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Future Internet: A Revolutionary Approach

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Abstract:The information revolution is bringing people from different backgrounds from around the world into a global superhighway of information. The Internet provides a global platform that connects thousands of networks all over the world. The users have access to a variety of information on the Internet. It has been thought of as a forum for users to share information resources around the world. The resources are so vast that many of us can't really fully understand or grasp the Internet. The number of internet connected users has increased exponentially. New applications have led to voice and data networks convergence Original Internet capacity is rapidly becoming inadequate to handle large volumes of traffic patterns delivered through new services such as mobile communications, server virtualization, cloud services, and big data. The future of the Internet depends heavily on future research into the internet. The paper presents a brief introduction to future research into the Internet.

Keywords: Future networks, Internet traffic, Internet access, Data services, Information access, Research.

INTRODUCTION

The Internethas been successful way beyond its creators' dreams. We are witnessing a dramatic growth in the size and complexity of the Internet [1]. It interconnects several million devices. The Internet's open architecture has facilitated service and application interoperability and globalization but the current Internet can't support application diversification anymore. Some of the new applications require large bandwidth and push the architecture and protocols on the Internet far beyond their original intent. Various weaknesses of the current Internet Future Internet research efforts have led to such results as performance, reliability, scalability and security. Strategies for future internet development range from incremental evolutionary steps to complete redesigns.

The Internet has become the most important medium for exchange of information and the core communication environment for both business relations and social interactions Millions of people worldwide use the Internet to find, access and exchange information, to enjoy multimedia communication, to take advantage of advanced software services, to buy and sell To keep in touch with friends and family, to name a few. Internet success has created even higher hopes and expectations for new applications and services which may not be supported to a sufficient level by the current Internet. The number of Internet nodes (computers, terminals, mobile devices, sensors, etc.) is expected to grow to over 100 billion shortly. Services and open application interfaces will similarly expand and many of these services will address essential societal needs in healthcare, transportation / automotive, emergency services, and so on. The reliability and availability required by these services in turn imposes an increase in the Internet architecture's robustness and survivability properties. At the same time, the advances in video capture and content / media generation have resulted in greater amounts of multimedia content and applications that offer immersive experiences, e.g., Compared to the quantity and type of data currently exchanged over the Internet, 3D videos, interactive immersive environments, network gaming, virtual worlds etc.All these applications create new demands, which to a certain extent can be addressed through "over-dimensioning".

Telecommunications and the Internet are increasingly forming an integrated system to process, store, access and distribute information and to manage content. This convergence process is based on the rapid development of the digital technology and the spread of the concept of the Internet. The steps of digital technology penetration and the classic Internet, as well as the evolution towards an

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integrated telecommunications, information technology and electronic media (TIM) sector, were presented and shown in figure 1. The first step was to digitize and integrate network functions in the fields of voice communication (telephony), data communication and media communication (radio broadcasting), each one divided by its content. In the second, a uniform digital communications of different contents and an integrated telecommunications sector (formally called electronic communications) were formed The third step presents the convergence of communication, information processing and content handling, the emergence of the integrated TIM sector and IPv4/TCP-based, synergistic TIM applications

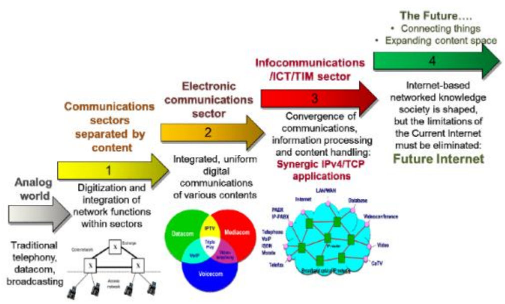

Fig.1: Steps of Penetration of Digital Technology and Internet, Towards

An Integrated Telecom, IT and Media sector

Recently, the content space is expanding through cognitive and sensory content in the fourth step, trillions of devices are to be interconnected, media convergence is highlighted and an open Digital Ecosystem is being formed An integrated value chain for information (TIM), as the information society's smart, digital infrastructure is shaped [2]. At the same time as the identification capacity of the Current Internet is running out, Internet architectures are being reconsidered to better manage mobility and quality requirements, safety issues as well as exploit opportunities derived from technological development and new data handling and cognitive concepts This convergence process transforms our everyday life into the spheres of business and banking, administration, production, agriculture, transportation, health, education and knowledge systems, etc. On the Internet base, the future networked knowledge society will be established, but the limitations of the Current Internet must be removed.

