



# **Tamar FCSAS FC to SAS Bridge Software Manual**

This manual covers the following products:

**FCSAS102800**

## **Eli-v6.5.391**

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# Table of Contents

<b>1</b>	<b>Introduction</b>	<b>6</b>
1.1	Overview . . . . .	6
1.2	Manual Layout . . . . .	7
1.3	Definitions . . . . .	7
1.3.1	Logical Unit Number (LUN) . . . . .	7
<b>2</b>	<b>Initial Setup and Operation</b>	<b>8</b>
2.1	Browsers . . . . .	8
2.2	Connecting to the Web Interface . . . . .	8
2.2.1	Connecting using a dynamically assigned IP address . . . . .	8
2.2.2	Connecting without a dynamically assigned IP address . . . . .	9
2.3	Initial screen . . . . .	10
2.4	Network Setup via CLI . . . . .	11
2.5	Management Console (Home screen) . . . . .	14
<b>3</b>	<b>Bridge Configuration Reference</b>	<b>15</b>
3.1	Network Connections . . . . .	15
3.1.1	Network Interfaces . . . . .	16
3.1.2	General Settings . . . . .	16
3.1.2.1	Hostname . . . . .	16
3.1.2.2	Hostname on login page . . . . .	17
3.1.2.3	DNS Servers . . . . .	17
3.1.2.4	Default Route . . . . .	17
3.1.2.5	Dead Gateway Detection . . . . .	17
3.1.2.6	Enable IPv6 . . . . .	19
3.1.3	Interface Statistics . . . . .	19
3.1.3.1	Data Transmission Rate . . . . .	20
3.1.3.2	Data Reception Rate . . . . .	20

---

3.1.3.3	Legend . . . . .	21
3.1.4	Network Routing . . . . .	21
3.1.4.1	Add Static Route . . . . .	21
3.1.5	LLDP . . . . .	22
3.1.5.1	LLDP Settings . . . . .	24
3.1.6	Network Tools . . . . .	24
3.1.6.1	Ping . . . . .	25
3.1.6.2	Traceroute . . . . .	26
3.1.7	Port Settings . . . . .	27
3.1.7.1	Enable Port . . . . .	28
3.1.7.2	Setting the MTU . . . . .	28
3.1.7.3	LLDP Port Settings . . . . .	28
3.1.7.4	LLDP Neighbours . . . . .	29
3.1.7.5	LLDP Statistics . . . . .	29
3.1.7.6	LLDP Settings . . . . .	29
3.1.7.7	Setting the IP Address . . . . .	30
3.1.7.8	Committing the Changes . . . . .	30
3.2	Passwords & Security . . . . .	30
3.2.1	System Password . . . . .	31
3.2.2	Password Reset Options . . . . .	31
3.2.2.1	Password Reset via Email . . . . .	32
3.2.2.1.1	Setup . . . . .	32
3.2.2.1.2	Using Password Reset via Email . . . . .	32
3.2.2.2	Password Reset via Local Console or SSH . . . . .	34
3.2.2.2.1	Setup . . . . .	34
3.2.2.2.2	Using Password Reset via Local Console or SSH . . . . .	35
3.2.3	Secure Connection . . . . .	37
3.2.3.1	Generate new Certificate Signing Request . . . . .	37
3.2.4	User Settings . . . . .	38
3.2.4.1	Session Timeout . . . . .	38

---

3.2.4.2	Unit Display Format . . . . .	38
3.2.5	Secure Shell (SSH) . . . . .	38
3.2.5.1	Managing Public Keys . . . . .	39
3.2.5.2	Using SSH . . . . .	40
3.3	Service Control . . . . .	40
3.3.1	Network Time Protocol (NTP) . . . . .	42
3.3.2	Simple Network Management Protocol (SNMP) . . . . .	44
3.3.2.1	System Information . . . . .	45
3.3.2.2	SNMP Trap Sinks . . . . .	45
3.3.2.3	Add SNMP Trap Sink . . . . .	45
3.3.2.4	Download MIB Files . . . . .	46
3.3.3	Email . . . . .	47
3.3.4	Event Notification Email . . . . .	48
3.3.5	Remote System Log . . . . .	48
3.3.5.1	Editing or Deleting a Connection . . . . .	50
<b>4</b>	<b>SAS Initiator</b>	<b>51</b>
4.1	SAS Initiator Page . . . . .	52
4.1.1	Hosts . . . . .	52
4.1.2	Expanders . . . . .	53
4.1.3	Display Options . . . . .	53
4.2	Phy Status Page . . . . .	54
<b>5</b>	<b>Fibre Channel Target Connections</b>	<b>55</b>
5.1	Port Configuration . . . . .	56
5.2	Connected Hosts . . . . .	57
5.3	Port Map . . . . .	58
5.3.1	Automatic . . . . .	59
5.3.2	Manual . . . . .	60
<b>6</b>	<b>SCSI Device Management</b>	<b>62</b>

---

6.1	Viewing Attached Devices . . . . .	62
<b>7</b>	<b>Bridge Maintenance</b>	<b>64</b>
7.1	System Information . . . . .	64
7.2	System Log . . . . .	65
7.3	Load/Save Configuration . . . . .	66
7.3.1	Loading a Saved Configuration . . . . .	67
7.3.2	Saving the Configuration to Disk . . . . .	67
7.3.3	Restoring to Factory Defaults . . . . .	68
7.4	Firmware Updates . . . . .	68
7.4.1	Updating Firmware Manually . . . . .	69
7.5	Licence Key Management . . . . .	70
7.5.1	Uploading a Licence Key . . . . .	71
7.5.2	Removing a Licence Key . . . . .	71
7.5.3	Downloading a Licence Key . . . . .	72
7.6	Diagnostics . . . . .	72
7.7	Task Scheduler . . . . .	73
7.7.1	Adding Tasks . . . . .	74
7.7.2	Removing/Editing Tasks . . . . .	74
7.7.3	Task Wizard . . . . .	76
7.7.3.1	Action - Email Performance Statistics . . . . .	76
7.7.3.2	Trigger . . . . .	77
7.7.3.3	Start Date . . . . .	78
7.7.3.4	End Date . . . . .	79
7.7.3.5	Summary . . . . .	79
<b>8</b>	<b>Troubleshooting</b>	<b>81</b>
8.1	Network Connectivity Problems . . . . .	81
8.2	SCSI Device Related Problems . . . . .	81
8.3	Network Performance Problems . . . . .	82
8.4	Recovery Wizard . . . . .	82

---

8.4.1	Factory Restore . . . . .	83
8.4.2	Delete Configuration . . . . .	85
<b>A</b>	<b>IP Protocols and Port Numbers</b>	<b>88</b>
A.1	Inbound LAN Protocols and Port Numbers . . . . .	88
A.2	Outbound LAN Protocols and Port Numbers . . . . .	88
<b>B</b>	<b>Accessing the Bridge from Windows using a static IP Address</b>	<b>89</b>
<b>C</b>	<b>Useful Links</b>	<b>93</b>

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# 1 Introduction

Thank you for purchasing the Bridgeworks Tamar FCSAS Fibre Channel to SAS Bridge.

The Bridge has been designed to ensure that in the majority of installations it will require minimal setup before use. However, we suggest you read the following section which will guide you through setting up both the network, Fibre Channel and SAS aspects of the Bridge.

## 1.1 Overview

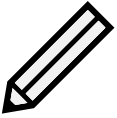


The FCSAS creates an interface between a network, which utilises the Fibre Channel protocol, and peripherals that utilise the SAS bus. The internal circuitry of the Bridge acts as a two-way interface converting the data packets that are received on the Fibre Channel network to SAS data packets.

This data is then ready to be sent across a network to SAS-enabled storage devices such as disks and tape drives.

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## 1.2 Manual Layout

Throughout the manual, symbols will be used to quickly identify different pieces of information.

	This icon represents a note of interest about a step or section of information.
	This icon represents an important piece of information.
	This icon represents a warning. Care must be taken and the warning should be read thoroughly.

## 1.3 Definitions

Throughout this manual, selected terms will be used to describe pieces of equipment and concepts. This section provides an explanation of those terms.

### 1.3.1 Logical Unit Number (LUN)

Each device in a SCSI storage system can support multiple sub-devices; these Logical Units (LU) are indexed by numbers called Logical Unit Numbers (LUN).



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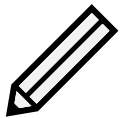
## 2 Initial Setup and Operation

The primary method for configuring any option is through the web interface. The following section highlights the requirements needed to access the web interface of the Bridge.

### 2.1 Browsers

This Bridge supports the following browsers:

- Microsoft Edge<sup>1</sup>
- Mozilla Firefox<sup>1</sup>
- Google Chrome<sup>1</sup>
- Safari<sup>1</sup>

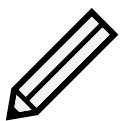


Note: JavaScript must be enabled within the web browser to use the web interface.



Important: If you choose to use a browser that is not in the list of supported browsers, Bridgeworks cannot guarantee the behaviour of the Bridge's functionality.

### 2.2 Connecting to the Web Interface



Note:

- DHCP is enabled by default on the management interface.
- The default hostname is `bridgeworks`.

For help locating management interfaces on hardware appliances, please refer to your hardware manual.

#### 2.2.1 Connecting using a dynamically assigned IP address

You can find the Bridge IP address on the server/router assigning the dynamic IP address, virtual console if you are using a virtual machine, or by attaching a monitor to the Bridge.

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<sup>1</sup>Latest version as of release



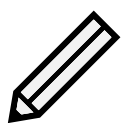
The image above represents something similar to what you would find when attaching a monitor to the Bridge.

If the Bridge is successfully assigned a dynamic IP address, and DNS resolution is enabled on your network by default, you can easily access the Bridge's web interface from the default hostname by navigating to: <http://bridgeworks/>

### 2.2.2 Connecting without a dynamically assigned IP address

Without a dynamically assigned IP address you will need to set up a static IP using the CLI, in order to access the web interface. To accomplish this, you will need to connect a keyboard and monitor to the Bridge. For virtual machines use the corresponding virtual keyboard and mouse.

Refer to Section [2.4: Network Setup via CLI](#) for the initial CLI setup.



Note: The hardware manual for the device includes details of where the ports are located. See Appendix [C: Useful Links](#) for information on how to access the manuals.



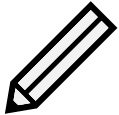
Important: Only US-International and compatible keyboards are supported.

## 2.3 Initial screen



Important: Your host will likely need to be directly-connected to the Bridge if DHCP is not enabled, and its subnet set appropriately. See [Appendix B: Accessing the Bridge from Windows using a static IP Address](#) for help with accessing the Bridge web interface without DHCP.

From within your web browser, connect to the Bridge's web interface using the default hostname or IP address of a connected management interface.



Note: If you have already configured the initial password via the CLI (Section [2.2.2: Connecting without a dynamically assigned IP address](#)) you can skip the following step on how to set up your password.

Once you have connected to the web interface on the Bridge you will be provided with the Bridgeworks End User License Agreement (EULA) which must be accepted before you are able to access the Bridge. Ensure you read this agreement thoroughly. To proceed, you must accept the agreement by clicking the *Accept* button.

**End User License Agreement**

Software License Agreement

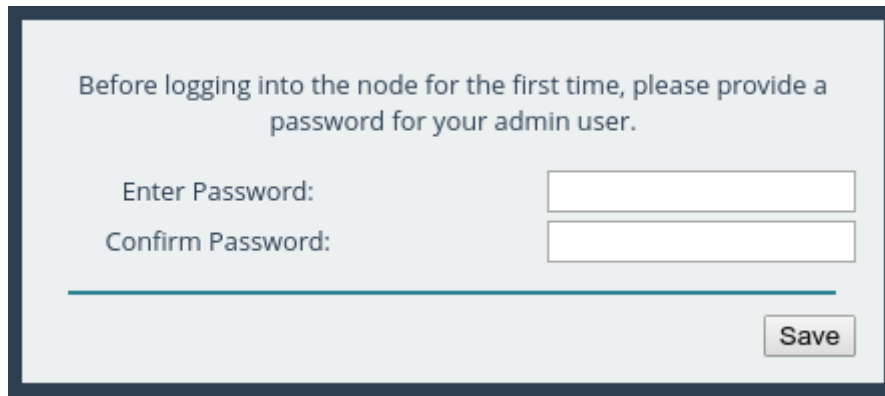
This Bridgeworks, Ltd. SOFTWARE LICENSE AGREEMENT (this "Agreement") forms a binding legal agreement by and between Bridgeworks and you, or if you are entering into this Agreement on behalf of another entity or organization, that entity or organization (in either case, "Licensee").

Licensee desires to obtain a license to certain software developed and offered by Bridgeworks, Ltd. ("Bridgeworks"). Licensee has completed one or more orders referencing this Agreement (whether completed online or in another form accepted by Bridgeworks, each an "Order") specifying such software (the "Software"). This Agreement establishes the terms and conditions under which Bridgeworks is willing to provide Licensee with a limited right to access and use the version of such Software set forth in each Order under this Agreement for Licensee's own internal business purposes. Bridgeworks is willing to make available the Software to Licensee on the condition that Licensee agrees to be bound by the terms and conditions of this Agreement.

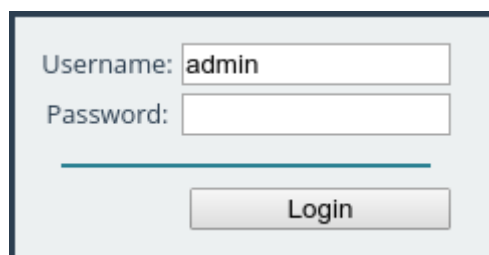
**Accept**

You will then see the entry page shown below:

---



Enter and confirm the new web interface password to be presented with the login screen. The password must be between 5 and 64 characters and should contain both symbols and numbers.



To access the web interface a username and password must be used. The default username is *admin*.

## 2.4 Network Setup via CLI

If you are initially unable to access the web interface, you may need to perform some initial setup via the CLI.

On the Bridge's interface, press Alt+F2 to enter the CLI.

If this is your first time logging into the Bridge, you will have to set a password.

```
Bridgeworks Management Interface
No password configured - Enter new password: _
```

You can now log into the Bridge using the default username *admin*, and the password you set.

Within the CLI, you can select an option by entering the number next to it. Navigate to *Network Connections* using *1*, then select the port you will be using to manage your Bridge.

```
=====
Network Port                                Bridgeworks WANrockIT
=====

1 Enable Port                               : Yes
2 MTU Size                                  : 1500
3 Enable Forwarding                         : No
4 Use DHCP to assign an IP address          : Yes
5 DNS Registration                          : Yes
6 Use the following IP address              : No
7 IP Address                               : 10.10.64.60
8 Netmask                                   : 255.255.0.0
9 Gateway                                   : 10.10.10.1

s Save
x Cancel
=====
```

Ensure this port is enabled by checking the *Enable Port* option. If this says *No* next to it, select it, then press *y* to enable it.

DHCP will be enabled by default. If you need to set a static IP address for your Bridge, select *Use the following IP address*, this will disable DHCP automatically.

Next, set your IP address by selecting *IP Address* and entering a valid IPv4 address. You may also need to adjust the netmask and default gateway.

When you are done modifying your port settings, press *s* to save.

If you need to set your default route, you can navigate to *Network Connections*, then *General Settings*, then *Default Route*, and select the port you configured. Then press *s* again to save.

Once you have saved all your settings, press *r* to reboot your Bridge to apply them.

Once the Bridge has finished rebooting, you should see the status screen. If the port is working, you should see an IP address, and *UP*.

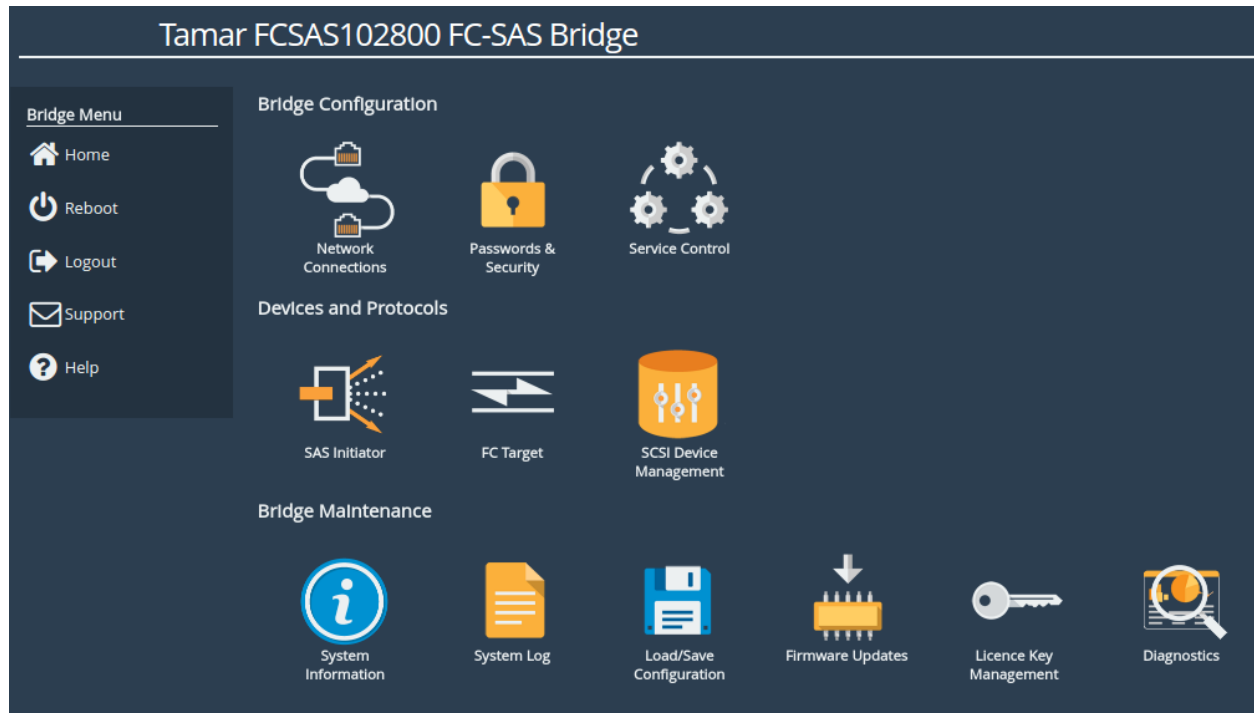


If you want to return to this screen without rebooting, you can do so with Alt+F1.

Once your port is set up correctly, you should be able to access the Bridge via a web browser as described in Section [2.2: Connecting to the Web Interface](#).

## 2.5 Management Console (Home screen)

The web interface will now display the Console Home screen as shown below:



The web interface is split into two sections. The left hand *Bridge Menu* panel typically remains constant wherever you are within the web interface. It allows you to reboot or logout of the web interface. The Home link may be used from any page to return to the Home screen.



Note: Whenever a Reboot command is issued, it may take several minutes for the Bridge to become accessible again.

The Support link will open up a new tab in your browser at the Bridgeworks website support page.

The Help will provide you with information relevant to the display and configuration data.



Note: To facilitate a quick setup of your Tamar, we suggest referring to the following subsections. Each subsection provides specific instructions tailored to the corresponding port type:

**SAS Port Setup:**

- Chapter 4: [SAS Initiator](#)

**Fibre Channel Port Setup:**

- Chapter 5: [Fibre Channel Target Connections](#)

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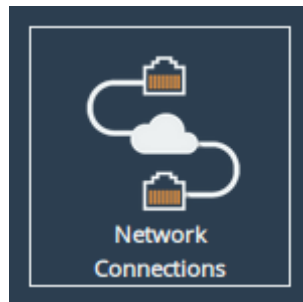
## 3 Bridge Configuration Reference

This section details the configuration of the Bridge's basic network and service settings.

### 3.1 Network Connections

This configuration page allows the administrator to configure network interface settings and view network statistics.

From the Home screen, select the *Network Connections* icon under the *Bridge Configuration* section.



The web interface will display a screen similar to the following (Not all options are available on some products):



Options at the top of the page allow you to access various network settings and tools. More information for these options can be found in the following sections:

- Section [3.1.2: General Settings](#)
- Section [3.1.3: Interface Statistics](#)
- Section [3.1.4: Network Routing](#)
- Section [3.1.5: LLDP](#)



- Section [3.1.6: Network Tools](#)

### 3.1.1 Network Interfaces

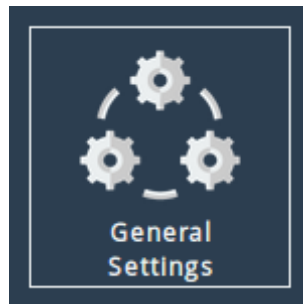
This section displays each network port present on the Bridge, along with its current status/link speed, and hardware identifier (MAC address).

Clicking on a particular interface will navigate to a bespoke configuration page for that particular interface. More information on the different interface settings is available in Section [3.1.7: Port Settings](#).

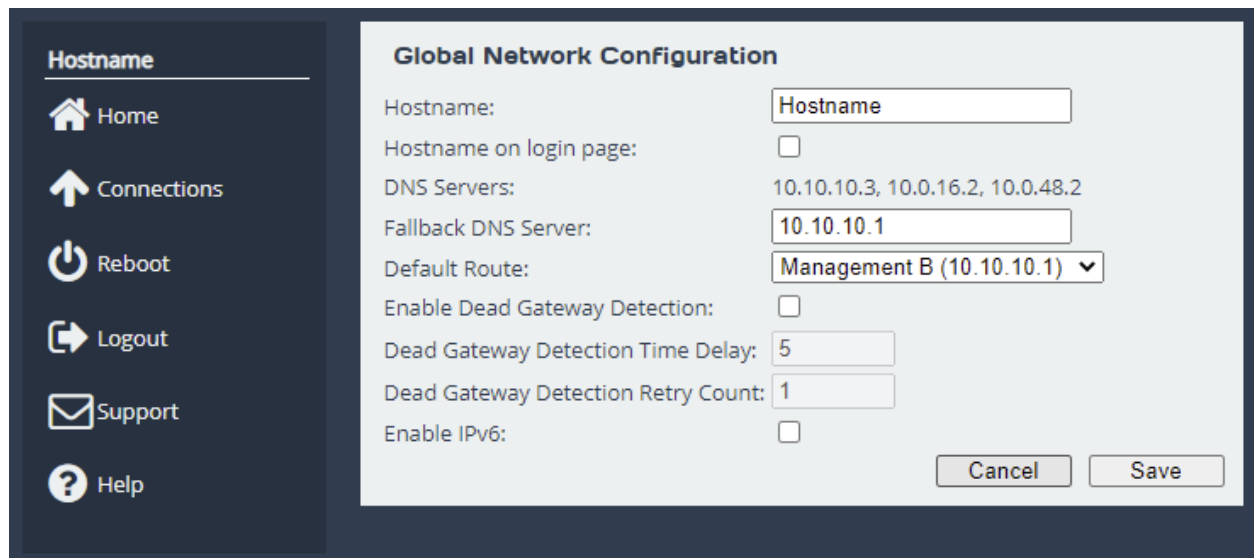
### 3.1.2 General Settings

This configuration page allows the administrator to configure general network settings for the Bridge.

From the *Network Connections* page, select the *General Settings* icon.



When selected, you will be presented with the following screen.

