3GPP SA5
OAM&P and Charging
Standards

Christian Toche

Huawei Technologies

3GPP SA5 Chair

Sanya Resort Horizon in November 2004

3GPP SA5 WG Officers

ITU-T

o **Chair**
  - Christian TOCHE (Huawei / CCSA)

o **Vice Chairs**
  - Dr Yewen LI (China Mobile / CCSA)
  - Gerald GÖRMER (Siemens / ETSI)

o **MCC Support**
  - Adrian ZOICAS (MCC)

SA5 Sub-WG structure

o **SWG-B Charging Management**
- Alain BIBAS (Orange) – Chair
- Nick MAZZARELLA (Lucent) – Vice Chair
- Benni ALEXANDER (Nokia) – Vice Chair

o **SWG-C OAM&P Interface Definition**
- John ISLIP (Lucent) – Chair
- Li YANG (Huawei) – Vice Chair
- Jörg SCHMIDT (Motorola) – Vice Chair

o **SWG-D OAM&P Data Definition**
- Shuqiang HUANG (ZTE) – Chair
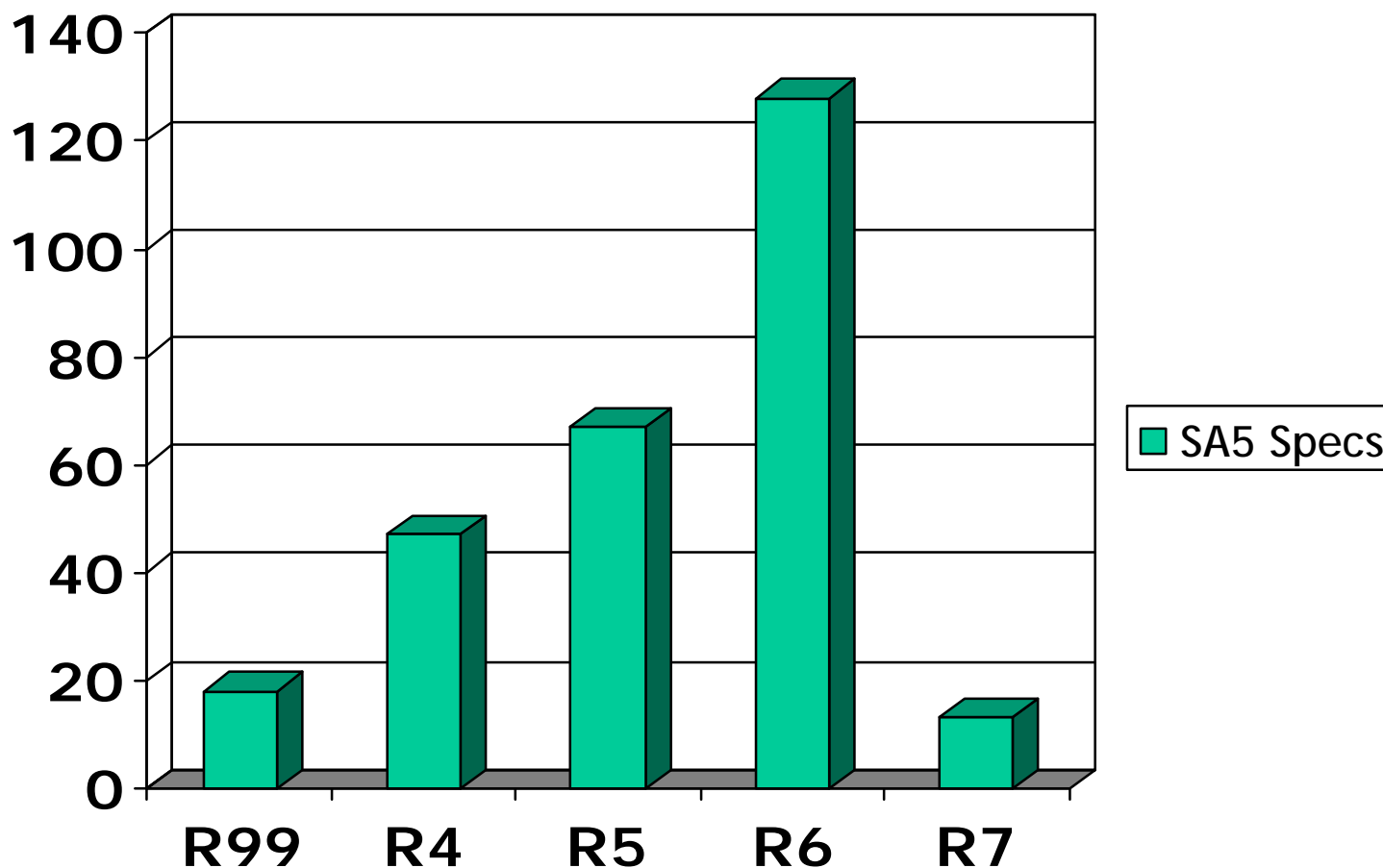- Olaf POLLAKOWSKI (Siemens) – Vice Chair

