

# Telekom Austria Case Study

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## Applications of Carrier ENUM to Voice Services

GSMA Pathfinder Seminar

Wednesday, 18<sup>th</sup> February 2009, 14:00 – 17:00



# Agenda

- Telekom Austria
- Carrier ENUM Trial
- Call Routing Scenarios based on Carrier ENUM
- Conclusions

# Telekom Austria Group is a Strong Player in Eastern- & South Eastern Europe...



# Christmas Promotion for Product Bundles Builds upon Success of Previous Bundles



Until Jan 20, 2009  
for new broadband  
customers

**€ 19,90**

- Product bundles increase customer retention and curb fixed-to-mobile substitution
- Improve price perception, reduce churn rates and increase customer loyalty



Until Jan 20, 2009  
for new broadband  
customers

**€ 24,90**

- Product bundles drive broadband net adds and defend market share against mobile broadband
- Increased share of wallet as already 1/3 of customers use more than one service of Telekom Austria

# Telekom Austria Wholesale

## Voice Solutions

- Stable network – 100% digital transmission via land and submarine cables, as well as satellite transmission system
- Telekom Austria – a renowned, financially stable company
- Competent customer service
- The 3 pillars for "one-stop shopping"
  - Worldwide telephony via direct voice links to 95% of all countries, in close cooperation with established partners
  - Within the global service network Telekom Austria already offers over 600 roaming connections in co-operation with international mobile phone operators using the International Signalling System No. 7 (SS7)
  - Implementation of IPX Services
    - GRX Transport
    - MMS- and SMS Hubbing
    - Participation at GSMA IPX trial projects

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# Carrier ENUM Trial

## Overview

- Participants
  - Telekom Austria
  - Mobilkom Austria
  - Neustar
- Trial systems
  - Carrier ENUM Tier 1+2 Server provided by Telekom Austria
  - SIP Proxy Server provided by Telekom Austria
  - IMS Core provided by Mobilkom Austria
  - GSMA Pathfinder provided by Neustar
- Inter and Intra Operator Test Cases
- Trial schedule

