Cisco 3900 Series Integrated Services Routers

Cisco® 3900 Series Integrated Services Routers build on 25 years of Cisco innovation and product leadership. The new Cisco Integrated Services Routers Generation 2 (ISR G2) platforms are architected to enable the next phase of branch-office evolution, providing rich-media collaboration and virtualization to the branch office while maximizing operational cost savings. The new routers support new high-capacity digital signal processors (DSPs) for future enhanced video capabilities, high-powered service modules with improved availability, multicore CPUs, Gigabit Ethernet switching with Cisco Enhanced Power over Ethernet (ePoE), and new energy visibility and control capabilities while enhancing overall system performance. Additionally, a new Cisco IOS® Software Universal image and Cisco Services Ready Engine (SRE) module enable you to decouple the deployment of hardware and software, providing a flexible technology foundation that can quickly adapt to evolving network requirements. Overall, the Cisco 3900 Series offers exceptional total cost of ownership (TCO) savings and network agility through the intelligent integration of market-leading security, unified communications, wireless, and application services.

Figure 1. Cisco 3900 Series Integrated Services Routers

Product Overview

The Cisco 3900 Series builds on the best-in-class offering of the existing Cisco 3800 Series Integrated Services Routers by now offering four platforms (Figure 1): the Cisco 3945E, Cisco 3925E, Cisco 3945, and Cisco 3925 Integrated Services Routers.

The Cisco 3900 Series offers embedded hardware encryption acceleration, voice- and video-capable DSP slots, optional firewall, intrusion prevention, call processing, voicemail, and application services. In addition, the platforms support the industry's widest range of wired and wireless connectivity options such as T1/E1, T3/E3, xDSL, copper, and fiber Gigabit Ethernet.

The Cisco 3900 Series offers superior performance and flexibility for flexible network deployments from small business offices to large enterprise offices - all while providing industry-leading investment protection.

Key Business Benefits

The Cisco® ISR G2 routers provide superior services integration and agility. Designed for scalability, the modular architecture of these platforms enables you to evolve and adapt with your growing business needs. Table 1 lists the business benefits of the Cisco 3900 Series.

Table 1. Cisco 3900 Series Business Benefits

Benefits	Description
Services integration	• The Cisco 3900 Series routers offer increased levels of services integration with voice, video, security, mobility, and data services. • The Cisco 3900 Series provides the highest performance and slot densities among the routers in the Cisco ISR G2 portfolio, enabling you to maximize services integration and reducing overall capital expenditures (CapEx) and operating expenses (OpEx).
Services on demand	• A single Cisco IOS Software Universal image is installed on each Cisco ISR G2. The Universal image contains all of the Cisco IOS Software technology sets, which you can activate with a software license. With the Universal image your business can quickly deploy advanced features without downloading a new Cisco IOS Software image. Additionally, larger default memory is included to support the new capabilities. • The Cisco SRE enables a new operational model that allows you to reduce CapEx and deploy a variety of application services as needed on a single integrated compute services module.
High performance with integrated services	• The Cisco 3900 Series enables deployment in high-speed WAN environments with concurrent services enabled up to 350 Mbps. • A multigigabit fabric (MGF) enables high-bandwidth module-to-module communication without compromising router performance.
Network agility	• Designed to address customer business requirements, the Cisco 3900 Series with the modular architecture offers increased capacity and performance as your network needs grow. • The Cisco Services Performance Engine (SPE) modular motherboard enables upgrades to processing capability in the future. • Dual integrated power supplies provide power redundancy; you can also configure them to provide additional Cisco ePoE power to endpoints. • Modular interfaces offer increased bandwidth, a diversity of connection options, and network resiliency.
Energy efficiency	• The Cisco 3900 Series architecture provides energy-savings features that include the following: ◦ The Cisco 3900 Series offers intelligent power management and allows you to control power to the modules based on the time of day. Cisco EnergyWise technology will be supported in the future. ◦ Services integration and modularity on a single platform allows you to perform multiple functions, optimizing consumption of raw materials and energy usage. ◦ Platform flexibility and ongoing development of both hardware and software capabilities lead to a longer product lifecycle, lowering all aspects of the TCO - including materials and energy use. ◦ High-efficiency power supplies and scalable power consumption are based on your network needs.
Investment protection	• The Cisco 3900 Series maximizes investment protection by supporting: ◦ Reuse of a broad array of existing modules supported on the original Cisco Integrated Services Routers to provide a lower TCO. ◦ A rich set of Cisco IOS Software features carried forward from the original Cisco Integrated Services Routers and delivered in a single universal image. • The Cisco 3900 Series offers extensive growth possibilities as your network expands: ◦ The SPE modular motherboard enables flexibility for future upgrades. ◦ The highest scale for module density provides flexibility to add services as your business needs expand. ◦ A 1-Gb default memory provides headroom to minimize field upgrades.

Platform Architecture and Modularity

The Cisco 3900 Series is architected to meet the application demands of today's branch offices with design flexibility for future applications. The modular architecture is designed to support increasing bandwidth requirements, time-division multiplexing (TDM) interconnections, and fully integrated power distribution to modules supporting 802.3af PoE and Cisco ePoE. Table 2 lists the architectural features and benefits of the Cisco 3900 Series.

