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Future Internet: trends and challenges

Key words: Future Internet; Network architecture; Service customized network

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Motivation

- Rapid advancement in computing technologies has enabled a great variety of applications and Internet services, such as cloud computing applications and smart-home applications.
- The traditional network has many problems and technical issues concerning performance, scalability, flexibility, and security, which make it difficult to meet the demands of applications and users.
- Prior surveys covered different aspects of the future Internet technologies. In this work, a comprehensive survey on various future Internet architecture and technologies is conducted.

Organization

- First, we present the main requirements of future Internet, including increasing performance, programmable data plane, flexible management, customized demands, and security.
- Then, we introduce some important architectures and technologies and examine the recent development and use of new technologies.
- Finally, we discuss the research directions and open challenges for the future Internet.

Contribution

- Compared with existing surveys, this survey jointly considers network architectures and new technologies. Besides, it shows practical use cases.

Table 1 Main differences between our survey and prior work

Survey	Covered aspects	Showing practical user case	Jointly considering new technologies
Bannour et al. (2018)	SDN control plane	No	No
Li and Chen (2015)	NFV, service chain	No	Partial (SDN)
Taleb et al. (2017)	Edge computing, 5G	No	Partial (SDN, NFV)
Our survey	Future Internet technologies (SDN, NFV, edge computing, CCN, etc.)	Yes	Yes

SDN: software defined network; NFV: network function virtualization; CCN: content centric network

- There are several important future research directions, including end-to-end deterministic latency, network artificial intelligence, and automatic management.

Summary

- We have conducted a comprehensive survey that jointly considers network architectures and new network technologies.
- The requirements of future Internet are presented. The pros and cons of various network architectures and technologies are analyzed.
- Several important future research directions and challenges are discussed.