Pays would not provide a level of privacy protection equivalent to non-publication of the subscriber's listing.

To publish such number or to make them available through directory assistance without the cellular subscriber's consent would, given previous practice, amount to the introduction of a service that would result in a reduction in the subscriber's privacy. The charging of a fee for Calling Party Pays, in conjunction with the introduction of the publication of listings without the subscriber's express consent, would be contrary to the principle that when new services are introduced, appropriate measures must be taken to maintain the customer's privacy at no extra cost unless there are compelling reasons for not doing so.[77]

Section 4.05 Technical Issues

The issues dealing with implementation of CPP will be largely a function of the nature and definition of the service. For example, a CPP service that is restricted to a local service area faces different (and significantly fewer) implementation issues than would one that is provided nationally. A basic local service can easily be implemented today using proprietary approaches and a business arrangement with the local exchange carrier. On the other hand, a "leak proof" and fraud resistant national CPP service that allows roaming opens a myriad of routing, billing, and caller notification issues. If, in addition to a national roaming capability, this national CPP service includes the ability to provide the customer with the selective screening of incoming calls (*e.g.*, the customer pays for incoming calls from selected numbers) and allows for the possibility of number portability, then the implementation issues become even more complex.

The technical issues and key decisions which must be addressed in the development of a CPP service description include the following:

- Location of CPP interception in the path of call setup.
- Notification to the caller of CPP charges.
- Minimization and handling of leakage.
- Flexibility in per-minute rates, and the ability to reverse charges.
- Local and toll CPP calls.
- Allocating roaming charges.
- Billing the caller.
- How billed revenue is shared with the wireless carrier.
- Interactions with Number Portability and Local Exchange Competition.

A major technical issue for CPP is to define where, in the path of call setup, the network recognizes that CPP applies to a call. Possible choices are the originating

[77] "CRTC: Report to the Governor in Council on Directory Subscriber Listings and on Unlisted Number Service (part 3), *MS Presswire*, December 24, 1996.

switch, an intermediate switch or the terminating CMRS switch. The switch at the location that is chosen will be responsible for notifying and billing the caller and forwarding a portion of the billed revenue to the terminating carrier. Choosing the originating switch would, if a national service is desired, require upgrades to all LEC and wireless switches in the U.S. to support CPP (although the use of intelligent networks in the form of IN/AIN may somewhat reduce the number of nodes needing an upgrade). This choice would also require every wireless carrier that supports CPP to have a business agreement with all possible originating carriers, to ensure that billed CPP revenue is transferred from the originating carrier to the terminating carrier, and to ensure that the correct per-minute charges are applied. If an intermediate switch is chosen as the location for CPP recognition, billing problems are somewhat reduced, as this switch would likely be controlled by an inter-exchange carrier which can already collect for toll charges. This choice would require business agreements with all inter-exchange carriers to forward the CPP revenue to the terminating carrier and signaling or databases to define the correct per-minute charges that apply to the call. In addition this choice may force all CPP calls to be handled as 1+ toll calls. The third choice is to allow the call to reach the terminating carrier's Mobile Switching Center (MSC) before determining that CPP applies. While this simplifies call processing, and restricts upgrades to only the wireless carrier (and selected customers) that wish to provide CPP, it requires the wireless carrier to have the ability to bill calls originating from any phone in the U.S. Problems of leakage from pay phones and hotel phones may be impossible to solve. Even when it is theoretically possible to bill back (*e.g.*, from a residential line), the wireless carrier will be required to have business agreements with every carrier in the U.S. from which CPP calls can be made (*e.g.*, LECs and competing wireless carriers).

Callers to CPP mobiles must be notified that they will be billed additional charges. This notification can be implicit in the number dialed (*e.g.*, separate NPA or NXX blocks), a recorded message or an interactive dialog (allowing other choices such as diversion to voice mail). Implicit notification will almost certainly not be adequate for some state and local regulatory organizations. More sophisticated notification methods are unlikely to be applicable if the originating switch handles the call. Even if an intermediate switch handles the call, diversion to voice mail will require, at the least, modifications to ISUP (ISDN User Part) signaling protocols. If the notification is to be specific to the CPP subscriber's carrier (*i.e.*, with the name of the carrier in the recorded message), it forces the terminating MSC to perform interception.

Leakage should ideally be eliminated, but this may be difficult given today's network architecture. If it cannot be eliminated, it probably cannot be simply tolerated as people will soon learn which types of phones (*e.g.*, COCOT - Customer Owned Coin Operated Telephones - pay phones) always leak. The best approach may be to ensure that leakage is always detected, so that incoming calls can be denied, diverted to voice mail or routed to a credit card billing operator. It may also be possible, as another alternative, to present the terminating subscriber with an indication (such as distinctive ringing) that they will be charged for the incoming call when leakage is detected.

Carriers have many choices for CPP charges. The per-minute charges for CPP can be restricted to a standard rate per carrier, or allowed to vary by subscriber and by time of day. It may be desirable to allow a CPP override to apply to calls from recognized numbers or to callers who enter a special PIN code. Some carriers may also wish to charge a different rate for the first minute than for subsequent minutes. These requirements can only be met if the intercepting carrier is either the terminating carrier, has an online rating database or a signaling link to the terminating carrier to obtain rating information per-subscriber in realtime.

