Enterprise SONiC Distribution by Dell Technologies

Quick Start Guide Release 3.0

April 2020
Rev. A01

DELL EMC

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

Contents

1 Revision history

Table 1. Revision history

Release	Revision	Description
3.0.1	A01 (April 2020)	Updated Enterprise SONiC overview and PowerSwitch support
3.0.0	A00 (March 2020)	Initial release

Additional documentation

Table 2. Additional documentation

Document	Description
Enterprise SONiC Distribution by Dell Technologies, User Guide Release 3.0	User guide
Enterprise SONiC Distribution by Dell Technologies, User Guide, Management Framework CLI Reference Guide Release 3.0	Management Framework CLI command syntaxes and examples
Enterprise SONiC Distribution by Dell Technologies, User Guide, SONiC CLI Reference Guide Release 3.0	SONiC CLI command syntaxes and examples
Enterprise SONiC Distribution by Dell Technologies, User Guide, Release Notes Release 3.0	New features introduced in the release; known and fixed issues

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SONiC overview

What is SONiC

SONiC is an open-source, Linux-based network operating system (NOS) that runs on switches from multiple vendors and ASICs. SONiC stands for Software for Open Networking in the Cloud. It implements standard Layer 2 and Layer 3 protocols, and provides developers with a straightforward way to add new features.

SONiC offers teams the flexibility to create data center networking solutions, while using the collective strength of a large ecosystem with an active developer community. SONiC is designed for scalability and is in production today in large data center fabrics.

SONiC's benefits include:

- Hardware independence
- Containerized architecture
- Open-sourced
- Access to a growing community

What is Enterprise SONiC

Enterprise SONiC Distribution by Dell Technologies is a hardened, validated, and supported version of SONiC for switch configuration and monitoring. It includes distribution of open-source community SONiC, and additional features to support the ecosystem and partners.

Enterprise SONiC supports an intuitive command-line interface, and object-based administration through a REST interface and Google's gRPC Network Management Interface (gNMI).

Dell EMC PowerSwitch support

S5232F-ON	• DellEMC-5232F-C32 (32x100G + 2x10G) • DellEMC-5232F-P-10G (1-24 4x10G breakout (96 ports), 25-32 100G (8 ports) + 2x10G) • DellEMC-5232F-P-25G (1-24 4x25G breakout (96 ports), 25-32 100G (8 ports), + 2x10G)
S5248F-ON	• DellEMC-5248F-P-10G (48x10G, 6x100G) • DellEMC-5248F-P-25G (48x25G, 6x100G)
S5296F-ON	• DellEMC-5296F-P-10G (48x10G, 6x100G) • DellEMC-5296F-P-25G (48x25G, 6x100G)
Z9100-ON	• DellEMC-Z9100-C32 (32x100G + 2x10G)
Z9264F-ON	• DellEMC-Z9264F-C32 (64x100G + 2x10G)
Z9332F-ON	• DellEMC-Z9332F-C32 (32x100G + 2x10G) • DellEMC-Z9332F-O32 (32x400G + 2x10G) • DellEMC-Z9332F-O16C64 (16x400G (bottom row 16 ports) + 64x100G (top row 16 ports)) • DellEMC-Z9332F-O16C64SH (16x400G (left 16 ports) + 64x100G (right 16 ports)) • DellEMC-Z9332F-C64O16SH (64x400G (left 16 ports) + 64x400G (right 16 ports))

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Quick start

This information describes how to install an Enterprise SONiC image on your ON-Series PowerSwitch.

Requirements

- Dell EMC ON-Series PowerSwitch with ONIE preinstalled
- Available DHCP server for automatic installation
- Valid Dell Digital Locker (DDL) account
- HTTP or FTP server, or USB thumb drive with 4GB space available

Before you start

Verify that you have connected the ONIE-enabled device correctly:

1. Connect a serial cable or terminal emulator to the console serial port — required serial port settings are 115200, 8 data bits, and no parity.
2. Connect the Management port to the network if you prefer downloading an image over a network.

NOTE: The front panel ports that connect to the switching ASIC are not available in an ONIE installation.

See the *Getting Started Guide* shipped with your specific PowerSwitch to locate the Console and Management ports, or the platform-specific *Installation Guide* at www.dell.com/support.

Download SONiC image

1. Sign into DDL using your account credentials.
2. Locate your entitlement ID or order number, then select the product name.
3. Select the **Available Downloads** tab on the Product page.
4. Select the SONiC image to download, then click **Download**.
5. Read the Dell End-User License Agreement. Scroll to the end of the agreement, then click **Yes, I agree**.
6. Select how to download the software files, then click **Download Now**.
7. Generate a checksum for the downloaded SONiC binary image by using the `md5sum` command on the image file.

```
md5sum image_filename
```

Once the image is available on your local machine, the image can be installed either by installing using a USB thumb drive or over the network.

