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Cisco 4000 Series Integrated Services Routers

General

- Q. What are the Cisco 4000 Series Integrated Services Routers (ISRs)?
- A. The Cisco[®] 4000 Series Integrated Services Routers build on the concept of the Application Experience router by integrating multiple services into a single platform that can provide all the services a typical branch office needs. The services include increased capacities for routing, switching, unified collaboration, security, WAN acceleration, application optimization, and Application Visibility and Control (AVC). At the same time, the routers are designed for expansion that can deliver increased performance and capabilities over time without the need for expensive system upgrades or hardware as remote sites grow.
- Q. What are the key new features and changes that are being introduced in the 4000 Series?
- A. The 4000 Series offers:
 - Default forwarding bandwidth that is upgradable with a software-activated upgrade license
 - The ability to house network interface modules (NIMs) and enhanced service modules (SM-Xs)
 - Support for kernel virtual machine (KVM)-based containers, providing support for integrated applications
 - Support for applications including Snort and Cisco Stealthwatch[®] Learning Network (SLN)
 - Network programmability using Netconf and YANG
- **Q.** Where do I position the Cisco 4451-X in comparison to the Cisco 3900 Series ISRs and the ASR 1000 Series Aggregation Services Routers?
- **A.** The Cisco 4451-X is positioned for high-end enterprise branch offices or enterprise headend where there is a performance requirement of 1 to 2 Gbps with services. Performance-wise the Cisco 4451-X is positioned between the 3945E ISR and the ASR 1001.
- Q. What software are the Cisco 4000 Series ISRs capable of running?
- A. The 4000 Series ISRs run Cisco IOS[®] XE Software. The initial version will be Cisco IOS XE Software Release 3.9.1. The 4300 and 4431 ISRs were released with Cisco IOS XE Software Release 3.13, and the 4200 Series ISRs were released with Cisco IOS XE Software Release 16.4.1.
- Q. Do the 4000 Series ISRs run a software release similar to the one on the Cisco ASR 1000 Series?
- A. Yes. The 4000 Series ISRs are similar to the Cisco ASR 1000 Series in terms of the software releases that they run.
- Q. Are the Cisco ASR 1000 Series Shared Port Adapter (SPA) cards supported on the 4000 Series ISRs?
- A. No. SPAs are not compatible with the 4000 Series ISRs.
- Q. Can the NIMs or service modules available on the Cisco 4000 Series work on the Cisco ASR 1000 Series?
- A. The service modules will work with the Cisco ASR 1000 Series. Select NIMs will also work with the ASR 1000 Series.

