ENUM - Tag

ENUM Interconnect of VoIP Islands

Is there a Life after Phone Call Charges?

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Some Notes on this Session

- **Technical details are left to other sessions in the show**
  - We may discuss some of them in the breaks
- **2007: “The year of VoIP peering”**
  - Mark Millan has some thoughts on that in his Blog
  - Is this yet another hype or can we turn it in to business?
- **The role of media gateways is not part of this session**
  - Of course, this has impacts on business decisions as well.
  - Third party ENUM operators can provide sharing of gateways too
- **This session can easily fill a 3 day workshop**
  - I will try to focus on things that generate money for ENUM operators
  - so lets focus on a few cornerstones around our headlines

Agenda

➔ENUM Interconnect of VoIP Islands

- **Evolution of ENUM Solutions**
- **Bridging VoIP islands through VoIP peering**
- **Challenges and Opportunities for VoIP Interconnect**

- The Afterlife of Phone Call Charges
  - Migration of Technology, Cost and Business
  - Net Neutrality - the Last Hideout?

Evolution towards ENUM

- **1995: IETF talks on tidying up DNS for phone numbers**
  - Going on from TPC.INT. These discussions ended up in the ENUM WG
- **1997: DNS / ENUM surfaces for IP-Telephony**
  - Address phone number resolution in the IP-Domain
- **2002: Name Resolution & Security heats up**
  - Agreement between IETF & ITU on number delegation was reached
  - Public and Infrastructure divide of ENUM heats up
- **2004: Initial Deployments of ENUM start**
  - Mostly in Europe with User- as well as Infrastructure ENUM
- **2006: Operators deploy ENUM at large**
  - Internet and PSTN/VMNO operators start deployment
  - US CableCo's start to build up a common ground against legacy ;-)

Bridging VoIP islands through peering

- **Open Peering**
  - No settlement agreements necessary
  - Make a living out of subscription and originating charges (called "Bill and Keep")

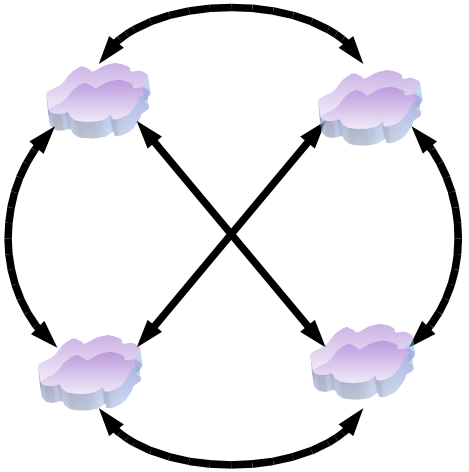
  No one gets termination fees any more
  ... regulators and operators are not ready for that yet ;-)

- **Controlled / Closed Peering**
  - Direct settlement
  - 3rd party settlement
    - Interconnect Agents with Gateways for Voice and Signalling
    - Closed ENUM/DNS location infrastructure (private name resolution)

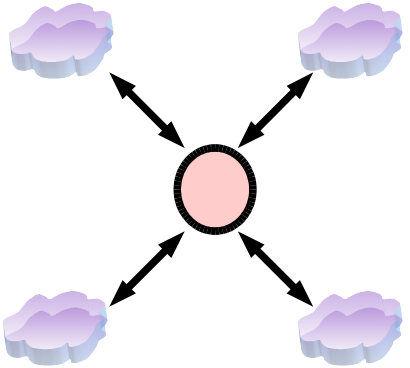
  Everyone carries on making their living out of call fees

