

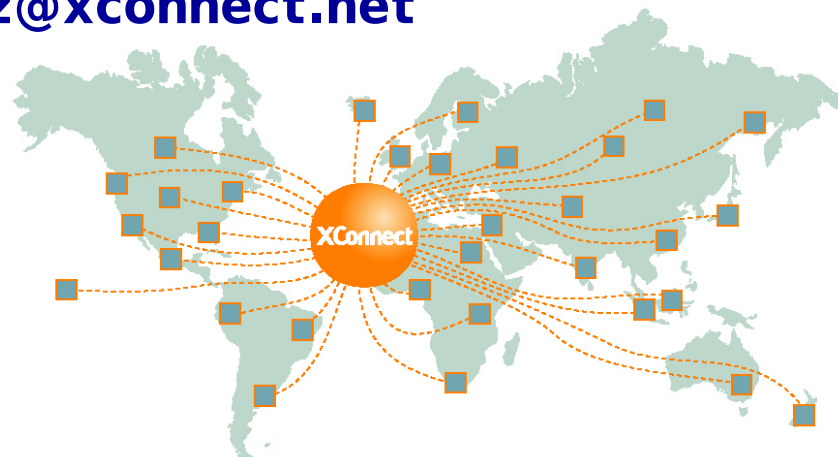


# Bridging the VoIP Islands with Federated Peering and ENUM

*Presentation to the SIP SIG  
Infrastructure ENUM Workshop*

*Den Haag, NL  
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**Eli Katz, CEO, [ekatz@xconnect.net](mailto:ekatz@xconnect.net)**

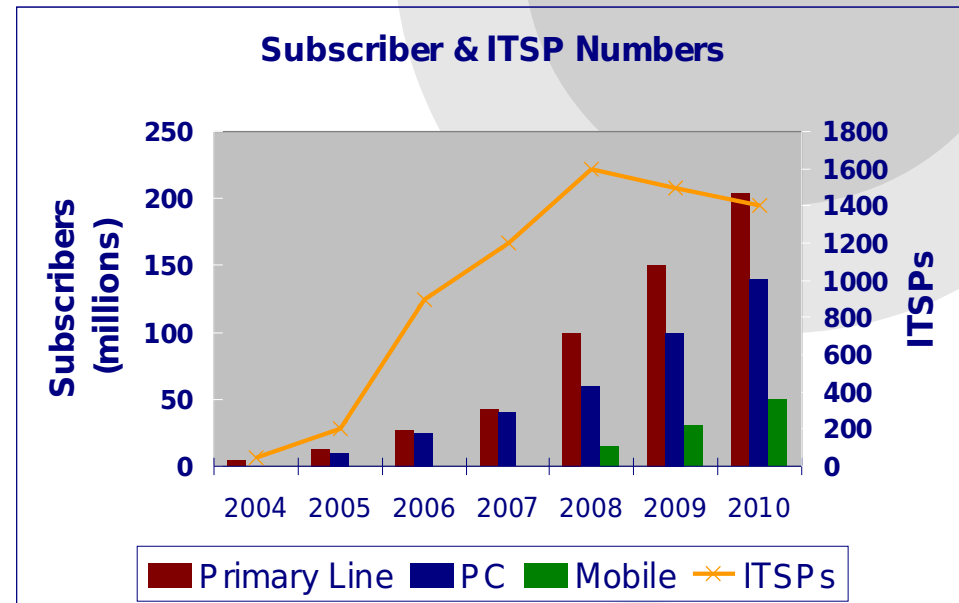


# Agenda

- Introduction
- IP Communications Industry – Market Update
- Why VoIP / NGN Peering
- Peering & the Federation Model
- Standardization of Peering

# VoIP / NGN Transition Underway

- **IP = “VoIP / NGN / IMS”**
  - MSOs (UPC-Liberty, CableVision)
  - Telcos (BT, KPN, FT)
  - ISPs (Tiscali); MNOs (T-Mobile)
  - New Entrants (Telio, Coolwave, Vonage)
  - PC (Skype, MSN, Yahoo)
- **Q2 2007**
  - **40+ million 1<sup>st</sup>/2<sup>nd</sup> line users**
  - **100+ million PC-based IM users,**
    - **15-20% using VoIP**
  - **Over 1000 VSPs in 40+ countries**
  - **<1% - 28% market penetration**
- **2010**
  - **250 million primary line users**
  - **200+ million PC-based VoIP users**
  - **100+ million GSM/WiFi handsets**
  - **1000s of VSPs in 90+ Countries**
  - **C. 35% penetration**



