"PARIS" VoIP-Monitoring

Reasons and solutions for automated
VoIP Blackbox- and Longterm-Monitoring
at the Telekom Austria Group

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A1 Telekom Austria

Overview

1. Reasons for Longterm Blackbox Monitoring
2. Realization of Monitoring Infrastructure
3. Findings

PARIS
Performance, Availability and Reliability Information System

Longterm Monitoring – Visual Representation of Signaling Delay

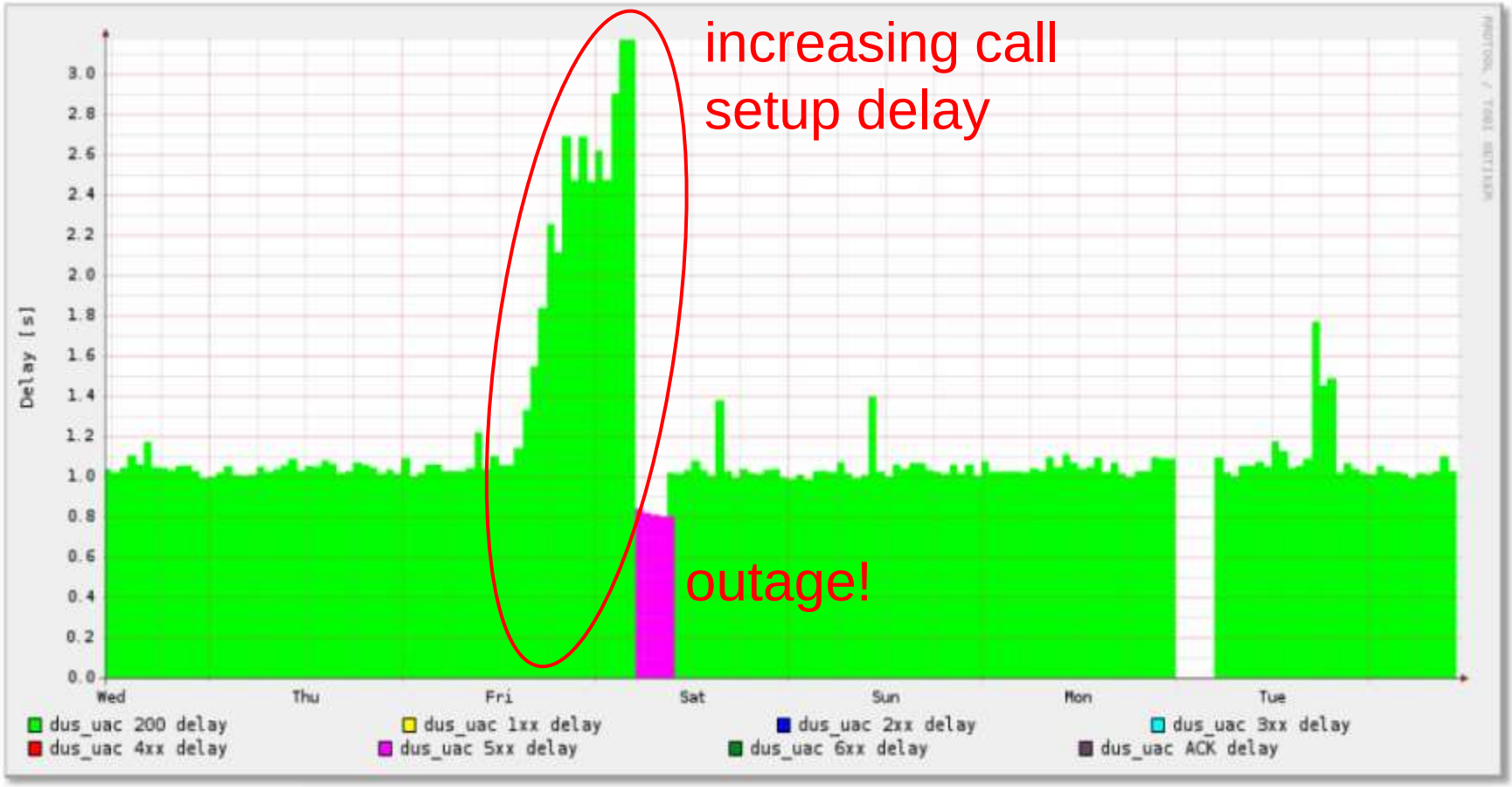


Figure 1: Upcoming system failure – monitored Call Setup Delay

Longterm Monitoring – Visual Representation of RTP - KPIs

- Jitter distributed over daytime ⇨ blackboxed RTP-proxy load monitoring
- End2End Latency distribution
- Packet loss monitoring

