

Tekoäly ja EDGE laskenta teollisuudessa



Presenters



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Managing Director, Wapice Oy

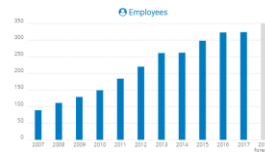


Wapice

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



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



EDGE is an essential part of IoT Systems nowadays
Distributed CPU power increases degree of freedoms





IoT-TICKET key features

Shape the world of tomorrow. Start creating today.

IoT-TICKET, The Internet of Things Office Suite

The most easy to use, complete and modern IoT experience



Dashboards



Reports



Apps



Analytics



Events



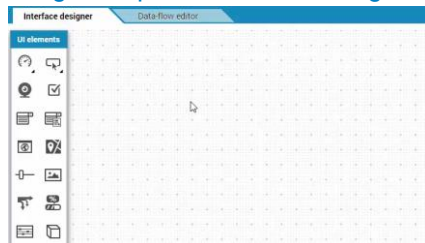
Edge Computing

IoT Office Suite

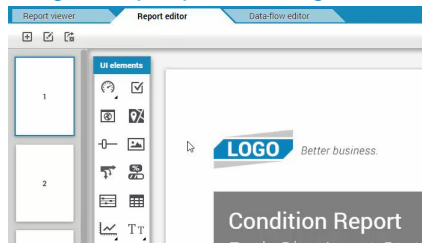
IoT-TICKET key features

Winning end-to-end IIoT with superior tools & usability

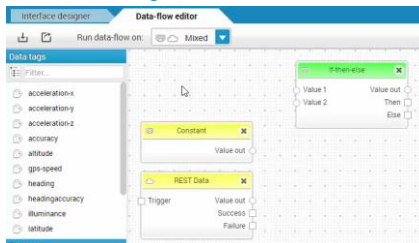
Drag & drop dashboard building



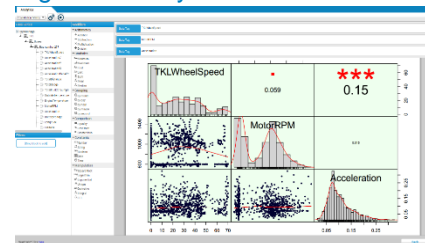
Drag & drop report building



Data-flow logic



Big Data Analytics



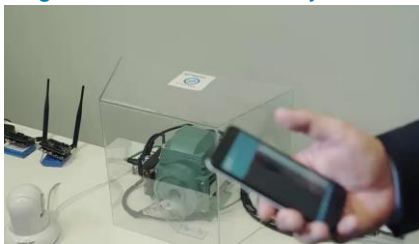
3D support, digital twins



Alarms & events



Augmented & virtual reality

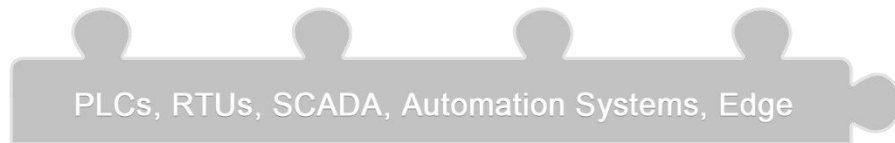


Mobile designer



IoT-TICKET connect *anywhere*

Bring IIoT applications to the market in no time



Monitoring & Control



Monitoring & Control

S e n s o r s & A c t u a t o r s



IoT OFFICESUITE

Dashboards, Reports, Analytics and much more
Industry leading IoT Application Design Tools
Intuitive and powerful - no need to code



ENTERPRISEMANAGER

Enterprise, Site, Asset, Device & Identity Management
Big Data & Analytics enabled, Linear scalability
Plug & Play Connectivity to virtually *Anything*



EDGEDEVICE

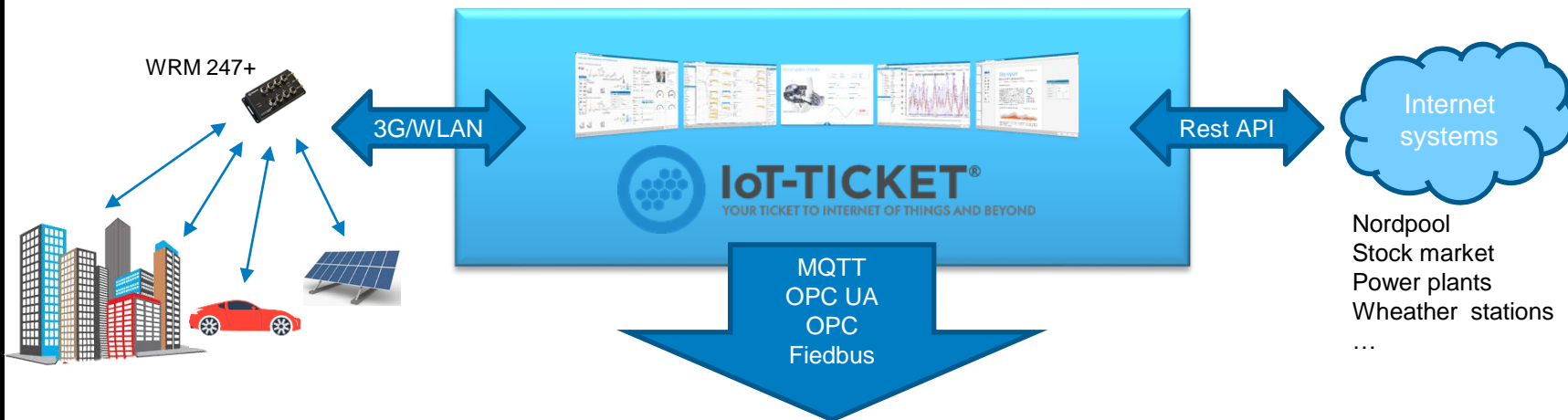
Own IoT-TICKET WRM247+ Data Acquisition Unit
Own IoT-TICKET WRM247App for 3rd Party Hardware
including Over-the-Air Updates



