



Zero Touch Provisioning (ZTP)

Purpose

This technical note provides step-by-step instructions and examples for using the automated configuration methodology of ZTP for Server Technology PRO1 and PRO2 PDUs.

What is Provisioning?

Provisioning is the automated configuration of new PDUs deployed in your network without manual intervention. Zero Touch Provisioning (ZTP) eliminates most of the manual work involved with actions like adding units to the network, while eliminating the need for a network engineer to be present during installation.

Fast, simple, and easy deployment is key to getting your networked PDUs up and running quickly so they can provide critical power and control information, as well as environmental monitoring within your data center.

ZTP can be adapted to many device deployment scenarios as an important way to automate the network and reduce the time to install fully customized PDUs. In addition, a significant benefit of ZTP is the reduction of errors associated with manual configuration.

Automatic Updates and Provisioning Status

ZTP allows a PDU to be provisioned and configured automatically, including an option for automatic updates where ZTP functions as continuous provisioning.

Once a ZTP-enabled PDU is provisioned, initial provisioning actions will no longer be performed. However, when you enable the Automatic Updates option, the automatic updates will always take place on a PDU that has previously been “provisioned”. This means that regardless of the current provisioned status of a ZTP-enabled PDU (either “provisioned” or “not provisioned”), the automatic updates – when enabled – will always occur on that PDU.

For more information about ZTP as continuous provisioning, see [Configuring Automatic Updates](#) in this document.

Implementing ZTP

ZTP is a feature available only on Server Technology PRO1 and PRO2 PDUs. ZTP is implemented via specific DHCP server options and Server Technology’s Configuration (STIC) protocol in conjunction with a simple TFTP server configuration pull.

This process allows PDUs to be provisioned and configured during the initial boot up, or whenever needed, to automate network setup, user permission updates, or other changes to the PDU as needed.

Before You Begin

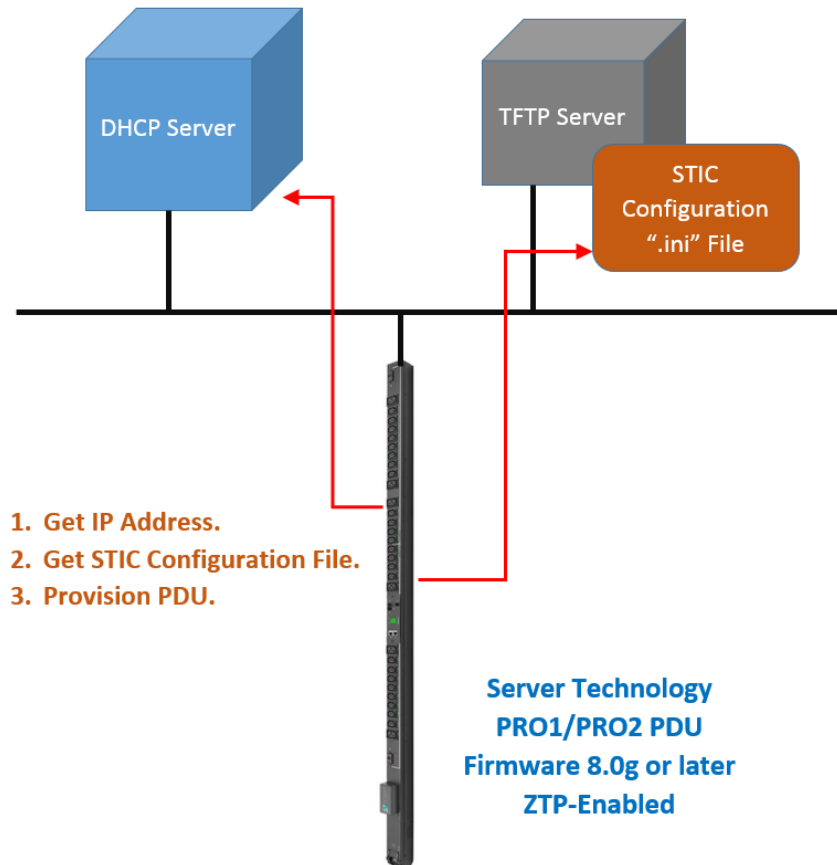
To use ZTP in your data center, you will need the following:

- Server Technology PRO1 or PRO2 PDUs running firmware version 8.0g or later.
- A running Trivial File Transport Protocol (TFTP) server to store the STIC configuration files and provide access to them.
- A working DHCP server configured to recognize PDUs and reply with ZTP data for them.
- Both the DHCP server and TFTP server must be on networks accessible to the PDUs; either a normal network or a special pre-deployment local network, whichever network setup works best for your data center.

