



# INTEL IOT DEVELOPER PRODUCTS AND PROGRAM

## ACCELERATING IOT SOLUTION DESIGN AND DEPLOYMENT

Developer Relations Division, Intel®



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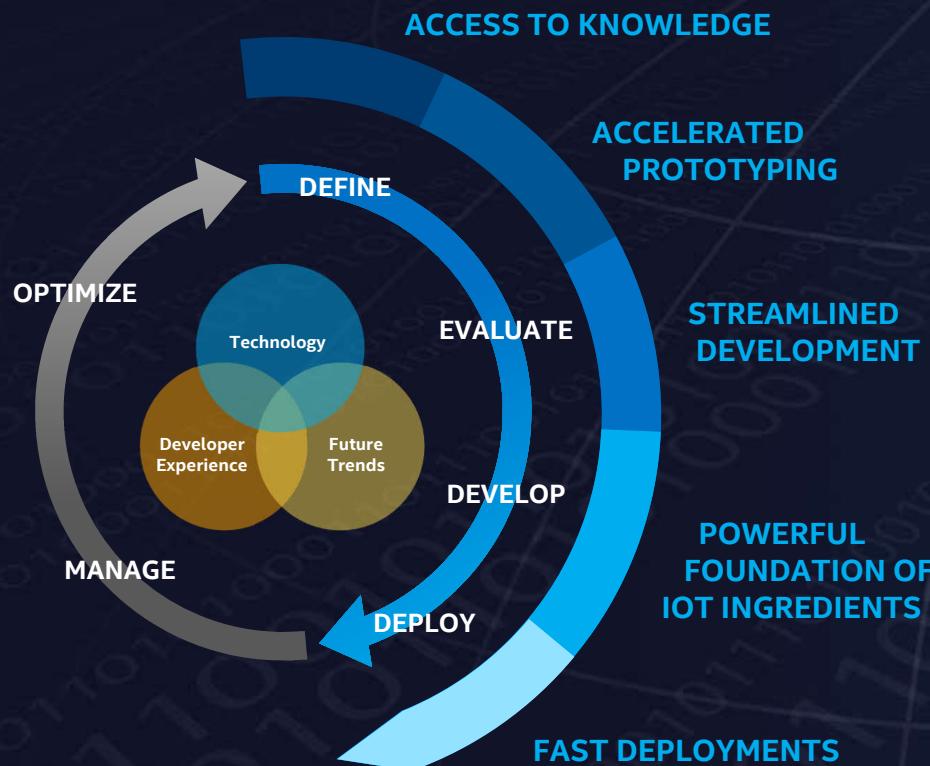
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# ENABLING NEW DEVELOPER OPPORTUNITIES

