MLaaS (Machine Learning as a Service) with MATLAB Production Server

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Power Management and Multimarket
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infineon

A world leader in semiconductor solutions

Our vision

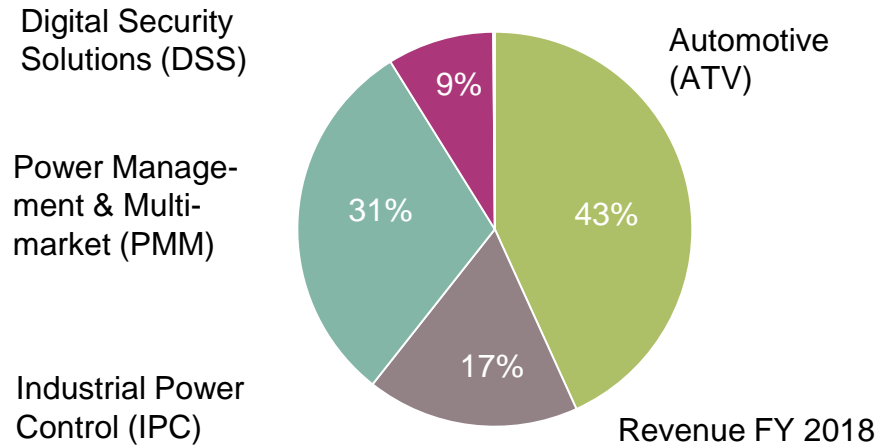We are the link between the real and the digital world.

Our values

We commit
We partner
We innovate
We perform

Our mission

We make life easier, safer and greener.
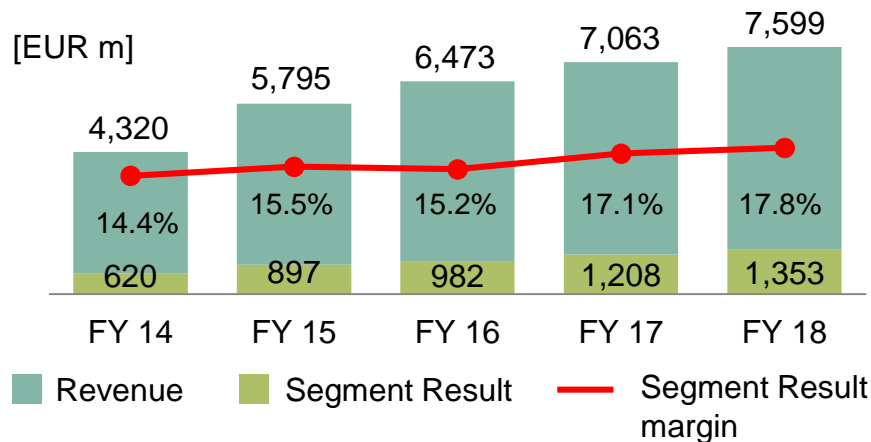
Part of your life. Part of tomorrow.
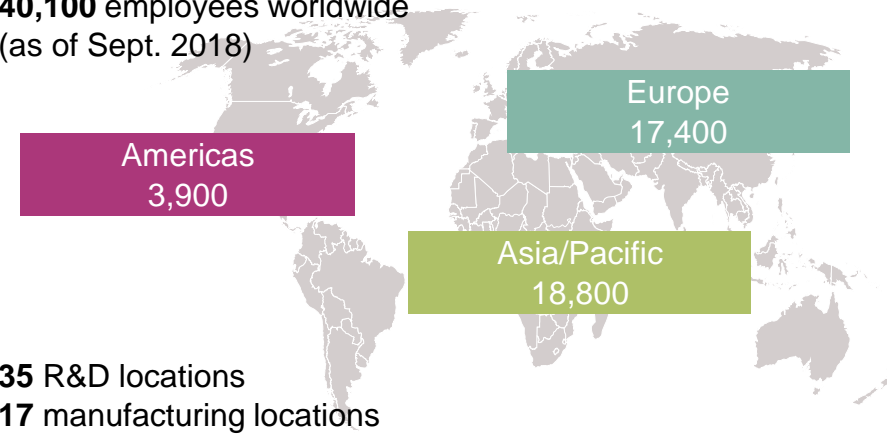
Infineon at a glance

Business Segments

Digital Security Solutions (DSS)

Power Manage-ment & Multi-market (PMM)

Industrial Power Control (IPC)

Automotive (ATV)

- DSS: 9%
- ATV: 43%
- IPC: 17%
- PMM: 31%

Revenue FY 2018

Further information in the
[Annual Report 2018](#)

Employees

40,100 employees worldwide (as of Sept. 2018)

Americas
3,900

Europe
17,400

Asia/Pacific
18,800

35 R&D locations
17 manufacturing locations

Financials

[EUR m]