The ZTP Process

The following illustration shows the relationship between the PDU and the DHCP/TFTP servers.

Server Technology's Zero Touch Provisioning (ZTP)



Using DHCP Options for ZTP

The Server Technology ZTP feature uses the following two DHCP options, 43 and 60, which must be configured on the DHCP server for ZTP actions to work. The PDU uses these options to determine where the STIC configuration file is located and then pulls the file down via TFTP for PDU configuration:

- DHCP option 43: "Vendor Specific Information", requested in the DHCP DISCOVER message and its reply data is expected in subsequent responses.
- DHCP option 60: "Vendor Class Identifier", sent in the DISCOVER message, identifies Server Technology to the DHCP server using the text data "ServerTech".

How ZTP Works

The Server Technology PDU, with firmware version 8.0g or later, is required for ZTP to function. The PDU is shipped DHCP-enabled and ZTP-capable out of the box.

Communication between the PDU and the DHCP server:

- When a ZTP-enabled PDU is powered up and physically connected to your network, the PDU will look for a DHCP server to obtain both an IP address and, based on either its MAC address or Vendor Class Identifier (option 60), ZTP information.
- The PDU will then boot up with its default factory configuration. Shortly afterwards, the ZTP information obtained during bootup will be used to locate and pull the STIC file needed to complete the PDU's ZTP configuration.
- Upon seeing the MAC address or option 60 in a DHCP DISCOVER packet (along with a DHCP option 43 request, described above), the DHCP server will respond with a DHCP OFFER that includes a URL pointing to where the STIC configuration file is located on the network.
- As long as the DHCP server is active, ZTP will be attempted on each lease renewal until ZTP succeeds.
- Note that with physical access to the PDU, disconnecting and reconnecting the PDU's Ethernet cable will restart DHCP service on the PDU.

About the Static Address Fallback Option

The Static Address Fallback option executes only when DHCP is enabled. When the Static Address Fallback option is enabled, the option informs the PDU to automatically fall back to a static IP address if a DHCP server does not respond after 90 seconds.

Notes:

- If the PDU has the Static Address Fallback option enabled and no DHCP server is available when the PDU boots, DHCP lookup will stop, the PDU will fall back to a static IP address, and ZTP cannot proceed.
- When Static Address Fallback occurs, PDU network status will show as "Static IPv4" just as it would if DHCP were disabled.

Using the STIC File Format

The Server Technology INI Configuration (STIC) file format is a text-based configuration format used by Server Technology's Power Distribution Units (PDUs). A STIC configuration file holds configuration settings entered as properties with values that are grouped under descriptive section names.

Example:

```
[Server Technology INI Configuration]
restart: auto
[access]
access method: local only
```

File Naming

Although STIC configuration files must use the ".ini" file extension, any base file name is acceptable, such as file names that incorporate PDU MAC address, for example, sti-000a9c600064.ini.

File Editing

You can open and edit STIC configuration files for PDUs using any text editor. The file is recognized by its specific name and file extension.

Location of STIC Resources

From the Website:

The STIC resources needed for using ZTP are available for direct download from the Server Technology website at www.servertech.com.

The following links provide direct access to the configuration files you can use as templates for ZTP.

When you reach the website, click the **STIC Documentation** button. A zipped file containing three resource files (described below) will be available for downloading.

For Switched products:

<https://www.servertech.com/support/rack-pdu-firmware-downloads/switched-rack-pdu-firmware-downloads>

For Smart products:

<https://www.servertech.com/support/rack-pdu-firmware-downloads/smart-rack-pdu-firmware-downloads>

From the FTP Server:

The FTP URL for the STIC resources is:

ftp://ftp.servertech.com/pub/firmware/Sentry4/Version_8/Pro/

Links point to the same STIC Documentation downloads from the website, as previously described.

File Descriptions

When you click the **STIC Documentation** button on the website, the downloaded zipped file provides the following three resources to support the ZTP process:

Server Technology INI Configuration (STIC), v2.12.pdf

A PDF file that defines the general rules for working with the STIC configuration file format.

Reference.ini

This file has all STIC properties for each possible section, including those not supported by all PDUs, along with either lists of possible property values (for example, “enabled | disabled”) or the rule for forming a compliant property value (must be a valid ASCII string from 0 to 30 characters). It also includes notes on which version of STIC a section or property first appeared.