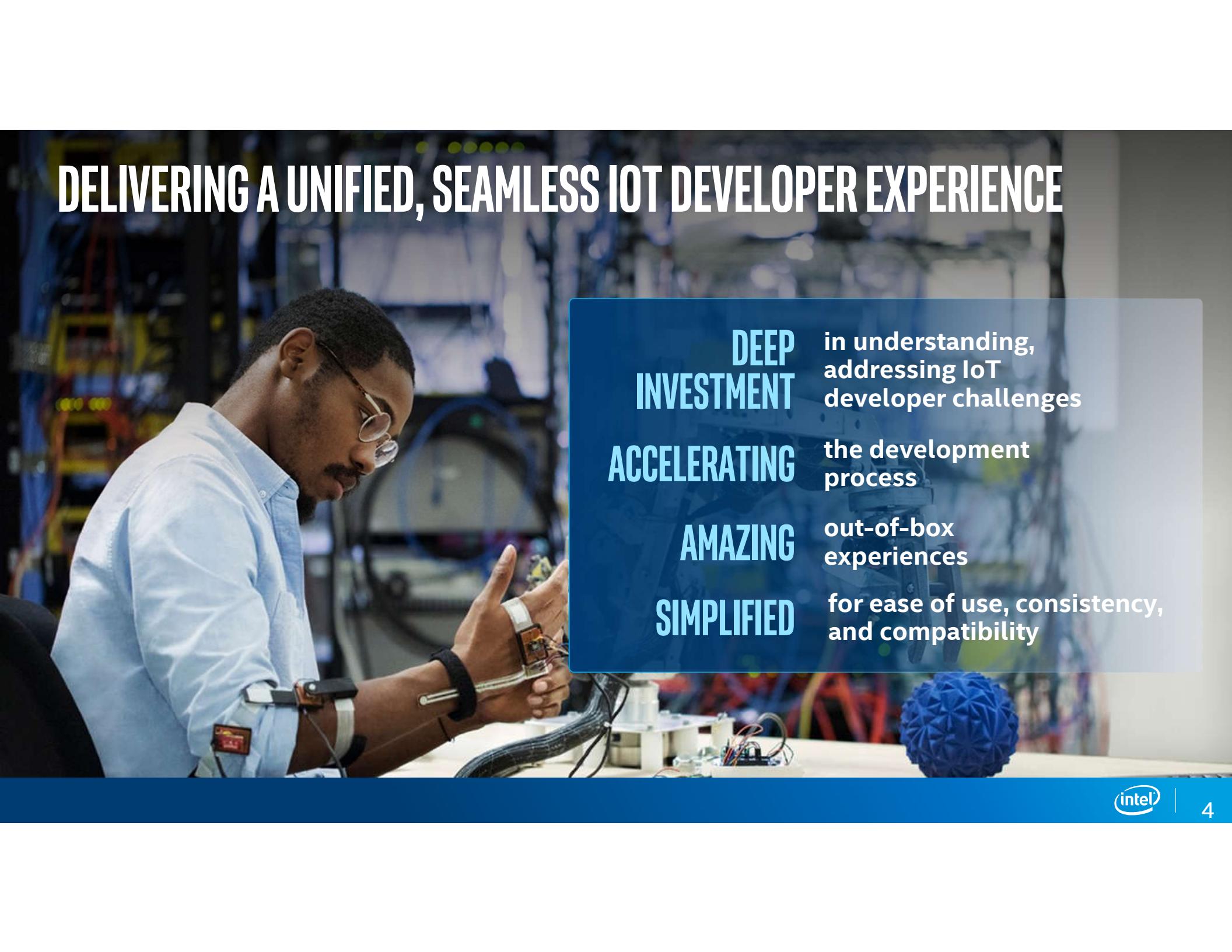
## The Developer's Journey



## What Intel Brings

- Common and seamless Developer experience
- Start to finish technologies for robust solutions
- Simplified path to develop and deploy products, systems, solutions
- Reusability, extensibility, portability, future proof

# DELIVERING A UNIFIED, SEAMLESS IOT DEVELOPER EXPERIENCE

A photograph of a man with glasses and a beard, wearing a light blue button-down shirt, working on a small electronic device. He is wearing a white smartwatch on his left wrist and a black armband with a red sensor on his right arm. The background is a blurred laboratory or workshop environment with various equipment and cables.

DEEP  
INVESTMENT

ACCELERATING

AMAZING

SIMPLIFIED

in understanding,  
addressing IoT  
developer challenges

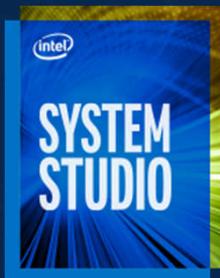
the development  
process

out-of-box  
experiences

for ease of use, consistency,  
and compatibility

# COMPREHENSIVE PORTFOLIO OF DEVELOPER RESOURCES

## TOOLS



## KITS



## SDKS

OpenVINO™ Toolkit

Intel® Media SDK and  
Intel® Media Server  
Studio

Intel® SDK for  
OpenCL™  
Applications

Intel® Active  
Management  
Technology (AMT)

mRAA/UPM

## INTEL DEVELOPER ZONE

A screenshot of the Intel Developer Zone website for the Internet of Things. The header reads "DEVELOPMENT RESOURCES FOR IOT PROFESSIONALS". Below it, a sub-header says "Create complete, scalable, and optimized IoT solutions and speed up time to market." There are sections for "Reference Implementations" showing examples like "Create a People Counter Application", "Develop an Intruder Detection System", "Build a Store Traffic Monitor", and "Create a Facial Recognition Access Application". A "Industries" section highlights "Smart Video | Industrial Automation | Retail | Smart Home".

INTERNET OF THINGS

DEVELOPMENT RESOURCES FOR IOT PROFESSIONALS

Create complete, scalable, and optimized IoT solutions and speed up time to market.

Reference Implementations

Learn about IoT solutions and how developers can use Intel® technology to connect the world.

Create a People Counter Application

Develop an Intruder Detection System

Build a Store Traffic Monitor

Create a Facial Recognition Access Application

Industries

Intel is powering IoT for global market opportunities and enabling change across industries.

Smart Video | Industrial Automation | Retail | Smart Home

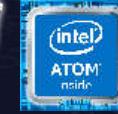
# FAST PROTOTYPING AND RICH OPTIMIZATION WITH CHOICE OF TOOLS

- Rapid Prototyping
- Cloud-Based developer environment
- Easy Out of Box Experience
- Supports Intel based platforms running Linux



- For Production and Performance Optimization
- Easy Migration From Arduino Create\*
- Integrates Analyzers and Debug Tools
- Leverages Sample Codes in the Kit

# DEVELOPER KITS ACCELERATE DESIGN OF INNOVATIVE SOLUTIONS



## UP2 GROVE IOT DEVELOPMENT KIT

- Versatile, broad prototype application
- Traditional computer vision
  - Non-inference based training/learning
- Basic essential components

## UP2 AI VISION DEVELOPMENT KIT

- Light computer vision/deep learning applications (1-2 cameras)
- Conceptualization and early CV prototype development
- Optional accelerator options

## iEi TANK AIoT DEVELOPMENT KIT

- Demanding computer vision/deep learning applications (multi-camera environments)
- Commercial production ready development
- Built-in scaled support for complex/parallel video streams

