



Blueberry.Zone

A Comprehensive Smart Home Platform
Powered by Java ME and Java EE



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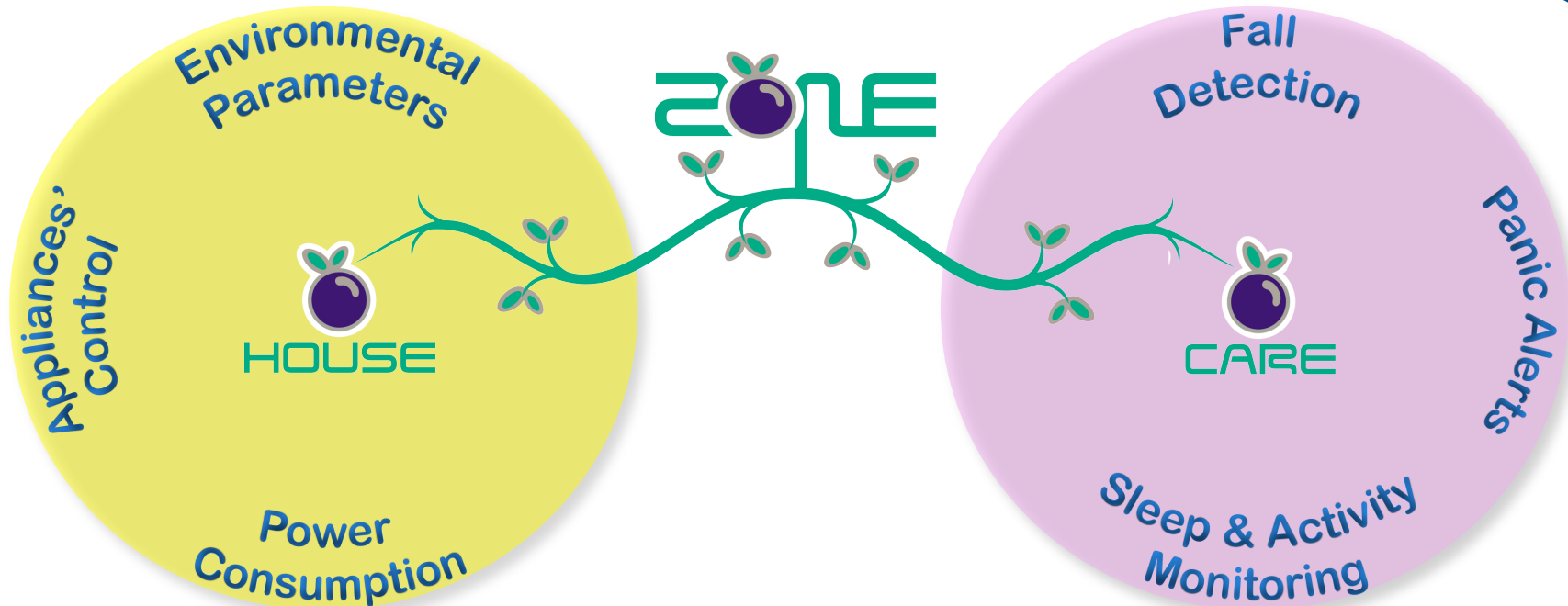
What is Blueberry Zone?

- **6 months startup based in London**
- **Smart Home and Smart Care integrated solution**
- **Pluggable Module and Wearable**
- **Companion iOS and Android Apps**
- **Multiple Hardware and Software platforms compatibility**
- **End-to-end Java ecosystem (ME, SE and EE)**

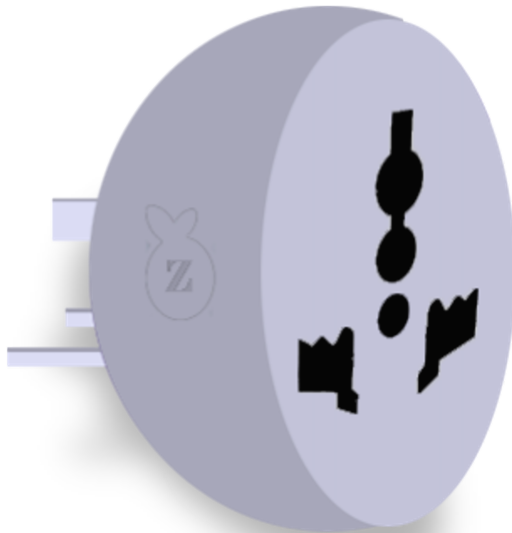
Goals

- **Security**
- **Reliability**
- **Simplicity**
- **Cost-efficiency**

Services



Products



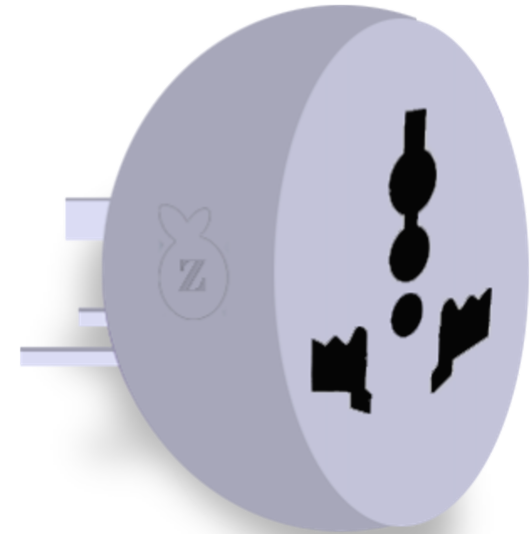
Plug



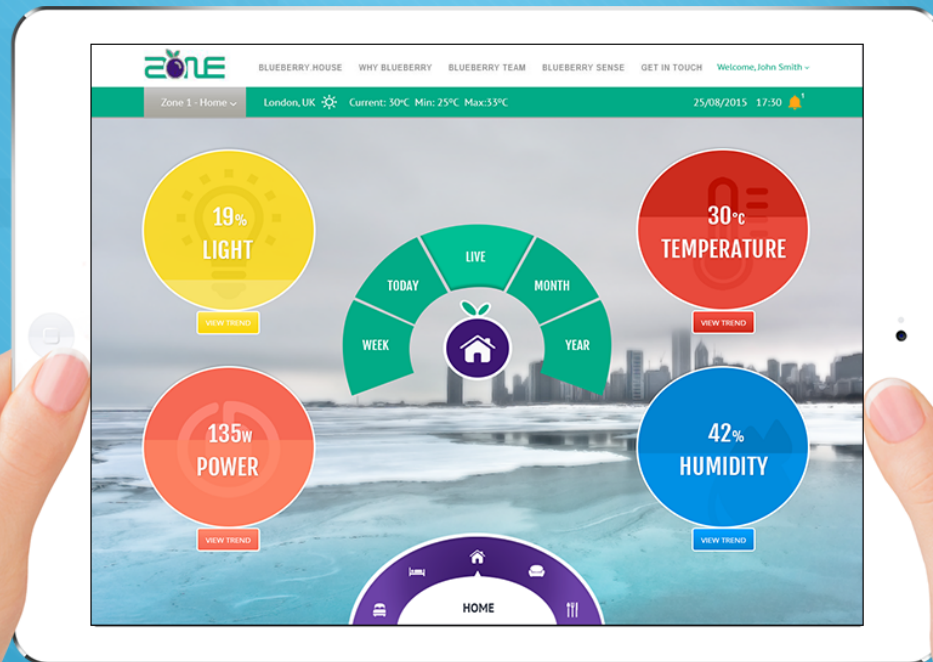
Wearable

Blueberry.House

- **Temperature**
- **Humidity**
- **Luminosity**
- **Power Consumption**



Blueberry.House



Blueberry.Care

- **Fall Detection**
- **Steps/Running/Walking**
- **Panic Alerts**
- **Sleep Monitoring**



Blueberry.Care

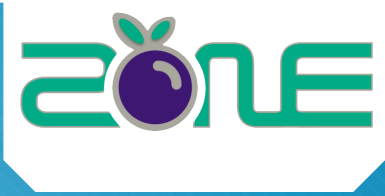


What is so special about Blueberry.Zone?



Existing Solutions

- **Expensive**
- **Complicated setup** (Wi-Fi setup, pairing devices, account setup, and etc.)
- **Limited lifetime**
- **Wireless communication** (limited coverage/interference)
- **Lacking Security** (eavesdropping, packet sniffing, malicious attacks)
- **Adapting to the Infrastructure** (house architecture, thickness of the walls)



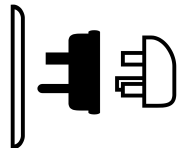
Blueberry.Zone

- Inexpensive (<\$15 per node)
- Ultra-low power (>2 months to unlimited lifetime)
- User-friendly
- Instant plug-and-play out of the box experience
- Secure
- Remote access and control

How does it work?