Bridging VoIP islands through peering

Bi-Lateral vs Multi-Lateral Network Peering



Number of agreements grows exponentially:
6 Bilateral
4 Multilateral

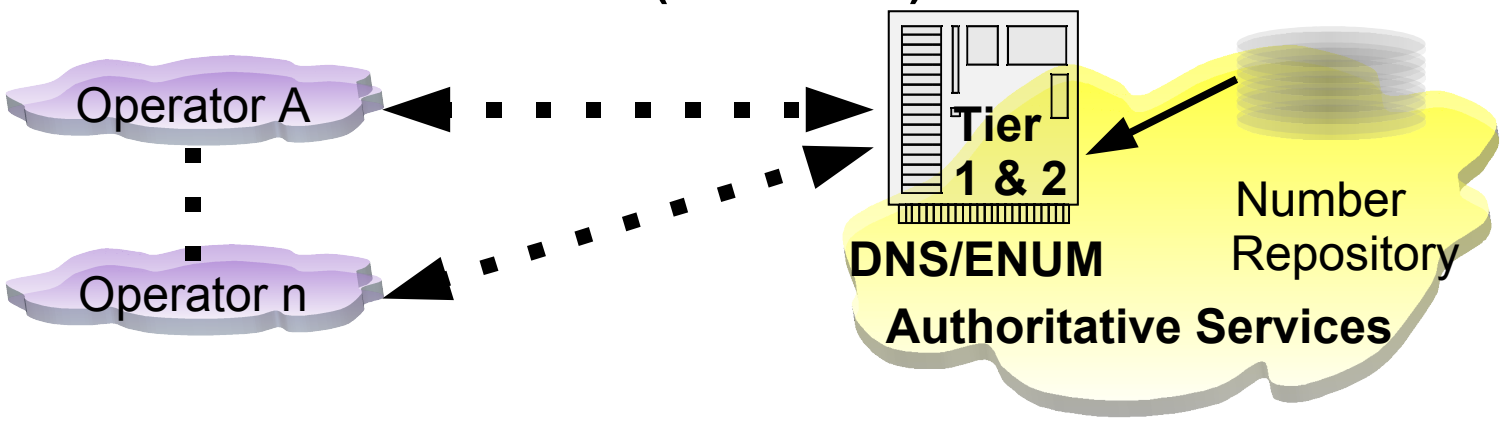


This opens quite substantial business cases for all participants

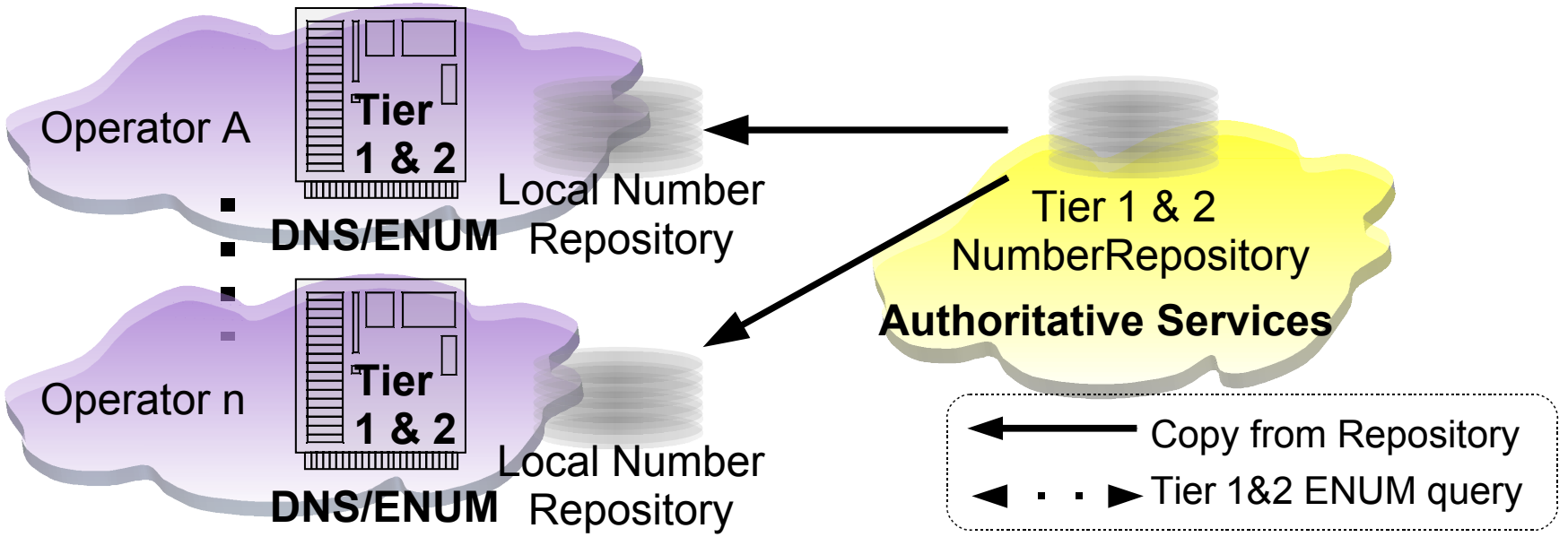
- Saving on administration overhead
- Maintaining a common instead of individual databases
- Sharing gateway resources
- Simplified LNP, charging and management
- Security and privacy enhancements