The screenshot shows a web interface for "Global Network Configuration". On the left is a dark sidebar with a "Hostname" header and several menu items: Home (house icon), Connections (upward arrow icon), Reboot (power icon), Logout (right arrow icon), Support (envelope icon), and Help (question mark icon). The main content area has a title "Global Network Configuration" and several settings: "Hostname:" with a text input field containing "Hostname"; "Hostname on login page:" with an unchecked checkbox; "DNS Servers:" with a text input field containing "10.10.10.3, 10.0.16.2, 10.0.48.2"; "Fallback DNS Server:" with a text input field containing "10.10.10.1"; "Default Route:" with a dropdown menu showing "Management B (10.10.10.1)"; "Enable Dead Gateway Detection:" with an unchecked checkbox; "Dead Gateway Detection Time Delay:" with a text input field containing "5"; "Dead Gateway Detection Retry Count:" with a text input field containing "1"; and "Enable IPv6:" with an unchecked checkbox. At the bottom right of the main area are "Cancel" and "Save" buttons.

#### 3.1.2.1 Hostname

In the *Hostname* field, enter the name you wish to use to address this Bridge. It is a good idea to make the name relevant to the Bridge's location and/or purpose.

---

You can then access the web interface from this hostname in future, from any DHCP-enabled management interface.

### 3.1.2.2 Hostname on login page

Selecting the *Hostname on login page* checkbox enables the display of the system hostname, and if available the DHCP domain name on the login page. This may be useful to identify which device you are logging in to.

### 3.1.2.3 DNS Servers

Setting a DNS server enables the use of DNS names when configuring network services.

The *DNS Servers* field lists the DNS servers that are currently in use by the Bridge. If DHCP is enabled on an interface and returns DNS servers, then these will be displayed in the list, otherwise the *Fallback DNS Server* will be used.

### 3.1.2.4 Default Route

The *Default Route* is the interface that the Bridge will use to route packets when no specific interface has been specified.



Important: The selected interface must have a gateway configured for this to take effect.

In addition to being able to select a specific interface for the *Default Route* it is also possible to select the interface automatically with the *Auto* option. In this case, an interface which has both *Management* mapped to it and a default gateway configured will be set as the default route. This operation is performed at startup only.

If the user requires no *Default Route* it is possible to set *None*. The factory default value for this setting is *Auto*.

### 3.1.2.5 Dead Gateway Detection

Selecting the *Enable Dead Gateway Detection* checkbox will allow the Bridge to detect dead gateways and remove network routes that specify those gateways. When the dead gateways are reachable again, the routes are restored. This provides a level of failover in the event that the gateways become unreachable.

*Dead Gateway Detection Time Delay* refers to the time in seconds between requests being sent to the gateway to see whether that gateway is still reachable.

*Dead Gateway Detection Retry Count* refers to the number of times an unreachable gateway will be contacted before being set as a dead gateway and removed.

The status of each gateway is displayed on the *Routing* page. The status of the gateways for an individual port are also shown on the *Port Settings* pages. Refer to [Section 3.1.4: Network Routing](#) for information on viewing and modifying network routes. An icon next to each gateway indicates its state:



**Live Gateway** Represents a gateway that responds to ICMP echo



**Dead Gateway** Represents a gateway that no longer responds to ICMP echo requests; it is dead



Important: Dead gateway detection functions by sending periodic ICMP echo requests to each gateway. Please ensure that the gateways can respond to such requests; if they're blocked by a firewall, dead gateway detection will always consider the gateways to be dead.

Hostname

Home

Connections

Reboot

Logout

Support

Help

Default routes should not be added here

Routing Tables

Destination	Gateway		Interface	Metric	
0.0.0.0/0	10.10.10.1	✓	Port 1	1	🔒
10.10.0.0/16			Port 1	1	🔒
192.168.1.0/24			Port 2	1	
192.168.2.0/24	192.168.1.1	✗	Port 2	1	
192.168.2.0/24	192.168.1.100	✓	Port 2	2	

Delete route

Add Static Route

Interface:

Port 1 ▾

Destination:

192.168.2.0

Prefix:

/24

Gateway:

192.168.1.100

Metric:

2

Add route

In this example, dead gateway detection has been enabled and multiple redundant routes to 192.168.2.0/24 have been added with different gateways (192.168.1.1 and 192.168.1.100) and different metrics (1 and 2, respectively).

---

The gateway with the IP address of 192.168.1.1 isn't responding to ICMP echo requests, so it's deemed to be dead. The corresponding route has been removed, so any traffic to 192.168.2.0/24 will now go via 192.168.1.100 instead.

When the gateway with the IP address of 192.168.1.1 starts to respond to ICMP echo requests again, the icon next to it will change from the red cross to the green tick and its route will be restored. Any traffic to 192.168.2.0/24 will go via 192.168.1.1.

### 3.1.2.6 Enable IPv6

Selecting the *Enable IPv6* checkbox will enable the Bridge to use IPv6 addresses. As with IPv4, you can either choose automatic address assignment or assign a static IPv6 address.

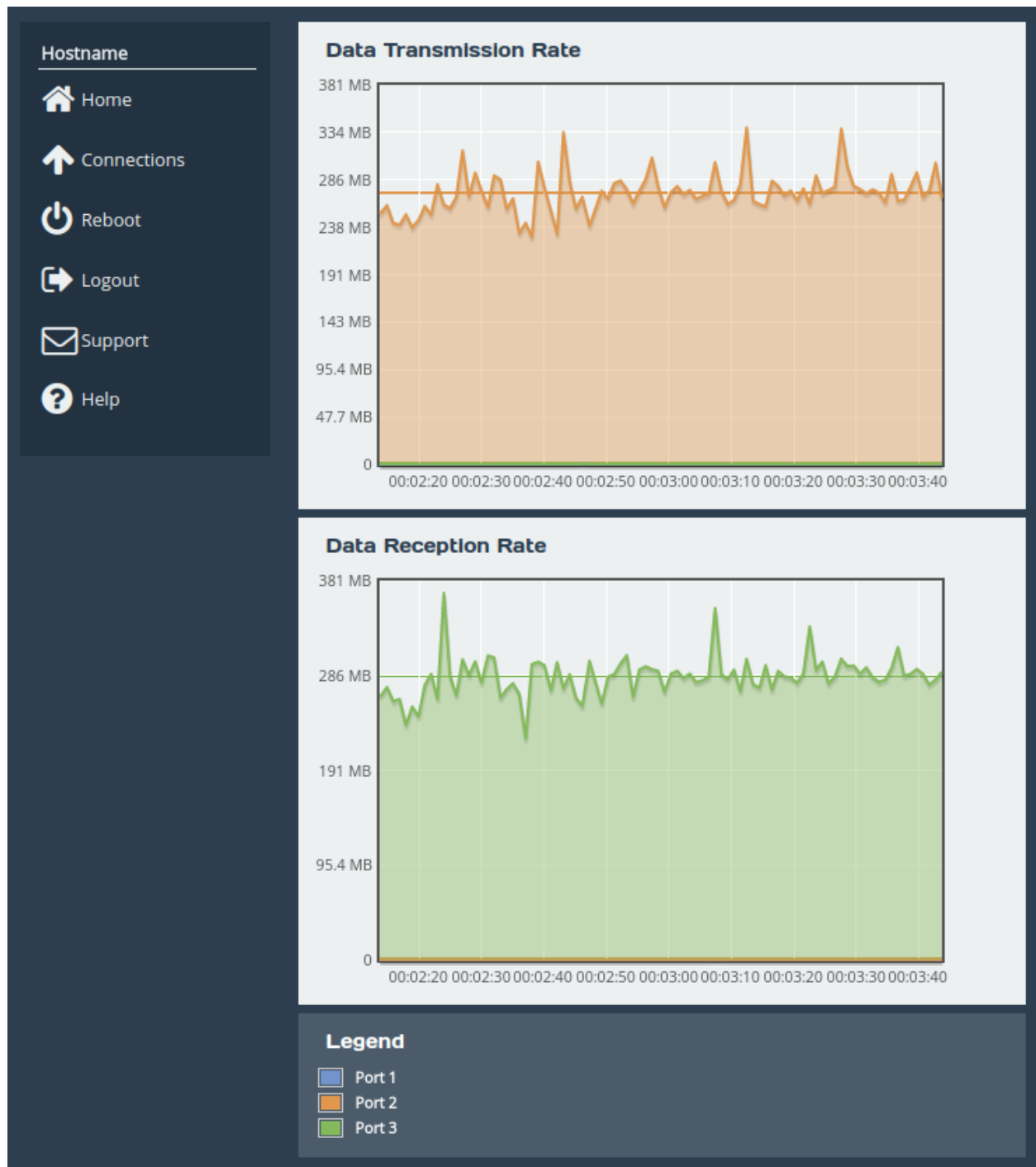
### 3.1.3 Interface Statistics

This page displays live network interface data rate statistics.

From the *Network Connections* page, select the *Interface Statistics* icon.



When selected, you will be presented with the following screen.



### 3.1.3.1 Data Transmission Rate

This section displays a graph, representing the data transmission rate for each network interface over the last 90 seconds. Each interface is displayed using a unique colour specified in the *Legend*. The average transmission rate over the last 90 seconds is displayed by a horizontal line for each interface.

### 3.1.3.2 Data Reception Rate

This section displays a graph, representing the data reception rate for each network interface over the last 90 seconds. Each interface is displayed using a unique colour specified in the *Legend*. The

---

average reception rate over the last 90 seconds is displayed by a horizontal line for each interface.

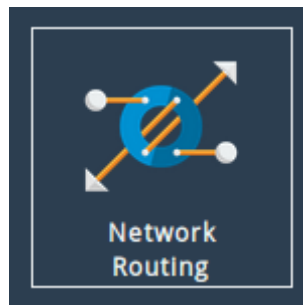
### 3.1.3.3 Legend

Each base network interface will be displayed using a unique colour for the data rate graphs. Each interfaces colour will be displayed alongside the ports name here.

### 3.1.4 Network Routing

This configuration page allows the user to view, add and remove network routes on the Bridge. Routes auto generated by the Bridge to support IP address and gateway configuration settings are read-only on this page. These are indicated by a padlock symbol against the route. User added routes may have a warning triangle shown after them indicating that the route is inactive. This occurs in situations where the configured route can't be applied due to conflicting configurations. Two likely causes of this are the gateway no longer being in the same subnet as the port, or the port having no valid IP address.

From the *Network Connections* page, select the *Network Routing* icon.



#### 3.1.4.1 Add Static Route

To add a route, fill in the following fields and click on the *Add route* button:

**Interface** The network interface to which the route applies.

**Destination** The IP address component of the CIDR block to which the route applies, e.g. 192.168.5.0.

**Prefix** The prefix length component of the CIDR block to which the route applies, e.g. /24.

**Gateway** Route traffic via the gateway with this IP address. Optional.

**Metric** Metric (priority) of the route. Optional; defaults to 1.

Hostname

Home

Connections

Reboot

Logout

Support

Help

Default routes should not be added here

Routing Tables

Destination	Gateway	Interface	Metric	
0.0.0.0/0	10.10.10.1	Port 1	1	🔒
10.10.0.0/16		Port 1	1	🔒
192.168.1.0/24		Port 3	1	⚠️
192.168.2.0/24		Port 2	1	
192.168.4.0/24	192.168.2.3	Port 2	2	

Delete route

Add Static Route

Interface:

Port 2 ▼

Destination:

192.168.5.0

Prefix:

/24

Gateway:

192.168.2.4

Metric:

3

Add route

In this example, a route is being added to 192.168.5.0/24 via the gateway at 192.168.2.4 on Port 2. The route has a metric of 3.

To remove an existing route, click on the *Delete* button next to it.

i

Important: Routes created automatically by the system cannot be removed.

When dead gateway detection is enabled, each gateway in the table will have an icon next to it indicating its current status (live or dead). Refer to Section 3.1.2.5: [Dead Gateway Detection](#) for more information.

### 3.1.5 LLDP

This page allows an administrator to configure Link-Layer Discovery Protocol (LLDP) system settings. LLDP is a layer 2 protocol used for discovering and advertising a system's identity, capabilities, and neighbours.

From the *Network Connections* page, select the *LLDP* icon.



When selected, you will be presented with the following screen.

Hostname

Home

Connections

Reboot

Logout

Support

Help

Link Layer Discovery Protocol (LLDP/CDP)

Enable LLDP/CDP: ☐

LLDP Settings

LLDP Transmit Interval:

LLDP Transmit Hold:

Cancel

Save

Checking the *Enable LLDP/CDP* checkbox will enable LLDP on all ports and show the LLDP Chassis Status section.

Hostname

Home

Connections

Reboot

Logout

Support

Help

LLDP Chassis Status

Name: Hostname

Description: PORTrockIT Hostname Eli.v6.05.297 (Nov 22 2024 06:29:41)

Chassis ID: mac 00:0c:29:e3:cb:e8

Capabilities: Router

Link Layer Discovery Protocol (LLDP/CDP)

Enable LLDP/CDP: ☒

LLDP Settings

LLDP Transmit Interval:

LLDP Transmit Hold:

Cancel

Save



---

**LLDP Chassis Status** The LLDP Chassis Status section displays the chassis information to be advertised to neighbours. This includes the system's name, description, chassis ID, and capabilities. These will be automatically created and updated by the Bridge when LLDP is enabled.

**Enable LLDP/CDP** When the *Enable LLDP/CDP* checkbox is selected, LLDP will be enabled and by default all ports will start to advertise device information from the Bridge whilst also discovering neighbouring device information. To view discovered neighbour information, navigate to any port on the *Network Connections* page.

### 3.1.5.1 LLDP Settings

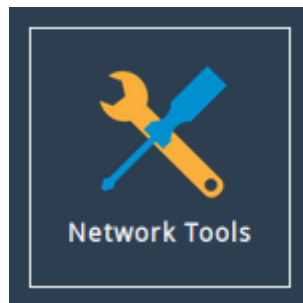
**LLDP Transmit Interval** The transmit interval is the time in seconds between LLDP packet transmissions. The total time-to-live (TTL) for LLDPDU's are the product of the transmit interval and transmit hold. Default is 30.

**LLDP Transmit Hold** The transmit hold is a multiplier for transmit interval used to determine the total TTL.

### 3.1.6 Network Tools

The Tamar product provides some network tools that can be used for verifying network connectivity and behaviour between the Bridge and network hosts.

From the *Network Connections* page, select the *Network Tools* icon.



This opens the network tools page, this is a tabbed interface where you may select from the available tools.

### 3.1.6.1 Ping

Hostname

- Home
- Connections
- Reboot
- Logout
- Support
- Help

**Ping** | **Traceroute**

Host:

Payload Size:

Count:

Network Interface:

**Ping**

**Ping Output**

Ping can be used to verify the connectivity between the Bridge and a network host.

To test connectivity, fill in the following fields and click on the *Ping* button:

**Host** The IP address of the network host.

**Payload Size** The ping payload size. Leave blank to default to 56 bytes.

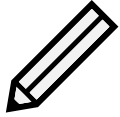
**Count** The number of ping attempts that you wish the Bridge to perform. Setting the count to 0 will send pings indefinitely, until the page is navigated away from, or another ping/traceroute operation is initiated.

**Network Interface** The interface that you want to ping from. If you are checking the routing on the unit, leave this option set to

On a successful ping, the *Output* box will fill with text similar to that below.

```
PING Address (Address): 56 data bytes
64 bytes from Address: seq=0 ttl=64 time=0.600 ms
64 bytes from Address: seq=1 ttl=64 time=0.129 ms
64 bytes from Address: seq=2 ttl=64 time=0.096 ms
64 bytes from Address: seq=3 ttl=64 time=0.143 ms
64 bytes from Address: seq=4 ttl=64 time=0.094 ms

--- Address ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0.094/0.212/0.600 ms
```



Note: *Address* is replaced with the IP address that you entered.

### 3.1.6.2 Traceroute

Traceroute can be used to determine the route packets take from the Bridge to a network host.

To test the routing, fill in the following fields and click on the *Traceroute* button:

**Traceroute Protocol** The type of protocol you wish to use: UDP, ICMP or TCP. UDP is the default option, ICMP can be used if firewalls block UDP datagrams. TCP is useful for testing access lists and firewall protocol rules.

**Host** The IP address of the network host.

**Packet Size** The traceroute payload size. Leave blank to default to 46 bytes for IPv4 or 72 bytes for IPv6.

**Destination Port** The destination port can be selected. This may be useful, alongside TCP probes, when testing policy based routing; or for testing specific ports, especially Dynamic Ports (also known as Private or Ephemeral Ports). It is disabled when using ICMP.

**Set Don't Fragment Bit** Select to set the don't fragment (DF) bit on the traceroute packets. This can be used to diagnose MTU issues on your network.

**Network Interface** The interface that traceroute packets will be sent from. Leave as *Default selection* for the interface to be selected according to the routing table.

The result from traceroute will appear in the *Output* box.

### 3.1.7 Port Settings

Clicking on an interface will navigate to a bespoke settings page for that particular interface. Depending on the type of interface that was selected and the current options that are enabled, different settings will be presented.

The screenshot shows a web interface for configuring a network interface. On the left is a sidebar with navigation links: Home, Connections, Reboot, Logout, Support, and Help. The main content area is titled 'Link Status' and 'Settings'. The 'Link Status' section shows: Link State: Up, Link Speed: 10Gb/s, RX Bytes: 272846, TX Bytes: 753281, RX Errors: 0, TX Errors: 0. The 'Settings' section shows: IPv4 Address: 10.10.10.95 /16, MTU: 1500 (user config) Max: 9000, Gateway: Global default via 10.10.10.1. Below this is a 'Mapped Protocols' section with a 'Management' button. A notification bar states: 'This management interface is currently in use'. The 'Port Settings' section includes: 'Enable Port' (checked), 'MTU Size' (1500), and two radio button options: 'Use DHCP to assign an IP address automatically' (selected) and 'Use the following IP address:'. Under the DHCP option, there are two checked checkboxes: 'Register this system's hostname on this interface' and 'Override configured MTU when supplied by DHCP'. Under the manual IP option, there are input fields for 'IP Address:', 'Netmask:', and 'Gateway:'. At the bottom right are 'Cancel' and 'Save' buttons.

Link Status			
Link State:	Up	Link Speed:	10Gb/s
RX Bytes:	272846	TX Bytes:	753281
RX Errors:	0	TX Errors:	0

Settings	
IPv4 Address:	10.10.10.95 /16
MTU:	1500 (user config) Max: 9000
Gateway:	Global default via 10.10.10.1

**Mapped Protocols**

Management

**Port Settings**

Enable Port: ☒

MTU Size:

☒ Use DHCP to assign an IP address automatically

☒ Register this system's hostname on this interface

☒ Override configured MTU when supplied by DHCP

☐ Use the following IP address:

IP Address:

Netmask:

Gateway:

Cancel Save

When dead gateway detection is enabled, each gateway on the port will have an icon next to it indicating its current status (live or dead). Refer to Section [3.1.2.5: Dead Gateway Detection](#) for more information.



Important: IPv6 Options will only be displayed if IPv6 has been enabled (see Section [3.1.2: General Settings](#)).

### 3.1.7.1 Enable Port

An interface may be enabled or disabled by toggling this option.

### 3.1.7.2 Setting the MTU

The maximum transmission unit (MTU) may be adjusted from the default of 1500 bytes. Lower values are sometimes required for best performance with some types of network VPN equipment. However, it is recommended to leave this value unchanged, unless advised by documentation for any external VPN equipment used in conjunction with the Bridge.

Enabling larger frames on a jumbo frame-capable network can improve your network throughput. Jumbo frames are Ethernet frames that contain more than 1500 bytes of payload (MTU).

Before enabling jumbo frames, ensure that all the devices/hosts located on the network support the jumbo frame size that you intend to use to communicate with the Bridge. If you experience network-related problems while using jumbo frames, use a smaller jumbo frame size. Consult your networking equipment documentation for additional instructions.



Important: Some networking switches require you to specify the size of the jumbo frame (MTU) when enabling, as opposed to a simple enable command. On these switches, it might be required to add the necessary bytes needed for the frame header to the MTU size you specify in the Bridge's port configuration. Typical header size is 28 bytes, so a 9000 byte MTU could translate to a 9028-byte total size. Refer to your switch documentation to understand what the maximum frame size settings are for your switch.

### 3.1.7.3 LLDP Port Settings

To configure LLDP settings on ports, first ensure that LLDP has been enabled from the LLDP page.



Important: The different LLDP protocols compatible with your Bridge are LLDP and CDP (Cisco Discovery Protocol.)

After enabling LLDP, the following statistics and configuration boxes will become visible.

**LLDP Neighbours**

System Name: Hostname

System Description: PORTrockIT Hostname Eli.v6.05.297 (Nov 22 2024 06:29:41)

Management IP: 10.10.10.10

System Capabilities: Router

Ports: port3

**LLDP Statistics**

LLDPDUs Transmitted:	34	LLDPDUs Received:	33
----------------------	----	-------------------	----

### 3.1.7.4 LLDP Neighbours

**System Name** The system name of the neighbour device.

**System Description** The description set for the neighbour device. This will usually contain information such as: kernel name, node name, kernel version, build date, architecture. Your Bridge will advertise a combination of product name, host name, firmware version.

**Management IP** The management IP address of the neighbour device.

**System Capabilities** A list of capabilities the neighbouring device has enabled. This can be any of the following: Bridge, Router, Station, Telephone, WLAN Access Point, Repeater, DOCSIS Cable Device, Other.

**Ports** A list of port descriptions from the connecting ports on the neighbouring device.

### 3.1.7.5 LLDP Statistics

**LLDPDUs Transmitted** Total LLDPDU's sent from this port.

**LLDPDUs Received** Total LLDPDU's received from this port.

### 3.1.7.6 LLDP Settings

**LLDP Settings**

LLDP Mode:

Port Description:

**LLDP Mode** Set the operation of LLDP on this port. The following options are available.

- *Disabled* LLDP will not run on this port, and therefore will not send or receive LLDPDU's. This option is useful if you want the port to remain anonymous to neighbouring machines using LLDP.
- *Only Listen* This port will receive LLDPDU's, however will not forward any. Use this if you want the port to remain anonymous to neighbouring machines whilst retaining the ability to view LLDP data from neighbours.

- *Only advertise* This port will send LLDPDU's, however will not receive any. Use this if you want the port to only advertise itself to neighbouring machines.
- *Advertise and Listen* This port will send and receive LLDPDU's, which will both allow the discovery of neighbouring machines and the advertisement of itself to neighbouring ports. This is the default setting.

**Port Description** Set a custom alphanumeric string to advertise from this port.

### 3.1.7.7 Setting the IP Address

There are two possibilities when configuring the IP address of a network port:

**DHCP** The Bridge will seek out your network's DHCP server and obtain an IP address for this port each time it boots.

If the server is not found, this port will fall back to its saved static IP settings.

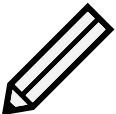
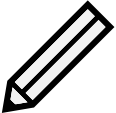
When DHCP is selected, the option to register the system's hostname with DNS is made available, this is enabled by default on management interfaces. Additionally, the option to override the configured MTU becomes available. When this option is applied and DHCP supplies the MTU, this will show as (DHCP) rather than (user config).

**Static IP** The IP address, netmask and gateway set in the corresponding fields will be used for this port.

The gateway field may be left blank.

The IPv4 netmask field must be specified in dot-decimal form, e.g. 255.255.255.0.

If IPv6 is enabled from the *Network Connections* page, you can choose to use automatic address assignment to assign an IPv6 address, or you can set a static IPv6 address.

	Note: DHCP is enabled by default on management interfaces.
	Note: If DHCP is enabled, we recommend that your DHCP server is set to automatically update the DNS server.

### 3.1.7.8 Committing the Changes

Click the *Save* button to save these parameters, then reboot the Bridge to apply them.

