Cisco Integrated Services Routers Generation 2

Q. What is Cisco adding to its portfolio of integrated services routers?

A. Cisco is introducing new integrated services routers that build on the concept of a truly borderless network 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 communications, security, and applications integration. At the same time, the new routers are designed for expansion that can deliver increased performance and capabilities over time without the need for expensive system upgrades for hardware as remote sites grow.

Q. Why is Cisco introducing these new routers?

A. The latest additions to the Cisco portfolio of integrated services routers enhance a rich history of integrated services with world-class routing. They are specifically designed to meet the needs of emerging Ethernet WAN deployments using the latest technical innovations in the industry.

Q. How do these new routers differ from the currently available integrated services routers?

A. These routers include several advancements developed as a result of customer feedback on the original routers. They support faster interface and application module form factors, including a service module (SM), an enhanced high-speed WAN interface card (EHWIC), and an internal services module (ISM), with an 802.11n wireless option on the new Cisco® 1941W Integrated Services Router. Also included are system innovations such as the multigigabit fabric (MGF) for module-to-module communication, dual Compact Flash memory slots, and, for the first time on any Cisco product, a USB console interface.

These new routers are also the flagship products for the introduction of a new and simplified form of Cisco IOS® Software packaging based on a single universal Cisco IOS Software image that delivers all features and functions through licensing keys. All routers by default now include additional Compact Flash and main system memory (DRAM) at no additional cost, and you can configure them to much higher densities than current integrated services routers. Also, the new Cisco 3900 Series Integrated Services Routers include a modular services performance engine (SPE) for field-upgradable performance. Finally, router performance has been dramatically improved with the new generation of integrated services routers delivering approximately 2–6 times the performance of the current generation of integrated services routers while simultaneously increasing the power efficiency and power management features to control the amount of power these systems consume.

Q. What are the plans to discontinue the currently available integrated services routers?

A. We currently have no plans for changing the status of the current generation of integrated services routers (Cisco 1800, 2800, and 3800 Series Integrated Services Routers) to end-of-sale or end-of-life status. These routers will continue to fill a role as part of the larger family of integrated services routers for some time to come. The current generation of integrated services routers, with more than 6 million in use worldwide, is proof of the popularity of these platforms for the foreseeable future.

Q. What are the typical applications of the Cisco Integrated Services Routers Generation 2 (ISR G2) in enterprise networks?

A. The Cisco ISR G2 Family offers an increased level of services integration and services density to enterprise customers needing to increase collaboration, virtualization, and reliability in branch offices. Enterprise customers can deploy these routers to support:

- Integration of production and infrastructure applications on the services-ready engine
- Enhanced use of collaboration technologies using the video-ready packet voice data module (PVDM3) for the Cisco 2900 Series and Cisco 3900 Series
- Virtualized services to the branch office using WAN optimization technologies

These routers offer these services in a reliable, safe environment while giving the enterprise customer an enhanced ability to control power consumption of network devices and router interfaces.

Q. What are the typical applications of the Cisco ISR G2 in service provider networks?

A. Primary service provider applications will be as multifunction customer premises equipment (CPE) in Metro Ethernet and other high-speed WAN environments. As service provider networks move toward higher-speed access circuits—with Ethernet WAN, Ethernet in the First Mile (EFM), and very high data rate DSL2+ (VDSL2+) being the first steps—the market needs CPE with greater performance and more integration of services. Service providers also need the ability to deploy services in the future without incurring the operational expense of sending field technicians to the site.

Platforms

Q. What new platforms are being added to the Cisco portfolio of integrated services routers?

A. Table 1 lists the new products.

Table 1. Cisco Integrated Services Routers Generation 2 Portfolio

	Cisco 1941 and 1941W Integrated Services Routers	Cisco 2901 Integrated Services Router	Cisco 2911 Integrated Services Router	Cisco 2921 Integrated Services Router	Cisco 2951 Integrated Services Router	Cisco 3925 Integrated Services Router	Cisco 3945 Integrated Services Router	Cisco 3925E Integrated Services Router	Cisco 3945E Integrated Services Router
Physical specifications (H x W x D)	2 rack units (2RU) x 13.5 x 11.5 in. (44.5 x 342.9 x 292.1 mm)	1RU x 17.25 x 17.3 in. (44.5 x 438.2 x 439.4 mm)	2RU x 17.25 x 12 in. (88.9 x 438.2 x 304.9 mm)	2RU x 17.25 x 18.5 in. (88.9 x 438.2 x 469.9 mm)	2RU x 17.25 x 18.5 in. (88.9 x 438.2 x 469.9 mm)	3RU x 17.25 x 18.75 in. (133.35 x 438.15 x 476.25mm)	3RU x 17.25 x 18.75 in. (133.35 x 438.15 x 476.25mm)	3RU x 17.25 x 18.75 in. (133.35 x 438.15 x 476.25mm)	3RU x 17.25 x 18.75 in. (133.35 x 438.15 x 476.25mm)
Service modules	0	0	1	1 single-(SW) or 1 double-wide (DW)	2 SW or 1 DW	2 SW or 1 SW + 1 DW	4 SW or 2 SW + 1 DW	2 SW or 1 SW + 1 DW	4 SW or 2 SW + 1 DW
EHWICs	2 SW or 1 SW + 1 DW	4 SW or 2 DW	4 SW or 2 DW	4 SW or 2 DW	4 SW or 2 DW	4 SW or 2 DW	4 SW or 2 DW	3 SW or 1 SW and 2 DW	3 SW or 1 SW and 2 DW
ISMs	1 (0 for Cisco 1941W)	1	1	1	1	1	1	0	0
Built-in Gigabit Ethernet ports	2 RJ-45	2 RJ-45	3 RJ-45	2 RJ-45 + 1 RJ-45 or 1 Small Form-Factor Pluggable (SFP) [1]	2 RJ-45 + 1 RJ-45 or 1 SFP[1]	1 RJ-45 + 2 RJ-45 or 2 SFP[1]	1 RJ-45 + 2 RJ-45 or 2 SFP1	2 RJ-45 + 2 RJ-45 or 2 SFP[1]	2 RJ-45 + 2 RJ-45 or 2 SFP[1]

[1] RJ-45 or SFP Gigabit Ethernet ports can use either the RJ-45 connection or an SFP, but not both at the same time.

