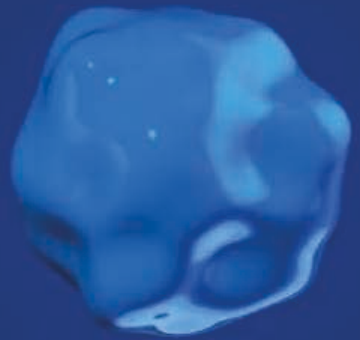
EDGE Architectures in Future Grid



Presenters

Dr. Pasi Tuominen Managing Director, Wapice Oy

Wapice

Wapice

Creating a smarter future today

- Established in 1999
- Private ownership (majority owned by employees)
- Continuous organic and profitable growth
- Employing over 330 highly skilled software and electronics experts
- 10 office locations in Finland
- ISO 9001:2008 and ISO 14001:2004 certified

National Entrepreneur Award 2016

AAA Highest Creditworthiness for more than 3 years

DNV·GL

FINNISH SERVICE

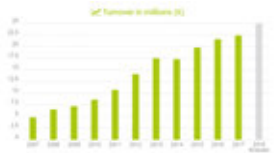
Microsoft Partner GOLD Application Development

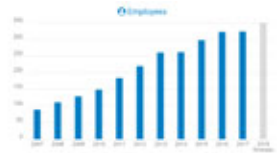
ENABLER OF EnergyWeek 2018

FDT Group Member

OPC FOUNDATION MEMBER

EtherCAT Technology Group





Wapice

Building a Better Future Together

OUR SERVICES

- Electronics Design and Embedded Systems
- Internet of Things Services
- Service Design
- Technology and Software Solutions
- Cloud Services
- Consulting
- Digital Solutions and Services
- Analytics and Big Data
- DevOps
- Web and Mobile solutions
- Augmented Reality and Artificial Intelligence
- InfoSec

Wapice

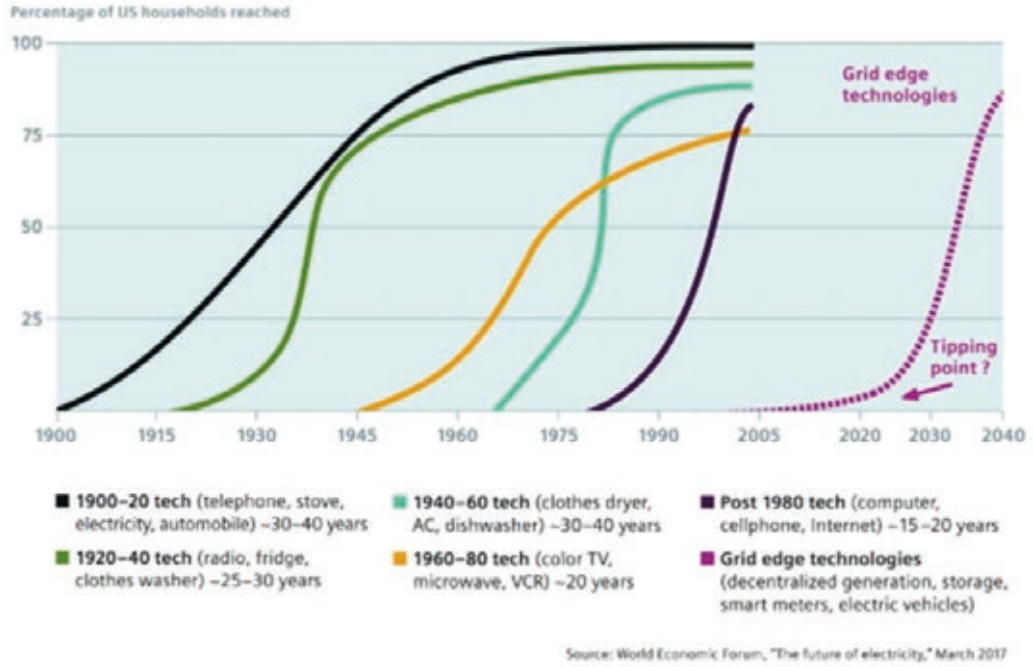
EDGE is an essential part of IoT Systems nowadays

Distributed CPU power increases degree of freedoms

Wapice

What is happening in near future..?

