Service providers are challenged to generate service revenue with maximum profit while delivering unsurpassed quality and reliability. In addition, service providers must be responsive to customer requirements, technology changes, and market trends to remain competitive and preserve its customer base. These three dynamics can add a great deal of stress to the daily operation and force churn continuously within the service delivery network. To meet the requirements of achieving services profitability, easing technology evolution, and delivering a reliable service, Nortel Networks offers the Passport 7400 Series of Multiservice switches.

What is the Passport 7400?

Nortel Networks Passport 7400 is a family of Multiservice switches designed to deliver services at the edge of a service provider’s network. The Passport 7400 is ideal for service adaptation and can perform backbone switching for most provider networks. It enables the service provider to cut the total cost of ownership by consolidating multiple data and voice transport networks. With one Passport 7400 switch, service providers can efficiently provision Layer 2 (ATM, frame relay, Ethernet), Layer 3 (IP, IP-VPN), circuit emulation, and voice services. All of these services can take advantage of sophisticated traffic prioritization and quality of service (QoS) capabilities for premium levels of Service Level Agreements (SLAs).
**Why the Passport 7400?**

By choosing a product from the Passport 7400 family, service providers will benefit from its modular design and rich feature set to deliver profitable services. An investment in the Passport 7400 family is protected from technology and customer growth changes, which typically require a wholesale hardware replacement. This Passport 7400 also protects investment outside of the direct purchase of the equipment. Expenses including sales, engineering, and operations training are preserved throughout the lifecycle of the product. Finally, the Passport 7400 family is supported by an intelligent management system that will offer ease of support and quick service provisioning to maximize service revenue.

**Profitable services**

The Passport 7400 switch enables you to deliver multiple services on a single switch. For instance, traditional Layer 2 services (e.g., ATM, frame relay, and Ethernet), with full feature capabilities including ATM Inverse Multiplexing and frame relay class of service, can co-exist with new revenue opportunities addressable with the support of Layer 3 services (e.g., IP-VPN services based on RFC 2547bis and RFC 2764 IP standards). By reusing the same platform to turn up new revenue-generating services through simple software provisioning, service providers have the flexibility to reduce their networking costs and therefore increase their profitability.

**Flexible evolution**

Passport 7400 switches are populated with fully interchangeable cards, any service/any port capability, and channelized DS1/E1 to OC-3/STM-1 interfaces. The Passport 7400 is available in four configurations with 3, 5, 8, or 16 slots to accept the dozens of processor cards available. Passport 7400 also features the MSA32 line card, which provides industry-leading physical port density and simultaneous support for multiple services. The MSA32 multiservice capability significantly improves network flexibility leading to greater operational simplicity.

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**Figure 1. Passport Multiservice Switches**

- **Passport Multiservice Switches** are an extensive portfolio supporting multiple service solutions and application networks.
Passport 7400 is also utilized for next-generation packet voice and wireless networking as well as for voice over IP and voice over ATM applications for converged voice-data networking. Passport 7400 is also deployed as part of next-generation wireless networks spanning TDMA, GSM/GPRS/UMTS, and CDMA/CDMA2000 applications. It is especially attractive for wireless access backhaul and aggregation applications which require a high concentration of functions in a small footprint.

Proven reliability

Passport delivers carrier-grade reliability for both hardware and software, even in networks with more than 3,000 nodes. It limits downtime so there is virtually no impact to services during equipment outages or software migration. And Passport extends existing Layer 2 OAM&P capabilities to Layer 3 services while meeting "real-time" regulatory requirements for public services. Designed for the rigors of the service provider environment, Passport 7400 switches offer high node availability through fully redundant, “hot-swappable” common equipment. In addition, Passport 7400 switches offer cost-effective reliability and availability through physical interface and line sparing with optional SONET APS/SDH MSP protection for optical interfaces, and 1:1 or 1:N sparing for electrical interfaces.