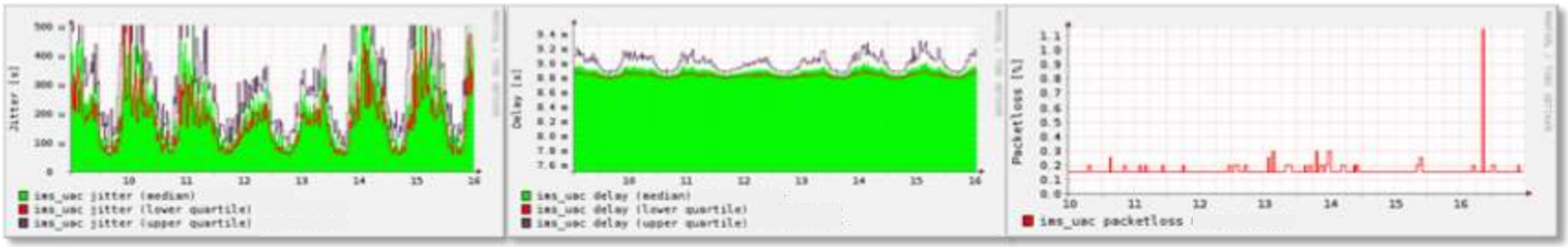


Figure 2a-c: RTP Analysis: Jitter, Latency and Packet Loss

- **Call-by-Call** Jitter and Latency monitoring

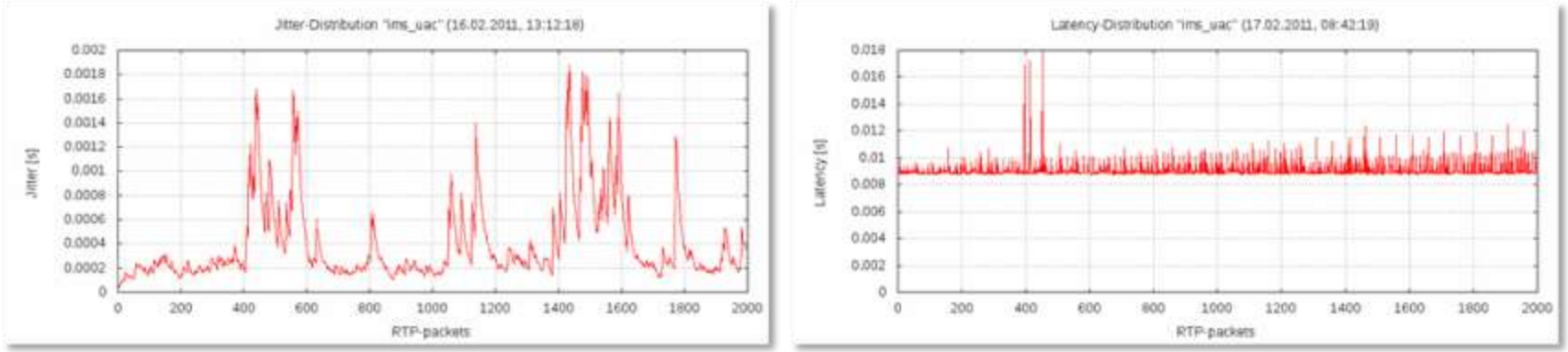


Figure 3a and b: automatic RTP Analysis: Jitter and Latency of one single testcall

Reasons for own Blackbox Monitoring solution

Some interesting monitoring products available on the market, like Empirix, “IPTEGO Paladin”, etc.

- *Costs*
- Heterogeneous Network – no common monitoring interface
- Different hardware vendors from different “universes” – Telco vs. Internet
- Geographical and organizational hardware dislocation
- Agile Development

Objectives for Blackbox Monitoring Solution

- „User perspective“
- „Continuous Monitoring“
- „Robust realtime Alerting“
- „Longterm monitoring“

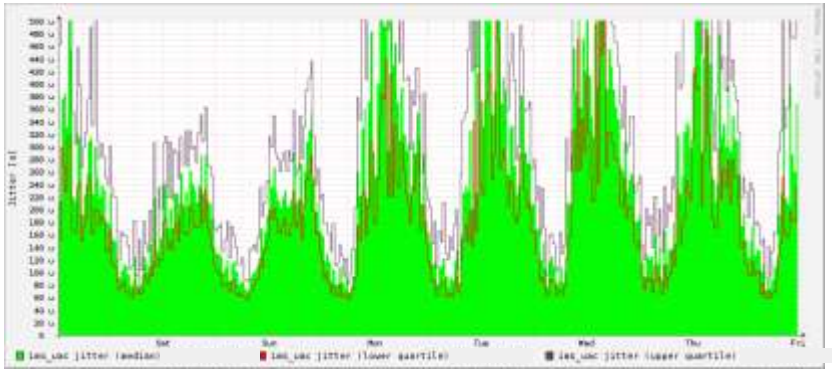


Figure 4: RTP Jitter distribution during one week

- „Flexible configurable and extendable“
- “Applicable to all types of VoIP infrastructures and providers”
- „Offered as a Service“

