



The Sedona Networks 8000 is a high-performance multi-service access switch located at the service provider's central office (CO) or first point of presence (POP). It is built to enable converged services delivery over any access network infrastructure by supporting a variety of edge switching applications. These include:

- High-speed subscriber data services
- Subscriber service aggregation
- Subscriber management
- Packet voice gateway
- Multi-context service switching

The 8000 anchors the Sedona Networks Services-aware Access Architecture™ (SAA) at the network's edge as part of a true end-to-end access network architecture. It provides a high-performance platform for service creation and delivery by leveraging Sedona Networks 3Ds – key access network technologies that comprise the SAA. The 3Ds of converged service delivery include Domain Switching™, Distributed Subscriber Management™ (DSM) and Dynamic Packet Conditioning™ (DPC).

Together, these access network innovations give service providers a cost-competitive edge by enabling differentiated quality of voice and data services and end-user self-provisioning for converged services.



BUSINESS BENEFITS

As an integral part of the Sedona Networks Services-aware Access Architecture, the Sedona Networks 8000 offers service providers a cost-effective method of leveraging their current network investment for converged services delivery and a clear migration path to next-generation network services.

The 8000 brings bottom-line benefits to a service provider's business:

- **Up to 75% reduction in network provisioning and costs** with Domain Switching, DSM, amalgamated edge elements (voice gateway, IP router, data switch and subscriber management system) and a services-aware access network architecture.
- **End-user self-provisioning** and the ability to switch between services and networks on the fly, with Distributed Subscriber Management. DSM pushes subscriber intelligence to the customer premises and gives end-users the power to control services.
- **Truly differentiated quality of service (QoS) for voice and data** services with Dynamic Packet Conditioning. DPC is a sophisticated QoS technology designed especially for the converged access network
- **Ability to mass-customize services** with a services-aware architecture. The SAA recognizes converged network traffic as service-specific and treats each packet according to its designated service profile.

A true carrier-class platform with redundant system components

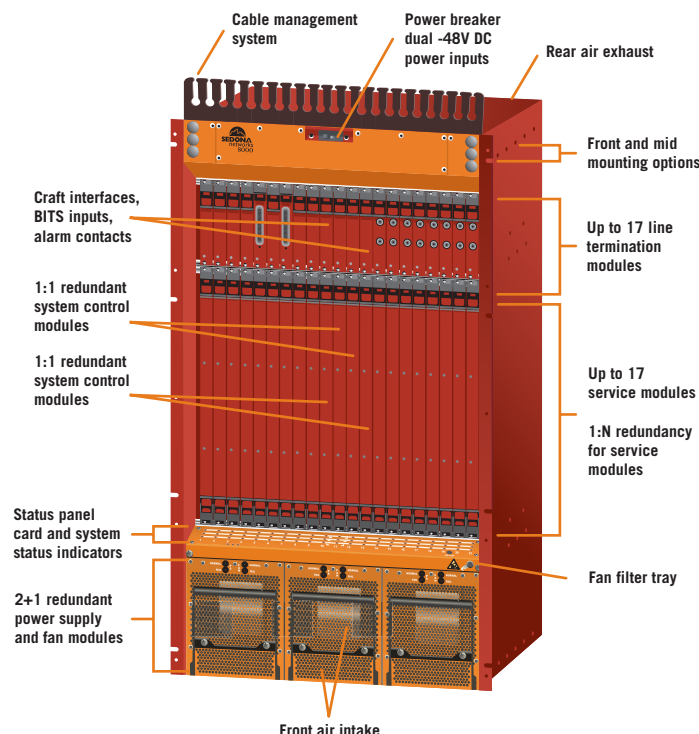
System Architecture

The Sedona Networks 8000 system architecture is a highly integrated multi-service switching platform designed for carrier-grade deployments. It enables the delivery of multiple services from a single converged platform, including:

- Internet access
- Applications
- Content
- Virtual private networks (VPN)
- Derived voice
- Next-generation packet voice services

The software, hardware and mechanical systems of the Sedona Networks 8000 are integrated in a fully certified, true carrier-class platform with redundant system components. It is designed to meet or exceed the strict system requirements for deployment in central offices and points of presence.

