Overview

This chapter provides an overview of the Cisco 5000 Series routers.

The Network Convergence System 5000 Series offers a high-density, small-form-factor MPLS aggregation router for metro aggregation. It is designed to economically scale large enterprise, over-the-top (OTT), and service provider Data Center networking architectures.

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Cisco NCS 5001

Cisco NCS 5001 Overview

The Cisco NCS 5001 router is an extension to Cisco's routing platform portfolio enabling Service Providers and MPLS enabled data center architectures to offer elastic networks with improved business agility and simplified operations to deliver high-bandwidth mobile, video, and cloud services.

It can also operate as an extension shelf of Cisco ASR 9000 Series Aggregation Services Routers using Network Virtualization (nV) technology, consolidating multiple layers in the network and dramatically reducing operational costs.

The Cisco NCS 5001 router is a small form factor dense GE/10GE aggregation systems. Powered by industry leading routing operation system, IOS-XR, the system also offers rich functions such as third party application hosting, machine-to-machine interface, telemetry and flexible package delivery.

Figure 1: Cisco NCS 5001 Router - Back (Fan Side) View

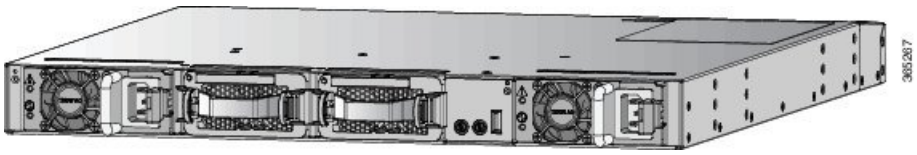
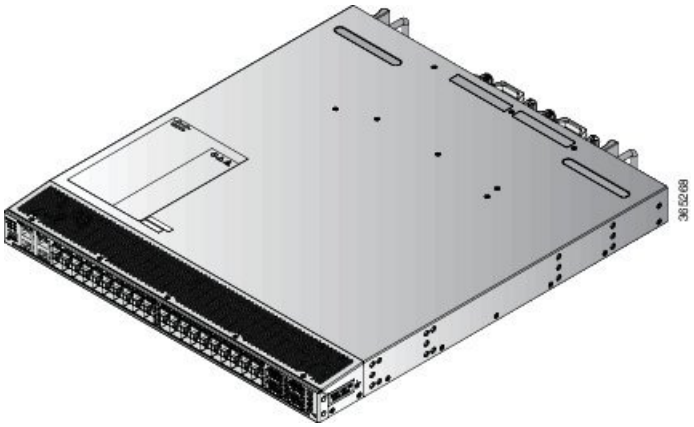


Figure 2: Cisco NCS 5001 Router - Front (Port Side) View



Ports

Cisco NCS 5001 router consists of the following ports:

- 40 x One GE/10GE SFP+ ports
  - 16 x Regular 10G SFP+ Ports
  - 24 x DWDM and ZR Capable 10G SFP+ Ports (Purple in color)
- 4 x 100G QSFP28 ports (Light Green in color)

Features

The Cisco NCS 5001 router has the following features:

- Two 1+1 redundant, hot-swappable power supplies, which provide port side intake or exhaust for cooling
- Two 1+1 redundant, hot-swappable fan modules, which provide port side intake or exhaust for cooling
- A management and console interface are on the port (front) side of the router whereas the USB interface on the fan (back) side of the router.

Power Supply

The Cisco NCS 5001 chassis has slots for two 1+1 redundant power supplies. Power supply options need to be configured with the base chassis. A minimum of one power supply is required for normal operation. The following table lists the power supplies that are configurable with the Cisco NCS 5001 router.

