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Forslöw

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(54) **COMMON ACCESS BETWEEN A MOBILE COMMUNICATIONS NETWORK AND AN EXTERNAL NETWORK WITH SELECTABLE PACKET-SWITCHED AND CIRCUIT-SWITCHED AND CIRCUIT-SWITCHED SERVICES**

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(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(52) **U.S. Cl.** **370/353**; 370/229; 370/328
(58) **Field of Search** 370/353, 351, 370/352, 389, 395.1, 400, 401, 402, 354–357, 360, 229, 230–231, 235, 310, 328–329, 335–336, 345, 347, 395.2, 395.21, 395.3, 395.4, 395.42, 395.52, 437, 465, 466, 486, 487; 455/403, 410, 411, 575

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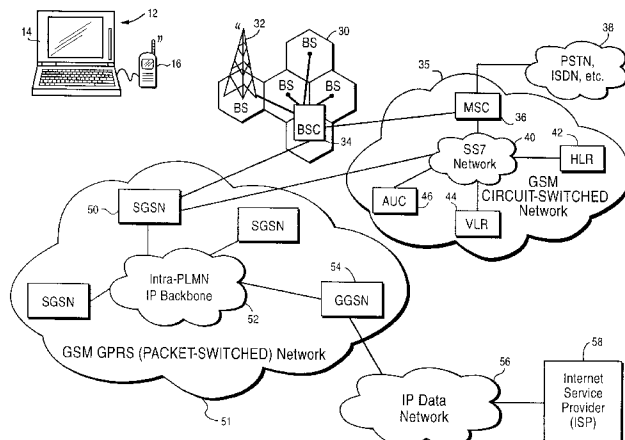(List continued on next page.)

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(57) **ABSTRACT**

Applications running on a mobile station or an external network entity such as an Internet service provider may specify on an individual application flow basis a requested quality of service. From that requested quality of service, an optimal type of bearer to transfer the application flow through the mobile communications network is determined. For example, a circuit-switched bearer may be allocated if the request is for a real-time service, and a packet-switched bearer may be allocated if the request is for a non-real time type of service. Various other decision making criteria may be employed. A mobile station and a mobile network gateway node each include a mapper for mapping an individual application flow to one of a circuit-switched network and a packet-switched network bearer depending on the quality of service requested for the individual application flow. The network layer quality of service parameters corresponding to an individual application flow are mapped to circuit-switched bearer parameters if the application flow is mapped to the circuit-switched network and to packet-switched bearer parameters if the application flow is mapped to the packet-switched network. The gateway node includes a common access server which permits a mobile station initially establishing a communications session with an external network entity to perform only a single, common access procedure for subsequent communications using one of the circuit-switched and packet-switched networks. After that common access procedure is completed, subsequent application flows between the mobile station and the external network entity are established using abbreviated procedures without having to access the external network entity.