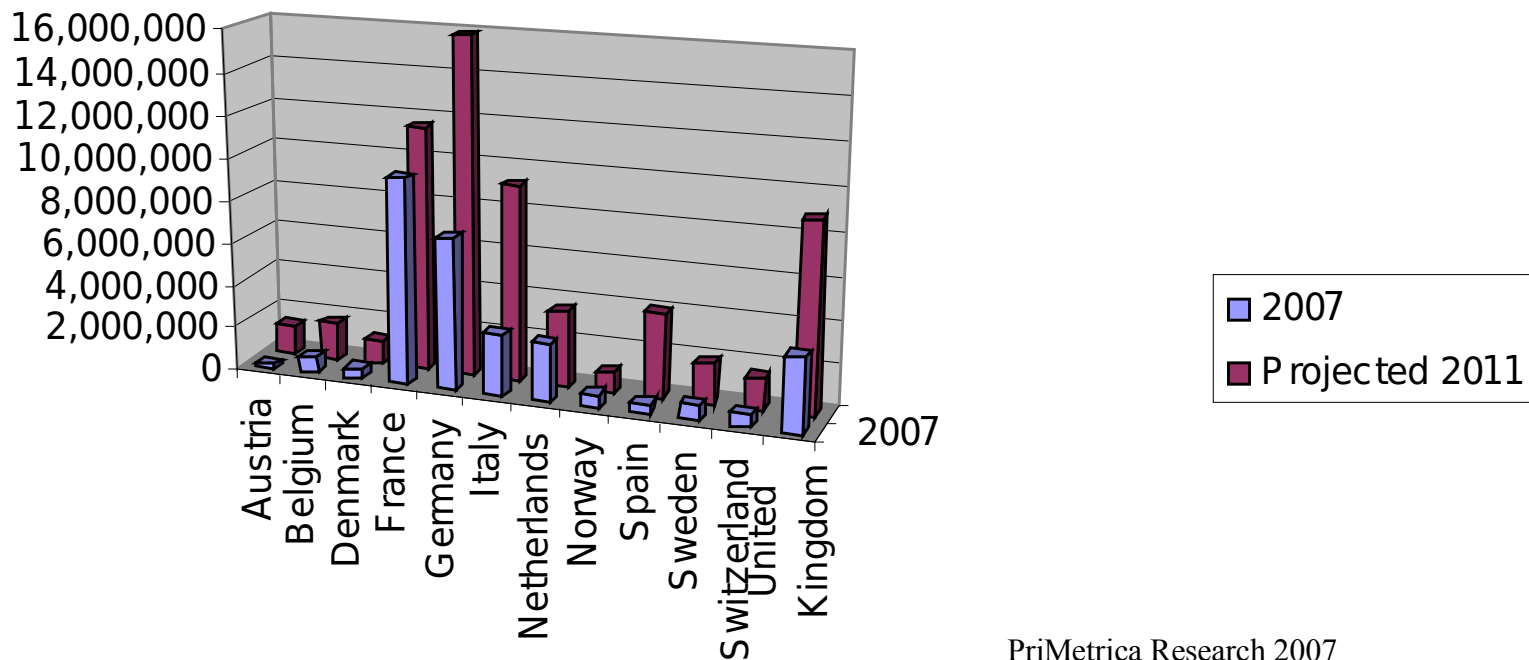
*“It was the industry’s bread and butter for over a century. But the end is now in sight for traditional telephone service, which will soon be overtaken by VoIP calls in terms of usage, and displaced by broadband internet access as the core revenue-earning service offered over fixed line by telecoms firms. And if the traditional telephone is not quite dead yet, its business model certainly is: metered telephone calls whose cost depends on the length of the call and the distance covered are becoming an anachronism.”*

**The Economist, Oct 14 2006**

# Regional View

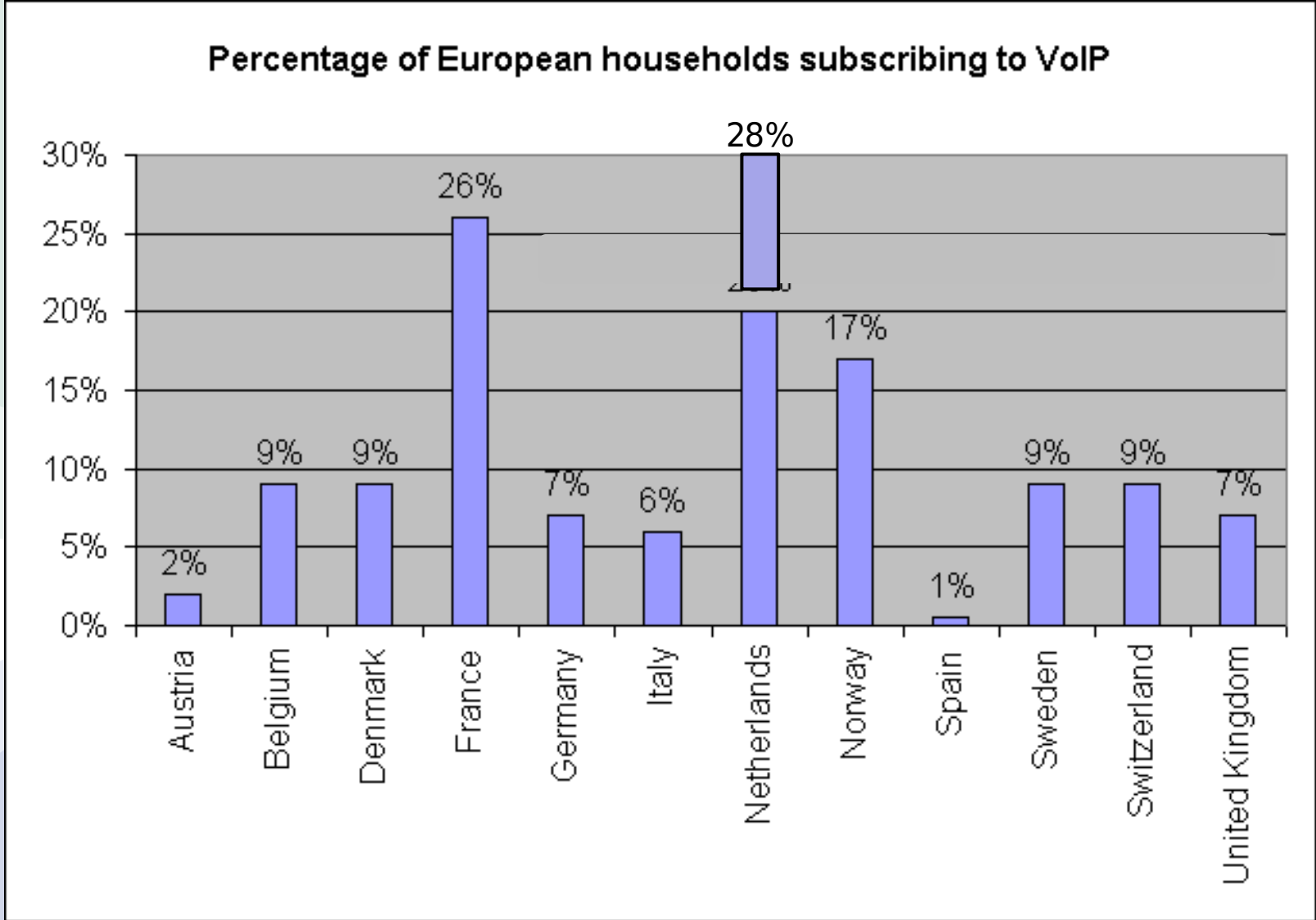
- European VoIP/VoBB Subscribers will double in five years from 29.8MM to 61.3 MM