- **Q.** Can I use the enhanced high-speed WAN interface cards (EHWICs) available on the Cisco 1900, 2900, and 3900 Series ISRs on the Cisco 4000 Series ISRs?
- A. EHWIC modules available on the Cisco ISR Generation 2 (ISR G2) routers will not work with the 4000 Series ISRs. The 4000 Series is targeted at new branch-office environments requiring high bandwidth and greater application performance, making most EHWICs unapplicable. Also, the newer NIM architecture allows for faster, more capable modules on a high-end platform.
- Q. Can I use the NIMs on the Cisco 1900, 2900, and 3900 Series ISRs?
- A. No. The NIMs are designed for a newer architecture and will not work on the Cisco 1900, 2900, and 3900 Series ISRs.
- **Q.** Can I use the Cisco Unified Computing System[™] (Cisco UCS[®]) E-Series Service Modules available on the Cisco 2900 and 3900 Series ISRs on the Cisco 4000 Series?
- A. Yes, the Cisco UCS E-Series Modules are supported on the 4000 Series ISRs. Please refer to the module support page located at http://www.cisco.com/c/en/us/products/routers/4000-series-integrated-services-routers-isr/relevant-interfaces-and-modules.html.
- Q. Can I use the Cisco Enhanced Service T3/E3 module (SM-X-1T3/E3) available on the Cisco 2900 and 3900 Series ISRs on the 4000 Series ISRs?
- A. Yes, the Cisco Enhanced Service T3/E3 module is supported on the 4000 Series ISRs. Please refer to the module support page located at <u>http://www.cisco.com/c/en/us/products/routers/4000-series-integrated-services-routers-isr/relevant-interfaces-and-modules.html</u>.
- Q. What memory upgrade options are available on the Cisco 4000 Series?
- A. The 4000 Series has separate data and control-plane memory. The control-plane memory comes with 4 GB as the default, and is upgradable up to 16 GB based on various platforms. The data-plane memory comes with 2 GB as the default and is not currently upgradable.
- Q. How many dual inline memory modules (DIMMs) does the Cisco 4000 Series have?
- A. The 4451-X and 4431 have three DIMM slots. Two slots are used for control-plane and one slot for data-plane memory. The 4331 and the 4351 have two DIMMs, and the 4321 has one DIMM slot. The 4221 has no DIMM slot for memory expansion.
- **Q.** In the case of control-plane memory, can I put, say, a 4-GB DIMM in one slot and a 2-GB DIMM in the other slot?
- A. No. Like the Cisco 3900 Series, the 4000 Series expects both DIMM slots to have the same size of memory; as an example, it must have either 4-GB memory in both slots for a total of 8 GB of control-plane memory, or 2-GB memory in both slots, for a total of 4 GB of control-plane memory. This setup is necessary because these platforms interleave memory devices for faster access.
- **Q.** Do all four ports with both RJ-45 and Small Form-Factor Pluggable (SFP) front panel Gigabit Ethernet (FPGE) connections support failover?
- A. Yes. You can configure auto-failover on any of the front-panel ports with both RJ-45 and SFP connections. When auto-failover is configured, if the primary interface type fails, either RJ-45 or SFP, the other media type becomes active and allows traffic to continue over the backup physical connection. In this scenario, the backup connection needs to be connected with the same speed and duplex as the primary connection.

Note that the auto-failover feature as described does support one Gigabit Ethernet interface acting as a backup to another. The two physical connections available on a single Gigabit Ethernet interface simply provide failover if a link fails.

- Q. Is MDI crossover (MDI-X) supported on the four onboard RJ-45 Ethernet interfaces?
- A. Yes.
- Q. What type of backplane is used between components in the Cisco 4000 Series?
- A. The 4000 Series uses multigigabit fabric (MGF) for Layer 2 connectivity between the modules. On the 4451-X, the MGF can provide either 2 Gbps to all NIM slots or up to 10 Gbps to all SM-X slots. The MGF is completely nonblocking and can forward in excess of 50 Gbps.
- Q. What power cables work with the Cisco 4000 Series?
- A. All power-supply options for the 4000 Series use a standard IEC C13 connector. No special IEC C15 cord is necessary for the Power over Ethernet (PoE) power supply because higher-efficiency power supplies (85 percent) are used in the 4000 Series. This cord thus helps lower the maximum current the power supplies can draw.
- Q. Are the Cisco 4451-X and 4431 power supplies field-replaceable units (FRUs)?
- A. Yes. The power supplies can be replaced in the field.
- Q. Are the Cisco 4451-X and 4431 power supplies hot-swappable?
- **A.** Yes. You do not need to power down the chassis to insert or remove a power supply. Also, unlike the 3900 Series ISRs, the bezel and fan tray can remain in place while a power supply is replaced.
- Q. Does the Cisco 4000 Series have a DC power-supply option?
- **A.** Yes, the Cisco 4400 Series and the 4351 ISR have DC power supplies.
- Q. What are the power options for PoE on the Cisco 4000 Series?
- A. The Cisco 4451-X and 4431 have two PoE options. Two of the FPGE interfaces can be powered with the addition of a dedicated power-conversion module installed into the system (PWR-GE-POE-4400). This module does not require a higher-capacity system power supply and will work with the default power supply. The PoE power for the FPGE ports is completely independent from PoE power to the rest of the system.

The Cisco 4000 Series also has the option of a PoE power supply to provide PoE power to modules in the system such as an Ethernet switch module. The Cisco 4451-X and 4431 can accept up to two PoE power supplies and power-conversion modules for redundant operation or PoE Boost mode. The PoE power supply in the 4451-X and 4351 actually includes two components as a single part: a higher-capacity system power supply and a PoE conversion module that converts system power into PoE for modules within the system.