DNS/ENUM Delegations for Carrier ENUM in a Country

Centralized ENUM / DNS Servers (Tier 1 & 2)

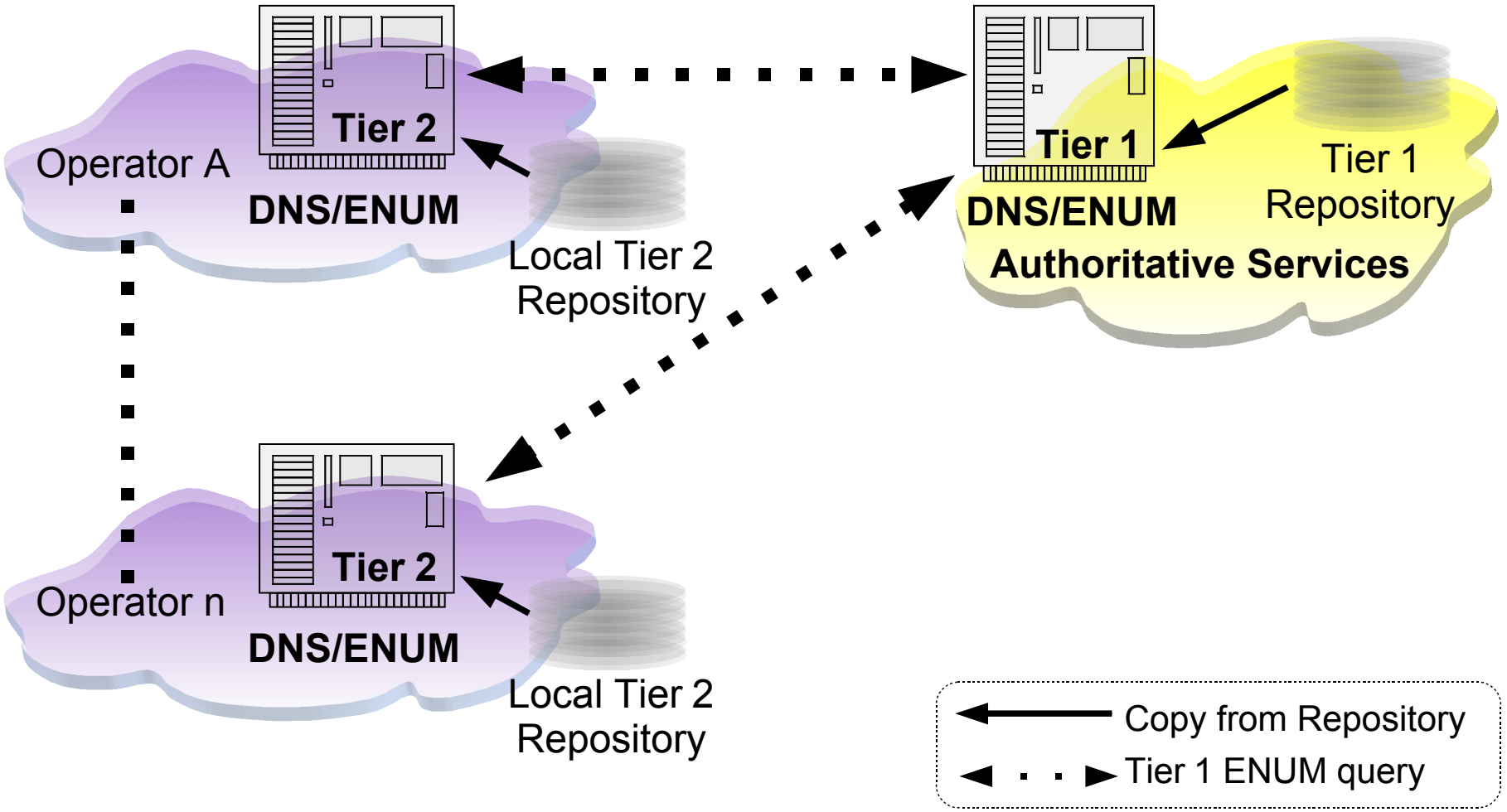


Local Replicas of all ENUM / NAPTR Records (Tier 1 & 2)



