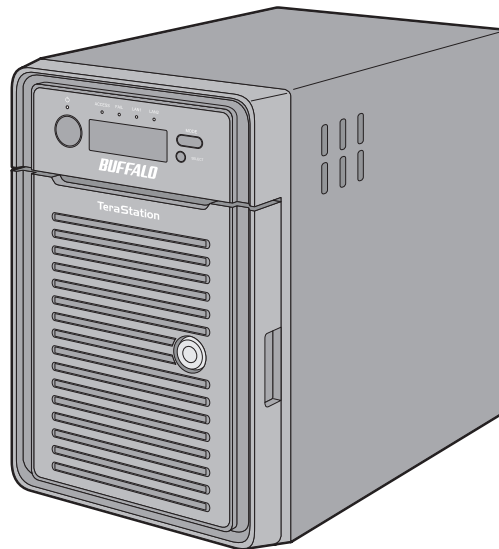


Network Attached Storage

TeraStation WSS WSH5010N6

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.

Americas: www.buffaloamericas.com

Europe: www.buffalo-technology.com

Asia Pacific: www.buffalo-asia.com

35021340-01
May, 2018

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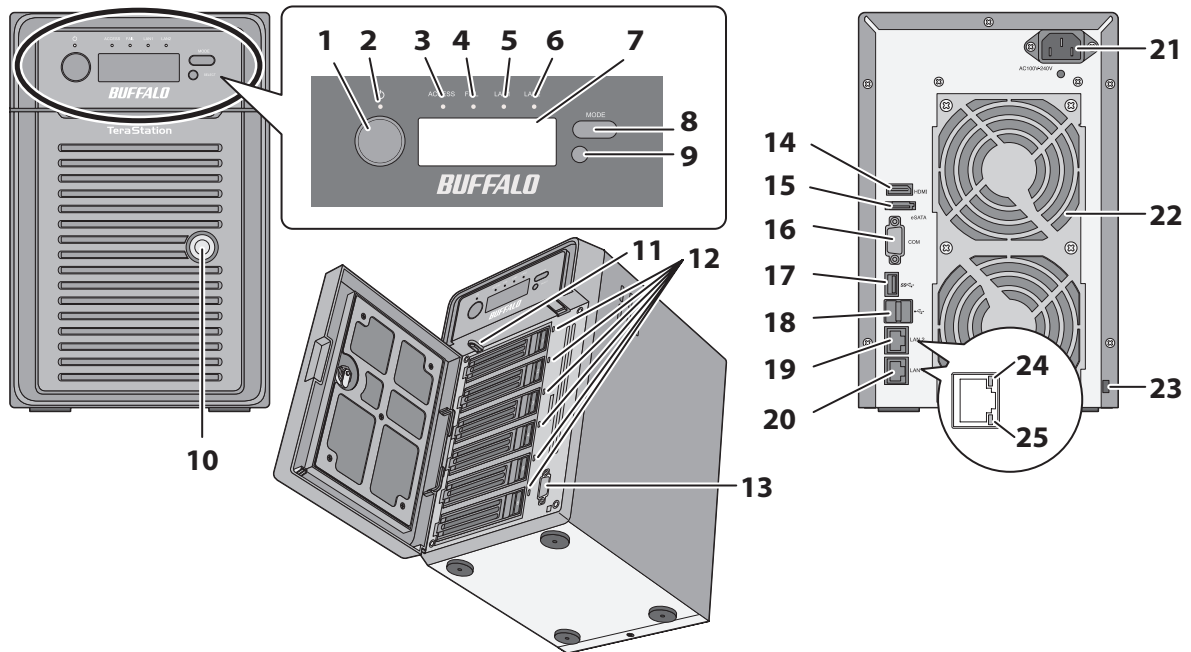
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Chapter 1 Getting Started

Diagrams

WSH5610DN6



1 Power Button (⏻)

To power on, connect the power cable and wait for 10 seconds, then press the power button. To power off, press the power button.

2 Power LED

The LED glows blue when power is on.

3 Access LED

Shows network activity. This LED blinks green when hard drives are being accessed.

4 Fail LED

If there is an error on the drives, this LED glows amber.
Open Buffalo Dashboard to see error messages.

5 LAN1 LED

When LAN port 1 is connected, this LED glows green. It blinks when the connection is active.

6 LAN2 LED

When LAN port 2 is connected, this LED glows green. It blinks when the connection is active.

7 LCD Panel

This display shows the status of many TeraStation settings.

8 Mode Button

Not in use normally; if the TeraStation beeps, press this button to stop the beeping.

9 Select Button

Not in use normally.

10 Drive Lock

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

11 Reset Button

To shut down and reboot the TeraStation, press and hold this button. Do not use this button normally.

12 Status LEDs

Normally, these LEDs blink green when hard drives are accessed. If a drive fails or dismounts, its LED will turn amber.

13 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.

14 HDMI Port

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

15 eSATA Port

eSATA-compatible hard drives are available with this port. Turn the TeraStation off before connecting the drives.

16 UPS Port

Connect to a UPS.

17 USB 3.0 Port ()

Compatible Buffalo USB 3.0 hard drives, USB memory devices, and USB UPSs can be connected. USB hubs are not supported.

18 USB 2.0 Port ()

Compatible Buffalo USB hard drives, USB memory devices, and USB UPSs can be connected. USB hubs are not supported.

19 LAN Port 2

This second Ethernet port may be used for network redundancy or backup. You may connect a second TeraStation directly to this port for backup.

20 LAN Port 1

Use an Ethernet cable to connect this port to your network.

21 Power Connector

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

22 Fan

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

23 Anti-Theft Security Slot

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

24 Link LED

Glows amber when the TeraStation is connected to a network.


25 Act LED

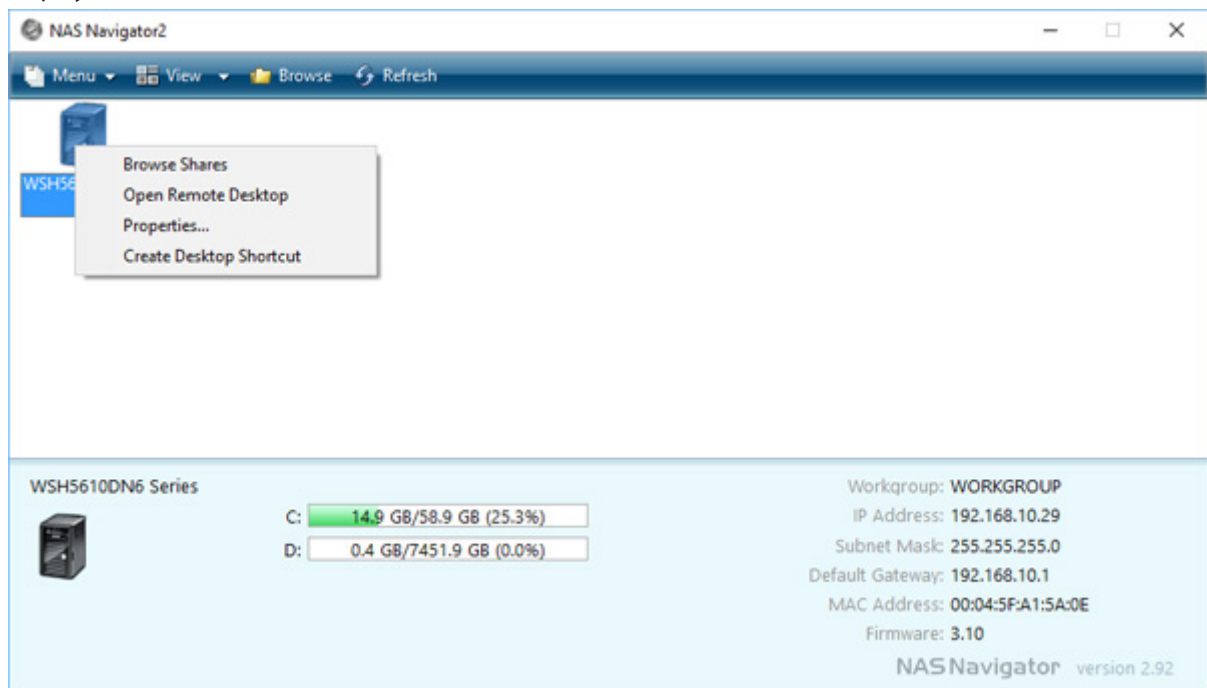
This LED shows network activity. It blinks amber when the TeraStation is accessed over the network.

Opening Windows Storage Server

To connect Windows Storage 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*.

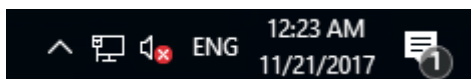


- 3 Enter the admin username and password and press the Enter key. The default username and password are “Administrator” and “password”.
Windows Storage Server will open in the remote desktop.

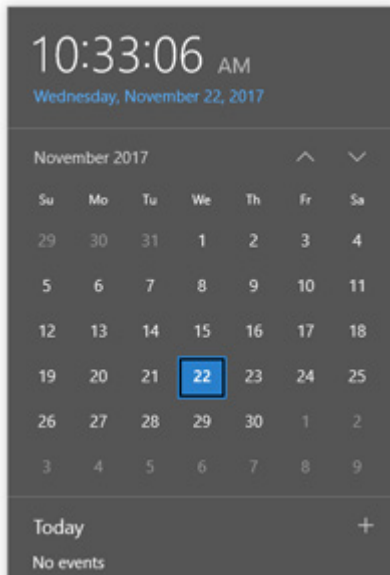
Changing Settings

Configuring Date and Time

- 1 Click the time in the system tray of Windows Storage Server.



2 Click *Change date and time settings* > *Change date and time*, select the current date and time, and click *OK*.



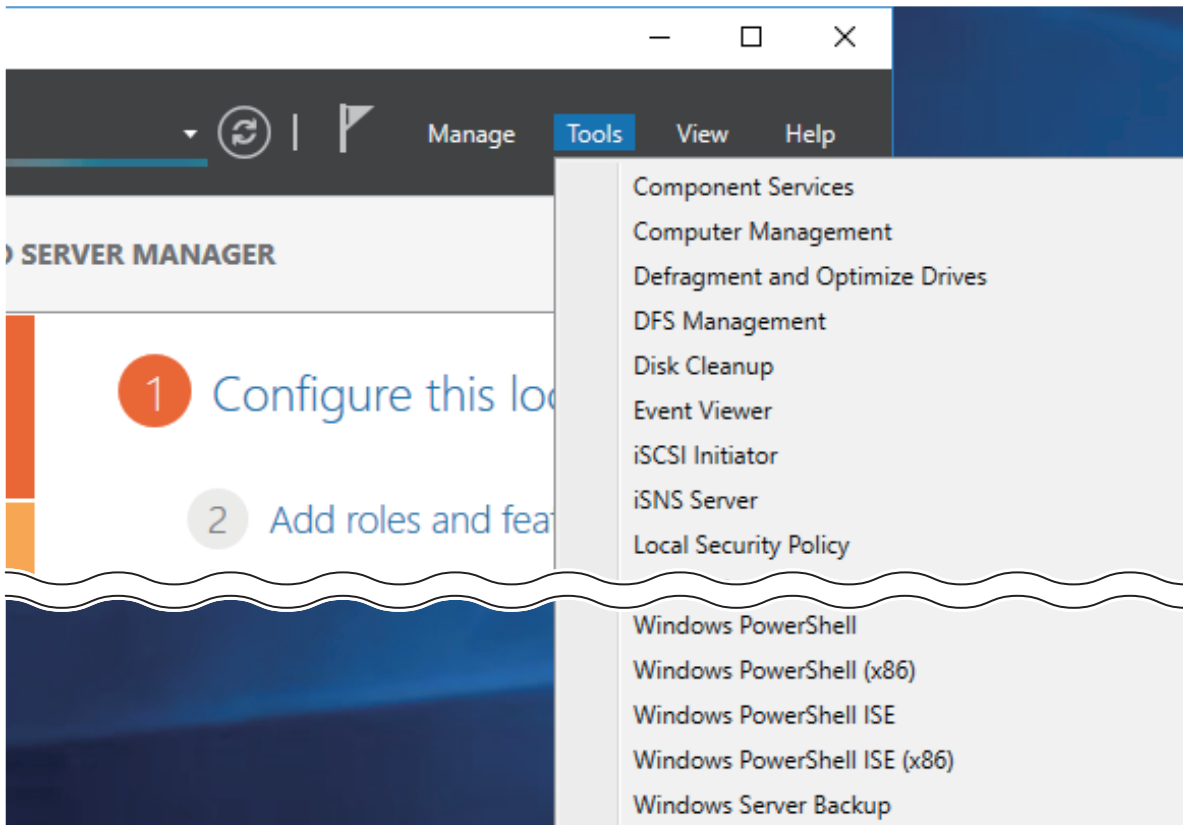
Note: From the *Internet Time* tab, click *Change settings*, then select *Synchronize with an Internet time server*. The date and time can be obtained automatically.

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.

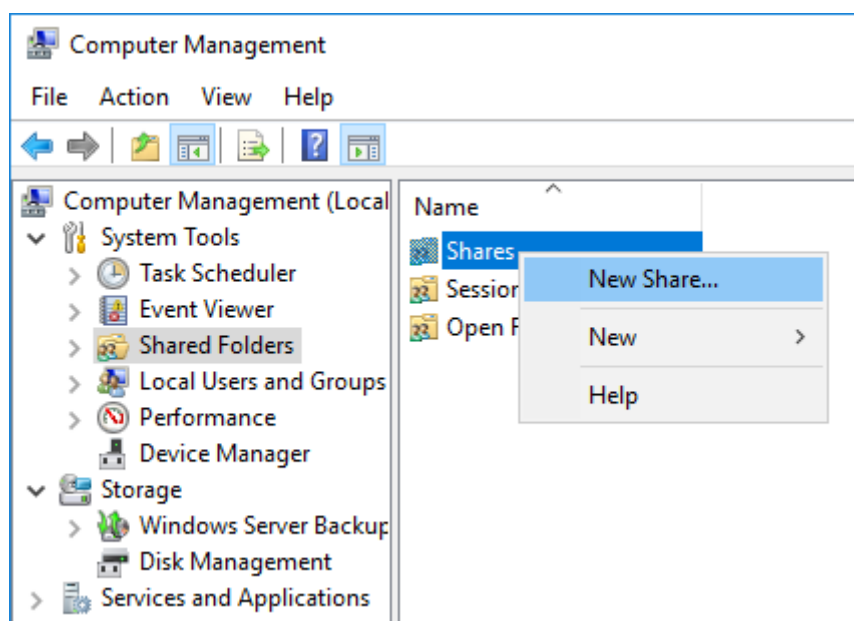
This is an example to create a shared folder, named “Share” in drive D, which anyone can access.

1 From Server Manager, click *Tools* > *Computer Management*.



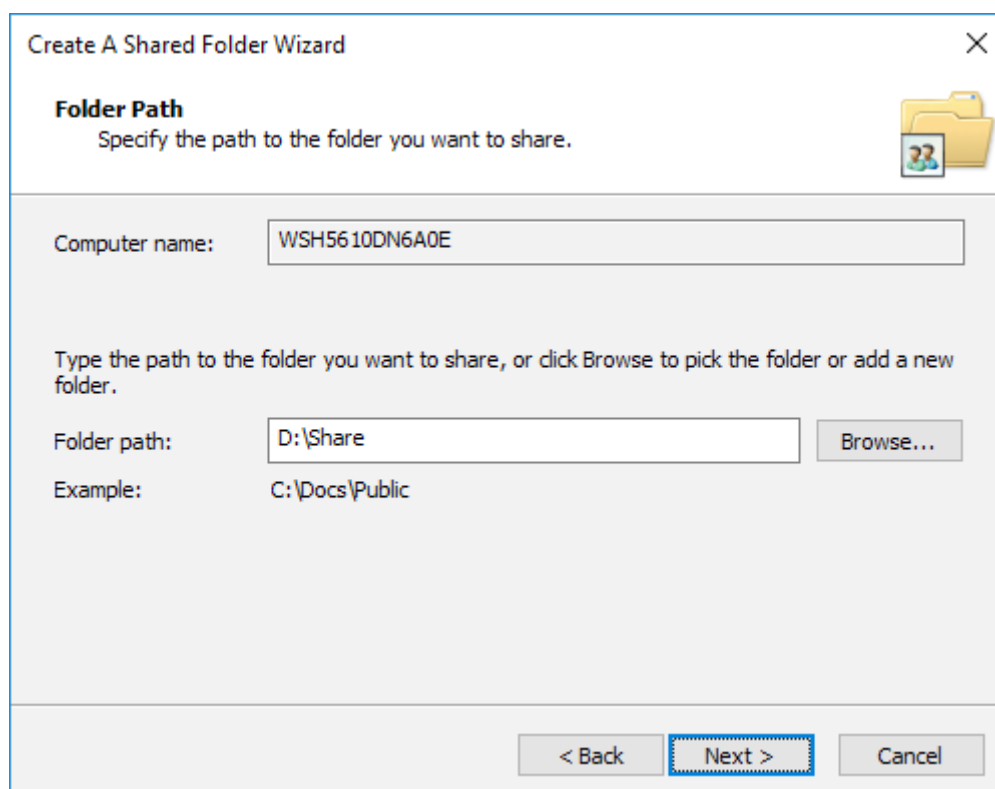
2 Click *Shared Folders*.

3 Right-click *Shares* and click *New Share*.



4 Click *Next*.

5 Enter the path of an existing folder or a new folder, then click *Next*.



Notes:

- Enter "D:\Share" into the folder path to create the shared folder for the first time.
- If the message "The system cannot find the specified path. Do you want to create it?" is displayed, click Yes.

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

The screenshot shows the 'Create A Shared Folder Wizard' dialog box. The title bar reads 'Create A Shared Folder Wizard' with a close button (X) on the right. Below the title bar, the section is titled 'Name, Description, and Settings' with a subtitle 'Specify how people see and use this share over the network.' and a folder icon with a person. The main area contains the following fields and controls:

- Share name: A text box containing 'Share'.
- Share path: A text box containing '\\WSH5610DN6A0E\Share'.
- Description: An empty text box.
- Offline setting: A dropdown menu showing 'Selected files and programs available offline' and a 'Change...' button.

At the bottom, there are three buttons: '< Back', 'Next >' (highlighted with a blue border), and 'Cancel'.

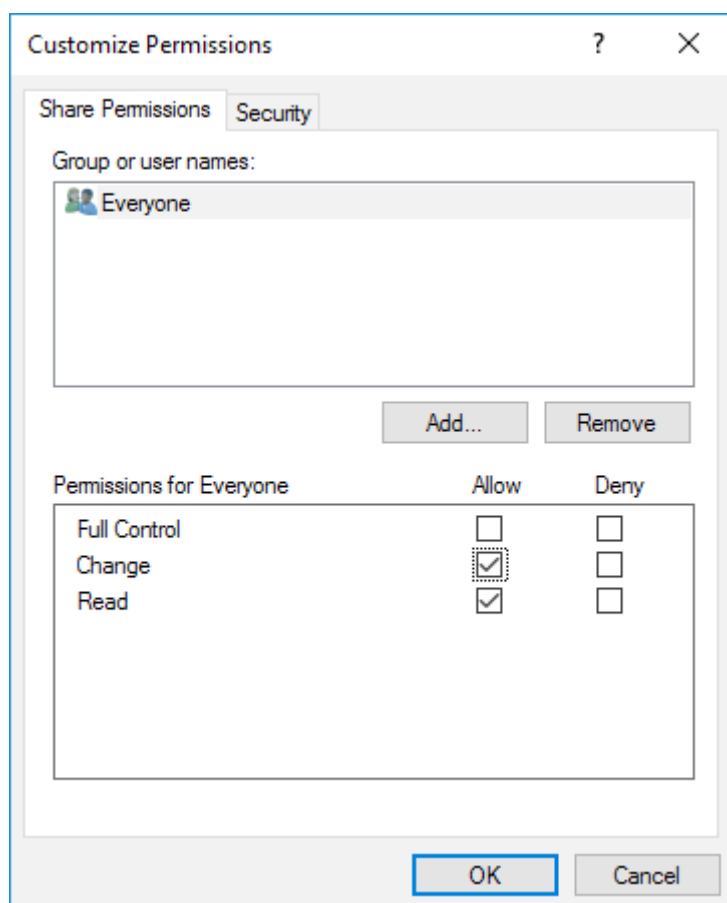
7 Select "Customize permissions", then click *Custom*.

The screenshot shows the 'Create A Shared Folder Wizard' dialog box. The title bar reads 'Create A Shared Folder Wizard' with a close button (X) on the right. Below the title bar, the section is titled 'Shared Folder Permissions' with a subtitle 'Permissions let you control who can see the folder and the level of access they have.' and a folder icon with a person. The main area contains the following elements:

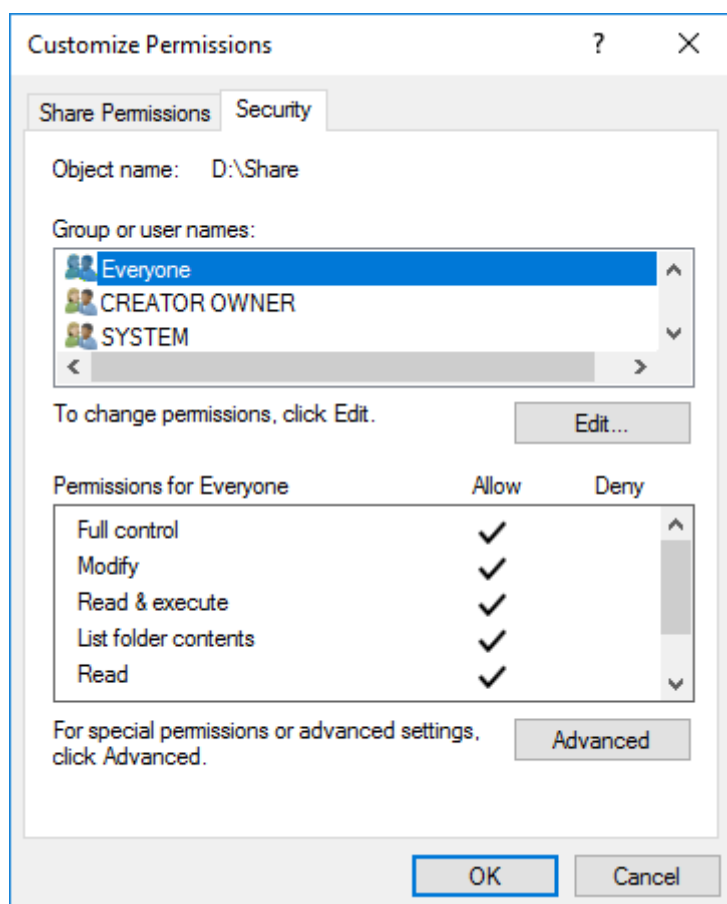
- Text: 'Set the kind of permissions you want for the shared folder.'
- Four radio button options:
 - All users have read-only access
 - Administrators have full access; other users have read-only access
 - Administrators have full access; other users have no access
 - Customize permissions
- A 'Custom...' button.
- Text: 'By default, only share permissions are set on this folder. To control local access permissions to this folder or objects within the folder, click Custom... and then modify the permissions on the Security tab to apply specific permissions on the folder.'

At the bottom, there are three buttons: '< Back', 'Finish' (highlighted with a blue border), and 'Cancel'.

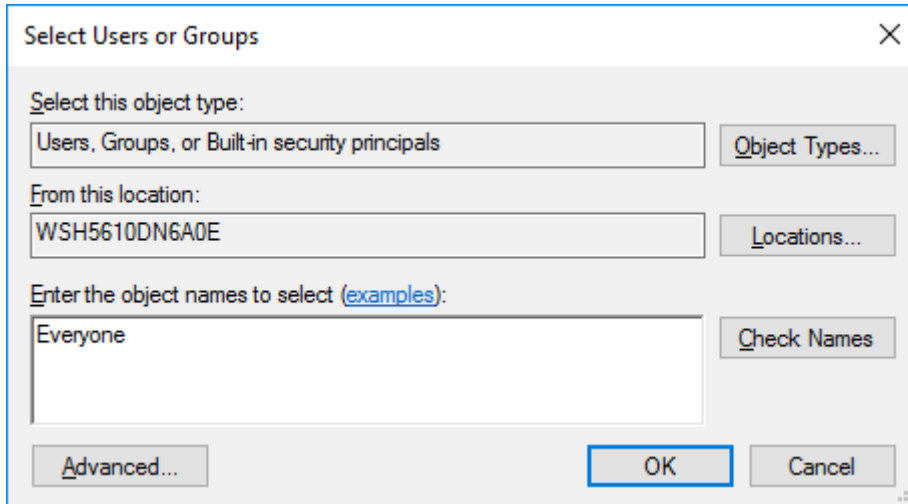
8 Choose *Everyone* and select the “Allow” checkbox for “Change”.



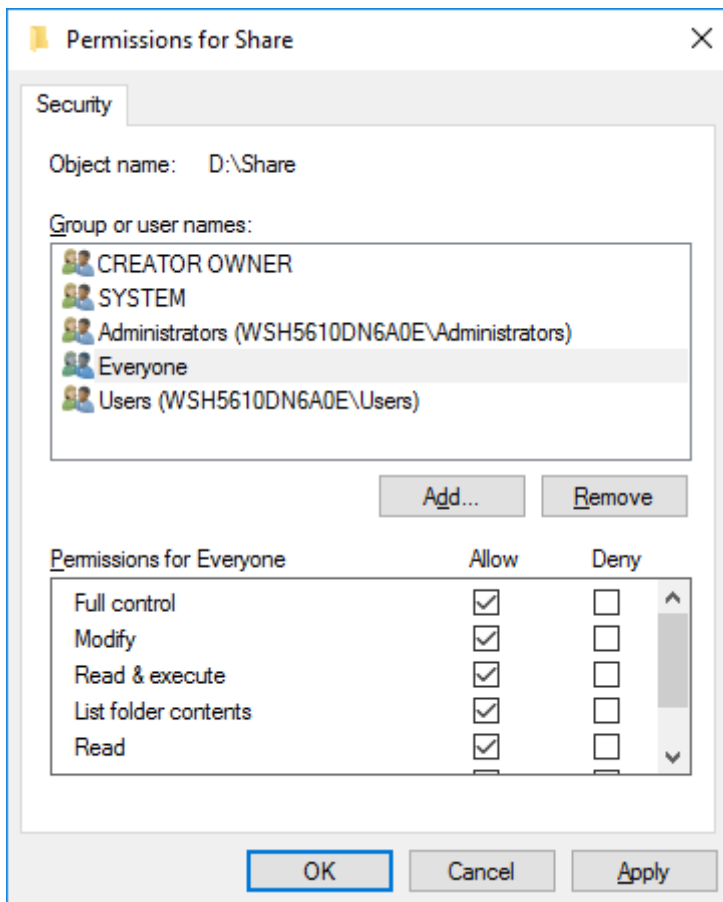
9 From the *Security* tab, click *Edit > Add*.



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



11 Choose "Everyone", then select the "Allow" checkbox for *Modify*.



12 Click *OK* > *OK* > *Finish* > *Finish*.

Notes:

Enable a guest account:

- (1) From Server Manager, click *Tools* > *Computer Management*.
- (2) Click *Local Users and Groups*.
- (3) Double-click *Users* > *Guest*.
- (4) From the *General* tab, clear the "Account is disabled" checkbox, then click *OK*.

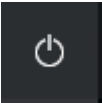
Enable access permissions:

- (1) From Server Manager, click *Tools > Computer Management*.
- (2) Click *Shared Folders*.
- (3) Double-click *Shares*, then double-click the desired shared folder.
- (4) From the *Security* tab, click *Edit*.
- (5) From the *Local Users and Groups* list, add the users or groups that will be allowed access (the groups and users must be created beforehand). To allow access for all users, add a guest and change Administrator's "Access Permission" to "Full Control".

Turning the TeraStation On and Off

Press the power button on the TeraStation to turn it on and off. Or you can turn off your TeraStation by following the procedure below.

- 1** Click the Start button.

- 2** Click the  icon, then *Shut down*.

- 3** Select the reason why you want to shut down, then click *Continue*.

When the power LED on the front of the TeraStation turns off, the shutdown process is complete.

Note: Always shut down the TeraStation before unplugging it. The TeraStation can be damaged if it is suddenly unplugged without being powered down first.

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 2 Preinstalled Software

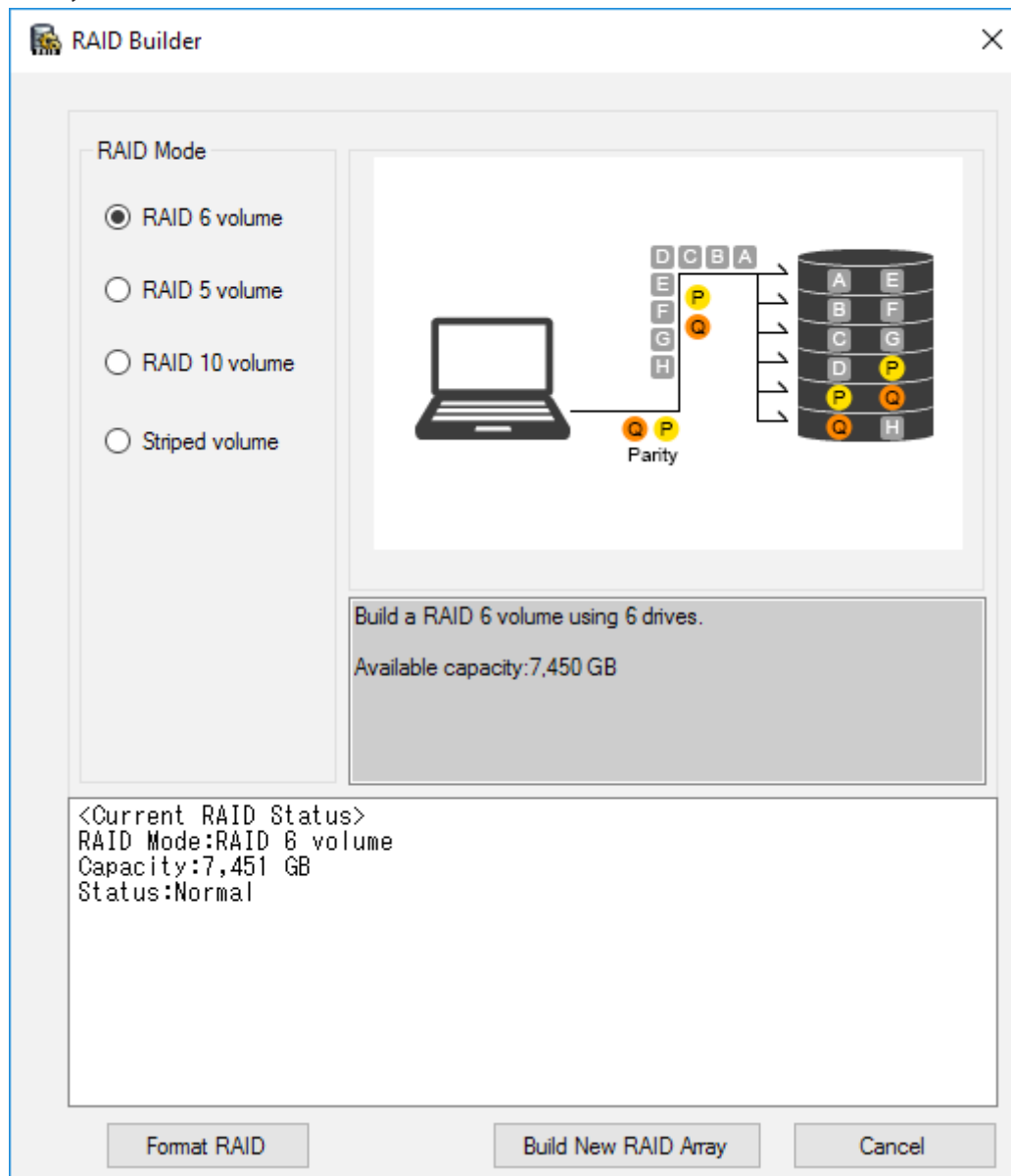
The following software is preinstalled on the TeraStation.

- RAID Builder
- Buffalo Dashboard
- Email Notification
- Buffalo Replication
- TeraStation Backup & Replication Folder Settings

RAID Builder


RAID Builder is used to create RAID volumes. See the “Storage Management” chapter for more details. To launch RAID Builder, you must be logged in as a member of the Administrators group in Windows Storage 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.

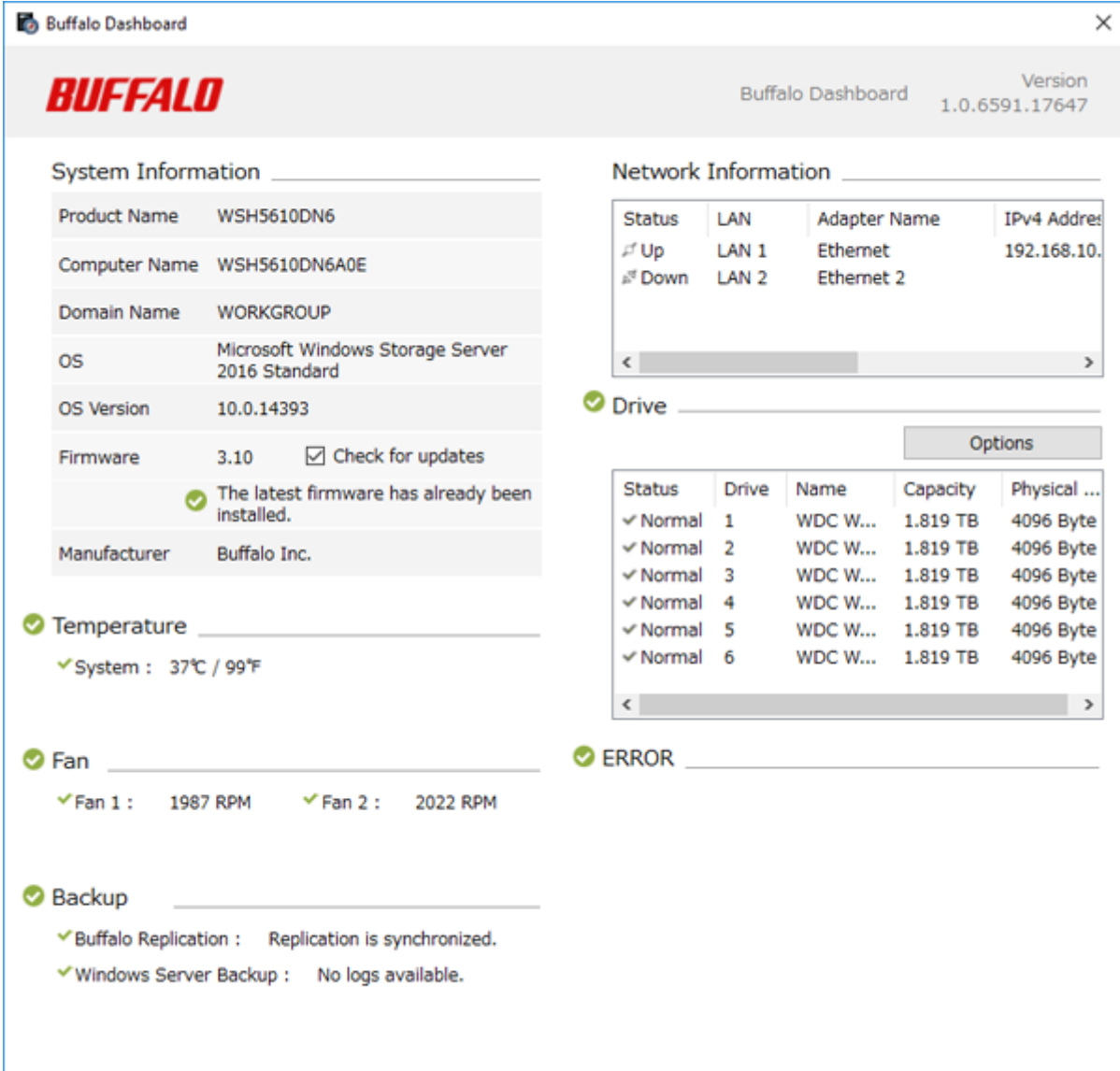


Buffalo Dashboard

Buffalo Dashboard displays system information and dismounts drives. To launch it, double-click the Buffalo

Dashboard icon  in 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.



The screenshot shows the Buffalo Dashboard interface. At the top left is the Buffalo logo. The title bar reads "Buffalo Dashboard" and the version is "1.0.6591.17647".

System Information:

- Product Name: WSH5610DN6
- Computer Name: WSH5610DN6A0E
- Domain Name: WORKGROUP
- OS: Microsoft Windows Storage Server 2016 Standard
- OS Version: 10.0.14393
- Firmware: 3.10 Check for updates. A green checkmark indicates: "The latest firmware has already been installed."
- Manufacturer: Buffalo Inc.

Temperature: System: 37°C / 99°F

Fan: Fan 1: 1987 RPM, Fan 2: 2022 RPM

Backup: Buffalo Replication: Replication is synchronized. Windows Server Backup: No logs available.

Network Information:

Status	LAN	Adapter Name	IPv4 Address
Up	LAN 1	Ethernet	192.168.10.
Down	LAN 2	Ethernet 2	

Drive:

Status	Drive	Name	Capacity	Physical ...
Normal	1	WDC W...	1.819 TB	4096 Byte
Normal	2	WDC W...	1.819 TB	4096 Byte
Normal	3	WDC W...	1.819 TB	4096 Byte
Normal	4	WDC W...	1.819 TB	4096 Byte
Normal	5	WDC W...	1.819 TB	4096 Byte
Normal	6	WDC W...	1.819 TB	4096 Byte

ERROR: (Section header with a green checkmark, but no error details are visible)

Items	Descriptions
System Information	<p>Product Name: Displays the model name of the TeraStation.</p> <p>Computer Name: Displays the hostname of the TeraStation.</p> <p>Domain Name: Displays the type of domain that the TeraStation is a member of.</p> <p>OS: Displays the type of Windows installed on the TeraStation.</p> <p>OS Version: Displays the version of the OS.</p> <p>Firmware: Displays the firmware version of the TeraStation.</p> <p>Check for updates: Enables or disables checking for new firmware releases. When a new firmware version is available, you will be notified here.</p> <p>Manufacturer: Displays "Buffalo Inc."</p>
Temperature	Displays the temperature of the system.
Fan	Displays the fan rpm.

Items	Descriptions
Backup	Displays the status of backup and replication.
Network Information	Displays IP addresses, subnet masks, default gateways, LAN port numbers, link speed, and status.
Drive	Displays the status, drive numbers, names, capacity, and physical sector sizes of each drive. Options: Shut down the TeraStation when the temperature of the drive becomes abnormally high: The TeraStation will automatically shut down if the drive gets too hot.
ERROR	Displays error or information codes. For more detail information, refer to the “Errors and Statuses on Buffalo Dashboard” section below.

