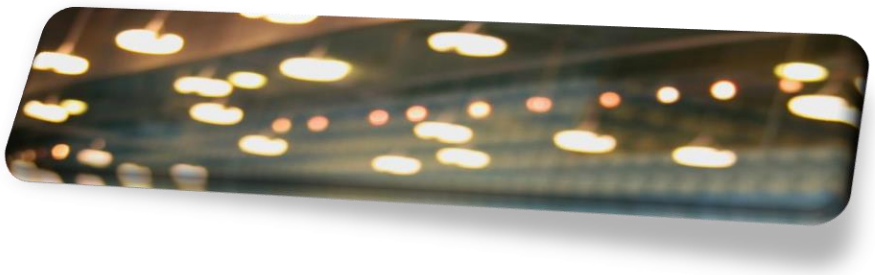
Safe Harbor LI-MDF™ Mediation and Delivery System



LI-MDF mediation system, including delivery and administration, supporting a variety of VoIP/IMS networks, LTE cores, broadband networks

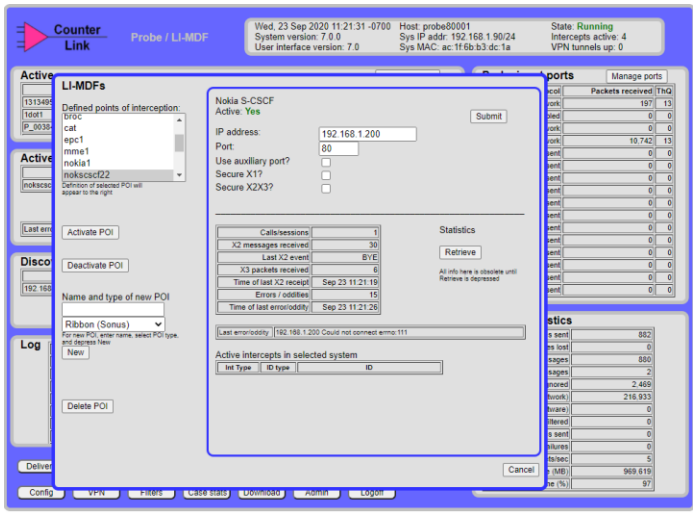
The Safe Harbor LI-MDF serves as a complete lawful-intercept solution for VoIP networks deploying equipment from Nokia, Metaswitch, Mavenir, Ribbon (Sonus/Genband) and Cataleya, LTE cores deploying the Mavenir Evolved Packet Core, and Arista Networks routers.

The LI-MDF is available as a physical appliance or as a virtual machine.

KEY FEATURES & BENEFITS

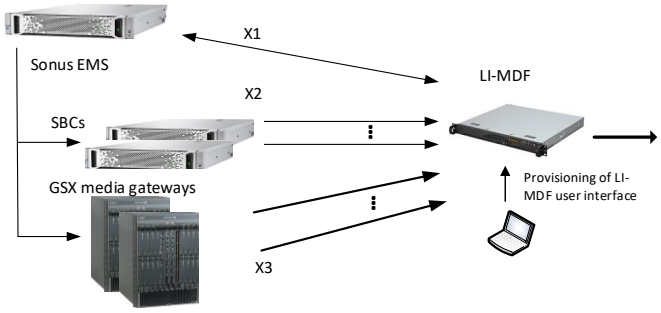
- Provides U.S. safe-harbor CALEA compliance
- Supports ATIS, 3GPP, and ETSI standards
- Much lower cost than alternative solutions
- Integrated provisioning requires no separate administrative system
- Integrated VPN reduces installation complexity
- Email alerts and notifications
- Buffering options selectable for each intercept

The Safe Harbor LI-MDF is an easy-to-install, self-contained system that provides interception, administration, and VPN security — all in one device. Intercepts are configured or provisioned in the Probe through a secure web-browser interface.



