

SAVE

ANIE
AUTOMAZIONE



OPC UA, lo standard per la comunicazione industriale

Alessandro Cazzola

Key Account Manager

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP

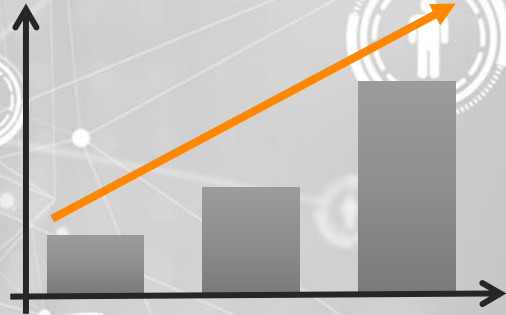


Sistema frammentato

Connettività assente

Sfide IT

Requisiti crescenti



Devicenet
Ethernet
Mobiles
POWERLINK
CAN
Sercos
Ethernet IP
Profinet

Apertura

Interoperabilità

Sicurezza

Prestazioni?

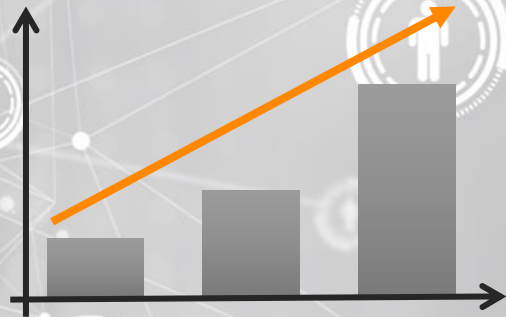


Plug &
Produce

Sicurezza

Big data

IT <> OT



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Ethernet IP
POWERLINK
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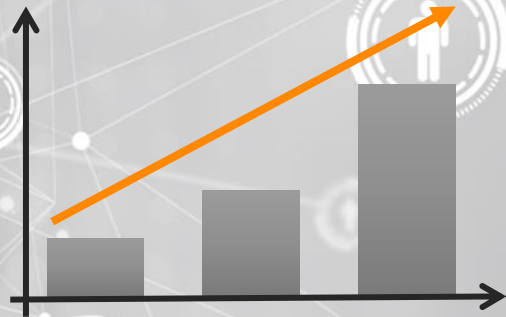


Plug &
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 **OPC UA**[®]

A hand is shown holding a glowing globe of the Earth. The globe is surrounded by a complex network of white lines and nodes. Several circular icons, each containing a white silhouette of a person, are connected to the network. The background is a soft blue gradient. A horizontal orange bar is positioned across the middle of the image, containing the text 'OPC Foundation' in white.

OPC Foundation



Dal 1996

Open Platform Communication

Supporto fornitori, costruttori, utilizzatori,
sviluppatori di software

Specifiche, tecnologie, processi, certificazioni

<https://opcfoundation.org>

FOUNDATION
T I O N



Più di 840 membri

F O U N D A T I O N

Unified Architecture Working Group

- Security sub-group
- PubSub Prototyping sub-group
- TSN sub-group

Compliance Working Group (CWG)