### European VoBB Subscribers By Country



PriMetrica Research 2007

# VoIP Penetration % (EU Analysis)

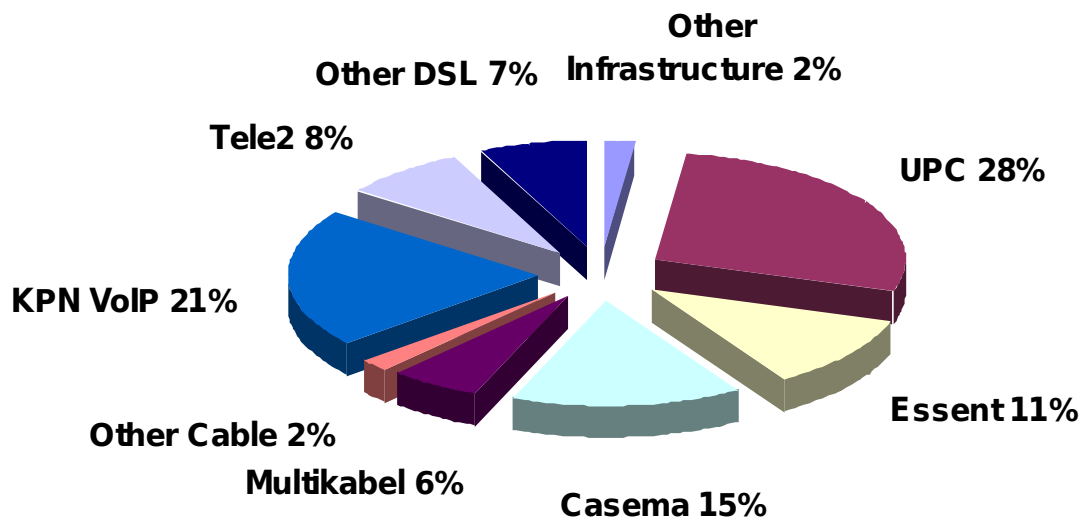


Source: Telegeography 2007

# Market Landscape in NL

- Dutch subscribers doubled in 2007 to 2.7 MM
- In 2008 an additional 644k subscribers projected, bringing total to 3.3 MM
- Growth slowing thereafter
- in 2011 projecting 3.53 MM subscribers ( PriMetrica Research)

