

Semiconductors Accelerate IoT Growth

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Semiconductors Enabling IoT

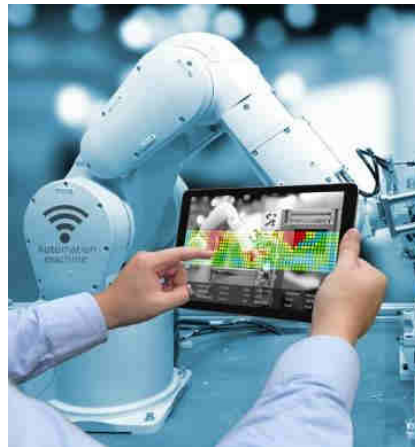
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Smart Driving



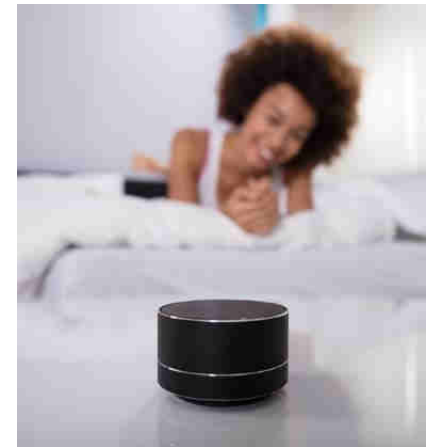
Smart Industry



Smart Home & City



Smart Things



- A global semiconductor leader
- 2017 revenues of **\$8.35B** with year-on-year growth of **19.7%**
- 2018 revenues of **\$9.66B** with year-on-year growth of **15.8%**
- Listed: NYSE, Euronext Paris and Borsa Italiana, Milan

Who We are

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- Research & Development
- Main Sales & Marketing
- Front-End
- Back-End



life.augmented

- Approximately **45,500** employees worldwide
- Approximately **7,400** people working in R&D
- **11** manufacturing sites
- Over **80** sales & marketing offices

As of December 31, 2017



Telecom
industry

Lower barriers
to be connected



Cloud
industry

Lower barriers
to create new services

The 3 Key Industry Players Enabling IoT

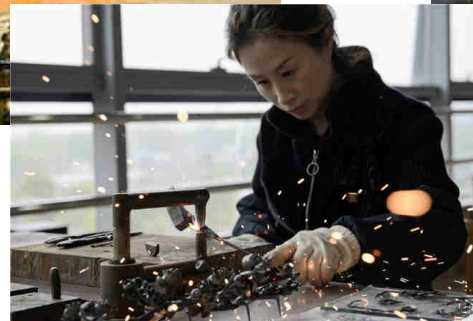
Lower barriers
to product creation



Semiconductor
industry

Allowing New Industry Sectors to Benefit From IoT

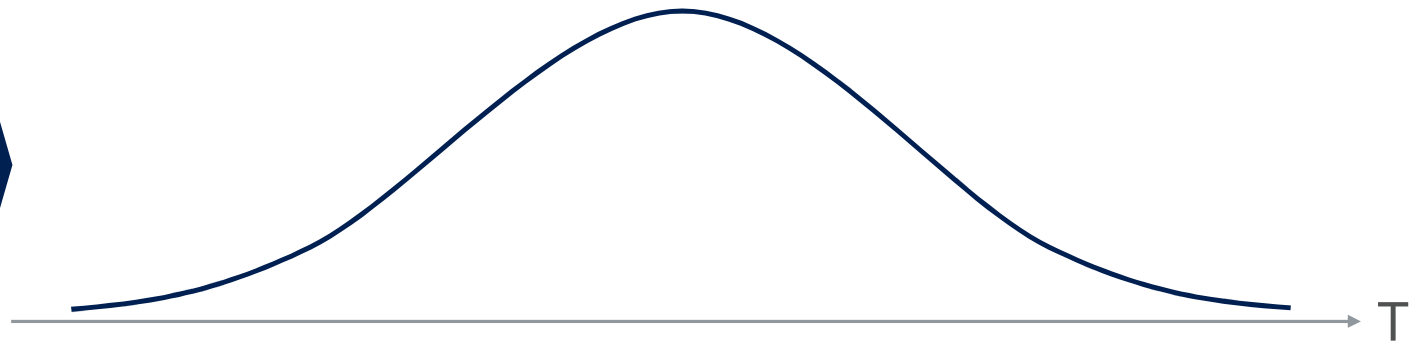
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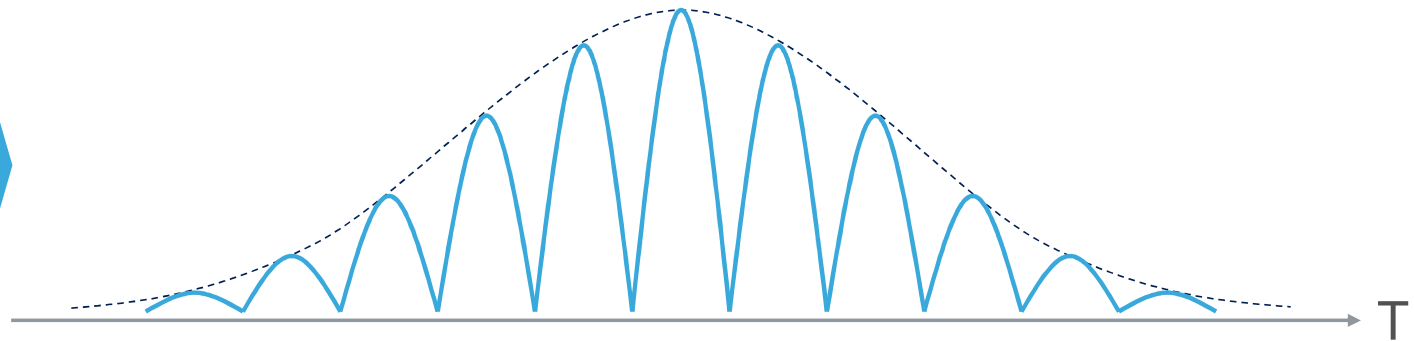
Markets Dynamics

