

# Day One+

## Onboarding Data Center Switches with Apstra - Quick Start

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## Step 1: Begin

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This guide explains how to prepare Juniper data center switches for deployment with the Apstra automation solution. Key tasks include:

- Installing device system agents on switches.
- Onboarding devices manually or using Apstra ZTP.

After onboarding, the switches become Managed Devices, ready for assignment in an Apstra blueprint.



**NOTE:** Before you begin, you must install and configure the Apstra server. For more information, see the [Juniper Apstra Quick Start](#).

Apstra automates data center networks of any size or complexity. Intent-based networking simplifies and improves the reliability and efficiency of data center fabrics. The solution achieves this by controlling each device in the managed fabric. Its distributed agent architecture makes Apstra a unique and powerful automation tool. Let's explore the onboarding process!

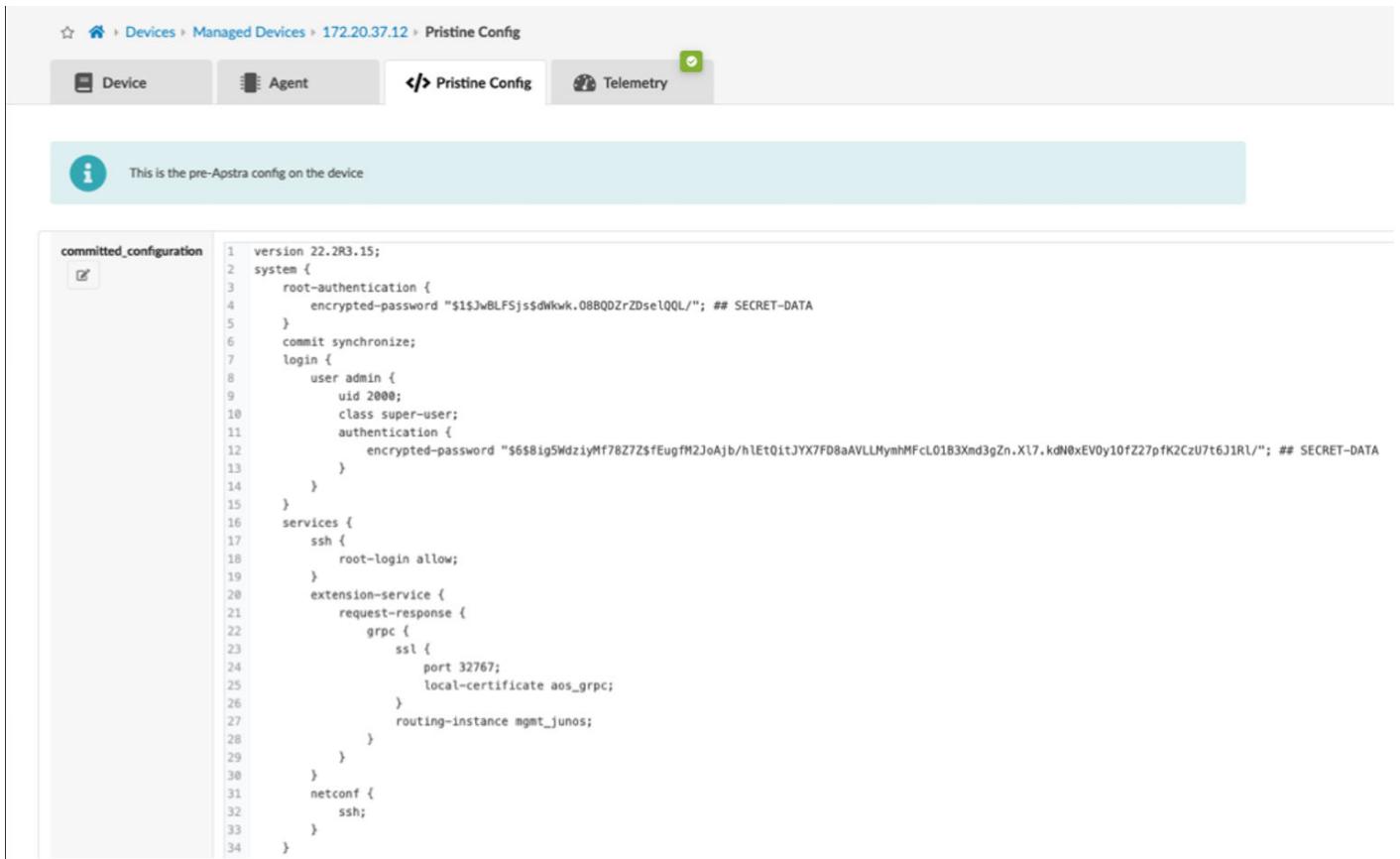
## System Agents

Device system agents handle communication with the Apstra server, configure devices, and transfer telemetry for intent-based analytics (IBA). Juniper rigorously tests supported device models and NOS software. Always check the [Qualified Device and NOS versions](#) tables when selecting hardware and software for your data center fabric.

You can install agents on a switch in the NOS user space (onbox) or in containers within the Apstra cluster (offbox). Your choice depends on the scenario. Some NOS types lack onbox agent support, and some operators avoid installing software on network devices. If you choose offbox agents, ensure the cluster has enough capacity.

## Device Configuration Stages

Apstra uses an out-of-band management network for the server and managed devices to communicate. A "pristine configuration" includes the IP address, user credentials, and basic configuration parameters. Once in place, and communication is established, you can install a device agent. Apstra then captures and saves the device's existing configuration as a baseline. See the example below.



```

This is the pre-Apstra config on the device

committed_configuration
1  version 22.2R3.15;
2  system {
3      root-authentication {
4          encrypted-password "$1$JwBLFSjs$dwkwk.08BQDZrZdse1QQL/"; ## SECRET-DATA
5      }