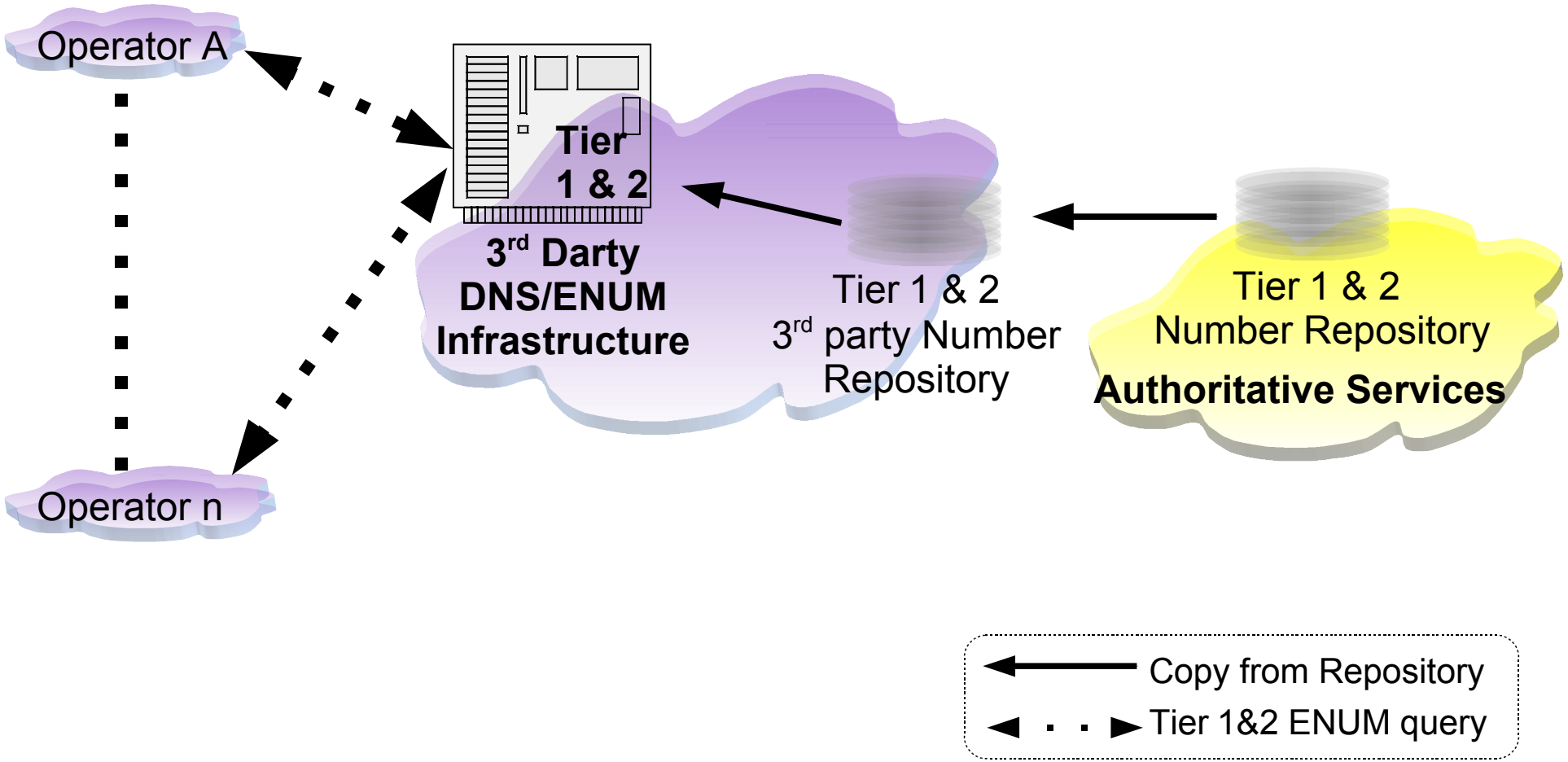
DNS/ENUM Delegations for Carrier ENUM in a Country

