**Alcatel·Lucent**

Enterprise

# Application Note

Zero Touch Provisioning (ZTP) Server
For laptop
OmniSwitch AOS release 8
OmniAccess Stellar AWOS 4.0.3
(VM for Windows 10)

**Alcatel Lucent Enterprise**

**Alcatel Lucent Enterprise OmniSwitch release 8.8 /release 5.1**

**Alcatel Lucent Enterprise Omni Access Stellar version 4.0.3**

**ZTP Server version 1.7**
**November 2021**

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# Introduction

This application note describes the installation of a stand-alone virtual machine on a maintenance PC, functioning as a Zero Touch Provisioning (ZTP) server, and explains the easy deployment of a small to medium-sized data network using the latest generations of Omniswitch 6360, 2260 and 2360 and the latest generations of OmniAccess Stellar AP13XX 6 WiFi access points. This server allows easy update and provisioning of each ALE device with the Zero Touch Provisioning (ZTP) function available in AOS release 8, release 5 and in Stellar version 4.0.3.

This installation is license-free and provides an answer for easy deployment for small and medium-sized SME deployments, up to 300 users, and exclusively uses unlicensed software and open-source software modules for the ZTP server.

It provides a ready-to-use LAN and WLAN network which can be managed further via the Web through Webview2.0 GUI for AOS8 OmniSwitches, AOS5 OmniSwitches, and through Stellar WebGUI for the Stellar access point group managed in Express mode .

## *Schema*
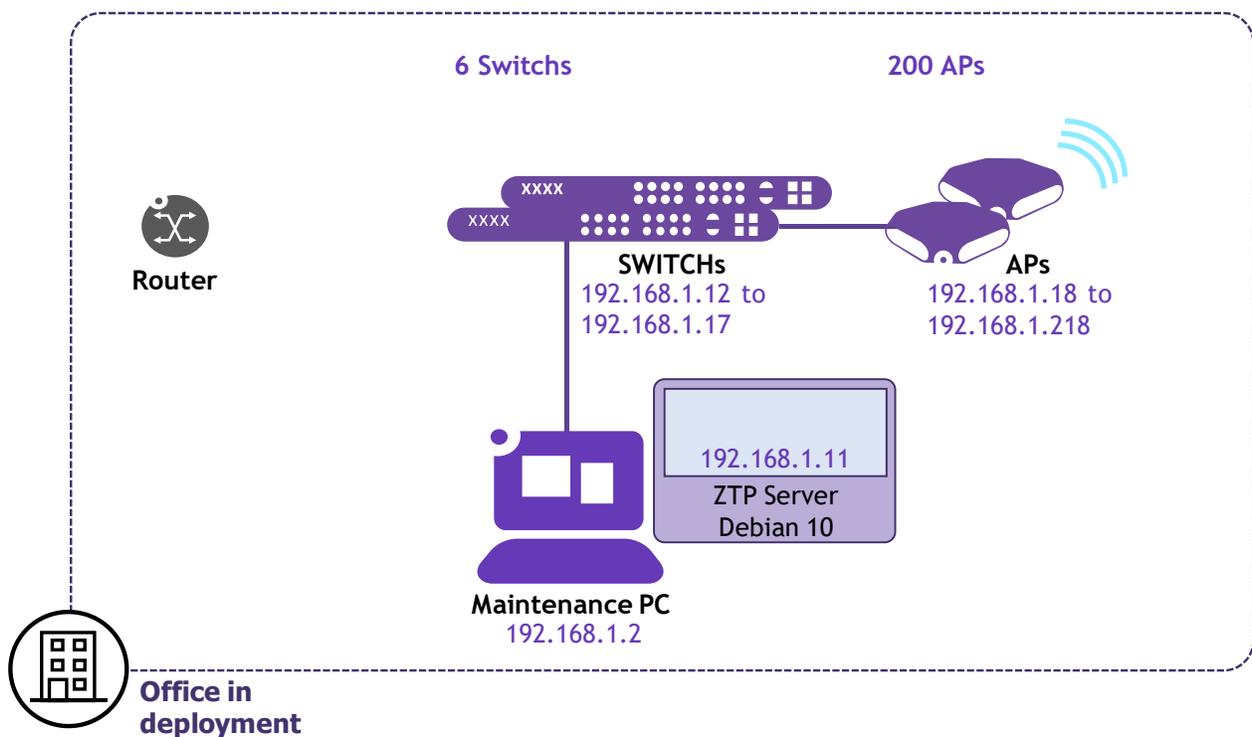
## Prerequisites

## Maintenance PC with ZTP Server

The prerequisites for the maintenance PC are based on the latest Windows systems and the latest virtualization tools available on the Internet.