6      commit synchronize;
7      login {
8          user admin {
9              uid 2000;
10             class super-user;
11             authentication {
12                 encrypted-password "$6$8ig5MdziyMf78Z7Z$eUgfm2JoAj/h1Et0itJYX7FD8aAVLLMyhMfcL01B3Xmd3gZn.X17.kdN0xEV0y10fZ27pfK2CzU7t6J1R1/"; ## SECRET-DATA
13             }
14         }
15     }
16     services {
17         ssh {
18             root-login allow;
19         }
20         extension-service {
21             request-response {
22                 grpc {
23                     ssl {
24                         port 32767;
25                         local-certificate aos_grpc;
26                     }
27                     routing-instance mgmt_junos;
28                 }
29             }
30         }
31         netconf {
32             ssh;
33         }
34     }

```

Pristine configuration is the first stage a device enters under Apstra management. Devices transition through various configurations during operation. See the [Device Configuration Cycle](#) section in the Juniper Apstra User Guide to understand these stages.

## Onboarding Manually

The minimum steps to manually connect the switch and server are:

1. Configure the management interface and IP address on the out-of-band management network, including a default route to the server.
2. Set user credentials and password for the Apstra server to connect to the switch.
3. Enable the switch's API for server-based lifecycle configuration.

Commands vary by vendor NOS. See the [Juniper Apstra User Guide](#) for details for supported vendors.

Once the switch can ping the Apstra server, you can use the Device Installer to install the agent. Do this from the Managed Devices view.

Query: All

Device Agent

Filter selected by:  all  selected only  unselected only

Device Information								
Management IP	Device Key	Device Profile	Hostname	OS	State	Comms	Acknowledged?	
172.20.108.13	5254003535A9	Juniper vEX	apstra-esi-001-leaf1	Junos 22.2R3.15	IS-ACTIVE			
172.20.108.15	52540079A519	Juniper vEX	apstra-single-001-leaf1	Junos 22.2R3.15	IS-ACTIVE			
172.20.108.14	5254000BF09A	Juniper vEX	apstra-esi-001-leaf2	Junos 22.2R3.15	IS-ACTIVE			
172.20.108.11	5254000A150E	Juniper vEX	spine1	Junos 22.2R3.15	IS-ACTIVE			
172.20.108.12	525400138171	Juniper vEX	spine2	Junos 22.2R3.15	IS-ACTIVE			

To initiate the installer, click either **Create Onbox Agent(s)** or **Create Offbox Agent(s)** in the upper right.

