Juniper NETWORKS ACX Series Paragon Automation Router User Guide

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JUNIPER NETWORKS

Juniper NETWORKS ACX Series Paragon Automation Router

Specifications

- **Supported Network Devices:** ACX Series, MX Series, PTX Series, and Cisco Systems devices
- **Prerequisites:** Paragon Automation installed, superuser access in Paragon Automation

Product Usage Instructions

- **Step 1: Begin**
  - **Supported Network Devices:**
    You can onboard ACX Series, MX Series, PTX Series, and Cisco Systems devices to Paragon Automation.
  - **Install the Device:**
    To install Juniper network devices, follow the instructions in the hardware documentation. For other vendors, follow respective vendor instructions.
  - **Prerequisites:**
    Ensure Paragon Automation is installed and superuser access is available.
- **Step 2: Up and Running**
  - **Onboard a Juniper Device:**
  - Navigate to Inventory > Network Inventory on the ParagonAutomation GUI.
  - Click Add Device on the Routers tab.
  - Click Adopt Router on the Add Devices page.
  - Select the site where the device is installed.
  - Copy the CLI commands under Apply the following CLI commands to adopt a Juniper Device.
  - Access the device via SSH, paste the commands, and commit the configuration.

Onboard a Device by Using ZTP

Prerequisites:
Create an onboarding script by saving outbound SSH configuration statements in a file. Obtain configuration statements using the getOutboundSshCommand REST API.

Step 1: Begin

SUMMARY
This guide walks you through the steps to onboard a router (both Juniper and non-Juniper) to Paragon Automation, so that the device can be managed, provisioned, and monitored through automated workflows. Use this guide if you are a user with the Super User or Network Admin role in Paragon Automation.

Supported Network Devices
You can onboard ACX Series, MX Series, PTX Series, and Cisco Systems devices listed in Supported Hardware to Paragon Automation and manage them.

Install the Device

To install Juniper networks devices, follow the instructions in the hardware documentation to unbox the device, mount it on a rack, and power on the device. For details about installing a device, see the device's Hardware Guide at **https://www.juniper.net/documentation/**.
To install devices from other vendors, follow instructions from the respective vendors.

Prerequisites

Ensure that the following prerequisites are fulfilled before you onboard a device to Paragon Automation:

1. Paragon Automation is installed. See Paragon Automation Installation Guide.
2. A superuser in Paragon Automation has:
    - Created an organization and a site to which the device can be onboarded.
    - Added one or more users with the Network Admin role.

      For more information, see the Paragon Automation Quick Start Guide.
3. A superuser or a network administrator has:
    1. In Paragon Automation, created network resource pools, device and interface profiles, and a network implementation plan; see Paragon Automation Quick Start Guide.
    2. On the device:
    3. Checked if a firewall exists between Paragon Automation and the device. If a firewall exists, the firewall is configured to allow outbound access on TCP ports 443, 2200, 6800, 4189, and 32,767.
    4. Configured static routes on the device to reach Paragon Automation. The following is an example of a command to configure static route:

       user@device# set routing-options static route 0.0.0.0/0 next-hop Gateway-IP-address
    5. Configured a DNS server on the device to resolve domain names or allow the device to access an external DNS server (for example, 8.8.8.8).
    6. Configured an NTP server on the device.

Step 2: Up and Running

To onboard a Juniper device to Paragon Automation, you must commit the outbound SSH command to connect with Paragon Automation, on the device. This method of onboarding a device by committing the outbound SSH commands is also referred to as “Adopting a Device”.

You can onboard a Juniper device to Paragon Automation by using any of the following methods:

- Onboard a Juniper device; see “Onboard a Juniper Device” on page 3.
- Onboard a device by using ZTP; see “Onboard a Device by Using ZTP” on page 4.

To onboard a non-Juniper device, see “Onboard a non-Juniper Device” on page 6.

NOTE: Among non-Juniper devices, only Cisco Systems devices are supported in this release. For a list of supported Cisco Systems devices, see Supported Hardware.

Onboard a Juniper Device

Paragon Automation provides the outbound SSH configuration that you can commit on the device to enable the device to connect with Paragon Automation.

To onboard a Juniper device by committing the SSH configuration:

1. Navigate to Inventory > Network Inventory on the Paragon Automation GUI.
2. On the Routers tab, click Add Device.
3. On the Add Devices page, click Adopt Router.
4. Click the Select Site drop-down list to select the site where the device is installed.

   The outbound SSH configuration that is required for the device to establish a connection with Paragon

Automation is displayed.