UA for Devices Working Group

Field Level Communication Initiative

Semantic Validation Group

Harmonization Working Group

PC
T I O N



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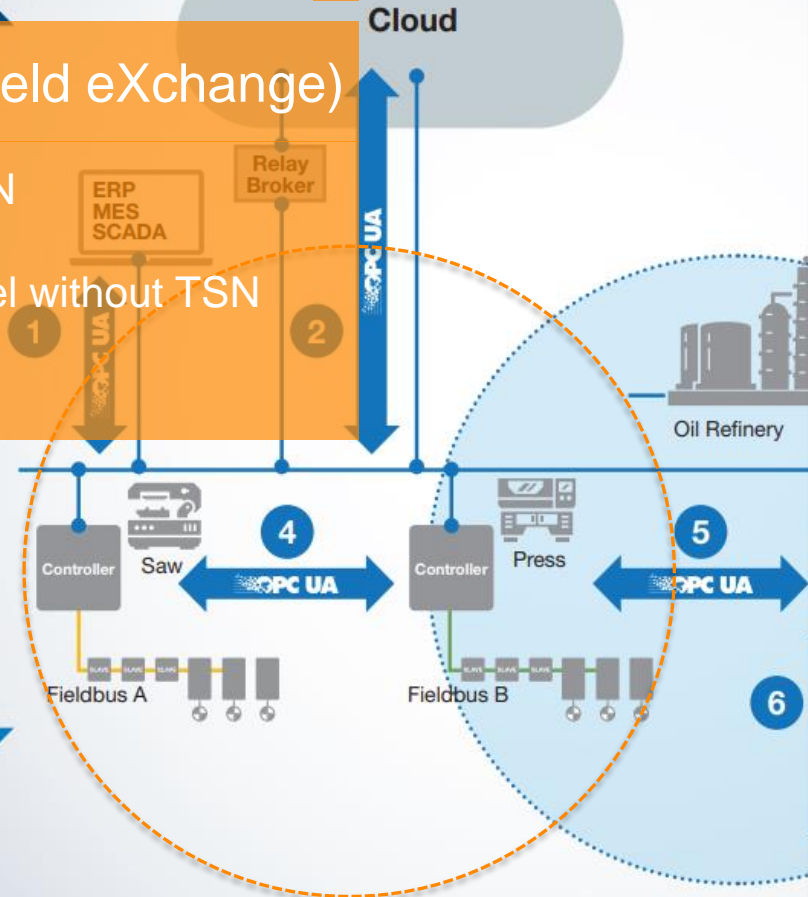


T I O N

Dal sensore al cloud

OPC UA FX (Field eXchange)

- OPC UA over TSN
- OPC UA over 5G
- OPC UA field-level without TSN
- OPC UA Motion
- OPC UA Safety



- 1 OPC UA on the business LAN
- 2 OPC UA for Cloud (WAN)
- 3 OPC UA over GSM (cellular)
- 4 OPC UA – Supervisory Control
- 5 Controller to controller (@ TSN)
- 6 Controller to field device (@ TSN)
- 7 OPC UA over 5G (cellular)
- 8 Future Ready

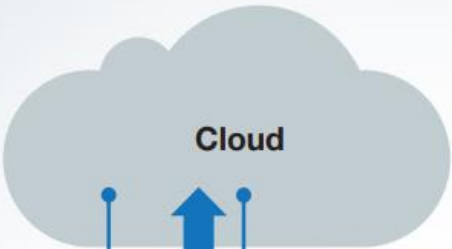
Initiative for Field Level Communications



Industrial Interoperability:
From Sensor
into Cloud

OPC UA

- Information model
- Semantica
- Security
- Connessione IT



2



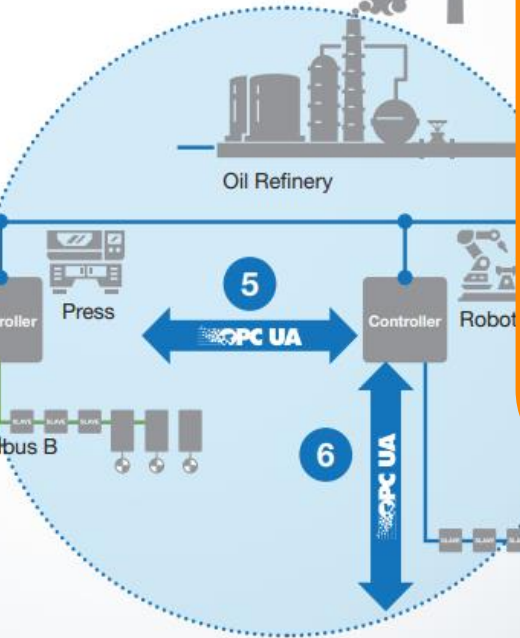
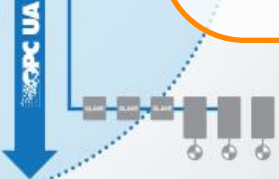
4



