OTC I 4.0 (Smart Factory)

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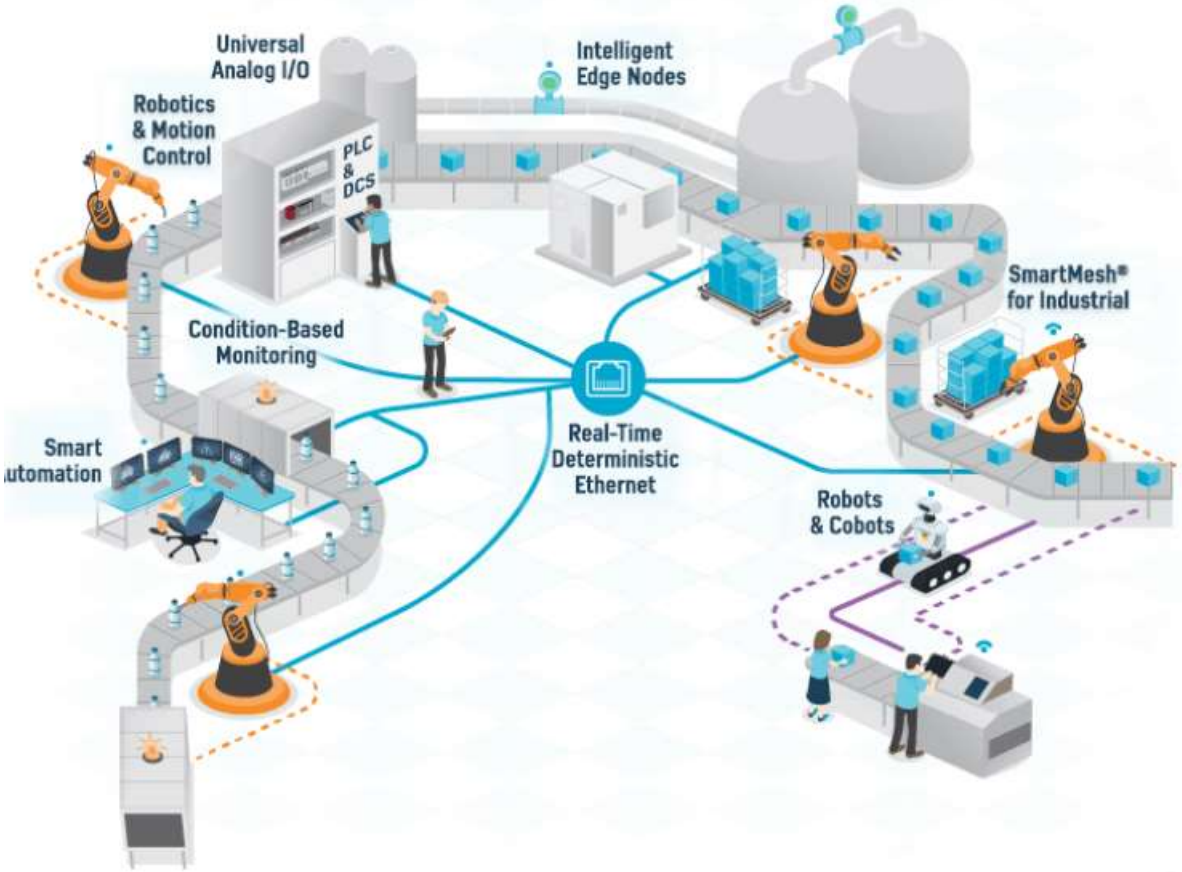
The next big thing in manufacturing



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What is I 4.0 (Smart Factory)

4th Industrial Revolution Future
(Big Data, M2M communication, Intelligent Automation)

3rd Industrial Revolution 1914-Present
(Computers, Automation)

2nd Industrial Revolution 1850-1914
(Electricity, Mass Production)

1st Industrial Revolution 1700s
(Mechanization, Water/Steam power)

I 4.0 (Smart Factory) Philosophy

Lights out manufacturing

Popular in Asian and European auto manufacturing

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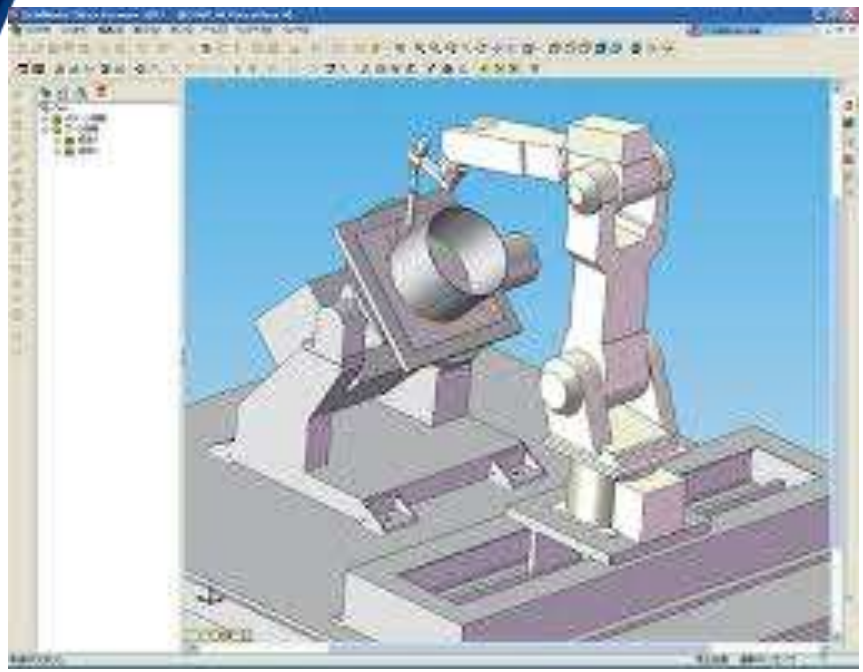
Nine Pillars of I 4.0