Notes:

- To avoid unintended configuration changes, Server Technology recommends that you do not use the Reference.ini file as is but instead edit the companion Template.ini file (described below) with your own custom parameters. When edited to uncomment and set properties as needed, the Template.ini file becomes your custom configuration template file.
- When loaded into an INI file aware editor, syntax highlighting will clearly display the sections and properties in this file; assisting in your review of all possible configuration options.
- As a guard against accidentally loading this file, it includes an invalid serial number. Until that serial number is either removed or replaced with a valid serial number, the file will be rejected.

Template.ini

This file can be used to create a configuration file applicable to multiple PDUs. All properties in this file are commented out (“;”) and, when processed, will be ignored until those comment characters are removed.

A typical programming editor will highlight the “section” entries of this INI file but will “gray-out” all the commented properties, however, when editing copies of this file, it should be straight-forward to uncomment and change desired properties as well as remove unneeded ones.

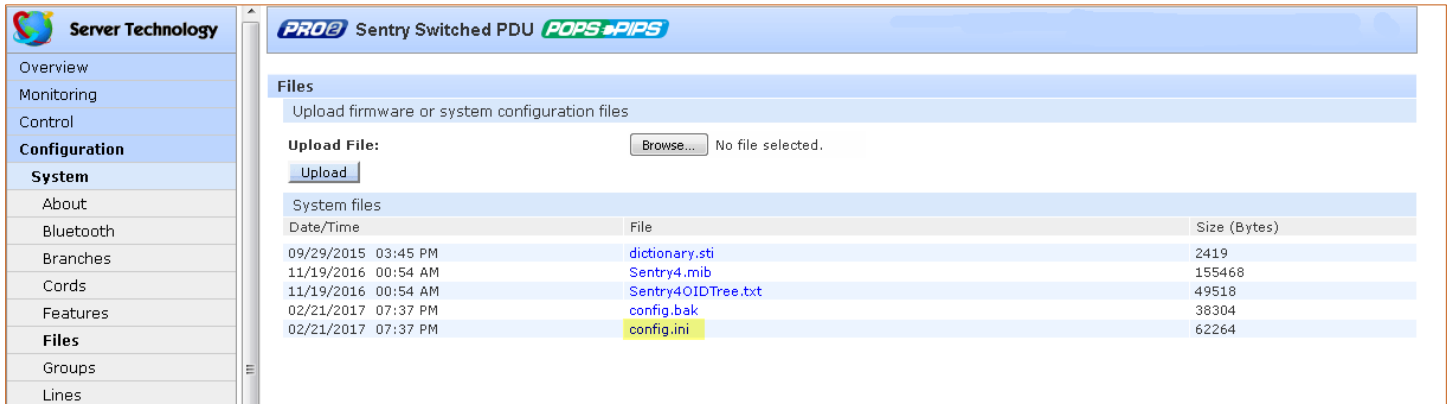
Notes:

- Except for the “;” on each property, only the header of this file differs from the Reference.ini file.
- Since all properties are commented out, you can use the Template.ini file as a test case: if loaded by ZTP unchanged, the PDU’s state will change from “Not Provisioned” to “Provisioned”.
- The Template.ini file is a helpful file to use for global changes (for example, firmware updates, setting time zones, etc.), but the file does not have the extra properties needed for specific PDUs (for example, repeated properties for multiple outlets). These PDU-specific properties would have to be added or merged from a PDU-pulled config.ini file.
- Starting from an existing config.ini file (pulled directly from a typical PDU), can be highly useful when you need to make changes to numerous branch and outlet properties.

- Alternatively, you can configure a single PDU, pull its config.ini file (see next section for instructions), and using it as a template by editing out the serial number, removing configuration details that are PDU-specific, and changing any general configuration details as needed to create a STIC configuration file that can be applied to multiple PDUs.

Downloading a Configuration File From a PDU

To download a current configuration file from any PDU, from the firmware's Web interface, go to the **Configuration > System > Files** page:



The screenshot shows the web interface for a Sentry Switched PDU. The left sidebar contains a navigation menu with options: Overview, Monitoring, Control, Configuration, System, About, Bluetooth, Branches, Cords, Features, Files, Groups, and Lines. The main content area is titled 'Files' and includes an 'Upload File:' section with a 'Browse...' button and the text 'No file selected.' Below this is a table of system files:

Date/Time	File	Size (Bytes)
09/29/2015 03:45 PM	dictionary.sti	2419
11/19/2016 00:54 AM	Sentry4.mib	155468
11/19/2016 00:54 AM	Sentry4OIDTree.txt	49518
02/21/2017 07:37 PM	config.bak	38304
02/21/2017 07:37 PM	config.ini	62264

Right-click the config.ini file (as highlighted in this example), and click the “Save Link As” option.