Realization

Four **use cases** for blackbox monitoring

1. SIP to SIP Call originated from PARIS-host
2. SIP to CS/ISUP Call originated from PARIS-host

3. SIP to SIP Call originated from deployed host
4. SIP to CS/ISUP Call originated from deployed host

Targets free definable

- Only Credentials needed
- Client acts RFC3261 and IMS compliant

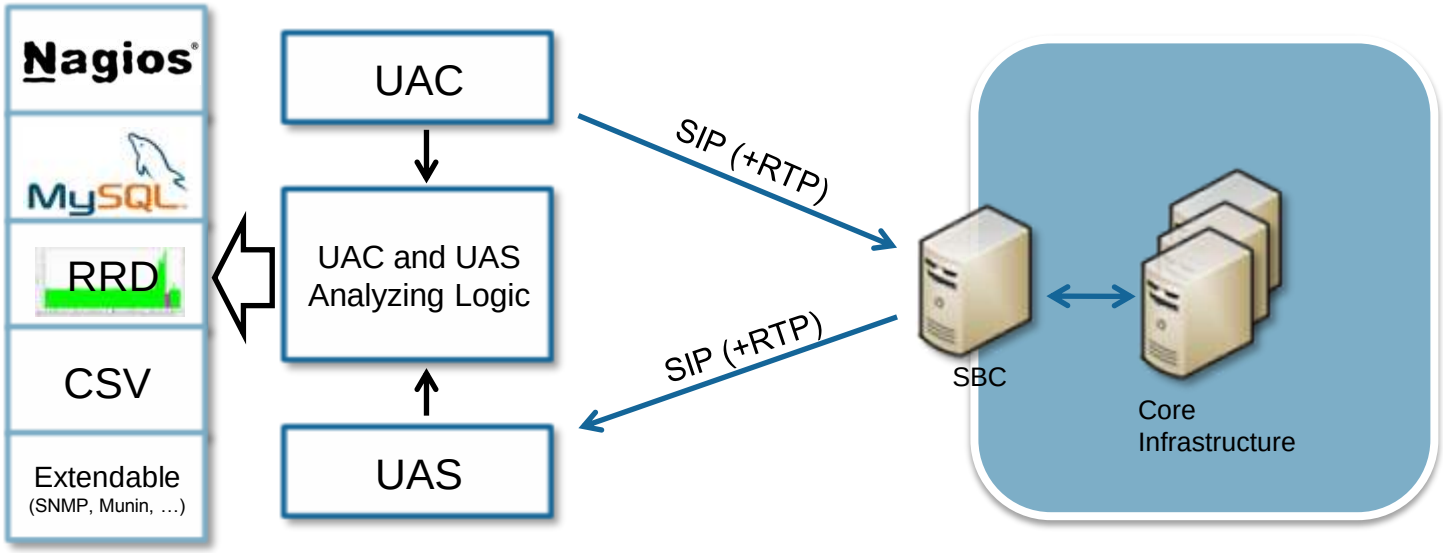
Time triggered call initiation

Length of Voice Call and Codec **free definable**

Clients implemented on Unix infrastructure

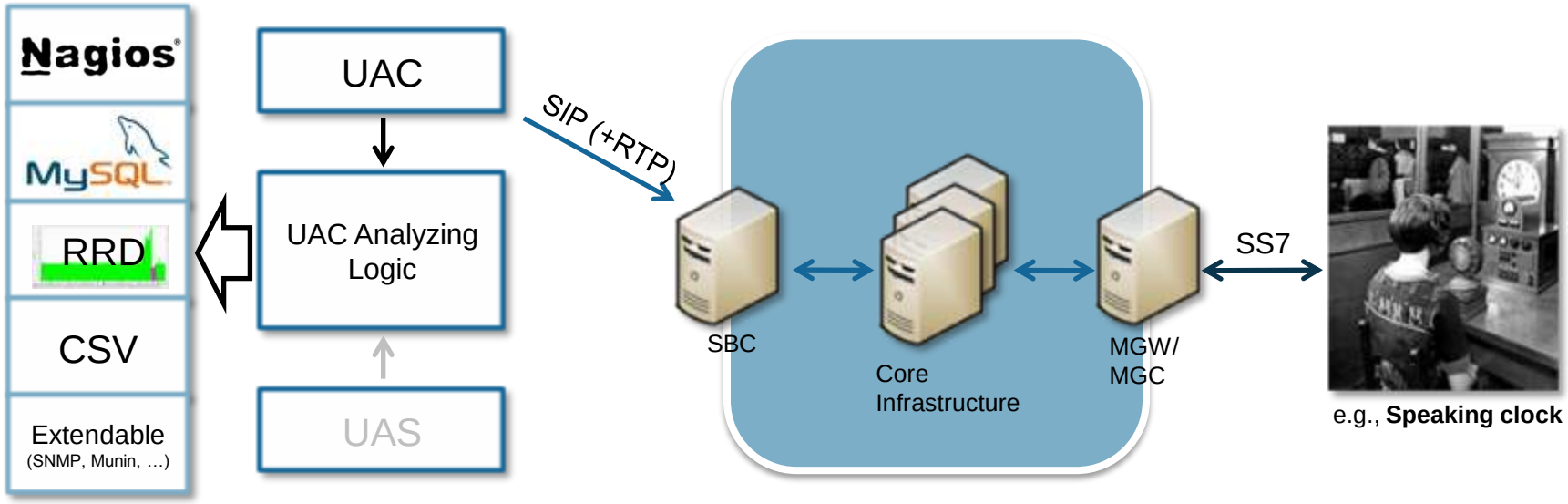
even on embedded devices

PARIS v1.1 – use case 1/4



