



Cellular Networking Perspectives

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Cats And Dogs Sign a Peace Treaty

It is not often that 3G Americas and the CDG agree with each other, let alone circulate a joint press release. 3G Americas promotes GSM and UMTS as the long term solution for wireless in the Americas while CDG just as enthusiastically preaches the opposite – cdma2000.

However, both these organizations have learned from the parochial experiences with SMS – a divided market is a much, much smaller market. Consequently, they have announced a joint program to try to ensure interoperability of MMS (Multimedia Messaging Service).

Their joint MMS implementation guidelines are available at:

[www.3gamericas.org/PDFs/
mms_americas_guidelines-may2004.pdf](http://www.3gamericas.org/PDFs/mms_americas_guidelines-may2004.pdf)

...and on the CDG website (although the URL was not available at press time).

It is impossible to predict how big a success MMS will be, but it can be confidently predicted that without widespread interoperability, it will definitely *not* be a success!

Too Many Technologies = Trouble

Cingular, in a filing to the FCC related to their proposed purchase of AT&T Wireless, has admitted that a significant problem for them is their surfeit of technologies, resulting in a shortage of spectrum that their purchase of AT&T Wireless will reduce, although not completely resolve.

Cingular still has to support analog (AMPS) until February 2008, TDMA until their customer migration can be completed, GSM (including GPRS and EDGE) and, eventually, to gain high speed data capabilities, UMTS (Wideband CDMA).

Even without UMTS deployed, this requires a complex balancing act to ensure adequate spectrum for their implemented technologies. CDMA carriers, by contrast, have to support only

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two technologies if they control cellular spectrum (e.g. Verizon), and just one if they are a PCS carrier (e.g. Sprint).

Ironically, it was CDMA that originally caused the spectrum headaches. Three TDMA timeslots fit neatly into one analog 30 kHz channel, allowing a channel-by-channel replacement, whereas CDMA required a 1.25 MHz channel to be freed. Now the shoe is on the other foot (and it's much tighter too). UMTS requires at least one pair of 5 MHz channels and is the fourth technology, not the second.

Cingular cannot (yet) gain trunking efficiencies by merging spectrum through eliminating even one technology, but can by merging the spectrum between two companies. They should be able to serve significantly more customers in this way, and reduce their dropped call and 'all circuits busy' problems.

Cingular is concerned that until they can migrate to UMTS, their data products (GPRS and EDGE) will not be competitive with cdma2000 technologies such as 'DO' and 'DV' which offer aggregate speeds up to 2.4 and 3 Mbps, respectively. They illustrate a dramatic difference in transfer times for a one megabyte file:

Technology	Transfer Time/seconds
GPRS	>400
EDGE	90
1xEV-DV	20

Cingular believes that if they can obtain the spectrum to launch UMTS they can compete with current CDMA carriers, providing US consumers with another choice – one that would certainly offer benefits for data roaming between North America and Europe.

ANSI-41 Revision E Really Does Exist!

The first parts of Revision E of ANSI-41 (Mobile Application Part for analog, CDMA and TDMA networks) have been published. The most important portion are the parts in the 5xx range. This includes the specification of operations, parameters and data types. Also published are part 000, which contains definitions, references, a table of contents and a mapping between the new part numbers and the six chapters of Revision D. Parts in the 7xx range relate to the Wireless Intelligent Network (WIN). X.S0004, the 3GPP2 equivalent to ANSI-41, can be downloaded from:

www.3gpp2.org/Public_html/specs/index.cfm#tsgx

Next to be published will be the 6xx series, containing procedures, which is currently in ballot. Stage 2 scenario diagrams (parts 2xx through 4xx) are still being redrawn and integrated.

IMSI News

The US IOC (IMSI Oversight Council) is unusually busy, with two proposals for changing the way IMSI is used in the United States and the Caribbean.

AT&T Wireless has proposed that US Mobile Country Codes (MCCs 310-316) be used within by GSM networks they own in Caribbean nations. Some Caribbean nations oppose this, although it would simplify the operation of AT&T systems and AT&T claims that all technical problems could be solved. Even if AT&T is given the go-ahead by the IOC, their proposal would also require the permission of the affected Caribbean nations and cooperation from competing carriers to achieve this.

