Shortpaper: IoT-NDN: An IoT Architecture via Named Data Netwoking (NDN)

Leonard Boetefuer

***Abstract*—als Leztes**

I. Introduction

als vorleztes

II. Related Work

XYZTEST2

III. Analysis of IoT and NDN

This section will talk about the limitations of IoT devices and the challenges of the current Internet architecture.

A. The connectivity of IoT devices:

Currently IoT devices use server-client or host-to-host connection to connect. In the server-client architecture every client has to communicate to the server and with a billion devices the server will be a massive bottleneck. In the host-host architecture, every host has to communicate to every other host. This results in exponential resource consumption. The server-client and the host-to-host model both need IP addresses for every single device, which is not possible with a billion devices.

B. Technological Standards:

The crucial standards are for the network protocols, the communication protocols, and the data aggregation. The challenge is that

C. Mobility:

The amount of mobile devices is rising and so are the challenges. The technologies of the mobile devices are divers and the IoT systems need to keep that in mind.

D. Complexity and Integration Issues:

IoT systems are composed of many different APIs (Application Programming Interfaces), protocols and platforms. The integration of new technologies in the system is very complicated because of all the different combinations. The IoT system should consider the resource limitation of its components.

E. NDN Packet Length:

Packages in NDN are not bound to a specific length, this is helpful to expand further protocols by adding or subtracting from the overhead. IoT devices will send only small packages; because of the limited resources in memory. The overhead needs to be kept small, because the information proportion of small packages is way more influenced by a big overhead.

F. Caching in IoT/NDN:

To keep the data up to date and reduce unnecessary package flow, we need to integrate caches in to the system. The problem is that the small devices don't have enough memory to keep an efficient cache. The solution is to use in-network caching, a feature of NDN. Even a small cache will dramatically increase the data availability [11].

G. Data Aggregation in Wireless Networks:

If a user's query requests for data that includes multiple packages, every single package has to be requested separately and excluding the others. This results in a greater overhead and will result in a more unnecessary package flow. The new system should fix the request problem.

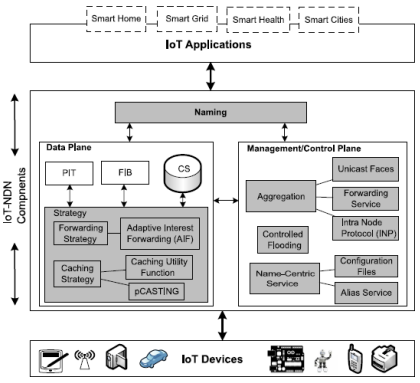
H. Naming Problems in Wireless Networks:

NDN supports on name-centric services [17], which facilitates access without knowing their location. There is still a need to automate naming convention, because of the size of the Networks. These Names should be kept short to minimize storage usage.

I. Routing Scalability in NDN:

In NDN routing is managed by names, instead of of usual number based systems. The scalability of routing is important to facilitate a large network.

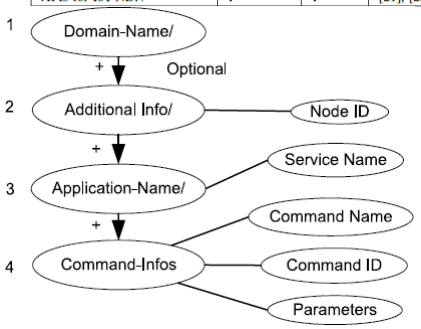
IV. Architecture of IoT-NDN System



IoT-NDN has three main components. The **naming** component is made up of naming schemes and structure for wireless networks. The **Management and control plane** is made up of Unicast Faces; Forwardinng Services Intra Node Protocol, Controlled Flooding, Configuartion and Alias services. The **dataplan component** is made up of the caching and forwarding strategies. Devices that use IoT-NDN

V. Conclusion

IoT-NDN Protocols & Algorithms	*Implemented*	*Evaluated*	*References*
Naming and NDN Protocols	✓	✓	[4], [18]
Name-Centric Services	✓	✓	[18]
Efficient Caching Algorithms	✓	✓	[6], [7]
Adaptive Interest Forwarding	✓	✓	[6]
Control Flooding	✓	✓	[6]
Data Aggregation Protocol	✓	✓	[5]
APIs for IoT-NDN	✓	✓	[21], [22]



VI. References

XYZ