5



6

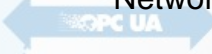


3

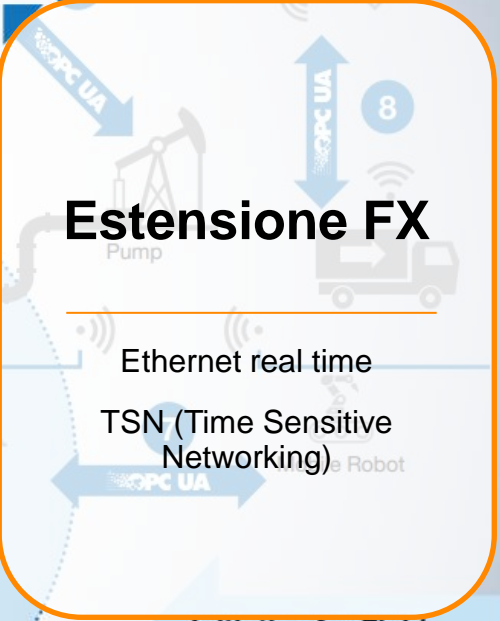


Estensione FX

- Ethernet real time
- TSN (Time Sensitive Networking)



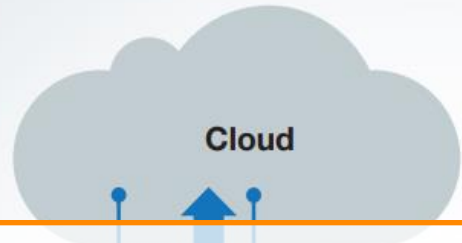
8



Initiative for Field Level Communications



Industrial Interoperability:
From Sensor
into Cloud



Cloud

OPC UA



2



3



Satellit



8



Estensione FX



Oil Refinery



Pump



Information model

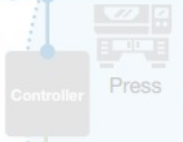
Semantica

Security

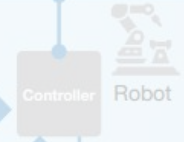
Connessione IT



4



5



Ethernet real time

TSN (Time Sensitive Networking)



