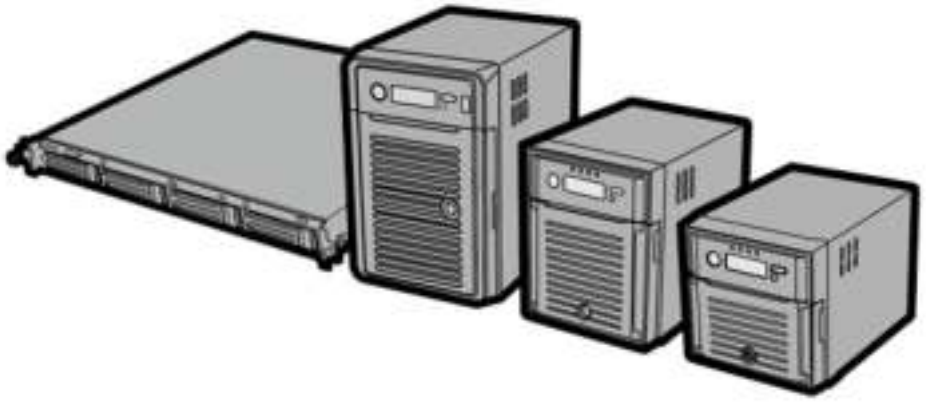
BUFFALO™

TeraStation WSS 5000R2

User Manual



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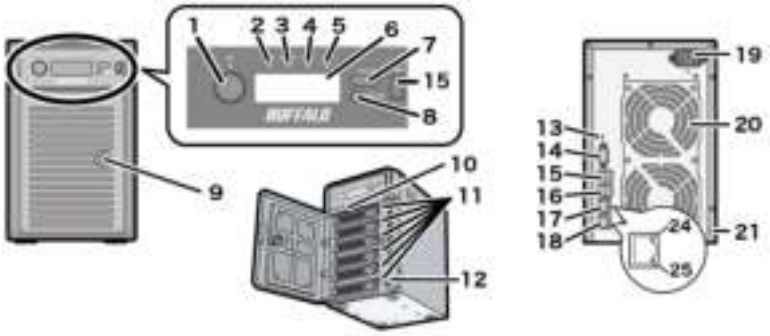
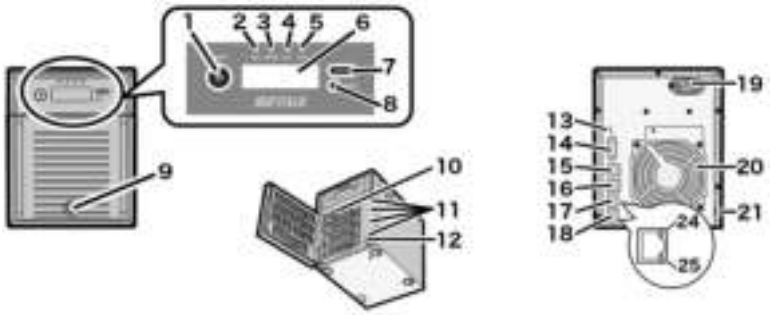
Chapter 1 Installation

Diagrams

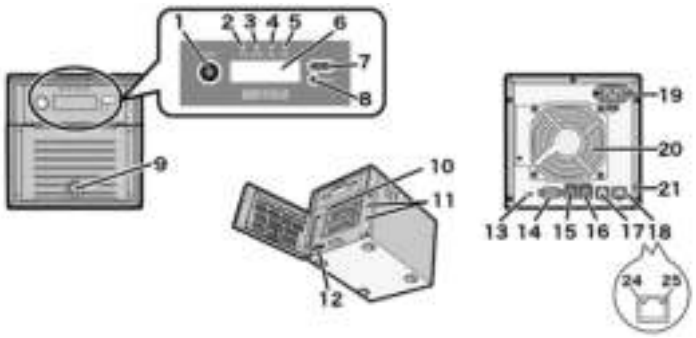
WS5600DR2



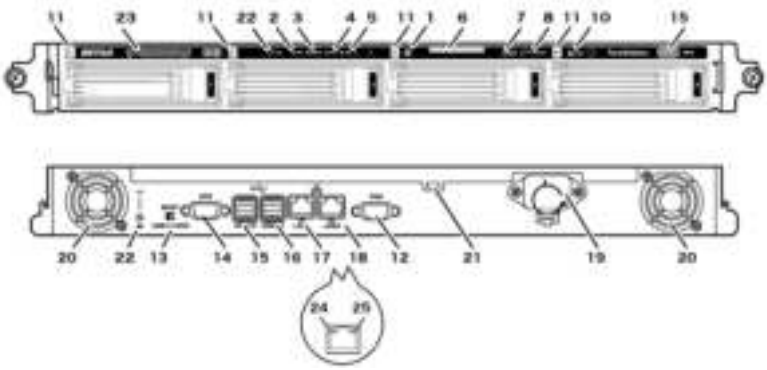
WS5400DR2



WS5200DR2



WS5400RR2



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 **Info LED**
If there is a status message, the amber info LED will light up. Check the LCD panel to see the status message.

3 **Error LED**
If there is an error, the red error LED will light up. Check the LCD panel to see the error message.

4 **LAN1 LED**
When LAN port 1 is connected, this LED glows green. It blinks when the connection is active.

5 **LAN2 LED**
When LAN port 2 is connected, this LED glows green. It blinks when the connection is active.

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

7 **Display Button**
Switches between the different display modes. Also, if the TeraStation is beeping, press this button to stop it.

8 **Factory Use Only**

9 **Drive Lock**
Open the front panel with the key to replace hard drives or press the reset button.

10 **Reset Button**
To shut down and reboot the TeraStation, hold down the reset button.

11 **Status LEDs**
Normally, these LEDs blink green when hard drives are accessed. If a drive fails, its LED will turn red.

12 **Factory Use Only**

13 **Boot Mode Switch**
Leave the switch in the HDD position during normal operation. To recover settings, insert the recovery USB drive

into a USB 3.0 port, move the boot switch to the USB position, and press the power button.

14 UPS Port
Connect to a UPS.

15 USB 3.0 Port
Compatible Buffalo USB 3.0 hard drives, USB flash drives, digital cameras, and USB UPSs can be connected. USB hubs are not supported.

16 USB 2.0 Port
Compatible Buffalo USB hard drives, USB flash drives, digital cameras, and USB UPSs can be connected. USB hubs are not supported.

17 LAN Port 1
Use an Ethernet cable to connect this port to your network.

18 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.

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

20 Fan
Do not block the fan.

21 Anti-Theft Security Slot
Use this slot to secure your TeraStation with a cable lock (not included).

22 UID Button
Press the UID button on the front or the back of the unit to cycle the blue LED on and off.

23 Serial Number
This sticker shows the TeraStation's serial number.

24 Link LED
Glows orange when the unit is connected to a network.

25 Act LED
This LED shows network activity. It blinks orange when the TeraStation is accessed over the network.

Installation

Note: If using OS X (10.4 or later), download and install "Remote Desktop Connection Client for Mac 2" from www.microsoft.com.

1 Connect the TeraStation's Ethernet and power cables and turn it on.

2 Connect the supplied USB device to your computer. Open the USB device and double-click *TSNavi.exe* in the

"TeraNavi" folder. TeraNavigator will launch.

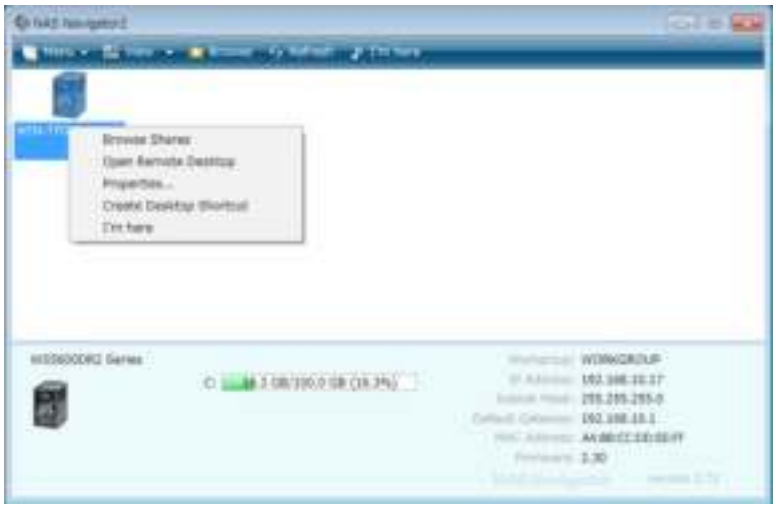
Notes:

- If using Windows 2000 or 2000 Server, make sure that write-protection on the USB device is disabled before connecting it. To disable write-protection, slide the switch on the USB device toward the USB connector.
- If "Do you want to allow the following program to make changes to this computer ?" is displayed by Windows 8.1, 8 or Windows 7, click *Yes*. If "A program needs your permission to continue" is displayed by Windows Vista, click *Continue*.
- With Mac OS, double-click the disk image "WS5000R2-XXX.dmg" (where "XXX" is the software version from the USB device and double-click *TeraNavigator*.
- Disable your antivirus software firewall before continuing. You may not be able to install the software if antivirus software or a software firewall are enabled. After you've finished setup, re-enable your firewall and antivirus software.

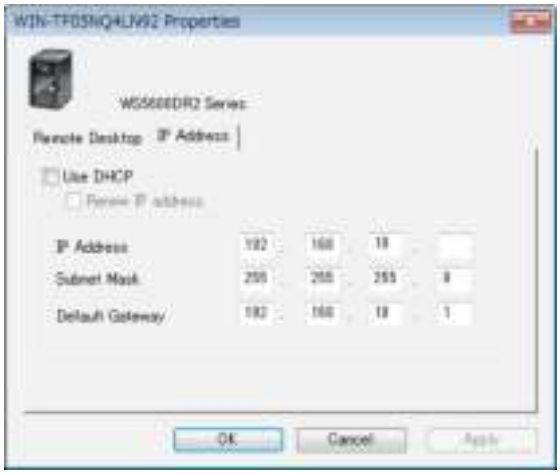
3 Click *Begin Installation*. The wizard will guide you through installing NAS Navigator2.

4 Click *Finish*. NAS Navigator2 will open.

5 Right-click on your TeraStation's icon, then select *Properties*. On a Mac, click the TeraStation's icon while holding down the control key, then select *Configure*.



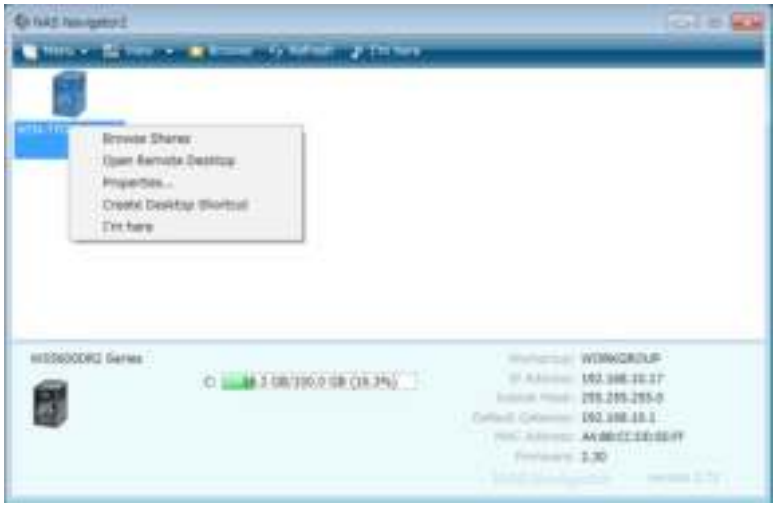
6 Select the *IP Address* tab and check "Use DHCP" (or enter the IP address settings manually). Click *OK*.



If you are prompted to enter the administrator password for the TeraStation, it is "password" by default.

Note: If you change the IP address manually, change the DNS settings in Windows Storage Server also.

7 Right-click on your TeraStation's icon and choose *Open Remote Desktop*. On a Mac, click the TeraStation's icon while holding down the control key, then select *Open Remote Desktop*.



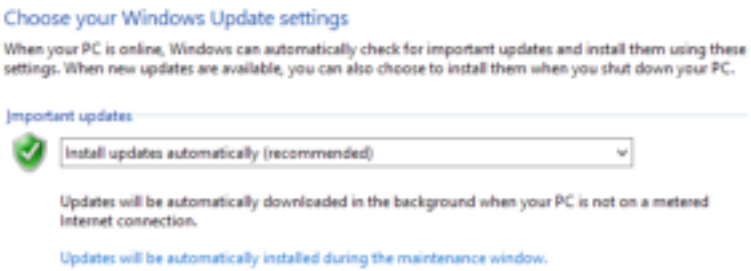
Notes:

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

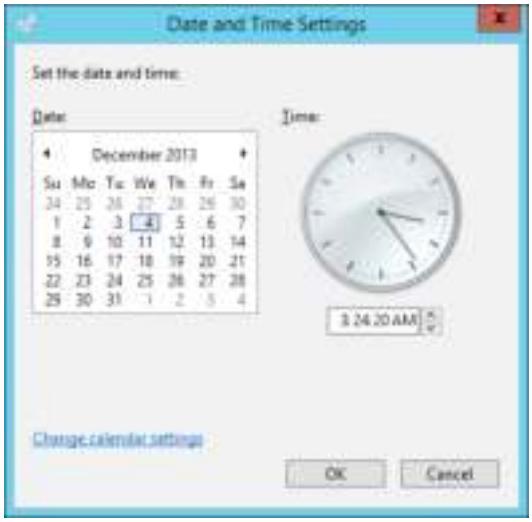
8 Enter the username and password, then press the Enter key.

Note: The default username and password are "Administrator" and "password".

9 Go to Server Manager and click *Local Server* to install the Windows Storage Server update program. Under "PROPERTIES", click the status shown next to "Windows Update". Click *Change settings*, select "Install updates automatically", then click *OK*.



10 Go back to "Local Server" to set the date and time. Under "PROPERTIES", click the item shown next to "Time zone". In the "Date and Time" tab, click *Change date and time*. Select the current date and time and click *OK*.



Note: In the "Internet Time" tab, click *Change settings*, and check "Synchronize with an Internet time server". The date and time will be updated automatically.

11 Create a shared folder. See the "Creating a Shared Folder" section in chapter 7 for more detail.

12 Change the TeraStation's password. See the "Changing the Password" section in chapter 7 for more detail.

13 In NAS Navigator2, double-click your TeraStation's icon. For Mac OS, the TeraStation is mounted as a drive icon on the desktop, or it is displayed in the sidebar of the Finder.

Note: Never disable the LAN (network device) settings in Windows Storage Server. Disabling the LAN settings will also disable access to the TeraStation.

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 the following procedure.

Shutting Down Windows Storage Server

1 In Windows Storage Server, point the cursor to the upper-right hand corner of the screen, then click the icon.

2 Click the icon - *Shut down*.

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

When all the LEDs on the front of the TeraStation turn 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.

Connect a USB CD/DVD drive to the TeraStation's USB port, load the antivirus software CD into the CD/DVD drive, and install the software.

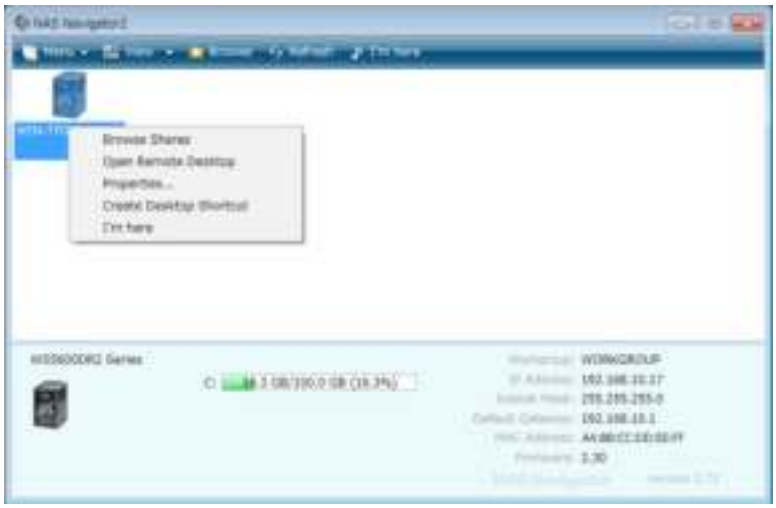
Chapter 2 Remote Desktop

Opening Windows Storage Server

Note: If using OS X (10.4 or later), download and install "Remote Desktop Connection Client for Mac 2" from www.microsoft.com.

1 Double-click the icon. NAS Navigator2 will start.

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



Notes:

- If Remote Desktop Connection Software doesn't start on a Mac, exit and re-launch NAS Navigator2. To exit NAS Navigator2, click the NAS Navigator2 icon while holding down the control key and click *Quit*.
- Click the TeraStation icon to view the IP address and other information for the TeraStation.
- 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. Windows Storage Server will open in the remote desktop.

Note: The default username and password are "Administrator" and "password".

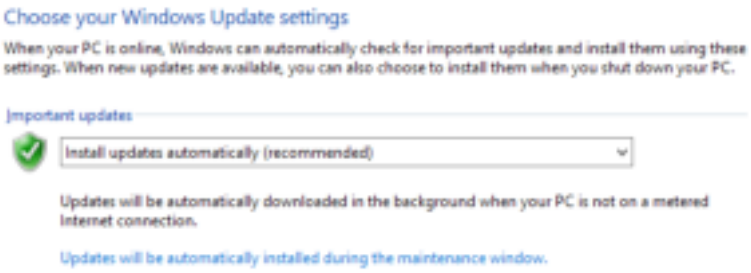
Chapter 3 Windows Update

Windows Update

For best results, Windows Storage Server should be updated regularly. Use Windows Update as described below.

Note: The TeraStation must be connected to the Internet to use Windows Update.

1. In Windows Storage Server, click *Control Panel* - *System and Security* - *Windows Update*.
2. Click *Check for updates*.
3. Click *Install updates*.

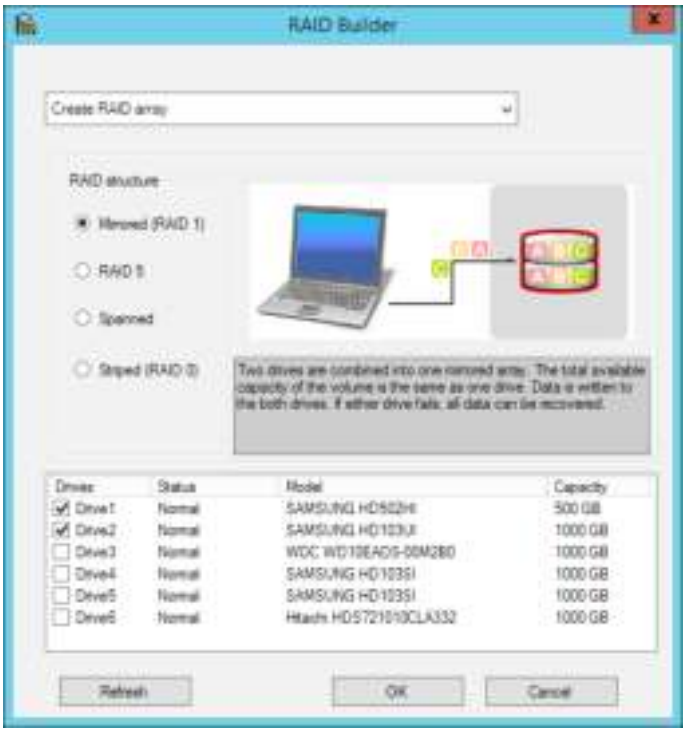


4. Step through the wizard to install the updates.

Chapter 4 Preinstalled Software

RAID Builder

RAID Builder is used to modify the RAID arrays. See chapter 5 for details.



Note: To launch RAID Builder, you must be logged in as a member f the Administrators group in Windows Storage Server.

