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Canvas<sup>®</sup> Location Middleware<sup>™</sup>

# Canvas® Location Middleware™

With the capabilities of the LTE networks, location-based services are opening a new page. Customer, operator and regulatory location-based services are easier and more accurate to implement and serve in the LTE networks. In addition to the popular LBS such as emergency services, people tracking and workforce management, location-based advertising and marketing, mobile authentication and fraud prevention, are some of the new services that are being deployed increasingly.

Canvas® Location Middleware™ is designed to offer a complete solution that can address constant change on location information delivery requirements of a mobile service provider with the new location determination technologies that LTE specifications offer. It achieves this task by providing interoperability, programmability and flexibility to service provider's network.

Canvas® Location Middleware™ offers an operator a powerful way of providing new revenue generating services for information, gaming, navigation, dating, advertising and fleet/resource management, as well as fulfilling legal requirements on positioning of emergency calls. Canvas Location Middleware enables the operator to differentiate on the market, increase loyalty, reduce churn and increase revenues.



# Benefits

## **Roadmap to 3G to LTE Networks**

Canvas® Location Middleware™ supporting and serving both 3G and LTE networks, provides a concrete roadmap for the operators to serve their customers today and tomorrow. With the support of new LTE based location determination methods, it is more accurate and more robust now.

## **A Complete End-to-end Location Solution**

Canvas Location Middleware provides e-SMLC, SLP, GMLC, Consent Management, GIS Server supporting Geocoding, Reverse Geocoding, Tracking, Geo-fencing and Map information on a single platform, to fulfill the all of the location related needs of the operator on a single platform.

## **Centralized Third Party Application and Traffic Control**

Canvas Location Middleware provides flexibility to view and control the traffic on the application provider interface. Almost every parameter in applications' request can be used for enforcement. With the complementary Canvas API Manager module, application development is easier, faster and more secure.

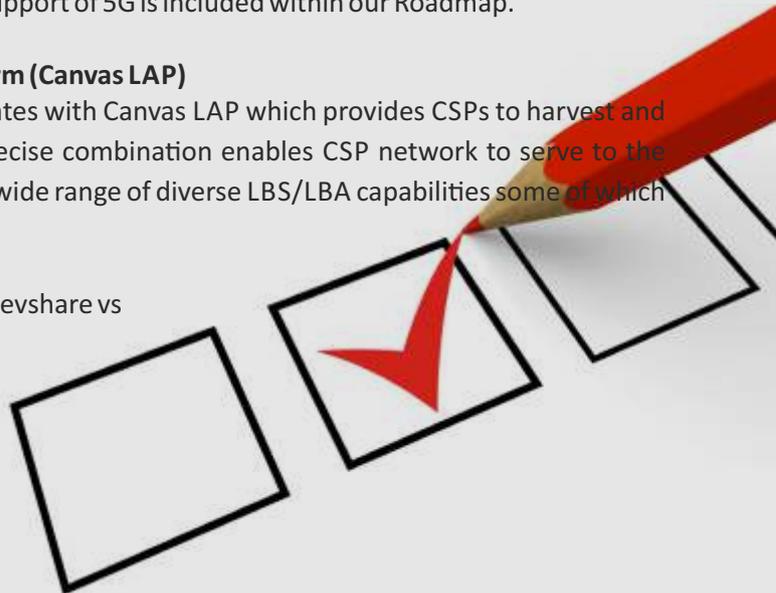
## **Standard Based Solution**

Canvas Location Middleware addresses the vendor lock-in concern for the location-based services, and deployable on any 3G/4G network that follows ETSI and 3GPP standards. Support of 5G is included within our Roadmap.

## **Seamless Integration with Canvas Location Analytics Platform (Canvas LAP)**

By using standard APIs, Canvas Location Middleware integrates with Canvas LAP which provides CSPs to harvest and monetize readily-available subscriber location info. This precise combination enables CSP network to serve to the needs of a variety of businesses or any agencies and offers a wide range of diverse LBS/LBA capabilities some of which are not feasible via conventional methods.

