OpenSER IMS

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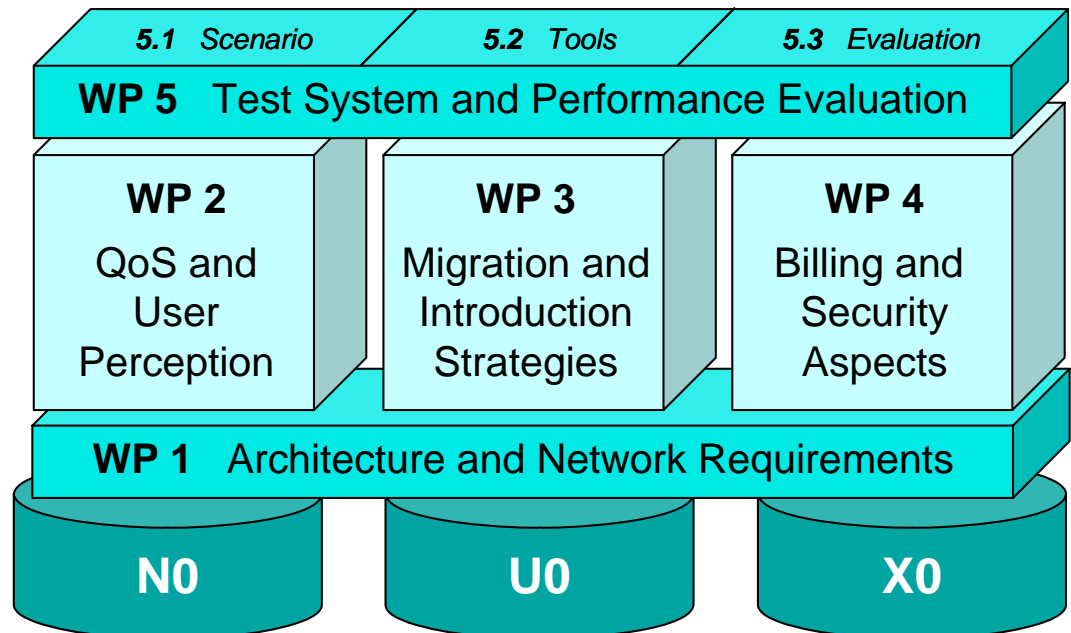Vienna University of Technology

Agenda

- IMS-related projects at ftw.
- CAMPARI IMS Testbed Architecture
- Services and Enablers
- IMS and XoIP Perspectives
- Conclusion

Telecommunications Research Center Vienna (ftw.)

- **CAMPARI**
  - Configuration, Architecture, Migration, Performance Analysis and Requirements of 3G IMS
- Project description: application-oriented project
- Duration: 2004/10 - 2006/08
- Project volume: 100 pm
- Participants:
  - ftw.
  - Alcatel Austria
  - Kapsch CarrierCom
  - mobilkom austria
  - TU Wien (IBK)

5.1 Scenario	5.2 Tools	5.3 Evaluation
WP 5 Test System and Performance Evaluation		
WP 2 QoS and User Perception	**WP 3** Migration and Introduction Strategies	**WP 4** Billing and Security Aspects
WP 1 Architecture and Network Requirements		
N0	**U0**	**X0**

IMS-related Projects at FTW

- SIMS
  - **„Services in IMS"**
  - Duration: 2005/01 - 2006/09
  - Participants
    - ftw, mobilkom austria, Kapsch CarrierCom, Alcatel Austria, TU Wien
  - Project volume: 57 pm
  - Focus: IMS Service Architecture

- CAIPIRINA
  - **„Converging towards All-IP:
    IMS Realization Issues for NGN Applications"**
  - Duration: 2006/10 – 2008/03
  - Participants
    - ftw, mobilkom austria, Kapsch CarrierCom, Alcatel Austria, TU Wien
 - Project volume: 96 pm

- http://www.ftw.at/ftw/research/projects

IMS: IP Multimedia Subsystem

- **Standardised by 3rd Generation Partnership Project (http://www.3gpp.org/)**
  - First IMS-Release Rel5
  - Rel6, Rel7, Rel8
- **All-IP overlay network architecture**
  - Covers access, core
  - Access-independent
  - Reuses IETF-standardised protocols for signaling and media
    - SIP, Diameter, RTP,...
  - Promises end-to-end QoS
- **Signaling Components**
  - CSCF: Call-Session Control Function
  - SIP proxies implementing specific IETF SIP extensions

