EXHIBIT 1
PART D

to a variety of form-factors as required to accommodate voice, video, and data termination requirements at the subscriber premises.

[0266] Regardless of form-factor, all EDGE SWITCHES are centrally managed by a SYSTEM MANAGEMENT PLATFORM [2], which is installed in the central office or central office equivalent. When the EDGE SWITCH is connected to the BROADBAND ACCESS NETWORK [6.1], it registers with a default SYSTEM MANAGEMENT PLATFORM [2]. At that time, the SYSTEM MANAGEMENT PLATFORM [2] remotely loads the EDGE SWITCH with all the software necessary for it to deliver the network services (service capabilities) purchased by the subscriber at whose premise the EDGE SWITCH has been installed. Once the EDGE SWITCH completes its system startup procedure with the new software load, the subscriber may then configure the EDGE SWITCH according to their personal preferences through a web user interface. A web application running on a WEB SERVER [11] initiates an authenticated (secure) login to the EDGE SWITCH and thereby mediates subscriber access to its features.

[0267] Architecturally, the EDGE SWITCH has two distinct "sides:" the network side and the subscriber side. The network side of the EDGE SWITCH incorporates a BROADBAND NETWORK INTERFACE [1.1] that physically connects it to the BROADBAND ACCESS NETWORK [6.1]; it provides all necessary electrical (and potentially optical) signal modulation and network adaptation necessary to terminate broadband network access. The network side ultimately presents the IP ROUTING MODULE [1.2] in the EDGE SWITCH with an IP access path through the BROADBAND ACCESS NETWORK [6.1], dynamically aggregating voice-over-IP, video-over-IP, and common data-over-IP packet flows into a composite IP packet flow. The total bitrate transmission requirements for this composite IP packet flow must be less than or equal to the total available through the BROADBAND NETWORK INTERFACE [1.1]. Central to its ability to support multi-service delivery through the BROADBAND NETWORK INTERFACE [1.1], the EDGE SWITCH supports internal service logic that determines if the projected composite IP packet flow that would be required to support the delivery of all requested voice, video, and data services would exceed the total bitrate transmission available from the network side.

[0268] The subscriber side of the EDGE SWITCH connects to TELEPHONE STATIONS [3], SET-TOP BOXES [4], and COMPUTER WORKSTATIONS [5] installed at the subscriber premise. It provides telephone services to the TELEPHONE STATIONS [3], video (multimedia) services to the SET-TOP BOXES [4], and data communication services to the COMPUTER WORKSTATIONS [5]. In the case of TELEPHONE STATIONS [3], the EDGE SWITCH converts analog electrical (and potentially digital) telephone device-level signaling and voice transmission conventions to and from IP packets containing SIP network signaling information and digitally-encoded voice. In the case of SET-TOP BOXES [4], it is assumed that device signaling information and media content are already digitally-encoded in IP packets and that SET-TOP BOXES [4] natively support SIP network signaling. The subscriber side supports admission control features that enable it to deny voice and/or video calling service delivery to TELEPHONE STATIONS [3] or SET-TOP BOXES, or attenuate data service delivery to COMPUTER WORKSTATIONS [5].

[0269] Support for voice-over-IP or video-over-IP call sessions on the subscriber side requires that the EDGE SWITCH perform a prioritized IP routing function to ensure the timely transport of IP packet flows bi-directionally between the TELEPHONE STATIONS [3] (and SET-TOP BOXES [4]) and the IP CARRIER NETWORK [6]. As TELEPHONE STATIONS [3] (and SET-TOP BOXES [4]) answer incoming SIP call sessions or originate outgoing SIP call sessions, the EDGE SWITCH dynamically reserves the requisite network side bandwidth on demand—effectively removing it from the pool of bandwidth available to COMPUTER WORKSTATIONS [5]—and discretely reassigns it to media transmission. IP packets needed for real-time voice and streaming video transmission are isolated into labeled IP packet flows. The labeled voice and video packet flows are then routed by the IP ROUTING MODULE [1.2] through the BROADBAND ACCESS NETWORK [6.1] at a higher priority than common data packets, thus enabling them to be routed preferentially through other elements of the IP CARRIER NETWORK [6], according to a higher quality of service than necessary to support common data transmission.

[0270] TELEPHONE STATIONS [3] and SET-TOP BOXES [4] plugged into the subscriber side of the EDGE SWITCH may to a certain extent be vendor-specific in the way they communicate with it. For the purpose of normalizing the way that end-users may access network services using different brands of TELEPHONE STATIONS [3] and SET-TOP BOXES [4], the EDGE SWITCH supports terminal adaptation features, performing device signaling and media format conversion bi-directionally in real-time as required to interoperate with SIP endpoints residing within the IP CARRIER NETWORK [6].

[0271] TELEPHONE STATIONS [3] also tend to differ from vendor to vendor in their function key layouts. For example, a telephone key dedicated to deleting a voice message will generate a tone sequence or key code that may not match the tone sequence or key code utilized by a particular vendor's voice messaging system for the same function. Telephone function key layout profiles can be programmed into the EDGE SWITCH by the subscriber (mediated through a network-based web server) so that the EDGE SWITCH can convert a vendor-specific tone sequence or key code used by a particular TELEPHONE STATION [3] to a user interface convention that can be understood by NETWORK-BASED ENHANCED SERVICES [18].

[0272] Although the SET-TOP BOXES [4] natively support SIP network signaling and communicate through an IP connection, the EDGE SWITCH may still be required to convert vendor-specific device signaling information (e.g. protocols for channel selection) to be compatible with conventions used by NETWORK-BASED ENHANCED SERVICES [18] providing video streaming content.

[0273] The EDGE SWITCH has sufficient storage and processing capabilities to implement an optimized subset of subscriber telephone features and services that are today provided by the CENTRAL OFFICE SWITCH [7.1], including certain Customer Local Access Signaling Services (CLASS) and selected PBX/Centrex features usually pro-

vided to businesses. Telephone services and features are provided by each EDGE SWITCH to the TELEPHONE STATIONS [3] plugged into it without any requirement to interface a CENTRAL OFFICE SWITCH [7.1], and without any requirement to interface network elements such as "IP Centrex" feature servers. Inasmuch as telephone features are implemented internally by the EDGE SWITCH, so too is the ability to generate and internally store event histories for subscriber access to these services. The internally stored event histories are sorted by the EDGE SWITCH such that billable events may be periodically transmitted to a SYSTEM MANAGEMEMENT PLATFORM [2] for further processing. The SYSTEM MANAGEMEMENT PLATFORM [2] positively identifies the end user that generated the billable events by matching the physical device address of the EDGE SWITCH that generated the billable events with the physical device address of an EDGE SWITCH registered to an end user.

[0274] Private dialing plans may be cached in the EDGE SWITCH, as are subscriber preferences and related configuration data necessary to support telephone feature delivery. A single EDGE SWITCH can internally store over a year of call log data, and make that information available to a third-party application; thus the EDGE SWITCHES deployed in the network collectively function as a distributed subscriber call log data base that scales with the network and is capable of real-time access by network applications. An EDGE SWITCH can make its feature delivery and call control capabilities available to a third-party application; thus the EDGE SWITCHES deployed in the network collectively function as a distributed call control and feature delivery resource that scales with the network and is capable of (near) real-time access by network applications. The capability of EDGE SWITCHES to make subscriber-specific information (call log and Class of Service data) and calling feature delivery remotely accessible to third-party applications enables new types of interactive calling services in which subscribers may actively participate in network service delivery by the EDGE SWITCHES.

[0275] Making the most intelligent use of policy data and subscriber preferences cached within it, the EDGE SWITCH [1] attempts to connect telephone calls and deliver telephone features in the most localized manner possible with minimal assistance from carrier network elements. The EDGE SWITCH [1] supports SIP network signaling natively and incorporates its own internal call routing functionality, making it possible for telephone calls between TELEPHONE STATIONS [3] plugged into the same EDGE SWITCH to be routed internally through its IP ROUTING MODULE [1.2] or potentially through its MEDIA STREAM CONTROLLER [1.7]. As a result, these "on-switch" call sessions do not require network resources to support end-to-end signaling, media transmission, or telephone device control, and thus are not significant consumers of network transmission resources.

[0276] For telephone calls between TELEPHONE STATIONS [3] that are not plugged into the same EDGE SWITCH, the call paths are established as SIP call sessions through the IP CARRIER NETWORK [6], between EDGE SWITCHES [1]. This mode of communication is possible because each EDGE SWITCH [1] presents the TELEPHONE STATIONS [3] (and SET-TOP BOXES [4]) to the IP CARRIER NETWORK [6] as an array of intelligent SIP endpoints.

BROADBAND NETWORK INTERFACE [1.1]

[0277] Hardware subcomponent of the EDGE SWITCH [1] that physically connects it to the BROADBAND ACCESS NETWORK [6.1] using any one of number of OSI Layer 1 broadband technologies (e.g. coaxial cable, Ethernet cable, optical coupling, or copper wire) as required by the host carrier. This subcomponent provides IP connectivity from OSI Layer 3 (network layer) down, which includes OSI Layer 2 (data link layer) and OSI Layer 1 (physical layer). While the BROADBAND NETWORK INTERFACE may be implemented using any type of OSI Layer 2 and OSI Layer 1 technology, it is required to aggregate all available broadband network transmission capacity into to single IP data service in OSI Layer 3, and then to present an interface to that data service to the IP ROUTING MODULE [1.2]. It is anticipated that in some implementations, the BROADBAND NETWORK INTERFACE may be support programmable logic that would enable it to be customized or upgraded, potentially remotely by the SYSTEM MANAGEMENT PLATFORM [2].

IP ROUTING MODULE [1.2]

[0278] Hardware subcomponent of the EDGE SWITCH [1] that performs all IP (OSI Layer 3) packet routing functions. It communicates with the BROADBAND ACCESS NETWORK [6.1] through the BROADBAND NETWORK INTERFACE [1.1]. It provides IP-based video stream connectivity for SET-TOP BOXES [4] through the VIDEO EXTENDER MODULE INTERFACE [1.4] and provides IP data connectivity to COMPUTER WORKSTATIONS [3] through the COMPUTER DATA INTERFACE [1.5]. It provides voice stream connectivity for TELEPHONE STATIONS [3] through its integration with the MEDIA STREAM CONTROLLER [1.7] and PACKETIZATION COPROCESSOR [1.6].

[0279] This subcomponent enforces preferential routing policies to ensure higher priority voice and video packets are routed in a timely fashion. The IP ROUTING MODULE prioritizes packets for routing based upon a labeling mechanism that assigns them to predefined QoS standards. Higher priority packets are classified and scheduled for processing ahead of lower priority packets. The IP ROUTING MODULE supports transmission pathways in which both connection endpoints correspond to voice or video terminals plugged into the same EDGE SWITCH [1], and supports a programmatic interface such that it may be directly controlled by software in the IP ROUTING SYSTEM [1.4].

POWER SUPPLY [1.3]

[0280] Hardware subcomponent of the EDGE SWITCH [1] that conditions power from a DC POWER SOURCE [6.2] prior to making it available to the electronic components of the EDGE SWITCH [1]. This subcomponent provides for surge protection and may be implemented with battery functionality so that it is able to continue powering the EDGE SWITCH [1] for a period of time after the DC POWER SOURCE [6.2] has failed. The POWER SUPPLY [1.3] may be implemented with a switch that enables it to be

switched between line power (from the BROADBAND ACCESS NETWORK [6.1] physical connection) or from a premise-based power source.

COMPUTER DATA INTERFACE [1.4]

[0281] Hardware subcomponent of the EDGE SWITCH [1] integrated with external cabling interface used to plug in one or more COMPUTER WORKSTATIONS [5] to the EDGE SWITCH [1]. The COMPUTER DATA INTERFACE supports bidirectional IP data paths used for common data transport between the IP ROUTING MODULE [1.2] and the COMPUTER WORKSTATIONS [5]. If more than one COMPUTER WORKSTATION [5] is used, an ETHERNET HUB [9] or ETHERNET SWITCH [28] may be used for the purpose of distributing data streams to more than one COMPUTER WORKSTATION [5] at the same time.

VIDEO STREAMING DEVICE INTERFACE [1.5]

[0282] Hardware subcomponent of the EDGE SWITCH [1] integrated with external cabling interface that is used to connect SIP video streaming devices such as SET-TOP BOXES [4]. SIP media streaming devices natively support SIP network signaling. The VIDEO STREAMING DEVICE INTERFACE supports bidirectional IP data paths used for SIP network signaling and real-time media streaming between the IP ROUTING MODULE [1.2] and one or more SET-TOP BOXES [4]. If more than one SET-TOP BOX [4] is plugged into the EDGE SWITCH [1], an ETHERNET SWITCH [28] should be used so as to ensure sufficient bandwidth necessary to maintain network quality of service for all video call sessions.

PACKETIZATION COPROCESSOR [1.6]

[0283] Hardware subcomponent of the EDGE SWITCH [1] that is used by the MEDIA STREAM CONTROLLER [1.7] to assist in real-time processing of voice media and voice-related IP data packets transmitted through the IP ROUTING MODULE [1.2]. Most packet processing carried out by the PACKETIZATION COPROCESSOR [1.6] is in support of IETF RFC 1889 on RTP: A Transport Protocol for Real-Time Applications, and IETF RFC 2833 on RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals. The PACKETIZATION COPROCESSOR may also be used for packet labeling to mark voice-related IP data packets originating at the TELEPHONE LINE INTERFACE [1.9] with the appropriate quality of service marker prior to their introduction to the IP ROUTING MODULE [1.2]. While some implementations may choose to implement voice encoding and decoding algorithms on the DIGITAL SIGNAL PROCESSOR [1.8], it is also possible that the PACKETIZATION COPROCESSOR [1.6] could be used for this purpose.

MEDIA STREAM CONTROLLER [1.7]

[0284] Hardware subcomponent of the EDGE SWITCH [1] used to interconnect, mix, and process full and half-duplex media streams. For a media stream to be interconnected, mixed, or processed by the MEDIA STREAM CONTROLLER, at least one of its endpoints must terminate on it, whereas the other endpoint of that media stream may terminate either on the TELEPHONE LINE INTERFACE [1.9] or within the IP CARRIER NETWORK [6] (transmitted through the BROADBAND NETWORK INTERFACE [1.1]).

[0285] The MEDIA STREAM CONTROLLER can be used to interconnect two media streams to create a full or half-duplex media session. It can interconnect three or more media streams to create a fully meshed conference. The MEDIA STREAM CONTROLLER enables multi-party conference calls of this type through the use of conferencing resources. All media streams that are interconnected through a conferencing resource will receive the media contents of all other media streams connected to that conferencing resource. Media transmission to or from any media stream endpoint can be enabled or disabled, and signal processing algorithms may be applied to any stream.

[0286] The MEDIA STREAM CONTROLLER physically interfaces the IP ROUTING MODULE [1.2] on the network side of the EDGE SWITCH [1] and the TELEPHONE LINE INTERFACE [1.9] on the subscriber side. In order to more efficiently transmit voice in real-time through the BROADBAND ACCESS NETWORK [6.1] (according to IETF RTP protocol standards), the MEDIA STREAM CONTROLLER [1.7] uses the PACKETIZATION COPROCESSOR [1.6] as a dedicated peripheral computing resource for packet processing. In like fashion, the MEDIA STREAM CONTROLLER [1.7] uses the DIGITAL SIGNAL PROCESSOR [1.8] as a dedicated peripheral computing resource to run digital signal processing algorithms that may be applied dynamically to media streams as needed.

DIGITAL SIGNAL PROCESSOR [1.8]

[0287] Hardware subcomponent of the EDGE SWITCH [1] that is a dedicated peripheral computing resource used to provide signal processing functions to the MEDIA STREAM CONTROLLER [1]. It may be implemented as an independent device or its capabilities may be integrated directly into the MEDIA STREAM CONTROLLER [1.7]. This subcomponent supports running various digital signal processing algorithms that may include DTMF digit detection, DTMF digit generation, network tone detection, network tone generation, noise cancellation, comfort noise generation, echo cancellation, voice onset detection, voice offset detection, modem (fax) tone detection, and media stream encoding/decoding/transcoding.