**Reduced time to prototype, expedite path to productization, and designed for scalability and extensibility**

All kits include the start-up essentials for a bootable development environment

# SDKS—COMMON TOOLS FOR HETEROGENEOUS SILICON DEVELOPMENT

## OPENVINO™ TOOLKIT

Accelerate  
Computer Vision,  
Integrate Deep  
Learning Inference

## INTEL® MEDIA SDK AND INTEL® MEDIA SERVER STUDIO

Deliver Fast,  
High-Density  
Video and  
Image Processing

## INTEL® SDK FOR OPENCL™ APPLICATIONS

Customize  
Solutions, Optimize  
Compute with  
Intel® Graphics

## INTEL® ACTIVE MANAGEMENT TECHNOLOGY (AMT)

Remotely access a  
device to discover,  
activate, monitor,  
protect, and  
manage it  
independent of  
its power state

## MRAA/ UPM

Easy,  
standardized  
connection and  
interface to over  
400 to devices  
and sensors



INTEL DEVELOPER ZONE FOR IOT:

# CENTRAL RESOURCE FOR E2E SOLUTION SUPPORT

Training, How-Tos,  
Documentation, Forums, Support

Development Kits, SDKs, Libraries, Sensor  
Drivers, APIs, Tools

Code Samples and Tutorials,  
End-to-End Reference Implementations

Guides for Productization and  
Commercialization



## Reference Implementations

Learn about IoT solutions and how developers can use Intel® technology to connect the world.



Create a People  
Counter  
Application



Develop an  
Intruder  
Detection  
System



Build a Store  
Traffic Monitor



Create a Facial  
Recognition  
Access  
Application

## Industries

Intel is powering IoT for global market opportunities and enabling change across industries.

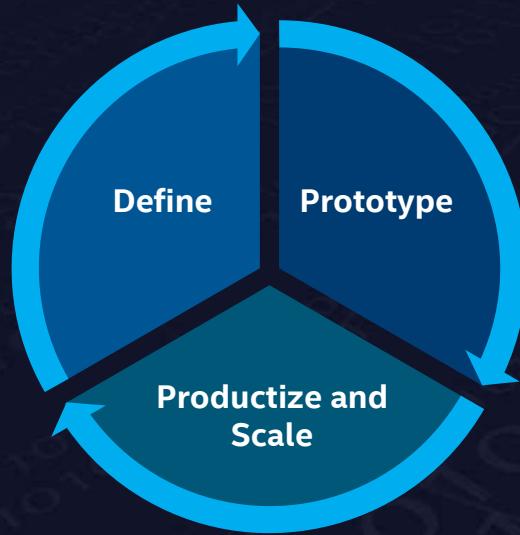
[Smart Video](#) | [Industrial Automation](#) | [Retail](#) | [Smart Home](#)



[software.intel.com/iot](http://software.intel.com/iot)



# ENGAGING THROUGH ALL PHASES OF DEVELOPMENT



## EVENTS

Virtual/Tradeshows  
(Global IoT DevFest)



## WORKSHOPS

Hands-On Training



## PROMOTION

Showcase Reference Implementations  
IoT Innovators sharing Expertise



## ENGAGEMENTS

ISV Engagement  
App Enablement  
Architecture Conversion

# INDUSTRIAL WORKSHOP OVERVIEW

## Control Stack Day 1

Introduction and  
Intel Developer Program

Virtualization of Workloads  
Intel Technology for Hypervisors & Containers

Real-Time and  
Deterministic Computer Systems

Real-Time and  
Deterministic Networks

Industrial Networking Protocols  
OPC-UA TSN

## Insights Stack Day 2

Industrial Systems Case Studies

Predictive Analytics

Time Series Data  
with the TICK Stack

Computer Vision  
With OpenVINO

Hardware Heterogeneity in  
Computer Vision Applications

# IOT CLIENT (CORE) FOUNDATION DEV KIT



The IOT Client Foundational Kit will provide **manageability**, **performance**, and a **scalable rapid path to market** solution that will support advanced **computer vision** and **deep learning** usages.

## IEI Tank-870-Q170 (2-slot)

PCIe slots that will support HDDL-F (FPGA) and HDDL-RC (Myriad X)

[http://eshop.usa.ieeworld.com/usa/items.php?CA=2&sub\\_CA=24](http://eshop.usa.ieeworld.com/usa/items.php?CA=2&sub_CA=24)

### Specs:

- Dimensions: 5" (121.5mm) x 10" (255.2mm) x 8" (205mm)
- Weight: 13.9lbs (6.3kg)
- Core i5 (Sky Lake at launch then convert to Coffee Lake Q4'18)
  - Kaby Lake Gen Gfx driver incompatible with CV SDK
- Fanless
- 8GB of RAM
- 1TB HDD
- 2x PCIe x8
- LAN1: Intel® I219LM PCIe controller
- LAN2 (iRIS): Intel® I210 PCIe controller
- WIFI/BT : Realtek RTL8821AE : 1T1R wifi module kit for embedded system, IEEE802.11a/b/g/n/ac WiFi with Bluetooth 4.0/3.0+HS, 1 x wifi module, 2 x 400mm RF cable, 2 x Antenna, RoHS
- I/O Ports: 4x USB 3.0, 4 x USB 2.0, 4x RS-232, 2x RS-232/485, 8-bit DIO, 1x Line-out, 1x Mic-in
- Operating Temp: -20°C~60°C

