NMS COMMUNICATIONS

SS7 Software

Flexible signaling software for worldwide deployment and interoperability

NMS Communications' SS7 Software provides developers and OEMs with a new level of call control and message redundancy for high availability options in the most demanding in-network applications. Part of the Open Access™ framework, SS7 Software is an integrated SS7 protocol stack working in combination with TX Series hardware and offers switch-specific and high-availability extensions that meet worldwide telecom requirements. NMS's SS7 Software includes support of either Message Transfer Part (MTP) or SIGTRAN at the lower level, as well as the higher-layer protocols, namely Integrated Services Digital Network User Part (ISUP), Telephone User Part (TUP), Signaling Control Connection Part (SCCP), and Transaction Capabilities Application Part (TCAP). Redundancy is supported for all layers of the SS7 stack, allowing applications to preserve stable calls or message transactions during maintenance upgrades or in the event of board or node failures.

NMS's SS7 Software also supports the BICC (Bearer Independent Call Control) stack capability as an extension to ISUP for setting up calls over packet bearer networks. This capability allows network operators to offer the complete set of PSTN/ISDN services, including all supplementary services, over a variety of packet networks. BICC can be transported over SS7 MTP3 or Sigtran M3UA/SCTP. The NMS implementation supports Capability Sets 1 and 2 (CS1and CS2) for integration with the 3GPP wireless networks (Nc) interface.

This data sheets covers the MTP, ISUP, BICC, TUP, SCCP, and TCAP support in NMS's SS7 software (see Figure 1). Refer to the SIGTRAN data sheet for specific details on NMS's support of that protocol suite.

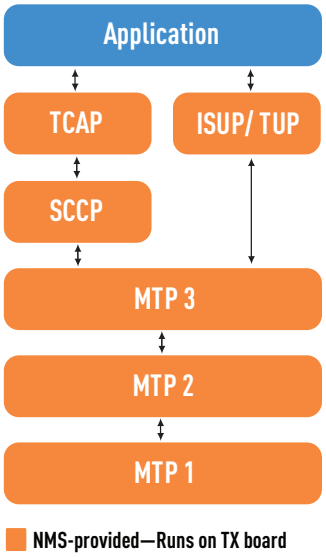

Figure 1: NMS SS7 Software Stack Block Diagram

FEATURES

- Modular implementation of SS7 protocol stack with host computer APIs to MTP layers 2 and 3, ISUP, SCCP, TUP, and TCAP
- Supports BICC (Bearer Independent Call Control) stack capability as an extension to ISUP for setting up calls over packet bearer networks
- Gives OEMs and infrastructure providers cost-effective access to the SS7 network for product integration
- Support for intelligent peripherals, service nodes, and adjunct processor applications
- Integrated board-based protocol stack off-loads SS7 protocol processing from the host computer
- Supports the sharing of a single point code by redundant MTP, ISUP, SCCP, and TCAP protocol layers
- Health management interface allows applications to detect and recover from hardware or software failures
- Automatic detection and prevention of application message overloads (congestion handling)
- Optional monitor filtering function for passive monitoring of links without overloading host with unwanted messages
- Supports multiple originating point codes for links, linksets, and routes
- Includes protocols required to support higher-layer mobile switching center (MSC) and base station controller (BSC) protocols

OPEN access

SS7 Software

TECHNICAL DESCRIPTION

Two Platforms, One Point Code

Carrier-grade systems require extremely high levels of network uptime, typically 99.999%. A critical requirement in these systems is the elimination of single points of failure in SS7 links, SS7 boards, and the system chassis. Furthermore, hardware and software upgrades must be performed without system downtime. One solution to this challenge is with multiple chassis, each with an SS7 board supporting one or more SS7 links. SS7 Software allows two TX Series boards to share the same point code so that the remote node sees the pair of boards as a single entity.

