RTB 5.1

IVR Self Service

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Chapter 1

IVR Self Service Overview

IVR Self Service Overview

Interactive Voice Response (IVR) Self Service is the combination of Comverse Media Server (CMS), Application Server Unit (ASU), and the IVR Application. IVR Self Service is a new solution which allows subscribers to query account balances, recharge accounts, change language or contact Customer Care by means of audible announcements played by an automated service. IVR also allows Service Providers to initiate informational announcements to subscribers about an account or the progress of a call.

The combination of the CMS, ASU, and IVR application replaces Progeny IVR.

NOTE Existing Service Logic Function (SLF) IVR customers can continue to use SLF.

Voice call announcements fall into two broad categories.

1. Announcements belonging to the Administrative Menu, Info Server, Recharge Server, Language Selection, and Customer Care. These announcements fall under the **Self Care Function**.
2. Pre-call and terminating announcements informing the caller of account status or providing the reason why a call can't connect. These announcements are called the **Pre-call and Terminating Function**.

Chapter 2 of this document details the operation and maintenance of IVR Self Service. Information is included on logging and alarms, as well as backup and restore procedures.

Chapter 3 of this document contains the callflows. Callflows are the visual and textual description of the voice application being implemented. The callplan is the graphical implementation of the application as exists in the Application Creation Environment (ACE).

Table 1 Products and Current Versions Used with IVR Self Service

System Name and Version	DiME ID	DiME Document Name
CMS 3.6	DOC-2-005-968	CMS 3.5.40 Standalone RDD
ASU 4.3.0.6	DOC-2-005-913	ASU 4.3.0.6_B1 RDD
CCS 7.2.2.2		
iVE 4.5.20	DOC-2-006-444	iVE 4.5.20 RDD
iVE 4.5.20 STF 4		ive_4.5.20.4_134756874_253.doc
LMD 1.2	DOC-0-026-871	LMD 1.2.0.0 RDD

Service Provider Perspective

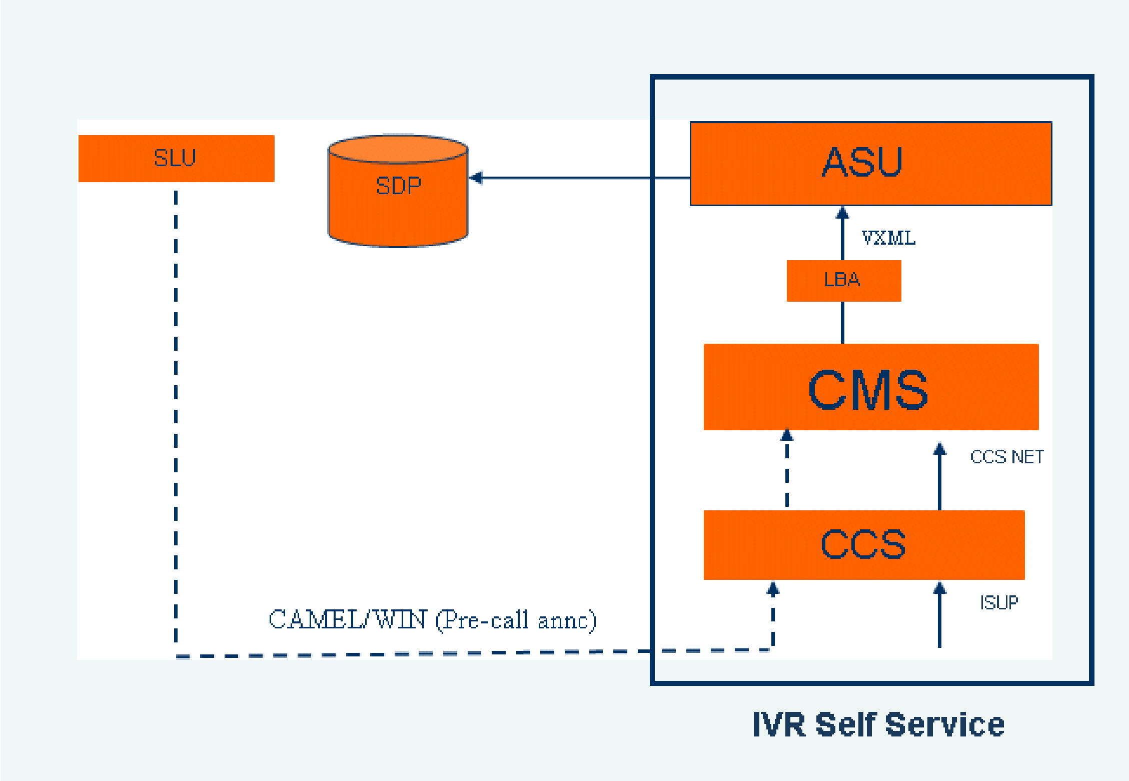
IVR Self Service allows the Service Provider to offload routine subscriber maintenance onto an interactive self care system. Automated balance information and voucher recharging free the Customer Care center for more exceptional and complex subscriber servicing. The ability of the Service Provider to adapt the IVR interface also provides the subscriber with a direct and easy way to manage accounts. This self care establishes subscriber satisfaction and loyalty.

The Service Provider tailors which IVR options are presented, their direct entry or entry from a common menu, the keys used for menu selection, the text of the announcements played, the timeout and retry values for user responses, and so on. The announcements heard in the IVR also reflect optional features of the Real-Time Billing (RTB) platform, of a subscriber's Class of Service (COS), or of an individual subscriber. For example, the platform can be configured to support balance confiscation announcements in the Info Server, a COS can be configured to allow or deny IVR access in post-active state, or if more than one language is supported, a subscriber selects the language for announcements received.

For this document, the terms callflow and callplan are defined as follows:

- The callflow is the visual and textual description of the voice application to be implemented.
- The callplan is the graphical implementation of the application as exists in ACE.

Figure 1 IVR Self Service



IVR is implemented on the framework of the CMS and the Interactive Voice Environment (iVE) ASU. The CMS understands various protocols and supports different kinds of media, including video. Most significantly from the perspective of RTB, it serves as a VoiceXML (or VXML, Voice Extensible Markup Language) and CCXML (Call Control XML) interpreter. When the CMS receives an incoming call on a specific number, it makes a request to the ASU. The ASU runs Comverse Linux and Apache Tomcat. A request from the CMS takes the form of an HTTP (Hypertext Transfer Protocol) request for a specific page with certain arguments. The Application Engine Servlet then creates a VXML document which is then sent back to the CMS as an HTTP response.

Application development is done in the ACE based on IBM's integrated development environment Eclipse. After defining an application and creating a callflow in ACE, a Web Archive file is generated which is then deployed to the ASU. This Web Archive file is not a complete application in itself, but a collection of files containing the service logic which the Application Engine Servlet interprets in order to generate VXML. The RTB CMS IVR platform consists together of the callflows and of JAR (Java ARchive) files containing Java classes developed by RTB.

Subscriber data and parameters like COS definitions are retrieved via the CCWS (Customer Care Web Service). Function calls over SOAP (Simple Object Access Protocol) are handled by libraries generated by Apache Axis from a Web Service Definition Language (WSDL) specification.

Comverse Media Server (CMS) Overview

The CMS is a front-end access unit and multipurpose media server that provides telephony and media management capabilities. The current functionality of CMS is:

- **Call Control:** CMS provides applications with call answering options that determine at which stage CMS answers an incoming call.
- **Embedded Signaling Extraction:** CMS supports both dedicated and embedded signaling extraction for PSTN networks.
- **Media Handling:** CMS enables DTMF Tone Detection and accepts DTMF input. CMS supports RFC2833 (RTP Payload for DTMF Digits, Telephone Tones, and Telephone Signals).

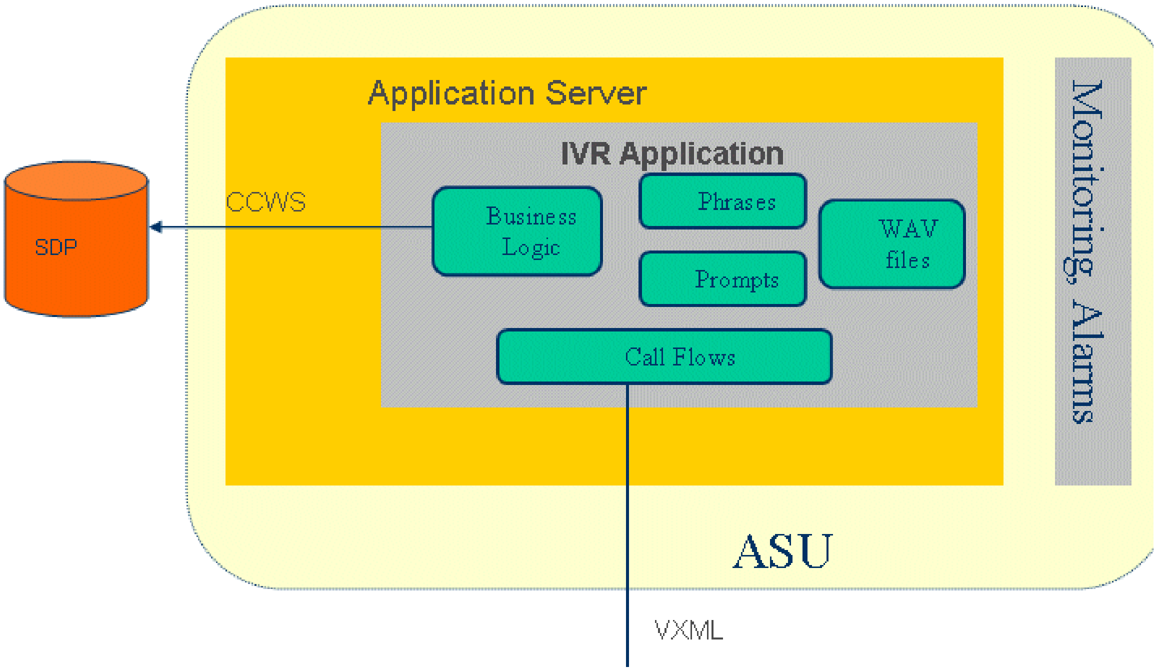
The CMS is a standards-based component that supports multiple telephony protocols, media types, audio formats, and application programming languages for maximum flexibility.

Application Server Unit (ASU) Overview

The ASU is the component in the Comverse-supplied IVR system that hosts and runs the IVR applications. These applications are developed using the iVE SCE (Service Creation Environment) and installed on the iVE SEE (Service Execution Environment).

The network self care logic is hosted in the ASU platform and CMS communicates with ASU via VXML. The ASU retrieves and updates subscriber data via CCWS. This solution includes the SCE which enables faster customization of IVR logic for customer needs.

Figure 2 ASU Detailed Flow



Call Control Server (CCS) Overview

The CCS processes Signaling System 7 (SS7) ISDN User Part (ISUP) messages associated with IVR sessions. It supports all layers of the SS7 protocol as defined by a variety of international standardization bodies, including International Telecommunications Union (ITU) and American National Standards Institute (ANSI).

The CCS uses the OMNI platform to distribute signaling software across multiple computers while maintaining a single system image to the network. Each computer shares the processing load, assuming responsibility for all call control functions in the event of hardware or software failure at its peer. The CCS supports up to eight signaling links at each computer and runs on Service Logic Unit (SLU) hardware implemented in a standard Linux environment. It is possible to include several CCS units in a single platform.

Acronyms

Table 2 Acronyms

Acronym	Meaning
ACE	Application Creation Environment
ANSI	American National Standards Institute
ASU	Application Server Unit
CCC	Customer Care
CCS	Call Control Server
CCWS	Customer Care Web Service
CCXML	Call Control eXtensible Markup Language
CMS	Comverse Media Server

Table 2 Acronyms

Acronym	Meaning
COS	Class of Service
DN	Dialed Number
DTMF	Dual Tone Multi-Frequency
F&F	Friends and Family
IAP	Integrated Alarm Package
ISUP	ISDN User Part
iVE	Interactive Voice Environment
IVR	Interactive Voice Response
LBA	Load Balancer
MSA	Management System Agent
PIN	Personal Identification Number
RMU	Remote Maintenance Unit
RTB	Real-Time Billing
SCE	Service Creation Environment
SEE	Service Execution Environment
SDP	Service Data Point
SLF	Service Logic Function
SLU	Service Logic Unit
SNMP	Simple Network Management Protocol
SOAP	Single Object Access Protocol
SS7	Signaling System 7
UP	Unified Platform
VXML	Voice eXtensible Markup Language

The IVR Application

IVR Self Service is made up of two applications: Self Care Function and Pre-call and Terminating Function.

The IVR application executables reside on the ASU. The ASU represents a Service Execution Environment (SEE), where the ACE callflow is run. Java code is developed to represent the business logic components used to retrieve and parse data from external data sources. Using the SEE and Service Creation Environment (SCE) features of business logic injection, this Java code is executed as libraries for the callflows. The objects in the callflow interface component of the business logic are invoked for the callflows to use, thus applying external business logic to the callflow.

Self Care Function

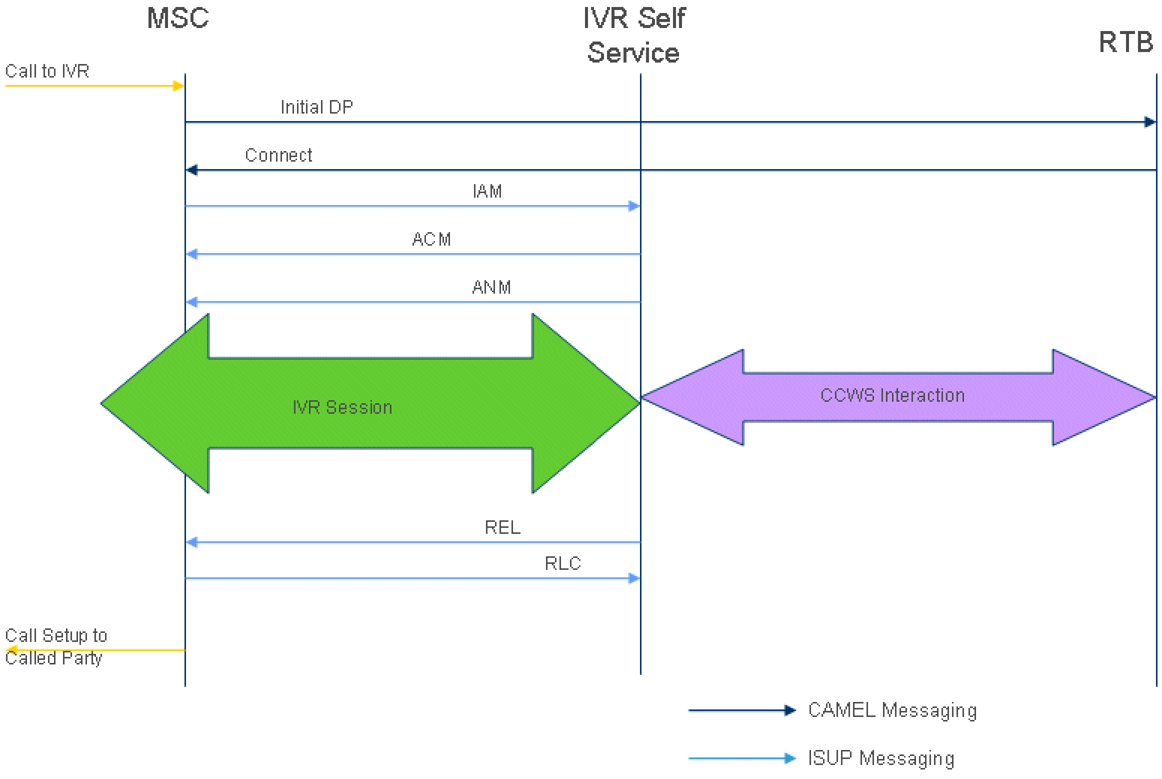
The default Self Care Function IVR Application offers four automated servers, three of which are interactive. These servers allow the user to hear account balances, recharge accounts by voucher, change account language, or talk to a Customer Care representative. Depending upon provisioning, each server is either accessed directly or from a main Administrative Menu. Help announcements are provided per menu. User navigation is through Dual Tone Multi-Frequency (DTMF) input from the subscriber.

The Self Care Function includes:

- Administrative Menu
- Info Server
- Recharge Server
    - Post-recharge Provisioning
- Language Selection
- Customer Care

In Self Care Function mode, the switch routes the call to the CCS. The CCS receives the call and connects it to the CMS. The CMS analyzes the Dialed Number (DN) and attempts to invoke an application. For CMS and ASU, an application is a series of one or more VXML documents that contain a callflow. The ASU generates VXML documents over HTTP, using a Java Servlet to create the page. This servlet is able to execute Java code by inserting business logic from external libraries, thus allowing the system to communicate with external data sources. In RTB, the applications on the ASU integrate with the Billing Solution Web Service, currently the CCWS. The ASU handles all of the generation of the server side logic and generation of the callflow logic. The CMS handles the voice channel and signaling trunks. It collects digits, plays announcements, and sends the user input back to the ASU.

Figure 3 Self Service Flow



Administrative Menu

The Administrative Menu is an optional menu of self service features from which the subscriber chooses. Servers in the default offering include an Info Server for account balance information, a Recharge Server for replenishing account balances by voucher, a Language Selection service for changing a subscriber’s announcement language, and a connection to Customer Care to speak to a service representative.

NOTE IVR Self Service supports 20 languages.

Info Server

The Info Server is an optional server which plays account balance information to the subscriber. The balance announcements are configurable with respect to which balances are heard and in what order they are presented. Expiration dates are included, if appropriate. Separate announcements for low balance and near expiration thresholds of the subscriber’s account, as well as announcements for a future balance confiscation date, are optional.

Recharge Server

The Recharge Server is an optional server which allows the subscriber to recharge accounts by voucher. The vouchers are located in the RTB database. The pre-recharge core balance is announced before the recharge is performed. The voucher information is collected by IVR and passed to the recharge process.

Two types of security are provided: detection of voucher number hacking leading to account locking, and hashing of the voucher numbers for added protection. Both are configurable options. The use of multiple vouchers in a single recharge session is also configurable per COS. A recharge history is generated by the recharge stored procedure for each successful recharge.

After recharge, all of the balance additions are announced.

Post-Recharge Provisioning

The option exists to provision a recharge voucher to allow the automatic change of the subscriber’s COS following a successful recharge. When this occurs, the subscriber’s COS is changed without user input and the caller is simply informed that the service package is changed. Alternatively, a recharge voucher is provisioned to allow the subscriber to select a COS change from a list.

Another option is to provision a recharge voucher to allow the subscriber to update the Friends & Family (F&F) phonebook following a successful recharge. F&F is an incentive billing feature which allows a subscriber to maintain a personal list of telephone numbers. Calls to these numbers are often eligible for a discounted tariff. Up to ten numbers are provisioned by the subscriber, depending on a COS maximum. The Service Provider also controls the numbers entered by validating the numbers against a list of prefixes. For example, international numbers can be barred from all subscriber phonebooks.

Language Selection

Language Selection is an optional server which allows a subscriber to listen to the available language choices and then select a preferred language from the list. Upon confirmation of the subscriber’s choice, the selected language is stored for use in all subsequent announcements made to the subscriber. Language Selection is needed only when multiple languages are supported by the Service Provider. English is delivered as the default. The Language server must be customized by the operator prior to use.

Customer Care

Customer Care is an optional server which allows the subscriber to speak to a Customer Care representative. The call is forwarded to a telephone number associated with the Service Provider’s Customer Care center.

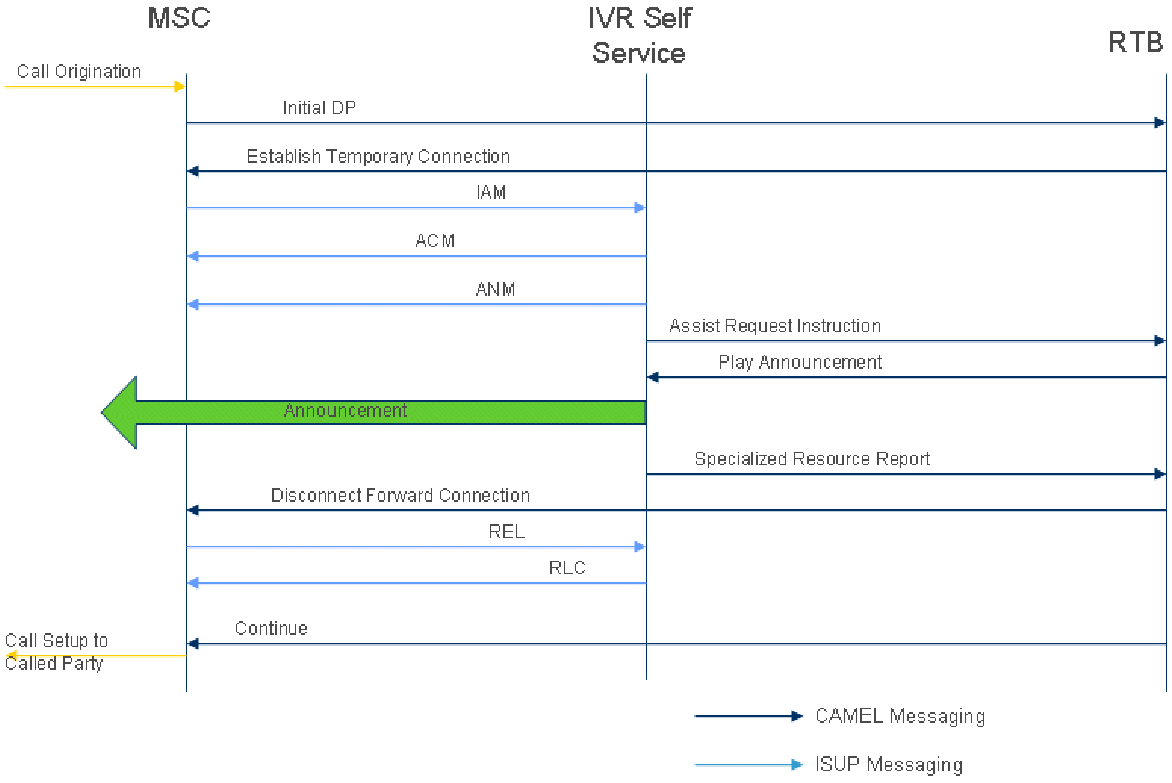
Pre-call and Terminating Function

The Pre-call and Terminating Function plays pre-call and terminating announcements to the subscriber. These configurable announcements inform a caller of a low balance, an approaching account expiration, a levied periodic charge, and so on. These announcements also collect Personal Identification Numbers (PINs) or a calling number needed to continue the call. The announcements inform the subscriber why a call is rejected. The announcements have the option of including tokens and requiring digit collection. Announcements in multiple languages are supported.

The Pre-call and Terminating Function includes:

- Pre-call Announcements
  - □ low balance
  - □ account expiration date
  - □ recurring charge application
- Terminating Announcements
  - □ reason for call termination

Figure 4 Pre-call Announcement Flow


MSC
IVR Self Service
RTB
Call Origination
Initial DP
Establish Temporary Connection
IAM
ACM
ANM
Assist Request Instruction
Play Announcement
Announcement
Specialized Resource Report
Disconnect Forward Connection
REL
RLC
Continue
Call Setup to Called Party
CAMEL Messaging
ISUP Messaging

The decision to play a pre-call or terminating announcement is made by the SLF. In this case, CMS functions as an Intelligent Peripheral (IP), playing announcements at the command of the callflow logic in the SLF. Some of these announcements, such as low balance or expiration threshold warnings, are optional according to the service provisioning. Other announcements, such as terminating announcements, are not optional.

On the SLF, the announcements are configured by means of the offline jPromptsTool, which generates a run-time file containing messages conforming to either CAMEL 2 or IS-826 (WIN) protocols. Each of the messages has a unique ID, which includes a language indicator, and up to five variable data tokens. The tokens can be of five data types: date, price, time, digits, and number. The messages conform strictly to the standards of the protocol in use. This means that no communication outside the scope of existing protocol standards is necessary for the interpretation and expansion of the messages with respect to prompts, tokens, digit collection, language, and such.

On CMS, a corresponding XML file is configured containing the expansion of each message per language used, and including the appropriate prompts to play as well as the insertion points for any tokens. All IP capabilities currently implemented by RTB are supported by CMS, including variable tokens according to the protocol, and support for digit collection, if required.

When one of these announcements is to be played on CMS, the message is first retrieved from the configuration file residing on the SLF, and then is sent by the SLF via the prevailing protocol to the CCS. At CCS, it is converted into a protocol-agnostic format (CCSNET) and forwarded to CMS. When CMS receives the message, it uses the ID to find the XML instructions belonging to the message, and then interprets the XML. The prompt recordings themselves can reside either on CMS or on the ASU.

Configuration Management

Prior to Configuration

Several steps must be completed before configuring the IVR application.

- Service Provider: Prompts must be recorded ahead of time.

Key Configurations for Startup

1. On CMS, the user must configure the Pre-call Announcement Utility xml files so that they point to the correct ASU(s) or Load Balancer (LBA) in the system. Instructions for completing this task are found in the utility's STF.
2. Also on CMS, the file /usr/cti/conf/cms/inflection.cfg file must be configured to add the access numbers used for each smart IP service. This file must also be configured to point to the correct ASU (or LBA) address for each access number.
3. On the ASU, the file /usr/cti/conf/ivrapp/IVRApplicationContext.xml must be edited to include the user and password for the CCWS server.
4. The user must ensure that the CCWS address or LBA address is in the etc/hosts file.

NOTE Configuration details are found in the CMS RDD and the ASU RDD.

Prompts

The PromptTool.xls spreadsheet is the reference for all prompts associated with the IVR application. Prompts must be copied onto the ASU. A prompt kit utility is provided as part of the release. The ASU RDD provides details on loading the prompts.

The following table shows samples of the prompts for identities, languages, balances, and units.

Table 3 IVR Prompt Samples

Prompt	Prompt ID Calculation	Note
This is your Personal account.	prompt ID = 1420 = identity ID	Identity ID can be between 1 and 7.
To change to your Personal account.	prompt ID = 9110 + identity ID	Identity ID can be between 1 and 7.
English	prompt ID = 9200 + language ID	Language ID can be between 1 and 20.
For English	prompt ID = 9240 + language ID	Language ID can be between 1 and 20.
Your primary balance is...	prompt ID = 1430 + annc type ID	Annc type ID can be between 1 and 50.
...has been added to your Primary balance.	prompt ID = 1480 + annc type id	Annc type ID can be between 1 and 50.
Octet	prompt ID = 1550 + unit type ID	Unit type ID can be between 1 and 50.
Octets	prompt ID = 1600 + unit type ID	Unit typeID can be between 1 and 50.

