

# INTELLIGENT NETWORK (IN) GATEWAY

**Intelligent Network (IN) Services** are value-added services that mobile operators offer their customers. The Intelligent Network Gateway can be used to differentiate an operator from its competitors by allowing it to offer unique services to subscribers, as well as to create new revenue streams for operators by offering new, high-value paid services.

**IN Services** in fixed and mobile networks are based on specially developed protocols, such as the CAMEL Application Part (CAP) protocol and WIN (CDMA) protocol. Modulo's Intelligent Network (IN) Gateway supports IN Services deployment using the MAP, INAP, WIN or CAP protocols on SS7 networks.

**The Modulo IN Gateway** is a key element for the successful deployment of intelligent applications which require real-time control of calls, SMS and GPRS sessions in the telephone network. The CAMEL Gateway has a unique API which allows for easy and cost-effective creation of new vendor-independent, value-added services for mobile networks.

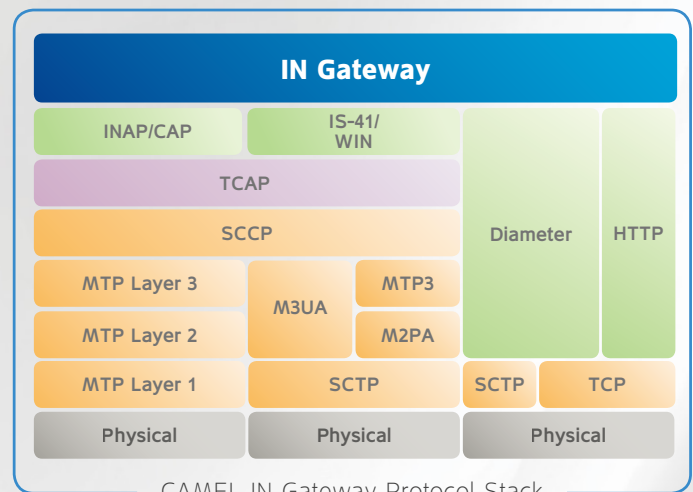
# SYSTEM HIGHLIGHTS

Features	Benefits
<b>Handling of simultaneous conversion of WIN, CAP or INAP signaling to Diameter or HTTP</b>	Supports multiple simultaneous conversion schemes: <ul style="list-style-type: none"> <li>• CAP (UMTS) to Diameter</li> <li>• CAP to HTTP</li> <li>• HTTP to CAP</li> <li>• WIN (CDMA) to Diameter</li> <li>• INAP to HTTP</li> <li>• Diameter to WIN</li> <li>• WIN to HTTP</li> <li>• HTTP to WIN</li> <li>• Diameter to CAP</li> </ul>
<b>Cross-technology billing</b>	Enables sending CAP and WIN signals to the same Diameter element, allowing two networks with different technologies (UMTS and CDMA) to operate with one single billing system (OCS).
<b>Real-time control via a simple HTTP/REST API</b>	The ability to quickly and easily develop Value-Added Services (VAS): <ul style="list-style-type: none"> <li>• Significantly shortens time-to-market on new network services</li> <li>• No need for deep understanding of SS7 protocols in order to develop new network services</li> </ul>
<b>Real-time control using the Diameter protocol</b>	Enables complete call control by any connected OCS
<b>Virtualization Support - Can be installed on any cloud service, with support for VMWare, KVM, AWS</b>	<ul style="list-style-type: none"> <li>• Low Entry Cost: Saves cost of purchase and maintenance of physical servers</li> <li>• Highly Scalable: Can start with a very small subscriber base and scale up (or down) quickly</li> <li>• Provides fast recovery capabilities in case of disaster</li> </ul>
<b>Full clustering for redundancy</b>	Enables seamless handover between units in case one unit fails, decreasing risk for network failures

## UNIQUE INTERWORKING FUNCTIONS

Our unique IN Gateway acts as an advanced interworking function. It converts signaling in the CAMEL Application Part (CAP) protocol to either Diameter or HTTP/REST, and vice versa. It also supports CDMA and converts WIN signaling to either Diameter or HTTP/REST, and vice versa.

