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Ameritech Personal Communication Services (PCS)

Wholesale Access Service for PCS Routing and Home Database Service Network Interface Specification.

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Points of Contact:

Debbie McCann - (708) 248-5354

Author(s):

N/A

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1. PURPOSE

This document provides a technical description of the network interface specifications for the Ameritech Personal Communication Services (PCS) Routing and Home Database Wholesale Access Service.

2. CHANGE AND REISSUE

This is the first issue of this document. This section will show future changes and modifications.

3. GENERAL

The PCS Routine and Home Database service is a wholesale access service. This service requires signaling transport, via Signaling Transfer Points (STPs), between the Ameritech Service Control Point (SCP) and a PCS Service Providers (PSP) database, referred to as a Visiting Location Register (VLR).

The Routing portion of this service allows calls to a PSP's end user to be identified and routed by the Ameritech network. The Home Database portion of this service enables the Ameritech PSTN to maintain PSP's end use location information, administer service profile data, and manage additional services usage. Both the Routing and Home Database portions of the service need to communicate with the PSP's VLR, via a Signaling System 7 (SS7) IS-41 Transaction Capabilities Application Part (TCAP) network interface.

3.1. Home Database Service

The PCS Home Database Service is a collection of network database capabilities that are provided to a PSP to maintain end user location information and manage vertical service usage. The PCS Home Database Service provides the PSP's end user with roaming capabilities, authentication and service validation, and access to vertical services. This Home Database Service is referred to as the Home Location Register (HLR).

The PCS Home Database Service is supported via SS7 signaling links utilizing IS-41 Rev. A messages (outlined in Section 5). A high-level overview of the PCS Home Database Service functions is provided below.

- Wireline/wireless registration - The registration functionality provided by the PCS Home Database Service allows the PSP's end users to roam and receive/originate calls while outside of their home area. The Ameritech HLR will automatically record and maintain the end user's location information as they roam.

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- Support of Call Delivery - When a call is being delivered to a PSP's end user, the PCS Home Database Service will accept the requests for the current routing address for that end user. The Ameritech HLR will, in turn, query the PSP currently serving the end user for the actual routing address and return this routing address to the originator for appropriate call completion.
- Authentication and Service Validation - The PCS Home Database Service includes mechanisms for providing security and fraud prevention.
- Vertical Services - The PCS Home Database Service supports the provision of IS-41 vertical features to the PSP's end user. These vertical features include Call Forwarding (Unconditional, Busy, and No Answer), Call Waiting, and Three-way Calling.

The PCS Home Database Service also supports end user call management features. In addition, the PCS Home Database Service allows the PSP to offer its end users a set of features accessible from any compatible PSP. The Ameritech HLR will allow a subset of the end user's service profile to follow them as they move.

- Profile Manipulation - The PCS Home Database Service provides profile manipulation: a feature that allows the PSP and/or end users to modify end user data stored in their service profile in the HLR.

3.2. Routing Service

The PCS Routing Service is offered in conjunction with the PCS Home Database Service. The PCS Routing Service allows calls to a PSP's end user to be identified and routed by the Ameritech network. Initially, geographic numbers served by a designated Ameritech network switch will be utilized. The Ameritech network recognizes that a called geographic number is assigned to a PSP, and initiates a query to the Ameritech HLR. The Ameritech HLR will then follow the procedures need to support a call delivery which includes the need to access a PSP's database via SS7 signaling links, utilizing IS-41 TCAP messages.

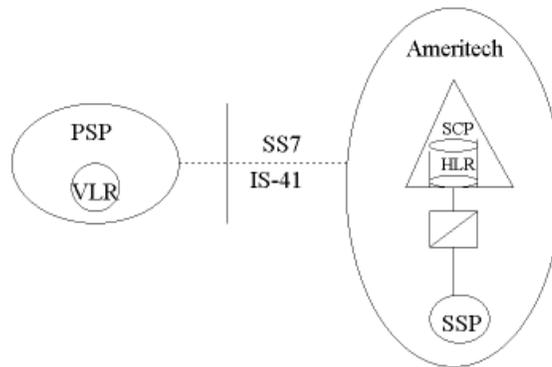
4. ARCHITECTURE

The PCS Routing and Home Database Service utilizes the Ameritech Advanced Intelligent Network (AIN). The Service Switching Point (SSP) enables the Ameritech network to recognize a call made to a PSP's end user for the Routing portion of the service. The Ameritech AIN SCP will provide the database capabilities needed for the Home Database portion of this service. The Ameritech SCP utilizes an SAI interface. This architecture is depicted in Figure 1.

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The network interface to access this service is via SS7 IS-41 TCAP signaling links. This signaling link connects the PSP's VLR and the Ameritech's SCP/HLR through the SS7 network via STPs, and uses the IS-41 TCAP Rev. A protocol to carry the application messages.



5. IS-41 MESSAGES

This Ameritech SCP for the PCS Routing and Home Database Service acts as the HLR defined within the IS-41 Rev. A, Cellular Radiotelecommunications Intersystem Operations documents. The Ameritech SCP/HLR IS-41 interface complies with the Cellular Radiotelecommunications Intersystem Operations documents as identified below, and in Section 7 - References.

