

Packet over SONET/SDH Port Adapter for the Cisco 7200 and 7500

Background

The explosive growth of the Internet coupled with the continued expansion of large enterprise networks has driven the emergence of a new era. Network technology consolidation centered on IP-based infrastructures and new (or existing) Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) transport networks has become key to addressing this growth and expansion. Packet over SONET/SDH technology is ideally suited for Internet and/or IP networks, because it provides superior bandwidth utilization efficiency over other transport methods.

Overview

The POS port adapter is a single-port, single-wide OC-3c/STM1 port adapter. The POS PA is specifically designed to provide high-performance SONET/SDH connectivity with increased port density and flexibility for the Cisco 7200 and 7500.

The POS port adapter provides the same level of high switching performance as the existing Packet over SONET/SDH Interface Processor (POSIP) in a single-wide port adapter design. This allows more flexible high-performance

networks to be designed with greater port density. Different port adapter technologies such as serial, multichannel, Ethernet, and Fast Ethernet can be combined with the POS port adapter to provide greater network design flexibility and increased port density.

Furthermore, the POS PA extends the benefits of POS connectivity to the Cisco 7200 series router. Providing tremendous network flexibility, the POS PA can be deployed on the Cisco 7200 in SONET/SDH networks that require a large number of distributed, multiservice edge routers.

Designed for a wide range of applications, the POS PA is ideal for Internet service provider (ISP) inter-Point-of-Presence (inter-POP) and backbone connectivity, carrier backbone, networks, high-speed cable operator backbones, and private enterprise networks. The POS PA is specifically suited for building high-speed and fault-tolerant IP networks that use Cisco's Gigabit Switch Router (GSR) 12000 series platforms. The POS PA leverages Cisco's IP class-of-service (CoS) capabilities for service providers to provide differentiated services while also providing advanced SONET features such as automatic protection switching (APS).

Features At A Glance

- Single-wide, single-port OC-3c/STM1 SONET/SDH port adapter design
- Various OC-3c/STM1 interfaces: multimode, single-mode intermediate reach and single-mode long reach
- High-performance flexibility and scalability for the Cisco 7200 (NPE-150 and NPE-200) and 7500 (VIP2-50)
- Standards-compliant SONET/SDH interface
- End-to-end POS connectivity with the GSR 12000 series platforms
- Various encapsulation support: PPP, HDLC-like, and Frame Relay
- Leverages Cisco's CoS capabilities to provide differentiated services
- APS for fault-tolerant connectivity in service provider backbones
- ATM forum data scrambling

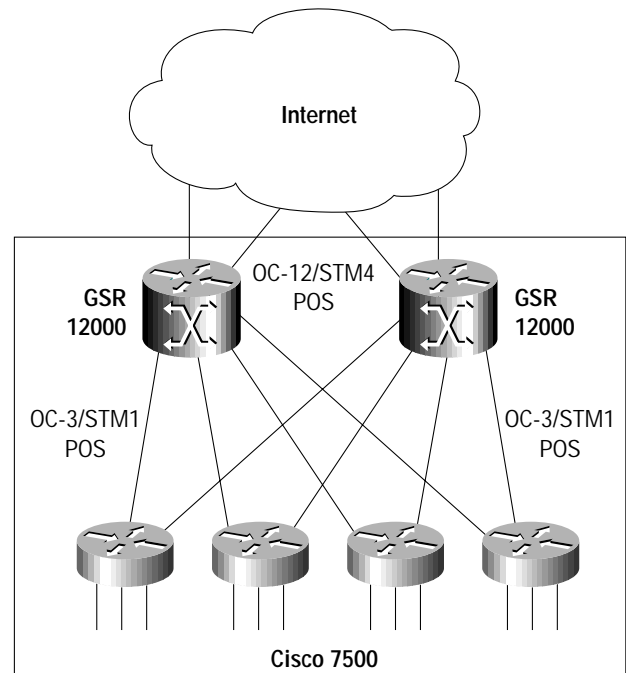
Applications

ISP POP/Backbone Application

Internet traffic has increased exponentially in the last few years. This explosive growth has required ISPs to deploy IP infrastructures that not only meet today's needs, but just as significantly, provide extensive room for future growth. Providing bandwidths in excess of 155 Mbps with utilization up to 98 percent, POS technology is ideal for ISP POPs and backbones.