Initiating the ZTP Process

Step-by-Step Instructions

The following steps initiate ZTP on ZTP-enabled PRO1 and PRO2 PDUs:

1. Decide on the configuration for your PDUs and create the STIC configuration file with your required configuration changes.
2. Disperse the STIC configuration file to a TFTP server reachable by all ZTP PDUs.



Notes:

- The STIC configuration file can either be tailored to individual PDUs, or you can create one (or more) generic STIC files.
 - In the example configuration file URLs below, it is assumed the config files will be in a public “sti” subdirectory. However, where the .ini files are placed is completely your choice.
3. Configure the DHCP server used by the PDUs. In the examples below, an ISC DHCP server is assumed and only the dhcpd.conf file used for its configuration is considered. Note that the Server Technology ZTP actions do not depend on any particular DHCP server type.
 4. Power the PDUs and connect them to the serviced network. In about five minutes (exact time to be determined), verify all your expected ZTP changes have been made. If so, the PDUs are now configured.

File Examples

Editing the DHCP Config File

The following is an example ISC DHCP server `dhcpd.conf` file before making changes for Server Technology ZTP support:

```
#
# Example ISC dhcpd simple configuration file
#
#

ddns-update-style none;
ignore client-updates;

subnet 192.168.3.0 netmask 255.255.255.0 {
    range 192.168.3.10 192.168.3.29;
    option domain-name-servers 192.168.3.1;
    option domain-name "internal.example.org";
    option routers 192.168.3.1;
    option broadcast-address 192.168.3.255;
    default-lease-time 7200;
    max-lease-time 86400;
}
```

Now, you will need to add a Server Technology (`servertech`) option space with sub-options to the `dhcpd.conf` like this:

```
option space servertech hash size 3;
option servertech.identifier code 1 = text;
option servertech.ztp-url code 2 = text;
```

Next, any fixed IP addresses set by MAC address for individual `servertech` PDUs can be modified to return a STIC configuration file URL like this:

```
host stipdu-sn9600100 {
    hardware ethernet 00:0A:9C:60:00:64;
    fixed-address 192.168.3.50;
    vendor-option-space servertech;
    option servertech.identifier "STI Params";
    option servertech.ztp-url "tftp://192.168.3.1/sti/asile-1-template.ini";
}
```



Notes:

- Server Technology (`servertech`) ZTP additions are shown directly above in **bold**.
- The “`servertech.ztp-url`” can point to any valid file on the TFTP server. The file name must end with a “.ini” extension.
- The TFTP server in the URL can be specified by either a dotted quad, as shown above, or by using a fully qualified domain name (FQDN).
- In the above example, there is no need to match the `servertech` PDU’s `vendor-class-identifier`.

Also, a class can be added that dynamically handles each STI ZTP PDU in a custom way :

```
class "servertech-ztp" {  
  match if substring (option vendor-class-identifier, 0, 10) = "ServerTech";  
  vendor-option-space servertech;  
  option servertech.identifier "STI Params";  
  option servertech.ztp-url "tftp://192.168.3.1/sti/stic- $\{mac\}$ .ini";  
}
```

For the above case, and a PDU with MAC address 00-0A-9C-60-00-64, the file:

```
stic-000a9c600064.ini
```

will be expected on the TFTP server in a public "sti" subdirectory.

STI defined text macros of the form:

```
 $\{<name>\}$ 
```

can appear anywhere in the URL and are expanded by the PDU before the URL is used. As shown above, the $\{mac\}$ macro expands to the PDU's MAC address. The Server Technology PDUs can also expand the macro $\{sn\}$ to the PDU's serial number (e.g. "9600100"). Additional macros will be added and documented as needed.

A dhcpd.conf file that has both a general and individual STI PDU case might look like:

```
#  
# ISC dhcpd configuration file with STI PDU ZTP option 43 support  
#  
#  
  
ddns-update-style none;  
ignore client-updates;  
  
option space servertech hash size 3;  
option servertech.identifier code 1 = text;  
option servertech.ztp-url code 2 = text;  
  
class "servertech-ztp" {  
  match if option vendor-class-identifier ~ "ServerTech";  
  vendor-option-space servertech;  
  option servertech.identifier "STI Params";  
  option servertech.ztp-url "tftp://192.168.3.1/sti/stic- $\{mac\}$ .ini";  
}
```

```
subnet 192.168.3.0 netmask 255.255.255.0 {
  range 192.168.3.10 192.168.3.29;
  option domain-name-servers 192.168.3.1;
  option domain-name "internal.example.org";
  option routers 192.168.3.1;
  option broadcast-address 192.168.3.255;
  default-lease-time 7200;
  max-lease-time 86400;
}

host stipdu-sn9600100 {
  hardware ethernet 00:0A:9C:60:00:64;
  fixed-address 192.168.3.50;
  vendor-option-space servertech;
  option servertech.identifier "STI Params";
  option servertech.ztp-url "tftp://192.168.3.1/sti/asile-1-template.ini";
}
```



