Cisco ASR 903 Router

The Cisco® ASR 903 Router is a fully featured aggregation platform designed for the cost-effective delivery of converged mobile and business services. With full redundancy, shallow depth, low power consumption and high service scale, this 3-rack-unit (3RU) router is optimized for small aggregation and remote point-of-presence (POP) applications. The Cisco ASR 903 Router (Figure 1) expands the Cisco service provider product portfolio while complementing the Cisco ME 3800X Series Carrier Ethernet Switch Routers, Cisco ME 3600X Series Ethernet Access Switches, and Cisco ASR 9000 Series Aggregation Services Routers by providing a rich and scalable feature set of Layer 2 VPN (L2VPN) and Layer 3 VPN (L3VPN) services in a compact package.

Figure 1. Cisco ASR 903 Router

Major Applications

Broadband Aggregation
The Cisco ASR 903 Router supports broadband aggregation for delivering "any-play" services (voice, video, data, and mobility). Designed to support thousands of subscribers, quality of service (QoS) on the Cisco ASR 903 Router is capable of scaling up to a large number of queues per device. This large number of queues, combined with a highly granular QoS algorithm (three-level hierarchical QoS), results in a greatly enhanced broadband user experience. This full-featured Layer 2 and Layer 3 switch router supports a variety of broadband applications including IPTV and video on demand (VoD), enhancing and extending the Cisco IP Next-Generation Network (IP NGN) architecture.

Pre-Aggregation for Mobile Applications

Deployed as a pre-aggregation platform for mobile backhaul, the Cisco ASR 903 Router can aggregate cell sites and use Multiprotocol Label Switching (MPLS) as a transport for Radio Access Network (RAN) backhaul traffic. The Cisco ASR 903 Router provides the timing services required in today's converged access networks, by offering integrated support for the Building Integrated Timing Supply (BITS), 10 MHz, 1 Pulse Per Second (1PPS) and Time Of Day (TOD) interfaces. The Cisco ASR 903 Router also supports synchronous Ethernet (SyncE) and IEEE-1588, and can act as the source for network clocking for time-division multiplexing (TDM), SDH and SONET, SyncE, and GPS interfaces. In addition to the timing services, the Cisco ASR 903 Router can be deployed in small and harsh environments, due to its shallow depth and qualification for extended temperature ranges.

Metro Ethernet Aggregation

The Cisco ASR 903 Router is built to meet service provider requirements for Carrier Ethernet aggregation. It is optimized for remote central office and smaller aggregation sites where a full-featured, small-footprint, fully redundant aggregation platform is needed. The Cisco ASR 903 Router offers service flexibility and delivers Layer 2, IP, and MPLS transport for advanced L2VPN, L3VPN, and multicast services.

Major Differentiators

The Cisco ASR 903 Router helps service providers deliver advanced services for residential broadband, mobile, and Metro Ethernet applications. This allows an operator to provide differentiated and cost-effective services to end-users.

Flexible Deployment Options

The Cisco ASR 903 Router is designed with a 3RU compact form factor to accommodate deployment in small spaces. Available with a range of mounting options, the router can be deployed in space-constrained locations such as ETSI 300-mm deep cabinets. The side-to-side airflow design allows two Cisco ASR 903 Routers to be mounted back-to-back in a 600-mm cabinet, while the extended temperature range supported by the ASR 903 Router allows the router to be deployed in locations with minimum environmental control. Small footprint and extended temperature range support allows service providers to extend the reach of their Carrier Ethernet networks to more challenging and remote locations and yet save money on air conditioning.

High Availability and Modularity

The Cisco ASR 903 Router is a fully modular platform. Cisco offers a choice of two distinct route switch processors (RSPs), AC and DC power supplies, a fan tray and a wide range of interface modules. The LAN interfaces are available in copper and fiber Ethernet interfaces with speed ranging from 10Mbps to 10Gbps. The WAN interfaces are available in speeds ranging from nxDS0 to OC12. The interface modules, power supplies, and fan tray are all field removable. The design of the Cisco ASR 903 Router delivers in-box hardware redundancy for all hardware components and supports software redundancy with In Service Software Upgrade (ISSU) support when a pair of route switch processors are inserted in the chassis. All components are field replaceable.

Cisco Carrier Ethernet ASIC

Powered by Cisco's Carrier Ethernet application-specific integrated circuit (ASIC), designed specifically for the needs of service providers, the Cisco ASR 903 Router delivers essential Carrier Ethernet technologies including: Hierarchical QoS (HQoS), IPv4, IPv6, MPLS, and Hierarchical Virtual Private LAN Services (HVPLS). The ASIC provides line-rate performance and supports advanced services including ACL and HQoS without affecting performance. This Carrier Ethernet ASIC incorporates innovative traffic management capabilities while providing intelligent packet switching and routing operations.