- Q. What is the difference between PoE Redundancy mode and PoE Boost mode?
- A. Both modes require that two power supplies be installed in the Cisco 4451-X or 4431. Redundancy mode provides backup PoE power to the chassis; full PoE power will be available in the event of a single power supply failure. PoE Boost mode provides double available PoE power—the maximum amount of power from both power supplies combined—meaning that if a single power supply fails the second redundant power supply will be cut in half.

- **Q.** With redundant power supplies, can we switch the power to primary when it fails and the router is running on the secondary power supply?
- A. There is no concept of primary or secondary power supply for the Cisco 4451-X and 4351. The power supplies are simply redundant, so that when one fails the other power-supply unit (PSU) takes over by transparently providing power to the entire system. No switching or intervention is required. Both share the load when running in the system; however, when one fails the other provides power to the complete unit. When the failed PSU is replaced with a new PSU in the system, the two power supplies are redundant.
- **Q.** Are the PoE interfaces PoE+?
- A. PoE+ is available on the new SM-X Ethernet switch modules as well as on the FPGE ports.
- Q. How does the system fan speed vary?
- A. The Cisco 4000 Series ISRs use both an inlet temperature and an altitude sensor to determine the best fanspeed setting. There are four different inlet temperature ranges and five different altitude ranges for a total of 20 possible different fan-speed settings. The addition of an altitude sensor is an industry first for a branchoffice platform. With altitude data incorporated into the fan speed, the system can account for the density of air cooling in order to select the most efficient and quietest fan-speed setting. All system fans run at the same speed.
- Q. Can the Cisco 4000 Series ISRs handle the failure of a fan?
- A. Yes, for systems with multiple fans (4331 and above). A fully loaded system will function normally below 6000 feet (1.82 km) with a single fan failure. If the ISR is above 6000 feet and in 32°F (or 0°C) temperatures it may shut down because of overheating. The system is rated to operate in 32°F temperatures at up to 10,000 feet (3.05 km).

Failure of a power-supply fan will likely result in overheating and shutdown of the power supply. If power redundancy is required, you should install two power supplies in a 4451-X or 4431.

- Q. Is a rack-mount kit available for the Cisco 4000 Series? How do I order it?
- A. Yes. A rack-mount kit is part of the default accessory kit and is shipped with the Cisco 4000 Series. Order part number ACS-4450-RM-19= for the spare 19-inch rack-mount kit for the 4451-X. Similarly, for the 4321, 4331, 4351, and 4431, you may use ACS-4320-RM-19=, ACS-4330-RM-19=, ACS-4430-RM-19=, and ACS-4450-RM-19=, respectively.
- Q. Is a 23-inch telco rack-mount kit available for the Cisco 4000 Series?
- **A.** Order part number ACS-4450-RM-23= for the spare 23-inch rack-mount kit for the Cisco 4451-X. Similarly, order the ACS-4430-RM-23= for the Cisco 4431 and the ACS-4330-RM-23= for the Cisco 4351 or 4331.
- **Q.** How can I calculate the mean time between failures (MTBF) information for the Cisco 4451-X with the plugged-in modules? Is a MTBF calculator available, such as for the ISR G2 routers?
- A. The MTBF for all the routers is listed on the data sheet at http://www.cisco.com/c/en/us/products/collateral/routers/4000-series-integrated-services-routers-isr/datasheet-c78-732542.html.