1. Virtual Reality



OFFLINE PROGRAMMING

Design without physical prototype

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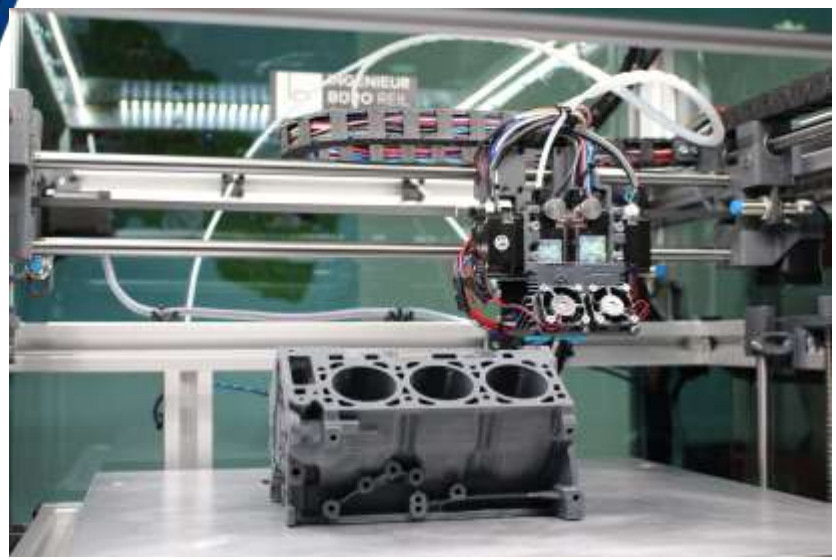
2. Adaptive Manufacturing

New way

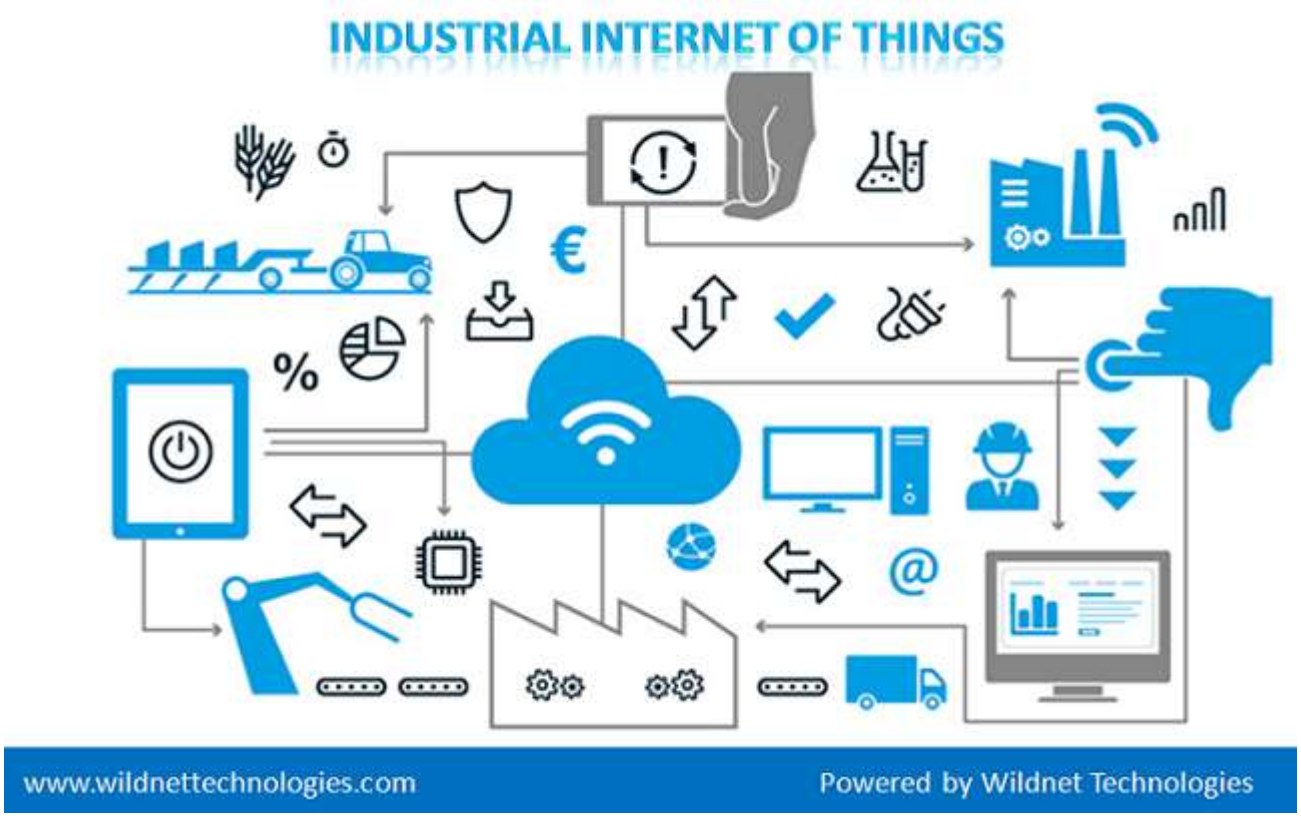


3 D Printing

Old way

Machining from block of steel

3. Internet Of Things
IIOT



Every machine and system connected

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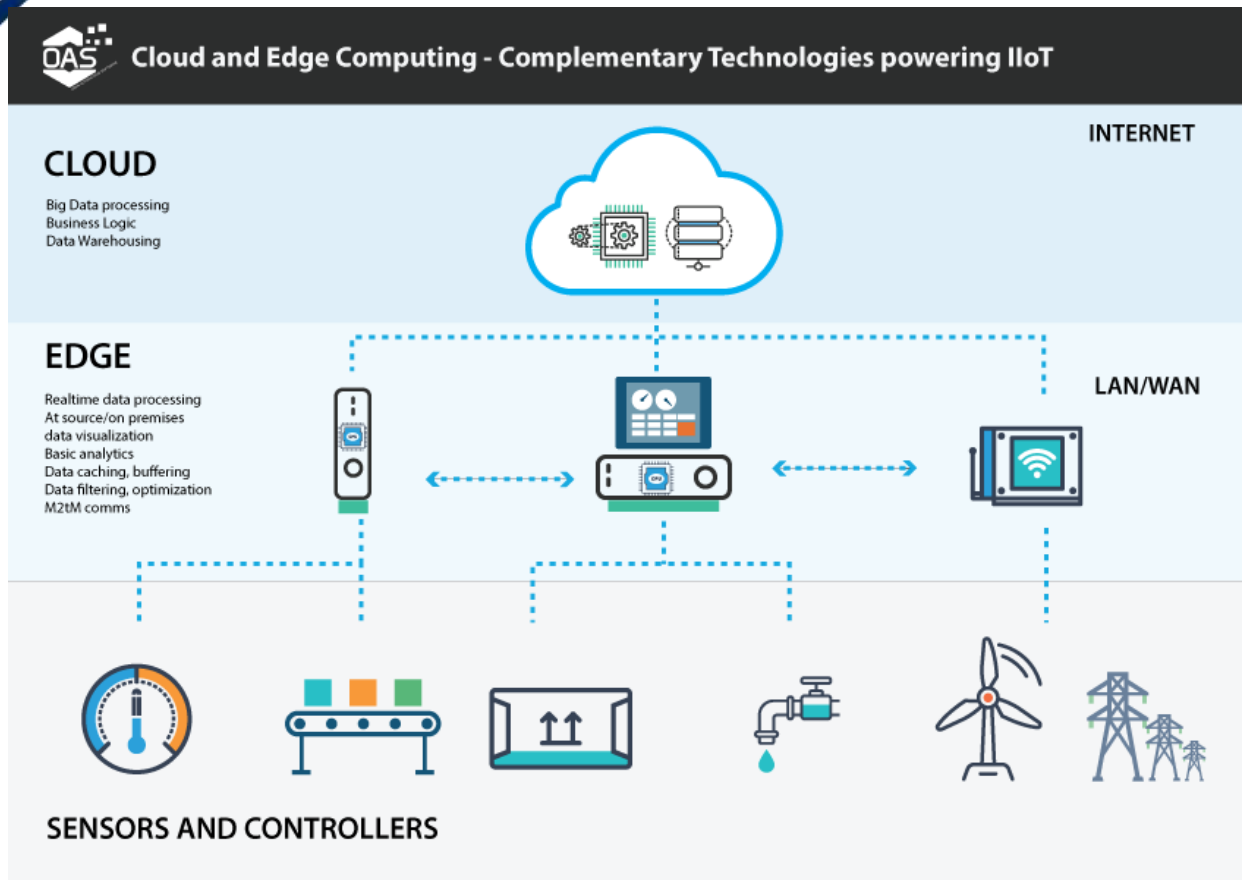
4. BIG DATA