Service Enhancement

With the Cisco ASR 903 Router, each service is assigned enhanced QoS and security attributes. The ASR 903 Router accomplishes advanced per-traffic-class metering and offers bidirectional packet count and byte count statistics. The service offering is enhanced with operations, administration, and maintenance (OAM) functionality that includes Layer 2 Connectivity Fault Management (CFM), IP service-level agreement (SLA) for Layer 3, and MPLS OAM.

Service Scale

The Cisco ASR 903 Router delivers flexible service scalability in a small footprint. This router delivers high performance and high scale for point-to-point and multipoint VPN services. The HQoS capabilities of the Cisco ASR 903 Router scale to eight queues per service, three levels of scheduling, and buffer sizes capable of accommodating today's most demanding wireline and wireless applications.

Operational Efficiency

The Cisco ASR 903 Router features essential capabilities that help service providers simplify and automate the management of their networks, resulting in efficiency gains in the deployment and operation of the networks. These features enhance performance awareness, facilitate troubleshooting, and simplify service turn-up and restoration, ultimately reducing operational cost. The Cisco ASR 903 Router provides proactive diagnostic tools including Generic On-Line Diagnostics (GOLD) and Onboard Failure Logging (OBFL). These tools help service providers avoid potential problems before they occur, troubleshoot any problems, and when these are diagnosed, implement solutions.

Network Simplification

Cisco network Virtualization (nV) technology can simplify network operations by reducing the number of components that must be managed and allowing for easier configuration. The result is increased network scalability, improved service velocity and lower cost operating costs. The nV capable ASR 903 Series can be deployed as a component in a Cisco ASR 9000 system to reduce the complexity of today's mobile Internet networks.

System Design

The Cisco ASR 903 Router is a fully modular system, with a future-ready design. The chassis supports online field replacement and upgrades of all components. The chassis contains four different components, one fan tray, two power supplies, two RSP cards, and up to six interface module cards.

Fan Tray

The Cisco ASR 903 Router has a single fan tray slot, which must be populated for the system to operate. The fan tray contains redundant fans and the system will continue to operate on a single fan failure. In addition to cooling the chassis, the fan tray also contains a connector for four dry-contact inputs and several system-level alarm LEDs.

Power Supply

Both an AC and a DC power supply are available for the Cisco ASR 903 Router. The system supports operation on a single power supply, while with two power supplies, both will function in a load-share configuration. Mixing of AC and DC power supplies in a single operational chassis is not supported.

Route Switch Processor

The Cisco ASR 900 Route Switch Processor (RSP1) is the centralized card in the system performing the data plane, network timing, and control plane functions for the system. This card contains separate control plane and data plane components. The main packet processing and traffic management is performed by the Cisco Carrier Ethernet ASIC. The RSP also contains the main control plane CPU for the Cisco IOS® XE operating system and platform control software.

Two RSP slots are provided in the Cisco ASR 903 Router for optional inter-chassis redundancy. With two RSPs inserted in the Cisco ASR 903 Router, one RSP operates in active mode and the other RSP operates in hot standby mode. The RSP is a field replaceable unit (FRU) and can be online inserted and removed (OIR) while the system is operating. The removal or failure of the active RSP results in the automatic switchover to the standby RSP.

There are two versions of the RSP, which provide the same capabilities and throughput, while differing in service scale. These differences are described in Table 7.

Interface Module

The Cisco ASR 903 Router has six interface module slots. There are two types of interface module slots. Four slots support all of the available interface modules. The remaining two slots support only the Gigabit Ethernet and TDM Interface modules, the 10 Gigabit Ethernet modules are not supported in these slots. One of these two slots is limited to a maximum of seven Gigabit Ethernet ports with the Cisco ASR 900 Route Switch Processor (RSP1).

Ethernet Interface Modules

There are three Cisco ASR900 Ethernet interface modules:

- Cisco ASR 900 Series 1-Port 10GE XFP Interface Module, this module supports a single 10-Gigabit Ethernet Small Form-Factor Pluggable (XFP) port.
- Cisco ASR 900 Series 8-Port Copper Gigabit Ethernet Interface Module, this module supports eight Copper RJ-45 Gigabit Ethernet ports.
- Cisco ASR 900 Series 8-Port SFP Gigabit Ethernet Interface Module, this module supports eight Gigabit Ethernet Small Form-Factor Pluggable (SFP)ports.

