

# Cellular Networking Perspectives

Editor: [David.Crowe@cnp-wireless.com](mailto:David.Crowe@cnp-wireless.com)

Vol. 11, No. 11 November, 2002

## In This Issue . . .

### *FCC Suspends the "123" Solution for Emergency Callback*

.....p. 1  
The FCC has suspended their previous order that "123-456-7890" should be used as a callback number for uninitialized phones. Most likely, the J-STD-036 solution, based on ESN or IMEI, will be used instead.

### *Major Report on US Emergency Services Implementations*.....p. 1

A former top FCC engineer has released a report on the (less than stellar) status of wireless 911 implementation in the US.

### *Adventures in Roaming: A Case for Improved International Service*.....p. 1

A veteran of the wireless industry has trouble roaming internationally, and reflects on what this might mean for customer perception and carrier revenue.

### *3GPP Release 5*.....p. 2

3GPP has basically completed its Release 5. This is the first release that is based on an All-IP core network, and is a massive undertaking, for which the completion of specifications is merely the beginning.

## Comments

We welcome comments on the format or contents of *Cellular Networking Perspectives*. We can be reached via email at:

[cnpaccts@cnp-wireless.com](mailto:cnpaccts@cnp-wireless.com)

**Next Issue: December 3<sup>rd</sup>, 2002**

## FCC Suspends the "123" Solution for Emergency Callback

On September 30, 2002 the **US FCC** issued a **stay of an order** that would have required the number "123-456-7890" to be used as the pseudo-callback number for mobiles that have placed an emergency call, but that cannot be called back (such as uninitialized phones). There are several problems with the FCC's proposed solution, including:

- The existence of a standardized solution (in TIA/ATIS J-STD-036 Annex C).
- The inability to distinguish between two different uninitialized mobiles making 911 calls.
- The potential for loss of an IRM block to identify international roamers.

The **Emergency Services Interconnect Forum (ESIF)** is taking the lead on a combined wireless industry/emergency services response to this. Although ESIF has not ruled out recommending a third approach, it is most likely they will recommend that the FCC should recognize the J-STD-036 solution, which is already being implemented by some wireless infrastructure vendors and carriers.

## Major Report on US Emergency Services Implementations

The FCC has published a **major report on US emergency services ("911") implementations**. Dale Hatfield, a former senior FCC employee, concluded in his report that 'antiquated' wireline technology is acting as a barrier to getting Enhanced 911 information (e.g. geographic position) to the emergency call takers.

Comments on the report should be filed with the FCC by November 15, 2002.

Not only does Hatfield conclude that the LEC infrastructure for 911 is antiquated, but he also noted that the role and responsibilities of these carriers have not been defined.

Most of Hatfield's recommendations are essentially bureaucratic:

1. More coordination with other government organizations,
2. A clearinghouse to exchange technical and status information,
3. An FCC advisory committee on wireless enhanced 911, and
4. Development of industry standards for compliance testing.

## Adventures in Roaming: A Case for Improved International Service

*Gustavo Pavon  
Telecom Learning*

On a recent international trip, I brought my cellphone along, expecting to remain wirelessly in touch. I based this expectation on information provided by my wireless carrier, since they claimed to offer international roaming coverage in the city I was visiting. I was even more confident because I knew that the visited network used the same technology as my home provider.

On arrival at the airport, I phoned my wife. Since I had researched the local dialing plan, the call went as expected, without a problem! However, a short time later, I tried calling my office voicemail from my taxi to the hotel, and got only a local announcement informing me that my local prepaid subscription had insufficient funds!

Editor: David Crowe.  
Accounts: Evelyn Goreham.  
Distribution: Debbie Brandelli.  
Production: Doug Scofield.