1) Tap the devices together

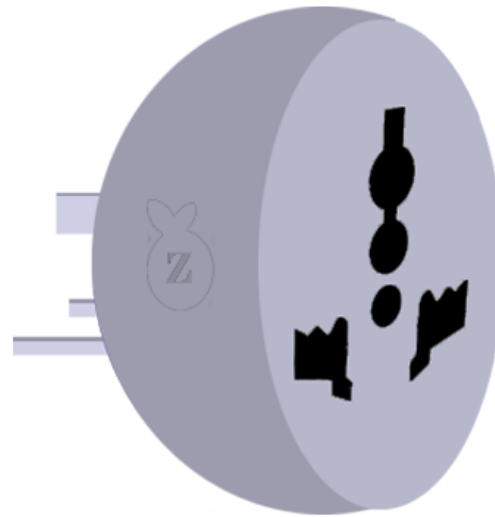
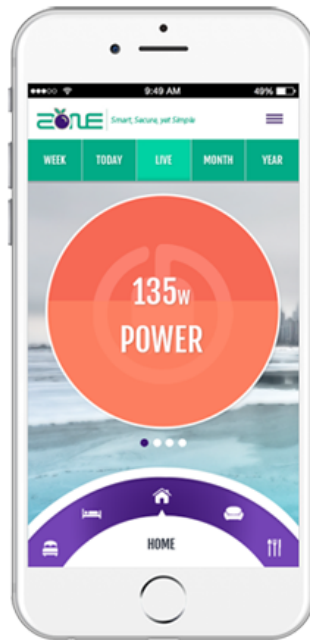


2) Plug them into the power outlets

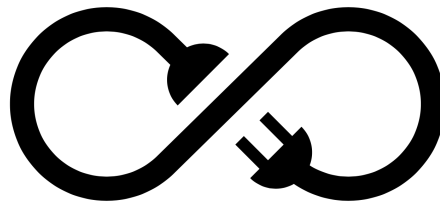


3) Tap your phone on one of the devices

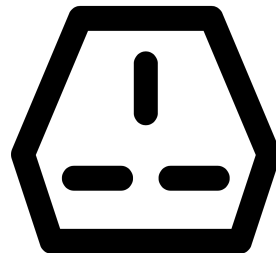
How does it work?



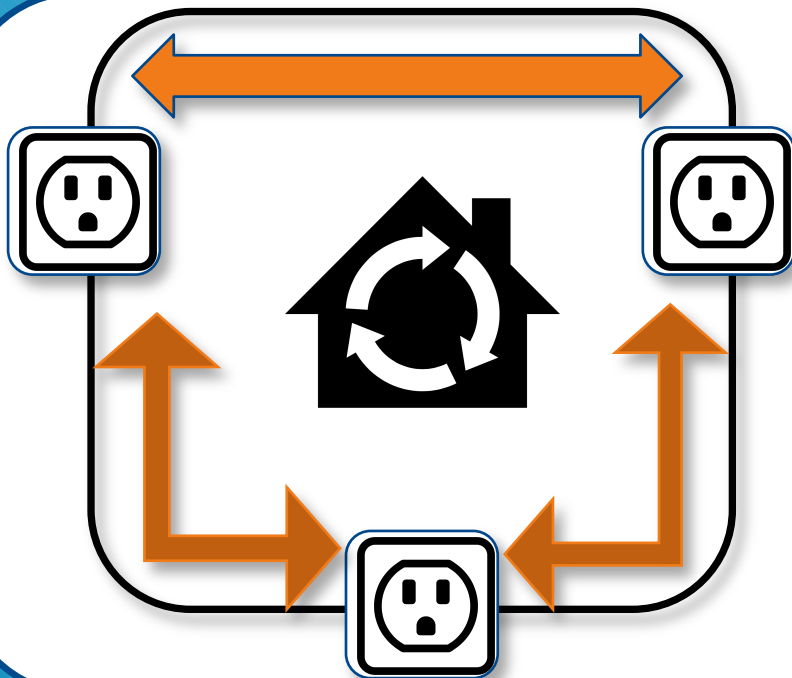
How does it work?



**Power-line communication
(PLC)**



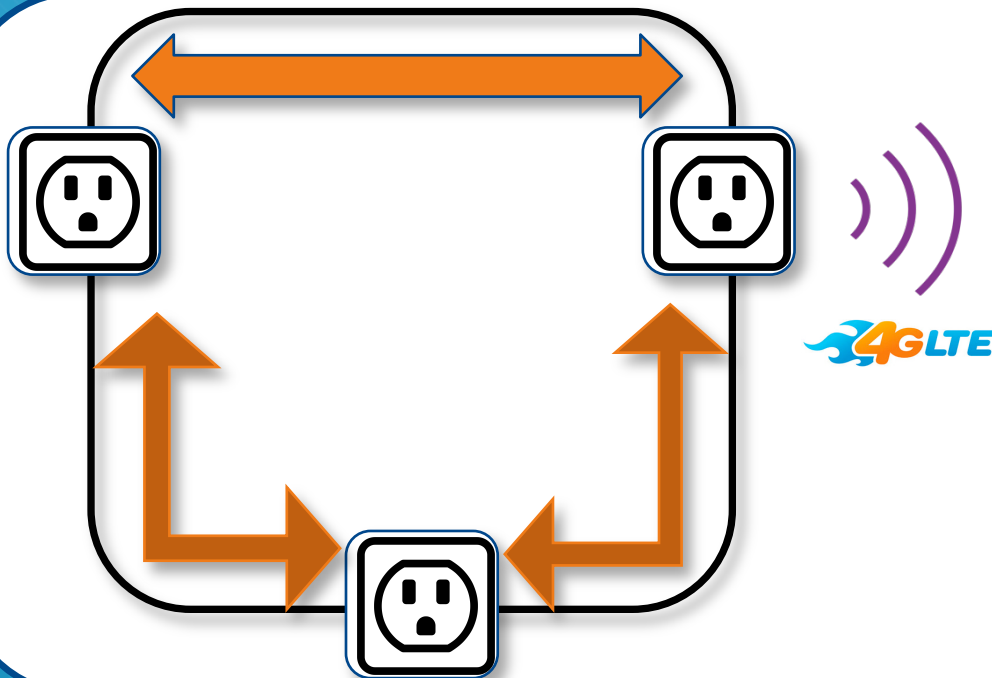
How does it work?



- **Power Line Communication**
- **Agent-based**
- **Full-duplex**
- **Encrypted**
- **Local aggregation**
- **Decentralized operation**

How does it work?

(Gateway)



Executes agents:
extracts data/attach commands

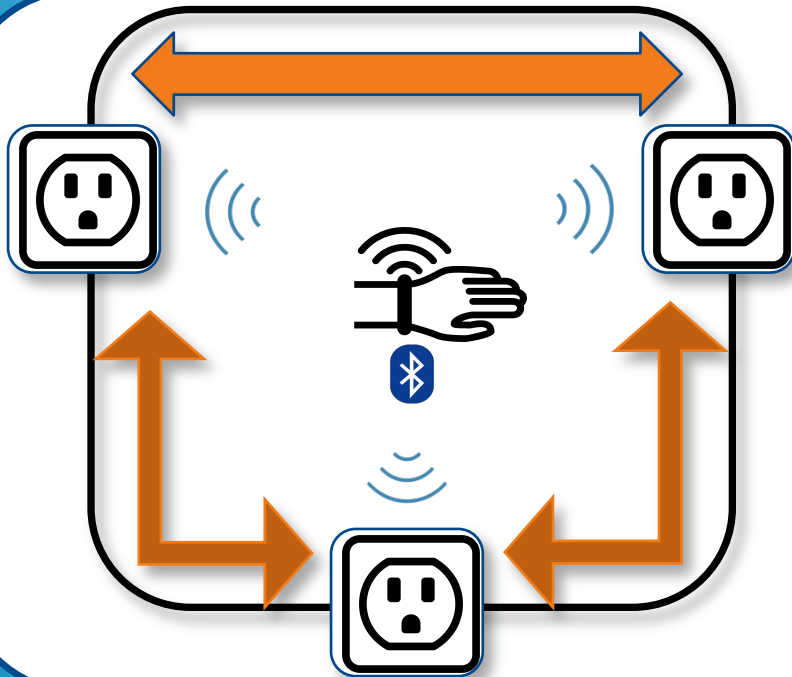
Data Relay:
Cellular communication with
Blueberry.Zone web servers

Decentralized operation:
Hierarchical multi-clustered
data aggregation locally

Data Storage:
Storing up to 32GB of data locally

How does it work?

