

The at43 broadband IP Communications platform

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IPA/Nic.at



Introduction - nic.at & IPA

- nic.at is the .at ccTLD registry
 - about 30 people, 310.000 domains
- academic, ISP association background
- now subsidiary of the beneficial „Internet Foundation Austria“
- goal
 - foster Internet development in Austria
 - operations of critical infrastructure for I(T)SP's

motivation

- „IP communications“ (VoIP, Chat/IM, Presence, Video, Gaming) reaches maturity – convergence is happening as we speak
 - terminals, soft clients, broadband deployment, codec advances...
 - Metcalfe’s law and the necessity for interworking
 - unified addressing through ENUM
 - ENUM production service start Q2/2004
- time to explore the nitty gritty of it

the at43 project

- prototypical „convergent“ service
 - assumption – besides Mail and Web IP realtime communications will be the „third pillar“ of ISP service
 - speculation: it will be driven by a SIP & ENUM combination
 - „contact is king“
- foster service development
 - start in a creative environment which is willing to trade innovation for some suffering
 - intended as a copy & paste job blueprint for ISP's für IPA
 - for us as likely production ENUM registry – a large scale proving ground for ENUM
- integrate several user communities by integration into a generic service platform (universities, ISP's, engineering schools)
- trial the concept of virtualized SIP/ENUM/PSTN service

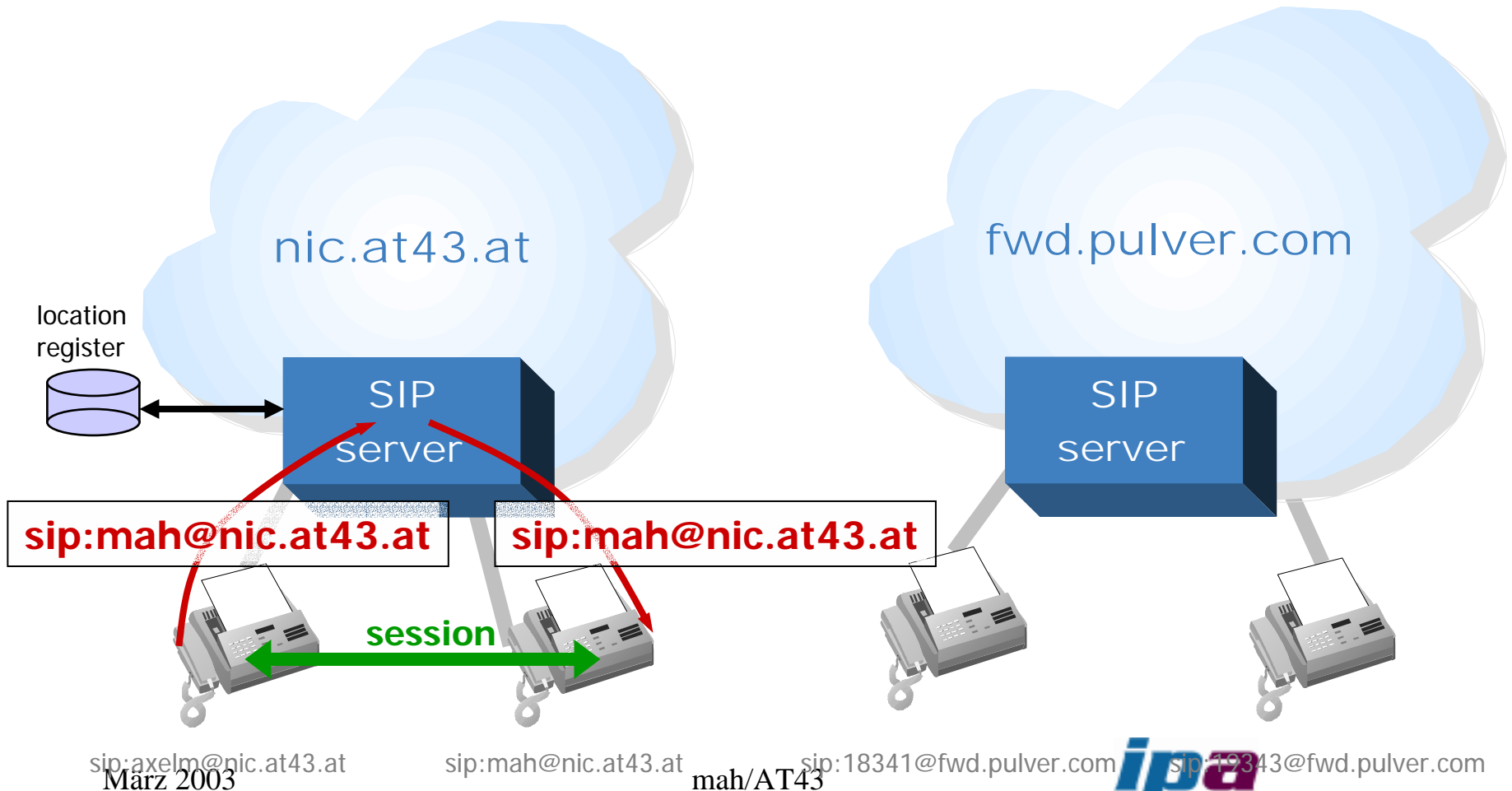
services provided by at43

- a point of contact for „sessions“ (speech, chat, video, gaming..)
 - an URI like sip:j7650719@sip.univie.ac.at
- a telephone number to go with it
- calls are delivered from PSTN->Internet
- Internet->PSTN too – if user has a contract with call-by-call telco (10xx access code)
- presence service for Instant Messaging
- a voice mailbox
- a conference bridge IP & PSTN homed

recap: what is SIP (Session Initiation Protocol) ?

