

AXOOM Gate

Configuration Guide For Networking Services Plugin (093)

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Chapter 1 Introduction to AXOOM Gate Plugins

1.1 Overview

This document covers configuring the Networking Services plugin running in AXOOM Gate (and compatible platforms). The Networking Services plugin provides two different means to determine whether a network resource is available to your IoT relay or not: network ping, and telnet ping. The reason for having two is that there are some sites for which the standard network ping has been disabled.

The Networking Services plugin is especially powerful when used in conjunction with the Rules Engine, where you can use the Network Status Plug-In as a source for a rule so that you take specific actions or provide notifications to users with more specific information.

Other plugins can use the Networking Services plugin to determine when network-connected resources are available.

1.2 About AXOOM Gate

AXOOM Gate provides remote and mobile access to industrial production equipment in a secure, efficient, extensible manner. In the interest of operational efficiency and reduced complexity, industrial systems are often configured with data security features disabled. With its built-in, IT-friendly data security settings, AXOOM Gate seamlessly links production systems with office and mobile systems without compromising either factory operation or IT data security requirements.

The installation folder for AXOOM Gate in Microsoft Windows is: **C:\Program Files (x86)\AXOOM\AXOOM-Gate**. The main executable program is AxoomGateService.exe, which can run both as a Windows service (akin to a Linux daemon) as well as a command-line program.

1.3 About Plugins

An AXOOM Gate plugin is a dynamic-link library (DLL) built with the C-Labs™ C-DEngine™ SDK. Plugins must have a filename with a prefix of **CDMy** or **C-DMy** (examples: **CDMyCharts.dll** and **C-DMyNetwork.dll**).

Plugins enable custom features in AXOOM Gate. The many types of plugins include:

- Configuration Plugins – provide a user interface for configuring hardware or software.
- Connector Plugins – enable a communication channel between AXOOM Gate nodes.
- Device Plugins – enable connections to and data collection from local sensors and devices directly connected to the system running AXOOM Gate.
- User Interface (NMI) Extension Plugins – provide custom controls and other user interface extensions to AXOOM Gate.

- Protocol Plugins – support industry standard protocols like OPC / UA, Modbus, MT Connect, serial ports, and proprietary programmable logic controllers (PLCs) such as the Siemens S7.
- Service Plugins – support other plugins.

As of this writing, there are over 100 plugins. AXOOM Gate v2.102 ships with 22 plugins. Most of these plugins exist to enable live capture of one or more data points from a running system. Such data capture plugins all share a common pattern in terms of how they are configured.

1.4 Plugin Deployment Patterns

To simplify the proper plugin deployment and configuration, this deployment pattern applies to almost every AXOOM Gate plugin:

- 1) Secure login – A username and password are required to log into AXOOM Gate.
- 2) Plugin button on home page – All plugins have a button on the AXOOM Gate home page, the first page displayed when you log into AXOOM Gate (see Figure 2.3). Click the plugin’s button to access the plugin dashboard.
- 3) Plugin dashboard – A plugin dashboard displays all configured items (connections, objects, devices, sensors). A plugin dashboard also has a button for creating new items (see Figure 1.1).
- 4) Editing existing items – Configuring connections involves setting network or device addresses.
- 5) Once connections are established, you pick specific data points – also known as “properties” – to read.
- 6) Such properties are grouped together as “Things,” such as you might expect to find in a package that was created to help connect to the “Internet of Things.”

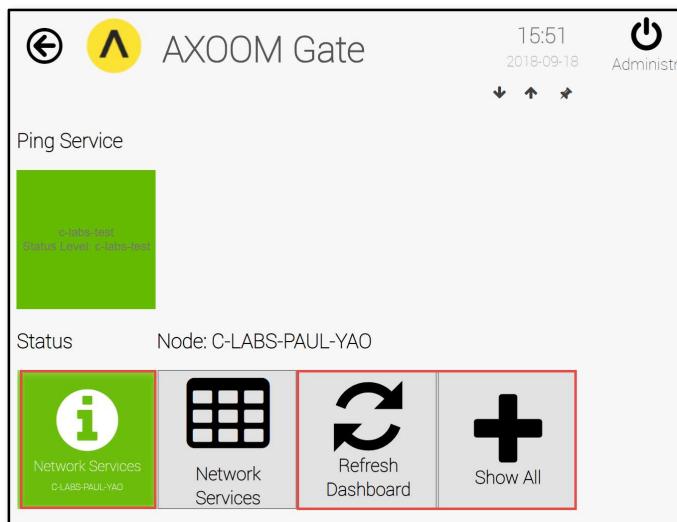


Figure 1.1. The Networking Services plugin dashboard.

