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# NORTEL

## Solution Brief

### Voice over IP Solutions — Nortel Media Gateway 9000

*Directly connects subscriber lines to your VoIP backbone with no overlay networks*

*Integrating business and residential lines with a packet infrastructure could not be easier. Nortel's carrier-grade voice over IP (VoIP) access Media Gateway 9000 directly connects existing line interfaces to a next-generation VoIP network. It delivers switched services — such as CLASS, Centrex, Coin and Meridian Business Set features — and non-switched services such as T1 private lines.*

*Via the variety of subscriber line voice services, this open-standards access gateway can replace switch remotes and digital loop carriers for additional network aggregation at the edge — and replaces end-office lines for simplified office consolidation.*

The Nortel Carrier VoIP portfolio enables carriers to profitably deliver voice, data and VPN services over a converged packet network by combining the best of the Internet with the best of today's telephone network. The advanced switching and routing architecture creates an economic engine that delivers today's high-value telephony features and tomorrow's advanced multimedia services — providing new revenue opportunities while reducing capital and operating expenses. This product brief introduces

the Nortel Media Gateway 9000 platform, one of a family of gateways in the expanding Carrier VoIP portfolio.

#### **A wealth of services in a single shelf**

The feature-rich access Media Gateway 9000 supports a long list of broadband and narrowband services simultaneously, including all of Nortel's DMS-100 line services. As an integrated access media gateway, this gateway seamlessly interconnects VoIP networks into existing TDM networks, supporting such subscriber-side interfaces and revenue-generating services as:

- High-density (32 ports per card) narrowband services such as POTS, Residential (RES) and Custom Local Area Signaling Services (CLASS) services
- Traditional line types such as Nortel's Centrex, coin, ground start and Meridian Business Set
- Private leased lines, which provide circuit emulation services through structured/unstructured DS-1 and fractional DS-1 facilities

#### **New ways to enhance your bottom line**

Nortel's Media Gateway 9000 combines ATM/IP backbone connectivity, standards-driven H.248 control (in line



with ETSI TISPAN NGN and IETF standards), and next-generation Digital Signal Processing technologies so you can deploy new revenue-generating services and seize new revenue opportunities while lowering your total cost of ownership.

Unique service-adaptive multi-line cards support multiple special line types on the same circuit pack to offer savings on rewiring, space and service provisioning — so you can customize your service offerings to individual end-user market segments and applications.

As service delivery technologies advance, you will be able to economically adjust your service mix to meet fluctuating demands and quickly offer the most advanced services available.

Since this gateway supports loop resistances up to 1,900 ohms, subscriber loops can reach up to 18,000 feet (5,486 meters) in length. In comparison, typical DLCs support a maximum loop resistance of 1,350 ohms, which limits loop length to 12,000 feet (3,658 meters) or less. The greater reach of this access media gateway translates into more subscribers and more revenue potential with no additional equipment — such as amplifiers — required.

### Flexible and scalable for an ever-changing future

The Nortel Media Gateway 9000's packet-based interfaces enable it to be deployed cost-effectively anywhere in the network — with virtually no geographic distance limitations. This flexibility enables you to cost-effectively centralize or distribute network capacity at any point of presence (POP), including wire centers, co-location cages, outside plant cabinets and customer premises. This gateway's modular, scalable design enables you to start at an entry point appropriate to your business and easily expand as subscriber-side requirements grow. Nortel's Media Gateway 9000 supports any-service/any-slot shelves, including POTS, RES, CLASS, Loop Start, Centrex, MBS, Coin and Private Lines. In all cases, these are cost-effectively serviced by one redundant (APS) network interface to your packet backbone. In a pure POTS model, this gateway supports 7,936 lines over a maximum of 16 shelves.

In addition to its access media gateway features, the Media Gateway 9000 supports Dynamic Packet Trunking capability, which enables a cost-efficient method of call routing between the domain controls of two Nortel Communication Server 2000s.

By supporting Dynamic Packet Trunking, call routing can be directly established between two Media Gateway 9000s in different communication server domains. This all-packet trunking capability eliminates bridging communication server domains through additional TDM VoIP trunking gateways. This represents significant systems cost savings in equipment and equipment management.