Table 1: Power Supplies for the Cisco NCS 5001 router

Part Number	Power Supply
NC5K-PDC-930W-FR	Cisco NCS 5000 Power DC 930W Front to Back Airflow
NC5K-PDC-930W-FR=	Cisco NCS 5000 Power DC 930W Front to Back Airflow, spare
NC5K-PDC-930W-BK	Cisco NCS 5000 Power DC 930W Back to Front Airflow
NC5K-PDC-930W-BK=	Cisco NCS 5000 Power DC 930W Back to Front Airflow, spare
NC5K-PAC-650W-FR	Cisco NCS 5000 Series Router Power AC 650W Front to Back Airflow
NC5K-PAC-650W-FR=	Cisco NCS 5000 Series Router Power AC 650W Front to Back Airflow, spare
NC5K-PAC-650W-BK	Cisco NCS 5000 Series Router Power AC 650W Back to Front Airflow
NC5K-PAC-650W-BK=	Cisco NCS 5000 Series Router Power AC 650W Back to Front Airflow, spare

Fan Modules

The Cisco NCS 5001 chassis has slots for two 1+1 redundant fan modules. The fan modules are hot-swappable. Fan modules operate in an 1+1 redundancy mode. Fan options need to be configured with the base chassis. The Cisco NCS 5001 system supports both forward and reverse airflow. The system can work with a single fan failure. More than one fan failure leads to system shutdown. The following table lists the fan modules that are configurable with the Cisco NCS 5001 router.

Table 2: Fan Modules for the Cisco NCS 5001 router

Part Number	Fan Module
NCS-5001-FN-FR	Cisco NCS 5001 Router Fan Front to Back Airflow
NCS-5001-FN-FR=	Cisco NCS 5001 Router Fan Front to Back Airflow, spare
NCS-5001-FN-BK	Cisco NCS 5001 Router Fan Back to Front Airflow
NCS-5001-FN-BK =	Cisco NCS 5001 Router Fan Back to Front Airflow, spare

Cisco NCS 5002

Cisco NCS 5002

The Cisco NCS 5002 router is also an extension to Cisco's routing platform portfolio enabling Service Providers and MPLS enabled data center architectures to offer elastic networks with improved business agility and simplified operations to deliver high-bandwidth mobile, video, and cloud services.

It can also operate as an extension shelf of Cisco ASR 9000 Series Aggregation Services Routers using Network Virtualization (nV) technology, consolidating multiple layers in the network and dramatically reducing operational costs.

The Cisco NCS 5002 router is a small form factor dense GE/10GE aggregation systems in 2RU form factor. Powered by industry leading routing operation system, IOS-XR, the system also offers rich functions such as third party application hosting, machine-to-machine interface, telemetry and flexible package delivery.

Figure 3: Cisco NCS 5002 - Back (Fan Side) View

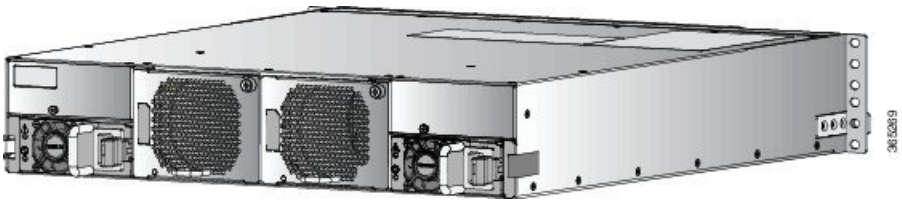


Figure 4: Cisco NCS 5002 - Front (Port Side) View

Ports

Cisco NCS 5002 router consists of the following ports:

- 80 x One GE/10GE SFP+ ports
  - 40 x Regular 10G SFP+ Ports, on baseboard
  - 40 x DWDM and ZR Capable 10G SFP+ Ports, on mezzanine (Cisco Metallic Grey in color)
- 4 x 100G QSFP28 ports (Light Green in color)

Features

The Cisco NCS 5002 router has the following features:

- Two 1+1 redundant, hot-swappable power supplies, which provide port side intake or exhaust for cooling
- Two 1+1 redundant, hot-swappable fan modules, which provide port side intake or exhaust for cooling
- A management, console, and the USB interface on the port (front) side of the router

Power Supply

The Cisco NCS 5002 chassis has slots for two 1+1 redundant power supplies. Power supply options need to be configured with the base chassis. A minimum of one power supply is required for normal operation. The following table lists the power supplies that are configurable with the Cisco NCS 5002 router.

