Agenda

- **International Update**

  Howzat!

  Federations – The Final Frontier

  UNITED FEDERATION of PLANETS

  Regulatory – Net Neutrality et al. (Federation vs Klingons)

Introduction to XConnect

- "Interconnecting our Digital World"
  - Enable network service providers to offer higher quality services, reduce call termination costs and deliver advanced multimedia services across any network by enabling scalable, secure and seamless routing between VoIP, NGN, IMS, Web 2.0 and mobile networks

- Leading neutral and trusted provider of Federation-based Interconnect Services.
  - Operates multiple federations for IP Voice, HD Voice, Video and Unified Communications, servicing over 150 Operators in 30+ countries.

- Utilises patented XConnect ENUM Registry technology for optimised routing

- Active in developing global standards with international IP Standards Bodies
  - IETF SIP WG, DRINKS WG, GSMA IPX & Pathfinder, OVCC, ENUM

- Institutionally funded with Tier 1 Private Equity funds and over $40M invested to date.

- Some key relationships :-

Federations Defined

Federations are secure and scalable communications exchanges that allow telecom service providers to realise the benefits of NGN/IP multi-media communications by enabling multilateral interconnection & interworking between Next Generation & VoIP Networks.
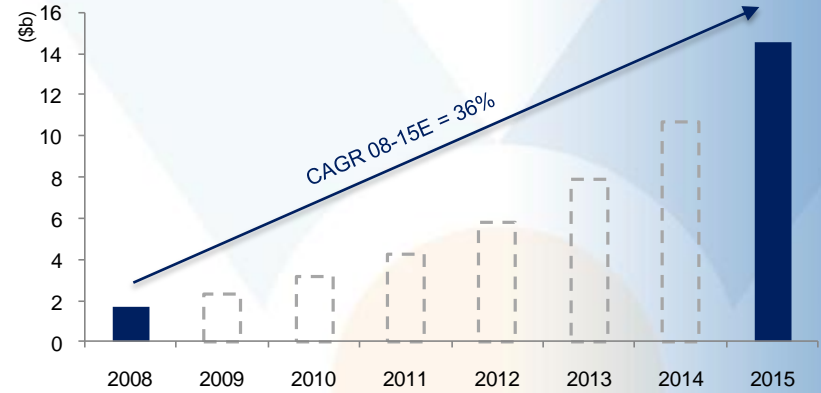
Forces Driving Federation Growth: New Services

- There is an ongoing explosion of multimedia IP communications including IP voice, HD voice, video and UC.

VoIP subs penetration to increase from 30% in 2009 to 45% in 2014
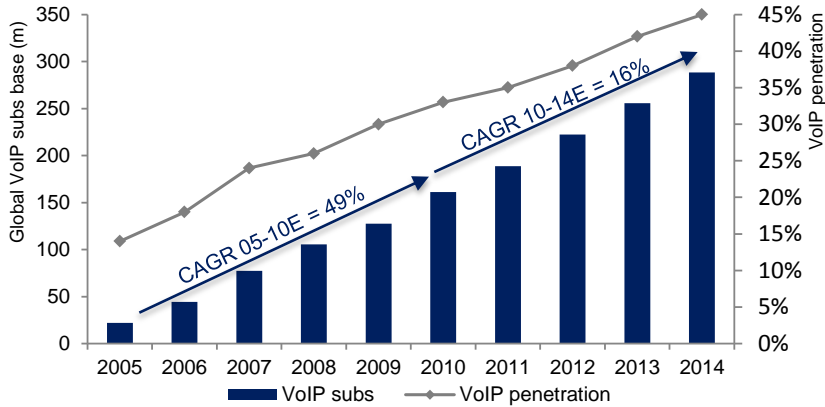

SOURCE: Infonetics historical, Goldman Sachs Research forward estimates

Unified communications market growth forecast

SOURCE: Forrester, 2009 Market Overview: Sizing Unified Communications. Forrester predicts that the worldwide market for UC will be growing from $1.7b in 2008 to $14.5b by 2015 (36% CAGR). Grey bars are implied by the CAGR growth.

