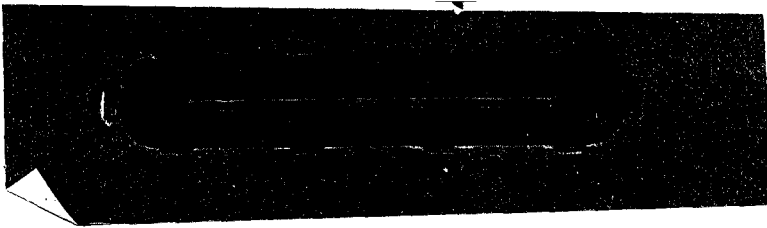


Cox Communications, Inc. Exhibit 1006

	Subclass
	Class
ISSUE CLASSIFICATION	



SERIAL NUMBER 60/028,760 PROVISIONAL	FILING DATE 10/23/96	CLASS	SUBCLASS	GROUP ART UNIT	EXAMINER
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APPLICANTS

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CONTINUING DATA***
VERIFIED

FOREIGN/PCT APPLICATIONS***
VERIFIED

Foreign priority claimed 35 USC 119 conditions met	<input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> yes <input type="checkbox"/> no	AS FILED →	STATE OR COUNTRY CAX	SHEETS DRWGS. 10	TOTAL CLAIMS	INDEP. CLAIMS	FILING FEE RECEIVED \$150.00	ATTORNEY'S DOCKET NO.
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Verified and Acknowledged
Examiner's initials

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ADDRESS

SERVICE ORDER MECHANISM FOR TELEPHONE SUBSCRIBER

TITLE

U.S. DEPT. OF COMM./ PAT. & TM—PTO-436L (Rev.12-94)

TEAM 1

PATENT APPLICATION



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APPROVED FOR LICENSE

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INITIALS

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PATENT APPLICATION SERIAL NO. **60/028760**

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

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BAR CODE LABEL		U.S. PATENT APPLICATION			
					
SERIAL NUMBER		FILING DATE	CLASS	GROUP ART UNIT	
60/028,760 PROVISIONAL		10/23/96			
APPLICANT	YAFAN AN, KANATA, CANADA; ERIC BIERMAN, OTTAWA, CANADA; MICHAEL A. KELLY, KINBURN, CANADA.				
	CONTINUING DATA*** VERIFIED _____				
	FOREIGN/PCT APPLICATIONS*** VERIFIED _____				
STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS	FILING FEE RECEIVED	ATTORNEY DOCKET NO.
CAX	10			\$150.00	
ADDRESS	FOLEY & LARDNER SUITE 500 3000 K STREET NW WASHINGTON DC 20007-5109				
TITLE	SERVICE ORDER MECHANISM FOR TELEPHONE SUBSCRIBER				
This is to certify that annexed hereto is a true copy from the records of the United States Patent and Trademark Office of the application which is identified above. By authority of the COMMISSIONER OF PATENTS AND TRADEMARKS					
Date		Certifying Officer			



60/028760

PTO/SB/16(6-95)
Approved for use through 04/11/98. OMB 0651-0037
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR 1.53(b)(32).

Docket Number		Type a plus sign (+) inside this box →	
INVENTOR(s)/APPLICANT(s)			
LAST NAME	FIRST NAME	MIDDLE INITIAL	RESIDENCE (CITY AND EITHER STATE OR FOREIGN COUNTRY)
<u>An</u>	<u>Yafan</u>		28 Crownridge Drive, <u>Kanata</u> , Ontario, Canada K2M 2M7
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<u>Kelly</u>	<u>Michael</u>	<u>A.</u>	3627 Diamondview Rd., RR#2, <u>Kinburn</u> , Ontario, Canada, K0A 2H0
TITLE OF THE INVENTION (280 characters max)			
SERVICE ORDER MECHANISM FOR TELEPHONE SUBSCRIBERS			
CORRESPONDENCE ADDRESS			
c/o <u>FOLEY & LARDNER</u> <u>Suite 500, 3000 K Street, N.W.</u>			
STATE	<u>Wash., DC</u>	ZIP CODE	<u>20007-5109</u>
COUNTRY	<u>USA</u>		
ENCLOSED APPLICATION PARTS (check all that apply)			
<input checked="" type="checkbox"/>	Specification	Number of Pages	<u>44</u>
<input type="checkbox"/>	Small Entity Statement		
<input checked="" type="checkbox"/>	Drawing(s)	Number of Sheets	<u>10</u>
<input type="checkbox"/>	Other (specify)		
METHOD OF PAYMENT (check one)			
<input checked="" type="checkbox"/>	A check or money order is enclosed to cover the Provisional filing fees		PROVISIONAL FILING FEE AMOUNT (\$)
<input type="checkbox"/>	The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number:		

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

SIGNATURE

DATE:

Oct 21 1996

TYPED or PRINTED NAME

James McGrawREGISTRATION NO.
(if appropriate)281681☐ Additional inventors are being named on separately numbered sheets attached hereto

PROVISIONAL APPLICATION FILING ONLY

SENT BY: 900-55 METCALFE

10-22-96 : 16:14 :

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F&L DC A: # 3431



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\$150-114

607028760 PROV.

BE IT KNOWN that WE, YAFAN AN, ERIC BIERMAN and
MICHAEL A. KELLY, citizens of Canada, whose full post office
addresses are 28 Crownridge Drive, Kanata, Ontario, Canada,
K2M 2M7, 71 Somerset Street W., Ottawa, Ontario, Canada, K2P
2G2 and 3627 Diamondview Rd., RR#2, Kinburn, Ontario, Canada,
K0A 2H0 have invented certain new and useful improvements in:

SERVICE ORDER MECHANISM FOR TELEPHONE SUBSCRIBER

of which the following is the specification.



Field of the Invention

This invention relates to configuring different telephone feature profiles for different subscribers and, more particularly, to a system which permits a subscriber to
5 add/change or delete features with respect to his/her particular telephone feature profile.

Background of the Invention

Today, telephone subscribers need to interact with a telephone service provider's service representative to order
10 new features or change existing ones. The addition or modification or activation or de-activation of features, when not performed through a service representative, often requires elaborate user interface actions which are difficult to remember (particularly when infrequently used) and difficult
15 to verify. For example, for a customer to turn on "call forward" feature, he/she needs to key in *73, wait for reorder tone, and then key in the forwarded-to number.

Summary of the Invention

What is proposed here is provide an alternate
20 parallel mechanism to those subscribers who are also subscribers to an information communications network, for example an "Internet" service. The subscriber can locate his personal "telephone feature profile" on the telephone service provider's server on the Internet, access it via a password,
25 such as his/her "calling card" PIN, and see at a glance the features and options currently active on his line/number. Additionally, the subscriber may submit requests to add/change/delete features, on-line.

As an example, we describe a scenario of how the

"call forward" feature could benefit significantly from this approach. A person arriving at a new location, such as a hotel room, or someone else's home, could access his/her "telephone feature profile" via the hotel or friend's Internet access and activate his/her "call forward" feature with the number of the telephone in the hotel or friend's home. All calls would then follow to the new location.

This mechanism removes the need for human interface from some (growing) percentage of feature modification requests and thus reduces operating cost to telephone service providers.

Through the Internet, a visual and user-friendly interface can be provided to subscribers which significantly simplifies service order procedures. Subscribers would configure their feature complements and be given the resulting monthly cost, helping them understand real costs versus real benefits. In some cases, such as ISDN service, where feature complements are more complex (to the point where the service representatives can often not answer the questions), a clearer exposition of what the features do in all of their permutations, by customer trial and error can be very beneficial. These frequent feature changes are managed by subscribers themselves.

Brief Description of the Drawings

Figure 1 is a schematic diagram illustrating the network configuration of one embodiment of the present invention; and

Figures 2 to 10 are illustrations of exemplary displays presented on the P.C. screen of a subscriber using

the invention.

Detailed Description of Preferred Embodiments

An HTTP server is placed on the machine which stores the feature profiles, or on a machine that has direct (and
5 probably proprietary) access to the machine that does have those profiles. In the case of the indirect method (our preferred approach), the intermediate machine would have replicas of the real data and the HTTP server would act on them. The intermediate machine would commit the contents of
10 change to the real data at critical points, such as when the customer decides to "submit" his changes. The intermediate machine could also pre-process and validate the request to reduce error and improve efficiency.

The machine with the HTTP server would be connected
15 to the public Internet, accessible on the World Wide Web (WWW). Feature profiles will be formulated as HTML pages on the WWW.

An Internet "browser", such as the Netscape Navigator, can be running on a Personal Computer or other
20 suitable devices. A telephone subscriber would use one of such devices and a Universal Resource Locator for access to his/her telephone service provider's server.

The browser would request the subscriber's telephone number and the PIN (see Figure 2). On verification of this
25 pair of numbers, the HTTP server would provide access to a series of pages about this particular telephone number. The contents of the pages could be almost without limit, showing perhaps current bill, detailed list of calls etc., as well as current features and cost what-ifs on possible feature

complements. Via a mechanism such as an HTML "form" or a Java "applet", a subscriber can activate/deactivate features and change the parameters of those features, on-line. Submission of the "form" will modify his "profile".

5 Figure 3 illustrates a first screen display that might be presented after verification. This specifies different categories of interest. By pointing and clicking on "calling out" the screen display shown in Figure 4 is presented. This shows the subscriber the features on his
10 profile and enables him to update this by pointing and clicking.

 Figure 5 illustrates the display that is presented to allow the subscriber to update his "speed call" list, Figures 6 and 7 illustrate displays which explain how to use
15 "speed call", Figure 8 illustrates the display which allows the subscriber to update his "Auto dial" button and Figure 9 shows how this option can be used, and Figure 10 is a display confirming the changes that have been made.

 A security mechanism which could involve encryption
20 and decryption known per se could be used to prevent revealing PINs to those tapping in on communications lines or intermediate servers or routers.

 When talking about an HTTP server, we mean a server using the Hyper Text Mark-up Language (HTML) and the Hyper
25 Text Transfer Protocol (HTTP) for World Wide Web (WWW) style access. Java executable content may or may not be used (will be used in the preferred approach) as part of this HTML mechanism. The Uniform Resource Location (URL) in a unique address given to a browser to find the appropriate server

using mechanisms already in place for Internet WWW use. The PIN referred to is a Personal Identity Number, which acts as a "password" to authenticate the customer. ISDN stands for Integrated Services Digital Network, but refers in the field to a single physical telephone line which provides two logical 64Kb/s content channels and one 8Kb/s signalling channel, all of which can be used for multiple purposes, hence complicating the feature complements possible. The Transaction Control Protocol (TCP) running over the internet Protocol (IP) is generally referred to as TCP/IP. Finally "Internet" is a network of networks of a very large number of servers and clients for interchange of data, well described elsewhere.

In a preferred aspect of the invention the machine storing the feature profiles is a switch, and Figure 1 illustrates the network configuration using a switch and a nodal system manager as the intermediate machine. The nodal system manager would normally be connected to a plurality of switches.

The switch is preferably a DMS (digital multiplexing switch) and the nodal system manager may be a Super-node Data Manager (SDM) of Nortel which is a high performance computing platform that provides nodal OAM&P services to DMS platforms. It provides a powerful set of services that allow SDM processes to read, change, delete and add tuples to DMS tables, thus changing customer's service profiles. It is a complete hardware and software server platform that is designed to conform to industry standards (NEBS, UNIX, etc.). (For SDM06, the SDM employs Motorola-supplied VME computing hardware based on the PowerPC family of processors.)

A potential implementation for DMS is to equip the SDM with a HTTP server and connect the SDM to the public Internet. As an alternative, if the SDM is connected with a Telco LAN, it only requires that the LAN be connected to the public Internet, and the HTTP server can be on any machine on the Telco LAN. In either case, the subscribers will be able to access the HTTP server from the public Internet.

The HTTP server has a communication link to the DMS switch. Through this link the HTTP server will be able to query and change the data tables on the DMS.

Attached hereto and forming part of this disclosure are Appendix 1, Appendix 2 and Appendix 3. Appendix 1 and Appendix 2 provide further information and details relating to the invention and its implementation and overlap in certain respects. It should be noted that, although Appendix 1 is entitled "Subscriber Service Provisioning Manager Architecture" and Appendix 2 is entitled "Internet-based Telephone Service Ordering System (ITSOS)", these titles are essentially synonymous. Appendix 3 illustrates an example of the protocol used for describing a subscriber profile.

WE CLAIM:

1. A telephone subscriber ordering system comprising a server acting directly or indirectly on a machine which stores
5 and implements a plurality of telephone feature profiles corresponding to a plurality of subscribers, the server being connected to an information communications network such as the Internet and accessible by subscribers through the information communications network and permitting when accessed by a
10 subscriber access to that subscriber's telephone feature profile for viewing and optionally changing, adding or deleting features by the subscriber.



60/028760

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

INVENTOR (S): YAFAN AN, ERIC BIERMAN and MICHAEL A. KELLY

SERIAL NO.:

FILED:

TITLE: SERVICE ORDER MECHANISM FOR TELEPHONE SUBSCRIBERS

ASSOCIATE POWER OF ATTORNEY

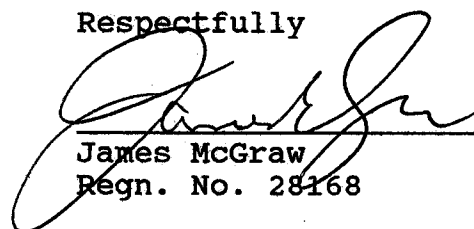
Honourable Commissioner of Patents and Trademarks,
Washington, D. C. 20231.

Sir:

Please recognize Stephen A. Bent, Regn. No. 29,768; David A. Blumenthal, Regn. No. 26,257; John J. Feldhaus, Regn. No. 28,822; Donald D. Jeffery, Regn. No. 19,980; Peter G. Mack, Regn. No. 26,001; Brian J. McNamara, Regn. No. 32,789; Sybil Meloy, Regn. No. 22,749; George E. Quillin, Regn. No. 32,792; Colin G. Sandercock, Regn. No. 31,298; Bernhard D. Saxe, Regn. No. 28,665; Richard L. Schwabb, Regn. No. 25,479; Arthur Schwartz, Regn. No. 22,115 and Harold C. Wegner, Regn. No. 25,258; who together constitute the firm of Foley & Lardner, jointly and severally, as Associate Attorneys in the above-identified application, with the usual powers.

Please direct all official correspondence to Foley & Lardner, 3000 K Street, N. W., Suite 500, Washington, D. C. 20007-5109, United States of America.

