

METHOD AND APPARATUS FOR AUTOMATICALLY DIRECTING CALLS BY AN INVISIBLE AGENT IN A SWITCH

TECHNICAL FIELD

This invention relates to telecommunication switching, and in particular, to the redirection of calls from a first switch to a second switching system.

BACKGROUND OF THE INVENTION

It is known in the prior art that as organizations grow geographically through mergers, acquisitions, or other means, it is desirable for a telecommunication system to operate as a single, geographically dispersed switching system with full feature transparency. It is known for a single telecommunication switching system to extend switching and control fabric of a single telecommunication system over a wide area using wide area networks (WAN) such as standard asynchronous transfer mode (ATM). Such a geographically dispersed switching system comprises a main telecommunication switch that provides the overall feature control for the system and remote switches that can be dispersed at great distances from the main telecommunication switch. Such a geographically dispersed system is described in U.S. patent application Ser. No. 09/718,909 filed on Nov. 22, 2000, which is hereby incorporated by reference. Such a geographically dispersed switching system allows individuals utilizing telephone sets directly connected to the remote switch to perform as if their telephone set was directly connected to the main telecommunication switch itself. The problem that arises is that when a user of the remote switch wishes to place a telephone call to a service system of the main telecommunication switch such as a voice mail system (VMS) from a local telephone that interconnects to the remote switch via a public switching office such as a central office. The central office is interconnected to the remote switch via trunks. The user of the local system can access the VMS system by placing a long distance call to the VMS system which incurs long distance charges and the user has to dial additional digits. In addition, if the local user that is utilizing a telephone set connected to the central office wishes to place a telephone call to an extension on the main telecommunication switch or an extension on another remote switch, again the user must place a long distance telephone call. There is no convenient mechanism that allows the local user calling from a telephone set connected to a central office to readily utilize the transmission capabilities of the geographically dispersed telecommunication switching system.

SUMMARY OF THE INVENTION

The foregoing problems are solved and a technical advance is achieved by an apparatus and method that utilize an invisible agent within a remote switch to allow the redirection of calls received from a telephone set connected to a public telephone network to a main switching system.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 illustrates an embodiment of the invention;

FIG. 2 illustrates an embodiment of a remote switch utilized in the invention;

FIG. 3 illustrates, in flow chart form, an embodiment of operations for implementing the invention.

DETAILED DESCRIPTION

FIG. 1 illustrates an embodiment of the invention. Remote switch 102 through remote switch 108 and Enterprise com-

munication system 109 (as a main telecommunication switch) along with voice mail system (VMS) 113 form a geographically dispersed telecommunication switching system. For example, Enterprise communication system 109 could be in the United States along with remote switch 108 whereas remote switch 102 is located in the United Kingdom. The significance of this is that the dialing plan of the United States is different than the dialing plan of the United Kingdom. Advantageously, to gain access to VMS 113, a user of telephone 103 places a call to an extension number of agent 116 in remote switch 102 via central office 101 (central switching system) and trunk 107. Remote switch 102 is responsive to the dialing of this extension to terminate the call on agent 116. In response to the call, agent 116 puts telephone set 103 on hold and dials the extension for VMS 113. A call is set up between agent 116 to VMS 113 via WAN 106. After this call has been set up, agent 116 transmits a call transfer message to the controller of remote switch 102 which is responsible to the transfer message to connect telephone set 103 to the call that had been previously set up with VMS 113 by implementing a call transfer feature. Advantageously, the implementation of this operation requires no modification of the software of remote switch 102 or Enterprise communication system 109. When agent 116 placed the call to VMS 113, Enterprise communication system 109 returned dial tone to agent 116 signaling that agent 116 could commence the dialing of the extension for VMS 113.

An embodiment of FIG. 1 allows a user of telephone set 103 to place a call to telephone 114 connected to Enterprise communication system 109 or telephone set 112 interconnected to remote switch 108. In this operation, the user of telephone set 103 places a call to agent 117. Agent 117 is responsive to this call from telephone set 103 to transmit a call origination to Enterprise communication system 109 and to transmit a redirect message to the control software controlling the operation of remote switch 102. The control software is responsive to this redirect message to interconnect the call path from telephone set 103 to the call path that has been set up to Enterprise communication system 109 by controlling the network of remote switch 102. The result is that telephone set 103 is now directly receiving dial tone (call proceed message) from Enterprise communication system 109 and can proceed to dial the extension number for either telephone set 114 or 112. In response to this dialed extension number, Enterprise communication system 109 will establish the call path through remote switch 102, Enterprise communication system 109, or remote switch 108.

FIG. 2 illustrates in greater detail remote switch 102. DSP pool 222 consists of DSPs 209-211 which are controlled by main CPU 201 via MPU bus 204. Router 221 comprises main CPU 201 that provides overall control of remote switch 102. Main CPU 201 executes control software module 226, agent software module 116, and agent software module 117. Time slot interchange (TSI) 206 provides a mechanism for interchanging time slots on local bus 225 and MPU bus 204. In addition, TSI 206 can be utilized to interexchange time slots that are being received from telecommunication terminals such as telephone set 104 via line circuits 117 and trunk circuits 218. This provides remote switch 102 with the capability of performing local circuit switching. Ethernet interface 202 interfaces local LAN 224 to bus 204. Local IP telephone sets can be connected to LAN 224. In addition, WAN interface 203 interconnects bus 204 to WAN 106. Bus 204 is the overall informational highway that is used to communicate both control and bearer information within router 221.