Table 2. Architectural Features and Benefits of Cisco 3900 Series

Architectural Features	Benefits
Modular platform	• The Cisco 3900 Series routers are highly modular platforms with several types of module slots to add connectivity and services for varied branch-office network requirements. • The routers offer an industry-leading breadth of LAN and WAN connectivity options through modules to accommodate field upgrades to future technologies without requiring platform replacement. • The Cisco SPE on the Cisco 3900 offers the ability to increase the performance of the router with a field-upgradable motherboard as your network needs grow.
Processors	• The Cisco 3900 Series routers are powered by high-performance multicore processors that can support the growing demands of high-speed WAN connections to the branch office while also running multiple concurrent services.
Embedded IP Security with Secure Sockets Layer (IPSec/SSL) VPN hardware acceleration	• Embedded hardware encryption acceleration is enhanced to provide higher scalability, which, combined with an optional Cisco IOS Software Security license, enables WAN link security and VPN services (both IPSec and SSL acceleration). • The onboard encryption hardware outperforms the advanced integration modules (AIMs) of previous generations.
Multigigabit fabric (MGF)	• The Cisco 3900 Series introduces an innovative MGF that allows for efficient module-to-module communication, enabling tighter services interactions across modules while reducing the overhead on the router processor.
TDM interconnectivity fabric	• Unified communications services in the branch office are significantly enhanced with the use of TDM interconnectivity fabric in the router architecture, allowing for scaling of DS-0 channel capacity.
Integrated Gigabit Ethernet ports	• The Cisco 3900 Series provides up to four 10/100/1000 Ethernet WAN ports. • Two of the 10/100/1000 Ethernet WAN ports on the Cisco 3900 Series can support Small Form-Factor Pluggable (SFP)-based connectivity in lieu of RJ-45 ports, enabling fiber connectivity.
Innovative universal-serial-bus (USB)-based console access	• A new, innovative, mini-B USB console port supports management connectivity when traditional serial ports are not available. • Traditional console and auxiliary ports are also available.
Optional integrated power supply for distribution of PoE and universal DC power supply	• An optional upgrade to the internal power supply provides inline power (802.3af-compliant PoE, Cisco ePoE, and Cisco Inline Power) to optional integrated switch modules. • An optional DC power supply that extends possible deployment environments such as central offices and industrial environments will be available in the future.
Optional integrated redundant power supply (RPS) and PoE boost	• Power redundancy is available by installing an optional integrated RPS, thereby decreasing network downtime and protecting the network from power-supply failures. • When populated with dual integrated power supplies, the Cisco 3900 Series can operate in a configurable PoE boost mode in lieu of redundant power mode whereby the power capacity of the platform is increased to almost twice the normal power to support additional PoE ports.
Designed for flexible deployments	• The Cisco 3945 and 3925 are designed for Network Equipment Building Systems (NEBS) environments.

Modularity Features and Benefits

The Cisco 3900 Series provides significantly enhanced modular capabilities (refer to Table 3) while maintaining investment protection for customers. Most of the modules available on previous generations of Cisco routers, such as the Cisco 3800 Series Integrated Services Routers, are supported on the Cisco 3900 Series. Additionally, modules used on the Cisco 3900 Series can easily be supported on other routers in the Cisco Integrated Services Router portfolio to provide maximum investment protection. Taking advantage of common interface cards across a network greatly reduces the complexity of managing inventory requirements, implementing large network rollouts, and maintaining configurations across a variety of branch-office sizes.

A complete list of supported modules, including a list of supported SFPs for the Cisco 3900 Series, is available at: http://www.cisco.com/en/US/products/ps10536/products_relevant_interfaces_and_modules.html.

Table 3. Modularity Features and Benefits

Architectural Features	Benefits
Cisco Services Performance Engine (SPE) 	• The Cisco 3900 Series offers field-replaceable SPEs. • These SPEs allow you to protect your initial investment in the Cisco 3900 platform for a longer time period and scale router performance as your network and branch-office needs grow.
Cisco Services Module 	• A service-module slot replaces the network module and the extension module for voice and fax (EVM) slots and is offered on Cisco 3900 Integrated Services Routers. • Each service-module slot offers high data-throughput capability: ◦ Up to 4-Gbps aggregate toward the router processor. ◦ Up to 2-Gbps aggregate to other module slots over the MGF. • Service-module slots are highly flexible, with support for doublewide service modules, which are service modules that require two service-module slots. Doublewide service modules provide flexibility for higher-density modules. • Service-module slots provide twice the power capabilities relative to the network-module slots, allowing flexibility for higher-scale and better-performance modules. • An adapter module enables backward compatibility with existing network modules, enhanced network modules (NMEs), and EVMs. • You can manage power to service-module slots by extensions similar to the Cisco EnergyWise framework, so your organization can reduce energy consumption in your network infrastructure. Full Cisco EnergyWise support will be available in future software releases.
Cisco Enhanced High Speed WAN Interface Card (EHWIC) 	• The EHWIC slot replaces the high-speed WAN interface card (HWIC) slot and can natively support HWICs, WAN interface cards (WICs), voice interface cards (VICs), and voice/WAN interface cards (VWICs). • Three integrated EHWIC slots on the Cisco 3945E and Cisco 3925E or four integrated EHWIC slots on the Cisco 3945 and Cisco 3925 allow for flexible configurations. • Each HWIC slot offers high-data-throughput capability: ◦ Up to 1.6-Gbps aggregate toward the router processor. ◦ Up to 2-Gbps aggregate to other module slots over the MGF. • Flexibility to support doublewide modules is enabled by combining two EHWIC slots. Up to 2 doublewide HWIC (HWIC-D) modules are supported.
Cisco Internal Services Module (ISM) 	• A single ISM slot provides flexibility to integrate intelligent services modules that do not require interface connections in the Cisco 3945 and Cisco 3925. • Each ISM slot offers high-data-throughput capability: ◦ Up to 4-Gbps aggregate toward the route processor. ◦ Up to 2-Gbps aggregate to other module slots over the MGF. • The ISM replaces the AIM slot; existing AIM modules are not supported in the ISM slot. • You can manage power to ISM slots by extensions similar to the Cisco EnergyWise framework, so your organization can reduce energy consumption in your network infrastructure. Full Cisco EnergyWise support will be available in future software releases.
Cisco High-Density Packet Voice Digital Signal Processor (DSP) Module (PVDM3) Slots on Motherboard 	• PVDM3 slots natively support PVDM3 modules, providing support for richer density for rich-media voice and video. • Each PVDM3 slot connects back to the system architecture through a 2-Gbps aggregate link through the MGF. • Investment protection for PVDM2 modules is supported through an adapter module. • You can manage power to the PVDM slots by extensions similar to the Cisco EnergyWise framework, so your organization can reduce energy consumption in your network infrastructure. Full Cisco EnergyWise support will be available in future software releases.
Compact Flash Slots	• Two external Compact Flash slots are available on the Cisco 3900 Series Integrated Services Routers. Each slot can support high-speed storage densities upgradable to 4 GB in density.
USB 2.0 Ports	• Two high-speed USB 2.0 ports are supported; they provide secure token capabilities and storage.

