



Infrastructure-ENUM

Connecting the Voip-Islands

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Telco-Landscape has changed ...



- ISPs offering Voice-Services as add-on
- Traditional Telcos offer VoIP
- IP-Centrex Solutions
- Cable Operators switching to VoIP
- Access independent VoIP-services
- Wholesale VoIP-products
- SIP-Trunking replace ISDN-PRI/BRIs

Observations



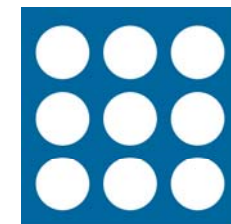
- There is no doubt that IP will be the most important technology also in voice services
- There is a demand for „open internet style“ solutions ...
- but „closed carrier gardens“ are also useful for certain applications
- This „battle“ is still undecided – both models may coexist side by side for a substantial periode

Conclusions

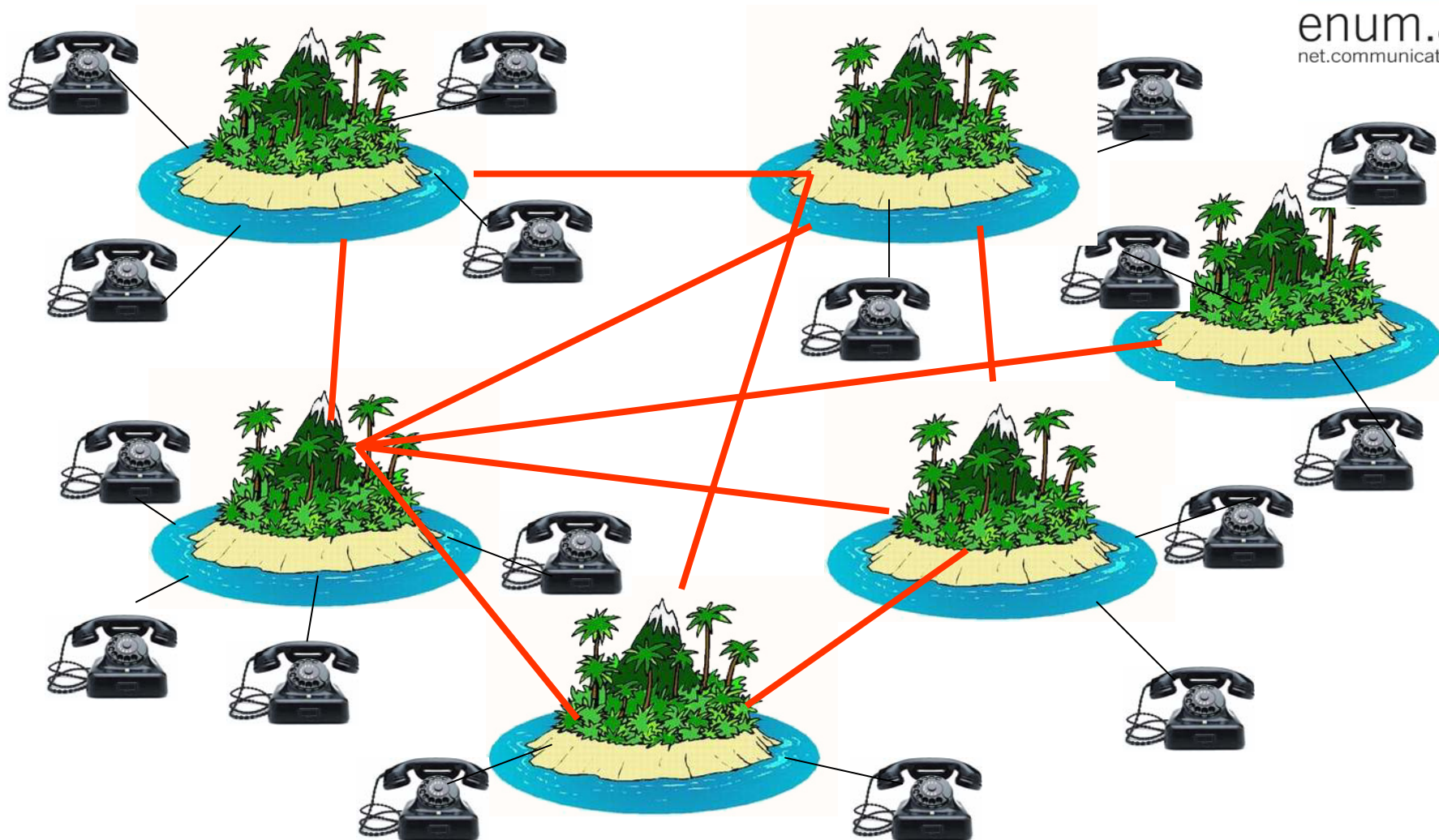


- Becoming telco has never been so easy (cheap)
- Not every telcos suffers from „legacy-equipment“ ...
- ... and they try to avoid shopping it if possible
- SS7 is still a prerequisite for interconnection – but does this still make sense from a technical and economic perspective?
- Using TDM to interconnect IP-based services makes very limited sense and should be avoided

