



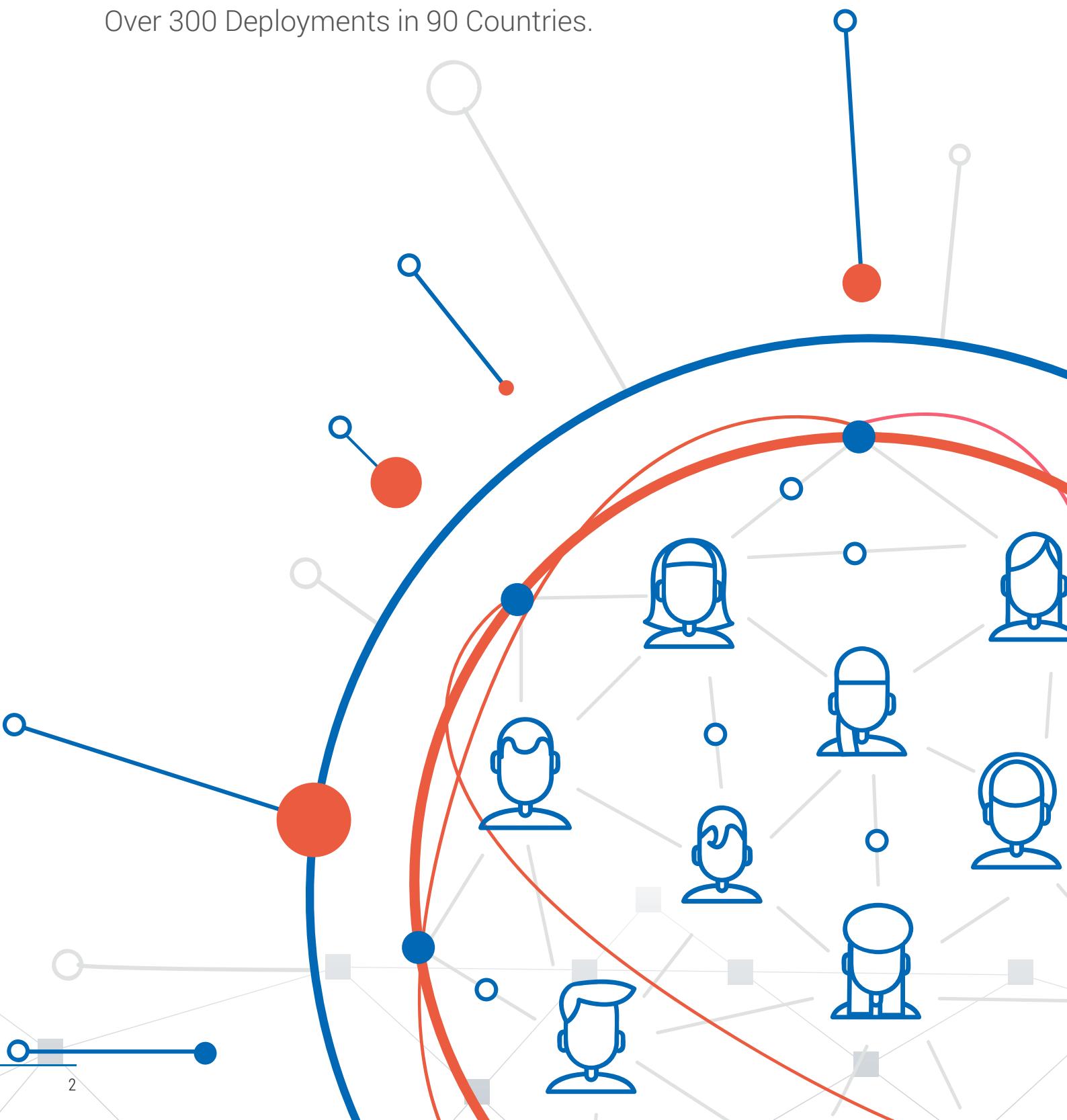
LAWFUL INTERCEPTION OF TELECOMMUNICATION SERVICES



**utimaco**<sup>®</sup>

*„Our solutions create trust to protect  
people and ideas in the digital world“*

