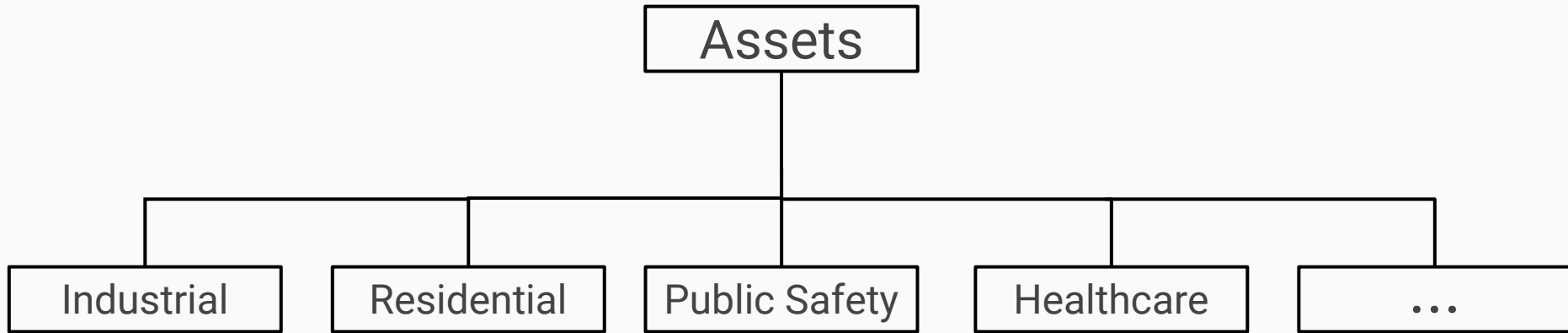


IoT Case Study Systems Architecture *for* Industrial Asset Management

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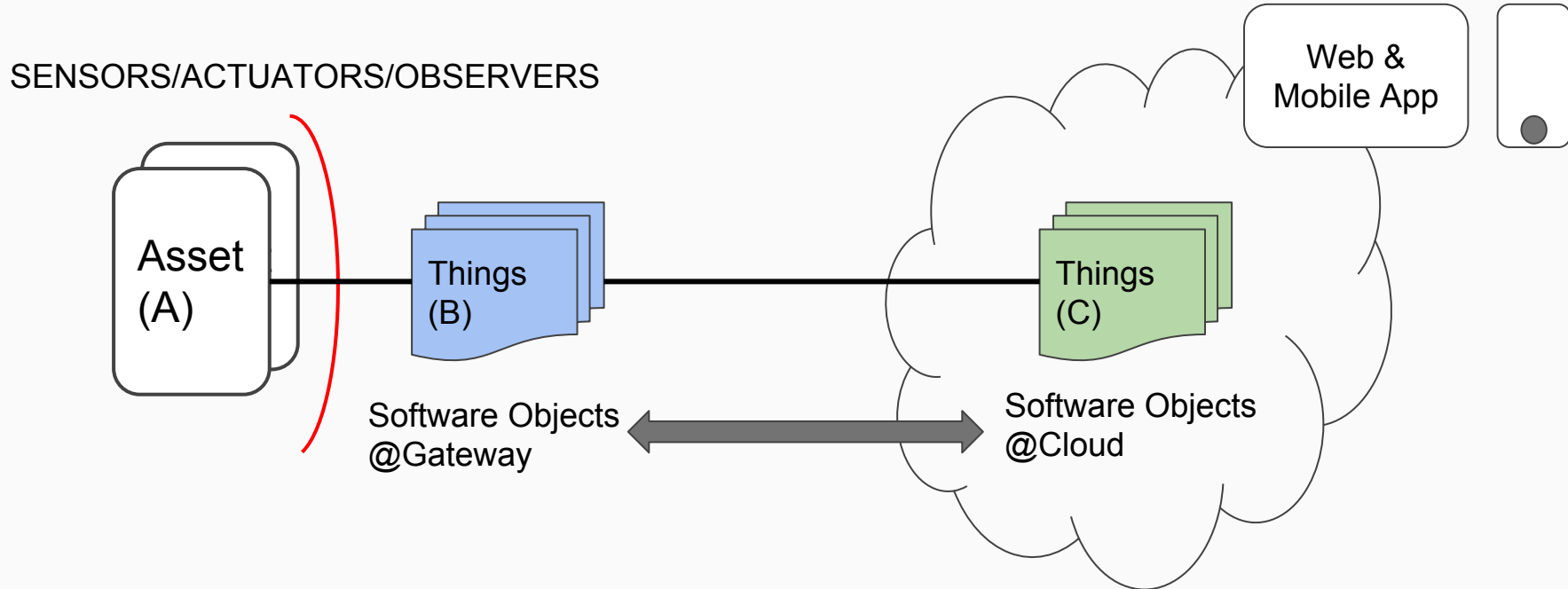