All of the Ethernet ports will only operate in non-oversubscribed mode. The SFP and XFP pluggables are hot swappable, and are listed in Table 2.

Legacy Interface Modules

The Cisco ASR 903 Router supports two TDM interface modules:

- Cisco ASR 900 Series 16-Port T1/E1 Interface Module, this module supports 16 T1 or E1 ports.
- Cisco ASR 900 Series 4-Port OC3/STM-1 or 1-Port OC12/STM-4 Interface Module, this combo module supports one of four modes: 4xOC3, 4xSTM-1, 1xOC12, and 1xSTM-4. If the module is configured for 4xOC3 or 4xSTM-1, then the individual interfaces can be configured to be clear-channel, POS, or channelized. 4xOC3/4xSTM-1/1xOC12/1xSTM-4 Interface Module

The T1/E1 Interface Module has a single high-density connector on the module. This high-density connector requires a single cable to connect to an external breakout patch-panel for connectivity to the individual T1/E1 ports.

The TDM interface modules support the Any Service Any Port (ASAP) concept, including Asynchronous Transfer Mode (ATM) and circuit emulation functionality.

Table 1 lists the hardware parts available for Cisco ASR 903 Router.

Table 1.   Hardware Components for Cisco ASR 903 Router

Part Number	Description
ASR-903	ASR 903 Router Chassis
ASR-903=	ASR 903 Router Chassis, Spare
A903-FAN	ASR 903 FAN Tray
A903-FAN=	ASR 903 FAN Tray, Spare
ASR 900 Common Equipment	
A900-PWR550-A	ASR 900 550W AC Power Supply
A900-PWR550-A=	ASR 900 550W AC Power Supply, Spare
A900-PWR550-D	ASR 900 550W DC Power Supply
A900-PWR550-D=	ASR 900 550W DC Power Supply, Spare
A903-RSP1A-55	ASR 903 Route Switch Processor 1, Base Scale
A903-RSP1A-55=	ASR 903 Route Switch Processor 1, Base Scale, Spare
A903-RSP1B-55	ASR 903 Route Switch Processor 1, Large Scale
A903-RSP1B-55=	ASR 903 Route Switch Processor 1, Large Scale, Spare
ASR 900 Interface Modules	
A900-IMA8T	ASR 900 8-Port 10/100/1000 Ethernet Interface Module
A900-IMA8T=	ASR 900 8-Port 10/100/1000 Ethernet Interface Module, Spare
A900-IMA8S	ASR 900 8-Port SFP Gigabit Ethernet Interface Module
A900-IMA8S=	ASR 900 8-Port SFP Gigabit Ethernet Interface Module, Spare
A900-IMA1X	ASR 900 1-Port 10GE XFP Interface Module
A900-IMA1X=	ASR 900 1-Port 10GE XFP Interface Module, Spare
A900-IMA16D	ASR 900 16-Port T1/E1 Interface Module
A900-IMA16D=	ASR 900 16-Port T1/E1 Interface Module, Spare
A900-IMA4OS	ASR 900 4-Port OC3/STM1 or 1-Port OC12/STM4 Interface Module
A900-IMA4OS=	ASR 900 4-Port OC3/STM1 or 1-Port OC12/STM4 Interface Module, Spare
Cisco ASR 900 Accessories	
A903-RCKMNT-ETSI	ETSI Rack Mount Option for the Cisco ASR 903
A903-RCKMNT-ETSI=	ETSI Rack Mount Option for the Cisco ASR 903, Spare
A903-RCKMNT-19IN	EIA 19in Rack Mount Option for the Cisco ASR 903
A903-RCKMNT-19IN=	EIA 19in Rack Mount Option for the Cisco ASR 903, Spare
A900-PWR-BLANK	ASR 900 Power Supply Blank Cover
A900-PWR-BLANK=	ASR 900 Power Supply Blank Cover, Spare
A903-RSPA-BLANK	ASR 900 Route Switch Processor Type-A Blank Cover
A903-RSPA-BLANK=	ASR 900 Route Switch Processor Type-A Blank Cover, Spare
A900-IMA-BLANK	ASR 900 Interface Module Type-A Blank Cover
A900-IMA-BLANK=	ASR 900 Interface Module Type-A Blank Cover, Spare
A900-CONS-KIT-U	ASR 900 USB Console Cabling Kit
A900-CONS-KIT-U=	ASR 900 USB Console Cabling Kit, Spare
A900-CONS-KIT-S	ASR 900 Serial Console Cabling Kit
A900-CONS-KIT-S=	ASR 900 Serial Console Cabling Kit, Spare
CABLE-16T1E1	Cable for 16 Port T1/E1 Interface Module, 12 Feet
CABLE-16T1E1=	Cable for 16 Port T1/E1 Interface Module, 12 Feet, Spare