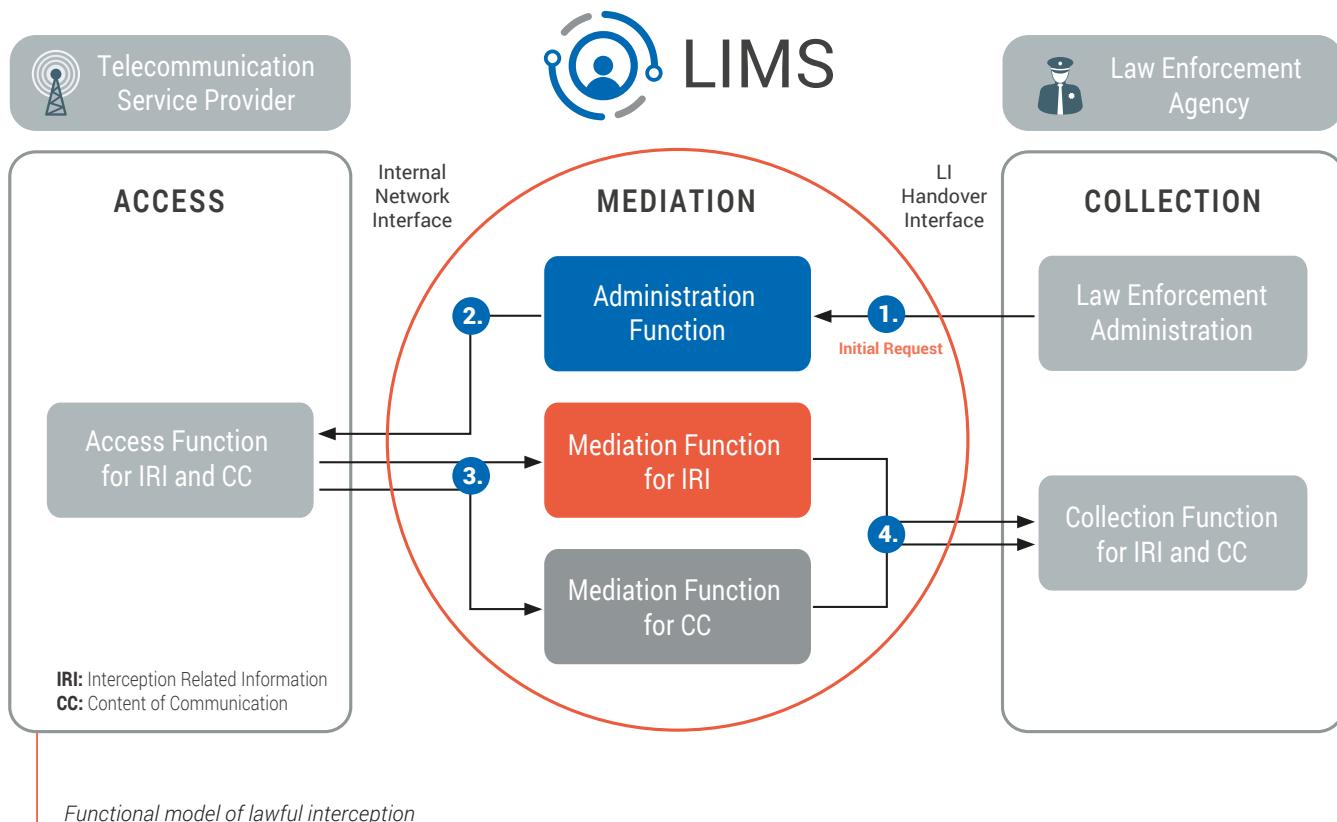
Over 300 Deployments in 90 Countries.



# Lawful Interception

Lawful Interception (LI) refers to the legally mandated surveillance of telecommunication services. Worldwide, telecommunication service providers and network operators are required to support law enforcement agencies (LEA) with authorized requests to identify, monitor, and instantly deliver all of the electronic communications of specified individuals and groups. Each such LI request requires a court order, search warrant or comparable authorization by national law. LI is an important tool for

national law enforcement agencies when investigating and prosecuting criminal activities and terrorism. While regulations and requirements vary from country to country, international telecom standardization bodies like ETSI, 3GPP, ANSI, ATIS have developed technical standards for LI that will facilitate the work of LEAs and help operators and service providers to minimize their costs. The following diagram shows the key roles and functions involved with LI.