- how do I address „mobile“ Internet-endpoints?
 - natural form is the URI
 - <mailto:mah@eunet.at>
 - sip:j7650719@sip.univie.ac.at
 - unfortunately the client IP-address varies with location and time
- solution chosen like e-mail:
 - fixed contact point provided by server
 - client reports to server periodically
 - server records „client coordinates“
 - *server can contact client when a session setup „comes in“*
 - *protocol flow pretty much like in cellular networks*

sessions within a SIP domain



Marz 2003
sip:axelm@nic.at43.at

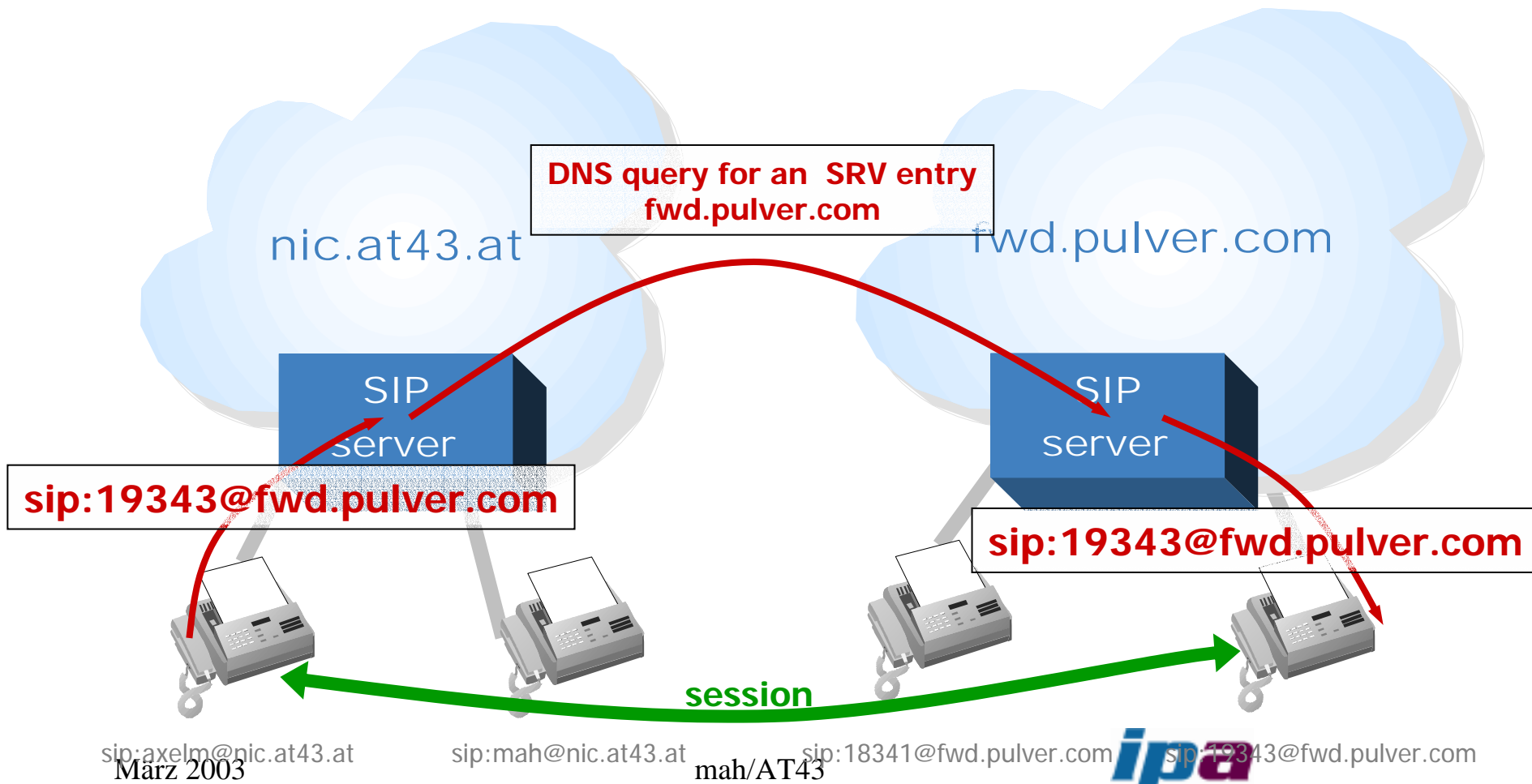
sip:mah@nic.at43.at

mah/AT43

sip:18341@fwd.pulver.com

sip:19343@fwd.pulver.com

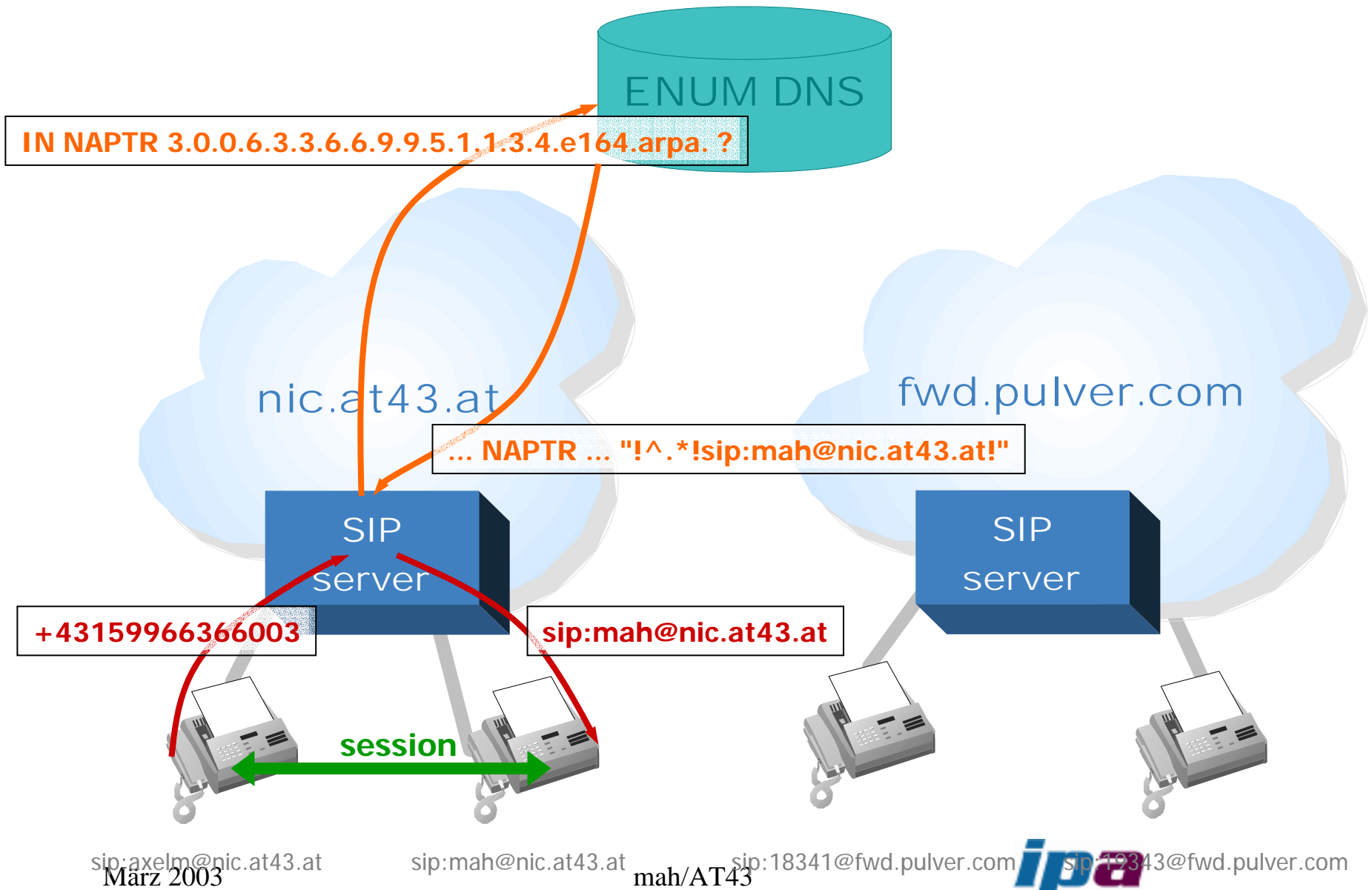
... and across domains



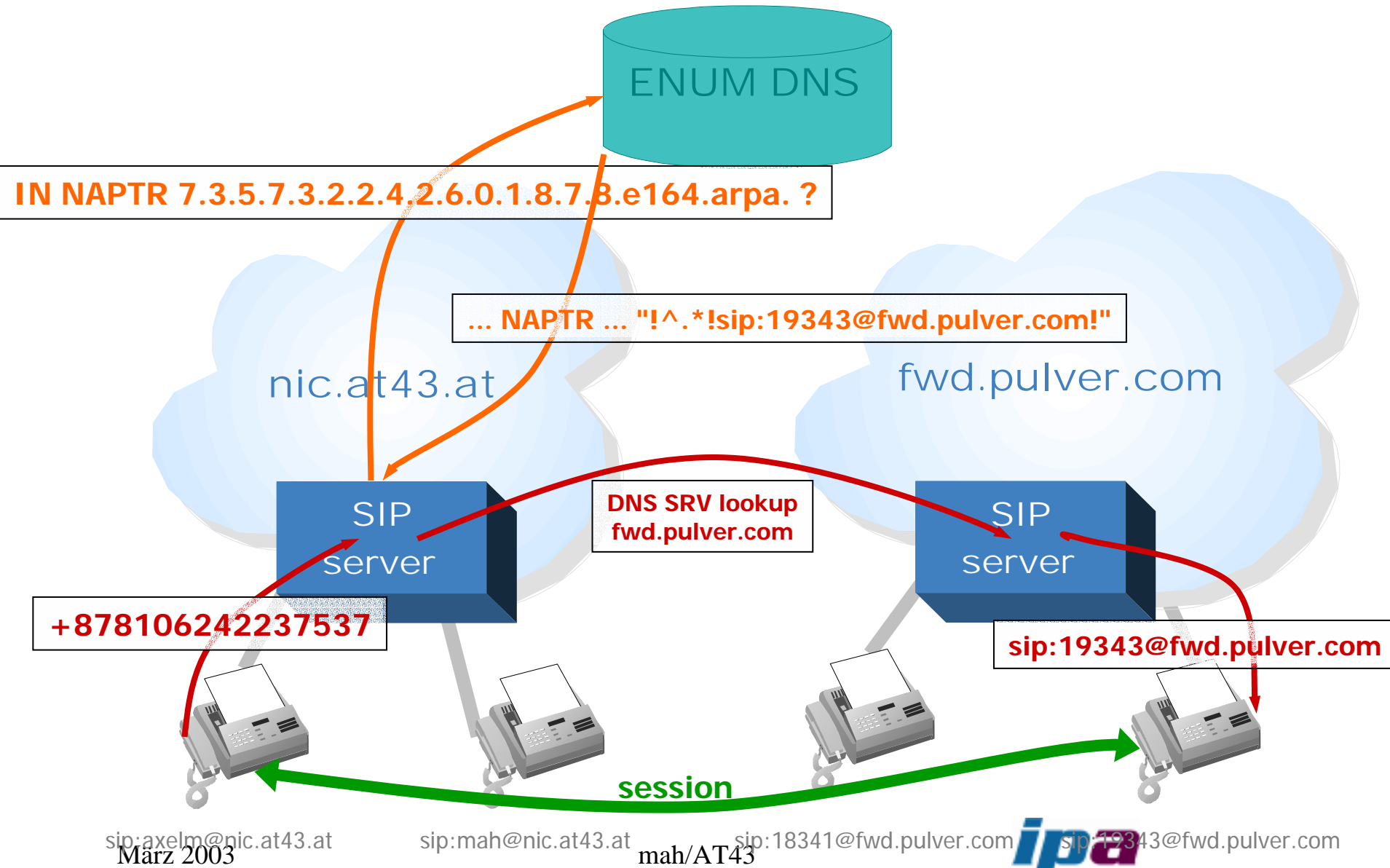
so what is ENUM?