PVDM3 slots	0	2	2	3	3	4	4	3	3
Default/ maximum memory	256 MB/2.256 GB[2]	512 MB/2.5 GB[2]	512 MB/2.5 GB[2]	512 MB/2.5 GB[2]	512 MB/4 GB[2]	1 GB /4 GB[2]	1 GB /4 GB[2]	1 GB /4 GB[2]	1 GB /4 GB2
Default/ maximum Compact Flash	256 MB/4 GB3[3]	256 MB/4 GB[3]	256 MB/4 GB[3]	256 MB/4 GB[3]	256 MB/4 GB[3]	256 MB/4 GB[3]	256 MB/4 GB[3]	256 MB/4 GB[3]	256 MB/4 GB[3]

Q. What is the migration path for current integrated services router customers?

A. The current generation of integrated services routers is expected to remain available for the foreseeable future to give customers adequate time to migrate to integrated services routers generation 2 based on their own requirements and schedule.

Q. What is the migration path for the Cisco 1861? Is a Cisco 1961 planned?

A. The Cisco 1861 is a relatively recent addition to the integrated services router portfolio. It continues to fill a vital role for users interested in unified communications functions in a compact form factor. A replacement for the Cisco 1861 is neither needed nor available at this time.

Q. How do the new Cisco 3900 Series Integrated Services Routers compare with the Cisco 3800 Series Integrated Services Routers?

A. Table 2 compares the Cisco 3825, 3925, 3925E, 3845, 3945, and 3945E Integrated Services Routers.

Table 2. Comparison of Cisco 3825, 3925, 3925E, 3845, 3945, and 3945E Integrated Services Routers

Feature Comparison	Cisco 3825	Cisco 3925	Cisco 3925E	Cisco 3845	Cisco 3945	Cisco 3945E
Default/maximum flash memory	64/256 MB	256 MB/4 GB	256 MB/4 GB	64/256 MB	256 MB/4 GB	256 MB/4 GB
Default/maximum DRAM	256 MB/1 GB	1 GB/4 GB	1 GB/4 GB	256 MB/1 GB	1 GB/4 GB	1 GB/4 GB
Compact Flash slots	1	2	2	1	2	2
Built-in LAN connectivity	Two 10/100/1000	Three 10/100/1000	Four 10/100/1000	Two 10/100/1000	Three 10/100/1000	Four 10/100/1000
Integrated SFP slots	1	2	2	1	2	2
Upgradable processor board	No	Yes	Yes	Yes	Yes	Yes
Multicore processor	No	Yes	Yes	No	Yes	Yes
USB host ports	2	2	2	2	2	2
USB console	No	Yes	Yes	No	Yes	Yes
WAN slots	4 HWICs	4 EHWICs	3 EHWICs	4 HWICs	4 EHWICS	3 EHWICS
Advanced-integration-module (AIM) slots	2	0	0	2	0	0
ISM slots	0	1	0	0	1	0
PVDM (digital-signal-processor [DSP]) slots on motherboard	4 (no PVDM3)	4 (PVDM2 or 3)	3 (PVDM2 or 3)	4 (no PVDM3)	4 (PVDM2 or 3)	3 (PVDM2 or 3)
Network-module slots	2	2 (with SM carrier)	2 (with SM carrier)	4	4 (with SM carrier)	4 (with SM carrier)

[2] Currently, Cisco IOS Software supports a maximum of 2 GB of addressable memory. More than 2 GB of memory will be available for future capabilities and features.
[3] Minimum and maximum Compact Flash is available in both flash-memory slots. A potential system maximum of 8 GB of flash-memory storage is available using both slots.

Service-module slots	0	2 SW or 1 SW and 1 DW	2 SW or 1 SW and 1 DW	0	4 SW or 2 SW and 1 DW	4 SW or 2 SW and 1 DW
Multigigabit fabric	No	Yes	Yes	No	Yes	Yes
Integrated encryption	Yes	Yes	Yes	Yes	Yes	Yes
Optional Cisco Inline Power (Power over Ethernet [PoE])	Yes	Yes	Yes	Yes	Yes	Yes
Optional Cisco Enhanced Inline Power (ePoE)	No	Yes	Yes	No	Yes	Yes
Redundant power supply (RPS)	Yes (external RPS)	Yes (internal)	Yes (internal)	Yes (internal)	Yes (internal)	Yes (internal)

Q. How does the Cisco 2900 Series compare with the Cisco 2800 Series Integrated Services Routers?

A. Table 3 compares these routers.

Table 3. Comparison of Cisco 2900 and 2800 Series Integrated Services Routers

Feature Comparison	Cisco 2801	Cisco 2901	Cisco 2811	Cisco 2911	Cisco 2821	Cisco 2921	Cisco 2851	Cisco 2951
Default/maximum flash memory	64 MB/128 MB	256 MB/4 GB	64 MB/256 MB	256 MB/4 GB	64 MB/256 MB	256 MB/4 GB	64 MB/256 MB	256 MB/4 GB
Default/maximum DRAM	128 MB/384 MB	512 MB/2.5 GB	256 MB/768 MB	512 MB/2.5 GB	256 MB/1 GB	512 MB/2.5 GB	256 MB/1 GB	512 MB/4 GB
Compact Flash slots	1	2	1	2	1	2	1	2
Built-in LAN connectivity	2 Fast Ethernet (FE)	2 Gigabit Ethernet (GE)	2 FE	3 GE	2 GE	3 GE	2 GE	3 GE
Integrated SFP slots	0	0	0	0	0	1	0	1
Multicore processor	No	Yes	No	Yes	No	Yes	No	Yes
USB host ports	1	2	2	2	2	2	2	2
USB console	No	Yes	No	Yes	No	Yes	No	Yes
WAN slots	4 HWIC	4 EHWIC	4 HWIC	4 EHWIC	4 HWIC	4 EHWIC	4 HWIC	4 EHWIC
AIM slots	2	0	2	0	2	0	2	0
ISM slots	0	1	0	1	0	1	0	1
PVDM (DSP) slots on motherboard	2	2	2	2	3	3	3	3
Network-module slots	0	0	1	1 (with SM carrier)	1	1 (with SM carrier)	1	2 (with SM carrier)
Service-module slots	0	0	0	1	0	1 SW or DW	0	2 SW or 1 DW
Multigigabit fabric	No	Yes	No	Yes	No	Yes	No	Yes
Integrated encryption	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Optional Cisco Inline Power (PoE)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Optional Cisco Enhanced Inline Power (ePoE)	No	Yes	No	Yes	No	Yes	No	Yes
Redundant power supply	No	No	Yes (external RPS)	Yes (external RPS)	Yes (external RPS)	Yes (external RPS)	Yes (external RPS)	Yes (external RPS)