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Traditional
markets



IoT markets





Make it Easier to Implement IoT Product Development

Create your Smart Thing

1 Select your functionality

2 Build your first prototype

3 Refine your idea

4 Get ready for market

 STM32 Open Development Environment

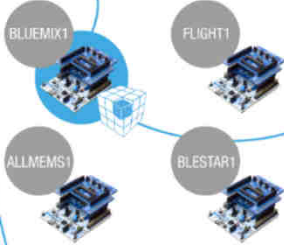
STM32 Nucleo development boards



STM32 Nucleo expansion boards

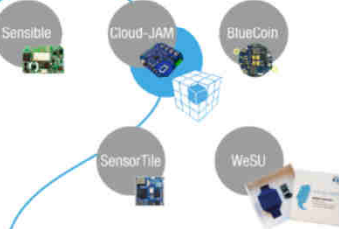


Plug and play with ready-to-go HW, SW and application Function Packs \$ 10's



Build your prototype and start your SW development

Advanced prototyping tools from ST or from ST Partners \$ 100's



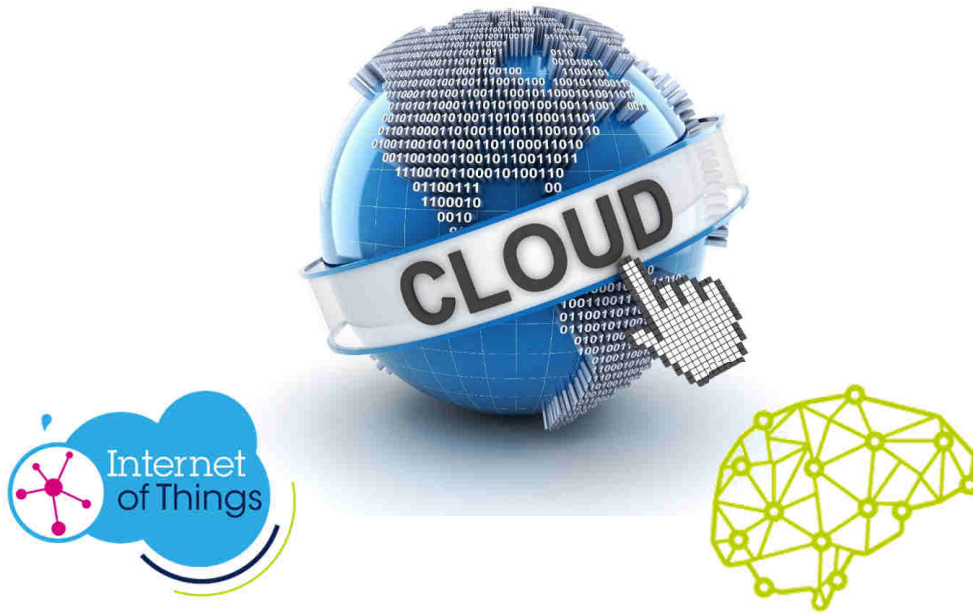
Accelerate your product development and start field trials

