



## Product Brief

### Nortel MSC Server

#### The GSM-UMTS MSC Server at Release NSS19

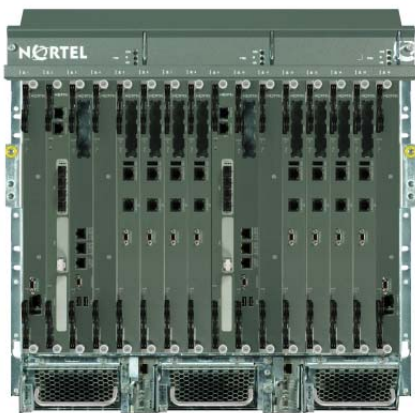
##### Introduction

Nortel's NSS19 VoIP Solution introduces a complete Next Generation Network (NGN) for the GSM and UMTS Voice Core. This solution is implemented using All-IP for both the bearer and control plane where the MSC Server (MSCS) provides the control plane network element. NGN technology provides cost savings and operational efficiencies through All-IP network consolidation with full support of VoIP for GSM and UMTS bearers combined with full support for Next Generation IP signalling: SIGTRAN.

The NSS19 MSC Server utilizes new high-density and highly scalable third-party Commercial Off-The-Shelf (COTS) computing equipment compliant to Advanced Telecommunications Computing Architecture (ATCA) standards and designed for serviceability in the Central Office environment. This enables the MSC Server to support up to one million BHCA in a single shelf of ATCA equipment. This is a key component of Nortel's vision of a simplified network that scales without adding complexity and without compromising

reliability. The use of high-density COTS technology is fundamental to the simplification of GSM/UMTS networks for a cost-efficient All-IP NGN using far fewer but much more scalable network elements. The use of fully third-party COTS technology from the generic computing marketplace also provides supply chain benefits when compared with conventional single-vendor telecom platforms.

Nortel's MSC products have been extensively deployed globally and offer a highly stable, mature and feature-rich



**Nortel's MSC Server using ATCA-compliant equipment**



application suite developed over the previous eighteen product releases and which is now simply re-used in the NSS19 MSC Server. Consequently, Nortel achieves the 'best of both worlds' by combining this feature-rich and stable MSC Server application suite with a truly carrier-grade, 'Hard' Soft-Switch platform. This means that the MSC Server application can be delivered in a very high density package with high capacity scalability without compromising the stability of the application by introducing completely new software.

The MSC Server at release NSS19 can be deployed in a variety of scenarios from completely new greenfield deployments to mixed TDM/NGN solutions and NGN overlays in order to provide the operator with the optimal business solution for their specific situation.

### **As simple as 1, 2, 3:**

#### ***Nortel: the 1st Choice for 2nd Generation ATCA on 3rd Party COTS***

The global wireless market shows continued substantial growth in mobile telephony in both subscriber numbers and in minutes of use, combined with continued price pressure on ARPU. This means that operators must adopt technologies that can scale up to very high capacities while also delivering services at a much lower cost than is possible using conventional circuit switched technology. Cost efficiencies are obtained by consolidating networks using far fewer higher density but much more scalable network elements to achieve a much simpler network solution. MSCS19 is a key component in Nortel's vision of this simplified network, capable of supporting up to one million subscribers in a single shelf. In subsequent releases, the capacity of the Nortel MSC Server is planned to scale up to three million subscribers and

beyond. Nortel's modular ATCA COTS-based MSC Server solution enables operators to start small and then add capacity by simply adding processor blades. In this way, scalability is achieved without adding complexity and without compromising reliability.

NGN solutions can be built using Server platforms evolved from existing proprietary call processing equipment such as Nortel already offers in NSS18. However, in NSS19 Nortel is introducing Commercial-Off-The-Shelf (COTS) platforms using entirely third-party supplied ATCA equipment. ATCA is a COTS equipment standard designed specifically for the telecommunications industry where the use of COTS equipment is often linked to the use of Soft-Switch technology. However, Nortel's evaluation of early ATCA equipment was that it did not meet carrier-grade expectations. Consequently, Nortel has worked in partnership with generic COTS equipment suppliers since 2003 to ensure that this technology is not only compliant to ATCA equipment standards, but also meets stringent design objectives for serviceability and operability in telecom Central Office environments. The result is a second generation of ATCA-compliant COTS equipment from third-party suppliers that meets operator targets for

availability, serviceability and operability. This is the technology that Nortel has applied to produce a 'Hard' Soft-Switch for the GSM/UMTS MSC server in NSS19 and to a variety of other control plane applications such as the GSM/UMTS HLR, the CDMA MSC Server and the IMS CSCF and HSS.