3G Telecom Management

- o **Interface-N (Itf-N) for UMTS, GPRS, GSM, CDMA, CDMA2000**
  - Multi-vendor interface between Network Managers and Element Managers / Network Elements
  - Interface N is specified by multiple Integration Reference Points (IRPs)

- o **3GPP Releases completed by SA5**
  - SA5 is in charge of UMTS 32-series, 52-series and GSM 12-series Standards
  - Rel-99 was delivered in 2000 / Rel-4 in 2001 / Rel-5 in 2002 / Rel-6 in 2004
  - Rel-7 work is ongoing and should be completed by December 2006
  - http://www.3gpp.org/ftp/Specs/latest (specifications)
  - http://www.3gpp.org/ftp/tsg_sa/WG5_TM/ (contributions)

SA5 specifications

SA5 delivered 128 specifications in 3GPP Rel-6

Bar chart titled "SA5 Specs" showing number of specifications per release:
- R99: ~18
- R4: ~46
- R5: ~66
- R6: ~127
- R7: ~13

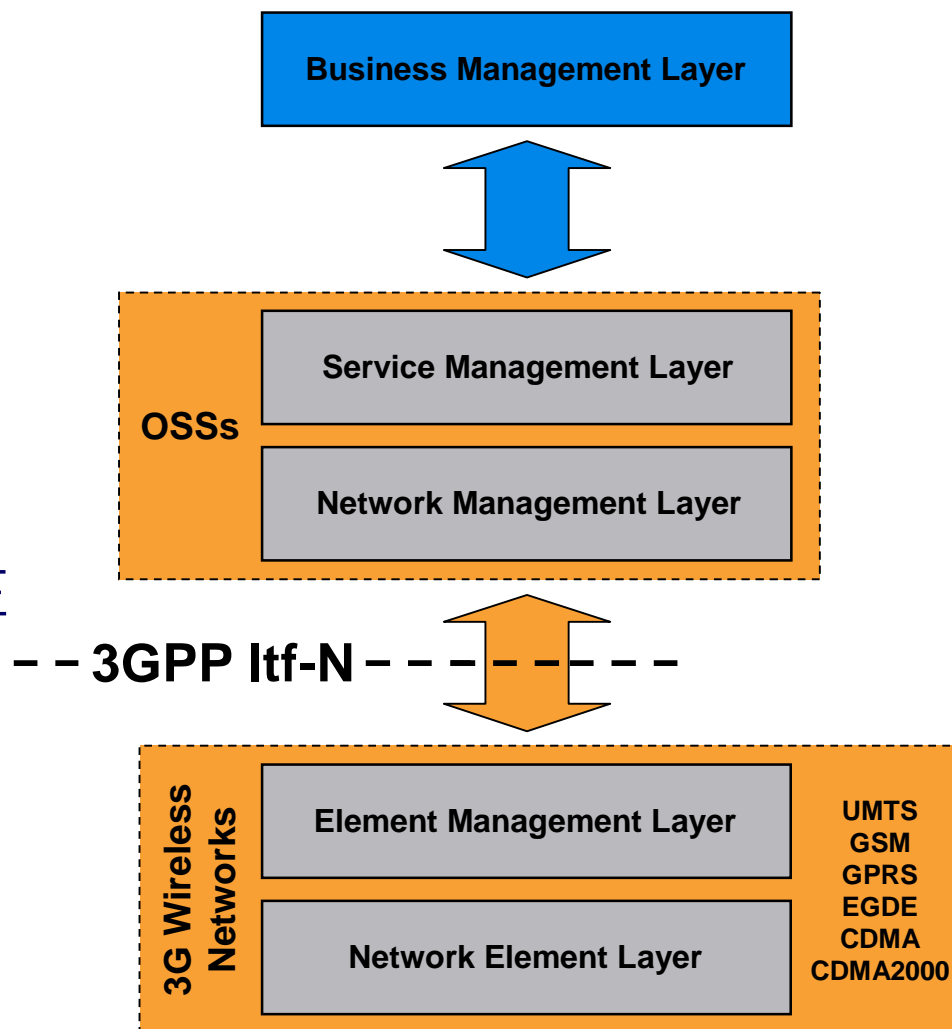Y-axis scale: 0, 20, 40, 60, 80, 100, 120, 140

