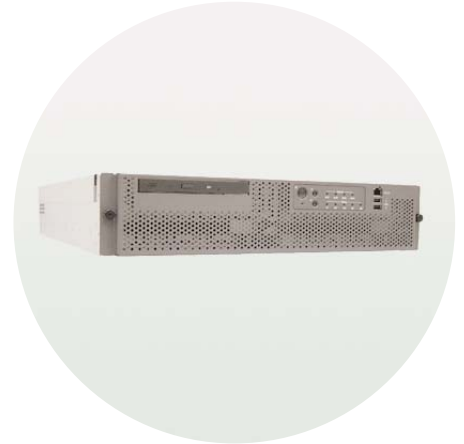


# Intel NetStructure® SS7G21 and SS7G22 Signaling Gateways

## SIGTRAN Gateway (SGW) Option

The Intel NetStructure® SS7G21 and SS7G22 Signaling Gateways with the SIGTRAN gateway (SGW) software option are key building blocks in the next generation of networks and service platforms. Providing an interface between Signaling System 7 (SS7) and Internet Protocol (IP) networks, they allow SS7 information to be carried over IP to IP-resident signaling points and applications such as softswitches and mobile network elements, or to another signaling gateway. The flexibility and control available with this option makes it ideal for a range of call control and transaction-based applications. Use it for creating wireless and intelligent networking systems and IP telephony gateways, and for expanding SS7 bandwidth on existing networks by using the SS7G21 or SS7G22 signaling gateway platforms.



Features	Benefits
<b>Enables the existing SS7 infrastructure for use with the IP network</b>	Allows next-generation networks to use current circuit-switched and mobile network value-added services. SS7 signaling can be offloaded onto the IP network or directly to IP endpoints.
<b>Prepackaged telco-grade NEBS chassis and SS7 components</b>	Provides a higher level SS7 building block and lets developers focus on solution development rather than SS7 integration
<b>Supports a number of SIGTRAN standards for transporting SS7 over IP</b>	Provides the flexibility to support different architectures such as the replacement of SS7 links with IP or the ability to eliminate some SS7 network constraints such as link bandwidth
<b>Supports distributed, resilient, and scalable architectures along with multiple SS7 variants (ANSI, ETSI, Japan) with options for higher performance and density</b>	Provides the flexibility to build small- to large-scale configurations to meet the varying needs of different deployments worldwide
<b>Capable of high message rates on all SS7 links, which allows an SS7G22 to support up to 30,000 MSUs per second</b>	Accommodates very demanding, mobile and intelligent networking transaction-intensive applications

The SGW option lets applications be distributed over multiple platforms, creating scalable and resilient networks. Routing algorithms do not simply re-create SS7 links and linksets in the IP domain: they form the foundation of advanced distributed service platforms. By using the Internet Engineering Task Force (IETF) SIGTRAN protocols, interoperability with third-party equipment is ensured. SIGTRAN's Stream Control Transmission Protocol (SCTP) and adaptation layers carry SS7 traffic transparently through IP networks to remote applications or between gateways. The SS7G2x platforms handle management interworking and the reporting of route availability between the IP and SS7 domains.

As a new range of services and architectures are deployed on existing networks and new data-centric networks are deployed, standards-based network-grade systems are

required. The SGW option for the SS7G2x platforms meet this need by combining mature SS7 software and hardware, interoperable SIGTRAN protocols, and powerful features for control over both SS7 and IP networks.

The SS7G21 and SS7G22 Signaling Gateways also provide these features.

- Support connectivity to SIGTRAN-compatible application servers
- Enable advanced routing capabilities
- Allow multihost distributed application server systems
- Supplies high performance in 2U form factor
- Operates on a managed wide area network (WAN) infrastructure