Data mining, Predictive analytics, Machine learning

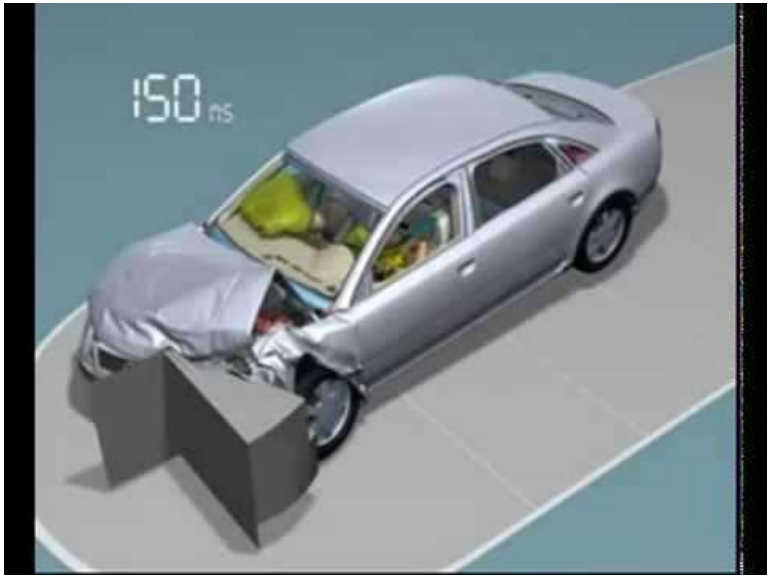
5G

5. Cloud Computing



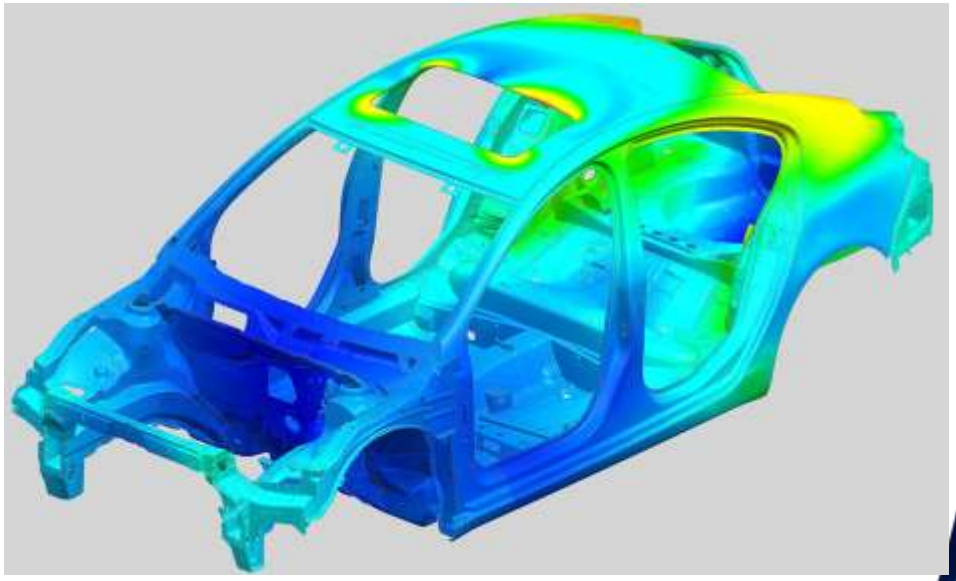
6. Advanced Simulations

TESTING



Test without destroying a car

DESIGN



FEA testing

Locate stress hot spots

7. Autonomous robots

AGVS, Cobots, Robot vision , Drones

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8. Universal Integration

