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(54) Title: SERVICE CONTROL ARCHITECTURE

(57) Abstract: A system, method and computer program product are provided for affording intention-based, context-sensitive services to mobile users. First provided is a database. Also included is a profiler module coupled to the database. The profiler module is adapted for collecting a state of a user along with profile information. Such profile information includes an identity, location, available services per location, devices per location, and/or security per location. In use, the profiler module communicates the profile information to the database for storage therein.

## **SERVICE CONTROL ARCHITECTURE**

### **RELATED APPLICATIONS**

**[0001]** This application is related to co-pending applications entitled "SERVICE CONTROL FRAMEWORK FOR SEAMLESS TRANSFER OF A MULTIMEDIA CONFERENCE OVER DIFFERENT MEDIA" and "CONTEXT SENSITIVE ADVERTISEMENT DELIVERY FRAMEWORK" which are each invented by Michel K. Bowman-Amuah and filed concurrently herewith under attorney docket numbers 60021-376201 and 60021-376301, respectively, and which are incorporated herein by reference in their entirety for all purposes.

### **FIELD OF THE INVENTION**

**[0002]** The present invention relates to network service control, and more particularly to controlling network resources for enabling advanced services.

### **GENERAL BACKGROUND AND STATE OF THE ART**

#### **INVENTION SUMMARY**

**[0003]** The Internet basically comprises several large computer networks joined together over high-speed data links ranging from ISDN to T1, T3, FDDI, SONET, SMDS, OT1, etc. In simplified fashion the Internet may be viewed as a series of routers connected together with computers connected to the routers. The Information Providers (IPs) constitute the end systems which collect and market the information through their own servers. Access providers are companies such as UUNET, PSI, MCI and SPRINT which transport the information. Such companies market the usage of their networks.

**[0004]** Referring to prior art Figure 1, there is shown a simplified diagram of the Internet and various types of systems typically connected thereto. Generally speaking the Internet consists of Autonomous Systems (AS) type packet data networks which may be owned and operated by Internet Service Providers (ISPs) such as PSI, UUNET, MCI, SPRINT, etc. Three such AS/ISPs are shown in Figure 1 at 110, 112 and 114. The Autonomous Systems (ASs) are linked by Inter-AS Connections 111, 113 and 115. Information Providers (IPs) 116 and 118, such as America Online (AOL) and

Compuserve, are connected to the Internet via high speed lines 120 and 122, such as T1/T3 and the like. Information Providers generally do not have their own Internet based Autonomous Systems but have or use Dial-Up Networks such as SprintNet (X.25), DATAPAC and TYMNET.

**[0005]** By way of current illustration, MCI is both an ISP and an IP, SPRINT is an ISP, and MicroSoft (MSN) is an IP using UUNET as an ISP. Other information providers, such as universities, are indicated in exemplary fashion at 124 and are connected to the AS/ISPs via the same type connections here illustrated as T1 lines 126. Corporate Local Area Networks (LANs), such as those illustrated in 128 and 130, are connected through routers 132 and 134 and high speed data links such as T1 lines 136 and 138. Computers 140 and 142 are representative of computers connected to the Internet via the public switched telephone network (PSTN) and are shown connected to the AS/ISPs via dial up links 144 and 146. As an option, cellular technology may be used to establish such dial up links 144 and 146.

**[0006]** A multitude of services are currently being offered over the Internet. Unfortunately, however, the Internet fails to provide much intelligence for affording advanced service control. Without such intelligence, services over the Internet are often limited.

**[0007]** In sharp contrast, the telephone industry has been developing an enhanced telephone network, sometimes referred to as an Advanced Intelligent Network (AIN), for providing a wide array of new voice grade telephone service features. In an AIN type system, local and/or toll offices of the public telephone network detect one of a number of call processing events identified as AIN "triggers". For ordinary telephone service calls, there would be no event to trigger AIN processing; and the local and toll office switches would function normally and process such calls without referring to the central database for instructions. An office which detects a trigger will suspend call processing, compile a call data message and forward that message via a common channel interoffice signaling (CCIS) link to a database system, such as an Integrated Service Control Point (ISCP) which includes a Multi-Services Application Platform (MSAP) database. If needed, the ISCP can instruct the central office to obtain and forward additional information. Once sufficient information about the call has reached the ISCP, the ISCP accesses its stored data tables in the MSAP database to translate the received message data into a call control message and returns the call control

message to the office of the network via the CCIS link. The network offices then use the call control message to complete the particular call.

**[0008]** In our increasingly mobile society, there is an ever increasing demand for mobile communications which allow a person to roam freely while making and receiving telephone calls from virtually any location. Further, there is a progressing need for advanced Internet services while roaming freely and receiving/making telephone calls from various locations. There is thus a need to incorporate the principles of AIN with next generation networks including the Internet.

**[0009]** A system, method and computer program product are provided for affording intention-based, context-sensitive services to mobile users. First provided is a database. Also included is a profiler module coupled to the database. The profiler module is adapted for collecting a state of a user along with profile information. Such profile information includes an identity, location, available services per location, devices per location, and/or security per location. In use, the profiler module communicates the profile information to the database for storage therein.

**[0010]** Also included is an application module coupled to the database. The application module includes a plurality of application program interfaces for interfacing with a plurality of applications. The application module is adapted for allocating application resources to the applications utilized by a user based on the corresponding profile information stored in the database.

**[0011]** Associated therewith is a network resource module coupled to the database and a plurality of network routers. The network resource module serves for configuring the network routers based on the profile information stored in the database and the application resources allocated to the applications. Also coupled to the database is a presentation module adapted for tailoring an output of the applications based on the profile information.

**[0012]** A policy server is coupled to the database, the application module, the network resource module, and the presentation module for controlling the operation thereof in accordance with policies identified utilizing the profile information.

**[0013]** In one embodiment, services provided by the present system may include Internet Protocol/Virtual Private Network (IP/VPN) services, Third Generation (3G) Wireless services, Voice over Internet Protocol (VoIP) services, and/or Application

Service Provider (ASP) services. Further, the database may include a directory schema. Still yet, the directory schema may include an object-oriented structure. The directory schema may also identify a logical relationship between the user, devices utilized by the user, services associated with the user, and functionality of the services.

**[0014]** In another embodiment, the profile information may include service attributes associated with the user. Such service attributes may indicate a type and/or class of service associated with the user. Still yet, the profiler module may be executed on a portal server for collecting the profile information. In use, the application module may allocate the application resources based on the service attributes collected by the profiler module. As an option, the application module may include JAVA code.