**Host:** Windows 10 Professional; X64 processor with 16GB of RAM. BIOS / firmware settings should enable virtualization on laptop processor. Reboot the host if this BIOS / firmware setting disables virtualization and refer to the laptop manufacturer's guide to enable virtualization.

**Hypervisor:** Oracle VM Virtualbox version 6.1; Oracle VM Virtualbox version 6.1 executable is available free for laptop use, and the binaries can be found directly here: https://www.virtualbox.org/wiki/Downloads

In term of functionalities, Oracle VM Virtualbox version 6.1 includes everything you need to run a standard ova-format virtual machine.

**VM:** ZTP Server in ova format

The ova file is built from the VA assistant deployed in one of our data centers in Brest on ESXi hypervisor. The ZTP server ova archive for Oracle VM Virtualbox is:

ZTP Server v17.ova (1230Mb)

|  | VMware Workstation 16 installation |
|---|---|
| CPU | one core |
| Memory | 2Gb |
| NICs | 1 |
| Hypervisor | Oracle VM Virtualbox |
| Hard Disk size | 8Gb |

**FTP client:** any free FTP client application for Windows 10 that offers fast installation and basic setup for file transfers with ZTP server. Filezilla server / client for example is a common FTP software for laptops.

You will need a FTP client on the PC to manage your configuration files and transfer your binaries updates for OmniSwitches and Stellar access points. An example is detailed further.

## Virtual Machine content

ALE provides this ZTP server in an ova format for the Oracle VM Virtualbox hypervisor. This virtual machine is Debian 10 x64 and it contains the following modules:

**DHCP**: Isc-dhcp server configured with boot options for six OmniSwitches and 200 Stellar access points

**TFTP:** openbsd tftp server for OmniSwitch and Stellar ZTP using TFTP method only

**FTP:** vsftp server for OmniSwitch and Stellar ZTP using the FTP method. The FTP server is also used for instruction files, configuration files and firmware uploaded from the PC. FTP is not over TLS for reason of simplicity.

**HTTP:** apache2 server for Stellar ZTP using the HTTP method. The HTTP server is also used to interface with ZTP server via Web browser on laptop. HTTP is not over TLS for reason of simplicity.

**Templates for configurations and Images:**    Configuration files for OmniSwitch and Stellar ZTP are available under: **/ home / edemo / ztp / configurations** and are accessible via FTP by connecting with **edemo** user. The last images for OmniSwitch (AOS8.8 and AOS5.1) and Stellar(AWOS 4.0.3) are placed under: **/ home / edemo / ztp / firmwares**

Instruction files for ZTP (TFTP, FTP or HTTP methods) are also available and don't need to be edited.

# Guideline

## Virtual Machine installation & launch

You must be administrator of the maintenance PC for the following manipulations.

## Virtual Machine installation

Start configuring your virtual machine by launching Oracle VM Virtualbox on your PC. Import the appliance to your hypervisor.

