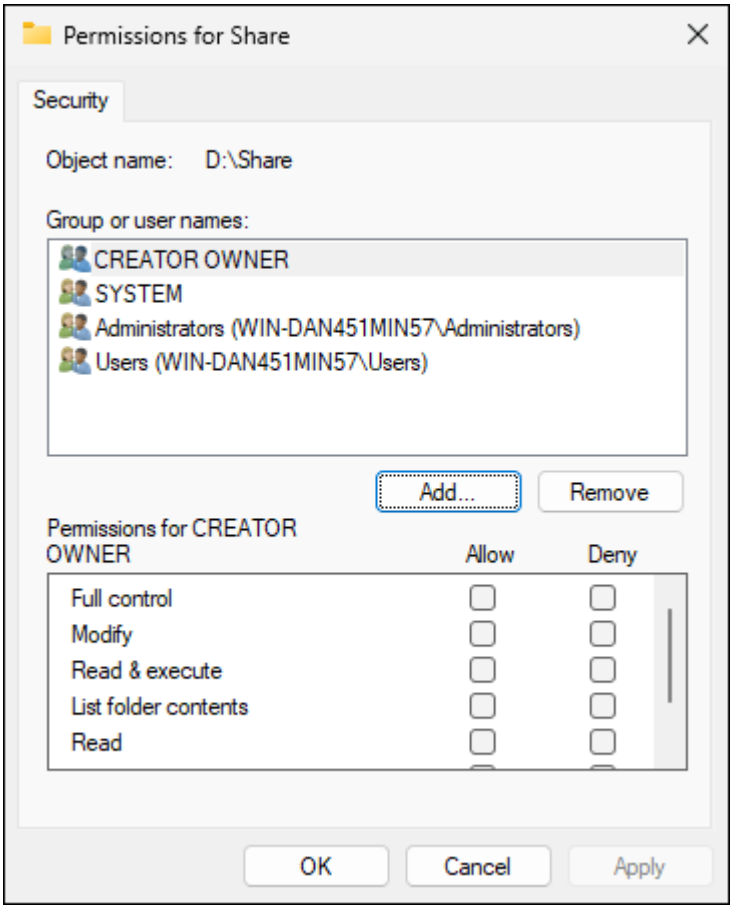
5 From the *Share Permissions* tab, select *Everyone*, then select the "Allow" checkbox for "Change".



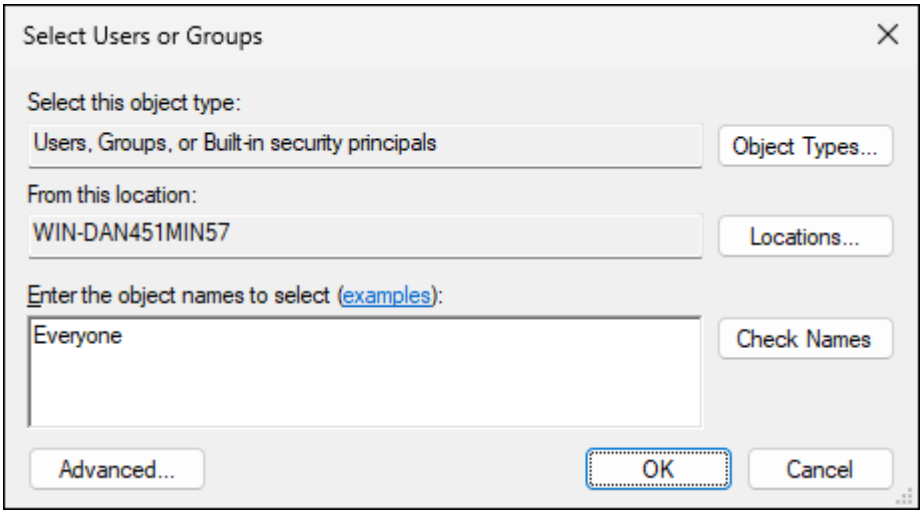
6 From the *Security* tab, click *Edit*.



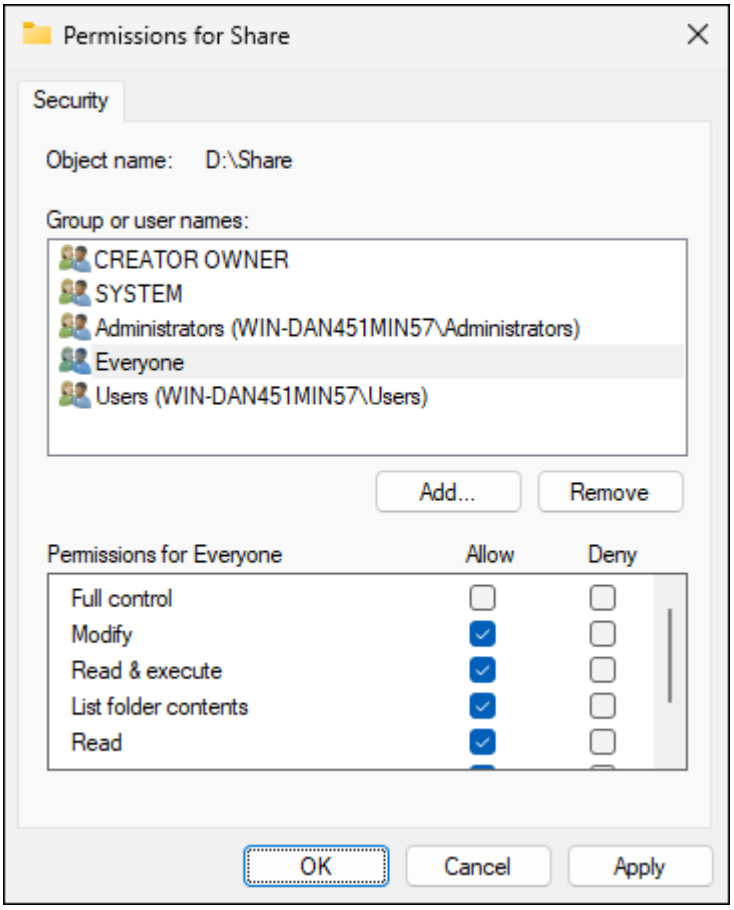
7 Click *Add*.



8 Enter "Everyone" under "Enter the object names to select", then click *OK*.



9 Select *Everyone*, then select the "Allow" checkbox for "Modify".



10 Click *OK*, then *OK* again.

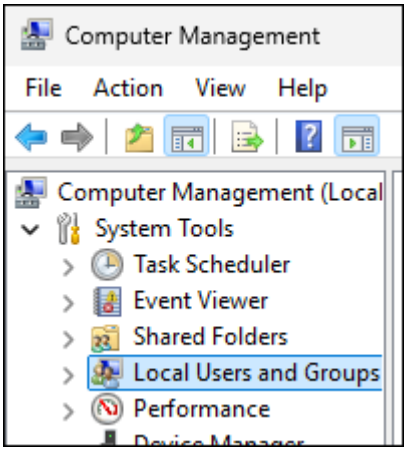
11 The process is complete once you close the window.

Step 3 Enabling Guest Accounts

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

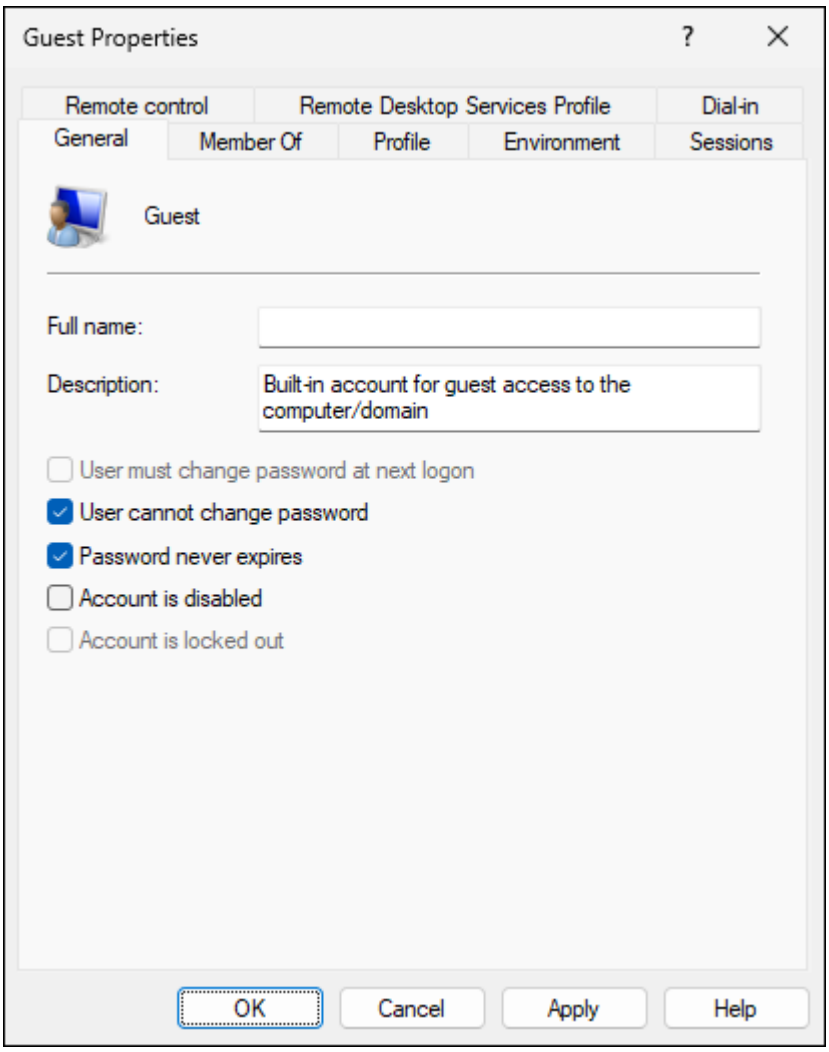
2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Click *Local Users and Groups* in the left-side menu.



4 Double-click *Users* > *Guest* to open the Properties window.

5 From the *General* tab, clear the "Account is disabled" checkbox and click *OK*.



6 The process is complete once you close the window.

Changing the IP Address

To change the IP address of your TeraStation on Windows Server, follow the procedure below. This example demonstrates how to change the IP address for LAN port 1.

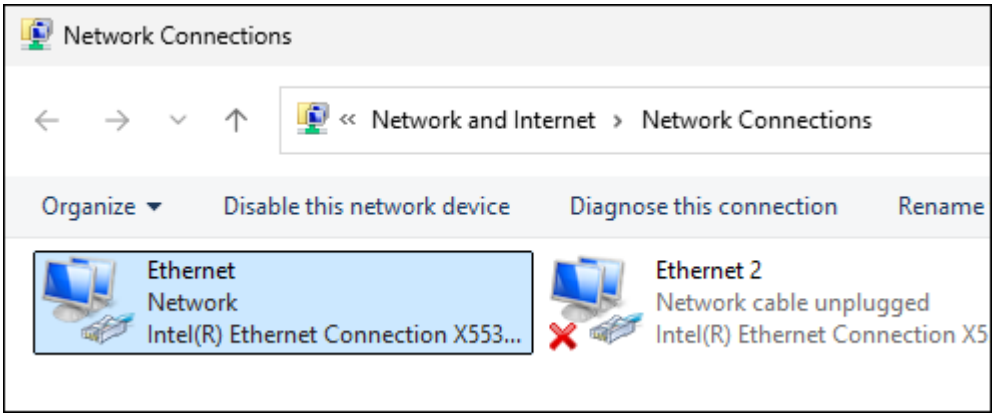
Note: You can change the IP address of the LAN port connected to the network switch using NAS Navigator2. For instructions on changing the IP address via NAS Navigator2, refer to the NAS Navigator2 help.

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

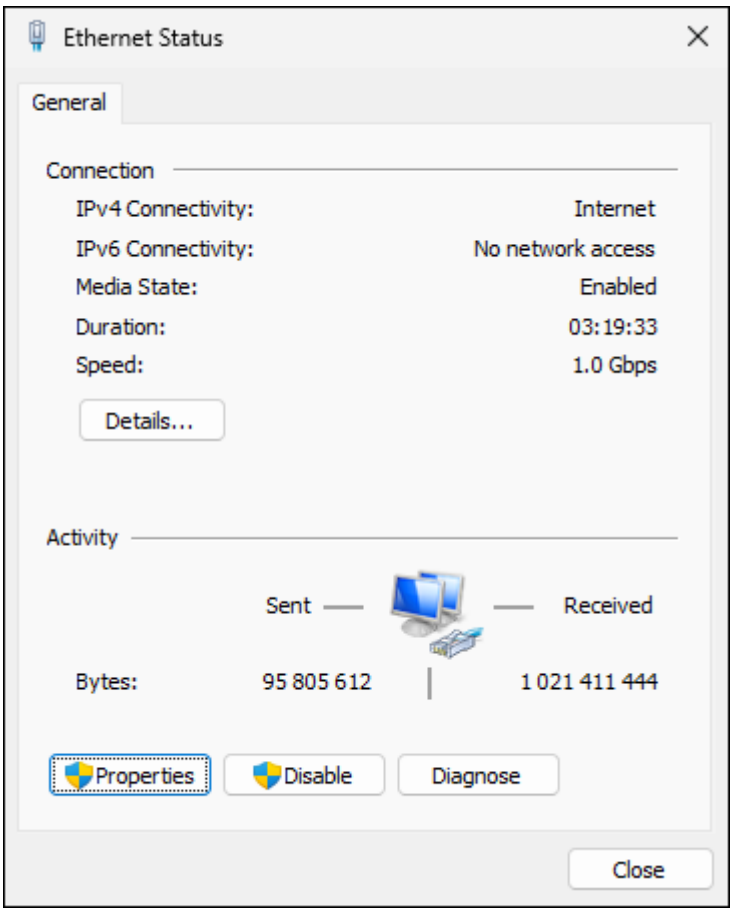
2 Click *Local Server* in the left-side menu.

3 Click the active Ethernet connection.

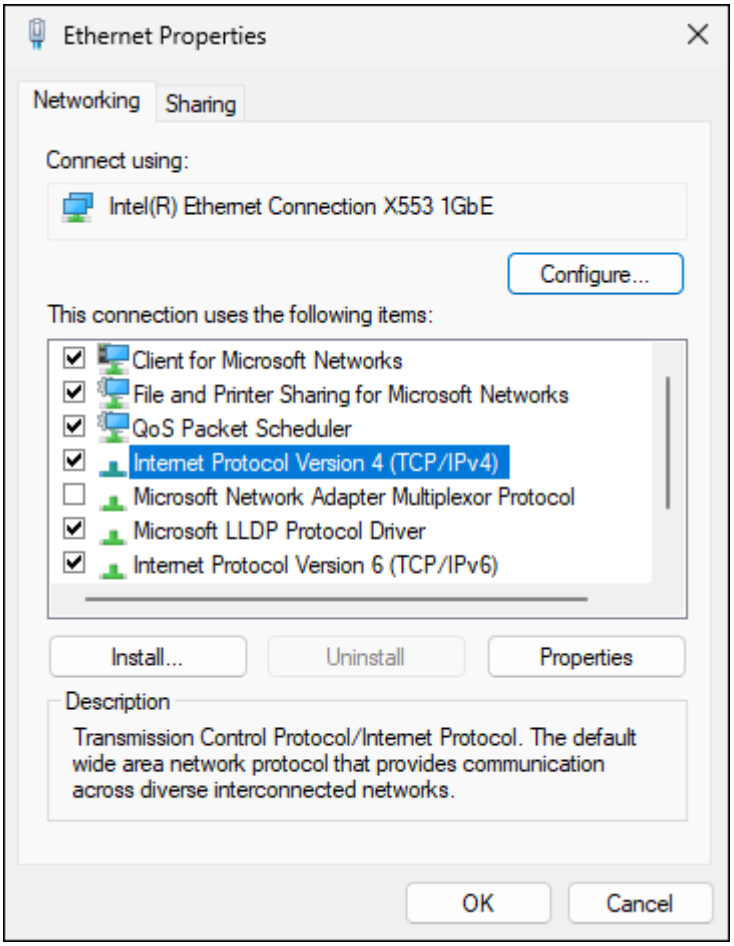
4 Double-click *Ethernet*.



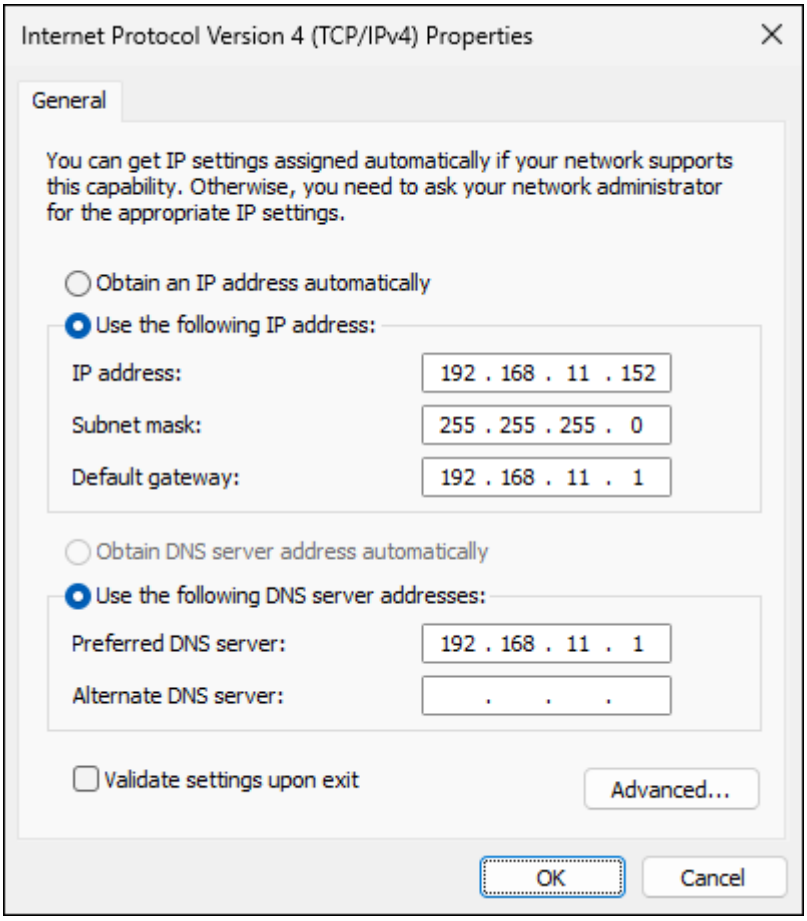
5 Click *Properties*.



6 Double-click *Internet Protocol Version 4 (TCP/IPv4)*.



7 Enter the desired network addresses, then click *OK*.



8 The process is complete once you close the window.

Installing Antivirus Software

Installing antivirus software on the TeraStation is strongly recommended. The installation process may vary depending on which antivirus software you use.

Chapter 3 Pre-installed Software

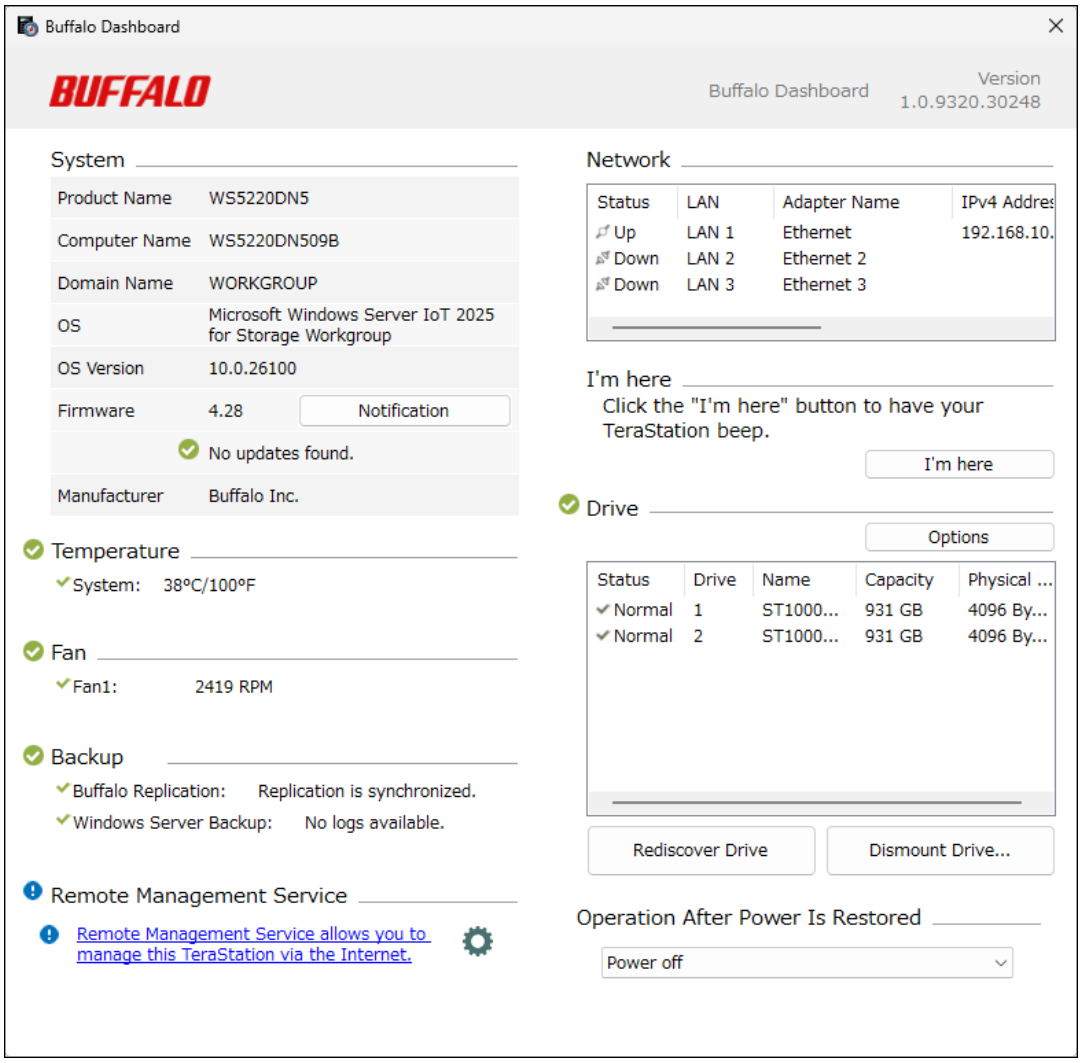
The TeraStation comes with the following software pre-installed:

- Buffalo Dashboard
- Buffalo Replication
- TeraStation Backup & Replication Folder Settings
- RAID Builder
- Email Notification
- Display Settings
- Buffalo Data Migration Tool

Buffalo Dashboard

Buffalo Dashboard displays system information and can be used to dismount drives. To launch Buffalo Dashboard, click the Buffalo Dashboard icon ( ) from the system tray.

Note: This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.



Refer to the chart below for details of each display item.

Item	Description
System	**Product Name**: Displays the model name of the TeraStation. **Computer Name**: Displays the hostname of the TeraStation. **Domain Name**: Displays the type of domain that the TeraStation is a member of. **OS**: Displays the type of Windows installed on the TeraStation. **OS Version**: Displays the version of the OS. **Firmware**: Displays the firmware version of the TeraStation. **Notification**: Enables or disables notifications for new firmware releases. For more detailed information, refer to the "Disabling Update Notification" section in chapter 8. To check for firmware releases, ensure the TeraStation is connected to a network with Internet access. You can also check the Buffalo website for updates. **Manufacturer**: Displays "Buffalo Inc.".
Temperature	Displays the temperature of the system.
Fan	Displays the fan RPM.
Backup	Displays the status of backup and replication.
Remote Management Service	Allows you to remotely manage the TeraStation via the Internet. After configuration is finished, the cloud service communication status will be displayed. Click the settings icon ( ) to change the Remote Management Service settings.
Network	Displays IP addresses, subnet masks, default gateways, LAN port numbers, link speed, and status.
I'm here	Causes your TeraStation to beep.
Drive	Displays the status, drive numbers, names, capacity, and physical sector sizes of each drive. **Rediscover Drive**: Updates the displayed drive information. **Dismount Drive**: Dismounts a drive for safe removal. Select the drive to dismount and click *OK*. **Options**: • **Shut down the TeraStation if the temperature of the drive becomes abnormally high**: The TeraStation will automatically shut down if the drive gets too hot. • **Turn off a drive if an error occurs**: The drive will automatically be turned off (dismounted) if a drive error occurs. **How to Dismount Drives:** Click *Dismount Drive*, check the drive to dismount, then click *OK*. After the drive is dismounted, unplug the drive from the TeraStation.
Operation After Power Is Restored	Configures the action to be taken after recovering from a power failure. • **Return to last state before power failure**: The TeraStation will be restored to the state before the power failure. If the TeraStation was turned off, it will remain powered off even if power is restored. If the TeraStation was on, it will be powered on when power is restored. • **Power on**: Turns the TeraStation on after power is restored. • **Power off**: The TeraStation will remain off after power is restored.

Note: The following functions are only available when logged in as the administrator:

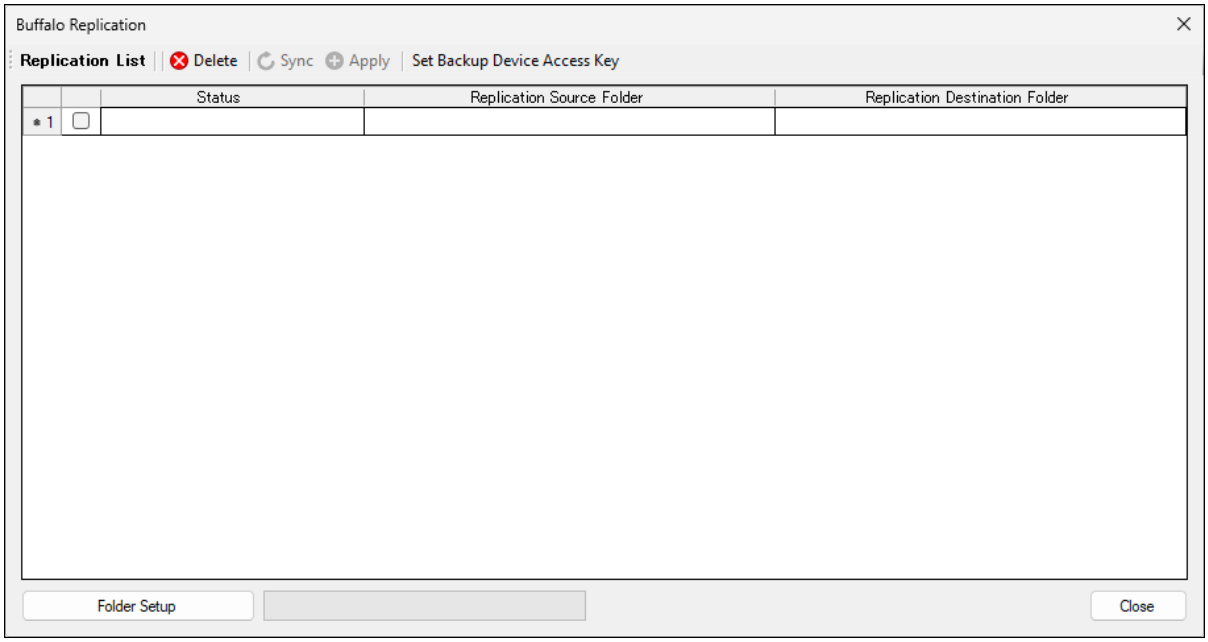
- Rediscover drive
- Dismount drive

- Options
- Notification
- Operation after power is restored

Buffalo Replication

Your TeraStation can be synchronized with another TeraStation, replicating most data. To launch Buffalo Replication, you must be logged in as a member of the Administrators group in Windows Server.

Note: This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.



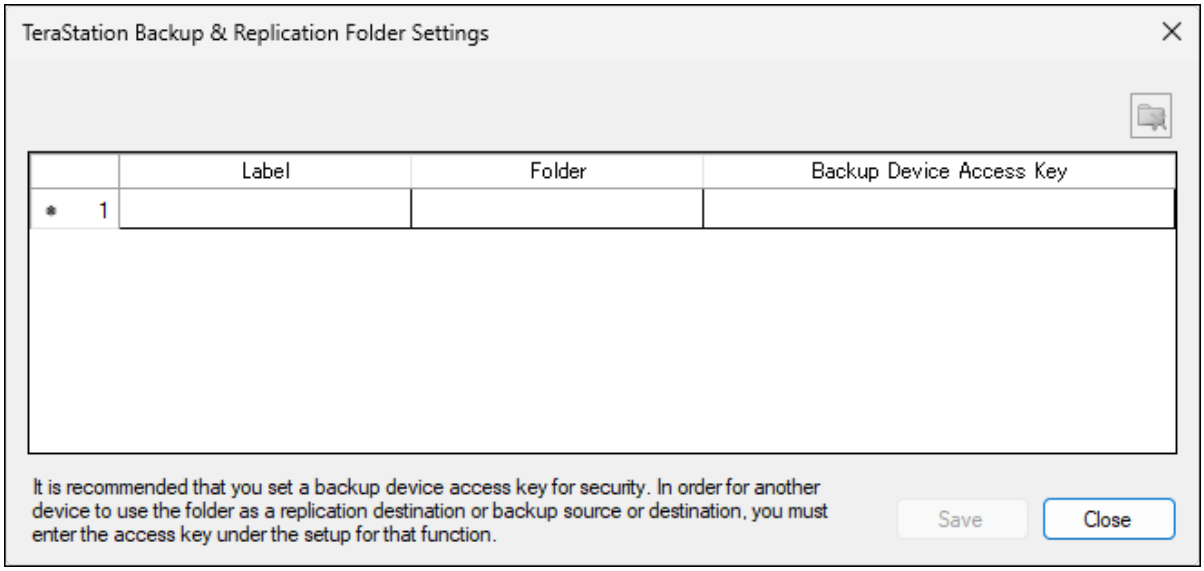
Refer to the chart below for details of each display item.

Item	Description
Delete	Deletes the selected jobs.
Sync	Runs all replication jobs in the list.
Apply	Saves and applies the settings.
Set Backup Device Access Key	Enter the backup device access key that has been configured for folders.
Status	Displays the job status. The following status will appear: **Editing**: The job is currently being edited. **Synchronizing**: The job is in progress. **Error**: An error occurred during the job. **Stop**: The job is suspended.
Replication Source Folder	Select a folder as replication source.
Replication Destination Folder	Select a folder as replication destination.
Folder Setup	Opens TeraStation Backup & Replication Folder Settings.

TeraStation Backup & Replication Folder Settings

Before using the TeraStation as a backup device on the network, configure it with the required settings using TeraStation Backup & Replication Folder Settings. To launch TeraStation Backup & Replication Folder Settings, you must be logged in as a member of the Administrators group in Windows Server.

Note: This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.



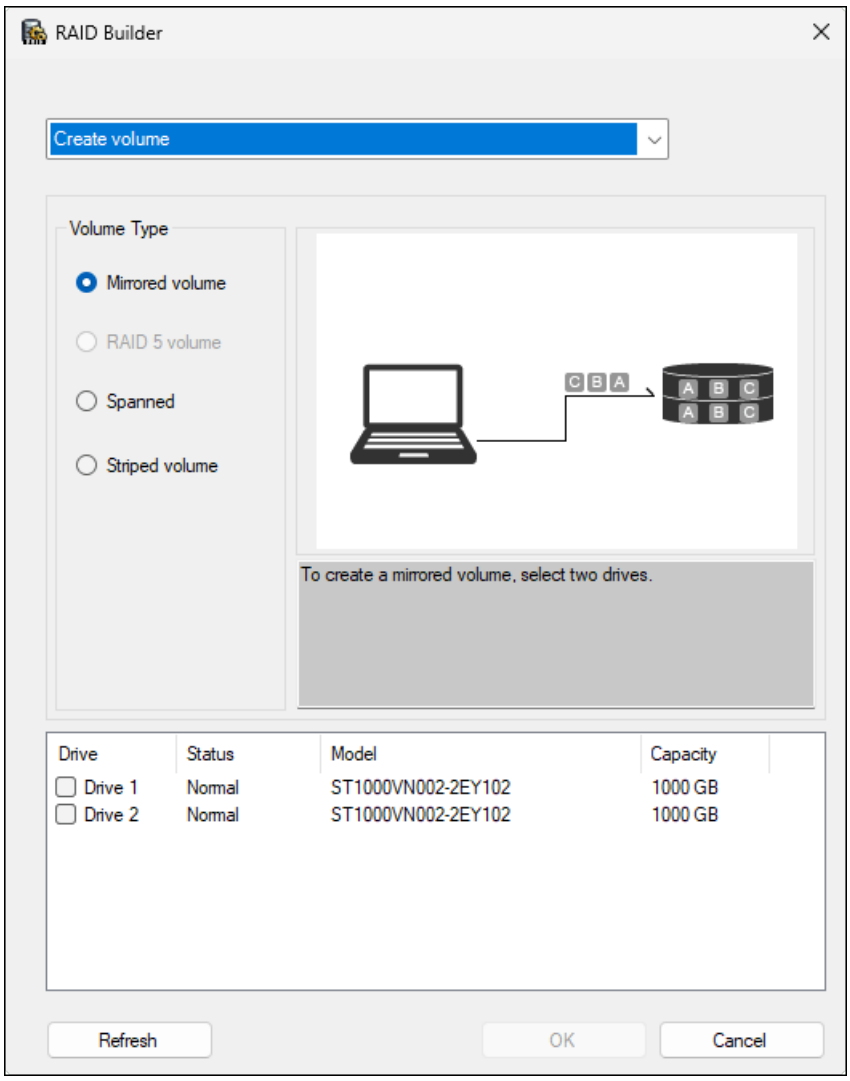
Refer to the chart below for details of each display item.

Item	Description
	Removes the selected folders from the list of available backup targets. You can click the number to the left of the "Label" field to select a folder.
Label	Enter a name for the backup or replication destination. When you search for backup devices on the network, this name will appear.
Folder	Specifies the shared folder where backup data will be stored. Do not select the root directory where the shared folder is created.
Backup Device Access Key	Configures the desired characters for a backup device access key. The backup device access key may contain up to 8 alphanumeric characters, hyphens (-), and underscores (_). The first character should not be a symbol. You may leave this field blank if you do not want a backup device access key, but for security reasons we highly recommend entering one for the shared folder. If a backup device access key is configured for the shared folder, that folder will not show up as a target for the replication destination or backup source or destination when configuring a backup job on another Buffalo device unless it's entered.
Save	Saves the settings.

RAID Builder

RAID Builder is used to create RAID volumes as data areas or to repair mirrored volumes as system areas. To launch RAID Builder, you must be logged in as a member of the Administrators group in Windows Server.

Note: This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.



Refer to the chart below for details of each display item.

Item	Description
Create volume	Creates a RAID volume as data areas.
Repair a mirrored system volume	Creates a mirrored volume as system areas.
Volume Type	Select a type of RAID volume.
Drive	Select drives used for a RAID volume.
Refresh	Redetects inserted drives.

Differences Between RAID Builder and Disk Management

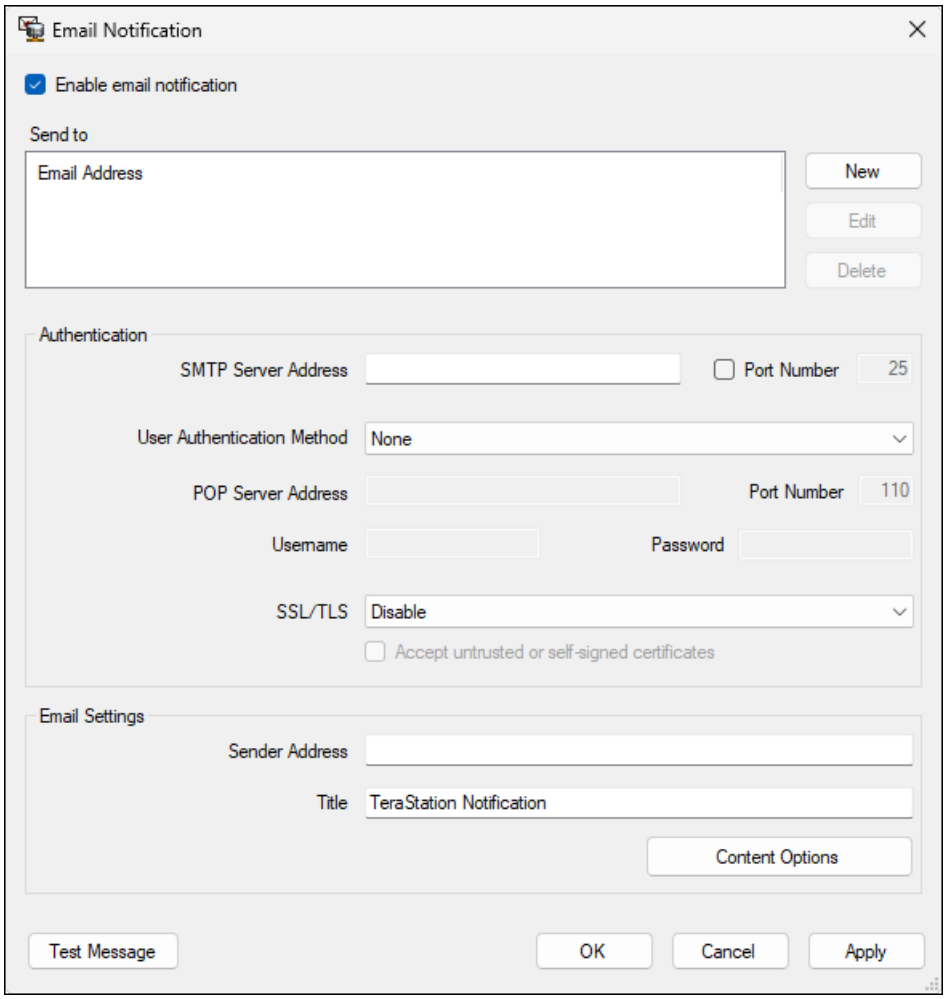
Windows offers a feature called Disk Management that functions similarly to RAID Builder but with some differences, as outlined below:

- Creating a system volume with RAID Builder ensures that if one of the drives used for the system volume fails, the TeraStation can boot using the remaining drive.
- RAID Builder supports the creation of mirrored volumes with GPT partitioning.
- RAID Builder lacks certain features available in Disk Management, including:
  - Creating multiple data volumes
  - Deleting volumes
  - Formatting volumes
  - Creating simple volumes
  - Creating a volume with a specified volume size

Email Notification

Your TeraStation can send you email reports when settings are changed or an error occurs. To launch Email Notification, you must be logged in as a member of the Administrators group in Windows Server.

Note: This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.



Refer to the chart below for details of each display item.

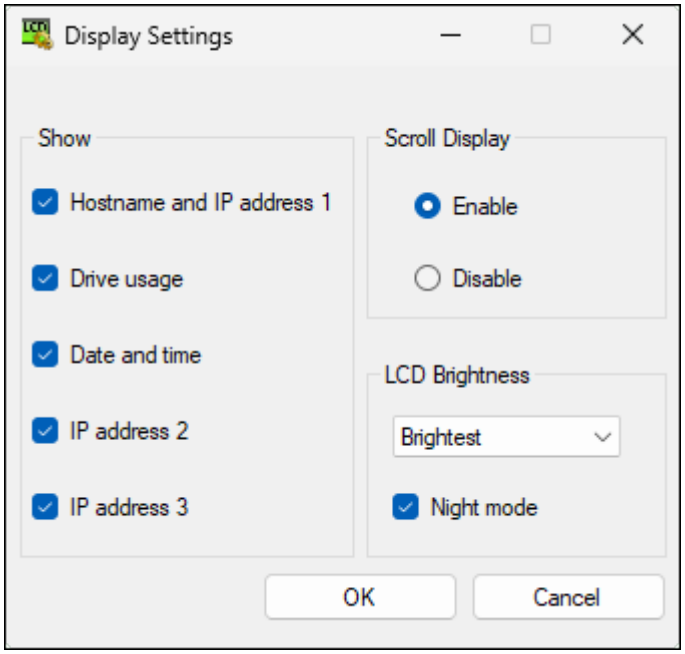
Item	Description
Enable email notification	Enables email notification.
Send to	**New**: Adds a new email address. **Edit**: Edits the email address. **Delete**: Deletes the selected email addresses.

Item	Description
Authentication	**SMTP Server Address**: Enter your STMP mail server address. **Port Number**: Enter the SMTP mail server port number after selecting the checkbox. **User Authentication Method**: Select between "POP before SMTP", "LOGIN (SMTP-AUTH/LOGIN)", "CRAM-MD5 (SMTP-AUTH/CRAM-MD5)", or "None". **POP Server Address**, **Port Number**: Enter the port number if "POP before SMTP" is selected for user authentication method. **Username**, **Password**: Enter the username and password for mail server authentication. **SSL/TLS**: Select the communication encryption type to be used from either SSL/TLS or STARTTLS if "LOGIN (SMTP-AUTH/LOGIN)" or "CRAM-MD5 (SMTP-AUTH/CRAM-MD5)" is selected for user authentication method.
Email Settings	**Sender Address**: Enter the email address as the notification email sender. **Title**: Enter the subject of notification email.
Content Options	Specifies the event categories to be notified.
Test Message	Sends a test message to confirm if all settings are correct.

Display Settings

The TeraStation's LCD panel settings can be changed using this software. To launch Display Settings, you must be logged in as a member of the Administrators group in Windows Server.

Note: This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.



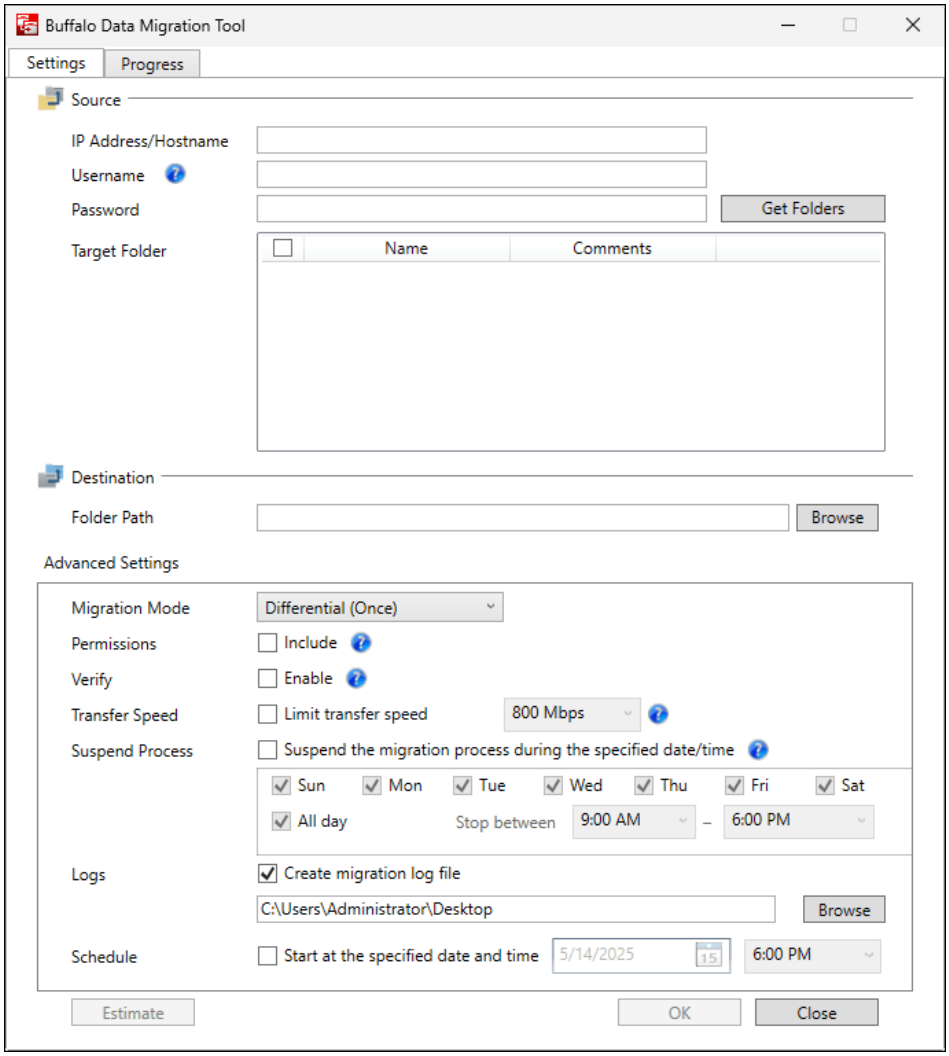
Refer to the chart below for details of each display item.

Item	Description
Show	Select the items to be displayed on the LCD panel.
Scroll Display	Configures whether to scroll display items at a regular interval.

Item	Description
LCD Brightness	Changes the brightness of the LCD panel and front LEDs from level 1 (darkest) to 5 (brightest). If "Night mode" is selected, the LCD brightness will be set at level 2 (dark) from 6 p.m. to 8:59 a.m. the next day. **Note:** If the brightness is already set to level 1 (darkest) or level 2 (dark), the "Night mode" option will be grayed out and cannot be selected.

Buffalo Data Migration Tool

This software allows you to migrate settings and data from another TeraStation to your current one. To launch Buffalo Data Migration Tool, you must be logged in as a member of the Administrators group in Windows Server.



Refer to the separate "NAS Migration Guide" for more detailed information on this software.

Chapter 4 User Management

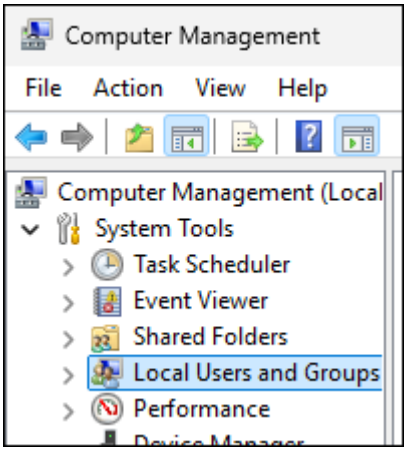
Creating a User

To create a user, follow the procedure below.

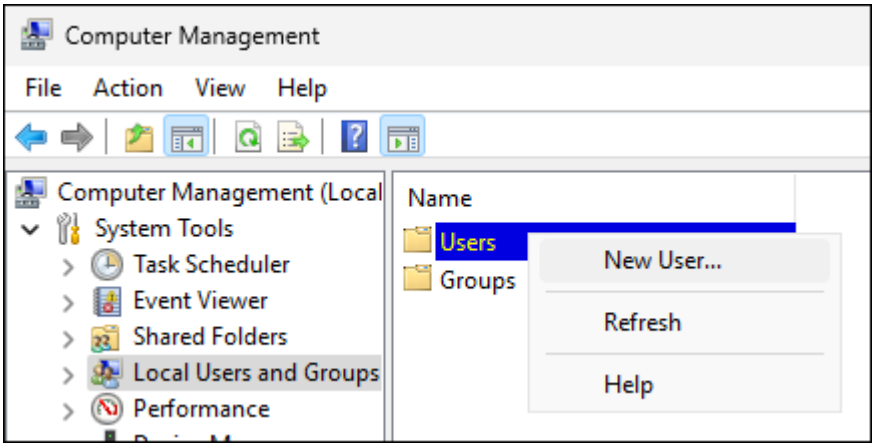
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

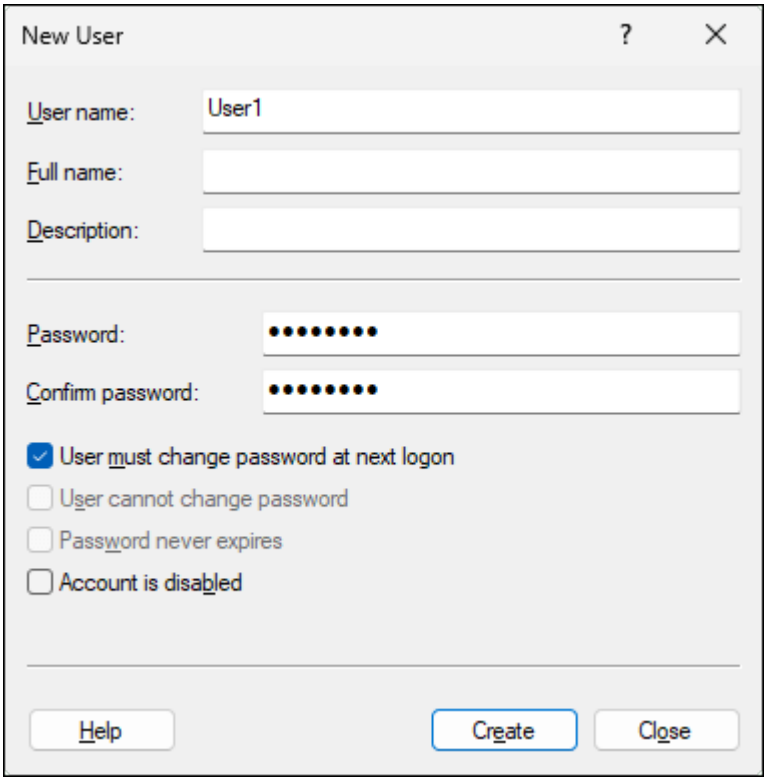
3 Click *Local Users and Groups* in the left-side menu.



4 Right-click *Users* in the center menu, then select *New User*.



5 Enter a username and passwords (twice), then click *Create*.



6 The process is complete once you close the window.

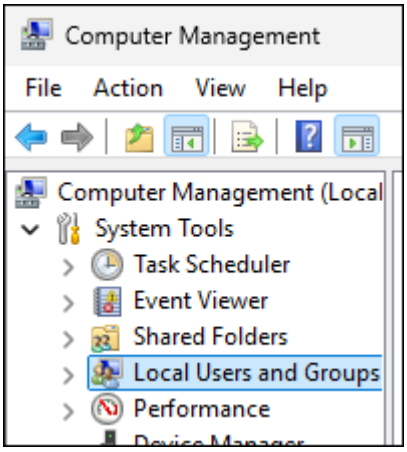
Note: To sign in to the TeraStation using the created user account, the user must have Administrator privileges or belong to the Administrators group. To grant Administrator access to the created account, select the user, click *Change the account type*, select "Administrator", and then click *Change Account Type*.
To add the created account to the Administrators group, refer to the "Connecting with Standard Accounts" section below.

Adding a Group

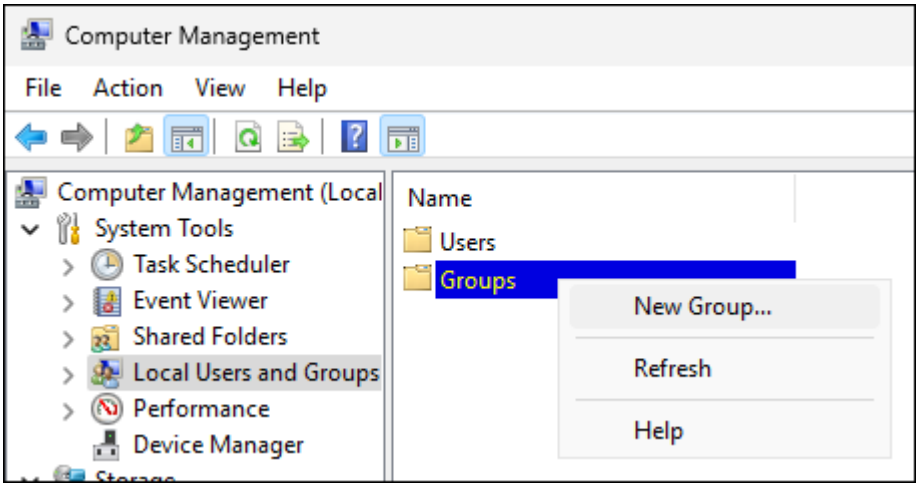
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

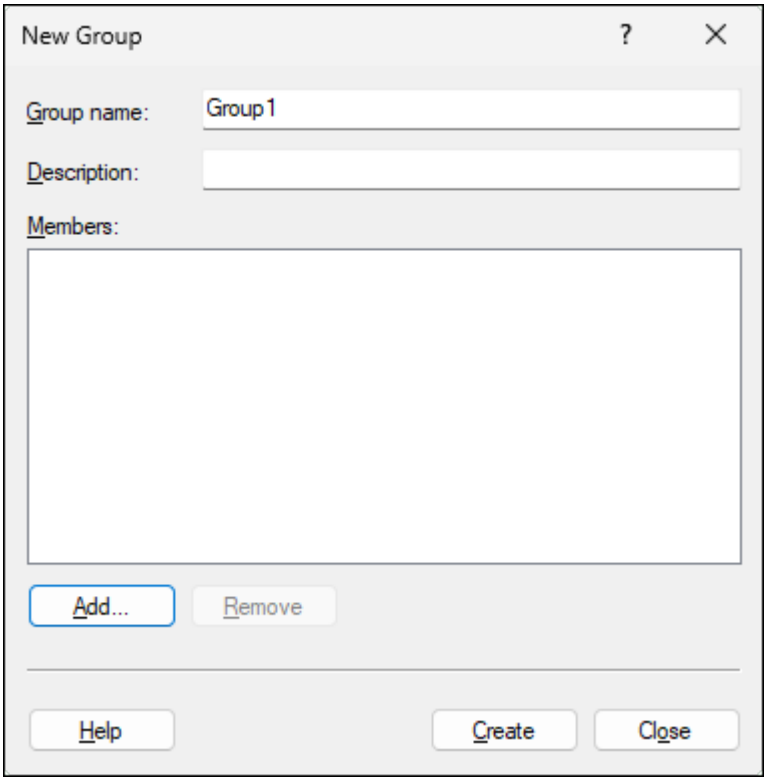
3 Click *Local Users and Groups* in the left-side menu.



4 Right-click *Groups* in the center menu, then select *New Group*.

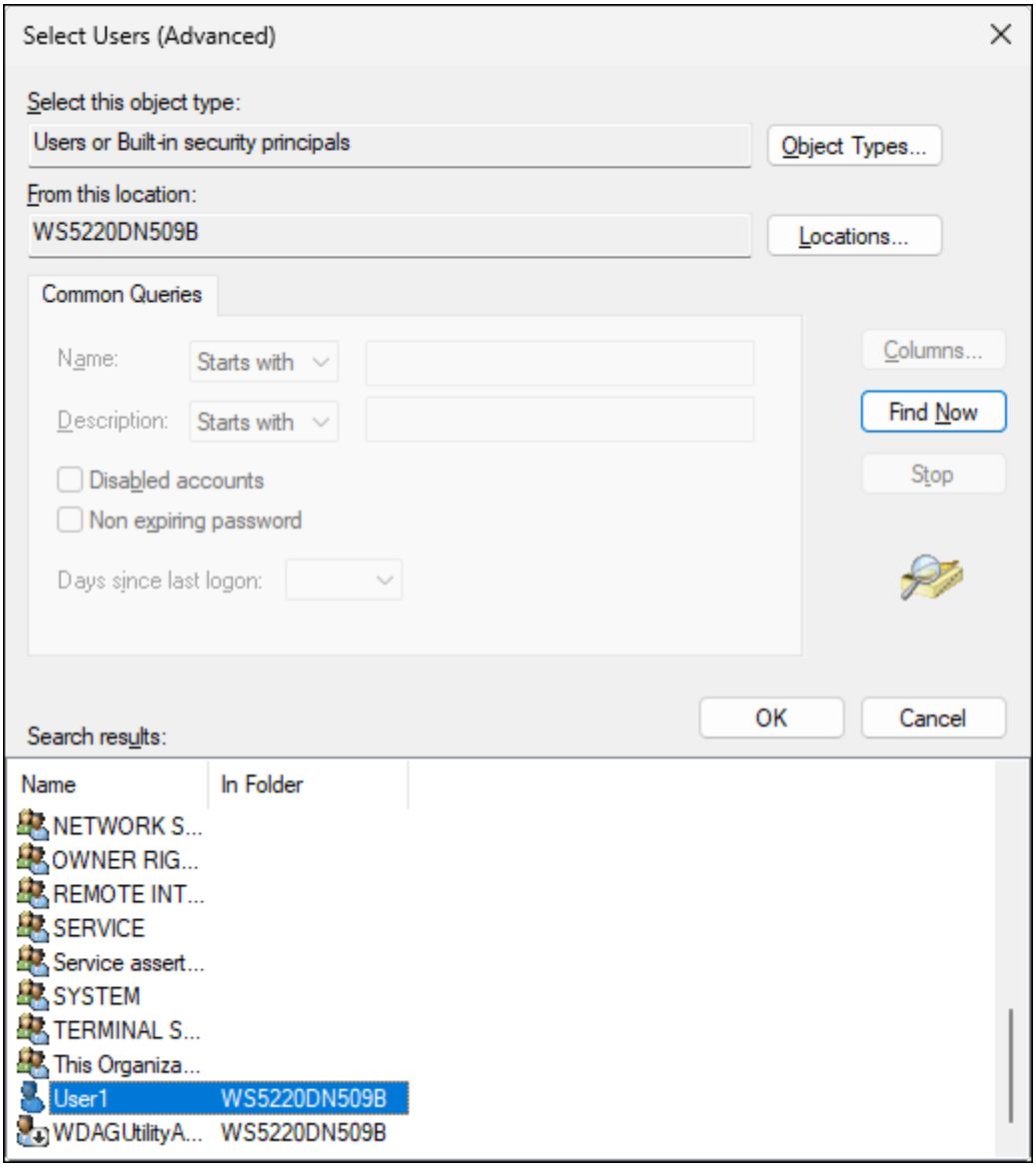


5 Enter a group name and click *Add*.



6 Click *Advanced* > *Find Now*.

7 Select the users to be registered to the group, then click *OK*.



8 Click *OK*, then click *Create*.

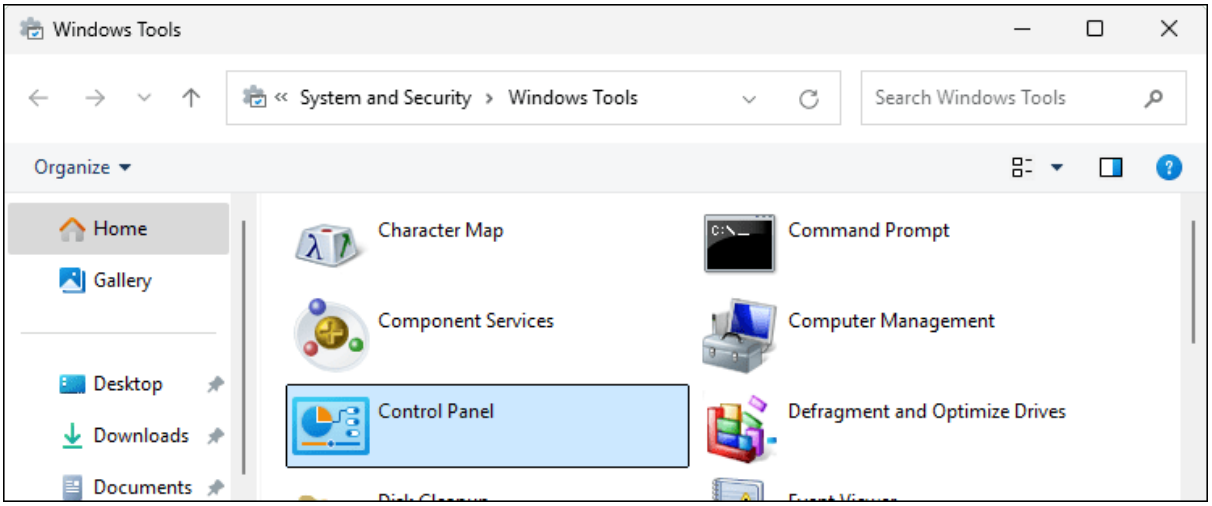
9 The process is complete once you close the window.