TELEPHONE LINE INTERFACE [1.9]

[0288] Hardware subcomponent of the EDGE SWITCH [1] integrated with external cabling interface that is used to connect TELEPHONE STATIONS [3]. TELEPHONE STATIONS [3] do not natively support SIP network signaling and as a result cannot present themselves to an IP network as SIP network signaling endpoints without assistance from the EDGE SWITCH [1].

[0289] The TELEPHONE LINE INTERFACE may also be adapted to support a variety of proprietary telephones, such analog POTS telephones, digital PBX telephones and various Centrex telephones.

[0290] If used to connect POTS telephones, the TELEPHONE LINE INTERFACE supports many of the BORSCHT functions, including: (B) Battery feed to power the subscriber's telephone, (R) Ringing signal to the subscribers

telephone, (S) Supervision to detect caller off-hook, calls in progress, calls terminated, (C) Coding of analog voice signals into PCM digital format, (H) Hybrid transformer for conversion from two-wire to four-wire, and filtering to provide impedance match to remove or minimize echoes, and (T) Testing of the local loop and circuits of the switching equipment to detect faults and provide maintenance. Each POTS service interface provided by the TELEPHONE LINE INTERFACE [1.9] is a basic two-wire "Tip and Ring" interface that is translated into the four-wire (balanced pair) at the point where it interfaces the MEDIA STREAM CONTROLLER [1.7].

CENTRAL PROCESSING UNIT [1.10]

[0291] Hardware subsystem of the EDGE SWITCH [1] consisting of various subcomponents that include a main processor, peripheral controllers and memory cache devices necessary for it to function as a stand-alone computer running a real-time, preemptive, multi-tasking operating system. The CENTRAL PROCESSING UNIT provides supervisory control, directly or indirectly, for all EDGE SWITCH [1] features and functions. It interfaces RANDOM ACCESS MEMORY [1.11], utilizing it to provide memory needed to run the operating system and various application programs; it interfaces NON-VOLATILE MEMORY [1.11], utilizing it to store vital system configuration parameters and as a FILE SYSTEM [1.23]; it interfaces both the MEDIA STREAM CONTROLLER [1.7] and the IP ROUTING MODULE [1.2] through a system bus or similar means, utilizing each as a dedicated peripheral computing resource (under software control) to implement media connectivity and IP routing operations respectively.

RANDOM ACCESS MEMORY [1.11]

[0292] Hardware subsystem of the EDGE SWITCH [1] consisting of any array of solid-state storage devices configured to provide randomly addressable memory directly accessible to the CENTRAL PROCESSING UNIT [1.10]. The storage devices that comprise this subsystem provide volatile memory whose contents are considered to be undefined after a system reset cycle and must be initialized prior to use.

NON-VOLATILE MEMORY [1.12]

[0293] Hardware subsystem of the EDGE SWITCH [1] consisting of any array of solid-state storage devices configured to provide block addressable memory accessible to the CENTRAL PROCESSING UNIT [1.10] using direct memory access (DMA) or equivalent means. The storage devices that comprise this subsystem user non-volatile memory whose contents are retained between system reset cycles.

NETWORK ADAPTATION LAYER [1.13]

[0294] EDGE SWITCH [1] subsystem comprised of software, firmware, or other programmable logic (or combination thereof) that is used to control or impart functionality into the BROADBAND NETWORK INTERFACE [1.1]. This programmable subsystem makes it possible for the EDGE SWITCH [1] to adapt to a variety of OSI Layer 1 and 2 technologies supported by the BROADBAND ACCESS NETWORK [6.1]. The NETWORK ADAPTATION LAYER provides all of the control logic necessary to enable the BROADBAND NETWORK INTERFACE [1.1] to aggregate all available broadband network transmission capacity into to single IP data service in OSI Layer 3, and then to present an interface to that data service to the IP ROUTING MODULE [1.2].

IP ROUTING SYSTEM [1.14]

[0295] Software subsystem of the EDGE SWITCH [1] consisting of software components and related applications necessary to control the IP ROUTING MODULE [1.2]; this software subsystem incorporates an IP protocol stack and implements IP routing services necessary to support voice, video, and data communications through the IP CARRIER NETWORK [6]. Software modules within the IP ROUTING SYSTEM support a programmable firewall, Network Address Translation (NAT), Dynamic Host Configuration Protocol (DHCP), and Virtual Private (data) Networking (VPN).

[0296] The IP ROUTING SYSTEM may utilize the FILE SYSTEM [1.23] to store routing tables. It will support IPv6 (the current build to standard). IPv6 provides both enhanced addressing capabilities as well as support for the quality of service capabilities previously only found in ATM implementations. Thus, by supporting IPv6, the IP ROUTING SYSTEM may employ open shortest path first (OSPF) routing to request a path to the desired endpoint for voice, video, and data packet transmission.

RTP PROTOCOL STACK [1.15]

[0297] Software subcomponent in the EDGE SWITCH [1] that implements support for IETF RFC 1889 on RTP: A Transport Protocol for Real-Time Applications (RTP), and its adjunct protocol IETF RFC 2833 on RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals. Most or all of the RTP PROTOCOL STACK software may run on the PACKETIZATION COPROCESSOR [1.6]. RTP is the media transmission protocol used by the DES to transmit all real-time voice and video media streams through the IP CARRIER NETWORK [6].

[0298] RFC 2833 describes a means by which DTMF digits, telephone tones, and telephony signals are transmitted "out of band" by encoding them as numerical codes that are inserted into special-purpose RTP packets. RFC 2833 is used when a selected voice media stream encoding format is likely to render these DTMF digits, telephone tones, and telephony signals unintelligible to digital signal processors when the media stream is decoded at the receiving end of the session.

[0299] The RTP PROTOCOL STACK is utilized by the ABSTRACT TELEPHONE CONTROLLER [1.19] as a means to establish real-time media stream sessions (i.e. bearer channel connections) between SIP network signaling endpoints within the IP CARRIER NETWORK [6]. RTP sessions maintained by the RTP PROTOCOL STACK are physically associated with media stream endpoints on the MEDIA STREAM CONTROLLER [1.7] under the control of the ABSTRACT TELEPHONE CONTROLLER [1.19]. The RTP PROTOCOL STACK uses the data communication services of the IP ROUTING SYSTEM [1.14] to support IP-based media transmission between a media stream endpoint (i.e. port) on the MEDIA STREAM CONTROLLER [1.7] and a media stream endpoint in the IP CARRIER

NETWORK [6] (or potentially with another media stream endpoint also on the MEDIA STREAM CONTROLLER [1.7] in the case of a call session that is internal to the EDGE SWITCH [1]).

SIP PROTOCOL STACK [1.16]

[0300] Software subcomponent in the EDGE SWITCH [1] that implements support for the "SIP Proxy Server" functionality described further in this disclosure (see SIP PROXY SERVER [12]) and is IETF RFC 2543 on SIP: Session Initiation Protocol (SIP). The SIP PROTOCOL STACK also implements support for IETF RFC 2327 on SDP: Session Description Protocol (SDP). SDP is an adjunct protocol to SIP and is used by SIP network signaling endpoints participating in a call session to describe to each other the detailed characteristics of the voice or video media streams (i.e. bearer channels) that they are capable of receiving from each other.

[0301] The EDGE SWITCH [1] represents each TELEPHONE STATION [3] internally as a SIP network signaling endpoint to the IP CARRIER NETWORK [6] by associating it with particular E.164 dialing number that is recognized by the SIP PROTOCOL STACK. The ABSTRACT CALL MODEL [1.20] supports a telephone gateway function in which a SIP User Agent is used to perform SIP network signaling endpoint functions on behalf of each TELEPHONE STATION [3] plugged into the TELEPHONE LINE INTERFACE [1.9]. This SIP User Agent directs its SIP network signaling operations to the SIP PROTOCOL STACK, using it as its default SIP Proxy Server.

[0302] Although a SET-TOP BOX [4] natively supports SIP network signaling and is an actual SIP network signaling endpoint (i.e. contains a SIP User Agent), it exchanges SIP messages through the SIP PROTOCOL STACK on the EDGE SWITCH [1]. The SIP User Agent in the SET-TOP BOX [4] directs its SIP network signaling operations to the SIP PROTOCOL STACK, using it as its default SIP Proxy Server.

[0303] The SIP PROTOCOL STACK uses the data communication services of the IP ROUTING SYSTEM [1.14] to support IP-based SIP network signaling operations between itself and the IP CARRIER NETWORK [6].

HTTP PROTOCOL STACK [1.17]

[0304] Software subcomponent in the EDGE SWITCH [1] that implements support for IETF RFC 2068 on Hypertext Transfer Protocol—HTTP Version 1.1 (HTTP). HTTP provides a generalized means for two programs to exchange text and data files over an IP network. The operational semantics of HTTP are based on the notion of a "HTTP client" (web browser) that makes requests for information and an "HTTP server" (web server) that responds to those requests. The HTTP PROTOCOL STACK implements support for both the "HTTP client" and the "HTTP server" elements of HTTP.

[0305] Support for the "HTTP client" element provides a means by which the XML MGMT INTERFACE [1.21] may communicate with the SYSTEM MANAGEMENT PLATFORM [2] (e.g. to report updated subscriber preferences or to upload billing records). Support for the "HTTP server" element makes it possible for any computer implementing the "HTTP client," such as the SYSTEM MANAGEMENT PLATFORM [2] or the WEB SERVER [11], to communicate with the XML MGMT INTERFACE [1.21] for the purposes of system management, service provisioning or subscriber interaction (e.g. to access its features and call log data).

[0306] A computer attempting to communicate with the EDGE SWITCH [1] using HTTP must log-in to the XML MGMT INTERFACE [1.21] and authenticate itself as a valid user. Information exchange and remote activation of EDGE SWITCH [1] features by an external computer is based on XML-encoding (via XML MGMT INTERFACE [1.21]) for both the requests and the responses thereto. The HTTP PROTOCOL STACK uses the data communication services of the IP ROUTING SYSTEM [1.14] to support IP-based HTTP sessions between the "HTTP client" and "HTTP server" instances that it maintains internally, and other "HTTP client" and "HTTP server" instances in the IP CARRIER NETWORK [6].

SNMP PROTOCOL STACK [1.18]

[0307] Software subcomponent in the EDGE SWITCH [1] that implements support for IETF RFC 1157 on SNMP: A Simple Network Management Protocol (SNMP). SNMP is a protocol by which management information for a network element may be inspected or altered by remote users. It is used to communicate management information between network management stations and "SNMP agents" (specialized software processes) running on the managed network elements. The SNMP functional paradigm for monitoring and control is designed to be extensible to accommodate additional, possibly unanticipated aspects of network operation and management; thus, the SNMP architecture is adaptable to accommodate the management of EDGE SWITCHES [1] by the SYSTEM MANAGEMENT PLATFORM [2].

[0308] In the DES management paradigm, the SYSTEM MANAGEMENT PLATFORM [2] functions as the primary management station for a select population of EDGE SWITCHES [1]. The SNMP PROTOCOL STACK uses the data communication services of the IP ROUTING SYSTEM [1.14] to support SNMP sessions between the SYSTEM MANAGEMENT PLATFORM [2] and the DEVICE MGMT AGENTS [1.22].

ABSTRACT TELEPHONE CONTROLLER [1.19]

[0309] Software subcomponent of the EDGE SWITCH [1] that logically defines a full-featured, abstract telephone device control model that enables a higher-level application program to programmatically control the operation of TELEPHONE STATIONS [3] plugged into the TELEPHONE LINE INTERFACE [1.9], including the ability to interconnect, mix, and process full and half-duplex media streams associated with them. It implements features of this abstract telephone device control model to the fullest extent possible by invoking the MEDIA STREAM CONTROLLER [1.7] as a media control resource and the TELEPHONE LINE INTERFACE [1.9] as a telephone control resource. Certain features such as tone detection, tone generation and media transcoding are supported by the MEDIA STREAM CONTROLLER [1.8] working in conjunction with the DIGITAL SIGNAL PROCESSOR [1.8].

[0310] There is no concept of a "call session" in this telephone control model since only telephone features and media streams are managed. The "call session" concept is maintained in the ABSTRACT CALL MODEL [1.20], which functions as the "higher-level application program"—an application with knowledge of all SIP network signaling endpoints involved in a given call session.

[0311] The telephone control features support enabling or disabling detection of telephone events originating from the TELEPHONE LINE INTERFACE [1.9] (e.g. detection of on-hook, off-hook, hook flash, feature keys, and calls in progress, etc.). Telephone control features also support various device-level telephone features such as activating standard ring signaling, enabling distinctive ringing, enabling or disabling stutter dial-tone, activating or deactivating the message-waiting indicator lamp or to display text on a telephone LCD screen.

[0312] The media stream control features of the ABSTRACT TELEPHONE CONTROLLER support programmatically enabling or disabling media transmission to or from any media stream endpoint, particularly with respect to media stream endpoints associated with TELEPHONE STATIONS [3] plugged into the TELEPHONE LINE INTERFACE [1.9]. Conferencing features enable multi-party calls (e.g. 3-way calling, n-way calling) through the use of conferencing resources that can be applied programmatically. Digital signal processing algorithms may be applied programmatically to any stream to support tone detection, tone generation, echo cancellation and media transcoding, for example.

[0313] The media stream control model used by the ABSTRACT TELEPHONE CONTROLLER reflects that of the underlying MEDIA STREAM CONTROLLER [1.7] used to realize its features. In some respects, the control model is similar to that used by time division multiplex (TDM) telephony devices that support multi-line call and media control interfaces. It assumes that at least one endpoint of a media stream terminates on a MEDIA STREAM CONTROLLER [1.7] port and that the other endpoint of that same media stream terminates either on the TELEPHONE LINE INTERFACE [1.9] or on an endpoint within the IP CARRIER NETWORK [6] (transmitted through the BROADBAND NETWORK INTERFACE [1.1] by the PACKETIZATION COPROCESSOR [1.6] using RTP). This control model also assumes that any two media stream endpoints terminating on MEDIA STREAM CONTROLLER [1.7] ports (regardless of where their other endpoints terminate) may be interconnected through the MEDIA STREAM CONTROLLER [1.7] to create a full or half-duplex media session between the two far-end endpoints.

ABSTRACT CALL MODEL [1.20]

[0314] Software subcomponent of the EDGE SWITCH [1] that logically defines an abstract call control model and adjunct telephone feature set that enables event-driven CALL PROCESSING APPLICATIONS [1.23.2] to deliver network service to subscribers through TELEPHONE STATIONS [3] and SET-TOP BOXES [4] plugged into the EDGE SWITCH [1]. The ABSTRACT CALL MODEL implements its abstract call control model and telephone feature set to the fullest extent possible by (a) invoking network signaling operations available through the SIP PROTOCOL STACK [1.16] and (b) invoking telephone features, media streaming capabilities, and related digital signal processing features available through the ABSTRACT TELEPHONE CONTROLLER [1.19]. By integrating with these software elements, the ABSTRACT CALL MODEL becomes the nexus between the IP CARRIER NETWORK [6] and service logic contained in CALL PROCESSING APPLICATIONS [1.23.2] that are stored within the FILE SYSTEM [1.23].

[0315] CALL PROCESSING APPLICATIONS [1.23.2] define how the EDGE SWITCH [1] responds to certain events—they define the EDGE SWITCH [1] workflow in response to network signaling events and device-level telephone events—and consequently they in effect define the network services that are provided to the subscriber through TELEPHONE STATIONS [3] and SET-TOP BOXES [4].

[0316] The ABSTRACT CALL MODEL supports five distinct functions that are implemented to the fullest extent possible in a device-independent fashion:

[0317] (1) Telephone Gateway Function

[0318] (2) Telephone Feature Delivery Function

[0319] (3) Terminal Adaptation Function

[0320] (4) Calling Service Delivery Function

[0321] (5) Admission Control Function

[0322] The Telephone Gateway Function and the Telephone Feature Delivery Function are only applicable to call sessions involving TELEPHONE STATIONS [3]. Both TELEPHONE STATIONS and SET-TOP BOXES [4] make use of the other three functions. FIG. 7 depicts the EDGE SWITCH [1] call model in some detail, showing specifically how the five ABSTRACT CALL MODEL functions above are implemented within the EDGE SWITCH [1] software architecture.