1.5 The Plugin Dashboard

A plugin's dashboard (see Figure 1.1) provides the primary plugin interface. All "live" items appear at the top of a plugin dashboard. A series of buttons appears at the bottom of the plugin dashboard. In the dashboard shown in Figure 1.1, red rectangles identify the three standard dashboard buttons:

1) About button: The button with the circled "i" is the About button. Click for details on the dashboard. The button color reflects the status. Status colors, associated status code, and meaning of the status, are summarized here:

- Gray (0): Idle.
- Green (1): Active / Ok.
- Yellow (2): Warning.
- Red (3): Error.
- Blue (4): Starting / Setup / Ramp Up.
- Brown (5): Design / Engineering / Configuration.
- Purple (6): Shutdown.
- Black (7): Unknown / Unreachable.

2) Refresh Dashboard button: Reloads the dashboard with latest values.

3) Show All button: Open all forms and tables associated with the plugin.

Figure 1.2 shows the default image on a table button. Click a table button to view and edit a table of items managed by the plugin. For example, you can add new items, edit existing item properties, or delete items.



Figure 1.2. Buttons with this table icon enable viewing and editing tables of plugin items.

Chapter 2 Connecting to the Networking Services Plugin

This chapter covers setting up the Networking Services plugin, and includes the following topics:

- About the Networking Services Plugin
- Login to AXOOM Gate
- Set up Networking Services plugin

2.1 About the Networking Services Plugin

The Networking Services Plugin monitors networks resources to see whether they are available (that is, connected to a network and “reachable”).

2.2 Login to AXOOM Gate

- 1) Enter this URL, <http://localhost:8701/nmi>, in a web browser. The following login page appears:

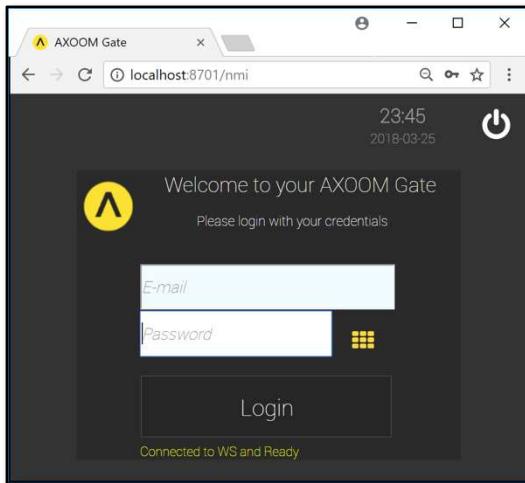


Figure 2.1. The dark scheme for the AXOOM Gate login page.

- 2) This URL, <http://localhost:8701/lmni>, enables the “light” display scheme:

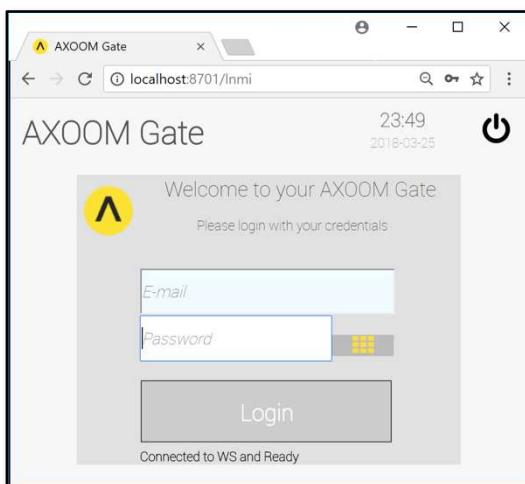


Figure 2.2. The light scheme for the AXOOM Gate login page.

3) After logging in, you see the AXOOM Gate home page, as shown in Figure 2.3.

