

## How Do I Upgrade Firmware and Save Configurations on PowerConnect Switches?

This Application Notes relates to the following Dell PowerConnect™ products:

- PowerConnect 33xx
- PowerConnect 52xx

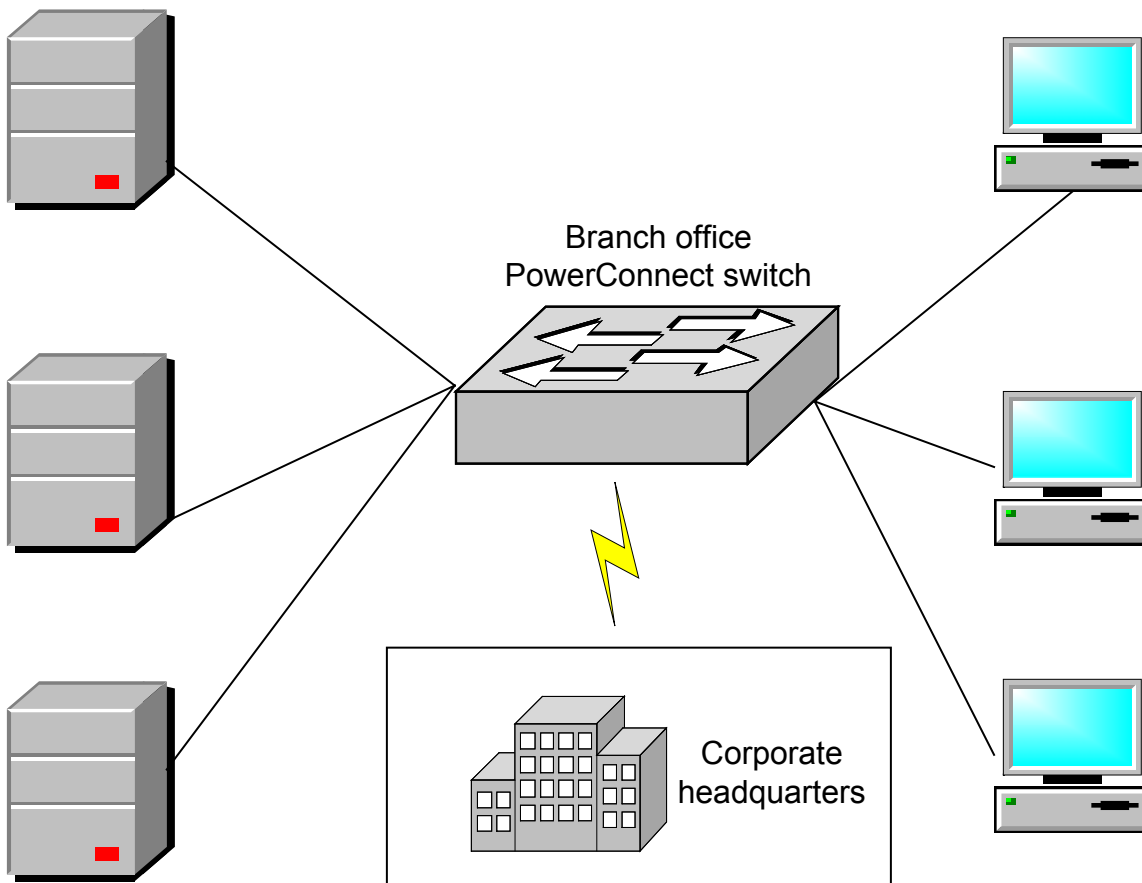
### Abstract

This application note explains how to use the trivial file transfer protocol (TFTP) to upgrade firmware and save configuration files for Dell PowerConnect switches. This document also provides step-by-step instructions for transferring files to and from a remote TFTP server.

### Applicable Network Scenarios

Upgrading software and backing up configurations are mandatory tasks in any production network environment. As networks grow, it becomes increasingly important to store software images and switch configurations in a central location on the network, as opposed to physically accessing each device with low-speed serial links.

Consider the example given in the diagram below, where a branch office has one PowerConnect switch but no technical staff onsite. The lack of a TFTP server introduces a business problem: Anytime a software upgrade is needed for this switch, the enterprise must go to the trouble and expense of sending a technician onsite to perform the upgrade. The enterprise also cannot maintain a record of configuration changes over time since there is no external machine for storing different configuration files.