Cisco IOS Software

Cisco 3900 Series Integrated Services Routers deliver innovative technologies running on industry-leading Cisco IOS Software. Developed for wide deployment in the world's most demanding enterprise, access, and service provider networks, Cisco IOS Software Releases 15M and T support a comprehensive portfolio of Cisco technologies, including the functions and features delivered in Releases 12.4 and 12.4T. New innovations in Release 15.0(1)M span multiple technology areas, including security, voice, high availability, IP Routing and Multicast, quality of service (QoS), IP Mobility, Multiprotocol Label Switching (MPLS), VPNs, and embedded management. Available immediately for the Cisco 3900 Integrated Services Routers, Release 15.0(1)M will be an extended support release. For more information about Release 15.0(1)M, please visit http://www.cisco.com/go/ios.

Cisco IOS Software Licensing and Packaging

A single Cisco IOS Universal image encompassing all functions is delivered with the platforms. You can enable advanced features by activating a software license on the Universal image. In previous generations of access routers, these feature sets required you to download a new software image. Technology packages and feature licenses, enabled through the Cisco software licensing infrastructure, simplify software delivery and decrease the operational costs of deploying new features.

Four major technology licenses are available on the Cisco 3900 Series Integrated Services Routers; you can activate the licenses through the Cisco software activation process identified at http://www.cisco.com/go/sa. The following licenses are available:

- IP Base: This technology package is available as default.
- Data
- Unified Communications
- Security (SEC) or Security with No Payload Encryption (SEC-NPE)

For additional information and details about Cisco IOS Software licensing and packaging on Cisco 3900 Series Integrated Services Routers, please visit http://www.cisco.com/go/g2licensing.

Key Branch-Office Services

The industry-leading Cisco Integrated Services Routers offer unprecedented levels of services integration. Designed to meet the requirements of the branch office, these platforms provide a complete solution with voice, video, security, mobility, and application services. Businesses enjoy the benefits by deploying a single device that meets all their needs, reducing CapEx and OpEx.

Unified Communications, Collaboration, and Voice-Gateway Services

The Cisco 3900 Integrated Services Router is the foundation for collaboration in branch offices of any size and is a critical component of Cisco's video architecture (Medianet) and enterprise Unified Communications solution. With embedded voice services and a wide range of telephony interfaces supported, the Cisco 3900 Series delivers maximum deployment flexibility for the distributed enterprise. Unified communications is enabled through a rich signaling and media-processing infrastructure, including a variety of protocols, media interworking, signal and media security, transcoding, conferencing, and QoS. Cisco Integrated Services Routers feature a wide range of voice-gateway interfaces, supporting a broad array of signaling and physical network interfaces. The performance improvements introduced with the Cisco 3900 Series help ensure that branch-office employees benefit from the

same productivity advantages and wide breadth of services and applications as those enjoyed by the headquarters-based employees.

The Cisco 3900 Series enables a full range of existing and emerging video services, with scaling improvement to support Cisco TelePresence® conferencing, security, and session control. Cisco Unified Border Element extends these capabilities for business-to-business TelePresence communications.

The Cisco 3900 Series adds support for the new Cisco High-Density Packet Voice Digital Signal Processor Module (PVDM3), which has been optimized for concurrent voice and video support. The PVDM3 modules support all voice-gateway functions of earlier generations of PVDMs, and add higher density and more processing power to support emerging rich-media applications. The Cisco 3900 Series can support up to 4 onboard PVDM3 slots, able to scale up to 768 G.729a channels.

Cisco Unified Communications Manager Express and Survivable Remote Site Telephony

The Cisco Integrated Services Routers inherently provide optional unified communications services within the Cisco IOS Software, delivering the advantage of server hardware reduction and lower energy costs at the branch office. Cisco Unified Communications Manager Express (CME) provides the broad range of IP private-branch-exchange (PBX) and key-system features integrated into the router for branch offices. Cisco Survivable Remote Site Telephony (SRST), also inherently available in Cisco IOS Software and an option on the Cisco 3900 Series, helps ensure that branch-office employees have uninterrupted telephony services and features, even if the connection to a centralized Cisco Unified Communications Manager is disrupted. Coupled with Cisco Unity® Express, the integrated solution for voicemail, Automated Attendant, and interactive voice response (IVR), the Cisco 3900 Series offers the branch office a complete range of unified communications services while delivering industry-leading security within a single platform.