6



Initiative for Field Level Communications



1 PLC

200 nodi

1 display

5 camere HD

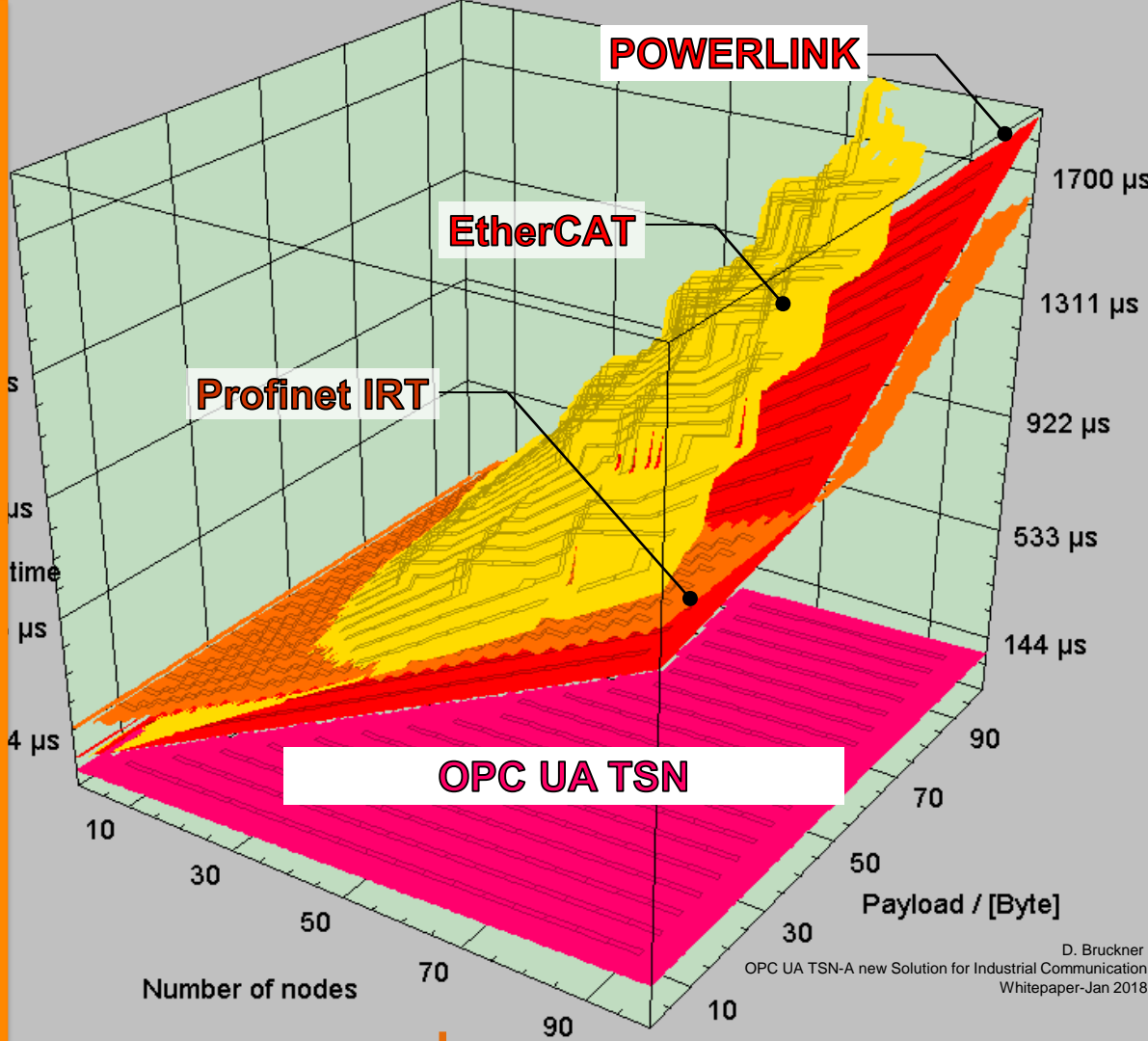
100 μ s tempo di ciclo

50 μ s cross traffic

100 ns sincronizzazione

Traffico real time

Aumento prestazioni
18 volte
Qualsiasi bus attuale



The background of the slide is a complex digital graphic. It features a central globe of the Earth, surrounded by a network of white lines and nodes. Several circular icons, each containing a white silhouette of a person, are connected to the network. The overall color palette is blue and white, with a prominent orange horizontal band across the middle. Two hands are visible at the top and bottom edges, appearing to interact with the digital elements.

Note tecniche

The OPC UA logo is located in the bottom right corner of the orange band. It consists of a stylized blue and white graphic of a network or data flow on the left, followed by the text "OPC UA" in a bold, black, sans-serif font.

OPC UA

OPC UA information model

Vendor specific extension

Companion Information Models

(e.g. robots, CNC machines, wind power, P&ID exchange)

Core Information Models

(e.g. analog data, alarms, state machines, file transfer)

Information Model Building Blocks

(Meta Model)