<https://software.intel.com/en-us/blogs/2018/06/13/introducing-the-tank-aiot-developer-kit>

# INTRODUCING THE UP2 GROVE IOT DEVELOPMENT KIT

## High-Performance Features

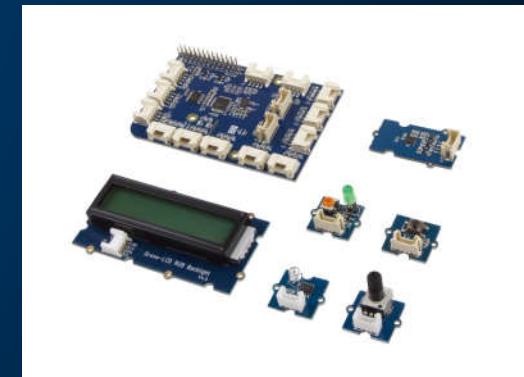
- Fast CPU and graphics capabilities
- Multiple displays, Dual network ports
- Many I/O expansion options

## Integrated Software

- Preinstalled Ubuntu\* 16.04
- Over 400 sensor libraries
- Integration for major third-party cloud providers

## Development

- Develop simply with Arduino Create\*
- Optimize code with Intel® System Studio



# INDUSTRIAL REVOLUTION 4.0

1<sup>ST</sup>



1760'S

Steam, Water  
Mechanized  
Production

2<sup>ND</sup>



1860'S

Electrification, Oil,  
Mass Production

3<sup>RD</sup>



LATE 1900'S

Invention of the  
Microchip

4<sup>TH</sup>



NOW

Invention of the  
computerized network

# INDUSTRIAL CUSTOMERS ARE ASKING ...

How can I  
**capture knowledge** for my  
transitioning workforce?



How Can I Better  
**Innovate?**



I need to achieve  
**Real Time  
Visibility**



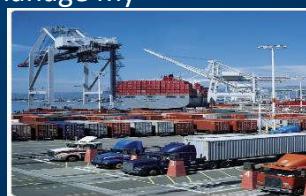
How Do I  
Improve **workforce  
productivity?**

How Can I  
Introduce new IOT  
solutions faster?

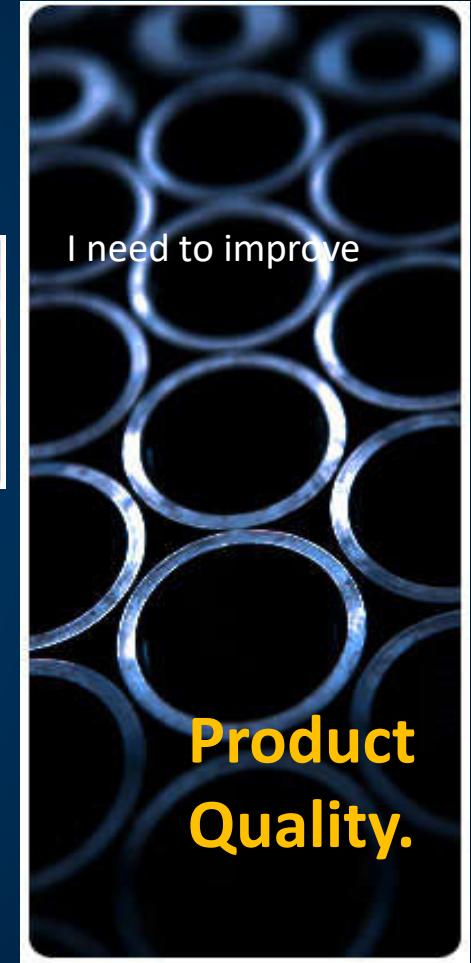


How can I  
**Reduce  
Downtime?**

How can I have better visibility to  
manage my



**Global Supply Chain?**



# VISIBILITY LEVERAGED FOR DECISION MAKING

*“While manufacturers have long had access to data collected on the plant floor, it's typically been locked away in proprietary manufacturing software silos, restricting their ability to leverage it for decision making, according to Matt Wells, product general manager for automation software at GE Digital, based in San Ramon, Calif. That changes with IoT, which makes it far easier to collect and manage large amounts of manufacturing data not just in a single factory, but across multiple production sites through the cloud, he said. When paired with analytics, companies will gain better insights, allowing them to optimize plant operations, reduce quality defects and perform preventative maintenance, according to Wells.”*

*Matt Wells, product general manager for automation software at GE Digital, based in San Ramon, Calif.*



# INDUSTRIAL EDGE COMPUTE IS TRANSFORMING

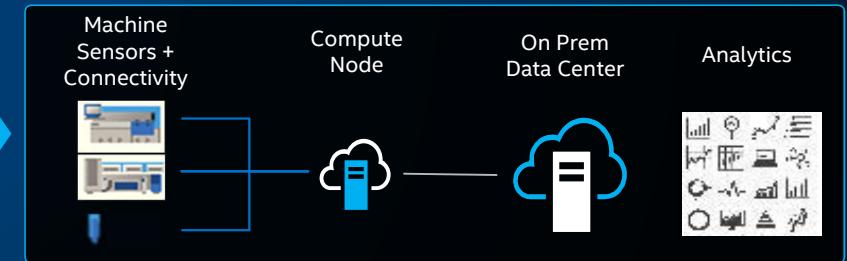
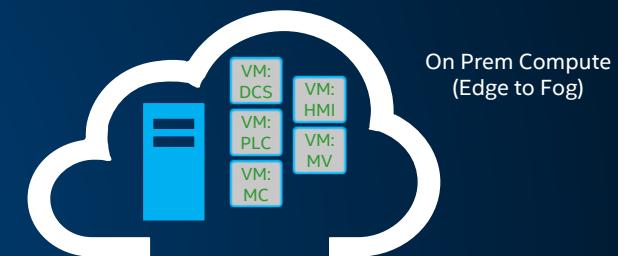
FROM THIS...

