

Bare Metal Provisioning Configuration

Dramatically reduce time to deploy new network switches.

Today's data center networks are undergoing significant change as companies are adopting new IT technologies and operational models such as cloud computing, virtualization and SaaS. The benefits of these new technologies – more flexibility, improved responsiveness, and greater agility – typically come at the price of more complexity. This results in higher operational expense as additional network management resources are required to manage this more complex network infrastructure.

Force10 Networks' Open Automation Framework helps customers fully realize the benefits of these new technologies without the added cost of more complexity. By automating network management tasks, Open Automation reduces complexity and increases the reliability of complex network infrastructure.

Bare Metal Configuration Provisioning, a key part of the Force10 Open Automation Framework, is designed to help network administrators minimize complexity, reduce

the time required to manage complex networks and enforce policy-based configuration by automatically loading pre-defined configurations that are stored on a Configuration Management Database (CMDB) server on to Force10 switches.

Minimize Network Complexity

Managing a network with a small number of network switches is relatively simple. But as the number of network devices increases, the effort required to manage the network also increases. It becomes critical that switches are configured in a similar fashion to maintain network performance and reliability. Bare Metal Provisioning helps network administrators minimize network complexity by giving them the tools required to ensure network devices are configured in a consistent manner.

Reduce Installation Time

Bare Metal Provisioning dramatically reduces the time required to install and configure network

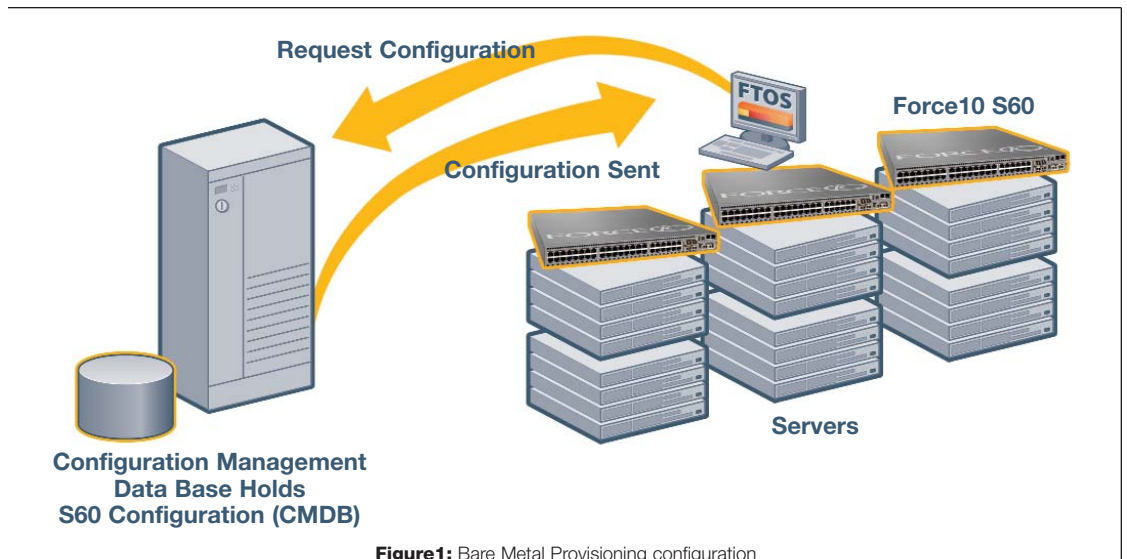


Figure1: Bare Metal Provisioning configuration

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switches. Instead of requiring network administrators to manually configure network switches, Bare Metal Provisioning performs bare metal configuration by searching the network for a valid configuration file and approved version of FTOS operating system. Upon identifying the approved configuration file and operating system, the switch automatically configures itself, saving the network administrator hours of time.

Enforce Policy-based Configuration Management

Standardizing network device configuration is critical to managing a highly available, complex network infrastructure. By ensuring network devices are configured in a similar manner, network administrators can deploy a highly available network infrastructure to meet their customer's demanding needs. Network administrators can define a network configuration, then use Bare Metal Provisioning to ensure every network device is configured accordingly.

