Introduction to Data communication networks

CST 05202: BASICS OF DATA COMMUNICATION NETWORKS

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Data and Communication concept…

Data

- A collection of text, numbers and symbols with no meaning. Data therefore has to be processed, or provided with a context, before it can have meaning.
- Simply we can say; Data refers to **raw input** that when **processed** or arranged makes **meaningful output**

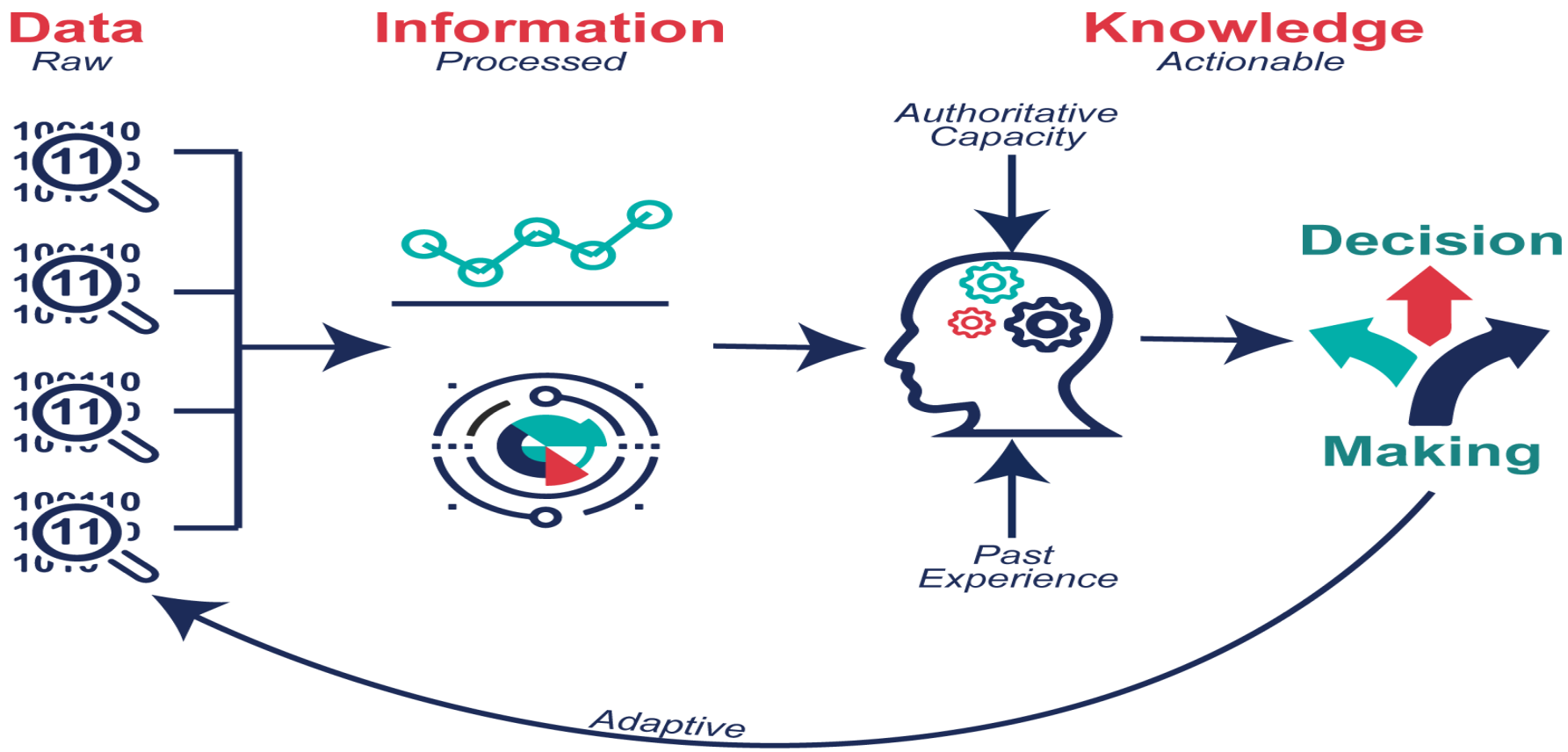
Information

- Information is the result of processing data, usually by computer. This results in facts, which enables the processed data to be used in context and have meaning.
- Simply we can say; Information is **data** that has **meaning**.

Knowledge

- Knowledge is produced as a result of **understanding** information that has been given to us, and using that information to **gain knowledge** of how to **solve problems.**

Data and Communication concept…



Data and Communication concept…

Data communications are the exchange of data between two devices via some form of transmission medium such as a wire cable.