Install SONiC image

When you turn on the ONIE-enabled device, the boot menu is visible and accessible using the console:

- **Install OS** — Installs a SONiC image offering both zero-touch through DHCP or manual installation
- **Rescue** — Provides access to troubleshoot or reinstall an ONIE image
- **Uninstall OS** — Deletes the contents of all disk partitions except ONIE
- **Update ONIE** — Installs a new ONIE image
- **Embed ONIE** — Formats an empty disk and installs ONIE

NOTE: If you have a current OS install on your ONIE-enabled device, use the Uninstall OS option before starting installation of the SONiC image.

Automatic installation

You can automatically (zero-touch) install an Enterprise SONiC image using the ONIE discovery process. Before you start installation, ensure that the image file follows the naming convention that is required for ONIE autodiscovery. The image filename must start with the keyword "onie-installer".

Manual installation

If zero-touch not available, there are several other ways to install the Enterprise SONiC image. This information describes how to install the Enterprise SONiC image over a network.

To start installation, you need the IP address of the Management interface, along with the IP address of the file served, and the path of the ONIE image. If an IP address for the Management interface is not found when the switch boots, 192.168.3.10 is automatically assigned by default.

1. Store the Enterprise SONiC image on an HTTP/TFTP/FTP server
2. Power up the switch and boot ONIE.
3. Select `ONIE: Uninstall OS` or `ONIE: Rescue` for manual installation.

```
 +--------------------------------------------------------------------------+
 |*ONIE: Install OS                                                         |
 | ONIE: Rescue                                                             |
 | ONIE: Uninstall OS  <----- Select this one                               |
 | ONIE: Update ONIE                                                        |
 | ONIE: Embed ONIE                                                         |
 +--------------------------------------------------------------------------+
```

4. Stop the ONIE discovery process if using manual installation.

```
onie-discovery-stop
```

5. If a DHCP server is not available, configure the Management port IP address. Once you configure the Management port, the response should be `up`.

```
ifconfig eth0 192.168.0.2 netmask 255.255.255.0
```

6. (Optional) Configure the default gateway.

```
route add default gw <gateway-IP>
echo "nameserver 8.8.8.8" > /etc/resolv.conf
```

7. Install the Enterprise SONiC image on the switch.

```
onie-nos-install https://192.168.2.210/SONiC-OS-3.0.0-Cloud-Standard.bin
```

When the installation finishes, the PowerSwitch reboots into Enterprise SONiC by default.

USB installation

You can manually install the Enterprise SONiC image using USB media. Verify that the USB storage device supports FAT, EXT2, EXT3, or EXT4 file system. Plug the USB storage device into the USB port on the device.

1. (Optional) Stop the ONIE discovery process if the device boots to `ONIE: Install OS`.

```
onie-discovery-stop
```

2. Select `ONIE: Rescue` or `ONIE: Install OS`.
3. Create a USB mount location on the system.

```
mkdir /mnt/media
```

4. Mount the USB media plugged into the USB port on the device.

```
mount —t vfat /dev/sdb /mnt/media
mount -t ext2 /dev/sbd/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 autodiscovery process discovers the image file at the specified USB path, loads the software image, and reboots.

Default login

The Management interface is configured as DHCP by default to acquire an IP address automatically.

1. Log in to the Linux shell from the console or through an SSH connection using the default username `admin` and password `YourPaSsWoRd`.

```
At Console:
Debian GNU/Linux 9 sonic ttyS1

sonic login: admin
Password: YourPaSsWoRd

SSH from any remote server to sonic can be done by connecting to the IP address of the
Management interface
user@debug:~$ ssh admin@sonic_ip_address(or SONIC DNS Name)
admin@sonic's password:
```

2. (Optional) When you log in for the first time, you are prompted to change your password.

```
You are required to change your password immediately (root enforced)
Changing password for admin.
(current) UNIX password: YourPaSsWoRd
Enter new UNIX password: *********
Retype new UNIX password: ********
Linux sonic 4.9.0-11-2-amd64 #1 SMP Debian 4.9.189-3+deb9u2 (2019-11-11) x86_64
You are on

 ____   ___   _   _ _  ____
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-- Software for Open Networking in the Cloud --

Unauthorized access and/or use are prohibited.
All access and/or use are subject to monitoring.

Help:    http://azure.github.io/SONiC/

admin@sonic:~$
```

Configure username and password

You can easily add new users with the `username` command. This is a Management Framework CLI command. For more information on Management Framework CLI commands, see Command reference or Management Framework CLI in the *Enterprise SONiC Distribution by Dell Technologies User Guide*.