- **Distributed ENUM / DNS Repository (Tier 2 only)**



DNS/ENUM Delegations for Carrier ENUM in a Country

- **Federated Multi Peer Infrastructure**



ENUM is a protocol and set of Functionalities

- **ENUM provides DNS functions for Phone Numbers**
  - IETF RFC 3761 specifies the basics of ENUM:
    The E.164 to Uniform-Resource-Identifiers (URI) Dynamic Delegation Discovery System (DDDS) Application (ENUM)
  - Besides RFC3761, the ENUM working group will have 14 other RFCs by mid 2007.
    These RFCs mostly specify use cases, provisioning and validation procedures and logistics for ENUM.
- **Why do we need all this functionality?**
  - Telephony requires different delegation rules to DNS
  - Protecting the turf sometimes blocks new approaches
  - Pragmatic requirements are sometimes locally dominant

ENUM is a Protocol and a Set of Functionalities

- **Functions besides the basic ENUM RFC provide**
  - Support for Carrier ENUM
    They should provide delegations and split horizons for
    - Individual Management, Access authorization
    - Should avoid the need for multiple roots

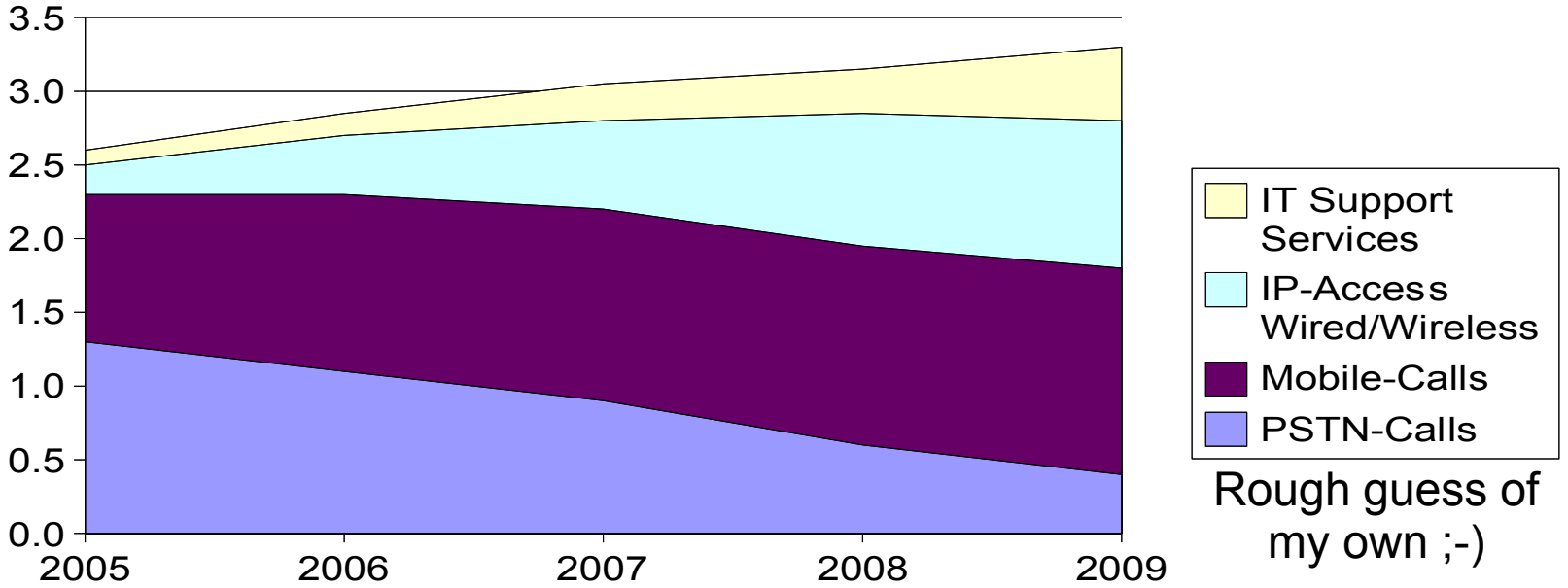
- **What could become reality with carrier ENUM?**
  - Individual or shared roots like e164.info, ...
  - 3rd party ENUM interconnect to hide the complexity of multiple settlements, trees, ...

Will users have their own entry before carrier agreements done?

Or might users be outside the walled gardens, before agreements between operators are in place? ... as some of us think

Challenges and Opportunities for Interconnect

For a start, look at the whole business; This may help to overcome ...