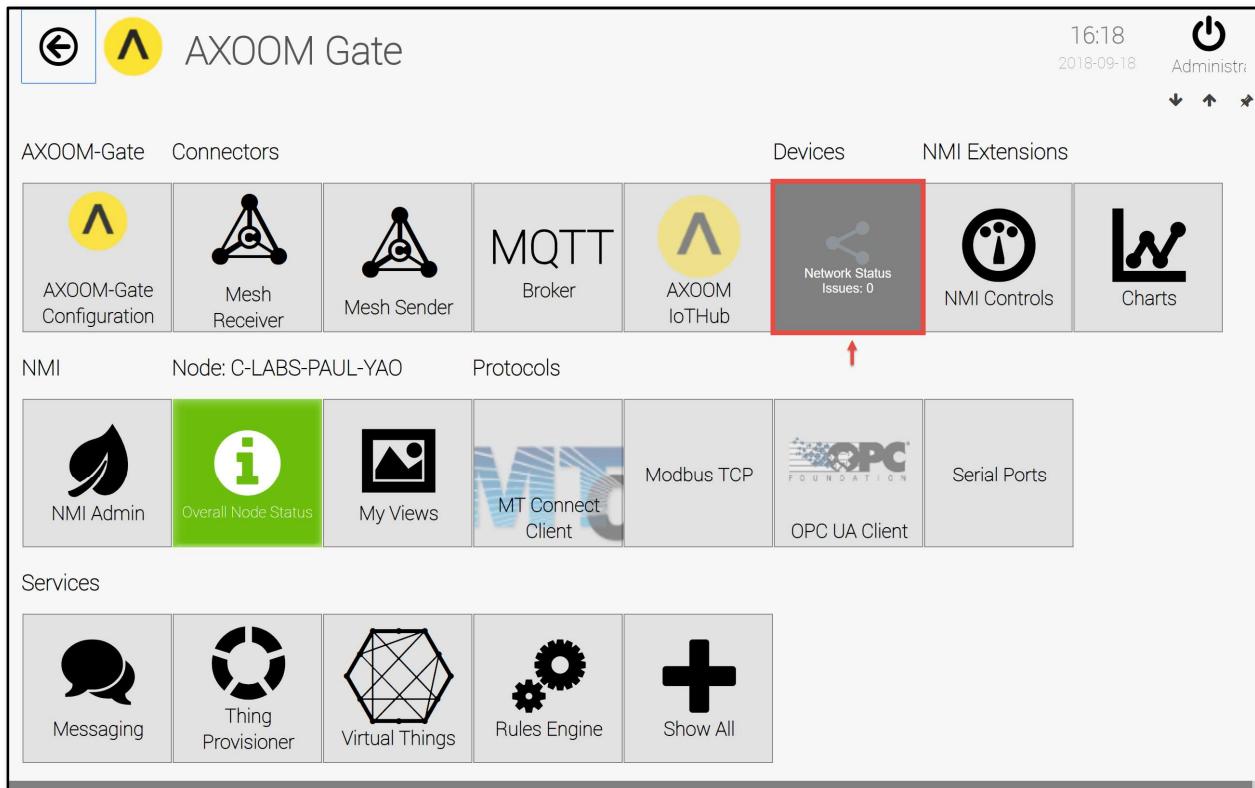


Figure 2.3. The “Networking Services” plugin button highlighted on the AXOOM Gate home page.

2.3 Accessing the plugin dashboard

- 1) When you click the **Networking Services** plugin button, the plugin dashboard appears (see Figure 2.4).

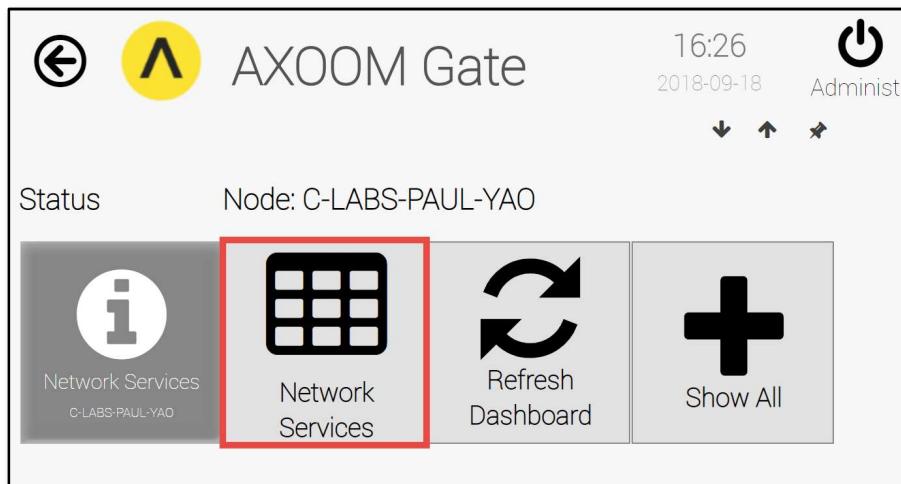


Figure 2.4. The Networking Services Plugin dashboard.

- 2) The Networking Services Plugin is a client that monitors network servers. The first step in setting up this plugin involves creating one or more connections to the appropriate servers. To do that, click the **Network Services** button (highlighted in red in Figure 2.4).

