Flexible API for IoT Services with Named Data Networking

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Introduction

- The Internet of Things (IoT) significantly enhances our daily activities through a myriad of applications and services provided by interconnected devices.
- IoT devices collect environmental data and monitor various events when connected to the internet, necessitating efficient integration methods with IoT applications.
- Named Data Networking (NDN) emerges as a potent solution to facilitate device and service integration, aligning with the Information-Centric Networking (ICN) paradigm for future network advancements [1] [2].
- This paper introduces a novel API tailored for IoT services in an NDN environment, refining the communication between IoT devices and services.

API for IoT Services

- IoT services provide crucial data from sensors and network environments, aiding decision-making processes [3].
- The proposed API aims to streamline the incorporation of services within the IoT-NDN framework, as depicted in Figure 1.
- Services, acting as modular system components, are essential for delivering information from device sensors and network environments, aiding in decision-making across various sectors.
- The API's design ensures adaptability for any service within the IoT-NDN system, fostering seamless information sharing and retrieval.
- A service-oriented integration is emphasized, catering to the constraints of IoT devices and promoting real-time protocols and smart technology movements.

Implementation

Naming Concept for IoT Services:

- NDN offers flexible data requests with hierarchically structured, human-friendly names [4].
- A structured naming concept is introduced for IoT services, which includes COMMAND, COMMAND ID, and COMMAND PARAMETER as illustrated in Figure 2.
- This naming structure enables the transmission of various information types and allows for the efficient retrieval of general service information.

Deployment of IoT Services:

- IoT services, small software units, monitor events and provide specific knowledge, enhancing decision-making efficiency.
- API architecture and service registration process demonstrated in Figure 3.
- Service integration involves the exchange of Interest/Data packets between IoT-Services and IoT-NDN layers.
- Example service registration for network time synchronization detailed, showcasing API's flexibility and integration benefits [2].

Conclusion

- Recaps the innovative approach of the flexible API in the context of IoT and NDN.
- Highlights the API's successful implementation and its potential to transform IoT service integration.
- Example of network time synchronization service highlights API's flexibility and integration benefits.
- Future work includes testing API with more services and further development for enhanced usability.

Figure 1

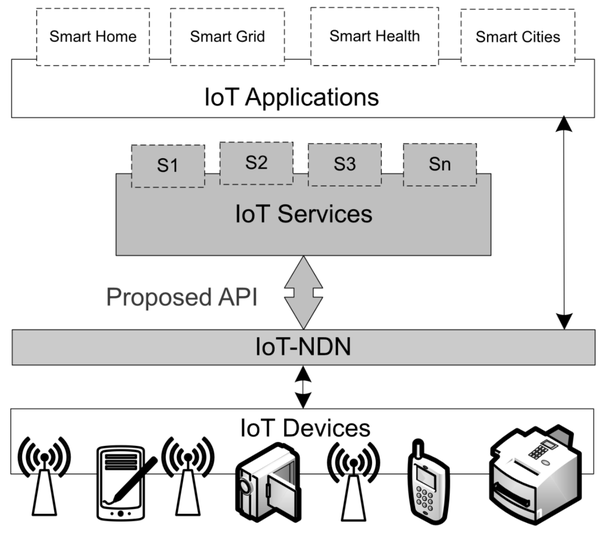


Figure 2

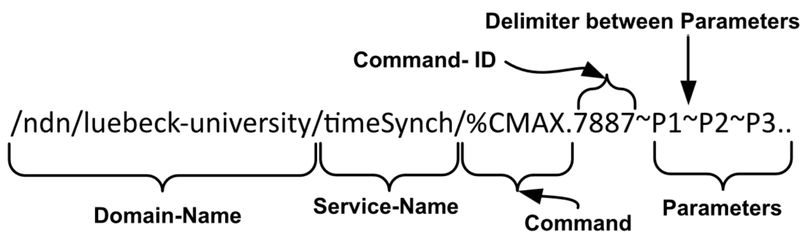
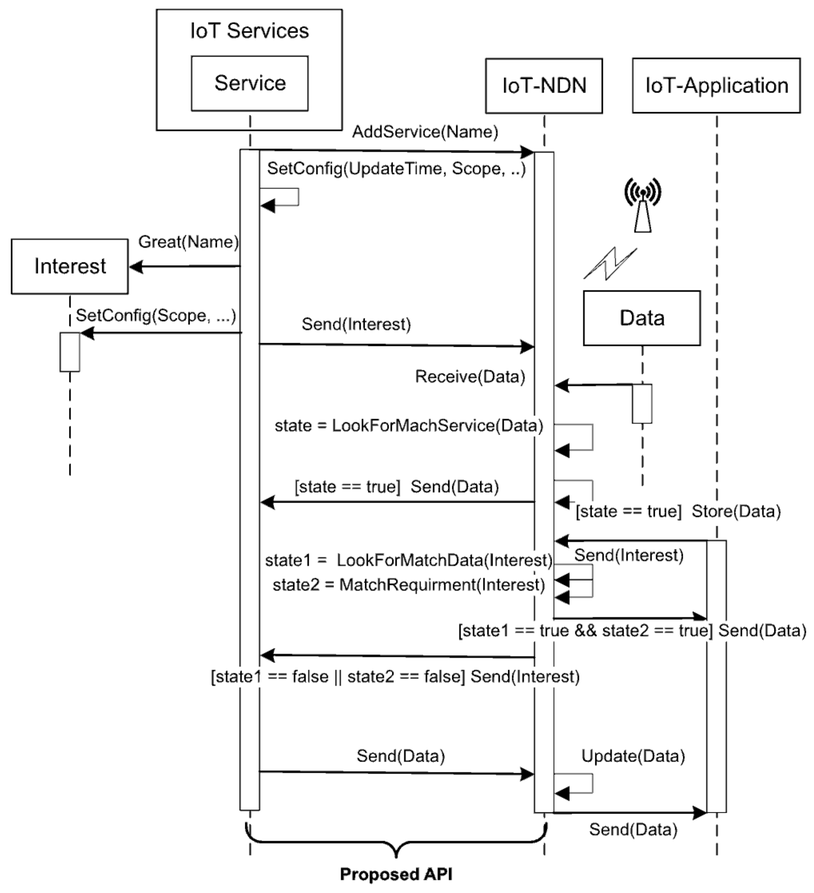


Figure 3



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