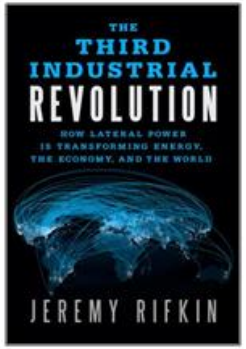
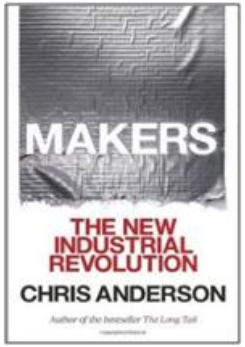
Industria 4.0

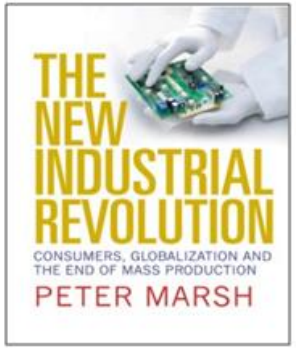
La Industria 4.0: Seguridad y nuevos perfiles professionales

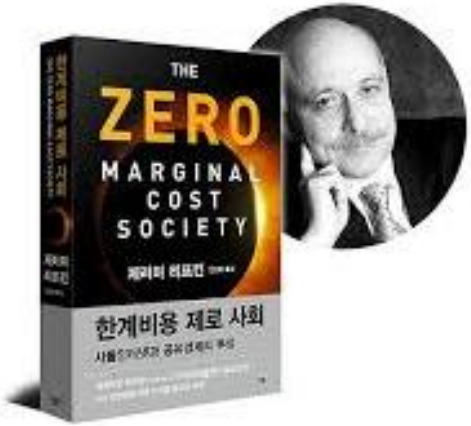
Enginyers Barcelona, 2-mayo-2017

¿La cuarta revolución industrial ?









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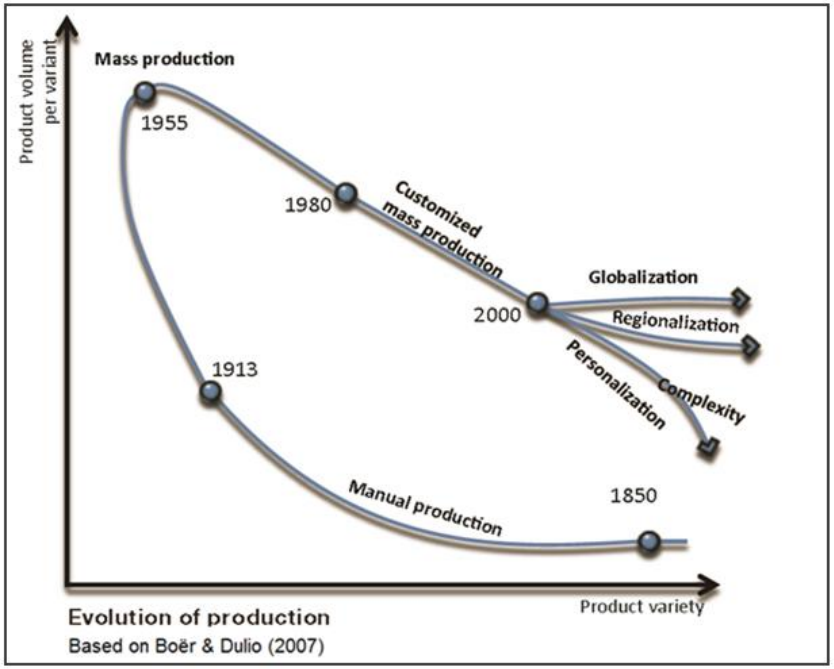
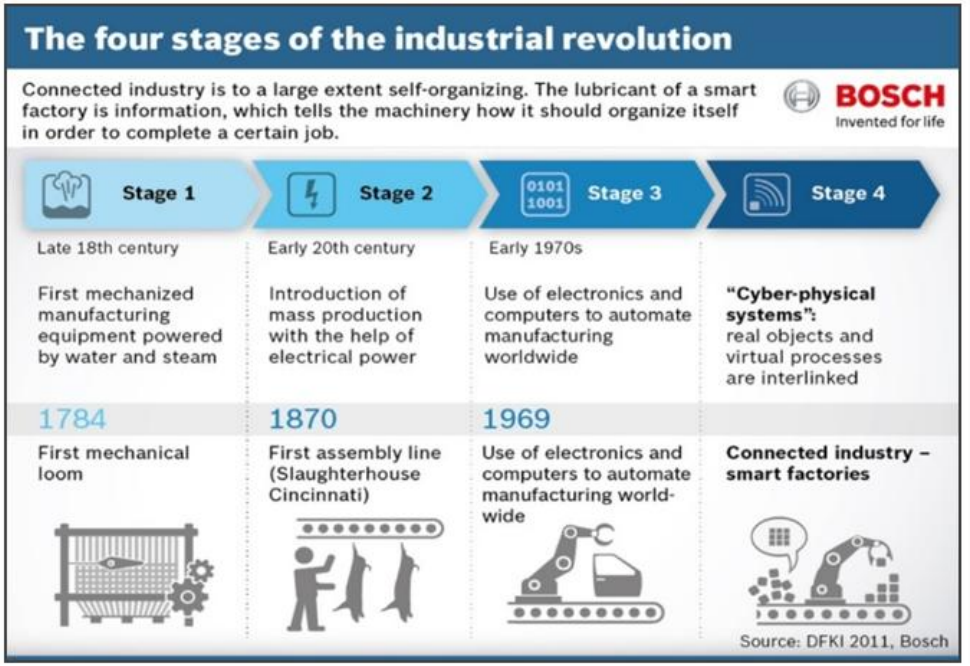