## 3.2 Passwords & Security

This configuration page allows the administrator to change the security settings of the Bridge.

From the Home screen, select the *Passwords & Security* icon under the *Bridge Configuration* section.



### 3.2.1 System Password

This section allows the administrator to change the access password for the web interface. The new password must be between 5 and 64 characters and should contain both symbols and numbers.

**System Password**  
**Old Password:**   
**New Password:**   
**Retype New Password:**   

Change Password



Important: The word “RESET” is reserved by the system and cannot be used as a password.

Enter the existing password into the *Old Password* field; then enter the desired new password into the two following fields. Then click *Change Password*.

### 3.2.2 Password Reset Options

This section allows the administrator to enable and disable different methods of password reset on the Bridge.



### Password Reset Options

☐ Enable password reset via email

☐ Send confirmation code to event notification email
☒ Send confirmation code to an alternative email:

☒ Enable password reset via the local console
☐ Enable password reset via SSH

Save


### 3.2.2.1 Password Reset via Email

#### 3.2.2.1.1 Setup

This method of password reset allows a user that is authorised to access a pre-configured email address to reset the password of any user account on the Bridge.

When a user forgets their password, they will be able to click on the *Forgot your password?* link on the login page to reset their password.

To successfully reset your password using this method, a confirmation code will be sent to an email address previously configured in the web interface. This code will have to be obtained by the user and entered into the password reset wizard to complete the password reset procedure.



Important: Resetting a password will log out any current sessions under that user name.

To enable password reset via email, SMTP settings will have to be configured first to allow the Bridge to send emails. Navigate to the *Service Control* page and enter your SMTP settings under the *Simple Mail Transfer Protocol (SMTP)* section. Refer to Section 3.3.3: [Email](#) for information on SMTP configuration.

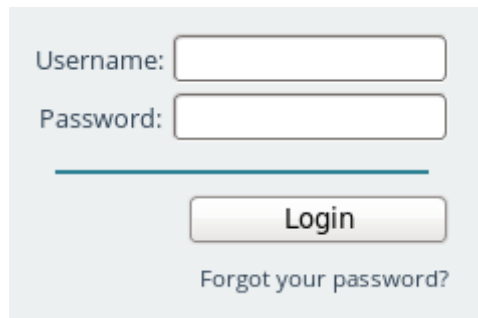
Next, navigate to the *Passwords & Security* page and tick the *Enable password reset via email* checkbox. You must then select whether you wish to have the confirmation code sent to the “event notification email” which is configured on the *Service Control* page, or to an alternative email which can be entered in the text box underneath.

Refer to Section 3.3.4: [Event Notification Email](#) for information on setting an event notification email. You will be required to enter an email address into the *alternative email* text box if an event notification email has not been set.

#### 3.2.2.1.2 Using Password Reset via Email

To reset the password of a user account using the email method, navigate to the login page of the Bridge you wish to reset the password for. If password reset via email is enabled, there will be a

“Forgot your password?” link underneath the login button as shown:



Username:

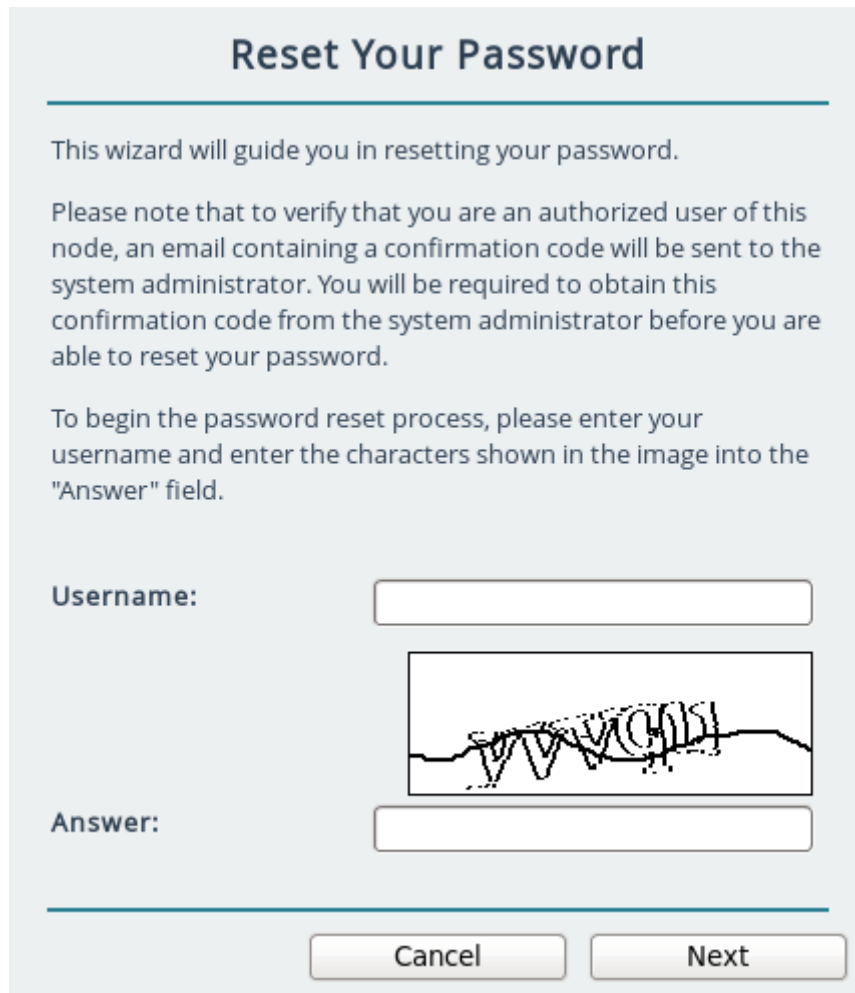
Password:

[Forgot your password?](#)



Important: If the “Forgot your password?” link is not present, then password reset via email has not been enabled on the Bridge.

Enter the username you wish to reset the password for and complete the captcha challenge by entering the characters in the image into the *Answer* text box. Then click *Next* to continue.



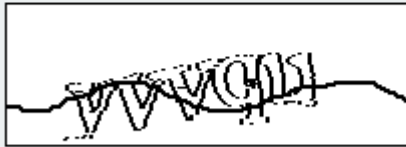
### Reset Your Password

This wizard will guide you in resetting your password.

Please note that to verify that you are an authorized user of this node, an email containing a confirmation code will be sent to the system administrator. You will be required to obtain this confirmation code from the system administrator before you are able to reset your password.

To begin the password reset process, please enter your username and enter the characters shown in the image into the "Answer" field.

Username:



Answer:



Important: You can try a different captcha challenge by refreshing the web page.

An email containing a confirmation code will be sent to the email address set in the *Passwords & Security* page. Enter the confirmation code sent in the email to the *Confirmation Code* text box.

Enter your new password into the *New Password* and *Confirm Password* text fields and press the *Next* button.



**Reset Your Password**

---

An email containing a 16-digit confirmation code has been sent to the system administrator of this Node.

Enter the confirmation code and your new password below.  
Please note that you will not be able to reset your password if the confirmation code is incorrect.

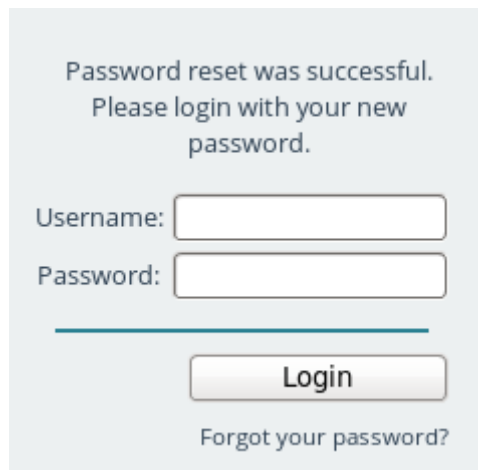
**Confirmation Code:**

**New Password:**

**Confirm Password:**

---

If password reset was successful, a message will be displayed and you will be able to log in with your new password.



Password reset was successful.  
Please login with your new password.

**Username:**

**Password:**

---

[Forgot your password?](#)

### 3.2.2.2 Password Reset via Local Console or SSH

#### 3.2.2.2.1 Setup

These methods of password reset allow any user that either has access to the local console or remote access via SSH to reset the password of any user account on the Bridge.



Warning: These methods of password reset should be disabled if unauthorised users may either have access to the local console or remote access via SSH.



Important: Resetting a password will log out any current sessions under that user name.

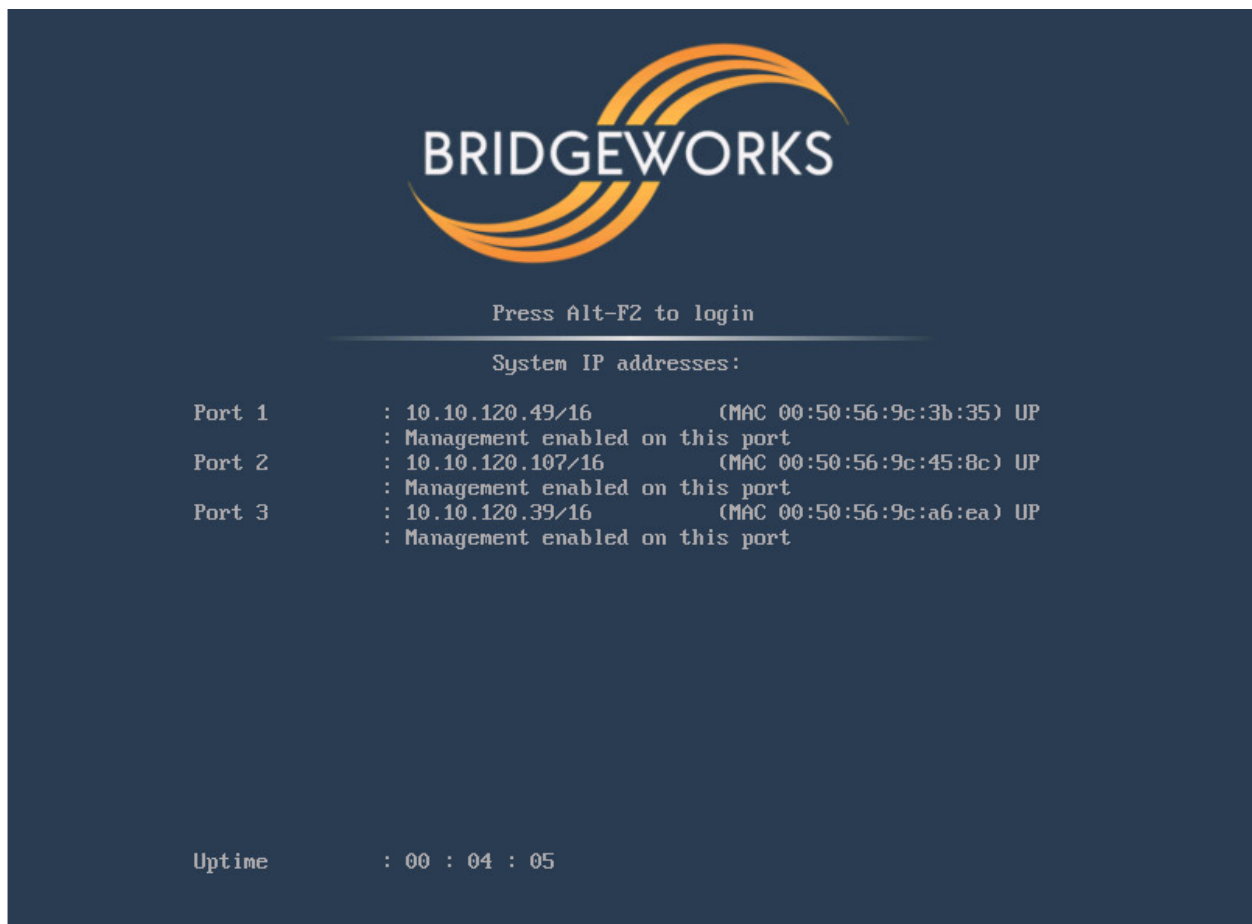
To enable password reset via local console, tick the *Enable password reset via the local console* checkbox or to enable via SSH, tick the *Enable password reset via SSH* checkbox. Then click Save.



Important: Password reset via local console is enabled by default.

### 3.2.2.2.2 Using Password Reset via Local Console or SSH

To reset the password of a user account using the local console method, connect a keyboard and monitor to the Bridge. You will see the following screen:



Press the “Alt” and “F2” keys at the same time to get access to the login prompt as shown:

---

```
Bridgeworks Management Interface
Username: _
```

To reset the password of a user account using the SSH method, connect to the Bridge via SSH to access the login prompt.

Enter the username you wish to reset the password for, such as “admin”. Then enter the password as “RESET”. Both the username and password are case-sensitive.

You will then be asked whether you wish to continue resetting the password. Press the “y” key then press the “Enter” key. Entering any other key will abort the password reset process.

```
Bridgeworks Management Interface
Username: admin
Password:
Are you sure you want to reset your password? y/n
_
```

Next, enter the new password you wish to set for the user selected. You will then be asked to enter the password again.



Important: If the two passwords do not match, or you are attempting to set the password as “RESET”, then password reset will fail.

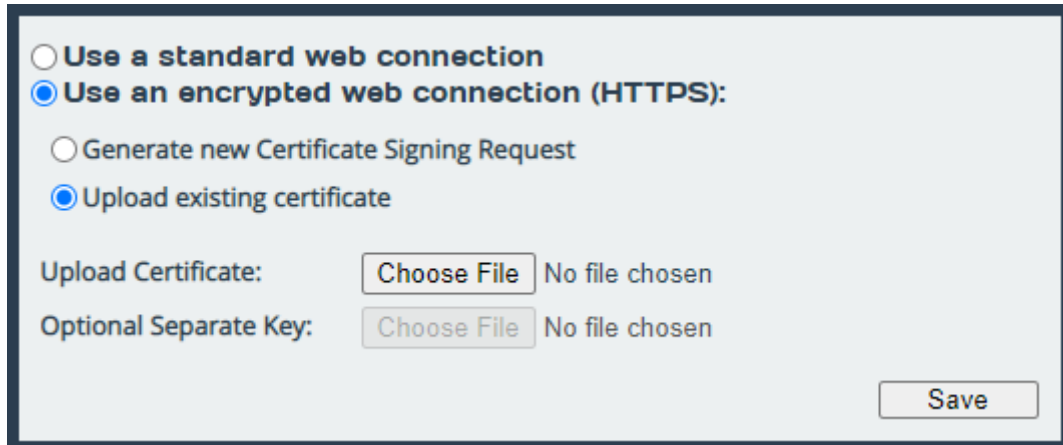
If your new password is accepted, the “Password set successfully” message will appear as shown:

```
Password set successfully
Bridgeworks Management Interface
Username: _
```

You will now be able to log into the web interface using your username and new password.

### 3.2.3 Secure Connection

To enable HTTPS, select the *Use an encrypted web connection (HTTPS)* radio button, then *Upload existing certificate*, and click Save.



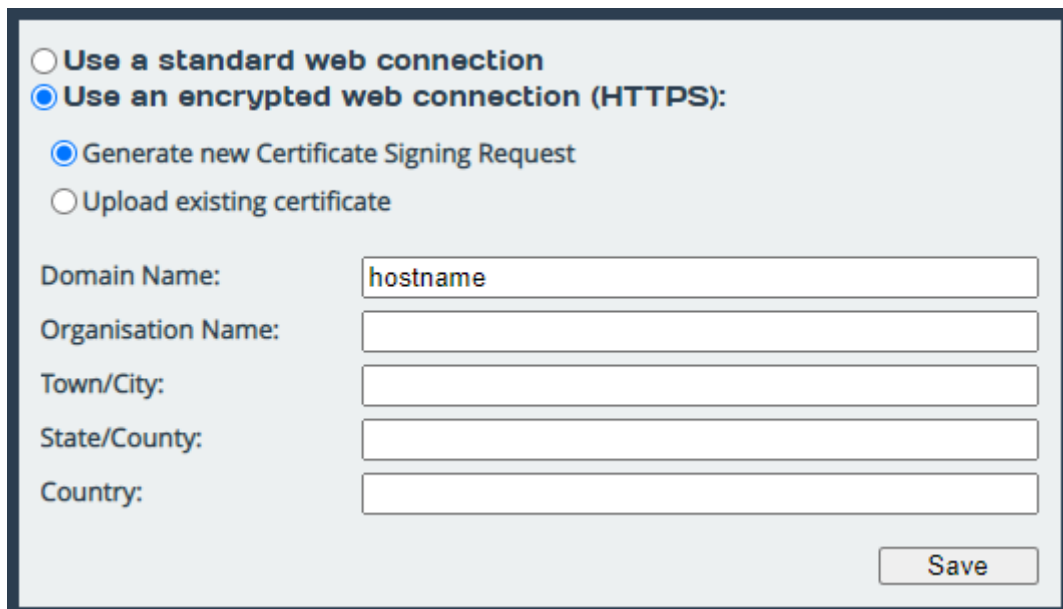
The screenshot shows a web form titled 'Secure Connection'. It has two main radio button options: 'Use a standard web connection' (unselected) and 'Use an encrypted web connection (HTTPS):' (selected). Under the selected option, there are two sub-radio buttons: 'Generate new Certificate Signing Request' (unselected) and 'Upload existing certificate' (selected). Below these, there are two rows of file upload controls. The first row is labeled 'Upload Certificate:' and has a 'Choose File' button and the text 'No file chosen'. The second row is labeled 'Optional Separate Key:' and also has a 'Choose File' button and the text 'No file chosen'. A 'Save' button is located at the bottom right of the form.

If you simply click Save without uploading any files for the certificate or key, a self-signed certificate will be automatically generated by the Bridge.

Alternatively, You can use your own certificate & key pair by selecting files to upload with the file-picker buttons. You may upload the key pair as two separate files, or one combined file.

You will be logged out of the Bridge's web interface, and further transactions with the web interface will use SSL/TLS encryption.

#### 3.2.3.1 Generate new Certificate Signing Request



The screenshot shows a web form titled 'Generate new Certificate Signing Request'. It has two main radio button options: 'Use a standard web connection' (unselected) and 'Use an encrypted web connection (HTTPS):' (selected). Under the selected option, there are two sub-radio buttons: 'Generate new Certificate Signing Request' (selected) and 'Upload existing certificate' (unselected). Below these, there are five text input fields with labels: 'Domain Name:' (containing 'hostname'), 'Organisation Name:', 'Town/City:', 'State/County:', and 'Country:'. A 'Save' button is located at the bottom right of the form.

If you need a certificate signed by an external certificate authority, you may use the *Generate new Certificate Signing Request* option to do so. Select *Use an encrypted web connection (HTTPS)*, then *Generate new Certificate Signing Request* to open the form.

---

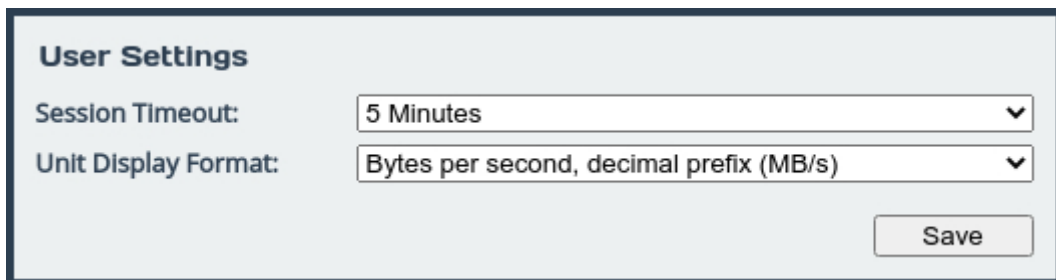
The fields which appear below this option when selected should be filled in with the details you want to appear on the certificate. The *Domain Name* field should be filled in with the IP address or fully qualified domain name which you use to access your Bridge. The following four fields should identify your company or organisation. Note that the *Country* field should contain a two-letter country code (ISO 3166-1 alpha-2), not a full country name.

Clicking *Save* will then download a CSR file. You should then send this file to your certificate authority, who should send you back a signed certificate file.

You can then upload this signed certificate file to the Bridge, using the *Upload existing certificate* option, leaving the *Optional Separate Key* field empty.

### 3.2.4 User Settings

Settings in this section allow you to change parameters for the user interface.



The screenshot shows a 'User Settings' panel with a light blue background. It contains two settings: 'Session Timeout' with a dropdown menu set to '5 Minutes', and 'Unit Display Format' with a dropdown menu set to 'Bytes per second, decimal prefix (MB/s)'. A 'Save' button is located at the bottom right of the panel.

#### 3.2.4.1 Session Timeout

After not interacting with the interface for a certain period of time, you will automatically be logged out. The Session Timeout setting allows you to adjust the length of time that must pass before you are logged out.

#### 3.2.4.2 Unit Display Format

To allow a user to view system graphs in a unit that is applicable to their use case, the system may be switched to display in one of 6 different unit scales:

- Bits per second, decimal prefix (Mbit/s)
- Bytes per second, decimal prefix (MB/s)
- Bits per second, binary prefix (Mibit/s)
- Bytes per second, binary prefix (MiB/s)
- Bytes per hour, decimal prefix (TB/h)
- Bytes per hour, binary prefix (TiB/h)

### 3.2.5 Secure Shell (SSH)

Secure Shell (SSH) is a protocol that allows for secure access to a Bridge's configuration console.

To enable SSH on network interfaces with the “Management” protocol mapped, tick the *Enable SSH* checkbox and click *Save*.

Note: At least one public key must be uploaded, as described below, before SSH can be enabled.

### 3.2.5.1 Managing Public Keys

To log on to a Bridge’s configuration console using SSH, a public key is required to be uploaded first. Users connecting to the Bridge without having uploaded the corresponding public key to the Bridge first will be refused access.

To upload a public key, click on the *Add Public Key* button. The *Add Public Key* dialog box will appear. Click on the *Browse* button to select a public key file.

Note: Only RSA keys in the OpenSSH or RFC4716 format are supported.

Click on the *Add* button to upload the selected public key file. The public key should then appear in



---

the *List of Public Keys*.

To delete a public key, click on the public key to delete in the *List of Public Keys* and then click on the *Remove Public Key* button.



Important: Open SSH connections will not be closed when a public key is removed, or if SSH is disabled. Only new SSH connections will be rejected.

### 3.2.5.2 Using SSH

To connect to a Bridge which has a management port with an IP address of 192.168.0.20 using the OpenSSH SSH client, use the command:

```
ssh admin@192.168.0.20
```

You will then be prompted for the username and password of the Bridge to log into the configuration console.

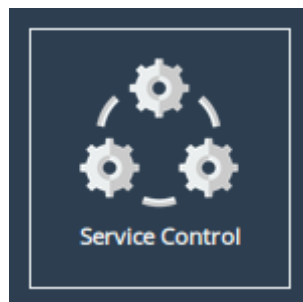
You will be denied entry to the configuration console if you have not uploaded a public key to the Bridge prior to connecting via SSH. A valid username and password for the Bridge are also required to log in using SSH.