Passport networking ensures cost-effective operations through intelligent features such as Private Network-to-Network Interface (PNNI) Edge-based Rerouting and MPLS Hot Standby LSPs (label switched paths), which provide effective fault recovery and route optimization at all times.

Comprehensive network management

Preside Multiservice Data Manager (MDM) is an open, flexible network management system that provides the operational tools to profit from the advantages offered by Passport Multiservice switches. Preside MDM facilitates the integration of Passport switches into the network and operating environment, efficiently runs operations, and assists in realizing service revenue potential. With Preside Multiservice Data Manager, network operators can take advantage of comprehensive fault management, simplified service provisioning, and detailed configuration management.

Together with Management Data Provider, Preside Multiservice Data Manager delivers an extensive set of data for usage billing—enabling rigorous service level agreement (SLA) reporting that enhances customer trust. Preside Multiservice Data Manager is designed to be easily integrated with OSS systems in the service provider’s management environment to further complement their service fulfillment, assurance, and billing functions.
Key technical specifications—services

**ATM services**
- SVCs, SPVPs, SPVCs, PVPs, and PVCs
- UNI 3.0, 3.1, 4.0 with interworking ILMI 4.0, AINI
- Point-to-multipoint (logical and spatial)
- Inverse multiplexing over ATM (IMA) n x DS-1/E1
- VPT (Virtual Path Termination)

**ATM traffic management services**
- ATM service categories: CBR, VBR (rt/nrt), UBR, UBR with MDCR, GRF

**Shaping and UPC enhancements**
- Dual leaky bucket traffic shaping (inverse UPC) and policing
- DGCRA, separate stats for GCRA1 and GCRA2 UPC violations

**Congestion management**
- EPD/PPD/LPD, W-RED (per connection, virtual circuits in virtual path)
- AAL5 auto detection

**Advanced queuing and scheduling**
- Eight quality of service classes per link/channel
- Per connection WFQ (weighted fair queuing) for each class

**Performance monitoring**
- Cell loss ratio, availability ratio, cell transfer delay

**ATM networking**
- PNNI, AINI, IISP
- SPVCs and SPVPs across UNI, IISP, and PNNI interfaces
- H-PNNI support
- PNNI DBR (Domain-based re-routing) and EBR (Edge-based re-routing)
- PNNI path and connection trace
- Specified Paths over PNNI and H-PNNI
- PNNI over IMA

**MPLS networking**
- Signaling (LDP-DoD, LDP-DU, RSVP-TE)
- Routing protocols (OSPF, OSPF-TE, IS-IS)

**Circuit emulation services**
- ATM CES 2.0 (AAL-1)
- Structured and unstructured services
- PVCs, CES signaling over SVCs and SPVCs

**IP services**
- IP-VPNs for intranet service, VPN access
- IP class of service
- Routing protocols: OSPF, RIPv2, BGP-4, IS-IS
- IP-VPN over ATM or MPLS
- IP accounting
  - IP Policing
  - MD5 authentication for OSPF, BGP, LDP

**Frame relay services**
- FR UNI and NNI (FRF.1, FRF. 2)
- (ITU-T, ANSI, Frame Relay and Vendor Forum)
- Frame relay usage-based accounting and detailed statistics
- X.121 and E.164 addressing schemes
- PVCs and SVCs
- Closed user groups (CUGs), signaled per DLCI and per port
- SVC call redirection and huntgroups (FRF.4)
- FR-ATM service and network interworking (FRF.8 and FRF.5)

**Packet Voice services**
- VoATM (AAL-1 or AAL-2) and VoIP options
- Toll-quality voice encoding, ITU-T G.711 PCM, G.726 ADPCM or G.729 CS-ACELP
- Silence suppression, comfort noise generation, and dynamic downsampling
- Congestion management
- 56/64 kbps clear-channel fax and modem support
- ETSI QSIG, Euro ISDN, NIS, CAS and MCDN signaling
**Key technical specifications—physical**