Buffalo Dashboard

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

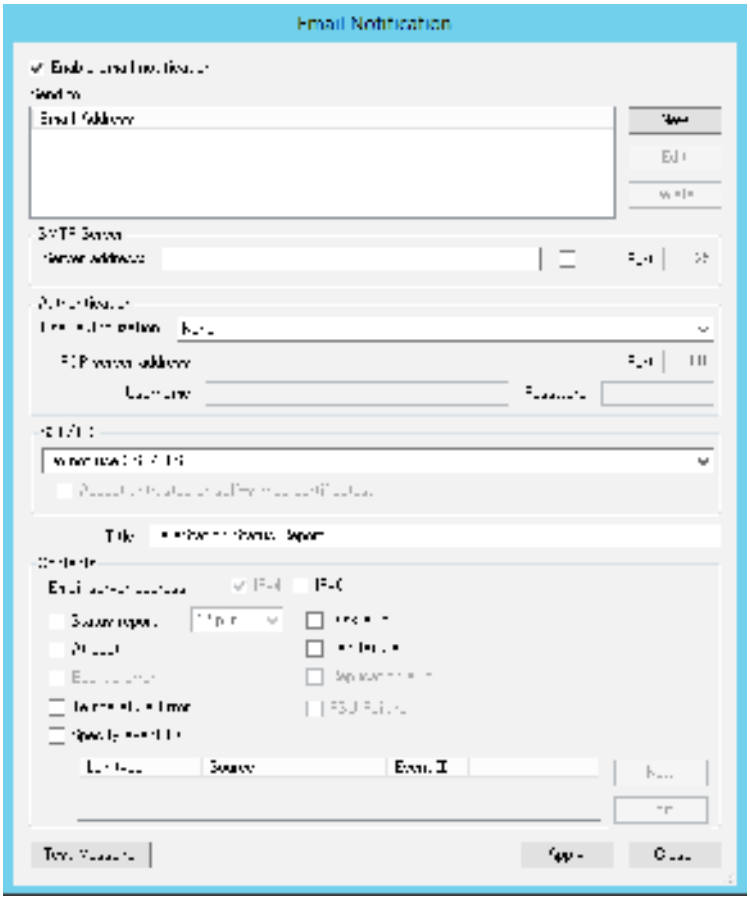
Items	Descriptions
System Information	Product Name: Displays the model name of the TeraStation. Computer Name: Displays the hostname of the TeraStation. Domain Name: Displays the type of domain that the TeraStation is a member of. OS: Displays the type of Windows installed on the TeraStation. OS Version: Displays the version of the OS. Firmware: Displays the firmware version of the TeraStation. Manufacturer: Displays "Buffalo Inc.".
Temperature	Displays the temperature of the system.
Fan	Displays the rpm.
Network Settings	Displays IP addresses, subnet masks, default gateways, LAN port numbers, and status.
I'm here!	Causes your TeraStation to beep.
Drive	Displays the status, drive numbers, names, capacity, and physical sector sizes of each drive. "Refresh": Updates the displayed drive information. "Dismount Drive": Dismounts a drive for safe removal. Select the drive to dismount and click *OK*. "Options": "Shut down when the drive's temperature reaches an abnormal value" - The TeraStation will automatically shut down if the drive gets too hot. "Turn off the drive if an error occurs" - The hard drive will automatically be turned off (dismounted) if a drive error occurs.Dismounting Drives Click *Dismount Drive*, check the drive to dismount, then click *OK*. After the drive is dismounted, unplug the hard drive from the TeraStation.

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

- Refresh
- Dismount drive
- Options

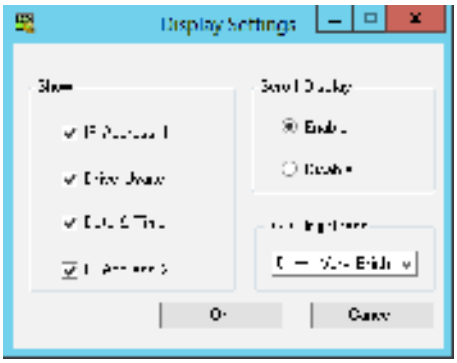
Email Notification

Your TeraStation can send you email reports when settings are changed or an error occurs. See chapter 7 for more details.



LCD Display Settings

TeraStation's LCD panel settings can be changed using this software. See chapter 7 for more details.


Display Settings

Chapter 5 Managing Your Storage

Creating Volumes

Volume Types

The features of each volume type are explained below.

Notes:

- Use RAID Builder to create a volume, not the Disk Management options in Windows Storage Server.
- When volumes are deleted or formatted, or the RAID mode is changed, all data stored in that volume is erased. Before executing these operations, back up any important data.
- In this manual, "recover" means reverting the TeraStation (including the data) to its formar state prior to the drive failure. It doesn't refer to reading data from a failed hard drive.
- RAID synchronization will run automatically after a volume is created. File transfers will be slower while it is running, which will take about 5 hours per terabyte.
- After a volume is created, unused extra space can't be added to the volume.
- Some space on each drive is not accessible because it is used by the system. The amount used on each drive is below.
  Drive 1: 50 MB
  Drive 2: 50 MB
  Drive 3: 100 GB + 150 MB
  Drive 4: 100 GB + 150 MB

RAID 5 Volumes*

The unallocated areas of three or more hard drives are used as a single array.

If one drive in a RAID 5 array fails, data on the array can be recovered after the failed drive is replaced. However, if two or more drives fail, all data is lost.

*Available for WS5600DR2, WS5400DR2, and WS5400RR2 series TeraStations.

Mirrored Volumes (RAID 1)

The unallocated areas of two drives are combined into a single RAID 1 array.

Because the same data is written to both drives simultaneously, if one drive fails, data can be recovered from the other drive. If both drives in the array fail, data cannot be recovered.

Striped Volumes (RAID 0)

The unallocated areas of two or more drives are combined into a single RAID 0 array. However, data cannot be recovered if even a single drive fails.

Spanned Volumes

The unallocated areas of multiple hard drives are joined to create a single logical volume. This allows various drive spaces to be combined efficiently. However, data cannot be recovered if even a single drive fails.

Simple Volumes (JBOD)

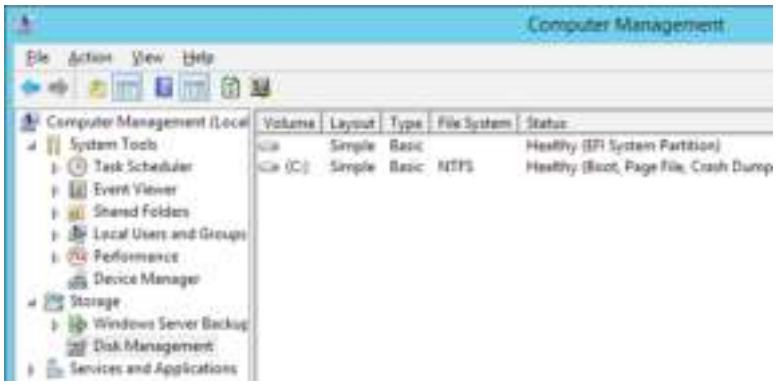
The internal hard drives of the TeraStation are each used as individual drives. If a hard drive fails, the data on the failed hard drive cannot be recovered.

Deleting Volumes

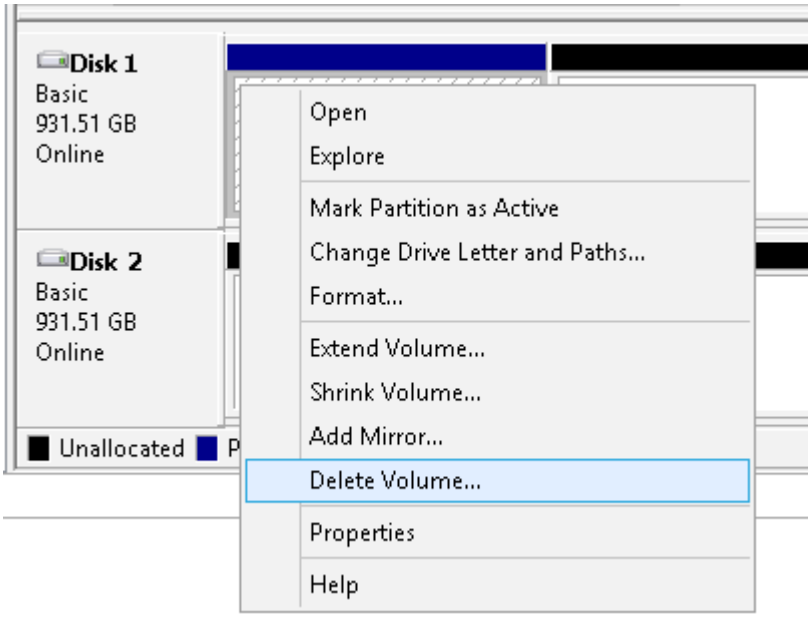
An unallocated area on a drive is required to create a volume. If there are no unallocated areas, create one by deleting an existing volume.

1 In Windows Storage Server, open *Administrative Tools*, then double-click *Computer Management*.

2 Click *Disk Management*.



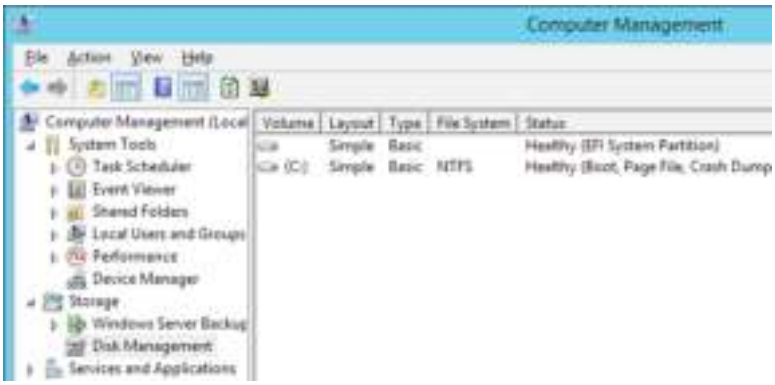
3 Right-click the volume that you want to delete and then select *Delete Volume*.



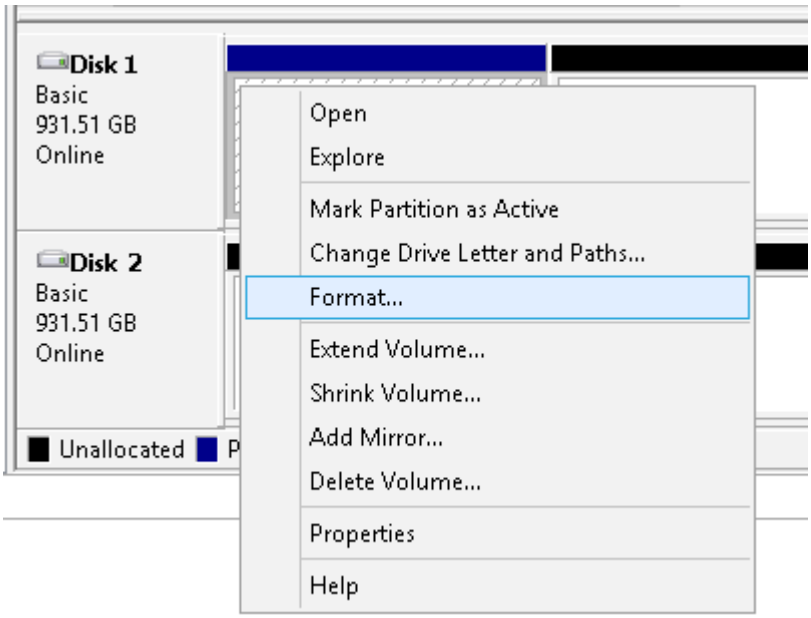
Formatting Volumes

1 In Windows Storage Server, open *Administrative Tools*, then double-click *Computer Management*.

2 Click *Disk Management*.



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



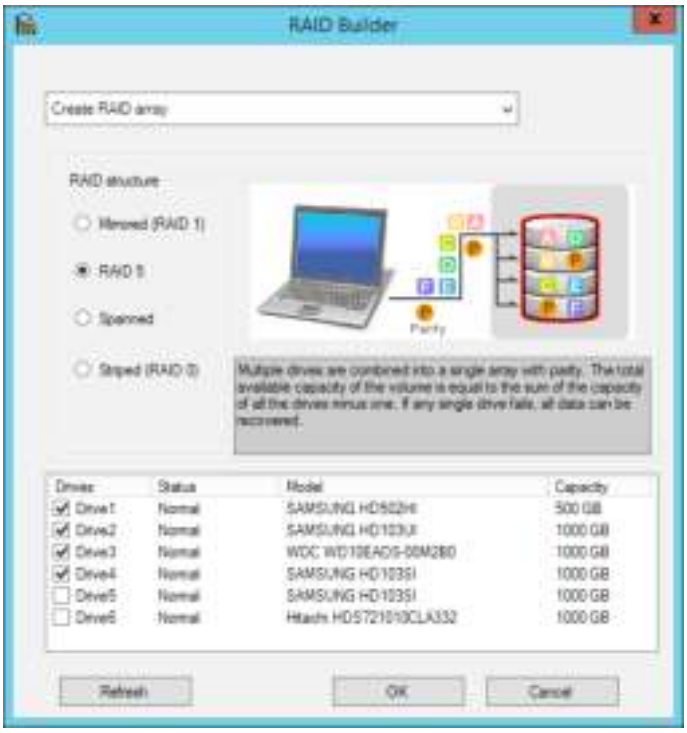
Creating a RAID 5 Volume

1 In Windows Storage Server, click *RAID Builder*.

2 Select "Create RAID array" from the drop-down menu and "RAID 5" under "RAID structure".

3 Select at least three drives to create a RAID 5 array.

4 Click *OK*.



Examples:

- For a configuration with drive 1 (50 GB), drive 2 (80 GB), drive 3 (58 GB), and drive 4 (100 GB), the usable space on the RAID volume will be (50 GB x 4 drives) ÷ 3/4 = 150 GB.
- For "n (1 to 4)" identical hard drives in a RAID 5 array, the available space is (n-1)/n times the total drive space.

A RAID 5 volume will be created. Next, create a shared folder on the volume as described in chapter 7.

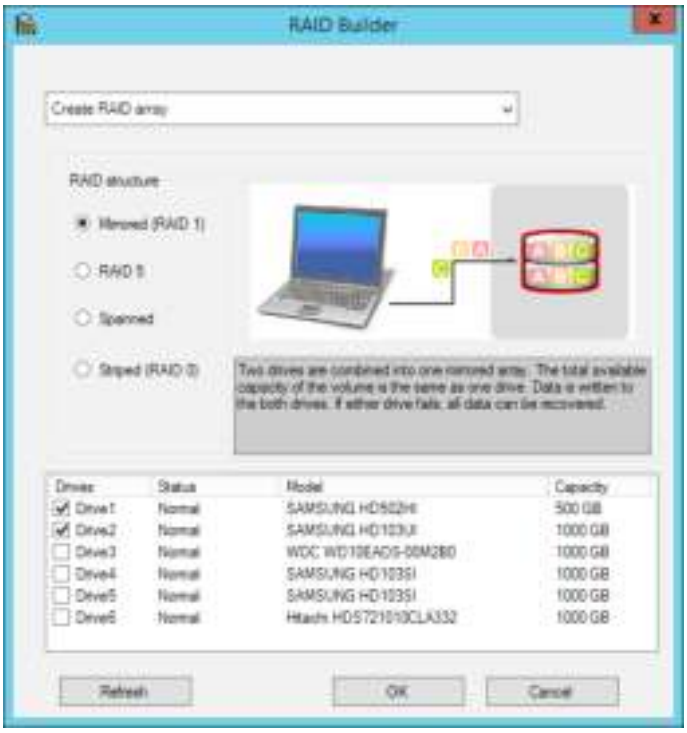
Creating a Mirrored Volume (RAID 1)

1 In Windows Storage Server, click *RAID Builder*.

2 Select "Create RAID array" from the drop-down menu and "Mirrored (RAID 1)" under "RAID structure".

3 Select at least two drives to create a RAID 1 array.

4 Click *OK*.



Example:
For a configuration with drive 3 (58 GB) and drive 4 (100 GB), the usable space on the mirrored volume will be 58 GB.

A mirrored volume will be created. Next, create a shared folder on the volume as described in chapter 7.

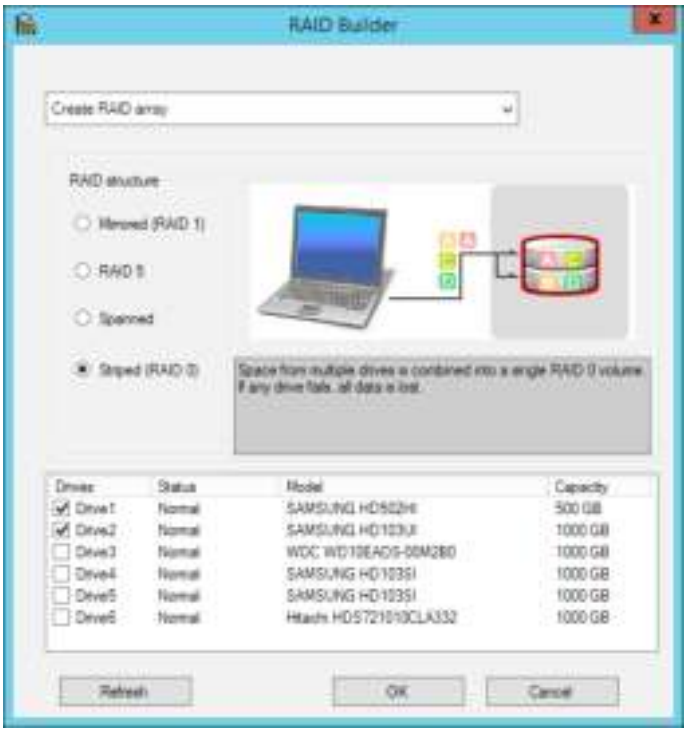
Creating a Striped Volume (RAID 0)

1 In Windows Storage Server, click *RAID Builder*.

2 Select "Create RAID array" from the drop-down menu and "Striped (RAID 0)" under "RAID structure".

3 Select at least two drives to create RAID 0 array.

4 Click *OK*.



Example:
For a configuration with drive 1 (50 GB), drive 2 (80 GB), drive 3 (58 GB), and drive 4 (100 GB), the usable space on the mirrored volume will be 50 GB x 4 drives = 200 GB.

A striped volume will be created. Next, create a shared folder on the volume as described in chapter 7.

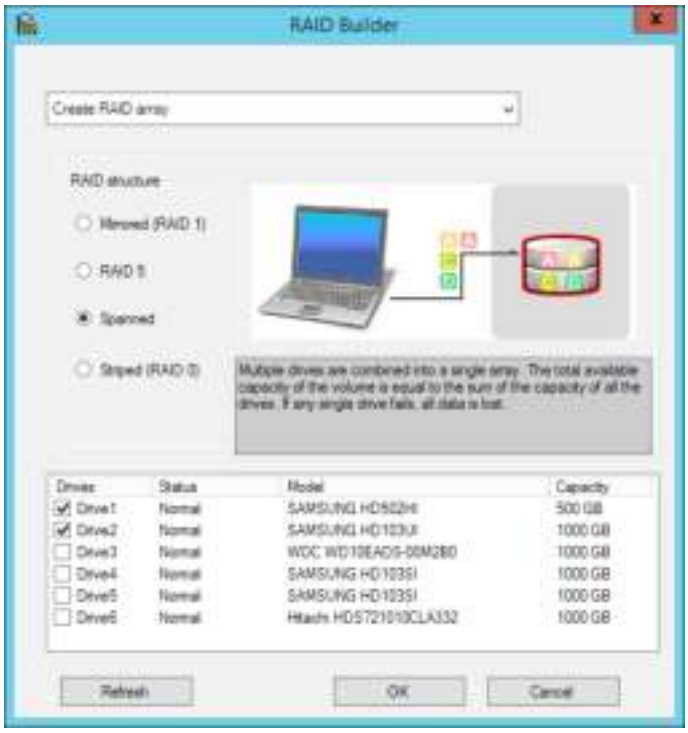
Creating a Spanned Volume

1 In Windows Storage Server, click *RAID Builder*.

2 Select "Create RAID array" from the drop-down menu and "Spanned" under "RAID structure".

3 Select at least two drives to create a spanned array.

4 Click *OK*.



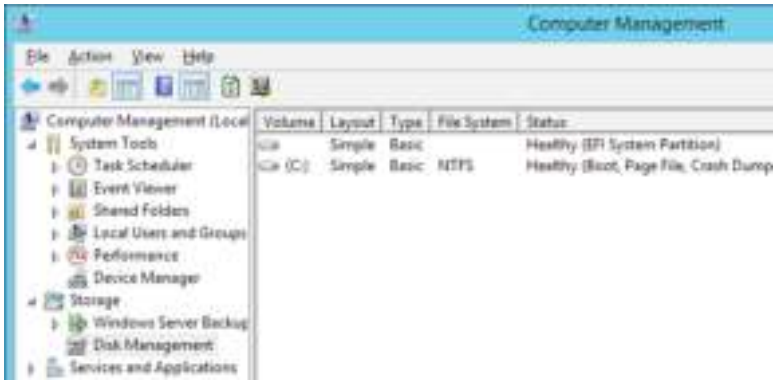
Example:
For a configuration with drive 1 (50 GB), drive 2 (80 GB), drive 3 (58 GB), and drive 4 (100 GB), the usable space on the RAID volume will be 50 GB + 80 GB + 58 GB + 100 GB = 288 GB.