2.4 Adding connections to the Networking Services plugin

- 3) If any connections have already been created, they will appear on the “All Network Services” screen. No such connections exist in the example shown (see Figure 2.5). To add a connection, click the **Add a Service** button.

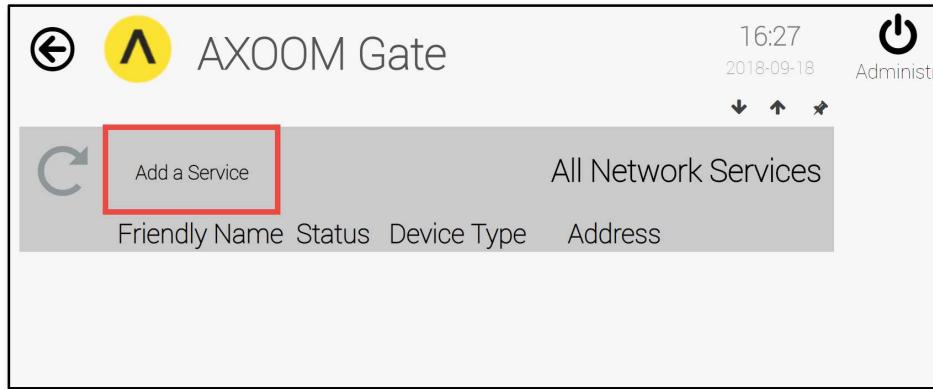


Figure 2.5. Click “Add a Service” to specify a network server to monitor.

- 4) An empty row appears, ready for new connection details (see Figure 2.6). Enter a value in the “Friendly Name” and “Address” fields, then click the checkmark () to save your work.
5) A new server is added to the list (see Figure 2.7).

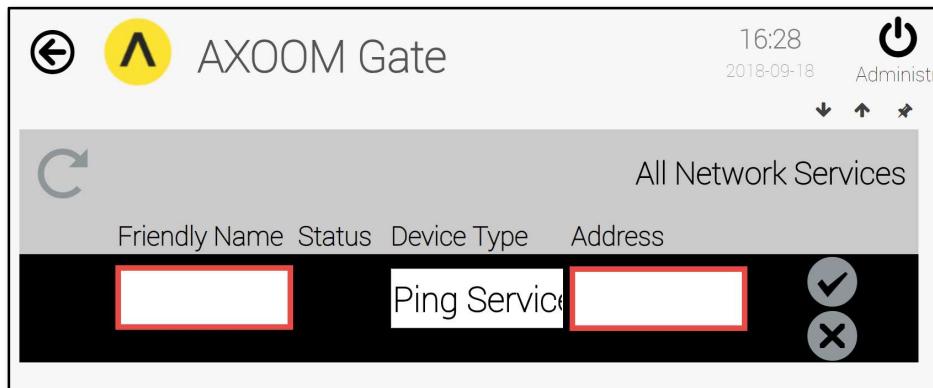


Figure 2.6. Enter Friendly Name. Click checkmark to save.

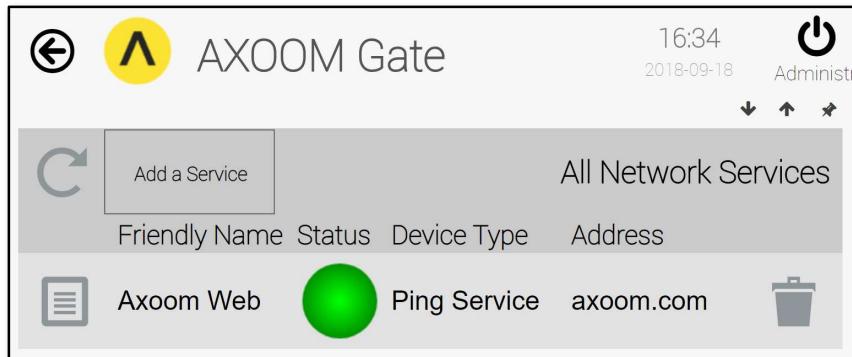


Figure 2.7. A connection to the AXOOM IoTHub.

Details about each column in the All Network Services list are provided in the following table:

Column	Description
	The Properties icon. Click to view and edit additional server settings.
Friendly Name	A name you pick. In the Device Status Group this is the Device Name .
Status	This is an output field that shows the status of a server using the color to indicate meaning: <ul style="list-style-type: none"> ■ Gray – the ping service not active. ■ Green – the ping returned before the indicated timeout. ■ Yellow – the last two pings were missed or took longer than the timeout. ■ Red – three pings were missed or took longer than the timeout.
Device Type	Two possible settings: <ul style="list-style-type: none"> ■ Ping Service ■ Telnet Ping Service
Address	Enter the DNS name (or local host name or IP address) of the network resource to be monitored.
	Trash can. Delete item on current row. After deleting, refresh the table by clicking the Refresh button ().