Changing the Password

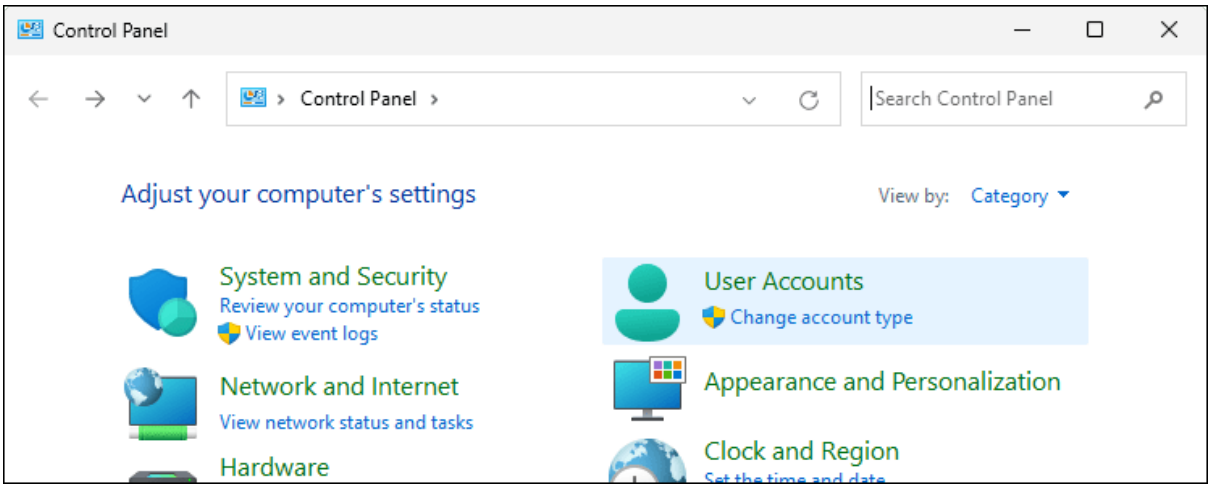
Follow the procedure below to change a user's password. This section explains the procedure of changing the password of an administrator user ("Administrator"). The default password for the TeraStation's administrator account is "password". This is public knowledge, so for security, you should change it immediately.

1 Click the Start button ( ) > *All* at the upper-right > *Windows Tools*.

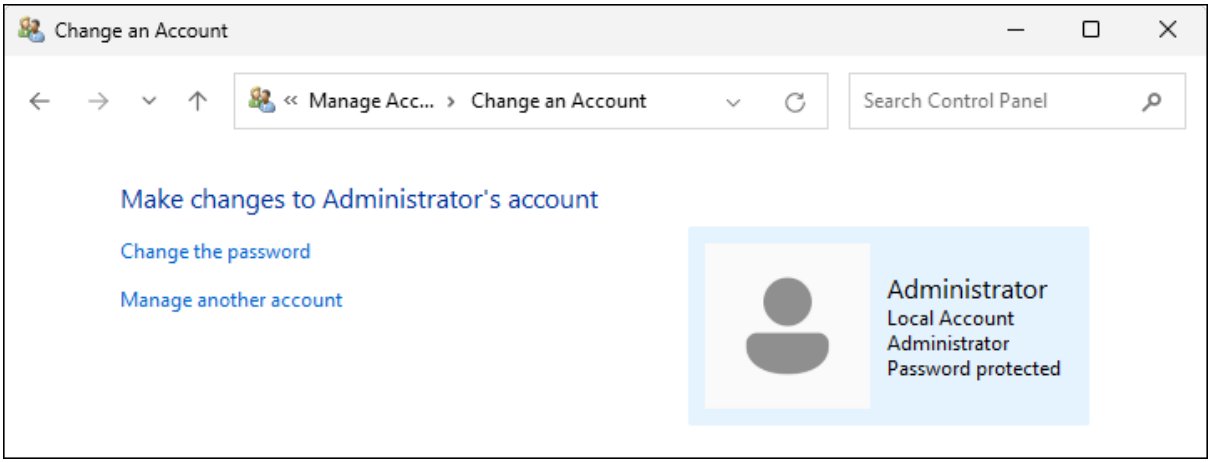
2 Double-click *Control Panel*.



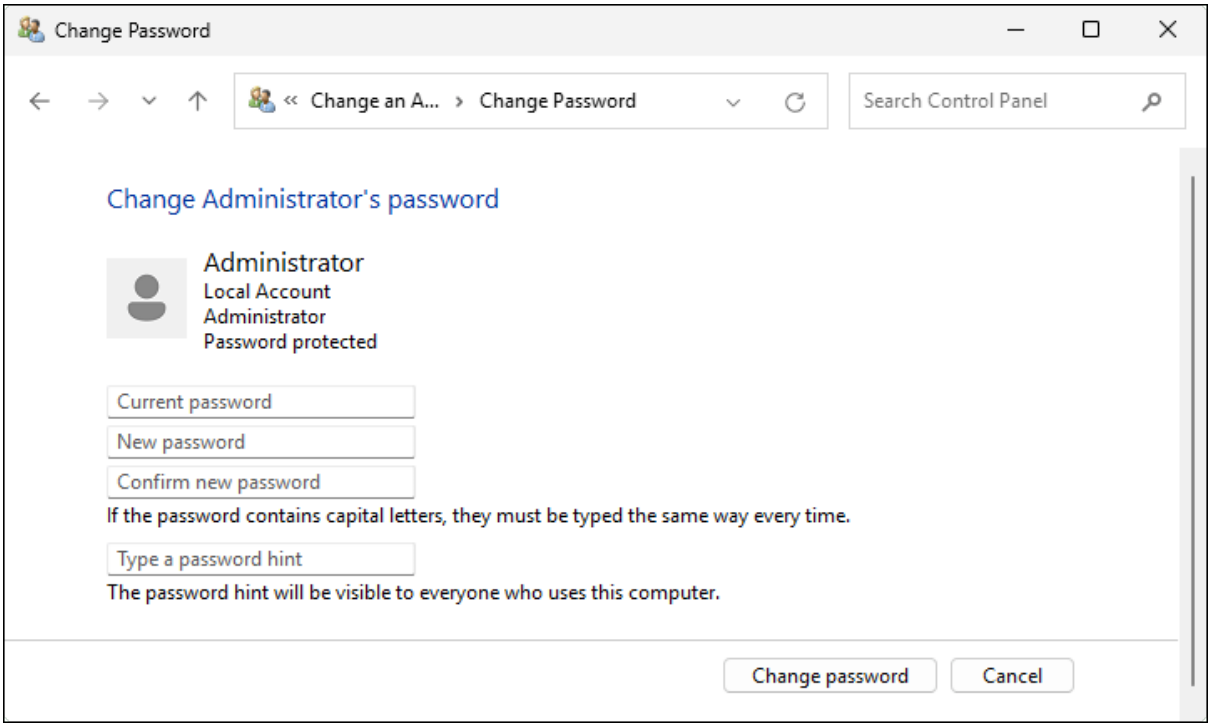
3 Click *Change account type* under "User Accounts".



4 Click *Administrator*, then click *Change the password*.



5 Enter the current administrator's password and a new password (twice), then click *Change password*.



6 The process is complete once you close the window.

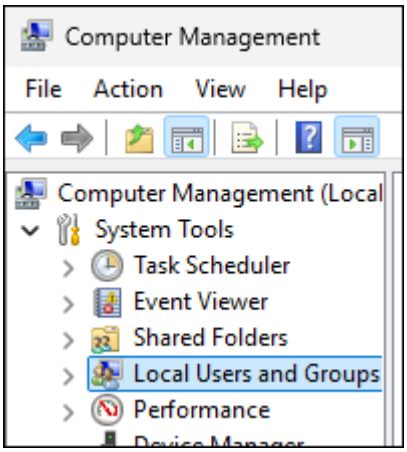
Connecting with Standard Accounts

Accounts not belonging to the Administrators group cannot connect to Windows Server through the remote desktop. Those accounts must first be added to the "Remote Desktop Users" group. Follow the procedure below to add accounts to the group.

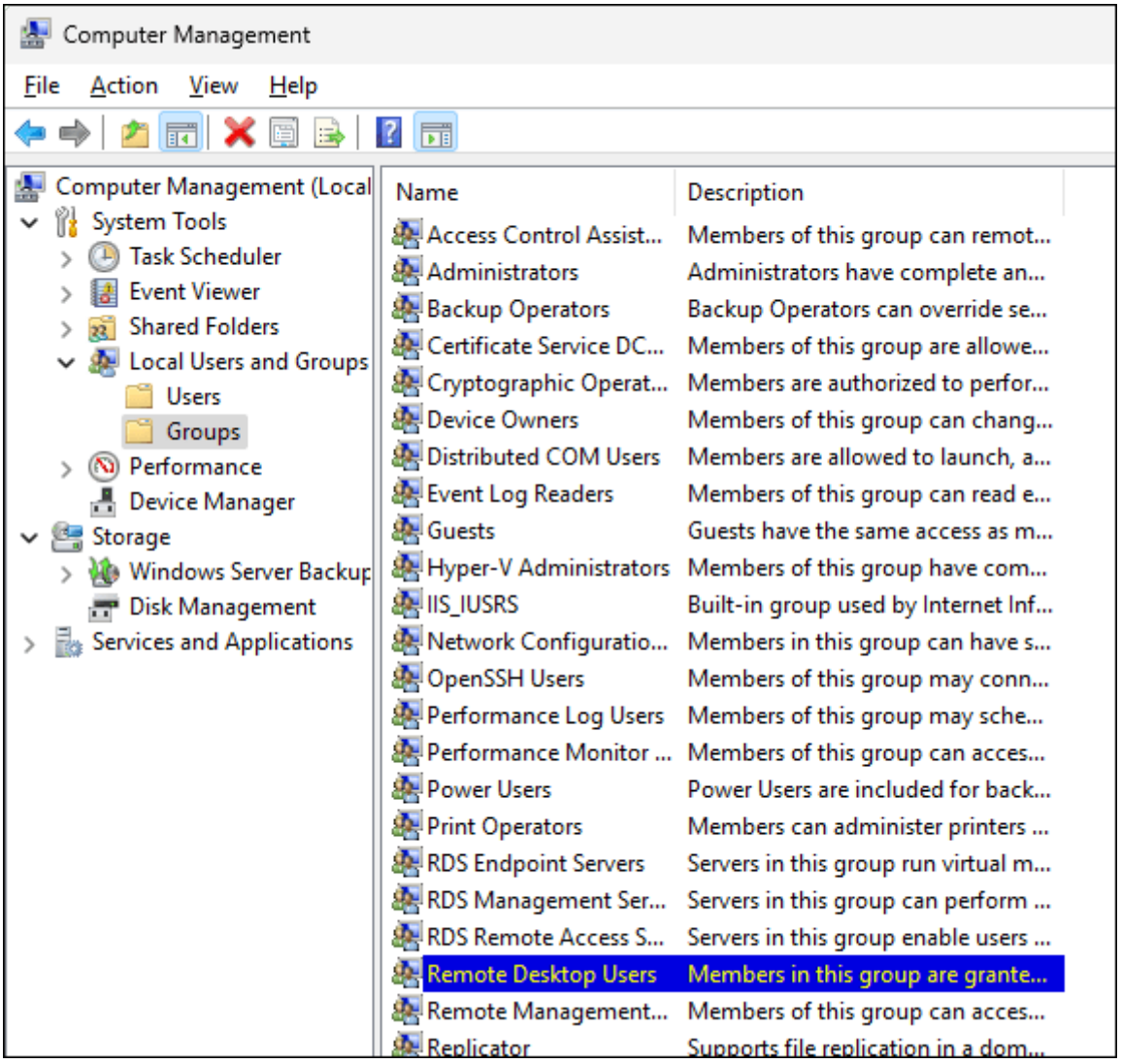
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

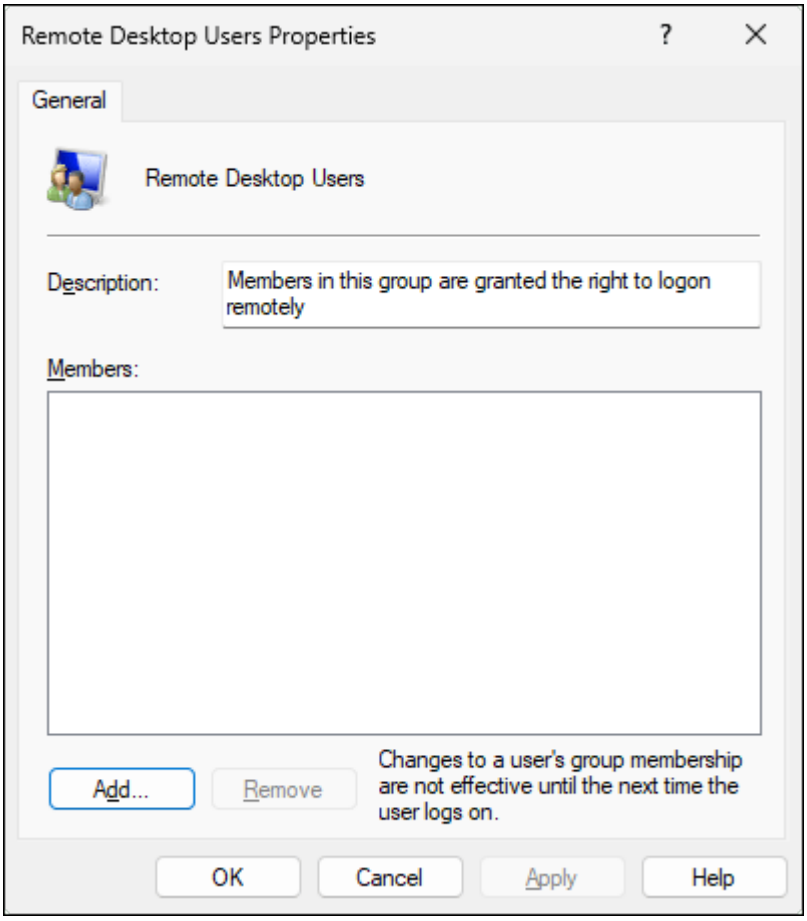
3 Click *Local Users and Groups* in the left-side menu.



4 Double-click *Groups* > *Remote Desktop Users* in the center menu.

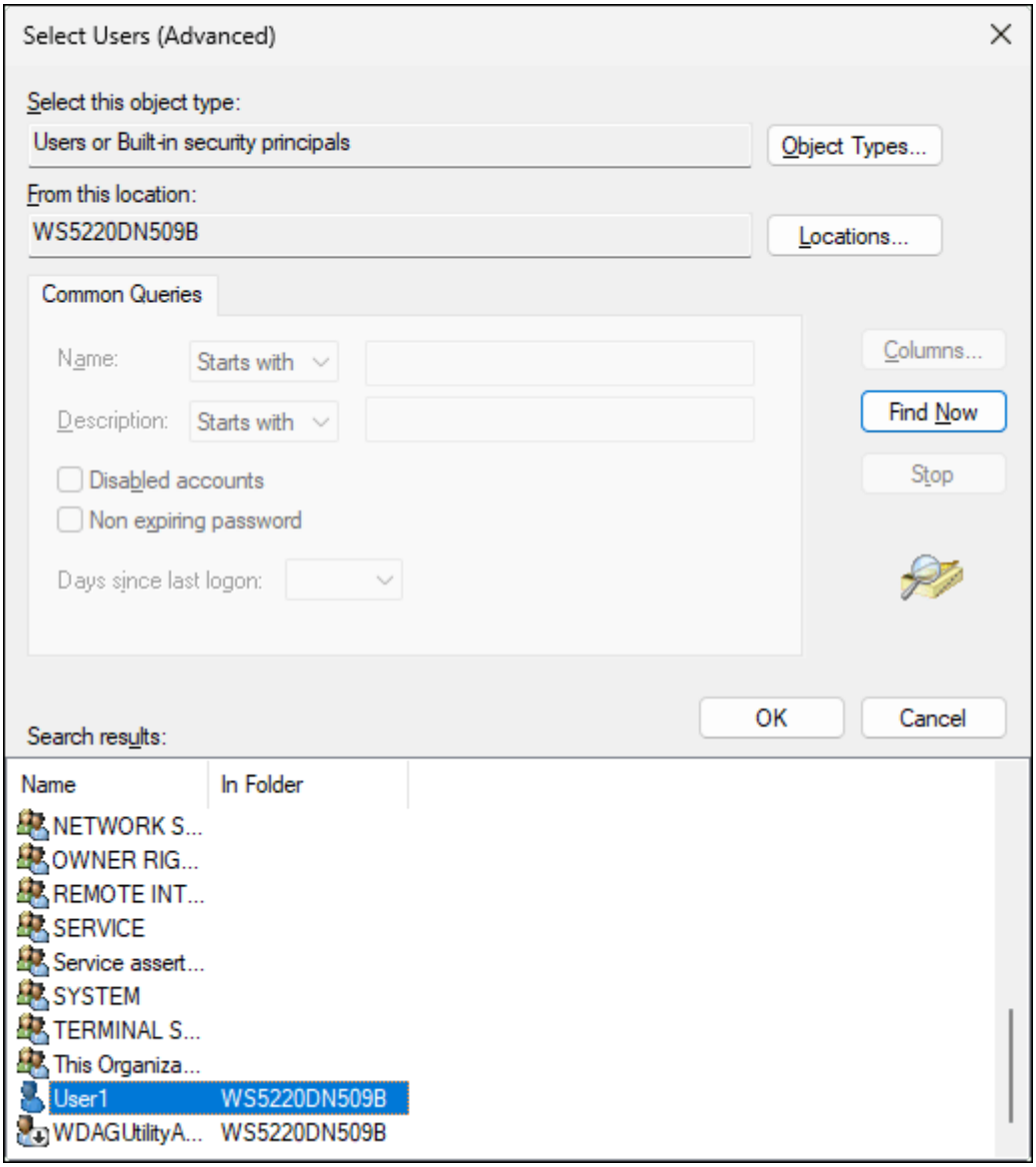


5 Click *Add*.



6 Click *Advanced* > *Find Now*.

7 Select the user to be added as a group member and click *OK*.



8 Click *OK*, then click *OK* again.

9 The process is complete once you close the window.

Chapter 5 Storage Management

You can store data using either RAID or Storage Spaces. To change from RAID volumes to Storage Spaces virtual disks, follow the procedure in the "Configuring Storage Spaces" section below.

Available RAID Volumes

The TeraStation supports multiple types of RAID. The type of RAID volumes available for use depends on how many drives are installed on your TeraStation.

Notes:

- To create a volume, use RAID Builder instead of the Disk Management option in Windows Server.
- When volumes are deleted, formatted, or changed to another volume type, all data stored on the volumes is erased. Before executing these operations, back up any important data.
- In this manual, "recover" means reverting the TeraStation (including the data) to its former state prior to the drive failure. It doesn't refer to reading data from a failed drive.
- After a volume is created, unused extra space can't be added to the volume.
- Some space on each drive is not accessible because it is used by the system. The amount used on each drive is below.

  Drives in slots 1 and 2: 50 MB each
  Drives in slots 3 and 4: 100.15 GB each

RAID 5 Volume

Three or more drives are combined into a single volume. The usable space is equal to the sum of the capacity of all the drives minus one. Data is written with parity. If any single drive becomes damaged, data can be recovered after replacing the defective drive. However, if two or more drives become damaged, then all data on the volume will be lost.

Mirrored Volume

Two drives are combined into a single volume. The usable space is equal to the capacity of a single drive. Data is written to both drives. If either drive becomes damaged, data can be recovered after replacing the defective drive. However, if both drives become damaged, then all data on the volume will be lost.

Striped Volume

Two or more drives are combined into a single volume. The usable space is equal to the sum of the capacity of all the drives. Data is striped to multiple drives. If any of the drives become damaged, then all data on the volume will be lost.

Spanned Volume

Two or more drives are combined into a single volume. The usable space is equal to the sum of the capacity of all the drives. If any of the drives become damaged, then all data on the volume will be lost.

The default RAID volume is mirrored for the WS5220DN5 TeraStation model and RAID 5 for the WS5420DN5 and WS5420RN5 TeraStation models.

Deleting a Volume

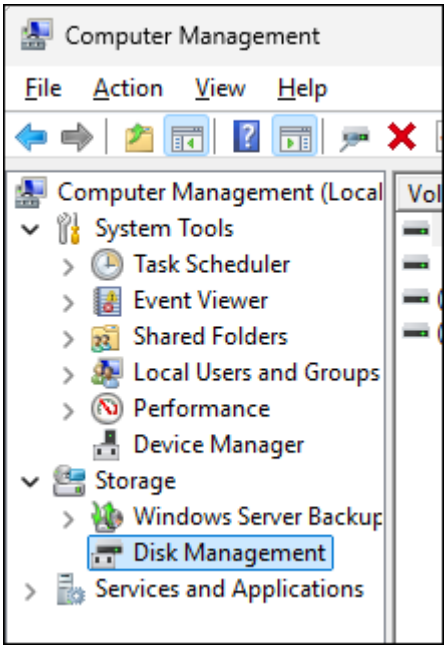
Before changing a volume, the previous volume must be deleted. Follow the procedure below to delete the volume.

Note: If a volume shows the status "Failed", two or more drives have been corrupted. In such a case, data on the volume can no longer be recovered.

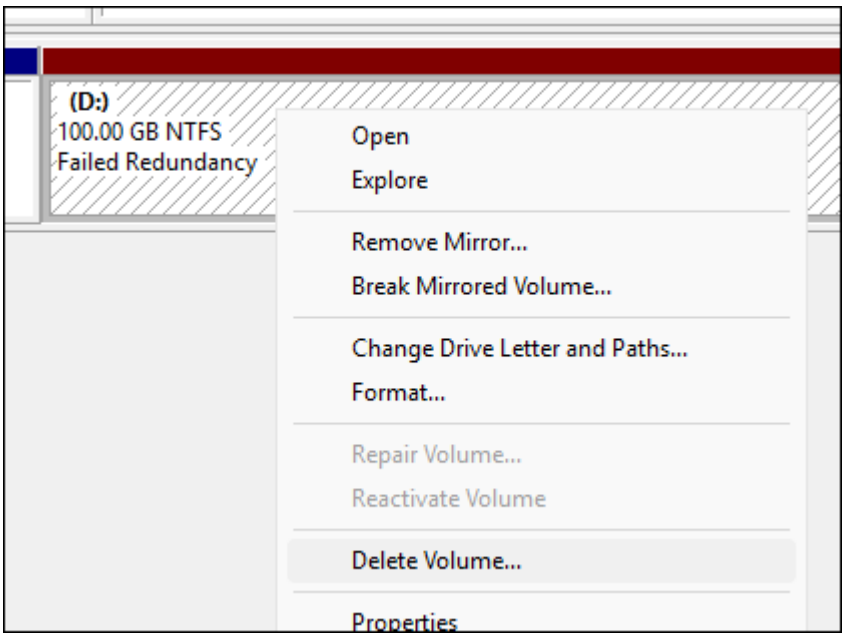
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Click *Disk Management* in the left-side menu.



4 Right-click the volume to delete and select *Delete Volume*.



5 Read the warning message carefully about the data that will be erased and click *Yes*.

Creating a Volume

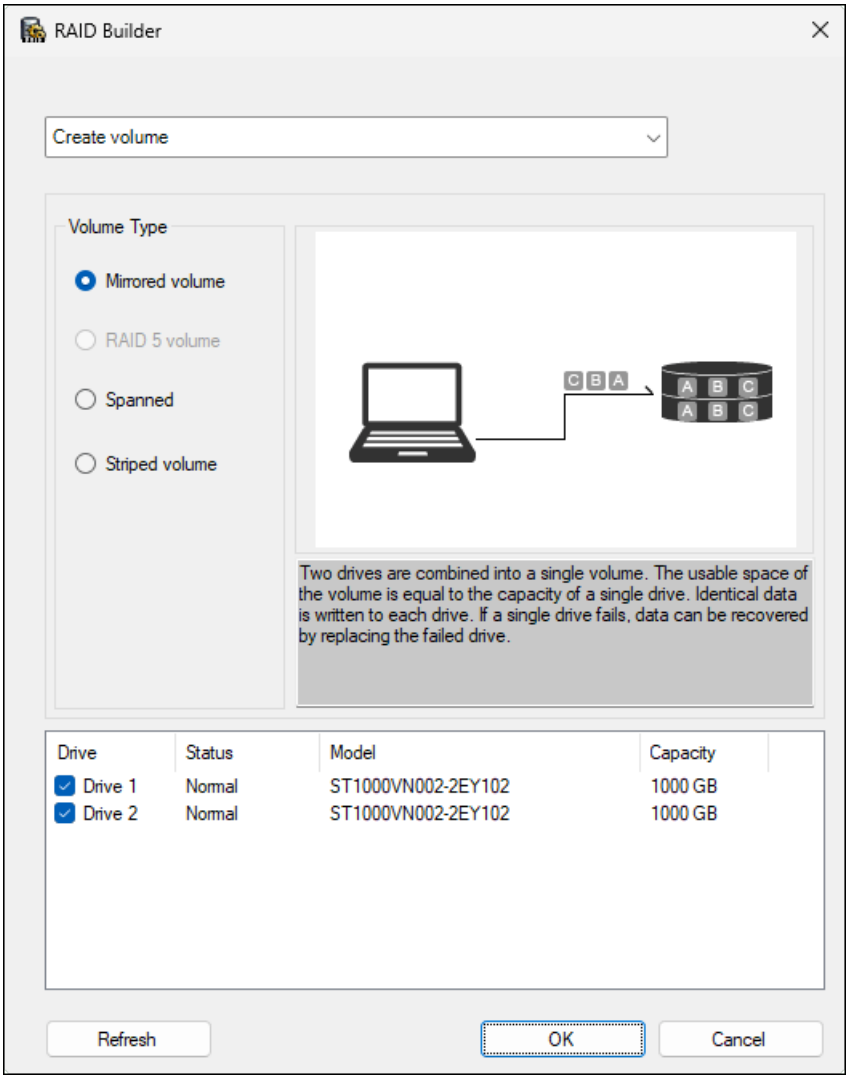
To create a volume using unallocated areas generated by deleting volumes, follow the procedure below. Completing this procedure will erase all data on the volumes.

Note: The following procedure for creating volumes with RAID Builder cannot be performed if there is a Storage Spaces virtual disk. To proceed with RAID Builder, delete any existing Storage Spaces virtual disks first.

1 Click the Start button ( ), then click *RAID Builder* in the Start menu.

2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Select "Create volume" from the drop-down list and select the volume type under "Volume Type".



4 Select the checkboxes of the drives that will be used to create a volume. If creating a RAID 5 volume, at least three drives are required. If creating a volume other than a RAID 5 volume, at least two drives are required.

5 Click *OK*. Resynchronization will start automatically. File transfers and system performance will be slower while resynchronization is running, which will take about 23 hours for a RAID 5 volume and about 2–3 hours for a mirrored volume per a 4 TB TeraStation model. Resynchronization cannot be canceled.

6 The process is complete once the new volume is created. Next, create a shared folder by referring to the "Creating a Shared Folder" section in chapter 2.

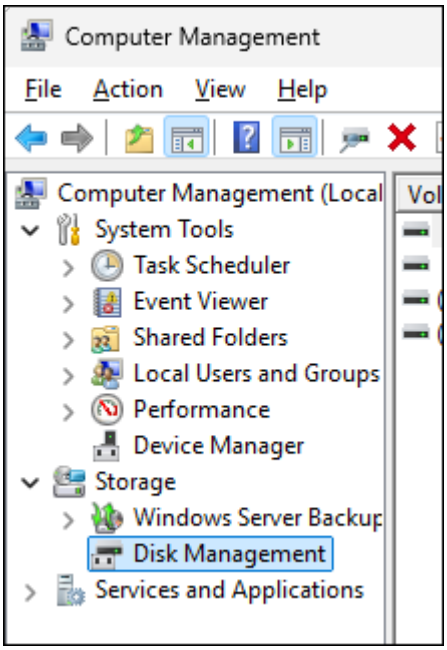
Formatting a Volume

To format a volume, follow the procedure below.

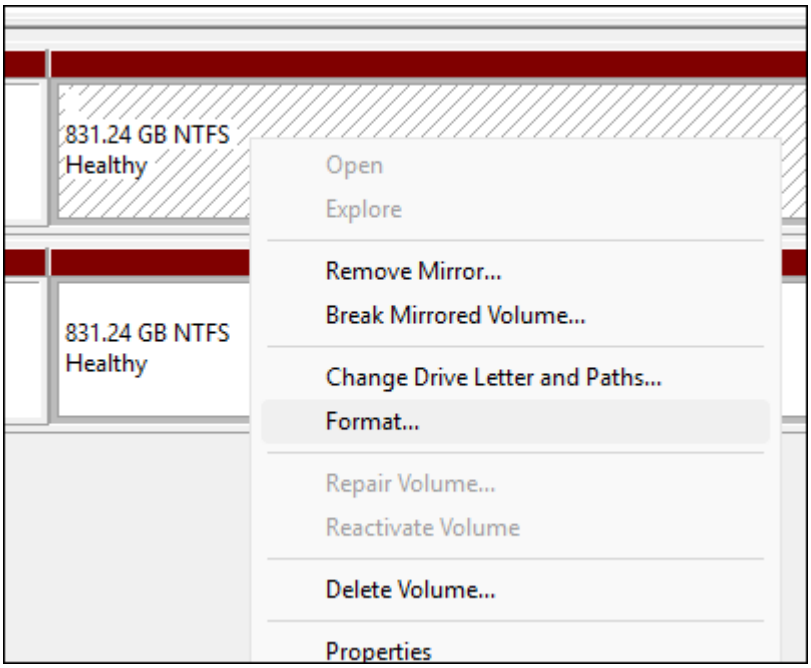
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Click *Disk Management* in the left-side menu.



4 Right-click the volume that you want to format and select *Format*.



5 The process is complete once formatting is finished. Next, create a shared folder by referring to the "Creating a Shared Folder" section in chapter 2.

Configuring Storage Spaces

Storage Spaces is a virtualization technology that aggregates multiple drives into a single logical storage pool, allowing you to create virtual disks that you can provision to your storage needs. You can expand storage later by adding more drives to the pool without affecting your existing data.
To configure Storage Spaces, follow the procedure below.

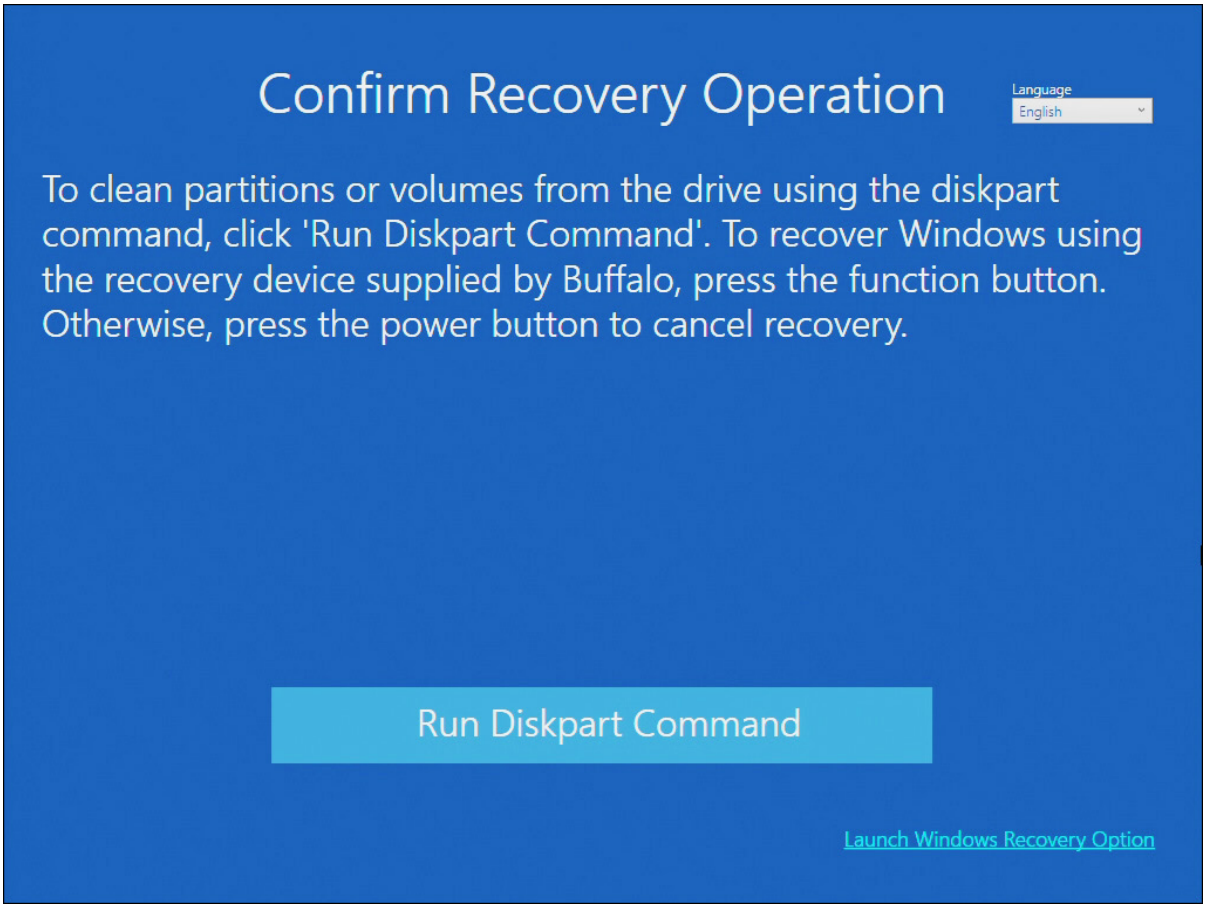
Step 1 Deleting Existing Partitions and Volumes

1 Power off the TeraStation.

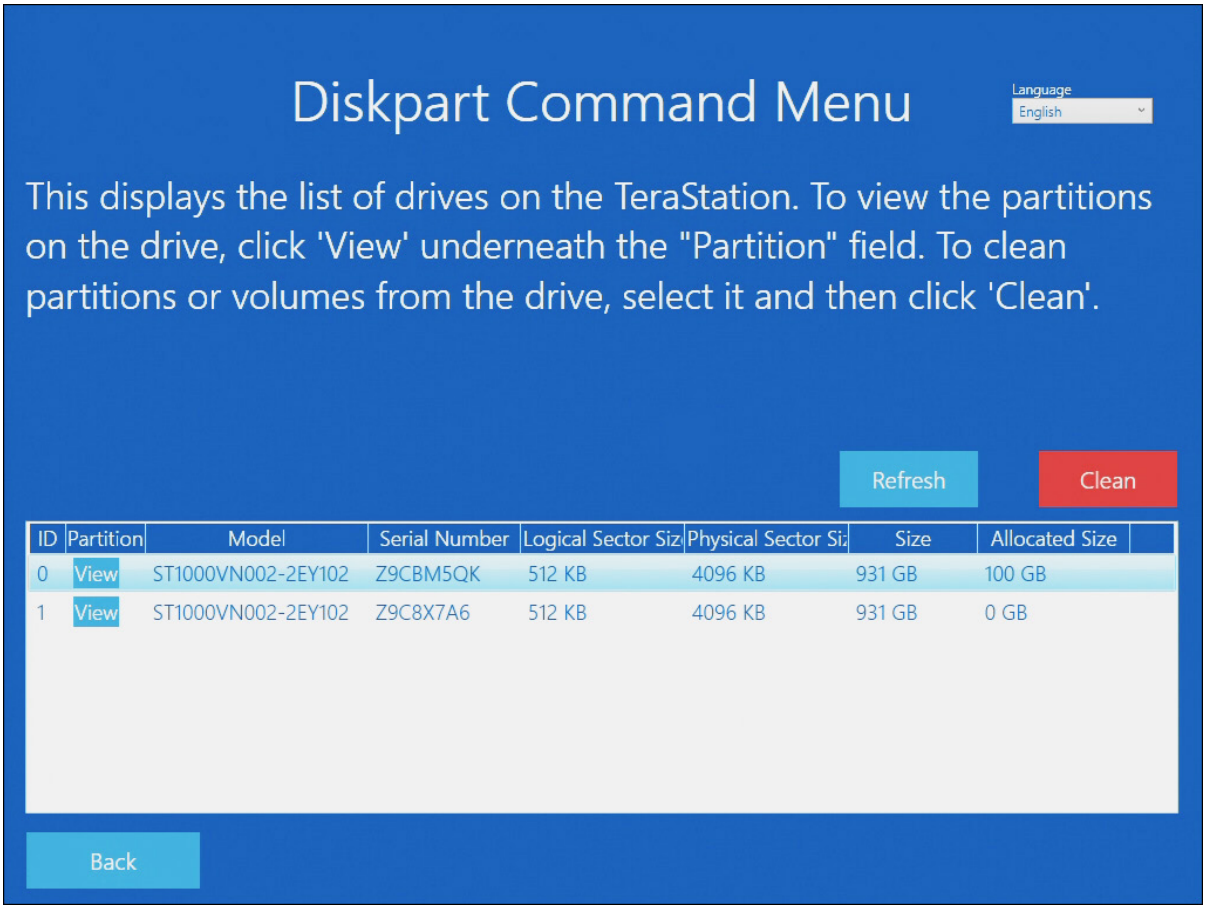
2 Connect a display device to the VGA port, and connect the card reader with the recovery SD card and USB mouse to the USB ports on the TeraStation.

3 Hold down the function button until the "Preparing Recovery..." message appears on the LCD panel. When the message appears, release the function button.

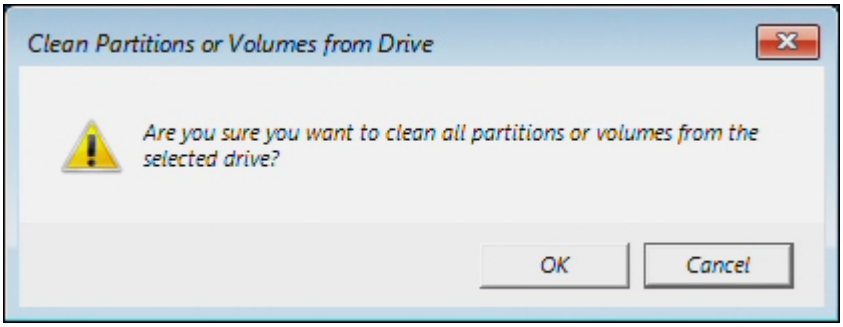
4 Click the *Run Diskpart Command* button that appears on the display device.



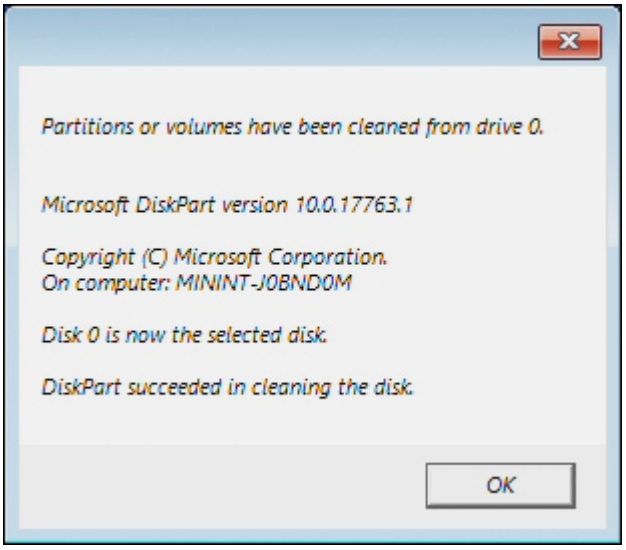
5 Choose a drive and click *Clear*.



6 Click *OK*.



7 When the following message appears, click *OK*.



8 Repeat steps 5–7 for all inserted drives.

9 The process is complete once all partitions on the drives have been cleared. Power off the TeraStation by pressing the power button.

Step 2 Recovering the TeraStation

Recover the TeraStation by referring to the "Recovering Using the Supplied SD Card" section in chapter 9.

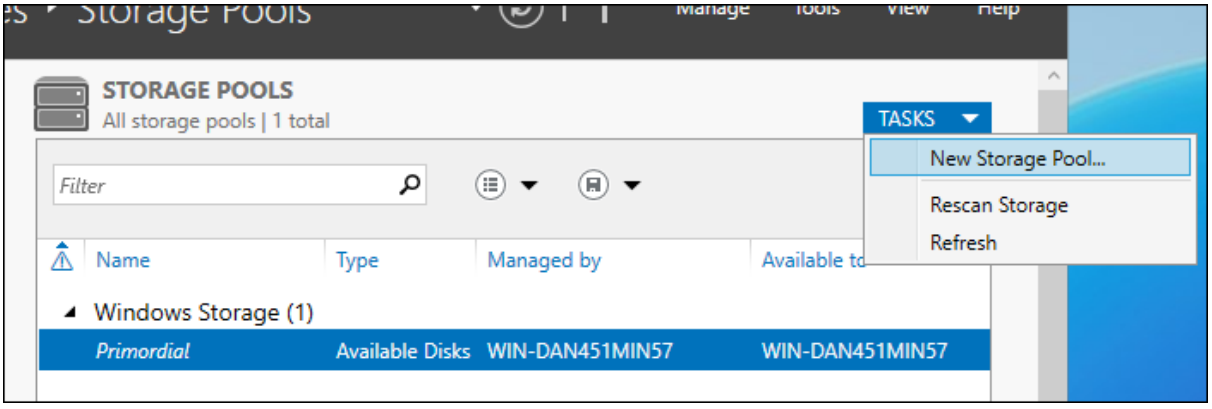
Step 3 Creating a Storage Pool

After recovery, follow the procedure below to create a storage pool.

1 Click the Start button ( ) and click *Server Manager* in the Start menu.

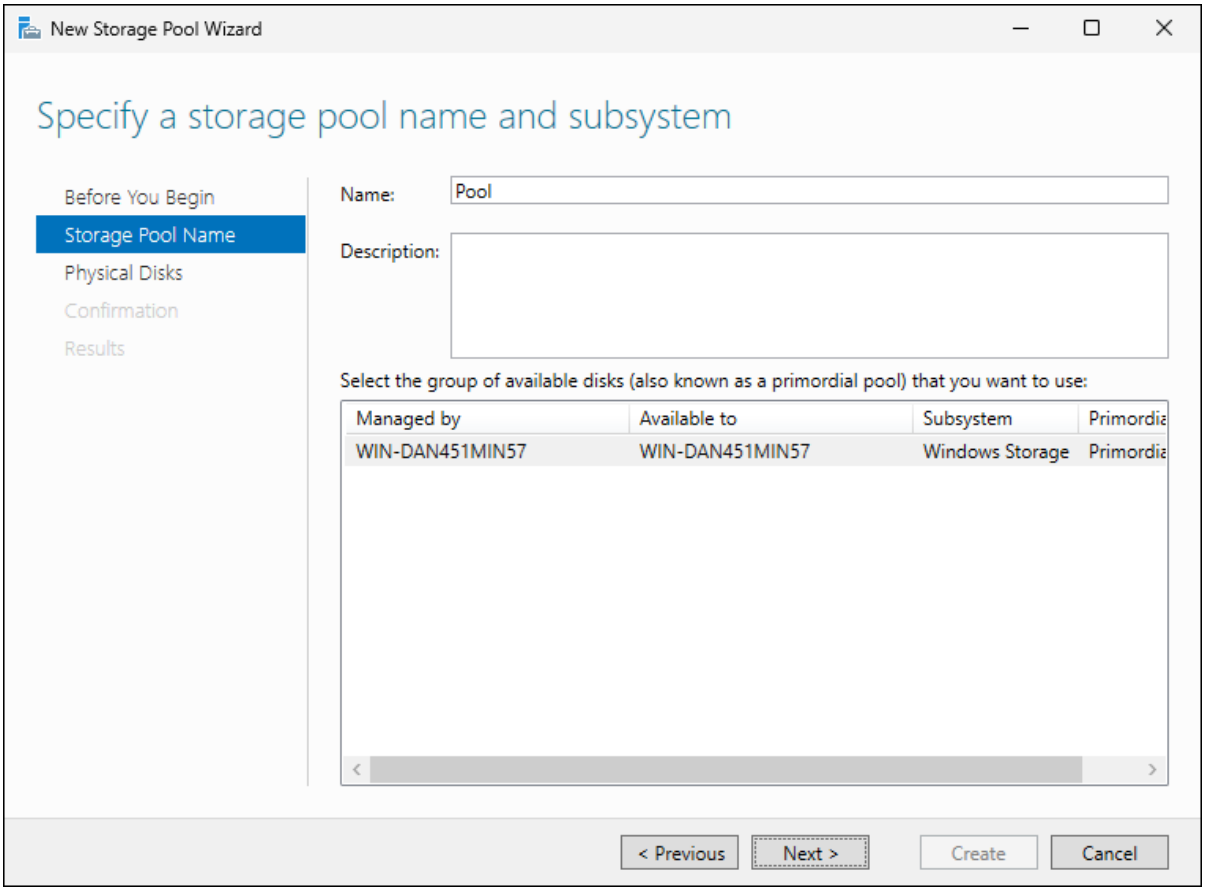
2 Click *File and Storage Services* > *Storage Pools* in the left-side menu.

3 Click *Tasks* to the right of "Storage Pools", then select *New Storage Pool*.

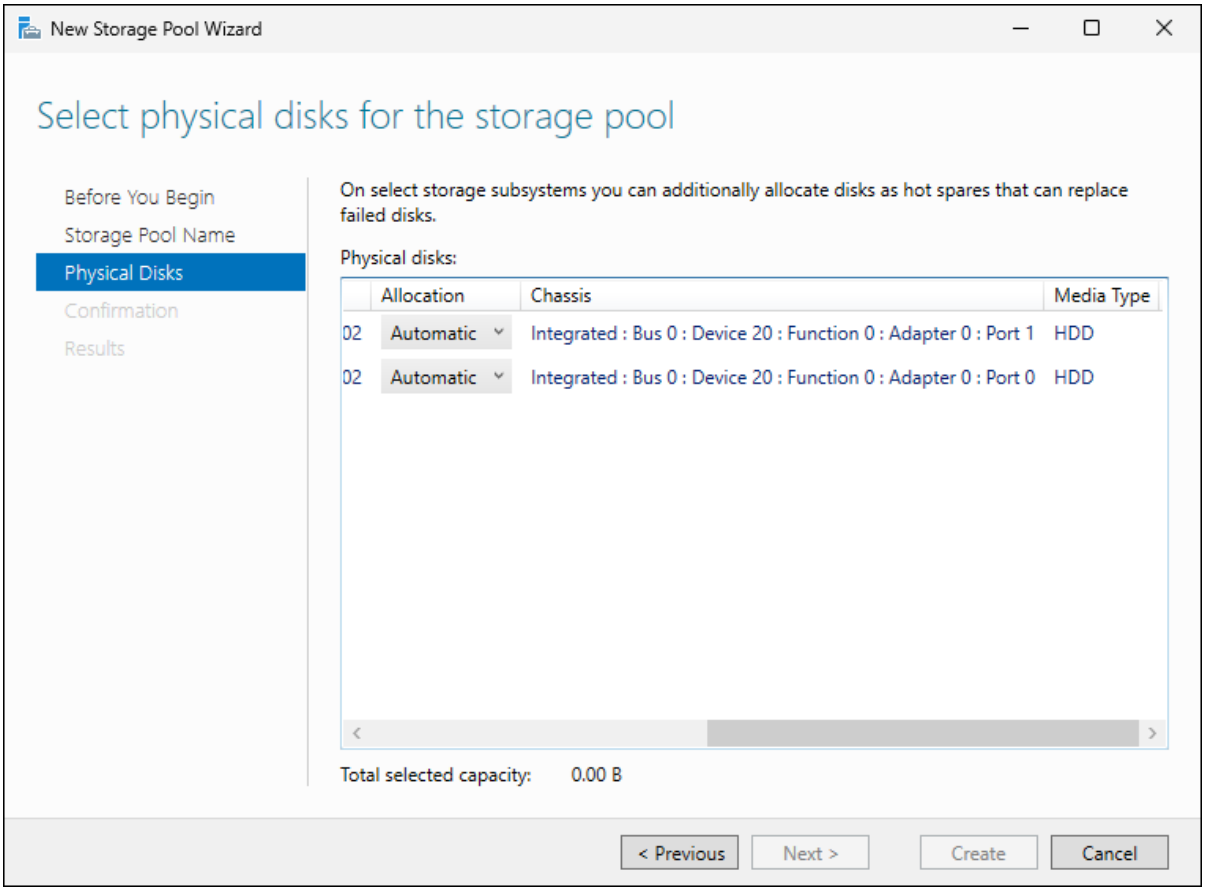


4 Click *Next*.

5 Enter the desired storage pool name and click *Next*.

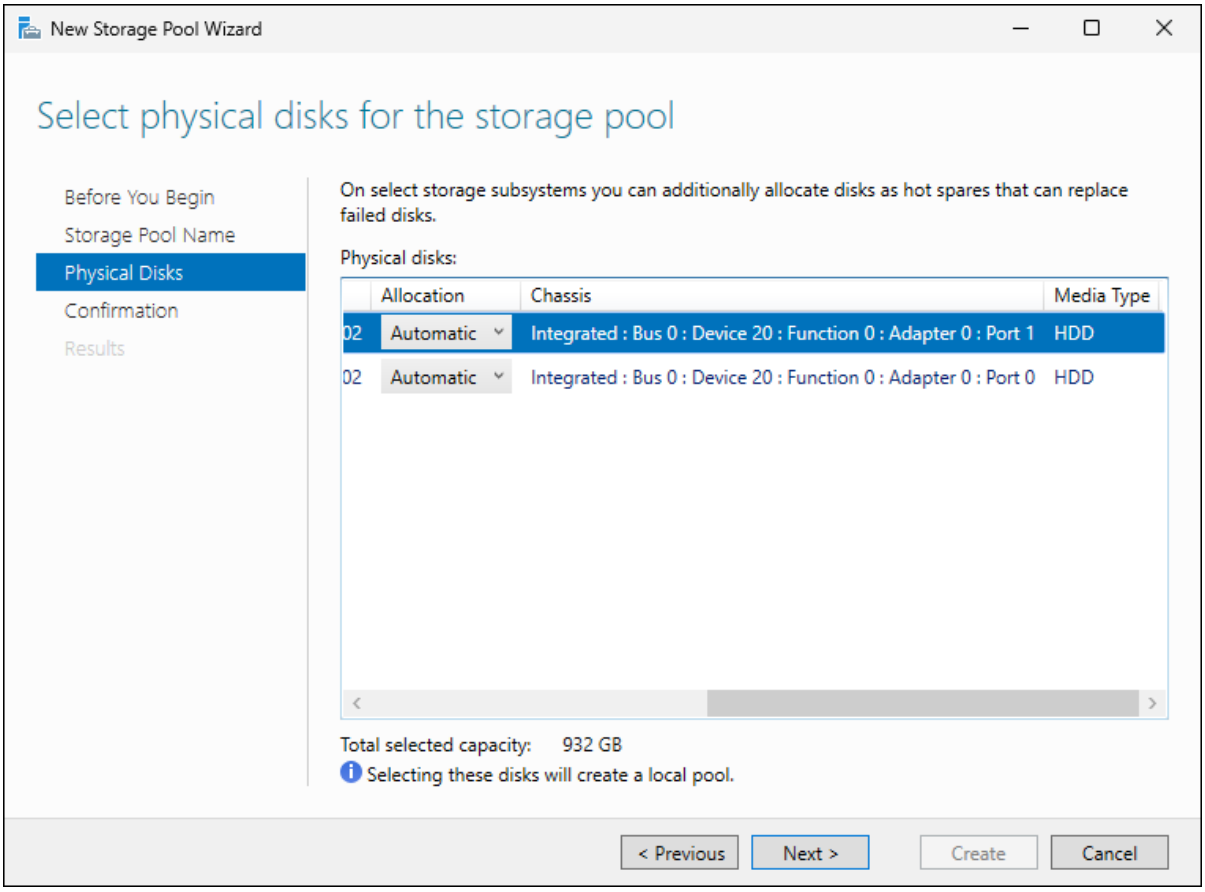


6 Move the scroll bar to the right until the "Chassis" field is shown.



7 Select all drives other than "Port 0" for the storage pool, then click *Next*.

Note: The drive labeled "Port 0" corresponds to the drive inserted as drive 1 on the TeraStation. This drive is excluded as the system will be installed onto it by default, and thus it cannot be used for storage pool creation. If you have installed the system onto a different drive, be sure to exclude the appropriate system drive instead.



8 The process is complete once you click *Create* after all displayed settings are confirmed.

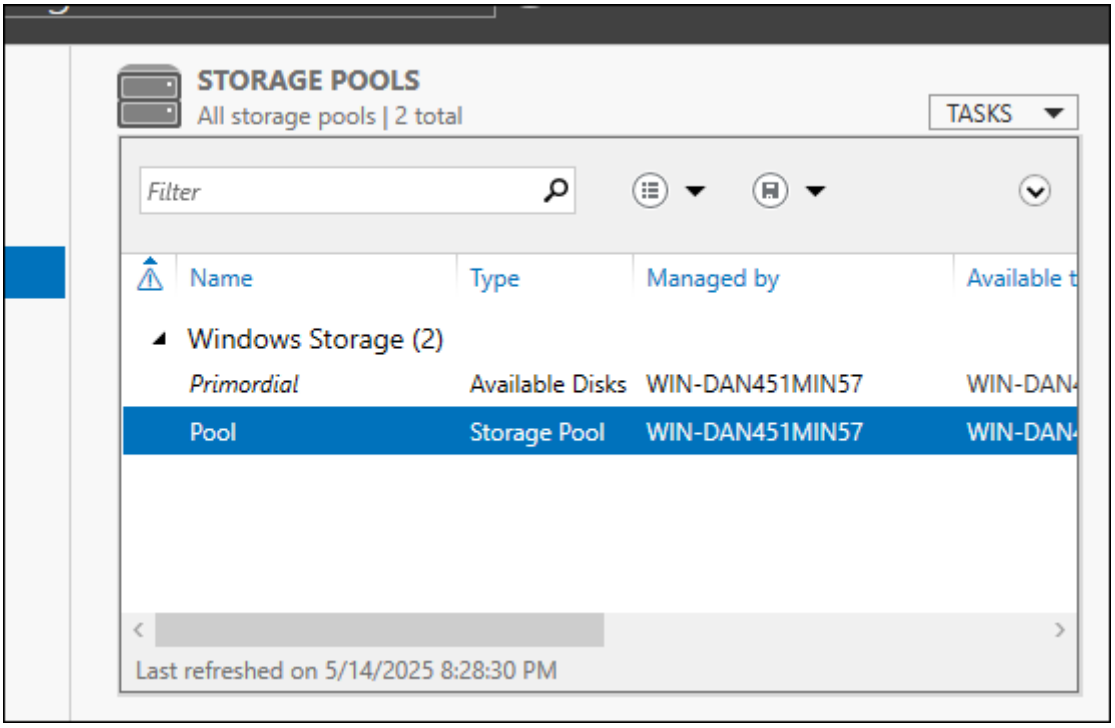
Step 4 Creating a Virtual Disk

After creating the storage pool, follow the procedure below to create a virtual disk.

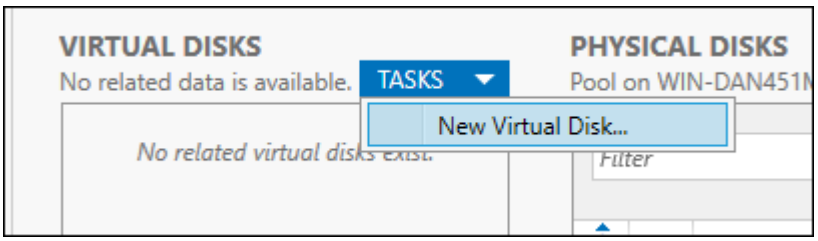
1 Click the Start button ( ) and click *Server Manager* in the Start menu.