Tracking parts through all machines and processes

From order to delivery

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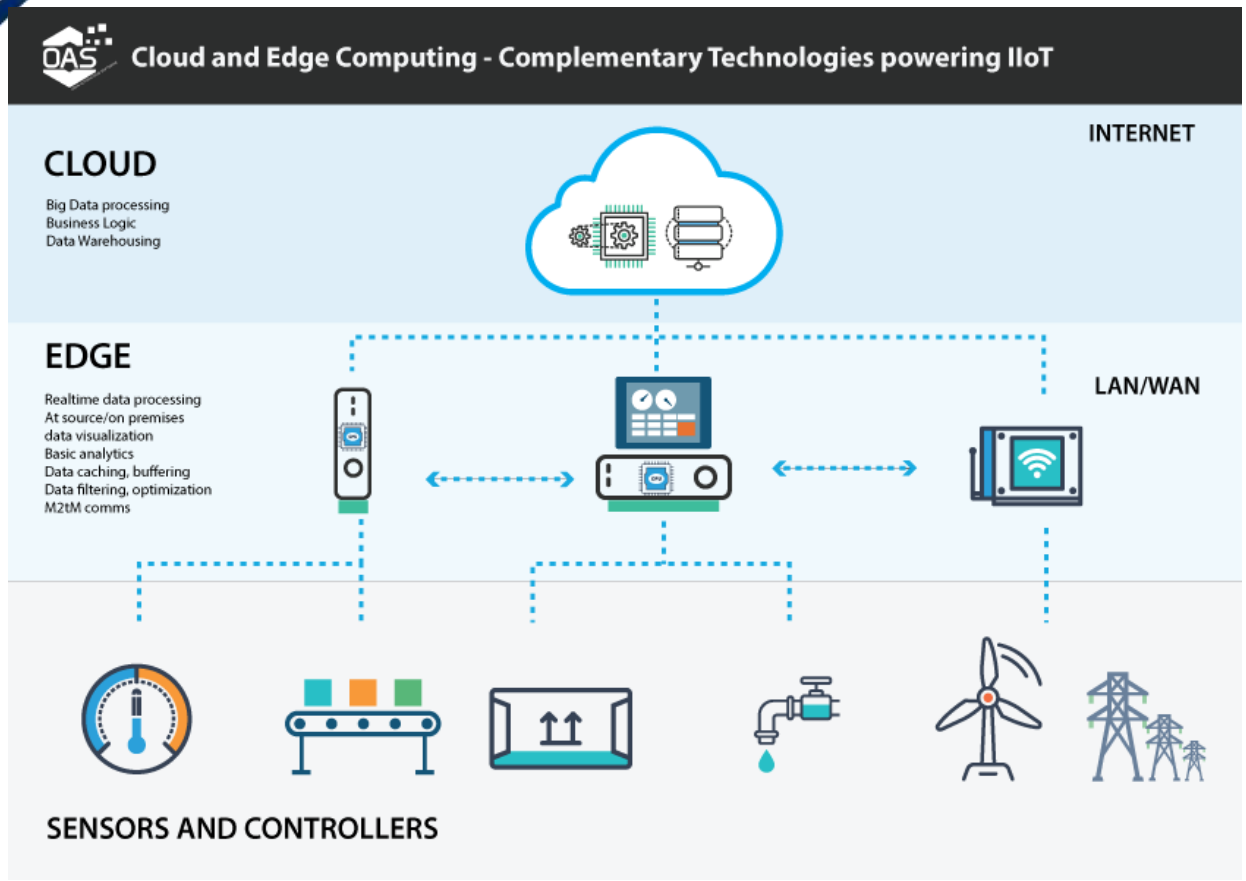
9. Cyber Security

Cloud Computing vs Edge



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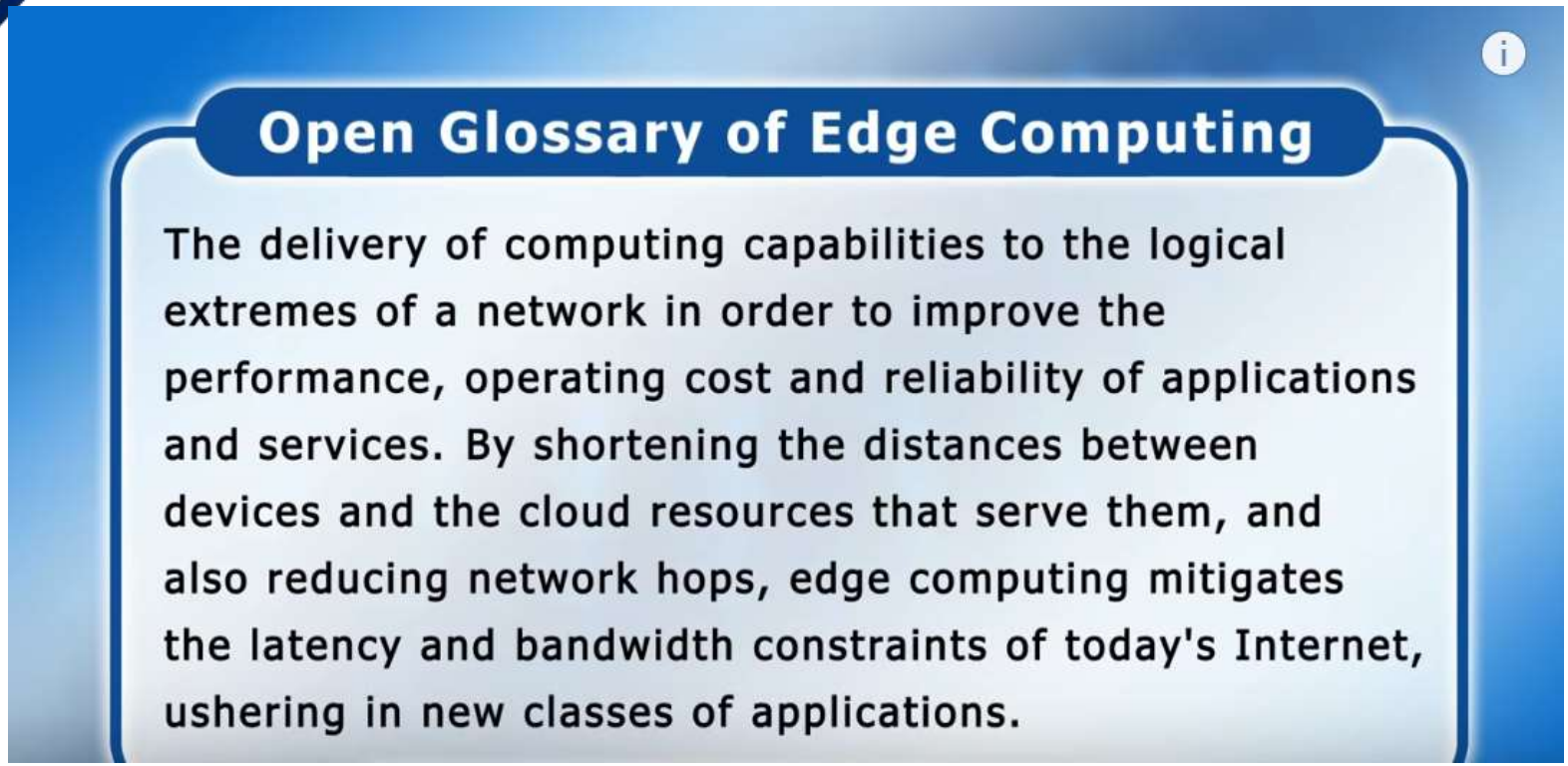
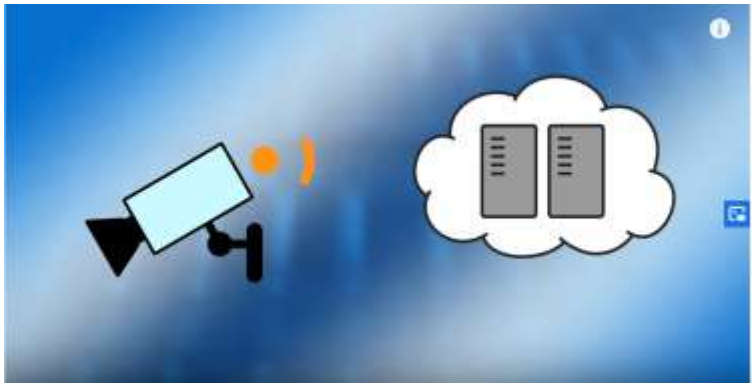
Edge Computing

