

## In This Issue...

*Calling Party Pays, Part III: More Implementation Alternatives..... p. 1*

Calling Party Pays could be implemented through access to the LIDB database that is currently used by landline carriers to validate operator assisted calls. But, even this approach has its problems. What would happen if one was to ignore all the barriers placed by the installed network and just design Calling Party Pays from scratch? Even if that was the perfect system, is anybody still interested?

*TIA TR-45.2 Wireless Network Standards ..... p. 4*

The latest information on standards that have been published by TIA's TR-45.2 standards subcommittee related to wireless networks, including a number of 3G-related standards that are currently being balloted, and many more that are under development.

*Status of IS-41 Rev. C & TIA/EIA-41-D Implementations p. 6*

Major vendors of infrastructure equipment report the status of their implementations of features provided by the TIA/EIA-41-D inter-systems operation standard, and a number of 'add-on' standards published later.

## Calling Party Pays, Part III: More Implementation Alternatives

In the January issue of *Cellular Networking Perspectives* we discussed two implementation alternatives for CPP (Calling Party Pays). The most commonly used alternative – *CPP Determined by Number Block* – has numerous restrictions, and does not allow CPP subscribers to port their phone numbers to other carriers, something that may well be a requirement in future. The second alternative is based on ISUP signaling modifications. Although it is significantly more flexible, and was chosen during the development of a CTIA Standards Requirements Document, there were some who believed that the use of the LIDB database was more appropriate, as less standardization would be required. After discussing this alternative, we will wipe the slate clean and describe the ultimate CPP system, assuming that the development and implementation of new standards is not a barrier to new approaches.

## Line Information DataBase (LIDB) Solutions

LIDB is maintained by each Local Exchange Carriers (LEC) in North America to allow inter-carrier validation and billing. Whenever a collect call is made from a phone number controlled by one LEC, to a phone number con-

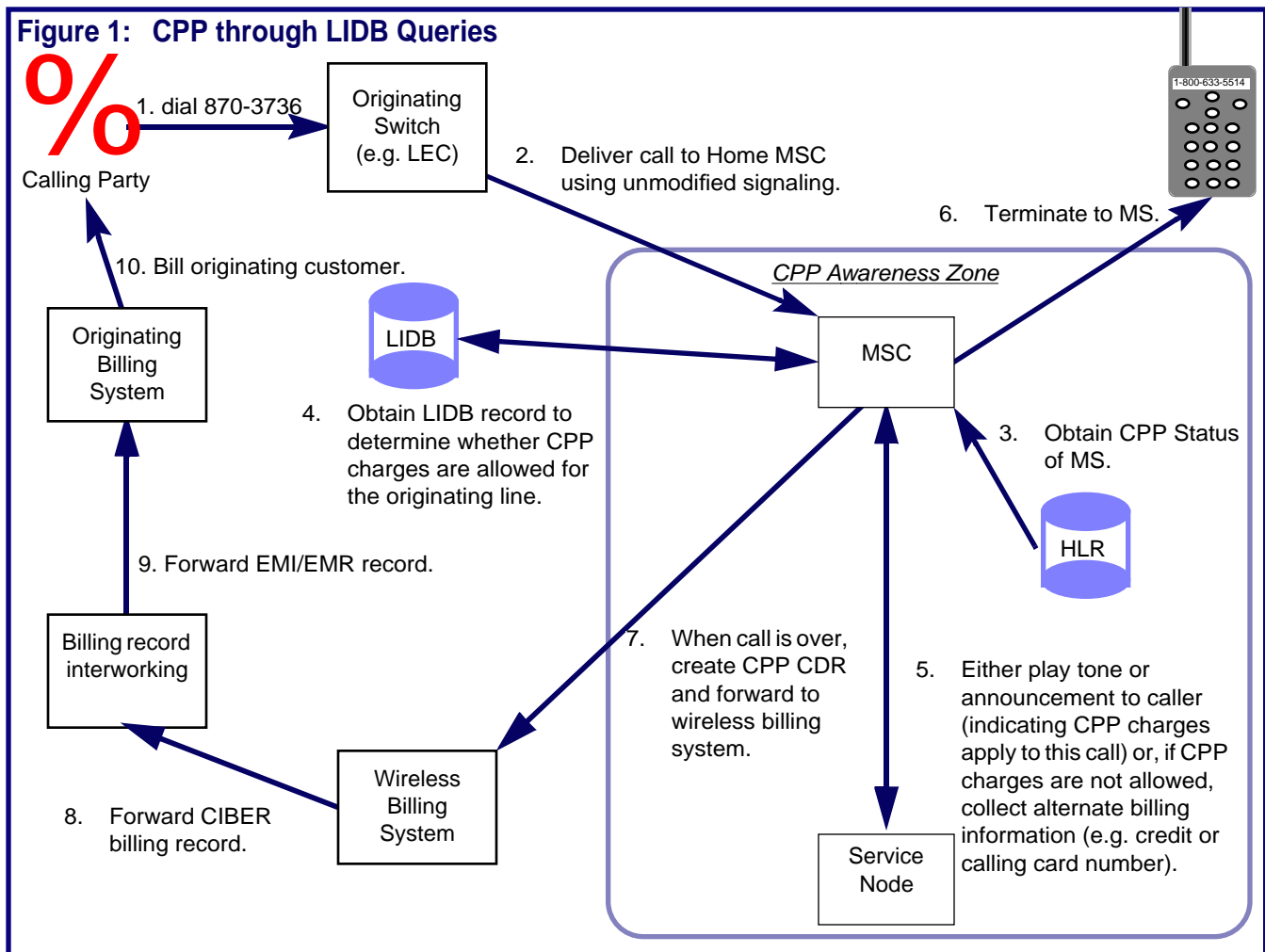
trolled by another LEC, a LIDB query is required. If it turns out that the destination number is a payphone, hotel/motel phone or a residential line blocked from making collect calls, the collect call will be denied. The lack of LIDB is what makes accepting collect calls from a wireless phone (and billing to a third party wireless phone, etc.) impossible today.