2 Click *File and Storage Services* > *Storage Pools* in the left-side menu.

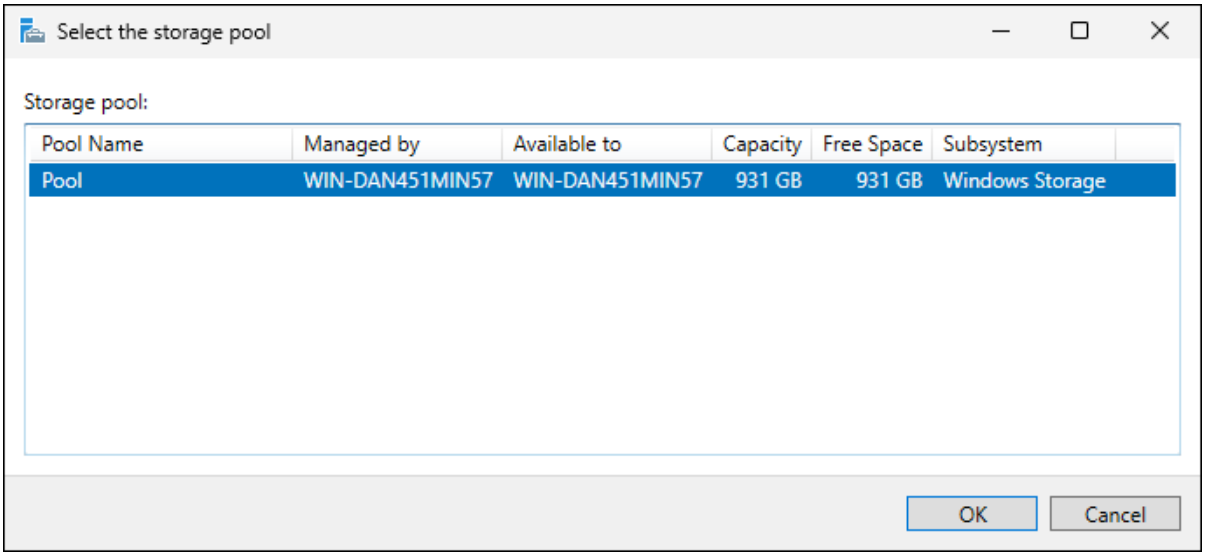
3 Make sure that the storage pool you created has been selected under the "Storage Pools".



4 Click *Tasks* to the right of *Virtual Disks*, then select *New Virtual Disk*.

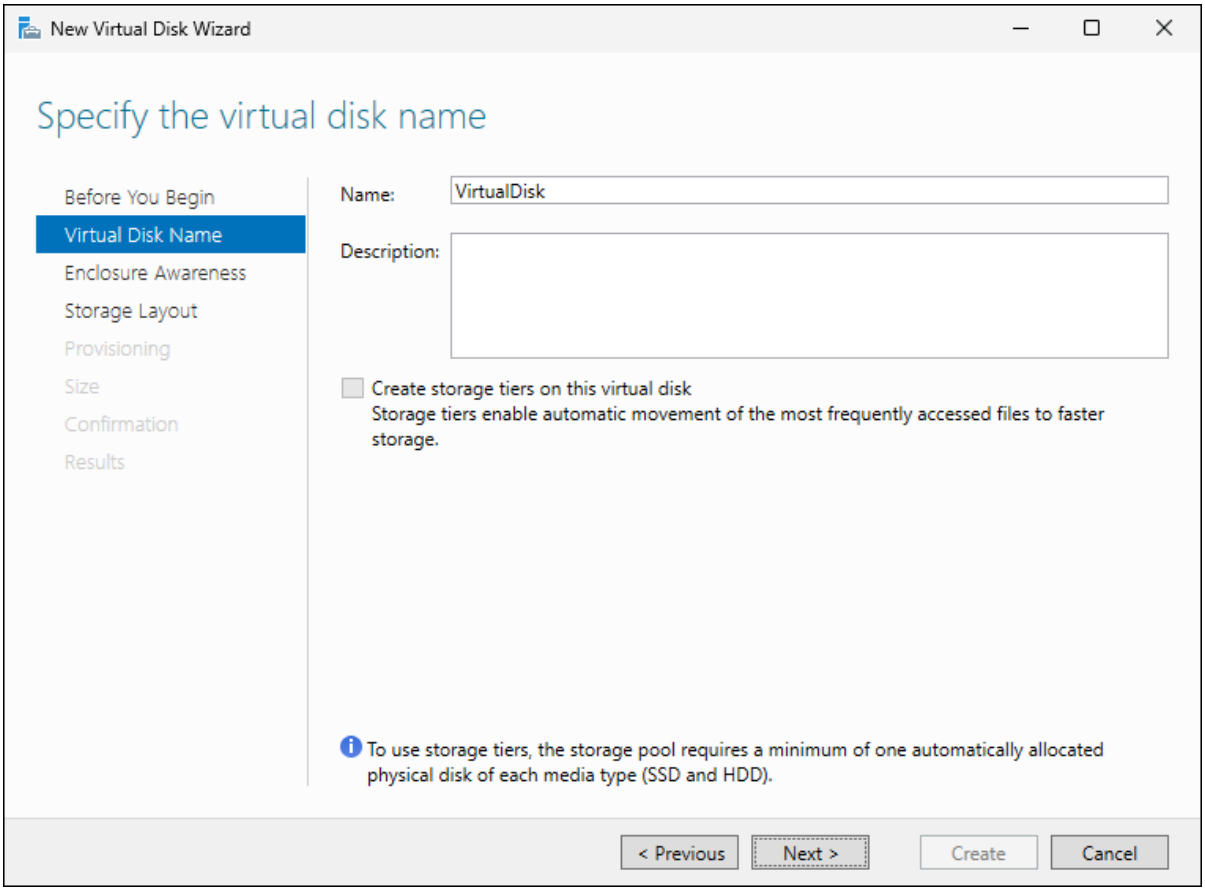


5 Select the storage pool created by the procedure so far and click *OK*.



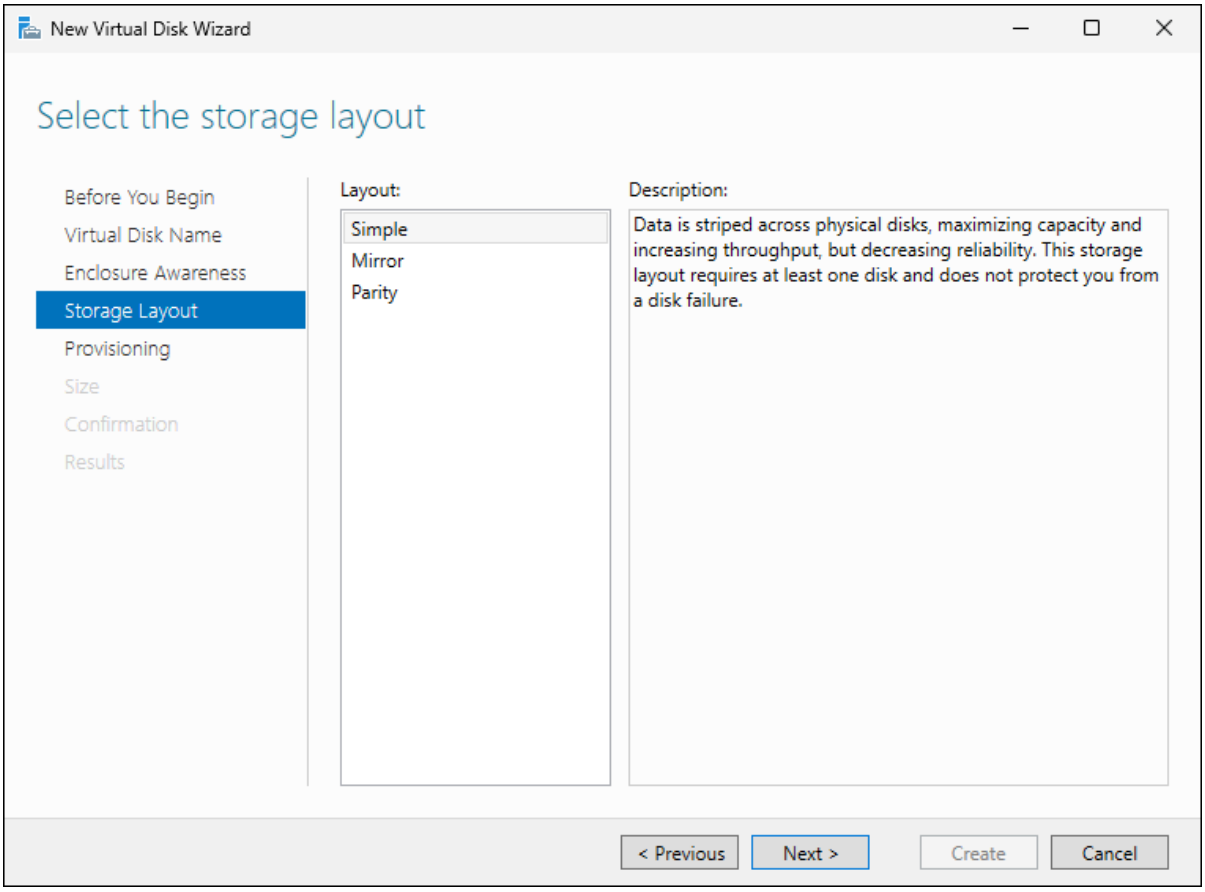
6 Click *Next*.

7 Enter the desired virtual disk name, then click *Next*.



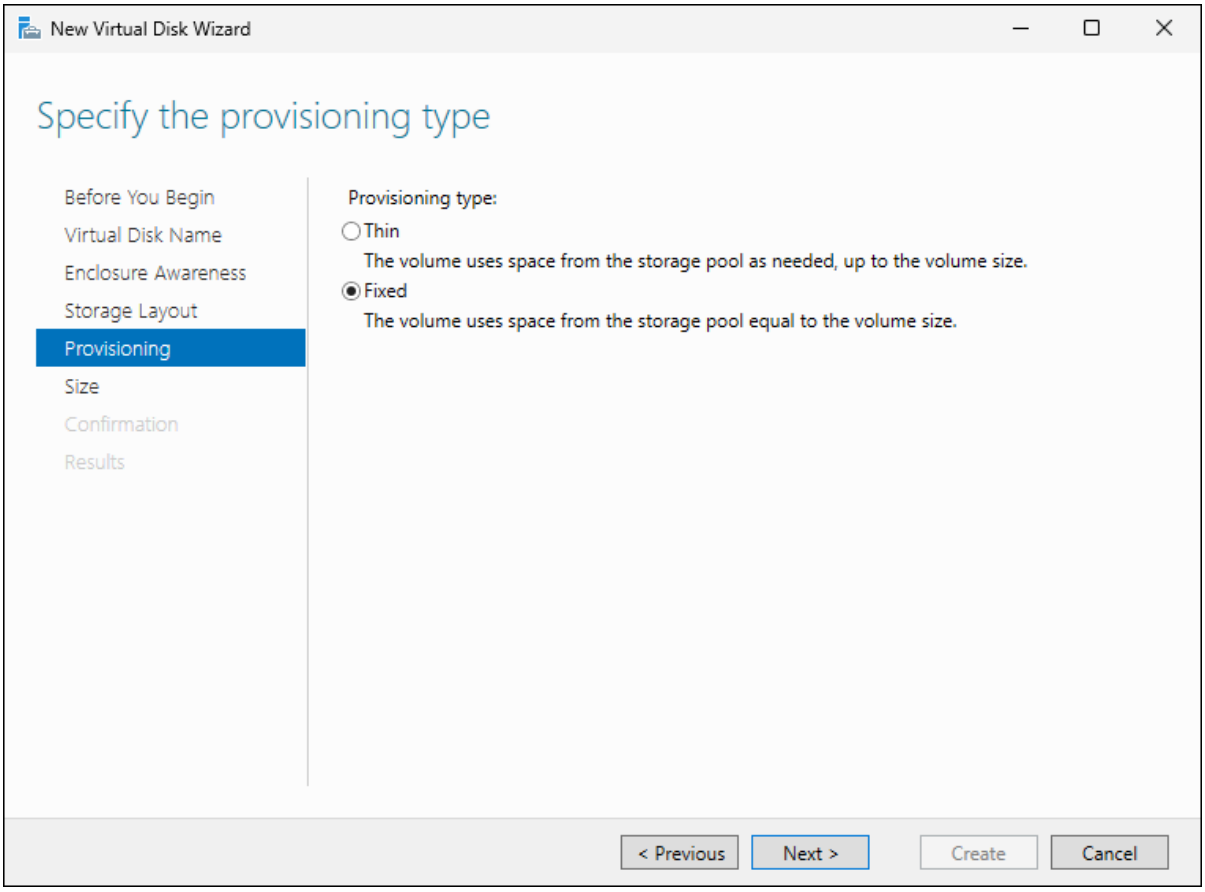
8 Click *Next* without making any changes.

9 Choose the storage layout, then click *Next*.

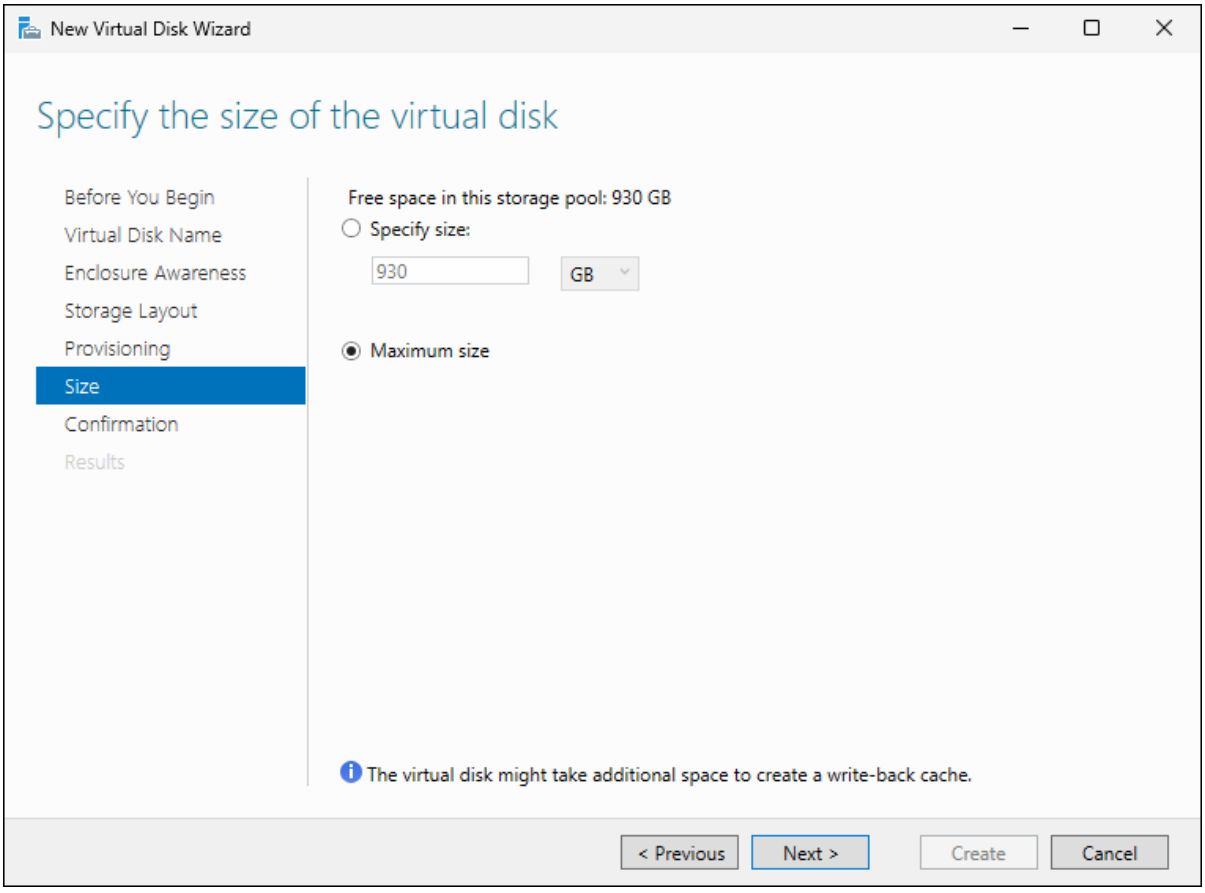


Note: Do not select "Parity" on this wizard. If you wish to create a parity storage pool, refer to the note at the end of this procedure.

10 Choose the provisioning type, then click *Next*.



11 Specify the virtual disk capacity, then click *Next*.



12 The process is complete once you click *Create* after all displayed settings are confirmed.

Note: To create a parity virtual disk, use Windows PowerShell by following the procedure below.
For detailed information on PowerShell cmdlets, refer to the Microsoft website at https://docs.microsoft.com/en-us/powershell/module/storage/new-virtualdisk?view=windowsserver2022-ps

(1) Click the Start button ( ) and click *Server Manager* in the Start menu.

(2) Click *Tools* > *Windows PowerShell* in the upper-right corner of the window.

(3) Enter the following cmdlet into Windows PowerShell, then press the Enter key:

```
New-VirtualDisk
    -StoragePoolFriendlyName <storage pool name>
    -FriendlyName <virtual disk name>
    -Size <virtual disk capacity>
    -ProvisioningType <either "Thin" or "Fixed">
    -ResiliencySettingName "Parity"
```

For example, to create 50 GB virtual disk named "VirtualDisk" in a storage pool named "Pool":

```
New-VirtualDisk
    -StoragePoolFriendlyName Pool
    -FriendlyName VirtualDisk
    -Size 50GB
    -ProvisioningType Fixed
    -ResiliencySettingName Parity
```

(4) Click the Start button ( ) and click *Server Manager* in the Start menu.

(5) Click *File and Storage Services* > *Disks* in the left-side menu.

(6) Right-click the created parity virtual disk and click *Bring Online*.

(7) The process is complete once you click *Yes*.

Step 5 Creating a Volume

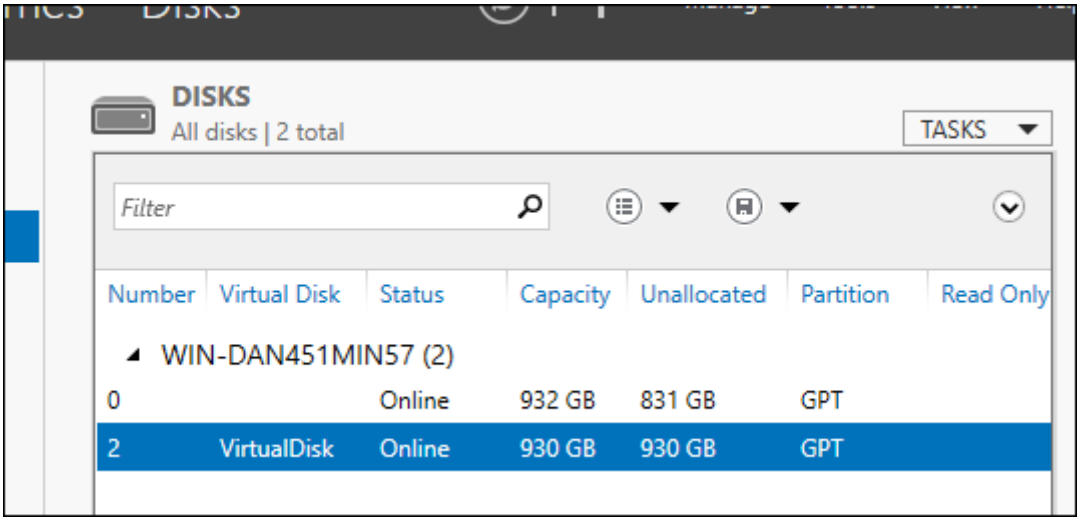
After creating the virtual disk, follow the procedure below to create a volume.

Note: If creating the virtual disk using the wizard, the New Volume Wizard will open automatically. In such a case, skip to step 4.

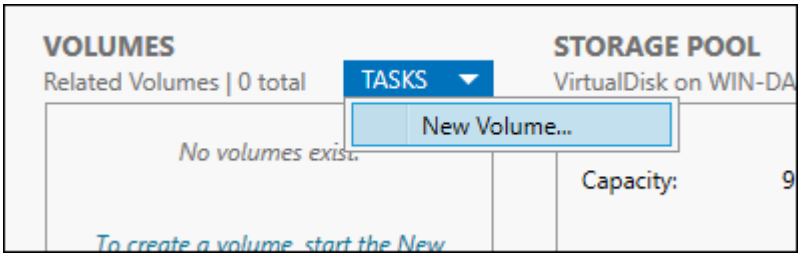
1 Click the Start button ( ) and click *Server Manager* in the Start menu.

2 Click *File and Storage Services* > *Disks* in the left-side menu.

3 Make sure that the virtual disk you created has been selected under the "Disks".

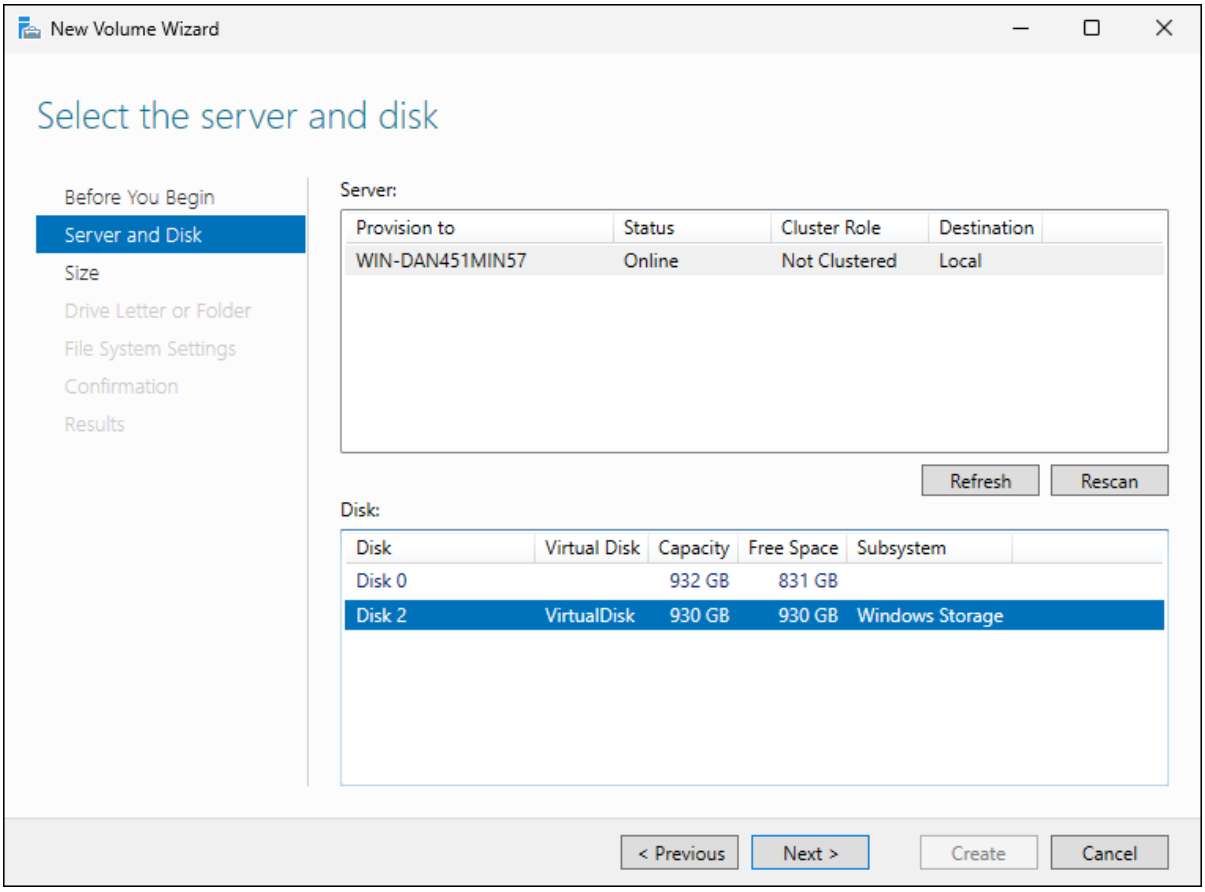


4 Click *Tasks* to the right of *Volumes*, then select *New Volume*.

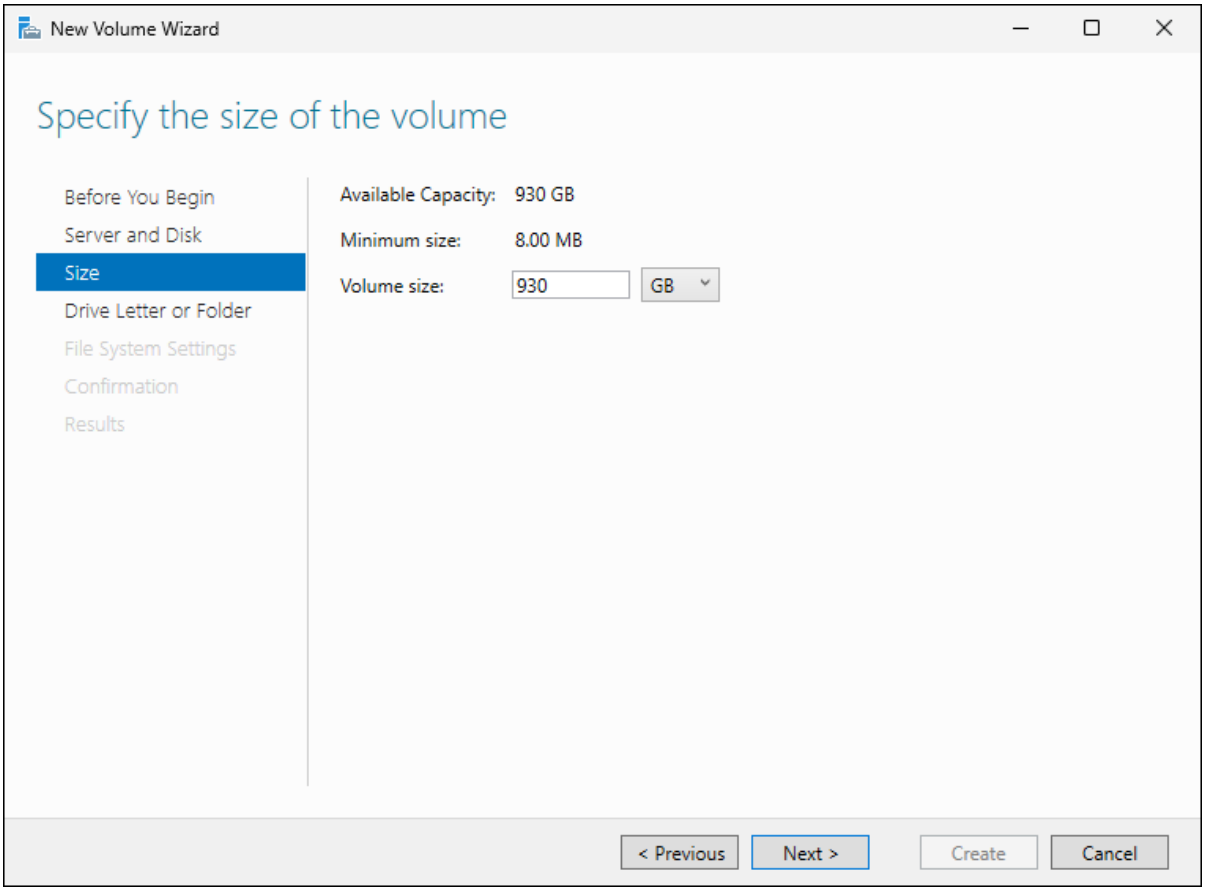


5 Click *Next*.

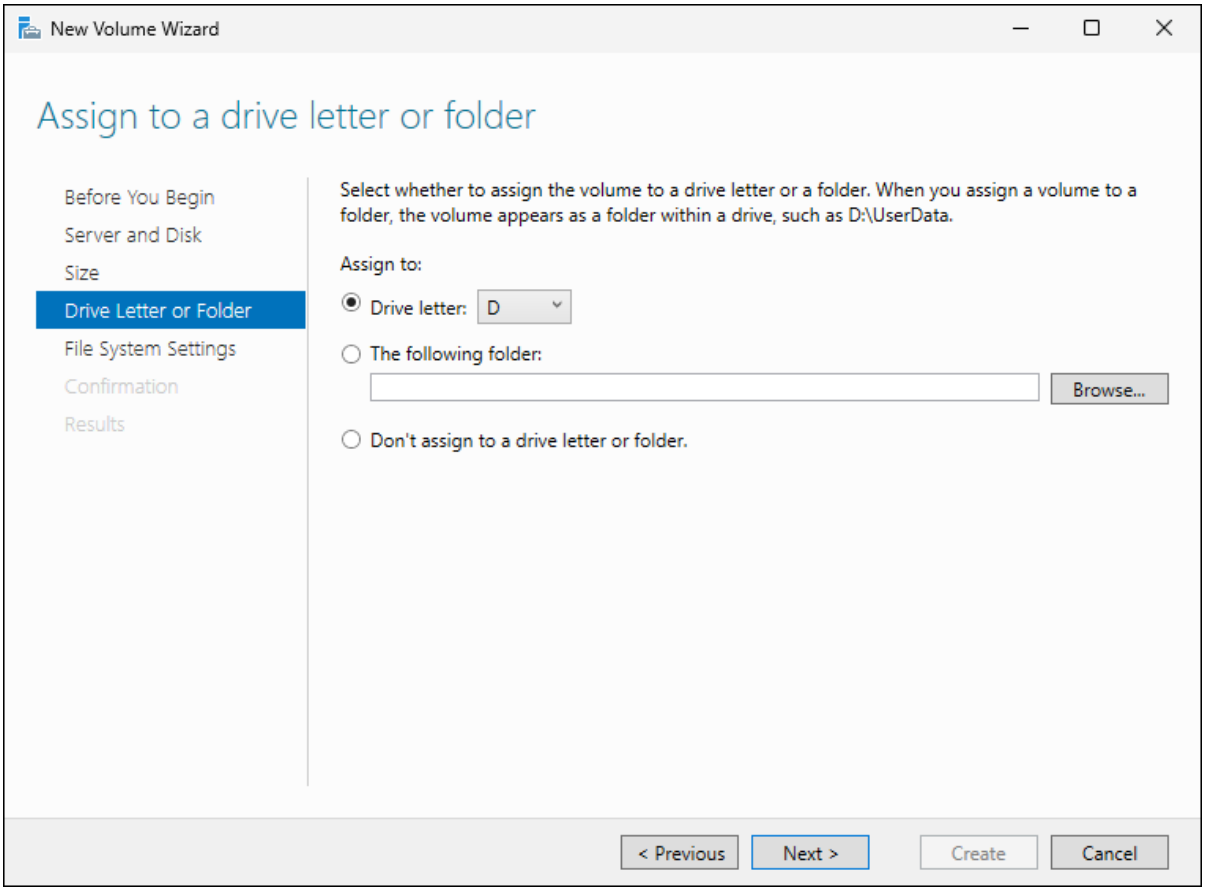
6 Select the created virtual disk under "Disk", then click *Next*.



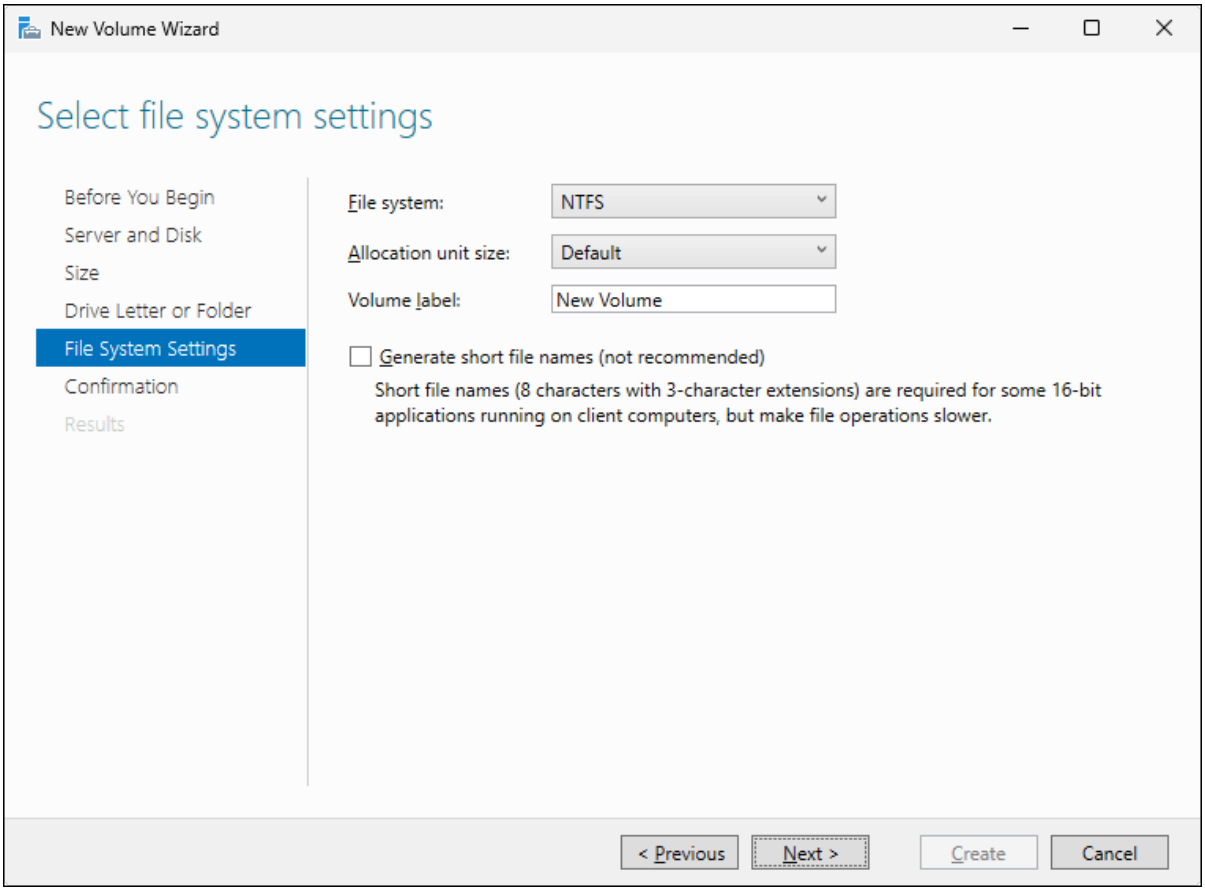
7 Enter the volume size, then click *Next*.



8 Choose the drive letter, then click *Next*.



9 Choose the file system and enter the volume name, then click *Next*.



10 The process is complete once you click *Create* after all displayed settings are confirmed.

Enabling Data Deduplication

Data deduplicaton is a feature that saves drive space by identifying and removing duplicate blocks on a specified volume. Follow the procedure below to configure it.

Step 1 Installing the Deduplication Role

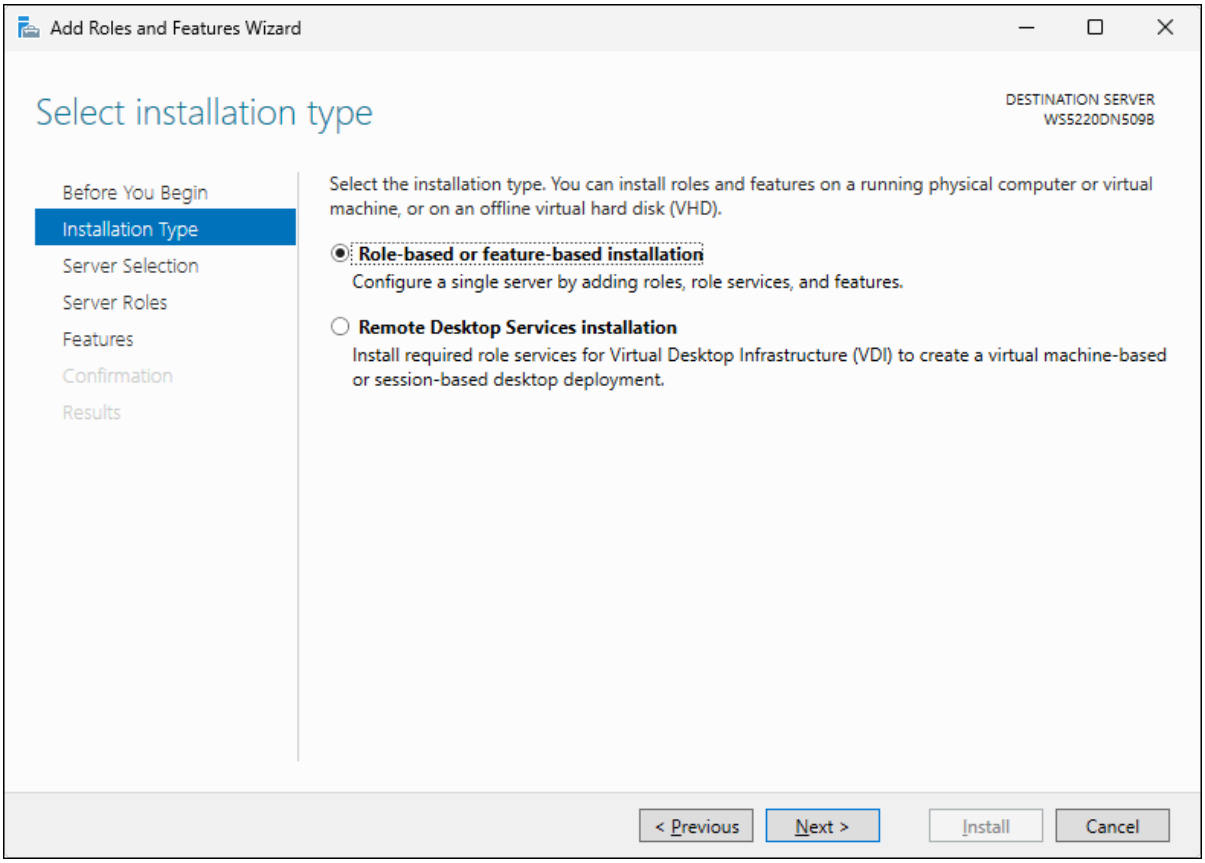
Follow this procedure if you are configuring data deduplication for the first time. Otherwise, skip to the "Step 2 Configuring Data Deduplication" section below.

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Add roles and features*.

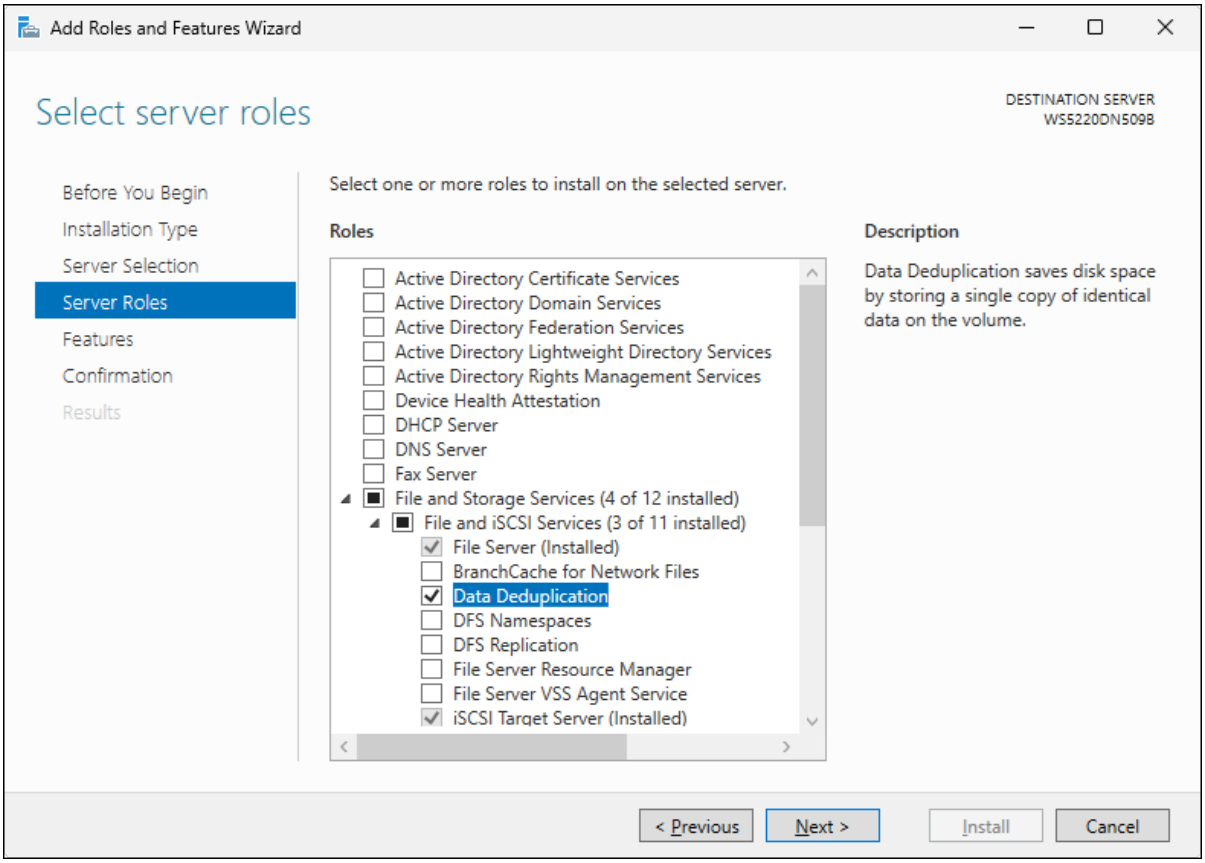
3 Click *Next*.

4 Select "Role-based or feature-based installation".



5 Click *Next*, then click *Next* again.

6 Select "Data Deduplication" under "File and Storage Services" > "File and iSCSI Services".



7 Click *Next* twice, then click *Install*.

8 The process is complete once you close the window.

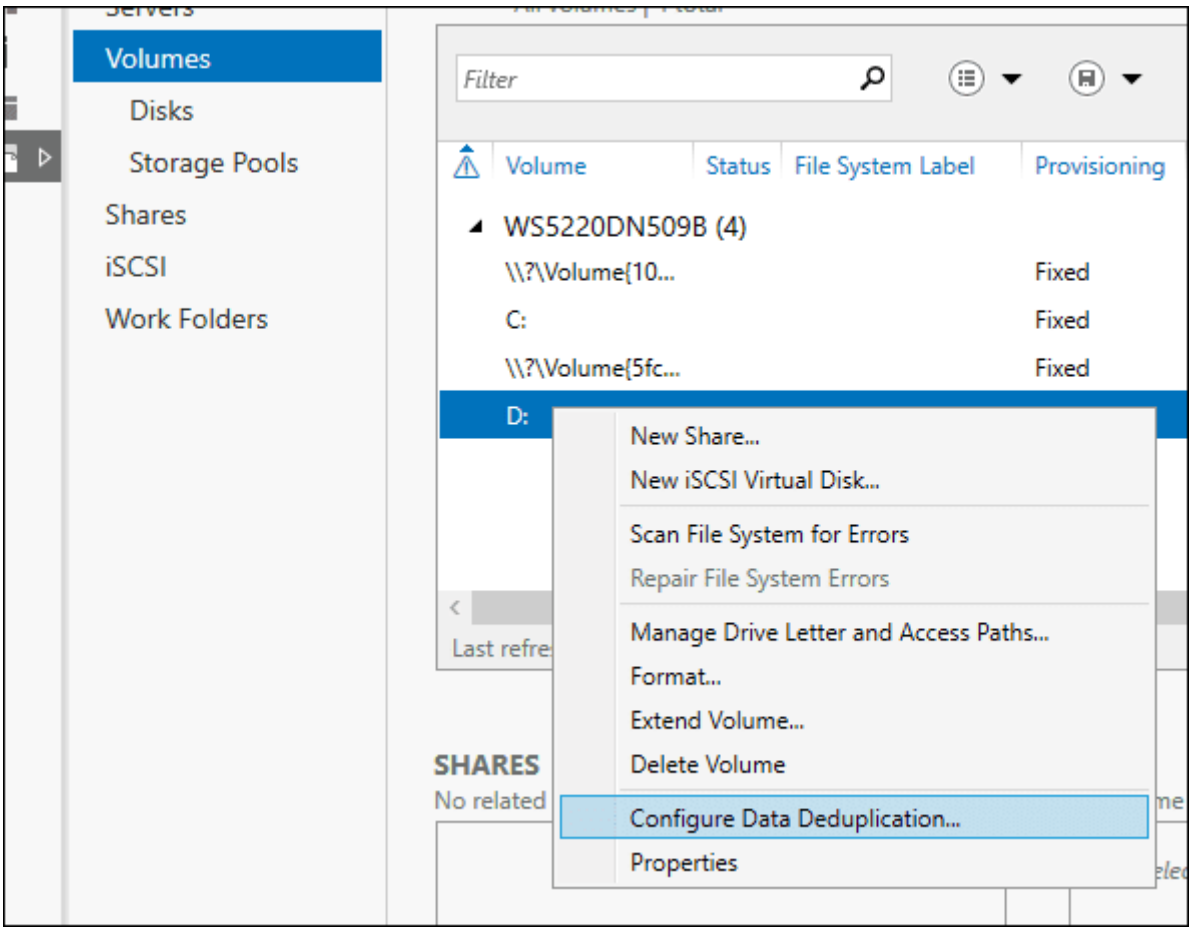
Step 2 Configuring Data Deduplication

Once the deduplication role has been installed, follow the procedure below.

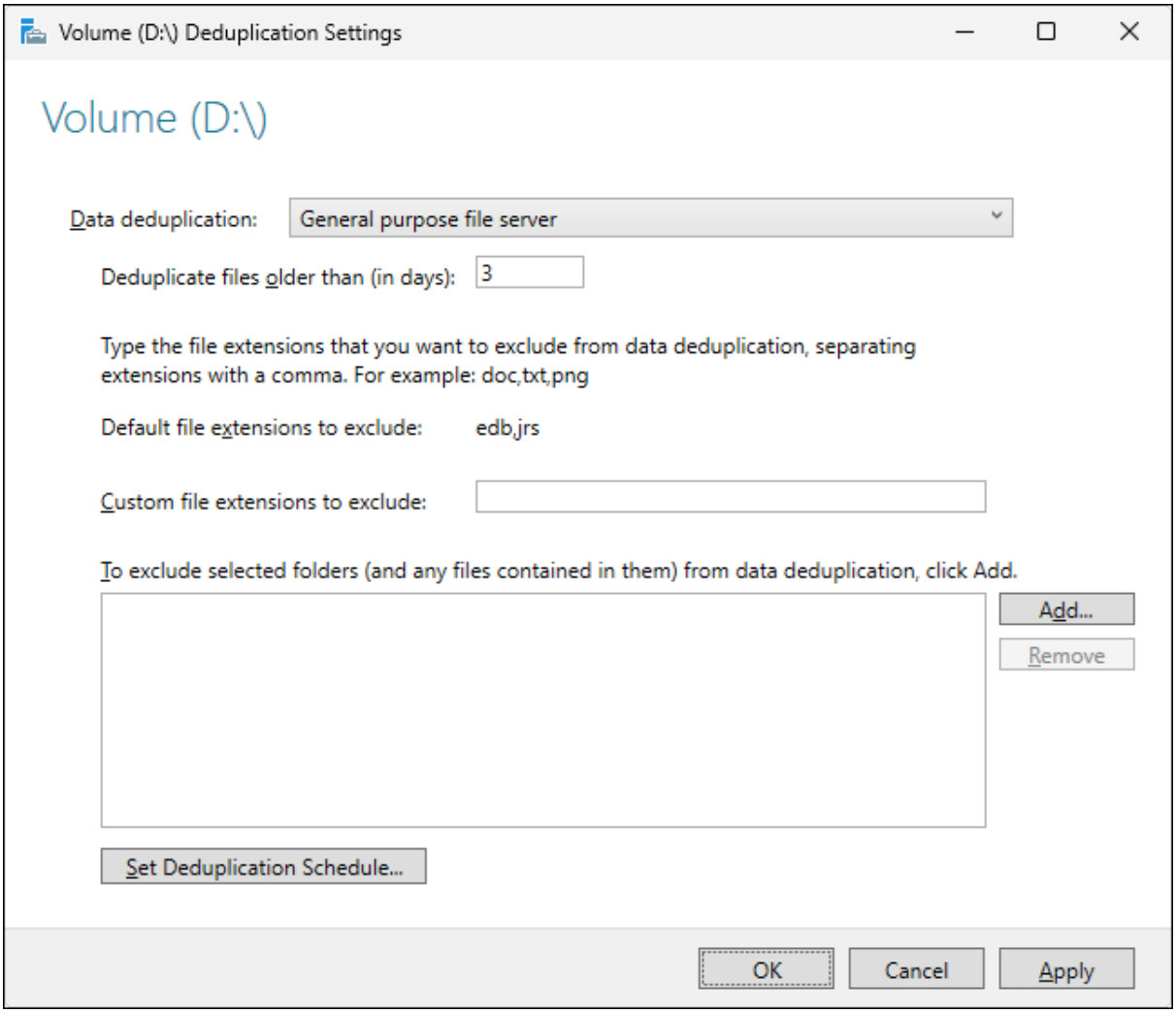
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *File and Storage Services* > *Volumes* in the left-side menu.

3 Right-click the drive which will be used to configure data deduplication, then select *Configure Data Deduplication*.



4 Select "General purpose file server" to the right of "Data deduplication", then click *OK*.



5 The process is complete once you close the window.

Chapter 6 Backup and Replication

Data stored in the TeraStation may be lost through drive failure or improper operation. To avoid losing data accidentally, back up your data regularly.
You can back up data using the following functions:

- Windows Server Backup
- Buffalo Replication
- DFS Replication

Backing Up in Windows Server

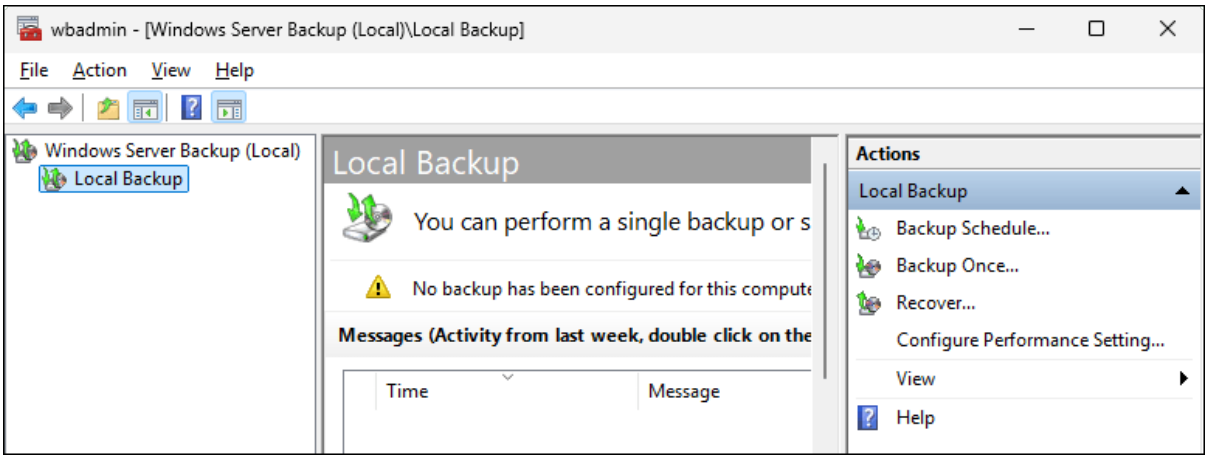
Backing Up Using Windows Server Backup

Follow the procedure below to set your backup schedule. This section explains the procedure for backing up to another network shared folder.

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

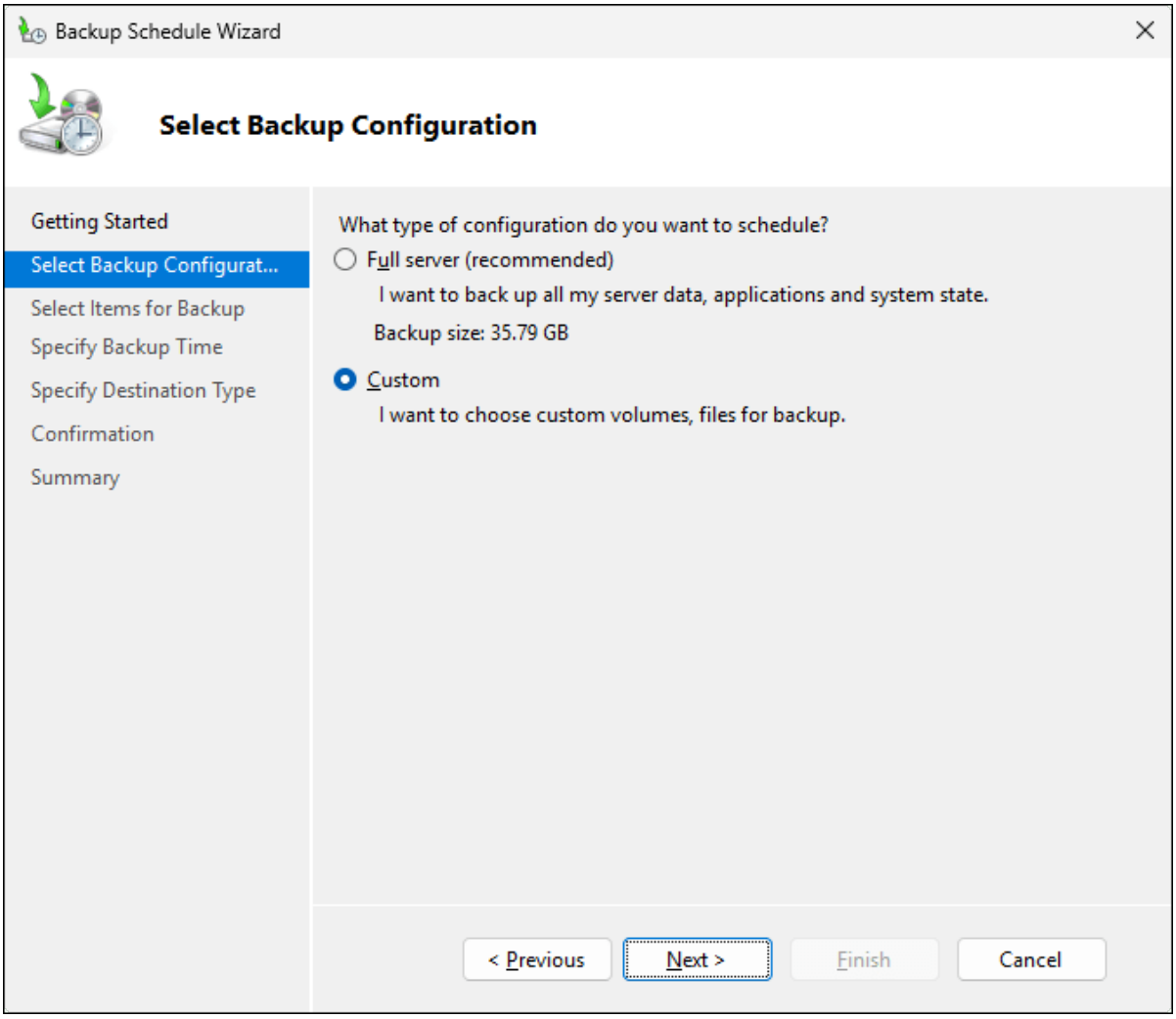
2 Click *Tools* > *Windows Server Backup* in the upper-right corner of the window.

3 Click *Local Backup* in the left-side menu, then click *Backup Schedule* in the right-side actions menu. If "Reading data; please wait" is displayed, wait until the message disappears.