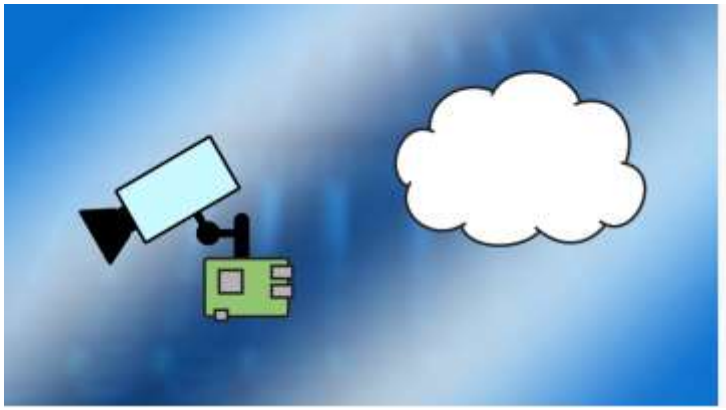


EDGE devices

Large amounts of data from video

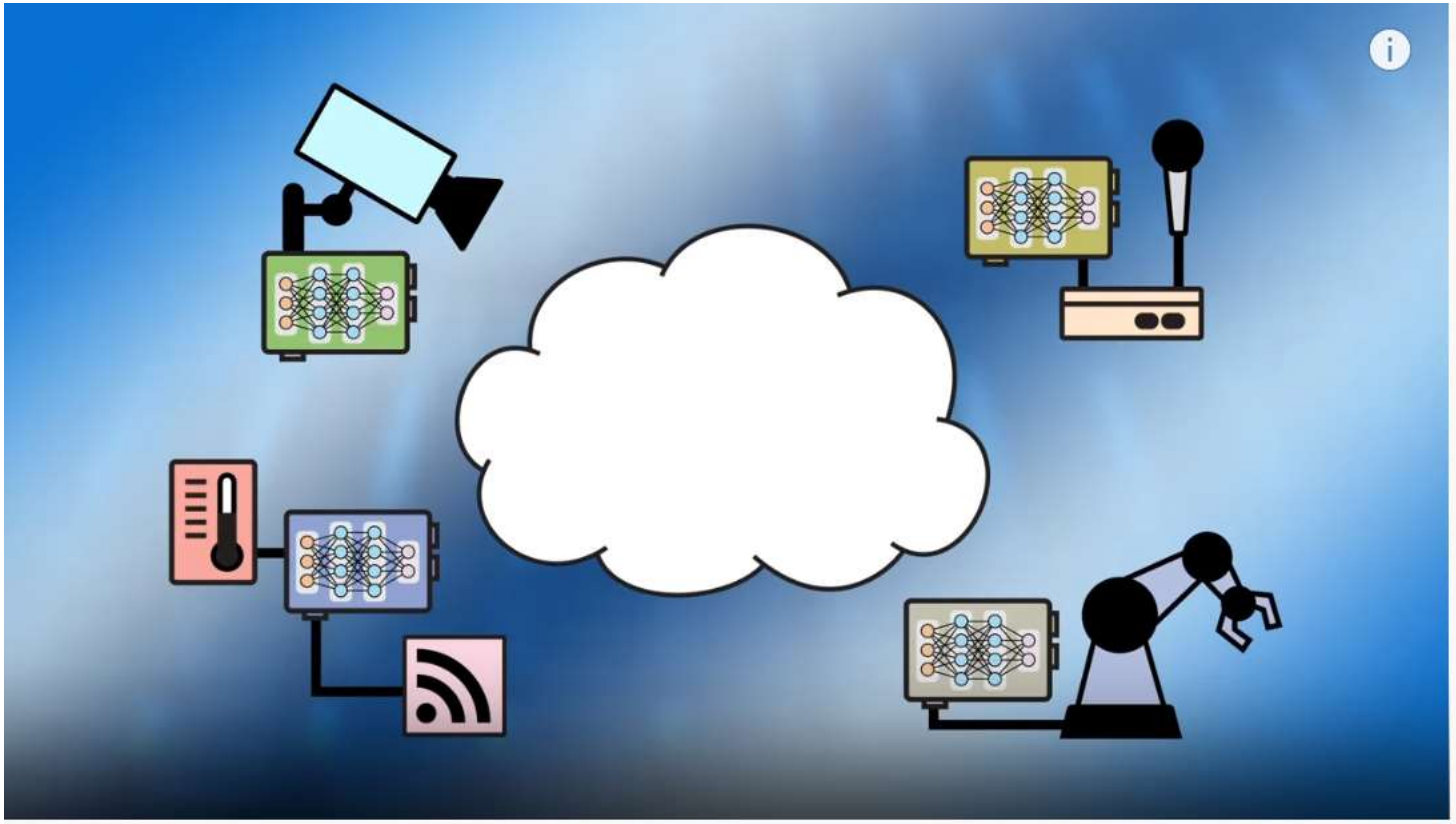


Local device (EDGE) reduce cloud computing



Save on band width and remove latency

EDGE devices with their own memory.



