Release Notes for SONiC on Cisco 8000 Series Routers, Release Master 1.1.0

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SONiC on Cisco Smart Switch, Release Master 1.1.0

Cisco 8000 series routers support disaggregating the hardware and software to provide a more robust, open ecosystem for service provider networks.

With the introduction of Open Compute Project (OCP), vendors collaborate on designs and specifications to enable a more efficient, scalable, and versatile consumption of hardware and software. This initiative broadens the spectrum for cloud and service provider transformations, hardware innovations, software evolutions, flexibility, lower costs, and better control of the network infrastructure. As part of the disaggregation journey, Cisco supports installing Software for Open Networking in the Cloud (SONiC) on Cisco 8000 Series Routers.

With the release of Master 1.1.0, Cisco introduces the Cisco Smart Switch, marking a significant advancement in network services.

Product ID (PID)	Description
8102-28FH- DPU-O	Cisco 8100 28x400G QSFPDD DPU enabled, 2RU Fixed Switch, with open Software without HBM. Also, known as Cisco Smart Switch.

The Cisco Smart Switch represents a significant advancement in network services. It is designed to meet the growing demand for high-performance, scalable, and flexible networking solutions. This innovative platform introduces a new software and hardware model integrating cutting-edge technologies, including the DASH open-source project, Cisco Silicon One, and the AMD DPU.

Leveraging the power of Cisco Silicon One's high-performance and power-efficient routing silicon, the Smart Switch is equipped with a P4 programmable pipeline, enabling unprecedented levels of customization and optimization. Including the AMD DPU, capable of delivering service offload to dedicated silicon at 200G per unit, further enhances the switch's ability to accelerate network functions and improve overall performance.

The Cisco 8102-28FH-DPU-O router is a first-generation Smart Switch equipped with the Cisco Silicon One Q200L switching processor and an AMD DSC-200 Data Processing Unit (DPU), all housed in a two-rack unit form factor. It offers a total network bandwidth of 12.8 Tbps, which includes 11.2 Tbps for switching and 1.6 Tbps for DPU processing, and it contains 28 QSFP-DD 400 Gigabit Ethernet (GbE) ports.

The Cisco Smart Switch supports Data Processing Units (DPUs) that offload and accelerate various data processing tasks. These DPUs operate using the Disaggregated API for SONiC Hosts (DASH).

For more information about Cisco Smart Switch, see Cisco Smart Switch.

Component Version

This table outlines the versions of various software components included in this release:

Table 1: Supported software components

Component	Version
Linux kernel	`6.1.0-22-2-amd64`
SAI API	`1.13.0`
FRR	`8.5.4-sonic-0`
LLDPD	`1.0.16-1+deb12u1`
TeamD	`1.31-1`
SNMPD	`5.9.3+dfsg-2`
Python	`3.11.2-1+b1`
SYNCD	`1.0.0`
swss	`1.0.0`
Radvd	`1:2.19-1+b1`
Isc-dhcp	`4.4.3-P1-2`
sonic-gnmi version	`0.1`
redis-server	`5:7.0.15-1~deb12u1`
redis-tools version	`5:7.0.15-1~deb12u1`
eventd version	`1.0.0-0`
mgmt-framework version	`1.0-01`

This table outlines the versions of various hardware and firmware components included in this release:

Table 2: Supported hardware and firmware components

Component	Version
BIOS	4-13 / 4-13
NVMe	2.200 / 2.200
Aikido	1.4 / 1.4
TAM	2.7 / 7.19
IOFPGA	1.1 / 1.1
eCPLD – power cpld	0.12 / 0.12
CPLD – cpu-cpld	0.12 / 0.12
uFPGA (fan fpga)	10.5 / 10.5

This table outlines the versions of DPU-related FPDs (on the host side):

Table 3: Supported DPU-related FPDs components

Component	Version
DPUFPGA	1.0 / 1.0
DPUCPLD0 DPUCPLD1 DPUCPLD02 DPUCPLD3	0.9 / 0.9
DPUFW-0 DPUCPLD1 DPUCPLD2 DPUCPLD3 DPUCPLD4 DPUCPLD5 DPUCPLD6 DPUCPLD7	20241119.204642 / 20241119.204642
DPUQSPI_UBOOTA-0 DPUQSPI_UBOOTA-1 DPUQSPI_UBOOTA-2 DPUQSPI_UBOOTA-3 DPUQSPI_UBOOTA-4 DPUQSPI_UBOOTA-5 DPUQSPI_UBOOTA-6 DPUQSPI_UBOOTA-7	1.5.0-EXP / 1.5.0-EXP
DPUQSPI_GOLDFW-0 DPUQSPI_GOLDFW-1 DPUQSPI_GOLDFW-2 DPUQSPI_GOLDFW-3 DPUQSPI_GOLDFW-4 DPUQSPI_GOLDFW-5 DPUQSPI_GOLDFW-6 DPUQSPI_GOLDFW-7	1.68-G-16 / 1.68-G-16

Component	Version
DPUQSPI_GOLDUBOOT-0 DPUQSPI_GOLDUBOOT-1 DPUQSPI_GOLDUBOOT-2 DPUQSPI_GOLDUBOOT-3 DPUQSPI_GOLDUBOOT-4 DPUQSPI_GOLDUBOOT-5 DPUQSPI_GOLDUBOOT-6 DPUQSPI_GOLDUBOOT-7	1.5.0-EXP / 1.5.0-EXP

Baseline Features

The following list provides common baseline features supported on SONiC:

- TACACS+ authentication for IPv4 or IPv6 addresses
- SSHv2 authentication for IPv4 or IPv6 addresses
- AAA authentication
- Syslog logging for IPv4 or IPv6 addresses
- Network Time Protocol (NTP) for IPv4 or IPv6 addresses
- Simple Network Management Protocol (SNMP) over IPv4 and IPv6 transport
- TFTP file transfers over IPv4 or IPv6 addresses
- Secure Copy (SCP) server support
- Dynamic Host Configuration Protocol (DHCP) relay agent
- Access Control Lists (ACLs) over IPv4 and IPv6 addresses
- IPv4 or IPv6 ACL match on 7 tuple
- ERSPAN and Everflow Support
    - Source interface to support IPv4 capture and IPv6 capture at the same time
    - Bit-wise match on DSCP
    - Capture IPv4 and IPv6 source packets and encapsulation with either IPv4 or IPv6 addresses
- IPv4 or IPv6 decapsulation
- IPv4 or IPv6 routing
- Static route
- iBGP over IPv4 or IPv6 addresses

- eBGP over IPv4 or IPv6 addresses
- Route policies
- IP prefix lists
- BGP
    - Multihop, AS-set, prefix-set, community-list
    - Max prefix limit
    - Bestpath as-path multipath-relax
    - Soft reconfiguration
    - Update source loopback
- 32-way ECMP
- LAG: IPv4 or IPv6 interfaces addresses
- LACP Support
- RDMA: QOS-RDMA and QOS-ECN
- MTU: Jumbo MTU 9100 for Management, Switched Virtual Interface (SVI) and Native interfaces
- SNMP: Trap source management interface in the management VRF
- COPP/LPTS: For both management and inband interfaces (v4 or v6 UMPP)
- NTP:
    - Support of IPv4 or IPv6 Servers
    - Access-group server ACL
- Security ACL:
    - SSH IPv4 and IPv6 access
    - Physical interfaces—IPv4 and IPv6 ACL support
    - ACL permit, deny actions or counters
- ACL

  Match conditions:
    - 5-tuple match for an ACL (source and destination IP, source and destination port and protocol type)
    - port range
- QoS classification and scheduling over IPv4 or IPv6 addresses
- Syslog support
- gRPC: Dial-out support to stream telemetry data
- Virtual local area network (VLAN)

- Added Resolution Protocol (ARP)
- FAN, PSU management
- Virtual Extensible Local Area Network (VXLAN) is supported on Cisco 8101-32FH-O and Cisco 8102-64H-O routers
- Bidirectional Forwarding Detection (BFD) is supported on Cisco 8101-32FH-O and Cisco 8102-64H-O routers
- Dynamic Host Configuration Protocol (DHCP) relay is supported on Cisco 8101-32FH-O and Cisco 8102-64H-O routers

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This release includes these features and enhancements:

Platform features:

- Platform Monitor (PMON): provides management capabilities for DPU management, including ON and OFF toggling, health monitoring, state assessments, and identification of reboot causes.
- OpenBios: supports the new generation of IceLake High Core Count (HCC) CPU chipsets with 8 cores, PCI Express Gen4, and 64 PCI-E lanes operating at 16 GT/s.
- Console Management: provides console access for the switch CPU, Baseboard Management Controller (BMC), and any DPUs. Includes a hotkey (Ctrl-o) for seamless switching between the switch CPU and BMC consoles.
- FPD Management: enables firmware upgrades for Field Programmable Devices (FPDs) utilizing standard SONiC firmware utilities (`fwutil`). Supports a wide array of FPDs.

Forwarding features:

- The router supports a total front panel port traffic capacity of 11.2 Tbps (400G x 28) and a DPU traffic throughput of 1.6 Tbps (200G x 8).

Smart Switch features:

- Enables communication between virtual networks using vnet-to-vnet architecture.
- Provides secure private link functionality.
- Supports a total processing capacity of over 2 million Connections Per Second (CPS) and 32 million Packets Per Second (PPS), resulting in an overall throughput of approximately 44 million PPS.

Known Issues

This section outlines potential issues that users may encounter and provides possible workarounds for these challenges.

- To enable complete Smart Switch functionality, the NPU SONiC image needs to be built with these unmerged upstream PRs:

  - sonic-net/sonic-host-services#169

- Use the latest sonic-net master branch code.
- Use only **show system-health dpu DPUX** option and do not use the **all** option.
- Restart the dhcp_server docker container using the **docker restart** <*dhcp_server*> command. If this does not help reboot the router.
- When upgrading the DPU image, the Ethernet IP address may occasionally be incorrect.

  For example, Ethernet 0 might display *18.X.202.1/31* instead of *18.0.202.1/31*. To resolve the issue perform these steps:

  1. SSH into the DPU.
  2. Edit the `/etc/sonic/config_db.json` file to correct the IP address.
  3. Reload the configuration using the **sudo config reload** command.

- To achieve a higher success rate during the sonic-mgmt test run, it is recommended to use the outstanding upstream PR (sonic-net/sonic-buildimage#20495).

Software Download

Download the SONiC image from the Cisco Software Download Center.

- Master 1.1.0: Download the SONiC image for the router from the Cisco Software Download Center
- DPU 1.1.0: Download the SONiC image for the DPU modules from the Cisco Software Download Center

Related Documentation

Refer the following pages for more information about SONiC on Cisco 8000 Series Routers:

- Explore SONiC on Cisco 8000 Series Routers
  - Documentation for SONiC on Cisco 8000 Series Routers
  - Install SONiC on Cisco 8000 Series Routers
  - Install SONiC on Smart Switch
  - Setup SONiC on Cisco 8000 Series Routers
  - Configure SONiC on Cisco 8000 Series Routers
  - Network Scenario: 3-Stage Clos Network with Static VXLAN
  - Serviceability
- Cisco 8000 Series Routers Data Sheet