Respectfully



James McGraw
Regn. No. 28168

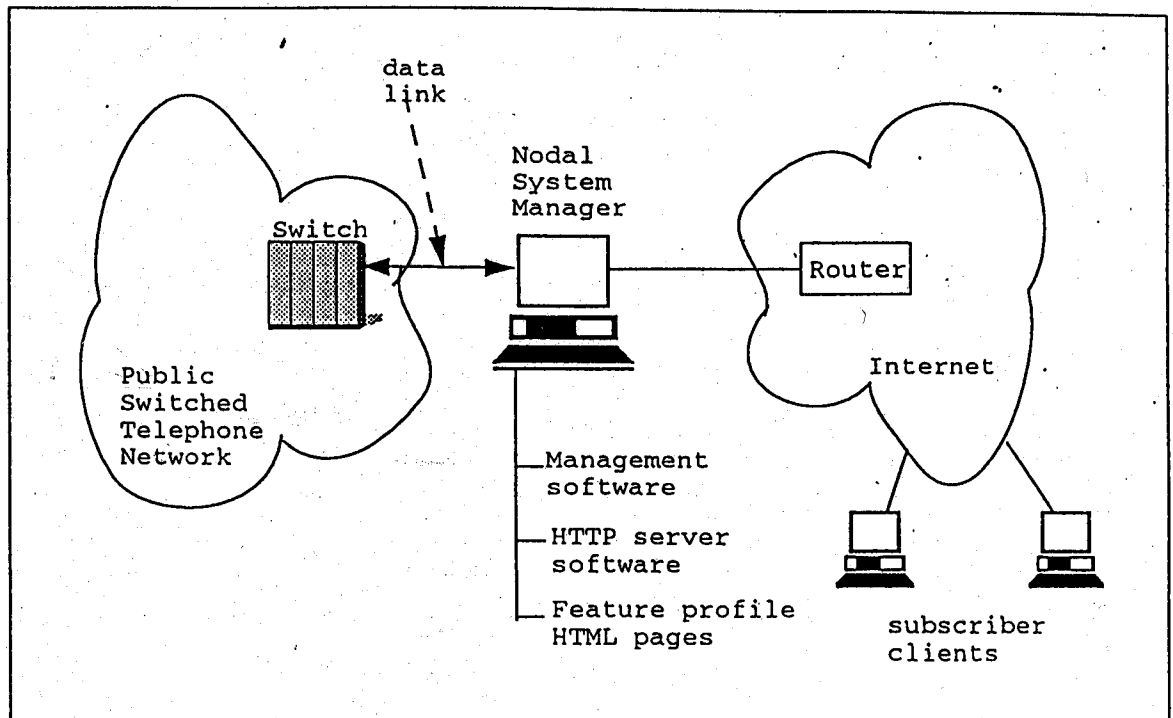
Ottawa, Canada

Dated: Oct 21, 1996

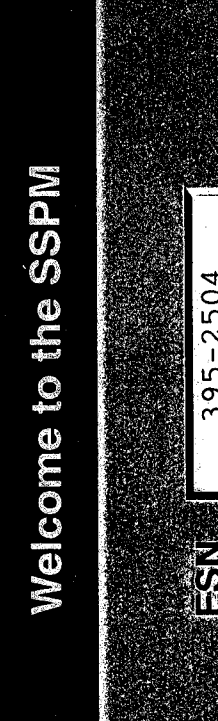
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U.S. DEPARTMENT OF TRANSPORTATION

FIGURE 1.



A circular postmark from New York, dated 1891. The number 28760 is printed in the upper left. The text "NEW YORK" is at the top, "1891" is in the center, and "U.S. POSTAGE" is at the bottom.



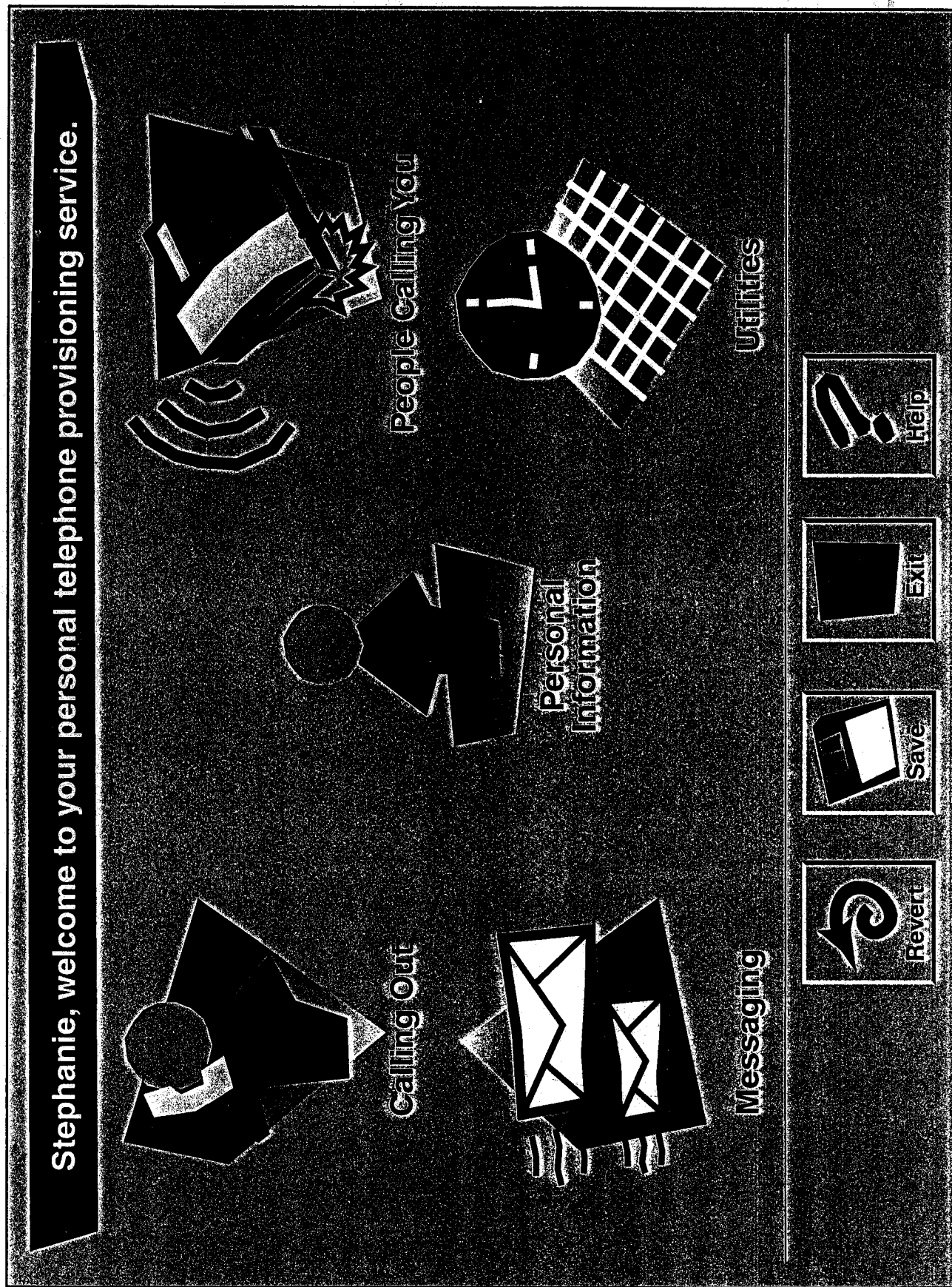
Welcome to the SSPM

ESN 395-2504

PIN XXXXXX

Cancel Enter

FIGURE 3



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FIGURE 4

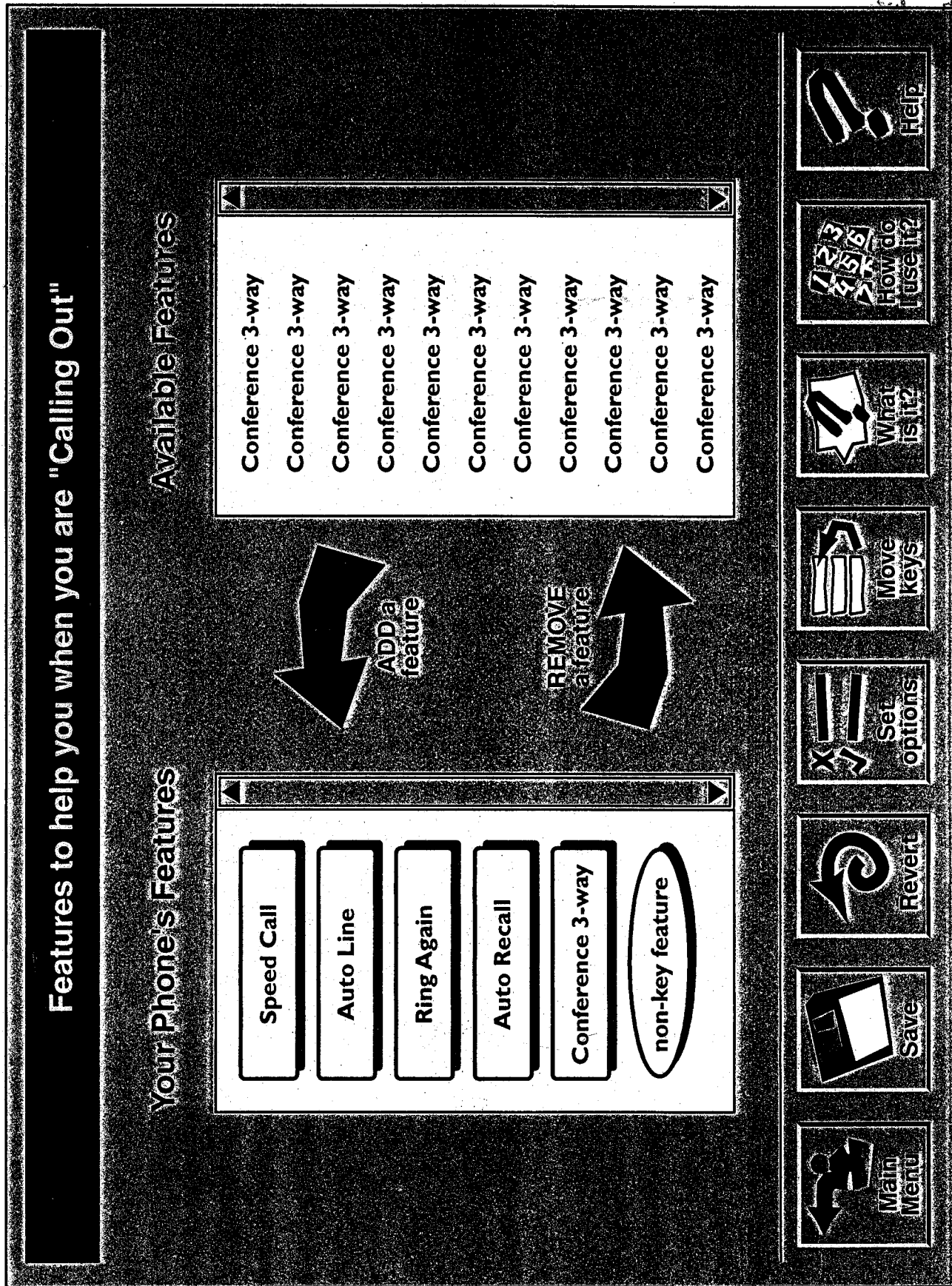
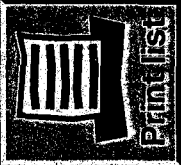


FIGURE 5


Speed Call Options

Allows you to reach predefined numbers by dialing specific programmed codes.

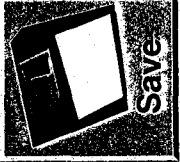
	Name	Phone Number
0	Bin Zou	393-9893
1	Julian Craddock	395-2164
2	Michelle Beaudry	395-2504
3	Chris Corner	393-2244
4	Rob McLellan	393-2167
5	Yafan An	393-2536
6	Mike Kelly	6-1-613-555-5555
7	David Harvey	393-9383
8	Jonathan Abrams	393-1347
9	Stephanie Baker	393-6130




Print List




Feature Menu



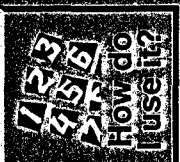
Save



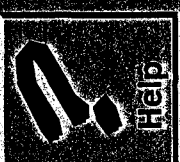
Revert



Move keys

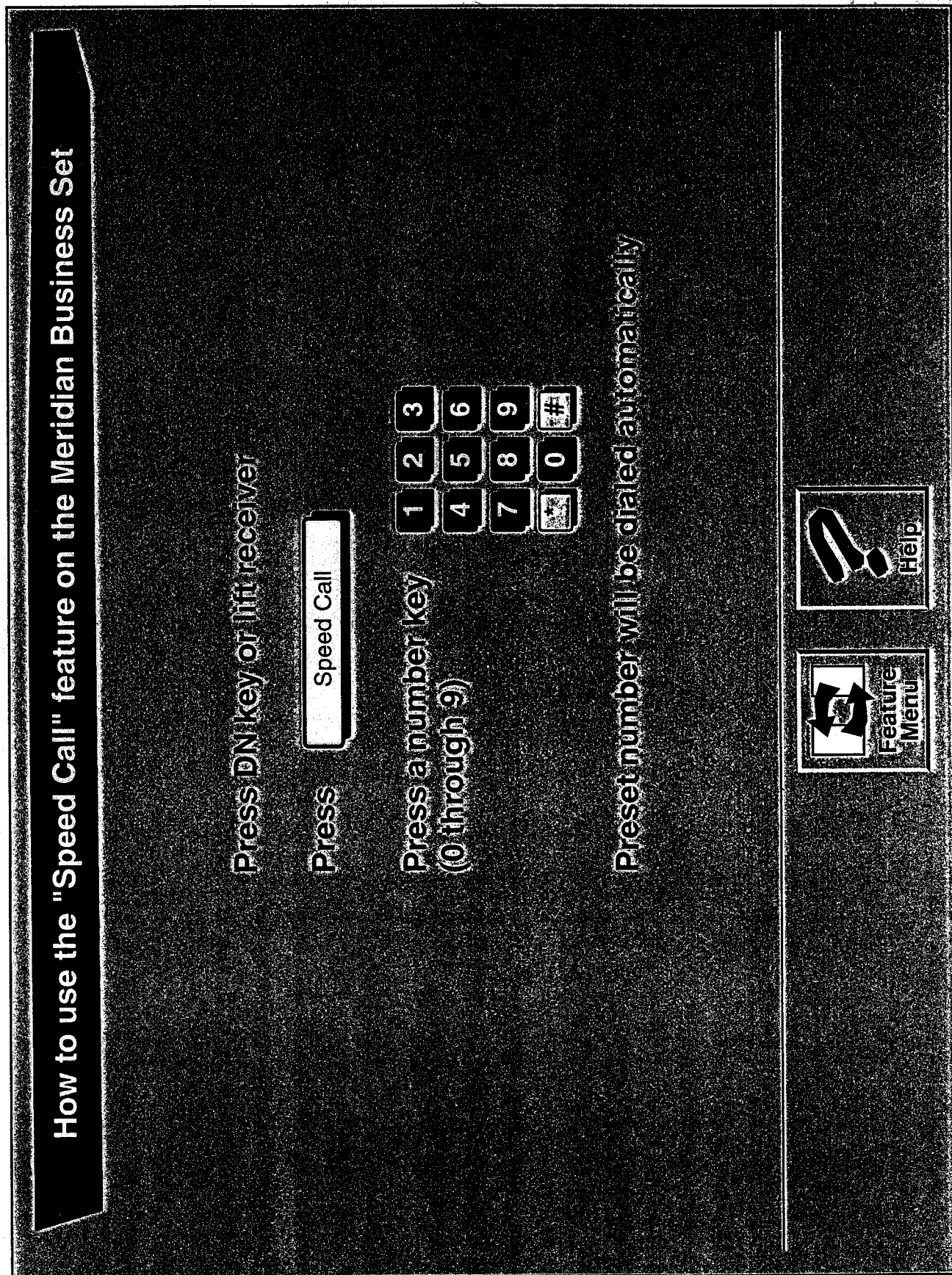


How do I use it?