2.5 Accessing other settings groups

After you create an entry in the list of servers, click the properties button () to see more settings.

Figure 2.8 shows the settings page for a Ping Service, with all settings groups displayed. Figure 2.9 shows

the settings page for the Telnet Service, also showing all settings groups. Here is the summary of display buttons that are used to modify the contents of the settings page:

Display Buttons	Description
	Up arrow. Closes a group.
	Down arrow. Opens a group.
	Left arrow. Decreases the width of browser space used to display property groups.
	Right arrow. Increases the width of browser space used to display property groups.

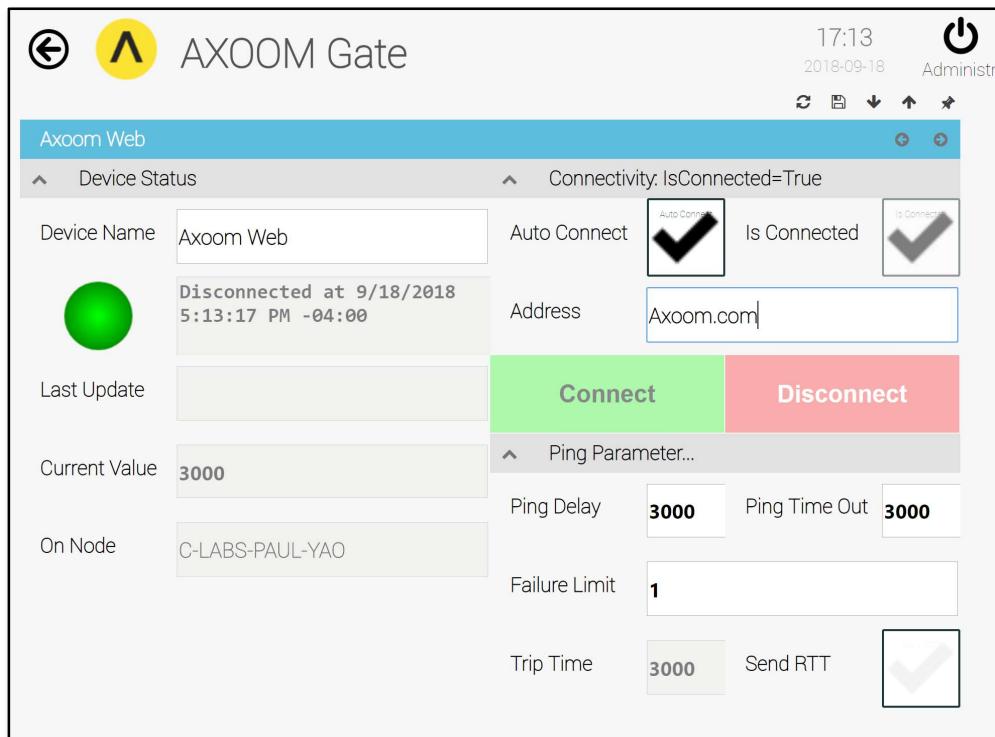


Figure 2.8. The Ping server properties page, with all settings groups open.