**Various business models** are supported including Capex vs Revshare vs Managed service.



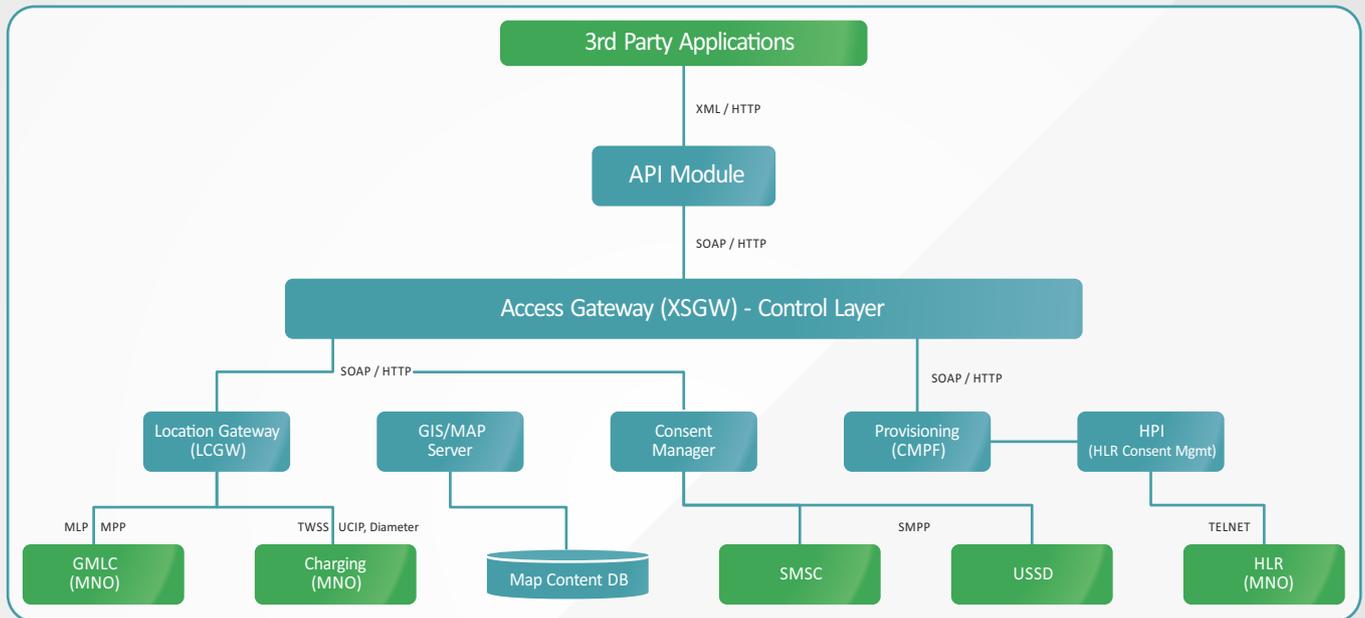
# Product Overview

Canvas® Location Middleware™ introduces a layer between the network and location based services to access the location enablers in a controlled manner. Canvas Location Middleware connects to enablers within the network with industry standard interfaces. It allows applications to utilize resources as specified in business processes and service level agreements

## Feature Summary

- Compliant with ETSI and 3GPP standards
- Compliant with ETSI Multi-Access Edge Computing Location API Standards. (MEC013)
- Supports CDMA, 2G, 2.5 GPRS, 3G, 4G and 5G networks
- Complete solution with e-SMLC, SLP, GMLC, Consent Management and GIS Server
- Can integrate with multiple other SMLCs and MPC.
- A-GNSS, Downlink (OTDOA), Enhanced Cell ID and Uplink (UTDOA) support in LTE Networks
- Cell id and ECID based positioning through HLR in 3G networks
- Fallbacks between positioning methods
- Seamless integration with Canvas Location Analytics Platform
- Rich API set (Get Location, Get Address, Tracking, Geofencing)
- Service Level Control, Enforcement and Privacy
- Advanced throttling per application/service
- Integrated GIS Server (Map, Geo-Coding, Reverse Geo-Coding, POI, Tracking)
- Geographic WGS84 and Lambert Conformal Conic Coordinate System Support
- Consent Manager Module to manage subscriber consent from SMS and USSD channels
- Screening list management
- MSISDN hiding and Opaque ID support
- Flexible Charging Implementation
- Centralized OA&M features, out-of-the-box reports, troubleshooting
- Modular and scalable architecture with built-in redundancy/high-availability
- Fully virtualized and NFV enabled deployment options
- Support for different deployment models (on-premises, cloud-based, hybrid)