Q. How do the new Cisco 1900 Series compare with the Cisco 1800 Series Integrated Services Routers?

A. Table 4 compares the Cisco 1900 Series and the Cisco 1800 Series Integrated Services Routers.

Table 4. Comparison of Cisco 1900 Series with Cisco 1800 Series Integrated Services Routers

Feature Comparison	Cisco 1841	Cisco 1941	Cisco 1941W
Default/maximum flash memory	32 MB/128 MB	256 MB/4 GB	256 MB/4 GB
Default/maximum DRAM	128 MB/384 MB	256 MB/2.25 GB	256 MB/2.25 GB
Compact Flash slots	1	2	2
Built-in LAN connectivity	2 FE	2 GE	2 GE
Multicore processor	No	Yes	Yes
USB host ports	1	2	2
USB console	No	Yes	Yes
WAN slots	2 HWIC	2 EHWIC	2 EHWIC
AIM slots	1	0	0
ISM slots	0	1[4]	01
PVDM (DSP) slots on motherboard	0	0	0
Integrated wireless LAN	None	None	802.11n
Network-module slots	0	0	0
Service-module slots	0	0	0
Multigigabit fabric	No	Yes	Yes
Integrated encryption	Yes	Yes	Yes
Optional Cisco Inline Power (PoE)	Yes	Yes	Yes
Optional Cisco Enhanced Inline Power (ePoE)	No	Yes	Yes
Redundant power supply	No	No	No

Q. Are there any restrictions with the memory modules for the new platforms?

A. The Cisco 1900, 2900, and 3900 Series Integrated Services Routers ship with higher default memory (both DRAM and Compact Flash) than today's integrated services routers. The Cisco 2951, 3925, 3925E, 3945, and 3945E routers have two modular dual-inline-memory-module (DIMM) slots for error-correcting code (ECC) double-data-rate 2 (DDR2) synchronous dynamic random access memory (SDRAM)—each slot capable of integrating 512 MB to 2 GB DIMM.

The Cisco 3900 Series uses symmetrical DIMM modules for increased performance, meaning that two identical DIMM modules must be installed into both DIMM slots at all times. By default, the Cisco 3925, 3925E, 3945, and 3945E ship with 1 GB of system DRAM consisting of two 512-MB DIMM modules. For the Cisco 2951, the default DRAM is 512 MB installed in a single DIMM slot. Any additional memory upgrades on the Cisco 2951 can be inserted into the second DIMM slot that is open and available.

In contrast, the Cisco 1941, 1941W, 2901, 2911, and 2921 routers ship with default DRAM soldered on the main system board and one modular DIMM slot for memory upgrades; therefore, no DIMM module will be installed in these systems when ordered with default DRAM. The default DRAM is 256 MB for the Cisco 1941 and 512 MB for the Cisco 2901, 2911, 2921, and the memory upgrade for the second DIMM can range from 512 MB to 2 GB.

Q. What is the USB console used for?

A. The small USB Type-B connector next to the traditional RJ-45 console port is the new USB console port. This new interface is available to respond to the demands of network professionals with newer computers lacking the traditional DB-9 serial port. This USB console port functions exactly like a traditional serial console port, but with a commonly available USB cable and a USB port available on any modern computer.

[4] The 802.11n wireless radio uses the ISM slot on the Cisco 1941W; therefore, no additional ISM can be installed in a Cisco 1941W. The non-wireless Cisco 1941 does have an open ISM slot that can be used for adding capabilities to the system through an expansion ISM module.

Q. How do I use the new USB console?

A. When connected to your computer for the first time, the operating system may ask you for drivers for this new hardware. These drivers are available for download from http://www.cisco.com. Many operating systems automatically recognize this USB console port as a generic USB-to-serial adapter and use it without any additional drivers. This port functions the same as the traditional serial console port and by default operates at the same 9600 8-N-1 settings for both ROMmon and Cisco IOS Software.

Q. Can I use the USB console and the traditional console port at the same time?

A. No. The USB console is simply a new, convenient method of accessing the same serial console available through the traditional console port; therefore, you can use only one access mechanism at a time. Two enable lights next to the two ports indicate which one is currently enabled. By default, the USB console connection takes precedence over the traditional RJ-45 console connection. In other words, when a computer is connected to the USB console, the traditional RJ-45 console is deactivated. When the USB cable is removed, the RJ-45 console port automatically becomes active.

Q. What version of USB do the onboard ports support?

A. All USB interfaces on the new integrated services routers support USB 2.0, including both the USB host ports used for USB flash memory and USB eTokens as well as the new USB console interface.

Q. What is the second Compact Flash slot on the Cisco ISR G2 used for?

A. In response to heavy customer demand, these new routers include a second Compact Flash slot. Both slots are functionally equivalent and both can hold Cisco IOS Software images, log files, voice configuration files, HTML files, backup configurations, or any other file needed for the system. By default, only slot 0 is populated with a Compact Flash device from the factory, and it is the default boot location. Without a boot system statement in the configuration, the system will attempt to boot the first file on the Compact Flash in slot 0.

Q. Do the combination RJ-45 + SFP front-panel Gigabit Ethernet ports support failover?

A. Yes. You can configure autofailover on any front-panel ports with both RJ-45 and SFP connections. When autofailover is configured, if the primary interface type fails—either RJ-45 or SFP—then the other media type becomes active and allows traffic to continue over the backup physical connection. In this scenario, the backup physical connection needs to be connected with the same speed and duplex as the primary connection.

