

Installation — Cooling Modules Avaya Virtual Services Platform 9000

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Chapter 1: Regulatory information and safety precautions

Read the information in this section to learn about regulatory conformities and compliances.

International Regulatory Statements of Conformity

This is to certify that the Avaya Virtual Services Platform 9000 chassis and components installed within the chassis were evaluated to the international regulatory standards for electromagnetic compliance (EMC) and safety and were found to have met the requirements for the following international standards:

- EMC—Electromagnetic Emissions—CISPR 22, Class A
- EMC—Electromagnetic Immunity—CISPR 24
- Electrical Safety—IEC 60950, with CB member national deviations

Further, the equipment has been certified as compliant with the national standards as detailed in the following sections.

Russia, Belarus, and Kazakhstan Requirement

В целях соблюдения действующего законодательства, продукты Компании Авайя, которые поставляются в Россию, Белоруссию и Казахстан, поставляются с конфигурацией, которая соответствует текущим требованиям нормативных актов. Любые изменения предустановленного программного обеспечения или прошивки программно-аппаратного комплекса, включая установленного программного а в случае таких изменений, лицо или компания их осуществившие несут ответственность на свой страх и риск. Компания Авайя не несет ответственности за внесение каких-либо изменений в продукт, произведенный на или для использования на территории России, Белоруссии и Казахстана, кроме модификаций, которые выполнены и сертифицированы Компанией Авайя.

In order to comply with existing laws, Avaya's products that are supplied to Russia, Belarus, and Kazakhstan are supplied with a configuration which is in line with existing legislation. Modifications may lead to product certifications becoming invalid. Any modification of preinstalled software and firmware, including installation of other or more current firmware or software, therefore is done at the responsibility of the person or company executing the changes. Avaya is not responsible for any modifications to the product made on or for use on the territory of Russia, Belarus and Kazakhstan other than modifications executed and certified by Avaya itself.

National Electromagnetic Compliance (EMC) Statements of Compliance

FCC Statement (USA only)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to take whatever measures may be necessary to correct the interference at their own expense.

ICES Statement (Canada only)

Canadian Department of Communications Radio Interference Regulations

This digital apparatus (Virtual Services Platform 9000 chassis and installed components) does not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique (Virtual Services Platform 9000 chassis) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.

CE Marking Statement (Europe only)

EN 55022 Statements

This is to certify that the Virtual Services Platform 9000 chassis and components installed within the chassis are shielded against the generation of radio interference in accordance with the application of Council Directive 2004/108/EC. Conformity is declared by the application of EN 55022 Class A (CISPR 22).

Caution:

This device is a Class A product. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users are required to take appropriate measures necessary to correct the interference at their own expense.

EN 55024 Statement

This is to certify that the Virtual Services Platform 9000 chassis is shielded against the susceptibility to radio interference in accordance with the application of Council Directive 2004/108/EC. Conformity is declared by the application of EN 55024 (CISPR 24).

EN 300386 Statement

The Virtual Services Platform 9000 chassis complies with the requirements of EN 300386 V1.3.3 for emissions and for immunity for a Class A device intended for use in either Telecommunications centre or locations other than telecommunications centres given the performance criteria as specified by the manufacturer.

EC Declaration of Conformity

This product conforms to the provisions of the R&TTE Directive 1999/5/EC.

European Union and European Free Trade Association (EFTA) Notice



All products labeled with the CE marking comply with R&TTE Directive (1999/5/ EEC) which includes the Electromagnetic Compliance (EMC) Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (ENs). The equivalent international standards are listed in parenthesis.

- EN 55022 (CISPR 22)—Electromagnetic Interference
- EN 55024 (IEC 61000-4-2, -3, -4, -5, -6, -8, -11)—Electromagnetic Immunity
- EN 61000-3-2 (IEC 610000-3-2)-Power Line Harmonics
- EN 61000-3-3 (IEC 610000-3-3)-Power Line Flicker

VCCI Statement (Japan/Nippon only)

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) for information technology equipment. If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準 に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波 妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず るよう要求されることがあります。

BSMI statement (Taiwan only)

BSMI statement (Taiwan only)

This is a Class A product based on the standard of the Bureau of Standards, Metrology and Inspection (BSMI) CNS 13438 and CNS 14336-1, Class A.

警告使用者:

這是甲類的資訊**產品,在居住的環境中使用時,可能會造成射頻** 干擾,在這種情況下,使用者會被要求採取某些適當的對策。

Chinese EMI and safety warnings

Voltage:

Risk of injury by electric shock

Before working on this equipment, be aware of good safety practices and the hazards involved with electrical circuits. Use only power cords that have a good grounding path. Ensure that the switch is properly grounded before powering on the unit.

▲ 電壓警告:

觸電受傷的危險性

在此設備上進行作業之前,要認知到良好的安全行為和**涉及電子** 電路可能的危害。使用的電源線需有接地路徑。確保供電給設備 之前,有適當的接地。

Warning:

Disconnecting the power cord is the only way to turn off power to this device. Always connect the power cord in a location that can be reached quickly and safely in case of emergency.

▲ 警告使用者:

斷開電源線,是關閉該設備電源的唯一方法。始終確保連接電源線的位置,在緊急情況下,是可以快速且安全抵達的一個位置。

Electrostatic alert:

Risk of equipment damage

To prevent damage from electrostatic discharge, always wear an antistatic wrist strap connected to an ESD jack when connecting cables or performing maintenance on this device.

▲ 靜電提醒:

設備損壞的風險

為了防止靜電放電的破壞, 在此設備上連接纜線或執行維護時, 始終戴上防靜電腕帶並連接到ESD插孔。

KCC Notice (Republic of Korea only)

This device has been approved for use in Business applications only per the Class A requirements of the Republic of Korea Communications Commission (KCC). This device may not be sold for use in a non-business application.