60 Claims, 12 Drawing Sheets

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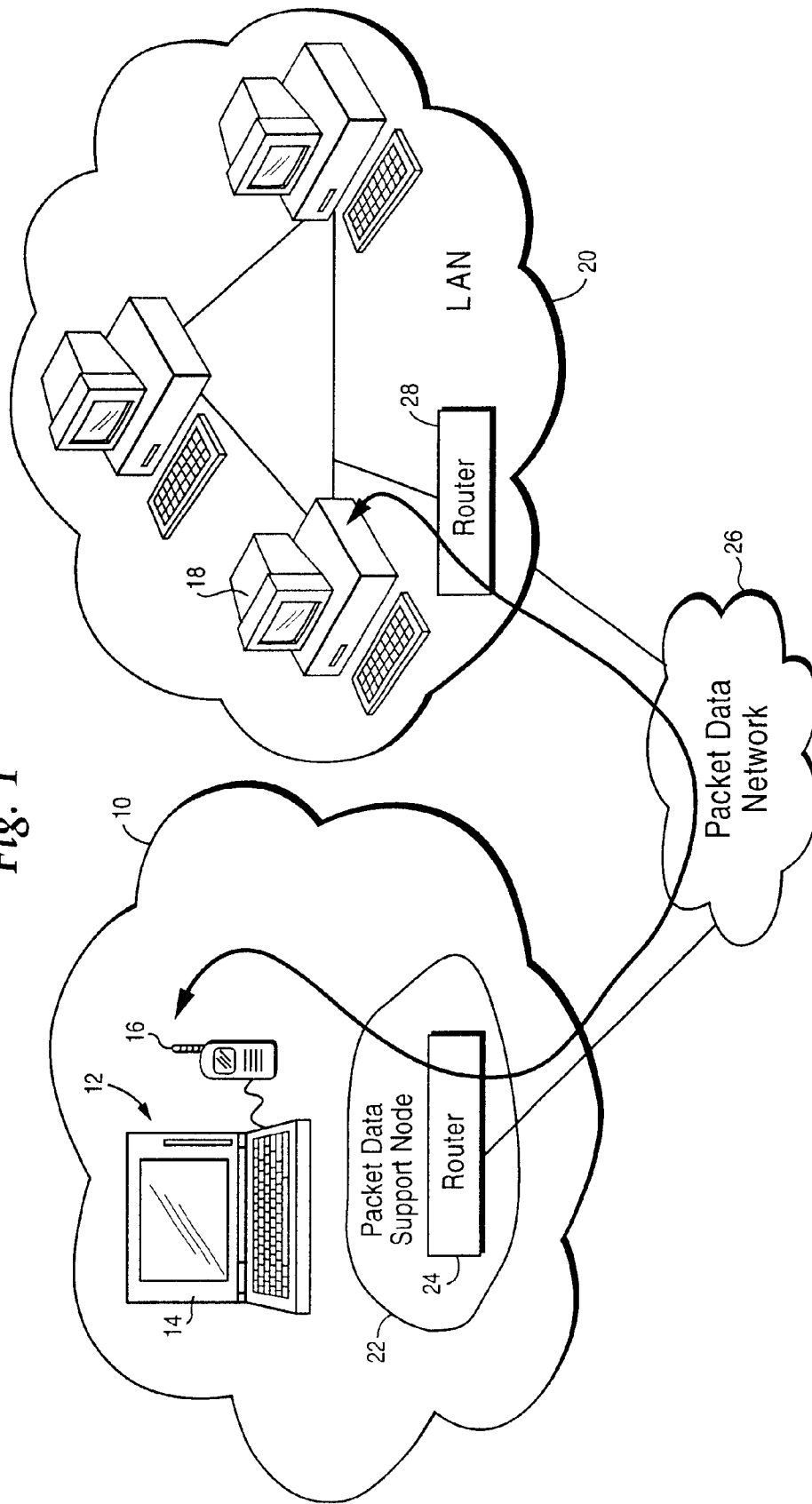
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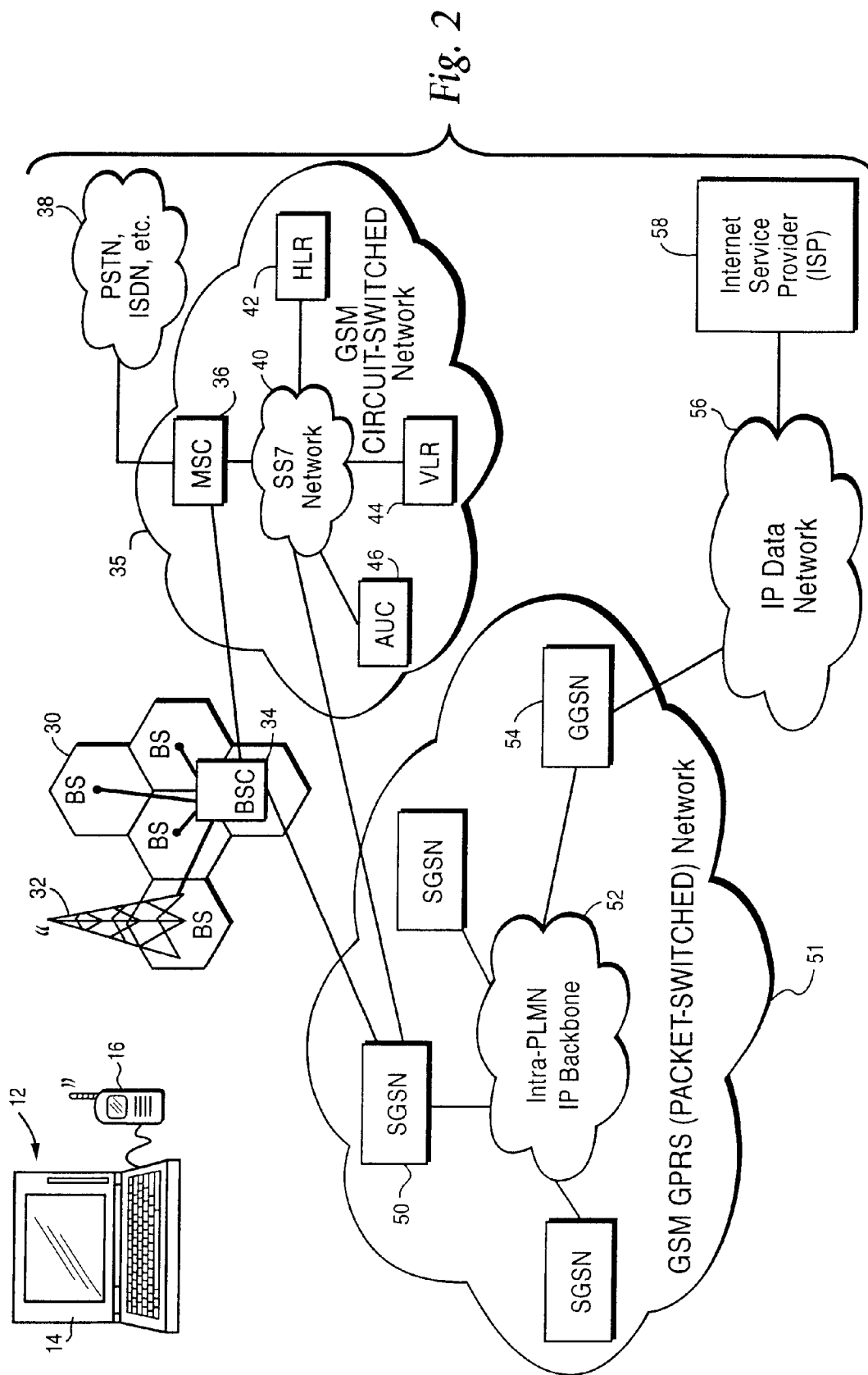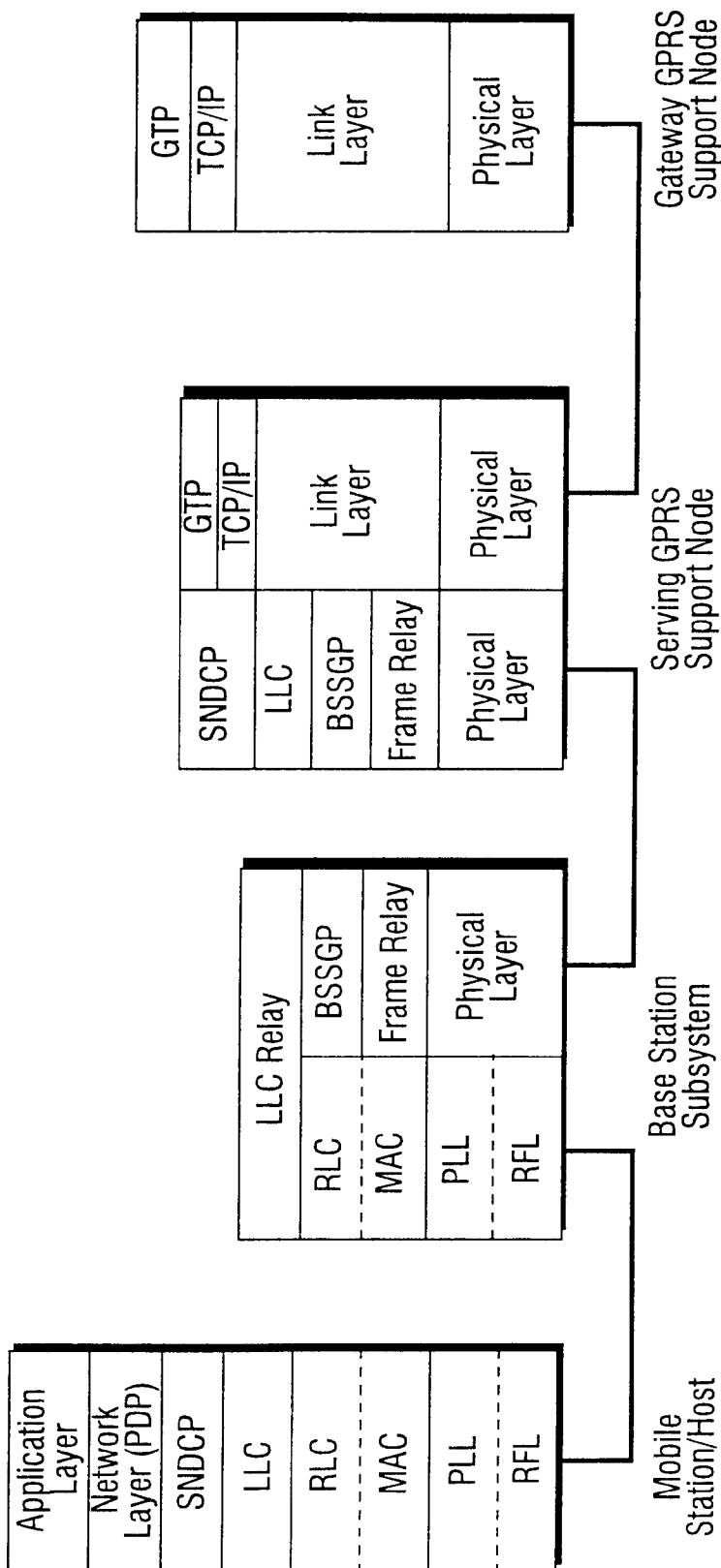
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Fig. 1

LAN

20

28

Router

18

26

Packet Data
Network

10

16

12

14

Packet Data
Support Node

Router

24

22

Fig. 2

Fig. 3

GTP		
TCP/IP		
Link Layer		
Physical Layer		

Gateway GPRS Support Node

GTP		SNDCP
TCP/IP		LLC
Link Layer		BSSGP
		Frame Relay
Physical Layer		Physical Layer

Serving GPRS Support Node

LLC Relay		
BSSGP	RLC	
	MAC	
Frame Relay	PLL	
Physical Layer	RFL	

Base Station Subsystem

Application Layer
Network Layer (PDP)
SNDCP
LLC
RLC
MAC
PLL
RFL

Mobile Station/Host

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