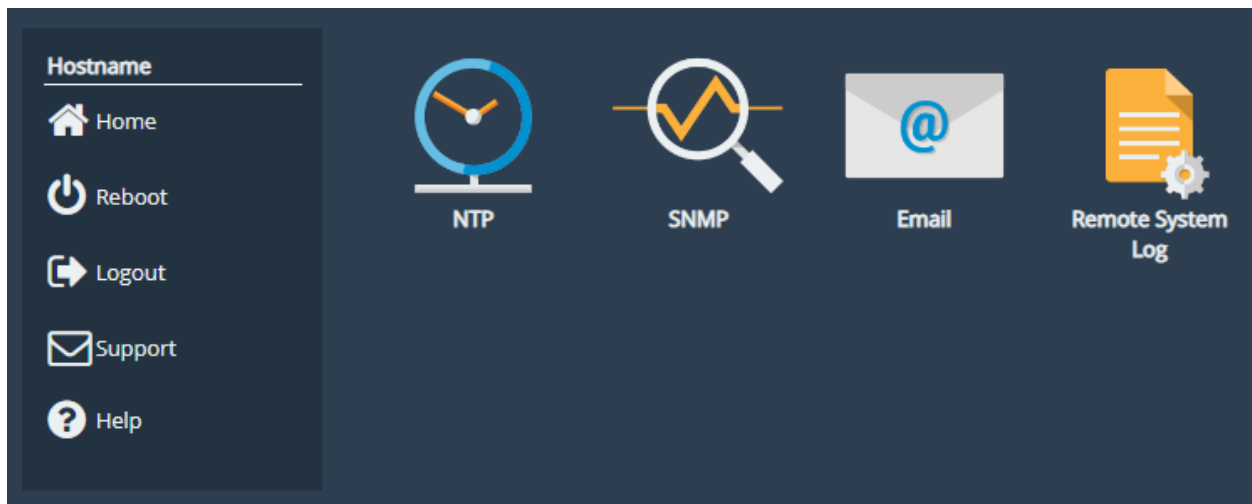
Important: Logging in as root user is disabled on SSH.

## 3.3 Service Control

This configuration page allows the administrator to configure network services for the Bridge. From the Home screen, select the *Service Control* icon under the *Bridge Configuration* section.



The web interface will display the following:



Each link leads to a different service.

The *NTP* (Network Time Protocol) page allows you to configure various settings available for NTP on the Bridge.

The *SNMP* (Simple Network Management Protocol) page allows you to configure various settings available for SNMP on the Bridge.

The *Email* page allows you to configure various settings available for Email alerts on the Bridge.

The *Remote System Log* page allows you to configure various settings available for remote logging on the Bridge.

### 3.3.1 Network Time Protocol (NTP)

**SNTP Status**

**Current server:** 62.149.2.7 (USER)

**Last Receive:** Jan 25, 2023 15:12:25 UTC

**Server Priority List:**

- 1 : USER 62.149.2.7
- 1 : USER 193.192.36.3
- 1 : USER 185.209.85.222
- 1 : USER 80.74.64.2
- 2 : DHCP 80.87.128.222 (port2)
- 2 : DHCP 80.87.128.222 (port4)
- 3 : DHCP 185.103.117.60 (port2)
- 3 : DHCP 185.103.117.60 (port4)

**SNTP Settings**

**Enable SNTP:** ☒

**NTP Server:**

**Priority:**

Time synchronization between the host machine and the guest VM is only enabled when NTP is disabled.

SNTP is a protocol for synchronising the clock of computer systems. This feature is critical if you are planning on using the scheduler or useful when viewing the logs to determine when an event occurred. Refer to Section [7.2: System Log](#) for more information.

SNTP may be configured by specifying either a hostname or IP address in the *NTP Server* field, or alternatively this can be left blank and the NTP servers may be obtained via DHCP or DHCPv6. In the case that a hostname is specified a DNS lookup will be performed to obtain the addresses of the NTP servers.

Servers received from all sources are placed into a prioritised list which can be ordered based on the user preference as specified in the *Priority* field. For servers received via DHCP they will be prioritised using the same mechanism as used for selecting the DNS, that is to say ports with the default route or management on them will be higher priority. The order in which the server appears in the list supplied by DHCP is also taken into account. For user specified servers the request will automatically take the optimal route to the destination so is not associated with any particular port.

The *Enable SNTP* checkbox is used to enable/disable SNTP and clicking the *Save* button will save all the SNTP settings.

When SNTP is enabled the *SNTP Status* is displayed showing the following information:

- 
- Current Server: The currently selected NTP server.
  - Last Receive: The last time a valid response was received.
  - Server Priority List: The ordered list of servers with highest priority at the top of the list. Each entry specifies if it is USER defined, or has been obtained via DHCP. In the case of DHCP provided servers it also shows which network port received the details from DHCP.

If the current server fails to provide a valid response after 5 attempts it will be deemed as failed and will have its priority temporarily lowered for a period of 10 minutes. If it becomes the highest priority server again and the first request is successful it will be considered fully functional again, if this request fails it will immediately be deemed failed again.

### 3.3.2 Simple Network Management Protocol (SNMP)

☐ **SNMP v2c Agent**  
Community Name:   
[Save](#)

☐ **SNMP v3 Agent**  
Username:   
Auth Type:   
Auth Password:   
Privacy Type:   
Privacy Password:   
[Save](#)

**System Information**  
System Location:   
System Contact:   
[Save](#)

**SNMP Trap Sinks**

Address	Port	Version	Community/User
No SNMP trap sinks configured			

[Delete Sink](#) [Add Sink](#)

**Download MIB Files**  
[Click Here to Download](#)

Two versions of SNMP are supported, 2c and 3. V3 is recommended as it has everything 2c has plus vastly superior security.

To enable SNMPv2c, check the box in the top left of the *SNMP v2c Agent* box, enter a *Community Name* and click *Save*.

---

To enable SNMPv3, check the box in the top left of the *SNMP v3 Agent* box, then enter a *Username*. Authentication verifies the sender of data while privacy protects the data. *SHA1* and *AES-128* are the superior and recommended hash function and encryption protocol respectively. Once done configuring the security settings, click *Save*.

### 3.3.2.1 System Information

The information configured here is accessible over SNMP.

*System Location* is the location of this Bridge. The value of this property should provide enough information for an administrator to locate this Bridge.

*System Contact* is the contact information for the person or department responsible for managing this Bridge. Click *Save* to save changes to System Information.

### 3.3.2.2 SNMP Trap Sinks

The Bridge notifies all configured *Trap Sinks* when a system event occurs. This means your SNMP manager can be notified should the Bridge encounter an error.

Click *More Info* link to view more information about a specific sink.

To add a new sink, click the *Add Sink* button to open the Add SNMP Trap Sink dialog.

### 3.3.2.3 Add SNMP Trap Sink

*Address* is the IP Address of the trap sink. Must be a valid IP address. Reserved and multicast addresses are not supported.

*Port* is the port of the trap sink.

*Version* is the version of SNMP the sink uses. It is recommended to use SNMPv3 where possible since it allows for authentication and privacy. The following versions are supported:

- v1: SNMPv1 (not recommended)
- v2c: SNMPv2c allows acknowledged traps
- v3: SNMPv3 allows privacy and authentication, making it more secure than SNMPv1 and SNMPv2c. (recommended)

*Type* is the type of notification sent to the trap sink. It is recommended to use the *Inform* notification type since it is acknowledged and therefore the notification is less likely to be unintentionally lost.

- Trap: Unacknowledged message
- Inform: Acknowledged message, not supported with SNMPv1

*Community* is the community string to use for the trap sink. Supported in SNMPv1 and SNMPv2c. Cannot contain spaces.

---

*Username* is the SNMPv3 unique identifier to associate these security details with. Must be 1-32 characters in length, and cannot contain spaces.

*Engine ID* is the SNMPv3 Engine ID of the trap sink. The Bridge should automatically discover the engine ID if this is left blank. If an Engine ID is provided, it must be 5-32 characters in length, and cannot contain spaces.

*Authentication* is the SNMPv3 authentication hash function used by the trap sink. Authentication allows only SNMP engines with the correct authentication password to connect to the trap sink. It is recommended to use authentication where available. It is not recommended to use the MD5 hash function since it suffers from vulnerabilities.

- SHA1: Uses the SHA1 hash function (recommended)
- MD5: Uses the MD5 hash function (not recommended)
- None: Authentication Disabled (not recommended)

*Auth Password* is the authentication password used to log in to the trap sink. An authentication password must be provided if *Authentication* is not set to *None*.

*Privacy* is the SNMPv3 privacy type used by the trap sink. *Authentication* must be enabled to use privacy. Privacy allows SNMP engines to communicate privately using encrypted messages. It is recommended to use privacy where available. It is not recommended to use the DES cipher function since it is cryptographically weak.

- AES-128: Uses the AES-128 cipher function (recommended)
- DES: Uses the DES cipher function (not recommended)
- None: Privacy Disabled (not recommended)

*Privacy Password* is the privacy password used to communicate privately with the trap sink. A privacy password must be provided if *Privacy* is not set to *None*. If the sink has privacy enabled but doesn't have a specific privacy password, then the privacy password is likely the same as the authentication password.

### 3.3.2.4 Download MIB Files

Several Management Information Bases (MIBs) are available for querying on this unit using SNMP and these MIBs can be accessed using unique Object Identifiers (OIDs).

MIB	OID
System	1.3.6.1.2.1.1
Interfaces	1.3.6.1.2.1.2
IP	1.3.6.1.2.1.4
ICMP	1.3.6.1.2.1.5
TCP	1.3.6.1.2.1.6
UDP	1.3.6.1.2.1.7
Bridgeworks Node Management Statistics	1.3.6.1.4.1.49599.11
Bridgeworks Service Statistics	1.3.6.1.4.1.49599.12

---

The MIBs describing data within the Bridgeworks' OID can be downloaded by clicking [Click Here to Download](#). A MIB file can be imported into an SNMP manager in order to provide useful information about data returned by the SNMP agent or sent in an SNMP trap.

### 3.3.3 Email

**Simple Mail Transfer Protocol (SMTP)**

SMTP Server:

SMTP Server Port:

Sender Email Address:

SMTP Username:

SMTP Password:

Save

**Event Notification Email**

Enable Email Alerts: ☐

Recipient Email Address:

System Event Level:

System Log Level:

Test Save

This section allows an SMTP server to be configured, to send emails on behalf of the Bridge.

The fields in this subsection are:

**SMTP Server** To enable an SMTP server, enter its IP address or hostname in this field.

The server must be reachable from the Bridge's Management interface (or whichever port the default route is set to) on this address. Refer to Section 3.1.2.4: [Default Route](#) for information on setting the default route.

**SMTP Server Port** Enter the port number of the SMTP server. If no port number is specified, it will use the default port (25).

**Sender Email Address** The address from which emails will be sent. This needn't be a previously in-use address; it can be anything your SMTP server will allow. This can be used to identify the emails from this Bridge.

Must be of the form: @.

**SMTP Username** Username credential to be used to send emails from the SMTP server. May be blank, depending on your server's configuration.

**SMTP Password** Password credential to be used to send emails from the SMTP server. May be blank, depending on your server's configuration.



---

Click **Save** to apply any changes made to the SMTP configuration.

### 3.3.4 Event Notification Email

The Bridge can notify a systems administrator when events of a certain urgency occur in the Bridge log. Before this can be done, SMTP settings must be configured. Refer to Section 3.3.3: [Email](#) for information on SMTP settings.

To enable email alerts on the Bridge, select the *Enable Email Alerts* checkbox. The two following fields should then be completed:

**Recipient Email Address** The email address/addresses to which the emails will be sent. Multiple email addresses can be specified, separated by a semicolon, e.g.:  
`office@example.com; home@example.com.`

**Trigger Event Log Level** The minimum log level to trigger an email. Events of higher urgency than the selected level will also trigger an email. The available levels are, in descending order of urgency:

**Critical** Example: The Bridge is running at non-recommended temperatures.

**Error** Example: A device attached to the Bridge has been disconnected.

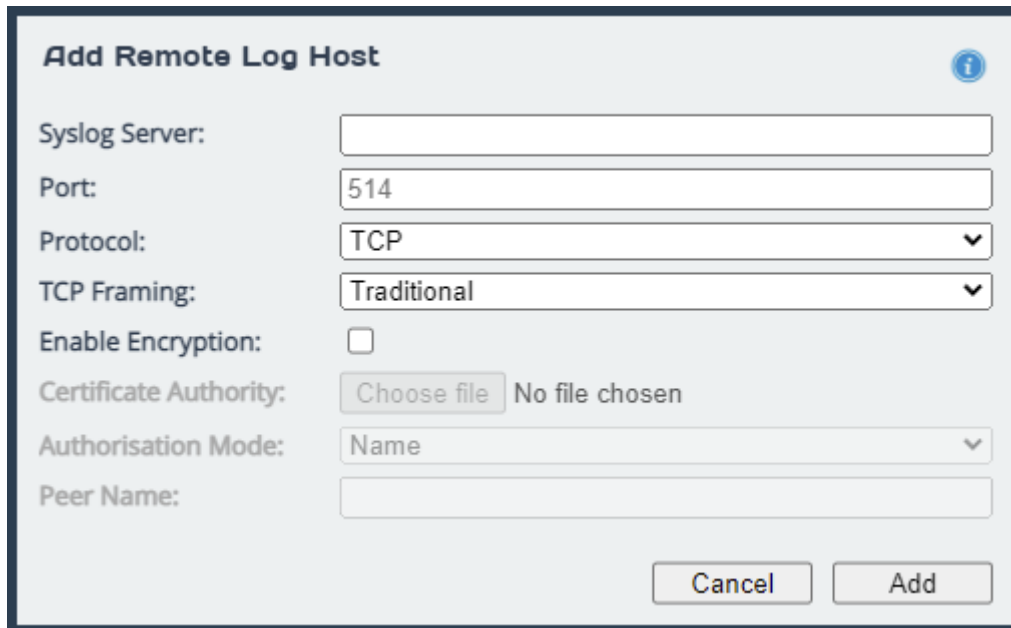
**Warning** Example: An invalid configuration file was uploaded.

Confirm these settings by clicking **Save**.

The *Test* button will send a test email to the recipient email address/addresses to confirm that the email configuration is working correctly.

### 3.3.5 Remote System Log

This section is about remote system logging, which allows the user to store the node's logs in a centralised external system. Each node can send its logs to a maximum of 10 different servers by completing the form below.



**Syslog Server** The IP address or hostname of the local server being accessed.

**Port** The port number to use when connecting to the log host. This defaults to 514 if not changed.

**Protocol** The type of protocol to use for forwarding: TCP or UDP. Only one protocol can be defined per remote log host.

**TCP Framing** When sending system log messages to TCP hosts there are two forms of message framing, traditional sends new line characters after each log, while octet-counted sends the message length ahead of the log entry. Select the method which is most compatible with your system log server.

**Enable Encryption** This section allows the log host connection to be encrypted. If you do not wish to encrypt your system log, leave the Enable Encryption checkbox unchecked.

**Certificate Authority** When encryption has been selected a Certificate Authority certificate must be provided using the file upload field. This should match the certificate authority used on your remote log host as it will be used to verify the connection.

**Authorisation Mode** There are two supported authorisation modes: Name and Anon. Name is the default option as it is the most secure.

**Name** Uses certificate validation and subject name authentication.

**Anon** Uses anonymous authentication. This mode checks for certificates, however they aren't validated.

**Peer Name** This is the name of the remote peer on your client's certificate. This is only relevant when Name Authorisation is selected.

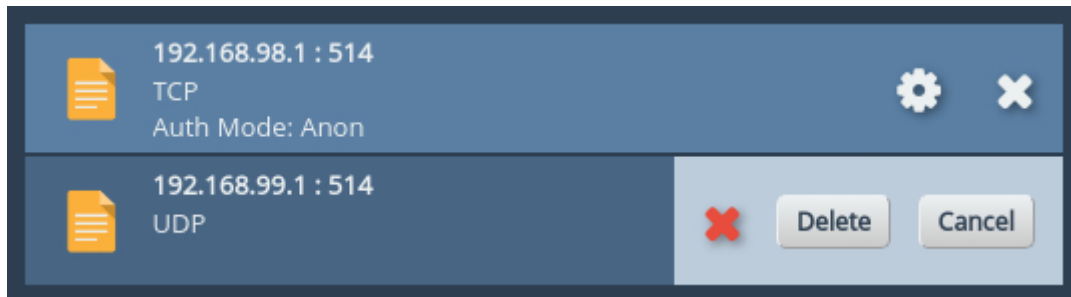
Once all the desired fields have been completed, click the *Add* button at the bottom right of the form.

---

### 3.3.5.1 Editing or Deleting a Connection

Once a connection has been created, the information can be updated by clicking the *gear* symbol. Any aspect of the connection can be edited from the address to type of encryption it uses. If a certificate authority has previously been uploaded for that connection, editing also means that this can be removed and a new one uploaded if desired.

Additionally, a host can be deleted by clicking the *X* icon on the main remote logging host page. Deleting a host will immediately remove the connection as well as the Certificate Authority linked to that connection, if applicable.



## 4 SAS Initiator

This section details the information displayed on the *SAS Initiator* page. This page allows the administrator to examine physical connections (hereinafter referred to as “phys”) from their SAS devices.

From the Home screen of the web interface, select the *SAS Initiator* icon from the *Devices and Protocols* section.



You will see the following page:

### SAS Initiator

Hostname

[Home](#)

[Reboot](#)

[Logout](#)

[Support](#)

[Help](#)

Display Options

Phy display filter: 

All

Live Update: ☒

Host - Slot 2

4 links active

A-1  
3.0 Gbit  
Expander

A-3  
3.0 Gbit  
Expander

B-1  
Unknown  
No Device

B-3  
Unknown  
No Device

A-2  
3.0 Gbit  
Expander

A-4  
3.0 Gbit  
Expander

B-2  
Unknown  
No Device

B-4  
Unknown  
No Device



Note: The *SAS Initiator* page may look different than pictured depending on your configuration.

---

## 4.1 SAS Initiator Page

This page displays physical SAS cards (or “hosts”) contained within your unit, and any devices to which they are connected (such as disk drives or expanders). A host will contain four phys for every physical port on the card.

### 4.1.1 Hosts

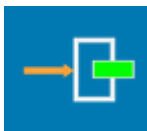
The heading of a host section shows the following information:

**Chevron** An arrow for expanding or collapsing the section.

**Name** (e.g. Host 1).

**Active Connections** A display of the number of connections available (e.g. 4 links active).

Under the host heading, a number of phys will be displayed. The icon represents their state.



**End Device** A device is connected



**No Device** No device is connected



**Expander Device** An expander is connected

The text to the right of each icon displays information relating to the phy:

**Device identifier** The identifier of the device, shown with a letter and a number (e.g. “B-3”). The letter pertains to the physical port, as displayed on your port mapping page.

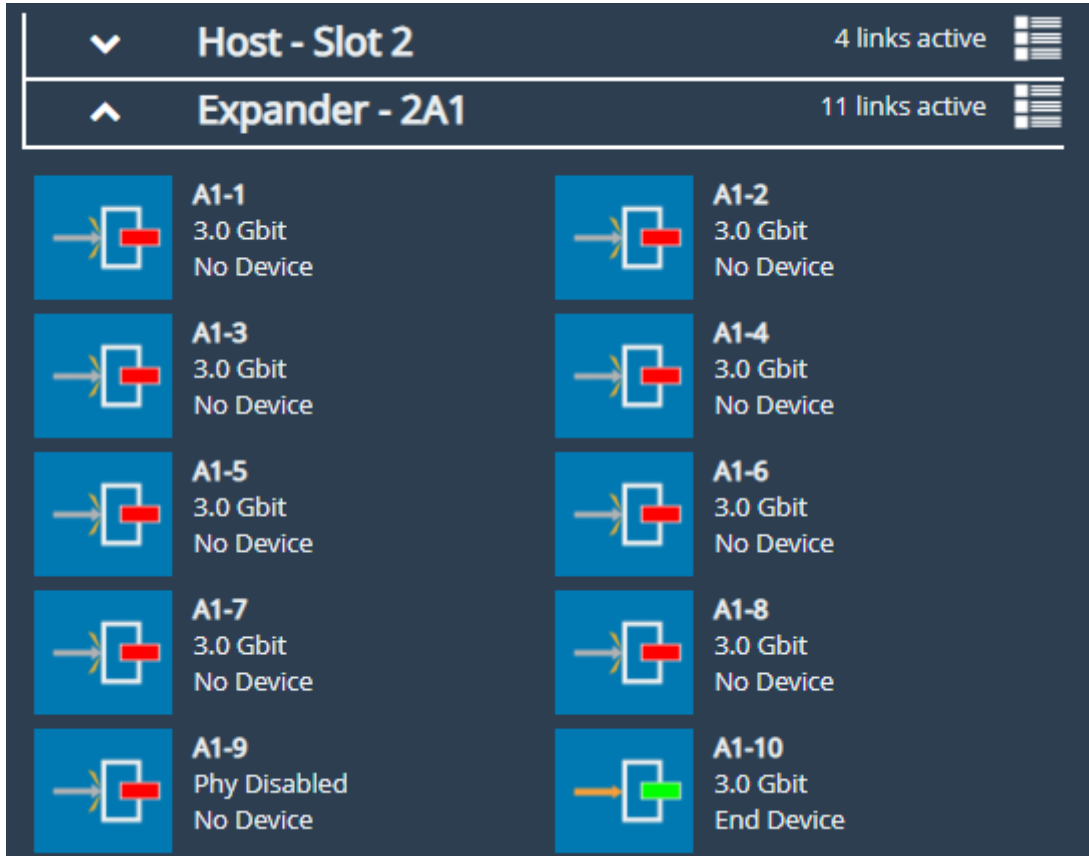
**Link speed** The negotiated link speed of the device. This will show a speed if a physical connection is made (e.g. “6.0 Gbit”), or otherwise displays “Unknown”.

**Device type** Whether there is an end device, no device, or expander (as represented by the icon).

If expanders are connected to a host, they will appear in their own sections starting underneath all listed hosts. The header contains number and letter designations pertaining to host it is connected to. For example, the 1<sup>st</sup> expander connected to port **A** of Host **2** will be labelled “SAS Expander - 2A1”. The display of the heading and the phys of an expander mirrors the host phys exactly.

### 4.1.2 Expanders

Expanders are displayed in a similar manner to hosts. The title bar continues to show a chevron, the name of the expander, and the links active. All the phys of the expander are shown underneath this heading, using the same icons as hosts.



The name of an expander signifies its origin, and its level. For example, an expander named **2A1** originates from the **2<sup>nd</sup>** host, from physical port **A**, and is the **1<sup>st</sup>** level of expander from that port.

Phys from an expander are similarly named. A phy from expander **2A1** may be labelled **A1-12**, where **A** represents the physical origin port, **1** represents the level of expander from that port, and **12** represents the number of the phy.

