Publish–Subscribe Deployment Option for NDN in the Constrained IoT

draft-gundogan-icnrg-pub-iot-02

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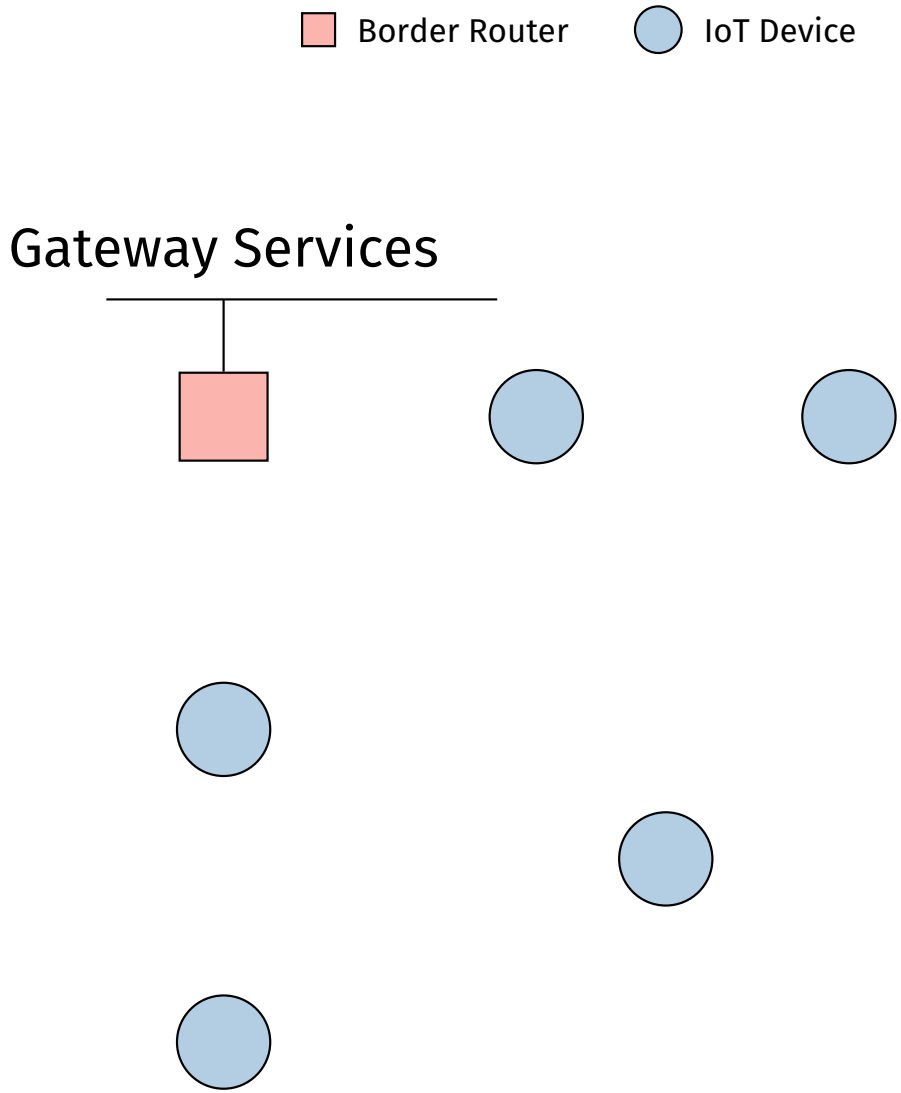
Agenda

Objectives

- Connect IoT devices
- Sensor data propagation
- Alert notifications
- Preserve flow-balance & security against unsolicited data
- Energy efficiency (no polling)



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Draft Updates

HoPP

Evaluations

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Draft Updates

Updates since -00 (Prague 2017)

- Approach got a name: HoP and Pull (HoPP)
- Content replication to multiple Content Proxies
- Extend `subscription` methods
- Major editorial changes

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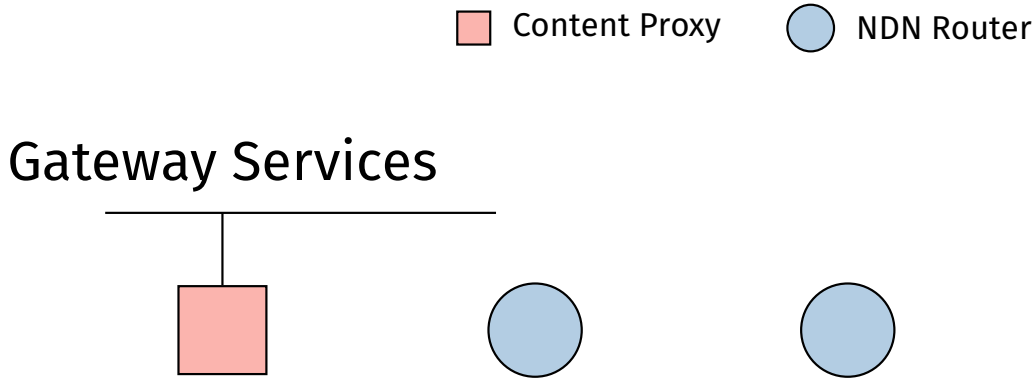
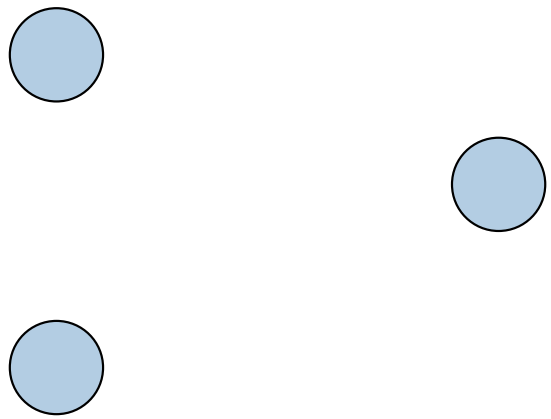
HoPP – Recap



1. Build Topology
2. Publish Name



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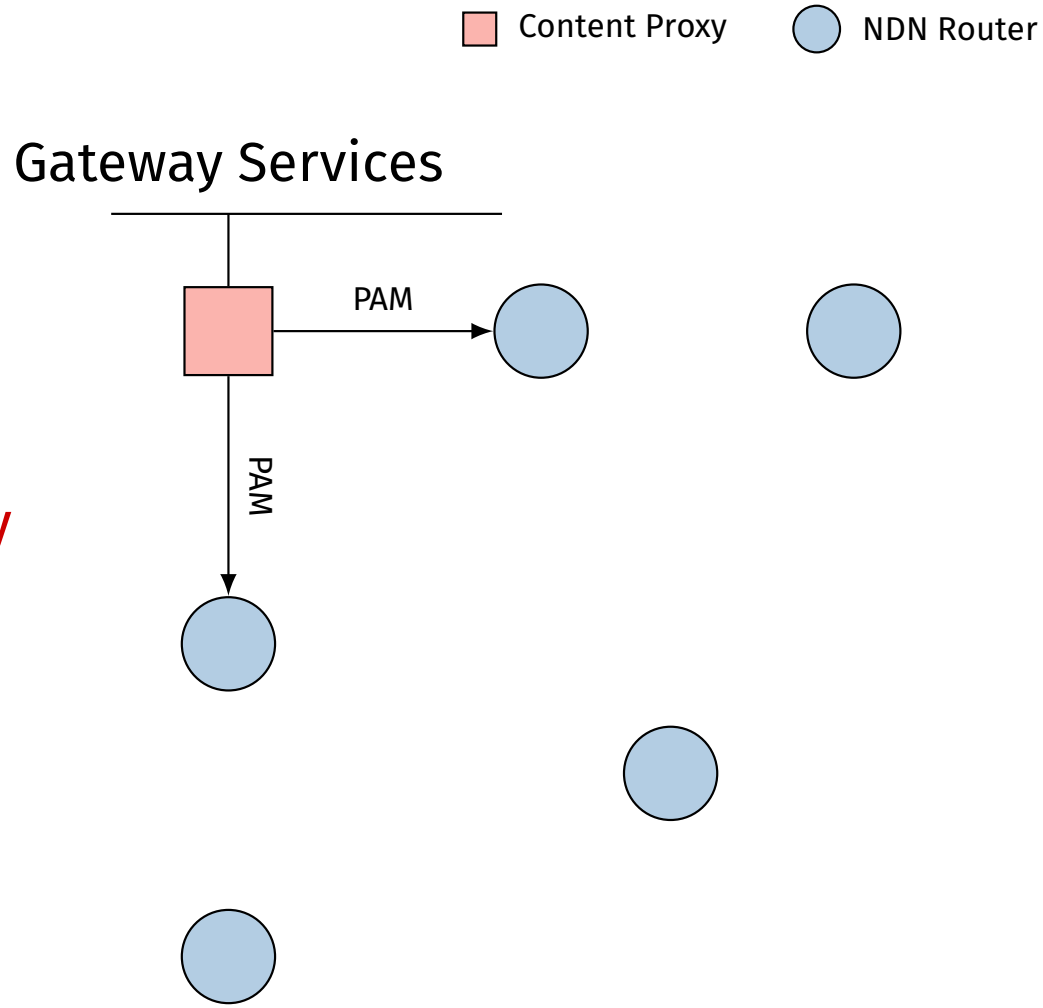