PROPRIETARY, SPECIALIZED, MONOLITHIC



TO THIS...

VIRTUALIZED, OPEN, INTEROPERABLE



ENABLED BY TECHNICAL PILLARS OF TRANSFORMATION

VIRTUALIZATION

SECURITY

SAFETY

ANALYTICS (A)

MACHINE VISION

REAL TIME

# INDUSTRIAL IOT

Industrial processes are taking on a **dual nature**, one **physical** and the other **digital**. Together Industry 4.0 runs on **Cyber-Physical** machines.



## WHAT?

Sensors are connecting our tools to their physical environment. The Internet of Things is connecting our tools to each other, and large scale computing is connecting our tools to us through optimization of process and analytics.



## WHY?

IIoT is about decoupling devices from applications and gaining visibility into business processes. When each manufacturing device can provide data about its use and status then manufacturing processes can be dynamically configured and reconfigured by a data-driven, software processes. Manufacturing will be able to move faster, be more flexible, meet higher work safety standards and fulfill higher quality standards.

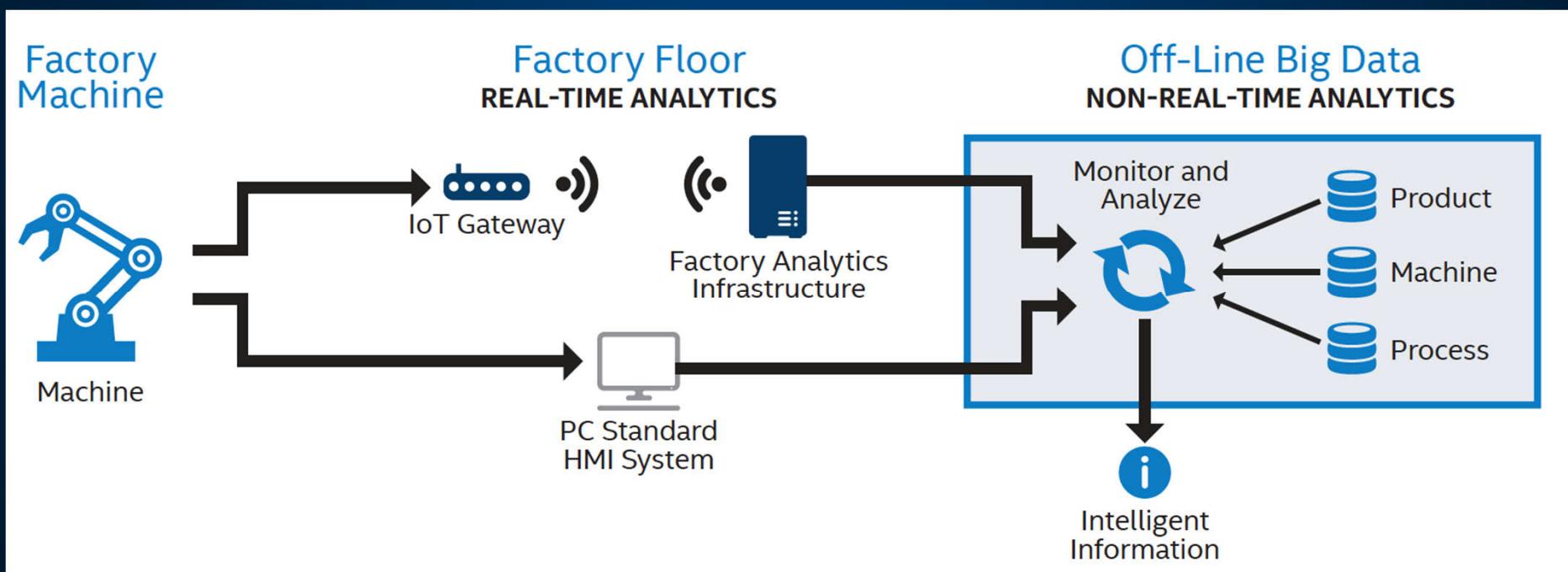


## HOW?

Working through Industrial Consortiums and Open Industrial Standards to connect current industrial processes to physical sensors, secure protocols, new safety standards, virtualization, real-time automation and machine learning will enable visibility and optimization of current business processes.

