Proposal to VIX
NGN Exchange

XConnect

- Provide VoIP/NGN interconnection, routing and number management services known as Federations.
- Based on XConnect patented and proprietary Interconnect Hub and ENUM Registry technology
- Established in 2006. HQ in London. PoPs and offices in the USA, Europe, Africa and Asia.
- Over 200+ customers in 70 countries including fixed, mobile, OTT, Video and UC Service Providers

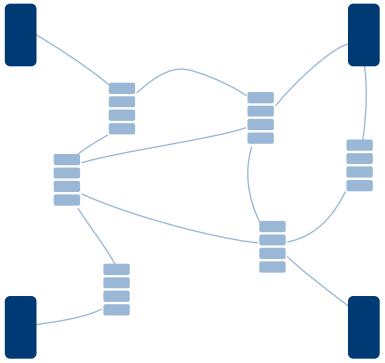
- Strong technology vendor partnerships for wide interoperability

Federations

What are Federations?

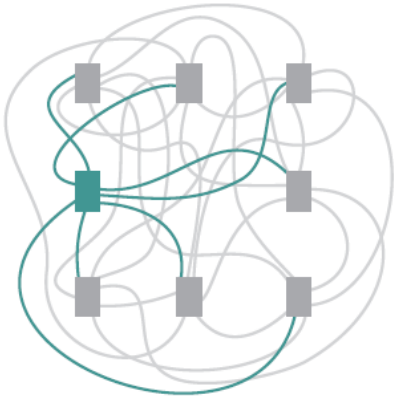
Federations enable hub based multilateral interconnection & interworking between VoIP networks for the cross-network delivery of IP services.

PSTN Interconnection



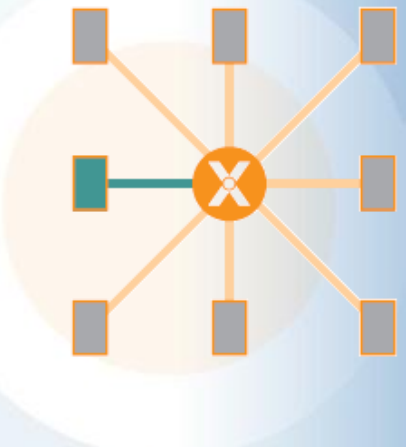
- ✘ Cannot support IP
- ✘ Attracts transit and termination charges
- ✘ Incorrectly routed calls

Direct Interconnection



- ✔ Supports IP end to end
- ✘ Non-scalable
- ✘ High CAPEX & OPEX

Hub Based Interconnection



- ✔ Supports IP end to end
- ✔ Scalable
- ✔ Enables cross-network IP services.
- ✔ Low CAPEX & OPEX

What's driving Federation Growth?

GLOBAL VOIP PENETRATION PREDICTED TO HIT 45% BY 2014

ENTERPRISE VIDEOCONFERENCING MARKET $6BN BY 2016

1 BN OTT USERS BY 2017

UC MARKET TO REACH $15BN BY 2015

REGULATORY CHANGES TO TERMINATION RATES

Regulation forces change

- October 2012: FCC proposes an entirely new model for inter-carrier compensation (ICC).
  - Carriers are required to reduce their termination rates (and in some cases transport rates) to bill-and-keep
  - Objective: Full migration to all-IP networks and full IP interconnection and the effective **"Death of the PSTN by July 1st 2017"**

- UK Narrowband Review implementation - Feb 2014
  - Overhaul of UK transit and termination regime in UK. FTR reduced from £0.00204 to £0.00034. **83% drop!**
  - Porting-in SPs will become net payers to range holders (FTR/APCC)
  - Will force direct SP IX rather than through transit operators

Regulation forces change

- BNetzA FTR €0.0036/€ 0.0025 vs EU FTR €0.0012/€0.0008.
  - What transit rate then? 10% FTR = €0.00008?!?!
  - Cost of running a transit service? ROI? Death of it?
  - Direct IX only option (but costly vs marginal rev)?
  - Moving towards Bill & Keep/Peering model (like IP Peering)

- Telecom Italia/AGCOM IP Deeping & replicating TDM IX into IP IX
  - SPs IP strategy in tatters
  - Rock & Hard Place:
    - No economics to IX on IP. No economics to keep TDM IX.
    - New on net NGN IP services stranded in islands
    - Options?

Regulation creates opportunity

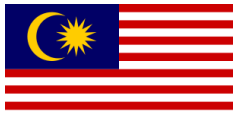
- Complete Reg change end 2009.
  - 300 full license SPs & reduced $, low pool of skills, resources
  - Chance to go IP without TDM legacy. NP CDB.
  - Bundle services: NP & Hosting, Hosted SoftSw, Managed Billing, Mins, IX, Hacking, Network/IP.
  - 75 SPs (2013). Telkom, VD, MTN, Cell C.