- how do I dial an URI when all I have is a rotary dial?
 - mapping phone number -> URI
 - domains map names to IP addresses
 - ENUM maps telephone numbers to URI
 - using the very same DNS
- an ENUM entry might be:
- +43 664 4213465 -> sip:mah@nic.at43.at

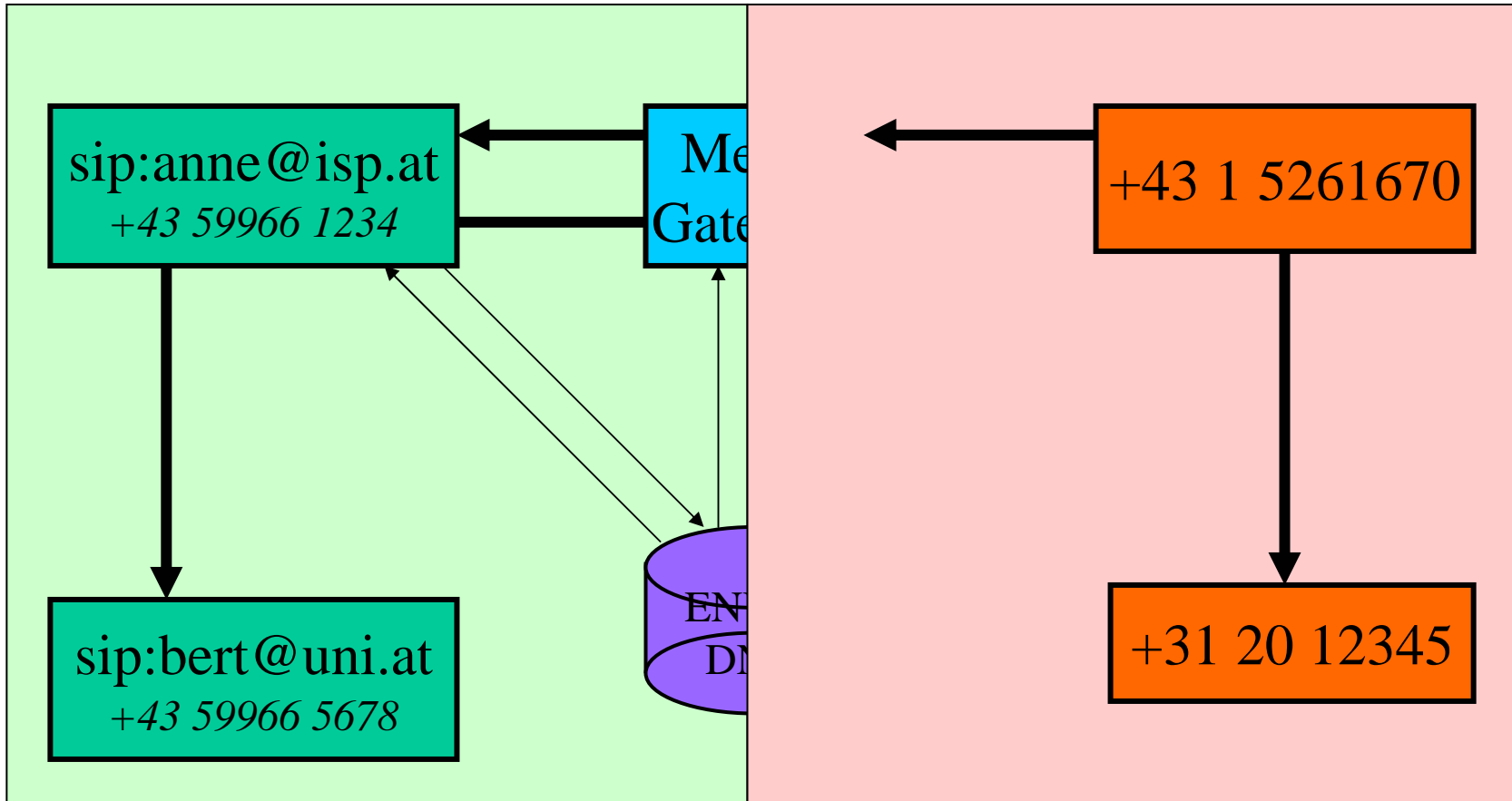
E.164 addressing with ENUM



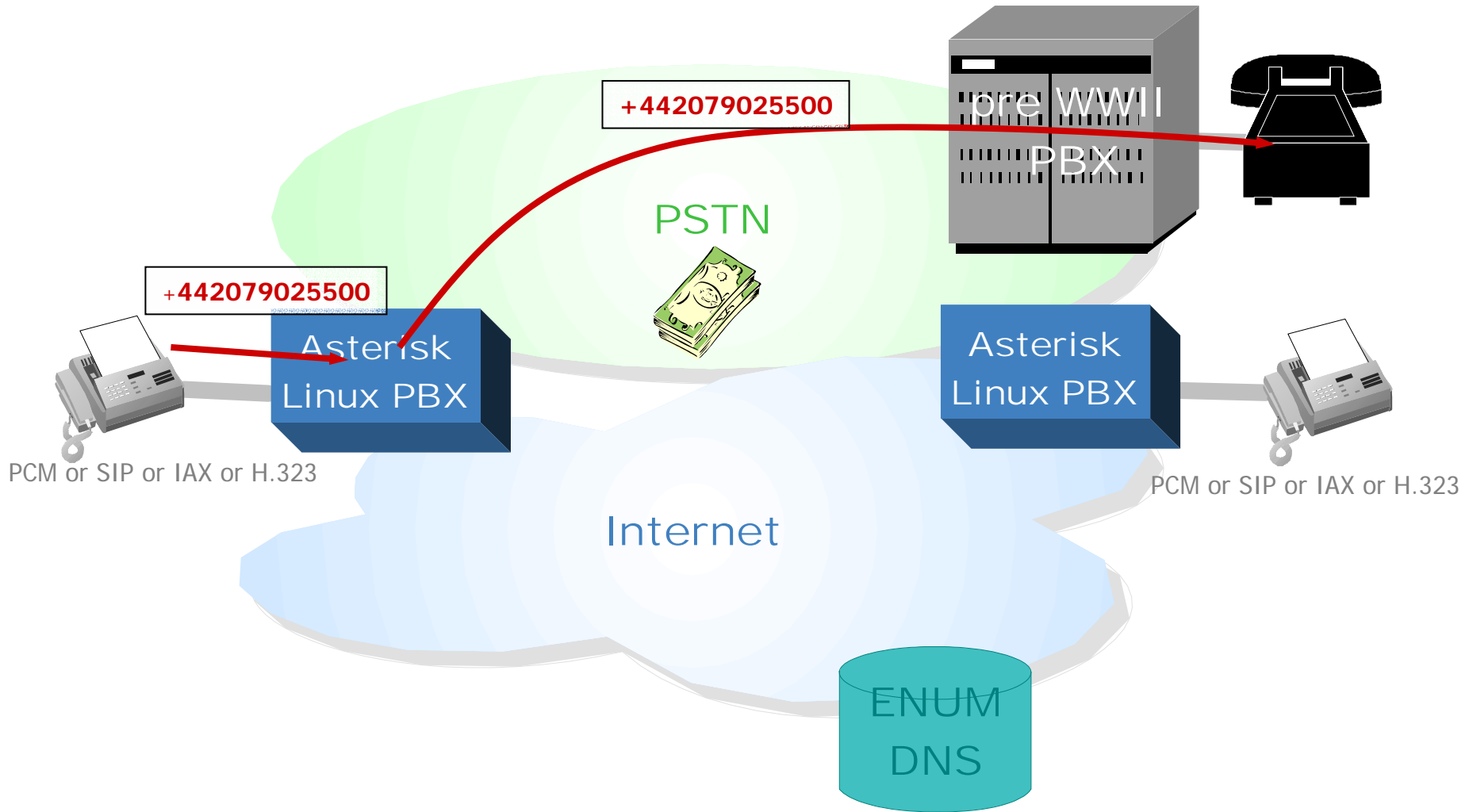
with ENUM across domain boundaries



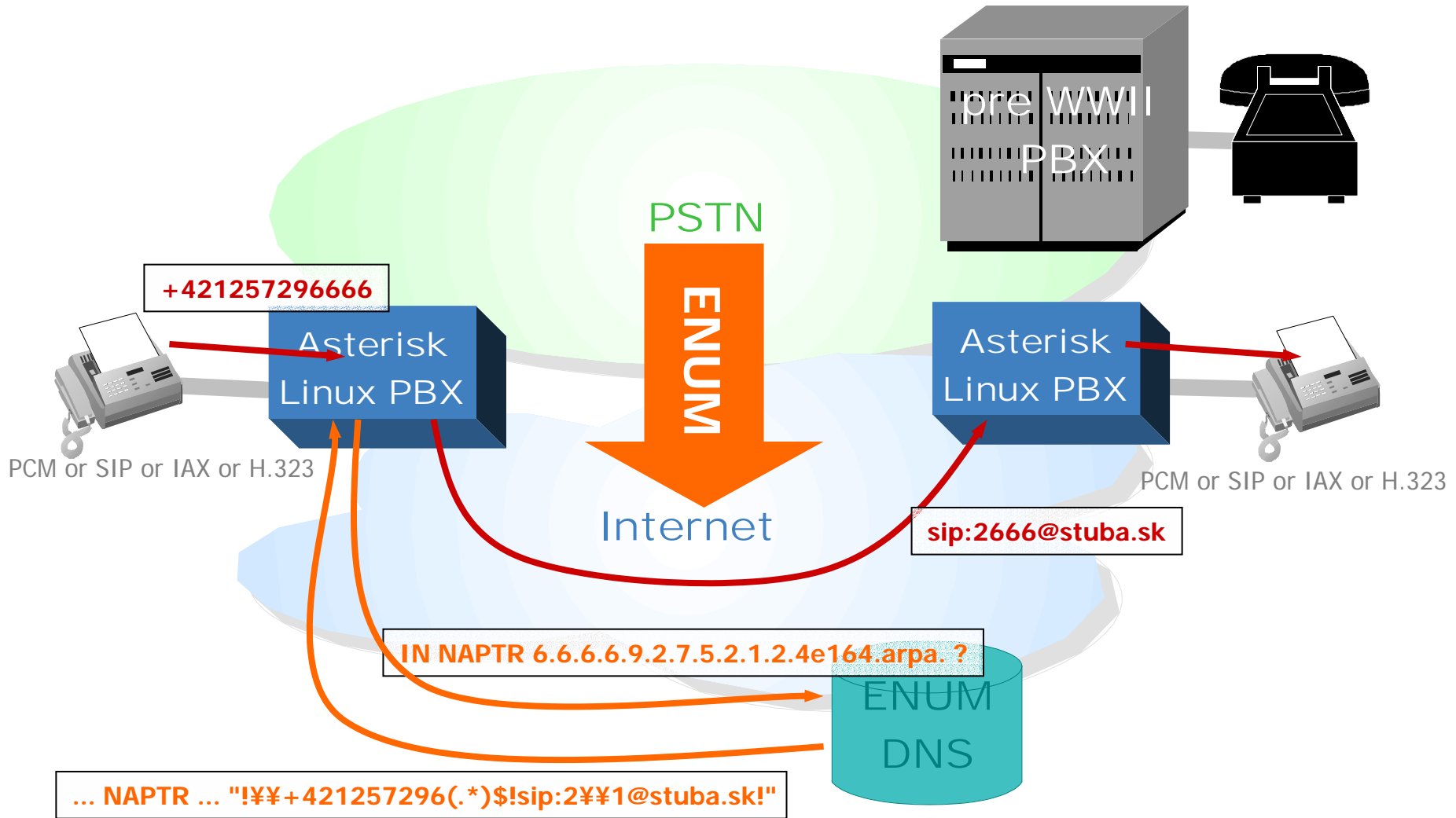