*Cellular Networking Perspectives* (issn 1195-3233) is published monthly by Cellular Networking Perspectives Ltd., 2636 Toronto Crescent NW, Calgary AB, T2N 3W1, Canada. Phone: 1-800-633-5514 (+1-403-274-4749) Fax: +1-403-289-6658  
Email: [cnp-sales@cnp-wireless.com](mailto:cnp-sales@cnp-wireless.com) Web: [www.cnp-wireless.com](http://www.cnp-wireless.com) Subscriptions: CDN\$350 in Canada (incl. GST), US\$350 in the USA and US\$400 elsewhere. Payment by cheque, bank transfer, American Express, Diners Club, MasterCard or Visa. Delivery: Email or 1st class mail. Back Issues: Single issues are \$40 in the US and Canada and \$45 elsewhere, or in bulk at reduced rates. Discounts: Educational and small businesses: 25% off any order. Copies: Each subscriber is licensed to make up to 10 copies of each issue or back issue. Please call for rates to allow more copies.

I tried calling from my room and from other points in the city throughout my trip, but was rarely successful. By now I was not surprised to find out that my daily infoservice SMS messages were not being delivered. Adding to the confusion, I did receive my incoming calls. This enabled me to discount a problem with Authentication settings.

The problem turned out to be that the local carrier had not fully coordinated their MIN (Mobile Identification Number) analysis trees. The MSC serving my call at the airport had recognized me as a roamer, and had successfully launched ANSI-41 queries to my HLR, received information about my calling features and was able to authenticate my phone. Other MSCs in the city, however, did not have updated MIN analysis trees, and therefore gave me default treatment, assuming my phone was a local device without a valid subscription.

After my investigation, I called the local customer support number. Again I heard the annoying local prepaid announcement. I was only able to get through by borrowing a mobile phone with a local subscription. The ensuing dialogue with the call taker was extremely amusing (to me anyway). He would not believe that I had a subscription with a foreign carrier, and that I was expecting service. Eventually he handed me over to a more senior person who began to tell me a fairy tale about how the cell I was on was not able to receive my signal.

## The Final Mile

There is money being left on the table. My cellular bill for that month showed about US \$150 in roaming charges for the incoming calls I did get. It would have easily been twice as much if I had been able to place outgoing calls.

IATA, the International Air Transport Association, reports that in 2001, almost 100 million scheduled passengers traveled between North and South America, Europe or Asia. Unfortunately, not all these travelers can benefit from international wireless roaming service. Many operators are taking adequate steps, but there are still important service gaps. Published studies demonstrate the sustainability of the business case.

Organizations such as IFAST, the CDG and 3GAmericas are hard at work analyzing and proposing resolution to the main issues. Another excellent example of global initiative is the 2nd symposium for CDMA global roaming, taking place November 4–5, 2002 in Seoul Korea, which will cover advanced topics including inter-standard and data roaming. A relatively small final effort can bring in significant additional

revenues to the individual operators who understand and introduce the recommendations to their networks.

## The Human Touch

I can empathize with how the customer service guy felt after he took my call. He was probably a part-time student with little understanding of the screen in front of him, minimal customer service training, and certainly was not conscious about the global context of mobility. But I also empathize with foreign visitors to North America trying to use their phones.

Customer Support and other customer interacting organizations need to be trained to understand the implications of international roaming scenarios, both when international visitors are trying to make use of the local network, and when local subscribers travel abroad.

Creative initiatives to take care of roamers make a positive impression and will encourage them to make more calls (and thereby pay more money to the carrier). As examples, operators could send a Welcome SMS with information about local dialing plans, set up a local customer service number specifically for roamers, or establish a direct line to the roamer's home customer care.

This is important because, in the roaming case, the visited operator is an extension of the home service. All aspects of the customer experience contribute to their degree of satisfaction, and international roamers – especially business travelers – belong to a premium customer segment.

## Conclusions

In an era of increasingly globalized markets, key customers are looking for International Roaming capabilities. Markets are deeper, broader and more connected. The ability to offer a global presence is key to success. Operators need to embrace the international roaming business opportunity throughout their organization.