Click **File > Import appliance**

Select last .ova file directory on your PC (**ZTP_Server_v1_7.ova** here) and click **Import**
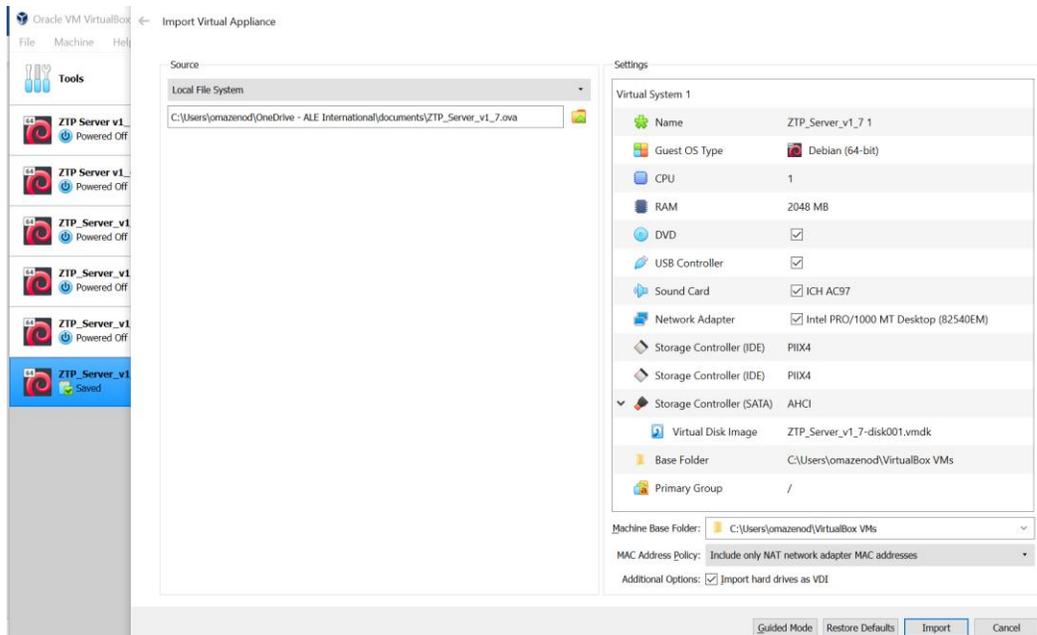


ZTP Server then will be added in your appliance library

## Launch ZTP server on maintenance PC

Recover **ZTP-Server-win10.bat** batch file for Windows 10 from **ALE MyPortal** website and run it as administrator.

Click right **ZTP-Server-win10.bat > Run as administrator**

The batch file launchs ZTP appliance if not already launched and will configure your PC to adapt it to local network for provisioning. ZTP server is preconfigured for a **local 192.168.1.0/24 network** with @IP = 192.168.1.11 for the server, @IP = 192.168.1.2 for ethernet network adapter and with default router with @IP = 192.168.1.1.

ZTP batch configures Windows 10 Defender exceptions to manage rules allowing all ZTP protocols traffic between ALE equipment to provision and ZTP server. IP protocols involved are DHCP, TFTP, FTP and HTTP and require rules for outgoing and for incoming traffics.

ZTP batch tests connectivity with equipment and launch the **ZTP welcome page** on browser if ethernet adapter is active.
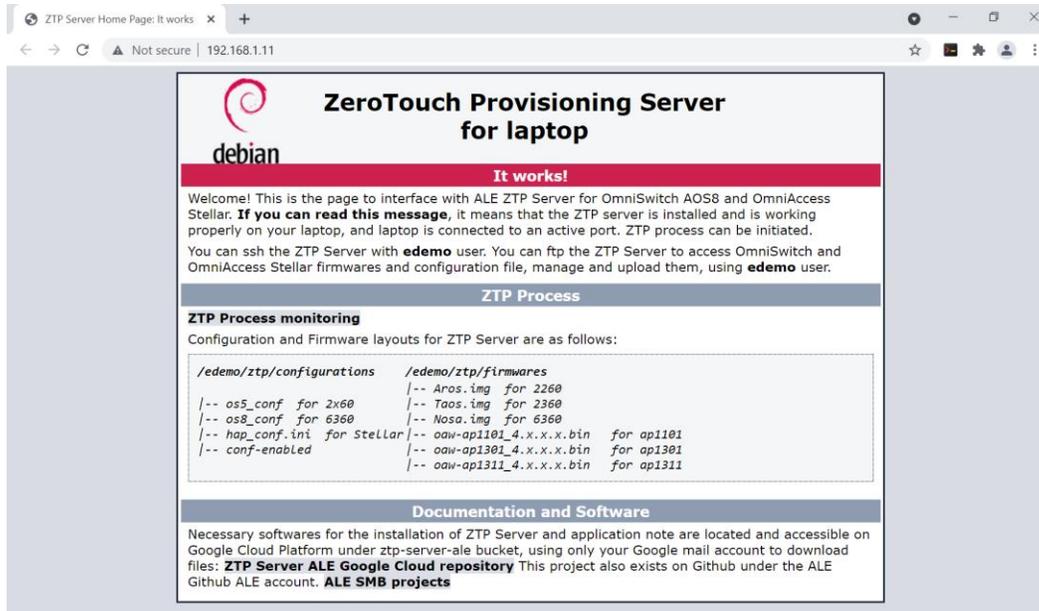