Cisco Unified Border Element

The Cisco Unified Border Element capabilities supported on the Cisco 3900 address the emerging requirements in an IP-centric interconnect for branch-office unified communications between enterprises and service provider networks. Cisco Unified Border Element provides intelligent border-element functions such as physical and logical ingress and egress demarcation points, signaling and media control, and consolidated security and management features. The Cisco 3900 Series supports higher scale than previously provided on the Cisco 3800 Series, with up to 2.5 times the number of sessions.

VoiceXML Application Services

The Cisco 3900 Series inherently provides standards-certified VoiceXML browser services. VoiceXML is an open-standard markup language used to create voice-enabled web browsers and IVR applications. Just as HTML enables you to retrieve data with a PC, VoiceXML enables you to retrieve data using voice or dual-tone-multifrequency (DTMF) telephony input. The Cisco 3900 Series can deliver a much higher range of concurrent voice-gateway services combined with VoiceXML browser services, for more than 300 sessions on the Cisco 3945.

Integrated Network Security for Data, Voice, Video, and Mobility

Security is essential to protect a business' intellectual property while also ensuring business continuity and providing the ability to extend the corporate workplace to employees who need anytime, anywhere access to company resources. As part of the Cisco Self-Defending Network (SDN) - an architectural framework that allows organizations to identify, prevent, and adapt to network security threats - the Cisco 3900 Series Integrated Services Routers facilitate secure data transactions and secure collaboration.

The Cisco IOS Software Security technology package for the Cisco 3900 Series offers a wide array of common security features such as advanced application inspection and control, threat protection, and encryption architectures for enabling more scalable and manageable VPN networks. The Cisco 3900 Series offers onboard hardware-based encryption acceleration to provide greater IPSec throughput with less overhead for the route processor when compared with software-based encryption solutions. Cisco Integrated Services Routers offer a comprehensive and adaptable security solution for branch offices that includes features such as:

- **Secure connectivity:** Secure collaborative communications with Group Encrypted Transport VPN, Dynamic Multipoint VPN (DMVPN), or Enhanced Easy VPN
- **Integrated threat control:** Responding to sophisticated network attacks and threats using Cisco IOS Firewall, Cisco IOS Zone-Based Firewall, Cisco IOS IPS, Cisco IOS Content Filtering, and Flexible Packet Matching (FPM)
- **Identity management:** Intelligently protecting endpoints using technologies such as authentication, authorization, and accounting (AAA) and public key infrastructure (PKI)

Detailed information about the security features and solutions supported on the Cisco 3900 Series is available at http://www.cisco.com/go/routersecurity.

Wireless and Mobility Services

Wireless LAN

The Cisco Integrated Services Routers supporting the Cisco Unified Wireless Architecture enable deployment of secure, manageable wireless LANs (WLANs) optimized for remote sites and branch offices, including fast, secure mobility; survivable authentication; and simplified management. The Cisco Wireless LAN Controller Module on the Cisco 3900 Series routers allows small and medium-sized businesses and enterprise branch offices to cost-effectively deploy and manage secure WLANs. Cisco Wireless LAN Controllers work in conjunction with Cisco lightweight access points and the Cisco Wireless Control System (WCS) to provide systemwide WLAN functions, managing up to 6, 12, and 25 access points. As components of the Cisco Unified Wireless Architecture, Cisco Wireless LAN Controllers present network administrators with the visibility and control necessary to effectively and securely manage business-class WLANs and mobility services such as enhanced security, voice, guest access, and location services.

Wireless WAN

Cisco third-generation (3G) wireless WAN (WWAN) modules combine traditional enterprise router functions such as remote management, advanced IP services such as voice over IP (VoIP), and security with mobility capabilities of 3G WAN access. Using high-speed 3G wireless networks, routers can replace or complement existing landline infrastructure, such as dialup, Frame Relay, and ISDN. Cisco 3G solutions support 3G standards High-Speed Packet Access (HSPA) and Evolution Data Only/Evolution Data Optimized (EVDO), offering you a true multipath WAN backup and the ability to rapidly deploy primary WAN connectivity. For more information about 3G solutions on Cisco Integrated Services Routers, please visit http://www.cisco.com/go/3g.

Integrated LAN Switching

The Cisco 3900 Integrated Services Routers support the new Cisco Enhanced EtherSwitch® Service Modules, which greatly expand router capabilities by integrating industry-leading Layer 2 or Layer 3 switching with feature sets identical to those found in the Cisco Catalyst® 3560-E and Catalyst 2960 Series Switches performing local line-rate switching and routing.

The new Cisco Enhanced EtherSwitch Service Modules take advantage of the increased power capabilities on the Cisco 3900 Series platforms. Additionally, the modules enable Cisco energy and power initiatives: Cisco EnergyWise, Cisco ePoE and per-port PoE power monitoring, and integrated redundant power system (RPS)-enabled PoE boost. These technologies allow you to meet increased endpoint power requirements without increasing the total power consumption of the branch office.

Application Services

As organizations continue to centralize and consolidate their branch-office IT infrastructure in an effort to reduce cost and complexity, they are challenged to provide adequate user experience, ensure continuous service availability, and deliver business-relevant applications when and where they are needed. To address these challenges, the Cisco 3900 Series enables you to host Cisco, third-party, and custom applications on a portfolio of high-performance Cisco SRE modules that transparently integrate into the router. The modules have their own processors, hard disks, network interfaces, and memory that operate independently of the host router resources, helping to ensure maximum concurrent routing and application performance while reducing physical space requirements, lowering power consumption, and consolidating management.