- **Q.** What else is part of the default accessory kit?
- A. The default accessory kit includes:
 - Mechanical ground lug 90 feet per screw kit
 - 19-inch rack-mount kit
 - Regulatory Compliance and Safety Information (RCSI) roadmap document
 - Plastic bag
 - Shipping label
 - Document pointer card for Cisco router
- **Q.** What is the purpose of the GigabitEthernet0 on the Cisco 4000 Series?
- A. The GigabitEthernet0 is the dedicated management port on the Cisco 4000 Series. This interface connects directly to the control-plane CPU and is ideal for managing the router through Telnet, Secure Shell (SSH) Protocol, Simple Network Management Protocol (SNMP), and other management protocols. It is also ideal for downloading software images, uploading logs, and connecting to other management devices such as RADIUS, Network Time Protocol (NTP), Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), and TACACS servers. This interface should never be used for forwarding normal data traffic through the system because every packet goes directly to the control-plane CPU, bypassing the platform data plane. Because of this sensitivity, G0 is in a dedicated Mgmt-Intf Virtual Route Forwarding (VRF) port by default. This setup prevents accidental routing mistakes that could cause data traffic to be routed to the management network.
- Q. Is MDI-X supported on the management RJ-45 Ethernet interface?
- A. Yes.
- Q. Is a console port available on the Cisco 4000 Series?
- A. The Cisco 4000 Series has the option of the regular RJ-45 console port as well as the USB console port. As with the ISR G2 routers, only one console port can be used at a time, with preference given to the USB console port. The Cisco 4221 router has a combo RJ-45 port for AUX and Console.
- **Q.** Is online insertion and removal (OIR) supported on the Cisco 4000 Series?
- **A.** Yes, OIR is supported on the Cisco 4000¹ Series for the following scenarios:
 - · Surprise insertion or removal of any NIM in any of the NIM slots
 - Surprise insertion or removal of any SM-X in the SM-X slots
 - Surprise insertion or removal of any power supply or system PoE conversion module
 - Surprise replacement of the system fan tray; note, however, that this replacement must take place quickly enough that the system does not overheat, and depending on altitude and ambient temperature, the amount of time can vary greatly

Note that SM-X and NIM modules allow replacement only for like-to-like modules. A faulty module can be replaced with a good module of the same type but cannot be replaced with a completely different module of a different type.

¹ The Cisco 4221 does not support OIR.

- **Q.** Will the NIMs and service modules continue to function as they normally do after OIR on a Cisco 4000 Series ISR?
- A. Yes, provided the OIR was carried out using a like-for-like module.

Software

- Q. What type of Cisco IOS Software is available for the Cisco 4000 Series?
- A. The Cisco 4000 Series runs the same feature-rich Cisco IOS XE Software as the current-generation Cisco ASR 1000 Series. By using the same software release as the Cisco ASR 1000 Series, the Cisco 4000 Series benefits from a rich history of branch-office feature development as well as ongoing feature development.
- Q. What software options are available for the Cisco 4000 Series?
- A. One change that customers like is the Cisco IOS Software images available on the ISR G2 routers, which reduce numerous software images into one. Therefore, the Cisco 4000 Series has a single Cisco IOS XE Software image. This image is known as a universal image. It contains all features and functions in a single software image. You can selectively enable functions within this universal image by using Cisco Software Activation Licenses that activate capabilities within that image. You now need only a single Cisco IOS XE Software image for the router regardless of the features or functions you need for any particular area in your network.
- Q. What is a universal image?
- A. For the Cisco 4000 Series, Cisco IOS XE Software is delivered in a single universal Cisco IOS XE Software image per platform for each release. With the universal image you need to choose only the Cisco IOS XE Software release you need for your network. With the Cisco 4000 Series, the universal image includes all features and options.

Cisco Software Activation is used to enable feature packages such as the Security, Application Experience, or Unified Collaboration technology package. This new model greatly simplifies the effort required to track license compliance across a large number of devices and reduces the number of images that must be supported in a network. Simultaneously, the number of feature packages is also greatly simplified so that now only major feature packages, including the IP Base default package, are available with a single universal image.

- Q. What does the software packaging and licensing model look like for the Cisco 4000 Series?
- **A.** The Cisco 4000 Series has packaging and licensing similar to that of the Application Experience routers (refer to Figure 1):
 - IP Base Technology Package (default)
 - Application Experience Technology Package (AppX)
 - Security Technology Package (SEC) and High Security (HSEC) for strong encryption throughput and tunnel count
 - Unified Collaboration Technology Package (UC)