ZTP Server is ready for use!

## ZTP Server default configuration

DHCP server is pre-configured and recognizes Stellar access points, OmniSwitch AOS8 and OmniSwitch AOS5 MAC address. Any other equipment is refused. The ZTP server comes with DHCP service active and enabled.

**DHCP service overview:**
subnet is 192.168.1.0
mask is 255.255.255.0
Scope for Omniswitches is:    **192.168.1.12 - 192.168.1.17**
Scope for Stellar is:              **192.168.1.18 – 192.168.1.218**
Boot servers are:                  **192.168.1.11**

All configuration files and firmware images can be found under: **/ home / edemo / ztp (edemo** user)

FTP methods and HTTP methods remain the fastest methods for provisioning with firmwares upgrading.

Prepare your equipment to ZTP

## Binaries provisioning

**ZTP Server version 1.7** includes latest GA AOS8 and AOS5 images for OmniSwitches:
**Nosa.img**    R8.8.257R1 image file for os6360
**Aros.img**    R5.1.44R2 image file for os2260
**Taos.img**    R5.1.44R2 image file for os2360
**Rescue.img** rescue file
**software.lsm** software description
and eventually **imgsha256sum** checksum file.

**ZTP Server version 1.7** includes latest GA AWOS4.0.3 images for OmniAccess Stellar:
**OAW-AP1101_4.0.3.28.bin**    image file for AP1101
**OAW-AP1301_4.0.3.28.bin**    image file for AP1301
**OAW-AP1311_4.0.3.28.bin**    image file for AP1311

You can obtain also latest GA releases for OmniSwitches and OmniAccess Stellar from **ALE MyPortal** website. Extract the archives into a directory on your PC and upload all files to the ZTP server using **edemo** user account with **1234567890** password to transfert binaries. In that case for OmniSwitches enter the version to provision in **os8_ins.alu os5_ins.alu** files. Download files from server and modify the firmware version line (in our example `Firmware version:OS_8_8_257_R1` for AOS8)
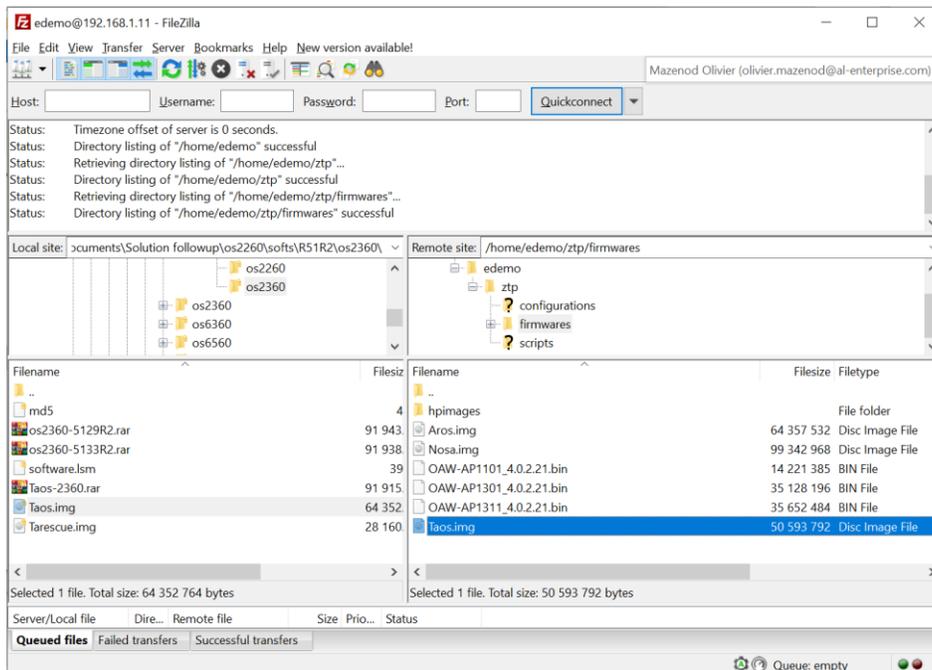
## Configurations templates

