MACH7-*i*STP

"The Next Generation Signaling Transfer Point"

Overview

As the Global network is undergoing immense changes and the Next-Generation IP networks become a reality, it signals an evolution towards using Internet Protocol (IP) based technologies side-by-side with traditional circuit-switched infrastructure of the Public Switched Telephone Network (PSTN). New technologies, lower costs and the ability to rapidly deploy enhanced IP-based services have sparked the need for effective means to support converged networks. Leveraging the strengths of both PSTN and IP networks will offer service providers with the benefits of greater efficiencies, lower cost and the means to deliver enhanced and fully integrated voice, data and multimedia services

The teleSys MACH7-*i*STP addresses service providers, network equipment manufacturers and OEMs requirements for open system, highly available, Signaling Transfer Solutions required for the complex and converging marketplace. The MACH7-*i*STP provides feature-rich signaling transfer solutions based on teleSys High-Available framework, allows easy integration of revenue generating service nodes in the carrier network as well as seamless transition to the Next Generation Network model.

Total Solution

Intense competition is driving service providers to capture and retain customers. New and enhanced services are being deployed to meet market demand. The teleSys MACH7-*i*STP is designed to be a stand-alone cost effective SS7 signaling transfer solution that can reside anywhere in the network and can be effectively expanded to meet the increasing traffic demand. Along with the signaling transfer capability the MACH7-*i*STP also provides IP signaling transport services in real time by enabling SIGTRAN based SS7oIP (SS7-over-IP) convergence solution while maintaining interoperability with the legacy PSTN networks.

Based on well-proven SS7 interface and highly available architecture which has been tested and deployed throughout the globe, MACH7-*i*STP virtually eliminates lost network messages and brings more than 99.999% (5 nines) transport service availability to the network elements. The system is scalable allowing for flexibility depending on the customer's requirements.

Benefits

- Cost-effective carrier-grade signaling transport solution.
- Proven reliability and performance characteristics as required by telecom operators.
- Increased revenue due to reduced downtime.
- Improved Network Management.
- Signaling infrastructure cost reduction.
- Easy migration from traditional to next-generation networks.
- Reliable and flexible scalability for signaling (TDM or IP).
- Complete interoperability due to standards based protocol implementation.
- Traditional STP feature set with global title translation (GTT), gateway screening, etc.
- Support for SS7-over-IP following open industry standards: M3UA, SUA and M2PA.
- Ease-of-use to the operators and network administrators.

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MACH7-*i*STP

The teleSys Advantages

SS7 Features

- **PROTOCOL CONFORMANCE**

The MACH7-*i*STP conforms to functions and message protocols as described in ANSI, ITU-T, ETSI, TTC-Japan, NTT-Japan, China and other specific country variants;

- **POINT CODE AND GLOBAL-TITLE ROUTING**

MACH7-*i*STP provides the capability to support Point Code based routing at the MTP3 layer. The advanced Global Title translation functionality at the SCCP layer provides network operators a means to manage any complex network architecture.

- **GATEWAY SCREENING**

The Gateway Screening functionality on the MACH7-*i*STP platform provides: the ability to protect against unauthorized traffic both within and between networks, and protects against malicious and unauthorized access to the network. In addition, it provides notification messages and the collection of measurements on traffic screening results.

- **MESSAGE ACCOUNTING**

The Message Accounting feature helps in monitoring and managing SS7 traffic in real-time to support accurate and detailed billing and reporting, as well as settlement agreements with interconnect service providers. The MACH7-*i*STP captures real-time SS7 traffic data and provides detailed statistics and data records to enable the accounting capabilities to generate revenue for the telecom carriers by selling signaling capacity.

- **MULTIPLE ORIGINATING POINT CODE**

This feature, with MTP Load Sharing, provides the capability to represent as multiple identifiers in the same network, as if multiple physical STP nodes were deployed. This allows for configuration of more than 16 SS7 links from the MACH7-*i*STP, terminating at any single high-capacity node and load-share the traffic across them.

- **APPLICATION TRANSPORT ACCESS**

The Application Transport Access feature intercepts messages that originate from the SS7 network and require further application processing, and redirects them to a specific service or customized application for further processing. The MACH7-*i*STP, as a part of total signaling and service solution, provides a variety of value-added applications essential for providing cost efficiencies, revenue generation, revenue assurance, and network security.