[0323] For TELEPHONE STATIONS [3] to participate in call sessions using SIP network signaling, the ABSTRACT CALL MODEL [1.20] performs a Telephone Gateway Function in which it actively converts vendor-specific, device-level telephone signaling (through its interface to the ABSTRACT TELEPHONE CONTROLLER [1.19]) into SIP network signaling operations. As depicted in FIG. 7, the ABSTRACT CALL MODEL maintains an instance of a SIP User Agent for each TELEPHONE STATION [3] plugged into the EDGE SWITCH [1]. This SIP User Agent is registered with the SIP PROTOCOL STACK [1.16], using it as its default SIP Proxy Server. The SIP PROTOCOL STACK [1.16] knows which registered SIP User Agent instance corresponds to which dialing number, thus it can direct SIP network signaling to it based on dialing number addressing.

[0324] Certain "TELEPHONE EVENTS" received from the ABSTRACT TELEPHONE CONTROLLER [1.19], and/or SIP network signaling events from the SIP PROTOCOL STACK [1.16], trigger the ABSTRACT CALL MODEL to invoke a CALL PROCESSING APPLICATION [1.23.2] to apply service logic to the call session. This service logic will respond to the received event with some programmed action.

[0325] Since the ABSTRACT CALL MODEL retains device-level control over TELEPHONE STATIONS [3]

plugged into the EDGE SWITCH [1] (through its software integration with the ABSTRACT TELEPHONE CONTROLLER [1.19]) it supports a Telephone Feature Delivery Function in which it may exert device-level control over TELEPHONE STATIONS [3] (see "TELEPHONE CONTROL" in FIG. 7). Commands sent to the ABSTRACT TELEPHONE CONTROLLER [1.19] are ultimately directed to the TELEPHONE LINE INTERFACE [1.9], and in some cases to the actual TELEPHONE STATION [3] itself (e.g. to display text on an LCD screen, activate a message-waiting indication lamp, or to initiate distinctive ring signaling).

[0326] The Terminal Adaptation Function may take place as an adjunct to the Telephone Gateway Function when the ABSTRACT CALL MODEL determines that a CONFIGURATION PROFILE [1.23.5] contains a telephone function key profile that has been programmed into the EDGE SWITCH [1] for a particular type of TELEPHONE STATION [3]. As a result, the ABSTRACT CALL MODEL converts vendor-specific tone sequences or key codes to comply with an appropriate user interface convention (in accordance with model set forth by the function key layout profile).

[0327] As an example of terminal adaptation, a speed-dial feature key on a POTS telephone may be programmed to generate a DTMF tone sequence such as "#45" when pressed. A CONFIGURATION PROFILE [1.23.5] on the EDGE SWITCH [1] contains a telephone function key profile specifying that any time the DTMF digit sequence "#45" is detected from that particular POTS telephone, a virtual function key code called "TRANSER" is generated and passed as a virtual function key event to the CALL PROCESSING APPLICATION [1.23.2] currently executing. Upon receiving the "TRANSFER" virtual function key event, the CALL PROCESSING APPLICATION [1.23.2] will interpret the next series of DTMF digits as the dialing number to which the current call session should be transferred. From the user's perspective, the programmed speed-dial key functions as a dedicated "TRANSFER" key.

[0328] In FIG. 7, two SIP call sessions are shown to illustrate potential SIP protocol message flow. One example shows a SET-TOP BOX [4] (shown as terminal "A") connected in a multimedia SIP call session to another SET-TOP BOX [4] (shown as terminal "C"). Presumably cameras are connected to the SET-TOP BOXES [4] to enable two-way video communications. In a second example, a TELEPHONE STATION [3] (shown as terminal "B") is connected in a voice SIP call session to another TELEPHONE STATION [3] (shown as terminal "D").

[0329] Thus, in summary: terminal A represents a near-end SIP User Agent communicating with terminal C, which represents a far-end SIP User Agent. Terminal B represents a near-end SIP User Agent communicating with terminal D, which represents a far-end SIP User Agent.

[0330] The SET-TOP BOX [4] plugged into the VIDEO STREAMING DEVICE INTERFACE [1.5] (terminal A) and the TELEPHONE STATION [3] plugged into TELEPHONE LINE INTERFACE [1.9] (terminal B)—the near-end SIP User Agents—are both registered with the SIP PROTOCOL STACK [1.16], using it as their default SIP Proxy Server. Thus, the client list for the SIP Proxy Server (i.e. SIP PROTOCOL STACK [1.16]) will treat them both in a consistent fashion as SIP network signaling endpoints representing near-end terminals plugged into the EDGE SWITCH [1].

[0331] The SIP PROTOCOL STACK [1.16], functioning the same as any SIP Proxy Server, will forward SIP protocol messages between the near-end SIP network signaling endpoints (terminals A & B) through the IP CARRIER NETWORK [6] to and from the far-end SIP network signaling endpoints (terminals C & D) to which they are respectively connected. It is the role of a SIP Proxy Server to make network signaling events (shown as "SIGNALING EVENTS") available to an application so that service logic can applied to the SIP call sessions. In the EDGE SWITCH [1] software architecture, the integration between the SIP PROTOCOL STACK [1.16] and the ABSTRACT CALL MODEL [1.20] serves this purpose.

[0332] The Calling Service Delivery Function occurs when the ABSTRACT CALL MODEL, triggered by SIP network signaling events (i.e. SIGNALING EVENTS) from the far-end terminals or near-end terminals, retrieves stored service logic and executes it as a means to participate in the associated SIP call sessions. Service logic for the EDGE SWITCH [1] is contained within CALL PROCESSING APPLICATIONS [1.23.2] stored in the FILE SYSTEM [1.23].

[0333] The ABSTRACT CALL MODEL will recognize certain signaling events (such as an incoming call from the network side) that will trigger it to respond by executing a CALL PROCESSING APPLICATION [1.23.2] that is currently loaded in memory. Or alternately, certain events might trigger the ABSTRACT CALL MODEL to retrieve a new CALL PROCESSING APPLICATION [1.23.2] and execute it anew. Certain CALL PROCESSING APPLICATIONS [1.23.2] will actively query SUBSCRIBER SERVICE PROFILES [1.23.4] to determine the Class of Service for the TELEPHONE STATION [3] involved in the call.

[0334] Ultimately, Calling Services take effect by active participation of CALL PROCESSING APPLICATION [1.23.2] in SIP call sessions; they perform telephone control operations, call control operations and make use of signaling information directly, such as the dialing numbers of the calling and called party.

[0335] The Admission Control Function occurs each time a SET-TOP BOX [4] or TELEPHONE STATION [3] attempts to originate or answer a call. The CALL PROCESSING APPLICATION [1.23.2] contains the service logic used to supervise the connection attempt. This service logic will consider two gating factors that could potentially cause it to deny admission to EDGE SWITCH [1] network services: (a) Class of Service and (b) physical resource availability. The Class of Service assigned to the TELEPHONE STATION [3] or SET-TOP BOX [4] will determine the exact service logic that should be applied to a connection attempt.

[0336] For example, if the Class of Service specifies that outgoing calls to a "900" number from a certain TELEPHONE STATION [3] are not permitted, and a connection attempt to a "900" number is the connection being attempted, then the CALL PROCESSING APPLICATION [1.23.2] will deny it.

[0337] If the service logic allows a connection attempt to proceed on the basis of it complying with the Class of

Service, the CALL PROCESSING APPLICATION [1.23.2] must then determine if sufficient physical resources are available to complete the transaction. Among other considerations, the service logic supported by the CALL PROCESSING APPLICATION [1.23.2] will need to ensure that the new connection will not exceed the maximum number of call sessions supported by the EDGE SWITCH [1] configuration, and that there is adequate network bandwidth, internal routing capability, and digital signal processing resources to support the connection. If all these criteria are met, the connection attempt is allowed to proceed.

[0338] The Terminal Adaptation Function as applied to SET-TOP BOXES [4] may take place as an adjunct to the Calling Service Delivery Function. When the ABSTRACT CALL MODEL determines that one of the CONFIGURATION PROFILES [1.23.5] contains a SET-TOP BOX [4] interface profile that has been programmed into the EDGE SWITCH [1] for a particular type of SET-TOP BOX [4], it will use this profile to convert the vendor-specific command sequences supported by that SET-TOP BOX [4] to comply with an appropriate interface convention.

[0339] Since the SET-TOP BOX [4] interfaces the EDGE SWITCH [1] through an routed IP data path, the ABSTRACT CALL MODEL can only exert device-level control of SET-TOP BOX [4] features indirectly by communicating commands to it through the VIDEO STREAMING DEVICE INTERFACE [1.5]. Commands directed to the SET-TOP BOX [4] may support displaying text over the video image (text overlay) or muting of audio output, for example.

[0340] As a further example of the Terminal Adaptation Function, the SET-TOP BOX [4] at the near-end may use a channel selection protocol incompatible with NETWORK-BASED ENHANCED SERVICES [18] at the far-end used to provide selectable video content; thus the protocol used at the near-end must be converted to an appropriate interface convention used at the far-end.

XML MGMT INTERFACE [1.21]

[0341] XML (extensible Markup Language) is a set of conventions used to create text formats that enable data to be structured as lists of text expressions. The XML MGMT INTERFACE [1.12] is a software subcomponent in the EDGE SWITCH [1] that provides a secure, XML-based data exchange interface for the purposes of (a) enabling a remote user to access information stored in various EDGE SWITCH [1] databases and (b) enabling a remote user to access features and functions supported by the EDGE SWITCH [1], including call control operations and the ability to remotely activate certain DEVICE MGMT AGENTS [1.22].

[0342] Database information and feature-related parameters exchanged through this interface are structured according to these XML text format conventions, making it possible for them to be easily specified and/or interpreted by remote users. Remote users, which might include web applications and network management stations, access the XML MGMT INTERFACE through the HTTP PROTOCOL STACK [1.17].

DEVICE MGMT AGENTS [1.22]

[0343] Software applications integrated into the EDGE SWITCH [1] that may be activated to perform diagnostic functions, system software upgrades, feature testing, automated reporting, and other related device management tasks. The DEVICE MANAGEMENT AGENTS may be activated internally by EDGE SWITCH [1] software processes or remotely by various applications and network management stations through the XML MGMT INTERFACE [1.21] and/or the SNMP PROTOCOL STACK [1.18]. Certain DEVICE MANAGEMENT AGENTS may access databases on the FILE SYSTEM [1.23] for the purpose of accessing event records in the EVENT RECORD REPOSITORY [1.23.1] or to access CONFIGURATION PROFILES [1.23.5], for example.

FILE SYSTEM [1.23]

[0344] Software subcomponent in the EDGE SWITCH [1] that functions as directory-based file system; it supports standard file system operating semantics (open, close, read, write) and hierarchical directory structures, using the NON-VOLATILE MEMORY [1.12] as the physical storage device. The file system is implemented as a system resource, accessible through the operating system functions calls.

EVENT RECORD REPOSITORY [1.23.1]

[0345] Database stored on FILE SYSTEM [1.23] that contains event records generated by various software processes running on the EDGE SWITCH [1]. Event records stored in the EVENT RECORD REPOSITORY [1.23.1] are selectively generated by internal software processes according to the EDGE SWITCH [1] device configuration. Examples of the types of events that are stored include those that relate to basic system operations, detailed call session events for all incoming and outgoing calls, user access to calling features, detected error conditions, software component updates, and changes to subscriber preferences.

CALL PROCESSING APPLICATIONS [1.23.2]

[0346] Collection of software program files (applications) stored on the FILE SYSTEM [1.23] that are used by the EDGE SWITCH [1] to support network service delivery to users. CALL PROCESSING APPLICATIONS are invoked by the ABSTRACT CALL MODEL [1.20]. They define the service logic for all network services delivered to subscribers through TELEPHONE STATIONS [3] and SET-TOP BOXES [4]. They may function as call control agents that determine the progression of the call session, and/or they may function as device control agents that perform various telephone gateway and feature delivery functions.

[0347] They can reference other CALL PROCESSING APPLICATIONS [1.23.2], enabling the implementation of call control services (calling services) that impose no upper limit on the complexity of service logic that may be supported. The CALL PROCESSING APPLICATIONS are responsible for generating call-related event histories and storing them in the EVENT RECORD REPOSITORY [1.23.1] as the call session proceeds. In creating connections, the CALL PROCESSING APPLICATIONS rely upon call routing information stored in the LOCAL CALL ROUTING TABLES [1.23.3]. In rendering calling services, the CALL PROCESSING APPLICATIONS rely upon subscriber capabilities and personal preferences stored along with Class of Service information in the SUBSCRIBER SERVICE PROFILES [1.23.4]

LOCAL CALL ROUTING TABLES [1.23.3]

[0348] Database stored on FILE SYSTEM [1.23] that contains call routing information used by the EDGE SWITCH [1] for voice and video (multimedia) call set-up. Call routing tables include lists of dialing numbers and related address information used by CALL PROCESSING APPLICATIONS [1.23.2] to create connections between SIP network signaling endpoints. The LOCAL ROUTING TABLES store the dialing numbers of TELEPHONE STATIONS [3] physically plugged into the EDGE SWITCH [1], as well as dialing numbers needed to access PSTN GATEWAYS[8] installed within the IP CARRIER NETWORK [6] for the purpose of enabling voice call sessions to PSTN [7] endpoints.

[0349] Stored call routes provide default dialing numbers of Emergency 911 platforms to which TELEPHONE STATIONS [3] will automatically connected when 911 is dialed.

[0350] Tables of subscriber-programmed speed-dialing numbers may also be stored in call routing tables (managed by the subscriber or a remote user through an application running on a WEB SERVER [11]), making it possible for the TELEPHONE STATIONS [3] to support advanced speed-dialing functions without having to store the speed-dialing numbers within the TELEPHONE STATION [3].

[0351] LOCAL CALL ROUTING tables also store translation tables needed to support private telephone networking features, which include private dialing plans that use abbreviated dialing. Due to the substantial storage and processing capacity of the EDGE SWITCH [1], large dialing plans containing potentially tens of thousands of entries could be accommodated.

SUBSCRIBER SERVICE PROFILES [1.23.4]

[0352] Database stored on FILE SYSTEM [1.23] that contains subscriber-specific information used by the EDGE SWITCH [1] for all network service delivery to the subscriber. In the DES administrative model, each subscriber is associated with one more EDGE SWITCHES [1] that are installed at the subscriber premise for the purpose of network service delivery. A residence or single-location business entity may be viewed as a single subscriber, or in the case of a business with multiple locations (i.e. branch offices), a collection of subscribers.

[0353] Each subscriber enables a set of Class of Service "capabilities" (i.e. the subscriber purchases "capabilities" in the form of network services) that describes the collection of features, functions, and services that they would like to be able to access. These capabilities will determine which network services their particular EDGE SWITCH [1] will be capable of delivering.

[0354] The subscriber may then activate or deactivate selected Class of Service capabilities at their discretion. The collection of Class of Service capabilities that the subscriber has activated or deactivated is called their Class of Service "settings." A subscriber cannot activate any capability not previously enabled. The EDGE SWITCH [1] will not render any enabled capability that is not shown in the settings to be activated.

[0355] Once activated, a setting may require additional information from the subscriber in order for the corresponding feature, function, or service to operate correctly. For those settings, the subscriber configures "preferences" that further describe details as to exactly how the Class of Service settings should be interpreted. Preferences usually take the form of parameters that must be selected or typed in by the subscriber through a configuration application (e.g. telephone numbers, screen names, service options).

[0356] EDGE SWITCH [1] service delivery requires that subscriber Class of Service capabilities, settings, and preferences are stored locally in the FILE SYSTEM [1.23.4], each in the form of a machine-readable data object called a "service profile." Service profiles may be created to store subscriber-specific information required by a variety of applications. CALL PROCESSING APPLICATIONS [1.23.2] require service profiles as a means to store subscriber-specific parameters that effect their control flow. In some cases, service profiles may be created on the EDGE SWITCH [1] by certain network-based applications to function as "cookies," storing application-specific information required for service delivery.

CONFIGURATION PROFILES [1.23.5]

[0357] Database stored on FILE SYSTEM [1.23] that contains configuration information specific to a particular EDGE SWITCH [1] and used for its basic operation. In the DES administrative model, each subscriber is associated with one or more EDGE SWITCH [1], each of which may have a unique set of physical and network-related configuration parameters not directly related to Class of Service.