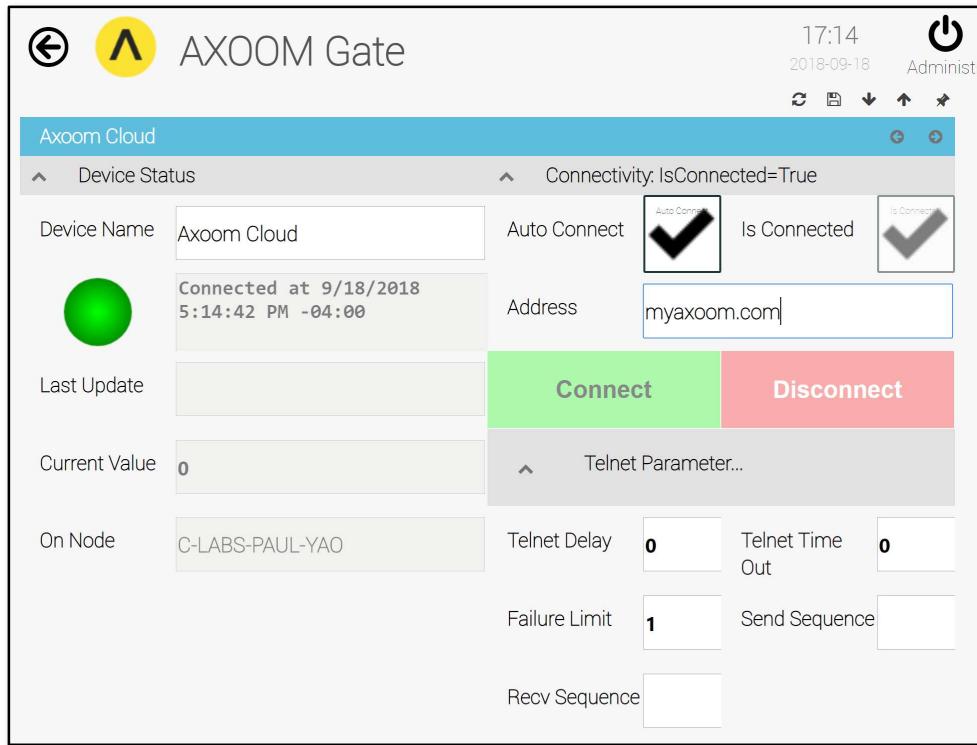


Figure 2.9. The Telnet Ping server properties page, with all settings groups open.

Each group is described in more detail in the sections that follow.

2.6 Device Status Settings Group

The Device Status group (see Figure 2.10) appears by default. It holds basic plugin details, including:

- Device Name – the “Friendly Name.” You can edit this value any time.
- Status light – Gray means not active; green means the ping returned in time; yellow means the last two pings did not return or took too long to return; red means three or more pings did not return, or took too long to return.
- Status text – Details about the current connection when connected; details about connection errors when not connected.
- Last Update – not in use.
- Current Value – For network ping, the round-trip time (RTT) when the “Send RTT” checkbox is selected.
- On Node – The name of the host system where the plugin is running.

Device Status

Device Name	Axoom Web
	Connected at 9/18/2018 5:18:47 PM -04:00
Last Update	
Current Value	3000
On Node	C-LABS-PAUL-YAO

Figure 2.10. Device Status group.

2.7 Connectivity Settings Group

You can check whether your server settings are correct, and whether the server is available, by clicking the **Connect** button (see Figure 2.11). The indicator labeled “Is Connected” shows the results of your connection attempt. Once connected, click the **Disconnect** button to close a connection.

Connectivity: IsConnected=True

Auto Connect	<input checked="" type="checkbox"/> Auto Connect	Is Connected	<input checked="" type="checkbox"/> Is Connected
Address	Axoom.com		
Connect		Disconnect	

Figure 2.11. The Connectivity Settings Group

The **Auto-Connect** setting lets you decide whether to always re-establish a connection when the system starts up (when checked), or whether a connection must manually be established.

The value for **Address** can be any valid network address, including an IP address or a network URL.

Note: You can change the address at any time. However, you must click “Disconnect” and then click “Connect” for the change to be recognized.

Connectivity Group Fields		Description
Auto Connect		Check this if you want the monitor to start whenever the Factory-Relay runs, specifically after a restart.
Is Connected		Indicates if the monitor is running or not (Read Only).
Address		The DNS name or IP address for the monitored network node.
Connect Button		Starts the ping service.
Disconnect Button		Stops the ping service.

2.8 Ping Parameter Settings Group

When the device type is set to “Ping Service”, the Ping Parameter Settings Group is included in the settings page (see Figure 2.12).

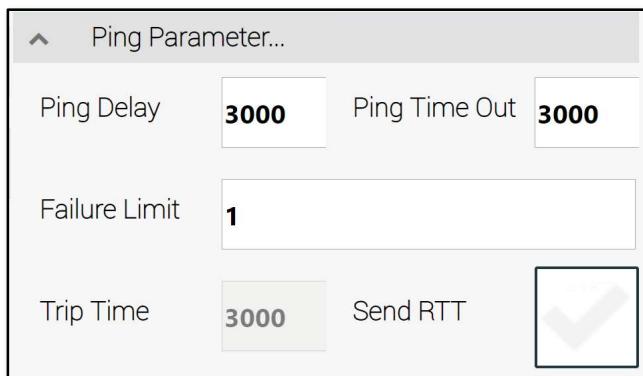


Figure 2.12. The Ping Parameter Settings Group

The ping settings have four entry fields and one read-only status field:

Ping Parameter Field Settings		Description
Ping Delay	3000	Time to wait between ping attempts (in milliseconds).
Ping Time Out	3000	Time after which a ping is considered as failed (in milliseconds).
Failure Limit	1	Number of failed pings after which an error condition is reported.
Trip Time	3000	If “Send RTT” is selected this field shows the last ping round trip time (read-only).
Send RTT	<input checked="" type="checkbox"/>	When checked, the round-trip time is reported as the value.