Default configuration templates already installed for OmniSwitches AOS8 and AOS5 provides the establishment of:

A **management VLAN 1**, the access to switches via **console**, **ssh** or **Webview2.0**, **automatic QoS** for ALE IP phones, **enable the PPoE** on all ports and the automatic **shutdown of AOS auto-fabric** process. This configuration allows Stellar access points to be provisioned regardless of the fast poe / ppoe port of switches to which they are connected.

The administrator always has the possibility of adapting this basic configuration at his convenience. Download the **os8_conf** or **os5_conf** files from ZTP Server to adapt the files.

For OmniAccess Stellar access points, main changes to provide for AP group are usually: the **country code** for regulation, **GMIP IP** configuration for the group, and **GMIP netmask** if maintenance is performed in a different subnet from the final network.

Download **hap_conf.ini** file from ZTP Server to adapt the file for targeted network. In our case country **code is FR**, **GMIP** for AP group management will be **192.168.42.211** with **netmask 192.168.42.192**.
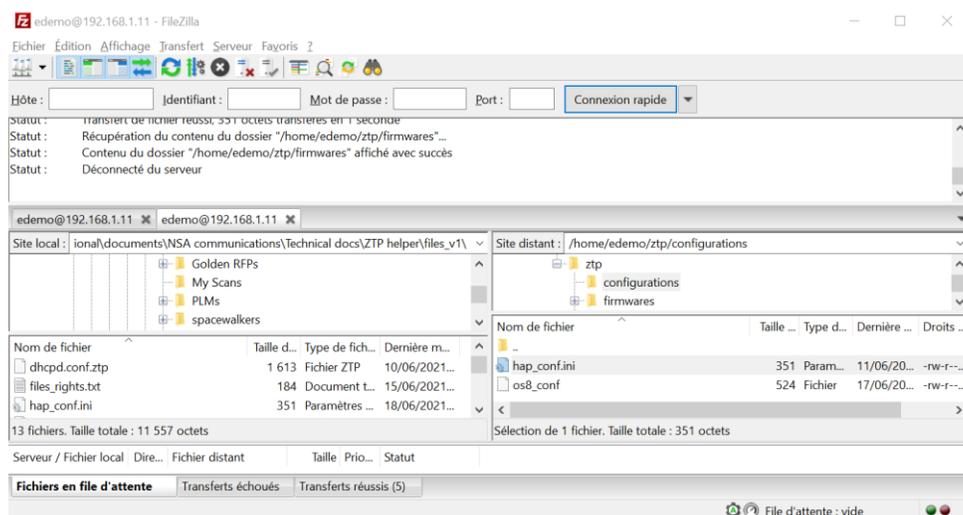
```
C:\Users\omazenod\OneDrive - ALE International\documents\NS...

Fichier  Édition  Recherche  Affichage  Encodage  Langage  Paramètres  Outils  Macro
Exécution  Modules d'extension  Documents  ?                                    X

software.lsm    os8_conf    hap_conf.ini

    1    config ap
    2        option countrycode 'FR'
    3        option clustervip '192.168.42.211'
    4        option vip_netmask '255.255.255.0'
    5        option password 'switch'
    6
    7    config wifi-iface "staff"
    8        option ssid 'staff_ebc_ZTP134567890'
    9        option key '1234567890'
   10        option network 'vlan1'
   11
   12    config wifi-iface "guest"
   13        option ssid 'guest_ebc_ZTP1234567890'
   14        option key '1234567890'
   15        option network 'vlan1'

Ln : 2   Col : 1   Sel : 103 | 3          Windows (CR LF)    UTF-8        IN
```

## ZTP process

### Connectivity with ZTP Server

For a proper connectivity first disconnect the switch(s) to provision from their uplinks if exist and connect the maintenance PC to a switch. All stellar access points to provision can be already connected to their ppoe/poe ports, or connected after. Once link on VLAN1 will establish they will request their IP configuration.