Asset Overview



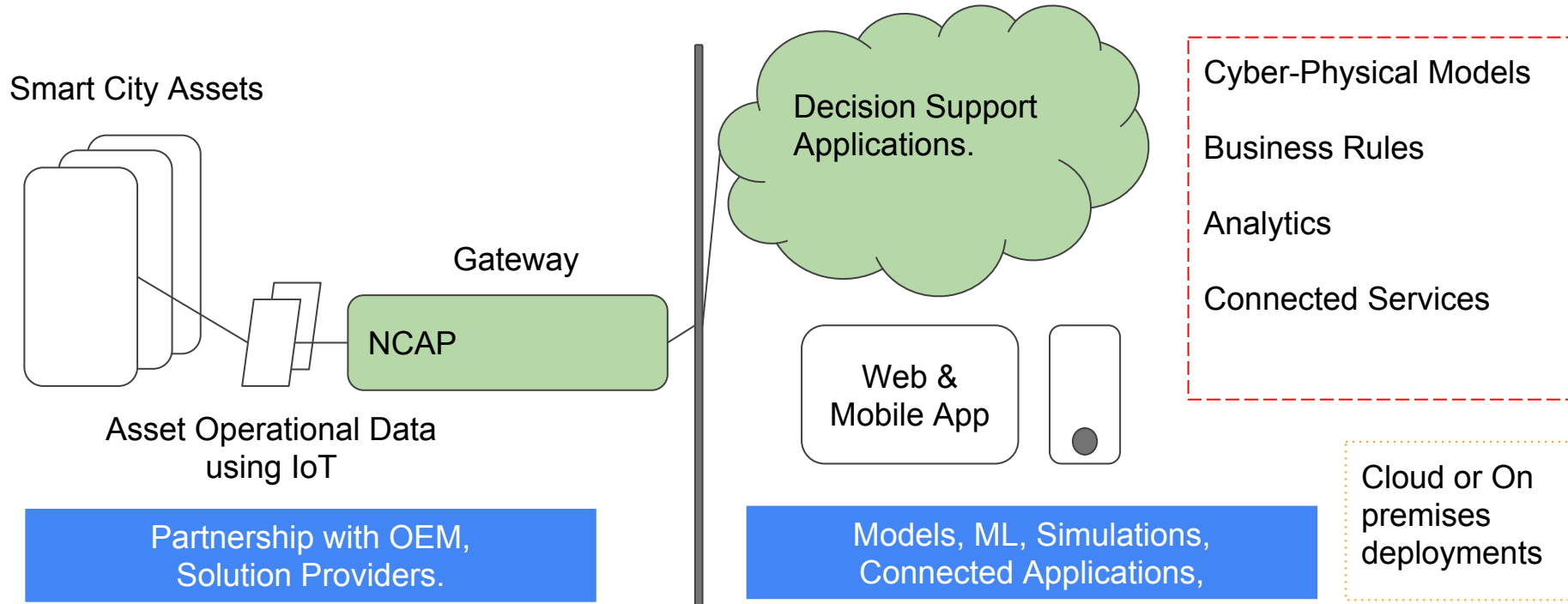
- Businesses manage “Assets” and create value, it is very obvious that those “Assets” are “THINGS” of IoT
- IoT is applicable to all business where “ASSETS” are connected