Table 3: Power Supplies for the Cisco NCS 5002 router

Part Number	Power Supply
NC5K-PDC-930W-FR	Cisco NCS 5000 Power DC 930W Front to Back Airflow
NC5K-PDC-930W-FR=	Cisco NCS 5000 Power DC 930W Front to Back Airflow, spare
NC5K-PDC-930W-BK	Cisco NCS 5000 Power DC 930W Back to Front Airflow
NC5K-PDC-930W-BK=	Cisco NCS 5000 Power DC 930W Back to Front Airflow, spare
NC5K-PAC-650W-FR	Cisco NCS 5000 Series Router Power AC 650W Front to Back Airflow
NC5K-PAC-650W-FR=	Cisco NCS 5000 Series Router Power AC 650W Front to Back Airflow, spare
NC5K-PAC-650W-BK	Cisco NCS 5000 Series Router Power AC 650W Back to Front Airflow
NC5K-PAC-650W-BK=	Cisco NCS 5000 Series Router Power AC 650W Back to Front Airflow, spare

Fan Modules

The Cisco NCS 5002 chassis has slots for two 1+1 redundant fan modules. The fan modules are hot-swappable. Fan modules operate in an 1+1 redundancy mode. Fan options need to be configured with the base chassis. The Cisco NCS 5002 system supports both forward and reverse airflow. The system can work with a single fan failure. More than one fan failure leads to system shutdown. The following table lists the fan modules that are configurable with the Cisco NCS 5002 router.

Table 4: Fan Modules for the Cisco NCS 5002 router

Part Number	Fan Module
NCS-5002-FN-FR	Cisco NCS 5002 Router Fan Front to Back Airflow
NCS-5002-FN-FR=	Cisco NCS 5002 Router Fan Front to Back Airflow, spare
NCS-5002-FN-BK	Cisco NCS 5002 Router Fan Back to Front Airflow
NCS-5002-FN-BK=	Cisco NCS 5002 Router Fan Back to Front Airflow, spare

Cisco NCS 5011

Cisco NCS 5011

The Cisco NCS 5011 router is also an extension to Cisco's routing platform portfolio enabling Service Providers and MPLS enabled data center architectures to offer elastic networks with improved business agility and simplified operations to deliver high-bandwidth mobile, video, and cloud services.

The Cisco NCS 5011 router consists of 32 QSFP+/QSFP28 ports. The NCS 5011 system supports 10GE, 25GE, 40GE, 50GE, and 100GE.

The Cisco NCS 5011 system extends 4x10G, 4x25G, and 2x50G breakout support for Copper Optics.

Configure Breakout

Log into the router in the config mode, and type the following command (in this example, the breakout optics is inserted in port 0):

```
RP/0/RP0/CPU0:router(config)# controller optics 0/0/0/0 breakout 4x10
RP/0/RP0/CPU0:router(config)# controller optics 0/0/0/0 breakout 4x25
RP/0/RP0/CPU0:router(config)# controller optics 0/0/0/0 breakout 2x50
```

Note

- The broken out interfaces are named as follows:
  - tenGigE 0/0/0/0/0, tenGigE 0/0/0/0/1, tenGigE 0/0/0/0/2, and tenGigE 0/0/0/0/3
  - twentyFiveGigE 0/0/0/0/0, twentyFiveGigE 0/0/0/0/1, twentyFiveGigE 0/0/0/0/2, and twentyFiveGigE 0/0/0/0/3
  - FiftyGigE 0/0/0/0/0, FiftyGigE 0/0/0/0/1
- The above commands fail if the optics inserted do not support breakout. Only copper optics are currently supported.
- The commands succeed if there are no optics inserted, and the breakout is executed whenever optics are inserted at a later stage.