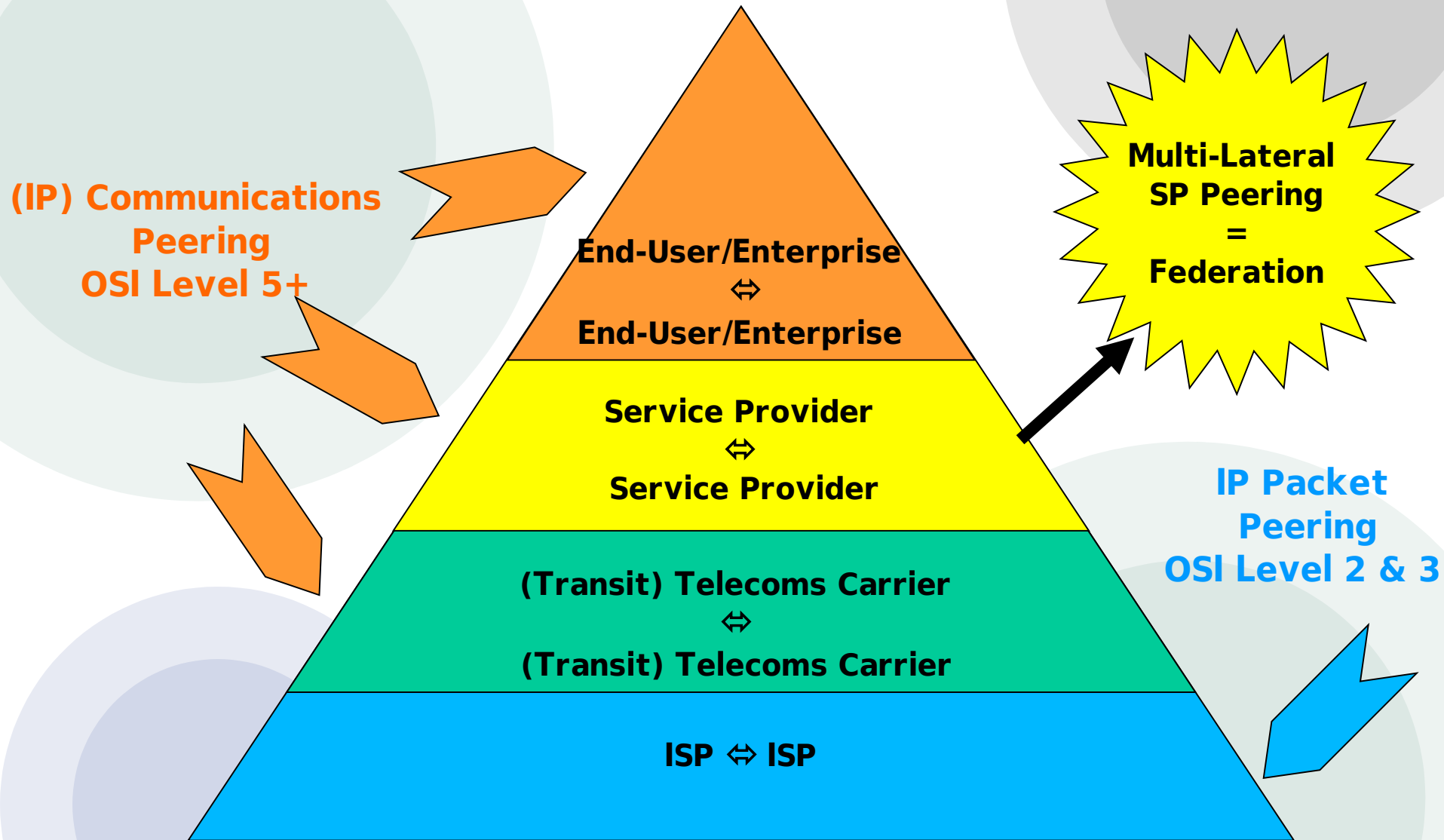
**Cable Operators Dominate Dutch VoIP Sector**  
**Digital Telephone Service Providers Market Share (%), Q306**



Source: OPTA

- VoIP / NGN Interconnection & Peering

# The "Peering" Hierarchy



**Note : IP Interconnection is not always Peering**



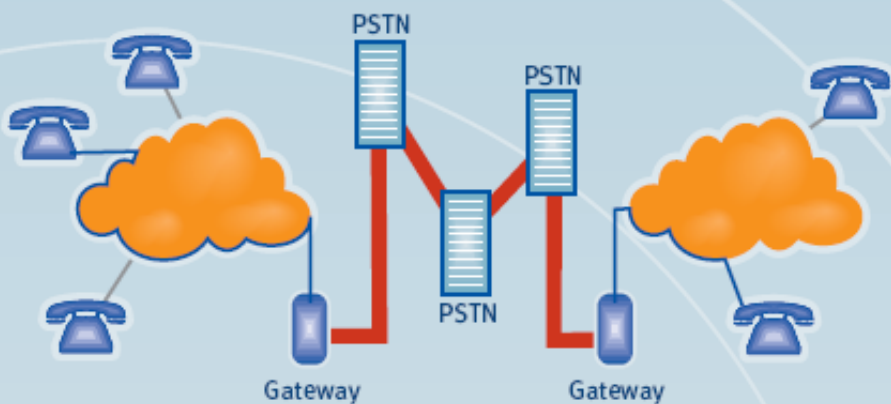
# NGN/VoIP Peering : WHY ?

- Disintermediate Legacy TDM (PSTN)
  - Reduce Costs (Transit/Settlement, Gateways)
  - Improve QoS & Reduce Transcoding
- Revenue Generation – new IP Services
  - Enable Mass Market adoption of new IP Services

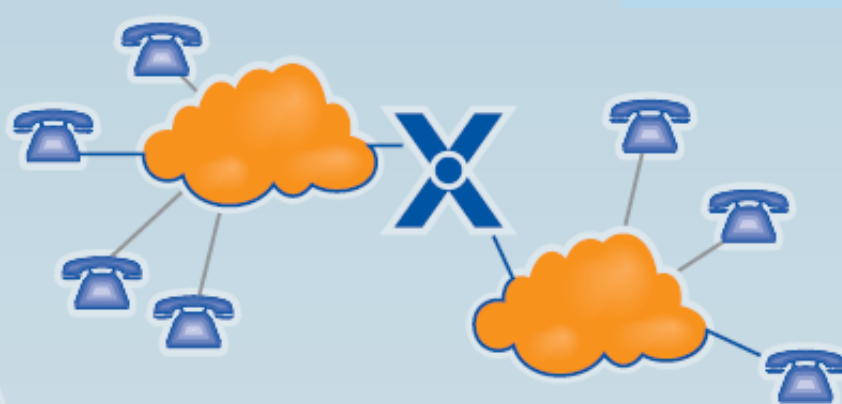
## VoBB connect via PSTN

Voice Over Broadband Provider (VoBB)

## VoBB connect via IP



"Calls Routed via Legacy PSTN, per minute costs & basic call features"



"Calls routed via IP; Zero-Cost & Rich Multi-Media (PSTN ByPass)"

# SMS Interconnection Case Study

SMS/person/ann um	In-Network	Cross-Network	Change-Year
UK	3	400 (2000)	1998
USA	4	300 (2004)	2003

**Lesson** - Interconnection of networks to support new services is inevitable

- Approaches to Peering & the Federation Model

# Layers 5 - 10 For NGN/VoIP Peering

Discovery / Location  
(ENUM Registry)

Which calls are terminating to NGN peer, and where do I route them to?

