Gateway Location and Gateway Decomposition

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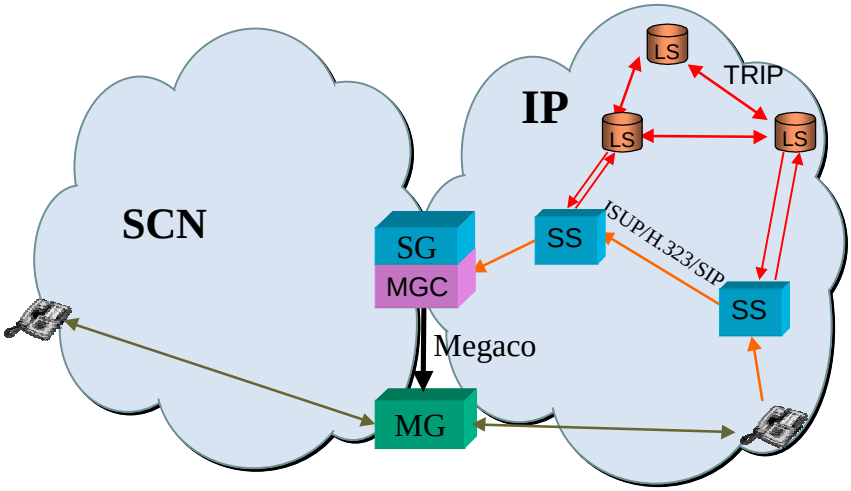
Outline

- Assumptions
- Locating GWs from the IP Telephony network
- Relationship of the problem of GW location and GW decomposition.
- Locating a SG from the ISDN network angle.
- Number portability across the technology boundary.
- GSM and 800 numbers.

Assumtions

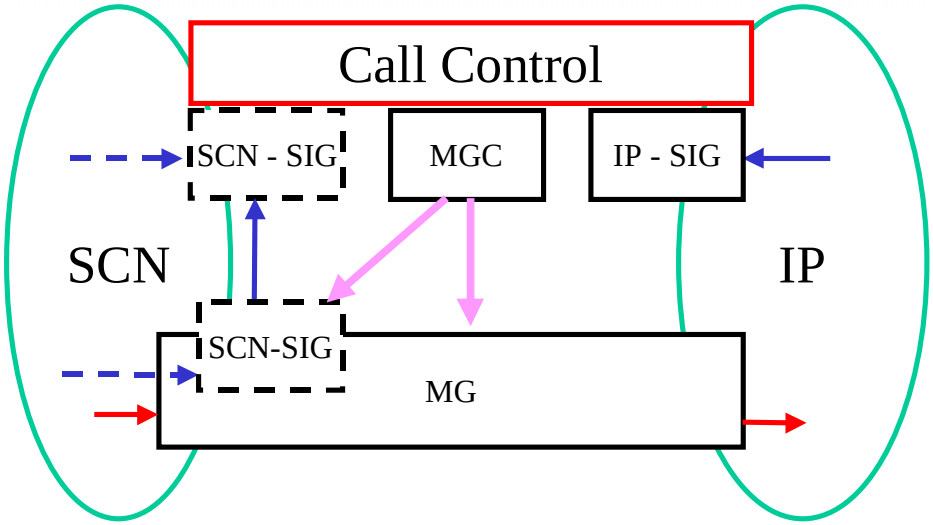
- We are headed towards fully peered SCN and IP-telephony networks due to
  - the increase in IP telephony connections and applications and
  - SIGTRANs work
- Efficient routing and numbering infrastructure across the emerging hybrid network is a necessity
  - Delay and jitter highly depend on call path

Architecture overview



TRIP = Telephony Routing over IP, SG - Signalling Gateway, MGC - Media Gateway Controller
MG - Media Gateway, SS = Signaling Server, LS = Location Server

Gateway decomposed



GW Location vs Decomposition

- The IP Telephony view:
  - LS provides info about Next hop Signaling server e.g. a Signaling Server or an MGC in the same domain
  - TRIP keeps information in LSs updated across IP Telephony systems
  - MGCs are registered e.g in LS (this information may be local to an Admin Domain)
  - SS can use LS to locate MGC and MG

GW Location vs Decomposition

- ISDN, GSM, PSTN view
  - Good news: SGs are large - easy to locate
  - Bad news: I do not hear any body working on the problem of Gateway location from the ISDN point of view
    - From the SCN it is equally important to select the most suitable Gateway for SCN to IP calls