General Parameters

Table 4 IVR Application General Parameters

Parameter Name	Description	Values	Location
Service Connector	Defines which CCWS release the system connects to for CCWS interface.	ccwsNNN, where NNN is release number	ASU: /usr/cti/conf/ivrapp/IVRApplicationContext.xml
scheduledTask.delay	Defines how often cached data is validated for refresh.	Whole number in milliseconds (60000)	ASU: /usr/cti/conf/ivrapp/IVRApplicationContext.xml
scheduledTask.period	Defines how often the task is invoked.	Whole number in milliseconds (300000)	ASU: /usr/cti/conf/ivrapp/IVRApplicationContext.xml
USERNAME	Defines user name used to connect to CCWS.	Valid CCWS user (web)	ASU: /usr/cti/conf/ivrapp/IVRApplicationContext.xml
PASSWORD	Defines password used to connect to CCWS	Valid CCWS password for user (qwerty)	ASU: /usr/cit/conf/ivrapp/IVRApplicationContext.xml
URL	URL for CCWS server.	http://ccws/CCWS/ccws.asmx. CCWS address is defined in the etc/hosts file.	ASU: /usr/cti/conf/ivrapp/IVRApplicationContext.xml
TIMEOUT	CCWS timeout threshold.	Any whole number (30000) in milliseconds	ASU: /usr/cti/conf/ivrapp/IVRApplicationContext.xml
DELAY	CCWS delay between subsequent attempts for the same request.	Any whole number (0) in milliseconds	ASU: /usr/cti/conf/ivrapp/IVRApplicationContext.xml

Table 4 IVR Application General Parameters

Parameter Name	Description	Values	Location
ATTEMPTS	Number of attempts to try the same CCWS request.	Any whole number of attempts (3).	ASU: /usr/cti/conf/ivrapp/IVRApplicationContext.xml
MI_INFOCUS_ONLY	Defines whether the system prompts for subscriber identity selection or considers only subscriber current InFocus identity.	0 - Considers only InFocus Identity (1) - Prompts for Identity Selection	SDP SERVICE_PARAMETERS table
SuspendISPrompt	Defines whether the suspended message with reason for suspension is played for suspended accounts.	0 - Plays only balance. (1) - Plays suspend message.	SDP SERVICE_PARAMETERS table
BAL_PLAY_ALWAYS	Defines whether to play information for additional balances when they are zero.	(0) - Plays if balance > zero. 1 - Always plays balances.	SDP SERVICE_PARAMETERS table

XML Files for Pre-call Announcements

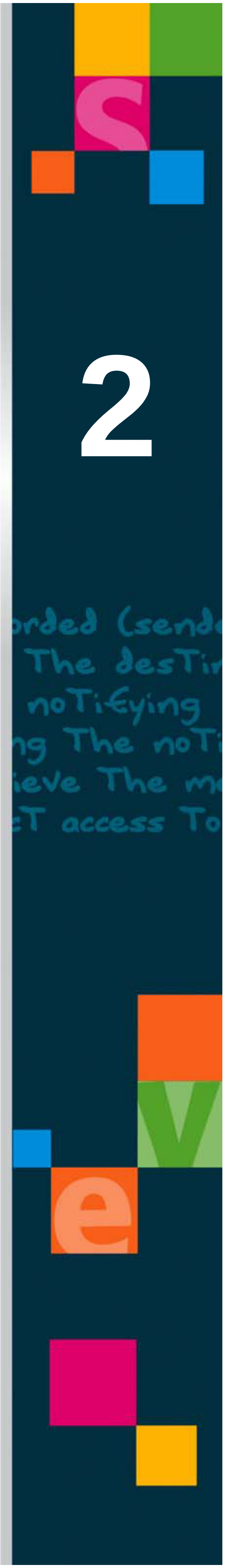
The xml files for Pre-call Announcements are located on the CMS machine under the directory usr/cit/announcements/conf. The files are listed in the table below:

Table 5 CMS Pre-call ANNC Progeny Replacement Utility

Pre-call Announcement xml Files (release 2)
announcements.xml
announcements-enus_CWJ.xml
announcements-base-enus.xml

Chapter 2

Operation and Maintenance



Alarms

Alarms are messages that notify the operator of a hardware, software, or service fault that adversely affects the operation of the system, and for which corrective action is usually necessary.

Alarms are categorized into three priority levels: critical, major, and minor.

The presence of an alarm is an indication to the operator that a corrective action is necessary. After the operator corrects the condition, the system recognizes that the problem is rectified and removes the alarm from the screen.

IVR Alarms

Alarms are converted from Simple Network Management Protocol (SNMP) format to Integrated Alarm Package (IAP) format using the Management System Agent (MSA).

MSA Alarms

In order for MSA to receive alarms from CMS subsystems in SNMP configurations, perform the following procedure:

1. Update the **trap2sink** section of the **/etc/snmp/snmpd.conf** file with the following:

   ```
   trap2sink 127.0.0.1 GAS361LI
   ```

2. Move **master agentx** to the end of the file.
3. Restart the **snmpd** using the following procedure:

   ```
   /etc/rc.d/init.d/snmpd stop
   /etc/rc.d/init.d/snmpd start
   ###################################################
   ###
   ###  trap2sink / trapsink
   ###  <IP of the SMU - physical address>
   ###  <Trap community name>
   ###
   ###  Notes: (1) Several entries can be defined. Each entry defines the IP address which will
   receive the SNMP V1/V2 traps.
   ###
   ##################################################
   #trap2sink snmpManager GAS361LI
   trap2sink 127.0.0.1 GAS361LI
   rwcommunity GSN905$N snmpManager1.3.6.1.4.1.5271.3.105
   rwcommunity GSN905$N snmpManagerPA11.3.6.1.4.1.5271.3.105
   rwcommunity GSN905$N snmpManagerPA21.3.6.1.4.1.5271.3.105
   rwcommunity GSN905$N localhost1.3.6.1.4.1.5271.3.105
   rocommunity GAS160NI localhost
   master agentx
   ```

NOTE For CMS and ASU alarm ID numbers and corrective actions, refer to the Alarm Tables Guide associated with RTB release 5.1.

IVR Application Logging

The IVR Application uses a logging mechanism for troubleshooting purposes.

Loggers are configured in `/usr/cti/conf/ivrapp/log4j.xml` file.

Depending on the amount of information required, the log level is set to one of the following levels (from laconic to verbose order):

- FATAL
- ERROR
- WARN
- DEBUG
- INFO

The correct (default) debug level is WARN. Setting the log level to DEBUG or INFO is done for debugging purposes only. The performance of the IVR Application is severely impaired when these log levels are used.

IVR Application log messages are written in files named `IVRAPPGEN_<DATE-TIME>.log` (for example, `IVRAPPGEN_20080319160816.log`). In this example, the log file was created on 3/19/2008 at 16:08:16. Those files are created in `/var/cti/logs/ive` directory.

Each log record has the following structure:

DATE TIME [THREAD ID] SEVERITY MESSAGE

Here is an example of a log record message:

```
20-Mar-2008 08:05:00 [http-8080-Processor15] ERROR Unable to retrieve subscriber
67xxxx0000000
```

During troubleshooting, it is useful to check log files created by other components installed on the ASU, especially Tomcat software and iVE framework.

All the log files are found in these two directories:

- `/var/cti/logs/ive`
- `/var/log/tomcat`

ASU Backup and Restore

The ASU is backed up and restored in two parts:

- **Configuration File Backup**: A utility installed on the ASU backs up the system and application configuration files and saves them in a compressed TGZ file on the ASU. There is a job on the ASU, managed by the MSA, that pushes the configuration files backup to the Remote Maintenance Unit (RMU) daily. The backups take place either according to a predefined schedule or are run manually, as described in Back Up ASU Configuration Settings. The configuration backup files are used to restore the configuration settings on an ASU server that is restored from a backup image, as described in Restore ASU Configuration Settings from a Backup File.
- **Server Backup**: An image of the ASU server's local hard drive is created, as described in Back Up an ASU Hard Drive With the PCcard. If the ASU is corrupted, restore the hard drive from the image, as described in Restore an ASU Hard Drive from a Backup Image.

ASU Backup Procedures

To backup the ASU:

1. Create a compressed backup file of the system and application configuration settings, as described in the following section.
2. Create an image of the local hard drive on a PCcard, as described in:
    - □ Create the PCcard Image
    - □ Back Up an ASU Hard Drive With the PCcard
    - □ Troubleshoot the Backup Procedure

Back Up ASU Configuration Settings

This procedure describes how to create a compressed backup file of the ASU system and application configuration files using the bar_config application on the ASU server.

bar_config backs up the following directories:

- **/usr/cti/conf** (and sub-directories)
- NMS configuration files:
    - □ /opt/nms/cg/cfg/cg.cfg
    - □ /opt/nms/cg/cfg/cg1.cfg
    - □ /opt/nms/cg/cfg/cg_client.cfg
    - □ /opt/nms/ctaccess/cfg/cnf.cfg
- Standard set of Linux system files

NOTE A cron job performs an automated backup of the configuration files every Sunday, at 01:00 PM.

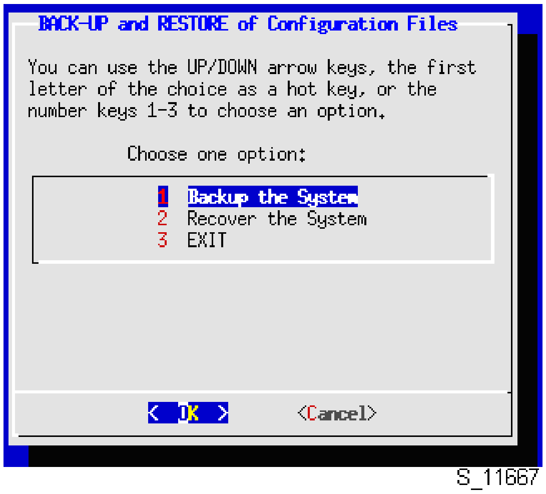
Backup the ASU:

1. Log in to the ASU as user **root.**
2. On the command line, type:

   bar_config

The Back-up and Restore of Configuration Files window appears.

Figure 5 Backup and Restore of Configuration Files Screen



BACK-UP and RESTORE of Configuration Files

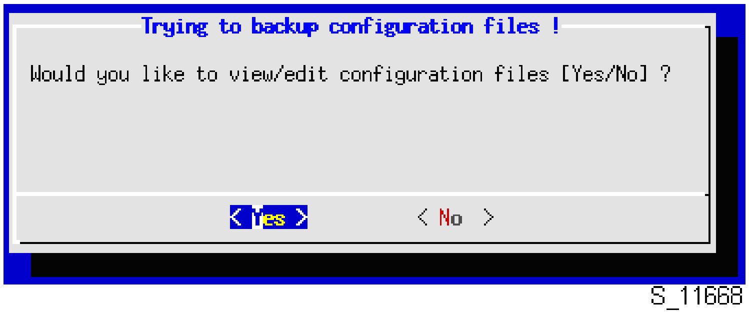
You can use the UP/DOWN arrow keys, the first letter of the choice as a hot key, or the number keys 1-3 to choose an option.

Choose one option:

3. Select **Backup the System**.

   The following screen appears:

Figure 6 Backup Configuration Files Screen



Trying to backup configuration files !

Would you like to view/edit configuration files [Yes/No] ?

4. Select **No.**

   The backup process begins. When the backup is complete, a confirmation message appears with the path to the backup file.

5. Check the log file to ensure the backup was successful. Type:

   more /var/cti/logs/swconfig_back.log

Copy the Configuration Backup to a Remote Server

This procedure describes how to copy your backup file of the ASU system and application configuration files to a remote server.

1. Log in to the remote server as user **root.**
2. Create a backup area (defined by Comverse Support) by typing:

   mkdir /usr/cti/<backup area>

   Example: **mkdir /usr/cti/ASUbackups**
3. Change directories to the backup area by typing:

   cd /user/cti/<backup area>

   Example: **cd /usr/cti/ASUbackups**
4. For each ASU, copy the backup file from the ASU to the remote server by typing:

scp <ASU-ipaddress>:/usr/cti/conf/backup/conf_<hostname >.bak.tgz .

Example: **scp 10.210.74.50:/usr/cti/conf/backup/conf_ce-ASU1.bak.tgz .**

Create the PCcard Image

This procedure describes how to create a PCcard image before creating a backup of the ASU hard drive. This procedure must be performed before creating an image of the ASU server, as described in Back Up an ASU Hard Drive With the PCcard.

What You Need

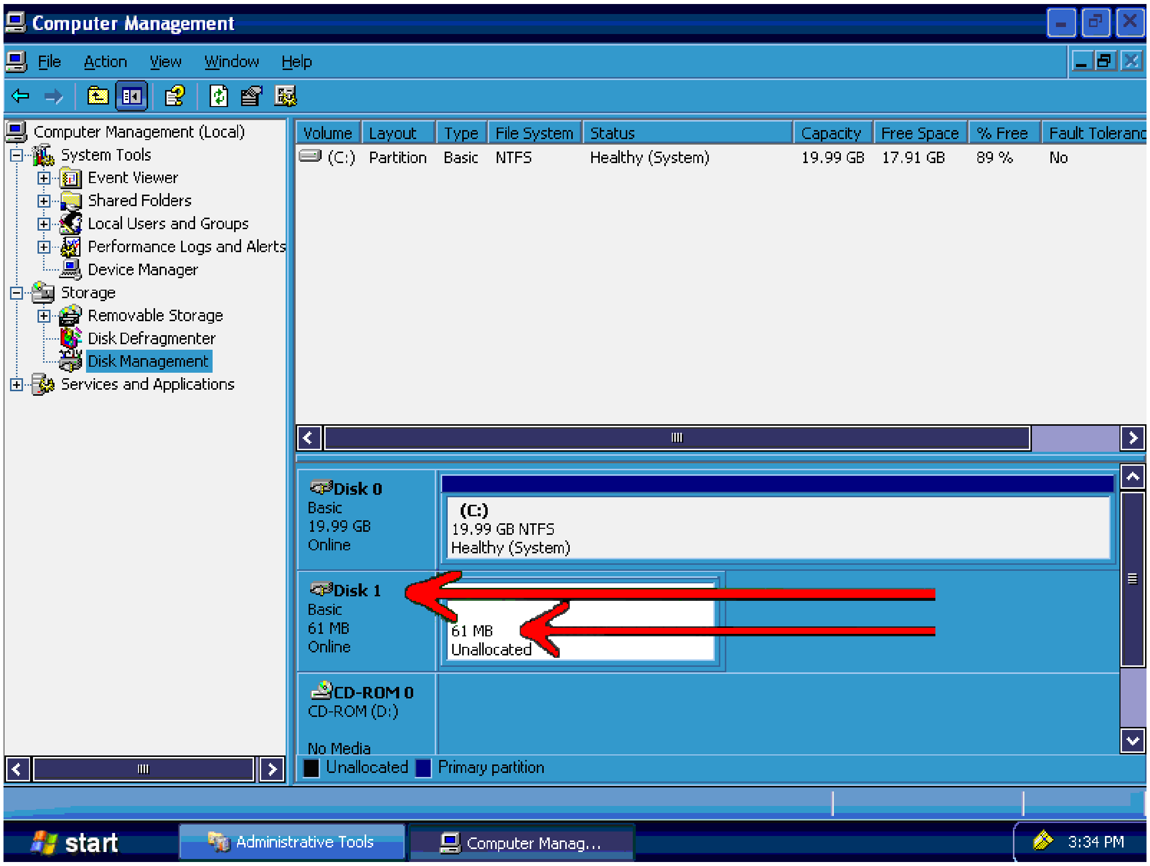
- Laptop with Windows XP/2000
- 64 MB PCcard

1. Contact Comverse customer support and request the following files:
   - □ **DD.EXE** .
   - □ **Image** file.

2. Insert the PCcard into the laptop's PCMCIA slot.
3. On the laptop, select **Start** > **Settings** > **Control Panel** > **Administrative Tools** > **Computer Management**.
4. In the tree on the left, double-click **Disk Management**.

   Information about the disks appears in the main pane of the window.

Figure 7 Computer Management Window with Disk Management Panel



Volume	Layout	Type	File System	Status	Capacity	Free Space	% Free	Fault Toleranc
(C:)	Partition	Basic	NTFS	Healthy (System)	19.99 GB	17.91 GB	89 %	No

Disk 0
Basic
19.99 GB
Online

(C:)
19.99 GB NTFS
Healthy (System)

Disk 1
Basic
61 MB
Online

61 MB
Unallocated

CD-ROM 0
CD-ROM (D:)

No Media

■ Unallocated ■ Primary partition

S_09633

NOTE Check the physical drive number of the PCcard (usually **Disk 1** or higher, but never **Disk 0**). The drive should indicate a total size of 64 MB or less.

CAUTION Ensure that you take note of the correct physical drive. Using the wrong physical drive number can leave your laptop formatted incorrectly.

5. Select **Start** > **Run**.

   The **Run** dialog box appears.

6. In the Run dialog box, type **cmd** and click **OK**.

   The command line terminal opens.

7. On the command line, type the commands in the order listed below:

   ```
   cd \
   dd if=<filename>.img of=\\.\PhysicalDrive<X>
   ```

   where

   <filename> is the name of the image you copied in Step 1.

   X is the number of the physical disk that you noted in Step 4.

For example,

```
C:\>dd if=swp-system-bar-1.0.0.0-1.img of=\\.\PhysicalDrive1
```

where **swp-system-bar-1.0.0.0-1** is the filename and **1** is X.

If the command is successful, the following output appears:

```
125440+0 records in
125440+0 records out
```

NOTE It might take some time before the output appears.

8. Do the following:
   - *a.* On the Taskbar click the green arrow and then select **Safely remove the device**.

     A message is displayed confirming that the device can be safely removed.
   - *b.* Eject the device from the laptop.

     The PCcard is now ready to be used for backup procedures.

   Continue with Back Up a ASU Hard Drive With the PCcard.

Back Up an ASU Hard Drive with the PCcard

This procedure describes how to back up the local hard drive to an image using a PCcard.

NOTE Make sure that the BIOS setup recognizes the PCcard as its primary boot device.

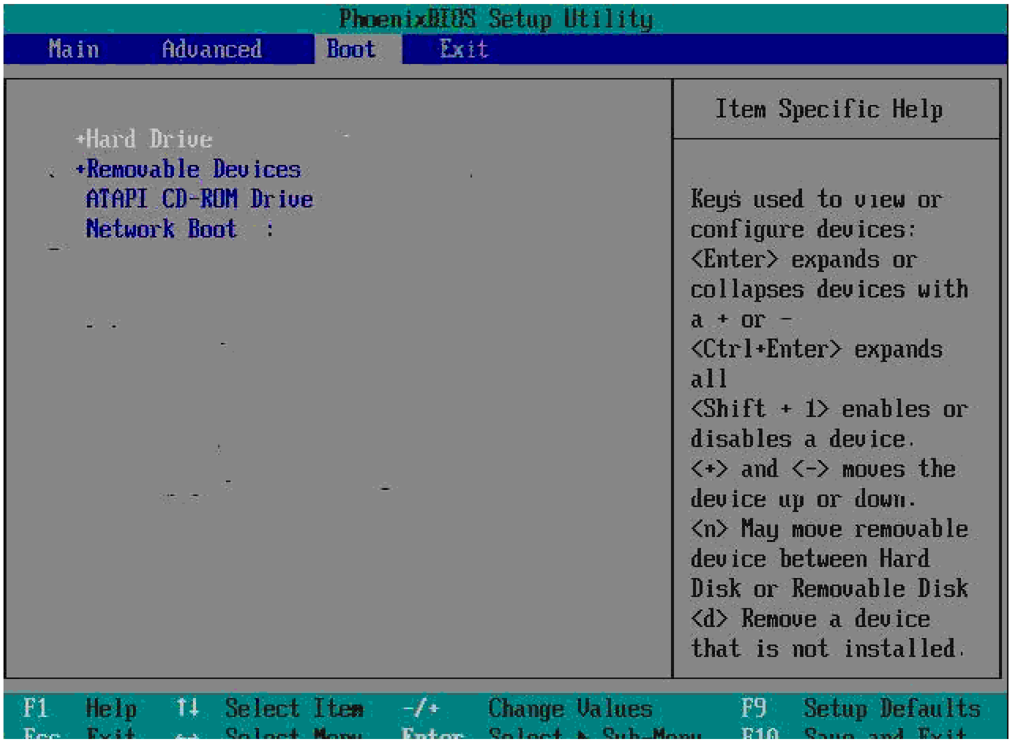
What You Need

- Successful completion of Create the PCcard Image.

1. Create the backup directories on the backup server as described in Create Backup Directories on the Backup Server.
2. On the ASU to be backed up, verify that no ASU applications are running.
3. Insert the PCcard into the ASU unit's PCMCIA slot.
4. On the ASU, press **Reset.**
5. Press **F2** to open the **Setup Utility.**

The **PhoenixBIOS Setup Utility** main screen appears.

Figure 8 PhoenixBIOS Setup Utility Main Screen

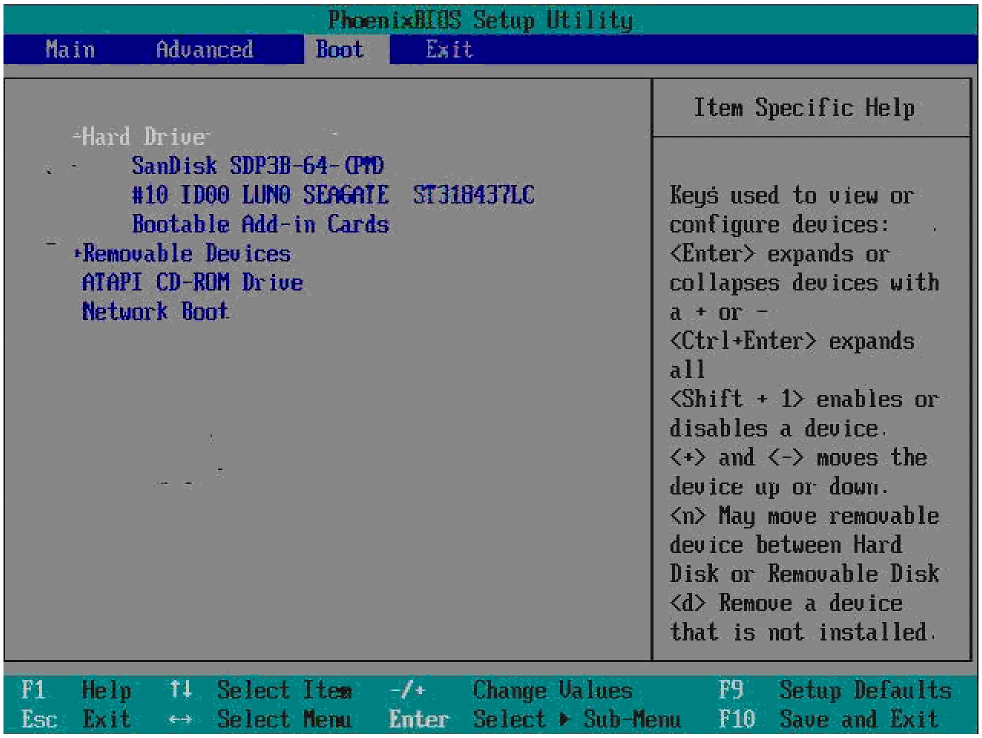


```
                    PhoenixBIOS Setup Utility
  Main      Advanced      Boot      Exit

                                          Item Specific Help
     +Hard Drive
     +Removable Devices                   Keys used to view or
      ATAPI CD-ROM Drive                  configure devices:
      Network Boot                        <Enter> expands or
                                          collapses devices with
                                          a + or -
                                          <Ctrl+Enter> expands
                                          all
                                          <Shift + 1> enables or
                                          disables a device.
                                          <+> and <-> moves the
                                          device up or down.
                                          <n> May move removable
                                          device between Hard
                                          Disk or Removable Disk
                                          <d> Remove a device
                                          that is not installed.

 F1   Help  ↑↓  Select Item  -/+    Change Values       F9   Setup Defaults
 Esc  Exit  ↔   Select Menu  Enter  Select ▸ Sub-Menu   F10  Save and Exit
```

S_09611

6. Select **Boot**>**+Hard Drive**>**SPD3B-64-(PM)** and move it to the top.

Figure 9 PhoenixBIOS Setup Utility Boot Screen



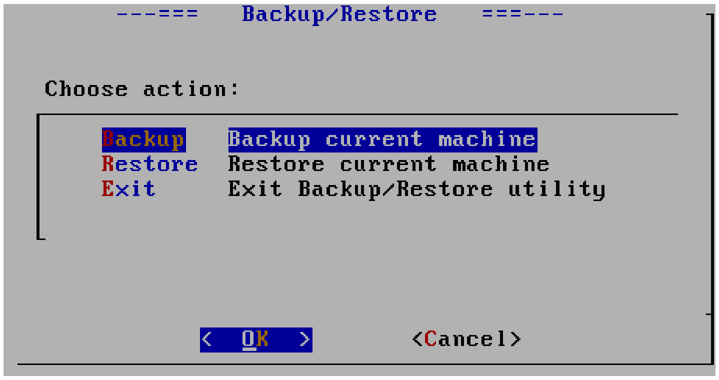
```
                    PhoenixBIOS Setup Utility
  Main      Advanced      Boot      Exit

                                          Item Specific Help
     -Hard Drive
          SanDisk SDP3B-64-(PM)
          #10 ID00 LUN0 SEAGATE  ST318437LC  Keys used to view or
          Bootable Add-in Cards           configure devices:
     +Removable Devices                   <Enter> expands or
      ATAPI CD-ROM Drive                  collapses devices with
      Network Boot                        a + or -
                                          <Ctrl+Enter> expands
                                          all
                                          <Shift + 1> enables or
                                          disables a device.
                                          <+> and <-> moves the
                                          device up or down.
                                          <n> May move removable
                                          device between Hard
                                          Disk or Removable Disk
                                          <d> Remove a device
                                          that is not installed.

 F1   Help  ↑↓  Select Item  -/+    Change Values       F9   Setup Defaults
 Esc  Exit  ↔   Select Menu  Enter  Select ▸ Sub-Menu   F10  Save and Exit
```

S_09612

7. Click **Save** and then click **Exit**.

The system boots up and after about 30 seconds, the Backup and Restore Main Menu screen appears.

Figure 10 Backup and Restore - Main Menu Screen



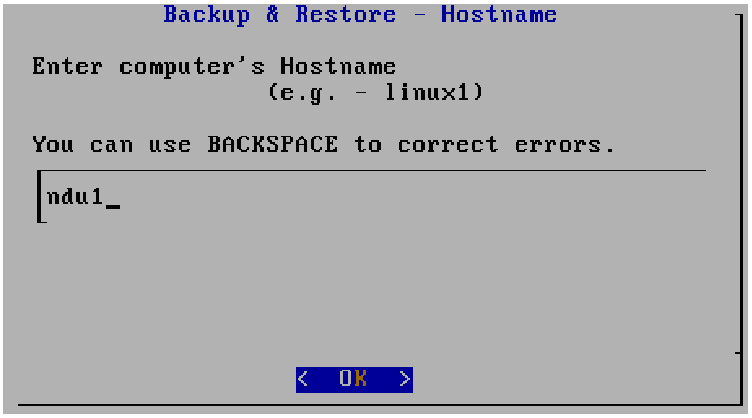
```
        -----   Backup/Restore   -----

  Choose action:

       Backup    Backup current machine
       Restore   Restore current machine
       Exit      Exit Backup/Restore utility


                <  OK  >       <Cancel>
```

S_09613

8. Select **Backup** and press **Enter**.

   The Backup & Restore – Hostname screen appears.