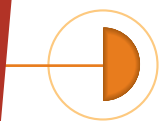
Full system redundancy, in-service upgrades and hot-swappable modules ensure that the Sedona Networks 8000 delivers non-stop service even during the most severe network overload or fault conditions. And, front access to all components increases deployment flexibility and reduces maintenance time and costs.



Service providers will increase profit margins with sophisticated subscriber management and will win new and sustainable revenue streams with the rapid turn-up of new services and subscribers.

SYSTEM ARCHITECTURE AT A GLANCE

FEATURES	BENEFITS
Carrier class system platform	<ul style="list-style-type: none"> • Fully certified for carrier central offices or points of presence • Assured service delivery at all times • Continuous service during upgrades and provisioning changes
Highly Integrated multi-service platform	<ul style="list-style-type: none"> • Internet Access, applications, content, VPNs AAA, derived voice, and Next Generation Packet voice service from a single integrated platform • Ease of service management and rapid turn-up of new services • Ease of subscriber management and rapid turn-up of new subscribers
Hot-swappable field replaceable components	<ul style="list-style-type: none"> • Replace or upgrade all field replaceable components while the system continues to deliver service • Eliminate system down-time due to routine maintenance and service provisioning activities
1:1 redundant control and switching	<ul style="list-style-type: none"> • High system availability and fast, automatic switchover to protection modules
1:N redundant input/output (I/O) modules	<ul style="list-style-type: none"> • Ensure continuous service during high-speed protection switchovers • Each I/O and service module is independently protected in a 1:N configuration with a low cost, efficient redundancy architecture
2+1 redundant power and cooling	<ul style="list-style-type: none"> • High system availability even if a unit is removed
Front access to all system components	<ul style="list-style-type: none"> • Increased flexibility for system installation, maintenance, upgrade and troubleshooting
Self-diagnostic routines	<ul style="list-style-type: none"> • Continuous, comprehensive system management and monitoring ensures the health of the system, including optimal cooling and performance
SONET APS	<ul style="list-style-type: none"> • Automatic protection switching provides redundancy during connectivity to existing SONET networks



Industry-leading packet processing architecture

Datapath Architecture

The Sedona Networks 8000 packet processing architecture provides consistent and deterministic performance under any offered load. The datapath architecture includes a combination of ASICs and programmable packet processing devices. The result is a non-blocking, lossless switching architecture with advanced congestion control.

The Sedona Networks 8000 datapath architecture eliminates the need for oversized fabrics with sophisticated virtual-output-queuing. Network media are terminated at the ingress input/output processor (IOP) module and IP packet processing is performed on ingress immediately as each packet enters the system. Therefore, each packet traverses the fabric only once on its way to the egress port.

Ingress and egress processing resources are independent from each other to ensure the physical separation of bi-directional traffic flows. And packet forwarding functions are clearly separated from routing functions on separate processing engines. This ensures the highest possible packet routing and forwarding performance.

Guaranteed Quality of Service

The Sedona Networks 8000 packet processing and datapath architecture guarantees service providers can offer truly differentiated quality of service for voice and data.

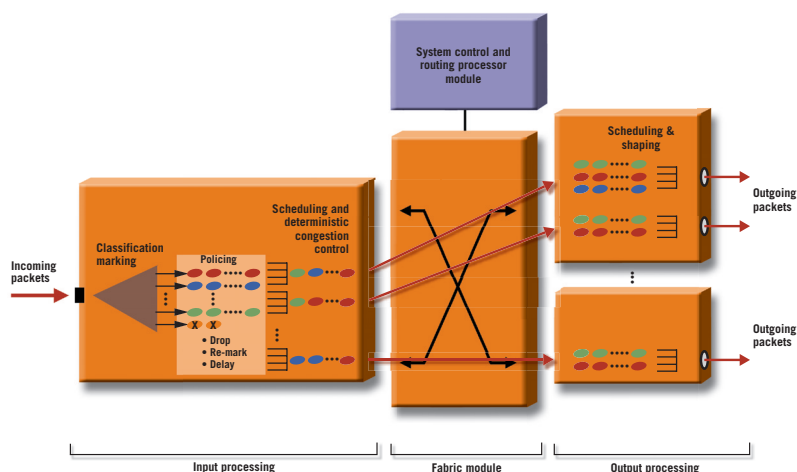
Each data service module on the 8000 is equipped to perform