BLE



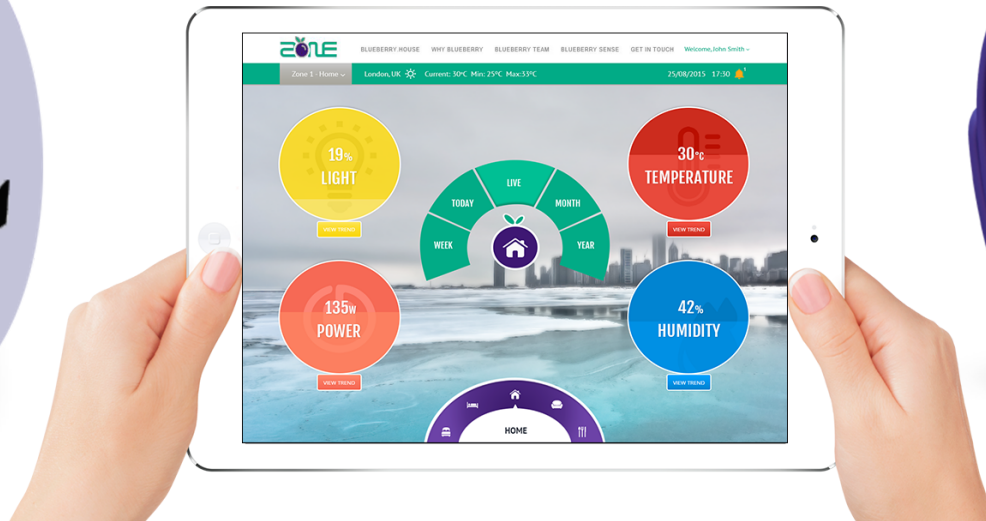
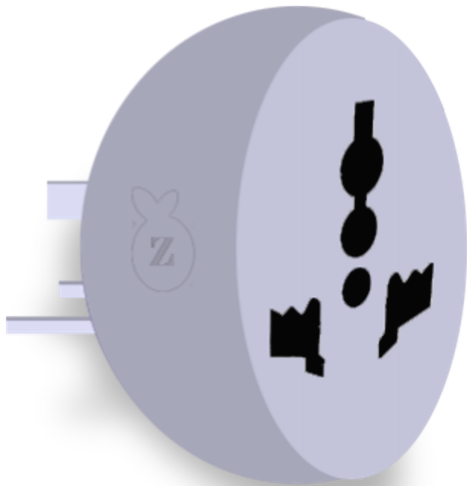
All plugs are BLE-enabled

Plugs only sniffs BLE packets

**Relay data to the gateway
based on their priorities**

Storing up to 2GB of data locally

Integrated, Secure & Seamless





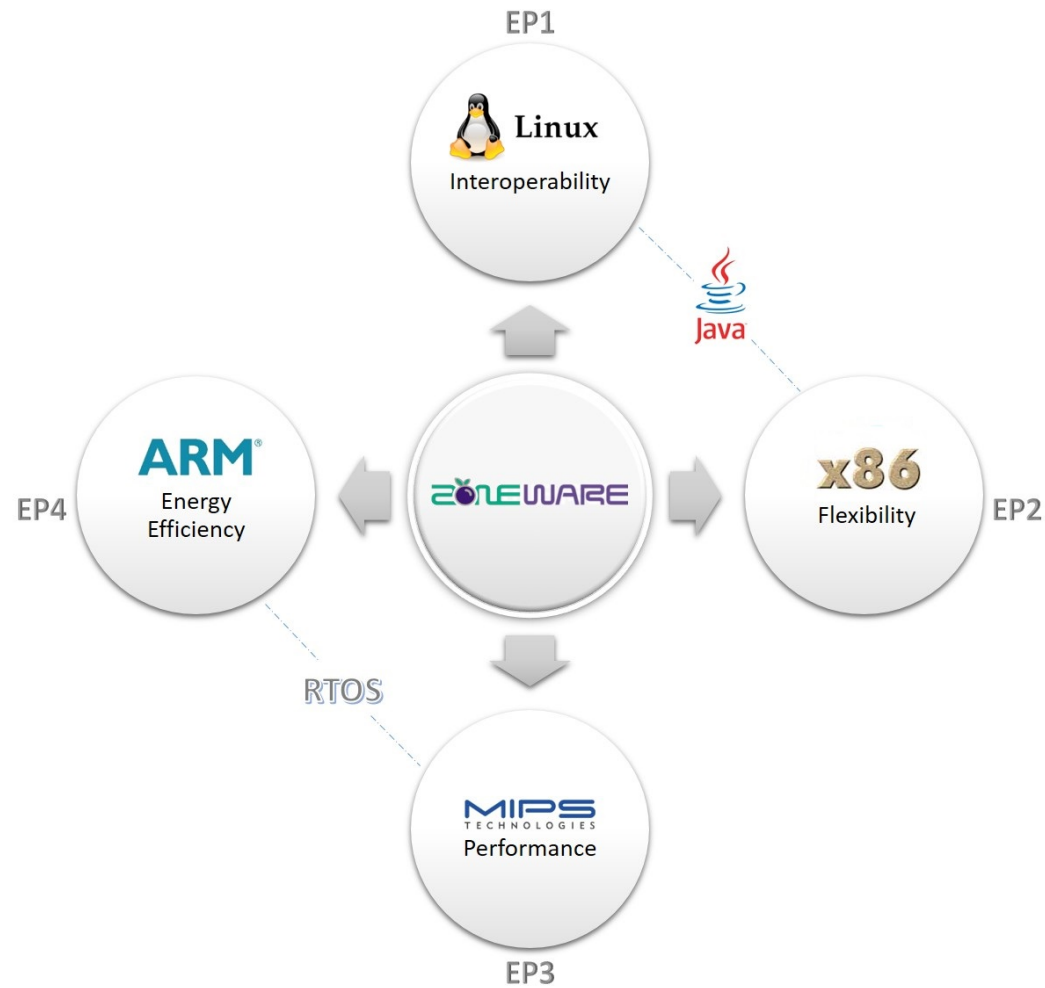
ZONEWARE

Cross-Platform Middleware

ZoneWare is an interoperable multi-platform middleware for dynamic and scalable data-gathering from blueberry plugs and wearable.

Based on the latest research in agent-based communications in wireless sensor networks and IoT.

It is compatible with the 4 most popular MCU/MPU architectures: MIPS, X86, ARM Cortex-M and ARM Cortex-A.



ZONEWARE

- ✓ **Agent-Based Model**
- ✓ **Adaptable to application requirements**
- ✓ **Applying Dynamic changes at Runtime**
- ✓ **Multi-Tasking support**
- ✓ **Serving multiple applications concurrently**
- ✓ **Decentralized/Centralized task execution**
- ✓ **In-network & inter-cluster aggregation/Processing**