CDMA carriers are planning to broadcast real IMSI values from base stations for roaming, instead of the filler values currently used. CDMA, just like GSM, is currently restricted to the use of 2-digit Mobile Network Codes (MNC), so the CDG has asked for the right to obtain compatible codes (e.g. 3-digit MNCs ending with the digit 0), just as GSM does. The proposed modifications to the IMSI assignment guidelines are at:

www.atiss.org/IOC/Docs/IOC-04-06-04-04-IMSI-Guidelines-v6.pdf

Documents from IOC meetings back to 2001 are available at:

www.atiss.org/ATIS/ioc/Iocontributions.htm

Enhanced 911: It's the Little Things That Count

Standards to support enhanced 911 have existed for some time, but this has not solved all problems with implementations. ESIF (Emergency Service Interconnect Forum) has taken on the job of solving many of the interconnect problems.

Recently, it has decided that overflowing 911 calls from dedicated trunks to normal PSTN facilities is not a good idea, because this will only serve to overwhelm the PSAP call takers. Dedicated 911 trunks are usually sized to the capacity of the PSAP, overflowing calls are likely just reporting the same emergency and are unlikely to help with emergency response.

ESIF has also asked carriers to ensure that the **ESRK** and **ESRD** routing numbers used in many Phase 2 implementations are not ported or pooled. If this restriction is not respected emergency calls may be routed to the wrong PSAP. ESIF's preferred long-term solution is to use non-dialable numbers for ESRD and ESRK, specifically numbers of the format NPA-511-XXXX or NPA-211-XXXX.

These ESIF issue identification documents and other information can be obtained from:

www.atis.org/atis/esif/esifhome.htm

3GPP TSG CN Update: Core Networks

3GPP TSG CN specifies the Core network of 3GPP systems, an evolution from the GSM Core Network. This includes:

- Layer 3 protocols between User Equipment and the Core network to support Call Control, Session Management and Mobility Management.
- Signalling between the core network nodes.
- Interconnection with external networks.
- Core network aspects of the **Iu** interface.
- O&M (Operations and Maintenance) requirements.
- Packet-data issues such as mapping of QoS.

TSG CN meeting #22 resolved the following Rel 5 issues:

- Interoperability and commonality between **IMS** using different Internet Protocol (IP) networks
- Enhanced Dialed Services.
- A short term solution for video telephony (BS30) accounting was approved, and will be effective as far back as Rel 99. No companies agreed to contribute to a longer term solution.
- An agreement was reached with **GMSA** on the proper use of ".3gppnetwork.org" and on maintenance of this domain. A liaison was sent to **GSMA IREG** to inform them that:
 - » 3GPP would like to transfer the ownership of the 3GPPnetwork.org domain to GSMA.
 - » GSMA would then be in charge of the allocation of 3gppnetwork.org sub-domains and will specify the format of the addresses to be used.
 - » **IREG** will be responsible for the allocation of the addresses used within 3GPP networks. The description of the addresses will be documented in **TS 23.003** for reference by other 3GPP specifications.
- TSG SA has decided that charging will not move into CN. However, TSG SA WG 5 Subworking Group B, that will be responsible, was urged to coordinate closely with other parts of 3GPP.

At TSG CN#23 the following agreements were reached:

- CN1 will continue to work on IMS messaging, Group Management and Presence, as scheduled for Rel 6, even though these work items strongly overlap with **OMA**.
- CN1 agreed that the **H.323** protocol for teleconferencing may be supported transparently over **GPRS**. At the moment there is no plan to integrate H.323 with GPRS to provide an additional IP Multimedia solution.
- A working assumption is that Radio Access Technology (RAT) by the User Equipment (UE) in Public Land Mobile Network (PLMN) selection will be used for PLMN background scanning, taking into account multiple technologies and the preferred list of carriers. A final decision will be made at CN#24.
- CN4 will coordinate and document **Diameter** codes for 3GPP.