A spanned volume will be created. Next, create a shared folder on the volume as described in chapter 7.

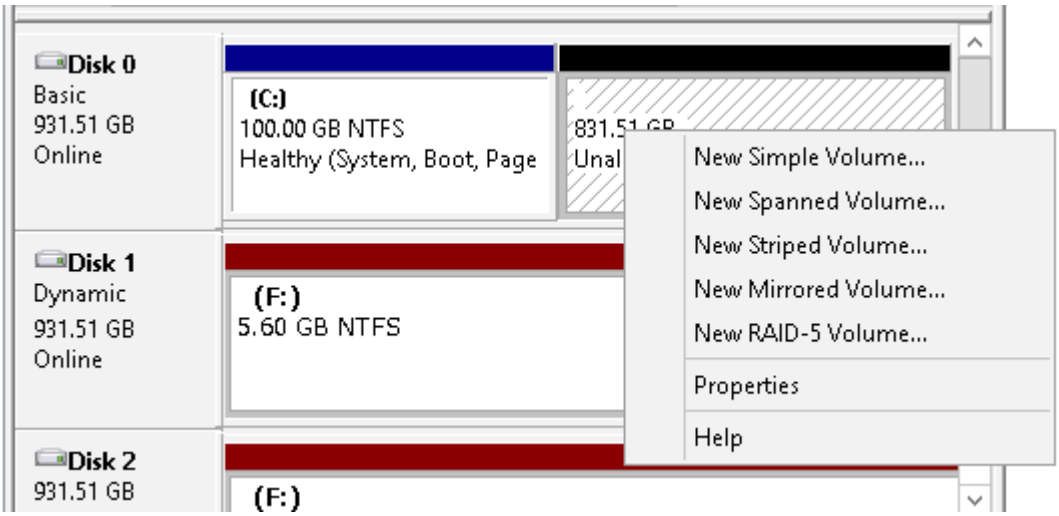
Creating Simple Volumes (JBOD)

1 In Windows Storage Server, open *Administrative Tools*, then double-click *Computer Management*.

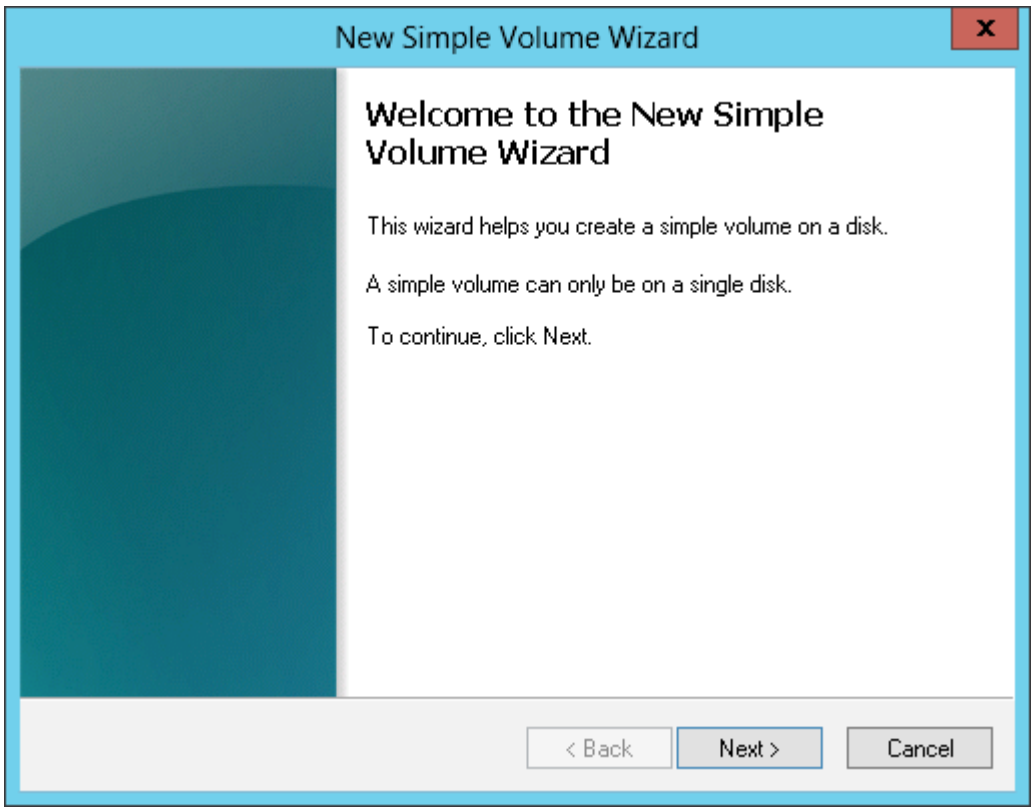
2 Click *Disk Management*.



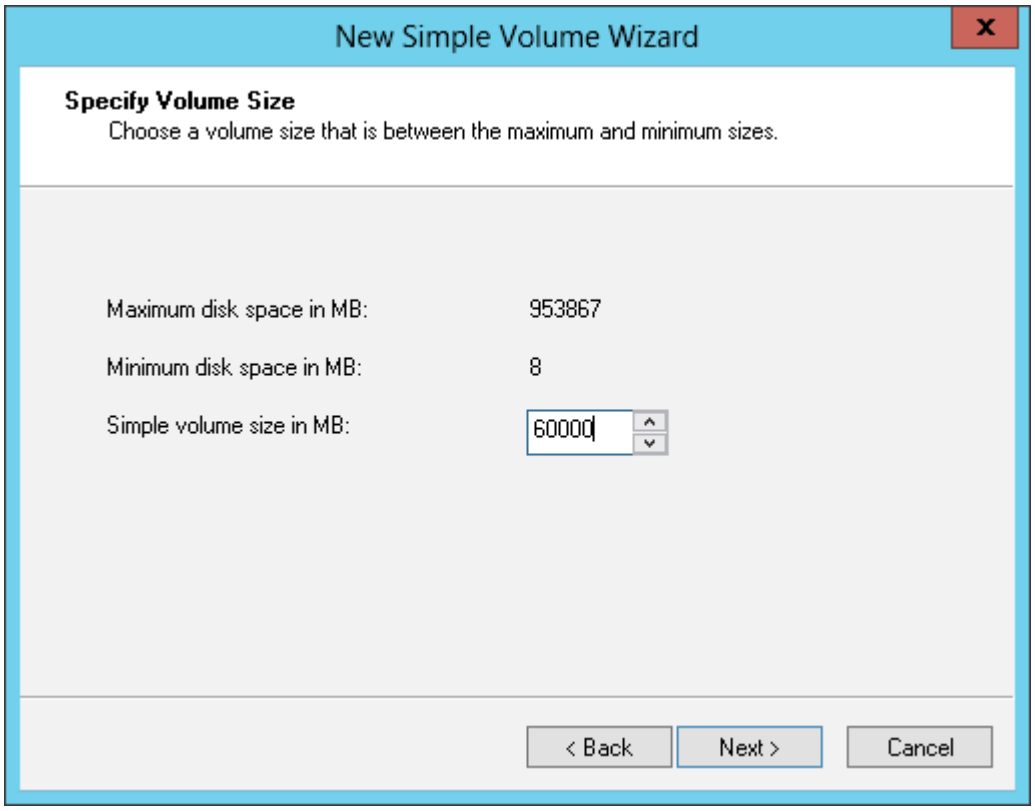
3 Right-click the unallocated area and select *New Simple Volume*.



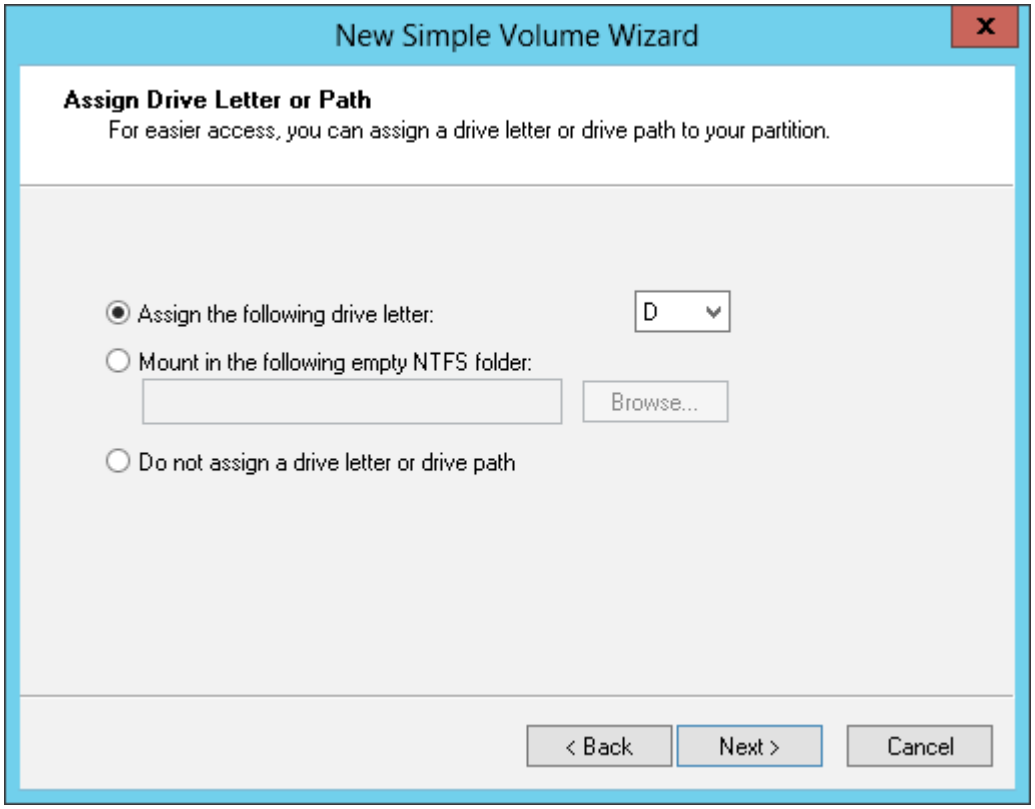
4 Click *Next*.



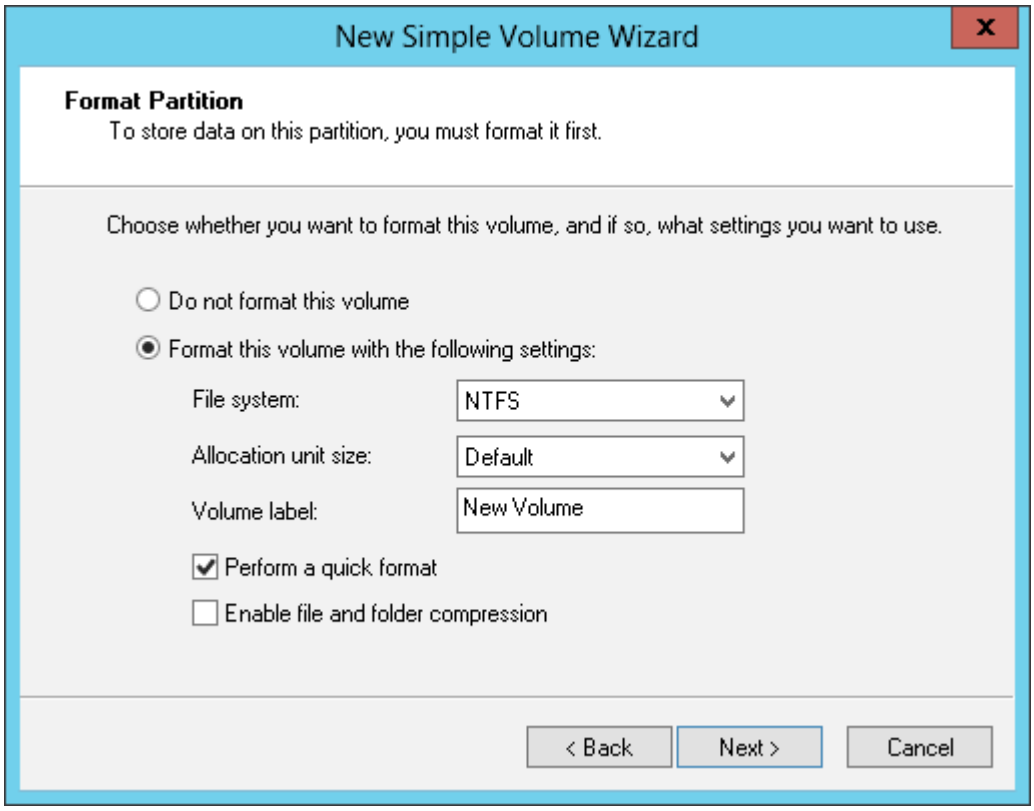
5 Enter the volume size that you want to create and click *Next*.



6 Select *Assign the following drive letter* and click *Next*.



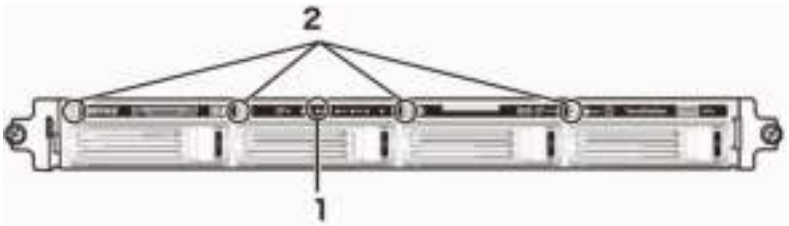
7 Select *Format this volume with the following settings* and *Perform a quick format* and click *Next*.



A simple volume will be created. Next, create a shared folder on the volume as described in chapter 7.

Hard Drive Replacement Procedure

Hard drives in the TeraStation show a green status LED during normal operation. When a drive fails, its error LED will glow red.



1 Error LED

Red if a drive has failed.

2 Status LEDs

Green: Normal operation.

Glowing red: If a drive's status LED is glowing red, the drive has malfunctioned. Dismount the drive in Buffalo Dashboard before unplugging it from the TeraStation.

Notes:

- Do not unplug a drive whose status LED is not lit red. If you remove the drive without properly dismounting it, data may be lost or the TeraStation may malfunction.
- When changing drives, the replacement drive should be a Buffalo OP-HDS series drive of the same size.
- The TeraStation is fragile. Handle it with care. Do not drop or bump the TeraStation.
- Use caution when handling the unit in order to avoid personal injury.
- Never disassemble any parts while you are replacing a hard 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 hard drives in the TeraStation. For example, pulling out drive 1 and replacing it with drive 2 may cause data to be corrupted or lost.
- In a RAID 1 configuration, the boot drive (C:) consists of the first and second hard drives from the top. Do not replace both of these hard drives at the same time.
- If a hard drive is replaced while saving a file, the file can be corrupted. Be sure that the saving operation is completed before replacing the hard drive.

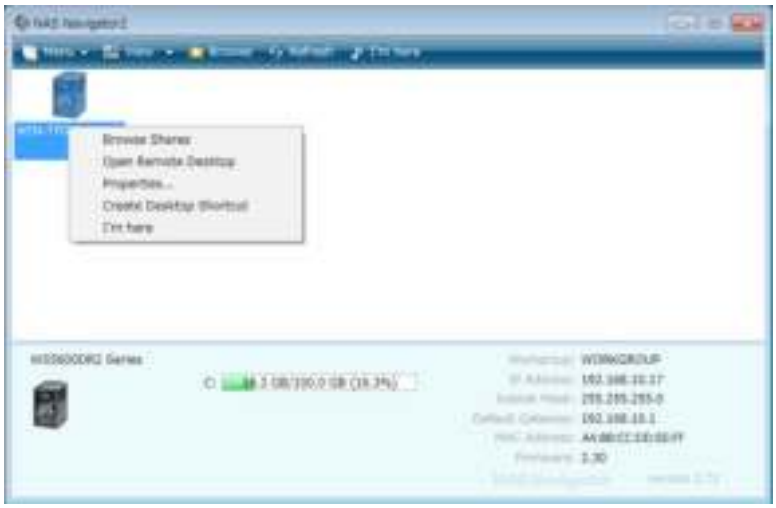
Hard Drive Replacement Examples

Note: If you used Disk Management to mirror the boot drive, the TeraStation will not boot when the drive fails. Follow the procedure below.

Hard Drive Replacement in Case of Disk Failure Other Than Drive 1 or Drive 2

1 Double-click the icon.

2 Right-click on your TeraStation's icon, then click *Open Remote Desktop*. For Mac OS, click the TeraStation's icon while holding down the control key, then click *Open Remote Desktop*.



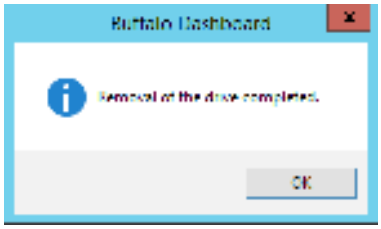
3 Enter the username and password, then press the Enter key. Windows Storage Server will open in the remote desktop.

Note: The default username and password are "Administrator" and "password".

4 The error message (E30) will be displayed in Buffalo Dashboard.

5 Click *Dismount Drive X* (where "X" is the number of the failed drive).

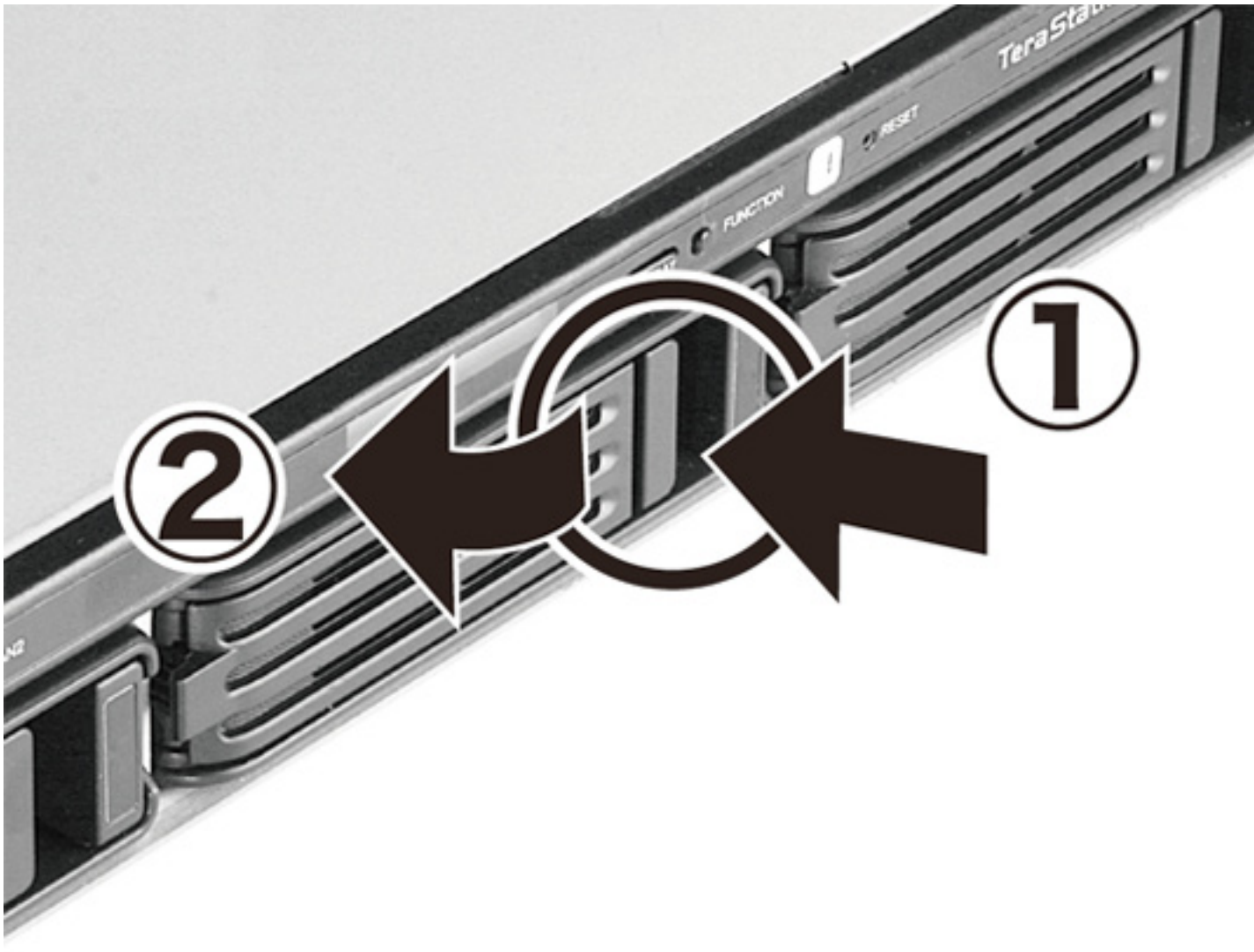
6 When the message "Removal of the drive completed." is displayed, click *OK*.



