SWITCH
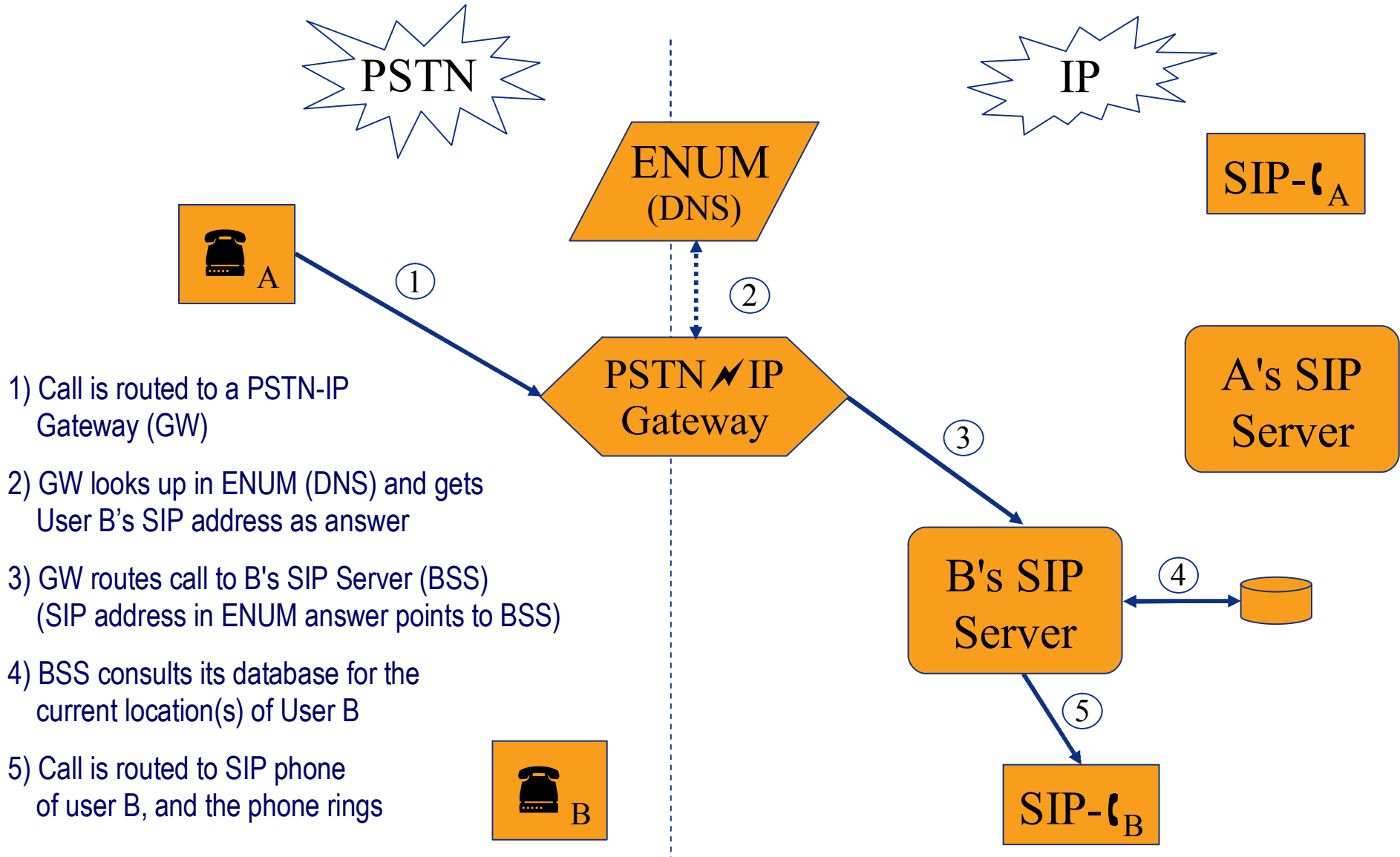
The Swiss