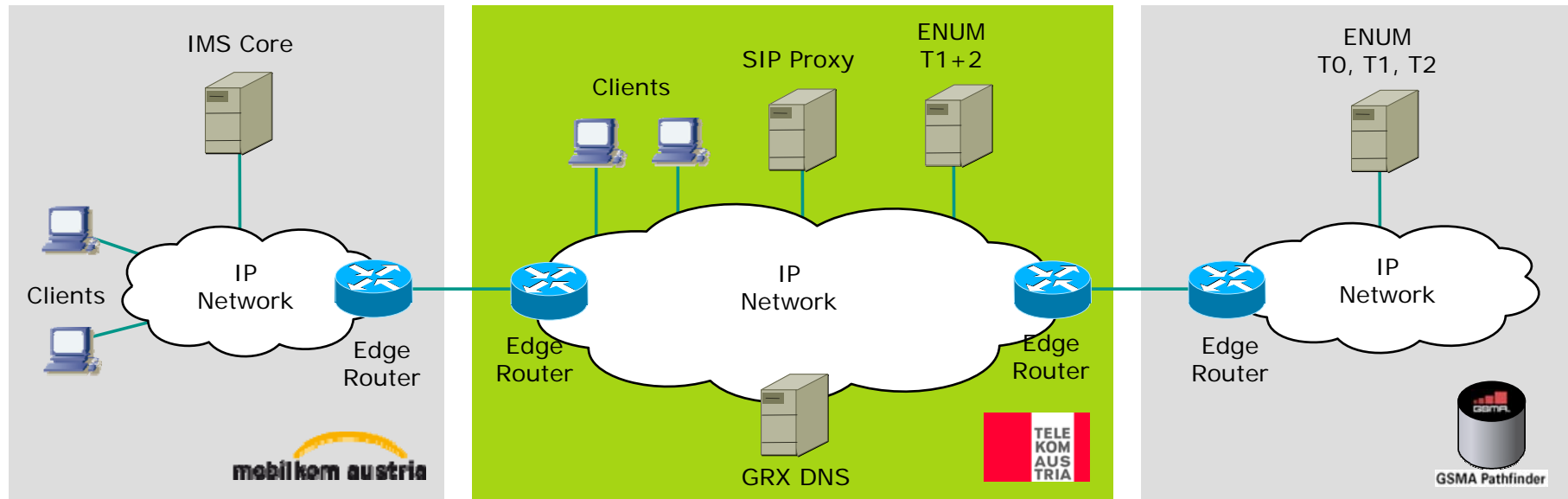


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# Carrier ENUM Trial

## Test Setup & Configuration

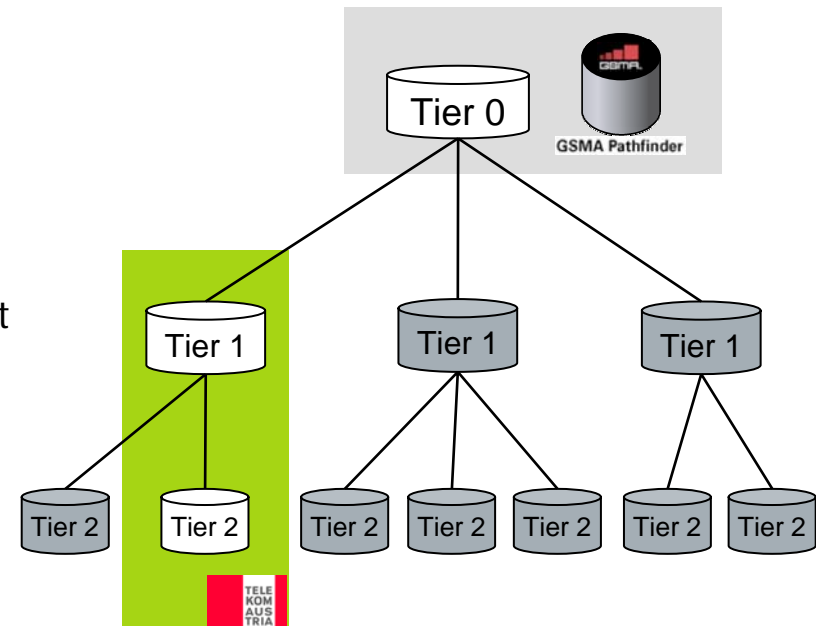


- GRX IP transmission and GRX IP addresses used
- Mobilkom Austria
  - IMS Core (CSCF, HSS, DNS-Server)
  - IMS Core interconnected with GRX domain via Telekom Austria GRX
  - ENUM/DNS-Relation established to Pathfinder via Telekom Austria GRX
  - Two scenarios tested for TN number hosting (Telekom Austria ENUM DB and GSMA Pathfinder)
- Telekom Austria
  - ENUM-enabled SIP Proxy Server used
  - Telekom Austria GRX connected with AMS-IX by means of BGP