IoT-Ticket connect systems together



Any Cloud



EPEC

SIEMENS

Schneider
Electric

Danfoss

ABB

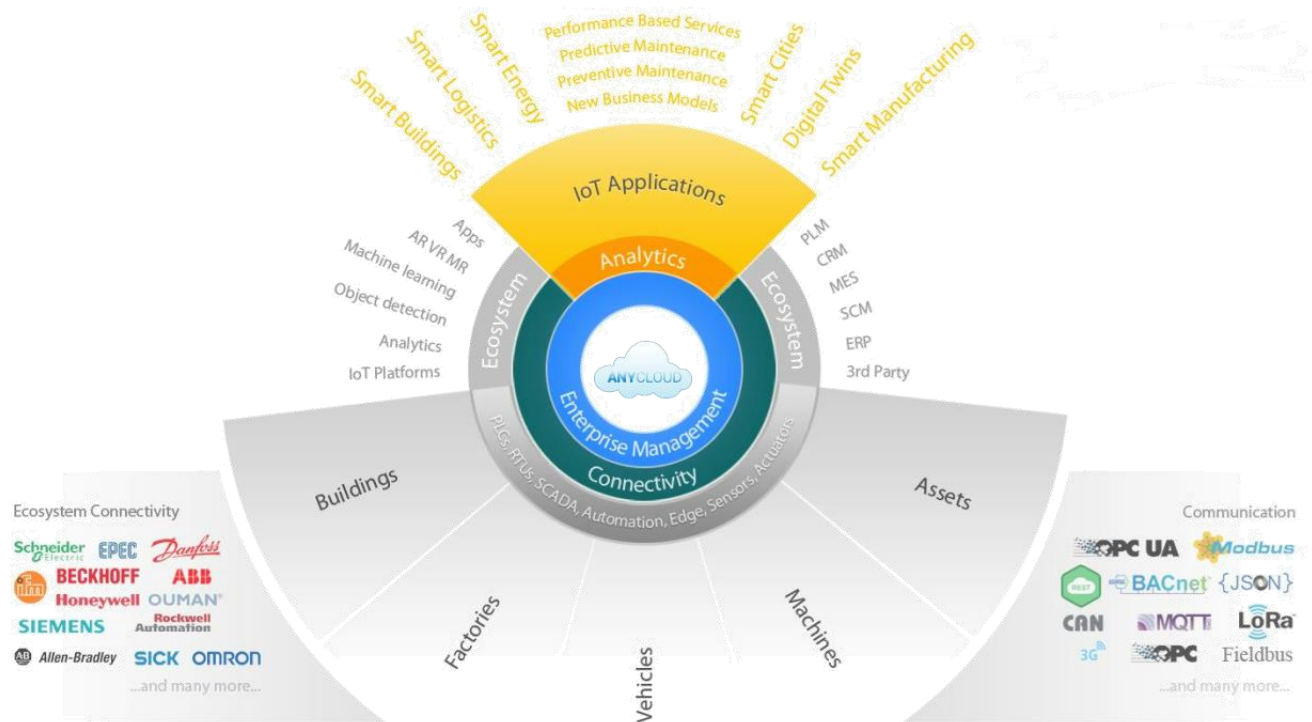
OMRON

OUMAN®



Let's build an AI powered application

Step 2: Environment sensors



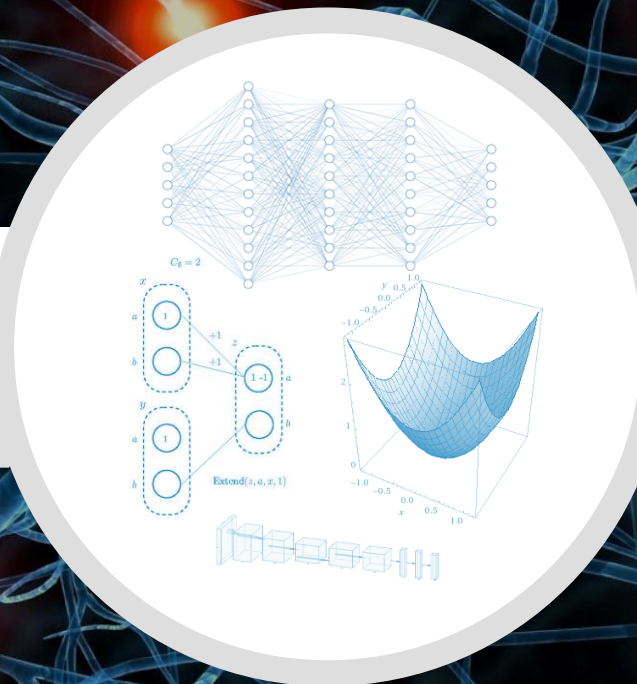
Transforming Industrial Companies with Artificial Intelligence



Artificial Intelligence features for industry

Real time data sources

Video
Audio / vibration
Streaming sensor data



Technological aspects

Deep Neural Networks (DNN)
CSP / mathematical optimization
Clustering

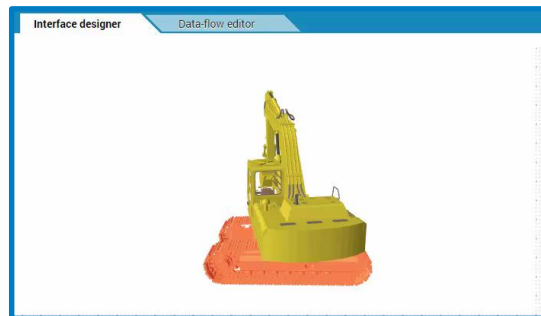
Smart connected products

Towards better utilization



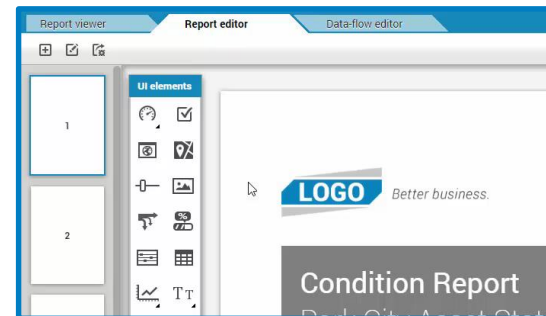
Intelligent Machine

- 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



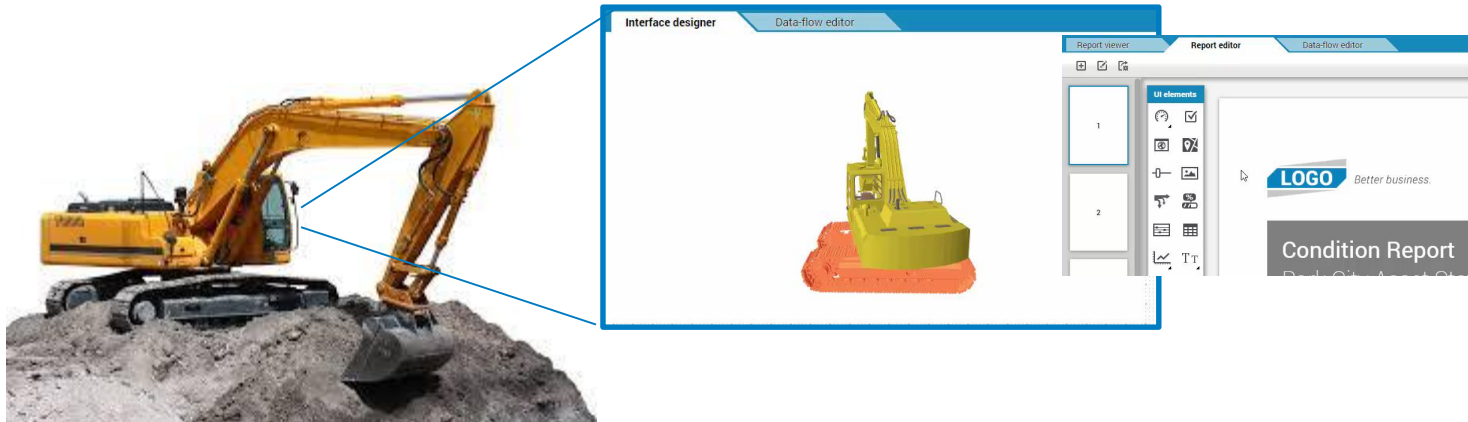
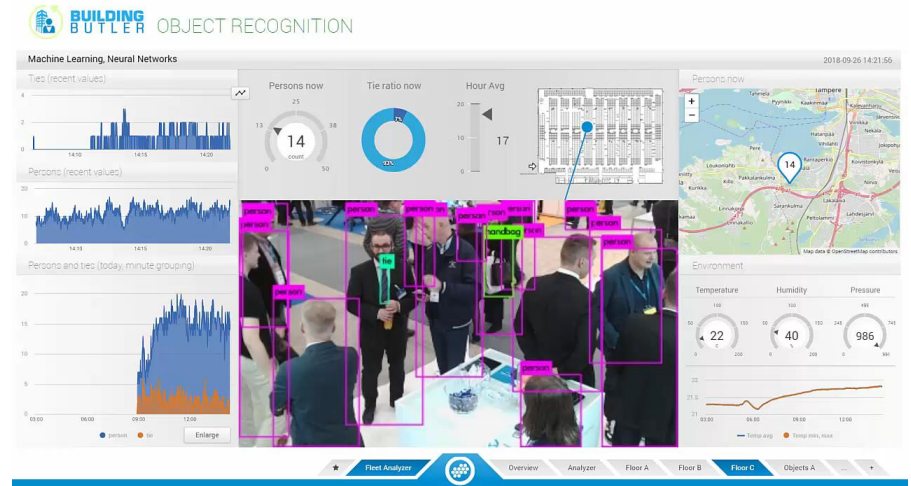
Smart Services