ITF-N – Interface Network

ITU-T

Multi-vendor
standard interface
between
Network Managers - OSSs

&

3G Wireless Networks
UMTS / GSM / GPRS / EGDE
CDMA / CDMA2000

Element Managers - EMs
and/or
Networks Elements - NEs
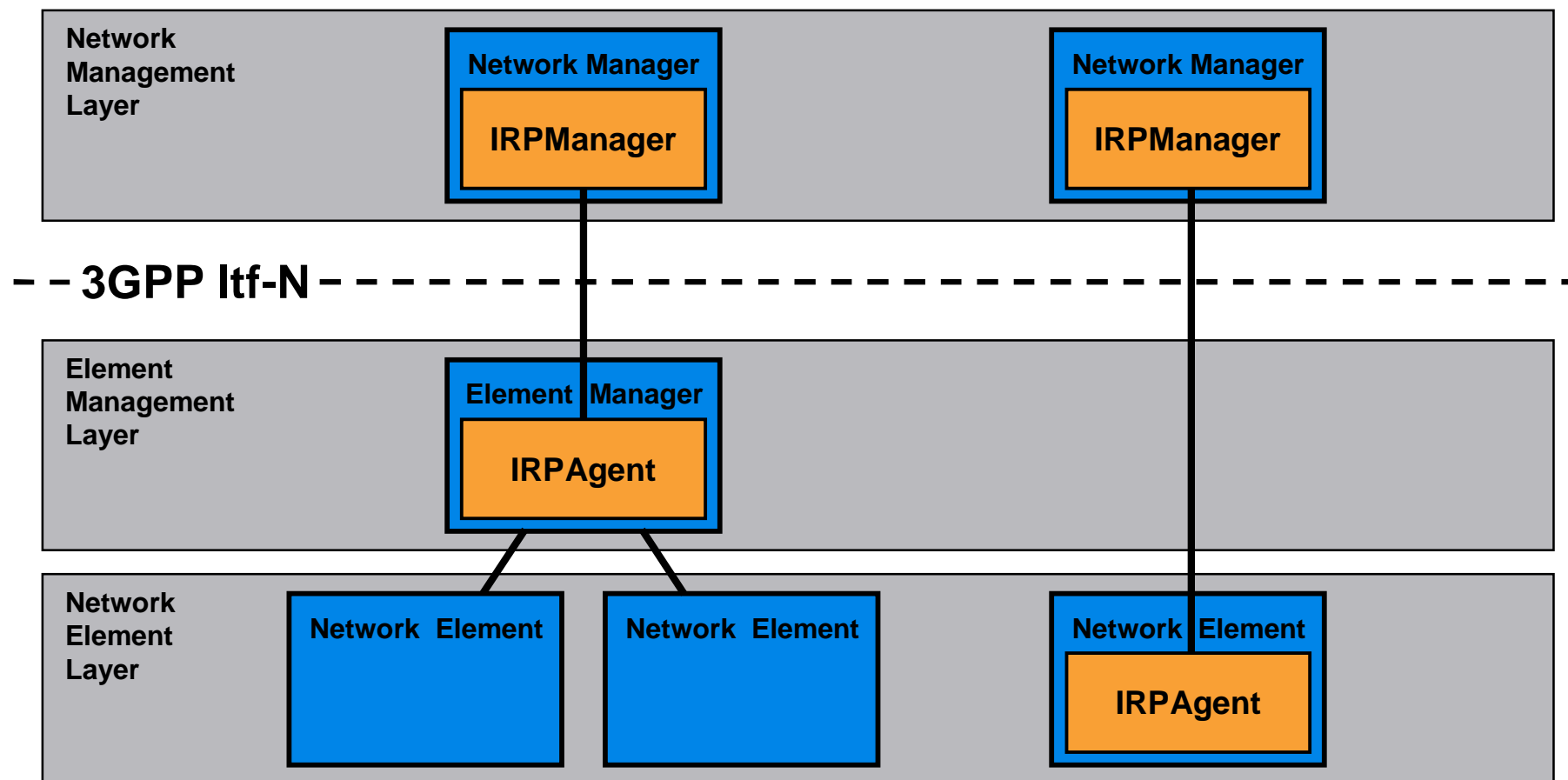
Business Management Layer

OSSs
- Service Management Layer
- Network Management Layer

- - -3GPP Itf-N- - - - - - - -

3G Wireless Networks
- Element Management Layer
- Network Element Layer

UMTS
GSM
GPRS
EGDE
CDMA
CDMA2000

Integration Reference Point

o **IRP Levels (top-down process)**
  - Requirements
  - Protocol-neutral Information Service (IS) / Network Resource Model (NRM)
  - Several protocol-specific Solution Sets (SS): CORBA / CMIP / ASN.1 / XML

o **IRP Types**
  - Interface - Operations & Notifications
  - NRM - Network Resource Model
  - Data Definition - abstract definitions for use in NRM IRPs