For Class A:

이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

National Safety Statements of Compliance

CE Marking Statement (Europe only)

EN 60 950 Statement

This is to certify that the Virtual Services Platform 9000 chassis and components installed within the chassis are in compliance with the requirements of EN 60 950 in accordance with the Low Voltage Directive. Additional national differences for all European Union countries have been evaluated for compliance. Some components installed within the Virtual Services Platform 9000 chassis may use a nickel-metal hydride (NiMH) and/or lithium-ion battery. The NiMH and lithium-ion batteries are long-life batteries, and it is very possible that you will never need to replace them. However, should you need to replace them, refer to the individual component manual for directions on replacement and disposal of the battery.

Denan Statement (Japan/Nippon only)



警告

本製品を安全にご使用頂くため、以下のことにご注意ください。

- 接続ケーブル、電源コード、ACアダブタなどの部品は、必ず製品に同梱されております添付品または指定品をご使用ください。添付品・指定品以外の部品をご使用になると故障や動作不良、火災の原因となることがあります。
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Información NOM (únicamente para México)

La información siguiente se proporciona en el dispositivo o en los dispositivos descritos en este documento, en cumplimiento con los requisitos de la Norma Oficial Mexicana (NOM):

Exportador: Avaya Inc.

4655 Great America Parkway Santa Clara, CA 95054 USA

Importador: Avaya Communication de México SA de CV

Av. Presidente Masarik 111

Piso 6

Col Chapultepec Morales Deleg. Miguel HIdalgo México D.F. 11570

Embarcar a: Model 9006AC:

100-120 VCA, 47-63 Hz, 13.3 A (100 VCA) - 11.2 A (120 VCA)

max. por fuente de poder

200-240 VCA, 47-63 Hz, 11.8 A (200 VCA) - 9.9 A (240 VCA)

max. por fuente de poder

NOM Statement (Mexico only)

The following information is provided on the devices described in this document in compliance with the safety requirements of the Norma Oficial Méxicana (NOM):

Exporter: Avaya Inc.

4655 Great America Parkway Santa Clara CA 95054 USA

Importer: Avaya Communication de México, S.A. de C.V.

Av. Presidente Masarik 111

Piso 6

Col Chapultepec Morales Deleg. Miguel HIdalgo México D.F. 11570

Model 9006AC: Input:

100-120 VAC, 47-63 Hz, 13.3 A (100 VAC) - 11.2 A (120 VAC)

maximum for each power supply

200-240 VAC, 47-63 Hz, 11.8 A (200 VAC) - 9.9 A (240 VAC)

maximum for each power supply

National Environmental Statement of Compliance

The WEEE Directive 2002/96/EC and RoHS (Restriction of Hazardous Substances) Directive 2002/95/EC set collection, recycling and recovery targets for various categories of electrical products and their waste.

Restriction on Hazardous Substances Directive Compliance Statement

The Restriction on Hazardous Substances Directive (RoHS) (2002/95/EC), which accompanies the WEEE Directive, bans the use of heavy metals and brominated flameretardants in the manufacture of electrical and electronic equipment. Specifically, restricted materials under the RoHS Directive are Lead (including solder used in PCB's), Cadmium, Mercury, Hexavalent Chromium, and Bromine.

Avaya declares compliance with the European Union (EU) RoHS Directive (2002/95/EC) in that Lead, which is a restricted hazardous substance, is used only in accordance to the exemption(s) to Articile 4(1), item 7 granted by the European Union (EU) RoHS DIrective (2002/95/EC) in the Annex—"lead in solders for network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunication".

WEEE Directive Compliance Statement



This product at end of life is subject to separate collection and treatment in the EU Member States, Norway, and Switzerland and therefore is marked with the symbol shown at the left. Treatment applied at end of life of these products in these countries shall comply with the applicable national laws implementing Directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE).

Avaya declares compliance with the European Union (EU) WSEEE Directive (2002/96/EC).

Safety Messages

This section describes the different precautionary notices used in this document. This section also contains precautionary notices that you must read for safe operation of the Avaya Virtual Services Platform 9000.

Notices

Notice paragraphs alert you about issues that require your attention. The following sections describe the types of notices. For a list of safety messages used in this guide and their translations, see the Translations of safety messages chapter.

Attention Notice

Important:

An attention notice provides important information regarding the installation and operation of Avaya products.

Caution ESD Notice

Electrostatic alert:

ESD

ESD notices provide information about how to avoid discharge of static electricity and subsequent damage to Avaya products.

Electrostatic alert:

ESD (décharge électrostatique)

La mention ESD fournit des informations sur les moyens de prévenir une décharge électrostatique et d'éviter d'endommager les produits Avaya.

Electrostatic alert:

ACHTUNG ESD

ESD-Hinweise bieten Information dazu, wie man die Entladung von statischer Elektrizität und Folgeschäden an Avaya-Produkten verhindert.

Electrostatic alert:

PRECAUCIÓN ESD (Descarga electrostática)

El aviso de ESD brinda información acerca de cómo evitar una descarga de electricidad estática y el daño posterior a los productos Avaya.

Electrostatic alert:

CUIDADO ESD

Os avisos do ESD oferecem informações sobre como evitar descarga de eletricidade estática e os consequentes danos aos produtos da Avaya.

Electrostatic alert:

ATTENZIONE ESD

Le indicazioni ESD forniscono informazioni per evitare scariche di elettricità statica e i danni correlati per i prodotti Avaya.

Caution Notice

Caution:

Caution notices provide information about how to avoid possible service disruption or damage to Avaya products.

Caution:

ATTENTION

La mention Attention fournit des informations sur les moyens de prévenir une perturbation possible du service et d'éviter d'endommager les produits Avaya.

Caution:

ACHTUNG

Achtungshinweise bieten Informationen dazu, wie man mögliche Dienstunterbrechungen oder Schäden an Avaya-Produkten verhindert.