# Architecture



## Interfaces

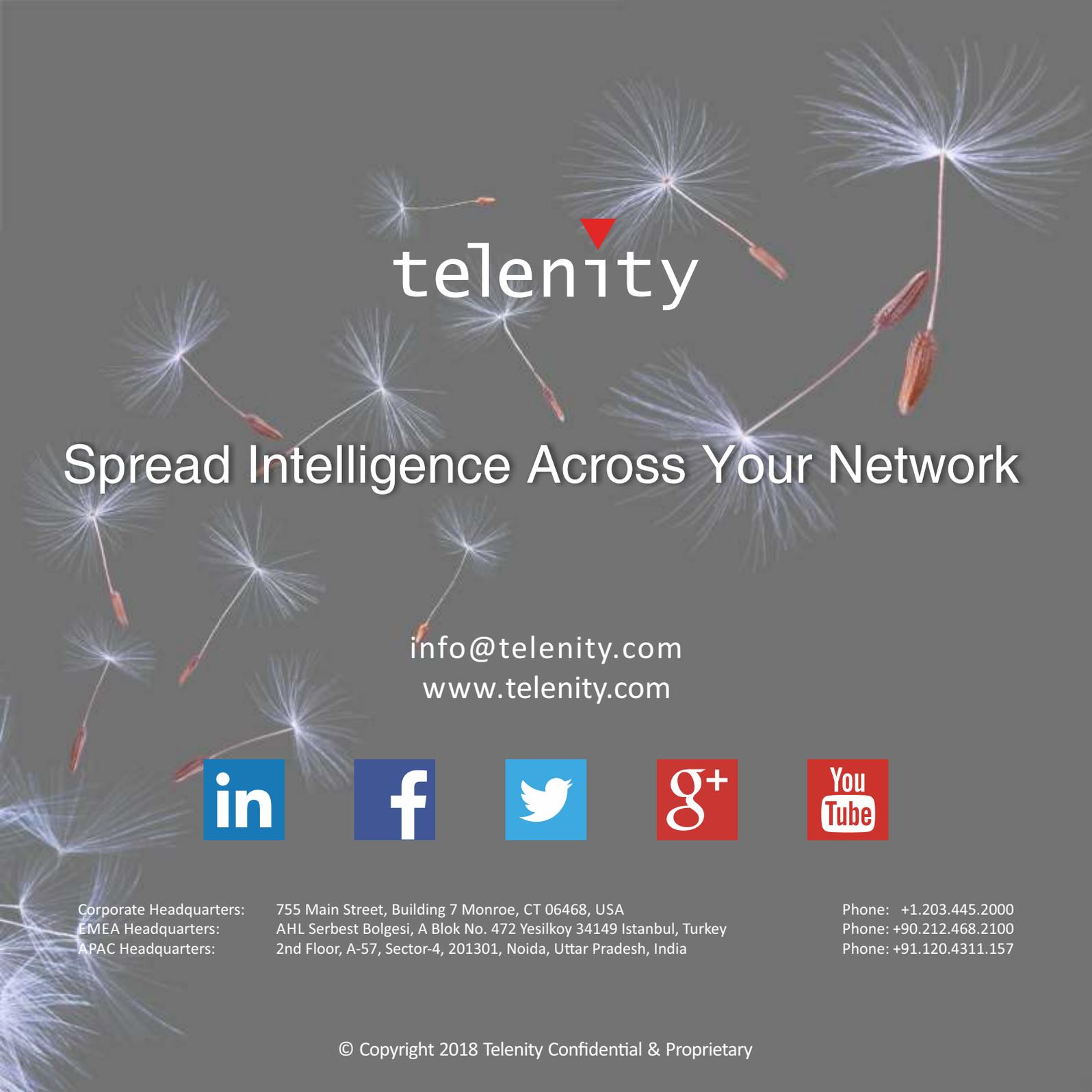
- GSM/GPRS/UMTS/CDMA/LTE/IMS
- SS7 TDM (LSL/HSL) and SS7 over IP (SIGTRAN)
- ITU & ANSI MAP
- Diameter
- SMPP, SOAP/XML, REST, MLP
- SNMP

## Core Technologies

- Java SE/EE, JDBC, JMX
- Web Services, REST, XML

## Operating Environment

- Red Hat Enterprise Linux, CentOS, Oracle Solaris
- Vmware, KVM, XenServer



telenity

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