IRP – System Context

System Context A   System Context B

Network Management Layer

Network Manager
IRPManager

Network Manager
IRPManager

‑ ‑ **3GPP Itf-N** ‑

Element Management Layer

Element Manager
IRPAgent

Network Element Layer

Network Element

Network Element

Network Element
IRPAgent

IRP – Methodology

o Telecom Management Principles & High Level Requirements - TS 32.101

o Telecom Management Architecture - TS 32.102

o IRP Concept & Definitions - TS 32.150

- Overall IRP concept, compliance rules, system context, style guides for CORBA IDL

o IRP IS Template - TS 32.151

- Template for class diagrams, interface definition templates

o IRP UML Repertoire - TS 32.152

- Basic model elements, stereotypes, visibility notation, notations for association classes and abstract classes

Common Management IRPs

o Generic IRP Management – TS 32.31x

o Notification IRP – TS 32.30x

o Entry Point IRP – TS 32.36x

o File Transfer IRP – TS 32.34x

o Communication Surveillance IRP – TS 32.35x

o Notification log IRP - TS 32.33x

o Security Management – TS 32.371

o Name Convention for Managed Objects - TS 32.300

Configuration Management IRPs

o   Passive CM
- Monitoring of network resources configuration
- Support for FM & PM data reporting functions

o   Active CM
- Modification & creation / deletion of Network resources

o   Configuration Management Concept & Requirements - TS 32.600

o   Kernel CM IRP - TS 32. 66x
- Only passive CM function
- Notification oriented

o   Basic CM IRP - TS 32.60x
- Both passive & active CM function
- Simple transaction oriented

o   Bulk CM IRP - TS 32.61x
- Both passive & active CM function
- Bulk & file oriented

Fault Management IRPs

o **Alarm IRP – TS 32.11x**

  • Based on ITU-T X.733 & X.736

o **Test Management IRP – TS 32.32x**

  • Based on ITU-T X.745

Performance Management/Trace

o **Performance Management Concept & Requirements - TS 32.401**

o **Performance Measurement Collection - TS 32.43x**

- Measurement file definition (not an IRP)

o **PM IRP - TS 32.41x**

- Measurement job and alarm threshold management

o **Subscriber & Equipment Trace - TS 32.42x**

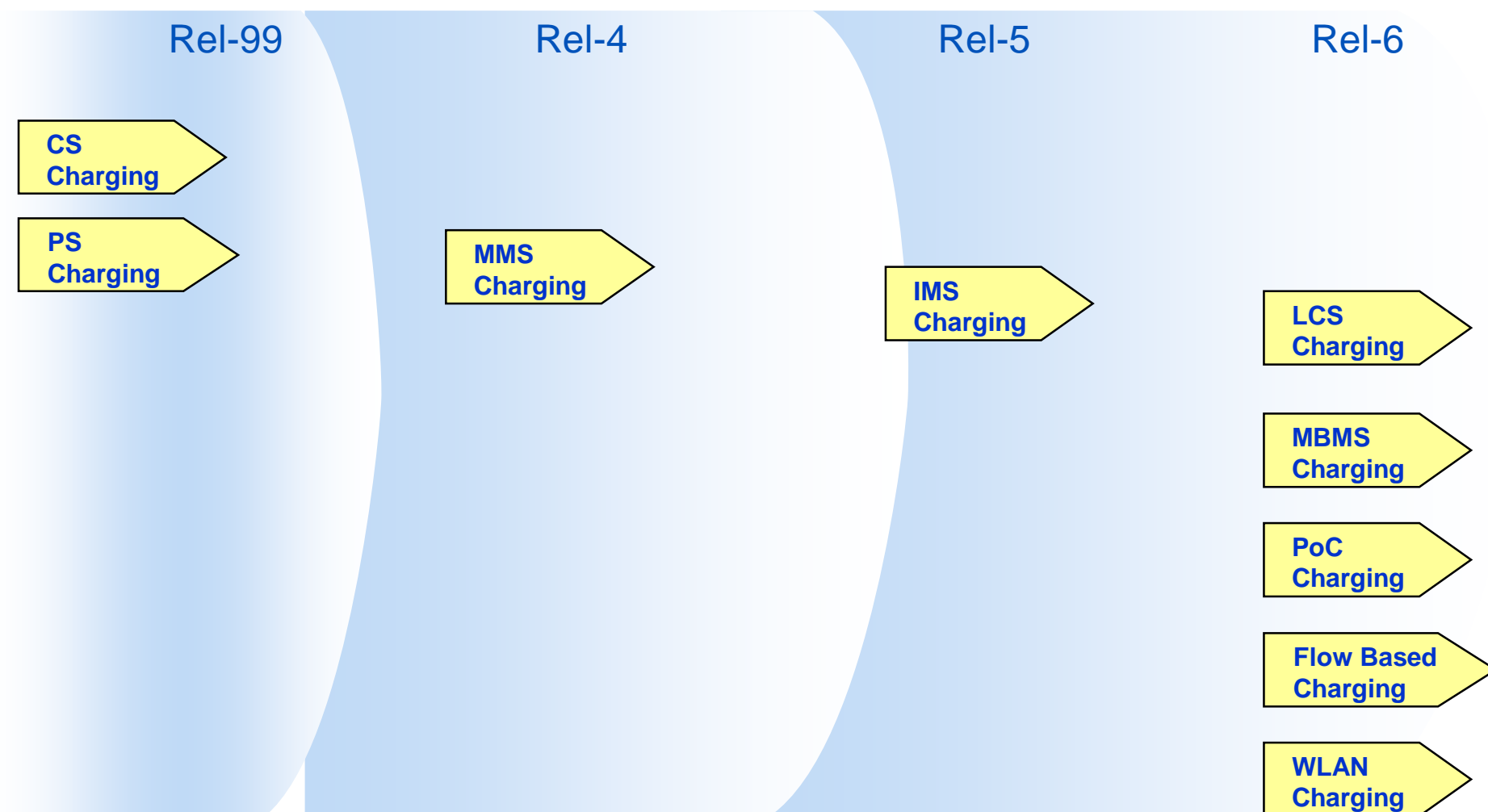- Activation/deactivation of Trace session & definition of Trace records (not an IRP in Rel-6)