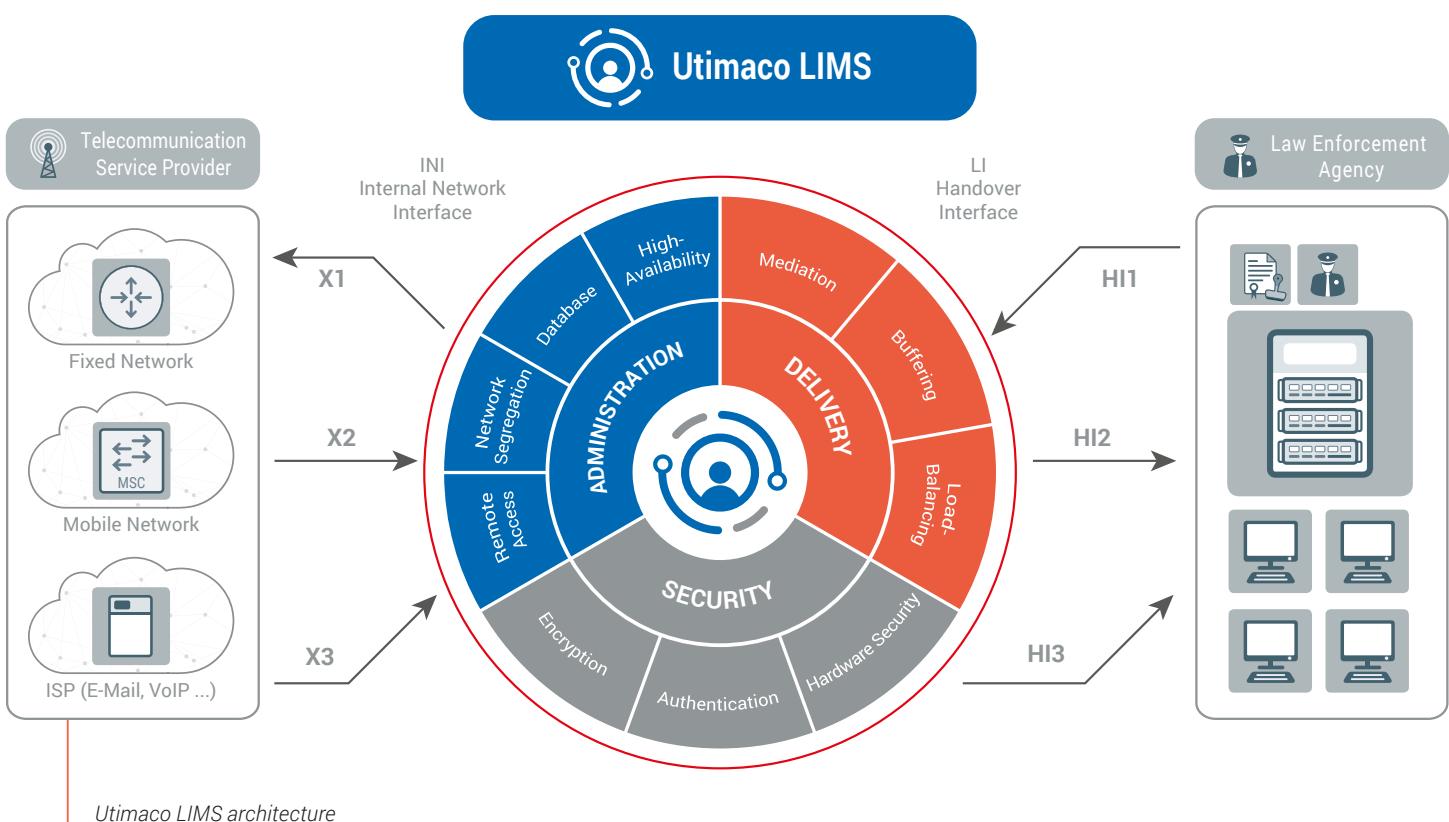


An LI system, sometimes also referred to as a mediation system, is used to administrate intercepts on a telecom network across internal network interfaces. Content of Communication (CC) and Interception Related Information (IRI) of a person under surveillance are intercepted in

the network, mediated and forwarded to the requesting law enforcement agency for decoding and analysis. The mediation system protects all private data from unauthorized access and prevents possible misuse of interception functions by comprehensive security features.



We deliver turn-key compliance solutions for fixed and mobile network operators worldwide.



# Utimaco LIMS

## A Carrier-grade LI Solution

The Utimaco Lawful Interception Management System (LIMS) is a state-of-the-art monitoring solution for fixed and mobile networks. It helps telecom operators and Internet service providers fulfill their legal obligation to intercept calls and data while maintaining maximum privacy protection.

Utimaco LIMS enables target-based monitoring of public communications services including telephone calls, mobile data and Internet-based services such as e-mail, Voice-over-IP, instant messaging and others. The system acts as a bridge or mediator between the service provider's network and the law enforcement's monitoring centers. Strong security provisions prevent unauthorized access, secure all private user data and facilitate security audits by comprehensive logging.

A key advantage of the Utimaco LI system is its ability to interface with hundreds of different elements in a provider's heterogeneous network and to process all intercepted data from the network in real-time. The LIMS modular architecture provides a future-proof path for operators to expand their LI capabilities throughout current and any future networks. The system can be configured as an entry-level single-server solution for thousands of subscribers and is scalable up to a multi-server cluster that enables real-time monitoring in networks with millions of subscribers.

# The Utimaco LIMS Portfolio

## LIMS MANAGEMENT SERVER



The Management Server, the core component of the LIMS system, incorporates the administration system for all system modules, the user interface, as well as security management for the whole system. The server maintains a central database of all intercept targets, interception access points and authorized LEAs. Once an intercept target is entered into the Management Server, it is automatically provisioned to the appropriate interception access point in the network.