**Interfaces**
- Control Processor with and without BITS interface

**ATM UNI/NNI interfaces**
- 8 port DS1/E1 IMA
- 3 port DS3/E3
- 2 and 3 port OC-3/STM-1 Single Mode and Multimode
- 2 port STM-1 electrical
- 2 port STM-1 electrical channelized (ATM, IMA, CES)

**Circuit emulation**
- 4 port DS1/E1 AAL1
- 2 port STM1 electrical channelized

**Ethernet interfaces**
- 6 port 10Base-T
- 2 port 100Base-T
- 4 port 10/100 Base-T
- 8 port 10/100 Base-T

**Frame relay interfaces**
- 8 port V.35
- 8 port V.11
- 4 port E1
- 4 port DS1/E1 channelized
- 8 port DS1
- 1 port DS3/E3
- 1 port DS3 channelized
- 1 port HSSI

**Multiservice access interface**
- Any service including ATM, FR, FRATM, FR-NNI, FR ISDN dialup, HTDS, AAL1 CES and IP, any channel
- 32 port DS1/E1 channelized
- 32 port DS1/E1 channelized with dual STM-1/OC-3 ports (Singlemode, Multimode)
- 32 port DS1/E1 channelized single slot

**Voice interfaces**
- 1 port DS1/E1/TTC2M
- 4 port DS1/E1/TTC2M
- Voice Service Processor AAL2

**TDM interfaces**
- 2 port DS3/E3c
- 32 port E1

**Server cards**
- VPN Extender

**Architecture and capacity**
- Multi-processor architecture
  - Passport 7480: 16-slot shelf, variant
  - Passport 7460: 8-slot shelf, variant
  - Passport 7440: 5-slot shelf, variant
  - Passport 7420: 3-slot shelf, variant
- 1.6 Gbps load sharing bus architecture

**Packaging**

**Passport 7420 (DC only)**
- Complete shelf unit dimensions (h x w x d): 133 mm x 492 mm x 524 mm (5.25” x 16” x 21”)

**Passport 7440**
- Complete shelf unit dimensions (h x w x d): 445 mm x 267 mm x 559 mm (17.50” x 10.50” x 22”)
- Cabinet dimensions: 1969 mm x 610 mm x 693 mm (77.50” x 24” x 27.30”)

**Passport 7460 (DC only)**
- Complete shelf unit dimensions (h x w x d): 355 mm x 483 mm x 495 mm (14” x 19” x 19.5”)

**Passport 7480**
- Complete shelf unit dimensions (h x w x d): 972 mm x 483 mm x 553 mm (38.25” x 19” x 21.75”)
- Cabinet dimensions: 1969 mm x 610 mm x 693 mm (77.50” x 24” x 27.25”)
- Seismic cabinet (NEBS Zone 4) 1970 mm x 600 mm x 790 mm (78” x 24” x 31”)
- Universal Frame: 2120.50 mm x 600 mm x 600 mm (83.66” x 23.62” x 23.62”)

**Mounting options**
- Nortel Networks supplied cabinet or standard 19” EIA/IEC rack

**Power**
- -48 VDC/-60VDC nominal voltage
- AC power option available

**Standards compliance**

**Safety**
- CSA C22.2 no. 950, EN 60950, UL 1950

**EMC**
- EN 55022/FCC Part 15B Class A, EN 50082-1

**Seismic**
- Up to Zone 4
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Nortel Networks is an industry leader and innovator focused on transforming how the world communicates and exchanges information. The company is supplying its service provider and enterprise customers with communications technology and infrastructure to enable value-added IP data, voice and multimedia services spanning Wireless Networks, Wireline Networks, Enterprise Networks, and Optical Networks. As a global company, Nortel Networks does business in more than 150 countries. More information about Nortel Networks can be found on the Web at:

www.nortelnetworks.com

For more information, contact your Nortel Networks representative, or call 1-800-4 NORTEL or 1-800-466-7835 from anywhere in North America.

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