What makes our IN Gateway unique is its support for simultaneous conversion of both technologies within the same CAMEL SCP, and unifying the converted signaling to the same billing server (OCS). This enables operators managing multi-technology and multi-generational networks to use one billing system for all of their different network infrastructures, saving huge expenditures on upgrading entire network infrastructures or purchasing entirely new billing systems.



CAMEL IN Gateway Protocol Stack

## A POWERFUL INTERFACE FOR MOBILE SOLUTION PROVIDERS & OEMS

One of the features that make Modulo's Intelligent Gateway special is the ability to customize the scenarios and the interfaces involved in a specific call flow. For example, you could easily translate an IDP message (service request) into a DIAMETER request towards a third party system.

This approach is much more flexible in comparison with traditional SCP architecture because the solution provider receives a powerful and flexible tool for creating new services without creating any constraint on the development environment he is familiar with. The manufacturer can dramatically decrease time to market while deploying innovative services that will enrich its offering and strengthen competitive standing.

# FUNCTIONAL SPECIFICATIONS

## Host

General purpose server with Linux OS

## IP Interface to Telephone Network

M3UA, M2PA, M2UA over SCTP

## IP Interface to Local Area Network

HTTP RESTful API  
DIAMETER

## TDM Interface

PCIe E1/T1/J1 adapter with MTP2 software

## SS7 Links

4 to 744 LSL

## SIGTRAN Associations

Up to 1024

## E1 Interfaces

4 to 24 per cluster

## Virtualization

Can be installed on cloud servers, supporting VMWare, KVM, AWS

## Protocols

### MTP Protocol Support

- ITU-T Q.700 through Q.707, Q.781, Q.782, Q.791
- ITU-T Q.703 Annex A - "Additions for a national option for high speed signaling links"
- TU-T Q.704 - MTP Restart
- ANSI T1.111-1992 Message Transfer Part

### SCCP Protocol Support

- ITU-T Q.711 through Q.714
- Connectionless - Class 0 and 1
- Connection-Oriented - Class 2
- ETSI ETS 300 589
- ANSI T1.112

### TCAP Protocol Support

- ITU-T Q.771 through Q.774, X.680, X.690
- ETSI ETS 300 134, ETS 300 287
- ANSI T1.114

### INAP Protocol Support

- ETSI ETS 300 374-1 - ETSI CS1
- EN 301 140-1 - ETSI CS2
- ITU-T Q.1218 CS-1R

### WIN Protocol Support

- ANSI/TIA/EIA-41.5-D
- ANSI/TIA/EIA/771
- ANSI/TIA/EIA/826

### CAP Protocol Support

- GSM 09.78 (ETSI TS101 046 - V5.6.0) CAMEL Phase 1
- GSM 09.78 (ETSI TS101 046 - V6.3.0) CAMEL Phase 2
- GSM 09.78 (ETSI TS129 078 - V4.6.0) CAMEL Phase 3
- 3GPP TS 29.078 V7.3.0 R7, 3GPP TS 29.278 V7.0.0 R7 (IMS) CAMEL Phase 4

### Diameter Protocol Support

- RFC 4006 - Diameter Credit-Control Application
- RFC 3588 / 6733 - Diameter Base Protocol
- 3GPP TS 32.299 - Telecommunication management; Charging management; Diameter charging applications

### SCTP Support

- RFC2960
- RFC3309

### M2PA Support

- RFC4165 (final version)
- RFC4165 (draft version 9)

### M3UA Support

- RFC3332

## USE CASE EXAMPLES



Number Translation Service



Call redirection



Real-time charging



Call Interception



Virtual Private Networks (VPN)