Caso de estudio: Nobilia

Maximum data transparency in kitchen manufacturing through PC-based control technology

Nobilia: Series production with lot-size-1 flexibility demonstrates the true potential of Industry 4.0

Nobilia manufactures an enormous number of kitchens per year, with over 580,000 produced in the two manufacturing plants located in Verl in East Westphalia, Germany. That may be series production in the truest sense of the words, but the real specialty here is the customization that is implemented at the same time. PC-based control from Beckhoff offers the ideal foundation for universal transparency of the parts and production data, allowing individual kitchens to be supplied flexibly and efficiently in a lot size of 1 – entirely in keeping with the ideals of Industry 4.0.

Fuente: Beckhoff

Caso de estudio: Rexroth (Planta de Homburg)

The Drive & Control Company

Rexroth
Bosch Group

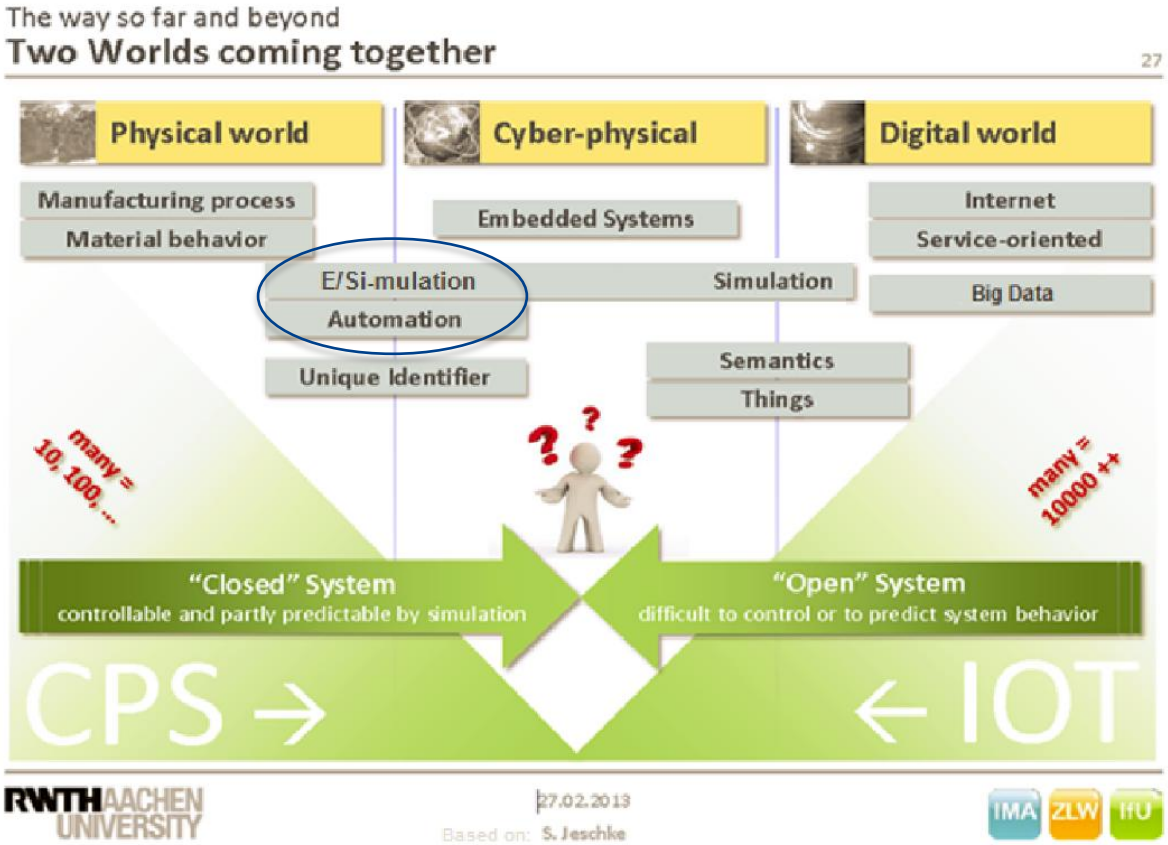
Rexroth Plant, Homburg: Networking of machinery and products