Figure 5: Cisco NCS 5011 - Back (Fan Side) View

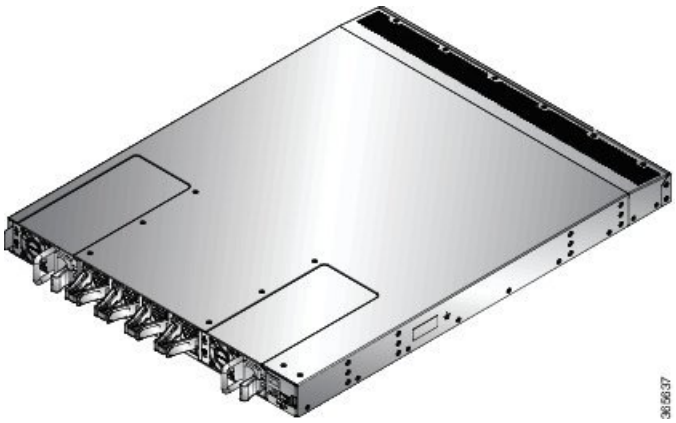
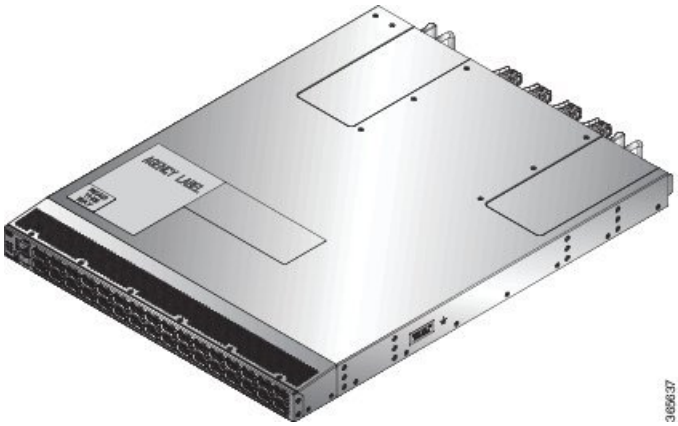


Figure 6: Cisco NCS 5011 - Front (Port Side) View



Ports

Cisco NCS 5011 router consists of the following ports:

- 2 x 10GE SFP + ports
- 32 x 100G QSFP28-100 ports

Features

The Cisco NCS 5011 router has the following features:

- Two 1+1 redundant, hot-swappable power supplies, which provide port side intake or exhaust for cooling
- Four 3+1 redundant, hot-swappable fan modules, which provide port side intake or exhaust for cooling
- A management, console, and the USB interface on fan side of the router

Power Supply

The Cisco NCS 5011 chassis has slots for two 1+1 redundant power supplies. Power supply options need to be configured with the base chassis. A minimum of one power supply is required for normal operation. The following table lists the power supplies that are configurable with the Cisco NCS 5011 router.

Table 5: Power Supplies for the Cisco NCS 5011 router

Part Number	Power Supply
NC5K-PDC-930W-FR	Cisco NCS 5000 Power DC 930W Front to Back Airflow
NC5K-PDC-930W-FR=	Cisco NCS 5000 Power DC 930W Front to Back Airflow, spare
NC5K-PDC-930W-BK	Cisco NCS 5000 Power DC 930W Back to Front Airflow
NC5K-PDC-930W-BK=	Cisco NCS 5000 Power DC 930W Back to Front Airflow, spare
NC5K-PAC-650W-FR	Cisco NCS 5000 Series Router Power AC 650W Front to Back Airflow
NC5K-PAC-650W-FR=	Cisco NCS 5000 Series Router Power AC 650W Front to Back Airflow, spare
NC5K-PAC-650W-BK	Cisco NCS 5000 Series Router Power AC 650W Back to Front Airflow
NC5K-PAC-650W-BK=	Cisco NCS 5000 Series Router Power AC 650W Back to Front Airflow, spare

Fan Modules

The Cisco NCS 5011 chassis has slots for four 3+1 redundant fan modules. The fan modules are hot-swappable. Fan options need to be configured with the base chassis. The Cisco NCS 5011 system supports both forward and reverse airflow. The system can work with a single fan failure. More than one fan failure leads to system shutdown. The following table lists the fan modules that are configurable with the Cisco NCS 5011 router.

Table 6: Fan Modules for the Cisco NCS 5011 router

Part Number	Fan Module
NCS-5011-FN-FR	Cisco NCS 5011 Router Fan Front to Back Airflow
NCS-5011-FN-FR=	Cisco NCS 5011 Router Fan Front to Back Airflow, spare
NCS-5011-FN-BK	Cisco NCS 5011 Router Fan Back to Front Airflow
NCS-5011-FN-BK=	Cisco NCS 5011 Router Fan Back to Front Airflow, spare