Within the POP, aggregation Cisco 7200 or 7500 routers can be deployed with redundant GSR 12000 systems at the core via high-speed OC-3/STM1 POS links. These POS links can be a single connection or redundant connections to provide a robust, high-speed, high-throughput transport for IP traffic. The GSR 12000 systems are interconnected to form a high-speed infrastructure to hundreds of other POPs (see Figure 1).

Figure 1 ISP POP Application

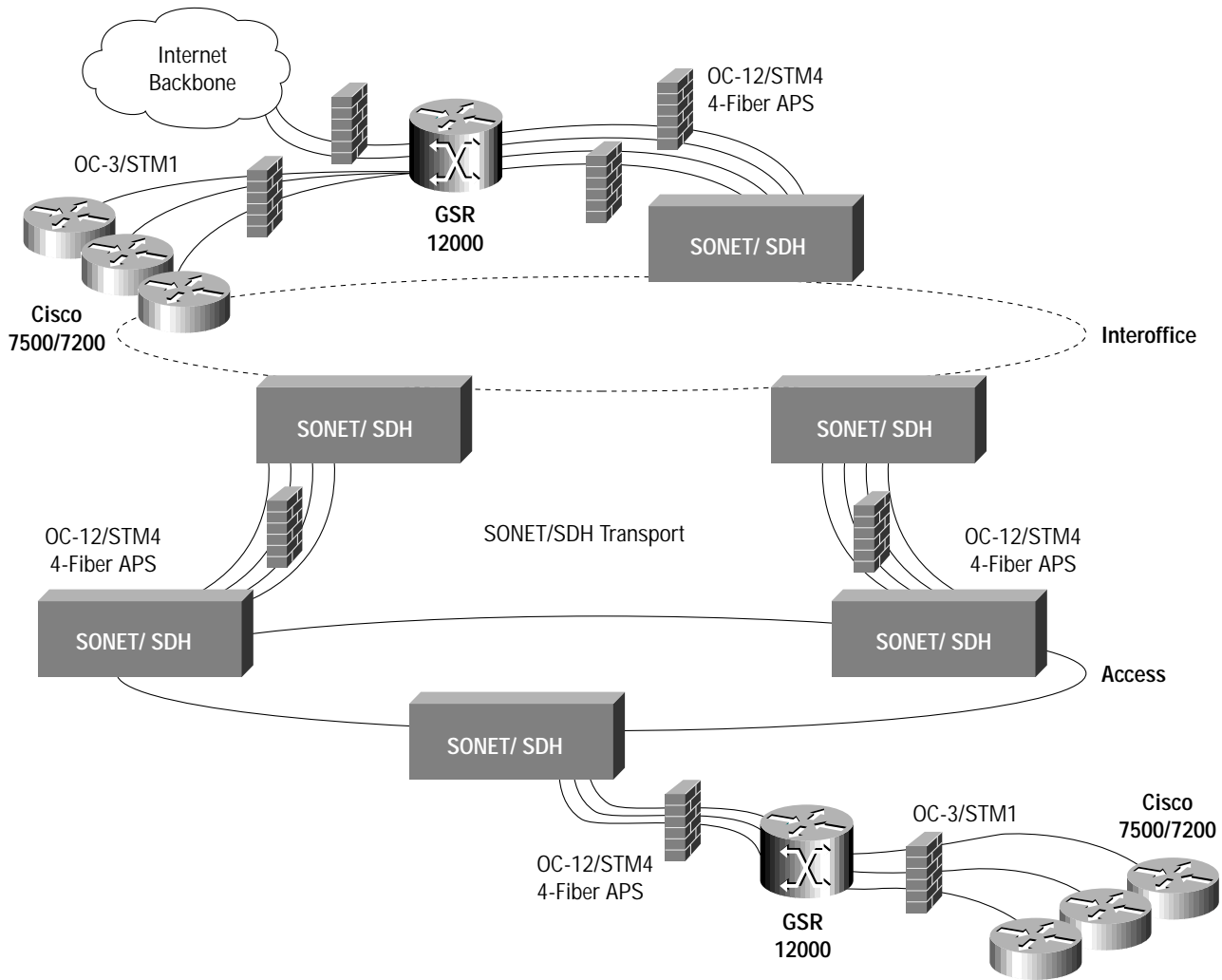


Leveraging Cisco's IP CoS capabilities, this application also provides ISPs with the ability to provide differentiated services to their customers using Committed Access Rate (CAR), Random Early Detection (RED), and Weighted Random Early Detection (WRED).