	FY 14	FY 15	FY 16	FY 17	FY 18
Revenue	4,320	5,795	6,473	7,063	7,599
Segment Result margin	14.4%	15.5%	15.2%	17.1%	17.8%
Segment Result	620	897	982	1,208	1,353

■ Revenue ■ Segment Result —— Segment Result margin

Market Position

Automotive	Power	Security ICs
# 2	# 1	# 1
Strategy Analytics, April 2018	IHS Markit, Technology Group, September 2018	ABI Research October 2018

RF and Sensing devices enable new services and will shape the way we live and work

Courtesy: BMW

Augmented Reality

Voice-controlled devices

Courtesy: eluminocity

Smart streetlights

Various use cases are enabled by a small set of versatile core technologies

Commercial and consumer multicopters

Gesture control

Industrial robotics

Infineon Proprietary

From Sensors to Smart Services

Infineon's intuitive sensing solutions

We believe that the most essential value of an alarm system is its reliability.

Existing glass break alarm systems:

Microphone → Audio data processing → Glass break detection

Infineon's glass break alarm system:

Microphone → Audio data processing → Glass break detection
Pressure sensor → Pressure data processing → Pressure pattern detection
Time synchronized → Intrusion event detection

Infineon's glass break alarm system testing solution can cover following applications:

Functionality vs Cost

- Infineon's all-in-one alarm system module
- Battery powered, connected glass break alarm system
- Standalone glass break alarm system
- All in one alarm system (including e.g. smoke detector, motion sensor etc.)
- Cloud connected smart devices e.g. smart speaker
- Infineon's full alarm system testing solution

Source：https://www.infineon.com/cms/en/product/promopages/intuitive-sensing/

Machine Learning as a Service (MLaaS) for connected devices

Public Cloud

Processed Data

Trained NN

Evaluation board

Classification results

Reference Kit/ Sensor

- Inference running in the cloud
- Requires to be online
- Depends on the sensor/applications latency & Bandwidth requirements
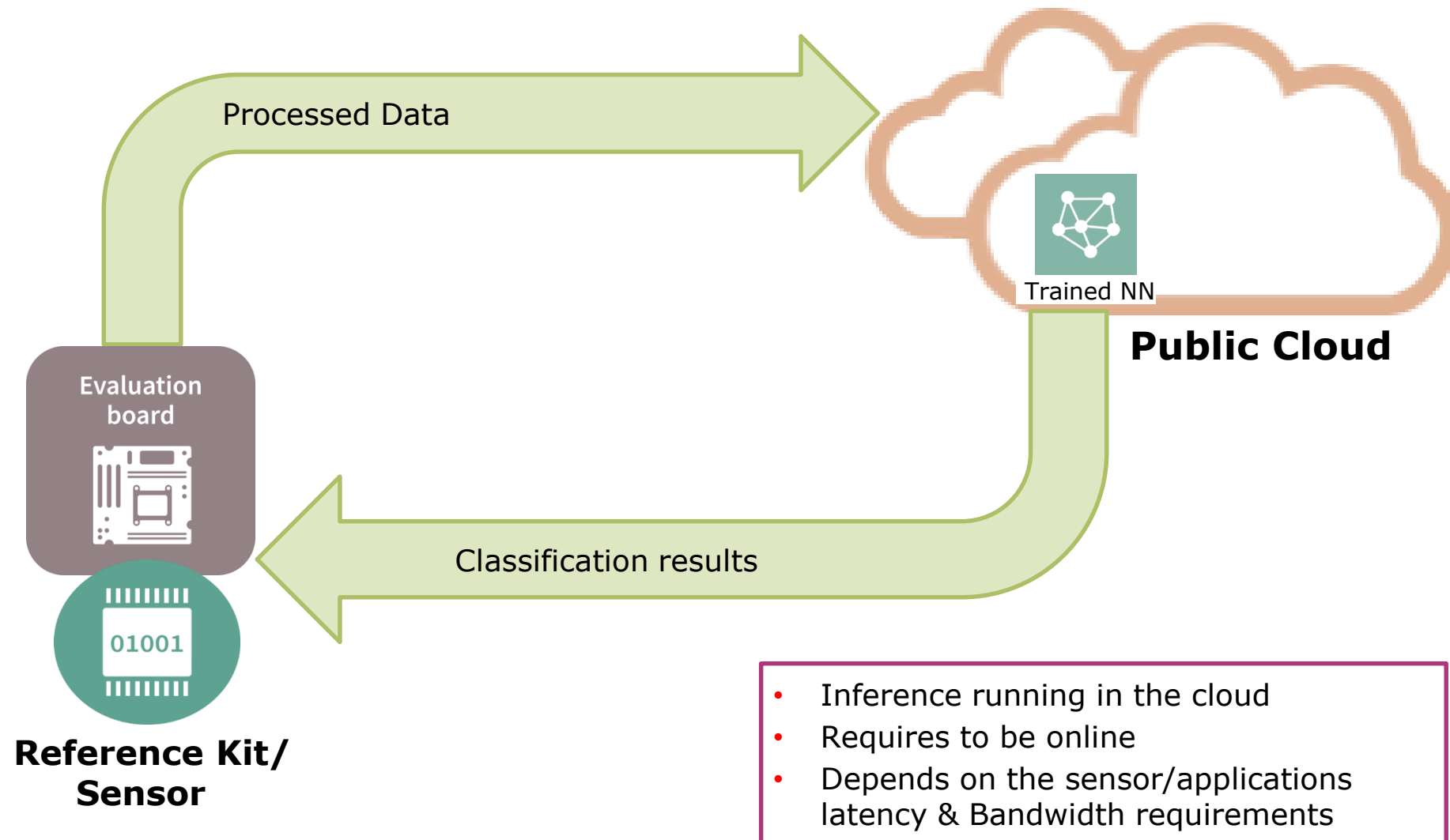
Machine Learning as a Service (MLaaS) for edge devices