**[0015]** In still yet another embodiment, the application program interfaces of the application module may be adapted to interface a first application with a second application. Further, the network resource module may be written in a scripting language. Still yet, the presentation module may include directory interfaces for interfacing the directory schema, and style sheets executed on a portal server. In use, the presentation module may manage a plurality of presentation views (i.e. fonts, colors, etc.) that are utilized to tailor the output of the applications based on the profile information.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0016]** Prior art Figure 1 shows a simplified diagram of the Internet and various types of systems typically connected thereto.

**[0017]** Figure 2 illustrates a service control architecture environment, in accordance with one embodiment.

**[0018]** Figure 3 illustrates a detailed overview of the service control architecture and the related services associated with each of the modules thereof.

**[0019]** Figure 4 illustrates a method for providing context-sensitive services, in accordance with one embodiment.

**[0020]** Figure 5 illustrates one intelligent network environment in which the service control architecture may be employed, in accordance with one embodiment.

**[0021]** Figure 6 illustrates the manner in which multiple sessions may be administered in the environment of Figure 5.

[0022] Figure 7 illustrates a plurality of exemplary policies associated with various specific devices.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

[0023] Figure 2 illustrates a service control architecture environment 200, in accordance with one embodiment. As shown, a plurality of applications 201 are provided including a unified messaging application 202, instant messaging application 204, PIM Sync application 206, voice portal application 208, and short message service application 210. Of course, any other desired applications may be provided per the desires of the user.

[0024] Further provided is a plurality of devices 211 including computers 212, telephones 214, and mobile devices such as mobile phones 216, personal digital assistants 218 (PDAs), etc. Some of such devices 211 may be coupled via a hub 220. Coupled to the devices 211 is a plurality of access networks 222. The access networks 222 include a Internet Protocol (IP) network 224, an integrated access network 226, personal communication services (PCS) network 228, and a public switched telephone network (PSTN) 230.

[0025] Each of the access networks 222 is in turn coupled to a gateway 232. Also provided is a plurality of application service providers (ASPs) 234, portals 236, and content providers 238 which are coupled to the Internet Protocol (IP) network 224.

[0026] With continuing reference to Figure 2, a plurality of Business Support Systems and Operations Support Systems (OSS/BSS) 240 are included. In particular, the OSS/BSS 240 include a service delivery system 242 coupled to the applications 201 and a service assurance system 244 coupled thereto. The OSS/BSS 240 also include a customer care system 246 and a billing system 248. Each of the OSS/BSS 240 is coupled to a customer self-service system 250.

[0027] Next provided is a service control architecture 260 for providing intention-based, context-sensitive services to mobile users in the context of the service control architecture environment 200. First provided is a database 262. Also included is a profiler module 264 coupled to the database 262. As will become apparent, the profiler module 264 is adapted for collecting a state of a user along with profile information. Such profile information includes an identity, location, available services per location,

devices per location, and/or security per location. In use, the profiler module **264** communicates the profile information to the database **262** for storage therein.

**[0028]** Also included is an application module **266** coupled to the database **262**. The application module **266** includes a plurality of application program interfaces for interfacing with the applications **201** via the database **262**. The application module **266** is adapted for allocating application resources to the applications **201** based on the profile information stored in the database **262** in a manner that will be set forth hereinafter in greater detail.

**[0029]** Associated therewith is a network resource module **268** coupled to the database **262** and a plurality of network routers (not shown). The network resource module **268** serves for configuring the network routers based on the profile information stored in the database **262** and the application resources allocated to the applications **201**. Also coupled to the database **262** is a presentation module **270** which is in turn coupled to the applications **201**. In use, the presentation module **270** is adapted for tailoring an output of the applications **201** based on the profile information.

**[0030]** Coupled to the billing system **248** of the OSS/BSS **240** and the database **262** is a service event collection platform **271** for tracking various events in the service control architecture environment **200** via the database **262**. Such events may then be aggregated, correlated, etc. for transmission to the billing system **248** for billing purposes. Also provided is an integration server **272**.

**[0031]** A policy server **274** is coupled to the database **262** and a Signal System 7 (SS7) network **276**, the application module **266**, the network resource module **268**, and the presentation module **270** for controlling the operation thereof in accordance with policies identified utilizing the profile information.

**[0032]** The service control architecture **260** thus communicates with the OSS/BSS **240**, the access networks **222** and the devices **211** via the gateway **232**. Further, the service control architecture **260** communicates with the applications **201** via the presentation controller **270**, and the billing system **240** via the service event collection platform **271**. By this design, the service control architecture **260** serves as a hub for the service control architecture environment **200** for providing Artificial Intelligent Networks (AIN)-like capabilities in an environment including a wide range of networks **222** and devices **211**.

**[0033]** Figure 3 illustrates a detailed overview **300** of the service control architecture **260** and the related services associated with each of the modules thereof. Each of such modules is coupled to a plurality of users **302** utilizing the devices **211** of Figure 2. In one embodiment, the database **262** is codified based on JAVA and/or JNDI. The database **262** provides a common data model that represents the logical relationship and data hierarchy between the users **302** and his/her services, devices and the features and functionality associated with such services. In use, the database **262** may be used to manage a user's Quality of Service (QoS), personalization and security on a per-service basis.

**[0034]** The profiler module **264** may include a user profiler **264** and a service profiler **264a**. The profiler module **264** is adapted for collecting a state of a user along with profile information. Such profile information includes an identity, location, available services per location, devices per location, and/or security per location. The profile information may further include presentation customization for a particular user. In one embodiment, the profiler module **264** includes a data entry I/O front end application written using JAVA code. As an option, the profiler module **264** may run on a portal server (i.e. iPlanet™, etc.) that collects information and stores the same in the database **262**.

**[0035]** As mentioned earlier, associated with the profiler module **264** is a service profiler **264a**. The service profiler **264a** is adapted for evaluating input and updating service attributes for a type of service [i.e. IP telephony (voice, fax over IP, etc.); IP/VPN unified messaging; calendaring; etc.] and a class of service (i.e. platinum, gold, silver, etc.). Table 1 illustrates a plurality of types of services, while Table 2 sets forth various classes of services.

Table 1

Conversational: (Bi-directional communication Two Parties)	Messaging Content Broadcast (Uni-directional) ASP Application Service Provider CAC (Conferencing & Collaboration) TAG (Text & Graphics)
Converse:	Telephone, Video, Instant Messaging
Message:	Voice Msg, Text Msg, VideoMsg, Graphics (Uni-directional)



Content Broadcast: Point to Multipoint, Unicast

ASP:	Client Server Application (Bi-directional Computing)
CAC:	Voice, Video, White boarding – Net Meeting type app. (Min 3 Participants – Bi-Directional)
TAG:	Text and Graphics (E-Mail apps)

Table 2

Example :	Platinum, Gold, Silver, and Bronze etc.
Quantitative:	(Bandwidth amount and type, Security on or off)
Qualitative:	Latency, Dropped packets, Min, Max and Sustained rate, Jitter etc.

