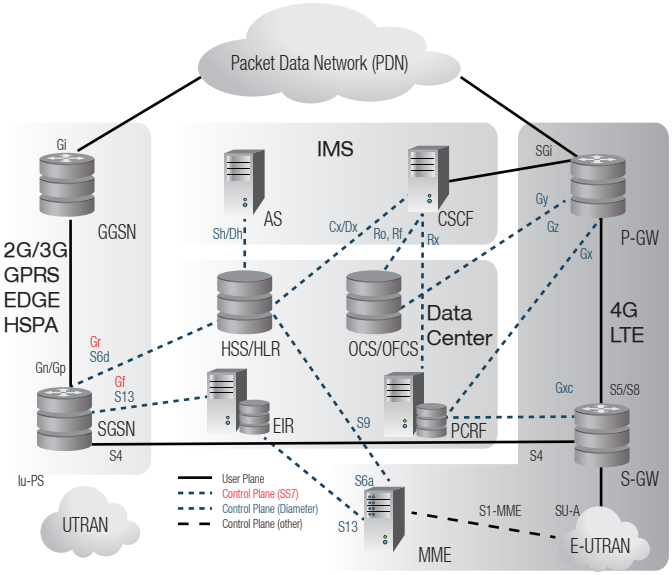
Diameter Routing Engine™

Managing the Explosion in Signaling Traffic for LTE and VoLTE

While data traffic continues to grow at an unprecedented rate, the rapid emergence of Long Term Evolution (LTE) networks is causing a fundamental shift in the core network from SS7-based signaling to Diameter signaling. This has given rise to a new class of products referred to as Diameter Signaling Controllers (DSCs) that address the growth and expected congestion in signaling traffic by efficiently routing signaling information.

There are many network elements that need to interconnect using Diameter in Evolved Packet Core (EPC) and IP Multimedia Subsystem (IMS) networks as well as interconnection to legacy networks.



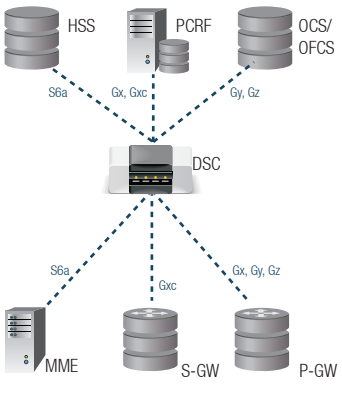
Diameter: Powerful Signaling Protocol for 4G LTE networks

Challenges for Operators in 4G Networks

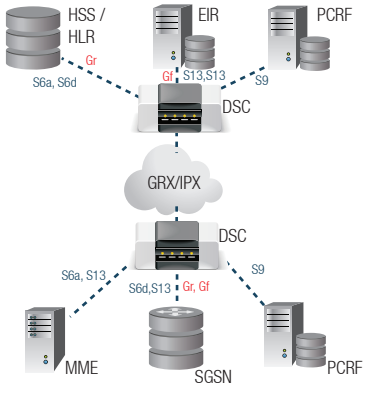
- Service Migration
  - √ Migration of 2G/3G services to 4G
- Traffic Management
  - √ Carrier-grade Diameter traffic management
- Roaming
  - √ Topology hiding and security when roaming
- Vendor Interoperability
  - √ Multi-vendor Diameter interoperability
- Legacy Interworking
  - √ Interworking with 2G/3G networks

With the growth in the number of LTE devices, the increased number of interfaces in the EPC and the migration of signaling from SS7 to Diameter, the volume of Diameter messages in the EPC has exploded. This explosion illustrates the need for a carrier-grade infrastructure to support scalability and reliability for Diameter in the EPC. For SS7 the Signaling Transfer Point (STP) was used to facilitate a carrier-grade infrastructure. For Diameter the Diameter Signaling Controller (DSC) is used for providing the same carrier-grade infrastructure in the EPC. As important as the STP was in SS7 networks, the DSC is critical to support this Diameter signaling explosion.