Internet & PSTN: the bridge



calls between PBXes



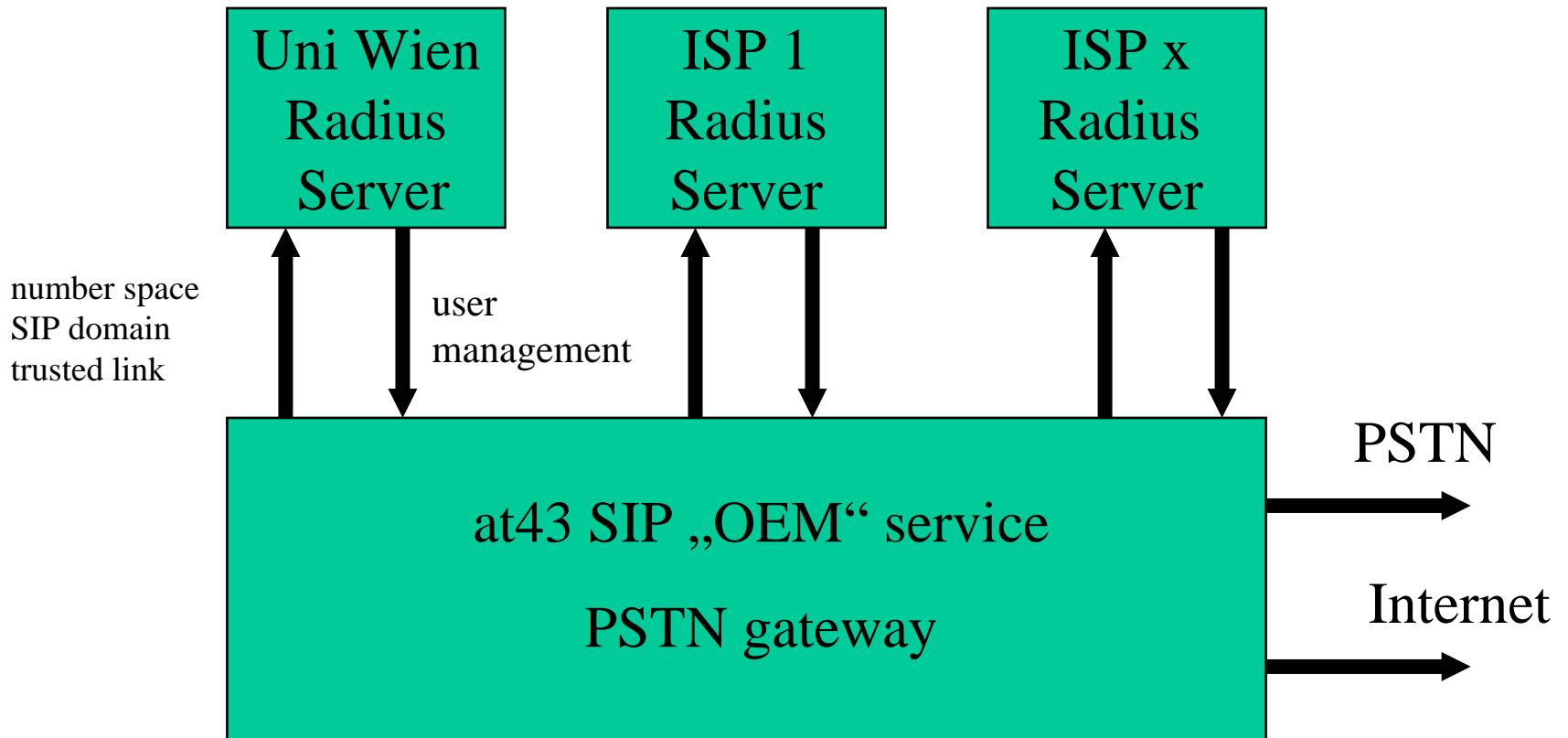
PBX2PBX least cost routing mit ENUM



at43 plan

- nic.at operates service for 2-3 years together with University of Vienna
- integrate new user groups
- if a success, finish the project
 - then the I(T)SP's will do it
- if a flop, finish the project
 - then we know how not to do it..

at43 hosting structure





März 2003