**[0036]** Service attributes may be used to define application and network resources required per service type and class of service. In use, the profiler module **264** and the service profiler **264a** communicate the user and service profile information to the database **262** for storage therein.

**[0037]** The application module **266** includes a plurality of application program interfaces for interfacing with the applications **201** via the database **262**. The application module **266** may be written using JAVA (JNDI)-based code that allocates application resources using the application program interfaces. Table 3 illustrates examples of application specific interfaces that may be associated with the application module **266**.

Table 3

- iCal to communicate with calendaring;
- iMAP, MIME, SMTP, POP, to communicate with mail;
- TAPI to communicate with computer telephony applications;
- XML to communicate with XML data sources; and
- VXML for voice XML.

[0038] The application module **266** is thus adapted for allocating application resources to the applications **201** based on the profile information (i.e. the service attributes, etc.) stored in the database **262** in a manner that will be set forth hereinafter in greater detail.

[0039] The network resource module **268** may include a Nortel® scripting language on a Shasta® platform. In use, the network resource module **268** communicates with network routers to configure parameters aligned to the profile information stored in the database **262** and the application resources allocated to the applications **201**. It should be noted that the network resource module **268** is further capable of implementing and enforcing the service policies to which the user has subscribed. Still yet, the network resource module **268** can dynamically allocate bandwidth based on the stored profile information.

[0040] The presentation module **270** may optionally include Java (J2EE) code with directory APIs as well as HTML and XML style sheets running on a server (i.e. iPlanet™ server, regular server, etc.). By managing channels of content and views of presentation that a user has profiled in the directory, the presentation module **270** is adapted for tailoring an output of the applications **201** based on the profile information. In particular, the presentation module **270** may be utilized to implement requests made by the user such as content channel requests (i.e. sports, stocks, news, etc.) or views (color, fonts, etc.).

[0041] Table 4 illustrates a matrix of managed attributes and exemplary implementation details associated with the application module **266**, network resource module **268**, and presentation module **270** for specifically enhancing Quality of Service, security, and personalization.

Table 4

	<b>QoS</b>	<b>Security</b>	<b>Personalization</b>
<b>Network</b>	1. -Bandwidth -Latency -Jitter -Traffic Shaping -Traffic Prioritization  2. -Orchestream® -Allot Communications® -Preside® Policy Server	3. -Access Control Lists -Firewalls -Proxy Servers -Logging  4. -iPlanet® Directory Access Router -Narus® – SECP for logging	5. -Time-Of-Day Routing -Bandwidth-On-Demand  6. -Policy Server development effort
<b>Application</b>	7. -CPU -Disk Space -User Priority -Server Optimization &	9. Authentication/PKI -Session Security -Encryption	11. -Look & Feel

	<p>Tuning -Transaction Performance</p> <p>8. -CompuWare® -SUN® -Halcyon® -DirecTools® -iPlanet® APPServer Console</p>	<p>-User Administration</p> <p>10.-iPlanet® Portal Server - iPlanet® Certificate Management System -enTrust® getAccess</p>	<p>12. - Halcyon® - iPlanet® APPServer Console -Custom Application programming</p>
<p><b>Presentation</b></p>	<p>-Esual® -iPlanet® Wireless -WOKUP® -OpenWave®</p>	<p>13. Registration/Identification -Single Sign-on</p> <p>14. -iPlanet® Portal Server -Netegrity® SiteMinder®</p>	<p>15. -Customized channel -Personalized content -Look &amp; Feel</p> <p>16.-iPlanet® Portal Server -iPlanet® Wireless Portal</p>

[0042] The policy server 274 includes a service logic execution program (i.e. JAVA-based) that executes the policies associated with each individual service. In one exemplary implementation, the policy server 274 may be executed in two parts: 1) Shasta® box for network resource module 268 and 2) iPlanet® for application and presentation modules 266 and 270. In use, service control by the policy server 274 provides quality of service (QoS) and class of service (CoS); personalization and contextualization; and security through use of a user-defined policy; a directory; and authentication, authorization, and access control; respectively.

[0043] Figure 4 illustrates a method 400 for providing context-sensitive services, in accordance with one embodiment. As shown, the database 262 is maintained in operation 402. Next, in operation 404, a state of a user is identified along with profile information. Such profile information is then communicated to the database 262 for storage therein, as indicated in operation 406.

[0044] Application resources may then be allocated to the applications based on the profile information stored in the database 262. Note operation 408. Thereafter, in operation 410, a plurality of network routers may then be configured based on the profile information stored in the database and the application resources allocated to the applications. An output of the applications is then tailored based on the profile information, as indicated in operation 412. During use, the collecting, communicating, allocating, configuring, and tailoring operations may be controlled in accordance with policies identified utilizing the profile information. See operation 414.

**[0045]** The service control architecture **260** is thus tightly integrated with network elements to provide intentions-based, context-sensitive services to mobile devices and users. By this design, the service control architecture **260** affords ubiquitous connectivity and data accessibility to enable the transfer of a single application session across varying access methods, and applications. The need for the aggregation of various wireless/wireline technologies and information is thus fulfilled to enable intelligent services.

**[0046]** Examples of enabled services include location-based services that open new content delivery possibilities [i.e. voice, audio, video(moving video), fax, static text and graphics (STAG)] while providing customers with increased levels of personalization (i.e. security level, features, bundles, language). Further provided is a personal services environment that enables personalization of services via user preferences and service profiles. Policy-based delivery provides intelligent, policy-driven delivery of services, while session control provides the ability to transfer a user's active session across devices, QoS boundaries, and physical locations.

**[0047]** In one embodiment, conventional services are provided and enhanced by the service control architecture **260**. For example, such services may include Internet Protocol/Virtual Private Network (IP/VPN) services, Third Generation (3G) Wireless services, Voice over Internet Protocol (VoIP) services, and/or Application Service Provider (ASP) services. More information regarding such services and the manner in which they are improved by the service control architecture **260** will now be set forth.

**[0048]** Virtual Private Networks (VPNs) typically provide connectivity deployed on a shared infrastructure with the same Quality of Service (QoS), security, and policies as a private network. IP/VPN extends these VPN capabilities to networks based on Internet protocol (IP). Personalization and self-service may be provided in IP/VPN services via the service control architecture **260** through use of portals, policies, and directories. Further, quality of service (QoS) is provided via the integration of network elements using the network resource module **268**. This may be accomplished, for example, by dynamically allocating bandwidth based on a user's profile. Still yet, the service control architecture **260** controls the security policy and delivers authentication, access control, data integrity, and encryption.