## LIMS MEDIATION DEVICES



The LIMS Mediation Devices perform all tasks related to the delivery of intercepted communications to the authorized law enforcement agency. Mediation encompasses the conversion and mapping of interception data received from the internal network to the appropriate formats, protocols and interfaces as required by the LEAs. Also, Intercept Related Information sometimes needs to be stored intermediately in the Mediation Device before it can be forwarded to its final recipient. Utimaco offers the industry's broadest list of mediation devices supporting a wide range of network technologies, services, protocols and standards. There are LIMS Mediation Devices for more than 300 different network elements of all major vendors. Delivery of intercepted data is compliant with various national regulations and international standards including 3GPP, ETSI, ANSI/ATIS standards.

## LIMS ACCESS POINTS



Depending on the topology and capabilities of a network, Utimaco recommends either active or passive approaches to intercepting communication data. In passive mode, network probes are integrated into the operator's network to filter, decode and forward intercept data to the LIMS, respectively to the appropriate LIMS Mediation Device. Utimaco has developed specialized network probes for deep-packet inspection of various communication services and application protocols such as e-mail, webmail, Internet access, instant messaging, Voice-over-IP and other IP-based services. Active interception, on the other hand, refers to the method of managing integrated interception capabilities of the available network elements, like switches or routers. In many real-world deployments a mixture of active and passive interception techniques provides the best results or is the only available option.

## LIMS GATEWAY



The Utimaco LIMS Gateway is a powerful, yet cost-effective media gateway appliance fully integrated with the Utimaco Lawful Interception Management System. The LIMS Gateway converts intercepted calls between SS7/ISDN and VoIP networks. It supports all common voice codecs including transcoding and protects calls by comprehensive access control and encryption features. In combination with Utimaco LIMS the gateway mediates intercepted calls in compliance with common LI standards, such as ETSI TS 102 232-5 and TS 101 671.

# LIMS Options

There are several software and hardware options available to complement the Utimaco LI solution.



## LIMS AUTHENTICATION

With this software option the LIMS internal user management can be integrated with an existing access control regime. Both, OS users and LIMS users can be authenticated at a central server using RADIUS and optionally by RSA tokens (2-factor authentication).



## LIMS LOADBALANCING

Utimaco LIMS is well prepared to scale with the ever increasing bandwidth requirements in modern telecom networks. Dynamic loadbalancing algorithms distribute intercepted data evenly among a range of mediation devices and server.



## LIMS SECURITY SERVER

Hardware-based encryption and protection of cryptographic keys complements LIMS for high-security environments, e.g. when multiple agencies share the access to one LIMS system.



## LIMS ENCRYPTION

This option applies strong encryption and hashing based on AES256 and SHA256 to protect confidentiality and integrity of sensitive LI data.



## LIMS HI-TEST TOOL

LIMS HI-TT provides a valuable tool that helps system administrators verify the correct syntax and content of intercepted data. The graphical user interface lets you browse through IRI and CC data received from network nodes or from a LIMS mediation device. VoIP calls can be received, saved and played back for testing purposes.



## LIMS DATABASE

This option is required to connect the LIMS internal database which stores private user data, warrants, configurations, logs, statistics and other critical information.



## LIMS DISASTER RECOVERY

In case of a full site failure the disaster recovery option helps to restore LI operation quickly at a disaster recovery site which runs in warm-standby mode.



## LIMS HIGH AVAILABILITY

The high-availability option for LIMS enables operators to build robust LI systems with 99,999% availability. The advanced Utimaco system monitoring software recognizes all kind of potential failures and bottlenecks and automatically switches system processes to hot-standby servers when necessary.



## LIMS REMOTE ACCESS INTERFACE

With this API, Utimaco LIMS can be integrated with 3rd party monitoring centers. All important functions for operation, administration and auditing are available over a secured IP connection.



## LIMS REMOTE PROVISIONING UNIT

The LIMS RPU facilitates remote administration, operation and auditing of LIMS via a secured IP connection. The software package is designed for Dell Optiplex workstations.

# Active vs. Passive Monitoring

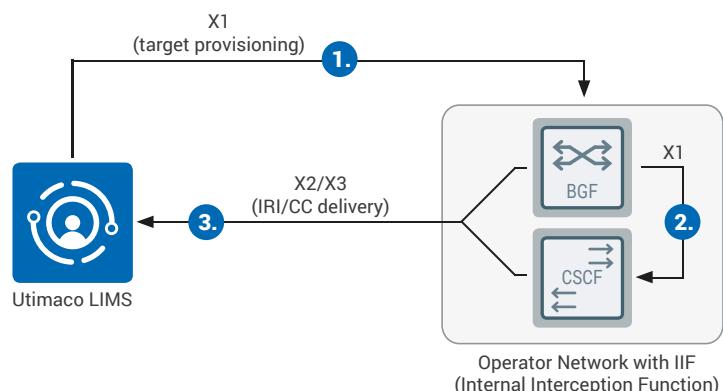
There are two basic methods to monitor and access network communication in real-time. Active interception employs integrated interception capabilities of the serving network elements, like call switches, routers and application servers. This method is cost-efficient and commonly supported by carrier-grade network equipment. Passive interception, on the other hand, requires specialized

network appliances, probes, which filter all traffic for particular target identifiers and extract data. Such probes are connected to selected network links by network taps or switch mirror ports, thus receiving a copy of the communications traffic. In some networks a mixture of active and passive interception techniques provides the best results or is the only available option.