The status LED will stop flashing and glow steadily.

7 WS5600DR2, WS5400DR2, WS5200DR2: Open the front cover with the included key.

8 Push the unlock button of the failed hard drive and swing the lock mechanism out.



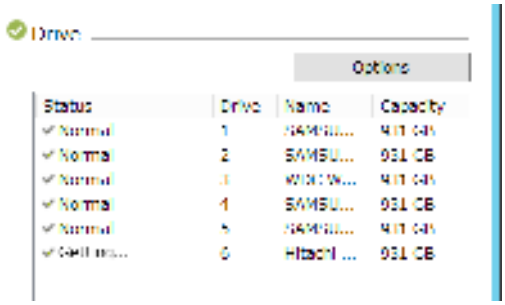
9 Pull out the hard drive cartridge and remove it from the TeraStation.

10 Insert the new hard drive (sold separately) into the empty slot. Slide the drive in with the locking mechanism open.

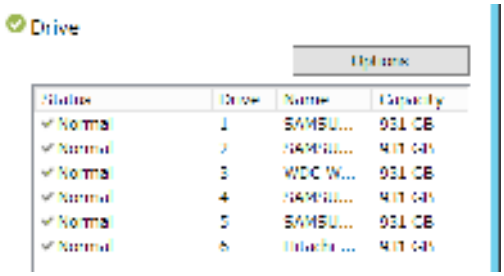
11 Swing the lock back down until it clicks into place.

12 Replace the front cover. If the hard drive was replaced while the TeraStation was off, power it on now. Run RAID Builder.

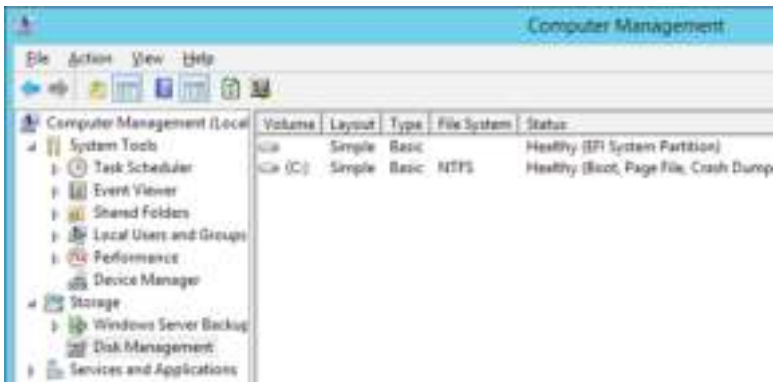
13 Buffalo Dashboard will show the drive status "Getting...".



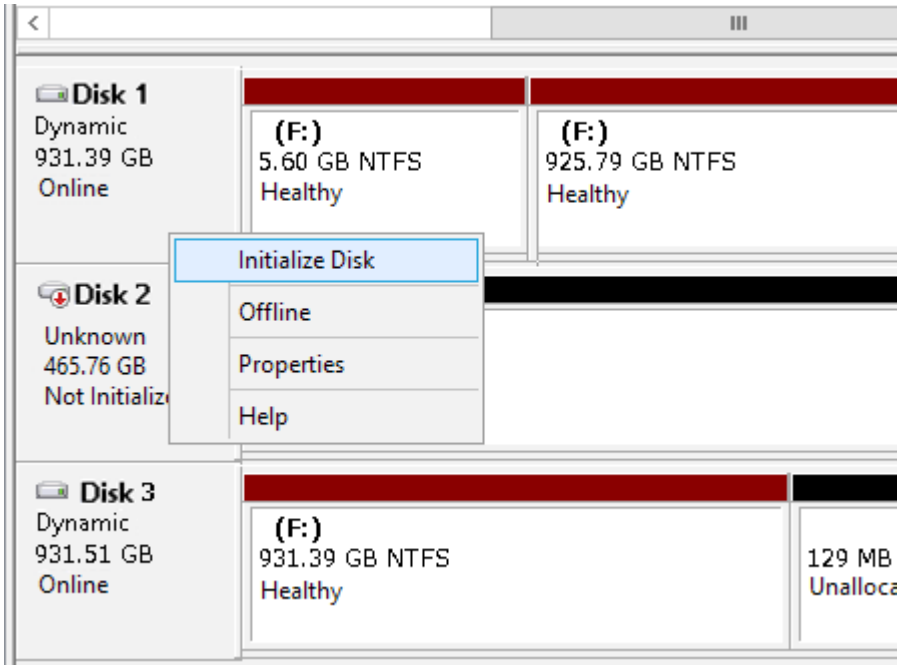
14 After the drive status changes to "Normal", open *Administrative Tools* and double-click *Computer Management* in Windows Storage Server.



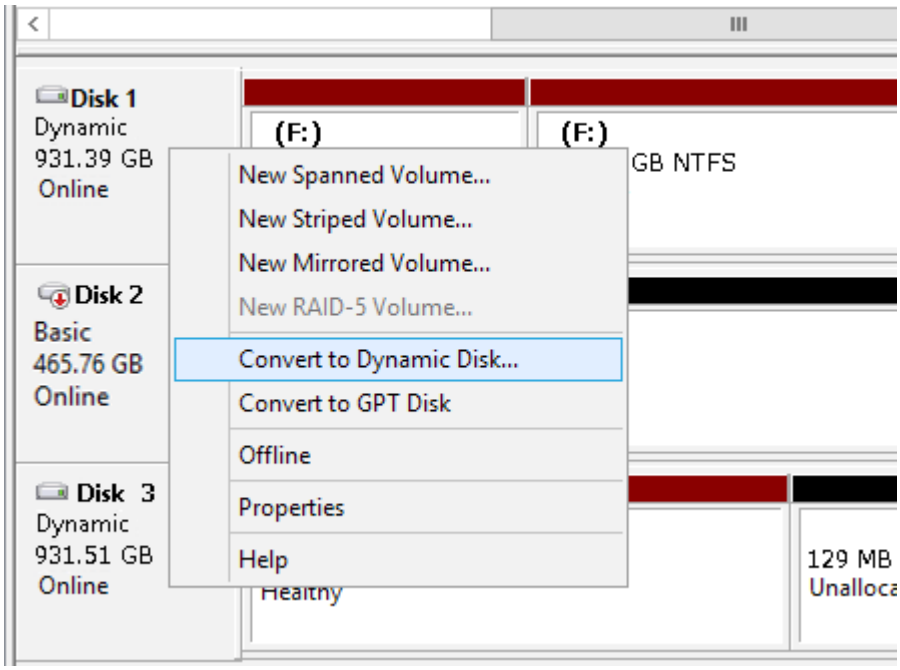
15 Click *Disk Management*.



16 Right-click the new drive and select *Initialize Disk*.



17 Right-click the initialized hard drive and select *Convert to Dynamic Disk*. A RAID array cannot be built unless the hard drive is converted to a dynamic disk.



18 Select the step depending on your purpose for a created volume.

To create a new volume:

(1) Right-click the new dynamic disk and select *New Volume*. (2) Follow the instructions on the screen to create a new volume.

To restore a RAID 5 volume (RAID resynchronization):

(1) Right-click the volume labeled "Failed Redundancy" and click *Restore Volume*. (2) When "Select the disk from the following list" is displayed, select the drive to restore and click *OK*. Perform steps (1) and (2) for each volume that requires RAID resynchronization. (3) Right-click the volume labeled "Missing" and select *Delete Disk*.

To restore a Mirrored volume (RAID resynchronization):

(1) Right-click the volume labeled "Failed Redundancy" and click *Remove Mirror*. (2) When "Remove Mirror" is displayed, select the drive with its status missing and click *Remove Mirror*. (3) In "Disk Management", click *OK*. Perform steps (1) to (3) for each volume that requires RAID resynchronization. (4) Select the new volume where mirroring will be performed and select *Add Mirror*. (5) When "Add Mirror" is displayed, select the drive where mirroring will be performed with the selected volume and click *Add Mirror*. (6) When "Disk Management" is displayed, click *OK*.

Hard Drive Replacement in Case of Disk Failure on Drive 1 or Drive 2

1 Shut down the TeraStation.

2 WS5600DR2, WS5400DR2, WS5200DR2: Open the front cover with the included key.

3 Push the unlock button of the failed hard drive and swing the lock mechanism out.

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

5 Insert the new drive in the empty slot. Slide the drive in with the locking mechanism open.

6 Swing the lock back down until it clicks into place.

7 Close the front cover with the included key. Press the power button on the TeraStation to turn it on.

Note: If drive 1 is being replaced, the red error LED will light up and "POST ERR: 00D9 Boot from HDD x" will be displayed on the LCD panel. Wait for the unit to reboot. When the reboot is finished, go on to step 8.

8 Open NAS Navigator2 by double-clicking the icon.

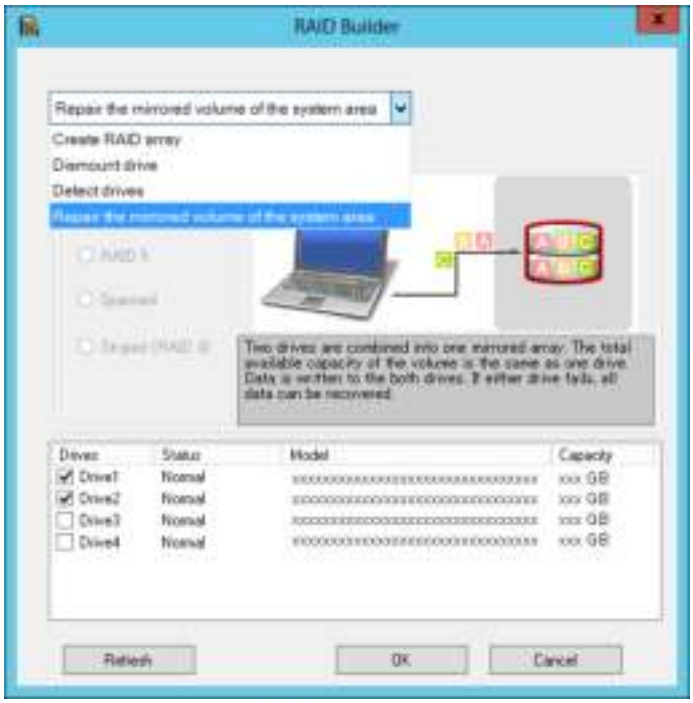
9 Right-click on your TeraStation's icon and click *Open Remote Desktop*. For Mac, click the TeraStation icon while holding down the control key and click *Open Remote Desktop*.

10 Enter the username and password and press Enter key. Windows Storage Server opens in the remote desktop.

Note: The default username and password are "Administrator" and "password".

11 Click *RAID Builder* from the Start menu of Windows Storage Server.

12 Select *Repair the mirrored volume of the system area*, check replaced hard drive, and click *OK*.



13 When "When Drive X will be initialized. Continue?" is displayed, click *OK*. It will take about an hour for the mirrored volume to be repaired. You can check the progress of the repair in "Disk Management".

14 In Windows Storage Server, open *Administrative Tools* and double-click *Computer Management*.

15 Click *Disk Management*.

16 Select the step depending on your purpose for a created volume.

To create a new volume:

(1) Right-click the new dynamic disk and select *New Volume*. (2) Follow the instructions on the screen to create a new volume.

To restore a RAID 5 volume (RAID resynchronization):

(1) Right-click the volume labeled "Failed Redundancy" and click *Restore Volume*. (2) When "Select the disk from the

following list" is displayed, select the drive to restore and click *OK*. Perform steps (1) and (2) for each volume that requires RAID resynchronization. (3) Right-click the volume labeled "Missing" and select *Delete Disk*.

To restore a Mirrored volume (RAID resynchronization):

(1) Right-click the volume labeled "Failed Redundancy" and click *Remove Mirror*. (2) When "Remove Mirror" is displayed, select the drive with its status missing and click *Remove Mirror*. (3) In "Disk Management", click *OK*. Perform steps (1) to (3) for each volume that requires RAID resynchronization. (4) Select the new volume where mirroring will be performed and select *Add Mirror*. (5) When "Add Mirror" is displayed, select the drive where mirroring will be performed with the selected volume and click *Add Mirror*. (6) When "Disk Management" is displayed, click *OK*.

If a Mirrored Volume Failed to Restore

If a mirrored volume doesn't restore the first time, try the steps above a second time. If the mirrored volume still cannot be restored, contact Buffalo technical support for assistance.

Chapter 6 Backup

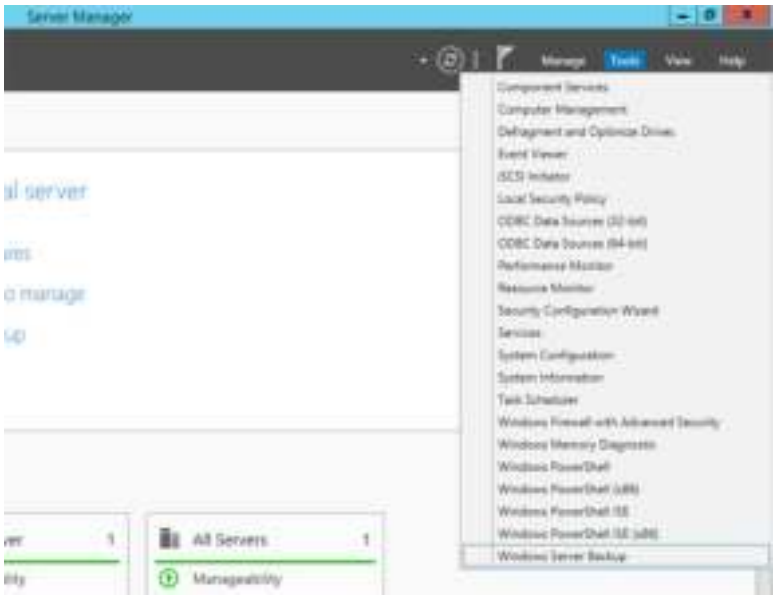
To avoid the data loss accidentally, back up your data regularly.

Back Up in Windows Storage Server

You can back up TeraStation folders in Windows Storage Server.

Preparing a Backup Destination

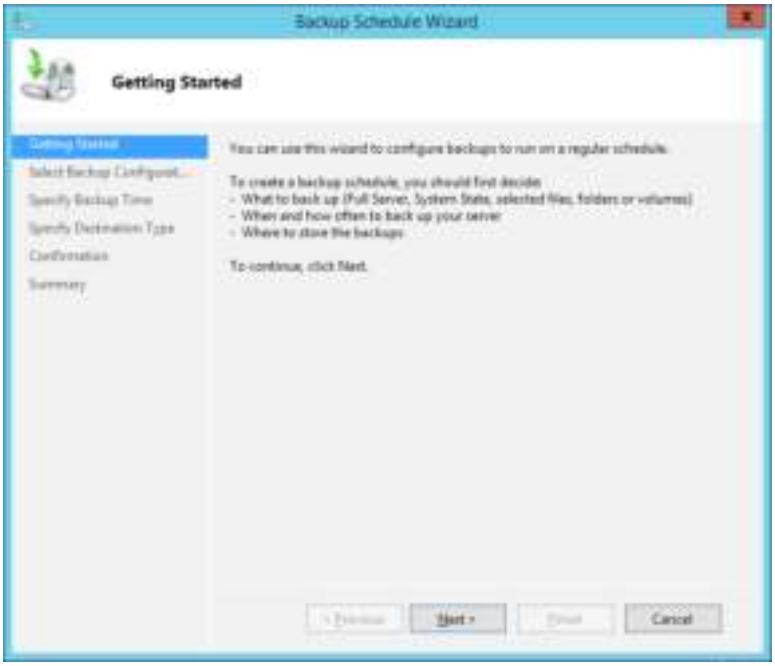
1 In Server Manager, click *Tools* - *Windows Server Backup*. Windows Server Backup will start.



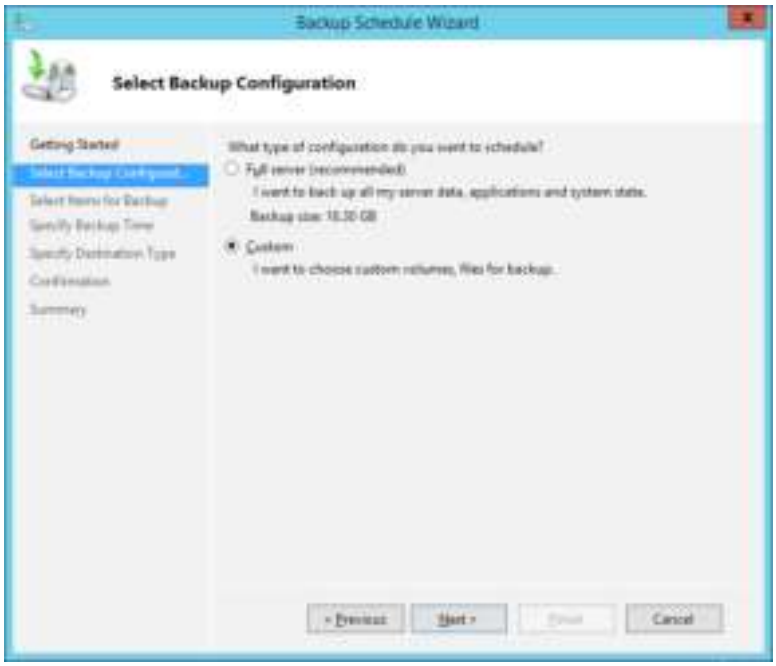
2 Click *Local Backup*. If "Reading data; please wait..." is displayed, please wait until these messages disappear.

3 Right-click on "Local Backup" and select *Backup Schedule...*. The backup schedule wizard will start.

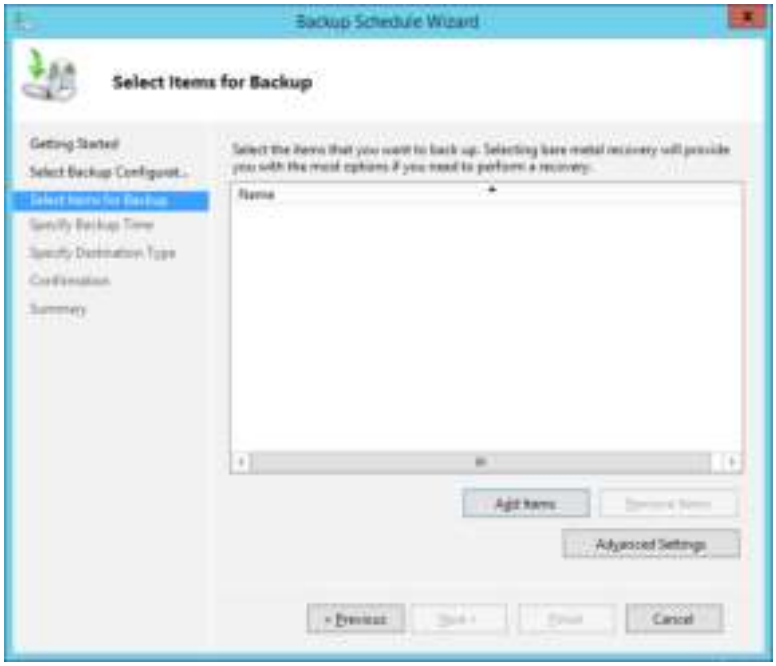
4 Click *Next*.