ATCA technology enables Generic Computer Vendors to supply the telecommunications industry with COTS equipment. However, it is important to note that the supply chain benefits made possible by ATCA will only be obtained if the equipment is supplied by a third-party vendor and is made generally available to the broader telecommunications and computing industry. In contrast, single-source ATCA-compliant equipment supplied by an individual telecom vendor but restricted just to the vendor's customer base is no different to using proprietary technology from a supply chain perspective.

### **Nortel's 'Hard' Soft-Switch**

MSCS19 utilizes the 2nd Generation of ATCA compliant technology which includes a range of performance, reliability and serviceability enhancements when compared with the 1st Generation of ATCA equipment. Nortel's MSC Server applies a highly reliable hardware and software architecture that has been

#### **The 1st Choice for the 2nd Generation of 3rd Party ATCA equipment**



designed for carrier-grade application and serviceability in the Central Office environment. This has been achieved by the application of Nortel carrier-grade design practices through close collaboration with computer industry partners. Consequently MSCS19 offers reliability enhancements through both the use of the 2nd Generation of ATCA equipment including a portfolio of carrier-class features beyond those stipulated in the ATCA standard as well as additional software robustness features. The product enhancements that make Nortel's MSC Server a truly 'Hard' Soft-Switch include:

**2nd generation enhancements to ATCA**

- > 16 slots per shelf with three shelves per frame for higher density
- > Improved heat management enabling extended service intervals
- > Distribution of mated-blades into different cooling zones for carrier-grade design practice — including the Switch Blades
- > Active and inactive mated-blades physically separated to reduce potential for craft errors that could impact both units

**Hardware robustness**

- > NEBS-L3/ETSI compliance
- > Physical, link, transport and network layer redundancy
- > Aggregated, line-rate IP interfaces
- > Hardware accelerated and integrated IPSec for enhanced security

**Software robustness**

- > Higher fault coverage enabling measured and fault tolerant action to be taken
- > Self stabilizing, resolving to an error-free state

- > Redundant boots, automated backups and near-real-time CDR and CDR backup
- > "Flight Recorder" capability, enabling system restoration without the loss of data necessary for root-cause analysis

**Design for carrier application and serviceability**

- > Hardware auto-discovery and front panel LED status reporting
- > Nortel carrier-grade Linux OS optimized for real-time-sensitive applications
- > Procedures, tools and measurement capabilities for GR-929 (RQMS) compliance
- > ROHS and WEEE compliance

**Nortel's MSC Server software architecture**

**Platform convergence and software re-use**

The second generation of ATCA equipment introduced with MSCS19 is also being introduced for many other Nortel mission-critical and real-time control-plane applications such as HLR, IMS and CDMA MSC Server. Each indi-

vidual product utilizes common standard blades for network interface connectivity, storage and storage management, system controller and switching. The application-specific software is run on generic computing blades.

*System Controller and Switch Blade*

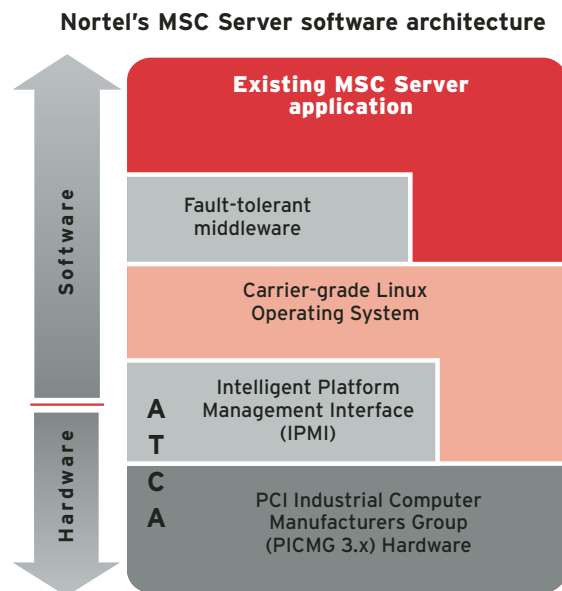
- > Dual-Dual-Star Gigabit Ethernet Switching Hub
- > PICMG 3.0 and 3.1 compliance
- > Used for all inter-shelf and intra-shelf switching
- > Redundant Blades in different cooling zones