CAMPARI IMS Testbed Requirements

- Focus on „Minimal optimal" IMS testbed
  - „Small is beautiful". How much IMS do we need?
  - Implementation robustness of minor importance
- Requirements
  - Script-configurable
  - Extendable, scaleable
  - Implemented parts should be standard-compliant
- Target: Emulate different IMS scenarios
  - Visited vs. Home GGSN scenario
  - IPv4 and/vs IPv6, TCP vs. UDP vs. SCTP vs. DCCP
  - Charging Interfaces
  - QoS
  - Deploy Services

CAMPARI IMS Testbed
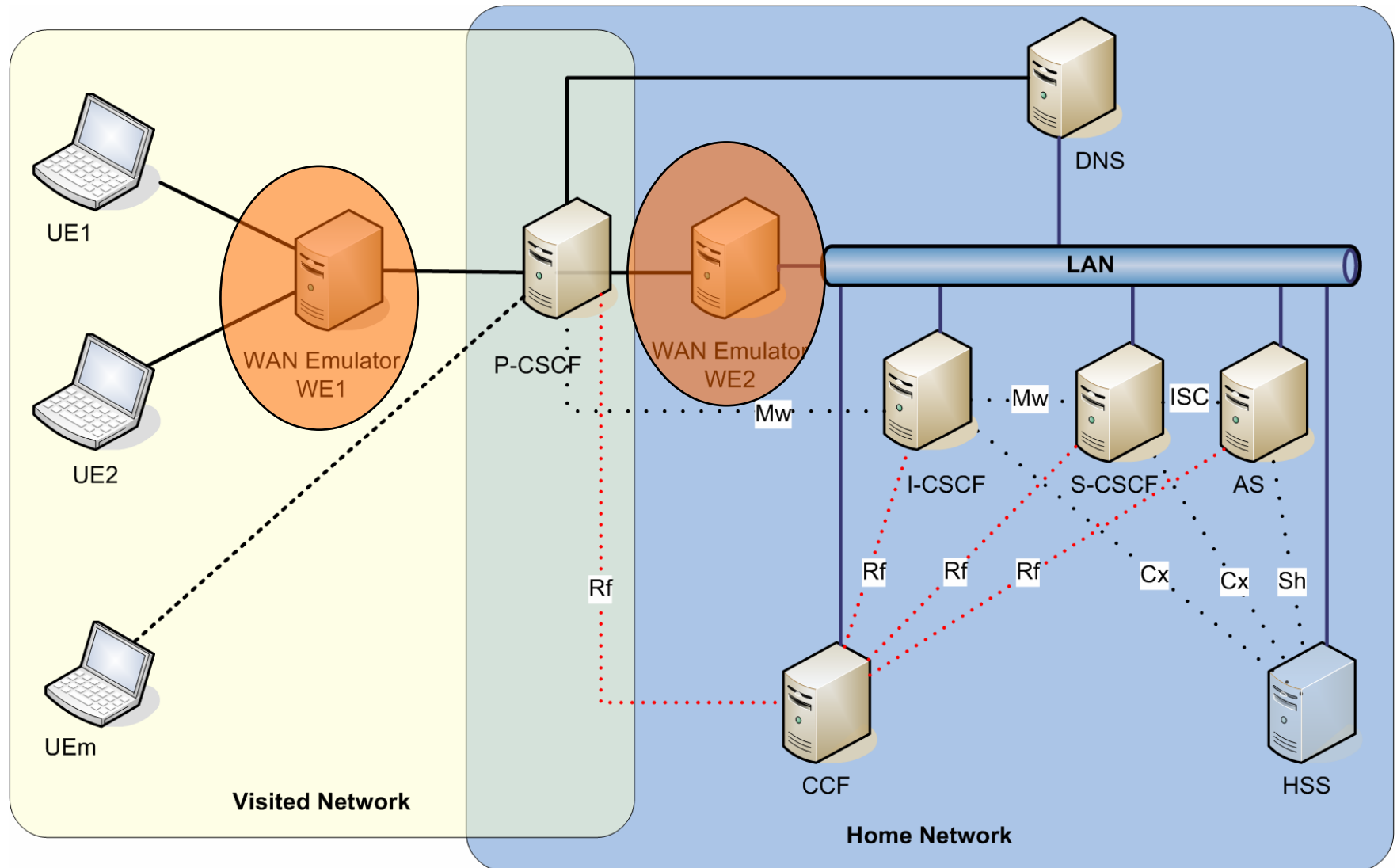
IMS Testbed: Time Synchronisation
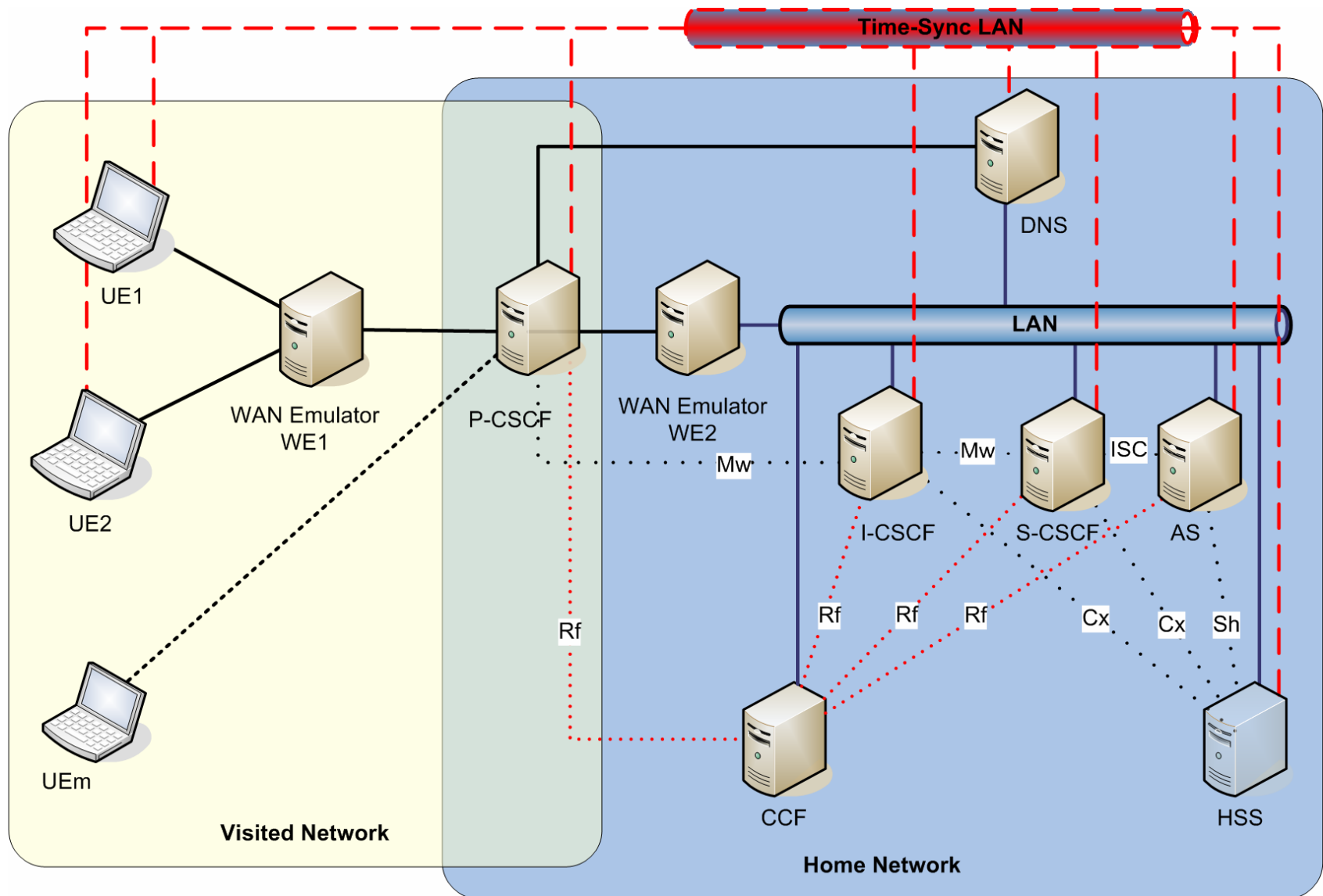
IMS Testbed Features