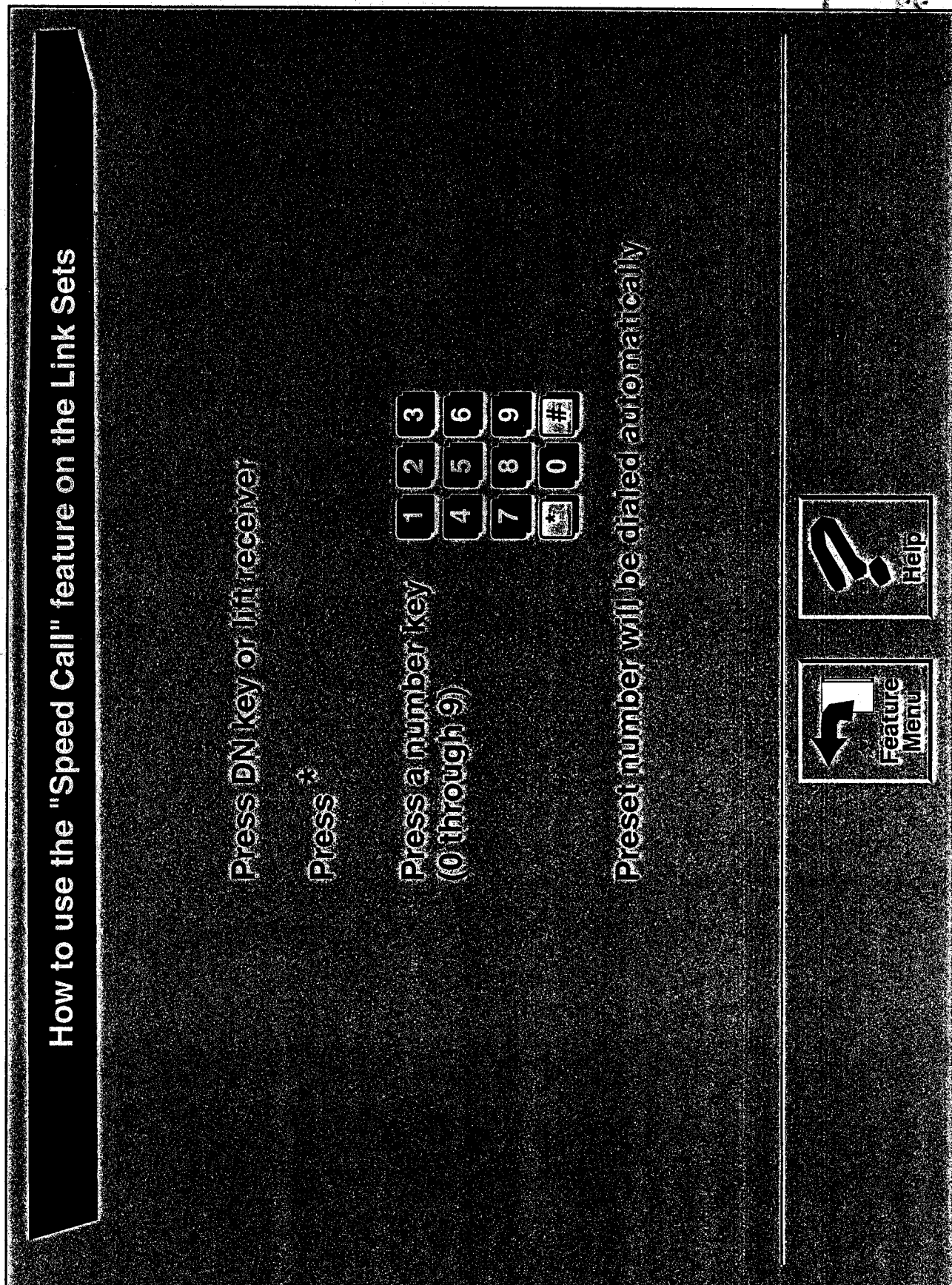
Help

FIGURE 6



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FIGURE 7



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FIGURE 8

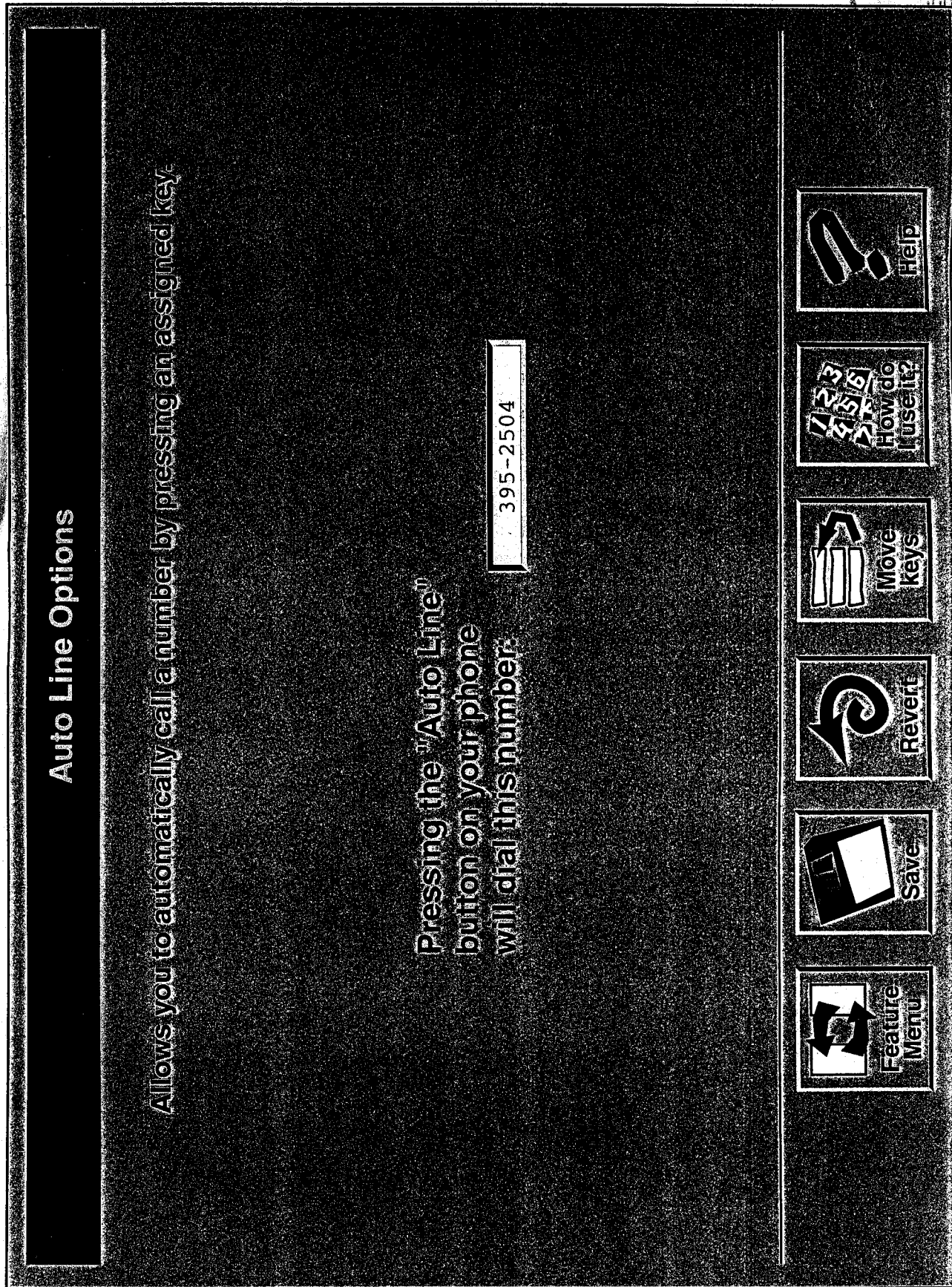
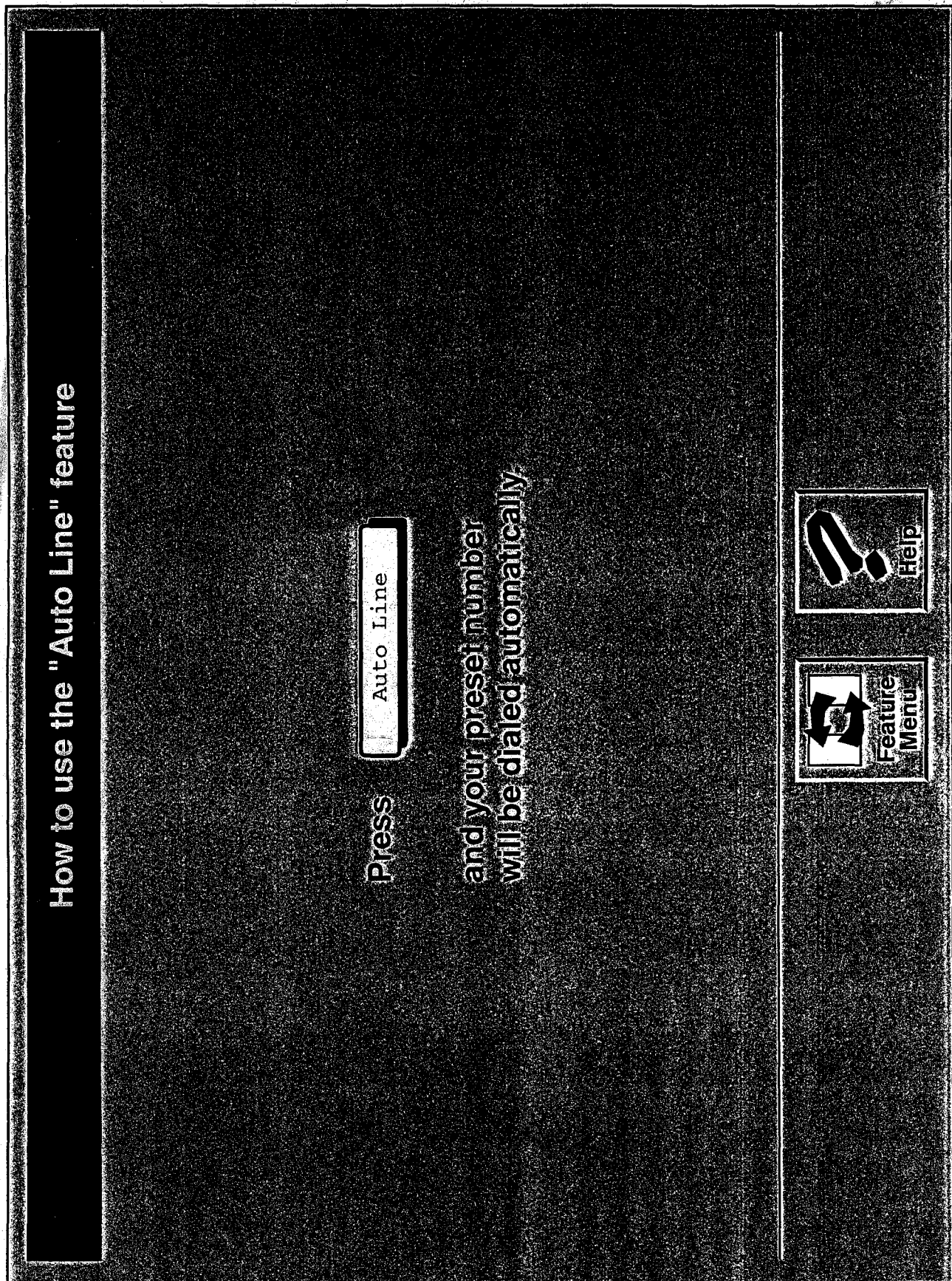


FIGURE 9




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FIGURE 10


Confirmation of Changes to Save

You have made changes to the following features:

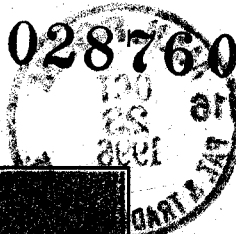
Speed Call	<input type="checkbox"/> Confirm	<input type="checkbox"/> Cancel
Auto Line	<input type="checkbox"/> Confirm	<input type="checkbox"/> Cancel
Call Forward	<input type="checkbox"/> Confirm	<input type="checkbox"/> Cancel

Cancel

Help

Save

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APPENDIX 1

1 Subscriber Service Provisioning Manager Architecture

1.1 Conceptual Framework

The Subscriber Service Provisioning Manager (SSPM) is intended to allow an end-user (Service subscriber) to configure various services and features related to their lines or terminals using an access method from their environment, such as their home computer or desk-top computer.

Currently most line-based service changes require interacting with a Telco operator or provisioner, with changes input through the Telco's OSS. Set-based features are typically programmed through a sometimes arcane sequence of key sequences, possibly with Interactive Voice Response (IVR).

Table 1 shows a sample list of line-based features. These features are provided by the switch (or adjunct) software involved with Call Control and Call Services. The ability to enable some services may require equipment changes at the Provider end of the subscriber loop; we do not address this here.

Table 2 Line-based Services

Service Name	Description
Call Forward	Incoming calls are automatically routed to a different specified DN
Call Waiting	Off-hook user is alerted when a new call arrives
Ring Again	Switch-based automatic retry of call with ring-back to user when successful
Speed Call	Personal directory of numbers and terminal shortcuts, maintained by switch.
Message Waiting	Terminal indication of voice mail messages waiting.
3-Way Conference	Third party added to call.
6-Way Conference	Up to 6 parties involved in call.

Table 2 Line-based Services

Service Name	Description
CLASS Services	Add CLASS features (caller id, ...) to line (requires equipment change).
ACMS	Advanced Call Management Services (Call Waiting with Disposition)

Table 2 shows Set-based features. The key mode of action is to modify the actions associated with terminal events, such as pushing a soft-key. In most cases this programming is carried out to provide convenient access to line-based features in Table 1. Currently this is often performed by the Telco craftperson in a private Terminal profile. A notable exception is Wireless, which allows users to program their cell phones extensively (?).

Table 3 Set-based Features

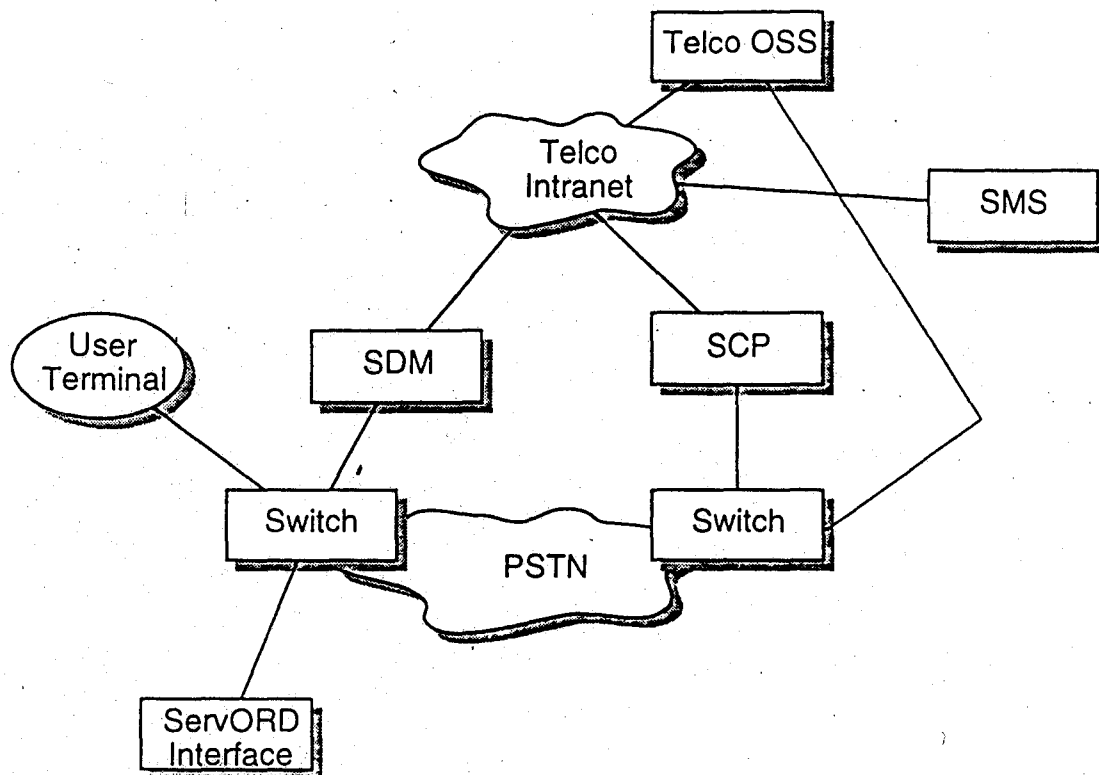
Service Name	Description
Soft Keys	Associate specific switch-interpreted signals with soft keys, to support access to specific functions.

A pictorial overview of a typical network scenario is shown in Figure 1. This depicts the situation with a Wireline set in a public network; similar situations can be drawn for Wireless services, private, etc.

We are targetting a broad variety of systems, including public and private (CPE), wireless and wireline, and potentially other kinds of services including pagers, etc.

It is important to note that line-based features can be realized at different places. Some of the features may be (A)IN based features, such as 800 services (ex. CallForward Time of Day), personal number services, etc. Other features are switch-based services, realized on the switch, such as CallWaiting, CallForward, etc. This gives rise to the need to interface to different service management systems — for example, IN services are managed through the SMS, while switch-services are managed through table control or the SDM.