The major advantage of LIDB-based solutions over ISUP, is that intermediate switching elements (in particular the inter-exchange carriers) do not need to upgrade their systems, and therefore cannot block the service or add unnecessary costs to it. On the downside, LIDB is currently only supported by landline carriers, and not wireless carriers. Consequently, LIDB solutions cannot support calls from other wireless phones. Also, like the ISUP solutions, some phones still cannot be billed, and the difficult technical and political issue of wireless/landline billing record conversion and exchange still remains.

## LIDB Advantages

1. Intermediate switching elements are not affected, consequently:
  - i. Inter-exchange carriers cannot block the service by refusing to upgrade their systems to pass information through.
  - ii. Inter-exchange carriers do not add costs to the service.

**Next Issue: March 1, 2000**



2. As with the ISUP-based solution, the service is controlled by the wireless carrier, allowing billing based on individual subscriber profiles, for example.
3. It may be possible to avoid MSC modifications through the use of LNP or loop-around trunks to divert CPP calls.

### LIDB Disadvantages

1. The LIDB record format will need to be updated. This is a proprietary format controlled by Telcordia ([www.telcordia.com](http://www.telcordia.com))
2. Wireless carriers do not maintain LIDB records for their subscribers.
3. Conversion and exchange of billing records will still be required.

Figure 1 illustrates the processing of a call using the LIDB method.

### Minimizing MSC Impact

It is notable that MSC call processing modifications are required for this solution, just as for the ISUP solution. However, there are methods that could be used to minimize the impact on the MSC, or even eliminate it entirely. This is not likely to be applicable to ISUP solutions, because it is hard to offload signaling from a switch, but relatively easy to offload database queries.

### LNP Diversion

Nortel had proposed that Local Number Portability (see our May 1999 issue for details) could be used to divert CPP calls to an Operator Services platform. This is based on the observation that a LIDB-based CPP service is similar to existing operator services, such as collect calling. The operator services platform can provide notification of CPP charges, validation of the calling party, acceptance of

alternate charging information, and billing using landline formats (EMI/EMR).

If the incoming call is accepted, the platform could forward the call to an MSC which would handle the call normally. Billing would be performed by the operator services platform, with the wireless billing system only being modified to ensure that airtime charges are suppressed for CPP subscribers.