- **FLEXIBLE SS7 INTERFACE SUPPORT**

MACH7-*i*STP supports wide variety of network interfaces which varies with the SS7 network, the SS7 variant and the supported equipments. MACH7-*i*STP supports T1, E1, J1 interfaces for the Low Speed Links (LSL) as well as for High Speed Links (HSL).

- **SS7 OVER IP TRANSPORT**

Based on IETF's SIGTRAN standards MACH7-*i*STP provides un-parallel IP signaling transport between STPs as well as connectivity to next-generation network elements, using M3UA, SUA and M2PA protocols over SCTP.

MACH7-*i*STP

High Availability Features

- **FULL REDUNDANCY**

The MACH7 high availability features keeps all hardware and software components synchronized across the platform while operating in All-Active mode, providing greater than 99.999% (5 nines) availability.

- **DISTRIBUTED SS7 PROCESSING SUB-SYSTEM**

Using teleSys' distributed SS7 algorithm, parallel processing of SS7 signaling traffic occurs via all available SS7 links on the system with distributed architecture. This cutting-edge distributed algorithm uniquely defines functional units within the STP architecture, each optimized for specific set of tasks and interfaces. This innovative architecture provides seamless scalability and flexibility to the MACH7-*i*STP solution to address enormous performance and capacity requirements.

System Features

- **SCALABILITY**

MACH7-*i*STP is designed with high scalability to minimize deployment costs while supporting incremental growth as demand increases. With the increase in service demand and signaling capacity in the network, the MACH7-iSTP allows in-service upgrades of signaling capacity and throughput needs by adding new CE(s) and interfaces, for manageable and cost-effective growth..

- **OAM&P INTERFACES**

The Platform offers a comprehensive Systems Management interface to manage system resources. The solution incorporates all interfaces required for operation and maintenance needs, including: Command Line Interface, Web Browser based Graphical User Interface, and SNMP Interface to the network management system. These provide capabilities to provision of all configurable parameters from the operator interface. This also allows fault-management capability to monitor the status of every modules and interfaces to help in detection, isolation and solution to any error condition. It also provides performance and statistics data which allows for the engineering of architectural and solution requirements based network demands.

- **THROUGHPUT PERFORMANCE**

With unprecedented throughput performance for each of its computing node, a fully equipped MACH7-iSTP platform can process up to 500,000 MSUs per second.

- **OPEN ARCHITECTURE**

The MACH7-*i*STP solution is available on scalable and flexible open-architecture hardware platform for network elements. It allows convenient customized implementation of the operator needs with regards to functionality, performance and reliability. This solution also incorporates industry standard telecom interface to allow ease in interoperability and operations. All network nodes can address a single logical MTP3 server and can also host multiple Originating Point Codes (OPC).

As a fully reliable solution, the MACH7-*i*STP is based on future-proof technology; making it very easy to improve existing functionality, implement new features, increase the performance figures, and adapt new interfaces and standards.

MACH7-*i*STP

Integrated Network Services

In addition to top performance, highest reliability, and complete scalability, the MACH7-iSTP is equipped with an optimal set of revenue generating and resource optimizing features which allow wireline and wireless carriers to support current and future services with a single, cost-effective solution. The unique integrated modular architecture, hosted on standard based MACH7 Application Server Platform, offers advantages over solutions that rely on external SCPs, and enables rapid introduction of services, security, setup, and control continue to provide the revenue generating features.

MACH7 Application Server generally connects to MACH7-*i*STP using SIGTRAN IP interface and also has the capability to interface using MTP based SS7 interface. Followings are some of these integrated network services:

- **ANSI-ITU INTER-WORKING**

The ANSI-ITU Gateway feature enables inter-connection and inter-working between the two SS7 networks supporting different standards. It performs seamless protocol conversion between the two networks at MTP and SCCP level and allows sharing of services between those. For example, Wireless Roaming, CDMA services in ITU based GSM networks, etc.

- **NUMBER PORTABILITY**

The Number portability service allows customers to move from one provider to another while retaining their numbers, which is required by law and a prime requirement to receive or keep an operating license. The Number Portability database hosted on Application Server, contains all ported numbers and their subscription networks, represents the central system to route calls to the networks of the respective service providers.

- **NUMBER TRANSLATION**

The application server database also provides the capability to offer basic and advanced call-routing services for the service providers. This includes toll-free, premium-rate, one-number services, etc. It provides translated number information to the switch which has generated the query for further call routing.