Note: “Options” and “Check for updates” functionalities are only available when logged in as an administrator.

Errors and Statuses on Buffalo Dashboard

Note: The “x” in the message is a number of drive or assigned drive letter where an error or information event occurs.

Message	Description	Corrective Action
SYSTEM Error E11 Fan Failure	An error occurred in the fan 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, air duster, or other tools to remove them. If the error is displayed again, contact Buffalo technical support for assistance.
SYSTEM Error E12 Cooling Failure	A rise in the system temperature may have exceeded the allowable safety value.	Do not place objects in the area around the TeraStation. Also, move the TeraStation to a cool location. Make sure that the TeraStation’s fan is working normally.
HDx Error E16 HDx Not Found	Unable to find the drive.	The drive may be disconnected or may have failed.
HDx Broken E30 Replace the DISK	An error occurred, so the drive was removed from the volume.	Replace the drive.
SYSTEM I10 TOO HOT !	A rise in 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.
Operation I12 DEGRADE MODE	Operating in degraded mode.	Check the drive where the error occurred and replace it with a new drive. For the replacement method, refer to chapter 6, “Drive Replacement”.
RAID I18 x Drive Rebuilding	Resynchronizing the volume. Note: Transfer speeds are slower during the resynchronizing process.	Wait until resynchronization finishes. It will take about 8–12 hours per terabyte for a RAID 5 volume and 3–6 hours per terabyte for a mirrored volume. This message will disappear when resynchronization finishes.
Replication I33 Replicate Failure	An error occurred during replication.	From Buffalo Replication, click <i>Sync</i> to execute resynchronization. If the error is displayed again, contact Buffalo technical support for assistance.
New Firmware I52 Available	A new firmware version has been released.	Update the firmware.

Message	Description	Corrective Action
I54 Backup 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, the network, and the backup source and destination. Also, check the backup log to see if any errors were recorded.

Email Notification

Your TeraStation can send you email reports when settings are changed or an error occurs. See the “Enabling Email Notification” section in chapter 5 for more details.

To launch Email Notification, you must be logged in as a member of the Administrators group in Windows Storage 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.

Email Notification

Enable email notification

Send to

Email Address

New Edit Delete

Authentication

SMTP Server Address: Port Number:

User Authentication Method:

POP Server Address: Port Number:

Username: Password:

SSL/TLS:

Accept untrusted or self-signed certificates

Email Settings

Sender Address:

Title:

Content Options

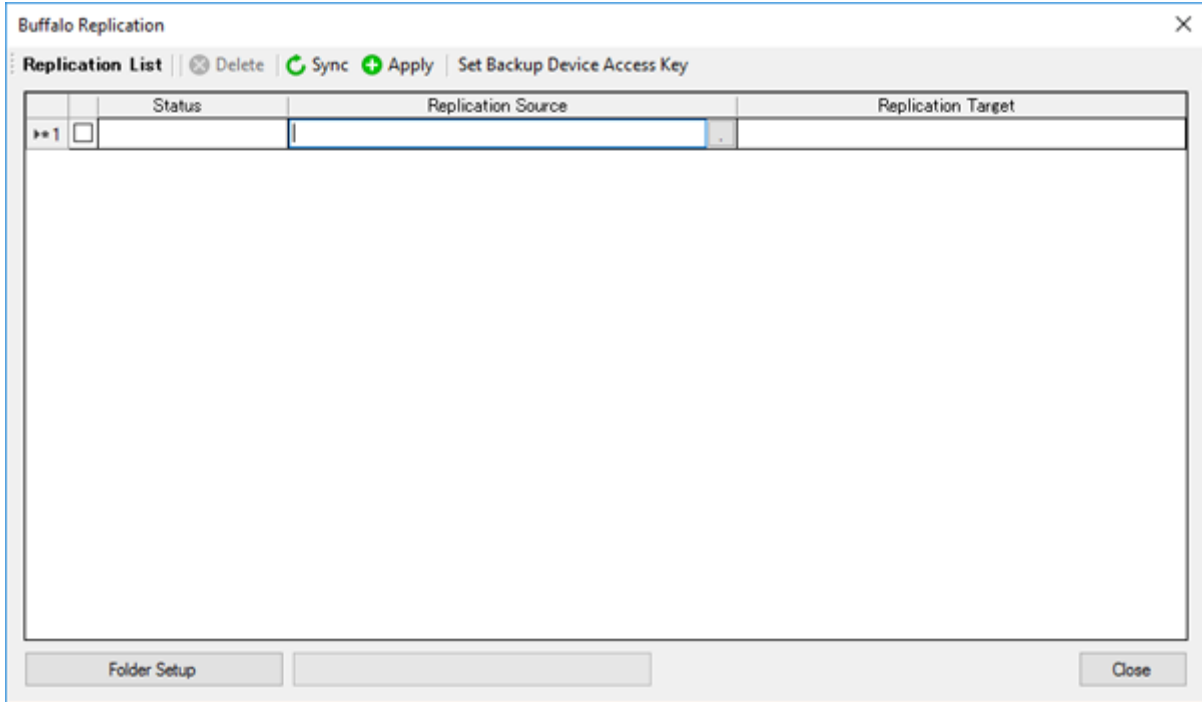
Test Message OK Cancel Apply

Buffalo Replication

Your TeraStation can be synchronized with another TeraStation, replicating most data. See the “Configuring Replication” section in chapter 4 for more details.

To launch Buffalo Replication, you must be logged in as a member of the Administrators group in Windows Storage 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.

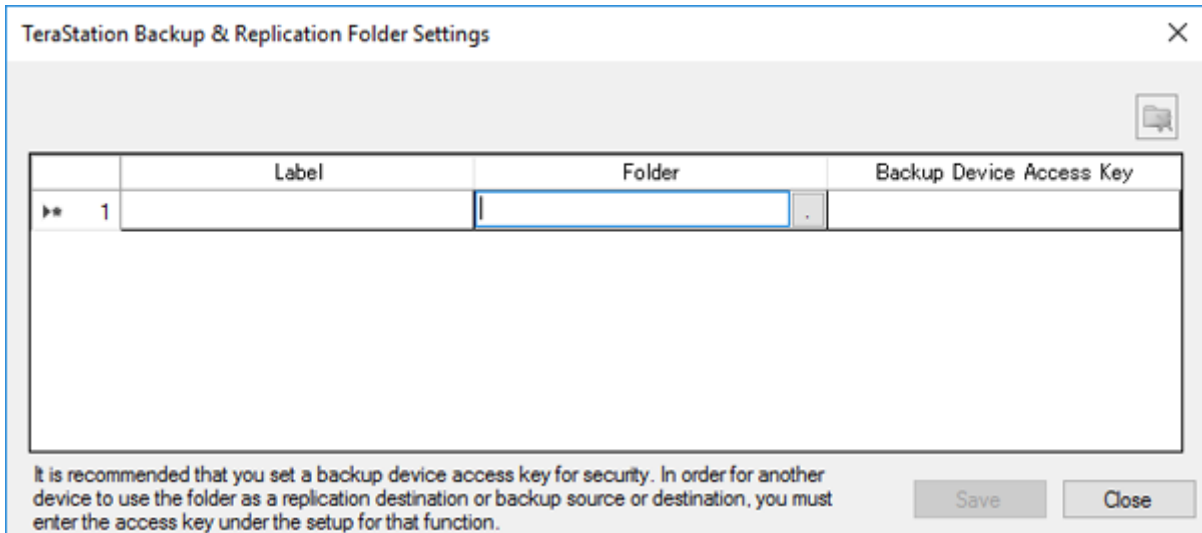



TeraStation Backup & Replication Folder Settings

Before using it as a backup device on the network, configure your TeraStation in “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 Storage 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.



Items	Descriptions
Label	Enter a name for the backup or replication destination. When you search for backup devices on the network, this name will appear.
Folder	Specify a shared folder where backup data will be stored. Do not select the root directory where the shared folder is created.
Backup Device Access Key	<p>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.</p> <p>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.</p>
	To remove a folder from the list of available backup targets, select the folder and click this button.
Save	Saves the settings.
Close	Exits TeraStation Backup & Replication Folder Settings.

Chapter 3 Storage Management

Working with Volumes

Notice When Creating Volumes

- To create a volume, use RAID Builder instead of the Disk Management option in Windows Storage 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 data) to its former state prior to the drive failure. It doesn’t refer to reading data from a failed drive.

Volume Types

RAID 6 Volumes

RAID 6 distributes two parity blocks when writing data. The usable space is equal to the sum of the capacity of four drives. If two drives in a RAID 6 volume fail, data on the volume can be recovered after the failed drives are replaced. However, if three or more drives fail, all data is lost.

RAID 5 Volumes

RAID 5 distributes a parity block when writing data. The usable space is equal to the sum of the capacity of the five drives. If one drive in a RAID 5 volume fails, data on the volume can be recovered after the failed drive is replaced. However, if two or more drives fail, all data is lost.

RAID 10 Volumes

Mirrored pairs of drives in RAID 1 volumes are combined into a RAID 0 volume. The usable space is equal to the capacity of three drives. The same data is written to multiple drives so that if one drive from either or both RAID 1 volume fails, data on the volume can be recovered after the failed drives are replaced. However, if two drives on the same RAID 1 volume or three drives in total fail, all data is lost.

Striped Volumes

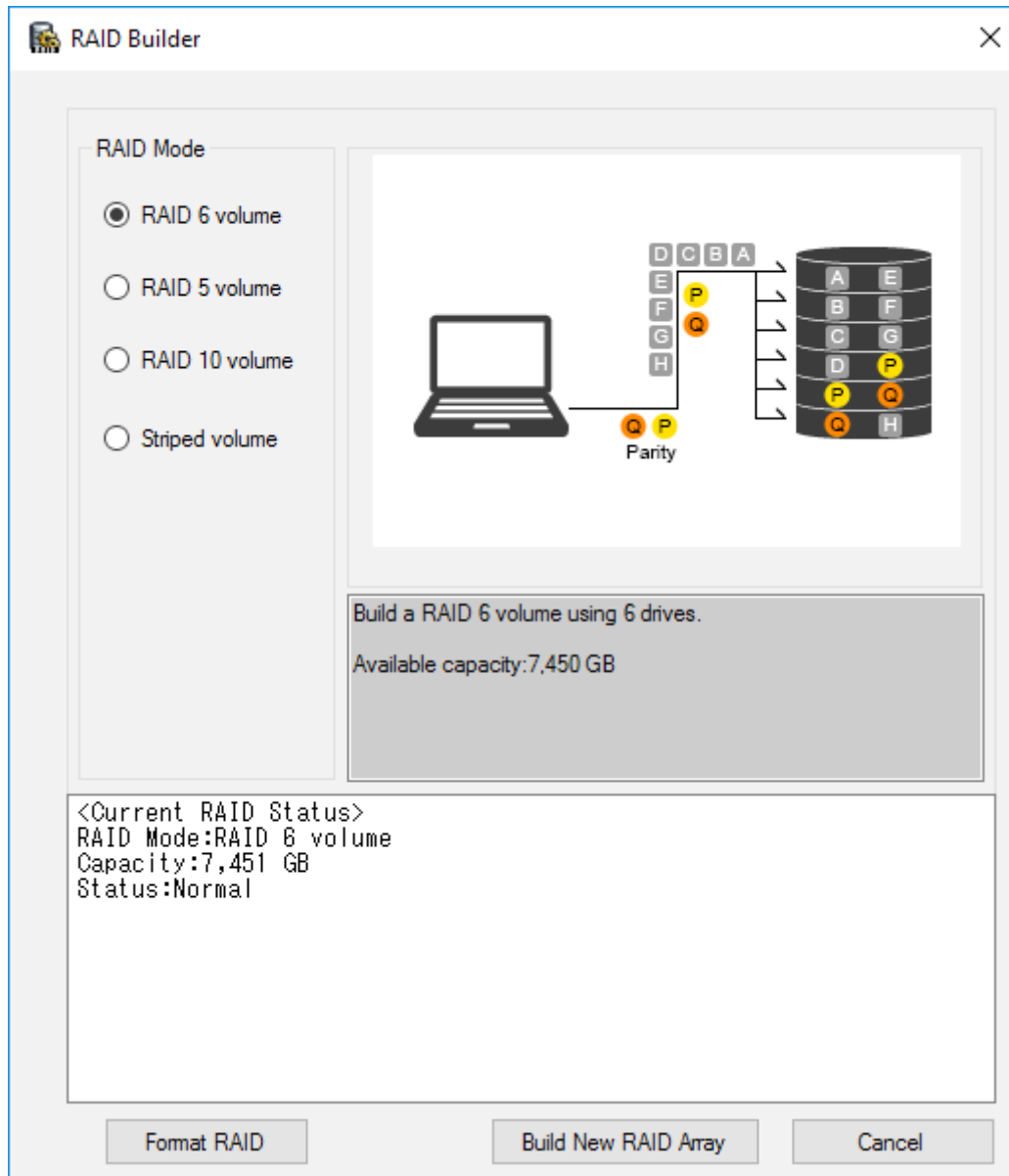
RAID 0 stripes data across the multiple drives, but lacks parity blocks like RAID 5 or RAID 6. The usable space is equal to the capacity of all drives on the TeraStation. RAID 0 doesn’t have any redundancy so data cannot be recovered if even a single drive fails.

Creating a Volume

To create a volume, follow the procedure below. Successfully following the procedure will erase all data stored on the volumes.

- 1** Click the Start button and click *RAID Builder*.

2 Select the desired volume type under “RAID Mode” and click *Build New RAID Array*.



3 Click *OK* when a warning message is displayed.

4 Click *OK* again. Creating the volume will begin. The TeraStation will shut down automatically after about a minute.

5 When the power LED is distinguished, press the power button on the TeraStation to turn it on.

6 Connect Windows Storage Server via the remote desktop.

7 Click the Start button and click *RAID Builder*.

8 Click *Format RAID* and click *OK*.

After creating the volume is completed, refer to chapter 1 to create a shared folder.

Notes:

- If the I18 message is displayed under “ERROR” on Buffalo Dashboard, the volume has not been created yet. Wait until the message disappears and try from the step 7 again.
- You can also format the volume using the “Format RAID” button on RAID Builder.

Chapter 4 Backup and Replication

Data stored in the TeraStation may be lost through drive failure or wrong operation. To avoid losing data accidentally, back up your data regularly.

You can back up data using the following functions:

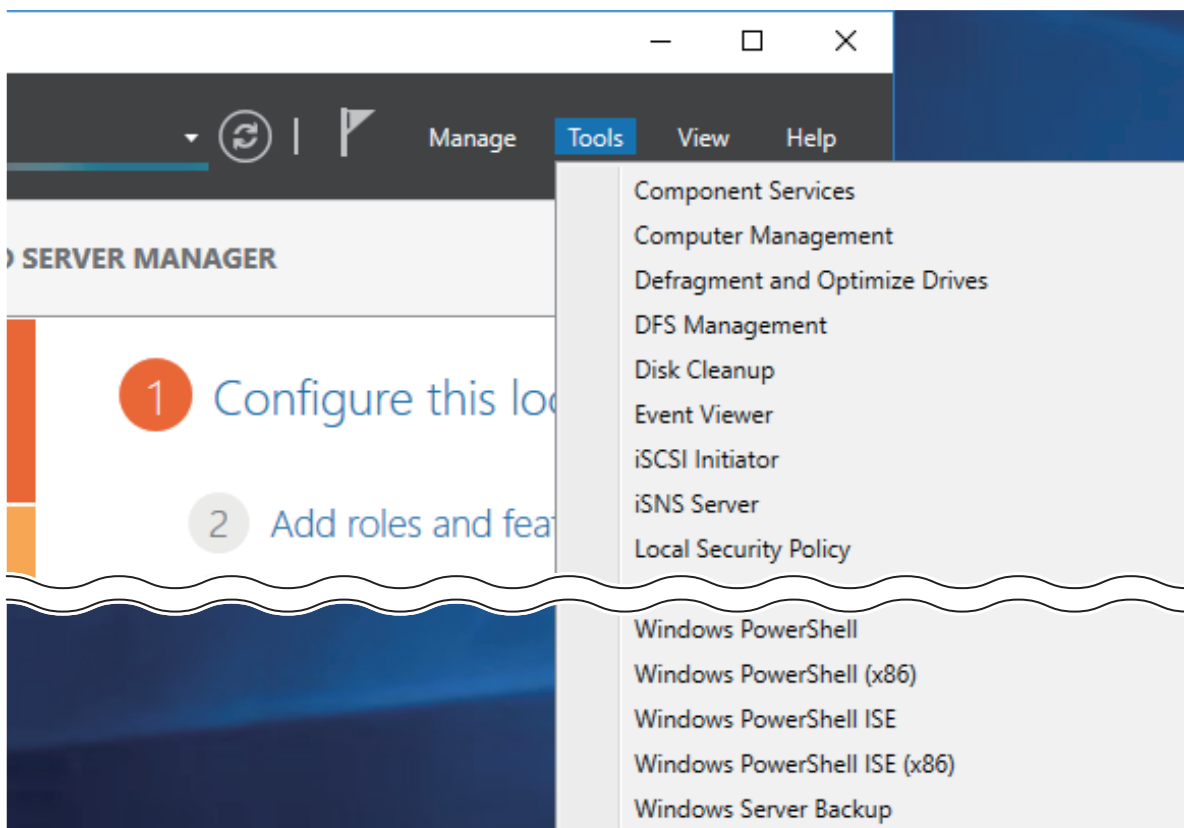
- Windows Server Backup
- Buffalo Replication
- DFS Replication

Backing Up in Windows Storage Server

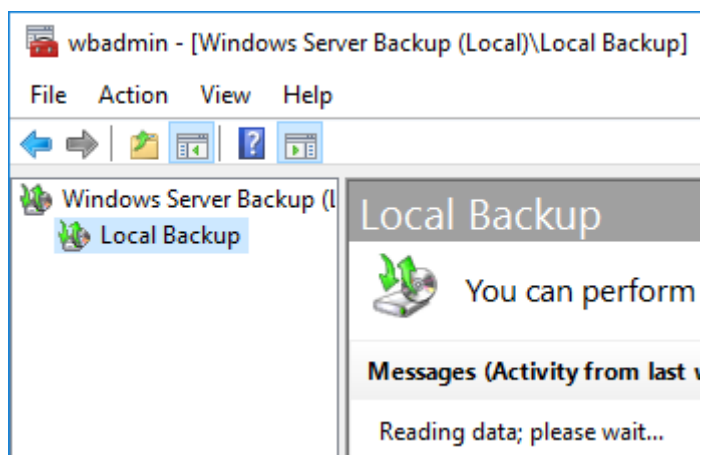
Preparing a Backup Destination

Follow the procedure below to set your backup schedule.

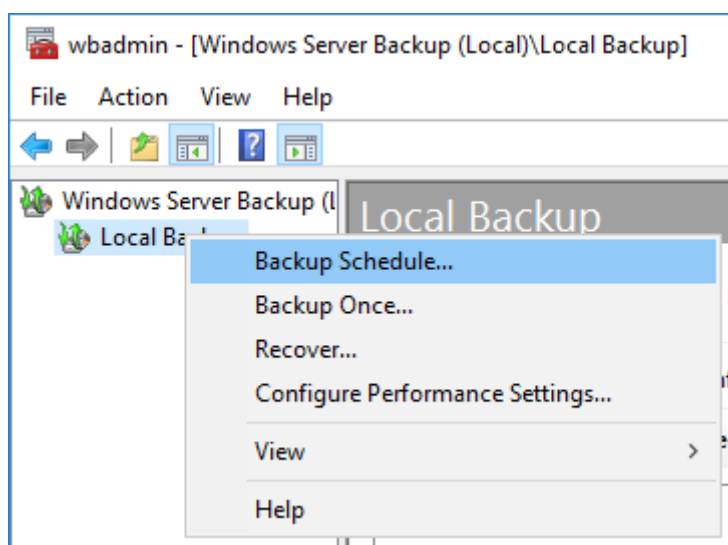
- 1 From Server Manager, click *Tools > Windows Server Backup*. The “Windows Server Backup” wizard will start.



2 Click *Local Backup*. If “Reading data; please wait...” is displayed, please wait until any messages disappear.

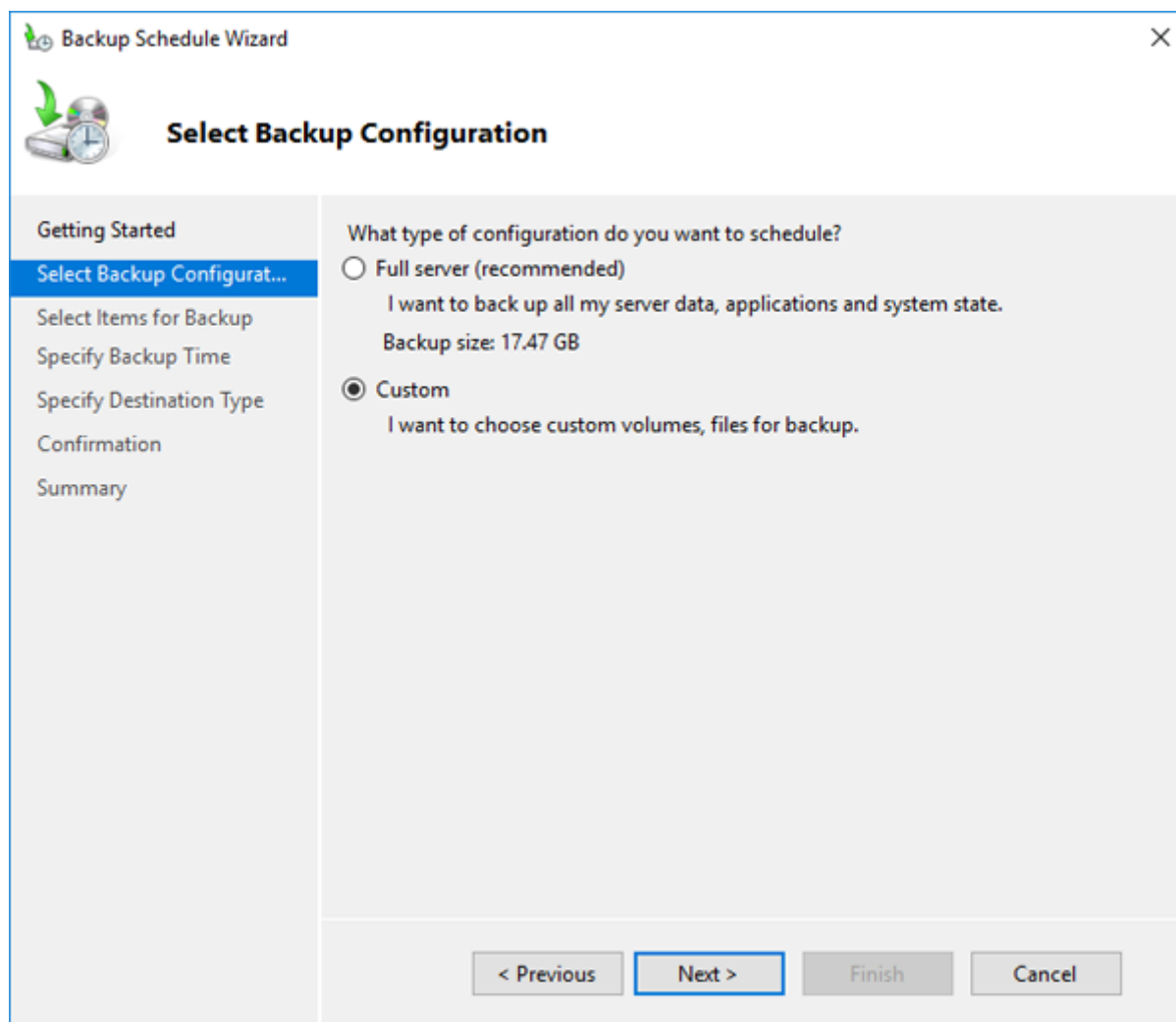


3 Right-click on “Local Backup” and select *Backup Schedule....* The “Backup Schedule Wizard” will start.



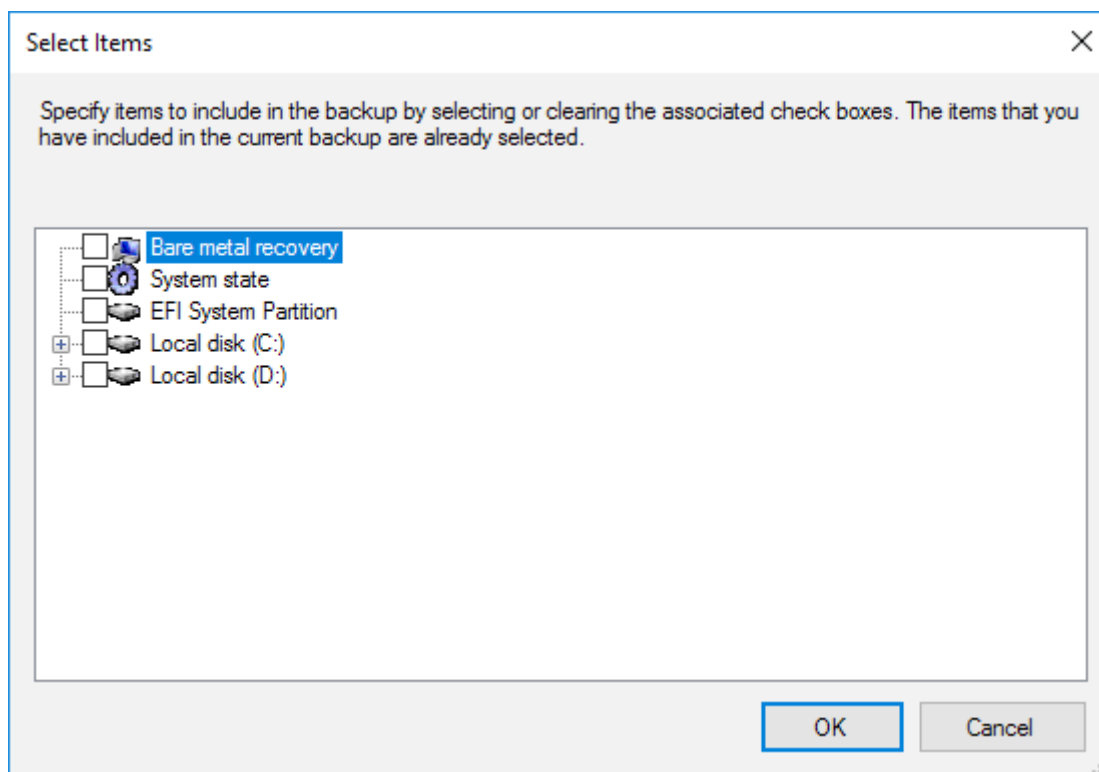
4 Click *Next*.

5 Select "Custom" and click Next.



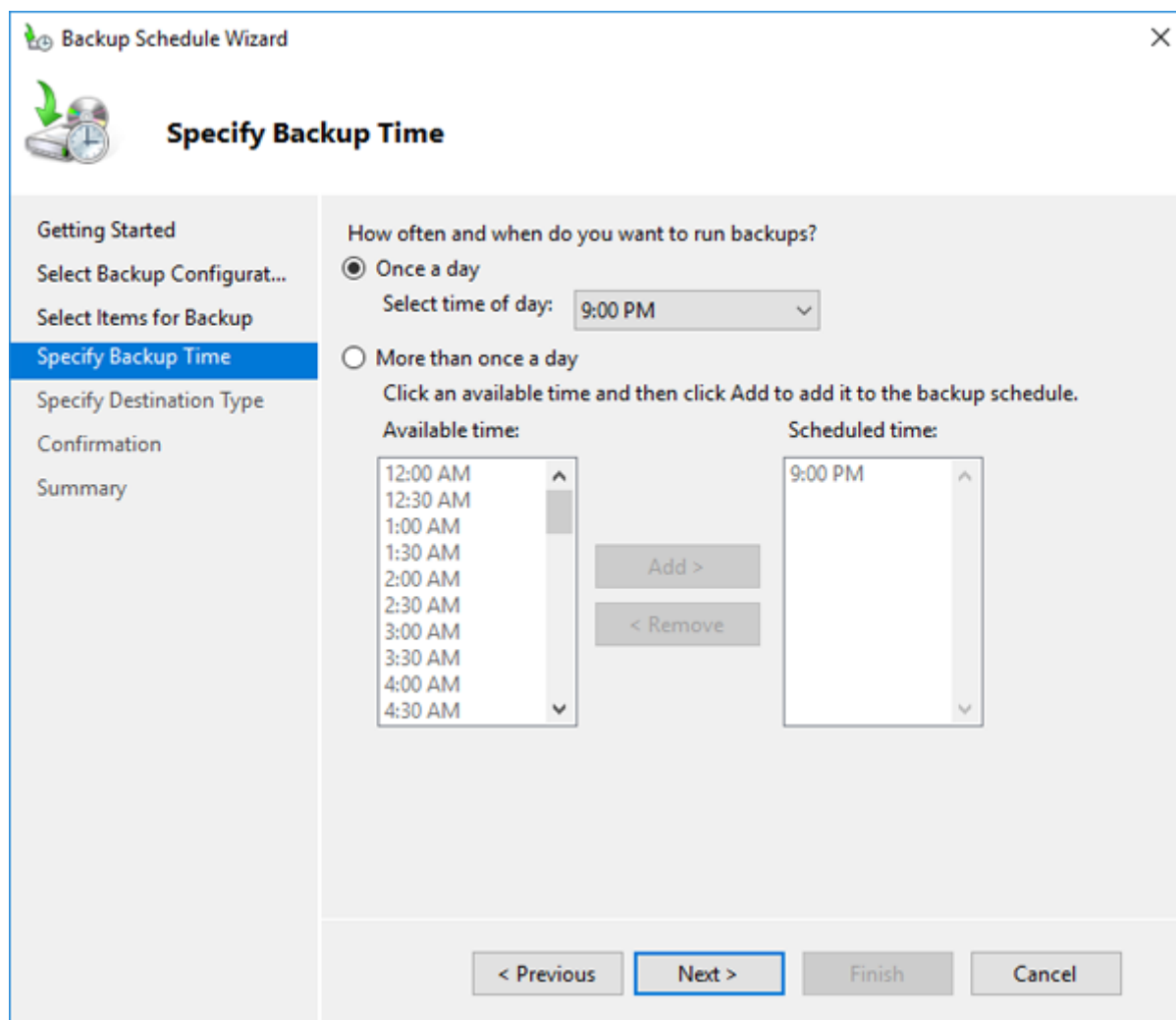
6 Click *Add Items*.

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

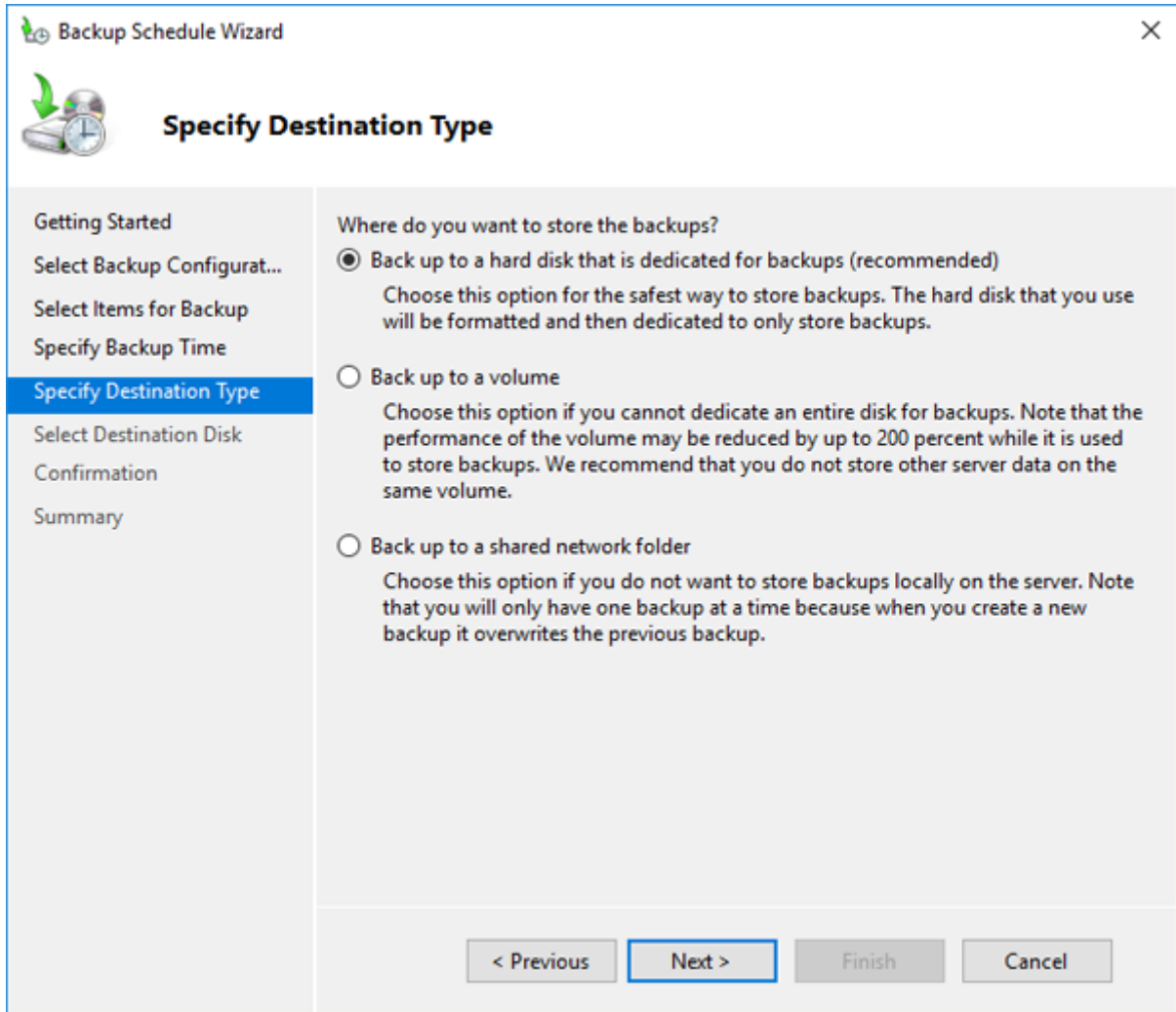


8 Click *Next*.

9 Specify the schedule to run the backup and click *Next*.



10 Select the backup destination and click *Next*.



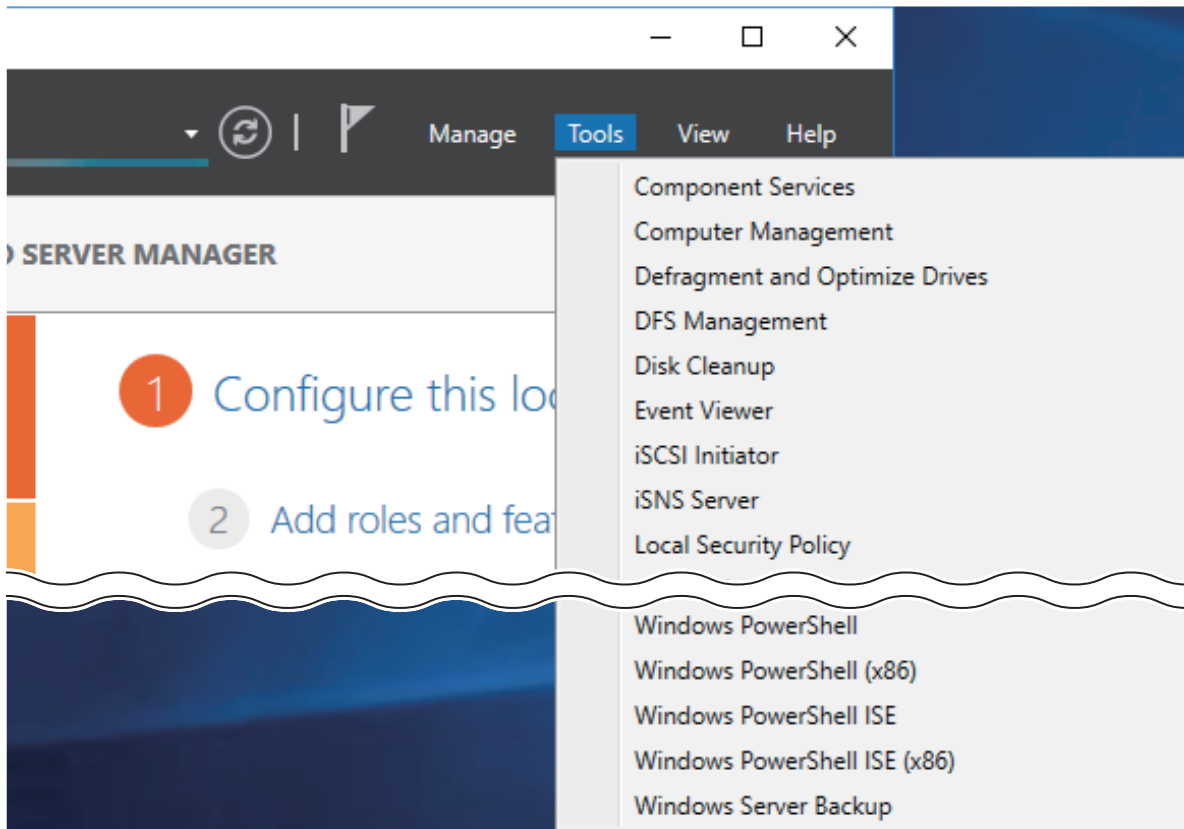
11 Step through the wizard to finish.

Recovering Backup Data

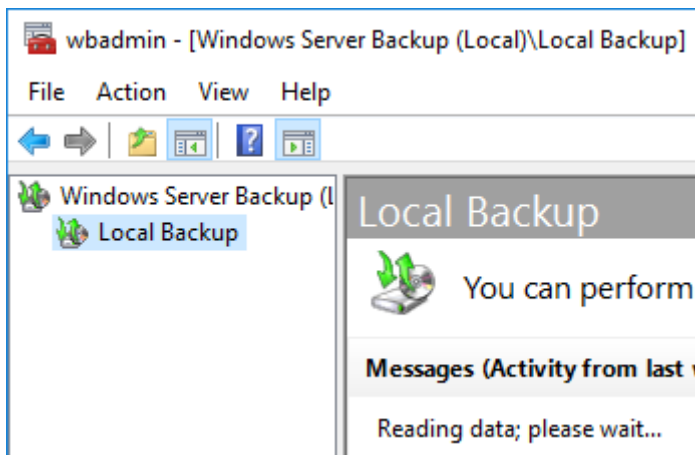
Follow the procedure below to recover the backup data to the TeraStation.

