

VoIP Provisioning Models

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Carrier Access Networks VoIP vs. Overlay VoIP

- **Raison d'être for designed VoIP/VON in the access network**
 - Facilities-based Carriers with own access network can add value, predictable quality
 - Constant toll quality plus POTS availability presently unattainable without link-layer designs
 - Willingness-to-pay two-part tariff with monthly base fee dependent on constant quality service level
 - Some services such as life-line 911 difficult to attain without line-powered/battery backup facilities

Carrier Access Networks VoIP vs. Overlay VoIP

- **QoS Designs in access networks vary**
 - Channelized vs. fat pipe
 - ATM/Ethernet mixed/MPLS (e.g. Ethernet over MPLS over Ethernet)
 - Carrying QoS up to VoIP termination point is challenging over multiple link layers
- **Carrier VoIP management is not simpler than for POTS ports**
 - Add Quality Probes, Line Quality/Test integrated in POTS/ISDN Line Cards
 - Wireline POTS OSs well integrated

Voice Gateway

- **Terminates VoIP and/loop emulation protocol**
- **Signalling towards class-5 circuit switch with GR-303/V5.x etc.**
- **Trunking gateway for PSTN calls from softswitch**
- **May do in-network switching**
- **Transcoding**
- **CPE - SIP Gateway/CPE control for BLES**

Feature Server

- **Tandem with Softswitch**
- **Features such as conf calling for at least in-network calls**
- **Present Carrier VoIP Networks offload some features to class-5 switch for better SS7/AIN integration**
- **Per subscriber feature provisioning not too difficult, logic of call flow/feature mapping complicated**

- **Provisioning**

- VoIP with PSTN Gateway typically involves multiple provisioning OSs
- Operators prefer to keep subscriber line records in same OS as POTS
- Resulting very complex interactions

- **Inventory**

- Impacts CPE (for carrier-managed CPE and VON), softswitch, trunk lines (all: TDM, Ethernet, SDH/SONET), intermediate ATM switches (not routers),
- Think voice takes a lot of bandwidth at n million subscriber level

- **Performance**

- Being addressed for VoIP
- Linkage to CAC in overlay approach has been suggested
- Prerequisite for eventual move to overlay model

- **Alarms**

- Addressed today for VoIP, approaches in alarm correlation models do not differ much from POTS/data services

- **EMSs for VOIP with PSTN show little commonality**

- No consensus even on line ID index field

Provisioning Models

- **Choice of models**
 - Pure per-subscriber provisioning
 - Template provisioning
 - Preprovisioning
 - Dynamic provisioning
 - Subscriber self-provisioning
- **Pure per-subscriber and the polar dynamic approach not well suited for carrier VoIP**
 - Pure pre-subscriber only applicable to fully channelized networks
- **Emerging channelized subscriber line with 'fat-trunk' needs combination of provisioning approaches**

Provisioning Models

- **Combined approach provides operator with good control, gives good turn-up times and**
 - Capacity activation on trunks: Ethernet, SDH/SONET
 - Avoid per-subscriber provisioning on IP routers
 - Preprovisioning of MPLS devices
 - Template provisioning of
 - NO per-subscriber attribute provisioning but of line/channel ID (ATM VCLs etc.), related information

Towards Unified Provisioning Protocols

- **Multi-protocol approach (CLI, SNMP, CORBA, XML cumbersome but in the end not too difficult)**
- **Multi-model approach very complex to handle across VoIP networks with PSTN gates**
- **NETCONF Draft is a major step forward**
 - Due lack of modelling language does not solve all prior problems
 - <draft-romascanu-netconf-datatypes-00.txt> and other frameworks step in the right direction
 - OASIS Service Provisioning Markup Language (SPML) disconnected from service provisioning requirements
- **Danger of following the same path as for CORBA models**

Towards Unified Provisioning Protocols

- **Normative models for VoIP/VON with PSTN networks are needed**
 - Service models
 - Capacity activation models
 - Equipment models
- **Underlying commonality in voice data models exists coming from PSTN world**
- ***Frameworks do make sense, impossibility to model every variation***
- ***Provide base model, extensions flexibility, modelling guidelines***