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Raspberry Pie

Raspberry PI

Single board device with memory ,I/O, mouse. Key board, USB connections

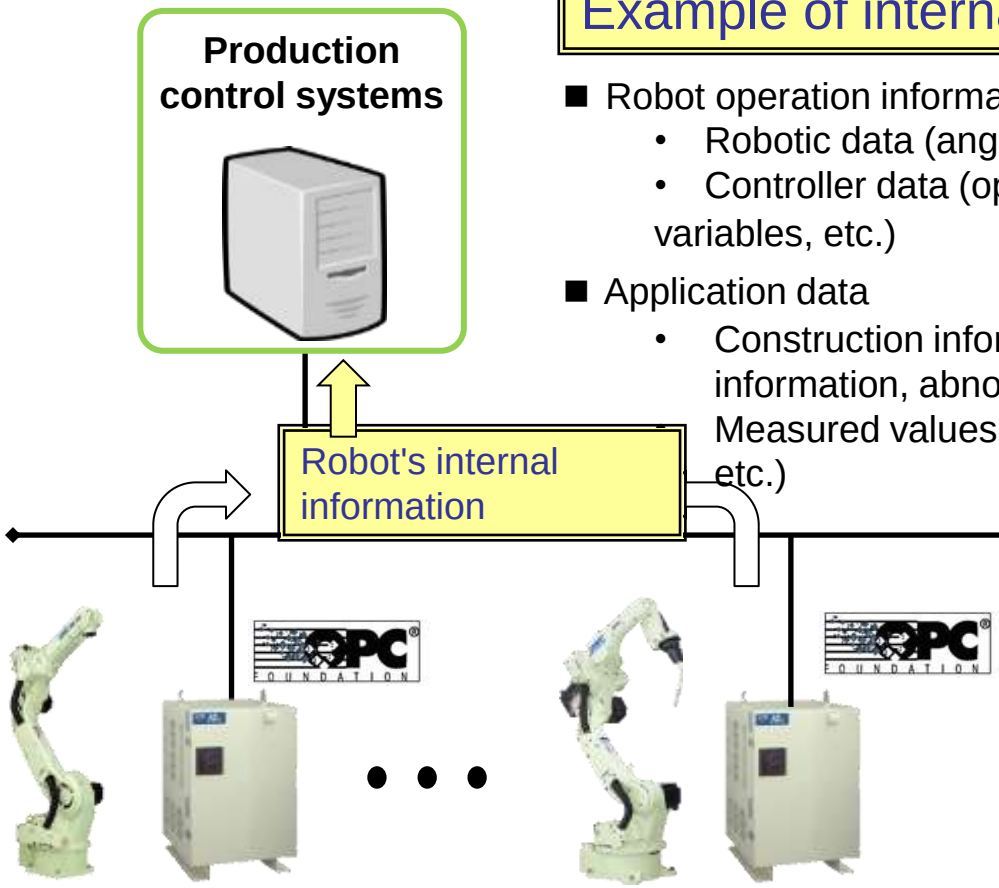
Similar products are popular for EDGE computing.

What does it mean for OTC?

Thank God. Not much.

Smooth information linkage with host systems

The robots required by our customers' production control systems can be easily processed. Supports advanced automation such as Industry 4.0.

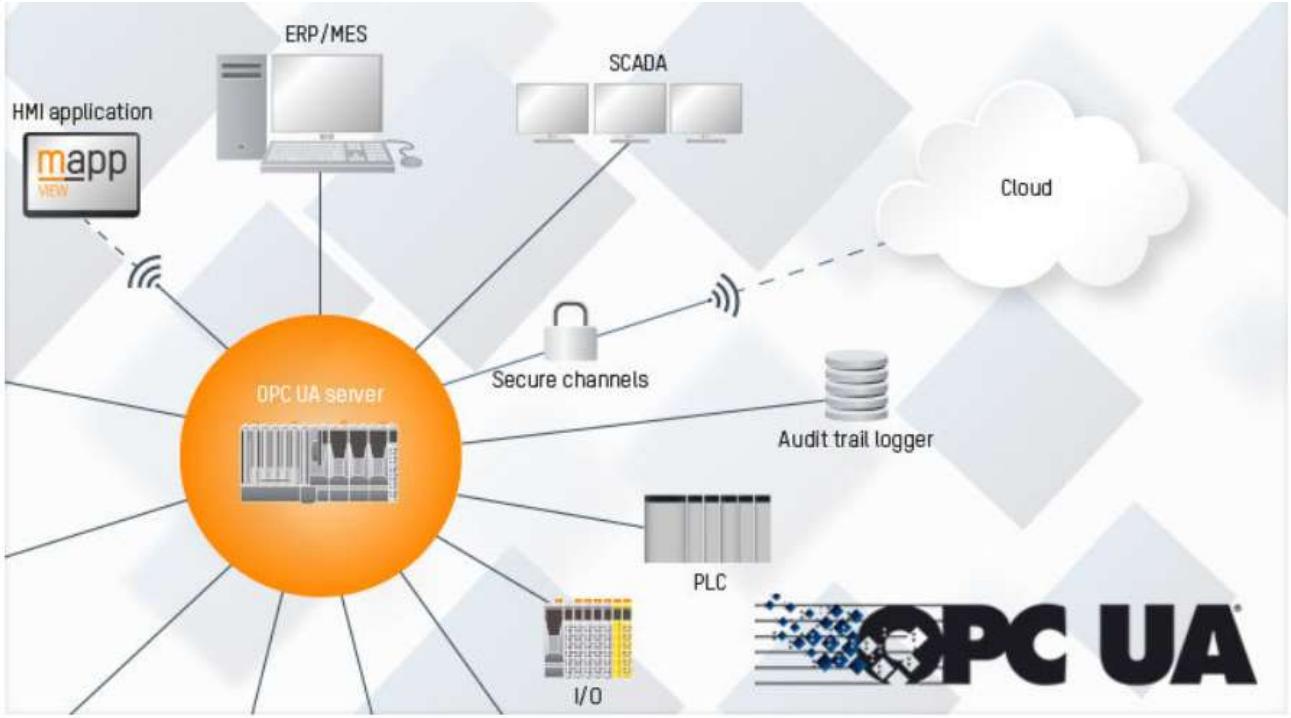


Example of internal robot information

- Robot operation information
  - Robotic data (angles, speeds, motor currents, temperature, etc.)
  - Controller data (operating modes, input/output signals, variables, etc.)
- Application data
  - Construction information (construction time, work piece information, abnormality information, etc.)
  - Measured values (welding current, voltages, wire feed load, etc.)

***** The internal information of the robot to be output is selected by TP.

What Is OPC UA?



The ideal communication protocol for Industry 4.0

OPEN PLATFORM COMMUNICATION

UA Stands for Unified Architecture

A Foundation made up of mostly controls engineers to create standards.

Similar to AWS.

Industrial Standard communication protocol for packaging data from the EDGE (your machines) to the IOT (Internet Of Things). Not a software.