5. Click Copy Cli Commands to copy the CLI commands under the Apply the following CLI commands to adopt a Juniper Device if it meets the requirements section to clipboard and close OK.
6. Access the device by using SSH and log in to the device in configuration mode.
7. Paste the contents of the clipboard and commit the configuration on the device.

   The device connects to Paragon Automation and can be managed from Paragon Automation.

After you adopt a device, you can verify the connectivity status by running the following command on the device:
user@host> show system connections |match 2200
tcp 0 0 ip-address:38284 ip-address:2200 ESTABLISHED 6692/sshd: jcloud-stcp 0 0 <varname>ip-address</varname>:38284 <varname>ip-address</varname>:2200 ESTABLISHED 6692/sshd: Established in the output indicates that the device is connected with Paragon Automation.

After the device is onboarded, the status of the device on the Inventory page (Inventory > Devices > Network Inventory) shows as Connected, You can now start managing the device. See Device Management Workflow. Also, you can move the device to In Service after onboarding so that services can be provisioned on the device. See Approve a Device for Service.

Onboard a Device by Using ZTP

Prerequisites:

- (Recommended) A network implementation plan be configured for the device.
- The device should be zeroized or in its factory default settings.
- A TFTP server is reachable from the device.
- A DHCP server is reachable from the device, with the ability to respond to the device with the TFTP server and configuration file (Python or SLAX script) name.

To onboard a device by using ZTP:

1. Create an onboarding script (in Python or SLAX) by saving the outbound SSH configuration statements in a file.

   You can obtain the outbound SSH configuration statements by using the getOutboundSshCommand REST API. See API Docs under the Help menu of the Paragon Automation GUI for information about using the API.
2. Upload the onboarding script to the TFTP server.
3. Configure the DHCP server with the onboarding script filename and path in the TFTP server.
4. Install the device, connect it to the network, and power on the device.

   For information about installing the device, see the respective Hardware guide at **https://www.juniper.net/documentation/**.

   After the device is powered on

   - **a.** The factory default settings in the device trigger a built-in script (ztp.py) which obtains the IP addresses for the management interface, default gateway, DNS server, TFTP server, and the path of the onboarding script (Python or SLAX) on the TFTP server, from the DHCP server.
   - **b.** The device configures its management IP address, static default route, and the DNS server address, based on the values obtained from the DHCP network.
   - **c.** The device downloads the onboarding script, based on the values from the DHCP network, and executes it, resulting in the onboarding configuration statements being committed.

- **d.** The device opens an outbound SSH session with Paragon Automation based on the committed onboarding configuration.

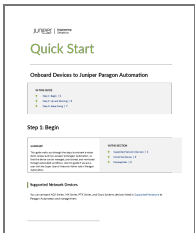
5. After the device connects with Paragon Automation, Paragon Automation configures management and telemetry parameters including gNMI by using NETCONF. Paragon Automation also uses NETCONF to configure the interfaces and protocols based on the network implementation plan associated with the device.
6. Log in to the Paragon Automation GUI and view the status of device onboarding on the Inventory (Inventory > Devices > Network Inventory) page. After the device status changes to Connected, you can start managing the device. See Device Management Workflow for details.

Sample Onboarding Script for Committing SSH Configuration on a Device
The following is a sample of the onboarding script that is downloaded from the TFTP server to the device:

FAQ

- **Q: Which network devices can be managed using Paragon Automation?**
  - A: ACX Series, MX Series, PTX Series, and Cisco Systems devices can be managed using Paragon Automation.
- **Q: What are the prerequisites before onboarding a device to Paragon Automation?**
  - A: Prerequisites include having Paragon Automation installed and superuser access in Paragon Automation.

Documents / Resources

	Juniper NETWORKS ACX Series Paragon Automation Router [pdf] User Guide ACX Series, ACX Series Paragon Automation Router, Paragon Automation Router, Automation Router, Router

References

- Documentation | Juniper Networks
- Documentation | Juniper Networks
- Quick Start | Step 1: Begin | Juniper Networks
- Quick Start | Step 2: Up and Running | Juniper Networks
- Paragon Automation Installation Overview | Juniper Networks
- Active Assurance Overview | Juniper Networks
- Device Life-Cycle Management Overview | Juniper Networks
- Observability Overview | Juniper Networks
- Service Orchestration Overview | Juniper Networks
- Trust and Compliance Overview | Juniper Networks
- Predefined User Roles Overview | Juniper Networks

- Device Management Workflow | Juniper Networks
- User Manual