In this scenario, the SS7 links and MTP2 layers are active on both boards (see Figure 2). On one board, MTP3, the higher SS7 protocol layers and the user's application can act in a primary (active) mode; on the other board, each layer acts in a secondary (backup) mode. The primary MTP3 passes MTP check-point information, including link, linkset, and route status changes, to the backup board. The primary ISUP layer passes SS7 traffic data to the application. The application can check-point the information to the backup ISUP layer. In providing SCCP/TCAP redundancy, these layers perform check-pointing directly between the primary and secondary boards before passing the results to the application.

An Ethernet connection between the primary and secondary boards is used to provide monitoring, health, and status checks. In the event of a failure, the back-up board takes over, using the check-pointed data both to know the current state of the SS7 network and to allow stable calls to remain active. The remote node views the failure of the primary board as it would a simple link failure and is therefore able to automatically handle the board or chassis failure as specified by the SS7 protocol.

TX Series Platforms

NMS's SS7 Software supports both the high-performance TX 4000 (PCI) and TX 4000C (CompactPCI) Series platforms, and the basic-performance TX 4000/20 and TX 4000C/20 platforms.

Natural Access Program Development

Natural Access is NMS's programming environment that allows developers to quickly and easily write applications. SS7 APIs are integrated with Natural Access such that applications implementing SS7 can also use the other Natural Access services for switching, play and record, IVR, etc.

H.100/H.110 Ensures Open Architecture, Vendor Independence

The H.100/H.110 bus and switching provides flexibility, openness, and vendor independence, with access to other resources such as voice and call processing, modem pools, and speech recognizers. The TX 4000 and TX 4000/20 provide an H.100 bus interface, while the TX 4000C and TX 4000/20C offer an H.110 bus interface, the CompactPCI counterpart to H.100.

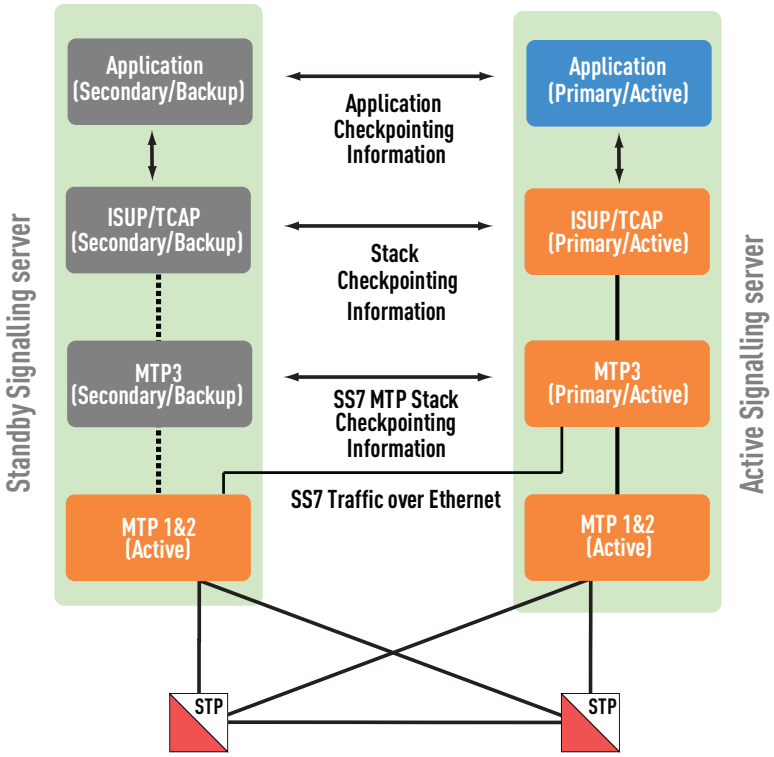

Figure 2: Redundancy with check-pointing

TECHNICAL SPECIFICATIONS

Supported SS7 Protocols

- MTP Layers 1 to 3
- ISUP
- SCCP
- TCAP
- TUP
- BICC stack capability supported as an extension to ISUP
- Redundancy is optional for all protocols
- Up to 4 high-speed links (HSL) supported over raw T1/E1

Refer to separate data sheet for SIGTRAN support.