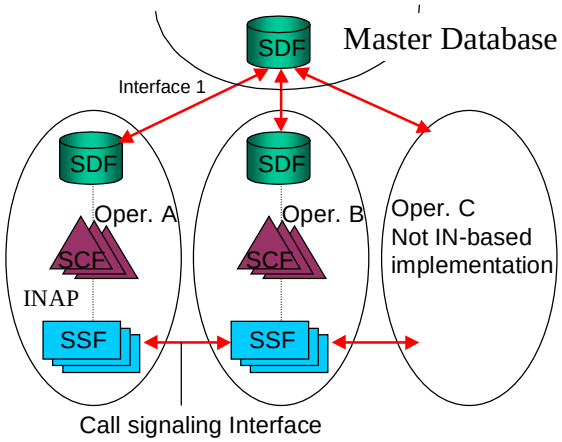
Numbering Issues

- What if an IP Telephony Number is ported to another ITSP operator?
  - ISDN side may need to choose another SG for calls to that number
- What if an ISDN number is ported to another ISDN operator?
  - IP side may need to choose another set of SG, MGC, MG
  - LSs need to know about the change
- What if a number is ported SCN to IP or vice versa

Current situation at the ISDN side

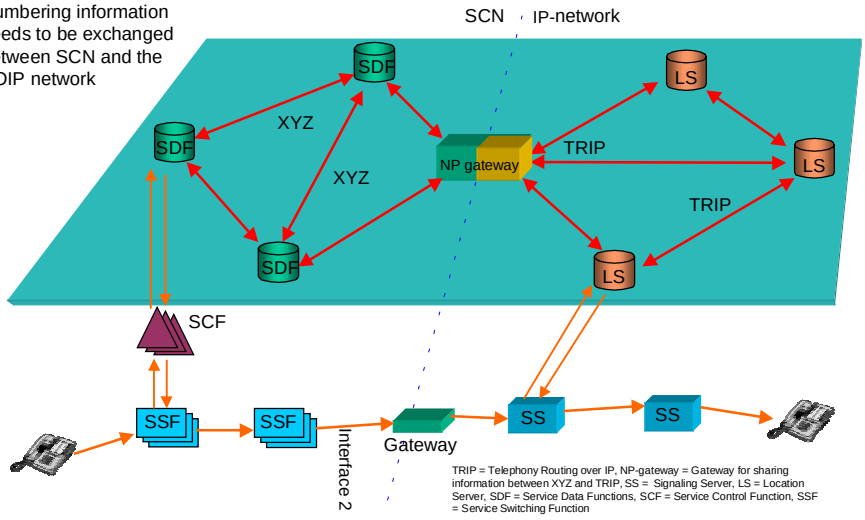
Number Portability is mandated by regulators in Europe and the US

Typical solution is based on IN



ISDN needs a pair to TRIP

Numbering information needs to be exchanged between SCN and the VOIP network

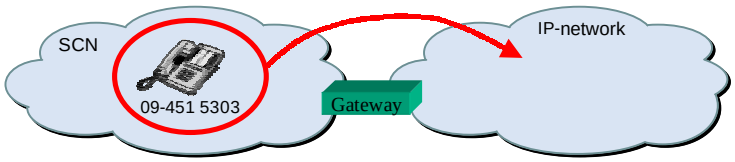


TRIP = Telephony Routing over IP, NP-gateway = Gateway for sharing information between XYZ and TRIP, SS = Signaling Server, LS = Location Server, SDF = Service Data Functions, SCF = Service Control Function, SSF = Service Switching Function

Requirements for Numbering&Routing

Number portability for IP subscribers

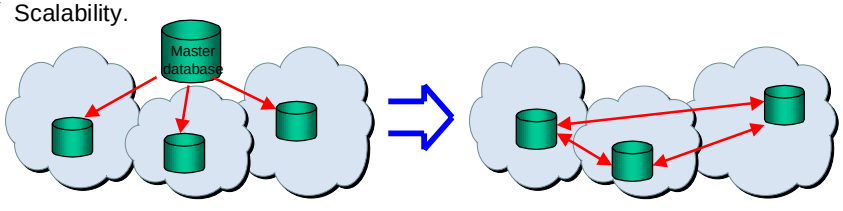
- ✓ Number portability within IP-networks.
- ✓ Number portability between the SCN- and IP-networks.
- ✓ Integration with the TRIP (Telephony Routing over IP) protocol for location of gateways and signalling servers. Integration with TRIP and DNS (enum) for location of IP terminals.
- ✓ Optimisation of routing between SCN- and IP-networks for portable numbers.
  - Location of nearest or most suitable gateway
  - Support for several geographical areas



Architecture for Numbering&Routing

Distributed architecture

- ✓ A distributed database instead of a single master database.
- ✓ No single point of failure.
- ✓ Master DB to SDF Interface replaced by a distributed database based on SCSP (Server Cache Synchronisation Protocol).
- ✓ Database updates made directly by the operators. Support for subscriber-initiated updates possible.
- ✓ Scalability.