Tool
- Start, stop, configure sensor
- Show classification results
- Retrain NN

Training data + labels

Retraining sequence

Database

Public Cloud

Retrained NN

Local PC

Evaluation board

Trained NN

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Reference Kit/ Sensor

- Inference running on the edge device
- Works offline with low latency
- Requires design level considerations to enable the use case
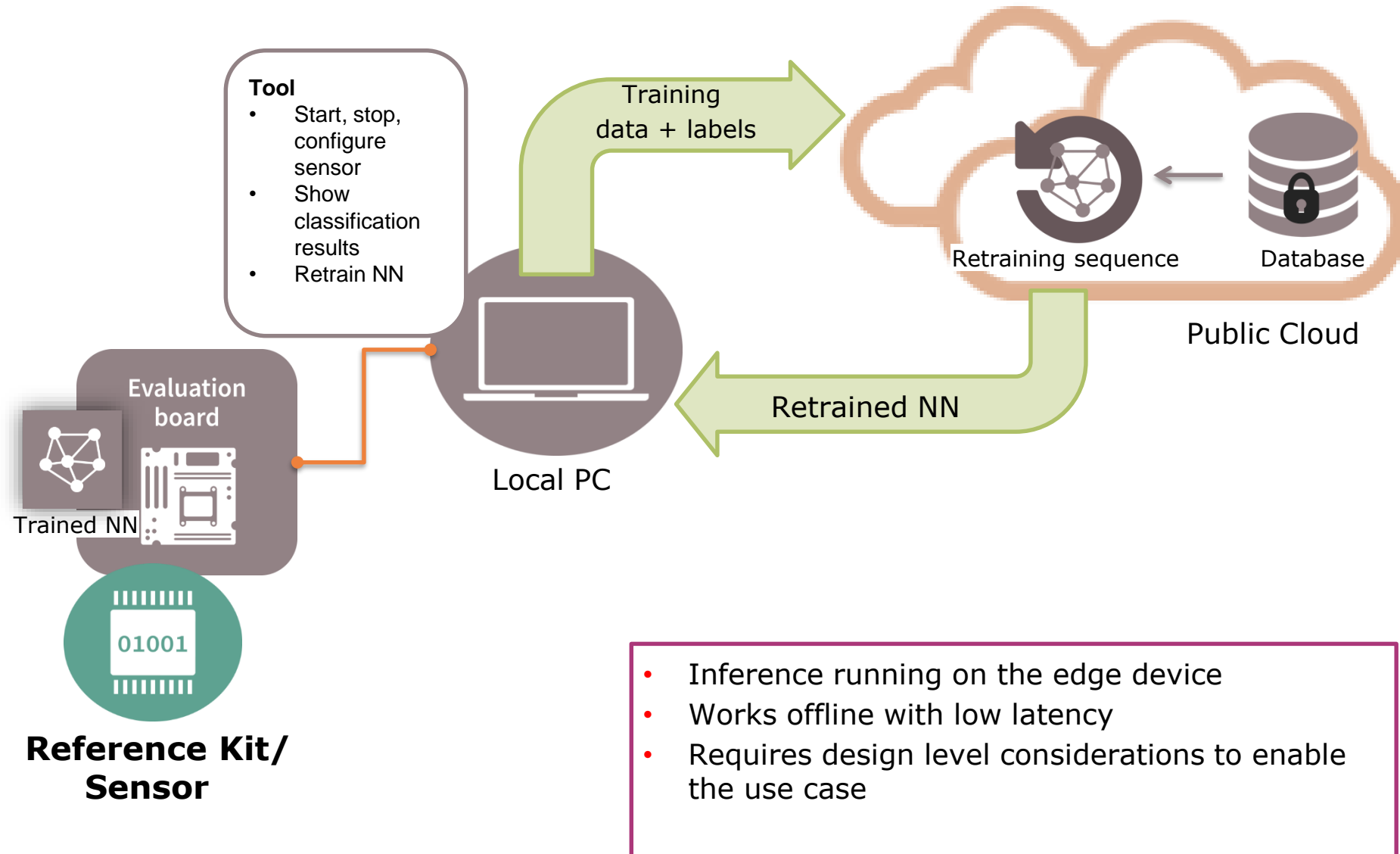
MATLAB Production Server (MPS) Evaluation