Caution:

PRECAUCIÓN

Los avisos de Precaución brindan información acerca de cómo evitar posibles interrupciones del servicio o el daño a los productos Avaya.

Caution:

CUIDADO

Os avisos de cuidado oferecem informações sobre como evitar possíveis interrupções do serviço ou danos aos produtos da Avaya.

Caution:

ATTENZIONE

Le indicazioni di attenzione forniscono informazioni per evitare possibili interruzioni del servizio o danni ai prodotti Avaya.

Warning Notice

Warning:

Warning notices provide information about how to avoid personal injury when working with Avaya products.

Warning:

AVERTISSEMENT

La mention Avertissement fournit des informations sur les moyens de prévenir les risques de blessure lors de la manipulation de produits Avaya.

Warning:

WARNUNG

Warnhinweise bieten Informationen dazu, wie man Personenschäden bei der Arbeit mit Avaya-Produkten verhindert.

Warning:

ADVERTENCIA

Los avisos de Advertencia brindan información acerca de cómo prevenir las lesiones a personas al trabajar con productos Avaya.

Warning:

AVISO

Os avisos oferecem informações sobre como evitar ferimentos ao trabalhar com os produtos da Avaya.

Warning:

AVVISO

Le indicazioni di avviso forniscono informazioni per evitare danni alle persone durante l'utilizzo dei prodotti Avaya.

Danger High Voltage Notice

Voltage:

Danger—High Voltage notices provide information about how to avoid a situation or condition that can cause serious personal injury or death from high voltage or electric shock.

Voltage:

La mention Danger—Tension élevée fournit des informations sur les moyens de prévenir une situation ou une condition qui pourrait entraîner un risque de blessure grave ou mortelle à la suite d'une tension élevée ou d'un choc électrique.

Voltage:

GEFAHR

Hinweise mit "Vorsicht – Hochspannung" bieten Informationen dazu, wie man Situationen oder Umstände verhindert, die zu schweren Personenschäden oder Tod durch Hochspannung oder Stromschlag führen können.

Voltage:

PELIGRO

Los avisos de Peligro-Alto voltaje brindan información acerca de cómo evitar una situación o condición que cause graves lesiones a personas o la muerte, a causa de una electrocución o de una descarga de alto voltaje.

Voltage:

PERIGO

Avisos de Perigo—Alta Tensão oferecem informações sobre como evitar uma situação ou condição que possa causar graves ferimentos ou morte devido a alta tensão ou choques elétricos.

Voltage:

PERICOLO

Le indicazioni Pericolo—Alta tensione forniscono informazioni per evitare situazioni o condizioni che potrebbero causare gravi danni alle persone o il decesso a causa dell'alta tensione o di scosse elettriche.

Danger Notice

Danger:

Danger notices provide information about how to avoid a situation or condition that can cause serious personal injury or death.

Danger:

La mention Danger fournit des informations sur les moyens de prévenir une situation ou une condition qui pourrait entraîner un risque de blessure grave ou mortelle.

Danger:

GEFAHR

Gefahrenhinweise stellen Informationen darüber bereit, wie man Situationen oder Umständen verhindert, die zu schweren Personenschäden oder Tod führen können.

Danger:

PELIGRO

Los avisos de Peligro brindan información acerca de cómo evitar una situación o condición que pueda causar lesiones personales graves o la muerte.

Danger:

PERIGO

Avisos de perigo oferecem informações sobre como evitar uma situação ou condição que possa causar graves ferimentos ou morte.

Danger:

PERICOLO

Le indicazioni di pericolo forniscono informazioni per evitare situazioni o condizioni che potrebbero causare gravi danni alle persone o il decesso.

Chapter 2: Purpose of this document

The Avaya Virtual Services Platform 9000 chassis includes IO and SF cooling modules to ensure proper cooling of installed interface, Central Processor (CP), and Switch Fabric (SF) modules.

Avaya Virtual Services Platform 9000 Installation — Chassis, NN46250-304 provides information about environmental specifications for the chassis.

Purpose of this document

Chapter 3: New in this release

The following sections describe the changes in Avaya Virtual Services Platform 9000 Installation — Cooling Modules, NN46250-302, for Release 3.3.

Features

There are no feature-related changes.

Other changes

See the following sections for changes that are not feature-related.

Regulatory information

Información NOM (únicamente para México) on page 12 is updated.

National Environmental Statement of Compliance on page 13 is added.

Documentation updates

The following sections are updated and added:

- 9012FC IO cooling module on page 23
- Protecting modules on page 26
- Airflow in the 9012 chassis on page 27
- Data center floor plan on page 30
- Optimizing cooling in a data center on page 31
- 9012 chassis placement on page 33
- Other cooling considerations on page 34
- Monitoring and temperature alarms on page 35
- Installing the I O cooling module on page 37
- Removing the I O cooling module on page 38
- Installing the SF cooling module on page 39

- Removing the SF cooling module on page 40
- Translation Cooling Module Fan Safety Message on page 45

Cooling modules

The model names for cooling modules are updated in software and documentation. For more information, see

- 9012FC IO cooling module on page 23
- 9012RC SF cooling module on page 25
- Airflow in the 9012 chassis on page 27

Chapter 4: Cooling module fundamentals

This section illustrates the Avaya Virtual Services Platform 9000 cooling modules: Input Output (IO) cooling module and Switch Fabric (SF) cooling module.

9012FC IO cooling module

You must install two IO cooling modules in the front of the chassis. The IO cooling modules provide cooling for the interface modules and the Central Processor (CP) modules. Each IO cooling module includes eight fans.

If a fault condition occurs in an IO module, the chassis shuts down all SF and CP modules with faults. It also gives an option to the user to shutdown the interface modules.

The IO cooling modules are hot swappable. You can replace them, one at a time, without turning off the Virtual Services Platform 9000.