2.9 Telnet Parameter Settings Group

When the device type is set to “Telnet Service”, the Telnet Parameter settings group is included in the settings page (see Figure 2.13). The telnet settings have the following five entries:

Telnet Parameter Field Settings	
Telnet Delay	Time (in milliseconds) between telnet attempts.
Telnet Time Out	Time (in milliseconds) after which a telnet access is considered as failed.
Failure Limit	Number of failed attempts after which the monitor is in a failure state (Level 3 – Red Status Light).
Send Sequence	A string of characters sent via telnet to the Address .

Telnet Parameter Field Settings

Recv Sequence	A string of characters expected to be returned by the server if the send sequence was received successfully
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▲ Telnet Parameter...

Telnet Delay	<input type="text" value="0"/>	Telnet Time Out	<input type="text" value="0"/>
Failure Limit	<input type="text" value="1"/>	Send Sequence	<input type="text"/>
Recv Sequence	<input type="text"/>		

Figure 2.13. The Telnet Parameter Settings Group

Chapter 3 An Example: Adding a Ping Network Service

In the **All Network Service** lookup table, click the **Add a Service** button (see Figure 3.1).

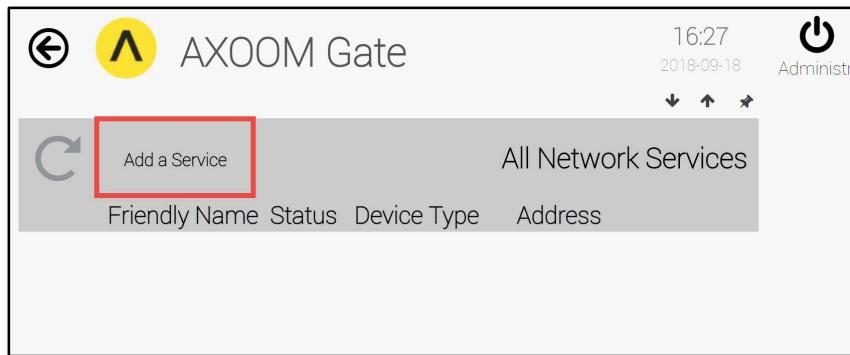


Figure 3.1 Click the “Add a Service” button to create a ping network service.

When an empty row appears (see Figure 3.2), enter a **Friendly Name**, and select “Ping Service” for the **Device Type**. Then, enter “8.8.8.8” as the **Address** and click the **Save** button (checkmark on right side).

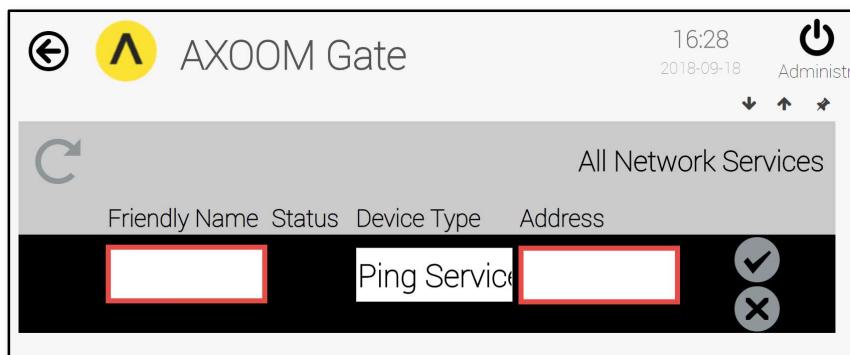


Figure 3.2 A new, empty row appears in the list.

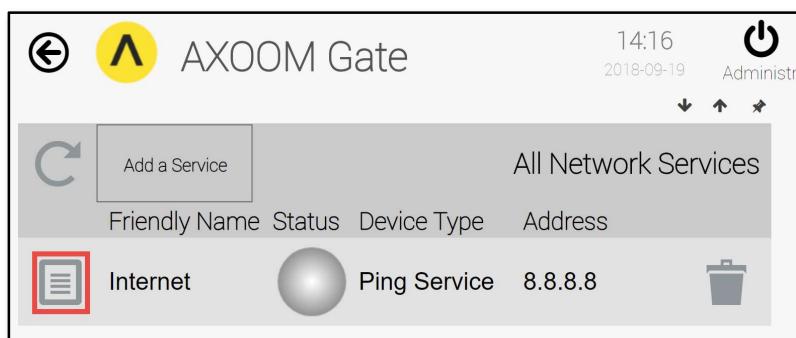


Figure 3.3. Click the properties icon (left side) to see the settings page.