Application Acceleration

The Cisco 3900 Series transparently combines industry-leading security, Cisco IOS Software-based traffic control, and visibility with Cisco application-acceleration solutions. Cisco IOS Software features such as Network-Based Application Recognition (NBAR), IP service-level agreement (IP SLA), and NetFlow provide visibility and monitoring of traffic patterns and application performance while Cisco IOS Software features such as QoS, access control lists (ACLs), and Performance Routing intelligently control the traffic to maximize the quality of the user experience and employee productivity. You can further enhance user experience by adding a Cisco Wide Area Application Services (WAAS) Network Module to securely provide more advanced WAN optimization techniques such as TCP optimization, caching, compression, and application acceleration. Cisco Integrated Services Routers combined with Cisco WAAS Network Modules provide optimal performance for applications delivered from a central data center to branch-office users. The solution allows you to consolidate costly server, storage, and backup infrastructure into data centers while maintaining LAN-like service levels for remote users.

Cisco Services Ready Engine

The Cisco Services Ready Engine solution is available in service-module (SM) and ISM form factors. The service-module hardware offers up to a seven-times performance improvement over the previous-generation network modules and provides a multicore x86 processor. The SRE modules also support up to 1 terabyte of storage, Redundant Array of Independent Disks (RAID) configurations, hardware-assisted virtualization, and cryptography options. The Cisco SRE module enables on-demand provisioning of branch-office applications on the Cisco 3900 Series platforms so that you can deploy the right application, at the right time, in the right place. The hardware and software decoupling provided by the service-ready deployment model enables you to provision applications on the module at the time of its installation, or remotely anytime thereafter. Supported solutions include Cisco WAAS, Cisco Unity Express, Cisco Application Extension Platform (AXP), Cisco Wireless LAN Controller (WLC), Cisco Video Surveillance, and other applications under development. The SRE enables organizations of various sizes to quickly deploy new branch-office applications without deploying new hardware, reducing the cost of rolling out branch-office services and helping ensure that the network applications will be compatible with future versions.

WAAS Express

Organizations today face several unique wide area network (WAN) challenges: the need to provide employees with constant access to centrally located information, the requirement to continuously back up and replicate mission-critical data to centrally managed data centers, the desire to provide satisfactory experience for IP phone and video communication, and the mandate to control bandwidth costs without sacrificing application availability and performance.

Cisco WAAS Express is designed to help organizations address these challenges. Cisco WAAS Express extends the Cisco WAAS product portfolio, with a small-footprint, cost-effective IOS-based software solution integrated into the ISR G2 to offer bandwidth optimization and application acceleration capabilities. Cisco WAAS Express increases remote user productivity, reduces WAN bandwidth costs, and offers investment protection by interoperating with existing Cisco WAAS infrastructure. Cisco WAAS Express is unique in providing network transparency, improving deployment flexibility with on-demand service enablement, and integrating with native IOS-based services such as security, Netflow, and QoS.

Cisco WAAS Express is fully interoperable with WAAS on SM-SRE modules, WAAS appliances and can be managed by a common WAAS Central Manager.

Cisco WAAS Express is available in IOS from version 15.1(2)T1.

Further information on Cisco WAAS Express can be found at http://wwwin.cisco.com/artg/products/waas/.

Medianet for 3900 ISRs

As video becomes pervasive in an organization and more video devices are used, new demands are placed on the network. It can be challenging to accommodate video needs while reducing complexity, planning for capacity, and providing the best possible user experience.

Smarter Network, Endpoints, and Services

Traditional IP networks need to evolve to medianets to accommodate these changes. A medianet is an end-to-end IP architecture that helps to enable pervasive media experiences.

The medianet architecture includes a smarter network, smarter endpoints, shared media services, cloud services, and shared media services.

More Medianet Benefits

A medianet reduces total cost of ownership and scales video through features such as auto-configuration and media monitoring. At the same time, it helps to ensure a quality user experience while optimizing bandwidth use and efficiency.

For more information on Medianet for 3900 ISR, please go to http://www.cisco.com/en/US/netsol/ns1094/index.html.

Managing Your Integrated Services Routers

Network management applications are instrumental in lowering OpEx while improving network availability by simplifying and automating many of the day-to-day tasks associated with managing an end-to-end network. “Day-one device support” provides immediate manageability support for the integrated services router, enabling quick and easy deployment, monitoring, and troubleshooting from Cisco and third-party applications.

Organizations rely on Cisco, third-party, and in-house developed network management applications to achieve their OpEx and productivity goals. Underpinning those applications are the embedded management features available in every integrated services router. The new integrated services routers continue a tradition of broad and deep manageability features within the devices. Features such as IP SLA, Cisco IOS Embedded Event Manager (EEM), and NetFlow allow you to know the status of your network at all times. These features, along with Simple Network Management Protocol (SNMP) and syslog support, enable your organization's management applications.

Refer to Tables 4, 5, and 6 for details about Cisco IOS Software, network management, and manageability support on Cisco 3900 Series Integrated Services Routers.

Table 4. Cisco 3900 with Cisco IOS Software Feature and Protocol High-Level Support

Protocols	• IPv4, IPv6, static routes, Open Shortest Path First (OSPF), Enhanced IGRP (EIGRP), Border Gateway Protocol (BGP), BGP Router Reflector, Intermediate System-to-Intermediate System (IS-IS), Multicast Internet Group Management Protocol (IGMPv3), Protocol Independent Multicast sparse mode (PIM SM), PIM Source Specific Multicast (SSM), Distance Vector Multicast Routing Protocol (DVMRP), IPv4-to-IPv6 Multicast, MPLS, Layer 2 and Layer 3 VPN, IPSec, Layer 2 Tunneling Protocol Version 3 (L2TPv3), Bidirectional Forwarding Detection (BFD), IEEE802.1ag, and IEEE802.3ah.
Encapsulations	• Generic routing encapsulation (GRE), Ethernet, 802.1q VLAN, Point-to-Point Protocol (PPP), Multilink Point-to-Point Protocol (MLPPP), Frame Relay, Multilink Frame Relay (MLFR) (FR.15 and FR.16), High-Level Data Link Control (HDLC), Serial (RS-232, RS-449, X.21, V.35, and EIA-530), PPP over Ethernet (PPPoE), and ATM.
Traffic management	• QoS, Class-Based Weighted Fair Queuing (CBWFQ), Weighted Random Early Detection (WRED), Hierarchical QoS, Policy-Based Routing (PBR), Performance Routing, and NBAR.