### VoIP migration from Nortel's DMS peripheral and standard DLCs

The Media Gateway 9000 also has the ability to host existing Nortel DMS line and trunk peripherals and industry-standard remotes, which ensures the smooth upgrade of Nortel's DMS-10 and DMS-100 switching centers as well as non-Nortel switch centers to full packet capability. Full support — including Nortel's Media Gateway 9000 intra-switching capability, dynamic packet trunking capability, emergency stand-alone and echo cancellation — will be available for the following peripherals and DLCs:

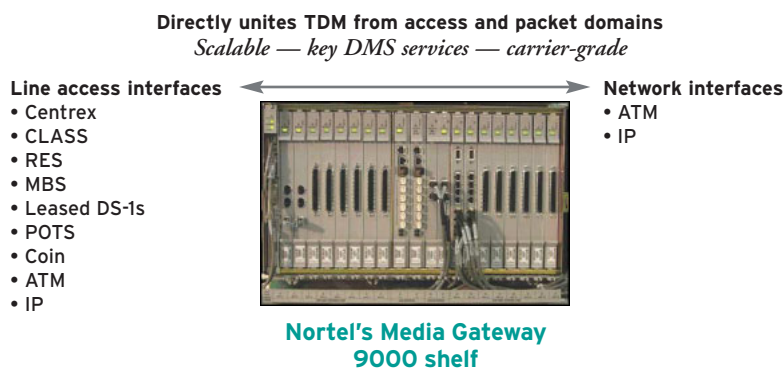
#### Access peripherals

- Line Concentrating Module (LCM)
- Line Concentrating Module Enhanced (LCME)
- Remote Switching Center (RSC)
- Remote Switching Center S (RSCS)
- Remote Line Concentrating Module (RLCM)
- Star Hub Remote (SRHE)
- Outside Plant Module (OPM)
- Outside Plant Access Cabinet (OPAC)
- Telcordia Standard GR-303 compliant Digital Loop Carriers
- Telcordia Standard TR-08 compliant Digital Loop Carriers

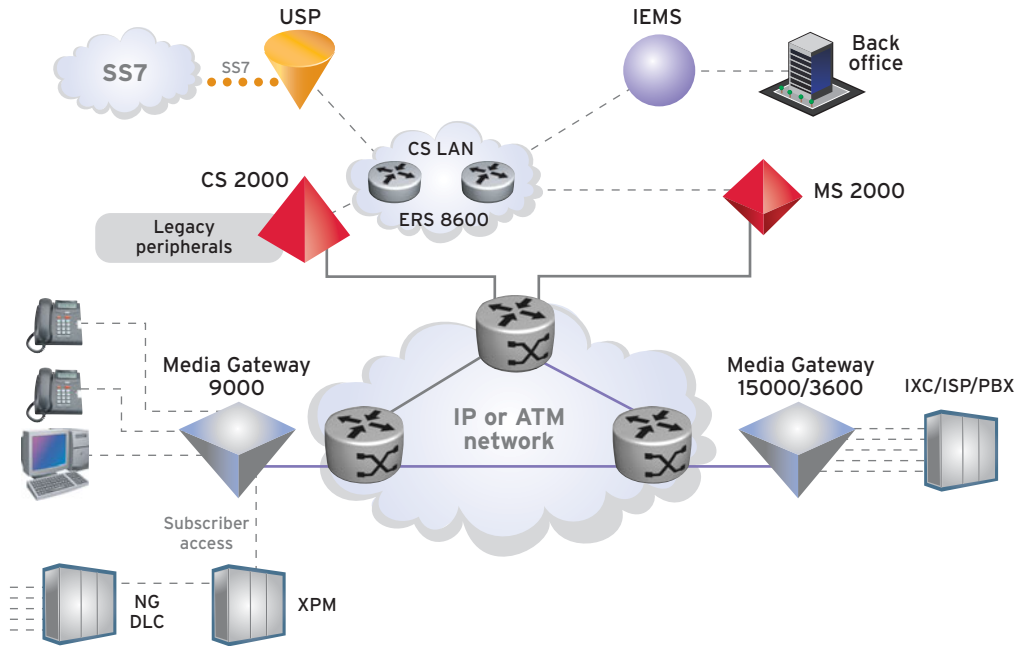
#### Trunk peripherals

- Digital Trunk Controller (DTC)
- ISDN Digital Trunk Controller (DTCI)
- Line/Trunk Controller (LTC)