Diametriq, an innovator in Diameter signaling control technologies, offers an exceptional suite of DSC solutions, the Diameter Routing Engine™ (DRE). Diametriq's service-enabled Diameter Routing Engine™ (DRE) includes a Diameter Routing Agent (DRA), Diameter Edge Agent (DEA), a Subscription Locator Function (SLF) and a Diameter Interworking Function (IWF). These functions can be configured to meet your specific network requirements as well as serve as a host for critical applications that utilize the information contained in Diameter messages.

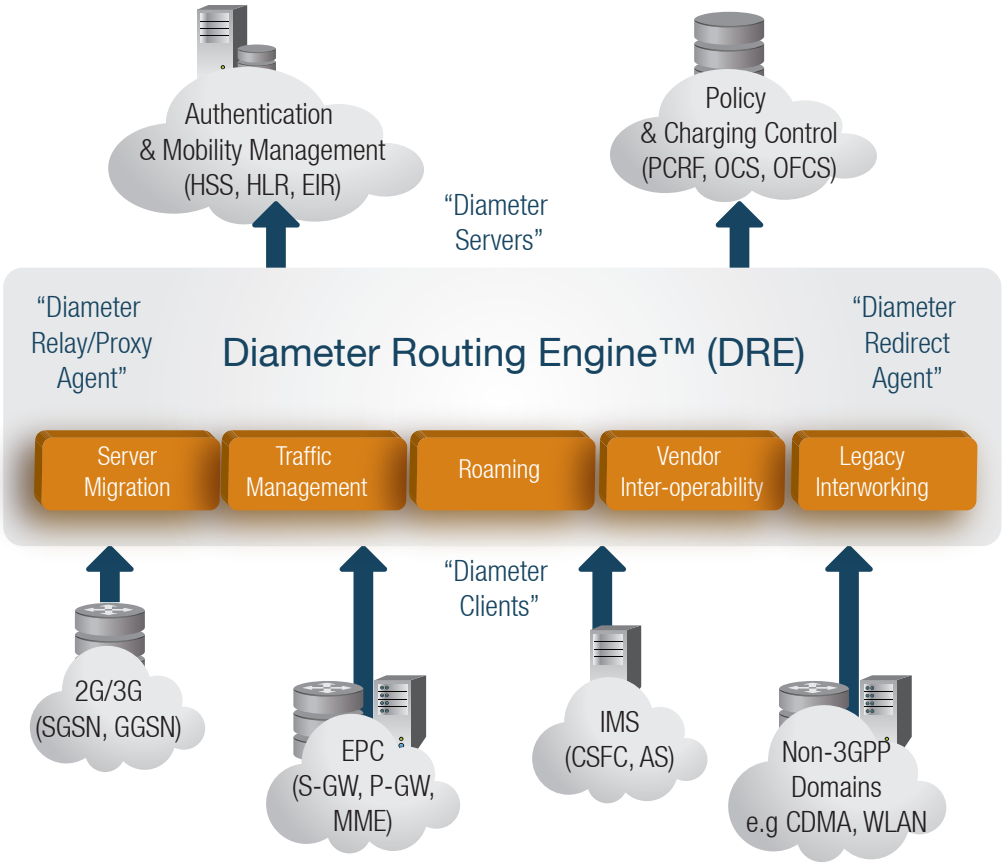


DSC in the home LTE network



DSC for Roaming

Diameter Routing Engine™



Features

- Flexible rules-based routing using configurable AVPs with AVP modification
- High availability (HA) solution on a single site giving at least 99.999% reliability
- Geographic redundant (GR) solution across multiple sites for disaster recovery (DR)
- Capacity of up to 100K messages/sec per server/blade
- Scalable to 1M messages/sec per cluster Linux-based using Intel or ATCA-based server

Benefits

- Simplifies the Diameter network reducing OPEX
- Secures the network from untrusted domains
- Flexible options for inter-operator interconnection
- Easier scaling of the network reducing time and risk
- Centralizes network configuration
- Enables reuse of legacy network elements

