



# Deploying an Information Centric Smart Lighting System in the Wild

Silva, U.D., Lertsinsruttavee, A., Sathiaselan, A., Molina-Jiménez, C., & Kanchanasut, K. (2016). Deploying an Information Centric Smart Lighting System in the Wild. ArXiv, abs/1607.05784.



# Introduction

- Build a unified host-centric IoT platform->Information-centric
- ICN (Information Centric Networking) offers:
  - Name based routing to deliver packets and provides inherent multicast
  - Great flexibility over naming and security
  - Avoids dependencies on separate protocols and various middleware in IoT networks.



# NDN (Named Data Networking)

- (1) Consumer sends Interest packet
- (2) Node receives packet: query local CS(content store)
  - (a) Hit: send back to consumer
  - (b) Miss:
    - (i) update PIT (Pending Interest Table) table, forwards the packet
    - (ii) Interest found: send back to consumer, store the packet into local CS, delete PIT record

# System: smart lighting

- Data dissemination from luminosity detectors
- Data dissemination from occupancy detectors
- Light Control

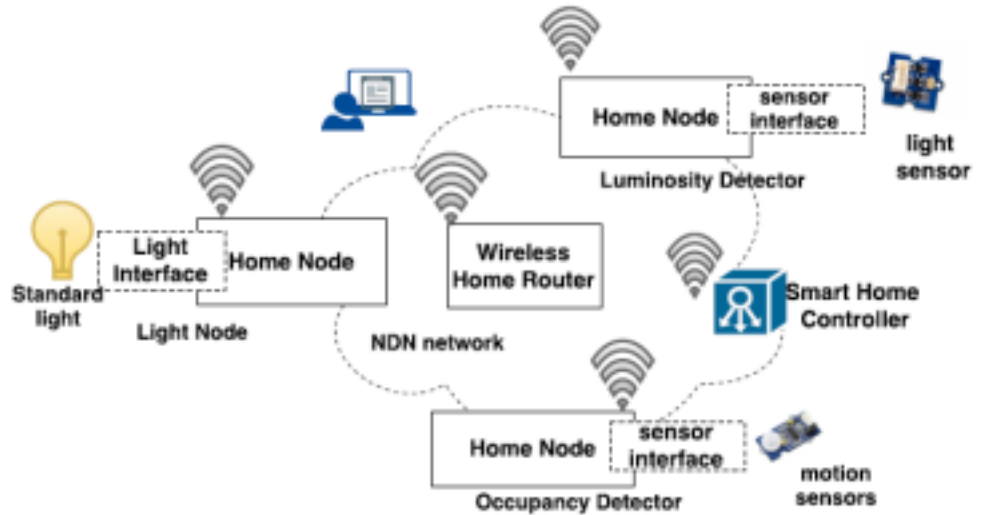


Fig. 1. NDN smart lighting architecture

# Naming scheme

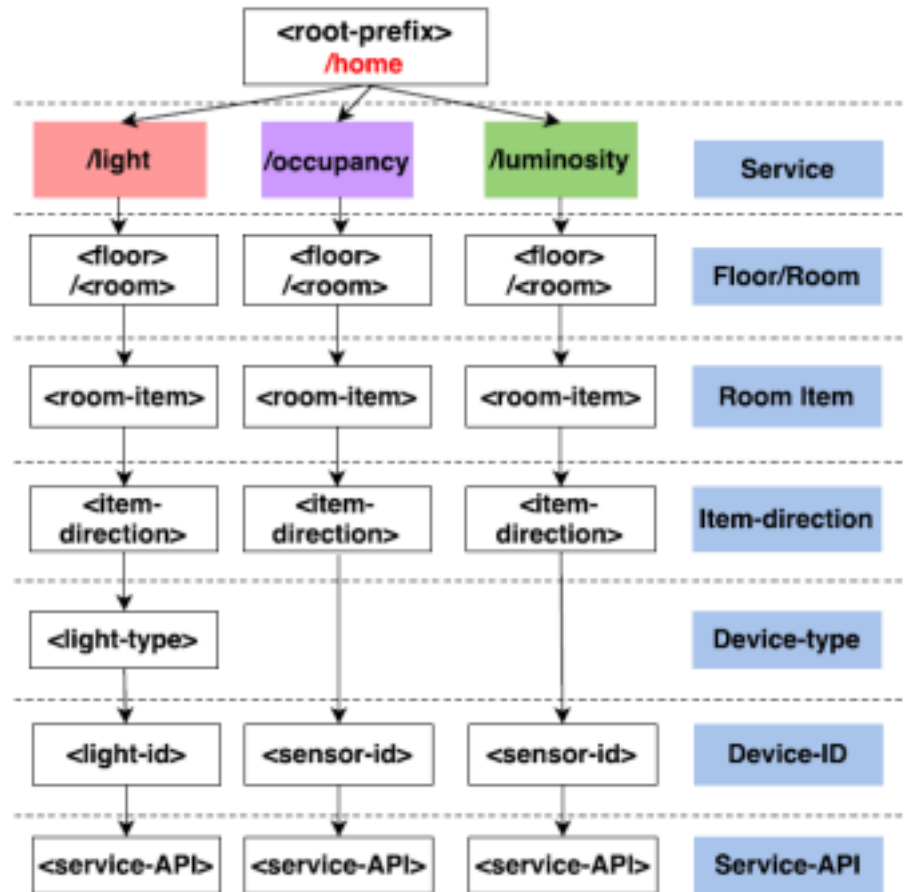
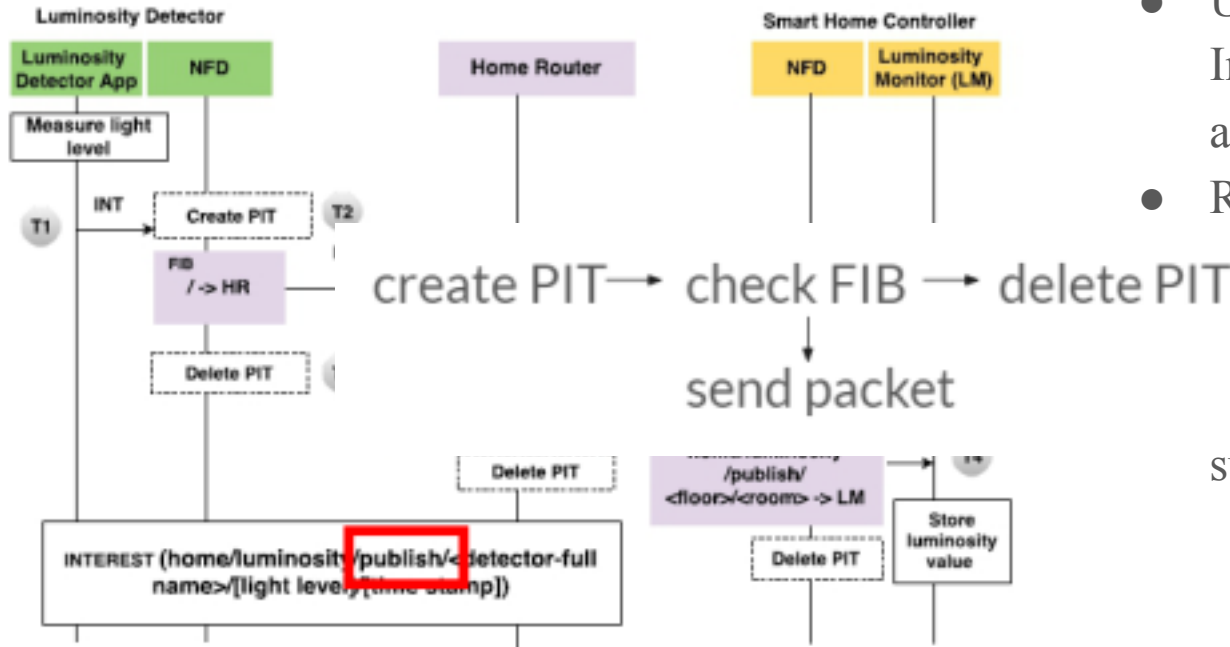