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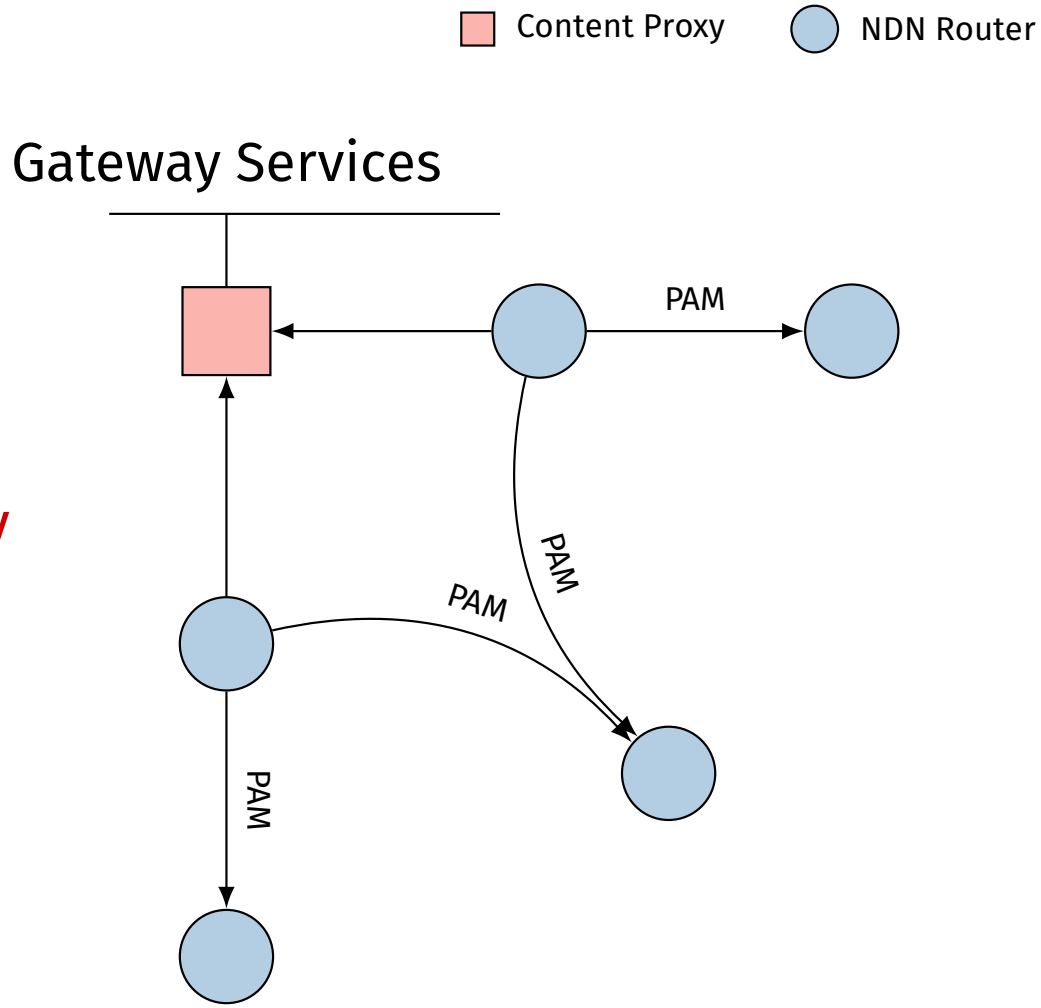

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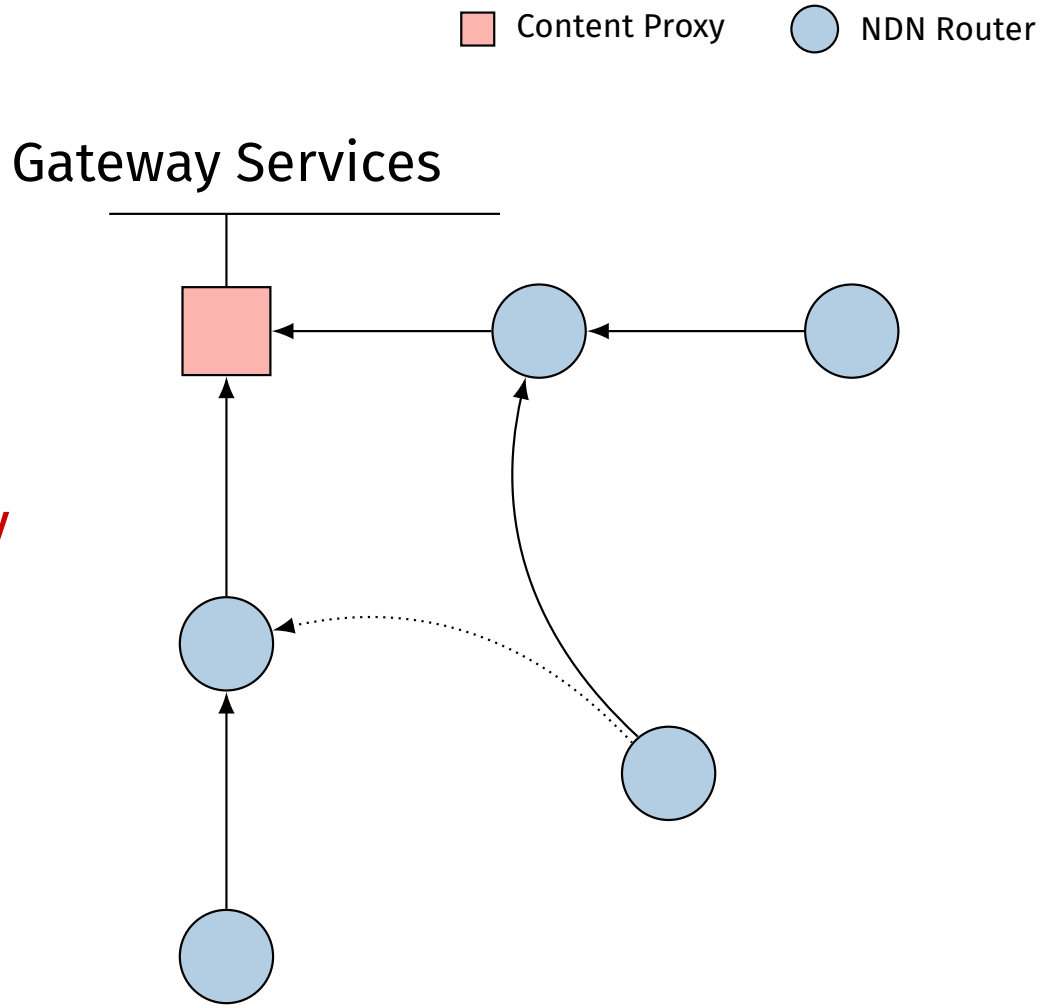