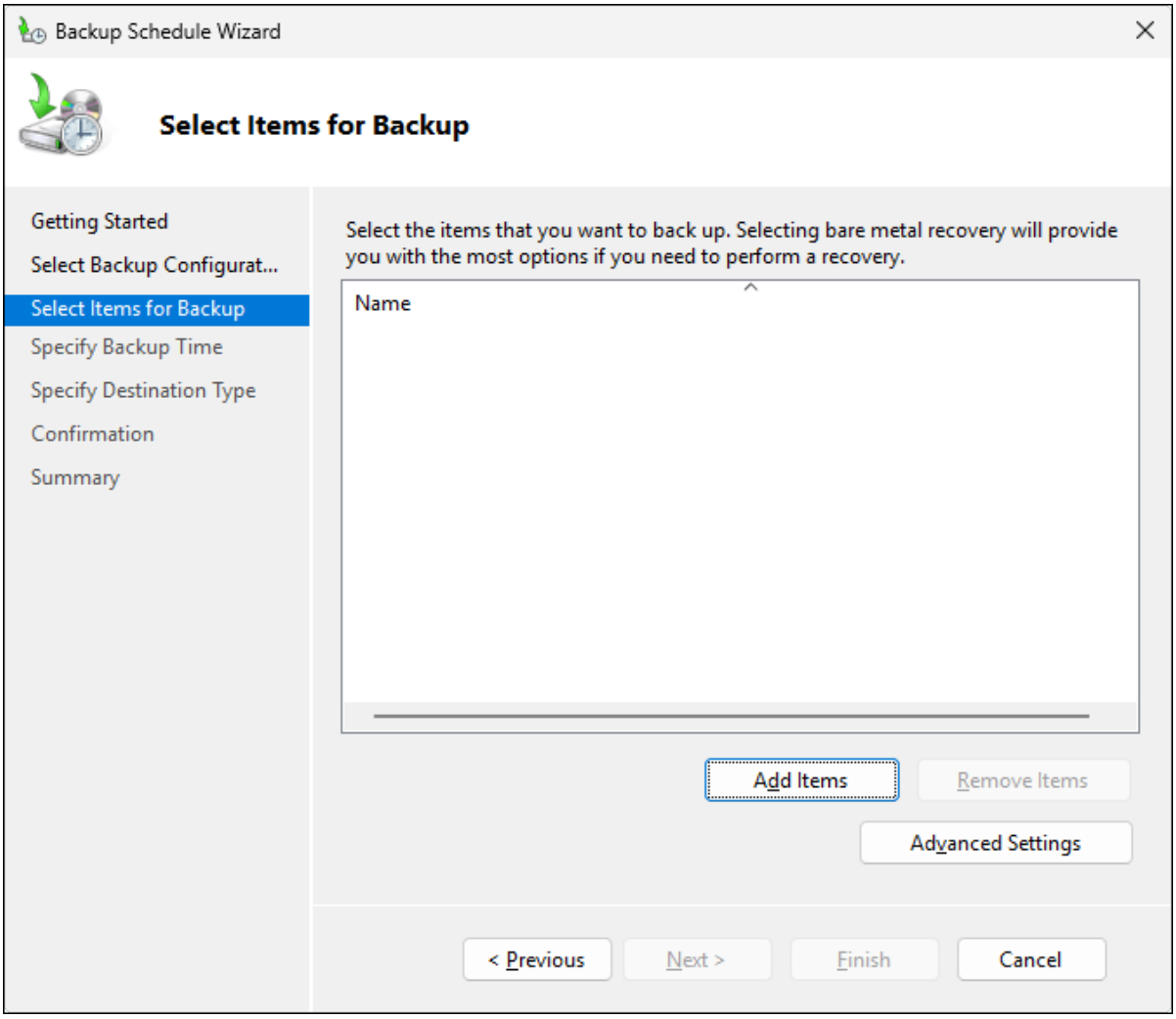


4 Click *Next*.

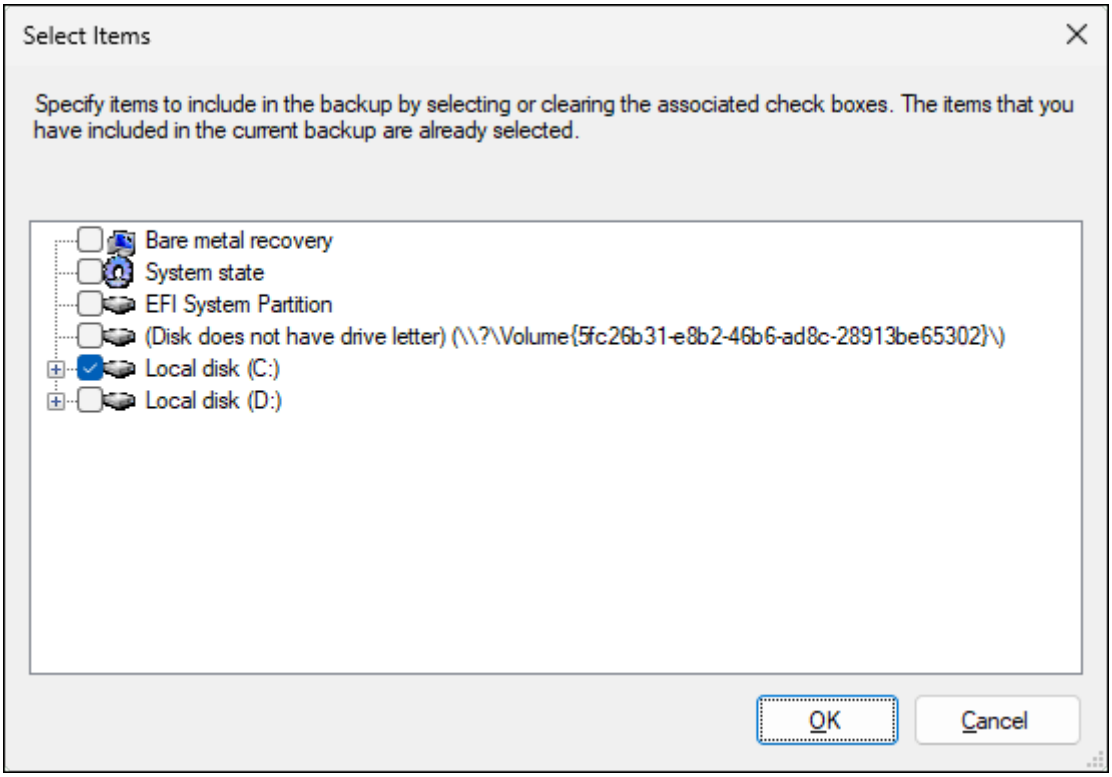
5 Select "Custom" and click *Next*.



6 Click *Add Items*.

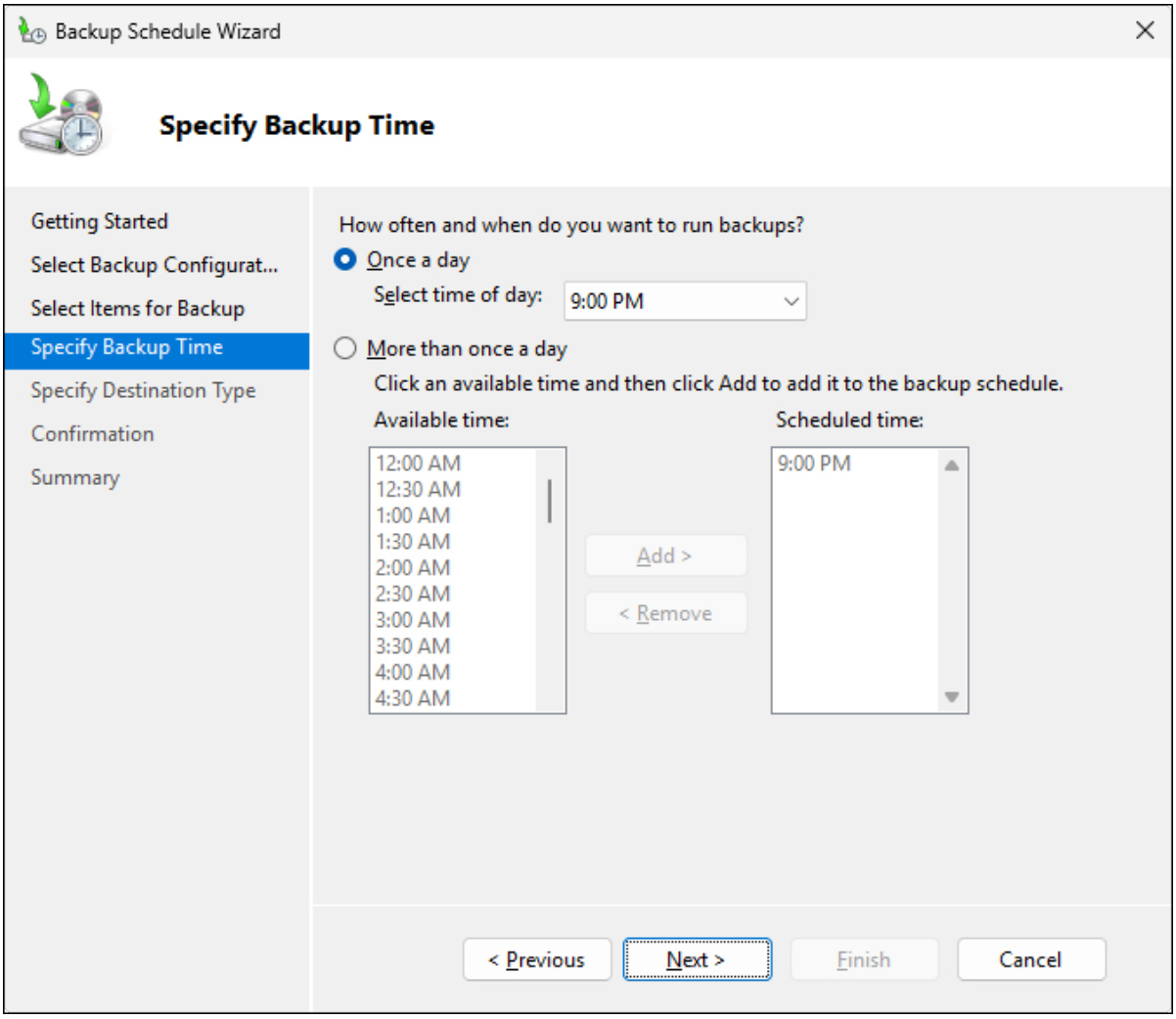


7 Select the checkboxes for the backup source folders or drives and click *OK*.

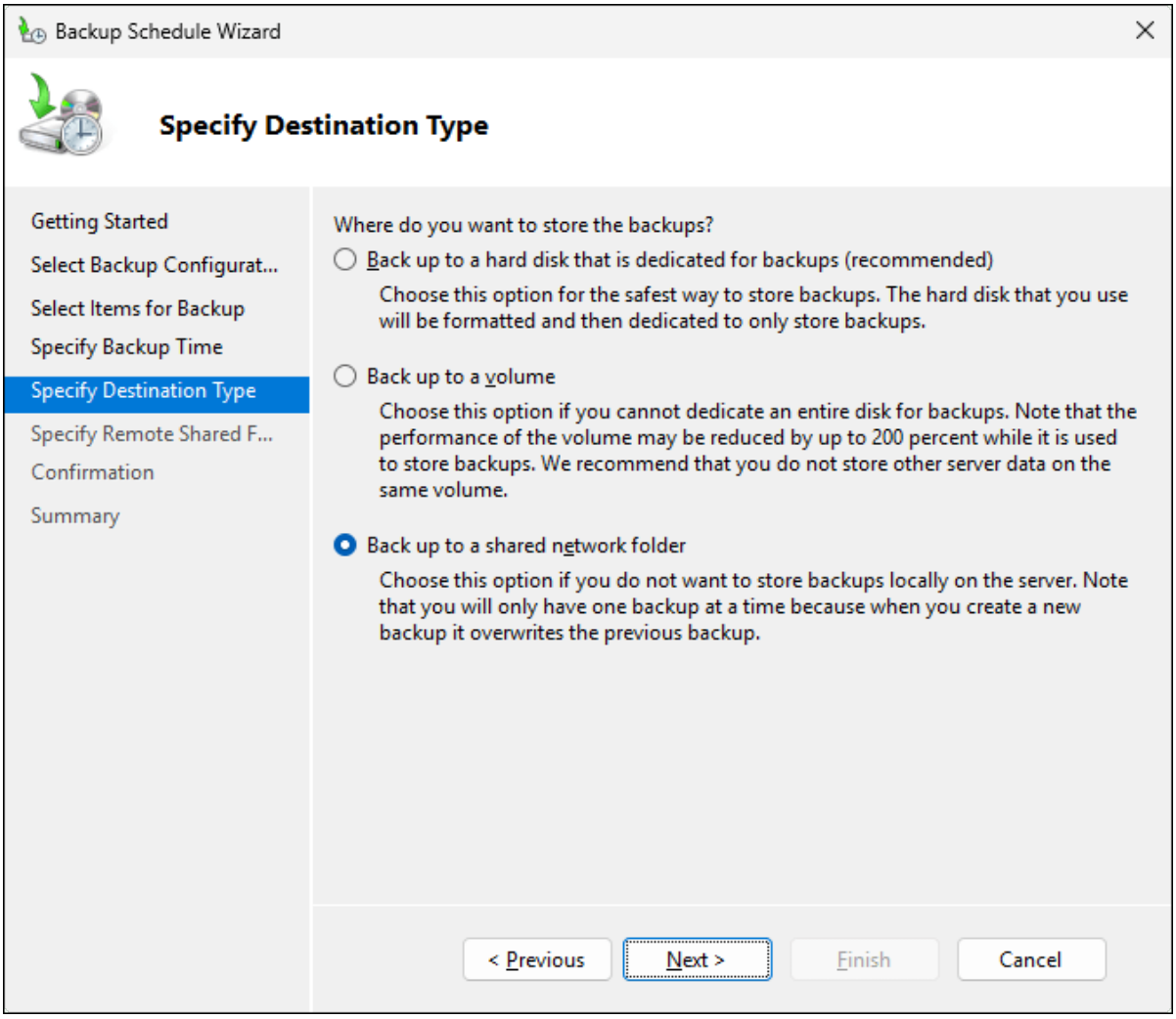


8 Click *Next*.

9 Specify the schedule for backup and click *Next*.



10 Select the backup destination and click *Next*.

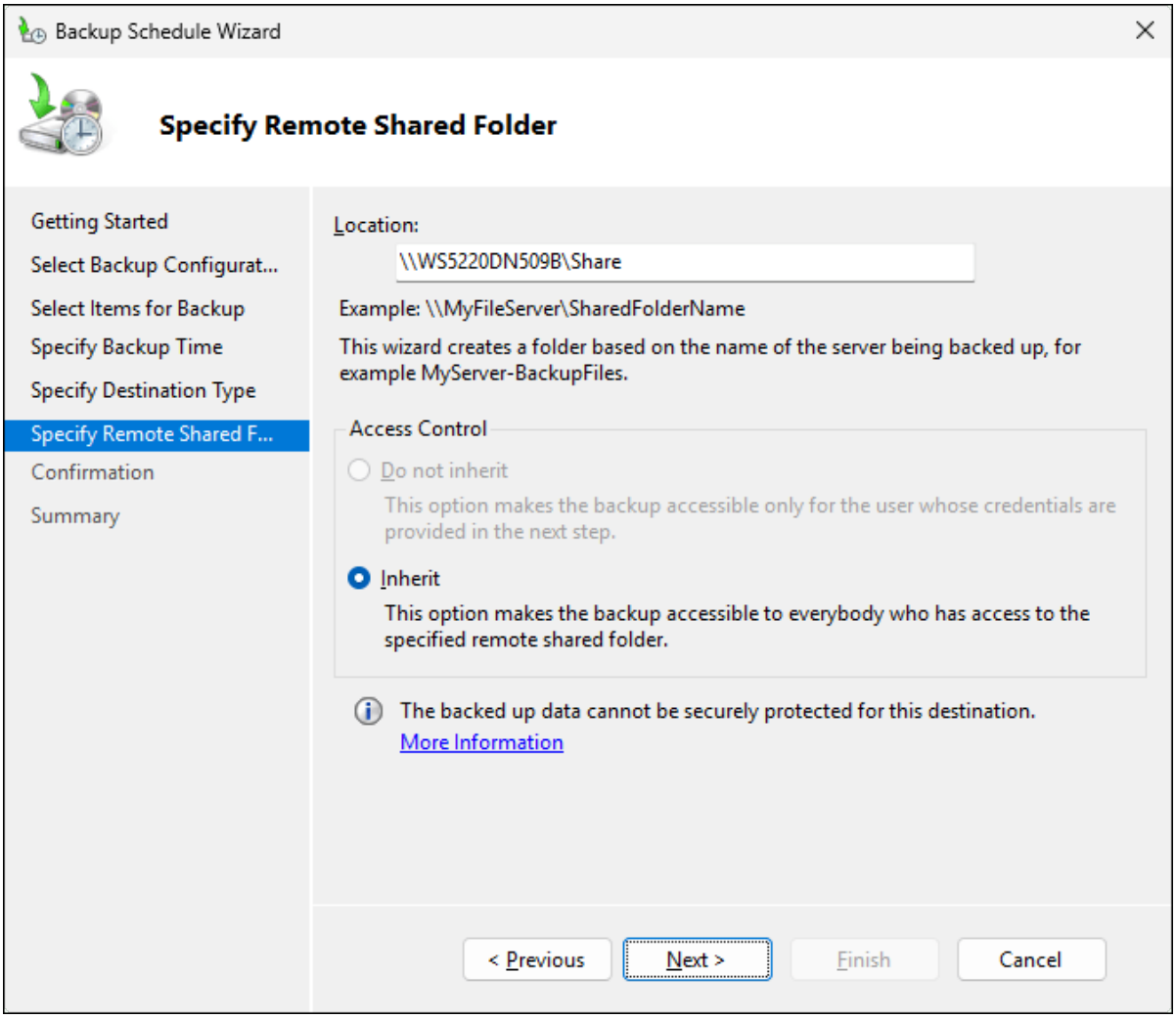


Note: If a network shared folder is specified as a backup destination, the error message may appear and specifying the folder may fail. In such a case, try the following corrective actions:

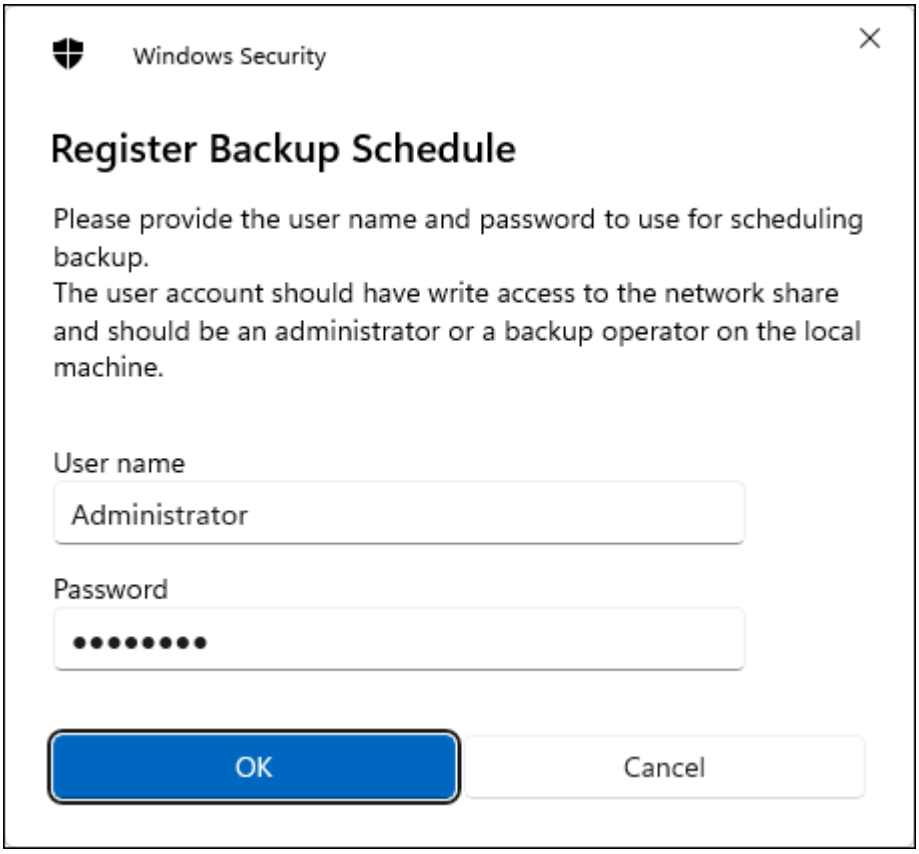
- Add both your TeraStation and the backup device to the Active Directory domain.
- Create a user with same username and password on both your TeraStation and the backup device.

11 Read the displayed message carefully and click *OK*.

12 Enter the path of the backup destination shared folder, then click *Next*.



13 Enter the username and password for the TeraStation and click *OK*.



14 The process is complete once you click *Finish* after all displayed settings are confirmed.

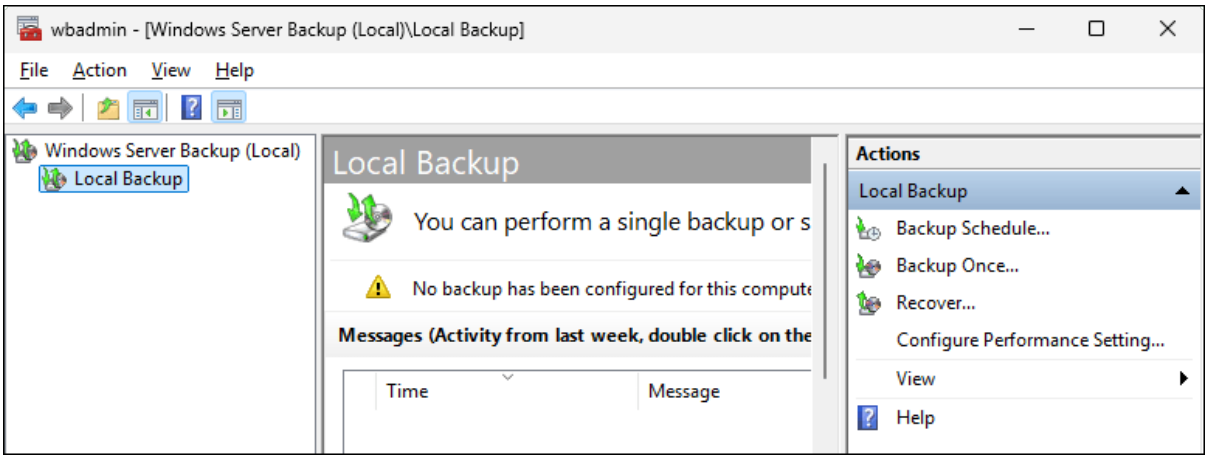
Recovering Backup Data

Follow the procedure below to recover the backup data to the TeraStation. This section explains the procedure for recovering an entire volume using data backed up on another network shared folder.

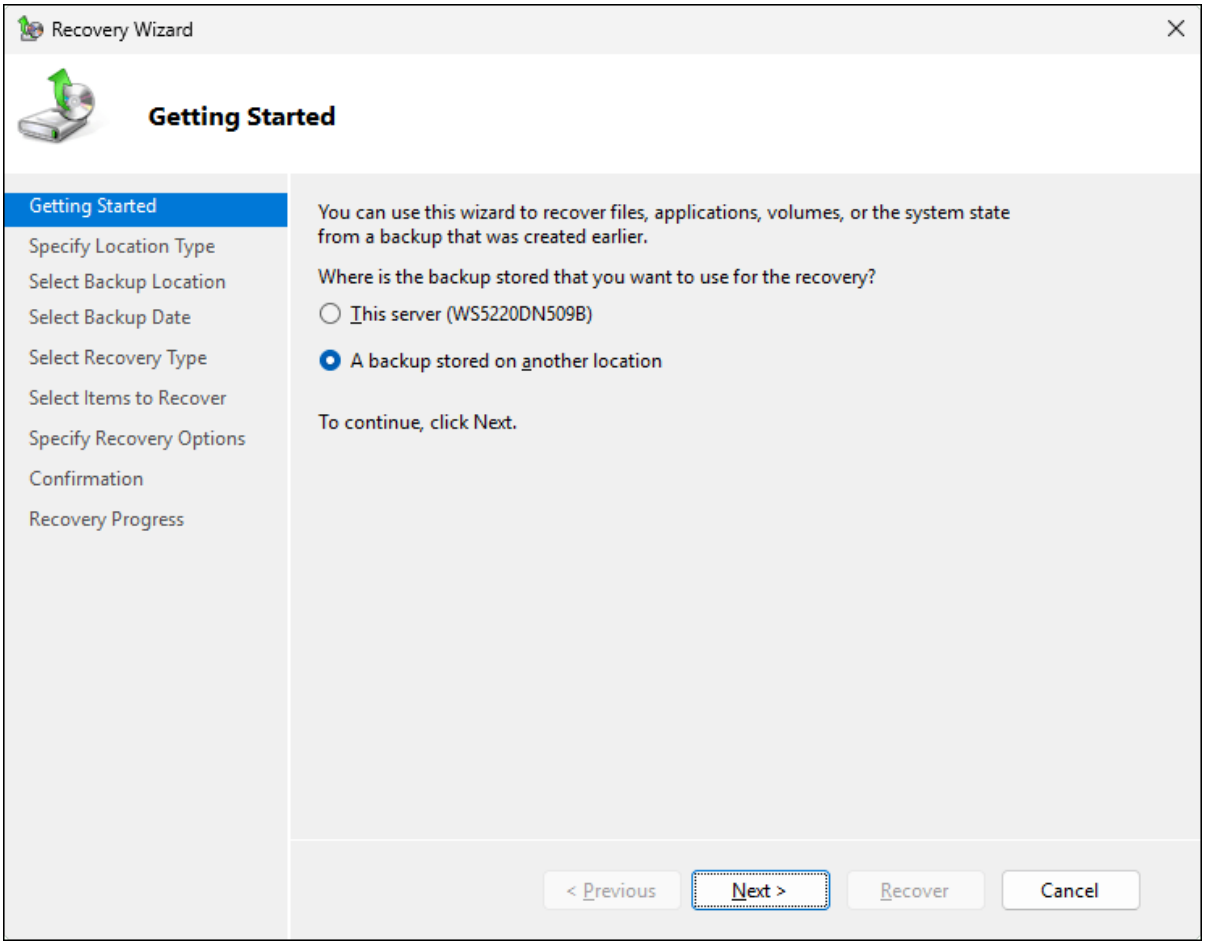
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Windows Server Backup* in the upper-right corner of the window.

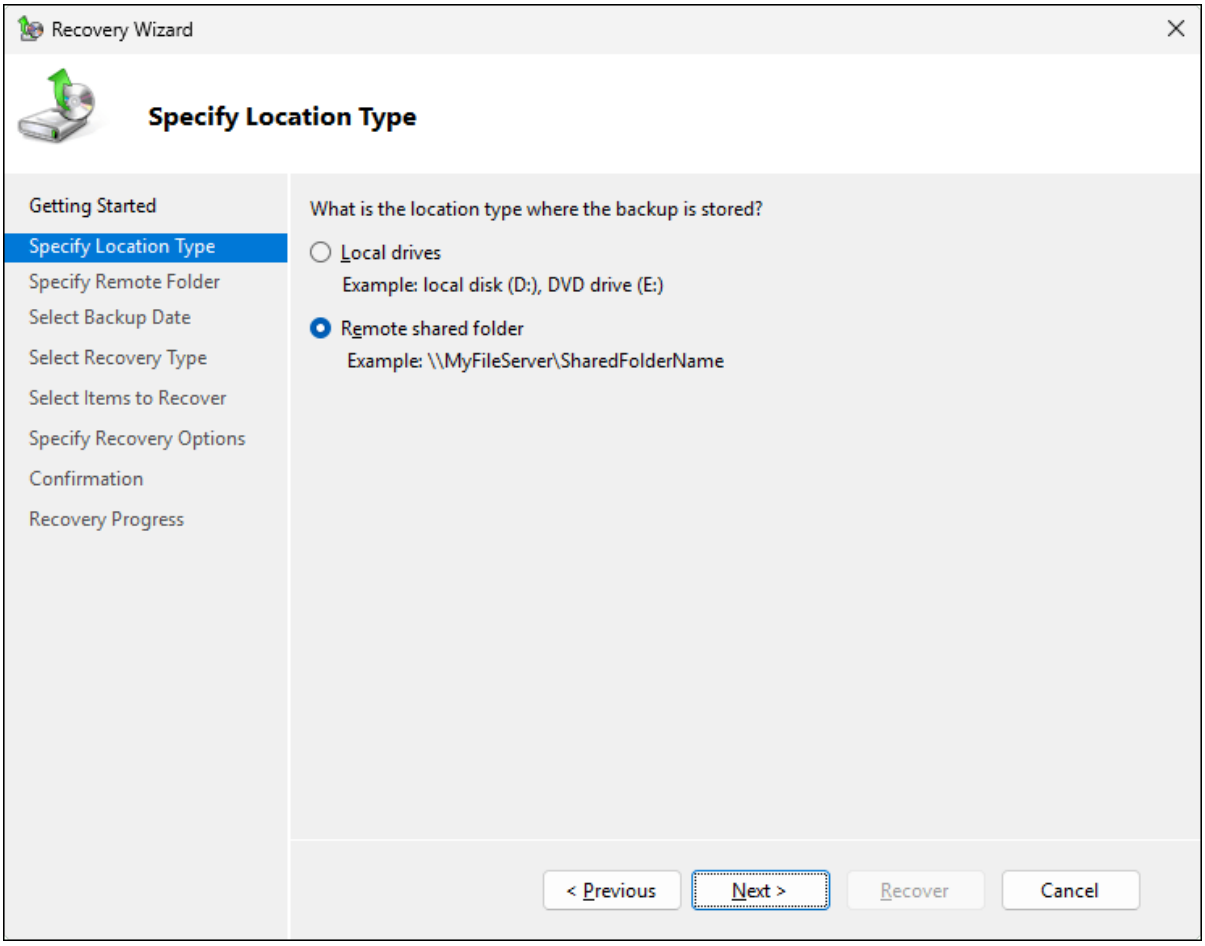
3 Click *Local Backup* in the left-side menu, then click *Recover* in the right-side actions menu. If "Reading data; please wait" is displayed, wait until the message disappears.



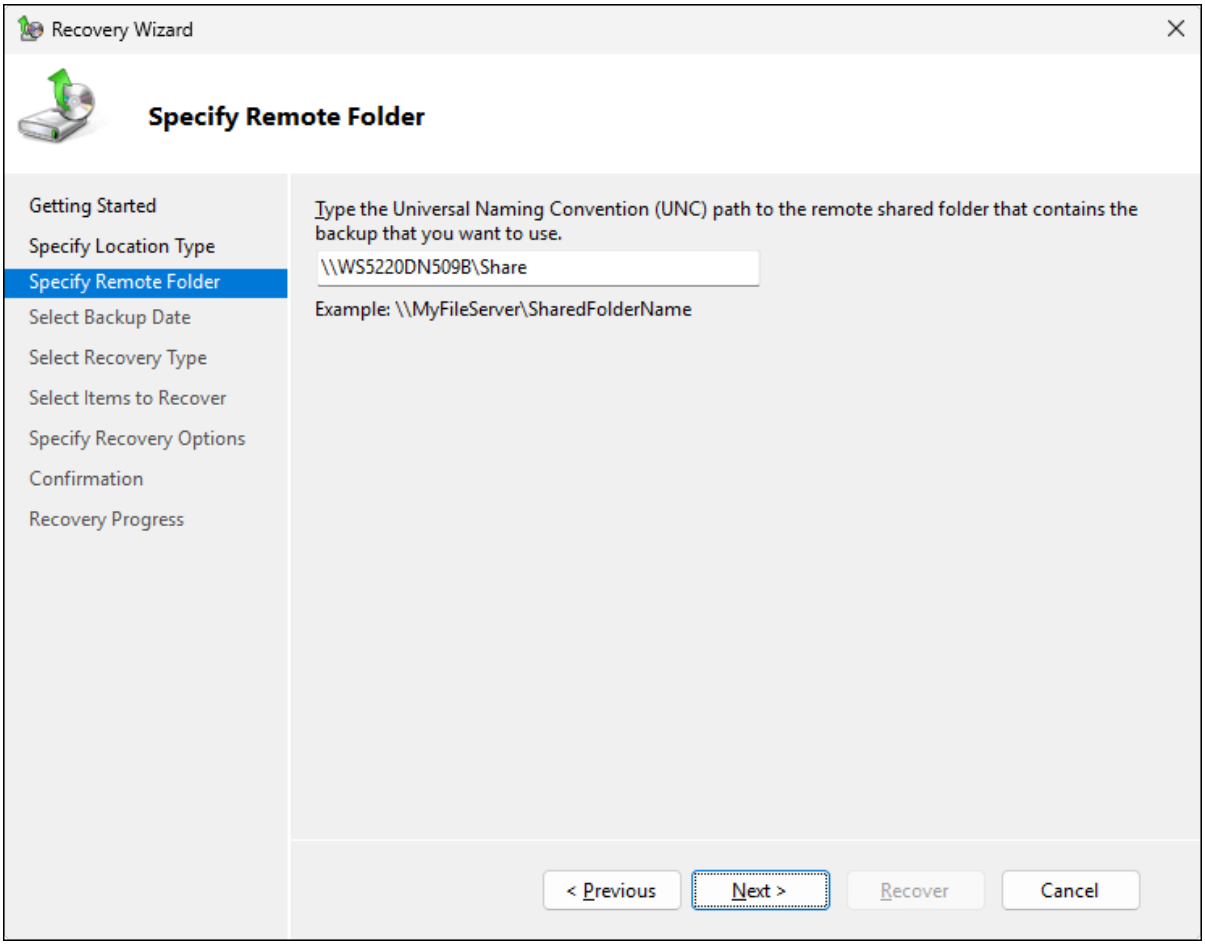
4 Select "A backup stored on another location" and click *Next*.



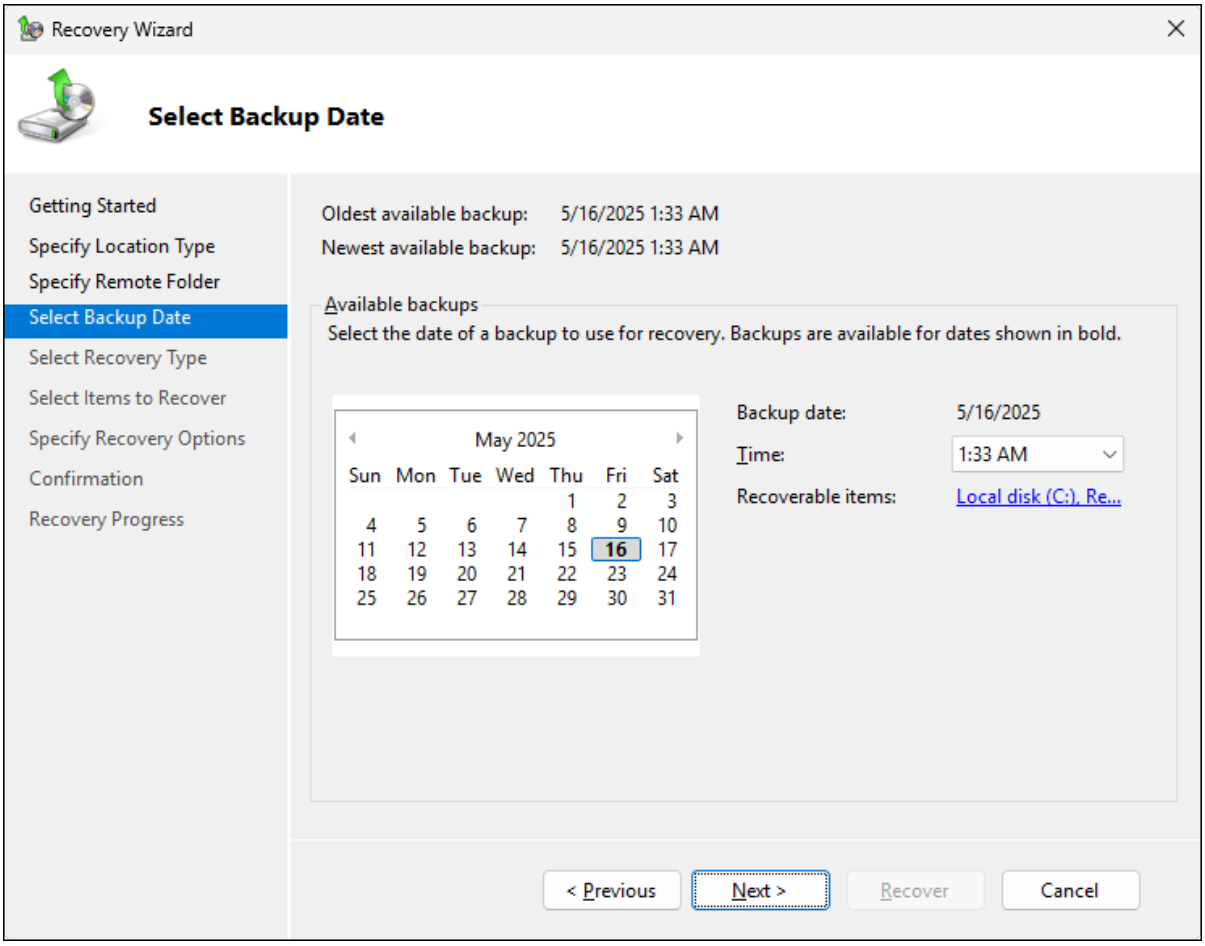
5 Select "Remote shared folder", then click *Next*.



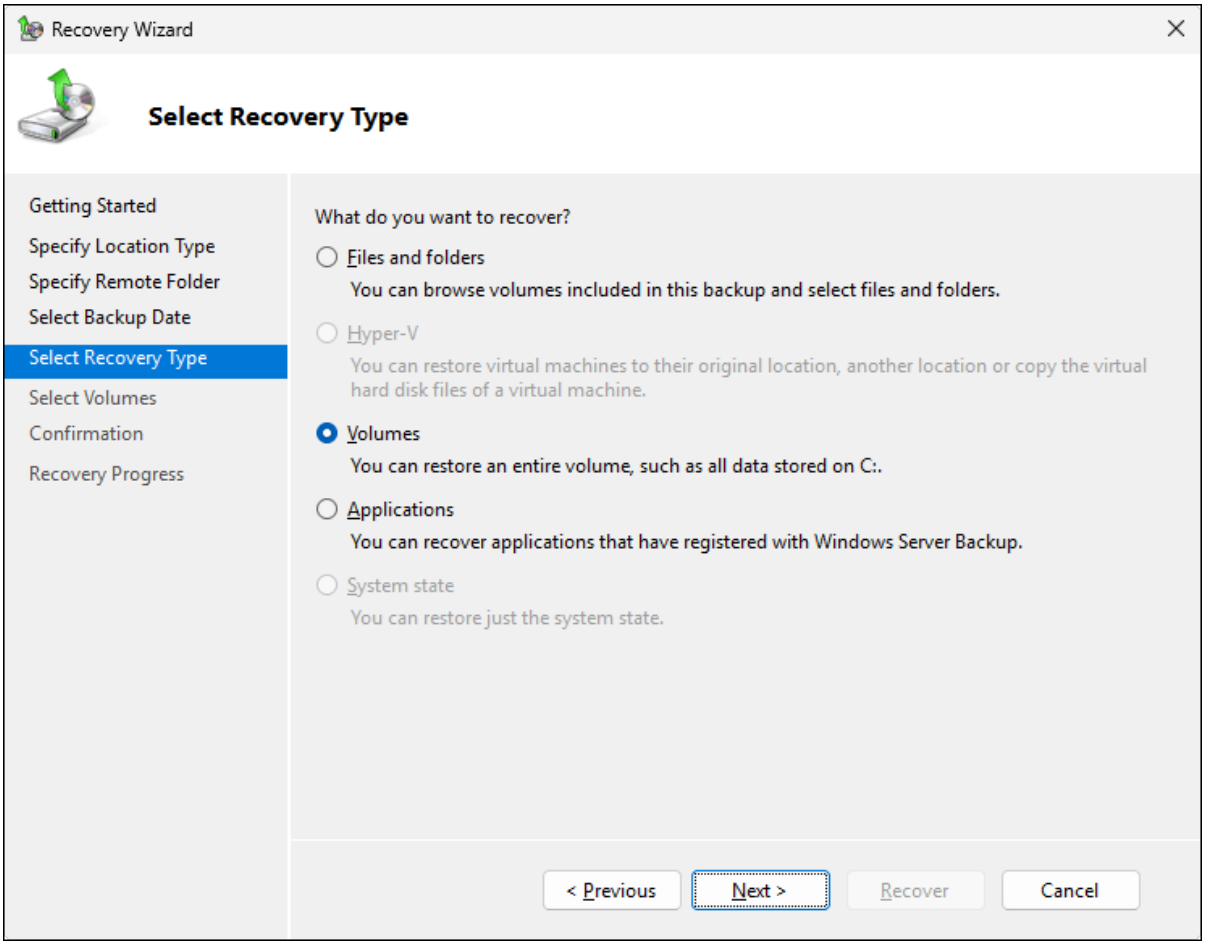
6 Enter the path of the backup destination shared folder, then click *Next*.



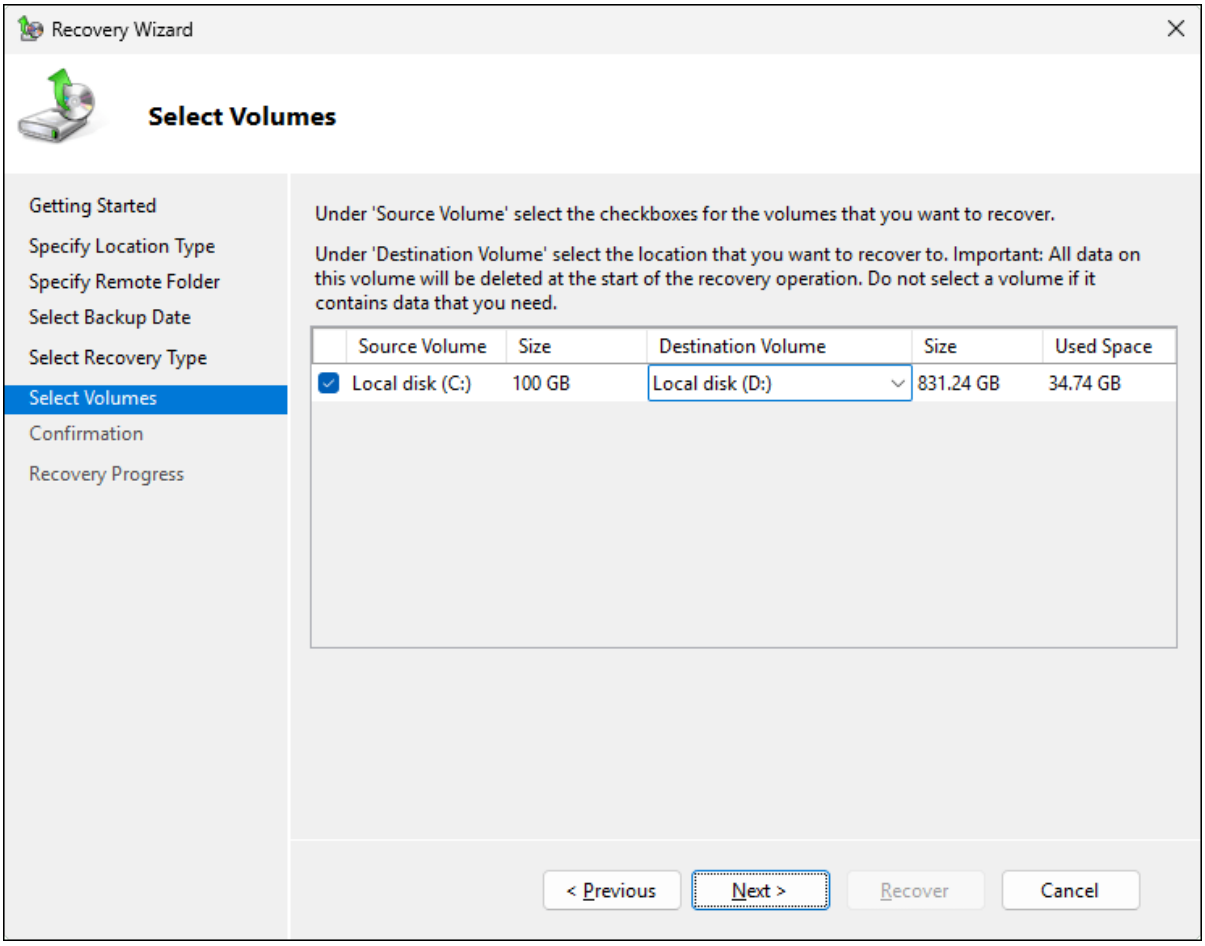
7 Select the date when a data backup occurred and click *Next*.



8 Select "Volumes" as the recovery target and click *Next*.



9 Select the checkbox and destination volume to be recovered, then click *Next*.



10 Read the displayed message carefully and click *Yes*.

11 The process is complete once you click *Recover* after all displayed settings are confirmed.

Configuring Replication

Replication copies all data from one share to another share on a different TeraStation. This is an easy way to set up a reliable system to provide data protection in the event your main TeraStation fails. To configure replication, connect an Ethernet cable to the LAN port of each TeraStation, then select a replication method below and follow its respective procedure.

Note: Replication may fail to proceed properly if a large number of files or an excessively large file is continuously replicated over an extended period, leading to data overload. Before starting replication, check if there are any possible issues that may cause operational pauses.

Differences Between Buffalo Replication and DFS Replication

Buffalo Replication

- Unidirectional replication (from the TeraStation to another device)
- Another Buffalo NAS device can easily be configured as the replication destination.

DFS Replication

- Bidirectional replication

- The Active Directory domain environment is required and the TeraStation should be joined to the domain.

If your network environment requires joining an Active Directory domain, use DFS replication. If joining the Active Directory is not required, or if a Buffalo NAS device has been configured as the replication destination, using Buffalo replication is recommended.

Before Using Replication

- For best results, use static IP addresses with the same subnet masks for both replication TeraStations (source and destination). If on a VPN network, configure the network settings so that broadcast packets are not dropped.
- Setting the TeraStation on a 1000 Mbps or faster network is recommended.
- Up to five replication jobs can be created.
- Make sure that the total number of characters in the file location and name does not exceed 170 alphanumeric characters or 85 multibyte characters. Exceeding this limit may result in files not being copied properly.

Buffalo Replication

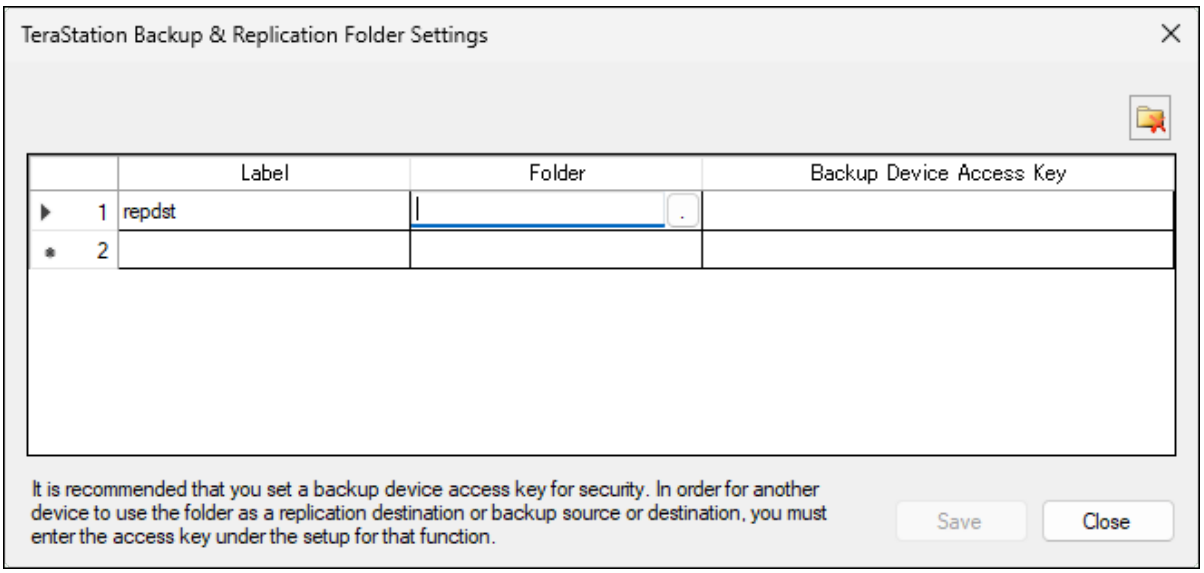
If using Windows Server Buffalo TeraStations as both the replication source and destination, start from step 1 below. If using a different TeraStation as the replication destination, instead refer to that TeraStation's user manual to configure it as a replication destination.

Step 1 Preparing the Replication Destination

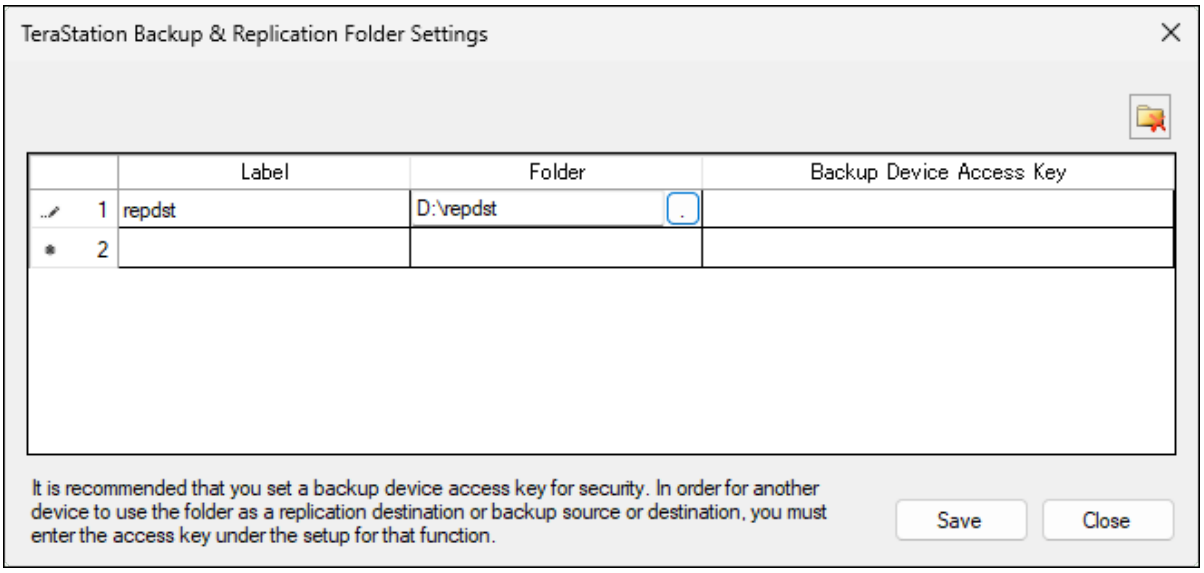
Follow the procedure below on Windows Server of the replication destination TeraStation.

1 Click the Start button ( ), then click *TeraStation Backup & Replication Folder Settings* in the Start menu.
If you have already configured the replication destination folder, skip to step 3.

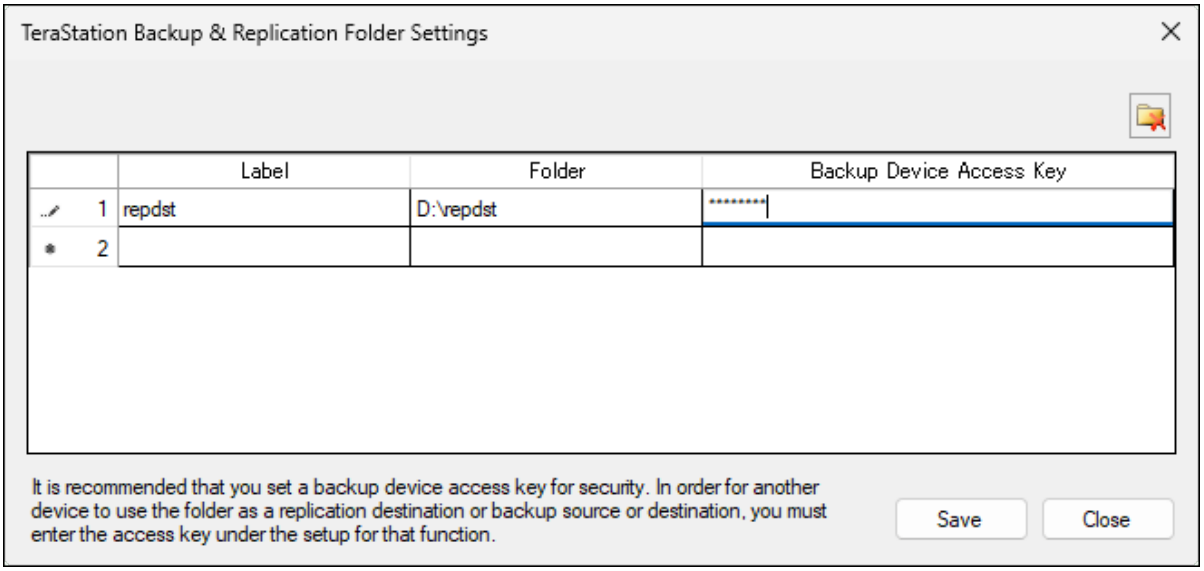
2 Click the blank space under "Label" and enter a label for the folder.



3 Click [.] under "Folder" and select the folder as a replication destination.



4 Enter the desired characters for a backup device access key. The backup device access key may contain up to 8 alphanumeric characters, hyphens (-), and underscores (_). The first character should not be a symbol.



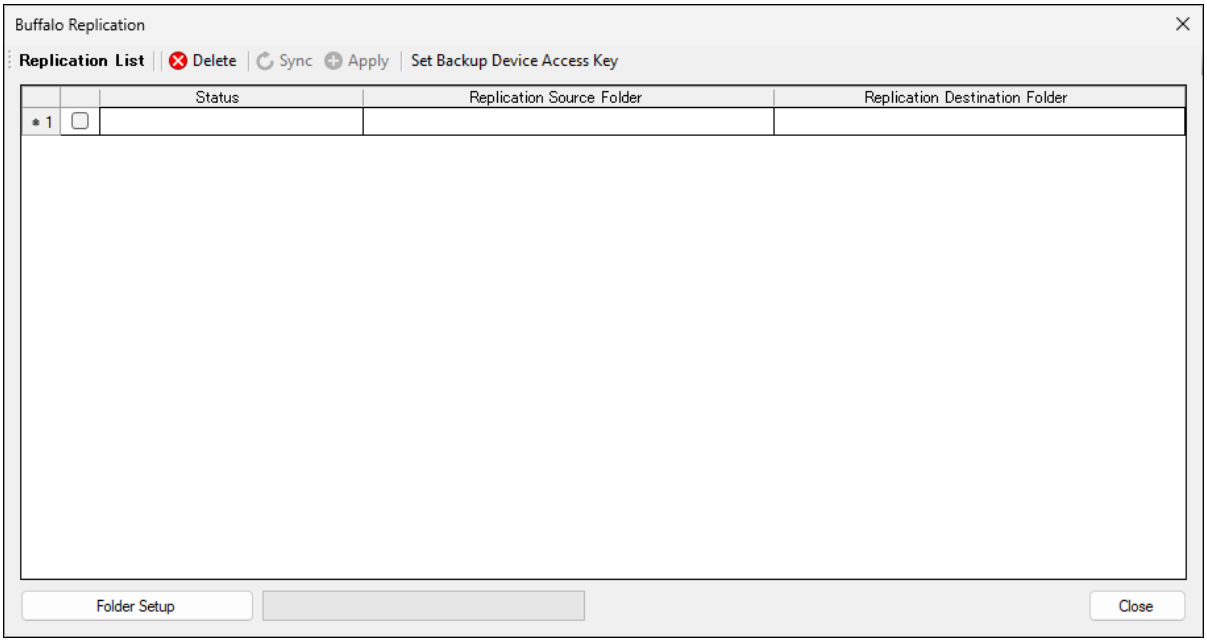
5 The process is complete once you click *Save*.

Step 2 Configuring the Replication Source

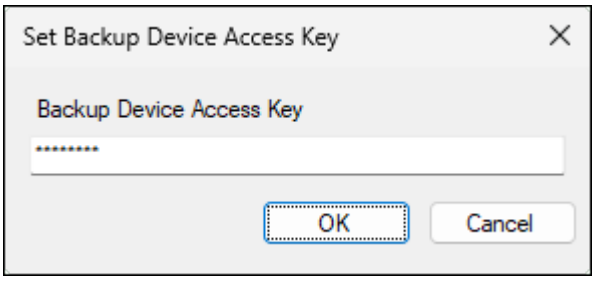
Follow the procedure below on Windows Server for the replication source TeraStation.

1 Click the Start button ( ), then click *Buffalo Replication* in the Start menu.

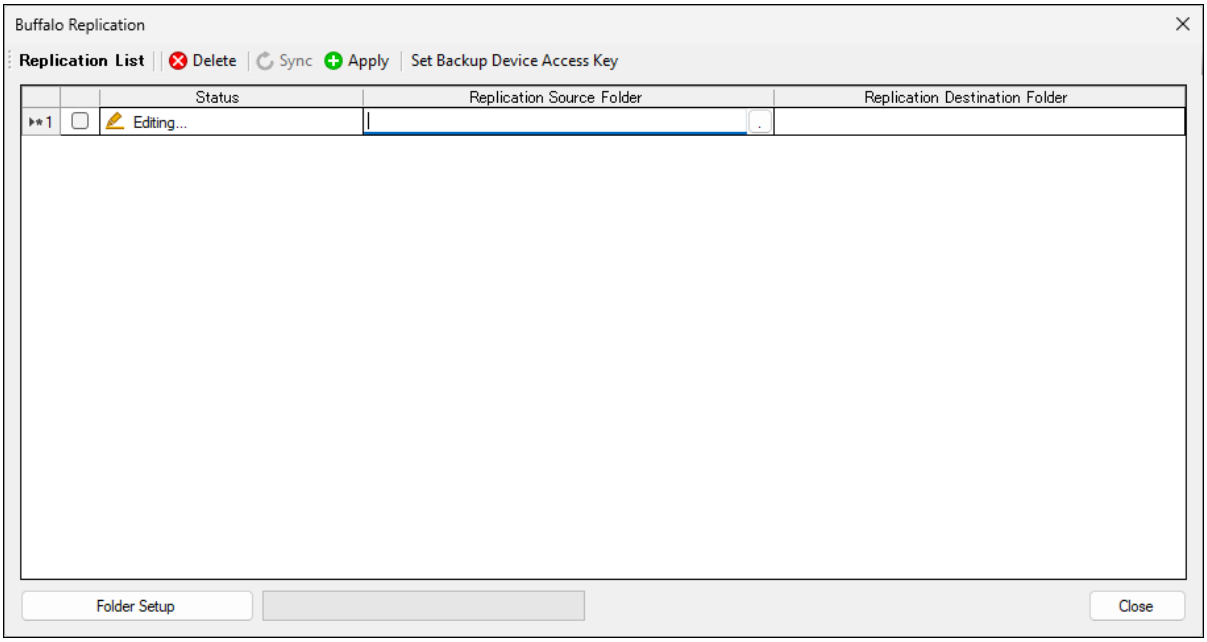
2 If you had configured a backup device access key to the replication destination folder, click *Set Backup Device Access Key*. If you didn't, skip to step 7.



