

Computer and Communication Networks

SECOND EDITION

NADER F. MIR

COMPUTER AND COMMUNICATION NETWORKS

Second Edition

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Nader F. Mir



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We begin by reviewing the basics of the *public switched telephone network* (PSTN). PSTN is the backbone of today's "traditional" voice communication and phone system and consists of numerous switching centers that allow telephone subscribers around the world to communicate with each other.

We then present an overview of the signaling in "packet-based" voice communication and the phone system known as *voice over IP* (VoIP). The signaling of two VoIP protocols are the topics of the next sections: the *H.323 series of protocols* and *Session Initiation Protocol* (SIP). We explain session signaling and numbering for these and other related protocols.

At the end of the chapter, we introduce situations in which a combination such protocols must be implemented to establish a call between users. This section is titled VoIP and Multimedia Internetworking and describes how various types of multimedia or VoIP environments are integrated for communications.

18.1 Public Switched Telephone Networks (PSTN)

The *Public Switched Telephone Network* (PSTN) includes two communication networking structures to provide telephone call services: *circuit-switched networks* in which a circuit is predetermined for each voice session, and the *Signaling System 7* (SS7) *network* for call control signaling. As a result of such structures, two separate transmission paths are used when a telephone call needs to be established: one for call control "signaling" established over the SS7 network; and the other one for media exchange or voice established over circuit-switched networks. Besides ordinary telecommunication services, the SS7 network provides special services such as caller ID, toll-free calling, and call screening. SS7 can also become compatible with voice over IP (VoIP) carriers. Before we get into any details of this topic, let us review some basic definitions of components of the PSTN:

- *Service switching point* (SSP). The SSP is the main switching node of the PSTN. Any phone set is directly attached to its corresponding SSP. When a phone number is dialed by a subscriber, SSP is the node through which a circuit to the destination SSP is initiated.
- *Signal transfer point* (STP). The STP acts as a router and transfers signaling messages from one STP to another once released from the first switching node.
- *Service control point* (SCP). The SCP is a node of the SS7 network that carries out advanced services. For example, when a toll-free 800 number is requested, the SCP finds the location address of the destination SSP to which the call should actually be sent.