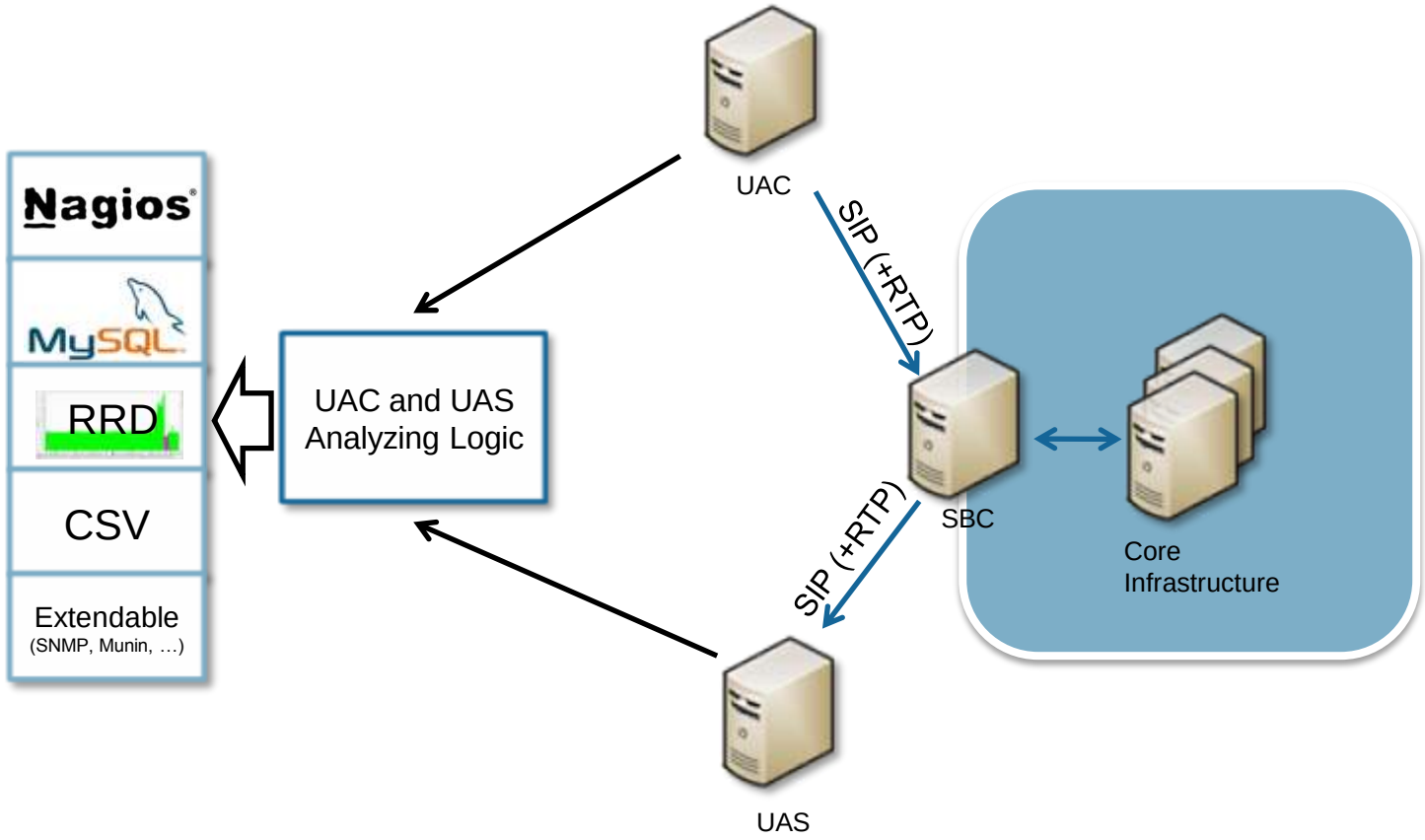
SIP to SIP calls

PARIS v1.1 – use case 2/4



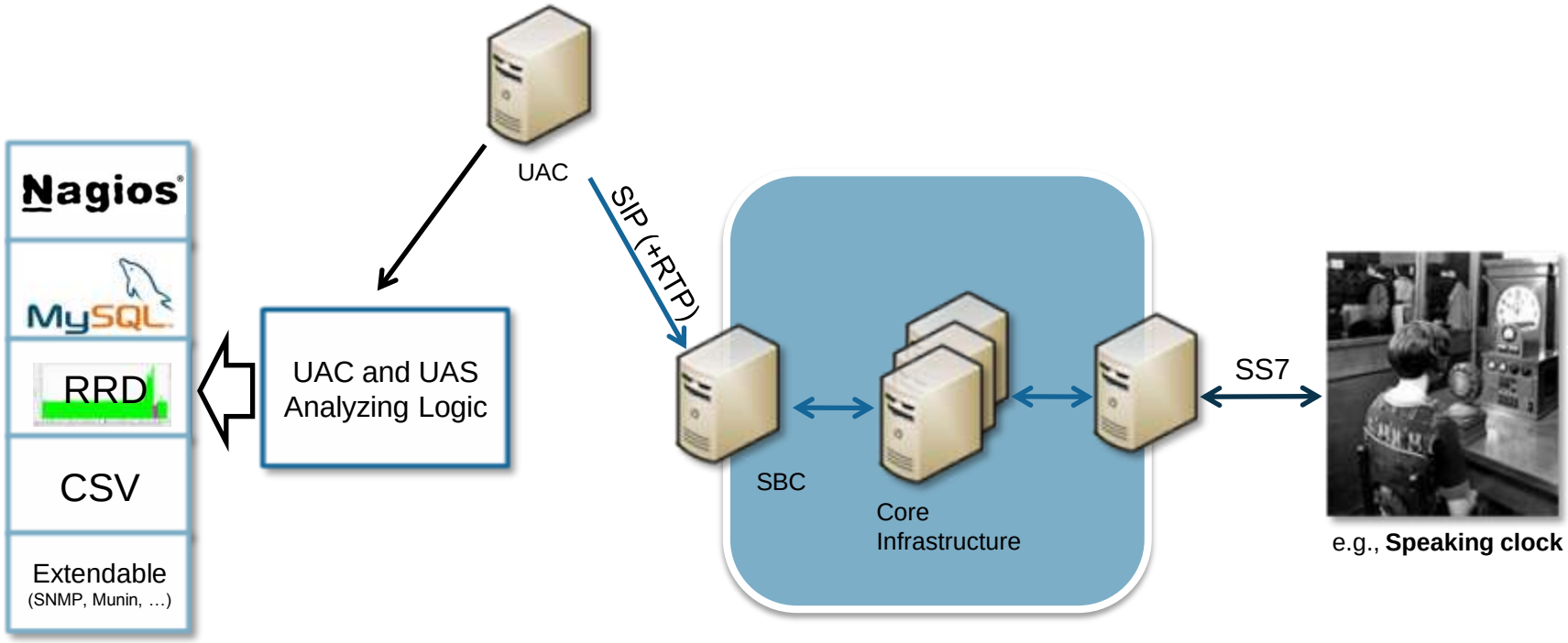
SIP2CS breakout calls

PARIS v1.1 – use case 3/4



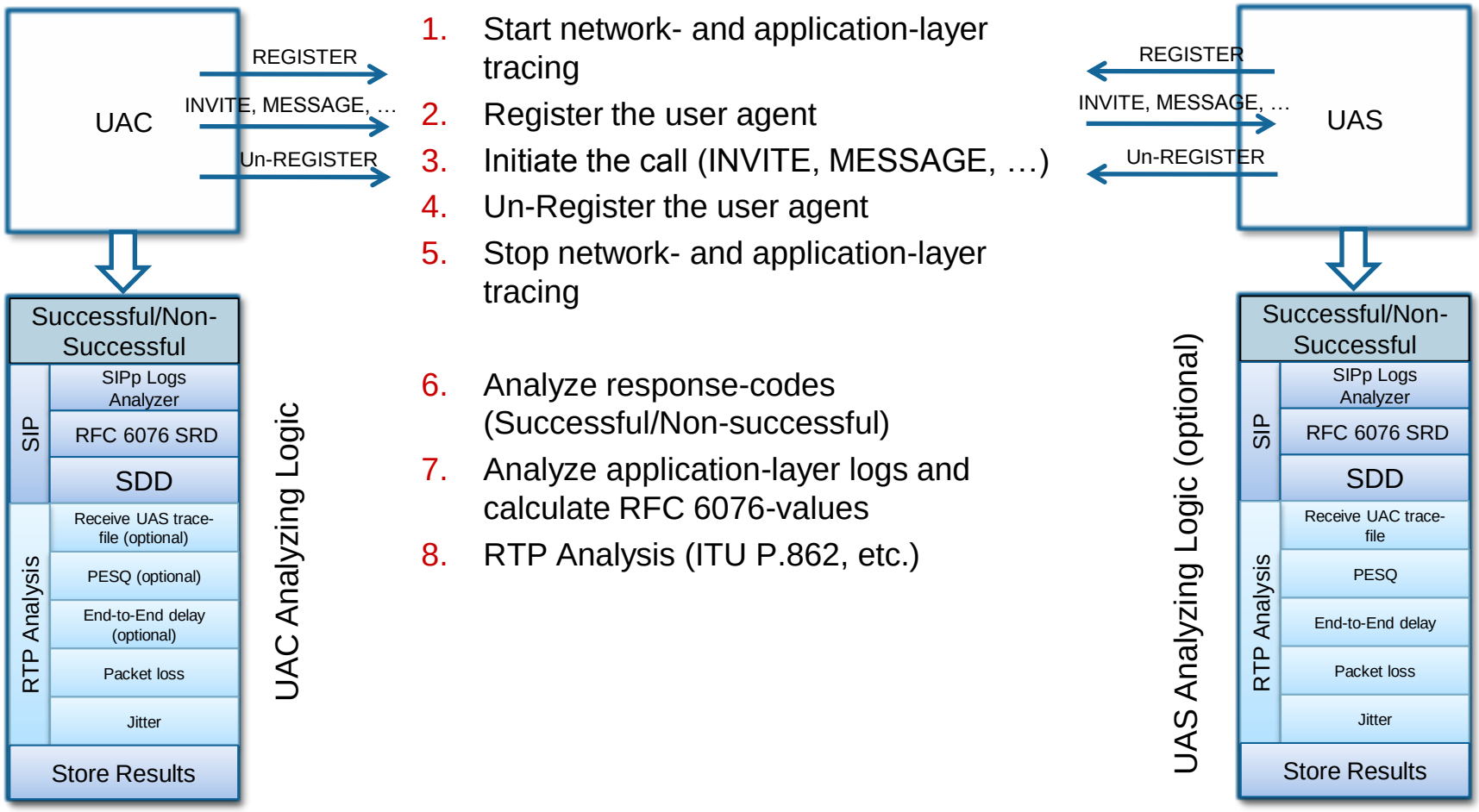
long distance solution, resp. *customer located* (in development)

