Nortel Networks
Univity GSM SGSN
GPRS Core Network Solutions

The Serving GPRS Support Node (SGSN) is the node serving the Mobile Station. The main functions of the SGSN include:

- Detection of new GPRS mobile stations in its service area
- Mobile Station authentication, authorization, and admission control
- Sending and receiving of data packets to and from the mobile stations
- Recording of the location of mobile stations inside its service area

GPRS is taking off thanks to the introduction of advanced wireless data services such as MMS, and this will surely increase the demand for additional capacity by mobile network operators.

Univity GSM SGSN, based on the Passport platform, is the right choice to provide operators with all the capacity and reliability needed.

The main SGSN functions are mobility management, traffic routing, and user authentication and authorization. In addition to these key functions, the SGSN provides a number of other functionalities such as ciphering and compression.

The supported interfaces of the Univity GSM SGSN are:

Gb—The interface between the SGSN and the BSS—this interface is Frame Relay

Gn—The interface based on IP that is between the SGSN and the GGSN

Gp—The interface based on IP that is between the SGSN and the GGSN in different PLMNs

Gr—The interface between the SGSN and the HLR

Gs—The interface between the SGSN and MSC/VLR

Gd—The interface between the SGSN and the SMS-GMSC/SMS-IWMSC

Ga—The interface between the SGSN and the Charging Gateway Function (CGF)

Fully open interfaces are supported between the core network and access network and between the GPRS core network and the NSS elements to allow interworking in a multi-vendor environment.

Nortel Networks GPRS core network has successfully proven interoperability with other vendors' HLR and BSS elements. Nortel Networks is one of the founding members of the IOT Forum. This means that each product and software release will go through complete interoperability tests with the major industry vendors' equipment, to guarantee a smooth deployment in the field.

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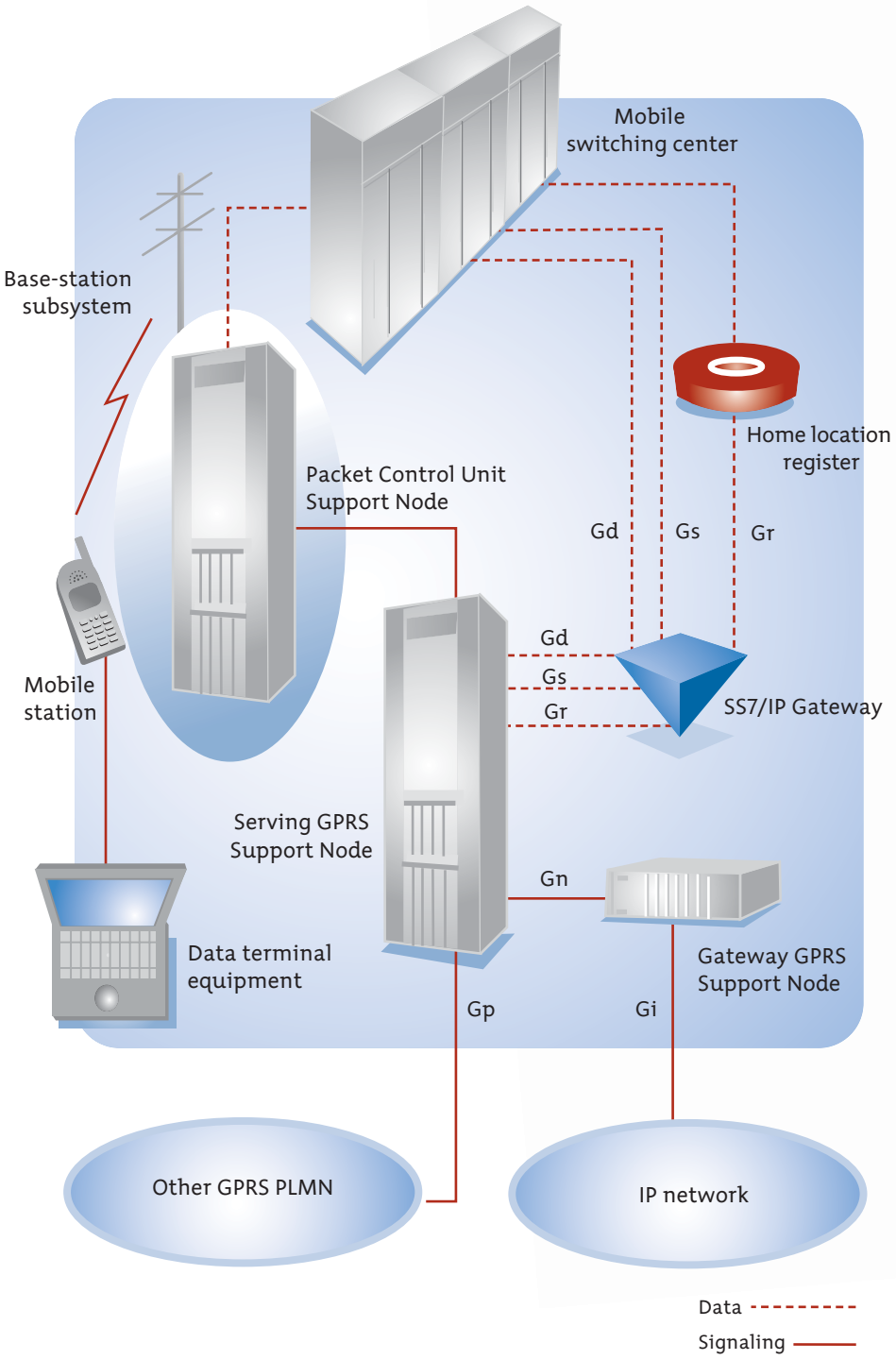