Note: Bare-metal recovery is not supported for the backup data stored using the backup function of Windows Storage Server.

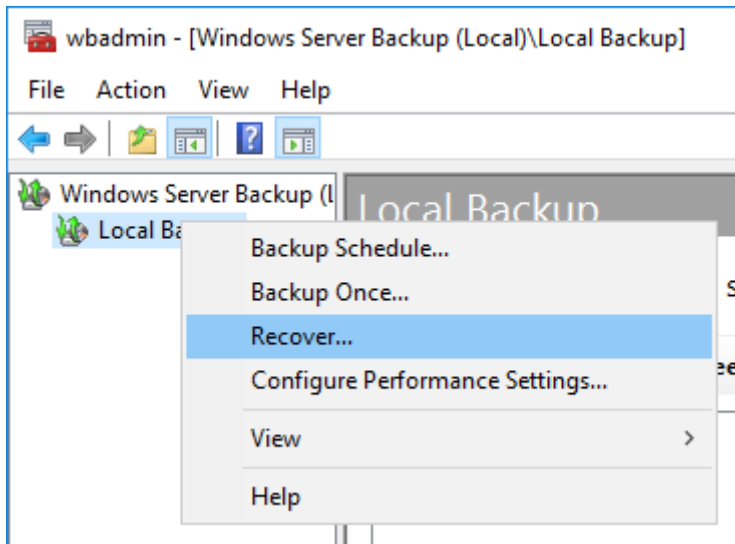
1 From Server Manager, click *Tools > Windows Server Backup*. The “Windows Server Backup” wizard will start.



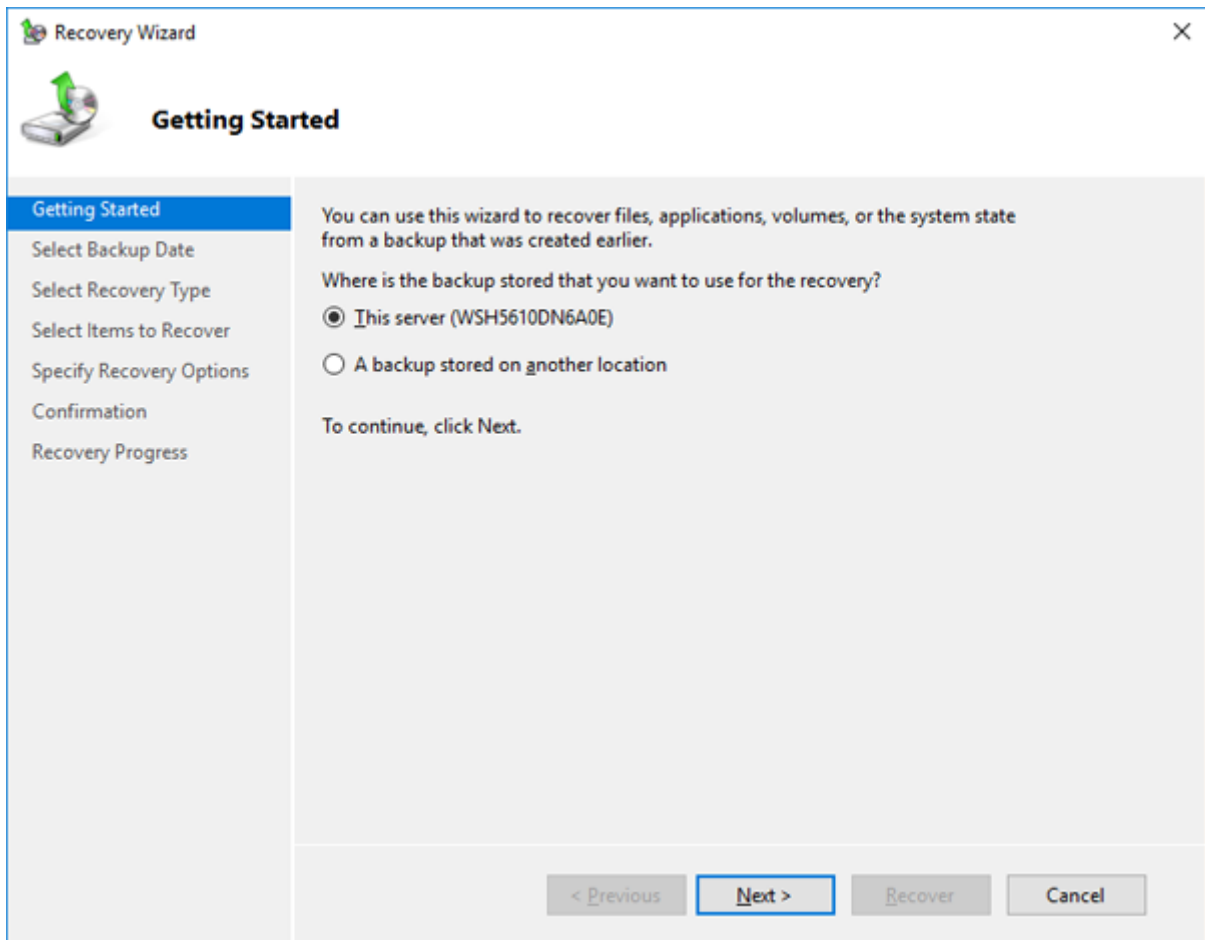
2 Click *Local Backup*. If “Reading data; please wait...” is displayed, please wait until any messages disappear.



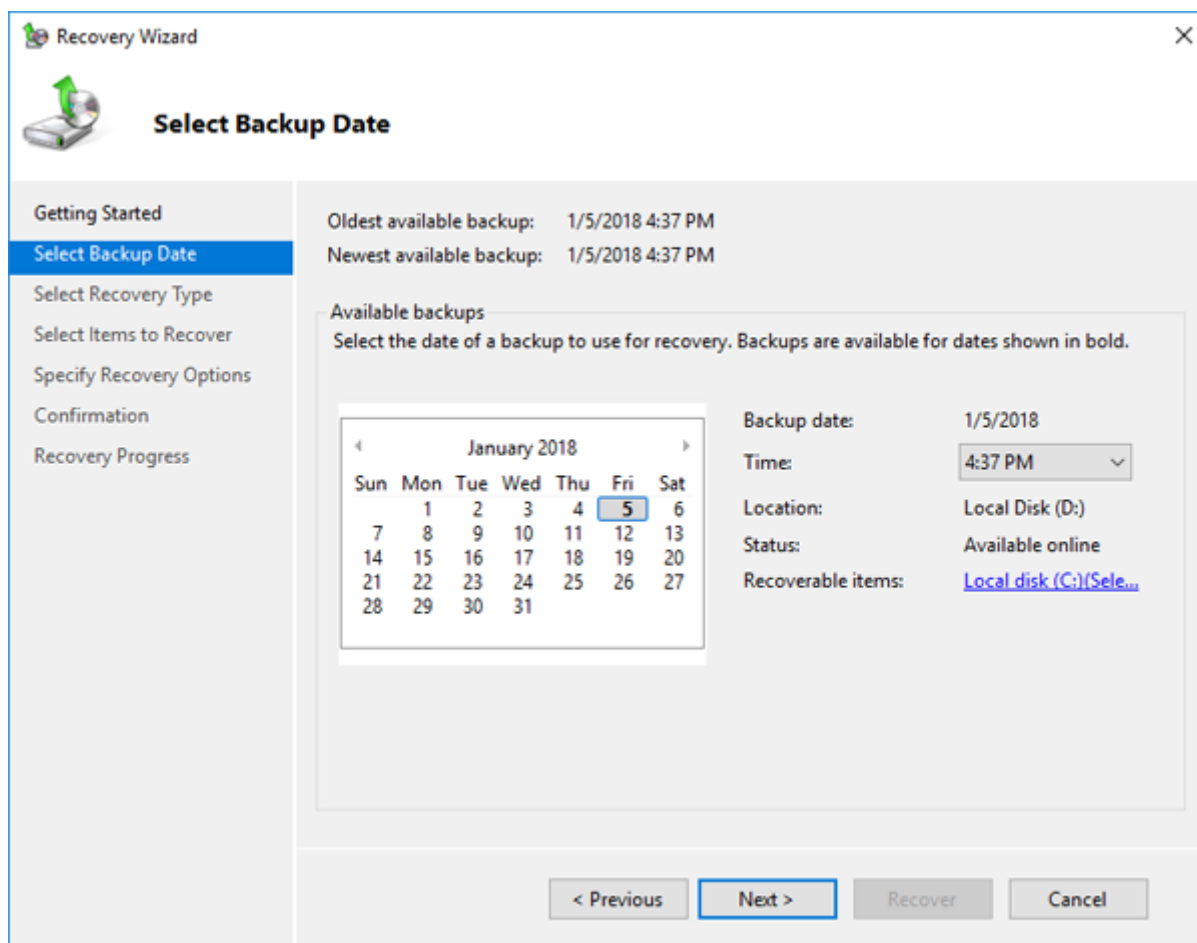
3 Right-click on "Local Backup" and click *Recover...*. The recovery wizard will start.



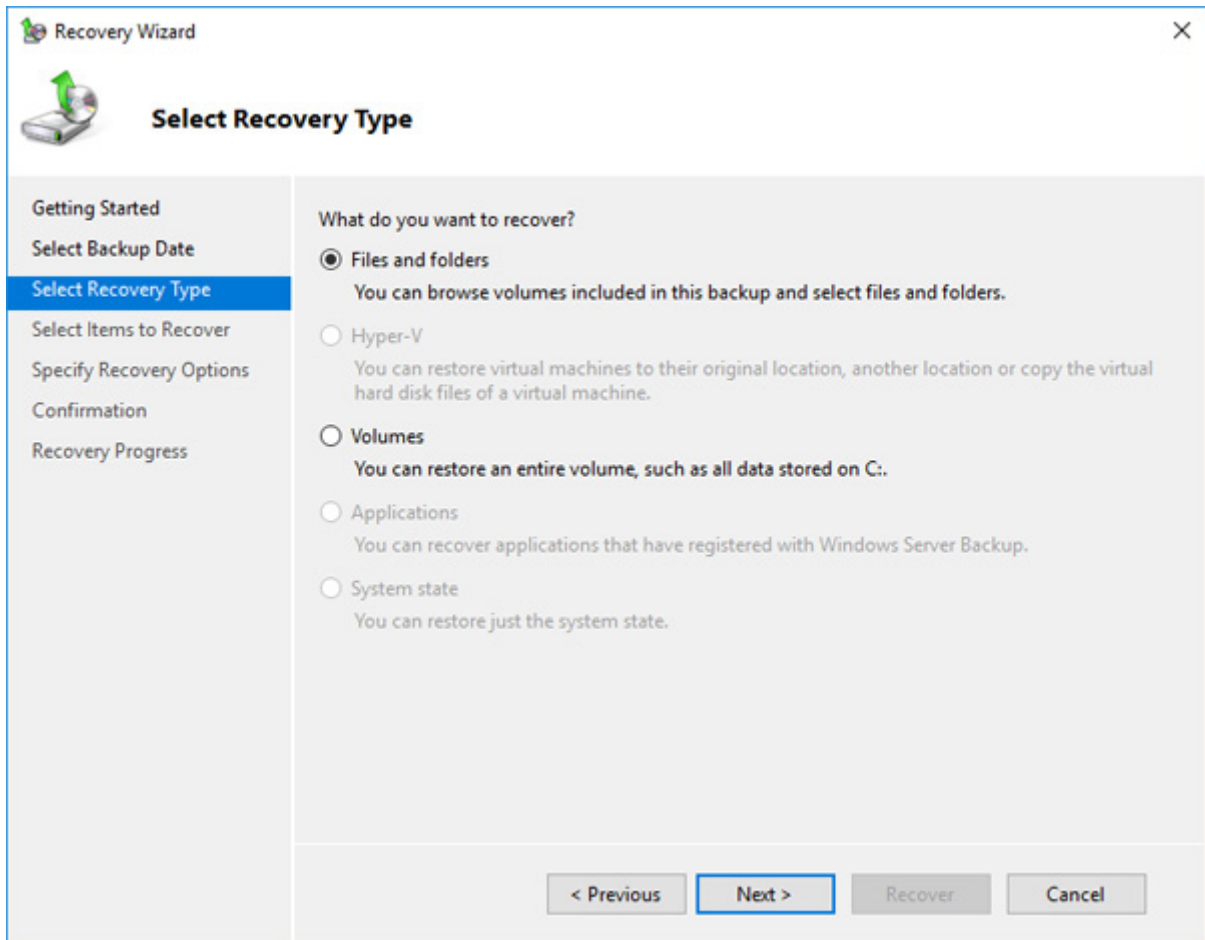
4 Select where the backup data is saved and click *Next*. When "A backup stored on another location" is selected, specify the folder of the backup data in the next page.



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



6 Select the recovery targets and click *Next*.



7 Step through the wizard to finish.

Configuring Replication

Replication copies all data from a share to a share on a different TeraStation. This is an easy way to configure 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 and follow the steps below.

Note: The replication operation may not proceed properly if a large number of files or a large capacity file have been replicated continually for a long time, causing too large of a data load. Before starting replication, check if there are any possible pauses for operational issues.

Differences Between Buffalo Replication and DFS Replication

Buffalo Replication

- One-way replication (from the TeraStation to another device)
- Another Buffalo NAS devices can easily be configured for the replication destinations.

DFS Replication

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

If your environment must join the Active Directory domain, use DFS Replication. If joining the Active Directory is not required, or if a TeraStation or LinkStation 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 network is recommended.
- Up to five replication tasks can be created.
- Filenames and file paths that will be copied by replication should be within 170 characters. Files with filenames that are longer than 170 characters may not be copied correctly.

Buffalo Replication

If using Buffalo Windows Storage Server-installed TeraStations as both the replication source and destination, start from step 1. If using a different TeraStation as the replication destination, refer to that TeraStation's user manual to configure it as a replication destination. After you finish configuring on the TeraStation's Settings, go to step 3.

1 Click *TeraStation Backup & Replication Folder Settings* in the Start menu on the replication destination TeraStation's Windows Storage Server.

2 Click the blank space under "Label" and enter a label for the folder. Click under "Folder" and select the folder as a replication destination. Enter the desired characters for a backup device access key and click *Save* when finished.

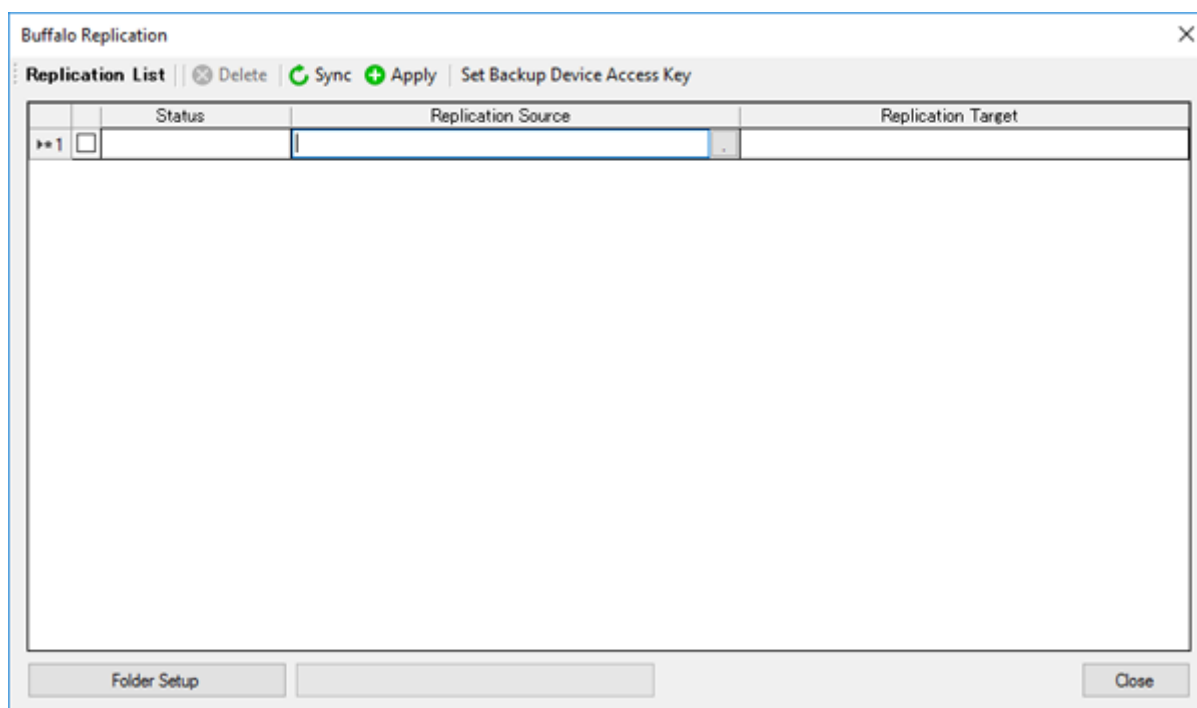
	Label	Folder	Backup Device Access Key
▶▶ 1		<input type="button" value="."/>	

It is recommended that you set a backup device access key for security. In order for another device to use the folder as a replication destination or backup source or destination, you must enter the access key under the setup for that function.

Save Close

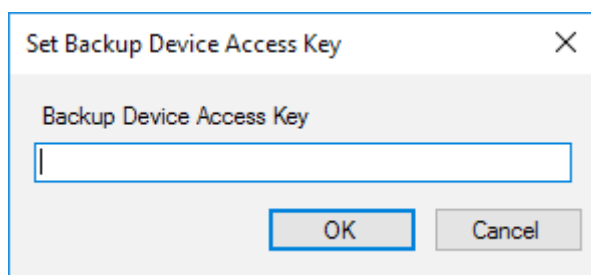
3 Click *Buffalo Replication* in the Start menu on the replication source TeraStation's Windows Storage Server.

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



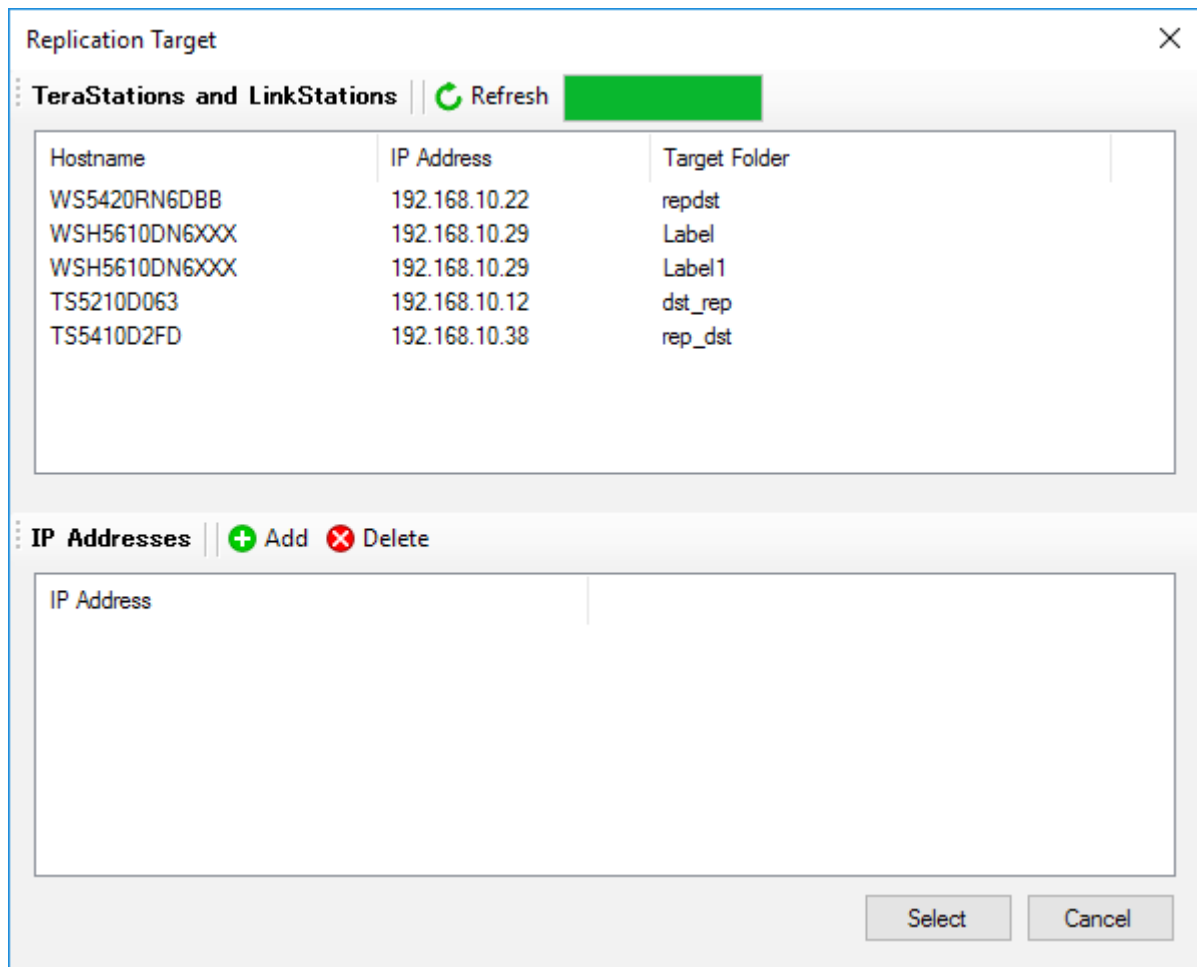
- 5 If you had configured a backup device access key to the replication destination folder, click *Set Backup Device Access Key*. If you didn't, skip to step 7.

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

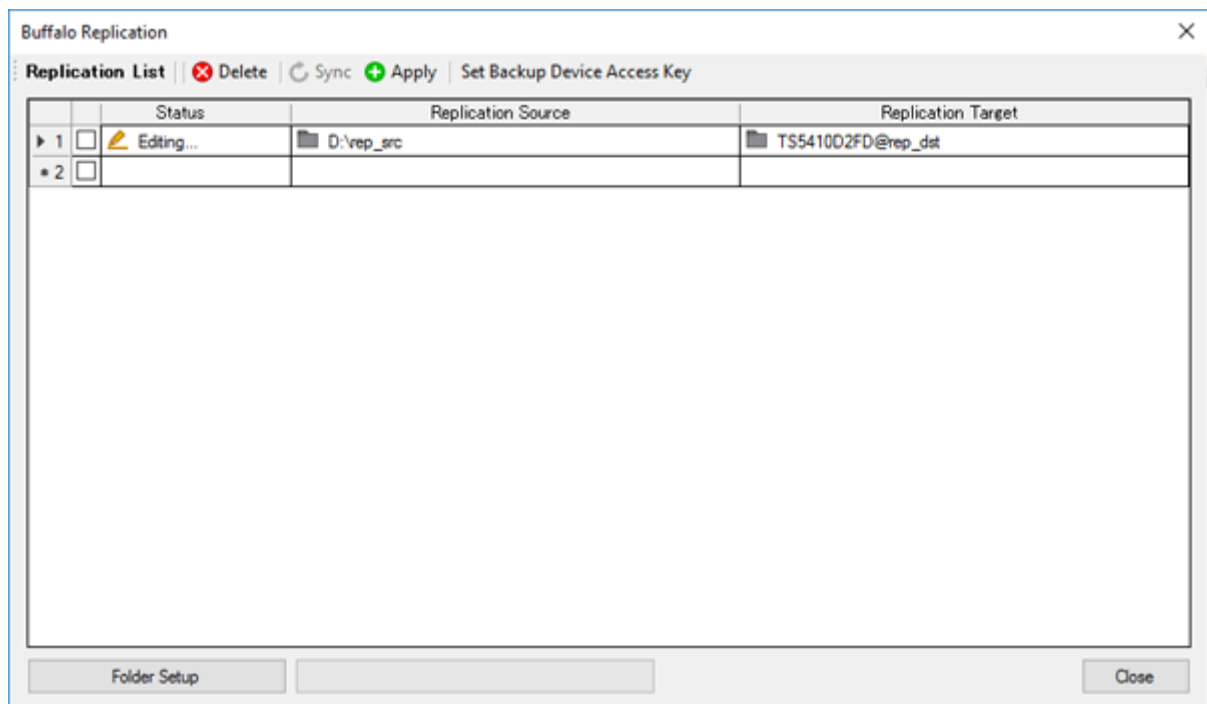


- 7 Click the blank space under “Replication Target” and select the folder, then click *Select* from a folder list. If no shared folders appear, click *Refresh* and try again.

To configure folders on the 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.



8 When finished configuring, click *Apply*.



9 Click *OK*. The task will start a differential overwrite from the replication source data to the replication destination. The task 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 task and click *Delete*.
- The Ethernet port number to use for replication cannot be specified in the replication task.
- 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 Replication Tasks Are Created

If the network settings are changed after replication tasks are created, the TeraStation cannot communicate with the replication destination TeraStation and replication may fail. For example, 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 TeraStations and LinkStations as follows.

- 1** Click *Buffalo Replication* in the Start menu on Windows Storage Server.
- 2** Click *Refresh* and refresh the detected TeraStations and LinkStations list.
- 3** When the TeraStation that the network settings were changed is displayed in the refreshed list, close the window and click *Sync*.

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 Storage Server.

This section uses the following environment parameters as an example:

Replication Source: "WSH5610DN6A0E"

Replication Destination: "Server-A"

Namespace Server: "WSH5610DN6A0E"

Namespace Name: "Public2"

Namespace Folder: "buffalo-share"

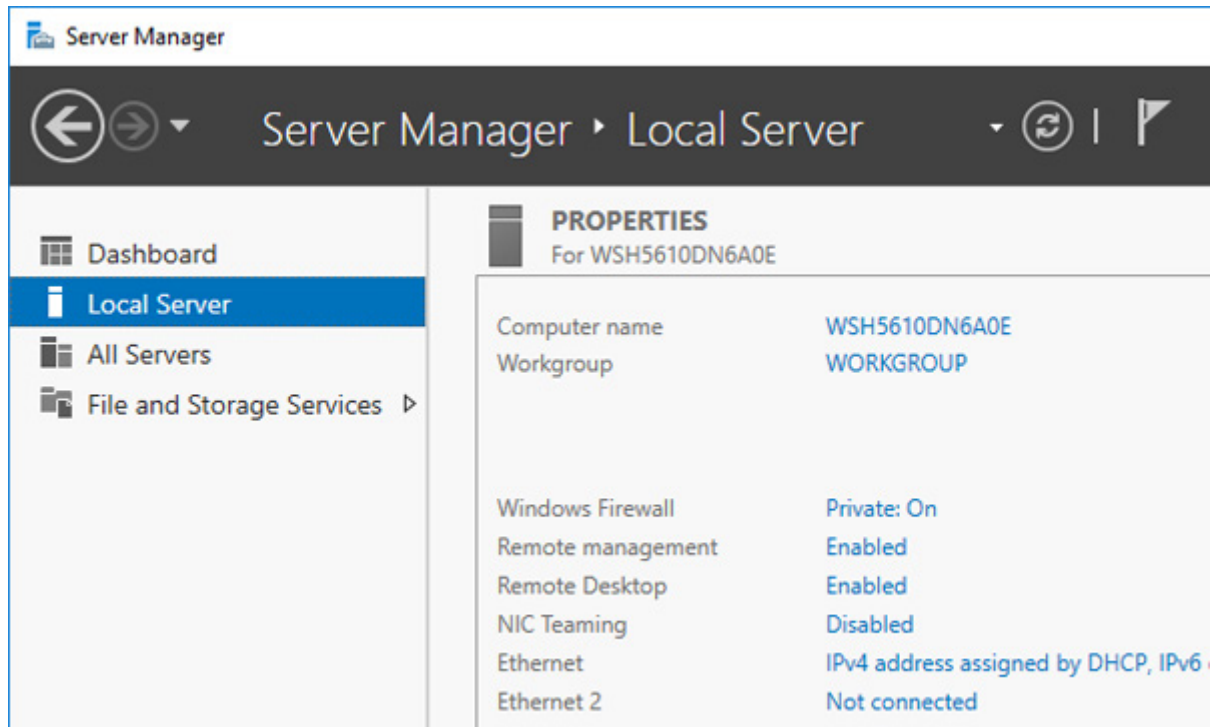
Replication Group: "Buffalo_DFS"

Replication Source Folder: "D:\rep_src"

Replication Destination Folder: "D:\rep_dst"

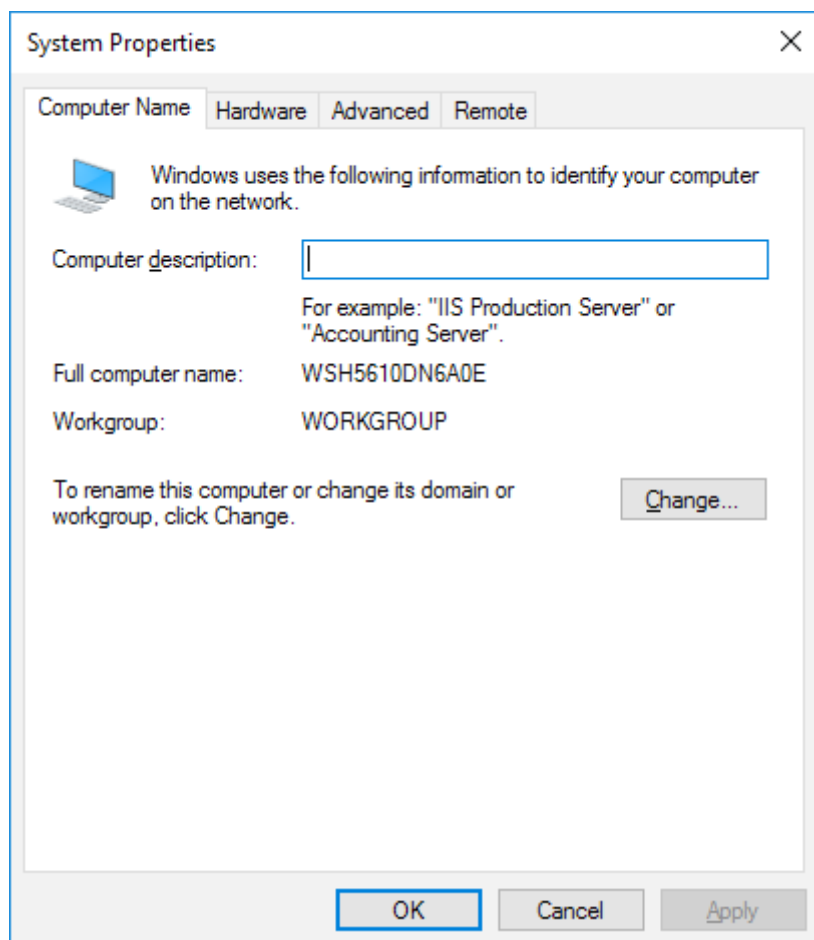
Joining an Active Directory

1 From Server Manager, click *Local Server*.

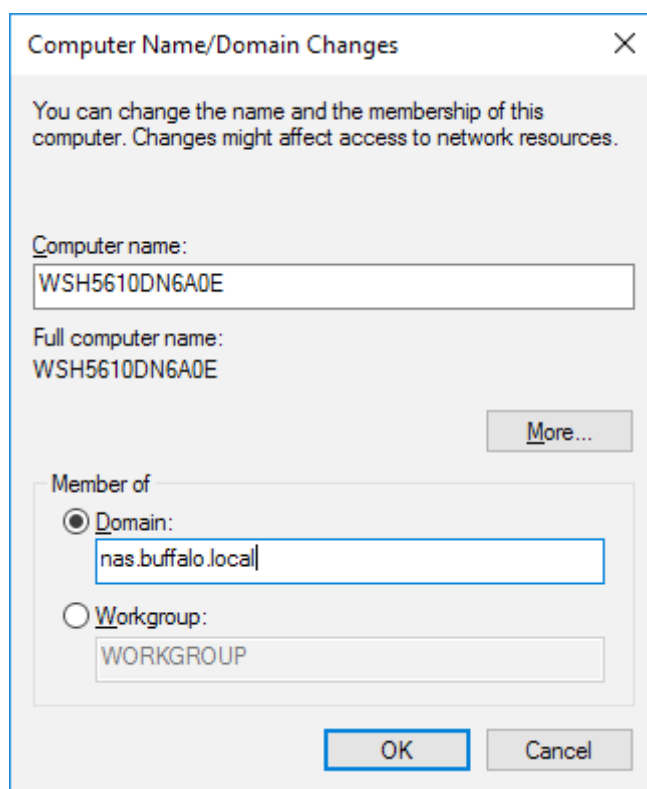


2 Click the hostname of your TeraStation.

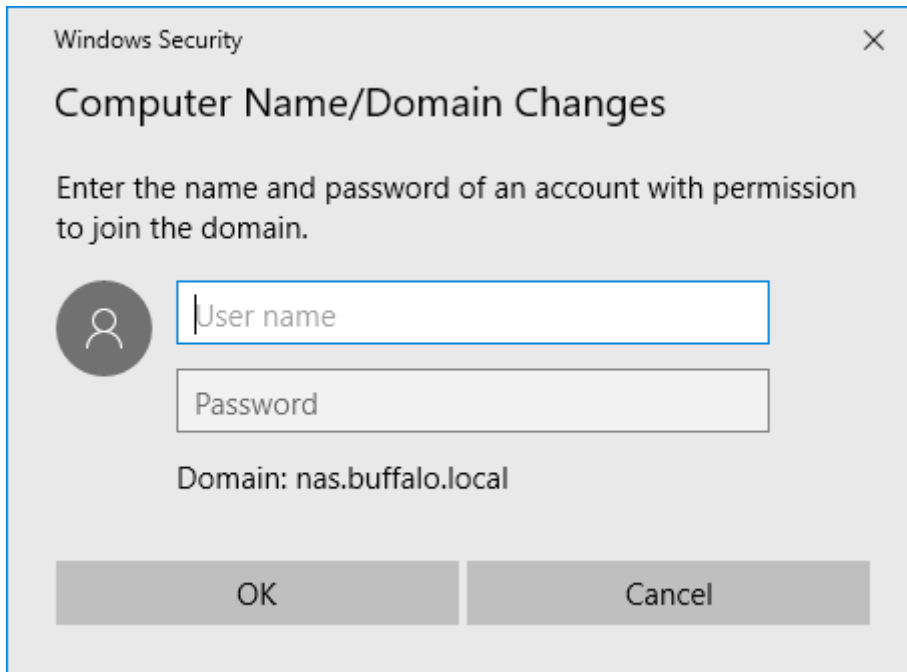
3 From the *Computer Name* tab, click *Change*.



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



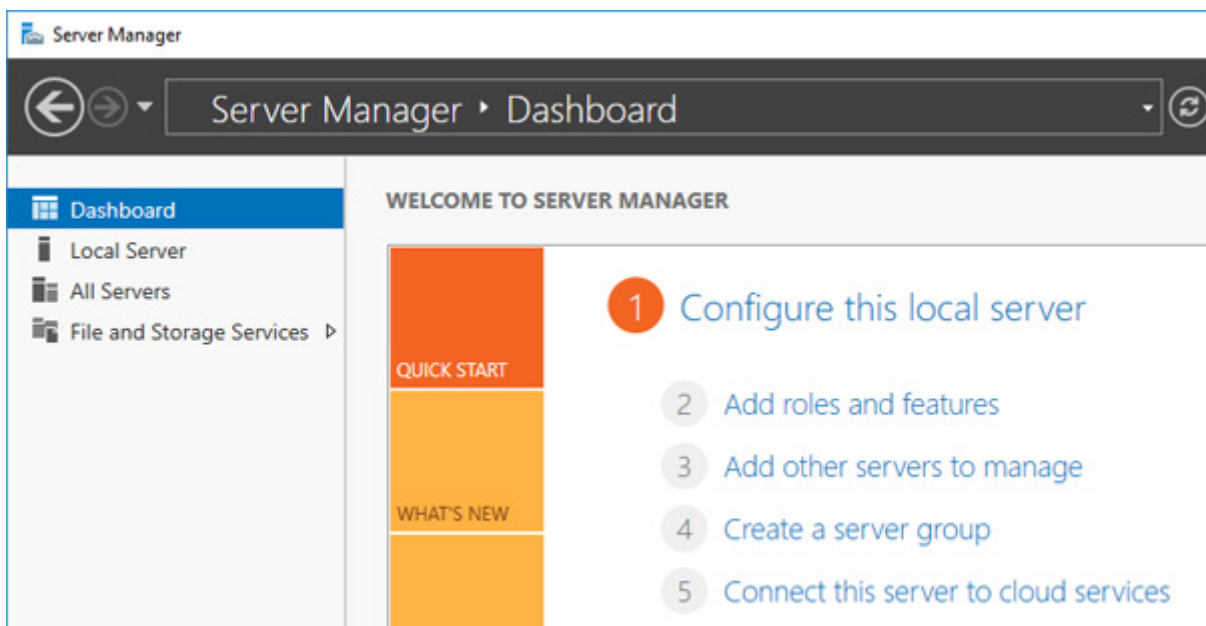
- 5** Enter an administrator username and password for the Active Directory domain controller.



- 6** Click *OK*, then click *OK* again.
- 7** Click *Close*.
- 8** Click *Restart Now* and restart your computer to apply settings.

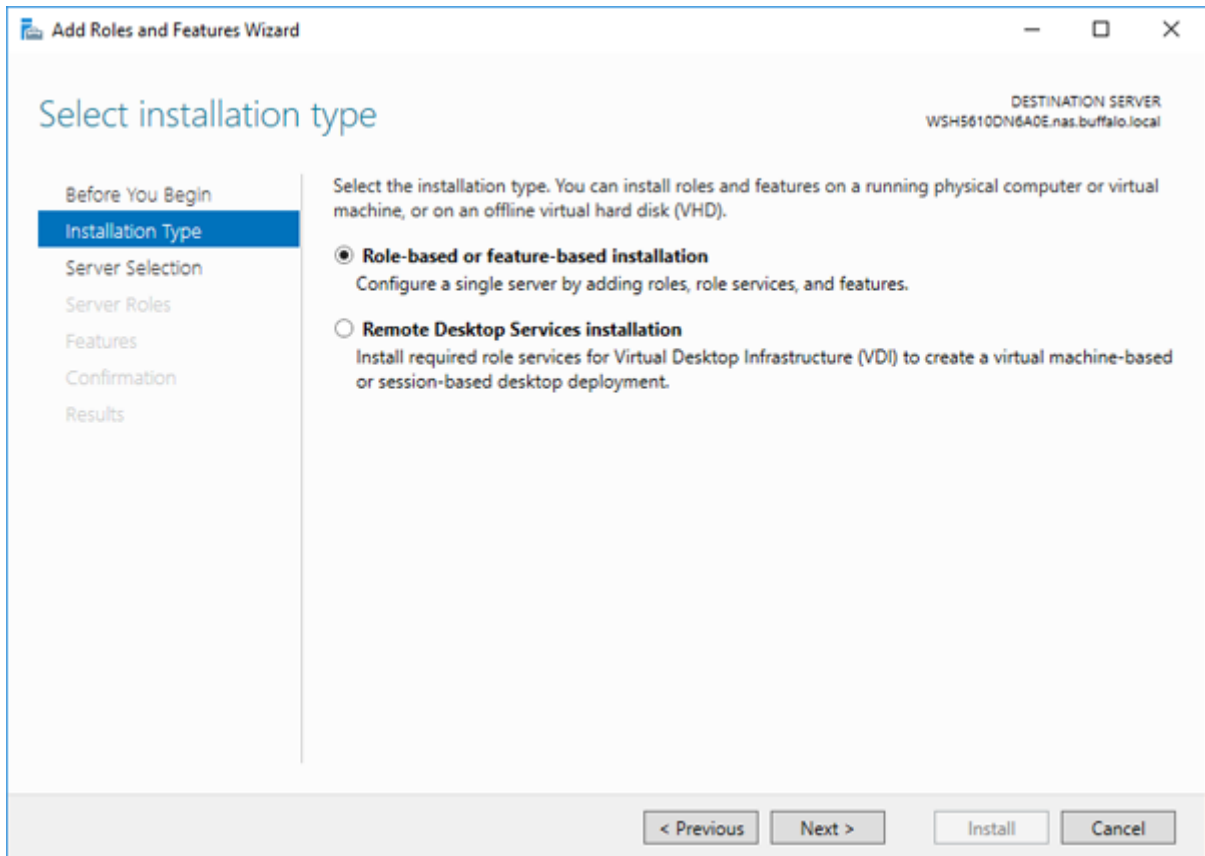
Installing DFS

- 1** From Server Manager, click *Dashboard > Add roles and features*.



