

Summary

The N-Squared Inter-Working Function (N2IWF) is a multi-protocol gateway which maps 3G and 4G network-side call-control and short-message protocols into concentrated real-time Diameter charging message channel for a Online Charging Server (OCS).

Built on Linux and commodity hardware (including VMs), the N2IWF solution combines easy and flexible service design with modern management features.

Protocols & Integration

The N2IWF integrates network channels (interfaces A-E) to a common charging channel (interface i).

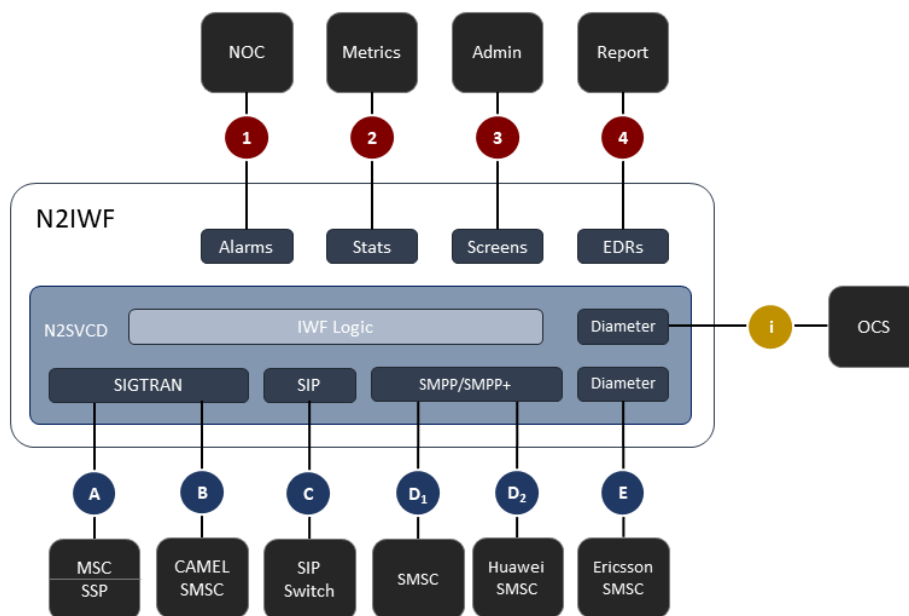


Figure 1: N2IWF Integration Points

Network-facing VOICE interfaces:

- **INAP/CAP InitialDP including CAP1**
- **SIP (RFC 3261)**

Network-facing SMS/MMS interfaces:

- **SMPP including Huawei SMPP+**
- **CAMEL InitialDPSMS**
- **Ericsson SCAP AAA**

Supported charging-side interfaces are:

- **Diameter Credit-Control (RFC 4006, RFC 8506)**
- **Diameter Base (other AAA message implementations)**

Voice Features

In addition to duration control, voice calls can be processed with controllable release causes, SIP reject codes, and SIP/CAMEL redirection (e.g. to customer care).

When integrated with a compatible announcement platform such as the N-Squared N2SRP Specialized Resource Platform, the N2IWF voice services (INAP/CAMEL and SIP) can perform pre-call and post-call announcements.

Announcements can include variable parts such as *account state*, *account balance*, etc. with information sourced via the OCS over Diameter or other sources (via DB query, REST, SOAP, etc.).

Site-Custom Logic Scripting

Site-custom service logic can be added using the sandboxed, memory-efficient, user-friendly Lua scripting language. All service features have full script-control via the documented N-Squared Lua library APIs, including *Network Control*, *Charging Control*, and supplementary integration via *Relational DB*, *MongoDB*, *REST* and *SOAP call-outs*.

OSS & BSS Integration

Standard Network Operation Centre integration features are built-in – SNMP alarm traps, and real-time statistics counters.

Data warehouse or client self-reporting is driven by an extensive set of protocol and service-level Event Data Records published for all key events. EDRs are generated for network, charging, and supplementary service features.

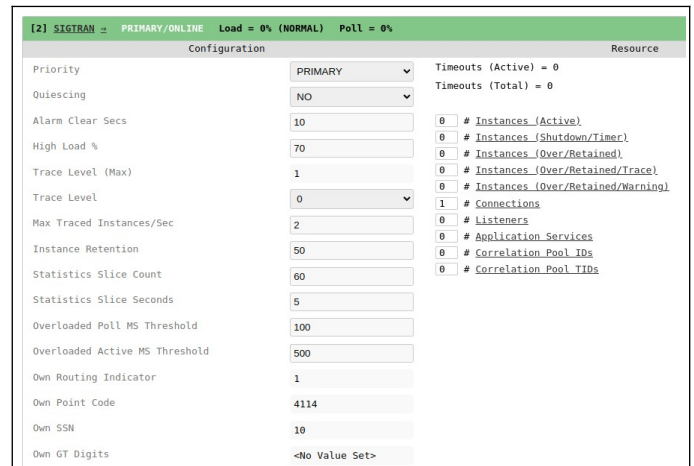
Site-custom scripting APIs can add enriched site-custom alarms, statistics, and event data records.

Platform Management & Control

The underlying N2SVCD service framework supports graphical and API-based management of the running system.

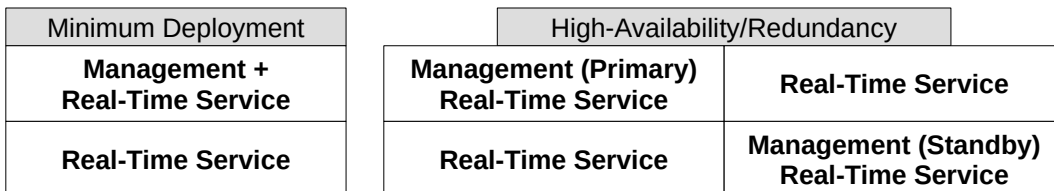
Via web-browser, system administrators may:

- View/modify running configuration.
- Track service statistics.
- Trace in-progress calls.
- Monitor resource usage.
- Activate/Quiesce/Standby nodes.



Scalability & Redundancy

Each N2IWF service node is independent, allowing flexible deployment design to meet the relevant operator capacity and geographic distribution requirements, e.g.:



Support & Maintenance

N-Squared offers ongoing 24/7 platform support and maintenance contracts for all framework solutions.

About N-Squared

N-Squared is based in New Zealand. We are specialist providers of products and services for the Telecommunications domain.

Key Protocol Specifications

ETSI INAP (ETS 300 374-1)
 CAMEL (ETSI TS 129 078, et. al.)
 SIGTRAN (RFC 2960, 4666, 3868)
 SIP (RFC 3261, et. al.)
 Diameter (RFC 6733, 8506)
 SMPP 3.4 & 5.0

Note: Protocols are supported to the extent necessary for advertised features.