TSG CN2 on **CAMEL** will be disbanded in May and its remaining work transferred to CN4.

CN1 (Mobility Management (MM), Call Control (CC), Session Management (SM) and SMS)

3GPP TSG CN Working Group 1 (CN1) defines protocols for Call Control, Session Management, Mobility Management and SMS, specifically **SIP** Call Control and **SDP** protocols for the **IM** subsystem.

Highlights of the recent CN1 meetings were:

- A Rel 99 CR was approved, based on an SA2 CR on **TS 23.060** (GPRS) approved in December 2003.
- Corrections were made to IMS Stage 3 **TS 23.228** and **TS 23.220**.
- Good progress is being made on the Presence work item, although **TR 24.841** has been reported as 80% completed for the last two CN meetings. CN1 is transferring material from **TR 24.841** to the draft of **TS 24.141** (SIP Stage 3) and to the existing **TS 24.229** (SIP/SDP call control).
- Specifications for Multimedia Broadcast and Multicast Service are being drafted.
- The IMS Phase 2 work item is progressing: Group Management is 20% complete, Conferencing is 75% and Messaging 30% complete.
- A draft of Wireless LAN and cellular interworking (**TS 24.234**) is estimated as 60% complete.
- A work item on Subscriber Certificates has been initiated, for completion by September 2004.
- The work item on Packet Switched emergency calls is on hold until **SA2** completes the Stage 2, which will not be until November 2004.

CN2 (CAMEL)

3GPP TSG CN Working Group 2 (CN2) specifies the Stage 2 and Stage 3 for CAMEL (Customized Applications for Mobile network Enhanced Logic). It provides IN-like mechanisms to provide consistent support for advanced operator-specific services independently of the serving network, even when subscribers roam outside their home system.

Having resolved most outstanding issues, CN2 will be disbanded, with CN4 taking over maintenance and enhancement of its specifications.

One of the last items completed, at CN#23, was the work item on CAMEL-SCUDIF Interworking.

Major outstanding issue include a decision on the GGSN address format (IPv4 or IPv6), which is still open pending input from SA5 sub-working group B.

Table 1: 3GPP TSG CN Working Group 1 (MM/CC/SM) Specification Update

Document	Title	Status
tbd	WID for Emergency Call Enhancements for IP & PS Based Calls – Stage 3	Changed the completion date to June 2004
tbd	WID for WLAN Interworking – Stage 3 Definition of WLAN – 3GPP Interworking	Added network selection task and changed completion date to June 2004.
tbd	WID for Revised IMS2 Work Item	Added interworking with non-3GPP SIP/SDP network and changed completion date to September 2004.
tbd	Network Sharing Stage 3	New work item
TS 04.08	Mobile Radio Interface Layer 3 Specification	Rel 98 version (7.21) being revised.
TS 23.122	NAS Functions Related to Mobile Station (MS) in Idle Mode	Rel 6 available.
TS 23.218	IP Multimedia (IM) Session Handling; IP Multimedia (IM) Call Model; Stage 2	Rel 5 and Rel 6 being revised.
TS 24.007	Mobile Radio Interface Signalling Layer 3; General Aspects	Rel 6 available.
TS 44.068	Group Call Control (GCC) Protocol	

Table 2: 3GPP TSG CN Working Group 2 (CAMEL) Specification Update

Document	Title	Status
tbd	Full CAMEL Phase 4 Prepaid support for Service Change and Unrestricted Digital Information Fallback (SCUDIF)	New Work Item
TS 23.078	CAMEL Phase 4 – Stage 2	Rel 99, Rel 4, Rel 5 and Rel 6 being revised.
TS 29.078	CAMEL Application Part (CAP)	Rel 5 and Rel 6 being revised.

CN3 (Interworking with External Networks)

3GPP TSG CN Working Group 3 (CN3) specifies bearer capabilities for circuit and packet switched data services and the necessary interworking functions towards both the UE in the UMTS PLMN and the terminal equipment in the external network. In addition, CN3 is responsible for end-to-end QoS for the UMTS core network from Rel 5 on.