EVOLUTION OF THE INTERNET

The ARPANET (sponsored by the Agency for Applied Research in the Department of Defense) was the first experimental network to support military research in 1960 [3]. There were a large number of machines with the Berkeley UNIX operating system on this network that have networking facilities for internet protocol (IP) [4][5]. The ARPANET, defined in 1969, eventually became a tool that offered services such as remote login, file transfer, e-mail, and information sharing. Over the past 24 years, the United States Department of Defense (DOD) has defined a tool for scientific elite: an amorphous computer network known as the Internet that allows Internet users to exchange electronic mail and share other computer resources Internet users ' population is increasing at a rate of more than 20 per cent per month.

The Internet is a collection of various types of computer networks that offers global connectivity between them for data communication. A common language defines communication between these computer networks through a standard protocol called the TCPIIP (Transmission Control Protocol/Internet Protocol). Although the Internet is derived from ARPANET, it now includes a variety of networks such as NSFNET, BITNET, NEARNET, SPAN, CSNET and many other networks of computers.The Local Area Networks (LANS)were also more or less simultaneously introduced and used to provide the ARPANET services to the users connected to them [6]. Other networks were also established and defined during the same time National Science Foundation (NSF) defined NSFNET as one of the most useful and important networks: a US Federal agency for providing connectivity for supercomputers. It is based mainly on the ARPANET concept of direct 5 kbps (kilo bytes per second) telephone lines connecting different supercomputer centers (about five) to every university in the USA.

LIMITATIONS OF CURRENT INTERNET

The research community has drawn its attention on the weaknesses of the original Internet. The shortcomings of the current Internet include:

- The limited addressing or identification capacity, not enough IPv4 domain names

- The essentially private wire line network concept
- The lack of a scalable efficient network and mobility management
- The best effort solutions, the lack of guaranteed and differentiable quality of services and security
- Energy awareness is critical due to the network size and usage
- Application development is inflexible
- Scalability in support of an increasing number of users
- Robustness and security

Approaches for handling these shortcomings include wireless or mobile technologies, optical broadband solutionsand huge storage capacity, moving towards IPv6 and material innovations. Experts are now debating whether to continue patching the current Internet architecture and protocol.New technological opportunities are for managing limitations:

- Advanced wireless/mobile technologies;
- Broadband optical solutions;
- Huge storage capacity, storage efficiency;
- Innovations in material and manufacturing technology, especially in the technology of sensors, CPUs, memories, energy sources;
- Potential opportunities from nanotechnology and biotechnology.

CONCEPT OF FUTURE INTERNET RESEARCH

Current Internet challenges, tangible and potential demands, and technical opportunities determine the critical research issues, research goals, and spheres and need to reconsider the classic concept of the Internet. Figure 2 shows the Future Internet vision based on Japan's National Institute of Information and Communications Technology (NICT) scheme, and FIA 2011 achievements in Budapest and Poznan, FIA 2012 in Aalborg and FIA 2013 in Dublin The classic Internet aimed at interconnecting people and content, the Future Internet also aims at interconnecting devices, resulting in a two-pillar concept: People's Internet (Media Internet) and Things Internet (IoT). (Updated on the FIA, the comprehensive concept of Internet of Everything was emerged.)