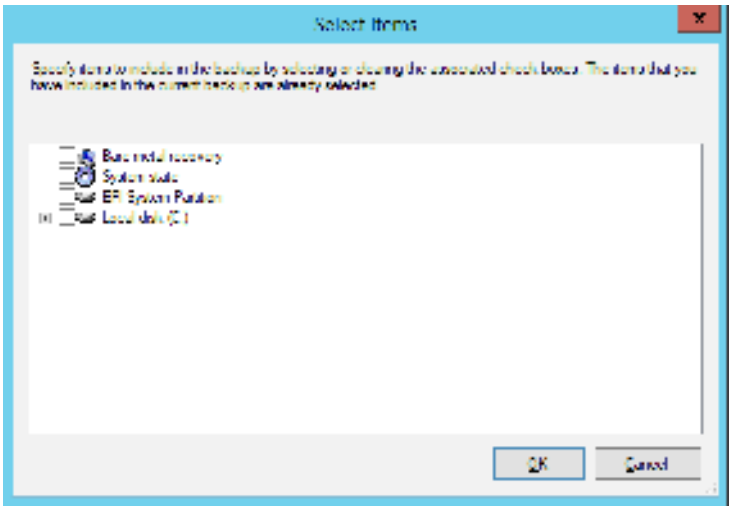
5 Select "Custom" and click *Next*.



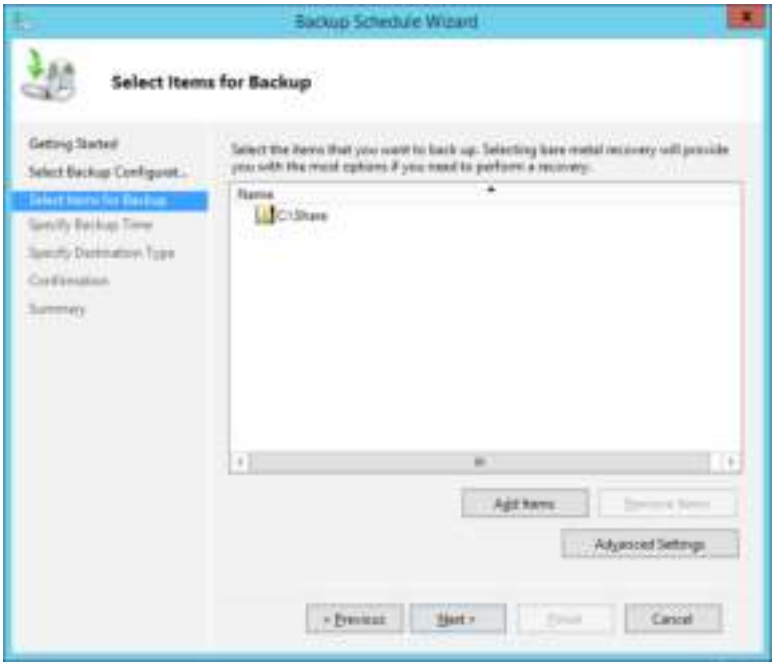
6 Click *Add Items*.



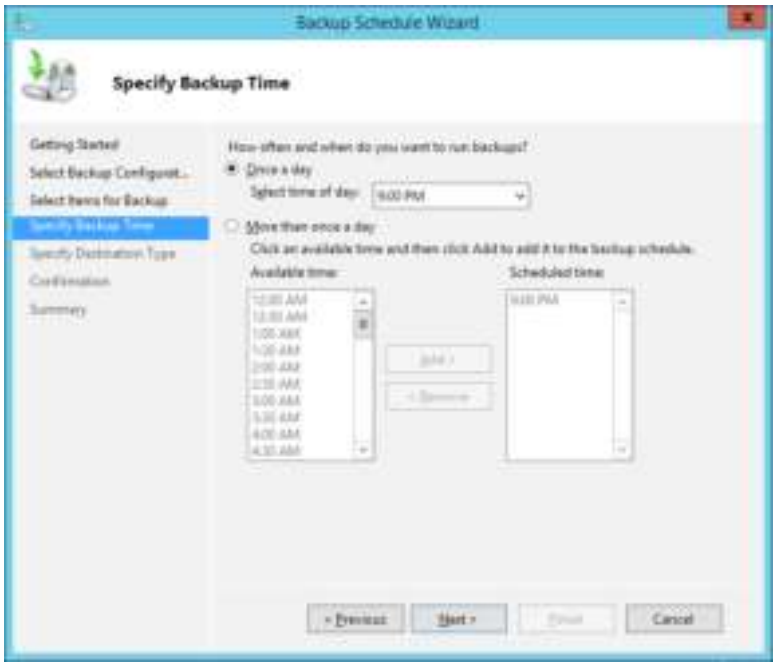
7 Select the backup source folders or drives and click *OK*.



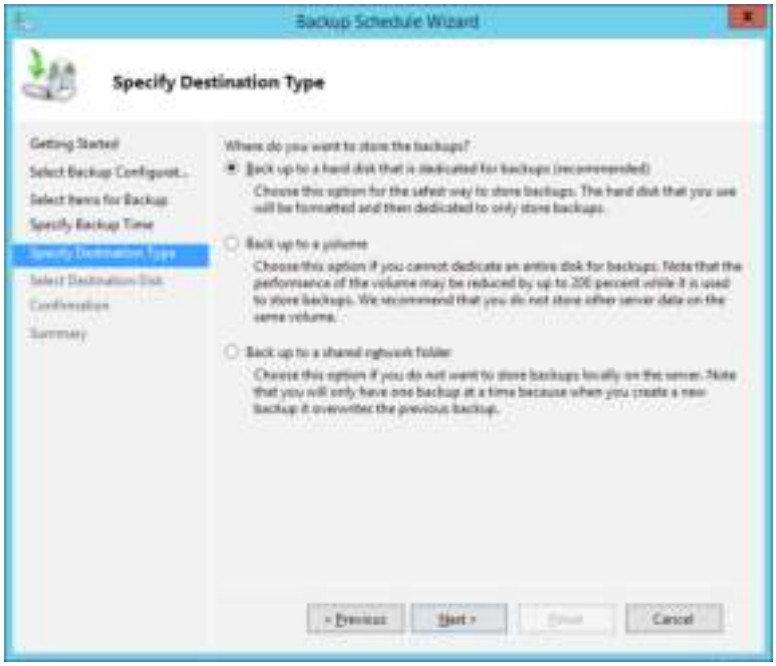
8 Click *Next*.



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



10 Select the backup destination and click *Next*.

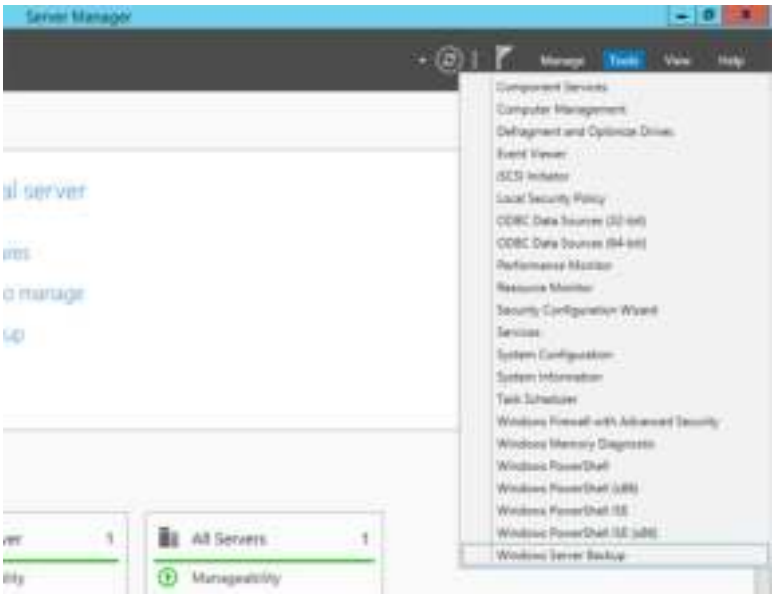


11 Step through the wizard to finish.

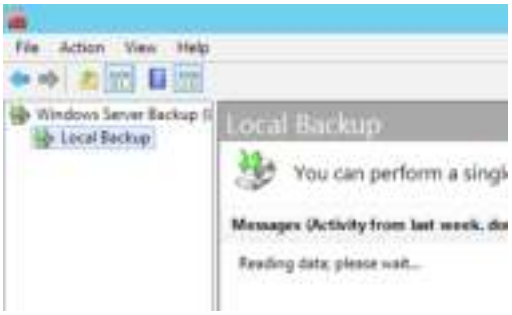
Recovering Backup Data

Recover the backup data to the TeraStation.

1 In Server Manager, click *Tools* - *Windows Server Backup*. Windows Server Backup will start.

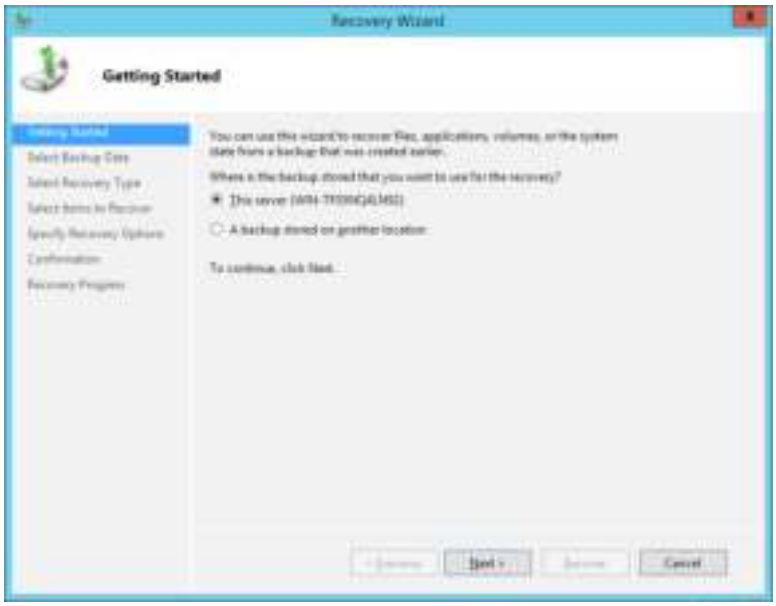


2 Click *Local Backup*. If "Reading data; please wait..." is displayed, please wait until these messages disappear.



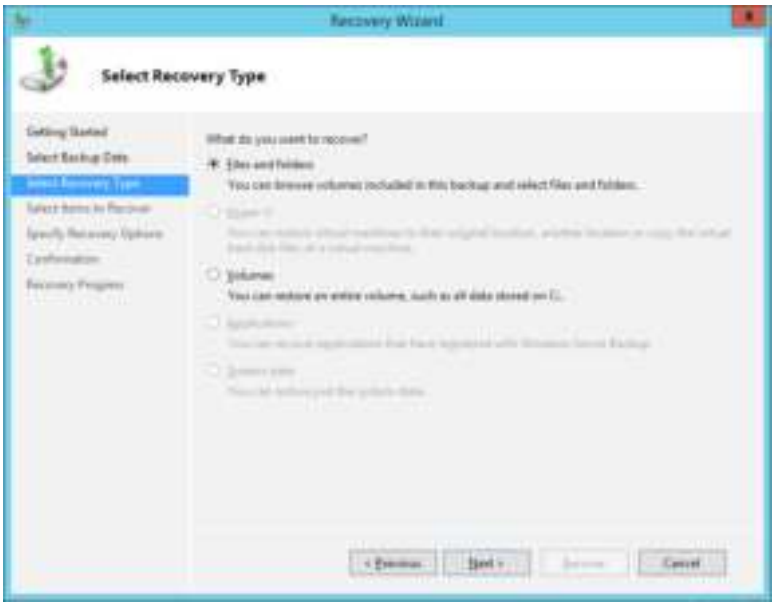
3 Right-click on "Local Backup" and click *Recover...*. The recovery wizard will start.

4 Click *Next*.



5 Select the date when backing up the data and click *OK*.

6 Select the recovery targets and click *Next*.



7 Step through the wizard to finish.

Back Up with NovaBACKUP

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

Installation

1 Connect the supplied USB device to your computer. Open the USB device and double-click *TSNavi.exe*. TeraNavigator will launch.

2 Click *Options - Additional Software Installation*.

3 Select "NovaBackup" and click click *Install*.

4 Click *Install* again.

5 Check "Backup Client" and click *Install* on the NovaBACKUP installation wizard.

6 Select the installation language and click *Next* twice.

7 Check on "I accept the terms in the License Agreement", then click *Next*.

8 Select "Typical" and click *Next*.

9 Enter your name, company name, and email address. Select "I have a license key" and click *Next*.

Notes:

- Name, company name, and email address are required.
- Don't change the license key which is displayed on the screen.

10 Click *Finish*.

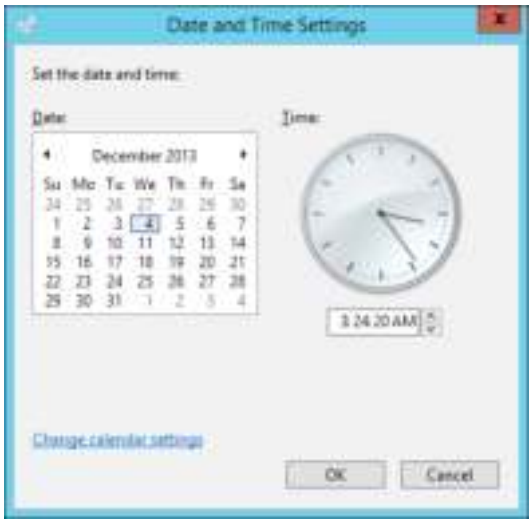
NovaBACKUP is now installed. To launch NovaBACKUP, click the icon on your computer's desktop. For more detail information, click *View Help* in the NovaBackup Express Wizard or click *Help Topics* at the upper right of the NovaBACKUP home screen.

Chapter 7 Settings

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*.



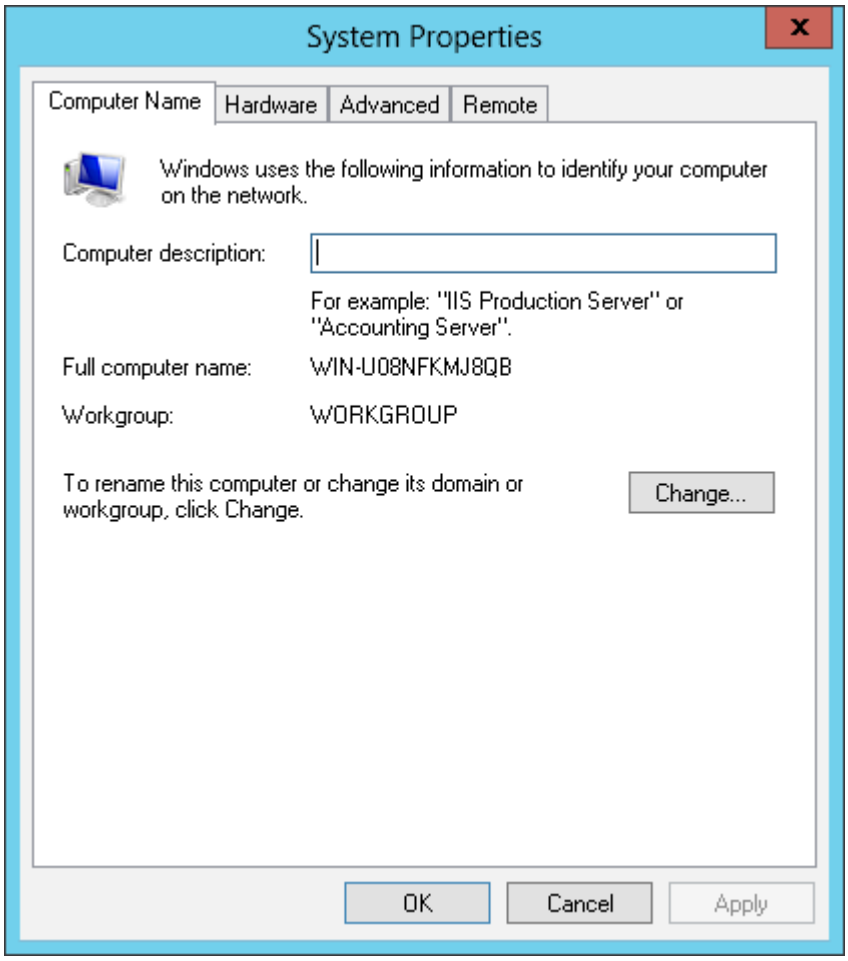
Note: In the *Internet Time* tab, click *Change settings*, then select *Synchronize with an Internet time server*. The date and time can be obtained automatically.

Server Name, Workgroups, and Domains

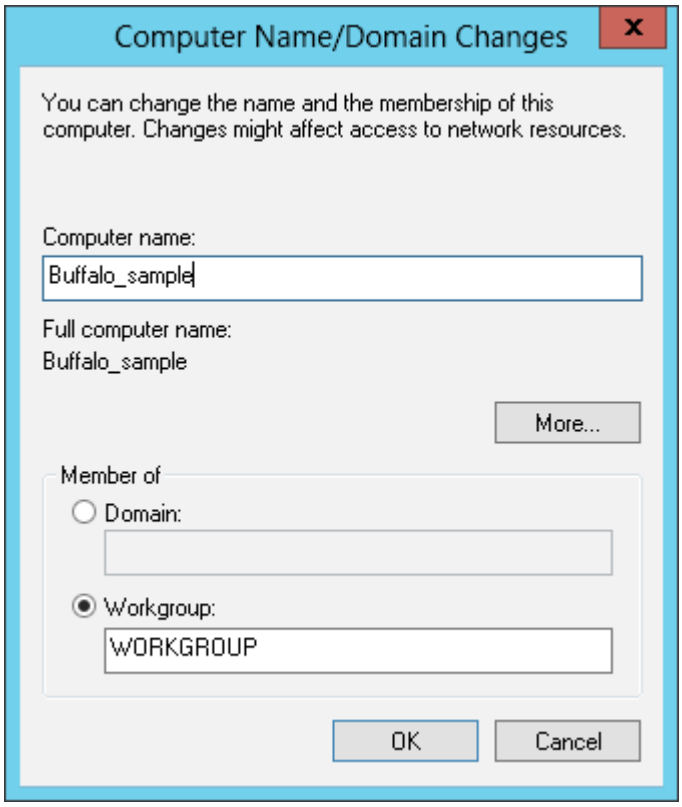
1 In Windows Storage Server, right-click *PC* and choose *Properties*.

2 Click *Change settings* under *Computer name, domain, and workgroup settings*.

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



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



Note: The computer name should have 16 characters or less. If more than 16 characters are entered, all characters from the 17th character on are ignored.

Changing the Password

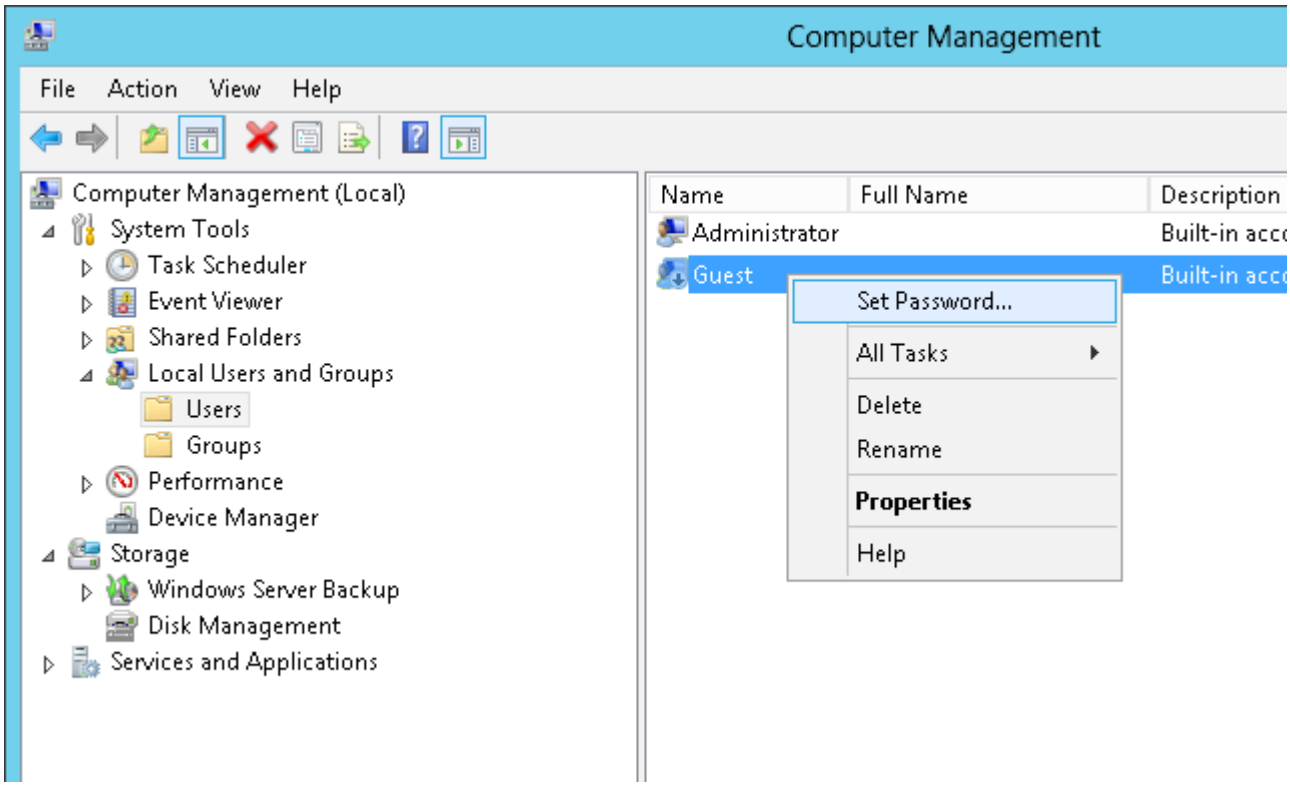
The default password for the TeraStation's administrator account is "password". This is public knowledge, so for security, you should change it immediately. Follow the procedure below to change the password.

