Element Controller
User Guide
(ZTP)

Version 0.9

October, 2017

NTT Confidential

Table of Contents

Table of Figures

Revision History

Ver. No.	Date	Change Description
0.9	October, 2017	Initial Version Registered

1. Introduction

This document describes how to operate ZTP in device installation or enhancement, which is conducted with Element Controller (EC).

ZTP (Zero Touch Provisioning) is a general term for the functions which will be triggered by resetting or powering-on of a device to automatically perform the collection/set-up of the configuration or OS installation of the device itself.

In this document, it is preconditioned that EC had been already installed in accordance with the instructions described in "Element_Controller_Installation_Manual" (hereafter referred to as "Installation Manual").

Besides, the command operations should be performed as the root user unless otherwise specified.

1.1 Expressional Conventions

The legends of command input are described below.

COMMAND parameter <parameter> [parameter] Enter

#	: the prompt sign
COMMAND	: a command name
parameter	: a regular parameter
<parameter>	: a parameter to be replaced (Change the content as required.)
[parameter]	: a parameter that can be omitted
Enter	: pressing the Enter key

1.2 Trademark Notice

All company names and product names mentioned in this document are registered trademarks or trademarks of their respective companies.

This document is not sponsored by, endorsed by or affiliated with Cisco Systems, Inc. Cisco, the Cisco logo, Cisco Systems and Cisco IOS are registered trademarks or trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

2. ZTP Operational Flow

The Figure 2-1 below illustrates the ZTP operational flow at the EC server.

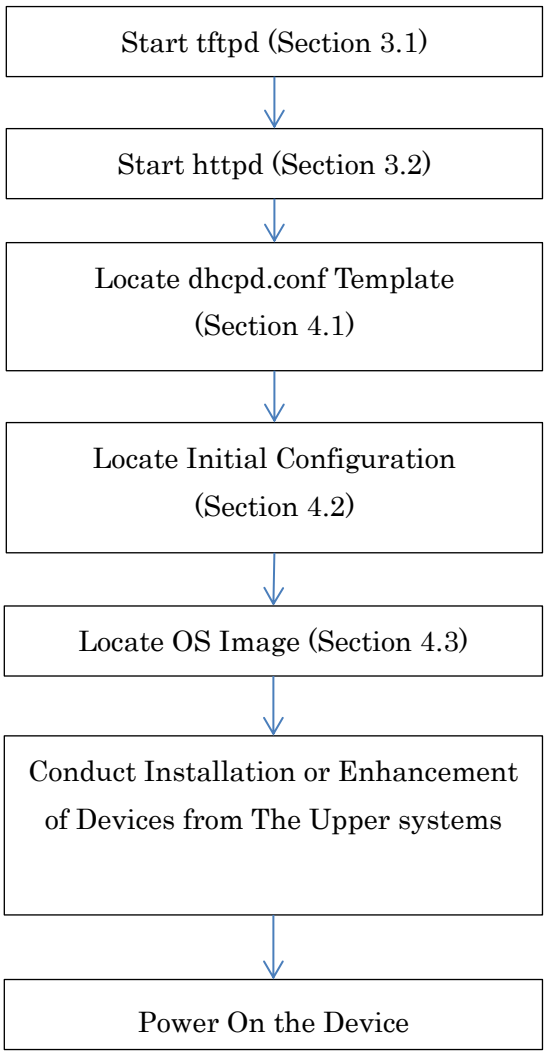

Figure 2-1 ZTP Operational Flow

The detail of each operation follows from the next section.

3. Confirmation of Process Startup

Sequences and file acquisition processes are different each time depending on the used device, and tftpd and httpd are used.

(It is presumed that tftpd and httpd have been already installed and launched in accordance with the Installation Manual.)

3.1 tftpd

3.1.1 Confirmation of tftpd Running

Confirm if tftpd is funning by use of the following command.

It should be noted that tftpd is started via xinetd.

```
# systemctl status xinetd.service Enter
```

In case the output result shows "active (running)“, the process is running.

[Output Result Process IS Running]
-- Active: active (running) --
[Output Result Process is NOT Running]
-- Active: inactive (dead) --

In case the process is not running, launch it with the following command. Execute the command and confirm that no error message is to be shown.

```
# systemctl start xinetd.service Enter
```

3.1.2 Confirmation of Port Release for tftpd

Confirm with the following command that the port #69 of UDP is released.

```
# ss -lnu | grep :69 Enter
```

Showing result reveals that the port is released.

In case the result is not shown, confirm the configuration of xinetd.

[Output Result]				
UNCONN	0	0	*:69	*:*

3.2 httpd

3.2.1 Confirmation of httpd Running

Confirm if httpd is funning by use of the following command.

```
# systemctl status httpd.service Enter
```

In case the output result shows "active (running)“, the process is running.

[Output Result Process IS Running]
-- Active: active (running) --
[Output Result Process is NOT Running]
-- Active: inactive (dead) --

In case the process is not running, launch it with the following command. Confirm that no error message is to be shown.

```
# systemctl start httpd.serviceEnter
```

3.2.2 Confirmation of Port Release for httpd

Confirm with the following command that the port #80 of TCP is released.

```
# ss -lnt | grep :80Enter
```

Showing result reveals that the port is released.