Time to make it real

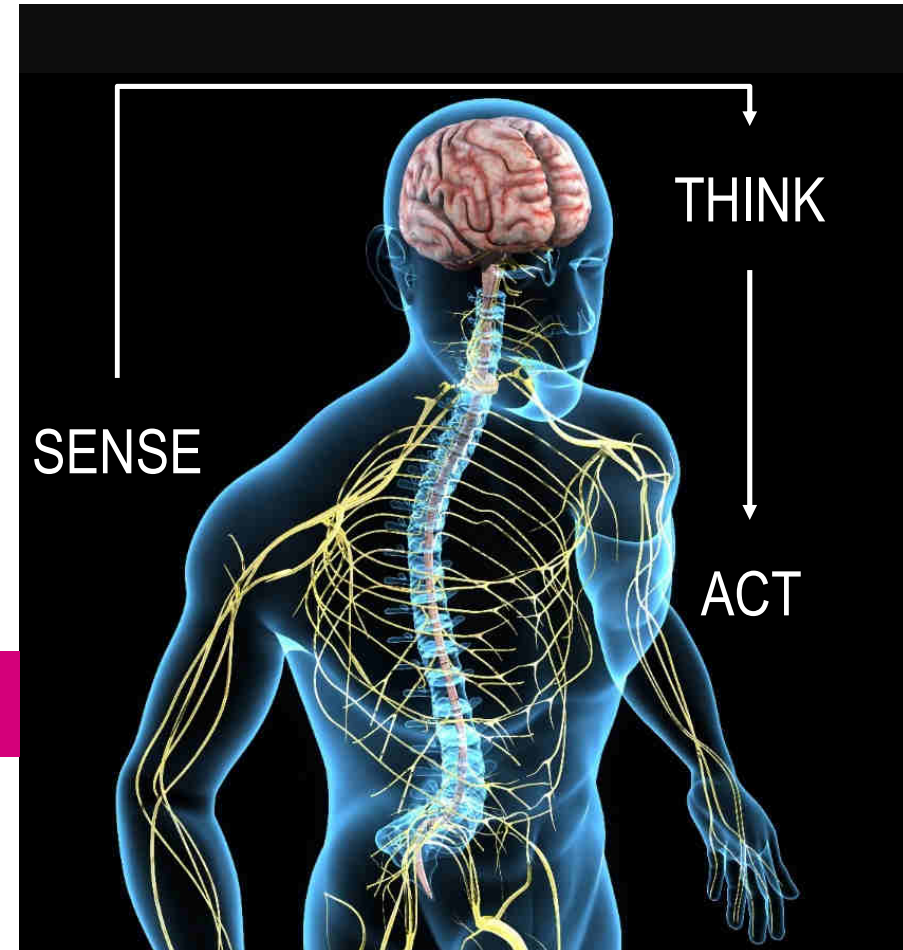


50 Billion Devices in IoT + Cloud + AI Will Enable the World to Sense, Think and Act

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IoT will robotize the WORLD !

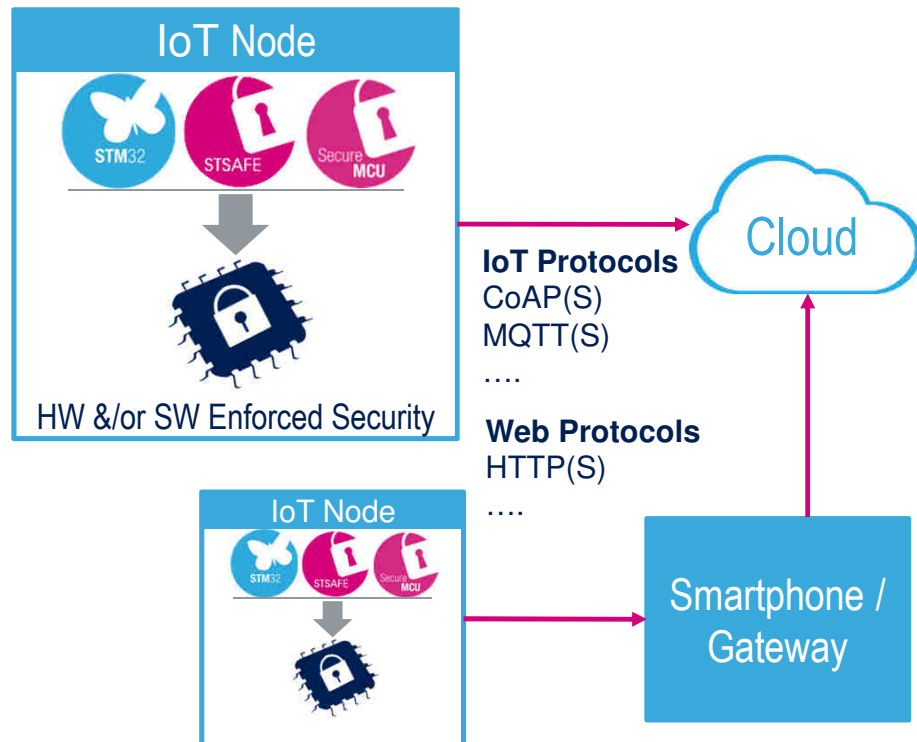




Make it More Secure

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Centralized



Distributed: Block Chain for IoT

Smart Contracts, Logistics, Authentication...