First Connected Industry line on-stream in daily production

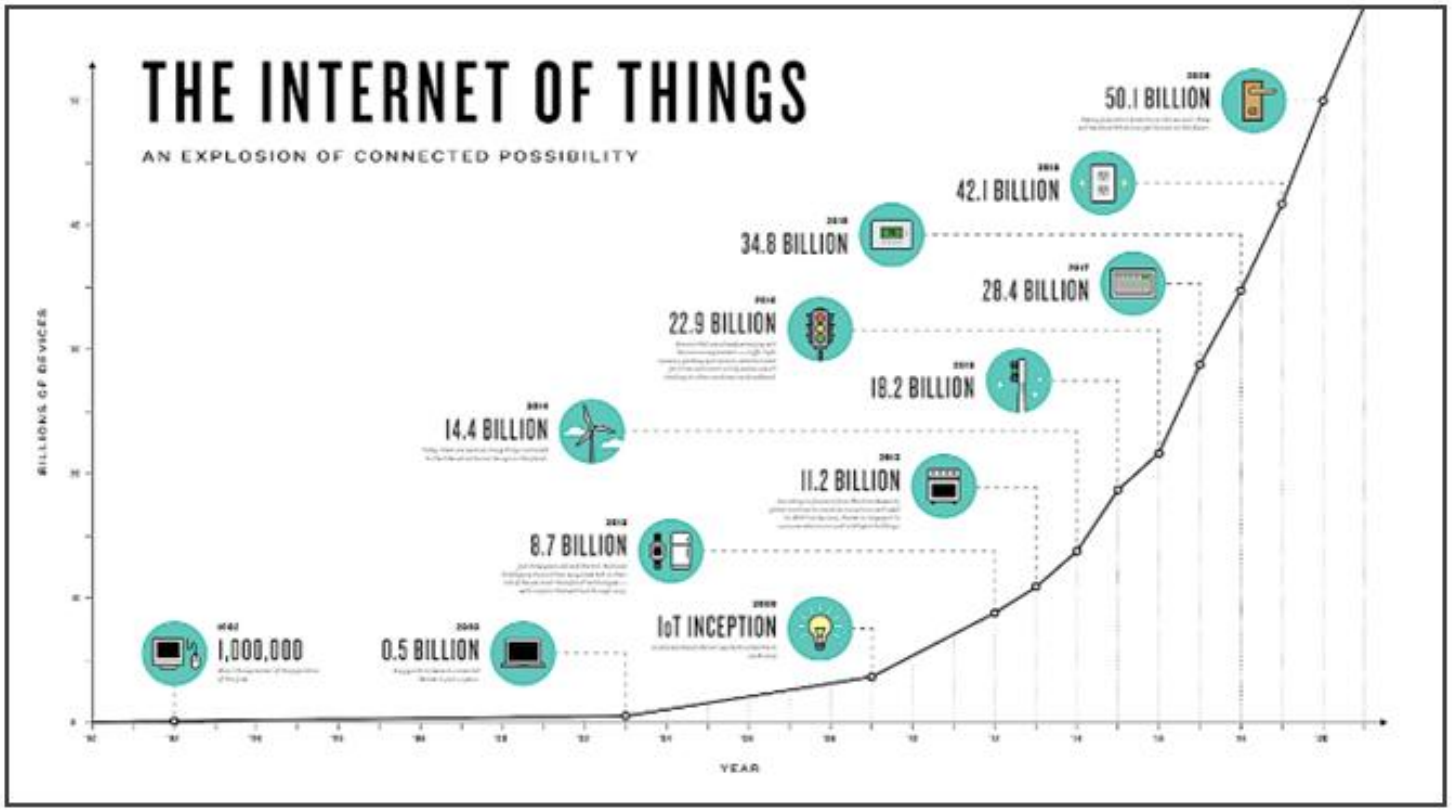
Tough application

Production of individual products in a semi-automatic