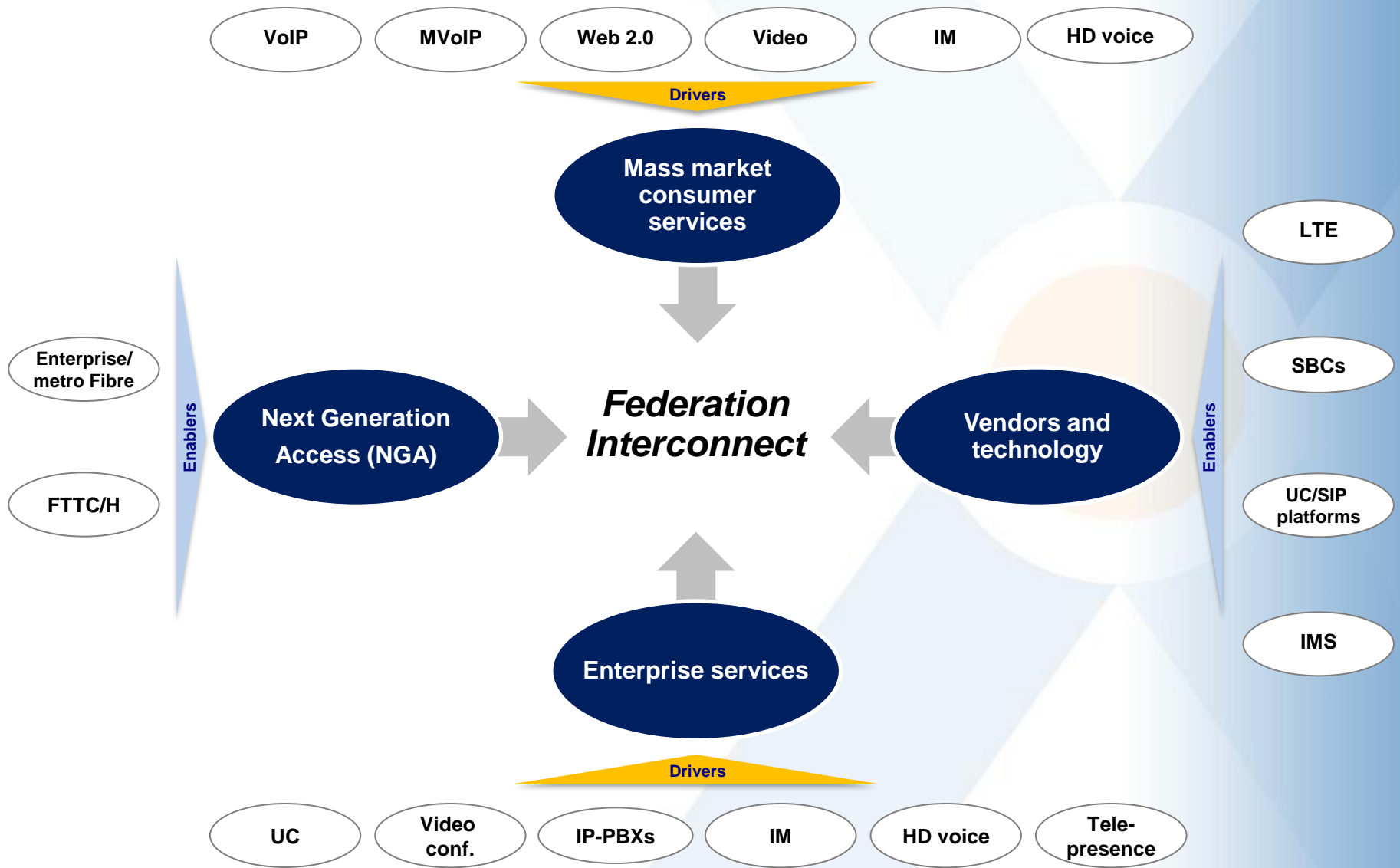## Worldwide LTE equipment market forecast ($m)
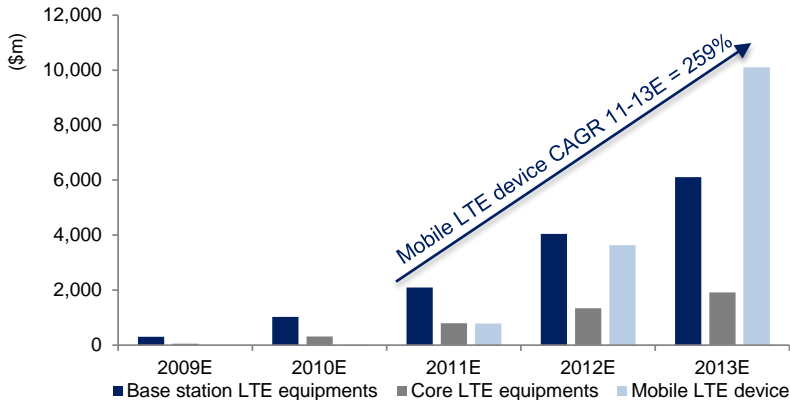
SOURCE: Gartner, company data, Morgan Stanley research

Enterprise video conferencing and telepresence

SOURCE: Infonetics research, Enterprise telepresence and Video Conferencing quarterly market size, share and forecasts, March 2011

XConnect

Forces Driving Federation Growth: New Services

VoIP | MVoIP | Web 2.0 | Video | IM | HD voice

Drivers

Mass market consumer services

Enterprise/metro Fibre

FTTC/H

Enablers

Next Generation Access (NGA) → *Federation Interconnect* ← **Vendors and technology**

Enablers

LTE

SBCs

UC/SIP platforms

IMS

Enterprise services

Drivers

UC | Video conf. | IP-PBXs | IM | HD voice | Tele-presence

XConnect

6

Interconnection Challenges

- PSTN delivered ubiquitous, inter-connected voice services. No such equivalent for IP based services creating islands of IP

- Migration from traditional multi-hop PSTN country/area code routing to cost-efficient direct routing to Terminating operator, requires real-time telephone number accuracy.

- Increasing interworking complexity within IP Communication Protocols - new protocols (standards and proprietary), new variants, and vendor and operator specific implementations - causing greater challenges, cost and delays for IP interconnection

- The interworking issue is amplified for new services (e.g. video and UC) at protocol, codec and device level.

- Direct routing information to terminating Service Provider (SP) is mandatory for multimedia interconnection (HD voice, video, IM, Presence etc).

- Additional data sources (eg SP subscriber data, NP databases, other registries, Enterprise federation Data) require complex provisioning, access policy and management.