- KPN market domination. Dutch Football Manager Syndrome.
  - KPN forward looking. NP well implemented.
  - But SPs want choice/options. Customers adventurous.
  - Highest VoIP in EU (France). SPs fastfwd moving from legacy into IP
  - NGN Services (Video) big on SPs roadmaps.
  - Big SPs do not want to but have to IX: Fed resolves

Regulation creates opportunity

- IP IX Delayed
  - Advanced ICT society - Opera, Tandberg (Cisco) spin offs
  - Small club of advanced SPs. Cannot wait.

- There is a Federation. But not XC
  - Political.
  - Free.
  - Cheap & cheerful – hacked, insecure, no identity managed



- More XC Federations (Korea, Malaysia)
  - NGN Services (Video) big on their roadmap.
  - Big SPs do not want but have to IX

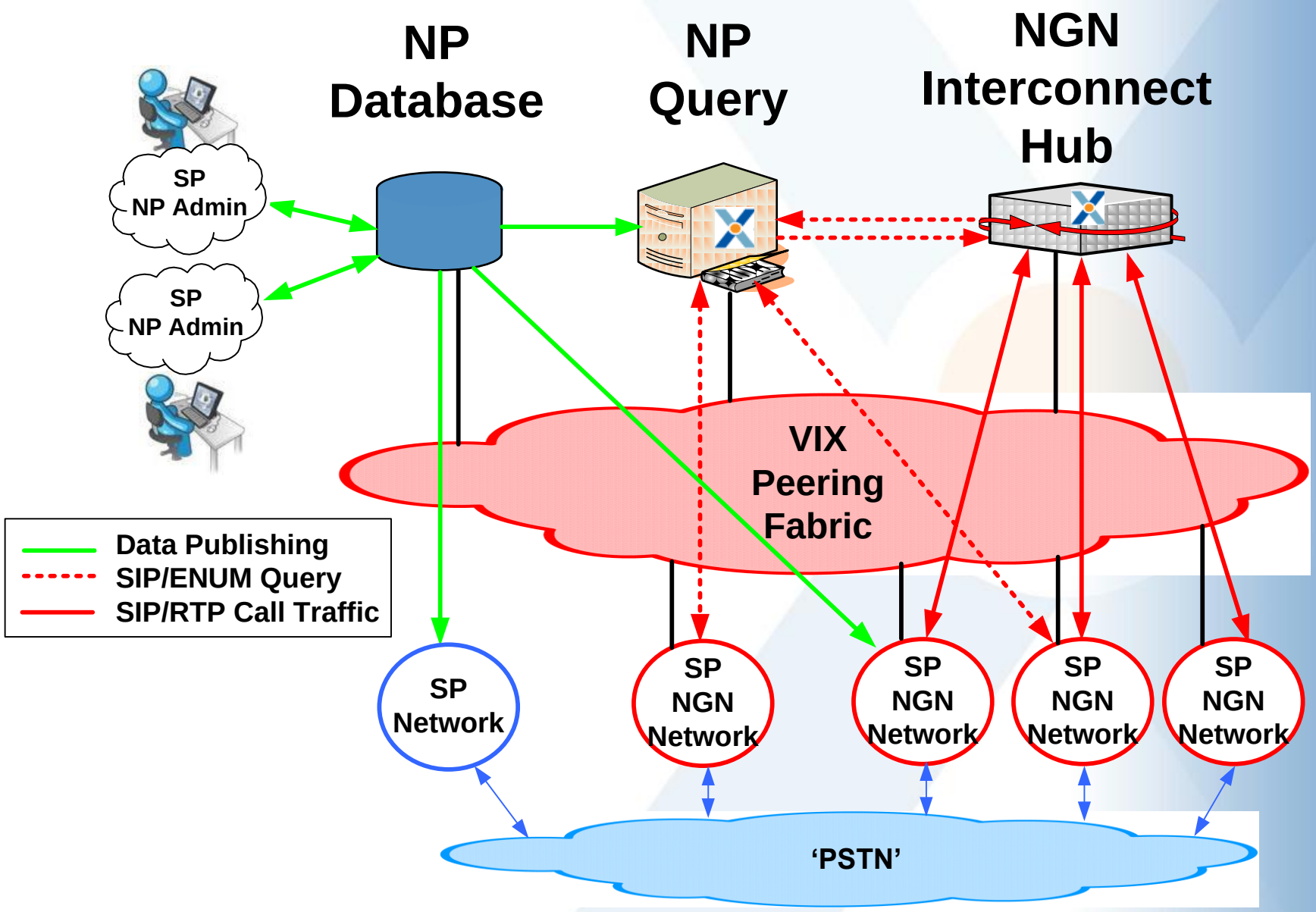
XConnect

Proposal to VIX - NGN Exchange

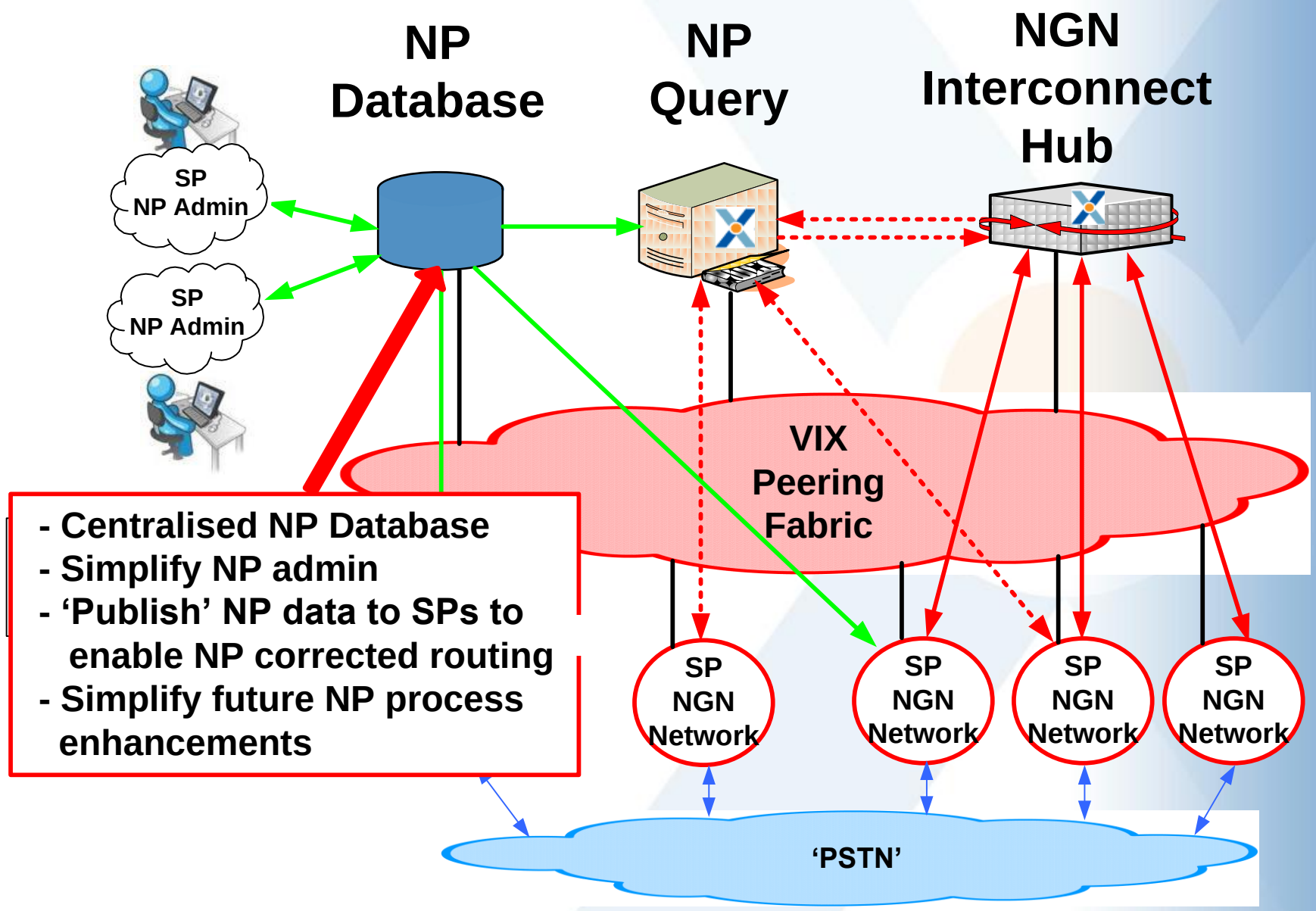
Proposal to VIX - NGN Exchange Services

- Enhance VIX existing IX products by adding services that facilitate NGN interconnection between Members at the application layer
  - Reduce overall interconnect costs
  - Enable cross network VoIP services
- Delivered in Phases
  - Start simple and grow
  - Member driven future roadmap
- Menu of Services
  - Enabling VIX Members to choose the most appropriate for their business
- Delivered to VIX standards
  - Neutral, Trusted, SLA Backed Reliability and Quality