process which enables short throughput time and ultimate quality down to a batch size of 1.

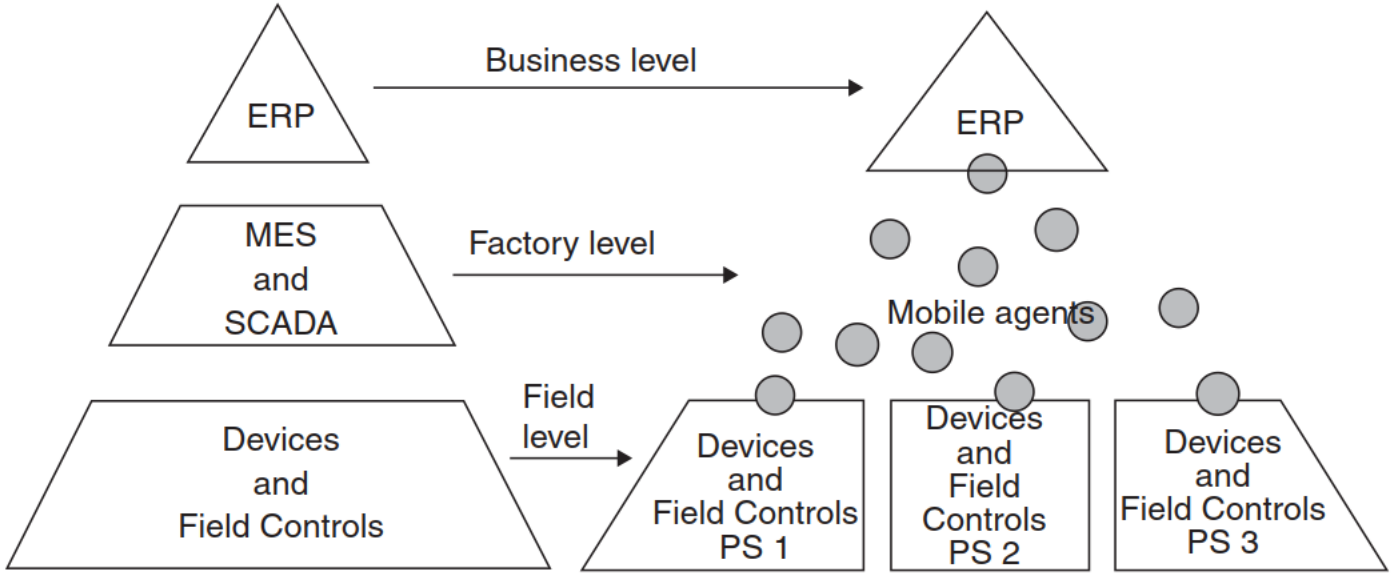
Dos pilares de la 4a revolución industrial