Bare Metal Provisioning on the S60

Bare Metal Provisioning simplifies the process of switch installation and management in large, complex networks in the following key areas:

- Obtaining IP address, running configuration and boot image information from a DHCP server.
- Allowing access to the switch through an Ethernet data port, with or without DHCP-based dynamic IP address configuration of the user device.
- Booting up in Layer 2 mode with interfaces already in no shutdown mode and with some basic protocols enabled to protect the switch and the network.

Upon initial power-up, the switch boots up in Client mode (Mode C) by default. The network switch then retrieves its boot file and configuration information from a DHCP server and downloads that information from the TFTP server.

Each network switch has its own configuration file and is automatically connected to the management network.

After the switch has been loaded and booted up with the desired FTOS image and configuration files, the implemented auto-configuration mode remains in the NVRAM. If the network switch undergoes an automatic reload, the network switch will reload in the previously used mode. There are several different auto-configuration modes available:

Normal mode (Mode A)

The network switch loads the FTOS image on the flash and boots up with the start-up configuration file on the flash. New configurations require that the Management IP and Management Interface IP addresses be configured. There is no DHCP interaction for this mode.

Server mode (Mode B)

The switch loads the FTOS image from the flash and acts as DHCP server with a temporary Management IP address, allowing connectivity to a user device to configure the startup configuration. The temporary Management IP must be replaced with a user configured Management IP address.

The network switch loads the base startup configuration (as in Mode A) and a DHCP configuration is loaded so the network switch acts as a DHCP server. The user can then connect to the network switch and manually configure the network switch.

Client mode (Mode C)

The switch loads without using the startup configuration on the flash and connects to a DHCP network server containing the required FTOS and startup configuration files. These files are downloaded to the network switch and the network switch is reloaded with those images. Client mode (Mode C) is the default boot mode when a new system arrives from the factory. Mode C requires DHCP and TFTP servers already

Enforce policy-based network device standardization.

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be configured and contain the desired FTOS image and startup configuration file.

If the switch cannot reach the DHCP server, or the TFTP network server does not contain the files, the switch reverts to Server mode (Mode B) enabling the user to configure the network switch directly.

When loading the FTOS image, if the FTOS image on the TFTP server is different from the image on the local flash, the switch downloads the image from the server onto the local flash and reloads using that image. If it is the same image, the network switch reloads from the flash without downloading a new image.

When booting up, the network switch determines if the ignore-startup-config option is implemented, which tells the network switch not to use the startup-configuration file on the local flash. The network switch retrieves the startup configuration file according to the hostname-specific file name (for example, switch33.config for hostname switch33). The switch executes the startup configuration file from the TFTP server, but does not store a copy.

If ignore-startup-config is not implemented, the switch executes the startup configuration file on the local flash.

Client only mode (Mode D)

The network switch loads without using the startup configuration on the flash and connects to a DHCP server containing the required FTOS and startup configuration files. These files are downloaded to the network switch and the network switch is reloaded with those images. If, however, no DHCP server responds, the network switch remains a DHCP client. Client only mode (Mode D) works similarly to Mode C. Mode D requires that DHCP and TFTP servers already be configured and contain the desired FTOS image and startup configuration file.



Figure 2: Force10 S60 Switch

If the switch cannot reach the DHCP server (number of tries is specified when configuring the DHCP server), or the TFTP server does not contain the files, the network switch reverts to Mode A, awaiting direct configuration by the user.

When loading the FTOS image, if the FTOS image on the TFTP server is different from the image on the local flash, the network switch downloads the image from the server onto the local flash and reloads using that image. If it is the same image, the network switch reloads from the flash without downloading a new image.

When booting up, the network switch determines if the ignore-startup-config option is implemented, which tells the switch not to use the startup-configuration file on the local flash. The network switch retrieves the startup configuration file according to the hostname-specific file name (for example, switch33.config for hostname switch33). The network switch executes the startup configuration file from the TFTP server, but does not store a copy.

If ignore-startup-config is not implemented, the network switch executes the startup configuration file on the local flash.

Availability

Automated Bare Metal Configuration is supported on Force10's more recent products, including the S-Series S60 Top of Rack GbE Switch.

Eliminate human error and simplify network management.



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