Transport, QoS

Public IP/ Private IP (QoS)

Signalling  
Interoperability

What protocol is peer using?  
What implementation, version?  
National NGN Inter. Standard ?

Policy, Trust &  
Security

Identity, SPIT, Spoofing  
Data Protection, Peering Policy

Media Handling

How about 3G-VoIP video?

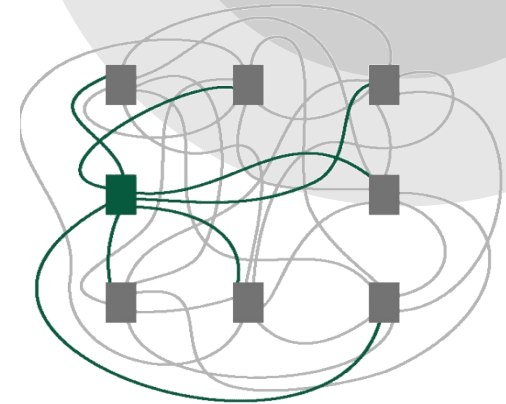
Commercial

Who charges who? How much?

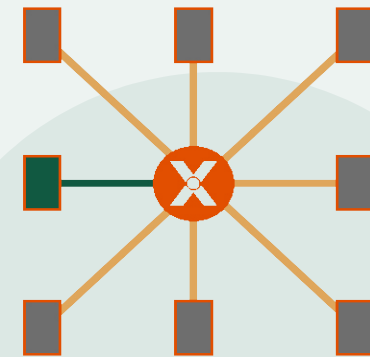
# Bi-Lateral vs Multi-Lateral (Federation)

Routing Optimally(Directly) to Service Providers

- Is technically demanding
  - $N^2$  problem, non-scalable
  - Proliferation of “standards”
- Is highly resource intensive
  - Bi-Lateral Exchange of ENUM Data
  - Negotiation of commercials
  - Settlement, Reconciliation
- Requires trust & neutrality
  - ENUM Registry Data



■ VoBB (Voice over Broadband provider)