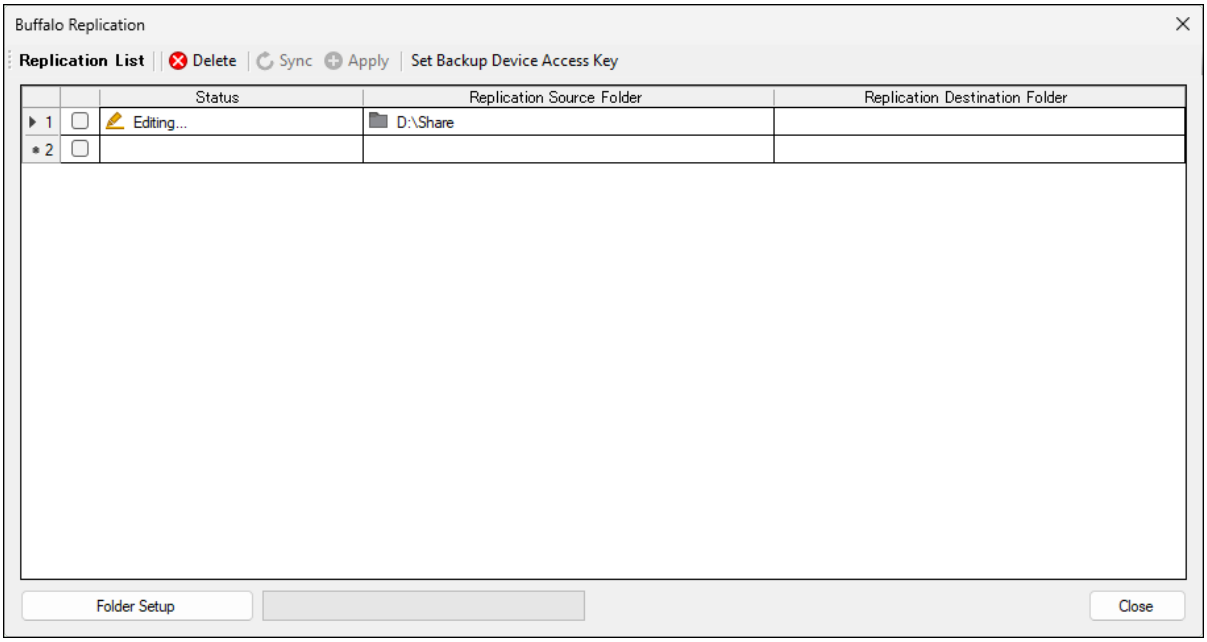
3 Enter the configured backup device access key of the replication destination folder and click *OK*.



4 Click the blank space under "Replication Source Folder", click , and select a folder from the list as the replication source folder, then click *OK*.

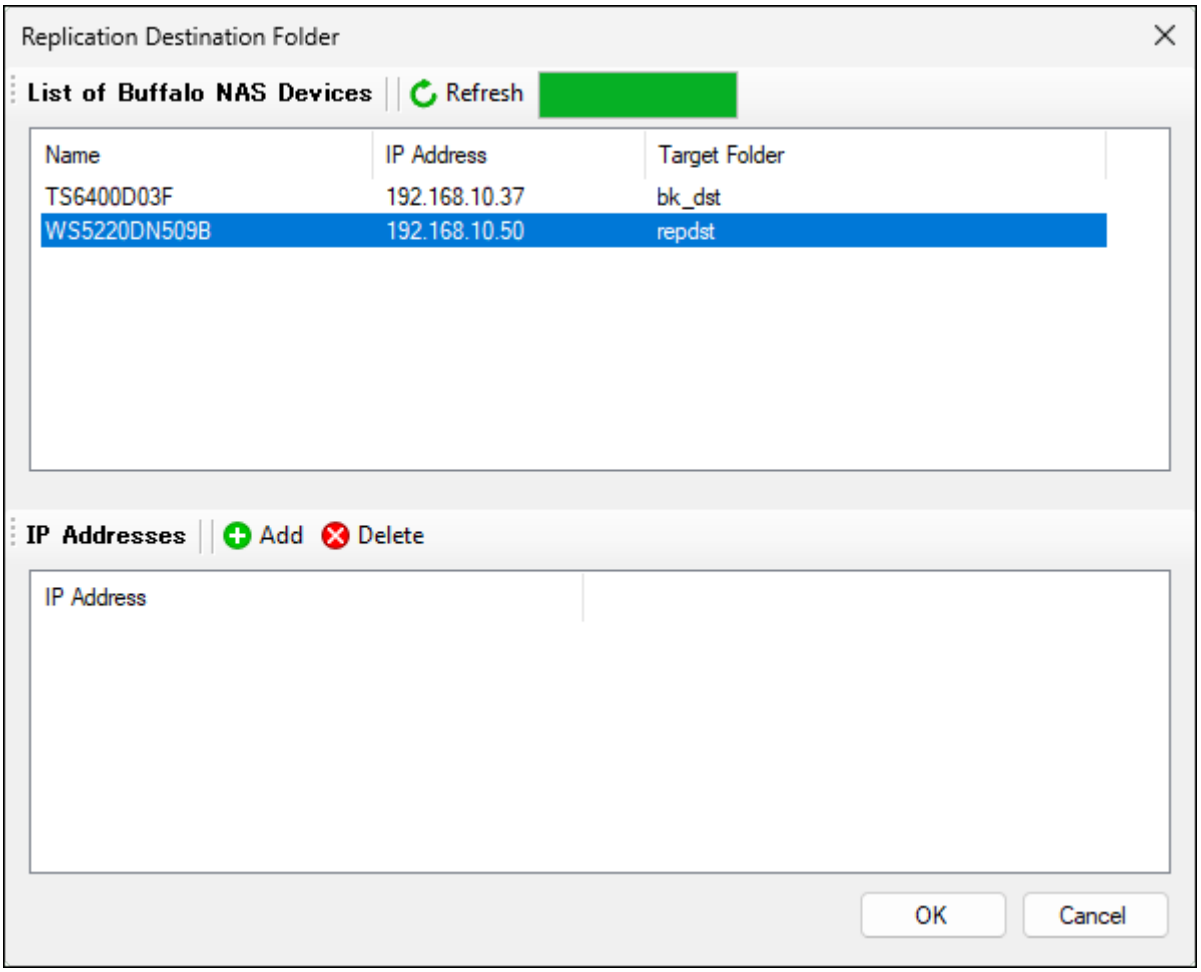


5 Click the blank space under "Replication Destination Folder".

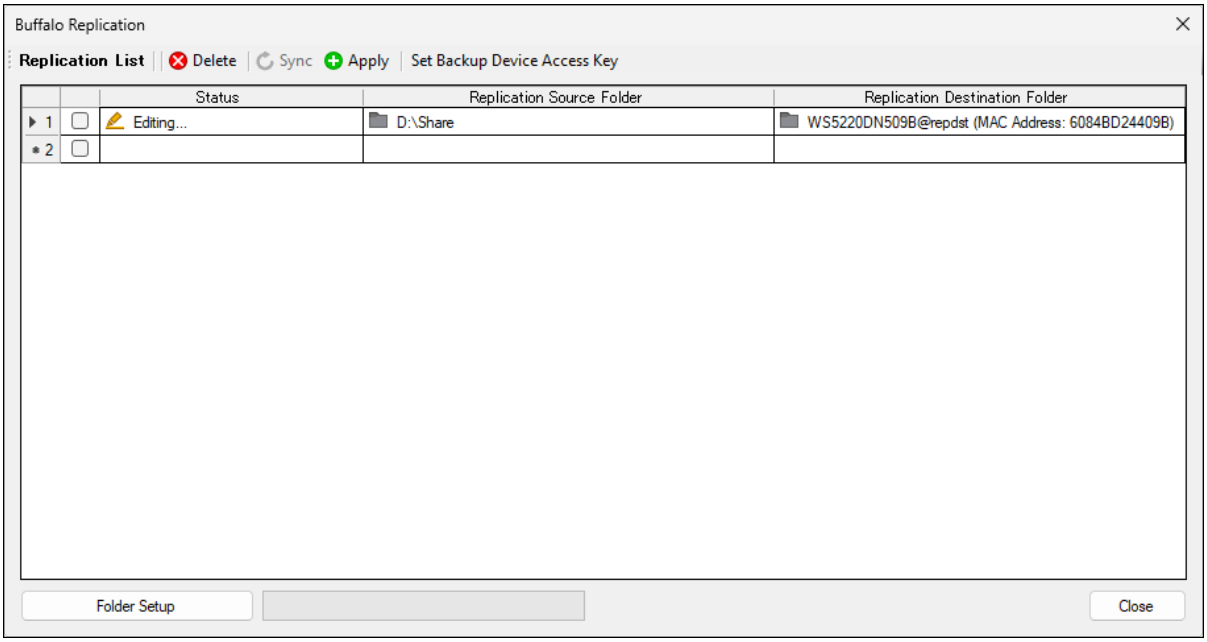


6 Select the folder from the folder list, then click *OK*. If no shared folders appear, click *Refresh* and try again.

To configure folders on a device that is located on another network, click *Add* and enter the IP address of the device, then click *Save*. After the IP address is added to the list, click *Refresh* again to add the folder to the list of folders.



7 Click *Apply*.



8 The process is complete once you close the confirmation window that appears. The job will start a full backup from the replication source data to the replication destination after deleting existing files in the replication destination.

Notes:

- To delete the settings from the list, select the job and click *Delete*.
- If you want to run the replication job manually, such as in case of an replication error occurring, click *Sync*. This will start all replication jobs in the list.
- The Ethernet port number to use for replication cannot be specified in the replication job.
- The following files and folders will not be replicated:
  - Files with periods (.) or underscores (_) as the first character in their name.
  - Folders with periods (.) or underscores (_) as the first character in their name.
  - .AppleDesktop/
  - Network Trash Folder/
  - TheVolumeSeHngsFolder/
  - .DS_Store/
  - .AppleDouble/
  - .AppleDB/

If the Network Settings Are Changed After Buffalo Replication Is Configured

If the network settings are changed after Buffalo replication is configured, the TeraStation will not be able to communicate with the replication destination TeraStation and replication may fail. Examples of network settings changes include disconnecting the Ethernet cable and reconnecting it to another LAN port or changing the IP address of the replication source or destination TeraStation. If the network settings are changed, refresh the list of Buffalo NAS devices by following the procedure below.

1 Click the Start button ( ), then click *Buffalo Replication* in the Start menu.

2 Click *Refresh* and refresh the detected Buffalo NAS devices list.

3 When the TeraStation whose network settings were changed is displayed in the refreshed list, close the window.

4 Click *Sync*. This will start all replication jobs in the list.

5 The process is complete once the replication jobs have been run.

DFS Replication

DFS (Distributed File System) is a set of client and server services that allows Windows users to organize many distributed SMB file shares into a distributed file system.
To use DFS replication, the TeraStation must be joined to an Active Directory domain. Make the necessary settings as detailed below to use DFS replication on Windows Server.

This section uses the following environment parameters as an example:
Replication Source: hostname "Server-A"
Replication Destination: hostname "Server-B"

Namespace Server: hostname "Server-A"
Namespace Name: "Public"
Namespace Folder: "buffalo-share"
Replication Group: "DFS"

Replication Source Folder: "D:\rep_src"
Replication Destination Folder: "D:\rep_dst"

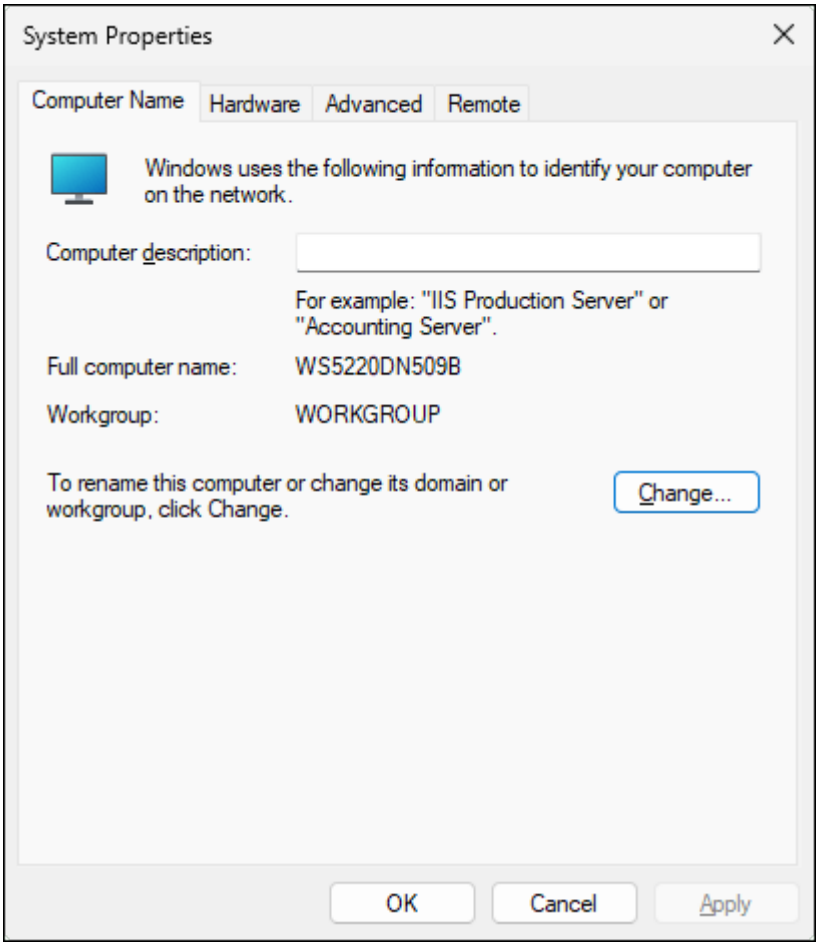
Step 1 Joining an Active Directory

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

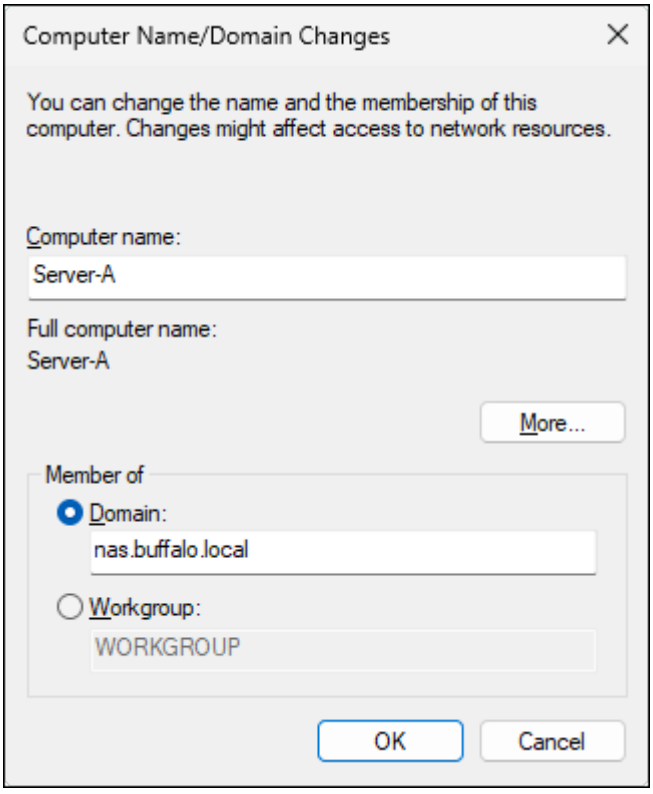
2 Click *Local Server* in the left-side menu.

3 Click the hostname of your TeraStation under "Properties".

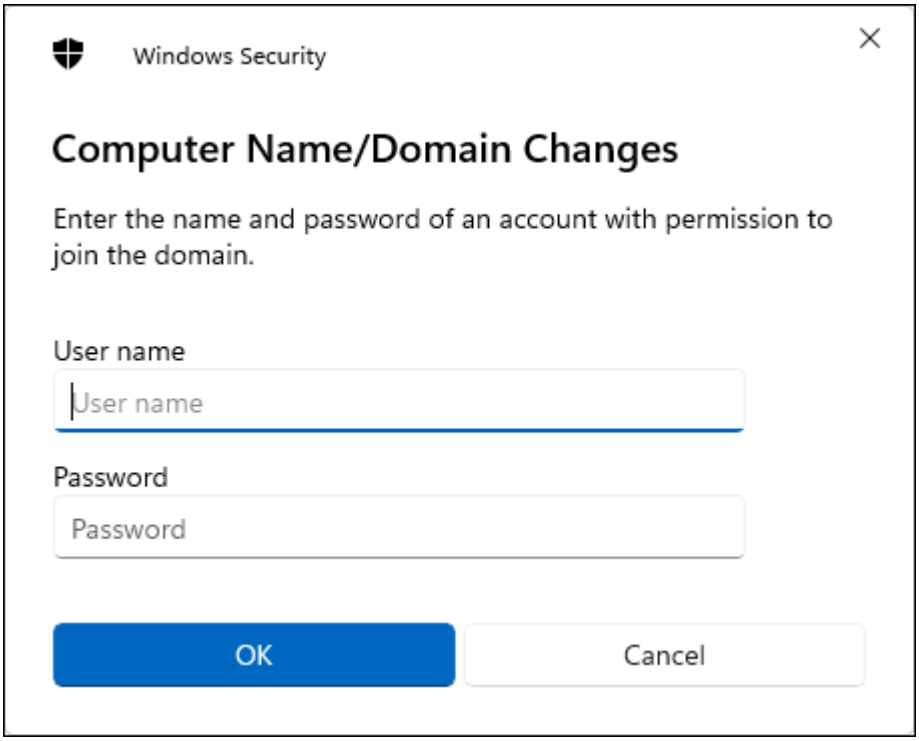
4 From the *Computer Name* tab, click *Change*.



5 Select "Domain", enter a domain name, and click *OK*.



6 Enter an administrator username and password for the Active Directory domain controller, then click *OK*.



7 Click *OK*, then click *Close*.

8 Click *Restart Now* and restart your computer to apply settings. The process is complete once the TeraStation has been restarted.

Step 2 Installing the DFS Role

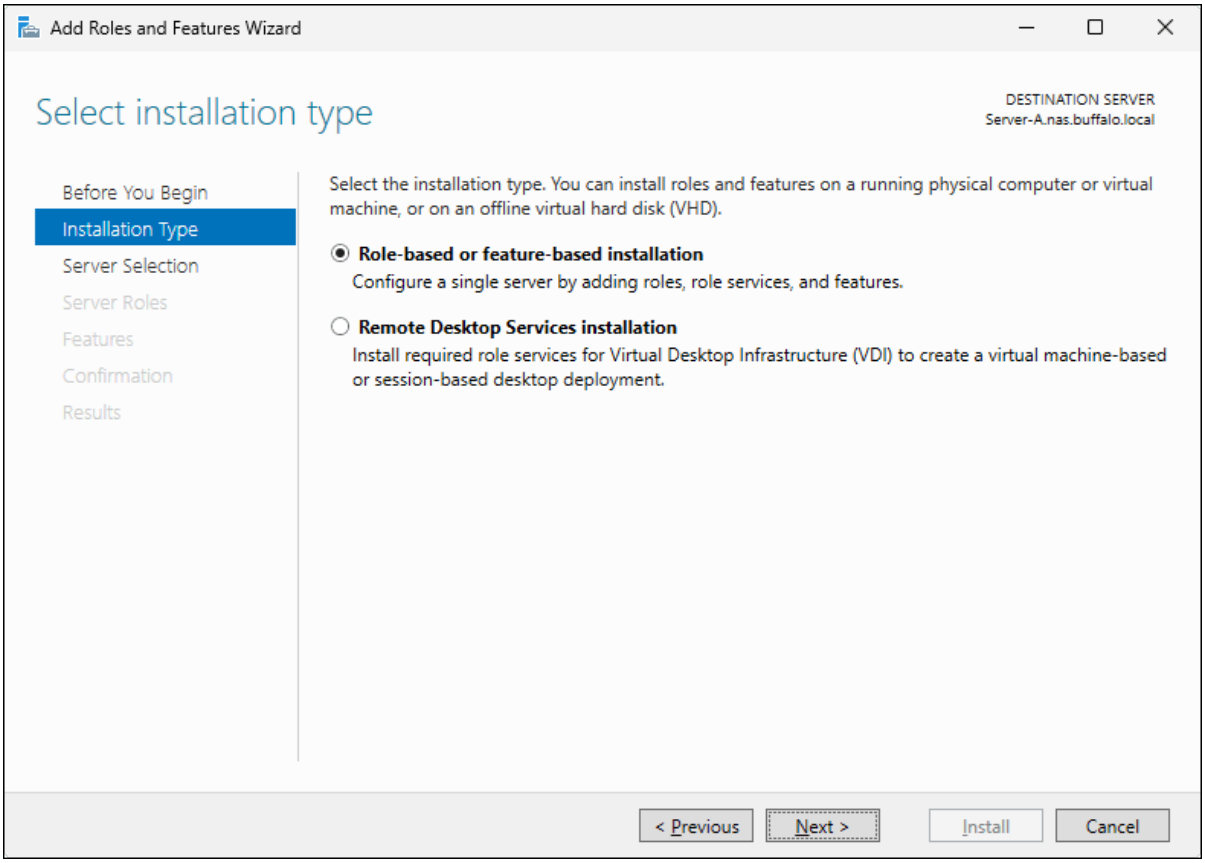
Follow the procedure below if you are configuring the DFS feature for the first time. Otherwise, skip to the "Step 3 Creating Namespaces" section below.

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Add roles and features*.

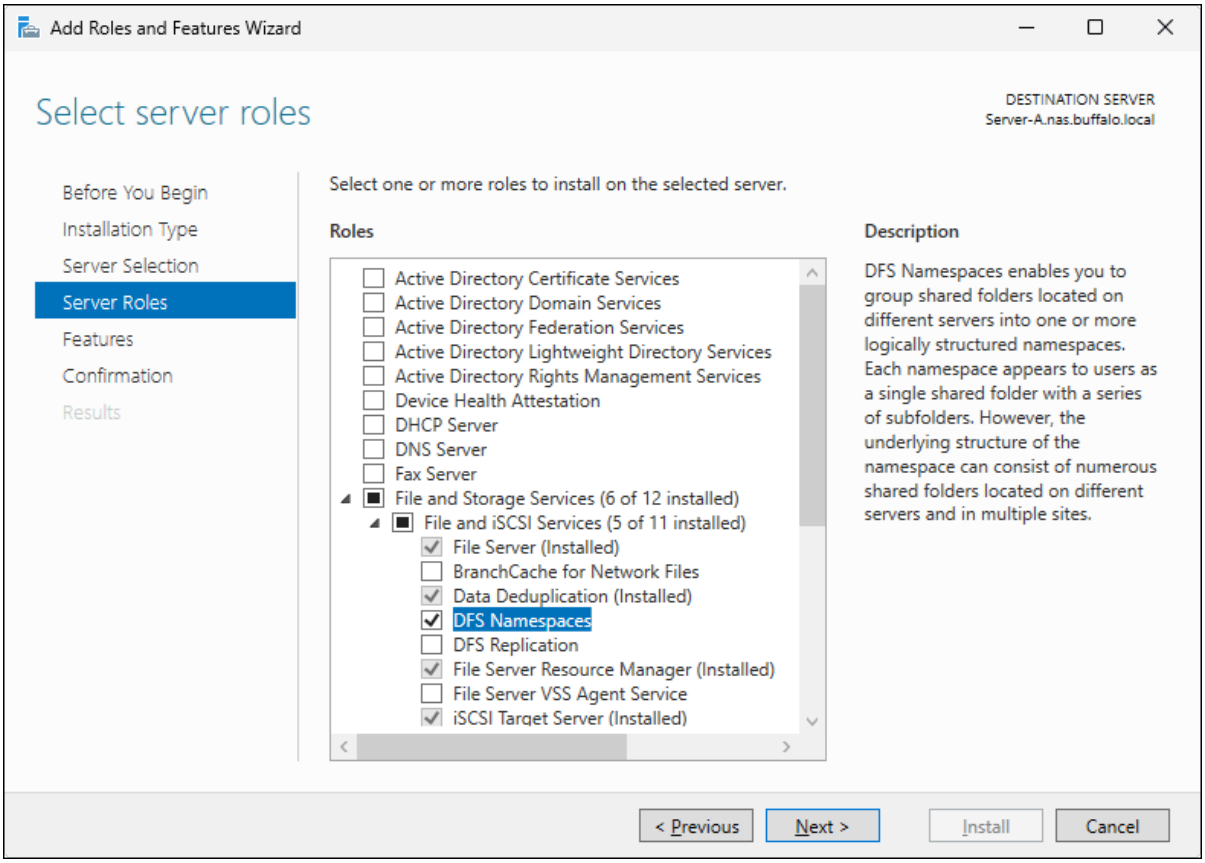
3 Click *Next*.

4 Select "Role-based or feature-based installation".

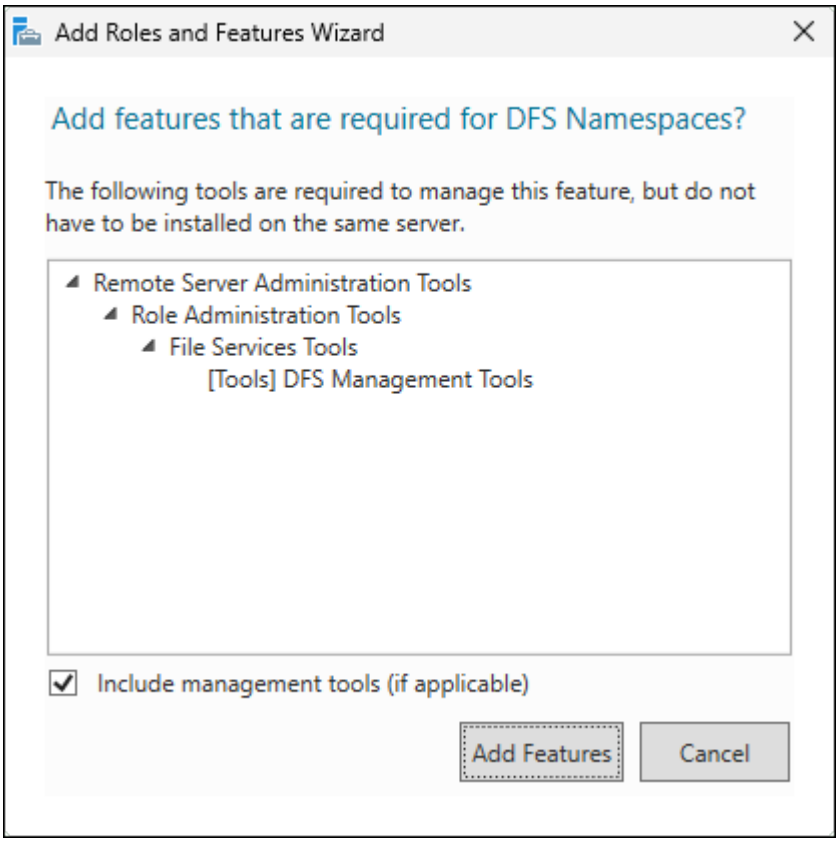


5 Click *Next*, then click *Next* again.

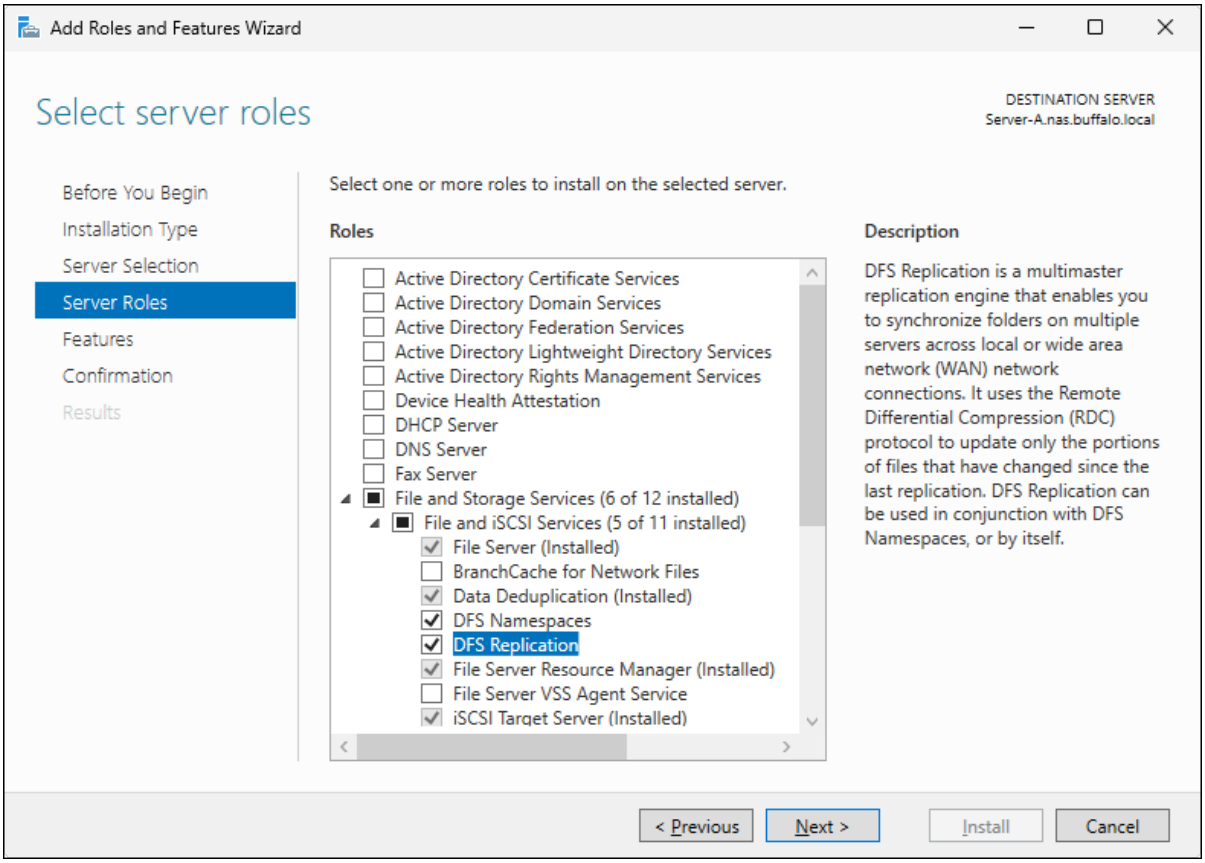
6 Select "DFS Namespaces" under "File and Storage Services" > "File and iSCSI Services".



7 Select "Include management tools (if applicable)" and click *Add Features*.



8 Select "DFS Replication" under "File and Storage Services" > "File and iSCSI Services".



9 Click *Next* twice, then click *Install*.

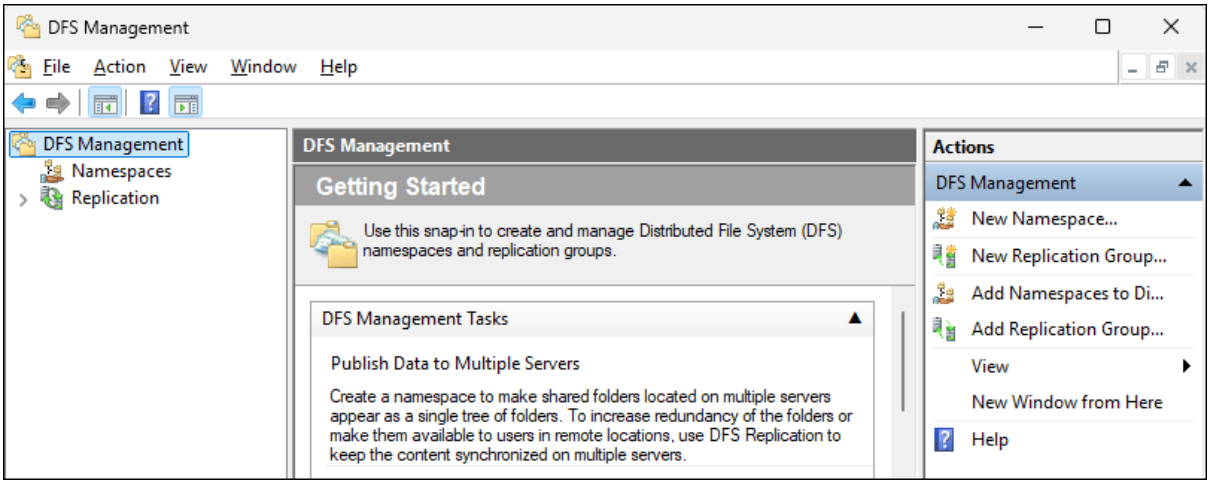
10 The process is complete once you close the window.

Step 3 Creating Namespaces

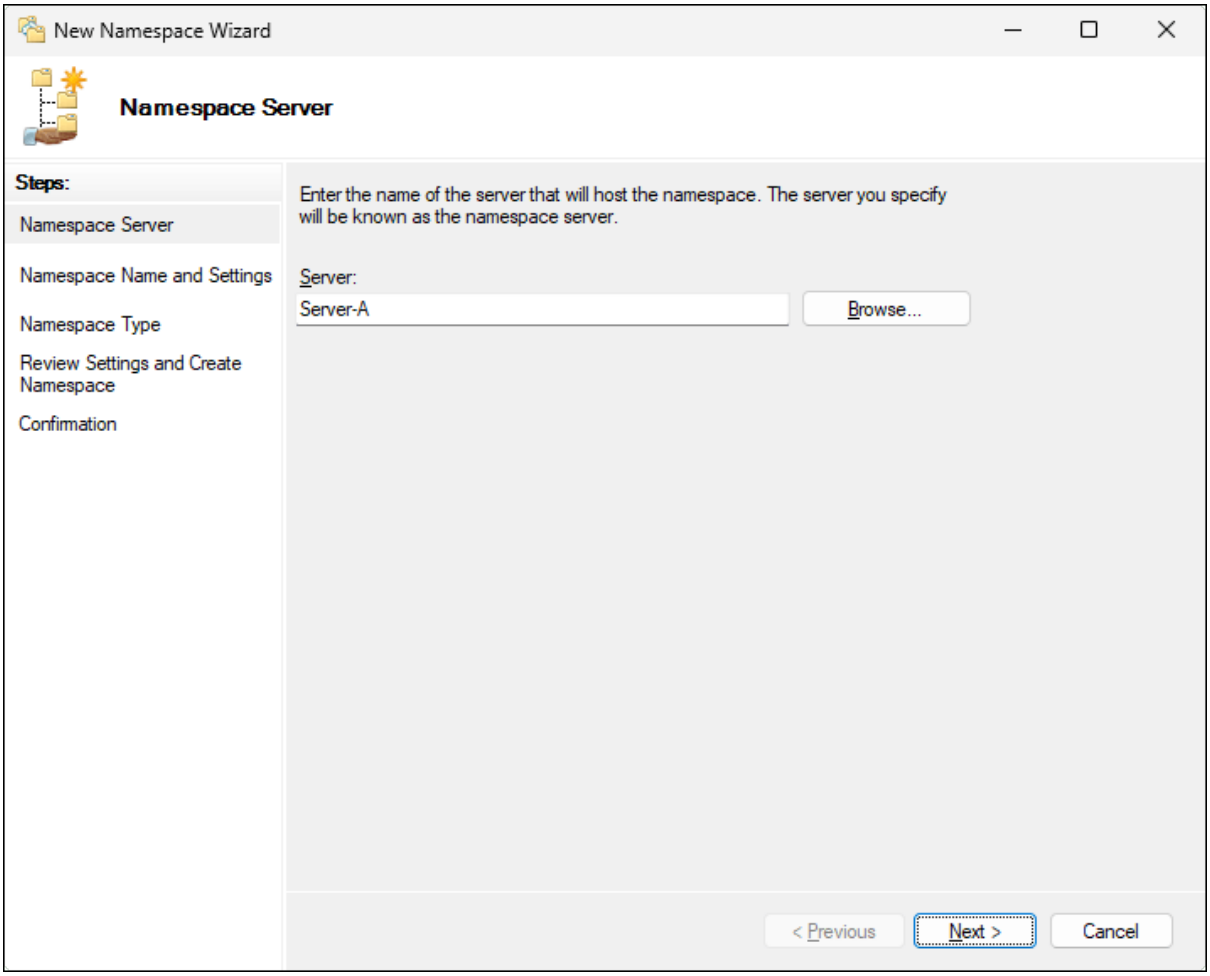
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *DFS Management* in the upper-right corner of the window.

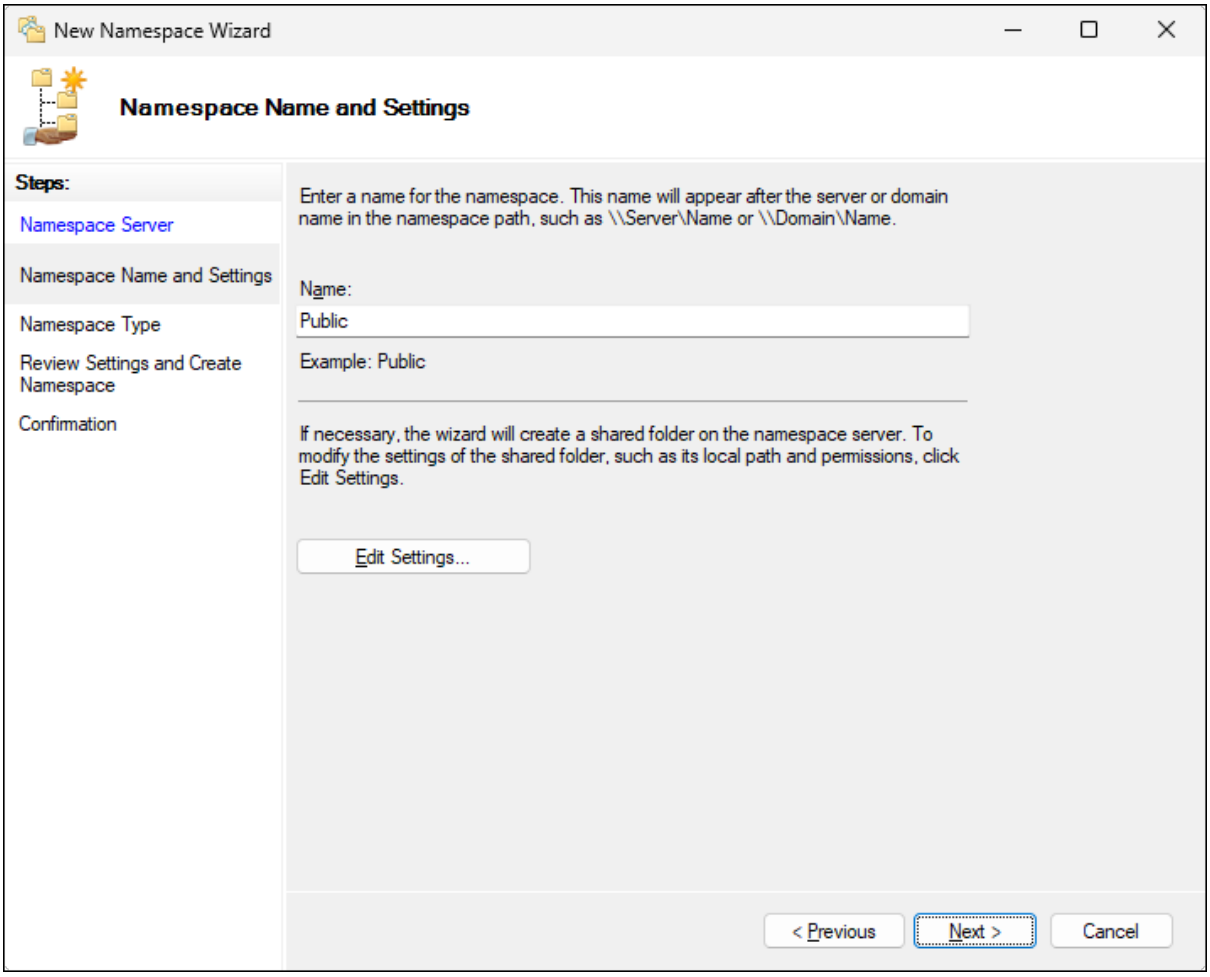
3 Click *New Namespaces* from the right-side actions menu.



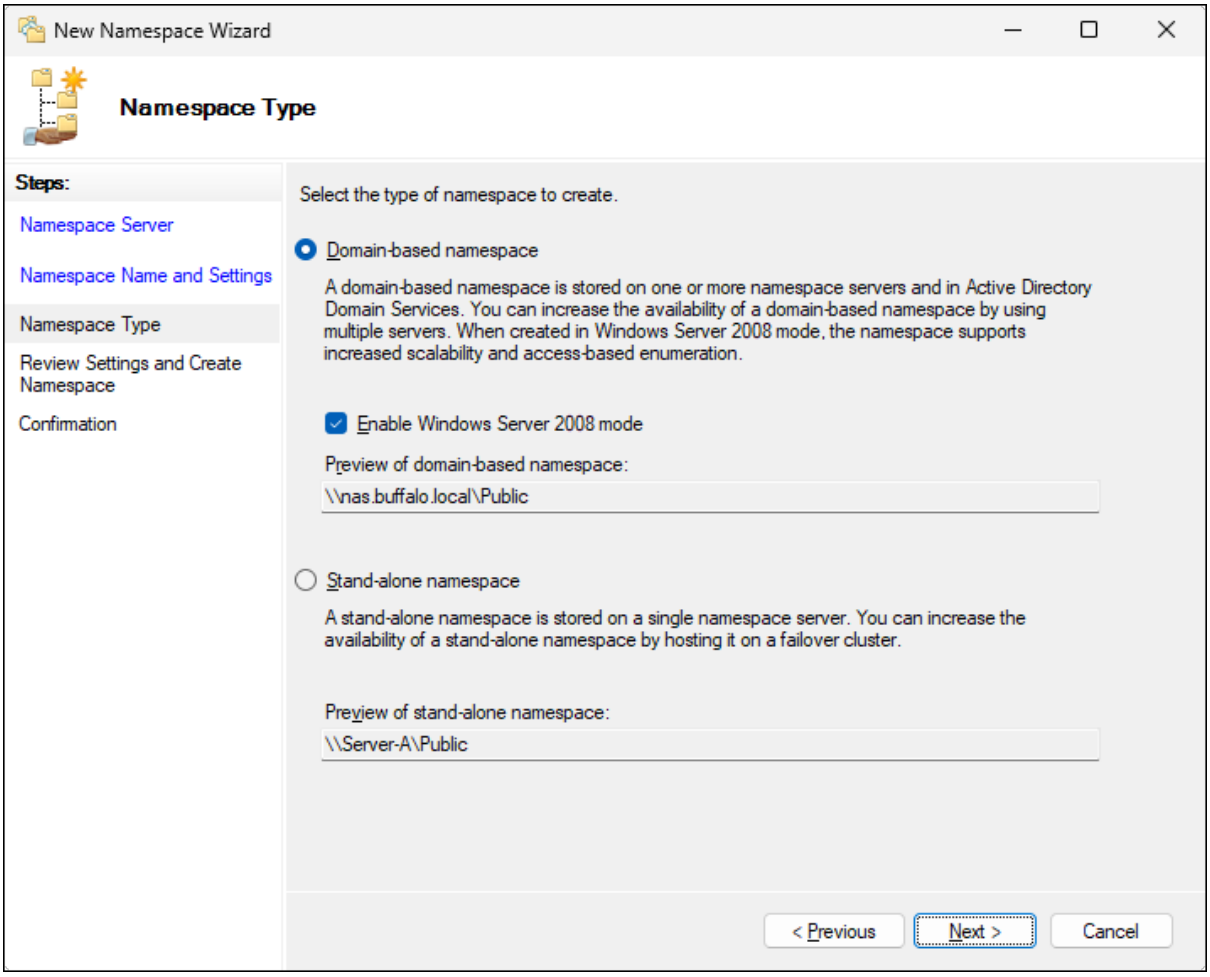
4 Enter a hostname for the namespace server and click *Next*.



5 Enter a name for the namespace and click *Next*.

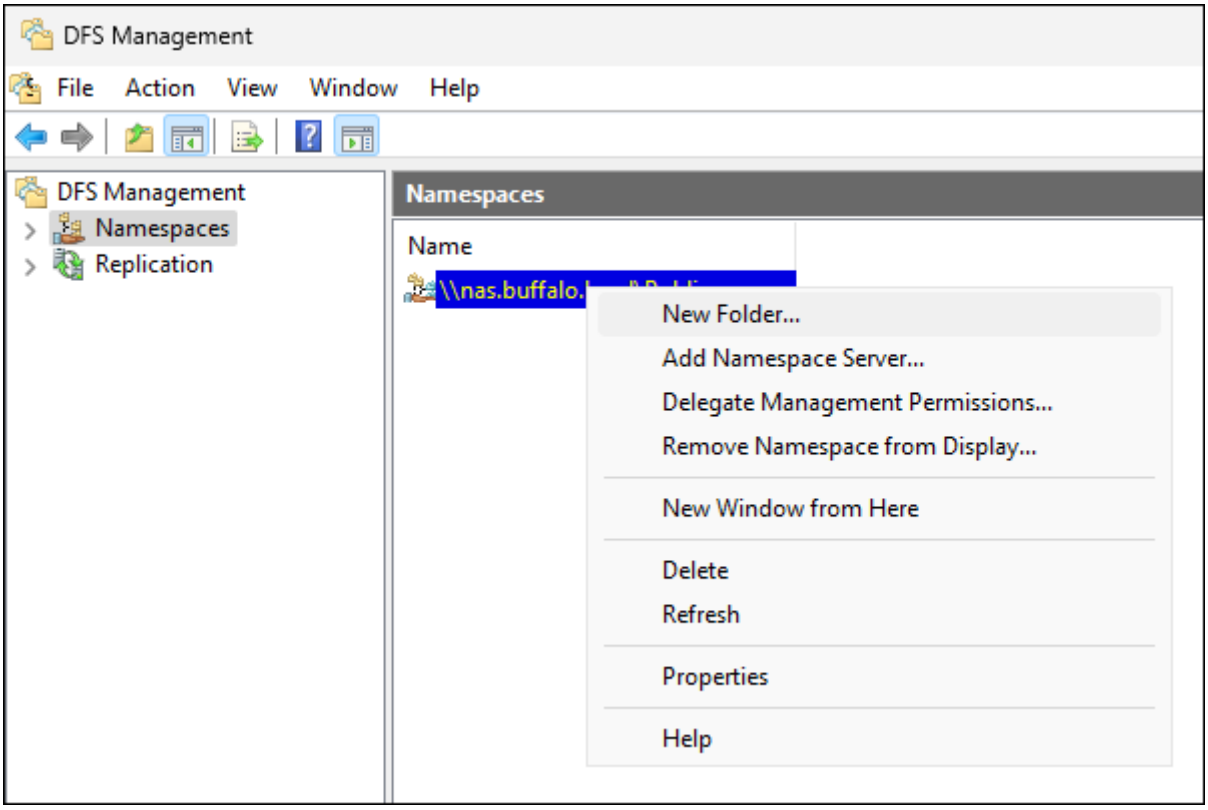


6 Select *Domain-based namespace* and click *Next*.

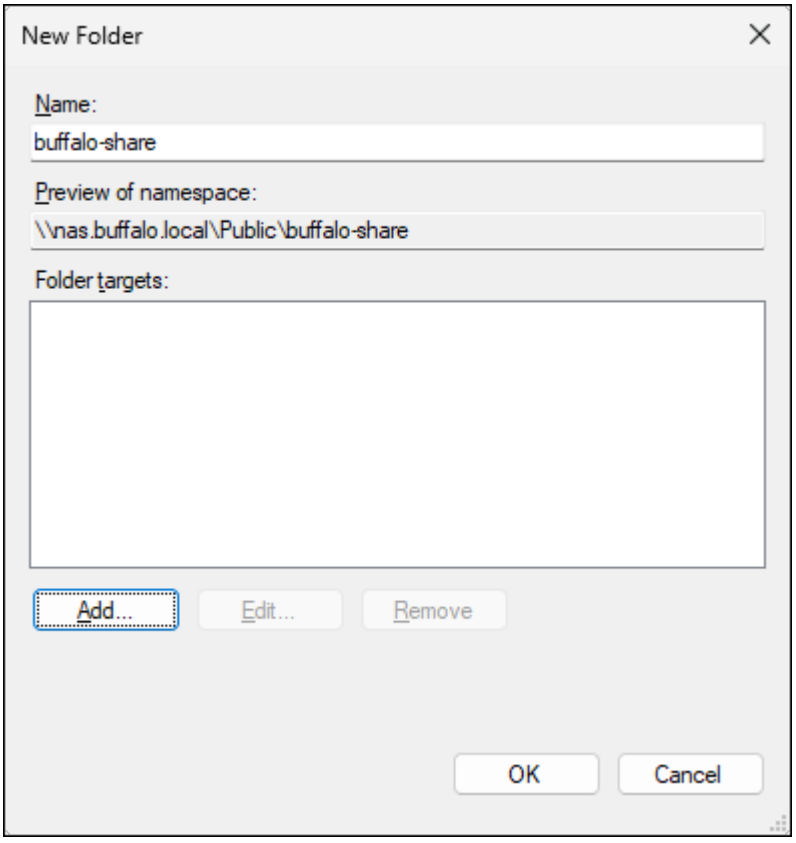


7 Click *Create*, then click *Close*.

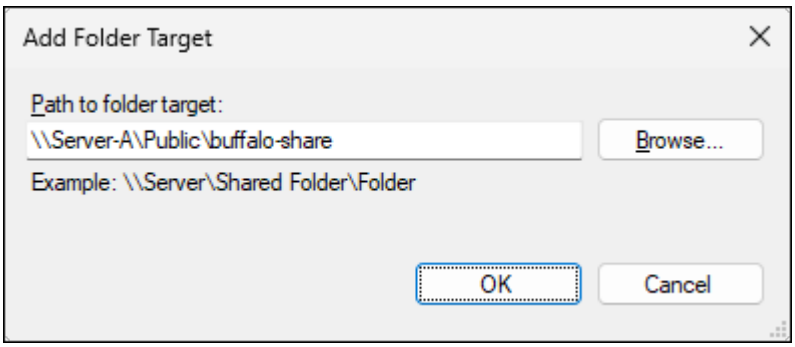
8 From DFS Management, click *Namespaces* under "DFS Management" in the left-side menu, right-click the name you created through the wizard in the center menu, then select *New Folder*.



9 Enter a folder name and click *Add*.



10 Enter a path to the folder or select a folder by clicking *Browse*, then click *OK*. You may be asked to create a new folder if the entered or selected path doesn't exist. In such a case, click *Yes*.



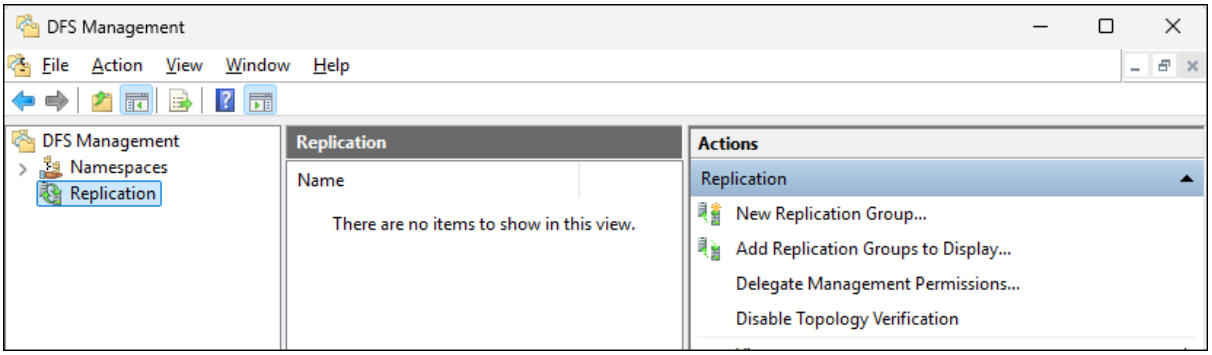
11 The process is complete once you close the window.

Step 4 Configuring DFS Replication

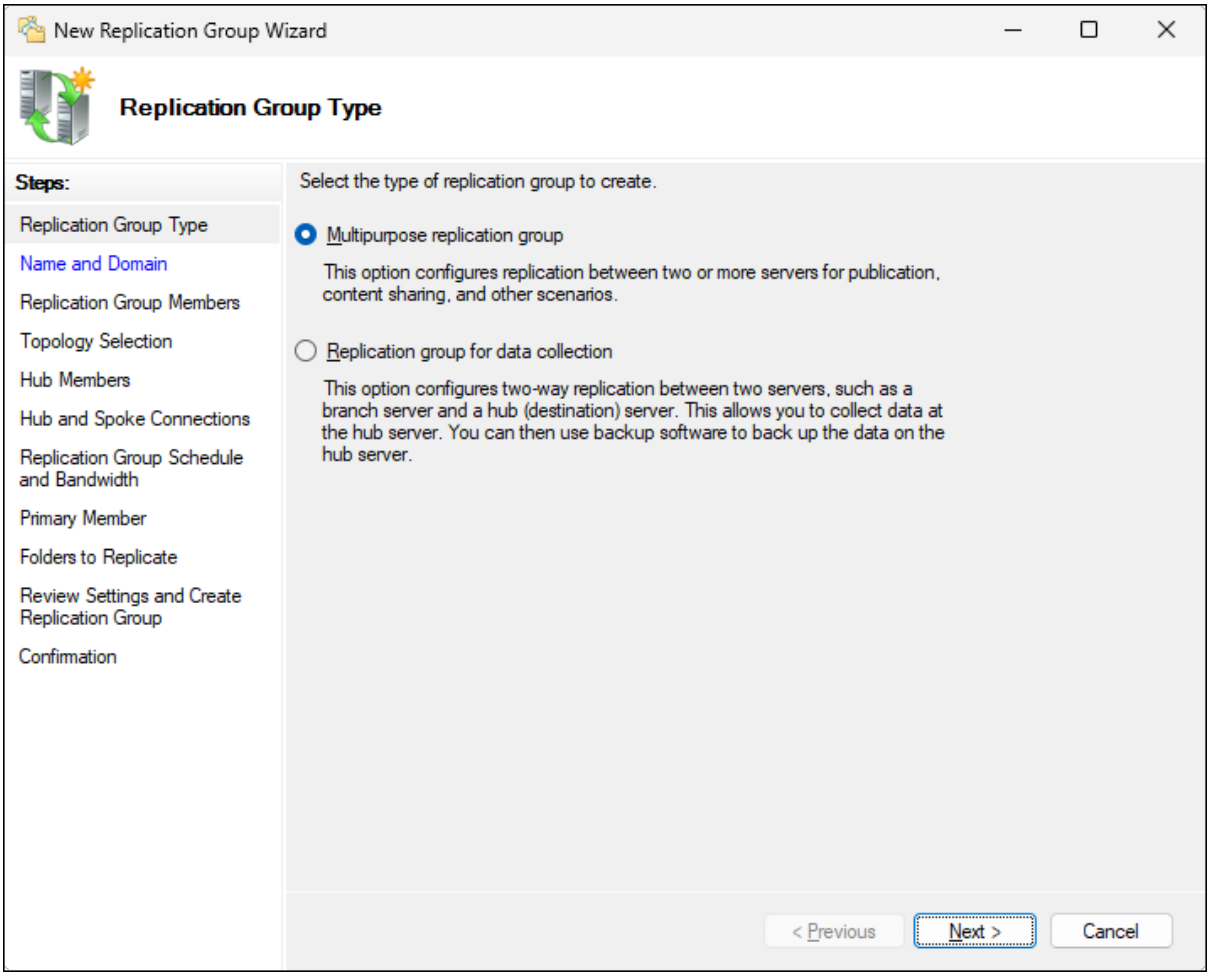
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *DFS Management* in the upper-right corner of the window.

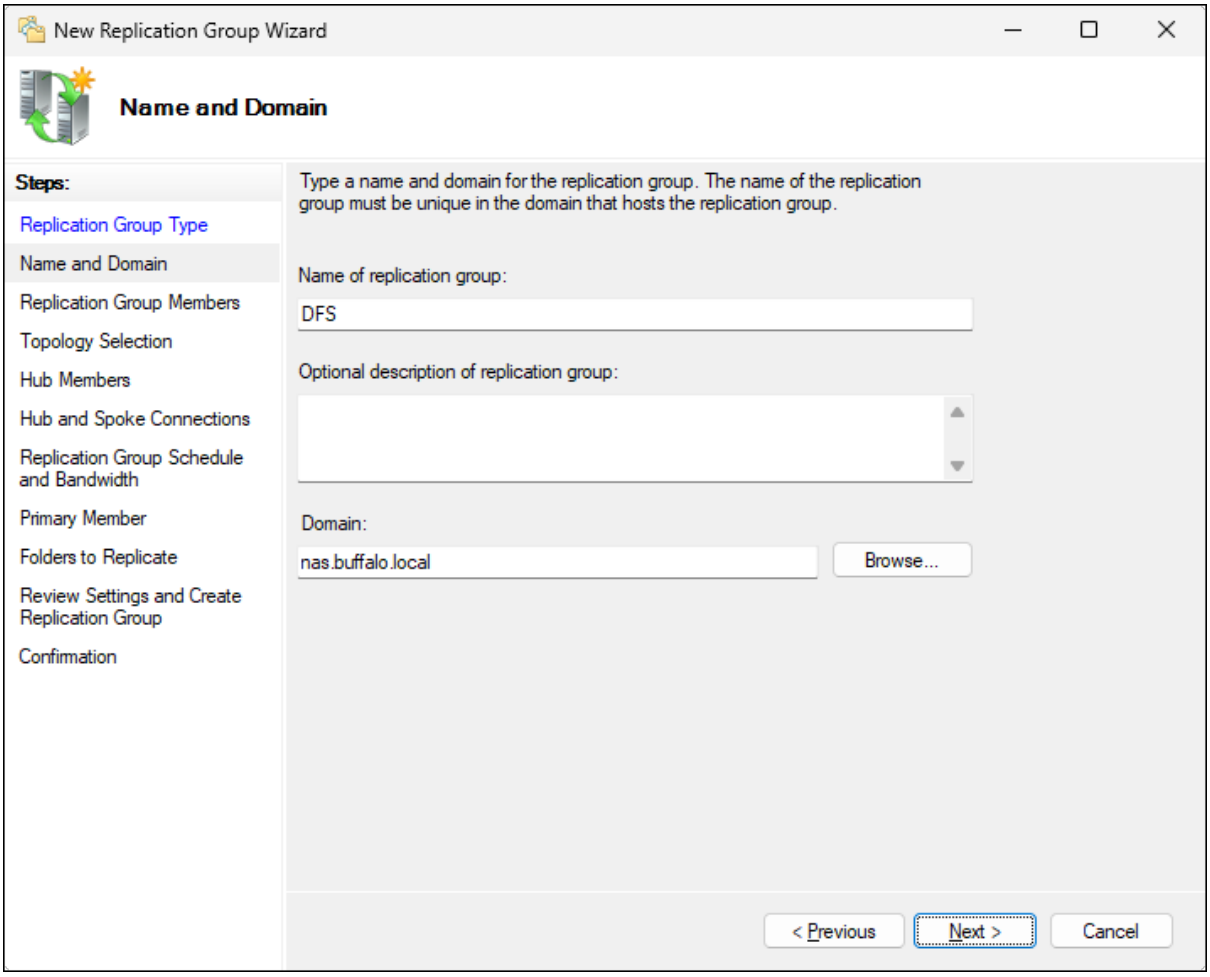
3 Click *Replication* under "DFS Management" in the left-side menu, then click *New Replication Group* in the right-side actions menu.