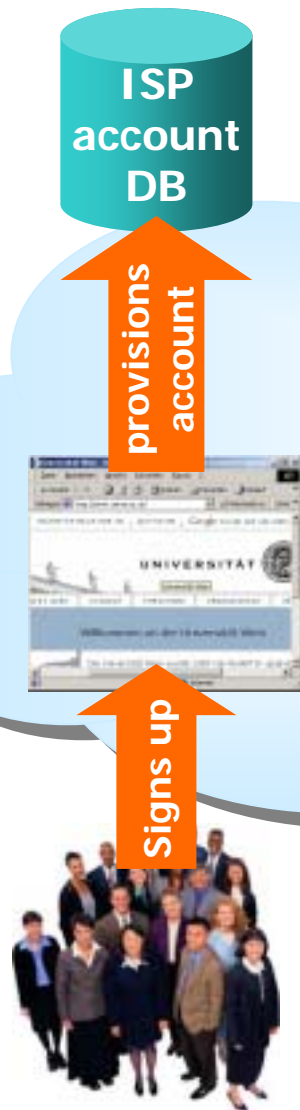
mah/AT43



at43 plug&phone - the ISP Interface

- external Radius-Server at ISP
- number space „loaned“ to ISP by at43
- SIP-domain, user management all by the ISP
- Radius reply attributes:
 - telephone number
 - SIP aliases-Aliases
 - Call-by-Call Access code (10xx)
- see <http://samuel.ops.at43.at/at43/> (sorry german, but you get the gist)
- installation time < 4h
- intent is to make learning curve cheap for ISP's