The following figure shows the cooling module for the Virtual Services Platform 9000 chassis.

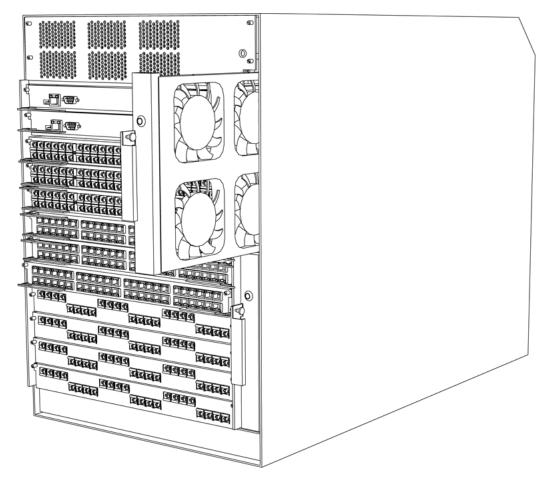


Figure 1: IO cooling module partially removed

The 9012FC IO cooling module measures 9.875 inches (in.) x 1.125 in. x 23.5 in. (250.8 millimeters [mm] x 28.6 mm x 596.9 mm) and weighs 9 pounds (4.08 kilograms).

Front Panel LED

The IO cooling module provides a bicolor LED on the front panel to indicate fan status. The following table explains the LED colors:

Table 1: Front panel LED status

LED Color	Status	Description
Green	Normal	All fans are functional and spinning above the program controlled FAN_FAULT_THRESHOLD register settings.
Amber (both red and green LED turned on)	Warning	One of the fans is not functioning properly. Either it is spinning below the FAULT threshold setting or does not spin at all. The fan tray can still provide enough cooling by increasing the fan speed of the remaining fans.

LED Color	Status	Description
Red	Fail	Two or more fans are not working, either from spinning too slowly or not at all. The fan tray may not provide enough cooling.

9012RC SF cooling module

You must install two 9012RC SF cooling modules in the back of the chassis. The SF cooling modules provide cooling based on the demand of the SF modules. Each cooling module includes two fans.

The SF cooling modules are hot swappable. You can replace them, one at a time, without turning off the Virtual Services Platform 9000.

The following figure shows the SF cooling module for the chassis.

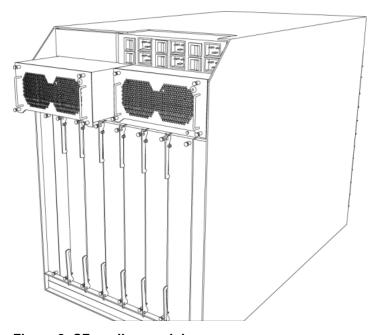


Figure 2: SF cooling module

The 9012RC SF cooling module measures 4.625 inches (in.) x 8.75 in. x 3.5 in. (117.5 millimeters [mm] x 222.3 mm x 88.9 mm) and weighs 2 pounds (0.91 kilograms).

Front Panel LED

The SF cooling module provides a bicolor LED on the front panel to indicate fan status. The following table explains the LED colors.

Table 2: Front panel LED status

LED Color	Status	Description
Green	Normal	Both fans are functional and spinning above the program controlled FAN_FAULT_THRESHOLD register settings.
Red	Fail	One or both fans are not working, either from spinning too slowly or not at all. The fan tray may not provide enough cooling.

Protecting modules

Virtual Services Platform 9000 modules are larger and heavier than Ethernet Routing Switch 8000 series modules.

Handle the modules used in Virtual Services Platform 9000 with care. Take the following items into consideration when you handle modules:

- To prevent damage from electrostatic discharge, always wear an antistatic wrist strap connected to an ESD jack when connecting cables or performing maintenance on this device.
- Always place the modules on appropriate antistatic material.
- Do not touch the top of the module or you can damage pins, components, and connectors. Doing so can result in equipment damage.
- Damage to a module can occur if it is bumped into another object, including other modules installed in a chassis. Use both hands to support modules.
- Support the module from underneath with two hands. Do not touch the top of the module. Do not touch the pins or electrical connections.
- Do not stack modules one on top of the other when you move them.
- Be careful not to bump module connectors against the action levers of an adjacent module. Damage to connectors can result.
- Do not leave slots open. Fill all slots with modules or filler modules to maintain safety compliance, proper cooling, and EMI containment.
- Do not over tighten screws. Tighten until snug. Do not use a power tool to tighten screws.

Airflow in the 9012 chassis

Airflow in the Virtual Services Platform 9000 9012 chassis is from left-to-right (as viewed from the front) for I/O modules and front-to-back for switch fabric cards and power supplies.

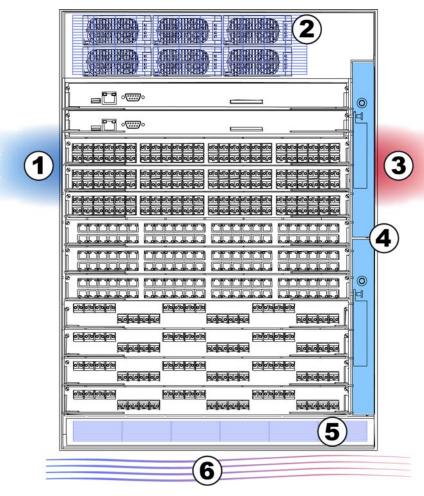


Figure 3: Front of the 9012 chassis

Table 3: Front of the 9012 chassis

Diagram	Description
1	I/O module air inlet
2	Power supply fan air inlet
3	I/O module air exhaust
4	9012FC cooling modules

Diagram	Description
5	Switch Fabric module air inlet
6	Airflow — left to right

Left-to-right cooling

Airflow moves from left to right to cool the Control Processor and interface modules. Two 9012FC cooling modules, located on the front right side of the 9012 chassis, provide this air movement and have adjustable fan speed that depends on the system temperature.