Note: With ZTP enabled, until a PDU has been successfully provisioned by ZTP, if a ZTP URL is returned by the DHCP server, the PDU will attempt to pull and apply the STIC file on every RESTART and on each DHCP lease renewal thereafter (beta release behavior is subject to change).

Using Sub-Option Headers

[In Development; TBD]

Two sub-options are available for DHCP option 43 data:

Sub-option 1: (optional) text ID, "STI Params"

Sub-option 2: ZTP URL text.

Confirmation of ZTP Configuration

The user can confirm that the PDU accepted and made changes via ZTP by looking at the Provisioned state on either the GUI or via the CLI.

Confirming with the GUI

To confirm the provisioning status using the GUI, go to **Configuration > Network > DHCP/IP**. Note that the ZTP field displays the provisioned state as either “Provisioned” or “Not Provisioned”, highlighted in this example:

The screenshot shows the configuration page for a Sentry Switched PDU. The left sidebar contains navigation options: Overview, Monitoring, Control, Configuration (selected), System, Network (selected), DHCP/IP (selected), Email/SMTP, FTP, HTTP/HTTPS, LDAP, RADIUS, SNMP, SNTP, Syslog, TACACS+, Telnet/SSH, ZTP, Access, and Tools. The main content area is titled 'DHCP/IP' and includes a 'Network configuration' section with fields for Network (Dual IPv6/IPv4), State (Static IPv4), Link (Up), Speed (1000 Mbps), Duplex (Full), Negotiation (Auto), Ethernet MAC Address (00-0A-9C-60-58-2C), Autocfg IPv6 Address (FE80::20A:9CFF:FE60:582C/64), IPv4 Address (10.1.2.58), IPv4 Subnet Mask (255.255.0.0), IPv4 Gateway (10.1.1.1), Primary DNS (10.1.5.133), and Secondary DNS (10.1.5.134). Below this is a 'Configure static IPv4/IPv6 settings' section with input fields for IPv6 Address, IPv6 Gateway, IPv4 Address, IPv4 Subnet Mask, IPv4 Gateway, Primary DNS, and Secondary DNS. The 'Configure DHCP settings' section includes checkboxes for DHCP, FQDN, Boot Delay, Static Address Fallback, and Zero Touch Provisioning (ZTP). The ZTP checkbox is checked and labeled 'Enable (Not Provisioned)', which is highlighted with a red box. 'Apply' and 'Cancel' buttons are at the bottom.

You can also confirm ZTP provisioning status at **Configuration > Network > ZTP**.

Confirming with the CLI

To confirm the provisioning status using the CLI, type **show network** and press **Enter**.

Note the Provisioned state (highlighted in the following example) is either “provisioned” or “not provisioned”.

Switched PDU: show network

Network Configuration

```
State:          DHCP IPv4          Network:          Dual IPv6/IPv4
Link:           Up                Negotiation:      Auto
Speed:          100 Mbps         Duplex:           Full
Ethernet MAC:   00-0A-9C-60-00-64
AutoCfg IPv6:   FE80::20A:9CFF:FE60:64/64
IPv4 Address:   192.168.3.50       Subnet Mask:      255.255.255.0
IPv4 Gateway:   192.168.3.1
DNS1:
DNS2:
```

Static IPv4/IPv6 Settings

```
IPv6 Address:   ::/64
IPv6 Gateway:   ::
IPv4 Address:   192.168.2.254   Subnet Mask:      255.255.255.0
IPv4 Gateway:   192.168.2.1
DNS1:           0.0.0.0
DNS2:           ::
```

DHCP Settings

```
DHCP:           enabled
FQDN:           enabled [sentry-600064]
Boot Delay:     disabled
Static Fallback: enabled
ZTP (0-Touch):  enabled (not provisioned)
```

Network Services

```
FTP Server:     enabled      Port: 21
FTP Updates:    disabled     Port: 21
SSH:            enabled      Port: 22   Auth: Password, Kb-Int
Telnet:         enabled      Port: 23
HTTP:           enabled      Port: 80
HTTPS:          enabled      Port: 443  Installed Cert: Self Generated
User Cert:      disabled
Stored Files:   None
User Passphrase: (none)

SNMPv1/2:       enabled      Port: 161  TrapPort: 162
SNMPv3:         disabled     Port: 161  TrapPort: 162
SPM Access:     enabled
```

Enabling and Disabling ZTP

To enable ZTP:

ZTP is enabled “out of the box” for PDUs running firmware version 8.0g or later.