For more details about Cisco IOS Software features, refer to http://www.cisco.com/go/fn.

Table 5. Embedded Management features available with Cisco IOS Software

Feature	Description of Feature Supported by Cisco Integrated Services Routers
WSMA	• The Web Services Management Agent (WSMA) defines a mechanism through which you can manage a network device, retrieve configuration data information, and upload and manipulate new configuration data. WSMA uses XML-based data encoding that is transported by the Simple Object Access Protocol (SOAP) for the configuration data and protocol messages.
EEM	• Cisco IOS Embedded Event Manager (EEM) is a distributed and customized approach to event detection and recovery offered directly in a Cisco IOS Software device. It offers the ability to monitor events and take informational, corrective, or any desired EEM action when the monitored events occur or when a threshold is reached.
IPSLA	• Cisco IOS IP Service-Level Agreements enable you to assure new business-critical IP applications as well as IP services that use data, voice, and video in an IP network.
SNMP, RMON, Syslog, NetFlow, TR-069	• Cisco 3900 Series Integrated Services Routers also support SNMP, Remote Monitoring (RMON), syslog, NetFlow, and TR-069, in addition to the embedded management features mentioned.

The Cisco network management applications listed in Table 6 are standalone products that you can purchase or download to manage your Cisco network devices. The applications are built specifically for the different operational phases; you can select the ones that best fit your needs.

Table 6. Network Management Solutions

Operational Phase	Application	Description
Device staging and configuration	Cisco Configuration Professional	• Cisco Configuration Professional is a GUI device-management tool for Cisco IOS Software-based access routers. This tool simplifies routing, firewall, IPS, VPN, unified communications, and WAN and LAN configuration through GUI-based easy-to-use wizards.
Networkwide deployment, configuration, monitoring, and troubleshooting	CiscoWorks LMS	• CiscoWorks LAN Management Solution (LMS) is a suite of integrated applications for simplifying day-to-day management of a Cisco end-to-end network, lowering OpEx while increasing network availability. CiscoWorks LMS offers network managers an easy-to-use web-based interface for configuring, administering, and troubleshooting the Cisco Integrated Services Routers, using new instrumentation such as Cisco IOS EEM. • In addition to supporting basic platform services of the integrated services router, CiscoWorks also provides added-value support for the Cisco SRE, enabling the management and distribution of software images to the SRE, thereby reducing the time and complexities associated with image management.

Operational Phase	Application	Description
Networkwide staging, configuration, and compliance	CiscoWorks NCM	• CiscoWorks Network Compliance Manager (NCM) tracks and regulates configuration and software changes throughout a multivendor network infrastructure. It provides superior visibility into network changes and can track compliance with a broad variety of regulatory, IT, corporate governance, and technology requirements.
Security staging, configuration, and monitoring	Cisco Security Manager	• Cisco Security Manager is a leading enterprise-class application for managing security. It delivers provisioning of firewall, VPN, and intrusion-prevention-system (IPS) services across Cisco routers, security appliances, and switch service modules. The suite also includes the Cisco Security Monitoring, Analysis and Response System (Cisco Security MARS) for monitoring and mitigation.
Voice and unified communications configuration and provisioning	Cisco Unified Provisioning Manager	• Cisco Unified Provisioning Manager provides a reliable and scalable web-based solution for managing a company's crucial next-generation communications services. It manages unified communications services in an integrated IP telephony, voicemail, and messaging environment.
Staging, deployment, and changes of licenses	Cisco License Manager	• Cisco License Manager, a secure client-server application, can help you easily manage Cisco IOS Software activation and licenses for a wide range of Cisco platforms running Cisco IOS Software as well as other operating systems.
Staging, deployment, and changes to configuration and image files	Cisco Configuration Engine	• Cisco Configuration Engine is a secure network management product that provides zero-touch image and configuration distribution through centralized, template-based management.

Summary

Businesses need more intelligent branch-office solutions as they strive to lower the TCO for running their network and increase their overall employee productivity with more centralized and collaborative network applications. The Cisco 3900 Series offers these solutions by providing enhanced performance and increased modular density to support multiple concurrent services. The Cisco 3900 Series is designed to consolidate the functions of many separate devices into a single system that you can manage remotely. Table 7 lists the specifications of the Cisco 3945E, 3925E, 3945, and 3925 Integrated Services Routers.