Figure 1. Packaging and License Model for the Cisco 4000 Series ISRs

- Q. Is the software packaging on the Cisco 4000 Series similar to that for the ISR G2, which is Right-To-Use (RTU)-based?
- A. The Cisco 4000 Series has software packaging similar to that of the ISR G2, and it is RTU, also known as honor-based. A 60-day evaluation license for all features is included with every 4000 Series ISR. After 60 days, an evaluation license automatically converts to a RTU license. At that point, it is expected that a RTU license will be purchased for that feature on that platform. This model is the same as that for the ISR G2.
- Q. What about export and import requirements for strong encryption?
- A. The strong enforcement of encryption capabilities provided by Cisco Software Activation satisfies requirements for the export of encryption capabilities, so non-k9 images are no longer needed. However, some countries have import requirements that require the release of the source code for strong payload (VPN) encryption features. To satisfy the import requirements of those countries, a universal image that lacks strong payload encryption is available. This image is identified by the "universalk9_npe" designation in the image name. The universal image with strong payload encryption is recognized by the "universalk9" tag. This image satisfies both import and export requirements for virtually all countries.
- **Q.** Is a High Security (HSEC) license offered on the Cisco 4000 Series to achieve greater cryptographic tunnel count and throughput?
- A. Yes, an HSEC license is required to achieve more than 225 cryptographic tunnel count and 170 Mbps of total IP Security (IPsec) throughput (bidirectional traffic).
- Q. What is an HSEC license?
- A. An add-on license above the Security (SEC) technology package license, known as HSEC, provides export controls for strong levels of encryption. HSEC is available to customers in all currently nonembargoed countries as listed by the U.S. Department of Commerce. Without an HSEC license, SEC performance is limited to 225 tunnels and a total of 170 Mbps of IPsec throughput. An HSEC license removes this limitation. Because of these export control requirements, the HSEC license is the only license on the Cisco 4000 Series that requires installation of a license key file to activate. In other words, HSEC is not an RTU license.
- Q. What types of licenses are available for the Cisco 4000 Series routers?
- Α.

- Permanent: A permanent license never expires. When a permanent license is installed on a system, it is good for that feature set for the life of the router, even across Cisco IOS XE Software releases. For example, when a Unified Collaboration, Security, or Application Experience (AppX) license is installed on a system, the subsequent features for that license are activated even if the system is upgraded to a new Cisco IOS XE Software release. A permanent license is the most common license type used when you purchase a feature set for a device.
- Temporary: A temporary license, sometimes referred to as an evaluation license, is good for a limited amount of time. The Cisco 4000 Series includes a full set of 60-day temporary licenses for the AppX, Unified Collaboration, and Security feature sets. You can activate and deactivate these licenses at any time to evaluate a feature set before making the decision to purchase and upgrade to a permanent license. You also have some flexibility when you need to upgrade to a permanent license.
- Only the time a temporary license is active is counted against the available time on the license. When a temporary license expires, you cannot extend it. However, in extreme cases the Cisco Technical Assistance Center (TAC) can issue new emergency temporary licenses to aid in troubleshooting a problem.
- Counted: A counted license actually counts something in the system. A typical example is the number of Cisco Unified Border Element or SRST Licenses possible on a system. These licenses are analogous to the counted paper licenses used with systems in the past. However, the new Cisco Software Activation infrastructure greatly simplifies the management of these licenses.
- Q. Is hardware or software high availability supported on the Cisco 4000 Series?
- A. The Cisco 4000 Series does not support hardware or software high availability.
- Q. Is the Cisco Locator/ID Separation Protocol (LISP) supported on the Cisco 4000 Series?
- A. Yes, LISP is supported on the Cisco 4000 Series.
- Q. Is In-Service Software Upgrade (ISSU) supported on the Cisco 4000 Series?
- A. ISSU is not supported on the Cisco 4000 Series.
- Q. Is Suite-B or Next-Generation Encryption (NGE) support available on the Cisco 4000 Series?
- A. Yes, Suite-B and NGE support is available on the Cisco 4000 Series as part of the initial release.
- Q. Is SSLVPN supported on the Cisco 4000 Series?
- A. No. The 4000 Series does not currently support SSLVPN. Future releases may support SSLVPN. Please refer to the features provided in every release for SSLVPN support.
- Q. What VPN methods are supported on the Cisco 4000 Series?
- A. The Cisco 4000 Series supports all current and any new VPN technologies such as Easy VPN, Group Encrypted Transport VPN, Dynamic Multipoint VPN (DMVPN), and Cisco IOS FlexVPN that are supported on the ISR G2 or ASR 1000 Series.
- Q. Is the intrusion prevention system (IPS) supported on the Cisco 4000 Series?
- A. Yes, signature-based IPS is now supported on the Cisco 4000 Series through the Snort engine. The 4000 Series routers also support next-generation IPS (NGIPS) through Cisco FirePOWER[™] on the Cisco UCS E-Series. Additionally, the Cisco Stealthwatch Learning Network (SLN) provides for an IPS system that supports anomaly detection and machine learning.