AT43 – signing up with an ISP



- Existing or new ISP subscribers sign up to AT43 services via ISP portal
- ISP assigns phone number, SIP aliases and Call-by-Call access code
- ISP modifies/adds AT43/SIP related parameters to existing subscriber DB
- Subscriber receives config information (and client software)

AT43 – first time login (part1)



- Users configure AT43 account in addition to existing ISP services
- SIP client logs on to AT43 SIP server
- ISP RADIUS server validates user credentials via AT43 RADIUS proxy
- ISP RADIUS server hands over phone number, Call-by-Call access code and alias information in response

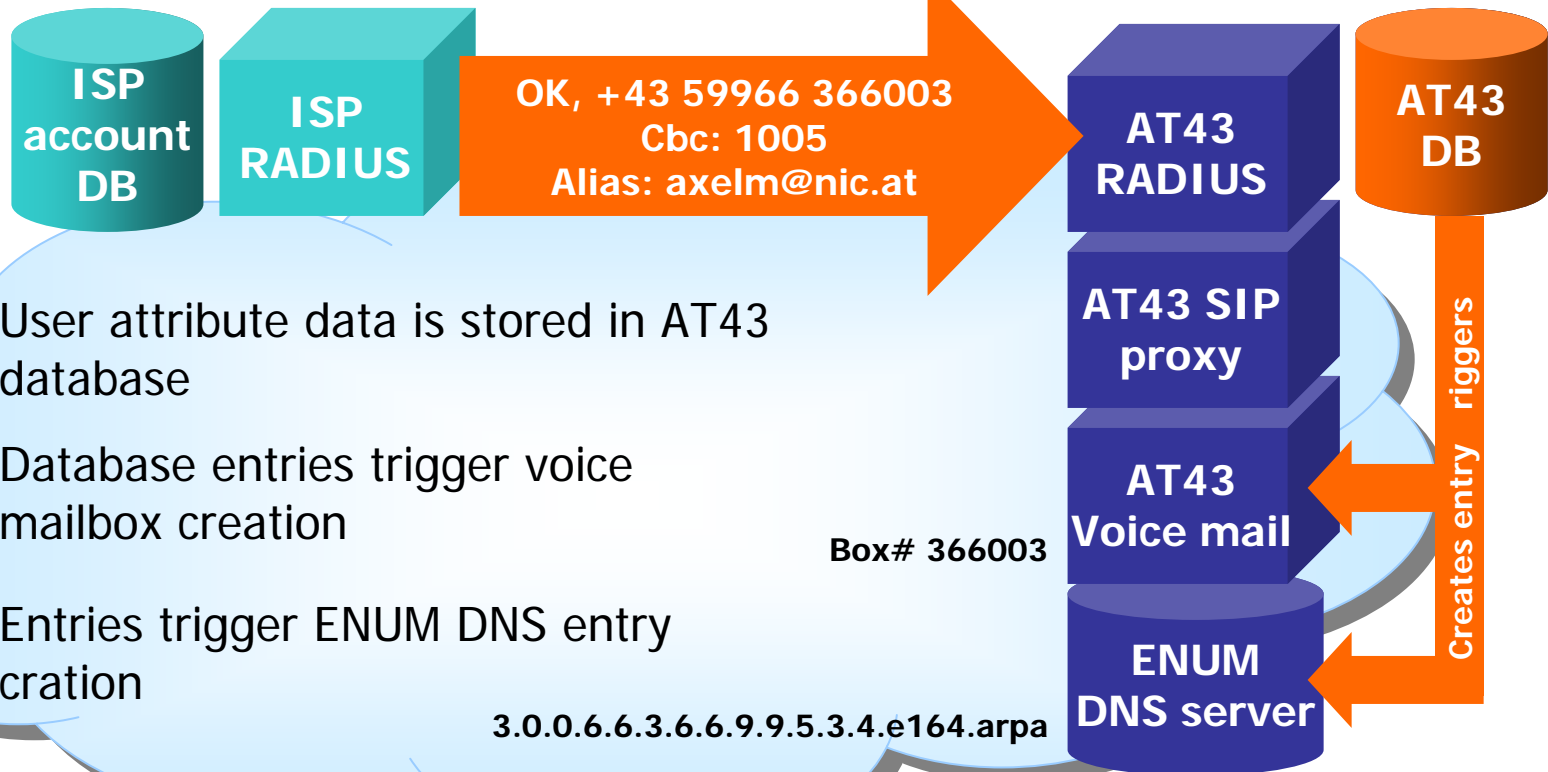


mah/AT43



AT43 – first time login (part2)