Figure 11 Backup and Restore - Hostname Screen



```
            Backup & Restore - Hostname

  Enter computer's Hostname
                  (e.g. - linux1)

  You can use BACKSPACE to correct errors.

  ndu1_


                      <  OK  >
```

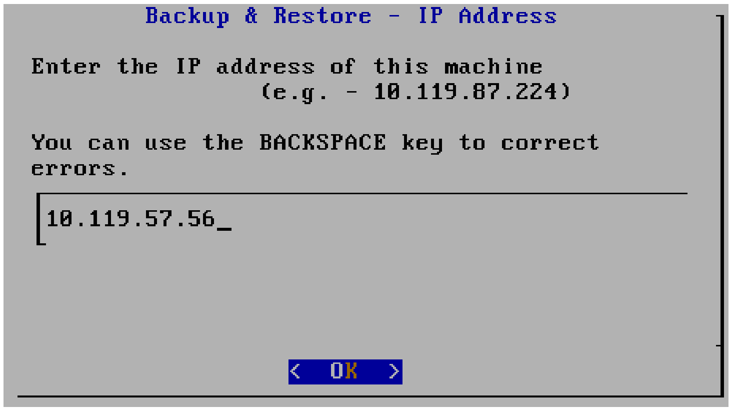
S_09614

9. If the program extracts the network information from the local hard drive, start with Step 9. Otherwise start with the step below.

   a. Type the Hostname of the local machine and press **Enter**.

   The Backup & Restore — IP Address screen appears.

Figure 12 Backup and Restore - IP Address Screen



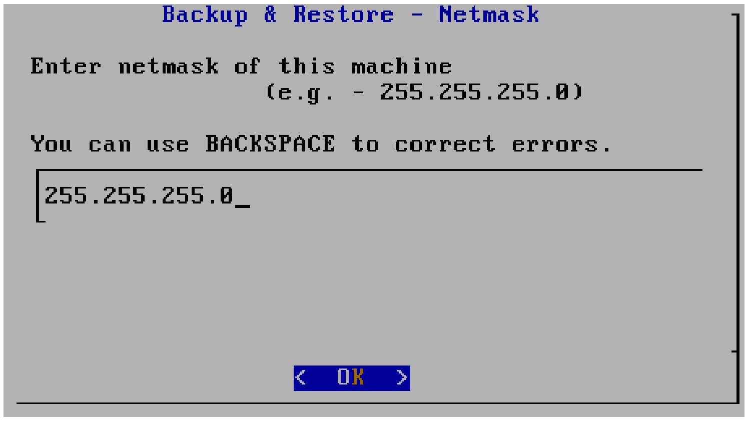
```
            Backup & Restore - IP Address

  Enter the IP address of this machine
                  (e.g. - 10.119.87.224)

  You can use the BACKSPACE key to correct
  errors.

  10.119.57.56_
```

S_09615

b. Type the IP address of the local machine and press **Enter**.

The Backup and Restore – Netmask screen appears.

Figure 13 Backup and Restore - Netmask Screen



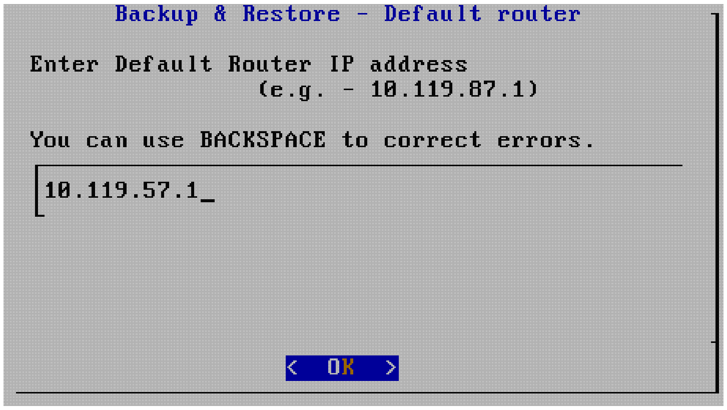
```
            Backup & Restore - Netmask

  Enter netmask of this machine
                  (e.g. - 255.255.255.0)

  You can use BACKSPACE to correct errors.

  255.255.255.0_
```

S_09616

c. Type the Netmask of the local machine and press **Enter**.

The Backup and Restore – Default Router screen appears.

Figure 14 Backup and Restore - Default Router Screen



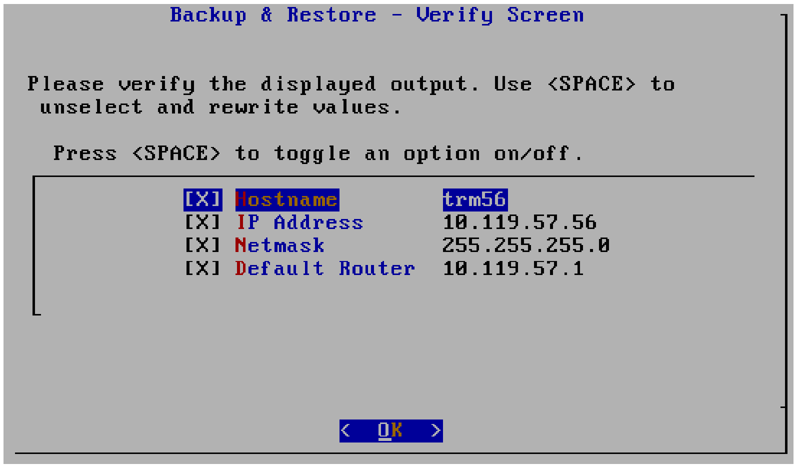
```
        Backup & Restore - Default router

  Enter Default Router IP address
                  (e.g. - 10.119.87.1)

  You can use BACKSPACE to correct errors.

  10.119.57.1_
```

S_09617

d. Type the IP address of the default router of the local machine and press **Enter**.

The Backup and Restore – Verify screen appears with the network information provided.

Figure 15 Backup and Restore - Verify Screen



```
                    Backup & Restore - Verify Screen

 Please verify the displayed output. Use <SPACE> to
  unselect and rewrite values.

   Press <SPACE> to toggle an option on/off.

            [X] Hostname        trm56
            [X] IP Address      10.119.57.56
            [X] Netmask         255.255.255.0
            [X] Default Router  10.119.57.1

                              <  OK  >
```

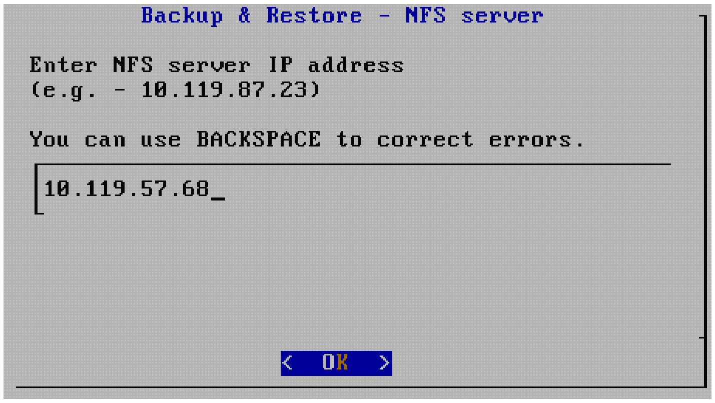
S_09618

e. To correct the information for any component, select the component using the arrow keys, press the spacebar and then press **Enter**.

Otherwise, to proceed, press **Enter**.

The Backup and Restore – NFS Server screen appears.

Figure 16 Backup and Restore - NFS Server Screen



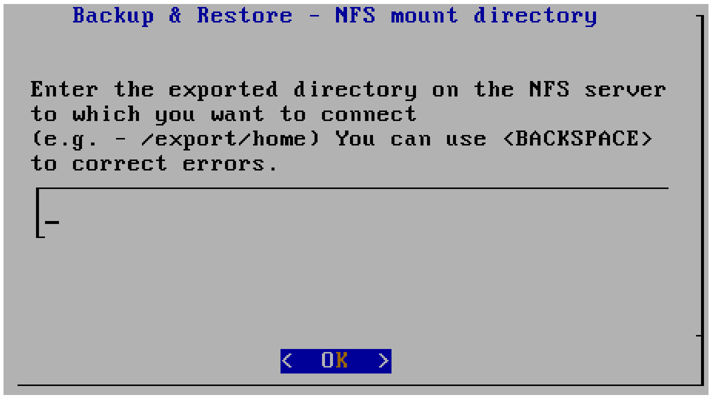
```
              Backup & Restore - NFS server

 Enter NFS server IP address
 (e.g. - 10.119.87.23)

 You can use BACKSPACE to correct errors.

  10.119.57.68_

                        <  OK  >
```

S_09619

f. Enter the IP address of the backup server to which the image is to be saved and then press **Enter**.

The Backup and Restore – NFS Mount Directory screen appears.

Figure 17 Backup and Restore - NFS Mount Directory Screen



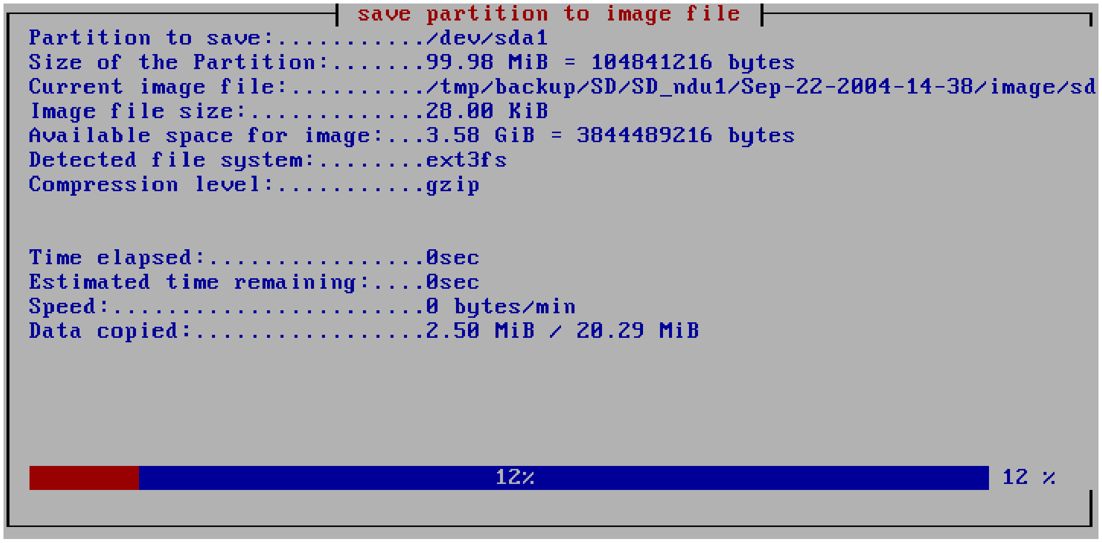
```
    Backup & Restore - NFS mount directory


 Enter the exported directory on the NFS server
 to which you want to connect
 (e.g. - /export/home) You can use <BACKSPACE>
 to correct errors.

 _
```

S_09620

g. Type the name of the directory created on the NFS server to which the image was saved (/backup/Unit_x_Image), and then press **Enter**.

The Save Partition to Image File screen appears.

Figure 18 Save Partition to Image File Screen



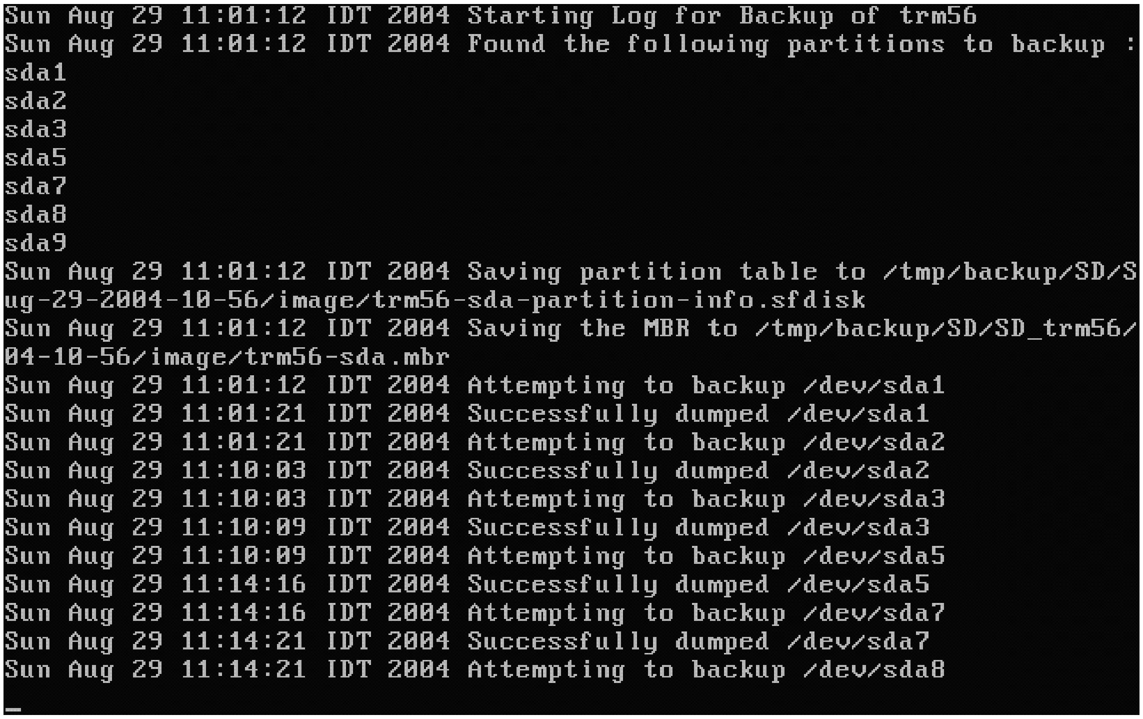
```
                    save partition to image file
Partition to save:...........:/dev/sda1
Size of the Partition:.......99.98 MiB = 104841216 bytes
Current image file:.........../tmp/backup/SD/SD_ndu1/Sep-22-2004-14-38/image/sd
Image file size:.............28.00 KiB
Available space for image:...3.58 GiB = 3844489216 bytes
Detected file system:........ext3fs
Compression level:...........gzip


Time elapsed:................0sec
Estimated time remaining:....0sec
Speed:.......................0 bytes/min
Data copied:.................2.50 MiB / 20.29 MiB
```

S_09621

The Backup program continues to back up each partition of the local unit.

NOTE To access the log at any time, press ALT+F9.
To return to the main screen, press ALT+F10.

Figure 19 Log Screen



```
Sun Aug 29 11:01:12 IDT 2004 Starting Log for Backup of trm56
Sun Aug 29 11:01:12 IDT 2004 Found the following partitions to backup :
sda1
sda2
sda3
sda5
sda7
sda8
sda9
Sun Aug 29 11:01:12 IDT 2004 Saving partition table to /tmp/backup/SD/S
ug-29-2004-10-56/image/trm56-sda-partition-info.sfdisk
Sun Aug 29 11:01:12 IDT 2004 Saving the MBR to /tmp/backup/SD/SD_trm56/
04-10-56/image/trm56-sda.mbr
Sun Aug 29 11:01:12 IDT 2004 Attempting to backup /dev/sda1
Sun Aug 29 11:01:21 IDT 2004 Successfully dumped /dev/sda1
Sun Aug 29 11:01:21 IDT 2004 Attempting to backup /dev/sda2
Sun Aug 29 11:10:03 IDT 2004 Successfully dumped /dev/sda2
Sun Aug 29 11:10:03 IDT 2004 Attempting to backup /dev/sda3
Sun Aug 29 11:10:09 IDT 2004 Successfully dumped /dev/sda3
Sun Aug 29 11:10:09 IDT 2004 Attempting to backup /dev/sda5
Sun Aug 29 11:14:16 IDT 2004 Successfully dumped /dev/sda5
Sun Aug 29 11:14:16 IDT 2004 Attempting to backup /dev/sda7
Sun Aug 29 11:14:21 IDT 2004 Successfully dumped /dev/sda7
Sun Aug 29 11:14:21 IDT 2004 Attempting to backup /dev/sda8
_
```

S_09622

When the backup is complete, the Backup and Restore Info Box appears with the following message:

Congratulations!
The Backup process has completed successfully. Press Enter to return to Main Menu.
<OK>

10. Press **Enter** to return to the Main Menu.

    If a message appears: Failed to backup <partition_name>, continue with Troubleshoot the Backup Procedure.

11. From the Main Menu, select Exit and then press **Enter**.

    The following prompt appears:

    ```
    Please remove the PC Card from the machine and reboot.
    ```

12. Remove the PCcard from the unit.

CAUTION You must reboot the unit.

13. On the ASU, press **Reset**.

    The local hard drive is nowbacked up to an image using the PCcard.

Create Backup Directories on the Backup Server

This procedure describes how to create backup directories on the backup server where all backed up images of the ASU reside.

1. Log in to the backup server and verify the physical IP address of the system.
2. On the command line, type the following commands to create a new directory under the backup folder:

   The directory name is <Unit_x_Image>

   cd /backup and press **Enter**

   mkdir<Unit_x_Image> and press **Enter**

   chmod 777 <Unit_x_Image> and press **Enter**

   where:

   Unit: is the unit name (ASU)

   x: is the unit number

   For example: ASU_1_IMAGE
3. On the command line, type Share /backup/<Unit_x_Image> and press **Enter** to share access to the directory.

Troubleshoot the Backup Procedure

This procedure describes how to proceed if for some reason the backup of the ASU fails.

1. When backing up the image on the ASU, the following message might appear:

   ```
   Failed to backup <partition_name>
   ```

   where <partition_name> is the partition on the local hard drive that was not backed up.

   This error message indicates errors on the file system. The backup application cannot back up a file system that contains errors.
2. While still booted in to the PCcard, press **ALT+F2**, and then type the following command:

   e2fsck -f <partition name>

   where <partition name> is the full path and name of the partition on the local hard drive that could not be backed up.
3. To return to the Backup and Restore menu, press **ALT+F1**.

Restore Procedures

The ASU is restored in three parts:

1. Ensures a valid backup file of the ASU server’s system and application configuration files exists, as described in Check for a Valid ASU Configuration Backup File.
2. Restores the ASU hard drive from an image backup, as described in Restore an ASU Hard Drive from a Backup Image.
3. Restores the ASU system and application configuration settings from the backup file, as described in Restore ASU Configuration Settings from a Backup File.

Check for a Valid Configuration Backup File

This procedure describes how to check that a valid configuration backup file exists for an ASU server to be restored. This is the first step in restoring a ASU server.

1. Check the backup server for a valid backup file for the ASU server to be restored.
2. Proceed to the next step in the restore process, Restore an ASU Hard Drive from a Backup Image.

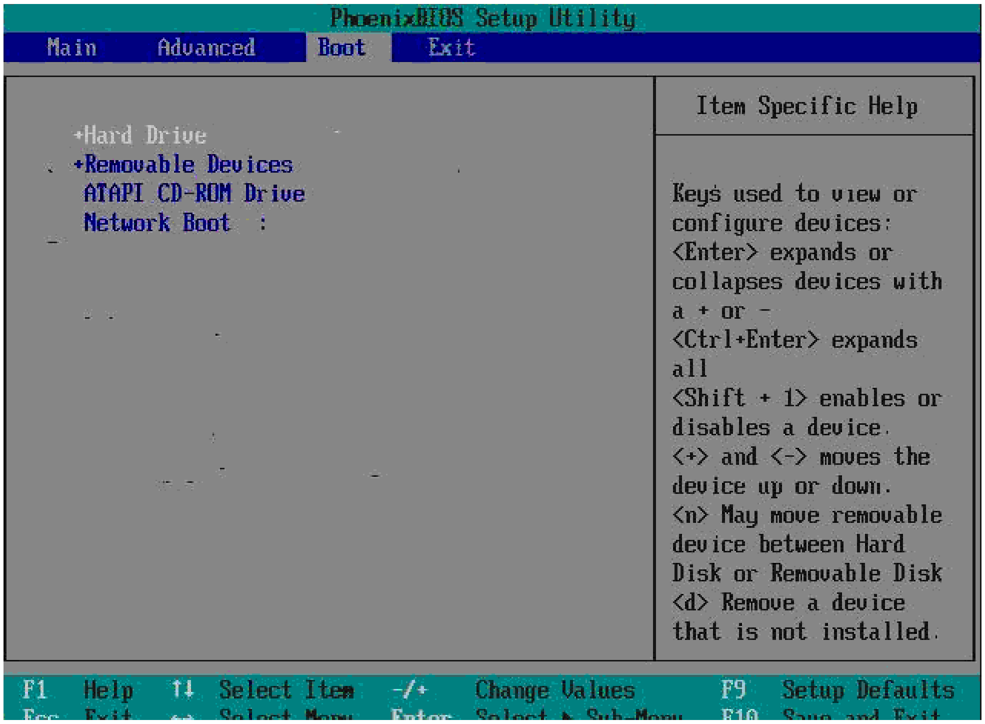
Restore an ASU Hard Drive from a Backup Image

This procedure describes how restore an ASU server hard drive from a backup image. This is the second step in restoring an ASU server and is only performed after confirming that a valid configuration backup file exists for the ASU server to be restored, as described in Check for a Valid ASU Configuration Backup File.

1. Log in to the backup server and verify the physical IP address of the system.
2. Insert the PCcard into the ASU unit's PCMCIA slot.
3. On the ASU, press **Reset**.
4. Press **F2** to open the Setup Utility.

The PhoenixBIOS Setup Utility main screen appears.

Figure 20 PhoenixBIOS Setup Utility Main Screen

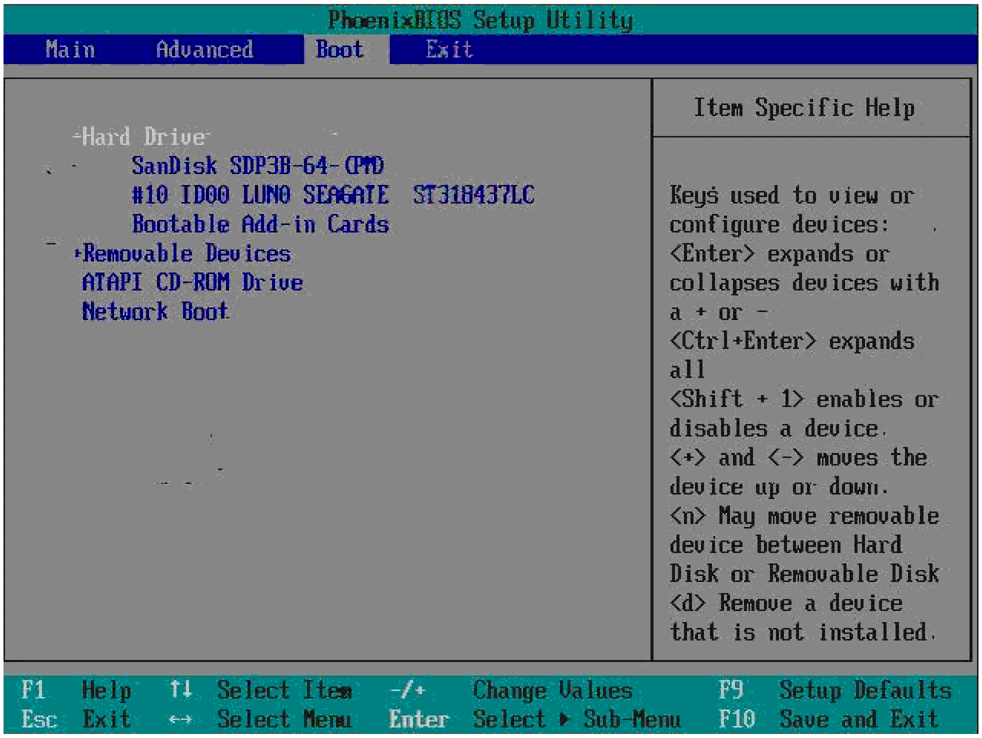


Keys used to view or configure devices:
<Enter> expands or collapses devices with a + or -
<Ctrl+Enter> expands all
<Shift + 1> enables or disables a device.
<+> and <-> moves the device up or down.
<n> May move removable device between Hard Disk or Removable Disk
<d> Remove a device that is not installed.

S_09611

5. Select Boot>+Hard Drive>SanDisk SDP3B-64-(PM) and move it to the top.

Figure 21 PhoenixBIOS Setup Utility Boot Screen



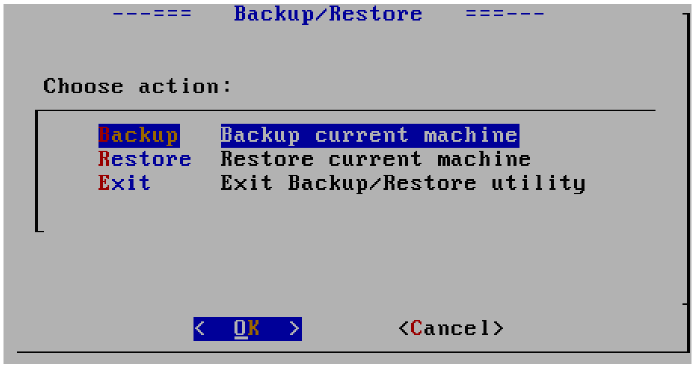
```
                         PhoenixBIOS Setup Utility
   Main      Advanced     Boot     Exit

                                                   Item Specific Help
     -Hard Drive
          SanDisk SDP3B-64-(PM)                    Keys used to view or
          #10 ID00 LUN0 SEAGATE  ST318437LC        configure devices:
          Bootable Add-in Cards                    <Enter> expands or
     +Removable Devices                            collapses devices with
      ATAPI CD-ROM Drive                           a + or -
      Network Boot                                 <Ctrl+Enter> expands
                                                   all
                                                   <Shift + 1> enables or
                                                   disables a device.
                                                   <+> and <-> moves the
                                                   device up or down.
                                                   <n> May move removable
                                                   device between Hard
                                                   Disk or Removable Disk
                                                   <d> Remove a device
                                                   that is not installed.

 F1   Help  ↑↓  Select Item  -/+    Change Values       F9   Setup Defaults
 Esc  Exit  ↔   Select Menu  Enter  Select ▸ Sub-Menu   F10  Save and Exit
```

S_09612

6. Click **Save** and then **Exit**.

   The system boots and after about 30 seconds, the Backup and Restore Main Menu appears.

Figure 22 Backup and Restore Main Menu Screen



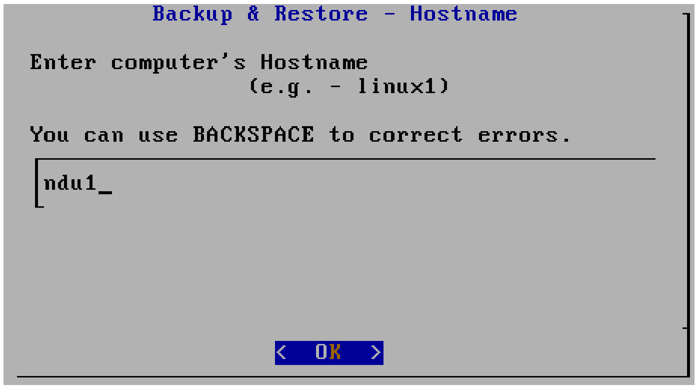
```
         -------  Backup/Restore  -------

   Choose action:

       Backup     Backup current machine
       Restore    Restore current machine
       Exit       Exit Backup/Restore utility


              <  OK  >          <Cancel>
```

S_09613

7. Select **Restore** and press **Enter**.

   The Backup and Restore – Hostname screen appears.

