PRACTICAL-6

AIM:

Test various test cases of Information Centric Network (ICN) and learn regarding transmission time, bandwidth and delay

IMPLEMENTATION:

Introduction

- Distributing and manipulating named information is a major application in the Internet today. In addition to web-based content distribution, other distribution technologies (such as P2P and CDN) have emerged and are promoting a communication model of accessing data by name, regardless of origin server location.

- In order to respond to increasing traffic volume in the current Internet for applications such as mobile video and cloud computing, a set of disparate technologies and distribution services are employed that employ caching, replication and content distribution in different specific ways.

- These approaches are currently deployed in separate silos – different CDN providers and P2P applications rely on proprietary distribution technologies. It is not possible to uniquely and securely identify named information independently of the distribution channel; and the different distribution approaches are typically implemented as an overlay, leading to unnecessary inefficiency.

- Information-centric networking (ICN) is an approach to evolve the Internet infrastructure to directly support this use by introducing uniquely named data as a core Internet principle.

- Data becomes independent from location, application, storage, and means of transportation, enabling in-network caching and replication.

- Traditional Internet is based on TCP/IP architecture. World wide web and other new protocols are developed, however, with increased demand for performance, security of

networks, distribution of multimedia contents it has become difficult to support these aspects.

- To address these problems, the ICN architectures have been proposed to handle new demands of future networks.

- The new era of Internet has widened host centric services to new Information Centric Networking (ICN).

- The distributed memory can be used to cache data objects for efficient retrieval

- The global network traffic is increasing every year which mostly consists of multimedia contents such as Video on Demand (VOD), Internet videos etc.

- To manage this huge network traffic Peer-to-Peer (P2P), ICN architecture is used for caching and efficient distribution of data. ICN is general form of CDN and P2P which enable to store local copies of repeatedly accessed data.

- In the current Internet architecture web contents are location specific and if domain name of the website is changed it is difficult to access that data. Lack of local caching requires persistent connection between client and host.

- Security is also a challenge in current Internet architecture which is also addressed in ICN architecture.

Critical Analysis of ICN

- In communication of model of ICN content is the core component which is independent of its location in Internet. This enables sharing and caching in network.

- ICN support distribution of information is named data which is unique.

- The advantage of ICN over TCP/IP architecture is mobility support, data transfer efficiency and security.

- In the author discusses about evaluation of ICN network for performance, content transfer and under limited storage resources and bandwidth.

- Efficient transfer of data is key advantage of ICN network as compared to TCP/IP architecture.

- It is assumed that contents are stored in repository permanently and are partly cached in the intermediate node which is according to content popularity for achieving optimal caching of contents and request and its distribution.

- Consumer can retrieve contents by implementing transport protocol. Expressions are derived for content delivery time which is function of bandwidth, size of cache, delay in propagation, and popularity of contents.

- Then model tree topology and linear topology are analysed. The proposed model can measure complete delay which includes propagation delay and queuing delay of all links with their paths.

- The paradigm of ICN feature enhances mobility management, better performance and efficient utilization of network resources. This is due to receiver unique endpoint, communication with sender which is connectionless, temporary localized copies of contents in network nodes.

Challenges of ICN

- For monitoring and managing of IoT devices requires specific name which is important to identify devices.

- In ICN data size is usually larger than actual file name while IoT sensors or devices generate data which is very small which may be a one byte of instruction. Name should be unique to identify the data content.

- Current naming scheme has longer name than actual data. So it is not feasible to use large name when actual data is of short size. Caching is useful feature of ICN but to use this feature in IoT requires careful designing.

- When authentication is required decoupling between consumer and publisher become challenge which is useful feature of ICN

- In ICN, router has limited amount of storage which could affect service. This effect is more prominent in heterogeneous devices where flow of data is different according to requirement.

- It is possible to design ICN architecture where it can be avoided to store content which belongs to real time streaming.

- So the cache is free for other kind of data contents. Another issue is the cost of cache, if the cache is high its cost will also be high and it will require more computational capabilities. So cache related issues will be a challenge in future

- ICN is one of the significant approaches for the future research activities of Internet.

- The goal of ICN is to provide better network services in term of content distribution and retrieval.

- In this review some of ICN architectures have been discussed. It is also discussed how research was done in field of ICN. ICN for IoT devices has also been discussed with respect to its trade-off.

- The advantages of using ICN for IoT also have challenges. ICN addresses some of the issues with today's internet.

CONCLUSION:

In this practical, we learnt about information centric networking.