- **SMS HUB**

teleSys' SMS Hub/Broker solution facilitates SMS clearing and settlement through the processing and reporting of SMS traffic on behalf of mobile operators. This solution allows for the management and administration of business relationships between mobile operators who do not have bilateral agreements. The platform enables flexibility in pricing for SMS events based on SMS event type on top of flat rate. This solution also facilitates least cost routing solution for SMS traffic by offloading them over IP using SMPP.

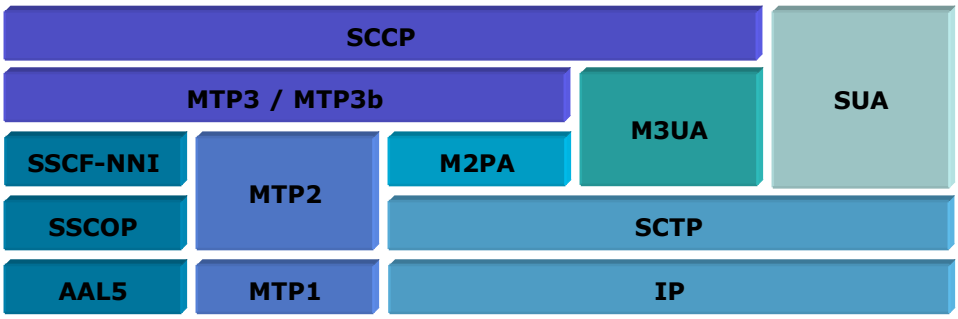
- **FRAUD CONTROL**

This service provides advanced signaling security, enforcing interconnect agreements to the service providers. It enables carriers to mediate access to network resources based on any message parameter or combination of parameters, present in incoming SS7 message. It also prevents unauthorized access to network elements, database services and leased facilities on real-time, and can block calls to and from black listed phone numbers.

- **SMS GATEWAY**

The SMS Gateway capability mitigates the throttling situation of SMSCs during traffic bursts. Using this feature, the MACH7-*i*STP authenticates an incoming short message and then directs it to the appropriate servicing MSC or to the destination server. This first-attempt message delivery service enables service providers to handle increasing levels of SMS traffic without the addition of new SMS-Cs by offloading mobile traffic to its destination instead of Message Center, if delivered successfully in the first-attempt.

MACH7-*i*STP



AAL5: ATM Adaptation Layer 5
IP: Internet Protocol
MTP1: Message Transfer Part Layer 1
MTP2: Message Transfer Part Layer 2
MTP3/MTP3b: Message Transfer Part Layer 3 or Layer 3b
M2PA: MTP2-User Peer-to-Peer Adaptation Layer
M3UA: MTP3 User Adaptation Layer
SCCP: Signaling Connection Control Part
SSCOP: Service-Specific Connection-Oriented Protocol
SCTP: Stream Control Transmission Protocol
SSCF-NNI: Service-Specific Coordination Function for Network Node Interface
SUA: SCCP User Adaptation Layer

Technical Specifications

SS7 Conformance

- **SCCP**

Q.711-714, Q.716, Q786 ITU-T, T1.112 ANSI.

- **MTP3**

Q.701-709, Q.781, Q.791 ITU-T, T1.111– ANSI**,** NTT Japan, TTC Japan and China SS7.

- **HIGH SPEED LINKS**

Q.703-Annex A, Q.2140, Q.2110, Q.2210, Q.2144 ITU-T, GR-2878, I.363, I.361 ANSI.

SIGTRAN Conformance

- **SCTP**

IETF RFC 2960: Stream Control Transmission Protocol.

- **M3UA**

IETF RFC 4666: SIGTRAN SS7 MTP3-User Adaptation Layer.

- **SUA**

IETF RFC 3868: SIGTRAN SS7 SCCP-User Adaptation Layer.

- **M2PA**

IETF RFC 4165: SIGTRAN SS7 MTP2-User Peer-to-Peer Adaptation Layer.

