ENUM

The history, now and the future

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Once upon a time...

- We had gateways from email to fax
  - 2.1.3.4.5.5.6.4.tpc.int
- RFC 1486

```
1486 An Experiment in Remote Printing. M. Rose, C. Malamud. July 1993.
     (Format: TXT=26373 bytes) (Obsoleted by RFC1528, RFC1529) (Status:
     EXPERIMENTAL)
```

Then VoIP

- Voice was interesting when quality of Internet access increased, and people got fixed connections to the Internet

- H.323 was standardized, but not really deployed

  - Too much the telco model

- IETF started working on SIP, and understood there was a need for address indirection

Some early slides

Address indirection

- URL
  - http://paf.se
- Domainname
  - paf.se
- IP-address
  - 130.244.195.146
- (Dynamic) Routing gives path towards the target

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Some early slides

DNS is a database

- IP-address to hostname
  - paf.se. IN A 130.244.195.146
- Domainname to mail host
  - paf.se. IN MX 0 mail.paf.se.
  - paf.se. IN MX 10 mailgw.swip.net.
- IP-address to hostname
  - 146.195.244.130.in-addr.arpa. IN PTR nic.cafax.se.

IETF

E2.TELE2.TEL
TELEFONI INTERNET MOBIL DATANÄT

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Some early slides

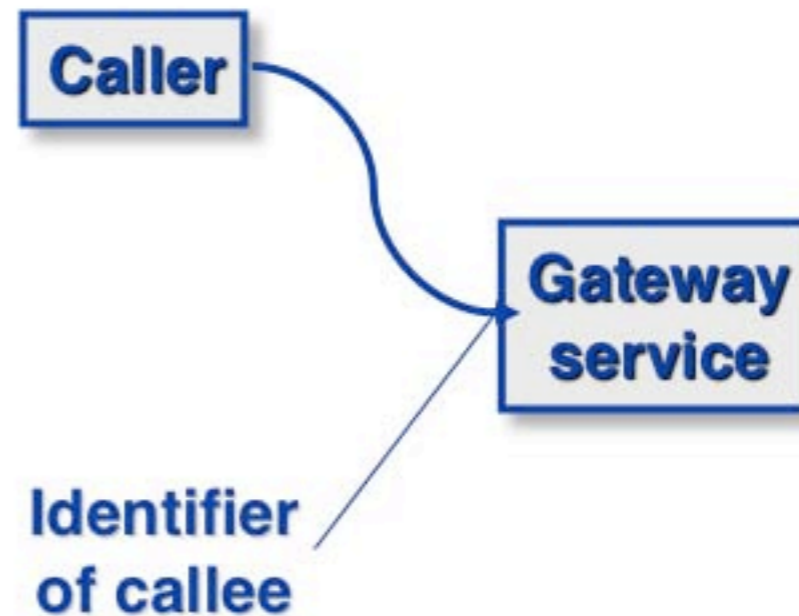## Grandfathering

- In DNS, <u>names</u> are stored
- IP-addresses are stored there
  - 130.237.222.71
  - 71.222.237.130.in-addr.arpa
- Least significant token first
- Also E.164 numbers are stored
  - +46-8-56264200
  - 0.0.2.4.6.2.6.5.8.6.4.tpc.int
- For email to fax services

I E T F

E2.TELE2.TEL
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Some early slides

Identifier

- E.164 address
- SIP URL
- Email address
- Fax Number
- Internet Fax URI

- Gateways will be created

Caller

Gateway service

Identifier of callee

E2.TELE2.TEL

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Some early slides

Conclusion

- It is good to know how an E.164 number is to be handled on the Internet
  - 0.0.2.4.6.2.6.5.8.6.4.e164.int
- This can then be used in ALL internet services in a unified way

E2.TELE2.TEL.
TELEFONI INTERNET MOBIL DATANÄT

What happened?

What happened?

- Negotiations with ITU-T

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You know the rest...