Part Number	Description
MEMUSB-1024FT	1GB USB Flash Token
MEMUSB-1024FT=	1GB USB Flash Token, spare
CAB-AC-RA	Power Cord, 110V, Right Angle
CAB-AC-RA=	Power Cord, 110V, Right Angle, Spare
CAB-ACA-RA	Power Cord, Australian, Right Angle
CAB-ACA-RA=	Power Cord, Australian, Right Angle, Spare
CAB-ACI-RA	Power Cord, Italian, Right Angle
CAB-ACI-RA=	Power Cord, Italian, Right Angle, Spare
CAB-ACE-RA	Power Cord, Europe, Right Angle
CAB-ACE-RA=	Power Cord, Europe, Right Angle, Spare
CAB-ACC-RA	Power Cord, China, Right Angle
CAB-ACC-RA=	Power Cord, China, Right Angle, Spare
CAB-JPN-RA	Power Cord, Japan, Right Angle
CAB-JPN-RA=	Power Cord, Japan, Right Angle, Spare
CAB-ACU-RA	Power Cord, U.K., Right Angle
CAB-ACU-RA=	Power Cord, U.K., Right Angle, Spare
CAB-ACS-RA	Power Cord, Switzerland, Right Angle
CAB-ACS-RA=	Power Cord, Switzerland, Right Angle, Spare
CAB-ACR-RA	Power Cord, Argentina, Right Angle
CAB-ACR-RA=	Power Cord, Argentina, Right Angle, Spare
CAB-IND-RA	Power Cord, India, Right Angle
CAB-IND-RA=	Power Cord, India, Right Angle, Spare

The Cisco ASR 903 Router supports a wide range of SFP and XFP optic modules. Table 2 lists their part numbers.

Table 2.   SFP and XFP Modules Supported with Cisco ASR 903 Router

	Part Number
Ethernet SFP	GLC-FE-100FX-RGD, GLC-FE-100LX-RGD, GLC-LX-SM-RGD, GLC-SX-MM-RGD, GLC-ZX-SM-RGD, GLC-BX-U, GLC-BX-D, GLC-EX-SMD, SFP-GE-T
OC3/STM-1 SFP	ONS-SI-155-SR-MM, ONS-SI-155-I1, ONS-SI-155-L1, ONS-SI-155-L2, ONS-SI-622-SR-MM, ONS-SI-622-I1, ONS-SI-622-L1, ONS-SI-622-L2
Ethernet XFP	XFP-10GLR-OC192SR-RGD, XFP-10GER-OC192IR-RGD, XFP-10GZR-OC192LR-RGD, XFP-10G-MM-SR, DWDM-XFP-C

Software

The Cisco ASR 903 Router is supported in Cisco IOS XE Software, which was introduced with the Cisco ASR 1000 Series Aggregation Services Routers as a modular operating system. Based on Cisco IOS Software, Cisco IOS XE Software is designed to provide modular packaging, feature velocity, and powerful resiliency.

With the Cisco ASR 903 Router supported as of Cisco IOS XE Software Release 3.5.0S, the concept of Cisco Software Activation is introduced to the Cisco ASR 903 Router. Table 3 describes the two Cisco IOS XE universal consolidated packages supported on the Cisco ASR 903 Router, and the functionality supported in each of these universal images. The functionality is enforced through the appropriate technology package licenses.

Table 3.   Universal Cisco IOS XE Software Consolidated Packages for Cisco ASR 903 Router

Cisco IOS XE Consolidated Package	Part Number	Description
Cisco ASR 903 Series RSP1 IOS XE Universal	SASR903R1U	• Provides low-cost base consolidated package • Offers only basic feature support • Satisfies export requirements for non-cryptographic software
Cisco ASR 903 Series RSP1 IOS XE - No Payload Encryption	SASR903R1NPEK9	• Provides low-cost base consolidated package • Offers only basic feature support, including SSH and SNMPv3 support

Flexible Software Options

The Cisco ASR 903 Router supports the Cisco IOS Software Activation feature. With this feature Cisco IOS Software feature sets can be activated by Cisco software licenses, supporting a "pay as services grow" model. This model allows service providers to invest in software resources only when their businesses need it. The Cisco ASR 903 Router offers three different Cisco IOS Software licenses:

- The **Metro Services** license offers advanced QoS, Carrier Ethernet Layer 2 features, synchronous Ethernet and Ethernet OAM capability.
- The **Metro IP Services** license offers all capabilities of the Metro Services license with the addition of IEEE 1588-2008 Ordinary Clock and Transparent Clock, Bidirectional Forwarding Detection (BFD), Layer 3 features for advanced IP routing protocols, multi-VPN routing, Layer 3 Multicast and Forwarding Customer Edge (multi-VRF CE) capabilities.
- The **Metro Aggregation Services** license adds the following capabilities to the Metro IP Services license: MPLS Transport Profile (MPLS-TP); MPLS, Ethernet over MPLS (EoMPLS), Circuit Emulation Service over Packet Switched Network (CESoPSN), and Structure Agnostic TDM over Packet (SAToP) pseudowires; MPLS traffic engineering (TE); MPLS Fast Reroute (FRR); and MPLS VPN support.

Table 4 lists the main features in the Cisco IOS licenses for the Cisco ASR 903 Router.

Table 4.   Feature Set in Cisco ASR 903 Router Licenses

Metro Services	Metro IP Services	Metro Aggregation Services
	All features in Metro Services plus:	All features in Metro IP Services plus:
QoS, with deep buffers and Hierarchical QoS	IP routing (RIP, OSPF, EIGRP, BGP, IS-IS)	MPLS (LDP and VPN)
Layer 2: 802.1d, 802.1q	PIM (SM, DM, SSM), SSM mapping	MPLS TE and FRR
Ethernet Virtual Circuit (EVC)	BFD	MPLS OAM
Ethernet OAM (802.1ag, 802.3ah)	Multi-VRF CE (VRF lite) with service awareness (ARP, ping, SNMP, syslog, trace-route, FTP, TFTP)	MPLS-TP
Multiple Spanning Tree (MST), Resilient Ethernet Protocol(REP)		Pseudowire emulation (EoMPLS, CESoPSN, SAToP)
Synchronous Ethernet		VPLS and HVPLS
IPv4 and IPv6 host connectivity		Pseudowire redundancy

Additional Feature Licenses

In addition to the preceding Cisco IOS licenses, two licenses used to enable new software functionality in the base Cisco IOS capabilities, and two others are used to enable ports on the multirate OC3 and OC12 interface module. These four additional feature licenses for the Cisco ASR 903 Router are:

- The **ATM license** allows service providers to enable ATM functionality on TDM interfaces when required. One license is required for each Cisco ASR 903 Router that needs ATM functionality to be enabled in the system. This includes support for ATM Pseudowires over MPLS (ATMoMPLS), ATM local switching, ATM interworking, and local ATM termination.

- The **IEEE 1588-2008 BC/MC license** allows service providers to enable IEEE 1588-2008 Boundary Clock (BC) or Master Clock (MC), or both, when required. One license is required for each chassis that needs IEEE 1588-2008 BC or MC functionality to be enabled in the system.

- The **OC3 port license** allows service providers to enable one OC3/STM-1 port, supporting a pay-as-you-grow strategy and simplified spare part management. One license is required for each OC3/STM-1 port that needs to be enabled on the Cisco ASR 903 Router (requires the purchase of a combined OC3, STM-1, OC12, and STM-4 combination interface module).

- The **OC12 port license** allows service providers to enable one OC12/STM-4 port, supporting simplified spare part management. One license is required for each OC12/STM-4 port that needs to be enabled Cisco ASR 903 Router (requires the purchase of a combined OC3, STM-1, OC12, and STM-4 combination interface module).

Table 5 lists the Cisco ASR 903 Router software options.

Table 5.   Cisco ASR 903 Router Software Options

Part Number	Product Name
Feature Set License Options	
SLASR903-M	ASR 903 Metro Services
SLASR903-I	ASR 903 Metro IP Services
SLASR903-A	ASR 903 Metro Aggregation Services
Feature Set Product Activation Keys	
SLASR903-M=	ASR 903 Metro Services Paper PAK
L-SLASR903-M=	ASR 903 Metro Services E-Delivery PAK
SLASR903-I=	ASR 903 Metro IP Services Paper PAK
L-SLASR903-I=	ASR 903 Metro IP Services E-Delivery PAK
SLASR903-A=	ASR 903 Metro Aggregation Services Paper PAK
L-SLASR903-A=	ASR 903 Metro Aggregation Services E-Delivery PAK
Feature Set Upgrade Options	
SLASR903-M-I=	ASR 903 Metro to Metro IP Paper PAK
SLASR903-M-A=	ASR 903 Metro to Metro Aggregation Paper PAK
SLASR903-I-A=	ASR 903 Metro IP to Metro Aggregation Paper PAK
L-SLASR903-M-I=	ASR 903 Metro to Metro IP E-Delivery PAK
L-SLASR903-M-A=	ASR 903 Metro to Metro Aggregation E-Delivery PAK
L-SLASR903-I-A=	ASR 903 Metro IP to Metro Aggregation E-Delivery PAK