Note that this description does not mean that one Gigabit Ethernet interface acts as a backup to another. In this scenario, it is not necessary to dedicate a complete Gigabit Ethernet interface for backup because the two physical connections available on a single Gigabit Ethernet interface provide failover if a link failure occurs.

Q. What is the Cisco Services Performance Engine (SPE)?

A. The Cisco Services Performance Engine is the modular motherboard for the Cisco 3900 Series routers primarily responsible for the processing and forwarding of traffic. Similar to today's Cisco 3845 motherboard, the SPE houses the PVDM slots, ISM slot, and the EHWIC slots in addition to the system memory. The SPE provides a modular approach to system upgradability such that you can upgrade Cisco 3900 Series routers deployed in the field with new performance and capabilities with a simple SPE swap. This form of investment protection helps ensure that routers deployed today will be upgradable for years to come with the latest innovations without the need for complete platform replacement.

Q. What SPE options are available?

A. Four versions of the SPE are available for the Cisco 3900 Series. Table 5 lists the models and their characteristics.

Table 5. Cisco Services Performance Engine Models

	Cisco SPE-100	Cisco SPE-150	Cisco SPE-200	Cisco SPE-250
ISMs	1	1	0	0

EHWICs	4	4	3	3
PVDM3	4	4	3	3
Built-in Gigabit Ethernet	1 RJ-45 + 2 RJ-45 or 2 SFP[5] 2 RJ-45 + 2 RJ-45 or 2 SFP1	1 RJ-45 + 2 RJ-45 or 2 SFP1 2 RJ-45 + 2 RJ-45 or 2 SFP1	2 RJ-45 + 2 RJ-45 or 2 SFP1 2 RJ-45 + 2 RJ-45 or 2 SFP1	2 RJ-45 + 2 RJ-45 or 2 SFP1 2 RJ-45 + 2 RJ-45 or 2 SFP1

Q. What power-supply options are available on the new integrated services routers?

A. Table 6 lists the part numbers of the available power supplies for the new routers.

Table 6. Power-Supply Part Numbers

	Cisco 1941 and 1941W	Cisco 2901	Cisco 2911	Cisco 2921 and 2951	Cisco 3925, 3925E, 3945, and 3945E
AC option	PWR-1941-AC	PWR-2901-AC	PWR-2911-AC	PWR-2921-51-AC	PWR-3900-AC
AC + PoE option	PWR-1941-POE	PWR-2901-POE	PWR-2911-POE	PWR-2921-51-POE	PWR-3900-POE
DC option1[6]	Not available	Not available	PWR-2911-DC	PWR-2921-51-DC	PWR-3900-DC
Redundant power supply	Not available	Not available	RPS 2300	RPS 2300	Internal

Q. Why does the power supply in the Cisco ISR G2 have a power light when the power switch is off?

A. In addition to being much more efficient, the power supplies in the new integrated services routers (except for the Cisco 1941 and 2901) also incorporate several advancements for environmental monitoring, even when the system is not running. The new power supplies now have an ON – STANDBY switch instead of the classic ON – OFF switch. When the power supply is in STANDBY mode, power is removed from the system and the router powered down. However, the power supply maintains a very small current to the environmental monitoring subsystem in the router. This capability maintains environmental monitoring to help ensure that the environmental status is known at all times before the router itself is powered on. This capability provides the potential for future features that use continuous environmental monitoring even when the router is powered down.

Q. What is PoE boost?

A. When a Cisco 2900 is connected to an external RPS device or a Cisco 3900 is configured with a second power supply, these routers can be configured in PoE boost mode. This mode takes advantage of the increased power capacity of the second power source to power additional PoE devices beyond what a single power source could drive.

In PoE boost mode the RPS, or second power supply in a Cisco 3900, does not provide power redundancy to the router. The failure of any single power source—RPS or internal power supply—in the system when PoE boost is configured will result in an unsupported configuration and could cause PoE, service module, or system failure.

Q. Why is the RPS indicator light not lit when PoE boost is configured on a Cisco 2900?

A. When PoE boost is configured, the system is in a nonredundant mode of operation; therefore, the redundancy provided by an RPS in a nonboost configuration is lost. To emphasize the fact that the system is in a nonredundant power configuration, the RPS indicator is turned off.

Q. What power-saving features are available on the new integrated services routers generation 2?

A. The new routers are the greenest integrated services routers ever produced. [[if you cannot prove this, please change wording; some of the greenest? Be careful of claims for legal reasons]] Built from the beginning to be sensitive to the environment, they are profitable because they consume much less power than is typical for

[5] Power over Ethernet is not available with the DC power option.
[6] Power over Ethernet is not available with the DC power option.

access or branch-office routers. The power supplies in the new routers use new power-savings designs and are 85-percent efficient, meeting industry requirements for 80-percent efficiency or greater.

The new routers also extend Cisco EnergyWise support from the Ethernet switching modules, which has previously been able to adjust the power available to PoE ports and power down PoE devices during periods of low activity or when the office is closed. Now that same capability is being extended to allow the router to adjust the power supplied to all modules in the system—service module, ISM, EHWIC, and PVDM3—so you can power down entire portions of the router when not needed to conserve power.

Finally, many of the system components of the new integrated services routers, including the cooling fans, have been selected to achieve as much energy efficiency as possible. System fans are low-friction and low-power. They also throttle their speed intelligently to maintain efficient cooling of the system without spinning fast unnecessarily. This feature has the added benefit of making the new routers exceptionally quiet, so it is often hard to tell that they are actually turned on.

Q. What is Cisco EnergyWise and what EnergyWise levels are supported?

A. Cisco EnergyWise allows you to place a device into a low power state to conserve power during periods of inactivity or planned downtime such as the hours a branch office is closed at night or on the weekend. With both current and next-generation integrated services routers, you can control the PoE consumption of devices attached to PoE ports on an integrated switching module. With the new integrated services routers generation 2, you can now also control the amount of power available to modules within the chassis itself. You can turn all modules on or off by command or with a timed script. Some newer modules also support up to 10 granular power levels that allow you to adjust their power consumption to finely control power consumption.