+43 59966 366003
Cbc: 1005
Alias: axelm@nic.at



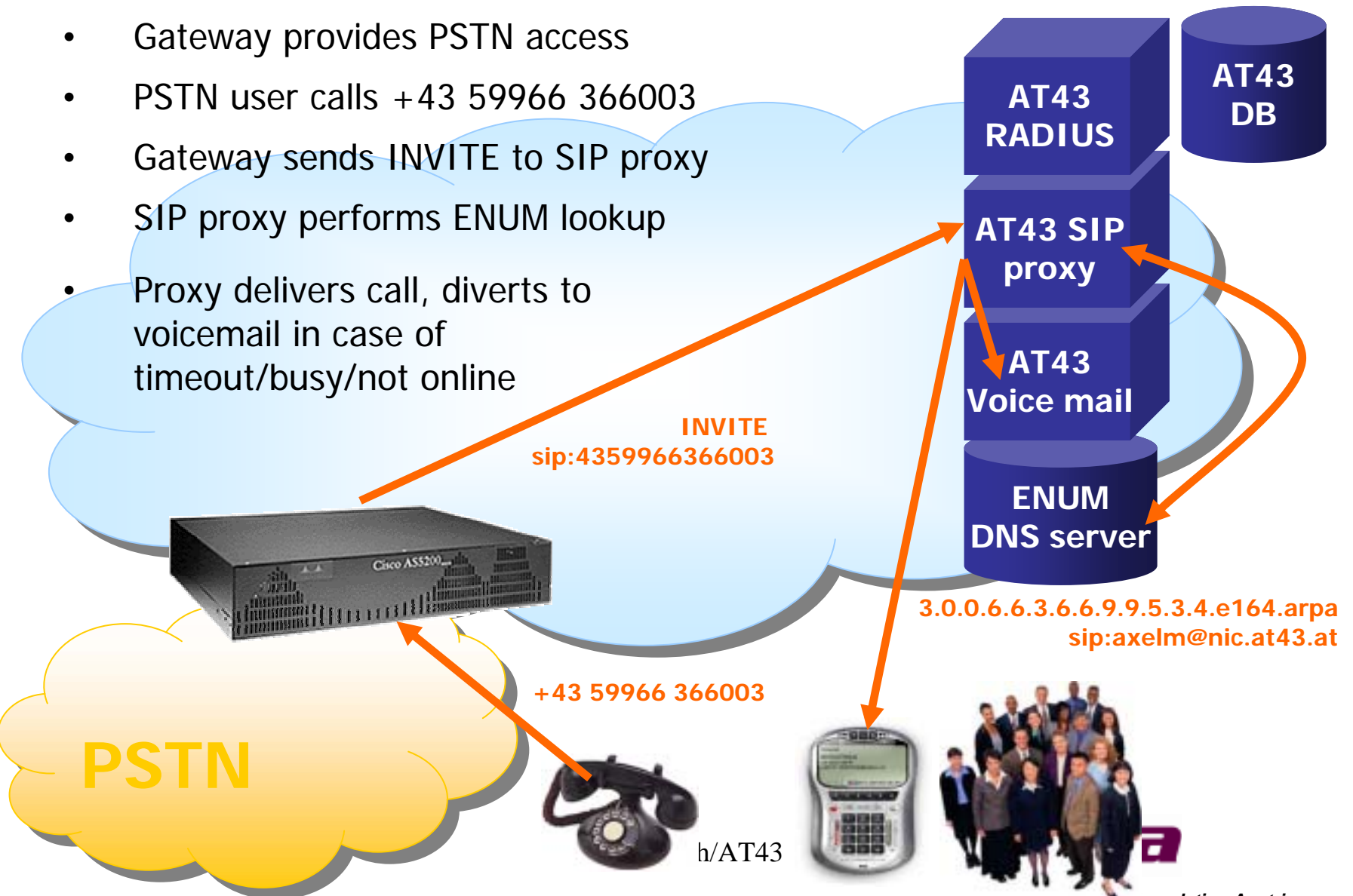
Subscriber is now fully provisioned



AT43 – inbound PSTN call

+43 59966 366003
Cbc: 1005
Alias: axelm@nic.at

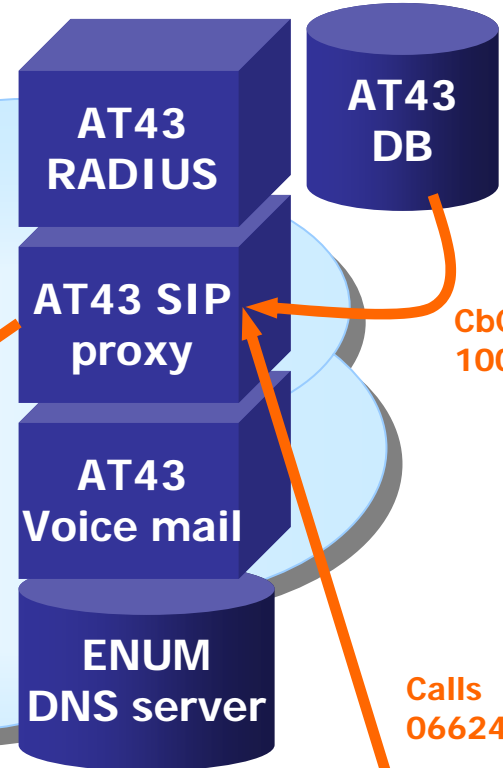
- Gateway provides PSTN access
- PSTN user calls +43 59966 366003
- Gateway sends INVITE to SIP proxy
- SIP proxy performs ENUM lookup
- Proxy delivers call, diverts to voicemail in case of timeout/busy/not online



AT43 – outbound PSTN call

+43 59966 366003
 Cbc: 1005
 Alice@nic.at

- User subscribes to Call by Call provider using assigned number
- User communicates Call by Call prefix to ISP
- User places call, is authenticated, Called Station Number is prefixed with Call by Call operator code **if no ENUM entry exists**
- CbC operator identifies user by Calling Station ID
- Call is routed **AND** accounted through Call by Call operator
- No accounting between at43 and user



INVITE
 1005066246690

Cbc
 1005

Calls
 066246690

PSTN (Call by
 Call operator
 1005)

Calling Station ID:
 +43 1 59966 366003



066246690

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+43 59966 366003

development direction

- client authentication with SIM cards
 - a single token für WLAN, SIP access
 - develop key open source components:
 - EAP-SIM, EAP-AKA supplicant, Radius support
 - HTTP/AKA SIP authentication (RFC3310)
 - HTTP/SIM – draft
- SMS gatewaying (accounting?)
- integration with WLAN roaming

plan and time axis

- University of Vienna – release 12/2002
 - manage support learning curve
 - manage terminal availability
- ISP workshop
 - at43 p&p introduction
 - voice peering – policy draft
- integrate other ISP's – first half year 2004
- engineering schools – Q3/Q4 2004

links

- FreeWorld Dialup Service – www.fwdnet.org
- SIP Express router – www.iptel.org
- Jasomi NAT Helper – www.jasominetworks.com
- Xten SIP clients – www.xten.com
- Asterisk ENUM-enabled IP/TDM PBX for Linux – www.asterisk.org
- Austrian ENUM Trial website – enum.nic.at
- shortly – www.at43.at
- enum.nic.at documents – at43 paper, slides