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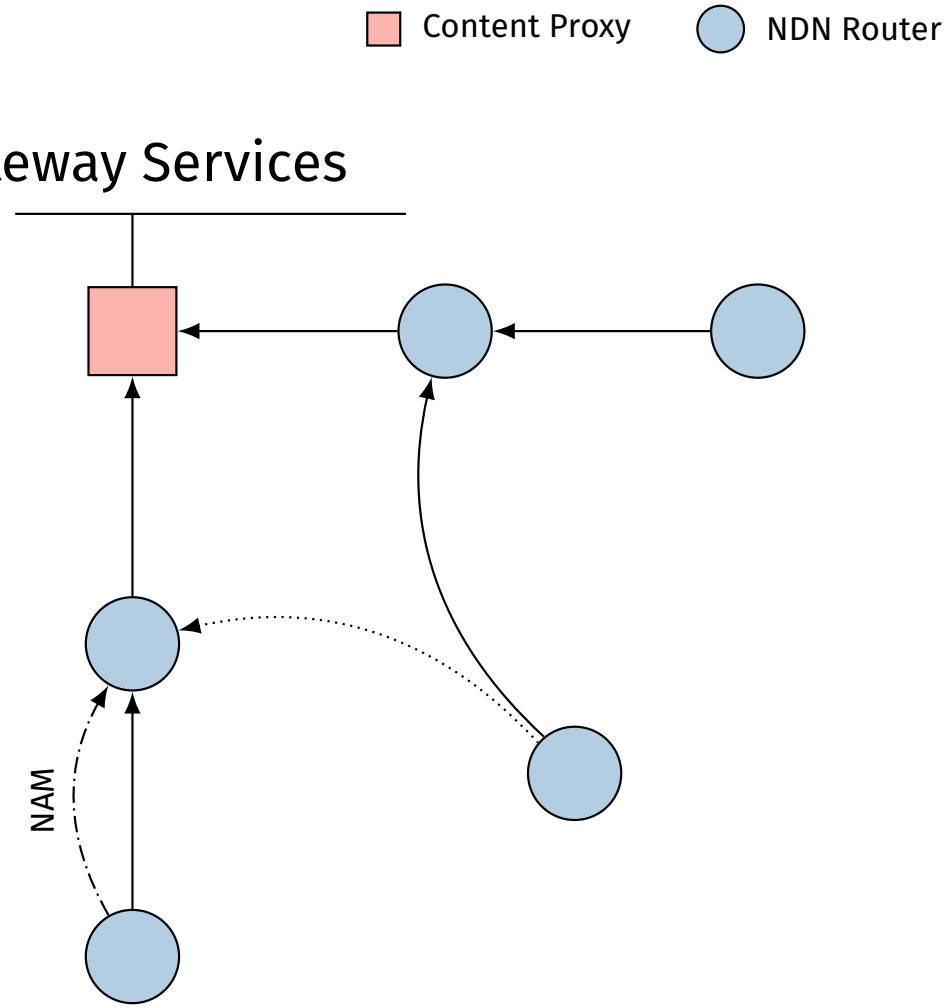

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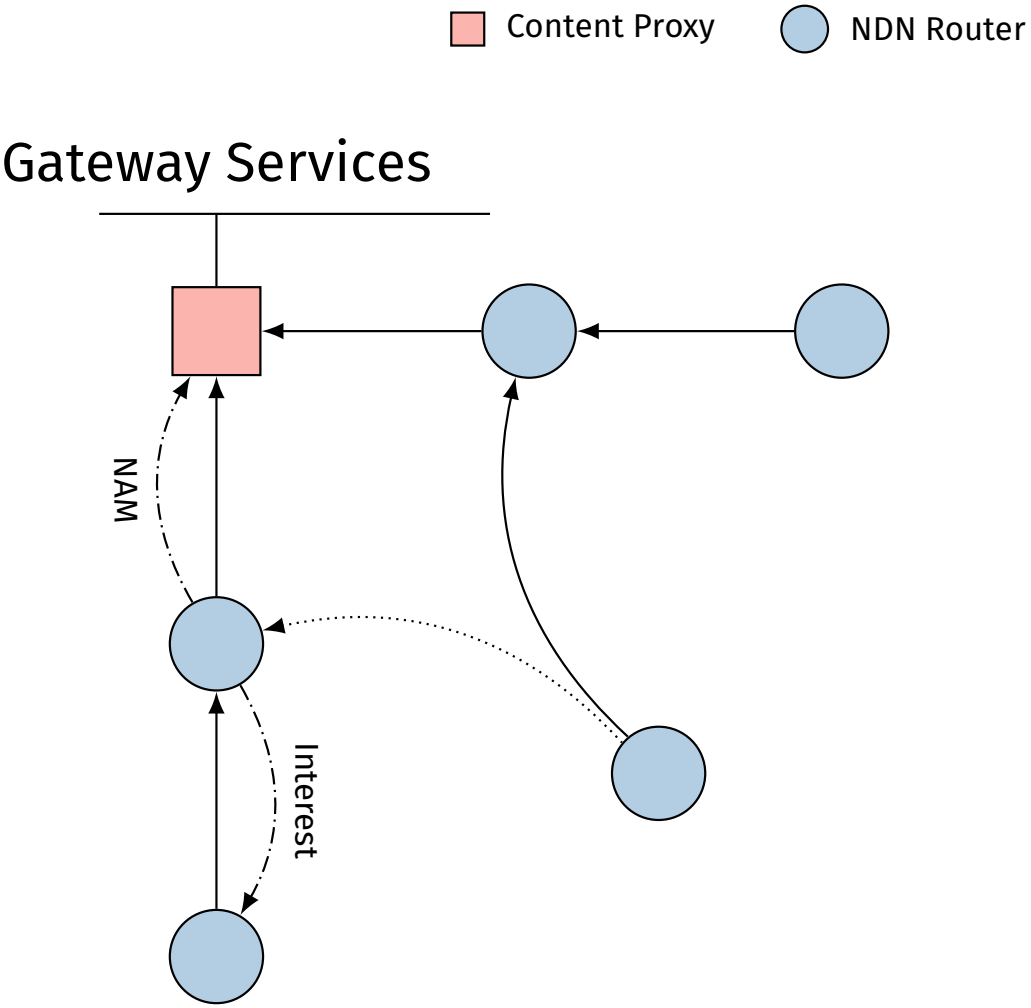

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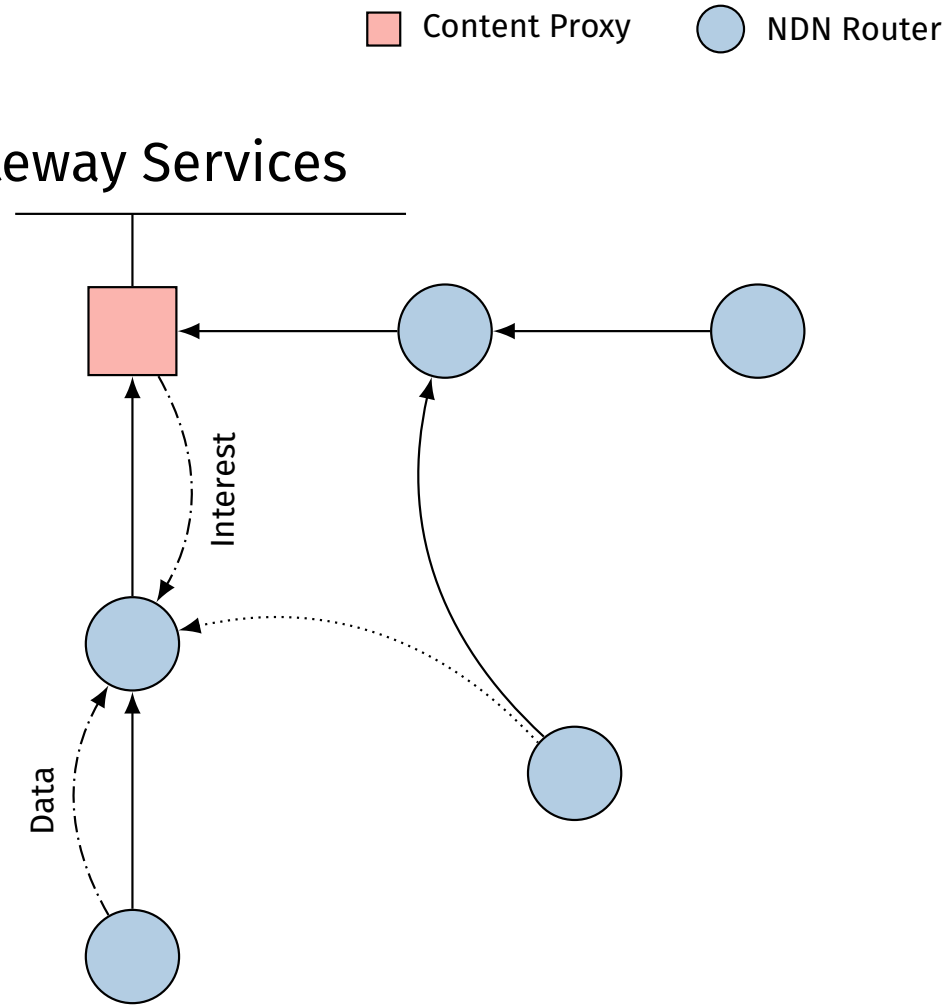