Modules

Q. What modules are supported in the new Cisco ISR G2 routers?

A. The new routers support most of the modules already available in the extensive integrated services router portfolio. Most WAN interface cards (WICs), voice WICs (VWICs), and HWICs are directly compatible with the new EHWIC form factor and will work natively in the EHWIC slots. Most network modules and enhanced network modules (NMEs) are also compatible with the new service-module form factor with an adapter (part number SM-NM-ADPTR). In addition, you retain any investment made with PVDM2 modules for voice DSP functions because these modules are also compatible with the new PVDM3 slots using a physical adapter (PVDM2-ADPTR).

Q. What wireless LAN interfaces are available?

A. The Cisco 1941 has a factory option to add an 802.11n Wi-Fi interface—this platform becomes the Cisco 1941W. You can configure the wireless LAN interface as a standalone access point or as a component of a unified wireless infrastructure. The Cisco 1941W is available in four region-specific variations that comply with various local wireless regulations (part numbers 1941W-A/K9 for FCC, 1941W-E/K9 for ETSI, 1941W-P/K9 for Japan, and 1941W-N/K9 for Australia and New Zealand).

The new Cisco 2900 and 3900 Series Integrated Services Routers also support the Cisco Wireless LAN Controller Network Module for controlling networks of access points using the Lightweight Access Point Protocol (LWAPP). The supported wireless LAN controller modules support 8, 12, or 25 access points (part numbers NME-AIR-WLC8, NME-AIR-WLC12, and NME-AIR-WLC25,).

Q. What module slots are available in the new routers?

A. The new routers support the new service-module form factor, the EHWIC module, improved PVDM3 DSP modules, and the ISM for improved functions without the need for an external-facing slot. In addition to these enhanced-capability interface types, the integrated services routers generation 2 also support most existing network modules and PVDM2 DSP modules through the use of carrier cards. Most existing HWICs, WICs, VWICs, and doublewide HWICs work in the new EHWIC slots without the need for any adapter card.

Q. What modules that are supported on the original integrated services routers are not supported on the integrated services routers generation 2?

A. The new routers support most of the many interfaces available on the current generation of integrated services routers. A few older modules that have updated replacements are not supported; only the newer module is supported. The new routers support no modules in the AIM form factor because this form factor has been replaced by the greatly enhanced ISM slot available on all of the new routers. For up-to-date information about supported modules, please visit: http://www.cisco.com/go/isr.

Q. Will the integrated services routers generation 2 support traditional interface types such as Inverse Multiplexing over ATM (IMA)?

A. The new routers are designed to provide the interfaces and services in today's advanced networks and to keep up with network growth for many years to come. As part of that design philosophy, some traditional connection methods with very little market demand are not supported in favor of more modern connection types. IMA is one such technology, and it will continue to be available for some time on existing integrated services routers. A full list of supported modules is available at http://www.cisco.com/go/isr.

Q. What is a service module?

A. A service module is a new interface form factor being introduced with the Cisco ISR G2 portfolio. Service modules include increased power and throughput capabilities as well as connections to the new MGF. Doublewide service modules that are twice the physical width of a single service module are also available. These modules have additional front-panel space for additional interface capacity.

Service modules are not backward-compatible with other integrated services router systems, but you can use existing supported network modules and NMEs in any service-module slot with an adapter. Enhanced extended network modules (NME-Xs), which are wider than traditional network modules, are not supported.

Q. Will my existing network modules, NMEs, and extension modules for voice (EVMs) work in the service-module slot on the new routers?

A. Yes, most are supported with an adapter card. The only physical exception is the NME-X, which is not compatible because of physical restrictions.

Q. Is online insertion and removal (OIR) supported on the new integrated services routers?

A. Yes. The new routers support the same OIR capabilities for service modules as existing integrated services router support for network modules. OIR is supported only on the Cisco 3900 Series and is not supported in the EHWIC slots.

Q. What is an enhanced high-speed WAN interface card (EHWIC)?

A. The EHWIC is an updated and enhanced version of the HWIC already available with existing integrated services routers. It offers greater speeds and higher port density than the current HWIC. EHWIC slots can support modules that provide both product-based Cisco Inline Power and PoE. EHWICs are available in two form factors: a singlewide form factor that takes up 1 slot and a doublewide form factor that takes up 2 slots. Note: You can combine two EHWIC slots into one bigger slot (EHWIC-D) by removing the center rail between two individual slots. The EHWIC slot is also backward-compatible with existing HWICs, voice interface cards (VICs), and WICs.

Q. What is an internal service module (ISM)?

A. The ISM is the evolution of the AIM slot available on earlier integrated services routers. It provides additional capabilities such as increased throughput and integration with the MGF in the integrated services routers generation 2. Note that existing AIMs will not work in the new ISM slot.

Q. What module will replace the Cisco AIM-VPN Module?

A. There is currently no plan for any VPN acceleration ISM module. The integrated services routers generation 2 include built-in hardware acceleration for encrypted traffic, and in effect they already include AIM-VPN functions as part of the default platform hardware.

Collaboration

Q. What collaboration capabilities are available on the new Cisco 2900 and 3900 Series routers?

A. The Cisco 2900 and 3900 Series platforms have collaboration feature parity with the Cisco 2800 and 3800 Series platforms, so all of the following collaboration capabilities and solutions are present:

- Cisco Unified Survivable Remote Site Telephony (SRST)
- Cisco Unified Border Element
- Time-division multiplexing public-switched-telephone-network (TDM PSTN) and private-branch-exchange (PBX) gateways
- VoiceXML contact-center gateways
- Cisco Unified Communications Manager (UCM) media resources (allowing conferencing, transcoding, and Media Termination Point [MTP])
- Resource Reservation Protocol (RSVP) Agent
- Cisco Unified Communications Manager Express (CME)
- Cisco Unified SIP Proxy
- Gatekeeper

Q. Can I reuse my existing PVDM2 DSP modules in the Cisco 2900 and 3900 Series routers?

A. Yes. You can install PVDM2s on the motherboard PVDM slots using the PVDM adaptor cards (PVDM2-ADPTR). You can also insert the high-density voice network modules (NM-HDV2s) with PVDM2s into the service-module slots of the Cisco 2900 and 3900 Series routers by using the network module-to-service module adapter card (SM-NM-ADAPTR).

