

# OpenSwitch OPX Installation Guide with Enhancement Package

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# Getting started

OpenSwitch OPX is implemented using a standard Linux distribution — Debian Stretch. OpenSwitch OPX is binary-compatible with Debian Linux packages.

<b>Linux kernel</b>	Unmodified Linux kernel included with Debian distribution provides a robust base to support current state-of-the-art and future networking.
<b>Linux IP stack</b>	Rich feature set provided by the Linux standard IP stack without vendor-specific changes.
<b>Linux tools</b>	Standard Linux system administration tools are factory-installed in OpenSwitch OPX, or can be easily installed from standard Debian repositories.

## Convergence of networking, servers, and storage

The use of Linux as an operating system provides a solid foundation for the convergence of networking, server, and storage solutions. OpenSwitch OPX allows you to easily deploy the management and orchestration solutions that are typically available for Linux servers and storage systems.

## Programmability

OpenSwitch OPX provides an object-centric API for application development—implement your own applications using a well-defined object model and set of programmatic APIs. The object model is defined using the YANG modeling language, and OpenSwitch OPX APIs support Python and C/C++. A set of standard Debian software development packages is provided to allow you to develop applications for OpenSwitch OPX.

## Open platform abstraction

OpenSwitch OPX implements a new, open object-centric application programming interface called the control plane service (CPS) application programming interface (API). The CPS API allows customer-developed applications to be independent of any underlying hardware or software technology. OpenSwitch OPX internally uses the switch abstraction interface (SAI) which Dell and partner companies contributed to the Open Compute Project. The SAI API allows OpenSwitch OPX to be independent of any network processor/switch hardware technology. See [opencompute.org](http://opencompute.org) for more information about SAI.

## System hardware integration with standard Linux APIs

OpenSwitch OPX integrates standard Linux networking APIs with the hardware functionality provided by networking devices—system and network processors. You can download and use open source software (such as Quagga and Nagios) on any OpenSwitch OPX platform.

## Disaggregated hardware and software

OpenSwitch OPX provides an environment in which hardware and software are fully modular. You can select the software modules you want to install, and the hardware platforms you would like to use for your networking needs.

## Hardware support

The following lists the supported hardware for OpenSwitch OPX, release 3.0.0:

- S3048-ON
- S4048-ON / S4048T-ON
- S4112F-ON / S4112T-ON
- S4128F-ON / S4128T-ON
- S4148F-ON / S4148FE-ON / S4148T-ON
- S4248FB-ON / S4248FBL-ON
- S5148F-ON
- S5232F-ON
- S5248F-ON
- S5296F-ON
- S6010-ON
- Z9100-ON
- Z9264F-ON

# Installation

You can install OpenSwitch OPX using an industry-standard open network install environment (ONIE) software image with auto-discovery, manually, or from a USB device. See [opencompute.org](http://opencompute.org) for detailed information about ONIE installation.

## ONIE installation support

- **Automatic (zero-touch) installation** — ONIE discovers network information including the DHCP server, connects to an image server, options to point to the server for the image, and downloads and installs an image automatically.
- **Manual installation** — Manually configure your network information if a DHCP server is not available (see [Manual installation](#)).

## System setup

Verify that the system is connected correctly before installation:

- Connect a serial cable and terminal emulator to the console serial port — required serial port settings are 115200, 8 data bits, and no parity.
- Connect the Management port to the network if you prefer downloading an image over a network. To locate the Console port and the Management port, see the *Getting Started Guide* shipped with your switch or the platform-specific *Installation Guide* at [www.dell.com/support](http://www.dell.com/support).

## Install OpenSwitch OPX

If there is a current OS installed, power up the switch to access the ONIE boot menu. The ONIE boot menu is visible and accessible via the console.

```
+-----+
|*ONIE: Install OS      |
| ONIE: Rescue         |
| ONIE: Uninstall OS   |
| ONIE: Update ONIE    |
| ONIE: Embed ONIE     |
| ONIE: Diag ONIE      |
+-----+
```

Available ONIE modes:

- Install OS — Installs an OpenSwitch OPX image.
- Rescue — Reboots the system into ONIE for repair, debugging, and forensics.
- Uninstall OS — Deletes the contents of all disk partitions except ONIE.
- Update ONIE — Installs a new ONIE version.
- Embed ONIE — Formats an empty disk and installs ONIE.
- Diag ONIE — Runs system diagnostics.

**⚠ CAUTION:** During an automatic or manual OpenSwitch OPX installation, if an error condition occurs that results in an unsuccessful installation, perform Uninstall OS first to clear the partitions if there is an existing OS on the switch. If the problem persists, contact Dell EMC Technical Support if you have purchased the support binary.

## Automatic installation

You can automatically (zero-touch) install an OpenSwitch OPX image on an ONIE-enabled device. Once the device successfully boots to ONIE: Install OS, auto-discovery obtains the hostname, domain name, Management interface IP address, as well as the IP address of the DNS name server(s) on your network from the DHCP server and DHCP options. The ONIE automatic-discovery process locates the stored software image, starts installation, then reboots the device with the new software image.