Education & Research Network
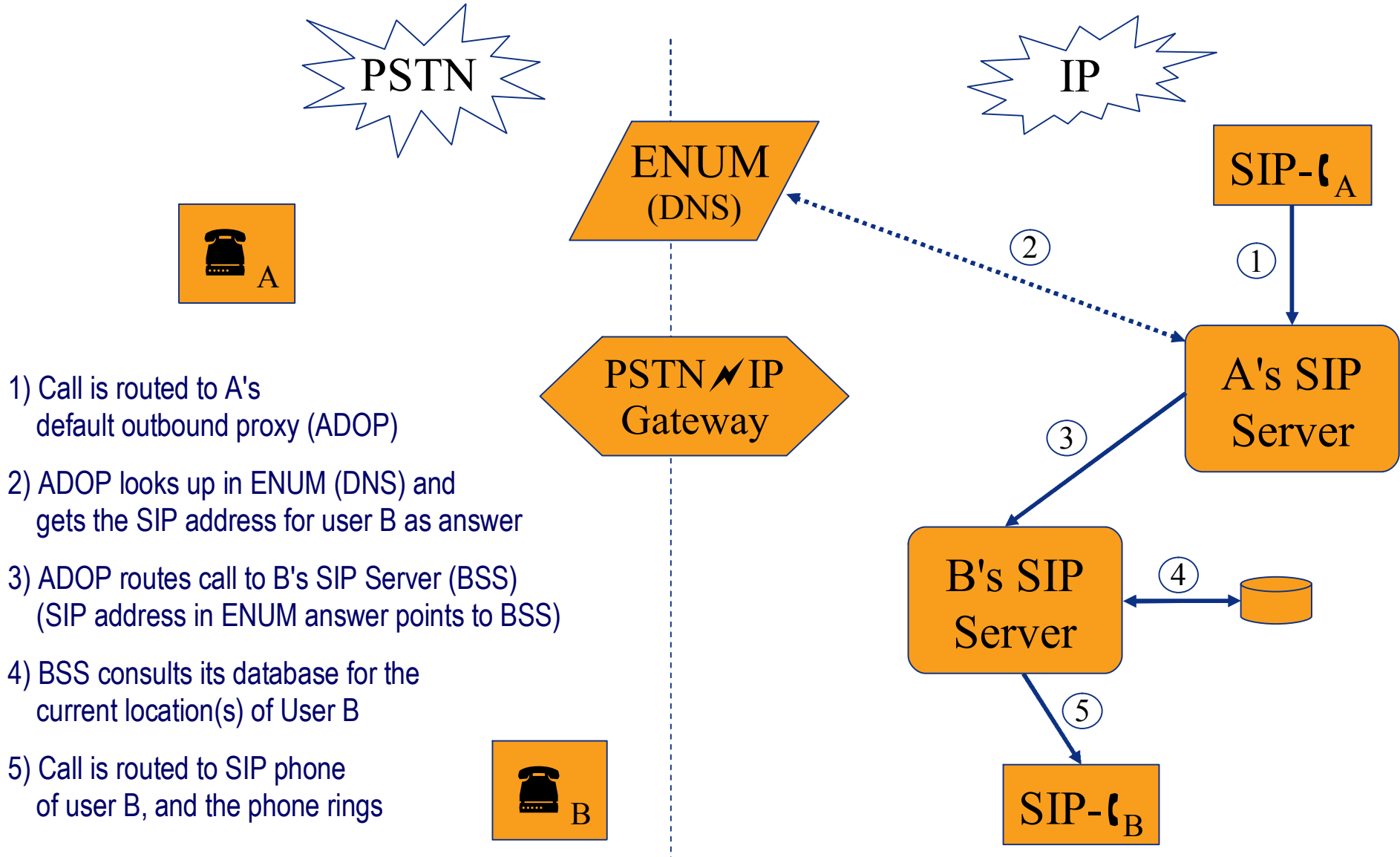