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

Smart connected products

EDGE in vehicles

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

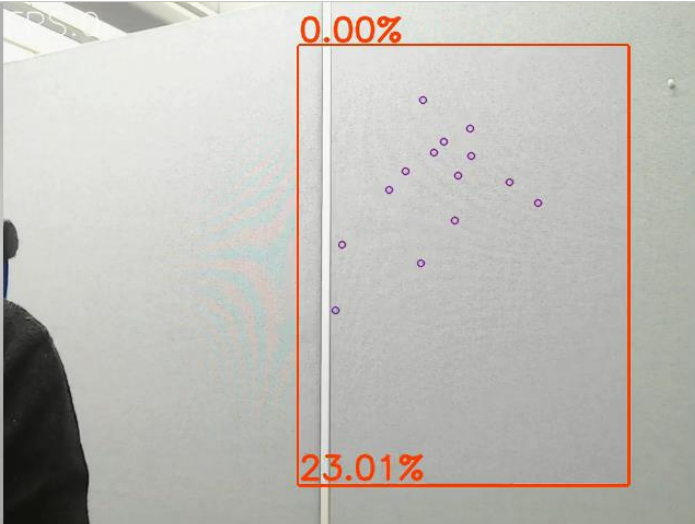


Trained object in good condition

Template

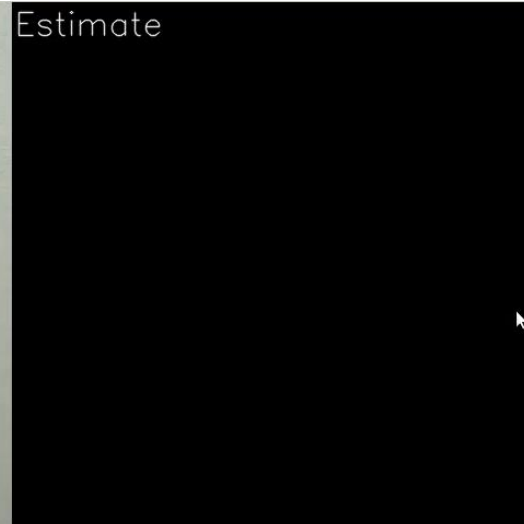


Live object stream



Stabilized object stream

Estimate



○ Anchor point

— Anchor trace line (trained vs. detected from stream)