We pay to be OPC UA compatible

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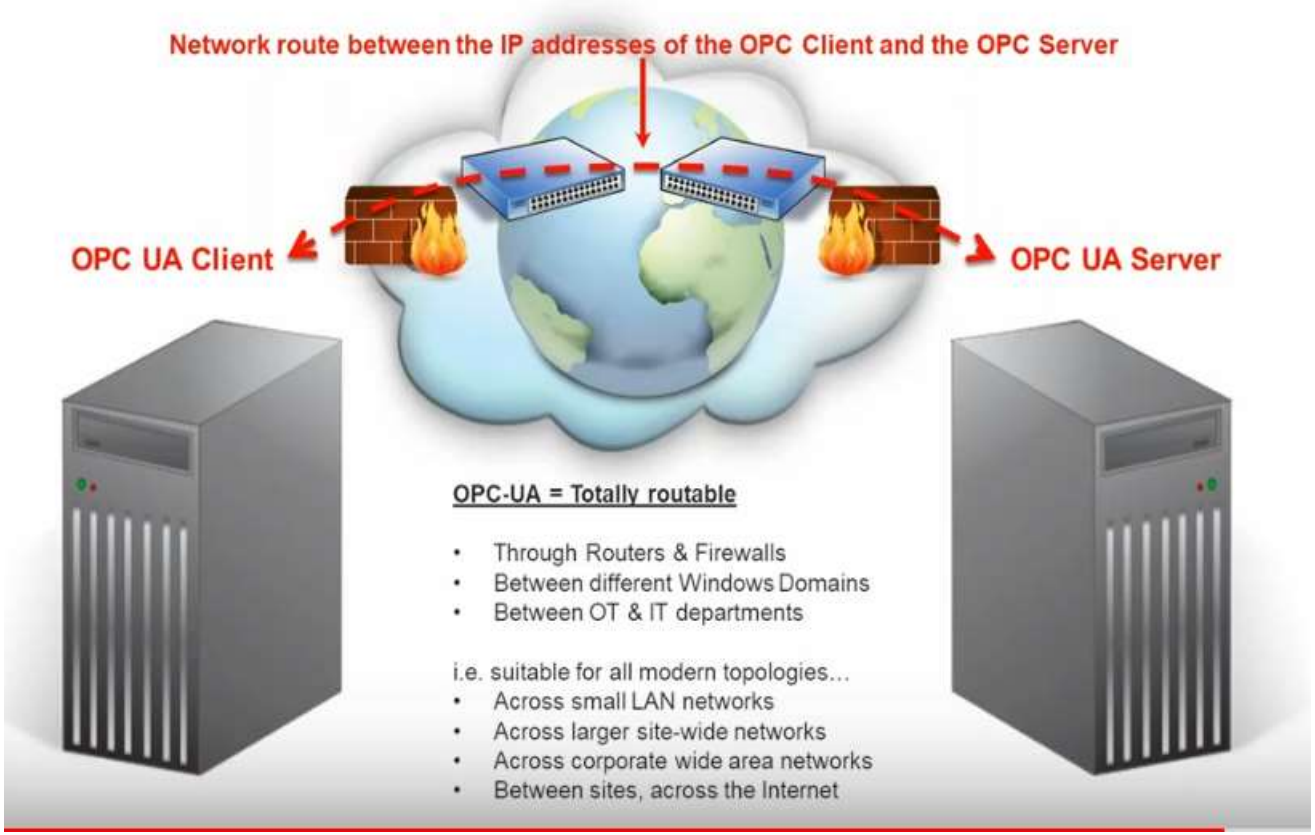
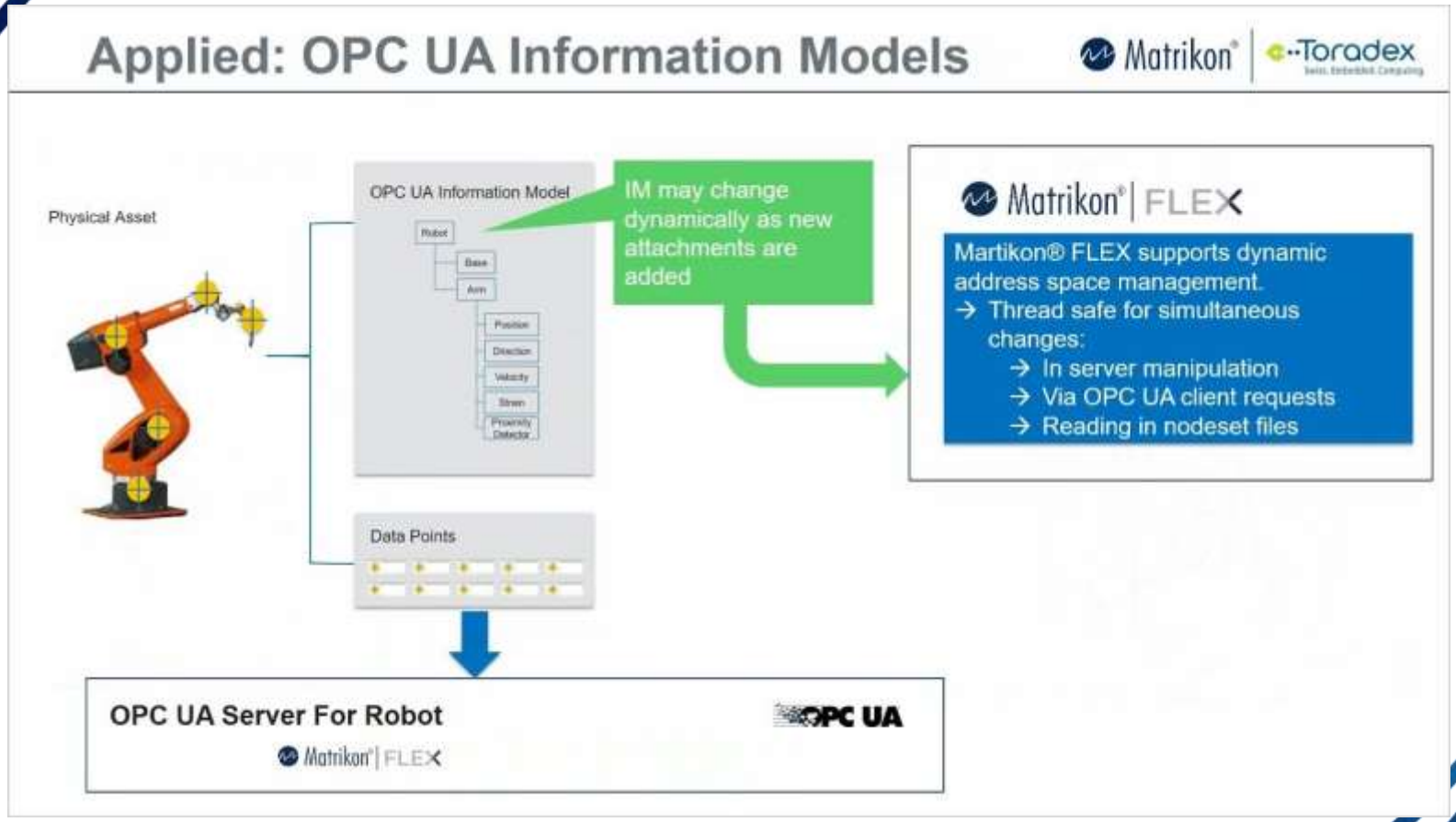
OPC-UA Server & Client communications



