Topic-1
Data communication components and Data representations in computer networks

Prepared by K.Lakshmipathi raju, Assistant professor
Dept of IT

Message
Sender
Receiver
Transmission Medium
Protocols

Data:

Communication of data means a message or data will be transmitted from one device and will be received in the destination or target device.

Sender:

A data must has to be sent to a destination from a source. This source is called the sender.

Receiver:

The destination of a transmitted data is the receiver which will receive the data. The device that receives the data that was sent by the Sender is the Receiver.

Transmission medium:

In data communication network, the transmission medium is the physical path for the data to travel to its destination after being sent by the Sender. Receiver receives the data at one end of this path and the sender sent from another end of the path. Transmission medium could be like twisted-pair cable, coaxial cable, fiber-optic cable etc.

Protocol:

A protocol is nothing but a set of rules that applies on the full data communication procedure. This is like an agreement between the two devices to successfully communicate with each other.

Data representation in computer networks:

Information can be in the form of

Text

Numbers

Images

Audio

video

Text symbols are represented with a sequence of bits 0 or 1. Each sequence is called a code, and the process is called coding. Two coding standards are

Unicode

ASCII

Numbers are also represented with a sequence of 0 and 1. ASCII is not used for number representation. Instead, the following numbering system is used in order to simplify the mathematical operations:

Base 10 (decimal)

Base 2 (binary)

Base 8 (octal)

Base 16 (hexadecimal)

Base 256 (IP address)

An image is also represented with a sequence of 0 and 1. A digital image is made up of small units called pixels. Each pixel is assigned a bit pattern whose size depends on the nature of the image.

If the image is made up of only black and white dots, only one bit is enough to represent a pixel.

White pixel = 1

Black pixel = 0

If the image contains two grey shade along with white and black color, then the 2-bit pattern can be used to represent a pixel.

White pixel = 11

Grey 1 pixel = 10

Grey 2 pixel = 01

Black pixel = 00

To represent a color image, a method like RGB and YCM are used.

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Audio

A sound which lies within the human hearing frequency range of 20 to 20000 Hertz is called audio. The sound is recorded with a microphone and then digitized to represent in the form of bit-patterns. Its transmitted form is called an audio signal.

Video

Flashing a sequence of images on the display screen which gives us a sensation of moving objects is called a video. A video is recorded with a camera and transmitted as a video signal.

Thank You