## Applications

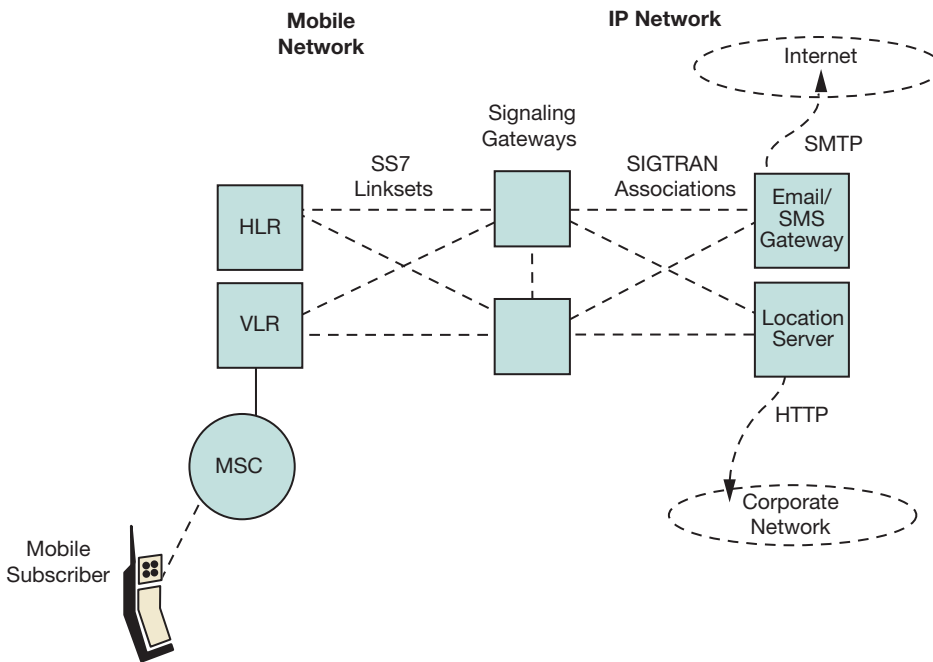
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- Mobile short messaging services
- Location-based services
- Distributed switch
- SS7 long haul and offload
- GPRS integration
- IP telephony gateways
- Intelligent networking SCP
- IP-based application service provider
- Intelligent messaging routing/parameter manipulation

## Deployment Scenarios

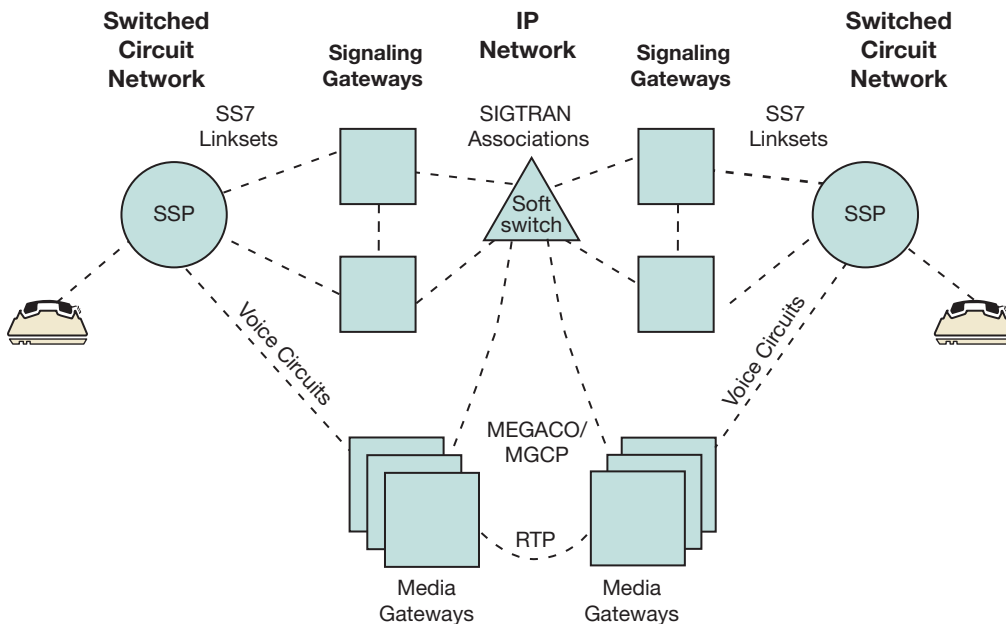
SS7G2x Signaling Gateways may be deployed in a wide variety of application scenarios and environments. Form factor and hardware features make these gateways ideal for the public network and other environments where reliability is a key factor. They can also enable a wide range of SS7/IP applications.