Figure 2 Scenario

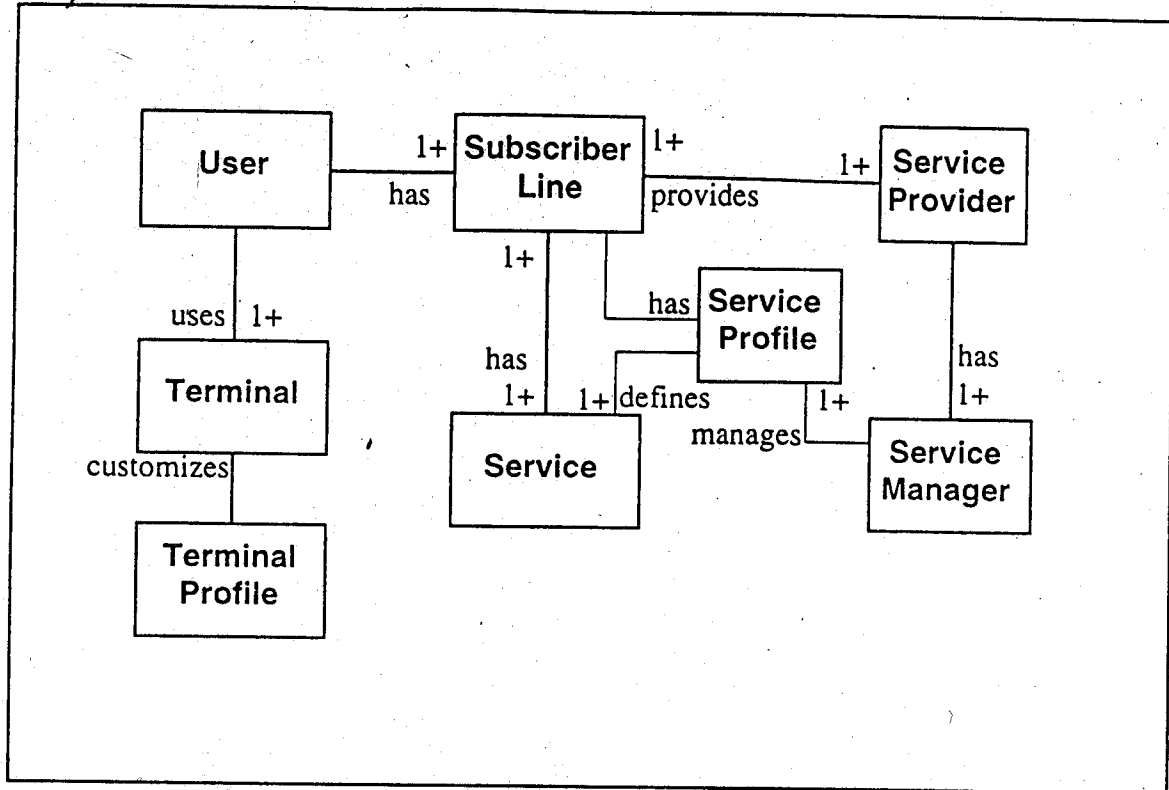


1.2 Domain Model

This section captures the key domain objects in the SSPM problem space. They are shown in Figure 2. User has terminals, owns subscriber lines, has services on the lines described/controlled by a service profile, lines are provided by serviceproviders, who have service managers to manage the services on the line. Terminals have features described by Terminal Profiles. Lines have services described by SubscriberLine profiles.

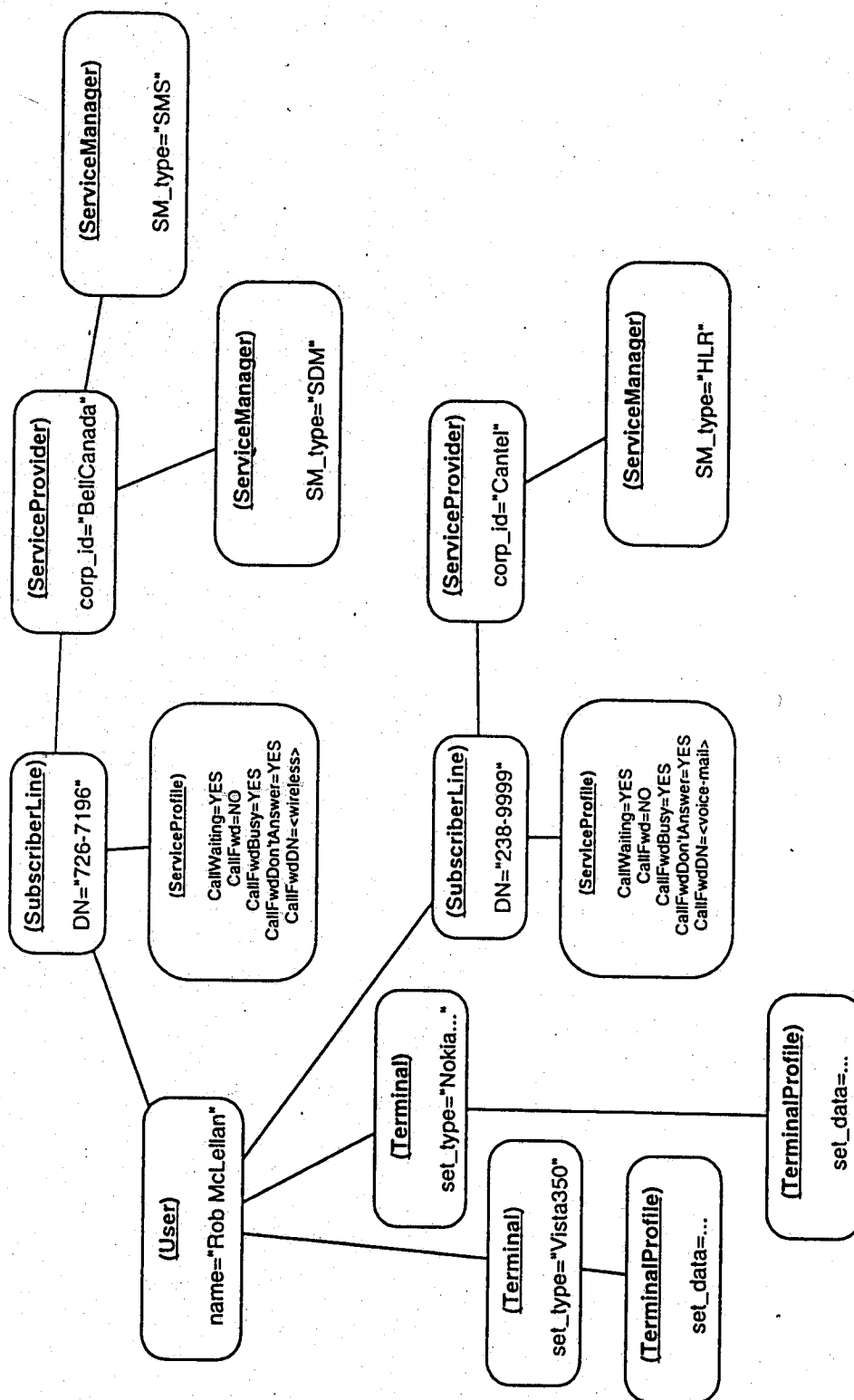
An object instance diagram illustrates a possible scenario for a user in Ontario. This is shown in Figure 3. This example shows a User with a wireless and wireline service, from two different providers. The wireline flips to the wireless, and the wireless flips to voice mail. The wireline network has SMS management for IN based services and SDM for switch-based services. The wireless network controls services through the HLR.

Figure 2² Domain Model



We are providing a comprehensive service change agent to allow the user to change his/her services by communicating with the service manager. We wish to do this in a comprehensive, unified way to the user (uniform view across different subscriber lines, line types (wireless, wireline, pager, ...), terminals, service providers, etc.).

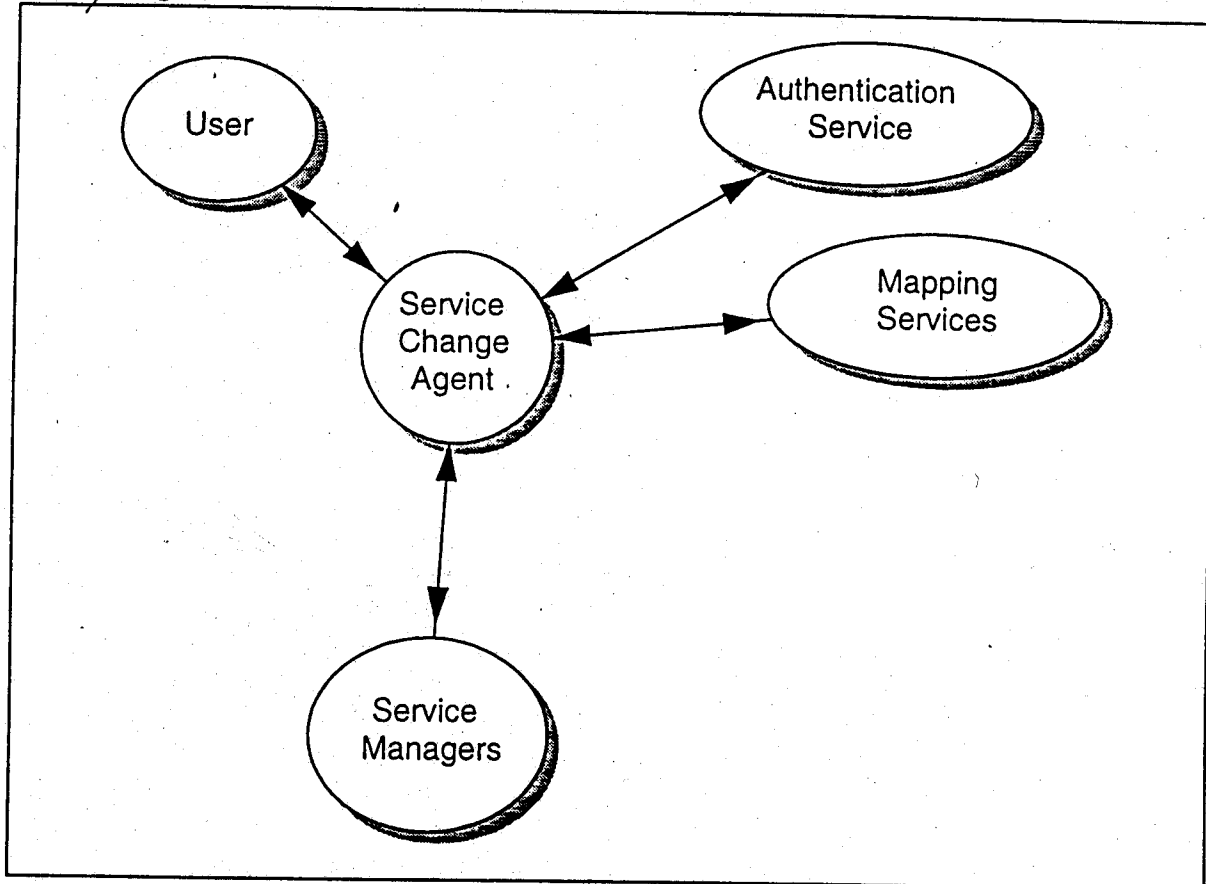
Figure 3 Object Instance Diagram



1.3 Architecture

The logical architecture is shown in Figure 4. The user interacts with a ServiceChangeAgent (SCA). The SCA interacts with an Authentication service to verify the user. The SCA is then free to interact with the Telco's ServiceManager to query the profile, change entries, etc. There may be multiple ServiceManagers if the User subscribes to many lines (wireline, wireless), different services (pager, local and long-distance), etc.

Figure 5 Logical Architecture



User

The subscriber or human agent interacting with the SSPM system.

Service Change Agent

The application providing the GUI, profile viewing and change features. It presents the current profiles, allows the user to modify them, and creates and sends the appropriate transactions to the requisite Service Managers for update. It first validates the user using an authentication service prior to accessing any profile data. Each transaction is validated.

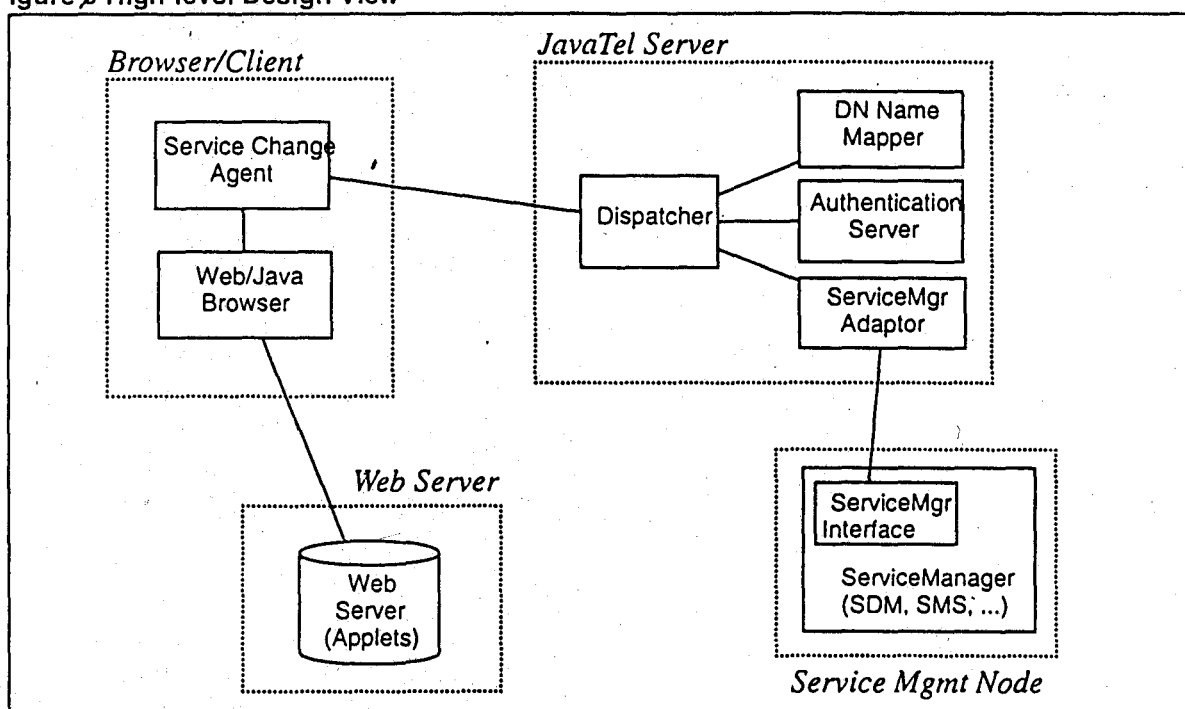
Service Manager

The service management service as used by the Service Provider. It provides the necessary interface to the profile repository, and has a transactional interface to the rest of the world (create, read, update, delete). There may be many Service Managers.

1.4 Mapped Architecture

The high-level design view of the Subscriber Service Profile Manager is shown in Figure 5. Each of the components is described here.