## ACTIVE MONITORING

### BENEFITS

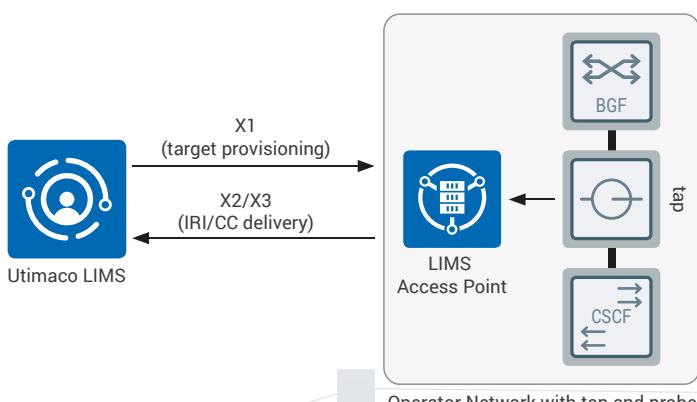
- Cost-efficient, software only, commonly no extra hardware required
- Fast deployment, use of available network resources
- Highly available – same as communication service
- Works with encryption – if the encryption is terminated at the providers network
- Standardized – Requirements and general functions covered in common ETSI, 3GPP standards
- Complete – Covers all communication of a target
- Broad vendor support
- Secure - extra security profile on serving nodes
- Scalable - scales with the network



## PASSIVE MONITORING

### BENEFITS

- Transparent - Independent of the serving network, no negative impact on performance or availability of the service
- Transparent - invisible for the subscriber and for the network
- High capacity - probes can be designed to capture large amounts of traffic
- Multi-purpose - probes may be used for multiple purposes at the same time
- Secure - probes are segregated and protected from unauthorized access



# Utimaco LIMS Access Points

## Real-time Monitoring with LI Probes

Utimaco offers a range of purpose-built LI probes for various networks and communication services. These probes analyze selected network traffic in real-time, intercept targeted data and generate data records (xDR). They

are an integral part of the Utimaco Lawful Interception Management System (Utimaco LIMS) and of the Utimaco Data Retention Suite (Utimaco DRS), thus maintaining a maximum level of data privacy and integrity protection.

### NETWORK ACCESS AND IP MONITORING



LIMS Access Point AAA detect user logins and device registrations by monitoring RADIUS and DHCP data in the core network. When a target is identified, LIMS automatically triggers the interception of the correlated IP data, either on IP routers with internal interception function or on one or more LIMS Access Point IP.

### VOIP / VOLTE / VOWIFI



Voice-over-IP monitoring requires deep analysis of the SIP signaling in the VoIP/VoLTE core network. LIMS Access Point VoIP can detect and intercept targeted calls even with call forwarding and in call conferences.

### MOBILE DATA



LIMS Access Point GTP enables passive interception of targeted data at various points in the network of a mobile operator. The traffic can be selectively extracted from 1G, 10G and 100G links in the radio access links, core networks and at roaming exchanges.

### MOBILE VOICE



In cases where access to mobile switching centers is not available, calls may be intercepted passively in the radio access network. Utimaco provides custom LI probes for IP-based and TDM-based A- and IuCS- interfaces.

### E-MAIL



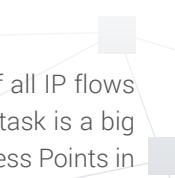
LIMS Access Point E-Mail are deployed in the core network of service providers to monitor and intercept targeted e-mails. As with all Utimaco LI probes they operate in a fully transparent without any impact on the service.

### WEB SERVICES



Lawful interception of web services requires deep packet inspection of http-based application protocols. The LIMS Access Point DPI can be tailored to intercept specific application data in the service provider's core network.

### IP-LOGGING



Tracing back source IP addresses in a carrier network requires high-speed logging of all IP flows through Network Address Translation (NAT/NAPT). This compute and data intensive task is a big burden on carrier routers and can be accomplished by hardware accelerated LIMS Access Points in a much more efficient and transparent way. Our probes aggregate and correlate all IP logs with AAA data and forward the records to Utimaco DRS in near real-time.

# Key Advantages of LIMS

Utimaco's carrier-grade compliance solutions enable real-time monitoring and long term data retention in public telecommunication networks. Utimaco LIMS interfaces with essentially all common network techno-

logies and communications services. The Utimaco LIMS solution is approved by national regulatory bodies and is used by more than 300 network operators worldwide.