Information Model Access

Browse and access data and semantics
execute methods, configure

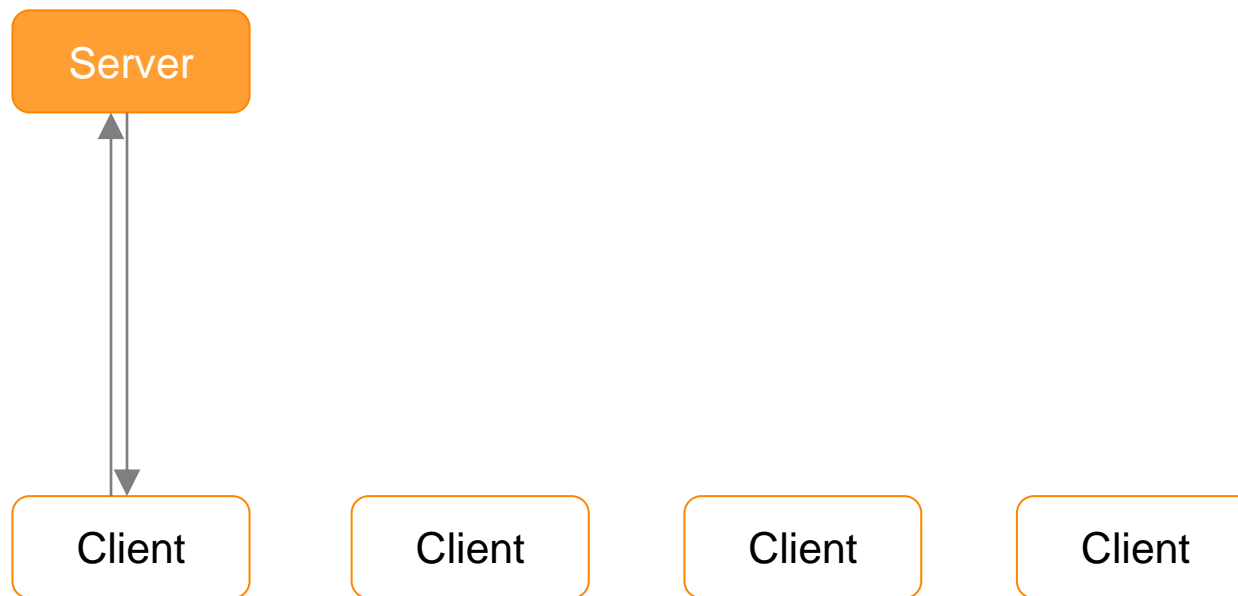
Data and event
notifications

Client-Server

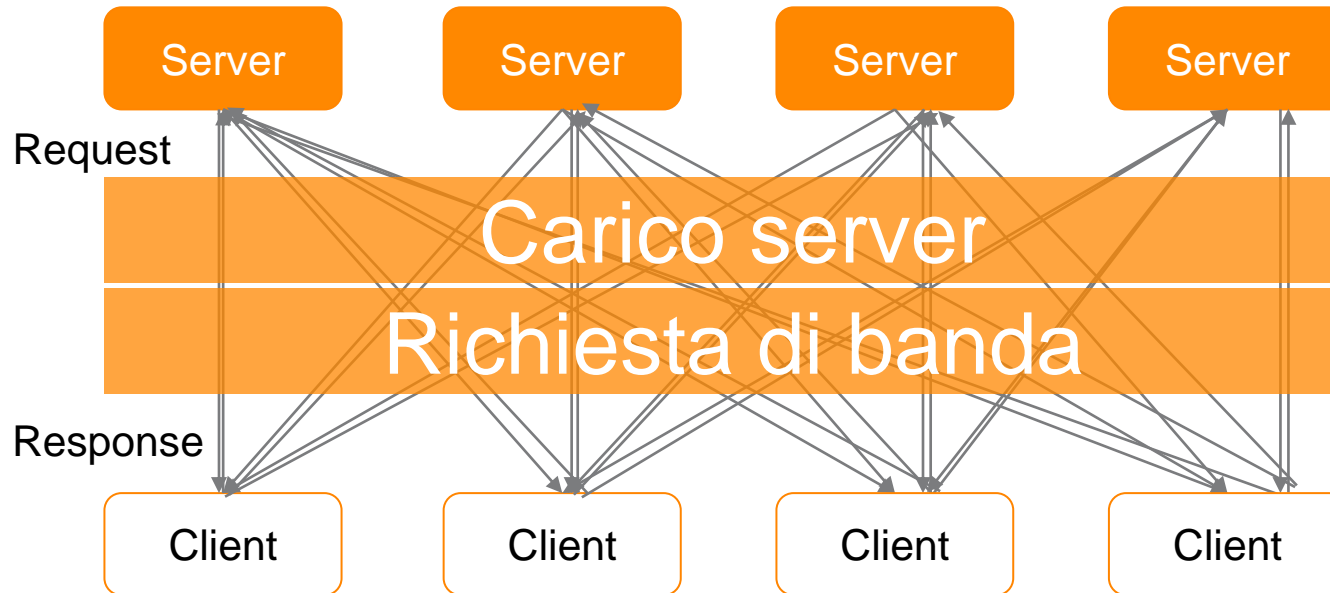
Pub-Sub

