

HINTON Locator Integration Fundamentals Application Note

This application note describes how the HINTON Locator may be integrated into an overall location-based services system based around a 2G GSM or 3G UMTS network.

Key Points

- HINTON Locator is a passive monitoring probe extracting data from the network
- Allows network based location services for all subscriber and handset types, even the most basic low cost handsets
- Data from Telesoft API provides information to 3rd party Geolocation process.
- Provided information can include:
 - Cell ID, timing advance from serving cell
 - Received signal strength from cells
 - Location area information
 - Roaming information etc
- Geolocation process provides X/Y location to supported applications
- Applications include services such as:
 - mobile advertising,
 - E911 emergency location,
 - 'where am I?' (find yourself)
 - 'where is?' (find something/someone)

Typical Interfaces Monitored

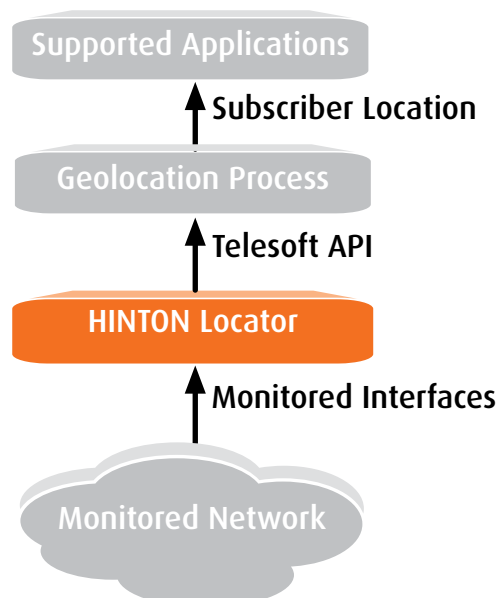
- Abis Interface
- A Interface
- IuB Interface
- IuCS Interface
- C/D Interface
- International Links

OVERVIEW

The HINTON provides the ability to passively monitor a cellular radio access network, and related interfaces, of cellular telecommunications networks gathering data relating to subscriber location. Combined with geolocation software this allows the calculation of subscriber locations using a variety of techniques.

The diagram below shows the components of a full location-based services (LBS) system, incorporating the HINTON Locator, for access to network data relating to subscriber location, along with the flow of information through this system. The full system consists of four major parts:

- 1) The monitored network - The design of this network and its radio planning provide the basic constraints on the potential accuracy of the system, and the distribution/dimensioning of the probe system deployed for monitoring.
- 2) The HINTON Locator - Provides monitoring of interfaces in the monitored network, through protected tap points. This data is filtered against subscriber identities and network events to provide reporting of necessary data to the Geolocation process through a TCP/IP based API.
- 3) The Geolocation process - This process correlates data provided by one or more HINTON Locator probes and uses this to calculate the location of subscribers for use by the top level application. There are a variety of available algorithms and methods available for this process, which determines the accuracy which can be established from the available network information.
- 4) Supported application - This application provides the required functionality to the system user, a wide variety of location based service applications are available covering value added services, network management and homeland security requirements amongst others.



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Where to Monitor?

The HINTON Locator monitors a number of network interfaces depending on the network type and accuracy needed. The typical interfaces monitored for different information are shown in the diagram below:

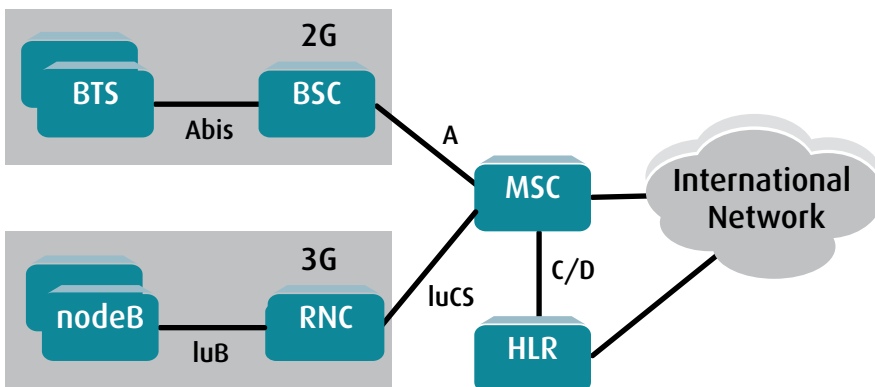
- Abis interface - for detailed location parameters in a 2/2.5G network, and correlation of IMSI-TMS-IMEI-LAC identities (and in some cases MSISDN from SMS messages).
- A interface - provides serving cell identity.
- IuB interface - equivalent to the Abis interface in a 3G UMTS network
- IuCS interface - equivalent to the A-Interface in a 3G UMTS network.
- C and D interfaces - provides mapping of IMSI and MSISDN identities where needed.
- International links from the MSC and HLR - gives information about inbound and outbound roaming subscribers.

Passive or Active monitoring?

The HINTON Locator provides a mechanism for extracting location information on subscribers from the mobile network without the need for direct interaction with network elements (such as the BSC through an SMLC), this has a number of advantages over the typically used active solution including:

- Mass monitoring - active solutions are typically limited to a very small number of subscribers by the available processing resource of network elements (NEs), while an independent probe can monitor up to 100% of subscribers.
- Vendor agnostic - a passive probe can provide a common delivery of information regardless of the manufacturer of network equipment.
- No Lb interface dependence - a passive probe does not require a dedicated location interface to the NEs, these are not always available, and even when present the probe removes the need for potentially expensive feature licenses on network equipment.
- Multiple application support - a passive probe can deliver information to multiple applications concurrently, allowing a common access platform for VAS, OSS and security applications.

- No network impact - the use of passive technology removes the potential for a location application to affect operational network performance by overloading or incorrectly accessing network elements.



www.telesoft-technologies.com

Headquarters:

Telesoft Technologies Ltd
Observatory House
Blandford Dorset
DT11 9LQ UK

T. +44 (0)1258 480880
F. +44 (0)1258 486598
E. sales@telesoft-technologies.com

Americas:

Telesoft Technologies Inc
Suite 601
4340 Georgetown Square
Atlanta GA 30338 USA

T. +1 770 454 6001
F. +1 770 452 0130
E. salesusa@telesoft-technologies.com

India:

Telesoft Technologies Ltd
Building FC-24 Sector 16A
Noida 201301
Uttar Pradesh India

T. +91 120 466 0300
F. +91 120 466 0301
E. salesindia@telesoft-technologies.com

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