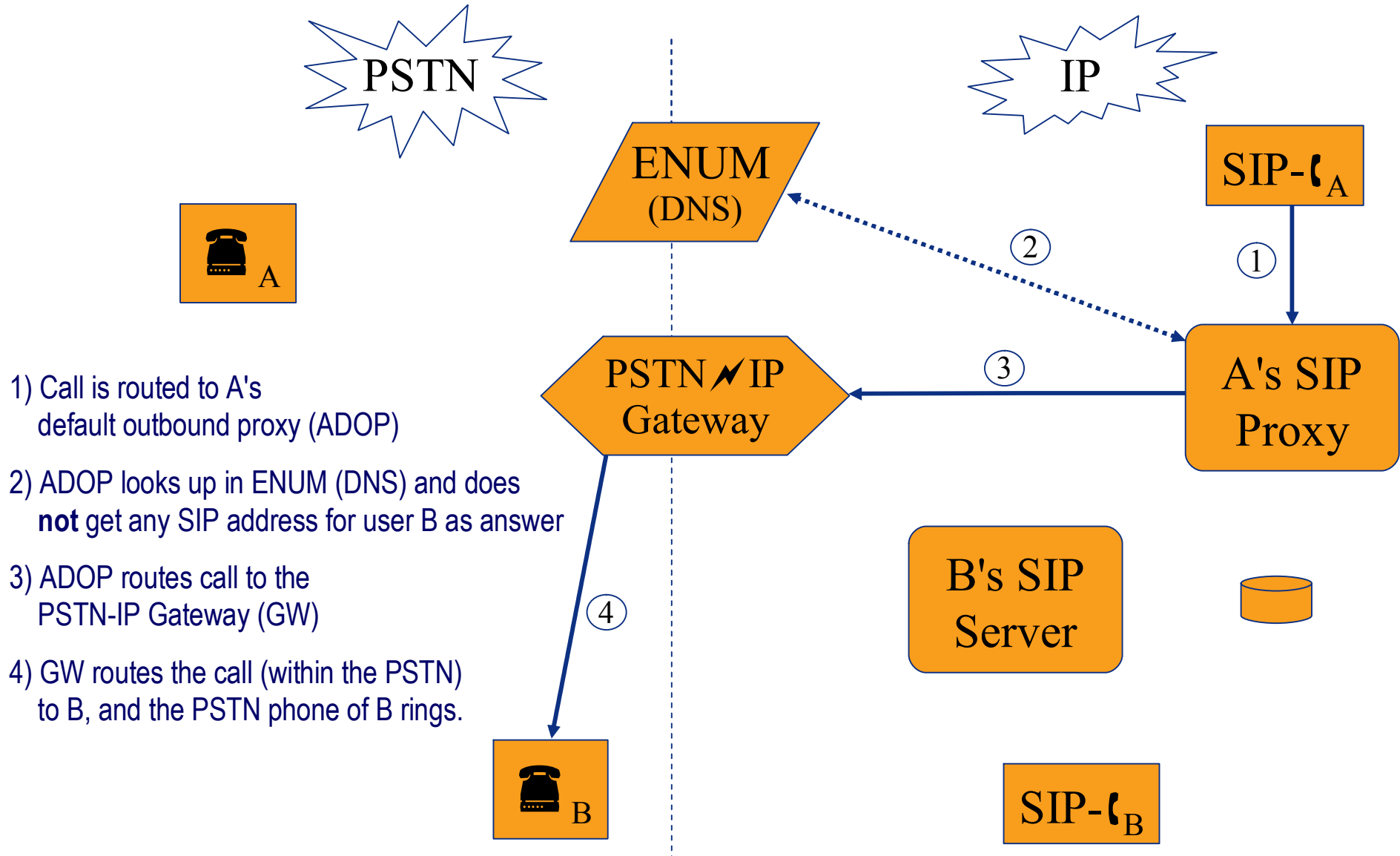# ENUM