Q. Can I reuse my TDM gateway interfaces on the Cisco 2900 and 3900 Series platforms?

A. In general, yes. For a specific list of supported modules, please refer to the inegrated services router page at http://www.cisco.com.

Q. Should I order the PVDM2 or PVDM3 DSPs on a Cisco 2900 or 3900 Series platform?

A. For the motherboard PVDM slots, the PVDM3 DSP modules offer the best DSP density—and these modules do not require adapter cards. For service-module slots, order the NM-HDV2, along with the network module-to-service module adapter (SM-NM-ADPTR), and PVDM2 DSPs.

Q. What capacity increases can I expect for collaboration applications on the Cisco 2900 and 3900 Series platforms?

A. Capacity increases vary across the different collaboration applications. Please refer to the applicable data sheet for specific information.

Q. The Cisco 2811 did not support the EVM card; does the Cisco 2911 support it?

A. Yes, EVM support on the Cisco 2900 and 3900 Series platforms starts at the Cisco 2911 using a network module-to-service module adapter (NM-SM-ADAPTR).

Q. Do the Cisco 2900 Series platforms have dedicated EVM slots similar to those on the Cisco 2800 Series?

A. No, the Cisco 2900 Series platforms do not have dedicated EVM slots, but they do support the EVM card in their service-module slots (unlike the Cisco 2800 platforms) with the network module-to-service module adapter (NM-SM-ADAPTR).

Q. What video capabilities do the Cisco 2900 and 3900 Series platforms have?

A. The Cisco 2900 and 3900 Series platforms have several video capabilities, including:

- Support for H.320 video to H.323 or Session Initiation Protocol (SIP) Video over IP
- Cisco Unified Communications Manager Express video endpoints
- Gatekeeper voice and video interconnect
- Cisco Unified Border Element video and Cisco TelePresence™ interconnect

Q. What new DSP modules are available with the Cisco 2900 and 3900 Series routers?

A. The Cisco 2900 and 3900 Series platforms support the new PVDM3 DSP module as well as the PVDM2 DSP module supported on the Cisco 2800 and 3800 Series routers. You can order the PVDM3 in six increasing densities of DS-0 channel support. Table 7 gives a complete list.

Table 7. PVDM3 Support

Name	Description
PVDM3-16	16-channel packet fax and voice DSP module
PVDM3-32	32-channel packet fax and voice DSP module
PVDM3-64	64-channel packet fax and voice DSP module
PVDM3-128	128-channel packet fax and voice DSP module
PVDM3-192	192-channel packet fax and voice DSP module
PVDM3-256	256-channel packet fax and voice DSP module

Q. Can the PVDM2 and PVDM3 DSP modules coexist on the Cisco 2900 and 3900 Series routers?

A. Yes, they can coexist as long as they are not both installed in the same domain. The motherboard PVDM slots form one domain and each service-module slot forms a separate domain. The motherboard domain can contain either all PVDM2 modules or all PVDM3 modules. A service-module domain can contain only PVDM2 modules housed by the NM-HDV2 carrier card. If a mix of PVDM2s and PVDM3s is detected on the motherboard, the PVDM2s are deactivated, allowing only the PVDM3s to be active. If PVDM2s are detected in service-module slots and PVDM3s are installed on the motherboard, then both continue to function in their own domain and coexist.

Q. Are the PVDM3 modules supported in a NM-HDV2?

A. You cannot install PVDM3 modules directly onto the PVDM slots of an NM-HDV2. However, for an NM-HDV2 that has no PVDMs installed, resources from the router motherboard PVDM slots can be shared across the chassis backplane.

Q. Do the Cisco ISR G2 support voice over Frame Relay (VoFR) and voice over ATM (VoATM)?

A. No, but these functions will remain available in the Cisco 2800 and 3800 Series routers for some time to come.

Security

Q. How is encryption different on the Cisco ISR G2?

A. These routers have a higher-performing, onboard encryption accelerator that increases the VPN performance three to five times that of the current integrated services routers.

Q. Do the Cisco 1900, 2900, and 3900 Series routers have security certifications?

A. The following certifications are in process:

- Federal Information Processing Standard (FIPS): FIPS 140-2 Level 2 and FIPS 140-3 Level 2
- Common Criteria/Evaluation Assurance Level (EAL): PSC, FW, SSLVPN, and IPS

Q. Are the same security features supported on the Cisco ISR G2?

A. Yes, there is security feature parity between the current and next-generation integrated services routers. However, for the next-generation routers you must purchase a security license to deploy any security features.

Q. What additional IP Security (IPSec) performance can I expect from the integrated services router generation 2 onboard encryption accelerator?

A. Performance improvements are two to three times that of the current integrated services routers.

Q. What cryptographic operations are performed by the hardware cryptography engine in the new integrated services routers?

A. Encryption and decryption of packets and authentication are carried out by the hardware cryptography engine. Table 8 shows the operations performed in hardware and those that are performed by the Cisco IOS Software.

Table 8. Cisco IOS Software Operations

	Low-End Routers	High-End Routers
Platforms	Cisco 1941, 2901, 2911, and 2921	Cisco 2951, 3925, 3925E, 3945, and 3945E
Cryptography hardware acceleration (encrypt, decrypt, and authenticate)	• Digital Encryption Standard (DES) and Triple DES (3DES) • Advanced Encryption Standard (AES) 128, 192, and 256 • Message Digest Algorithm 5 (MD5) and MD5 with Hashed Message Authentication Codes MD5_hmac • Secure Hashing Algorithm-1 (SHA-1) and SHA1_hmac	• DES and 3DES • AES 128, 192, and 256 • MD5 and MD5_hmac • SHA1 and SHA1_hmac
Internet Key Exchange (IKE)	Cisco IOS Software	Cisco IOS Software
Header processing	Cisco IOS Software	Cisco IOS Software
Secure Sockets Layer VPN (SSL VPN)	Cisco IOS Software	Transport Layer Security (TLS) Acceleration[7]
IPSec compression (IP Payload Compression Protocol [IPPCP])	Cisco IOS Software	Cisco IOS Software

Q. Is Cisco IOS Firewall performance enhanced in the Cisco ISR G2? What about the Cisco IOS Intrusion Prevention System (IPS)?