Part Number	Product Name
Port and Feature Licenses	
FLSASR900-ATM	ASR 900 ATM License
FLSASR900-1OC3	ASR 900 1 Port OC3/STM-1 License
FLSASR900-1OC12	ASR 900 1 Port OC12/STM-4 License
FLSASR900-1588	AS0 IEEE 1588-2008 BC/MC License
Port and Feature Licenses Product Activation Keys	
FLSASR900-ATM=	ASR 900 ATM License Paper PAK
L-FLSASR900-ATM=	ASR 900 ATM License E-Delivery PAK
FLSASR900-1OC3=	ASR 900 1 Port OC3/STM-1 License Paper PAK
L-FLSASR900-1OC3=	ASR 900 1 Port OC3/STM-1 License E-Delivery PAK
FLSASR900-1OC12=	ASR 900 1 Port OC12/STM-4 License Paper PAK
L-FLSASR900-1OC12=	ASR 900 1 Port OC12/STM-4 License E-Delivery PAK
FLSASR900-1588=	ASR 900 IEEE 1588-2008 BC/MC License Paper PAK
L-FLSASR900-1588=	ASR 900 IEEE 1588-2008 BC/MC License E-Delivery PAK

Major Features

Table 6 lists the features of the Cisco ASR 903 Router.

Table 6.   Cisco ASR 903 Router Features

Features
Ethernet Services
- Ethernet Virtual Connections (EVCs) for: 802.1q   - Selective QinQ   - Inner and Outer VLAN classification   - IEEE bridging   - Resilient Ethernet Protocol (REP)   802.3ad Link Aggregation Bundles   - Layer 2 Protocol Tunneling (L2PT)   - Hierarchical VPLS (HVPLS), Virtual Private Wire Service (VPWS), EoMPLS   - Pseudowire redundancy
TDM and ATM Pseudowire
- Support for MPLS and User Datagram Protocol (UDP); UDP is supported for CESoPSN only   - Pseudowire setup and maintenance using the Label Distribution Protocol (LDP) - RFC 4447   - Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP) - RFC 4553   - Encapsulation methods for transport of ATM over MPLS networks - RFC 4717   - Pseudowire Emulation Edge-to-Edge (PWE3) ATM Transparent Cell Transport Service - RFC 4816   - Circuit Emulation Service over Packet Switched Network (CESoPSN) - RFC 5086   - CESoPSN over UDP/IP   - ATM PWE3 redundancy   - IETF ATM PWE3 over MPLS   - Transparent Cell Transport Service and ATM Port Mode   - ATM N:1 (N = 1) virtual channel connection (VCC) cell mode and ATM N:1 (N = 1) virtual path (VP) Cell Relay Mode   - ATM Port Cell Relay Service; ATM cell packing   - IMA v1.0, 1.1, ATM SAR, ATM AAL0 (for AAL2 voice and data), ATM Class of Service (CoS) features constant bit rate (CBR) and unspecified bit rate (UBR), per virtual circuit queuing, and ATM PVC routing

Features

Layer 3 and MPLS Services

- Layer 3 routing
- Cisco Express Forwarding (CEF) load sharing of Equal Cost Paths (ECMP)
- Open Shortest Path First (OSPF)
- Border Gateway Protocol (BGP)
- Intermediate System-to-Intermediate System (IS-IS)
- Bidirectional Forwarding Detection (BFD) support for OSPF, IS-IS, BGP, and static routes
- IPv4 multicast
- Protocol Independent Multicast sparse mode (PIM-SM), PIM Source Specific Multicast (PIM SSM), PIM SSM mapping
- MPLS
- LDP with Label Edge Router (LER) and Label Switch Router (LSR) support
- Hot Standby Router Protocol (HSRP)
- Virtual Router Redundancy Protocol (VRRP)
- MPLS L3VPN
- MPLS Transport Profile (MPLS-TP)

IPv6

- Addressing and discovery
- Manual IPv6 interface addressing
- ICMPv6 (RFC 4443)
- IPv4 and IPv6 dual stack
- IPv6 static routing
- OSPF for IPv6 (RFC 5340)
- Hardware based IPv6 data forwarding