[0358] Virtually every software component of the EDGE SWITCH [1] requires a CONFIGURATION PROFILE that includes initialization and run-time parameters. As a few examples, CONFIGURATION PROFILES stored on the EDGE SWITCH [1] may include the number of terminals that it may have plugged into it, available bitrate of its connection to the BROADBAND ACCESS NETWORK [6.1], input/output buffer sizes, QoS parameters, IP routing parameters, IP address assignments, and function key layout profiles for TELEPHONE STATIONS [3].

EDGE SWITCH BASIC FEATURES [1.24]

[0359] The term EDGE SWITCH BASIC FEATURES refers to a specific collection of end-user features and functions that: (a) have become well-established in common use; (b) are likely to be highly-utilized on a day-to-day basis by the target subscriber group; and (c) are unlikely to change over time. The vast majority of voice, video, and data communications functions fall into this category, with features that include Customer Local Access Signaling Services (A.K.A. "CLASS features"), Centrex features, office telephone features, basic video channel selection, data firewall features, and Virtual Private (data) Networking, to name a few. EDGE SWITCH BASIC FEATURES are sorted into three broad categories according to the terminal type used to present them to the subscriber:

[0360] TELEPHONE STATION FEATURES

[0361] SET-TOP BOX FEATURES

[0362] COMPUTER WORKSTATION FEATURES

[0363] These feature categories define the core feature set of the EDGE SWITCH [1]. Network services are built up by

enabling collections of these basic features, and adding to them access to network-based features and services. A network-based feature may be used in some cases to override a basic feature for the purpose of providing enhanced or alternative functionality that is logically equivalent to the basic feature. The three categories of basic features are discussed below in detail:

TELEPHONE STATION FEATURES

[0364] For the purposes of this disclosure, the respective types of TELEPHONE STATION FEATURES will be differentiated on the basis of whether they generally enhance usability in a wide variety of subscriber environments, or whether the are primarily applicable to an office environment. The following list summarizes common features that "generally enhance usability in a wide variety of subscriber environments:"

[0365] Basic dial-tone

[0366] Automatic callback

[0367] Last number redial

[0368] Repeat dialing

[0369] Audible message-waiting indication (stutter dial tone)

[0370] Visible message-waiting indication (indicator lamp)

[0371] Distinctive ringing

[0372] Call-waiting indication/call-waiting cancel

[0373] Caller-ID with name

[0374] Call-blocking

[0375] Call-forwarding

[0376] Direct-connect

[0377] Emergency 911

[0378] The EDGE SWITCH [1] supports basic dial-tone, enabling the subscriber to originate (or receive) both on-network calls and off-network calls. Call-blocking features (A.K.A. "call-diverting features") enable the EDGE SWITCH [1] to block the origination of a call (outbound voice call) by a particular TELEPHONE STATION [3] based on the called party dialing number, or to block answering of a call (inbound voice calls) by a particular TELEPHONE STATION [3] based on the calling party dialing number. The EDGE SWITCH [1] supports configurable call blocking of this type, wherein the subscriber may selectively block inbound and/or outbound calls by specifying area codes, exchanges, and line numbers (or various combinations of the three).

[0379] Call-forwarding features enable the EDGE SWITCH [1] to automatically transfer (redirect) an inbound call based on a number of considerations. Call-forwarding features are often activated to automatically or conditionally transfers inbound calls to application servers for further processing or to provide access to NETWORK-BASED ENHANCED SERVICES [18]. Examples of NETWORK-BASED ENHANCED SERVICES [18] that may be accessed via call-forwarding include an auto attendant (used to answer calls directed to a main office number), voice mail, automatic call distribution, group conferencing bridge, or a personal call screening service. The EDGE SWITCH [1] supports configurable call-forwarding, wherein the subscriber may program it to redirect inbound calls based on:

[0380] Point of origination (determined by calling party dialing number);

[0381] Determination of a busy or "ring-no-answer" condition existing for the called party dialing number;

[0382] Determination that the incoming call is a fax or modem call;

[0383] Date, day of week, or time of day.

[0384] Direct-connect features (A.K.A. "direct-connect originating") enable the EDGE SWITCH [1] to automatically originate a call to a pre-programmed dialing number when a TELEPHONE STATION [3] goes off-hook, or upon the detection of some other event, such as a particular TELEPHONE STATION [3] function key sequence. Direct-connect features are often used for security telephones outside of a building, or at kiosks to provide immediate access to a call center help desk; they may also be used by the EDGE SWITCH [1] to implement speed-dialing by associating certain TELEPHONE STATION [3] key sequences with subscriber-programmed speed-dialing numbers stored in LOCAL CALL ROUTING TABLES [L23.3].

[0385] Support for Emergency 911 (E911) is implemented by configuring the dialing number "911" as a reserved dialing number. Any call to the dialing number 911 creates a connection to a SIP APPLICATION SERVER [13] or TDM APPLICATION SERVER [7.4] (through a PSTN GATEWAY [8]) that supports emergency services intervention. SIP network signaling passes the calling party dialing number to the APPLICATION SERVER, which then may determine the physical (geographical) location of the calling party as would be required to support emergency services intervention.

[0386] Customer Local Access Signaling Services (A.K.A. "CLASS features) comprise an additional layer of features that make TELEPHONE STATIONS [3] more generally useful in both residential and office settings. Depending upon one's point of reference, there is a significant overlap between what some may consider "CLASS features" and "office telephone features." Many of the features mentioned above, such as Distinctive Ringing and Audible message-waiting indication are considered by most local exchange carriers as CLASS features. For the purposes of this disclosure, CLASS features are not viewed as a distinct feature set and are instead subsumed by the broader category of TELEPHONE STATION FEATURES.

[0387] Office telephone features (A.K.A. "Centrex" or "PBX features") comprise an additional layer of specialized features that make TELEPHONE STATIONS [3] more useful in an office environment. Certain office telephone features make it possible for a user at a TELEPHONE STATION [3] to transfer calls between TELEPHONE STATIONS [3] that may not necessarily be plugged into the same EDGE SWITCH [1]. In the case where TELEPHONE STATIONS [3] are not plugged into the same EDGE SWITCH [1], implementation of certain features may require special communication between EDGE SWITCHES

[1] in which a SIP call session is initiated from one to another, not to set-up a new call, but to request that a call in progress be managed in a particular way (e.g. transferred to a different SIP signaling endpoint residing on a different EDGE SWITCH [1]). The following list summarizes common office telephone features that are "primarily applicable to an office environment:"

[0388] Private telephone network (private dialing plan)

[0389] Speed dialing

[0390] Multiple line appearances

[0391] Three-way calling

[0392] Call-hold

[0393] Call-transfer

[0394] Call-pickup

[0395] Call-park

[0396] Call-waiting with display

[0397] Call log

[0398] Calling reason display

[0399] Do not disturb

[0400] Executive busy override

[0401] Feature button support

[0402] Make busy key

[0403] The DES as a system supports the ability to create a virtually unlimited number of private telephone networks (A.K.A. "virtual private telephone network" or "virtual telephone network") that are implemented by programming private dialing plans into participating EDGE SWITCHES [1]. Generally speaking, a private telephone network is a collection of telephone endpoints that may address each other as specific community of users, thus enabling the carrier to offer special configuration options and rate plans to participating subscribers. Often, on-network calls made between participating subscribers are billed at a flat rate. The private dialing plan is managed by the subscriber and supports abbreviated dialing number formats that seamlessly integrate with existing dialing plans (e.g. the North American Dialing Plan).

[0404] Private telephone networks may operate within a single IP CARRIER NETWORK [6] or within a wider area through a more expansive IP network infrastructure that consists of interconnected IP CARRIER NETWORKS [6]. Since EDGE SWITCH [1] support for private telephone networks is based on dialing numbers, a private telephone network can include both SIP network signaling endpoints within the IP CARRIER NEWORKS [6] and PSTN [7] endpoints accessible through a PSTN GATEWAY [8].

SET-TOP BOX FEATURES

[0405] SET-TOP BOXES [4] are known to the EDGE SWITCH [1] as stand-alone SIP network signaling endpoints. The EDGE SWITCH [1] assumes that they will originate and answer multimedia call sessions independently and will support only limited remote (indirect) control of their feature sets by CALL PROCESSING APPLICATIONS [1.23.2] running on the EDGE SWITCH [1]. SET-TOP BOXES [4] originate multimedia call sessions to SIP APPLICATION SERVERS [13] that are capable of delivering streaming video content to the connecting SET-TOP BOX [4].

[0406] In support of this type of video (multimedia) call session, the SIP PROTOCOL STACK [1.15] residing on the EDGE SWITCH [1] functions as a SIP Proxy Server, mediating the multimedia call session, the CALL PROCESSING APPLICATION [1.23.2] managing the multimedia call session may at the same time communicate with the SET-TOP BOX [5] over the IP connection to the access its internal feature set. The following list summarizes common SET-TOP BOX [5] features that should be implemented as EDGE SWITCH BASIC FEATURES:

[0407] Detect, decode, and translate multimedia channel selection protocol

[0408] Detect, decode, and translate interactive services protocols (e.g. pay-per-view)

[0409] Display text overlay on top of video image

[0410] Control audio output gain

[0411] Detect, decode, and translate camera control protocol for two-multimedia applications

[0412] Download/upload device settings and preferences

COMPUTER WORKSTATION FEATURES

[0413] These features relate to the EDGE SWITCH'S [1] ability to provide data connectivity through the COMPUTER DATA INTERFACE [1.4]. Data feature examples include:

[0414] Network Address Translation (NAT) to provide IP address support for multiple COMPUTER WORKSTATIONS [5];

[0415] Programmable firewall features used to support file system protection and content filtering;

[0416] Dynamic Host Configuration Protocol (DHCP);

[0417] Virtual Private (data) Networking (VPN);

[0418] Packet metering for connects that use QoS transport services;

[0419] Admission control, dialing number assignment, and protocol message grooming for SIP call sessions.

EDGE SWITCH OVERRIDE FEATURES [1.25]

[0420] The term EDGE SWITCH OVERRIDE FEATURES refers to a specific collection of end-user features and functions that provide alternative versions of EDGE SWITCH BASIC FEATURES [1.24]; they in some way modify or subsume the behavior of EDGE SWITCH BASIC FEATURES [1.24], and may be implemented internally by the EDGE SWITCH [1] as alternative versions CALL PROCESSING APPLICATIONS [1.23.2] used to implement EDGE SWITCH BASIC FEATURES [1.24]. They may also be implemented external to the EDGE SWITCH [1] as NETWORK-BASED OVERRIDE FEATURES [19]

that are transparently and dynamically accessed through the BROADBAND ACCESS NETWORK [6.1] when the feature is invoked. EDGE SWITCH OVERRIDE FEATURES implemented externally as NETWORK-BASED OVERRIDE FEATURES [19] are accessed by originating a SIP call session to a SIP APPLICATION SERVER [13].

SYSTEM MANAGEMENT PLATFORM [2]

[0421] All EDGE SWITCHES [1] are provisioned, configured, managed, and actively monitored by a SYSTEM MANAGEMENT PLATFORM deployed in a carrier central office, or central office equivalent. The SYSTEM MANAGEMENT PLATFORM is a scalable, fault-tolerant, high-availability network element that functions as the nexus between carrier operations support systems (A.K.A. "carrier OSS" or "back-office interfaces") and the EDGE SWITCHES [1] deployed at the subscriber premises; it does not directly participate in network service delivery at any time, but provides only a supporting, administrative role.

[0422] EDGE SWITCHES [1] do not interface the carrier OSS directly, but do so only through mediation by software applications running on the SYSTEM MANAGEMENT PLATFORM. The software applications running on the SYSTEM MANAGEMENT PLATFORM support the following DES system management functions:

[0423] Configure and upload software loads to the EDGE SWITCHES [1] as part of a provisioning or upgrade process;

[0424] Dynamically provision EDGE SWITCH [1] service capabilities (using default settings and preferences) according to a Class of Service provisioning model;

[0425] Actively monitor EDGE SWITCH [1] service delivery and report status through carrier OSS;

[0426] Remotely retrieve, view, and modify EDGE SWITCH [1] base configuration and subscriber Class of Service parameters through carrier OSS;

[0427] Remotely initiate EDGE SWITCH [1] diagnostics and system test procedures, and provide capability to report results through carrier OSS;

[0428] Synchronize EDGE SWITCH [1] information with same information stored in SYSTEM MANAGEMENT PLATFORM databases and information repositories, including Class of Service capabilities, Class of Service settings, subscriber preferences, local call routing tables, subscriber service profiles, and configuration profiles;

[0429] Collect event logs from EDGE SWITCHES [1], then store in databases and information repositories according to programmed policies;

[0430] Sort and re-format billable events, then forward to carrier OSS;

[0431] Provide for and adapt to all standardized carrier OSS requirements related to telecommunications service delivery (operations, administration, management and provisioning).

[0432] The software applications supporting these DES system management functions operate in conjunction with scalable databases and information repositories (for bulk storage) that are integral components within the SYSTEM MANAGEMENT PLATFORM. In some cases, SYSTEM MANAGEMENT PLATFORM databases store and manage information that duplicates specific subsets of information stored on the carrier's POLICY SERVER [14]. As a result, operations support system workflow models provide for some level of synchronization to ensure consistency between the DES and the carrier OSS.

[0433] SYSTEM MANAGEMENT PLATFORM databases and information repositories provide reliable, redundant storage for the following:

[0434] Administrative information needed to track and manage EDGE SWITCH [1] deployments at the subscriber premise, including a subscriber database that details the physical addresses, hardware revisions, software revisions, and physical locations of all EDGE SWITCHES [1] assigned to each subscriber;

[0435] Synchronized backup copy of all subscriber-specific information stored on every EDGE SWITCH [1], including Class of Service capabilities, Class of Service settings, subscriber preferences, local call routing tables, subscriber service profiles, and EDGE SWITCH [1] configuration profiles;

[0436] Software loads, event logs, service records, billing records, provisioning templates, diagnostic reports, and other operational information referenced by administrative information or received as output from the EDGE SWITCHES [1] in the course of network service delivery.

TELEPHONE STATION [3]

[0437] Terminal device that is plugged into the TELEPHONE LINE INTERFACE [1.9] and used for voice communications. The term "voice communications" refers to the ability of a terminal device to participate directly or indirectly as an endpoint in a "voice call session." A voice call session is defined as a SIP call session in which at least one bearer connection is transporting voice media content. A TELEPHONE STATION does not support SIP network signaling and cannot present itself to the IP CARRIER NETWORK [6] as a SIP network signaling endpoint; therefore it cannot participate directly in a voice call session and relies upon the EDGE SWITCH [1] to perform the necessary conversions.

[0438] A TELEPHONE STATION communicates with the EDGE SWITCH [1] directly through the TELEPHONE LINE INTERFACE [1.9] using analog electrical (or potentially digital) device-level telephone signaling (i.e. not network signaling). Beyond support for basic telephone line signaling (e.g. on-hook, off-hook, DTMF tone generation), device-level telephone signaling is used by the TELEPHONE LINE INTERFACE [1.9] to activate and control special features supported by the TELEPHONE STATION, such as illuminating message-waiting indication lamps or to detect feature key presses by the user. Ultimately, it becomes the task of the EDGE SWITCH [1] (through the TELEPHONE LINE INTERFACE [1.9] and other internal components) to convert the TELEPHONE STATION'S analog

or digital device-level telephone signaling and voice transmission conventions to and from IP packets containing SIP network signaling information and digitally-encoded voice, respectively.

[0439] TELEPHONE STATIONS [3] work best with EDGE SWITCH [1] features when they support function keys that the EDGE SWITCH [1] can convert to an appropriate user interface convention. EDGE SWITCH [1] CALL PROCESSING APPLICATIONS [1.23.2] and NETWORK-BASED ENHANCED SERVICES [1.8] are implemented with the highest possible degree of device-independence, and therefore rely upon user input (feature key presses) that comply to a known user interface convention.

[0440] A POTS telephone with programmable speed-dial keys or a PBX telephone with dedicated functions keys can both be used as TELEPHONE STATIONS [3]. In the case of supporting a POTS telephone, the TELEPHONE LINE INTERFACE [1.9] must embody "SLIC" (Subscriber Line Interface Circuit) functionality whereas in the case of supporting a digital PBX telephone, the TELEPHONE LINE INTERFACE [1.9] must support a particular, vendor-specific line-level interface for that device.