- **No new modules**
  - All OpenSER extensions implemented based on AVPs
- **SIP extensions**
  - 3GPP Headers (RFC 3455), Path (RFC 3327), Service Route (RFC 3608),
- **IFCs**
  - Currently very basic, MySQL-based
- **Offline Charging**
  - Java application implements Rf interface
  - OpenSER Diameter module
- **„IMS in a Bottle"**
  - Feasibility Study: Complete Originating and Terminating IMS network running on one single PC (VMware)

IMS Testbed Details

- **IMS Traffic Generator**
  - SIPp enhanced with Pre- and Post-Scenarios
  - Can be used for IMS and for plain SIP
- **Time Synchronisation**
  - All IMS Nodes equipped with additional Ethernet interface for relative time synchronisation (50μs accuracy)
    - Dedicated time synchronisation LAN
    - Used exclusively for time synchronisation traffic
  - Bypasses WAN Emulators
  - OpenSER log module implementation changed for microsecond precision, syslog facility
  - Enables offline-correlation of IMS node-local log files
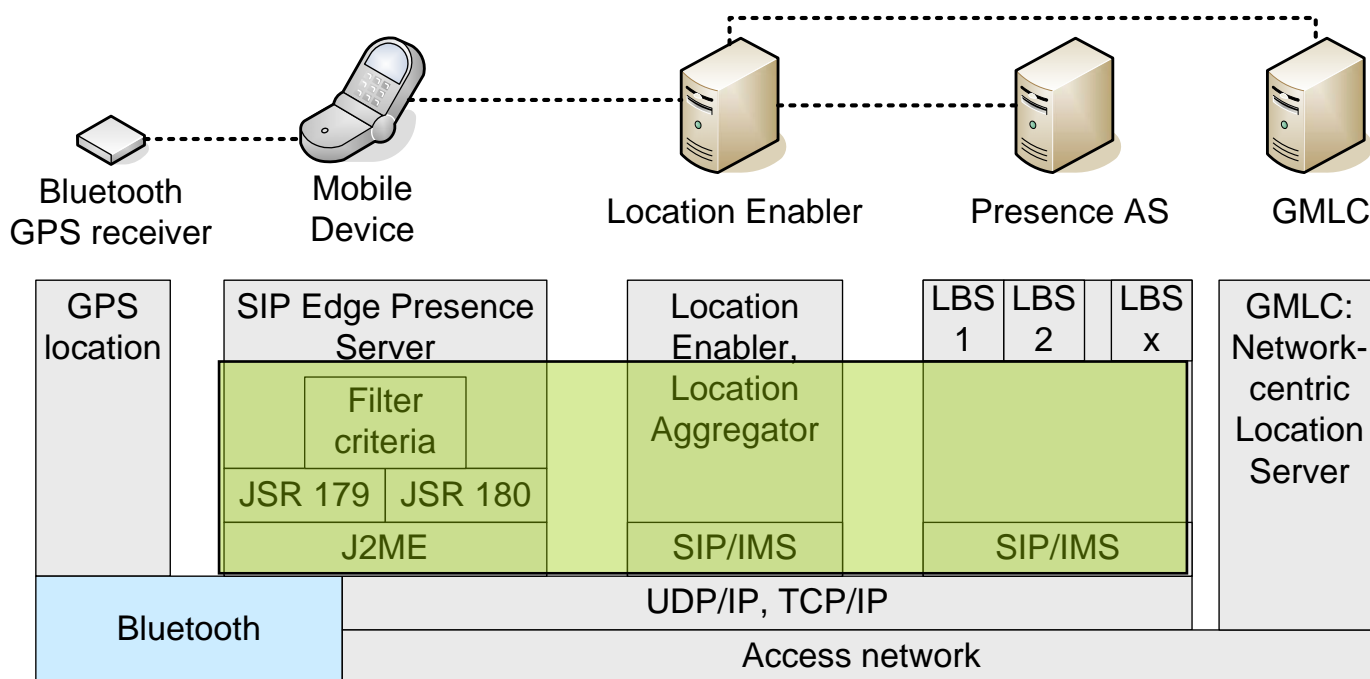- **KPhone extensions**
  - SIM-based authentication

Content

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Service Enabler

- Enabler: Generic Service, Middleware
  - To be used by other **services**
  - Horizontal service architecture
  - 3GPP examples: Presence, PTT, IM

- Client-Centric IMS Location Enabler
  - Reason: network-centric location mechanisms not sufficiently accurate
  - „**Terminal knows best where it is located**".
    - Accuracy depends on location mechanism implemented within mobile device (e.g. Bluetooth+GPS, WLAN+DHCP).
  - „**Location is just another kind of presence**".
    - „I am in my office" or
    - „Position is <N 48°12'27,3"; E 16°22'30,3", Radius:15m>

Client-Centric Location Enabler

- Accurate and cost-effective location mechanism
- Fully functional protype
  - Symbian S60 3rd ed. Mobile, BEA WebLogic, Google Maps
- Specified for, but not restricted to IMS
- Ongoing standardisation work
  - IETF Draft, 3GPP proposal

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Factors that drive Telecom development

- Four factors for Telecom Technology success
  - **Simplicity** (user friendliness):
    - Will technology ever become more user-friendly than telecom in 1900?
    - Think about Mobile Phone SIP client configuration...
    - IMS can help, even multiple identities stored on ISIM
    - VoIP operators should take Skype as an example
  - **Mobility**: Enabled GSM success
  - **Cost**: Is currently driving XoIP development
  - **Service Integration**: Do we have any services that force users to decide in favour of XoIP and/or IMS?
- Customer
  - Mobility & service quality at reasonable cost.
  - Underlying networking infrastructure does **not** matter.
  - Technical QoS vs. QoE (Quality of Experience)
    - Mapping between these two metrics far from trivial
    - What if agreed QoS can not guarantee user-expected QoE?