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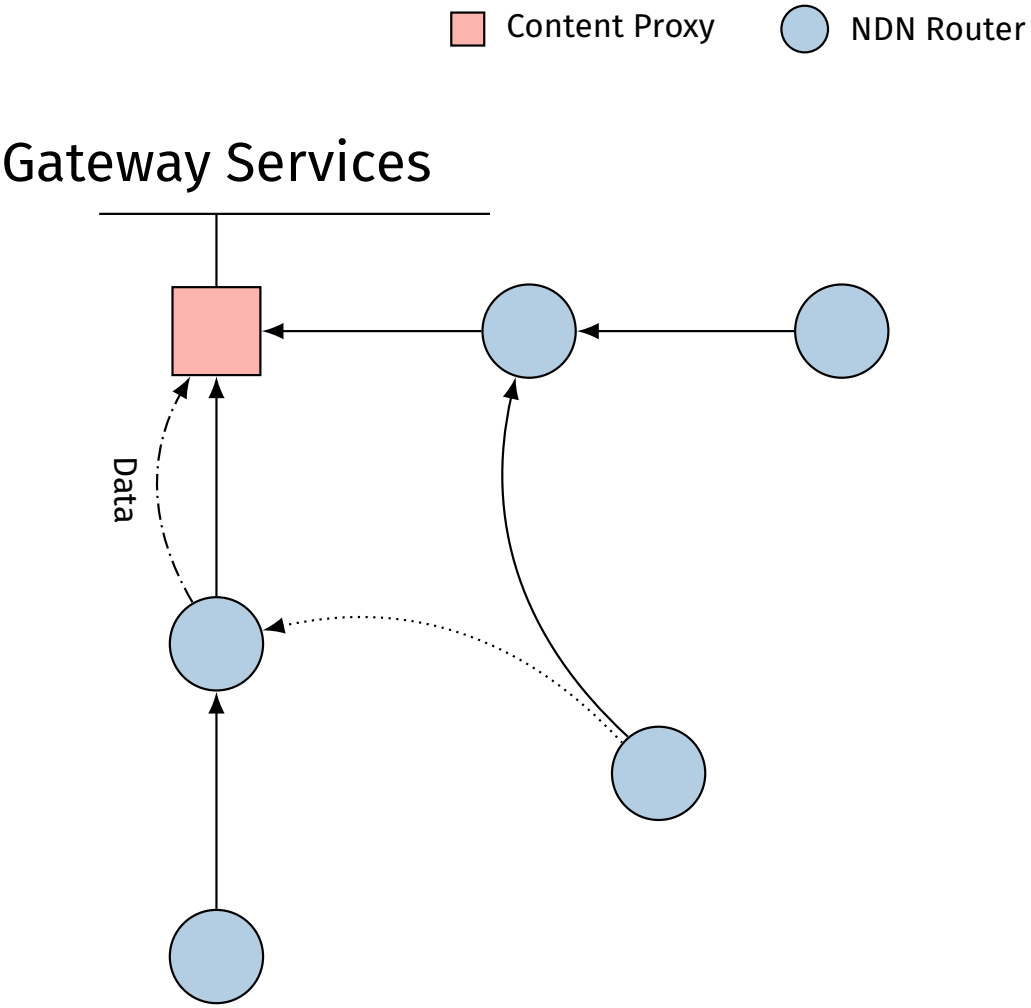

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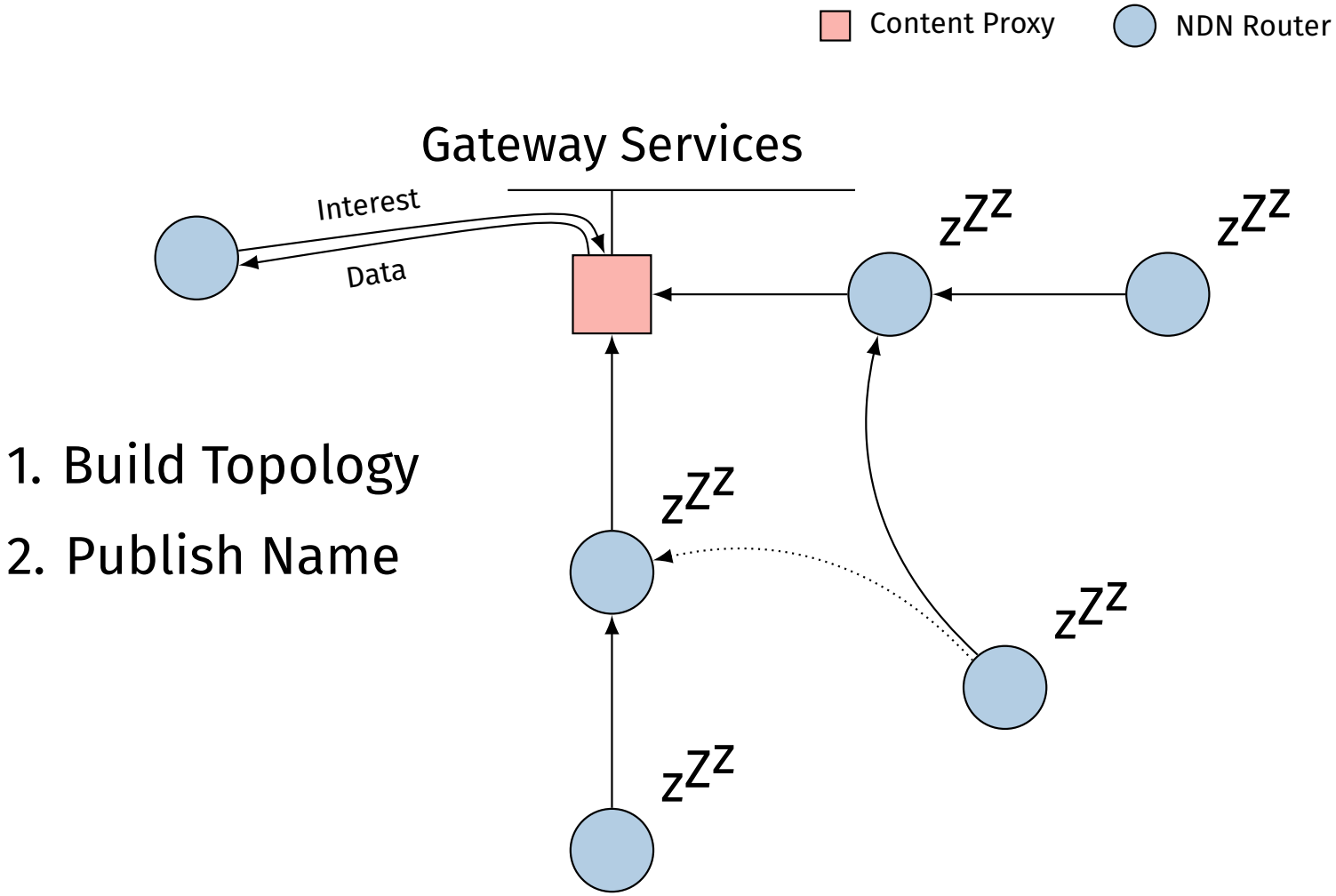