Figure 5 High-level Design View



Service Change Agent

Responsibilities:

- provides the User Interface for accessing, browsing, and modifying subscriber service profile information
- interacts with the JavaTel services to query and modify service profile information in the relevant ServiceManager
- performs limited validation of the service options created by the user — final validation is performed by the ServiceManager or switch
- interacts with the Authentication Service to verify user and access privileges
- interacts with ServiceManagers from Service Providers
- all interactions are routed through the Dispatcher

-
- runs in the User's environment (i.e. user client)

Protocols:

- communicates with Dispatcher using J-protocol over HTML, service record format
- receives HTTP
- uses HTML formatting where appropriate

Implementation Decisions:

- transaction results (service profile records, etc.) are received from the Dispatcher as HTTP-encapsulated data streams and are subsequently parsed in the SCA into the relevant service profile structures

Dispatcher

Responsibilities:

- receives service change transactions from the ServiceChangeAgent and routes them to the appropriate ServiceManager, via the ServiceManagerAdaptor
- routes ServiceManager responses back to ServiceChangeAgent
- routes transactions to the DNMapper to resolve the subscriber's DN into the appropriate ServiceManager type and specific address; the actual connections are managed by the ServiceManagerAdaptor
- bridges Internet and Intranet access domains, receiving Internet transactions and dispatching Intranet transactions to Service Managers
- provides per-transaction authentication using authentication service
- may participate (future) in encryption schemes as required; options include Secure Socket Layer, secure HTTP (SHTTP)

Protocols:

- receives J-protocol on top of HTTP from ServiceChangeAgent
- returns SMrecord format data stream on HTTP if successful, formatted as HTML if unsuccessful
- uses DN Mapper protocol for mapping transactions
- uses Authentication Server protocols for authentication requests

Implementation Decisions:

- Java application process running on JavaTel node
- forks a new Java thread for every received SCA transaction to process the transaction — all downstream execution (SMA) executes in this thread

Web Server (Applets)

Responsibilities:

- acts as a repository for relevant ServiceChange applets (and others)
- provides the "base working directory" for supporting Java classes
- public Internet-connected server, may be separate from JavaTel node to avoid congestion problems

Protocols:

- HTTP

Implementation Decisions:

- runs as a separate Web server node (from the JavaTel server)
- prototype: Netscape only allows an applet to connect to the server it originated from, therefore the WebServer will likely have to be on the JavaTel server

Web/Java Browser

Responsibilities:

- provides the Java-supporting environment for the User on their computer
- used to acquire the ServiceChange applet, launch it, and provide necessary supporting context (base classes, virtual machine, etc.)
- interprets HTML documents

Protocols:

- HTTP, HTML, Java

Implementation Decisions:

- Netscape, other Java-enabled browsers, HotJava

DN Name Mapper

Responsibilities:

- maps Directory Numbers (DN) to specific ServiceManager references
- returns ServiceManager class (type) to support selecting appropriate ServiceManagerAdaptor
- returns specific ServiceManager address (typically in the ServiceProvider's Intranet)

-
- mapping data is either maintained locally (receiving updates from ServiceProviders) or is acquired dynamically through interactions with Telco OSS's or nodes *<to be determined>*
 - other mapping services may be required if other identifiers / logical names are encountered

Protocols:

- "map DN" *<to be specified – object protocol>*

Implementation Decisions:

- may run as a Java server thread, a separate process, or somewhere else in the network — *<to be determined>*

Authentication Server

Responsibilities:

- validates the user's right to modify services for the specified DN through use of a password, personal identification number, or some other mechanism *<to be determined>*
- performs individual authentication on a per-ServiceManager transaction

Protocols:

- "validate user's DN..."
- *<other?>*

Implementation Decisions:

- prototype: to be stubbed in
- may run as a thread in the Java server process, as a separate process on the JavaTel node, or somewhere else in the network

ServiceManagerAdaptor

Responsibilities:

- encapsulates the specific protocols to be used to communicate with each class ServiceManager
- establishes and manages connection with ServiceManager on a per-transaction basis
- receives transactions from the Dispatcher, formats them in a ServiceManager specific protocol, and sends them to the ServiceManager

-
- returns results in SMrecord format to Dispatcher (which re-encapsulates them in J-protocol)
 - each class of ServiceManager has a specific ServiceManager class
 - SMA's communicate synchronously with the ServiceManager (blocking connection)

Protocols:

- transactions are received in the J-Protocol format, encapsulated as Request objects
- transaction records are returned in the SMrecord format
- specific ServiceManager transactions are used with the ServiceManager; for example, SERVORD queries are used with the SDM, on top of a socket transport

Implementation Decisions:

- an instance of the appropriate ServiceManagerAdaptor class is created in each Dispatcher execution thread to handle the transaction with the ServiceManager
- SMA's communicate with the SM's using socket-level communications

ServiceManagerInterface

Responsibilities:

- provides ServiceManager end of communications with ServiceManagerAdaptor
- handles protocol and uses C-API (or other mechanism) provided with the specific ServiceManager to interact with it
- supports single socket connection — SMA's block on connection request until socket is free (transaction completed)

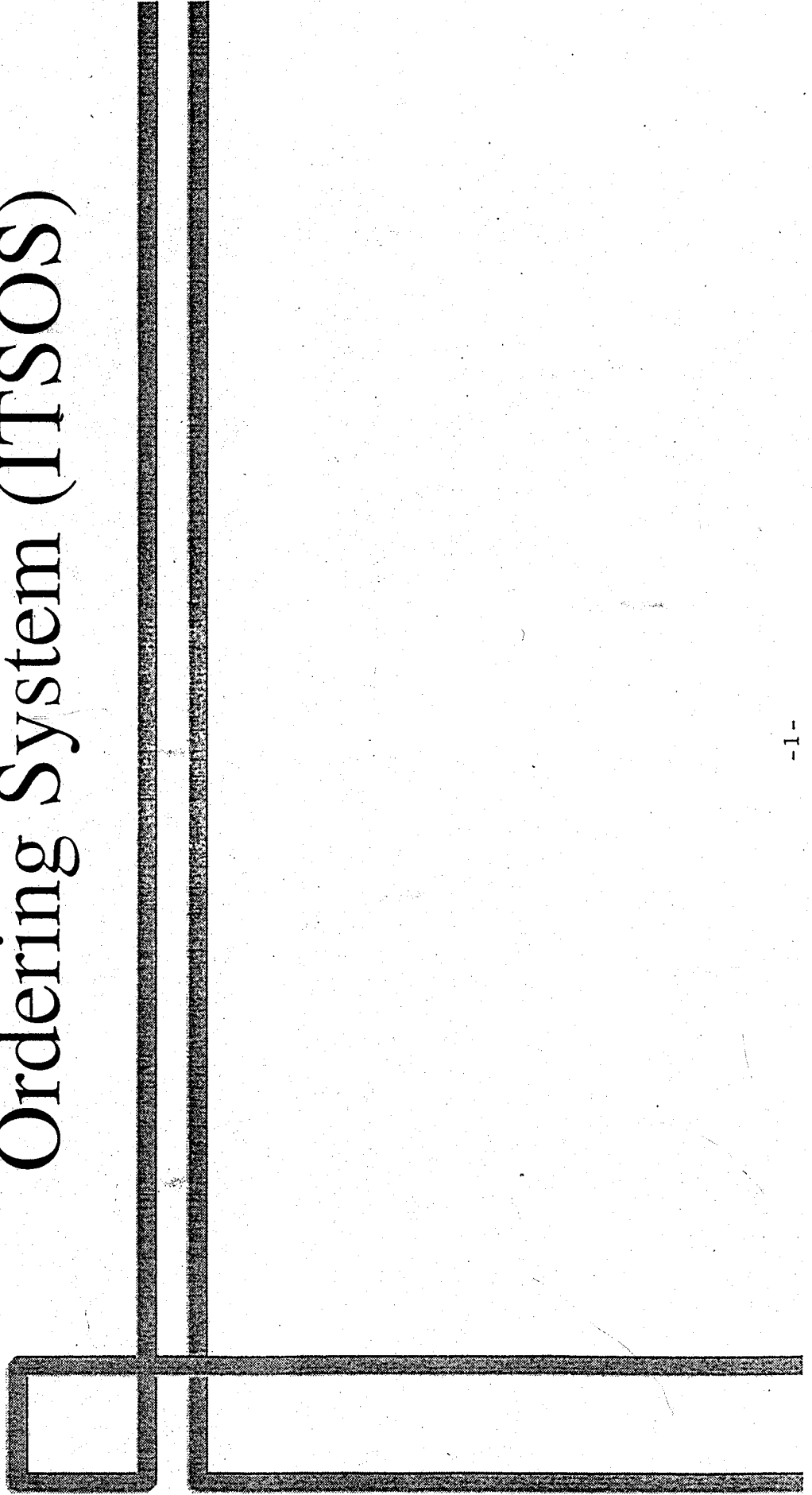
Protocols:

- J-Project developed protocols specific to each ServiceManager on top of socket-level communications from SMA
- ServiceManager-specific communications with access interface (ex. ipc, etc.)

Implementation Decisions:

- light-weight interface with minimal code to achieve low resource usage on ServiceManager
- minimizes interaction with ServiceManager product code to simplify interaction with the SM development and release process (published API's, public interfaces only)

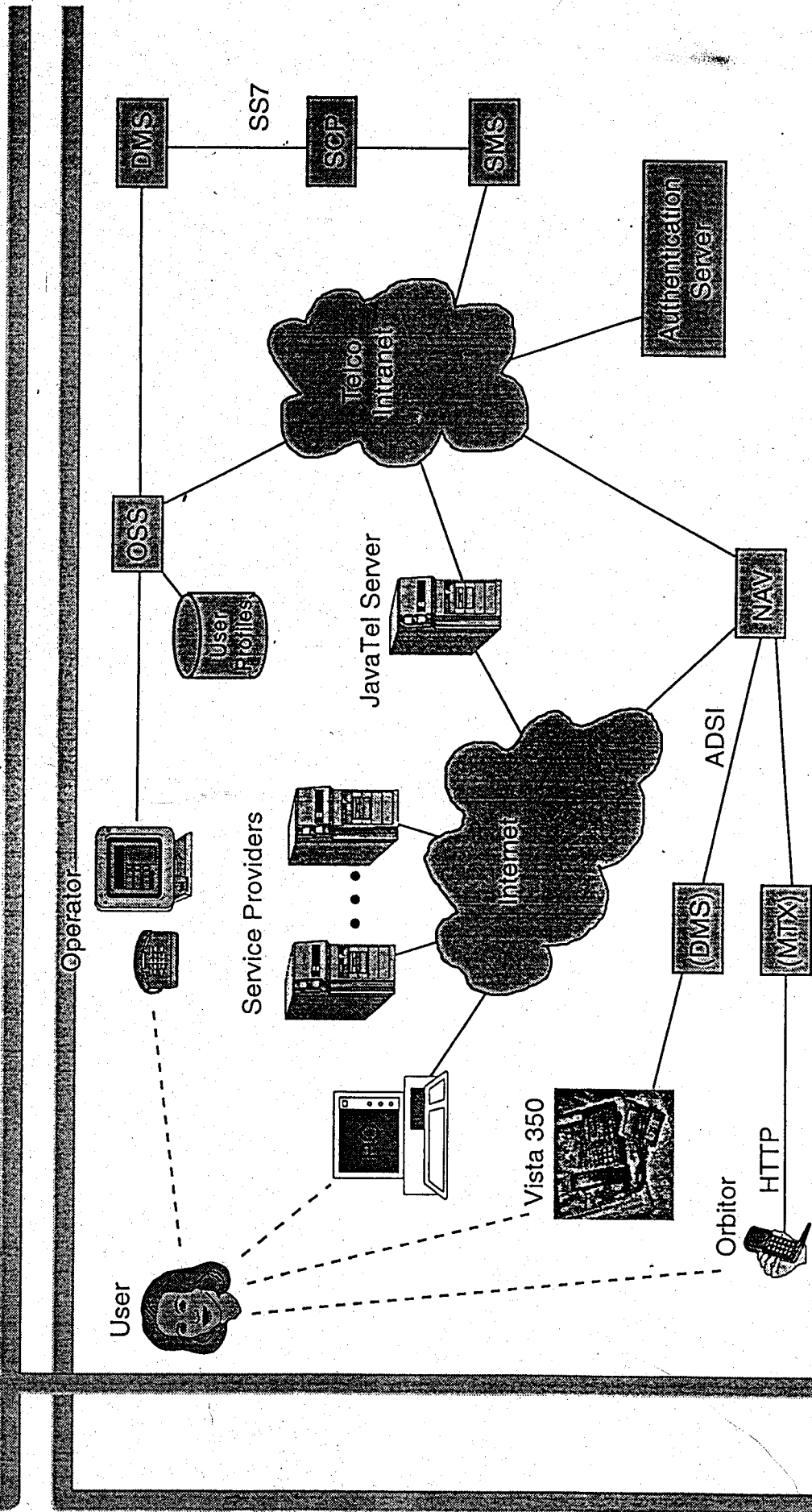
Internet-based Telephone Service Ordering System (ITSOS)



Highlights

- Reuse existing DMS functionality.
- Reuse existing SDM functionality.
- Use commercial software and technology.
- ITSOS opens doors for Java :
 - Additional security measures.
 - Off-loading DMS and ITSOS by client side request processing and validating.
 - Responsive interaction and better user interfaces.

ITSOS -- A JavaTel Server

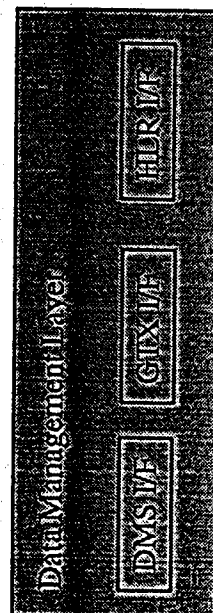
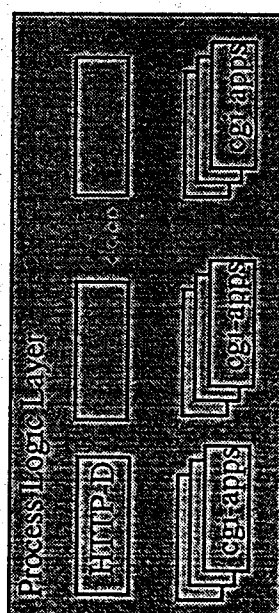
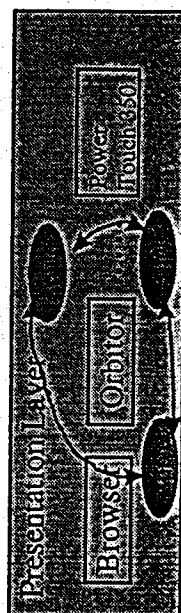


ITSOS Platform

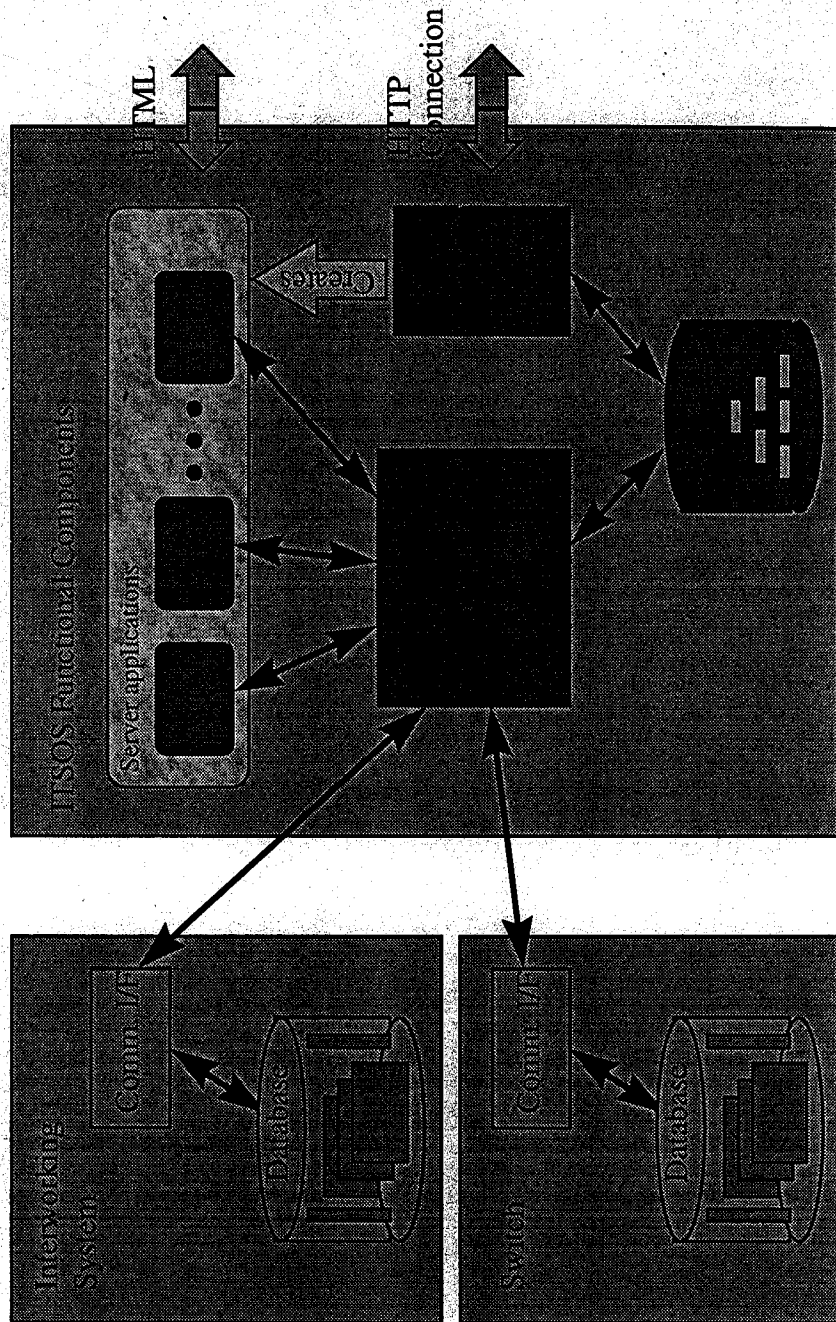
- JavaTel server is a general server platform with interfacing capabilities to the OSS, SMS, and other Telco systems. Nortel should provide such interfacing modules.
- JavaTel has an open API (CGI, HTML and Java). Nortel could provide the server applications for the JavaTel server. More importantly, Telco can develop their own server applications.
- The NAV should be able to speak ADSI to ADSI phones, and the Orbitor version of "HTTP" to Orbitor phones.
- The NAV should be an Java-enabled and allow uploading of applets. This open this application vehicle to new opportunities.
- Access devices, such as Orbitor phones, Vista 500 phones should also be Java-enabled. The JavaTel server can be the Applet Bank for these thin clients.