```
sonic# username newuser password
```

NOTE: You cannot modify user credentials in this release. You must delete the user with the `no username` command, then re-add the user using the `username` command.

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Command reference

This information describes how to start the command-line interface (CLI). SONiC includes commands to view platform, transceivers, Layer 2, IP, BGP status, and so on. For complete configuration information, see the *Enterprise SONiC Distribution by Dell Technologies User Guide*.

NOTE: The `sonic-cli` should not be run by the *root* user.

Start the CLI

1. You can access the CLI in EXEC mode from the Linux shell as a non-root user. From this mode, you can run `show` commands to monitor various functions on the switch, or `debug` commands to troubleshoot switch operation. Use `?` to display the available commands.

```
admin@sonic:~$ sonic-cli
sonic# ?
  clear      Clear commands
  configure  Enter configuration mode
  copy       Perform file copy operations
  debug      Debug commands
  exit       Exit from the CLI
  image      Image related commands
  no         No commands under exec mode
  show       Show running system information
  system     System command
  write      Save config
  ...
```

2. You can access CONFIGURATION mode to configure switch settings. In CONFIGURATION mode, you can change the current running configuration. Configuration changes are not automatically saved by default. You must use the `write memory` command.

```
sonic# config terminal
sonic(config)#
```

Basic show commands

`show system` — Displays host name, current time, boot time, and other system details.

```
sonic# show system
-------------------------------------------------------
Attribute            Value/State
-------------------------------------------------------
Hostname            :sonic
Current Datetime    :2020-02-19T19:53:15Z+00:00
Boot Time           :1582140551
```

`show system memory` — Displays memory usage and availability information.

```
sonic# show system memory
-------------------------------------------------------
Attribute            Value/State
-------------------------------------------------------
Used                :1304976
Total               :8162872
```

`show system cpu` — Displays CPU usage details per core and consolidated CPU usage.

```
sonic# show system cpu
------------------------------------------------------------------------
CPU                  %KERNEL             %USER               %IDLE
------------------------------------------------------------------------
CPU-0                 25                   25                   47
CPU-1                 26                   24                   47
CPU-2                 25                   25                   47
CPU-3                 25                   25                   47
CPU-4                 25                   25                   47
```

`show system processes` — Displays brief information about all the processes running in the host system.

```
sonic# show system processes
-------------------------------------------------------------------------------
PID       %CPU      %MEMORY   MEM-USAGE(Bytes)      NAME
-------------------------------------------------------------------------------
1          0           0          58761216    /sbin/init
10         0           0          0           [lru-add-drain]
100        0           0          0           [scsi_eh_0]
1000       0           0          409763840   docker
101        0           0          0           [scsi_tmf_0]
10179      0           0          12124160    /bin/bash
102        0           0          0           [scsi_eh_1]
10217      0           0          42135552    python
103        0           0          0           [scsi_tmf_1]
107        0           0          0           [bioset]
10862      0           0          256139264   /usr/sbin/rsyslogd
...
```

`show system processes pid` — Displays detailed information of a specified process.

```
sonic# show system processes pid 1
-------------------------------------------------------------
Attribute            Value/State
-------------------------------------------------------------
Memory Usage        :59142144
Uptime              :1658
Name                :/sbin/init
Memory Utilization  :0
Pid                 :1
Cpu Utilization     :0
Cpu Usage System    :2819
Cpu Usage User      :11244
Start Time          :1582140552000000000
```

`show platform syseeprom` — Displays available system EEPROM data.

```
sonic# show platform syseeprom
-------------------------------------------------------------
Attribute            Value/State
-------------------------------------------------------------
description         :x86_64-dellemc_s5232f_c3538-r0
serial-no           :MX0N99V6CEM0096B06Y9
part-no             :0N99V6
hardware-version    :A00
       software-version    :'engops_sonicbuild_build_287'
name                :System Eeprom
mfg-name            :Dell
location            :Slot 1
removable           :False
oper-status         :ACTIVE
id                  :S5232F-ON
empty               :False
mfg-date            :2019-06-12
```

`show interface status` — Displays a brief summary of the interfaces.

```
sonic# show interface status
------------------------------------------------------------------------------------------
Name                Description         Admin          Oper           Speed          MTU
------------------------------------------------------------------------------------------
Ethernet0           -                   up             down           40GB           9100
Ethernet4           -                   up             up             40GB           9100
Ethernet8           -                   up             down           40GB           9100
Ethernet12          Ethernet12          up             down           40GB           9100
Ethernet16          -                   up             down           40GB           9100
Ethernet20          -                   up             down           40GB           9100
Ethernet24          -                   up             down           40GB           9100
```

`show interface Ethernet <id>` — Displays details about a specific interface.