PARIS v1.1 – use case 4/4



long distance solution, resp. *customer located against CS callee* (in development)

PARIS v1.1 - Call and Analyzing Logic



Processing Results – Nagios® Alerts

Test results seamless integrable in existing Nagios infrastructure

Alerting can be triggered on

- Testcall succeeded or not?
- Aggregation of multiple testcalls
- Signaling Delay above threshold?

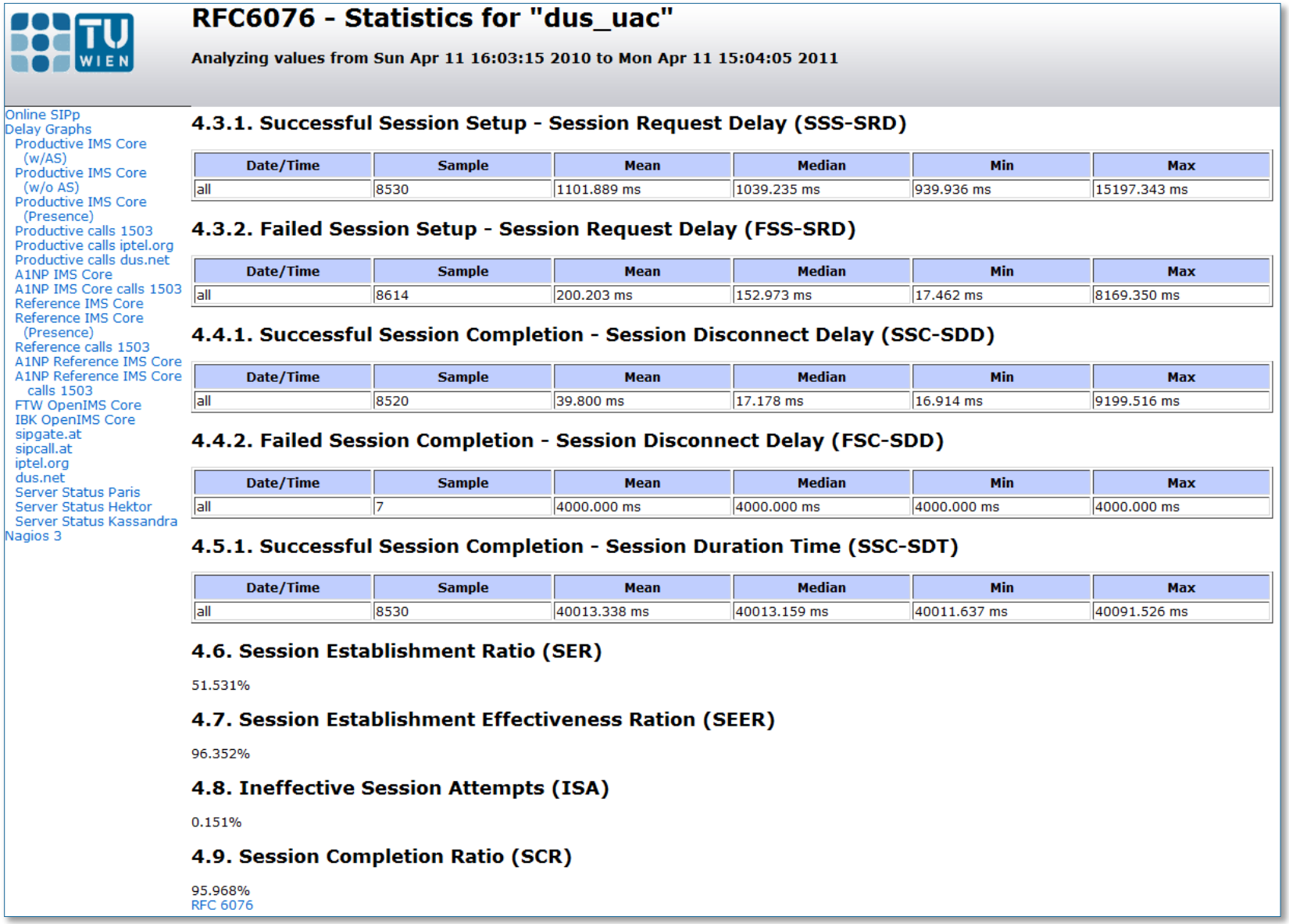
productivecore	AS available	OK	2011-02-15 18:27:15	0d 0h 41m 47s	1/7	Implicit Test (xor): "IMS Call Setup w AS" suceeded, "IMS Call Setup w/o AS" suceeded
	IMS Call Setup to iptel.org	OK	2011-02-15 18:28:26	0d 3h 31m 36s	1/7	.206388 seconds delay
	IMS Call Setup w AS	OK	2011-02-15 18:29:02	2d 11h 16m 0s	1/7	.326075 seconds delay
	IMS Call Setup w/o AS	OK	2011-02-15 18:28:54	7d 8h 38m 57s	1/7	.166164 seconds delay
	IMS Deregistration	OK	2011-02-15 18:27:42	4d 15h 17m 20s	1/7	.098082 seconds delay
	IMS Registration	OK	2011-02-15 18:29:52	2d 11h 16m 23s	1/7	.096518 seconds delay
	IMS SUBSCRIBE	OK	2011-02-15 18:27:21	7d 7h 59m 41s	1/7	.074657 seconds delay
	IMS to CS Call Setup	OK	2011-02-15 18:28:58	0d 5h 19m 4s	1/7	3.997187 seconds delay
	MGW/MGC available	OK	2011-02-15 18:29:51	0d 0h 0m 11s	1/7	Implicit Test (xor): "IMS Call Setup w AS" suceeded, "IMS to CS Call Setup" suceeded
	PESQ/MOS 31d Longterm Average	OK	2011-02-15 18:28:34	242d 6h 48m 53s	1/7	Average PESQ/MOS value of 4.194 is higher than acceptable 3.8
	PESQ/MOS currently	OK	2011-02-15 18:29:09	2d 11h 15m 53s	1/7	PESQ 4.196
	TCP connection to 5060	OK	2011-02-15 18:27:45	7d 11h 26m 17s	1/7	TCP OK - 0,013 second response time on port 5060