### 4.1.3 Display Options

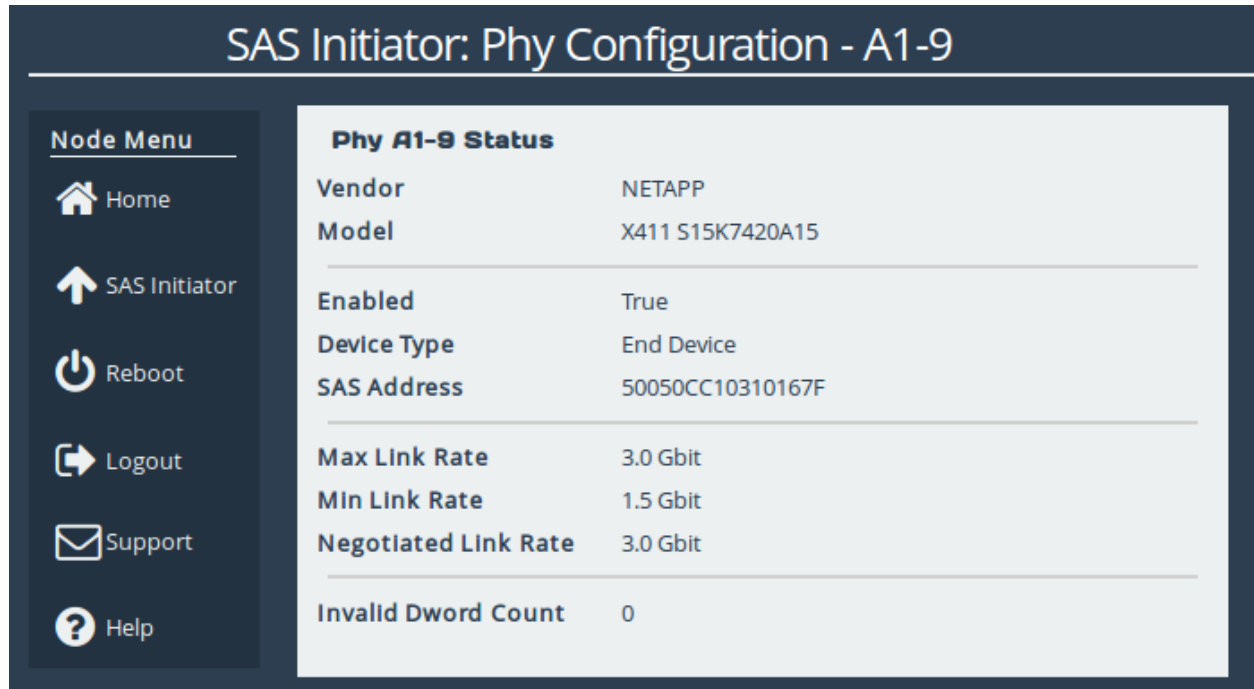
Options are available for configuring how devices are viewed. These are:

**Phy display filter** Show all phys, or choose to display phys based on whether they are connected.

**Live update** Ticked will update all phy information on the page every two seconds. Unticked will leave device information as it is at the time of unticking.

## 4.2 Phy Status Page

Clicking on a phy, either under a host or an expander, will lead to a status page showing information about that phy, as shown below. This shows information about the device as it was at the time of page load.



Phy A1-9 Status	
Vendor	NETAPP
Model	X411 S15K7420A15
Enabled	True
Device Type	End Device
SAS Address	50050CC10310167F
Max Link Rate	3.0 Gbit
Min Link Rate	1.5 Gbit
Negotiated Link Rate	3.0 Gbit
Invalid Dword Count	0

Information differs per connected device and not all fields will show on the page. Possible data includes:

**Vendor** Manufacturer of the device.

**Product** Product name of the attached expander.

**Model** Model name of the attached end device.

**Enabled** True or false.

**Device Type** No device, end device, or expander.

**SAS Address** Unique address of the SAS host the phy is from.

**Max Link Rate** Maximum link speed allowed by the hardware.

**Min Link Rate** Minimum link speed allowed by the hardware.

**Negotiated Link Rate** Link speed currently used for transfers. Unknown if no link rate has been decided.

**Invalid Dword Count** Number of malformed Dwords received.

---

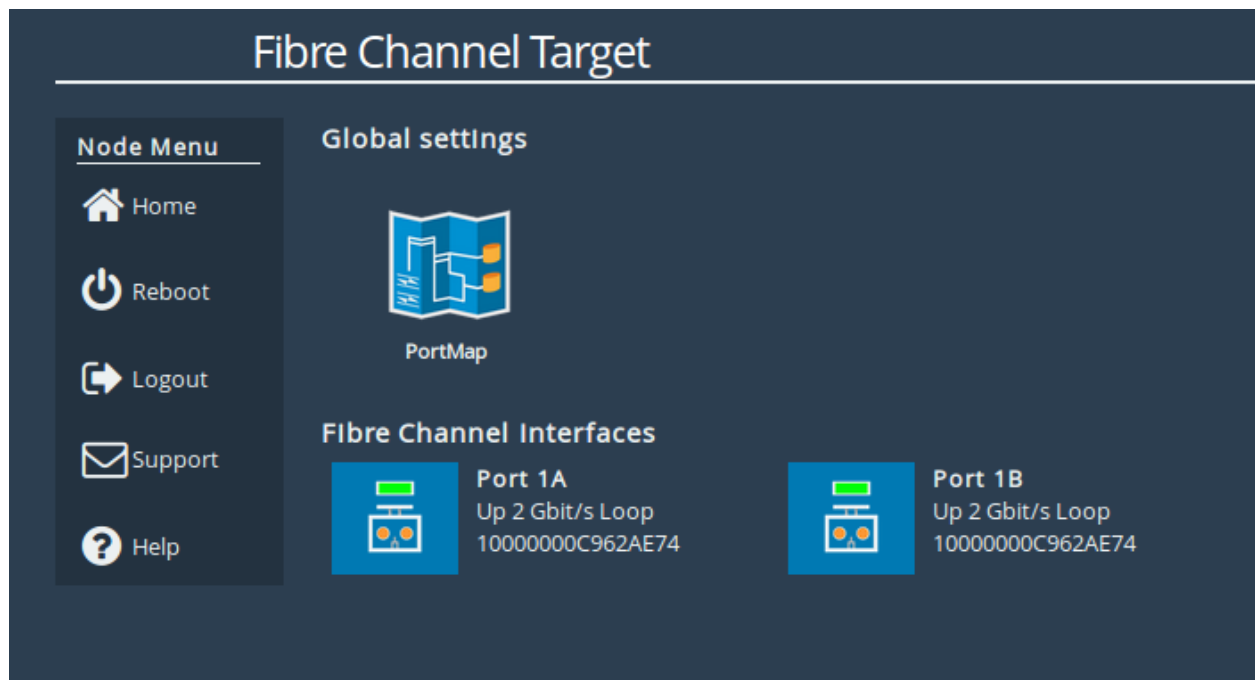
## 5 Fibre Channel Target Connections

This configuration page allows the user to configure ports designated as Fibre Channel Target interfaces.

From the Home screen of the web interface, select the *FC Target* icon from the *Devices and Protocols* section.



The web interface will then display the following:

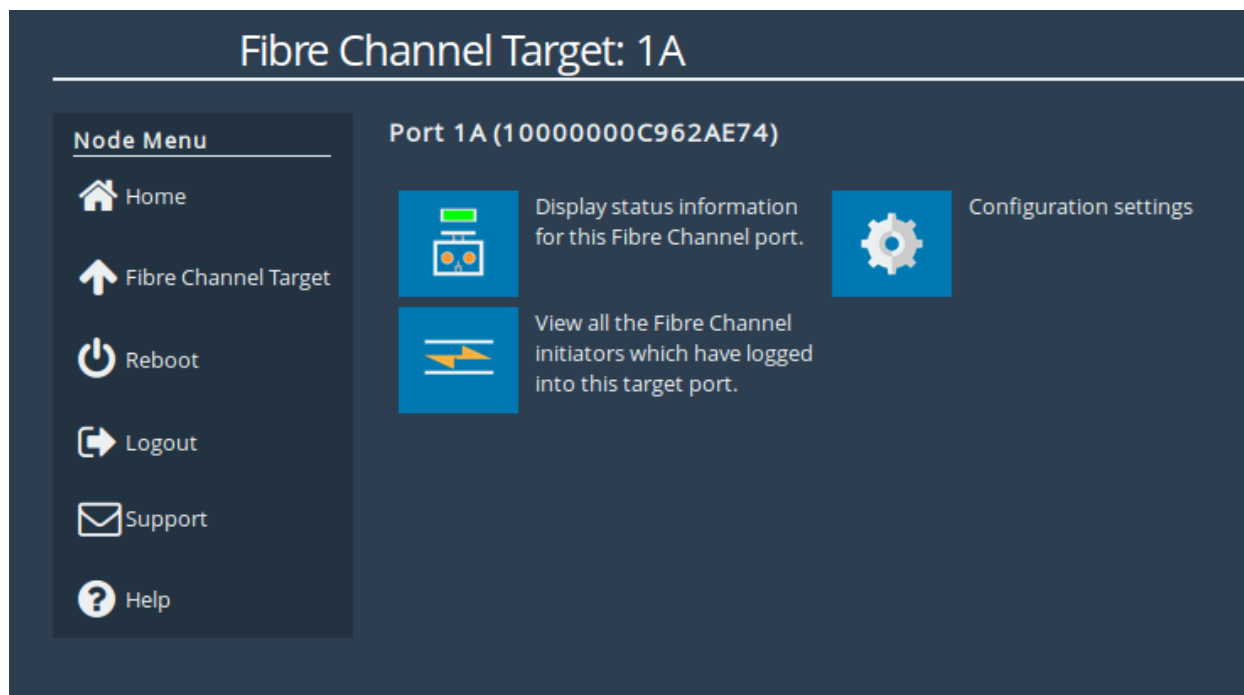


The icons displayed in the *Fibre Channel Interfaces* section show the current state of each Fibre Channel Port.

The green or red light in the icon show whether the port is up or down. This is also shown in the text next to each icon with the negotiated Fibre Channel speed and the selected topology. The port WWN is also shown next to each icon.

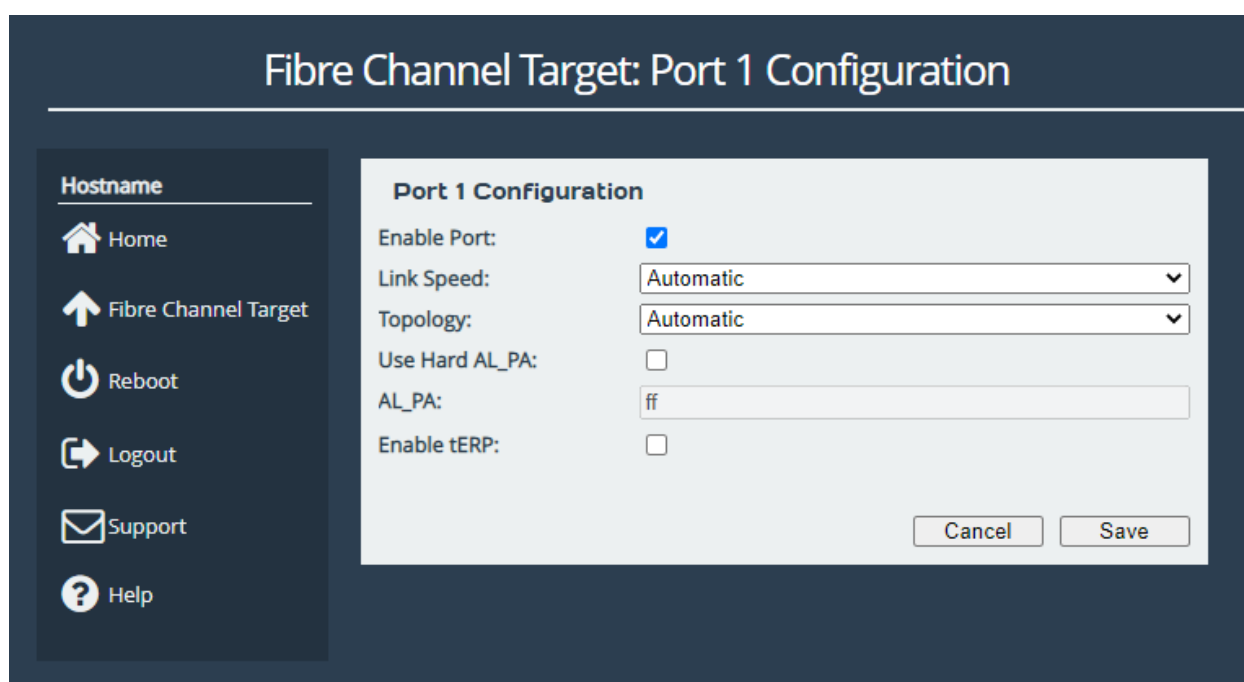
Clicking on an icon will display different options related to the specific port as shown:





## 5.1 Port Configuration

Selecting the *Configuration settings* icon will display the following:

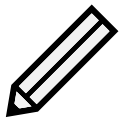


The first parameter is the *Port Enable* check box. Check this to enable the link onto the Fibre Channel Storage Area Network (SAN).

The *Link Speed* drop down menu allows you to select the Fibre Channel network speed. In most cases this can be kept as *Automatic*.

The *Topology* drop down menu allows you to force the Fibre Channel topology when the Bridge

logs on to the Fibre Channel SAN.



Note: It is recommended to leave *Hard AL\_PA* unchecked unless you are conversant with the lower levels of the Fibre Channel protocol, as certain AL\_PA addresses are reserved.

The *Enable tERP* check box, which is only present for 8Gb/s cards, will enable or disable the Target Error Recovery Protocol for the port. tERP will attempt to recover frames that are missed or time out during transfer. For tERP to correctly function, the connected initiator must also support tERP.

Clicking **Save** will save the configuration to memory for use at the next reboot.

## 5.2 Connected Hosts

To list which hosts are connected to the Bridge, select a port under *Fibre Channel Interfaces*, then select the icon labelled *View all the Fibre Channel initiators which have logged into this target port*. The following will then be displayed:

### Fibre Channel Target: Connected Hosts - Port 1

**Hostname**

- Home
- Fibre Channel Target
- Reboot
- Logout
- Support
- Help

**Host initiators connected to Port 1**

World Wide Node Name	World Wide Port Name	Port ID
20000090fa79d339	10000090fa79d339	010000

## 5.3 Port Map

The *Port Map* page allows the user to assign devices to Fibre Channel ports with a fixed Logic Unit Number (LUN).

From the *Fibre Channel Target* page select the *Port Map* icon.



A screen similar to the following will be displayed:

### Fibre Channel Target: Port Map

**Hostname**  
[Home](#)  
[Fibre Channel Target](#)  
[Reboot](#)  
[Logout](#)  
[Support](#)  
[Help](#)

**Configuration Type**  
Automatic ▼

**Port Assignment**

Target Port	LUN	Devices	LUN
Port		WWN	
FCTPORT1	13	iqn.1991-05.com.microsoft:win-rdp25uho s8m-ramdisk-target,t,0x000001	7
FCTPORT1	2	iqn.1991-05.com.microsoft:win-rdp25uho s8m-ramdisk-target,t,0x000001	18
FCTPORT1	5	iqn.1991-05.com.microsoft:win-rdp25uho s8m-ramdisk-target,t,0x000001	15
FCTPORT1	0	iqn.1991-05.com.microsoft:win-rdp25uho s8m-ramdisk-target,t,0x000001	20
FCTPORT1	7	iqn.1991-05.com.microsoft:win-rdp25uho	13

Cancel Remove All Remove

**New Device Assignment**

Device & Logical Unit: --- Select a Target --- ▼  
Port: --- Select a Port --- ▼  
LUN: Input LUN Number  
Add Assignment

Save

---

There are two modes of operation:

**Automatic** will assign all devices to all Fibre Channel target ports, so that any connected host will see all devices.

**Manual** will allow the user to manually assign which target devices appear on which Fibre Channel port.

When switching between modes all changes are held pending until the user selects *Save*.

### 5.3.1 Automatic

In this mode, the *Port Assignments* table shows the active mappings. When switching from manual to automatic mode the display will show the manual mappings greyed out until the user selects *Save* at which point they will be updated with the active automatic mappings.



Important: When *Automatic* port mapping is selected, LUN order is not guaranteed to be the same between reboots.

### 5.3.2 Manual

Selecting *Manual* will show something similar to the following:

The screenshot displays a configuration window with the following sections:

- Configuration Type:** A dropdown menu set to "Manual".
- Port Assignment:** A table with columns for Target Port, LUN, and Devices. It contains five entries, all with a green background indicating pending changes.
- Buttons:** "Cancel", "Remove All", and "Remove" are located below the Port Assignment table.
- New Device Assignment:** A section with three input fields: "Device & Logical Unit:" (dropdown), "Port:" (dropdown), and "LUN:" (text input). An "Add Assignment" button is at the bottom right of this section.
- Save:** A "Save" button is located at the bottom right of the entire window.

Target Port	LUN	Devices
Port	LUN	WWN
FCTPORT1	13	iqn.1991-05.com.microsoft:win-rdp25uho s8m-ramdisk-target,t,0x000001
FCTPORT1	2	iqn.1991-05.com.microsoft:win-rdp25uho s8m-ramdisk-target,t,0x000001
FCTPORT1	5	iqn.1991-05.com.microsoft:win-rdp25uho s8m-ramdisk-target,t,0x000001
FCTPORT1	0	iqn.1991-05.com.microsoft:win-rdp25uho s8m-ramdisk-target,t,0x000001
FCTPORT1	7	iqn.1991-05.com.microsoft:win-rdp25uho s8m-ramdisk-target,t,0x000001

When switching from *Automatic* to *Manual* the mapping is prepopulated with the same settings as those currently active. Initially, all entries are shown in green to indicate these are pending changes which will be added upon save. Similarly, if the user deletes an active mapping it will be shown in red as a pending removal as shown in the following example:

Port Assignment

Target Port		Devices	
Port	LUN	WWN	LUN
FCTPORT1	0	iqn.1991-05.com.microsoft:win-rdp25uhos 8m-ramdisk-target,t,0x000001	0
FCTPORT1	1	iqn.1991-05.com.microsoft:win-rdp25uhos 8m-ramdisk-target,t,0x000001	1
FCTPORT1	1	iqn.1991-05.com.microsoft:win-rdp25uhos 8m-ramdisk-target,t,0x000001	16

Cancel
Remove All
Remove

To assign a target device to a Fibre Channel Port:

1. Select a target device from the list in the *Device & Logical Unit* drop down menu. Note that devices that are already mapped are greyed out.
2. Select which Fibre Channel Port you wish the device to appear on.
3. Select the LUN you wish the device to have on the selected Fibre Channel Port.
4. Click the *Add Assignment* button at the bottom of the panel.

To remove a mapped device, select the device from the table and click the *Remove* button below the table. To remove all mapped devices, click the *Remove All* button.

Selecting *Cancel* allows the user to abandon any pending changes.



Important: Manually assigned LUN mappings should be sequential and include a LUN 0 to ensure correct operation.

---

## 6 SCSI Device Management

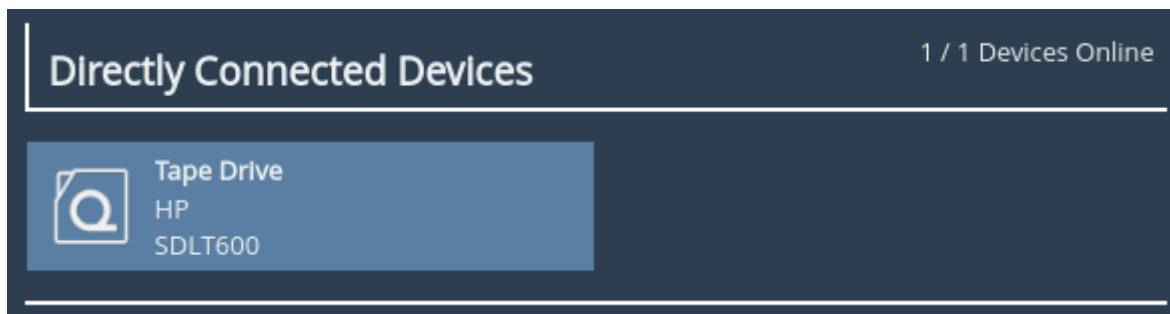
This page allows you to view details of devices connected to the FCSAS.

### 6.1 Viewing Attached Devices

From within the Home screen of the web interface, select the *SCSI Device Management* icon under the *Devices and Protocols* section.



The web interface will then display the following:



You will be presented with a list of all the devices connected to the FCSAS.

Clicking on a device will open a page displaying more information about the device, as shown below.

## Device Details

### Node Menu



Home



Devices



Reboot



Logout



Support



Help

### Tape Drive Details

Vendor: HP

Product: SDLT600

Port Name: iqn.2002-12.com.4bridgeworks.001bd1:eui.00041B0002001BD1.0,t,0x000001

Node Name: iqn.2002-12.com.4bridgeworks.001bd1:eui.00041B0002001BD1.0

LUN: 0 (0x0000000000000000)

SCSI

Revision: SPC

Ok

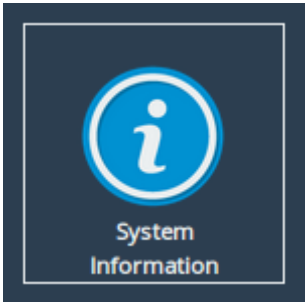


# 7 Bridge Maintenance

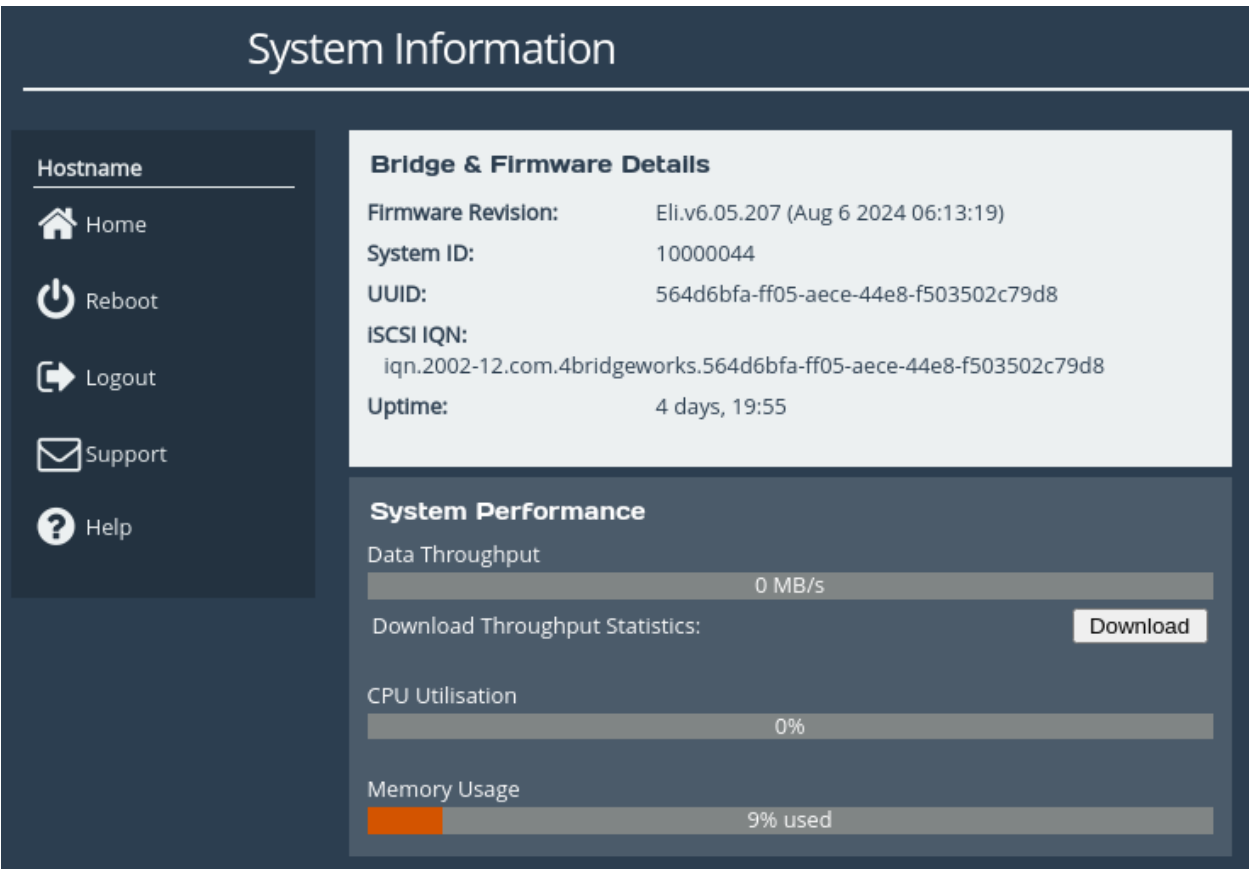
The following section describes the various pages that are available to the administrator to monitor performance and maintain the Bridge.