In case the result is not shown, confirm the configuration of httpd.

[Output Result]				
LISTEN	0	128	*:80	*:*

4. Locate the Configuration File

4.1 Locate the dhcpd.conf Template

The dhcpd.conf template files are different each time depending on the used device.

Locate the dhcpd.conf template file corresponding to the type of device to be enhanced into the file path configured at the time of registering the device information. Please refer to the attached document for an actual example of the template file. The following table illustrates the list of attached document.

[dhcp.conf Template Files] List of Attached Documents	
File Name	Overview
dhcpd.conf.qfx5100	Juniper QFX5100 Template File
dhcpd.conf.qfx5200	Juniper QFX5200 Template File
dhcpd.conf.ncs5001	Cisco NCS5001 Template File
dhcpd.conf.ncs5011	Cisco NCS5011 Template File

4.2 Locate the Initial Configuration

The initial configurations are different each time depending on the usage and type of the used device.

Locate the initial configuration corresponding to the type and usage of device to be enhanced into the file path configured at the time of registering the device information.

4.2.1 Legends of the file's section to be modified

The following table shows the legends of modified sections in the initial configuration. Modify the highlighted part as required.

[Initial Configuration] (Juniper)	

1	syslog {
	host [EC Server Address] {
	any info;
	--

2	interfaces {
	vme {
	unit 0 {
	family inet {
	address [Address/Prefix for administration]; *only for QFX5200
	}
	}
	}
	}

3	snmp {
	community dhcp-provisioning-only {
	authorization read-only;
	}
	trap-group dhcp-provisioning-only {
	version v2;
	targets {
	[EC Server Address];
	}
	}
	trap-group rmon-trap-group {
	version v2;
	categories {
	rmon-alarm;
	}
	targets {
	[EC Server Address];
	}
	}
	--

[Initial Configuration] (Cisco)	
4	/bin/ping -c 5 [EC Server Address]
5	logging [EC Server Address] vrf default severity info port default
6	snmp-server host [EC Server Address] traps version 2c dhcp
7	ntp server [NTP Server Address]

4.2.2 Example of Sections in the File To Be Modified

The following tables show actual examples of sections to be modified. Please refer to the attached document for more details.

It should be noted that the attached document provides just a part of whole examples since the initial configuration may vary depending on the role of switches as well as the type of devices.

[Initial Configuration] (Juniper)			
File Name	Section to be Modified (line #)	Change Description	Legend #
ztp.conf.qfx5100-24q_Spine	23	Enter the EC server address.	1
	73	Enter the EC server address.	3
	82	Enter the EC server address.	3
ztp.conf.qfx5100-48s_L2Leaf	23	Enter the EC server address.	1
	71	Enter the EC server address.	3
	80	Enter the EC server address.	3
ztp.conf.qfx5100-48s_L3Leaf	23	Enter the EC server address.	1
	73	Enter the EC server address.	3
	82	Enter the EC server address.	3
ztp.conf.qfx5200-32c_L3Leaf	23	Enter the EC server address.	1

	70	Enter the address/prefix for administration.	2
	82	Enter the EC server address.	3
	91	Enter the EC server address.	3
ztp.conf.qfx5200-32c_Spine	23	Enter the EC server address.	1
	70	Enter the address/prefix for administration.	2
	82	Enter the EC server address.	3
	91	Enter the EC server address.	3
[Initial Configuration] (Cisco)			
File Name	Section to be Modified (line #)	Change Description	Legend #
ztp.script.ncs5001_L3Leaf	7	Enter the EC server address.	4
	26	Enter the EC server address.	5
	44	Enter the EC server address.	6
	76	Enter the NTP server address.	7
ztp.script.ncs5011_Spine	7	Enter the EC server address.	4
	26	Enter the EC server address.	5
	44	Enter the EC server address.	6
	76	Enter the NTP server address.	7

4.3 Locate the OS Image

This operation is only required if the type of enhanced device is QFX5200.

Locate the OS image in the file path specified in the dhcpd.conf template. Please refer to the following figure.

[dhcpd.conf Template]

```
--
##########
# host
##########

## QFX5200 ##
host QFX5200-1 {
      hardware ethernet $$MACADDRESS$$;
      fixed-address $$MANAGEMENTADDRESS$$;
      next-server $$TFTPHOSTNAME$$;
      option tftp-server-name "$$TFTPHOSTNAME$$";
      option QFX.alt-image-file-name
"/junos-conf/jinstall-qfx-5e-flex-15.1X53-D30.5-domestic-signed.tgz";
      option QFX.transfer-mode "http";
      option QFX.config-file-name "$$INITIALCONFIG$$";
```

```
}
dhcpd.conf.qfx5200 (END)
--
```

(*) The file path (relative path) of the OS image.

Since the QFX5200's acquisition process is httpd, the absolute path here should be:
/var/www/html/junos-conf/jinstall-qfx-5e-flex-15.1X53-D30.5-domestic-signed.tgz