Changing the password for the administrator account

1. In Windows Storage Server, navigate to *Control Panel - User Accounts - User Accounts - Manage another account*.
2. Select a user and click *Change password*.
3. Enter the current password ("password") and a new password (twice).
4. Click *Change password*.

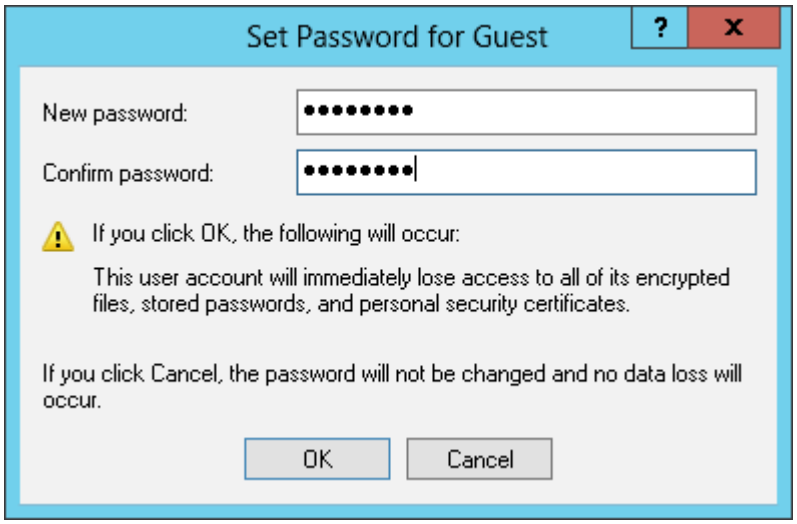
Changing the password for other accounts

1. In Windows Storage Server, open *Administrative Tools*, then double-click *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).

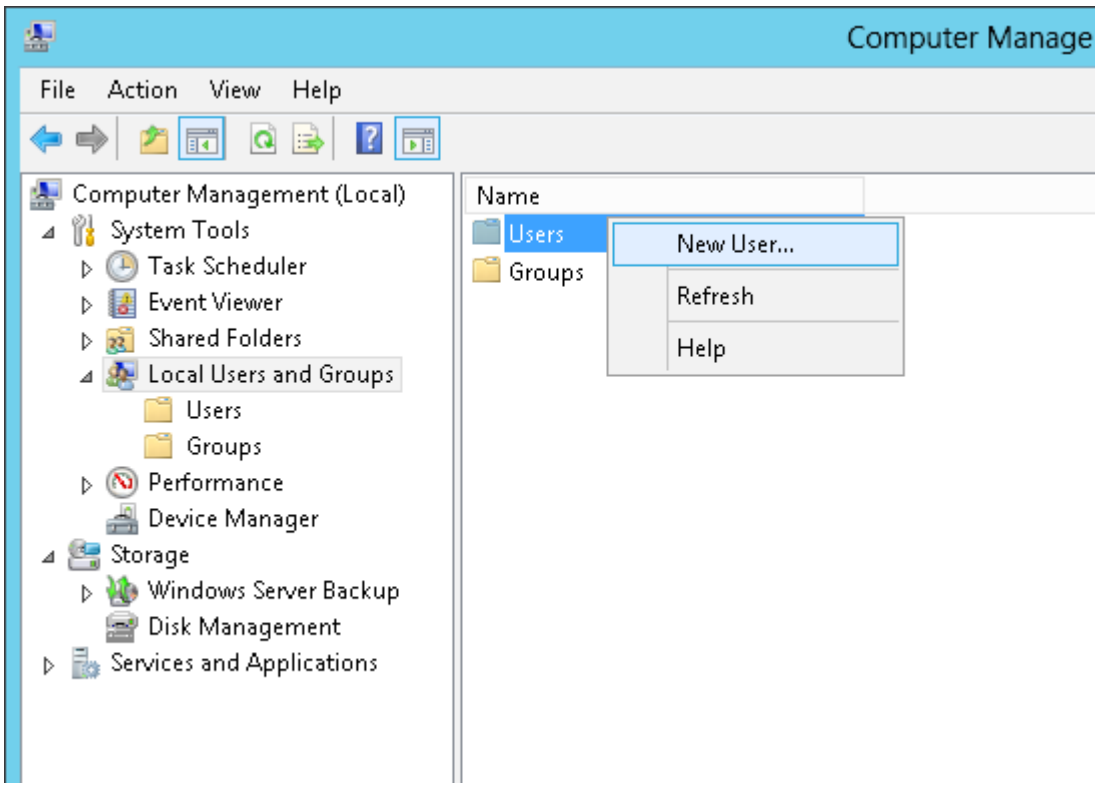


Adding a User

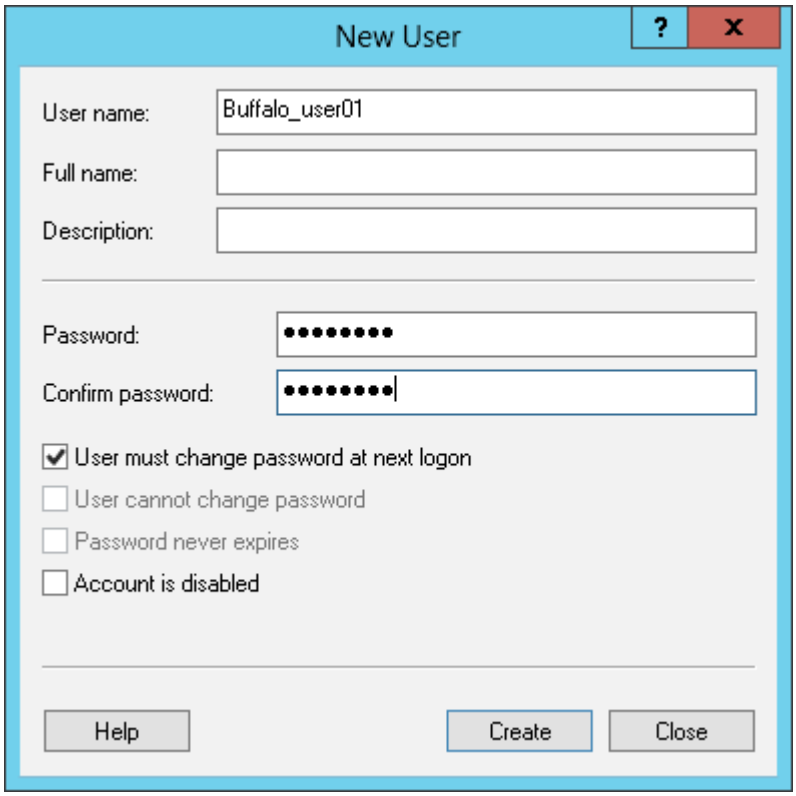
1 In Windows Storage Server, open *Administrative Tools*, then double-click *Computer Management*.

2 Click *Local Users and Groups*.

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



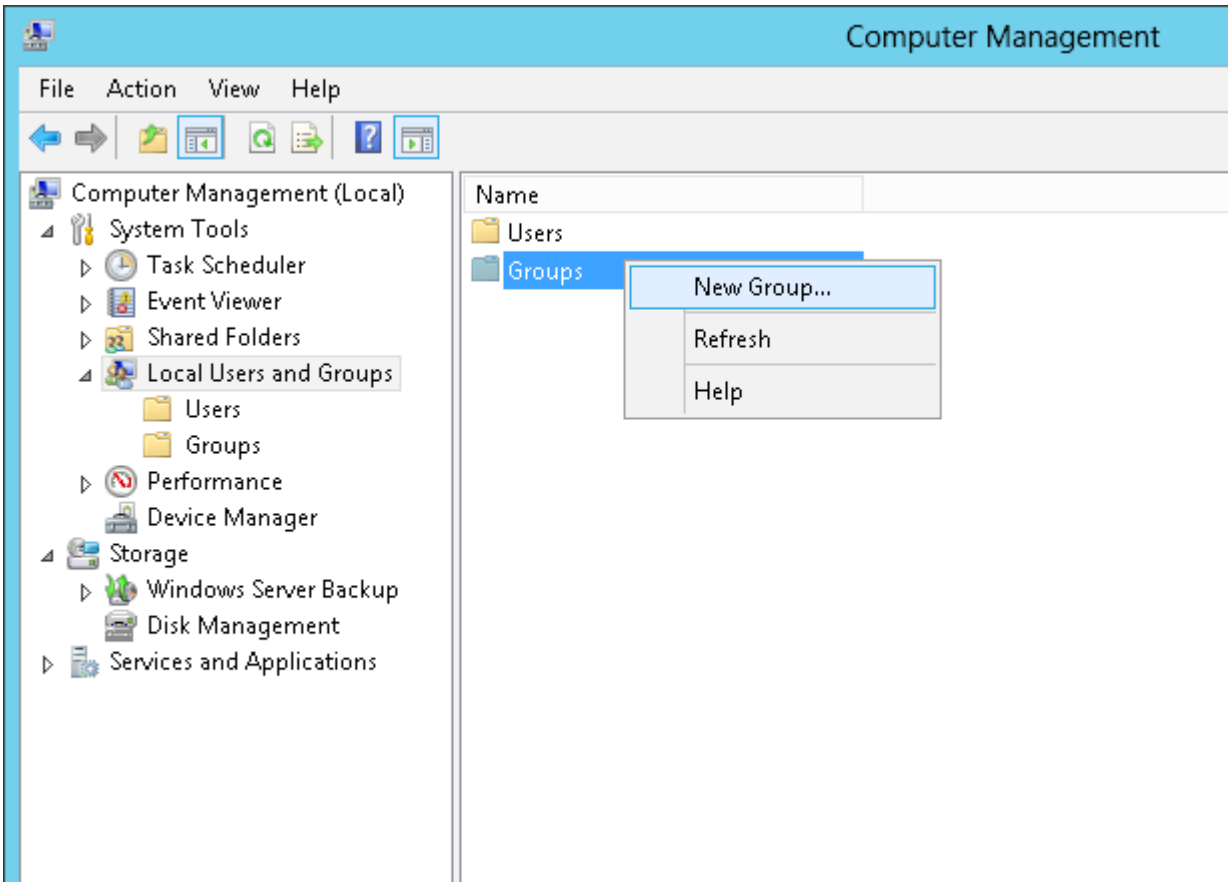
4 Enter the desired settings and click *Create* .



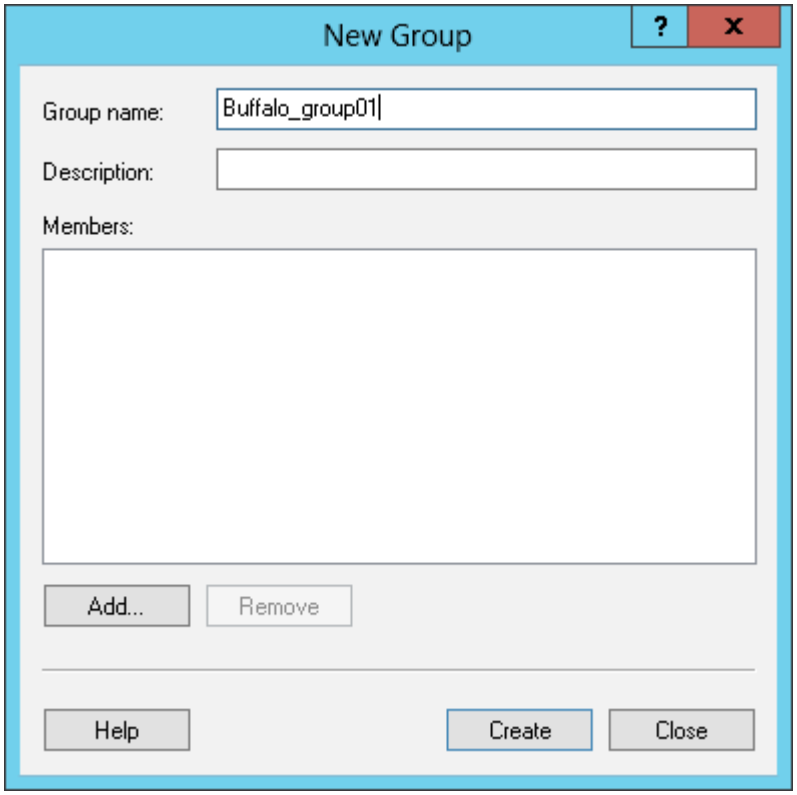
Note: Accounts not belonging to the Administrators group cannot be connected by the remote desktop.

Adding a Group

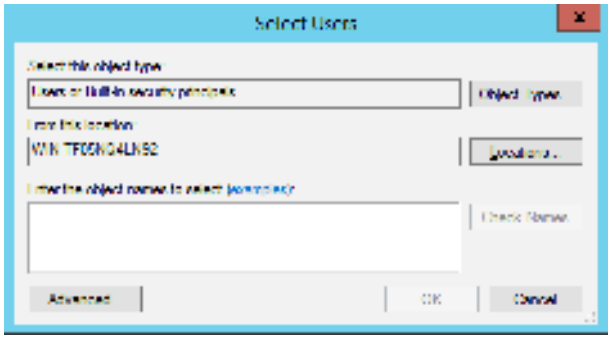
1. In Windows Storage Server, open *Administrative Tools*, then double-click *Computer Management*.
2. Click *Local Users and Groups*.
3. Right-click *Groups* and choose *New Group*.



4 Enter the desired settings, then click *Add*.

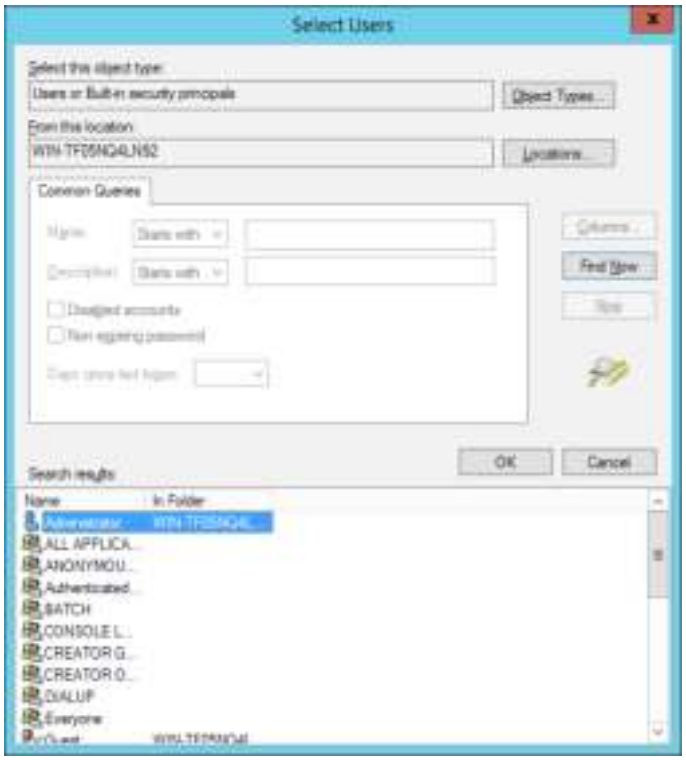


5 Click *Advanced*.

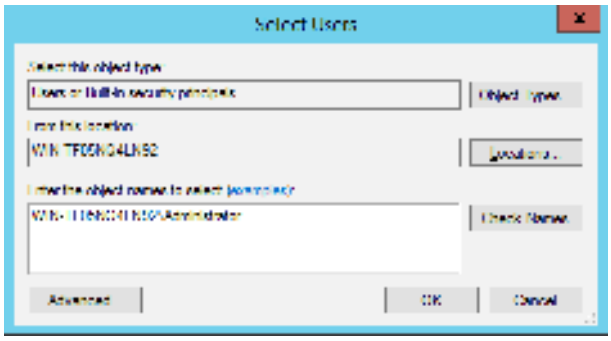


6 Click *Find Now*.

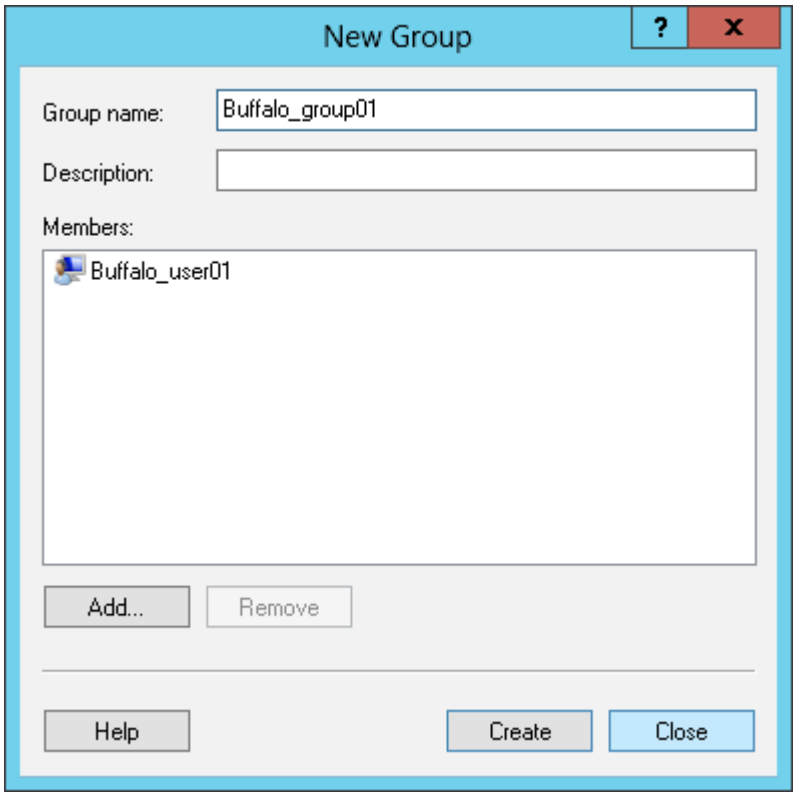
7 Select the users to be registered to the group, then click *OK*.