Carrier SONET/SDH Infrastructure Application

Most carriers transport their router traffic through the SONET/SDH platforms over long distances to form the primary infrastructure of many carrier and telco networks worldwide. In the past, these infrastructures have been built using a myriad of technology and vendor equipment. Minimizing the amount of gear required for carriers to route data over their networks, POS provides efficient, direct mapping of IP into the SONET/SDH payloads (see Figure 2).

Figure 2 Carrier SONET/SDH Infrastructure Application

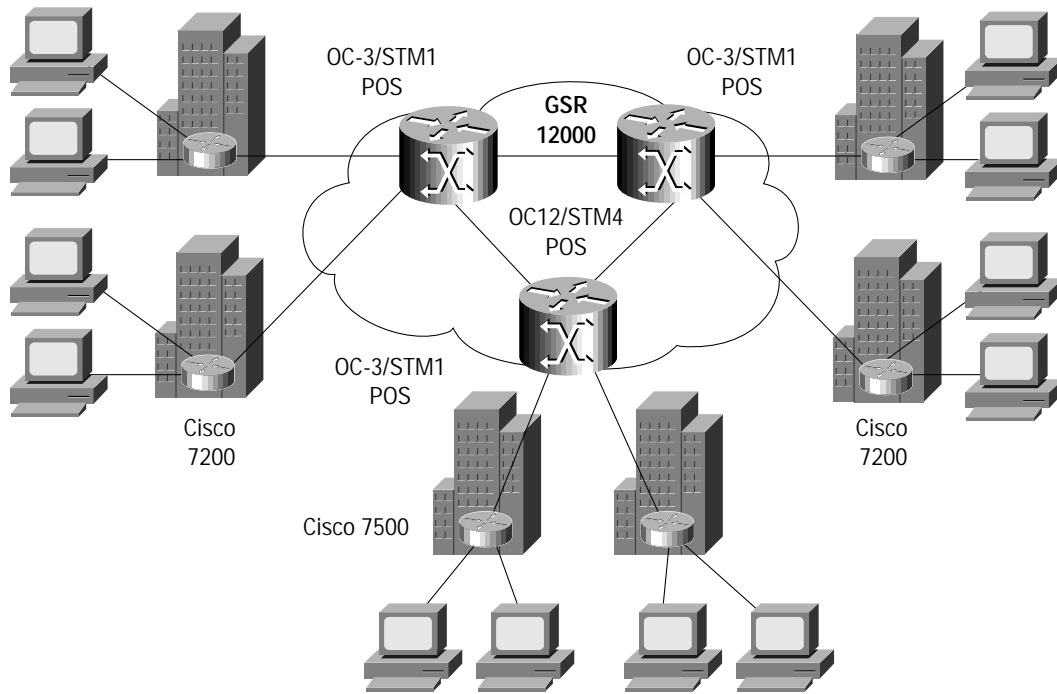


With the distributed switching capability of the VIP2-50 in the Cisco 7500, the POS PA delivers tremendous performance scalability in these carrier backbone networks. Using APS, the Cisco 7500 (and/or Cisco 7200) can provide fault tolerance and increased overall survivability. APS provides very fast switchover from the working fiber to the protection fiber in the case of a fiber cut (or hardware failure) between the SONET/SDH equipment and the Cisco 7500. APS is well known and has been deployed by the carriers for many years.

Enterprise Application

Large corporations worldwide are becoming increasingly dependent on the Internet and the Web for business transactions. As a result, network planners are realizing that their current bandwidth capacity may not sustain this rapid growth long into the future. Concurrently, there is clearly a shift toward minimizing the protocols on the network and building pure IP environments starting in the backbone.

Figure 3 Enterprise WAN IP Backbone



POS technology in the enterprise provides the scalable bandwidth and performance required to cost-effectively stay ahead of network growth. Deploying Cisco's GSR 12000 at the core of a large enterprise wide-area network and the Cisco 7200/7500 at the edge optimizes the enterprise network for IP traffic while providing superior performance and network efficiency (see Figure 3).



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