Grid edge technologies: The next rising star



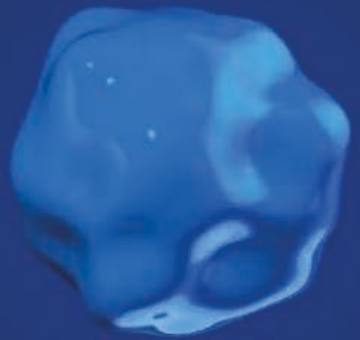
” Edge is increasing in Electrical systems "

Elon Musk at Model Y Reveal: ‘This Is the Year of the Solar Roof and Powerwall’

ERIC WESOFF **MARCH 15, 2019**

Wapice

What is EDGE?



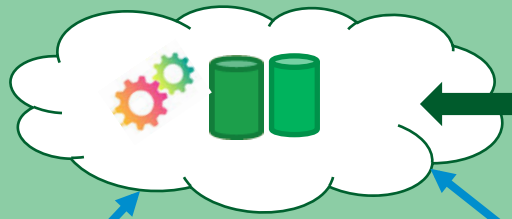
In next we detect some facts about EDGE

Wapice

EDGE is a boundary between device and cloud

"Hierarcial IoT"

CLOUD
Big Data Processing
Data Warehouse



REST API

3G, 4G, 5G
LAN

EDGE
Realtime data processing
Location: on premises
Basic Analytics
Data Filtering
Communication:
- M2M
- Fieldbus
- Wireless

Peer-to-peer communication

WLAN
Bluetooth
Zigbee
MESH
FB Protocols

SENSOR/CONTROLLER/DEVICE

Less data/Slow latency time

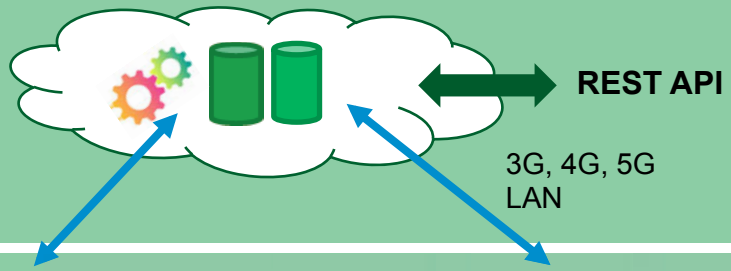
Much data/Fast latency

Wapice

EDGE + FOG is a boundary between device and cloud

"Hierarcial IoT"

CLOUD
Big Data Processing
Data Warehouse



FOG
Complex data processing
Continuous connection to cloud

EDGE
Realtime data processing
Location: on premises
Basic Analytics
Data Filtering
Communication
INDEPENDENT