% Probability

□ Object in good condition detected

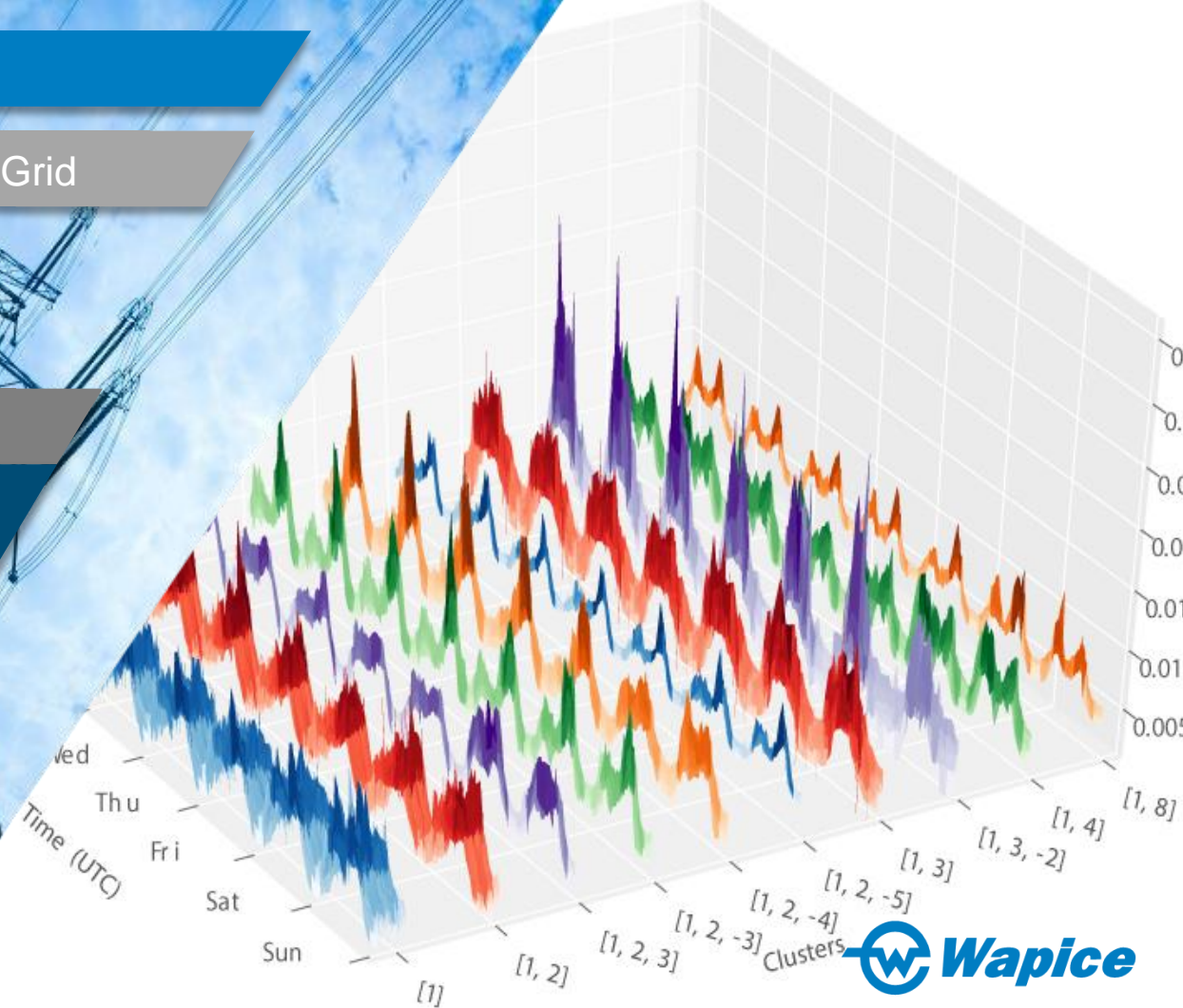
□ No or invalid object detected

Operations Analytics

Better forecasts for the Electrical Grid

Optimizing the electrical grid

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



Smart Service and Maintenance

Closing the loop with cloud powered AI

Machines ordering spare parts for themselves



Transforming Industrial Companies with Artificial Intelligence

From sales to service and maintenance



Sales process

- Clustering customers
- Detecting process errors
- Suggesting better products and services



Smart connected products

- Situation aware products
- Autonomous products



Operations

- Automated quality control
- Production capacity improvements
- Lead time reduction



Service and Maintenance

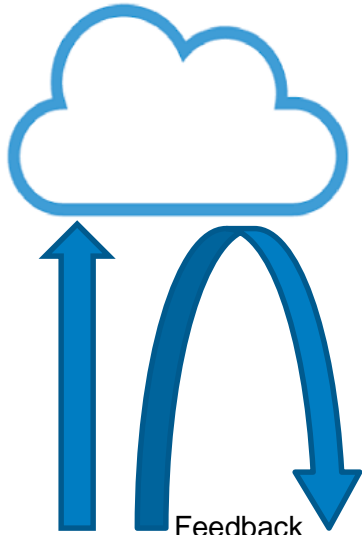
- Condition based maintenance
- Automatic spare part and service orders

What is EDGE?



In next we detect some facts about EDGE

CLOUD is NICE but DIFFICULT SOMETIMES



Data flow:
4000 GB/day
300 TB/Year

Feedback
loop is long

- Direct connection to cloud is possible but not always optimal
- Huge data -> transmission, data storage problems
- Real-Time Features are almost impossible to satisfy
- Critical operations are risky with cloud
- Feedback loop is long and undeterministic

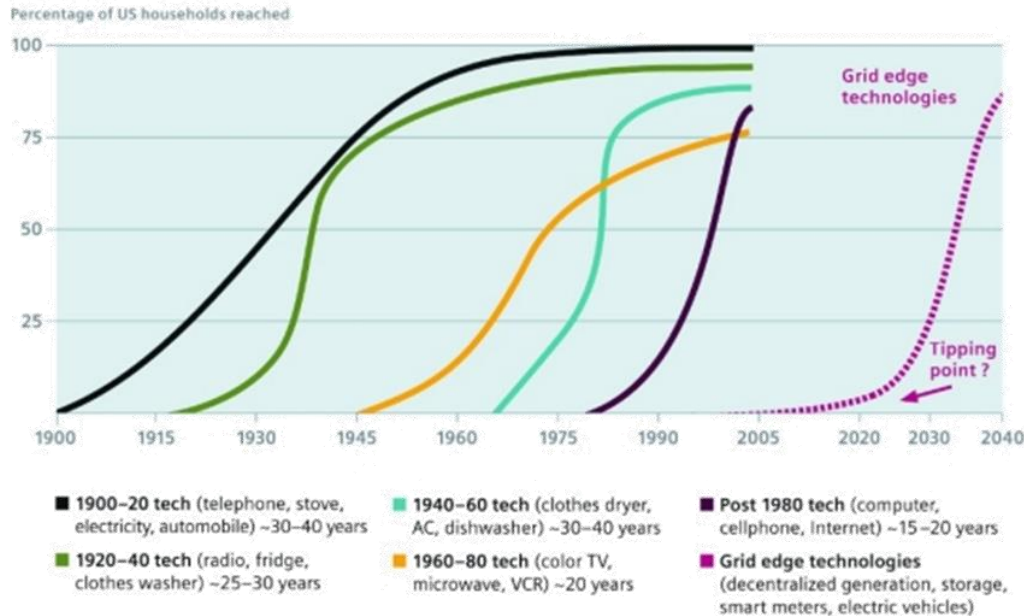


Autonomously moving car

What is happening in near future..?

" Edge is increasing in Electrical systems "

Grid edge technologies: The next rising star



Source: World Economic Forum, "The future of electricity," March 2017



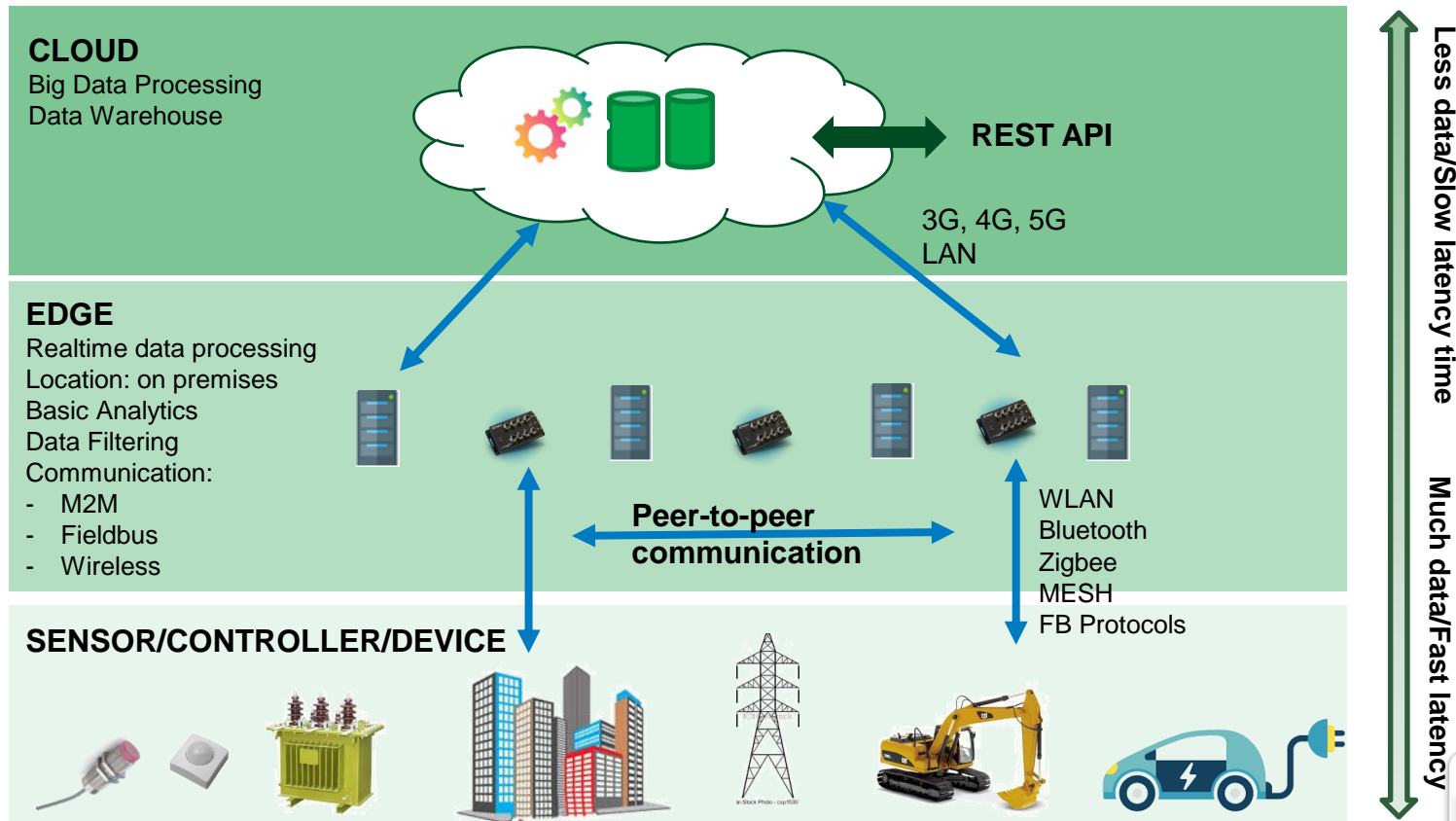
Elon Musk at Model Y Reveal: 'This Is the Year of the Solar Roof and Powerwall'