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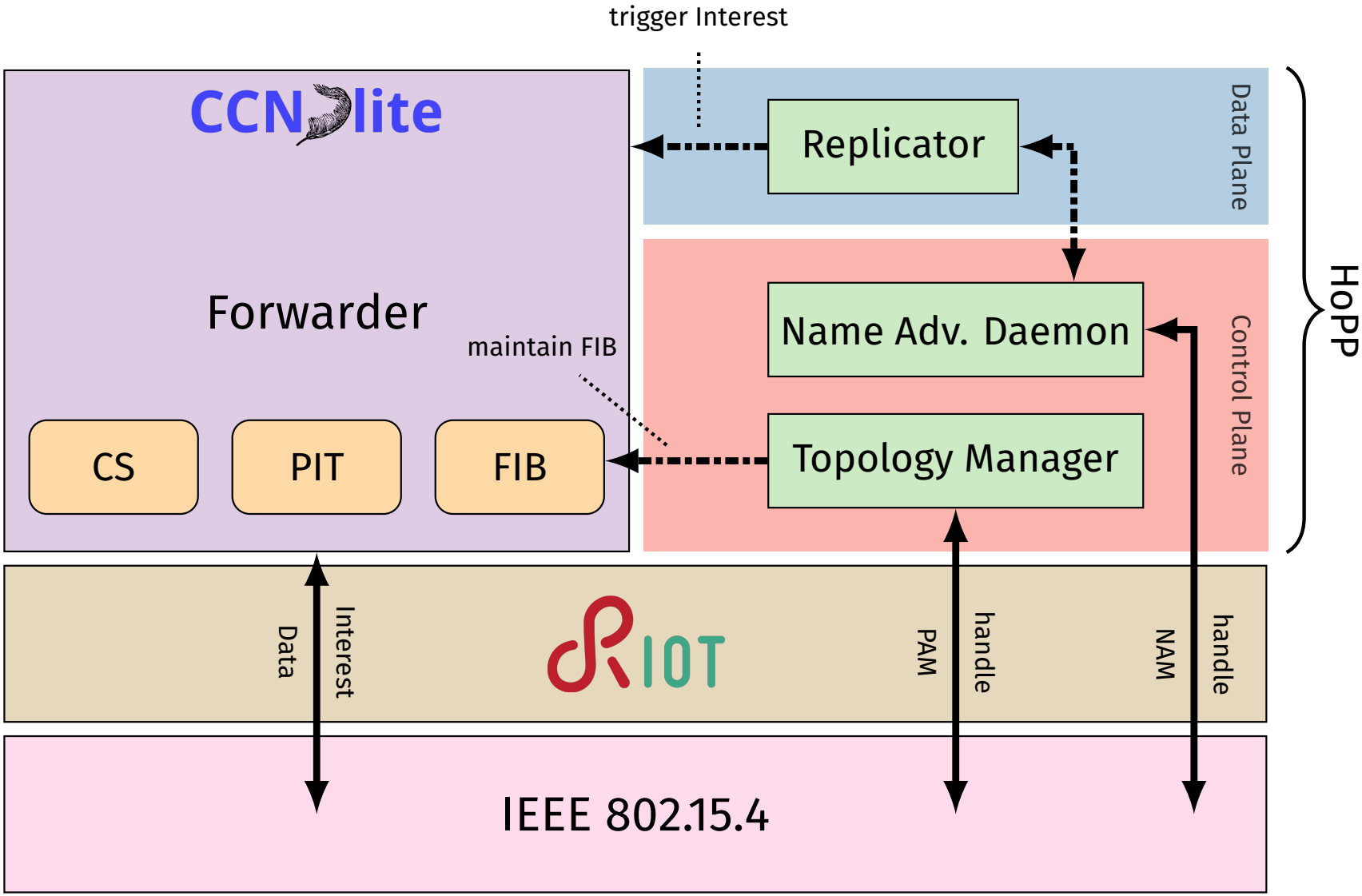
HoPP – Subscription Methods

Several alternatives

1. Name advertisements by Content Proxy (CP)
2. Request named topic from CP $\Rightarrow$ receive specific name
3. Polling `name inventory` that contains meta info
4. Encode `topic` into `name` (e.g., part of prefix): $/\rho$`/topic/unique_part`

Subscriptions are regular Interest requests

HoPP – Implementation



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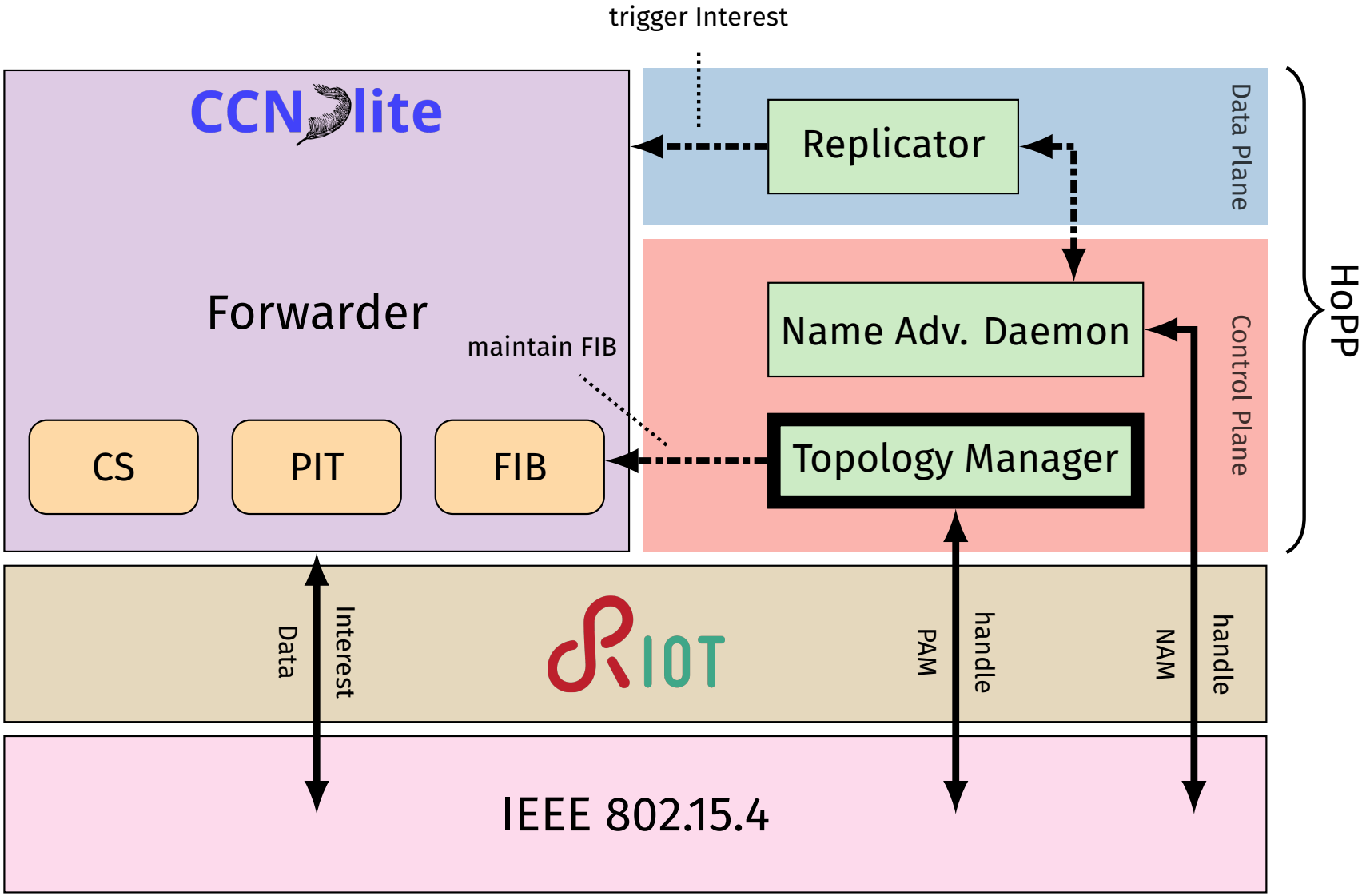