QoS

- IEEE 802.1p QoS
- IP Precedence Type of Service (ToS)
- Differentiated Services Code Point (DSCP) traffic shaping and policing
- Class-Based Weighted Fair Queuing (CBWFQ)
- Priority Queuing
- 2-rate 3-color (2R3C) Policing
- Egress shaping per queue
- Modular QoS CLI (MQC)
- Hierarchical QoS (HQoS)
- Classification based on inner and outer CoS or VLAN ID
- Copy inner to outer CoS

Timing

- IEEE1588-2008 Ordinary Clock
- IEEE 1588-2008 Boundary Clock
- T1/E1 line timing
- Global navigation satellite system (GNSS) ports, Time of Day (ToD), 10MHz, 1 Pulse Per Second (1PPS)
- Building Integrated Timing Supply (BITS),
- Adaptive Clock Recovery
- ITU-T SyncE with Ethernet Synchronization Messaging Channel (ESMC) support
- Synchronization Status Messages (SSM)

OAM

- IEEE 802.1ag Connectivity Fault Management (CFM)
- Ethernet Local Management Interface (E-LMI)
- IEEE 802.3ah Link OAM
- MPLS OAM
- ITU-T Y.1731

Features
Security
• Authentication, authorization, and accounting (AAA) with TACACS+ and RADIUS • Secure Shell (SSH) Protocol v2 • MAC limiting per Ethernet flow point (EFP) or bridge domain • Layer 3 ACLs
Manageability
• Simple Network Management Protocol (SNMP) • MIBs • Command Line Interface (CLI) • Cisco Prime™ Network: fault, provisioning and performance management

Product Specifications

Tables 7 through 9 list the product, power, and environmental specifications for the Cisco ASR 903 Router. Table 10 gives safety and compliance information.

Table 7. Cisco ASR 903 Router System Specifications

Description	Cisco ASR 903 Router	
Physical specifications	Height: 5.22 in. (132.6 mm) – 3RU Width: 17.44 in. (443 mm) Depth: 9.22 in. (234.2 mm) Weight: • 34.17 lb (15.5 kg) with two RSPs, DC power supplies, and loaded with a typical combination of interface module cards • 11.2 lb (5.1kg) for an empty chassis	
Rack mounts	ETSI rack mount kit 19 in. rack mount kit	
Interface modules	6 interface module slots	
Route switch processors	2 RSP slots	
Fan trays	1 fan tray with fan redundancy 4 dry contact input alarms on the fan tray	
Air flow	Side-to-side airflow; inlet on the right side, outlet on the left side when looking from the front	
Power supplies	Up to 2 power supplies (AC or DC) Note: Mixing of AC and DC modules is not supported. Module redundancy: 1:1 Modules operate in load share mode.	
Route Switch Processors		
	A900-RSP1A-55	A900-RSP1B-55
Route Switch Processor Memory	2 GB	4 GB
Service scale	Base service scale	Large service scale
Maximum Transmission Unit	Configurable maximum transmission unit (MTU) of up to 9,216 bytes, for bridging on Gigabit Ethernet and 10 Gigabit Ethernet	
Management ports[1]	Copper 10/100/1000Base-T LAN management port – RJ45 connector port Console/Aux RS232 serial ports – RJ45 connector port Console – USB 2.0 type A receptacle connector port	

Description	Cisco ASR 903 Router
Timing ports	BITS simultaneous input and output (T1/E1) – RJ48 connector port
	1PPS input – mini-coax connector port
	1PPS output – mini-coax connector port
	2.048/10MHz input – mini-coax connector port
	2.048/10MHz output – mini-coax connector port
	1PPS input or output and ToD input or output – RJ45 connector port
External USB flash memory	Mass storage – USB 2.0 type A receptacle connector port

1. At one moment in time either the USB console port or the RS232 Serial Console/Aux port can be active. These ports cannot be active concurrently.