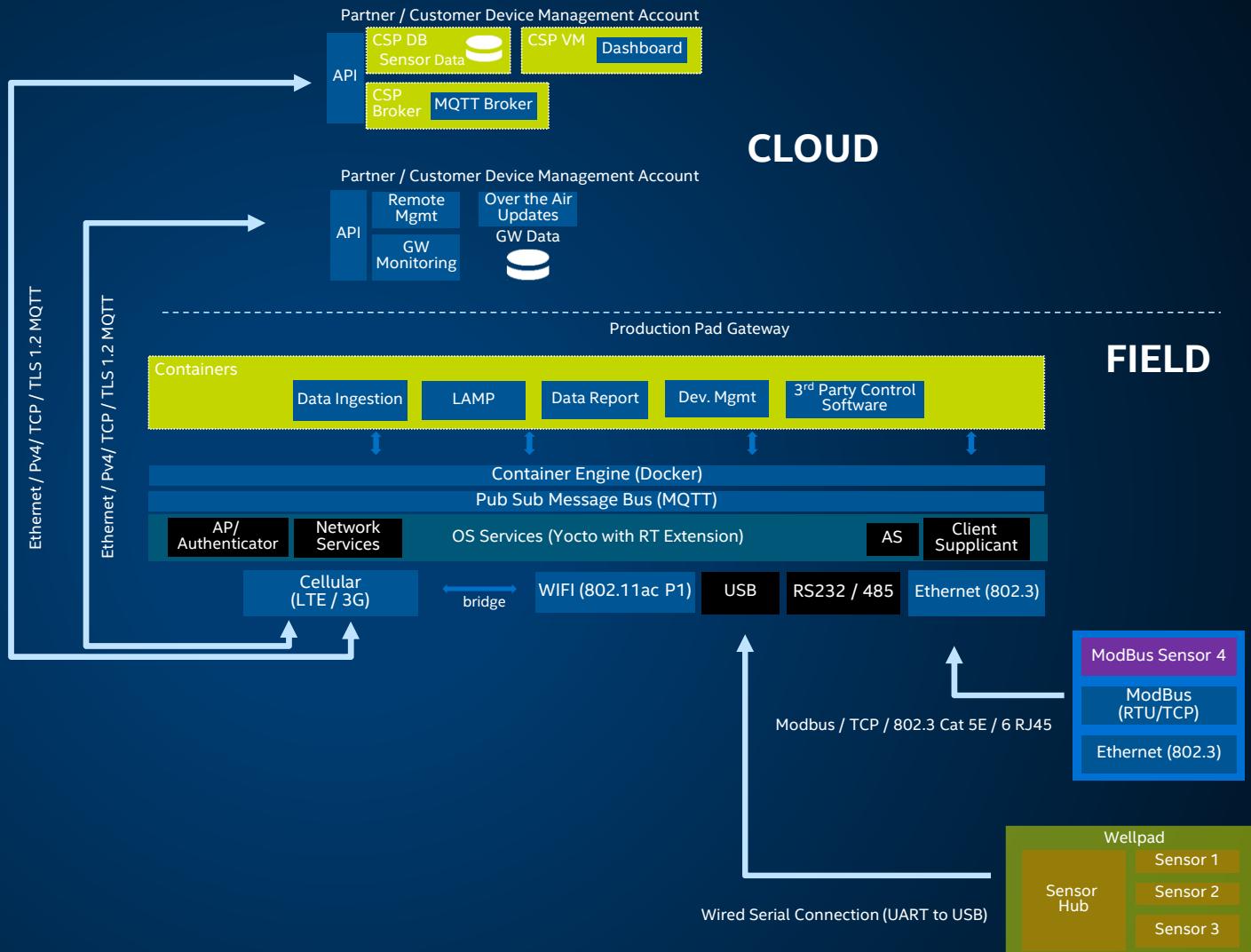
# INTEL FACTORY AUTOMATION

- Pervasive Robotic Transport
- Real-Time Excursion Control
- Advanced MES & Decision Making
- Predictive Maintenance
- Remote Operation