Use case specific protocol mappings

Differenza Client-Server e Pub-Sub



Differenza Client-Server e Pub-Sub



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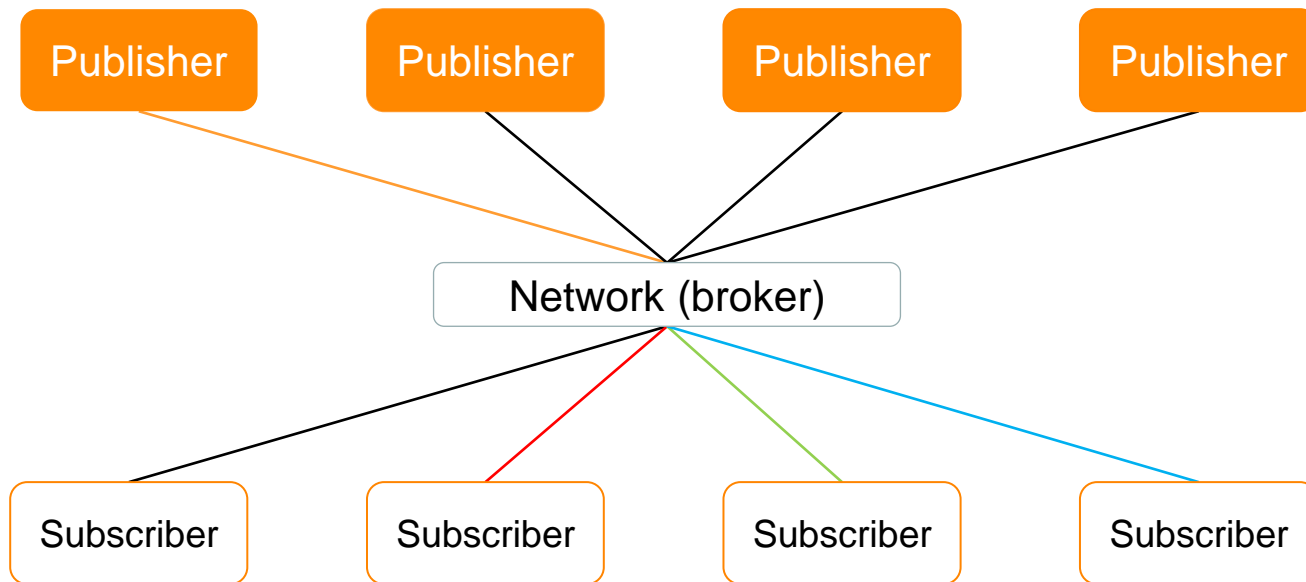
Client-Server