SENSOR/CONTROLLER/DEVICE

Less data/Slow

Much data/Fast

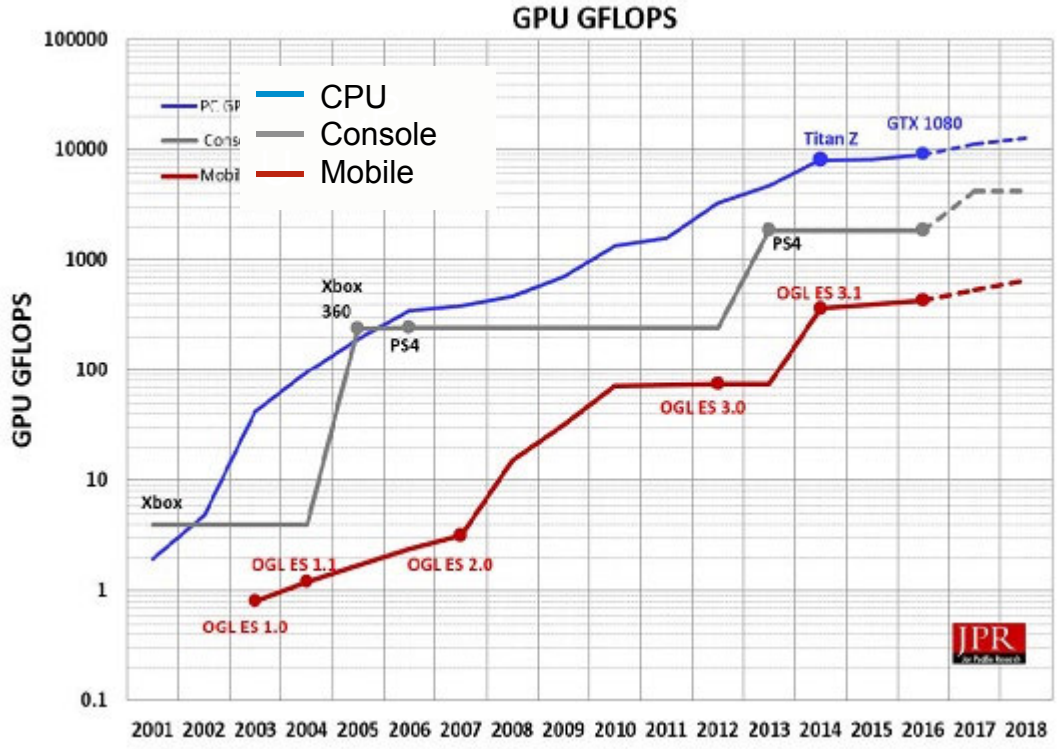
FOG level is continuously connected to cloud

EDGE level could work even if the cloud is temporaly not connected!

Wapice

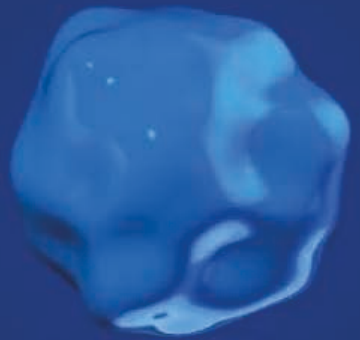
CPU Power is continuously Increasing

New possibilities to distribute power



Low cost CPU power increases possibilities
To add functionality to EDGE-level

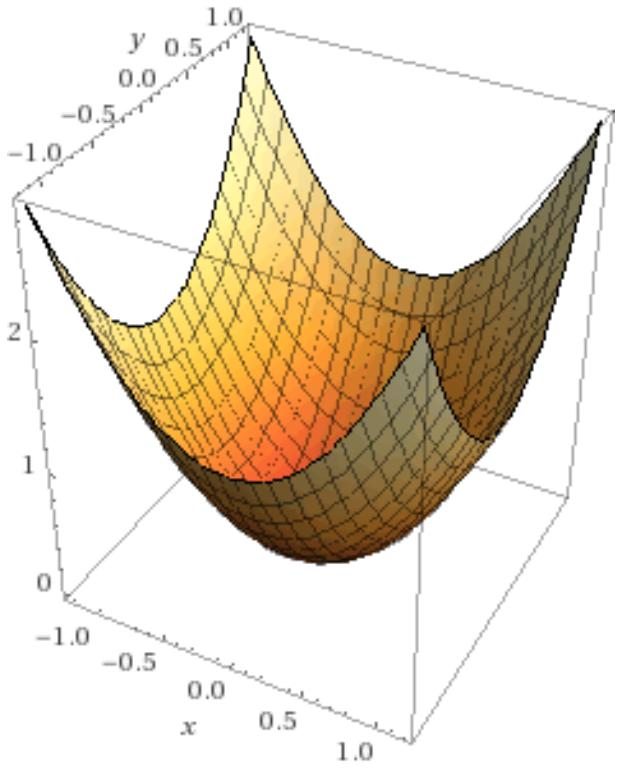
What are the benefits of EDGE?



