

## Location services consolidation

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The rising demand from mobile broadband and smartphones users has prompted operators to deploy rich location-based Internet services, but the deployment and operational costs of many traditional solutions can be daunting. Distributed architecture - control plane - location services, require location service platforms at a great number of network nodes, considerably raising costs and complexity. A consolidated location system using virtual node technology can meet all of an operator's needs through a single Mobile Location Center (MLC) platform.



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Location services have long offered an opportunity for network operators to climb the value chain ensuring their networks offer more than just commodity bit-pipe functionality. In recent years, the value of location has been taken to a whole new level due to the advent of mobile broadband, smartphones, and rich Internet services that are enabled by location information. This 'awareness' of the value of location is even driving demand back into markets dominated by 2G technology deployments with sophisticated LBA (location-based advertising) delivered on commodity SMS and USSD (unstructured supplementary services data).

In order to capitalize on their networks' strengths and guarantee their position in the location value chain, operators need to make

certain that their networks are optimally location-enabled. To location-enable their networks, operators must deploy new nodes in their network. When deployed as separate platforms this has a direct impact on costs that the operator needs to pay upfront and on an ongoing basis. As operators struggle to reduce the Capex and Opex (capital and operational expenses) when trying to location-enable their networks, a Mobile Location Center (MLC) hardware platform may be the best way to address operators' needs.

Location Services in 3GPP Networks are defined in both Secure User Plane Location (SUPL) and Control Plane (CoPL) architectural models. Often these two models are used together to locate mobile devices connected to 2G, 3G, and 4G networks.

SUPL supports commercial location-based services (LBS) for SUPL-capable handsets and CoPL supports emergency and security LBS for all mobiles and value-added services (VAS) for non-SUPL capable handsets.

The SUPL architecture defined by the Open Mobile Alliance (OMA) is an inherently centralized architecture. On the other hand, the Control Plane architectural model defined by 3GPP is essentially distributed. A Gateway Mobile Location Center (GMLC) node provides gateway functions (receipt of location requests, authorization and authentication, and routing). A Serving Mobile Location Center (SMLC) - a part of the access network - provides serving functions (location determination via multiple location technologies).

For an operator, supporting location services within their networks implies having to deploy, connect and manage multiple nodes. The number of nodes required varies depending on the capabilities, capacity and coverage requirements of the operator. The complexity and cost associated with deploying multiple nodes, and the operations, administration, and maintenance (OAM) tasks, scale directly with the number of nodes deployed.

### Consolidated location systems

Given the inherently distributed nature of the control plane architecture and the common desire to deploy both SUPL and CoPL location architectures, an operator wishing to support location services for all of their radio access technologies (2G, 3G, etc.) must deploy multiple location-related nodes in their network.

The cost and complexity of deployment scales in proportion to the number of separate platforms deployed. A system with a larger footprint requires more points of integration with the network and a corresponding increase in the associated operations, administration, and maintenance costs.

Costs include ongoing operational costs (power consumption, real estate), maintenance costs such as warranties and software licences, upgrade, end-of-life of equipment, replacements, spares kit, administration costs such as fault monitoring, and provisioning coordination. Moreover, as an operator's business grows and greater capacity demands push existing infrastructure towards its performance limits, additional hardware deployment becomes necessary and creates churn in the operator's network. All of which adds to the cost of owning and operating the system.

A consolidated location system supporting virtual node technology, on the other hand, is able to meet the entire location needs of an operator. Whatever network nodes the operator needs can run as virtual nodes on a single Mobile Location Center (MLC) platform. Needless to say, the platform must be powerful and flexible enough to allow operators to run all of their location nodes flexibly in any desired combination on a single hardware platform and it must be able to scale to meet an operator's changing business needs.

For example, an operator may begin with a basic Control Plane Location System; a Gateway Mobile Location Center (GMLC)

and Serving Mobile Location Center (SMLC) for 2G networks and add nodes to support 3G and 4G and SUPL as those radio access technologies and architectures are brought online. These additional nodes can be added to the same hardware platform without any churn to the hardware through non-service interrupting software-only licence upgrades. A SMLC should also be a high capacity, scalable platform with no single point of failure which means that additional capacity and coverage can be added through software licences at the time it is required and without additional hardware churn.

### Consolidated platforms

Some of the latest MLCs concurrently support both Control Plane and Secure User Plane architectures for GERAN (*GSM EDGE Radio Access Network*) and UTRAN (*UMTS Terrestrial Radio Access Network*). These are new generation hardware platform, custom-designed to ensure that the operators have the ability to co-locate all their location functional nodes on a single platform. Furthermore, the high-throughput, high-capacity, and large-coverage capability of the MLC ensures that an operator can support emergency, commercial and legal Intercept services for 2G, 3G, and 4G over both SUPL and Control Plane by deploying a single consolidated system with a common OAM (*Operations Administration Maintenance*) infrastructure. In many cases, a single MLC platform can provide all of location-enabling capabilities and capacity of an entire network. The concept of a single consolidated platform for all location needs is a powerful one with tremendous benefits to the operator. Key benefits include:

- Reduced footprint - a single bay of hardware equipment supports 2G, 3G, and 4G and provides Control Plane and SUPL location methods;
- Simplified integration into the network - fewer platforms mean shorter deployment and commissioning timelines because there are fewer points to integrate into the network;
- A common OAM infrastructure simplifies day-to-day maintenance - configuration variables, base station almanacs, event records, performance metrics, logs and alarms, system backups and restores can be performed centrally, once, for all nodes;
- Lower operational costs - smaller power consumption with associated environmental and ongoing operational cost benefits;
- Lower ongoing maintenance costs - warranties, spares kit, end-of-life maintenance, and upgrades are minimized

with fewer hardware platforms; and

- Reduced hardware churn in the network - scalable high-capacity platform allows operators to add nodes and capacities as business needs grow.

Today, SUPL and Control Plane architectures are deployed as complementary architectures to support emergency, commercial, and security services. With the advent of smartphones, location-aware apps have exploded, leading to demand for higher capacity. For operators wishing to location-enable their networks, in the past this has meant deploying multiple platforms in their network. Multiple platforms multiply the costs that the operator needs to pay upfront and on an ongoing basis. As such, an effectively location-enabled network is a key value proposition for network operators today. Cost of ownership derived from Capex and Opex components remains as critical as ever. The new generation MLC with virtual node technology provides an optimal solution addressing both key criteria. ●



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