Figure 23 Backup and Restore Hostname Screen



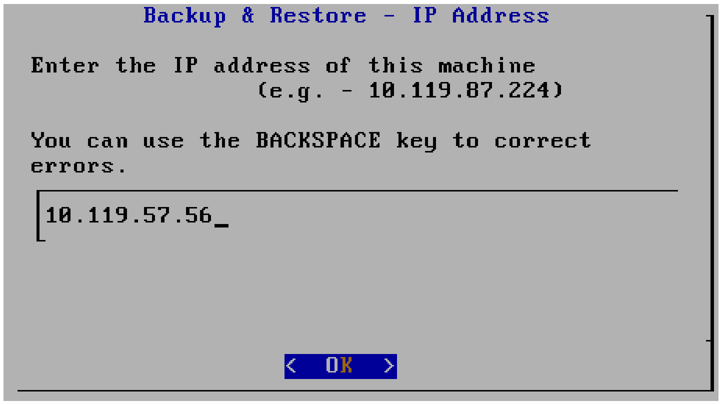
```
          Backup & Restore - Hostname

 Enter computer's Hostname
                (e.g. - linux1)

 You can use BACKSPACE to correct errors.

 ndu1_
```

S_09614

8. Type the Hostname of the local unit and press **Enter**.

   The Backup and Restore – IP Address screen appears.

Figure 24 Backup and Restore - IP Address Screen



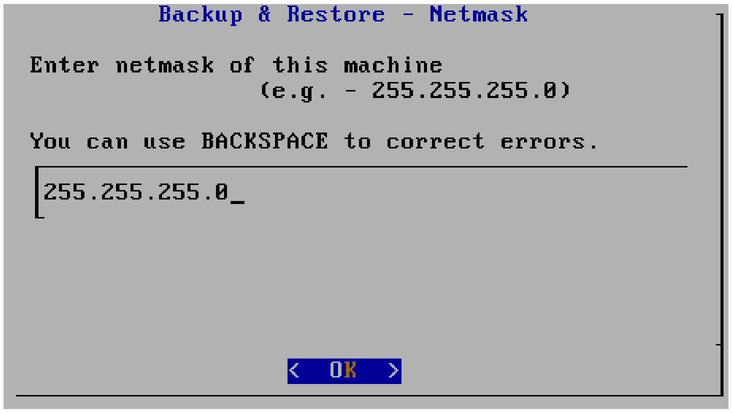
```
          Backup & Restore - IP Address

 Enter the IP address of this machine
                (e.g. - 10.119.87.224)

 You can use the BACKSPACE key to correct
 errors.

 10.119.57.56_
```

S_09615

9. Type the IP address of the local unit and press **Enter**.

   The Backup and Restore – Netmask screen appears.

Figure 25 Backup and Restore - Netmask



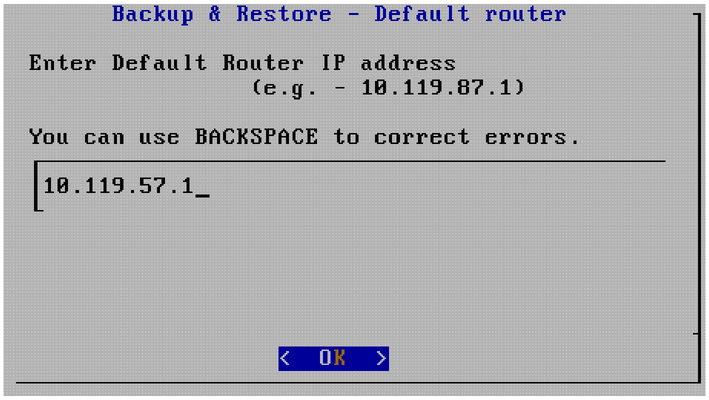
```
          Backup & Restore - Netmask

 Enter netmask of this machine
                (e.g. - 255.255.255.0)

 You can use BACKSPACE to correct errors.

 255.255.255.0_
```

S_09616

10. Type the Netmask of the local unit and press **Enter**.

    The Backup and Restore – Default Router screen appears.

Figure 26 Backup and Restore - Default Router Screen

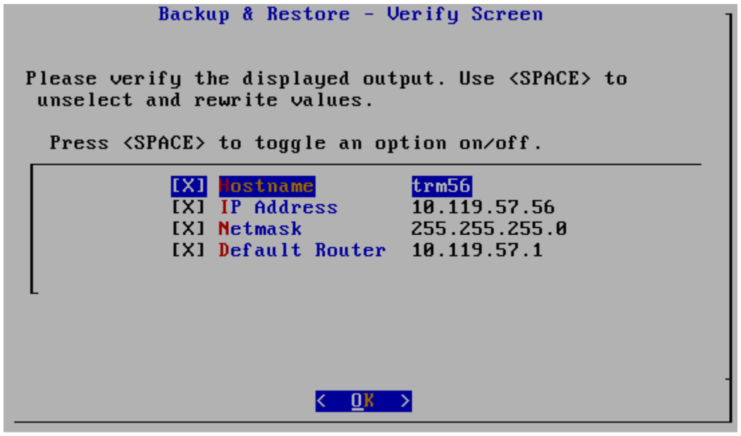


```
        Backup & Restore - Default router

 Enter Default Router IP address
                (e.g. - 10.119.87.1)

 You can use BACKSPACE to correct errors.

 10.119.57.1_
```

S_09617

11. Type the IP address of the default router of the local unit and press **Enter**.

    The Backup and Restore – Verify screen appears with the information provided.



```
          Backup & Restore - Verify Screen

 Please verify the displayed output. Use <SPACE> to
  unselect and rewrite values.

   Press <SPACE> to toggle an option on/off.

             [X] Hostname        trm56
             [X] IP Address      10.119.57.56
             [X] Netmask         255.255.255.0
             [X] Default Router  10.119.57.1
```

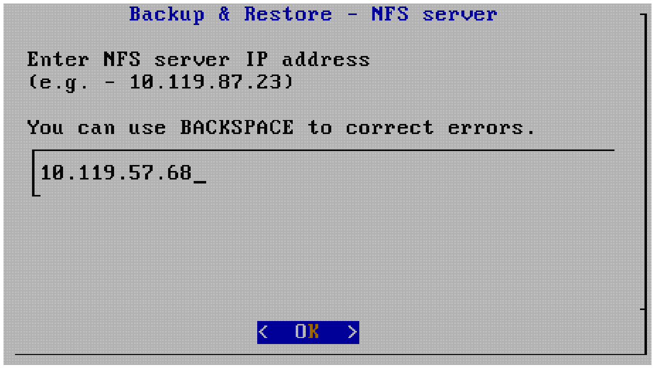
S_09618

12. To correct the information for any component, select using the arrow keys, press the spacebar, and then press **Enter**.

    Otherwise, to proceed, press **Enter**.

    The Backup and Restore – NFS Server screen appears.

Figure 27 Backup and Restore - NFS Server Screen



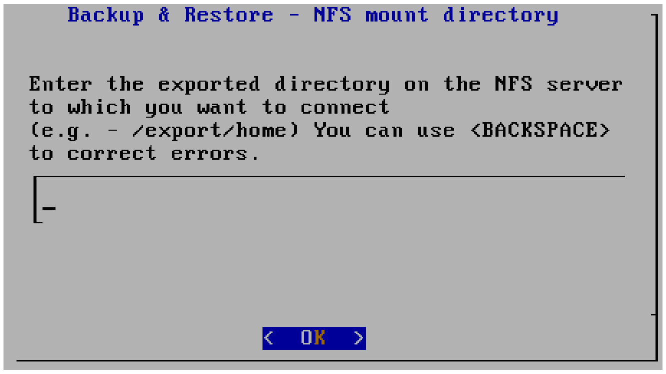
```
      Backup & Restore - NFS server

 Enter NFS server IP address
 (e.g. - 10.119.87.23)

 You can use BACKSPACE to correct errors.

 10.119.57.68_
```

S_09619

13. Type the IP address of the backup server from which you want to restore the image and then press **Enter**.

The Backup and Restore – NFS Mount Directory screen appears.

Figure 28 Backup and Restore - NFS Mount Directory Screen



Backup & Restore - NFS mount directory

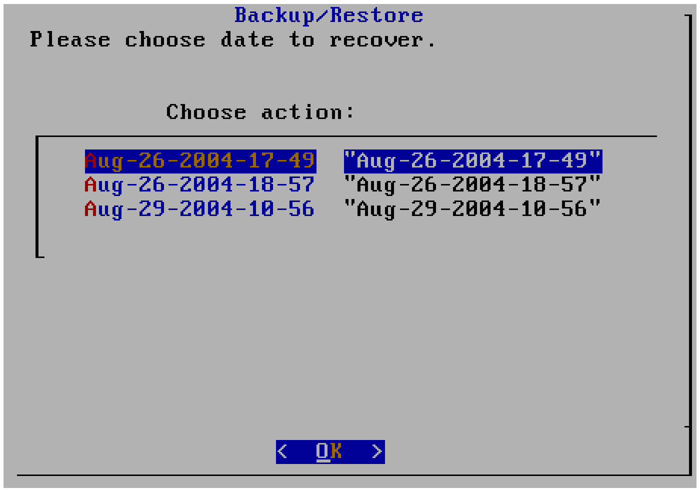
```
Enter the exported directory on the NFS server
to which you want to connect
(e.g. - /export/home) You can use <BACKSPACE>
to correct errors.
```

S_09620

14. Type the name of the directory created on the NFS server from which the image is to be restored (/backup/<Unit_x_Image>), and then press **Enter**.

    The Backup and Restore - Please Choose Date to Recover screen appears.

Figure 29 Backup and Restore - Please Choose Date to Recover Screen



Backup/Restore

```
Please choose date to recover.

         Choose action:

    Aug-26-2004-17-49  "Aug-26-2004-17-49"
    Aug-26-2004-18-57  "Aug-26-2004-18-57"
    Aug-29-2004-10-56  "Aug-29-2004-10-56"
```

S_09624

15. Select the date and time of the image backup to restore from (for example: Aug–26–2004–17–49.

    The Restore program restores each partition of the local unit.

NOTE To access the log at any time, press ALT+F9.
To return to the main screen, press ALT+F10.

The restore completed message appears:

Congratulations!!!
The Restore process has completed successfully. Press Enter to return to main menu

16. Do the following:

    a. To return to the Main Menu, press **Enter**.

    b. From the Main Menu, select Exit and then press **Enter**.

    The following prompt appears:

```
Please remove the PC Card from the machine and reboot.
```

CAUTION You must reboot the unit.

    c. Remove the PC Card from the machine.

17. On the ASU, press Reset.
18. Proceed to the next step in the restore process, Restore ASU Configuration Settings from a Backup File.

Restore ASU Configuration Settings from a Backup File

This procedure describes how to restore ASU system and application configuration settings from a backup file to a remote server. This is the third and final step in restoring a ASU server, and is only performed after restoring the ASU hard drive from a backup image, as described in Restore an ASU Hard Drive from a Backup Image.

What You Need

- A valid configuration backup file for the ASU server to be restored.

1. Log in to the remote server as user **root**.
2. Change directories to the backup area by typing:

   cd /user/cti/<backup area>

   Example: cd /usr/cti/ASUbackups
3. Restore the backup file to the remote server by typing:

   scp conf_<hostname >.bak.tgz <ASU-ipaddres>:/usr/cti/conf/backup/conf_<hostname>.bak.tgz

   Example: scp conf_ce-ASU1.bak.tgz 10.210.74.50:/usr/cti/conf/backup/conf_ce-ASU1.bak.tgz
4. Log in to the ASU as **root**.
5. On the command line, type hostname <hostname>

   where <hostname> is the ASU unit you want to restore.

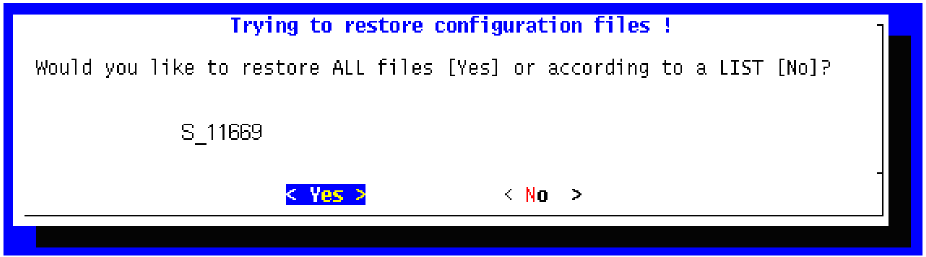
   Example: hostname ASU11
6. On the command line, type:

   bar_config

   The Backup and Restore of Configuration Files screen appears.
7. Select **Recover the System** and **OK**.

   The following screen appears:

Figure 30 Backup Configuration Files Window



```
Trying to restore configuration files !

Would you like to restore ALL files [Yes] or according to a LIST [No]?
```

8. Select **Yes**.

   The configuration files are restored.

9. Check the log file to ensure the restore ran successfully by typing:

   ```
   more /var/cti/logs/swconfig_back.log
   ```

10. Reboot the ASU for the configuration changes to take effect.

CMS Backup and Restore

Backups for images and configurations are stored on the RMU. Use the following steps to ensure proper storage on the RMU.

1. The CMS configuration file archive is backed up to the RMU by the MSA. In order for the MSA to function properly, edit the /etc/hosts file and insert the following entry:

   ```
   <RMU_HOST_IP_ADDRESS> rmu1
   ```

   The /usr/cti/conf/backup/conf_<host_name>.bak.tgz file is transferred to RMU as the /home/rmuser/conf/conf_<host_name>.bak.tgz file. The file is backed up to RMU daily at 23:50 pm while the file is created locally at CMS at 22:30 pm daily.

2. When using the *Backing Up a CMS Hard Drive with the Pccard* procedure from the CMS Unit Description:

   - There is no need to create the backup directories on the backup server.
   - The user enters the RMU IP address as the NFS server (backup server) address.

3. Enter the following RMU directory as the NFS directory:

   ```
   /home/rmuser/package/os
   ```

4. When using the *Restoring a CMS Hard Drive from a Backup Image* procedure from the CMS Unit Description:

   - The user needs to enter the RMU IP address as the NFS server (backup server) address

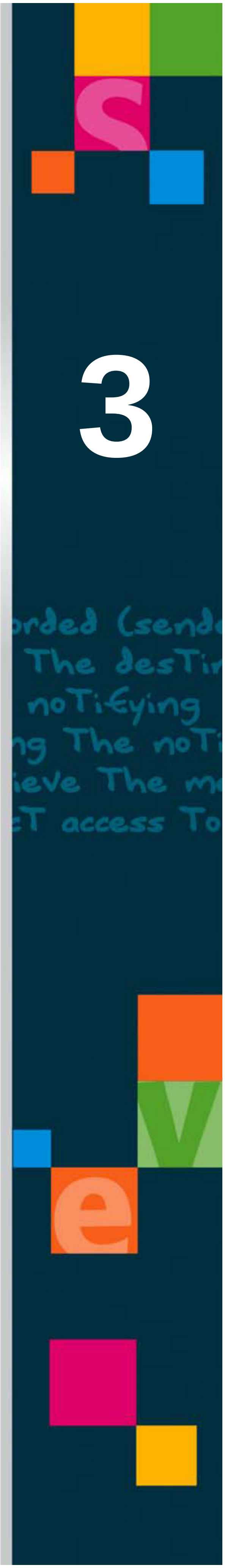
5. Enter the following RMU directory as the NFS directory:

   ```
   /home/rmuser/package/os
   ```

NOTE Refer to the Comverse Media Server IVR Overview for further details on CMS.

Chapter 3

Callflows



Callflow Overview

Callflows detail the logic flow of specific scenarios. Multiple access numbers can map to the same callflow. Different resellers have the option to publish different numbers but share the same logic.

The operator publishes two numbers:

1. One for the subscriber to call from their own phone.
2. Another for the subscriber to call from a different phone.

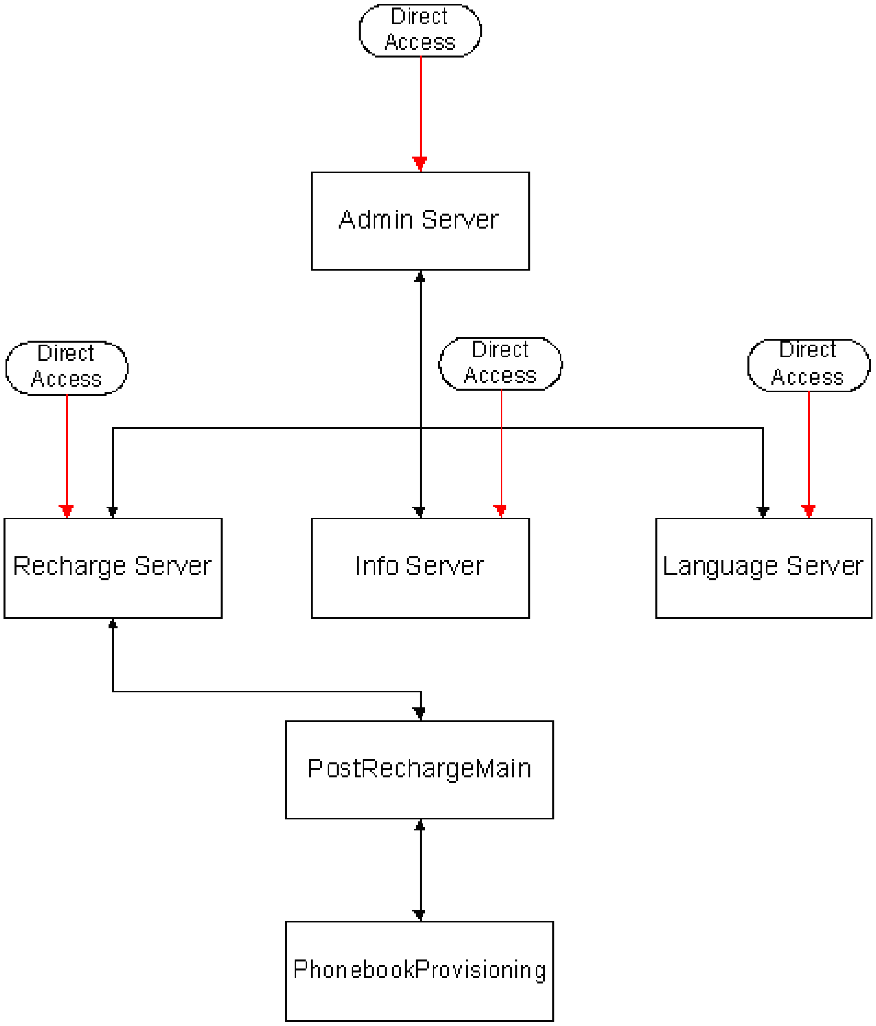
The access number profile is checked to determine if the caller is to be prompted for their number or not.

Operators frequently customize default callflows. In particular:

- Admin menu
- Add languages (English is delivered as the default)
- Create additional phrases

Basic Menu Structure

Figure 31 Basic Menu Structure



Local Configuration Settings

The following tables contain local configuration parameters used with the 3Log IVR. The equivalent is needed for CMS / ASU.

Language Table

The following table shows the correlation between supported locales and what language they are heard in. The file language.properties are used to map language names as returned by the CCWS.

Table 6 Language Table

Locale	Language Heard	Description
en_US	British English	British prompts based on UR10
en_BR	British English	British prompts based on UR10

General Parameters Table

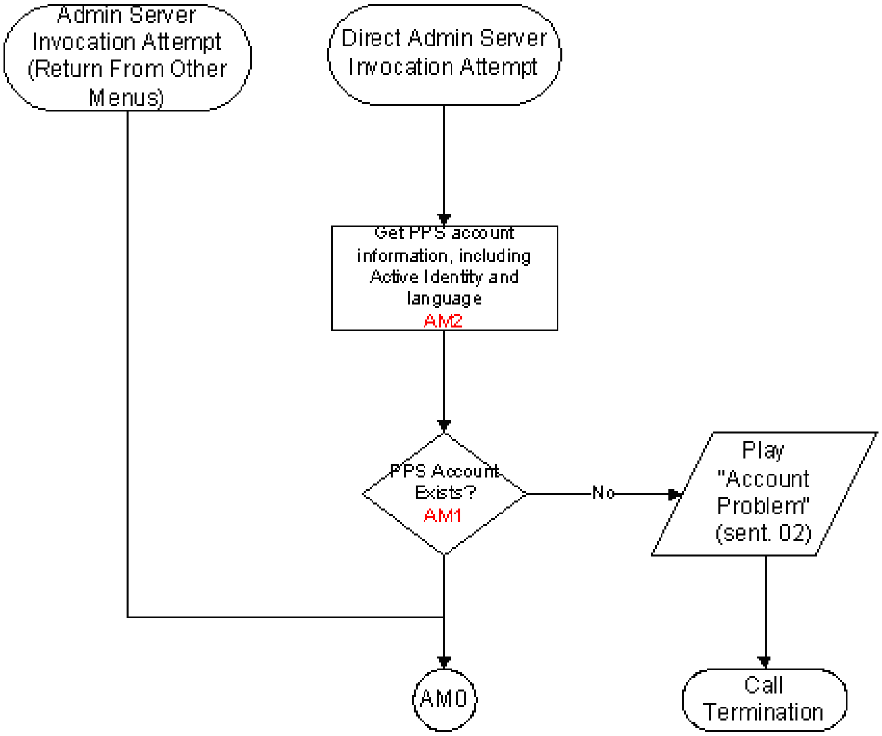
The general parameters table includes all system-based configuration and the keymapping and input properties. The list of all keys, where they are located, as well as valid and default values is found in the General Parameters file in:

<\\us-nj-file01\Shares\Application Engineering\Records Staging Area\IVR App 2.0\Draft\Callflows\General Parameters.xls>

ASU IVR Callflows

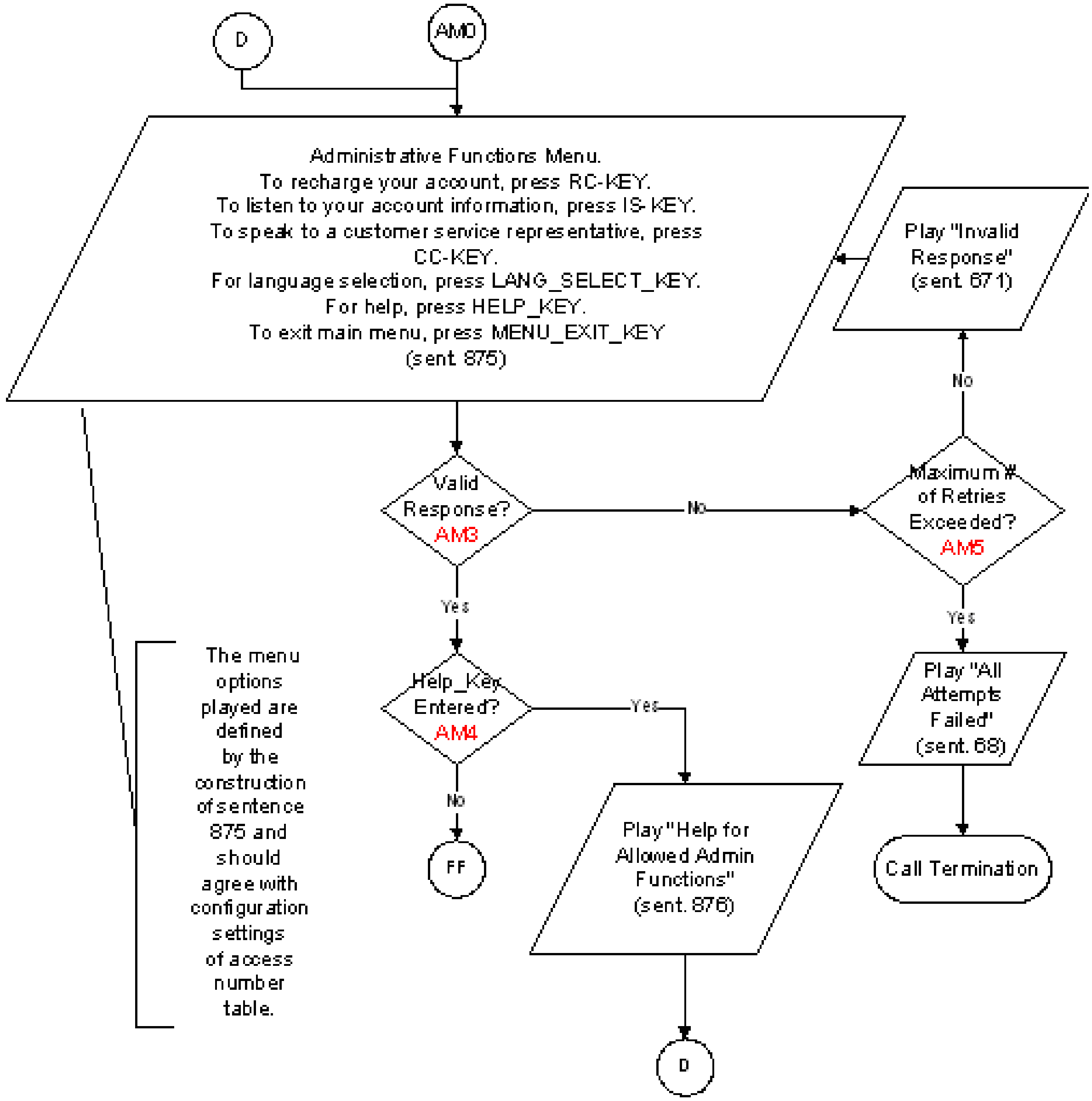
Admin Server Invocation Attempt

Figure 32 Admin Server Invocation Attempt


Admin Server Invocation Attempt (Return From Other Menus)
Direct Admin Server Invocation Attempt
Get PPS account information, including Active Identity and language
AM2
PPS Account Exists?
AM1
No
Play "Account Problem" (sent. 02)
AM0
Call Termination