8 Click *OK*.



9 Click *Close*.



Creating a Shared Folder

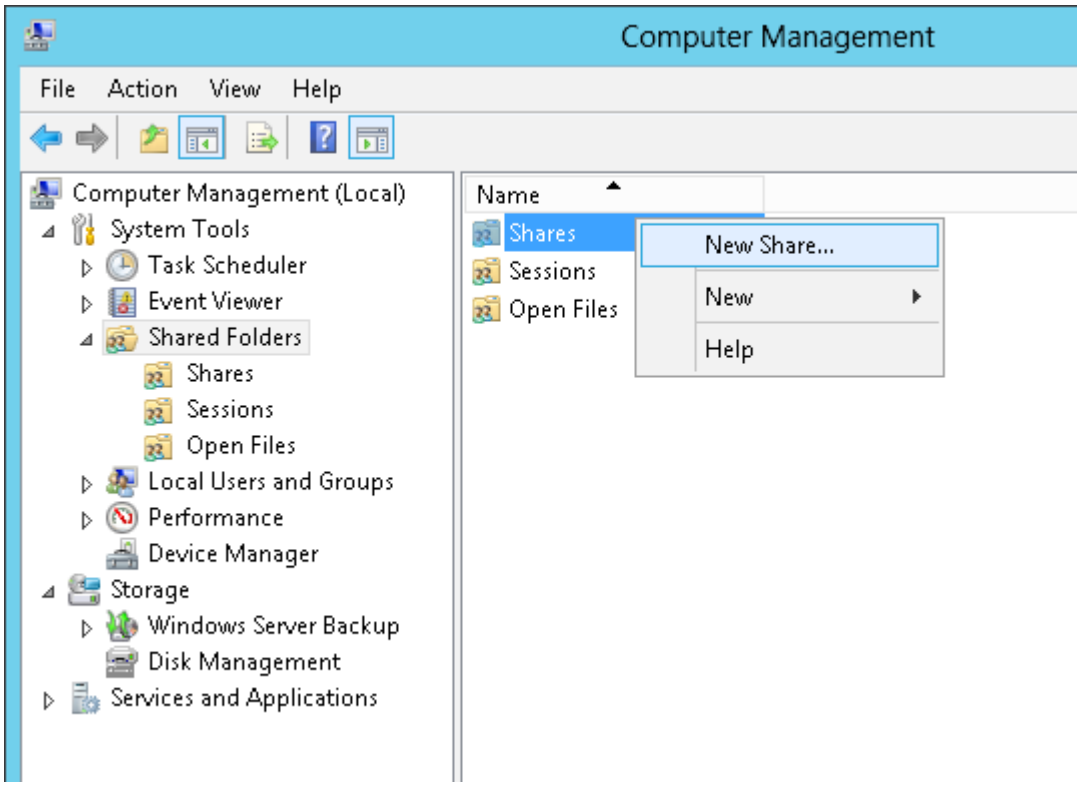
No shared folders are configured by default. Before using the TeraStation, follow the procedure below to create one or more shared folders.

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

1 In Windows Storage Server, open *Administrative Tools*, then double-click *Computer Management*.

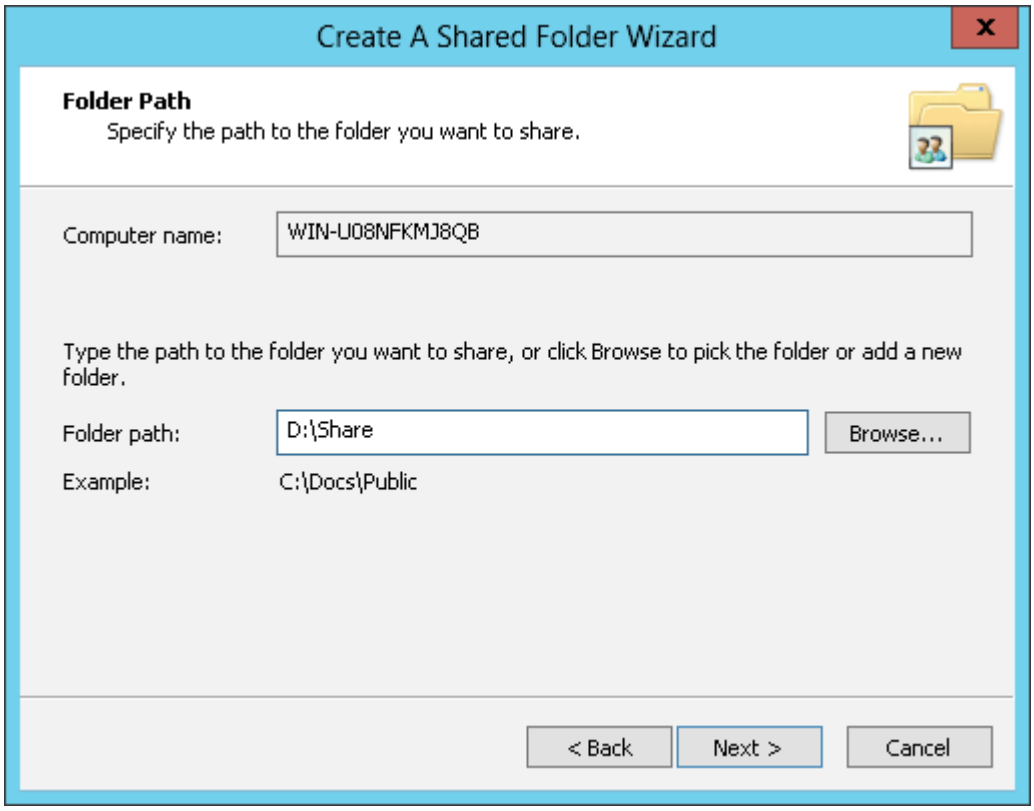
2 Click *Shared Folders*.

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



4 Click *Next*.

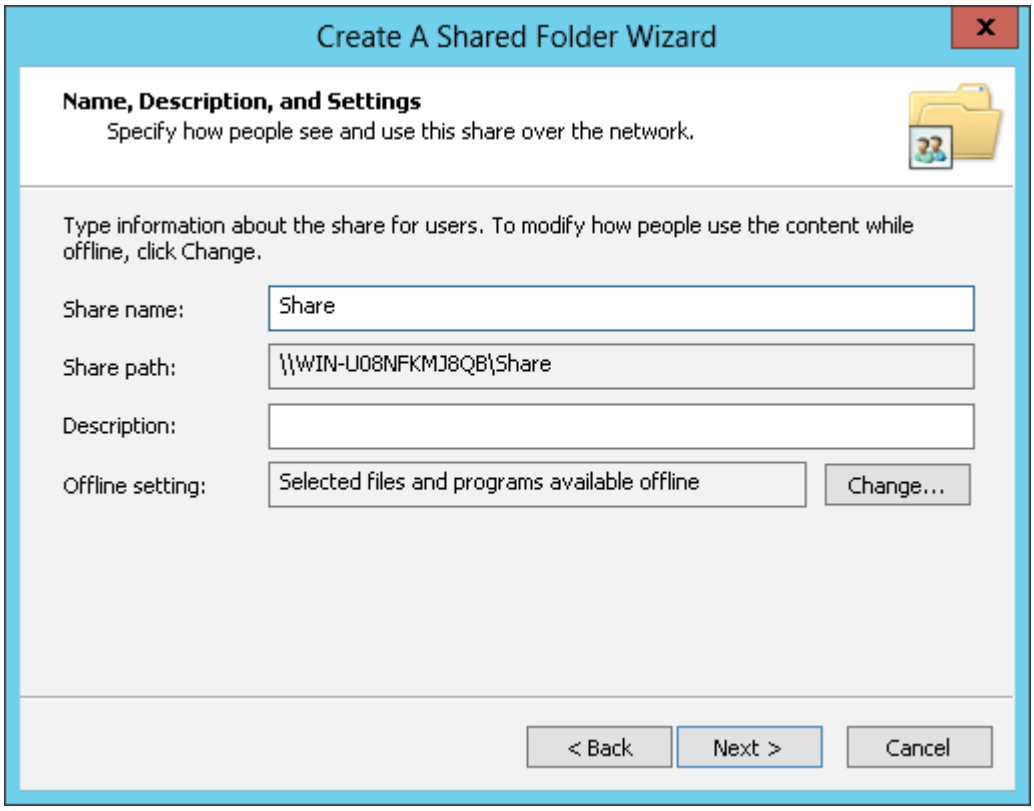
5 Enter the path of an existing folder or a new folder, then click *Next*.



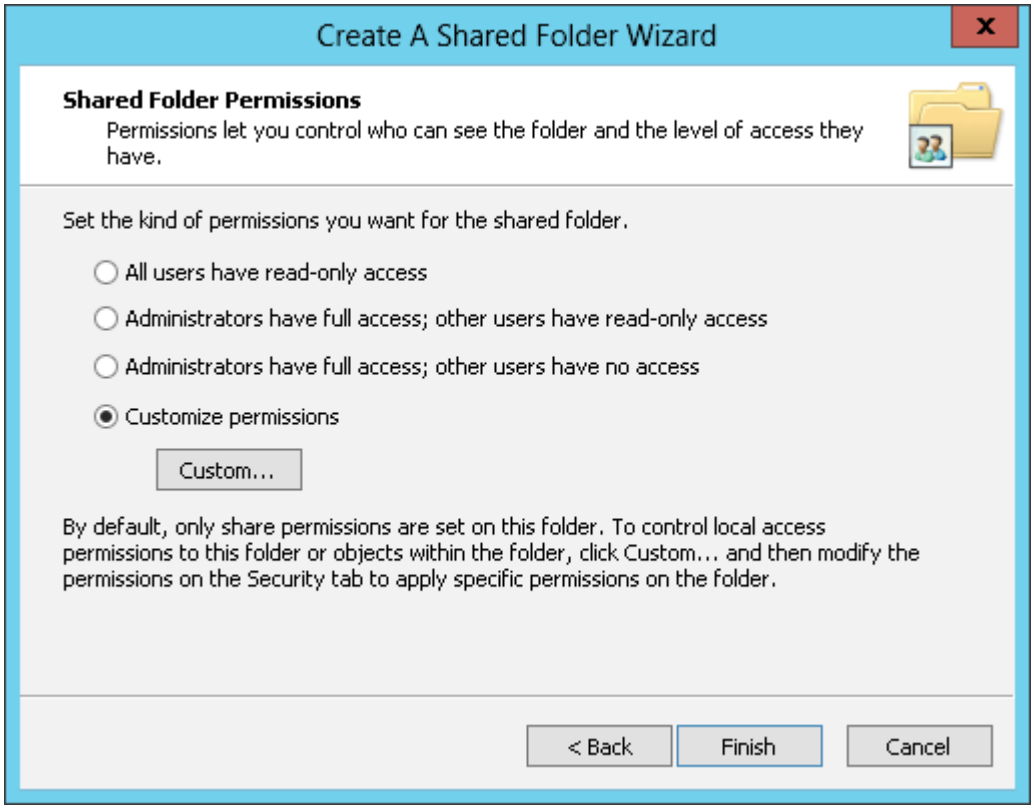
Notes:

- Enter "D:\Share" in 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*.

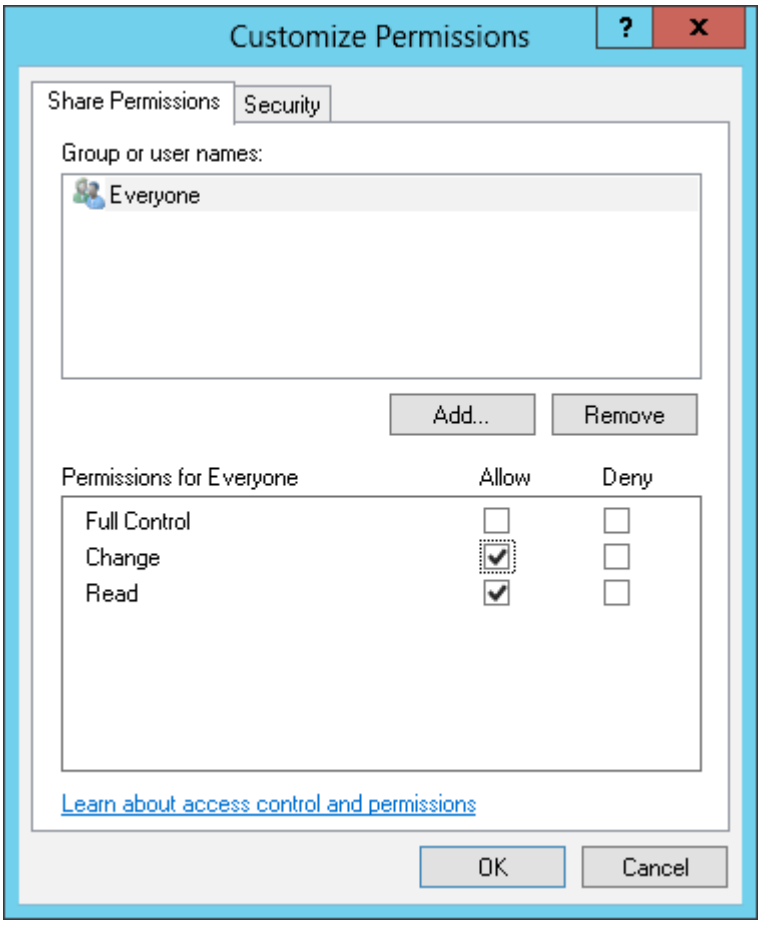
6 Enter a name for the share and a description (optional), then click *Next*.



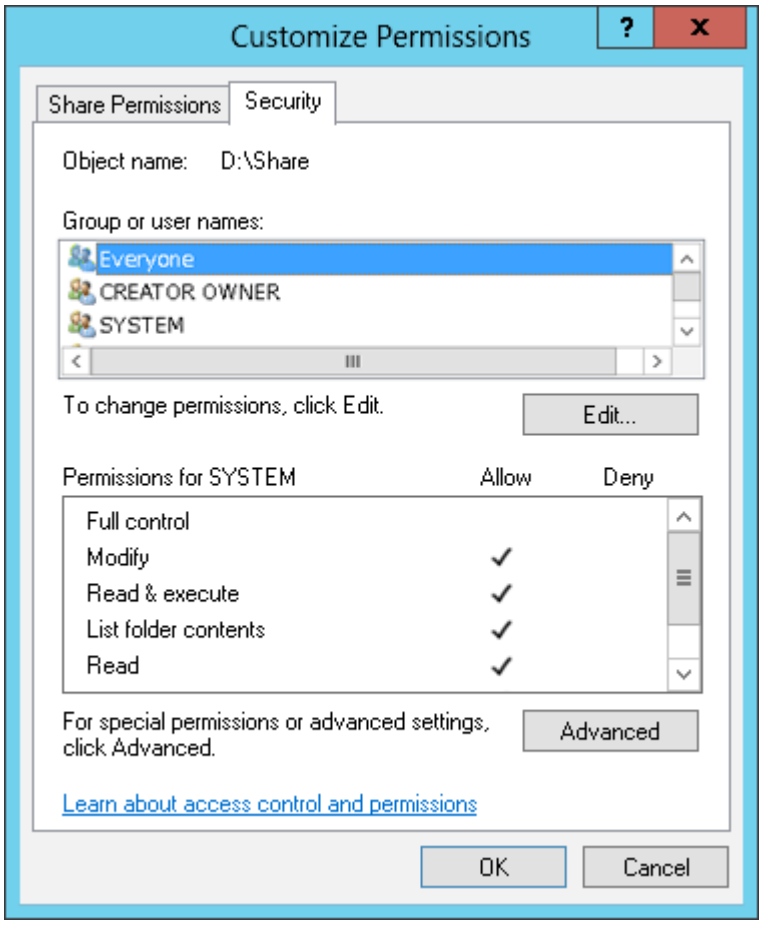
7 Check *Customize permissions*, then click *Custom*.



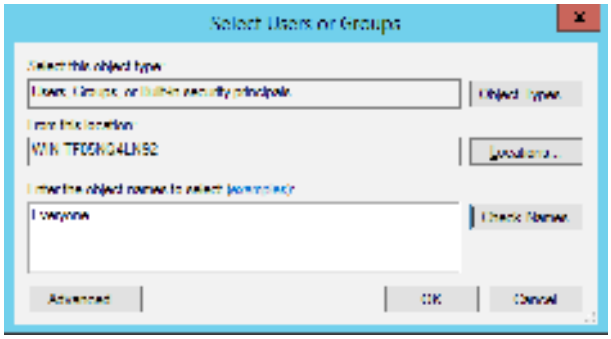
8 Choose *Everyone* and check *Allow* for "Change".



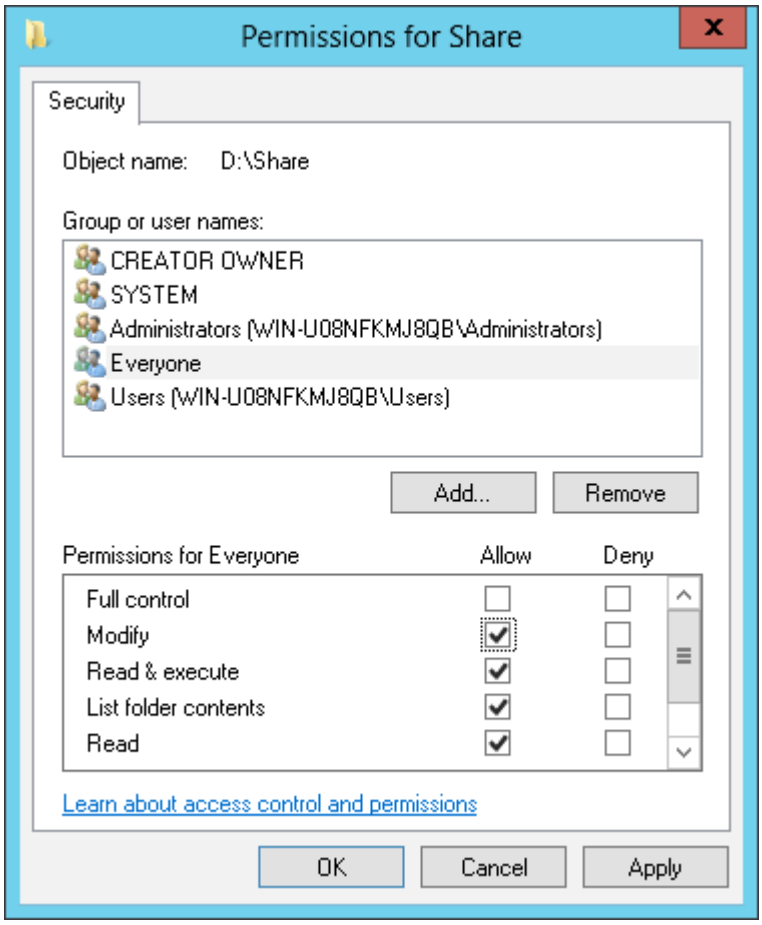
9 In the *Security* tab, click *Edit* - *Add*.



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



11 Choose "Everyone", then check *Allow* for *Modify*.



12 Click *OK* - *OK* - *Finish* - *Finish*.

13 Click *Local Users and Groups* in *Computer Management*.

14 Double-click *Users* - *Guest*.

15 In the *General* tab, uncheck *Account is disabled*, then click *OK*.

Notes:

Enable a guest account:

(1) In Windows Storage Server, open *Administrative Tools*, then double-click *Computer Management*.

(2) Click *Local Users and Groups*.

(3) Double-click *Users* - *Guest*.

(4) In the *General* tab, uncheck *Account is disabled*, then click *OK*.

Enable access permissions:

(5) In Windows Storage Server, open *Administrative Tools*, then double-click *Computer Management*.

(6) Click *Shared Folders*.

(7) Double-click *Shared*, then the shared folder.

(8) In the *Security* tab, click *Edit*.

(9) 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 by all users, add a guest and change "Administrators Access permission" to "Full Control".