SET-TOP BOX [4]

[0441] Terminal device that is plugged into the VIDEO STREAMING DEVICE INTERFACE [1.5] and used for multimedia communications. The term "multimedia communications" refers to the ability of a terminal device to participate directly or indirectly as an endpoint in a "multimedia call session." A multimedia call session is defined as a SIP call session in which at least one bearer connection is transporting video media content. In this disclosure, the term "video call session" should be understood as synonymous with "multimedia call session." The use of the term "video" remains to preserve the general concept of the EDGE SWITCH [1] providing support for all three media types: voice, video, and data.

[0442] Depending on terminal device capabilities and network capabilities, a single multimedia call session may encapsulate any number of concurrent voice, video, and data bearer connections simultaneously, and any one of them may be operating in a half-duplex or full-duplex mode. By plugging and ETHERNET SWITCH [28] into the VIDEO STREAMING DEVICE INTERFACE [1.5], more than one SET-TOP BOX can be connected to the EDGE SWITCH [1].

[0443] To participate in multimedia call sessions, the SET-TOP BOX interfaces with a television set, using it as an audiovisual output device. A camera apparatus may be connected to and controlled by the SET-TOP BOX for two-way multimedia communications. As required for direct participation in a multimedia call session, the SET-TOP BOX supports SIP network signaling and presents itself to the IP CARRIER NETWORK [6] as a SIP network signaling endpoint. It communicates with the EDGE SWITCH [1] through the VIDEO STREAMING DEVICE INTERFACE [1.5] using: (a) a QoS IP connection; (b) SIP network signaling; and (c) a number of adjunct, vendor-specific device control protocols as required to implement EDGE SWITCH BASIC FEATURES [1.24] described for the SET-TOP BOX.

[0444] Since the EDGE SWITCH [1] is functioning as a SIP Proxy Server, mediating the multimedia call session originated by the SET-TOP BOX, it may directly communicate with the SET-TOP BOX over the same IP connection for the purpose of accessing its internal feature sets. Vendor-specific device control protocols may be implemented either as distinct protocols or as SIP extensions, depending on SET-TOP BOX requirements.

[0445] A telephone terminal that supports SIP network signaling and that can present itself to the IP CARRIER NETWORK [6] as a SIP network signaling endpoint is considered to be operationally identical to a SET-TOP BOX. A so-called "SIP phone" is an example of this type of terminal device. Accordingly, a SIP phone could be plugged into the VIDEO STREAMING DEVICE INTERFACE [1.5] and participate directly in a voice call session.

[0446] Whereas a SIP phone cannot be controlled directly by the TELEPHONE LINE INTERFACE [1.9] using device-level telephone signaling, access to its internal feature set must be accomplished by communicating with it through the IP connection to it, using SIP extensions and potentially other vendor-specific device control protocols as required to implement EDGE SWITCH BASIC FEATURES [1.24] described for the TELEPHONE STATION [3].

[0447] This disclosure has deliberately characterized SIP phones to be the functional equivalent of SET-TOP BOXES to avoid creating confusion between the direct control of telephone features through the TELEPHONE LINE INTERFACE [1.9] and the indirect control of telephone features through vendor-specific IP protocols.

COMPUTER WORKSTATION [5]

[0448] Terminal device that is plugged into the COMPUTER DATA INTERFACE [1.4] and used for data communications. In most cases, this terminal device will be a desktop PC with an Ethernet LAN adapter running an IP protocol stack. By plugging an ETHERNET HUB [9] into the COMPUTER DATA INTERFACE [1.4], more than one COMPUTER WORKSTATION can be connected to the EDGE SWITCH [1].

IP CARRIER NETWORK [6]

[0449] Large-scale, routed internet protocol (IP) network designed to support the delivery of voice, video, and data communications services to a subscriber base made up of potentially millions of subscribers. The IP CARRIER NETWORK is a private network offering controlled access to a public subscriber base. It is owned and operated by a telecommunications carrier (A.K.A. "facilities-based network service provider"). It consists of a backbone network that is used to interconnect a number of access networks, and all transmission paths through both the backbone network and the access network are engineered to ensure that both signaling and bearer channel connections can be maintained with a Quality of Service (QoS).

[0450] QoS generally refers to the ability of the network to honor certain quality guarantees (i.e. minimum bit transfer rates, maximum allowable latency, maximum allowable jitter, maximum rate of packet loss, etc.) as necessary to support real-time, full-duplex voice and video calls in addition to providing "best effort" data communications at specified minimum bitrates.

[0451] An IP CARRIER NETWORK is fully managed such that its performance (QoS transmission and service delivery) is monitored at all times. In addition, such a network supports the capability to be securely partitioned so as to logically or physically segregate subscriber data, and subscriber data types, from each other into Virtual Private (data) Networks. The IP CARRIER NETWORK in most cases is implemented as a hybrid network in that IP connectivity in the network layer (OSI Layer 3) may be transported over an ATM packet-switched infrastructure in the data link layer (OSI Layer 2).

BROADBAND ACCESS NETWORK [6.1]

[0452] Specific type of access network that is designed to provide a relatively high-bitrate IP data path to the subscriber premise. For the purposes of this disclosure, the term "high-bitrate" is used loosely here to characterize a minimum bit transfer rate of 128 Kbit/second for both the downstream (toward the premise) or upstream (away from the premise) direction. For most implementations without video support, it is recommended that BROADBAND ACCESS NETWORK support a nominal bit transfer rate of at least 500 kilobit/second for both the downstream or upstream direction. Support for video services would require a 20 megabit/second downstream bitrate capacity.

[0453] In addition to minimum bitrate requirements, the BROADBAND ACCESS NETWORK must support QoS for its connections. The BROADBAND ACCESS NETWORK is often described as the segment of the IP CARRIER NETWORK [6.1] that bridges the "last mile" between the central office and the subscriber premise. Examples of "last mile" technologies that are suitable for integration into the BROADBAND NETWORK INTERFACE [1.1] include Digital Subscriber Line (DSL), coaxial cable, T1 in modem-pooled mode, and Passive Optical Network (PON).

DC POWER SOURCE [6.2]

[0454] The EDGE SWITCH [1] is a computing device that requires a DC POWER SOURCE to operate. BROADBAND ACCESS NETWORKS [6.1] based on DSL or coaxial cable usually provide power through the copper wire or cable, respectively. In some cases, this source is sufficient to power the EDGE SWITCH [1]. Otherwise, power must be provided at the premise.

PSTN [7]

[0455] Public Switched Telephone Network. The network depicted in FIG. 1 consisting of CENTRAL OFFICE SWITCHES and a TDM TRANSPORT NETWORK.

CENTRAL OFFICE SWITCH [7.1]

[0456] End-office switch deployed in a central office as the PSTN [7] network element used to provide telephone service to network subscribers. It is the same as the CENTRAL OFFICE SWITCH depicted in FIG. 1. The telephone features provided by the CENTRAL OFFICE SWITCH are virtually identical to the TELEPHONE STATION FEATURES described as a subset of the EDGE SWITCH BASIC FEATURES [1.24].

T1/E1/PRI [7.2]

[0457] T1, E1 or ISDN Primary Rate Interface digital trunk interfaces used in the PSTN [7]. T1, E1, and PRI are based upon circuit-switched time division multiplex (TDM) technology; they enable the transmission of voice or bearer channel content along with varying degrees of network signaling information.

SS#7[7.3]

[0458] Signaling System #7; the out-band signaling network used in the PSTN [7].

TDM APPLICATION SERVER [7.4]

[0459] Application server deployed in a central office as a PSTN [7] network element used to provide NETWORK-BASED ENHANCED SERVICES [18] to network subscribers. The TDM APPLICATION SERVER contains hardware and software components required to support the operation of one or more NETWORK-BASED ENHANCED SERVICES [18]. It typically presents access to these services through a digital trunk interface (see T1/E1/PRI [7.2]).

[0460] The TDM APPLICATION SERVER operates conceptually as an array of "computer-controlled" telephones in which the service logic contained in a software application program replaces a human operator as the controlling entity. According to this model, the software application program is able to use a variety of system resources (databases, speech recognition systems, media storage systems) to provide computer-controlled, personalized network services to connecting voice telephones.

PSTN GATEWAY [8]

[0461] ESN connectivity element that translates network signaling and bearer channel encoding formats so as to enable a call session in which one end of the call is a SIP network signaling endpoint in the IP CARRIER NETWORK [6] and the other end is a legacy TDM endpoint in the PSTN [7].

ETHERNET HUB [9]

[0462] Simple, low-cost, multi-port data distribution device that enables data communications to occur between all network devices plugged into it using Ethernet technology or the equivalent. This type of device has only modest transmission capacity and therefore cannot guarantee that a certain minimal bandwidth is maintained for each data path passing through it. This device may operate in a wired or wireless capacity.

DNS SERVER [10]

[0463] Distributed database application (A.K.A. "Domain Naming Server") that works at the transport layer (OSI Layer 4—above the network layer) to provide name-to-address mapping for all client applications in an IP network. The client applications can include e-mail, web hosting, and SIP-based telecommunications. It is a component in the DES carrier reference network architecture and serves multiple purposes as it would in any IP-based network architecture.

[0464] Three principal DNS SERVER functions stand out as most significant to the operation of the DES:

[0465] Translate generic network element names into one or more IP addresses that correspond to actual physical instances of that network element type;

[0466] Convert E.164 dialing numbers into IP addresses as required for call routing with the IP network;

[0467] Enable load balancing by providing IP addresses for multiple instances of a certain type of network element or other network resource.

WEB SERVER [11]

[0468] Software application program that implements support for the "web server" functionality described by IETF RFC 2068 on Hypertext Transfer Protocol—HTTP Version 1.1 (HTTP). The WEB SERVER is a component in the DES carrier reference network architecture and primarily used as a means to enable subscribers to communicate indirectly with EDGE SWITCHES [1] for the purposes of interactive configuration and interactive network service delivery.

[0469] With respect to interactive configuration, the WEB SERVER presents a web browser-based graphical user interface that enables subscribers to selectively enable or disable Class of Service settings and then to control or input preferences that relate to the delivery of activated network services. The WEB SERVER performs an authenticated log-in to the subscriber's EDGE SWITCH [1], and thus functions as an intermediary agent to ensure that the subscriber's settings and preferences are written to the target EDGE SWITCH [1] in a secure and syntactically correct manner.

[0470] To support interactive network service delivery to the subscriber, the WEB SERVER once again functions as an intermediary agent, hosting service-related applications that enable browser-based interactions between the subscriber and the EDGE SWITCH [1]. The WEB SERVER again performs an authenticated log-in to the subscriber's EDGE SWITCH [1], but this time for the purposes of (a) accessing call log data stored within it so that it may be used as application data, and (b) exerting control over internal EDGE SWITCH [1] features, such as originating or answering a call.

SIP PROXY SERVER [12]

[0471] This term refers specifically to a network-based implementation of a stand-alone SIP Proxy Server (or SIP Proxy Server cluster) and not to the SIP Proxy Server functionality supported by the SIP PROTOCOL STACK [1.16]. While the SIP Proxy Server functionality supported by both is essentially identical, they operate independently in support of different roles.

[0472] According to IETF RFC 2543 on SIP: Session Initiation Protocol a SIP PROXY SERVER is defined as follows:

[0473] "An intermediary program that acts as both a server and a client for the purpose of making requests on behalf of other clients. Requests are serviced internally or by passing them on, possibly after translation, to other servers. A proxy interprets, and, if necessary, rewrites a request message before forwarding it."

[0474] The SIP PROXY SERVER is a component in the DES reference carrier network architecture and is required to support many SIP network signaling operations within it by shuttling SIP messages back and forth between two or more SIP User Agents participating in a SIP call session.

[0475] Specifically, the SIP PROXY SERVER functions much like an intermediary SIP message router to ensure that the SIP network signaling messages to/from the SIP endpoints in the network are ultimately channeled to the correct destination. In this message-routing capacity, several SIP PROXY SERVERS can cooperate to pass SIP network signaling messages bi-directionally through a hierarchy of SIP PROXY SERVERS, each of which gets it closer to the target endpoint. SIP PROXY SERVERS access both the DNS SERVER [10] and the POLICY SERVER [14] to determine how to route SIP call sessions within the IP CARRIER NETWORK [6].

SIP APPLICATION SERVER [13]

[0476] ESN connectivity element deployed in an IP CARRIER NETWORK [6] to provide NETWORK-BASED ENHANCED SERVICES [18] to network subscribers. The SIP APPLICATION SERVER contains hardware and software components required for the operation of one or more NETWORK-BASED ENHANCED SERVICES [18]. It presents itself as a SIP network signaling endpoint that may communicate with any other SIP network signaling endpoint in a SIP call session.

[0477] It is assumed that the SIP APPLICATION SERVER will provide a means, directly or indirectly, to support one or more RTP bearer channel connections that are likely to be required for voice or multimedia call sessions. Because bearer channel capabilities for these SIP-based call sessions are assumed, the SIP APPLICATION SERVER may viewed conceptually to operate as an array of "computer-controlled" voice or multimedia terminals in which the service logic contained in a software application program replaces a human operator as the controlling entity.

[0478] According to this model, the software application program is able to use a variety of system resources (databases, speech recognition systems, media storage systems) to provide computer-controlled, personalized network services to connecting voice or multimedia terminals.

[0479] As a consequence of the fact that most call sessions in which the SIP APPLICATION SERVER participates are mediated through a SIP PROXY SERVER [12], each SIP signaling path created to support these call sessions may be used as a context to invoke additional capabilities of the SIP PROXY SERVER [12].

[0480] By exchanging SIP messages with the SIP PROXY SERVER [12] (through the SIP signaling path created to support a call session), the application program responsible for controlling a call session may perform complex call control operations, such as to transfer calls, add/drop call participants, or connect to a specialized type of SIP APPLICATION SERVER [13] called a "media server" for the purpose of invoking media services. A media server is capable of supporting media-intensive application services

such as speech recognition, interactive voice response, or music-on-hold. Media servers are called "dialog servers" when they interpret and execute interactive voice response commands written in Voice XML.

POLICY SERVER [14]

[0481] Collection of database applications owned, operated, and maintained by the carrier for the purpose of managing network service delivery to network subscribers. These database applications are referred to collectively as a POLICY SERVER for two reasons:

[0482] (a) It is a practical impossibility to accurately characterize a "generic" carrier policy database server configuration; carrier network elements of this type will vary according to their unique network infrastructure requirements;

[0483] (b) It is a practical impossibility to accurately characterize how a particular carrier logically organizes its information; each may conceive scheme and/or combine data objects in very different ways that will vary according to their unique network infrastructure requirements;

[0484] The POLICY SERVER thus represents a logical entity that stores essential network operational support information and enable DES system elements to access that information. Information stored on the POLICY SERVER includes:

[0485] Subscriber-specific information (Class of Service, account status, service profiles, preferences);

[0486] Connection policies and related call routing information; dialing plans;

[0487] Billing policies and rate plans for service delivery; General network authentication services for all human and machine users.

[0488] The connection policies are abstract data representations of the control logic necessary to route calls, invoke services, and perform other interconnection operations that define the behavior of the SIP PROXY SERVER [12] as it establishes specific call paths through the IP CARRIER NETWORK [6].

NETWORK PROVISIONING SYSTEM [15]

[0489] Network operations support system used by carrier to enable, disable, or modify network service delivery for network subscribers.

NETWORK OPERATIONS CENTER [16]

[0490] Network operations support system used by carrier to configure, monitor, troubleshoot, and manage network elements involved in delivering network services to network subscribers.

NETWORK BILLING SYSTEM [17]

[0491] Network operations support system used by carrier to collect billing records from network elements involved in delivering network services to network subscribers, and then to convert them to customer invoices based on billing policies and rate plans.

NETWORK-BASED ENHANCED SERVICES [18]

[0492] In contrast to NETWORK-BASED OVERRIDE FEATURES [19], NETWORK-BASED ENHANCED SERVICES are typically stand-alone network services that perform complete, independent functions; they are not functionally bound to any EDGE SWITCH [1] feature, but are generally accessible through the IP CARRIER NETWORK [6] using TELEPHONE STATIONS [3] and/or SET-TOP BOXES [4] plugged into and EDGE SWITCH [1]. They are general-interest applications that appeal to a wide audience.