Asset \Rightarrow Thing

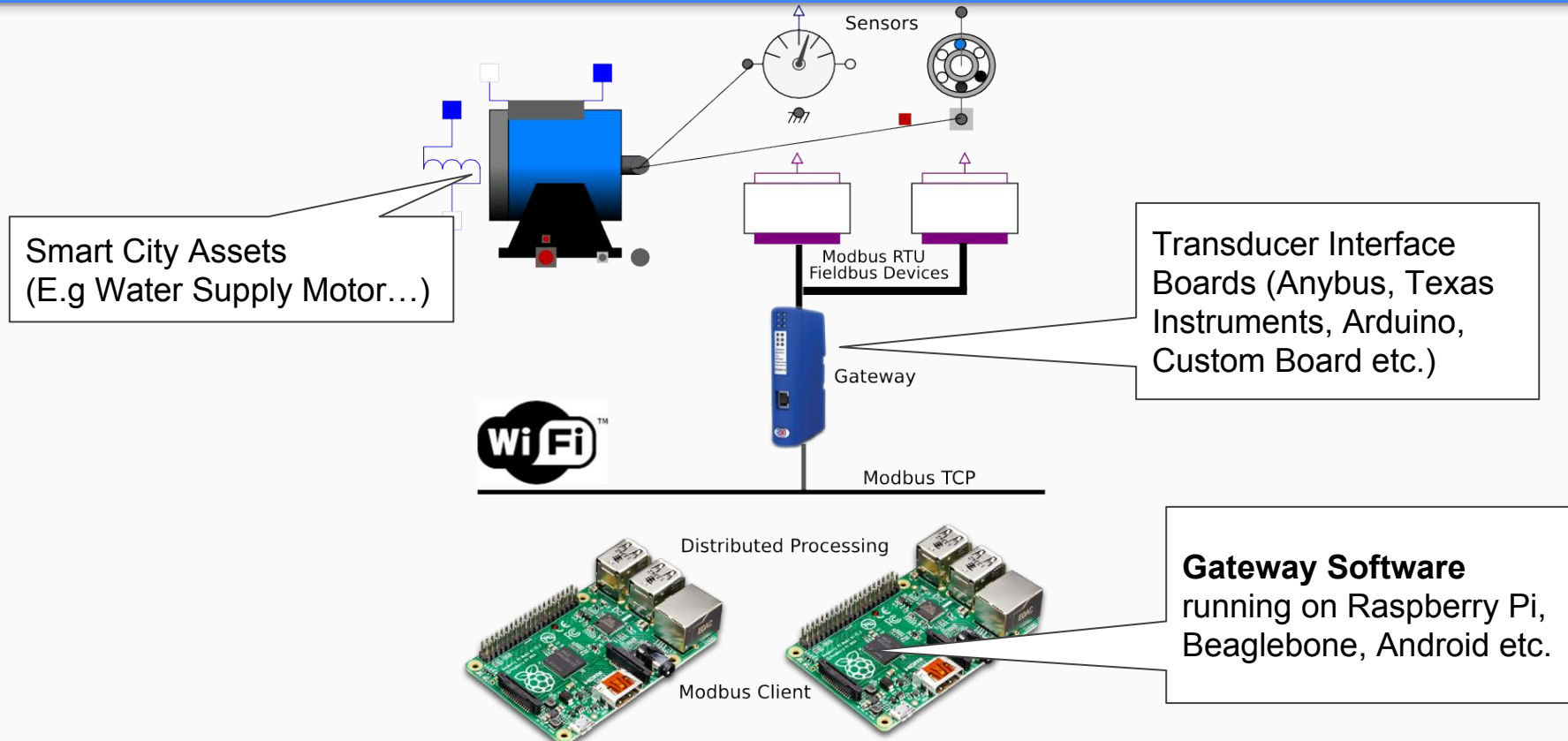


- Assets {A} are now connected AS {B} at the Edge and AS {C} in the cloud.
- This is the crux of IoT designs. Once the software objects of Assets are present in the “Compute and Network”, environment, it opens doors of “Connected” Apps.