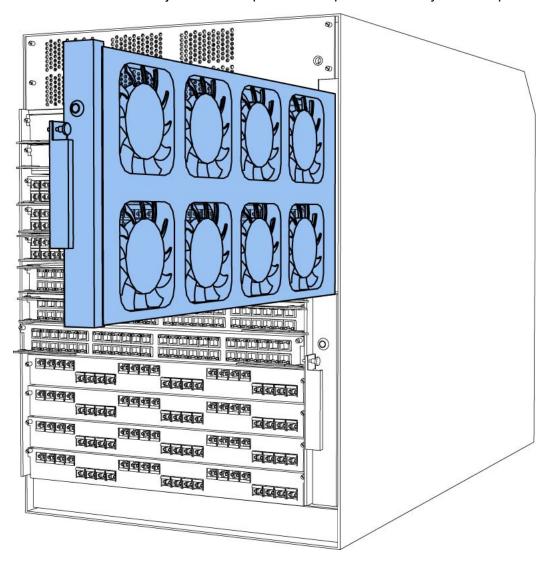


Figure 4: 9012FC cooling module

Each 9012FC cooling module has eight fans. The platform polls all line card and CP card sensors and adjusts the 9012FC fan speed accordingly.

Front-to-back cooling

Airflow moves from front-to-back to cool the Switch Fabric and auxiliary modules. Two 9012RC cooling modules, at the top back of the 9012 chassis, provide the air movement and have adjustable fan speed that depends on system temperature.

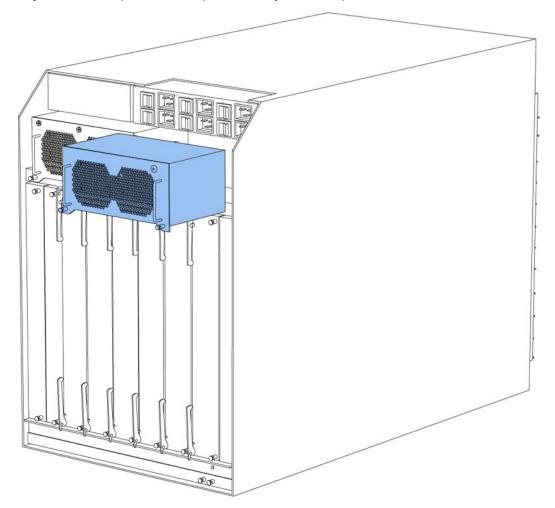


Figure 5: 9012RC cooling module

In the 9012 chassis, two fans exist in each 9012RC cooling module and pull air from front-to-back. The platform polls all Switch Fabric card sensors and adjusts the 9012RC fan speed accordingly.

Note:

Do not place the 9012 chassis directly against a wall, equipment, or other obstruction. Avaya recommends 36 inches (91 centimeters) of free space in both the front and back of the machine and also 6 inches (15.2 centimeters) on each side extra). Depending on the circumstances, increase the free space at the side to allow for more airflow or cool airflow into the 9012 chassis.

Data center floor plan

Typically a data center optimizes airflow through the creation of hot aisles and cold aisles.

The cold aisles can have a raised floor, which consists of tiles with perforations to allow cold air to enter the devices.

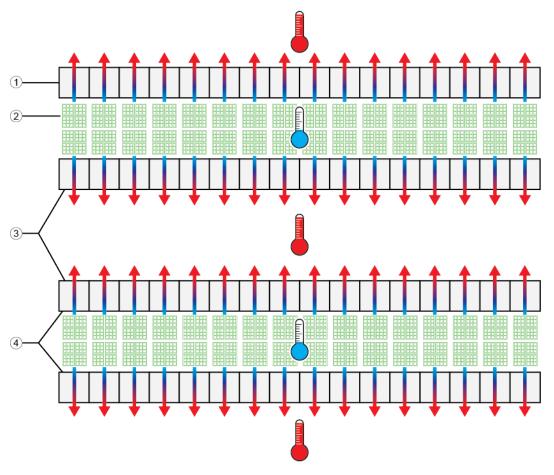


Figure 6: Data center floor plan of hot and cold aisles

Diagram	Description
1	Chassis racks
2	Cold aisle floor tiles in a raised floor
3	Back of chassis
4	Front of chassis

In a data center configuration, the front of equipment faces the cold aisle, while the rear of the equipment faces the hot aisle. The chassis take in cold air from the cold aisle and discharge hot air into the hot aisle.

Each 9012 chassis takes in cold air from the left and discharges hot air to the right.

The typical data center layout works well for front-to-back cooling, but not as well for side-toside cooling.

In this typical setup, if you place each 9012 chassis in a row from left to right, then the chassis to the left discharges hot air into the cool intake of the chassis to the right. This installation does not optimize cool airflow.

Optimizing cooling in a data center

To optimize left-to-right cooling, perform the following tasks:

- Increase the space between each 9012 chassis
- Relocate the cooling floor tiles to improve cool air movement into the side of the 9012 chassis
- Add baffles to redirect the hot air the 9012 chassis discharges from the right side to the hot aisle at the back

For instance, in the following diagram the hot and cold aisles remain, but now space exists between some of the 9012 chassis. Baffles are added to redirect air from the side to the back of the chassis into the hot aisles. Cooling tiles are relocated near the cool air intake to improve cooling.