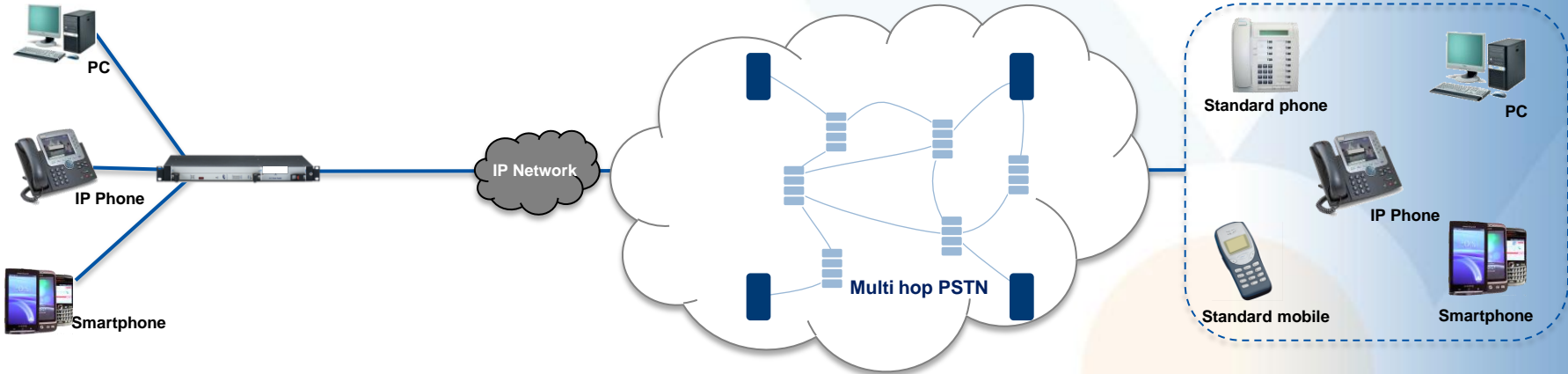XConnect

XConnect delivers a new Federation paradigm

BEFORE

| VoIP end-users | Interconnection between various operators (multi hop PSTN) | Terminating parties |

Current VoIP interconnect paradigm

- PC
- IP Phone
- Smartphone

IP Network

Multi hop PSTN

Standard phone · PC · IP Phone · Standard mobile · Smartphone

*Multimedia IP communications services are not supported by the standard multi hop PSTN paradigm
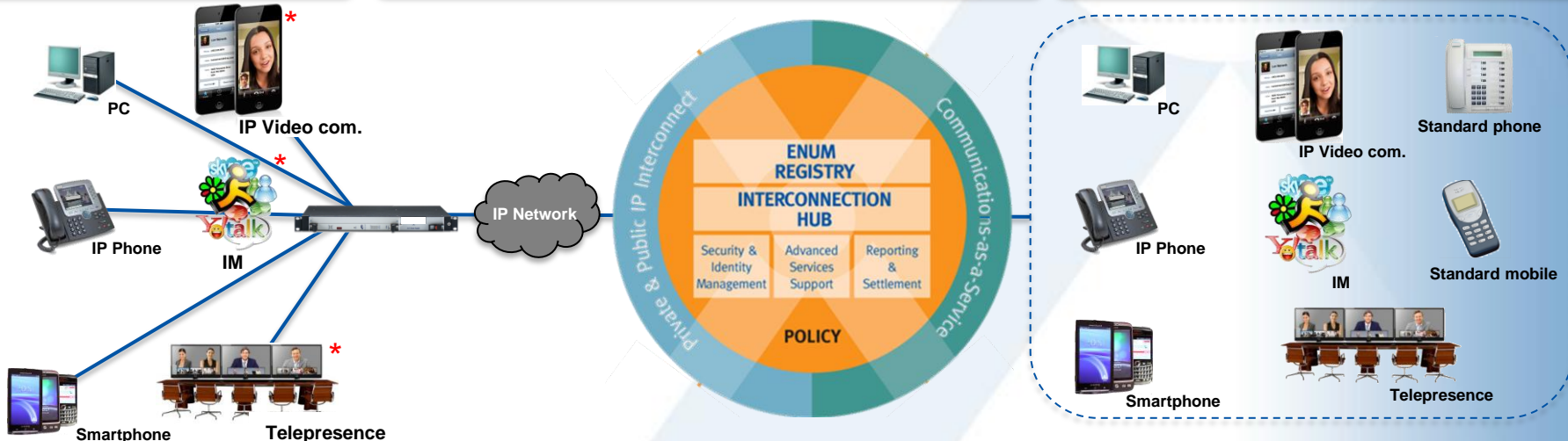
AFTER

| IP communications end-users | Multimedia hub-based interconnect and ENUM Registry | Terminating parties |

All encompassing Federation paradigm

- PC
- IP Video com. *
- IP Phone
- IM *
- Smartphone
- Telepresence *

IP Network

Private & Public IP Interconnect · Communications-as-a-Service

ENUM REGISTRY
INTERCONNECTION HUB
Security & Identity Management · Advanced Services Support · Reporting & Settlement
POLICY

