

ZTP Script (ztp.py)

Purpose

The ztp.py script facilitates initial device configuration, using continuous connectivity checks to determine when each device is ready to be configured. Once the device is reachable, the script pushes configuration files to it over SSH.

Workflow

1. Device Configuration Details:

- Device-specific details, such as IP, username, password, and the configuration file path, are defined in the script for each device.

2. Ping Monitoring:

- The script pings each device's IP address every 3 seconds until a response is received, confirming device availability.

3. Configuration Push:

- Upon detecting that the device is online, the script:
 - Initiates an SSH session.
 - Executes the configuration commands listed in the associated configuration file.
 - Saves the configuration on the device to ensure persistence across reboots.

4. Error Handling and Logging:

- The script uses loguru for logging, which provides detailed logs for debugging and tracking. It logs each step, including device reachability status, configuration success, or any errors that arise.

Once R8 and the new switch is added, my script is triggered and pushes the configuration saved in /home/student/git/csci5840/ztp/ folder.

```

student@csc15840-vm2-sntr8112: ~/git/csc15840/script$ python3 ztp.py
PING 192.51.0.2 (192.51.0.2) 56(84) bytes of data.
PING 172.20.20.20 (172.20.20.20) 56(84) bytes of data.
64 bytes from 172.20.20.20: icmp_seq=1 ttl=64 time=0.074 ms

--- 172.20.20.20 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/ndev = 0.074/0.074/0.074/0.000 ms
PING 192.51.0.6 (192.51.0.6) 56(84) bytes of data.
2024-11-11 19:54:40.246 | INFO | _main_:ping_until_reachable:44 - 172.20.20.20 (R8) is reachable.
64 bytes from 192.51.0.2: icmp_seq=1 ttl=63 time=6.94 ms

--- 192.51.0.2 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/ndev = 6.941/6.941/6.941/0.000 ms
2024-11-11 19:54:40.250 | INFO | _main_:ping_until_reachable:44 - 192.51.0.2 (R6) is reachable.
64 bytes from 192.51.0.6: icmp_seq=1 ttl=62 time=7.22 ms

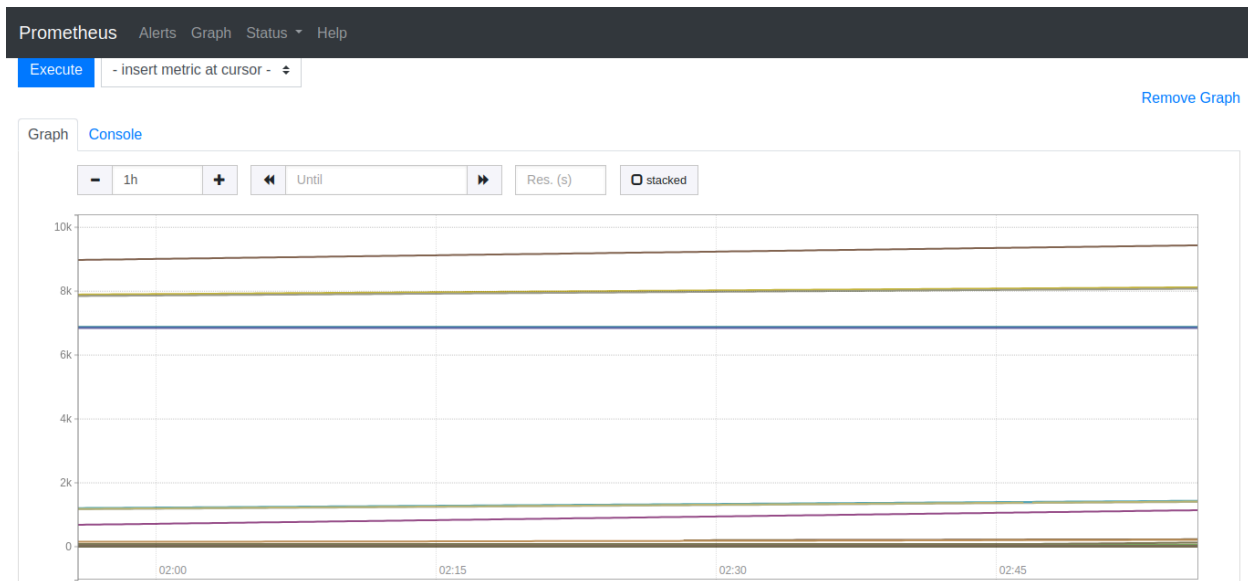
--- 192.51.0.6 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/ndev = 7.216/7.216/7.216/0.000 ms
2024-11-11 19:54:40.254 | INFO | _main_:ping_until_reachable:44 - 192.51.0.6 (R7) is reachable.
2024-11-11 19:54:41.193 | SUCCESS | _main_:push_config:78 - Configuration applied successfully to 192.51.0.6.
2024-11-11 19:54:41.204 | INFO | _main_:push_config:83 - Disconnected from 192.51.0.6.
2024-11-11 19:54:41.454 | SUCCESS | _main_:push_config:78 - Configuration applied successfully to 192.51.0.2.
2024-11-11 19:54:41.465 | INFO | _main_:push_config:83 - Disconnected from 192.51.0.2.
2024-11-11 19:54:41.563 | SUCCESS | _main_:push_config:78 - Configuration applied successfully to 172.20.20.20.
2024-11-11 19:54:41.575 | INFO | _main_:push_config:83 - Disconnected from 172.20.20.20.
2024-11-11 19:54:41.576 | SUCCESS | _main_:module:96 - Configuration process completed for all devices.
student@csc15840-vm2-sntr8112: ~/git/csc15840/script$