In a future column, I will present the issues as seen from a foreign operator perspective – in particular, the challenges of prepaid interoperability.

## About the Author

Gustavo Pavon has over 14 years of Telecommunications experience ranging from system design to standards representation to Latin America market development. He operates *Telecom Learning*, a consulting company assisting operator sales channels by anticipating knowledge needs through technology transition periods. He can be reached at +1-214-566-9193 or by email at [gustavo\\_pavon@yahoo.com](mailto:gustavo_pavon@yahoo.com).

## 3GPP Release 5

3GPP Release 5 (Rel5) defines the All-IP architecture for 3GPP, which has been in development for 2 years. This new architecture is more formally known as the IP Multimedia Subsystem (IMS). It is built on standard internet protocols (IETF RFCs, standards and drafts), although to support the wireless and mobile environment, these have been, and continue to be, enhanced by the IETF, based on input from 3GPP.

Previous releases of functionality focussed on the radio interface, migrating from GSM – based on 1980's technology – to Wideband CDMA, to compete with CDMA2000 systems from 3GPP2. Rel5 focuses on the Core Network, hoping to increase flexibility and service integration while reducing costs by merging voice, data and signaling onto one network.

The functional content of Rel5 was frozen at the June 2002 3GPP TSG meeting, although some items, such as CAMEL control of IMS services and Shared Network support were not completed until September 2002.

Even though the contents of Rel5 are frozen and most specifications published, it is expected that substantial corrections and clarifications will occur before the specification stabilizes. This is particularly true for testing cases, charging issues, and operation and maintenance issues (OA&M).

While continuing clean-up work on Rel5, 3GPP has now turned its attention to Release 6 (Rel6). It contains many new features, including some postponed from Rel5. The current Rel6 work plan is to have contents froze by June 2003.

**Table 1** lists the major 3GPP Release 5 features and **Table 2** lists those scheduled for inclusion in 3GPP Release 6. Working groups are identified as Rx for TSG-RAN, CNx for TSG-CN, Tx for TSG-T and SAx for TSG-SA. A detailed summary of 3GPP TSGs and their working groups is shown in our **August 2001** issue.

### Huh?

If there are any acronyms or terms that you are unfamiliar with, check our website glossary – you will probably find them there:

[www.cnp-wireless.com/glossary.html](http://www.cnp-wireless.com/glossary.html)