To disable ZTP:

If for some reason you would like to disable ZTP, you can use either the firmware’s Graphical User Interface (GUI) or the Command Line Interface (CLI) as follows:

Using the GUI of the PDU to disable ZTP:

Go to **Configuration > Network > DHCP/IP > Zero Touch Provisioning (ZTP)** and clear the Enable checkbox.

The screenshot shows the configuration interface for a Sentry Switched PDU. The left sidebar contains a navigation menu with categories like Overview, Monitoring, Control, Configuration, System, Network, DHCP/IP, Email/SMTP, FTP, HTTP/HTTPS, LDAP, RADIUS, SNMP, SNT, Syslog, TACACS+, Telnet/SSH, ZTP, Access, and Tools. The main content area is titled 'DHCP/IP' and 'Network configuration'. It displays various network parameters such as Network (Dual IPv6/IPv4), State (Static IPv4), Link (Up), Speed (1000 Mbps), Duplex (Full), Negotiation (Auto), Ethernet MAC Address (00-0A-9C-60-58-2C), Autocfg IPv6 Address (FE80::20A:9CFF:FE60:582C/64), IPv4 Address (10.1.2.58), IPv4 Subnet Mask (255.255.0.0), IPv4 Gateway (10.1.1.1), Primary DNS (10.1.5.133), and Secondary DNS (10.1.5.134). Below these are sections for 'Configure static IPv4/IPv6 settings' and 'Configure DHCP settings'. In the DHCP settings, 'Zero Touch Provisioning (ZTP):' is checked and highlighted with a red box, with the status '(Not Provisioned)' next to it. Other DHCP settings include Enable checkboxes for DHCP, FQDN, Boot Delay, and Static Address Fallback.

You can also disable ZTP at **Configuration > Network > ZTP > Zero Touch Provisioning (ZTP)**.

Using the CLI of the PDU to disable ZTP:

At the CLI prompt, type **set ztp disabled** and press **Enter**.

You can verify enabled/disabled status at the CLI prompt by typing **show network** and pressing **Enter**.

```
Switched PDU: show network
```

Network Configuration

```

State:          Static IPv4      Network:        Dual IPv6/IPv4
Link:           Up              Negotiation:    Auto
Speed:          100 Mbps        Duplex:         Full
Ethernet MAC:   00-0A-9C-60-33-49
AutoCfg IPv6:   FE80::20A:9CFF:FE60:3349/64
IPv4 Address:   10.1.2.205      Subnet Mask:    255.255.0.0
IPv4 Gateway:   10.1.1.1
DNS1:           10.1.5.133
DNS2:           10.1.5.134
    
```

Static IPv4/IPv6 Settings

```

IPv6 Address:   ::/64
IPv6 Gateway:   ::
IPv4 Address:   10.1.2.205      Subnet Mask:    255.255.0.0
IPv4 Gateway:   10.1.1.1
DNS1:           10.1.5.133
DNS2:           10.1.5.134
    
```

DHCP Settings

```

DHCP:           disabled
FQDN:           enabled [sentry-603349]
Boot Delay:     disabled
Static Fallback: enabled
ZTP (<0-Touch>): disabled
    
```

Network Services

```

FTP Server:     enabled      Port:          21
FTP Updates:    disabled     Port:          21
SSH:            enabled      Port:          22      Auth:          Password, Kb-Int
Telnet:         enabled      Port:          23
HTTP:           enabled      Port:          80
HTTPS:          enabled      Port:          443      Installed Cert: Factory
User Cert:      disabled
Stored Files:   None
User Passphrase: <none>
SNMPv1/2:       enabled      Port:          161      TrapPort:     162
SNMPv3:         disabled     Port:          161      TrapPort:     162
SPM Access:     enabled
    
```

```
Switched PDU:
```

Configuring Automatic Updates

The ZTP default process is 1-time provisioning, but the Automatic Updates option (available in firmware version 8.0h and later), allows you to change ZTP to a continuous provisioning process.