### Mobile Short Messaging/Location-based Services



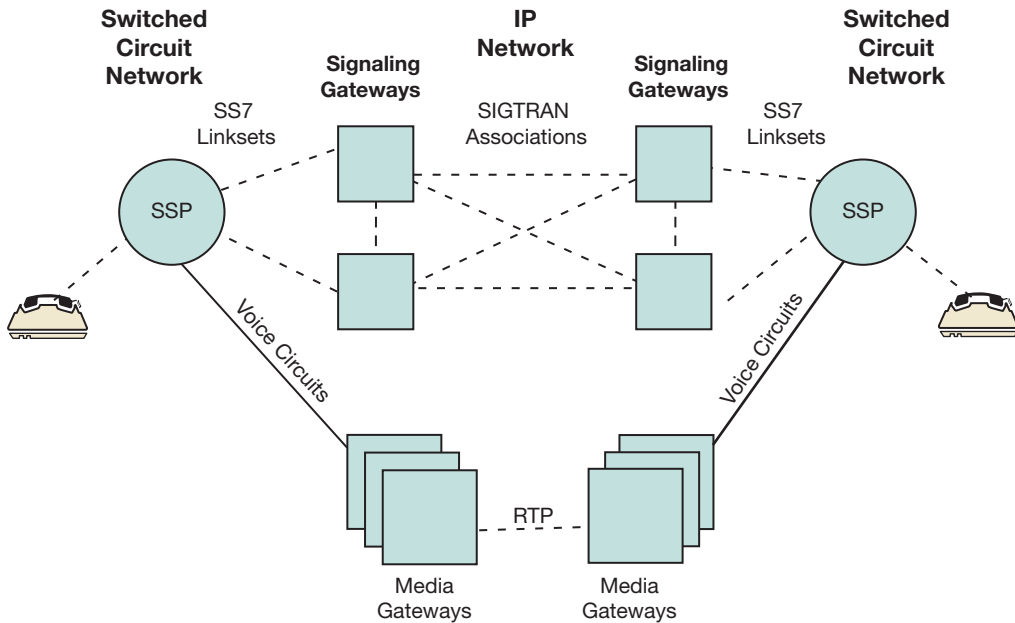
Combined with GSM-MAP/TIA-41 and SIGTRAN software, or another SIGTRAN compatible application server, the Signaling Gateway can be used to create advanced mobile short messaging or location-based services. Message routing and SS7 link management for distributed IP hosts is also provided, which allows highly scalable and reliable systems to be constructed using low-cost components. They are also an ideal component for integrating Web, email, and other data services into a traditional 2G network.

### Distributed Switch



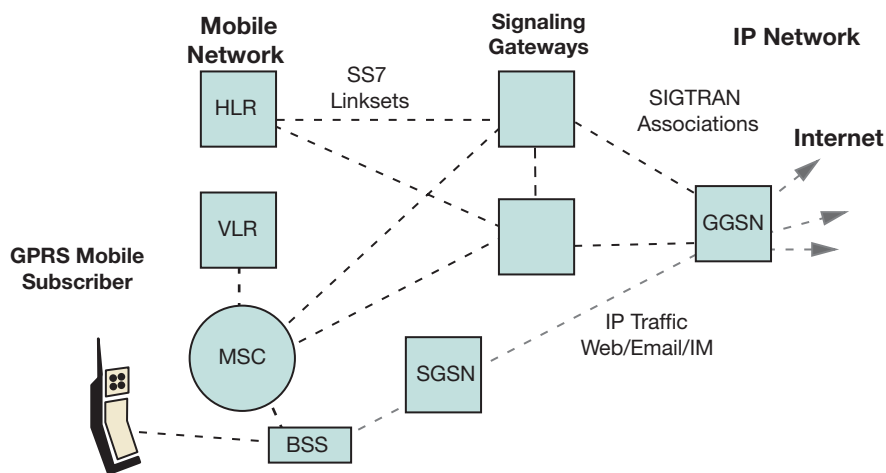
A distributed switch can be built using the Signaling Gateways to provide signaling connectivity, allowing signaling gateways, media gateways, and call control platforms to be placed in the most efficient locations. They can also be used as a replacement for expensive monolithic transit switches to enable distributed, scalable, and more cost-effective IP-based systems.

### SS7 Long Haul and Offload



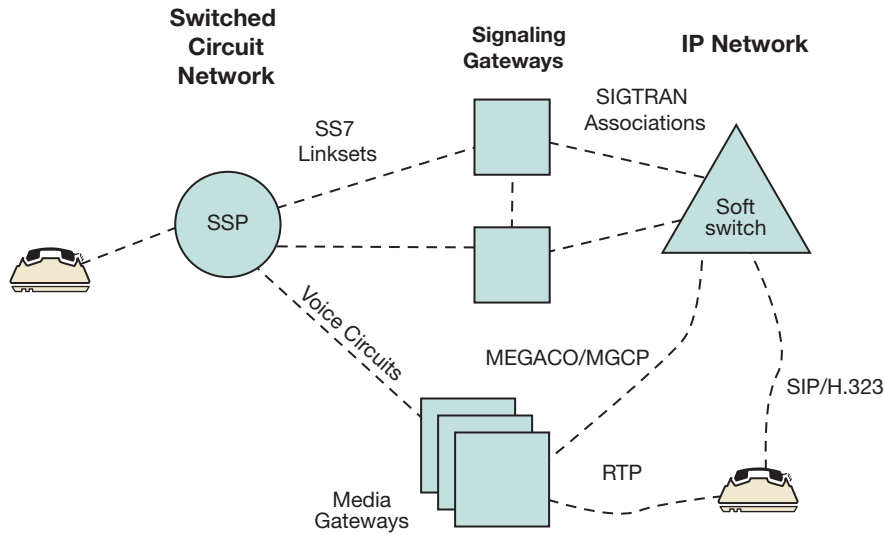
Two SS7G21 or SS7G22 units can enable low-cost, high-bandwidth IP links for reliable SS7 messaging. SS7 networks, originally dimensioned for basic call control applications, can become overloaded by new revenue-creating services such as short messaging and intelligent networking. The Signaling Gateways can use IP data networks for reliable SS7 transport, providing added bandwidth quickly and efficiently. In addition, the chassis includes four Ethernet ports per gateway for resilient network design.