If a USB drive is inserted, auto-discovery searches the USB storage supporting FAT or EXT2 file systems. It also searches SCP, FTP, or TFTP servers with the default DNS name of the ONIE server. DHCP options are not used to provide the server IP, and the auto-discovery method repeats until a successful software image installation occurs and reboots the device.

# Manual installation

You can manually install an OpenSwitch OPX software image if a DHCP server is not available. If the IP address for the Management port (`eth0`) is not automatically discovered, ONIE sets the IP address to `192.168.3.10`. You must manually configure the Management port and configure the software image file to start installation.

- 1 Save the OpenSwitch OPX software image on an SCP/TFTP/FTP server.
- 2 Power up the device and select `ONIE Rescue` for manual installation.
- 3 (Optional) Stop the DHCP discovery if the device boots to ONIE Install.  

```
onie-discovery-stop
```
- 4 Configure the IP addresses on the Management port, where `x.x.x.x` represents your internal IP address. Once you configure the Management port, the response should be `up`.  

```
ifconfig eth0 x.x.x.x netmask 255.255.0.0 up
```
- 5 Install the software on the device. The installation command accesses the OpenSwitch OPX software from the provided SCP, TFTP, or FTP URL, creates partitions, verifies installation, and reboots itself.  

```
onie-nos-install <image-location>
```

The OpenSwitch OPX installer image creates several partitions, including OPX-A (active and default) and OPX-B (standby). After installation completes, the system automatically reboots and loads OpenSwitch OPX.

## Install OpenSwitch OPX manually

```
ONIE:/ # onie-nos-install ftp://x.x.x.x/PKGS_OPX-3.X.X.X-installer-x86_64.bin
```

Where `x.x.x.x` represents the location to download the image file from, and `3.X.X.X` represents the version number of the software to install.

## Install using USB drive

You can manually install the OpenSwitch OPX software image using USB media. Verify that the USB storage device supports a FAT or EXT2 file system. Plug the USB storage device into the USB storage port on the device.

- 1 Power up the system to automatically boot with the ONIE: Rescue option.
- 2 (Optional) Stop the ONIE discovery process if the device boots to ONIE: Install.  

```
onie-discovery-stop
```
- 3 Create a USB mount location on the system.  

```
mkdir /mnt/media
```
- 4 Mount the USB media plugged in the USB port on the device.  

```
mount -t vfat /dev/sdb /mnt/media
```
- 5 Install the software from the USB, where `/mnt/media` specifies the path where the USB partition is mounted.  

```
onie-nos-install /mnt/media/image_file
```

The ONIE auto-discovery process discovers the image file at the specified USB path, loads the software image, and reboots.



## Install enhancement package

You can optionally purchase an OPX enhancement package which allow you to obtain Dell EMC support.

- 1 Sign in to the Dell Digital Locker ([DDL](#)) using your account credentials, or create a new account.
- 2 Locate the product name with the entitlement ID and order number.
- 3 Check that the service tag of the purchased device displays in the `Assigned to` field on the Product page. If the `Assigned to:` field is empty, continue to the next step.
- 4 Click **Key Available for Download**.

**NOTE:** A license file downloads as a zip file — delete this file as it is not required.

- 5 Enter the 7-digit service tag in the `Bind to:` field to bind the enhancement package to the switch, enter the service tag again, select how you want to download the license, then click **Submit**.
- 6 Select the **Available Downloads** tab, select `OPX_EP_<release_number>.deb`, then click **Download**.
- 7 Save the file locally or to a remote server.
- 8 Install the package and include the path to the file.

```
$ sudo dpkg -i OPX-EP_releaseNumber.deb
```
- 9 Reboot the switch.

## Log into switch

The first time OpenSwitch OPX starts, use `admin` for both the user name and password to log in.

```
Debian GNU/Linux 9 OPX ttyS0
OPX login: admin
Password:
Linux OPX 4.9.110-opx #1 SMP Thu Nov 15 23:51:16 etc 2018 x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.

admin@OPX:~$
```

## Support resources

The Dell Networking Support site provides a range of documents and tools to assist you with effectively using Dell Networking devices. Through the support site you can obtain technical information regarding Dell Networking products, access software upgrades and patches, download available management software, and manage your open cases. The Dell Networking support site provides integrated, secure access to these services.

To access the Dell Networking Support site, go to [www.dell.com/support/](http://www.dell.com/support/). To display information in your language, scroll down to the bottom of the page and select your country from the drop-down menu.

- To obtain product-specific information, enter the 7-character service tag or 11-digit express service code of your switch and click **Submit**.  
To view the service tag or express service code, pull out the luggage tag on the chassis or enter the `show chassis` command from the CLI.
- To receive additional kinds of technical support, click **Contact Us**, then click **Technical Support**.

To access system documentation, see [www.dell.com/manuals/](http://www.dell.com/manuals/).

To search for drivers and downloads, see [www.dell.com/drivers/](http://www.dell.com/drivers/).

To participate in Dell community blogs and forums, see [www.dell.com/community](http://www.dell.com/community).