all QoS functions for IP flows, and the 8000 is capable of managing thousands of flows per service module.

Individual packets are classified at the ingress port with a high-performance, fully programmable multi-field classifier. This classification determines the flow to which each packet belongs. And each packet flow is then measured for conformance to traffic descriptors as specified in service level agreements (SLA). Non-conforming flows are processed by a policing function.

Virtual Output Queuing allows the ingress service module to maintain an up-to-date, realtime view of the state of each egress port in the system on a packet-by-packet basis.

Logical view of Sedona Networks 8000 packet processing architecture



DATAPATH ARCHITECTURE AT A GLANCE

FEATURES	BENEFITS
End-to-end, state-of-the-art datapath implemented in ASICs and network processors	<ul style="list-style-type: none">Assures wire rate regardless of forwarding complexity and choice of QoS mechanismsEnables service providers to meet interoperability and new feature needs with ASIC performance and the flexibility to quickly add featuresProgrammable deep packet classifier allows fine-granularity packet classification without performance hits
Non-blocking, lossless, virtual output queued switch fabric	<ul style="list-style-type: none">Achieves sustained 100% system utilization with well-defined QoS levelsNo need to over-provision the network to achieve QoSService is delivered based on QoS level, regardless of offered load and packet sizeUser traffic and the system is protected against denial of service (DOS) attacks
Flexible QoS mechanisms and multiple real-time and non real-time QoS classes	<ul style="list-style-type: none">Supports edge and boundary SLAs with single or dual bucket ingress policing and egress shapingCan serve as a proxy edge node for user-side devices that do not have edge QoS capabilitiesSupports flexible selection of maximum and minimum bandwidth guarantees with well-defined, multiple real-time and non real-time QoS classes and proportional (weighted) excess bandwidth allocationQoS mechanisms can be chosen and provisioned on a per-flow basisConsistent end-to-end QoS supported by internetworking functions between IP, ATM, and Ethernet networks
Per-flow monitoring capabilities	<ul style="list-style-type: none">Allows SLA compliance checkingAids network engineering, provisioning and troubleshootingAchieves a consistent view of the system with latched statistics counts

Voice Architecture

Complementing its state-of-the-art packet processing architecture, the Sedona Networks 8000 supports a fully integrated, high-density packet voice gateway. It offers full connectivity and interoperability with the PSTN and with next-generation voice-over-packet networks.

Voice quality on the 8000 is indistinguishable from that of the PSTN. The voice architecture includes industry-leading echo cancellation and voice signal processing resources. It offers the lowest speech latency and highest density of voice ports in the industry for a multi-service access switch.

In addition, voice quality across the Sedona Networks Services-aware Access Architecture is assured with sophisticated clock synchronization mechanisms. Sedona Networks' clock-sync was designed especially for voice-over-everything implementations, and achieves stratum-quality clocking to synchronous interfaces across packet-based networks.

The voice processing subsystem's non-blocking design ensures that quality voice service is delivered under even the highest network load.