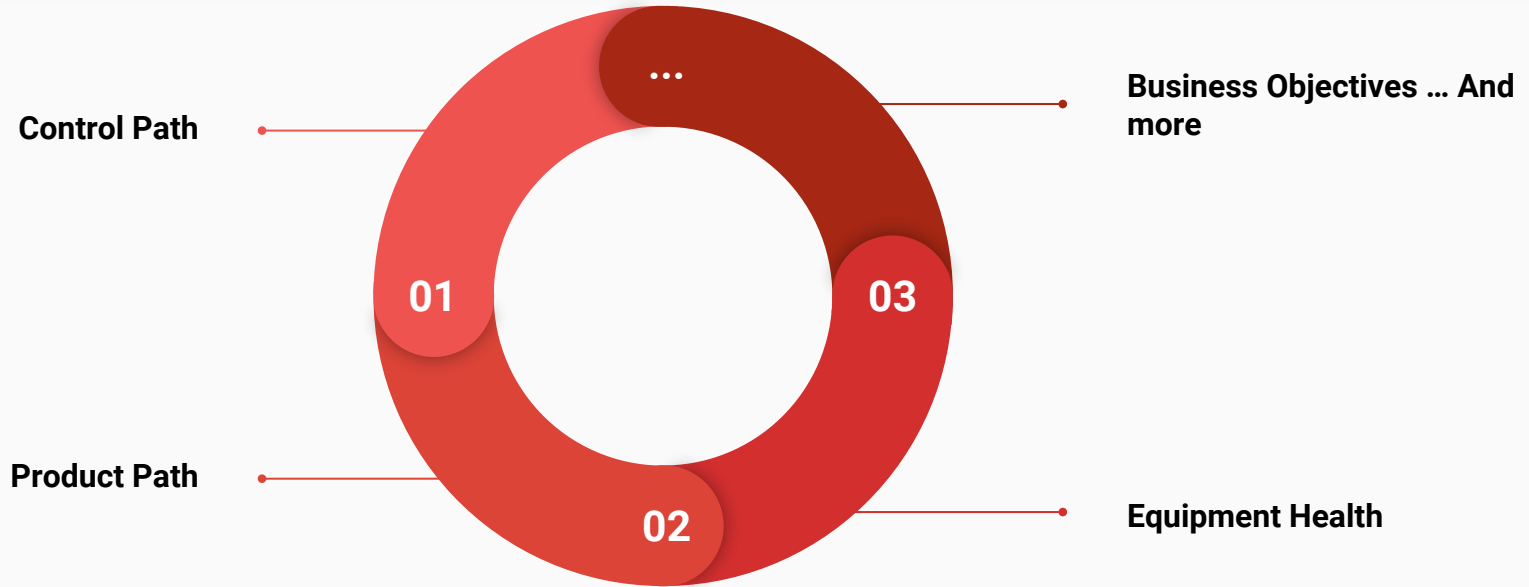
Asset Management System Overview



AN EXAMPLE APPLICATION



A SIMPLE ILLUSTRATION OF IOT GATEWAY APPLICATIONS



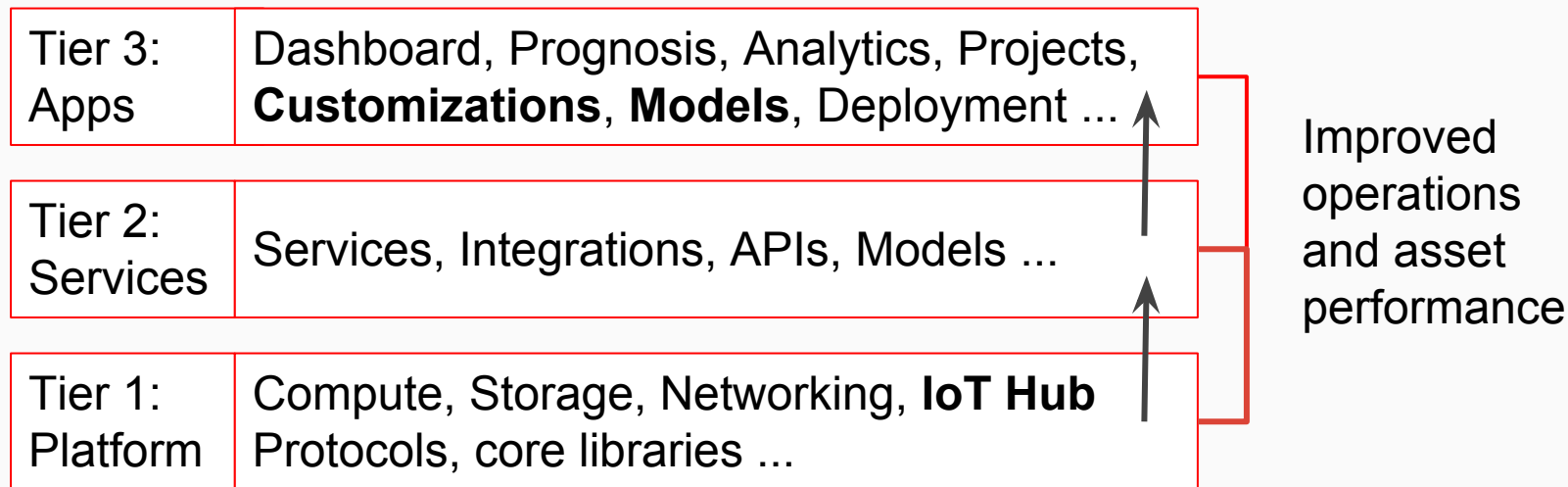
- IoT is a new channel to observe and control the assets
- IoT is NOT a replacement of Automation (Yet!).
- IoT augments the present day industrial technologies enabling “Things” (Digital Twins)

Asset Management System Architecture

IoT Edge Gateway + Cloud Decision Support Apps

- Software solution for asset management.
- Pervasive sensing collecting asset operational data.
- Models based processing on asset operational data.
- Correlating with other asset operational, transaction data.
- Integrating with ERP, Customer, and Equipment Services.
- On-premises, Cloud deployments.

A Platform Model for IoT



Tier 1, 2 are core platform offerings. Tier 3 (Apps) is a service layer.

NCAP (=Gateway) Implementations

NCAP (Network Capable Application Processor)

- Runs on SBC such as Raspberry Pi, Beaglebone etc.
- Interfaces with Transducer Boards (Anybus Communicators, Texas Instruments, Arduino, Custom Boards)
- Supports variety of communication protocols
- Portable Storage for Transducer data (millions of data points at the gateway).