o   Data Definitions

- State Management Data Definition IRP

o   NRMs

- Generic NRM IRP
- CN NRM IRP
- UTRAN NRM IRP
- GERAN NRM IRP
- Transport Network NRM IRP
- Signalling Transport Network NRM IRP
- Inventory Management NRM IRP
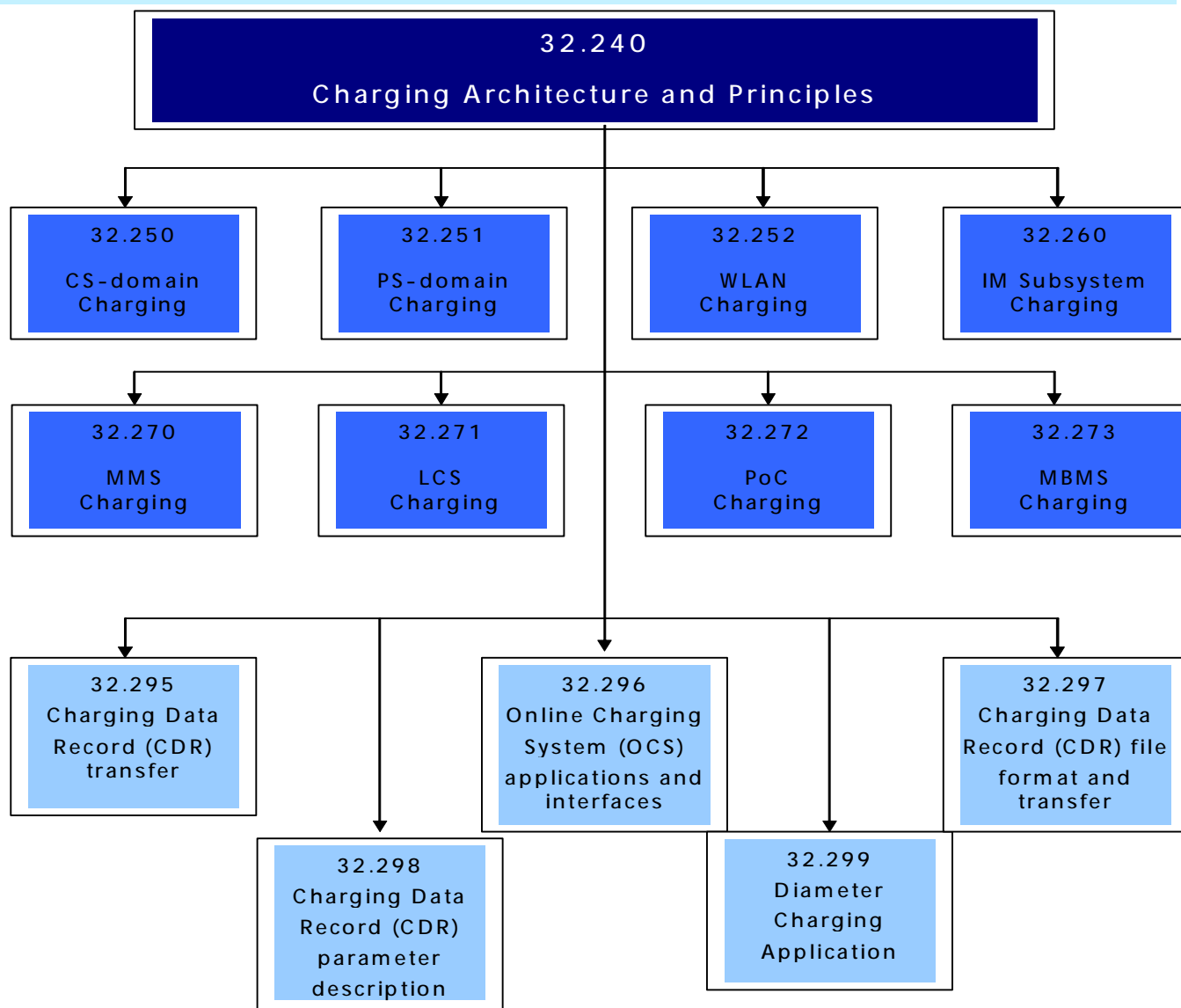- Subscription Management NRM IRP