Usage scenarios and trees

B. Höneisen, Switch

<hoeneisen@switch.ch>

Content
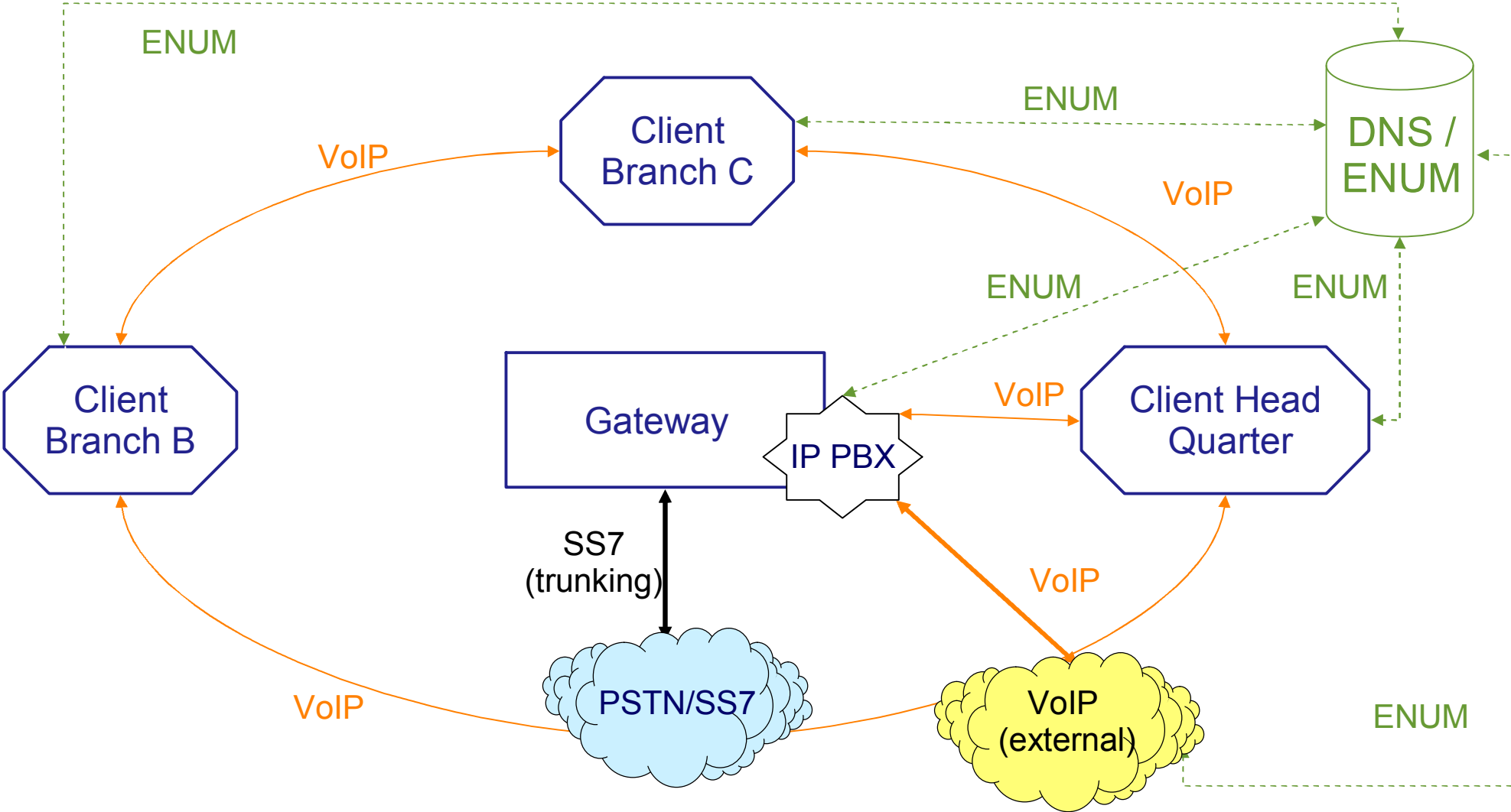
- Interworking examples with SIP and ENUM

  - ENUM and H.323

  - The ENUM forest

- Proposal how to proceed in the ENUM forest (for discussion)

  - Roles in ENUM Provisioning (if of any interest)

  - Validation (if of any interest)

PSTN to SIP terminal

PSTN

IP

ENUM
(DNS)

SIP-📞 A

A
①

②

PSTN ⚡ IP
Gateway

③

A's SIP
Server

1) Call is routed to a PSTN-IP
Gateway (GW)

2) GW looks up in ENUM (DNS) and gets
User B's SIP address as answer

3) GW routes call to B's SIP Server (BSS)
(SIP address in ENUM answer points to BSS)