VOICE ARCHITECTURE AT A GLANCE

FEATURES	BENEFITS
High-density, integrated packet voice gateway	<ul style="list-style-type: none"> Delivers derived voice services using standard PSTN interfaces and protocols Delivers next-generation voice-over-packet services to the edge of the network
Open standard signaling and encapsulation interfaces	<ul style="list-style-type: none"> Ensures widest interoperability with switches, media gateways, user devices and controllers
Industry-leading echo cancellation and voice signal processing	<ul style="list-style-type: none"> Voice subsystem adapts to network conditions to ensure delivery of highest quality voice services Achieves voice quality indistinguishable from the PSTN Reliably delivers stable, high-speed fax and modem calls
Voice activity detection, silence suppression and speech compression	<ul style="list-style-type: none"> Reduces network load by eliminating packets carrying silence Increases network utilization
Network clock synchronization	<ul style="list-style-type: none"> Ensures quality of sync-sensitive services such as voice and video through frequency synchronization Delivers stratum quality clocking to synchronous interfaces across packet-based networks
GR-303 path protection switching	<ul style="list-style-type: none"> Provides redundancy during connectivity via GR-303

Management and Provisioning Architecture

The Sedona Networks 8000 runs an industrial-strength software system with built-in reliability and performance. The architecture facilitates network management and integration with alarm generation and reporting, open interfaces and a service-based provisioning system.

MANAGEMENT AND PROVISIONING ARCHITECTURE AT A GLANCE

FEATURES	BENEFITS
Hierarchical alarm reporting system	<ul style="list-style-type: none"> Ensures only meaningful alarms are reported to reflect actual root cause of faults Eliminates alarm flooding due to side effects of faults
Open standard management interfaces	<ul style="list-style-type: none"> Ease of integration with network management and operational support systems
Service-based provisioning system	<ul style="list-style-type: none"> Provisioning procedures reflect a services-aware architecture Offers multiple provider contexts for simplified view of services and system resources

Sedona Networks 8000 Specifications

DATA SERVICES

LAN protocols	<ul style="list-style-type: none"> • IP • Ethernet
WAN protocols	<ul style="list-style-type: none"> • ATM
Encapsulations	<ul style="list-style-type: none"> • Ethernet, RFC 2684 (formerly 1483) bridged and routed
Packet forwarding	<ul style="list-style-type: none"> • Domain Switching • Routed, bridged and tunneled
Routing protocols	<ul style="list-style-type: none"> • Static, RIP, RIPv2
Subscriber awareness	<ul style="list-style-type: none"> • Domain, session or IP address
Layer 2 QoS	<ul style="list-style-type: none"> • Independent traffic shaping for thousands of connections • ATM traffic classes including CBR, VBR-rt, VBR-nrt and UBR • 802.1p, 802.1q
Layer 3 QoS	<ul style="list-style-type: none"> • DiffServ-compliant supporting EF, AF, class selector and default PHBs (RFC 2598, 2597 and 2474) • Wire-rate, multi-field classification on thousands of flows per service module • DSCP marking, ingress single or dual bucket policing, scheduling, egress shaping, per-flow statistics counters and consistent congestion control based on QoS level
QoS interworking functions	<ul style="list-style-type: none"> • IP <-> ATM • IP <-> Ethernet • ATM <-> Ethernet
Virtual private networks	<ul style="list-style-type: none"> • Multiple contexts
Advanced data features	<ul style="list-style-type: none"> • Distributed Subscriber Management (DSM) • Multiple context (independent management views, multiple virtual routers and RADIUS clients and private address spaces) • Dynamic provider selection • Dynamic service selection

VOICE SERVICES

Circuit connectivity	<ul style="list-style-type: none"> • Line-side: GR-303 and TR-08 interfaces • All line-side CLASS features • Trunk-side: T1, CAS, ISDN, PRI, ESF, D4 AMI
Packet connectivity	<ul style="list-style-type: none"> • MGCP (RFC 2705) • RTP/RTCP (RFC 1889) • BLES (af-vmoa-00145.000) • SIP (RFC 2543) • Megaco/H.248
Echo cancellation	<ul style="list-style-type: none"> • G.168 (up to 128ms)
CODEC support	<ul style="list-style-type: none"> • G.711 PCM, G.726 (32Kbps) ADPCM, G.729A • Voice activity detection, silence suppression, comfort noise generation • FAX and modem detection • CODEC negotiation