The operator services platform would probably have to be controlled by the wireless carrier, but this expense could be leveraged to allow wireless carriers to provide other operator services for their customer.

Although this solution has a number of advantages, it faces some significant hurdles as well:

- It does not provide a solution for mobile originated CPP calls, where there is no LIDB to query and CIBER records are used for billing.

- The platform needs to stay connected for the duration of the call, which increases the resources required.
- Wireless carriers would have to implement Local Number Portability, something that they are currently trying to avoid.

### Other Ways to Minimize MSC Impacts

Another solution that also minimizes the impact of CPP on the MSC that was promoted by AGCS is to use a loop-around trunk to divert calls to a platform that would handle the billing issues, and then back into the MSC to actually deliver the call. Alternatively, WIN-based triggers could be used from WIN-enabled MSC's to perform the diversion to a CPP platform.

### The Ultimate CPP Solution

All current CPP solutions are a compromise, trying to achieve a workable and profitable solution without forcing too many network changes. But, what if network changes were not a barrier? What kind of system could provide a CPP ser-

vice to seamlessly transcend even international boundaries?

There are two seemingly contradictory goals:

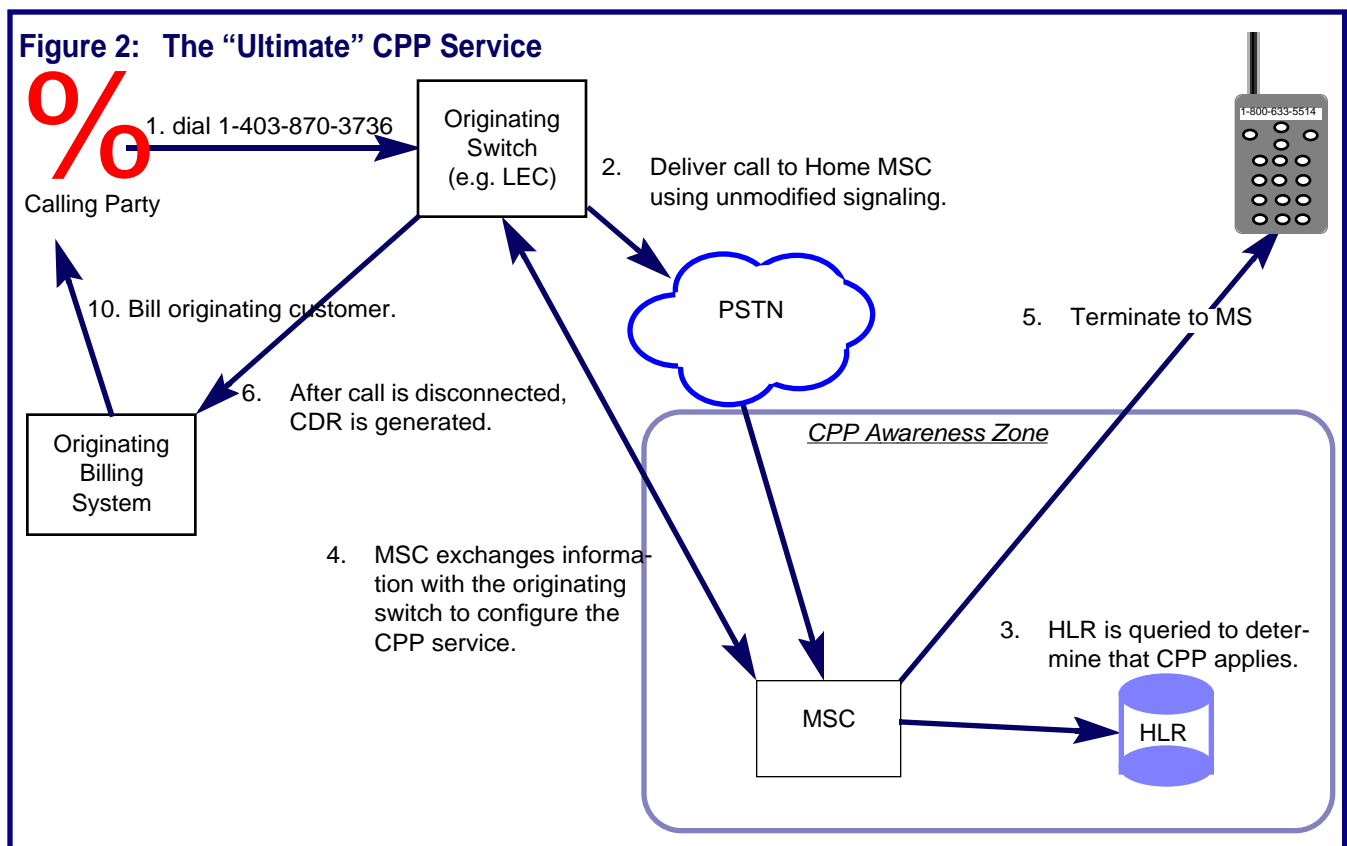
- The interface to the caller should be at the originating point, to provide announcements, charging options and billing services in a way that they are accustomed to (including in their own language), but...
- The decision as to whether CPP applies to a call should be made by the terminating wireless carrier.