### GPRS Integration



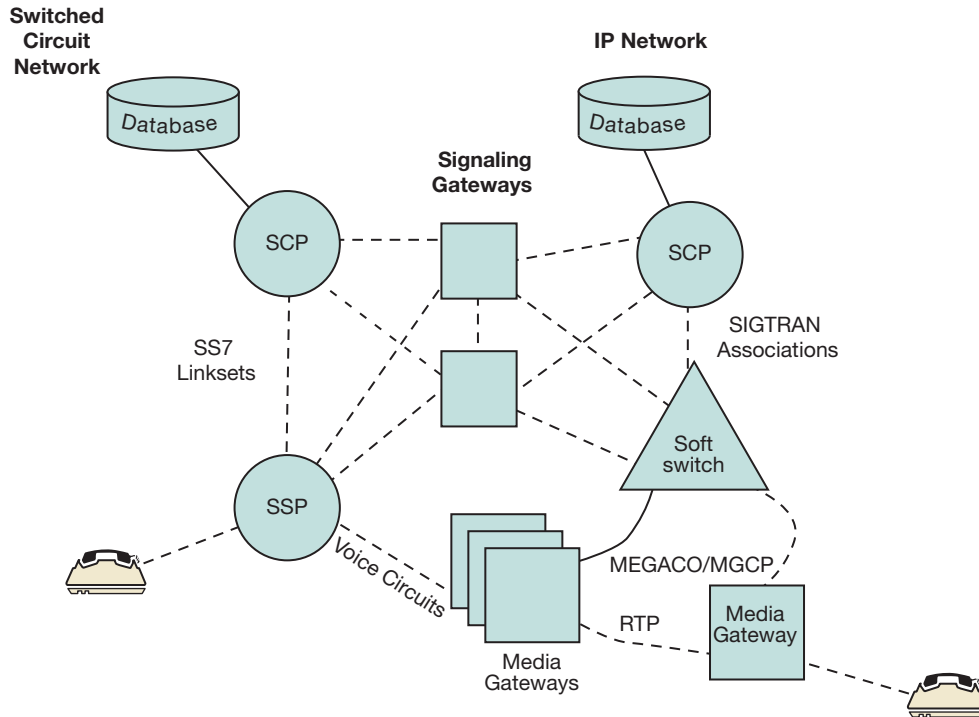
Adding general packet radio service (GPRS) integration for 2.5G mobile networks to global system for mobile communications (GSM) systems requires the overlay of reliable bearer and management IP capabilities to existing circuit-switched networks. The Signaling Gateways can effectively consolidate such a system by transmitting the SS7 signaling over IP or standard time-division-multiplex (TDM) links as required. Such a strategy lets operators add GPRS service to existing networks at a significantly lower total cost of ownership (TCO). It also provides opportunities to consolidate further since IP links can replace SS7 links as opportunities arise.

