

## Class Notes on Management Information System

### *Digital Networks and the triple bottom line*

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Smart phones have become the main gateway to the internet and corporate networks. An estimated 10 billion smart mobile phones are connected to mobile networks world wide. 25 percent of all worldwide transactions are done through mobile payment gateways. CISCO predicts that by 2025, global mobile traffic will increase many folds. This is due to high acceptance of wireless devices and wearable technologies.

In the current COVID-19 pandemic period, the entire globe is looking at the digital network connectivity as an alternative to traditional business practices to sustain their business models. Hence the new generation managers must understand the basics of digital networks such as

- (a) Internet protocol
- (b) IP addressing
- (c) Application program interface
- (d) Bandwidth
- (e) Various generations in mobile communication
- (f) Routers, circuit switching, packet switching
- (g) Near field communication
- (h) Integrated technologies (mashup)
- (i) Collaboration technology and instant messaging
- (j) Sustainability and triple bottom line

Let us see the fundamentals of this new alternative connectivity solution named digital Networks.

#### **Internet protocol**

Protocols are rules and standards that govern how devices on a network exchange data and “talk to each other”. This is the method by which data are sent from one device to another via a network.

#### **Internet Protocol addressing**

Every device that communicates with a network must have a unique identifying address. This unique address is called IP address. We can compare an IP address to a telephone address or home address.

## **Application Program Interface (API)**

API is the boundary where two separate systems meet. An API provides a standard way for different things such as software, content, or web sites to talk to each other in a way that they both understand without extensive programming.

## **Bandwidth**

In simple term, Bandwidth is the communication capacity of a network. Bandwidth is the amount of data that passes through a network connection over time as measured in bits per second. Bandwidth is used in both directions – for uploads and downloads.

Very large **data transfers** reduces availability for everyone on the network. **Network speed** depends on amount of traffic. Data flows quickly and smoothly when traffic volume on the network is small relative to the capacity.

## **Demand for High Capacity Networks**

The demand for high capacity networks is growing at unprecedented rates. The many fold increase in factors like

### **(a) Communication**

Relatively simple term, denotes the facility to provide facilities for exchange of ideas. The exchange of ideas can happen between human and machine generated transmissions. Delays are frustrating such as large video files pause during an important and serious discussions. Buffering means the network can not handle the speed at which the video is being delivered and therefore stops to collect packets.

### **(b) Search**

Able to locate ideas, data, contracts, documents, spreadsheets and other knowledge within an organization easily and efficiently

### **(c) Mobility**

This provides secure, trusted and reliable access from any mobile device anywhere at satisfactory download and upload speeds.

### **(d) Relationships**

Managed interactions with different stakeholders of one's business such as customers, supply chain partners, shareholders, employees, regulatory agencies and so on.

### **(e) Collaborations**

Supports teamwork that may be synchronous or asynchronous, brainstorming, documents sharing and knowledge

The above factors added the necessity of powerful networks. Examples of such powerful networks are

### **(a) Wireless mobile**

### **(b) Satellite wireless sensor**

### (c) Voice over Internet Protocol

The a and b can be known to all. However voice over internet protocol need to be understood. VOIP networks carry voice calls by converting voice (analog signals) to digital signals. VOIP has become one of the latest costly ways to communicate.

All networks depend on switching. Earlier networks involved circuit switching, which is slower than packet switching. 4G was the first to be fully packet switched, which significantly improved performance. Let us see the precise explanations for the two basic types of switching

#### **Circuit switching**

A circuit is a dedicated connection between a source and destination. In the past, when a call was placed between two landline phones, a circuit or connection was created that remained until one party hung up. Circuit switching is an older technology that originated with telephone calls, it is inefficient for digital transmission.

#### **Packet Switching**

Packet switching transfers data or voice in packets. Files are broken into packets, numbered sequentially, and routed individually to their destination. When received at destination, packets are reassembled into their proper sequence.

Wireless networks use packet switching and wireless routers whose antennae transmit and receive packets. At some point, wireless routers are connected by cables to wired networks.

#### **Traffic Shaping and Quality of Service**

An important management decision is the network's quality of service (QoS), especially for the bandwidth intensive apps and time sensitive data such as real-time voice and high quality video. The higher the QoS, the more expensive the technologies needed to manage company networks. QoS technologies are applied to create two traffic tiers:

##### **Prioritize Traffic**

Data and apps that are time delay sensitive or latency sensitive apps, such as voice and videos are given priority on the network.

##### **Throttle Traffic**

In order to give latency-sensitive apps priority other types of traffic need to be held back, or throttled.

This the ability to prioritize and throttle network traffic is referred to as **traffic shaping**.

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