Rel 5 CRs accepted at the recent meetings were for:

- Service Change and UDI Fallback for CS multimedia (SCUDIF).
- End-to-end Quality of Service over Go interface.

Rel 6 topics addressed included:

- A year has passed since the last contributions on IMS/IP-network Interworking TS 29.162. Instead of abandoning this WI it will be reoriented to describe Stage 3 for interworking between IPv4 and IPv6 after IMS work has stabilized. The IMS IPv4 and IPv6 interworking Stage 2 is being developed by SA2.
- CRs on IMS/CS-network Interworking were accepted.
- The Gq interface will be based on Diameter. This interface is used for service-based policy set-up information exchange between the Policy Decision Function (PDF) and the Application Function (AF; e.g. the P-CSCF).
- A working assumption is that Diameter will be the protocol for the MBMS Gmb interface.

- No progress has been made on Presence Capability due to a lack of contributions.
 - A new specification will be created to document the WLAN interface, instead of incorporating it into an existing TS.
- CN4 (MAP, GTP, BCH and SS)**
- 3GPP TSG CN Working Group 4 (CN4) specifies the Stage 2 for Core Network Supplementary Services (SS), Basic Call Handling (BCH), Mobility Management (MM) and the Bearer Independent Architecture. CN4 also specifies mobile specific protocol specifications within the mobile core network
- Highlights of the recent meetings include:
- Rel 6 CRs for Public Service Identity and sharing public identifies across multiple User Equipment were agreed to for inclusion in Subscriber Data Handling for the IP Multimedia Subsystem (IMS).
 - Some progress was made in the development of the Rel 6 Wireless LAN Interworking specification Stage 3 (**TS 29.234**) on the Wx interface between the Home AAA and the HSS for:
 - » Authentication commands.
 - » Profile download procedure.
 - » Registration and Cancel Registration procedures.
 - CN4 has completed Presence for Rel 6. The Presence Network agent will use the same national subsystem number as gsmSCF (MAP) and CAMEL Application Server (IM-SSF) for the Ph, Pc, and Pg reference points between the Presence Network agent and, respectively, the HSS/HLR, MSC/VLR and SGSN.
 - The GUP interface for Rel 6 will be defined by referencing relevant specifications from the Liberty Alliance (www.projectliberty.org), with GUP-specific enhancements when needed.

Table 3: 3GPP TSG CN Working Group 3 (External Interworking) Specification Update

Document	Title	Status
TS 23.172	Technical realization of Circuit Switched (CS) Multimedia Service UDI/RDI Fallback and Service Modification; Stage 2	Rel 5 being revised. Rel 6 available.
TS 27.001	General on Terminal Adaptation Functions (TAF) for Mobile Stations	Rel 99 (version 3.14) being revised.
TS 29.007	General Requirements on Interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)	Rel 99 (version 3.14), Rel 4 and Rel 5 being revised.
TS 29.061	Interworking between the Public Land Mobile Network (PLMN) Packet Based Services and Packet Data Networks (PDN)	Rel 99, Rel 4, and Rel 5 being revised. Rel 6 available.
TS 29.163	Interworking between the IMS CN and Circuit Switched Networks	Rel 5 and Rel 6 being revised.
TS 29.208	End-to-end QoS Signalling flows	Rel 6 being revised.

Table 4: 3GPP TSG CN Working Group 4 (MAP/GTP/BCH/SS) Specification Update

Document	Title	Status
tbd	Work Item for Support for Certificates, Stage 3	Description updated to enhance the relationship with Generic Authentication Architecture.
tbd	Trace Management; Stage3	New work item.
TS 03.16	Subscriber Data Management; Stage 2	Rel 98 being revised.
TS 03.18	Basic Call Handling; Technical Realization	Rel 97 and Rel 98 being revised.
TS 09.02	Mobile Application Part (MAP) Specification	Rel 98 being revised.
TS 23.003	Numbering, Addressing and Identification	Rel 99, Rel 4 and Rel 5 being revised. Rel 6 available.
TS 23.007	Restoration Procedures	
TS 23.008	Organization of Subscriber Data	Rel 6 available.
TS 23.012	Location Management Procedures	
TS 23.016	Subscriber Data Management; Stage 2	Rel 99, Rel 4, Rel 5 and Rel 6 being revised.
TS 23.018	Basic Call Handling; Technical Realization	Rel 5 and Rel 6 being revised.
TS 23.094	Follow-Me (FM); Stage 2	Rel 6 available.
TS 24.030	Location Services (LCS); Supplementary Service Operations; Stage 3	Rel 6 being revised.
TS 24.080	Mobile Radio Interface Layer 3 SS Formats and Coding	