NGN Service Features

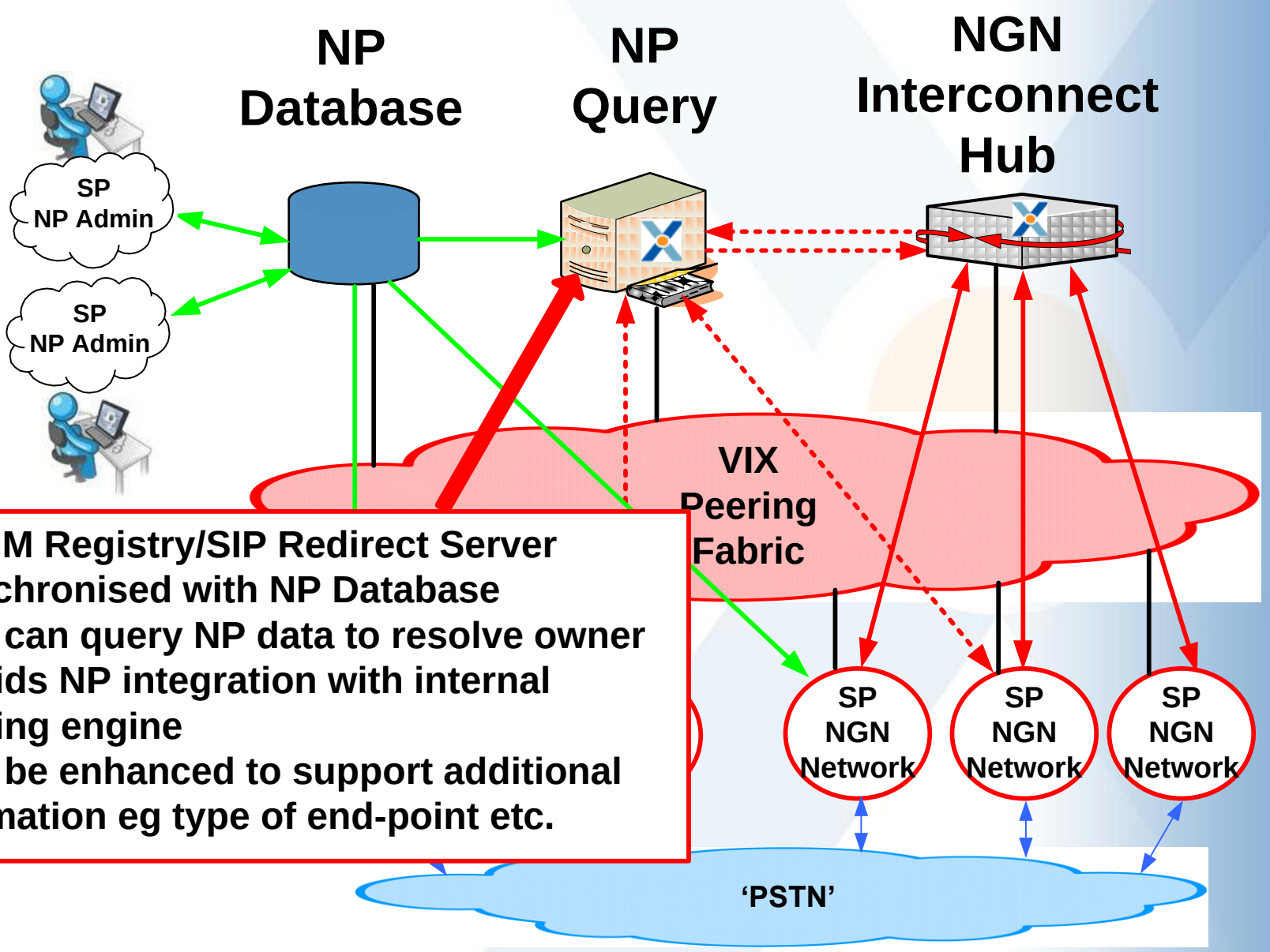


NP Database



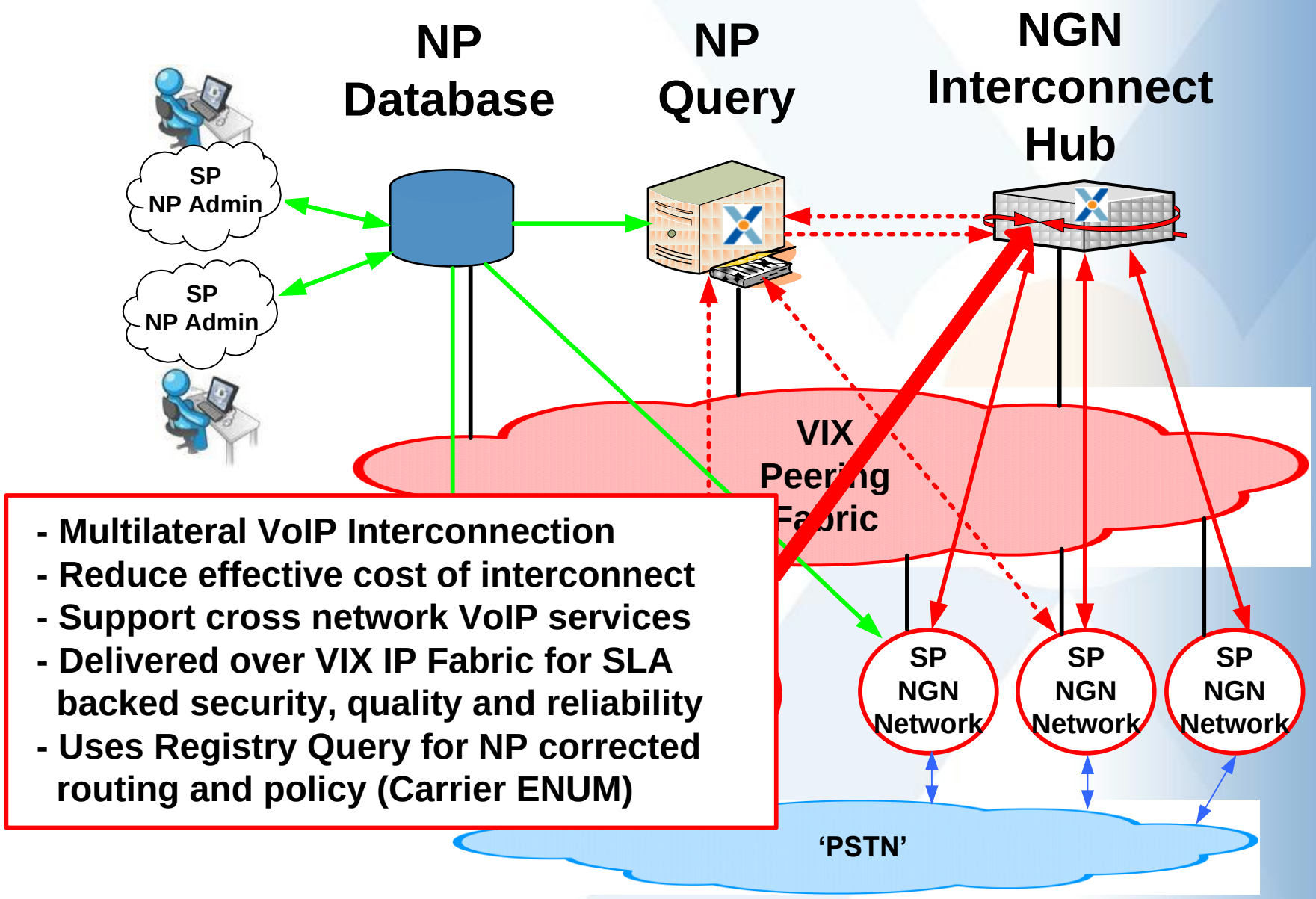
- Centralised NP Database
- Simplify NP admin
- 'Publish' NP data to SPs to enable NP corrected routing
- Simplify future NP process enhancements

NP Query



- ENUM Registry/SIP Redirect Server
- Synchronised with NP Database
- SPs can query NP data to resolve owner
- Avoids NP integration with internal routing engine