Wapice

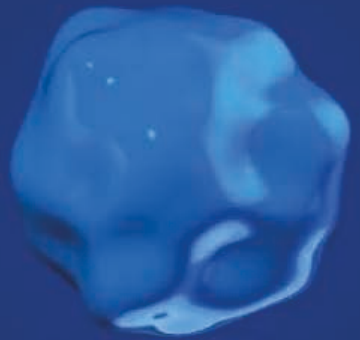
Benefits of EGDE

- Near to device/machine
  - Short feedback loop
  - Real time features
  - Reduce data amount sent ahead to cloud
  - Make fast local analysis
  - Increase CPU capability
- Increase security
- Reduce bottlenects, optimize performance
- Analys capability, Artificial Intelligence
  - Video, Text, Audio/vibration
  - Streaming sensor data



Wapice

What are the drawbacks of EDGE?



Wapice

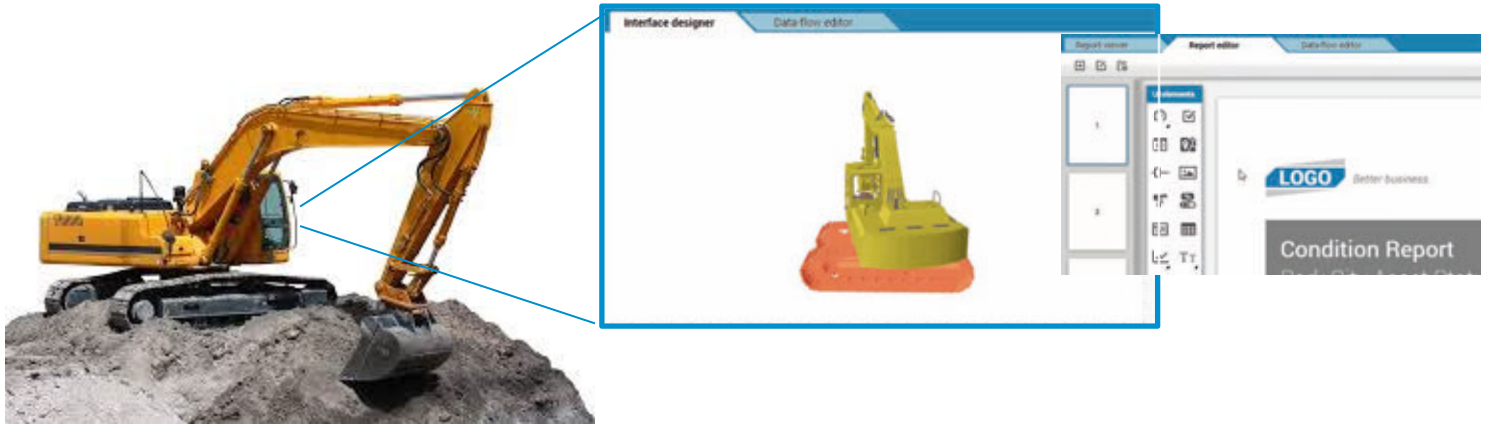
Drawbacks of EGDE

- Cannot use resourche pooling
- Less scalable than cloud computing
- System is little bit more complicated
- Security is depending on local circumtances

Wapice

Smart connected products
EDGE in vehicles

- Situational awareness
- Decision support for operators
- EDGE analytics – video streaming
- Autonomously operating machines



Wapice

Smart connected products

Towards better utilization

Intelligent Machine

- Situational awareness
- Decision support for operators
- EDGE analytics – video streaming
- Autonomously operating machines

Digital Twin

- Cloud connected devices
- Auto-calibration and configuration
- Utilization and UX optimization
- Data science services

Smart Services

- Monetization
- Performance based services
- Predictive / preventive maintenance
- Chatbots