Make it More Intelligent

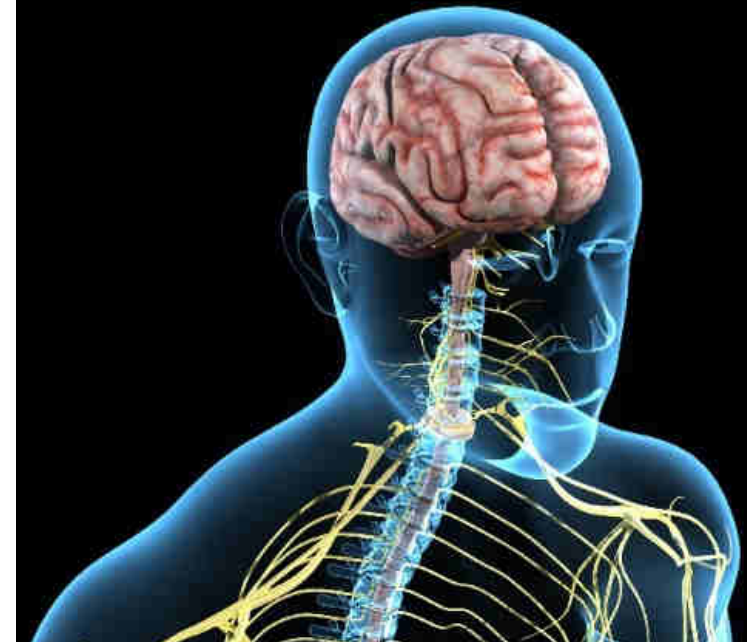
AI everywhere

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Cognitive & Autonomous thinking...on the way!



THINK

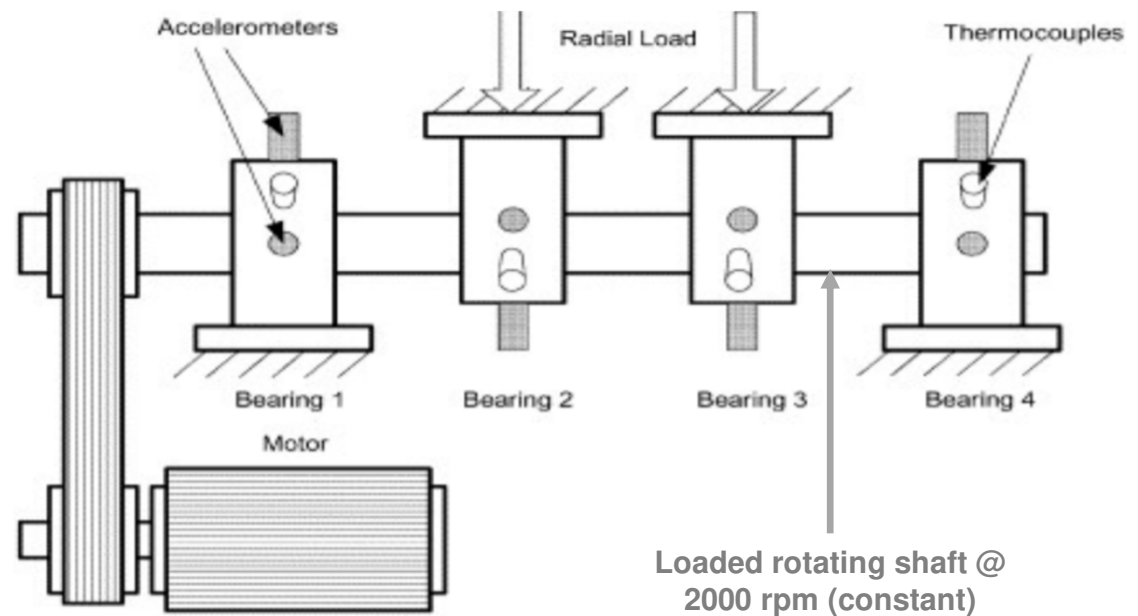


Data Challenge

Cloud Predictive Maintenance

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- Total Data Rate: 320 KB/sec, leading to **27.648 GB/day** for this single Set-Up in a single equipment of a single Industry, if in continuous mode



Data Challenge

The Cloud Voice Recognition Example



KLINT FINLEY BUSINESS 06.08.17 12:09 PM

HOW GOOGLE COPEs WHEN EVEN IT CAN'T AFFORD ENOUGH GEAR

....

