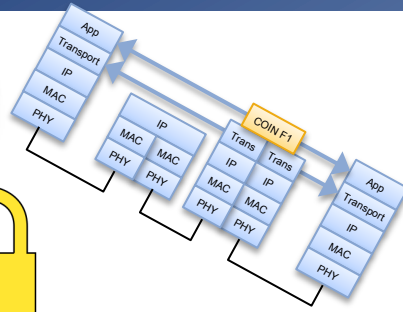


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Industrial Use Cases *for*, Transport Issues *of*, and Security & Privacy Enhancements *with* **In-Network Computing Systems**

Ina Fink, Ike Kunze, Klaus Wehrle

- **Potential Benefits**

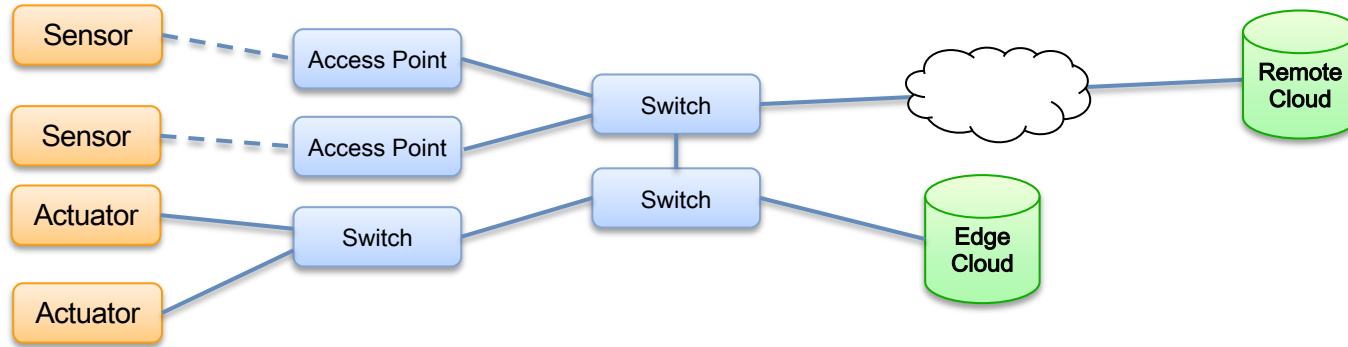
- ▶ Industrial Use Cases (draft-kunze-coin-industrial-use-cases-02)
- ▶ Security & Privacy Enhancements (draft-fink-coin-sec-priv-00)

- **Implementation Challenges**

- ▶ Transport Issues (draft-kunze-coinrg-transport-issues-01)