All-IP and Horizontal Service Architecture

- Traditional telephony
  - Bundle: Service (Voice) and Access Network (Wiring)
- IP enables separation of Services and Access
  - Voice becomes just one service among others
  - IP Access is easily interchangeable (Bit-Pipe-Providers)
  - Services are the key to differentiation
- **But**: All-IP does **NOT** mandatorily enforce a horizontal service architecture
  - VoIP mobility requires standardised mechanisms for technology-independent L2-handover (IEEE 802.21)
  - Enablers („meta-services") must implement generic, standardised interfaces, accessible by other services.
  - Are free XoIP standards too open?
  - Many problems show up only during **INTEGRATION**

IMS Perspectives

- Community view: IMS threatens plain (IETF) XoIP
  - „Bloated", „too complex", „enforces centralised operator control", etc.
- Operator view
  - 3G licensed wireless frequency spectrum is expensive
  - Maintaining CS and PS network in parallel expensive, too
- Neutral view on customer experience: mobility
  - Mobile operators can create Mobile XoIP infrastructure
    - Real-time IP traffic mobility requires L1/L2 interaction
    - Who else can implement and finance infrastructure?
    - OR: Do customers accept a „downgrade" from mobile CS voice to PS no(madic) mobility? Why should they? Cost?
  - Unlikely that „bitpipe-providers" (both, fixed and mobile) will disappear from the market
  - If IMS providers can offer better quality at lower cost than free VoIP – why not accept the offer?

Conclusion: XoIP and IMS Perspectives

- IMS and „free" XoIP target different audience
  - Both technologies share main signaling part: SIP
  - Advances of one may support the other (mobility)
  - Most likely scenario: co-existence
- GSM development and evolution
  - Remember GSM „mobiles" 20 years ago?
    - Size, weight, battery lifetime, coverage
  - Customers were ready to accept low(er) voice quality in change of mobility
  - What can XoIP and IMS offer more than mobile CS technology?
- The future will show whether
  - We find services that make users switch to XoIP
  - **Service integration** can cause a technology change

Thank you

- Contact:

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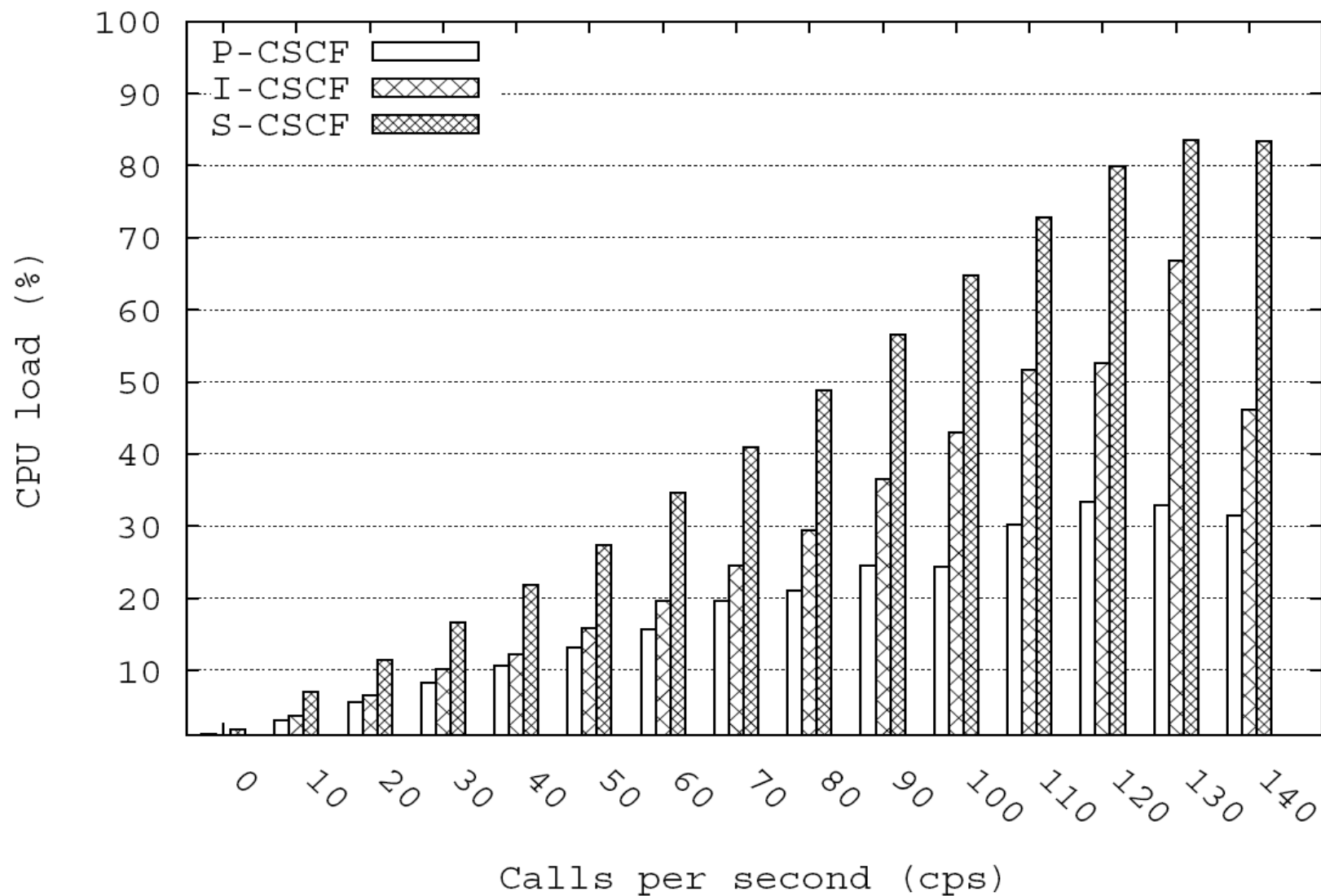fax: +43-1-58801-38898
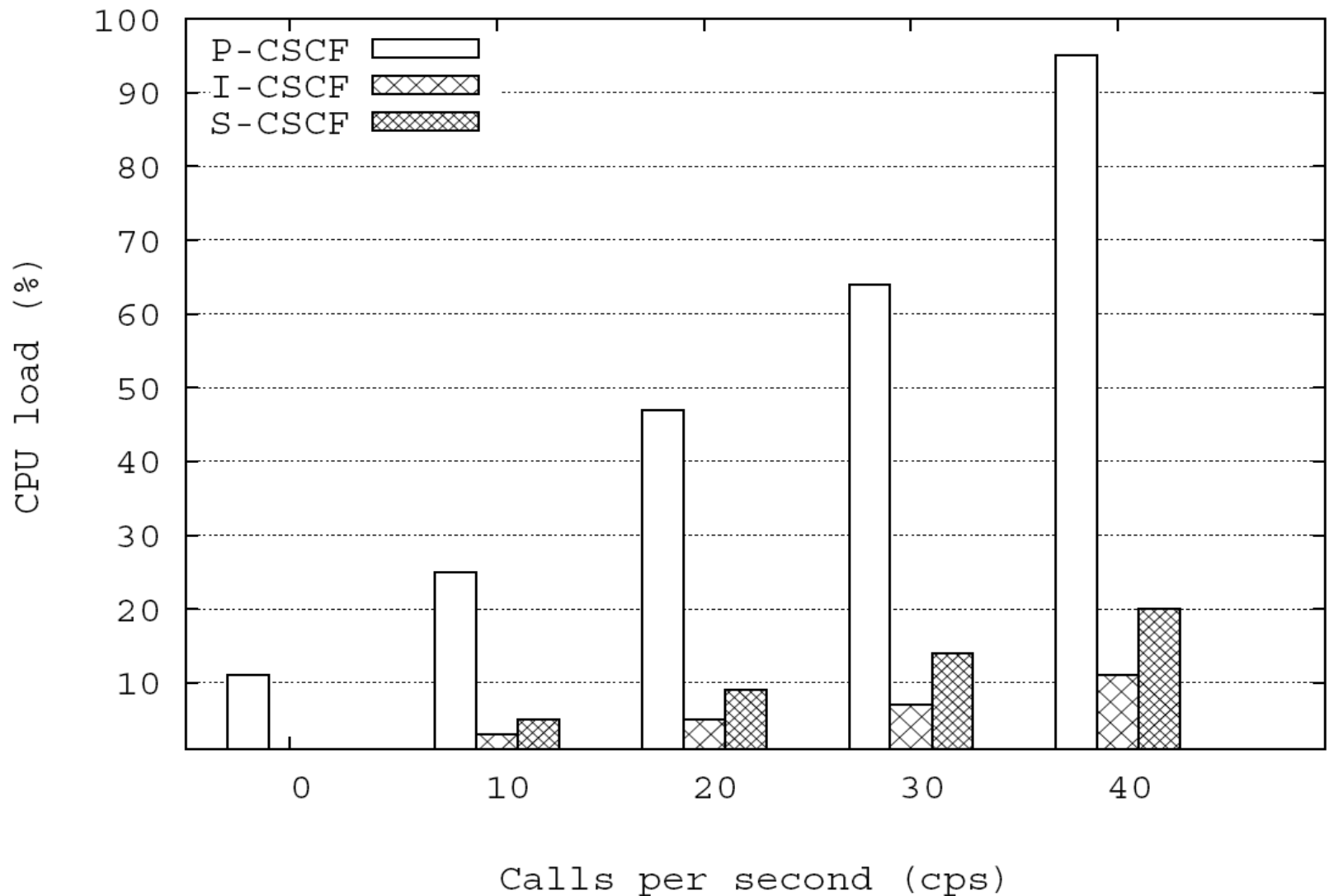
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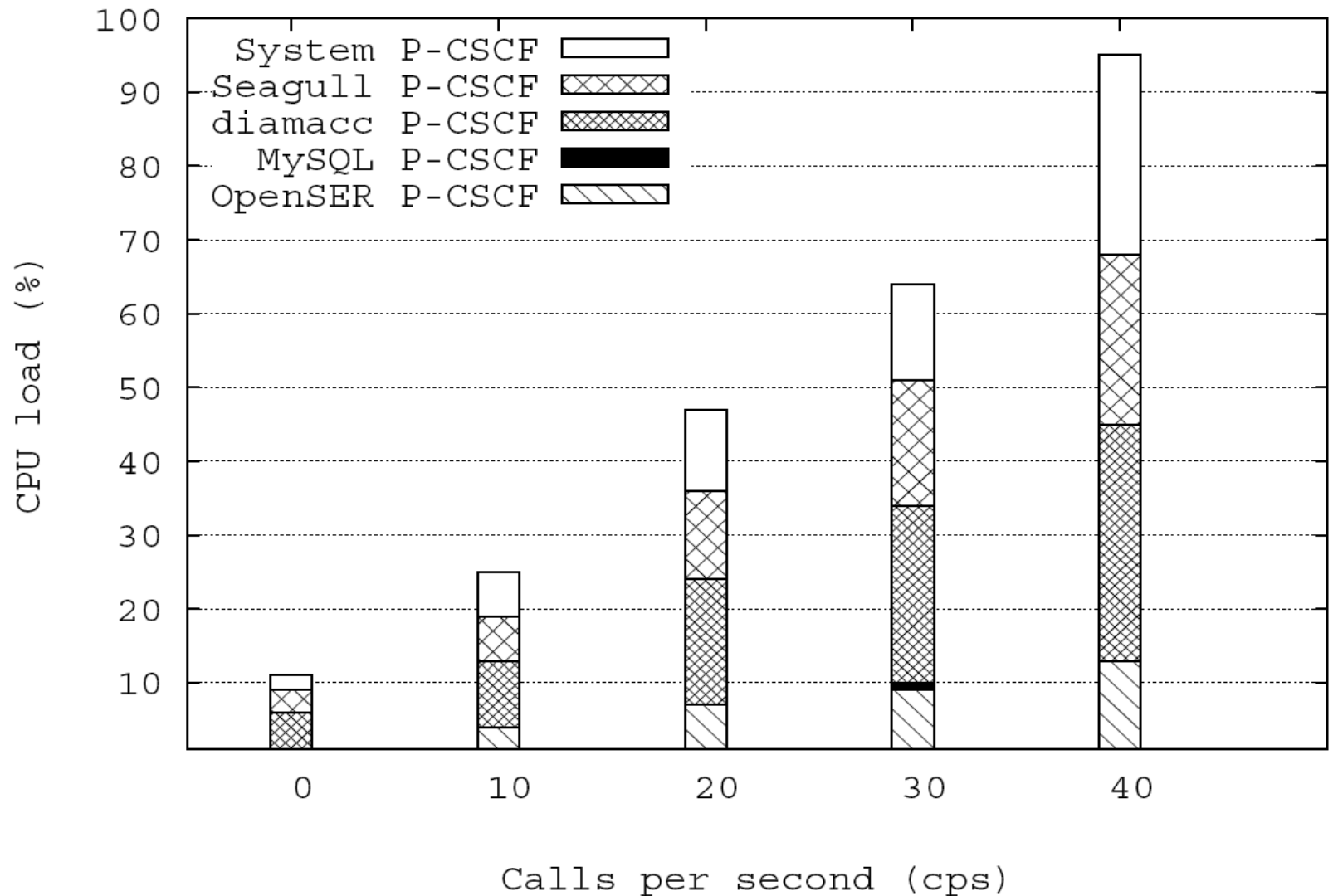**Dipl.-Ing. Joachim FABINI**
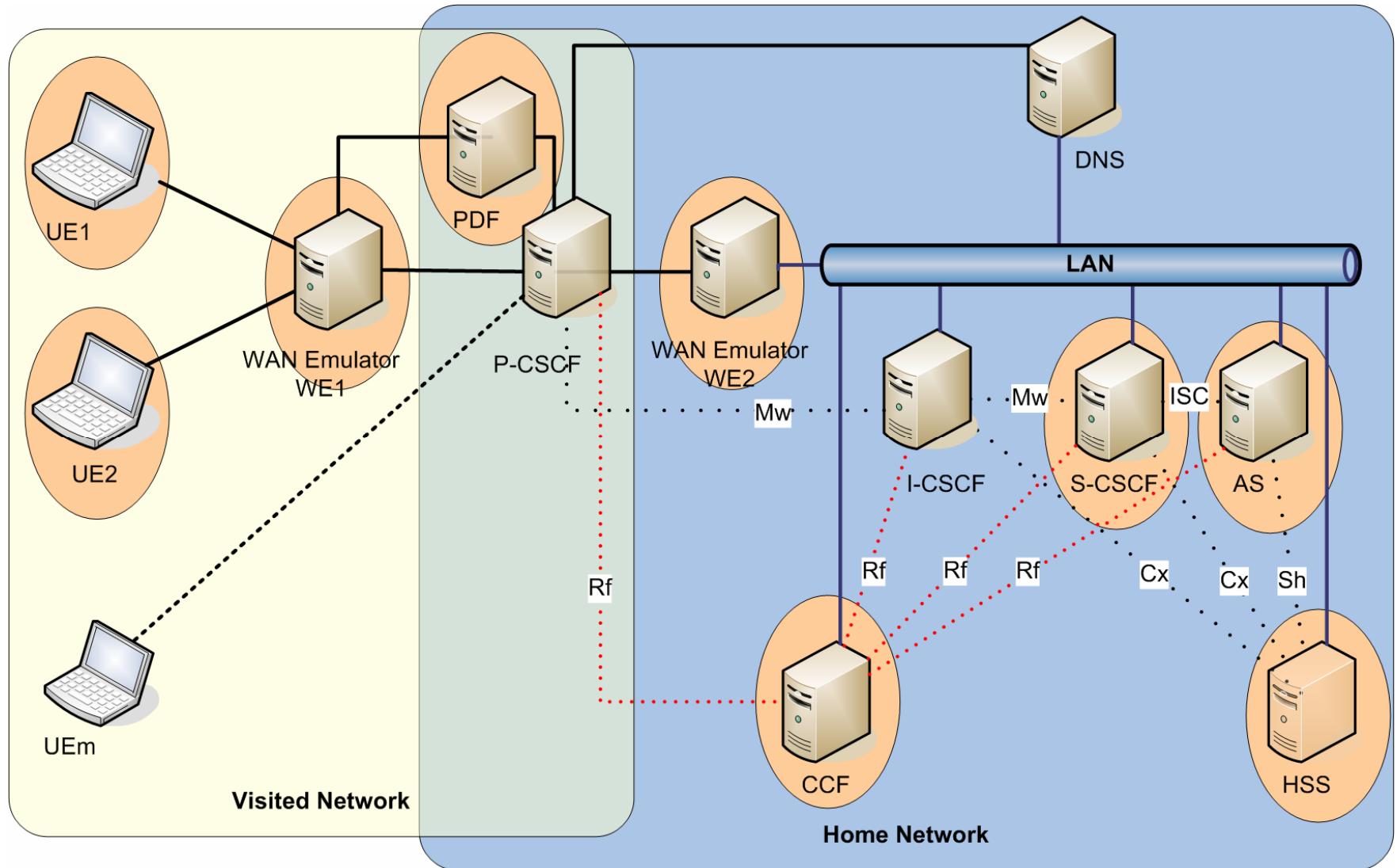University Assistant

Backup Slide: IMS Testbed CPU Load

Backup Slide: Performance: IMS Testbed CPU Load (Accounting enabled)

Backup Slide: Performance: IMS P-CSCF CPU Load (Accounting enabled)

Backup Slide: IMS Future Testbed: Affected components

Backup Slide: Reasons (not) to switch to VoIP or IMS?

- **Circuit Switched Telephony**
  - CS voice is working perfectly
  - Mobile and Fixed Networks
  - Roaming aspects
  - GSM raises high user expectations on NGN performance
    - Mobility and Coverage, including roaming
    - Voice quality
    - Costs

- **Fixed-Mobile Convergence**
  - XoIP technologies - what do they converge to?
    - SIP, H.323, Skype, ...
  - Interoperability and revenue generator: CS telephony