## 7.1 System Information

This page allows the administrator to view the performance of the Bridge. From the Home screen, select the *System Information* icon from the *Bridge Maintenance* section.



The following page will be displayed:



In the *Bridge & Firmware Details* section, the following information is displayed:

**Firmware Revision** is the installed firmware revision level.

---

**Serial Number/UUID** is the unique identifier of that specific FCSAS.

**Uptime** is the amount of time the FCSAS has been powered on for.

The *System Performance* section contains three meters which provide an approximation of the following performance parameters:

**Data Throughput** This indicates the current performance in MB/s.

**CPU Utilisation** This indicates the percentage of the time the CPU is occupied undertaking the management and scheduling the transfer of data between the two interfaces.

**Memory Usage** This indicates the percentage of memory used by all processes.

The following section will also appear on this page:

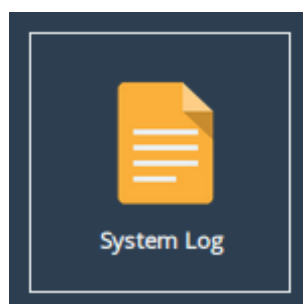
Inventory	
Component	Description
Chassis	Model a004
PCI Slot 1	Intel X540 T2 10 Gigabit Network Connection
PCI Slot 2	Emulex Lancer-G6 LPe31002-M6-D Fibre Channel Host Adapter

The *Inventory* section shows the hardware your Bridge is running on, including the board and any cards installed in it.

## 7.2 System Log

This page displays the system log, useful for diagnosing problems with the Bridge, attached devices and connections.

From the Home screen, select the *System Log* icon from the *Bridge Maintenance* section.



The web interface will now display the following:

System Log

Hostname

Home

Event Log

Reboot

Logout

Support

Help

```

Nov 22 10:28:03 info bwmanger[348]: Loaded module: Log file rotation
Nov 22 10:28:03 info kernel:vmxnet3 0000:0b:00.0 port1: renamed from eth0
Nov 22 10:28:03 info kernel:vmxnet3 0000:13:00.0 port2: renamed from eth1
Nov 22 10:28:03 info kernel:vmxnet3 0000:1b:00.0 port3: renamed from eth2
Nov 22 10:28:03 info kernel:vmxnet3 0000:0b:00.0 port1: intr type 3, mode 0, 5 vectors allocated
Nov 22 10:28:03 info kernel:vmxnet3 0000:0b:00.0 port1: NIC Link is Up 10000 Mbps
Nov 22 10:28:03 info bwmanger[348]: Loaded module: LLDP
Nov 22 10:28:03 info bwmanger[348]: Loaded module: network configuration
Nov 22 10:28:03 info lldpd[411]: protocol LLDP enabled
Nov 22 10:28:03 info lldpd[411]: protocol CDPv1 enabled
Nov 22 10:28:03 info lldpd[411]: protocol CDPv2 enabled
Nov 22 10:28:03 info lldpd[411]: protocol SONMP disabled
Nov 22 10:28:03 info lldpd[411]: protocol EDP disabled
Nov 22 10:28:03 info lldpd[411]: protocol FDP disabled
Nov 22 10:28:03 info lldpd[411]: libevent 2.1.12-stable initialized with epoll method
Nov 22 10:28:03 info bwmanger[348]: Initialising Bridgeworks Core
Nov 22 10:28:03 info bwmanger[348]: Loaded module: Bridgeworks Core
Nov 22 10:28:03 info kernel:softdog: initialized. soft_noboot=0 soft_margin=60 sec soft_panic=0 reboot_delay=10 (nowayout=0)
Nov 22 10:28:03 info bwmanger[348]: Loaded module: Watchdog module
Nov 22 10:28:03 info bwcore[425]: Bridgeworks Core: Protocol-Neutral(Eli_v6.05.297 Nov 22 2024 06:32:05)
Nov 22 10:28:03 info bwcore[425]: Bridgeworks Core: Patented: GB2433396 US765377482 GB2380642 US725124882 GB2436627 GB2472164 GB2464793 Patents pending
Nov 22 10:28:03 notice bwcore[425]: user_init: Physical memory access unavailable: No such file or directory (2)
Nov 22 10:28:03 info bwcore[425]: Initialising memory manager 8GiB / 1MiB
Nov 22 10:28:03 info lldpccli[407]: lldpd should resume operations
Nov 22 10:28:03 info bwmanger[348]: Loaded module: Certificates
Nov 22 10:28:03 info bwmanger[348]: Loaded module: WebSocket
Nov 22 10:28:03 info bwmanger[348]: Loaded module: mail sending support
Nov 22 10:28:03 info bwmanger[348]: Loaded module: socket support
Nov 22 10:28:03 info bwmanger[348]: Loaded module: HTTP server
Nov 22 10:28:03 info bwmanger[348]: Loaded module: Lua templates
Nov 22 10:28:03 info bwmanger[348]: Loaded module: SNMP client
Nov 22 10:28:03 info bwmanger[348]: Loaded module: persistent LUNs
Nov 22 10:28:03 info bwmanger[348]: Loaded module: Task Scheduler
Nov 22 10:28:03 info bwmanger[348]: Loaded module: SNMP
Nov 22 10:28:03 info bwmanger[348]: Loaded module: SSH server
Nov 22 10:28:04 info bwmanger[348]: Loaded module: Myelin
Nov 22 10:28:04 info bwmanger[348]: Loaded module: WCCPv2
Nov 22 10:28:04 info bwmanger[348]: Loaded module: WANrockIT
Nov 22 10:28:04 info bwmanger[348]: Loaded module: Syslog
Nov 22 10:28:04 info bwmanger[348]: System Information: Firmware Version - Eli.v6.05.297 (Nov 22 2024 06:29:41)
Nov 22 10:28:04 info bwmanger[348]: Loaded module: system control
Nov 22 10:28:04 info bwmanger[348]: Loaded module: VMware Tools
Nov 22 10:28:04 notice bwmanger[348]: Bridgeworks Manager 2.00 Initialised
Nov 22 10:28:04 info bwmanger[348]: Manager configuration saved (3180 bytes)
Nov 22 10:28:04 info bwmanger[348]: DHCP Started on port port1
Nov 22 10:28:04 info bwmanger[348]: DHCP set address on port1, IP:10.10.10.10/15
Nov 22 10:28:04 info bwmanger[348]: DHCP bound on port1, IP: 10.10.10.10, Mask: 255.254.0.0, Gateway 10.10.10.1, Lease Time: 172800
Nov 22 10:28:04 info bwmanger[348]: DHCP done on port1 10.10.10.10/15
Nov 22 10:28:04 notice bwmanger[348]: Setting IPv4 default route on port1 via 10.10.10.1
Nov 22 10:28:04 info bwmanger[348]: port1: 10.10.10.10/15 MTU: 1500
Nov 22 10:28:05 notice bwmanger[348]: This product includes software developed by the OpenSSL Project
Nov 22 10:28:05 notice bwmanger[348]: for use in the OpenSSL Toolkit (http://www.openssl.org/)
Nov 22 10:28:10 notice bwmanger[348]: Login by 'admin' from '10.0.80.163'
Nov 22 10:28:10 notice bwmanger[348]: HTTP server Login by 'admin' from '10.0.80.163'

```

Click Here to Download

Clear System Log

© 2024 Bridgeworks Ltd

Below the log display pane are two options:

**Click Here to Download** This will download the log file to your local machine.

**Clear System Log** This will clear all logs within the Bridge.

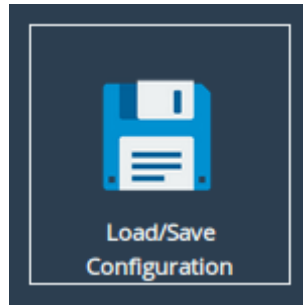
For information on troubleshooting your Bridge, see Chapter 8: [Troubleshooting](#).

## 7.3 Load/Save Configuration

The configuration Load/Save feature allows you to save a copy of the Bridge’s configuration to a file and optionally restore back to that configuration at a later time.

Once you have finished configuring your Bridge we recommend that you save your configuration data to a local disk. By doing so you could save valuable time if the Bridge requires replacement or if configuration is lost during upgrades.

From the Home screen, select the *Load/Save Configuration* icon from the *Bridge Maintenance* section.



The following page will be displayed:

## Load/Save Configuration

### Hostname

- Home
- Reboot
- Logout
- Support
- Help

#### Import Configuration

! HTTPS and IPsec certificates and keys will need to be restored manually after uploading a saved configuration.

Choose File

No file chosen

Upload

#### Export Configuration


Click Here to Download

#### Restore Defaults

Restore Factory Defaults

### 7.3.1 Loading a Saved Configuration

To reload a configuration, click the *Choose file* button and locate the configuration file to upload to the Bridge. Once located, click the *Upload* button and the new configuration data will be uploaded.



Important: Once a valid configuration file is uploaded, a reboot will automatically occur.

### 7.3.2 Saving the Configuration to Disk

To save the configuration data, click the *Click Here to Download* button. Then choose to save the file.

The Bridge will now download an encoded file that contains all of its configuration settings.

67

---

### 7.3.3 Restoring to Factory Defaults

To restore the Bridge to factory defaults, click the *Restore Factory Defaults* button. This resets all configuration parameters including the hostname, IP addresses and passwords. This option is useful to protect sensitive information if a Bridge appliance is ever returned for maintenance.

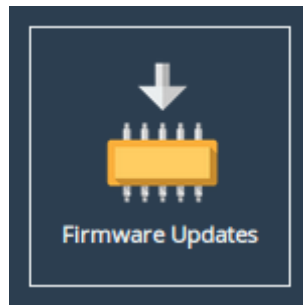


Important: After clicking the *Restore Factory Defaults* button, a reboot will automatically occur.

## 7.4 Firmware Updates

From time to time it may be necessary to upgrade the firmware within the Bridge. New versions contain resolutions to known issues as well as new features and improvements to the functionality of the Bridge.

The *Firmware Updates* page allows the administrator to load new firmware onto the Bridge. From the Home screen, select the *Firmware Updates* icon from the *Bridge Maintenance* section.



The following page will be displayed:

# Firmware Updates

---

Hostname

Home

Reboot

Logout

Support

Help

## Automatic Firmware Update

Check For Updates Automatically: ☐

Save

Check Now

Note: No information regarding your bridge is sent during the check for firmware updates.

## Firmware Upload

Firmware Revision:

Eli.v6.05.207 (Aug 6 2024 06:13:19)

Firmware Image:

Choose file

No file chosen

Update

After clicking update please wait for this page to change before proceeding.

You can now manually upload and update to a firmware version of your choosing.

### 7.4.1 Updating Firmware Manually

Contact Bridgeworks support at [support@4bridgeworks.com](mailto:support@4bridgeworks.com) providing the serial number of your product to receive the latest version of the firmware.



Warning: Do not load on a firmware which has an earlier release revision unless you have been instructed to by the Bridgeworks support team. Always ensure that you have the correct firmware for your product.

**If in any doubt, please contact Bridgeworks support. See Appendix C: Useful Links for contact information.**

Once you have downloaded the new firmware to your local machine:

1. Click on the *Choose file* button to locate the file you have downloaded from the Bridgeworks website.
2. Click on the *Update* button to start. A progress bar labelled *Uploading* will appear showing the progress in uploading the new firmware on to the FCSAS.
3. When the label above the progress bar changes to *Progress*, you can navigate away from this page and the installation will continue.

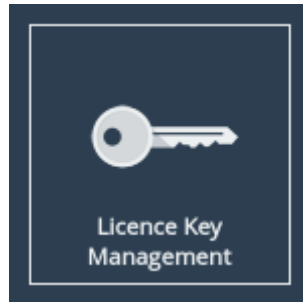
Updating the firmware will take a few minutes. After the update is complete, a notification will appear under the *Bridge Menu*, indicating that a system reboot is necessary. To reboot the Bridge, click on the *Reboot* button located in the *Bridge Menu* at the left side of the web interface.

69

## 7.5 Licence Key Management

This page allows you to view, upload, download or remove licence keys installed on the Bridge. Licence keys are required to enable features on installed feature cards.

From the Home screen, select the *Licence Key Management* icon from the *Bridge Maintenance* section.



The following page will be displayed:

### Licence Keys

**Node Menu**

- Home
- Reboot
- Logout
- Support
- Help

#### Installed Licence Keys

ID	Feature Type	Limit	Expires
315953172	Fibre Channel	1	Expired
777490233	Fibre Channel	1	5 Days
2018560049	WAN	8	N/A
	iSCSI	8	
	SAS	8	
2125412457	Fibre Channel	8	N/A

Some of your licence keys have expired. Functionality may be missing from your node as a result. Please remove the expired licence keys.

RemoveDownload

#### Licence Key Upload

Licence Key File:

Choose fileNo file chosen

Upload

The *Installed Licence Keys* table displays the installed licence keys with the following information:

**Feature Type** The feature that the licence key enables.

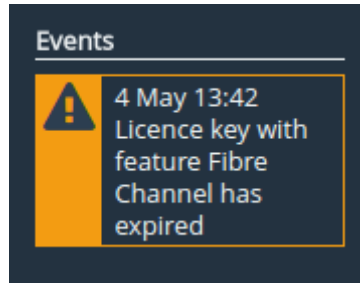
**Limit** The number of interfaces that the feature may be mapped to.

**Expires** The amount of time left until a temporary licence key expires. If *N/A* is in this column, it

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indicates the licence key is not temporary.

When a temporary licence key has expired, there will be a warning on the page and the *Expires* field will say *Expired* as shown in the image above. At the point of expiration, an event will be displayed below the *Bridge Menu* similar to the one shown below.




### 7.5.1 Uploading a Licence Key

To upload a licence key:

1. Click the *Choose file* button in the *Licence Key Upload* section.
2. Locate and select the licence key to upload.
3. Click the *Upload* button.

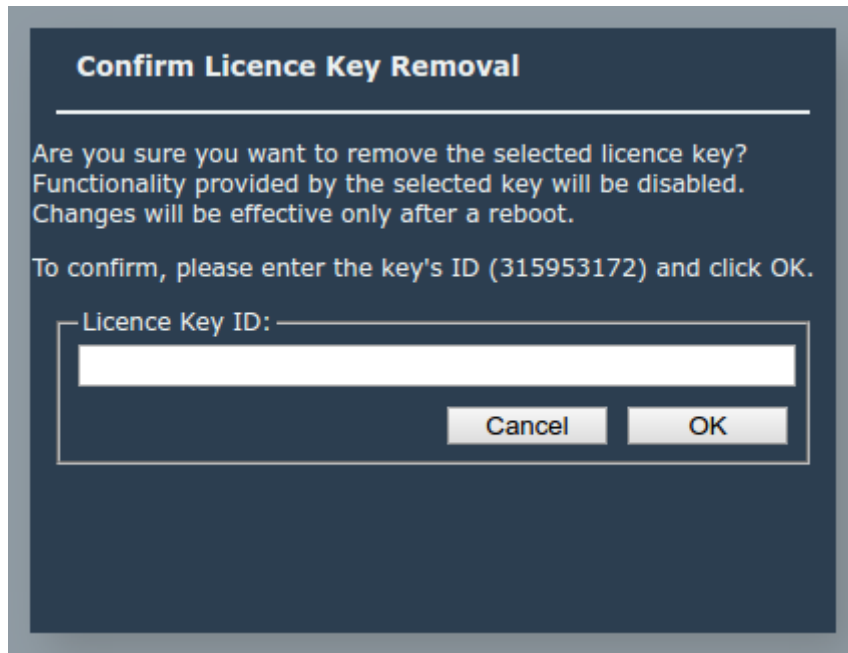
After the upload completes, a valid licence key will appear in the *Installed Licence Keys* table.

	Important: The Bridge will require a reboot for the licence key to be activated.
---	--

### 7.5.2 Removing a Licence Key

To remove a licence key, select the licence key from the *Installed Licence Keys* table, then click the *Remove* button. This will open a dialog box, as shown below.





Copy the licence key ID into the *Licence Key ID* field and click *OK*. The licence key will be removed from the Bridge and will no longer be displayed in the *Installed Licence Keys* table.

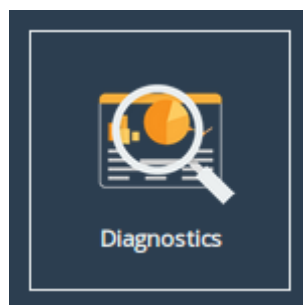
### 7.5.3 Downloading a Licence Key

To download a licence key, select the licence key from the *Installed Licence Keys* table, and click *Download*.

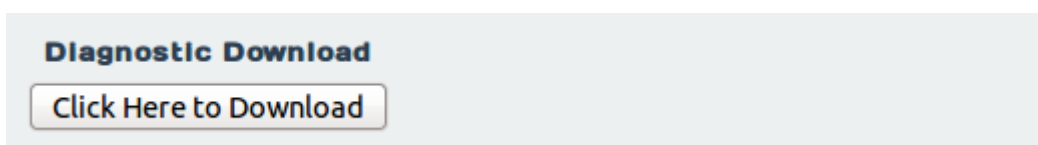
## 7.6 Diagnostics

In the unlikely event that a problem arises with your FCSAS, you may be requested by Bridgeworks Support to provide a diagnostic file.

To download the diagnostic file, click on the *Diagnostics* icon on the Home screen:



Then click on the *Click Here to Download* button.



---

This will cause the FCSAS to collect data regarding various modules and store them in a single file. Once this process is complete, a download for “diagnostics.bin” will begin.

## 7.7 Task Scheduler

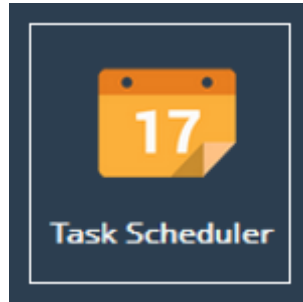


Important: Before configuring the Task Scheduler SNTP must be setup as described in [Section 3.3.1: Network Time Protocol \(NTP\)](#).

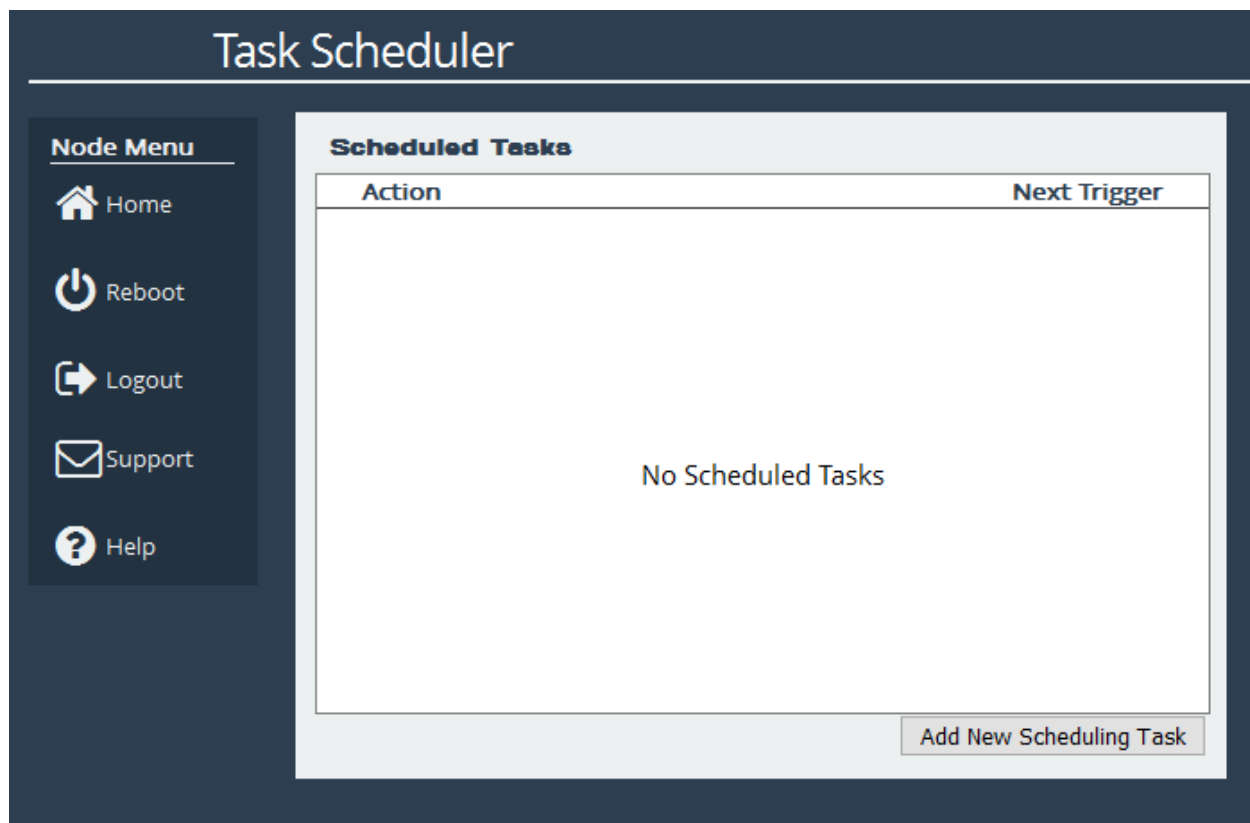
This page allows the administrator to schedule tasks with the following action:

**Email Performance Statistics** This will email the log of the throughput rate to a given email address(es).

From the Home screen, select the *Task Scheduler* icon from the *Bridge Maintenance* section.



