The Changing Pattern of Data Transfer: A Theoretical Overview

P.K. Paul[1], K.S. Shivraj[2] and A. Bhuimali [3]

[1]FBAS, Indian Institute of Engineering Science and Technology (IIEST), Shibpur- An Institute of National Importance,
Howrah, West Bengal, India,
[2]K.L. University, Andhra Pradesh, India
[3]Vice-Chancellor, Raiganj University, Raiganj, West Bengal, India
Email: prancloud@outlook.com

Abstract - **Internet is changing the world and overall activities. Internet is the global system of network of networks and comprised with the private, public, academic and research, business and commercial, activities and sectors. Initially internet was mainly offered in the Government activities and mainly in the defense and space stations but gradually internet become a tool of common man and involved in most of the activities and sectors. Internet may be accessed in various way and methods; importantly internet services are also changing due to its features and emerging speed. The data transfer rate is differs from the technology to technology and importantly country to country. This paper is talks about the data transfer and its changing pattern and emphasizing speed divide among the countries. Paper highlights all these aspects in brief manner with theoretical context.**
Keywords: **Internet, Digital Divide, Information Technology, Data Transfer, Internet Speed, Multilink, Information Science, Broadband Access**

I. INTRODUCTION

The development and origin of internet was take place in 1960's, when US Government initiated the efforts of resource sharing. The ARPANET was the most important and significant aspects of internet, primary it was saved as an important fact for collection and cooperation of regional academic and military network and similar foundations. The National Science Foundation Network was treated as the most vital and important name for the finding and financial sources of implementing these technologies and systems. The 1980's was the important year as that time many efforts was taken for implementing new and emerging technologies.

II. OBJECTIVES

The core aim as well as objective of this theoretical paper is includes but not limited to the following.

1. To know about the internet and its background and instant and gradual features.
2. To learn about the services and characteristics of internet that attracts millions of users worldwide.
3. To know about the ARPANET and other important initiatives with future potentialities.
4. To know about current uses of internet, data transfer and internet speed worldwide.

5. To know about the factors which efforts to data transfer and internet speed worldwide.

III. INTERNET, DATA AND GROWTH

Internet is the network of networks. A network consists with huge computers and similar systems. Internet initially started in 1960 for private users in the Governmental efforts in the United States and thereafter it was grow around the world and used in many other sectors and affairs. The emerging services and facilities created a lot of new users. The change in data communication and data transfer are also important facet for the development of computing systems and internet in this regard was important and most valuable. Initially the internet service was mainly dialup based but gradually new technologies have emerged and were implemented. The speed and data transfer rate also changed day by day. In the mid of 1990's the internet become a tools of the individual and in between 1995-2015 the internet users have grown hundred times. After decommissioned the NSF in the US the internet had gear up rapid success and internet also increased rapid manner in the Europe and Austria. The development of internet was took place in between 1985-1990s. The first high-speed internet was started in 1990 (March) with speed of 1.5 Mbit/s between the NSENET and Europe. The project was implemented between Cornel University and CERN. After introduction of the web browser and HTML and HTTP the internet become most useful and touches a new height. The accessibility of Usenet and FTP files sharing started that time. However the data transfer speed was increased during the 1990's (late) and higher speeds offered over the fiber optic network operating at 1-Gbit/s, 10-Gbit/s and more gradually the TCP/IP protocol and IPv4 started and internet entered in to a new scale. According to the latest data, the internet users increased from 394 million to 1858 billion in between 2000-2009. In the 2014 the internet user base touches 3 billion and percentage wise 43.6% of total population in the world. The following connection and type have great impact in the rise of internet users around the world.

a. Dialup Access.
b. Multilink Dialup,
c. Integrated Service Digital Network.

d. Leased Lines.
e. Cable Internet Access.
f. Asymmetric Digital Subscriber Line.
g. Bonded DSL.
h. Fiber to the Home.
i. Power Line Internet.
j. ATM and Frame Relay.

In addition to these wireless broadband also played an important role and these include

a. Satellite Broadband.
b. Mobile Broadband.
c. WiMax.
d. Wireless ISP.
e. Local Multipoint Distribution Services.

Internationally the user of the internet has been raise rapidly during the last five years due to wonderful possibilities of these mentioned technologies, the internet users have grow-up (the changes of users from 2000 to 2015 in the Asian Countries have listed in Table: 1. As provided by IWS [26]. According to the ITU, the total population was 6.5 billion worldwide and the internet users touches 16%.