## IP Telephony Gateways



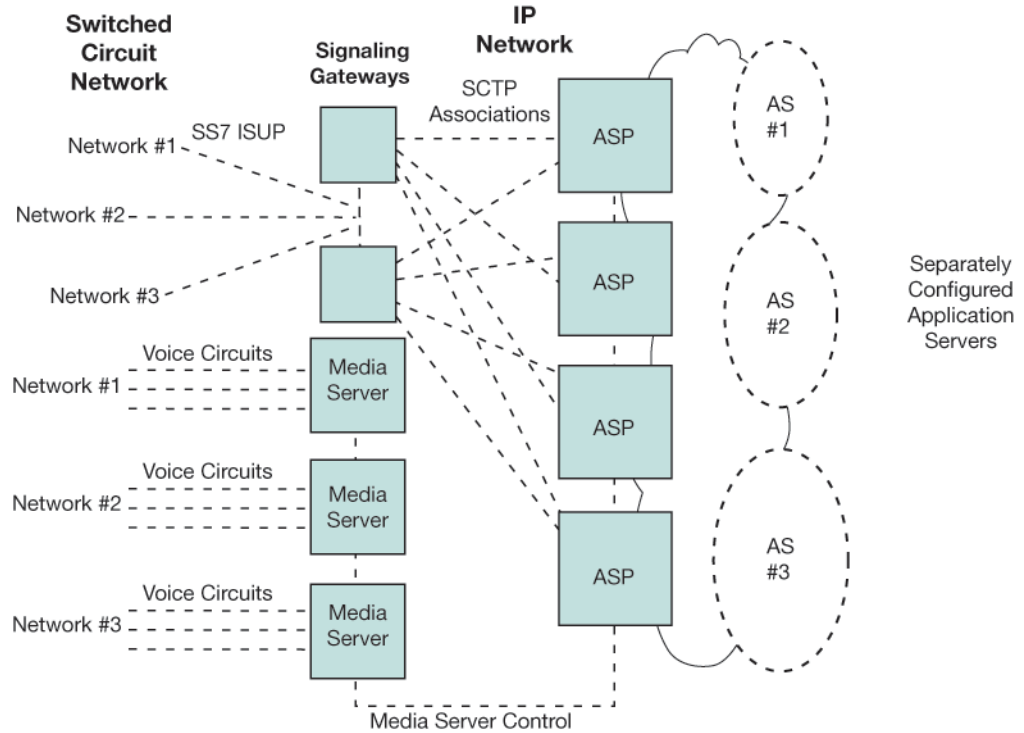
The SS7G21/SS7G22 is an ideal component in new PSTN/VoIP gateways. The Signaling Gateway interconnects to SIGTRAN/SS7 compatible softswitches to provide consolidated, completely standards-based SS7 connectivity. Such deployments ensure scalability and vendor independence, allowing more units and equipment from other vendors to be added as required.

## Intelligent Networking Service Control Point (SCP)



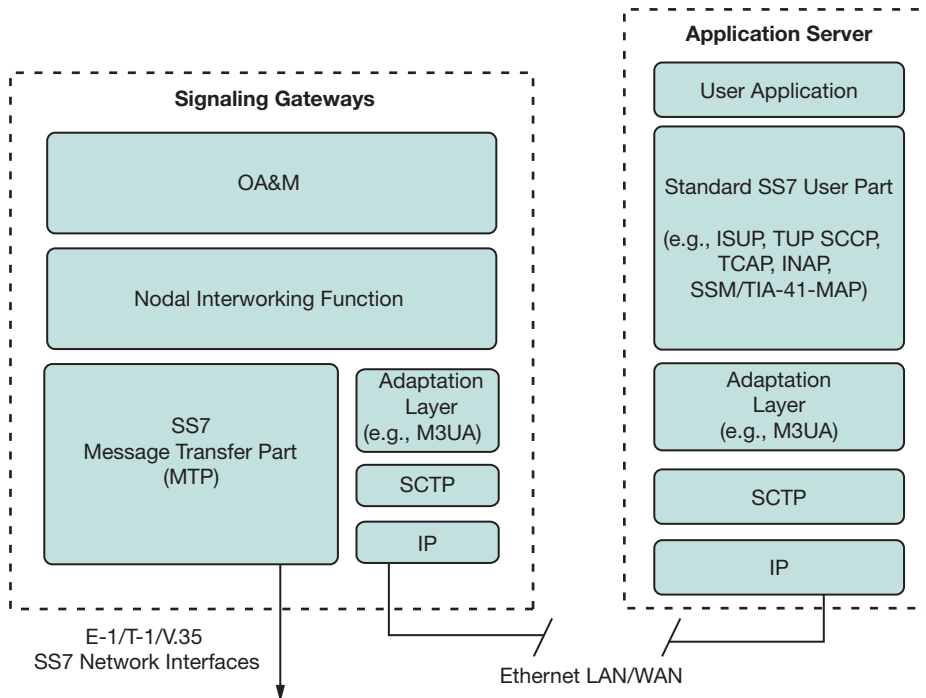
IP-based entities may query SS7 databases through the Signaling Gateway or visa versa. For example, a single database can be maintained while networks are migrated to IP, and that database can be located in either network, with the SS7G21/SS7G22 providing seamless interoperation.