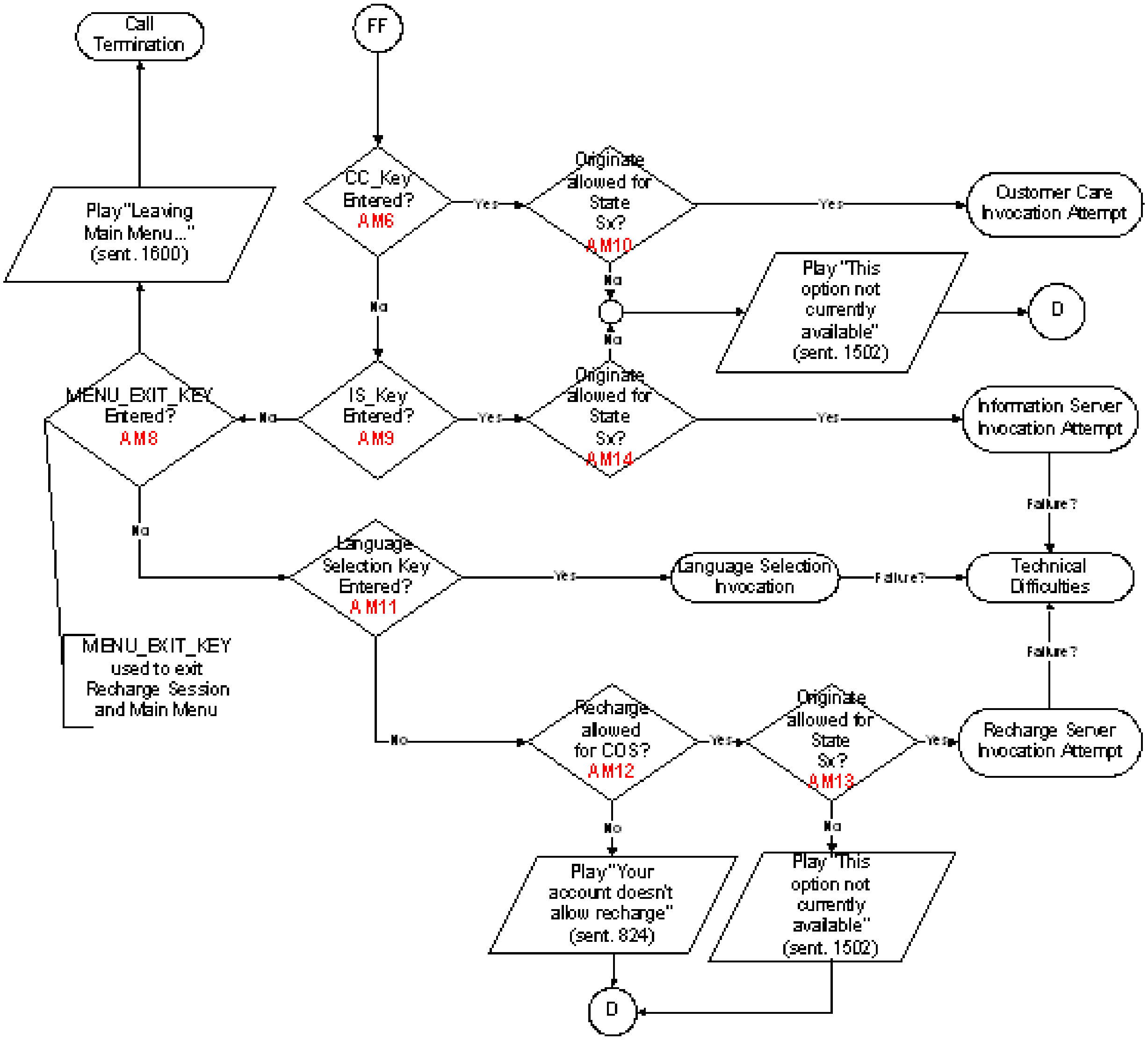
Admin Server Invocation Attempt (continued) - AM0, D

Figure 33 Admin Server Invocation Attempt - AM0, D


D
AM0
Administrative Functions Menu.
To recharge your account, press RC-KEY.
To listen to your account information, press IS-KEY.
To speak to a customer service representative, press CC-KEY.
For language selection, press LANG_SELECT_KEY.
For help, press HELP_KEY.
To exit main menu, press MENU_EXIT_KEY
(sent 875)
Play "Invalid Response" (sent 671)
No
Valid Response? AM3
No
Maximum # of Retries Exceeded? AM5
Yes
Yes
The menu options played are defined by the construction of sentence 875 and should agree with configuration settings of access number table.
Help_Key Entered? AM4
Yes
Play "All Attempts Failed" (sent. 68)
No
FF
Play "Help for Allowed Admin Functions" (sent. 876)
Call Termination
D

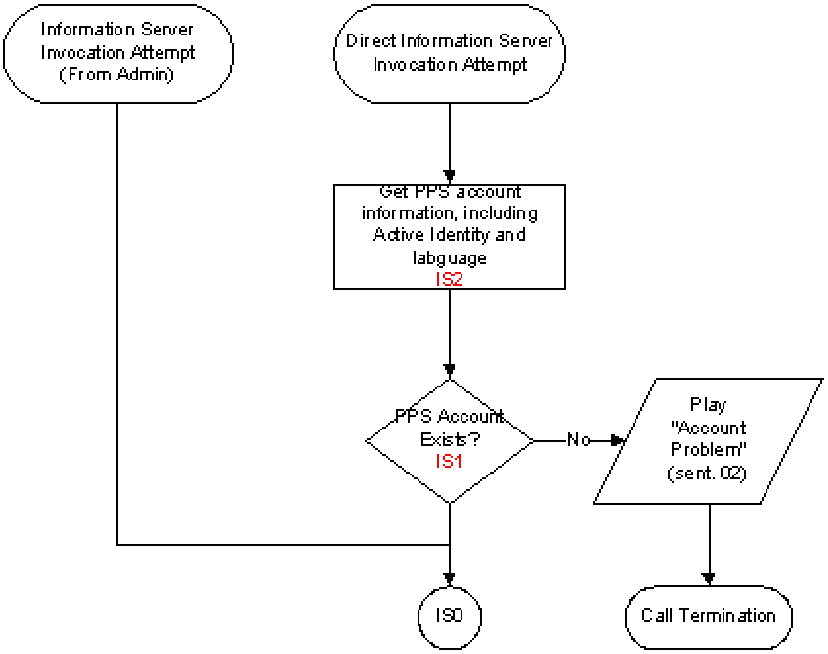
Admin Server Invocation Attempt (continued) – FF

Figure 34 Admin Server Invocation Attempt - FF


Call Termination
FF
Play "Leaving Main Menu..." (sent. 1600)
CC_Key Entered? AM6
Yes
Originate allowed for State Sx? AM10
Yes
Customer Care Invocation Attempt
No
Play "This option not currently available" (sent. 1502)
D
No
No
MENU_EXIT_KEY Entered? AM8
No
IS_Key Entered? AM9
Yes
Originate allowed for State Sx? AM14
Yes
Information Server Invocation Attempt
Failure?
No
Language Selection Key Entered? AM11
Yes
Language Selection Invocation
Failure?
Technical Difficulties
Failure?
MENU_EXIT_KEY used to exit Recharge Session and Main Menu
No
Recharge allowed for COS? AM12
Yes
Originate allowed for State Sx? AM13
Yes
Recharge Server Invocation Attempt
No
No
Play "Your account doesn't allow recharge" (sent. 824)
Play "This option not currently available" (sent. 1502)
D

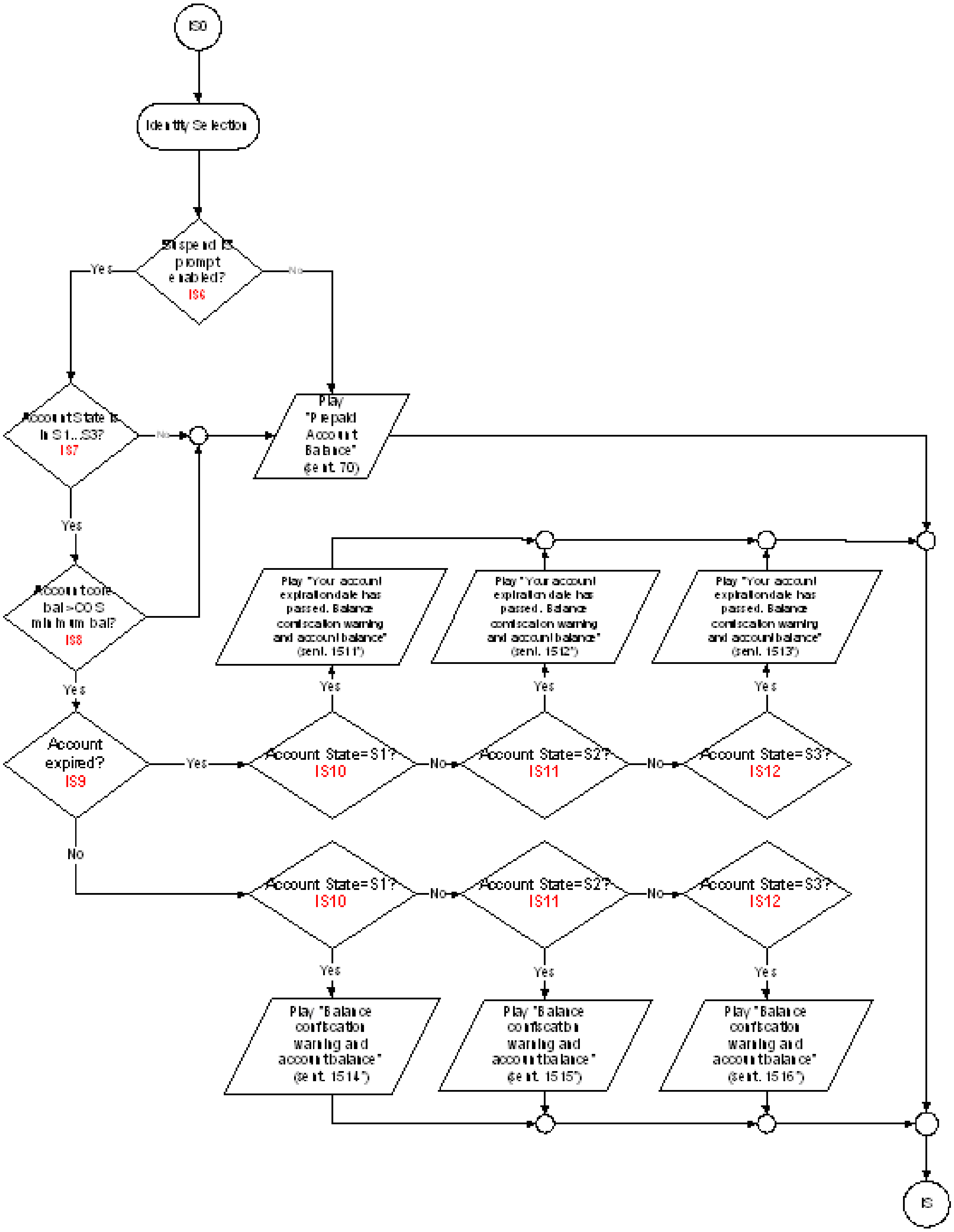
Information Server Invocation Attempt

Figure 35 Information Server Invocation Attempt


Information Server Invocation Attempt (From Admin)
Direct Information Server Invocation Attempt
Get PPS account information, including Active Identity and labguage
IS2
PPS Account Exists?
IS1
No
Play "Account Problem" (sent. 02)
IS0
Call Termination

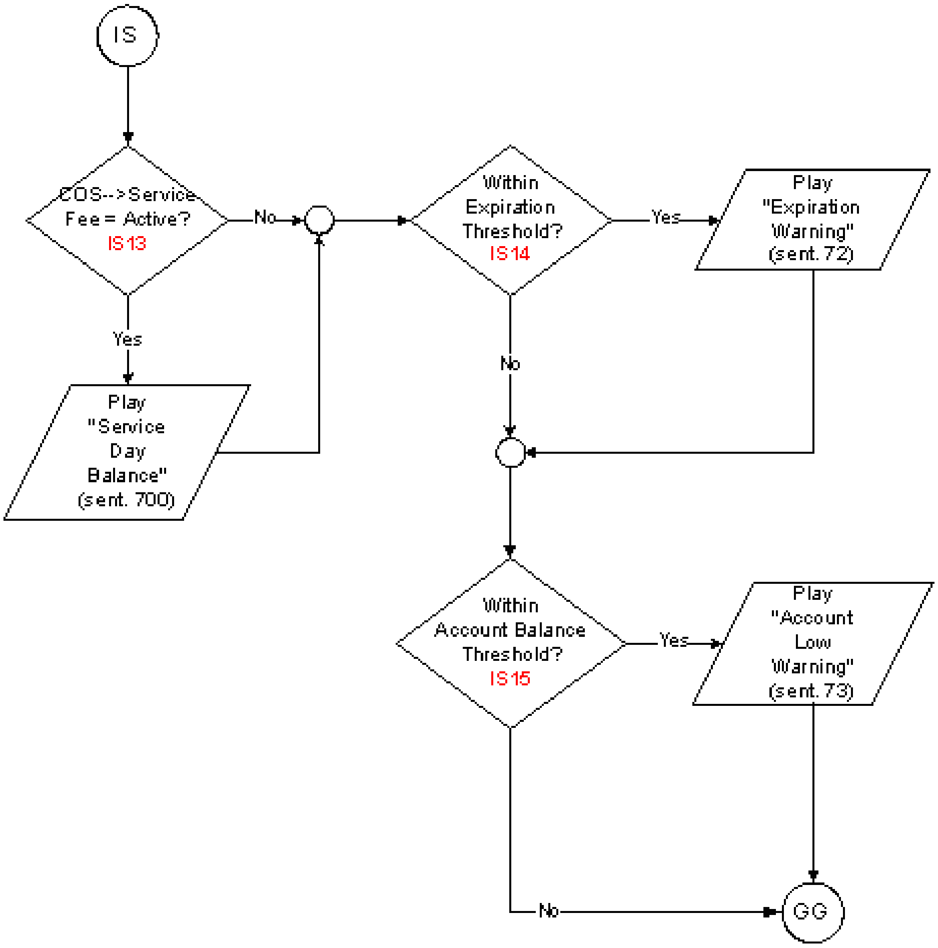
Information Server Invocation Attempt (continued) - IS0

Figure 36 Information Server Invocation Attempt - IS0


IS0
Identity Selection
Suspend IS prompt enabled?
IS6
Yes
No
Account State is in S1...S3?
IS7
No
Play "Prepaid Account Balance" (sent. 70)
Yes
Account core bal > COS minimum bal?
IS8
Yes
Account expired?
IS9
Yes
Account State=S1?
IS10
No
Account State=S2?
IS11
No
Account State=S3?
IS12
Yes
Play "Your account expiration date has passed. Balance confiscation warning and account balance" (sent. 1511")
Yes
Play "Your account expiration date has passed. Balance confiscation warning and account balance" (sent. 1512")
Yes
Play "Your account expiration date has passed. Balance confiscation warning and account balance" (sent. 1513")
No
Account State=S1?
IS10
No
Account State=S2?
IS11
No
Account State=S3?
IS12
Yes
Play "Balance confiscation warning and account balance" (sent. 1514")
Yes
Play "Balance confiscation warning and account balance" (sent. 1515")
Yes
Play "Balance confiscation warning and account balance" (sent. 1516")
IS

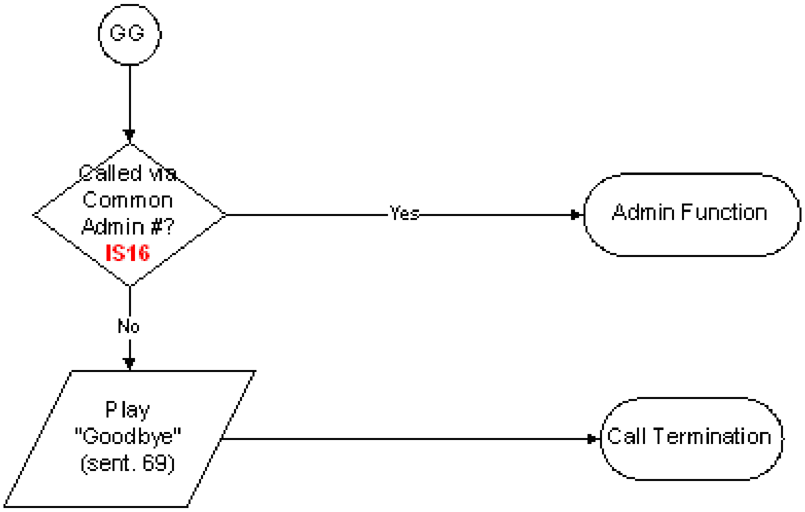
Information Server Invocation Attempt (continued) - IS

Figure 37 Information Server Invocation Attempt - IS


IS
COS-->Service Fee = Active?
IS13
No
Yes
Play "Service Day Balance" (sent. 700)
Within Expiration Threshold?
IS14
Yes
Play "Expiration Warning" (sent. 72)
No
Within Account Balance Threshold?
IS15
Yes
Play "Account Low Warning" (sent. 73)
No
GG

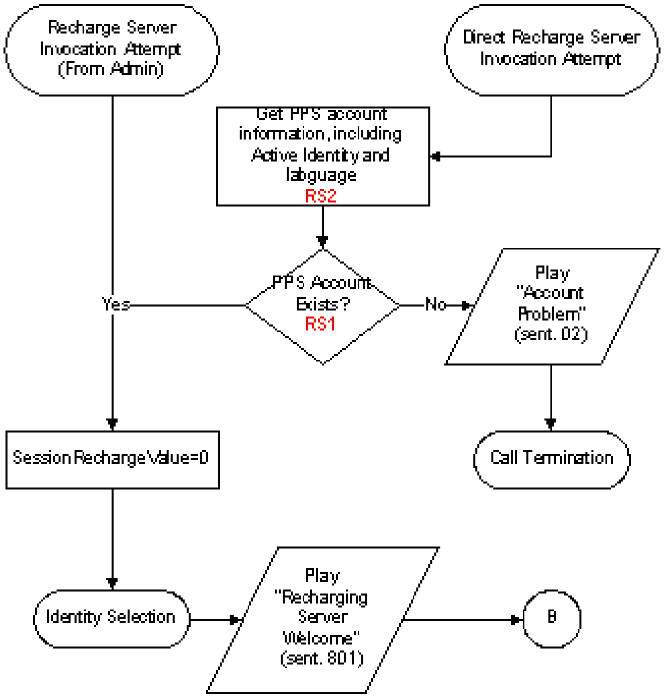
Information Server Invocation Attempt (continued) - GG

Figure 38 Information Server Invocation Attempt - GG



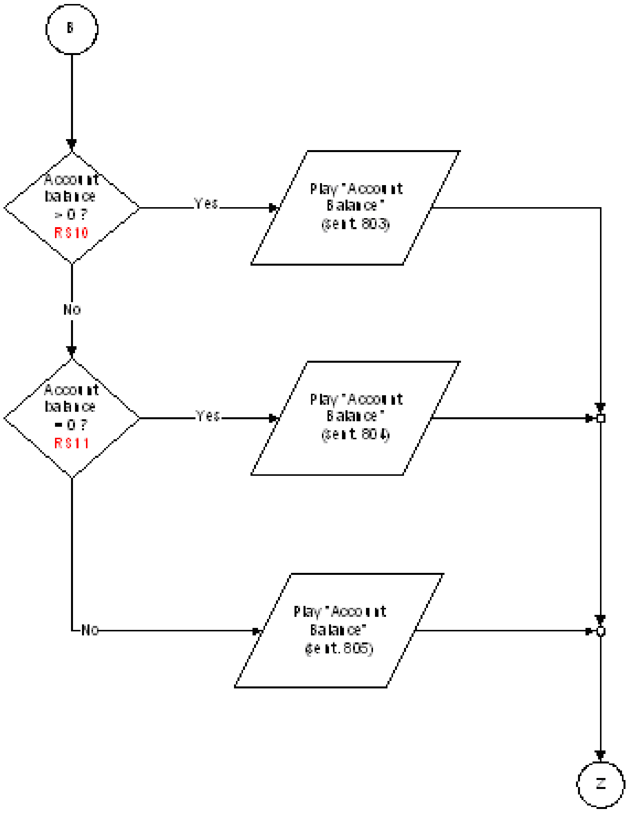
Recharging Server Invocation Attempt

Figure 39 Recharging Server Invocation Attempt


Recharge Server Invocation Attempt (From Admin)
Direct Recharge Server Invocation Attempt
Get PPS account information, including Active Identity and labguage
RS2
PPS Account Exists?
RS1
Yes
No
Play "Account Problem" (sent. 02)
Call Termination
Session Recharge Value=0
Identity Selection
Play "Recharging Server Welcome" (sent. 801)
B

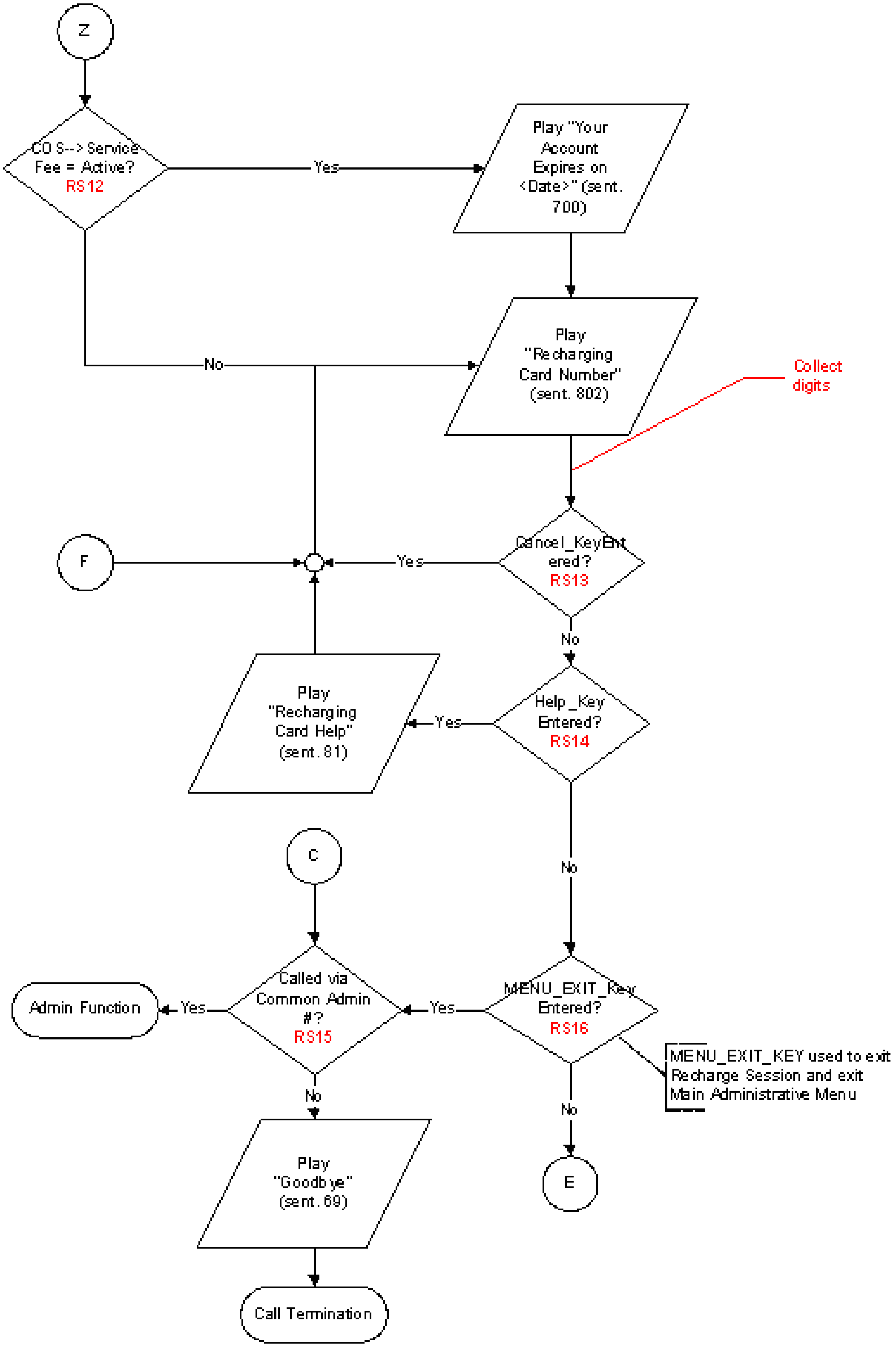
Recharging Server Invocation Attempt (continued) - B

Figure 40 Recharging Server Invocation Attempt - B


B
Account balance > 0 ?
RS10
Yes
Play "Account Balance" (sent. 803)
No
Account balance = 0 ?
RS11
Yes
Play "Account Balance" (sent. 804)
No
Play "Account Balance" (sent. 805)
Z

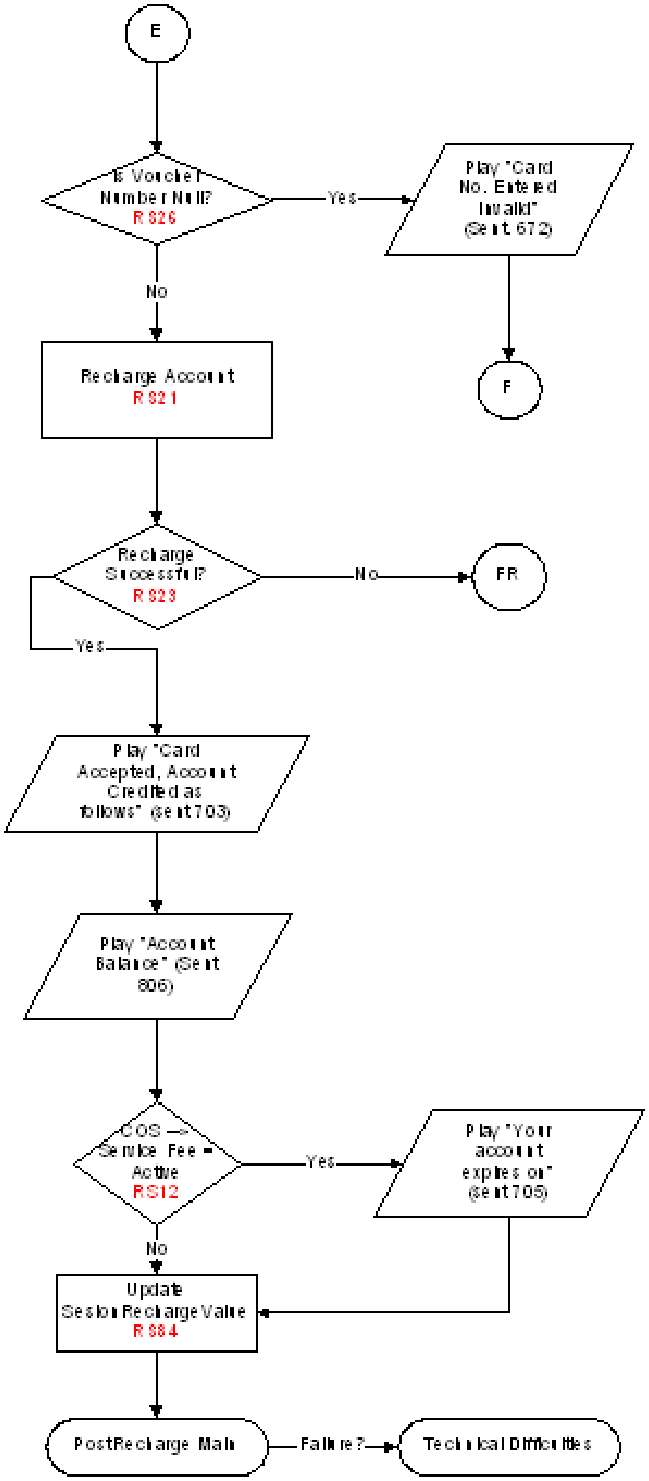
Recharging Server Invocation Attempt (continued) - Z, F, C

Figure 41 Recharging Server Invocation Attempt - Z, F, C


Z
COS--> Service Fee = Active? RS12
Yes
Play "Your Account Expires on <Date>" (sent. 700)
No
Play "Recharging Card Number" (sent. 802)
Collect digits
F
Yes
Cancel_KeyEntered? RS13
No
Play "Recharging Card Help" (sent. 81)
Yes
Help_Key Entered? RS14
C
No
Admin Function
Yes
Called via Common Admin #? RS15
Yes
MENU_EXIT_Key Entered? RS16
MENU_EXIT_KEY used to exit Recharge Session and exit Main Administrative Menu
No
No
Play "Goodbye" (sent. 69)
E
Call Termination