- Can be enhanced to support additional information eg type of end-point etc.

Interconnect Hub

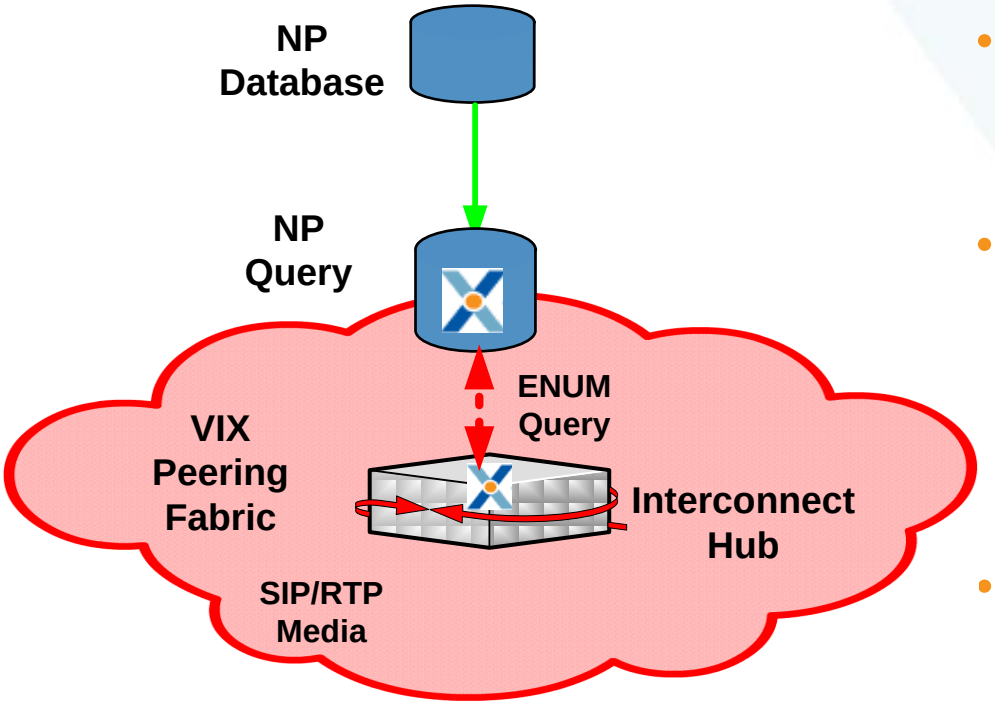


- Multilateral VoIP Interconnection
- Reduce effective cost of interconnect
- Support cross network VoIP services
- Delivered over VIX IP Fabric for SLA backed security, quality and reliability
- Uses Registry Query for NP corrected routing and policy (Carrier ENUM)

Why NGN Exchange ?