SENSOMAX → ZONEWARE

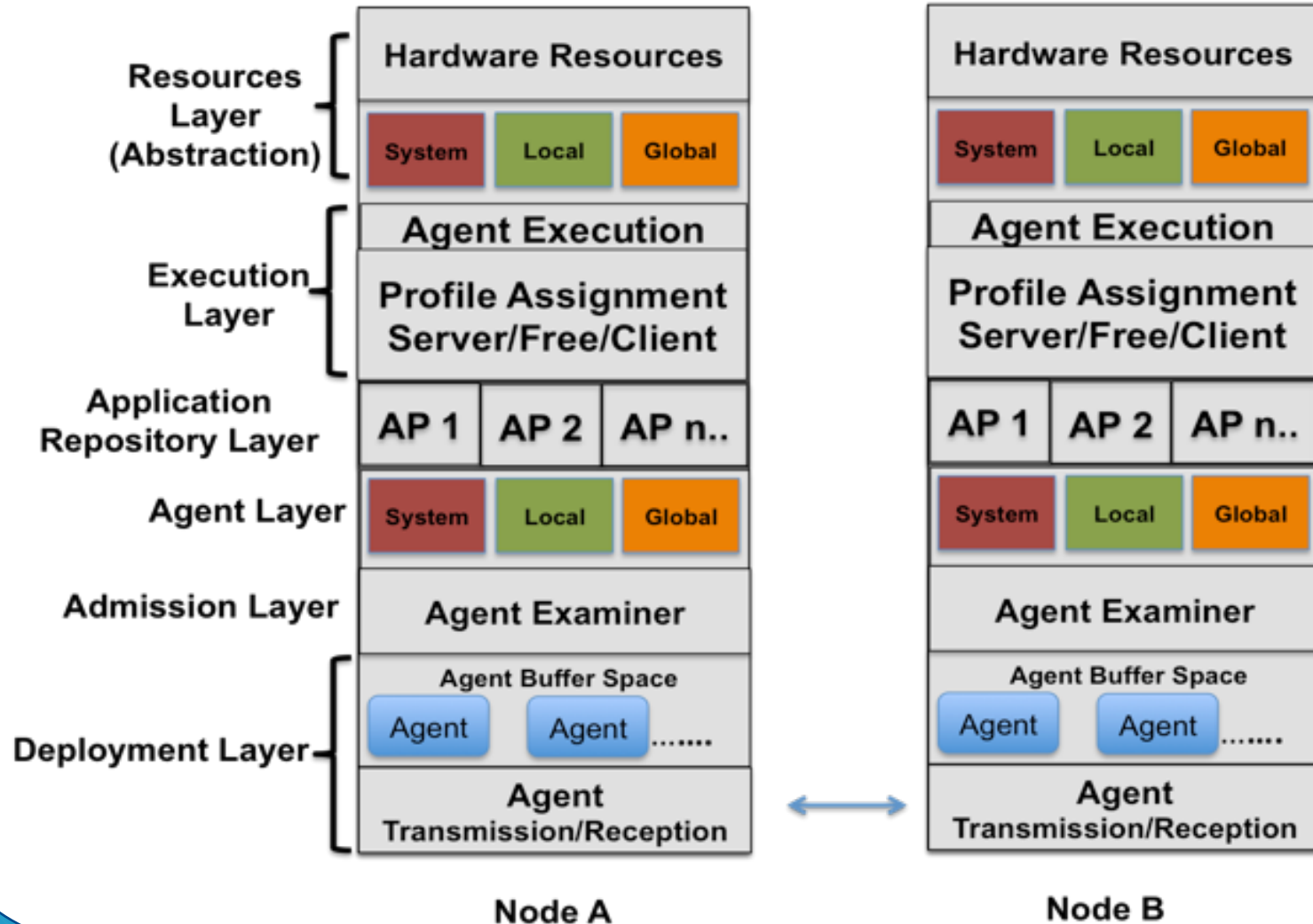




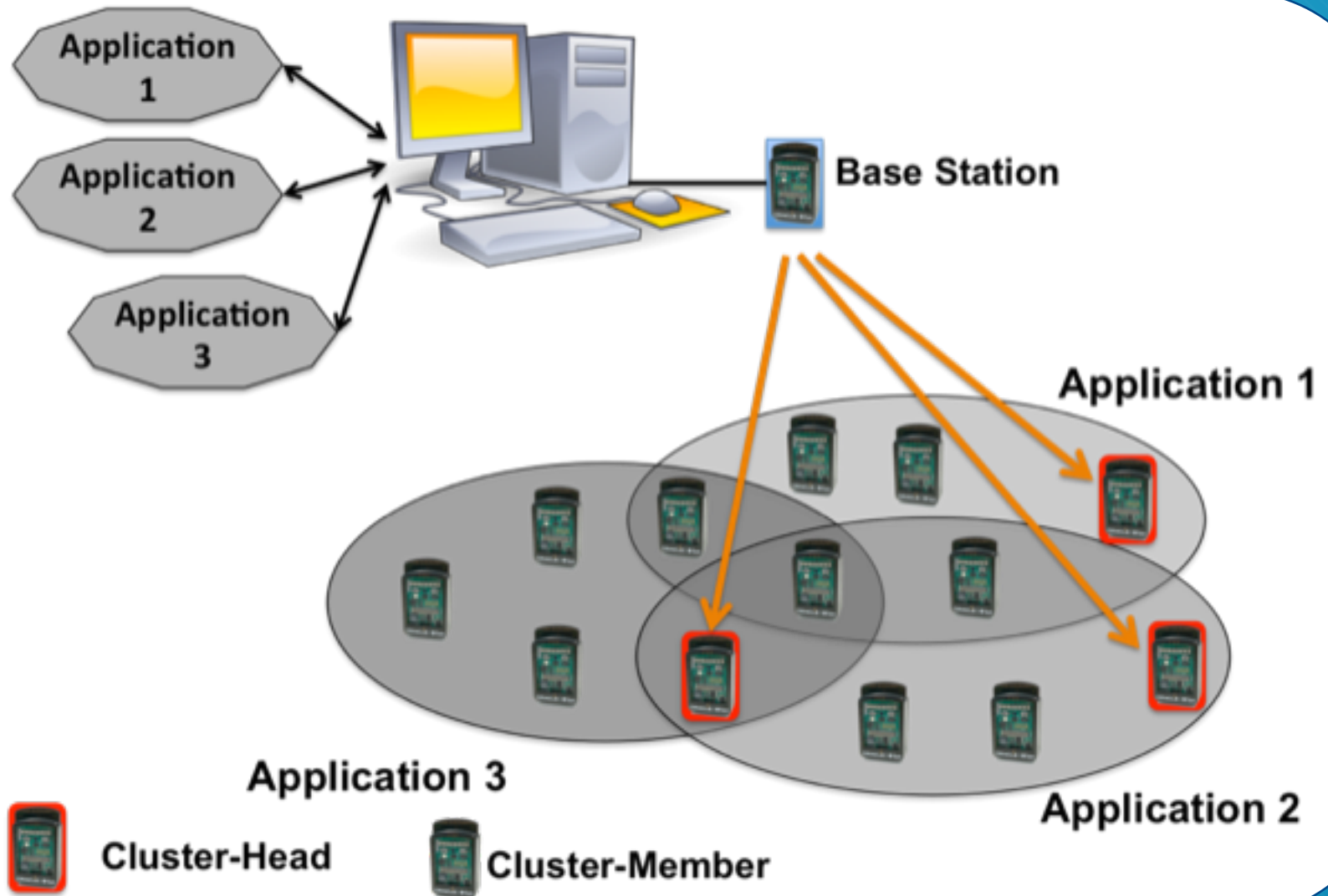
SENSOMAX

- ✓ Developed at the University of Bristol
- ✓ 3 IoT research projects with funding of up to £25m
- ✓ 15 journal and conference publications IEEE
- ✓ Sensors, IEEE IoT, IEEE VTS, ACM and Springer.
- ✓ Presented in 12 countries