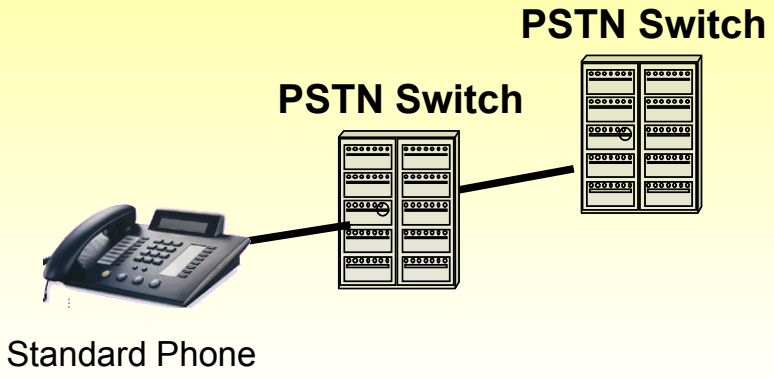
- Industry revenue is growing; we just need to be in the right segment
- We shouldn't spend money on declining central services
- Access fees and supporting IT-Services are where money can be made.
- Net Neutrality? Ha!
  ... users and service providers pay for their bandwidth already

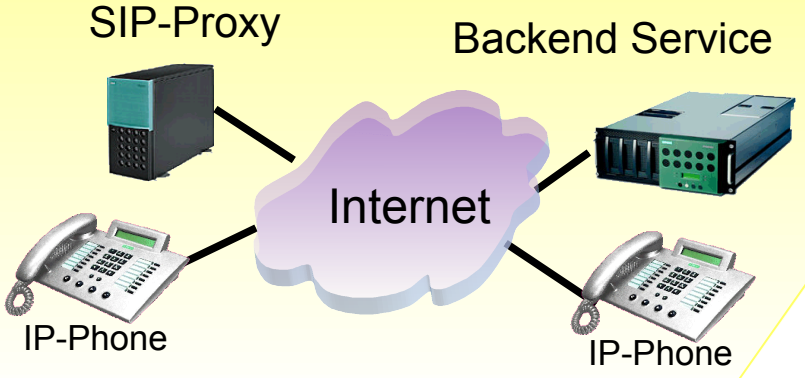
Challenges and Opportunities for Interconnect

From “From Trust by Wire” to “Trust by Authentication”

Today’s PSTN Networks:
Users and Network Elements are tightly coupled and use Trust relations by “Wiring”

Next generation VoIP Networks:
Users and Network Elements can be anywhere and they need trust by “Authentication”





- **Management of Trust and Authentication**
  Replacement of "trust by wire", IP users are **not** authenticated by a physical pair of wire**.**
- **Trusted authorities must be deployed**
  e.g.: Passwords or Certificate Authorities that issue security certificates / tokens

This slide is ten years old! **But does this impact on ENUM?**

Challenges and Opportunities for Interconnect

- **Each operator has his own ENUM tree**
  - Authoritative Repository required (replicas may not in sync)
  - High cost for updates maintenance and auditing
  - Owning the user without his agreement only gives a short term gain.
- **3rd party DNS/ENUM operator federation**
  - Authoritative repositories aggregated at ENUM interconnect
  - Reduce number of settlement partners and cost
  - Could be sustainable; Lower cost, services like LNP, hiding ...
- **Keep in mind:**
  - Operators want to save on Number-Queries (SS7-dips)
  - All that for a service for which we get less money every day; "Phone Calls" ... so there is pressure to save money!

Are there other ways to reduce cost or increase income?

Challenges and Opportunities for Interconnect

- **What is the competition in the carrier ENUM space?**
  - User ENUM registries, DNS registries providing end-to-end reach
  - 3rd Party ENUM operators, NEUSTAR, XCONNECT, ...
  - P2P systems doing the same without registrars and DNS

  Guess: They all sell to the end-user (the one with the money)!

- **Why don't operators & suppliers want to open up?**
  - Do not want to sell phone number hosting and registration services because they do not see incentives for them or end user advantages.
  - Scared to go into the field of DNS hosting / registration services
  - Told regulators for ages that this is wrong and might loose face now
  - **Oh!** They just discovered new set of excuses: “Network Neutrality”

They must know: For every year they talk, that's another 2 years for other companies to work around the problem (them) ; – (

Challenges and Opportunities for Interconnect

Think about new sorces of income instead of sticking to old sources of revenue that will fade away anyhow!