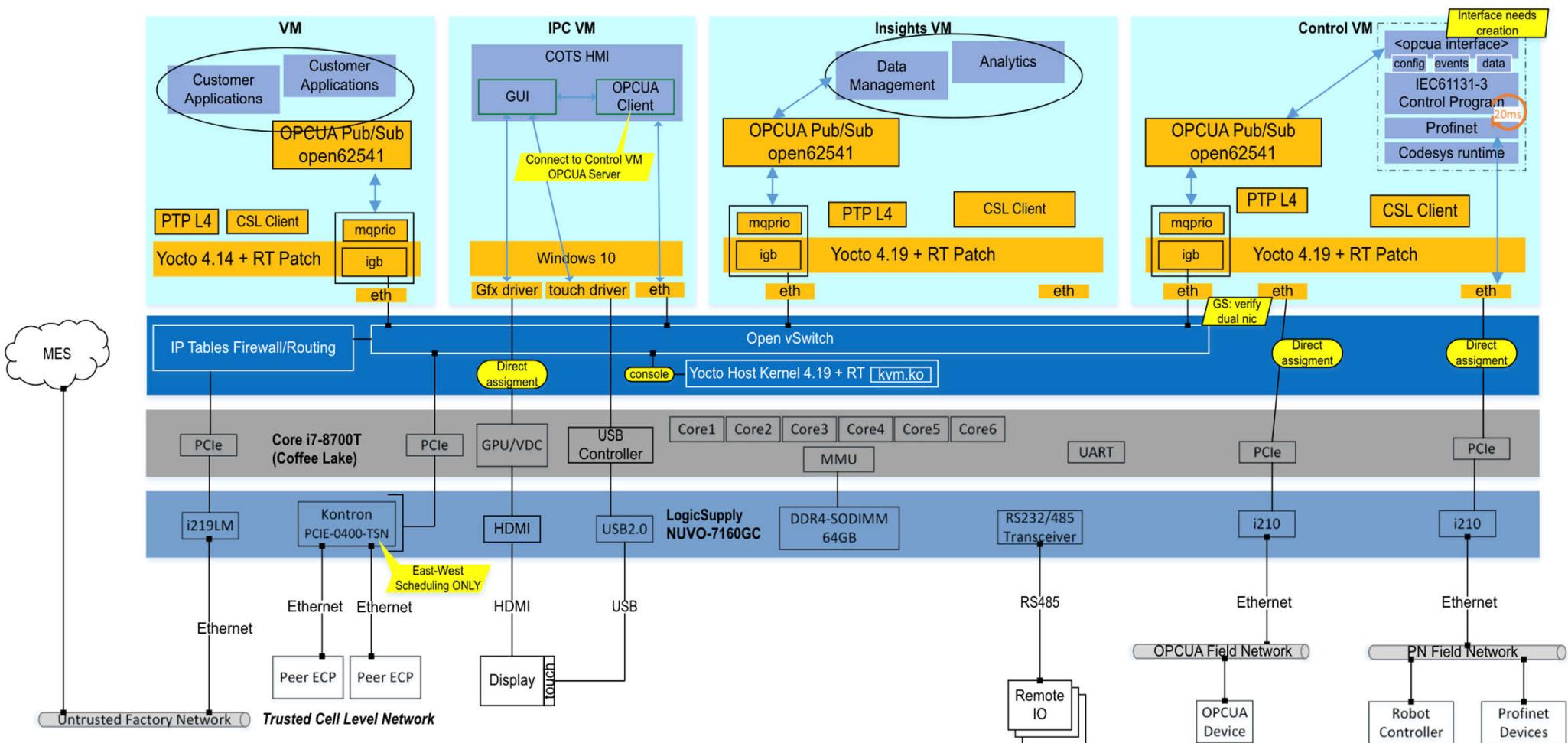


# UNIVERSAL WELLPAD CONTROLLER

SECURELY AND ECONOMICALLY  
MONITOR AND CONTROL OIL AND GAS  
PRODUCTION FACILITIES



# INTEL POWERED MANUFACTURING





# VISION FOR INDUSTRIAL IOT

# INTEL TECHNOLOGY FOR INDUSTRIAL IOT/INDUSTRY 4.0



## Open Platform

built with interfaces and APIs that enable integration with legacy systems and devices and with platforms from multiple vendors.



## Interoperability

is designed into IA CPUs to offer backward compatibility to help SW and application reuse thus reducing development time and resources.



## Performance at the Edge

that enables near-real-time analytics, local decision making, and tighter process controls.



## Advanced Security

for trusted data from edge to cloud and protection from costly attacks.



## Scalability

for varying levels of gateway performance, with a broad range of support from Intel® Quark™, Intel® Atom™, Intel® Core™ and Intel® Xeon® processor D and E families.



## Manageability

for secure remote upgrades and services.



## Faster, More Flexible Deployment

with a platform that supports your choice of operating systems and ecosystem applications.



# INTEL IS PARTNERING WITH THE ECOSYSTEM

# ECOSYSTEM PARTNERS

IOT EQUIPMENT  
BUILDERS

IOT SOLUTION  
PROVIDERS

IOT TECH  
PROVIDERS



\* Other names and brands may be claimed as the property of others.