B's SIP
Server

④

4) BSS consults its database for the
current location(s) of User B

⑤

5) Call is routed to SIP phone
of user B, and the phone rings

B

SIP-📞 B

SIP to SIP terminal

PSTN

IP

ENUM
(DNS)

SIP-☎ A

②

①

PSTN ⚡ IP
Gateway

A's SIP
Server

☎ A

③

④

B's SIP
Server

1) Call is routed to A's
   default outbound proxy (ADOP)

2) ADOP looks up in ENUM (DNS) and
   gets the SIP address for user B as answer

3) ADOP routes call to B's SIP Server (BSS)
   (SIP address in ENUM answer points to BSS)

4) BSS consults its database for the
   current location(s) of User B

5) Call is routed to SIP phone
   of user B, and the phone rings

⑤

☎ B

SIP-☎ B

SIP to PSTN terminal

PSTN

IP

ENUM
(DNS)

SIP-☎ A

☎ A

② ①

A's SIP
Proxy

PSTN ⚡ IP
Gateway

③

1) Call is routed to A's
   default outbound proxy (ADOP)

2) ADOP looks up in ENUM (DNS) and does
   not get any SIP address for user B as answer

B's SIP
Server

3) ADOP routes call to the
   PSTN-IP Gateway (GW)

④

4) GW routes the call (within the PSTN)
   to B, and the PSTN phone of B rings.

☎ B

SIP-☎ B

Many sites / hosted PBX

ENUM and H.323

- ENUM to replace GDS
  - WG formed at SURA / ViDe

- GnuGK supports ENUM lookups
  - Transition scenario (GDS -> ENUM):
    - » Lookup ENUM first
    - » if no ENUM entry, route via GDS

- Manufacturers start to consider ENUM on Endpoints

- ENUM to support SIP – H.323 Gateways

The ENUM forest...

- ENUM technology used in two "dimensions":
  - public vs. private
  - User vs. Infrastructure

	User ENUM	Infrastructure ENUM
public ENUM	**e164.arpa**	ie164.arpa
private ENUM	e164.org, nrenum.net, ...	e164.info, ...

  - User ENUM:
    » Assignee of E.164 numbers (e.g. university) control ENUM entries
  - Infrastructure ENUM:
    » Carrier/Service Provider control ENUM entries

- For NRENs User ENUM is of interest

- Only e164.arpa is real ENUM as standardized by the IETF

Public vs. private ENUM

Public ENUM (e164.arpa)