If any android user would use **3 mn** of voice recognition they would need to **double computing** power into the cloud



The Sustainability Challenge

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‘Tsunami of data’ could consume one fifth of global electricity by 2025

Billions of internet-connected devices could produce 3.5% of global emissions within 10 years and 14% by 2040, according to new research, reports [Climate Home News](#)

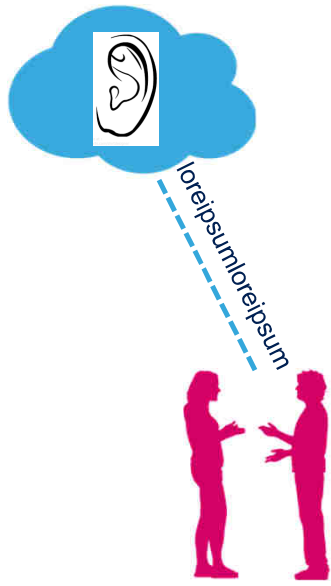


The communications industry could use 20% of all the world's electricity by 2025, hampering attempts to meet climate change targets and straining grids as demand by power-hungry server farms storing digital data from billions of smartphones, tablets and internet-connected devices grows exponentially.

He expects industry power demand to increase from 200-300 terawatt hours (TWh) of electricity a year now, to 1,200 or even 3,000TWh by 2025. Data centres on their own could produce 1.9 gigatonnes (Gt) (or 3.2% of the global total) of carbon emissions, he says.



A 2016 [Berkeley laboratory report](#) for the US government estimated the country's data centres, which held about 350m terabytes of data in 2015, could together need over 100TWh of electricity a year by 2020. This is the equivalent of about 10 large nuclear power stations.



The Privacy Challenge

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PRIVACY ON THE CLOUD

An Oregon family's encounter with Amazon Alexa exposes the privacy problem of smart home devices

By Youyou Zhou · May 25, 2018

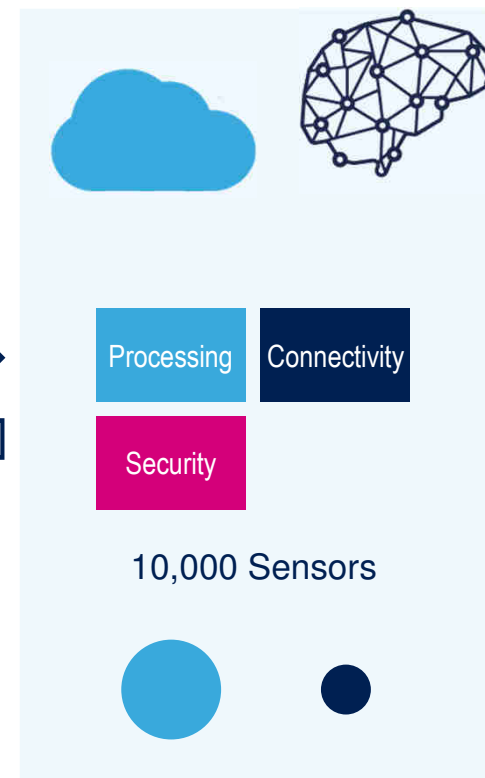
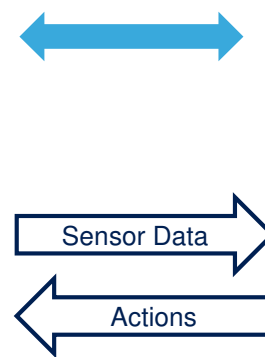
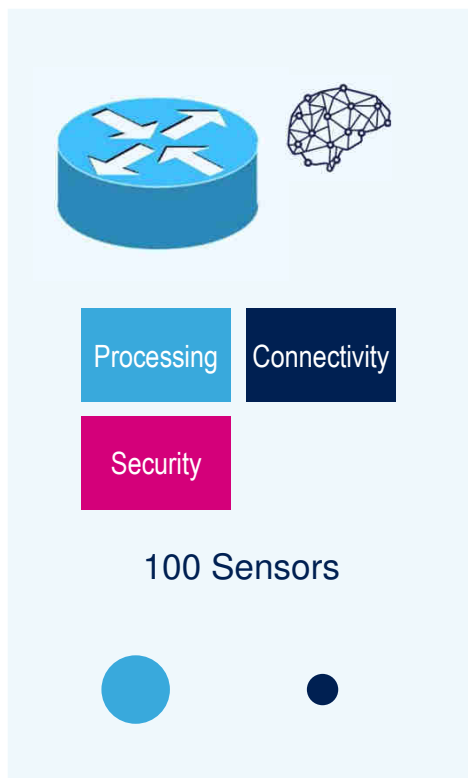
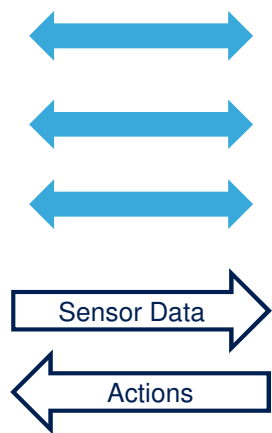
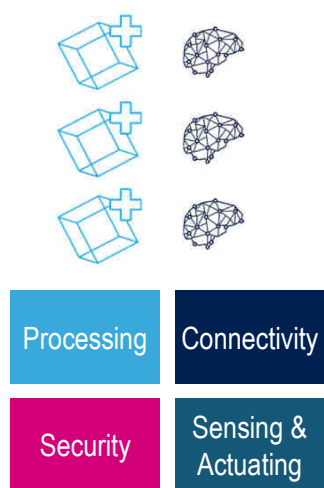
Here's the latest nightmare scenario for the tech-phobic: A woman in Portland, Oregon [found out](#) that her family's home digital assistant, Amazon's Alexa, had recorded a conversation between her and her husband without their permission or awareness, and sent the audio recording to a random person on their contacts list.