Platform:

From launch, the Univity GSM SGSN is built on a Nortel Networks industry-leading[1] ATM and Frame Relay switch—the Passport 15000 Variable Speed Switch (Passport 15000-VSS). The Passport 15000-VSS combines a Passport 7000 shelf and a Passport 15000 shelf into one single Passport 15000 cabinet.

Use of the Univity GSM SGSN provides the benefit of:

- **Reliability**—Essential to providing dependable commercial service. More than just a proven platform, Passport is an industry leader with extensive deployment. It is a carrier-grade platform with full redundancy, allowing the operator to quickly and successfully launch their GPRS network, and ensure network availability for its GPRS subscribers.
- **High capacity**—Allowing the operator to meet today's capacity demands and easily accommodate future subscriber growth.
- **Scalability**—Enabling the deployment of smaller configurations that can be easily grown to provide additional capacity. Subscriber capacity and data throughput are independently scalable and can be added as required.

[1] Synergy Research

- **Simple evolution to 3G**—An important consideration when strategically looking at network planning and network evolution. As with 2G, Nortel Networks 3G SGSN is also based on the Passport 15000 with additional cards required to provide the 3G UMTS functionalities. In addition to the SGSN, Passport is used as the Nortel Networks solution for PCU, RNC, Media Gateways, and core ATM/IP switching, including MPLS. Commonality of platforms between 2G and 3G reduces the operator's investment in the areas of hardware, operation and maintenance, support, and training.

The Passport uses two types of cards—the Control Processor (CP) cards and the Functional Processor (FP) cards. The CP card controls and manages the entire Passport shelf. The FP cards house the different functions of the SGSN and provide connectivity to the other network elements.

The SGSN functions residing on the FP cards are the following:

- **GTL Cards**—The Gb Transport Layer (GTL) serves as the connection to the PCUSN. It handles the NS/BSSGP/FR protocols that transport the upper layer information for both the U-plane and the C-plane.
- **GSD Cards**—The GPRS per Subscriber Datapath (GSD) handles the LLC/SNDCP/GTP-U protocol layers and portions of the BSSGP protocol. The GSD also performs all compression associated with the data path as well as any GSM encryption associated with the user session. The number of supported subscribers is proportional to the number of GSD cards.
- **GSC Cards**—GPRS per Subscriber Control plane (GSC) manages the Mobility Management (MM), Session Management (SM), and GTP-C functions (GTP control plane). The GSC card also hosts the HLR Cache (HLRC) function which stores subscriber profiles once downloaded from the HLR. DNS agent support is also one of the functions of the GSC card.
- **SAS Cards**—Service Accounting Server provides the SGSN billing functionality and is responsible for Call Detail Record generation/handling (S-CDR, M-CDR, and SMS CDRs), ASN.1 formatting of CDRs prior to transfer to the CGF, and support of the GTP' protocol used to transfer CDRs to the CGF.
- **LAN or ATM cards**—Provide connectivity for the Gn, Gr, Gs, Gd, and OAM interfaces. It is recommended to physically configure OAM on one port (Ethernet 100BaseT port for the LAN card or STM-1/OC-3 port for the ATM) and Gn, Gs, Gd, and Gr on the second port.

The benefit of deploying the Univity GSM SGSN based on the Passport is the scalability and reliability that it will deliver to operators. Furthermore, it is ready to evolve towards future network requirements such as MPLS, etc.

Basic features:

- **GPRS point-to-point and mobile initiated PDP context activation**
- **Intra-SGSN and inter-SGSN handovers**
- **DNS client support**
- **SGSN accounting, compliant to 3GPP TS 32.015 v3.6.0**
- **Packet compression over Radio Interface**
- **IP and PPP PDU type support**
- **Ciphering**
- **June 2001 Release 99 compliancy**

Advanced features:

- **SMS over GPRS**
- **Camel Phase 3 for real-time data prepaid**
- **MPLS on the Gn interface**
- **Increased resiliency to GGSN node failure**
- **EDGE support**
- **Lawful interception integrated on the SGSN**
- **Multiple primary PDP contexts**
- **Mobile and SGSN-initiated PDP context modification**

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