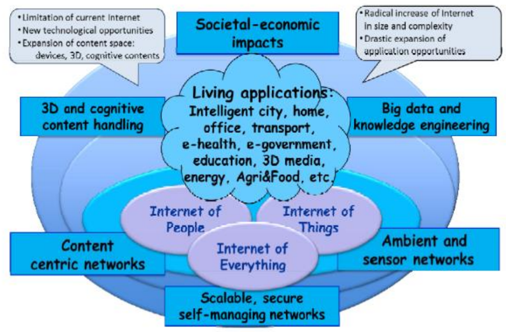

Fig.2: Concept of Future Internet Research, based on Japan NICT's Future Internet Vision

Future Internet research activities therefore focus primarily on network architecture issues in order to solve challenges in terms of scalability, security, management and sustainability, both for ambient and sensor networks (IoT) and efficient media networks (content-centric networks) [7]. Big data and knowledge engineering (acquisition, management, storage, etc.), handling of 3D and cognitive content became also important research questions. Also intensively investigated are the dramatic expansion of application opportunities and recently the societal-economic impacts.The aims and spheres of research can be combined into the usual three levels. The Internet is considered a complex network system, and its common attributes are heavily investigated in the Network Science framework. In general, the Internet Science collects basic research topics related to the fundamentals of the Future Internet, embracing mathematical modeling of large-scale networks, cryptography as security theory, human, socio-economic and environmental aspects, the principles of legislation and governance, etc. Engineering research issues – such as the creation and development of Future Internet technologies, network architectures and protocols, data and content management methods and design procedures – are the backbone of applied Internet research, called Internet Engineering Lastly, Future Internet experimental research and innovation actions aim to develop FI-based solutions, smart industrial and community applications, customizable content services, involving their experimentation, demonstration and standardization issues, shortly referred to as development of Internet applications.

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RELEVANT FUTURE INTERNET FUNCTIONSAND FEATURES

Recently there is no accepted definition for the Future Internet, rather it is described by some capabilities that do not exist in the Current Internet, or are not typical. Some new functions have been created and some special features have become evident over the past few years, which are relevant criteria for separating the Internet of the present and the future. Eight functions and four features related to Future Internet are listed in the following. The lists are open as a matter of course; one or more functions and some of the features recently are characteristic of the Future Internet solutions.

- Identification and interconnection of things, devices, sensors (Internet of Things);
- Network architecture intrinsically handling mobility, anywhere, anytime" data collection and presentation (Mobility centric architectures);
- Networked data bases, real time access and global handling of huge scale multimedia contents (Big Data);
- Content-aware technologies: content selection, distribution, outsourcing and management, content centric networks, content mining;
- Programmability of networks: virtualized, software defined networks (SDN)
- Communicating and managing 3D and cognitivecontents, virtual and augmented world;
- Cloud computing and communications: software,platform, network, etc. can be provided as a service(SaaS, PaaS, NaaS, etc.);
- Remote collaboration, monitoring

A list of relevant Future Internet features is:

- Embedded, intrinsic localization, tracking and tracing;
- Inherent information security, personal data protection;
- Customized solutions and presentation (personal profile);
- Managed quality, service-aware architectures and application platforms.

FUTURE INTERNET

While the current, classic Internet has been designed to interconnect computer devices, the future Internet is intended to interconnect people and devices that result in the Internet of People (Media Internet) and the Internet of Things (IoT). Together with other wireless technologies such as WiMAX[8] and WiFi, cellular technologies will provide omnipresent Internet access in the future [9].Any strategy aimed at improving the existing Internet cannot be limited to paperwork. It requires early experimentation and testing in environments of great scale. Several regional initiatives are emerging, and future global networks are being proposed. In the United States in 2005 GENI (Global Environment for Networking Innovations) was proposed [10]. Its goal is to develop an Internet of next generation for the future computing environment and a test bed for global network measurement. FIRE (Future Internet Research and Experimentation), which promotes experimentally driven research, networking concepts, is an example of European initiative another is FEDERICA (a project funded by the European Commission), which creates custom-made virtual environments and makes them available to future researchers on the Internet. Collaboration between FEDERICA and FIRE.