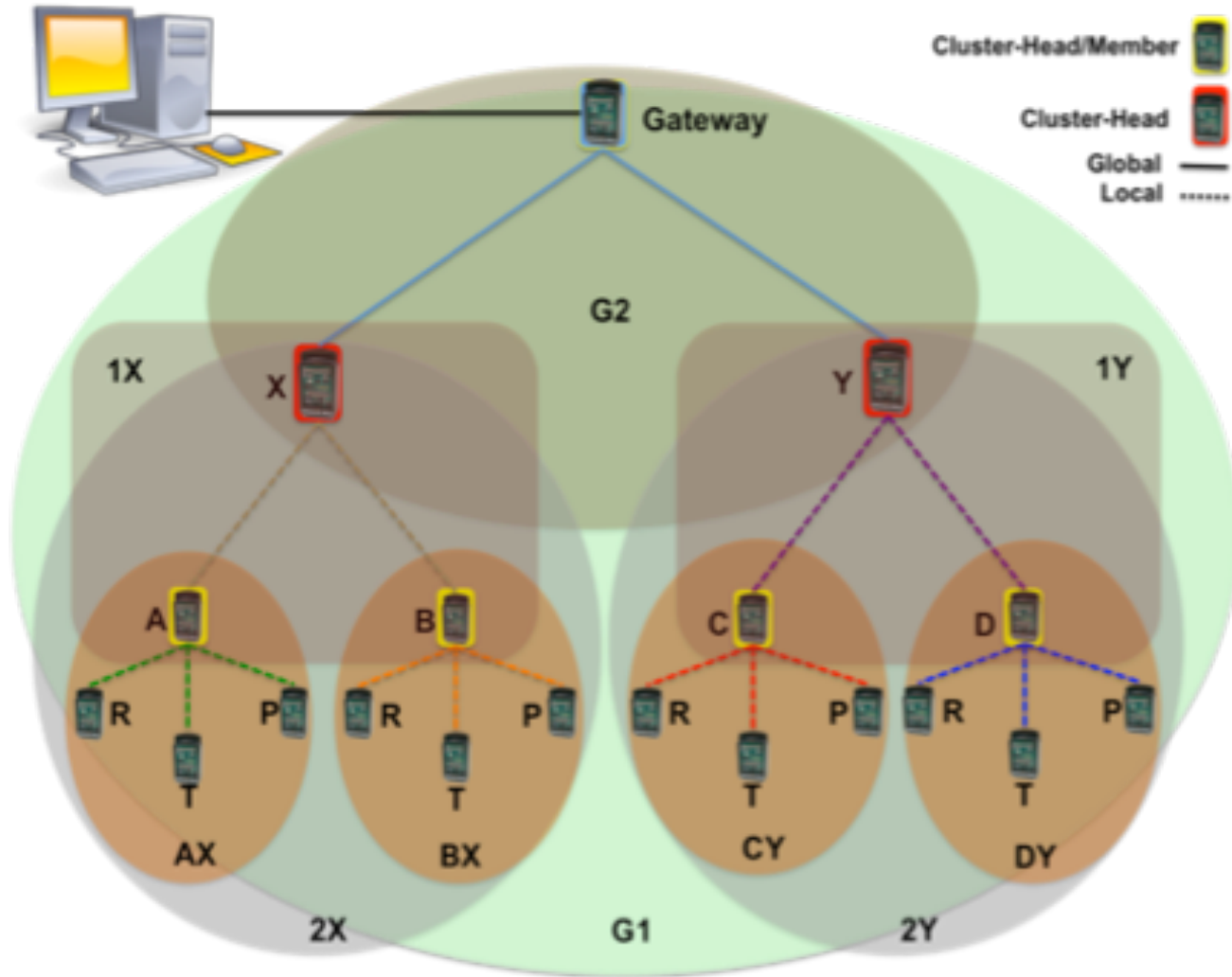
Agent Transition between Nodes



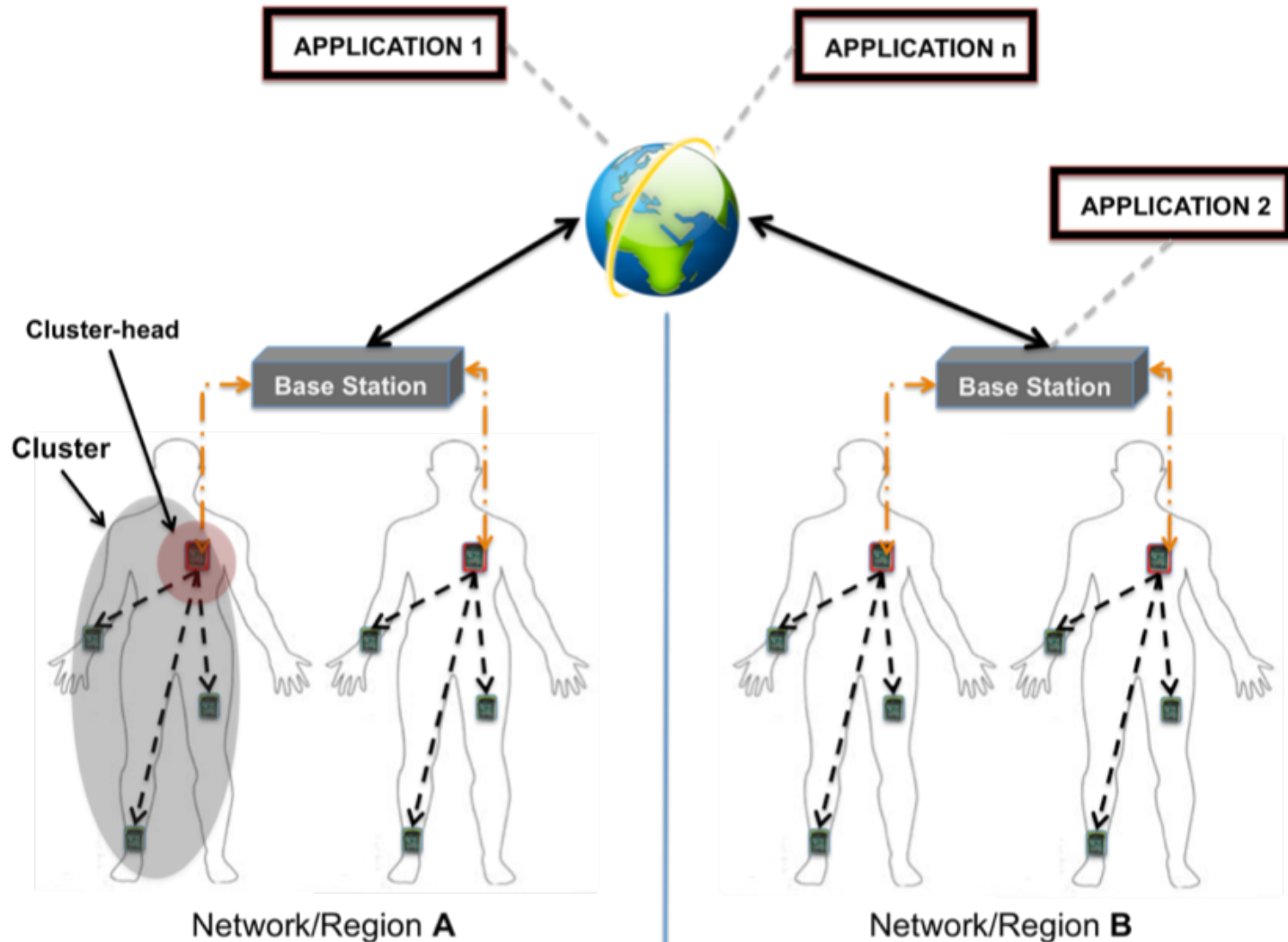
Clustered Hierarchical multi-tasking



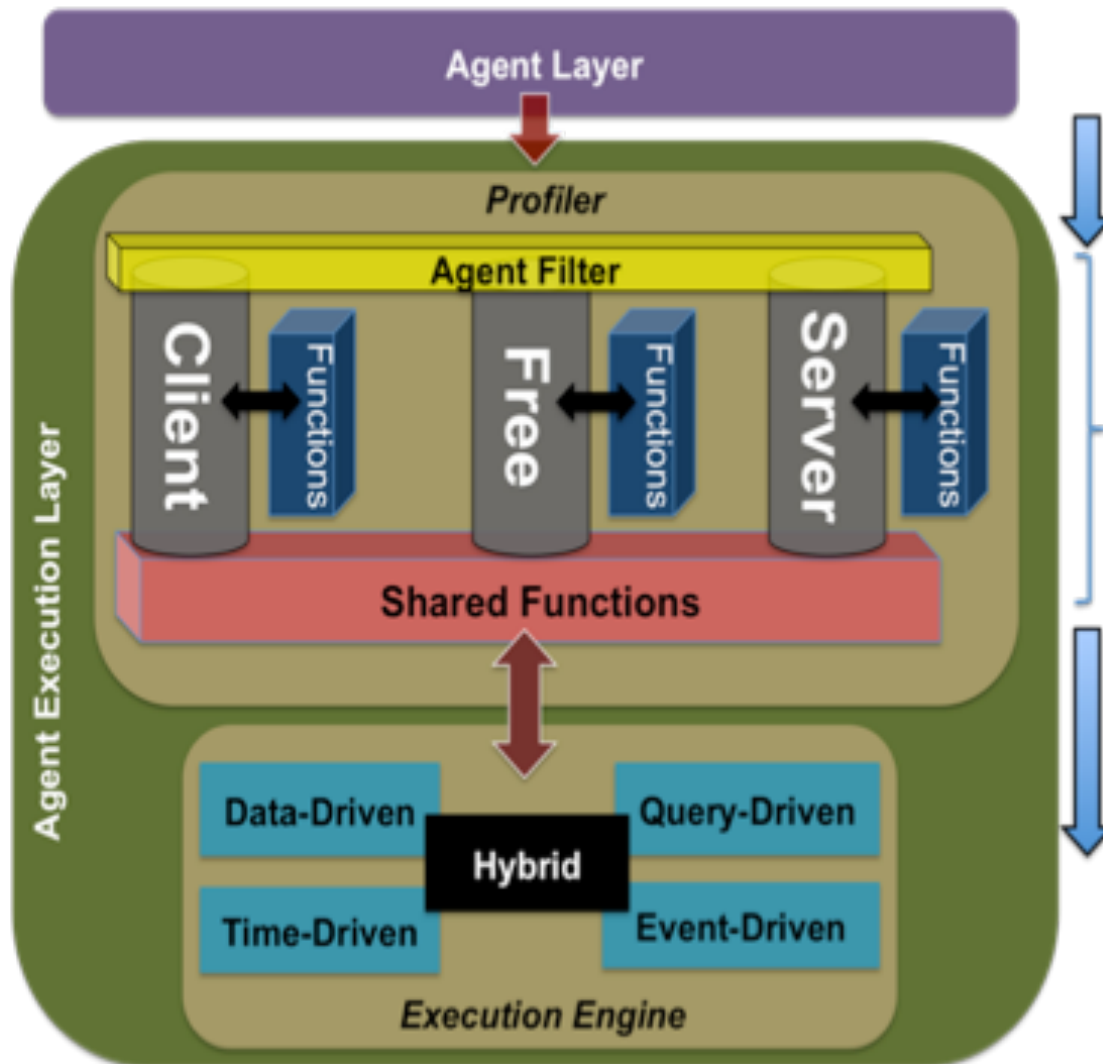
Clustered Hierarchical multi-tasking



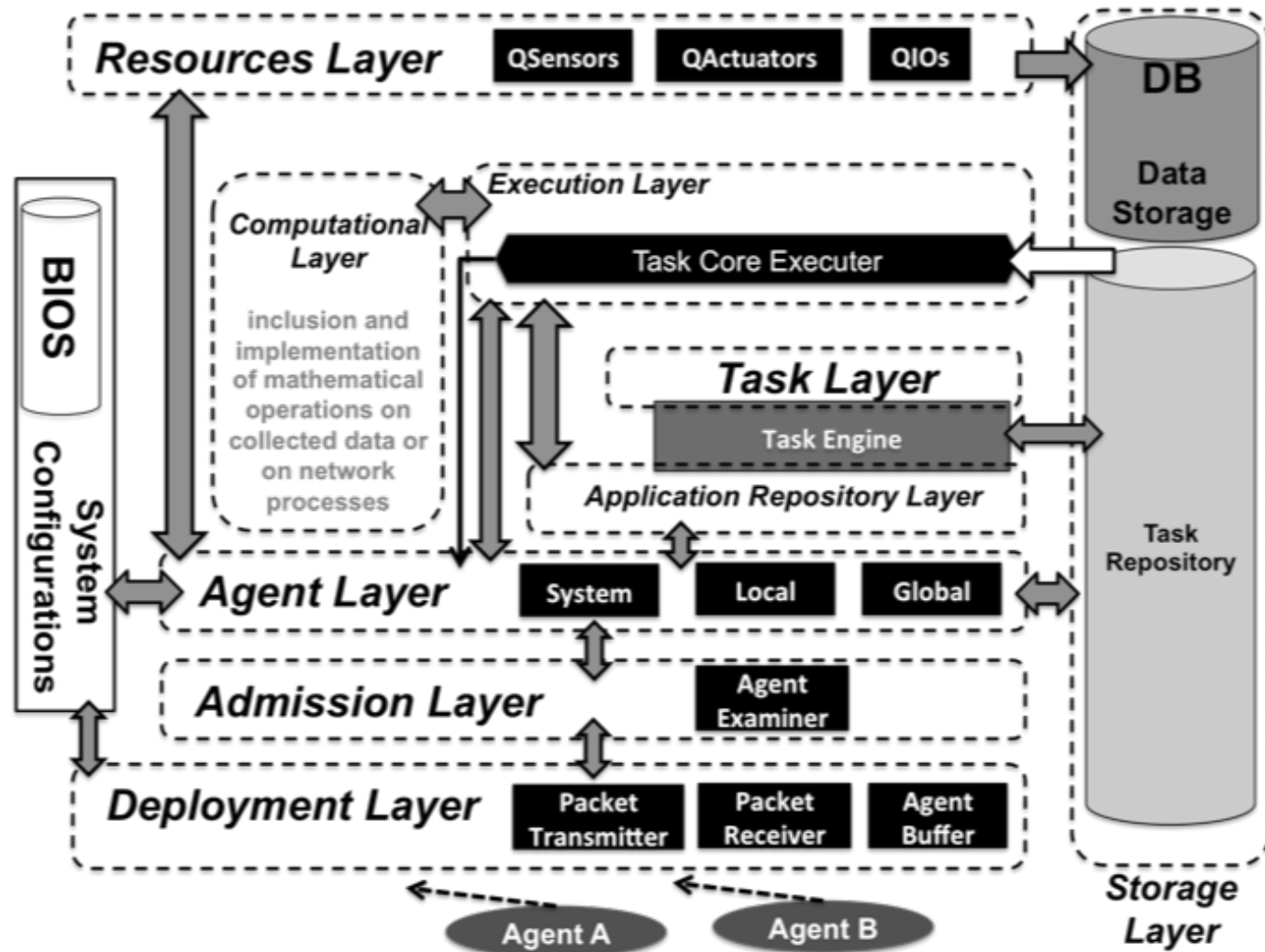
Clustered Hierarchical multi-tasking



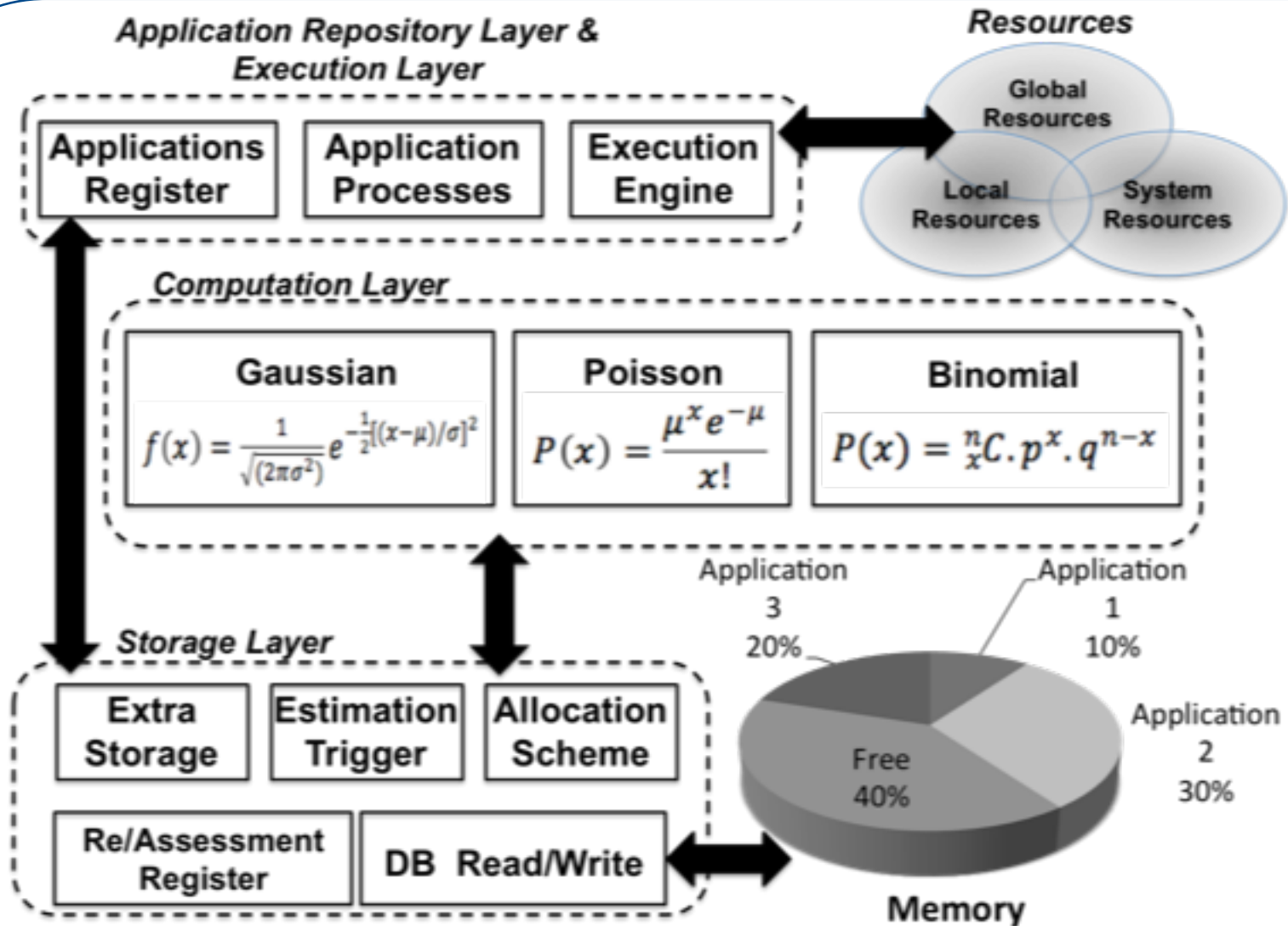
Multiple Operational Paradigms



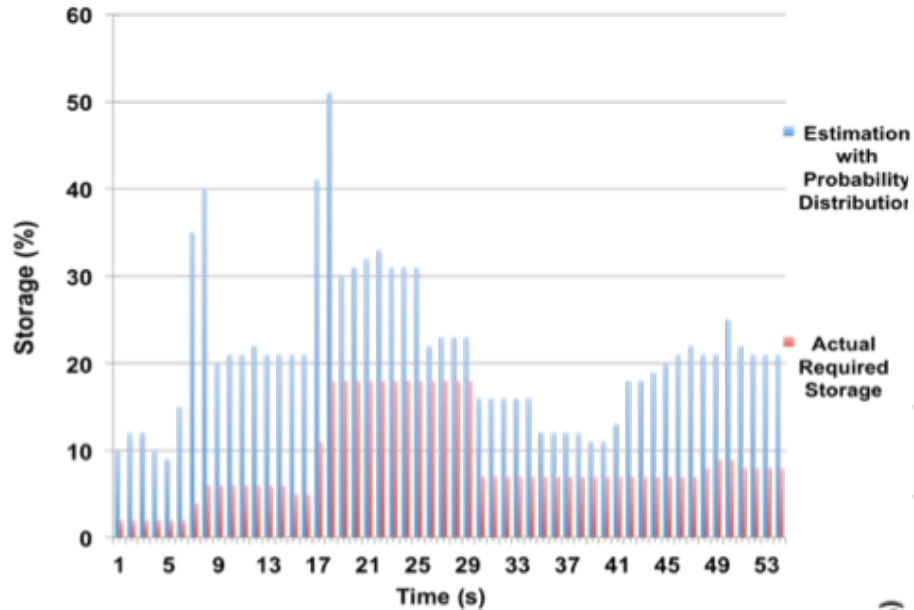