The growth of population touches 6.9 billion in 2010 and internet users was 30% of the total population in the world. Study of IWS data that up to the last Nov, 2005 the share of the internet users between Asia and rest of the world was 48.2% and 51.8% respectively (in terms of population, the share was 55.5% and 44.5%).
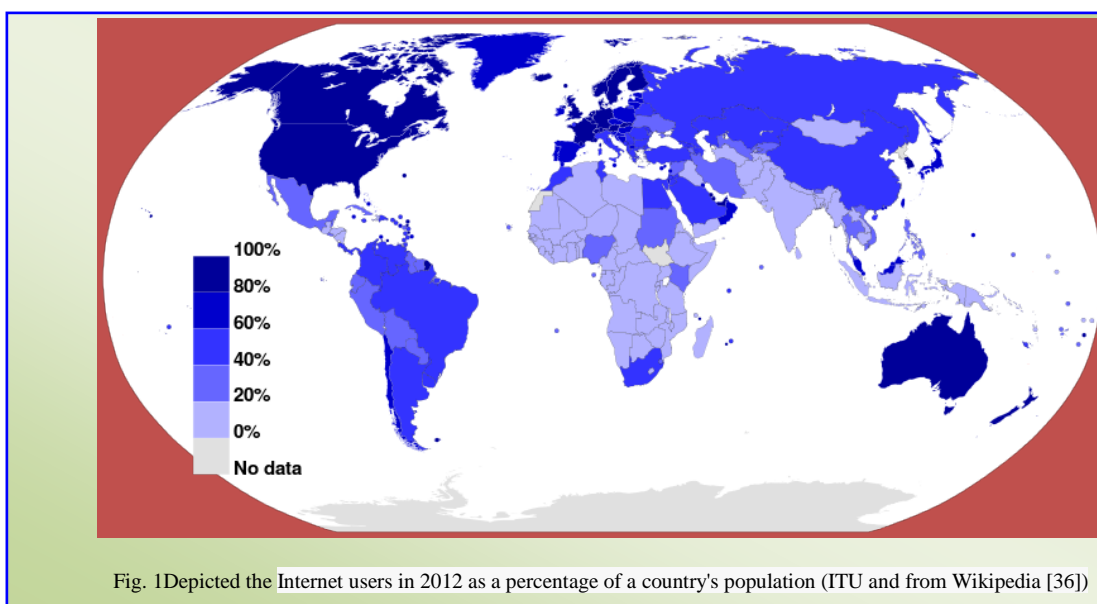
TABLE I DEPICTED THE INTERNET USERS IN ASIA [26]

ASIA	Population (2015 Est.)	Internet Users, (Year 2000)	Internet Users 30-Nov-2015	Penetration (% Population)
Afganistan	32,564,342	1,000	4,005,414	12.3 %
Armenia	3,056,871	30,000	2,126,716	69.6 %
Azerbaijan	9,593,038	12,000	5,851,753	61.0 %
Bangladesh	168,957,745	100,000	53,941,000	31.9 %
Bhutan	741,919	500	254,998	34.4 %
Brunei Darussalam	429,646	30,000	318,900	74.2 %
Cambodia	15,708,756	6,000	5,000,000	31.8 %
China	1,361,512,535	22,500,000	674,000,000	49.5 %
Georgia	4,931,226	20,000	2,411,370	48.9 %
Hong Kong	7,141,106	2,283,000	5,751,357	80.5 %
India	1,251,695,584	5,000,000	375,000,000	30.0 %
Indonesia	255,993,674	2,000,000	78,000,000	30.5 %
Japan	126,919,659	47,080,000	114,963,827	90.6 %
Kazakhstan	18,157,122	70,000	9,966,444	54.9 %
Korea, North	24,983,205	--	7,200	0.0 %
Korea, South	49,115,196	19,040,000	45,314,248	92.3 %
Kyrgystan	5,664,939	51,600	2,194,400	38.7 %
Laos	6,911,544	6,000	985,586	14.3 %
Macao	592,731	60,000	413,608	69.8 %
Malaysia	30,513,848	3,700,000	20,596,847	67.5 %
Maldives	393,253	6,000	230,000	58.5 %
Mongolia	2,992,908	30,000	1,300,000	43.4 %
Myanmar	56,320,206	1,000	7,100,000	12.6 %
Nepal	31,551,305	50,000	5,700,000	18.1 %
Pakistan	199,085,847	133,900	29,128,970	14.6 %
Philippines	109,615,913	2,000,000	47,134,843	43.0 %
Singapore	5,674,472	1,200,000	4,653,067	82.0 %
Sri Lanka	22,053,488	121,500	5,689,800	25.8 %
Taiwan	23,415,126	6,260,000	19,666,364	84.0 %
Tajikistan	8,191,958	2,000	1,432,773	17.5 %
Thailand	67,976,405	2,300,000	38,000,000	55.9 %
Timor-Leste	1,231,116	0	290,000	23.6 %
Turkmenistan	5,231,422	2,000	638,233	12.2 %
Uzbekistan	29,199,942	7,500	12,716,575	43.6 %
Vietnam	94,348,835	200,000	47,300,000	50.1 %
TOTAL ASIA	4,032,466,882	114,304,000	1,622,084,293	40.2 %