› Deployment of a scalable and secure infrastructure is a huge challenge

MATLAB and
MATLAB Compiler SDK

Deployable
Archive

MATLAB Production Server

Enterprise
Applications

Source: https://www.mathworks.com/cloud/
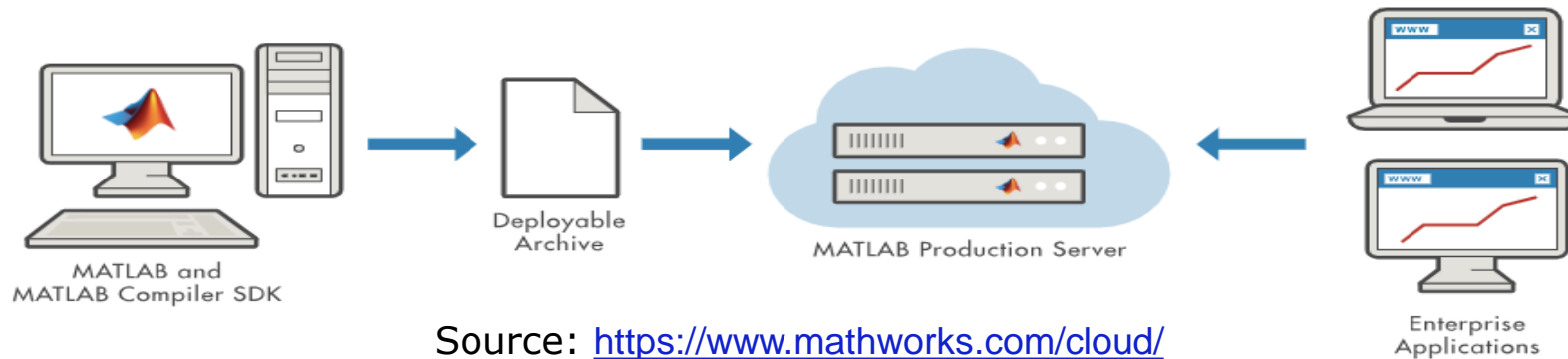
› Evaluation of MPS for a demo project

- Deployed on AWS

- Classification as a service

- Web application as client

› The process

o **Prototype**
With Machine learning toolbox

o **Compile**
Using Matlab Compiler SDK

o **Deploy**
on public cloud with MPS

Infineon Prop
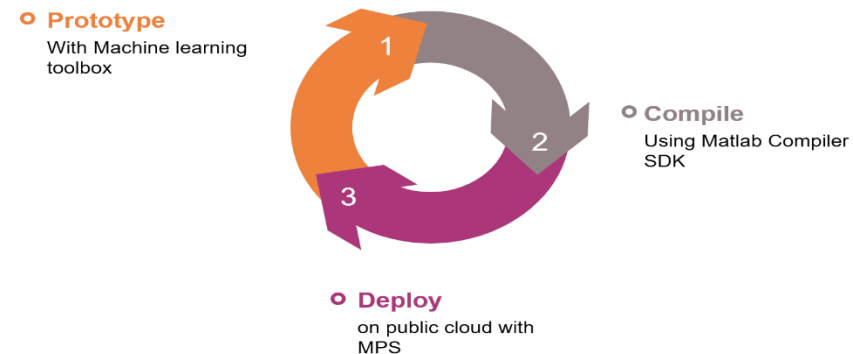
How MATLAB Production Server (MPS) helped?

› Reduced time-to-market

  ➢ From prototype MATLAB code to web service

› Scalable infrastructure

  ➢ On demand scaling

  ➢ Public cloud hosting

  ➢ Security

› Integration

  ➢ API access

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Summary / Conclusion

MPS Evaluation

› MPS is a well-placed product that reduces our time-to-market

MLaaS validation

› Validated that MLaaS is also relevant for us and our end customers

Next Steps

› Evaluation of MPS for MLaaS in a complex real-life system

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