SYSTEM MANAGEMENT

Security	<ul style="list-style-type: none"> • Closed user groups • RADIUS authentication • Multiple levels of administrative passwords • Transmit and receive packet filtering
Accounting	<ul style="list-style-type: none"> • Per-subscriber and per-session, statistics, SNMP and RADIUS support
Management interfaces	<ul style="list-style-type: none"> • TELNET, SNMP, command line interface, RMI • SNMP

SYSTEM CONFIGURATIONS

Base configuration	<ul style="list-style-type: none"> • 21-slot chassis with 2+1 redundant power and fans • 1 system control processor module • 1 switch, maintenance and control module • 3 power supplies and fan units • 1 status panel • Cable management guides • 19" and 23" rack mounting kits
Configuration options	<ul style="list-style-type: none"> • 2 system control processor modules (1:1 redundant) • 2 switch, maintenance and control modules (1:1 redundant) • Maintenance, BITS and alarm modules • I/O modules: up to 17 service modules

SYSTEM CLOCKING

- Primary, secondary and tertiary clock sources
- Dual BITS timing inputs
- DS1 or STS-1 line timing
- Internal stratum 4 clock with optional stratum 3 (with holdover)
- Network clock synchronization over any packet network to ensure frequency synchronization of CODECs
- Simultaneous synchronization to multiple timing sources

INTEROPERABILITY WITH OTHER NETWORK ELEMENTS

- DSLAMs
- CMTS
- ATM switches
- Ethernet switches
- IP routers
- Class 5 and Class 4 circuit switches
- Softswitches

Sedona Networks 8000 Specifications continued

CARRIER-CLASS HIGH AVAILABILITY

- All components hot swappable
- In-service system upgrades and maintenance
- Primary, secondary and tertiary clock references

System control • 1:1 redundant

Fabric • 1:1 redundant

BITS • 1:1 redundant

I/O modules • 1:N redundant

Power • 2+1 redundant

Cooling • 2+1 redundant

Optical interfaces • GR-253 compliant SONET linear APS

Voice interfaces • GR-303 path protection switching

CHASSIS, POWER AND OPERATING SPECIFICATIONS

- Physical**
- H: 33.25 in (84.46 cm)
 - W: 17.5 in (44.45 cm)
 - D: 12 in (30.5 cm)
 - Rack mount: 19" and 23" options
 - Weight: 80 lb (36.4 kg) without modules; up to 150 lb (68.2 kg) fully loaded
 - Chassis per 7' rack: 2
 - Cooling: filtered, vertical forced air (included in chassis height)
 - Power input: dual A&B -42V to -56V DC, front and rear accessible
 - Maximum current draw: 41 amperes typical fully loaded at -48V DC
 - Maximum power consumption: 1714 Watts
 - Front access to all modules with dedicated I/O interface and cable management

Environmental

- Operating temperature: 32°F to 104°F (0°C to 40°C)
- Operating altitude: 0-5900 feet (0-1800 meters)
- Operating humidity: 5% to 90% maximum relative non-condensing
- Maximum thermal output: 5800 BTU/hour

Certifications

- Safety: UL 1950 (USA), CSA C22.2 950 (Canada)
- Electromagnetic compliance: FCC Class A (USA), ICES-003 Class A (Canada)
- NEBS 3 per Telcordia SR-3580, GR-63-CORE, GR-1089-CORE
- Terminal equipment: FCC Part 68 (USA), CS-03 (Canada)

SYSTEM CAPACITY

Each fully-redundant system supports

- Up to 112 DS1s (1:N redundancy)
- UP to 8 STS-1s (1:N redundancy)
- Up to 5376 DS0s
- Up to 21 DS3x (1:N Redundancy)
- Up to 14 10/100 BaseTX (1:N redundancy)
- Up to 7 OC3s (1:N redundancy)
- 3.2 Gbps full-duplex throughput
- Wire-rate packet processing regardless of packet size and routing complexity

Sedona Networks™ 8000



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