# Carrier ENUM Trial

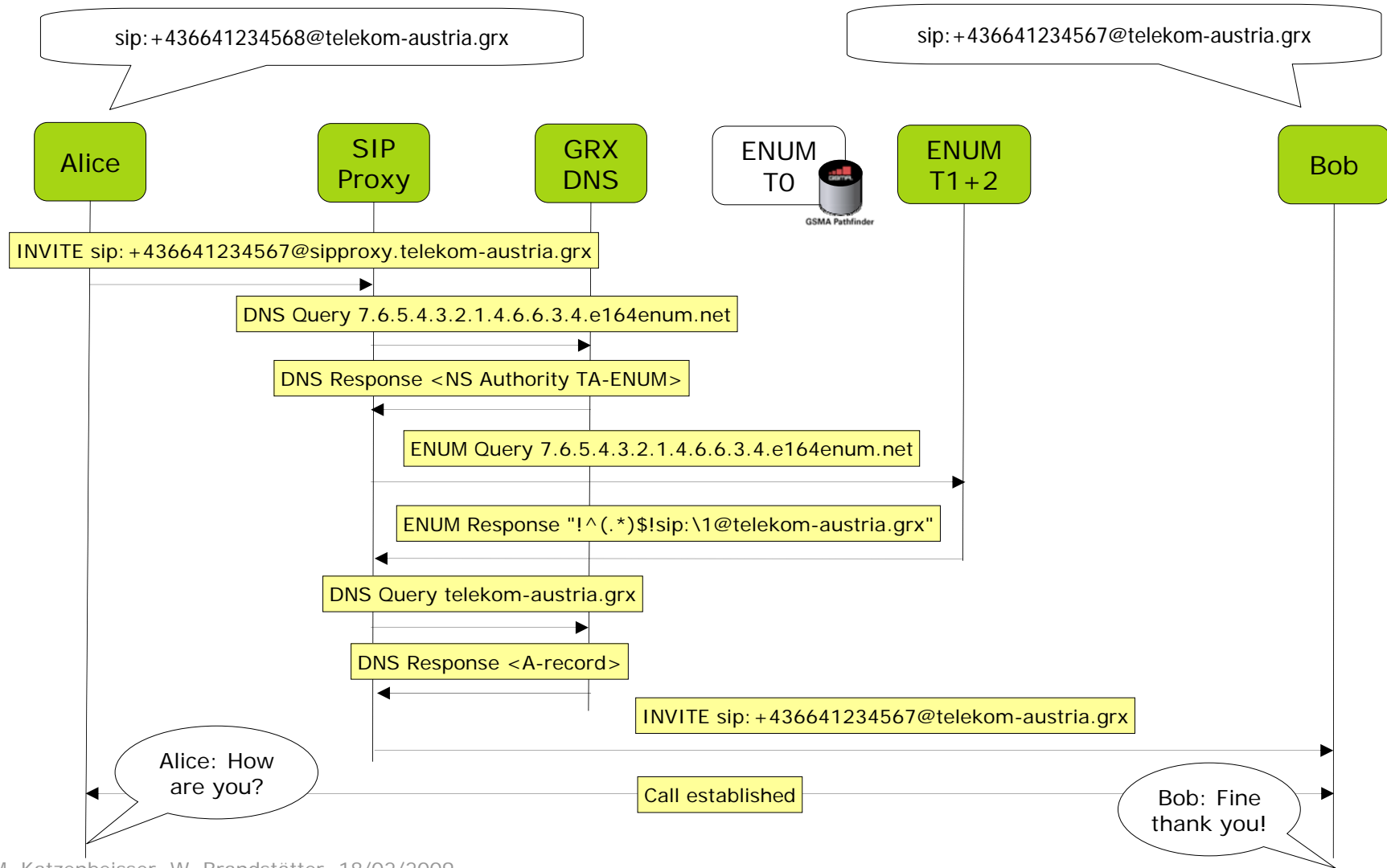
## ENUM Databases

- Carrier ENUM "Single Root" Model
- Managed Service
- Access through GRX/IPX
- GSMA Pathfinder provides for Tier 0
  - Authoritative for TLD e164enum.net
  - Delegation for CC43 Zone to Telekom Austria Tier 1
- Telekom Austria Tier 1 + 2
  - Authoritative for zone 3.4.e164enum.net
  - Hosts TN of Mobilkom Austria domain 4.6.6.3.4.e164enum.net
  - Service Types "E2U+sip" and "E2U+voice:sip"
  - Support of Regular Expressions  
 Regex: "!^(.\*)\$!sip:\1@telekom-austria.grx!"