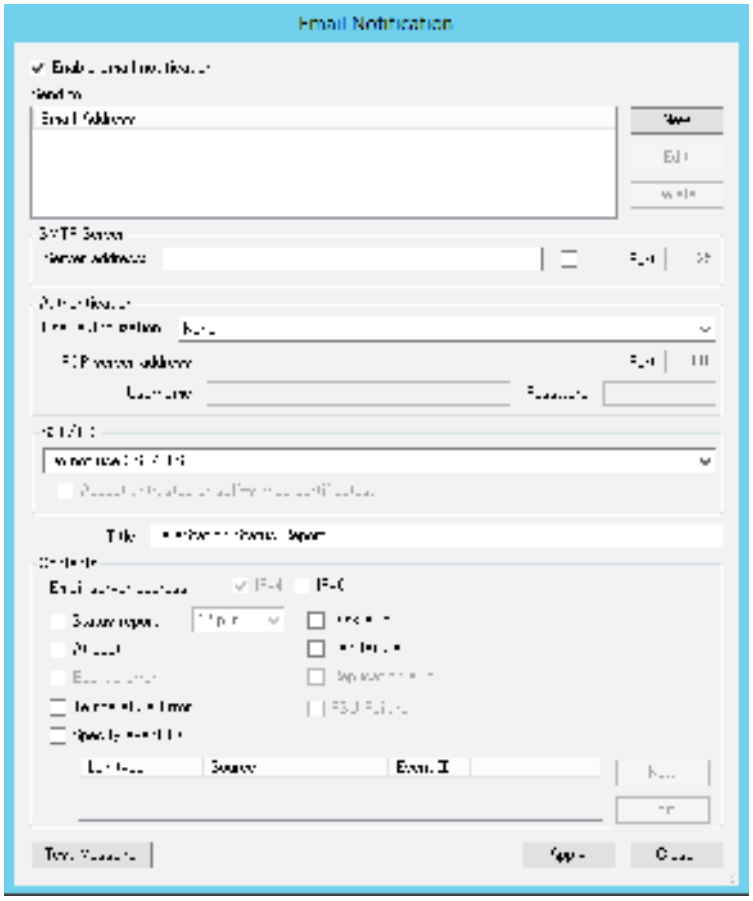
Email Notification

Your TeraStation can send you email reports daily, or when settings are changed or an error occurs. Notification emails may triggerd by any of the following events:

- Hard drive statu at scheduled time
- Hard drive read error
- TeraStation booted
- Fan error
- Temperature exceeded
- Specified event ID logged

1 In Windows Storage Server, click *Email Notification*.

2 Check "Enable email notification".



3 Click *New* and enter an email address. You may enter up to five email addresses to receive notifications.

4 Enter your mail server settings and choose what events will trigger notification. Click *Apply* to finish the email notification settings. You can send a test email when clicking *Test Message*.

Items	Descriptions
Enable email notification	Enables or disables the email notification.

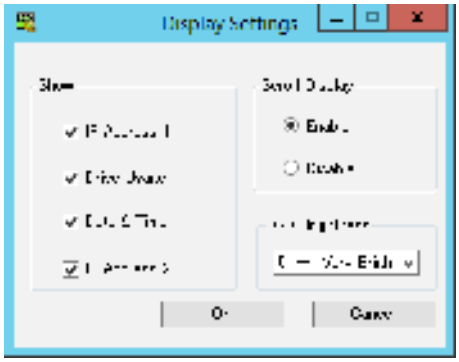
Send to	Adds new receiver of the notification emal. Click *New* to add a new email address. Click *Edit* to change the receiver settings or *Delete* to delete from the list. **Note:** Up to 5 email address may be added.
SMTP Server	Enter your email SMTP server's address and port number. Port number 25 is configured by default. **Note:** If you choose "None" or "POP before SMTP" for the user authorization, the port number is locked to "25" if you enter any other numbers.
Authentication	Select the user authorization type from "None", "POP before SMTP", "LOGIN (SMTP-AUTH/LOGIN)", and "CRAMMD5 (SMTP-AUTH/CRAM-MD5)". If "POP before SMTP" is selected, enter the POP server address, port number, username, and password. Unless specified otherwise, the standard port number (110) is used.
SSL/TLS	If "LOGIN (SMTP-AUTH/LOGIN)" or "CRAMMD5 (SMTP-AUTH/CRAM-MD5)" is selected, select wether to use SSL or TLS.
Title	Enter the subject of the notification email.
Contents	Email server address: Check "IPv6" add add IPv6 compatibility to the email notifications. Select the trigger when send and notification emails. Status report: Sends regular notification emails at the specified time. Disk error: Sends an email when a hard drive error occurs. At boot: Sends an email when the system is booted or restarted. Fan failure: Sends an email when a fan error occurs. Temperature error: Sends an email when the TeraStation temperature exceeds. Specify event ID: Sends an email when the specified event IDs are logged. Enter an event ID to trigger email notifications.
Test Message	Sends a test email to the email address which is configured.

LCD Display Settings

You may configure the LCD on the front of the TeraStation.

1 In Windows Storage Server, click *LCD Display Settings*.

2 Configure the desired settings and click *OK*.



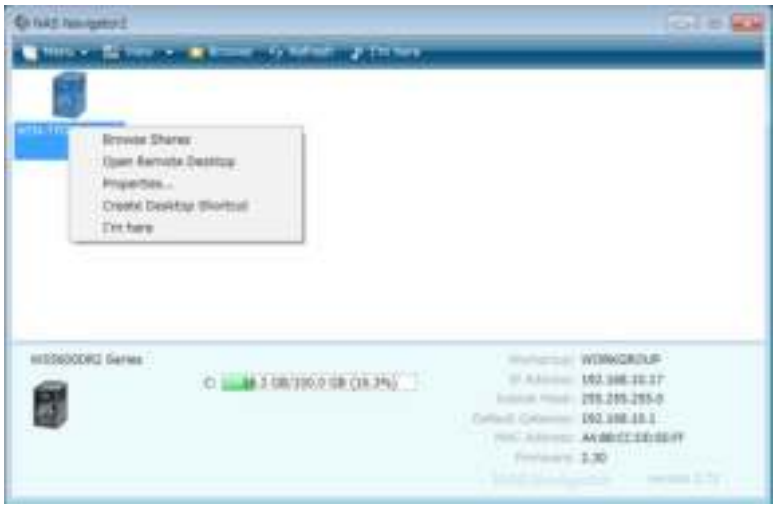
Items	Descriptions

Show	Selects from "IP Address 1", "Drive Usage", "Date & Time", and "IP Address 2" to show on the LCD display or not.
Scroll Display	Enable or disable if switches the items regularly on the LCD.
LCD Brightness	Change the brightness of the LCD display from level 1 (Dim) to 5 (Bright).

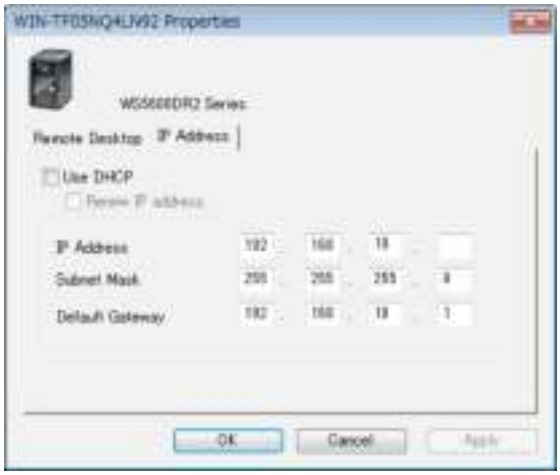
Changing the IP Address

Note: If the TeraStation is being used in a domain environment, the IP address cannot be changed by NAS Navigator2. To change the IP address, the domain environment administrator must change it at the domain server.

1 Right-click on your TeraStation's icon and click *Properties*.
For Mac OS, click the TeraStation icon while holding down the control key, then click *Configure*.



2 Click the *IP Address* tab, enter the desired settings, and click *OK*.



Notes:

- If you don't know how to configure these settings, check "Use DHCP".
- If you are prompted to enter the administrator's password, enter the TeraStation's password (it is set to "password" by factory default).

Chapter 8 NAS Navigator2

NAS Navigator2 is a utility program that makes it easy to display Windows Storage Server, change TeraStation's IP address, or check its hard drive in remote desktop. If you installed the TeraStation with the TeraNavigator CD, NAS Navigator2 was installed automatically.

NAS Navigator2 will run in the system tray when the computer is on.

To launch NAS Navigator2, double-click the icon.

Click your TeraStation's icon to open a share on the TeraStation and display:

- Total capacity
- Capacity in use
- IP address
- Workgroup
- Subnet mask
- Default gateway
- MAC address
- Firmware version

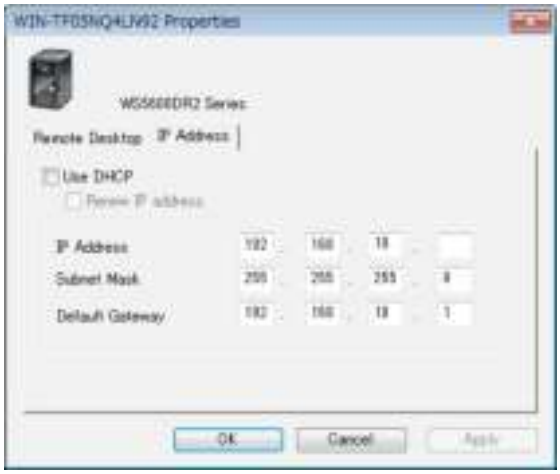
Name		Description
Menu	Map Share*	Not available for this product (grayed out).
	Disconnect Share*	Not available for this product (grayed out).
	Map All Remote Shares to Drive Letters	Assigns all the TeraStation's shared folders as network drives. This is available only when a shared folder has been created.
	Create Desktop Shortcut*	Creates a shortcut icon to the TeraStation's shared folder "share" on the desktop.
	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 pop up from the NAS Navigator2 icon in the system tray.
	Properties*	Opens the selected TeraStation's properties page.
	Close	Closes NAS Navigator2.
View	View	Icons: Displays icons. Details: Displays hostname, product name, workgroup, IP address, subnet mask, and default gateway.
	Sort by	Select the sort order from following to display when multiple NAS are found: Hostname, product name, workgroup, IP address, subnet mask, and default gateway.
Browse*		Opens the TeraStation's shared folder.
Refresh		Searches for NAS devices on the network again.
I'm here*		Causes your TeraStation to beep.
Right-click your device's icon to show these options.	Browse Shares	Opens the TeraStation's shared folder.
	Open Remote Desktop	Opens Windows Storage Server in remote desktop.
	Properties	Opens the TeraStation's properties page.
	Create Desktop Shortcut	Creates a shortcut icon to the TeraStation's shared folder "share" on the desktop.
	I'm here	Causes your TeraStation to beep.

*Click on the TeraStation's icon to display these options.

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

Name		Description
TeraStation Name	Browse Shares	Opens the TeraStation's shared folder.
	Open Remote Desktop	Opens Windows Storage Server in remote desktop.
	Properties	Opens the TeraStation's properties page.
	Create Desktop Shortcut	Creates a shortcut icon to the TeraStation's shared folder "share" on the desktop.
	I'm here	Causes your TeraStation to beep.
Refresh		Refreshes list of NAS devices.
Browse Shares		Displays NAS Navigator2 window.
Exit		Exits NAS Navigator2.

The following tasks may be performed from the TeraStation's properties page.



Name	Description
Remote Desktop	Click *Open Remote Desktop* to open Windows Storage Server.
IP Address	Check *Use DHCP* to assign an IP address automatically. If there is no DHCP server in the network, you cannot use this function. Check *Renew IP address* to obtain an IP address from DHCP server. You can manually enter an IP address, subnet mask, and default gateway.

Chapter 9 Appendix

LCD Display

The LCD display can be cycled through different modes by pressing the display button on the front of the TeraStation.

Modes

LCD Message		Description
LINK SPEED **Note:** When an Ethernet cable is connected to LAN Port 2, "LINK SPEED 2" is displayed.	LINK SPEED No LINK	Not connected to network.
	LINK SPEED 10Mbps	Connected at 10 Mbps.
	LINK SPEED 100Mbps	Connected at 100 Mbps.
	LINK SPEED 1000Mbps	Connected at 1000 Mbps full duplex.
Disk Space Used	HDD USED 	Bar graphs are shown to indicate the used space for the C, D, E, and F internal drives of the TeraStation. When a hard drive is full, it is indicated by "^".
Hostname/IP Address	WS5000xxx 192.168.11.150	Displays the hostname and IP address.
Calendar/Clock	DATE TIME 2013/1/1 11:11	Displays the date and time set in the TeraStation.
Installed OS	Windows Storage Server 2012	Displays the OS installed on the TeraStation.
IP Address 2	NETWORK2 192.168.11.151	Displays the IP address of LAN port 2 when an Ethernet cable is connected to LAN port 2.

Errors and Status

LCD 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 tool 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 hard drive X.	Hard drive X may be disconnected or may have failed. After shutting down, reinstall the hard drive.
HDx Broken E30 Replace the DISK	An error occurred, so hard drive X was removed from the RAID array.	Replace hard drive X.
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.	-
RAID I18 xDive Rebuilding	Rebuilding X th drive in the array. **Note:** Transfer speeds are slower during the rebuilding process.	-

Default Settings

Administrator's Name	Administrator
Password	password
Shared Folders	No shared folders are preconfigured.
DHCP Client	Normally, 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 Group	This is not set.

Microsoft Network Group Setting	WORKGROUP
RAID Mode	Drive C: A mirrored array using drives 1 and 2 Drive D: A RAID 5 array using all drives* *WS5200DR2: drive D is a mirrored array using drives 1 and 2.
Local Security Policy	"Password must meet complexity requirements" is disabled by default.

Specifications

Check www.buffalotech.com for information about the latest products and specifications.

Installed System	Workgroup Edition Model: Microsoft Windows Storage Server 2012 R2 Workgroup Edition Standard Edition Model: Microsoft Windows Storage Server 2012 R2 Workgroup Standard Edition **Note:** The Microsoft Software License is contained in the *ms-license* folder in the supplied USB device. Be sure to read the terms and conditions of this license.	
LAN Port	Interface	IEEE 802.3ab (1000BASE-T) IEEE 802.3u (100BASE-TX) IEEE 802.3 (10BASE-T)
	Transfer Speed	1000 Mbps full duplex (autonegotiation) 100 Mbps full duplex/half duplex (autonegotiation) 10 Mbps full duplex/half duplex (autonegotiation)
	Number of Ports	2 ports (supports Auto-MDIX)
	Connector Type	RJ-45 8-pin
USB Port	WS5600DR2, WS5400RR2: USB 2.0 port (type A) x 2, USB 3.0 port (type A) x 3 WS5400DR2, WS5200DR2: USB 2.0 port (type A) x 2, USB 3.0 port (type A) x 2	
UPS Port	D-sub 9 pin (male) x 1 Compatible UPS are manufactured by Omron or APC.	
Internal Hard Drive	If a hard drive in the TeraStation malfunctions, replace it with a Buffalo OP-HDS series drive of the same capacity, available from www.buffalotech.com.	
Power Supply	AC 100-240 V, 50/60 Hz	
Power Consumption	WS5600DR2: max ~120 W WS5400DR2: max ~86 W WS5400RR2: max ~100 W WS5200DR2: max ~47 W	
Dimensions (W x H x D) / Weight	WS5600DR2: 170 x 260 x 230 mm; 6.7" x 10.2" x 9.1" (excluding protruding parts)/ ~ 10 kg (22.1 lb.) WS5400DR2: 170 x 215 x 230 mm; 6.7" x 8.5" x 9.1" (excluding protruding parts)/ ~ 7.5 kg (16.5 lb.) WS5400RR2: 430 x 44 x 430 mm; 16.9" x 1.7" x 16.9" (excluding protruding parts)/ ~ 9 kg (19.8 lb.) WS5200DR2: 170 x 170 x 230 mm; 6.7" x 6.7" x 9.1" (excluding protruding parts)/ ~ 4 kg (8.8 lb.)	

Operating Environment	Temperature: 5 - 35°C; 41 - 95° F Environment Humidity: 20 - 80% (no condensation)
Compatibility	Windows and Mac computers with Ethernet interface. **Note:** The TeraStation requires an Ethernet connection with your computer for operation. It cannot be connected via USB.
Supported OS	Windows 8.1*, Windows 8*, Windows 7*, Windows Vista*, Windows XP, Windows 2000, Windows XP Media Center Edition (2004 or 2005), Windows Server 2012, Windows Server 2012 R2, Windows Server 2008, Windows Server 2008 R2, Windows Server 2003, Windows 2000 Server OS X 10.9, 10.8, 10.7, 10.6, 10.5, 10.4 *32-bit and 64-bit

Data Backup

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.

Troubleshooting

If you can't access your TeraStation:

Typical problems and when you are unable to search using NAS Navigator2 and when 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. Software running in the background is blocking communication.

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

Cause 3. Wireless and wired adapters are both enabled.

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

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

Try changing the hub port or Ethernet cable that you use 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 LAN board or hub transmission mode has not been set.

Change the transmission mode in the LAN board or hub to "10M semi-duplex" or "100M semi-duplex". Some LAN boards or hubs may be unable to connect to the network correctly when the transmission 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 Client for Mac" is not installed on your Mac.

If using OS X 10.4 or later, download and install "Remote Desktop Connection Client for Mac 2" from www.microsoft.com.

When TeraStation shared folders suddenly do not open

If the TeraStation shared folder is assigned and used as a network drive, access to the TeraStation may suddenly fail if network settings such as IP addresses or groups are changed. If this happens, follow the procedure in chapter 2 to open the TeraStation's shared folder with NAS Navigator2.

If you are unable to access the shared folder or the system is unstable

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

Windows Storage Server Recovery Procedure

If Windows Storage Server no longer functions properly, perform recovery using the supplied USB device.

This recovery procedure makes your data erased. Backing up regularly is highly recommended to avoid missing your important data.

Do not connect the supplied USB device to another TeraStation. The recovery process performed by the supplied USB device is intended for this product only.

Recovery is performed by deleting the area for drive 1, setting up a new 100 GB (Basic Disk/Simple) area, and then copying the Windows Storage Server image to this area.
Note: If there are system areas (or mirrored locations) on hard drives other than drive 1, be sure to delete the system areas (or disable the mirrored locations) before performing the recovery procedure. If recovery is performed without deleting these areas, Windows Storage Server may not run after recovery is performed.
If Windows Storage Server fails to run, turn off the TeraStation and perform the recovery procedure again while all hard drives except for drive 1 (disk 0) are disconnected. After recovery is complete, reconnect the disconnected drives, which will appear in "Disk Management" as "Foreign". In "Disk Management", right-click *Foreign*, select *Import Foreign Disks*, then right-click this area and click *Reactivate Volume* to rebuild the RAID array.

1 Turn off the TeraStation, following the procedure in "Turning the TeraStation On and Off" in chapter 1.

2 Connect the supplied USB device to the USB 3.0 port.

3 Set the boot mode switch to "USB", then press the power button.
This executes the recovery process.

4 The TeraStation shuts down automatically when the recovery process is complete.

5 Remove the USB device, set the boot mode switch to "HDD", and press the power button.
When the initial setup is complete, the TeraStation will reboot into Windows Storage Server.

After the recover process is completed, the TeraStation is set to the state below when used at the default settings.

- Drive 1

100 MB (EFI System partition)

100 GB (Basic Disk/Simple)

The remaining space is an unallocated area.

- Drives 2 to 4

The data on the drives cannot be viewed. They appear as a "Foreign" in "Disk Management".

Note: The data on the drives can be viewed by right-clicking the area displayed as "Foreign" in "Disk Management" and then selecting *Import Foreign Disks*.

(1) Mirror the system area by using RAID Builder (drive 1 to drive 2).

(2) Remove the area for RAID 5 in drive 3 and 4.

(3) Create a RAID 5 volume with drives 1 - 4 using RAID Builder.

Notes

Using an Omron UPS

The TeraStation's LCD panel will not display information correctly when an Omron UPS is first connected. This is because the LCD panel control and the Omron UPS both use COM port 2. To resolve, refer to the Omron's user manual and change its UPS communication port to a port other than COM 2, then restart the TeraStation.

Ethernet port number is not correct on the Windows Storage Server.

Ethernet port numbers on the Windows Storage Server are assigned in the order of recognizing them. They might be different from printed port numbers.

Compliance Information

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Mark Statement

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Environmental Information

- The equipment that you have purchased required the extraction and use of natural resources for its production.
- The equipment may contain hazardous substances that could impact health and the environment.
- In order to avoid the dissemination of those substances in our environment and to diminish the load on natural resources, we encourage you to use the appropriate take-back systems.
- The take-back systems will reuse or recycle most of the materials of your end of life equipment appropriately.
- The crossed-out wheeled bin symbol invites you to use those systems.
- If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

KC

기종별	사 용 자 안 내 문
A급 기기(업무용 정보통신기기)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

BSMI

警告使用者：

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

CCC

警告

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

设备的最高使用室内环境温度: 35° C

仅适用于海拔 2000m 以下地区安全使用。

断开装置为电源软线上的插头。插座应当装在设备的附近，而且应当便于触及到。

电池警告语

1.电池不得暴露。

2.使用型号不正确的电池可能导致爆炸。

Models

WS5200D, WS5200D0202WR2, WS5200D0402WR2, WS5200D0802WR2

WS5400D, WS5400D0404WR2, WS5400D0804WR2, WS5400D1204WR2

WS5400R, WS5400R0404WR2, WS5400R0804WR2, WS5400R01204WR2, WS5400R0804SR2, WS5400R1604SR2

WS5600D, WS5600D1206SR2, WS5600D2406SR2