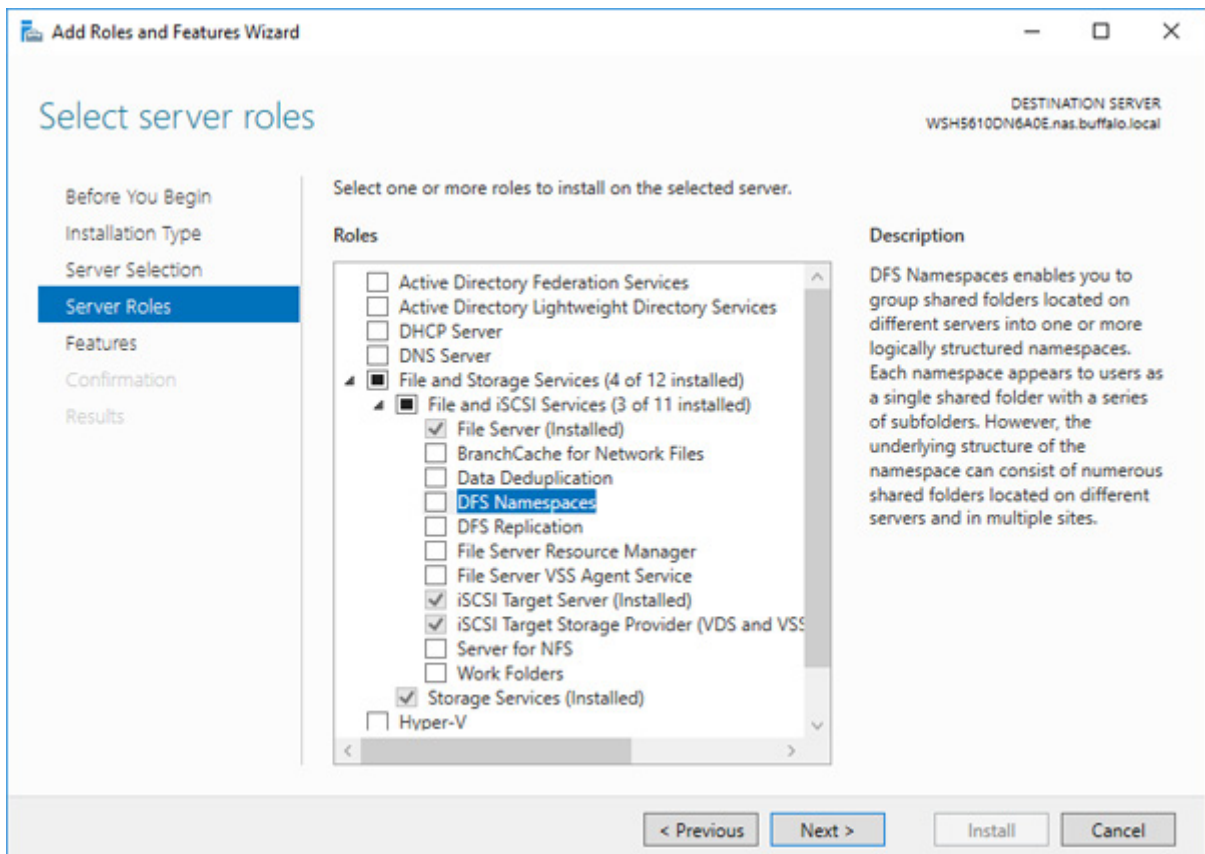
- 2** Click *Next*.

3 Select “Role-based or feature-based installation” and click *Next*.

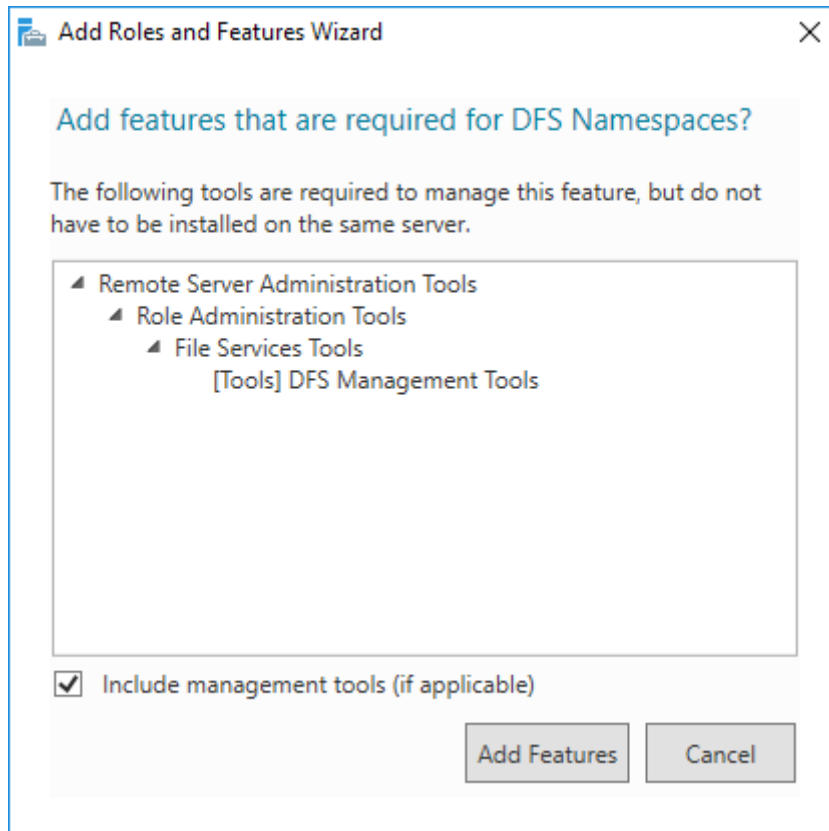


4 Click *Next*.

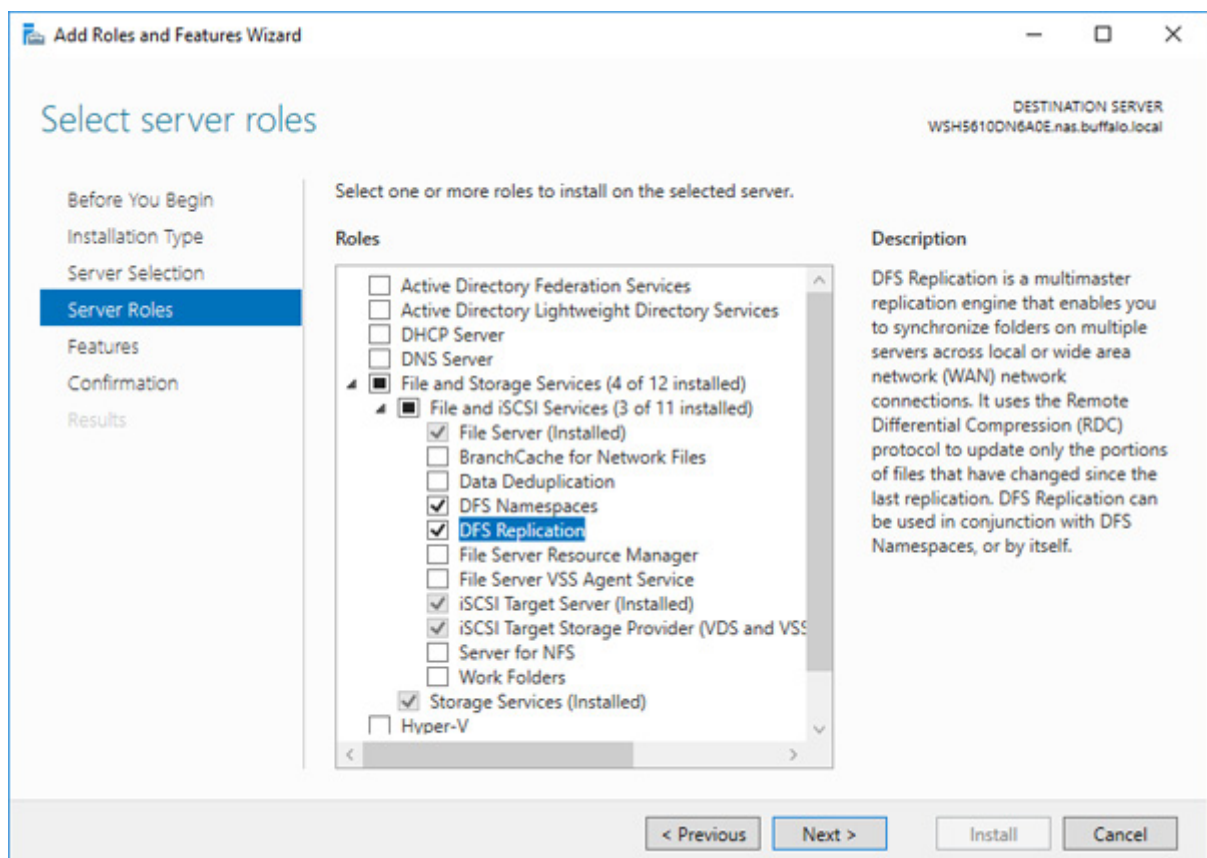
5 Select “DFS Namespaces” under “File and Storage Services” > “File and iSCSI Services”.



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



7 Select and "DFS Replication".

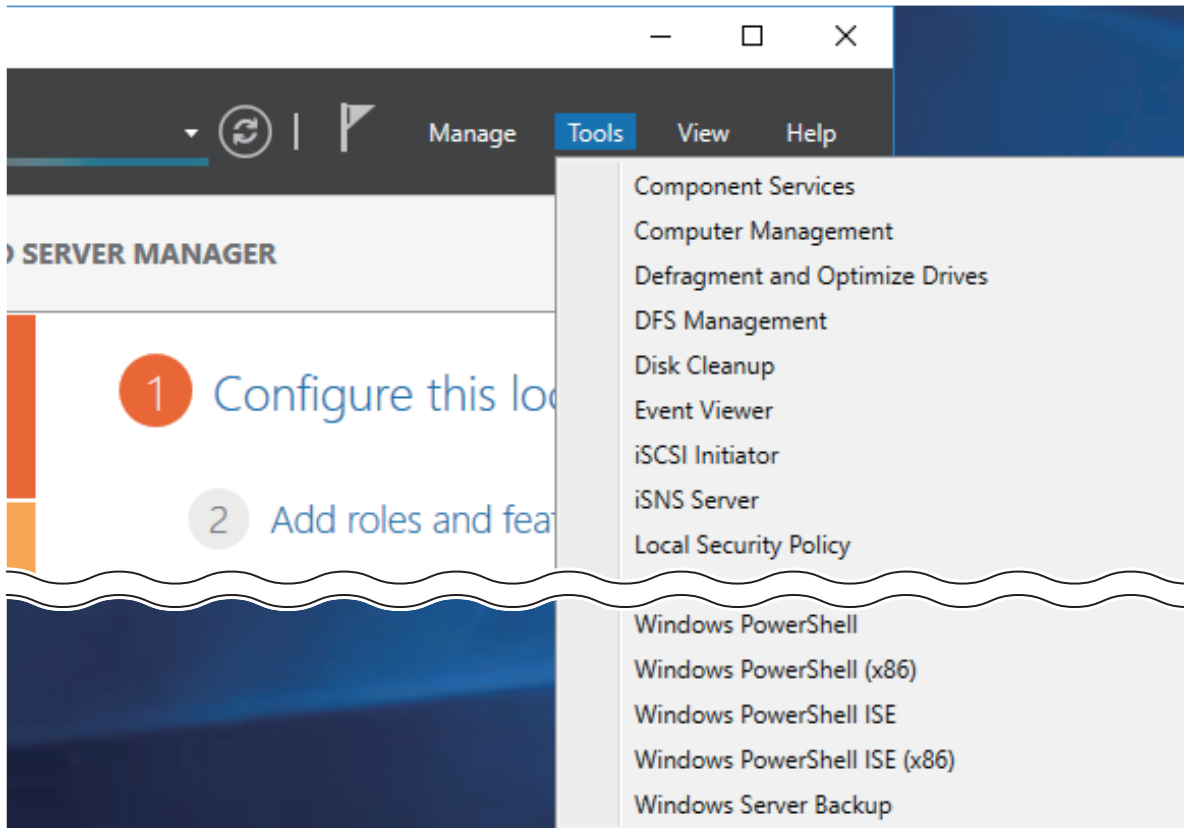


8 Click *Next* twice, then click *Install*.

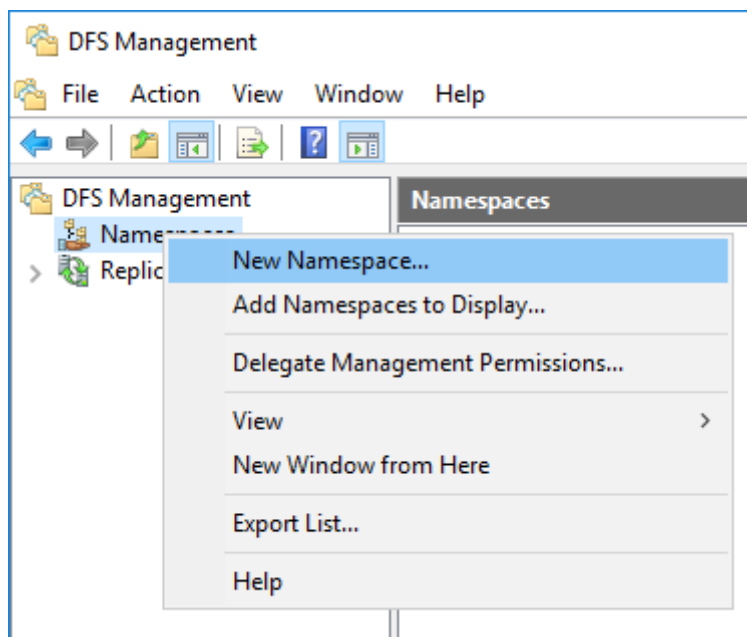
9 Click *Close* to finish.

Creating Namespaces

1 From Server Manager, click *Tools > DFS Management*.



2 Right-click *Namespaces*, then click *New Namespace*.



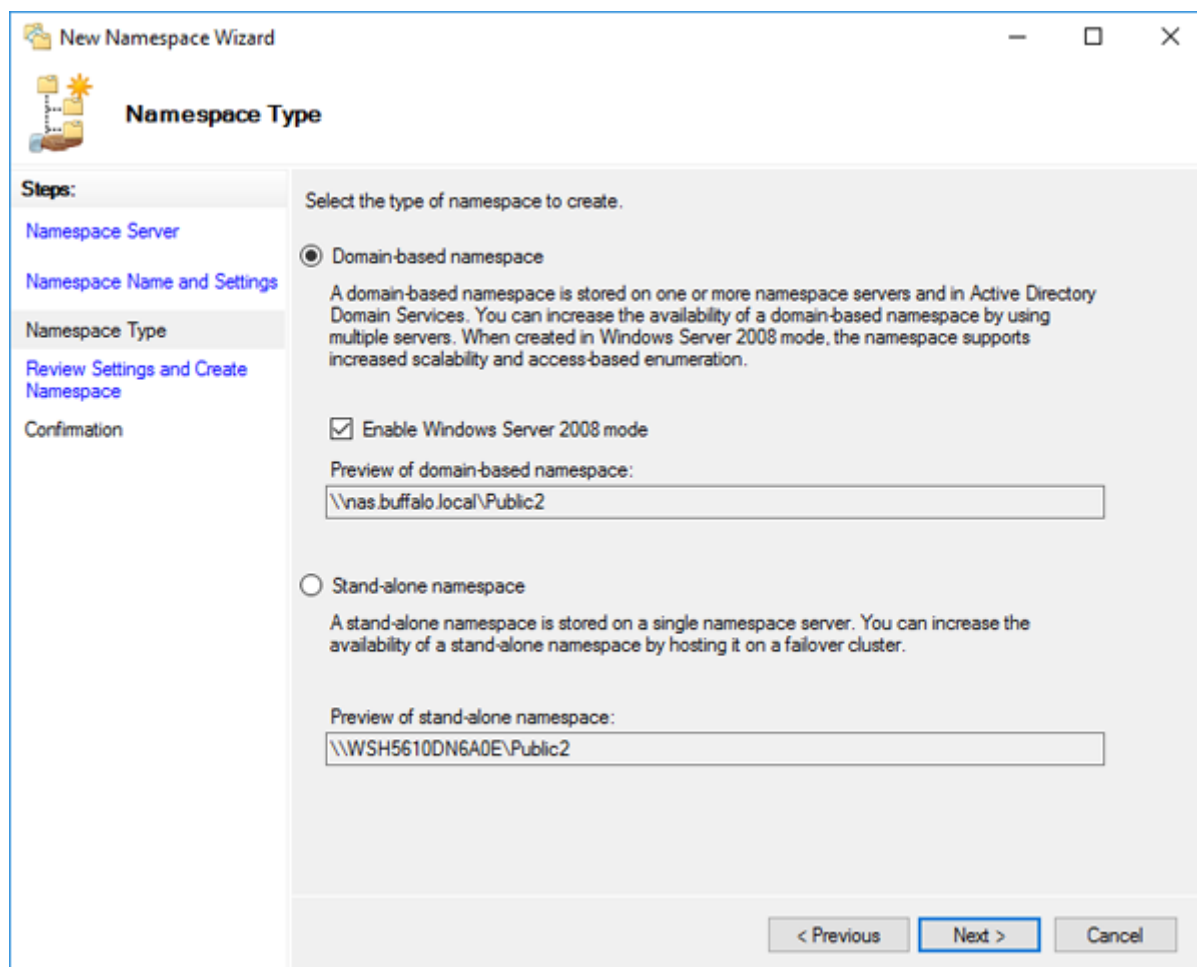
3 Enter a hostname for the namespace server and click *Next*.

The screenshot shows a window titled "New Namespace Wizard" with a standard Windows title bar (minimize, maximize, close). The main title is "Namespace Server". On the left, a "Steps:" pane lists the wizard's progress: "Namespace Server" (highlighted), "Namespace Name and Settings", "Namespace Type", "Review Settings and Create Namespace", and "Confirmation". The main area contains the instruction: "Enter the name of the server that will host the namespace. The server you specify will be known as the namespace server." Below this is a "Server:" label, a text input field containing "WSH5610DN6A0E", and a "Browse..." button. At the bottom right, there are three buttons: "< Previous" (disabled), "Next >" (active/highlighted), and "Cancel" (disabled).

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

The screenshot shows a Windows-style dialog box titled "New Namespace Wizard". The window has standard minimize, maximize, and close buttons in the top right corner. The main title bar also includes a small icon of a folder with a star. The dialog is divided into two main sections. On the left is a "Steps:" sidebar with a vertical list of steps: "Namespace Server" (highlighted in blue), "Namespace Name and Settings" (the current step), "Namespace Type", "Review Settings and Create Namespace", and "Confirmation". The main area on the right is titled "Namespace Name and Settings" and contains the following text: "Enter a name for the namespace. This name will appear after the server or domain name in the namespace path, such as \\Server\Name or \\Domain\Name." Below this is a "Name:" label followed by a text input field containing "Public2". Underneath the input field is the text "Example: Public". A horizontal line separates this from the next paragraph: "If necessary, the wizard will create a shared folder on the namespace server. To modify the settings of the shared folder, such as its local path and permissions, click Edit Settings." Below this text is a button labeled "Edit Settings...". At the bottom right of the dialog are three buttons: "< Previous", "Next >", and "Cancel".

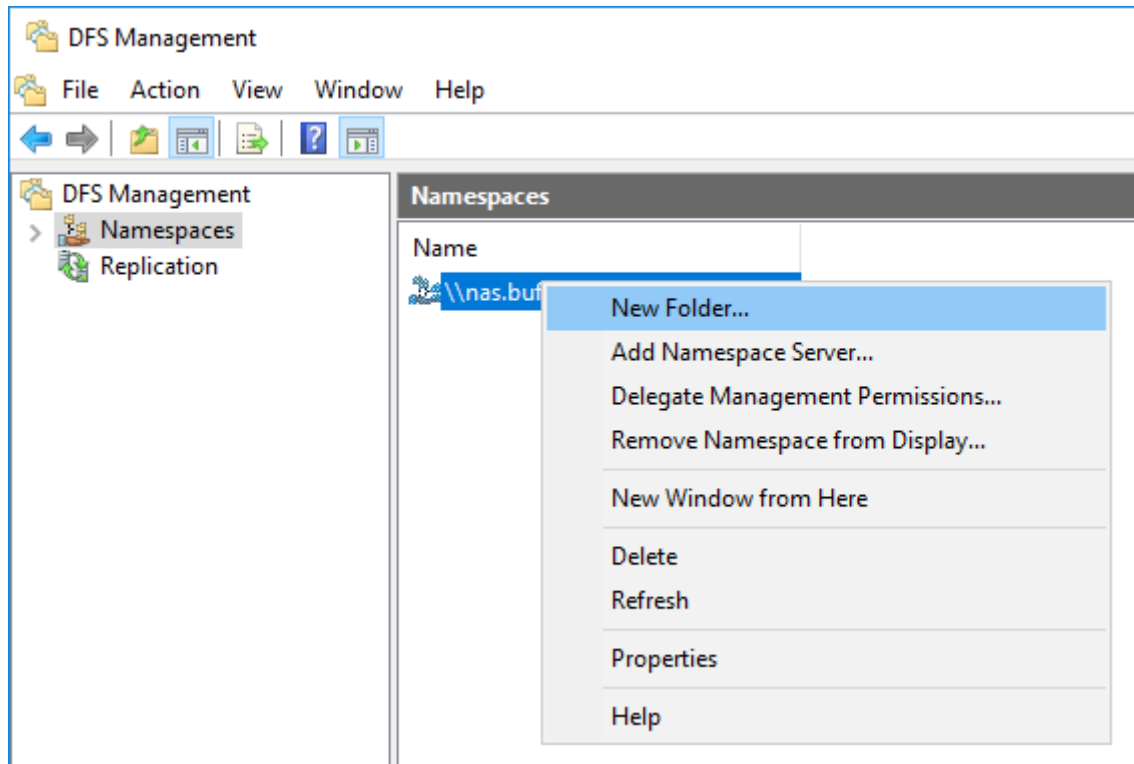
5 Select *Domain-based namespace* and click *Next*.



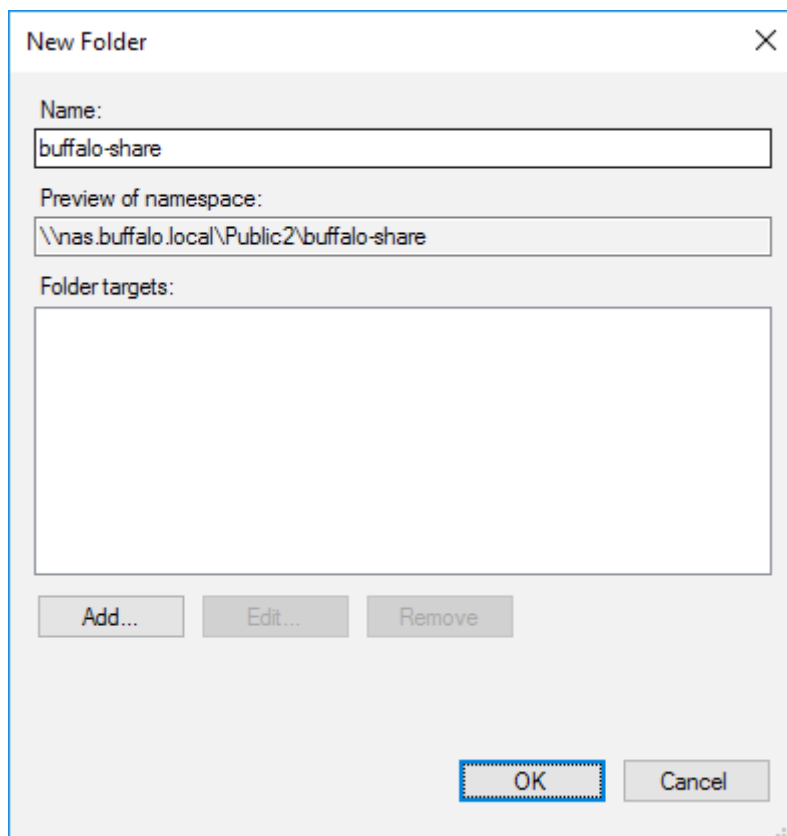
6 Click *Create*.

7 Click *Close* when the New Namespace Wizard finishes.

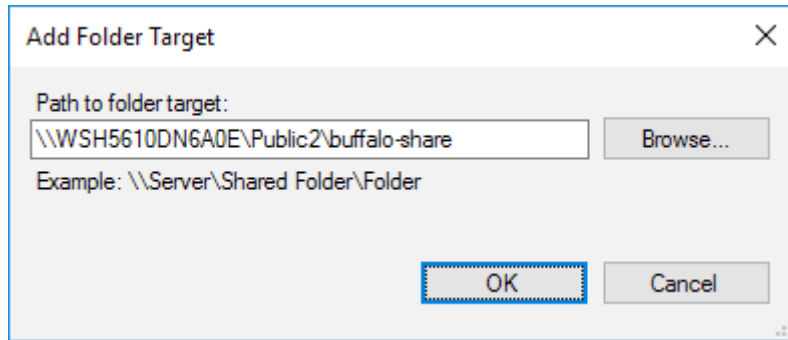
8 From DFS Management, right-click the name you created through the wizard and click *New Folder*.



9 Enter a folder name and click *Add*.



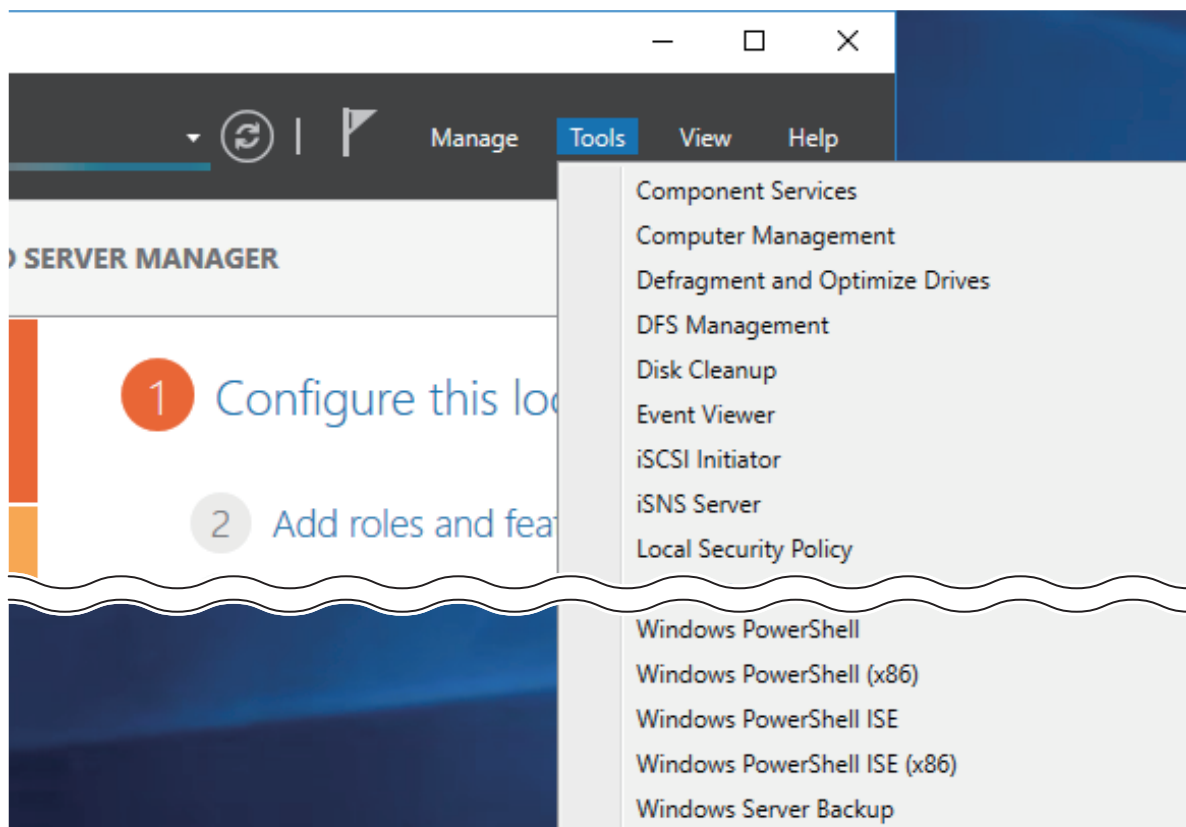
- 10** Enter a path to the folder or select from the list by clicking *Browse*. Click *OK*. You may be asked to create a new folder if the selected path doesn't exist. In such a case, click *Yes*.



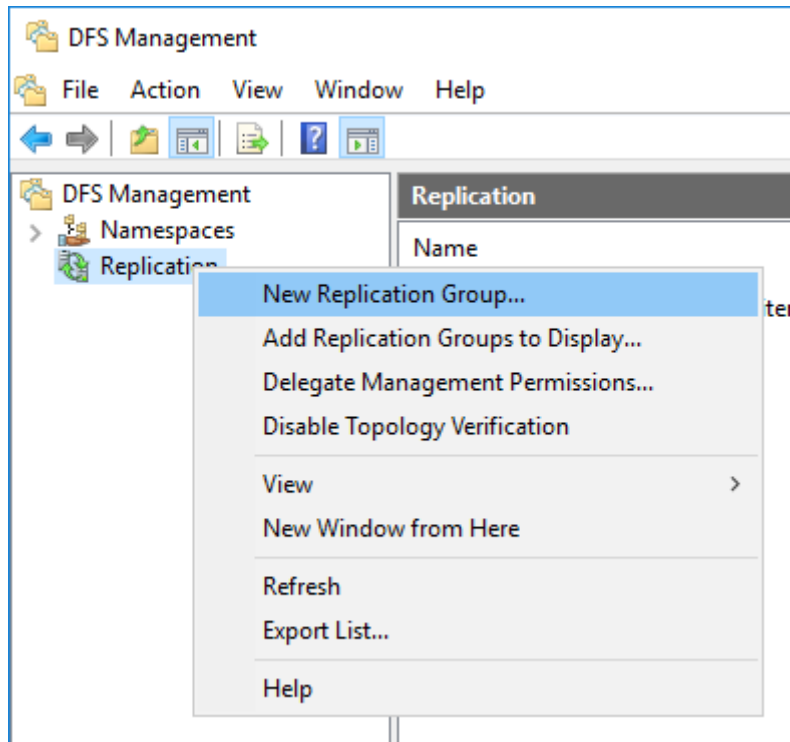
- 11** Click *OK* again.

Configuring DFS Replication

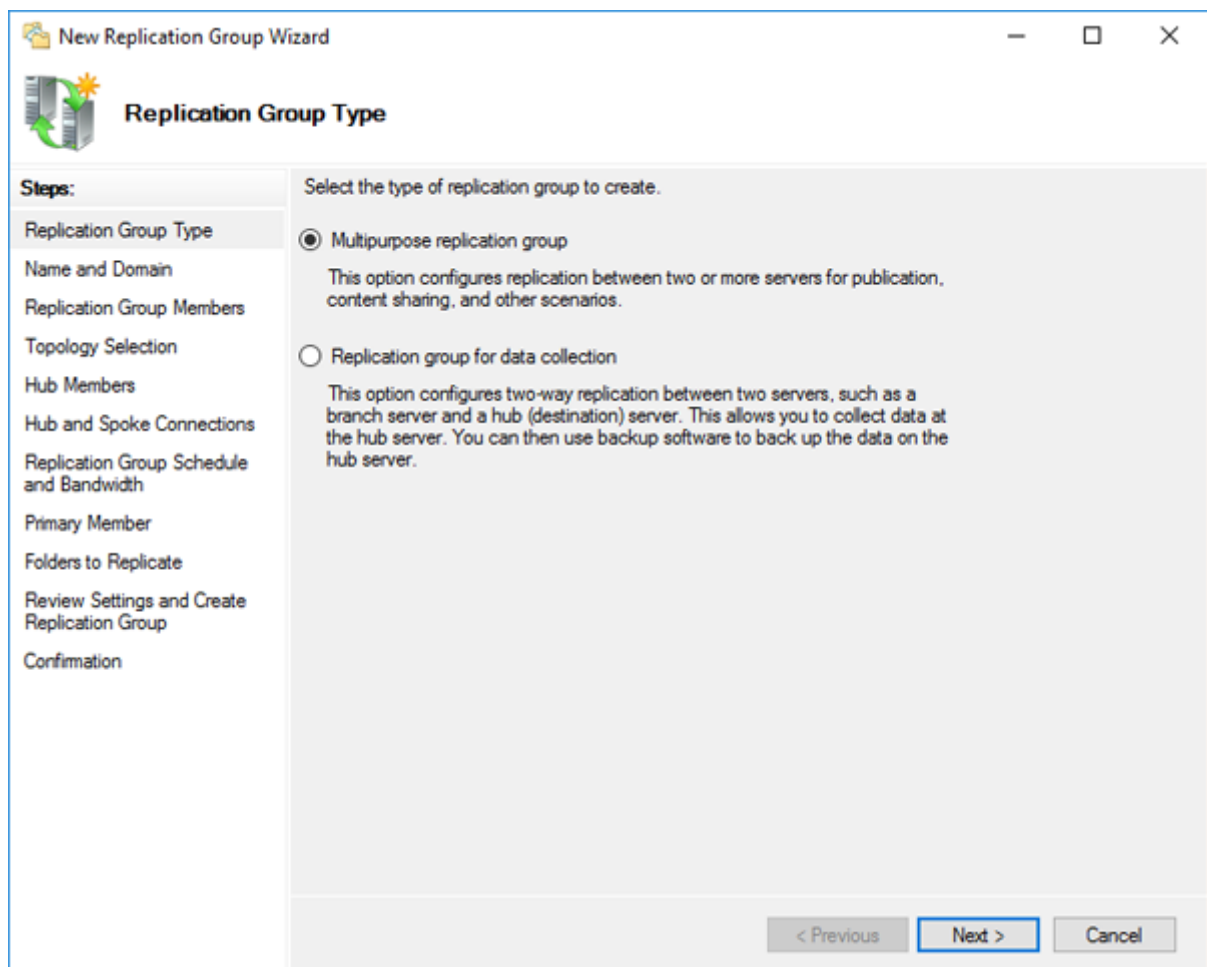
- 1** From Server Manager, click *Tools > DFS Management*.



2 Right-click *Replication*, then click *New Replication Group*.



3 Select the group replication type and click *Next*.



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

The screenshot shows the 'New Replication Group Wizard' window. The title bar reads 'New Replication Group Wizard'. The main heading is 'Name and Domain'. On the left, a 'Steps:' list includes: 'Replication Group Type', 'Name and Domain' (highlighted), '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', and 'Confirmation'. The main area contains the following text and fields:

Type a name and domain for the replication group. The name of the replication group must be unique in the domain that hosts the replication group.