# Carrier ENUM Trial

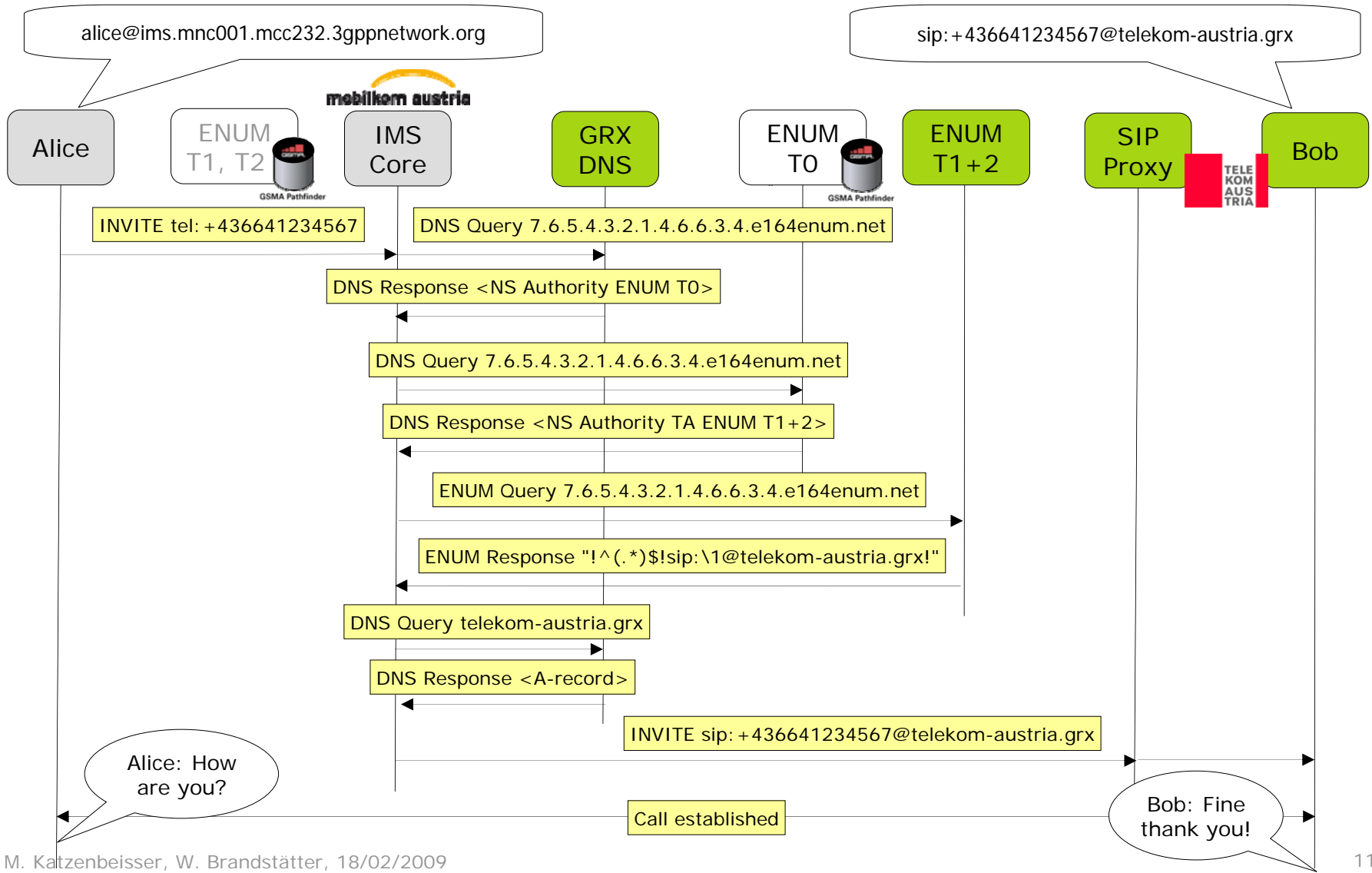
## Intra Operator at Telekom Austria



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# Carrier ENUM Trial

## Inter Operator between Mobilkom Austria and Telekom Austria



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# Carrier ENUM Trial

## Results & Conclusions

- Successfully tested
  - Intra and Inter Operator calls based on Carrier ENUM
  - Queries of Carrier ENUM Tier 0, Tier 1 and Tier 2
  - Zone transfer/delegation from ENUM Tier 0 to Telekom Austria ENUM DB
  - Processing and routing of SIP NAPTR records in Mobilkom Austria and Telekom Austria domain
  - ENUM Zone delegation
  - Iterative mode of operation on ENUM Pathfinder root server
- For further study
  - Queries of external ENUM Tier 1 and Tier 2 (Pathfinder or other Operator)
  - Number portability
  - TDM termination and call routing to TDM voice network including
  - Enum-query-policy enforcement not specified and given today
  - DNS concept for TLD 3gppnetwork.org to be implemented
  - Multiple-SIP-AOR provisioning in ENUM (equal priority and preference) for multiring-functionality
  - Role of Border Nodes and Session Border Controllers in routing scenarios

