NETWORKING, DATA COMMUNICATION AND COMPUTER NETWORK

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Abstract: *Taking a look at Networking, Data Communication and Computer Networking, what are these three topics? Well, they are branches of technologies that deals with Connections, sharing of information and the group of systems that mostly take advantage of the first two technologies. But, what do they have in common? By delving into these three technological fields, it is obvious that they are systems which enables interconnectivity, sharing of information and the type of systems that comes together to make sharing of resources possible. We can further assume that these three technologies should, and can coexist to form a stronger, more versatile interconnected web of different systems that can be called* ***Synchronous Systems****. With the goal of; Allowing continuous implementation of task across different systems and machines.*

Keywords: *Networking, Data, Systems, Communication, Synchronous System, Computers*

Introduction

Focusing on the Information Technology field of study;

NETWORKING defines that process of creating and using computer networks. while this can be implemented in a wired or wireless technological configurations, hardware devices, protocols and software technologies are other factors behind its implementation.

DATA COMMUNICATION on the other hand makes the exchange of data possible between a point and another; that is, a source and a receiver, through transmission medias such as a wire cable or wireless radio transmitters and receivers. While data communications allow seamless transfer of data and maintenance of data, it's important to note that the generation of information(data) at the source and receiving end is not carried out by data communication.

Furthermore, COMPUTER NETWORK are sets of computer devices connected to share resources, the sets of computers on a computer network can also be called nodes, its worthy of note that resources shared by network computers are vast and not limited to files, printers, access to the internet (WEB-world wide web). All these made possible via Ethernet cabling, wireless radio frequencies and even light based data transmission means like fiber optics.

It can therefore be observed that there is a relation of data exchange between these three. Therefore, the relation can thus be assumed to be: Synchronous System. Why not?

Review

Networking is the process of creating and using computer networks. Data Communication is the process of exchanging data between a source and a receiver via transmission medias such as wire cable, wireless radios or fiber optics. While, Computer Network is a set of computer devices connected together for the purpose of sharing resources in order for the computers to do more.

Again, why not eliminate the twist between these three information technology architecture and define them as Synchronous System? Let's have a broader view of the three and point out the relation.

First off, how can we define **Synchronous System**?

Synchronous System is assumed to be a group of different systems linked together to allow continuous implementation of task like data sharing, system resources sharing and processed task that can be paused and resumed at a later time, thereby enabling continuity across systems of different architecture, protocols and operations.

Evolution of a **Synchronous System**

Taking the three systems one after the other, standard procedure in Networking require selecting materials like cabling and networking hardware while at the same time establishing required telecommunication protocols, software and hardware. Without forgetting that networking hardware's have also advanced by providing multiple hardware technologies, like hubs, routers and switches. These can be taken in as one of the base for the creation of a Synchronous System.

Networking will therefore serve as the means of linking the Synchronous System altogether while eliminating the need to build up a new framework of connectivity which will cost a lot of money, lots of research, lots of time and eventually prove to be inefficient.

Data communication handles the delivery of information which will be transmitted over the networking channels. At this point it, ensuring that data is adequately sent over the synchronous System might become more of a challenge. Therefore, there will be the need to establish a unique identification ID on each machines within the synchronous System.

While we start thinking of ways to go about executing this, it's essential that we look back at the fundamental rules that govern data transmission in the current data communication systems. This in turn requires that we study data communication and how nodes on a network system transfers and receive data, which can be referred to as data packets transmission.

The movement of data from one node of a network to the next is called **node-to-node data transfer, this** is handled by the lowest two layers in the OSI (Open System Interconnection) which are: the data link layer and the physical layer.

Data link layer

The **data layer**, is the second layer of the seven-layer OSI model of computer networking. This layer is the protocol layer that transfers data between adjacent network nodes in a wide area network (WAN) or between nodes on the same local area network (LAN) segment. The data link layer provides the functional and procedural means to transfer data between network entities and might provide the means to detect and possibly correct errors that may occur in the physical layer.

The data link layer is concerned with local delivery of frames between nodes on the same level of the network. Data-link frames, as these protocol data units are called, do not cross the boundaries of a local area network. Inter-network routing and global addressing are higher-layer functions, allowing data-link protocols to focus on local delivery and addressing. In this way, the data link layer is analogous to a neighborhood traffic cop; it endeavors to arbitrate between parties contending for access to a medium, without concern for their ultimate destination. When devices attempt to use a medium simultaneously, frame collisions occur. Data-link protocols specify how devices detect and recover from such collisions, and may provide mechanisms to reduce or prevent them.

Examples of data link protocols are Ethernet for local area networks (multi-node), the Point-to-Point Protocol (PPP), HDLC and ADCCP for point-to-point (dual-node) connections. In the Internet Protocol Suite (TCP/IP), the data link layer functionality is contained within the link layer.

Physical layer

The **physical layer** or **layer 1** is the first and lowest layer. This layer may be implemented by a PHY chip.

The physical layer consists of the electronic circuit transmission technologies of a network. It is a fundamental layer underlying the higher level functions in a network. Due to the plethora of available hardware technologies with widely varying characteristics, this is perhaps the most complex layer in the OSI architecture.

The physical layer defines the means of transmitting raw bits rather than logical data packets over a physical data link connecting network nodes. The bitstream may be grouped into code words or symbols and converted to a physical signal that is transmitted over a transmission medium. The physical layer provides an electrical, mechanical, and procedural interface to the transmission medium. The shapes and properties of the electrical connectors, the frequencies to broadcast on, the line code to use and similar low-level parameters, are specified here.

Within the semantics of the OSI model, the physical layer translates logical communications requests from the data link layer into hardware-specific operations to cause transmission or reception of electronic signals.

By factoring the data link layer and the physical layer, data communication within the synchronous systems becomes a practical possibility. Although, the need to enhance data communication in the system may become a requirement due to the large volumes of different machines exchanging data over the communication link. Therefore, an optimization protocol may be factored into the synchronous system configuration.

Computer Networks as we know, are the set of computing devices sharing resources over the network, these set of computers have laid the bases for a working synchronous system. In what way?

Since the goal is to create a group of different systems linked together to allow continuous implementation of task like data sharing, system resources sharing and processed task which can be paused and resumed at a later time; this made the computer networks have their issues resolved with the

synchronous system and what is left is to modify the hardware and software configuration of other systems and machines to accommodate networking interface and allow data communication across the different architecture.

Conclusion

How interesting can it be?

A versatile system whereby every machine we use to achieve productivity is linked to provide a continuous loop of operations, sharing task and resuming task from each other; With the likes of File sharing, Communications, System-resource sharing and up to sharing of technical task from one machine to another while arriving at the same result.

This may seem to be an impossible marriage of existing network protocol systems but, it's worthy of note that a similar interconnectivity method is currently on the horizon across tech devices of different architecture. That interconnectivity is what is called IOT (Internet of Things), as much as this is a new venture into ways we can get systems of different platform to cross communicate, it is without doubt that Synchronous System is the ultimate solution to creating a seamless interconnected platform for systems of different functionality.

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