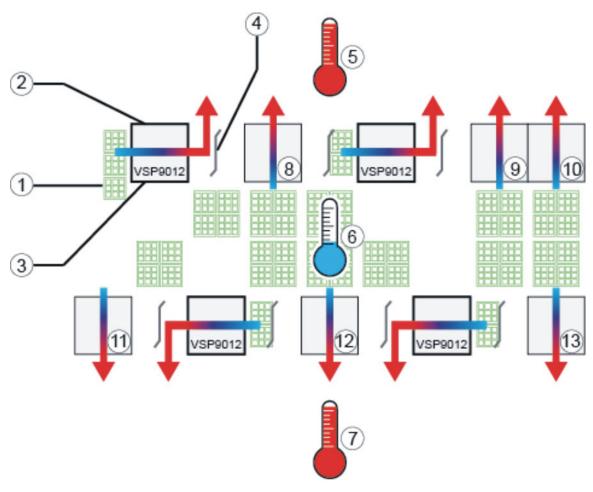


Figure 7: Data center with optimized cooling

Table 4: Data center with optimized cooling

Diagram	Description
1	Cooling tiles
2	Back of 9012 chassis
3	Front of 9012 chassis
4	Baffle
5, 7	Hot aisles
6	Cold aisle
8 to 13	Other equipment, front to back cooling

9012 chassis placement

If you place each 9012 chassis in a row from left to right, then the chassis to the left discharges hot air into the cool intake of the chassis to the right.

To optimize airflow, stagger each chassis in racks and add a baffle that redirects hot air discharged by a chassis from the side to the hot aisle at the back.

Note:

Before setting up your data center plan airflow of cool air into each chassis.

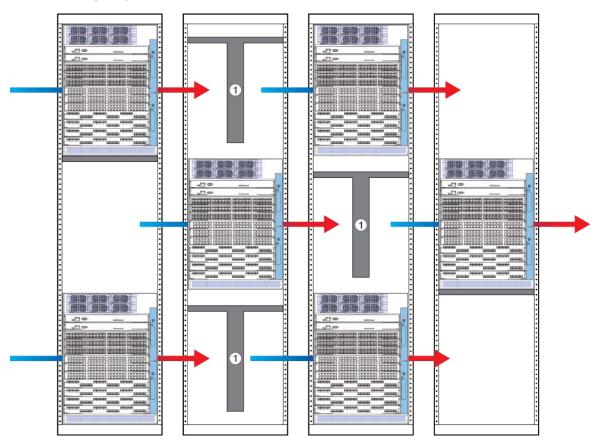


Figure 8: Arrangement of 9012 chassis in rack to optimize airflow

Other cooling considerations

This table offers suggestions for other cooling considerations.

Situation	Con	siderations
Raised floors versus non-raised floors for cooling		s for cooling you need to ensure air is the left side. You can add extra stand s the chassis.
Adjacent equipment	the 9012 chassis. Computers,	r pieces of equipment in the vicinity of Telecommunications, and other below the 9012 chassis can discharge
Blocked cooling modules	Placement of the 9012 chassis near walls or placement of exterior items for cable management can decrease the capacity of the cooling modules. For instance, the following diagram shows how cable management blocks two out of four fans in a row. As a result, the cooling module can only offer 50 per cent of the cooling airflow.	
	1 2222	-2
		7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
	Figure 9: Cooling module ca	able management
	Diagram	Description
	1	Cable management blocking fan
	2	Fans

Situation	Considerations
Clearance	Do not place the 9012 chassis directly against a wall, equipment, or other obstruction. Avaya recommends 36 inches (91 centimeters) of free space in both the front and back of the machine and also 6 inches (15.2 centimeters) on each side). However, dependent on circumstances, increase the space at the side of the 9012 chassis to improve airflow.

Monitoring and temperature alarms

The system monitors the temperature on the modules. An alarm is triggered after the module temperature exceeds the threshold value (60 degrees Celsius (°C)). The module alarms are cleared after the module temperature falls below the threshold value (2 degrees below 60 C). The module shuts down at 65 C.

The following command displays the temperature on all the modules:Show sys-info temperature

```
VSP-9012:1 (config) #show sys-info temperature
Temperature Info :
Slot Zone-1 Zone-2 Zone-3 Zone-4 Zone-5 Highest Lowest Alarm
Temp Temp Temp Temp Temp Temp
                                              Threshold Threshold
1 27 24 --
4 29 26 30
                                 27
30
                           25
                                        24
                                              60 65
                     28
                                        26
                                               60
                           26
                                                       6.5
SF4 26 --
                     28
                               28
                                      26
```

Each of the zones correspond to temperature sensors on the modules. For instance, the I/O module has five temperature zones. Zones 1, 2, and 3 are inlet sensors and 4 and 5 are outlet air sensors. The SF has two temperature sensors and the CP has four temperature sensors.

The alarm threshold is the temperature the zone can reach before the device moves from normal to alarm mode. The shutdown threshold is the temperature that causes the module to shutdown if reached on any sensor in a module.

The zone alarm is triggered after one of the following events occurs:

- A module alarm is triggered.
- Module alarms are cleared, but the fan still cools the system.

You can see the zone alarm information under the Fan Trays Info section of the command output for show sys-info command:

```
Fan Trays Info :
    Zone Info :
    FRONT zone :
        Mode : NORMAL
        Zone Alarm Timer : 0 seconds
        Mode Status : Normal
        Highest Temperature : 42 C
    REAR zone :
```

Cooling module fundamentals

```
Mode : NORMAL
Zone Alarm Timer : O seconds
Mode Status : Normal
Highest Temperature : 29 C
```

When the zone alarm is triggered, the fan speed increases and the LED color changes on the front panel. The system clears the module alarm after the temperature falls below 59 °C (2 degrees below 60 C); however, the zone temperature must reduce further to avoid multiple set and clear alarms and constant turning up and down of the fan speed when the module temperature fluctuates continuously around (above and below) the threshold temperature. The zone alarm clears after the temperature falls below 50 °C.

Chapter 5: Cooling module installation and removal

This section describes how to install the cooling modules in the Avaya Virtual Services Platform 9000.

Install a cooling module to provide cooling to the interface, Switch Fabric (SF), and Central Processor (CP) modules. Installation takes 2 to 5 minutes.