### ZTP boot process
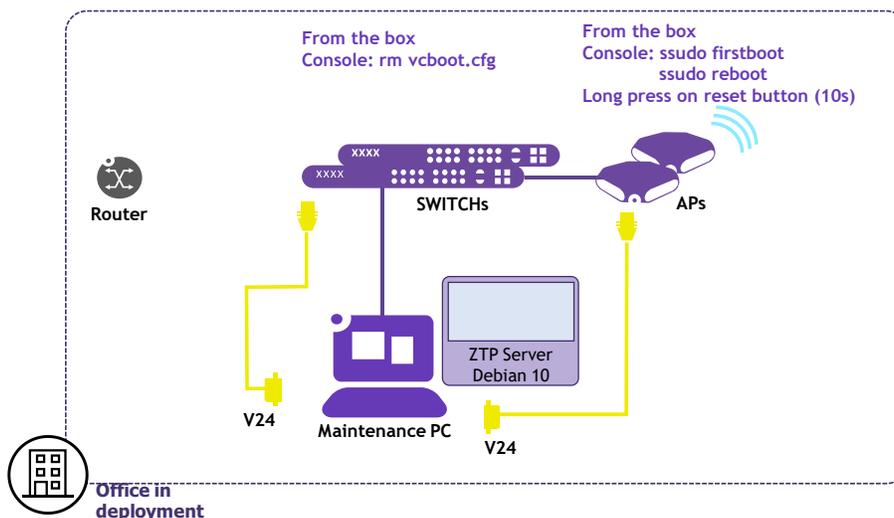
Perform a factory reboot for all AOS8 switch and Stellar access points to provision.

**ALE Equipment from the Box with no existing configurations**

OmniSwitch(s) and OmniAccess Stellar from the box perform automatically a factory reset and will request automatically for ZTP.

**OmniSwitches and OmniAccess Stellar with existing configurations**

You need to remove the existing `vcboot.cfg` file on OmniSwitches if present (save the existing configuration if require).

From OmniSwitch console:
```
>cd working
>rm vcboot.cfg
>reload from working no rollback-timeout
```

You need to perform factory boot on Stellar access points.
From OmniAccess Stellar console with **support** account.
```
>ssudo firstboot
>ssudo reboot
```

Stellar factory reboot can be done also with reset button (long press on reset button-10 seconds minimum)

**Important:**

**Entire ZTP process (updating firmwares and configuring equipment) takes almost 15 minutes** with automatic reload for OmniSwitches to apply configurations and copy to certify partition.

> VLAN 1, with QoS on all ports, PPoE active on supported ports.

> Broadcast of default SSIDs, one for staff and one for guests by default.

Once ZTP process completed, the maintenance PC can be disconnected and OmniSwitches and Stellar access points can be connected to their network equipped with standard external DHCP in order to take over with IP configurations.

# Annexes

**Tested with**
OmniSwitch OS6360-P24
OmniSwitch OS2260-P10

OmniAccess Stellar AP1201, AP1311

**ALE MyPortal** repository exists for software and documentation download from the partner MyPortal account: https://al-enterprise.lightning.force.com
This project also exists on GitHub under GitHub ALE account (documentation only):
https://github.com/olivier-github92/smb-projects

The VM build and related files are accessible from **Taxonomies > Network Management** menu:
VM build:                                ZTP_Server_v1_7.ova
Batch Windows 10 & release note:        ZTP-server-win10.bat
App note:                                app-note-ZTP-Server.pdf

## Document History

**Ed1.0 june 2021**                      Document creation
**Ed1.7 november 2021**                  ZTP Server v1.7 with batch Windows 10 and Web interface
                                         update for AWOS4.0.3, AOS8 R8.8R1, AOS5 R5.1R2