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**Assignment** Essay – Current IT Topic

Telecommunications and networks technology so far and outlook

In yester years even the fastest mode of communication would be asynchronous i.e. you send a message and it will take days to months to reach the recipient, however with the advent of radio and telegraph that changed and have gradually progressed synchronous voice communication (telephone) and to video conferencing. We live in a time of World Wide Web, which is the largest network with over 3 billion devices. Every day millions of new devices are attached to it. There are wide range of software’s and protocols running on these devices, however each of them can talk to internet and with each other. This is made possible because these devices follow the preset communication protocols set by Institute of Electrical and Electronics Engineers (IEEE).

Telecommunications mediums with different applications usually follow different channel classifications and bandwidths. Mediums can be classified based on direction of data flow such as simplex (capable of sending in one direction only such as radio), half-duplex (capable of sending data in both directions send and receive however no simultaneously used in computer networks) and full-duplex channels where data moves both ways simultaneously these are mostly in leased lines and telephone connections. Whereas bandwidth pertains to amount of data transferred at, in last few years most amount of improvement in the available bandwidth. Available bandwidth has been increasing owing to advancement in the telecommunication media, twisted pair such as used in the telephone services, coaxial cables used for cable and DSL services, fiber-optics cable and broadband over powerlines.

However, these cable mediums come with inherent disadvantage that they are susceptible to physical barriers, cost of laying out cable, breakage etc. Wireless mediums are gaining notoriety these days as they are more reliable and does not need cumbersome wiring. Wireless has an advantage of being able to be transmitted over large distance and difficult terrain. The range and bandwidth that can be fit into a wireless transmission depends on the frequency. Infrared range, usually are for very small distance within a room and require line of sight to operate, Radio frequency range used for mobile devices etc, Microwave range usually used in long distance transmissions and involve communication satellites. The speeds and bandwidths available are improving by the day.

Cellular networks have been at the forefront in bringing the new technology and improvements in the wireless technology. Various municipal corporations have tried to establish city wide wireless access points using wireless mesh with mixed success, these technologies suffer from limitations of the range and power of the access points. These initiatives also have stiff resistance from the other ISPs in the areas as they see these to be infringing on their business and market share. Over the last few years the cellular data speeds have increased tremendously from 3G to 4G LTE networks and graduating to experimental 5G technologies capable of 100Gbits speed. However, the preference to different geographic regions to CDMA vs GSM technologies have not been very conductive to their success as these provide constant challenge in making one system talk to another. However, with advancement in mobile technologies we now have devices that can talk to both types of network. Once such example is Google Fi project, it a telecommunication network that tap in to both CDMA and GSM networks prevalent in USA. It also takes the network technology one step forward by tapping in to open WIFI hotspots in the vicinity to route mobile calls and data transfers.

Gradually the cost of internet connectivity has been coming down so much so that Inflight w-ifi was discussed as something in the offering in near future has become a staple and standard on almost all the flights these days. Government has been encouraging the technology companies to move away from analog broadcasts to digital ones have also led to speeding up of technology development.

# References

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