Fig. 3. Naming scheme

# Message flow-send data



- Use “public” to distinguish Interest notification name and regular name
- Register name prefixes `me/luminosity/publish` the FIB(forwarding Information Base) to subscribe

# Mess return

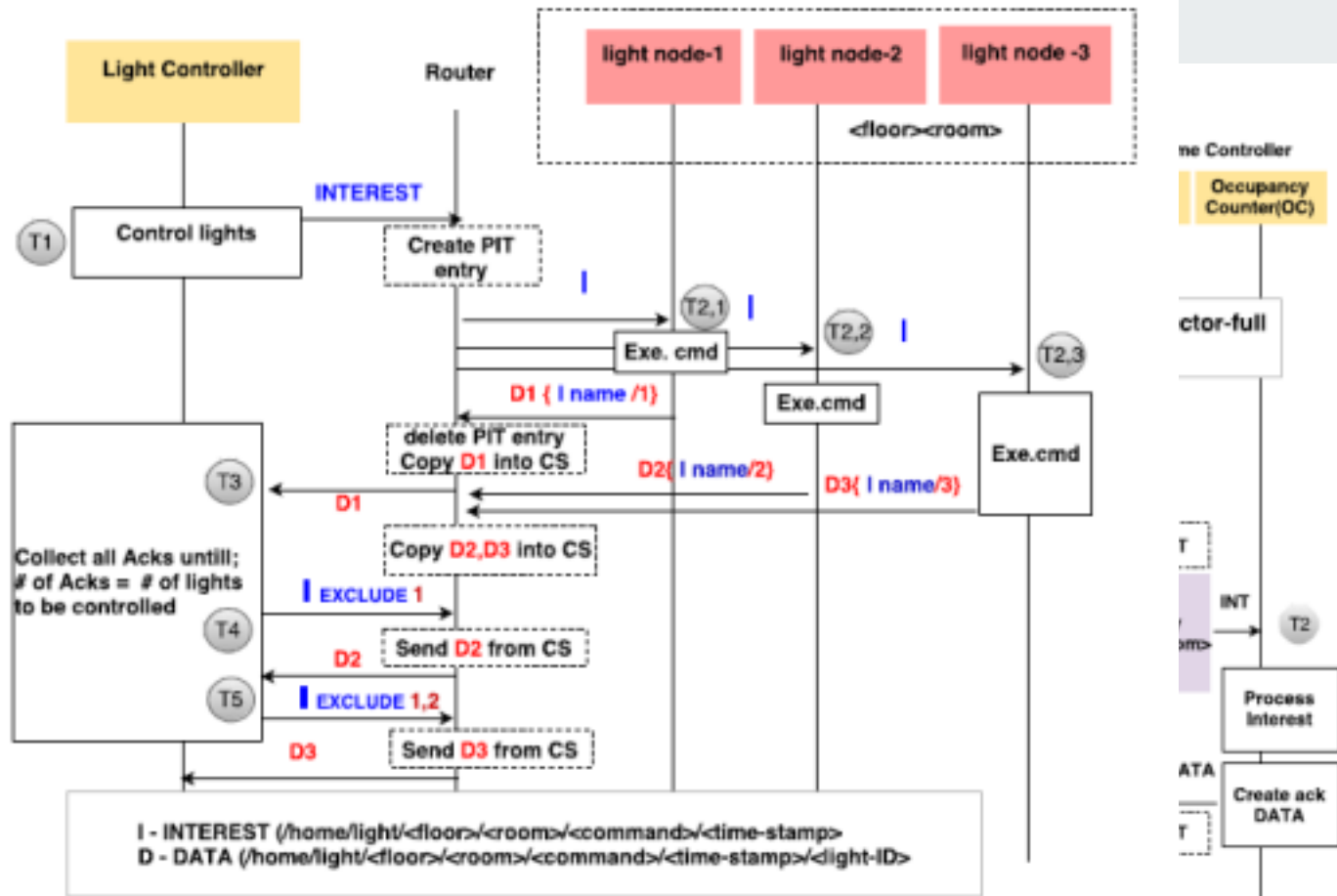


Fig. 6. Controlling lights via pull based communication



## Command sending

- Unicast: **/home/light/<floor>/<room>/<light-ID>/<command>**.
- Multicast: **/home/light/floor1/** (eachlight node is required to reply with ACK Data by appending own light ID to the received Interest name)