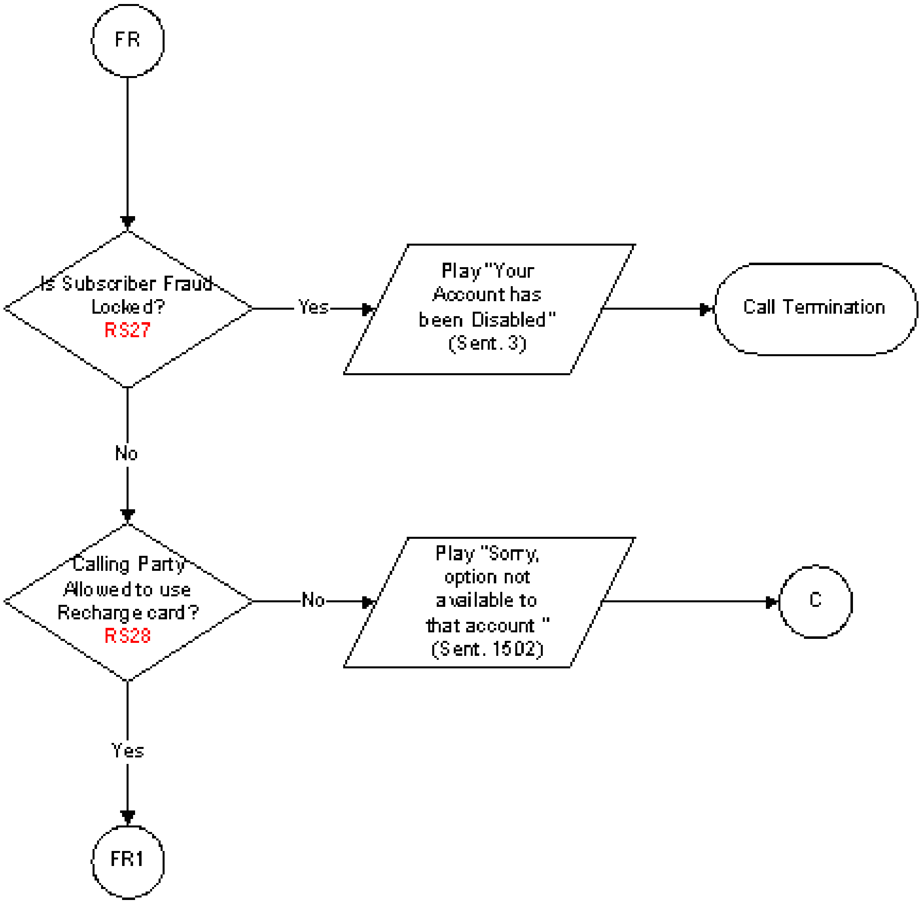
Recharging Server Invocation Attempt (continued) - E

Figure 42 Recharging Server Invocation Attempt - E


E
Is Voucher Number Null? RS26
Yes
Play "Card No. Entered Invalid" (Sent 672)
F
No
Recharge Account RS21
Recharge Successful? RS23
No
FR
Yes
Play "Card Accepted, Account Credited as follows" (sent 703)
Play "Account Balance" (Sent 806)
COS --> Service Fee = Active RS12
Yes
Play "Your account expires on" (sent 705)
No
Update Session Recharge Value RS84
PostRecharge Main
Failure?
Technical Difficulties

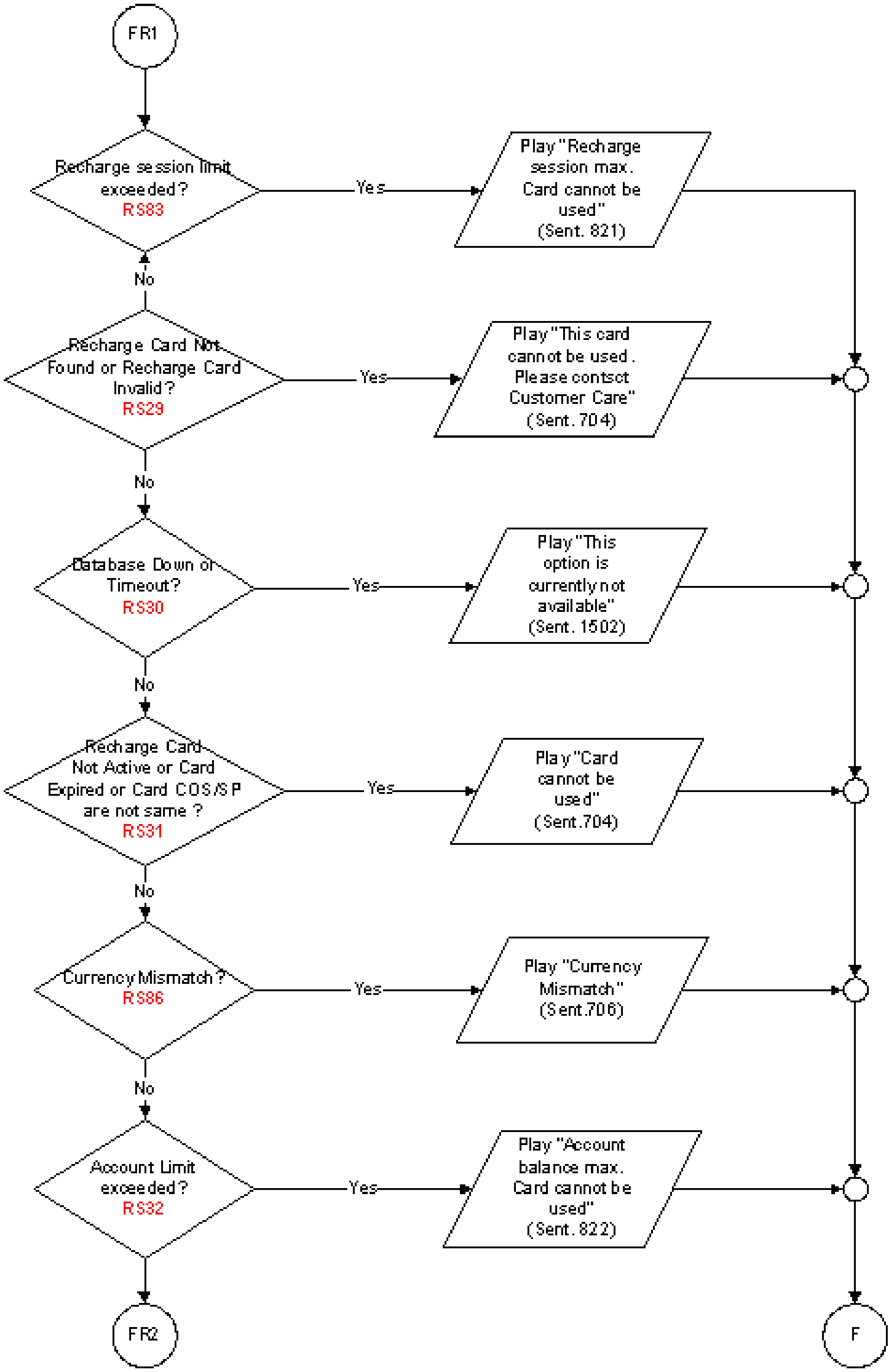
Recharging Server Invocation Attempt (continued) - FR

Figure 43 Recharging Server Invocation Attempt - FR


FR
Is Subscriber Fraud Locked?
RS27
Yes
Play "Your Account has been Disabled" (Sent. 3)
Call Termination
No
Calling Party Allowed to use Recharge card?
RS28
No
Play "Sorry, option not available to that account " (Sent. 1502)
C
Yes
FR1

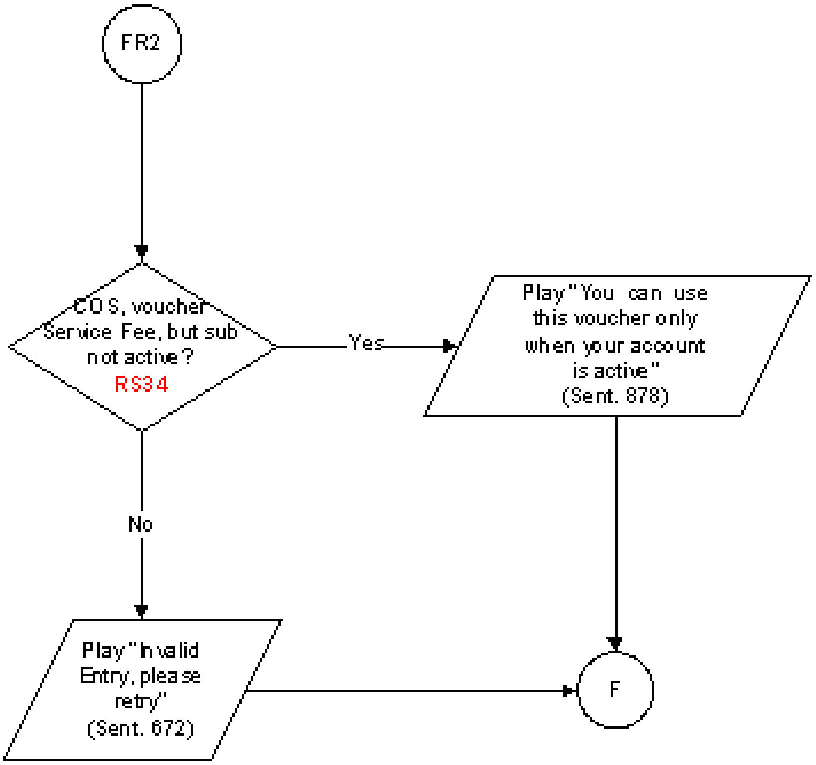
Recharging Server Invocation Attempt (continued) - FR1

Figure 44 Recharging Server Invocation Attempt - FR1


FR1
Recharge session limit exceeded? RS83
Yes
Play "Recharge session max. Card cannot be used" (Sent. 821)
No
Recharge Card Not Found or Recharge Card Invalid? RS29
Yes
Play "This card cannot be used. Please contsct Customer Care" (Sent. 704)
No
Database Down or Timeout? RS30
Yes
Play "This option is currently not available" (Sent. 1502)
No
Recharge Card Not Active or Card Expired or Card COS/SP are not same ? RS31
Yes
Play "Card cannot be used" (Sent.704)
No
Currency Mismatch? RS86
Yes
Play "Currency Mismatch" (Sent.706)
No
Account Limit exceeded? RS32
Yes
Play "Account balance max. Card cannot be used" (Sent. 822)
FR2
F

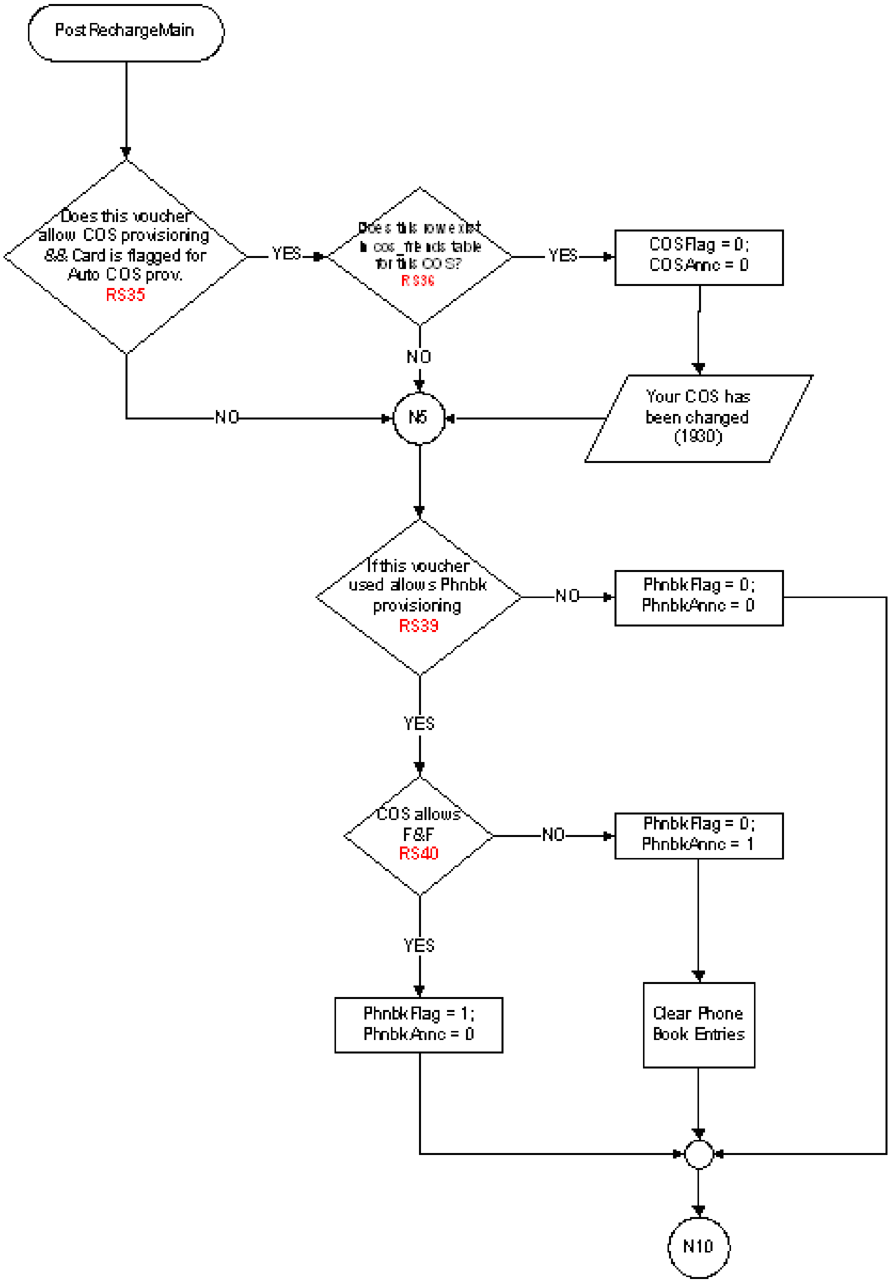
Recharging Server Invocation Attempt (continued) - FR2

Figure 45 Recharging Server Invocation Attempt - FR2


FR2
COS, voucher Service Fee, but sub not active? RS34
Yes
Play "You can use this voucher only when your account is active" (Sent. 878)
No
Play "Invalid Entry, please retry" (Sent. 672)
F

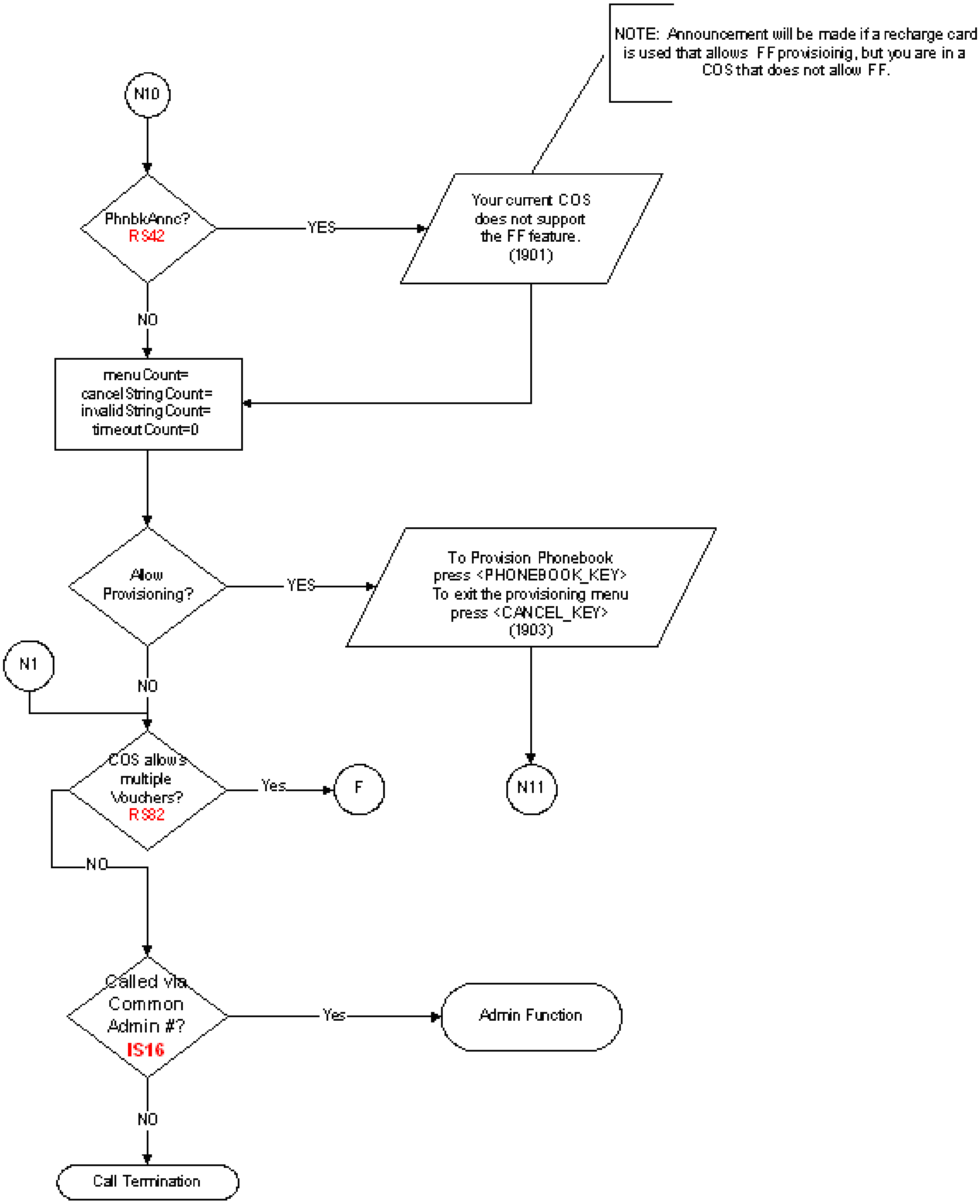
Post Recharge Processing - N5

Figure 46 Post Recharge Processing - N5


Post RechargeMain
Does this voucher allow COS provisioning && Card is flagged for Auto COS prov.
RS35
YES
Does this row exist in cos_friends table for this COS?
RS36
YES
COSFlag = 0;
COSAnnc = 0
NO
NO
N5
Your COS has been changed (1930)
If this voucher used allows Phnbk provisioning
RS39
NO
PhnbkFlag = 0;
PhnbkAnnc = 0
YES
COS allows F&F
RS40
NO
PhnbkFlag = 0;
PhnbkAnnc = 1
YES
PhnbkFlag = 1;
PhnbkAnnc = 0
Clear Phone Book Entries
N10

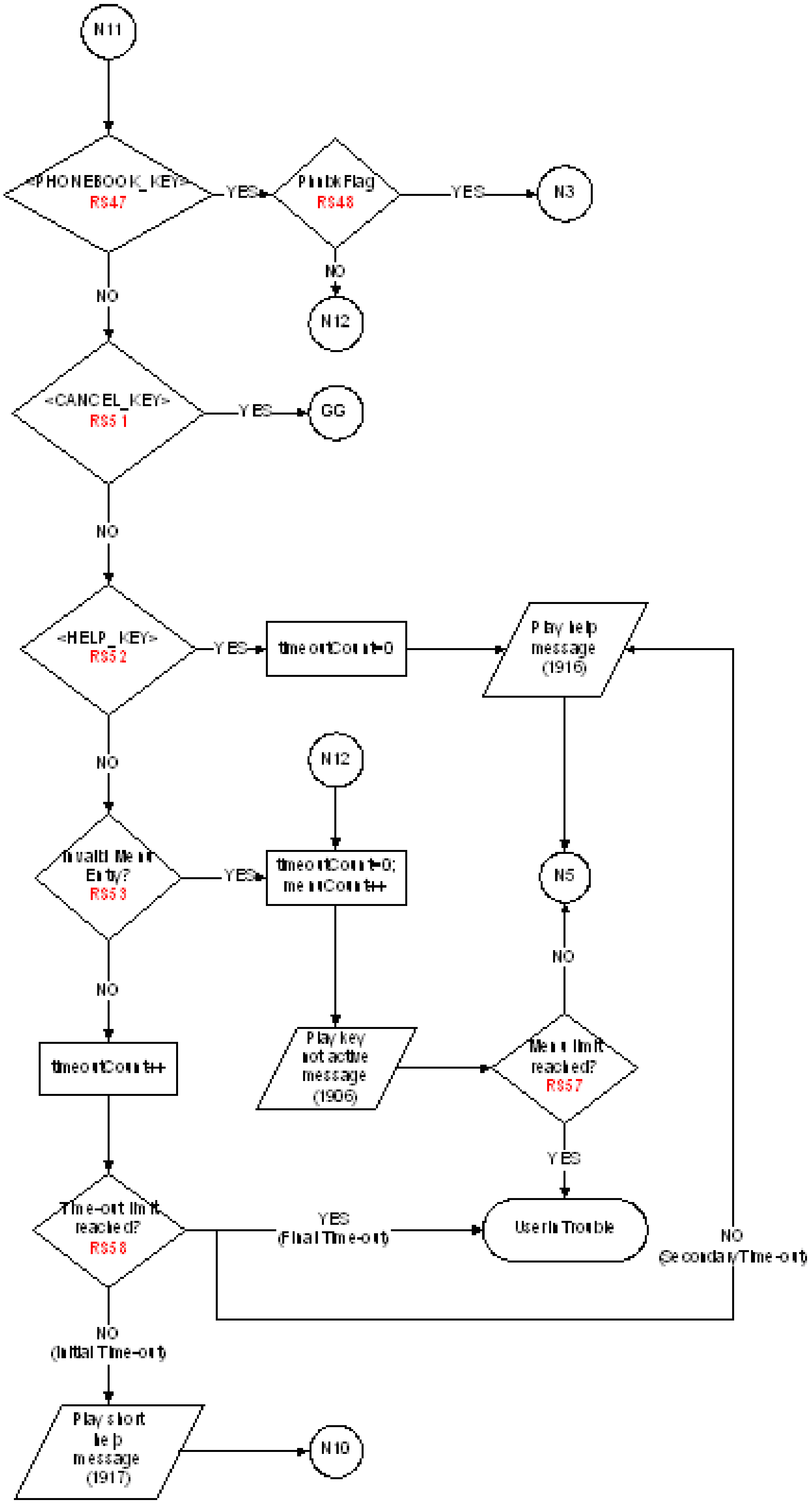
Post Recharge Processing (continued) - N1, N10

Figure 47 Post Recharge Processing - N1, N10


NOTE: Announcement will be made if a recharge card is used that allows FF provisioinig, but you are in a COS that does not allow FF.
N10
PhnbkAnnc?
RS42
YES
Your current COS does not support the FF feature. (1901)
NO
menuCount=
cancelStringCount=
invalidStringCount=
timeoutCount=0
Allow Provisioning?
YES
To Provision Phonebook press <PHONEBOOK_KEY>
To exit the provisioning menu press <CANCEL_KEY>
(1903)
N1
NO
COS allows multiple Vouchers?
RS82
Yes
F
N11
NO
Called via Common Admin #?
IS16
Yes
Admin Function
NO
Call Termination

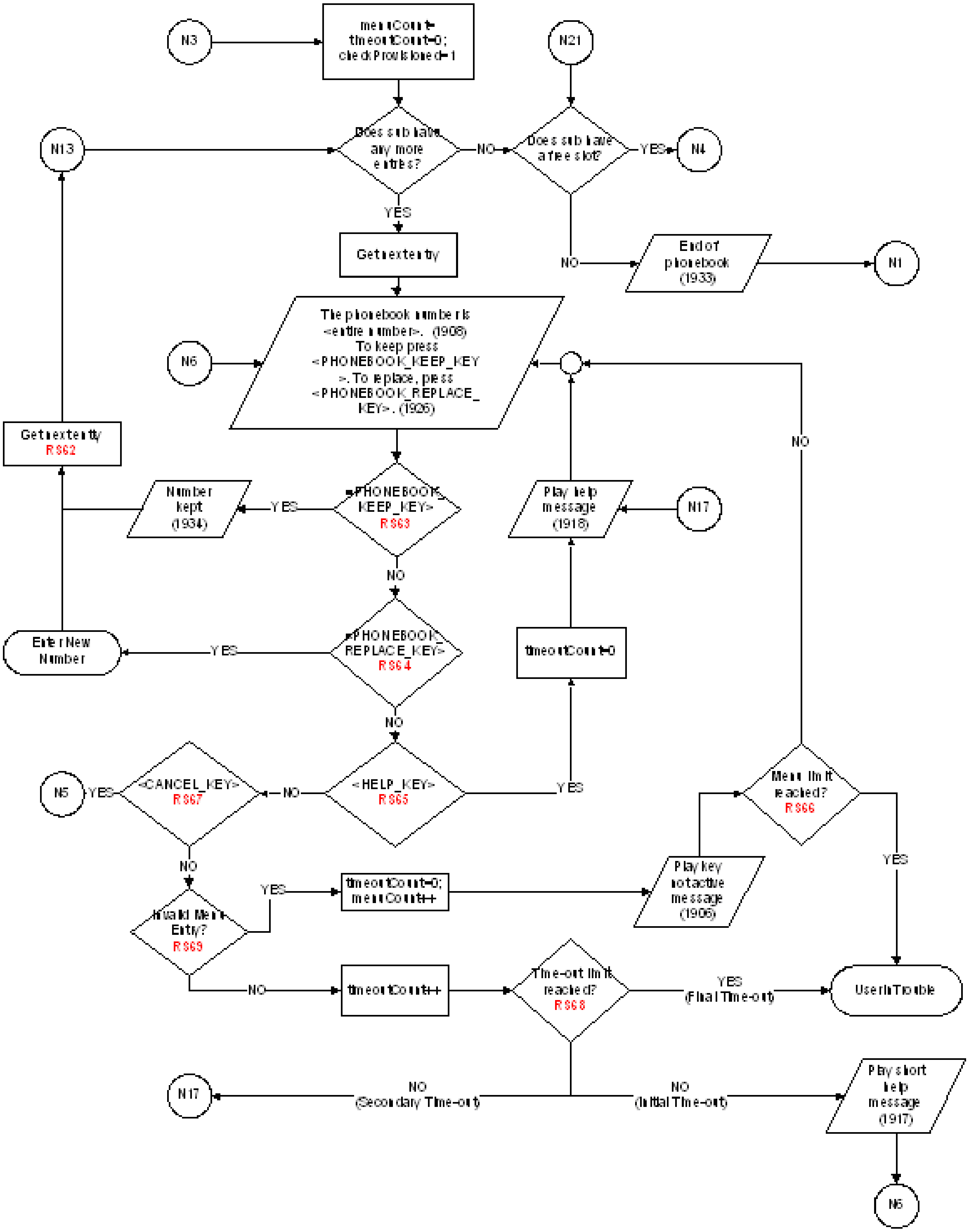
Post Recharge Processing (continued) - N11, N12