## IP-based Application Service Provider



Application service providers (ASPs) can use SS7G21 and SS7G22 Signaling Gateways to build distributed platforms running multiple services for existing networks. Application servers can fully run several services, and use gateway routing information to process calls in a particular context. This strategy allows an ASP to use a single distributed system instead of separate “virtual” application servers for configuration information and status.

## Intelligent Message Routing/Parameter Manipulation



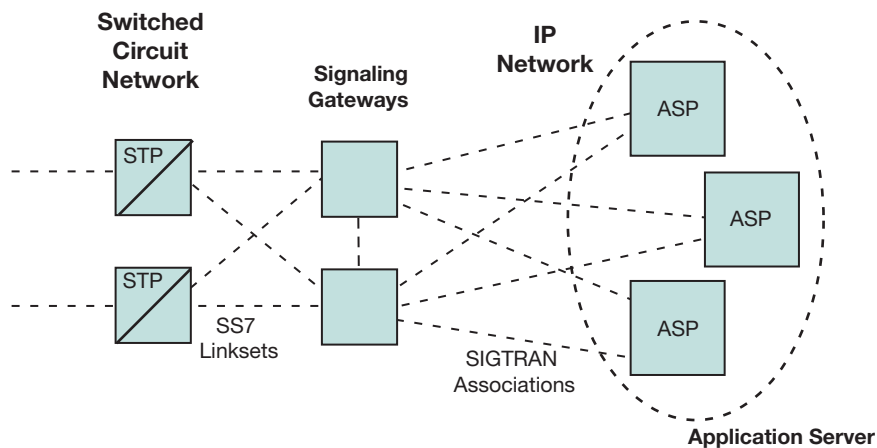
The SS7G21 and SS7G22 Signaling Gateways support standard SIGTRAN-based SS7 routing capabilities and allows more complex custom routing for additional flexibility and control in real-world network deployments. Combined with SS7 message parameter manipulation, such a deployment can resolve many problems with incompatible networks or equipment. Powerful innovative services that require a more sophisticated handling of messages can be created without extra equipment. The Signaling Gateway with the SGW license can route messages to IP hosts based on a wide variety of parameters, including originating point code, destination point code, originating network, service indicator, and integrated services digital network (ISDN) user part/telephone user part (ISUP/TUP) carrier identification code (CIC).

## Application Server Software

A complete suite of protocol software may be provided to complement the Signaling Gateways. This includes SIGTRAN SCTP and adaptation layers, such as the MTP3 user adaptation layer (M3UA) and MTP2 peer-to-peer adaptation layer (M2PA), along with standard SS7 user part software such as ISUP, mobile application part (MAP), or intelligent network application part (INAP). Standard configuration and messaging interfaces, along with Global Call software from Intel, allow easy migration for existing systems and a highly flexible and powerful interface for creating new advanced services.

Combining signaling gateway and application server software based on Intel® architecture lets complete signaling applications be constructed in a scalable, resilient, and cost-effective manner. With a wide range of SS7 protocol variants and interoperable SIGTRAN protocols supported, the SIGTRAN gateway and application server software may be deployed worldwide, enabling interoperation with multiple vendors seamlessly.

## System Resilience



A pair of Signaling Gateways may be run in dual active/active operation, taking advantage of the resilience of SS7 architecture. In this configuration, each gateway operates independently, cooperating with the other to maintain status awareness. Under normal operation, both units share the load and contribute actively to system throughput. If either fails, the other unit takes over the full load, maintaining service at all times.

The connected IP hosts may act as discreet application server processes making up a single distributed application server. This allows systems to be scaled as required and is also designed for N+1 load-sharing or fail-over capability.

A pair of Signaling Gateways may also operate as one point code for high availability of an SS7 node. Each gateway includes four Ethernet ports. The ports may be used for management, traffic, or a combination of both for maximum resilience and flexibility. This combination of hardware and software features gives a very high level of fault tolerance without the need for complex application management.

## Operation, Administration, and Maintenance

The SS7G21/SS7G22 supports standard operations, administration, and maintenance (OA&M) interfaces, including signaling network management protocol (SNMP), allowing easy integration into automated, centralized management systems.

### Gathering Statistics

The Signaling Gateway supports the collection of statistical data for protocol layers and system operation. Traffic measurements provide statistics allowing close and accurate monitoring of link utilization\*\*, traffic volume, and system performance. This data may be requested through the OA&M interfaces or reported periodically to a remote data center. Critical data can be maintained within the unit in non-volatile storage.