Echo woke up due to a word in [background conversation](#) sounding like "Alexa." Then, the subsequent conversation was heard as a "[send message](#)" request. At which point, Alexa said out loud "To whom?" At which point, the background conversation was interpreted as a name in the customers [contact list](#). Alexa then asked out loud, "[contact name], right?" Alexa then interpreted background conversation as "right". As unlikely as this string of events is, we are evaluating options to make this case even less likely."



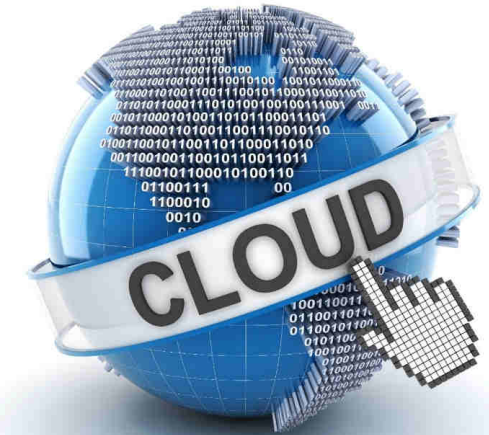
AI-IoT: Distributed Intelligence

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Everything More Cognitive and Interactive

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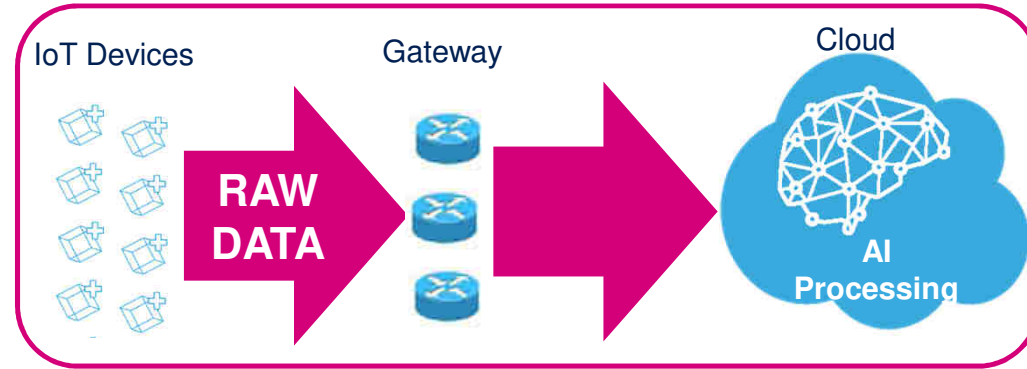