**Bi-Lateral VoIP/NGN Interconnect is NOT SCALABLE**

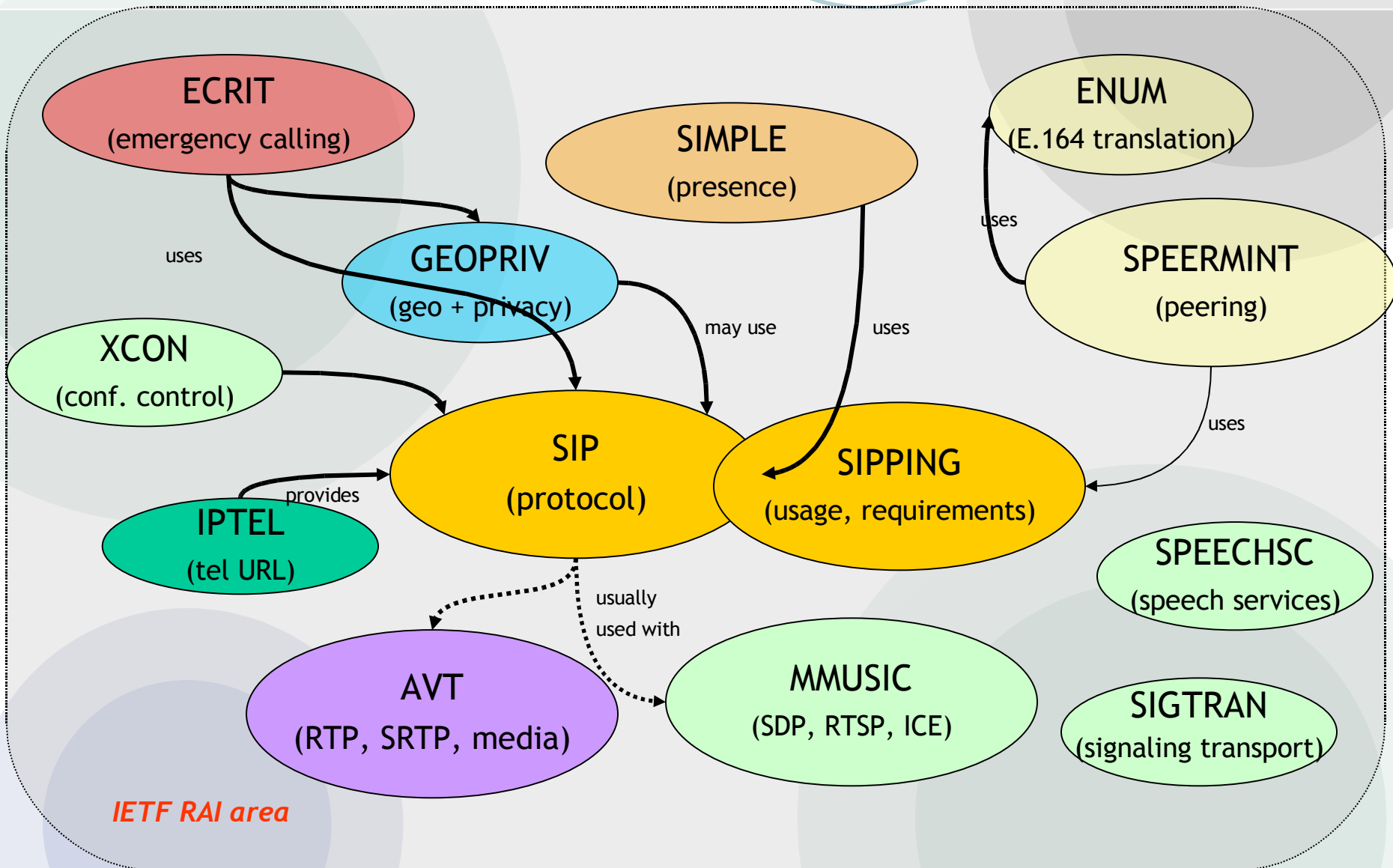
# 2006/7 – Federation Activity

- **Global VoIP Peering & ENUM Registries**
  - XConnect, Neustar, Telcordia, Verisign, Arbinet
- **National & Private Federations**
  - Netherlands Cable Operators SIP-Exchange
  - USA CableLabs, Brazil VoIP Federation
  - BT Wholesale IP Exchange
  - Multiple In-Country & Private Federations emerging
- **Mobile Operators - GSMA**
  - IPX & ENUM Registry
- **National Local Number Portability - LNP**
  - Reviewing in UK, NL, IT & Others