ERIC WESOFF MARCH 15, 2019



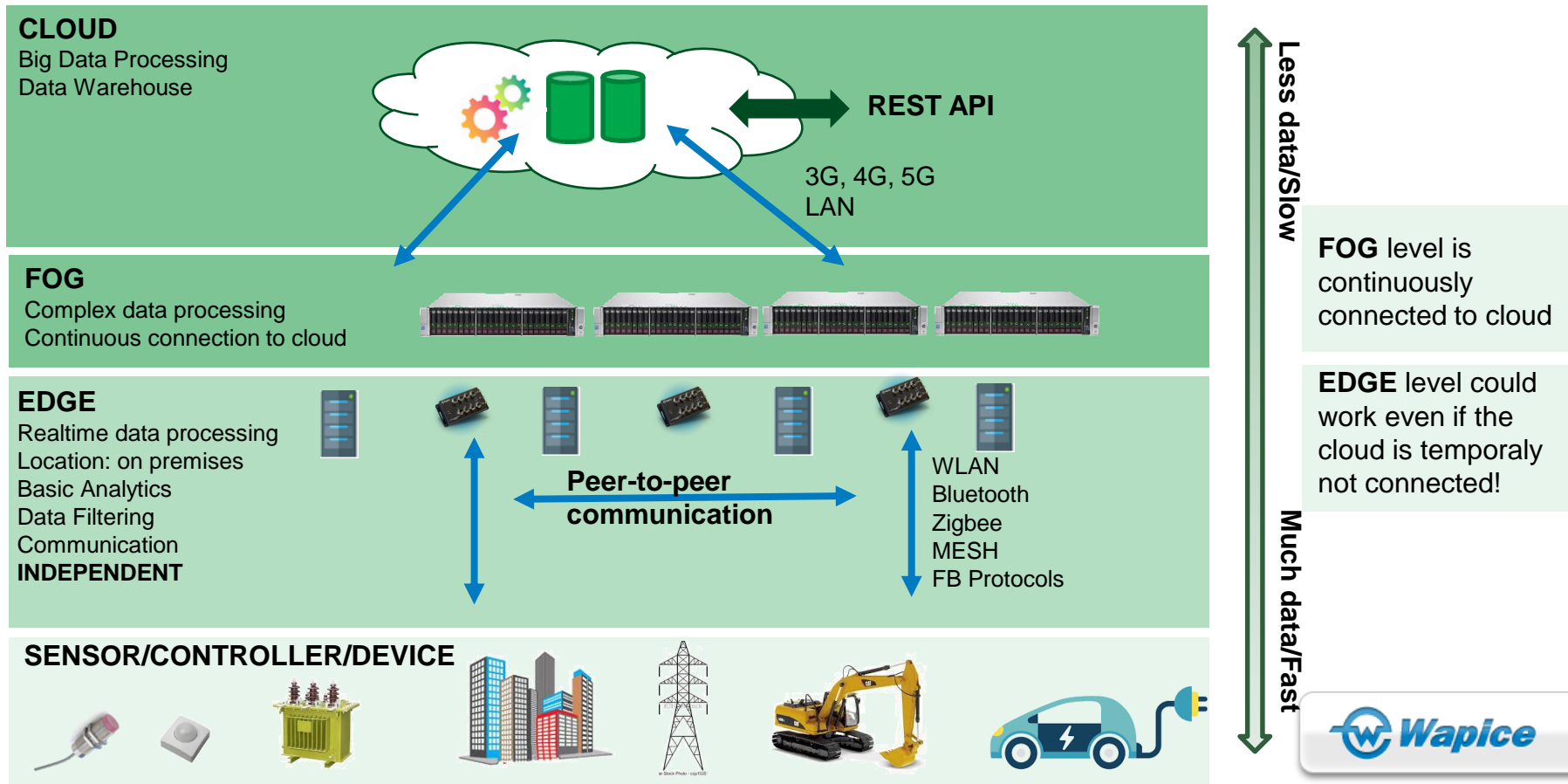
EDGE is a boundary between device and cloud

"Hierarchical IoT"



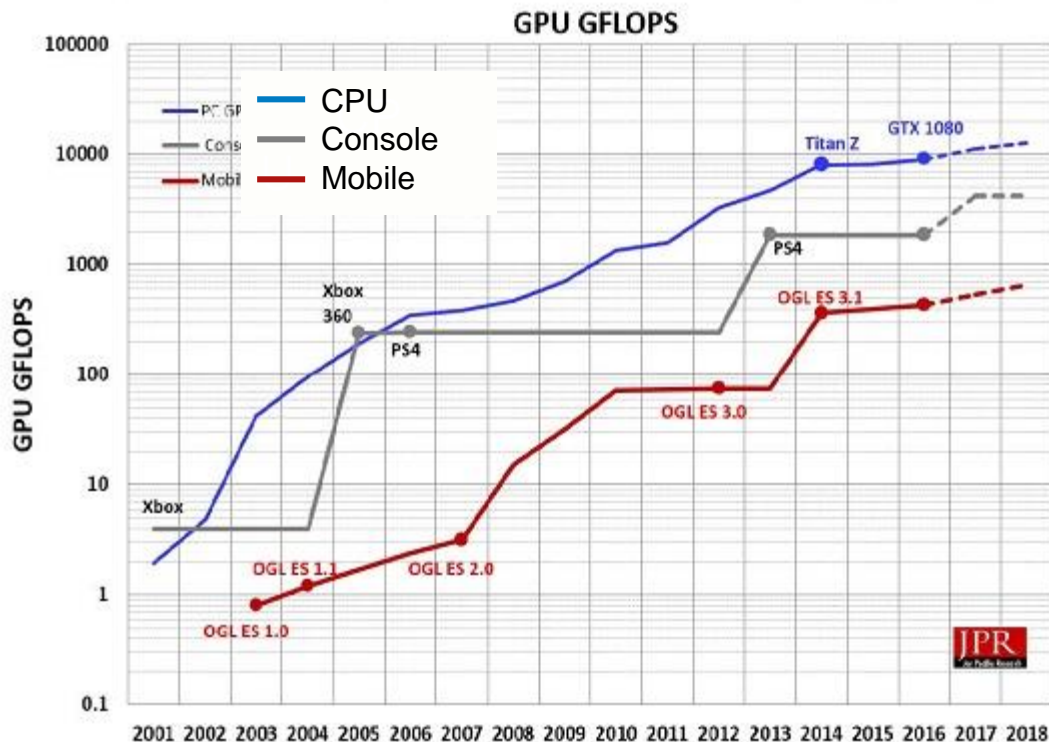
EDGE + FOG is a boundary between device and cloud