SA5 Charging Roadmap

ITU-T

Rel-99

Rel-4

Rel-5

Rel-6

CS Charging

PS Charging

MMS Charging

IMS Charging

LCS Charging

MBMS Charging

PoC Charging

Flow Based Charging

WLAN Charging

SA5 Charging specifications

ITU-T

32.240
Charging Architecture and Principles

32.250 CS-domain Charging	**32.251** PS-domain Charging	**32.252** WLAN Charging	**32.260** IM Subsystem Charging
32.270 MMS Charging	**32.271** LCS Charging	**32.272** PoC Charging	**32.273** MBMS Charging

32.295 Charging Data Record (CDR) transfer

32.296 Online Charging System (OCS) applications and interfaces

32.297 Charging Data Record (CDR) file format and transfer

32.298 Charging Data Record (CDR) parameter description

32.299 Diameter Charging Application

OAM&P Rel-7 Work Plan (1/3)

ITU-T

o   WT44 Enhance NRM to accommodate NGN (IMS as basis of the Next Generation Network)

o   WT45 IRP usage scenarios

o   WT47 Network Management (NM) Itf-N performance criteria

o   WT48 Delta synchronization between IRP Manager and IRP Agent

o   WT49 Subscription Management (SuM) IRP Solution Sets

o   WT50 Integration Reference Point (IRP) Security Management WT51 Integration Reference Point (IRP) Methodology

o   WT52 Partial suspension of Itf-N during maintenance/testing

o   WT53 Advanced Alarming on Itf-N

o   WT54 Management of Legacy Equipment

o   WT55 Rules for Vendor Specific Extensions

o   WT56 CN CS Bearer Transport Network (BTN) relative NRM (45%)

o   WT64 Backward and Forward Compatibility of IRP systems (10%)

o   WT71 Repeater NRM Definition (5%)

o   WT72 UTRAN radio channel power monitoring

OAM&P Rel-7 Work Plan (2/3)

ITU-T

o **WT46** Study of Co-operative Element Management interface (TMF CO-OP project)

o **WT65** Study of Element Operations Systems Function (EOSF) definition

o **WT66** Study of SOAP/HTTP IRP Solution Sets

o **WT67** Study of Itf-N Implementation Conformance Statement (ICS) template

o **WT68** Study of IRP Information Model

o **WT74** Study on MTOSI XML Harmonization

OAM&P Rel-7 Work Plan (3/3)

- o WT57 Performance measurements definition for CN CS
- o WT58 Enhancement UTRAN Performance Measurements
- o WT 59 Add TDD specific counters in Performance Measurements
- o WT60 ATM bearer network Performance Measurements
- o WT61 IP bearer network Performance Measurement
- o WT69 Performance Measurements definition for IMS
- o WT73 HSDPA Performance Measurements
- o WT62 End-to-end Service Level tracing for IMS
- o WT63 Trace record content for UTRAN TDD
- o WT70 IRP for Subscriber and Equipment Trace Management

Cooperation with other bodies

o   NGN Management Focus Group

o   ITU-T SG4 on IRP Methodology specifications (IS Template, UML Repertoire)

o   TISPAN WG8 on the reuse of IRP concept and other SA5 specifications

o   3GPP2 TSG-S on Methodology, Network Resource Models (NRM) and measurement definitions

o   IEEE 802.16 on NRM IRP development for WMAN/WIMAX networks [802.16i]

o   ATIS TMOC on NGN Charging harmonization

o   IETF AAA Working Group on Diameter Credit Control application for 3GPP Online Charging

o   Open Mobile Alliance (OMA) on re-use of 3GPP Charging Architecture and Specifications