**[0049]** ASPs traditionally host, deploy, and manage a software application service in a rental model for multiple customers. Application Infrastructure Providers (AIPs) deploy

and manage the infrastructure and hosting services to ASPs and independent software vendors. In the context of the service control architecture **260**, a personal services environment is delivered for customer self-service, activation, & control. The service control architecture **260** manages session control by transferring a user's active application session across terminal types and QoS boundaries. Further, the collection platform **271** tracks service delivery events, where such information may be used by BSS/OSS **240** (i.e. Billing, service level agreement (SLA) management, etc.). Further, the service control architecture **260** provides single sign-on across subscribed services.

**[0050]** Unified communications conventionally act as a "hub" for various types of messages and communications technologies. Such communications bring together e-mail, instant messaging, short message service, paging, voicemail, multimedia and fax into a single user interface. Services delivered are typically independent of device type, location, and communications medium. In such environment, the service control architecture **260** provides a single point of access to various message types (i.e. voice, text, fax, streaming video, etc.) Further, all messages may be accessed and read from a single interface, while such messages are prioritized based on user defined criteria. Still yet, the service control architecture **260** serves to prevent unauthorized access, use, and hacking/misuse of a system, while determining and managing the device (i.e. PDA, PC, etc.) and connection type (i.e. DSL, mobile digital, etc.) accessing the messages.

**[0051]** Wireless technology traditionally involves cellular telephones which are primarily intended for speech and not particularly good for delivering data. Enhancements to existing 2nd generation systems have allowed data to be carried more easily and at higher rates. The next generation of cellular telephony (3G) has been designed to carry packet data. The service control architecture **260** forms the basis for separating the signaling and control of applications and services from the delivery channel. Further, QoS assurance is provided along with network resource management and adoption, context-sensitive applications, and service and information delivery services. The service control architecture **260** allows full exploitation of high data rates, a packet data transport medium, device-specific features and network capabilities. Multimedia traffic is supported over a packet network and high data rates are ensured for next generation wireless services.

**[0052]** Figure 5 illustrates one intelligent network environment **500** in which the service control architecture **260** may be employed, in accordance with one embodiment. As shown, the service control architecture **260** may be coupled to a content/media manager **502**, a gateway/translation manager **504**, and a route/topology manager **506**. The content/media manager **502** and the route/topology manager **506** are in turn coupled to network elements **508** (i.e. routers) which are in turn coupled to a network **510**, i.e. the Internet.

**[0053]** Coupled to the network elements **508** is the policy server **274** and database **262** which are capable of communicating via Common Open Policy Service Protocol (COPS) or any other desired protocol. Also coupled to the network elements **508** is a plurality of the devices **211**. As an option, the access devices may be equipped with plug-ins **512**. The service control architecture **260** thus provides the backbone of the intelligent network environment **500** by acting as the controller of the execution architecture that enables dynamic management and control of applications and services.

**[0054]** Figure 6 illustrates the manner **600** in which multiple sessions may be administered in the environment **500** of Figure 5. The service control architecture **260** delivers services by instantiating, binding, coordinating, and managing atomic, multi-layered functions into a federated service based on user profile, service definition, policy information, current resource allocation, and resource state. As shown in Figure 6, various sessions are executed over multiple devices **211**. It should be noted that such sessions are managed by way of the policy server **274** which implements various policies. Figure 7 illustrates a plurality of exemplary policies **700** associated with various specific devices **211**.

**[0055]** It should be noted that many well known techniques may be utilized to improve the performance and QoS in the context of the present embodiment. For example, allocation of bandwidth may be optimized using techniques such as reservation protocol (RSVP). Further, packets may be prioritized using differentiated services (DiffServ). Still yet, paths may be created using techniques such as multi-protocol label switching (MPLS).

**[0056]** The present embodiment may be used in the context of various applications. For more information on such applications, reference may be made to co-pending applications entitled "SERVICE CONTROL FRAMEWORK FOR SEAMLESS

TRANSFER OF A MULTIMEDIA CONFERENCE OVER DIFFERENT MEDIA” and “CONTEXT SENSITIVE ADVERTISEMENT DELIVERY FRAMEWORK” which are each invented by Michel K. Bowman-Amuah and filed concurrently herewith under attorney docket numbers 60021-376201 and 60021-376301, respectively, and which are incorporated herein by reference in their entirety for all purposes.

**[0057]** While various embodiments have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of a preferred embodiment should not be limited by any of the above-described exemplary embodiments, but should be defined only in accordance with the following claims and their equivalents.

**[0058]** While the specification describes particular embodiments of the present invention, those of ordinary skill can devise variations of the present invention without departing from the inventive concept.

**WE CLAIM:**

1. A service control system for providing intention-based, context-sensitive services to mobile users, comprising:

a database;

a profiler module coupled to the database, the profiler module adapted for collecting a state of a user along with profile information selected from the group consisting of identity, location, available services per location, devices per location, and security per location, wherein the profiler module communicates the profile information to the database for storage therein;

an application module coupled to the database and including a plurality of application program interfaces for interfacing with a plurality of applications, the application module adapted for allocating application resources to the applications based on the profile information stored in the database;

a network resource module coupled to the database and a plurality of network routers, the network resource module adapted for configuring the network routers based on the profile information stored in the database and the application resources allocated to the applications;

a presentation module coupled to the database, the presentation module adapted for tailoring an output of the applications based on the profile information; and

a policy server coupled to the database, the application module, the network resource module, and the presentation module for controlling the operation thereof in accordance with policies identified utilizing the profile information.

2. The system as recited in claim 1, wherein the services are selected from the group consisting of Internet Protocol/Virtual Private Network (IP/VPN) services, Third Generation (3G) Wireless services, Voice over Internet Protocol (VoIP) services, and Application Service Provider (ASP) services.

3. The system as recited in claim 1, wherein the database includes a directory schema.

4. The system as recited in claim 3, wherein the directory schema includes an object-oriented structure.

5. The system as recited in claim 3, wherein the directory schema identifies a logical relationship between the user, devices utilized by the user, services associated with the user, and functionality of the services.



6. The system as recited in claim 1, wherein the profile information includes identity, location, available services per location, devices per location, and security per location.

7. The system as recited in claim 1, wherein the profile information includes service attributes associated with the user.

8. The system as recited in claim 7, wherein the service attributes indicates a type of service associated with the user.

9. The system as recited in claim 7, wherein the service attributes indicates a class of service associated with the user.

10. The system as recited in claim 1, wherein the profiler module is executed on a portal server for collecting the profile information.

11. The system as recited in claim 7, wherein the application module allocates the application resources based on the service attributes collected by the profiler module.

12. The system as recited in claim 1, wherein the application module includes JAVA code.

13. The system as recited in claim 1, wherein the application program interfaces of the application module interfaces a first application with a second application.

14. The system as recited in claim 1, wherein the network resource module is written in a scripting language.

15. The system as recited in claim 3, wherein the presentation module includes directory interfaces for interfacing the directory schema.