Artificial Intelligence: The Big Wave

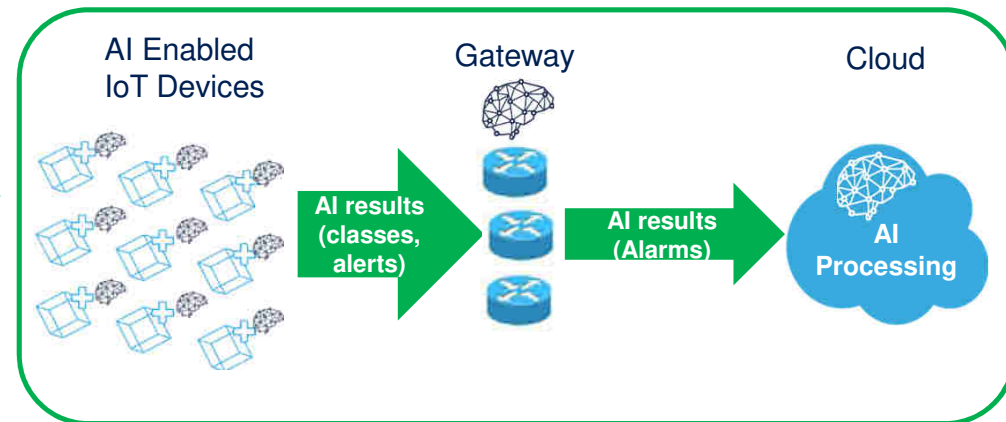
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Centralized Intelligence



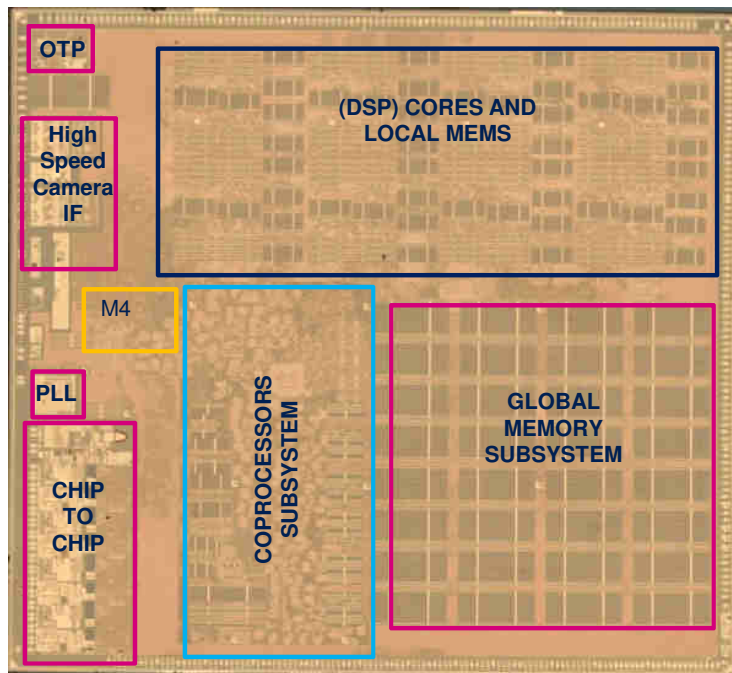
AI @ The Edge





Example of AI for the Node

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ISSCC Feb 2017

ST ORLANDO 2.9 TeraOps per Watt

Deep Convolutional Neural Network SoC in 28 nm FD-SOI for Intelligent Embedded Systems

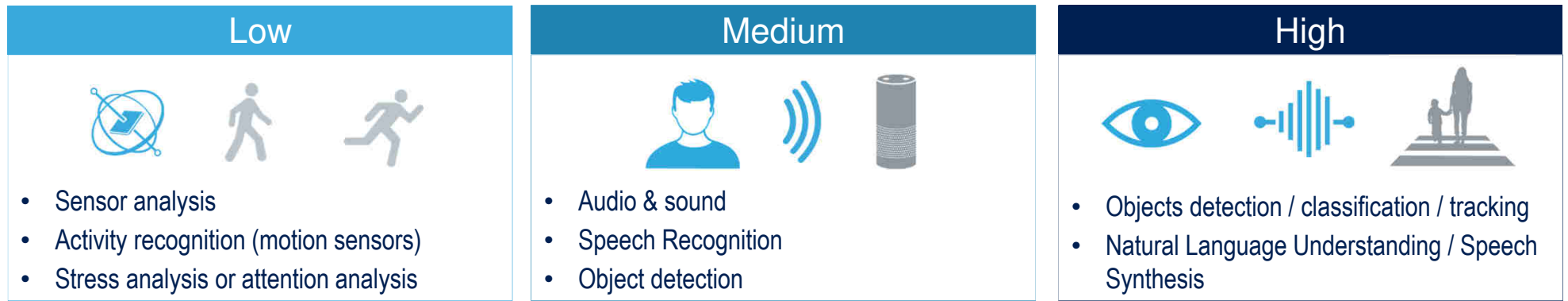


Intelligence @ Low Power available for IoT Node!