These goals can both be attained by a system shown in Figure 2. This method would require signaling between the originating carrier and the destination mobile's home wireless carrier. This signaling would establish that the terminating mobile subscribes to the CPP service, and whether the calling party is eligible for a CPP call, and would establish the method to be used for charging. Billing would be the responsibility of the originating carrier, with revenue shared with the terminating wireless carrier through settlement procedures.

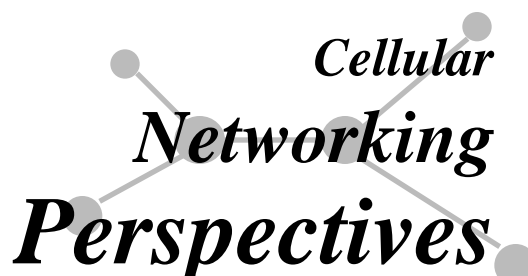
### Conclusion

CPP in North America is either the service that time has passed by or the service whose time has not yet come. There are tremendous hurdles to be overcome, yet could be an important way to encourage customers to keep their phones turned on, and generate more revenue for the carrier. A smart carrier might even pay every CPP customer for each call they receive!

Currently, there is no proponent of CPP that has both the clout to push a standard solution forwards and the stamina to stick with a process that would likely take several years to substantially eliminate the barriers facing CPP. Now that the CTIA appears to have lost interest, only time will tell whether the FCC will be CPP's Fairy Godmother, or perhaps whether a major carrier (like Bell Atlantic) that still has an interest in CPP will determine that it needs to broaden the scope of the service, and will attempt to stimulate a concerted industry-wide effort to resolve them.



# TIA TR-45.2 Wireless Network Standards



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## ANSI Standards and Annexes

ANSI Std.	Description	Status
TIA/EIA-41-D	Intersystem Operations	Published 12/97
TIA/EIA-93-A	Ai and Di Interfaces Standard (including 9-1-1 Phase I cell/sector location)	Published 11/98
TIA/EIA-124-B	Cellular Inter-System Non-Signaling Data Communications	Published
TIA/EIA-660	Cellular Dialing Plan (formerly IS-52)	Published 09/96
TIA/EIA-664	Cellular Feature Descriptions (formerly IS-53)	Published 09/96