- e164.arpa created

- Delegated to RIPE NCC

- Request for delegation synchronized with process defined by ITU-T TSB

- Everything nice and cosy...

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...until...

Infrastructure ENUM!

Why did this happen?

- To a large degree business model issue

- To a large degree lack of ability for competition

- To a large degree responsibilities for "functional service"

Where are we?

- e164.arpa exists (and signed since nov 28)

- Other roots exist in public DNS

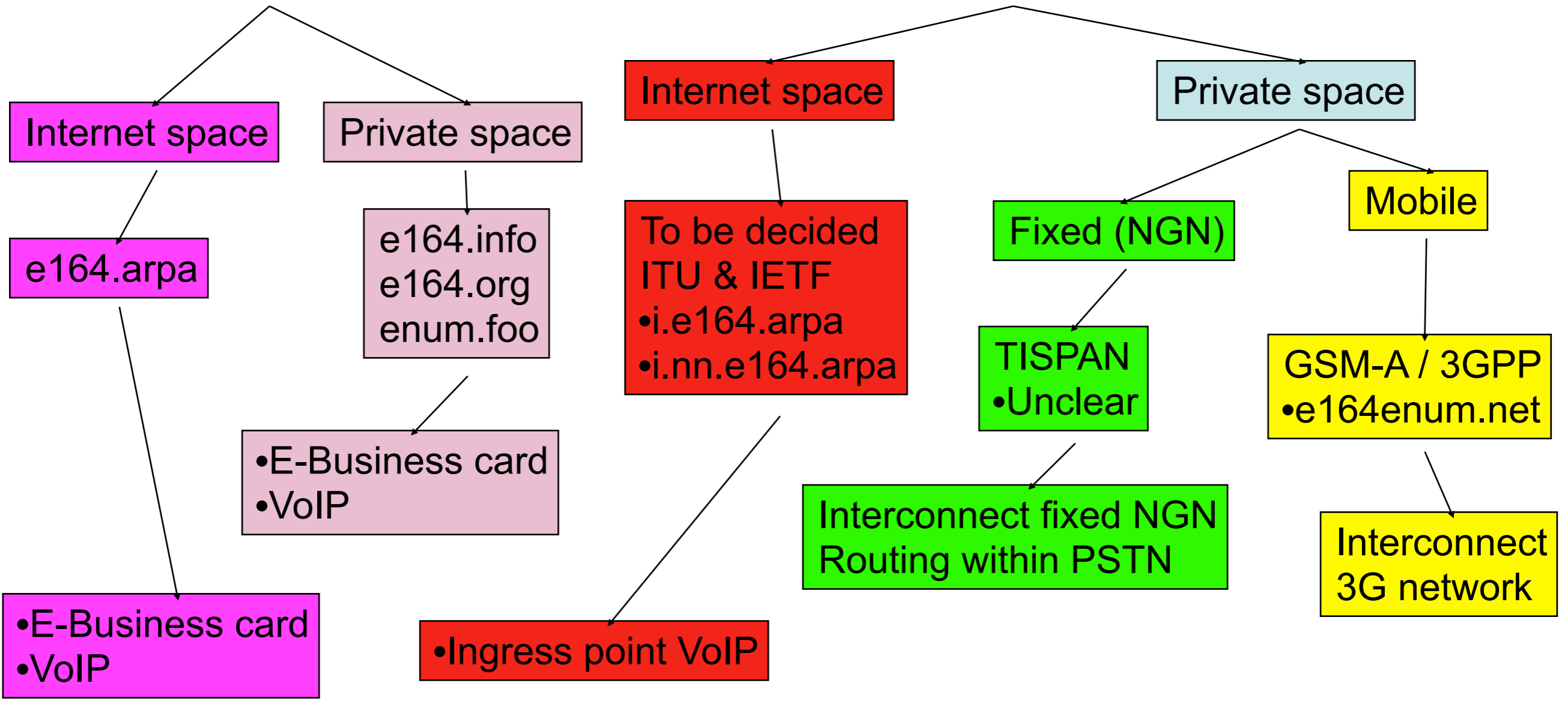- Other roots exist in non-public DNS

User and infrastructure ENUM

User ENUM
- User register number
- User populates & crontrol record
- User is authenticated
- User is possibly aware of ENUM