ITSOS Server Architecture

- Server connected with any *network*
- Access to the Server from any *network*
- Server provides programmability to any *Service Provider* in any *network*
- Applets may establish peer-to-peer communication among themselves, depending on services' needs.

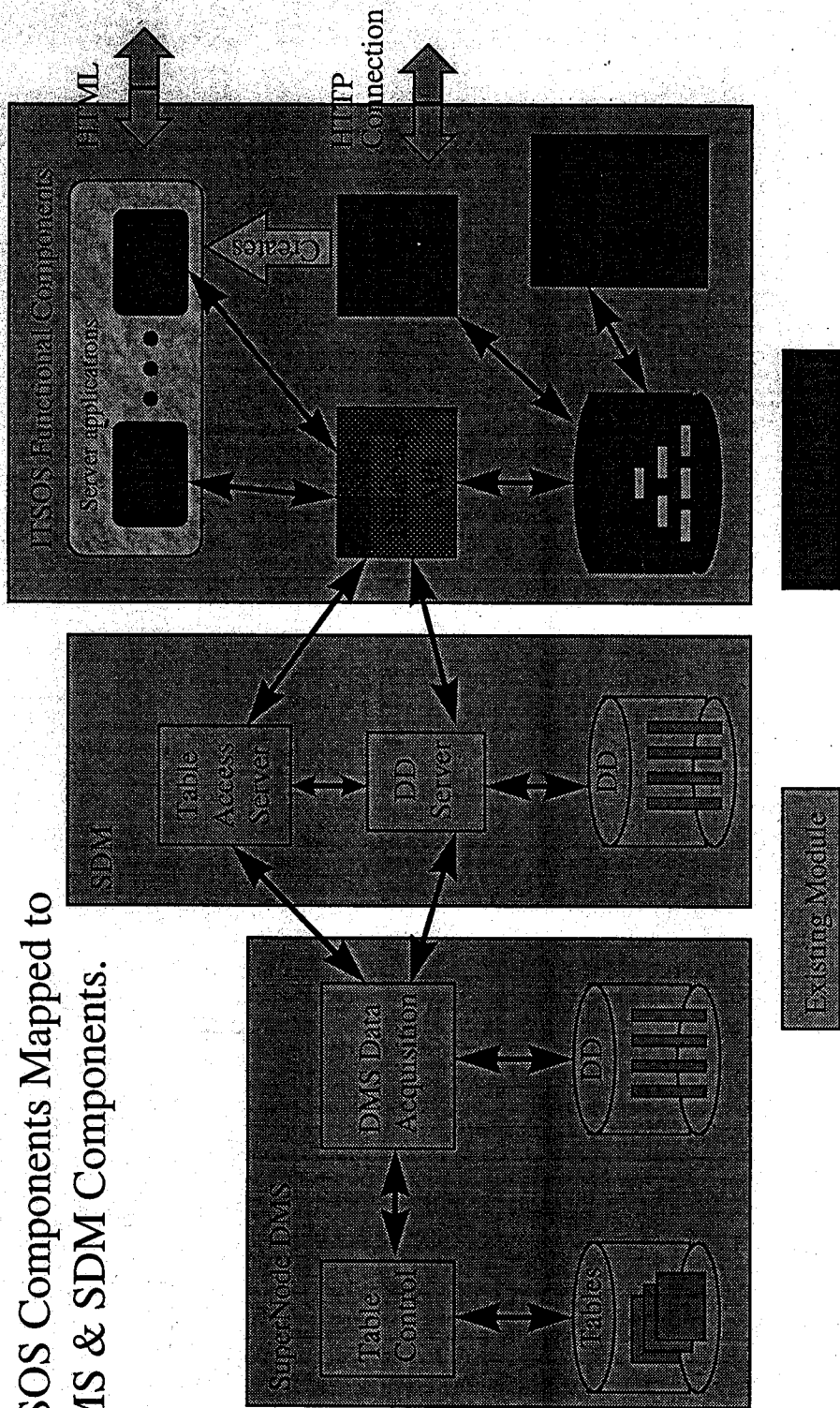


ITSOS Components



Components Mapped to DMS

ITSOS Components Mapped to DMS & SDM Components.



Basic Components and API

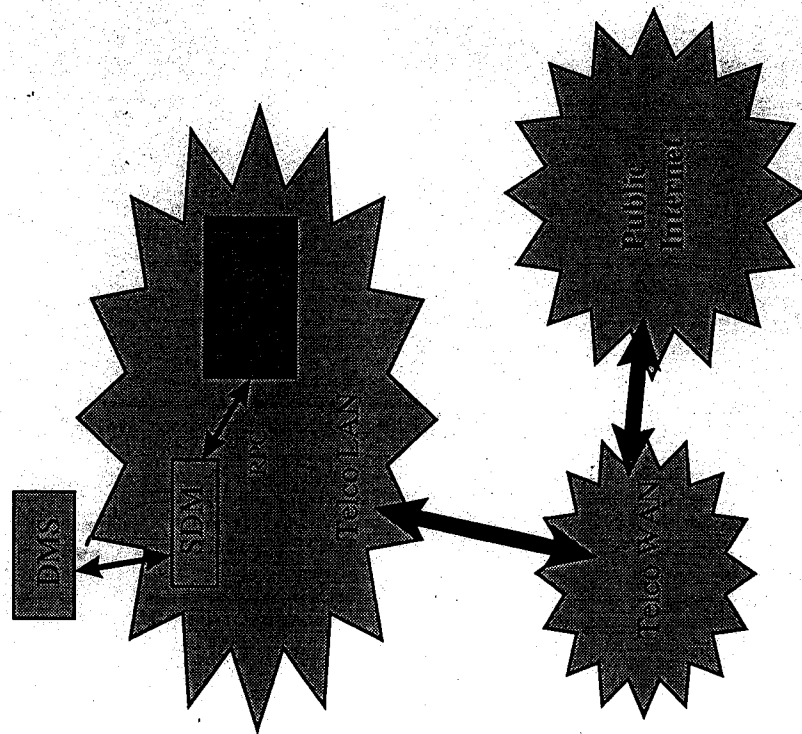
- File system based data manager (directory tree):
 - Data types:
 - » HTML page "templates".
 - » Temporary HTML pages.
 - » Transient data needed for building new pages.
 - » Executable content, e.g. Java™ Applets.
 - » Password, user id, group.
 - Features to Support.
 - » I/F to DD and Table Access servers.
 - » I/F to other components (e.g. billing, log, OM, authentication system, etc.)
 - » Multiple security measures
 - IP address verification
 - Hierarchical directory permission
- Garbage File Collector.
- HTTP Daëmon
 - Use commercial HTTPD software
 - » Constantly evolving, climb industry power curve.
 - » Comply to existing and evolving standard.
 - » Must have good security features.
 - » Current candidates
 - Netscape Commerce server (currently favored server)
 - IBM Internet Connect Secure server
 - Open Market Secure Web server
 - Hardware platform
 - » No particular restriction. (PowerPC, Sparc, SGI, Win-NT, etc.)
 - » PowerPC is favored as it is used by SDM, to make software reuse easy.
- DMS data duplication & synchronization.

ITSOS Server Applications

- Authentication
 - local
 - external/central authentication system, e.g. PIN database.
- Service Order “Services”
- Transaction recording
- Logs
- OMs
- Billing
- Server monitoring

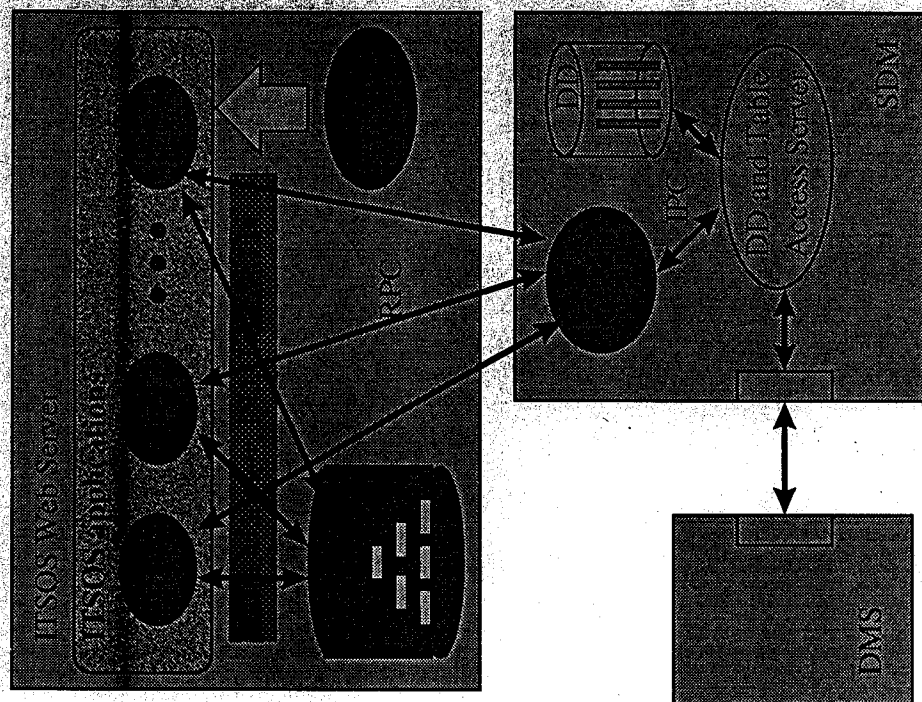
ITSOS Deployed with SDM

- SDM connected to the Telco LAN.
- The ITSOS Web Server can be anywhere in the Telco LAN.
 - RPC protocol required.
- Web browser as an alternate to SDM GUI clients.
 - Access to the ITSOS Web Server anywhere from the Telco WAN.
 - No extra client side software required.
- It is up to the Telco to configure for public access to the ITSOS Web Server.
 - Telco WAN firewall could add another layer of security.



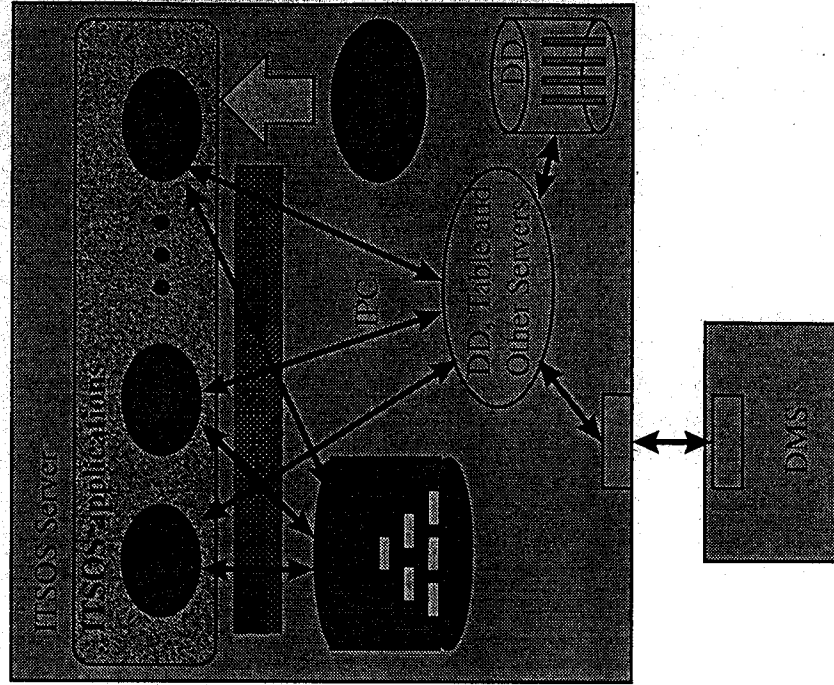
ITSOS Deployed with SDM

- SDM as a pre-condition and bridge between ITSOS web server and DMS.
- An *ITSOS Agent* is needed on the SDM to support RPCs from ITSOS applications.
 - Establish and maintain IPC with DD and Table access processes
 - Apply session control for multiple RPCs from ITSOS applications.
- This configuration can be easily expanded to allow an ITSOS server to support multiple DMS'/SDMs.



Independent ITSOS Deployment

- ITSOS as an independent product.
- ITSOS interface with DD, Table Access, and other components through IPC.
- Directory service required by option (1) and (2) to map user-provided phone number to ITSOS/SDM.