16. The system as recited in claim 1, wherein the presentation module includes style sheets executed on a portal server.

17. The system as recited in claim 1, wherein the presentation module manages a plurality of presentation views that are utilized to tailor the output of the applications based on the profile information.

18. The system as recited in claim 1, wherein the presentation views include different views and fonts.

19. A service control method for providing intention-based, context-sensitive services to mobile users, comprising:  
providing a database;

collecting a state of a user along with profile information utilizing a profiler module coupled to the database, the profile information selected from the group consisting of identity, location, available services per location, devices per location, and security per location, wherein the profiler module communicates the profile information to the database for storage therein;

interfacing with a plurality of applications utilizing an application module coupled to the database and including a plurality of application program interfaces, the application module adapted for allocating application resources to the applications based on the profile information stored in the database;

configuring a plurality of network routers based on the profile information stored in the database and the application resources allocated to the applications utilizing a network resource module coupled to the database and the network routers;

tailoring an output of the applications based on the profile information utilizing a presentation module coupled to the database; and

controlling the operation of the database, the application module, the network resource module, and the presentation module in accordance with policies utilizing a policy server coupled thereto.

20. The method as recited in claim 19, wherein the services are selected from the group consisting of Internet Protocol/Virtual Private Network (IP/VPN) services, Third Generation (3G) Wireless services, Voice over Internet Protocol (VoIP) services, and Application Service Provider (ASP) services.

21. The method as recited in claim 19, wherein the database includes a directory schema.

22. The method as recited in claim 21, wherein the directory schema includes an object-oriented structure.

23. The method as recited in claim 21, wherein the directory schema identifies a logical relationship between the user, devices utilized by the user, services associated with the user, and functionality of the services.

24. The method as recited in claim 19, wherein the profile information includes identity, location, available services per location, devices per location, and security per location.

25. The method as recited in claim 19, wherein the profile information includes service attributes associated with the user.

26. The method as recited in claim 25, wherein the service attributes indicates a type of service associated with the user.

27. The method as recited in claim 25, wherein the service attributes indicates a class of service associated with the user.

28. The method as recited in claim 19, wherein the profiler module is executed on a portal server for collecting the profile information.

29. The method as recited in claim 25, wherein the application module allocates the application resources based on the service attributes collected by the profiler module.

30. The method as recited in claim 19, wherein the application module includes JAVA code.

31. The method as recited in claim 19, wherein the application program interfaces of the application module interfaces a first application with a second application.

32. The method as recited in claim 19, wherein the network resource module is written in a scripting language.

33. The method as recited in claim 21, wherein the presentation module includes directory interfaces for interfacing the directory schema.

34. The method as recited in claim 19, wherein the presentation module includes style sheets executed on a portal server.

35. The method as recited in claim 19, wherein the presentation module manages a plurality of presentation views that are utilized to tailor the output of the applications based on the profile information.

36. The method as recited in claim 19, wherein the presentation views include different views and fonts.

37. A service control method, comprising:

maintaining a database;

collecting a state of a user along with profile information selected from the group consisting of identity, location, available services per location, devices per location, and security per location;

communicating the profile information to the database for storage therein;

allocating application resources to the applications based on the profile information stored in the database;

configuring a plurality of network routers based on the profile information stored in the database and the application resources allocated to the applications;  
tailoring an output of the applications based on the profile information; and  
controlling the collecting, communicating, allocating, configuring, and tailoring in accordance with policies identified utilizing the profile information.

38. A service control system, comprising:

means for maintaining a database;

means for collecting a state of a user along with profile information selected from the group consisting of identity, location, available services per location, devices per location, and security per location

means for communicating the profile information to the database for storage therein;

means for allocating application resources to the applications based on the profile information stored in the database;

means for configuring a plurality of network routers based on the profile information stored in the database and the application resources allocated to the applications;

means for tailoring an output of the applications based on the profile information;  
and

means for controlling the collecting, communicating, allocating, configuring, and tailoring in accordance with policies identified utilizing the profile information.

39. A service control system for providing intention-based, context-sensitive services to mobile users, comprising:

a database including a directory schema;

a profiler module coupled to the database, the profiler module adapted for collecting a state of a user along with profile information including identity, location, available services per location, devices per location, security per location, and service attributes, wherein the profiler module communicates the profile information to the database for storage therein;

an application module coupled to the database and including a plurality of application program interfaces for interfacing with a plurality of applications, the application module adapted for allocating application resources to the applications based on the profile information stored in the database;

a network resource module coupled to the database and a plurality of network routers, the network resource module adapted for configuring the network routers based on the profile information stored in the database and the application resources allocated to the applications;

a presentation module coupled to the database, the presentation module adapted for tailoring an output of the applications based on the profile information, wherein the presentation module manages a plurality of presentation views that are utilized to tailor the output of the applications based on the profile information; and a policy server coupled to the database, the application module, the network resource module, and the presentation module for controlling the operation thereof in accordance with policies identified utilizing the profile information;

wherein the system provides services including Internet Protocol/Virtual Private Network (IP/VPN) services, Third Generation (3G) Wireless services, Voice over Internet Protocol (VoIP) services, and Application Service Provider (ASP) services.