"Hierarchical IoT"



CPU Power is continuously Increasing

New possibilities to distribute power



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



IoT Application Development Tool



IoT-TICKET®
YOUR TICKET TO INTERNET OF THINGS AND BEYOND

Algorithm
adaption and
tuning

Edge analytics

WRM 247+

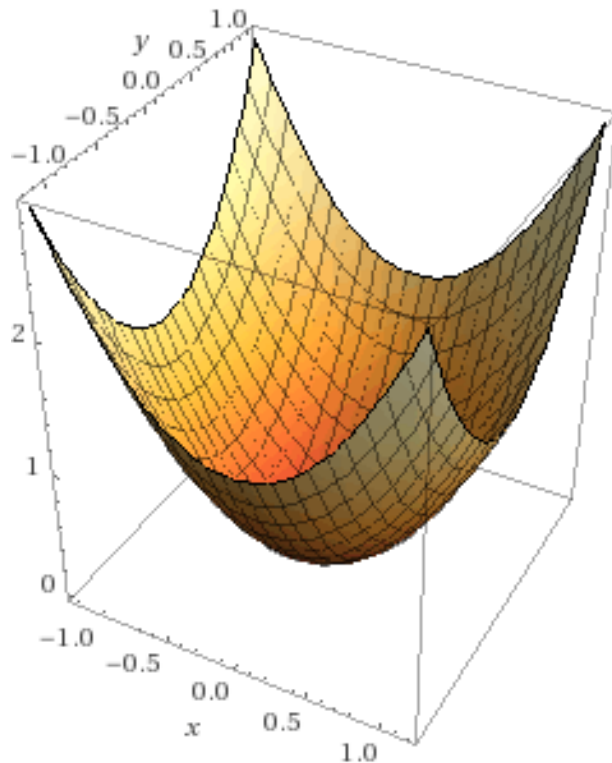


What are the benefits of EDGE?



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 bottlenecks, optimize performance
- Analys capability, Artificial Intelligence
 - Video, Text, Audio/vibration
 - Streaming sensor data



What are the drawbacks of EDGE?

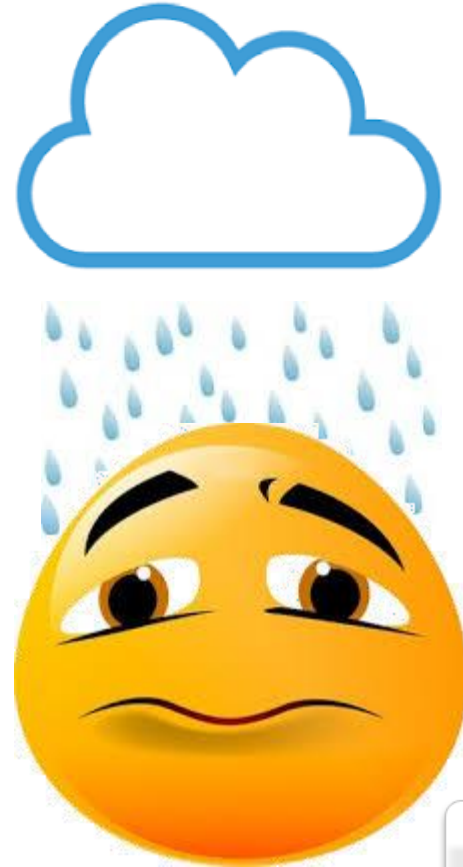


Drawbacks of EGDE

- Cannot use resource pooling
- Less scalable than cloud computing
- System is little bit more complicated
- Security is depending on local circumstances
- Standardication is on its way just coming
- Maintenance of software and versions