**Table 1: Major 3GPP Release 5 Features**

Feature	Description and Responsible Working Groups	Status
	Evolution of transport to IP in the UTRAN (R3)	<ul style="list-style-type: none"> <li>Work completed at TSG-RAN#15 (March 2002)</li> </ul>
	Evolution of transport in the Core network: Feasibility Study on SUA (SCCP User Adaptation) (CN4)	<ul style="list-style-type: none"> <li>Completed at TSG-CN#14. Concluded that SUA will not be part of Release 5</li> </ul>
	HSDPA (High Speed Downlink Packet Access; R1 and R4)	<ul style="list-style-type: none"> <li>Completed at TSG-RAN#15 (March 2002) except RF Radio Transmission/Reception, System Performance Requirements and Conformance Testing (R4)</li> </ul>
Improvement of Radio Interface	UMTS 1800/1900 (R4)	<ul style="list-style-type: none"> <li>Completed at TSG-RAN#15</li> </ul>
	Enhancement on DSCH (Downlink Shared Channel) hard split mode (R1)	<ul style="list-style-type: none"> <li>Completed at TSG-RAN#15</li> </ul>
	BS Classification for 1.28 Mcps TDD option (R4)	<ul style="list-style-type: none"> <li>Completed at TSG-RAN#16 (June 2002)</li> </ul>
IMS (IP-based Multimedia Subsystem)	Stage 1 requirements	<ul style="list-style-type: none"> <li>TS 22.228 completed at TSG-SA#14 (December 2001)</li> </ul>
	Stage 2 architecture and system requirements	<ul style="list-style-type: none"> <li>TS 23.228 published as version 5.0.0 at TSG-SA#13 (September 2001)</li> <li>Many corrections and clarifications since the publication of version 5.0.0</li> </ul>
	Detailed stage 2 and stage 3 protocols (various SA and CN WGs)	<ul style="list-style-type: none"> <li>Still open issues and IETF draft dependencies on Stage 3, but estimated to be 90 – 95% completed</li> </ul>
	Stage 2 call model (CN1)	<ul style="list-style-type: none"> <li>TS 23.218 frozen at TSG-CN#15 (March 2002) and published in June 2002 as version 5.0</li> </ul>
	Stage 3 information flows (CN1)	<ul style="list-style-type: none"> <li>TS 24.228 completed, and now accepting CRs.</li> </ul>
	Stage 3 protocol details (CN1)	<ul style="list-style-type: none"> <li>TS 24.229 95% frozen at TSG-CN#16</li> </ul>
	IMS – Security Issues (SA3)	<ul style="list-style-type: none"> <li>TS 33.203 (access security for IP-based Services Stage 2) approved at TSG-SA#15</li> <li>TS 33.210 (Network Domain Security) approved at TSG-SA#15</li> <li>TS 33.108 (Lawful interception) completed at TSG-SA#16</li> </ul>
	SIP compression (CN1)	<ul style="list-style-type: none"> <li>CN1 work is done, but one open item on an error case to be solved by IETF.</li> <li>Completion depends on IETF SigComp</li> </ul>
	Charging (SA1, SA2, SA5)	<ul style="list-style-type: none"> <li>Stage 1 – TS 22.115 – completed</li> <li>Stage 2 – TR 23.815 – completed</li> <li>Stage 3 – TS 32.225 – Approved as version 5.0 in September 2002</li> </ul>
	Extended Transparent End-to-End Packet Switched Mobile Streaming Applications (SA4)	<ul style="list-style-type: none"> <li>Stage 1 – TS 22.233 and CRs to TS 22.105 completed at TSG-SA#15</li> <li>Stage 2 CRs to TS 26.233 and TS 26.234 completed at TSG-SA#15</li> <li>Stage 3 – not strictly necessary, will not be produced.</li> </ul>