- Advantages:
  - Trust (national regulators have the final word on delegation)
  - Global solution (standardized in IETF with ITU involvement)
  - High availability
- Disadvantages:
  - Not available for every Country Code (often due to political reasons)
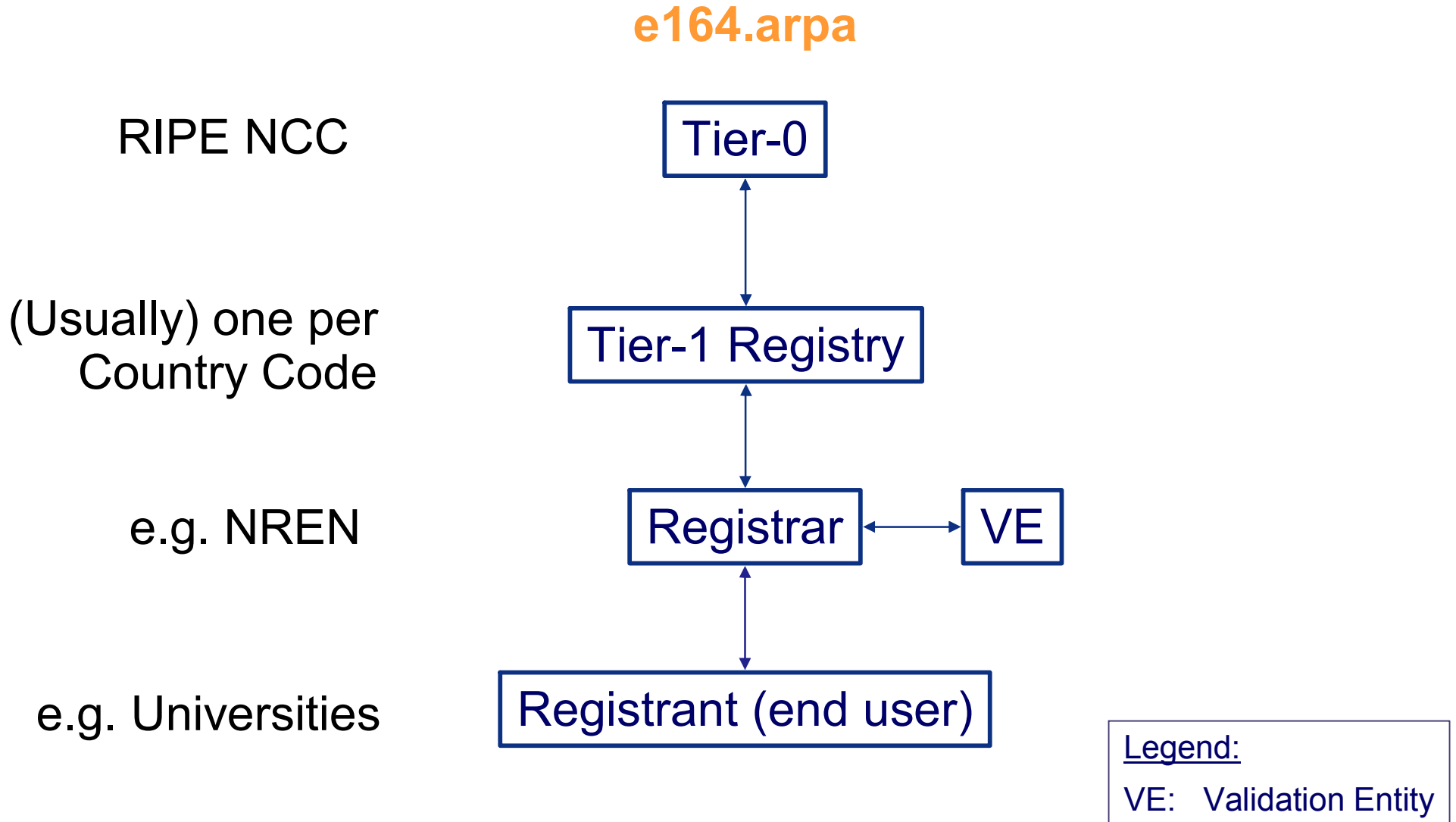
Private ENUM (e.g. e164.org)

- Advantages:
  - Available everywhere
- Disadvantages:
  - Holder of superordinate domain name has the sole power to rule, e.g.:
    » Impose restrictions or costs (without any kind of control)
  - Continuity not guaranteed
    » Sell the superordinate domain name / shut the tree down