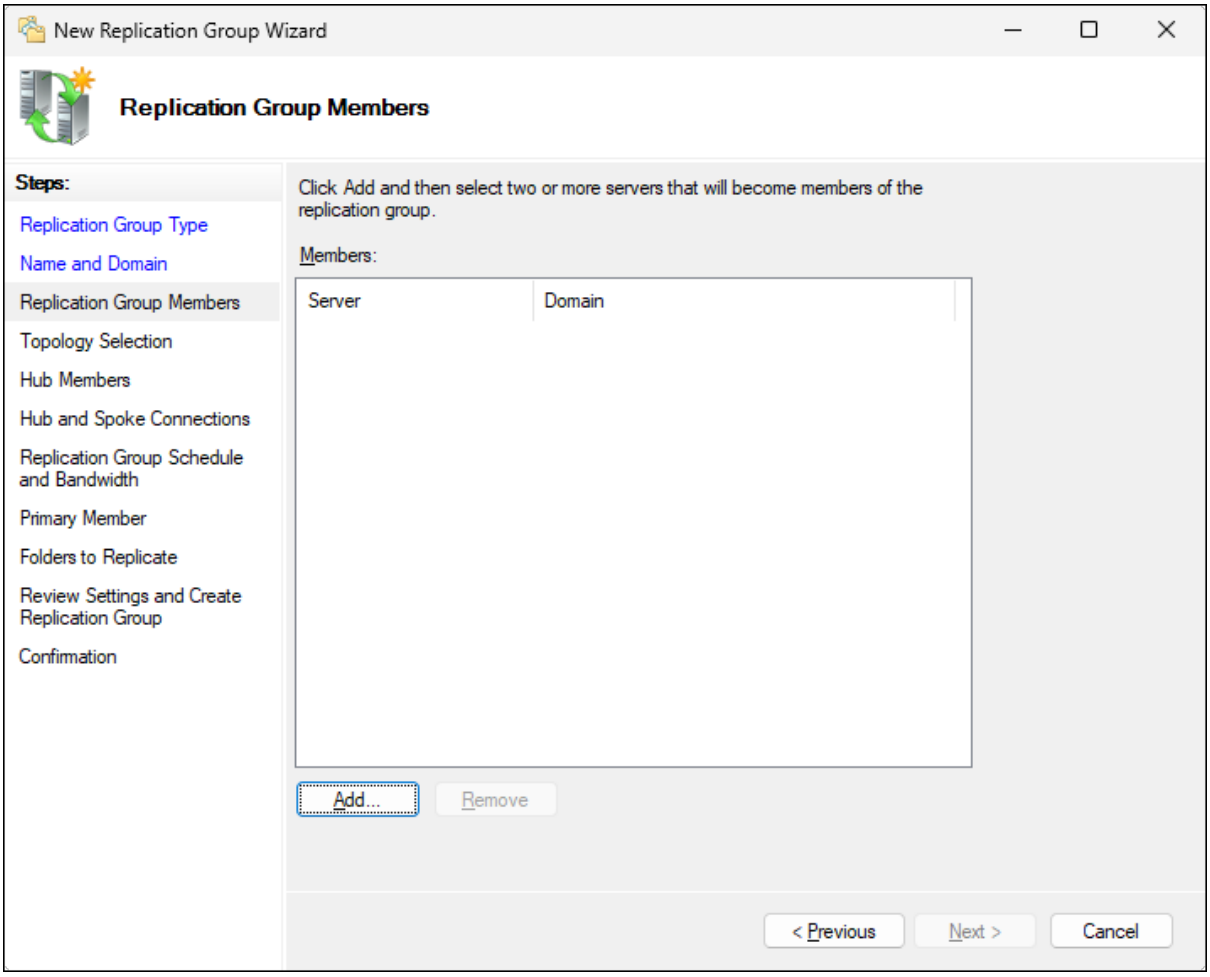
4 Select the type of the replication group and click *Next*. The procedure below uses selecting "Multipurpose replication group" as an example.



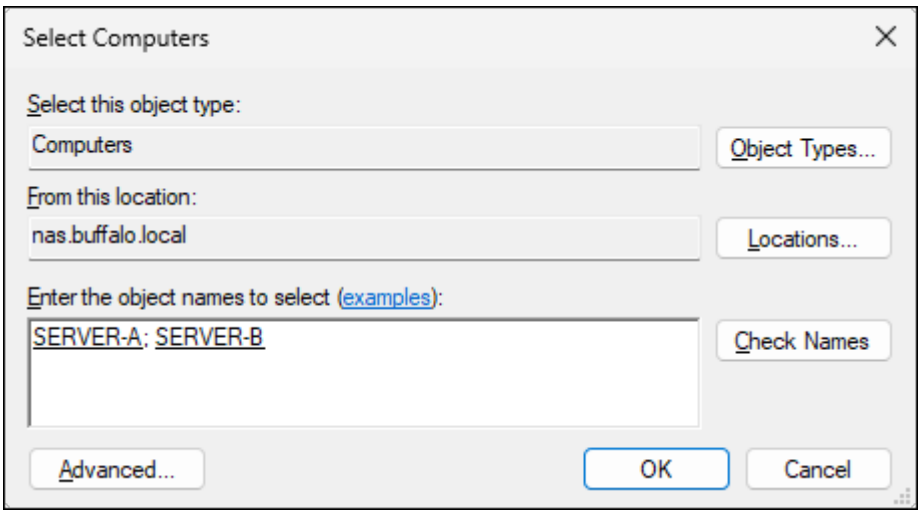
5 Enter a name for the replication group and click *Next*.



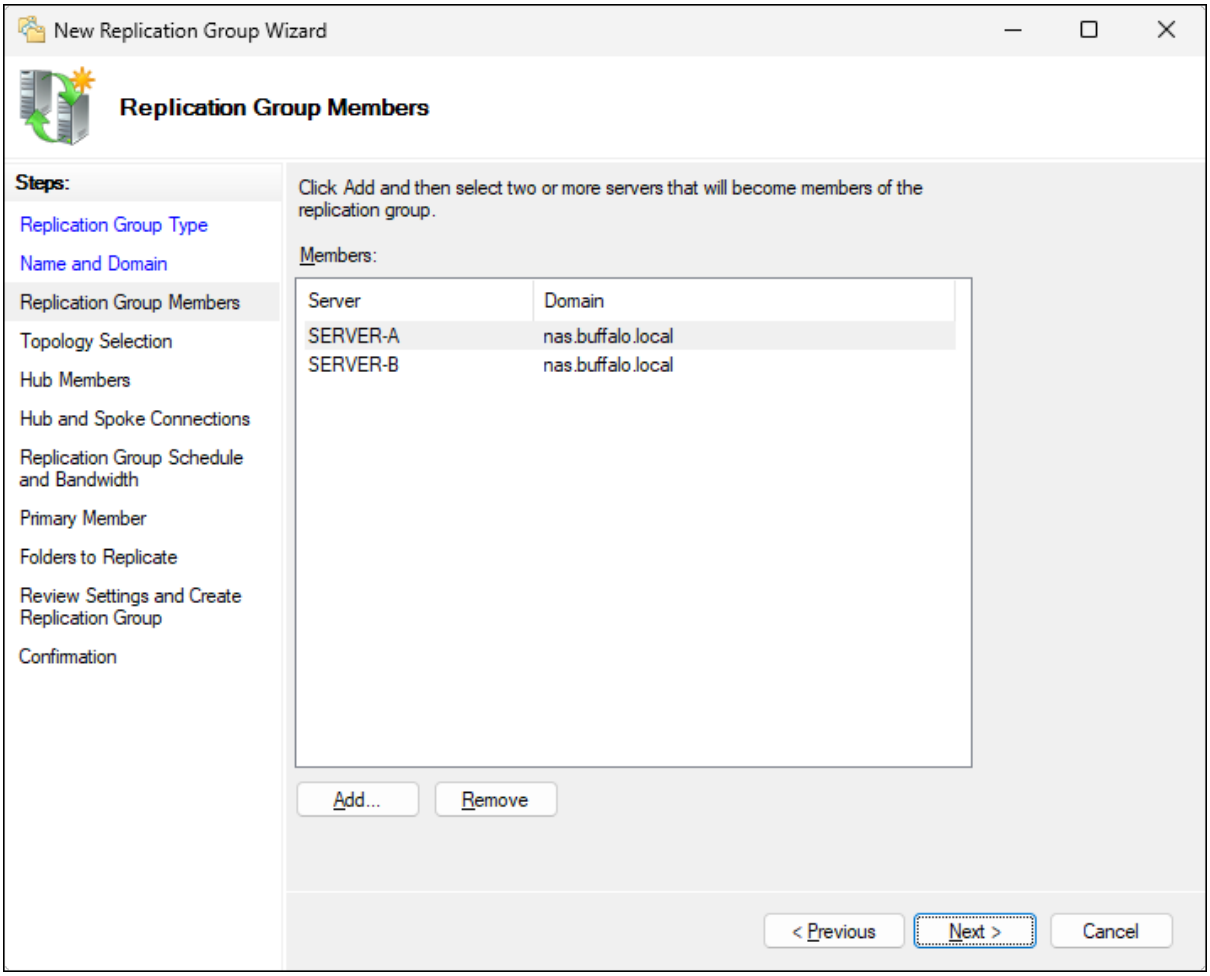
6 Click *Add*.



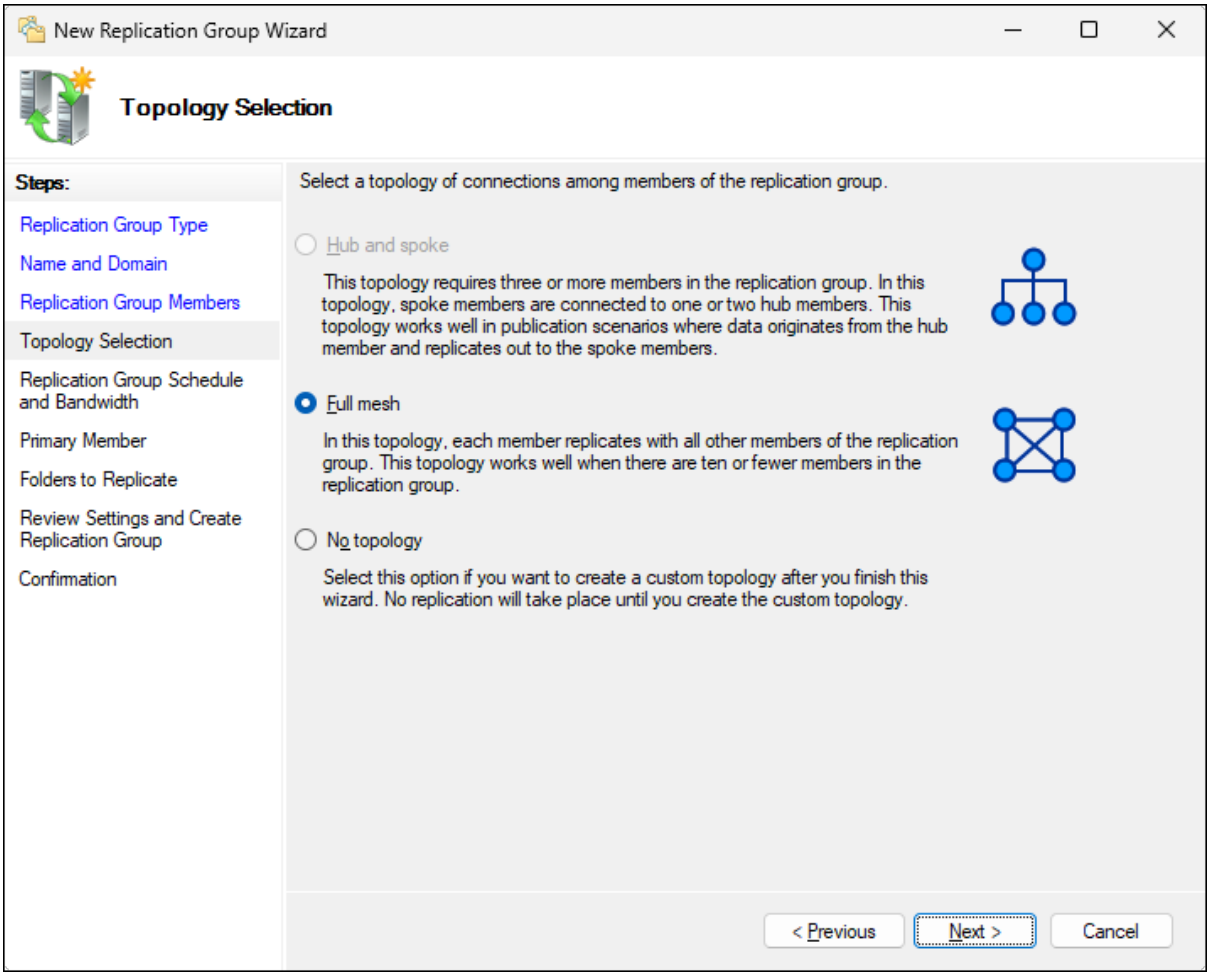
7 Enter the hostnames of the replication group member and click *OK*.



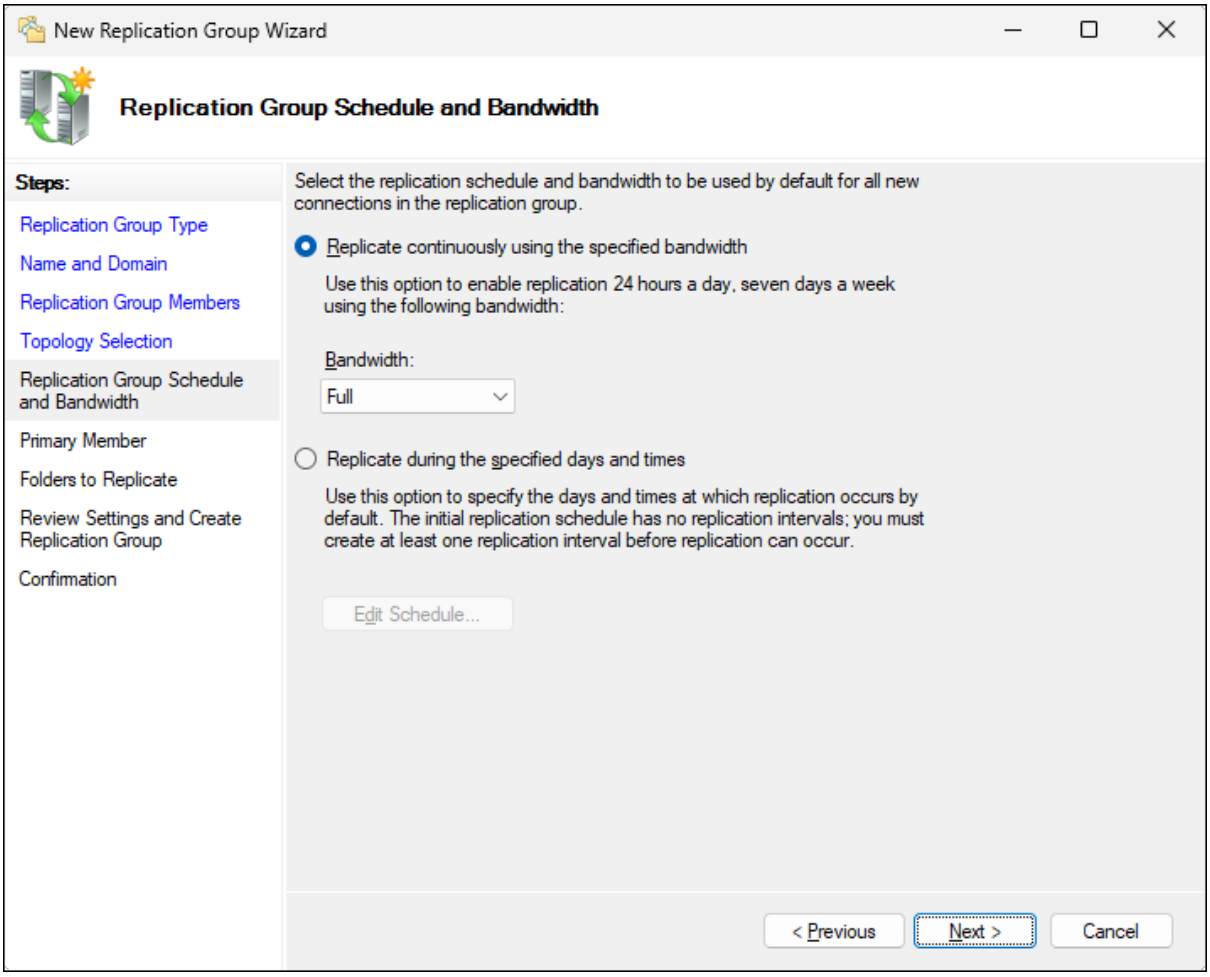
8 Click *Next*.


New Replication Group Wizard
Replication Group Members
Steps:
Replication Group Type
Name and Domain
Replication Group Members
Topology Selection
Hub Members
Hub and Spoke Connections
Replication Group Schedule and Bandwidth
Primary Member
Folders to Replicate
Review Settings and Create Replication Group
Confirmation
Click Add and then select two or more servers that will become members of the replication group.
Members:
Server
Domain
SERVER-A
nas.buffalo.local
SERVER-B
nas.buffalo.local
Add...
Remove
< Previous
Next >
Cancel

9 Select "Full mesh" and click *Next*.



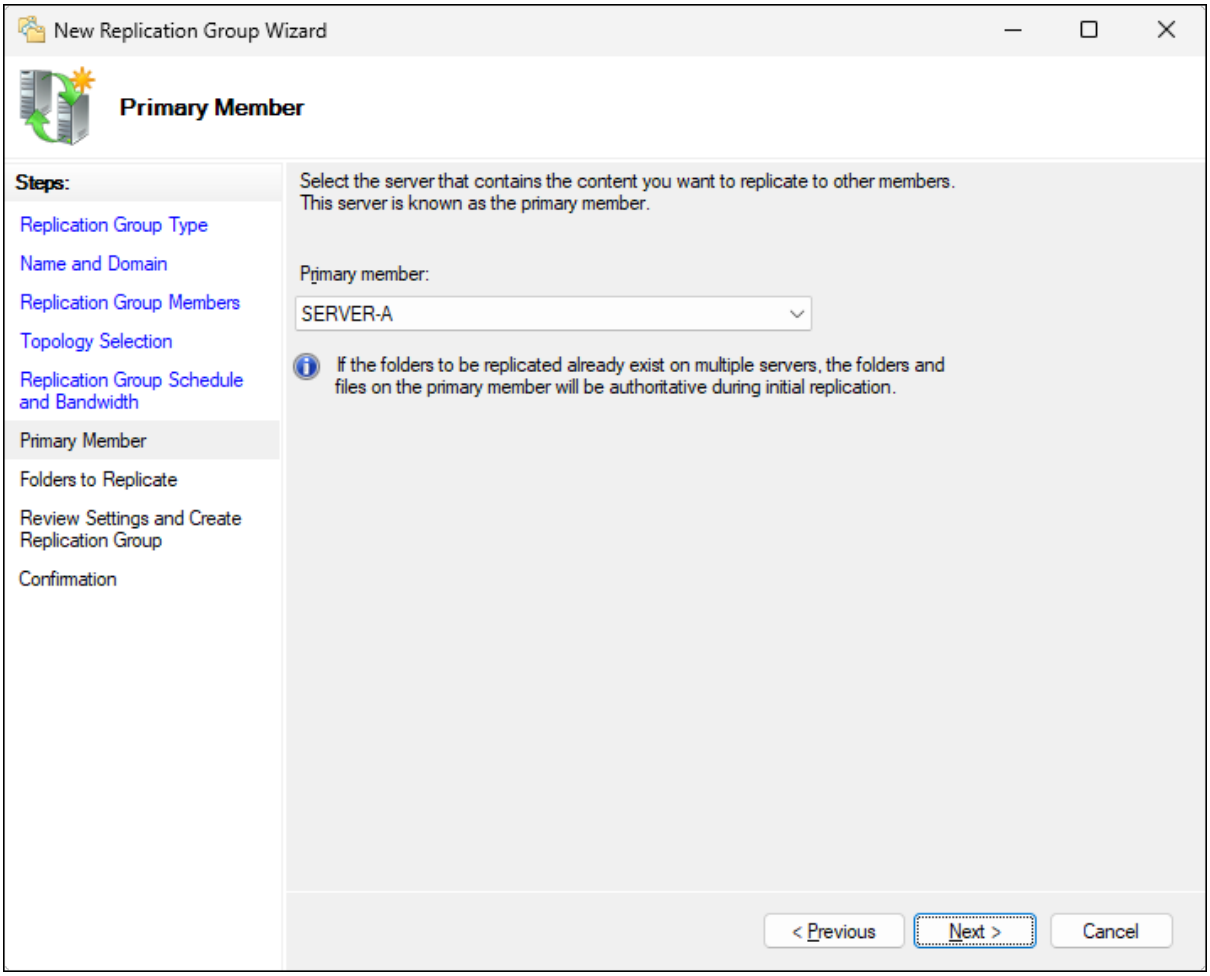
10 Click *Next*.



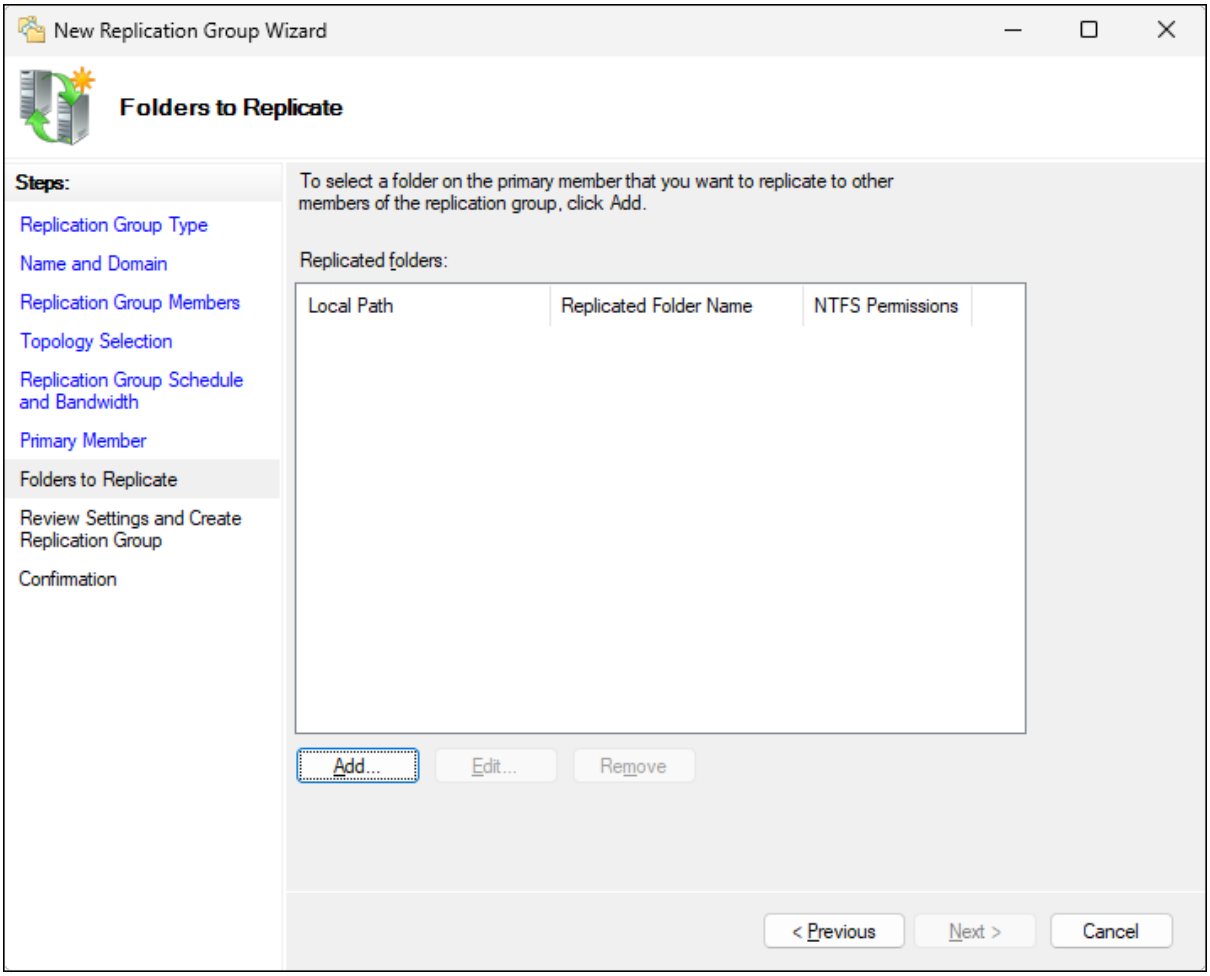
Notes:

- If you want to use a fixed bandwidth, select the desired bitrates from the drop-down list.
- If you want to specify the date and time for when to replicate, select "Replicate during the specified days and times", then edit the schedule.

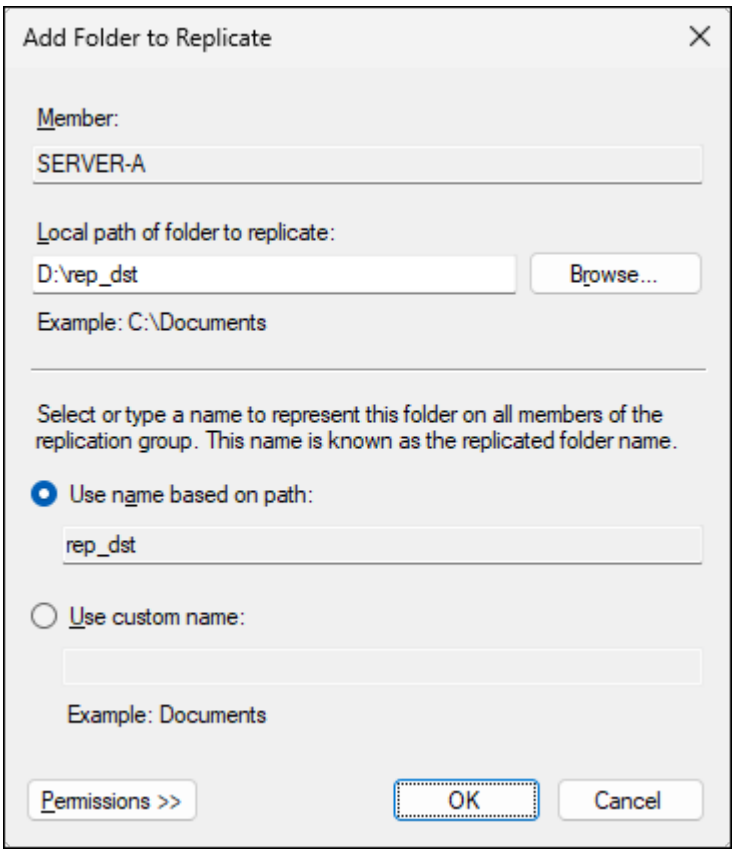
11 Select the TeraStation that has the replication source folder (Server-A) as the primary member, then click *Next*.



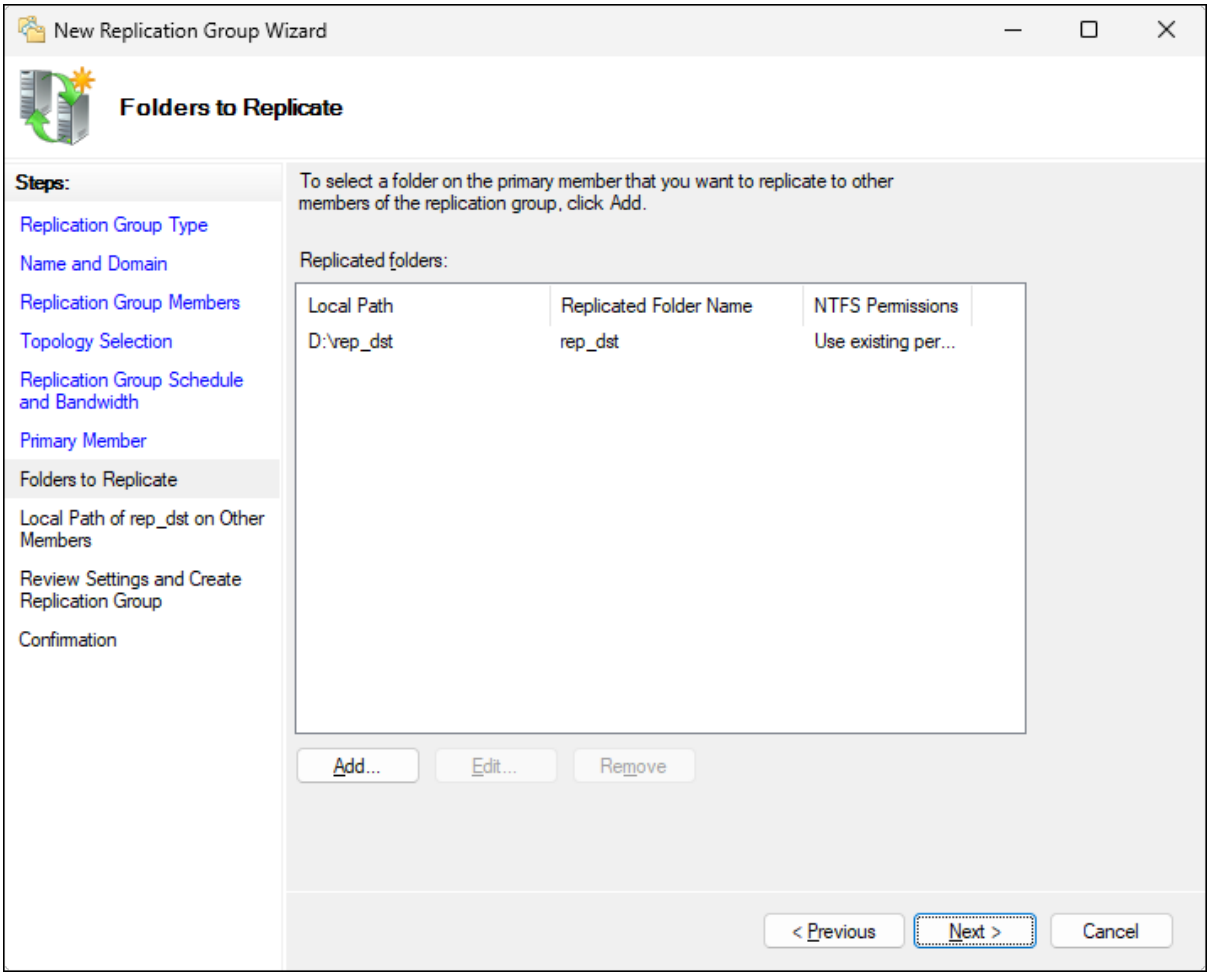
12 Click *Add*.


New Replication Group Wizard
Folders to Replicate
Steps:
Replication Group Type
Name and Domain
Replication Group Members
Topology Selection
Replication Group Schedule and Bandwidth
Primary Member
Folders to Replicate
Review Settings and Create Replication Group
Confirmation
To select a folder on the primary member that you want to replicate to other members of the replication group, click Add.
Replicated folders:
Local Path
Replicated Folder Name
NTFS Permissions
Add...
Edit...
Remove
< Previous
Next >
Cancel

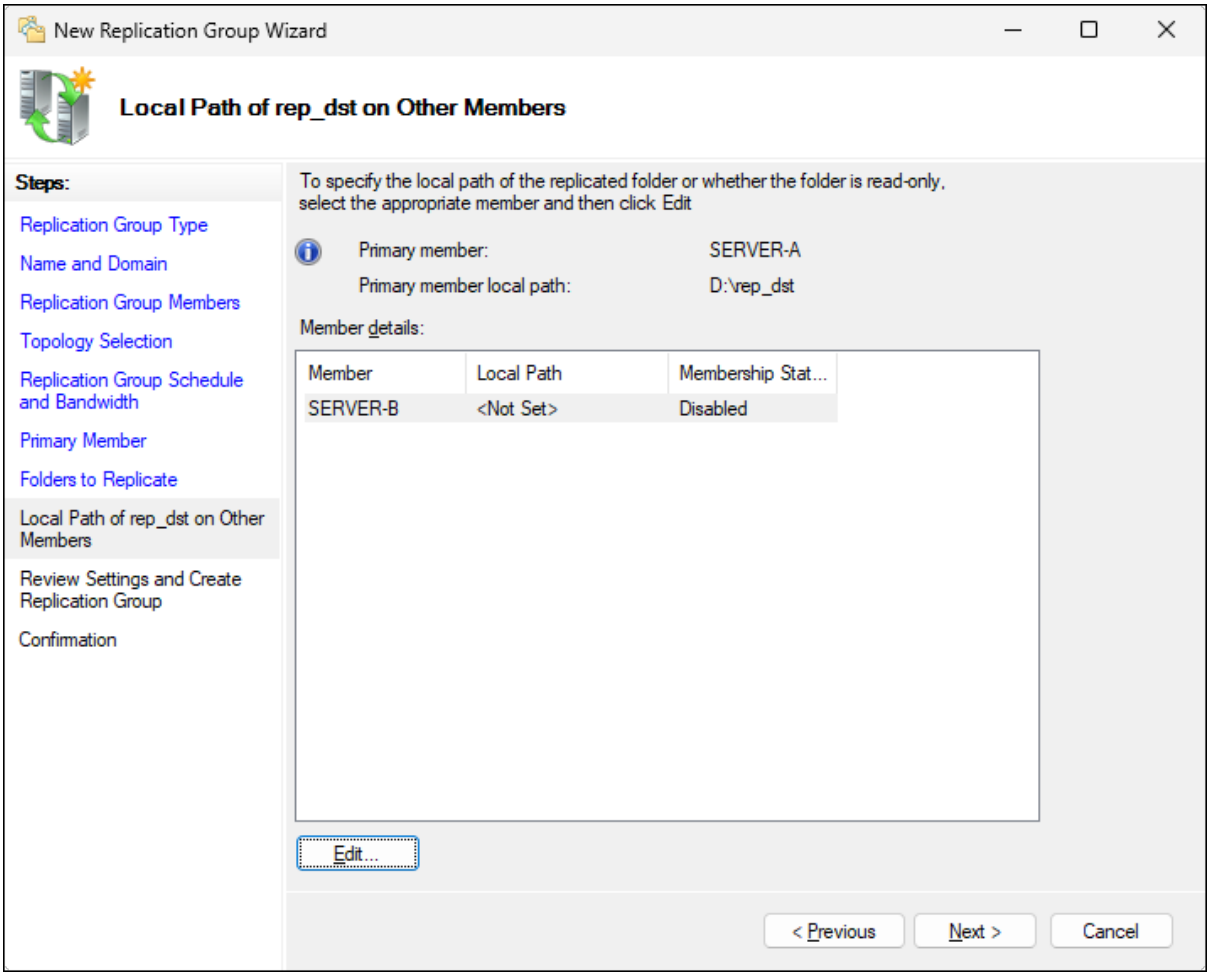
13 Enter a path to the replication source folder or select a folder by clicking *Browse* (D:\rep_src), then click *OK*. You may be asked to create a new folder if the entered or selected path doesn't exist. In such a case, click *Yes*.



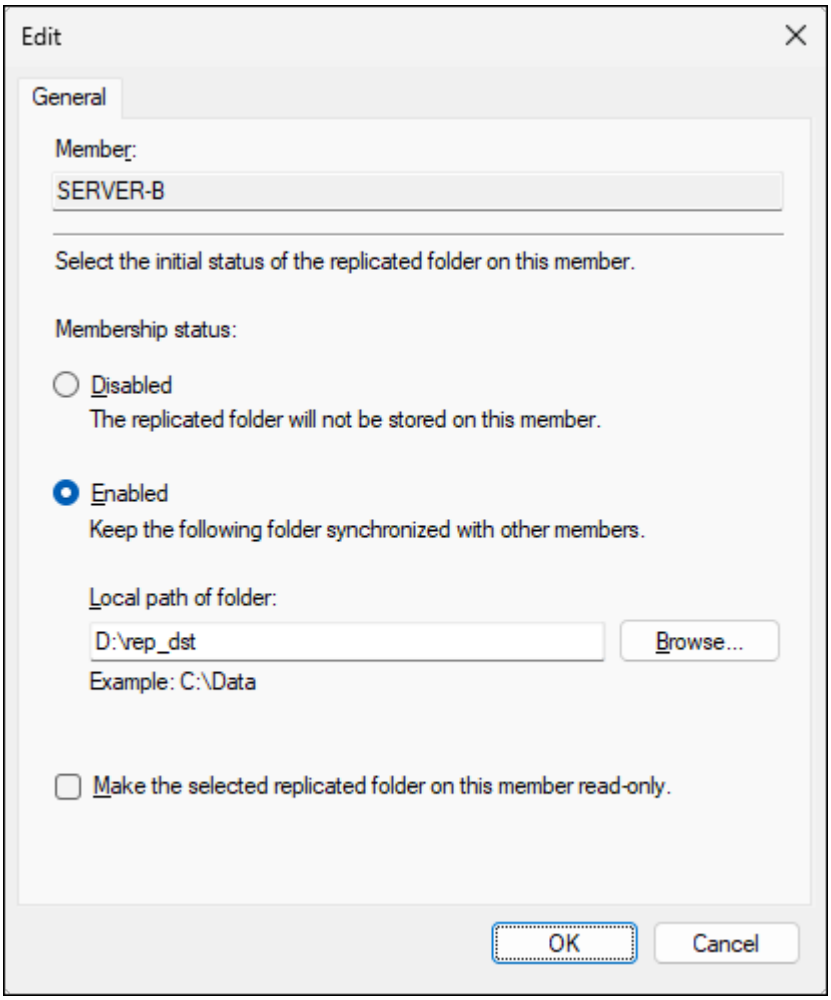
14 Click *Next*.



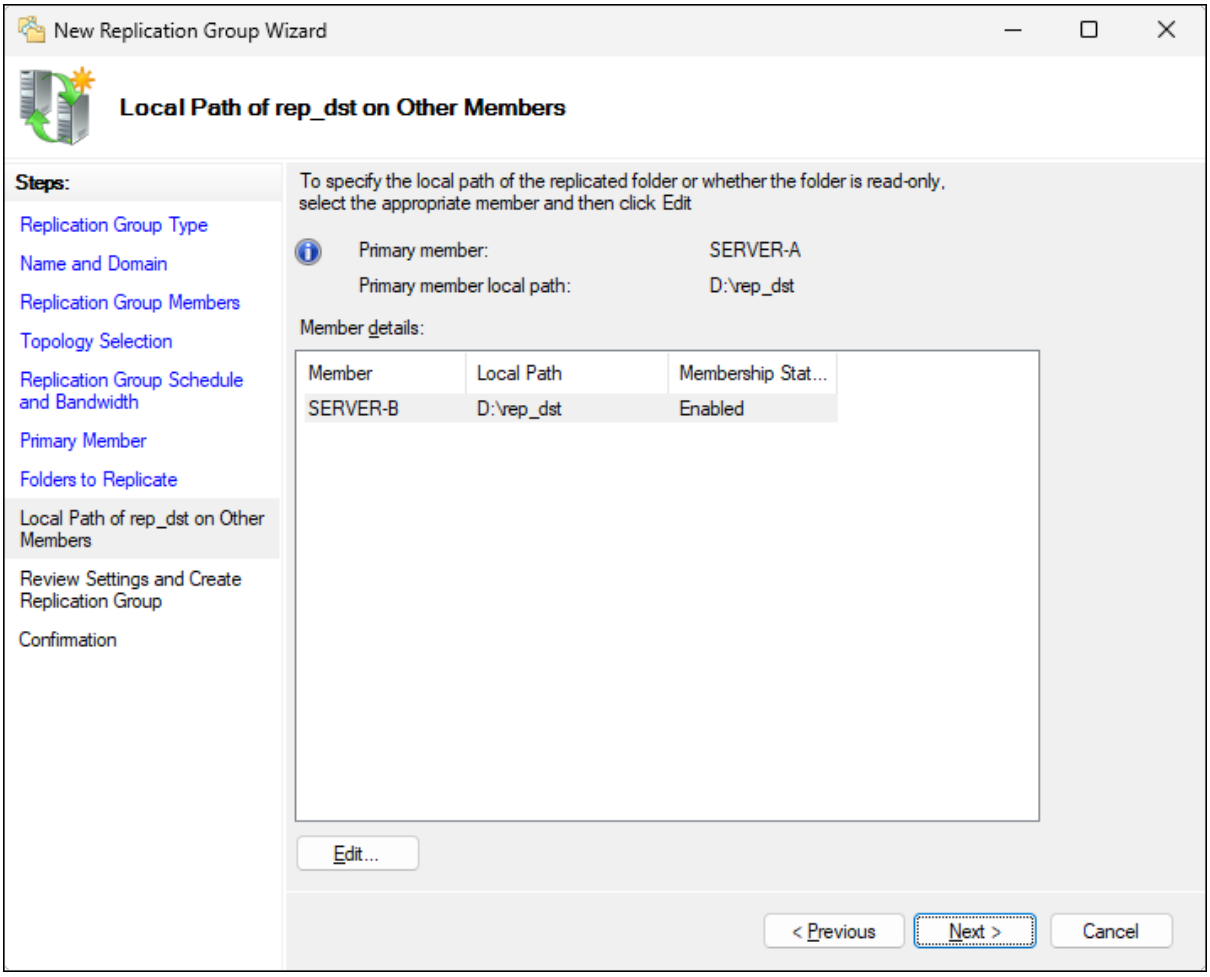
15 Click *Edit*.



16 Change the "Membership status" to "Enabled", then enter a path to the replication destination folder or select a folder by clicking *Browse* (D:\rep_dst) and click *OK*. You may be asked to create a new folder if the entered or selected path doesn't exist. In such a case, click *Yes*.



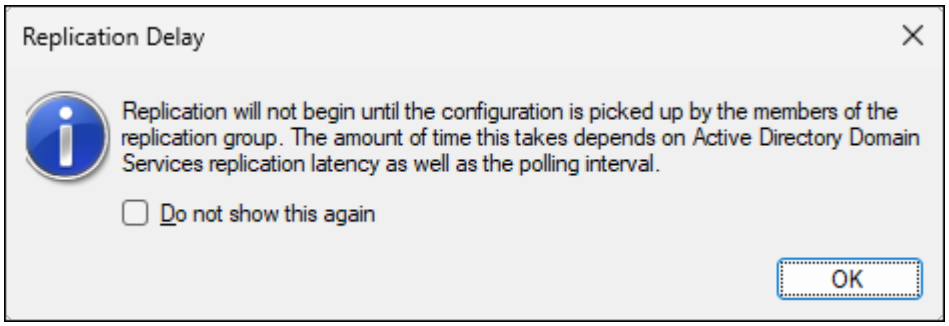
17 Click *Next*.



18 Click *Create* after all displayed settings are confirmed.

19 The process is complete once you close the window.

Note: It may take some time until replication begins. If the following message is displayed, click *OK*.



Chapter 7 Network Settings

Configuring NIC Teaming

Follow the procedure below to configure NIC teaming.

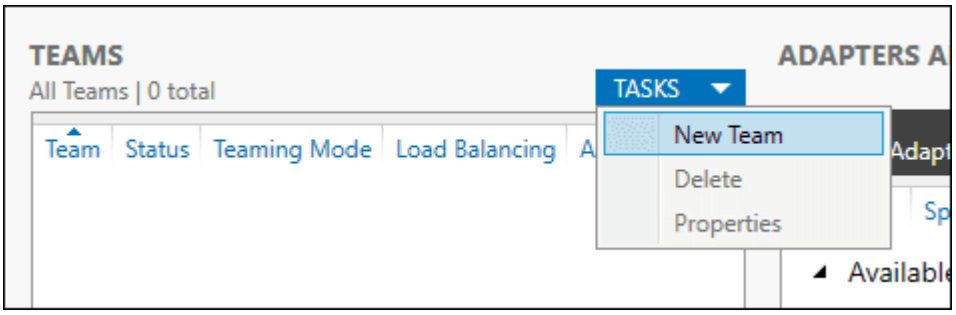
1 Connect the Ethernet cables to LAN ports 1 and 2 on the TeraStation and a network device, such as a switch.

2 Click the Start button ( ), then click *Server Manager* in the Start menu.

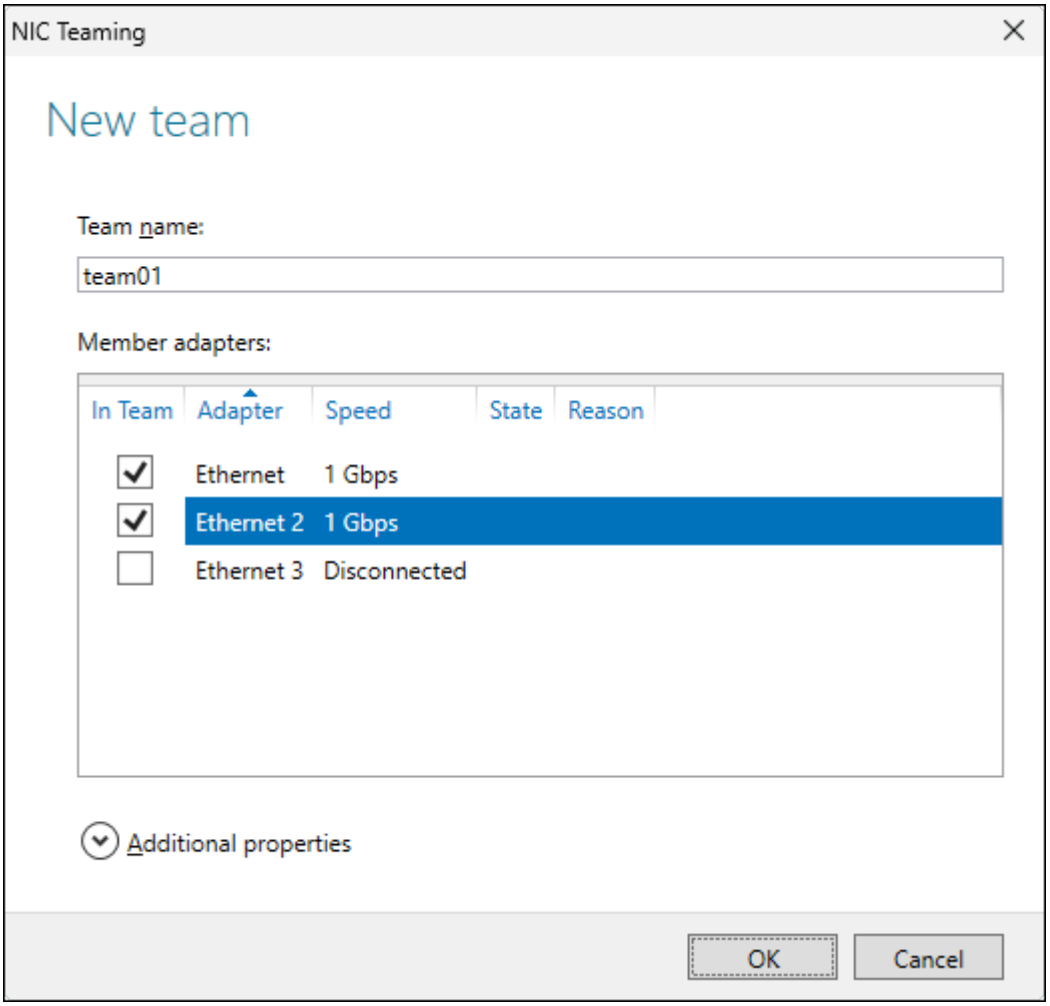
3 Click *Local Server* in the left-side menu.

4 Click *Disabled* to the right of "NIC Teaming" under "Properties".

5 Click *Tasks* to the right of "Teams", then select *New Team*.



6 Enter a desired team name. Select the 1GbE adapters to join the team and click *OK*.



7 The process is complete once the created team has been added to the list. Wait until the status changes to "OK". It may take a few minutes.

After configuring NIC teaming, the IP address will be assigned automatically. You can check the new IP address using NAS Navigator2. To change the new IP address to a different one, refer to the "Changing the IP Address" section in chapter 1.

Enabling Wake-on-LAN

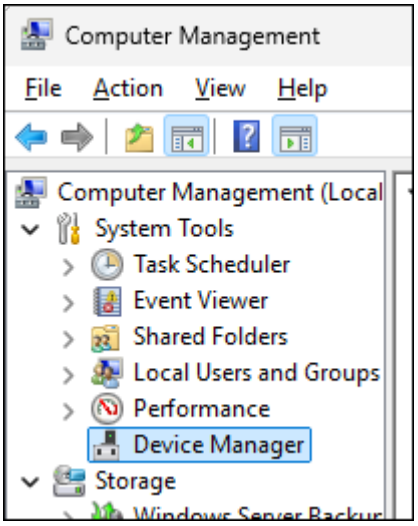
You can turn on the TeraStation via Wake-on-LAN. You can control the powered-down TeraStation remotely without needing to be next to the unit.

Configuring the 1GbE Port (LAN Ports 1 or 2)

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

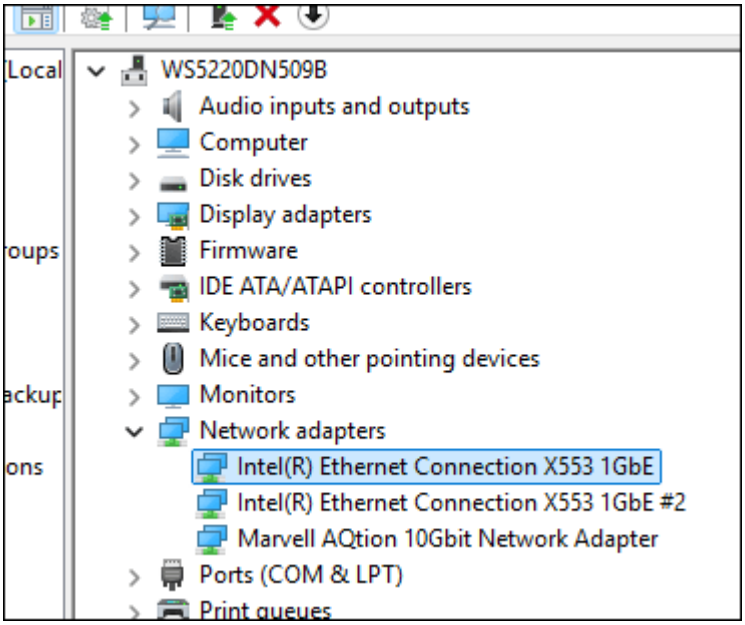
2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Click *Device Manager* in the left-side menu.

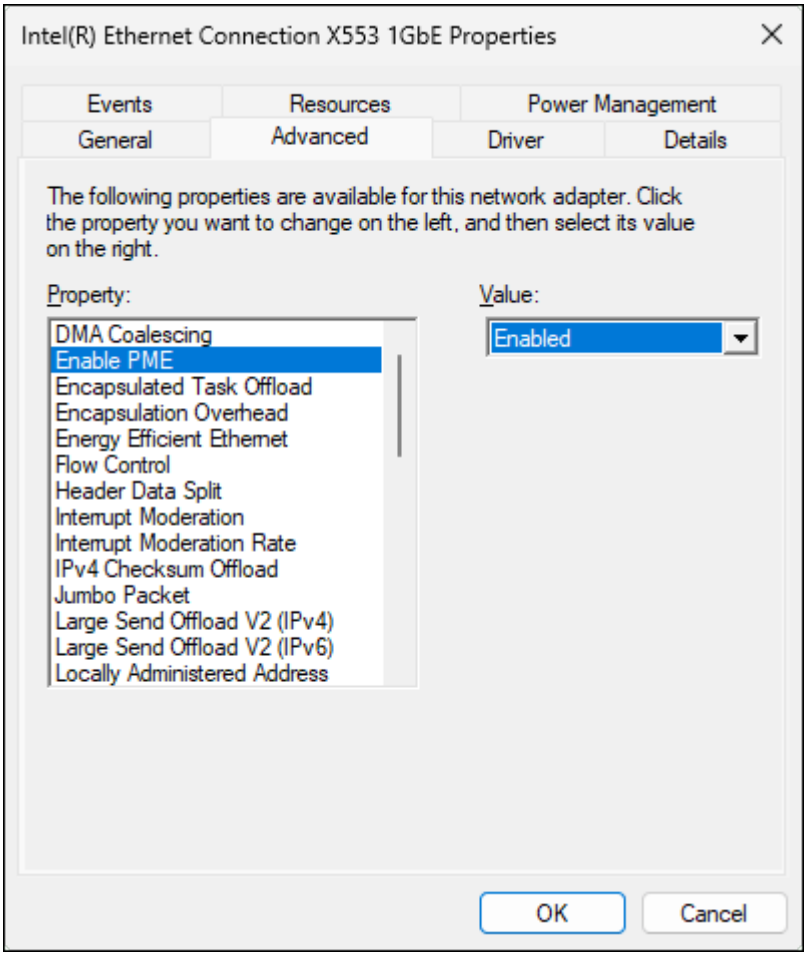


4 Double-click *Network adapters* in the center menu to expand the tree.

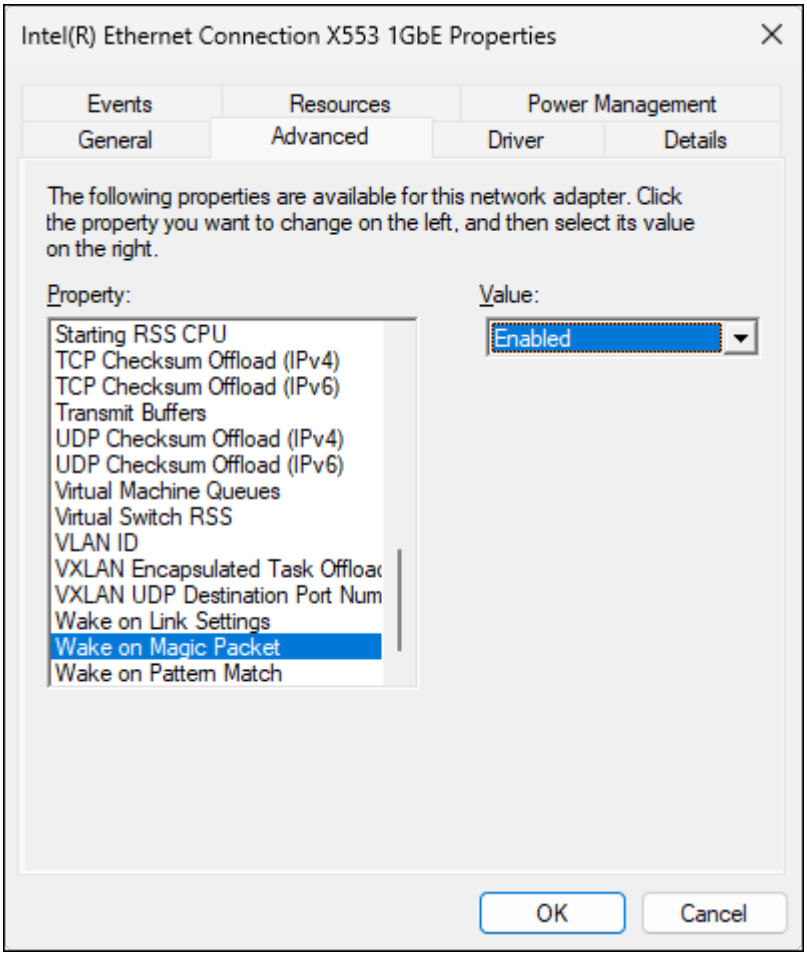
5 If configuring LAN port 1, double-click *Intel(R) Ethernet Connection X553 1GbE*. For LAN port 2, double-click *Intel(R) Ethernet Connection X553 1GbE #2*.



6 From the *Advanced* tab, select "Enable PME" under "Property" and change the "Value" to "Enabled".



7 Select "Wake on Magic Packet" under "Property" and change the "Value" to "Enabled".



8 Click *OK*. The process is complete once you close the window.

To use Wake-on-LAN, you'll need Wake-on-LAN software that sends magic packets. The TeraStation does not include Wake-on-LAN software.

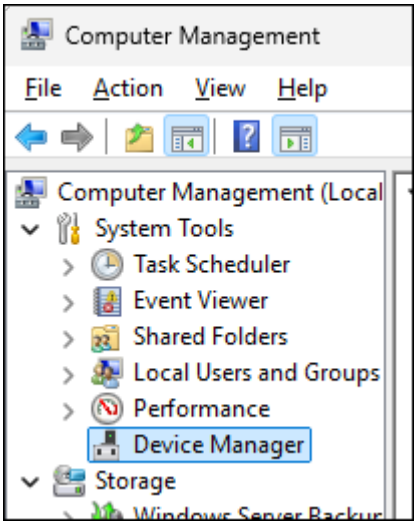
Configuring the 10GbE Port (LAN Port 3)

Note: If Wake-on-LAN on 10GbE (LAN port 3) is enabled, the link speed after shutting down the TeraStation will be fixed at 100 Mbps. To use with a 10GbE port, all network devices must support 100 Mbps.