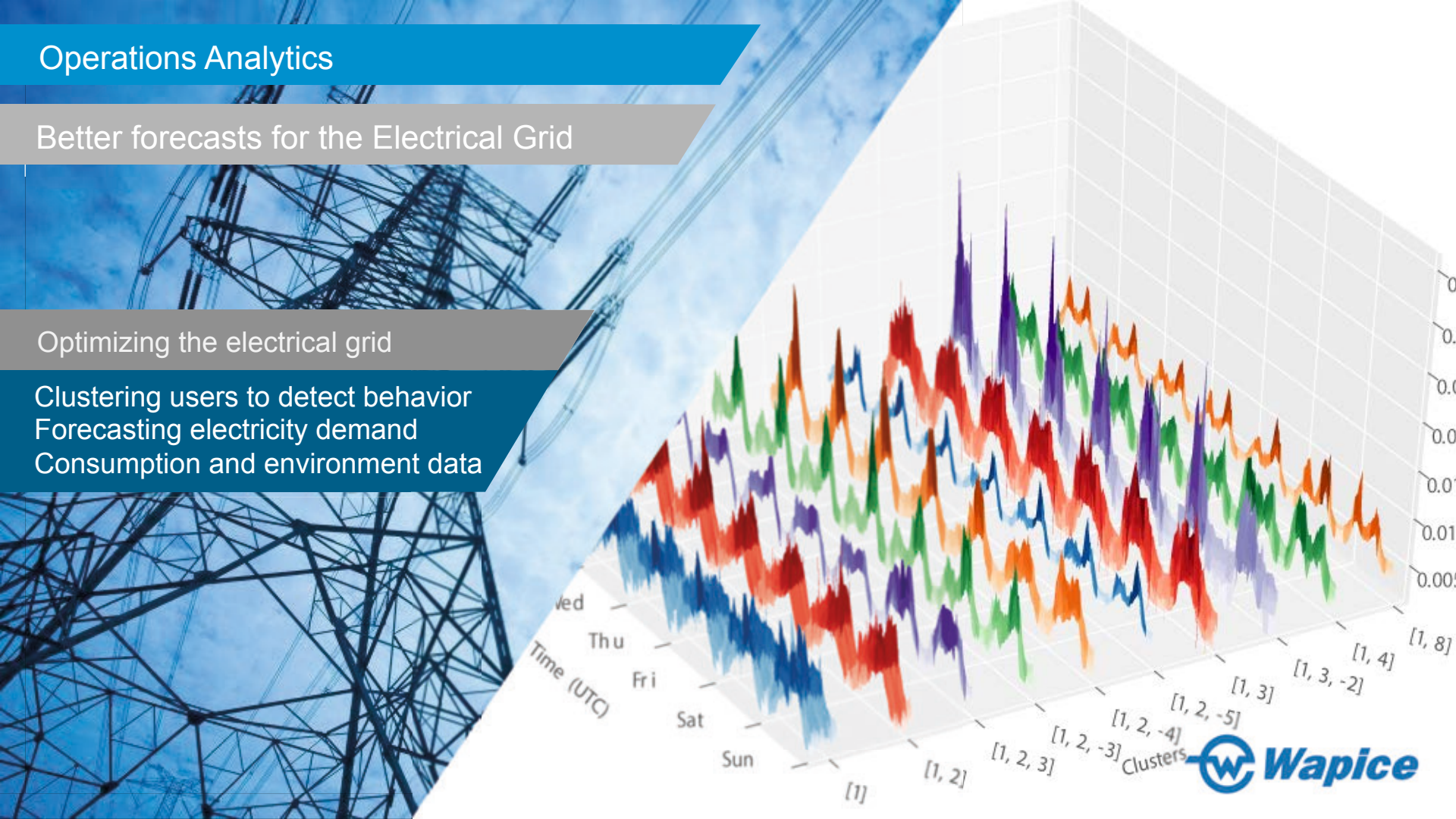
Wapice

Operations Analytics

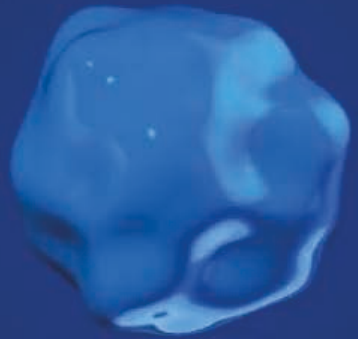
Better forecasts for the Electrical Grid

Optimizing the electrical grid

Clustering users to detect behavior
Forecasting electricity demand
Consumption and environment data



How to create an EDGE application with Artifian Intelligence (AI)?