- Q. What is the Cisco Stealthwatch Learning Network for ISRs?
- A. The Cisco Stealthwatch Learning Network license embeds security into the network infrastructure by turning the router into a security device. The Learning Network license uses the ISR as a security sensor to monitor branch traffic through NetFlow, Network-Based Application Recognition (NBAR), intelligent sensors that use machine learning, and packet capture. It baselines traffic patterns to detect anomalies and help build effective branch security policies. Cisco can mitigate threats directly from the branch by using our SLN Manager to instruct the ISR to drop suspicious packets. It is designed to be lightweight in terms of memory and CPU consumption.
- Q. What is Cisco Snort IPS for ISRs?
- A. Cisco Snort IPS for the 4000 Series ISRs offers a lightweight threat defense solution that uses industry-recognized Snort open-source IPS technology. It is perfect for customers who are looking for a cost-effective solution that provides one box for both advanced routing capabilities and integrated threat defense security to help comply with regulatory requirements. Snort provides term-based subscription rule sets to keep current with the latest threats.
- Q. What is Cisco Firepower Threat Defense for ISRs?
- A. Cisco FirePOWER Threat Defense for ISRs extends industry-leading Cisco threat protection beyond the network edge and data center to an additional platform in branch offices: the Cisco ISR. It is managed centrally through the Cisco Firepower Management Center.

It's particularly valuable to organizations with distributed branch offices or retail stores, where cloud applications, video, and bring-your-own-device (BYOD) policies are driving the need for direct Internet access (DIA) at the branch.

- Q. Is content filtering supported on the Cisco 4000 Series?
- A. Yes, Content filtering is supported on the Cisco 4000 Series using Cisco Umbrella Branch/Cisco Open DNS.
- **Q.** The Cisco 4000 Series ISRs already support a wide range of security capabilities. What does the Cisco Umbrella Branch solution bring to the table?
- A. The cloud-delivered security service complements the existing security offerings on the 4000 Series ISRs by adding simple, easy-to-manage DNS-layer cloud security and content filtering that can be up and running in minutes. It prevents branch users from accessing inappropriate content and known malicious sites that might contain malware and other security risks. It offers security protection for guests and employee users alike.
- Q. Is the Cisco 4000 Series Network Equipment Building System (NEBS) certified?
- A. No.
- Q. Does the Cisco 4000 Series have certifications such as Common Criteria and Evaluation Assurance Level 4 (EAL4)?
- A. Common Criteria and EAL certification are present for the 4000 Series.

WAN Modules

- Q. Is the solid-state drive (SSD) or hard-drive carrier card field upgradable or replaceable?
- **A.** Yes, the carrier card is field replaceable, with some restrictions in the first release where only the third NIM slot supports it. This restriction will, however, go away in a future release.
- Q. Is OIR possible on the hard disk drive (HDD)?
- A. Yes.

- Q. Is a service module adapter available that will support hosting of any of the older network modules?
- A. The older network modules are not supported on the Cisco 4000 Series.
- **Q.** What is the maximum number of SSDs that can be present in the NIM-SSD? Do they work in a redundant fashion?
- A. There can be two drives as part of the NIM-SSD. They do not work in a redundant fashion in the initial release.
- Q. Is there a channelized solution on the Cisco 4000 Series?
- A. A channelized solution is available on the T1/E1 interfaces. No channelized solution is available on the T3/E3 module.

Cisco UCS E-Series Module

- Q. Are the Cisco UCS E-Series modules supported on the Cisco 4000 Series?
- A. Yes. The Cisco UCS E140S, E140D, E140DP, E160D, and E160DP modules are all supported on the Cisco 4000 Series.
- **Q.** Can we run Cisco virtual Wide Area Application Services (vWAAS) for larger-scale WAAS deployments on the Cisco UCS E-Series?
- A. Yes, vWAAS supports up to 6000 TCP connections on the Cisco UCS E-Series. Additionally, standard VMware virtual machines can coexist with vWAAS, allowing the Cisco UCS E-Series module to be used for branch-office server consolidation.
- Q. Are SSDs supported on the Cisco 4000 Series?
- A. Yes, SSDs are supported on both a NIM-SSD for onboard services as well as the Cisco UCS E-Series module.

