Mobile Service Selection in the Evolved Packet Core

SUMMARY

Legacy authoritative DNS infrastructure often is missing critical automation and agility components that provides the crucial service-selection information that impacts fast, accurate connections between packet gateways (PGW), serving gateways (SGW), mobility management entities (MME), and other elements within the mobile network evolved packet core (EPC).

The Infoblox mobile service solution enables next level networking by supporting use cases defined by 3GPP and delivers carrier-grade performance and availability to support a superior subscriber experience. Dynamic monitoring of element status and efficient assignments improves availability and reduces operating costs.

The Role of DNS in EPC Gateway Selection

Every time a subscriber or the device initiates a connection request into the network or moves to a different coverage area, the LTE network must discover and select the appropriate network gateways to use. Domain Name System (DNS) is widely used to handle the selection of the PGW, SGW, MME, serving GPRS support node (SGSN), and home subscriber server (HSS) within the network.

The interaction process between the DNS and the EPC elements is defined in detail by 3GPP. Triggered by a query from the eNodeB, the MME sends a DNS query message to the authoritative DNS server for a list of available nodes. The MME selects an available gateway to serve the user equipment (UE), typically based on network topology and the location of the equipment within the network. The discovery and selection process covers a variety of intra-operator and roaming use cases.

Infoblox Authoritative DNS for Mobile Service Selection

The Infoblox mobile service selection solution supports 3GPP specifications for DNSA, S-NAPTR, and SRV records. The product portfolio provides a range of high-performance, carrier-grade physical and/or NFV-ready virtual appliances to fit each operator’s scalability and capacity requirements. All solutions and products include Infoblox Grid™ technology, providing centralized management and control such as:

- **Simultaneous updates:** A single point of configuration for all DNS name servers enables a single binary upload, making any update immediately available on all name servers.
- **Single restoration point:** A single back-up file encompasses all name servers deployed, with no need for individual server back-ups.
- **Auto-configuration:** The Infoblox Grid upgrades and configures remote appliances with no manual intervention once the appliance is connected to the Grid.

![Figure 1: The critical role of DNS in EPC gateway selection](image-url)
• **Staged upgrades:** In a staged upgrade, a group of appliances is isolated, allowing a limited “burn in” for new code, before the remaining appliances are upgraded.

• **Secure communications:** Intercommunication between the Infoblox appliances is via SSL VPN, and communication between the administrator and the Grid Master, is via HTTPS or SSH.

**Automated Processes Reduce Administrative Burden**

Rapid and accurate node selection is critical to optimizing both subscriber experience and use of network resources. In a dynamic and growing LTE network, network elements are being added or changed continuously in response to traffic growth, new service areas, re-allocation of capacity, new network services, and other factors. Every element requires an accurate IP address, and every change requires an update of the database or zone map of the authoritative DNS servers.

Without an automated approach, adding or changing authoritative DNS zone records is labor intensive and vulnerable to error. Administrators must manually copy and paste identified changes into each zone database. More importantly, activating changes requires extensive and costly hands-on support by the operations team, because traditionally DNS software needs to be restarted in each zone. An error either in the original configuration or in the manual data entry process can cause the servers to crash that negatively impacting service availability to subscribers.

Infoblox Authoritative DNS for mobile service selection utilizes a four-step automated process to reduce administrative burden and safeguard against manual data entry or configuration errors.

- The process starts with a single bulk import
- The change is automatically pre-tested to eliminate possible syntax errors
- A simultaneous update of all server zone changes, upgrades, and patches is performed
- In the event of any other type of emergency or error, saved prior configurations can easily be rolled back.

**Dynamic Monitoring Maintains Service Availability and Protection**

Capacity planning in LTE networks is a delicate balance between cost and service availability and is nearly impossible to predict in today’s LTE networks.

**DNS provides the selection list to the MME and so plays a crucial role in appropriately distributing traffic load among the network nodes. In a static service selection environment, the DNS authoritative service has a set list of network elements to provide to the eNodeB. If conditions unexpectedly change (for example if local traffic spikes or there is an outage), the MME could select a PGW or SGW that is near exhaustion, unable to handle additional load, or already out of service. Subscribers would experience a delay or the connection could time out.**

Dynamic monitoring of changes in the network also insures against advanced threats such as man-in-the-middle attacks on the Gp interface. By providing visibility to all changes, the service provider can identify unauthorized, malicious changes to elements such as routers and switches. Infoblox advanced capabilities further strengthen the security profile of service providers by providing visibility and reporting of these changes.

**Create a Superior Subscriber Experience**

Mobile subscribers demand fast, always-available, and highly secure network communications. Network operators must maintain high performance and availability while still minimizing administrative inefficiencies and excess capacity. Infoblox Authoritative DNS enables next level networking for mobile service selection reduces administrative burden, supports efficient node assignments, improves network visibility, and helps mobile operators meet subscriber expectations for high reliability and responsiveness.

Visit [www.infoblox.com/sp](http://www.infoblox.com/sp) to find out more about the Infoblox mobile service selection solution.