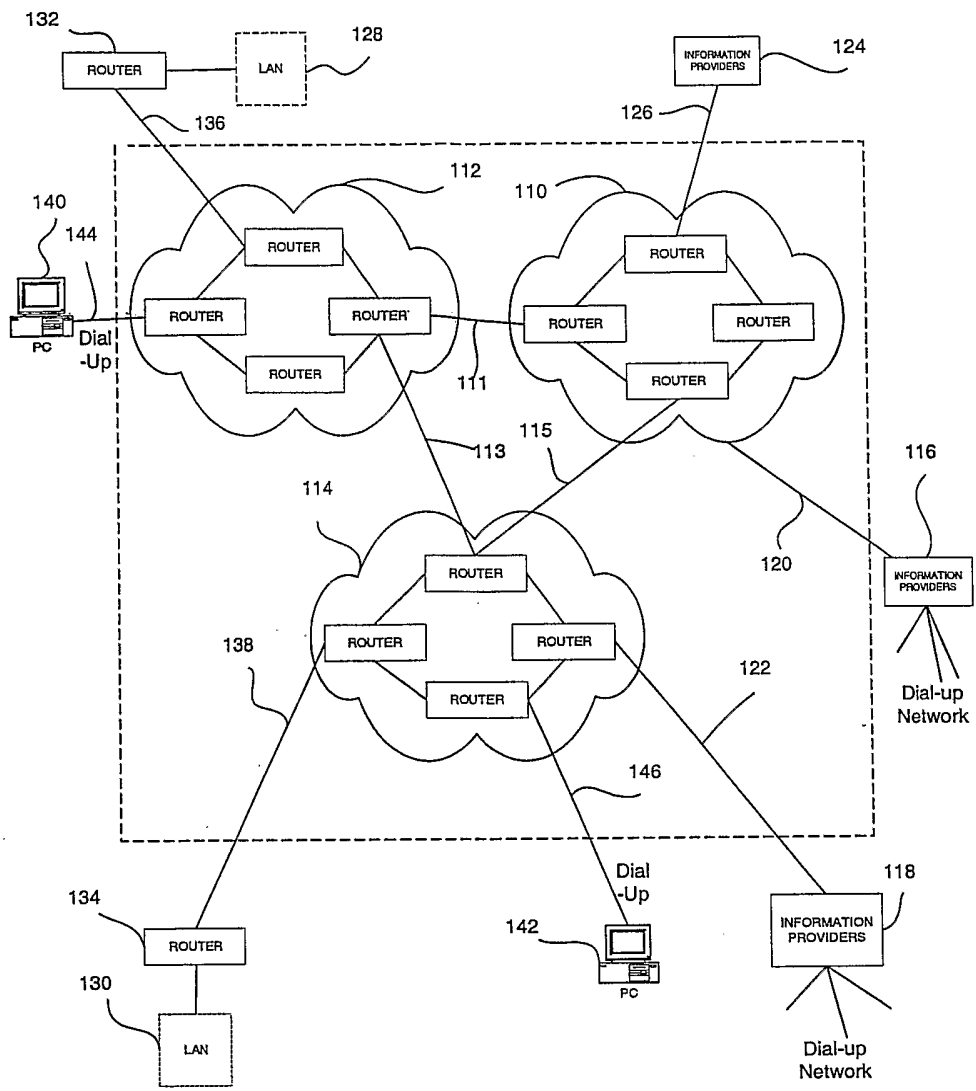


Figure 1  
(Prior Art)