Software Environment

- Natural Access 2005-1 SP5, or later
- Operating Systems:
  - Windows® 2003, Enterprise and Standard, R2, sp1
  - x86 Solaris™ 10, 32-bit mode
  - SPARC® Solaris 9, 32-bit, 64-bit, and mixed mode
  - SPARC Solaris 10, 64-bit and mixed mode
  - Red Hat® Enterprise Linux® (RHEL) 4.0, 32-bit mode

NMS Platforms Supported

- TX 4000, TX 4000C, TX 4000/20, and TX 4000C/20

Programming Modules

- Data APIs for ISUP, BICC (implemented as an extension to ISUP), TUP, SCCP, TCAP, and MTP Layer 3
- Management APIs for ISUP, BICC (implemented as an extension to ISUP), TUP, SCCP, TCAP, and MTP Layers 2 and 3
- Natural Access-based Health Management API for platform redundancy

Monitoring

NMS offers an extra cost option for link passive monitoring. To prevent host overload, filtering passes only the messages of interest to the host application. Filters can be set to capture only specific SIO type (ISUP, SCCP, TUP, or MTP Management messages) from a specific originating point code to a specific destination point code.

Compliance

The NMS SS7 protocol stack implements the following functions and is compliant with the listed recommendations. In addition, users can take advantage of NMS Communications' Global Messaging Toolkit, which allows users to create support for any ETSI, ITU, or ANSI-based ISUP variant.

MTP

- ETS 300-008-1, 300-308-2, ETSI, 1997
- GF001-9001 (SS7 for National Telephone Network of China)
- Q.701-702, ITU-T, 1992
- Q.703-704, ITU-T, 1996
- Q.707, ITU-T, 1992
- Q.781-782, ITU-T, 1996
- T1.111, 234, ANSI, 1992
- TTC JJ-90.10
- TTC Q.701-704, Q.707
- NTT Q.701-704, Q.707
- GR-246-CORE
- GR-606-CORE

ISUP

- China ISUP
- EN 300-356-1, ETSI ISUP V.3, 1998
- ETS 300-121, ETSI ISUP V.1, 1992
- ETS 300-356-1, ETSI ISUP V.2, 1995
- ETS 300-356-33, ETSI
- Q.730-737, ITU-T, 1992
- Q.761-764, ITU-T, 1997
- Q.767, ITU-T, 1992
- Q.784, ITU-T, 1996-1997
- T1.113, 236, ANSI, 1995
- NTT Q.761-764
- TTC JJ-90.10

BICC

- Q.1901/1902 (CS1/CS2)

TUP

- Q.721-725, ITU-T, 1992
- Q.783, ITU-T, 1992
- GF001-9001

SCCP

- Q.711-715, ITU-T, 1996
- Q.786, ITU-T
- T1.112, 235, ANSI, 1995

TCAP

- Q.771-775, 787, ITU-T, 1997
- T1.114, ANSI, 1992

Worldwide Deployment

NMS customers have successfully deployed SS7 equipment in major networks such as AT&T, British Telecom, Chung Hwa Telecom, Deutsche Telekom, France Telecom, NTT, Orange, Telefonica, Telstra, and others. NMS has enabled its customers to deploy SS7 in the following countries:

Argentina• Australia• Austria• Brazil• Belgium• Cambodia• Canada• China• Colombia• Croatia• Czech Republic• Finland• France• Germany• Haiti• Hong Kong• Hungary• Iceland• India• Indonesia• Ireland• Israel• Italy• Japan• Korea• Lithuania• Malaysia• Mexico• Monaco• The Netherlands• New Zealand• Norway• Philippines• Portugal• Russia• Singapore• South Africa• Spain• Sri Lanka• Surinam• Sweden• Switzerland• Taiwan• Thailand• United Kingdom• United States• Vietnam

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For the latest information on supported features an operating systems, refer to our web site at **www.nmscommunications.com**.

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NMS also has offices throughout North America, Europe, and Asia.

Visit the NMS web site for a complete listing.

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