Fundamental characteristics of data communication:

1. **Delivery:** The data should be delivered to the correct destination and correct user.
2. **Accuracy:** The communication system should deliver the data accurately, without introducing any errors. The data may get corrupted during transmission affecting the accuracy of the delivered data.
3. **Timeliness:** Audio and Video data has to be delivered in a timely manner without any delay; such a data delivery is called real time transmission of data.
4. **Jitter:** It is the variation in the packet arrival time. Uneven Jitter may affect the timeliness of data being transmitted.

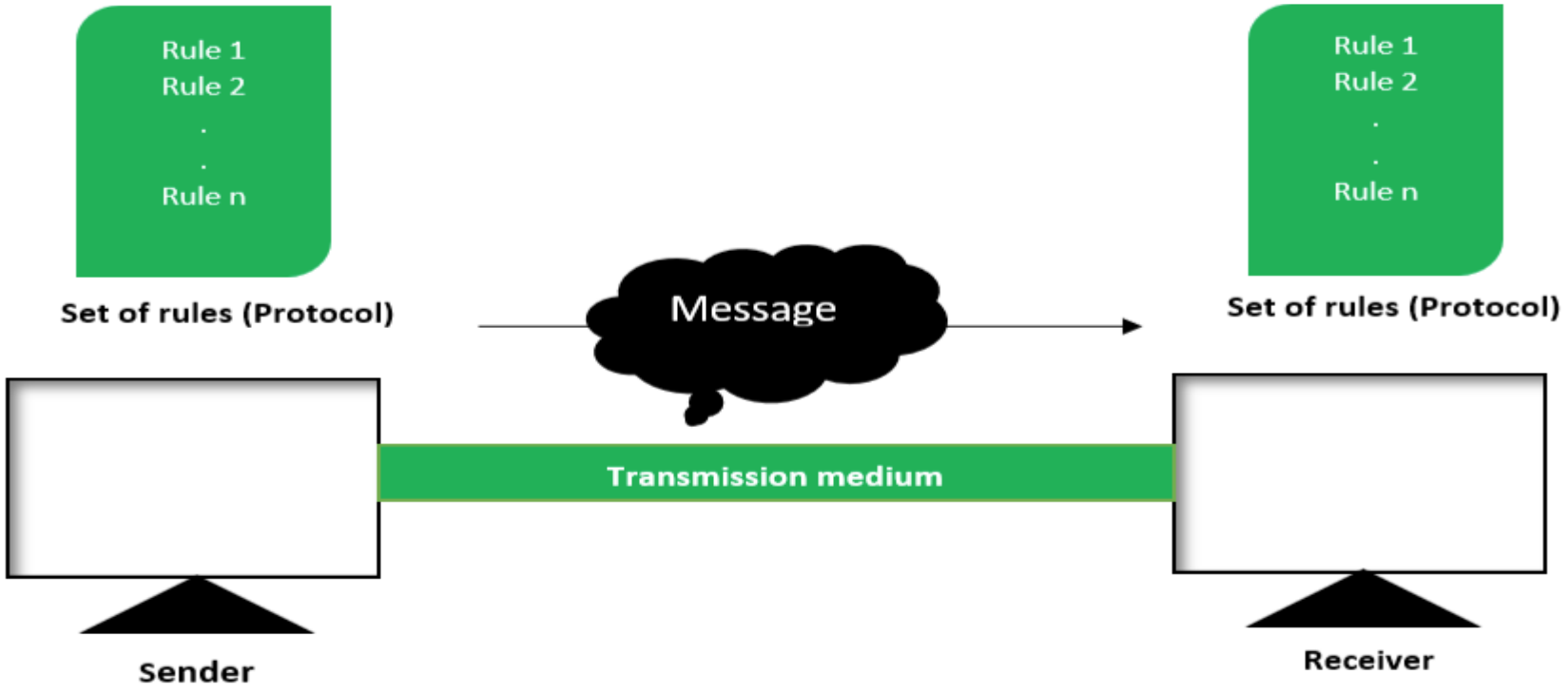
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Five components for Communication:

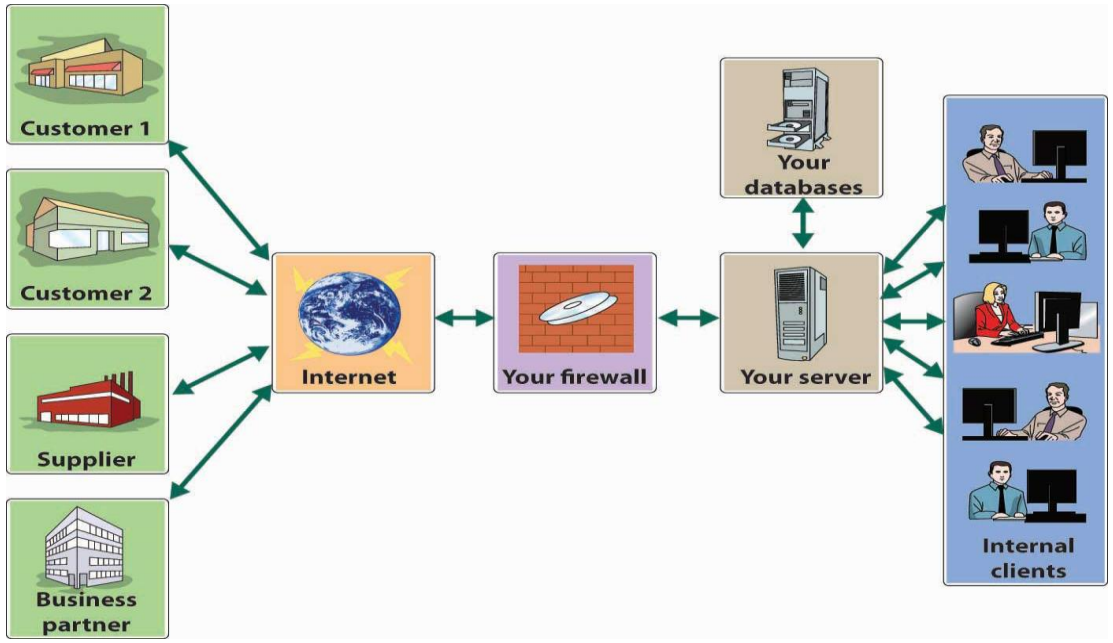
1. **Message.** The message is the information (data) to be communicated. Popular forms of information include text, numbers, pictures, audio, and video.
2. **Sender.** The sender is the device that sends the data message. It can be a computer, workstation, telephone handset, video camera, and so on.
3. **Receiver.** The receiver is the device that receives the message. It can be a computer, workstation, telephone handset, television, and so on.
4. **Transmission medium.** The transmission medium is the physical path by which a message travels from sender to receiver. Some examples of transmission media include twisted-pair wire, coaxial cable, fiber-optic cable, and radio waves.
5. **Protocol.** A protocol is a set of rules that govern data communications. It represents an agreement between the communicating devices (Between sender and Receiver).

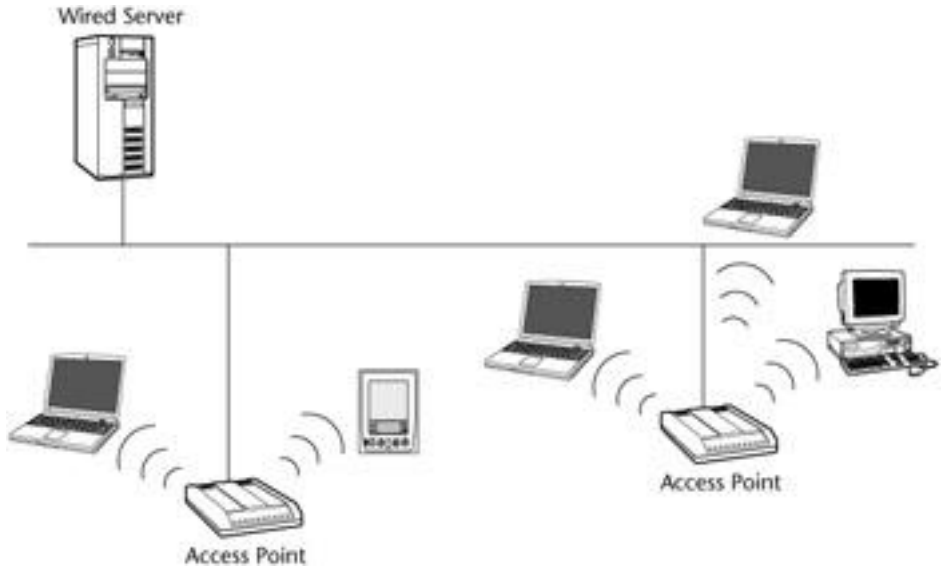
Data and Communication concept…



Communication Networks

Communication networks transmit digital data from one computer to another computer using a variety of wired and wireless communication channels.