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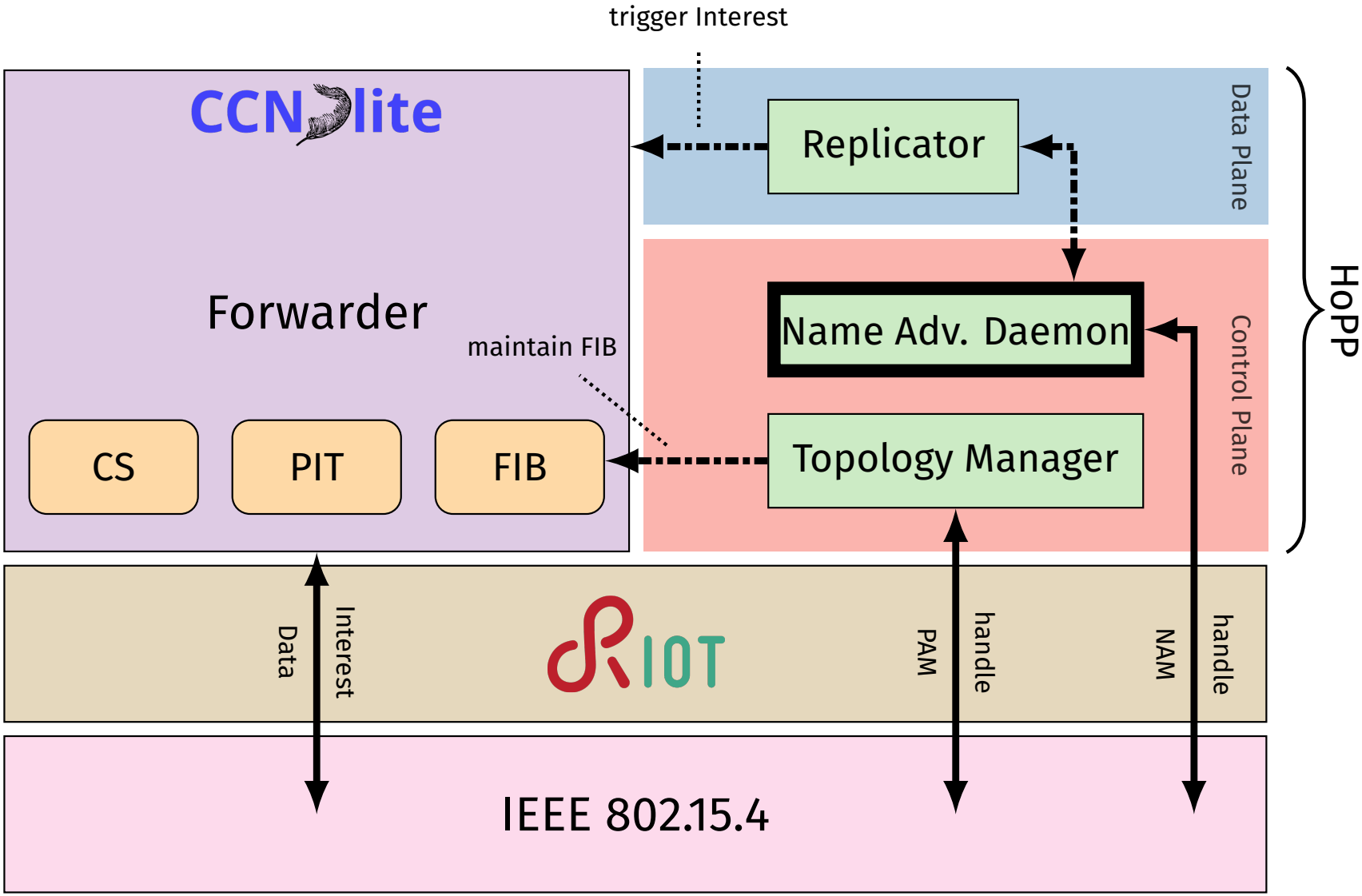

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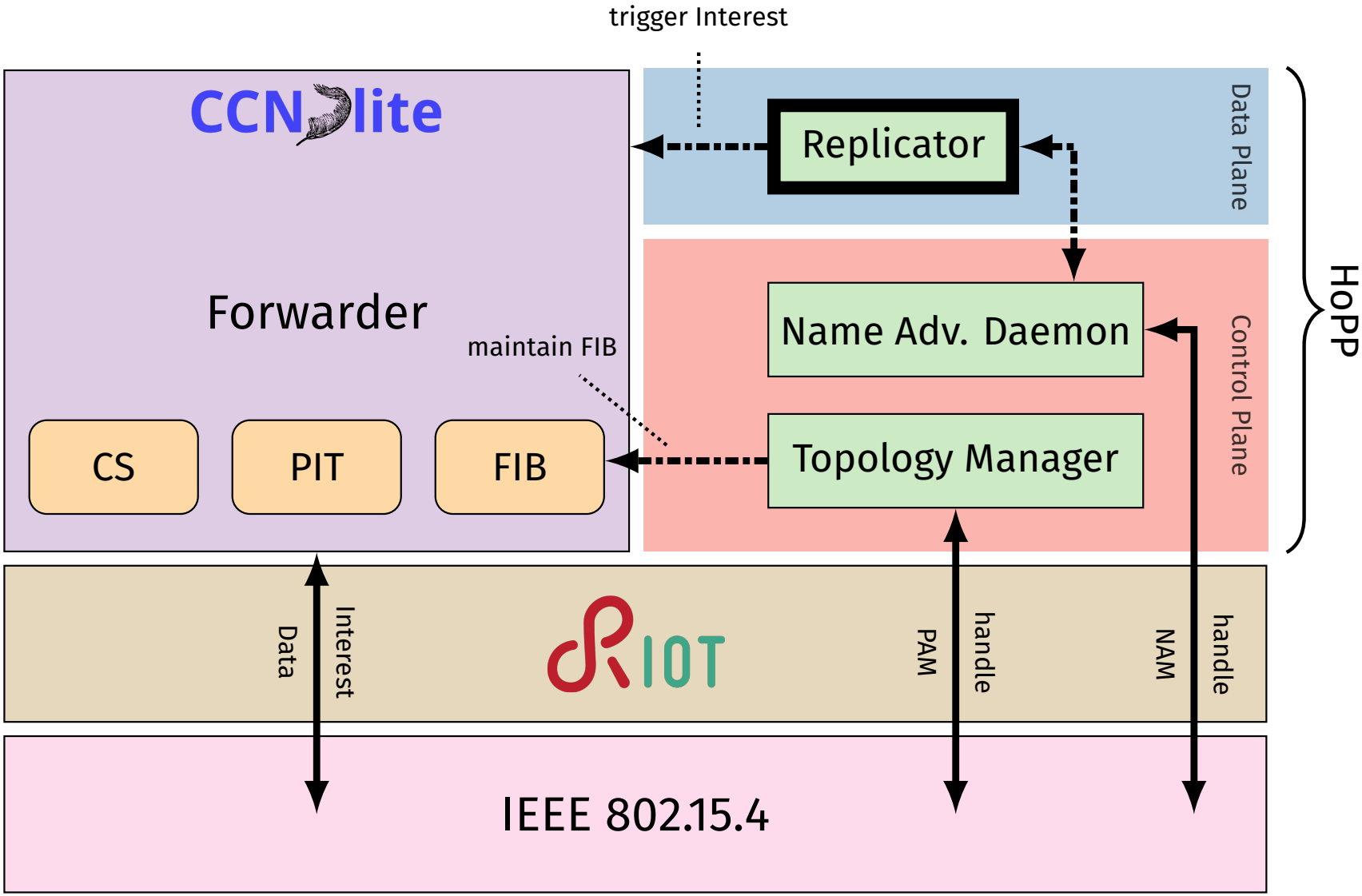