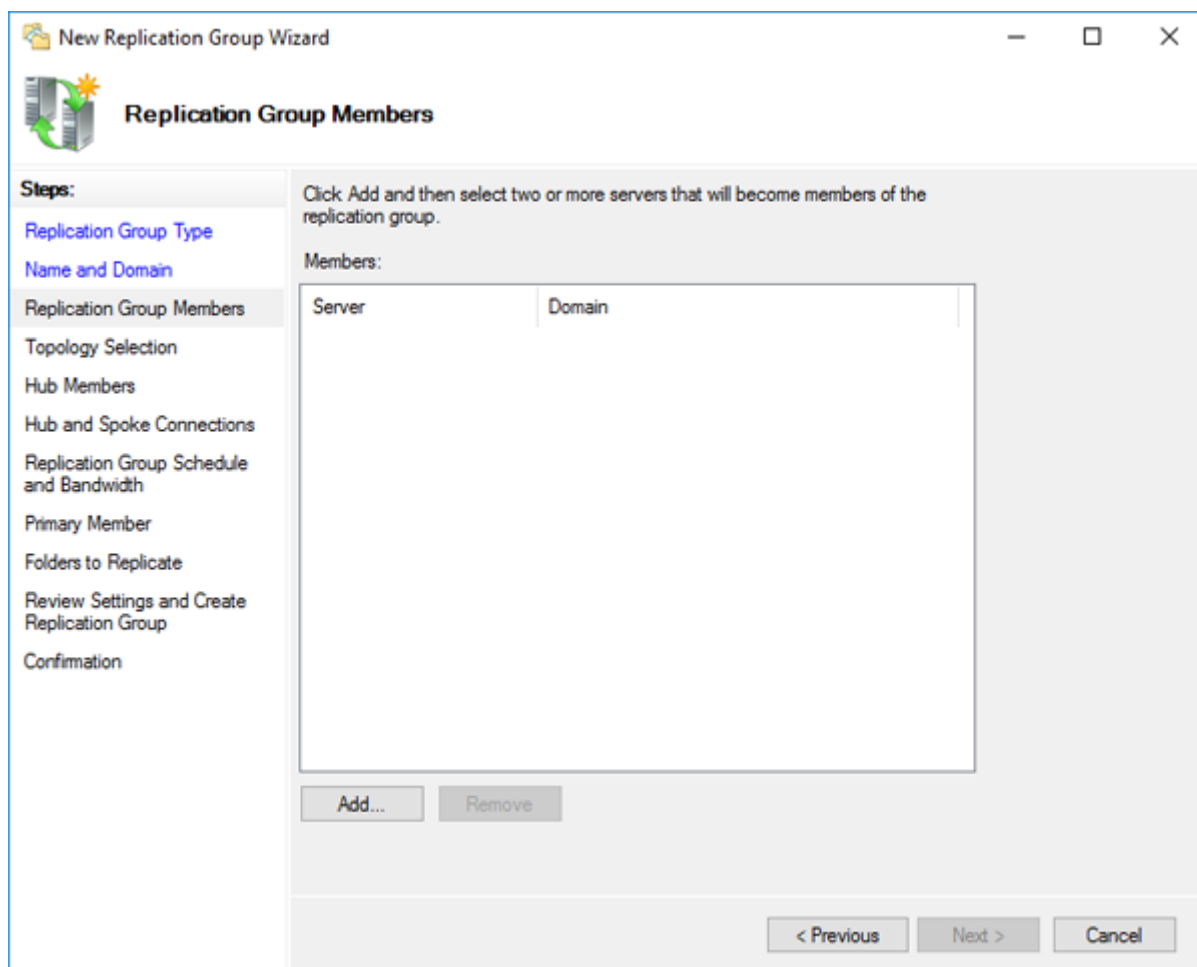
Name of replication group:

Optional description of replication group:

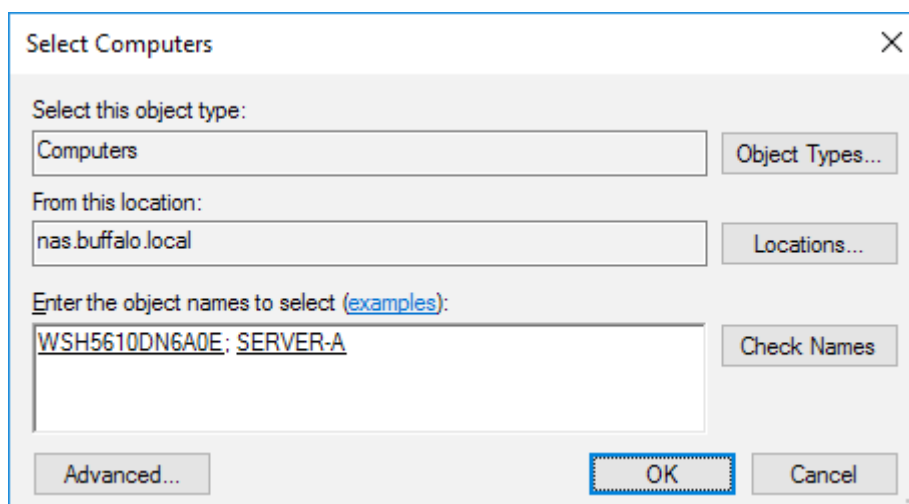
Domain:

At the bottom right, there are three buttons: '< Previous', 'Next >' (highlighted with a blue border), and 'Cancel'.

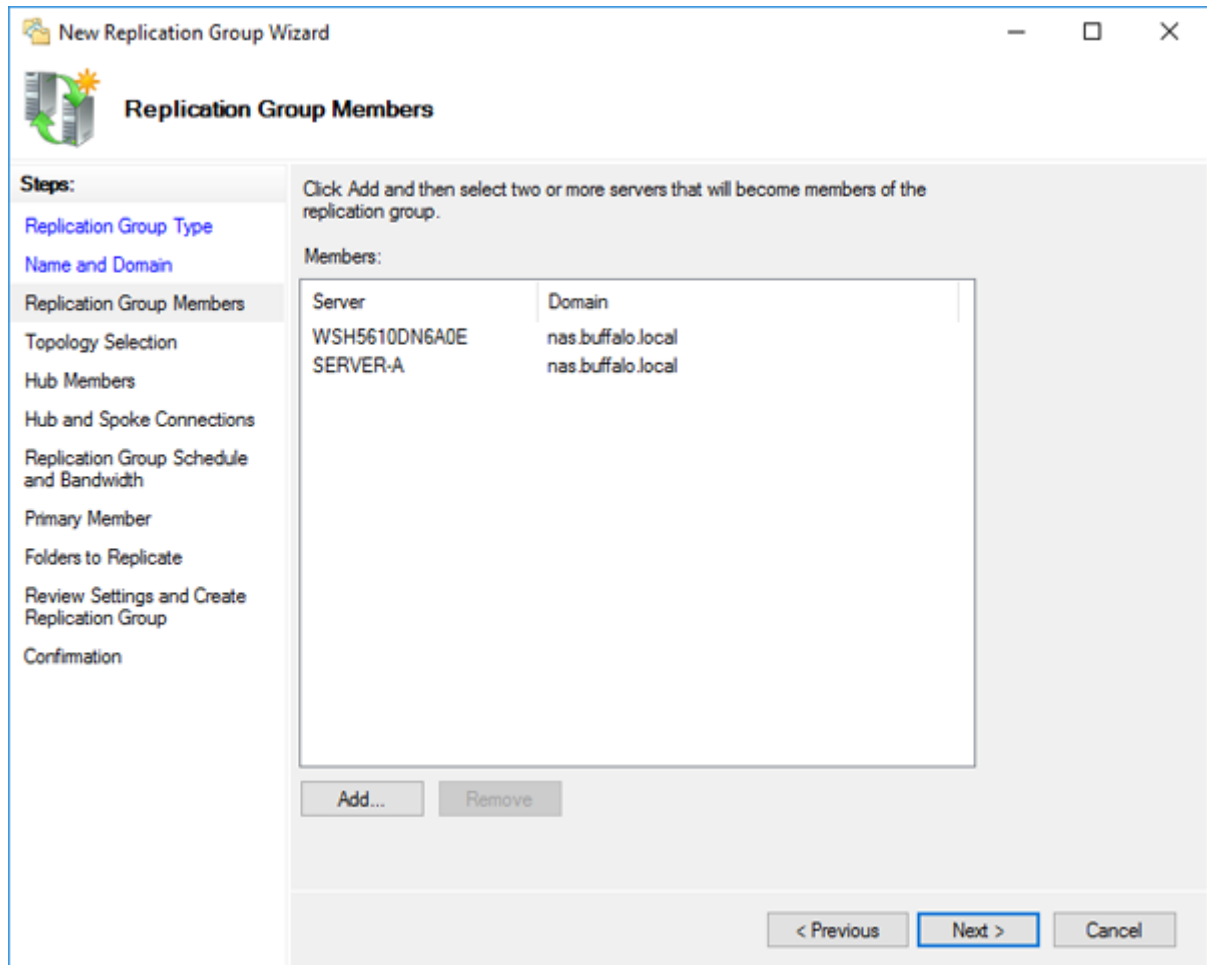
5 Click *Add*.



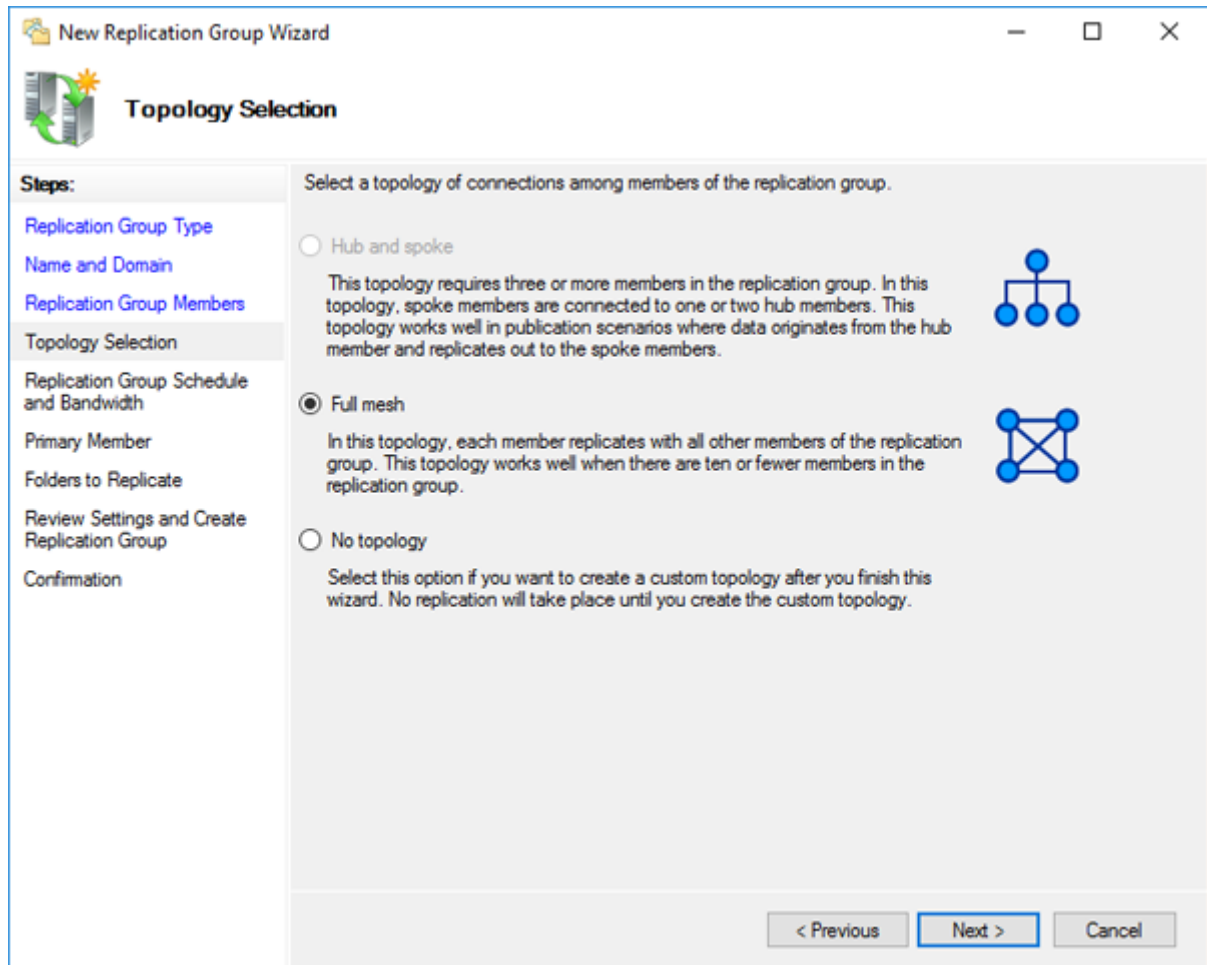
6 Enter more than two servers' hostnames to join the replication group and click *OK*.



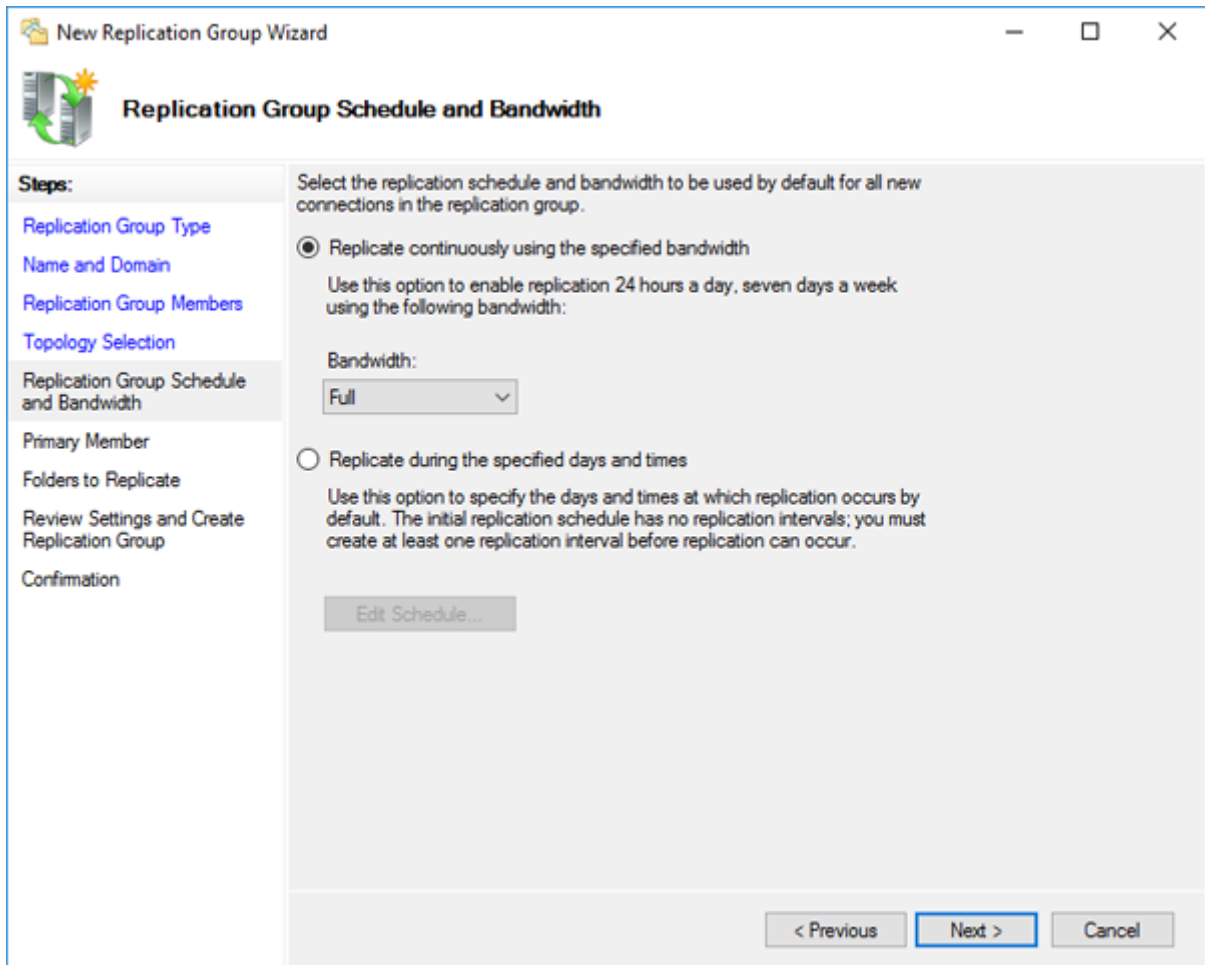
7 Click Next.



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

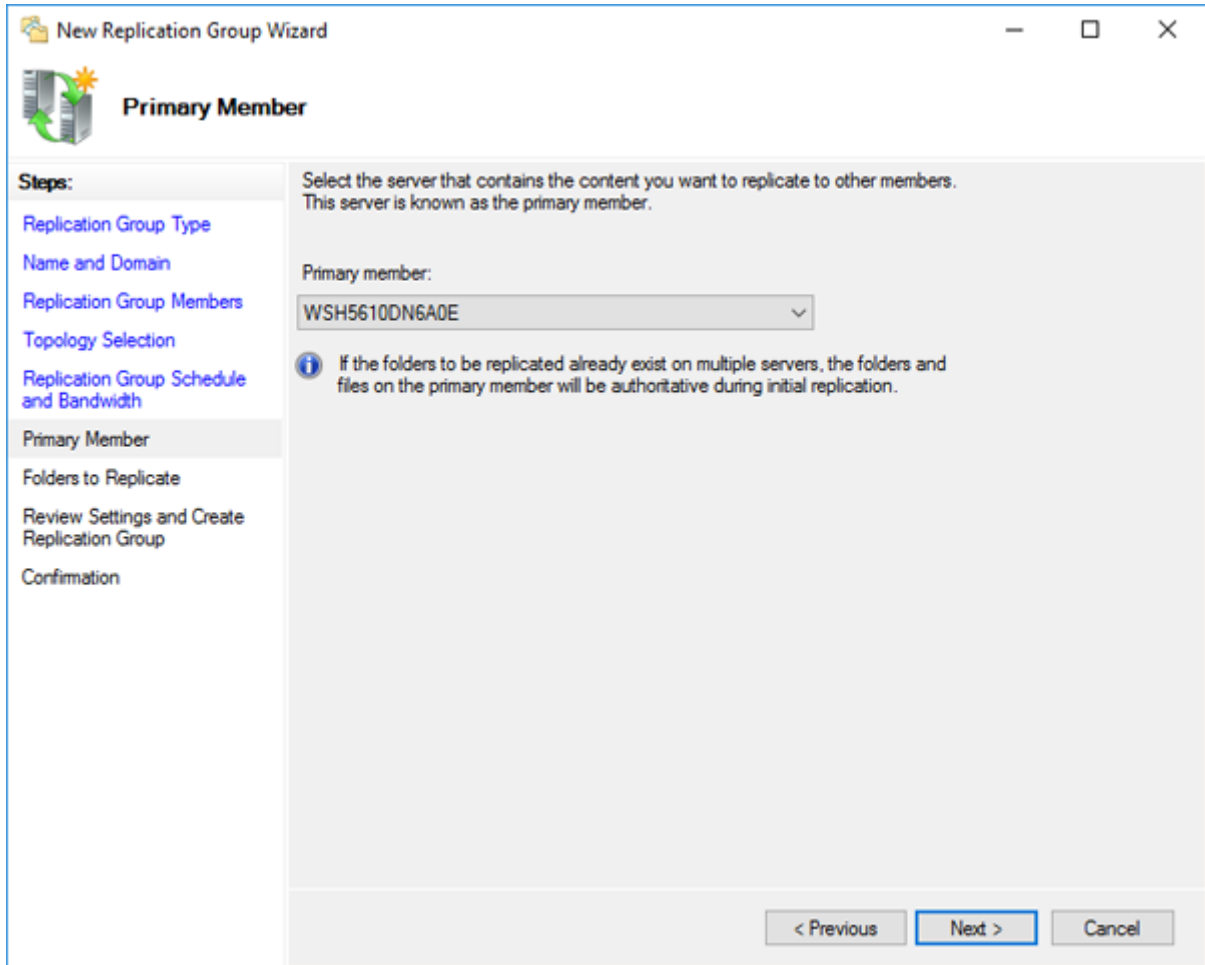


9 Click Next again.

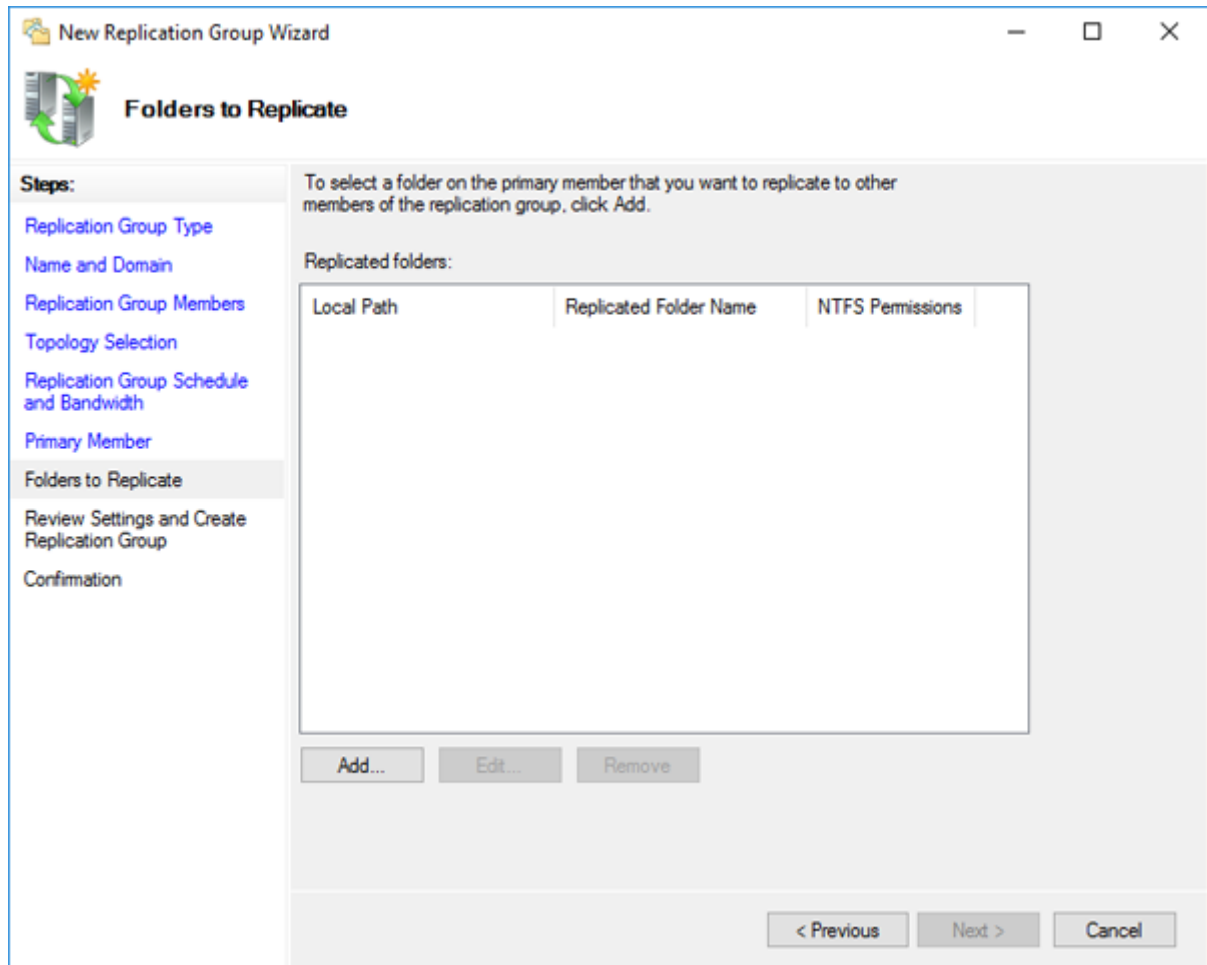


Note: You have options to specify the network band and the date and time. To configure bandwidth, select *Replicate continuously using the specified bandwidth* and the bit rate from the drop-down list. To configure the schedule time, select *Replicate during the specified days and times* and click *Edit Schedule*. You can select the date and time in the displayed window.

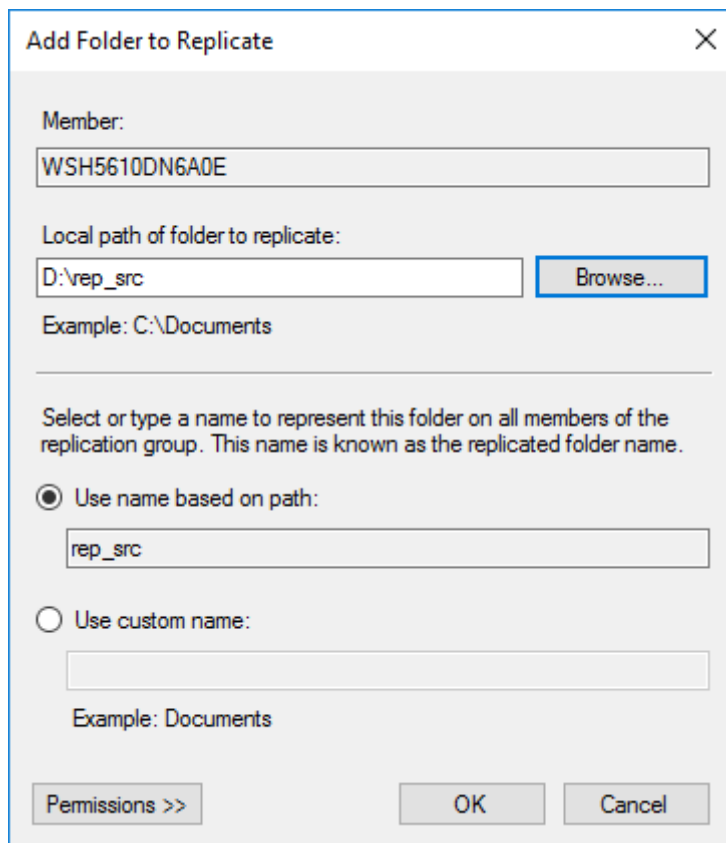
10 Select the device as the primary member and click *Next*.



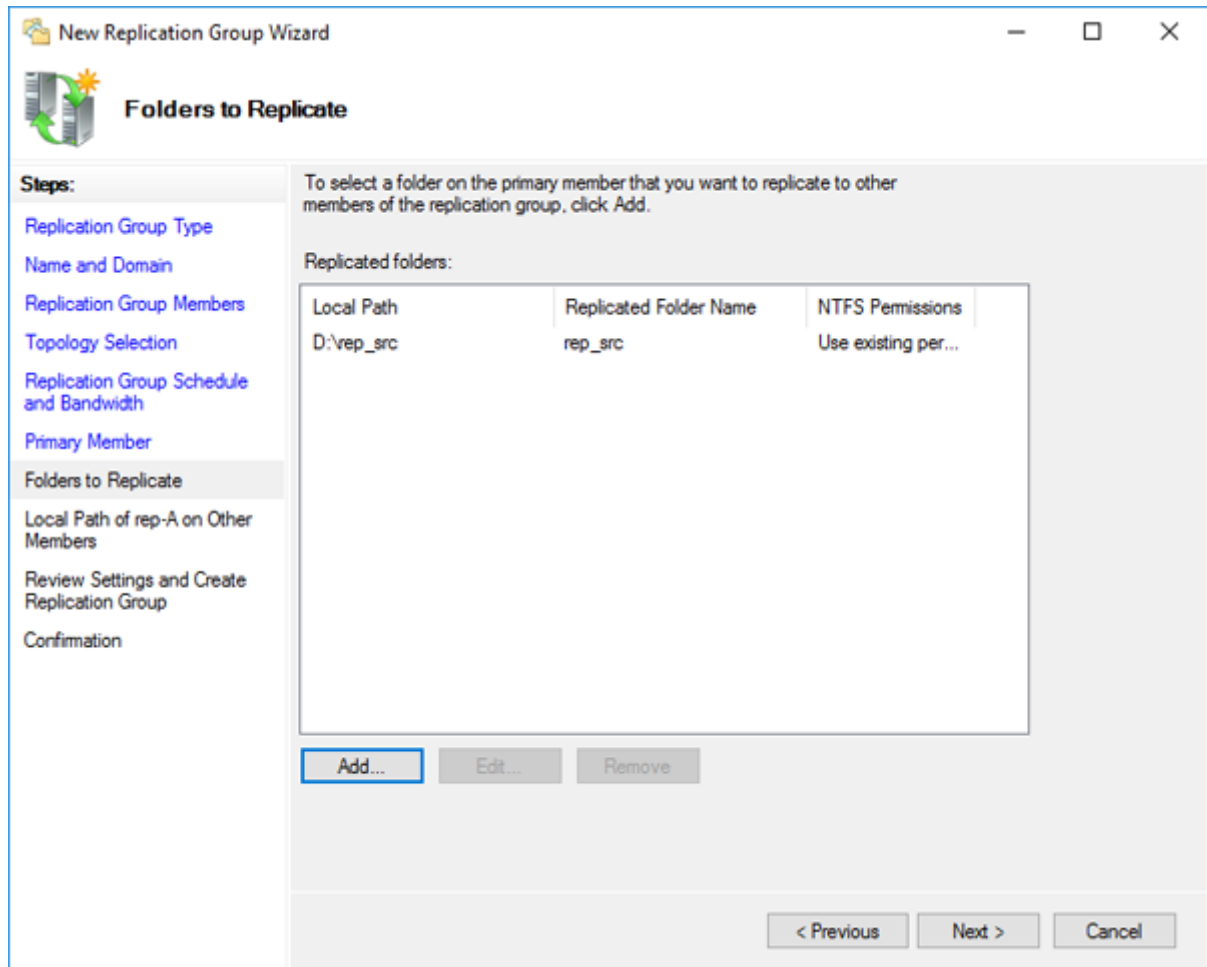
11 Click Add.



12 Select the folder as the replication source and click OK.



13 Click Next.



14 Click *Edit*.

The screenshot shows the 'New Replication Group Wizard' window. The title bar reads 'New Replication Group Wizard'. The main title is 'Local Path of rep-A on Other Members'. On the left, a 'Steps:' pane lists the following steps: 'Replication Group Type', 'Name and Domain', 'Replication Group Members', 'Topology Selection', 'Replication Group Schedule and Bandwidth', 'Primary Member', 'Folders to Replicate', 'Local Path of rep-A on Other Members' (which is highlighted), 'Review Settings and Create Replication Group', and 'Confirmation'. The main area contains the following text: 'To specify the local path of the replicated folder or whether the folder is read-only, select the appropriate member and then click Edit'. Below this is an information icon and the text: 'Primary member: WSH5610DN6A0E' and 'Primary member local path: D:\rep-A'. Underneath is a 'Member details:' section with a table:

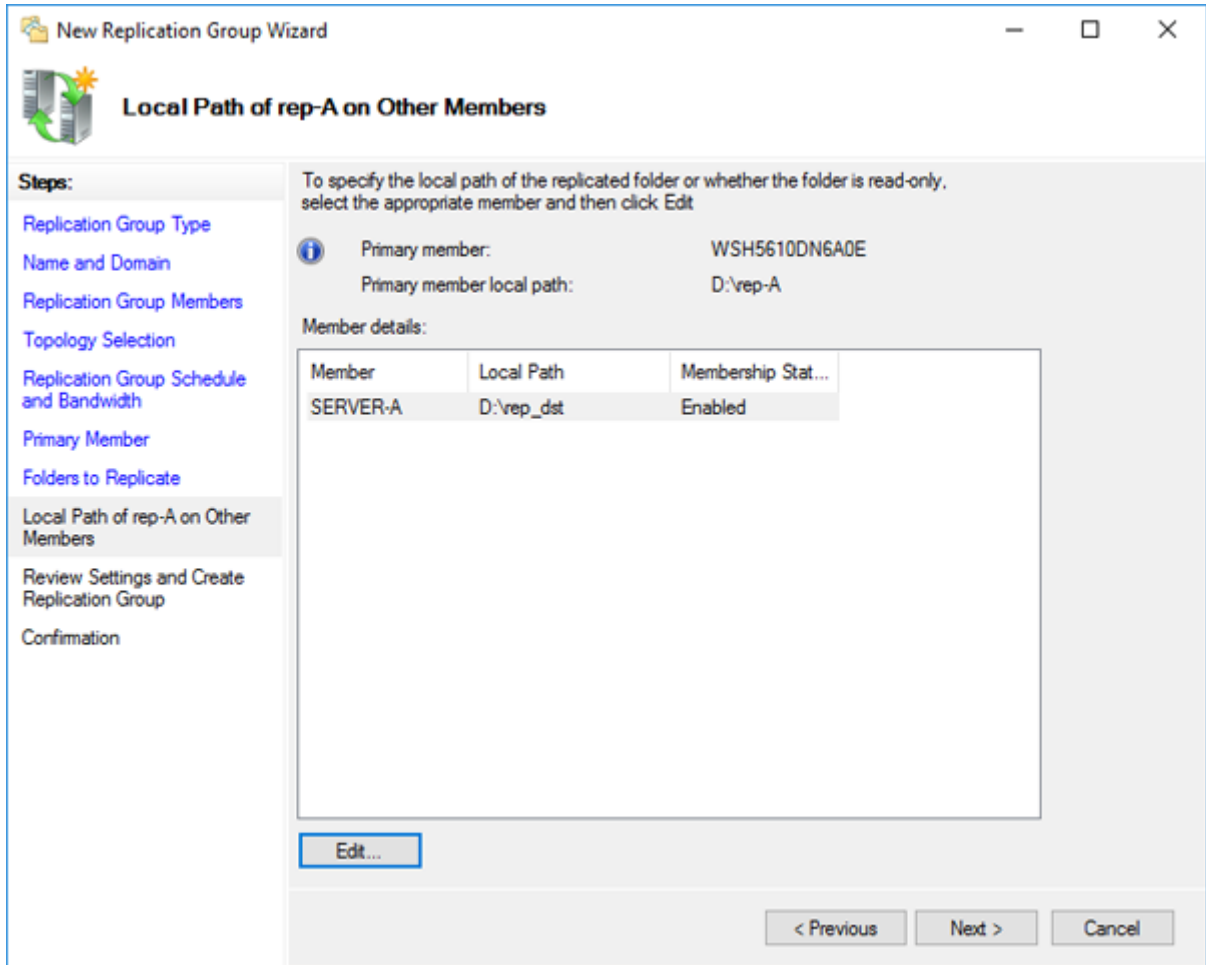
Member	Local Path	Membership Stat...
SERVER-A	<Not Set>	Disabled

Below the table is an 'Edit...' button. At the bottom right, there are three buttons: '< Previous', 'Next >' (which is highlighted with a blue border), and 'Cancel'.

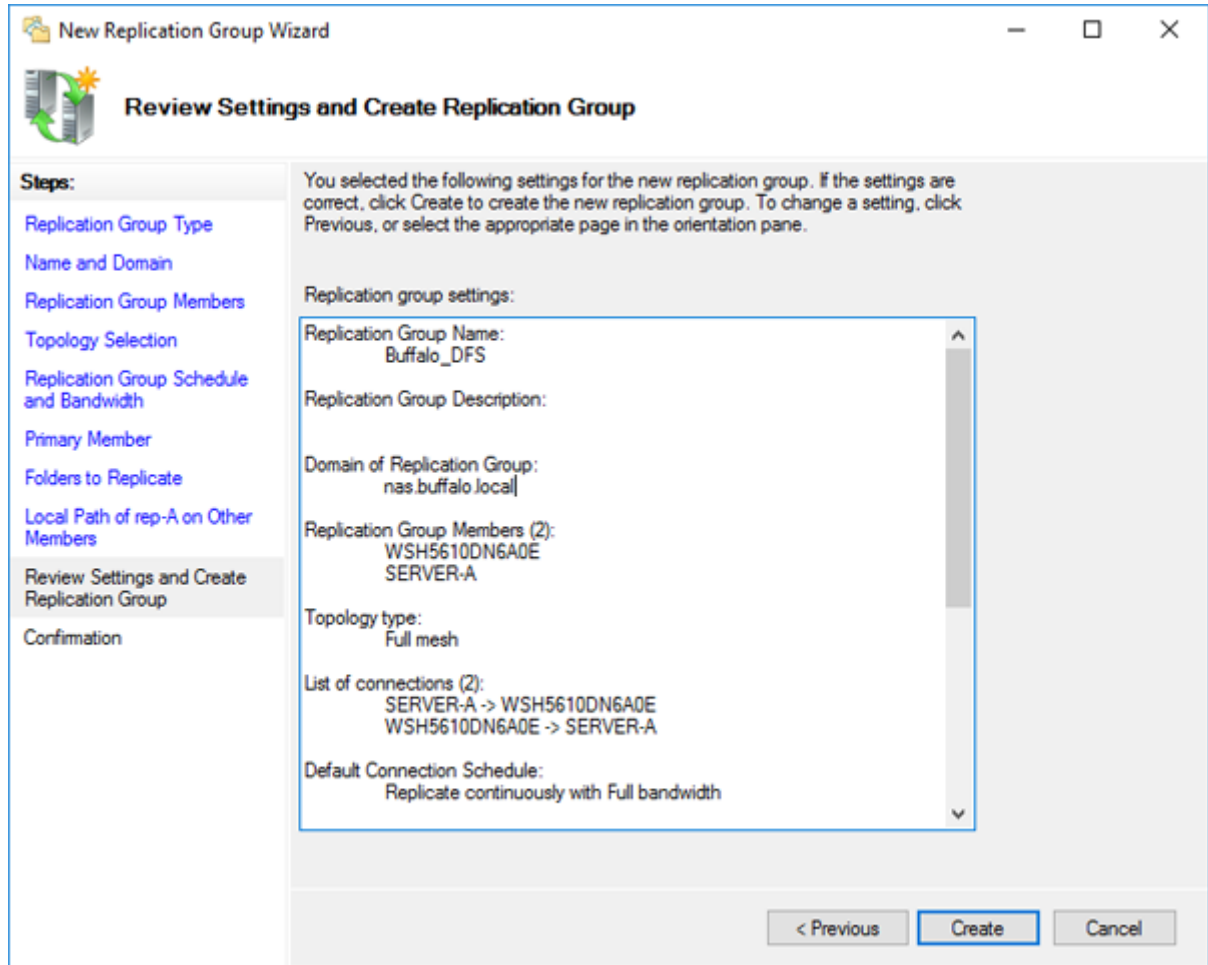
15 Select "Enabled" and select the folder as the replication destination, then click *OK*.

The image shows a Windows-style dialog box titled "Edit" with a close button (X) in the top right corner. The dialog has a "General" tab selected. Inside the dialog, there is a "Member:" label followed by a text box containing "SERVER-A". Below this is a horizontal line and the text "Select the initial status of the replicated folder on this member." Underneath is the "Membership status:" label, followed by two radio button options: "Disabled" (with the text "The replicated folder will not be stored on this member.") and "Enabled" (with the text "Keep the following folder synchronized with other members."). The "Enabled" option is selected. Below the radio buttons is the "Local path of folder:" label, followed by a text box containing "D:\rep_dst" and a "Browse..." button. Below the text box is the text "Example: C:\Data". At the bottom left is a checkbox labeled "Make the selected replicated folder on this member read-only." At the bottom right are "OK" and "Cancel" buttons.