Installing the I/O cooling module

Install the I/O cooling module in the front of the chassis to provide cooling to the interface and CP modules. You must install two I/O cooling modules in the chassis. You can hot swap the cooling modules.

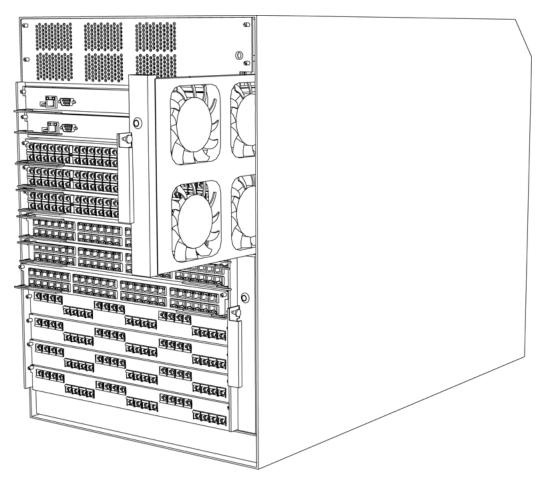
Warning:

Risk of personal injury

Remove the cooling modules using the provided handles. Be careful to keep your fingers out of the fan blades. When you remove a cooling module, allow time for the fans to spin down before you fully withdraw the cooling module.

Procedure

- 1. Locate the bay where you want to install the cooling module.
- 2. Slide the cooling module into the chassis.



- 3. With one hand, pull the pin on the cooling module to the right, and then hold it in place.
- 4. Slide the cooling module into the chassis until the connector at the rear of the cooling module connects to the midplane.
- 5. Release the pin on the cooling module.
- 6. Verify that the cooling module LED light is green.

Removing the I/O cooling module

Remove the I/O cooling module from the slot at the front of the chassis to replace it. You can hot swap the cooling modules.

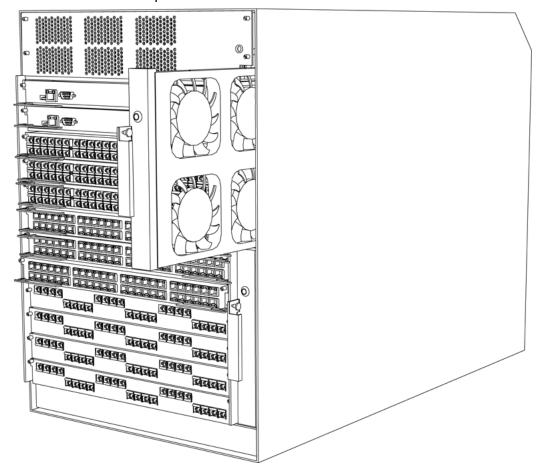
Warning:

Risk of personal injury

Remove the cooling modules using the provided handles. Be careful to keep your fingers out of the fan blades. When you remove a cooling module, allow time for the fans to spin down before you fully withdraw the cooling module.

Procedure

- 1. With one hand, pull the pin on the cooling module to the right and hold it in place.
- 2. Pull the cooling module partially from the chassis until the connector at the rear releases from the midplane.



3. Slide the cooling module out of the chassis.

Installing the SF cooling module

Install the SF cooling module in the back of the chassis to provide cooling to the SF modules. You must install two SF cooling modules in the chassis. You can hot swap the cooling modules.

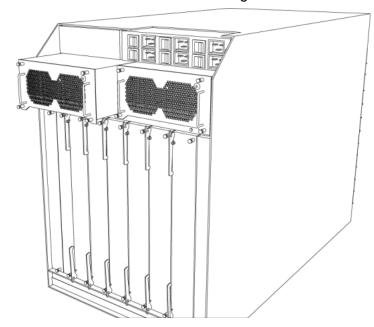
Warning:

Risk of personal injury

Remove the cooling modules using the provided handles. Be careful to keep your fingers out of the fan blades. When you remove a cooling module, allow time for the fans to spin down before you fully withdraw the cooling module.

Procedure

- 1. Locate the bay where you want to install the cooling module.
- 2. Using the handles on the cooling module, slide the module into the chassis until the connector at the back of the cooling module connects with the midplane.



- 3. Tighten the captive screws on the bottom of the cooling module to fasten the cooling module to the chassis.
- 4. Verify that the cooling module LED light is green.

Removing the SF cooling module

Remove the SF cooling module from the slot to remove it. You can hot swap the cooling modules.

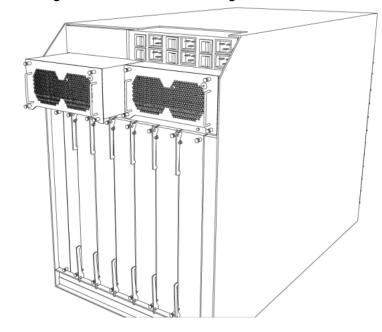
Warning:

Risk of personal injury

Remove the cooling modules using the provided handles. Be careful to keep your fingers out of the fan blades. When you remove a cooling module, allow time for the fans to spin down before you fully withdraw the cooling module.

Procedure

- 1. Loosen the captive screws that secure the cooling module to the midplane.
- 2. Using the handles on the cooling module, slide the module out of the chassis.



Cooling module installation and removal

Chapter 6: Translations of safety messages

This chapter describes the translations of safety messages which you need to be aware of while executing the installation of AC power supply.

Class A electromagnetic interference caution statement

Caution:

Risk of electromagnetic interference

This device is a Class A product. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users are required to take appropriate measures necessary to correct the interference at their own expense.

Caution:

ATTENTION

Le périphérique est un produit de Classe A. Le fonctionnement de cet équipement dans une zone résidentielle risque de causer des interférences nuisibles, auquel cas l'utilisateur devra y remédier à ses propres frais.