- **Content for today**

- ▶ First steps towards realization
- ▶ Thoughts on research group drafts



- Strategic Placement of Network Functions

C

Networked Control

F

Traffic Filters

P

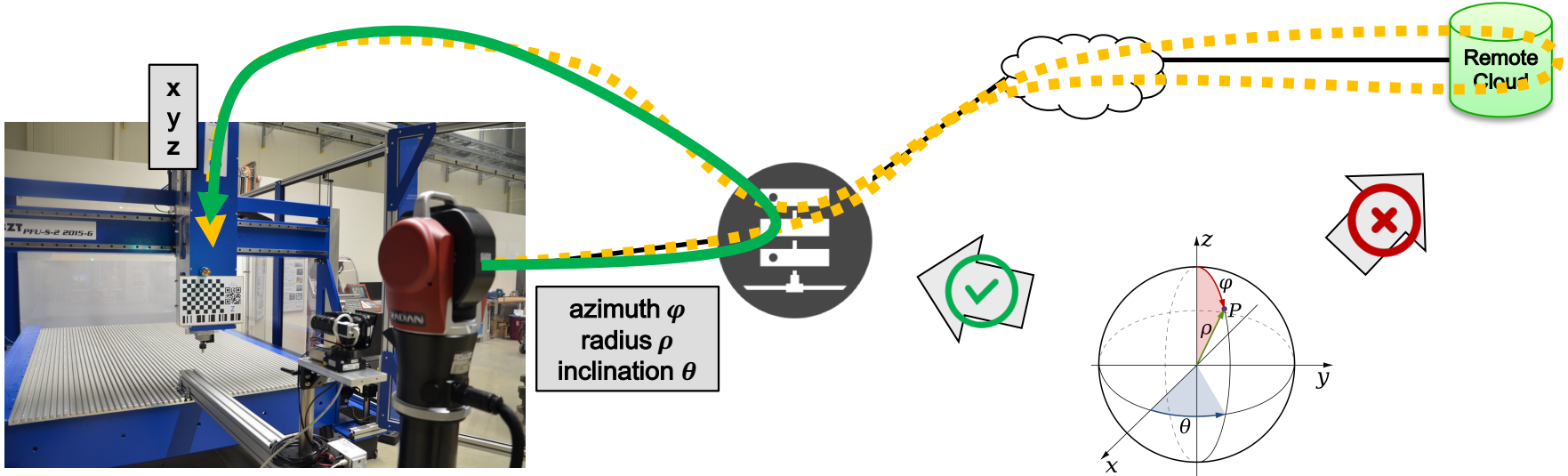
Data Stream (Pre-)Processing

S

Industrial Safety

- Latency Reduction

- ▶ *In-Network Coordinate Transformation*



$$\rho * \sin(\theta) * \cos(\varphi) = x$$

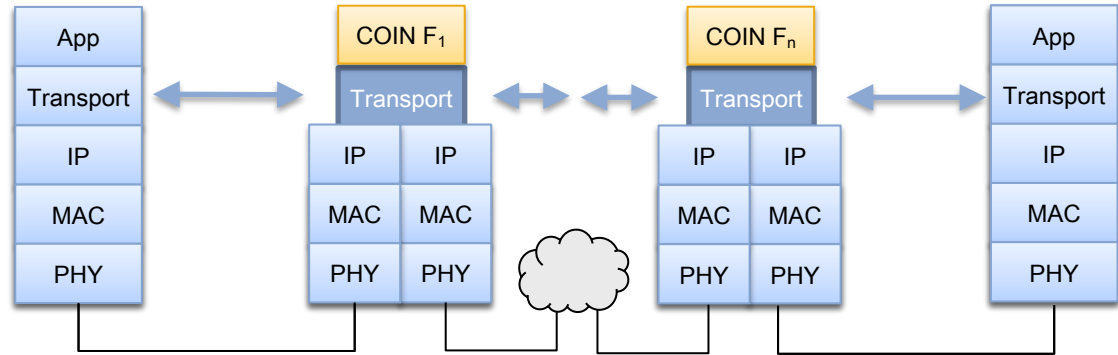
$$\rho * \sin(\theta) * \sin(\varphi) = y$$

$$\rho * \cos(\theta) = z$$

Implementation Challenges – Transport Issues

- **Open Issues**

- ▶ Addressing
- ▶ Flow Granularity
- ▶ Authentication
- ▶ Security
- ▶ Advanced Transport Features



- **First goal**

- ▶ Achieve generic transport connection supporting and understanding changes in the network

✓	✗
Addressing: IPv6 (Segment Routing)	Authentication
Flow Granularity: Datagram (SCTP)	Security
Adv. Transport Features: SCTP	

Potential Benefits – Security & Privacy

- **Legacy devices hard to update**

- ▶ Lack of security & privacy mechanisms
- ▶ Sensitive data & processes

Basic protection mechanisms

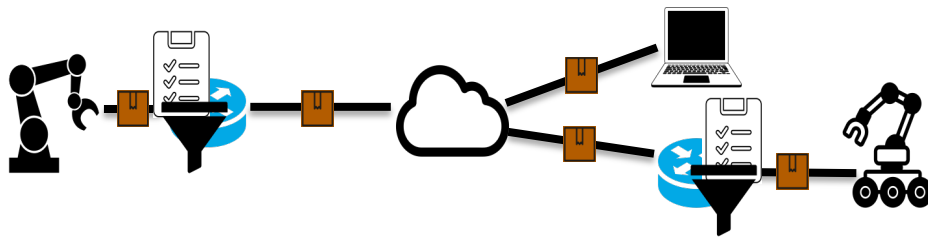
Intrusion & anomaly detection

Incident reappraisal

- **Potential to retrofit within the network**

- **Manufacturer Usage Description (MUD)**

- ▶ RFC 8520
- ▶ Idea
 - Enforce on P4 Switches



- **Update drafts with new findings** (More feedback welcome 😊)
- **Research group drafts**
 - ▶ Condense/Collect information in joint RG drafts as a common research basis?

What is COIN?

[kutscher-coinrg-dir](#)

Universal Definitions?

Challenges/Requirements for COIN

Data Discovery

[defoy-coinrg-mobile-discovery](#)

[mcbride-data-discovery-problem-statement](#)

[mcbride-edge-data-discovery-overview](#)

Transport Issues

[kunze-coinrg-transport-issues](#)

Management & Reservation Requirements

[liu-coin-differential-reservation](#)

[liu-coinrg-requirement](#)

Benefits of COIN

Security & Privacy

[fink-coin-sec-priv](#)

Industrial Systems

[kunze-coin-industrial-use-cases](#)

App-Centric Micro-Services

[sarathchandra-coin-appcentres](#)