Internet space

Private space

e164.arpa

e164.info
e164.org
enum.foo

- E-Business card
- VoIP

- E-Business card
- VoIP

Infrastructure ENUM
- Carrier register number range/block
- Carrier populates & control record
- Carrier is authenticated
- User is unaware of ENUM

Internet space

Private space

To be decided
ITU & IETF
- i.e164.arpa
- i.nn.e164.arpa

- Ingress point VoIP

Fixed (NGN)

Mobile

TISPAN
- Unclear

GSM-A / 3GPP
- e164enum.net

Interconnect fixed NGN
Routing within PSTN

Interconnect
3G network

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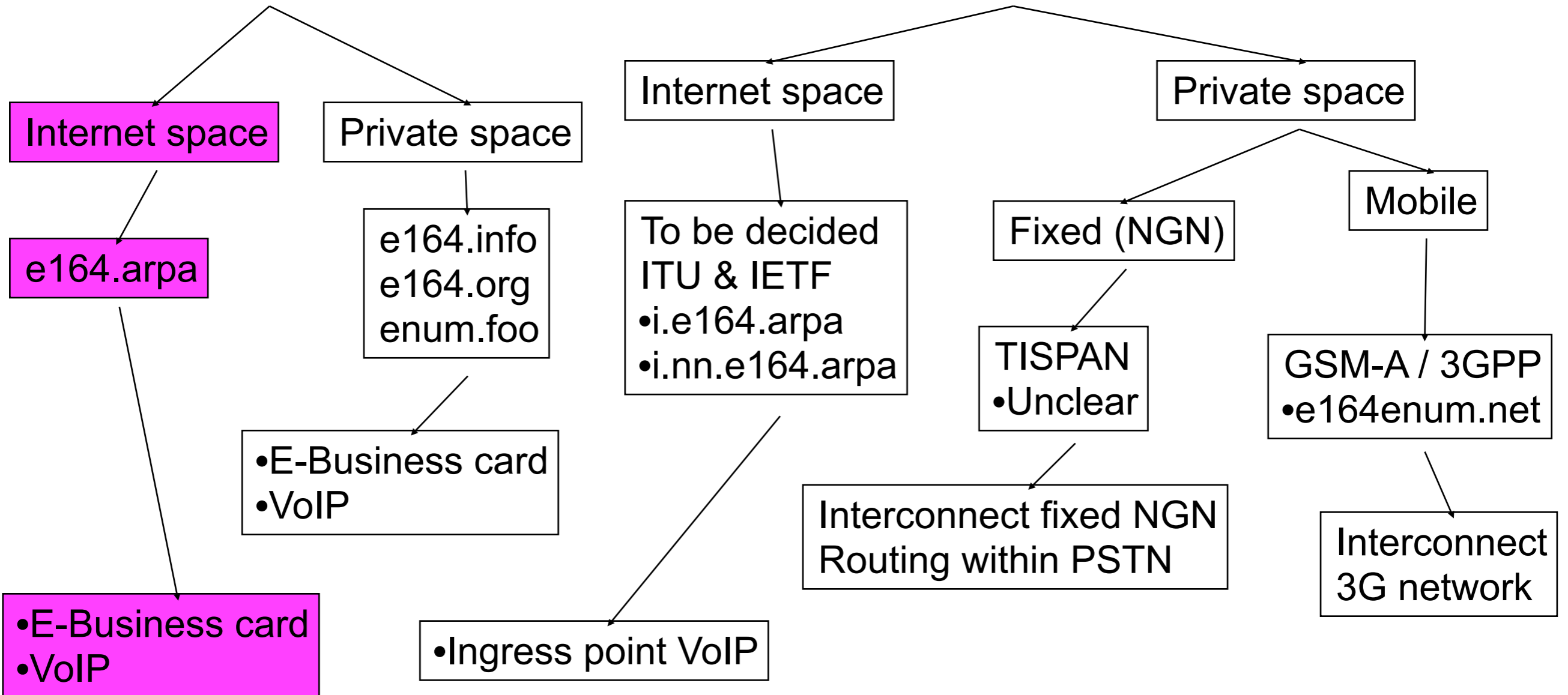