Sonus-Based VoIP Networks

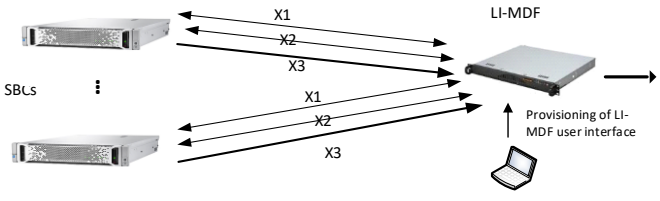
The diagram below shows the relationship of the LI-MDF to the Sonus network elements. One connection is to the Sonus EMS, and over this interface the LI-MDF communicates the identifiers of the calls to be intercepted. The EMS then distributes LI policies to the GSX and SBC, causing them to serve as Intercept Access Points (IAPs). Subsequently, as call events and call content are discovered for a call matching an LI policy, the GSXs and SBCs sent x2 and x3 information back to the LI-MDF



The LI-MDF supports the original Sonus LI architecture (also called direct mode and legacy) and the newer encapsulation mode (aka IMS).

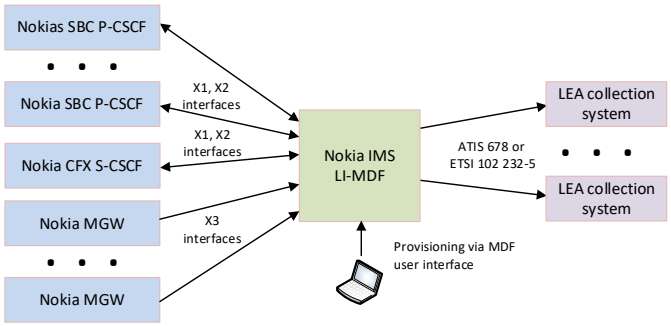
Genband QUANTiX VoIP Networks

In a similar fashion, the LI-MDF provides LI mediation for a network of one or more Genband "Q" network elements. The X1 provisioning interface is HTTPS/SOAP. Call data is sent to the LI-MDF atop TCP Diameter messages and intercepted media is sent on the X3 interface using UDP.



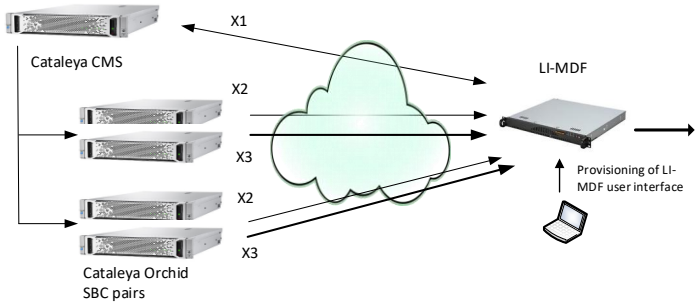
Nokia IMS

The LI-MDF provides the LI mediation function for a Nokia-based VoIP or IMS network. The diagram below shows connections between the LI-MDF and IMS P-CSCFs and S-CSCFs, as well as media gateways. The X1 and X2 interfaces use BER-encoded information over TCP, and the X3 interfaces are RTP over UDP.



Cataleya-Based VoIP Networks

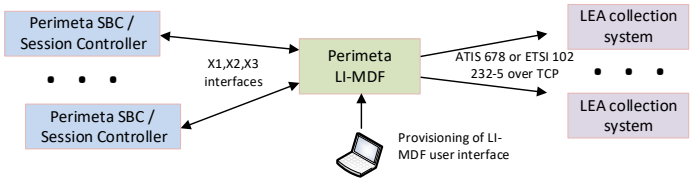
As shown in the diagram below, Cataleya-based VoIP networks are supported in a similar fashion. The LI-MDF configures intercepts in the Cataleya CMS, which in turn communicates this information to the Cataleya SBCs in the network. The SBCs deliver signaling to the LI-MDF over an X2 interface and call media over an X3 interface.



