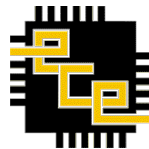# StreamBox-TZ:
Secure Stream Analytics at the Edge with TrustZone

Heejin Park[1], Shuang Zhai[1], Long Lu[2], and Felix Xiaozhu Lin[1]
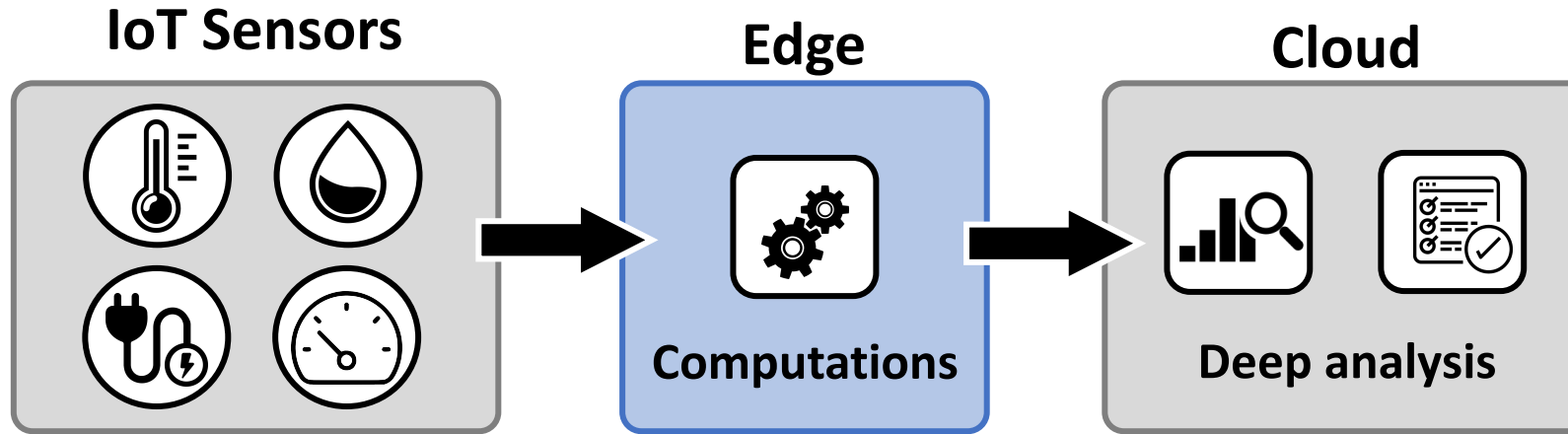
[1]Purdue ECE, [2]Northeastern University

Scenario: Edge Processing

IoT Sensors

Edge

Cloud

Computations

Deep analysis

- **Large telemetry data streams come from IoT sensors**
  - Smart grid: 140 million power samples per day
  - Oil production line: 1-2 TB of data

- **Edge processing is emerging**
  - Cleanses telemetry data
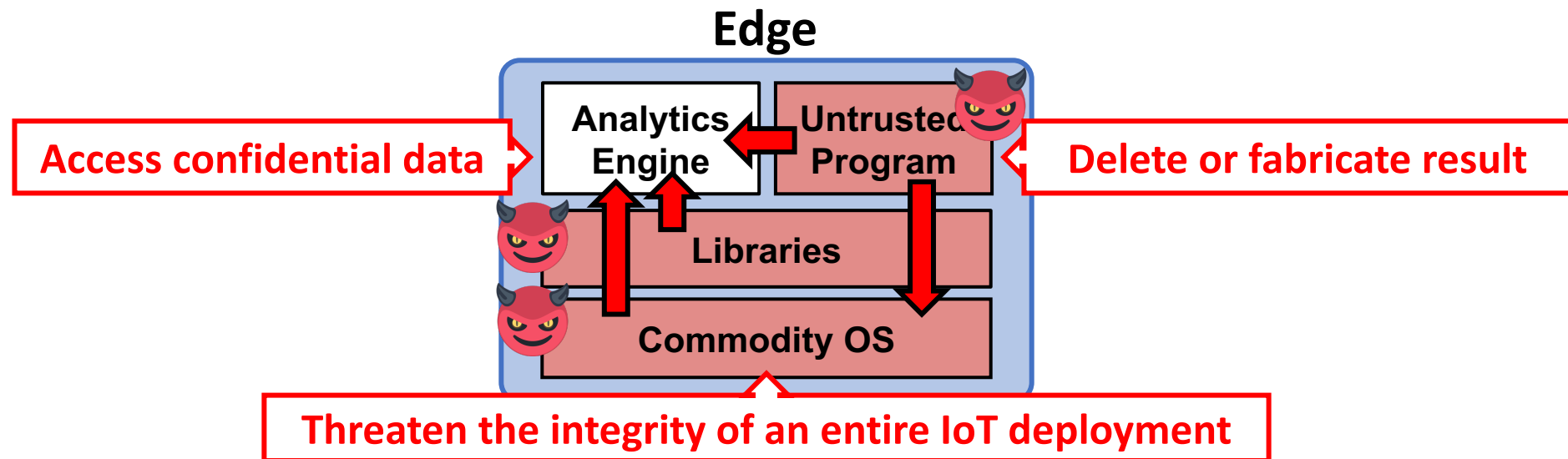 - Reports the results to cloud servers