Figure 5: Nagios States of one monitored Core Infrastructure, 15/02/2011

Processing Results – Online presentation

Figure 6: Online presentation of continuous quality measurements over one monitored week

Processing Results – RFC 6076 analyses



RFC6076 - Statistics for "dus_uac"

Analyzing values from Sun Apr 11 16:03:15 2010 to Mon Apr 11 15:04:05 2011

Online SIPp
Delay Graphs
- Productive IMS Core (w/AS)
- Productive IMS Core (w/o AS)
- Productive IMS Core (Presence)
- Productive calls 1503
- Productive calls iptel.org
- Productive calls dus.net
- A1NP IMS Core
- A1NP IMS Core calls 1503
- Reference IMS Core
- Reference IMS Core (Presence)
- Reference calls 1503
- A1NP Reference IMS Core
- A1NP Reference IMS Core calls 1503
- FTW OpenIMS Core
- IBK OpenIMS Core
- sipgate.at
- sipcall.at
- iptel.org
- dus.net
- Server Status Paris
- Server Status Hektor
- Server Status Kassandra

Nagios 3

4.3.1. Successful Session Setup - Session Request Delay (SSS-SRD)

Date/Time	Sample	Mean	Median	Min	Max
all	8530	1101.889 ms	1039.235 ms	939.936 ms	15197.343 ms

4.3.2. Failed Session Setup - Session Request Delay (FSS-SRD)

Date/Time	Sample	Mean	Median	Min	Max
all	8614	200.203 ms	152.973 ms	17.462 ms	8169.350 ms

4.4.1. Successful Session Completion - Session Disconnect Delay (SSC-SDD)

Date/Time	Sample	Mean	Median	Min	Max
all	8520	39.800 ms	17.178 ms	16.914 ms	9199.516 ms

4.4.2. Failed Session Completion - Session Disconnect Delay (FSC-SDD)

Date/Time	Sample	Mean	Median	Min	Max
all	7	4000.000 ms	4000.000 ms	4000.000 ms	4000.000 ms

4.5.1. Successful Session Completion - Session Duration Time (SSC-SDT)

Date/Time	Sample	Mean	Median	Min	Max
all	8530	40013.338 ms	40013.159 ms	40011.637 ms	40091.526 ms