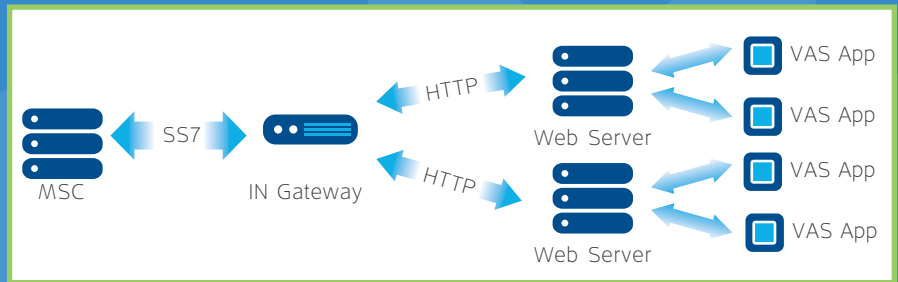


Roaming control for bill shock prevention

# OPERATION MODES

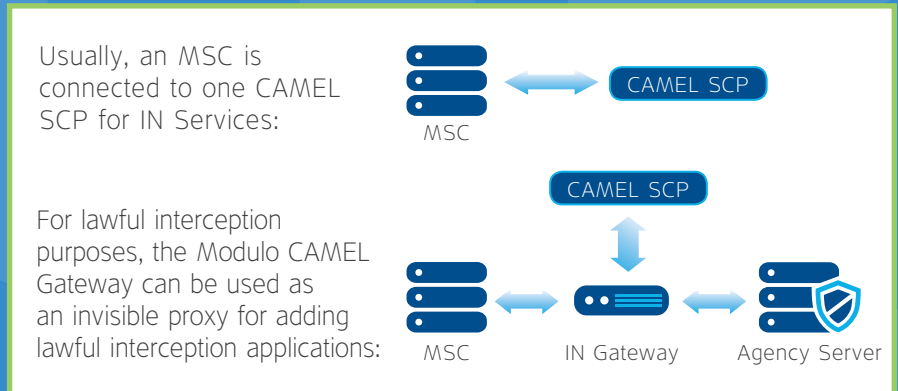
## Application Mode

The RESTful run-mode allows a 3<sup>rd</sup> party web application server to implement an intelligent application by exchanging Json objects through RESTful HTTP requests.



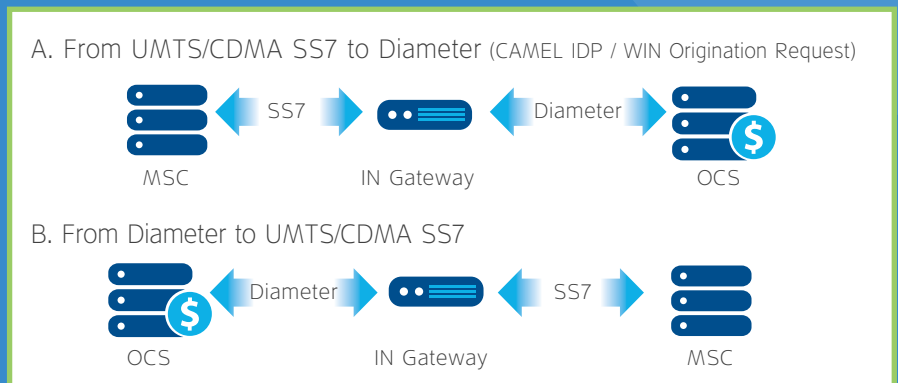
## Proxy-mode

The proxy-mode can be used when there is a need for invisible lawful interception in the network, while providing a single entry point for intelligent services.



## Conversion-mode - for Unified Credit Control

When a mobile operator wants to deploy a new billing system that communicates using the Diameter protocol, there is a need for an interworking function to convert signaling between the Diameter OCS and the SS7-based mobile network. The Modulo CAMEL Gateway converts SS7 signaling to Diameter and Diameter to SS7, for both UMTS (CAMEL) & CDMA (WIN) networks.



# ABOUT MODULO C.S.

Modulo Communication Systems Ltd is a Telecom Solution Center. Modulo provides customers with the best and most cost-effective modern and converged telecom solutions in the market.

Modulo specializes in mobile-network technology, including specifications such as LTE, WebRTC, IMS, and Diameter, as well as legacy protocols such as 3G/UMTS, GSM, SIP, SS7 and Analog protocols. We provide services in design, development, integration, QA, maintenance and training for standard or customized telecom solutions, based on the most competitive off-the-shelf telecom products from market-leader suppliers.

Our services vary from simple reselling to fully-customized solutions through delivery, support, solution design, integration, development, maintenance, training and more.

## For more information

For more information about the product, contact our sales team at [www.modulo.co.il/contact](http://www.modulo.co.il/contact).

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