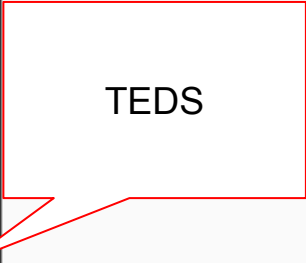
NCAP Implementations contd..

- Runs OPC (Open Platform Communication) client to connect any existing Automation infrastructure.
- Supports variety of networking protocols to connect to the cloud applications.
 - HTTP, CoAP, Websockets, MQTT, XMPP, AMQP, ZeroMQ
- Development in C/C++, Python, JavaScript...
- Modular designs for Transducer interfaces.
- Alarm Management

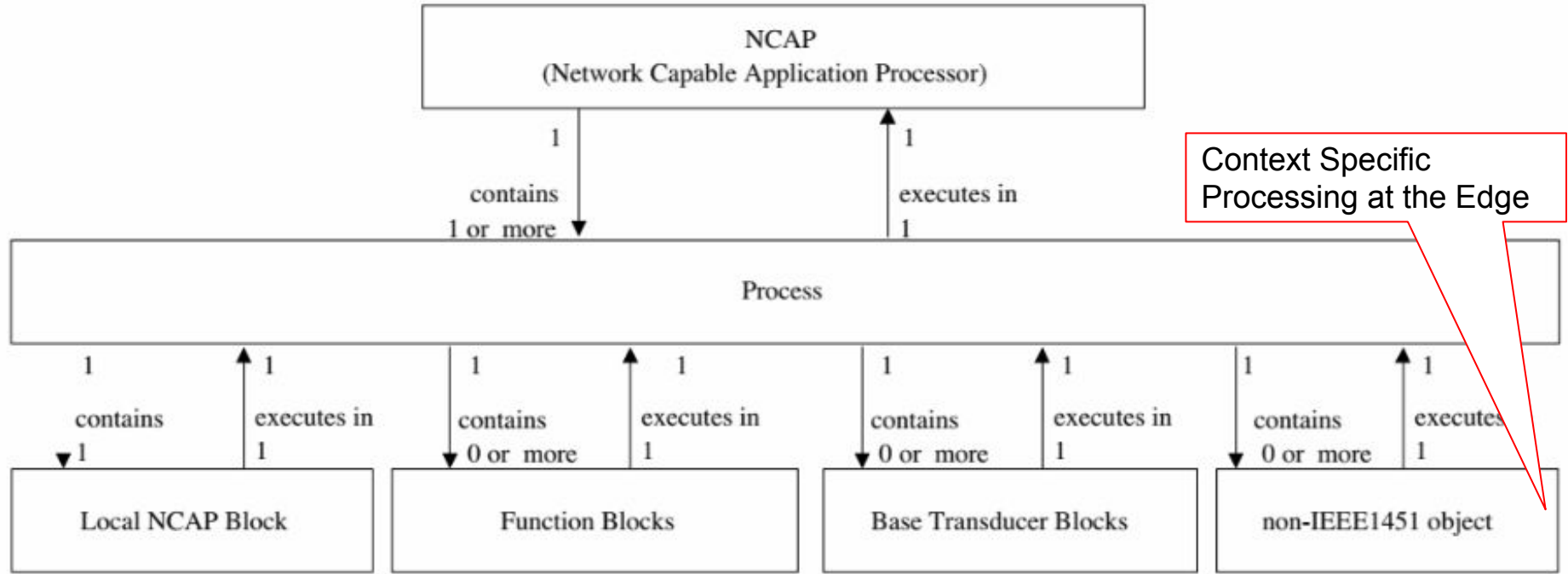
Models and Processing demands at the NCAP:

- Ability to process data at the NCAP.
- Statistical analysis on transducer data at the NCAP.
- Scalable gateway architecture - adding additional gateway units for more compute power.
- Bidirectional communication - Cloud <> Gateway (for decision events)