Create Offbox System Agent(s)

Agent Parameters

Device Addresses (25 max)\*

Comma-separated list of hostnames, individual IP addresses, and IP address ranges, e.g. 192.168.1.5-192.168.1.10,mydevice.local

Operation Mode

FULL CONTROL  TELEMETRY ONLY

Platform\*

Select...

Username\*

Password\*

Agent Profile

Select...

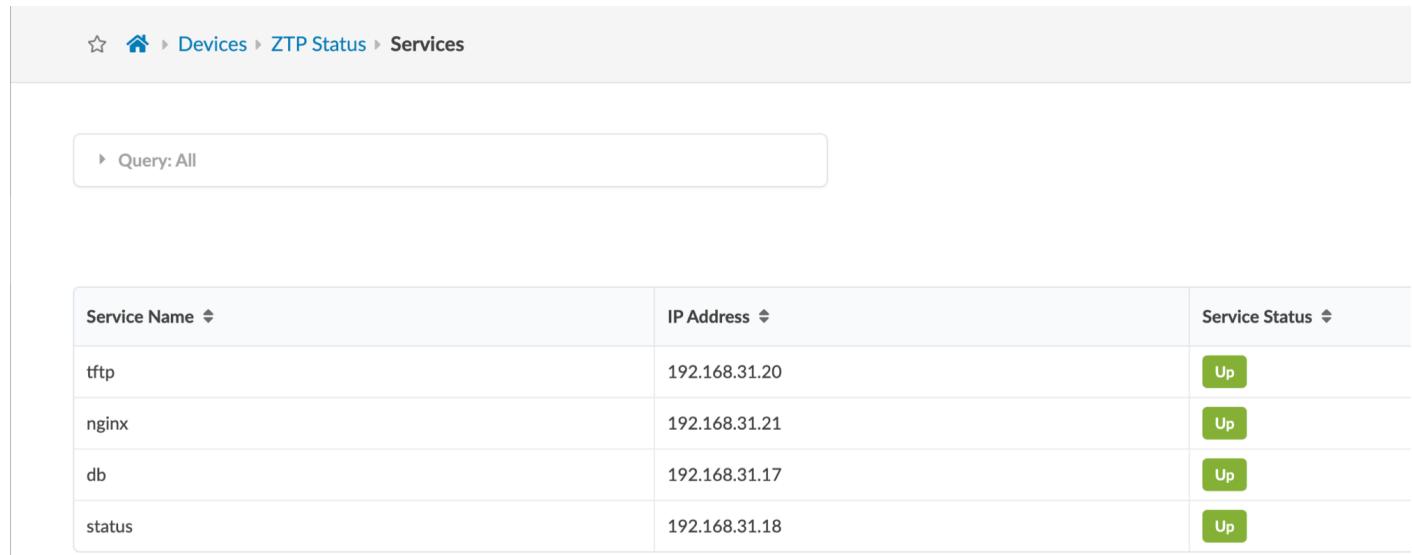
Enter the required information into the Create Agent(s) form, then click **Create**. The server takes some time to complete the installation. Once done, the device appears in the table view as quarantined. Additional steps move quarantined devices to the OOS-Ready state, making them assignable to a blueprint.



**NOTE:** Use of the Device Installer to bring switches into the Apstra automation platform is shown in detail in the [Managed Devices](#) section of the Juniper Apstra User Guide.

## Onboarding with Apstra ZTP

Apstra ZTP runs on a separate VM from the Apstra server and discovers new or factory-reset switches. Use the Apstra server GUI to monitor the ZTP server and manage devices. This setup simplifies onboarding devices quickly with desired settings and NOS versions.