Traveling to even one branch office to upgrade firmware is an inefficient use of time and resources, and this problem only becomes more acute as the enterprise grows. TFTP helps address this problem by providing a mechanism for central storage and distribution of software images and configuration files.

## Technology Background

The trivial file transfer protocol (TFTP), as defined in the Internet Engineering Task Force Request for Comment 1350 (RFC 1350), provides a simple mechanism for transferring files that uses the underlying user datagram protocol (UDP). Since UDP is a connectionless protocol, TFTP provides all error checking and flow control. If an error occurs during a TFTP transmission, the connection must be terminated and the transfer must be restarted. Dell PowerConnect switches will report any errors that occur.

Because of its simple implementation, TFTP is commonly used for transferring relatively small files to and from a central location. Such files include system software images and device configuration files.

TFTP servers are easily obtained. Numerous shareware implementations exist for Windows®, and TFTP servers are included in most commercial and open-source Unix® and Linux® implementations.

TFTP packets use destination port 69. This is a “Well-Known” port, meaning it is reserved for use by TFTP traffic. There is a complete list of Well-Known port numbers for both TCP and UDP traffic at <http://www.iana.org/assignments/port-numbers>.

Using a TFTP server as a central repository for configurations and system images can greatly ease the administration of networks of Dell PowerConnect switches. Besides enabling remote backups and software upgrades, a TFTP server can keep a historic archive of changes to device configuration.

TFTP downloads can be initiated on the Dell PowerConnect switch using the `copy tftp` command:

```
copy tftp://172.16.101.101/image.new image
```

The above example would copy a file named “image.new” from a TFTP server with the IP address 172.16.101.101. The Dell PowerConnect switch would save the file with the file name “image” in its flash memory.

Files can also be uploaded from the Dell PowerConnect switch to the TFTP server. Both running and startup configuration can be backed up to TFTP server using the `copy running-config` and `copy startup-config` commands.

```
copy startup-config tftp://172.16.101.50/startup.bak
copy running-config tftp://172.16.101.50/running.bak
```

The above examples would copy the existing startup-configuration and running-configuration files to a TFTP server with the IP address 172.16.101.101. The files would be saved on the TFTP server with the filenames “startup.bak” and “running.bak” in whatever directory the TFTP server has designated as the TFTP root.

One security consideration is that TFTP has no facility for authenticating users or encrypting data. Since configuration files contain sensitive data such as the topology of enterprise networks, administrators should ensure that security safeguards are in place between switches and TFTP servers. Examples of such safeguards include access control lists (ACLs) and virtual private networks (VPNs), which are not discussed in this document.