- Support Cross Network End to End VoIP Services
  - Calls do not transit the TDM PSTN
  - Future proof: Video Telephony, HD Voice, …….
- Reduce Effective Interconnect Costs
  - Avoid ‘TDM-VoIP’ Gateway Costs
  - Single Interconnect to implement and administer
- Increase VoIP Quality
  - Avoid ‘transcoding’ degradation
  - Support higher quality voice
  - Calls go directly to the owning network
  - SLA backed IP Performance

NGN Exchange - Architecture



- NP Database
  - Regulated Authoritative records of TN to SP mapping
- NP Registry
  - TN to SP to Route mapping (sync from NP DB)
  - Central routing and policy server
  - ENUM or SIP query from Hub
- Directory Server
  - Support Registry Edge query from SP network (SIP/ENUM

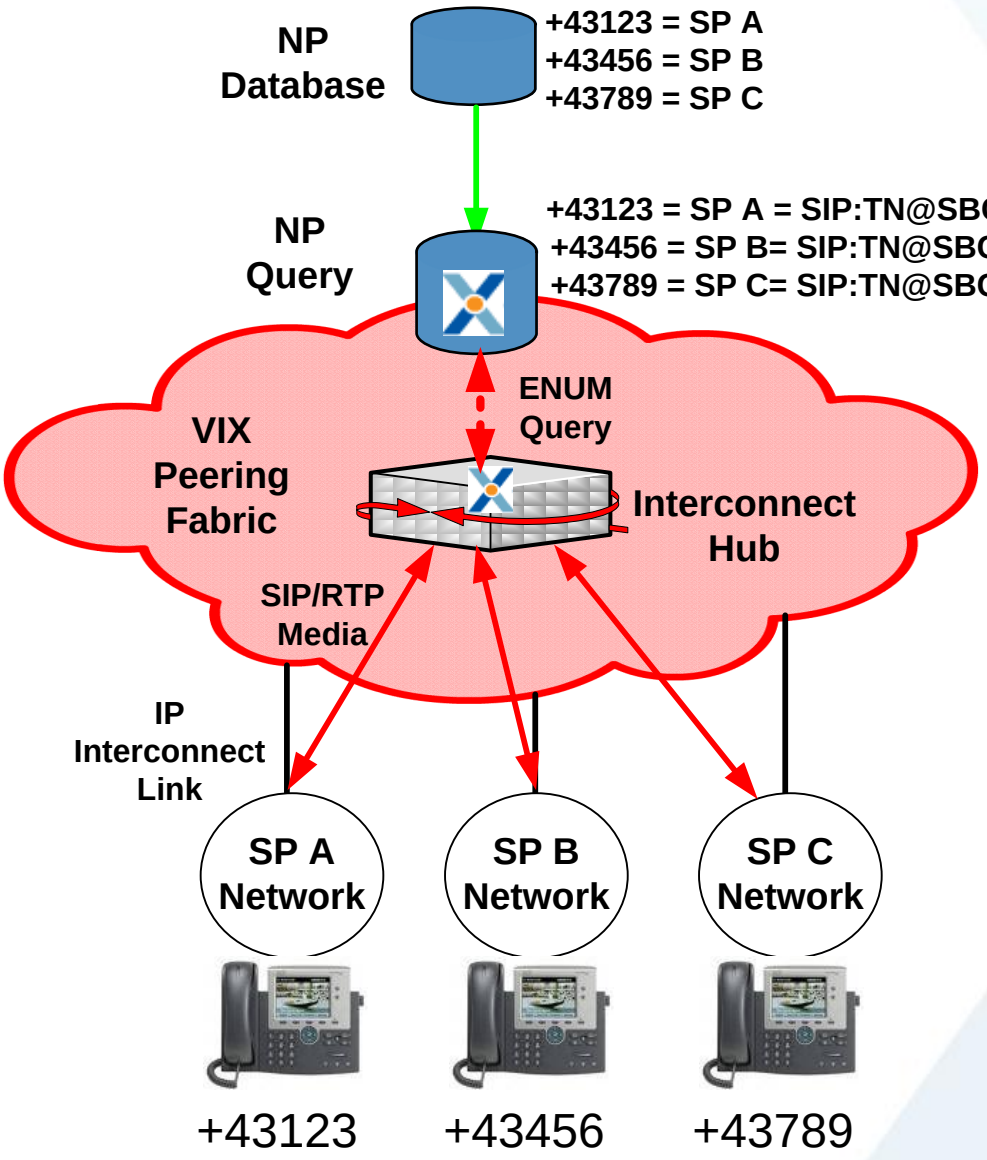
- NGN Interconnect Hub
  - SBC, SIP Proxy and RTP Relay
    - CAC, Topology Hiding,
    - Interworking (SIP-SIP)
  - Registry query for policy and routing
  - Can generate CDR - billing & reporting