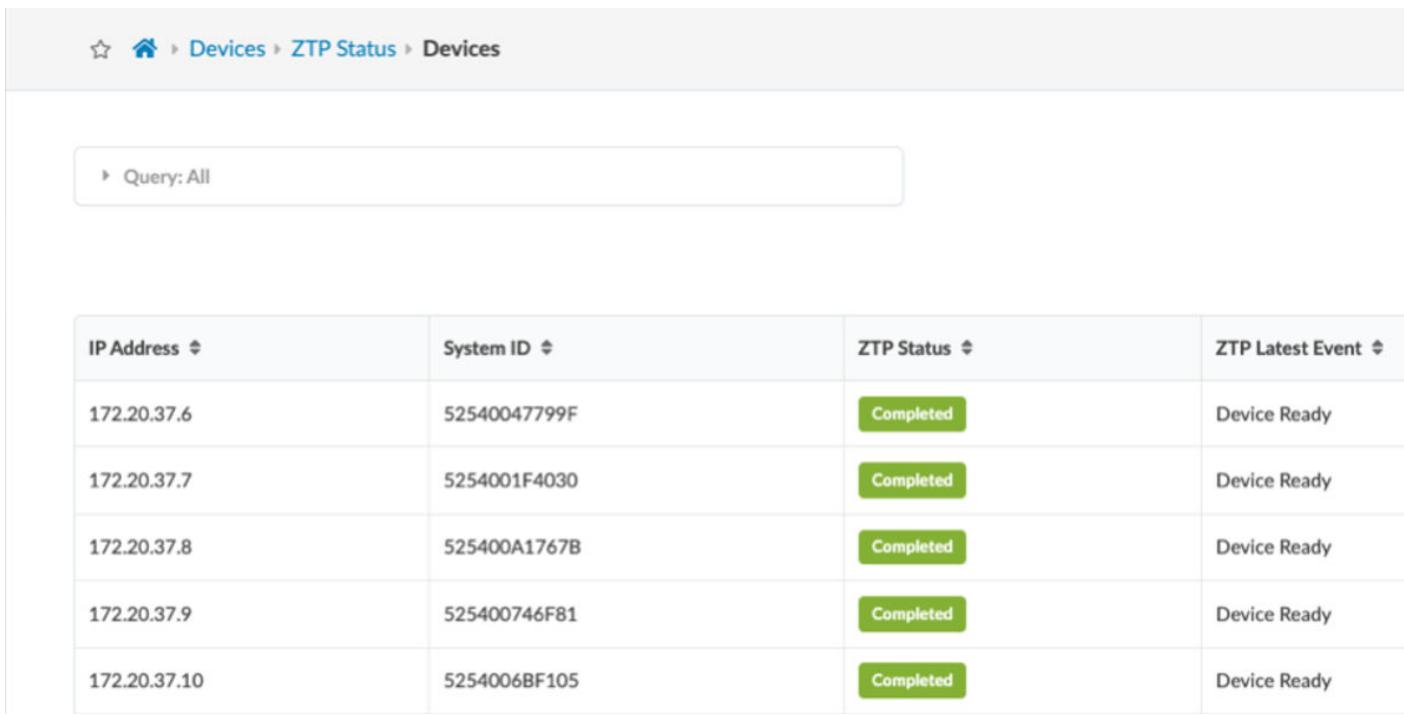


The screenshot shows the Apstra ZTP Status Services page. The top navigation bar includes a star icon, a home icon, and links to Devices, ZTP Status, and Services. Below the navigation is a search bar with the placeholder 'Query: All'. The main content area displays a table of services with the following data:

Service Name	IP Address	Service Status
tftp	192.168.31.20	Up
nginx	192.168.31.21	Up
db	192.168.31.17	Up
status	192.168.31.18	Up

The ZTP service provides DHCP for automatic IP addressing, installation of pristine configurations and the installation of the system agents. Apstra ZTP performs these steps:

1. **DHCP (optional)**
  - a. The device requests an IP address via DHCP.
  - b. The device receives the assigned IP address and a pointer to the specified OS image.
2. **Device Initialization**
  - a. The device downloads the customizable ZTP script via TFTP.
  - b. The device executes script preparing it for management. The OS image is checked and is upgraded, if necessary.
  - c. The device admin/root password is set.
  - d. System Agent ID is initialized.
3. **Agent Initialization**
  - a. The ZTP script leverages APIs to initiate the agent installation. It recognized automatically whether onbox or offbox is needed.