MACH7-*i*STP

Category	teleSys MACH7-iSTP Capability
SS7 routing	Any-to-any routing between network interfaces, along with • MTP routing. • SIGTRAN routing. • SCCP routing with enhanced Global Title Translation (GTT). • Protocol variant conversion at SCCP and MTP level. • Cross network (e.g. National and International) interworking support. • Message content (MAP, CAP, INAP, TCAP and ISUP) based intelligent routing.
GTT Support	Full support for SCCP GTT with address masking for best possible match up to max address digits.
Gateway screening	Full STP screening capability at MTP3 and SCCP layer using access lists for any combination of the following MSU parameters: - MTP3 / M3UA Screening (Origination point code, Destination point code , Service indicator) - SCCP / SUA Screening (Called Party Parameters, Calling Party Parameters, SCCP Management Messages)
SCCP Application Group	SCCP Application group routing to distribute traffic across multiple destinations or route based on Primary / Secondary status of remote nodes
SS7 load sharing	Complete load-sharing of traffic across available SS7 and SIGTRAN connections simultaneously
Multiple point codes	Support for Multiple OPC on a single installation. Support Capability Point Code for GTT in case of mated-pair configuration.
SIGTRAN Interworking	Complete support for SIGTRAN interworking across all SIGTRAN (M3UA , SUA and M2PA) and SS7 (MTP2 / MTP2 HSL / ATM HSL) interfaces
Trouble-shooting	Full debugging and tracing capabilities for troubleshooting
Statistics	Statistics for both data and network management traffic at all interfaces.
OAM&P	Web browser based GUI, along with command line interface for remote ssh sessions. SNMP interface for alarms and error reporting
Security	Well-defined protection against unauthorized access at operation interfaces of the system with tiered access-control levels and session logs for the users.
Hardware Platform	Carrier-grade off-the-shelf platforms, from industry leading vendors with support for multi-threaded and multi-core processing environment

MACH7-*i*STP

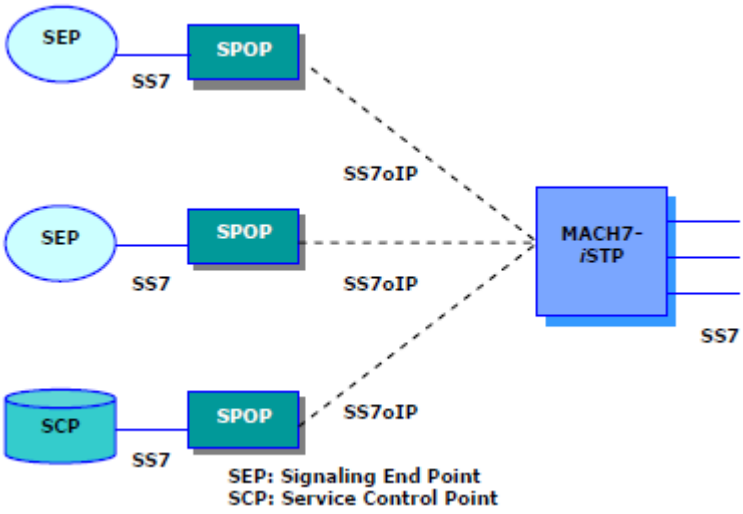
Signaling Transport Solution over IP

teleSys MACH7-*i*STP also provides a cost-effective SS7 off-load solution to the network providers by enabling reliable, efficient transport of SS7 signaling over IP to the remote locations using MACH7-SPOP, the Signaling-Point-of-Presence.

Small, compact and operationally transparent MACH7-SPOP systems are positioned next to wireless or wire line network entities such as Home Location Registers (HLRs), SMSCs, Switching Service Points (SSP, or switches) and Signal Transfer Points (STP) delivers IP connectivity from MACH7-*i*STP to the edge of the network rather than over dedicated, long haul expensive SS7 links.

The MACH7-SPOP, shares the same Originating Point Code utilizes IETF's SIGTRAN SS7-over-IP protocol standard over SCTP, which ensures the same high level of reliability when transporting messages over IP as with traditional SS7 circuits.

With the SPOP, a gradual transition to IP networks can cost-effectively supplement MTP based transport with little or no risk to existing networks, nodes and revenue streams.



Benefits of the teleSys offload solution include:

- Significantly reduce transport costs as it off-loads heavy use SS7 traffic cost-effectively over IP; Short Message Service (SMS) directly to a SEP such as a MSC, HLR or SMSC.
- Supports remote switch deployment in locations where SS7 cannot be provided cost-effectively.
- Back-hauls long distance SS7 signaling traffic from national and international networks.
- Replaces A-Links for SEPs while consolidating traffic and reducing STP ports.
- Supports next generation customer premise or enterprise equipment, e.g. In-Building Wireless Systems to connect to SS7 networks.
- Telco-grade reliability while delivering the convenience of remote location deployments.
- Remote secure access to allow provisioning, maintenance, and upgrades.

teleSys Software, Inc.

teleSys is the premier provider of advanced Telecommunications solutions for the next generation LTE Signaling Networks, providing open systems hardware and software.

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