*Network Gateway Blade*

- > System external IP Interfaces
- > Provides secure and reliable IP connectivity
- > 1+1 redundancy with 4 Gigabit Ethernet ports
- > Native IP security including Firewall and IPSec

*Storage Manager Blade*

- > Provides storage management, OAM and Database functions
- > Paired with the Storage Blade
- > General-purpose Computing Blade



### *Storage Blade*

- › Provides disk storage for OAM function
- › Paired with the Storage Manager
- › Dual 147 GB disks

### *SIGTRAN Services Gateway — Scalable Signalling Capacity Element*

- › Provides Native support for Next Generation IP Signalling
- › Load Shared N+1 Capacity Pool
- › RFC-compliant M3UA
- › RFC-compliant SCTP

### *MSC Server Blade — Scalable Capacity Element for the MSC Server*

- › Provides MSC Server processing capacity
- › Load Shared N+1 Capacity Pool
- › VLR
- › MAP/CAP/INAP/Access Signalling

The MSC application itself resides on a generic processing blade which uses the same commercial microprocessor family as used in Nortel's proprietary call processing equipment. This enables the existing software application to operate natively on the new ATCA platform, such that the evolution to ATCA can be regarded as a processor upgrade. This means that MSCS19 utilizes the same software as the traditional, widely deployed Nortel MSC. This software

re-use enables MSCS19 to offer the same rich feature set for both GSM and UMTS without the need to re-develop those features all over again. This approach also ensures that Nortel's existing highly stable software is not compromised by the addition of a large quantity of newly developed and unproven software. In this respect, MSCS19 achieves the 'best of both worlds' by combining the feature-rich and stable MSC application with a third-party COTS Hard Soft-Switch platform

### **Comprehensive set of compliant, value-added services**

MSCS19 supports voice, video, SMS and CS data as well as a comprehensive suite of supplementary services that an operator would expect to find from mature and widely deployed MSC software. All 3GPP standardized features in MSCS19 are implemented in compliance with Release 6 of 3GPP standards.

In addition to the standard wireless service set, MSCS19 also supports several wireline features such as PRI and QSIG. The ability to host 2G/3G and wireline enterprise customers on the same MSC Server provides for flexibility and network efficiencies through equipment consolidation.

Value-added services such as Virtual Private Networking, Personalized Ring Back Tone and Pre-Paid services are delivered on MSCS19 through support of SSP functionality and the various Intelligent Networking standards.

- › CS-1R INAP
- › CAMEL phases 1, 2 and 3

In addition to Pre-Paid services, MSCS19's extensive suite of intelligent and flexible billing features offers operators a wide variety of billing options. This intelligent charging approach is extended to subscribers through the Advice of Charge feature set that allows a Mobile Station to calculate the cost of a call in real time.

MSCS19 also meets many other regulatory requirements such as:

- › Legal Intercept and Communications Assistance for Law Enforcement Act
- › E911 support and associated Location Based Services
- › Mobile/Local Number Portability
- › Text Telephony
- › Wireless Priority Service
- › Malicious Call Trace

Nortel is a recognized leader in delivering communications capabilities that enhance the human experience, ignite and power global commerce, and secure and protect the world's most critical information. Our next-generation technologies, for both service providers and enterprises, span access and core networks, support multimedia and business-critical applications, and help eliminate today's barriers to efficiency, speed and performance by simplifying networks and connecting people with information. Nortel does business in more than 150 countries. For more information, visit Nortel on the Web at [www.nortel.com](http://www.nortel.com).

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

Nortel, the Nortel logo and the Globemark are trademarks of Nortel Networks. All other trademarks are the property of their owners.

Copyright © 2006 Nortel Networks. All rights reserved. Information in this document is subject to change without notice. Nortel assumes no responsibility for any errors that may appear in this document.



**In the United States:**  
Nortel  
35 Davis Drive  
Research Triangle Park, NC 27709 USA

**In Canada:**  
Nortel  
8200 Dixie Road, Suite 100  
Brampton, Ontario L6T 5P6 Canada

**In Caribbean and Latin America:**  
Nortel  
1500 Concorde Terrace, Sunrise, FL 33323 USA

**In Europe:**  
Nortel  
Maidenhead Office Park, Westacott Way  
Maidenhead Berkshire SL6 3QH UK

**In Asia Pacific:**  
Nortel  
Nortel Networks Centre, 1 Innovation Drive  
Macquarie University Research Park  
Macquarie Park, NSW 2109 Australia

**In Greater China:**  
Nortel  
Sun Dong An Plaza, 138 Wang Fu Jing Street  
Beijing 10000 China