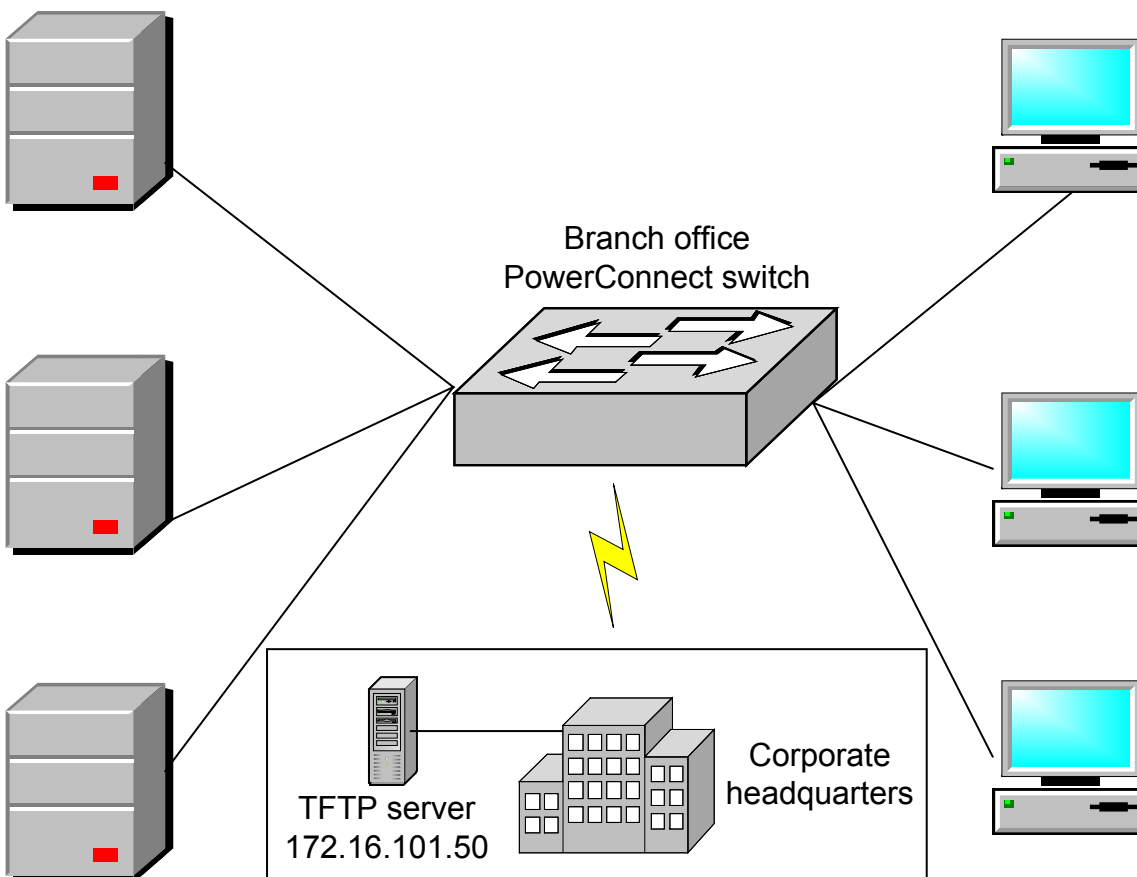
## Proposed Solution

The following is an example of performing an upgrade and backup of a Dell PowerConnect system image and configuration, via a TFTP server with IP address 172.16.101.50 at a hypothetical headquarters location. Using this TFTP server, a new system image will be downloaded to the PowerConnect switch at a hypothetical branch-office location; back up the switch’s existing running-configuration; and configure the switch to boot from the new image.

### Overview

1. Verify network connectivity to the TFTP server.
2. Download new system image from TFTP server.
3. Transfer a backup copy of the running-configuration to TFTP server.
4. Verify flash contents.
5. Configure switch to boot from new image.
6. Reboot the switch with the new image.

### Typical Network Designs



### Step-By-Step Instructions

The following configuration guidelines work with any Dell PowerConnect 33xx or 52xx switch.

1. Verify network connectivity to TFTP server.

PowerConnect 33xx:/52xx:

```
console>
console>en
console# ping 172.16.101.50
```

Do not continue to step 2 unless you have verified that you can reach the TFTP server. Note that if access control lists (ACLs) are in use, they must permit both ICMP (ping) and TFTP traffic along the entire path between the switch and the TFTP server.

2. Download new system image from TFTP server.

PowerConnect 33xx:

```
console# copy tftp://172.16.101.50/image.new image
```

PowerConnect 52xx:

```
console# copy tftp file
```

```
TFTP server ip address: 172.16.101.50  
Choose file type:
```

```
1. config: 2. opcode: <1-2>: 2
```

```
Source file name: image.new
```

```
Destination file name: image
```

3. Transfer a backup copy of the running-configuration to the TFTP server.

PowerConnect 33xx:

```
console# copy running-config tftp://172.16.101.50/startup.bak
```

PowerConnect 52xx:

```
console# copy file tftp
```

```
TFTP server ip address: 172.16.101.50
```

```
Choose file type:
```

```
1. config: 2. opcode: <1-2>: 1
```

```
Source file name: running-config
```

```
Destination file name: running-config.bak
```

4. Verify flash contents.

PowerConnect 32xx:

```
console# dir
```

PowerConnect 52xx:

```
console# dir opcode
```

5. Configure switch to boot from new image.

PowerConnect 32xx/52xx:

```
console# config  
console(config)# boot system opcode: image.new  
console(config)# exit  
console# copy running-config startup-config
```

6. Reboot switch with new image.

PowerConnect 32xx/52xx:

```
console(config)# exit  
console# reload
```

### Conclusion

With a central TFTP server in place, network administrators can remotely manage firmware upgrades and configuration backups.

The concept of configuration backups can be extended to keep an archive of configuration changes over time. Network administrators may be interested in scheduling a task that automates the periodic upload of configuration files from all switches to a central location.

The filenames of such backups should specify both the date of the backup and the name of the switch. For example, the filename "051231\_aus\_3348\_marketing.txt" might designate the configuration file uploaded on December 31, 2005 from a PowerConnect 3348 switch in the marketing department of a company's office in Austin, Texas.

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