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HoPP vs Interest Notification

Setup

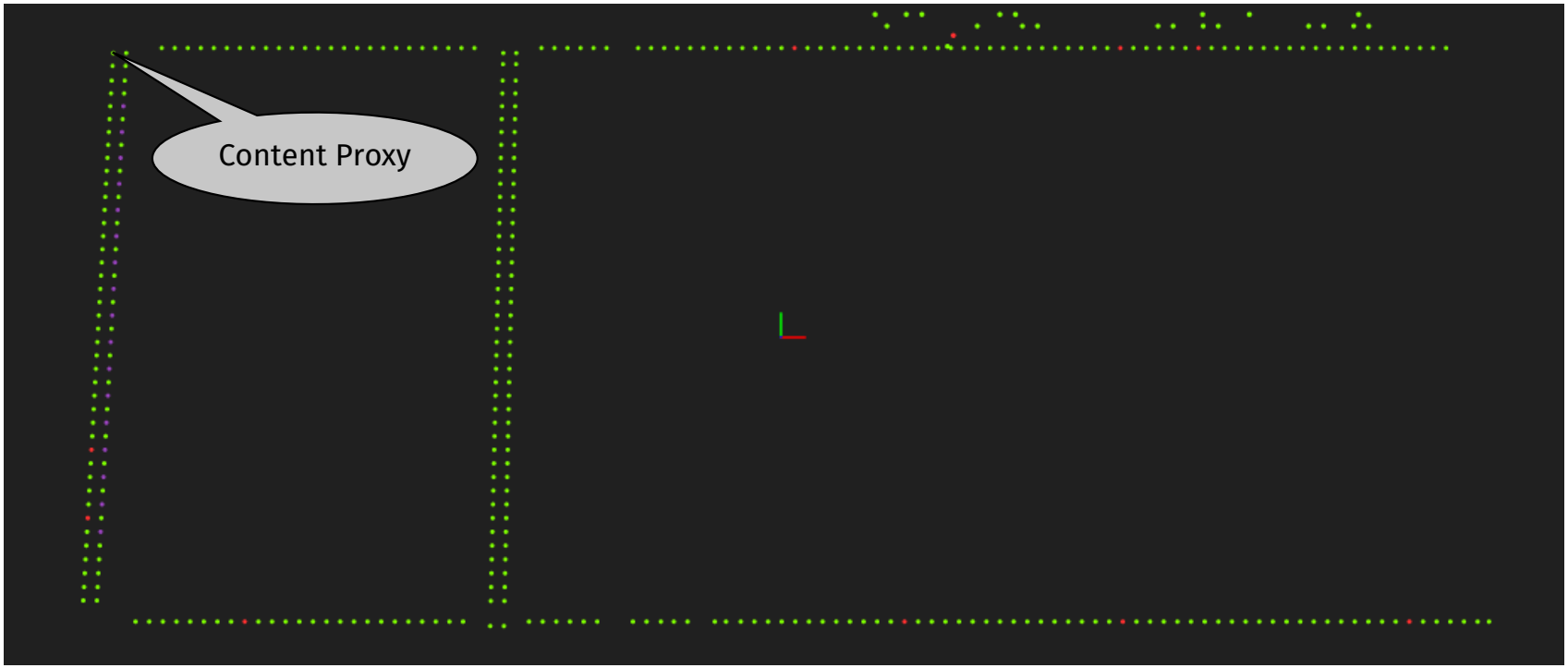
- IoTLAB testbed with $\approx$ 200 devices and $\approx$ 7 hops
- CCN-lite with RIOT
- Convergecast (Many-to-One)
- Nodes publish sensor readings every 30s + 15s jitter
- Static route setup for Interest Notification approach

Tech Report:

HoPP: Robust and Resilient Publish-Subscribe for an Information-Centric Internet of Things