SA5 Meetings in 2006

TITLE	DATES	LOCATION	CTRY	HOST
3GPPSA5#45	13 - 17 Feb 2006	Sophia Antipolis	FR	ETSI
3GPPSA5#45-SWGB	13 - 17 Feb 2006	Denver	US	NAF
3GPPSA#31	13 - 15 Mar 2006	Sanya	CN	Huawei, CCSA, CWTS
3GPPSA5#46-SWGB	27 - 31 Mar 2006	Sophia Antipolis	FR	ETSI
3GPPSA5#46	3 - 7 Apr 2006	Athens	GR	EF3
3GPPSA5#47	8 - 12 May 2006	Sophia Antipolis	FR	ETSI
3GPPSA#32	5 - 7 Jun 2006	Warsaw	PL	EF3
3GPPSA5#48	3 - 7 Jul 2006	Kunming	CN	China Mobile
3GPPSA5#49	28 Aug - 1 Sep 2006	Budapest	EU	EF3
3GPPSA#33	25 - 27 Sep 2006	Palm Springs	US	NAF
3GPPSA5#50	30 Oct - 3 Nov 2006	Fairfax	US	NAF
3GPPSA#34	4 - 6 Dec 2006	Budapest	HU	EF3

http://webapp.etsi.org/MeetingCalendar/QueryForm.asp

Background Material

Rel-6 Specifications (1/7)

ITU-T

Number	Title
32.101	TM; Principles and high level requirements
32.102	TM; Architecture
32.111-1	TM; Fault Management; Part 1: 3G fault management requirements
32.111-2	TM; Fault Management; Part 2: Alarm IRP: Information Service
32.111-3	TM; Fault Management; Part 3: Alarm IRP: CORBA SS
32.111-4	TM; Fault Management; Part 4: Alarm IRP: CMIP SS
32.111-5	TM; Fault Management; Part 5: Alarm IRP: XML definitions
32.140	TM; Subscription Management (SuM) requirements
32.141	TM; Subscription Management (SuM) architecture
32.150	TM; IRP Concept and definitions
32.151	TM; IRP Information Service template
32.152	TM; IRP Information Service UML repertoire
32.171	TM; Subscription Management (SuM) NRM IRP: Requirements
32.172	TM; Subscription Management (SuM) NRM IRP: Information Service
32.175	TM; Subscription Management (SuM) NRM IRP: XML definition

ITU-T

Number	Title
32.240	TM; Charging management; Charging architecture and principles
32.250	TM; Charging management; CS domain charging
32.251	TM; Charging management; PS domain charging
32.252	TM; Charging management; Wireless Local Area Network (WLAN) charging
32.260	TM; Charging management; IP Multimedia Subsystem (IMS) charging
32.270	TM; Charging management; Multimedia Messaging Service (MMS) charging
32.271	TM; Charging management; Location Services (LCS) charging
32.272	TM; Charging management; Push-to-talk over Cellular (PoC) charging
32.273	TM; Charging management; Multimedia Broadcast and Multicast Service (MBMS) charging
32.295	TM; Charging management; Charging Data Record (CDR) transfer
32.296	TM; Charging management; Online Charging System (OCS): Applications and interfaces
32.297	TM; Charging management; Charging Data Record (CDR) file format and transfer
32.298	TM; Charging management; Charging Data Record (CDR) parameter description
32.299	TM; Charging management; Diameter charging applications

ITU-T

Number	Title
32.300	TM; CM; Name convention for Managed Objects
32.301	TM; CM; Notification IRP: Requirements
32.302	TM; CM; Notification IRP: Information Service
32.303	TM; CM; Notification IRP: CORBA SS
32.304	TM; CM; Notification IRP: CMIP SS
32.305	TM; CM; Notification IRP: XML definition
32.311	TM; Generic IRP management; Requirements
32.312	TM; Generic IRP management; Information Service
32.313	TM; Generic IRP management; CORBA SS
32.314	TM; Generic IRP management; CMIP SS
32.321	TM; Test management IRP: Requirements
32.322	TM; Test management IRP: Information Service
32.323	TM; Test management IRP: CORBA SS
32.324	TM; Test management IRP: CMIP SS
32.331	TM; Notification Log (NL) IRP: Requirements
32.332	TM; Notification Log (NL) IRP: Information Service
32.333	TM; Notification Log (NL) IRP: CORBA SS
32.334	TM; Notification Log (NL) IRP: CMIP SS
32.335	TM; Notification Log (NL) IRP: XML solution definitions
32.341	TM; File Transfer (FT) IRP: Requirements
32.342	TM; File Transfer (FT) IRP: Information Service
32.343	TM; File Transfer (FT) IRP: CORBA SS
32.344	TM; File Transfer (FT) IRP: CMIP SS