## COMPLIANT

Utimaco LIMS has been designed to help operators comply with national laws and regulations as well as with international lawful interception standards developed by ETSI, 3GPP, ANSI/ATIS and CableLabs. Utimaco shares its experience and expertise in standards and regulations with partners and customers to implement and operate a hassle-free and reliable LI solution.



## UNIVERSAL

LIMS supports all public telecommunications services and networks of all leading vendors. One system can serve one or multiple networks at the same time and with full separation of users and intercepted data. This facilitates various business models and deployment options.



## SECURE & RELIABLE

IT security has been Utimaco's core business since its foundation in 1983. As such, Utimaco thoroughly understands the security and privacy aspects of lawful interception and has implemented end-to-end security mechanisms throughout the entire LIMS system. All user data are protected from unauthorized access, data loss and manipulation at any time. Utimaco LIMS is regularly scrutinized and audited by leading telecom operators and independent 3rd party auditing firms.



## COSTS-EFFICIENT

Utimaco LIMS keeps the investment in LI compliance low by integrating with available service platforms in the network and leveraging internal interception functions. Once installed and configured, Utimaco LIMS is almost maintenance-free. The central administration and operation functions minimize the cost to serve law enforcement requests quickly and efficiently.



## CUSTOMIZED

Utimaco delivers LIMS as a turn-key solution with all hardware, software and professional services needed for a successful network integration. Customers can choose from pre-defined bundles that serve one hundred LI targets up to several hundred thousand targets at the same time. The modular architecture of Utimaco LIMS enables operators to tailor the system to its network services and traffic demands with ease.



## POWERFUL AND EXTENSIBLE

LIMS runs on Dell® OEM servers with Red Hat® Enterprise Linux, which provides the solid basis for a reliable, scalable system with sufficient performance reserves for all current and future network sizes. Intercepted traffic is mediated by one or more LIMS DF servers, each of which can process up to ten gigabit per second. As the network grows and new communication services are added, the LIMS system can be easily extended with additional servers and LIMS Mediation Device licenses.

# Designed for modern Networks

Utimaco LIMS has been designed to help network operators and service providers comply with national lawful interception mandates.



## FOR MOBILE NETWORKS

- Integrates with any 2G, 3G, 4G network
- Supports 5G and NFV



## FOR FIXED NETWORKS

- Supports with all kind of DSL, cable, fiber and fixed wireless networks
- Active and passive interception methods



## FOR ISP'S

- Supports a large range of communication services
- IMS, VoLTE, NB-IOT, RCS, E-Mail, OTT messaging, VoIP, Inflight Internet and others

## LIMS Security Features

- Role-based access control: authentication and authorization with granular user rights management
- Full audit trail with detailed accounting of all user and system events
- Integrated alarm system to alert for system and application failures
- Regular consistency checks guarantee the data integrity in the target database and on the interception access points in the network
- Encryption of internal and external data traffic
- Encrypted storage of all sensitive data records, and complete removal of user data after termination of the LI request
- Transparent separation of different agencies and networks, and isolated delivery of interception data to multiple LEAs
- No back doors: The Utimaco LIMS never permits access to unauthorized users or by means other than those described in the documentation.
- The Utimaco LIMS security is assessed by 3rd party audit firms

## Memberships & Certifications



Associate Member

# About Utimaco

Utimaco TS GmbH is a leading supplier of carrier-grade compliance solutions. Since 1994, Utimaco has been developing lawful interception and data retention systems for telecom operators and Internet service providers. With more than 300 deployments in over 90 countries, Utimaco is a true global supplier and market leader in Lawful Interception and Data Retention.

Utimaco is a member and supporter of international telecom standardization bodies and industry associations, such as, ETSI, 3GPP, ANSI/ATIS, GSMA. Customers and partners of Utimaco in all parts of the world trust the long-term proven reliability and investment protection, as well as the manifold certified IT-security standards. Utimaco stands for recognized product quality, user-friendly software, excellent support and trusted high-security, made in Germany.

## A strong team

Utimaco LIMS and the Utimaco DRS have been developed by a team of telecom professionals with more than 25

years of working experience in this field. At Utimaco, about 75% of our professionals are exclusively involved in product development and customer service. The Utimaco team is committed to ongoing investment in product research and development to provide all of our customers with the very best-of-breed solutions. Utimaco TS GmbH is a member of the Utimaco group, a worldwide supplier of professional cybersecurity solutions, founded in 1983.