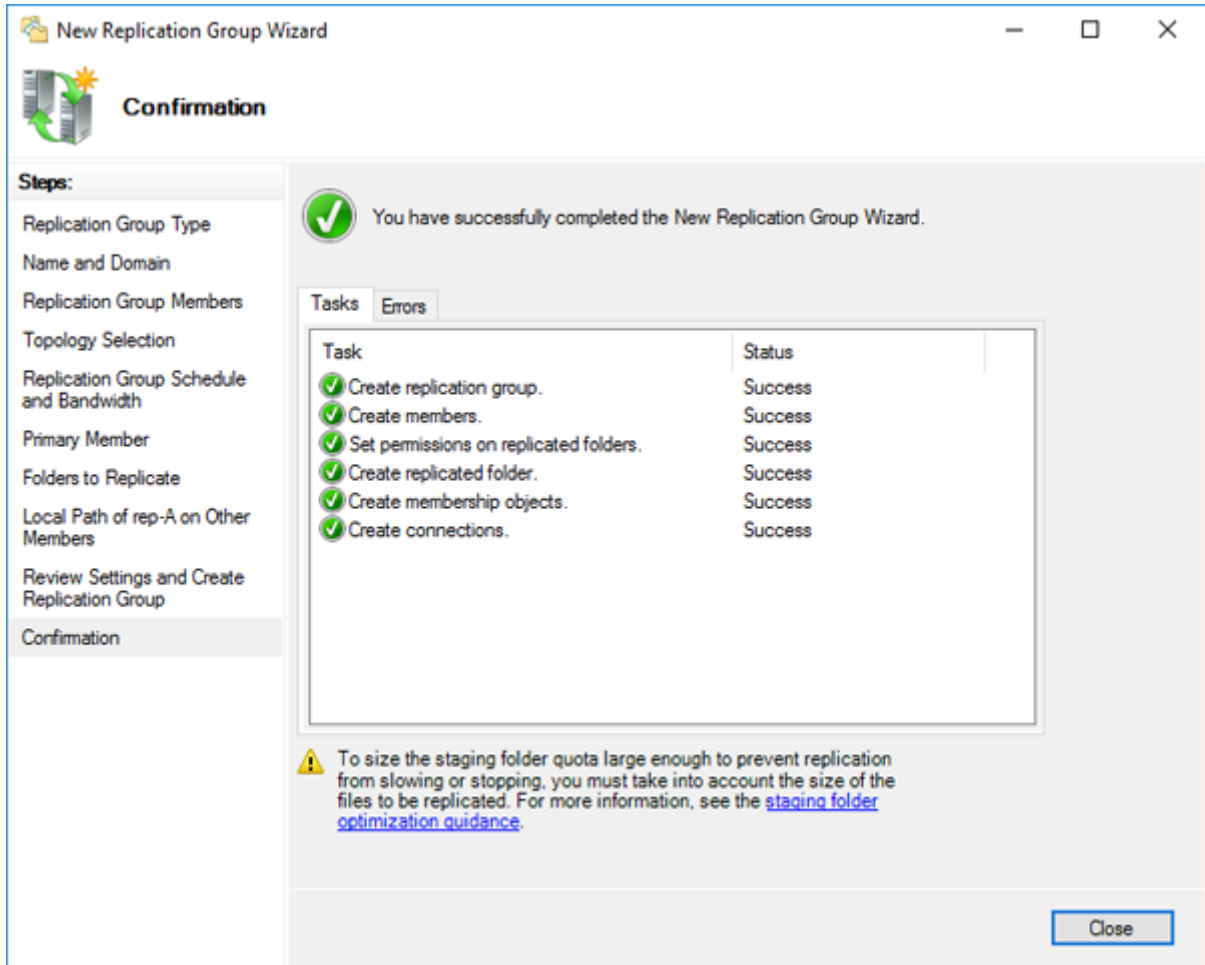
16 Click Next.



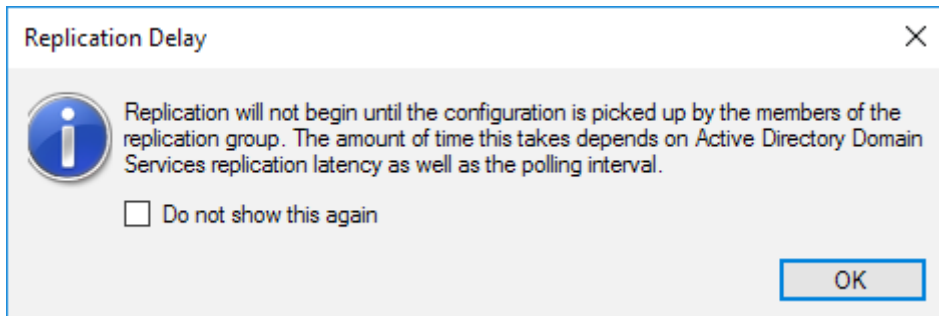
17 Click Create.



18 Click *Close* when completed.



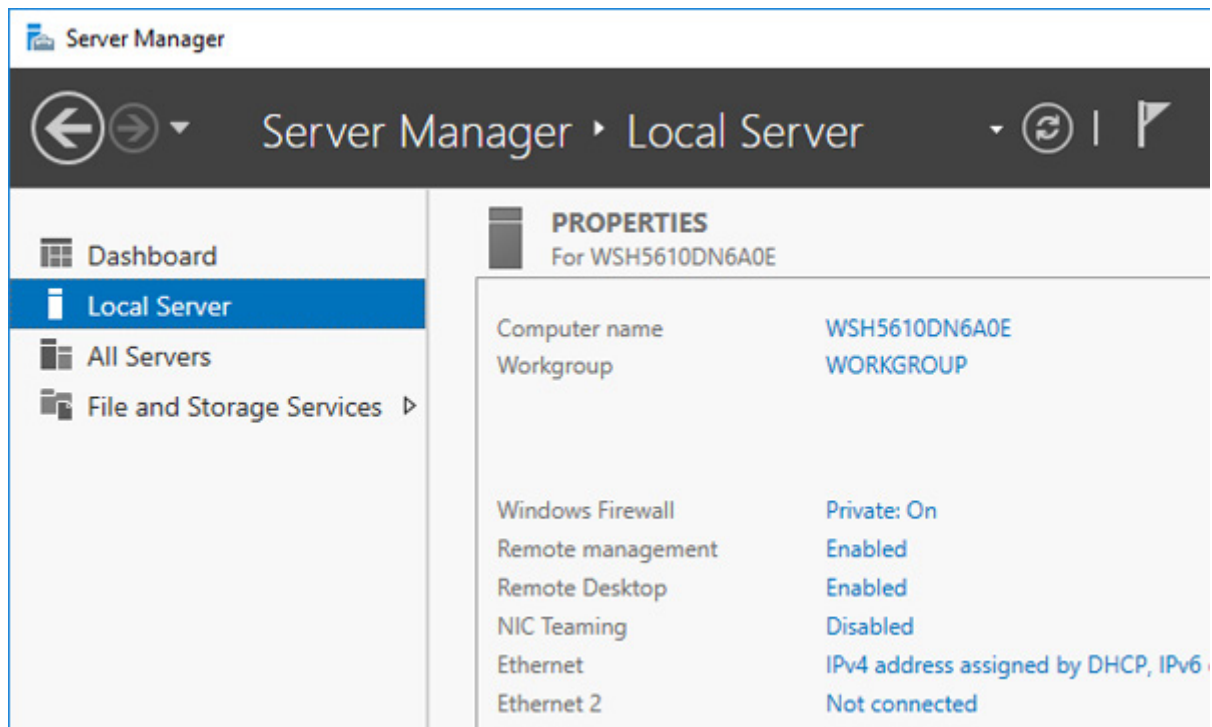
Note: >It may take some time before actual replication is caught up. When the following window appears, click *OK*.



Chapter 5 Additional Settings

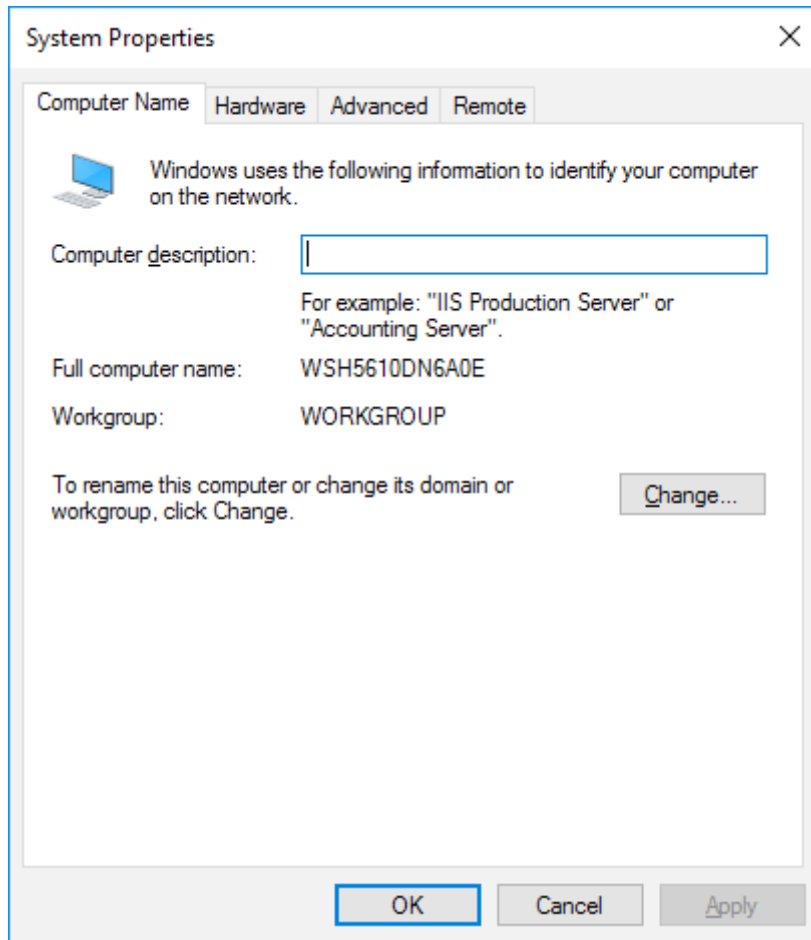
Changing Server Name, Workgroups, and Domains

1 From Server Manager, click *Local Server*.

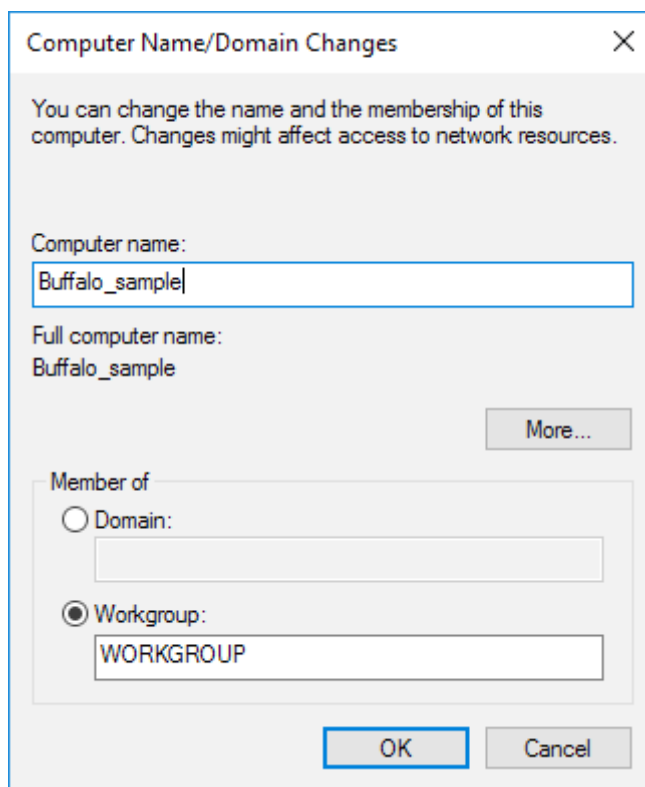


2 Click the hostname of your TeraStation.

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



4 Enter the computer name, choose domain or workgroup, and click *OK*.



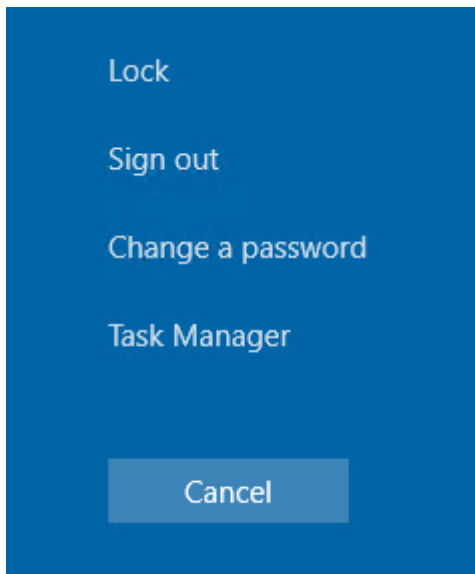
Note: The computer name should contain 15 characters or less. If 16 or more characters are entered, all characters from the 16th character on are ignored.

Changing the Password

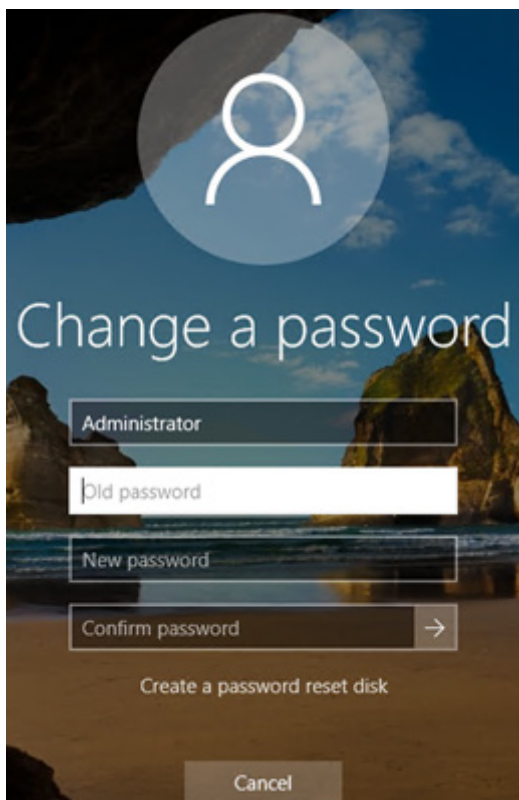
The default password for the TeraStation's administrator account is "password". This is public knowledge, so for security, you should change it immediately. Follow the procedure below to change the password.

Administrator's Password

- 1 Log on to Windows Storage Server using "Administrator".
- 2 Press Ctrl+Alt+End.
- 3 Click *Change a password*.

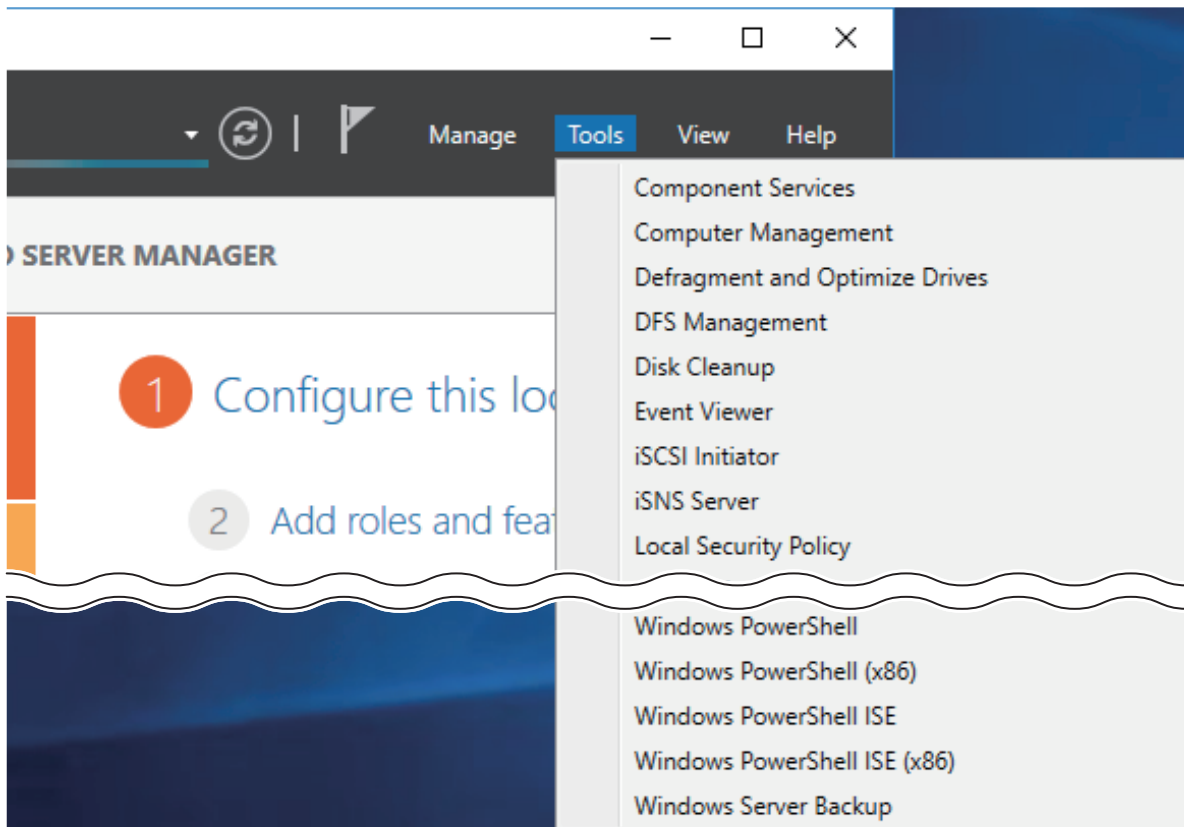


- 4 Enter the current administrator's password and a new password (twice), then press the Enter key.



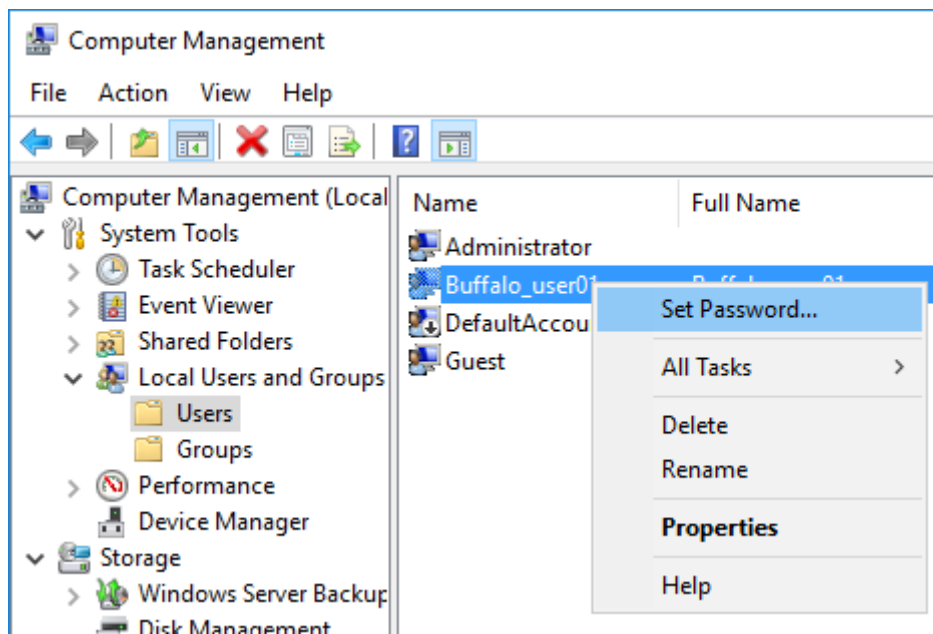
Passwords for Other Users

1 From Server Manager, click *Tools > Computer Management*.



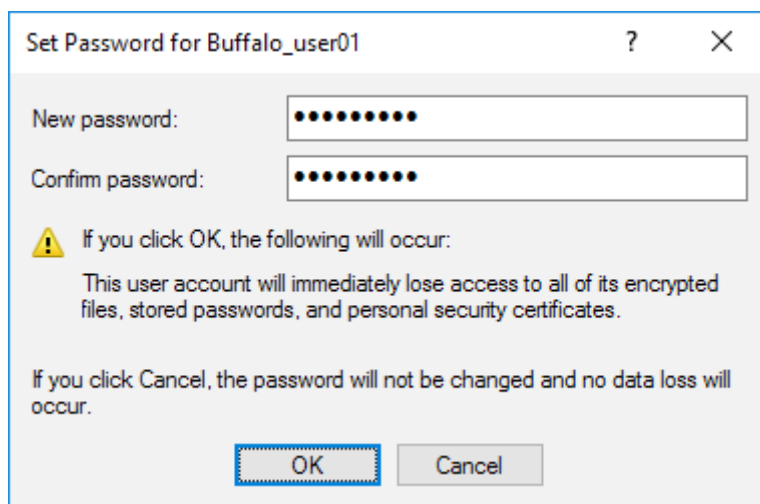
2 Click *Local Users and Groups*, then double-click *Users*.

3 Right-click the user whose password will be changed and click *Set Password*.



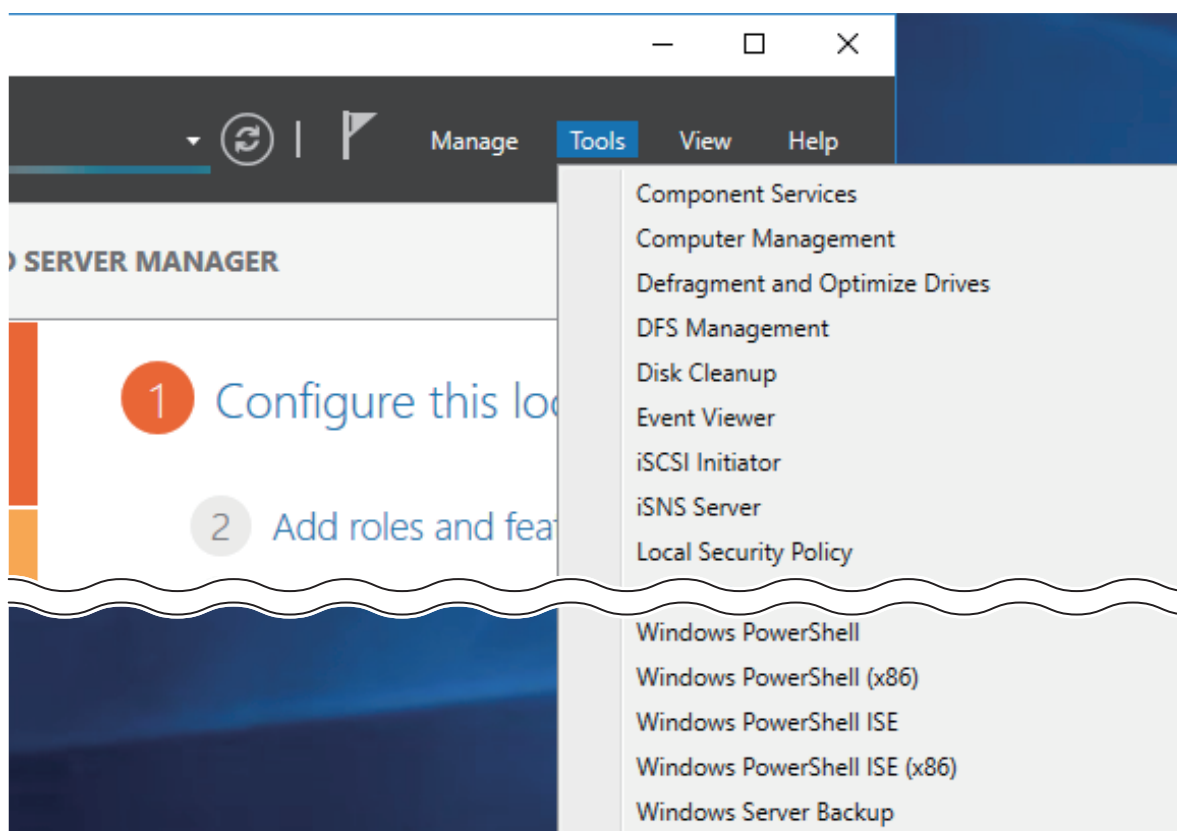
4 Click *Proceed*.

5 Enter a new password (twice).



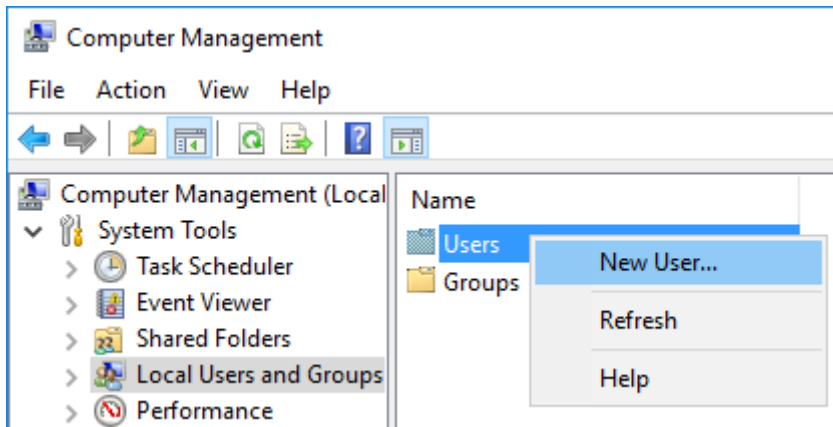
Adding a User

1 From Server Manager, click *Tools > Computer Management*.

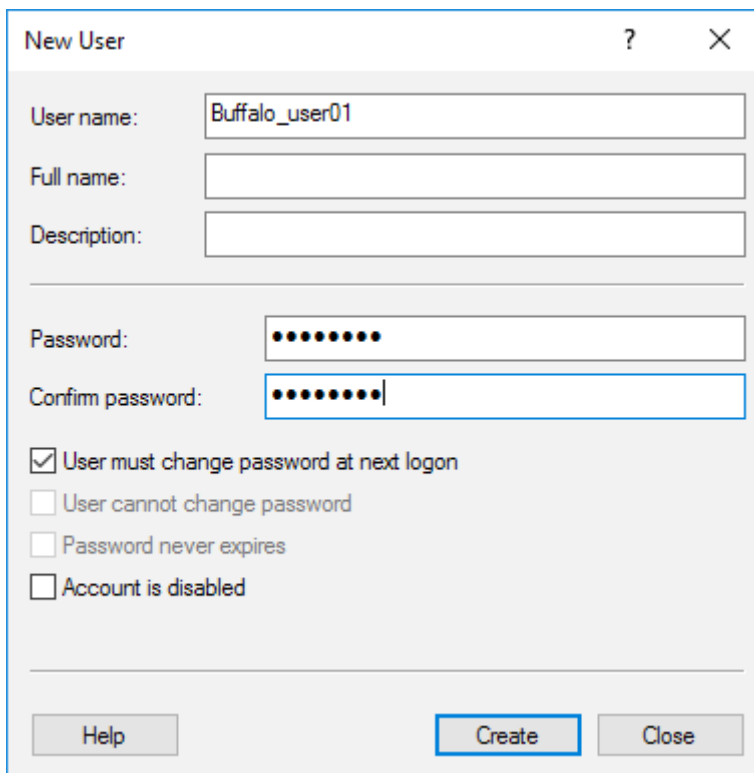


2 Click *Local Users and Groups*.

3 Right-click *Users* and click *New User*.



4 Enter the desired settings and click *Create*.

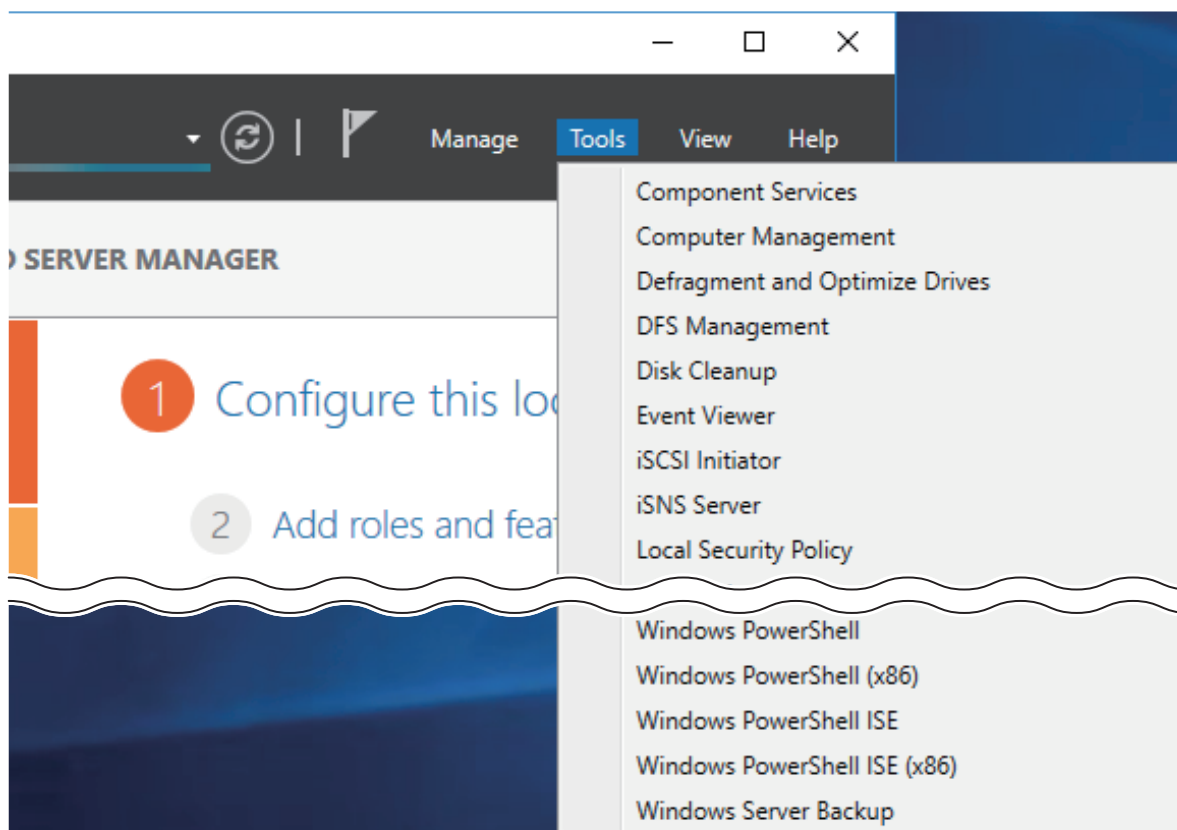


5 Click *Close*.

Connecting with Standard Accounts

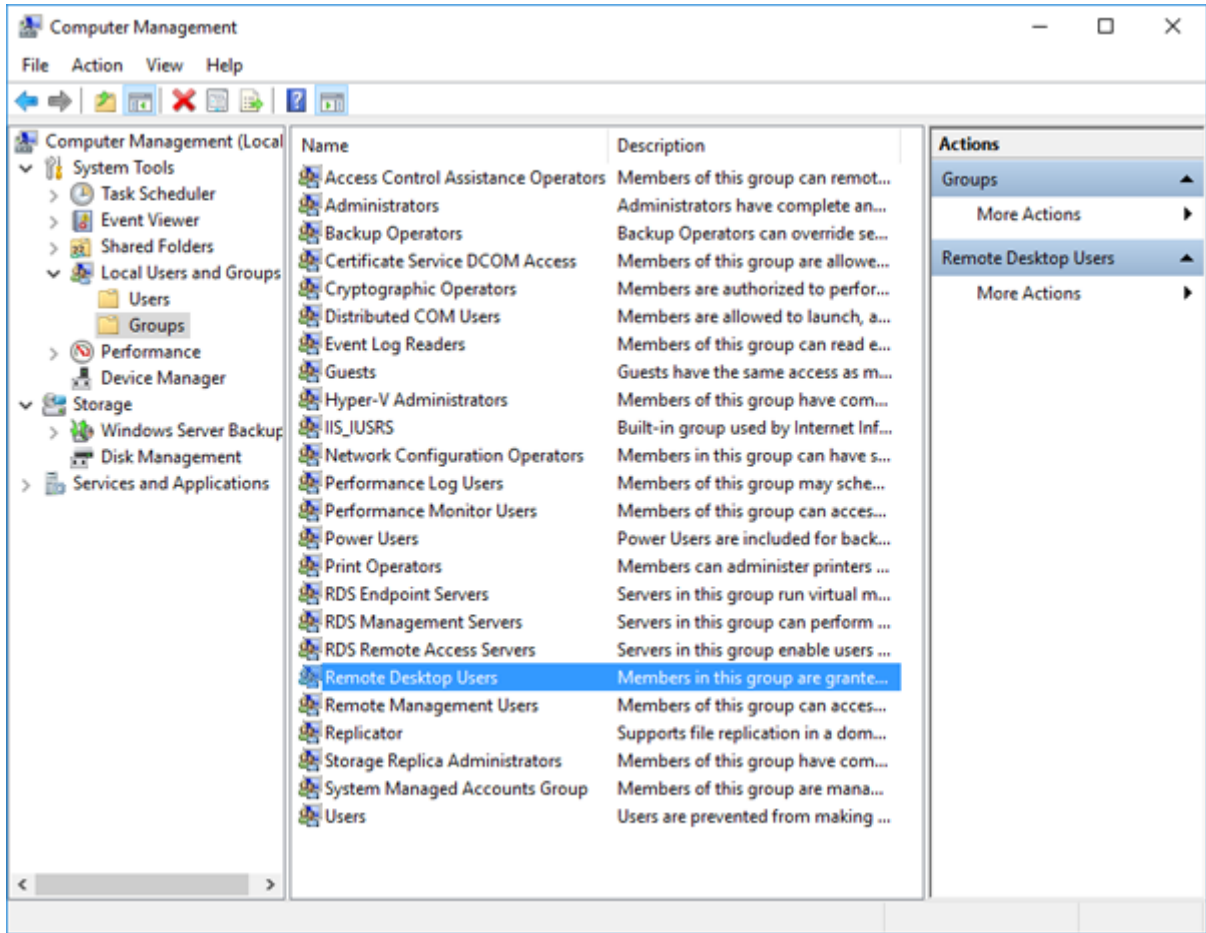
Accounts not belonging to the Administrators group cannot connect to Windows Storage Server through the remote desktop. Those accounts must be added to the "Remote Desktop Users" group. Follow the procedure below to add accounts to the group.

1 From Server Manager, click *Tools > Computer Management*.



2 Click *Local Users and Groups*, then double-click *Groups*.

3 Double-click *Remote Desktop Users*.

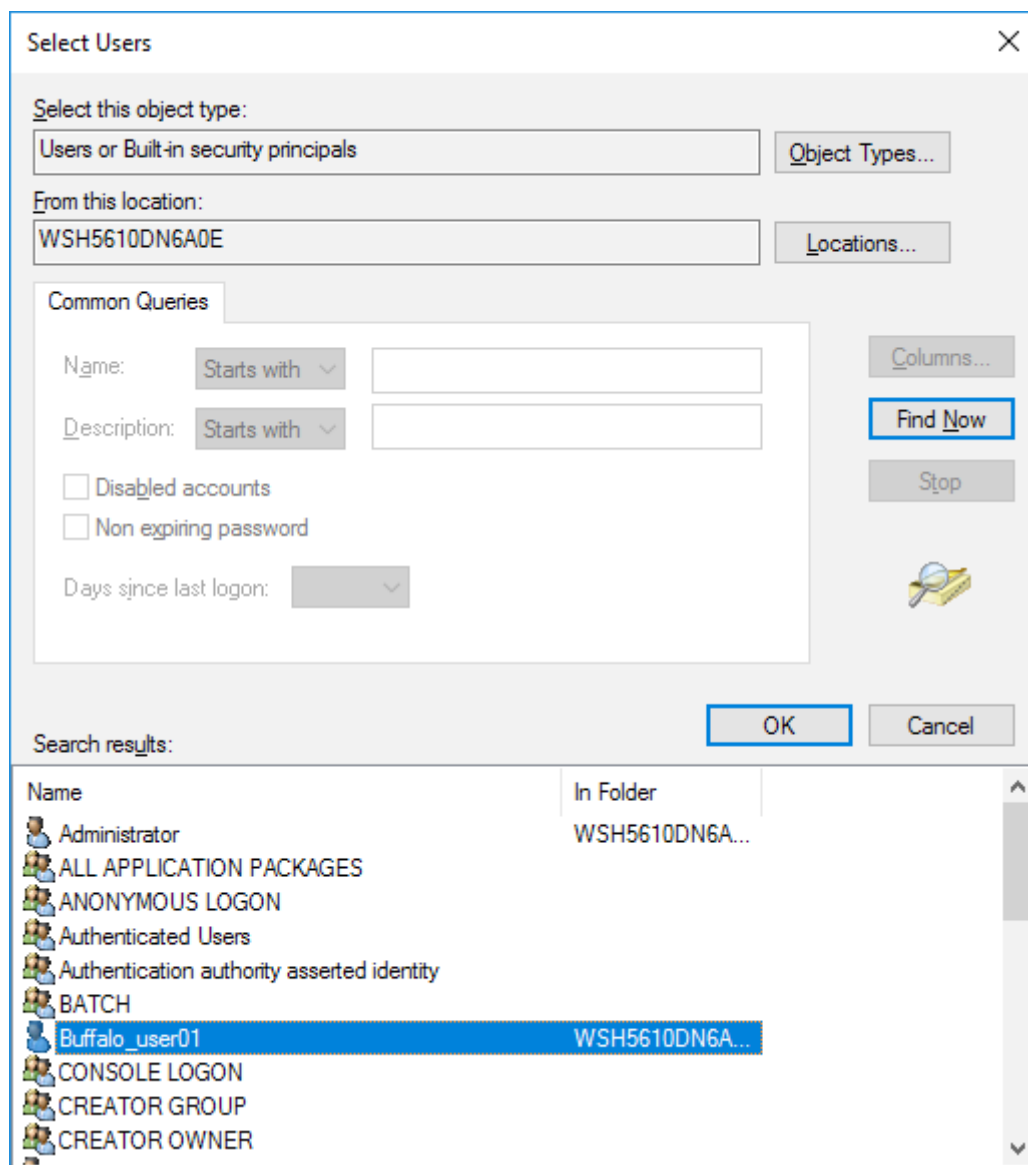


4 Click *Add*.

5 Click *Advanced*.

6 Click *Find Now*.

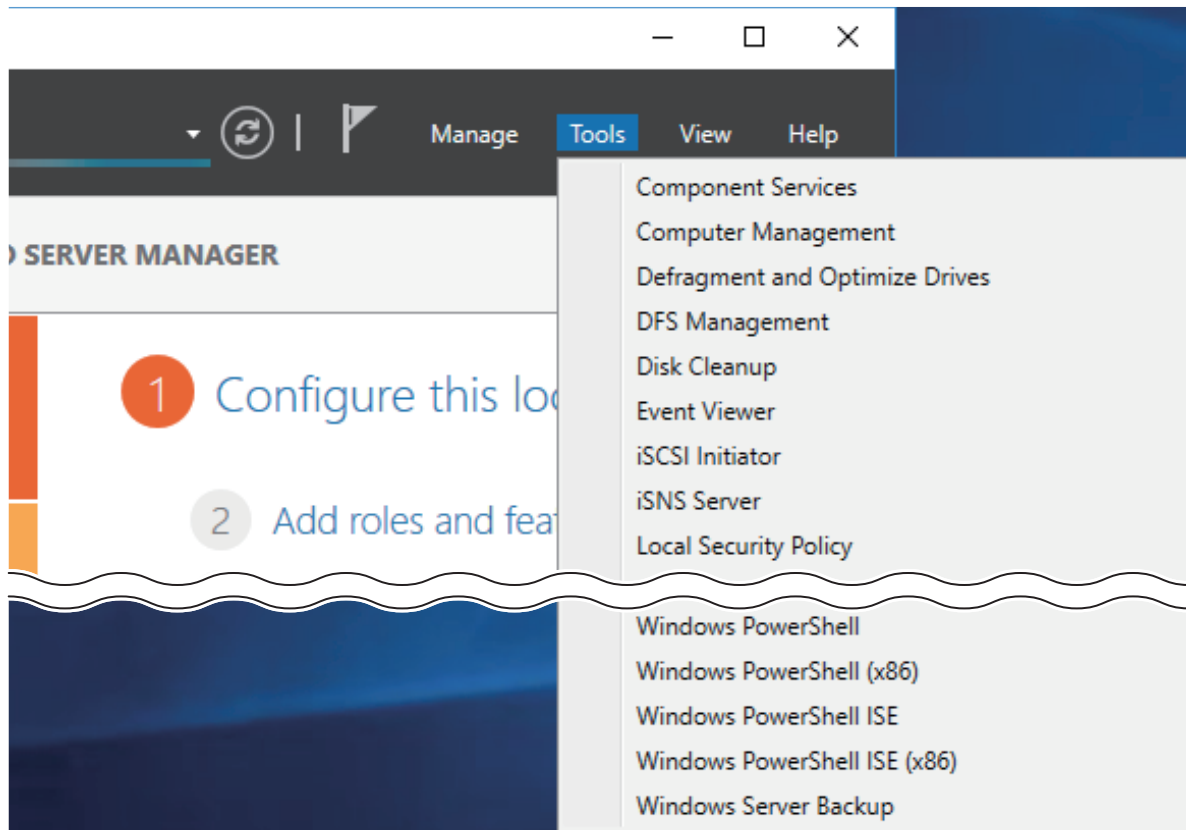
7 Select the user to be added as a group member and click *OK*.



