

VoIP and CLI

Trusted Identification

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VoIP and ENUM Tutorial
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Today's Roadmap on Numbering

1. POTS – from Comfort to Numbering
 - Why are the numbers in the PSTN in the way they are?
 - A History
2. ENUM and VoIP – Numbering and Dialing Plans
 - ENUM Mapping of E.164 Numbers to Internet Names and Addresses
 - E.164 Numbers for VoIP and Routing on the PSTN
 - Numbering and Dialing Plans for VoIP
 - An Overview and a Proposal
3. VoIP and CLI – Trusted Identification
 - Calling Line Identification on VoIP
 - A Proposal

Calling Line Identification

- Numbers are also used for CLI
- the CLI serves different purposes:
 - Call back information to the called user (as dial string)
 - Identification of the user and his location to emergency services and for legal intercept
 - Identification of the user for malicious call identification (MCI)
 - Identification of the user for accounting purposes (e.g. carrier selection)
- In the PSTN the CLI is tagged with
 - a Screening Indicator (SI) and
 - a Presentation Indicator (PI) set by the user (CLIR)
- In the PSTN all networks are in a Circle of Trust
 - so the information is transmitted via all Network-Network Interfaces (NNI) and is withheld on most User-Network-Interfaces (UNI) (except emergency services) if requested by the PI

CLI in the PSTN

- In the PSTN the CLI is tagged with a screening indicator:
 - network provided,
 - user provided, verified and passed
 - user provided, unscreened
 - This information is set by the calling party and is neither screened by the PBX or by the switch, if transmitted via the User-Network-Interface. It is always replaced by the switch with the **network provided number** in the calling party identification. Only if there is the possibility of transmitting a second CLI as **generic number**, this information is transmitted IN ADDITION.
- The subscriber may request with a (mandatory) supplementary service (CLIR) (permanent or call-by-call) that the presentation of the network provided number is restricted with the PI
 - presentation restricted
 - presentation allowed

Trust Circle

- PSTN networks are able to rely on this information because they trust each other
- To extend this trust to VoIP and the Internet, the following is necessary:
 - Network-network-Interfaces between the PSTN and the Internet (SS7 Gateways), because on UNIs always the network provided number is inserted
 - A Circle of Trusted VoIP service providers (SP)
 - Secure signaling between the servers operated by the SP
 - Proper identification of subscribers and authentication of users
 - properly assigned E.164 numbers
 - Secure signaling between users and servers
- See work on SIM card authentication, trusted Remote Party IDs and network asserted identities (NAI)

Reliable CLI of E.164 Numbers on VoIP

1. E.164 Number provided by service provider
 - Currently the normal case
 - may be implemented immediately
 - Identity of subscriber held by service provider
2. E.164 number provided by user
 - requires E.164 certificates
 - allows in connection with accounting certificates ad-hoc or call-by-call subscription
 - may be implemented later in addition
 - Identity of subscriber held by E.164 number issuer or credit card company

E.164 Number provided by Service Provider

- The user MUST have a subscription with a VoIP SP with proper identification
- The E.164 number SHALL be either assigned by the VoIP SP or ported in by the subscriber (REQUIRES proper validation or certificate)
- The user MUST register by the VoIP SP in a secure manner
- The user is setting up a call via secure signaling and MUST be able to indicate the VoIP SP if the presentation of his identification (the E.164 number) to other users SHALL be restricted (CLIR)
- The VoIP SP SHALL send this identification only to trusted partners and only via secure signaling (e.g. TLS or VPN).
- The user MAY set up a different identification as user provided
- If the trusted partner is a gateway to the PSTN, the gateway SHALL set up the trusted identification as network provided and set the proper Presentation Indicator (this requires SS7 Signaling)
- The gateway MAY in addition set up the user provided identification as generic number, if available.
- A trusted partner MUST withhold the transmission of the identification to a UA or an untrusted service provider (proxy) if presentation is restricted
- If a communication to an untrusted partner is established, only the user provided information SHALL be delivered if the presentation is restricted.
- In case of law enforcement, the identity of the user (subscriber) holding the E.164 number MUST be retrievable from the VoIP service provider

E.164 Number provided by User

- The user MUST have a E.164 Number assigned by a certified entity and also MUST have a certificate showing the right to use this number
- The user MAY have a subscription with a VoIP SP, but MAY also subscribe ad-hoc
- The user MUST register by the VoIP SP in a secure manner providing his certificate.
- The user is setting up a call via secure signaling and MUST be able to indicate the VoIP SP if the presentation of his identification (the E.164 number) to other users SHALL be restricted (CLIR)
 - The VoIP SP SHALL send this identification only to trusted partners and only via secure signaling (e.g. TLS or VPN).
 - The user MAY set up a different identification as user provided
 - If the trusted partner is a gateway to the PSTN, the gateway SHALL set up the identification as network provided and set the proper Presentation Indicator (this requires SS7 Signaling)
 - The gateway MAY in addition set up the user provided identification as generic number, if available.
 - A trusted partner MUST withhold the transmission of the identification to a UA if presentation is restricted
 - If a communication to an untrusted partner is established, only the user provided information SHALL be delivered if the presentation is restricted.
- In case of law enforcement, the identity of the user (subscriber) holding the E.164 number MUST be retrievable from the entity assigning the E.164 Number

Proposal

- It is proposed to set up a global field trial for exchanging trusted CLIs
- This requires:
 - creation a Circle of Trust between (some) of the ITADs currently interworking already in VoIP and ENUM
 - Note: this does not prevent communication with "untrusted" entities (on the contrary, you just have to stick with the rules)
 - establishing a secure communication between the trusted entities
 - some entities should provide SS7 based interworking with the PSTN/ISDN
 - Trusted entities need to get access to genuine E.164 numbers
 - Trusted entities need to identify their subscribers

The End

**Thank you for
your attention**