PC · IP Video com. · Standard phone · IP Phone · IM · Standard mobile · Smartphone · Telepresence
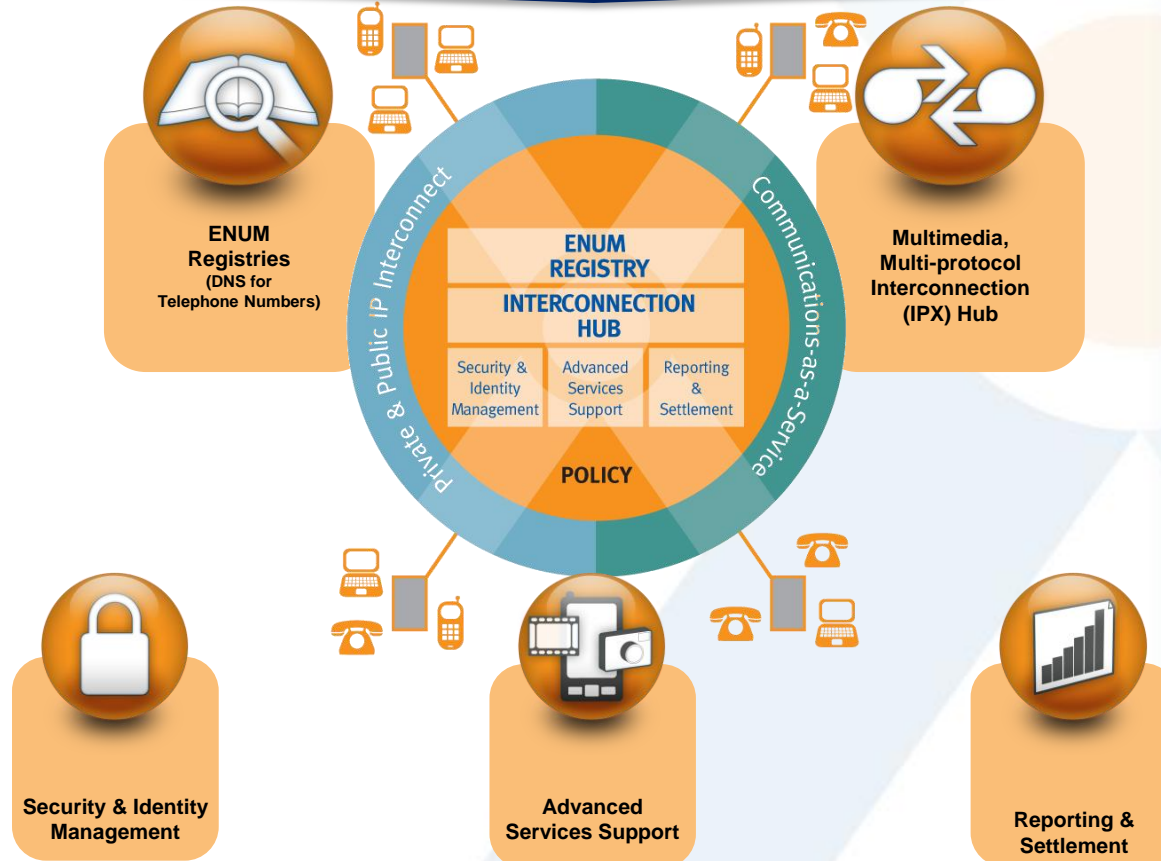
XConnect

8

XConnect Federations

XConnect's core platform including the ENUM Registry and interconnect (IPX) hub systems is based on patented, market-leading and proprietary technology. The XConnect secure and carrier-grade platform addresses all the key challenges of IP Federation services with fully configurable advanced peer-by-peer policy control.
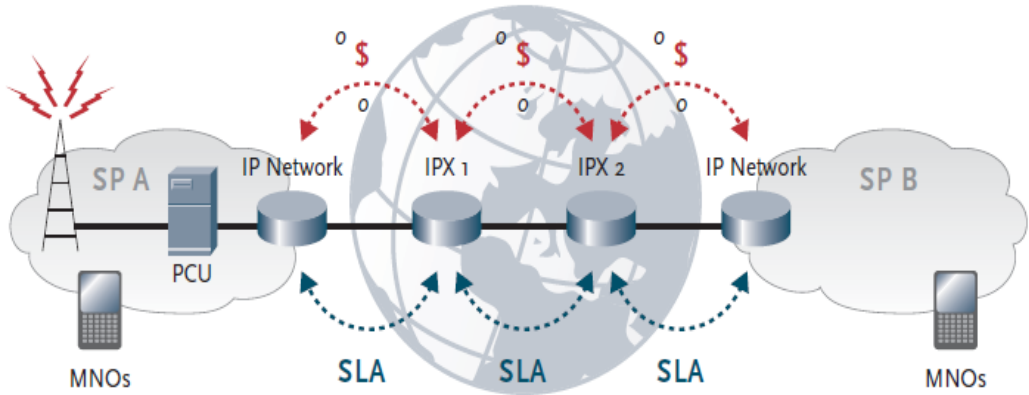
XConnect patented and developed ENUM Registry and Directory technology, with advanced Policy Control, Routing and Security.

Unique, XConnect developed, multimedia and multi-protocol interconnect (IPX) hub platform with support for H323, SIP and XMPP/Jingle across voice, HD voice and video.

Advanced services to support video Federation and complex device, network and protocol interworking.

ENUM Registries
(DNS for Telephone Numbers)

Multimedia, Multi-protocol Interconnection (IPX) Hub

Private & Public IP Interconnect

Communications-as-a-Service

ENUM REGISTRY

INTERCONNECTION HUB

Security & Identity Management

Advanced Services Support

Reporting & Settlement

POLICY

Security & Identity Management

Advanced Services Support

Reporting & Settlement

XConnect

Federation Initiatives: GSMA IPX

Initiative	Description	Challenges
	The GSMA represents the interests of mobile operators worldwide. Spanning more than 220 countries, the GSMA unites nearly 800 of the world's mobile operators, as well as more than 200 companies in the broader mobile ecosystem.	Transition from circuit-switched communication to a flexible IP environment. Services like Packet Voice, MMS, Mobile IM and IMS create new revenue but can't realise their full potential unless subscribers can reach each other worldwide. NP implementation. Carriers and Hubs don't always have access to in-country NP data, so the originators don't always know which carrier/hub to choose . Traffic can be routed to the wrong SP

Solution	Network
IPX & PathFinder Registry IPX - controlled IP backbone that will interconnect SP's according to mutually beneficial business models. Designed to offer methods of establishing interworking and roaming interconnection arrangements for IP services PathFinder: ENUM based telephone number registry. Providing information on number ownership, destination network entry points, interconnect capabilities and other number registries.	

