Computer Network

Lecture-46

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Remote Logging, Electronic Mail, and File Transfer

REMOTE LOGGING

- Remote Login is a process in which user can login into remote site i.e. computer use services that are available on the remote computer.
- After logging on, a user can use the services available on the remote computer and transfer the results back to the local computer.

TELNET

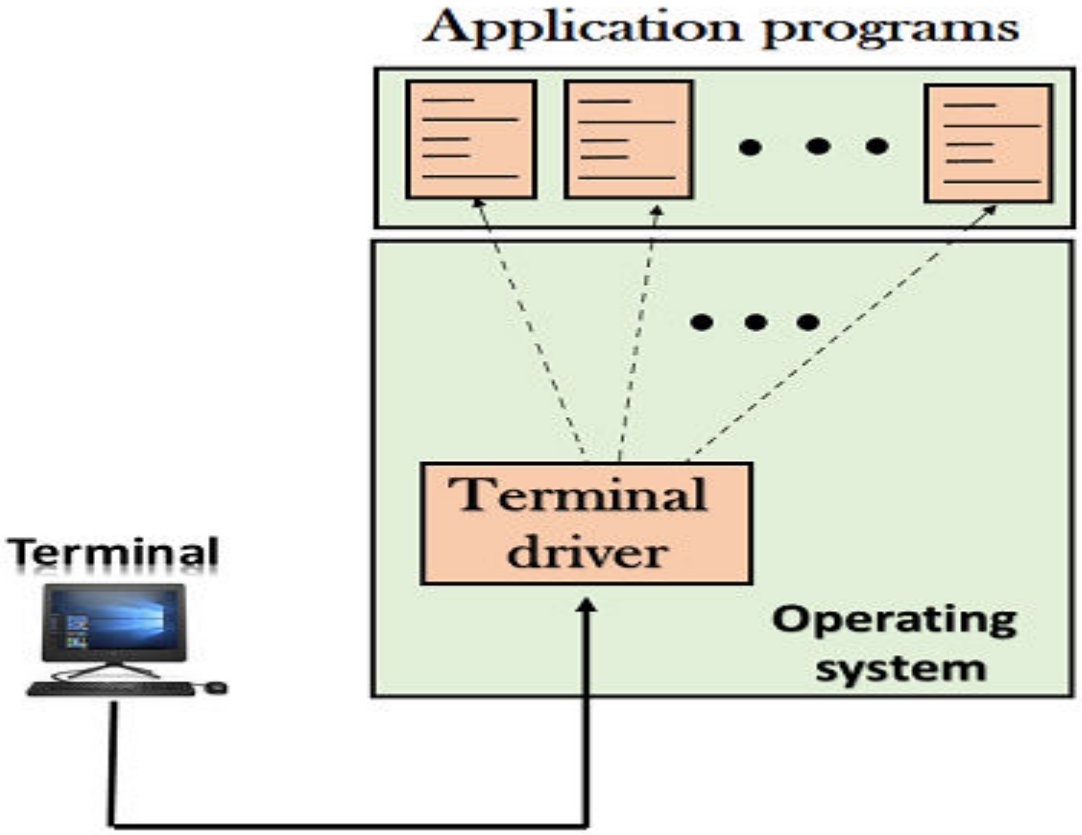
- It is a client/server application program.
- TELNET is an abbreviation for TErminaL NETwork.
- It is the standard TCP/IP protocol for virtual terminal service as proposed by the International Organization for Standards (ISO).
- TELNET enables the establishment of a connection to a remote system in such a way that the local terminal appears to be a terminal at the remote system.

TELNET

Types of login

There are two types of login: local login and remote login.