Figure 48 Post Recharge Processing - N11, N12



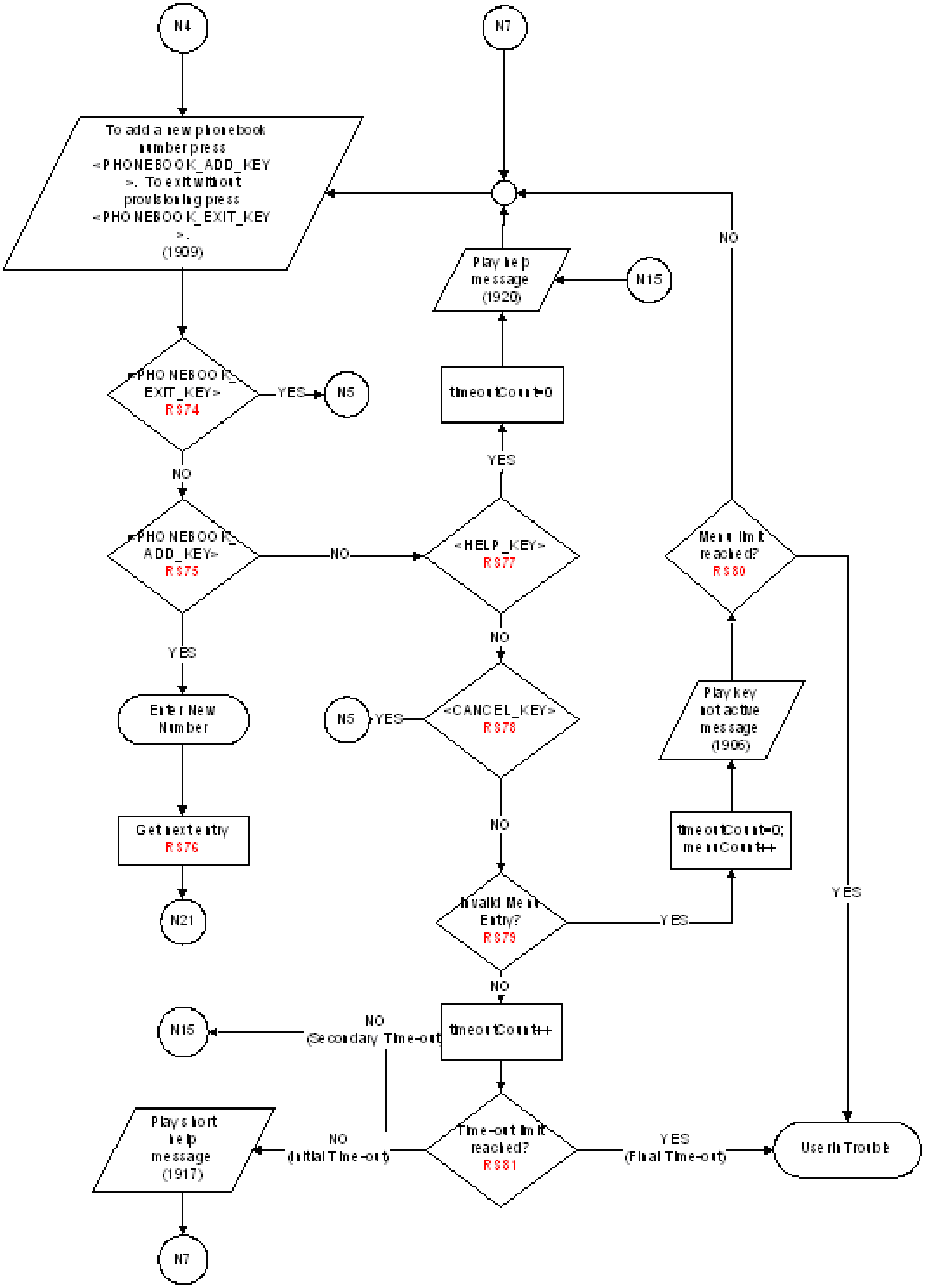
Post Recharge Processing (continued) - N3, N6, N13, N17, N21

Figure 49 Post Recharge Processing - N3, N6, N13, N17, N21



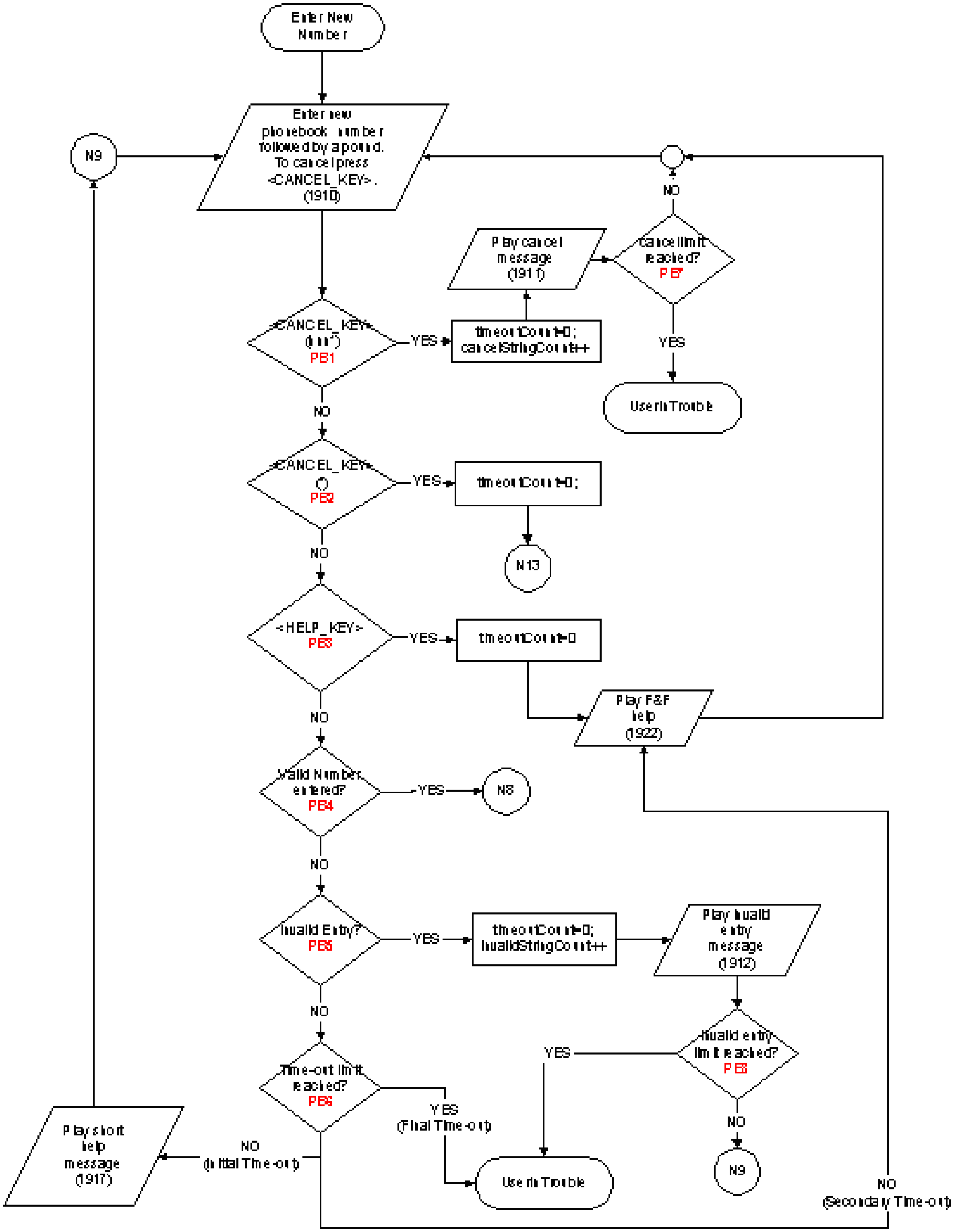
Post Recharge Processing (continued) - N4, N7, N15

Figure 50 Post Recharge Processing - N4, N7, N15



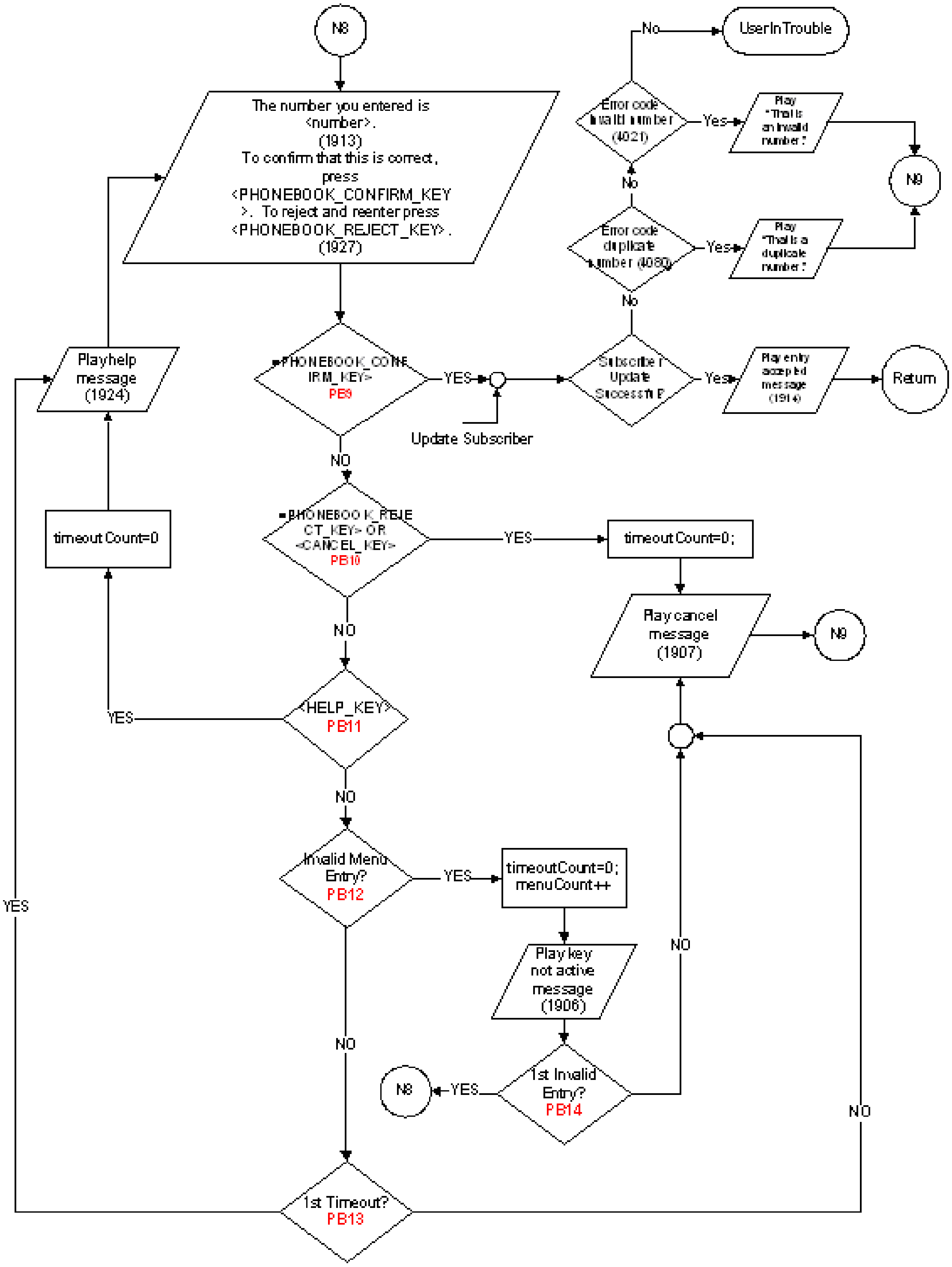
Enter New Phonebook Number - N9

Figure 51 Enter New Phonebook Number - N9


Enter New Number
Enter new phonebook number followed by a pound. To cancel press <CANCEL_KEY>. (1910)
N9
<CANCEL_KEY> (timer) PE1
YES
timeoutCount=0; cancelStringCount++
Play cancel message (1911)
cancel limit reached? PE7
NO
YES
User in Trouble
<CANCEL_KEY> () PE2
YES
timeoutCount=0;
N13
NO
<HELP_KEY> PE3
YES
timeoutCount=0
Play F&F help (1922)
NO
Valid Number entered? PE4
YES
N8
NO
Invalid Entry? PE5
YES
timeoutCount=0; InvalidStringCount++
Play invalid entry message (1912)
Invalid entry limit reached? PE8
YES
NO
N9
NO
Time-out limit reached? PE6
YES (Final Time-out)
User in Trouble
NO (Initial Time-out)
Play short help message (1917)
NO (Secondary Time-out)

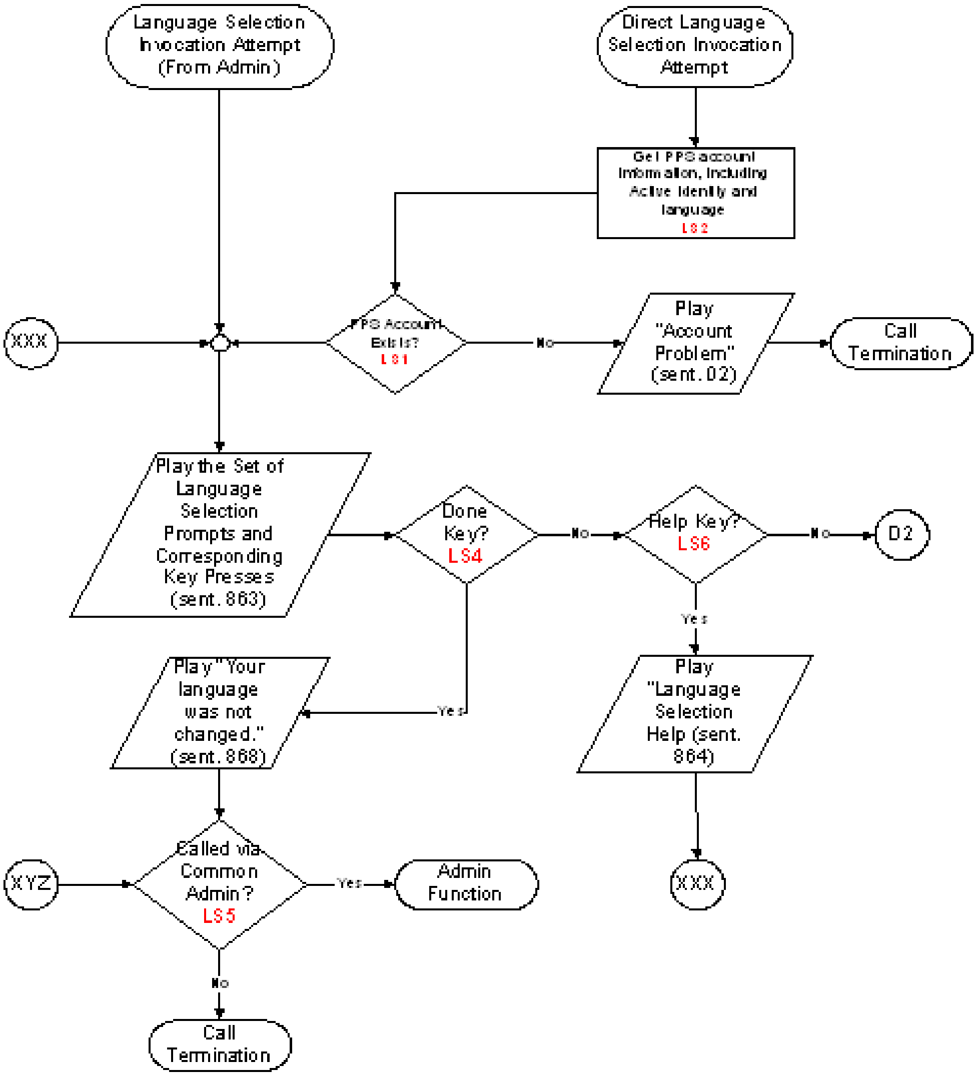
Enter New Phonebook Number (continued) - N8

Figure 52 Enter New Phonebook Number - N8


N8
The number you entered is <number>. (1913) To confirm that this is correct, press <PHONEBOOK_CONFIRM_KEY>. To reject and reenter press <PHONEBOOK_REJECT_KEY>. (1927)
<PHONEBOOK_CONFIRM_KEY> PB9
YES
Update Subscriber
Subscriber Update Successful?
Yes
Play entry accepted message (1914)
Return
No
Error code duplicate number (4080)
Yes
Play "That is a duplicate number"
No
Error code Invalid number (4021)
Yes
Play "That is an invalid number"
N9
No
UserInTrouble
NO
<PHONEBOOK_REJECT_KEY> OR <CANCEL_KEY> PB10
YES
timeoutCount=0;
Play cancel message (1907)
N9
NO
<HELP_KEY> PB11
YES
timeoutCount=0
Playhelp message (1924)
NO
Invalid Menu Entry? PB12
YES
timeoutCount=0; menuCount++
Play key not active message (1906)
1st Invalid Entry? PB14
YES
N8
NO
NO
1st Timeout? PB13
YES
NO

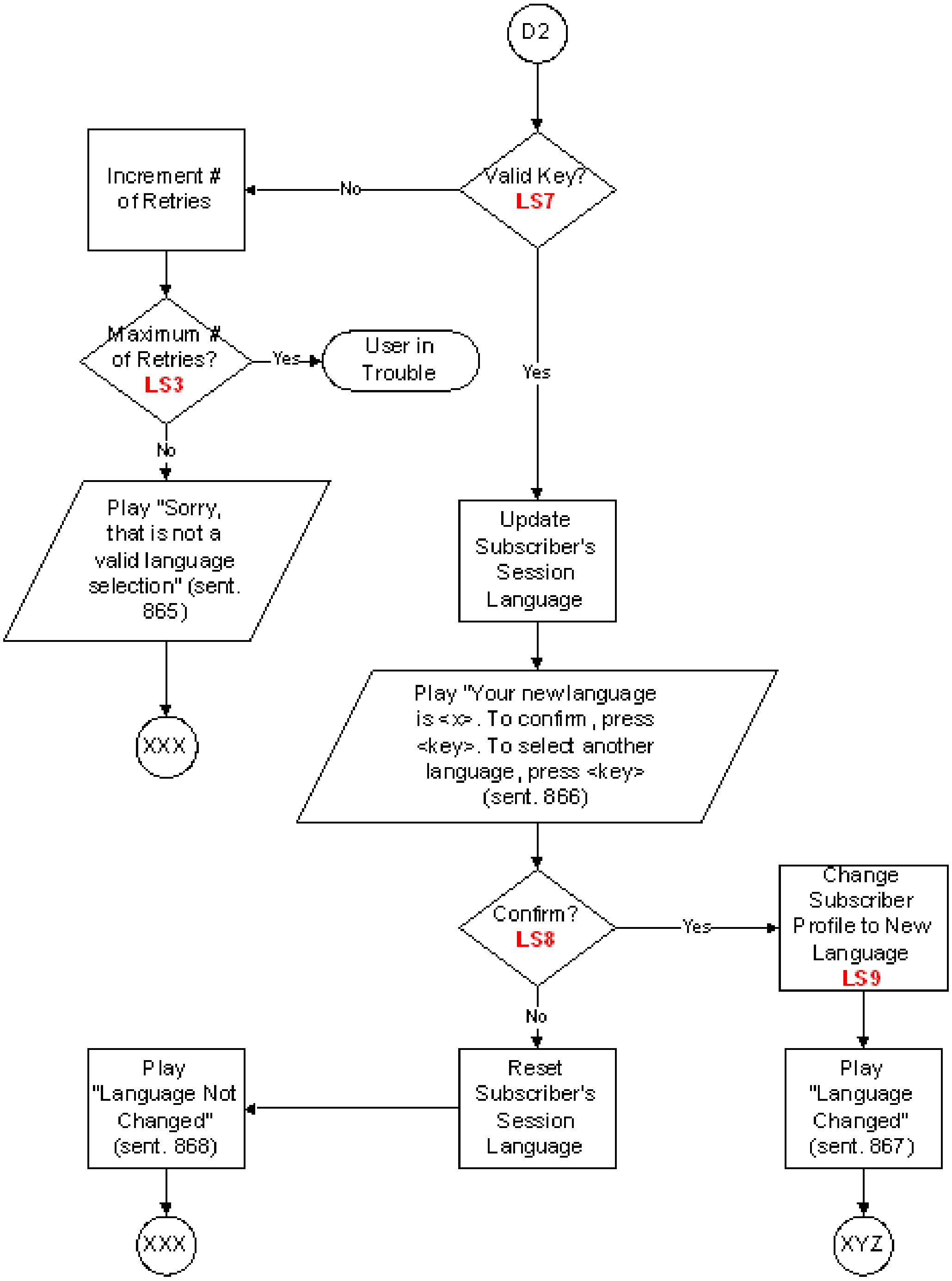
Language Selection Invocation Attempt - xxx, xyz

Figure 53 Language Selection Invocation Attempt - xxx, xyz


Language Selection Invocation Attempt (From Admin)
Direct Language Selection Invocation Attempt
Get PPS account Information, Including Active Identity and language LS2
XXX
PPS Account Exists? LS1
No
Play "Account Problem" (sent.02)
Call Termination
Play the Set of Language Selection Prompts and Corresponding Key Presses (sent.863)
Done Key? LS4
No
Help Key? LS6
No
D2
Yes
Play "Language Selection Help (sent. 864)
XXX
Play "Your language was not changed." (sent.868)
Yes
XYZ
Called via Common Admin? LS5
Yes
Admin Function
No
Call Termination

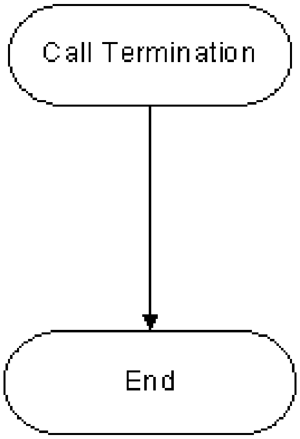
Language Selection Invocation Attempt (continued) - D2

Figure 54 Language Selection Invocation Attempt - D2


D2
Valid Key?
LS7
No
Increment # of Retries
Maximum # of Retries?
LS3
Yes
User in Trouble
No
Play "Sorry, that is not a valid language selection" (sent. 865)
XXX
Yes
Update Subscriber's Session Language
Play "Your new language is <x>. To confirm, press <key>. To select another language, press <key> (sent. 866)
Confirm?
LS8
Yes
Change Subscriber Profile to New Language
LS9
No
Reset Subscriber's Session Language
Play "Language Not Changed" (sent. 868)
XXX
Play "Language Changed" (sent. 867)
XYZ

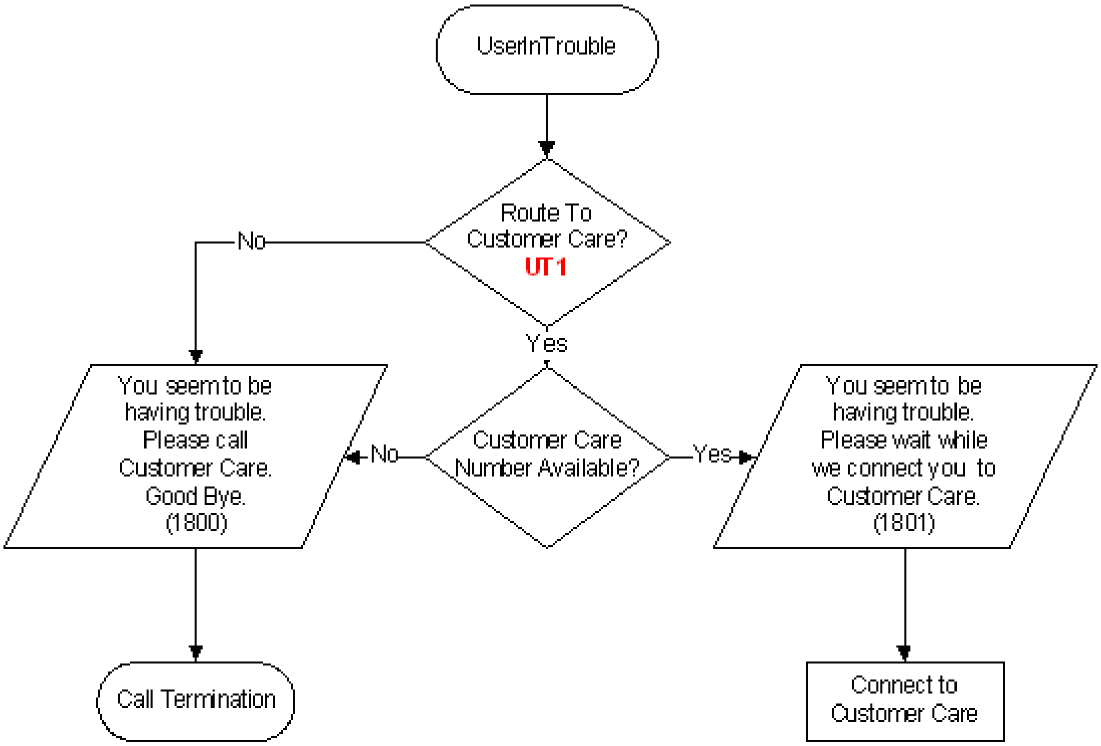
Call Termination

Figure 55 Call Termination



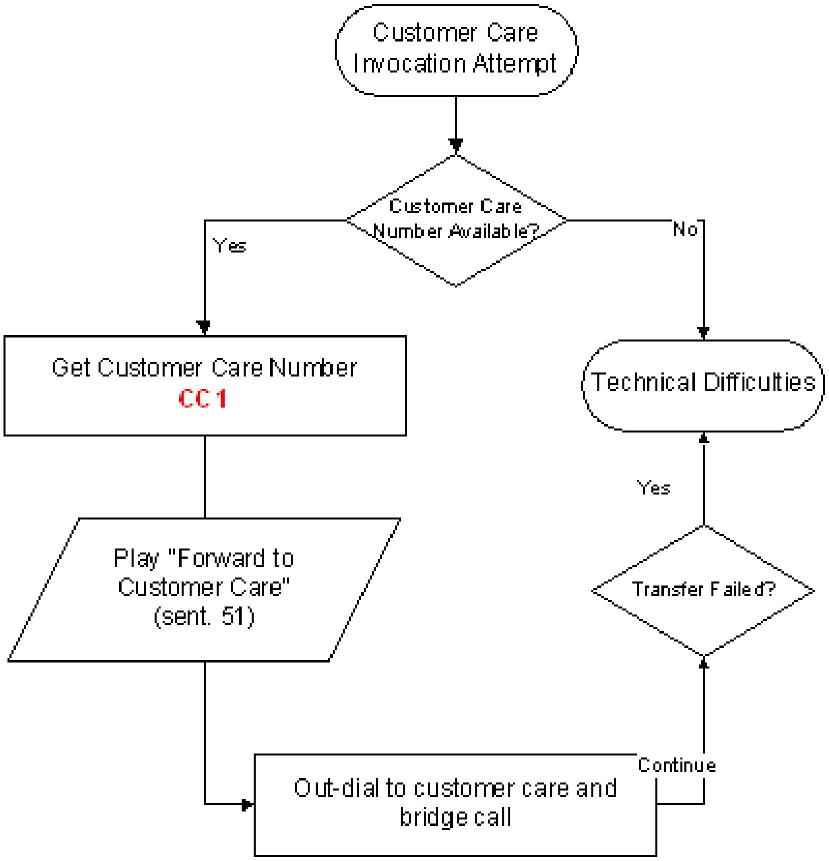
User In Trouble

Figure 56 User In Trouble


UserInTrouble
Route To Customer Care?
UT1
No
Yes
Customer Care Number Available?
No
Yes
You seem to be having trouble. Please call Customer Care. Good Bye. (1800)
You seem to be having trouble. Please wait while we connect you to Customer Care. (1801)
Call Termination
Connect to Customer Care