### Configuration

Configuration is performed using either of the two local terminal ports or remotely over a large area network/wide area network (LAN/WAN) using transmission control protocol/Internet protocol (TCP/IP, Telnet). Configuration parameters can be modified dynamically without impacting ongoing normal operation in other parts of the unit, and once entered, new parameters take immediate effect. All configuration data is stored internally in non-volatile memory, and in the event of a power outage, the unit will automatically restart when power is restored, and resume full operation using the current configuration parameters.

### Alarms

Status commands let the user interrogate the current operating state of all internal modules. An internal alarm log maintains a history of the occurrence and clearance of all recent alarm conditions, and can be viewed from any management interface. The user can freely configure the class of each alarm event to cause it to activate the alarm relays (designated Minor, Major, and Critical) that would normally be cabled to the alarm panel in the network management center. All alarm events can optionally be reported as they occur to a remote management center over TCP/IP using the Remote Data Center or SNMP.

### Remote Data Center

The Remote Data Center capability lets several types of management data be automatically transferred to one or more computers at remote locations. Usage records, message failures, and alarm events are all transferred as they happen, while traffic measurements are generated periodically at user-configurable intervals. All data transferred to the Remote Data Center is in comma delimited (CSV) format text files, permitting easy import into spreadsheet or database applications for post-processing.

The Remote Data Center feature also lets information be uploaded onto the unit from a remote site. Configuration information may be prepared offline and loaded dynamically from a remote location without any impact on operation. Software updates can also be performed remotely without a site visit.

### SNMP

In addition to the comprehensive management facilities already provided, the unit supports an SNMP interface allowing monitoring from a remote SNMP management station.

## Technical Specifications

### SS7 Signaling Capabilities of the Intel NetStructure® SS7G21 and SS7G22 Signaling Gateways with the SIGTRAN Gateway (SGW) Software Option

- Connects directly to a maximum of 64 adjacent switches
- Connects indirectly (via signaling transfer points [STPs]) to a maximum of 512 switches
- Connect to four different SS7 networks with simultaneous use of the following:
  - American National Standards Institute (ANSI)
  - Telecommunications Standards Section (ITU-T)
  - Japanese Message Transfer Parts (MTP)
- Supports combined link sets
- Enables fully flexible connections with 14-, 16-, and 24-bit point code sizes
- Allows multiple local point codes (up to 4)
- Supports configurable data rate (48, 56, or 64 kb/s) and error correction mode (basic or PCR)
- SCTP associations for 32 other signaling gateways for highly meshed networks
- SCTP associations for 200 application server processes

### System Specifications

Maximum capacity is dependent on the number of signaling boards installed. The figures listed here are for a single unit. Use of the SS7G21 and SS7G22 with the SGW option in dual pairs or in clusters will proportionally increase the capacity of the overall system while still acting as a single SS7 point code or deliver a highly resilient platform which supports multiple networks or point codes.

Capacity	SS7G21	SS7G22
Signaling boards per chassis	Up to 3	Up to 3
Physical ports per unit		
T-1/E-1	Up to 12	Up to 12
V.11 (V.35 compatible)	Up to 6	0
SS7 links per unit (including M2PA)	Up to 12	Up to 128
SS7 linksets per unit	Up to 48	Up to 64
Number of SS7 routes	512	512
Number of networks	4	4
10/100/1000 Mbit/sec Ethernet interfaces	4	4

### Reliability/Warranty

MTBF prediction for Bellcore* Method @ 40° C (1 signaling board and single psu configuration)	55,700 hours	49,000 hours
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Warranty

Intel® Telecom Products Warranty Information at  
<http://www.intel.com/network/csp/products/3144web.htm>

## Technical Specifications (cont.)

### Interfaces (SS7G21 and SS7G22)

LAN interface	4 x 10/100/1000 MB/s Ethernet
Line interface: PCM	Up to 12 interfaces, each software configurable as either T-1 or E-1
Pulse mask	T-1: TIA-968-A, CS-03, and AT&T* TR62411 E-1: ITU-T G.703
Data rate	T-1: 1544 kbits/s ± 50 ppm E-1: 2048 kbits/s ± 50 ppm
Frame format	T-1: D4, ESF, and ESF-CRC6 E-1: E1 and E1-CRC4
Line codes	HDB3 AMI (ZCS) AMI B8ZS
Connector type	RJ-45
Line interface: Serial	Up to six interfaces (SS7G21 only)
Electrical	V.11 (V.35 compatible)
Connector type	D-type (26-pin high density)

### Power

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DC-powered Products	
Supply voltage (range nominal)	-48 VDC to -60 VDC
Input power (fully equipped)	200 W
Range limits	-38 VDC to -75 VDC
AC-powered Products	
Supply voltage (auto ranging)	100 VAC to 127 VAC / 200 VAC to 240 VAC
Input power (fully equipped)	230 W
Frequency	50 Hz to 60 Hz