```
sonic# show interface Ethernet 44
Ethernet44 is up, line protocol is down
Hardware is Eth

Interface index is 11
IPV4 address is 44.2.3.4/24
Mode of IPV4 address assignment: MANUAL
IPV6 address is a::e/64
Mode of IPV6 address assignment: MANUAL
IP MTU 9100 bytes
LineSpeed 40GB, Auto-negotiation off
Input statistics:
        0 packets, 0 octets
        0 Multicasts, 0 Broadcasts, 0 Unicasts
        0 error, 0 discarded
Output statistics:
        0 packets, 0 octets
        0 Multicasts, 0 Broadcasts, 0 Unicasts
        0 error, 0 discarded
```

`show interface Ethernet` — Displays details about all physical interfaces.

```
sonic# show interface Ethernet

Ethernet0 is up, line protocol is down
Hardware is Eth
Interface index is 0
IPV4 address is 10.0.0.0/31
Mode of IPV4 address assignment: MANUAL
Mode of IPV6 address assignment: not-set
IP MTU 9100 bytes
LineSpeed 40GB, Auto-negotiation off
Input statistics:
        0 packets, 0 octets
        0 Multicasts, 0 Broadcasts, 0 Unicasts
        0 error, 0 discarded
Output statistics:
        0 packets, 0 octets
        0 Multicasts, 0 Broadcasts, 0 Unicasts
        0 error, 0 discarded


Ethernet4 is up, line protocol is up
Hardware is Eth
Interface index is 1
IPV4 address is 10.0.0.2/31
Mode of IPV4 address assignment: MANUAL
Mode of IPV6 address assignment: not-set
IP MTU 9100 bytes
LineSpeed 40GB, Auto-negotiation off
Input statistics:
        1054 packets, 141640 octets
        430 Multicasts, 624 Broadcasts, 0 Unicasts
        0 error, 0 discarded
Output statistics:
        434 packets, 102267 octets
```

```
        434 Multicasts, 0 Broadcasts, 0 Unicasts
        0 error, 0 discarded


Ethernet8 is up, line protocol is down
Hardware is Eth
Interface index is 2
IPV4 address is 10.0.0.4/31
Mode of IPV4 address assignment: MANUAL
Mode of IPV6 address assignment: not-set
IP MTU 9100 bytes
LineSpeed 40GB, Auto-negotiation off
Input statistics:
        0 packets, 0 octets
        0 Multicasts, 0 Broadcasts, 0 Unicasts
        0 error, 0 discarded
Output statistics:
        0 packets, 0 octets
        0 Multicasts, 0 Broadcasts, 0 Unicasts
        0 error, 0 discarded
```

`show interface counters` — Displays port statistics of all physical interfaces.

```
sonic# show interface counters
-------------------------------------------------------------------------------------------
Interface      State  RX_OK  RX_ERR  RX_DRP  RX_OVERSIZE  TX_OK  TX_ERR  TX_DRP  TX_OVERSIZE
-------------------------------------------------------------------------------------------
Ethernet0      D      0      0       0       0            0      0       0       0
Ethernet4      D      0      0       0       0            0      0       0       0
Ethernet8      D      0      0       0       0            0      0       0       0
Ethernet12     D      0      0       0       0            0      0       0       0
Ethernet16     D      0      0       0       0            0      0       0       0
Ethernet20     D      0      0       0       0            0      0       0       0
Ethernet24     D      0      0       0       0            0      0       0       0
Ethernet28     D      0      0       0       0            0      0       0       0
Ethernet32     D      0      0       0       0            0      0       0       0
Ethernet36     D      0      0       0       0            0      0       0       0
Ethernet40     D      0      0       0       0            0      0       0       0
Ethernet44     D      0      0       0       0            0      0       0       0
Ethernet48     D      0      0       0       0            0      0       0       0
Ethernet52     D      0      0       0       0            0      0       0       0
Ethernet56     D      0      0       0       0            0      0       0       0
Ethernet60     D      0      0       0       0            0      0       0       0
Ethernet64     D      0      0       0       0            0      0       0       0
Ethernet68     D      0      0       0       0            0      0       0       0
Ethernet72     D      0      0       0       0            0      0       0       0
Ethernet76     D      0      0       0       0            0      0       0       0
Ethernet80     D      0      0       0       0            0      0       0       0
Ethernet84     D      0      0       0       0            0      0       0       0
Ethernet88     D      0      0       0       0            0      0       0       0
Ethernet92     D      0      0       0       0            0      0       0       0
Ethernet96     D      0      0       0       0            0      0       0       0
Ethernet100    D      0      0       0       0            0      0       0       0
Ethernet104    D      0      0       0       0            0      0       0       0
Ethernet108    D      0      0       0       0            0      0       0       0
Ethernet112    D      0      0       0       0            0      0       0       0
Ethernet116    D      0      0       0       0            0      0       0       0
Ethernet120    D      0      0       0       0            0      0       0       0
Ethernet124    D      0      0       0       0            0      0       0       0
Ethernet128    D      0      0       0       0            0      0       0       0
Ethernet129    D      0      0       0       0            0      0       0       0
```

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