The screenshot shows a table of managed devices. The columns are: IP Address, System ID, ZTP Status, and ZTP Latest Event. All devices listed have a 'Completed' status and are marked as 'Device Ready'.

IP Address	System ID	ZTP Status	ZTP Latest Event
172.20.37.6	52540047799F	Completed	Device Ready
172.20.37.7	5254001F4030	Completed	Device Ready
172.20.37.8	525400A1767B	Completed	Device Ready
172.20.37.9	525400746F81	Completed	Device Ready
172.20.37.10	5254006BF105	Completed	Device Ready

The Apstra ZTP service is a comprehensive set of tools that you can customize in various ways to adapt to your specific requirements. Once you have downloaded the server image and performed any customizations, it's ready to simplify bringing switches into the Apstra automation platform.



**NOTE:** The Apstra ZTP service requires installation and configuration to adapt to your specific environment. You can find step-by-step instructions for installing and onboarding devices, see the [Apstra ZTP](#) chapter in the Juniper Apstra User Guide.

Now we've seen how devices are initialized. Let's now look at how we move them into an operating network.

## Step 2: Up and Running

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## Managed Devices

You've followed the manual steps or you've used ZTP to get your devices installed with their management IP addresses and device agents. Plus, your switches are registered with the Apstra server. But they're not quite ready for deployment.

Just after being added, devices are placed into the Out-of-Service Quarantine state. To place them under full control of the system, they need to be acknowledged.

Query: All

1-5 of 5

Columns (15/17) Page Size: 25

Filter selected by: all selected only unselected only

	Device Information							Agent Information							
0 selected	Management IP	Device Key	Device Profile	Hostname	OS	State	Comms	Acknowledged?	Blueprint	Type	Agent Profile	Apstra Version	Last Job Type	Job State	Actions
	172.20.1.13	5254006CABF6	Juniper vEX	apstra-esi-001-leaf1	Junos 22.2R3.15	IS-ACTIVE	🔌	✓	apstra-pod1	OFFBOX	profile_vmx	Leblon/Sandbox/Developers/cl-4.2.0.1	INSTALL	SUCCESS	⋮
	172.20.1.12	52540094FA0E	Juniper vEX	spine2	Junos 22.2R3.15	IS-ACTIVE	🔌	✓	apstra-pod1	OFFBOX	profile_vmx	Leblon/Sandbox/Developers/cl-4.2.0.1	INSTALL	SUCCESS	⋮
	172.20.1.15	525400E28AF9	Juniper vEX	apstra-single-001-leaf1	Junos 22.2R3.15	IS-ACTIVE	🔌	✓	apstra-pod1	OFFBOX	profile_vmx	Leblon/Sandbox/Developers/cl-4.2.0.1	INSTALL	SUCCESS	⋮
	172.20.1.14	525400945DFE	Juniper vEX	apstra-esi-001-leaf2	Junos 22.2R3.15	IS-ACTIVE	🔌	✓	apstra-pod1	OFFBOX	profile_vmx	Leblon/Sandbox/Developers/cl-4.2.0.1	INSTALL	SUCCESS	⋮
	172.20.1.11	525400633CE8	Juniper vEX	spine1	Junos 22.2R3.15	IS-ACTIVE	🔌	✓	apstra-pod1	OFFBOX	profile_vmx	Leblon/Sandbox/Developers/cl-4.2.0.1	INSTALL	SUCCESS	⋮

After acknowledging your devices, you can explore various aspects of their status. Additional tools display the agent state, access the Pristine Config, and view device telemetry.

User Config

Device Profile	Juniper vEX
Admin State	normal
Location	leaf2

Status

State	IS-ACTIVE
Acknowledged?	✓
Operation Mode	FULL CONTROL
Error Message	N/A
Blueprint	Robert_Lancaster_10030_Juniper_SE_Demo_4.2.0_55ec5fd59cfb - evpn-vex-virtual (active)
Blueprint Active?	yes
Online?	🔌
Hostname	leaf2
FQDN	leaf2
Agent Start Time	2023-10-12T16:18:19.299636Z
Device Start Time	2023-10-12T16:04:44.000000Z

n



**NOTE:** Use of the tools in the Managed Devices view is covered in the [Managed Devices](#) section of the Juniper Apstra User Guide.