VoIP-Peering / Interconnect



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ENUM „flavours“



- User ENUM
 - number holder is in charge
 - standardization done
 - up and running in several countries
 - long term potential for end users
 - carriers don't embrace it
 - slow proliferation

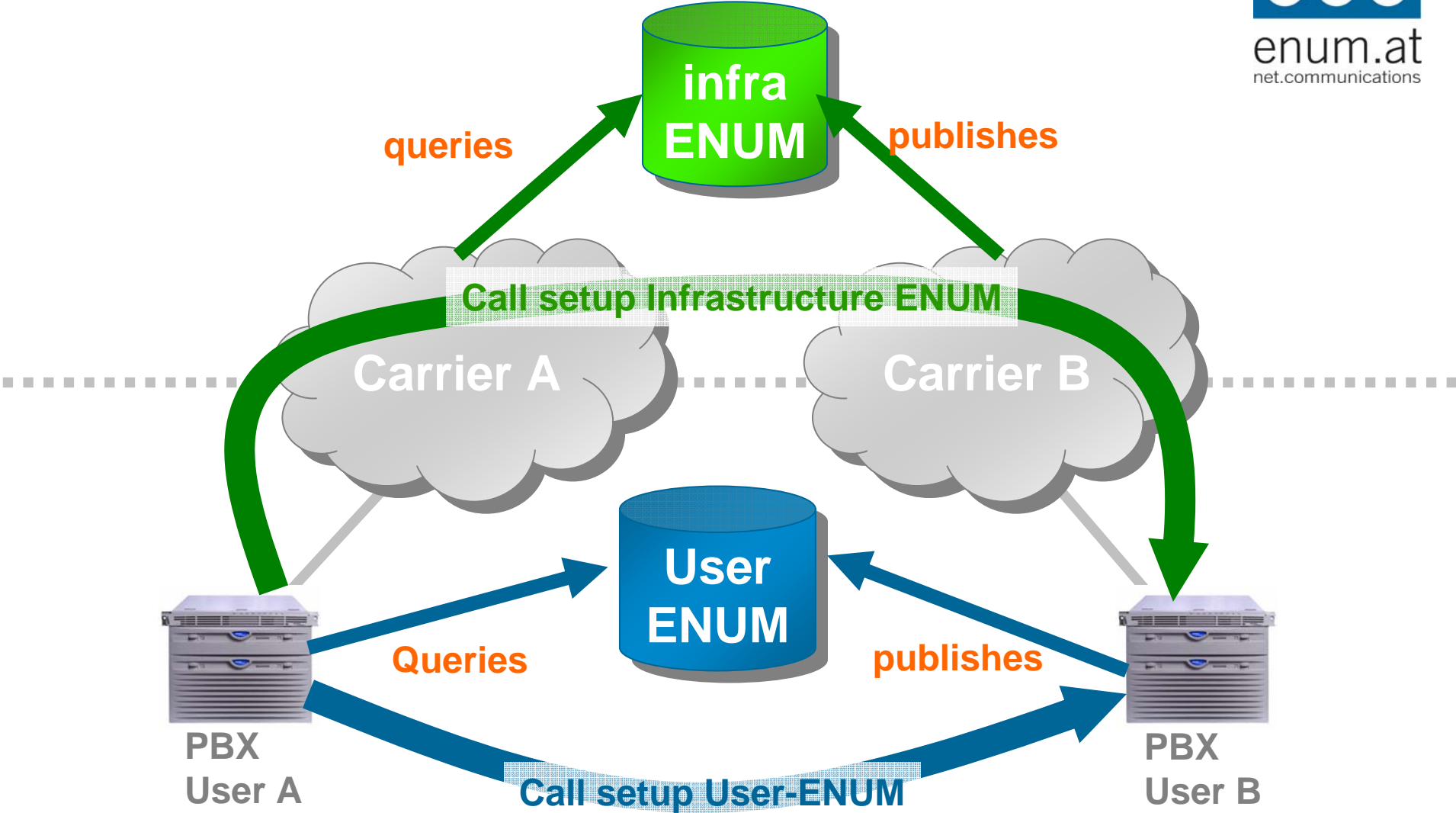
ENUM „flavours“



- Infrastructure ENUM
 - Carrier / number range holder in charge
 - standardization still ongoing
 - terms & conditions for peering agreement can be defined between carriers
 - no direct benefit to end user

- Private ENUM
 - ENUM in closed environments

ENUM at a glance



"What happened so far"



- Recap User-ENUM:
 - From phone numbers to internet addresses
 - Under control of the end customer, „opt-in“
 - Assumption: destinations "freely" reachable
 - One domain per number
 - Validation on registration
 - Recurring re-validation
 - +43 in operation since december 2004
 - 780-numbers available from may 2005

Our service offering



- Why another ENUM?
 - Enabler for Voice-Peering on IP between Carriern
 - "ENUM" as a technology a logical choice
 - However, user-ENUM a limited fit to carrier's requirements
 - Directory for information about phone numbers
 - Routing numbers, tariff information, ...