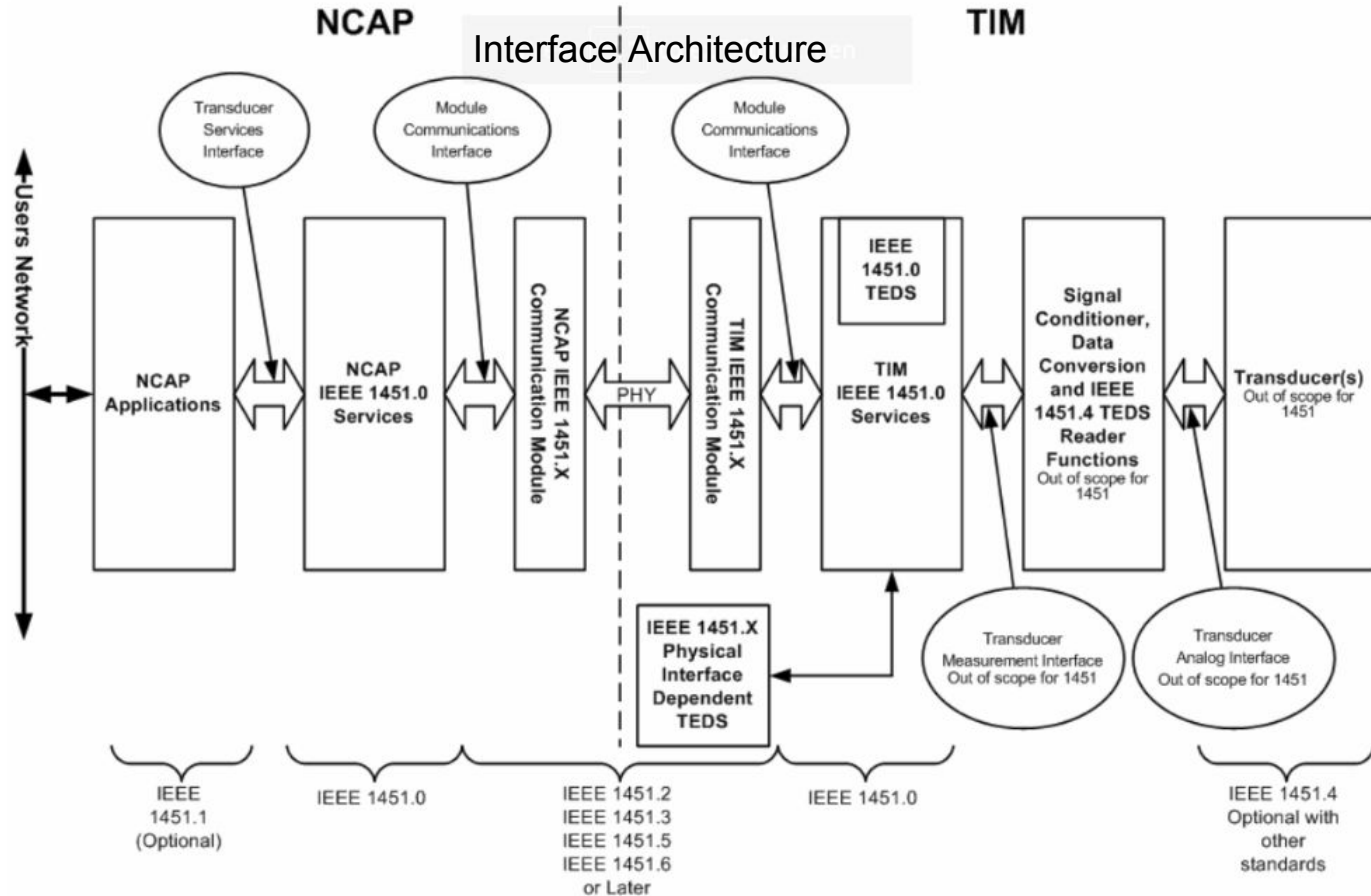
Things



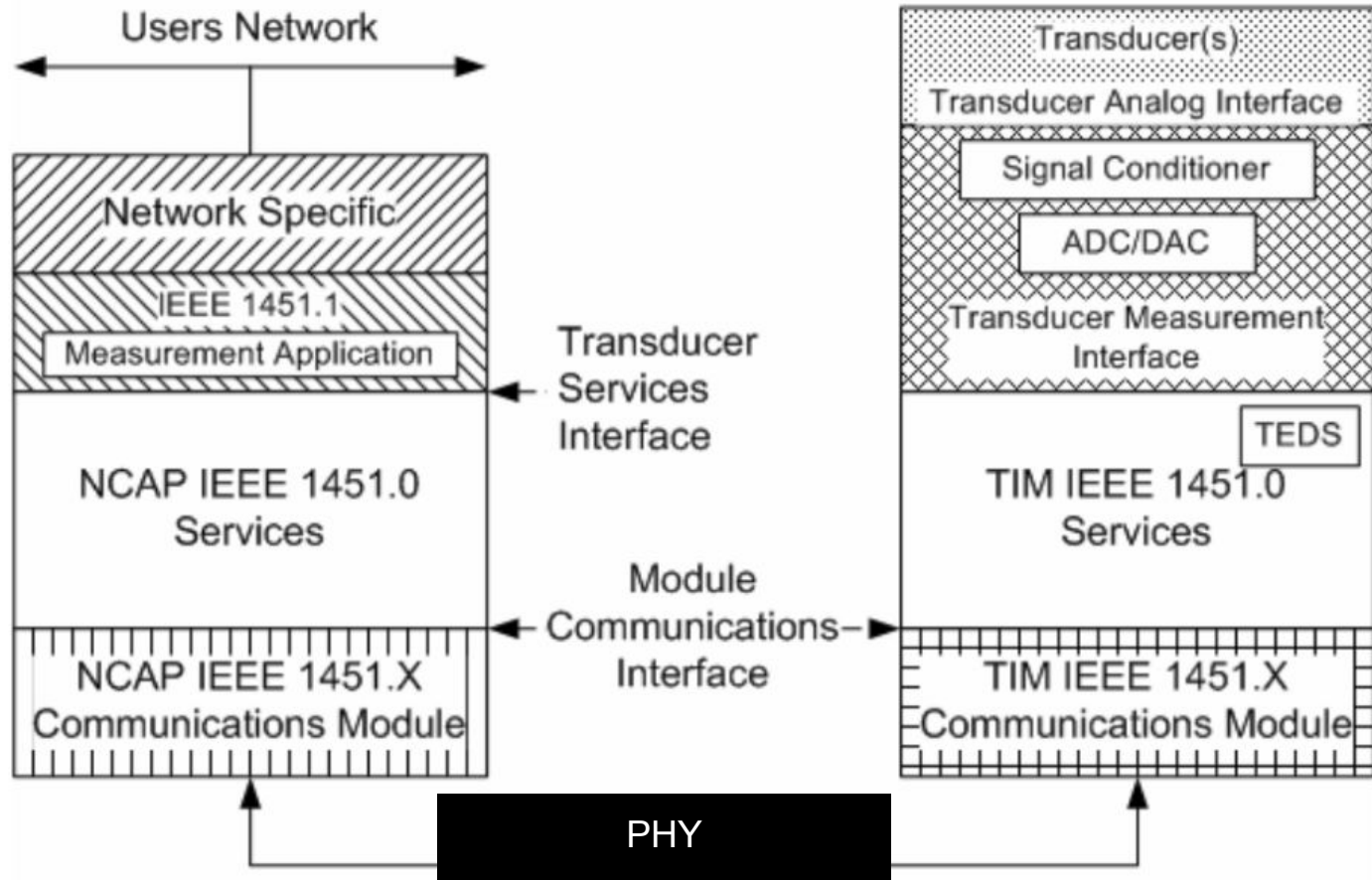
Let's take a look at the IEEE 1451 Standard contd...