The web interface will now display the following:

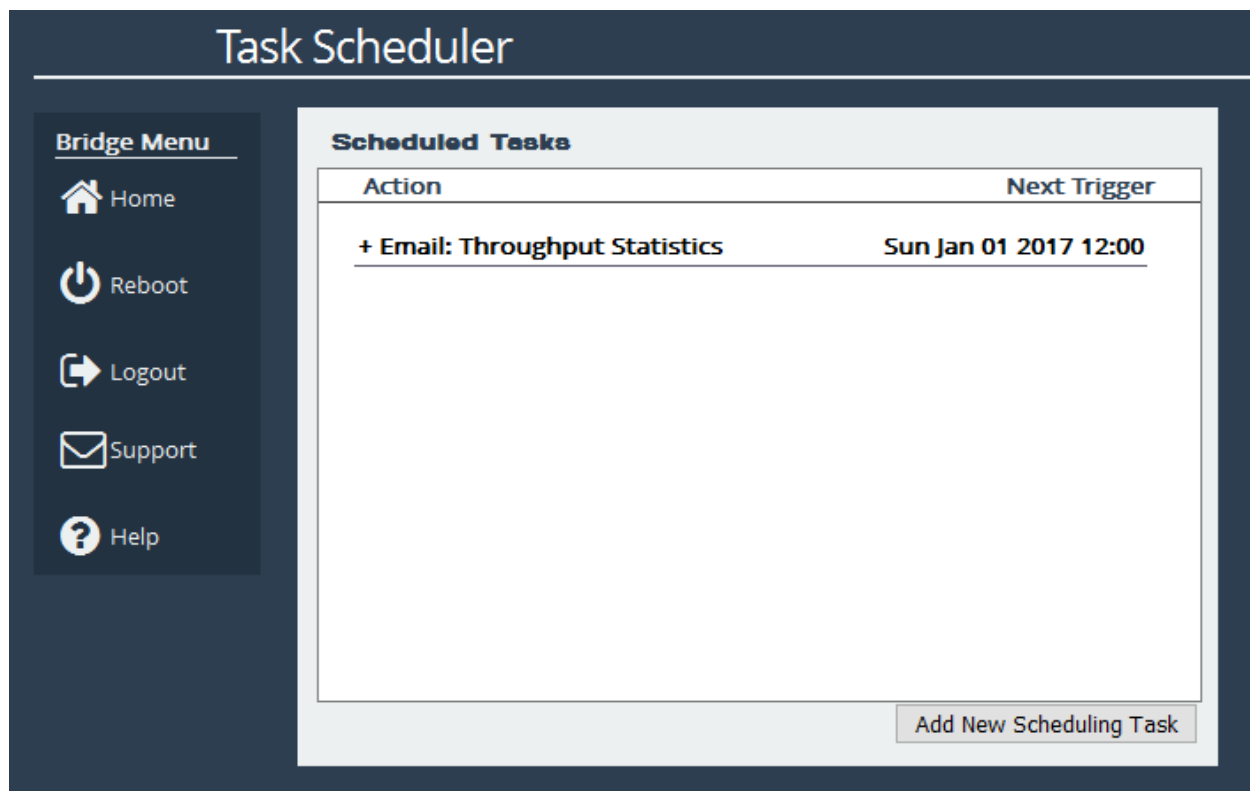


### 7.7.1 Adding Tasks

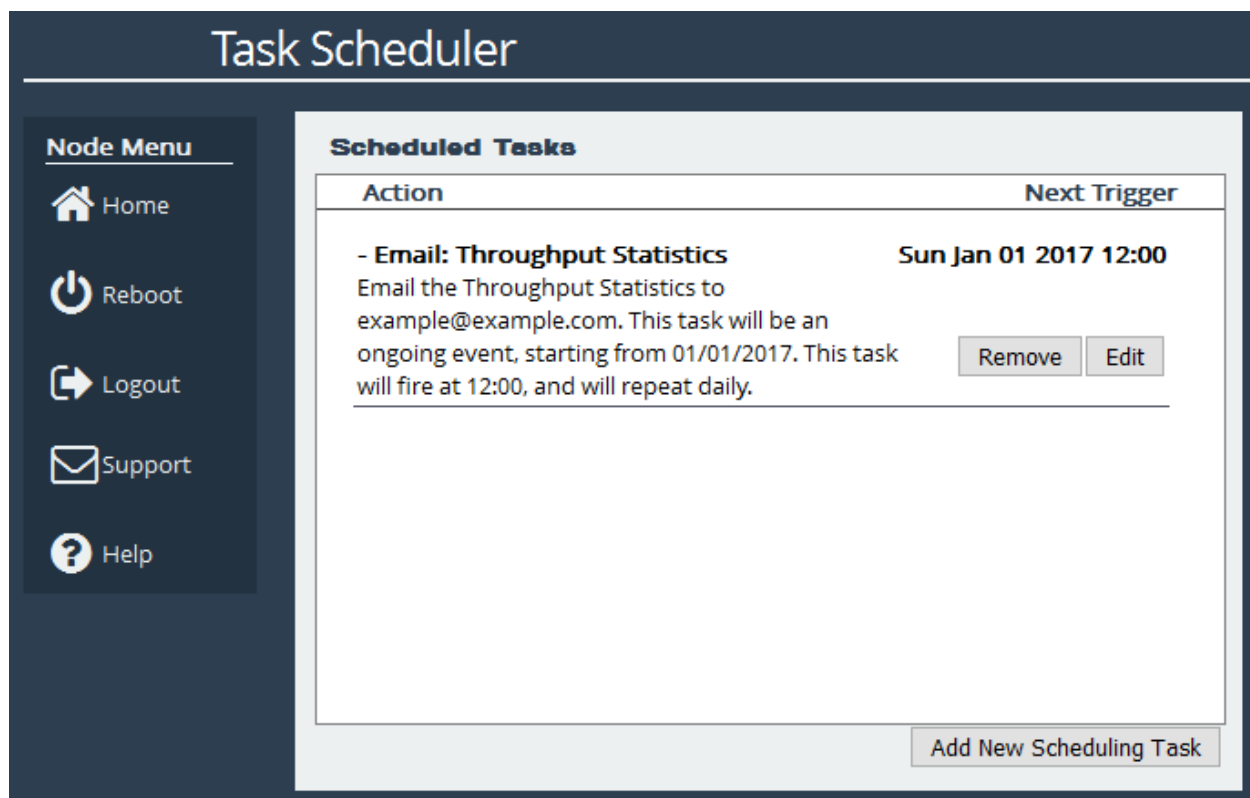
Tasks can be added by clicking on the *Add New Scheduling Task* button, which will start the task wizard.

### 7.7.2 Removing/Editing Tasks

If you already have some tasks added, they will be listed in the Scheduled Tasks window as shown:



Clicking on a task will expand it as shown:



Clicking the *Remove* button will remove the task from the task scheduler. Clicking the *Edit* button will start the task wizard for the task, allowing it to be edited.

### 7.7.3 Task Wizard

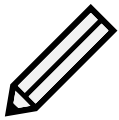
The task wizard will guide you through the adding or editing of scheduled tasks. There are a few common buttons across the individual sections of the wizard:

**Help** Clicking this button will display the Online Help page for the Task Scheduler.

**Cancel** Clicking this button will discard the changes being made to the task and close the wizard.

**Next** If present, this button will navigate you to the next section of the wizard.

**Previous** If present, this button will navigate you to the previous section of the wizard.



Note: The currently active section of the wizard will be highlighted in orange on the left-hand side.

#### 7.7.3.1 Action - Email Performance Statistics

The screenshot shows the 'Adding New Scheduler Task' wizard. On the left, a vertical list of sections is shown: '1 - Action' (highlighted in orange), '2 - Trigger', '3 - Start Date', '4 - End Date', and '5 - Summary'. The main content area is titled 'Adding New Scheduler Task' and contains a 'Function:' dropdown menu set to 'Email Performance Statistics' and a 'Recipient Email(s):' text input field. In the top right corner is a 'Help' button. In the bottom right corner are 'Next' and 'Cancel' buttons.

On the Action section of the wizard, enter the recipient email(s), separating multiple emails with semi-colons.



Important: If you see the following image, click on the yellow box to be taken to the Service Control page where SMTP can be set up. See Section [3.3.3: Email](#).

Adding New Scheduler Task		Help
1 - Action	Function: <input type="text" value="Email Performance Statistics"/>	
2 - Trigger	<div>Please setup SMTP Settings before scheduling this function. Click here to take you straight to the setup page.</div>	
3 - Start Date		
4 - End Date		
5 - Summary		
		Next
		Cancel

### 7.7.3.2 Trigger

Adding New Scheduler Task		Help
1 - Action	How often would you like it to trigger? <input type="text" value="Daily"/>	
2 - Trigger		
3 - Start Date		
4 - End Date		
5 - Summary		
Previous		Next
		Cancel

On the Trigger section of the wizard, you can pick the frequency of the event. The options are:

**Once** This means the action will be performed at the specified time and not repeat.

**Daily** This means the action will be performed every day at the specified time.

**Weekly** This means the action will be performed on specified days every week at the specified time. When selecting this option, you will be able to pick which days to trigger the action by

selecting checkboxes. Each day will have its own checkbox, as shown:

Adding New Scheduler Task Help

1 - Action

How often would you like it to trigger? Weekly

Select days to trigger on:

Sun	Mon	Tue	Wed	Thu	Fri	Sat
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

2 - Trigger

3 - Start Date

4 - End Date

5 - Summary

Previous Next Cancel

### 7.7.3.3 Start Date

Adding New Scheduler Task Help

1 - Action

Please select start date for new task: Time for the first trigger: 12:00

2 - Trigger

3 - Start Date

4 - End Date

5 - Summary

Previous Next Cancel

On the Start Date section of the wizard, you can pick the starting date and time for the new task. Enter a time into the *Time for the first trigger* box and select your start date using the calendar. The selected date will be marked with a red cross.

### 7.7.3.4 End Date

The screenshot shows a wizard titled "Adding New Scheduler Task" with a sidebar on the left containing five steps: 1 - Action, 2 - Trigger, 3 - Start Date, 4 - End Date (highlighted in orange), and 5 - Summary. The main content area displays the "Ongoing Event" checkbox checked and the instruction "Please select end date for new task:". Below this is a calendar for September 2019. The calendar grid shows dates from 2 to 30. The date 17 is highlighted with a red cross. A "Display today" button is located below the calendar. At the bottom of the wizard, there are "Previous", "Next", and "Cancel" buttons.

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	2	3	4	5	6	
	9	10	11	12	13	
	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

On the End Date section of the wizard, you can pick the end date for the new task. You can either select the *Ongoing Event* checkbox for a task that should run until cancelled, or select a date using the calendar. The selected date will be marked with a red cross.

### 7.7.3.5 Summary

The screenshot shows the same wizard at the "Summary" step. The sidebar now highlights "5 - Summary" in orange. The main content area displays the title "Summary" followed by a text summary: "Email the Throughput Statistics to example@example.com. This task will be an ongoing event, starting from 01/10/2019. This task will fire at 12:00, and will repeat daily." At the bottom, the buttons are "Previous", "Save", and "Cancel".



---

On the Summary section of the wizard, a brief description of the task will be displayed. If you are happy with this task, click the **Save** button to add the task to the task scheduler. Saving will automatically close the wizard.

---

# 8 Troubleshooting

## 8.1 Network Connectivity Problems

Under normal operation, you should be able to “ping” the network address of the Bridge and receive a response. If this fails, run through the following list to identify and solve the problem.

- Ensure the Bridge is powered on. This can be verified on hardware appliances by checking that the power LED is illuminated.
- Ensure that the Ethernet cable is plugged in at both ends.
- For hardware appliances, ensure the *Link indicator* LED of the Ethernet connector is illuminated. If it is not, check with your Network Administrator. Refer to the *Visual Indicators* appendix within the relevant hardware manual for help identifying the LED.
- If you are using a Bridge with two Management ports and only one network cable, try using the other network address and/or the other Management port.
- If the Bridge is transferring large amounts of data, then the response from the web interface may seem slower than usual as the process that controls the web interface has the lowest priority for Network and CPU resources.
- If you can “ping” the Bridge but the web interface fails to appear, check the settings within the web browser you are using. If you are directly connected to the Bridge then any proxy settings will require adjustment and may require you to contact your Network Administrator.
- Ensure you are using the correct network address and netmask. See Appendix B: [Accessing the Bridge from Windows using a static IP Address](#).

If none of the above resolves your problem, then after consulting with your Network Administrator, please contact support. See Appendix C: [Useful Links](#) for information on how to contact Bridgeworks Support.

## 8.2 SCSI Device Related Problems

Once the Bridge has finished booting up, and the target devices have finished initialising, these devices should be available on the host machine. After checking that you have correctly configured the initiator, run through the following list to identify and solve the problem.

- Ensure that the devices are powered on and are ready - some libraries can take 5 minutes or more before they are ready and appear on the Bridge. The power up status of libraries are usually displayed on the front panel.
- Ensure that the cables between the Bridge and the devices are connected.
- Reboot the devices and the Bridge.

If none of the above resolves your problem, please contact support. See Appendix C: [Useful Links](#) for information on how to contact Bridgeworks Support.

---

## 8.3 Network Performance Problems

Poor network performance can be caused by many differing reasons. The following list is provided as a guide to where you may find ways to improve performance.

- Ensure that the entire network cabling between the network and the Bridge is of the correct standard.
- Ensure your network and Bridge are communicating at the fastest possible network speed. Current link speeds can be found next to each interface on the *Network Connections* page. The link speed should be *1000Mb/s* on a 1 Gigabit network link. If it is 10 or 100Mb/s, this will limit the performance dramatically. See Section [3.1: Network Connections](#) for help finding the *Network Connections* page.
- Packet loss can be a cause of poor performance. Within the *Link Status Box* check the number of TX and RX errors for relevant network interfaces that are displayed on each *Network Port* page. This should be zero or a very small number. If these are showing large numbers of errors, check the connections between the Bridge and the network. See Section [3.1.7: Port Settings](#) for help finding the *Network Port* page.

The screenshot shows a dark-themed interface with three sections: Link Status, Settings, and Mapped Protocols. The Link Status section displays Link State (Up), Link Speed (10Gb/s), RX Bytes (20287073), TX Bytes (3112662), RX Errors (0), and TX Errors (0). The Settings section lists IPv4 Address (10.10.10.95 /16), IPv6 Address (2a00:2381:1a72:b:20c:29ff:feab:562e /64), IPv6 Link Address (fe80::20c:29ff:feab:562e%port1 /64), MTU (1500 (user config) Max: 9000), and Gateway (Global default via 10.10.10.1, fe80::222:19ff:fe66:c08b). The Mapped Protocols section has a button labeled Management.

Link Status	
Link State:	Up
Link Speed:	10Gb/s
RX Bytes:	20287073
TX Bytes:	3112662
RX Errors:	0
TX Errors:	0

Settings	
IPv4 Address:	10.10.10.95 /16
IPv6 Address:	2a00:2381:1a72:b:20c:29ff:feab:562e /64
IPv6 Link Address:	fe80::20c:29ff:feab:562e%port1 /64
MTU:	1500 (user config) Max: 9000
Gateway:	Global default via 10.10.10.1 fe80::222:19ff:fe66:c08b

**Mapped Protocols**

Management

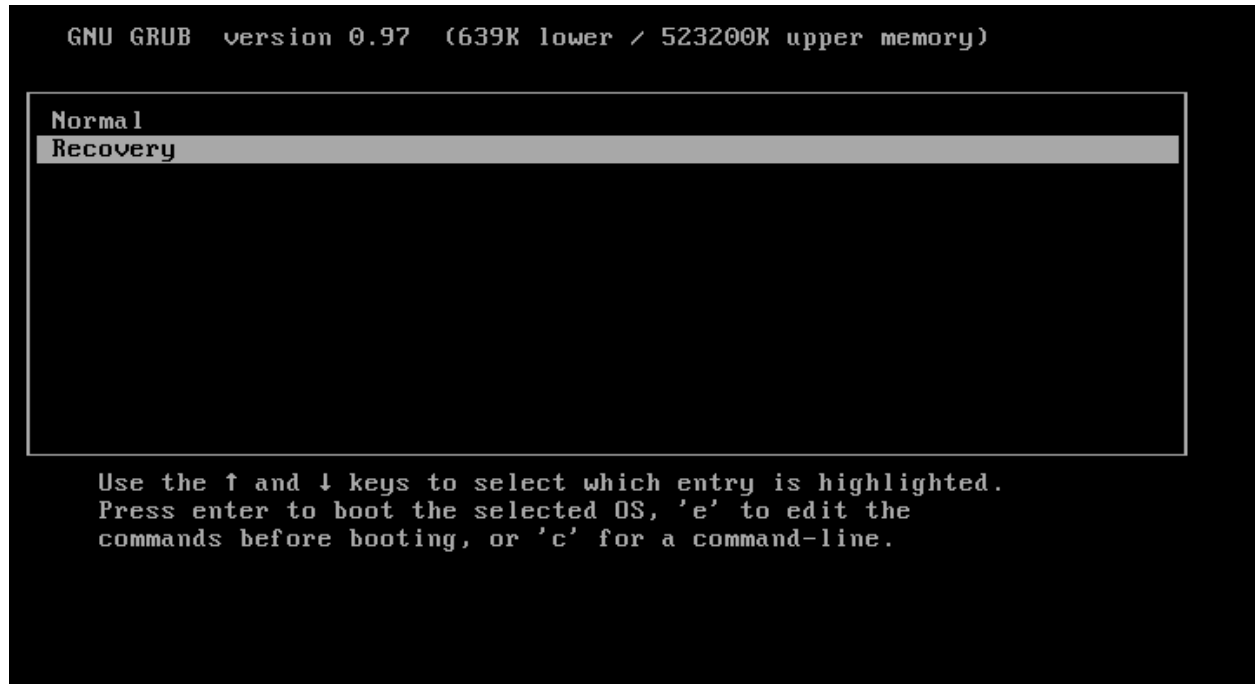
If none of the above resolves your problem, then after consulting with your Network Administrator, please contact support. See Appendix [C: Useful Links](#) for information on how to contact Bridgeworks Support.

## 8.4 Recovery Wizard

If access to the system is being disrupted because of problems with the configuration file then, in consultation with Bridgeworks support, the following procedures can be used to recover your system.

---

To access the Recovery Wizard press the *Esc* key during the unit's boot sequence as soon as you see the message "GRUB loading, please wait..." Select the *Recovery* option on the menu that follows.

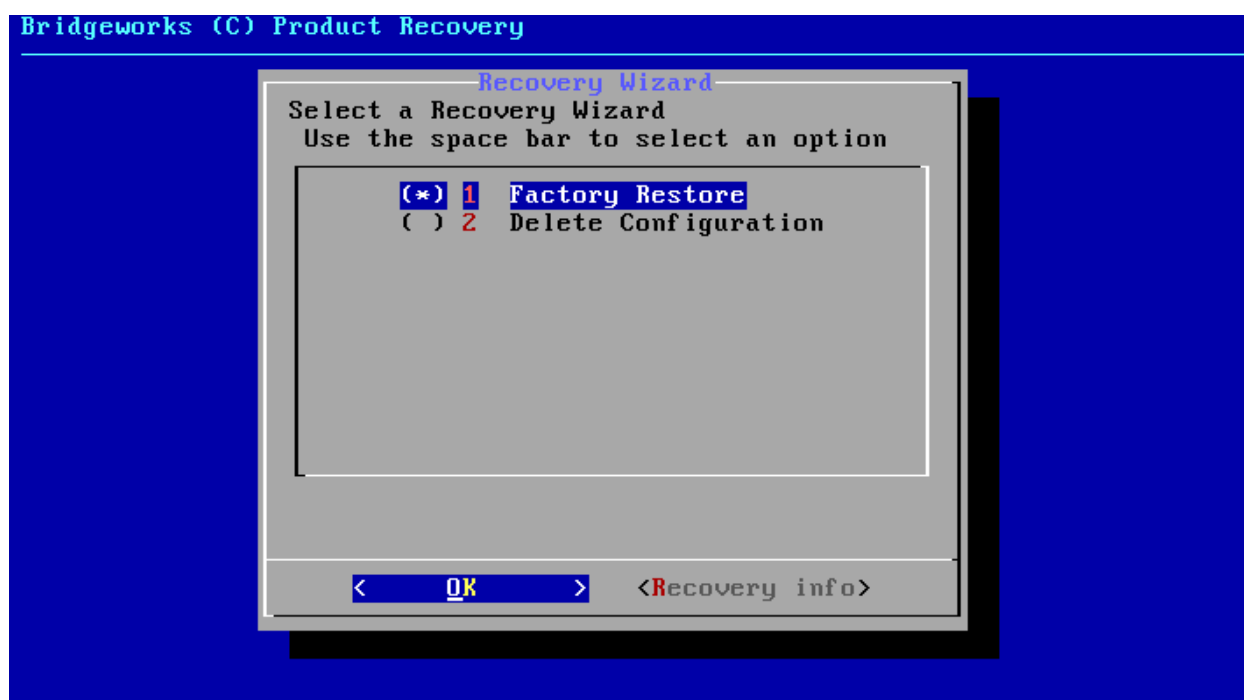


The Recovery Wizard provides two options for system recovery: restoring your unit to factory defaults, and deleting your configuration file.

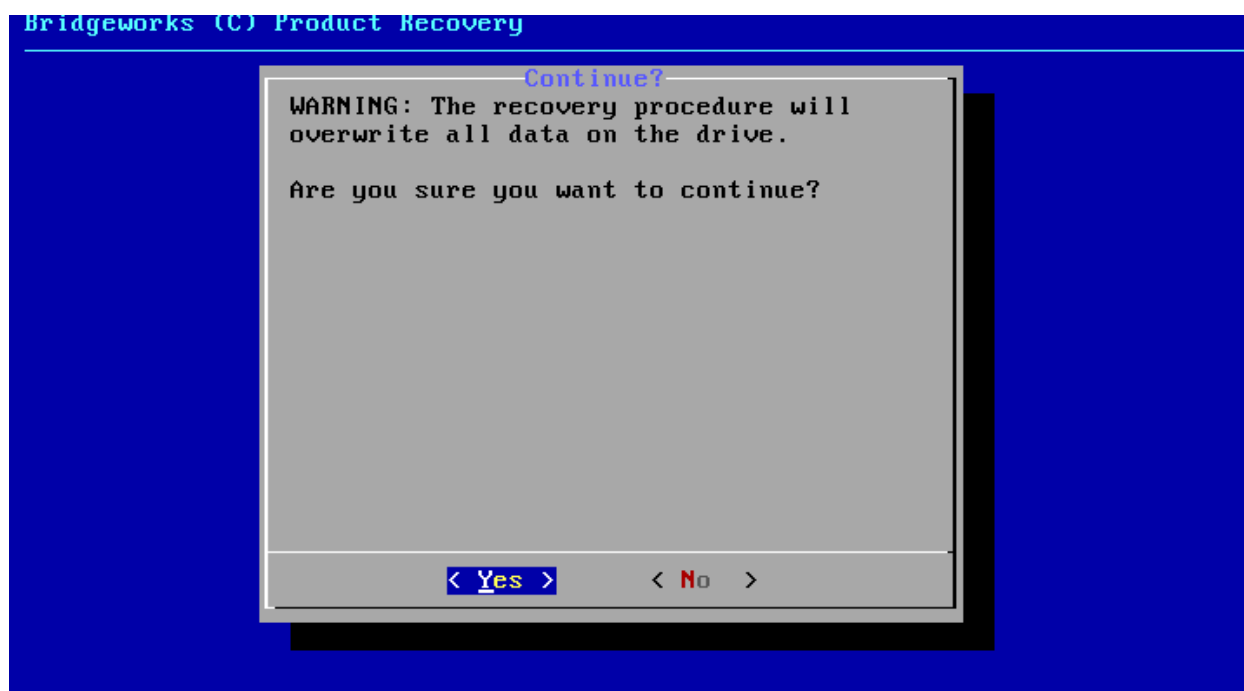
### 8.4.1 Factory Restore

This option will restore your unit to its factory defaults, removing any current configuration on your system including your current firmware and licence keys.