Conclusion

- Private ENUM trees to be considered with care!
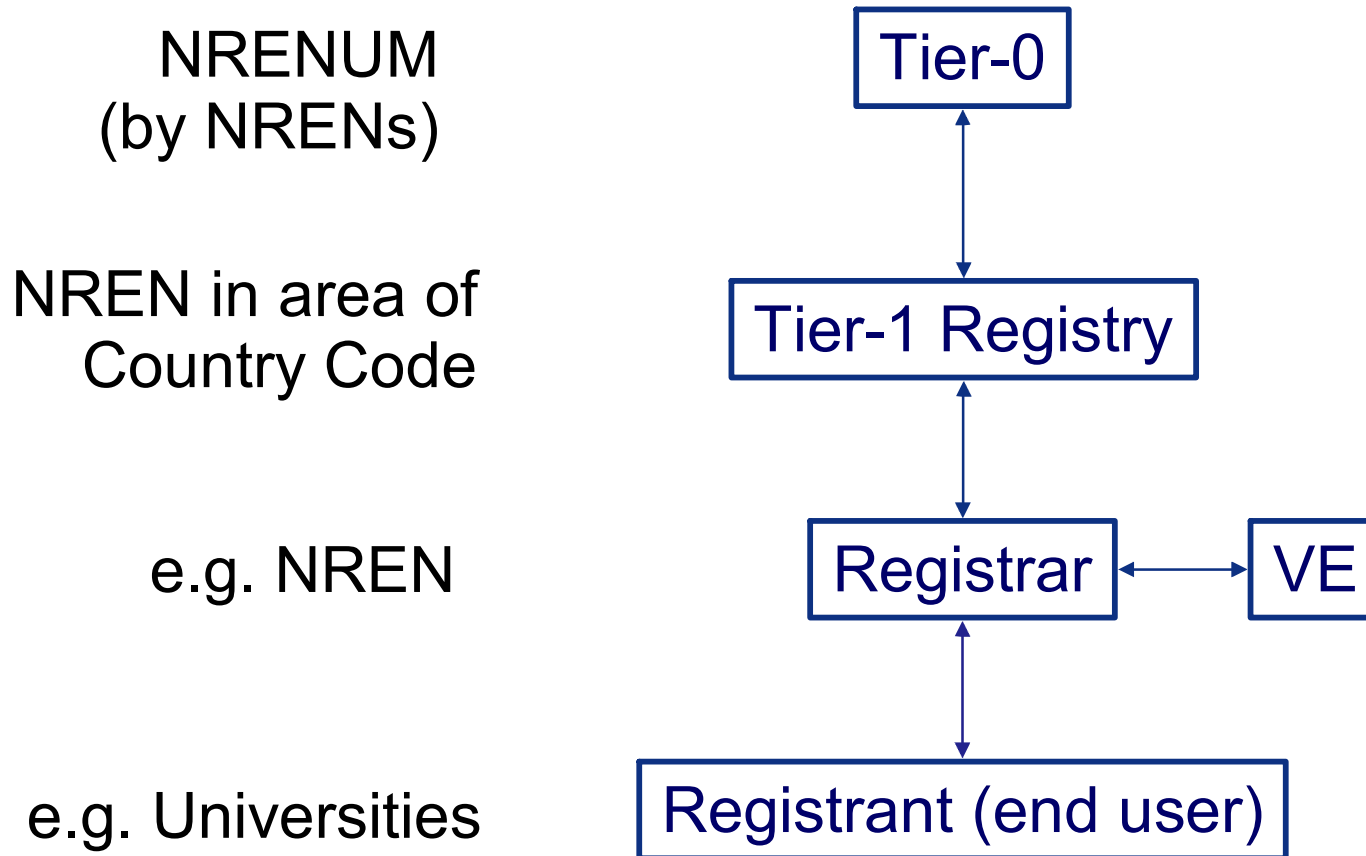
Proposal for Resolution (1/2)

To start trials also in areas, where the Country Code (CC)
is not delegated in e164.arpa, it is proposed:

- Maintain an own NREN trial tree (nrenum.net) for a limited period (6 months):

- delegations in nrenum.net are made only for those CCs, where access to e164.arpa is not feasible (e.g. no delegation, unacceptable conditions, ...)

  - ENUM entries are either in e164.arpa or in nrenum.net (but not in both)
  - Transition to e164.arpa, if local situation with ENUM changes

- ENUM queries to be made first in e164.arpa, then nrenum.net

Proposal for resolution (2/2)

- During the trial period
  - Gain experience on ENUM
  - Discuss and propose the final solution / tree

- More info on the idea
  - http://www.nrenum.net (draft version of charter proposal)

ENUM Provisioning (e164.arpa)

e164.arpa

RIPE NCC

Tier-0

(Usually) one per
Country Code

Tier-1 Registry

e.g. NREN

Registrar ⟷ VE

e.g. Universities

Registrant (end user)

Legend:

VE: Validation Entity

ENUM Provisioning (nrenum.net)

nrenum.net

NRENUM
(by NRENs)

NREN in area of
Country Code

e.g. NREN

e.g. Universities

Tier-0

Tier-1 Registry

Registrar ←→ VE

Registrant (end user)

Legend:

VE: Validation Entity

Validation

Main Goals:

- Consistency
  - The **Registrant** of the ENUM domain name is **identical to** the **Assignee** of the corresponding E.164 number

- Identification / Authorization
  - The registration of the ENUM domain name is **authorized by the Assignee** of the corresponding E.164 number
  - To prevent fraud

The Swiss army knife for ENUM