Computational Analysis



Storage Estimation

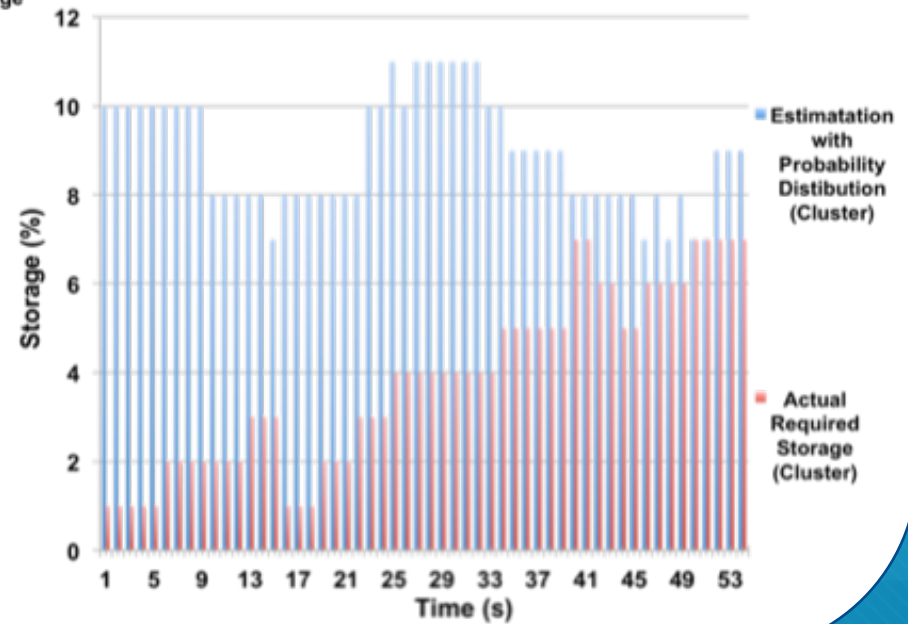


Storage Estimation

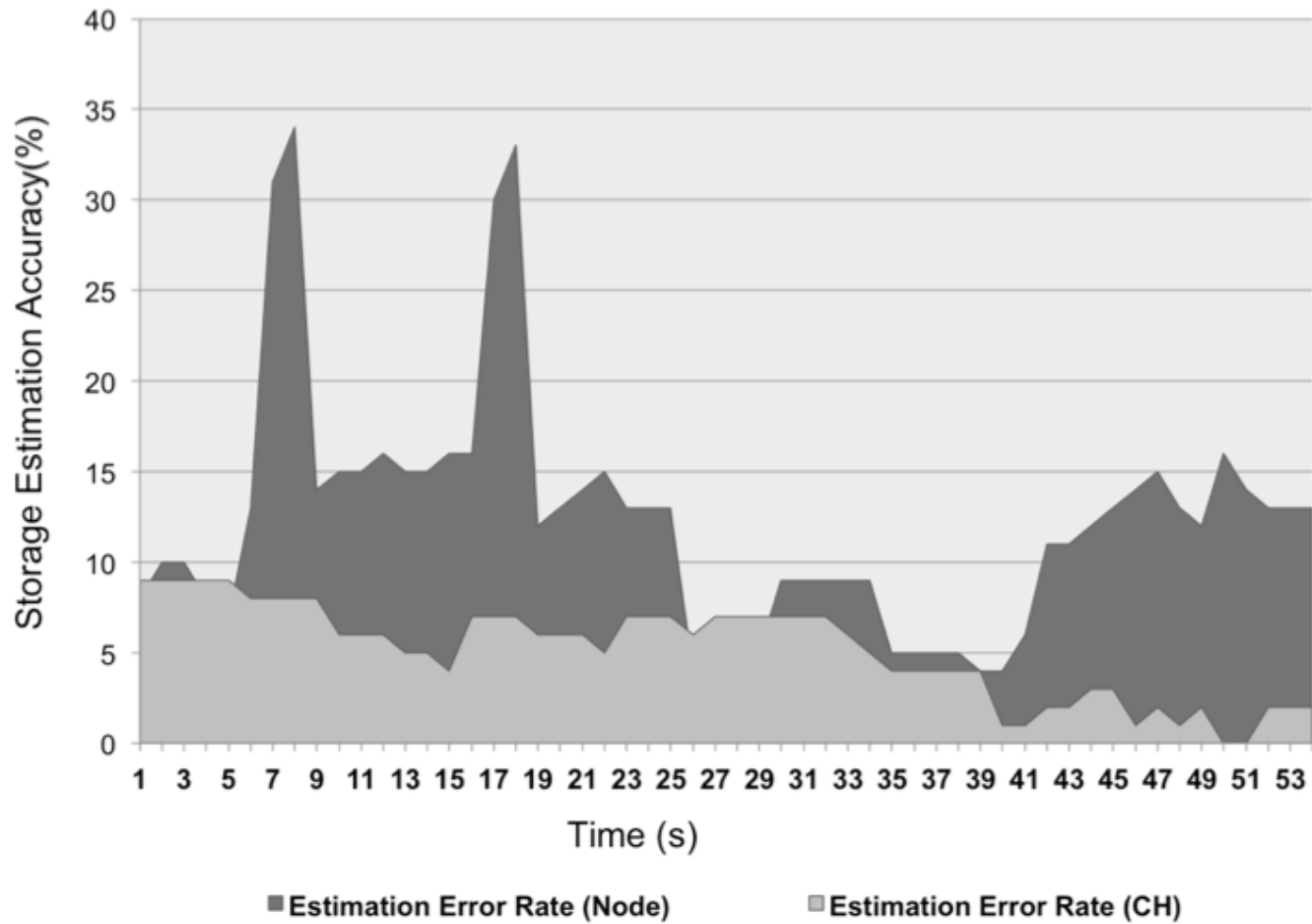


Estimation in Clusters

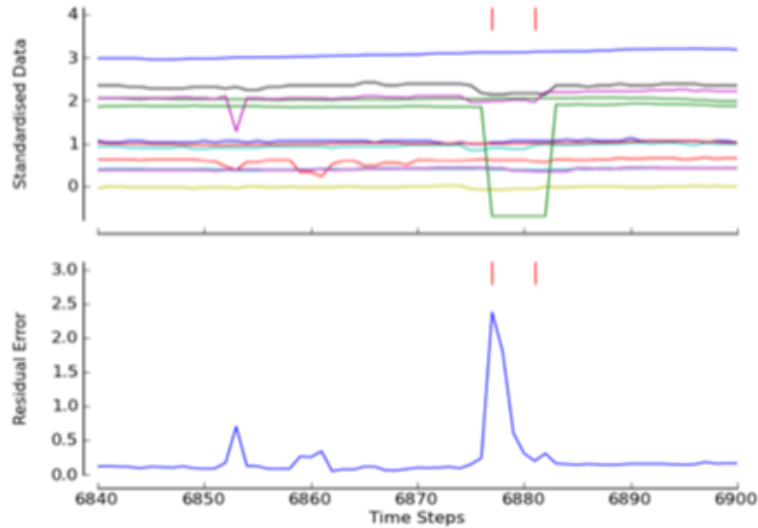
Estimation in Nodes



Storage Estimation

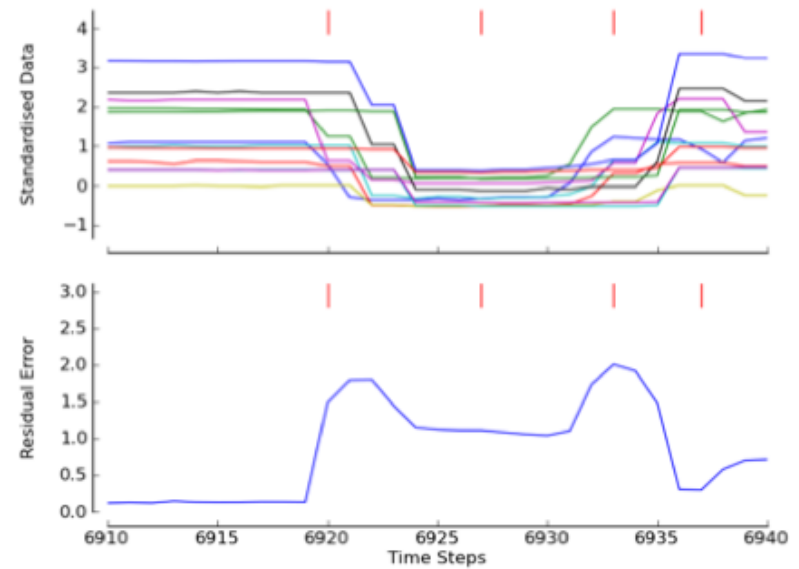


Anomaly detection

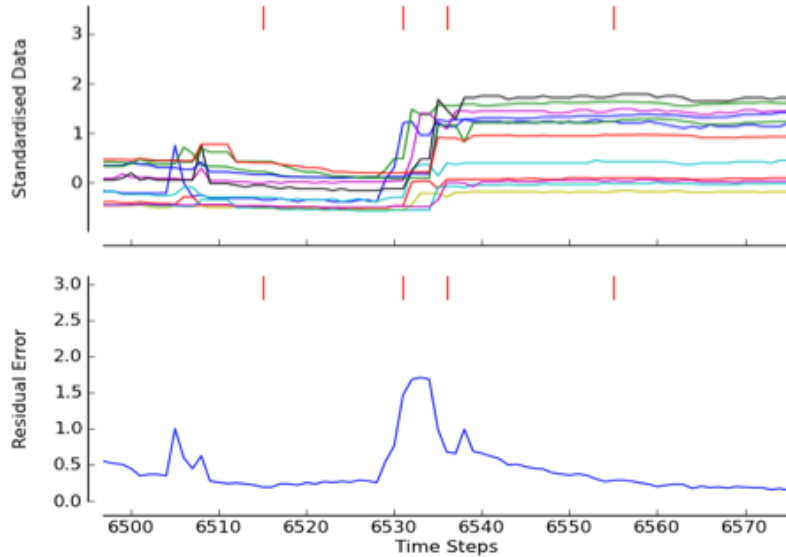


Single Change Point

Multiple Change Points

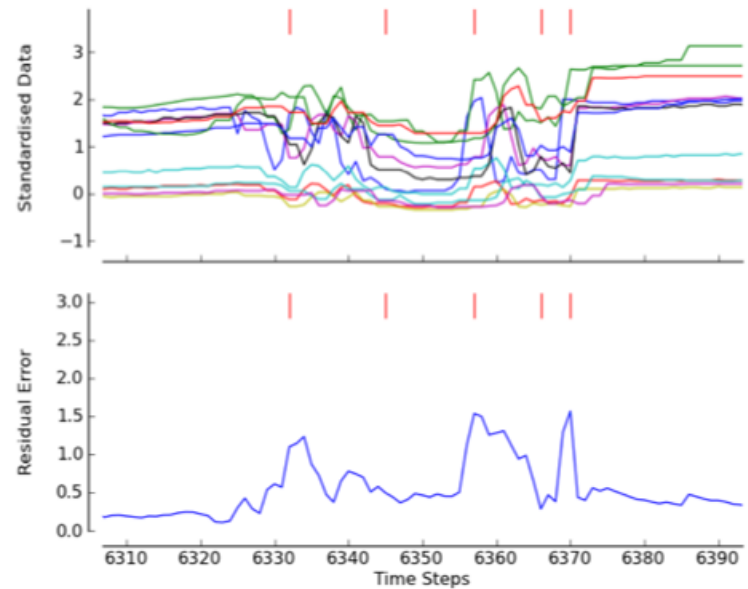