Let us show you how an AI application is built

Case: Cognitive air conditioning

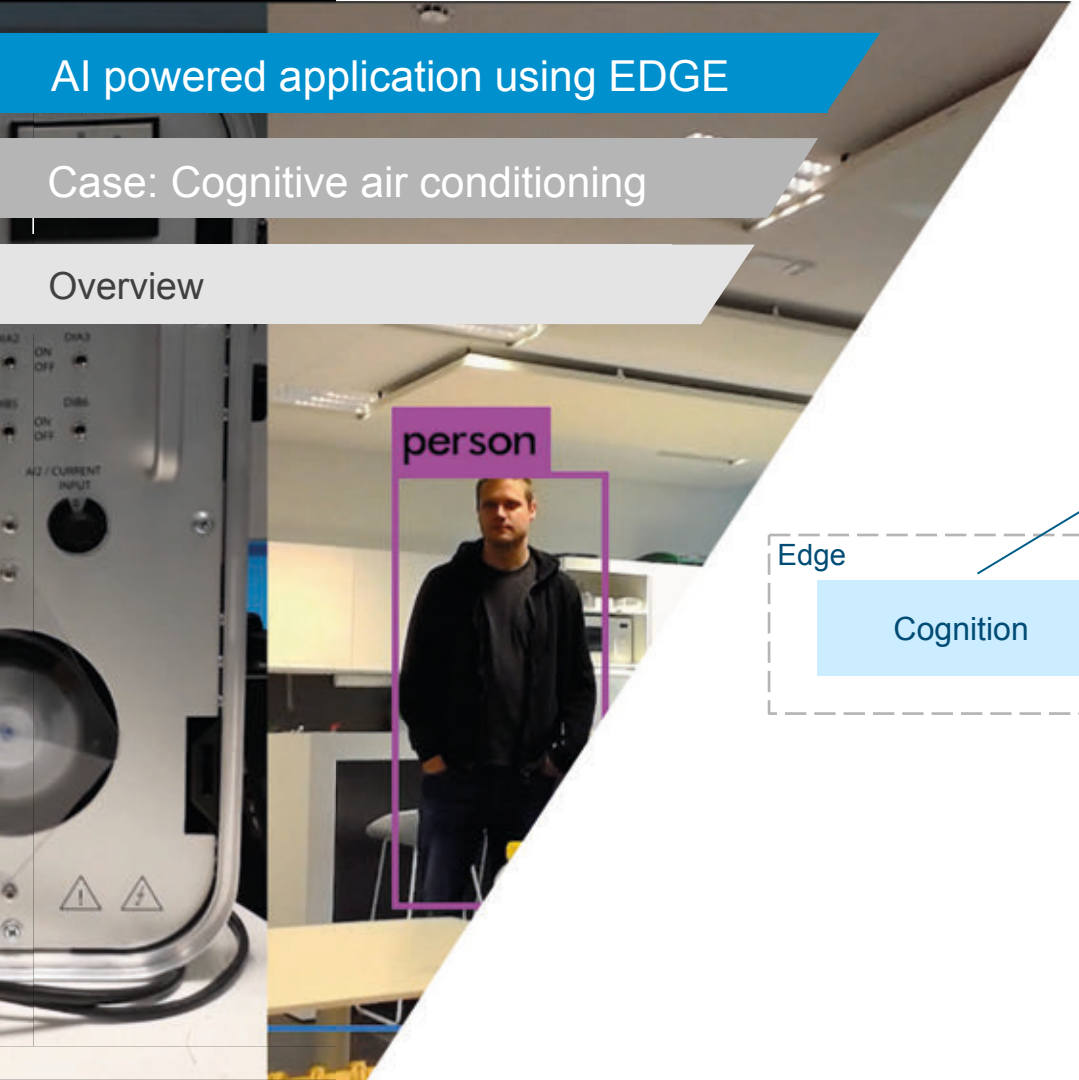
Wapice

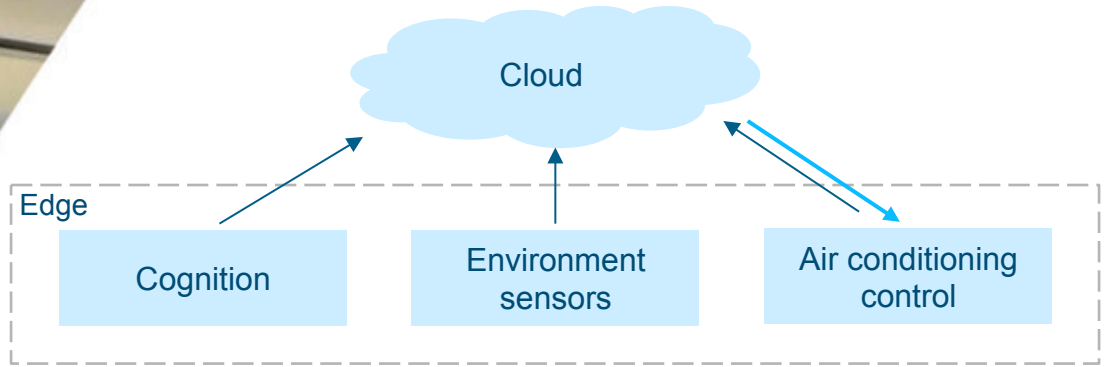

chair
chair
chair
cha r
Wapice

AI powered application using EDGE

Case: Cognitive air conditioning

Overview



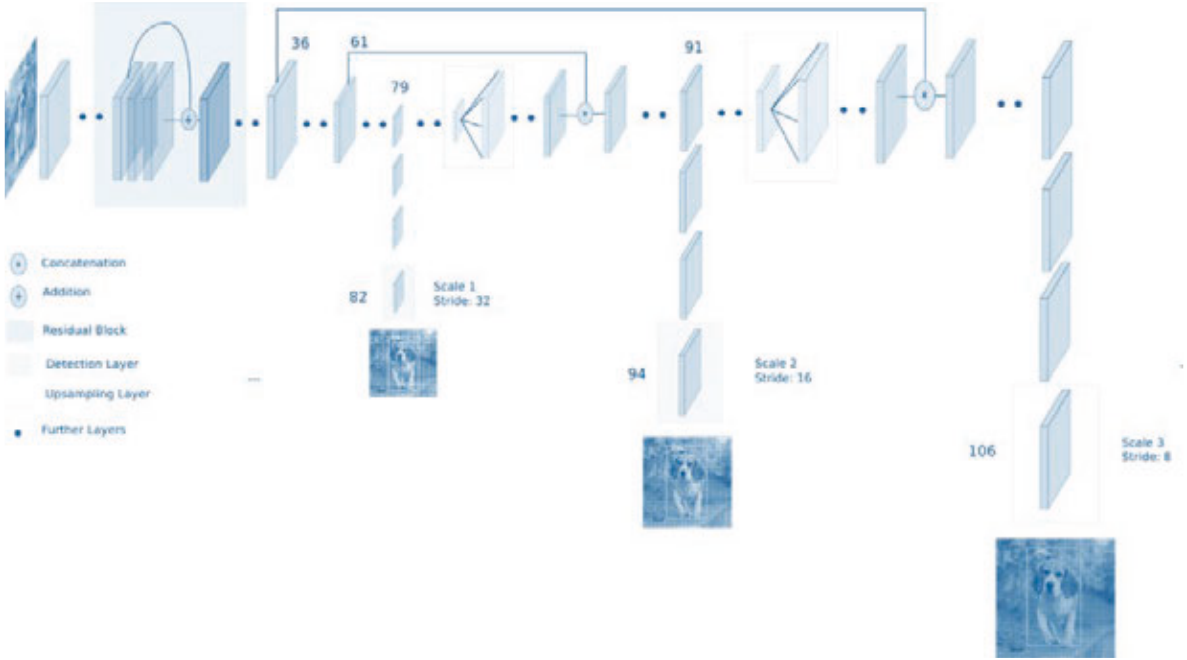


Wapice

Let’s build an AI powered application

Architecture: Detector

Deep neural network



Wapice

Let’s build an AI powered application

Step 4: Building the application

Wapice

EDGE is increasing and it will effect our day-to-day life.

Smart cities will be even smarter from single sensors to whole systems.

EDGE is a tool used In future IoT systems

Thank you!

Creating a smarter future today.

@Wapice

Wapice

www.wapice.com