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What is Signaling System Seven (SS7)?

SS7 is a critical component of modern telecommunications systems. SS7 is a communications protocol that provides signaling and control for various network services and capabilities. Being a layered protocol, SS7 provides various protocol levels for connection oriented and connectionless (database) signaling in fixed and mobile networks.

- **Transaction Capabilities Application Part (TCAP):** TCAP is the portion of the SS7 protocol stack utilized for transport of the payload of other application processes
- **ISDN User Part (ISUP):** ISUP is a form of connection oriented signaling used for call set-up

While the Internet, wireless data, and related technologies have captured the attention of millions, many forget or do not realize the importance of SS7. Every call in every Public Switched Telecommunications Network (PSTN)

system is dependent on SS7. Likewise, every mobile phone user is dependent on SS7 to allow inter-network roaming. SS7 is also the “glue” that sticks together circuit switched (traditional) networks with packet-switched (IP based) networks.

Origins of SS7

Common Channel Signaling Network (CCSN) technology was introduced in the mid-1970s to improve trunk signaling (e.g. signaling for call set up involving inter-office facilities). Prior to CCSN, trunk signaling was performed via multi-frequency. After the introduction of CCSN, this form of signaling would be referred to as “in-band” signaling.

The early form of CCSN was known as Common Channel Signaling number Six (CCS6) and was used within the AT&T toll network for trunk signaling. It was also used by AT&T to provide great efficiency for their In-WATS (incoming Wide-Area Telephone Service) offering, the original version of toll-free calling, which at the time was available only to AT&T prior to portability of 800 numbers.

In the 1980s, a new CCSN protocol known as Signaling System number Seven (SS7), was developed and deployed. Telephone companies soon realized the advantages in SS7 that surpassed improvements in trunk signaling and it became the vehicle for signaling to databases and other platforms associated with enhanced services enabling the advent of intelligent networking. Variations of SS7 are now the standard through the world.

SS7 Network Elements

Networks elements involved in SS7 include the following examples:

- **Service Control Point (SCP):** SCPs are usually deployed in pairs. They are the brains of the SS7 network – where service logic resides
- **Signal Transfer Point (STP):** STPs are always deployed in pairs. They are the backbone of the SS7 network – routes signals to network nodes.
- **Service Switching Point (SSP):** By definition, an SSP is a switch that is intelligent network capable, meaning that they have software logic and triggering necessary to invoke SS7 messages based on events as well as respond to SS7 messages received to affect call control.

More SS7 Information

Do you have questions about SS7, intelligent networks, or SS7/IN based applications and services?

Intelligent Networks



The term “Intelligent Network” (IN) pertains to a framework for intelligence in support of Time Division Multiplex (TDM) circuit-switched networks. As opposed to IP-based networks, typified by intelligence at the edge and very flat, democratized communications, IN provides support for carrier-controlled networks with intelligence residing in centralized databases.

Inter-system Signaling

There are two major types of inter-system signaling for mobile/cellular database signaling: GSM Mobile Application Part (MAP) and ANSI-41. GSM MAP is the standard utilized for GSM and ANSI-41 is the inter-system standard for other mobile networks including CDMA. Both ANSI-41 and GSM MAP rely upon **SS7** as a signaling protocol and both support intelligent network operations in terms of subscriber registration, roaming, and service profile portability.

Intelligent Network Standards for Cellular

The two recognized global standards for IN in mobile/cellular networks are Wireless Intelligent Network (WIN) and Customized Applications for Mobile Enhanced Logic (CAMEL). WIN and CAMEL are the standards used to provide network intelligence in ANSI-41 and GSM networks respectively. The two standards are similar in the sense that they achieve the same high-level technical and business goals. Both WIN and CAMEL rely upon SS7 as a signaling protocol.

Wireless Intelligent Network (WIN)

As WIN standards have been introduced, accepted and evolved, they have become part of the core ANSI-41 standards. In contrast, the GSM CAMEL Application Part (CAP) represents that portion of the GSM standard that uses CAMEL, and will remain a separate yet associated standard to the core GSM networking standard, GSM MAP.

WIN is based on an open industry standard that enables equipment from different suppliers to interoperate successfully, and allows automatic roaming between various networks. The WIN standard is part of the ANSI-41 family of standards, which allows additional capabilities to any existing ANSI-41-based network within an open vendor environment, to ensure full interoperability with third-party products and services.

Customized Applications for Mobile Enhanced Logic (CAMEL)

Finalized in 1997, CAMEL phase I introduced improved capabilities as mobile operators could begin to offer services and features to their customers that could work while roaming. This initial version of CAMEL represented an improvement over previous GSM systems that relied upon the Intelligent Network Application Part (INAP). This

is because INAP is an IN protocol designed for fixed networks and accordingly has many limitations for use in mobile/cellular networks.

Intelligent Network Conceptual Model (INCM)

WIN and CAMEL are both based on the same Intelligent Network Conceptual Model (INCM). The INCM represents an architectural framework and certain capabilities, not services. Similarly, WIN and CAMEL call models represent high-level models of call control functionality that define capabilities, not the services themselves.

The call model makes information concerning the call state and associated data visible to external intelligent network elements such as the SCP and HLR so they can use their logic to process the call. Because the service logic and call switching functionality are separated, external intelligent network elements can control services.

All intelligent networking for telecommunications involves the concept of a “query/response” system. This system entails the notion of intelligence residing in a remote database that is queried for information necessary for call processing.

For example, a Mobile Switching Center (MSC) equipped with WIN or CAMEL call logic, can launch a message or “query” to a database hosted by a network element called a Service Control Point (SCP). The SCP processes the request and issues a “response” to the MSC so that it may continue call processing as appropriate.

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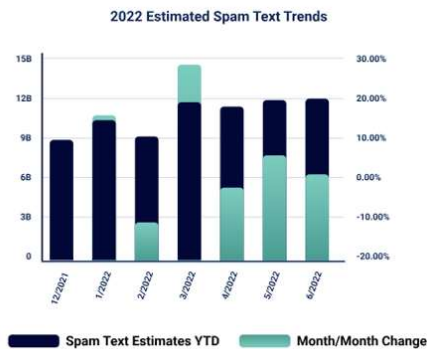
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Telemarketing	0.76 billion (-8%)	19% (-1%)



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