Table 4: 3GPP TSG CN Working Group 4 (MAP/GTP/BCH/SS) Specification Update - cont.

Document	Title	Status
TS 29.010	Information Element Mapping between MS and BS and between BS and MSC; Signalling Procedures and MAP	Rel 99, Rel 4, Rel 5 and Rel 6 being revised.
TS 29.228	IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling Flows and Message Contents	Rel 5 and Rel 6 being revised.
TS 29.229	Cx and Dx Interface based on the Diameter Protocol; Protocol Details	Rel 6 available.
TS 29.328	IP Multimedia (IM) Subsystem Sh Interface; Signalling Flows and Message Content	Rel 5 and Rel 6 being revised.
TS 29.329	Sh Interface based on the Diameter Protocol; Protocol Details	Rel 5 being revised. Rel 6 available.

CN5 – Open Service Access (OSA)

3GPP TSG CN Working Group 5 (CN5) develops the Application Programming Interfaces (APIs) for the UMTS Open Service Access (OSA). Its work is based on Service Requirements from SA1 and the Architecture from SA2.

Table 5: 3GPP TSG CN Working Group 5 (OSA) Specification Update

Document	Title	Status
tbd	Work Item Description for OSA Stage 3	Updated to merged the static and dynamic part of the “Expected Output and Time Scale” and changed the completion date to June 2004.
TS 29.198-01	OSA Part 1: Overview	Rel 5 being revised. Rel 6 available.
TS 29.198-02	OSA Part 2: Common data	Rel 4 and Rel 5 being revised. Rel 6 available.
TS 29.198-03	OSA Part 3: Framework	Rel 5 being revised. Rel 6 available.
TS 29.198-04	OSA Part 4: Call Control (in four sub-parts)	Rel 4, Rel 5 and Rel 6 being revised.
TS 29.198-05	OSA Part 5: Generic User Interaction	Rel 4 and Rel 5 being revised.
TS 29.198-06	OSA Part 6: Mobility	Rel 6 being revised.
TS 29.198-07	OSA Part 7: Terminal Capabilities	Rel 6 available.
TS 29.198-08	OSA Part 8: Data Session Control	
TS 29.198-11	OSA Part 11: Account Management	
TS 29.198-12	OSA Part 12: Charging	Rel 4, Rel 5 being revised. Rel 6 available.
TS 29.198-13	OSA Part 13: Policy Management SCF	Rel 5 and Rel 6 being revised.

Meetings

TSG CN held its most recent plenary meeting from March 10–12th 2004 in Phoenix, Arizona.

Future plenaries will be held:

- June 2 – 4th 2004 in Seoul, Korea.
- September 8 – 10th in USA.
- December 8 – 10th in Athens, Greece.
- March 9 – 11th 2005 in Tokyo, Japan.
- June 1 – 3rd 2005.
- September 7 – 9th 2005.
- November 30th – December 2nd 2005.

CN1, CN3 and CN4 meetings are planned for May 10th – 14th 2004 in Zagreb, Croatia; August 16th – 20th 2004 in Sophia Antipolis, France; and November 15th – 19th 2004 in Asia.

The last CN2 meeting is planned for May 10th – 14th 2004 in Zagreb, Croatia.

CN5 meetings are planned for May 10th – 14th 2004 in Miami, USA; August 9th – 13th 2004 in New Jersey, USA; and November 1st – 5th 2004 in Zurich, Switzerland.

For a complete schedule of 3GPP meetings consult:

www.3gpp.org/Meetings/meetings.htm