A. Yes, Cisco IOS Firewall and Cisco IOS IPS performance is twice that of the current Cisco IOS Firewall.

Q. Do the integrated services routers generation 2 support the same set of IPS signatures as current-generation integrated services routers?

A. Yes. And because of the additional memory on the next-generation routers and the new enhancements in Cisco IOS IPS Software, the next-generation routers can load and scan for more signatures at the same time. Also, a new default signature set optimized for Cisco IOS IPS is now available.

Q. Does Cisco IOS IPS still require an additional subscription license?

A. Yes, a signature subscription license is required.

Q. How will the new licensing model affect security features support?

A. You must purchase a security license to use security features.

Q. Is Cisco IOS Content Filtering supported in the Cisco ISR G2?

A. Yes, Cisco IOS Content Filtering is supported in the next-generation integrated services routers. A subscription license is needed as before.

[7] If transform set matches supported algorithms

Q. With the new licensing strategy for security features, how will import restrictions be enforced?

A. Certain Cisco products require a U.S. export license for sale to government customers in most emerging markets. Any product that supports greater than 55-Mbps aggregate encrypted data throughput or 200 concurrent encrypted tunnels require a U.S. export license. Cisco IOS Software is used to enforce licensing for various feature sets. The same infrastructure is used to enforce encryption export restrictions when an evaluation license is used. Activating an evaluation license restricts the VPN payload throughput to 55 Mbps and should also restrict the encrypted tunnels for IPSec, SSL VPN, secure voice, or any combination of these protocols to 200 tunnels.

Q. What is code signing?

A. Code signing is a FIPS 140-3 requirement that is now part of the Cisco IOS Software Release 15.0 that is supported on the next-generation integrated services router platforms. It helps ensure that the content source is trustworthy so you can confirm that the software really comes from the publisher who signed it. The process also helps ensure content integrity to allow you to verify that the software has not been altered or corrupted since it was signed.

Q. Will security bundles be available?

A. Yes, information about new security bundles is available on the Cisco ISR G2 page at http://www.cisco.com/go/isrg2.

Q. What security modules are supported on the Cisco ISR G2?

A. The next-generation routers support the Cisco IPS Network Module (NME-IPS-K9) and the Cisco NAC Network Module (NME-NAC-K9). Please note that the IPSec VPN AIM modules have been replaced by the onboard encryption accelerator. You no longer need to purchase a separate standalone encryption module.

Software

Q. What type of Cisco IOS Software is available for the Cisco ISR G2?

A. These routers run the same feature-rich Cisco IOS Software as the current generation of integrated services routers. The way the Cisco IOS Software is delivered has changed, however, based on customer feedback. Customers have requested fewer software image choices and a streamlined release schedule that more closely aligns to customer deployment cycles than the traditional “mainline” and “T Train” releases. To reflect many of these changes, a new major version of Cisco IOS Software is being released starting with Cisco IOS Software Release 15.0(1)M. Cisco IOS Software Release 15.0 builds on the significant feature development made in Cisco IOS Software through the 12.4(24)T release available for the current generation of integrated services routers.

Q. What software options are available for the Cisco ISR G2?

A. One of the major customer requests received over the years has been to simplify the number of available Cisco IOS Software images for a platform. Therefore, the Cisco ISR G2 routers have a single universal Cisco IOS Software image available for each platform and each Cisco IOS Software release. This Cisco IOS Software image is known as a universal image, and it contains all features and functions that were previously separated into multiple feature-set images for each platform. 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 Software image for all of your routers 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 ISR G2, Cisco IOS Software is delivered in a single universal Cisco IOS Software image per platform for each release. In the past, as many as 11 different Cisco IOS Software images were available for each platform and each release to cover all the combinations for software feature sets. You needed to ensure

that you purchased the correct feature license for every device in your network and dedicate a significant amount of time to ensure that you were running the correct image on each platform. With the universal image you need only to choose the Cisco IOS Software release you need for your network.

With the Cisco ISR G2, the universal image includes all features and options for a particular platform. Cisco Software Activation is used to enable feature packages and, in some cases, individual features or capacities such as the number of IP phones supported in a voice configuration. 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 there are now only major feature packages, including the IP Base default package, available with a single universal image.

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.

Software Activation

Q. What is Cisco Software Activation?

A. Cisco Software Activation is the mechanism used to activate software features and components on the Cisco ISR G2. It generates a unique license key for a feature set on a specific device and activates that function on the router.

Cisco Software Activation has previously been available on several products from Cisco, including the latest additions to the Cisco 800 Series Router portfolio. Additional information is available at http://www.cisco.com/go/sa.

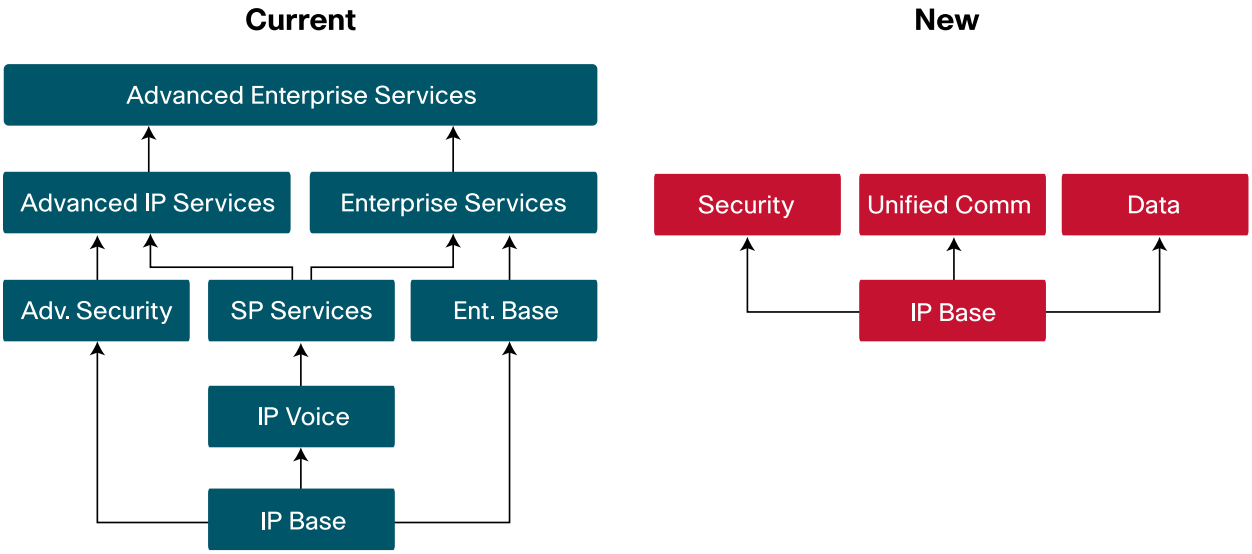
Q. How has feature packaging changed with the Cisco ISR G2?

