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[Dell Force10 Part 1: Initial Configuration](#)

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When it comes to networking Dell has two main series of switches. PowerConnect/N-series, which run DNOS 6.x operating system. And S/Z-series switches, which run on DNOS 9.x derived from Force10 OS (FTOS). In this series of blogs we will go through the configuration of Force10 switch series and use Dell S4048-ON top of the rack switch as an example.

Interesting to note, that unlike other S-series switches S4048-ON is an Open Networking switch. Dell is one of the first companies which apart from its own OS lets customers run other operating systems on its network switches, such as Cumulus Linux OS and Big Switch Networks Switch Light OS. While Cumulus and Big Switch has its own use cases, in this blog we will look specifically at configuring FTOS.

Boot process

S4048-ON comes from the factory pre-configured for bare metal provisioning (BMP). This is what you will see when you boot the switch for the first time:

```
This device is in Bare Metal Provisioning (BMP) mode.
BMP is attempting to download an image, configuration file or boot script using
DHCP.

To continue with the standard manual interactive mode, it is necessary to abort
BMP.
Press A to abort BMP now.
Press C to continue with BMP.
Press L to toggle BMP syslog and console messages.
Press S to display the BMP status.
[A/C/L/S]:
```

If you just want to boot FTOS, simply skip the BMP by choosing A and switch will boot the OS.

After some time BMP will time out. If you've missed the above wizard, you can also disable BMP from CLI using the following commands:

```
> enable
# stop bmp
# config
# reload-type normal-reload
# exit
# reload
```

When prompted choose to save the configuration and proceed with reload. After the switch has rebooted check that the next boot is set to normal reload:

```
# show reload-type
```

Initial configuration

First steps of any switch installation is assigning a hostname and management interface settings:

```
# hostname DELL4048-SWITCH
# int managementethernet 1/1
# ip address 172.10.10.2/24
# no shut
# management route 0.0.0.0/0 172.10.10.10
```

Then set admin / enable passwords and allow remote management via SSH:

```
# enable password 123456
# username admin password 123456
# ip ssh server enable
```

Configure time zone and NTP:

```
# clock timezone UTC 11
# ntp server 172.10.10.20
# show ntp associations
# show ntp status
# show clock
```

Firmware upgrade

Force10 switches have two boot banks A: and B:. It's a good practice to upload new firmware into one boot bank and keep the old firmware in the other in case you need to roll back.

The easiest way to upgrade is via TFTP using Tftpd64, which you can download for free from [here](#). If you're upgrading an existing switch, make sure to save the running config and make a backup. If it's an initial install you can skip this step.

```
# copy run start
# copy start tftp://10.0.0.1/FORCE10_SWITCH_01.01.16.conf
```

Then upload new firmware to image B:, change active boot bank to B: and reload:

```
# show version
# show boot system stack-unit 1
# upgrade system tftp://10.0.0.1/FTOS-SK-9.9.0.0P9.bin b:
# conf t
# boot system stack-unit 1 primary system b:
# exit
# reload
```

You will be prompted to save the configuration and reboot. After the reboot you may be asked to enable SupportAssist. SupportAssist helps to automatically open Dell service tickets if there is a switch fault. You can enable SupportAssist by running the following commands and answering prompts:

```
DELL4048@ben
Password:

The SupportAssist EULA acceptance option has not been selected. SupportAssist
can be enabled once the SupportAssist EULA has been accepted. Use the:
'support-assist activate' command to accept EULA and enable SupportAssist.
```

```
# conf t
# support-assist activate
# support-assist activity full-transfer start now
# show support-assist status
```

My pair of switches were configured in a Virtual Link Trunking (VLT) domain. I'll explain how VLT works later in the series. But from the upgrade point of view, each switch in a VLT domain is treated as a separate switch and has to be upgraded separately. If you decided to use a stack instead of VLT, you can find the upgrade process for a Force10 stack in my other post about Dell MXL switches [here](#).

Spanning tree

Spanning Tree Protocol (STP) helps to prevent network topology loops and is highly recommended for use in any network. Switches connected in an actual loop topology in today's networks are rare. But STP can save you from consequences of a potential human error, such as port channel misconfiguration. If instead of creating one port channel with two links, you by mistake create two port channels with one link each and both carry the same VLANs, you've accidentally created a loop, which will bring your whole network to an immediate halt.

It's a good practice to enable STP as a safeguard mechanism from such configuration errors. S4048-ON supports STP, RSTP, MSTP and PVST+. In my case S4048s were uplinked into HP core, which supported STP, RSTP and MSTP. If you have Cisco switches in your network core you can use PVST+. In my case I used RSTP, which is a good choice if you don't require enhancements of MSTP and PVST+ in your network. Just make sure to not use the basic STP protocol, as it provides the slowest convergence.

```
# protocol spanning-tree rstp
# no disable
# show spanning-tree rstp
```

In every STP topology there is also a root switch, which by default is selected automatically. For a more deterministic STP behaviour it's recommended to select the root switch manually, by assigning the lowest STP priority to it. Typically your core switch should be your root switch. In my case it was a HP core switch, which was assigned priority of "0".

When configuring server and storage facing ports make sure to enable EdgePort mode to minimize the time it takes for the port to come online:

```
# int range Te1/45-1/48
# spanning-tree rstp edge-port
# switchport
# no shut
```

If you want to know more about how STP works, you can read a few of my previous blog posts on STP [here](#) and [here](#).

Flow control

To avoid dropped packets on 10Gb switch ports at times of potential heavy utilization it is also a best practice to as a minimum enable bi-directional Flow Control on the storage array ports. I enabled it on the iSCSI links connected from the Dell Compellent storage array:

```
# int range Te1/17-1/18
# flowcontrol rx on tx on
```

If you specifically interested in switch best practices for Compellent and EqualLogic storage arrays, Dell has a full list of guides for various switches at communitites wiki [here](#).

Port channels and VLANs

Port channels and VLANs are configured similarly to any other switch, but I include them here in case you want to know the syntax. In this example we have two access ports 1/46 and 1/47 and an uplink to the core configured as port channel 1:

```
# interface port-channel 1
# switchport
# no shutdown

# interface range Te1/1-1/2
# port-channel-protocol LACP
# port-channel 1 mode active
# no shutdown

# int vlan 254
# untagged Te1/46-1/47
# tagged po 1
```

Keep in mind, that port channels are used either in one switch configurations or when two or more switches are stacked together. If you're using Virtual Link Trunking (VLT), you will need to create Virtual Link Trunks (VLTs). Which are similar to port channels, but have a slightly different syntax. We will talk about VLT in much more detail in the following Force10 blogs.

Conclusion

One feature which I didn't specifically mentioned in this blog post was Jumbo Frames. I tend not to use it in my deployments until I see convincing evidence of it making a difference for iSCSI/NFS storage implementations. I did a post about Jumbo Frames long time ago [here](#) and hasn't changed my opinion ever since. Interested to here your thoughts if have a different take on that.

References

- My blog:
 - [Jumbo Frames justified?](#)

- [Spanning Tree Protocol Overview](#)
- [How STP and RSTP converge](#)
- [Force10 MXL: Firmware Upgrade](#)
- External sources:
 - [Switch Configuration Guides for PS Series or SC Series SANs](#)
 - [Dell Networking S4048-ON: Switch Configuration Guide for Dell SC Series iSCSI SANs](#)