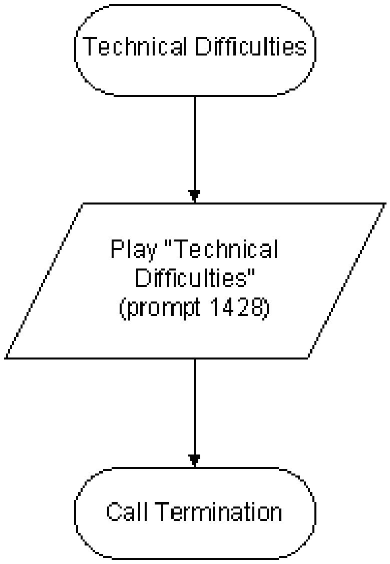
Customer Care Invocation Attempt

Figure 57 Customer Care Invocation Attempt


Customer Care Invocation Attempt
Customer Care Number Available?
Yes
No
Get Customer Care Number
CC1
Technical Difficulties
Yes
Play "Forward to Customer Care" (sent. 51)
Transfer Failed?
Continue
Out-dial to customer care and bridge call

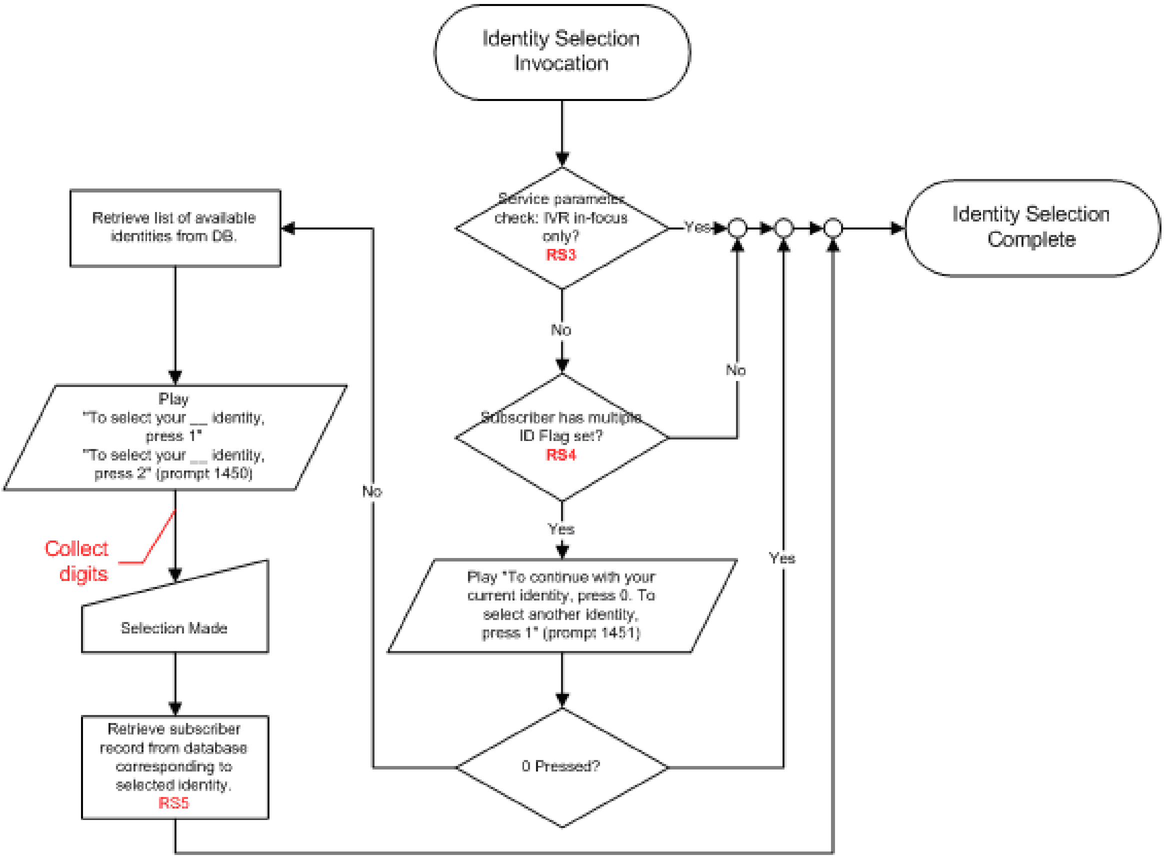
Technical Difficulties

Figure 58 Technical Difficulties



Identity Selection

Figure 59 Identity Selection


Identity Selection Invocation
Service parameter check: IVR in-focus only?
RS3
Yes
No
Identity Selection Complete
Retrieve list of available identities from DB.
Play "To select your __ identity, press 1" "To select your __ identity, press 2" (prompt 1450)
Collect digits
Selection Made
Retrieve subscriber record from database corresponding to selected identity.
RS5
No
Subscriber has multiple ID Flag set?
RS4
No
Yes
Play "To continue with your current identity, press 0. To select another identity, press 1" (prompt 1451)
0 Pressed?
Yes

Operation Description

Admin Server

Table 7 Admin Server Table

Label	Summary	Details
AM1	RTB Account Exists?	Determine if A-Number corresponds to an RTB account. Get A-number from signaling message. Use A-number for CCWS query. RetrieveSubscriber(A-number from signaling message). If subscriber is retrieved, then RTB account exists. Otherwise account does not exist.
AM2	Get RTB account Information	Retrieve RTB subscriber information, including selected language (to specify what language is used to play the announcements). RetrieveSubscriber(Subscriber ID, Identity, 1). Language used for all announcements in this session is obtained from Subscriber.SubscriberEntity.LanguageName, which retrieves the language name.
AM3	Valid Response	Is entered key one of <HELP_KEY, <IS_KEY>, <RS_KEY>, <CC_KEY>, <GENERIC_MENU_EXIT_KEY>, <LANG_KEY>?
AM4	Was Help Key Entered?	Entered digit = <HELP_KEY>?
AM5	Max # of retries exceeded?	Number of retries > <MenuLimit>? The ASU application must internally keep track of retries.
AM6	CC_KEY entered?	Entered digit = <CC_KEY>?
AM7	Is this identity a member of a spending limit only group account?	Is the AccountType parameter of the SubscriberEntity = 1?
AM8	MENU_EXIT_KEY entered?	Entered digit = <GENERIC_MENU_EXIT_KEY>?
AM9	IS_KEY entered?	Entered digit = <IS_KEY>?
AM10	Customer Care allowed in current state?	ClientCache.ClassOfService.cosName == Subscriber.SubscriberEntity.COSName and _ ClientCache.ClassOfService.LifeCycles.state == Subscriber.SubscriberIdentity.CurrentStateName ClientCache.ClassOfService.LifeCycles.allowCustomerCare == TRUE?
AM11	Language selection key entered?	Entered digit = <LANG_KEY>?

Table 7 Admin Server Table

Label	Summary	Details
AM12	Recharge allowed in COS?	ClientCache.ClassOfService.cosName == Subscriber.SubscriberEntity.COSName ClientCache.ClassOfService.rechargeAllowed == TRUE ?
AM13	Recharge allowed in current state?	ClientCache.ClassOfService.cosName == Subscriber.SubscriberEntity.COSName and _ ClientCache.ClassOfService.LifeCycles.state == Subscriber.SubscriberIdentity.CurrentStateName ClientCache.ClassOfService.LifeCycles.allowRechargeServer == TRUE?
AM14	Info Server allowed in current state?	ClientCache.ClassOfService.cosName == Subscriber.SubscriberEntity.COSName and _ ClientCache.ClassOfService.LifeCycles.state == Subscriber.SubscriberIdentity.CurrentStateName ClientCache.ClassOfService.LifeCycles.allowInfoServer == TRUE

Info Server

Table 8 Info Server Table

Label	Summary	Details
IS1	RTB Account Exists?	Determine if A-Number corresponds to an RTB account. Get A-number from signaling message. Use A-number for CCWS query. RetrieveSubscriber(A-number from signaling message). If subscriber is retrieved, then RTB account exists. Otherwise account does not exist.
IS2	Get RTB account Information	Retrieve RTB subscriber information, including selected language (to specify what language should be used to play the announcements). RetrieveSubscriber(Subscriber ID, Identity, 1) Language used for all announcements in this session is obtained from Subscriber.SubscriberEntity.LanguageName, which retrieves the language name.
IS3	Restricted to in-focus identity?	<AllIdentities> = 0?
IS4	Subscriber has multiple identities?	Use method GetSubscriberIndentities(SubId). If more than one identity is returned, then sub has multiple identities.
IS5	Retrieve identity corresponding to chosen one	Retrieve chosen identity via RetrieveSubscriber(SubId, SubIdentity…….) and get whatever information is needed. The subscriber’s language is retrieved and is used for all announcements going forward.
IS6	Suspend IS prompt enabled?	<SuspendISPrompt> = 1?
IS7	Account state S1, S2, or S3?	Using identity from above, does Subscriber.SubscriberEntity.CurrentStateName contains (S1) or (S2) or (S3)?
IS8	Core balance > COS minimum balance?	Get subscriber’s core balance from the subscriber record. Get COS minimum balance as follows: ClientCache.ClassOfService.cosName == Subscriber.SubscriberEntity.COSName and _ ClientCache.ClassOfService.CosBalanceOrder.balanceName == balance name of the core balance ClientCache.ClassOfService.CosBalanceOrder.minimumBalance
IS9	Account expired?	Get BalanceName for Core balance: Find BalanceName in ClientCache.BalanceDefinition where ISCoreBalance = True Get Core balance expiration date: Subscriber.SubscriberIdentity.Balances(0) with BalanceName = name found above. Get value of AccountExpiration. If value earlier than today?
IS10	Account state = S1	Subscriber.SubscriberEntity.CurrentStateName contains (S1)?
IS11	Account state = S2	Subscriber.SubscriberEntity.CurrentStateName contains (S2)?
IS12	Account state = S3	Subscriber.SubscriberEntity.CurrentStateName contains (S3)?
IS13	COS Service Fee Active?	Get subscriber’s COS for the Identity to be used (SubscriberEntity.COSName). In ClientCache, for subscriber’s COS, retrieve parameter ServiceFeeActive If true?

Table 8 Info Server Table

Label	Summary	Details
IS14	Within expiration threshold?	Get subscriber's COS for the Identity to be used (SubscriberEntity.COSName). Get subscriber's core balance expiration date. In ClientCache, for the subscriber's COS, retrieve PreCallThresholds array This array contains couplets of type and value. In this case, only look at values where the corresponding type is expiration (0? 1?) and find the smallest value. This value represents a number of days. Ultimately, the test is as follows: Is the subscriber's core expiration date earlier than, or equal to today + the minimum offset value found above. If True, then it is within the threshold.
IS15	Within account balance threshold?	Get subscriber's COS for the Identity to be used (SubscriberEntity.COSName). Get subscriber's core balance value. In ClientCache, for the subscriber's COS, retrieve PreCallThresholds array. This array contains couplets of type and value. In this case, only look at values where the corresponding type is balance (1? 0?) and find the smallest value. This value represents a minimum balance. Ultimately, the test is as follows: Is the subscriber's core balance less than or equal to the minimum balance value found above? If True, then it is within the threshold. For a group account member, the comparison is made against the minimum of the member's core balance total spending limit and the group account owner's core balance. The owner's balance information is obtained as follows: GroupName from the member's subscriber information is used to retrieve the group account information using GetGroupAccount(GroupName). The OwnerId and the OwnerIdentityName from the group account information are then used to retrieve the owner's subscriber information using RetrieveSubscriber(OwnerId, OwnerIdentityName, 1). Both the member's total spending limits and the owner's balances are already retrieved according to the balance charge order of the owner's COS.

Table 8 Info Server Table

Label	Summary	Details
IS16	Called via common admin number	Was info server accessed from Admin menu?
IS17	Is this identity a group account member with spending limits only, or spending limits first in the precedence order of the group account?	This decision is true in two cases. 1) If the AccountType parameter of the SubscriberEntity = 1, then the subscriber is a group member with spending limits only, and the subscriber's spending limits are announced. 2) If the AccountType parameter of the SubscriberEntity = 4, then the subscriber is a group member with both balances and spending limits. The decision regarding which to announce in the Info Server then depends on the PrecedenceOrder parameter of the group account (see IS15 above on how to retrieve the group account information for a subscriber). If the PrecedenceOrder = 1, the subscriber's spending limits are announced (the decision is true). This includes any balances with a FundsType = 1 or = 3. If the PrecedenceOrder = 2, the subscriber's balances are announced (the decision is false). This includes any balances with a FundsType = 2 or = 3. For all other AccountType values of the SubscriberEntity, the subscriber's balances are announced (the decision is false).
IS18	Is account prepaid or postpaid?	Get subscriber's COS for the Identity to be used (SubscriberEntity.COSName). In ClientCache, for subscriber's COS, retrieve parameter serviceType If value=2 and <CONVERGED> in General Parameters Table = 1, then it is postpaid. Otherwise, it is prepaid.

Recharge Server

Table 9 Recharge Server Table

Label	Summary	Details
RS1	RTB account Exists?	Determine if A-Number corresponds to a RTB account. Get A-number from signaling message. Use A-number for CCWS query. RetrieveSubscriber(A-number from signaling message). If subscriber retrieved, then RTB account exists, otherwise account does not exist.
RS2	Get RTB account Information	Retrieve RTB subscriber information, including selected language (to specify what language should be used to play the announcements). RetrieveSubscriber(Subscriber ID, Identity, Subscriber Identity). Language used for all announcements in this session is obtained from Subscriber.SubscriberIdentity.LanguageName, which retrieves the language name.
RS3	Recharge in-focus identity only?	<AllIdentities> = 0?
RS4	Subscriber has multiple identities?	Use method GetSubscriberIndentities(SubId) If more than one identity is returned, then sub has multiple identities.

Table 9 Recharge Server Table

Label	Summary	Details
RS5	Retrieve identity corresponding to chosen one	Retrieve chosen identity via RetrieveSubscriber(SubId, SubIdentity…….) and get the necessary information. The subscriber’s language is part of the retrieve and is used for all announcements going forward.
RS6	Valid selection?	Is response = 1 (billed balance)?
RS7	Valid selection?	Is response = 1 (billed balance) or 2 (credit limit)?
RS8	Is this identity a member of a spending limit only group account?	Is the AccountType parameter of the SubscriberEntity = 1?
RS9	Prepaid or postpaid?	Get subscriber’s COS for the Identity used (SubscriberEntity.COSName). In ClientCache, for subscriber’s COS, retrieve parameter serviceType. If value=2 and <CONVERGED> in General Parameters Table = 1, it is postpaid. Otherwise, it is prepaid.
RS10	Core Balance > 0?	Get BalanceName for Core balance: Find BalanceName in ClientCache.BalanceDefinition where ISCoreBalance = True Get Core balance: Subscriber.SubscriberEntity.Balances(0) with BalanceName = name found above Get value of Balance If value > 0?
RS11	Core Balance = 0?	Get BalanceName for Core balance: Find BalanceName in ClientCache.BalanceDefinition where ISCoreBalance = True Get Core balance: Subscriber.SubscriberIdentity.Balances(0) with BalanceName = name found above. Get value of Balance. If value = 0?
RS12	COS Service Fee Active?	Get subscriber’s COS for the Identity to be used (SubscriberEntity.COSName). In ClientCache, for subscriber’s COS, retrieve parameter ServiceFeeActive. If true?
RS13	CANCEL_KEY entered?	<CANCEL_KEY> entered?
RS14	HELP_KEY entered?	<HELP_KEY> entered?
RS15	Called via Admin #?	Was Recharge Server accessed from Admin menu?
RS16	MENU_EXIT_KEY entered?	<GENERIC_MENU_EXIT> key entered?
RS17	Prepaid or postpaid?	Get subscriber’s COS for the Identity to be used (SubscriberEntity.COSName) In ClientCache, for subscriber’s COS, retrieve parameter serviceType If value=2 and <CONVERGED> in General Parameters Table = 1, then it is postpaid. Otherwise, it is prepaid.
RS18	Credit update allowed?	Use method RetrievePostaidBilledBalance (Sub Id, Identity Id) and look at TREATMENT value. If 0, then update allowed, otherwise disallowed.

Table 9 Recharge Server Table

Label	Summary	Details
RS19	Billed balance selected?	Balance selected = 1 (billed)?
RS20	Apply recharge to billed balance	Use method RechargeBilledAccount (Sub Id, Entity Id, voucherNumber, NULL).
RS21	Apply recharge	Use RechargeAccount method with voucher number entered by user.
RS22	Recharge Successful?	RechargeBilledAccount successful?
RS23	Recharge Successful?	RechargeAccount (or RechargeUnbilledAccount) successful?
RS24	Prepaid or postpaid?	Get subscriber's COS for the Identity to be used (SubscriberEntity.COSName). In ClientCache, for subscriber's COS, retrieve parameter serviceType. If value=2 and <CONVERGED> in General Parameters Table = 1, then it is postpaid. Otherwise, it is prepaid.
RS25	Recharge Unbilled Account	apply voucher to unbilled postpaid account. In systems where Balance Forward accounting is used (as in 4.6), billed and unbilled account are essentially the same, so the CCWS method RechargeBilledAccount(Sub ID, Entity Id, voucherNumber, NULL) should be used.
RS26	Voucher number null?	Is entered voucher number NULL?
RS27	Subscriber in Fraud Lock?	Subscriber.SubscriberEntity.CurrentStateName contains "Fraud"?
RS28	Recharge allowed?	RechargeAccount Error 4903
RS29	Card not found, or card invalid?	RechargeAccount Error 4910, 4912, 4923, 4924
RS30	Database unavailable?	RechargeAccount Error 4900, 4901, 4908, 4909, 4917, 4919, 4920, 4921, 4925, 4927, 4928
RS31	Card found but expired, or SP does not match subscriber's?	RechargeAccount Error 4902, 4904, 4905, 4911, 4913, 4916, 4918, 4926
RS32	Account limit exceeded?	RechargeAccount Error 4906, 4907, 4922
RS34	Service Fee problem.	RechargeAccount Error 4914
RS35	Voucher allows automatic post recharge COS change?	Use method RetreiveVoucherBySecretCode(voucher number) to get the voucher information If VoucherEntity.changeCOS_F is not 0, AND VoucherEntity.changeCOS contains a non-negative number, then automatic post recharge COS change is allowed.
RS36	Appropriate row available in COS table?	Get subscriber's COS for the Identity to be used (SubscriberEntity.COSName). In ClientCache, for subscriber's COS, retrieve COSFriend array. This array contains couplets of the format : New COS ID : Value The goal is to change the subscriber's COS to the COS corresponding to the VoucherEntity .changeCOS parameter from above. Is there a row in the COSFriend array with a TransferNumber equal to VoucherEntity.changeCOS?
RS39	Voucher allows post recharge F&F phonebook change?	Use method RetriveVoucherBySecretCode(voucher number) to get the voucher information. If VoucherEntity.changePhonebook is not 0, then post recharge F&F change is allowed.

Table 9 Recharge Server Table

Label	Summary	Details
RS40	COS allows F&F?	Get subscriber's COS for the Identity to be used (SubscriberEntity.COSName). In ClientCache, for subscriber's COS, retrieve COSFriendsAndFamily. If value > 0, COS allows F&F. This value represents the maximum number of Friends & Family entries allowed in this COS.
RS42	Phonebook announcement?	The variables COSFlag, COSann, PhnbkFlag, and PhnbkAnnc must be internally kept by the ASU application. They contain status information regarding the change COS and Phonebook process. PhnbkAnnc=1?
RS44	Phonebook AND COS flag set?	PhnbkFlag=1 AND COSFlag=1?
RS45	NOT phonebook AND COS flag?	PhnbkFlag=0 AND COSFlag=1?
RS46	Phonebook and NOT COS flag?	PhnbkFlag=1 AND COSFlag=0?
RS47	Phonebook key entered?	<PHNBK_KEY> entered?
RS48	Phonebook flag set?	PhnbkFlag=1?
RS51	CANCEL_KEY entered?	<CANCEL_KEY> entered?
RS52	HELP_KEY entered?	<HELP_KEY> entered?
RS53	Invalid key pressed?	Invalid key?
RS54	Phonebook flag && COS flag set?	PhnbkFlag=1 AND COSFlag=1?
RS55	!Phonebook flag && COS Flag?	PhnbkFlag=0 AND COSFlag=1?
RS56	Phonebook flag && !COS flag?	PhnbkFlag=1 AND COSFlag=0?
RS57	Menu limit reached?	Retries = <Menu_Limit>?
RS58	Timeout limit reached?	TimeoutCounter = <secondaryTimeoutLimit>?
RS59	Check provisioned?	CheckProvisioned=1? Phonebook entries are contained in SubscriberPB, which is an array of up to 10 phone numbers.
RS60	Current slot provisioned?	Is there an entry (phone number) in the current slot?
RS61	End of list?	Reached COSFriendsAndFamily limit (from RS40)?
RS62	Get next entry	Go to next entry in phonebook list.
RS63	PHONEBOOK_KEEP_KEY entered?	<PHNBK_KEEP_KEY> entered?
RS64	PHONEBOOK_REPLACE_KEY entered?	<PHNBK_REPLACE_KEY> entered?
RS65	HELP_KEY entered?	<HELP_KEY> entered?
RS66	Menu limit reached?	Retries = <Menu_Limit>?
RS67	CANCEL_KEY entered?	<CANCEL_KEY> entered?
RS68	Timeout limit reached?	TimeoutCounter = <secondaryTimeoutLimit>?
RS69	Invalid menu entry?	Invalid entry?
RS70	Get first entry in list	Get first entry in phonebook list.

Table 9 Recharge Server Table

Label	Summary	Details
RS71	Slot open?	Is there a phone number already provisioned in this slot?
RS72	End of list?	Reached COSFriendsAndFamily limit (from RS40)?
RS73	Get next entry in list	Go to next entry in phonebook list.
RS74	PHONEBOOK_EXIT_KEY entered?	<PHNBK_EXIT_KEY> entered?
RS75	PHONEBOOK_ADD_KEY entered?	<PHNBK_ADD_KEY> entered?
RS76	Get next entry	Go to next entry in phonebook list.
RS77	HELP_KEY entered?	<HELP_KEY> entered?
RS78	CANCEL_KEY entered?	<CANCEL_KEY> entered?
RS79	Invalid menu entry?	Invalid key?
RS80	Menu limit reached?	Retries = <Menu_Limit>?
RS81	Timeout limit reached?	TimeoutCounter = <secondaryTimeoutLimit>?
RS82	COS Allows Multiple Vouchers per session?	For subscriber and identity COS ClientCache.ClassofService.multipleVouchers = True?
RS83	Recharge session limit exceeded?	RechargeAccount Error 4906
RS84	Update SessionRechargeValue	SessionRechargeValue = SessionRechargeValue + VoucherEntity.faceValue
RS85	Balance Forward?	Is <OTH_SYS_RECH> in General Parameters Table = 1?
RS86	Currency mismatch?	RechargeAccount Error 4915

Language Server

Table 10 Language Server Table

Label	Summary	Details
LS1	RTB Account Exists?	Determine if A-Number corresponds to an RTB account. Get A-number from signaling message. Use A-number for CCWS query. RetrieveSubscriber(A-number from signaling message) If subscriber retrieved, then RTB account exists, otherwise account does not exist.
LS2	Get RTB account Information	Retrieve RTB subscriber information, including selected language (to specify what language is used to play the announcements). RetrieveSubscriber(Subscriber ID, Identity, 1) Language used for all announcements in this session is obtained from Subscriber.SubscriberEntity.LanguageName, which retrieves the language name.
LS3	Max number of retries?	<MenuLimit> reached?
LS4	Done key entered?	<GENERIC_MENU_EXIT_KEY> entered?
LS5	Called via Admin #?	Menu reached via Admin Menu?
LS6	HELP_KEY entered?	<HELP_KEY> entered?

Table 10 Language Server Table

Label	Summary	Details
LS7	Valid key entered?	One of <GENERIC_MENU_EXIT_KEY>, <HELP_KEY>, <LANG_ACCEPT_KEY>, or valid new language key entered?
LS8	Confirm key entered?	<LANG_ACCEPT_KEY> entered?
LS9	Set subscriber to new language	Use ModifySubscriber method to set subscriber's language (Subscriber.SubscriberEntity.LanguageName) to Language Name corresponding to Language Number from Language Table.

Phone Book Entry

Table 11 Phone Book Entry Table

Label	Summary	Details
PB1	CANCEL_KEY entered?	<CANCEL_KEY> entered?
PB2	CANCEL_KEY entered?	<CANCEL_KEY> entered?
PB3	HELP_KEY entered?	<HELP_KEY> entered?
PB4	Valid number entered?	Does the entered phone number appear to be valid? (For this item, just make sure it has at least four digits.)
PB5	Invalid entry?	Invalid entry?
PB6	Timeout limit reached?	TimeoutCounter = <secondaryTimeoutLimit>?
PB7	Cancel limit reached?	Number of cancels = <CancelStringLimit>?
PB8	Invalid entry limit reached?	Number of invalid entries = <invalidStringLimit>
PB9	PHONEBOOK_CONFIRM_KEY entered?	<PHNBK_KEEP_KEY> entered?
PB10	PHONEBOOK_REJECT_KEY or <CANCEL_KEY> entered?	<PHNBK_REJECT_KEY> or <CANCEL_KEY> entered?
PB11	HELP_KEY entered?	<HELP_KEY> entered?
PB12	Invalid menu key entered?	Invalid key?
PB13	1st timeout?	No keystroke within 10 seconds?
PB14	1st invalid entry?	Is this the first invalid entry?

User In Trouble

Table 12 User In Trouble Table

Label	Summary	Details
UT1	Route to customer care?	<RouteToCustomerCare>= 1?

Customer Care Invocation

Table 13 Customer Care Invocation Table

Label	Summary	Details
CC1	Get customer care number	Get subscriber’s Service Provider SubscriberEntity.spName. From ClientCache, get Customer Care Access Number. Destination Number: AccessNumberInfo.DestinationNumber

Dates and Balances

In addition to the information in the preceding call flowcharts and in the comments to the PromptTool spreadsheet, the following apply to balances and expiration dates wherever used.

Expiration Dates

Expiration dates should never be played when announcing the spending limits of a group account member, or for a converged billing subscriber. Spending limits and credit limits never expire. There is no expiration threshold check for these cases. However, anywhere tokens bal1_exp_date … bal10_exp_date are used in a sentence, expiration dates should also be skipped for these subscribers.

Group Account Member Spending Limits

Whenever the spending limits of a group account member are checked or announced, each balance used should be the lesser of the member's total spending limit for that balance, and the group account owner's corresponding balance, both according to the balance charge order of the owner's COS. This is because the member has only a spending limit, while the real money is the owner's. Since the announcement is regarding the funds actually available to the member, neither one is used alone. This affects the balance threshold check, as well as anywhere a balance value token is used in a sentence, for example, tokens core_bal_value in sentences 803-6, 1511-16, and 1526-28, and bal1_value … bal10_value in sentences 70, and 71.

NOTE Only a subscriber's own balances are announced in the Recharge Server since spending limits can never be recharged. This is true even for group account members with both balances and spending limits with a precedence order of spending limits first.

Balance Rounding

It is a limitation of the MXU that it can only play integers for noncurrency balances. Fractions cannot be announced for seconds or any other noncurrency balances. Therefore, though not mentioned in the comments to the PromptTool, values for non-currency balances are rounded up if >= .5; else, rounded down. If the same user experience is desired from the ASU IVR, the same rounding must also be performed.