# INTEL INGREDIENTS IN INDUSTRIAL AUTOMATION

Data Center

Compute Performance  
I/O intensive



Factory server

Compute Performance  
I/O intensive



Industrial PC

Compute Performance  
Visualization/ UX  
RT Perf



PLC/PAC

I/O intensive  
Form Factor Sensitive  
RT Perf



HMI

Compute Performance  
Visualization/ UX  
Form Factor Sensitive



Remote IO

I/O intensive  
RT Perf



Robots

Compute Performance  
I/O intensive  
RT Perf



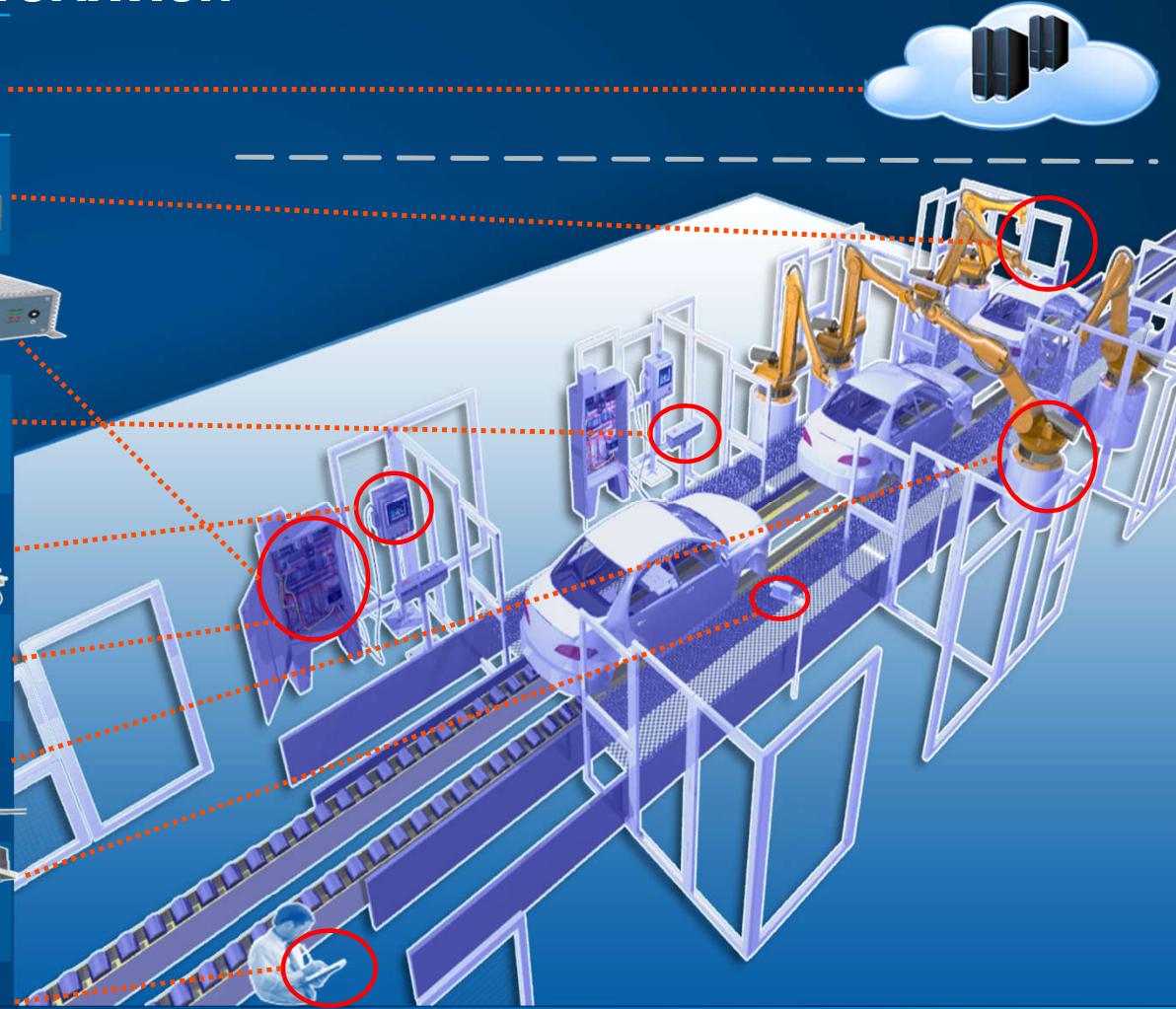
Machine visions

Compute Performance  
Form Factor Sensitive



Mobile workforce

Visualization/ UX  
Form Factor Sensitive



# HONEYWELL CONNECTED FREIGHT

Intel and Honeywell collaborate to develop 1<sup>st</sup> instantiation of Intel connected logistic platform through close partnership with key 3PL companies. The platform will deliver a cost effective and connected asset management solution.

## Solution

- Smart sensor tags with proprietary wireless sensor network
- Intel based gateway with cellular and Wi-Fi connectivity
- Analytics capability
- End to end HW enabled security

## Use Cases

- Asset location tracking
- Condition monitoring: Humidity, shock, tilt, fall, ...
- Logistic routing optimization
- Speedier customs clearances
- Customer satisfaction

\*Other names and brands may be claimed as the property of other companies.  
<https://www.honeywell.com/solutions/workflow/connected-freight>



[https://www.youtube.com/watch?list=PL6g2Y3N0CFAZUID8Mlb48a33Lz3Hq0Y\\_8&v=zeRLY9ZanXA](https://www.youtube.com/watch?list=PL6g2Y3N0CFAZUID8Mlb48a33Lz3Hq0Y_8&v=zeRLY9ZanXA)



# CASE STUDY HEADLINES

- Fast Track IoT Smart Building, Industrial and City Solutions with Altiux and Intel
- Altiux Helps Integrated Steel Plant Reduce ACC Energy Consumption by 18%
- Altiux Helps Intelligent Glass Manufacturer Reduce On-site Maintenance Calls
- Alleantia - Achieving the Power of Industry 4.0 with Plug-and-Play Simplicity
- Intel Partner Simularity Delivers AI Software for Asset Monitoring
- Cut Energy Costs with a Smart Real-Time Occupancy Solution from Feedback Solutions and Intel
- The Infiswift IoT platform based on high-performance Intel® architecture enables more efficient agricultural operations.
- Enabling data-driven insight and holistic visibility for Telco, service providers, and the enterprise

<http://www.altiux.com/solution-brief-altiux-iot-and-intel.html>