Local login

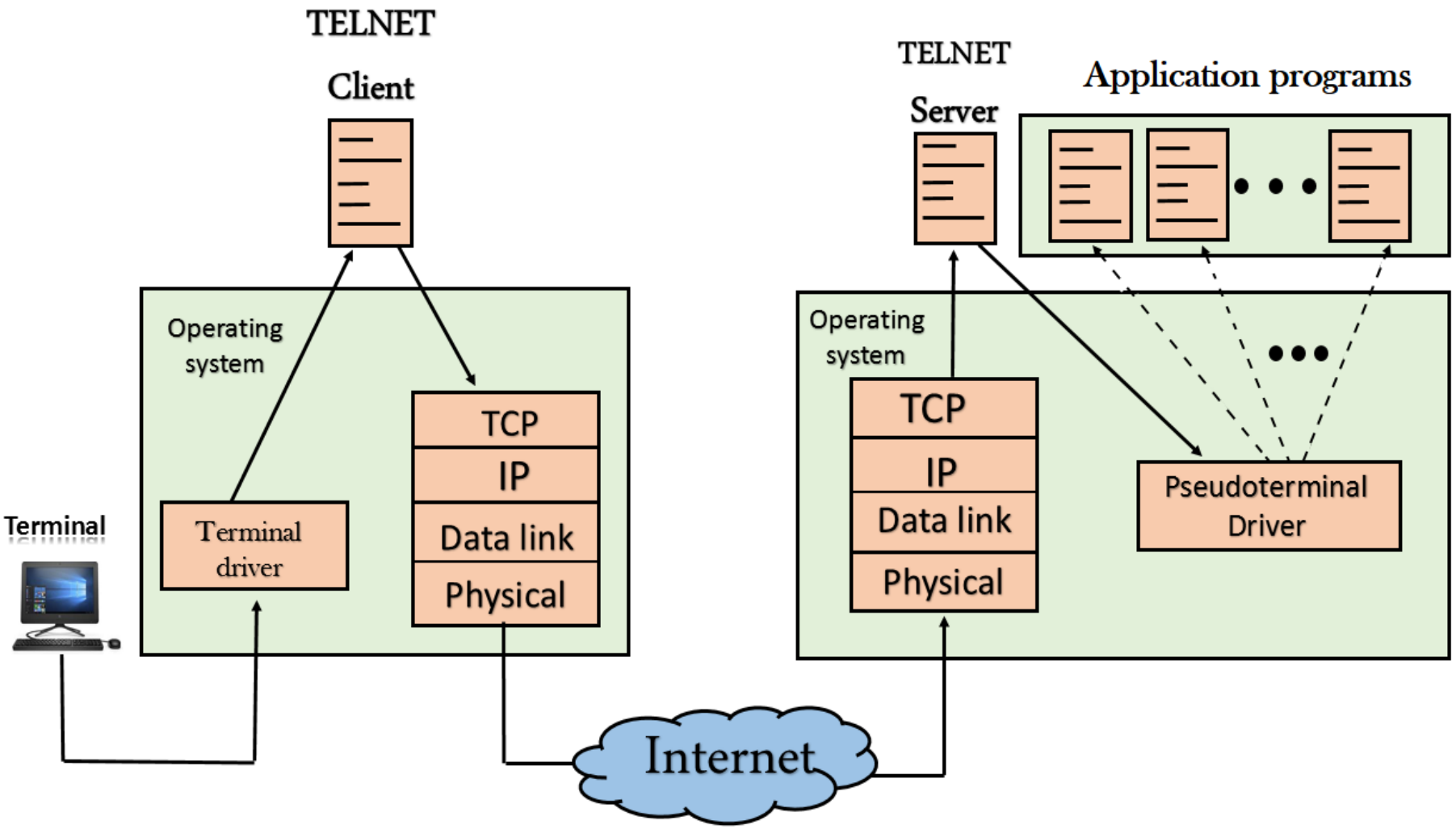


Local Login(continue)

When a user logs into a local timesharing system, it is called local login. As a user types at a terminal or at a workstation running a terminal emulator, the keystrokes are accepted by the terminal driver. The terminal driver passes the characters to the operating system. The operating system, in turn, interprets the combination of characters and invokes the desired application program or utility.

Remote login

Remote login



Remote login(continue)

- When a user wants to access an application program or utility located on a remote machine, he performs remote login.
- Here, the TELNET client and server programs come into use.
- The user sends the keystrokes to the terminal driver, where the local operating system accepts the characters but does not interpret them. The characters are sent to the TELNET client, which transforms the characters to a universal character set called **network virtual terminal** (NVT) characters and delivers them to the local TCP/IP protocol stack.

Remote login(continue)

- The commands or text, in NVT form, travel through the Internet and arrive at the TCP/IP stack at the remote machine.
- Here, the characters are delivered to the operating system and passed to the TELNET server, which changes the characters to the corresponding characters understandable by the remote computer. However, the characters cannot be passed directly to the operating system because the remote operating system is not designed to receive characters from a TELNET server: It is designed to receive characters from a terminal driver.
- The solution is to add a piece of software called a pseudoterminal driver which pretends that the characters are coming from a terminal. The operating system then passes the characters to the appropriate application program.

Network Virtual Terminal(NVT)

- The mechanism to access a remote computer is complex. This is so because every computer and its operating system accept a special combination of characters as tokens.