- VIX Peering Network
  - Private, Dedicated SLA-backed transport layer on VIX network
  - Connects customers to NGN Exchange elements
  - Connect in VIX locations

NGN Exchange – Security/Availability

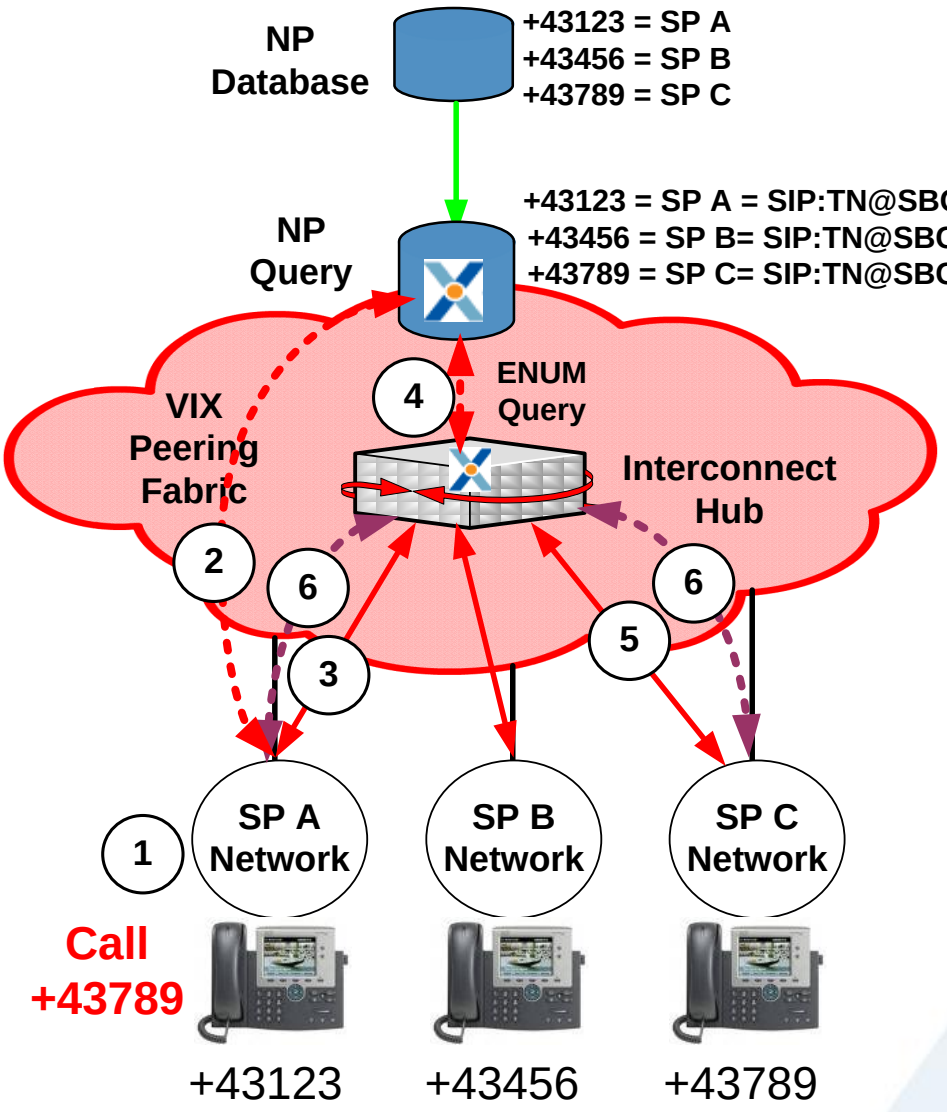
- NGN Exchange is a ‘Carrier Class’ Service
- Security
  - IP layer
    - Direct connection to private LAN (VIX)
    - Firewall protection of NGN Exchange (DDOS, ACL etc.)
  - SIP/RTP Media Layers
    - SBC – topology hiding, CAC, SIP normalisation/validation
    - RTP relay – topology hiding, NAT traversal, no media detection
  - Business Layer
    - A/B number validation and policy enforcement
- Availability
  - No single point of failure (N+M for all components)
  - Dual-site (geographical redundancy)
  - SLA backed IP and transport infrastructure (VIX)
  - 99.99% Availability target

NGN Exchange – SP Connection



- Connect to NGN Exchange VLAN
  - At any VIX Location
  - New port or existing port
- Create SIP trunk(s) to Hub
  - Trust SIP and RTP IPs in SBC/FWs
- TN to SP to SIP trunk routing and policy created in Registry
  - via download from NP DB
- SP Originating Routing
  - All call query, All call, NP DB

Example Call Flow – Edge Query



(1) SP A user dials +43789

(2) SP A network queries Edge DS (SIP or ENUM).
- Registry checks that the B TN is reachable via the Exchange
- Returns the SIP address of the NGN Interconnect Hub.