Continuous provisioning means you can revise the configuration file (config.ini) as needed and push the file down through the ZTP process multiple times. ZTP will recognize the latest revisions in the configuration file, giving you the flexibility of a ZTP process for maintenance as well as for initial provisioning.

The Automatic Updates option works by allowing provisioning to occur based on a given hour: either every day or weekly (on any single weekday).



Note: The Automatic Updates option is designed for the Simple Network Time Protocol (SNTP). If you do not use SNTP, you can still configure the Automatic Updates option, but continuous provisioning will begin as follows:

Without SNTP Service:

For the “Everyday” option updates – continuous provisioning begins 24-hours from the time of the last RESTART.

For any weekly setting (any day) – continuous provisioning begins 7-days from the time of the last RESTART.

To set automatic updates:

The firmware is shipped with the Automatic Updates option disabled by default. When using ZTP, set desired values in the template.ini configuration file, and turn on automatic updates to make additional updates in the future.

The Automatic Updates option can be configured three ways, using the:

- STIC protocol,
- Firmware Graphical User Interface (GUI), or
- Firmware Command Line Interface (CLI).

Using the STIC protocol:

Download the STIC protocol template.ini file as described in the “Location of STIC Resources” section of this document. The STIC configuration file holds configuration settings entered as properties with values that are grouped under descriptive section names, such as [ztp].

Using any text editor, revise the settings for ZTP automatic updates as shown in the following sample of the template.ini file’s [ztp] section.

To make a property active, do the following:

1. Set the value as you want it for ZTP automatic updates.
2. Remove the comment characters (“;”) from the front of the property line you edited.
3. Save the file.
4. Push the file to the location where the PDU ZTP process will find it based on the DHCP information the ZTP process receives from the DHCP server.

ZTP section of templat.ini file:

[ztp]

;;automatic updates: disabled

; (v2.13) enabled | disabled

;;state reset: no

; (v2.12) yes | no (write only)

;;update scheduled day: everyday

; (v2.13) sunday | monday | tuesday | wednesday | thursday | friday | saturday | everyday

;;update scheduled hour: 12 am

; (v2.13) 12 am | 1 am | 2 am | 3am | 4 am | 6 am | 7 am | 8 am | 9 am | 10 am | 11 am | 12 pm | 1 pm | 2 pm | 3 pm | 4 pm | 5 pm | 6 pm | 7 pm | 8 pm | 9 pm | 10 pm | 11 pm

Using the Firmware GUI:

1. Go to **Configuration > Network > ZTP** to display the ZTP window.

The screenshot displays the Server Technology web interface. On the left is a navigation sidebar with categories: Overview, Monitoring, Control, Configuration, System, Network, DHCP/IP, Email/SMTP, FTP, HTTP/HTTPS, LDAP, RADIUS, SNMP, SNTP, Syslog, TACACS+, Telnet/SSH, ZTP, Access, and Tools. The 'ZTP' option is highlighted. The main content area shows the 'ZTP' configuration page for a 'PRO2 Sentry Switched PDU PIPS' device. The page title is 'ZTP' and the subtitle is 'Configure Zero Touch Provisioning options (DHCP required)'. The configuration includes:

- Zero Touch Provisioning (ZTP):** A checkbox labeled 'Enable' is checked, with the status '(Not Provisioned)' and a 'Reset' button.
- Automatic Updates:** A checkbox labeled 'Enable' is checked.
- Scheduled Day:** A dropdown menu is set to 'Everyday'.
- Scheduled Hour:** A dropdown menu is set to '12 AM'.

 At the bottom of the configuration area are 'Apply' and 'Cancel' buttons.

2. Note that “Zero Touch Provisioning (ZTP)” is the same field located at **Configuration > Network > DHCP/IP**. Either screen can be used to enable/disable ZTP and to view the “Provisioned” or “Not Provisioned” status. If ZTP was enabled on the DHCP/IP window, ZTP will also show as enabled on the ZTP window here, and you can bypass this field when setting automatic updates.
3. Check (or uncheck) Automatic Updates to enable (or disable) the option. When enabled, Automatic Updates takes priority over the “Provisioned” or “Not Provisioned” status.
4. Select the Scheduled Day of the week (or Everyday) for automatic updates to occur.
5. Select the Scheduled Hour of the day for automatic updates to occur.
6. Click **Apply**.

**Note:** Resetting ZTP

Reset is available only when ZTP is enabled. When reset to “Not Provisioned”, the PDU will attempt ZTP again after the next RESTART, behaving as it did prior to being provisioned.