+

Common Problems of distributed systems

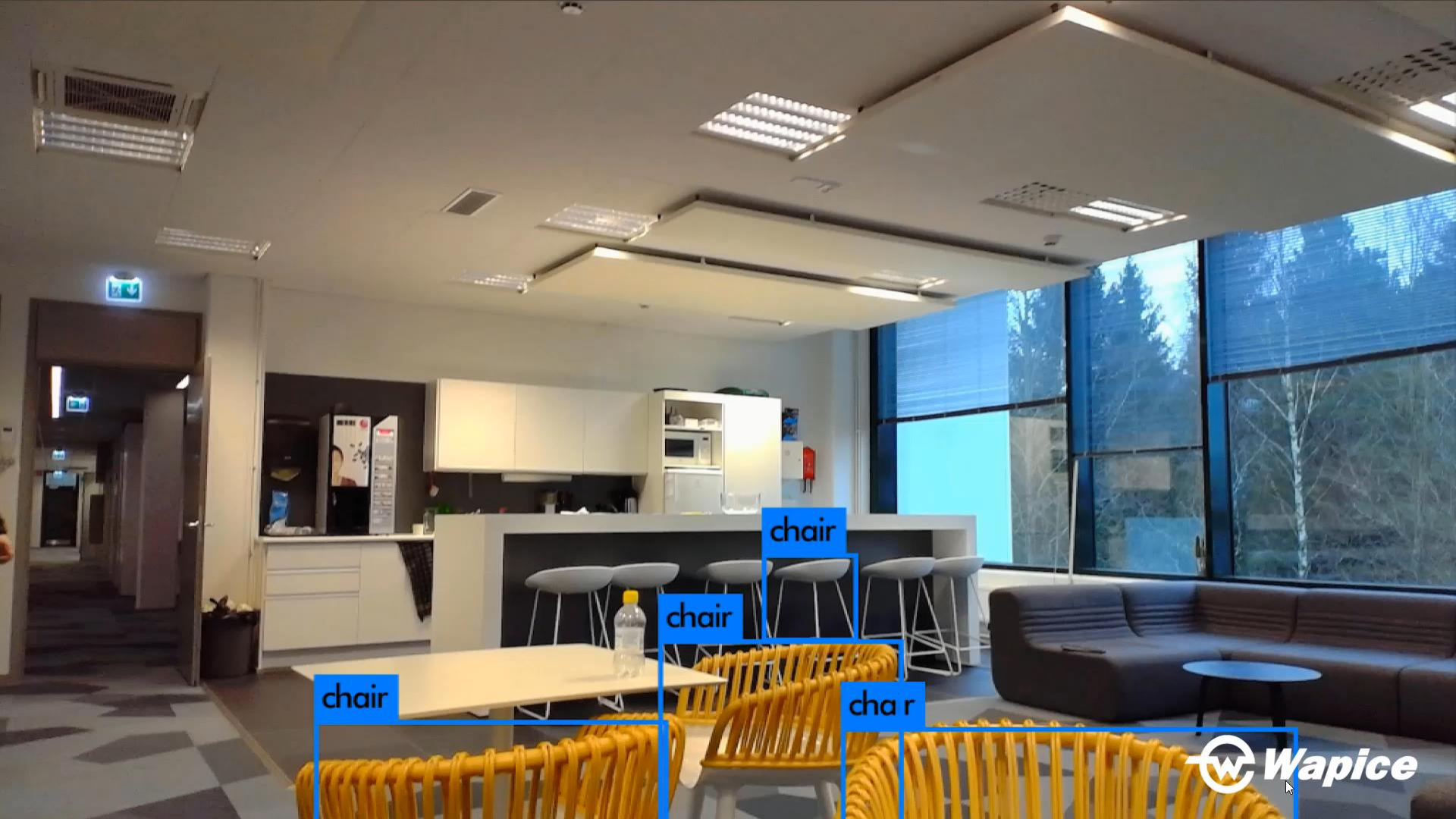


How to create an EDGE application with Artifian Intelligence (AI)?



Let us show you how an AI application is built
Case: Cognitive air conditioning





chair

chair

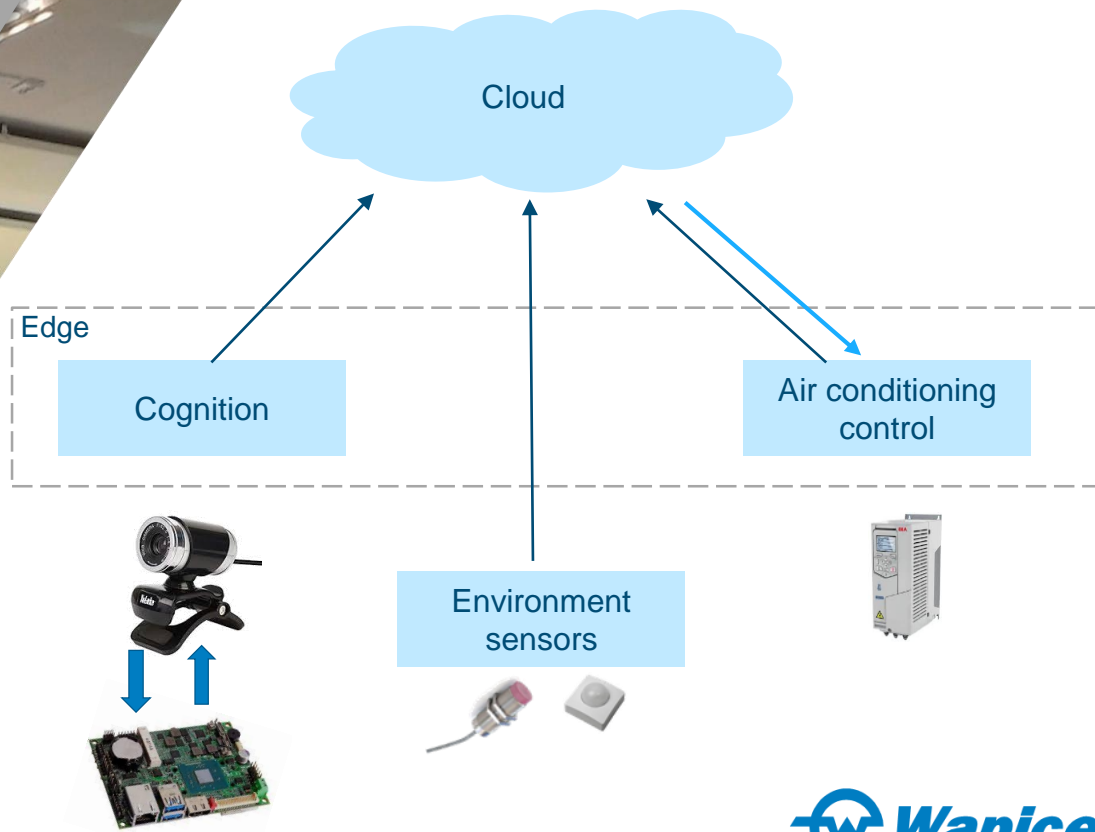
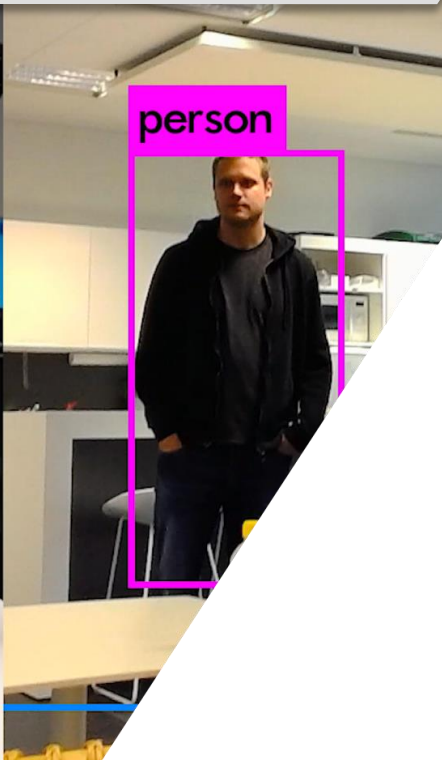
chair