Managing the huge amount of data and information on the Internet will create ongoing chances and challenges for the foreseeable future to come. Making the Internet safe and secure is important to economic competitiveness. The future Internet will allow the vision of the smart cities to be realized. New technologies such as sensor networks, optical networks, cloud computing, the Internet of Things, big data, and software-defined networking will take hold. A critical understanding of these emerging technologies is needed to tackle the various challenges in the realization of the future Internet.

CONCLUSION

The new Internet holds the promise of supporting network visualization, scalability, security, reliability, mobile broadband apps and 3D applications. In the near future, network operators need to provide convergent, dynamic and adaptive networks in a heterogeneous, multi-service, multi-protocol, and multi-technology environment Research activities on future Internet architectures and protocols need to address a wide range of issues such as addressing, virtualizing networks, routing and traffic engineering, dynamic optical circuit switching, and management capability.

REFERENCES

[1] Internet World Stats, "Internet World Stats," *Internet World Stats*, 2015. .

[2] P. Weill and S. L. Woerner, "Thriving in an Increasingly Digital Ecosystem," *MIT Sloan Manag. Rev.*, 2015.

[3] B. S. Steel, "Arpanet," in *Science and Politics: An A-to-Z Guide to Issues and Controversies*, 2014.

[4] S. Allesina and M. Wilmes, "Unix," in *Computing Skills for Biologists*, 2019.

[5] A. Lagendijk, "8. Internet Protocols," in *Survival Guide for Scientists*, 2019.

[6] J. Amoss, "Local area networks," in *The CRC Handbook of Modern Telecommunications*, 2010.

[7] S. Li, L. Da Xu, and S. Zhao, "The internet of things: a survey," *Inf. Syst. Front.*, 2015, doi: 10.1007/s10796-014-9492-7

[8] M. Maier, N. Ghazisaidi, M. Maier, and N. Ghazisaidi, "WiMAX," in *FiWi Access Networks*, 2012.

[9] M. Maier, N. Ghazisaidi, M. Maier, and N. Ghazisaidi, "WiFi," in *FiWi Access Networks*, 2012.

[10] M. Berman *et al.*, "GENI: A federated testbed for innovative network experiments," *Comput. Networks*, 2014, doi: 10.1016/j.bjp.2013.12.037.

[11] Vishal Jain and Dr. S. V. A. V. Prasad, "Mapping between RDBMS and Ontology: A Review", International Journal of Scientific & Technology Research (IJSTR), France, Vol. 3, No. 11, November, 2014 having ISSN No. 2277-8616.

[12] Vishal Jain and Dr. S. V. A. V. Prasad, "Mining in Ontology With Multi Agent System in Semantic Web : A Novel Approach", The International Journal of Multimedia & Its Applications (IJMA) Vol.6, No.5, October 2014, page no. 45 to 54 having ISSN No. 0975-5578.

[13] Vishal Jain, "A Brief Overview on Information Retrieval in Semantic Web", International Journal of Computer Application, RS Publication, Issue 4, Volume 2 (March - April 2014), page no. 86 to 91, having ISSN No. 2250-1797.

[14] V.M. Prabhakaran, Prof S.Balamurgan ,A.Brindha ,S.Gayathri ,Dr.GokulKrubaShanker,Duruvakkumar V.S, "NGCC: Certain Investigations on Next Generation 2020 Cloud Computing-Issues, Challenges and Open Problems," Australian Journal of Basic and Applied Sciences (2015)

[15] V.M.Prabhakaran, Prof.S.Balamurugan , S.Charanyaa, "Data Flow Modelling for Effective Protection of Electronic Health Records (EHRs) in Cloud", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 3, Issue 1, January 2015

[16] R. Santhya, S. Latha, S. Balamurugan and S. Charanyaa, "Further investigations on strategies developed for efficient discovery of matching dependencies" International Journal of Innovative Research in Science, Engineering and Technology Vol. 4, Issue 1, January 2015