Dos pilares de la 4a revolución industrial



Agent-Based Computing (Holonic Manufacturing)

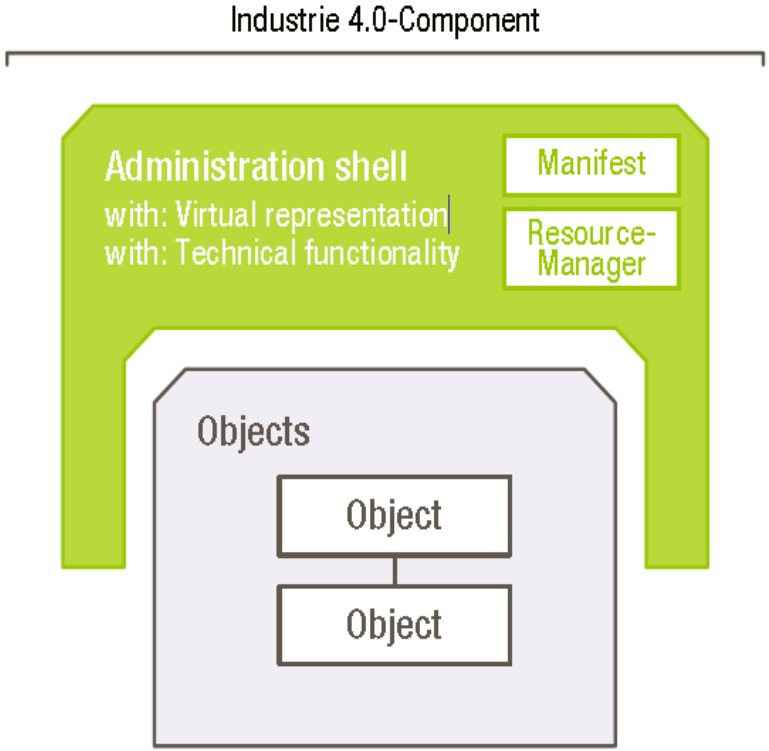


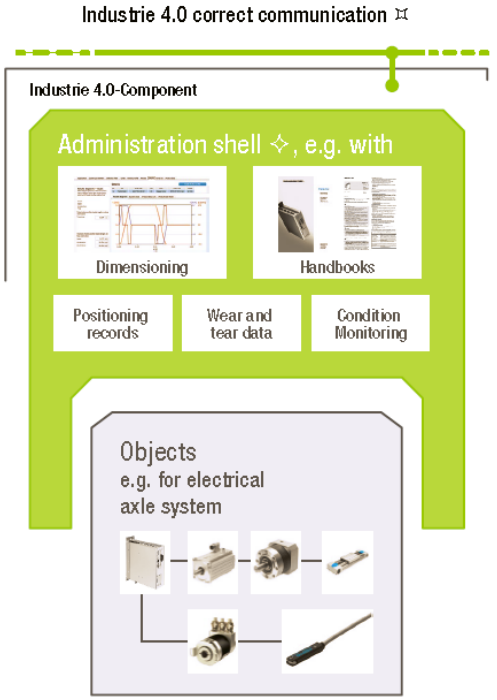
Transition of information and communication from rigid to reconfigurable systems