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

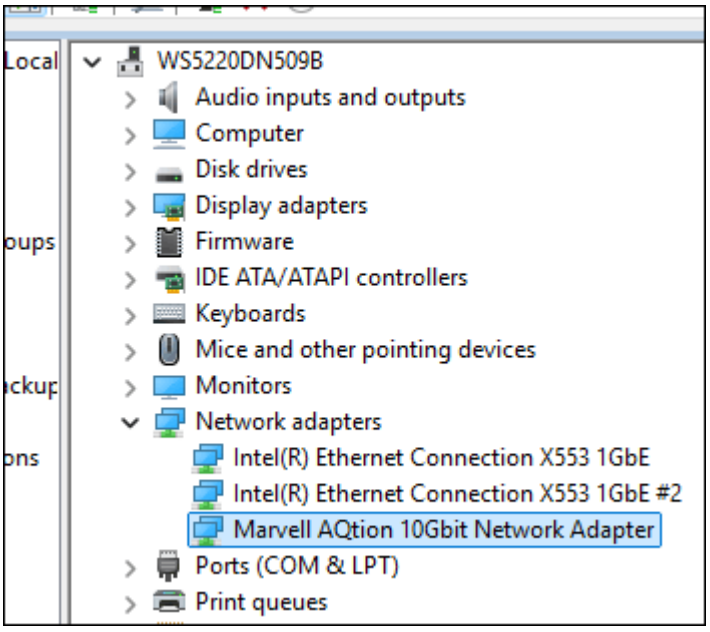
2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Click *Device Manager* in the left-side menu.

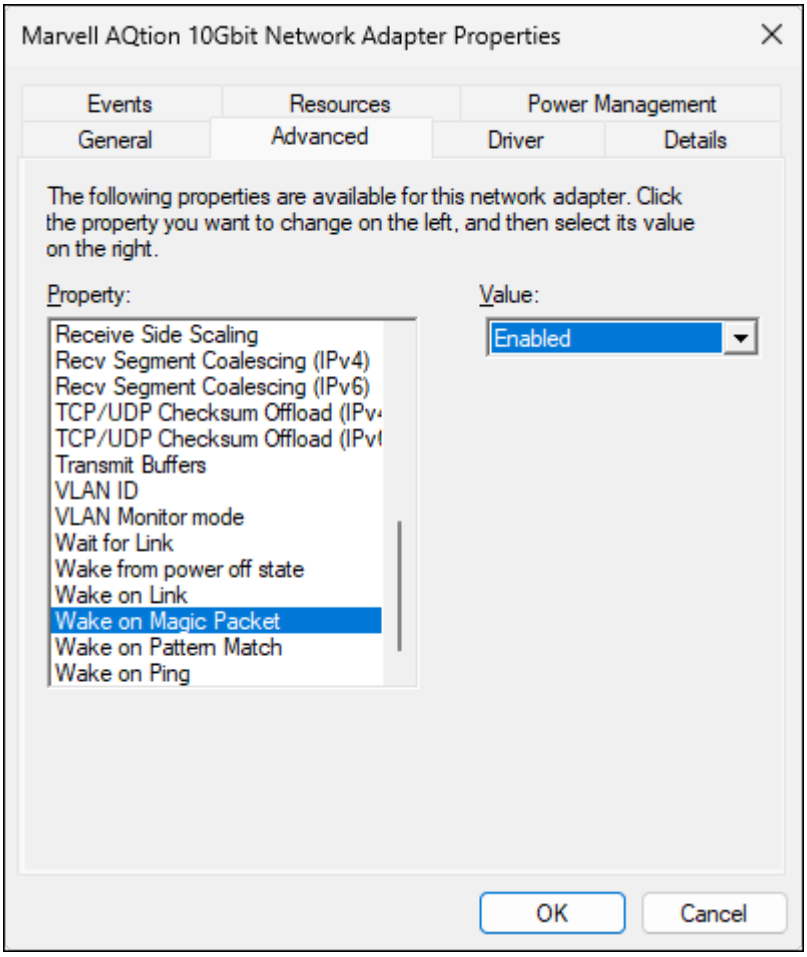


4 Double-click *Network adapters* in the center menu to expand the tree.

5 Double-click *Marvell AQtion 10Gbit Network Adapter*.



6 From the *Advanced* tab, select "Wake on Magic Packet" under "Property" and change the "Value" to "Enabled".



7 Click *OK*. The process is complete once you close the window.

Chapter 8 Additional Settings

Enabling Email Notification

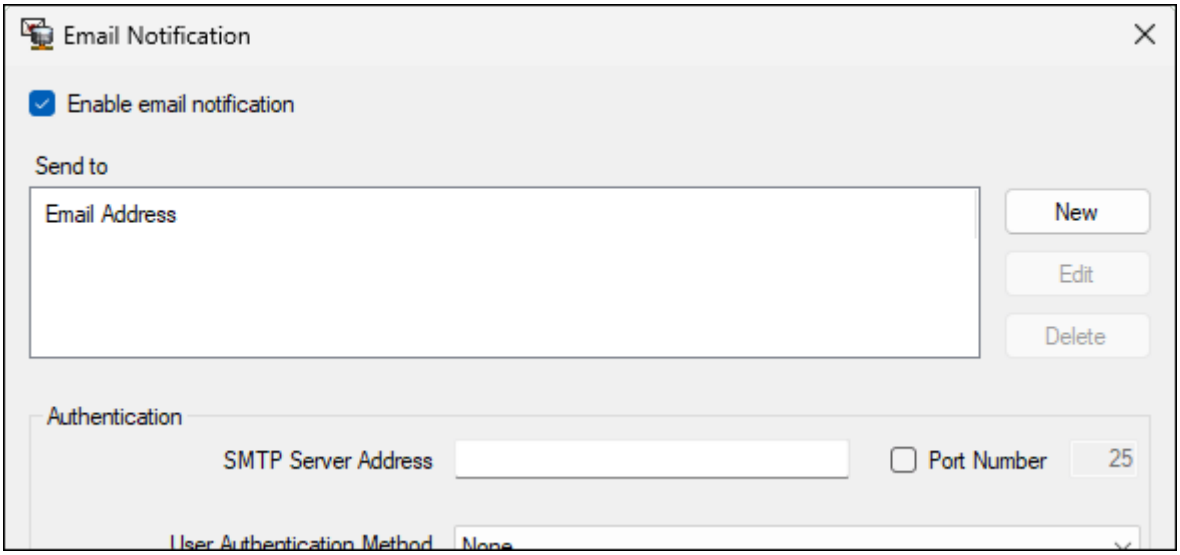
Your TeraStation can send you email reports daily, or when settings are changed or an error occurs. Notification emails may be triggered by TeraStation reports or Windows event logs.

Notifying via TeraStation Reports

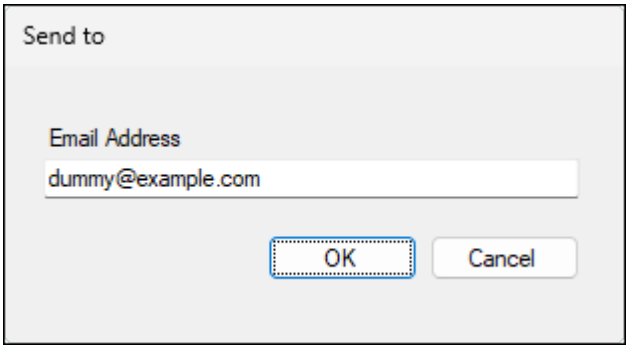
Follow the procedure below to enable email notifications via TeraStation reports.

1 Click the Start button ( ), then click *Email Notification* in the Start menu.

2 Select the "Enable email notification" checkbox.

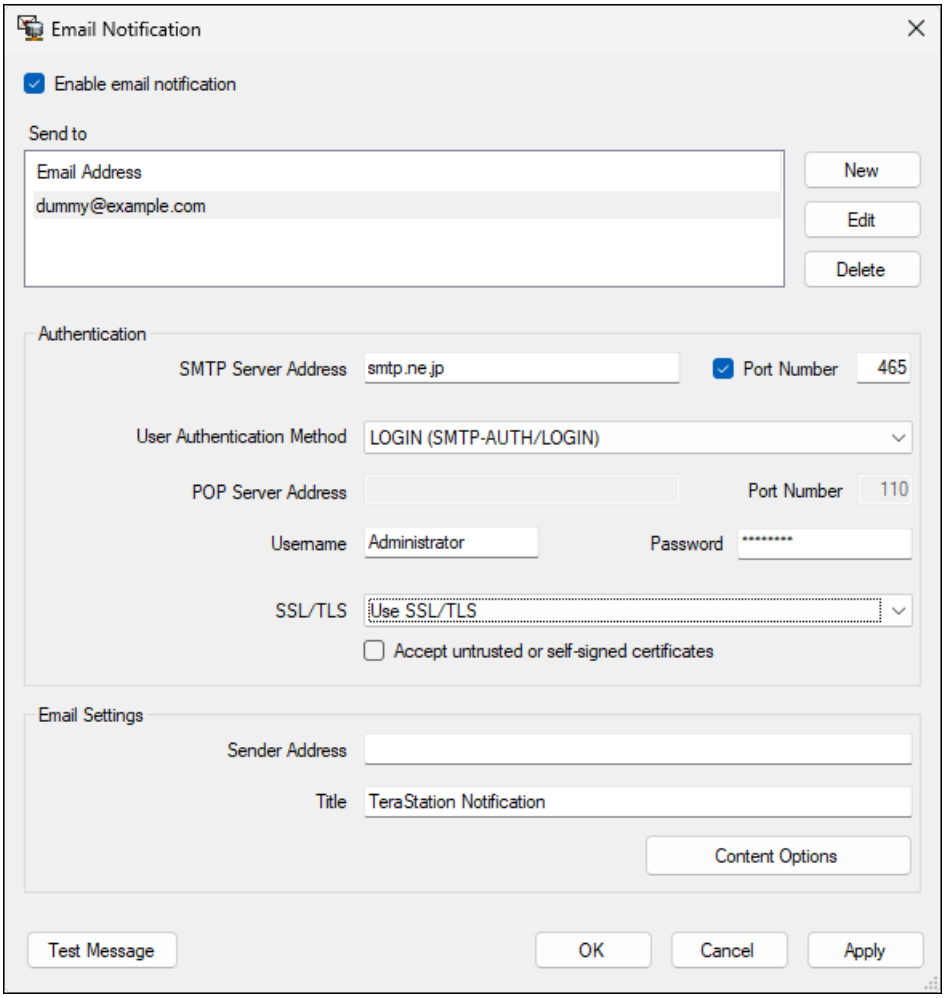


3 Click *New* and enter an email address as a sender, then click *OK*. Up to five email addresses can be added



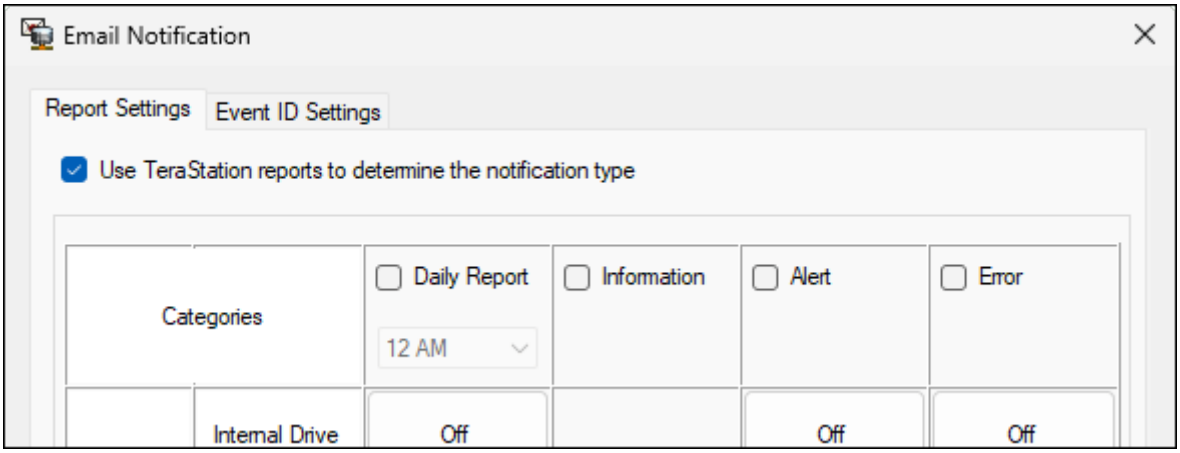
4 Enter your email server settings along with the default subject for notification emails, then configure the recipients and the schedule for email reports.

If you select an authentication type other than "None" from the drop-down list, you can enter the sender email address and credentials of the email server. If the password includes an apostrophe ('), that email server account cannot be used.

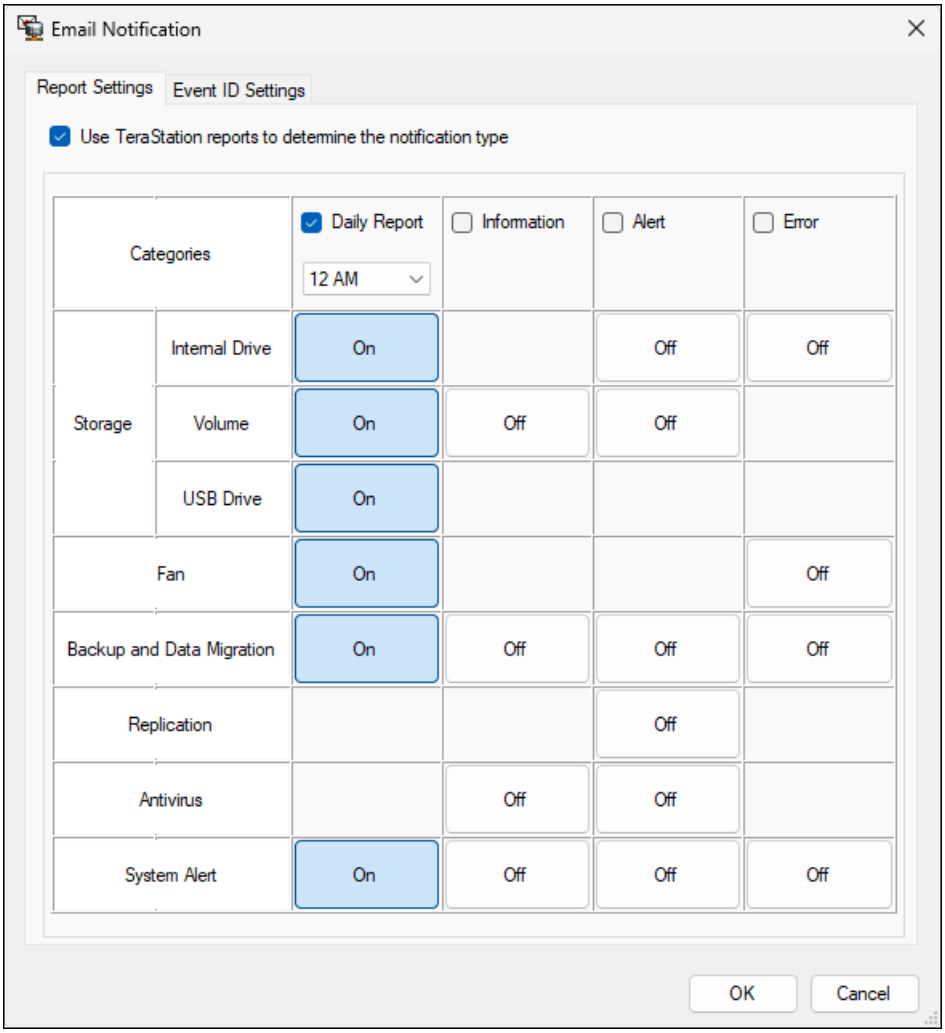


5 Click *Content Options*.

6 From the *Report Settings* tab, select the "Use TeraStation reports to determine the notification type" checkbox.



7 Click *On* or *Off* for each category, then click *OK*. When you select the checkboxes next to each log level, all notifications in that line will be selected at once.



Notification emails will be categorized into the following importance levels. Refer to the chart below for the detailed information of category importance levels.

Levels	Details
Daily Report	Describes the status of the TeraStation in a daily report email.
Information	Sends a notification email if an event occurs. Info reports will contain just information such as capacity information, job starts/completes, etc.
Alert	Sends a notification email if a non-critical error occurs. Refer to the "Alerts" section in chapter 11 for the list of events that will trigger this event notification. Alert reports will contain warnings such as something has failed, but the function or unit can continue operating as usual. It is recommended to perform the corrective action for the alert as soon as possible.
Error	Sends a notification email if a critical error occurs. Refer to the "Errors" section in chapter 11 for the list of events that will trigger this event notification. Error reports will describe critical failures that prevented a function or unit from operating properly. It is recommended to perform the corrective action for the error immediately.

8 Click *OK* to save the configured settings and have a test email sent.

9 Enter the password of the user you're logged in as, then click *OK*.

10 The process is complete once you close the window.

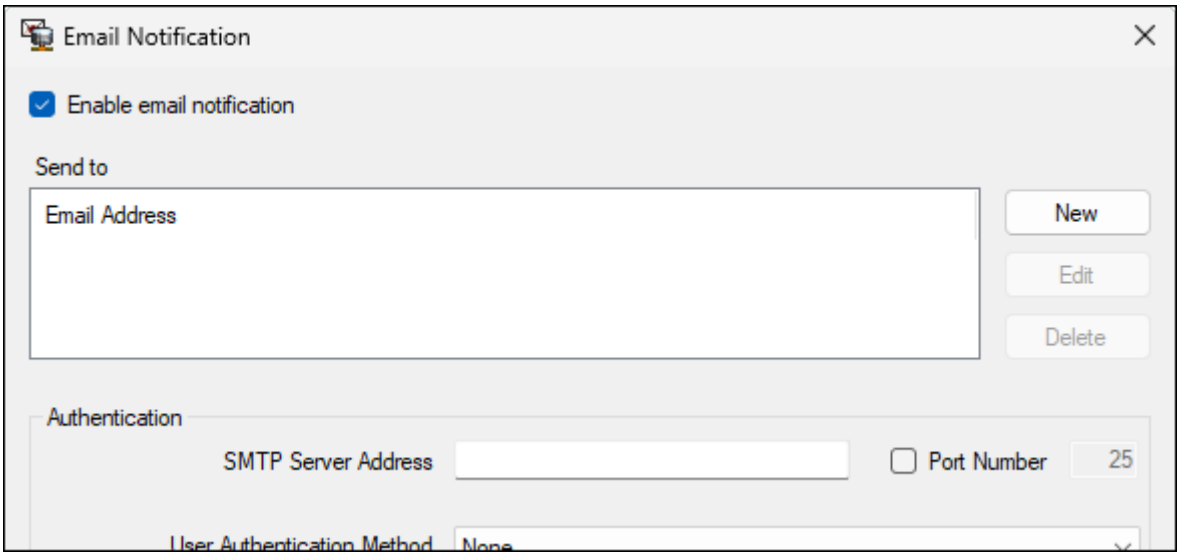
Note: If you have changed the display language on Windows after configuring the email notification settings, open the Email Notification application window again and click *Apply*.

Notifying via Windows Event Logs

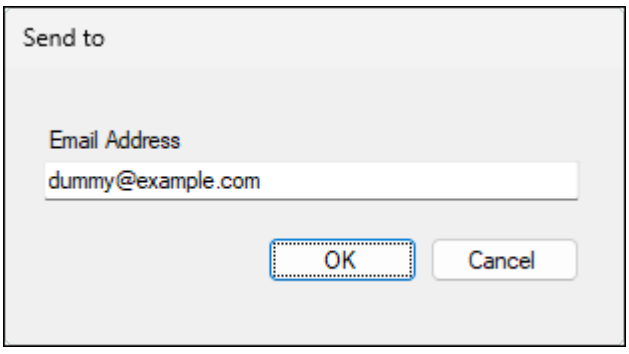
Follow the procedure below to enable email notifications via Windows event logs. This section describes notifications using Windows Update events.

1 Click the Start button ( ), then click *Email Notification* in the Start menu.

2 Select the "Enable email notification" checkbox.

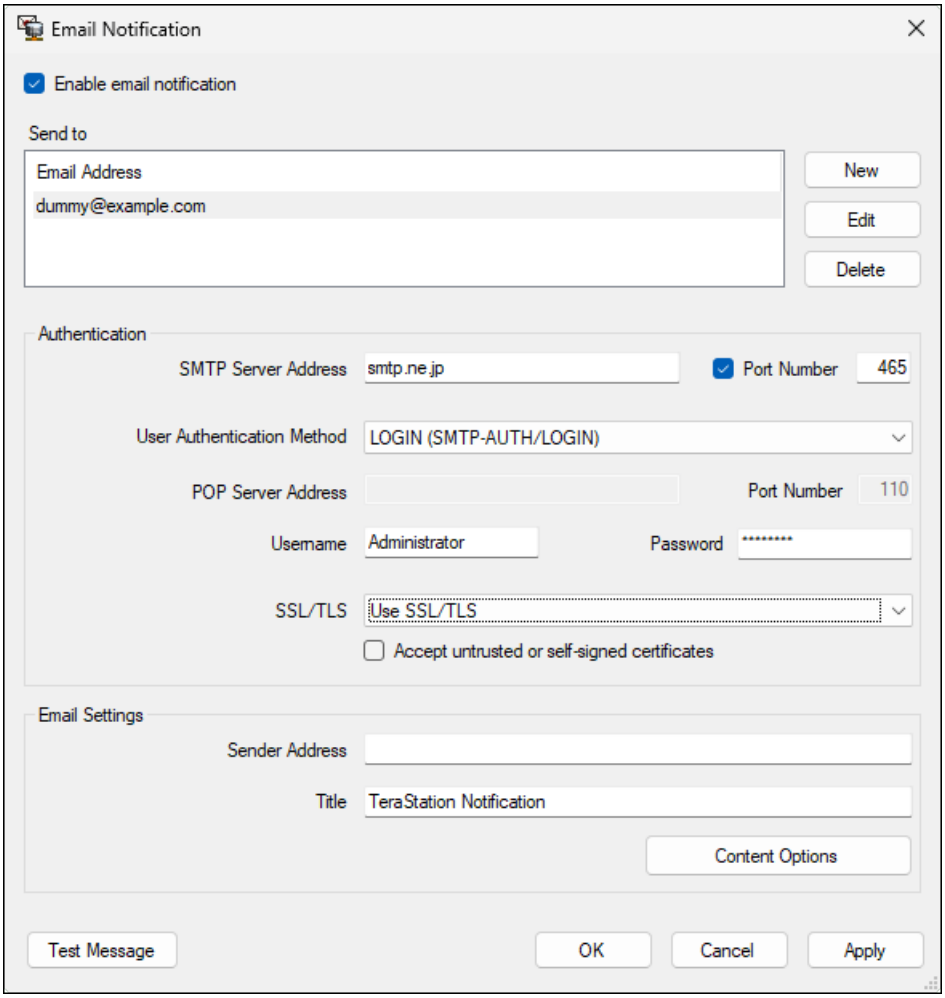


3 Click *New* and enter an email address as a sender, then click *OK*. Up to five email addresses can be added



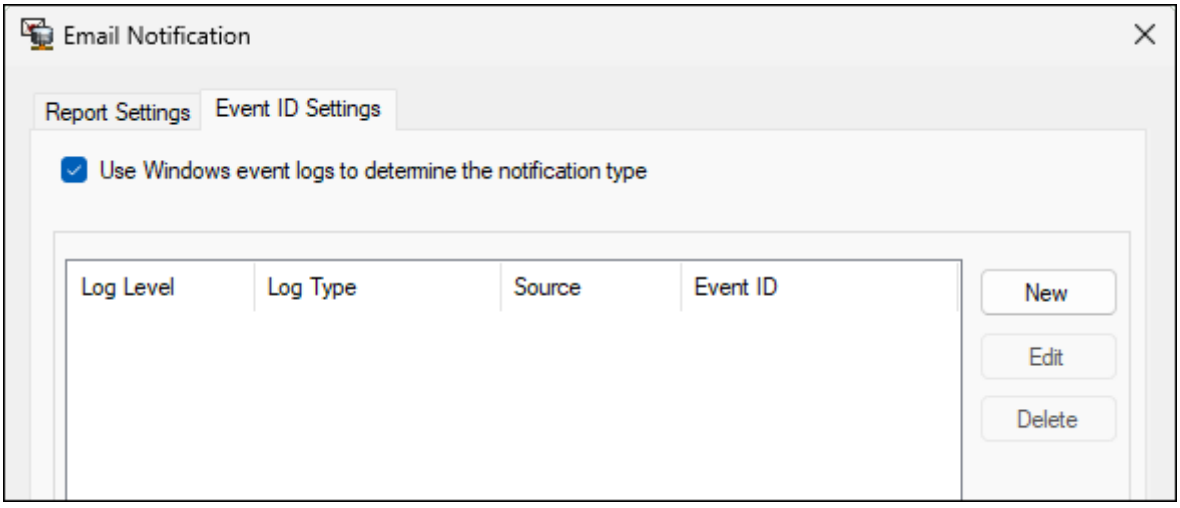
4 Enter your email server settings along with the default subject for notification emails, then configure the recipients and the schedule for email reports.

If you select an authentication type other than "Disable" from the drop-down list, you can enter the sender email address and credentials of the email server. If the password includes an apostrophe ('), that email server account cannot be used.



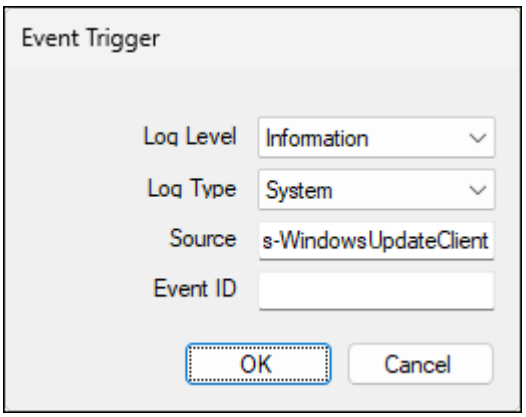
5 Click *Content Options*.

6 From the *Event ID Settings* tab, select the "Use Windows event logs to determine the notification type" checkbox.



7 Click *New*.

8 Select the importance level from the "Log Level" list.



9 Select "System" from the "Log Type" list.

10 Enter "Microsoft-Windows-WindowsUpdateClient" into the "Source" box.

11 An event ID can be blank. All events triggered by Windows Update will be notified. If you prefer only being notified of specific events, enter those event IDs.

12 Click *OK*, then click *OK* again.

13 Enter the password of the user you're logged in as, then click *OK*.

14 The process is complete once you close the window.

Changing the Computer Name

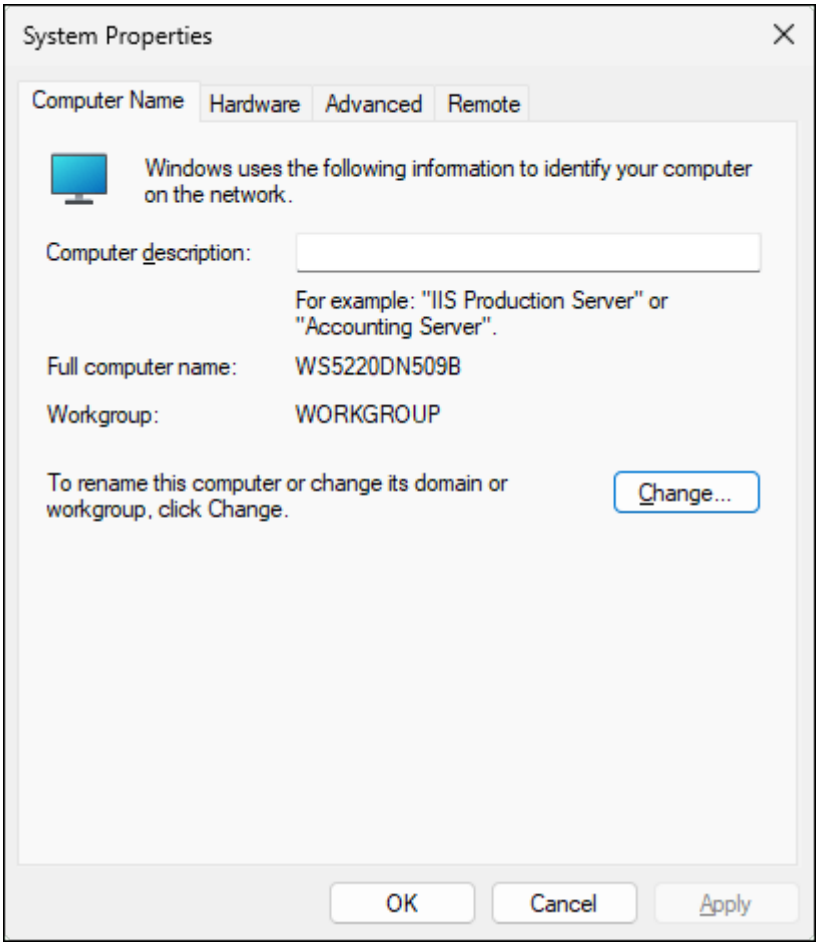
Follow the procedure below to change the computer name.

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

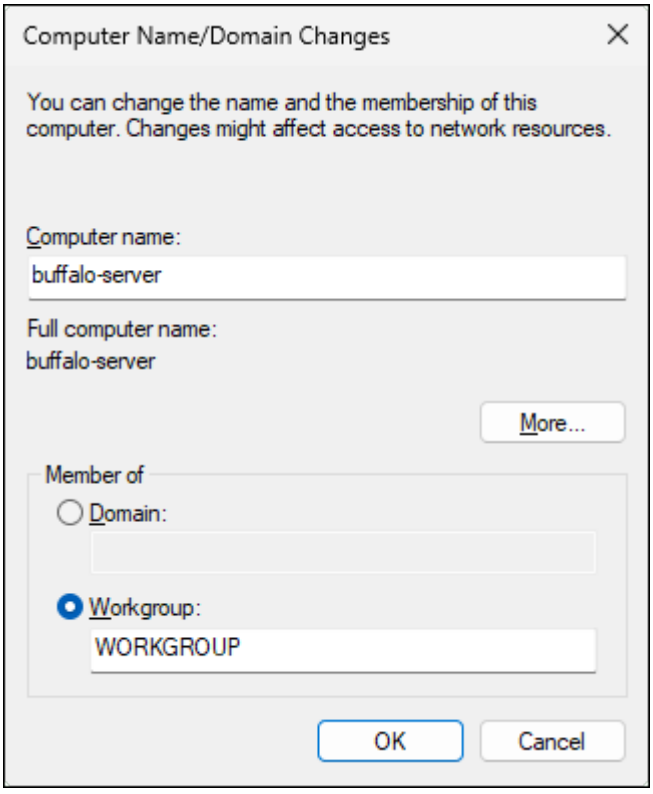
2 Click *Local Server* in the left-side menu.

3 Click the hostname of your TeraStation under "Properties".

4 From the *Computer Name* tab, click *Change*.

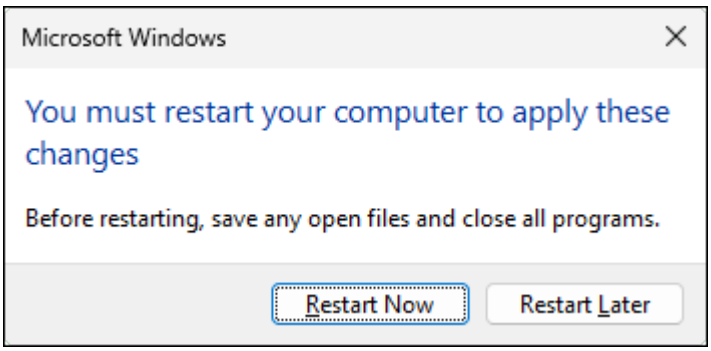


5 Enter the desired computer name and click *OK*.



6 Click *OK*, then click *Close*.

7 Click *Restart Now* and restart your computer to apply settings.



8 The process is complete once the TeraStation finishes restarting.

Notes:

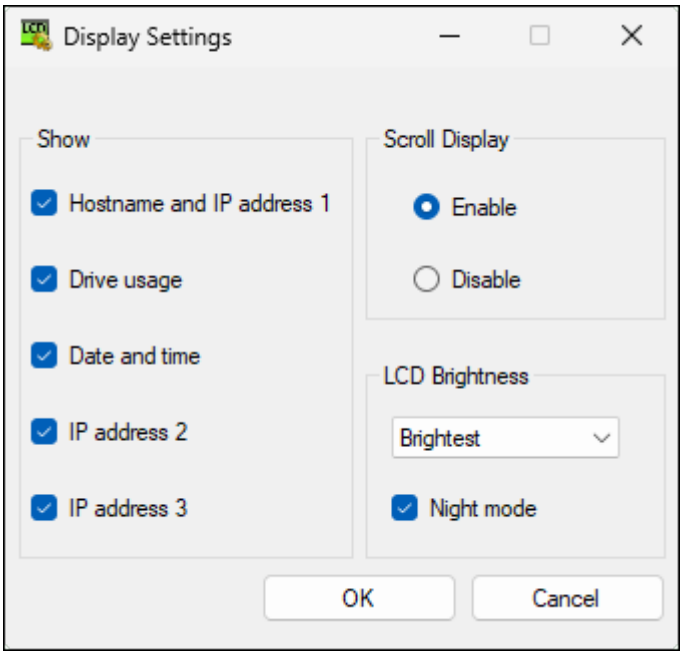
- The computer name must be 15 characters or fewer. Exceeding this limit will make the TeraStation inaccessible.
- The computer name may use alphanumeric characters and hyphens. Using multibyte characters is not recommended.

Changing the Display Settings

You may configure options for the LCD panel and adjust the brightness of the LCD panel.

1 Click the Start button ( ), then click *Display Settings* in the Start menu.

2 Configure the desired settings, then click *OK*.



3 The process is complete once you close the window.

Acquiring Windows Event Logs

To acquire event logs of the TeraStation, follow the procedure below.

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Event Viewer* in the upper-right corner of the window.

3 Double-click *Windows Logs* in the left-side menu to expand the tree.

4 Right-click on either "Application", "Security", "Setup", or "System" in the left-side menu to determine the logs to be saved.

5 Click *Save All Events As*.

6 Specify the desired location and enter a filename, then click *Save*. Do not change the file type.

7 The process is complete once you close the window.

Once the event log file has been saved, open the log file from the specified location to review its contents.

Encrypting SMB Connections

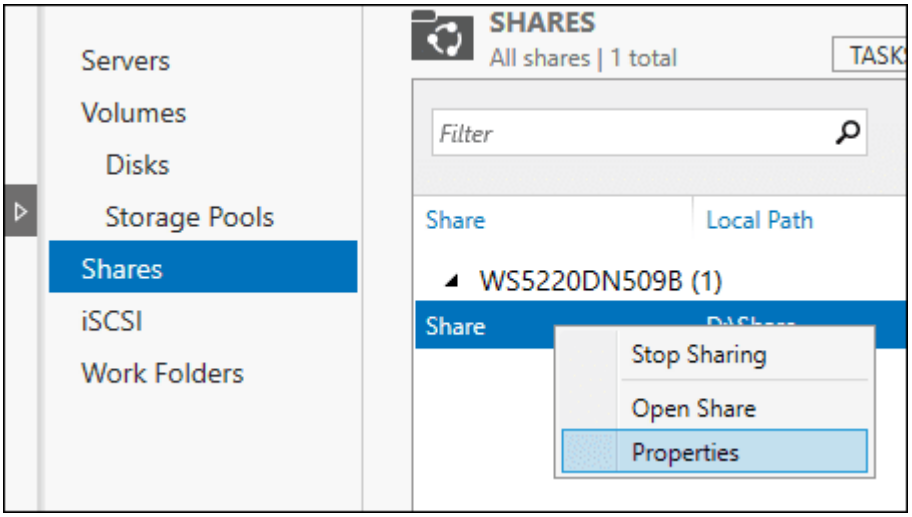
To encrypt communication when accessing shared folders via SMB, follow the procedure below.

Note: Enabling encryption may reduce data transfer speeds.

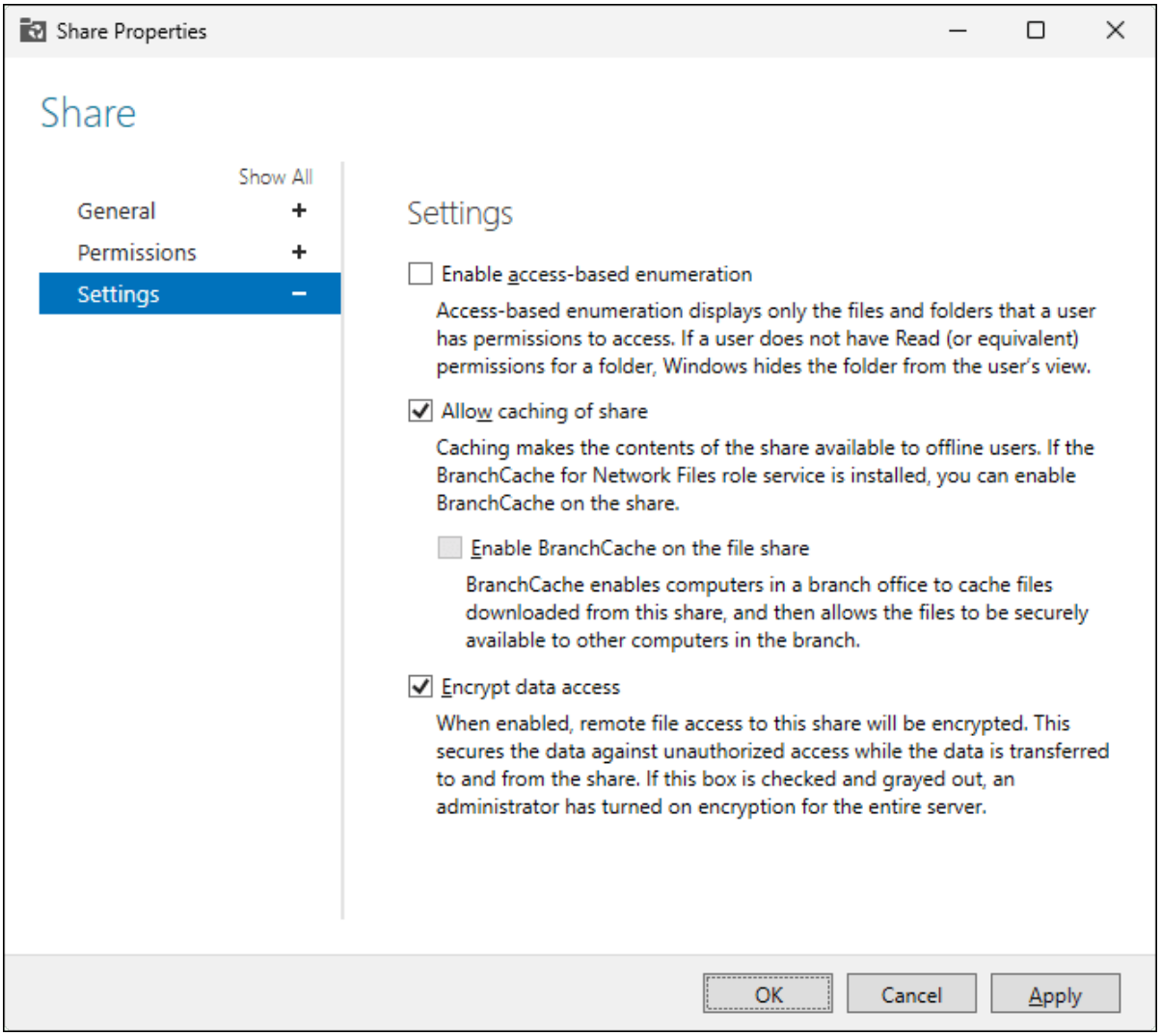
1 Click the Start button ( ) and click *Server Manager* in the Start menu.

2 Click *File and Storage Services* > *Shares* in the left-side menu.

3 Right-click the shared folder under "Shares", then select *Properties*.



4 Click *Settings*, then select the "Encrypt data access" checkbox.



5 The process is complete once you close the window by clicking *OK*.

Configuring File Screening

File screening allows you to control the types of files that can be saved to shared folders. Follow the procedure below to configure file screening.

Installing the File Screening Role

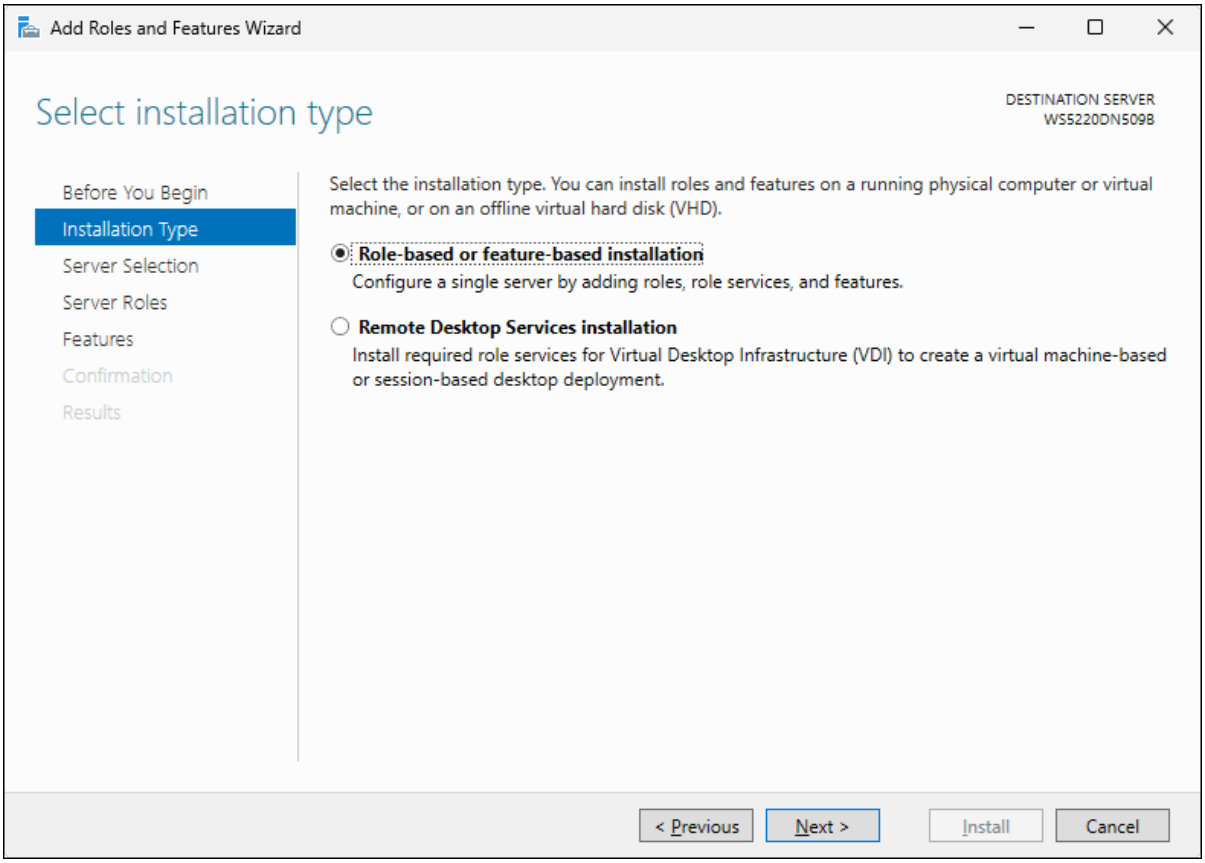
Follow the procedure below if you are configuring file screening for the first time. Otherwise, skip to the "Creating a File Screen" subsection below.

1 Click the Start button ( ) and click *Server Manager* in the Start menu.

2 Click *Add roles and features*.

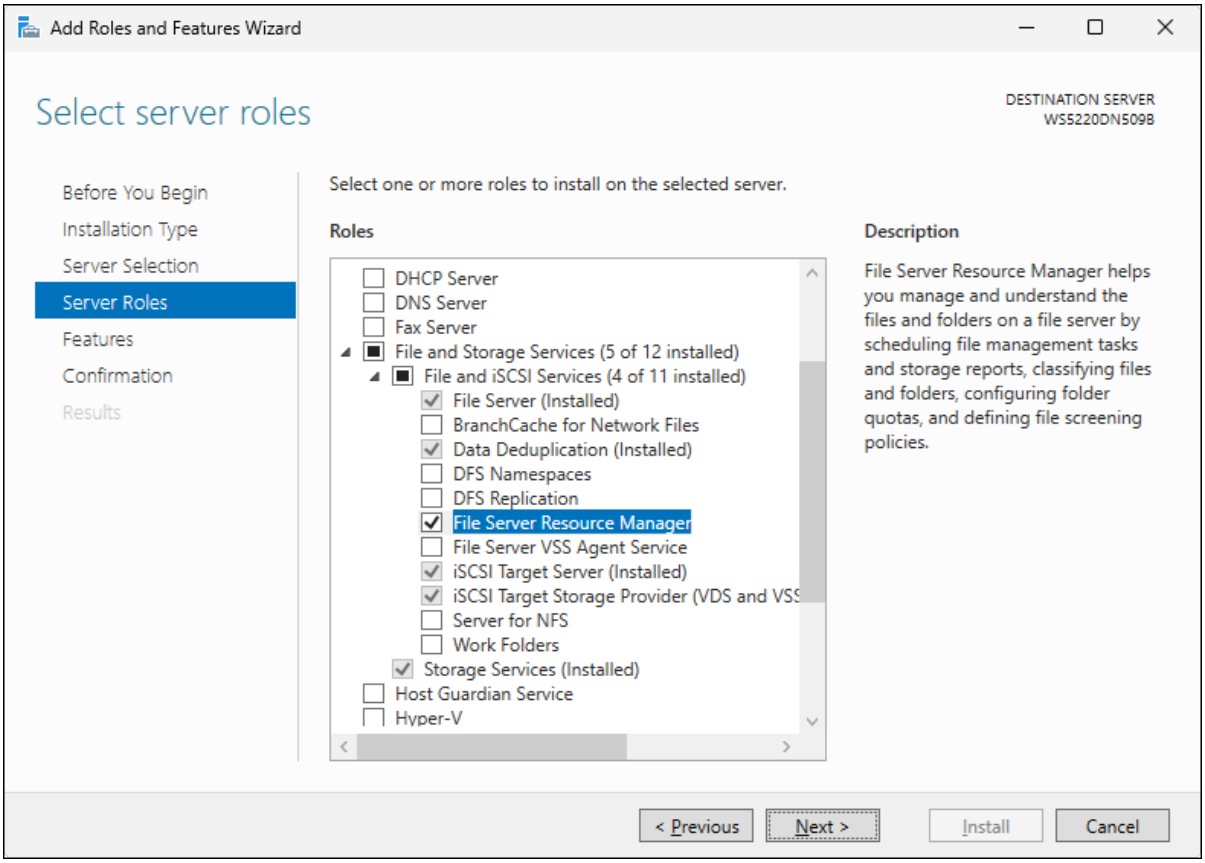
3 Click *Next*.

4 Select "Role-based or feature-based installation".

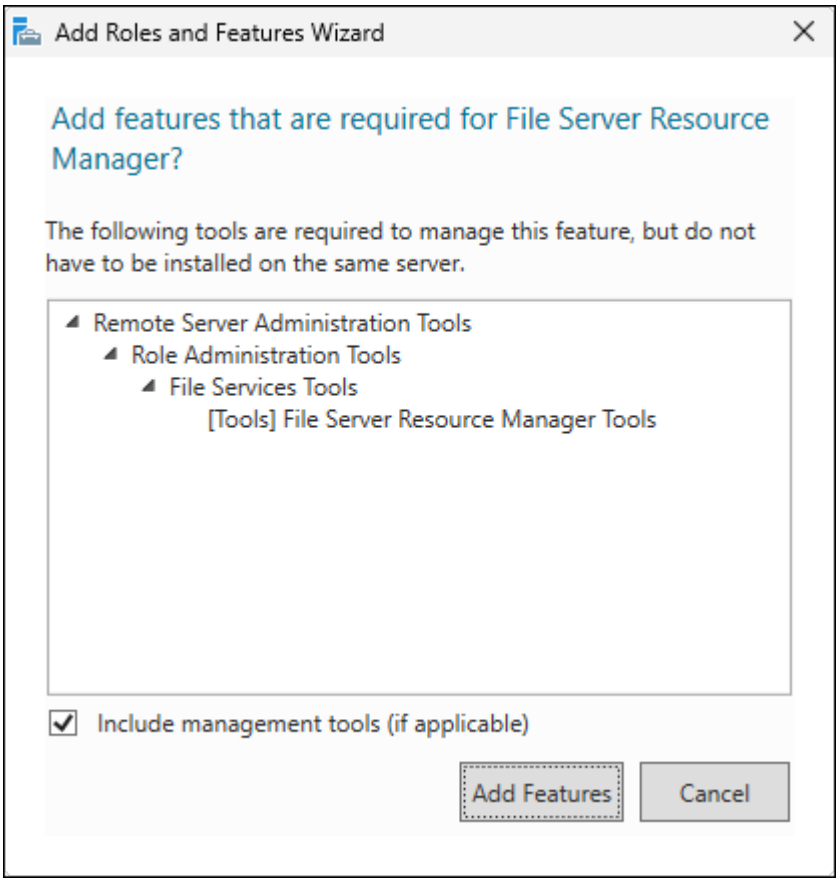


5 Click *Next*, then click *Next* again.

6 Select "File Server Resource Manager" under "File and Storage Services" > "File and iSCSI Services".



7 Select "Include management tools (if applicable)" and click *Add Features*.



8 Click *Next* twice, then click *Install*.

9 The process is complete once you close the window.

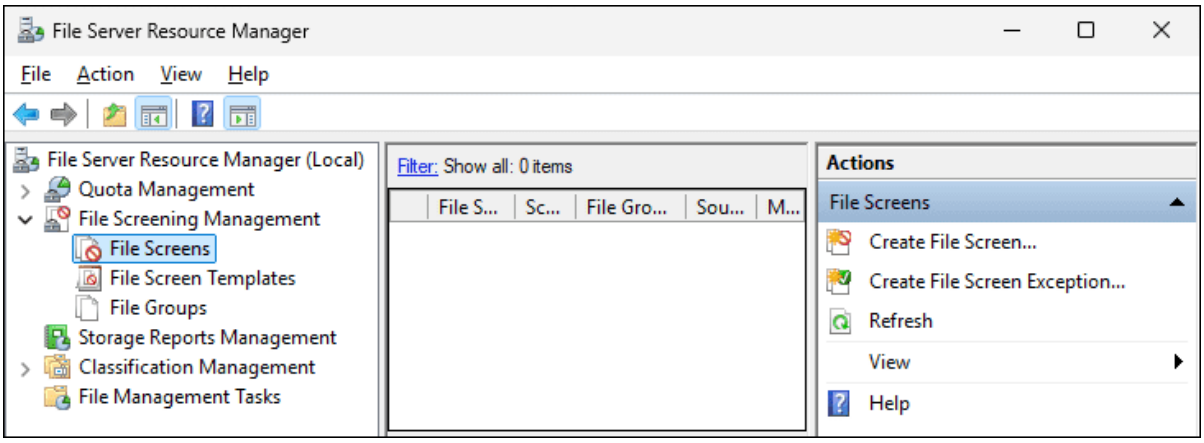
Creating a File Screen

To create a new file screen, follow the procedure below.

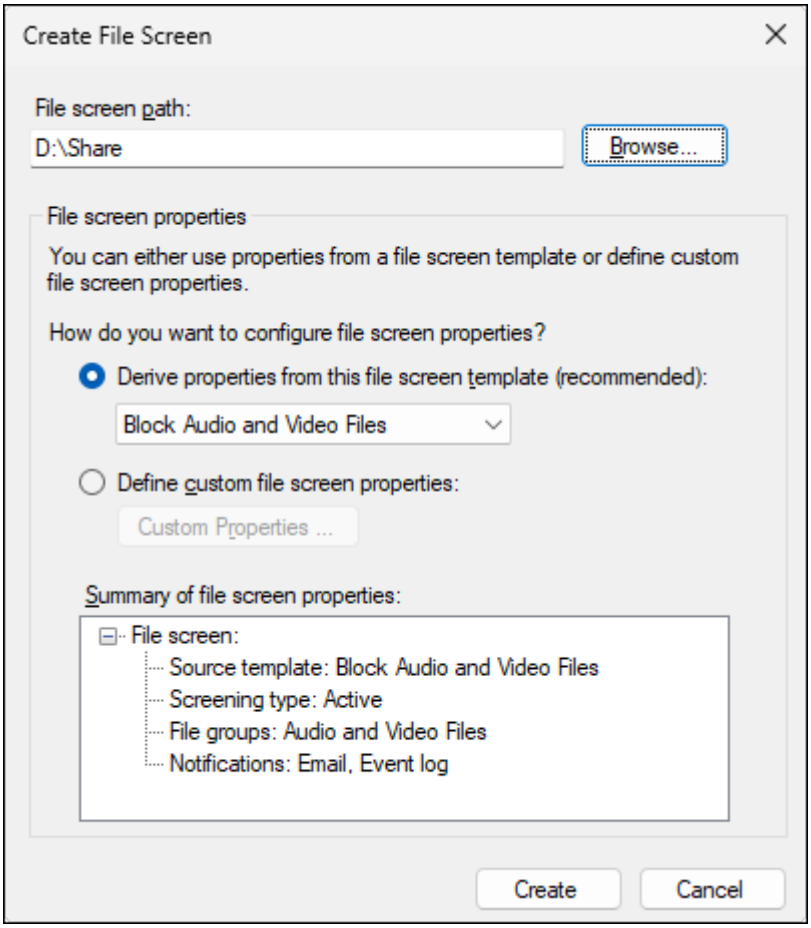
1 Click the Start button ( ) and click *Server Manager* in the Start menu.

2 Click *Tools* > *File Server Resource Manager* in the upper-right corner of the window.

3 Select *File Screens* under "File Screening Management" in the left-side menu, then click *Create File Screen* in the right-side actions menu.



4 Under "File screen path", enter the name or browse for the shared folder to which the file screen will be applied.



5 Select the desired file screen properties, then click *Create*.

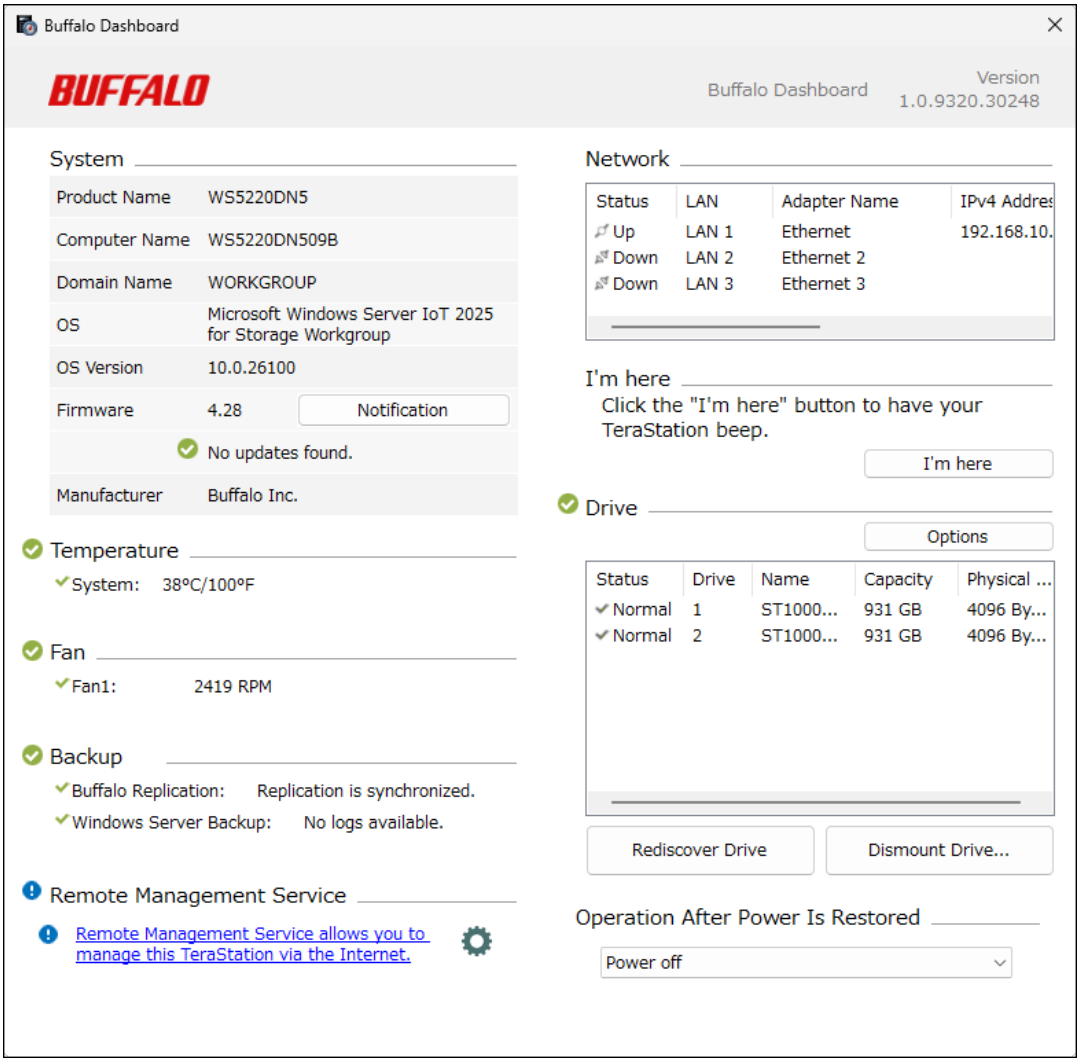
6 The process is complete once the created file screen appears on the File Server Resource Manager window.