(3) SP A sends SIP call to Hub.

(4) Hub queries Registry
- Registry checks A/B TN
- Is call allowed ?
- Returns SIP address of SP C.

(5) Hub forwards SIP call to SP C, (with interworking as required) and onward to SP C user.

(6) Subsequent SIP/Media relayed via hub.

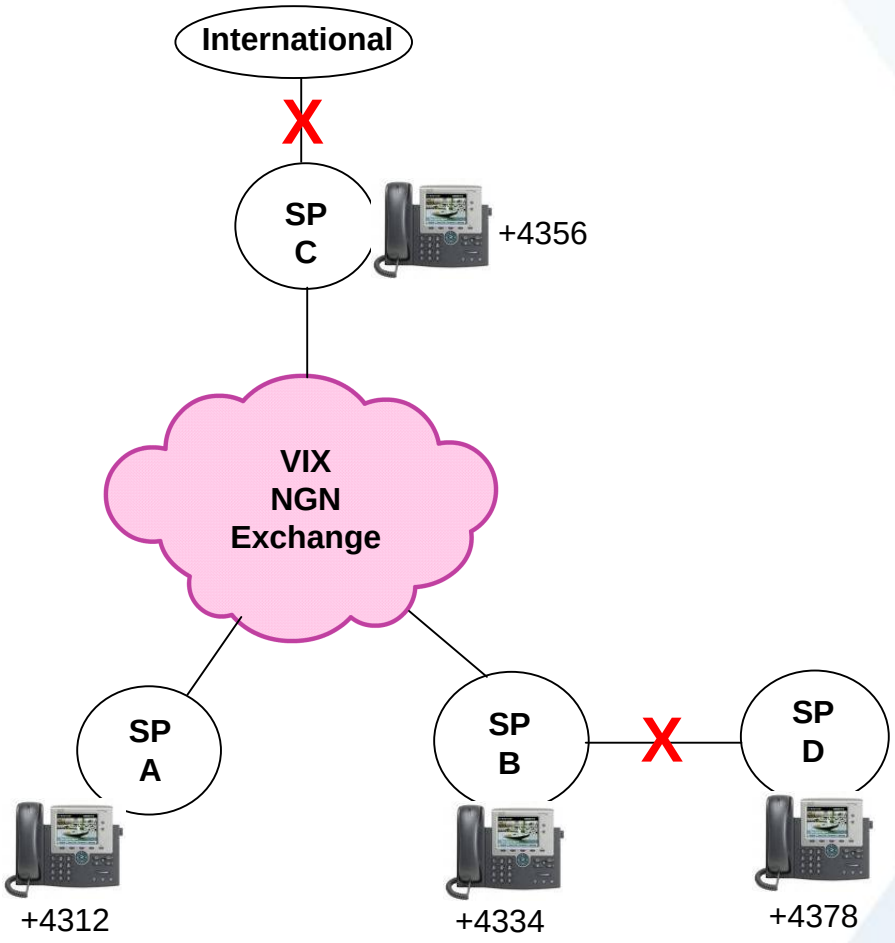
XConnect

So, how could it all work?

How could it work?

- XC/VIX would work with the SP to document, implement and test the interconnect to the NGN Exchange
  - Member Information Document
- SP interconnect to the NGN Exchange :-
  - IP Interconnect to VIX NGN Exchange VLAN
  - SIP Trunk(s) to NGN Exchange Interconnect Hub
    - Enable NGN Exchange SIP/RTP IP in SP SBC/Firewalls
  - TNs and route uploaded to Registry (SP Direct or via NP DB)
  - SP Originating Routing
    - All Call Query NP Registry, All Calls, NP DB download, SP knows
  - SP Terminating Routing
  - Interconnect Testing and CDR validation
    - NGN Exchange to SP network

Phase 1 Service – National On-Net Traffic



- Traffic flows across the Exchange set by policy
  - TNs supported, SPs allowed
- Only support national calls between on-net Austrian SPs
  - A/B number validation by Registry
- Other traffic flows would be supported in future phases driven by Member demand
  - Nation Off-Net, International etc.
- Only be available to Austrian SPs with TN allocation from the Austrian Regulator & Portability.

Phase 1 Commercials

- Qualification Criteria
  - Austrian National Service Provider
  - Telephone Numbers Issued by Austrian Regulator
- Contract
  - Contract with VIX for NGN Exchange
    - Maybe an Addendum to VIX standard contract?
  - Contract with each partner SP for minute termination
- Commercial Terms
  - One-Off Installation Fee
    - Per NGN Exchange Port
  - Monthly Port Rental
    - Based on port size
  - Monthly NGN Exchange Service Rental
    - Based on the size of the SP (number of TNs)

XConnect

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