According to that report the total number of internet users was 3, 366, 261, 156 while in terms of the average of the world percentage it was 46.4% (*and penetration % of the population*). In the world few important countries are China, US, India, Brazil, Japan, Russia, Nigeria, Germany, Bangladesh, Mexico, UK, Indonesia. While the reason of higher internet users varies country to country. Percentage wise some of the good countries are

- Iceland—96.55%.
- Bermuda—95.30%.
- Norway—95.05%.
- Luxemburg—93.73%.
- Finland—91.51%.
- Bahrain—90.00%.
- Faruc Ssland—90.00%

- UAE—88.00%.
- Qatar 85.30%.
- New Zealand 82.78%.
- Austria—80.62%.

The Data of ITU of 2012 regarding the internet users in 2012 was provided in Fig: 1. For the improvement of the more uses, many countries have been purely associated with the framing of new rules, policies and methodologies for their implementation. Today most of the countries putting efforts in satellite broadband, mobile broadband. The third generation computer network is the core importance in many developing countries. While many countries have involved the R&D and further implantation of 4G Network with the HSPA+, Mobile WiMax, LTE, LTE Advance, MBWA and other medium.

Fig. 1Depicted the Internet users in 2012 as a percentage of a country's population (ITU and from Wikipedia [36])

IV. DATA TRANSFER AND EMERGING SERVICES

Today many new services are emerged and among these some popular includes but not limited to the

- Instant Messaging.
- Internet Forum.
- Online Shopping.
- Social Networking.
- Online Game.
- Telemedicine.
- E-Governance.
- E-Banking.
- E-Leaning and so on.

In all these, Data Transfer is very much important and mainly in the telecommunication and in E-Governance project. Thus many countries have implemented the latest tools and methods for higher internet speed. The latest report of the AKAMAI, 2015 is states that the South Korea hold highest average internet connection speed 26.7 while the second position hold by the Sweden 19.1 and third is Norway 18.8. The details of the report are provided in Table: 2; source Akamai [26]. However based on average peak connection speed, Singapore is hold 1st position with average internet speed 105.2MB/s. While Romania hold 16th position with 73.6 MB/s average packet connection speed. The India is holding the lowest average internet speed of 2.8 MBPS. Though it has 2nd highest users base in the world and share around 13% Internet sharing in the world. The emerging services like internet television, internet phone etc many ways dealing the average speed and thus government need to put more efforts in the infrastructure development. Though, the global speed is 5.6 Mb/s.

TABLE II DEPICTED THE RANKING OF COUNTRIES BASED ON AVERAGE INTERNET SPEED

Rank	Country	Average Internet Speed (Mb/s)
International (Global)		5.6
1	South Korea	26.7
2	Sweden	19.1
3	Norway	18.8
4	Japan	17.4
5	Netherlands	17.0
6	Hong Kong	16.8
7	Latvia	16.7
8	Switzerland	16.7
9	Finland	16.6
10	Denmark	16.1

V. FINDINGS

1. The global average internet speed is 5.6 MBPS and which is 23% better from the year 2014.
2. In the world, South Korea ranked 1st position in internet speed with 26.7 MBPS and India hold the average speed of 2.8 MBPS.
3. According to the latest data the 43 Countries saw IPv6 address counts grew of 10% and 13 countries dealing 10% (TOI).
4. As far as mobile speed is concerned the Bahrain hold first position with 26.8 MBPS. However IRAN had the most lowest internet speed of 1.8 MBPS.
5. Technology wise the HSPA+, Mobile WiMax, MBWA, GSM-EDGE, CDMA 2000 EV-DO are the most important and emerging.
6. Many countries lacking the number of users and internet speed due to failure in good policies and framework.

VI. CONCLUSION

Information is the power and today most of the governments are putting importance to the better and healthy information governance and for this practice internet need to put higher importance. The digital divide and information divide-many ways possible to remove by the implementation of solid telecommunication, policy and regulation. In many context, the too much interfere by the government in the speed, access and other related affairs. Like government private companies are also need to provide thrust on better internet services and systems.

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