Disabling Update Notification

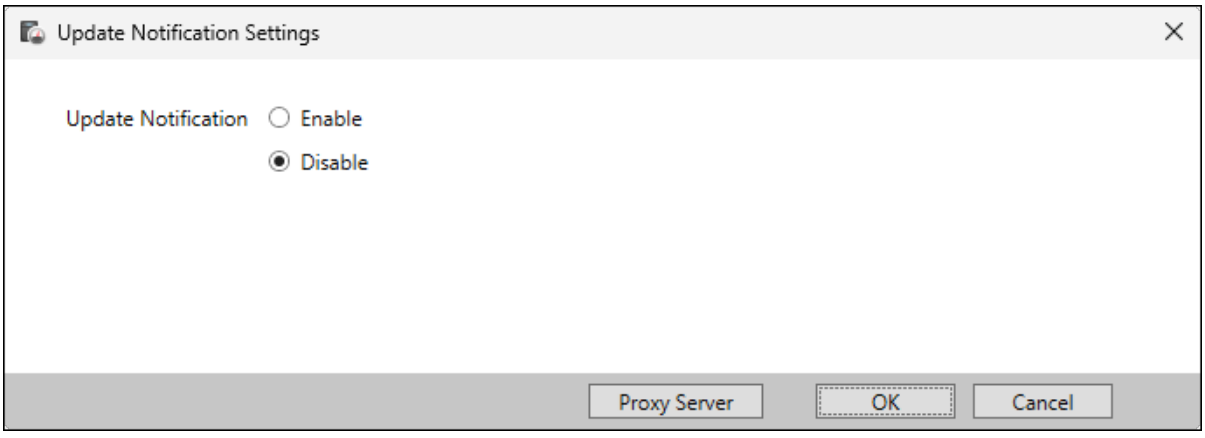
By default, you will receive a notification when a new firmware version becomes available. If you do not want to receive this notification, you can disable it by following the procedure below.

1 Click the Buffalo Dashboard icon ( ) from the system tray.

2 Click *Notification*.



3 Disable "Update Notification", then click *OK*.



4 The process is complete once you close the window.

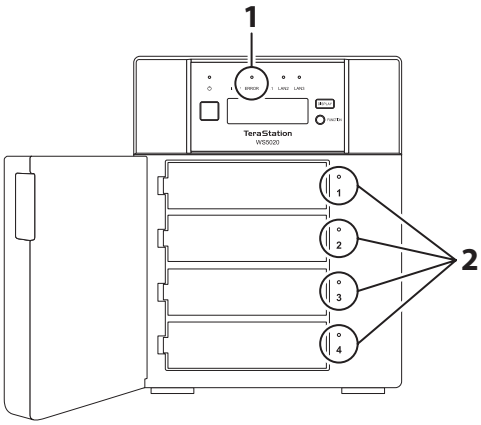
Chapter 9 Drive Replacement and Device Troubleshooting

Replacing a Defective Drive

Drive replacement procedures will vary depending on which drive that was used to configure the volume has failed. Refer to the appropriate replacement procedure in the following sections that corresponds to the configured volume. The following drive replacement examples use the case of the WS5420DN5 TeraStation model.

LEDs

Drives on the TeraStation will have its status LED glow green during normal operation. If a drive fails, its error LED will glow red.



1 Error LED

Glows red if a drive has failed.

2 Status LED

The failed drive's status LED will be glowing a steady red.

Notes Before Drive Replacement

- Do not unplug a drive whose status LED is green instead of red. If you remove the drive without properly dismounting it, data may be lost and the TeraStation may malfunction.
- Use a Buffalo OP-HDN series drive as the replacement drive. The replacement drive should be the same capacity or larger as the original drive. If a larger drive is used, the extra space will not be usable in a volume.
- The TeraStation is fragile. Handle it with care. Do not drop or bump the TeraStation.
- Use caution when handling the unit in order to avoid personal injury.
- Never disassemble any parts while you are replacing a drive unless instructed to do so in this manual. Any malfunction or damage caused by disassembling the TeraStation will void your warranty.
- To avoid damaging the TeraStation with static electricity, ground yourself by touching something made of metal before handling any sensitive electronic parts.
- Do not change the order of the drives on the TeraStation. For example, pulling out the drive in slot 1 and replacing it with the drive in slot 2 may cause data to be corrupted or lost.

- The system volume (C:) consists of the mirrored volume and a portion of the two drives from the top. Do not replace both of these drives at the same time.
- If a drive is replaced while saving a file, the file can be corrupted. Be sure that the saving operation is finished before replacing the drive.

Drive Replacement for a Failed System Volume

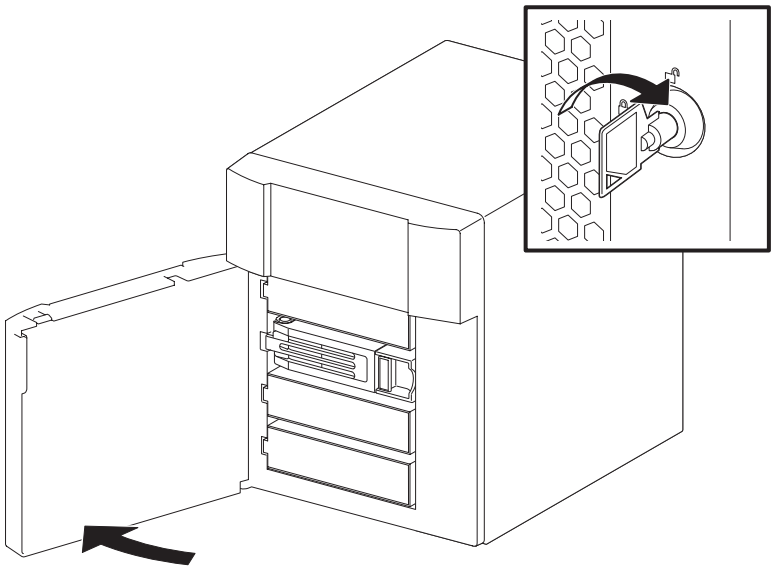
By default, the system volume will consist of the drives in slots 1 and 2. If a drive used in the system volume fails, you will need to repair the system volume after replacing the defective drive with a new drive. Repairing the data volume before repairing the system volume may not always succeed.

Notes:

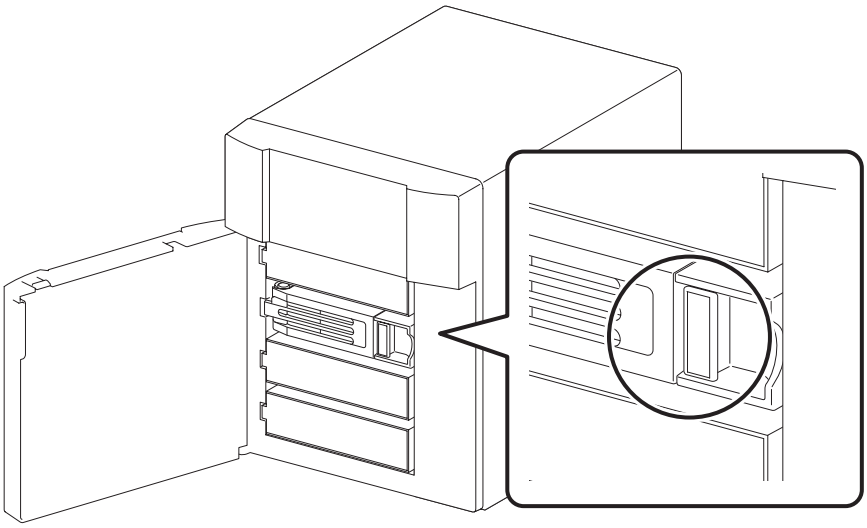
- Follow the procedure below to take the proper precautions before repairing the system volume. If you use Disk Management instead, the TeraStation will not boot if the drive fails.
- If you changed the display language to one that is not listed below, change it to one of the following languages before replacing a drive that is used for the system volume: English, French, German, and Japanese.

1 Power off the TeraStation.

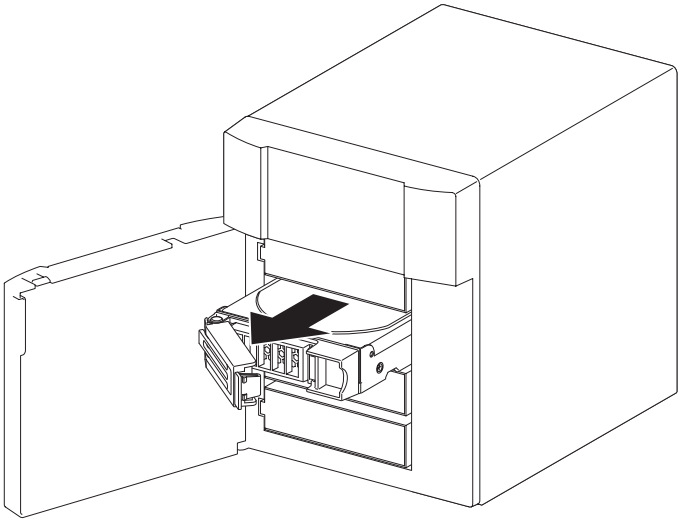
2 Open the front cover with the included key.



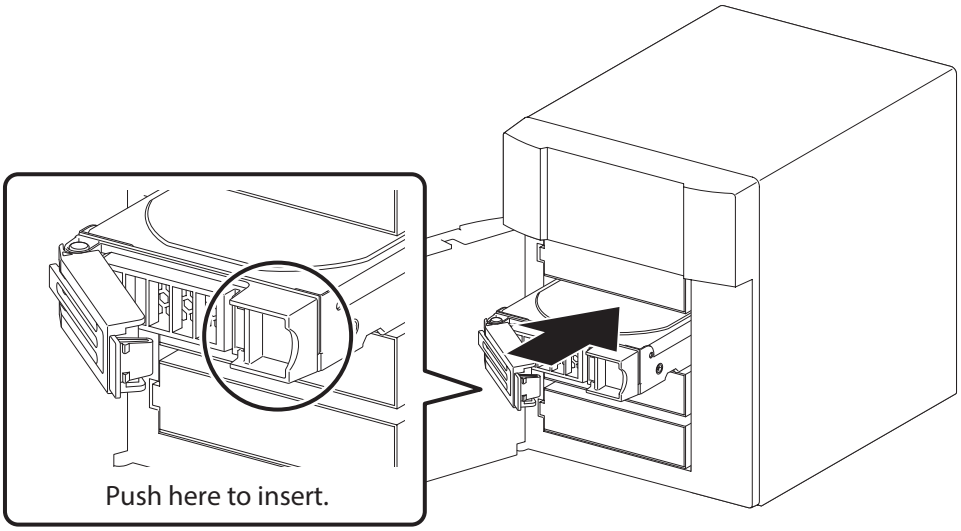
3 The failed drive's status LED will be glowing red. Push its unlock button and swing the lock mechanism out.



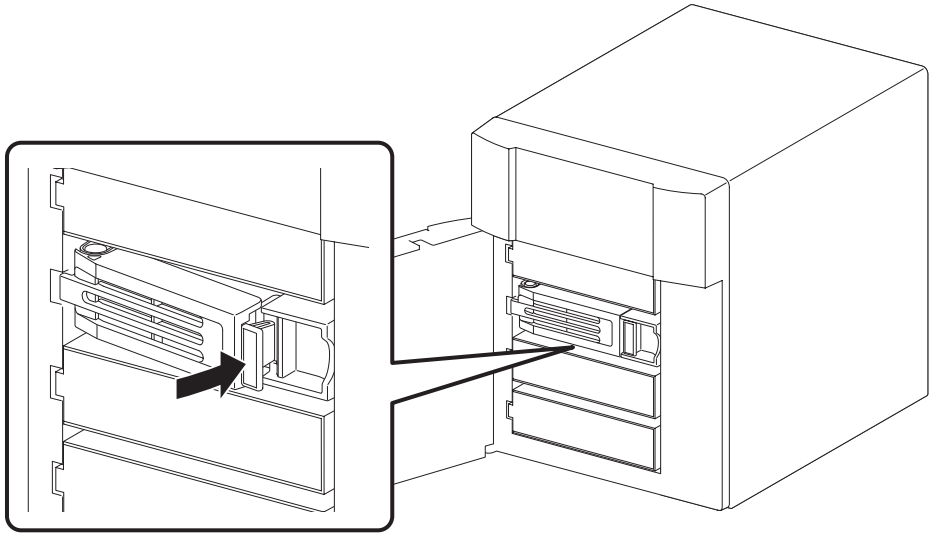
4 Pull out the drive cartridge and remove it from the TeraStation.



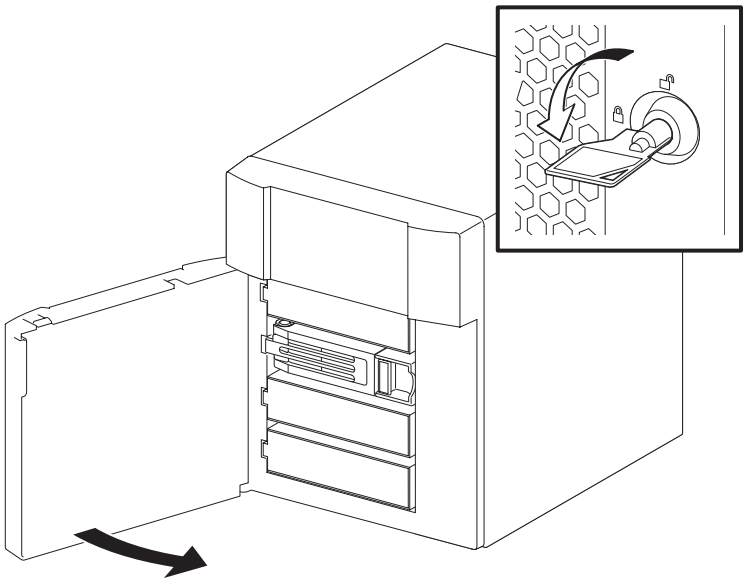
5 Firmly insert the new drive into the empty slot with the lock mechanism remaining open. Make sure the replacement drive is inserted exactly as the previous drive.



6 Swing the lock back down until it clicks into place. Make sure that the inserted drive has been pushed in as far as the other drives. If the drive has not been inserted properly, it will not be detected by the TeraStation.



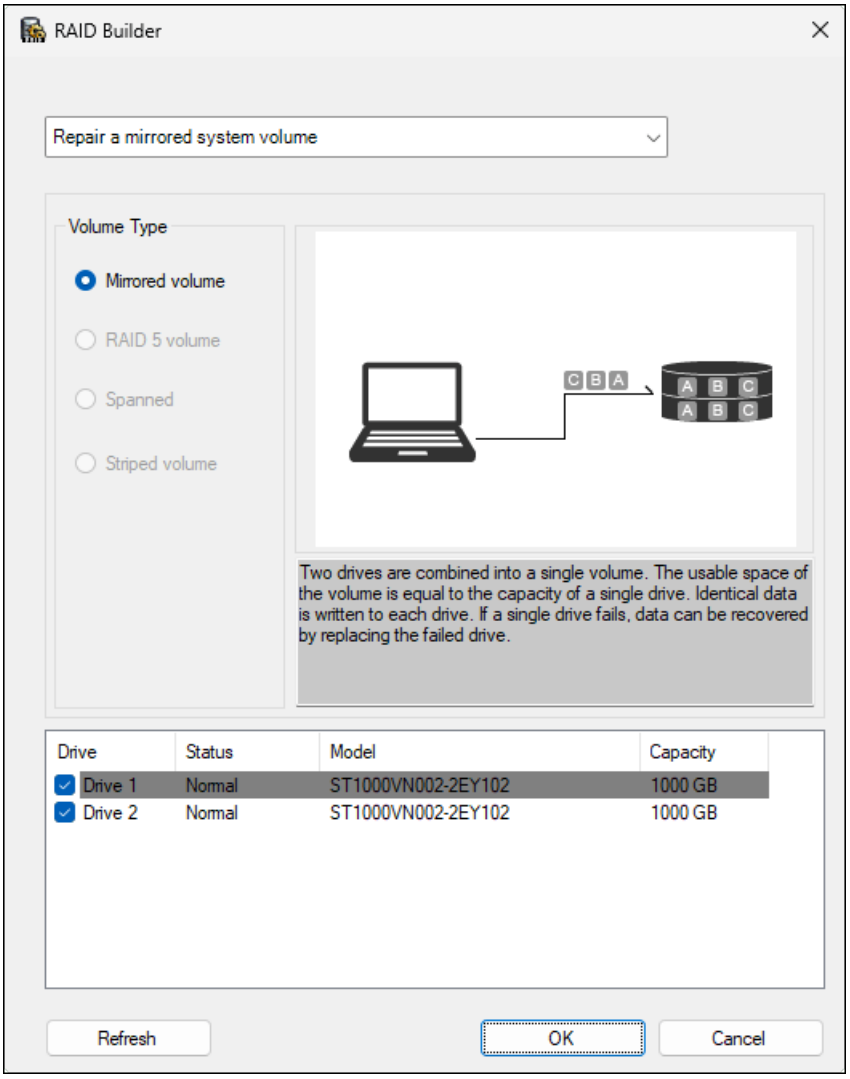
7 Close the front cover.



8 Press the power button on the TeraStation to turn it on.

9 Click the Start button ( ), then click *RAID Builder* in the Start menu.

10 Select "Repair a mirrored system volume" from the drop-down list, select the checkbox of the replaced drive, then click *OK*.



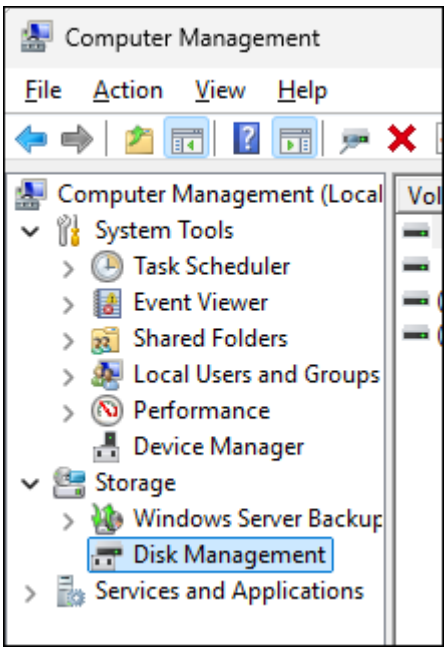
11 You will be asked to initialize the replaced drive. Click *OK*.

12 The message that lets you restart the TeraStation will appear. Follow the instructions on the screen and restart the TeraStation.

13 Click the Start button ( ), then click *Server Manager* in the Start menu.

14 Click *Tools* > *Computer Management* in the upper-right corner of the window.

15 Click *Disk Management* in the left-side menu. Make sure the status of the system volume shows "Healthy". Creating the system volume will take about an hour to complete.



16 Select the appropriate procedure depending on the type of volume you wish to repair.

Procedure for a RAID 5 Volume

(1) Right-click the volume labeled "Failed Redundancy" and click *Repair Volume*.
(2) When "Select one of the disks listed below." is displayed, select the drive to repair and click *OK*.
(3) Repeat steps (1) and (2) for each volume that requires resynchronization.
(4) Right-click the drive labeled "Missing" and select *Remove Disk*.

Procedure for a Mirrored Volume

(1) Right-click the volume labeled "Failed Redundancy" and click *Remove Mirror*.
(2) When "Remove Mirror" is displayed, select "Missing" and click *Remove Mirror*.
(3) When "Are you sure you want to remove the mirror?" is displayed, click *Yes*.
(4) Repeat steps (1) to (3) for each volume that requires resynchronization.
(5) Select the volume to be repaired and select *Add Mirror*.
(6) When "Add Mirror" is displayed, select the drive to be added to the mirrored volume and click *Add Mirror*.

Procedure for a Striped Volume or Spanned Volume

Refer to the "Creating a Volume" section in chapter 5 for the procedure to create a new volume. Data will not be recovered.

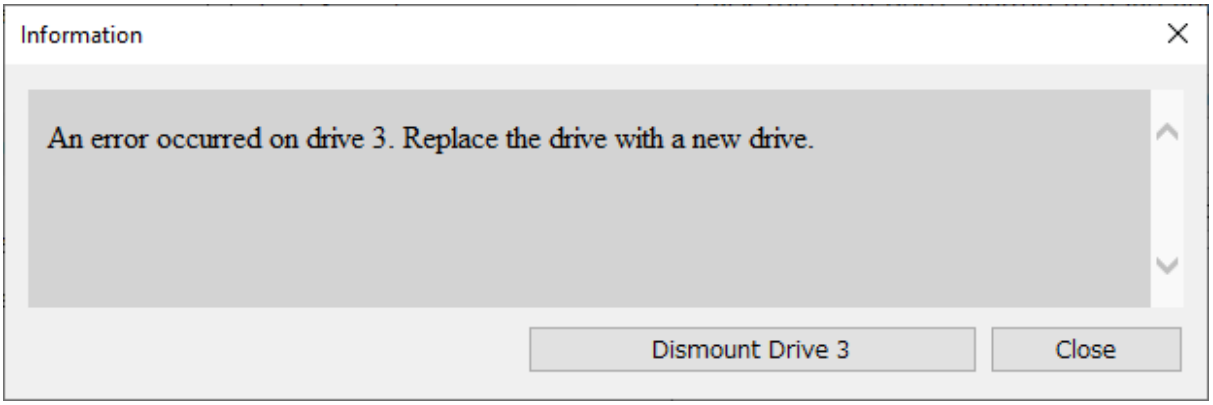
17 The process is complete the volume repair is finished.

Drive Replacement for a Failed Non-System Volume

By default, the system volume will consist of the drives in slots 1 and 2. If a drive **not** used in the system volume fails, you will need to repair the volume after replacing the defective drive with a new drive.

1 Click the Buffalo Dashboard icon ( ) in the system tray to open Buffalo Dashboard.

2 The error message will notify you of the failed drive's location. Click *Dismount Drive x* (where "x" is the number of the failed drive).



3 When dismounting the drive is finished, click *OK*. The drive's status LED will stop flashing and glow steadily.

4 Open the front cover with the included key.

5 The failed drive's status LED will be glowing red. Push its unlock button and swing the lock mechanism out.

6 Pull out the drive cartridge and remove it from the TeraStation.

7 Firmly insert the new drive into the empty slot with the lock mechanism remaining open. Make sure the replacement drive is inserted exactly as the previous drive.

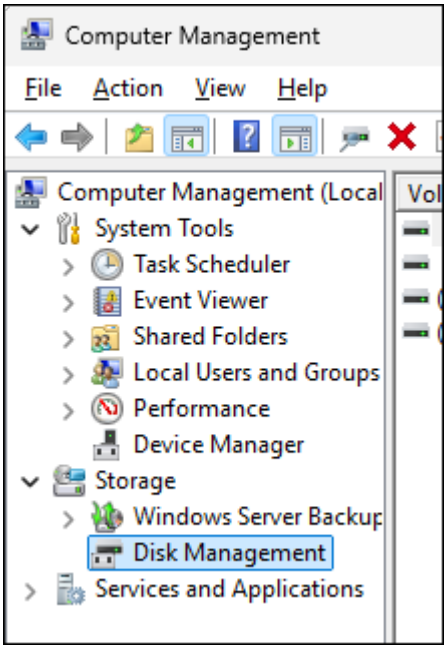
8 Swing the lock back down until it clicks into place. Make sure that the inserted drive has been pushed in as far as the other drives. If the drive has not been inserted properly, it will not be detected by the TeraStation.

9 Close the front cover.

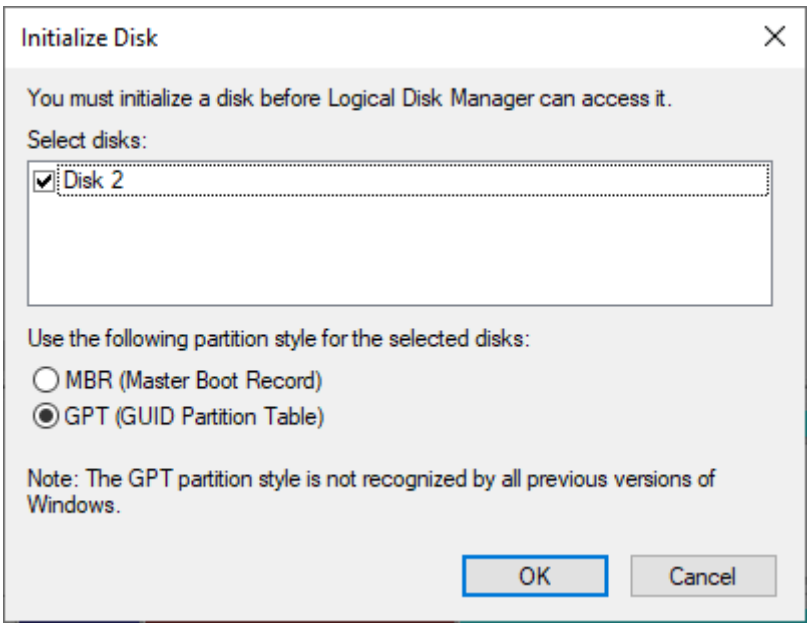
10 Buffalo Dashboard will show the drive status "Getting drive status...". After the drive status changes to "Normal", click the Start button ( ) and click *Server Manager* in the Start menu.

11 Click *Tools* > *Computer Management* in the upper-right corner of the window.

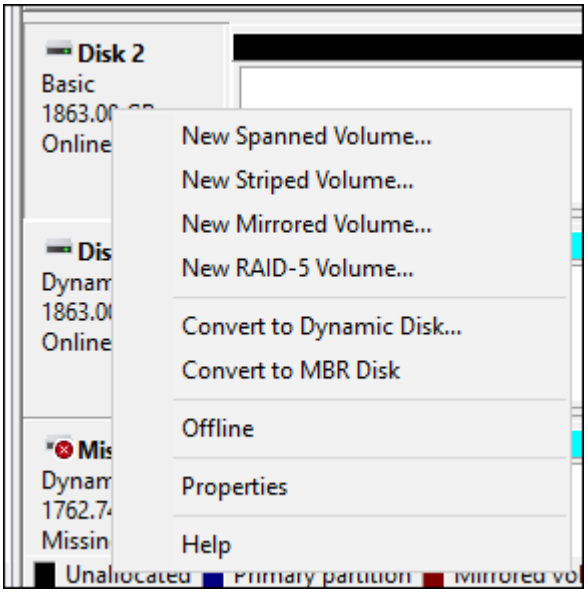
12 Click *Disk Management* in the left-side menu.



13 When the "Initialize Disk" window appears, make sure the drive number that you have replaced is displayed in the "Selected disks" field and "GPT" is selected, then click *OK*.



14 Right-click the initialized drive and select *Convert to Dynamic Disk*. A volume cannot be created unless the drive is converted to a dynamic disk.



15 Select the appropriate procedure depending on the type of volume you wish to repair.

Procedure for a RAID 5 Volume

(1) Right-click the volume labeled "Failed Redundancy" and click *Repair Volume*.
(2) When "Select one of the disks listed below." is displayed, select the drive to repair and click *OK*.
(3) Repeat steps (1) and (2) for each volume that requires resynchronization.
(4) Right-click the drive labeled "Missing" and select *Remove Disk*.

Procedure for a Mirrored Volume

(1) Right-click the volume labeled "Failed Redundancy" and click *Remove Mirror*.
(2) When "Remove Mirror" is displayed, select "Missing" and click *Remove Mirror*.
(3) When "Are you sure you want to remove the mirror?" is displayed, click *Yes*.
(4) Repeat steps (1) to (3) for each volume that requires resynchronization.
(5) Select the volume to be repaired and select *Add Mirror*.
(6) When "Add Mirror" is displayed, select the drive to be added to the mirrored volume and click *Add Mirror*.

Procedure for a Striped Volume or Spanned Volume

Refer to the "Creating a Volume" section in chapter 5 for the procedure to create a new volume. Data will not be recovered.

16 The process is complete once the volume repair is finished.

Replacing a Non-Malfunctioning Drive

If you need to replace a functioning drive, refer to the appropriate section below that corresponds to the RAID volume in use. If replacing multiple drives, replace them one at a time to ensure your data is preserved.

Operating in a RAID 5 Volume or Mirrored Volume

If you are using a RAID 5 or mirrored volume, the volume will enter degraded mode after replacing the drive. You can use the TeraStation but it will offer less redundancy until you rebuild the RAID volume with a new drive. To rebuild the volume:

(1) First, power off the TeraStation and disconnect the drive, then turn it on.

(2) Refer to the "Drive Replacement for a Failed System Volume" section above and follow the procedure from step 8 on, or refer to the "Drive Replacement for a Failed Non-System Volume" section above and follow the procedure from step 11 on.

Operating in a Striped Volume or Spanned Volume

All data on the RAID volume will be deleted after replacing the drive. You will be unable to use the TeraStation until you delete the volume and create a new one with the new drive. To create a new volume:

(1) First, power off the TeraStation and disconnect the drive, then turn it on.

(2) Refer to the "Drive Replacement for a Failed System Volume" section above and follow the procedure from step 8 on, or refer to the "Drive Replacement for a Failed Non-System Volume" section above and follow the procedure from step 11 on.

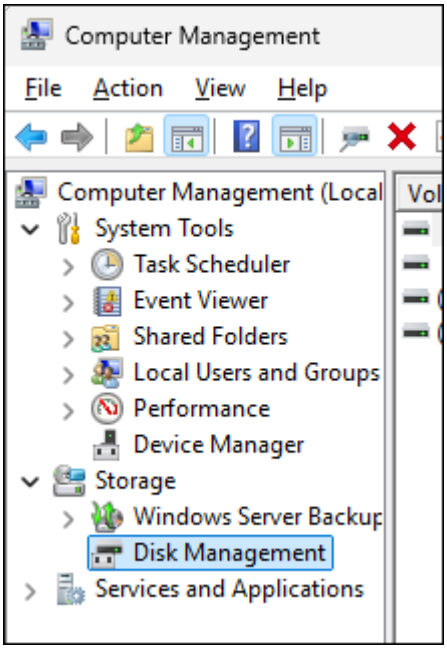
I12 Message Appears Despite No Drive Errors

If both the I12 and E30 error messages appear at the same time, refer to the "Replacing a Defective Drive" section above and replace the corresponding drive. If the I12 message appears on the LCD panel (or NAS Navigator2) but the E30 error message does not, this indicates that no drive error messages actually occurred. To check the volume status, follow the procedure below. The procedure will vary depending on how seriously the RAID volume is corrupted.

1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Click *Disk Management* in the left-side menu.

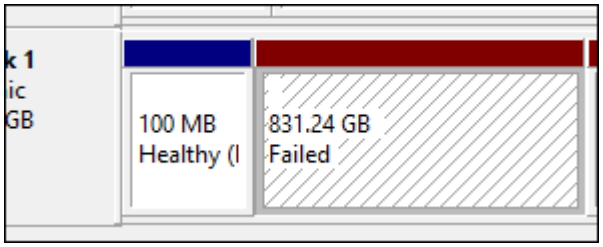


4 Check whether the volume status shows either "Failed Redundancy" or "Failed".

Status Shows "Failed"

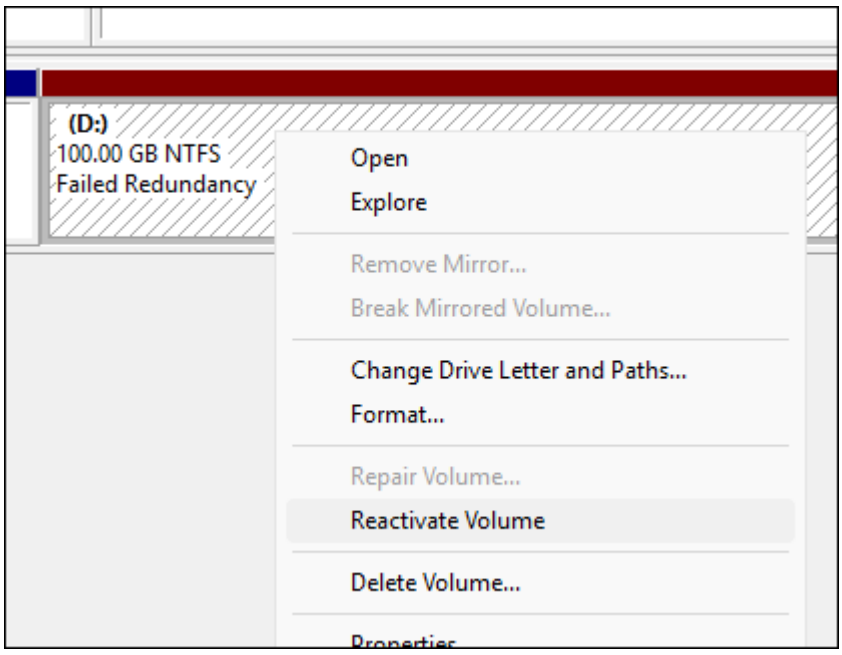
If the two or more volumes are corrupted, the volume status will show "Failed" and the TeraStation will not be accessible. Data cannot be recovered. In such a case, refer to the "Deleting a Volume" section in chapter 5 to delete

the volumes labeled "Failed". After the volumes are deleted, create the desired RAID volume by referring to the "Creating a Volume" section in the same chapter.



Status Shows "Failed Redundancy"

If the status shows "Failed Redundancy", then a volume in the RAID volume has been corrupted and the RAID volume is operating in degraded mode. In such a case, right-click the volume labeled "Failed Redundancy" and click *Reactivate Volume* in Disk Management.



When you reactivate the volume, resynchronization will run automatically. File transfers and system performance will be slower while resynchronization is running, which will take about 23 hours for a RAID 5 volume and about 2–3 hours for a mirrored volume per a 4 TB TeraStation model.

TeraStation Does Not Boot

If Windows Server no longer functions properly, perform recovery using the supplied SD card.

Notice Before Recovery

Before recovering the TeraStation, read the following guidelines:

- This recovery procedure erases your data. Backing up regularly is highly recommended to avoid losing your important data.
- **Do not connect the SD card to another TeraStation or your computer. The recovery process that involves using this SD card is intended for this product only.**
- If you have enabled a storage pool, disable it.
- Do not connect any USB devices other than the card reader with the SD card inserted. The connected USB devices should be connected again after the TeraStation has been properly recovered.

Recovering Using the Supplied SD Card

Recovery will be processed by removing all partitions on the drives once, then creating a new partition and installing the Windows Server image onto that partition.

Note: Recovery will take about 15–30 minutes.

1. Power off the TeraStation.
2. Remove all drives other than the drive in slot 1.
3. Insert the SD card into the card reader (not included).
4. Connect the card reader to the USB port on the TeraStation.
5. Power on the TeraStation while holding down the function button.
6. You should hold down the function button until the "Preparing Recovery..." message appears on the LCD panel. When the message appears, release the function button.
7. When the "Press Func to Start Recovery" message appears, press the function button once. The recovery process will start.

   Note: To cancel the recovery process, press the power button. The TeraStation will be turned off.
8. The TeraStation shuts down automatically when the recovery process is finished. Return the disconnected drives to the original position.
9. Remove the card reader and press the power button.
10. The TeraStation will automatically perform initial setup during startup, which will take approximately 10–15 minutes.
11. The process is complete once the messages on the LCD panel changes to ones described in the "Modes" section in chapter 11.

After the recovery process is finished, if using the RAID volume for storing data, refer to the "Repairing the System Volume" section below to revert to the previous volume state. If you wish to extend the system volume capacity, refer to the "Extending the System Volume Capacity" section before repairing the system volume.
If using Storage Spaces, start from step 3 at the "Configuring Storage Spaces" section in chapter 4.
By recovering the TeraStation, the display language will also revert to English, as the default shipped language. If you want to change it to a different language, refer to the "Changing the Display Language" section in chapter 2 and try changing the display language first.

Repairing the System Volume

After the recovery process is finished, the TeraStation will be set to the state below when running under default settings.

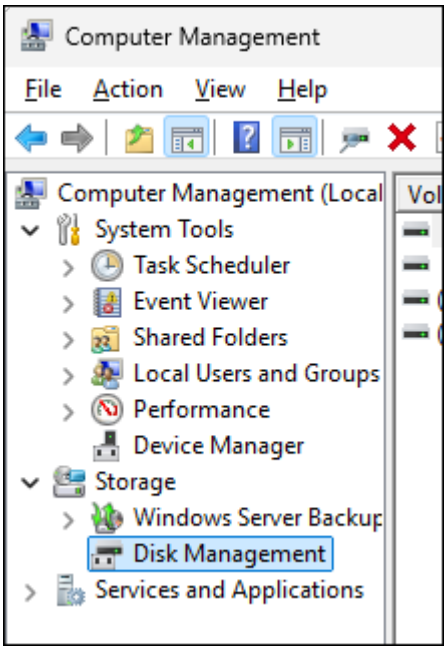
- Drive in slot 1
  100 MB (EFI System partition)
  100 GB (Basic Disk/Simple)
  The remaining space is an unallocated area.
- Drives in slots 2–4
  The data on the drives cannot be viewed.

Follow the procedure below to retrieve the factory default state of the TeraStation.

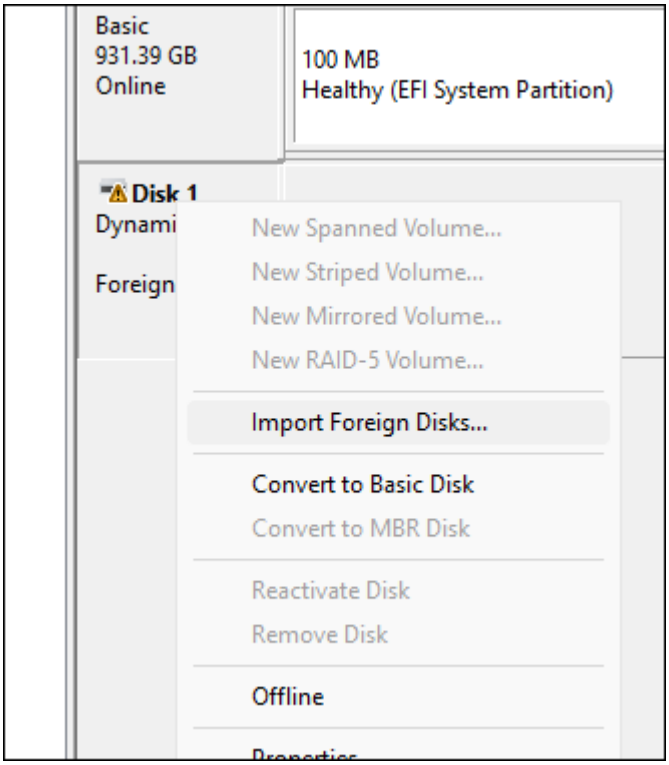
1 Click the Start button ( ), then click *Server Manager* in the Start menu.

2 Click *Tools* > *Computer Management* in the upper-right corner of the window.

3 Click *Disk Management* in the left-side menu.

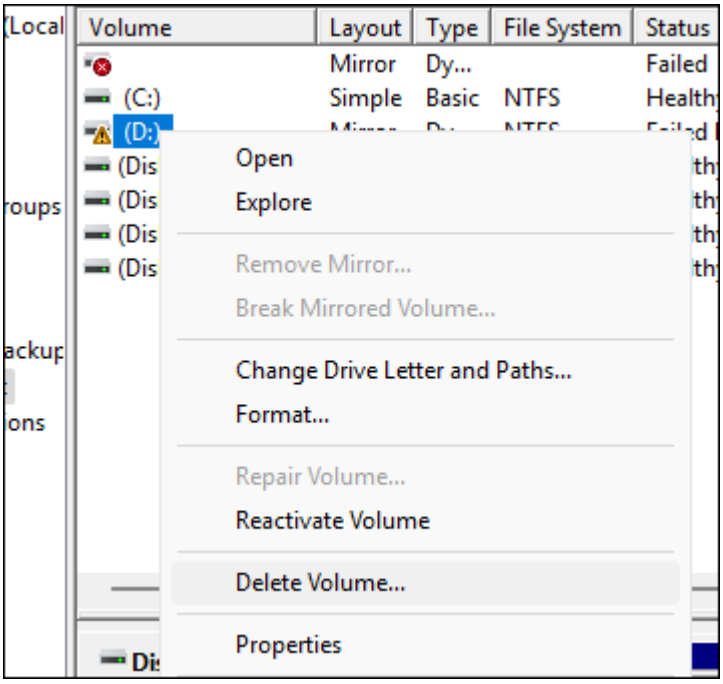


4 Right-click the volumes labeled "Foreign", then click *Import Foreign Disks*. If there are multiple "Foreign" drives, all drives will be imported at once.



5 Click *OK*, then click *OK* again.

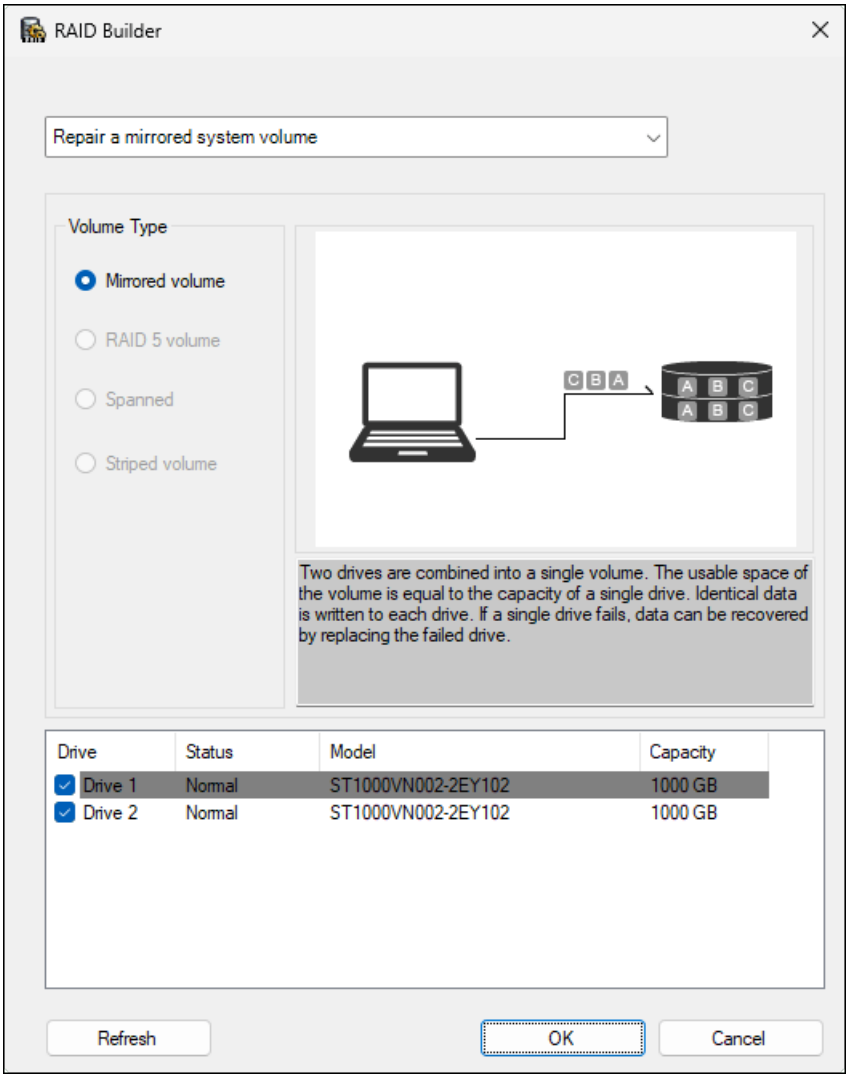
6 Right-click "(D:)" under the "Volume" field, then click *Delete Volume*. Repeat this step to delete all volumes other than volume C.



7 Deleting the volume will erase all data. Read the displayed message carefully and click *Yes*.

8 Click the Start button ( ), then click *RAID Builder* in the Start menu.

9 Select "Repair a mirrored system volume" from the drop-down list, select the checkbox of the drive in slot 2, then click *OK*.



10 You will be asked to initialize the drive in slot 2. Click *OK*.

11 The message that lets you restart the TeraStation will appear. Follow the instructions on the screen and restart the TeraStation.

12 The process is complete once the TeraStation boots up. Next, create a data volume by referring to the "Creating a Volume" section in chapter 5.

Extending the System Volume Capacity

The capacity of the system volume can be extended right after recovering the TeraStation and before creating the data volume (drive D). Follow the procedure below to extend the system volume capacity.

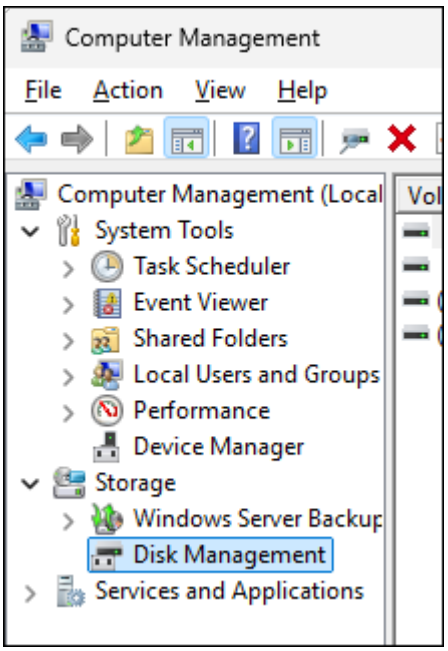
1 Ensure the TeraStation is in the following state:

- The system volume has not been repaired yet. If it has already been repaired, recover the TeraStation again.
- The data volume has not been created yet. If it has already been created, delete it by referring to the "Deleting a Volume" section in chapter 5.

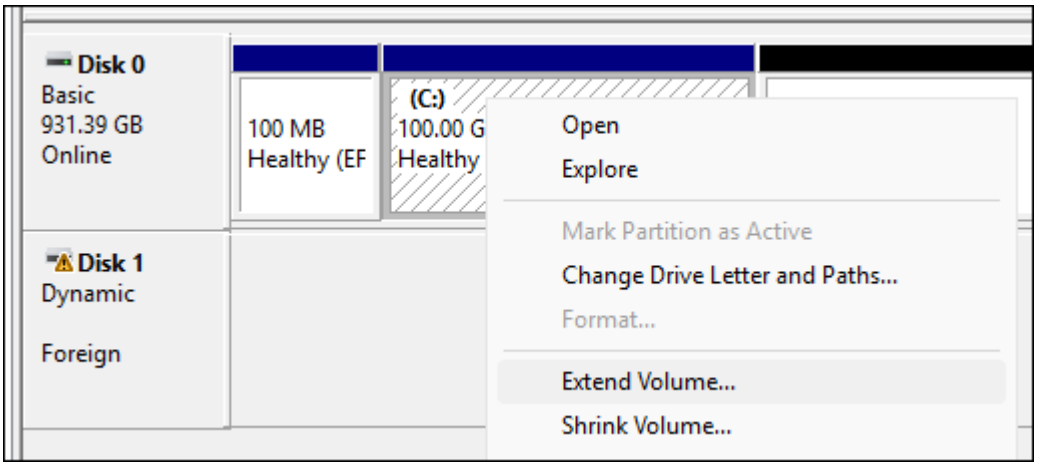
2 Click the Start button ( ), then click *Server Manager* in the Start menu.

3 Click *Tools* > *Computer Management* in the upper-right corner of the window.

4 Click *Disk Management* in the left-side menu.



5 Right-click the system volume and click *Extend Volume*.



6 The process is complete when you finish the wizard.

Other Device Troubles

Unable to Access the Shared Folder or the System Becomes Unstable

This usually occurs because too many software applications are running on Windows Server, causing a memory shortage. Exit or uninstall some of the software running on Windows Server, then restart the TeraStation.

LAN Port Number Displayed on Windows Server Is Different from the One on the Device Label

The LAN port numbers displayed in Windows Server are assigned based on the order in which they are recognized. As a result, the numbers shown in Windows Server may not match the ones on the physical label on the device.

Buffalo Dashboard and Windows Disk Management Display Different Information

Because different drive error algorithm rules are used between Buffalo Dashboard and Windows Disk Management, drive error messages may not appear on both.

Chapter 10 Utilities

NAS Navigator2

NAS Navigator2 is a utility program that makes it easy to display Windows Server, change the Buffalo NAS device's IP address, or check its drives in remote desktop. To install NAS Navigator2, refer to the appropriate procedure below for your computer.

Windows

The NAS Navigator2 installer for a Windows computer is available from the d.buffalo website, accessible from https://d.buffalo.jp/WS5020N5/.
Once you have accessed the URL, select the region and model to go to your specific model's d.buffalo website. Download the NAS Navigator2 installer and install the utility onto your computer.
Refer to the software help for more detailed information on operating the software. To open the help, launch NAS Navigator2 and navigate to *Menu* > *Help*.

macOS

The NAS Navigator2 app for a macOS computer is available from the Mac App Store. Download the app and install it. Refer to the software help for more detailed information on operating the software. To open the help, launch NAS Navigator2 and navigate to *Help* > *NAS Navigator2 Help* from the menu bar.

NovaBACKUP

NovaBACKUP is a Windows utility that lets you back up data on your computer.
The NovaBACKUP installer is available from the d.buffalo website, accessible from https://d.buffalo.jp/WS5020N5/.
Once you have accessed the URL, select the region and model to go to your specific model's d.buffalo website. Download the NovaBACKUP installer and install the utility onto your computer.
To download the installer, you will need the serial number of your TeraStation. The serial number is printed on the label on the back or the top of the unit. For the WS5420RN5 TeraStation model, the serial number can be found on the front as well. Refer to the "Diagrams" section in chapter 2 for information on where to find the serial number of your device.

Chapter 11 Appendices

LCD Panel

Modes

The LCD panel can be cycled through different modes by pressing the display button.

LCD Message		Description	Corrective Action
Link Speed **Note:** The "x" indicates the number of the LAN port where the Ethernet cable is connected.	LAN*x* Not Connected	Not connected to a network.	Connect an Ethernet cable to the LAN port.
	LAN*x* Full Duplex 10 Mbps	Connected at 10 Mbps full duplex.	-
	LAN*x* Full Duplex 100 Mbps	Connected at 100 Mbps full duplex.	-
	LAN*x* 1000 Mbps	Connected at 1000 Mbps.	-
	LAN*x* 2.5 Gbps	Connected at 2.5 Gbps.	-
	LAN*x* 5 Gbps	Connected at 5 Gbps.	-
	LAN*x* 10 Gbps	Connected at 10 Gbps.	-
Drive Space Used	Used Space C: 15% D: 0%	Displays the used space for drives C and D on the TeraStation.	-
Installed OS	Windows Server IoT 2025 for Storage	Displays the OS installed on the TeraStation.	-
Hostname and IP Address of LAN Port 1	WS5420DN5*xxx* 192.168.11.150	Displays the hostname and the IP address of LAN port 1. **Note:** This example is using the WS5420DN5 TeraStation model. The "xxx" is assigned using the last three-digits of the MAC address.	-
Date and Time	Date Time YYYY/MM/DD hh:mm	Displays the date and time set on the TeraStation.	-
IP Addresses of LAN Ports 2 and 3	LAN*x* 192.168.11.150	Displays the IP addresses of LAN ports 2 and 3.	-

Errors

If a critical error occurs, one of the following messages will appear on the LCD panel and the error LED will glow red. If there is a corresponding corrective action described below for the code, try it first. If the code is still displayed after trying the corrective action, contact Buffalo technical support for assistance.
You can also confirm the current status by using NAS Navigator2. If NAS Navigator2 displays the error as an unknown error, check the LCD panel for the error details.

Note: The "x" in the LCD message is the number of the drive or assigned drive letter involved in the process.

LCD Message	Description	Corrective Action
E11 Fan Failure	An error occurred with the fan's speed.	Check that no foreign objects or dust are clogging the fan. If any foreign objects or dust are found, use a pair of tweezers, an air duster, or other tools to remove them.
E12 Cooling Failure	The system temperature has exceeded the allowable safety value.	Move the TeraStation to a cool location. Do not place objects in the area around the TeraStation.
E16 Drive *x* Not Found	The drive cannot be found.	Re-insert the drive after shutting down.
E30 Replace Drive *x*	An error occurred, so the drive was removed from the volume.	Replace the drive by referring to the "Replacing a Defective Drive" section in chapter 9.
E42 Migration Canceled	The migration process has been canceled because an error occurred.	Refer to the NAS migration guide for the detailed corrective actions.

Alerts

If a non-critical error occurs, one of the following messages will appear on the LCD panel and the info LED will glow amber. If there is a corresponding corrective action described below for the code, try it first. If the code is still displayed after trying the corrective action, contact Buffalo technical support for assistance.
You can also confirm the current status by using NAS Navigator2. If NAS Navigator2 displays the error as an unknown error, check the LCD panel for the error details.

Note: The "x" in the LCD message is the number of the drive, assigned drive letter, or job involved in the process.

LCD Message	Description	Corrective Action
I10 System Is Overheating	The system temperature may have exceeded the allowable safety value.	Move the TeraStation to a cool location. Do not place objects in the area around the TeraStation.
I12 Degraded Mode	The volume is in degraded mode.	Check if the E30 error is also displayed. If it is, refer to the corrective action for the E30 error. If only this message is displayed, refer to the "I12 Message Appears Despite No Drive Errors" section in chapter 9.
I33 Replication Failure	An error occurred in replication.	From Buffalo Replication, click *Sync* to run the replication jobs.
I54 Backup Job Failure	The backup job failed.	Make sure that the backup job is configured correctly. Make sure that the NAS is on and not in standby mode. If the backup job still fails, check the status of NAS, network, and backup source and destinations. Also, check the backup log to see if any errors were recorded.
I75 Some Items Not Migrated	Data migration has finished but some files and folders could not be migrated.	Refer to the NAS migration guide for the detailed corrective actions.

Information Events

After you change any settings, one of the following messages will appear on the LCD panel and the info LED will glow amber. If there is a corresponding corrective action described below for the code, try it first. If the code is still displayed after trying the corrective action, contact Buffalo technical support for assistance.
You can also confirm the current status by using NAS Navigator2. If NAS Navigator2 displays the status as an unknown error, check the LCD panel for the status details.

Note: The "x" in the LCD message is the number of the drive, assigned drive letter, or job involved in the process.

LCD Message	Description	Corrective Action
I18 Rebuilding Drive *x*...	Resynchronizing the volume. **Note:** Transfer speeds are slower during resynchronization.	-
I52 New Firmware Available	A new firmware version has been released.	Update the firmware.
I73 Migration Processing...	Data or settings migration is in progress.	-
I74 Migration Finished	Data or settings migration has finished.	Refer to the NAS migration guide for the detailed corrective actions.

Default Settings

Setting	Default
Administrator's Name	Administrator
Password	password
Shared Folders	Drives C and D are configured as administrative hidden shares by Windows Server's default settings.
IP Address	The TeraStation will get its IP address automatically from a DHCP server on the network. If no DHCP server is available, then an IP address will be assigned as follows: IP Address: 169.254.*xxx.xxx* ("xxx" is a number randomly assigned when booting the TeraStation.) Subnet Mask: 255.255.0.0
Registered Groups	Windows Server's default groups are registered.
Microsoft Network Group Settings	WORKGROUP
Created Volumes	Drive C: a mirrored volume that uses the drives in slots 1 and 2 Drive D: a RAID 5 volume that uses all drives* *For the WS5220DN5 TeraStation model, drive D is a mirrored volume that uses the drives in slots 1 and 2.
Local Security Policy	"Password must meet complexity requirements" is disabled by default.

The TeraStation has the following functions and roles:

Features:

.NET Framework 4.8, iSNS Server, Windows PowerShell 5.1, WoW64 Support etc.

Roles:

File and Storage Services

Note: For other installed roles and features, see "Roles and Features", which you can reach by clicking *Local Server* on the left-side menu in Server Manager.

Specifications

Check the Buffalo website for the latest product information and specifications.

Technical Specifications	
1GbE LAN Interface	
Standards Compliance	IEEE 802.3ab (1000BASE-T), IEEE 802.3u (100BASE-TX), IEEE 802.3 (10BASE-T)
Data Transfer Rates	10/100/1000 Mbps (auto sensing)
Number of Ports	2
Connector Type	RJ-45 8-pin (auto MDI-X)
10GbE LAN Interface	
Standard Compliance	IEEE 802.3an (10GBASE-T), IEEE 802.3bz (2.5GBASE-T, 5GBASE-T), IEEE 802.3ab (1000BASE-T), IEEE 802.3u (100BASE-TX)
Data Transfer Rates	2.5/5/10 Gbps, 100/1000 Mbps (auto sensing)
Number of Ports	1
Connector Type	RJ-45 8-pin (auto MDI-X)
USB Interface	
Standards Compliance	USB 3.2 Gen 1
Data Transfer Rates	Max. 5 Gbps
Number of Ports	WS5220DN5, WS5420DN5: 2 WS5420RN5: 3
Connector Type	Type A
VGA Connector	
Connector Type	D-sub 15 pin (female)
Number of Ports	1
Internal Drive	
Number of Drive Bays	WS5220DN5: 2 WS5420DN5, WS5420RN5: 4
Drive Interface	SATA 6 Gbps
Supported Volume Types	WS5220DN5: mirrored, striped, spanned WS5420DN5, WS5420RN5: RAID 5, mirrored, striped, spanned
Replacement Drive	Buffalo OP-HDN series drive **Note:** The replacement drive should be the same capacity or larger as the original drive. The drives listed above are available from the Buffalo website.

Product Specifications	
Installed OS	Microsoft Windows Server IoT 2025 for Storage Standard **Note:** The Microsoft Software License is on the d.buffalo website, https://d.buffalo.jp/WS5020N5/. Be sure to read the terms and conditions of this license.
Power Supply	WS5220DN5, WS5420DN5: AC 100–240 V, 1.5 A, 50/60 Hz WS5420RN5: AC 100–240 V, 2.5–1.25 A, 50/60 Hz
Dimensions (W × H × D, excluding protruding parts)	WS5220DN5: 170 × 170 × 230 mm (6.7 × 6.7 × 9.1 in.) WS5420DN5: 170 × 215 × 230 mm (6.7 × 8.5 × 9.1 in.) WS5420RN5: 430 × 44.3 × 430 mm (16.9 × 1.7 × 16.9 in.)
Weight	WS5220DN5: approx. 5.0 kg (11.0 lbs) WS5420DN5: approx. 7.4 kg (16.3 lbs) WS5420RN5: approx. 8.9 kg (19.6 lbs)

Product Specifications	
Maximum Power Consumption	WS5220DN5, WS5420DN5: 85 W WS5420RN5: 100 W
Operating Environment	Temperature: 0–40°C (32–104°F) Humidity: 10–85% non-condensing
Compatible Devices	Windows PCs, Apple silicon- and Intel-based Mac computers with wired or wireless Ethernet connection.
Supported OS	Windows 11, 10 Windows Server 2025, 2022, 2019, 2016 macOS 15, 14, 13