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# FUTURE INTERNET RESEARCH

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## ABSTRACT

*The number of users connected to the Internet has grown exponentially. New applications have led to the convergence of voice and data networks. The capacity of the original Internet is rapidly becoming inadequate to handle large volumes of traffic patterns delivered by new services such as mobile communications, server virtualization, cloud services, and big data. The future of Internet heavily depends on future Internet research. The paper provides a brief introduction to future Internet research.*

***Key words**: Future Internet research, future Internet.*

## 1. INTRODUCTION

The Internet has succeeded way beyond the dreams of its creators. We are witnessing a dramatic growth in Internet in size and complexity. Several millions of devices are being interconnected. The open architecture of the Internet has facilitated interoperability and globalization of services and applications. But the current Internet can no longer support diversifications of applications. Some of the new applications require large bandwidth and are pushing the Internet architecture and protocols well beyond their original intent.

Several shortcomings of the current Internet, such as performance, reliability, scalability, and security, have led to future Internet research efforts. Strategies for developing a future Internet range from incremental evolutionary steps to complete redesigns [1].

## 2. 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 [2]:

- 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 deficiencies include wireless or mobile technologies, broadband optical solutions, huge storage capacity, move towards IPv6, and innovations in material. Experts now debate whether the current Internet architecture and protocol can continue to be patched.

## 3. FUTURE INTERNET

While the current, classic Internet was designed to interconnect computing devices, the future Internet is for interconnection of people and devices resulting in *Internet of People* (Media Internet) and *Internet of Things* (IoT). In the future Internet, cellular technologies along with other wireless technologies such WiMAX and WiFi will provide the ubiquitous access to the Internet [3].

Any strategy to improve the current Internet cannot be limited to paperwork. It requires early experimentation and testing in large-scale environments. Several regional initiatives are emerging and proposing future global networks. GENI (Global Environment for Networking Innovations) was proposed in the United States in 2005. Its goal is to develop a next generation Internet for future computing environment and a global network measurement test bed [4]. An example of European initiative is FIRE (Future Internet Research and Experimentation), which promotes experimentally-driven research, networking concepts [5]. Another one is FEDERICA (an European Commission funded project), which creates custom-made virtual environments and makes them available for future Internet researchers [6,7]. FEDERICA and FIRE collaborate.

The management of the huge amount of data and information in the Internet will create ongoing opportunities and challenges for the next foreseeable future. For economic competitiveness, it is important to make the Internet safe and secure. The future Internet will enable the realization of the smart cities vision. It will take on new technologies such as sensor networks, optical networks, cloud computing, Internet of things, big data, and software-defined networking. A critical understanding of this emerging technologies is necessary to address the several challenges in realizing the future Internet.

## 4. CONCLUSION

The new Internet holds the promise to support network visualization, scalability, security, reliability, mobile broadband applications, and 3D applications. Network operators in the near future must provide convergent, dynamic and adaptive networks that will operate in a heterogeneous, multi-services, multi-protocols, and multi-technology environment. Research activities on future Internet architectures and protocols must address a wide range of issues such as addressing, network virtualization, routing and traffic engineering, dynamic switching of optical circuits, and management capabilities [6].

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