Number	Title
32.351	TM; Communication Surveillance (CS) IRP: Requirements
32.352	TM; Communication Surveillance (CS) IRP: Information Service
32.353	TM; Communication Surveillance (CS) IRP: CORBA SS
32.354	TM; Communication Surveillance (CS) IRP: CMIP SS
32.361	TM; Entry Point (EP) IRP: Requirements
32.362	TM; Entry Point (EP) IRP: Information Service
32.363	TM; Entry Point (EP) IRP: CORBA SS
32.371	TM; Security Management concept and requirements
32.401	TM; Performance Management (PM); Concept and requirements
52.402	TM; Performance Management (PM); Performance measurements - GSM
32.403	TM; Performance Management (PM); Performance measurements - UMTS and combined UMTS/GSM
32.411	TM; Performance Management (PM) IRP: Requirements
32.412	TM; Performance Management (PM) IRP: Information Service
32.413	TM; Performance Management (PM) IRP: CORBA SS
32.414	TM; Performance Management (PM) IRP: CMIP SS
32.421	TM; Subscriber and equipment trace; Trace concepts and requirements
32.422	TM; Subscriber and equipment trace; Trace control and configuration management
32.423	TM; Subscriber and equipment trace; Trace data definition and management
52.008	TM; GSM subscriber and equipment trace
32.432	TM; Performance measurement: File format definition
32.435	TM; Performance measurement: XML file format definition
32.436	TM; Performance measurement: ASN.1 file format definition

ITU-T

Number	Title
32.600	TM; CM; Concept and high-level requirements
32.601	TM; CM; Basic CM IRP; Requirements
32.602	TM; CM; Basic CM IRP: Information Service
32.603	TM; CM; Basic CM IRP: CORBA SS
32.604	TM; CM; Basic CM IRP CMIP SS
32.611	TM; CM; Bulk CM IRP: Requirements
32.612	TM; CM; Bulk CM IRP: Information Service
32.613	TM; CM; Bulk CM IRP: CORBA SS
32.614	TM; CM; Bulk CM IRP: CMIP SS
32.615	TM; CM; Bulk CM IRP: XML file format definition
32.621	TM; CM; Generic network resources IRP; Requirements
32.622	TM; CM; Generic network resources IRP: NRM
32.623	TM; CM; Generic network resources IRP: CORBA SS
32.624	TM; CM; Generic network resources: IRP: CMIP SS
32.625	TM; CM; Generic network resources IRP: Bulk CM XML file format definition
32.631	TM; CM; Core network resources IRP: Requirements
32.632	TM; CM; Core Network Resources IRP: NRM
32.633	TM; CM; Core network resources IRP: CORBA SS
32.634	TM; CM; Core network resources IRP: CMIP SS
32.635	TM; CM; Core network resources IRP: Bulk CM XML file format definition

Number	Title
32.641	TM; CM; UTRAN network resources IRP; Requirements
32.642	TM; CM; UTRAN network resources IRP: NRM
32.643	TM; CM; UTRAN network resources IRP: CORBA SS
32.644	TM; CM; UTRAN network resources IRP: CMIP SS
32.645	TM; CM; UTRAN network resources IRP: Bulk CM XML file format definition
32.651	TM; CM; GERAN network resources IRP: Requirements
32.652	TM; CM; GERAN network resources IRP: NRM
32.653	TM; CM; GERAN network resources IRP: CORBA SS
32.654	TM; CM; GERAN network resources IRP: CMIP SS
32.655	TM; CM; GERAN network resources IRP: Bulk CM XML file format definition
32.661	TM; CM; Kernel CM; Requirements
32.662	TM; CM; Kernel CM; Information service
32.663	TM; CM; Kernel CM IRP: CORBA SS
32.664	TM; CM; Kernel CM IRP: CMIP SS
32.671	TM; CM; State Management IRP: Requirements
32.672	TM; CM; State Management IRP: Information Service
32.673	TM; CM; State Management IRP: CORBA SS
32.674	TM; CM; State Management IRP: CMIP SS
32.675	TM; CM; State Management IRP: Bulk CM XML file format definition

ITU-T

Number	Title
32.690	TM; Inventory Management (IM): Requirements
32.691	TM; Inventory Management (IM) network resources IRP: Requirements
32.692	TM; Inventory Management (IM) network resources IRP: NRM
32.695	TM; Inventory Management (IM) network resources IRP: Bulk CM XML file format definition
32.711	TM; CM; Transport Network (TN) NRM IRP: Requirements
32.712	TM; CM; Transport Network (TN) NRM IRP: Information Service
32.713	TM; CM; Transport Network (TN) NRM IRP: CORBA SS
32.714	TM; CM; Transport Network (TN) NRM IRP: CMIP SS
32.715	TM; CM Transport Network (TN) NRM IRP: Bulk CM XML file format definition
32.741	TM; CM; Signalling Transport Network (STN) interface NRM IRP: Requirements
32.742	TM; CM; Signalling Transport Network (STN) interface NRM IRP: Information Service
32.743	TM; CM; Signalling Transport Network (STN) interface NRM IRP: CORBA SS
32.744	TM; CM; Signalling Transport Network (STN) interface NRM IRP: CMIP SS
32.745	TM; CM; Signalling Transport Network (STN) interface NRM IRP: Bulk CM XML file format definition
32.803	TM; Process guide; Use cases in UML
32.804	TM; Control of Remote Electrical Tilting (RET) antennas; Requirements
32.815	TM; Charging management; Online Charging System (OCS) architecture study