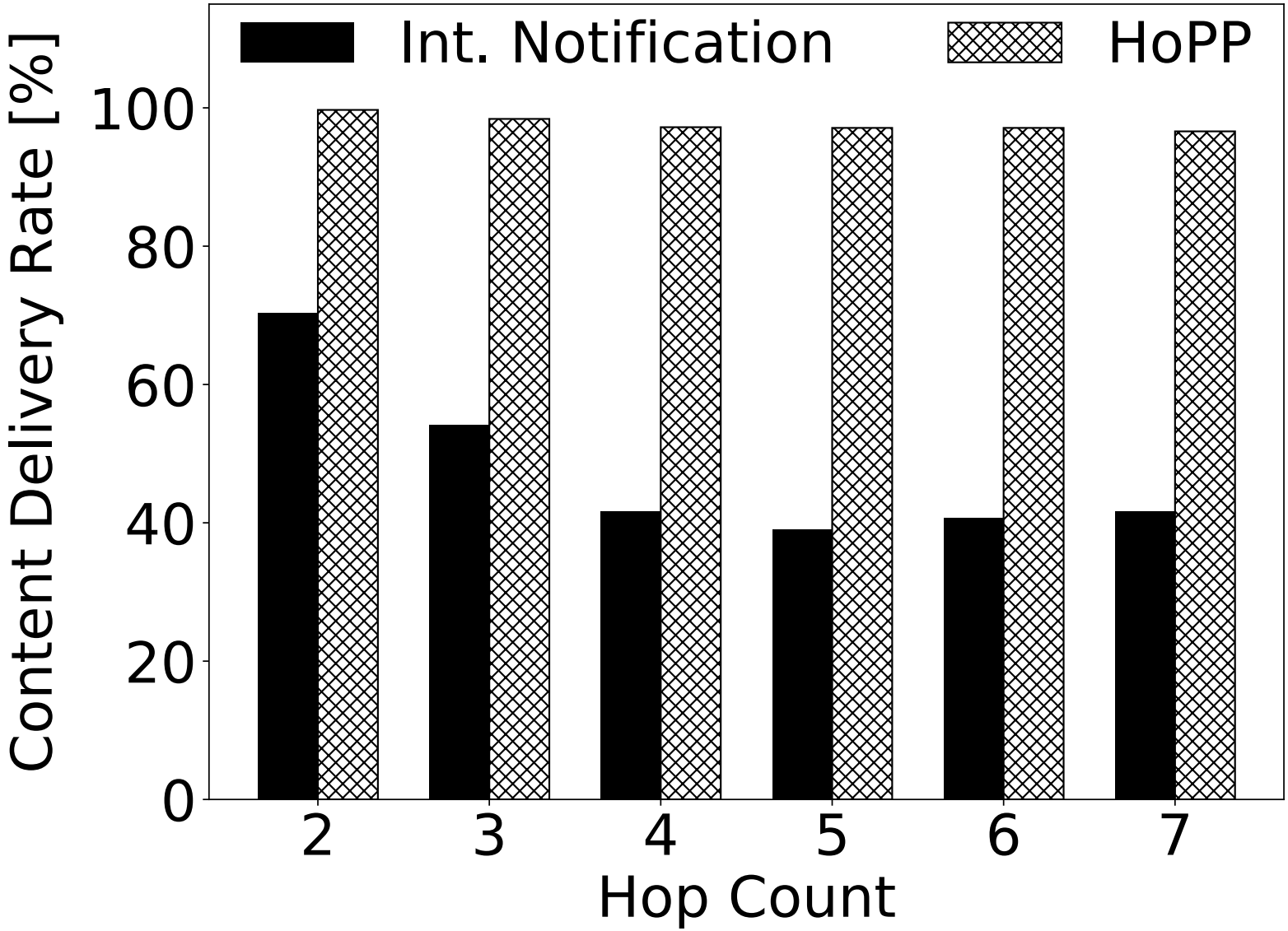
`https://arxiv.org/pdf/1801.03890.pdf`

IoTLAB Testbed: Grenoble



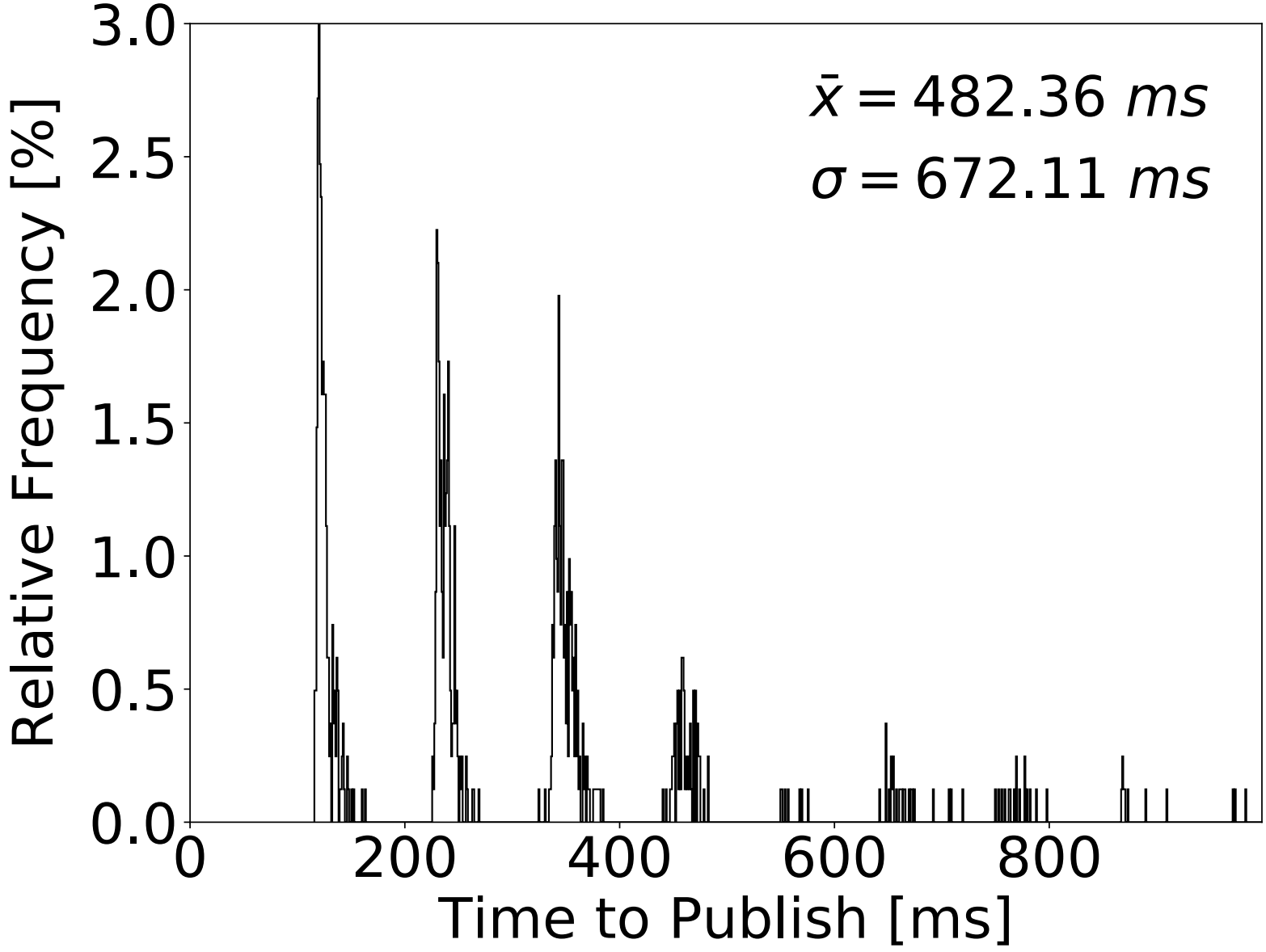
Grenoble Testbed

Content Delivery Rate



Success rate of content delivery to one consumer

Time to Content Publish (HoPP)



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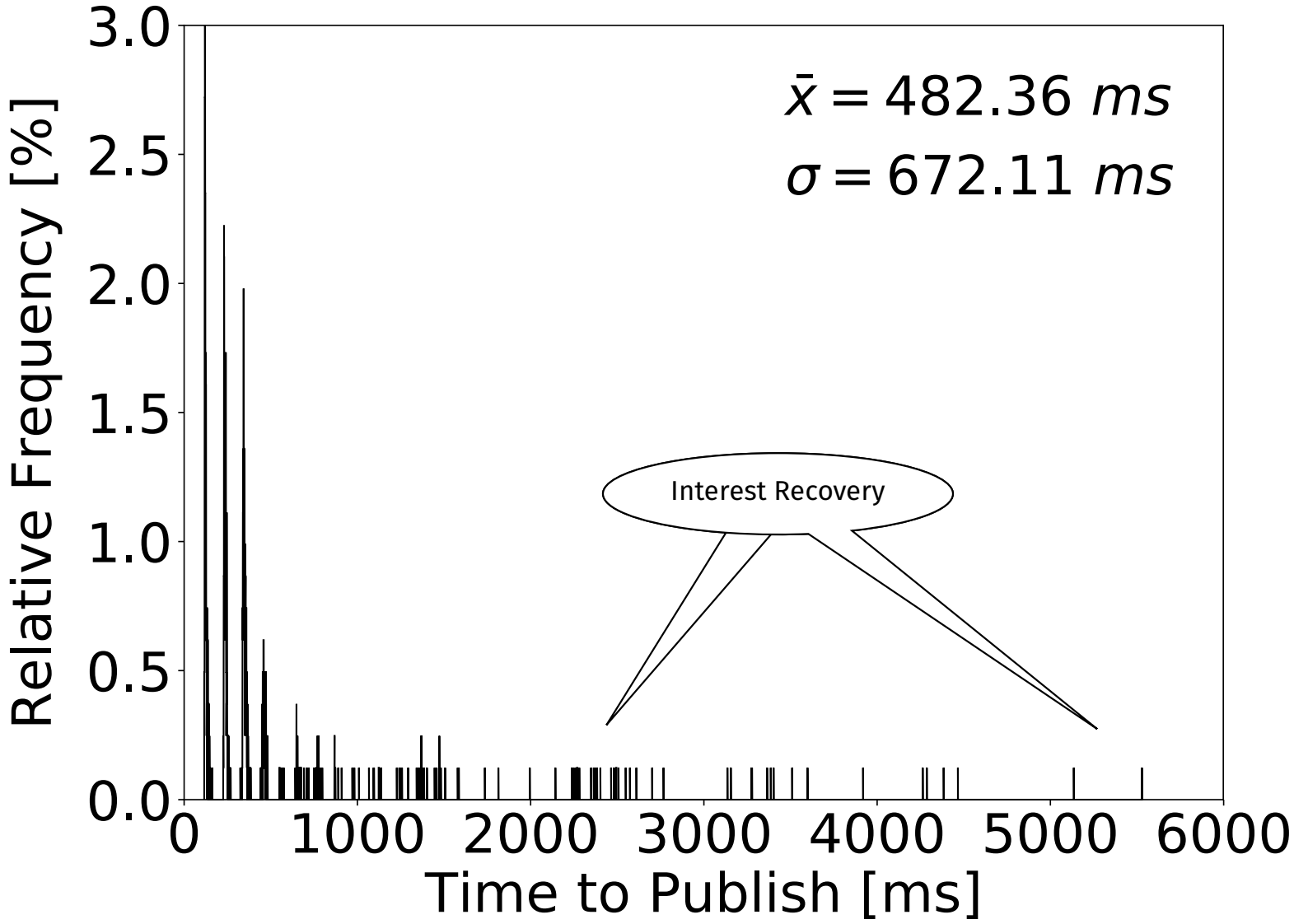

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- Compare to further proposals of ICN Pub–Sub systems
- Evaluate different `subscription` methods
- PAM / NAM mappings (signaling vs Interest/Data)
  - → according to ICNRG development of control plane signaling