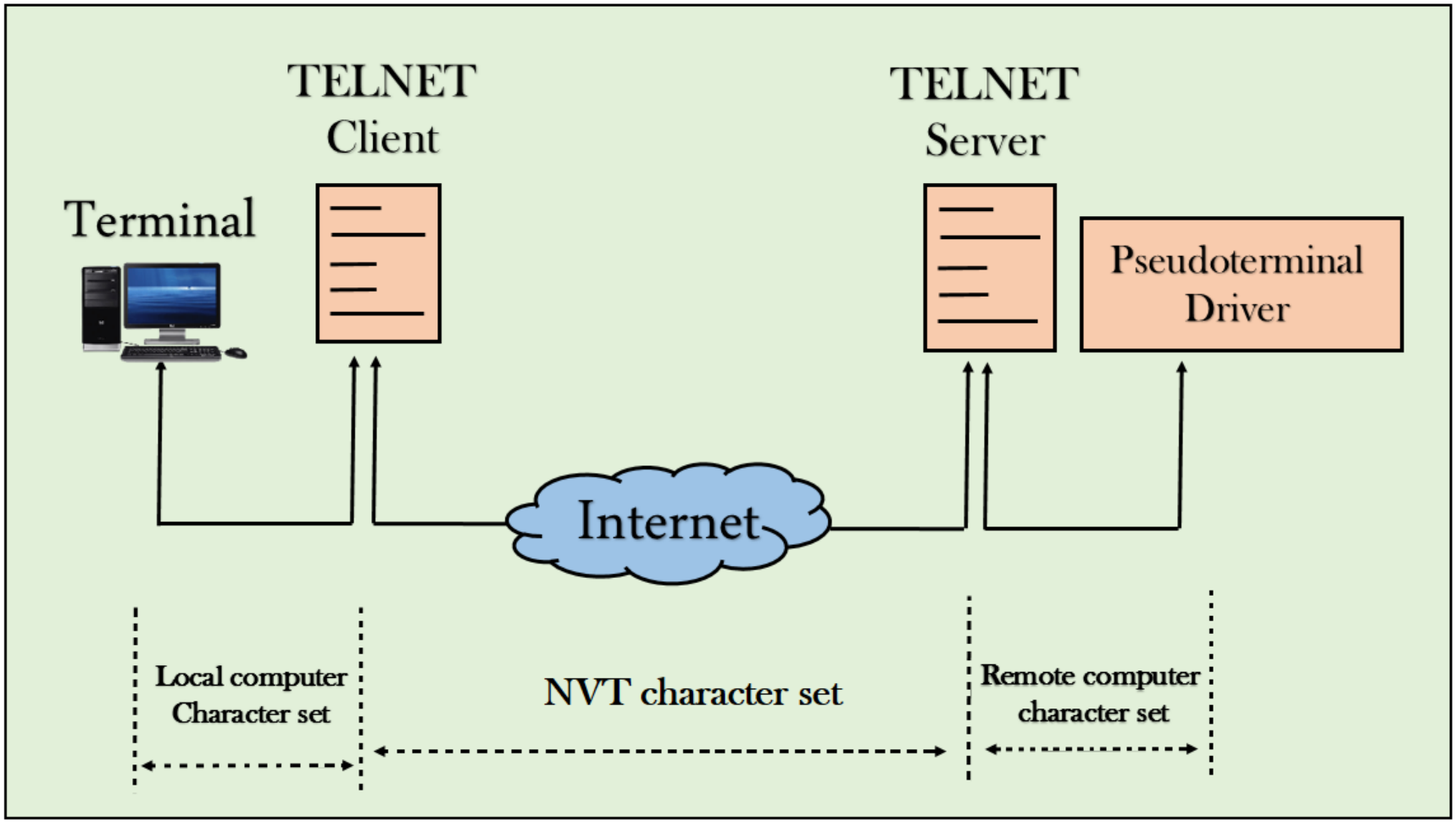
- For example, the end-of-file token in a computer running the DOS operating system is Ctrl+z, while the UNIX operating system recognizes Ctrl+d.

- TELNET solves this problem by defining a universal interface called the network virtual terminal (NVT) character set.

- Via this interface, the client TELNET translates characters (data or commands) that come from the local terminal into NVT form and delivers them to the network. The server TELNET, on the other hand, translates data and commands from NVT form into the form acceptable by the remote computer.

Network Virtual Terminal(NVT)

It is illustrated in the following figure:-



Network Virtual Terminal(NVT)

NVT Character Set

- NVT uses two sets of characters, one for data and the other for control. Both are 8-bit bytes.
- For data, NVT is an 8-bit character set in which the 7 lowest-order bits are the same as ASCII and the highest-order bit is 0.
- To send control characters between computers (from client to server or vice versa), NVT uses an 8-bit character set in which the highest-order bit is set to 1.

Telnet

- TELNET uses only one TCP connection. The server uses the well-known port 23, and the client uses an ephemeral port.
- The same connection is used for sending both data and control characters.
- TELNET accomplishes this by embedding the control characters in the data stream. However, to distinguish data from control characters, each sequence of control characters is preceded by a special control character called ***interpret as control*** **(IAC).**