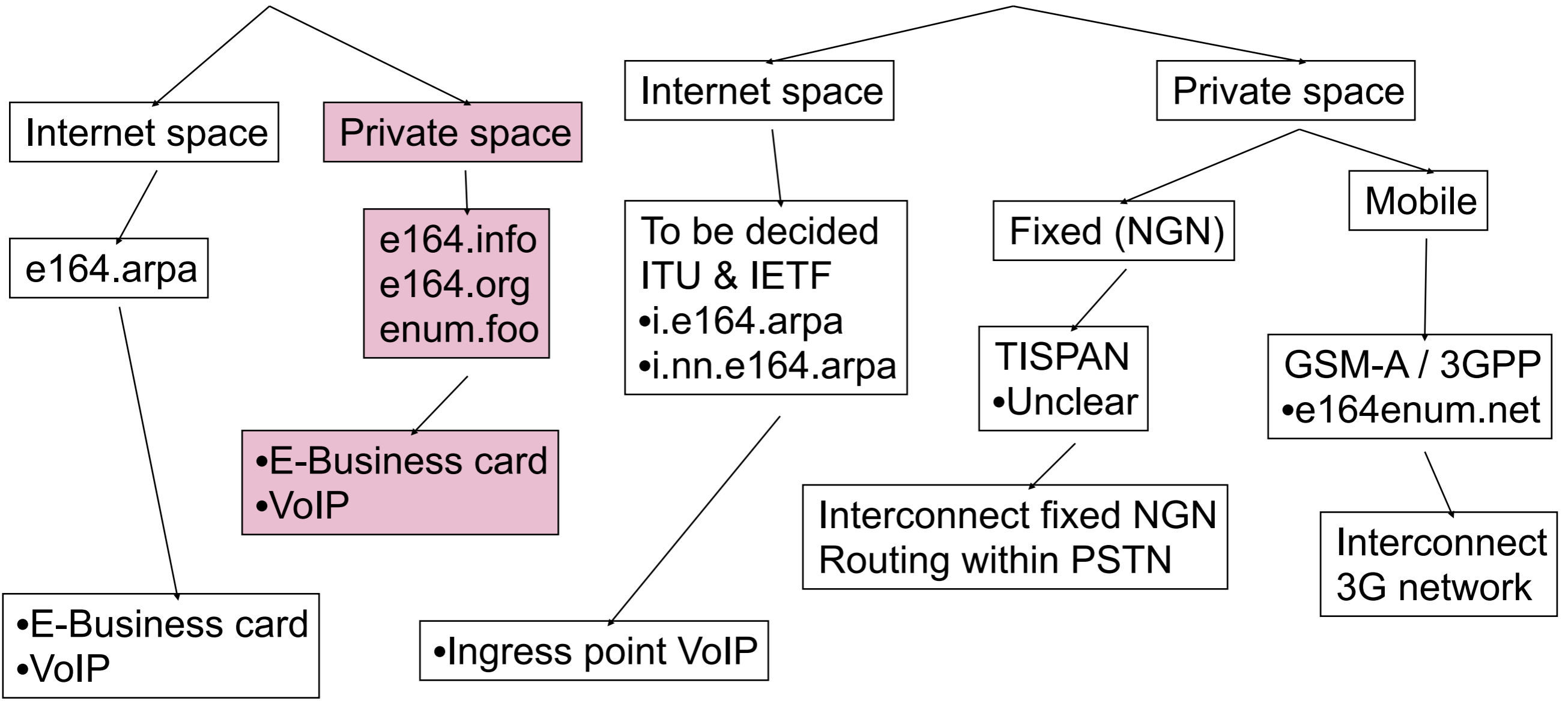- Carrier is authenticated
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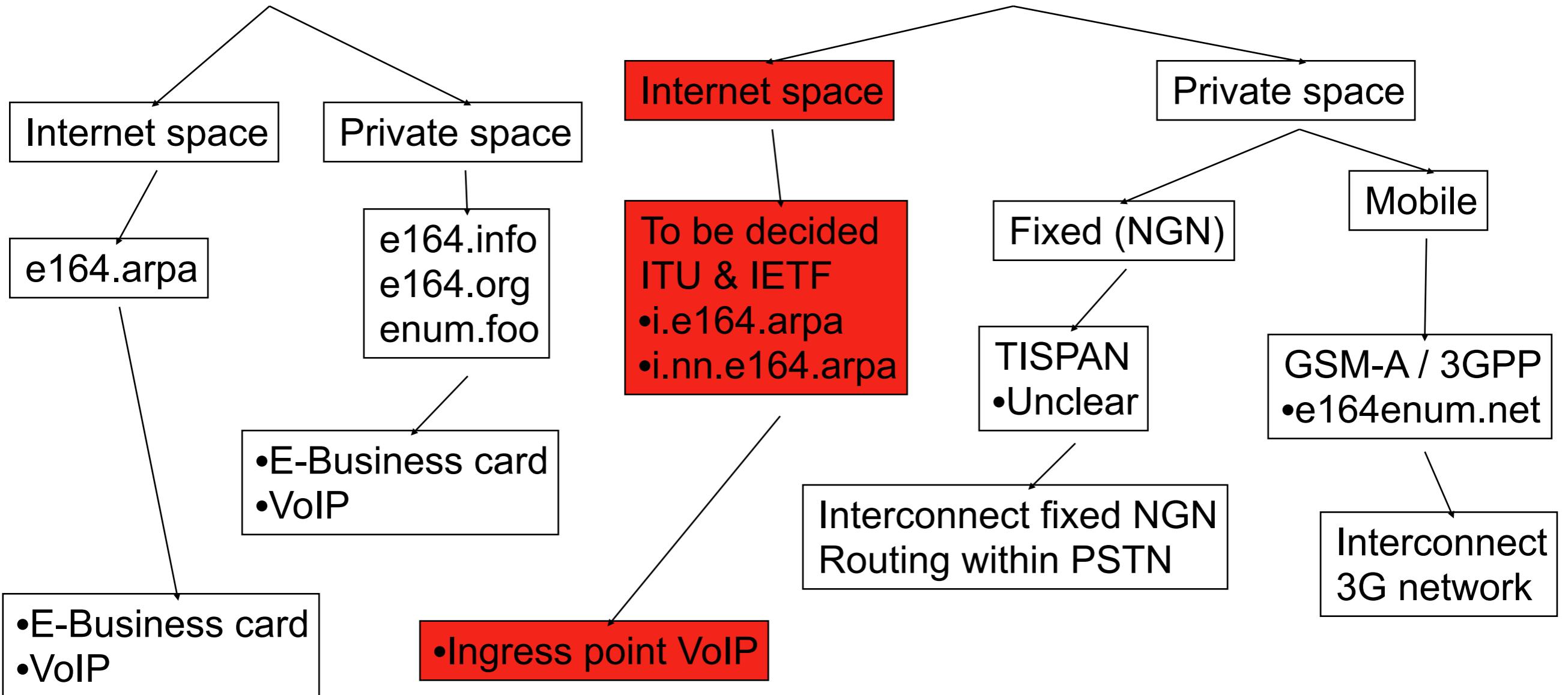- Carrier is authenticated
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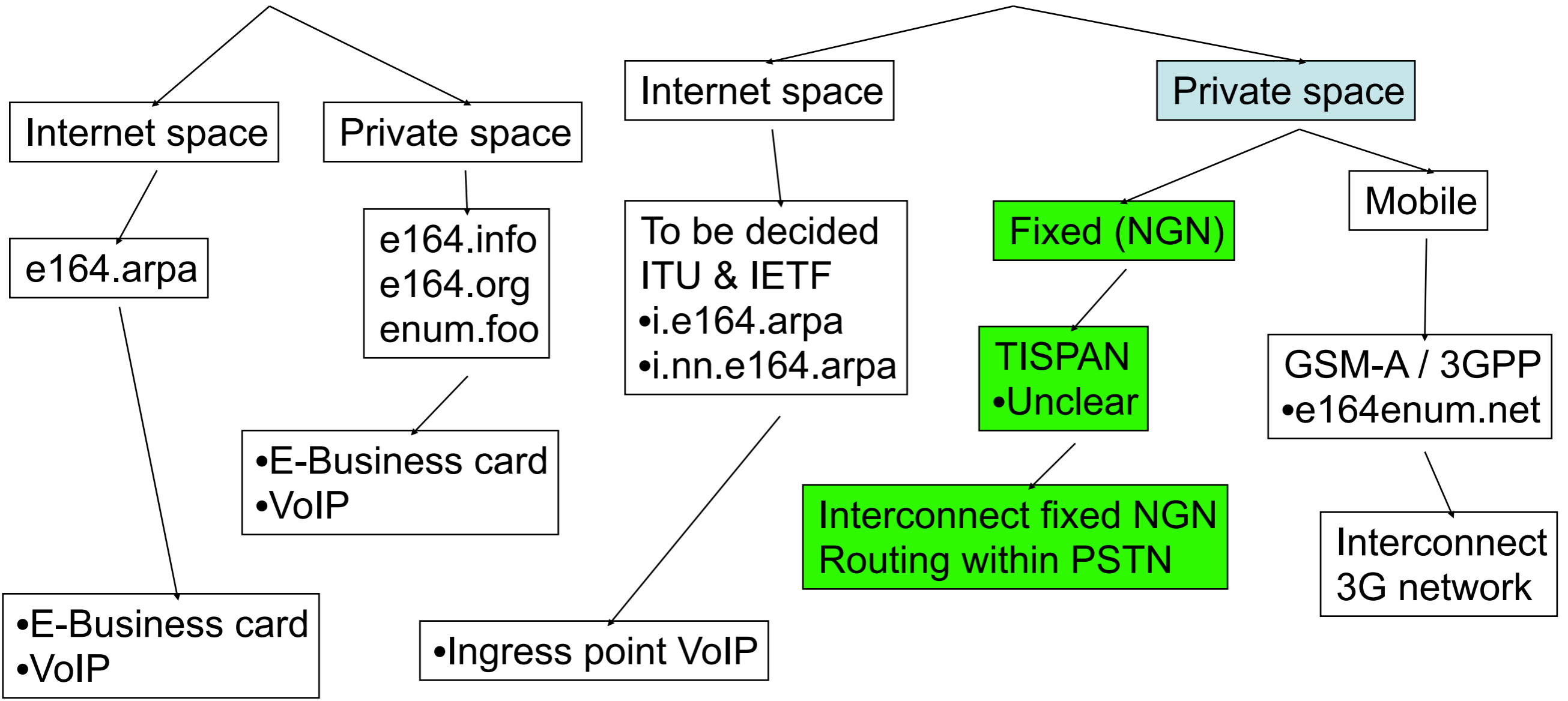- Carrier is authenticated