Table 7. Specifications of Cisco 3945E, 3925E, 3945, and 3925 Integrated Services Routers

Services and Slot Density	Cisco 3945E	Cisco 3925E	Cisco 3945	Cisco 3925
Embedded hardware-based cryptography acceleration (IPSec + Secure Sockets Layer [SSL])	Yes	Yes	Yes	Yes
Cisco Unified Communications Manager Express Sessions**	450	400	350	250
Cisco Unified SRST sessions	1500	1350	1200	730
Total onboard WAN or LAN 10/100/1000 ports	4	4	3	3
RJ-45-based ports	4	4	3	3
SFP-based ports	2	2	2	2
Service-module slots	4	2	4	2
Doublewide service-module slots	1	1	1	1
EHWIC slots	3	3	4	4
Doublewide EHWIC slots	1	1	2	2
ISM slots	0	0	1	1
Online insertion and removal (OIR)	Services modules	Services modules	Services modules	Services modules
Onboard DSP (PVDM) slots	3	3	4	4
Memory DDR2 ECC DRAM: Default	1 GB	1 GB	1 GB	1 GB
Memory DDR2 ECC DRAM: Maximum	2 GB	2 GB	2 GB***	2 GB***
Compact Flash (external): Default	Slot 0: 256 MB Slot 1: None	Slot 0: 256 MB Slot 1: None	Slot 0: 256 MB Slot 1: None	Slot 0: 256 MB Slot 1: None

Services and Slot Density	Cisco 3945E	Cisco 3925E	Cisco 3945	Cisco 3925
Compact Flash (external): Maximum	Slot 0: 4 GB Slot 1: 4 GB	Slot 0: 4 GB Slot 1: 4 GB	Slot 0: 4 GB Slot 1: 4 GB	Slot 0: 4 GB Slot 1: 4 GB
External USB 2.0 slots (Type A)	2	2	2	2
USB console port (Type B) (up to 115.2 kbps)	1	1	1	1
Serial console port (up to 115.2 kbps)	1	1	1	1
Serial auxiliary port (up to 115.2 kbps)	1	1	1	1
Power-supply options	Internal: AC, PoE, and DC*	Internal: AC, PoE, and DC*	Internal: AC, PoE, and DC*	Internal: AC, PoE, and DC*
Redundant power supply	Internal: AC, PoE, and DC*	Internal: AC, PoE, and DC*	Internal: AC, PoE, and DC*	Internal: AC, PoE, and DC*
Power Specifications				
AC input voltage	100 to 240 VAC autoranging	100 to 240 VAC autoranging	100 to 240 VAC autoranging	100 to 240 VAC autoranging
AC input frequency	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
AC input current range, AC power supply (maximum)	7.1 to 3.0A	7.1 to 3.0A	7.1 to 3.0A	7.1 to 3.0A
AC input surge current	<50A	<50A	<50A	<50A
DC Operating Input Voltage	24Vdc - 60Vdc	24Vdc - 60Vdc	24Vdc - 60Vdc	24Vdc - 60Vdc
Max Input Current range, DC power supply (A)	33.2 - 12.4	33.2 - 12.4	33.2 - 12.4	33.2 - 12.4
DC Input Surge Current	<50A	<50A	<50A	<50A
Typical power (no modules) (watts)	158	150	105	100
Maximum power with AC power supply (watts)	540	420	540	420
Maximum power with PoE power supply (platform only) (watts)	540	420	540	420
Maximum endpoint PoE power available from PoE power supply (watts)	520	520	520	520
Max power with DC input (W)	574	446	574	446
Maximum endpoint PoE power capacity with PoE boost (watts)	1040	1040	1040	1040
Dimensions (H x W x D)	5.25 x 17.25 x 18.75 in. (133.35 x 438.15 x 476.25 mm)	5.25 x 17.25 x 18.75 in. (133.35 x 438.15 x 476.25 mm)	5.25 x 17.25 x 18.75 in. (133.35 x 438.15 x 476.25 mm)	5.25 x 17.25 x 18.75 in. (133.35 x 438.15 x 476.25 mm)
Rack height	3 rack units (3RU)	3RU	3 RU	3RU
Rack-mount 19in. (48.3 cm) EIA	Included	Included	Included	Included
Rack-mount 23in. (58.4 cm) EIA	Optional	Optional	Optional	Optional
Wall-mount	No	No	No	No
Weight with AC power supply (no modules)	39 lb (17.7 kg)	39 lb (17.7 kg)	39 lb (17.7 kg)	39 lb (17.7 kg)
Weight with PoE power supply (no modules)	40 lb (18.1 kg)	40 lb (18.1 kg)	40 lb (18.1 kg)	40 lb (18.1 kg)
Typical weight (with modules)	60 lb (27.2 kg)	60 lb (27.2 kg)	60 lb (27.2 kg)	60 lb (27.2 kg)
Airflow	Back to front	Back to front	Back to front	Back to front
Optional airflow kit (includes filter)	None	None	Front to Back	Front to Back
Environmental specifications **Operating conditions**				
Temperature: 5906 ft (1800m) maximum altitude	32 to 104ºF (0 to 40ºC)	32 to 104ºF (0 to 40ºC)	32 to 104ºF (0 to 40ºC)	32 to 104ºF (0 to 40ºC)
Temperature: 9843 ft (3000m) maximum altitude	32 to 104ºF (0 to 40ºC)	32 to 104ºF (0 to 40ºC)	32 to 104ºF (0 to 40ºC)	32 to 104ºF (0 to 40ºC)
Temperature: 13123 ft (4000m) maximum altitude'	32 to 86ºF (0 to 30ºC)	32 to 86ºF (0 to 30ºC)	32 to 86ºF (0 to 30ºC)	32 to 86ºF (0 to 30ºC)