Phone calls get cheaper and thus, any new cost should be avoided

Why not make ENUM attractive for users to buy?

- **One address (phone-number) for all needs and networks**
  This contradicts current operator ethics but network independent operators will not care and provide Multi-Service-ENUM.
- **Overlay PABX & other numbers on any device globally**
  Oh yes, there are impacts on regulation and emergency calls!
  Some operators and Network Independent providers leave the choice to the user ;-)
- **Mobile-Phones can have multiple appearances on the Internet**
  - The secretary can pick up calls on the SIP-Phone
  - Calls can be completed which are otherwise lost

This and more can be sold to users as long as features kept simple

Agenda

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  - Evolution of ENUM Solutions
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➔The Afterlife of Phone Call Charges

- **Migration of Technology, Cost and Business**
- **Net Neutrality the Last Hideout?**

Migration of Cost, Technology and Business

Drivers and thoughts for deploying services that build new business

- **Users can run almost any service on their own CPE**
  see P2P SIP, ... reduces carriers responsibility e.g. for reliable systems
- **Minimize cost positions wherever you can**
  The end user is the ultimate place with least purchasing power.
  Migrate all possible cost to the end user. This saves on billing too.
- **CPE spending per port grows while service pricing declines**
  Whether we talk about Cell-Phones or IPTV endpoints, equipment suppliers get port prices phone operators & network-suppliers have been dreaming of for years.
- **Pricing for plain IP access increases by bandwidth!**
  So please do not provide QOS! This stops users upgrading.

ENUM/DNS identity/name binding is also a sustainable business

Migration of Cost, Technology and Business Issues for Operators

- **Operators guarantee transport and service**
  - They are still responsible for high service availability
    ... but they get less money for this work
  - They handle identity/phone number registration & maintenance
  - They have substantial costs and less income to provide that
- **Operators must reduce their cost and grow**
  - Change billing from line-minutes & volume-based to flatrate
  - Users are now responsible for purchasing, running and securing their home/office based server & telephony switch.
  - Users publish their identity and thus can be reached and authenticated anywhere.

A new industry will support these users if operators don't !

Migration of Cost, Technology and Business Issues for End Users

- **User Infrastructure**
  - Users care for their own CPE infrastructure purchase & repair
  - Users pay for their own power consumption
  - ... But they can't handle the technology of their own systems
- **On Users Trust, Security and Applications**
  - Trust-By-Wire had implicit trust and security; For a price ;-)
  - They had few identities only (Phone-Nr, Bank-Account)
  - Now they need multiple identities and trust relations, at the same time as they are losing trust from “Trust-By-Wire”
  - Users are losing track of all of these ever growing identities, business- and trust relations – they need help

These Users need System Support and new Trust Services!

Network Neutrality the Last Hideout of Bellheads?

- **Avoid debates around toll-tax issues**
  - This is just good way to generate stranded cost
  - It is based on greed and ends up in finger pointing to hide the real reasons (like trying to push up transport prices, ...)
- **Real issues we shall overcome or think about**
  - On the internet both parties pay for bandwidth
  - Network Neutrality stops new technology turning into business
  - Provides nice arguments to keep the regulators busy
  - Makes it hard for regulators to enforce realistic charges.
- **Possible outcome**
  - Toll taxes if introduced, generate stranded cost on billing, ...
  - Fat pipe users will move between access providers to get all they need for a reasonable cost
  - The discussion will quietly go away ... (most likely)

Conclusions

- ENUM provides excellent sources for new income
- Sell features your customer may find useful instead of spending money on phone system emulation

For the time being:

- Build the ENUM infrastructure you can sell
- Keep ENUM open to sell new functions to end users in future

- Go fishing to avoid wasting money on creating white elephants, keeping them fed ... ;-)

Finally think about

- The final point of convergence is the end-user and that is the consumer. - Your customer!
  Richard Stastny in a heated discussion

- SKYPE on Nokia N800 is expected 2nd half of 2007
  Adrian Georgescu commented on this:
  - SIP, an open standard IETF protocol, is nowadays the chosen protocol for closed networks
  - Skype, a closed solution, becomes the facto standard of communications over open networks

Thanks, and here's yet another reason for having ENUM

Any Questions?

If they come up Later you may contact me at

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