Caution:

ACHTUNG

Dies ist ein Gerät der Klasse A. Bei Einsatz des Geräts in Wohngebieten kann es Störungen des Radio- und Fernsehempfangs verursachen. In diesem Fall muss der Benutzer alle notwendigen Maßnahmen ergreifen, die möglicherweise nötig sind, um die Störungen auf eigene Rechnung zu beheben.

Caution:

PRECAUCIÓN

Este es un producto clase A. El uso de este equipo en áreas residenciales puede causar interferencias nocivas, en cuyo caso, se requerirá que los usuarios tomen cualquier medida necesaria para corregir la interferencia por cuenta propia.

Caution:

CUIDADO

Este dispositivo é um produto Classe A. Operar este equipamento em uma área residencial provavelmente causará interferência prejudicial; neste caso, espera-se que os usuários tomem as medidas necessárias para corrigir a interferência por sua própria conta.

Caution:

ATTENZIONE

Questo dispositivo è un prodotto di Classe A. Il funzionamento di questo apparecchio in aree residenziali potrebbe causare interferenze dannose, nel cui caso agli utenti verrà richiesto di adottare tutte le misure necessarie per porre rimedio alle interferenze a proprie spese.

Electrostatic discharge caution statement

Electrostatic alert:

ESD

To prevent damage from electrostatic discharge, always wear an antistatic wrist strap connected to an electrostatic discharge (ESD) jack when performing maintenance on this product. Ensure that the wrist strap makes contact with your skin.

Electrostatic alert:

ATTENTION

ESD (décharge électrostatique)

Pour prévenir tout dommage dû à une décharge électrostatique, vous devez toujours porter un un bracelet antistatique connecté à une prise pour décharge électrostatique (ESD) lors de l'exécution d'opérations de maintenance sur ce produit. Assurez-vous que le bracelet antistatique est en contact avec votre peau.

Electrostatic alert:

ACHTUNG

ESD

Um Schäden durch elektrostatische Entladung zu verhindern, tragen Sie bei der Instandhaltung dieses Produkts immer ein antistatisches Band am Handgelenk, das mit einer ESD-Buchse verbunden ist. Stellen Sie

Electrostatic alert:

PRECAUCIÓN

ESD (Descarga electrostática)

Para prevenir el daño producido por una descarga electrostática, use siempre una pulsera antiestática conectada a un enchufe de descarga electrostática (ESD) al realizar el mantenimiento de este producto. Asegúrese de que la pulsera antiestática haga contacto con su piel.

Electrostatic alert:

CUIDADO

ESD

Para evitar danos com descarga eletrostática, sempre use uma pulseira antiestática que esteja conectada a uma tomada de descarga eletrostática (ESD) quando estiver realizando a manutenção deste produto. Certifique-se de que a pulseira esteja em contato com sua pele.

Electrostatic alert:

ATTENZIONE

FSD

Per evitare danni derivanti da scariche elettrostatiche, indossare sempre un polsino antistatico collegato a una presa di scarico elettrostatico (ESD) durante la manutenzione del prodotto. Accertarsi che il polsino sia a contatto con la pelle.

Cooling module fan safety warning statement

Warning:

Risk of personal injury

Remove the cooling modules using the provided handles. Be careful to keep your fingers out of the fan blades. When you remove a cooling module, allow time for the fans to spin down before you fully withdraw the cooling module.

Warning:

AVERTISSEMENT

Risque de blessures corporelles

Retirez les modules de refroidissement à l'aide des poignées fournies. Veillez à tenir vos doigts à l'écart des pales du ventilateur. Lorsque vous retirez un module de refroidissement, prenez le temps de laisser le ventilateur ralentir avant de retirer complètement le module de refroidissement.

Warning:

WARNUNG

Verletzungsgefahr

Entfernen Sie das Kühlmodul mithilfe der mitgelieferten Handgriffe. Achten Sie darauf, dass Ihre Finger nicht die Lüfterflügel berühren. Wenn Sie ein Kühlmodul entfernen, warten Sie, bis die Lüfter zum Stillstand gekommen sind, bevor Sie das Modul komplett herausnehmen.

Warning:

ADVERTENCIA

Riesgo de lesiones

Retire los módulos de refrigeración utilizando las asas que se proporcionan. Tenga cuidado y mantenga los dedos fuera de las aspas del ventilador. Cuando retire un módulo de refrigeración, espere a que las aspas disminuyan sus revoluciones antes de retirar completamente el módulo de refrigeración.

Warning:

AVISO

Risco de ferimentos

Remova os módulos de refrigeração utilizando as alças fornecidas. Tome cuidado para manter os dedos longe das pás do ventilador. Quando remover um módulo de refrigeração, espere um pouco para que as pás parem de girar antes de retirar totalmente o módulo de refrigeração.

Warning:

Avvertenza

Rischio di lesion personali

Rimuovere I moduli di raffreddamento utilizzando i supporti in dotazione. Fare attenzione a non avvicinare le dita alle lame della ventola. In fase di rimozione del modulo di raffreddamento, prima di estrarlo completamente, attendere che le ventole rallentino.

Translations of safety messages

Chapter 7: Customer service

Visit the Avaya Web site to access the complete range of services and support that Avaya provides. Go to www.avaya.com or go to one of the pages listed in the following sections.

Getting technical documentation

To download and print selected technical publications and release notes directly from the Internet, go to www.avaya.com/support.

Getting product training

Ongoing product training is available. For more information or to register, you can access the Web site at www.avaya.com/support. From this Web site, you can locate the Training contacts link on the left-hand navigation pane.

Getting help from a distributor or reseller

If you purchased a service contract for your Avaya product from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller for assistance.

Getting technical support from the Avaya Web site

The easiest and most effective way to get technical support for Avaya products is from the Avaya Technical Support Web site at www.avaya.com/support.

Customer service