**Table 1: Major 3GPP Release 5 Features (continued)**

Feature	Description and Responsible Working Groups	Status
OSA (Open Service Access; SA1, SA2, CN5)		<ul style="list-style-type: none"> <li>• Stage 1 and Stage 2 have been aligned to the reduced scope of OSA Rel-5</li> <li>• Corresponding aligned Parlay 4.0 and ETSI OSA 2.0 specifications will now also be produced.</li> <li>• Release 5 is completed at TSG-CN#16</li> <li>• Remaining Stage 3 work on:               <ul style="list-style-type: none"> <li>• OSA APIs for multi-media</li> <li>• Retrieval of Terminal Capabilities</li> <li>• Framework</li> <li>• Generic User Interaction</li> <li>• Charging</li> <li>• Policy management</li> <li>• Presence and Availability Management</li> </ul> </li> </ul>
CAMEL Phase 4 (CN2)		<ul style="list-style-type: none"> <li>• Stage 2 – CRs to TS 23.078 completed at TSG-CN#16</li> <li>• New stage 2 TS 23.278 95% completed at TSG-CN#17</li> <li>• Stage 3 – CRs to TSA29.078 completed at TSG-CN#16</li> <li>• New stage 3 TSA29.278 approved at TSG-CN#17</li> </ul>
MExE (Mobile Execution Environment; T2)		<ul style="list-style-type: none"> <li>• Completed at TSG-T#15</li> </ul>
WB-AMR (WideBand - Adaptive Multi Rate Voice Coder; SA4, CN4)		<ul style="list-style-type: none"> <li>• Completed at TSG-SA#16</li> </ul>
LCS (Location Services; SA2, CN1, TSG RAN)		<ul style="list-style-type: none"> <li>• Completed at TSG-SA#16</li> </ul>
UICC/USIM enhancements and interworking (Universal Integrated Circuit Card / Universal Subscriber Identity Module enhancement and interworking; T3)		<ul style="list-style-type: none"> <li>• TS 31.103 “ISIM Application” completed at TSG-T#16 (June 2002)</li> <li>• TS 23.048 “Test Specification” Work item approved at TSG-T#15. Technical work has not started</li> </ul>
Security Enhancement: Network Domain Security (SA3)		<ul style="list-style-type: none"> <li>• TS 33.210 completed at TSG-SA#15</li> </ul>
Iu-Flex (Intra Domain Connection of RAN Nodes to Multiple Core Network Nodes; SA2, CN1, CN4, TSG RAN, TSG GERAN)		<ul style="list-style-type: none"> <li>• Work completed at TSG-SA#15</li> <li>• No stage 1 defined for this feature</li> <li>• Stage 2 TSG 23.236 completed at TSG-SA#13</li> <li>• Stage 3 completed at TSG-CN#15</li> <li>• Stage 3 TR25.875 and CR completed at TSG-RAN#15</li> <li>• Stage 3 GERAN just started</li> </ul>
End-to-End QoS (Quality of Service; SA2, CN3)		<ul style="list-style-type: none"> <li>• Stage 2 – TS 23.207 completed TSG-SA#12 (June 2001)</li> <li>• Stage 3 – TS 29.207 completed TSG-CN#16</li> <li>• Stage 3 TS 29.208 completed TSG-CN#16</li> </ul>
Messaging Enhancements	MMS (multimedia messaging service) T2	<ul style="list-style-type: none"> <li>• TS 23.140 completed at TSG-T#15</li> </ul>
	EMS (Enhanced Messaging Service) T2	<ul style="list-style-type: none"> <li>• Completed at TSG-T#15</li> </ul>
UE (User Equipment) functionality split (SA1)		<ul style="list-style-type: none"> <li>• Technical report on feasibility from SA1 completed</li> <li>• Conclusion of the FS: care is needed when implementing functionally split of UE. No specification work foreseen at this time.</li> </ul>
User Equipment Management (SA1, T2)		<ul style="list-style-type: none"> <li>• Work is completed at TSG-SA#16</li> <li>• TR 32.802 feasibility study produced in co-operation with T2</li> </ul>



**Table 1: Major 3GPP Release 5 Features (continued)**

Feature	Description and Responsible Working Groups	Status
Charging and OAM&P (Operation, Administration, Management and Provisioning; SA5)		<ul style="list-style-type: none"> <li>Completed at TSG-SA#17 in September 2002</li> <li>TS 32.225 IMS charging – detail review on-line charging and diameter protocol needed</li> <li>TS 32.200 Charging Principles – alignment of Stage 2/Stage 3 for MMS charging needed. Addition of LCS charging needed</li> <li>TS 32.403 Performance Measurement – needs more time to complete the work</li> <li>TS 32.600/300-series - Network Infrastructure Management - needs more time to complete the work</li> </ul>
UTRAN Sharing in Connected Mode		<ul style="list-style-type: none"> <li>R3 has completed the necessary CRs, and it has been approved as a Rel5 feature</li> </ul>

