

# Diameter Solution Suite™ Use Case

## Interworking Diameter between LTE and Legacy for Inter-PLMN (Roaming)

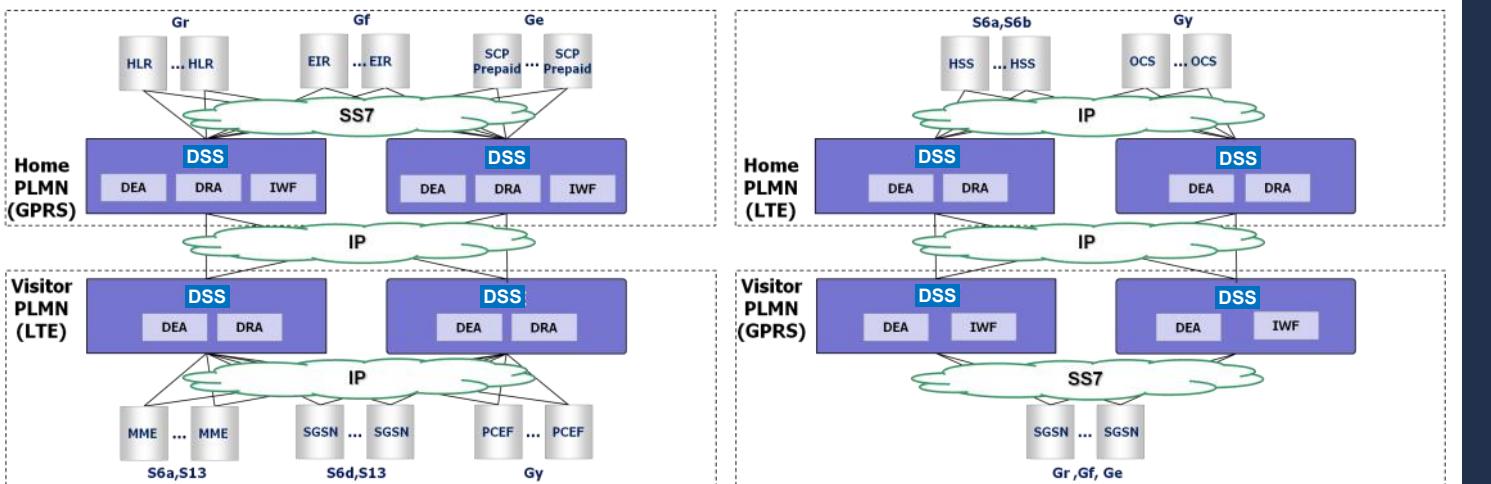
### Problem

The Evolved Packet Core (EPC) uses Diameter for access to the HSS, EIR and OCS. If the EPC has not been deployed in a PLMN and a subscriber roams into a network where an EPC has been deployed, then queries from the V-PLMN will use Diameter and the H-PLMN has existing legacy elements like the HLR, EIR and Prepaid SCP that use SS7. Conversely, If the EPC has been deployed in a PLMN and a subscriber roams into a network where an EPC has not been deployed, then queries from the V-PLMN will use SS7 and the H-PLMN has EPC elements like the HSS and OCS that use Diameter. In both cases there is a need for an interworking function (IWF) between Diameter and SS7. Additionally, the correct instance of the HLR/EIR, Prepaid SCP, HSS or OCS needs to be selected. The 3GPP defines a IWF between Diameter and MAP, but there is no corresponding standard for Diameter to CAP. Here the 3GPP defines a Diameter Routing Agent (DRA) selection function. Additionally, there is a need to provide border security and topology hiding at the edge of both the visited and home PLMNs. The GSMA defines the Diameter Edge Agent (DEA) to perform this function.

### 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 DEA, DRA 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 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, Gf) to Diameter (S6a, S6d, Gy) and sends 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 roaming between PLMN with and without an EPC.



# 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.



**Corporate Headquarters**    **Development Center**  
1990 W. New Haven Ave.    210 Oxford Towers  
Suite 303    139 Airport Road  
Melbourne, FL 32904 USA    Bangalore - 560017 India  
Tel: + 1 321 726 0686  
Fax: + 1 321 726 0683

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