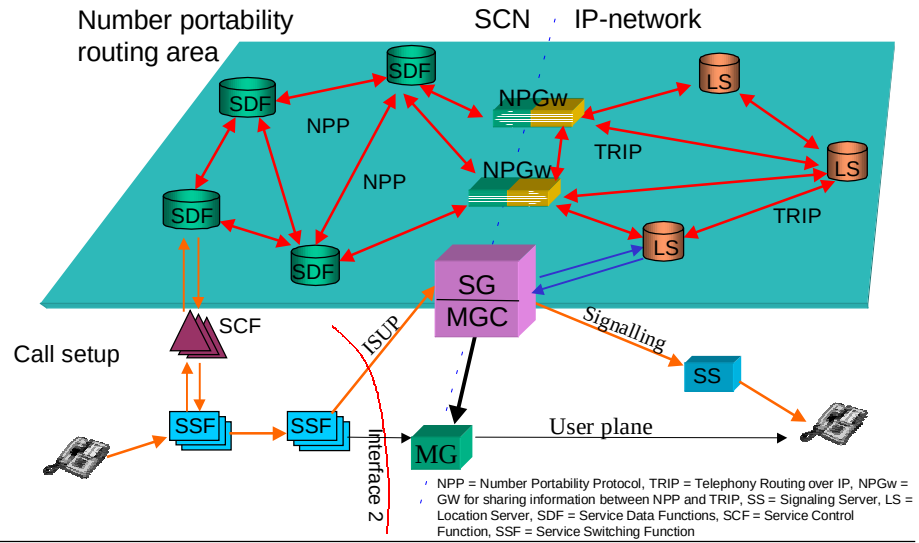
Requirements for 800- and GSM numbers

- IP Telephony view
  - an 800-number and a Cellular Mobile Number may be located anywhere in the ISDN/PSTN cloud or the Cellular cloud respectively
  - additional round of indirection for choosing the GW is needed to ensure adequate quality voice
  - LS needs to cascade the request to an SDF or to an HLR or return the address of an SDF or HLR so SS can make a subsequent query

Requirements for 800- and GSM numbers

- SCN view
  - an 800-number (and a Cellular Mobile Number - only a matter of time!) may be located anywhere in the IP cloud
  - additional round of indirection for choosing the GW is needed to ensure adequate quality voice
  - SDF needs to cascade the request to an LS
  - It is not efficient to flood Mobile numbers among LSs when a mobile number is in an IP cloud - a solution scalable to frequent location changes is needed

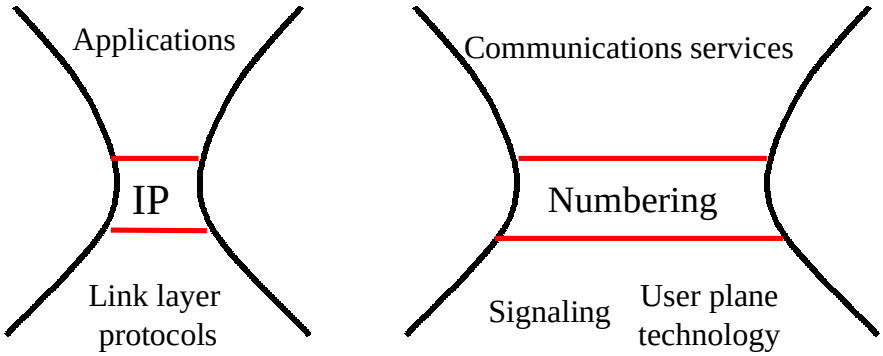
The solution is NPP + NP gateway



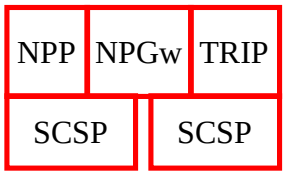
An analogy

Protocol centered view
"How"

Reachability view
"To whom you can call"



Conclusions



- Gateway model needs to be complemented by Numbering&Routing Information gateways
- SCSP can be the common Numbering infrastructure component for both SCN and IP Telephony networks
- TRIP, NPP can be finalised when GW decomposition model is fixed
- Location servers need to be able to cascade requests to cater for 800-numbers, any service specific routing methods and for mobility