## .... and a reliable partner

We build relationships with our partners that go far beyond the normal vendor-client relationship and are based on trust, honesty, reliability and openness. We provide products, support, and training that contribute significantly to the technical work and business prosperity of our partners and customers. We are responsive to the needs of our customers in product design, technical support, and customer service. We provide exceptional value and a level of personalized service that set a new standard in our industry – a standard with which our competitors must measure themselves. These are the

*Utimaco Headquarter - Aachen, Germany*

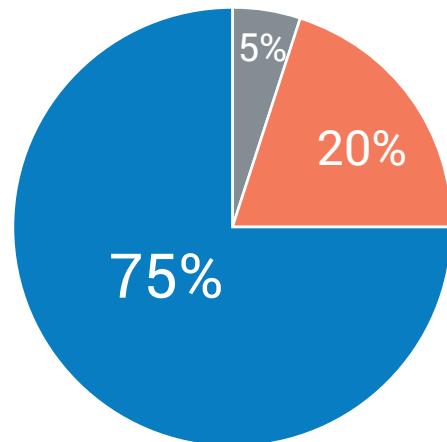


reasons why many of the leading telecom operators and network vendors worldwide rely on products and solutions developed by Utimaco.

#### **With global service and support**

Utimaco understands that telecom compliance solutions are not simply about purchasing hardware and software – it's about implementing capabilities according to national legal requirements and operators' technical prerequisites. Utimaco provides the services, support and resources that help you become compliant with these requirements while minimizing the costs and effort for installation and operation.

With Utimaco's help, your staff can accomplish lawful interception while also keeping your service network tuned for maximum performance and utilization. Utimaco provides worldwide expert consulting services, 24x7 technical assistance, online support, onsite training and installation services.



- Research & Development Support & Services
- Sales
- Product Management & Business Development



# Utimaco LIMS

## Specifications

### NETWORK/SERVICES

- PSTN: Fixed voice (TDM), voice mail
- Mobile Wireless: Mobile voice (GSM, UMTS), mobile data (GPRS, UMTS, LTE), SMS, IMS/VoLTE, NB-IOT
- Fixed broadband: IPv4, IPv6 (xDSL, Cable, WLAN, WiMAX, FTTx)
- Core network: VoIP, IMS/RCS, e-mail, webmail

### LI STANDARDS

- ETSI TS 101 671 (voice), TS 101 331 (generic), ES 201 158 (generic), TS 102 232-1 to 102 232-7 (IP, E-Mail, Internet Access, Multimedia, Mobile)
- ANSI/ATIS: J-STD-025-B (Voice, CDMA), T1.678v2 (VoIP), ATIS-1000013.a.2009 (IAS), T1.724 (UMTS), TIA-1072 (PoC)
- 3GPP: TS 33.106, TS 33.107, TS 33.108 (Mobile)
- PacketCable v1.5 (Cable)

### SUPPORTED SERVICES

- VoIP (SIP, H.323, SCCP, RTP)
- GSM, GPRS, UMTS, LTE, 5G, IMS, VoLTE, RCS, NB-IOT
- CDMA, CDMA2000
- SMS, MMS, Voicemail
- Push-to-Talk over Cellular (PoC)
- PSTN (Fixed Telephony)
- Broadband Access (DSL, Cable, WLAN, WiMAX)
- E-mail (POP3, SMTP, IMAP, webmail)
- other IP-based services

### NETWORK INTERFACES

- 1Gb - 10Gb Ethernet

### PERFORMANCE

- Max. number of subscribers: scalable from 1,000 up to millions of subscribers (virtually unlimited)
- Max. number of targets: up to 400,000 targets
- Max. number of LEAs: 256

### VENDOR INTERFACES

- Affirmed-Networks, Arris, Broadsoft, Casa Systems, Cisco, Comverse, Ericsson, Fuze, Genband/Ribbon, Huawei, Ipageon, Iptego, Italtel, Juniper, Mavenir, Metaswitch, Nokia, Oracle (Acme Packet), Open Exchange, Saguna, Samsung, Sitronics, Sonus Networks, Squire, Thomson-Cirpack, WIT, Zimbra, ZTE and others

### SECURITY

- Role-Based Access Control (local or central AAA)
- Detailed accounting (full logging)
- IPsec/SSL/TLS encryption
- Encrypted storage, encrypted backup
- System monitoring and alarms
- Full system redundancy with hot-standby
- Disaster recovery system (warm-standby)
- Secure remote access

### OTHER FEATURES

- Integrated accounting and billing functions
- Dynamic load-balancing
- Data Buffering (in-memory, on-disk)
- Easy-to-use graphical user interface
- Remote management of other LI systems
- Multi-tenant support
- Location Monitoring

# LIMS Access Points

## Specifications

### NETWORK/SERVICES

- PSTN: Fixed voice (TDM)
- GSM, UMTS, LTE: Mobile voice (A, IuCS interface), mobile data (Gn/S5, Gp/S8, Gb/IuPS, SGi interface), SMS, IMS/VoLTE
- Broadband access: IPv4, IPv6, RADIUS, DHCP, CGNAT
- Core network: VoIP, IMS/RCS, web/http, E-mail

### TARGET IDENTIFICATION

- Fixed Networks: E.164 number, circuit-ID
- Mobile Networks: MSISDN, IMSI, IMEI, Cell-ID
- Broadband: IPv4/IPv6 address, port number, VLAN tag, MPLS label, MAC address, user name
- Core: SIP-URI, TEL-URL, email address, User-ID