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# Call Routing Scenarios based on Carrier ENUM

## Numbering scheme

- Numbering scheme in Austria
  - Mobile number blocks assigned to operators (e.g. +43664 -> Mobikom)
  - Mobile number portability solved with direct routing
  - Fixed numbers can be assigned as block or single number to operators and individuals
  - Fixed number portability solved with onward routing
  - No centralised database for ported numbers

- GSMA SIP addressing not defined for fixed networks

Workaround:

Use *<NAME>.telekom-austria.grx*

instead of *.mnc<MNC>.mcc<MCC>.3gppnetwork.org*

See IR.67 for details

# Call Routing Scenarios based on Carrier ENUM

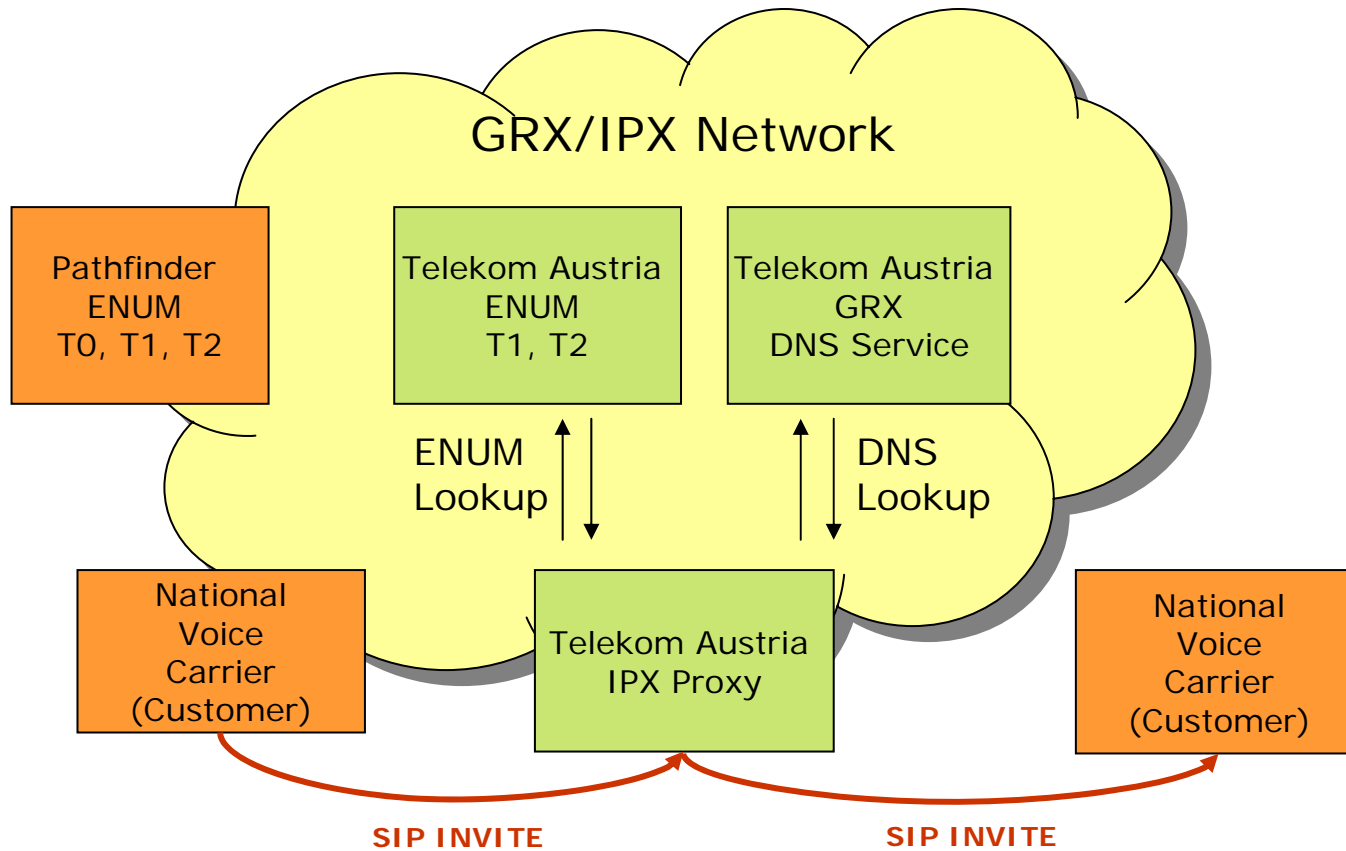
## Onward vs. Direct routing

- Onward routing