[0493] Examples of NETWORK-BASED ENHANCED SERVICES include voice call-answering, group audio conferencing, language translation services, or video content delivery. Most NETWORK-BASED ENHANCED SERVICES are suitable to be offered as either stand-alone applications or as part of an overall services package that incorporates other features and services. An important distinction between EDGE SWITCH BASIC FEATURES [1.24] and NETWORK-BASED ENHANCED SERVICES is that the latter are not substitutes for, or alternative versions of, EDGE SWITCH BASIC FEATURES [1.24], but are independent, companion network services with which EDGE SWITCH BASIC FEATURES [1.24] must interoperate.

NETWORK-BASED OVERRIDE FEATURES [19]

[0494] Special-purpose, network-based applications that work in conjunction with EDGE SWITCH OVERRIDE FEATURES [1.25] for the purpose of imparting the EDGE SWITCH [1] with more advanced feature delivery capabilities. Advanced features of this type are likely to appeal to only a select subset of subscribers and/or are potentially costly to implement; thus they do not meet the requirements necessary to be implemented as EDGE SWITCH BASIC FEATURES [1.24].

[0495] An simple example of a NETWORK-BASED OVERRIDE FEATURE is an "inbound call management" network-based application (implementing the feature) that enables the end-user to accept or deny an incoming call from the PC desktop. In this case, the EDGE SWITCH [1] would transfer the inbound call to a network-based application rather than simply ringing the TELEPHONE STATION [3]. The network-based application would support a NETWORK-BASED OVERRIDE FEATURE that would present the identity of the calling party on the PC desktop (through a web browser graphical user interface). If the end-user accepts the incoming call through the web browser graphical user interface, the NETWORK-BASED OVERRIDE FEATURE transfers the call back to the EDGE SWITCH [1] with a marker indicating that call-setup should be allow to proceed in the normal fashion.

ETHERNET SWITCH [20]

[0496] Multi-port data distribution device based on Ethernet technology. The ETHERNET SWITCH enables data communications to occur between all network devices plugged into it at the same time, and is able to guarantee a minimal amount of bandwidth for each data transmission path passing through it. This device may operate in a wired or wireless capacity.

SUBSCRIBER NETWORK INTERFACE (POTS)
[22]

[0497] Demarcation point that defines the interface between the public carrier network (PSTN [7] or IP CARRIER NETWORK [6]) and the subscriber's inside wiring plant. The SUBSCRIBER NETWORK INTERFACE (A.K.A. "Telco Entrance Facility") is required to be physically located in a "publicly accessible place." Its physical manifestation is usually a modest wire interface device (channel bank) used to connect copper wires from the street to the copper wiring within the premise. From a regulatory perspective, everything on the network side of the SUBSCRIBER NETWORK INTERFACE is the responsibility of the carrier and everything on the premise side is the responsibility of the subscriber. For residential telephone service, the SUBSCRIBER NETWORK INTERFACE is usually located on the outside of the residence. Businesses often have more complex termination requirements and allocate a wiring closet to serve this purpose.

[0498] A number of embodiments of the invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. Accordingly, other embodiments are within the scope of the following claims.

What is claimed is:

1. A network device comprising:

a plurality of communication interfaces, including a telephone line interface, a computer data interface, and a broadband network interface;

a processor;

a machine-readable storage medium which during use stores a call processing application and service profiles, and which stores executable instructions to mediate communications between the plurality of communication interfaces, the instructions causing the network device to

detect network signaling events or trigger points in a telephone call and

invoke the call processing application in response to the detected network signaling events or trigger points, the call processing application operating according to parameters defined in the service profiles.

2. The network device of claim 1, wherein the plurality of communication interfaces further includes a video streaming device interface.

3. The network device of claim 1, wherein the broadband network interface terminates a broadband network link that joins a customer premises to a packet carrier network.

4. The network device of claim 1, wherein the instructions further cause the network device to route IP data between the computer data interface and the broadband network interface.

5. The network device of claim 1, wherein the network device is contained in a single physical enclosure.

6. The network device of claim 1, wherein the instructions further cause the network device to provide a first SIP proxy agent to represent a telephone that uses the telephone line interface, and provide a second SIP proxy agent to represent a computer that uses the computer data interface.

7. The network device of claim 1, wherein the storage medium during use further stores call routing tables, and

the instructions further cause the network device to perform call routing for telephone calls that use the telephone line interface.

8. The network device of claim 1, wherein the storage medium during use further stores call routing tables, and

the instructions further cause the network device to perform call routing for telephone calls according to the call routing tables, the telephone calls using the telephone line interface.

9. A network device comprising:

a plurality of communication interfaces, including a telephone line interface, a computer data interface, and a broadband network interface;

a processor;

a machine-readable storage medium which during use stores call routing tables, and which stores executable instructions to mediate communications between the plurality of interfaces, the instructions causing the network device to perform call routing according to the call routing tables, the telephone calls using the telephone line interface.

10. The network device of claim 9, wherein call routing includes peer-to-peer call signaling between customer premises over a shared IP network.

11. The network device of claim 10, wherein the call signaling is performed without requiring stateful elements of the shared IP network above the IP infrastructure.

12. The network device of claim 10, wherein the broadband network interface terminates a link that joins the network device to the shared IP network.

13. The network device of claim 9, wherein call routing includes call signaling to a PSTN endpoint via a PSTN gateway that is reachable over the broadband network interface.

14. The network device of claim 9, wherein the network device is contained in a single physical enclosure.

15. The network device of claim 9, wherein the instructions further cause the network device to route IP data between the computer data interface and the broadband network interface.

16. The network device of claim 9, wherein the plurality of communication interfaces further includes a video streaming device interface.

17. A network device comprising:

a plurality of communication interfaces, including a telephone line interface, a computer data interface, and a broadband network interface;

a processor; and

a machine-readable storage medium which stores executable instructions to mediate communications between the plurality of interfaces, the instructions causing the network device to log a telephone event record to a telephone event repository, the event record describing a telephone call communication mediated by the network device.

18. The network device of claim 17, wherein the telephone event repository is included in the network device.

19. The network device of claim 17, wherein the telephone event repository is remote relative to the network device.

20. The network device of claim 17, wherein the network device is contained in a single physical enclosure.

21. The network device of claim 17, wherein the plurality of communication interfaces further includes a video streaming device interface.

22. A network device comprising:

a broadband network interface;

a plurality of interfaces, including a telephone line interface and a computer data interface;

a processor; and

a machine-readable storage medium that stores processor-executable instructions to provide proxy agents, the instructions causing the network device to

provide a telephone SIP proxy agent to represent a non-SIP telephone that uses the telephone line interface, and

provide a distinct SIP proxy agent for each additional device that uses an interface in the plurality of interfaces, and

the instructions further causing the network device to implement a proxy server that mediates all SIP communications over the broadband network interface involving the non-SIP telephone and the each additional devices.

23. The network device of claim 22, wherein the computer data interface passes IP data.

24. The network device of claim 22, wherein the plurality of interfaces includes a video streaming device interface.

25. The network device of claim 22, wherein the network device is contained in a single physical enclosure.

26. A method for establishing a voice-over-packet network architecture, the method comprising:

locating a system management platform in a shared packet network, the system management platform collecting call log data from a plurality of network devices; and

distributing the plurality of network devices that each include

a telephone line interface,

a computer data interface,

a broadband network interface terminating a link from the shared packet network,

a processor, and

a machine-readable storage medium storing processor-executable instructions to control telephone calls, the instructions causing each network device to route telephone calls in a peer-to-peer fashion over the shared packet network and to send call log data to the system management platform.

27. The method of claim 26, wherein for each device the broadband network interface terminates a link from the shared packet network.

28. The method of claim 26, wherein the routing of telephone calls includes SIP signaling.

29. The method of claim 26, wherein the storage medium further stores processor-executable instructions to act as an SIP proxy server for devices using the telephone line interface and for devices using the computer data interface.

30. The method of claim 26, wherein the shared packet network uses IP protocols.

31. The method of claim 26, wherein the shared packet network uses ATM protocols.

32. The method of claim 26, wherein the plurality of network devices each further include a video streaming device interface

* * * * *

IN THE UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF TEXAS

TEXARKANA DIVISION

ESN, LLC,	)	
Plaintiff,	)	
v.	)	**Civil Action No. 5:07-cv-156-DF-CMC**
CISCO SYSTEMS, INC., and CISCO-LINKSYS, LLC,	)	**JURY DEMANDED**
Defendants.	)	

EXHIBIT B

Peter McAndrews

From: b.hollander5674@gmail.com
Sent: Friday, August 11, 2006 1:36 PM
To: legal@cisco.com
Cc: ggirard@girardcp.com; Peter McAndrews
Subject: Patent application of interest to Cisco

Attachments: ENVELOPE.TXT

ENVELOPE.TXT (2 KB)

To whom it may concern:

I am a Member of ESN, LLC located in Hartford, CT. The other Member of the company is Greg Girard, the inventor of published U.S. Patent Application No. 10/122,589, entitled Distributed Edge Switching System For Voice-Over-Packet Multiservice Network. The Chicago law firm of McAndrews, Held & Malloy is our outside law firm.

We have begun discussions with potential infringers and patent investors who could benefit from owning the application or owning/licensing the patent(s) that issue from the application. Based on our review of publicly available information about certain of Cisco's VoIP products, and Cisco's published U.S. Patent Application No. 2006/0089991, entitled Providing A Proxy Server Feature At An Endpoint, it would appear that Cisco might have an interest in exploring such a business transaction.

We have a clear sense of the type of transaction we would be willing to do now, which we believe would be attractive to Cisco. We would be prepared to share our ideas with you as part of a serious business discussion.

Brian L. Hollander
ESN, LLC
860-916-7200
b.hollander5674@gmail.com

Peter McAndrews

From: b.hollander5674@gmail.com
Sent: Friday, August 11, 2006 1:53 PM
To: dproctor@cisco.com
Cc: ggirard@girardcp.com; Peter McAndrews
Subject: U. S. Patent Application 10/122,589

Attachments: ENVELOPE.TXT

ENVELOPE.TXT (2 KB)

Dear Mr. Proctor,

I am sending this email to you because you appear to be the most appropriate member of the Executive Team listed on the Cisco website to receive a VoIP related communication. I tried to locate inside patent counsel through a Cisco operator, but as I am sure you know this is an impossible task without a name.

I am a Member of ESN, LLC located in Hartford, CT. The other Member of the company is Greg Girard, the inventor of published U.S. Patent Application No. 10/122,589, entitled Distributed Edge Switching System For Voice-Over-Packet Multiservice Network. The Chicago law firm of McAndrews, Held & Malloy is our outside law firm.

We have begun discussions with potential infringers and patent investors who could benefit from owning the application or owning/licensing the patent(s) that issue from the application. Based on our review of publicly available information about certain of Cisco's VoIP products, and Cisco's published U.S.Patent Application No. 2006/0089991, entitled Providing A Proxy Server Feature At An Endpoint, it would appear that Cisco might have an interest in exploring such a business transaction.

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Brian L. Hollander
ESN, LLC
860-916-7200
b.hollander5674@gmail.com

IN THE UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF TEXAS

TEXARKANA DIVISION

ESN, LLC,	)	
Plaintiff,	)	
v.	)	**Civil Action No. 5:07-cv-156-DF-CMC**
CISCO SYSTEMS, INC., and CISCO-LINKSYS, LLC,	)	
Defendants.	)	**JURY DEMANDED**

EXHIBIT C

mcandrews
McANDREWS HELD & MALLOY LTD

500 WEST MADISON STREET 34TH FLOOR CHICAGO ILLINOIS 60661
(T) 312 775 8000 (F) 312 775 8100 www.mcandrews-ip.com

PETER J. MCANDREWS
(T) 312 775 - 8080
pmcandrews@mcandrews-ip.com

June 8, 2007

VIA EMAIL

Kurt M. Pankratz
Baker Botts L.L.P.
2001 Ross Avenue
Dallas, TX 75201-2980

Re: U.S. Patent Application Publication No. 2002/0176404

Dear Kurt,

We are somewhat disappointed that Cisco is refusing to hold open and honest discussions pursuant to Rule 408 in an effort to avoid litigation. Nevertheless, we believe that both parties can benefit from moving forward with discussions that may lead to Cisco taking a license to, or purchasing, ESN, LLC's pending U.S. Patent Application Publication No. 2002/0176404 ("the '404 Application") and the related U.S. Patent Application Publication No. 2007/0110043 ("the '043 Application"). We base this primarily on a firm belief that Cisco is, and has been, making, using, selling, and offering for sale products that embody the subject matter of one or more claims of the '404 Application.[1]

A preliminary analysis of an example Cisco product in view of example pending claims of the '408 Application is provided in the attached claim chart (Exhibit A). Our analysis is obviously preliminary in view of the fact that it is based upon the limited technical information that is publicly available for these products. Only the Cisco ISR 2851 is analyzed in the attached claim chart as an example, however, we believe that the following products embody the subject matter of one or more claims of the '404 Application:

- the Linksys SPA-9000 product (at least as configured with the components described in Exhibit B attached hereto)
- the Linksys One SVR-3000 product (at least as configured with the components described in Exhibit C attached hereto)

[1] Cisco's products and related conduct also contribute to and/or induce the practice of methods covered by one or more claims of the '404 application.

mcandrews

- Cisco ISR models, for example, the 2800 and 3800 series models, which include Cisco's CallManager Express or Communication Manager Express.

Your letter states that you have "reviewed the '404 Application and do not believe that it has relevance to any current or planned Cisco products." While we doubt the sincerity of that statement, we request that you explain the facts and analyses upon which you based this statement. Additionally, after you have had a chance to review our preliminary analysis, if you disagree with our analysis in any way, we invite you to point out and explain any disagreement with our analysis and provide any information that you believe may support your explanation. We ask for a complete analysis since on present information we would be seeking enhanced damages, if litigation ensues, for any continued infringement beyond the issue date of the '404 application.

Your paragraph attributing statements to us regarding the relationship between the '404 Application and Cisco's pending U.S. Patent Application Serial No. 10/973,146 ("the '146 Application) mischaracterizes the parties' communications on this topic. We further note that you fail to point out what references, if any, are relevant or material to the prosecution of the '404 Application due to a relationship to the '146 Application. Undoubtedly, this is due in part to the fact that Cisco, through your firm, has made arguments to the U.S. Patent Office that are contrary to such a position. Whatever the intent of your discussion of references cited against the '146 Application, the issue is moot since we have disclosed all such references to the U.S. Patent Office in the prosecution of the '404 Application.

More to the point, we do not believe that any of the references cited against the '146 Application are material to the examination of the '404 Application. Indeed, many do not even qualify as prior art given that the priority date for the '404 Application is two and one half years prior to that of Cisco's '146 Application. Thus, we are confident that the pending claims will be allowed in their present form.

Since we fully expect the current claims to issue in their present form, upon issuance of the '404 Application as a patent, potential damages in a patent infringement action will include all infringing activity occurring since Cisco had actual knowledge of the published '404 Application. Cisco has had actual knowledge since at least as early as August 11, 2006.

While we had hoped that the parties exchange would not devolve to the discussion of litigation, your asserted ignorance of the relevance of the '404 Patent to Cisco's product

mcandrews
McANDREWS HELD & MALLOY LTD

10 months after ESN brought it to Cisco's attention (with numerous written and verbal communications between Mr. Lang and Mr. Hollander in the interim) and the obvious attempt in your letter to fabricate an inequitable conduct defense, suggests that ESN may have to pursue other means to resolve this dispute. Nevertheless, ESN is willing to delay completing certain alternative business arrangements for a short time to provide an opportunity to discuss a reasonable business arrangement if Cisco has a serious interest in having such a discussion.

We look forward to receiving your response.