**Table 2: Major 3GPP Release 6 Features**

Feature	Description and Responsible Working Groups	Status
Support of Presence Capabilities: The capability to support management of presence information between watchers and presentities, in order to enable applications and services to make use of presence information (SA1, SA2, CN1)		<ul style="list-style-type: none"> <li>Stage 1 TS 22.141 was completed at TSG-SA#13 (September 2001)</li> <li>Stage 2 TR 23.841 completed at TSG-SA#16</li> <li>Stage 3 and other aspects not started, but CN1 has stated a TR outline and has nominated a rapporteur</li> </ul>
MBMS (Multimedia Broadcast and Multicast Service; SA1, SA2, R2)		<ul style="list-style-type: none"> <li>Stage 1 TS 22.146 was completed at TSG-SA#13</li> <li>Stage 2 TR 23.846 is work-in-progress</li> <li>SA2 will be responsible for the overall system and architecture</li> <li>R2 will be responsible for access network impact</li> <li>Stage 3 will be developed by CN WGs. No technical work started.</li> </ul>
Push Service (SA1, SA2)		<ul style="list-style-type: none"> <li>Stage 1 is provided by SA1 in TS 22.174</li> <li>Stage 2 will be developed by SA2, not yet started.</li> </ul>
Wireless LAN (IEEE 802.11) Interworking (SA1, SA2)		<ul style="list-style-type: none"> <li>Stage 1 – TR 22.934 work on going</li> <li>Stage 2 – just started at SA2</li> </ul>
MExE (Mobile Execution Environment) Enhancements (T2)		<ul style="list-style-type: none"> <li>Work Item Description (WID) on MExE improvement and investigation was approved at TSG-T#15</li> <li>Work Item Description on Run-Time Independent Framework Feasibility Study was approved at TSG-T#15</li> </ul>
LCS (Location Services) Enhancements (SA1, SA2, RAN)		<ul style="list-style-type: none"> <li>Two Work Item Descriptions (one for SA1 requirements and one for SA2 architecture and system) approved at TSG-SA#16</li> <li>Study Item on User Equipment position approved at the TSG-RAN#16</li> </ul>

**Table 2: Major 3GPP Release 6 Features (continued)**

Feature	Description and Responsible Working Groups	Status
IMS (IP-Based Multimedia Subsystem) Phase 2 (All WGs)		<ul style="list-style-type: none"> <li>• SA1 WID approved at TSG-SA#16. It includes the Rel-5 postponed items and the newly created ones.</li> <li>• Newly created:               <ul style="list-style-type: none"> <li>• Radio optimization impacts on Packet Switch domain architecture</li> <li>• IMS messaging</li> <li>• IMS Group management</li> </ul> </li> <li>• Postponed from Rel-5:               <ul style="list-style-type: none"> <li>• Identification portability (was number portability in IMS)</li> <li>• IMS local services</li> <li>• IMS to PS interworking</li> <li>• IMS to CS interworking</li> <li>• Interface to Mc (MGCF – IM-MGW): 29.232 based on existing H.248 specification.</li> </ul> </li> </ul>
Emergency Call Enhancements	Emergency calls from UEs without UICC/USIM in Network containing an IMS (SA2, CN1)	<ul style="list-style-type: none"> <li>• Stage 2 call flow and architecture developed by SA2</li> <li>• Stage 3 is responsible by CN1</li> </ul>
	Emergency Call enhancements for IP & PS based call with USIM (SA1, SA2, CN1)	<ul style="list-style-type: none"> <li>• Requirements covered by SA1 IMS Stage 1 TS 22.228</li> <li>• Stage 3 work has started in CN1, but completion depends on the related IMS progress still under discussion in SA2. Still open at SA2</li> </ul>
OSA (Open Service Access for Rel 6; SA1, SA2, CN5)		<ul style="list-style-type: none"> <li>• In line with SA1 OSA Rel-6 WID</li> <li>• Plus postponed Rel-6 work moved by SA1 and SA2</li> </ul>
GUP (Generic User Profile; SA1, SA2, T2)		<ul style="list-style-type: none"> <li>• Work ongoing in SA1, SA2, T2.</li> </ul>
Digital Rights Management (SA1)		<ul style="list-style-type: none"> <li>• Stage 1 – TS 22.242 version 2.0.0 sent to TSG-SA#16 for approval</li> </ul>
Speech Recognition and Speech Enabled Services		<ul style="list-style-type: none"> <li>• Stage 1 – TS 22.243 is stable in SA1. Draft version sent for information at the TSG-SA#16</li> </ul>