ENUM for carriers



- Requirements from the Carriers view:
 - From phone numbers to internet addresses
 - Under full control of the carrier
 - Carrier stays in the call flow
 - Number ranges possible
 - Minimal provisional expense
 - For all E.164 numbers

What is entered into ENUM?



- **User-ENUM:**
 - Internet resources of the end customer associated to his number

- **Infrastructure-ENUM:**
 - Internet resources of the carrier associated to his numbers (number ranges)

Infrastructure-ENUM and User-ENUM compared

Who enters data?



- **User-ENUM:**
 - Entries under full control of end customer – "if" and "what" is his sole decision
- **Infrastructure-ENUM:**
 - Entries under sole control of the carrier

Infrastructure-ENUM and User-ENUM compared

Reachability of targets



- **User-ENUM:**
 - Target addresses are public reachable
 - Circumvents carriers usual call flow / settlement

- **Infrastructure-ENUM:**
 - Call flow under full control of the carrier – all business models possible
 - Full control of interconnect policy
 - Implementation: „Peering Federations“
 - details: "Policy Announcement" IETF drafts

Infrastructure-ENUM and User-ENUM compared

DNS-Structure



- **User-ENUM:**
 - One number == one ENUM domain
 - NS-Delegation, one zone per number
- **Infrastructure-ENUM:**
 - Whole blocks possible (One block == one entry)
 - Drastically simplified DNS management
 - Resolution without DNS dependency possible (local DB replication)

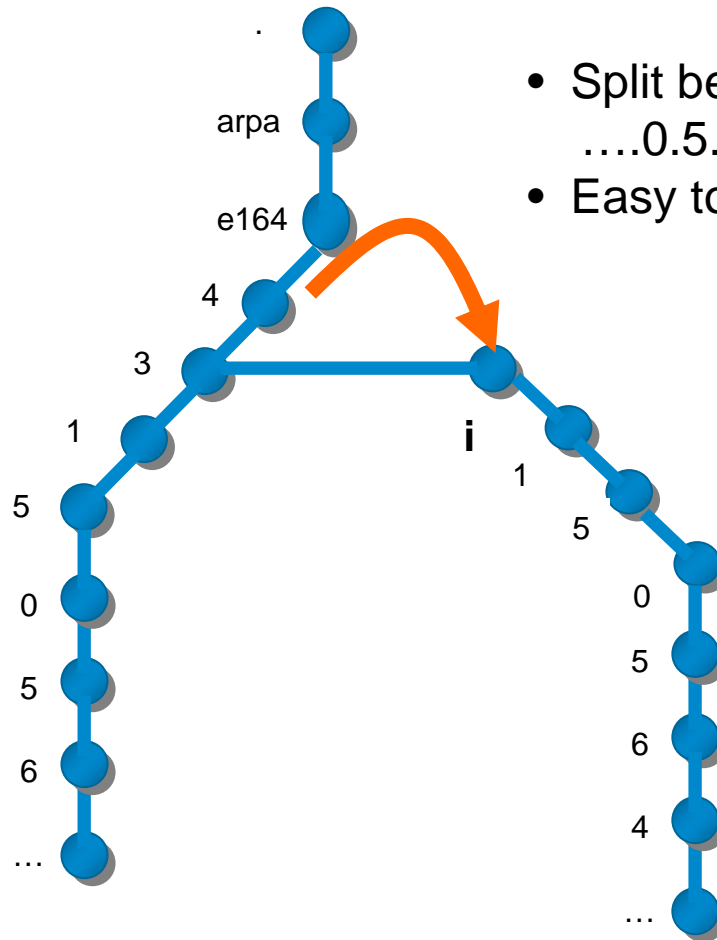
Infrastructure-ENUM and User-ENUM compared

Validation



- **User-ENUM:**
 - All registrars can provision all numbers, given that:
 - Validation guarantees quality level of entries
- **Infrastructure-ENUM:**
 - CSP administrated only his "own" numbers
 - Blocks, imported numbers, directly assigned
 - No (re)-validation

Infrastructure-ENUM-Tree +43



- Split below cc
....0.5.0.5.1.i.3.4.e164.arpa
- Easy to change to other location

„Ultimate“ solution