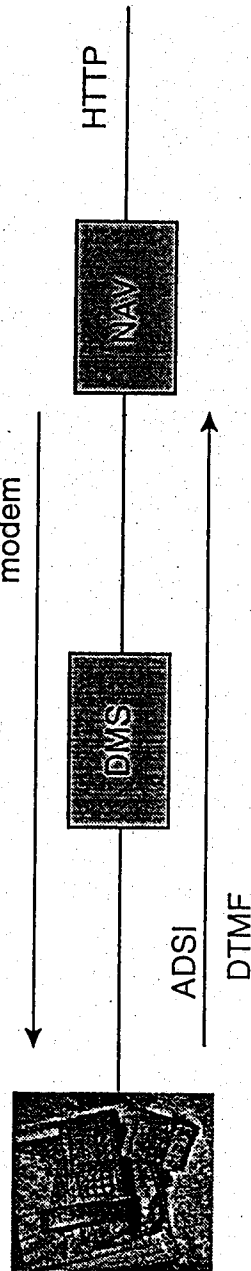


– Master page at HTTP:
[//www.bell.ca/ServOrd/](http://www.bell.ca/ServOrd/)

Accessing ITSOS Services

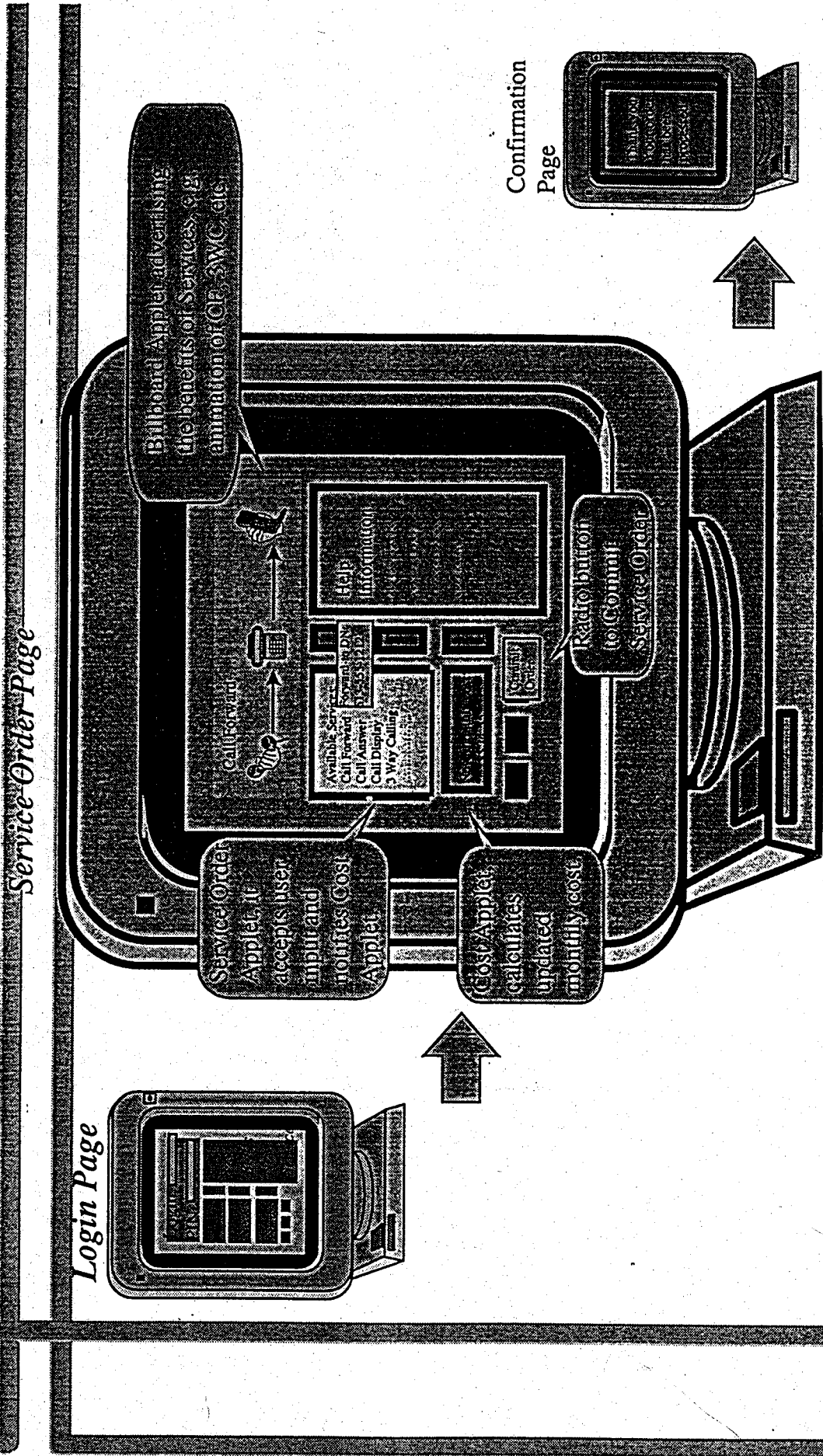
■ Using a Web browser running on:

- a workstation,
- a Cornerstone set-top box,
- an Orbitor, or
- a NAV driving a Vista/PowerTouch 350 using ADSI:

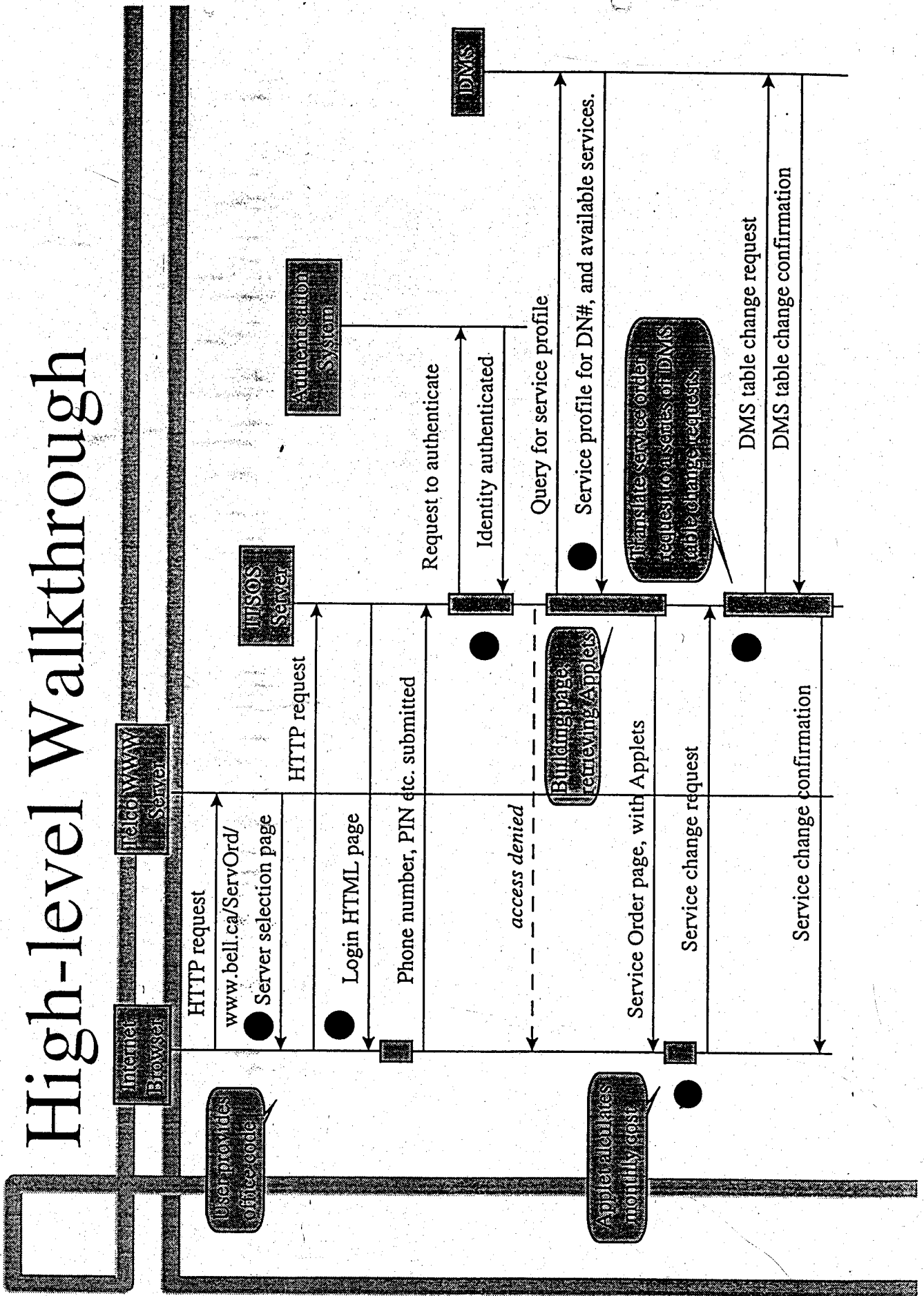


- Note that the NAV is both an HTTP client and server
- Screen and bandwidth characteristics influence page formatting and may require adaptation by browser

Client Side UI Scenario



High-level Walkthrough

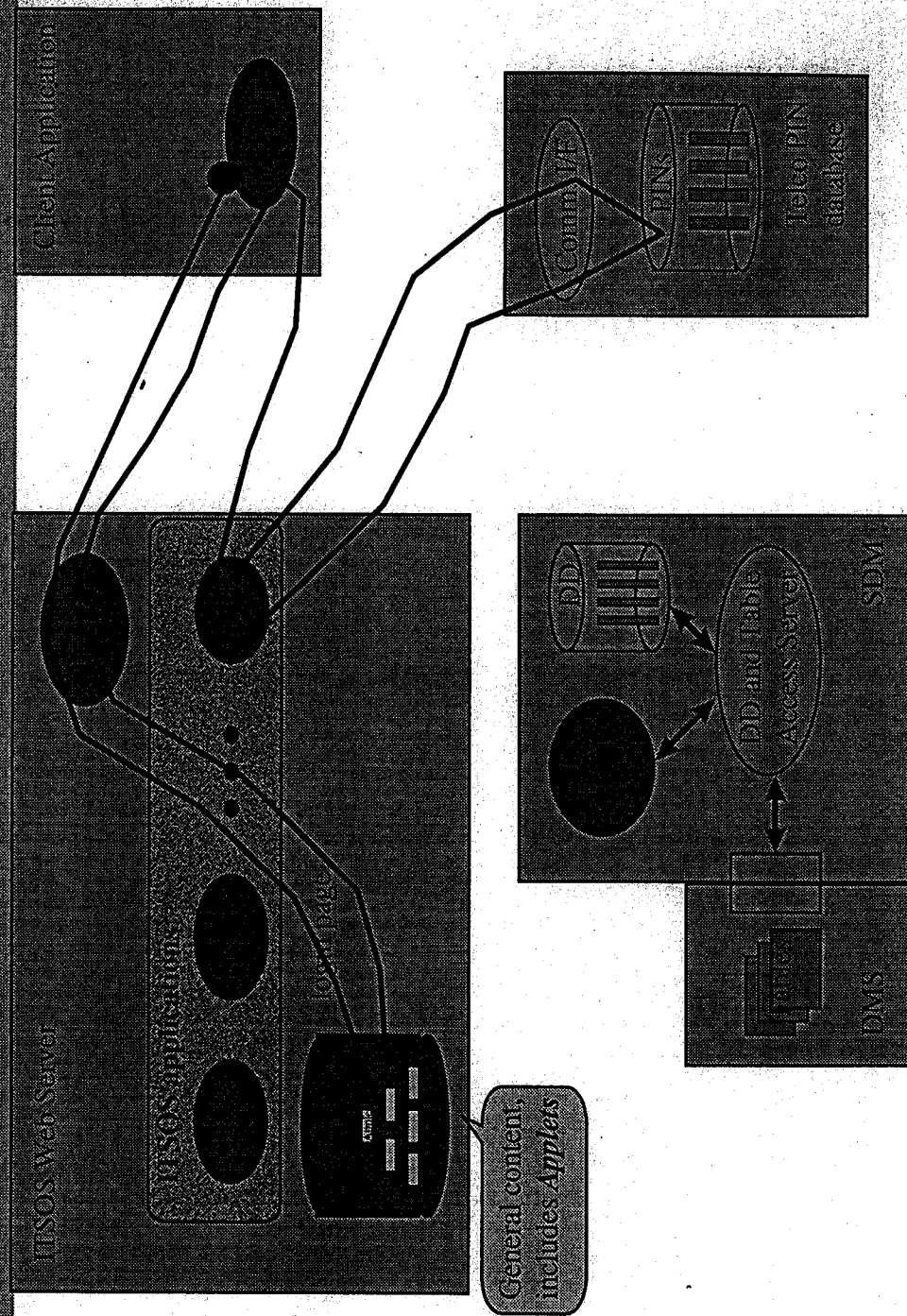


High-level Walkthrough (con't)

- To order a service using ITSOS, a telephone subscriber load his/her Telco's Service Order page. This page shall provide the Universal Resource Locators (URLs) of ITSOS'. The subscriber can locate the ITSOS which is serving his phone line. One way of locating the serving switch is by specifying the office code of that switch.
- The subscriber shall then select the appropriate ITSOS URL. The ITSOS first presents the "Login HTML Page". This page asks the subscriber to provide his phone number and a PIN number.
- When ITSOS receives the phone number and PIN, it performs authentication procedure. If the system is configured to use an external authentication system, ITSOS will request that system to do it and wait for answer. If the authentication fails, an "Access Denied" HTML page will be returned.
- If the user's identity is successfully authenticated, ITSOS will query the switch for this subscriber's service profile, and other available services for this subscriber's line type.
- When ITSOS receives the data from the switch, an application will be fired up to build a customized Service Order page. The content of this page is virtually unlimited. Typically it includes the subscriber's current service profile, other available services, an Applet which will react to user selection and calculates monthly cost etc. An area on this page can be used for advertising new telephone services. With the help of Java Applets, such ads can be very educational and attractive.
- When the subscriber submits his service order request, ITSOS fires up an application to translate the request to a series of DMS table change requests. These requests will be sent to DMS for processing. When confirmations of table changes have been received, a confirmation will be sent to the subscriber's browser. The confirmation could also be through an email or other means.