Click the properties button () on the left side of the newly created item (see Figure 3.3). When the settings window appears, open the two settings groups for **Connectivity** and **Ping Parameters** (see Figure 3.4). In this form, you can start or stop the monitor via the **Connect** and **Disconnect** buttons.

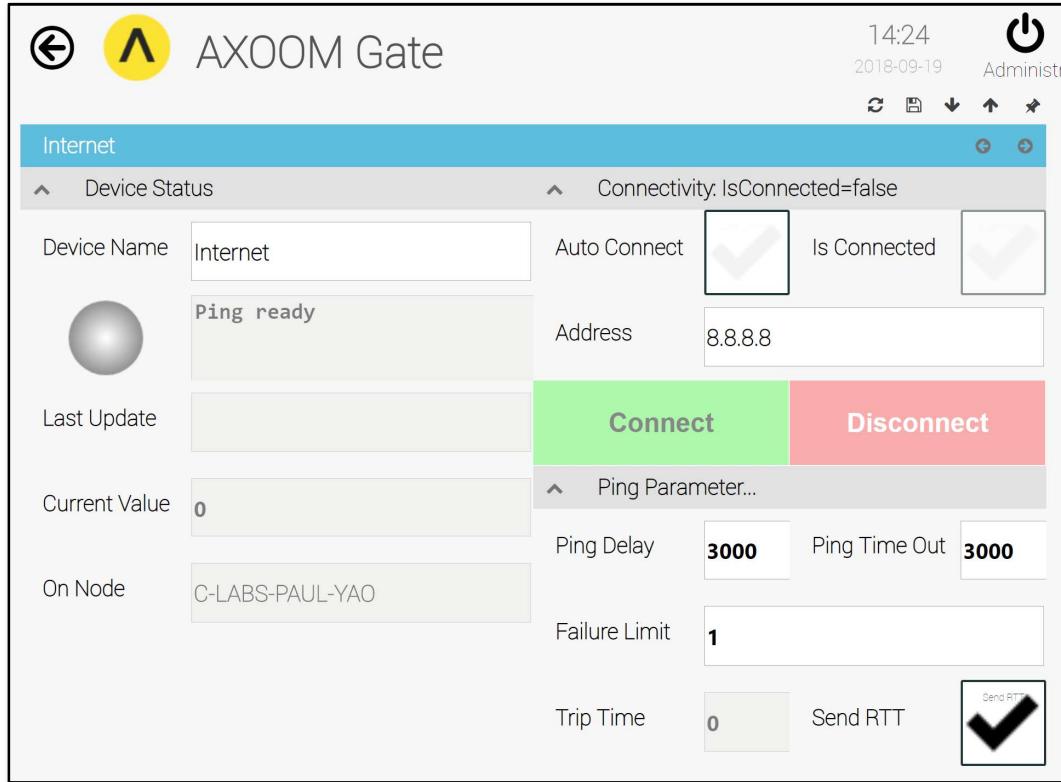


Figure 3.4 Settings for the new network ping service.

The basic settings for the ping parameter are shown here:

Address	8.8.8.8 (Google DNS)
Ping Delay	leave @ 3000 (default)
Ping Time Out	leave @ 3000 (default)
Failure Limit	leave @ 1 (default)
Send RTT	Select this to see the ping RTT (Round Trip Time)

Click on (or Tap) the “**Connect**” button to activate the monitor. When the monitor is active, its status appears on the main AXOOM Gate dashboard as well as on the dashboard for the Network Settings plugin. A summary status of all monitors is shown in the top-level “Network Status” tile, indicating the highest status value of all monitors.

You can also use the Network Service monitors in rules in the Rules Engine, to perform actions (such as notifying an operator) when the monitor’s status changes. Refer to the Rules Engine configuration guide for details on configuring rules.

Appendix A: AXOOM Gate Navigation Icons

Here is a summary of the AXOOM Gate navigation icons:

Icon	Name	Comments
	Home	Click to navigate to home page.
	Back	Use instead of the browser's built-in back button.
	Refresh	Use instead of the browser's built-in refresh button.
	Properties	Click to view properties.
	Trash Can	Delete an item.
	Up arrow	Closes a group of controls.
	Down arrow	Opens a group of controls.
	Left arrow	Decreases the width of browser space used to display property groups.
	Right arrow	Increases the width of browser space used to display property groups.

Appendix B: Error and Logging Messages for Networking Services plugin

The Networking Services plugin does not generate any error or logging messages.