# Diameter Solution Suite™ Use Case

## Interworking Diameter between LTE and Legacy Elements Intra-PLMN (Home)

### Problem

The Evolved Packet Core (EPC) uses Diameter for access to the HSS, EIR and OCS. When the EPC is deployed in a PLMN there may be a need to use existing legacy elements like the HLR, EIR and Prepaid SCP with SS7. Conversely, when the HSS, EIR and OCS are deployed or upgraded to use Diameter there may be a need for them to be used by legacy elements using SS7.  In both cases there is a need for an interworking function (IWF) between Diameter and SS7. Additionally, the correct instance of the HLR/EIR and Prepaid SCP needs to be selected. Here the 3GPP defines a SLF selection function. The 3GPP defines an IWF between Diameter and MAP, but there is no corresponding standard for Diameter to CAP.

### Solution

Diametriq, an innovator in Diameter signaling control technologies, offers an exceptional suite of Diameter Signaling Controller (DSC) solutions which can be configured to your specific network requirements.

The Diameter Solution Suite™ (DSS) can be deployed in the EPC to act as a SLF and IWF at the same time. When the MME, SGSN and PCEF use Diameter, the DSS selects the correct instance and converts the Diameter (S6a, S6d, S13, Gy) to SS7 (Gr, Gf, Ge) and sends them to the HLR/EIR or Prepaid SCP and converts the SS7 response back to Diameter (See figure on left below).

When the SGSN uses SS7, the DSS selects the correct instance and converts the SS7 (Gr,Ge)  to Diameter (S6a, S6d, Gy) and sends them to the HSS or OCS and converts the Diameter response back to SS7 (See figure on right below). The DSS may be deployed in a distributed or centralized configuration and optionally in a geographic redundant configuration for disaster recovery. The use of the DSS allows for easy transition from legacy to the EPC within a PLMN.
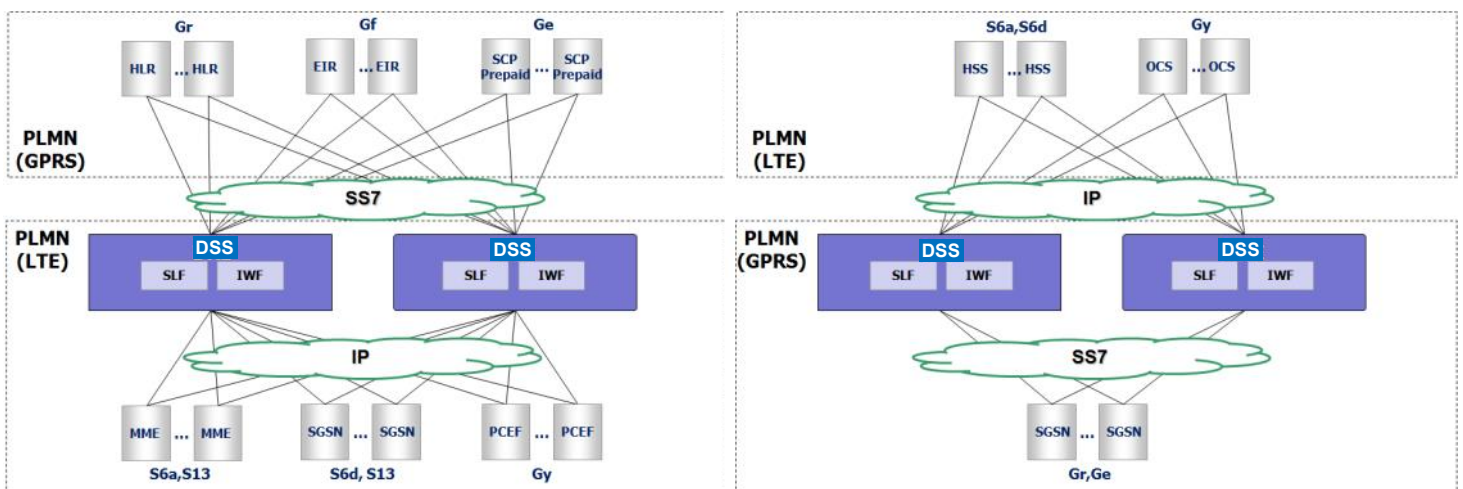
# Diameter Solution Suite™

## Interconnection Mesh

The Diameter Solution Suite (DSS) can be deployed at the core of the PLMN in a highly scalable, highly available and redundant configuration where all Diameter signaling passes through the DRE resulting in a hub rather than a mesh network.

## Roaming and Interconnection

In roaming scenarios where there are multiple MNO's, the DSS is deployed at the edge of the PLMN and performs the Diameter Edge Agent (DEA) role, passing all Diameter signaling through the DSS while performing routing and security functions.

## Congestion Control

The DSS detects congestion and can throttle the Diameter signaling passing through the network. The DSS sees all Diameter traffic and can be configured to detect overload and perform overload control on a global or per server basis.

## Security

When there are untrusted elements, the DSS provides security at the edge of a PLMN, including DoS, DDoS, NAT with topology hiding and IPsec and TLS for protocols.

## Selection and Distribution

When there are multiple Diameter servers (HSS, PCRF, etc.), the DSS selects and distributes across the multiple server instances and sends all messages in a session to the same server. The DSS can act as a proxy or redirect, e.g., the DSS performs the role of a Subscriber Location Function (SLF) for an HSS or a Diameter Routing Agent (DRA) for a PCRF.

## Scalability

The DSS has connections to all clients and servers. A client/server instance can be added and a configuration change made at the DSS without other servers or clients being affected.

## Interoperability

Vendors of client products need to interoperate with vendors of server products creating a large number interoperability testing combinations. The DSS has connections to all clients and servers, so adding a new vendor only requires interoperability testing with the DSS.

## Diameter Interworking

The DSS supports an interworking function (IWF) that interworks between legacy SS7 elements within a PLMN or roaming scenarios that involve a legacy PLMN.

## Transport Interworking

The DSS supports an interworking function (IWF) that interworks between Diameter over TCP and Diameter over SCTP.

## IP Interworking

The DSS supports an interworking function (IWF) that interworks between Diameter over IPv4 and Diameter over IPv6.

## Value-added Applications

The DRE provides a multi-application environment and API to allow new Diameter-based applications to be developed, e.g. Roamer Steering.

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