After a PDU has been successfully provisioned by ZTP, to use the GUI to reset ZTP to re-provision the PDU again either after the next RESTART or next DHCP lease renewal, click the **Reset** button on the ZTP window.

Note that the PDU’s provisioned state (“provisioned” or, “not provisioned”) is not reset by disabling ZTP. When ZTP is re-enabled on a previously provisioned PDU, the state will still show as provisioned.

Using the Firmware CLI:

The same Automatic Updates options available on the GUI ZTP window can be issued from the CLI.

To view and issue menu options for ZTP:

At the CLI prompt, type **set ztp** and press **Enter**.

```
Switched PDU: set ztp
' set ztp ' menu options:
  autoupdate  disabled  enabled  resetprov
Switched PDU:
```

To enable ZTP automatic updates:

At the CLI prompt, type **set ztp autoupdate enabled** and press **Enter**.

```
Switched PDU: set ztp autoupdate enabled
Command successful
Switched PDU:
```

To disable ZTP automatic updates:

At the CLI prompt, type **set ztp autoupdate disabled** and press **Enter**.

```
Switched PDU:
Switched PDU: set ztp autoupdate disabled
Command successful
Switched PDU:
```

To set the date for ZTP automatic updates:

At the CLI prompt, type **set ztp autoupdate day** and press **Enter**.

```
Switched PDU: set ztp autoupdate day
'set ztp autoupdate day' menu options:
  sunday monday tuesday wednesday thursday friday saturday everyday
Switched PDU:
```

To set the hour for ZTP automatic updates:

At the CLI prompt, type **set ztp autoupdate hour** and press **Enter**.

```
Switched PDU: set ztp autoupdate hour
'set ztp autoupdate hour' menu options:
  12am 1am 2am 3am 4am 5am 6am 7am 8am 9am 10am 11am 12pm 1pm
  2pm 3pm 4pm 5pm 6pm 7pm 8pm 9pm 10pm 11pm
Switched PDU:
```

To reset ZTP:

At the CLI prompt, type **set ztp resetprov** and press **Enter**.

See the **Note** above, "Resetting ZTP".

```
Switched PDU: set ztp resetprov
  Command successful
Switched PDU:
```

To verify the values of the ZTP Automatic Updates option:

At the CLI prompt, type **show ztp** and press **Enter**.

```
Switched PDU: show ztp

Zero Touch Provisioning Configuration (DHCP required)

ZTP:          enabled (not provisioned)
Auto Updates: disabled
Update Day:   Everyday
Update Hour:  12 AM

Switched PDU:
```

To verify the status and provisioning state of ZTP

At the CLI prompt, type **show network** and press **Enter**.

```
Switched PDU: show network

Network Configuration

State:          Static IPv4      Network:        Dual IPv6/IPv4
Link:           Up                Negotiation:    Auto
Speed:          1000 Mbps         Duplex:         Full
Ethernet MAC:   00-0A-9C-60-58-2C
AutoCfg IPv6:   FE80::20A:9CFF:FE60:582C/64
IPv4 Address:   10.1.2.58           Subnet Mask:    255.255.0.0
IPv4 Gateway:   10.1.1.1
DNS1:           10.1.5.133
DNS2:           10.1.5.134

Static IPv4/IPv6 Settings

IPv6 Address:   ::/64
IPv6 Gateway:   ::
IPv4 Address:   10.1.2.58           Subnet Mask:    255.255.0.0
IPv4 Gateway:   10.1.1.1
DNS1:           10.1.5.133
DNS2:           10.1.5.134

DHCP Settings

DHCP:           disabled
FQDN:           enabled [sentry-60582c]
Boot Delay:     disabled
Static Fallback: enabled
ZTP (0-Touch): enabled (not provisioned)

Network Services

FTP Server:     enabled           Port:           21
FTP Updates:    disabled        Port:           21
SSH:            enabled           Port:           22   Auth:           Password, Kb-Int
Telnet:         enabled           Port:           23
HTTP:           enabled           Port:           80
HTTPS:          enabled           Port:           443  Installed Cert: Factory
User Cert:      disabled
Stored Files:   None
User Passphrase: (none)
SNMPv1/2:       enabled           Port:           161  TrapPort:      162
SNMPv3:         disabled        Port:           161  TrapPort:      162
Web Svc API:    enabled
SPM Access:     enabled
```

Contact Technical Support



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Server Technology, Inc.

1040 Sandhill Drive

Reno, Nevada 89521 USA

Tel: 1-800-835-1515

Fax: 775-284-2065

Web: www.servertech.com

Email: support@servertech.com

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