### INTERFACE SUPPORT

- E1/T1 (TDM)
- SDH/SONET (STM-1/OC3, STM-4/OC-12, STM-16/OC-48, STM-64/OC-192)
- 1G/10G/40G/100G Ethernet (SFP+)

### PERFORMANCE

- Scalable hardware platforms for monitoring up to 16,000 TDM connections or up to 300 Gbps per unit
- Supports up to 50,000 active targets

### HARDWARE MODELS

- 1U, 2U appliance with 2-8 Monitoring ports (FPGA accelerated)
- 3U blade appliance with 8 slots, up to 32 monitoring ports (FPGA accelerated)

### HIGH-AVAILABILITY

- 1:1 Redundancy with hot-standby (managed by Utimaco LIMS, DRS)
- Redundant Power Supplies (AC and DC option)

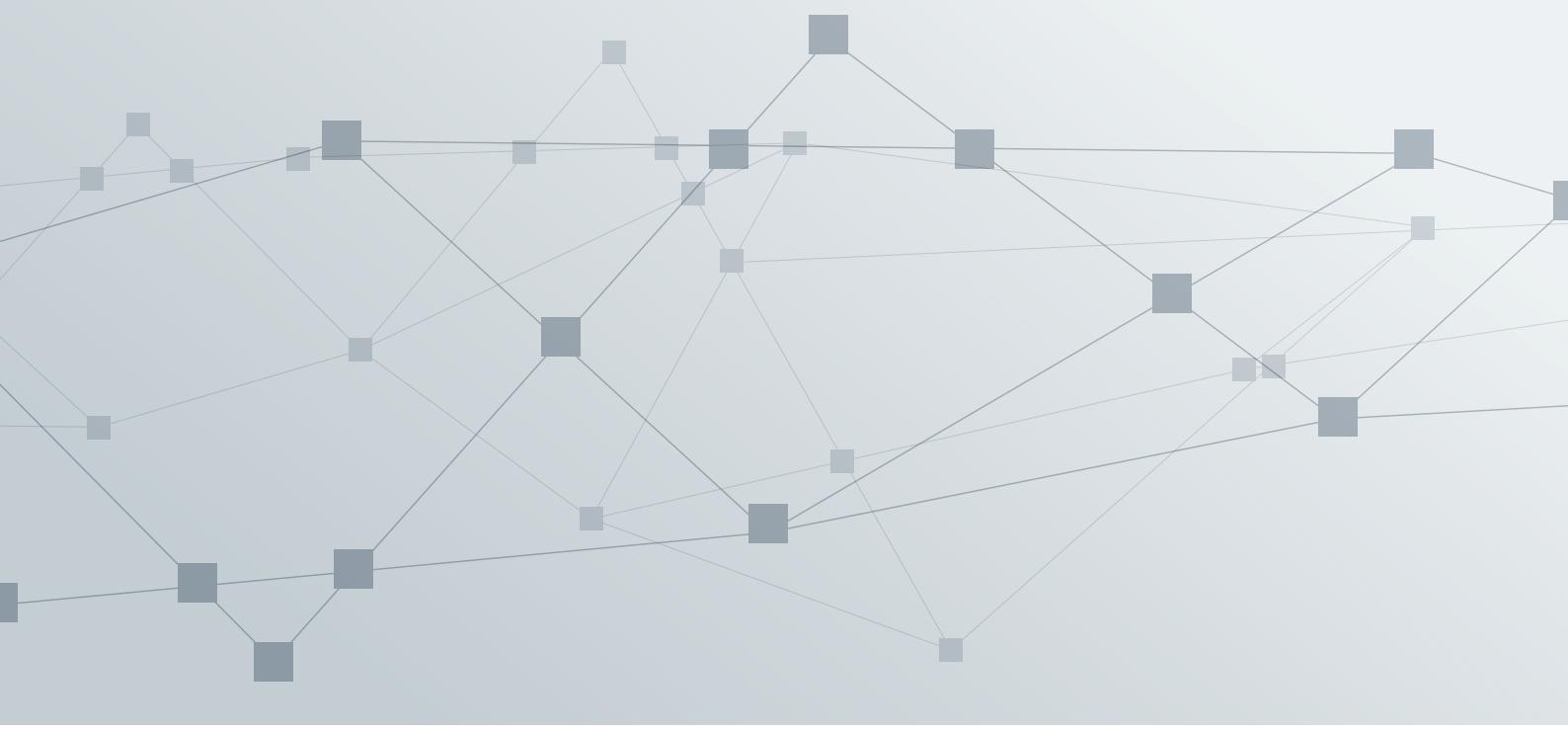
### LI STANDARDS

- ETSI TS 101 671 (TDM delivery)
- ETSI TS 102 232-1/2/4/5/7 (IP delivery)

### CERTIFICATIONS

- RoHS, UL, CE, FCC





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