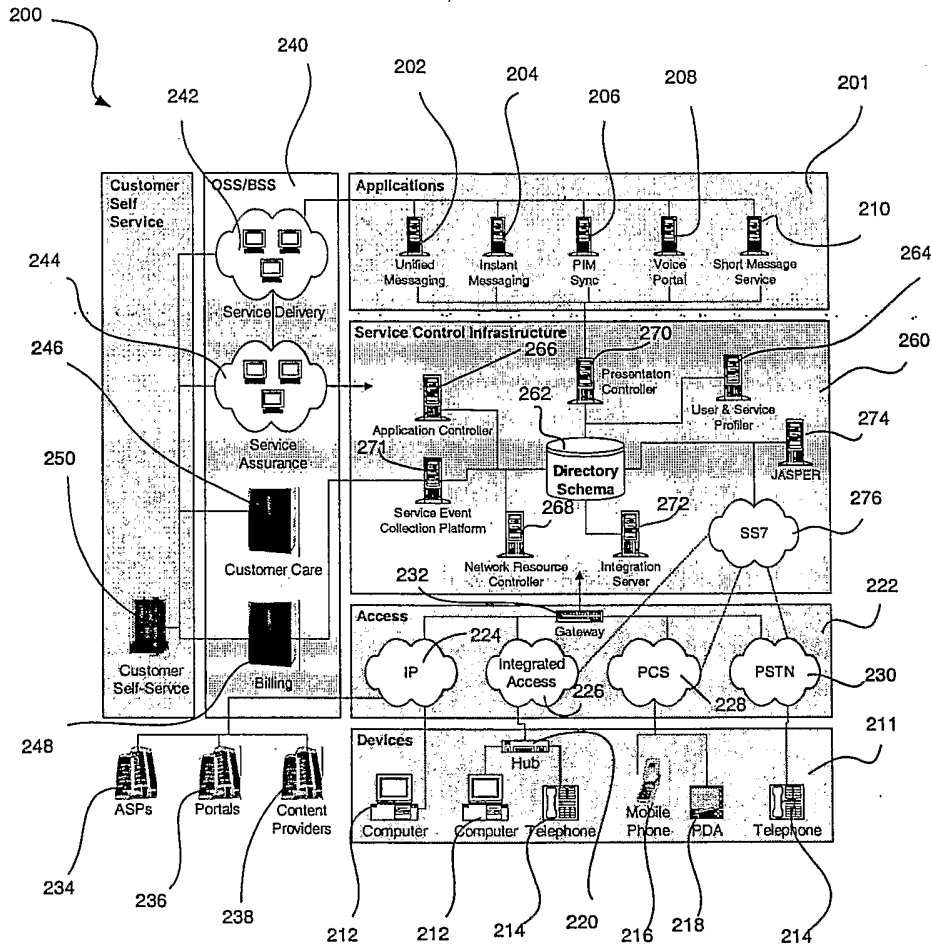


Figure 2

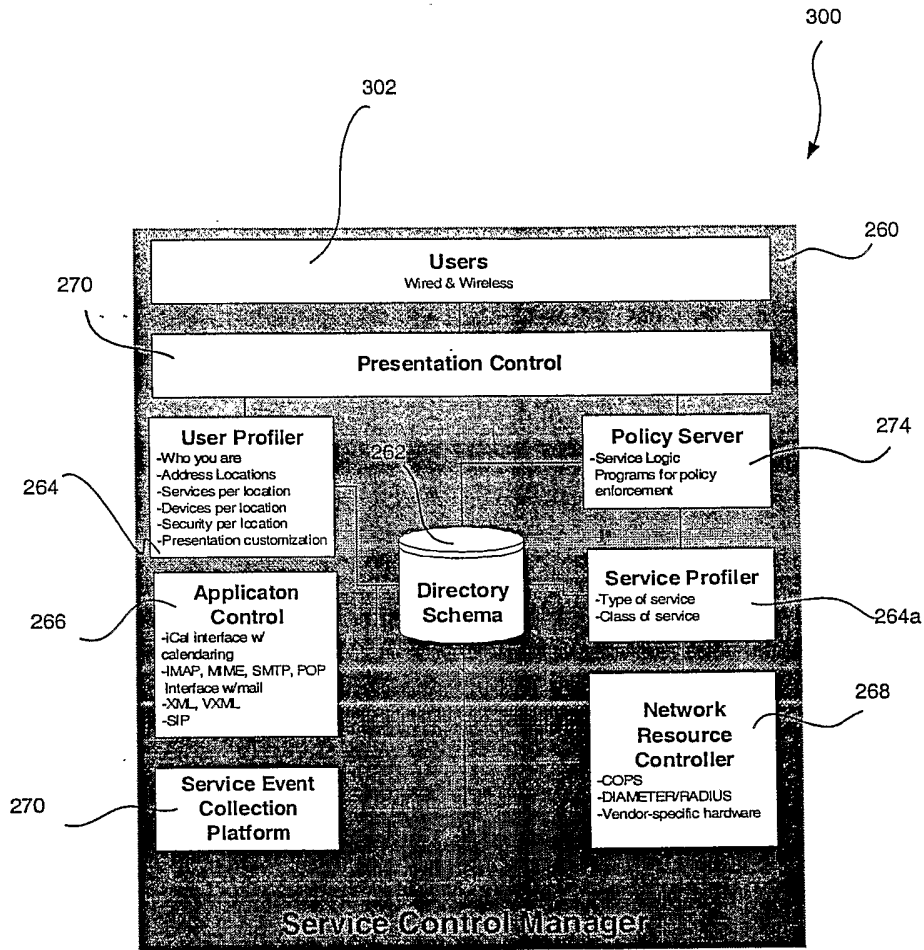


Figure 3



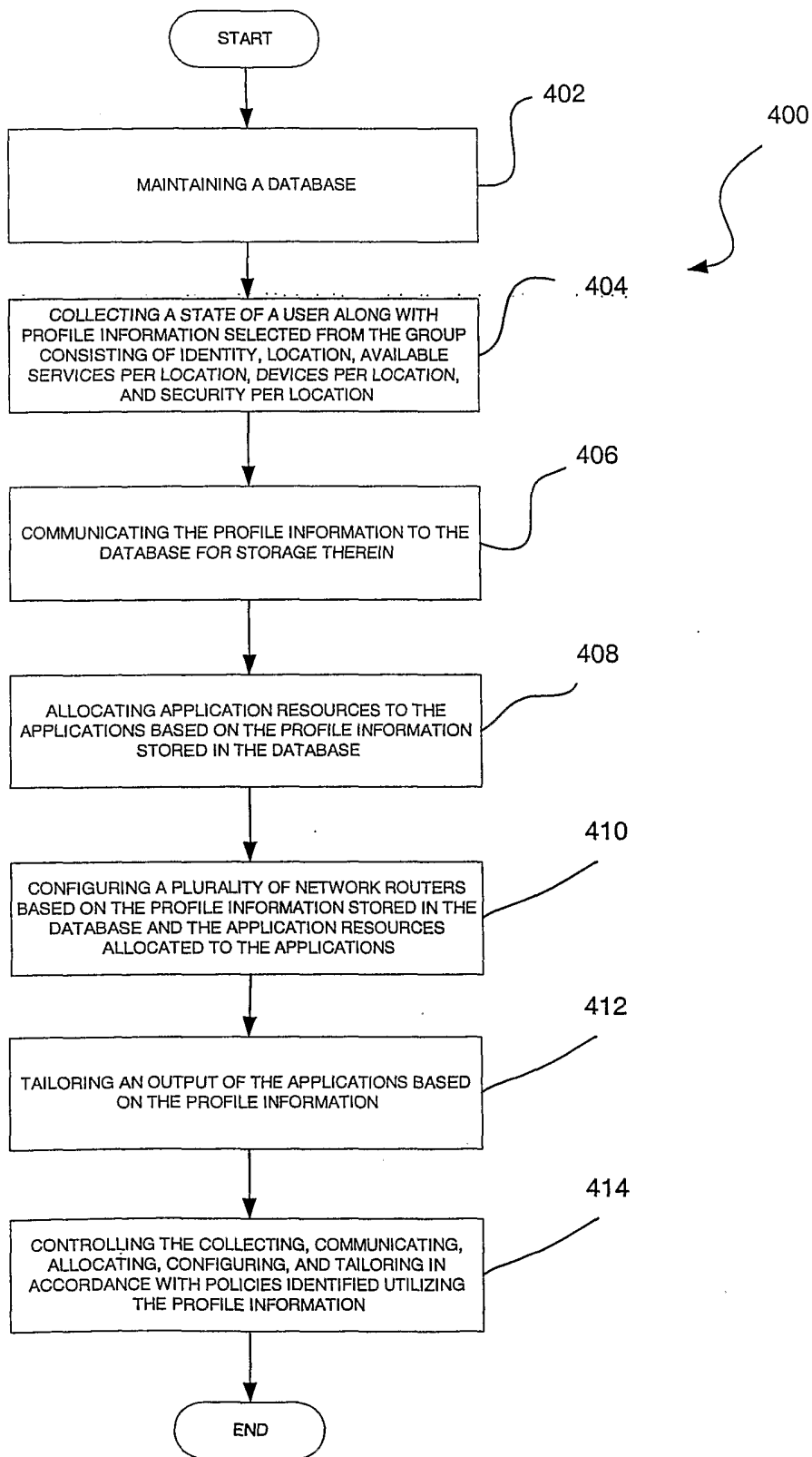


Figure 4

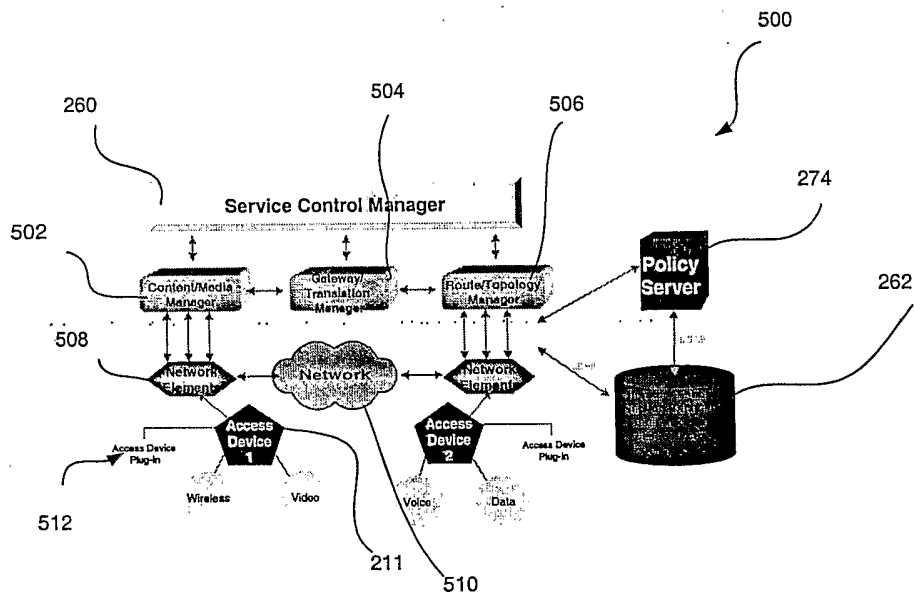


Figure 5

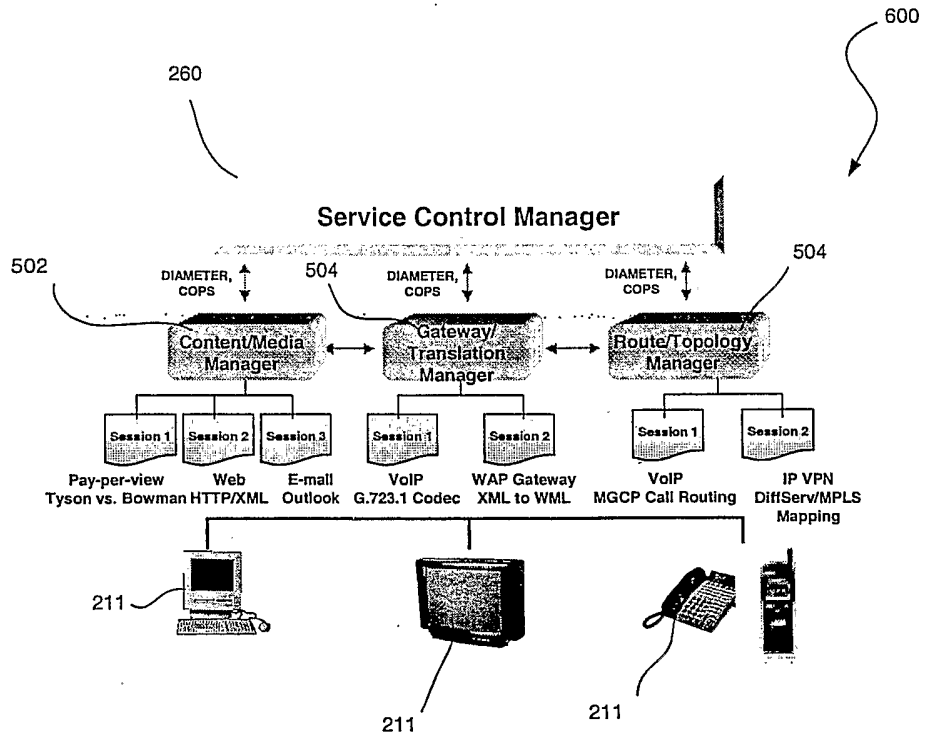


Figure 6

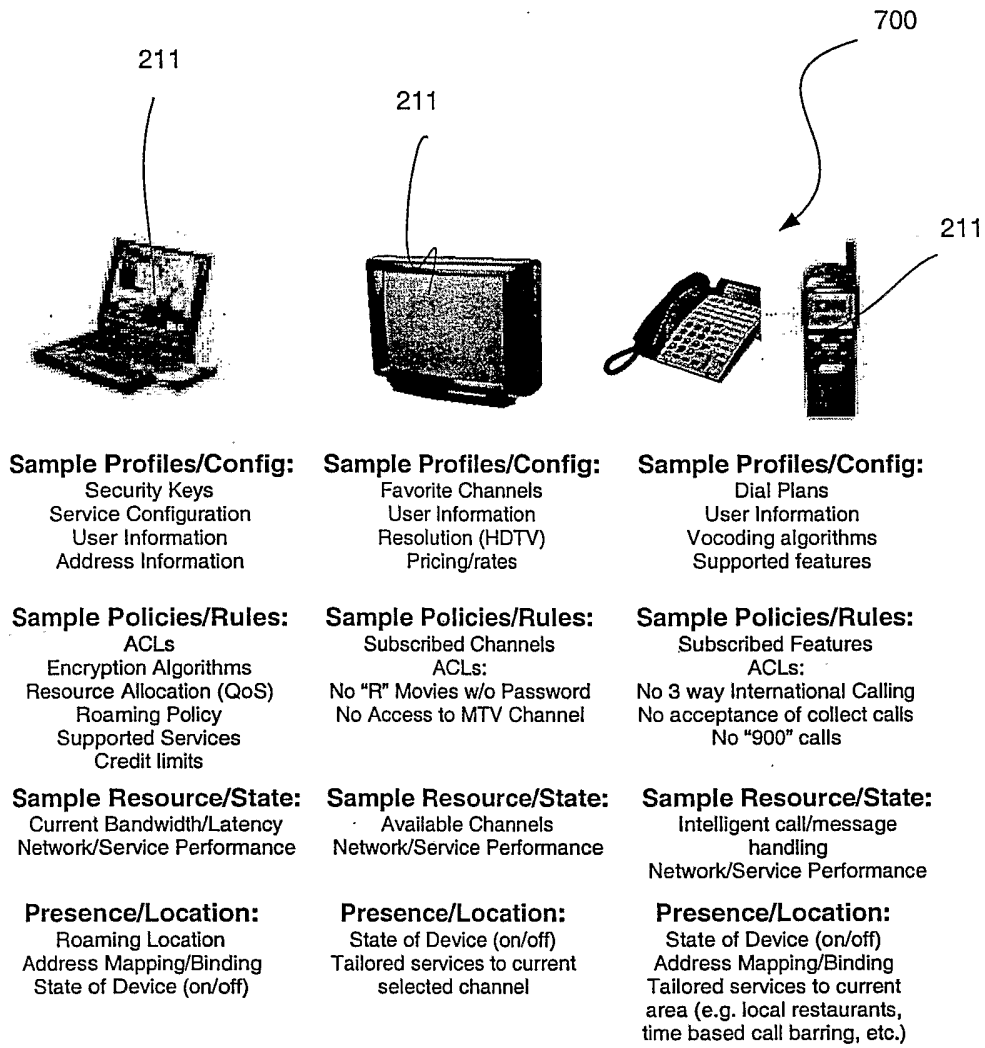


Figure 7

# INTERNATIONAL SEARCH REPORT

International application No.  PCT/US02/38137
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**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC(7) : G06F 7/00, 17/00, 15/167; G09G 5/00  
 US CL : 707/100; 709/212; 345/742  
 According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**  
 Minimum documentation searched (classification system followed by classification symbols)  
 U.S. : 707/100; 709/212; 345/742

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 6,385,592 B1 (Angles et al.) 07 May 2002 (07.05.2002), column 2, line 49 - column 4, line 49.	1 - 39
Y,P	US 6,425,005 B1 (Dugan et al.) 23 July 2002 (23.07.2002), column 2, line 40 - column 6, line 50.	1 - 39
Y,P	US 6,470,386 B1 (Combar et al.) 22 October 2002 (22.10.2002), column 1, line 48 - column 2, line 9, and column 3, line 18 - column 6, line 40.	1 - 39
Y,P	US 6,377,993 B1 (Brandt et al.) 23 April 2002 (23.04.2002), column 2, line 9 - column 4, line 64.	1 - 39

Further documents are listed in the continuation of Box C.       See patent family annex.

<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>
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Date of the actual completion of the international search 23 March 2003 (23.03.2003)	Date of mailing of the international search report <b>24 APR 2003</b>
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Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer David A. Wiley <i>James R. Matthews</i> Telephone No. none
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