

Scalable Voice Core

NeatPathNetworks

Neat Path Networks Scalable Voice Core disrupts the voice core telco providers market bringing compliance with the latest standards, including the strictest security features, combined with the practical needs of complex VoLTE/VoNR/VoWiFi/MCX deployments. With the 2G/3G sunset as a catalyst, renewal of existing networks, IoT providers, MVNOs and private network operators demand a forward looking voice solution that scales and adapts to current and upcoming deployment best practices.

The standard IP Multimedia Subsystem (IMS) provides voice for mobile networks, designed for large operators but usable beyond that, the products in the market didn't fit all possible deployment scenarios. Neat Path Scalable Voice Core adapts to any deployment from private networks to country-wide MCX deployments or world-wide IoT MVNOs.

Benefits

Solid Performance

Completely built from scratch in Go, its user-space IPsec implementation, paired with a newly designed SIP and Diameter stacks, adapting also to smaller network demands, with minimal resource consumption.

Flexible Integrations

User-to-Network-Integration is the cornerstone of an IMS deployment; strict in regard to security but extremely flexible for correcting miss-interpretations of the standard on device side makes deployments easier. Integrations with HSS and PCRF/PCF provide flexibility and are tested with different vendors.

Voice and SMS system

With all the features required to provide commercial devices with Voice and SMS and without all the 3GPP features bloating for everything else which is never used in real scenarios.

Cloud

Lean and stateless applications that shine when deployed in the cloud or in very constrained environments. Whether in public or private cloud, whether AMD or ARM platforms, deployment becomes automatic by using the most standard practices and tools.

The solution includes all standard components necessary for adding voice and SMS over IP to any network with standard compliance, security, flexibility and simplicity, avoiding 3GPP feature bloating, and adding non-standard features that make adding voice to even the smallest private network possible.

Based on 3GPP Release 18 the solution includes the P-CSCF, I-CSCF, S-CSCF, IP-SM-Gw and BreakoutGw with the following highlights:

- Security in focus, with latest encryption algorithms
- Authentication and configurations for all types of networks
- Local delivery features for isolated private networks where voice and SMS stay local
- Integration to SIP trunking services over the Internet for voice call delivery outside of the local network
- Supports special logic for emergency calling according to regulatory requirements
- Different options for state persistence
- Flexible standard interpretation makes integrations with HSS and PCRF/PCF simple
- Integrates with RTP Engine to transcode and anchor calls when necessary

Neat Path Networks Scalable Voice Core provides all these features keeping the scalability and manageability of the solution using common paradigms and standard tools both for very large and very small deployments.

The software is fully implemented in Go, with a stateless approach that permits containerized deployments and integration with public and private clouds.

For the most advanced customers who have embraced DevOps, simulation tools are provided, to create pipelines of continuous testing in their CI/CD architecture. These tools also test security and IPsec scenarios.

P-CSCF

Security features like a new IPsec implementation in user space with scalability and support for all security algorithms from Release 19, and privacy information removal avoiding information leakage in accordance with GSMA recommendations. Supports from Rx interface with access network location information and events support, to integration with RTPEngine for transcoding or anchoring (IPv4/IPv6); and different options of emergency call detection and PSAP routing tested in an ESTI Plugtest.

S-CSCF

Completely stateless and scalable. Supports Cx with several authentication methods and standard service triggering using HSS defined IFCs. Local-delivery features permits detection in MO if target MT is registered in the same S-CSCF, if it is auto-delivers MT avoiding need for additional hops. Without auto-delivery it performs ENUM queries and flexible DNS alternatives to detect routing to termination.

I-CSCF

Completely stateless, it acts as load-balancer to the S-CSCF using the HSS Cx interface.

Rx-To-N5

Permits the P-CSCF to integrate with a PCF instead of a PCRF. Supports different interactions and events necessary in VoNR.

IP-SM-Gw

SMS local-delivery in the same network or using Diameter SGd to an external SMSC.

Sh interface according to Release 18 for SMS registration and deregistration.

BreakoutGw

Call origination and termination in PSTN.

Integrates with external networks or Internet SIP Trunking services.

Support for native interface to RTPEngine for transcoding and anchoring when necessary.

Protocols IPv4, IPv6, IPSec ESP, SIP, RTP, RTCP, SIP over TLS Diameter on SCTP and TCP, HTTP2	Security Algorithms (Rel.19) aes-gcm-us, aes-gcm, aes-cbc, des-ede3-cbc, enc-null aes-gmac-us, aes-gmac, hmac-sha1-96, hmac-md5-96, int-null
3GPP interfaces Gm, Mw, Rx, N5, Cx, Sh, SGd	3GPP Specifications (Release 18) TS 24.229, TS 33.203, TS 29.214, TS 29.514, TS 29.228, TS 29.229, TS 24.341, TS 29.338, TS 29.328, TS 29.329
Deployment options AWS, Google Cloud, Azure OpenStack, Docker, VMWare, OpenShift, any Kubernetes, any Linux	Other Specifications RFC3261, RFC8866, RFC6733, RFC4302, RFC4303, RFC2403, RFC2404, RFC2405, RFC3602, RFC4106, RFC4543, RFC3329 and more ETSI 103.221
Observability Prometheus & Grafana	Use Cases VoLTE, VoNR, VoWiFi, Private Networks, IoT, MVNOs

About Neat Path Networks GmbH

Neat Path Networks (NPN) delivers new software solutions for telecommunications based on the latest software development paradigms and tooling. The vision is to remove complexity bringing solutions to customers of all sizes and which often go beyond what is available in the market and with the actually required features that never appear in the standards.

Founded in Berlin in 2024, the NPN founding team builds on the experience of having created an Open Source IMS implementation in 2004 (which is the roots of the most popular Open Source IMS) and a closed-source implementation of the EPC which is used in production by various companies today.

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