XConnect

Federation Initiatives: OVCC

Initiative	Description	Challenges
OPENVISUALCOMMUNICATIONSCONSORTIUM OVCC	A team of companies working together to close the existing gaps that prevent open Video communications. OVCC Vision: Bridge the Islands through Full Interoperability	**Video Network & Technology Islands** • Transition to IP has created islands between service providers and enterprise private networks • A variety of open standard and proprietary solutions exist • Lack a consistent and secure way to communicate **Existing Industry Standards are Not Enough** • A variety of open standard and proprietary solutions exist

| Overview	Vision
Establishing a common approach for inter exchange of video meetings • B2B exchange federation approach • Interconnection • Interoperability • Service coordination Enabling its members to commercialize a service within 2012 OVCC is not a standard: It leverages existing video standards OVCC is not a Product: Members will sell their own products and services	
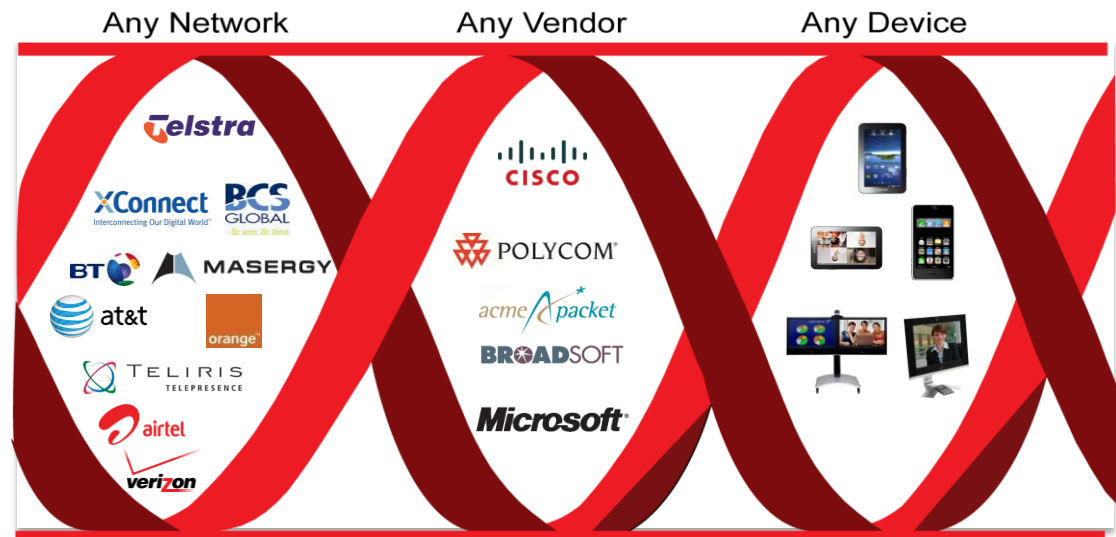
Video Interconnection Exchange (VIE)

Drivers for Growth in Video Services

- IP Network Infrastructure can now fully support video calls

- Increased use of Telepresence & Videoconferencing
    - Efficient real time collaboration
    - Cost savings compared to international travel
    - Increase productivity

- Increase in Social Media & Web 2.0 Channels
    - Increase penetration of pc's and smart phones

Challenges of Video Interconnect

- Mass-market adoption requires full-cross network IP interconnection

- Highly fragmented, multiple ecosystems

- High degree of complexity
    - Multiple standards
    - Routing & Addressing
    - Signalling and media
    - Transcoding & Bridging

VIE

- **World's first, neutral Global Video Federation:**

- VIE addresses the challenges of cross-network video calling and conferencing

- **Off-net Reach Of Services:**
  Interworking between Video Conference, OTT, Fixed And Mobile Video Services

- **Security**
  Protection against SPIT, spoofing & Identity validation

- **Multiprotocol Interworking & Codec Support**

- **Policy Control & Management**

- **Routing & Addressing & Number Management**

- **VIE Portal Access**
  Identify new networks, create and manage peering relationships

- **Directory Access**
  Searchable Directory of VIE members and end-user details.

- **Support For Flexible Business Models & Settlement Options**

VIE Ecosystem
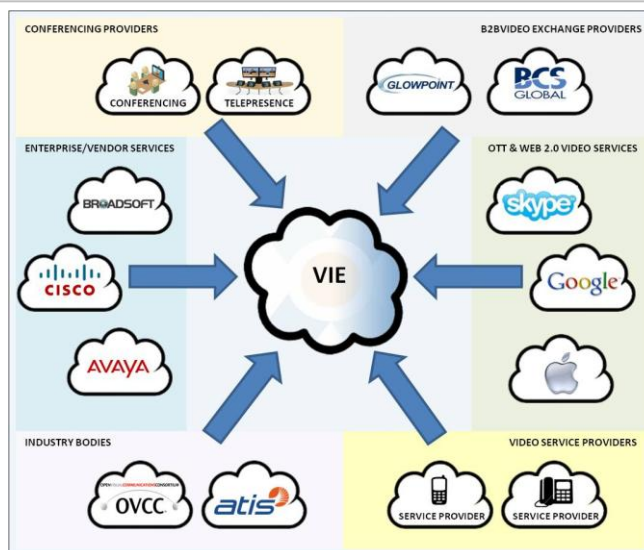
XConnect

Federation Partners : IXs

- Trusted provider of Layer 2 / 3 - IP / Ethernet peering and interconnect today

- Ideally positioned to to expand range of services to IP Communications / NGN services.