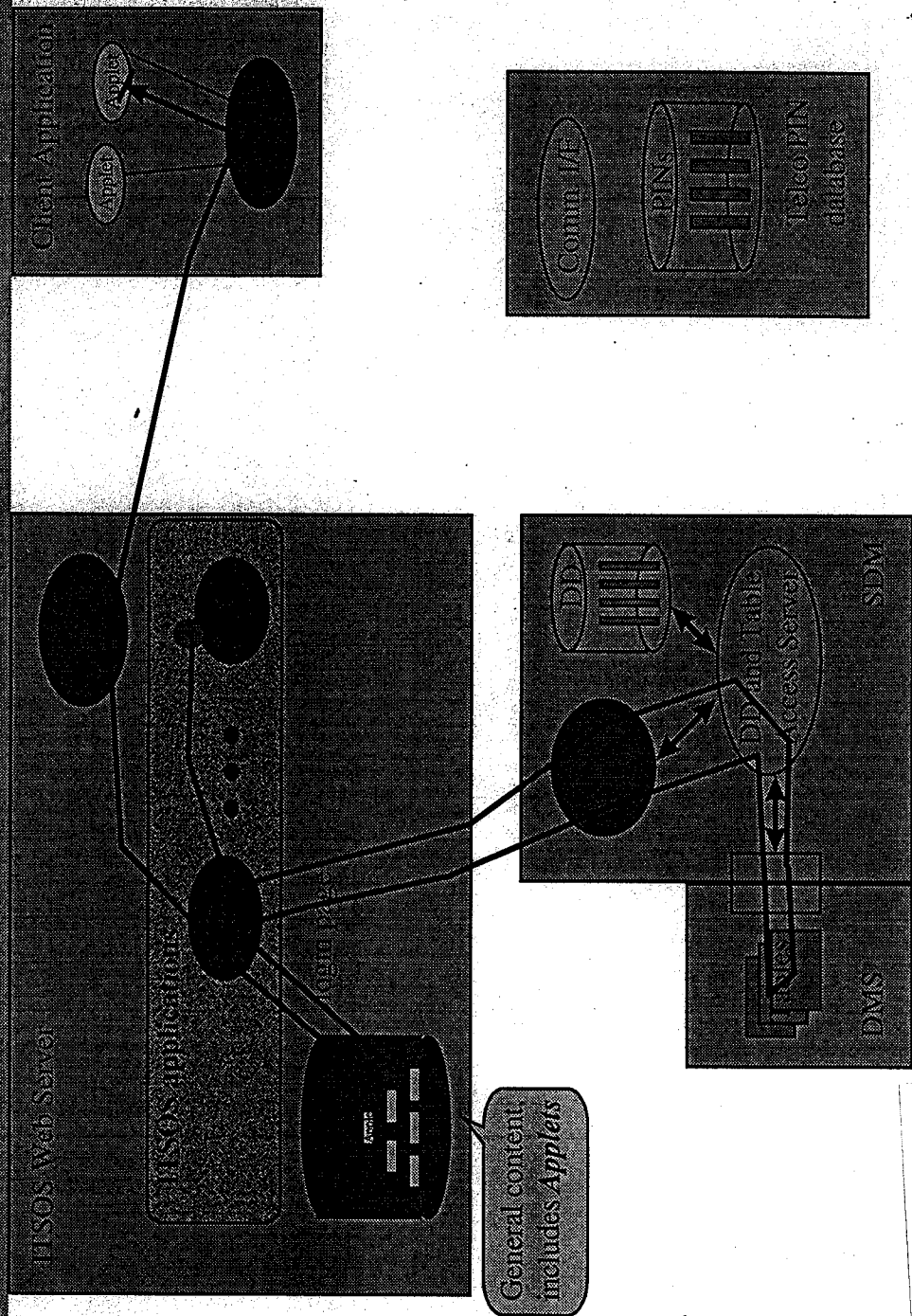
Detailed Walkthrough - 1

Authentication procedures



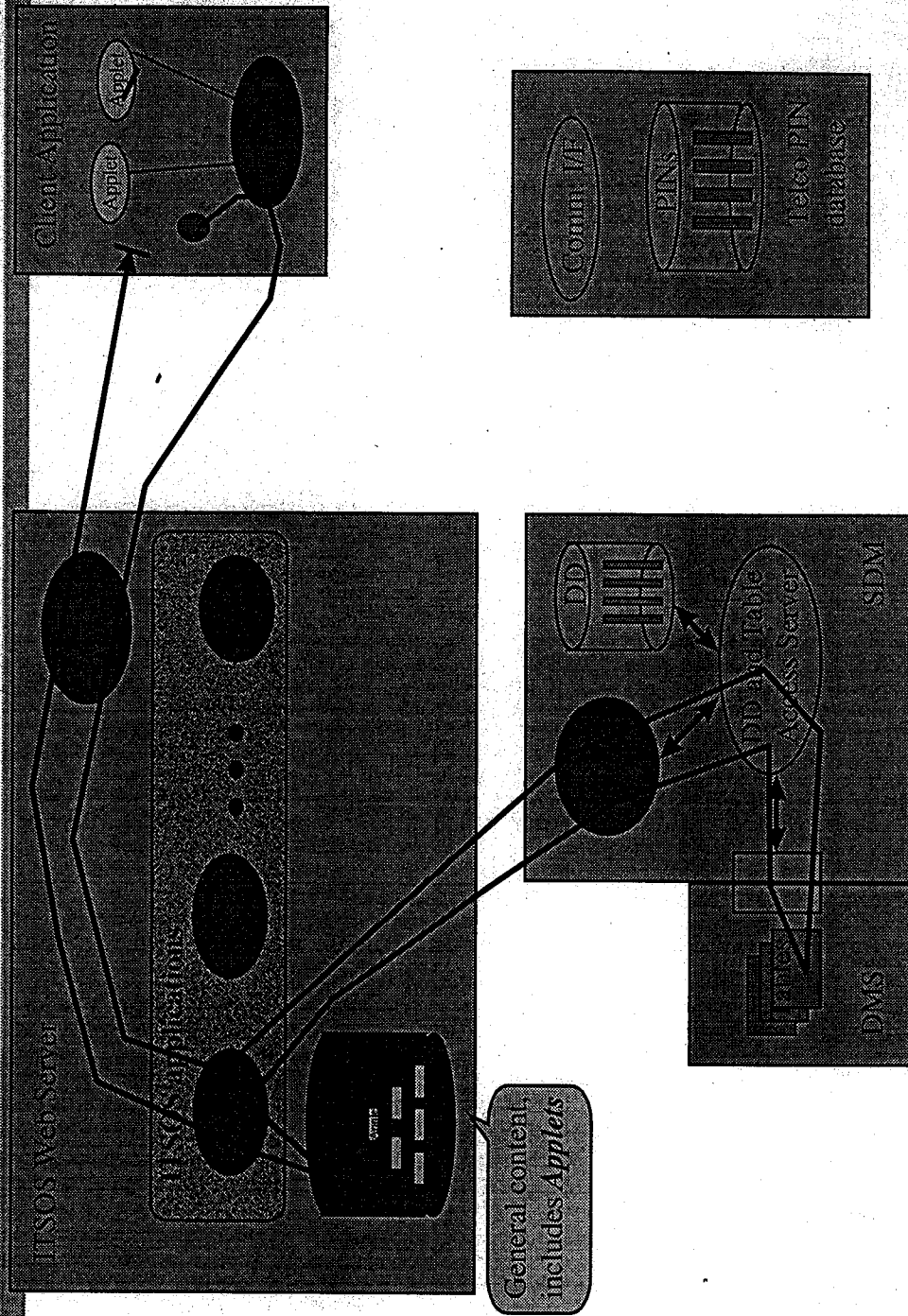
Detailed Walkthrough - 2

Building Service Order HTML Page



Detailed Walkthrough - 3

Service Order Request Processing



Detailed Walkthrough

● Authentication Walkthrough:

- User sends an http request to the server, the server retrieves the "Login Page" from the "File System" to send it to the user;
- User submit userid and PIN number;
- The HTTP Daemon on ITSOS receives the request and fires up the "Authentication" application;
- The Authentication application is programmed to consult an external authentication database, for example the Telco's Calling Card PIN number database for verification;
- The authentication system returns the result of authentication.

● Service Order page generation Walkthrough:

- If authentication result is positive, the "Service Order" application is fired up to generate the Service Order HTML page;
- The Service Order app first query the DMS data tables by going through the ITSOS Agent on SDM and DMS Table Control facility;
- Service Order app receives the this subscriber's service profile and available services, and starts to build a customized html page for this subscriber. This page is generated based a html templates in the ITSOS Database. This page may include various Applets and html entities for user interaction;

● Service Order request processing:

- When the subscriber commits his order, the http server will fire up the "Request Processing" application, which will translate the request to a series of table change request and send them to DMS for processing.
- Confirmation is sent back to the subscriber.

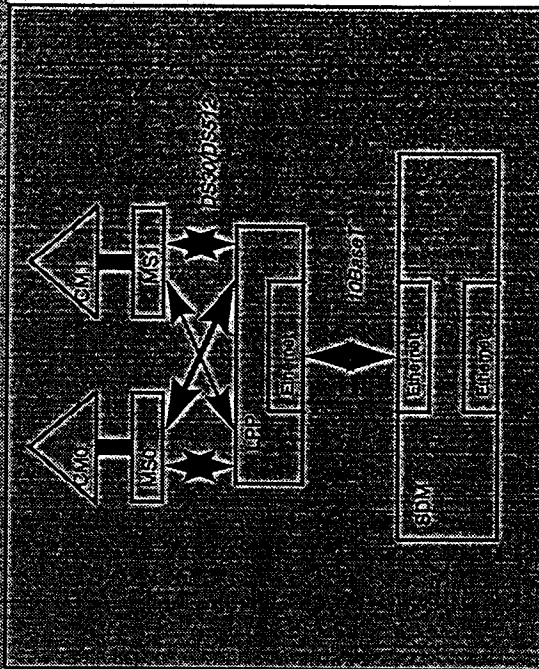
Key Issues

- SDM software and hardware reuse
- Lab setup
- Testing environment, involves DMS

Next Steps

- Purchase server software, set up server and development environment.
- Ensure SDM software availability and reusability.
- Set up ITSOS lab.
- Emulate DMS interface for testing?
- Sample ITSOS services requirements and design
- Project plan (milestones and dates)

Data Link to DMS

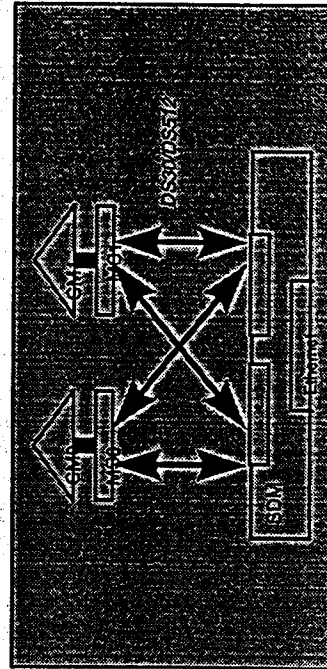


Existing link

- Ethernet Interface Card (EIU) in LPP/FLIS.
- DS30/DS512 between LPP and Message Switch (MS).
- LPP hosts multi-applications, it can be very slow.

New link card

- DS30/DS512 connects directly to Message Switches.
- ITSOS Server has to support DMS native protocol.
- Much Faster than EIU.
- Hardware: the link card being developed by SDM.
- Available 4Q96.



DMS Data Acquisition Process

■ Make DMS table available to ITSOS server

- Initial downloading of Data Dictionary
- Asynchronous notification of Data Dictionary changes
- Register/Re-register for asynchronous notification of a given set of tables, limited notification of table changes
- On demand read, creation, deletion and modification of a tuple
- On demand field validation
- Table security by a lock manager

■ Limitations

- Side-effect of table changes not notified
- Format aspect types not downloaded to ITSOS server

SDM Server Processes

■ Data Dictionary Manager:

- Establish & maintain TCP/IP connections to the DMS Data Acquisition system.
- Retrieve DMS Data Dictionary and store it on the server.
- Synchronize between the DMS DD and Server DD by handling asynchronous notifications.
- Apply session control for multiple clients.

■ Table Access API

- Establish & maintain TCP/IP connections to the DMS Data Acquisition system.
- Apply session control so as to communicate with multiple ITSOS applications.
- Provide asynchronous notification link status changes and table data changes.

After a few discussions, the following tags are defined to describe a customer profile:

APPENDIX 3

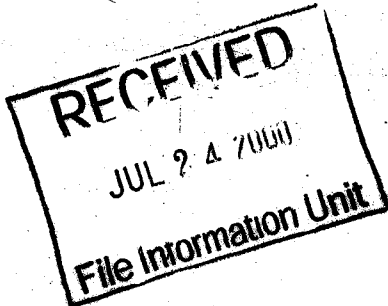
```
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  <DN>directory_number
    <FEATTURE>feature_name
      <PARAMETER>parameter_value</PARAMETER>
      <PARAMETER>parameter_value
        <ACTUATOR>actuator_identifier</ACTUATOR>
      </PARAMETER>
      <ACTUATOR>actuator_identifier</ACTUATOR>
    </FEATTURE>
    <ACTUATOR>actuator_identifier</ACTUATOR>
  </DN>
  <FEATURE>feature_name
    <PARAMETER>parameter_value</PARAMETER>
    <PARAMETER>parameter_value
      <ACTUATOR>actuator_identifier</ACTUATOR>
    </PARAMETER>
    <ACTUATOR>actuator_identifier</ACTUATOR>
  </FEATURE>
</TERMINAL>

<AVAILABLE>
  <FEATURE>feature_name
    <PARAMETER>parameter_value</PARAMETER>
    <PARAMETER>parameter_value
      <ACTUATOR>actuator_identifier</ACTUATOR>
    </PARAMETER>
    <ACTUATOR>actuator_identifier</ACTUATOR>
  </FEATURE>
</AVAILABLE>
```

These tags are defined following the SGML fashion. The above basically describes an implicit SGML Document Type Definition (DTD), and it has a set of rules as follows:

1. A profile must have at least one TERMINAL or DN entity, all the others are optional.
2. The AVAILABLE entity is included in the document.
3. The following elements must be non-empty and immediately following its corresponding tag: terminal_type_Identifier, directory_number, feature_name, parameter_value, actuator_identifier.
4. Taged fields in the AVAILABLE entity can be any non-empty strings, for example, you can use npa-nxx-xxxx for any DN parameters.

REQUEST FOR ACCESS OF ABANDONED APPLICATION UNDER 37 CFR 1.14(a)



In re Application of

Application Number

Filed

60028760

OCT 23 '96

Group Art Unit

Examiner

Paper No. 2

Assistant Commissioner for Patents ,
Washington, DC 20231

I hereby request access under 37 CFR 1.14(a)(3)(iv) to the application file record of the above-identified ABANDONED application, which is: (CHECK ONE)

☐ (A) referred to in United States Patent Number 6031904, column _____,

☐ (B) referred to in an application that is open to public inspection as set forth in 37 CFR 1.11, i.e., Application No. _____, filed _____, on page _____ of paper number _____,

☐ (C) an application that claims the benefit of the filing date of an application that is open to public inspection, i.e., Application No. _____, filed _____, or

☐ (D) an application in which the applicant has filed an authorization to lay open the complete application to the public.

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Application Number

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Filed

10-23-96

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United States Patent Application Publication No. _____, page, _____ line _____,

United States Patent Number 603/909, column _____, line, _____ or

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Henry H. Webb
Typed or printed name

Registration Number, if applicable

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Telephone Number

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In re Application of

Application Number

Filed

60/028,760

Oct, 23, 1996

Paper No. 04

I hereby request access under 37 CFR 1.14(a)(1)(iv) to the application file record of the above-identified ABANDONED application, which is not within the file jacket of a pending Continued Prosecution Application (CPA) (37 CFR 1.53(d)) and which is identified in, or to which a benefit is claimed, in the following document (as shown in the attachment):

United States Patent Application Publication No. _____, page, _____ line _____,

United States Patent Number 6031904, column _____, line, _____,

WIPO Pub. No. _____, page _____, line _____.

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Alexander Nalbert
Signature
Alexander Nalbert
Typed of printed name

Registration Number, if applicable

703901 9790
Telephone Number

1/27/2011
Date

Approved by:

JAN 27 2011

(initials)

Unit:

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Application Number

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Filed

10, 23, 96

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United States Patent Number 6031,904, column _____, line, _____,

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United States Patent [19]
An et al.

[11] Patent Number: 6,031,904
[45] Date of Patent: Feb. 29, 2000

[54] SERVICE ORDER MECHANISM FOR
TELEPHONE SUBSCRIBER

[75] Inventors: Yafan An, Plano, Tex.; Eric Bierman,
Ottawa; Michael A. Kelly, Kinburn,
both of Canada

[73] Assignee: Nortel Networks Corporation,
Montreal, Canada

[21] Appl. No.: 08/878,966
[22] Filed: Jun. 19, 1997

Related U.S. Application Data

[60] Provisional application No. 60/028,760, Oct. 23, 1996.

[51] Int. Cl.⁷ H04M 3/42

[52] U.S. Cl. 379/201, 379/93.12; 379/93.23;
370/352; 370/466

[58] Field of Search 379/201, 114,
379/115, 93.12, 93.23, 265, 142; 370/352,
401, 466, 467, 465

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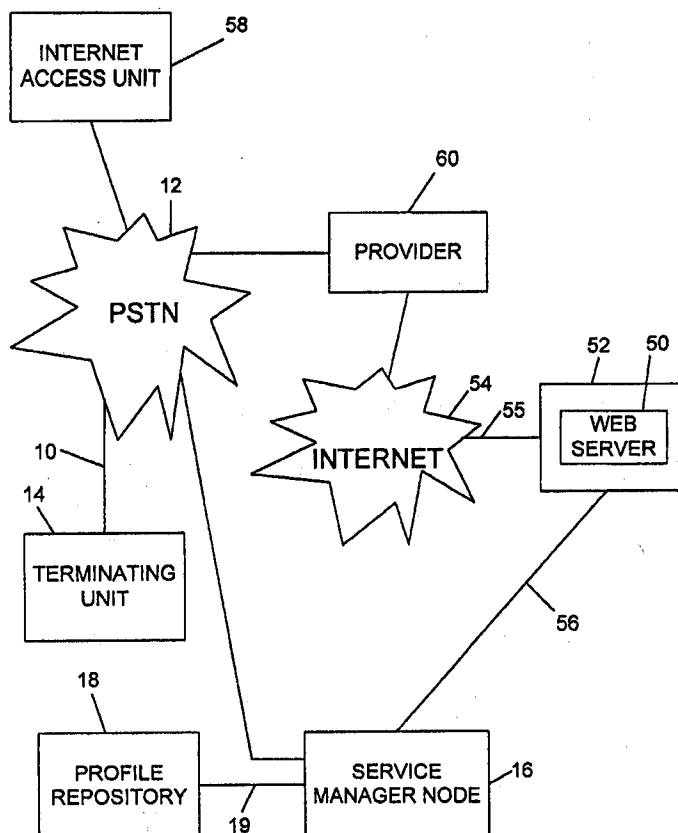
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Primary Examiner—Scott Wolinsky

[57] ABSTRACT

A system and method for allowing telephone subscribers to update over the Internet the features which are active on the telephone. A server on the Internet is connected to a profile repository which determines which features are active on each subscriber line. Subscribers with Internet access may access a special home page, and access their feature profile and make additions, deletions etc. to it. This eliminates the need for a human operator to process requests for changing feature profiles.

15 Claims, 16 Drawing Sheets



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APPLICATION NUMBER	TYPE APPL	FILING DATE	SPECIAL HANDLING	GROUP ART UNIT	CLASS	SHEETS OF DRAWING
60/028760	2	10/23/96	0			1/0

TOTAL CLAIMS	INDEPENDENT CLAIMS	SMALL ENTITY?	FILING FEE	FOREIGN LICENSE	ATTORNEY DOCKET NUMBER
		0	150	0	

CONTINUITY DATA

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