AUTOMATION OF BROWNFIELD IOT DEPLOYMENTS USING EDGE COMPUTING

The last few years have seen the emergence of an ocean of connected devices due to the ubiquity of IoT – by 2020 there are likely to be more than 30 billion connected devices. This places constraints around latency necessitating that data is processed closer to the source without being transmitted to the data centers.

However, harnessing the true potential of these connected devices requires embracing an edge computing model that is tailored to deliver services closer to the end network nodes using distributed computing.

The possibilities of Edge Computing

To put it simply, Edge computing happens near the source of the data. For instance, with Industrial IoT, this could mean industrial machines that gather data from a variety of equipment and sensors.

This significantly reduces the cost of transmitting large amounts of data to the centralized data center while increasing responsiveness and improving reliability. In addition, edge computing can also help guard against cyber-attacks that IoT solutions can be susceptible to.

The Edge is Open and is driven by Open Source

The open source community has played a major role in accelerating the development of edge computing solutions and in realizing the benefits of edge computing faster and at significantly lower costs.

Some of the key Open Source projects are listed below:

Project	Description
AKRAINO EDGE STACK	An open source software stack that supports high-availability cloud services optimized for edge computing systems and applications.
EDGEXFOUNDRY	An open micro services framework for IoT edge computing.
HOME EDGE	Home Edge project is an interoperable, flexible, and scalable edge computing services platform for home devices.
STARLINGX	Open Stack StarlingX is a complete cloud infrastructure software stack for the edge used by the most demanding applications in industrial IOT, telecom, video delivery and other ultra-low latency use cases.
ioFog	Eclipse ioFog is a complete edge computing platform that makes available all the pieces needed to build and run applications at the edge at an enterprise scale.

An Edge Computing Architecture
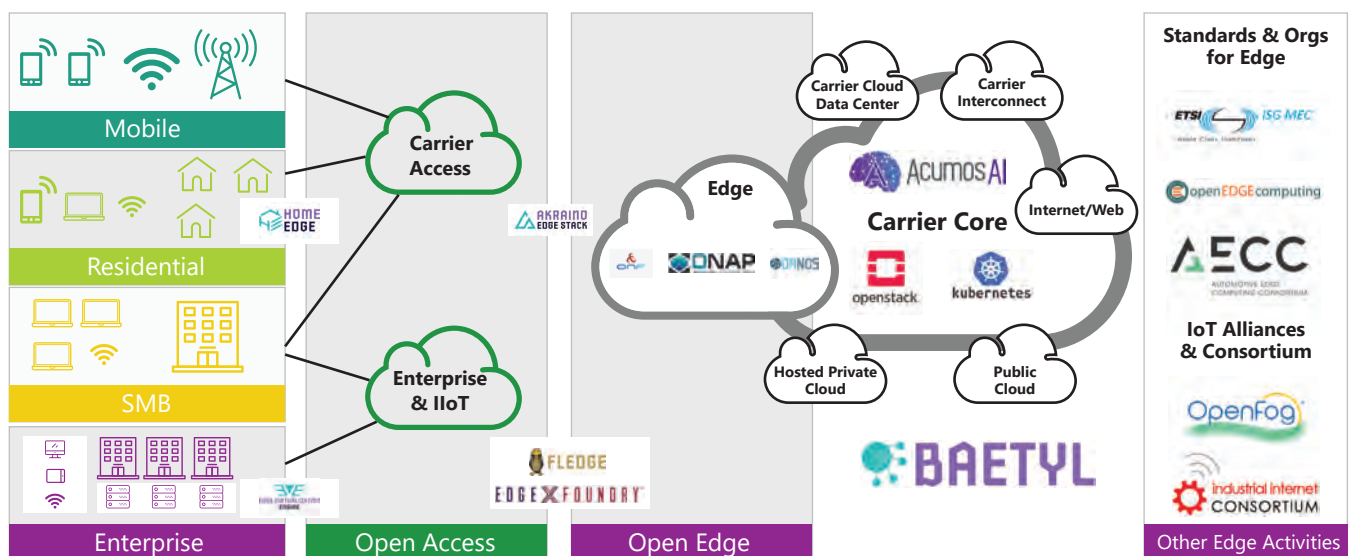
Edge Computing Use Case
Automation of Brownfield IoT deployments

While there has been enough talk about use cases like autonomous driving and remote medical surgery, Edge computing can also play a pivotal role even in Brownfield IOT deployments.