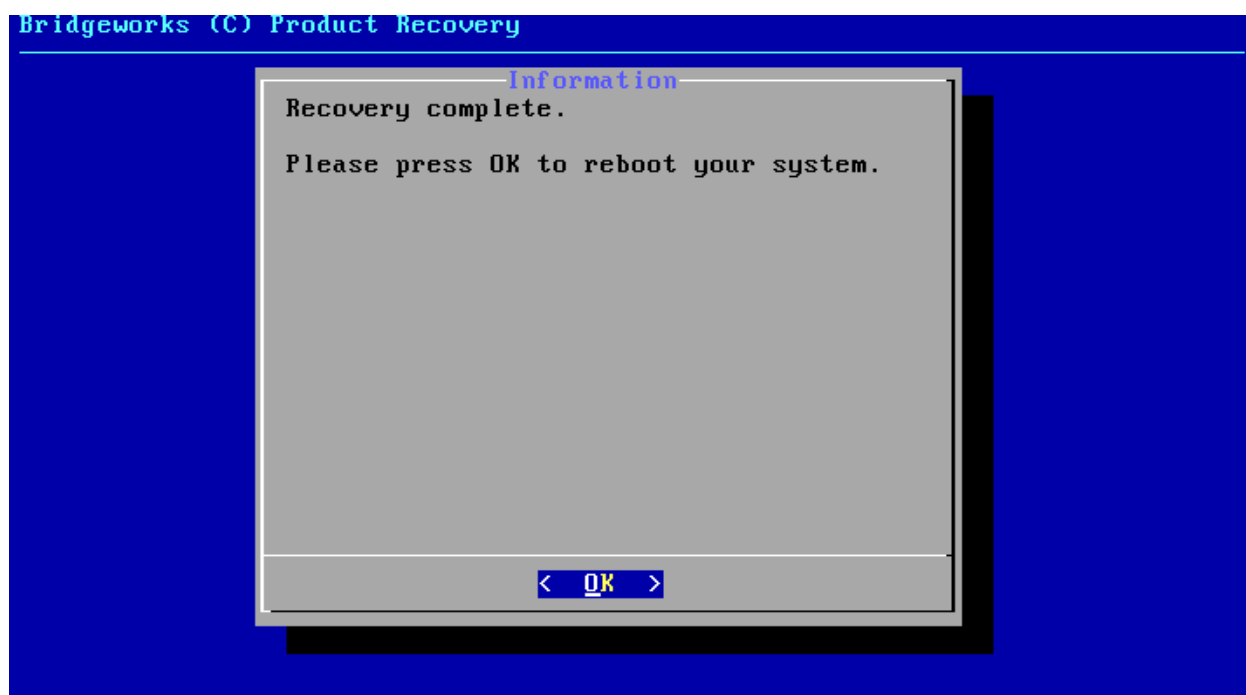
To restore your unit to defaults, ensure that the *Factory Restore* option is highlighted in the Recovery Wizard menu and press the *Space Bar* to select it. Press the *Enter* key to start the factory restore process.



This procedure cannot be undone once complete; only continue if you are sure that you wish to do so. You will be asked to confirm that you wish to proceed. Choosing Yes will restore your unit to defaults and No will exit the Recovery Wizard menu and drop to the shell.



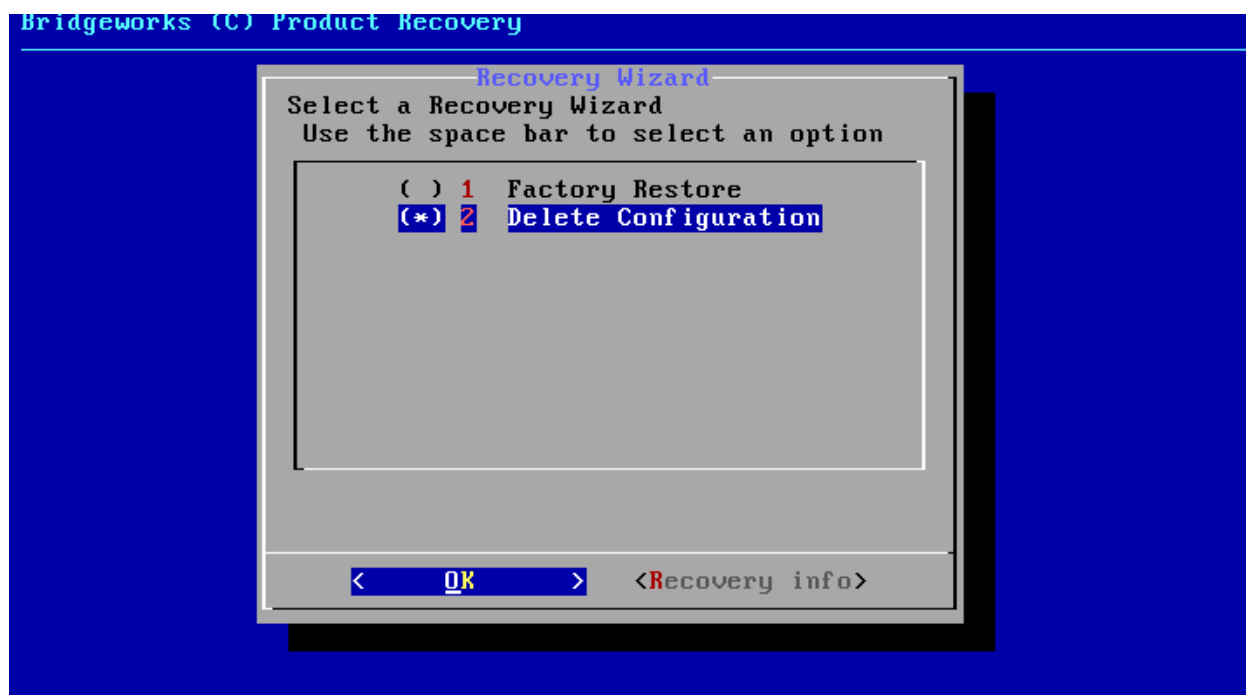
Once the factory restore procedure has completed successfully you will need to reboot your system.



## 8.4.2 Delete Configuration

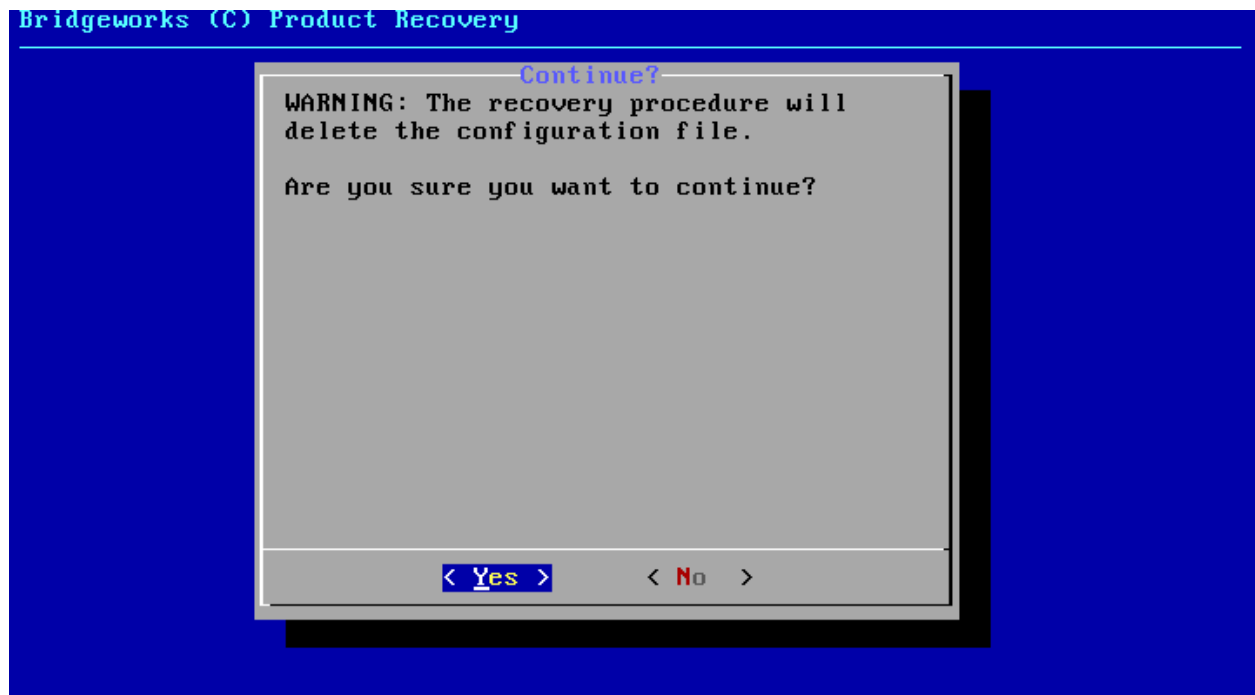
This option will delete your configuration file, removing any current configuration on your system but keeping your current firmware and licence keys.

To delete your configuration file, ensure that the *Delete Configuration* option is highlighted in the Recovery Wizard menu and press the *Space Bar* to select it. Press the *Enter* key to start the deletion process.

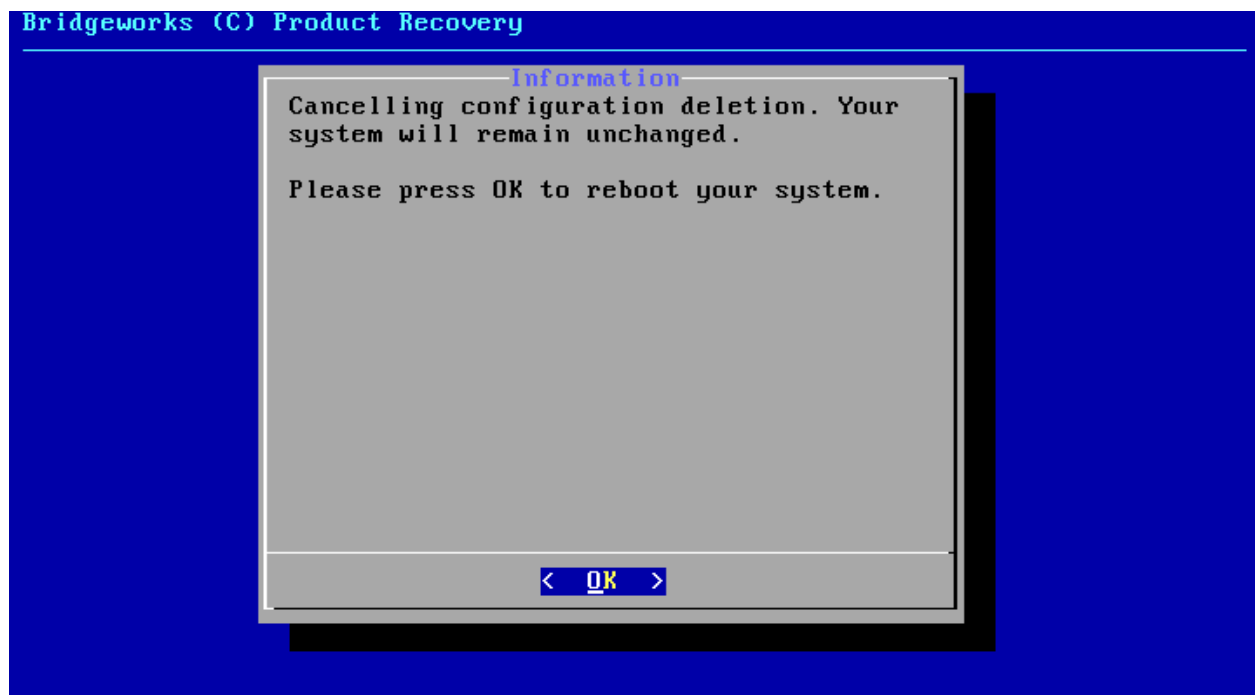


This procedure cannot be undone once complete; only continue if you are sure that you wish

to do so. You will be asked to confirm that you wish to proceed. Choosing Yes will delete your configuration file and No will cancel the configuration deletion wizard.



If you cancel the deletion wizard at this point nothing on your system will be affected.



Once the delete configuration procedure has completed successfully you will need to reboot your system.

## Bridgeworks (C) Product Recovery



When the Recovery Wizard completes and you connect to the web interface of your unit, it will be reset to its original configuration. For help re-establishing your setup see [Section 2.2: Connecting to the Web Interface](#).



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# Appendix A: IP Protocols and Port Numbers

For the Bridge to be able to communicate with other network hosts, it may be necessary to contact your network administrator to ensure that the required IP protocols & port numbers are available.

## A.1 Inbound LAN Protocols and Port Numbers

Protocol/Port	Name	Description
TCP 22	SSH	Required to access the configuration console through management interfaces when SSH is enabled. See Section <a href="#">3.2.5: Secure Shell (SSH)</a> .
TCP 80	HTTP	Required to access the web interface through management interfaces when HTTP is enabled.
TCP 443	HTTPS	Required to access the web interface through management interfaces when HTTPS is enabled.
UDP 161	SNMP	Required for management interfaces to respond to Simple Network Management Protocol requests, see Section <a href="#">3.3.2: Simple Network Management Protocol (SNMP)</a> .

## A.2 Outbound LAN Protocols and Port Numbers

Protocol/Port	Name	Description
TCP 25	SMTP	Simple Mail Transfer Protocol, see Section <a href="#">3.3.3: Email</a> .
UDP 123	NTP	Network Time Protocol, see Section <a href="#">3.3.1: Network Time Protocol (NTP)</a> .
ICMP		Internet Control Message Protocol. Required by dead gateway detection (see Section <a href="#">3.1.2.5: Dead Gateway Detection</a> ) and network debugging tools (see Section <a href="#">3.1.6: Network Tools</a> ).

# Appendix B: Accessing the Bridge from Windows using a static IP Address

This appendix describes how to configure a Windows host to access the Bridge's web interface from its default static IP address, if DHCP is not enabled on the Bridge.

These instructions apply to Windows Vista, 7, 8, 10 and to Windows Server 2008, 2012, 2016, 2019 and their respective R2 versions.



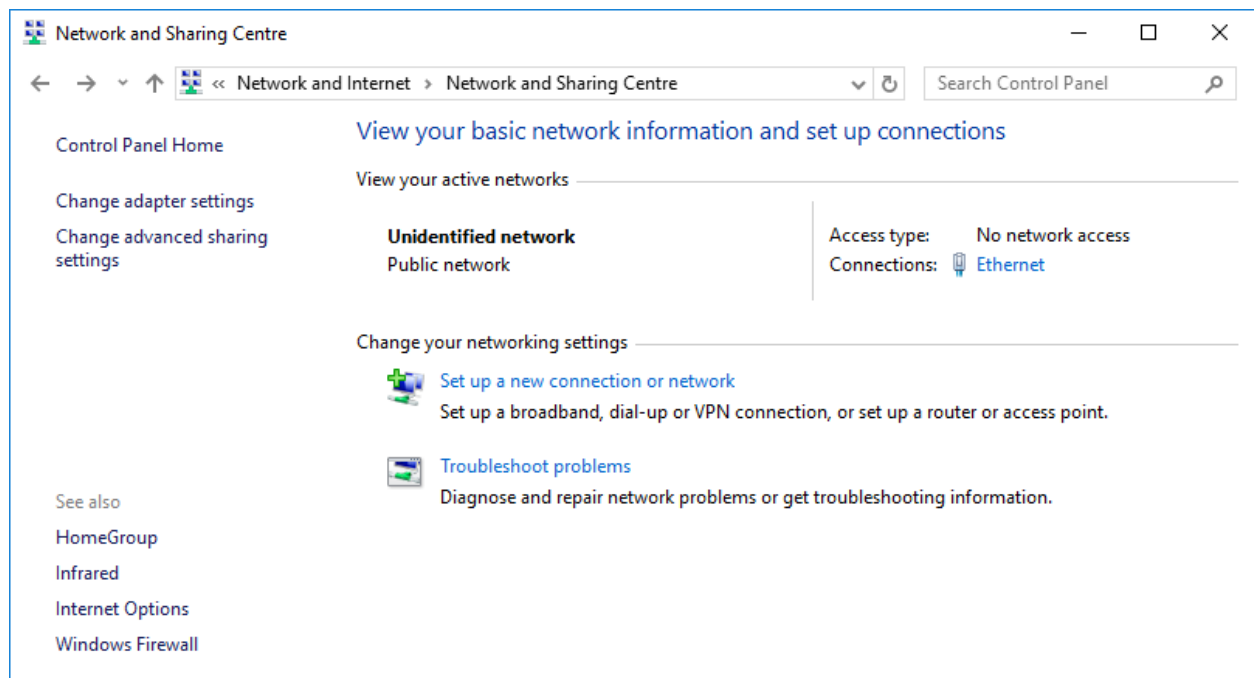
Warning: Administrative privileges may be required to modify network device settings.

From the Start menu, select *Control Panel*.

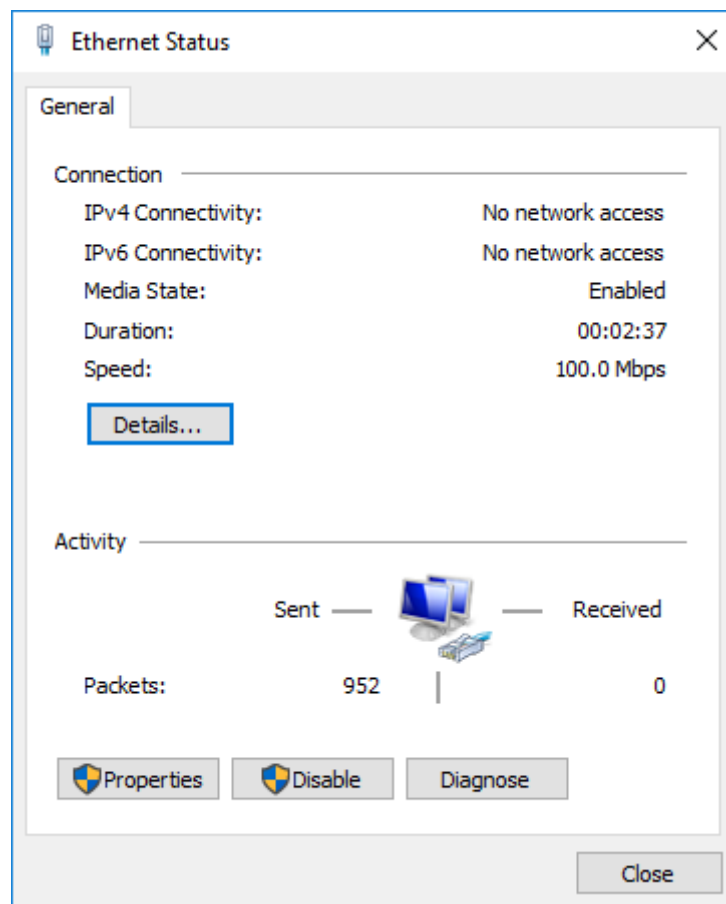


Important: It may be required to search for "Control Panel" in the Start menu before it appears as an entry.

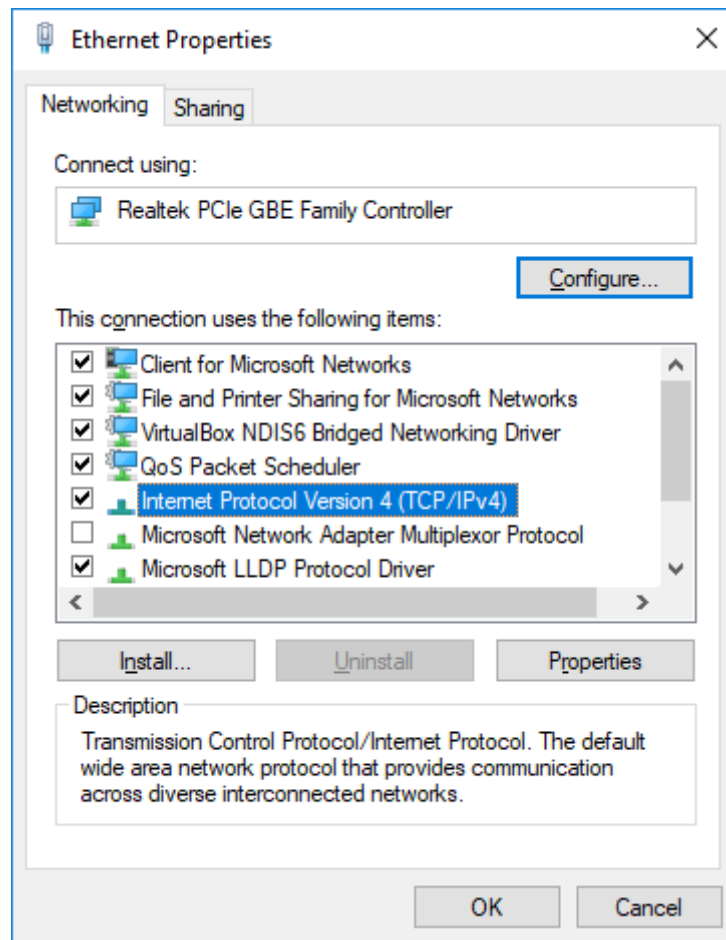
From the Control Panel select the *Network and Internet* link, followed by the *Network and Sharing Centre* link. Click on the link next to "Connections" for your respective network. This is named "Ethernet" in the screenshot below.



A general status page will be displayed. From within this page select *Properties*.



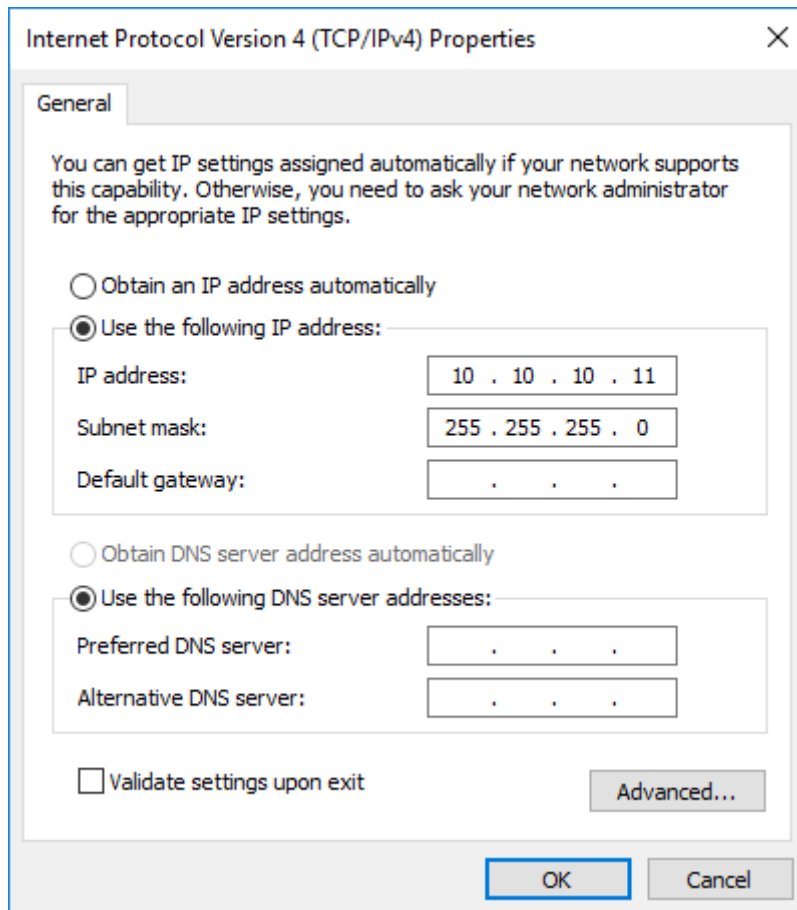
Select the *Internet Protocol Version 4 (TCP/IPv4)* entry and then *Properties*.



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Before continuing, make a note of your current configuration as it will be modified. Afterwards,

1. Click *Use the following IP Address*.
2. Enter *10.10.10.11* into the *IP Address* field.
3. Enter *255.255.255.0* into the *Subnet Mask* field.
4. Finally click the *OK* button.



Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 10 . 10 . 10 . 11

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: . . .

Alternative DNS server: . . .

☐ Validate settings upon exit

Advanced...

OK Cancel



Note: Once you have completed the initial set up of the Bridge, return your computer to the original settings and reconnect to the Bridge.

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## Appendix C: Useful Links

Further documentation and support is available through our website: <https://support.4bridgeworks.com/>

If your question is not answered in our documentation, please submit a ticket: <https://support.4bridgeworks.com/contact/>