- Additional revenue lines (services, ports, bandwidth)

- Attract new customers (new segments, OTT, Mobile Apps)

- Strategic Development for more services including (ENUM) Registry, ASP

XConnect

Case Study – DE-CIX

- DE-CIX is the largest and longest established IX with over 450 customers from 52 countries

Top 10 Global IX's by Throughput

Top 10 Global IX's Members
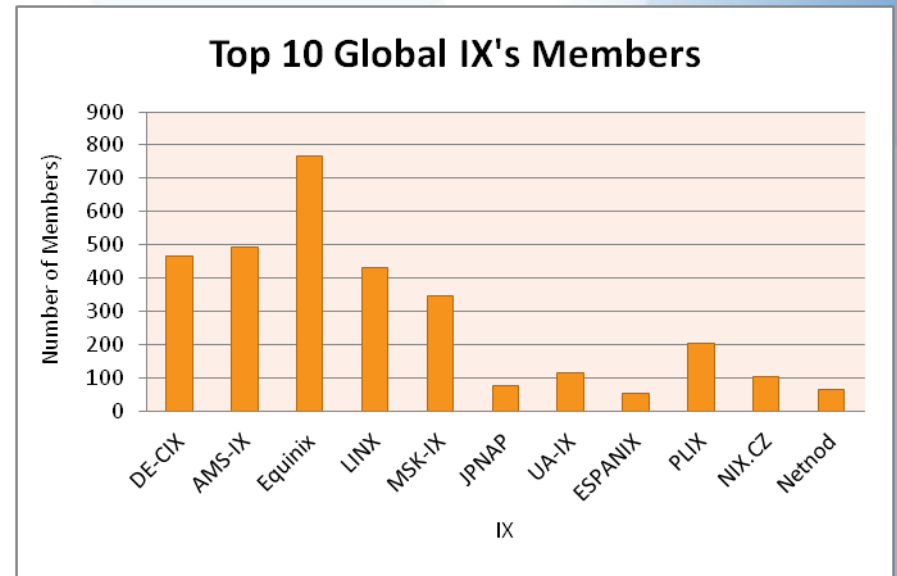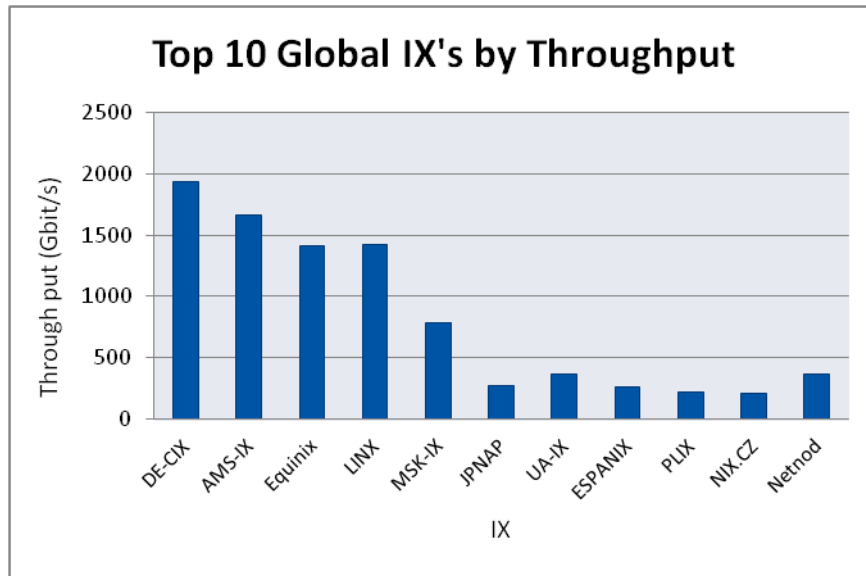
- Strictly carrier neutral and is owned by the eco association - the world's largest non-profit association for the Internet industry.
- Provides direct and settlement-free IP interconnection ("peering") IX infrastructure services to all types of ISPs including broadband providers, content delivery networks, web hosters, and incumbent operators

XConnect

Challenges in German Telecoms Market

- Diverse and complex regionalised market with no central interconnect hub for NGN and VoIP traffic

- Incumbent slow to react to demands of market for federation based interconnect

- De-centralised number portability system – each SP manages numbers and updates own routing tables

- Desire to differentiate services to maintain market leading position and increase revenue from new service offerings

Federation Service Launched in 2012

- Recognised opportunity to move "higher up the food chain" by offering essential NGN Federation Services to new and existing customers

- Initial Services include

  - Multimedia QoS-enabled SIP Interconnection Hub

  - Central number-management and number-portability platform for operators, facilitating ENUM-based number discovery and routing that will enable calls to be delivered accurately and directly across networks.

  - International Routing

NGN

DE·CIX Where networks meet

Vortex NP Database

Vortex NP Query

Vortex VoIP Exchange

SP NP ADMIN
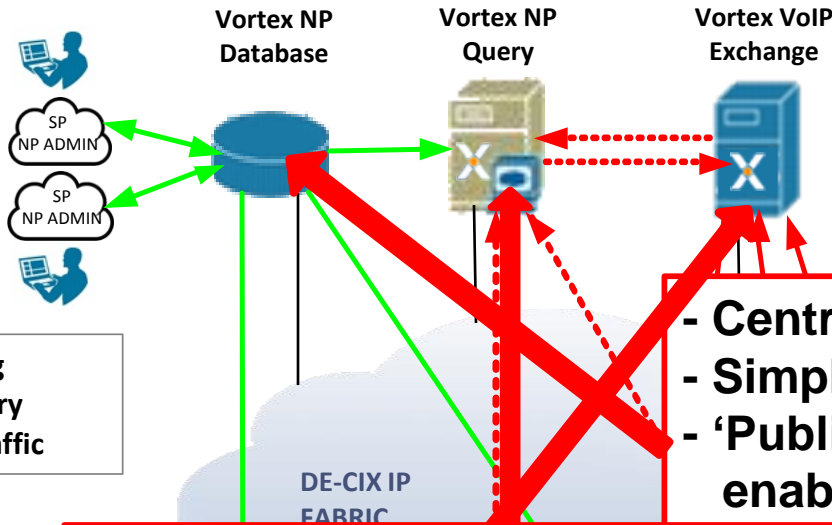
SP NP ADMIN

Data Publishing
SIP ENUM Query
SIP RTP Call Traffic

DE-CIX IP FABRIC

- **Centralised NP Database**
- **Simplify NP admin**
- **'Publish' NP data to SPs to enable NP corrected routing**
- **e NP process**