  - The call is delivered to the donor network (= the network to which the ported number first belonged). The donor network delivers the call to the destination network.
  - Need: Resolve all assigned number blocks and eventually assigned single numbers
  - Don't need: resolve ported numbers
  - ENUM datafill: all number blocks (and single numbers, if assigned)
- Direct routing
  - The call is delivered directly to the destination network.
  - Need: Resolve all assigned numbers (including blocks and single numbers)
  - ENUM datafill: all assigned numbers
- Routing Strategy for implementing Carrier ENUM
  - Step 1: Onward routing for mobile numbers
  - Step 2: Direct routing for mobile numbers
  - Step 3: Onward routing for fixed numbers
  - Step 4: Direct routing for fixed numbers



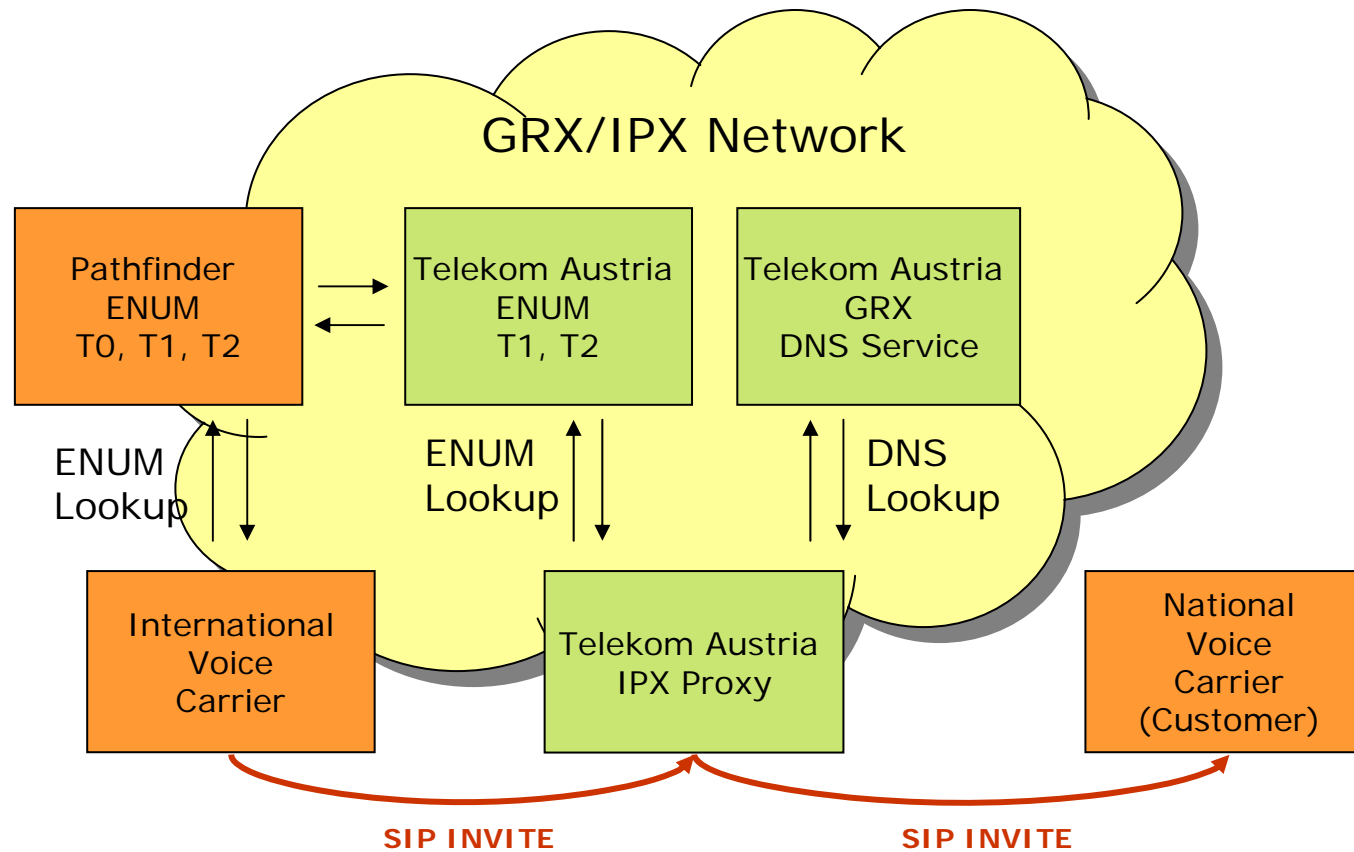
# Call Routing Scenarios based on Carrier ENUM