IS-41.1-A	Cellular Radiotelecommunications Intersystem Operations: Functional Overview – February 1988
IS-41.3-A	Cellular Radiotelecommunications Intersystem Operations: Automatic Roaming – February 1988
IS-41.4-A	Cellular Radiotelecommunications Intersystem Operations: Operations, Administration, and Maintenance - February 1988
IS-41.5-A	Cellular Radiotelecommunications Intersystem Operations: Data Communications – February 1988

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The following table summarizes the IS-41 Automatic Roaming messages, defined within IS-41.5-A, "Cellular Radiotelecommunications Intersystem Operations: Data Communications," that are applicable to the PCS Routing and Home Database Service.

Family Name	Automatic Roaming Message	Applicable to the PCS Rtg & Home DB Service
IS-41 MAP	QualificationRequest	X
IS-41 MAP	QualificationDirective	X
IS-41 MAP	RegistrationNotification	X
IS-41 MAP	RegistrationCancellation	X
IS-41 MAP	LocationRequest	X
IS-41 MAP	RoutingRequest	X
IS-41 MAP	RemoteFeatureControlRequest	X
IS-41 MAP	ServiceProfileRequest	
IS-41 MAP	ServiceProfileDirective	
IS-41 MAP	TransferToNumberRequest	X
IS-41 MAP	CSSInactive	X
IS-41 MAP	RedirectionRequest	X
IS-41 MAP	CallDataRequest	

In addition, the PCS Routing and Home Database Service utilizes the Unreliable Roamer Data Directive message as defined in the Automatic Roaming section of IS-41.4-A, "Cellular Radiotelecommunications Intersystem Operations: Operations, Administration, and Maintenance."

6. SIGNALING TRANSPORT

The AM TR-OAT-000069 document specifies the required interfaces between the out-of-band Common Channel Signaling (CCS) architecture using SS7 protocol deployed by the Ameritech network and other Interconnecting Networks (ICNs). ICNs include Interexchange Carriers (IXCs), International Carriers (INCs), Exchange Carriers (ECs), Independent Telephone Companies (ITCs), Alternative Local Providers, Cellular Providers, and Enhanced Service Providers (ESPs).

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The "Ameritech Supplement Common Channel Signaling (CCS) Network Interface Specification" builds upon and provides exceptions to the Bellcore TR-TSV-000905.

The queries sent to the Ameritech HLR by a PSP's VLR utilize IS-41 messages as described within the IS-41 Rev. A documents identified in Section 5. The IS-41 messages are transported in the TCAP component of the SS7 protocol as described in TR-NPL-000246.

The TCAP of SS7 protocol provides functions that control non-circuit-related information transfer between two or more signaling nodes via a signaling network. It provides a set of procedures that can be used for a variety of services (e.g., transport of IS-41) thereby avoiding the inefficiency of creating specific procedures tailored to a particular need. Thus TCAP provides a framework for a common approach to new services within a network as well as framework for service architecture for cooperative internetwork services. From an end user's point of view, Transaction Capabilities lie within the Network layer of the Open Systems Interconnection (OSI) model. The nature of anticipated services to be supported suggests that the protocol may require the equivalent of many of the functions provided in OSI layers 6, 5, 4 called the Application Service Part (ASP) in SS7. The ASP consists of Presentation, Session, and Transport layers.

The IS-41 messages are routed by the Ameritech network utilizing Message Transfer Part (MTP) routing as described in TR-NPL-000246 also. Specifically, the route selected for routing the IS-41 messages is based on the Destination Point Code (DPC) of the VLR. The messages sent in response to the queries are also routed over the Ameritech network using MTP routing. Additionally, IS-41 messages generated by and responding to the Ameritech HLR are routed via the SS7 network utilizing MTP routing.

7. REFERENCES

1. AM TR-OAT-000069 - "Ameritech Supplement: Common Channel Signaling (CCS) Network Interface Specification", Issue 3, July 1993.
2. Telcordia (formerly Bellcore) TR-NPL-000246 - "Bell Communications Research Specification of Signaling System Number 7", Issue 2 (Bellcore June 1991) plus Revision 1, December 1991 and Revision 2, December 1992.
3. EIA/TIA Interim Standard - IS-41.1-A, "Cellular Radiotelecommunications Intersystem Operations: Functional Overview", February 1988. (\$25)
4. EIA/TIA Interim Standard - IS-41.3-A, "Cellular Radiotelecommunications Intersystem Operations: Automatic Roaming", February 1988. (\$25)
5. EIA/TIA Interim Standard - IS41.4-A, "Cellular Radiotelecommunications Intersystem Operations: Operations, Administration, and Maintenance", February 1988. (\$25)

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6. EIA/TIA Interim Standard - IS-41/5-A, "Cellular Radiotelecommunications Intersystem Operations: Data Communications", February 1988. (\$25)

References 3 thru 6 can be ordered from:

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