# IETF, Speermint & Federations

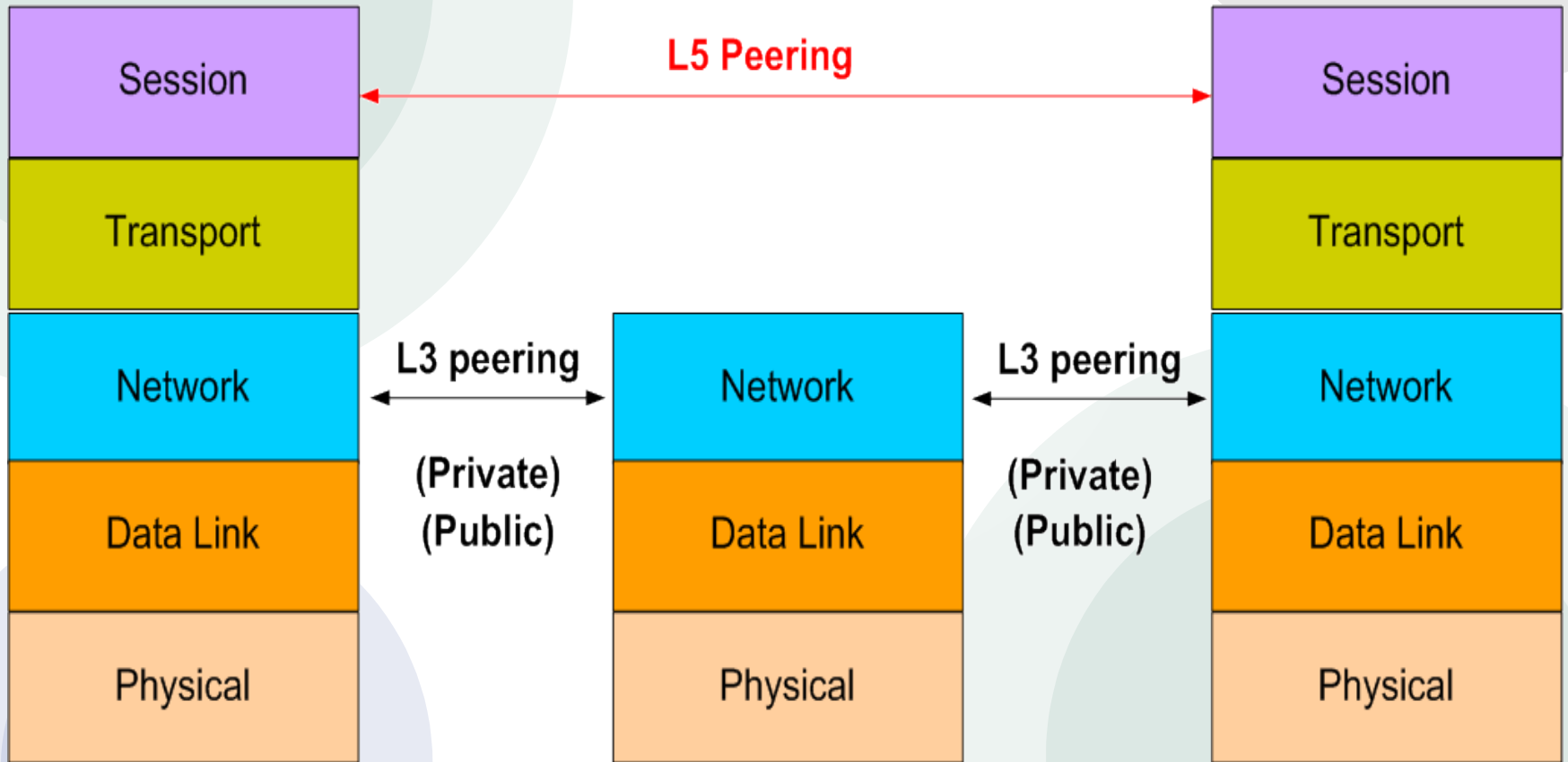
- IETF & Peering
- Speermint

# IETF VoIP Efforts









# SPEERMINT: Peering Network Scope



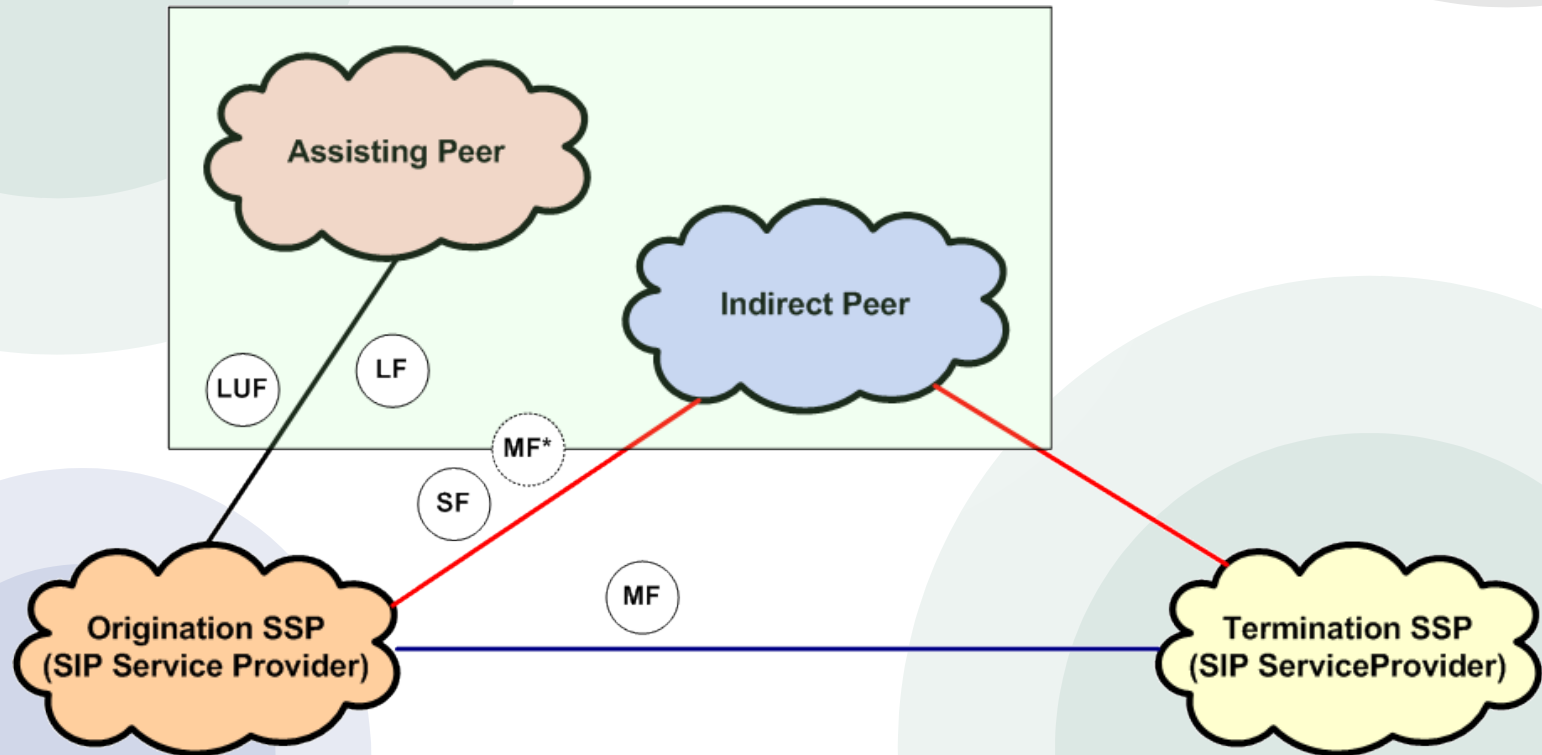
# SPEERMINT: peering Functions

## Peering Functions

<b>LUF</b>	<b>Look-Up</b>	provides a mechanism for querying an internal and/or external database, which maintains a list of user names and associated peering domains	
<b>LF</b>	<b>Locate</b>	develops call routing data (CRD) by discovering the Signaling Function (SF), and SF's reachable host (IP Address and port)	
<b>SF</b>	<b>Signaling</b>	performs routing of SIP messages, to optionally perform termination and re-initiation of the call, and to assist in the discovery/exchange of parameters to be used by the Media Function (MF)	
<b>MF</b>	<b>Media</b>	performs media related functions such as media transcoding and media security implementation between two SSPs	

# SPEERMINT Federation Terminology

- Peering Models
  - Direct, Indirect, Assisted



# SPEERMINT - Federation

- Federation

- A federation is a group of SSPs which agree to receive calls from each other via SIP, and who agree on a set of administrative rules for such calls (settlement, abuse-handling, ...) and the specific rules for the technical details of the interconnection

- Membership of Federation(s)

- Finally, note that a SSP can be a member of
  - No federation (e.g., SSP has only bilateral peering agreements)
  - A single federation
  - Multiple federations
  - an SSP can have any combination of bi-lateral and multi-lateral (i.e., federated) interconnections.