## Performance Evaluation

Cloud's delay is higher than in NDN due to processing overhead in the cloud platform and its protocol stack

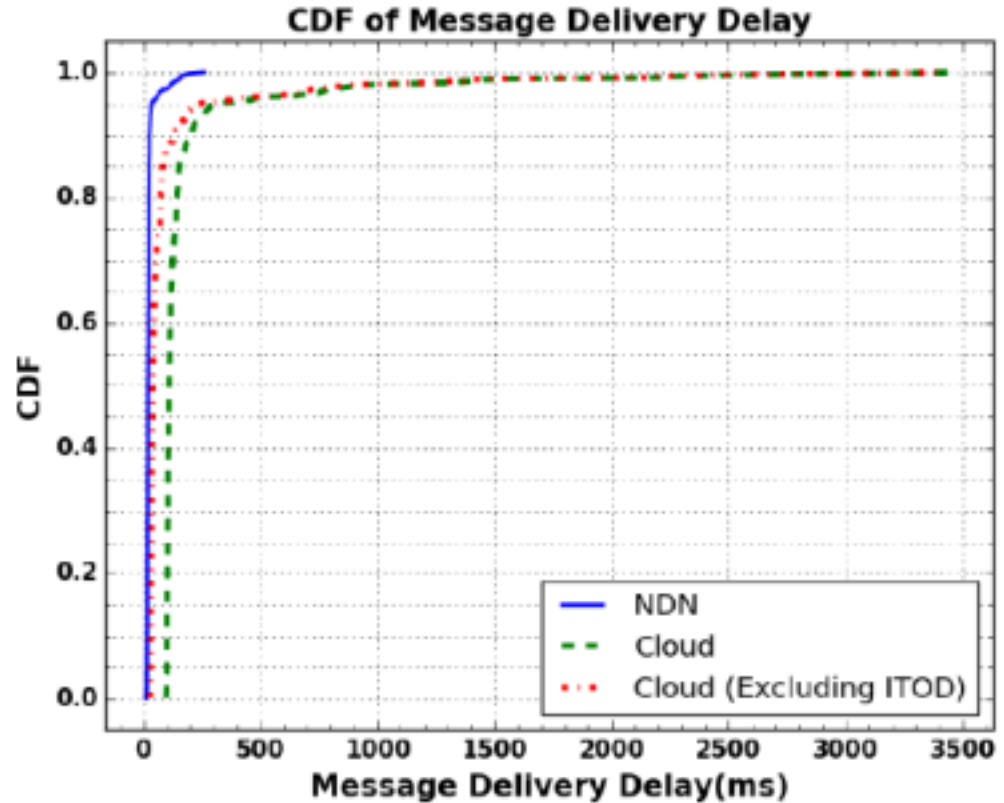


Fig. 7. CDF of message delivery delay



## Conclusion

- Explored the flexibility of NDN over two main aspects of IoT applications, including **data dissemination** and **command execution** with a prototype implementation.
- Keeping consistent naming in both **application and network layer**
- Enable periodic and event based data dissemination with a lower message overhead and latency