```

Screenshot 1: Running ztp.py script to include the newly added R8 device

Monitoring and IPAM

From my previous labs, I added the newly added devices, i.e., R6, R7 and R8 to SNMP Exporter & Prometheus for monitoring.



Screenshot 2: Graph of all Broadcast packets from all devices including R6, R7 and R8

| Prometheus Alerts Graph Status ▾ Help | | | | | | |
|--|-------|---|-------------|-----------------|-------|--|
| Endpoint | State | Labels | Last Scrape | Scrape Duration | Error | |
| http://localhost:9116/snmp target="192.168.100.2" | UP | group="arista" instance="192.168.100.2" job="snmp" | 270ms ago | 97.16ms | | |
| http://localhost:9116/snmp target="192.168.100.3" | UP | group="arista" instance="192.168.100.3" job="snmp" | 565ms ago | 119.7ms | | |
| http://localhost:9116/snmp target="192.168.100.4" | UP | group="arista" instance="192.168.100.4" job="snmp" | 965ms ago | 62.25ms | | |
| http://localhost:9116/snmp target="192.168.100.5" | UP | group="arista" instance="192.168.100.5" job="snmp" | 418ms ago | 131.7ms | | |
| http://localhost:9116/snmp target="192.168.100.6" | UP | group="arista" instance="192.168.100.6" job="snmp" | 183ms ago | 69.3ms | | |
| http://localhost:9116/snmp target="192.168.100.7" | UP | group="arista" instance="192.168.100.7" job="snmp" | 880ms ago | 82.26ms | | |
| http://localhost:9116/snmp target="192.168.100.8" | UP | group="arista" instance="192.168.100.8" job="snmp" | 780ms ago | 73.76ms | | |
| http://localhost:9116/snmp target="192.168.100.9" | UP | group="arista" instance="192.168.100.9" job="snmp" | 579ms ago | 95.64ms | | |
| http://localhost:9116/snmp target="192.51.0.10" | UP | group="arista" instance="192.51.0.10" job="snmp" | 708ms ago | 86.05ms | | |
| http://localhost:9116/snmp target="192.51.0.2" | UP | group="arista" instance="192.51.0.2" job="snmp" | 525ms ago | 74.12ms | | |
| http://localhost:9116/snmp target="192.51.0.6" | UP | group="arista" instance="192.51.0.6" job="snmp" | 453ms ago | 69.94ms | | |

Screenshot 3: Prometheus targets

I also added these devices to my IPAM for IP address management.

>>> nautobot

Search Nautobot

ORGANIZATION

CLOUD

DEVICES

DEVICES

Devices

Virtual Chassis

Device Redundancy Groups

Interface Redundancy Groups

DEVICE TYPES

Device Types

Device Families

Manufacturers

MODULES

Modules

Module Types

Devices

Search Devices

Configure

Filter

Saved Views

+ Add Device

>>> Devices

| <input type="checkbox"/> | Name | Status | Tenant | Role | Type | Location | Rack | IP Address |
|--------------------------|------|--------|--------|--------|-----------------------|--------------|------|------------|
| <input type="checkbox"/> | R1 | Active | — | Access | Arista Arista cEOSLab | ContainerLab | — | — |
| <input type="checkbox"/> | R2 | Active | — | Access | Arista Arista cEOSLab | ContainerLab | — | — |
| <input type="checkbox"/> | R3 | Active | — | Core | Arista Arista cEOSLab | ContainerLab | — | — |
| <input type="checkbox"/> | R4 | Active | — | Core | Arista Arista cEOSLab | ContainerLab | — | — |
| <input type="checkbox"/> | R5 | Active | — | Edge | Arista Arista cEOSLab | ContainerLab | — | — |
| <input type="checkbox"/> | R6 | Active | — | Access | Arista Arista cEOSLab | ContainerLab | — | — |
| <input type="checkbox"/> | R7 | Active | — | Access | Arista Arista cEOSLab | ContainerLab | — | — |
| <input type="checkbox"/> | R8 | Active | — | Access | Arista Arista cEOSLab | ContainerLab | — | — |

Edit Selected

+ Add Components

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cscl5840-vm2-snr8112 (v2.3.6)

2024-11-12 02:45:52 UTC

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Screenshot 4: All the devices in Nautobot