ST Roadmap for AI @ the Edge

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10s MOPs

GOPs

0.5-1 TOPs

1-2 TOPs

MCU

From IP embedded in MCU/MPU to dedicated SOC

Sagemcom

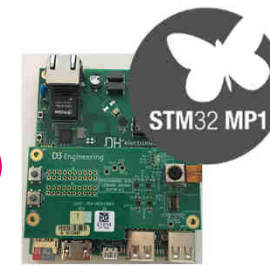
Industrial Maintenance Module



Smart Shoes
Human Activity Tracking



OpenMV Machine Vision Camera



Arrow Avenger96 Board +
Camera Module





Making it **More Friendly**



...to Smart Mobiles

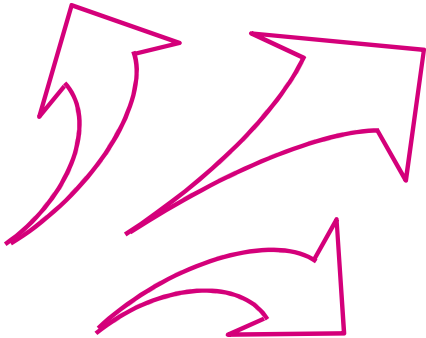


IoT voice assistant

...to “Anything Connectable”



From professional PC applications



...to Home / Office Terminals



Voice is just the beginning ...!

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The Internet of Things Continues to Evolve



The Internet of Things Continues to Evolve.....

.....& ST is Committed to Fuel This Evolution

Make it **easily connected**



→ ST Connectivity Solutions

Make it **easier to implement**



→ ST HW/SW ecosystem & Tools

Make it **more secure**



→ ST Secure HW/SW solutions

Make it **more intelligent**

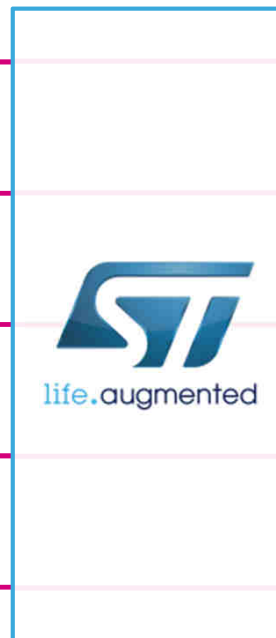


→ ST Artificial intelligence in the node

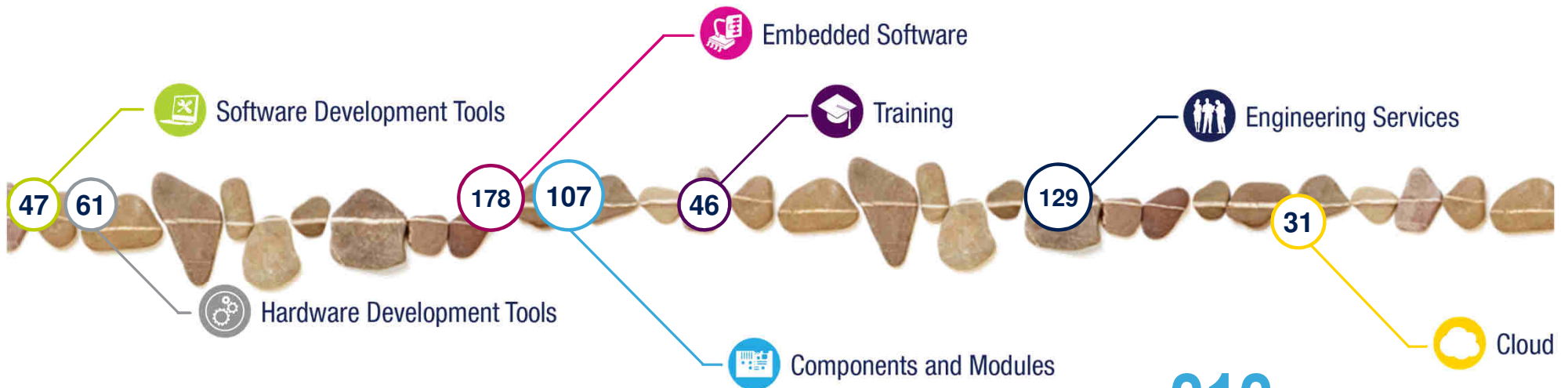
Make it **more friendly**



→ ST Intelligent Sensors for User Interfaces



Ecosystem of partners to support our customers



The “Partner Program” promote collaboration between ST and Authorized third party Companies in the area of **Marketing, Technical Support and Business**

Thank You!