A. With the introduction of the new routers, Cisco is changing the way Cisco IOS Software is packaged. Previously, each platform and release resulted in between 7 and 11 different Cisco IOS Software images, with different features and capabilities in every image.

Cisco Software Activation enables a much more practical approach to software packaging. With the new routers, all features are included in a single Cisco IOS Universal image [[unless that is part of the name]]. Premium features beyond what is included in the default IP Base package are generally grouped into three major technology packages: Data, Security, and Unified Communications. These three packages represent the vast majority of features available in Cisco IOS Software.

In addition to the three major technology packages, additional feature licenses are available for premium features requiring subscription services or counted quantities (Figure 1).

Figure 1. Feature Licenses



Q. What types of licenses are available for the Cisco ISR G2?

A.

- Permanent: A permanent license never expires. When a permanent license is installed on a system, it is good for that particular feature set for the life of the router, even across Cisco IOS Software releases. For example, when a unified communications, security, or data 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 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. All of the new integrated services routers include a full set of 60-day temporary licenses for the Data, Unified Communications, 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 SSL VPN connections 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.
- Subscription: A subscription license allows access to a feature or capability for a given amount of time unless the subscription is renewed. Subscription licenses typically relate to regular updates from a third-party service such as a content filtering license, which provides regular updates from a filtering database.

Q. Are any trust-based licenses available on the new integrated services routers?

A. Although the primary licensing and feature activation method for the new integrated services routers is Cisco Software Activation, trust-based licensing is still provided for a few features. These trust-based licenses will be phased out over time and replaced by Cisco Software Activation Feature Licenses. This approach gives you even more flexibility in the way you can configure and pay for features in your network as the new platforms are introduced, as well as the way you adopt software activation licenses in your network.

Q. What licenses are available on the Cisco ISR G2?

A. Technology package licenses, software activation feature licenses (at first customer shipment [FCS]), and right-to-use feature licenses (at FCS) are available:

- Technology package licenses are delivered with new systems; they are also available as an upgrade through Cisco Software Activation.
- Software activation feature licenses are typically upgrades to one or more technology package license; they can be included on new systems or upgraded through Cisco Software Activation.
- Right-to-use feature licenses follow the traditional licensing model and do not use Cisco Software Activation. You can order them when you purchase the system or at a later date. These licenses will be migrated to software activation feature licenses over time to give you some degree of flexibility in how you migrate to these licenses in your network.

Tables 9 through 11 give more information about these licenses.

Table 9. Technology Package Licenses

Technology Package Name	Prerequisites	License Types
IP Base	None	Permanent
Security	IP Base	Permanent and temporary
Unified Communications	IP Base	Permanent and temporary
Data	IP Base	Permanent and temporary

Table 10. Software Activation Feature Licenses

Feature License Name	Prerequisites	License Types
SSL VPN	IP Base and Security	Counted
Intrusion Prevention	IP Base and Security	Subscription
Content Filtering	IP Base and Security	Subscription
SNA Switching	IP Base and Data	Permanent and temporary
Gatekeeper	IP Base and Unified Communications	Permanent and temporary
Lawful Intercept	IP Base, Security, Unified Communications, and Data	Permanent

Table 11. Right-to-Use Feature Licenses

Feature License Name	Prerequisites	License Types
CME	IP Base and Unified Communications	Counted
SRST	IP Base and Unified Communications	Counted
CUE	IP Base and Unified Communications	Counted
VXML/IVR Gateway	IP Base and Unified Communications	Counted
CUBE	IP Base and Unified Communications	Counted
Land Mobile Radio	IP Base and Unified Communications	Permanent
Multi-Level Precedence and Preemption	IP Base and Unified Communications	Permanent

Q. Where can I learn more about Cisco Software Activation?

A. For more information, please visit: http://www.cisco.com/go/sa.

Management

Q. What version of Cisco Configuration Professional supports the Cisco ISR G2?

A. Cisco Configuration Professional supports the new additions to the integrated services router portfolio as of Version 2.0. Cisco SPE-200 and SPE-250 based models are supported on Version 2.1. More information about Cisco Configuration Professional is available at: http://www.cisco.com/go/ccp.

Q. Will Cisco Security Manager continue to be supported with the Cisco ISR G2?

A. Yes. Cisco Security Manager Version 3.3.1 and later support the new additions to the integrated services router portfolio.

Q. What features related to security on the Cisco ISR G2 does Cisco Security Manager support?

A. In general, Cisco Security Manager supports all the security-related features such as Firewall, IPS, and VPN on integrated services routers. Please refer to http://www.cisco.com/en/US/products/ps6498/index.html for details about features supported in Cisco Security Manager.

Q. Does Cisco License Manager support the Cisco ISR G2?

A. Yes. Cisco License Manager supports the full range of Cisco Software Activation features available on the new routers. It is the simplest way of managing licenses in large networks and automating many of the day-to-day tasks. Cisco License Manager supports the new integrated services routers as of Version 3.0. More information about Cisco License Manager is available at: http://www.cisco.com/go/clm.

Q. What version of CiscoWorks supports the Cisco ISR G2?

A. Both CiscoWorks LAN Management Solution (LMS) and CiscoWorks Network Compliance Manager (NCM) support the additions to the integrated services router portfolio in a future release.

Q. Does the Cisco Configuration Engine support the Cisco ISR G2?

A. Yes. Cisco Configuration Engine supports the additions to the integrated services router portfolio for zero-touch deployment and configuration distribution as of Version 3.0.

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

Printed in USA C67-553891-01 03/10