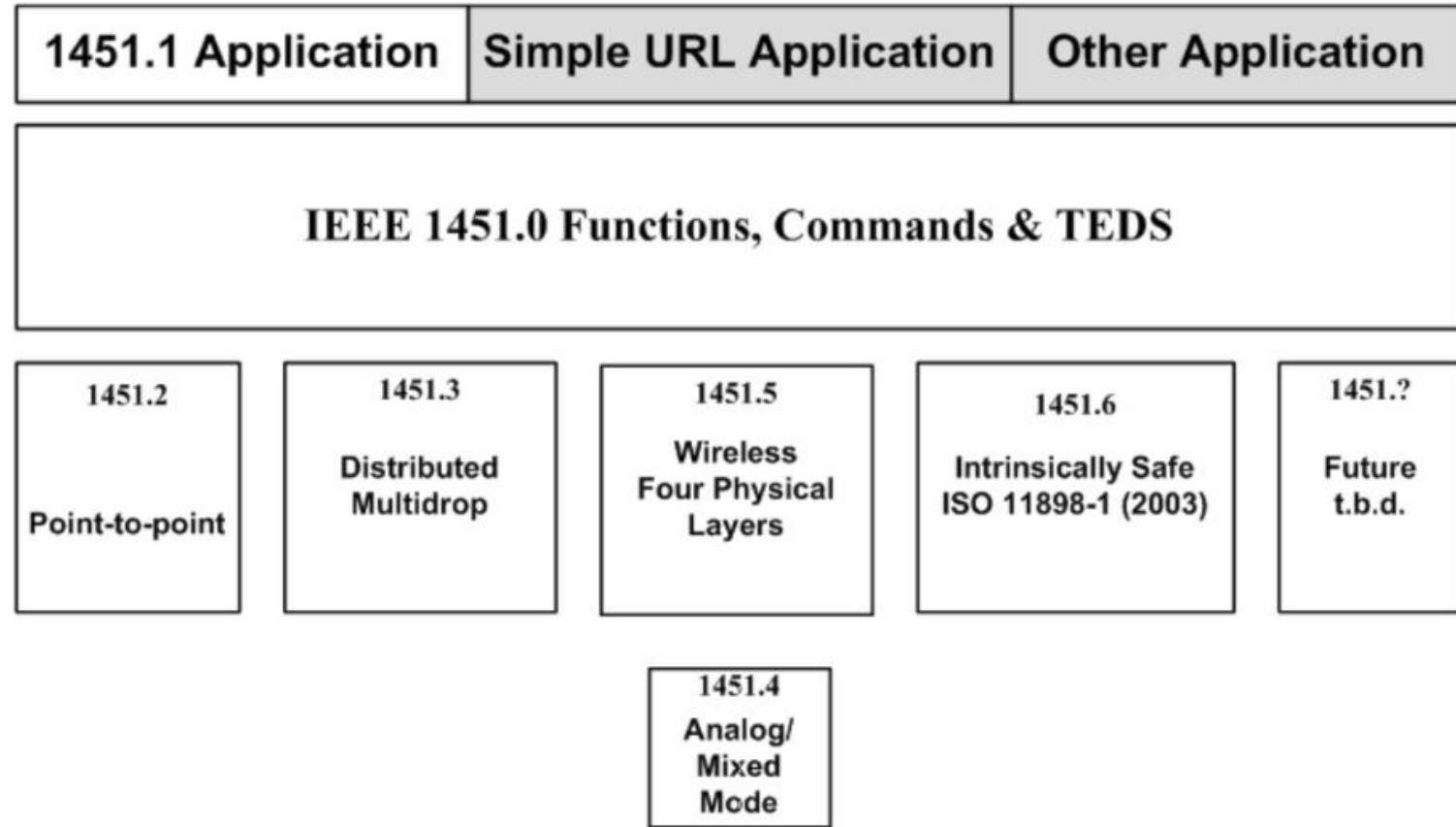
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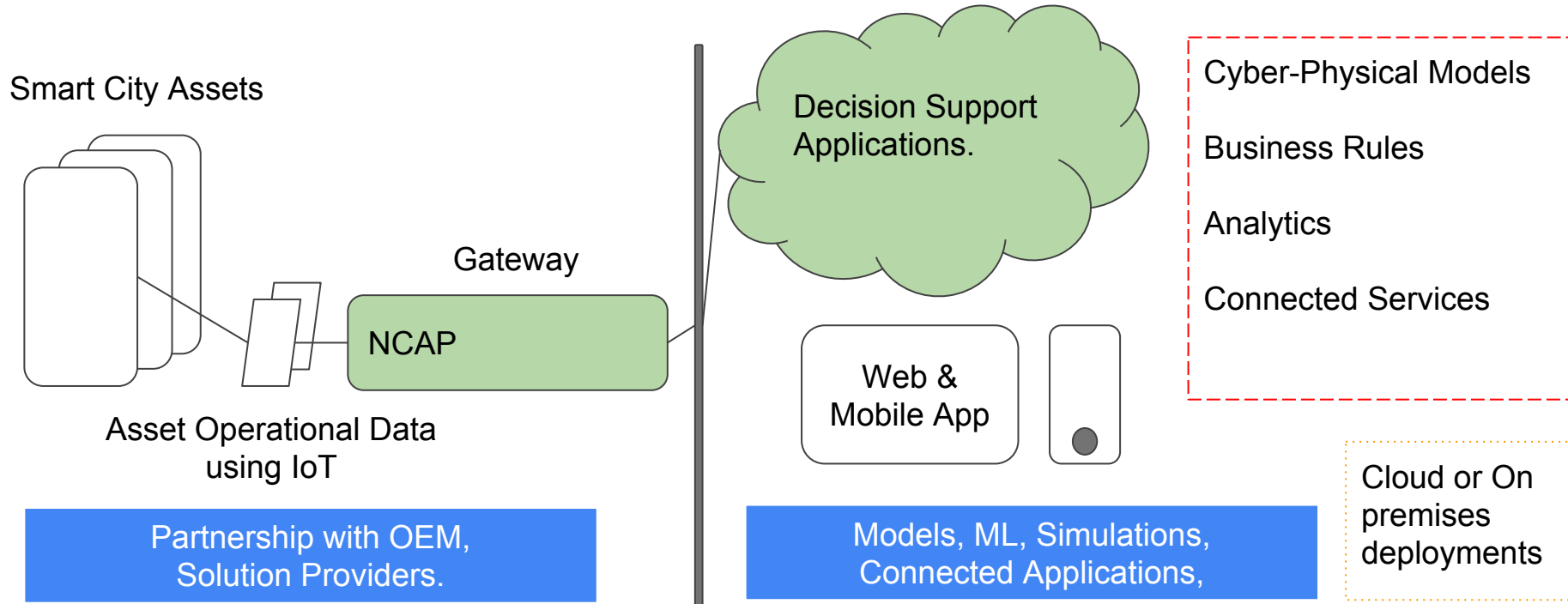
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Let's take a look at the IEEE 1451 Standard contd...



Asset Management System Overview recap...



Thank You

Q&A