ct Server
abase
resolve owner
internal

uting and policy
Carrier ENUM
de future
ts

- **Multilateral VoIP Interconnection**
- **Reduce effective cost of interconnect**
- **Support cross network VoIP services**
- **Delivered over DE-CIX IP Fabric for SLA backed security, quality and reliability**
- **Uses Vortex Registry for NP corrected routing and policy (Carrier ENUM)**

XConnect
Interconnecting Our Digital World™

ITSPA

FEDERATION v KLINGONS

NET NEUTRALITY

NAKED DSL

SECURITY

NUMBER PORTABILITY

XConnect

Role of ITSPA

- ITSPA was established in 2004 to represent network operators, service providers and other businesses involved with the supply of NGN & VOIP Services in the UK.

- Over 60 members, representing 90%+ of communications industry.

- ITSPA aims to promote competition and self-regulation in order to encourage the development of a flourishing and innovative NGN & VoIP industry.

  – Represent the UK NGN & VoIP community to Ofcom, the UK Government and the European institutions, to ensure the UK and Europe remain the most favourable environment in which to run a VoIP business and in which to be a VoIP customer;

  – Respond to UK Government and European regulators on behalf of its members;

  – Investigate solutions for industry, including portability , security and interoperability;

  – Reassure consumers that any product or service bought from a company displaying the ITSPA logo comes with a high standard of consumer protection, which is properly enforced and includes a dispute resolution procedure.

ITSPA Priorities

- Ensuring a truly competitive and innovative market develops where VoIP providers can compete with existing service providers on a level playing field;
  - The promotion of a high-level of consumer information, in particular with regards the differences between emergency access via VoIP and legacy voice services;
  - Efficient and competitively priced number portability through the implementation of a new approach to number portability;
  - Network neutrality
  - The provision of a Naked-DSL product (standalone broadband access i.e. no need for the consumer to pay line rental in order to get broadband access).

- Launched Quality Mark & Logo - for extra assurance for consumers

- Best Practice Documents include :
  - VoIP - Security : IP-PBX Deployments for End Users (2011)
  - (ISPA) : Blocking and filtering of Internet Traffic (2007)
  - Porting between ITSPA members (2007)

Net Neutrality

- **Net Neutrality** is a principle that advocates no restrictions by Internet service providers or governments on consumers' access to networks that participate in the Internet. Specifically, network neutrality would prevent restrictions on services, content, sites, platforms, types of equipment that may be attached, and modes of communication. Network owners can't interfere with content, applications, services, and devices of users' choice and remains open to all users and uses

XConnect

Net Neutrality : EU BEREC

- The Body of *European Regulators for Electronic Communications* (**BEREC**) published ".. *the results of an investigation into traffic management and other practices resulting in restrictions to the open Internet in Europe*"

  - *"traffic management and differentiation practices are capable of being used for questionable purposes"*
  - At least 20% of mobile Internet users in Europe experience some form of restriction on their ability to access VoIP services

- Competition is expected to discipline operators, and ensure the best offers for consumers

- Both NRAs and end users should be able to monitor the performance of the Internet access service, and of the applications used via that Internet access service.

- Where competition and transparency are inadequate or insufficient to address concerns, existing regulatory tools (including quality of service requirements) should enable NRAs to address net neutrality.

The diversity of measures reported by ISPs
Relative frequency of ISP reporting underline some level of restriction

- User's access is throttled/blocked (e.g. data caps)
- Specialized services affecting the Internet access service
- Restrictions on P2P
- Restrictions on VoIP
- Restrictions on Instant messaging
- Restrictions on other kind of traffic
- Restrictions on specific providers
- Specific type of over-the-top traffic given preferential treatment
- Measures related to network security and integrity
- Measures upon legal order

absent — most frequent

■ Mobile ISPs ■ Fixed ISPs

Number of operators applying some level of restriction

	FIXED	MOBILE	FIXED	MOBILE	FIXED	MOBILE	FIXED	MOBILE
all users	40	28	1	4	5	4	7	12
some users	9	13	1	23	5	6	23	1
not restrict	217	74	264	88	256	105	236	102

P2P blocked/throttled | VoIP blocked/throttled | Blocking/throttling of other specific traffic | Specific type of over-the-top traffic given preferential treatment

■ Number of operators which restrict considered application for all their users
■ Number of operators which restrict considered application for some of their users only
■ Number of operators which do not restrict considered application for any of their users

21

NET NEUTRALITY (UK) – Open Internet Principles

- 2007 : Increasing issues from (Telco-based) ISPs on blocking/degrading VoIP.
- ITSPA & ISPA "jointly" create Best Practice Policy – " Blocking and filtering of Internet Traffic (2007)"
- 2011 - > 3G / 4G - Increasing blocking, charging, degrading of Voice and Video Apps on Mobile Networks
- Government has tasked industry to find a self-regulatory solution that preserves an open Internet whilst ensuring effective consumer transparency.
- ITSPA played active role with Broadband Stakeholders Group (BSG) and UK Communications Minister Ed Vaizey ; ITSPA has been concerned the attitude of the major UK mobile network operators (MNOs).
  - December 2011 - ITSPA research revealed majority of MNOs were not transparent about their charging or blocking policies towards VoIP over mobile data.
  - January 2012 - Research presented to BSG, Ofcom and the Department for Culture Media and Sport (DCMS) in January 2012
  - June 2012 - BSG presented a code of practice that was met with approval from many of the MNOs (O2, Three) and all leading ISPs; BUT NOT ALL – Vodafone, Orange/T-Mobile
- The code follows on from the Communications Minister Ed Vaizey MP's statement in 2011 that the concept of an open internet should be guided by three principles:
  - users should be able to access all legal content
  - there should be no discrimination against content providers on the basis of commercial rivalry; and
  - traffic management policies should be clear and transparent.