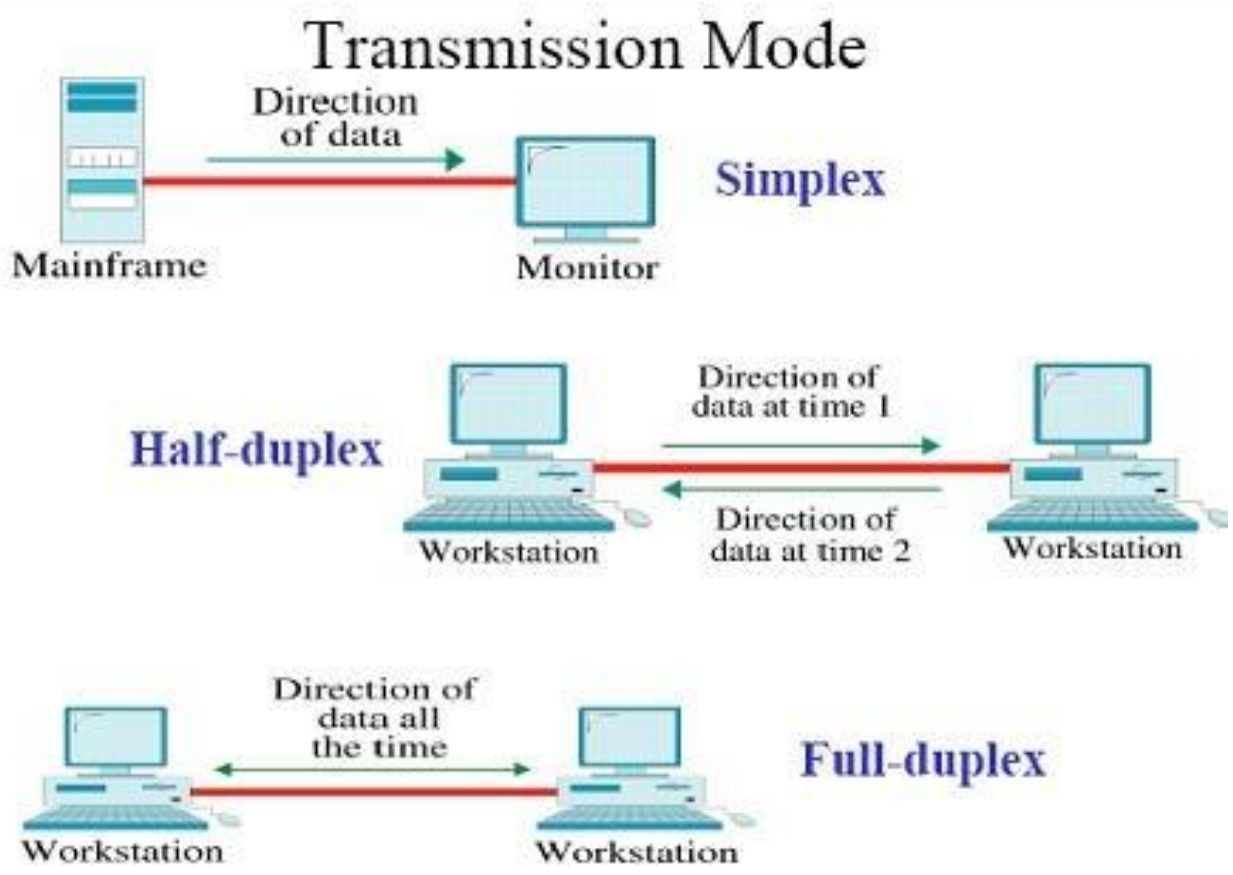


Data Transmission modes

Data Transmission mode defines the direction of the flow of information between two communication devices . **It is also called Data flow Communication or Directional Mode.**

It specifies the direction of the flow of information from one place to another in a computer network.

Data Flow Communication between two devices can be **simplex, half-duplex, or full-duplex**



Simplex:

In simplex mode, the communication is unidirectional, as on a one-way street. Only one of the two devices on a link can transmit; the other can only receive. Keyboards and traditional monitors are examples of simplex devices.

Half-Duplex

In half-duplex mode, each station can both transmit and receive, but not at the same time. When one device is sending, the other can only receive, and vice versa. Walkie-talkies and CB (citizens band) radios are both half-duplex systems.

Full-Duplex

In full-duplex, both stations can transmit and receive simultaneously. One common example of full-duplex communication is the telephone network. When two people are communicating by a telephone line, both can talk and listen at the same time. The full-duplex mode is used when communication in both directions is required all the time.