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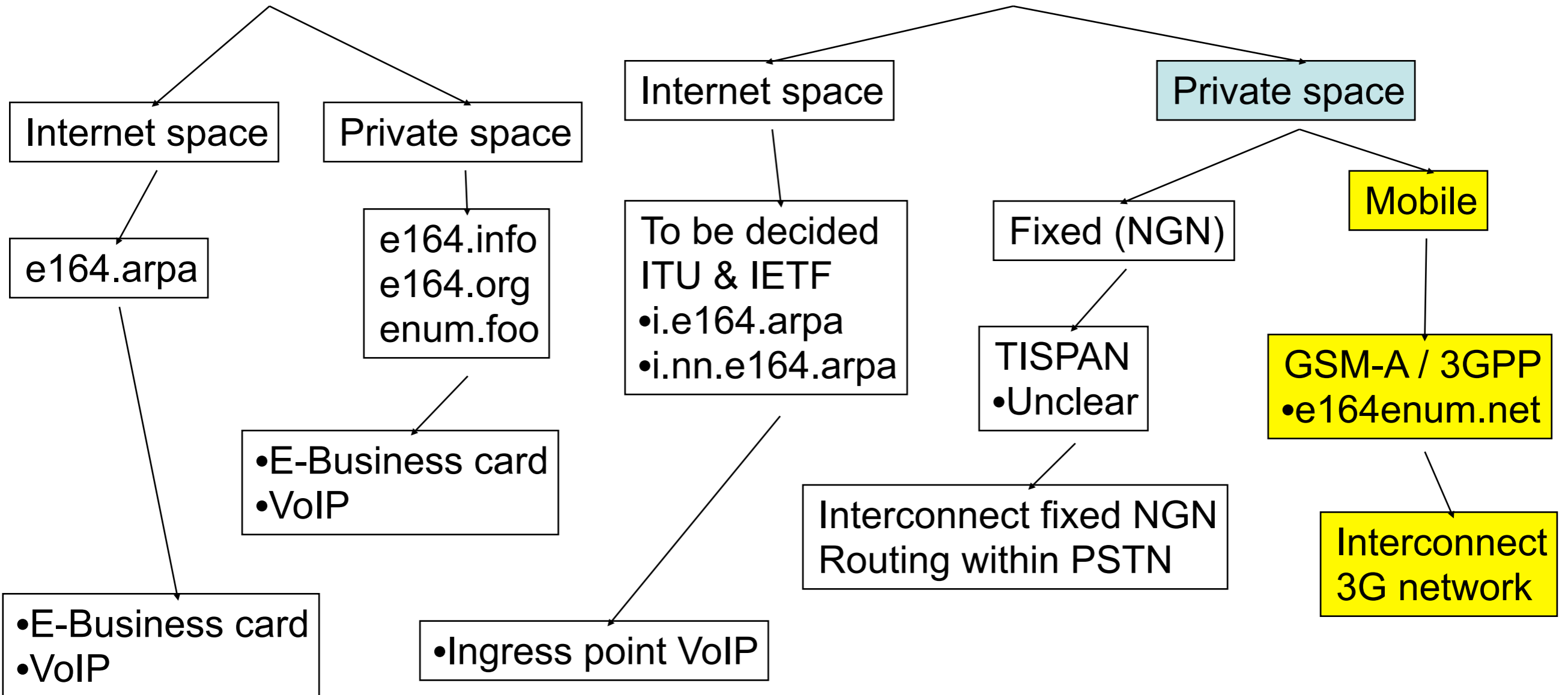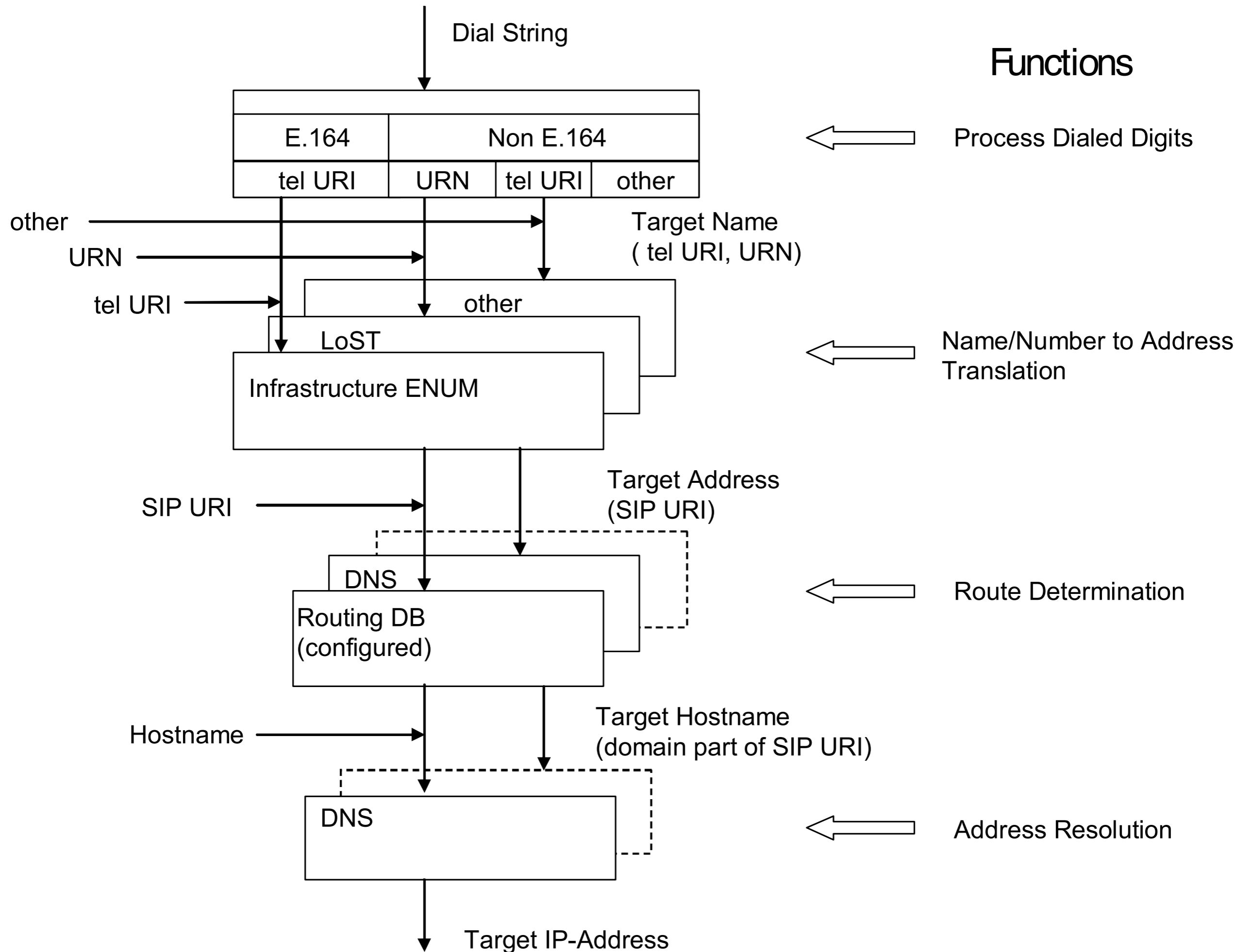- Carrier is authenticated
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Dial String

	E.164	Non E.164		
	tel URI	URN	tel URI	other

⇐ Process Dialed Digits

other

URN

tel URI

Target Name
(tel URI, URN)

other

LoST

Infrastructure ENUM

⇐ Name/Number to Address
Translation

SIP URI

Target Address
(SIP URI)

DNS

Routing DB
(configured)

⇐ Route Determination

Hostname

Target Hostname
(domain part of SIP URI)

DNS

⇐ Address Resolution

Target IP-Address

Functions

Conclusion

- ENUM is **the** technology used for getting information about E.164 numbers

- *Private* and *public* solutions will exist

- Policies will decide what tree to use

Congratulations!

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