

Summary

The N-Squared Interactive Voice Response Platform (N2IVR) is a multi-protocol SIP voice-channel IVR for Telecommunications operators.

The N2IVR solution offers CAMEL/INAP, VXML, MSML, and standalone scripting logic scenarios, with additional customization features via database (local or remote, relational or MongoDB), REST/SOAP API, and other integration points.

Control Logic Options

Each N2IVR deployment can be directed by any combination of the following media server control mechanisms:

- A. Traditional INAP/CAMEL over SIGTRAN M3UA
- B. VXML Server instruction fetch.
- C. MSML in SIP INFO from the SIP Switch.
- D. Local services using Lua scripting language and SDK.

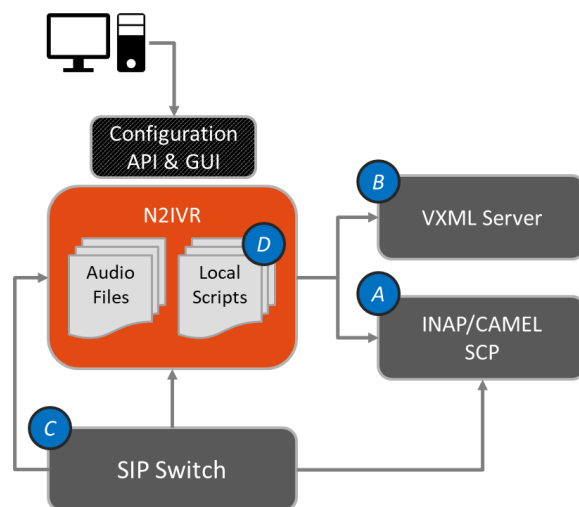


Figure 1: N2IVR Integration

The Lua scripting framework also allows the development of custom control logic integration.

Variable Part Synthesis

N2IVR performs synthesis for “variable parts” in various languages, with each language implemented in an independent synthesis codec.

Number, Digit String, Date, Time, Price are supported, depending on individual language.

Common Architectural Framework

The solution runs on the N2SVCD (N-Squared Service Daemon) framework which underlies the entire suite of N-Squared products including the N2IWF Interworking Function, N2VS Voucher Server, N2ACD Automated Call Distribution, and other solutions from the N-Squared telco product family.

The N2SVCD uses a shared-memory message bus underpinning our flexible set of micro-architecture applications. These can be combined and configured to meet new protocol integrations and can be scaled for additional performance on multi-core architectures including x86-64 and ARM chipsets.

SIP & RTP Protocol Support

Standard RFC 3261 inbound or outbound A-Leg SIP INVITE is used for call set-up, including support for most relevant standard messages and extensions such as Early Media 18x, Late SDP Offer, PRACK, 401 Authentication, SIP REGISTER, SIP INFO, etc.

Audio is via RTP using G.711 μ -Law, A-Law, or AMR Wideband. DTMF detection is via in-band RTP telephony-event, SIP INFO, or Goertzel FFT in software.

B-Leg pass-through is implemented with the N2IVR acting as a Back-to-Back User Agent (B2BUA) in the SIP control path, but not involved in the RTP stream (transcoding/RTP-relay is not performed).

Key Protocol Specifications

- ETSI INAP (ETS 300 374-1)
- CAMEL Phase 2+ (ETSI TS 101 046)
- SIGTRAN (RFC 2960, 4666, 3868)
- SIP (RFC 3261)
- RTP (RFC 3550)
- RTP DTMF (RFC 4733)
- VXML 2.0 & 2.1 (W3C)

Protocols are supported to the extent necessary for advertised features.

N-Squared Interactive Voice Response

Provisioning Interface

Audio mapping configuration for N2IVR is managed via an intuitive web-based provisioning interface. Fine-grained security control allows Telcos to grant secure self-management of announcements to resellers and virtual network operators.

Key Features:

- Secure in-browser management.
- REST API for automated provisioning.
- User-based resource access control.
- Automatic format conversion.
- In-browser audio playback.
- Version control & backup/restore.
- Integrated Node Synchronisation

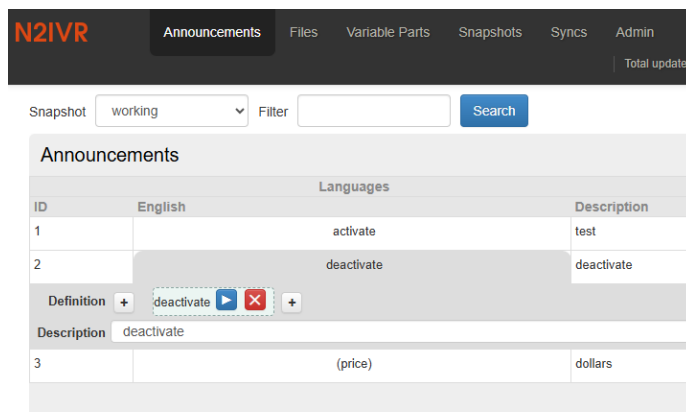


Figure 2: N2IVR Web Interface

All provisioning features are also available via REST API.

Platform Management & Control

The N2IVR service layer includes a web-based interface for interaction with the run-time service-layer components.

Via a web browser, system administrators may:

- View running configuration.
- Track service statistics.
- Interrogate in-progress calls.
- Monitor resource usage.
- View system alarms.
- Modify platform configuration.

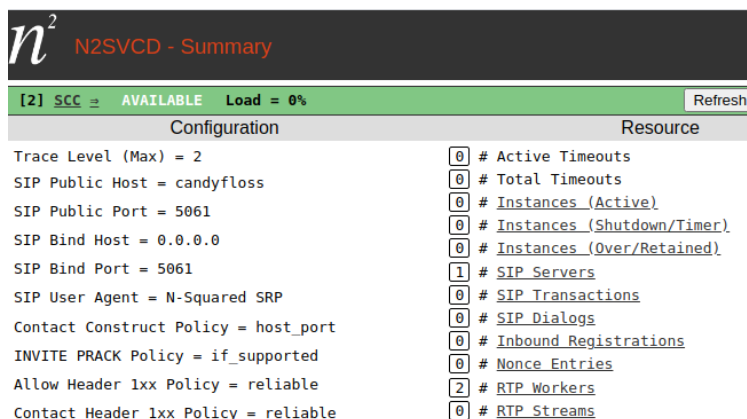


Figure 3: N2IVR Operational GUI

All administration features are also available via REST API.

Platform Monitoring & Reporting

Platform activities are reported by:

- Alarms off-platform via SNMP.
- Statistics off-platform via StatsD/Prometheus.
- Call Data Records in flat-file format.

Support & Maintenance

N-Squared offers ongoing 24/7 platform support and maintenance contracts for all N2IVR solutions.

About N-Squared

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