Anomaly detection



**Recursive
Change Points**

**Non-recursive
Change Points**



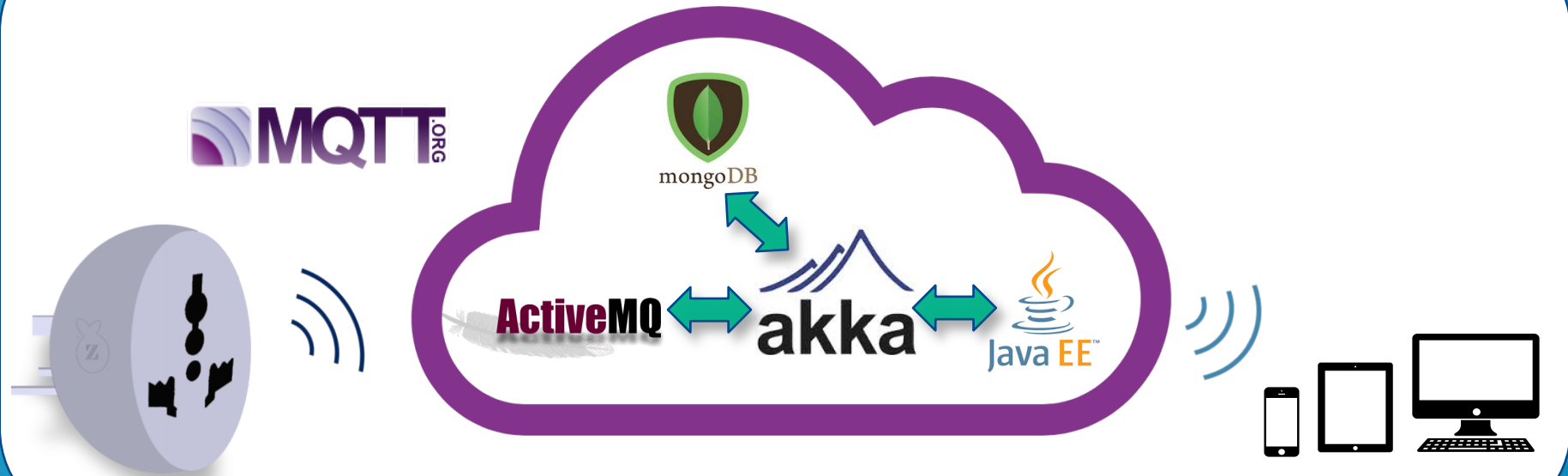
Blueberry Zone Cloud



Blueberry Zone Cloud



Blueberry Zone Cloud



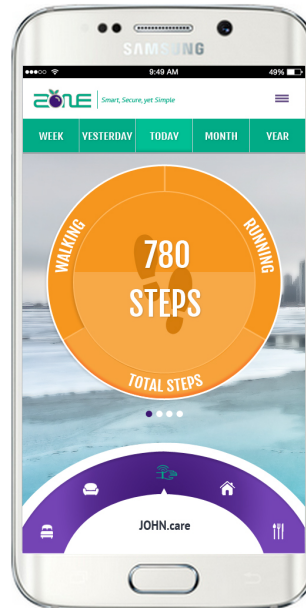
Aesthetic Design

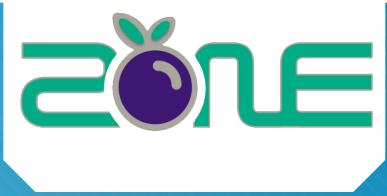


- **Sleek, Subtle and Discreet design, rather than stigmatizing.**
- **Modular Design / Choices: Can be worn on wrist as a watch, on the neck as a necklace, or even on the belt or pocket as a clip-on.**
- **Actually 'Wearable': comfortable enough to be worn all day – water resistant and long battery life**

Aesthetic Design

- Simple: Minimal learning curve
- Efficient: Minimal clicks/taps
- Intuitive: consistent – internally and externally, feedback on user actions, colour-coding





Blueberry Zone

Thank You
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