Very truly yours,

Peter J. McAndrews

Enclosures

Exhibit A
Preliminary Comparison of '404 Application Claims to Cisco's ISR 2851

Claim 1	ISR 2851
1. A network device comprising:	The ISR 2851 is a network device.
a plurality of communication interfaces, including a telephone line interface, a computer data interface, and a broadband network interface;	The ISR 2851 includes a telephone line interface for connecting, for example, analog telephones or fax machines. For example, the ISR 2851 is configured to include one or more Extension Voice Modules ("EVM"). The type of EVM depends on the nature and number of the analog connections. The ISR 2851 includes a computer data interface for connecting, for example, computers to allow the computers to communicate data over the Internet via the broadband access network. For example, the ISR 2851 is configured to include one or more Ethernet interfaces. The ISR 2851 includes a broadband network interface for connecting the 2851 to a broadband access network. For example, the ISR 2851 is configured to include one or more High-Speed Wan Interface Cards ("HWIC"). The type of HWIC depends on the broadband access network carrier.
a processor;	The ISR 2851 includes one or more processors.
a machine-readable storage medium which during use stores a call processing application and service profiles, and which stores executable instructions to mediate communications between the plurality of communication interfaces,	The ISR 2851 includes a machine-readable storage medium that stores, among other system software components and databases, Cisco's "Communication Manager Express" (formerly "CallManager Express") software instructions ("CME"). CME software instructions that mediate communications between ISR 2851 interfaces includes one or more call processing applications (i.e. Session Applications) operating in concert with, e.g., a Virtual Telephony Service Provider Interface, a Packet Network Service Provider, and a Call Control API. Service profiles stored on the ISR 2851 contain, for example, call routing tables (dial peers), call routing policies, user-specific capabilities/settings, administrative information, and user authentication data.
the instructions causing the network device to detect	Virtual Telephony Service Provider (VTSP) interface and Packet Network Service Provider (PNSP) detect network

network signaling events or trigger points in a telephone call and invoke the call processing application in response to the detected network signaling events or trigger points,	signaling events and device-level states from analog telephones and IP telephones, respectively, that are participating in a telephone call. The telephone may be interfaced directly to the ISR 2851 or accessible to the ISR 2851 by communicating through the broadband access network. The VTSP and PNSP make these events and states available to the Call Control API (CCAPI). The CCAPI then makes them available to a Session Application. According to its service logic, the Session Application may respond by invoking a particular CCAPI operation that controls: the delivery of a particular calling service; the overall progression of the telephone call; the number of call participants; and/or the activation of telephone feature defined for a calling service.
the call processing application operating according to parameters defined in the service profiles.	A Session Application relies upon, inter alia, call routing tables (dial peers), call routing policies, user-specific capabilities/settings, administrative information, and user authentication data when executing its service logic.
Claim 22	**ISR 2851**
22. A network device comprising:	The ISR 2851 is a network device.
a broadband network interface;	The ISR 2851 includes a broadband network interface for connecting the 2851 to a broadband access network. For example, the ISR 2851 is configured to include one or more High-Speed Wan Interface Cards ("HWIC"). The type of HWIC depends on the broadband access network carrier.
a plurality of interfaces, including a telephone line interface and a computer data interface;	The ISR 2851 includes a telephone line interface for connecting, for example, analog telephones or fax machines. For example, the ISR 2851 is configured to include one or more Extension Voice Modules ("EVM"). The type of EVM depends on the nature and number of the analog connections. The ISR 2851 includes a computer data interface for connecting, for example, computers to allow the computers to communicate data over the Internet via the broadband access network. For example, the ISR 2851 is configured to include one or more Ethernet interfaces.
a processor; and	The ISR 2851 includes one or more processors.

a machine-readable storage medium that stores processor-executable instructions to provide SIP agents, the instructions causing the network device to provide a SIP user agent to represent a non-SIP telephone that uses the telephone line interface, and	The ISR 2851 includes a machine-readable storage medium comprising storage devices located within the ISR 2851. Instructions stored on the storage devices collectively provide, for example, one or more SIP agents: a SIP user agent, a SIP proxy, SIP redirect service, and a back-to-back SIP user agent. A SIP user agent is used to represent each analog (non-SIP) telephone interfaced to a telephone line interface provided by an ISR 2851 Extension Voice Module ("EVM). An analog telephone interfaced to the EVM is monitored and controlled by the CME Virtual Telephony Service Provider (VTSP) interface software element. The VTSP operates in concert with the CME Call Control API and one or more Session Applications to enable the telephone to be represented by a SIP user agent that performs SIP communications on behalf of the telephone. This SIP user agent enables the telephone to be managed as a SIP endpoint device by the back-to-back user agent, an element of the SIP proxy executing within the ISR 2851.
the instructions further causing the network device to implement a SIP proxy server that mediates all SIP communications over the broadband network interface involving the non-SIP telephone.	The CME also causes the ISR 2851 to implement a SIP proxy server that mediates all SIP communications over the broadband network interface involving the non-SIP (analog) telephone. In particular, the ISR 2851 provides a "stateful" SIP proxy that includes a back-to-back user agent.
Claim 26	**ISR 2851**
26. A method for establishing a voice-over-packet network architecture, the method comprising:	Cisco provides the ISR 2851 and related equipment which establishes a voice-over-packet network.
locating a system management platform in a shared packet network, the system management platform collecting call log data from a plurality of network devices; and	Cisco provides a range of a system management platforms to be deployed in a shared packet network. For example, Cisco provides the MIND-M.E.IP.S. that may collect call records directly from two or more ISRs.
distributing the plurality of network devices that each	Cisco provides ISRs, e.g., ISR 2851s or other ISRs.

include a telephone line interface, a computer data interface, a broadband network interface terminating a link from the shared packet network,	The ISR 2851 includes a telephone line interface for connecting, for example, analog telephones or fax machines. For example, the ISR 2851 is configured to include one or more Extension Voice Modules ("EVM"). The type of EVM depends on the nature and number of the analog connections. The ISR 2851 includes a computer data interface for connecting, for example, computers or SIP phones to allow the computers or SIP phones to communicate data (including voice data) over the Internet. For example, the ISR 2851 is configured to include one or more Ethernet interfaces. The ISR 2851 includes a broadband network interface for connecting the 2851 to a broadband access network. For example, the ISR 2851 is configured to include one or more High-Speed Wan Interface Cards ("HWIC"). The type of HWIC depends on the broadband access network carrier.
a processor, and	The ISR 2851 includes one or more processors.
a machine-readable storage medium storing processor-executable instructions to control telephone calls, the instructions causing each network device to	The ISR 2851 includes a machine-readable storage medium that stores Cisco's "Communication Manager Express" (formerly "CallManager Express) software instructions ("CME"). The CME controls telephone calls made through the ISR 2851.
route telephone calls in a peer-to-peer fashion over the shared packet network and	The CME routes telephone calls in a peer-to-peer fashion over the shared packet network between CME/ISRs.
to send call log data to the system management platform.	The CME sends call log data to the data collection subsystem of the currently deployed system management platform, e.g. the MIND – M.E.I.P.S.

Exhibit B
Linksys

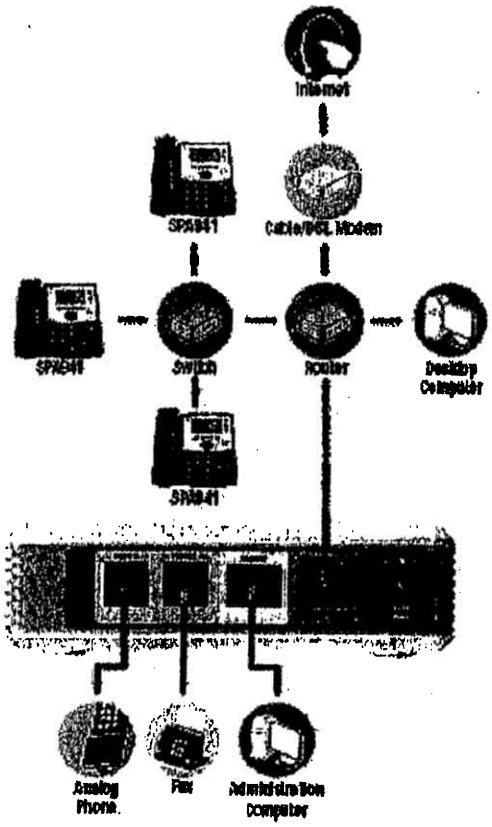

Figure 4-1: A Typical Scenario for the IP Telephony System

Exhibit C
Linksys One

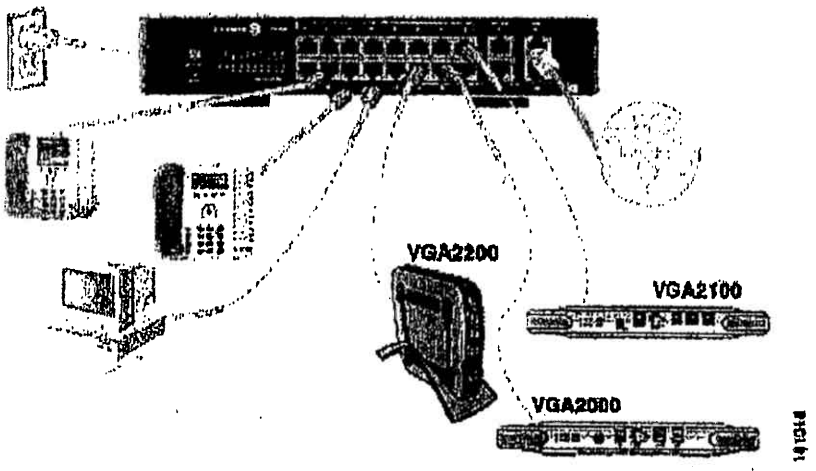

EXHIBIT I

Gmail

Patent Troll <trolltracker@gmail.com>

ESN

jdslf jfslk <mjka1998@gmail.com> **Thu, Oct 18, 2007 at 5:30 AM**
To: trolltracker@gmail.com

Go back and check the "modified" filing date for the original complaint in the ESN v. Cisco case. They're cookin' something up to keep this case in Texas.

Gmail

Rick Frenkel <trolltracker@gmail.com>

[Patent Troll Tracker] New comment on Troll Jumps the Gun, Sues Cisco Too Early.

1 message

Anonymous <noreply-comment@blogger.com> **Thu, Oct 18, 2007 at 10:03 AM**
To: trolltracker@gmail.com

Anonymous has left a new comment on your post "Troll Jumps the Gun, Sues Cisco Too Early":

This is a wonderful turn.

Publish this comment.

Reject this comment.

Moderate comments for this blog.

Posted by Anonymous to Patent Troll Tracker at October 18, 2007 11:03 AM

EXHIBIT J

Patent Troll Tracker

THURSDAY, OCTOBER 18, 2007

ESN Convinces EDTX Court Clerk To Alter Documents To Try To Manufacture Subject Matter Jurisdiction Where None Existed

I got a couple of anonymous emails this morning, pointing out that the docket in ESN v. Cisco (the Texas docket, not the Connecticut docket), had been altered. One email suggested that ESN's local counsel called the EDTX court clerk, and convinced him/her to change the docket to reflect an October 16 filing date, rather than the October 15 filing date. I checked, and sure enough, that's exactly what happened - the docket was altered to reflect an October 16 filing date and the complaint was altered to change the filing date stamp from October 15 to October 16. Only the EDTX Court Clerk could have made such changes.

Of course, there are a couple of flaws in this conspiracy. First, ESN counsel Eric Albritton signed the Civil Cover Sheet stating that the complaint had been filed on October 15. Second, there's tons of proof that ESN filed on October 15. Heck, Dennis Crouch may be subpoenaed as a witness!

You can't change history, and it's outrageous that the Eastern District of Texas is apparently, wittingly or unwittingly, conspiring with a non-practicing entity to try to manufacture subject matter jurisdiction. This is yet another example of the abusive nature of litigating patent cases in the Banana Republic of East Texas.

(*n.b.*: don't be surprised if the docket changes back once the higher-ups in the Court get wind of this, making this post completely irrelevant).

Posted by Troll Tracker at 1:13 PM 0 comments

WEDNESDAY, OCTOBER 17, 2007

Troll Jumps the Gun, Sues Cisco Too Early

Well, I knew the day would come. I'm getting my troll news from Dennis Crouch now. According to Dennis, a company called ESN sued Cisco for patent infringement on October 15th, while the patent did not issue until October 16th. I looked, and ESN appears to be a shell entity managed by the President and CEO of DirectAdvice, an online financial website. And, yes, he's a lawyer. He clerked for a federal judge in Connecticut, and was an attorney at Day, Berry & Howard. Now he's suing Cisco on behalf of a non-practicing entity.

Send email

email TrollTracker

About Me

Troll Tracker
Just a lawyer, interested in patent cases, but not interested in publicity

View my complete profile

Blogs TrollTracker Reads

- Dennis Crouch's Patently-O Blog
- Peter Zura's 271 Patent Blog
- Patent Prospector
- Michael Smith's EDTX Blog
- Delaware IP Law Blog
- Chicago IP Litigation Blog
- Phillip Brooks' Patent Infringement Updates
- Just a Patent Examiner
- SCOTUSBlog
- Patently Silly

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I asked myself, can ESN do this? I would think that the court would lack subject matter jurisdiction, since ESN owned no property right at the time of the lawsuit, and the passage of time should not cure that. And, in fact, I was right:

> A declaratory judgment of "invalidity" or "noninfringement" with respect to Elk's pending patent application would have had no legal meaning or effect. The fact that the patent was about to issue and would have been granted before the court reached the merits of the case is of no moment. Justiciability must be judged as of the time of filing, not as of some indeterminate future date when the court might reach the merits and the patent has issued. We therefore hold that a threat is not sufficient to create a case or controversy unless it is made with respect to a patent that has issued before a complaint is filed. Thus, the district court correctly held that there was no justiciable case or controversy in this case at the time the complaint was filed. GAF contends, however, that the issuance of the '144 patent cured any jurisdictional defect. We disagree. Later events may not create jurisdiction where none existed at the time of filing.

GAF Building Materials Corp. v. Elk Corp. of Texas, 90 F.3d 479, 483 (Fed. Cir. 1996) (citations and quotations omitted).

One other interesting tidbit: Cisco appeared to pick up on this, very quickly. Cisco filed a declaratory judgment action (in Connecticut) yesterday, the day after ESN filed its null complaint. Since Cisco's lawsuit was filed after the patent issued, it should stick in Connecticut.

Perhaps realizing their fatal flaw (as a couple of other bloggers/news items have pointed out), ESN (represented by Chicago firm McAndrews Held & Malloy and local counsel Eric Albritton and T. Johnny Ward) filed an amended complaint in Texarkana today - amending to change absolutely nothing at all, by the way, except the filing date of the complaint. Survey says? XXXXXX (insert "Family Feud" sound here). Sorry, ESN. You're on your way to New Haven. Wonder how Johnny Ward will play there?

Posted by Troll Tracker at 7:00 PM 1 comments

TrollSurfing: Monts & Ware, Ward & Olivo, and Their Clients

Similar to surfing the web, I started by checking out a hunch I had about Monts & Ware being behind all sorts of troll cases. Then I trollsurfed through a bunch of cases, and I ended up not only with Monts & Ware (Dallas litigation firm), but also Ward & Olivo (patent lawyers from New York/New Jersey), as a thread behind a bunch of

Blog Archive

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ESN Convinces EDTX Court Clerk To Alter Documents ...

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A Look at the Fortune 100 and Patent Litigation, P...

Adendum to Part 1, Fortune 100

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Last Week Wasn't Even the First Time Niro Scavone ...

Acacia Targets Linux in New Lawsuit Against Red Ha...

Patent Troll Sues Fish & Richardson

Bill Gates, Steve Jobs, Hugh Hefner and Larry Flyn...

Troll Call and Other Patent Stats for September 20...

Ode to Patent Trolls

Wednesday Miscellany

Unveiling TrollTracker's Troll Severity Assessment...

Patent Reform, Front and Center in the News -- and...

► September (27)

► August (20)

► July (11)

► June (3)

► May (5)

Sitemeter

EXHIBIT K

Patent Troll Tracker

An alternative look at patent litigation trends, focusing on the increasing number of patent lawsuits brought by shell corporations that make or sell no goods or services.

Thursday, October 18, 2007

ESN Convinces EDTX Court Clerk To Alter Documents To Try To Manufacture Subject Matter Jurisdiction Where None Existed

I got a couple of anonymous emails this morning, pointing out that the docket in ESN v. Cisco (the Texas docket, not the Connecticut docket), had been altered. One email suggested that ESN's local counsel called the EDTX court clerk, and convinced him/her to change the docket to reflect an October 16 filing date, rather than the October 15 filing date. I checked, and sure enough, that's exactly what happened - the docket was altered to reflect an October 16 filing date and the complaint was altered to change the filing date stamp from October 15 to October 16. Only the EDTX Court Clerk could have made such changes.