The X1-X3 protocols use end-end encryption over the TCP protocol, allowing the LI-MDF to be remote from the VoIP network if desired.

Metaswitch Perimeta VoIP or IMS

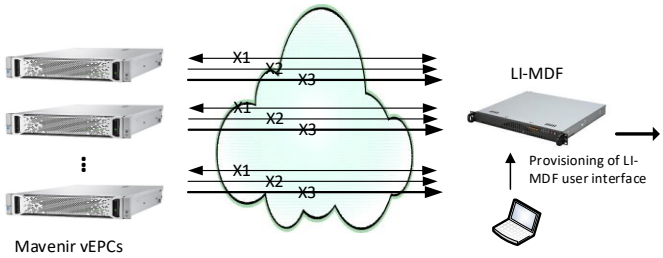
The diagram below shows the LI-MDF as an LI mediation system for Perimeta SBCs, or a Perimeta acting as P-CSCF in an IMS.



The X1 is XML over HTTPS, X2 is BER over TCP, and X3 is media over UDP.

Mavenir LTE Core

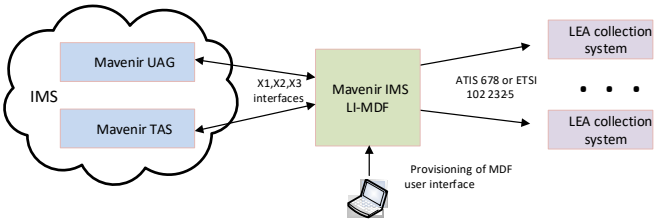
The following diagram shows the connection of the LI-MDF to one or more Mavenir vEPCs (virtual Embedded Packet Cores) to provide data intercept in LTE and 5G EPC-core-based networks. Where the LTE functionality is distributed over multiple vEPCs, the LI-MDF connects to each one, delivering the intercept criteria to each. Intercepts can be based on MSISDN (phone numbers), IMSIs, or MEIs. Network events are communicated to the LI-MDF over the X2 interfaces, and intercepted packets over the X3 interfaces.



The LI standard supported is 3GPP 33.108. The X1-X3 protocols use end-end encryption over the TCP protocol, allowing the LI-MDF to be remote from the VoIP network if desired.

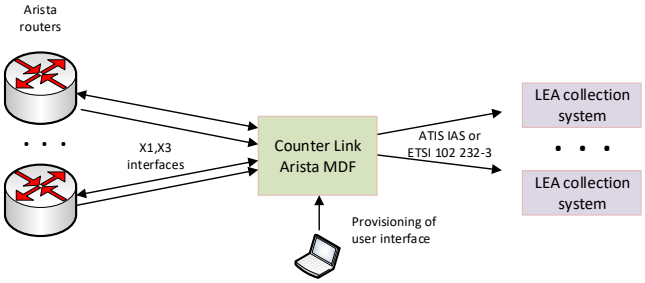
Mavenir IMS

The diagram below shows a LI-MDF being used in a Mavenir-based IMS system for lawful intercept. The LI-MDF interfaces with the Mavenir UAG, which is an SBC and the IMS P-CSCF, and the TAG converged telephony application server.



Intercepted VoIP sessions, including multimedia, are sent to law enforcement in either the ATIS 678 or ETSI 102 232-5 standards

Arista Networks

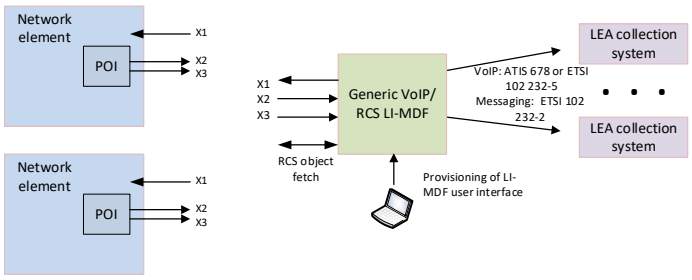


The diagram shows the LI-MDF for networks using routers from Arista Networks. Broadband data (packet) intercepts are done using a variety of identifiers such as IPv4/IPv6 addresses and DHCP and RADIUS identifiers. A new feature – a POI (point of

interception) map allows specific intercepts to be directed to specific groups of routers.