Services and Slot Density	Cisco 3945E	Cisco 3925E	Cisco 3945	Cisco 3925
Temperature: Short-term per NEBS/5906 ft (1800m) maximum altitude	23 to 122℉ (-5 to 50℃)	23 to 122℉ (-5 to 50℃)	23 to 122℉ (-5 to 50℃)	23 to 122℉ (-5 to 50℃)
Altitude	4000m (13000 ft)	4000m (13000 ft)	4000m (13000 ft)	4000m (13000 ft)
Relative humidity	5 to 85%	5 to 85%	5 to 85%	5 to 85%
Short-term (per NEBS) humidity	5% to 90%, not to exceed 0.024 kg water/kg of dry air	5% to 90%, not to exceed 0.024 kg water/kg of dry air	5% to 90%, not to exceed 0.024 kg water/kg of dry air	5% to 90%, not to exceed 0.024 kg water/kg of dry air
Acoustic: Sound pressure (typical/maximum)	57.6/77.6	57.6/77.6	57.6/77.6	57.6/77.6
Acoustic: Sound power (typical/maximum)	67.8/84.7	67.8/84.7	67.8/84.7	67.8/84.7
Nonoperating conditions			2	
Temperature	-40 to 158ºF (-40 to 70ºC)	-40 to 158ºF (-40 to 70ºC)	-40 to 158ºF (-40 to 70ºC)	-40 to 158ºF (-40 to 70ºC)
Relative humidity	5 to 95%	5 to 95%	5 to 95%	5 to 95%
Altitude	15,584 ft (4750m)	15,584 ft (4570m)	15,584 ft (4750m)	15,584 ft (4570m)
Regulatory and Compliance				
Safety	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1
EMC	47 CFR, Part 15 ICES-003 Class A EN55022 Class A CISPR22 Class A AS/NZS 3548 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 EN50082-1	47 CFR, Part 15 ICES-003 Class A EN55022 Class A CISPR22 Class A AS/NZS 3548 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 EN50082-1	47 CFR, Part 15 ICES-003 Class A EN55022 Class A CISPR22 Class A AS/NZS 3548 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 EN50082-1	47 CFR, Part 15 ICES-003 Class A EN55022 Class A CISPR22 Class A AS/NZS 3548 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 EN50082-1
Telecom	TIA/EIA/IS-968 CS-03 ANSI T1.101 ITU-T G.823, G.824 IEEE 802.3 RTTE Directive	TIA/EIA/IS-968 CS-03 ANSI T1.101 ITU-T G.823, G.824 IEEE 802.3 RTTE Directive	TIA/EIA/IS-968 CS-03 ANSI T1.101 ITU-T G.823, G.824 IEEE 802.3 RTTE Directive	TIA/EIA/IS-968 CS-03 ANSI T1.101 ITU-T G.823, G.824 IEEE 802.3 RTTE Directive

[*] DC power supplies available in H1CY2010
[***] 2GB is the maximum IOS addressable memory but the system can support up to 4GB

The Cisco 3900 Series supports a wide range of modules that span industry-leading breadth of services at the branch office. For a list of modules supported on the Cisco 3900 Series, please visit: http://www.cisco.com/en/US/products/ps10536/products_relevant_interfaces_and_modules.html.

Ordering Information

The Cisco 3900 Series Integrated Services Routers are orderable and shipping. For more information about how to order the Cisco 3900 Series, please visit the ISR G2 Ordering Guide. To place an order, visit the Cisco Ordering Home Page and refer to Table 8.

For additional product numbers, including the Cisco 3900 Series bundle offerings, please check the Cisco 3900 Series Integrated Services Router Price List or contact your local Cisco account representative. To place an order, visit the Cisco Ordering Home Page. To download software, visit the Cisco Software Center.

Table 8. Cisco 3900 Ordering Information

Product Name	Product Description
CISCO3945E/K9	• Cisco 3945 with 4 onboard GE, C3900-SPE250/K9, 3 EHWIC slots, 3 DSP slots, 4 SM slots, 256MB CF default, 1 GB DRAM default, IP Base
CISCO3925E/K9	• Cisco 3925 with 4 onboard GE, C3900-SPE200/K9, 3 EHWIC slots, 3DSP slots, 2 SM slots, 256MB CF default, 1 GB DRAM default, IP Base
CISCO3945/K9	• Cisco 3945 with 3 onboard GE, C3900-SPE150/K9, 4 EHWIC slots, 4 DSP slots, 1 ISM slot, 4 SM slots, 256MB CF default, 1 GB DRAM default, IP Base
CISCO3925/K9	• Cisco 3925 with 3 onboard GE, C3900-SPE100/K9, 4 EHWIC slots, 4 DSP slots, 1 ISM slot, 2 SM slots, 256MB CF default, 1 GB DRAM default, IP Base

Integrated Services Router Migration Options

Cisco 3900 Series Integrated Services Routers are included in the standard Cisco Technology Migration Program (TMP). Refer to http://www.cisco.com/go/tmp and contact your local Cisco account representative for program details.

Warranty Information

The Cisco 3900 Series Integrated Services Routers have a 90-day limited liability warranty.

Cisco and Partner Services for the Branch

Services from Cisco and our certified partners can help you transform the branch-office experience and accelerate business innovation and growth in the Borderless Network. We have the depth and breadth of expertise to create a clear, replicable, optimized branch-office footprint across technologies. Planning and design services align technology with business goals and can increase the accuracy, speed, and efficiency of deployment. Technical services can help you improve operational efficiency, save money, and mitigate risk. Optimization services are designed to continuously improve performance and help your team succeed with new technologies. For more information, please visit http://www.cisco.com/go/services.

Cisco SMARTnet® technical support for the Cisco 3900 Series is available on a one-time or annual contract basis. Support options range from help-desk assistance to proactive, onsite consultation. All support contracts include:

- Major Cisco IOS Software updates in protocol, security, bandwidth, and feature improvements
- Full access rights to Cisco.com technical libraries for technical assistance, electronic commerce, and product information
- Access 24 hours a day to the industry's largest dedicated technical support staff

For More Information

For more information about the Cisco 3900 Series, visit http://www.cisco.com/go/3900 or contact your local Cisco account representative.

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