Pub-Sub

Use case specific protocol mappings

OPC
UA
information
model

Differenza Client-Server e Pub-Sub



Vendor specific extension

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Pub-Sub

Use case specific protocol mappings

OPC
UA
information
model

Il valore aggiunto della descrizione semantica

Data



Information



Semantic information

Only machine readable

Human readable

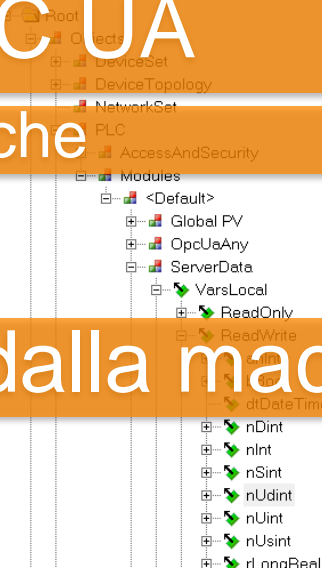
Human and machine interpretable

Il modello informativo OPC UA

fornisce informazioni semantiche

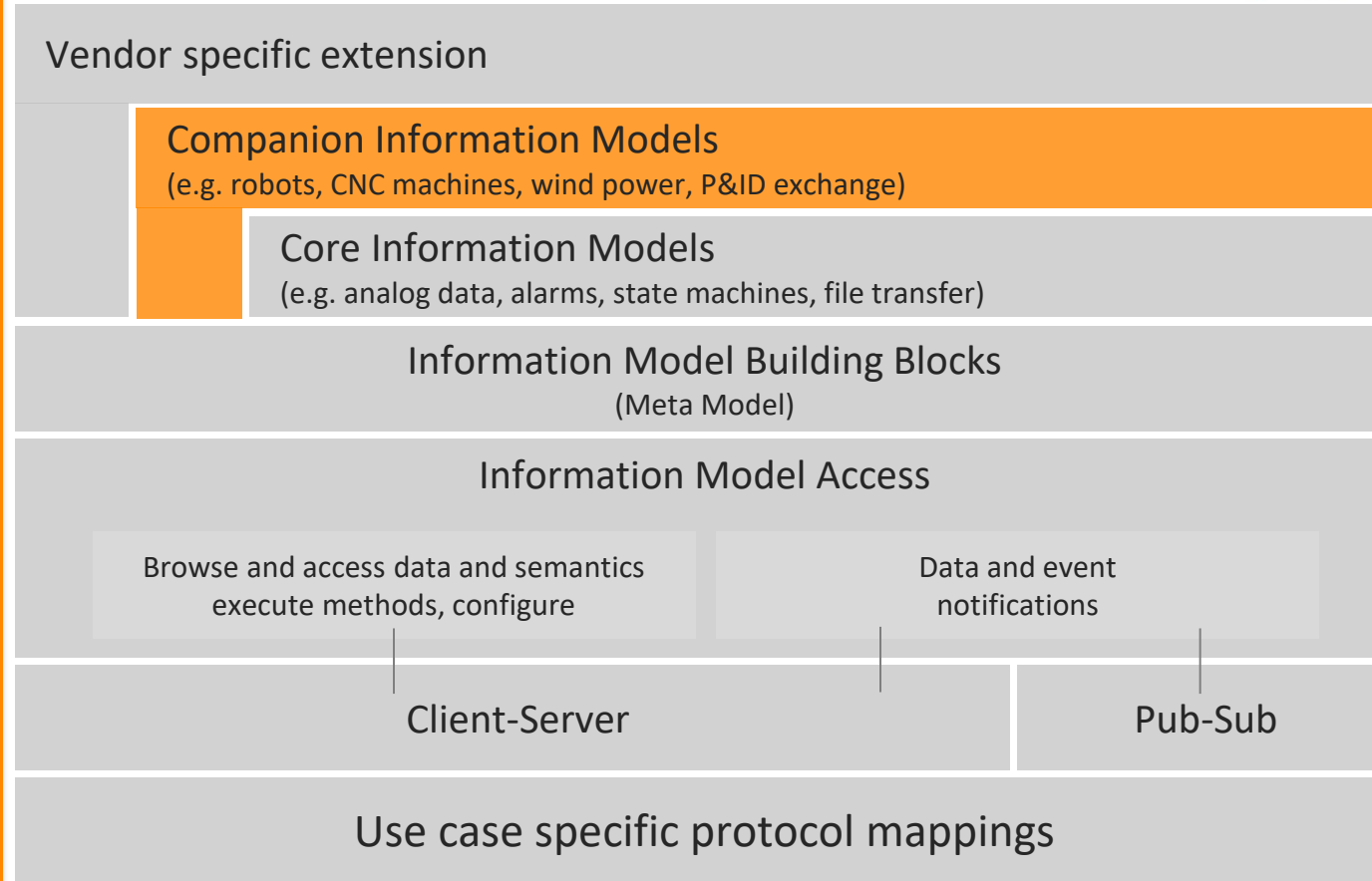
0010101110101010100010101
 0111110001001111000101010
 0010010001010100111111111
 1000011010010010101010000
 1111111101010101000100011
 0011001100101010101001010
 1101010100000000011111111
 1010101010101010010101010
 1010101010101010001010101
 010110010000100010101010
 1010101000010010010111111
 0101011111001110011100101
 0101111001100000110000

Minimum value speed axis 01
 Nominal value speed axis 02
 Actual value speed axis 01
 Actual value speed axis 02
 Actual value speed axis 03
 Asset status
 Status axis 01
 Status axis 02
 Status axis 03
 Temperature axis 01
 Temperature axis 02
 Temperature axis 03
 Status door switch 01