Generic VoIP/RCS Mediation System

Where the other LI-MDFs use proprietary "X" interfaces defined by the network-equipment manufacturers, this LI-MDF uses the newly defined standard defined by ETSI as 103 221-1 and 103 222-2.



This LI-MDF can manage any network equipment designed to meet these new interfaces. The first version of the LI-MDF is specific to VoIP and RCS. This LI-MDF supports as handover standards the U.S. 678 standard and the ETSI VoIP and messaging standards.

Overall Characteristics of the Mediation Systems

VoIP Intercepts: Pen-register and full-content voice intercepts are provided. Depending on the mediated devices, the identifiers that can be provisioned are phone numbers, SIP URIs, IMSIs, and IMEIs.

For all but the Sonus direct/legacy mode, two VoIP handover standards are provided: ATIS 678 version 3 and ETSI 102 232-5. Only 678 is available for the Sonus direct/legacy mode. For messaging the ETSI 102 232-2 standard is used.

DTMF (dialed digits) reporting is a selectable option. Also, the LI-MDF contains several optional functions to filter out duplicate intercepted calls, a problem often arising in large voice networks.

Email Alerts and Notifications: The LI-MDF can be provisioned to send periodic reports to designated email addresses, including overall status reports (e.g., to operational personnel), and intercept-case-specific reports to law enforcement. Additionally, certain events (e.g., delivery error, disk capability, VoIP call start) can be selected to trigger email messages.

ATIS-1000069 Reporting: The LI-MDF supports the ATIS-1000069 standard, which allows the LI-MDF to report conditions such as failed delivery interface, input interface down, lost output, dropped input, and others to the collection systems of the law-enforcement agencies..

Delivery: The LI-MDF contains a variety of mechanisms to maximize the robustness of the intercept delivery. One of these, buffering, prevents the loss of intercept information if anything fails on the upstream path. The buffering implemented in the LI-MDF is called "transparent buffering" in that the file system used is not visible outside the LI-MDF and thus this can be used with any law-enforcement collection system.

The LI-MDF integrates a site-to-site VPN capability, eliminating the need for a separate VPN appliance. The VPN is provisioned through the LI-MDF's web-browser-based interface.

Security: The LI-MDF has two interfaces, both of which are highly protected – the provisioning interface and the delivery interface. The LI-MDF contains a firewall function that permits access to only a few services, and permits access from only a certain set of IP addresses. A specific client certificate is required to access the SSL-based provisioning interface. The delivery interface is typically protected using the built-in VPN capability. Certain information within the LI-MDF is encrypted, such as buffer files and the database.

Content Filtering: When used for data intercepts, the LI-MDF has an optional content-filtering engine that can remove packets associated with designated content services, such as Netflix, YouTube, Amazon Prime, Hulu, and others. The rule set is open-ended such that it can be extended by the user.

Virtual Machine: In addition to being available as a 1U physical appliance, the mediation systems are available as virtual machines **that** can run in Amazon Web Services and other cloud infrastructure services, and on hypervisors such as VMware. For instance, this allows multiple LI-MDFs to run on the same physical machine or allows the LI-MDF to run on the same physical machines as virtualized SBC and LTE platforms.

St. Helens Intercept Mediator Physical and Electrical Characteristics

- 1U, 16.9" deep
- Approximately 16 lbs
- Operating temperature: 10-35ºC
- Two 1G system ports (typically one for provisioning and delivery, one for connection to the internal network)
- AC power, typical power 50w
- Remote management via BMC/IPMI