4.6. Session Establishment Ratio (SER)

51.531%

4.7. Session Establishment Effectiveness Ration (SEER)

96.352%

4.8. Ineffective Session Attempts (ISA)

0.151%

4.9. Session Completion Ratio (SCR)

95.968%

RFC 6076

Figure 7: Online presentation of selected RFC6076-KPIs

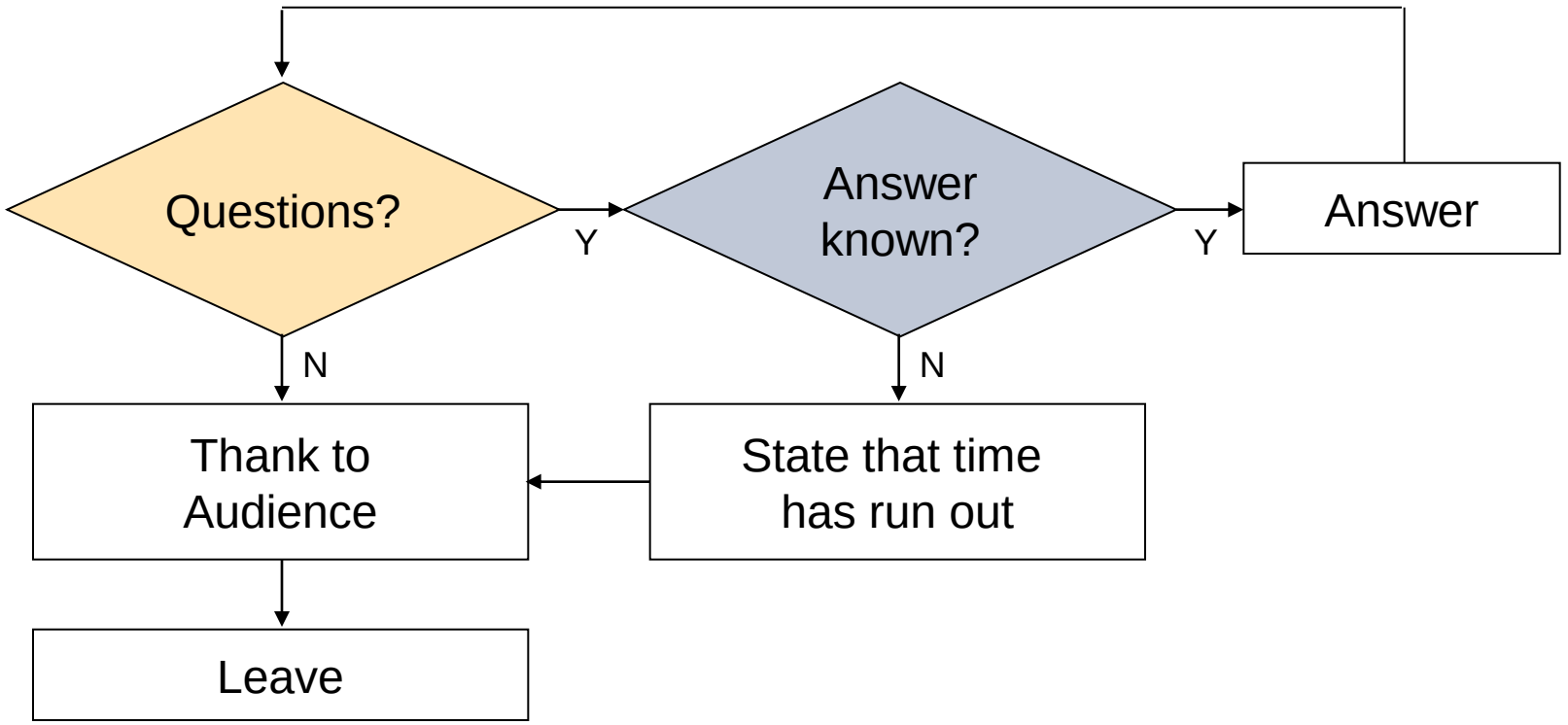
Summary

(Longterm) Blackbox-monitoring is essential

- Customer, not Operator perspective
- Provider independent
- Vendor independent
- Trends detectable – failures predictable

"The whole is different from the sum of its parts" (Aristoteles)

Thank you!



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Ende der Bildschirmpräsentation. Zum Beenden klicken.

Facts & Figures A1 Telekom Austria

Establishment of the Company	The "K.K. Post und Telegraphenverwaltung" was founded in 1887. Merger of Telekom Austria and mobilkom austria into A1 Telekom Austria in July 2010
Corporate Structure	Subsidiary of the Telekom Austria Group – leading telecommunications company in the CEE region
Business Segments	Voice telephony, data & IT solutions including wholesale, Internet access and media as well as a range of solutions for home & office
Brands	
Customers	5.1 million mobile communications customers and 2.3 million customers in the fixed net
Revenues*	Revenues: EUR 3,064.2 million; EBITDA EUR 1,032.4 million
Employees*	Approximately 9,700
Shops	101 Austria-wide

* Annual Results 2010

Corporate Structure Telekom Austria Group

Key Financial Figures FY 2010
Telekom Austria Group

Revenues: € 4,650.8 million
EBITDA: € 1,645.9 million
Employees: 16,501

TELEKOM AUSTRIA GROUP

- A1 Telekom Austria (Österreich)
- Mobiltel (Bulgarien)
- Vipnet (Kroatien)
- Vip operator (Mazedonien)
- Vip mobile (Serbien)
- Velcom (Weißrussland)
- Si.mobil (Slowenien)
- mobilkom liechtenstein