### Physical Dimensions

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Height	3.45 in. (8.763 cm)
Width	17.11 in. (43.46 cm)
Depth	20 in. (50.8 cm)
Weight – fully equipped	40.5 lbs (18.5 Kg)

### Environmental

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Operating temperature	+5° C to +40° C
Storage temperature	-40° C to +70° C

### Approvals

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Declaration of Conformity	See <a href="http://developer.intel.com/design/litcentr/ce_docs/index.htm">http://developer.intel.com/design/litcentr/ce_docs/index.htm</a>
Country-specific Approvals	See the Global Product Approvals list at <a href="http://resource.intel.com/globalapproval/globalapproval.asp">http://resource.intel.com/globalapproval/globalapproval.asp</a>

### Safety, EMC, and Telecommunications

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International	Safety: CB Certificate to IEC 60950-1, EN60950-1 EMC: EN 300 386, EN55022, EN 55024, CISPR 22 Telecommunications: TBR12, TBR13
United States	Safety: UL 60950-1 EMC: FCC Part 15 Class A Telecommunications: TIA/EIA-IS-968 (SS7G21), TIA-968-A (SS7G22)
Canada	Safety: CAN/CSA-C22.2 No 60950-1 EMC: ICES-003 Telecommunications: CS-03

## Ordering Information

The SS7G21 is fitted with Intel NetStructure SPCI4 or SPCI2S boards with a system maximum of 12 SS7 links and provides a form, fit, and function replacement for the Intel NetStructure SG430 Signaling Gateway on a higher performance platform. An SS7G21 may be purchased with either

- 1, 2, or 3 SPCI2S boards (4 SS7 links, 2 T-1/E-1 interfaces, two V.11 serial ports per board)
- 1, 2, or 3 SPCI4 boards (4 SS7 links, 4 T-1/E-1 interfaces per board)

The SS7G22 is fitted with Intel NetStructure SS7HDP boards and offers significantly greater performance and link density than the SS7G21. An SS7G22 may be purchased with 1, 2, or 3 SS7HDP boards (64 SS7 links, 4 T-1/E-1 interfaces per board with a system maximum of 128 SS7 links).

Both the SS7G21 and SS7G22 use the same 2U carrier-grade chassis and operate with the same software. For each one, many variants are available offering different numbers of signaling boards and power supply types (AC or DC). Differences include

- The type of SS7 signaling boards installed in the unit
- The number of T-1/E-1 ports provided
- The number of signaling links that can be processed (from 4 to 128)
- The processing performance

Optional redundant power supply units may be ordered separately.

When ordering the SS7G21 or SS7G22, there is no need to order individual signaling boards, as the product is delivered with boards already installed. According to the requirement, the correct Product ID (item market name) can be ordered to identify a unit with 1, 2, or 3 boards of any variant, and power supply type.

## Product Line Overview Table

Product (Item Market Name)	Description
SS7SBG20SGW	SGW base and M3UA software license
SS7SBG20M2PA	M2PA software license (requires SS7SBG20SGW)
SS7G22AH1 or SS7G22AH2 or SS7G22AH3	SS7G22 AC system with 1, 2, or 3 SS7HDP boards
SS7G22DH1 or SS7G22DH2 or SS7G22DH3	SS7G22 DC system with 1, 2, or 3 SS7HDP boards
SS7G21AQ1 or SS7G21AQ2 or SS7G21AQ3	SS7G21 AC system with 1, 2, or 3 SPCI4 boards
SS7G21DQ1 or SS7G21DQ2 or SS7G21DQ3	SS7G21 DC system with 1, 2, or 3 SPCI4 boards
SS7G21AD1 or SS7G21AD2 or SS7G21AD3	SS7G21 AC system with 1, 2, or 3 SPCI2S boards
SS7G21DD1 or SS7G21DD2 or SS7G21DD3	SS7G21 DC system with 1, 2, or 3 SPCI2S boards
<b>Optional</b>	
TLPACPSU002	Redundant AC power supply module for SS7G21Axx or SS7G22Axx
TLPDCPSU002	Redundant DC power supply module for SS7G21Dxx or SS7G22Dxx
TMLPMOUNT51	2/4-post 19" (48.26 cm) rack mount
TMLPMOUNT52	2/4-post 23" (58.42 cm) rack mount

To learn more, visit us at <http://www.intel.com>.

1515 Route Ten  
Parsippany, NJ 07054  
Phone: 1-973-993-3000

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