Of course, there are a couple of flaws in this conspiracy. First, ESN counsel Eric Albritton signed the Civil Cover Sheet stating that the complaint had been filed on October 15. Second, there's tons of proof that ESN filed on October 15. Heck, Dennis Crouch may be subpoenaed as a witness!

You can't change history, and it's outrageous that the Eastern District of Texas may have, wittingly or unwittingly, helped a non-practicing entity to try to manufacture subject matter jurisdiction. Even if this was a "mistake," which I can't see how it could be, given that someone emailed me a printout of the docket from Monday showing the case, the proper course of action should be a motion to correct the docket.

Email Rick

trolltracker@gmail.com

About Me

Rick Frenkel:

Patent lawyer, trying to gather and organize information about patent litigation in an informative and useful way.

View my complete profile

EFF is helping bloggers protect their Constitutional right to anonymous speech

Blogs I Read

- Above The Law (People Magazine, for Lawyers)
- Anticipate This!

(*n.b.*: don't be surprised if the docket changes back once the higher-ups in the Court get wind of this, making this post completely irrelevant).

EDIT: You can't change history, but you can change a blog entry based on information emailed to you from a helpful reader.

Posted by Rick Frenkel at 1:13 PM

Labels: Cisco, ECF, Eric Albritton, ESN, magically changing docket dates

0 comments:

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- Chicago IP Litigation Blog
- Delaware IP Law Blog
- Dennis Crouch's Patently-O Blog (the Godfather of Patent Blogs)
- How Appealing (Howard Bashman)
- IAM Magazine Blog (Euro-focused)
- Ideation Lab
- IP Dragon (China)
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- Spicy IP (India)
- Techdirt
- The Volokh Conspiracy
- Washington State Patent Law Blog
- WSJ Law Blog

EXHIBIT L

Patent Troll Tracker

An alternative look at patent litigation trends, focusing on the increasing number of patent lawsuits brought by shell corporations that make or sell no goods or services.

Wednesday, November 7, 2007

Troll Call and Other Patent Stats for October 2007

Let's get right to it this month. The onslaught of cases in Eastern Texas continues. This month, I notice somewhat of an uptick in declaratory judgment cases. Also, as I posted yesterday, I notice perhaps the first troll case filed by Altitude Capital Partners. Note that in September, Computer Acceleration (Acacia) filed one lawsuit against 7 defendants. This month, Judge Clark ordered that case closed and split into 7 new cases, which were filed in October. I have therefore only added 6 cases (and no defendants) to this months's stats to account for this. I didn't add to the troll list, either - it was already counted last month. I also didn't add the two Katz cases that showed up in CDCA, since they were transferred from elsewhere.

October Statistics

With those disclaimers out of the way, here are the October stats:

ED Texas: 34 patent cases, 115 defendants sued (12 troll cases)

D New Jersey: 23 patent cases, 39 defendants sued (3 troll cases)

CD California: 21 patent cases, 150 defendants sued (1 troll case)

SD New York: 5 patent cases, 8 defendants sued (0 troll cases)

D Delaware: 20 patent cases, 33 defendants sued (6 troll cases)

ND Illinois: 14 patent cases, 25 defendants sued (1 troll case)

ND California: 13 patent cases, 19 defendants sued (0 troll cases)

Non-EDTX Troll Cases

Email Rick

trolltracker@gmail.com

About Me

Rick Frenkel

Patent lawyer, trying to gather and organize information about patent litigation in an informative and useful way.

View my complete profile

EFF is helping bloggers protect their Constitutional right to anonymous speech

Blogs I Read

- Above The Law (People Magazine, for Lawyers)
- Anticipate This!

Wow, this month there are almost as many non-EDTX troll/NPE cases as there are EDTX troll/NPE cases. But don't get too excited, many are DJ suits.

1) Heidelberg USA v. Screentone Systems Corp. (DJ) (Del., October 1). Acacia. These DJs (and ones in the Western District of Washington) relate to a case filed in EDTX where, allegedly, Acacia failed to get proper standing.

2) Konica Minolta v. Screentone Systems Corp. (DJ) (Del., October 1)

3) American Patent Development Corp. v. Movielink LLC (Del., October 2)

4) International Intellectual Management Corp. v. 111 Defendants (CDCA, October 2). New patent troll - website here. Apparently run by a few LA patent attorneys who, not surprisingly, are representing the IIMC in their lawsuit against 111 small businesses. And who says patent trolls are the plague of large corporations alone?

5) Discover Products, Inc. v. Phoenix Licensing, LLC (DJ) (NDIL, October 11)

6) Papst Licensing GmbH & Co v. Samsung (2 entities) (DNJ, October 12)

7) Refined Recommendation Corp. v. Netflix (DNJ, October 16). Acacia. Posted on it.

8) Citicorp Credit Services v. LPL Licensing (DJ) (Del., October 17)

9) HP v. Acceleron (DJ) (Del., October 17)

10) Cisco v. GPNE (DJ) (Del., October 24)

11) Digital Technology Licensing, LLC v. T-Mobile (DNJ, October 25). Posted about DTL and its parent General Patent Corp here. I guess they thought they couldn't get personal jurisdiction over T-Mobile in EDTX? Because it's the same patent that is being litigated there.

Cumulative Statistics for 2007

- Benefit of Hindsight
- Chicago IP Litigation Blog
- Delaware IP Law Blog
- Dennis Crouch's Patently-O Blog (the Godfather of Patent Blogs)
- How Appealing (Howard Bashman)
- IAM Magazine Blog (Euro-focused)
- Ideation Lab
- IP Dragon (China)
- IP Geek (Euro-focused)
- IP Kat (UK)
- Just a Patent Examiner
- Michael Smith's EDTX Blog
- Overlawyered
- Patent Baristas
- Patent Demand
- Patent Prospector
- Patently Absurd Inventions Archive
- Patently Silly
- Peter Zura's 271 Patent Blog
- Phillip Brooks' Patent Infringement Updates
- SCOTUSBlog
- Spicy IP (India)
- Techdirt
- The Volokh Conspiracy
- Washington State Patent Law Blog
- WSJ Law Blog

Here are the statistics for the first ten months of 2007, comparing the various districts:

ED Texas: 309 patent cases, 1,076 defendants sued (124 troll cases)

CD California: 224 patent cases, 602 defendants sued (15 troll cases)

D New Jersey: 156 patent cases, 296 defendants sued (10 troll cases)

ND California: 116 patent cases, 222 defendants sued (16 troll cases)

ND Illinois: 114 patent cases, 219 defendants sued (21 troll cases)

D Delaware: 113 patent cases, 271 defendants sued (15 troll cases)

SD New York: 86 patent cases, 229 defendants sued (11 troll cases)

So the Eastern District has already blown away the record for most number of patent cases filed in a judicial district in one year. 309 patent cases in 304 days.

Troll Call for October 2007

Now here's the non-practicing entity/troll call for the Eastern District of Texas for October, 2007:

113) Data Match Enterprises of Texas, LLC v. eHarmony.com, Inc., Date.com, Friendfinder Network, and Singlesnet, Inc. (Marshall, October 4). Posted on this here. A Ward & Olivo special.

114) Digital Reg of Texas, LLC v. Hustler.com, Apple, Audible, Blockbuster, LEP, Inc., Macrovision, Microsoft, Playboy, and Sony (and one related Sony company) (Tyler, October 5). Ah yes, Larry Flynt comes to Tyler. Read about it here.

115) IP Innovation, LLC v. Red Hat & Novell (Marshall, October 9). This one got a lot of press due to the attack on Linux. But you read it first here.

116) ESN, LLC v. Cisco (and related company) (Texarkana, October 15. No wait, October 16. No, October 15. When was it "filed" again?). I posted on it here. Michael Smith also had a post on the case. I had thought there was a dueling jurisdictional battle. But then I read an article yesterday

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    - Email From Sorensen

that ESN dismissed its case against Cisco. I looked, and the same is true for the Cisco case against ESN: gone.

I got some critical emails for using the word "altered" with respect to the Texas docket. Well, let me respond. If a document appears one day with a date stamp, and the next day that date stamp disappears and is replaced with a different stamp, what would *you* call it? To the extent the use of the word "altered" implied that anyone did anything *illegal*, that was not my intent. I'm positive the court clerk was following local custom, as was the ESN Texas lawyer. But putting aside the propriety of such actions with respect to local custom, isn't such a "customary" action detrimental to the credibility of the Court? We have to be able to trust the U.S. courts and their ECF system. How can we trust the courts when date stamps on documents disappear one day and reappear the next day with a different date?

This all could be averted if the Local Rules committee adds a rule that no document shall be replaced without a motion made to correct the docket.

117) Mobile Micromedia Solutions LLC v. General Motors (Marshall, October 16). I posted about Mobile Micromedia here. At the time, MMS had only sued Nissan, and was about to go to trial. I guess GM is #2.

118) VTran Media Technologies, LLC v. Comcast, Charter Communications, Time Warner Cable and Verizon Communications (Marshall, October 17). Wow, a case I appear to have missed. I saw the name VTran and assumed it was a real company. But, now I think not. The manager of VTran is Lawrence Brannian, who lists an address at the Dallas law firm Snell, Wylie & Tibbals. Brannian is of counsel there. The complaint, filed by Ward & Olivo, says that VTran is located at 104 E. Houston St., Suite 140, Marshall TX. Hmmmmmm. Same address as Ward & Olivo client Data Match Enterprises of Texas - see #113 above. Getting crowded in that suite!

- Mike Masnick on Intellectual Property
- Troll Wars
- Saffran Final Judgment Upped to $501 Million Again...
- Business Method Patents To Face Scrutiny By En Ban...
- Friday Miscellany, 2/15/08
- Happy Valentine's Day
- Taurus/Orion/ Spangenberg Hold Off Ford in Madison;...
- $432 Million Verdict in Marshall Texas Patent Case...
- Saffran v. Boston Scientific
- Two New Blogs I'm Reading on Global IP
- Acacia Sues Apple over iTunes ... In East St. Loui...
- Patent Litigation Statistics for January 2008
- Global Patent Holdings' Amended Complaint in Flori...
- Victory for Rembrandt
- The Once-Company

Anyway, according to this Ocean Tomo press release, the patents-in-suit were auctioned on October 26, 2006 in New York City. And according to this article, "an anonymous bidder paid $900,000" for these 2 patents (the expected value was $1,250,000). Hey - is this the first instance of an Ocean Tomo auctioned patent asserted in patent litigation?

USPTO assignment records show that on 10/26/06 -- same date as the Ocean Tomo Auction -- the inventors and some other guy who apparently went to college in Kansas with the inventors assigned the patent to Concert Technology Corporation of Durham, NC. Concert Technology is interesting - they have been transferred patents through this auction, and also from 3Com and others. According to their website, Concert "has a strong focus on acquiring and licensing core technologies in the music and video markets." Evidently, Concert does some R&D, or at least their website makes it look like they do.

So I'm stumped and befuddled by who is behind this. It looks like a burgeoning troll. But on the other hand, they employ engineers. And if this is Concert, why use a fake corporate shell in Texas through a Dallas law firm? Why not take advantage of the CSIRO decision and try to exert leverage through the fact that they are a real-ish company and can get an injunction?

More on the patents. Taeus, an engineering firm that helps clients make money from their patent portfolios, gave the lead patent a TIPScore of 3.8 on a scale of 1.0 to 5.0. Finally, if you search for the lead inventor on Google, the fifth or so hit is for a divorce proceeding, where Monslow and his ex-wife fought over the two patents-in-suit in a case that went all the way to the Supreme Court (of Kansas, that is).

See, a simple boring patent case, when you dig deeper merely by using Google for a few minutes, involves divorce, Supreme Court battles, auctions, and nefarious manipulation of Texas shell corporations. Discovery in this case would seem to be appropriate in Kansas, North

- Manic Monday
- January (29)
- 2007 (136)

Labels

- 104 E. Houston St. (3)
- 1st Media (1)
- 1st Technology (3)
- Acacia (47)
- Accolade Systems (1)
- ADISCOV (2)
- Adv Tech Incubator (1)
- Alexsam (5)
- Aloft Media (1)
- Altitude Capital Partners (9)
- anagrams (3)
- anonymity (12)
- Anthony O. Brown (1)
- Antor Media (5)
- AOL (1)
- Apple (9)
- Aris Mardirossian (1)
- Artesyn (1)
- AT_T (6)
- attorney-trolls (7)
- Austin (1)
- Automated Facilities (2)
- Autotext (3)

Carolina, maybe New York, but probably not Texas.

119) Saxon Innovations, LLC v. Nokia (2 entities), High Tech Computer Corp., LG (2 entities), Nintendo (2 entities), Palm, Research in Motion (2 entities), Samsung (3 entities), and Sharp (2 entities) (Tyler, October 18). I posted on this case here. Then I put two and two together in this post. Saxon Innovations is Altitude Capital Partners, who I posted on here. Now, in addition to pulling the strings in the Visto v. Microsoft case (and other Visto cases), Altitude is flying high with a case of its own. Who knows if it's the first. That's the thing about this business: you can have shell after shell and remain relatively hidden.

Hmm. The Federal Rules of Civil Procedure require disclosure of parent corporations in order to assist judges in recusal decisions. But it only requires the immediate parent. In light of the trend of multiple layers of corporations, the rules should be changed to require disclosure of all parents, up to the ultimate parent.

120) Sky Technologies, LLC v. Procuri, Inc. (Marshall, October 19). Sky Technologies is no stranger to the courts in Texas. Their latest suit was against SAP and Oracle in late June.

121) Phoenix IP, LLC v. Schneider Electric (and 1 related company), Power Measurement Ltd. (and 1 related company), and Square D Company (Marshall, October 22). Erich Spangenberg and David Pridham, continuing the litigation factory.

122) Advanced Technology Incubator, Inc. v. Sharp Corp. (and related company) and Dai Nippon Printing (and related company) (Marshall, October 29). Advanced Technology Incubator is a company set up by Zvi Yaniv, an Israeli who moved to the US for graduate school and stayed (apparently). He set up the company in Michigan when he lived there, but then moved it to Austin, Texas when he moved there to be CEO of an Austin-area company and a kinetic artist. According to the complaint, the

- Barry Thomas (1)
- BarTex (3)
- Beneficial Innovations (1)
- Bill Gates (1)
- bio-pharma (4)
- Blackboard (2)
- blogging (22)
- Boca Resort (3)
- Bodog (2)
- Boston (1)
- Boston Scientific (2)
- bounty (2)
- Brian Marcus (1)
- British Technology Group (1)
- Bruce Renouard (1)
- Burst.com (1)
- business method patents (1)
- Cablevision (1)
- Calvin Ayre (3)
- Card Activation Techs (1)
- champerty (1)
- Charles Hill (1)
- Choongsoo Park (1)
- Ciba (3)
- Cingular (1)
- Cisco (4)
- Citrix (1)
- Clay Dark (1)

patent was originally assigned to LG-Philips but now he has the rights. This entity is more along the lines of an individual inventor holding company/ NPE, not a troll.

123) Wi-LAN, Inc. v. Acer (2 entities), Apple, Atheros, Best Buy, Broadcom, Circuit City, Dell, Gateway, HP, Intel, Lenovo (2 entities), Marvell, Sony (4 entities), and Toshiba (3 entities) (Marshall, October 31). See post here.

124) Wi-LAN, Inc. v. Westell Technologies, 2Wire, Atheros, Belkin, Best Buy, Broadcom, Buffalo, Circuit City, D-Link (2 entities), Infineon (2 entities), Intel, Marvell, Melco Holdings, Netgear, and Texas Instruments (Marshall, October 31). See post here.

That's it for this month's installment.

TT

Posted by Rick Frenkel at 8:34 AM

Labels: 104 E. Houston St., Acacia, Adv Tech Incubator, Cisco, Data Match, ESN, International Intellectual Mgmt, Ocean Tomo, Phoenix IP, Sky Technologies, statistics, Taeus, venue, VTran, Ward Olivo

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