Robot data output chain example



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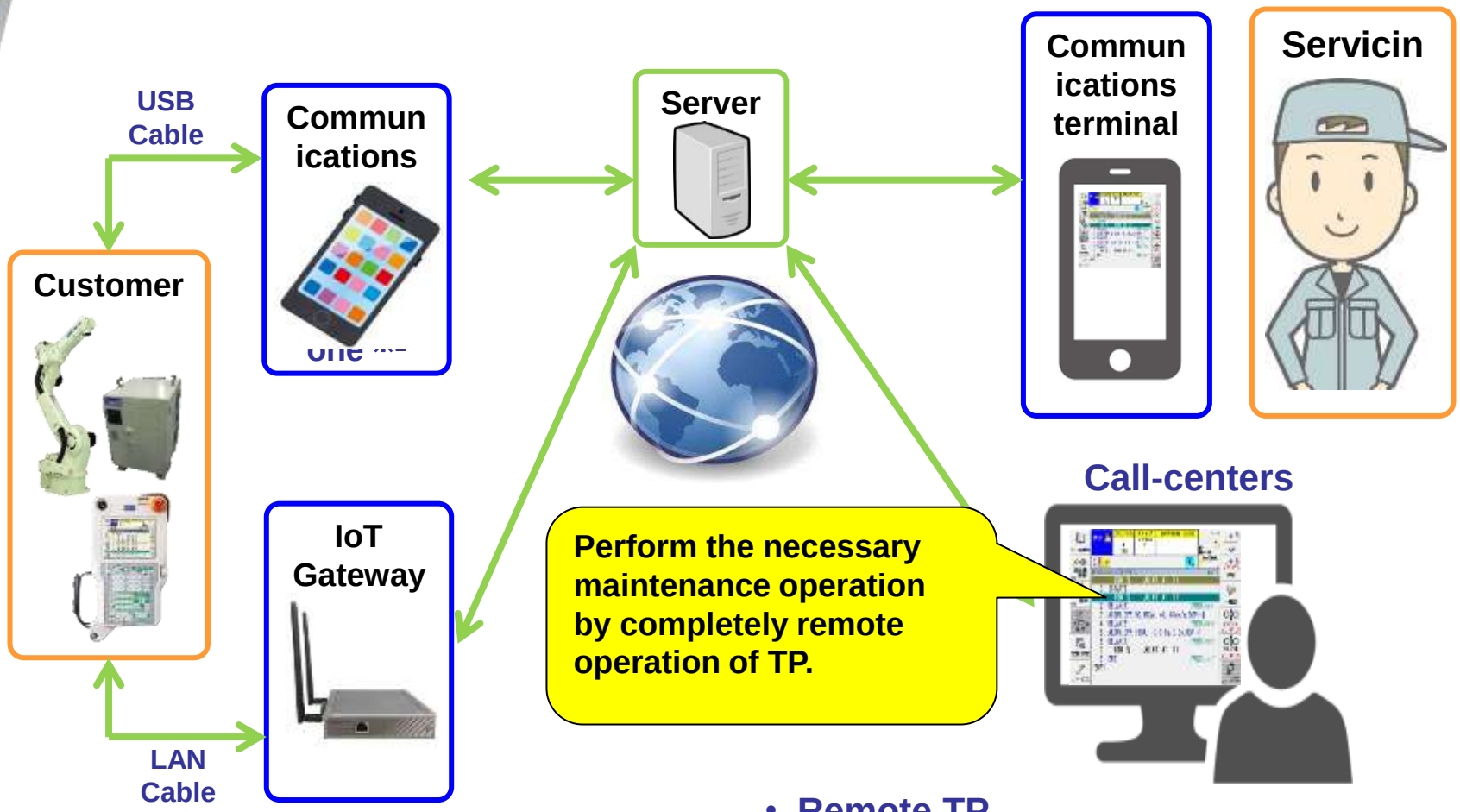
FD 21 output data example for I4.0 system

Robot information Group1 Welding Application

Group Number	Category Number	Item	unit
1	1	Arc ON time [Hour] (Last)	Hour
1	2	Arc ON time [Minute] (Last)	Minute
1	3	Arc ON time [Second] (Last)	Second
1	4	Arc ON time [Hour] (Previous)	Hour
1	5	Arc ON time [Hour] (Previous)	Minute
1	6	Arc ON time [Hour] (Previous)	Second
1	7	Weld Ratio (Last)	%
1	8	Weld Ratio (Previous)	%
1	9～12	Welder1～4 Setting value of Weld currenr	A
1	13～16	Welder1～4 Setting value of Weld voltage	V
1	17～20	Welder1～4 Setting value of Weld speed	cm/min
1	21～24	Welder1～4 Setting Gas flow	L/min
1	25～28	Welder1～4 Weld current (Monitor)	A
1	29～32	Welder1～4 Weld voltage (Monitor)	V
1	33～36	Welder1～4 Weld speed (Monitor)	cm/min
1	37～40	Welder1～4 Wire load factor	%
1	41～44	Welder1～4溶接機１～４のスパッタ抑制率	%
1	45～48	Welder1～4 Motor current of Wire Feeder	A
1	49～52	Welder1～4 Wire Feed speed (Wire Feeder)	cm/min
1	53～56	Welder1～4 Gas flow	L/min
1	57～60	Welder1～4 Driving force of Gas valve	%
1	61～64	Welder1～4 Wire load factor of Tig filler	%
1	65～68	Welder1～4 Wire feed speed (monitoring unit)	cm/min
1	69～72	Welder1～4 Wire feed speed of Tig filler (Monitoring unit	cm/min
1	73～76	Welder1～4 Primary input voltage	V
1	77～80	Welder1～4 Temperature of Control board	℃
1	81～84	Welder1～4 Temperatur of Main curcit	℃
1	85～88	Welder1～4 Frequency of cooling FAN1	rpm

Remote maintenance

Connect the robot controller to the service center via the network in case of trouble. Rapid support is available.



- Remote TP
- Remote backup
- Remote upgrade

*1 Only Android terminal is supported.

The good news is we only need to speak the I4.0 language. The rest is up to IT departments.

The Bad News is.

Our competition is about 3 years ahead

Miller , Lincoln ,Fronius

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NEW Words

I 4.0 (Smart factory)

IIOT Ind. Internet of Things

Edge Computing

Raspberry PI

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Thank you.

Questions???

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