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

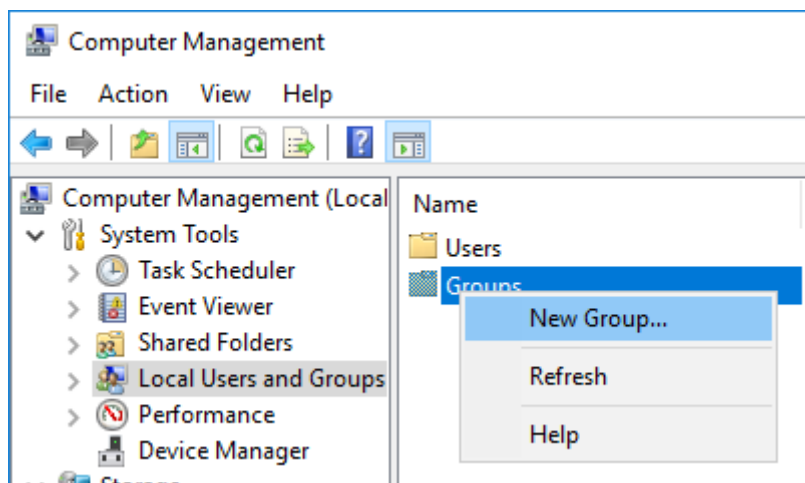
Adding a Group

- 1 From Server Manager, click *Tools > Computer Management*.



- 2 Click *Local Users and Groups*.

- 3 Right-click *Groups* and choose *New Group*.



4 Enter a group name and click *Add*.

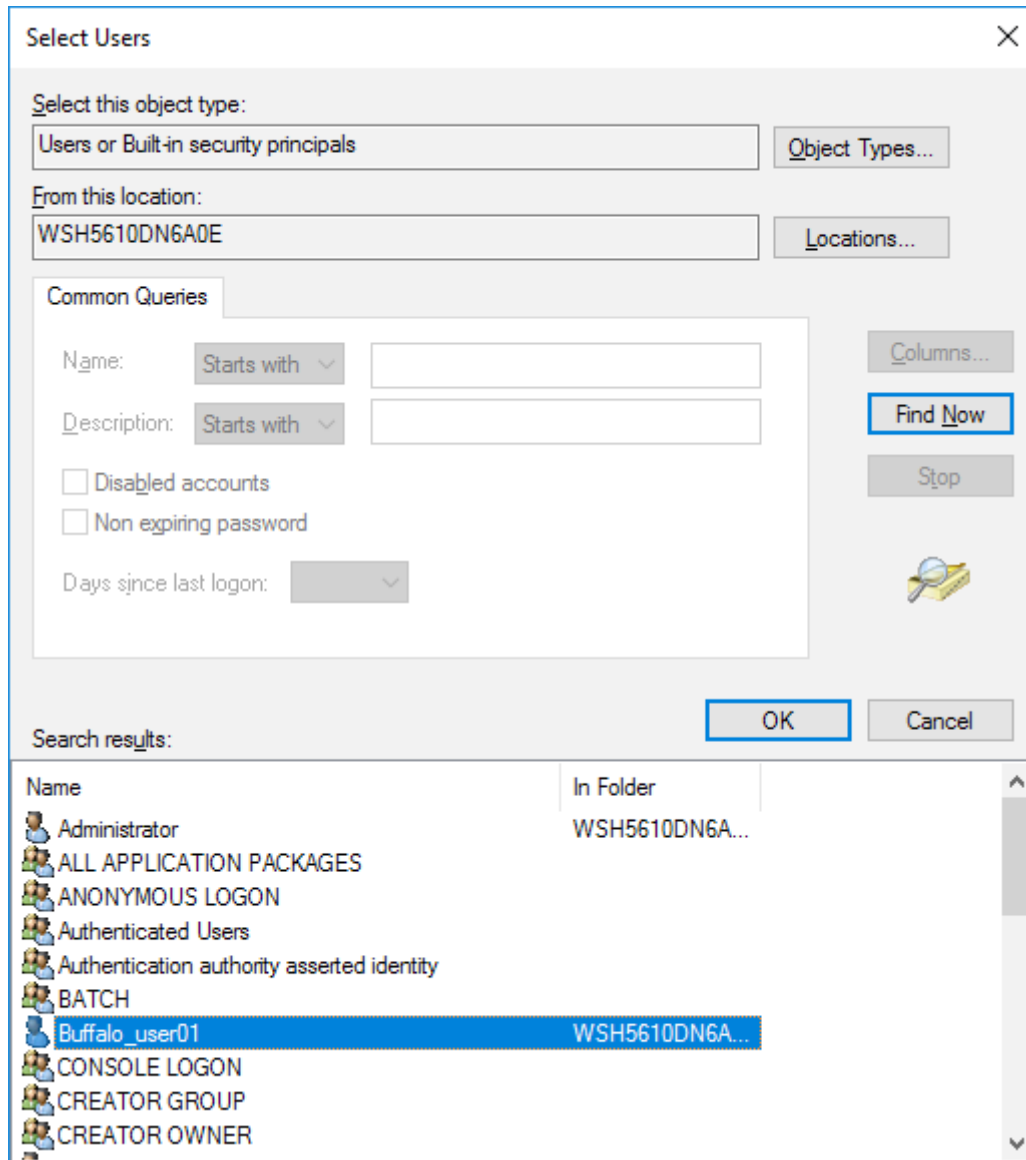
The image shows a 'New Group' dialog box with the following elements:

- Group name: Buffalo_group01
- Description: (empty)
- Members: (empty list)
- Buttons: Add..., Remove, Help, Create, Close

5 Click *Advanced*.

6 Click *Find Now*.

7 Select the users to be registered to the group.



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

9 Click *Create*.

10 Click *Close*.

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 any of TeraStation reports or Windows event logs.

Configuring Email Server

1 Click the Start button and click *Email Notification*.

2 Select the “Enable email notification” checkbox.

3 Click *New* and enter an email address.

4 Enter your email server settings. Click *OK* to finish the email notification settings. You can send a test email when clicking *Test Message*.

5 Enter the password of the user you’re logged in as and click *OK*.

Items	Descriptions
Enable email notification	If enabled, email reports will be sent during specific events.
Send to	Adds a new receiver for the notification email. Click <i>New</i> to add a new email address. Click <i>Edit</i> to change the receiver settings or <i>Delete</i> to remove an address from the list. Note: Up to five email addresses may be added.

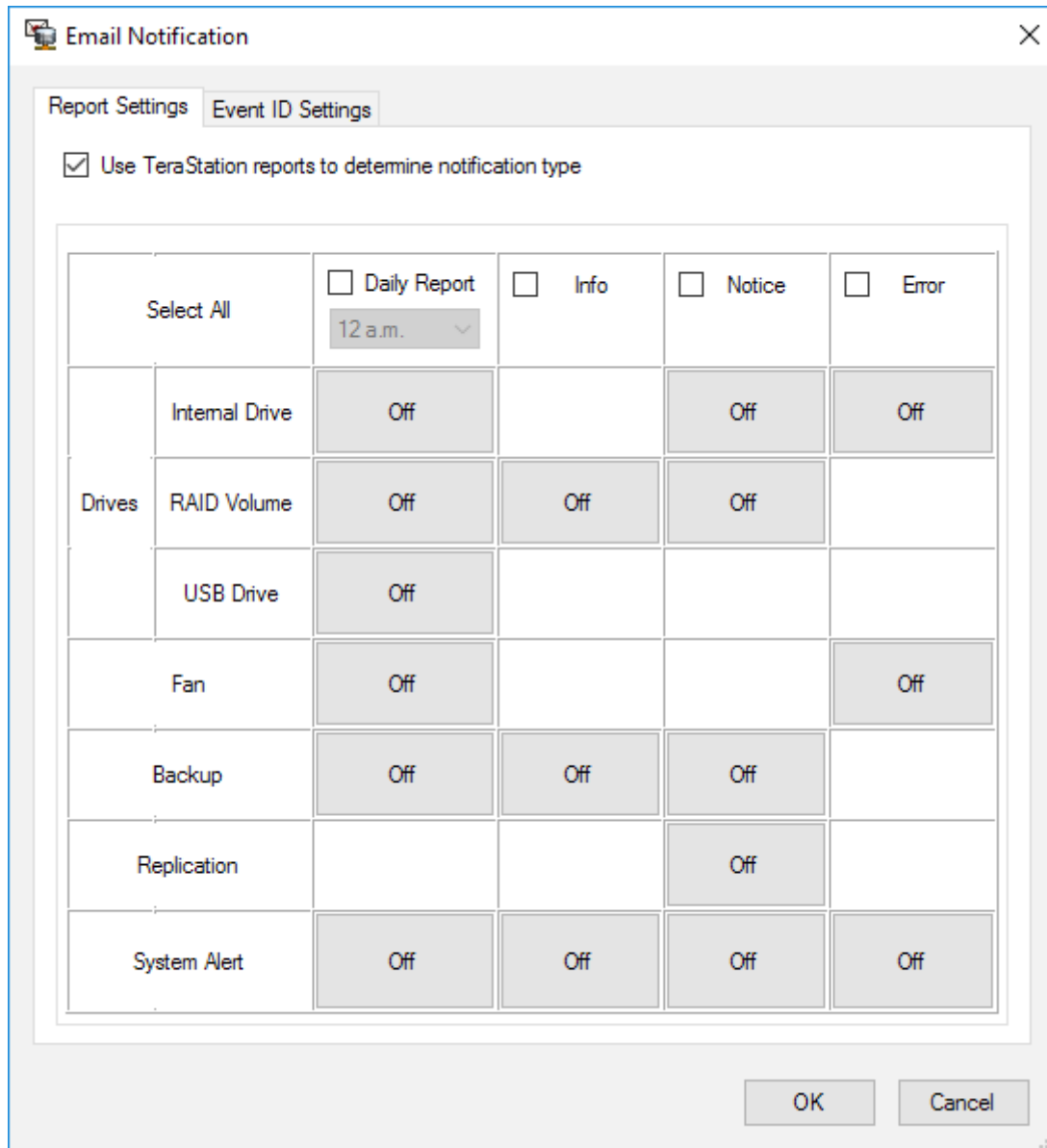
Items	Descriptions
Authentication	<p>SMTP Server Address: Enter your email SMTP server's address and port number. Port number 25 is configured by default.</p> <p>Note: If you choose "None" or "POP before SMTP" for the user authorization, the port number is locked to "25".</p> <p>User Authentication Method: Select the user authorization type from "None", "POP before SMTP", "LOGIN (SMTP-AUTH/LOGIN)", and "CRAM-MD5 (SMTP-AUTH/CRAM-MD5)". If "POP before SMTP" is selected, enter the POP server address and port number. Unless the port is specified, the standard port number (110) is used.</p> <p>Username and Password: Enter the username and password of your email server.</p> <p>SSL/TLS: If "LOGIN (SMTP-AUTH/LOGIN)" or "CRAM-MD5 (SMTP-AUTH/CRAM-MD5)" is selected, select whether to use SSL/TLS or STARTTLS.</p>
Email Settings	<p>Sender Address: Enter the sender's email address for notification emails.</p> <p>Title: Enter the subject of the notification email.</p> <p>Click <i>Content Options</i> to select the event that will trigger the notification emails to be sent.</p>
Test Message	Sends a test email to the email address which is configured.

Specifying TeraStation Reports

A notification email can be sent using TeraStation reports.

- 1 Click the Start button and click *Email Notification*.
- 2 Click *Content Options*.

3 Click the *Report Settings* tab and select the “Use TeraStation reports to determine notification type” checkbox.



4 Click *On* or *Off* to enable/disable the notifications of the function. When you select the checkboxes to the left of each log level, all notifications of the line will be selected at once.

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

6 Enter the password of the user you’re logged in as and click *OK*.

The notification emails will be categorized into the following importance levels.

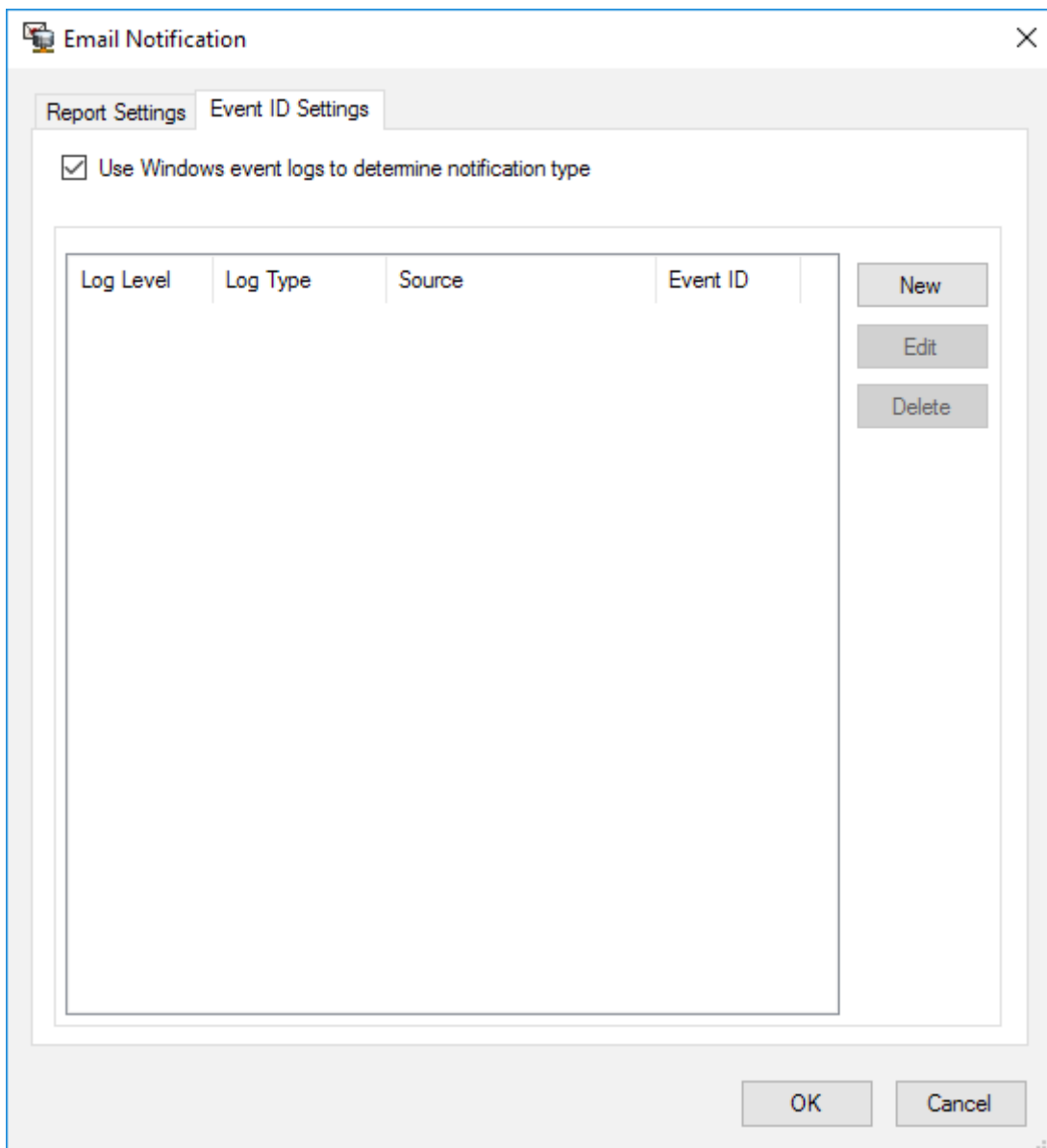
Levels	Details
Daily Report	Describes the status of the TeraStation in a daily report email.
Info	Sends a notification email if an event occurs. Info reports will contain just information such as capacity information, backup job starts/finishes, etc.
Notice	Sends a notification email if a non-critical error occurs. Notice reports will contain warnings such as something has failed, but the function or TeraStation can continue operating as usual. It is recommended to do the corrective action for the notice as soon as possible.

Levels	Details
Error	Sends a notification email if an error occurs. Error reports will describe any critical failures that prevented a function or TeraStation from operating. It is recommended to do the corrective action for the error immediately.

Specifying Windows Event Logs

A notification email will be sent when the specified event occurs. This section describes notifications using Windows Update events.

- 1** Click the Start button and click *Email Notification*.
- 2** Click *Content Options*.
- 3** Click the *Event ID Settings* tab and select the “Use Windows event logs to determine notification type” checkbox.



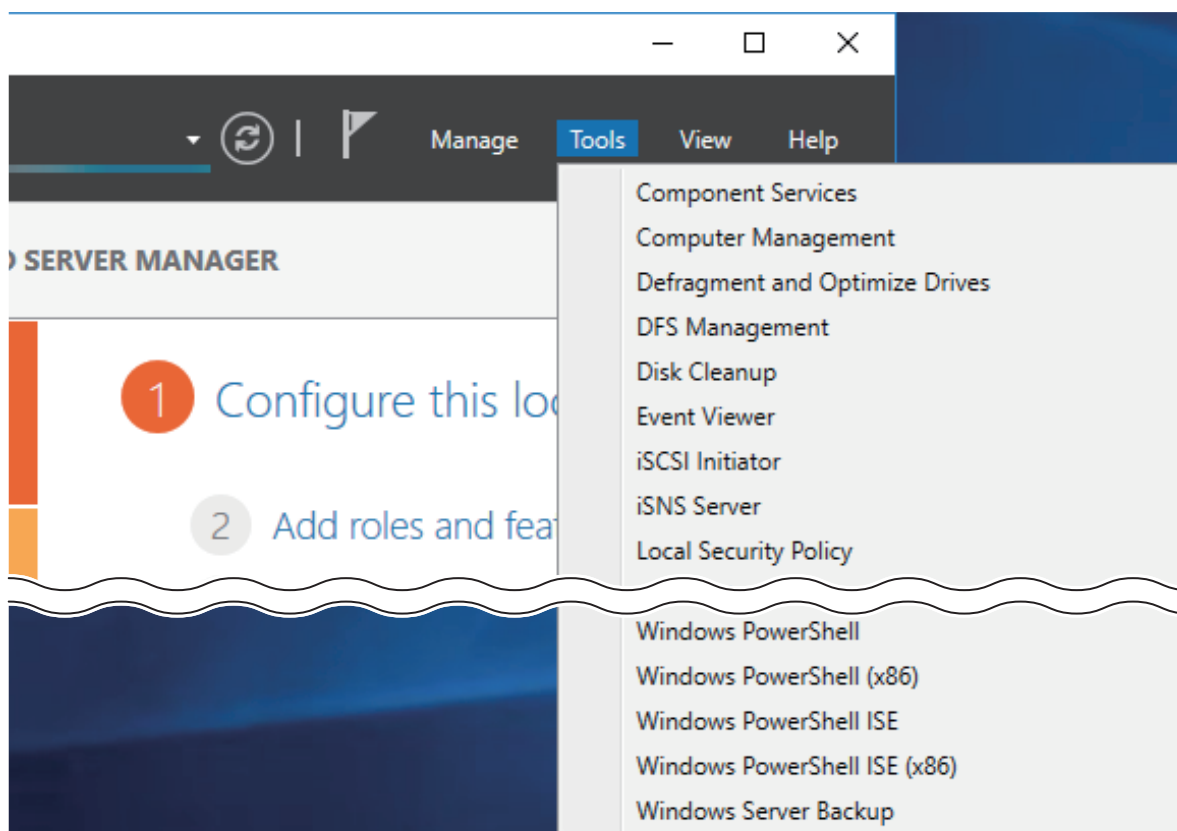
- 4** Click *New*.
- 5** Select the importance level from the “Log Level” list.

- 6 Select "System" from the "Log Type" list.
- 7 Enter "Microsoft-Windows-WindowsUpdateClient" into the "Source" box.
- 8 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.
- 9 Click *OK* three times.
- 10 Enter the password of the user you're logged in as and click *OK*.

Acquiring Windows Event Logs

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

- 1 From Server Manager, click *Tools > Event Viewer*.



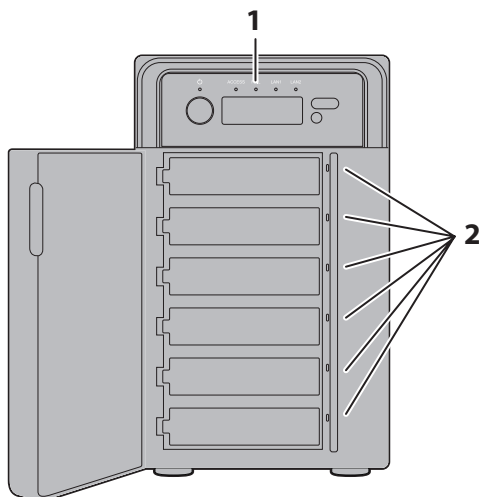
- 2 Double-click *Windows Logs*.
- 3 Right-click on either "Application", "Security", "Setup", or "System" in the left-side menu to determine the logs to be saved.
- 4 Click *Save All Events As*.
- 5 Specify the desired location and enter a filename, then click *Save*. Do not change the file type.
- 6 When the "Display Information" screen appears, click *OK*.

The operation to acquire event logs is complete. Open the log file stored in the specified location to check the contents of the event logs.

Chapter 6 Drive Replacement

LEDs

If a drive fails or dismounts, the LED will glow as below. To see the status LEDs, open the front cover.



1 Fail LED

Glowes amber if a drive has failed.

2 Status LEDs

The failed drive's status LED will be glowing a steady amber. It also glows when the drive is dismounted.

If the volume is fragmented by a drive failure, such as in the case of a 3-drive failure in a RAID 6 volume, the LEDs will glow as above and the "SYSTEM DOWN" message will be displayed on the LCD panel.

Notes:

- For the replacement drive, use a Buffalo OP-HDBN/B series drive. The new drive should be the same size as the replacement drive.
- The TeraStation is fragile. Handle it with care. Do not drop or bump the TeraStation.
- Use caution when handling the TeraStation in order to avoid personal injury.
- Never disassemble any parts while 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 in the TeraStation. For example, pulling out drive 1 and replacing it with drive 2 may cause data to be corrupted or lost.

Drive Replacement Procedure

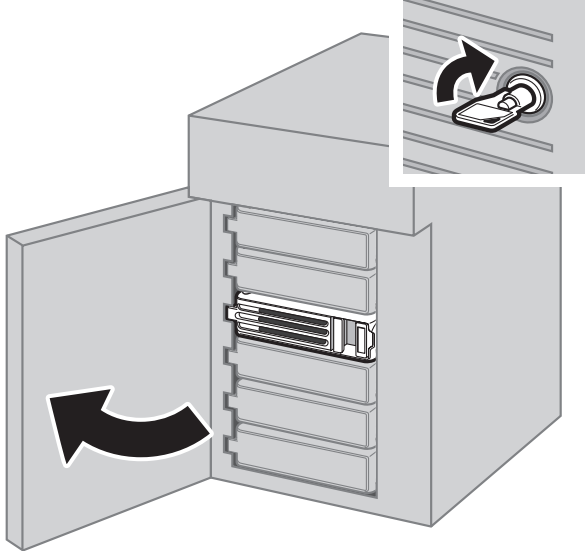
Follow the procedure below to replace a defective drive.

“ONE DRIVE DOWN” Is Displayed on the LCD Panel

If the “ONE DRIVE DOWN” message is displayed, there is no redundancy for RAID 5 and RAID 10 volumes. It is recommended to replace the defective drive immediately. Back up data before replacing drives.

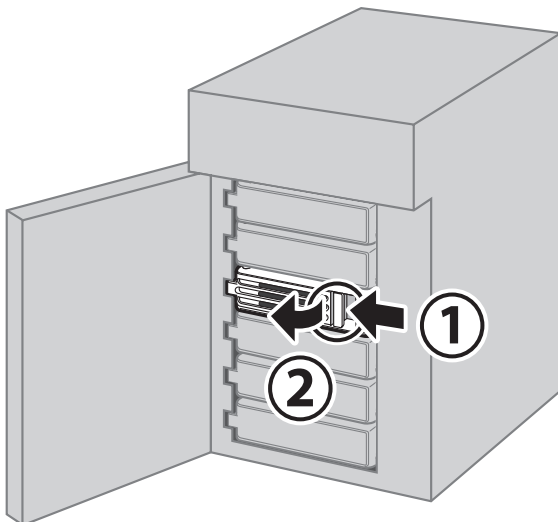
Note: The “x” on the LCD panel message is a number of volume type.

- 1** Open the front cover with the included key.

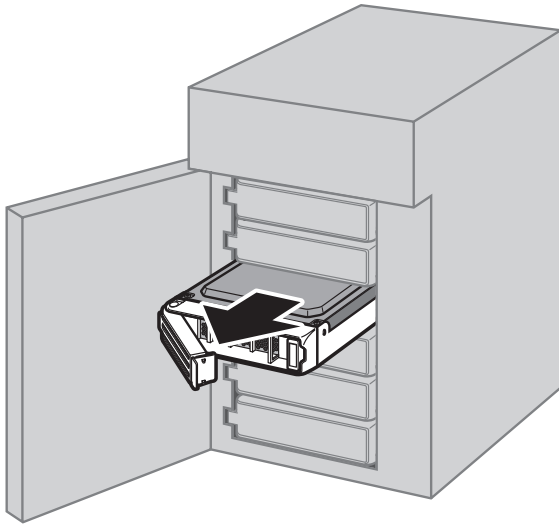


- 2** Check the status LEDs. The LED for the failed drive glows amber.

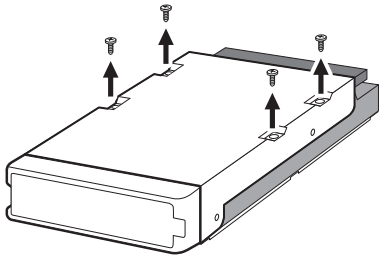
- 3** Push the unlock button of the drive whose status LED is glowing amber and swing the locking mechanism out.
Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.



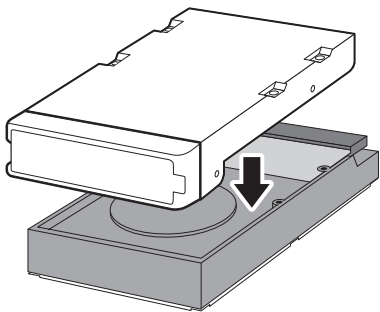
4 Pull out the drive cartridge and remove it from the TeraStation.



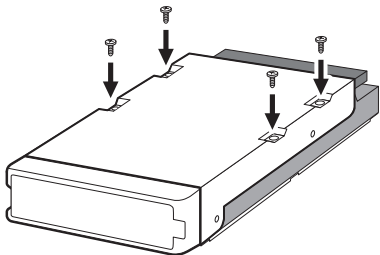
5 Remove the drive from the cartridge.



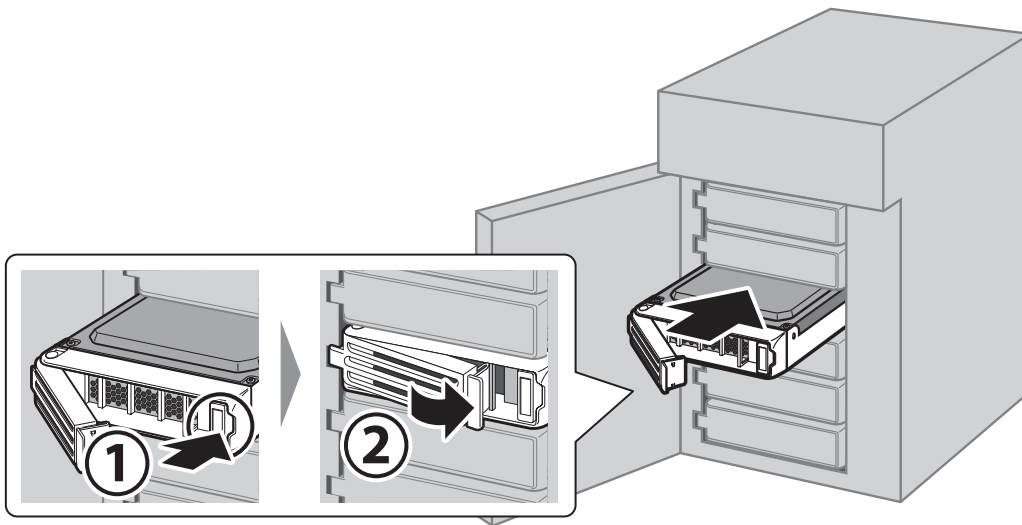
6 Install a new drive into the cartridge.



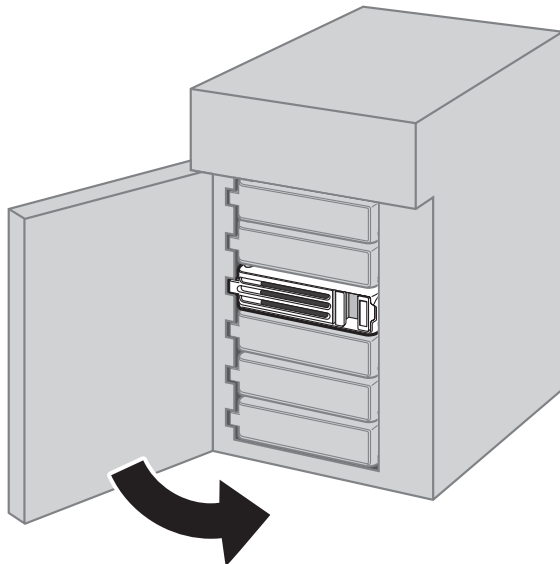
7 Replace the four screws.



- 8** Insert the new drive into the empty slot, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.



- 9** Close the front cover with the key.



- 10** The “RAID-x RECOVERING 0%” message will be displayed on the LCD panel after 3 minutes.

RAID-x
RECOVERING 0%

- 11** When “RAID-x NORMAL” is displayed, drive replacement is finished.

RAID-x
NORMAL

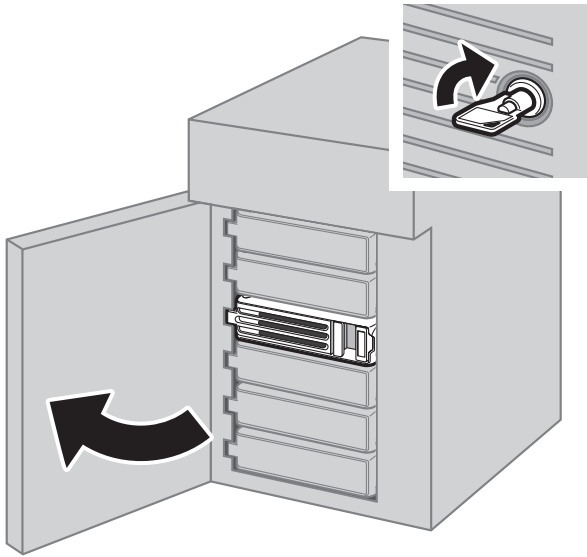
Drive replacement is finished.

“TWO DRIVE DOWN” or “MULTIPLE DOWN” Is Displayed on the LCD Panel

If either the “TWO DRIVE DOWN” message or the “MULTIPLE DOWN” message is displayed, there is no redundancy. It is recommended to replace the defective drive immediately. Back up data before replacing drives.

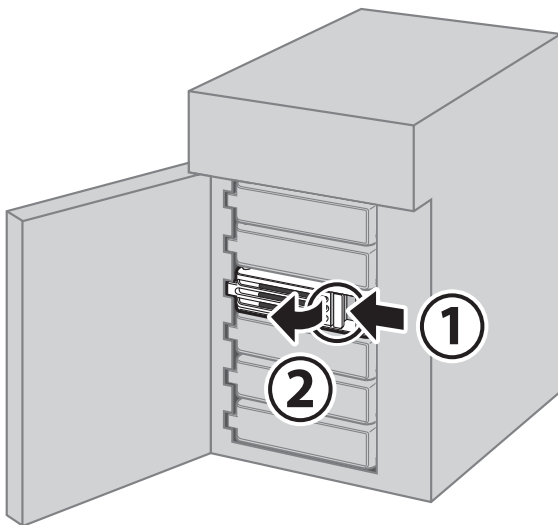
Note: The “x” on the LCD panel message is a number of volume type.

- 1 Open the front cover with the included key.

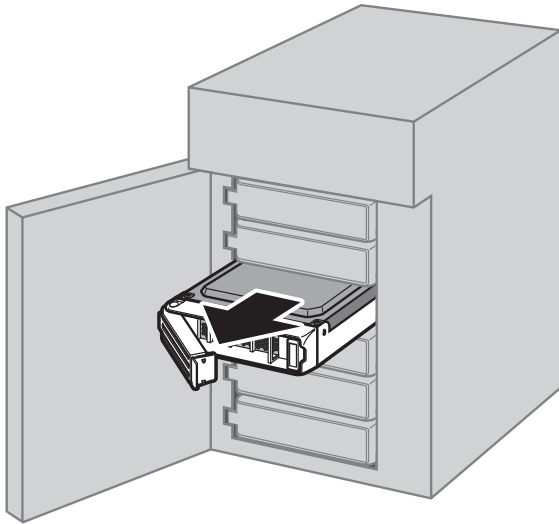


- 2 Check the status LEDs. The LED for the failed drive glows amber.

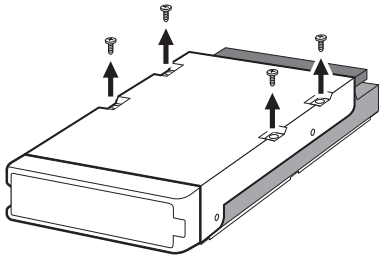
- 3 Push the unlock button of the drive whose status LED is glowing amber and swing the locking mechanism out.
Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.



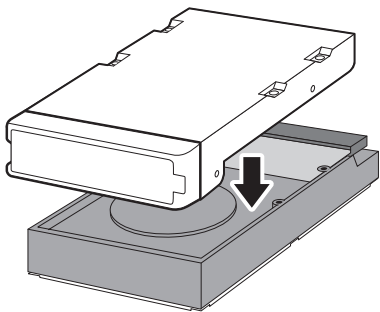
4 Pull out the drive cartridge and remove it from the TeraStation.



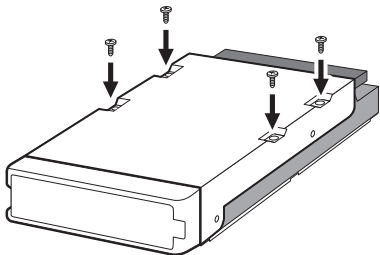
5 Remove the drive from the cartridge.



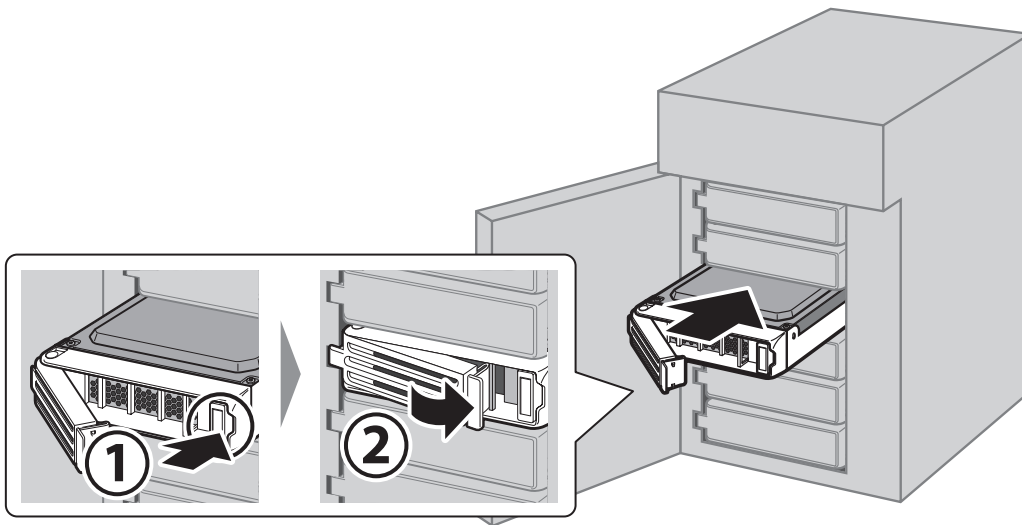
6 Install a new drive into the cartridge.



7 Replace the four screws.



- 8** Insert the new drive into the empty slots, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.



- 9** The “RAID-x RECOVERING 0%” message will be displayed on the LCD panel after 3 minutes.

RAID-x
RECOVERING 0%

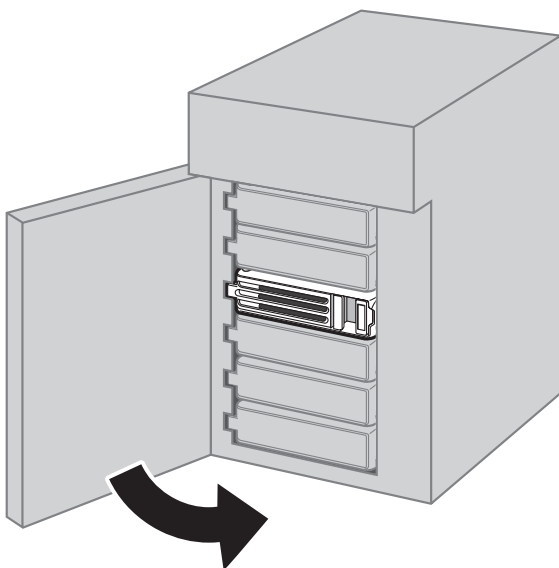
- 10** When “RAID-x ONE DRIVE DOWN” is displayed, replacement for a defective drive is finished.