Example 1: National Telekom Austria Customer → National Telekom Austria Customer



# Call Routing Scenarios based on Carrier ENUM

Example 2: International Carrier → National Telekom Austria Customer



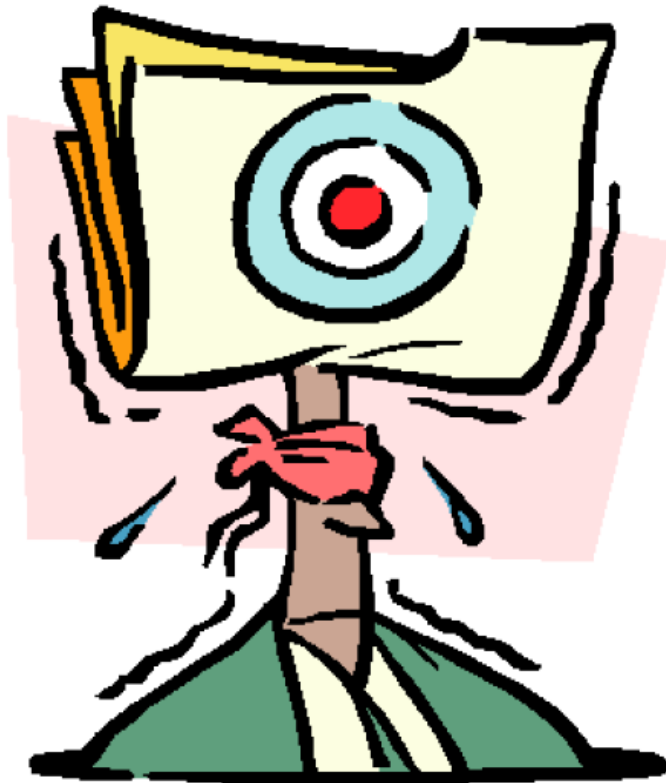
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# Conclusions

- Carrier ENUM Trial successfully proved the deployment for basic voice call scenarios
- Some technology issues to be solved prior to the commercial deployment of Carrier ENUM based IPX services
- Routing schemes based on Carrier ENUM have to be specified for every call scenario
- Open regulatory issue on responsibility for Carrier ENUM TN database (national ENUM Tier 1)
- Direct routing for all fixed and mobile TN (including number portability) as the overall objective
- Carrier ENUM as the key enabler for routing of voice calls in the GRX/IPX domain

## Thanks – Questions & Answers



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