Standards Compliance

3GPP

- √ Diameter Routing Agent (DRA) : TS 29.213
- √ Subscription Locator Function (SLF) : TS 29.228
- √ Interworking Function (IWF) for Diameter-MAP: TS 29.305

IETF

- √ Diameter Relay/Proxy Agent (DRL) : RFC 3588
- √ Diameter Redirect Agent (DRD) : RFC 3588
- √ Diameter Translation Agent (TLA) : RFC 3588

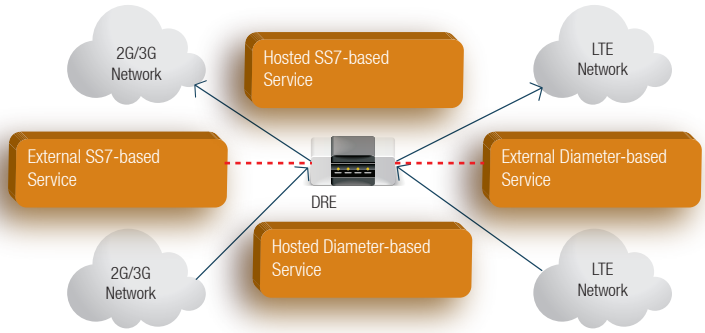
GSMA

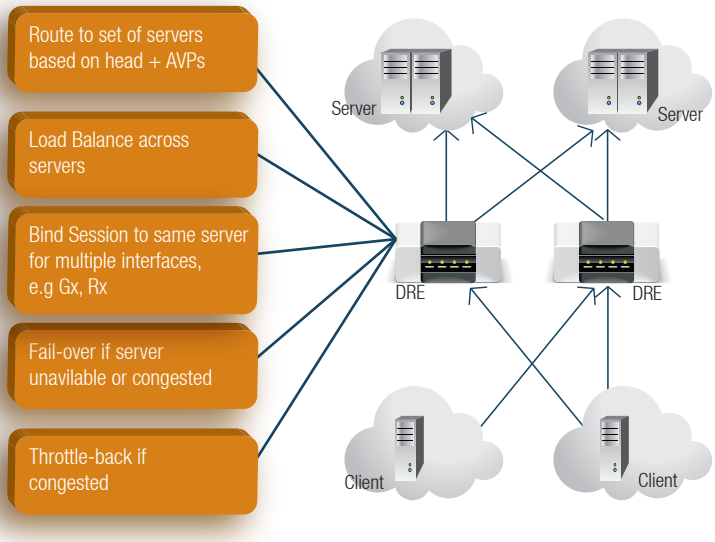
- √ Diameter Edge Agent (DEA) – IR.88
- √ S6a/S6d Proxy – IR.88
- √ IWF S6a/S6d to Gr – IR-88

Diameter Routing Engine™ Use Cases

Service Migration

You can migrate 2G/3G services, which are based on SS7 using GSM/ANSI41 MAP, CAP or WIN, and migrate them to the 4G network using the DRE. The services can be hosted on or external to the DRE and can be Diameter-based or SS7-based. The DRE supports different variants of Diameter/SS7. You can maintain your existing CAPEX by utilizing this feature on the DRE and save additional CAPEX by hosting services on the DRE platform.





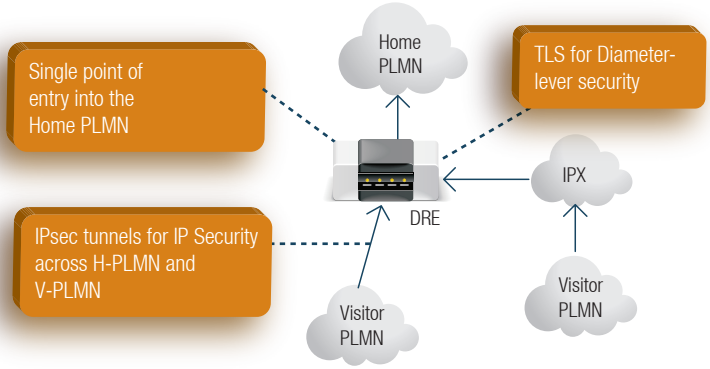
Traffic Management

Diameter interfaces are peer-peer with no central management resulting in a mesh with no scalability or reliability in the network. The DRE functioning as a Diameter Routing Agent (DRA) provides:

- Flexible load balancing to enable maximum usage of servers with failover and failback
- Enhanced routing to enable flexible configuration of the network and independent scalability of the clients/servers
- Session binding and congestion management with Diameter throttling

Roaming

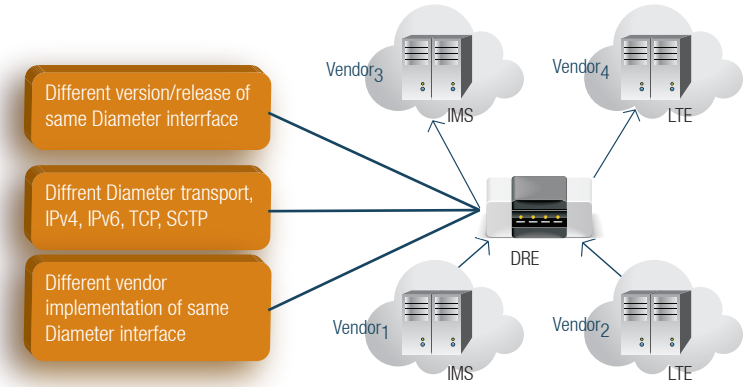
Diameter interfaces across operator boundaries need security and topology hiding from the internal deployment of Diameter servers. The DRE functioning as a Diameter Edge Agent (DEA) provides security at multiple levels including TLS, IPsec, firewall and access control lists. It acts as the entry point to the home LTE network and supports all Diameter interfaces from the visitor LTE network. Security is provided across non-trusted domains and the visitor network does not need to be aware of the topology of the home network. Home networks can scale and be re-configured without affecting the visitor network configuration.

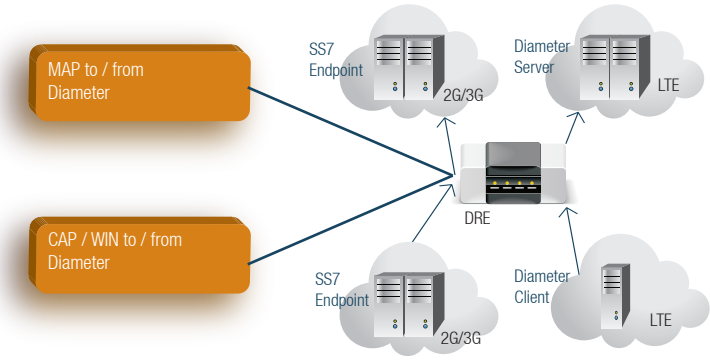


Diameter Routing Engine™ Use Cases

Vendor Interoperability

The DRE provides a flexible Diameter transformation capability to accommodate non-standard Diameter releases and custom variants. Diameter interfaces may be dynamically customized using script or plugins. The DRE acting as a Diameter Translation Agent (TLA) allows AVPs to be added, deleted, modified, regrouped or reordered and the transformation may be performed on a per peer-peer basis. Operators can control the integration of 3rd party Diameter clients and servers especially for roaming where there is no control over the vendors.





Legacy Interworking

4G networks need to interoperate with 3G networks, but not all operators will migrate to 4G at the same time resulting in a hybrid of 3G and 4G network elements. The DRE serving as a Diameter Interworking Function (IWF) provides an interworking capability for Diameter and SS7 that may be dynamically customized using script or plugins. The DRE supports MAP to/from Diameter (e.g., S6a, S6d, S13, S13' to GSM MAP and ANSI41 MAP) and CAP/WIN to/from Diameter (e.g., Gy, Ro to CAP and IS-826 WIN. The DRE maintains existing CAPEX in 2G/3G elements and utilizes them in the 4G network, while enabling roaming with operators that have not yet transitioned to 4G.

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