Problem Statement

Sensors typically capture a variety of information that can enable almost real time decision making. However, traditional sensors typically do not have connectivity due to which integration with an IoT platform to facilitate automated action can be challenging.

Solution

We at Happiest Minds have attempted to resolve this challenge by capturing an image of the sensor and performing image recognition through analytics. This determines the value of the sensor and eliminates the need for connectivity.

For near real-time processing, the analytics is performed at the edge itself thus reducing delays and providing faster results compared to traditional centralized computing.

Solution Components

The solution that we have used at the edge is based on EdgeX Foundry. We chose EdgeX foundry as it offers the following benefits:

EdgeX foundry is a vendor neutral open source project hosted by the Linux foundation which helps in building a common open framework for IoT Edge Computing. Also, it is agnostic to hardware CPU, OS and application environments to support customer preferences for differentiation.

Provides a flexible microservices architecture that can support the use of any combination of heterogeneous ingredients plugged into a common interoperability foundation. Also, allows services to scale up and down based on device capability and use case.

Enable reference microservices (e.g., northbound message bus, rules engine, database) to be quickly replaced with a preferred open source or proprietary alternative.

Enable support for any combination of device interfaces to normalize connectivity protocols (both existing standards and proprietary) into a common API.
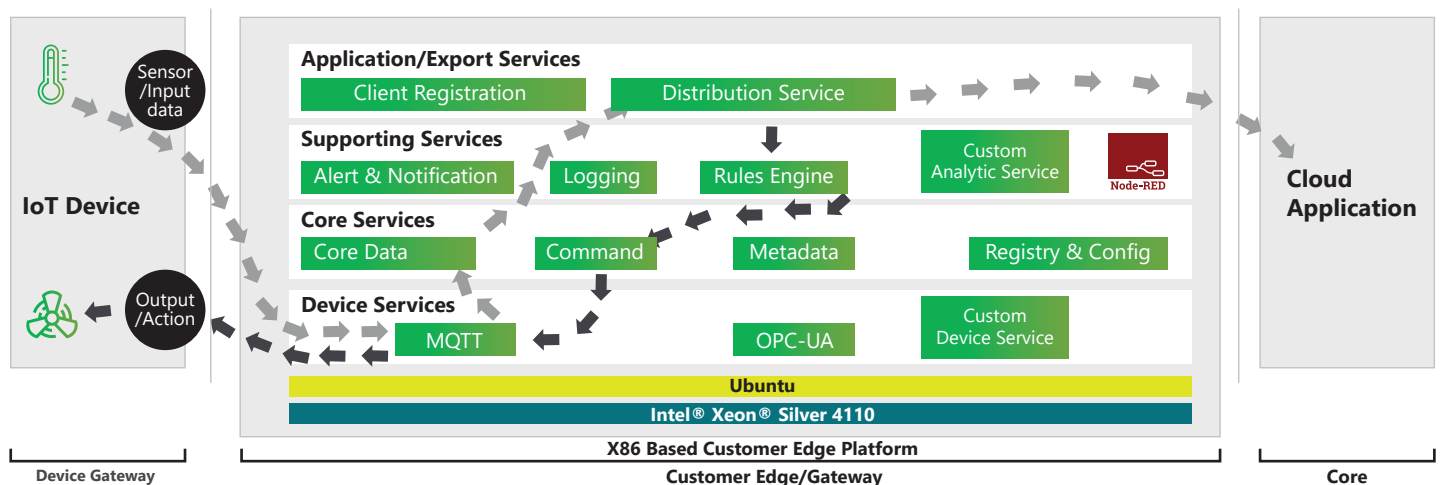
As can be seen in this diagram, the input data from the sensor is captured with the camera attached to the customer equipment or gateway and processed at the customer edge to determine temperature. This data is then sent to the edge gateway and action is taken based on the rule processing result. The action information is sent to the customer edge device in near real time and only the data about the event is sent to the cloud for storage and audit.

Likewise, there is a possibility of many such use cases or challenges being addressed by the effective use of edge computing and edge analytics.

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