## Published TIA/EIA Interim Standards (IS)

IS-	Description	Status
J-STD-025	CALEA surveillance support (joint with ATIS T1) - interim standard	Published 12/97
J-STD-034	Enhanced Wireless 9-1-1, Phase I: identify mobile and cell/sector location	Published 12/97
TIA/EIA-664-536	Analog Group III Fax for CDMA Wireless Local Loop Systems (Stage I description)?	In press
IS-725-A	IS-725 enhanced to include Over-the-air Parameter Administration (OTAPA)	Published
IS-728	Inter-System Link Protocol (ISLP). Supports data calls after inter-MSC handoff.	Published 04/98
IS-730	IS-41 Support for IS-136 DCCCH (TDMA digital control channel)	Published 10/97
IS-735	IS-41 Support for IS-95-A (advanced CDMA)	Published 02/98
IS-737	IS-41 support for data services for digital terminals (TDMA and CDMA)	Published 05/98
IS-751	International Mobile Station Identity (E.212 IMSI)	Published 02/98
IS-756-A	Wireless Number Portability (WNP), Phase II (MDN/MIN separation to allow porting to or from wireless phone numbers)	Published 12/98
IS-764	Calling Name Presentation/Restriction (Stage II, III)	Published 06/98
IS-771	Wireless Intelligent Network (WIN)	Published
IS-778	Authentication enhancements	Published 03/99
IS-807	Internationalization of TIA/EIA-41	Published
IS-812	TIA/EIA-41 message segmentation (to overcome SS7 network packet size limitations of 272 octets)	Published 08/99

## Current Telecommunications Systems Bulletins (TSBs)

TSB	Description	Published
TSB-29-C	International Implementations of Wireless Systems	Published 09/99
TSB-29-C.1	Addendum to international Implementations of Wireless Systems	Published
TSB-56-A	Application Level Testing for IS-41 Rev. B, IS-53 Rev. 0 and TSB-51	Published 06/94
TSB-76	PCS Multi-Band Support	Published 09/96
TSB-114	<b>Broadcast of emergency alert messages to wireless phones (EAS)</b>	<b>In press</b>

## Balloting TR-45.2 Projects

Standard	PN/SP	Description	Status
J-STD-025-A	PN-4465	CALEA surveillance support (joint with ATIS T1) including FCC Report and Order requirements	Ballot 3/1/2000
TIA/EIA-124-C	SP-4528	Support for WIN and CIBERNET NSDP-B-and-S protocol	Ballot
TIA/EIA-664-A	PN-4652	Cellular features Stage I description (formerly PN-3362)	Ballot
IS-824	PN-4104	Broadcast/Multicast Short Message Service (BTTC)	Post-ballot
IS-826	PN-4287	WIN Phase II: Prepaid calling	Ballot
	PN-4289	WIN Phase II: Premium Rate Charging, Wireless Freephone	Ballot 3/16/2000
	PN-4550	Answer Holding (AH)	Ballot 3/1/2000
	PN-4551	User Selective Call Forwarding (USCF)	Ballot 3/16/2000
	PN-4582	User Identification Module (UIM) for use within 3G and IMT-2000 systems	Ballot 4/3/2000

## Developing TR-45.2 Projects

PN/SP	Description	Editor	Standard
J-STD-025-B	SP-4464	CALEA surveillance support (joint with ATIS T1) including FCC Report and Order requirements	On hold
J-STD-034-A	PN-3890	Enhanced 9-1-1 (E911), Phase II (125 m. location accuracy)	Development
TIA/EIA-41-E	PN-3590	Intersystem Operations	Development
TIA/EIA-93-B	PN-4206	Ai and Di Interfaces Standard (including LNP, 9-1-1 Phase II location and CPP)	Development
IS-756-B	PN-4411	Wireless Number Portability (WNP) Phase III (Feature Interactions and Optimization)	Development
TSB-29-C.2	PN-xxxx	Addendum to International Implementations of Wireless Systems	Development
	<b>PN-3362</b>	<b>Cellular Features, Stage I Description. See TIA/EIA-664-A (PN-4652)</b>	<b>(replaced by PN-4652)</b>
	PN-4177	Enhanced Surveillance Services (non-CALEA "punch-list" items)	Development
	PN-4284	TIA/EIA-41 and TIA/EIA-124 modifications for expanded ESN (Electronic Serial Number)	On hold
	PN-4285	Calling Party Pays (CPP)	On hold
	PN-4288	Enhanced Emergency Services (E9-1-1), Phase III: Optional features beyond FCC mandate	Development
	<b>PN-4371</b>	<b>Personal Mobility</b>	<b>Project cancelled (see PN-4582)</b>
	PN-4392/3	Enhanced Security (authentication and encryption) for TIA/EIA-41	Development
	PN-4410	Automatic Code Gapping (ACG) Overload Control	Development
	PN-4610	Optimal routing to roamers.	On hold
	PN-4615	Out-of-band feature control (i.e. GSM-compatible)	Development
	PN-4616	3G circuit switched data	Development
	<b>PN-4720</b>	<b>Intersystem support for 3G packet data, Phase I</b>	<b>Development</b>
	<b>PN-4746</b>	<b>Location services authentication, privacy and security</b>	<b>Development</b>
	<b>PN-4747</b>	<b>Location service enhancements</b>	<b>Development</b>
<b>PN-4755</b>	<b>Intersystem support for 3G packet data, including simultaneous voice and data</b>	<b>Development</b>	
<b>PN-xxxx</b>	<b>VLR Roamer Database Query</b>	<b>Development</b>	