ZTP can handle NOS upgrades during setup, but upgrades after system control require the Managed Devices page tool. This tool keeps NOS versions secure and ensures proper network operation. It also simplifies updates needed to address issues. The tool provides flexibility for image storage and tracks installation progress.

★  Devices > Managed Devices

Query: All

Device  Agent 

Filter selected by  all  selected only  unselected only

Device Information								
<input checked="" type="checkbox"/> 5 selected	Management IP	Device Key	Device Profile	Hostname	OS	State	Comms	Acknowledged?
<input checked="" type="checkbox"/>	172.20.108.13	5254003535A9	Juniper vEX	apstra-esi-001-leaf1	Junos 22.2R3.15	IS-ACTIVE		
<input checked="" type="checkbox"/>	172.20.108.15	52540079A519	Juniper vEX	apstra-single-001-leaf1	Junos 22.2R3.15	IS-ACTIVE		
<input checked="" type="checkbox"/>	172.20.108.14	5254000BF09A	Juniper vEX	apstra-esi-001-leaf2	Junos 22.2R3.15	IS-ACTIVE		
<input checked="" type="checkbox"/>	172.20.108.11	5254000A150E	Juniper vEX	spine1	Junos 22.2R3.15	IS-ACTIVE		
<input checked="" type="checkbox"/>	172.20.108.12	525400138171	Juniper vEX	spine2	Junos 22.2R3.15	IS-ACTIVE		



NOTE: Upgrading the NOS of a device from the Managed Devices view is described in detail in the [Upgrade Device NOS](#) section of the Juniper Apstra User Guide.

## Step 3: Keep Going

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With your devices connected and optimized, you can now move on to the next steps of automating your data center deployment. Use the links in the next section to start exploring the Apstra AI solution.

## What's Next?

Table 1: What's Next?

If you want to	Then
Replace the SSL certificate with a secure one	See the <a href="#">Apstra Installation / Configure Apstra Server / Replace SSL Certificate</a> section in the <a href="#">Juniper Apstra Installation and Upgrade Guide</a> .
Configure user access with user profiles and roles	See the <a href="#">Platform/User/Role Management</a> section in the Juniper Apstra User Guide.
Build your virtual environment with virtual networks and routing zones	See the <a href="#">Staged/Virtual</a> section in the Juniper Apstra User Guide.
Learn about Apstra telemetry services and how you can extend them	See the <a href="#">Devices/Telemetry</a> section in the Juniper Apstra User Guide.
Learn how to leverage intent-based analytics (IBA) with apstra-cli	See <a href="#">Intent-Based Analytics with apstra-cli Utility</a> in the Juniper Apstra User Guide.

## General Information

Table 2: General Information

If you want to	Then
See all Juniper Apstra documentation	See the <a href="#">Juniper Apstra</a> documentation page.
Stay up to date about new and changed features and known and resolved issues in Apstra	See the <a href="#">Juniper Apstra Release Notes</a> .

## Learn with Videos

Our video library is expanding! We offer videos on everything from hardware installation to advanced Junos OS network configurations. Explore these resources to enhance your Junos OS knowledge. Here are some great video and training resources to help you expand your knowledge of Junos OS.

**Table 3: Video Library Links**

If you want to	Then
Watch short demos to learn how to use Juniper Apstra to automate and validate the design, deployment, and operation of data center networks, from Day 0 through Day 2+.	See <a href="#">Juniper Apstra Demos</a> and <a href="#">Juniper Apstra Data Center videos</a> on the Juniper Networks Product Innovation YouTube page.
Get short and concise tips and instructions that provide quick answers, clarity, and insight into specific features and functions of Juniper technologies.	See <a href="#">Learning with Juniper</a> on Juniper Networks main YouTube page.
View a list of the many free technical trainings we offer at Juniper.	See <a href="#">Get Started with Free Juniper Training</a> on the Juniper Learning Portal.