RAID-x
ONE DRIVE DOWN

- 11** Push the rest of the failed drive’s unlock button and swing the locking mechanism out.

- 12** Insert the new drive into the empty slot, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.

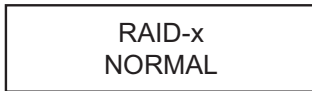
- 13** Close the front cover with the key.



- 14** The “RAID-x RECOVERING 0%” message will be displayed on the LCD panel after 3 minutes.



- 15** When “RAID-x NORMAL” is displayed, drive replacement is finished.

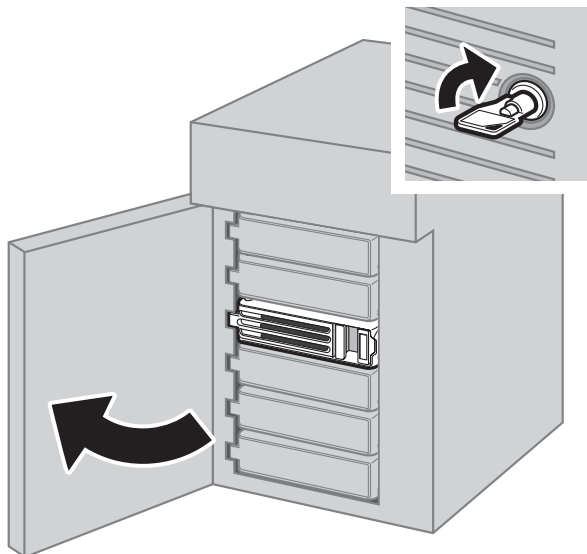


“SYSTEM DOWN” Is Displayed on the LCD Panel

When the “SYSTEM DOWN” message is displayed, data on the TeraStation has already been lost. The issue occurs on the drive so the operating system may become unstable. It is recommended to replace the defective drive immediately. Back up data before replacing drives.

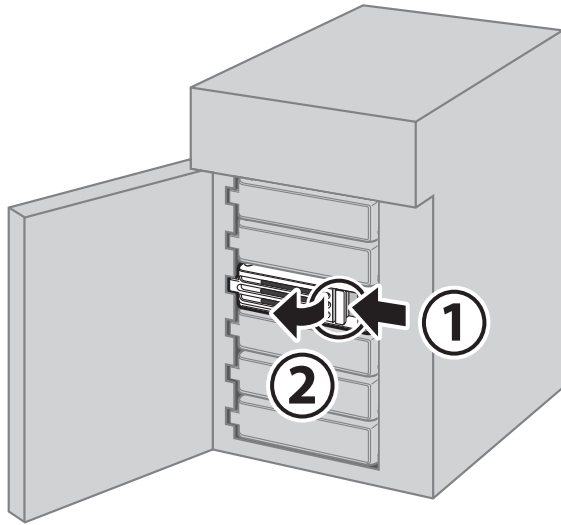
For Striped Volume:

- 1** Turn off the TeraStation. It may take some time until the shutdown process completes.
- 2** Turn the TeraStation on while holding down the mode button.
- 3** When “RAID-0 NORMAL” is displayed, you can proceed.
If “SYSTEM DOWN” is still displayed, go to the next step to replace the defective drive.
- 4** Open the front cover with the included key.

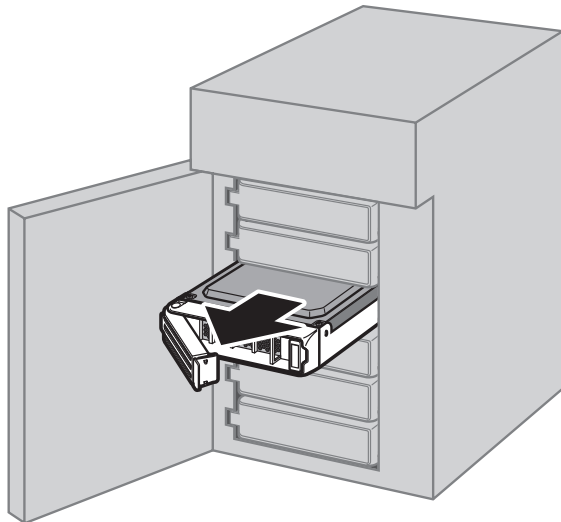


- 5** Check the status LEDs. The LED for the failed drive glows amber.
- 6** Push the unlock button of the drive whose status LED is glowing amber and swing the locking mechanism out.

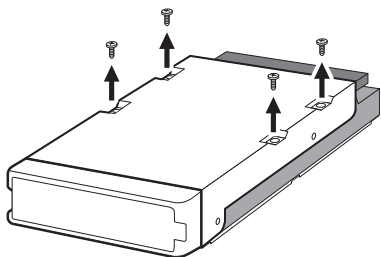
Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.



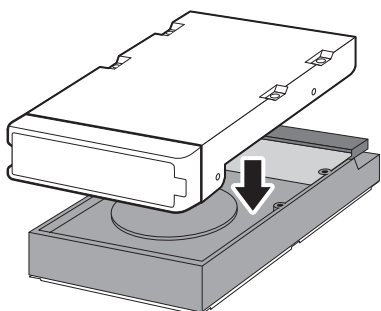
7 Pull out the drive cartridge and remove it from the TeraStation.



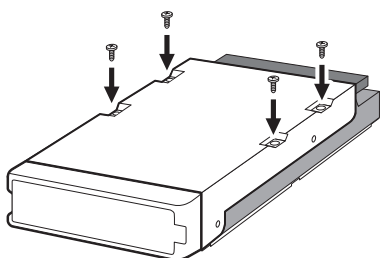
8 Remove the drive from the cartridge.



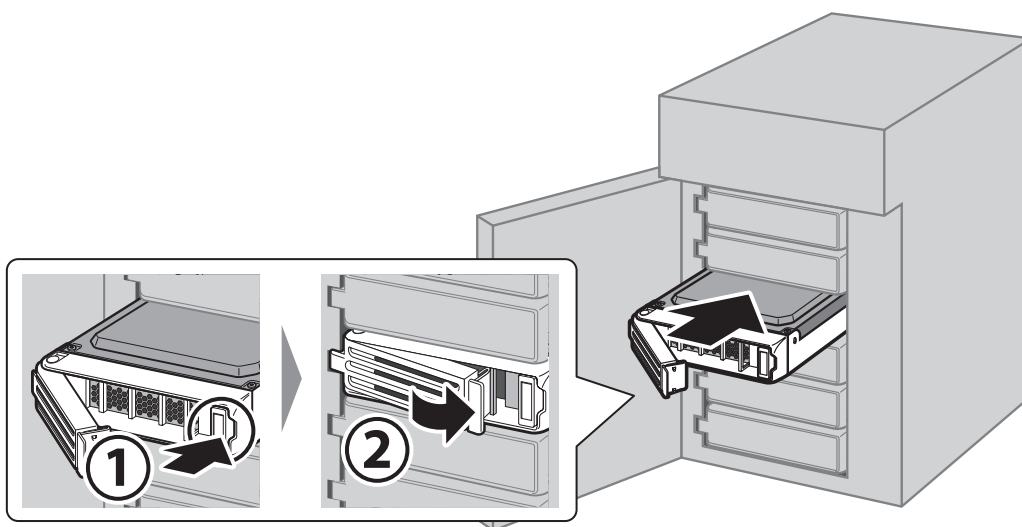
9 Install a new drive into the cartridge.



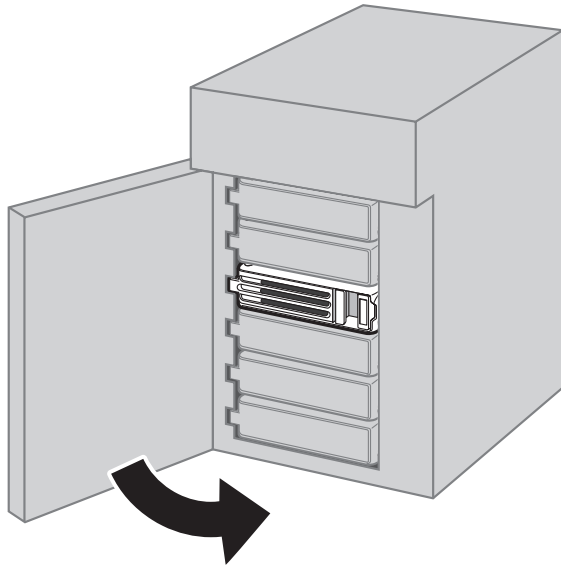
10 Replace the four screws.



11 Insert the new drive into the empty slots, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.

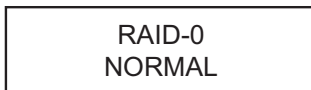


12 Close the front cover with the key.



13 Turn the TeraStation off first, then turn it on while holding down the mode button.

14 "RAID-0 NORMAL" will be displayed on the LCD panel.



15 Create a volume by referring to the "Creating a Volume" section in chapter 3.

For RAID 6 or RAID 10 Volumes:

1 Open the front cover with the included key.

2 Check the status LEDs. The LED for the failed drive glows amber.

3 Pull out two drive cartridges whose status LED glow amber and remove them from the TeraStation. Leave the drives whose status LEDs blink amber in the TeraStation.

Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.

4 Turn off the TeraStation. It may take some time until the shutdown process completes.

5 Turn on the TeraStation while holding down the mode button with the drives left removed.

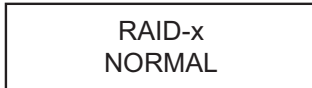
6 When either the "RAID-x TWO DRIVE DOWN" message or the "MULTIPLE DOWN" message is displayed, replace the defective drive by referring to the "TWO DRIVE DOWN" or "MULTIPLE DOWN" Is Displayed on the LCD Panel" section above.

If "SYSTEM DOWN" is still displayed, go to the next step to replace more defective drives.

7 Pull out other defective drive cartridges whose status LED glows amber and remove them from the TeraStation.

8 Remove drives from the cartridges and install new drives in them.

- 9 Insert the new drive into all empty slots, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.
- 10 Close the front cover with the key.
- 11 Turn the TeraStation off, then turn it on while holding down the mode button.
- 12 "RAID-x NORMAL" will be displayed on the LCD panel.

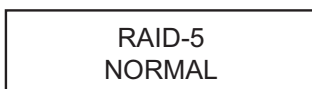


If either "RAID-x ONE DRIVE DOWN", "RAID-x TWO DRIVE DOWN", or "SYSTEM DOWN" messages are displayed, try the procedure described in each section above.

- 13 Create a volume by referring to the "Creating a Volume" section in chapter 3.

For RAID 5 Volume:

- 1 Open the front cover with the included key.
- 2 Check the status LEDs. The LED for the failed drive glows amber.
- 3 Pull out one drive cartridge whose status LED glow amber and remove them from the TeraStation. Leave the drives whose status LEDs blink amber in the TeraStation.
Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.
- 4 Turn off the TeraStation. It may take some time until the shutdown process completes.
- 5 Turn on the TeraStation while holding down the mode button with the drives left removed.
- 6 When the "RAID-5 ONE DRIVE DOWN" message is displayed, replace the defective drive by referring to the "ONE DRIVE DOWN" Is Displayed on the LCD Panel" section above.
If "SYSTEM DOWN" is still displayed, go to the next step to replace the defective drive.
- 7 Remove another defective drive cartridge whose status LED glows amber from the TeraStation.
- 8 Remove drives from the cartridges and install new drives in them.
- 9 Insert the new drive into all empty slots, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.
- 10 Close the front cover with the key.
- 11 Turn the TeraStation off, then turn it on while holding down the mode button.
- 12 "RAID-5 NORMAL" will be displayed on the LCD panel.



If "RAID-5 ONE DRIVE DOWN" or "SYSTEM DOWN" is displayed, try the procedure described in the each section above.

13 Create a volume by referring to the “Creating a Volume” section in chapter 3.

Replacing a Non-Malfunctioning Drive

Do not replace a drive that is not malfunctioning.

If you must change a drive that is not malfunctioning, shut down the TeraStation before replacing the drive. If you need to replace more than one drive at the same time, replace the drives one at a time to preserve your data. When replacing the non-malfunctioning drive, follow the procedures below:

Operating in Striped Volume

All data on the volume will be deleted after replacing the drive. You will not be able to use the TeraStation until the drive has been replaced. Refer to the ““SYSTEM DOWN” Is Displayed on the LCD Panel” section above for the procedure.

Operating in a Redundant Volume Other Than Striped Volume

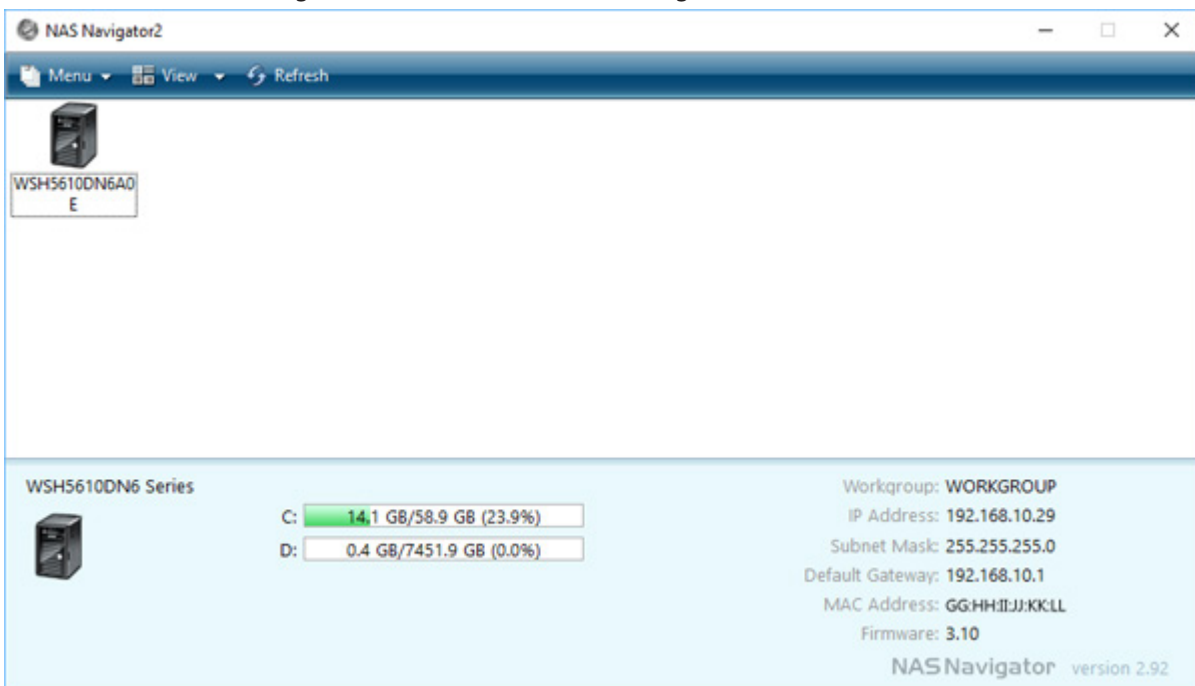
If you are using a redundant volume such as RAID 5 or 6, the volume will be in degraded mode after replacing the drive. You need to recover from degraded mode by replacing the drive. Refer to the ““ONE DRIVE DOWN” Is Displayed on the LCD Panel” section above for the procedure.

Chapter 7 Utilities

NAS Navigator2 for Windows

NAS Navigator2 is a utility program that makes it easy to display Windows Storage Server, change the TeraStation's IP address, or check its drive in remote desktop. To install NAS Navigator2, download the installer from <http://d.buffalo.jp/WSH5010N6/>.

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



Click a TeraStation's icon to display total capacity, used capacity, workgroup name, IP address, subnet mask, default gateway, MAC address, and firmware version.

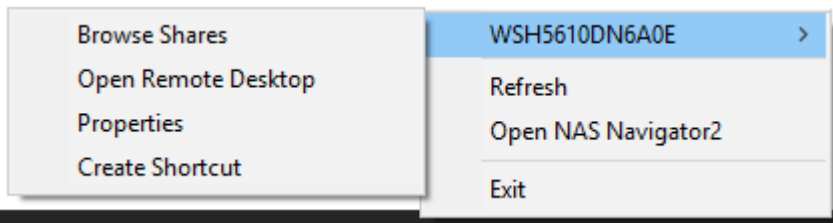
Double-click the icon to open a shared folder on the TeraStation.

Name	Description	
Menu	Map All Remote Shares to Drive Letters	Assigns all Buffalo NAS devices' shared folders as network drives. This is available only when a shared folder has been created.
	Create Desktop Shortcut*	Creates a desktop shortcut to the Buffalo NAS device's shared folders.
	Launch NAS Navigator2 on Startup	Launches NAS Navigator2 in the system tray when Windows boots.
	Display Errors	If an error occurs, an error message will appear from the NAS Navigator2 icon in the system tray.
	Properties*	Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.
	Close	Closes NAS Navigator2.

Name		Description
View	View	Icons: Displays icons. Details: Displays the hostname, product name, workgroup, IP address, subnet mask, and default gateway.
	Sort by	If you have multiple Buffalo NAS devices on the network, you may choose to display them in order of hostname, product name, workgroup, IP address, subnet mask, or default gateway.
Browse*		Opens the Buffalo NAS device's shared folders.
Refresh		Searches for the Buffalo NAS devices on the network again.
Right-click your device's icon to show these menus.	Browse Shares	Opens the Buffalo NAS device's shared folders.
	Open Remote Desktop	Opens Windows Storage Server in remote desktop.
	Properties	Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.
	Create Desktop Shortcut	Creates a desktop shortcut to the Buffalo NAS device's shared folders.

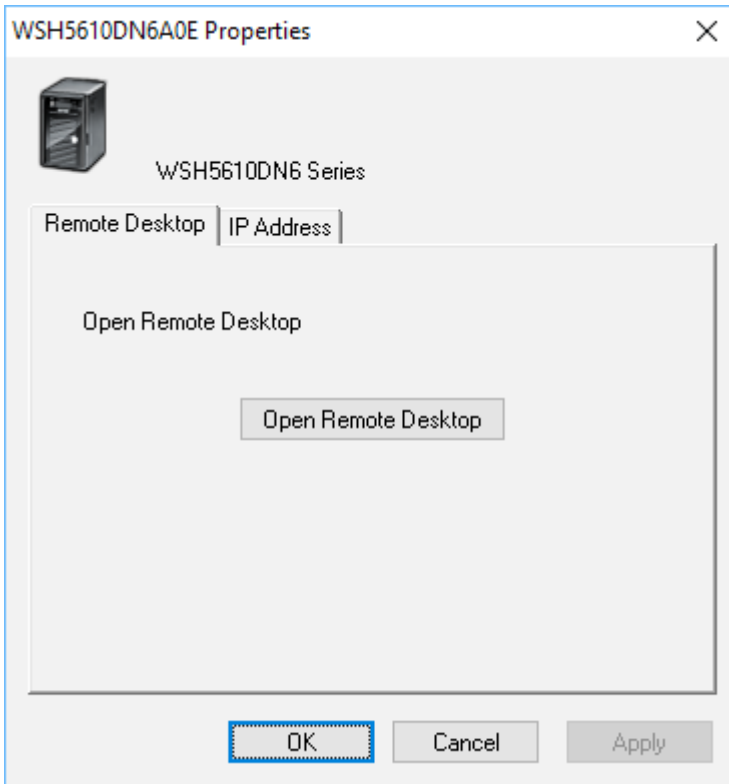
*Click on the Buffalo NAS device's icon to display these options.

When NAS Navigator2 is closed, right-click the NAS Navigator2 icon in the system tray for the following options.




Name		Description
Buffalo NAS device name	Browse Shares	Opens the Buffalo NAS device's shared folders.
	Open Remote Desktop	Opens Windows Storage Server in remote desktop.
	Properties	Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.
	Create Shortcut	Creates a desktop shortcut to the Buffalo NAS device's shared folders.
Refresh		Searches for the Buffalo NAS devices on the network again.
Open NAS Navigator2		Opens the NAS Navigator2 window.
Exit		Exits NAS Navigator2.

The following tasks may be performed from the Buffalo NAS device's properties page.



Name	Description
Remote Desktop	Click <i>Open Remote Desktop</i> to open Windows Storage Server.
IP Address	Select the "Use DHCP" checkbox to assign an IP address from the DHCP server automatically. If there is no DHCP server on the network, you cannot use this function. Select the "Renew IP address" checkbox to obtain an IP address from the DHCP server. You can manually enter a static IP address, subnet mask, and default gateway.

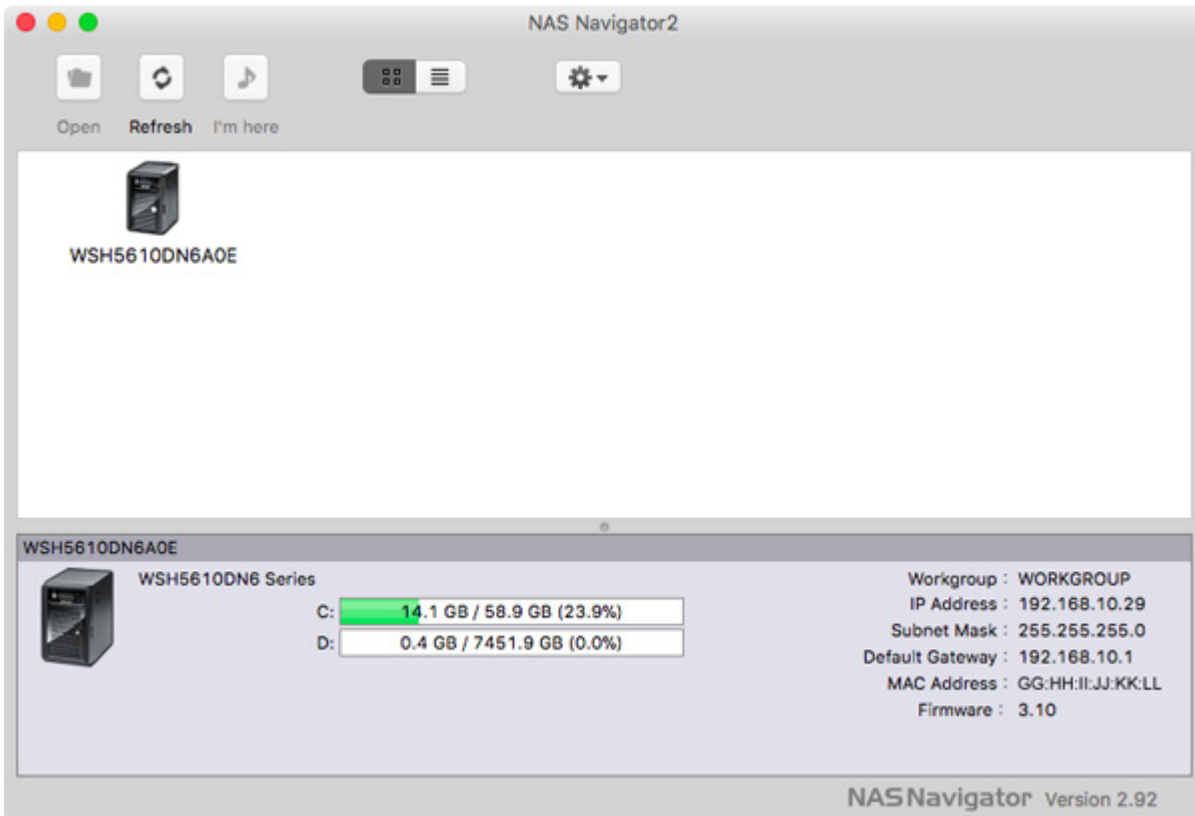
Changing the IP Address

- 1** Double-click the NAS Navigator2 icon () to start NAS Navigator2.
- 2** Right-click your TeraStation's icon and select *Properties > IP Address*.
- 3** Clear the "Use DHCP" checkbox and enter the desired settings, then click *OK*. If the username and password prompt appears, enter the admin username and password.

NAS Navigator2 for macOS

NAS Navigator2 is a utility program that makes it easy to display Windows Storage Server, change the TeraStation's IP address, or check its drive in remote desktop. To install NAS Navigator2, download the installer from <http://d.buffalo.jp/WSH5010N6/>.

Click the NAS Navigator2 icon () in the Dock to start NAS Navigator2.

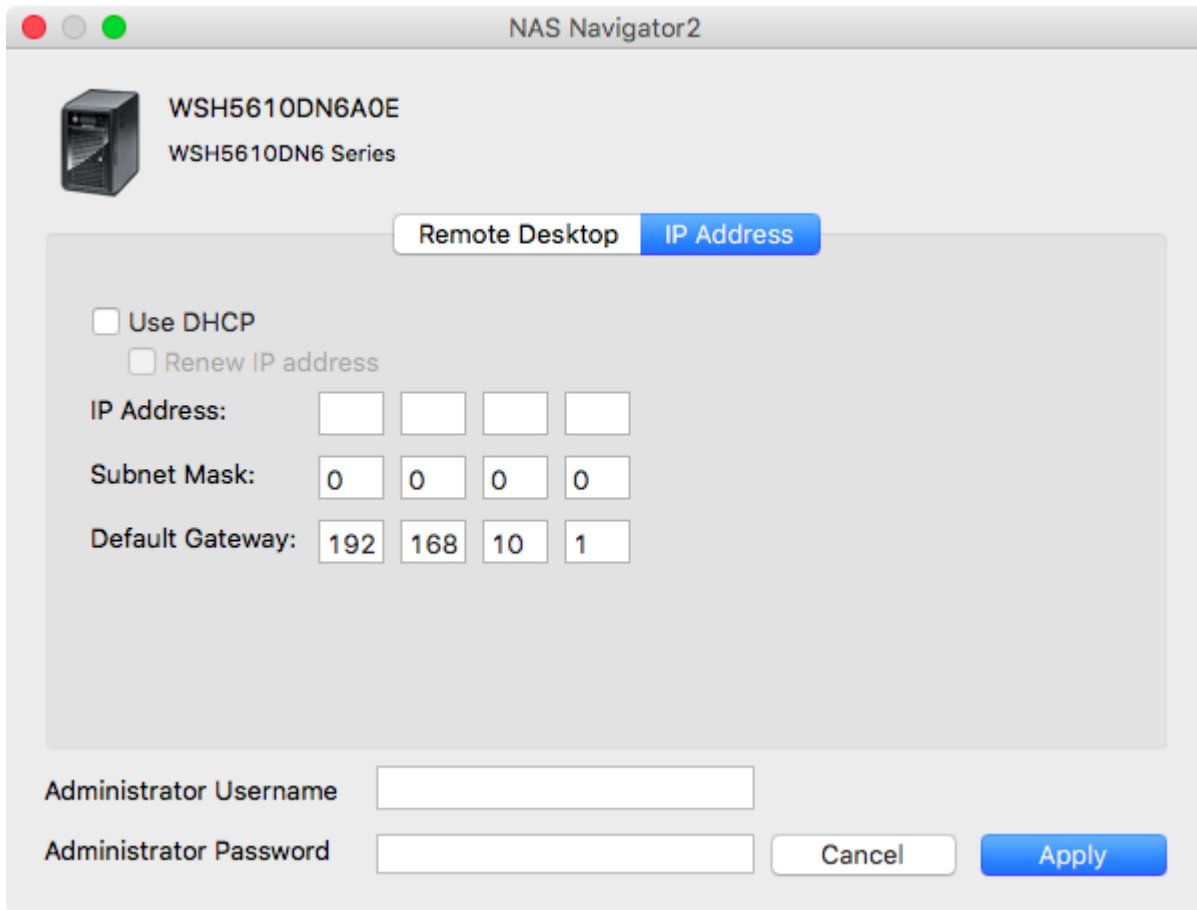


Click a TeraStation's icon to display total capacity, used capacity, workgroup name, IP address, subnet mask, default gateway, MAC address, and firmware version.

Double-click the icon to open a shared folder on the TeraStation.


Name	Description	
Open	Opens the Buffalo NAS device's shared folders.	
Refresh	Searches for the Buffalo NAS devices on the network again.	
Open Remote Desktop	Opens Windows Storage Server in remote desktop.	
Configure	Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.	
Label Color	Selects the color of the name displayed below the icon.	
View Options	Lets you choose icon size, position, and view mode.	
Auto Power Mode	Auto power mode can turn supported Buffalo NAS devices on the network on and off automatically.	
To display these options, hold down the control key and click your device's icon.	Open Folder	Opens the Buffalo NAS device's shared folders.
	Open Remote Desktop	Opens Windows Storage Server in remote desktop.
	Configure	Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.
	Label Color	Selects the color of the name displayed below the icon.

The following tasks may be performed from the Buffalo NAS device's properties page.



Name	Description
Remote Desktop	Click <i>Open Remote Desktop</i> to open Windows Storage Server.
IP Address	Select the "Use DHCP" checkbox to assign an IP address from the DHCP server automatically. If there is no DHCP server on the network, you cannot use this function. Select the "Renew IP address" checkbox to obtain an IP address from the DHCP server. You can manually enter a static IP address, subnet mask, and default gateway.

Changing the IP Address

- 1 Click the NAS Navigator2 icon () in the Dock to start NAS Navigator2.
- 2 Click the TeraStation icon while holding down the control key, then select *Configure > IP Address*.
- 3 Clear the "Use DHCP" checkbox; enter the desired settings and the administrator password, then click *Apply*.

NovaBACKUP

NovaBACKUP is a Windows utility that lets you back up data on your computer.

The NovaBACKUP installer is available from <http://d.buffalo.jp/WSH5010N6/>. Select the region and model to go to your specific model's d.buffalo website. Download the NovaBACKUP installer and install it 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 of the unit.

Chapter 8 Troubleshooting

While using the TeraStation, you may lose your important data due to sudden accidents, hard disk failure, or accidental misoperation. Back up your data regularly! For best results, back up your data to Buffalo drives like the TeraStation, LinkStation, or DriveStation series.

The TeraStation Becomes Unaccessible

Common causes of typical issues that may occur, including if you are unable to search using NAS Navigator2 or the remote desktop screen does not open, are described below.

Cause 1. The cables are not connected correctly:

The cables are not physically connected, or there may be a contact defect. Reconnect the AC cable and Ethernet cable and restart both the computer and TeraStation.

Cause 2. Security software in the background is blocking communication:

Add an exception to your firewall software, or disable the firewall software completely. Turn off any software security suite that might include a firewall. Try searching again.

Cause 3. Wireless and wired adapters are both enabled:

Disable all adapters except for the Ethernet adapter connected to the TeraStation.

Cause 4. The Ethernet cable is defective, or the connection is unstable:

Try changing the hub port or Ethernet cable that you used to connect.

Cause 5. The LAN board, card, or adapter that you are using is defective:

Try changing the LAN board, card, or adapter.

Cause 6. The duplex mode of the network adapter or hub has not been set:

Select either "10M half-duplex" or "100M half-duplex" for the duplex mode of the network adapter or hub. Some network adapters may be unable to connect the network correctly when the duplex mode is set to auto negotiation.

Cause 7. A network bridge is installed:

If the network has a network bridge that is not being used, remove it.

Cause 8. You are searching from a different network:

You cannot conduct searches beyond your local network subnet. Connect the TeraStation to the same network subnet as the computer performing the search.

Cause 9. TCP/IP is not operating correctly:

Reinstall the LAN adapter drivers.

Cause 10. Remote desktop connection software is not installed on your Mac:

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

Shared Folders Suddenly Do Not Open

If the TeraStation shared folder is assigned and used as a network drive, the TeraStation may suddenly become inaccessible if network settings such as IP addresses or groups are changed. If this happens, open NAS Navigator2 and double-click your TeraStation icon to access a shared folder.

Unable to Access the Shared Folder or the System Becomes Unstable

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

Drive Status Cannot Be Found

If the language settings are not the same for the following options, the drive status such as error, resynchronization, or degraded may not be detected correctly. Configure the same language for these options.

- Display language
 - Welcome screen and system account
 - System locale
-

LCD Panel Displays a Different IP Address

The IP address displayed when pressing the select button is for maintenance use only and this is not the IP address of the TeraStation.

Resynchronization Regressed When TeraStation Was Restarted While Resynchronizing

If you restart the TeraStation while resynchronizing, the resynchronization temporarily halts and will resume after the reboot completes. The ones place digit of the progress display will be reset to "0".

For example, if rebooted when resynchronizing has proceeded to 15%, the progress status after restarting will be 10%.

TeraStation Does Not Boot

If Windows Storage Server no longer functions properly, perform recovery using the supplied SD card. This recovery procedure erases your data. Backing up regularly is highly recommended to avoid losing your important data.

Notice Before Recovery

- 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 the storage pool is created on drive 1, delete the storage pool before running the recovery process.
- Remove all USB devices except for the supplied SD card, a card reader, a mouse, and keyboard before recovering. When it's completed, you can connect them back to the TeraStation.

Recovering Windows Storage Server

- 1** Turn off the TeraStation, following the procedure on the "Turning the TeraStation On and Off" section in chapter 1.
- 2** Insert the SD card into the card reader (not included).
- 3** Connect a mouse, keyboard, and the card reader to the TeraStation using a USB 3.0 or 2.0 port.
- 4** Connect the monitor to the TeraStation using a HDMI or VGA port.
- 5** Press the power button to turn the TeraStation on.
- 6** Press the F11 key some times until the "Please select boot device:" is displayed. When it's displayed, stop pressing F11. If it not displayed, repeat from the step 1.
- 7** Press the Down Arrow key and select the SD card beginning from "UEFI:", then press the Enter key.
- 8** The recovery process proceeds automatically.
- 9** When the recovery process finishes, the TeraStation shuts down automatically.
- 10** Turn on the TeraStation. If it boots up properly, recovery is completed.

Chapter 9 Appendix

Default Settings

Administrator's Name	Administrator
Password	password
Shared Folders	Drives C and D are configured as administrative hidden shares by Windows Storage 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 assigned randomly when booting the TeraStation.) Subnet Mask: 255.255.0.0
Registered Groups	Windows Storage Server's default groups are registered.
Microsoft Network Group Setting	WORKGROUP
Volume Type	RAID 6 volume
Local Security Policy	"Password must meet complexity requirements" is disabled by default.

Note: The Windows settings on this TeraStation have been customized for best performance so that the power options settings can be left alone as recommended.

The TeraStation has the following functions and roles:

Features:

.NET Framework 4.7, 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".


Errors on the LCD Panel

The TeraStation indicates errors on the LCD panel. The LCD panel can help you troubleshoot problems. Refer to the "Diagrams" section in chapter 1 to locate where the LCD panel is.

If an error occurs, the TeraStation will beep. You can stop the beeping by pressing the mode button.

Note: The "x" on the LCD panel message is a number of volume type.

Error Messages

LCD Panel	Corrective Action
	One drive failed. Check the LED in front for the defective drive. Refer to chapter 6, "Drive Replacement", and replace the failed drive with a new drive. You can stop the beeping by pressing the mode button.

LCD Panel	Corrective Action
RAID-x TWO DRIVE DOWN	Two drives failed. Check the LED in front for the defective drive. Refer to chapter 6, "Drive Replacement", and replace the failed drive with a new drive. You can stop the beeping by pressing the mode button.
MULTIPLE DOWN	Two or three drives failed. Check the LED in front for the defective drive. Refer to chapter 6, "Drive Replacement", and replace the failed drive with a new drive. You can stop the beeping by pressing the mode button.
SYSTEM DOWN	Three or more drives failed. Check the LED in front for the defective drive. Refer to chapter 6, "Drive Replacement", and replace the failed drive with a new drive. You can stop the beeping by pressing the mode button.
Code ROM Error System Halted	Program ROM cannot be read. Shut off the TeraStation, wait 10 seconds, then turn it back on. If the error still remains, contact Buffalo technical support.
Work RAM Error System Halted	A work memory error occurred on the array controller. Shut off the TeraStation, wait 10 seconds, then turn it back on. If the error still remains, contact Buffalo technical support.
Dispatch Nesting Error	Internal error. The TeraStation cannot be accessed. Contact Buffalo technical support.
Divide or FPP or Invalid Code Err	
System INTERRUPT Error	
System SBI INT Occur	
System RIE INT:0x000	
System AE INT:0x000	
System TRAP Error	
Buffer Manager Queue Error	
Cache Buffer Error 0x#####	
Buffer Size Error	
Buffer Manager Link Error	

Characters Added When “ONE DRIVE DOWN” or “SYSTEM DOWN” Occurs

When “ONE DRIVE DOWN” or “SYSTEM DOWN” is displayed on the LCD panel, one of the following characters will also be displayed. Refer to the chart below for more detailed information about the error that occurred.

For Hardware Errors

r	The drives may be malfunctioning.	Replace the drive by referring to chapter 6, “Drive Replacement”.
A		
B		
C		
D		
E		
I		
M		
N		
O		
p		
R		
S		
T		
Y		
Z		
z		
L		
W		
X	Drive disconnected.	Reconnect the drive.

Note: If “S”, “Z”, or “z” is displayed, the drives may be malfunctioning. Contact Buffalo technical support while keeping the TeraStation power on.

For Software Errors

U	The drives may be malfunctioning.	Replace the drive by referring to chapter 6, “Drive Replacement”.
E		

Specifications

Check the Buffalo website for information about the latest products and specifications.

Installed System	Microsoft Windows Storage Server 2016 Standard Edition Note: The Microsoft Software License is on the d.buffalo website, http://d.buffalo.jp/WSH5010N6/ . Be sure to read the terms and conditions of this license.	
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)

USB Interface	Standards Compliance	USB 3.0/2.0
	Data Transfer Rates	USB 3.0: max. 5 Gbps USB 2.0: max. 480 Mbps
	Number of Ports	2 x USB 2.0, 1 x USB 3.0
	Connector Type	Type A
Other Interfaces	1 x eSATA port, 1 x HDMI port, 1 x VGA port, 1 x D-sub 9 pin (male) port	
Internal Hard Drives	Number of Drive Bays	6
	Drive Interface	SATA 3 Gbps
	Supported Volume Types	RAID 0/10/5/6
	Replacement Drive	Buffalo OP-HDBN/B series drive Note: The new drive should be the same size as the replacement drive. The drives listed above are available from the Buffalo website.
Other	Power Supply	AC 100–240 V, 3.0 A, 50/60 Hz
	Dimensions (W x H x D, excluding protruding parts)	170 x 260 x 230 mm; 6.7 x 10.2 x 9.1 in
	Weight	9.0 kg; 19.8 lb
	Power Consumption	Max. 120 W
	Operating Environment	Temperature: 5–35°C; 41–95°F Humidity: 20–80% non-condensing
	Compatible Devices	Windows PCs, tablets, and Mac computers with wired or wireless Ethernet connection. Note: The TeraStation requires an Ethernet connection with your computer for operation. The TeraStation cannot connect via USB.
	Supported OS	Windows 10, 8.1, 7 Windows Server 2016, 2012 R2, 2012, 2008 R2, 2008 macOS 10.13, 10.12, 10.11