- Note:
1. IS- TIA Interim Standard, J-STD- Joint ATIS/TIA Standard, TSB- TIA Telecommunications Systems Bulletin, PN- TIA Project Number, SP- ANSI Standards Proposal.
  2. **Bold Type** indicates a modification since the previous publication of this information.
  3. Published TIA standards can be obtained from Global Engineering Documents at 1-800-854-7179.
  4. The date associated with a balloting standard is the deadline for submitting votes and comments.

# Status of IS-41 Rev. C & TIA/EIA-41-D Implementations

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Intersystem Operations Capability	Vendor and Radio Technology													
	Alcatel (MSC)			<b>Ericsson (MSC/BS)</b>		GTE (HLR)	Lucent (MSC/BS)			<b>Motorola (MSC/BS)</b>		<b>Nortel (MSC/BS)</b>		
	Analog	CDMA	TDMA	Analog	TDMA	all	Analog	CDMA	TDMA	Analog	CDMA	Analog	CDMA	TDMA
Authentication (CAVE)	4	4	4	4	4	4	4	4	4	4	4	4	4	4
IS-778 Authentication Enhancements														
CNAP/CNAR		4	4		4	4		⓪	ⓧ			⓪	⓪	⓪
CNIP/CNIR		4	4	4	4	4	4	4	4	4	4	4	4	4
Data (IS-737)		4			4						4		⓪	⓪
Inter-MSC handoff: Analog to...	4		4	4	4		4		4	4		4		4
Inter-MSC handoff: CDMA to...	4	4					4	4		4	4	4	4	
Inter-MSC handoff: TDMA to...	4		4	4	4		4		4	4		4		4
International (IS-751 IMSI and IS-807)		⓪	⓪		4			⓪	⓪				⓪	⓪
Hyperband handoff (TSB-76)		1Q'00	4		4			4	4		4		4	4
LNP Phase I (IS-756)	4Q'98	4Q'98	4Q'98	4	4	⓪	4	4	4	⓪	ⓧ	4	4	4
LNP Phase II (IS-756-A)	1Q'00	1Q'00	1Q'00	4	4					⓪	ⓧ	⓪	⓪	⓪
MWN		4	4	4	4	4		4	4	4	4	4	4	4
Origination Triggers	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Over-the-air Activation (IS-725)		1Q'00	1Q'00		ⓧ			4	⓪		4		4	4
SMS Origination		4Q'98	4Q'98		4	4		ⓧ	ⓧ		1Q'00		4	4
SMS Termination		4	4		4	4		4	4	4	4	4	4	4
Termination Triggers				4	4	4	4	4	4	4	4	4	4	4
Voice Privacy - basic			4		4			4	4					
Voice Privacy - EPE														⓪
WIN Phase I (IS-771)	1Q'00	1Q'00	1Q'00	4	4		⓪	⓪	⓪	⓪	⓪	4	4	4

Terms: See <http://www.cnp-wireless.com/glossary.html>.

Symbols: 4 In field trial or commercial service.

XQ'9X Specifies the quarter during which commercial availability is expected (e.g. 4Q'98).

ⓧ In lab trial.

⓪ Under Development

█ Indicates a capability that is not technically feasible at present, or for which no standard yet exists.

**Bold type** Company names in **bold type** have indicated a change in status since the last report.

**Red** Text and figures in **red** indicate specific changes since the last report (visible only in electronic edition of newsletter).

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