Table 8. Power Specifications

Description	Cisco ASR 903 Router
Power consumption	Maximum input power 630W
AC input voltage and frequency	Voltage range: 85VAC to 264 VAC, Nominal 115VAC/230VAC
	Frequency Range: 47Hz to 63Hz, Nominal 60Hz/50Hz
DC input voltage	Voltage range: -19.2VDC to -72VDC, Nominal -24VDC/ -48VDC

Table 9. Environmental Specifications

Description	Cisco ASR 903 Router
Operating environment and altitude [1]	–40ºC to 65ºC operating temperature (DC operation)
	–5ºC to 55ºC operating temperature (AC operation) [2]
	0ºC to 40ºC operating temperature (AC operation)
	–60m to 1800m operating altitude (for full operating temperature range)
	Up to 4000m operating altitude (at up to +40ºC temperature)
Relative humidity	5% to 95%, non-condensing
Acoustic noise [3]	Acoustic noise peak operation maximum 55dBA sound pressure level, bystander position for rack mount products at 20ºC operation as measured by ISO 7779 NAIS noise measurement test standard
	Acoustic noise peak operation compliant to the NEBS GR-63-Core Issue 3 sound power level of 78dB at 27ºC operation as measured by the ANSI S12.10/ISO 7779 NAIS noise measurement test standard
Storage environment	Temperature: –40 to +70ºC altitude: 15,000ft (4570m)
Seismic	Zone 4

1. Optics used may limit the temperature range.

2. Not more than the following in a one-year period: 96 consecutive hours, or 360 hours total, or 15 occurrences.

3. The above are for normal (nonfailure) operation. When operating with a fan failure, the above may be exceeded.

Table 10. Safety and Compliance

Type	Standards
Safety	• UL 60950-1, 2nd edition
	• CAN/CSA C22.2 No. 60950-1-07 2nd edition
	• IEC 60950-1, 2nd edition
	• EN 60950-1, 2nd edition
	• AS/NZS 60950.1:2003
Electromagnetic	• FCC CFR47 Part 15 Class A
Emissions Compliance	• EN55022, class A
	• CISPR22, class A
	• ICES-003, class A
	• EN 300 386, class A
	• VCCI, class A
	• KN22, class A
	• EN61000-3-2 to EN61000-3-3

Type	Standards
Immunity Compliance	• EN 300 386 • EN 61000-6-1 • EN 50082-1 • CISPR24 • EN 55024 • KN 24 • EN 50121-4 • EN/KN 61000-4-2 to EN/KN 61000-4-6 • EN/KN 61000-4-8 • EN/KN 61000-4-11
NEBS[1]	• GR-63-CORE Issue 3 • GR-1089-CORE Issue 5 • SR-3580 NEBS Level 3
ETSI	• ETS/EN 300 119 Part 4 • ETS/EN 300 019 – Storage: Class 1.2, Transportation: Class 2.3, In-Use/Operational: Class 3.2 • ETS/EN 300 753
Telecom	T1: • ITU-T G.703/G.824 • TIA-968-B • IC CS-03 • HKTA 2028 • ID0002 • DSPR Technical Conditions • ANSI T1.403 E1: • ITU-T G.703/G.704 • AS/ACIF S016 • ETSI TBR12/13 • RRA 2009-38 (RRL 2005-96) • IDA TS DLCN SONET/SDH subrate: • GR-253-CORE • ANSI T1.105 • ITU G.957 • ITU G.783 • ITU G.707 Ethernet • DSPR Technical Conditions • RRA 2009-38 (RRL 2005-96) • IEEE 802.3-2005
Network Synchronization	• GR-1244-CORE • ITU-T G.813 • ITU-T G.703 clause 5 • ITU-T G.703 clause 9 • ITU-T G.8261/Y.1361 • ITU-T G.781 • ITU-T G.8262 • ITU-T G.8264 • IEEE1588-2008

1. Notable exceptions: Fans do not have filters, and all cabling is provided through the front panel.

Warranty Information

Find warranty information on Cisco.com at the [Product Warranties](#) page.

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, refer to Cisco Technical Support Services or Cisco Advanced Services.

Cisco is committed to minimizing your total cost of ownership. Cisco offers a portfolio of technical support services to help ensure that Cisco products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 11 are available as part of the Cisco Carrier Ethernet Switching Service and Support solution and are available directly from Cisco and through resellers.

Table 11. Service and Support

Advanced Services	Features	Benefits
Cisco Total Implementation Solutions (TIS), available directly from Cisco Cisco Packaged TIS, available through resellers	• Project management • Site survey, configuration, and deployment • Installation, text, and cutover • Training • Major moves, adds, and changes • Design review and product staging	• Supplement existing staff • Help ensure functions meet needs • Mitigate risk
Cisco SP Base Support and Service Provider-Based Onsite Support, available directly from Cisco Cisco Packaged Service Provider- Based Support, available through resellers	• 24-hour access to software updates • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center (TAC) • Advance Replacement of hardware parts	• Facilitate proactive or expedited problem resolution • Lower total cost of ownership by taking advantage of Cisco expertise and knowledge • Minimize network downtime