chair

AI powered application using EDGE

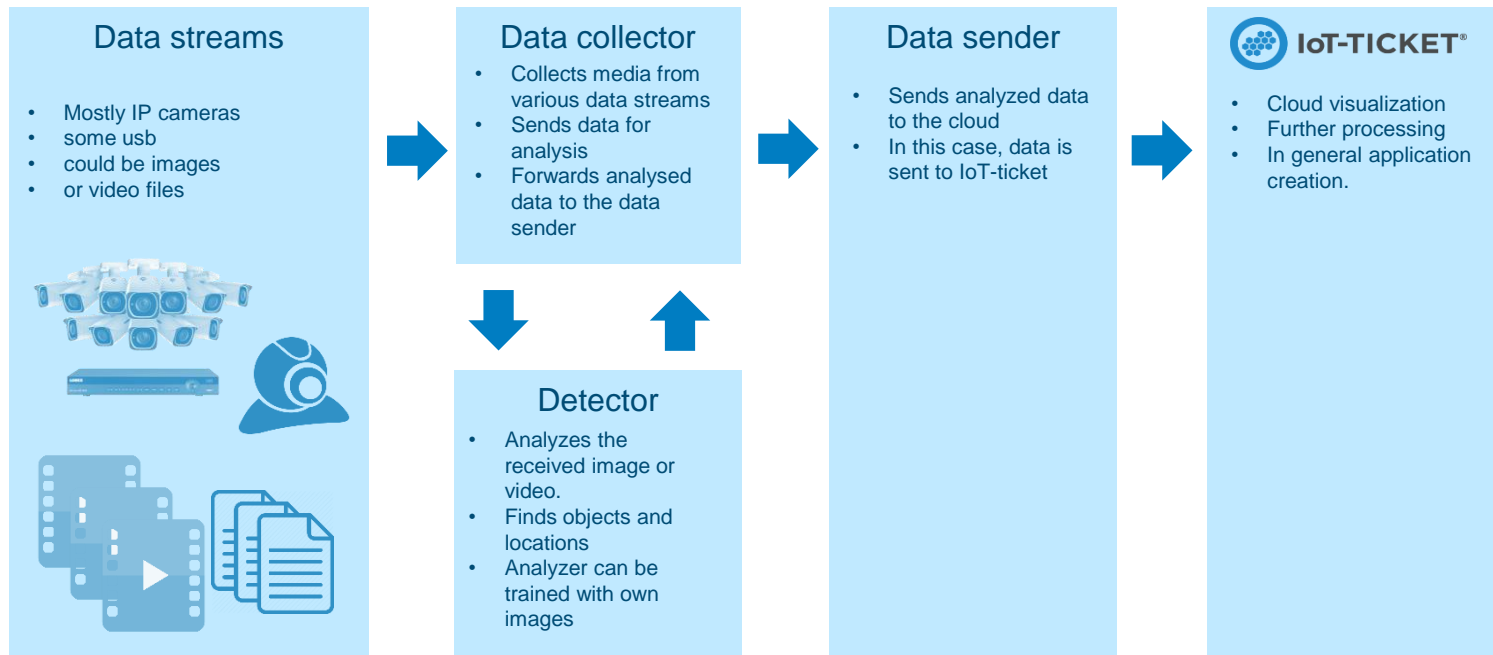
Case: Cognitive air conditioning

Overview



Let's build an AI powered application

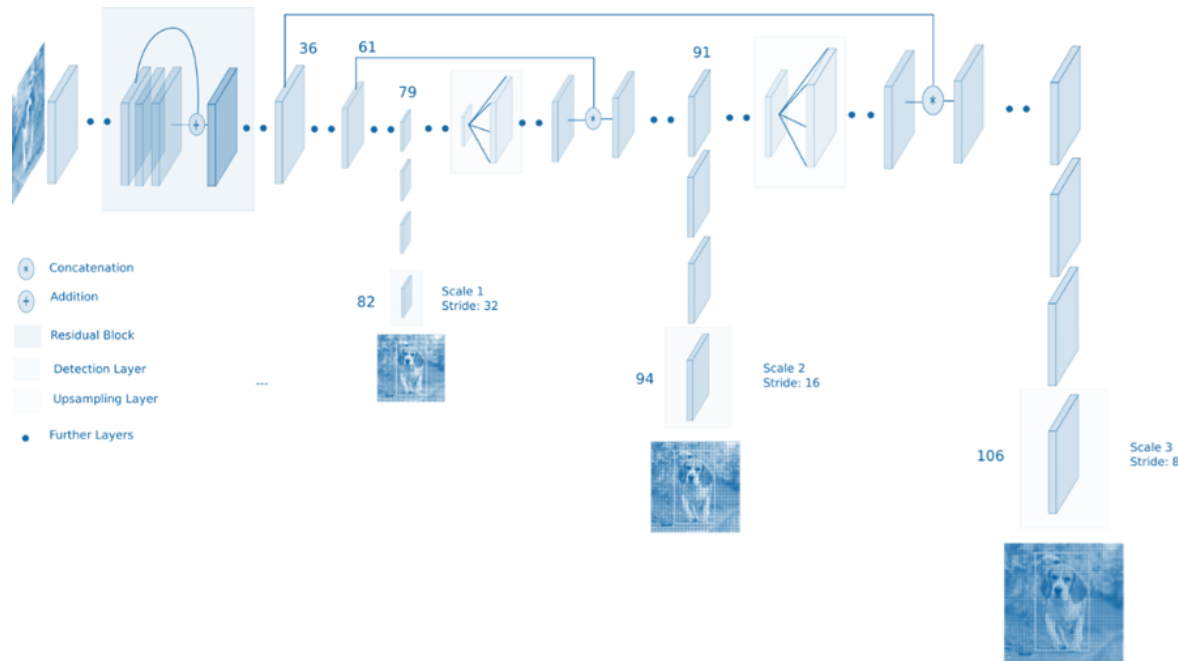
Step 1: Cognition



Let's build an AI powered application

Architecture: Detector

Deep neural network



Let's build an AI powered application

Step 3: Air conditioning control



Drive exposes an interface for reading and controlling motor state (speed, rotation, on/off etc.)

Intranet



Status data:
speed,
direction of
rotation, fault
state etc.



Write
speed and
other control



Gateway provides secure connectivity between the drives in intranet and IoT-ticket in the Internet.

Internet



**Scheduled
sending of
status data**



**Update
control
commands**



Big data
Dashboard
Logic

Let's build an AI powered application

Step 4: Building the application



% 56.7%

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Start creating today.

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 **Wapice**
Technology Partner



IoT-TICKET

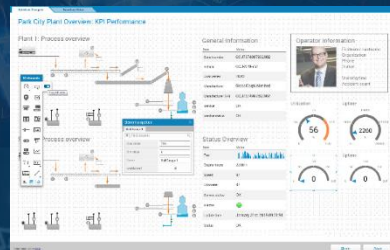
YOUR TICKET TO INTERNET OF THINGS AND BEYOND...

› The Office Suite for IoT

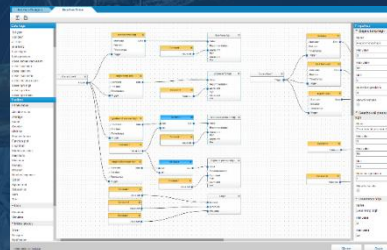
OUR TOOLS FOR IOT APPLICATION BUILDING



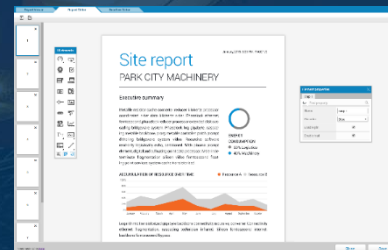
DASHBOARD



INTERFACE DESIGNER



DATAFLOW EDITOR



REPORT DESIGNER

IoT-Ticket is a complete Internet of Things (IoT) platform covering data acquisition, reporting, dashboard and analytics. It enables operational efficiency and business model innovation for companies. The platform supports supervisory monitoring, control, automation and advanced reporting functionalities.

- ✓ Create IoT-applications with ease
- ✓ Web-based Dashboard UI for your application
- ✓ Remote monitoring and control of assets
- ✓ Powerful report creation and analytics

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 an important part to be used in future IoT systems

Thank you!

Creating a smarter future today.