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# Federation Functionality

- Common static policies

- o Routing, Domain
- o Location, Next hop, Network-to-Network Interface (NNI) .

- Common dynamic policies

- o Congestion control
- o Codec preference
- o Authentication preference
- o Quality monitoring capabilities

- Policy management (enforcement)

- o Ad-hoc o Published in the DNS, or
- o Policy might also be managed by a federation entity .

- A federated ENUM root .

- Address resolution mechanisms .

- Session signaling (via federation policy) .

- Media streams (via federation policy) .

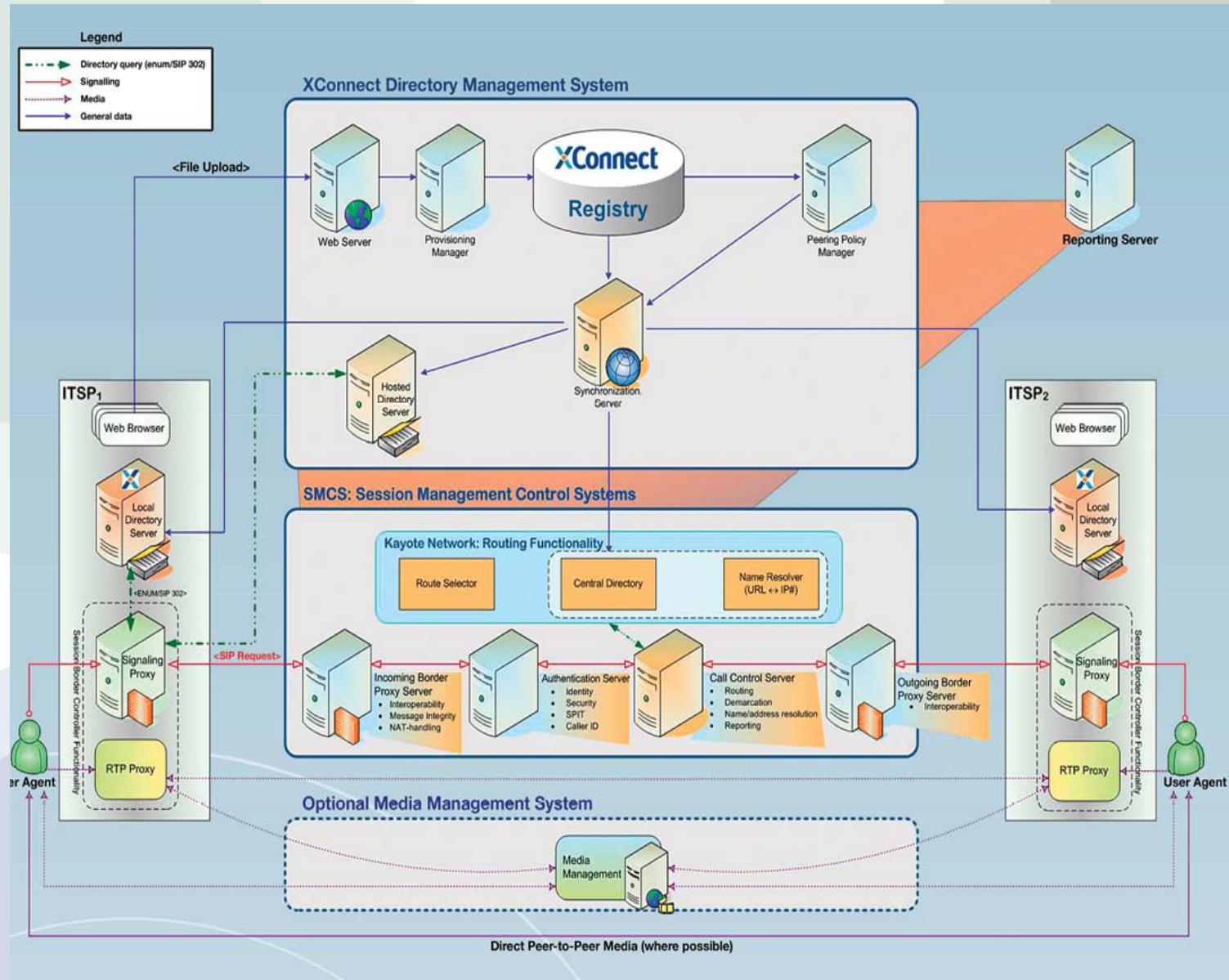
- Federation security policies .

- Interconnection policies .

- Other layer 2 and layer 3 policies

- Security parameters .

# Federation System Architecture



# Introducing XConnect

## World's leading provider of Secure VoIP/NGN Federated Peering & ENUM Registry Services

- 2005, a pioneer in the development of federated peering services
- 400 Customers, in 35 Countries, and >500 Million TN in XC Registry
- Awarded National VoIP/NGN Peering contracts in 3 Countries
- Acquired IPeerX Inc. (USA) and E164.info (Europe)
- VC Funding from Venrock and Accel Partners
- Advisory Board includes leading IETF ENUM & SIP experts





# Selected XConnect Clients and Partners



## XConnect Ready Partners





**Thank You - Dank U!**

**Eli Katz, [ekatz@xconnect.net](mailto:ekatz@xconnect.net)**