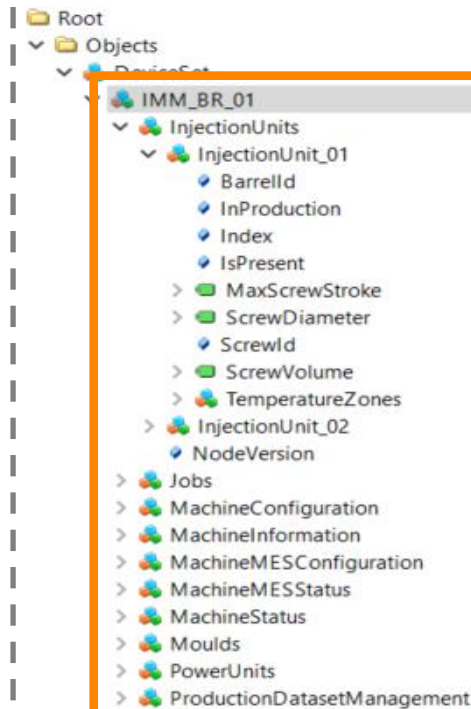
Leggibili dall'uomo e interpretabili dalla macchina

OPC UA information model



Companion Information Model e Information Model generico

Companion Information Model



Macchina a iniezione

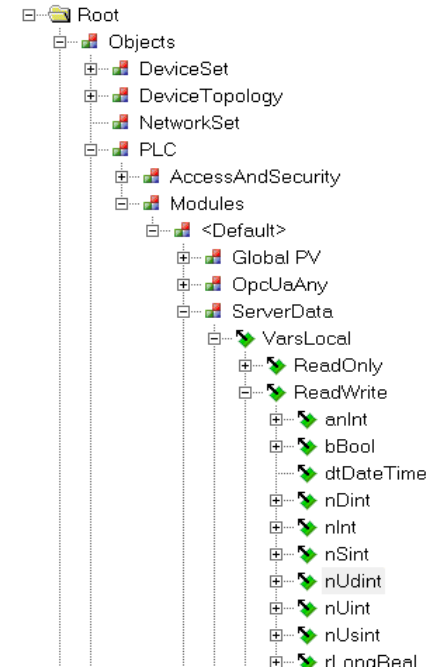
Strutture standard

Variabili standard

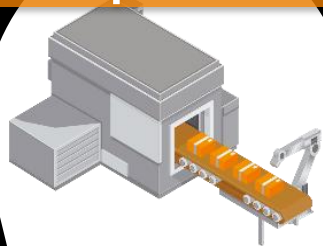
Data type standard

Metodi standard

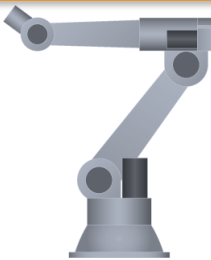
Information Model generico



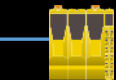
Companion specifications



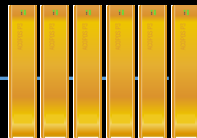
OMAC
PackML



VDMA
Robotics



Imballaggio



Robot

Esempio Euromap83

Metodi

EnableAutomaticRun

DisableAutomaticRun

Funzioni

Mould is installed

JobData available

Injection Units is present

Temperature Zones ok



Iniezione



Caso reale

Packaging

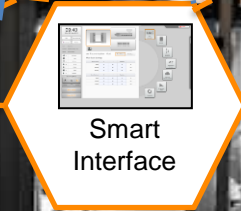
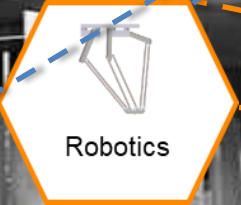
 **OPC UA**



UNILOGO
ROBOTICS

Cleanline

<https://www.youtube.com/watch?v=Npm-wHyLc08>



Apertura

Interoperabilità

Sicurezza

Prestazioni

Seamless communication

Unified semantics from sensor to cloud

The largest ecosystem "ever in history"

Plug & produce