Application Experience

- Q. Will WAAS performance be software licensed?
- A. The Application Experience license, included with the AX bundle, includes a license for up to 2500 TCP connections. This model can be supported with WAAS integrated into the Cisco 4000 Series. For additional scale, a Cisco UCS E-Series module can be added to run vWAAS. Integrated AppNav functions in the Cisco 4000 Series allow the pooling of these WAAS resources to make the most efficient use of all.
- Q. What technology license is required for AVC?
- A. The Application Experience (AppX) technology package is required for using the AVC feature set. The AVC solution encompasses Network-Based Application Recognition 2 (NBAR2), Flexible NetFlow, Media Monitoring, and Application Response Time metrics.
- Q. What WAN optimization solutions are available on the Cisco 4000 Series?
- A. ISR WAAS is available as an application that can run within a virtual container on the Cisco 4000 Series. One other option is to run the vWAAS on the Cisco UCS E-Series module.
- Q. Is NIM-SSD necessary to run applications such as ISR-WAAS on the Virtual Container?
- A. Yes, NIM-SSD is required to run applications such as ISR-WAAS.
- Q. Is AppNav available on the Cisco 4000 Series?
- A. Yes AppNav is available on the Cisco 4000 Series.

- Q. Is the Web Cache Control Protocol (WCCP) available on the Cisco 4000 Series?
- A. WCCP is available on the Cisco 4000 Series, and we recommend that you use AppNav for WAN optimization deployments.
- Q. Is Cisco WAAS Express one of the WAN optimization solution options on the Cisco 4000 Series?
- **A.** Cisco WAAS Express is not available on the Cisco 4000 Series. The integrated ISR-WAAS solution includes full WAAS functions without compromise.

Unified Collaboration

- **Q.** Is support provided for Survivable Remote Site Telephony (SRST) and Cisco United Border Element (CUBE) functions on the Cisco 4000 Series?
- A. Yes, support for SRST and CUBE is part of the Cisco 4000 Series.
- Q. Is Cisco Unified Communications Manager Express (Unified CME) supported on the Cisco 4000 Series?
- **A.** Cisco Unified Communications Manager Express is not currently supported on the Cisco 4000 Series. This support may be available in a future release.
- **Q.** For the case where we have digital signal processor (DSP) conferencing, will we have functions similar to the video conferencing feature on the ISR G2 routers? How will it scale?
- A. At this time there is no support for video conferencing on the Cisco Packet Voice Data Module 4 (PVDM4) DSPs.
- Q. Where do I insert PVDMs on the Cisco 4000 Series?
- A. You can insert PVDMs on both the motherboard and directly on some NIMs, depending on the use case. CUBE requires that PVDMs be installed on the motherboard, whereas time-division multiplexing (TDM) deployments require them to be installed directly on the NIM. Unlike the ISR G2 routers, the Cisco 4000 Series ISRs do not have a TDM domain on their motherboard.
- Q. How many PVDM slots are present on the motherboard?
- A. There is only one PVDM slot on the motherboard across the Cisco 4000 Series.²
- Q. Can the TDM cards use the motherboard PVDMs?
- A. No.

Management

- Q. What version of Cisco Configuration Professional supports the Cisco 4000 Series?
- A. Cisco Configuration Professional Version 2.7 supports the Cisco 4000 Series.
- Q. Is Cisco Security Manager supported on the Cisco 4000 Series?
- A. No. Cisco Security Manager support is not available for the 4000 Series.
- **Q.** What version of the Cisco Prime[®] enterprise and service provider management application supports the Cisco 4000 Series?
- A. Cisco Prime 2.0 supports the Cisco 4000 Series. Support for the Cisco 4221 ISR will be available in Cisco Prime 3.1.
- Q. Does the Cisco Configuration Engine support the Cisco 4000 Series?
- A. Support for the Cisco 4000 Series is available on the Cisco Configuration Engine.

² The 4221 does not have any PVDM slot.



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