**Figure 1. Replacing TDM equipment with Nortel's Carrier VoIP solution — including the Media Gateway 9000 — allows circuit switches to be decommissioned at end-office locations.**



**Figure 2. A Nortel typical local VoIP solution**



With this hosting capability, the Media Gateway 9000 enables carriers to leverage their current TDM investments, dramatically reduce their capital expenses and simplify the task of migrating their wire centers to packet.



**Nortel's Media Gateway 9000**

### Proven carrier-grade performance

The Media Gateway 9000 delivers 99.999 percent availability with such features as:

- Provisioning of control cards in pairs in a 1+1 configuration (one in Active mode while the other operates in Hot Standby mode)
- Fully redundant multi-layer backplane with independent fault isolated pathways from each line card to the shelf control cards
- Fully redundant cooling fans and redundant power sources distributed to all control and line cards
- Fifty-millisecond network-side switchover to redundant fiber links, with all established calls maintained
- Self-healing switched virtual circuits for transporting DS-1 private line traffic; if a path through your ATM network is lost, this gateway automatically reestablishes the connection through an alternate backbone path

- Optional 3:1 card sparing helps extend DS-1 private line availability; supports DS-1 and fractional DS-1 services
- Line intra-switching without routing through the network interface, thus reducing demand on the network interface bandwidth
- Emergency Stand Alone (ESA) capability allows the Media Gateway 9000 to support basic intra-switched POTS service and E911 translations in ESA mode for native lines, DMS peripheral lines and standard DLC lines

### Element management

The Media Gateway 9000 Element Manager supports OSS integration and flow-through provisioning, thereby enabling remote configuration, monitoring and maintenance of the Media Gateway 9000.

## Media Gateway 9000 technical specifications

### Physical characteristics

#### Shelf size (w x d x h)

- Cm: 54.3 x 30 x 35.56
- Inches: 21.375 x 11.8 x 14
- Only requires front access

#### Frame size (w x d x h)

- Cm: 68.6 x 45.7 x 213.4
- Inches: 27 x 18 x 84
- Only requires front access

#### Weight

- Empty shelf: 14 kg (30 lb)
- Full shelf: 39 kg (85 lb)
- Full frame: 307 kg (675 lb)

#### Operating environment

##### Temperature:

- Normal: 5° to 40°C (41° to 104°F)
- Short term: -20° to 50°C (-4° to 122°F)

##### Humidity:

- 5% to 85%, noncondensing

### Input power requirements

- Typical power requirements: 1950 Watts
  - > Single frame at 8 ccs
- Nominal voltage: -48.0 VDC

### Line-side capacity

The following summarizes the maximum number of single-type lines/ports one 7-foot frame can support:

- POTS/RES/CLASS/Loop Start — 1,952 lines
- Centrex/MBS/Coin — 732 lines
- Private line — 128 DS-1 ports with sparing

### WAN interfaces

- OC-3c/STM-1
- OC-3/STS-1
- DS-1 IMA
- Gigabit Ethernet (future)

### Voice services protocols

- G.711 over AAL1
- UNI 4.0
- International Emergency Stand-Alone (ESA) services
- ESA Call Diversion
- PKI

### Voice services protocols (continued)

- G.711
- G.729 over IP
- RTP, RTCP
- Silence suppression
- T.38 fax
- RFC 2833
- Voiceband data fax and modem support
- Call admission control

### Control protocols and security

- Support H.248 compliant protocols, behaving as an access media gateway in line with TISPAN NGN standards
- SIP service for interworking (thus, behaving as a TISPAN NGN Voice Gateway)
- IPSec for Signaling and OAM

### Regulatory compliance

Complies with Telcordia GR-63-CORE and ETS 300-019 for climate, seismic, fire and other specifications. Product safety compliance includes:

- UL 1950, 3rd edition
- CAN/CSA 22.2 No. 950-95, 3rd edition
- EN 60950



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NN123223-120407