Calls to CPP mobiles may be local or long distance. Allowing local CPP calls to be dialed as 7 digit calls will make it extremely difficult to prevent leakage from pay phones and hotel phones. The choices are either to handle the leakage (*e.g.*, by diversion to voice mail or by connection to a credit card operator) or to force all calls to CPP mobiles to be dialed as 1+ toll calls. This second choice may not be acceptable to all carriers or their regulatory agencies. It would be desirable to handle toll calls to CPP mobiles with integrated CPP/toll billing, both to simplify the notification to the caller and to prevent the caller from having to enter credit card information twice in one call. This can only be done if an inter-exchange switch intercepts CPP calls.

Although this may be changing, traditionally roaming mobiles incur additional charges: possible toll charges from their home system to their current visited system, airtime charges that are likely at a higher rate than at home and possibly one-time daily access fees. It is unlikely that standard CPP rates will cover these charges that could amount to several dollars for the first minute in a day. Consequently, CPP rates to a roaming mobile may have to be considerably higher than to a mobile that is registered in its home system. In the absence of postalized rates, it will be very difficult for originating or intermediate switches to correctly calculate and apply these additional charges (that may vary from call to call). Also, because the caller has no knowledge of the whereabouts of the mobile they are calling, some regulatory agencies may refuse to allow these charges to be billed back to the caller. An alternative would be to charge the subscriber for all roaming charges incurred.

Billing the calling party is simple if the originating switch handles the call and the originating carrier handles the billing, although determining the amount to bill may be difficult. Inter-exchange carriers can also bill the calling party, with somewhat less difficulty in determining the amount. Terminating carriers will have no difficulty in determining the amount to bill, but great difficulty in placing the amount on the caller's bill, given that the originator could be calling from any local, long distance or wireless carrier in the U.S.

If the terminating carrier does not bill the call, revenue has to be forwarded from the carrier that intercepted the CPP call to the wireless carrier, with business agreements to cover the portion of the charges that are forwarded versus the charges that are retained. This will also require wireless carriers to have special software to segregate and audit the expected revenue on a per-originating carrier basis, to ensure that all CPP charges owed are actually forwarded.

Calling Party Pays will interact with other changes in the telecommunications environment, particularly local number portability and local exchange competition. Number portability probably rules out the ability to segregate CPP subscribers into separate NPA or NXX blocks, as this would not allow subscribers to add or delete the CPP service without changing their phone number. On the positive side, number portability also places a new type of Service Control Point (SCP) into the network that could be used to supply CPP information (such as rating and diversion information). Local exchange competition will simply increase the number of carriers, which will make negotiating nationwide business agreements with this industry sector even more complex.

The complex technical challenges facing a CPP implementation in the U.S. reflect the competitive and dynamic nature of the US telecommunications industry. In many countries that currently have CPP for mobile calls there are very few carriers, often only one carrier providing both local and long distance service, along with a handful of wireless carriers. Also, CPP is usually applied universally to all mobiles who are identified by a distinct area code. This vastly simpler environment dramatically reduces the technical challenges that are faced.

It is questionable whether *any* actions are required of federal regulators with respect to implementation. If any actions are required of the FCC, they are relatively limited. Indeed, as noted in section 4.0 above, the FCC may have already taken sufficient action in its prior orders to provide the impetus for a timely resolution of outstanding technical issues, and to foster the ubiquitous availability of CPP as a consumer option.[78]

Section 4.051 Implementation Plan

This Service Report will provide the first step in a CPP implementation plan -- providing background and historical information, along with a list of the technical challenges that must be solved before CPP can be implemented.

The next step is for CTIA to facilitate a carrier effort to define the specific requirements for CPP that meet the needs of wireless carriers, and also fits the existing and future business and regulatory telecommunications environment. This will result in the development of a service description that will define the capabilities and limitations of a practical CPP service.

The service description will need to be validated by the development of information flows for both CPP call processing and billing. This will identify interfaces and network elements that likely require modification and will ensure that information required for CPP call processing is available when and where it is required during the call processing, billing and settlement phases.

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[78] *See e.g., First Report and Order, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996,* 11 FCC Rcd 15499, at 15633, 15660-61, 15741-42, and 15763-64 (1996), *appeal pending sub nom.* Iowa Utilities Board, *et al.*, v. Federal Communications Commission, No. 96-3321 (8th Cir.); *see also Second Report and Order, Policies and Rules Concerning Local Exchange Carrier Validation and Billing Information for Joint Use Calling Cards,* 8 FCC Rcd 4478, at 4481 (1993).

Once a service description has been validated against information flows that show that it will work, a Standards Requirement Document (SRD) can be prepared as input to standards organizations, including both the TIA TR-45 standards committee and ATIS T1. Depending on the decisions documented in the SRD, other standards organizations and industry bodies may also be affected. These organizations may not have a wireless focus and consequently may need to be educated on the need for wireless CPP and the benefits to their industry segment.

Finally, an implementation guide should be prepared to indicate how the various aspects of a CPP feature can be integrated into a cohesive whole using existing and newly defined standards.