Problem: Exposing High Security Threats

- **Common IoT threats**
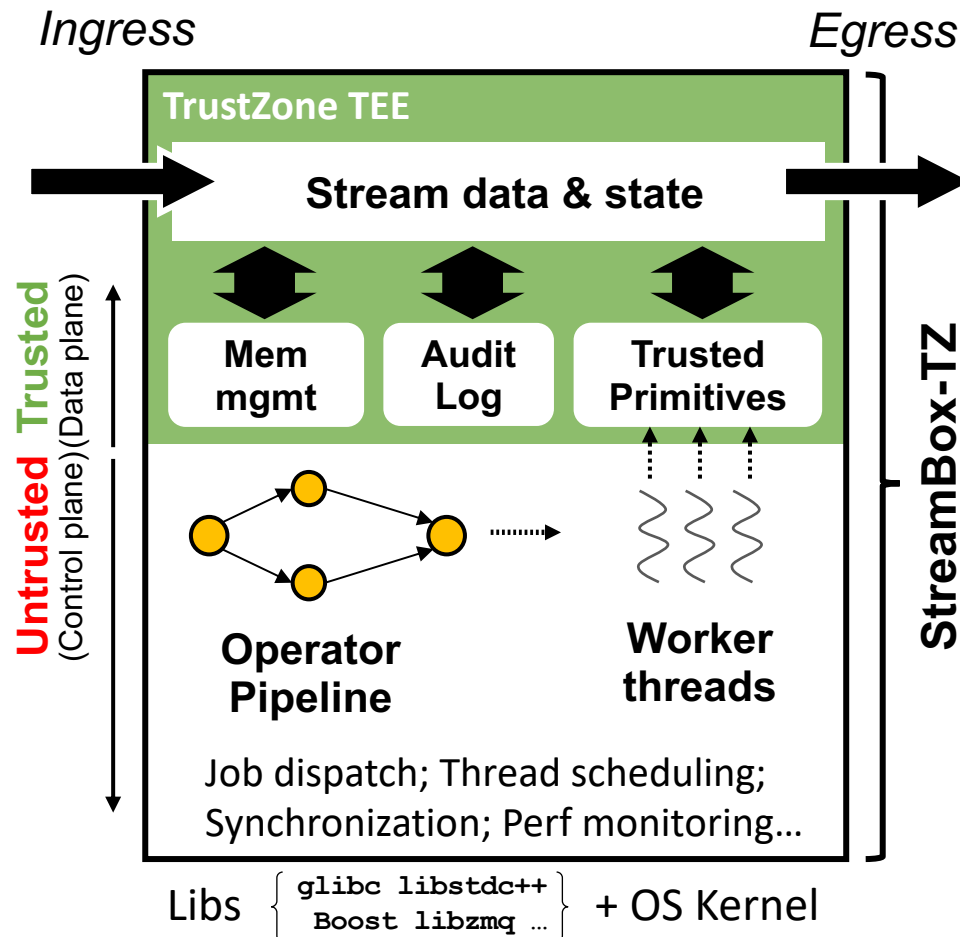 - Lack of professional supervision
  - Delayed security updates

- **Edge processing threats**
  - High-value target
  - Wide attack surface on software stack

Edge

Access confidential data

Analytics Engine

Untrusted Program

Delete or fabricate result

Libraries

Commodity OS

Threaten the integrity of an entire IoT deployment

StreamBox-TZ

Designed for data-intensive, parallel computations on minimal TCB inside ARM TrustZone

- **Approach:** Isolate data and computations

- Architecting data plane for protection
  - Trusted primitives: low level stream algorithms

- Performance optimization within TEE
  - Memory management / trusted IO

- Verifying analytics execution
  - Remote attestation with audit log

StreamBox-TZ:
Secure Stream Analytics at the Edge with TrustZone

Come to our talk on July 11 at
Track II, Security #2: Isolation