XConnect

Other Interesting Regulatory Matters

- Naked – DSL
  - Norway – highly successful.
  - Austria, Belgium, Estonia, France, Italy, Holland, Norway and Sweden – some level of success
  - UK – lost cause. 5 years and ongoing battle.
- Portability
  - Ensuring faster and more standardised process for Porting
  - Standard format for Commercial Porting Agreements
  - Industry-led initiative on Central Database, after Ofcom failure.
- Security
  - PBX Hacking & VoIP Fraud – increasing concerns
  - Issue of industry first, Security Advice for PBX security for Business, with ongoing development and liasing with vendors.
  - Monthly publication of Fraud list of A- and B- numbers.

XConnect

XConnect

ELI KATZ

📞 +44 (0) 20 8371 4810

✉ ekatz@xconnect.net

🖱 www.xconnect.net

XConnect

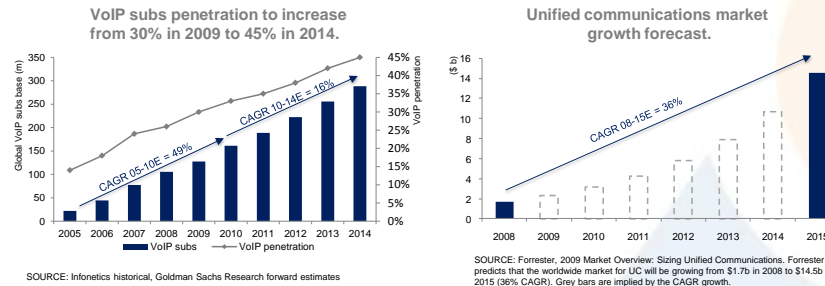# APPENDIX

XConnect – Overview

Overview

XConnect Global Networks provides secure, managed ENUM Registries and SIP-based multilateral peering services which enable seamless routing between VoIP, NGN, IMS, mobile and legacy networks.

Key services include:

- **UC Federations:** Registry technology supporting complex video/UC interworking.
- **National Federations:** In-country ENUM-based Federations enabling service providers (SPs) to exchange voice and multimedia sessions on a national basis.
- **Global Alliance:** Global ENUM-based peering Federation, enabling service providers to exchange voice and multimedia (eg. HD voice and video) sessions globally.
- **Registry voice:** Terminates carrier wholesale traffic to a global Registry of telephone numbers.

Key management

- **Eli Katz**: CEO and Founder
- **Neil Cohen:** Director of Finance
- **David Schwartz:** CTO
- **John Wilkinson:** Global Director of Sales and Products
- **Myer Luknar:** Director of Information Technology
- **Ronnen Slasky:** Director of Operations and Product Development
- **Enrique Garcia-Ayesta:** VP, EMEA

Board members

- **Eli Katz:** CEO and Founder - Executive
- **John Wilkinson:** Global Director of Sales and Products - Executive
- **Ohad Finkelstein:** Chairman of the Board - Independent
- **Dr. Paul Reynolds:** (Chief executive Director Telecom New Zealand) - Independent
- **Dr. Torsten G. Kreindl:** (Board member and Chairman of the Finance Committee of Swisscom) Grazia Equity
- **David Hand:** Crescent Point

Market Growth:

VoIP subs penetration to increase from 30% in 2009 to 45% in 2014.

CAGR 05-10E = 49%
CAGR 10-14E = 16%

SOURCE: Infonetics historical, Goldman Sachs Research forward estimates

Unified communications market growth forecast.

CAGR 08-15E = 36%

SOURCE: Forrester, 2009 Market Overview: Sizing Unified Communications. Forrester predicts that the worldwide market for UC will be growing from $1.7b in 2008 to $14.5b by 2015 (36% CAGR). Grey bars are implied by the CAGR growth.

Strategy:

Synergistic growth from a global multi – Federation strategy

\+

Leverage and Expand XConnect world-leading ENUM Registry

\+

Product innovation for new segments (HD voice, video and UC)

Selected flagship customers (130 customers)

Key technology partners

Notable awards

Ranked 5th

2009 WINNER

Scalable and layered architecture

Legend:
- XConnect
- Operator
- Provisioning
- Replication
- Call flow
- query
- Media flow

ENUM Directory Management
- Master Data Store
- Peering Manager
- *API*
- Provisioning Manager
- External Sources
- Web Server

Service Provider
- Web Browser (Provisioning)

Replication / Data Push
- Replication Server
- Policy Server

Security and Identity Management

Service Provider
- Local Directory Server
- Hosted Directory Server
- *Directory Service Subsystem*
- Master Directory Server

Multi-Media, Multi-Protocol interconnection (IPX) hub

Number query

- Session Border Element
- Session Border Element
- Session Control Element
- Session Border Element
- Session Border Element

Advanced Services Support
- Session Media Element
- *Media Flow*
- Session Media Element
- Video / Web 2.0 Support
- Session Media Element

- Web Browser (Reporting)

Reporting and Settlement
- Reporting Server
- Rating Server
- *API*
- Quality Control Server