Fuente: Klostermeyer (2005)

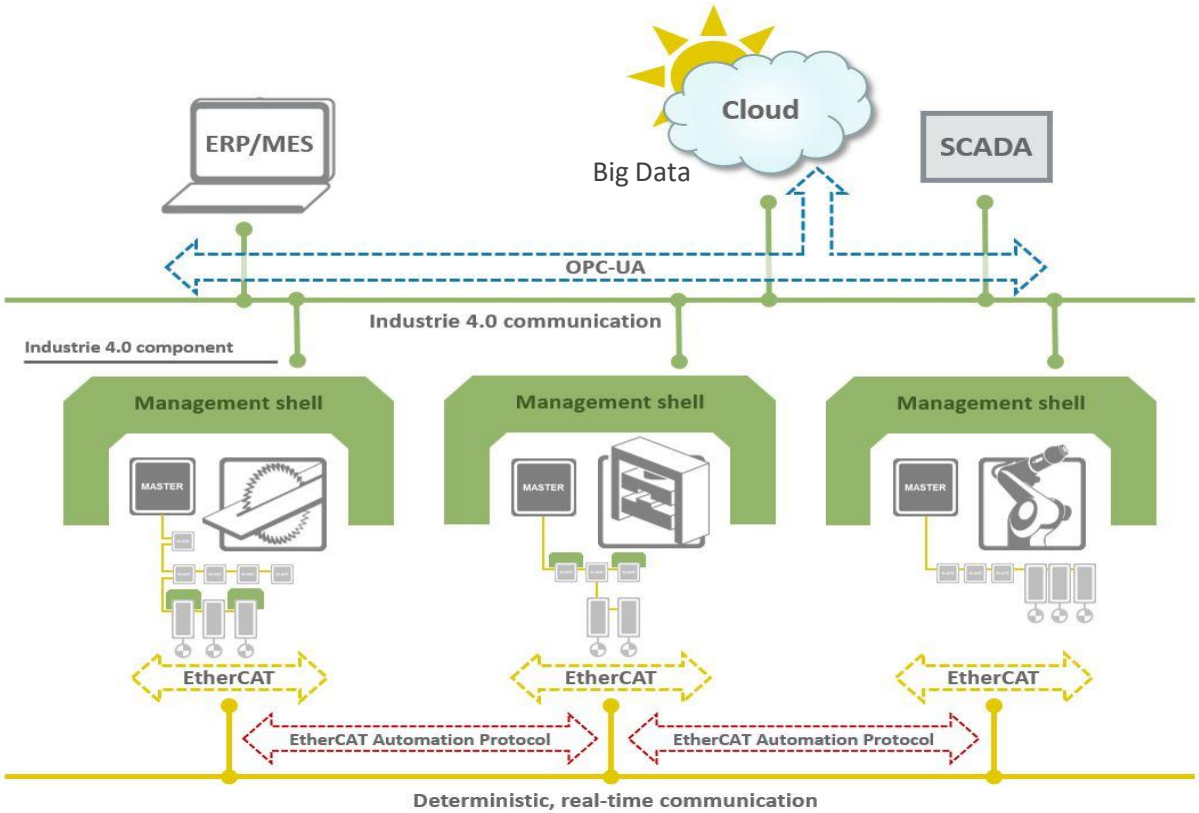
Arthur Koestler (1968): “Beyond Atomism and Holism - the concept of the holon”

RAMI 4.0: I4.0 Component (DIN 91345 / IEC 63088)





Modularidad en red (comunicaciones)



OPC-UA: ¿El pegamento de la Industria 4.0?

CONTROL ENGINEERING EUROPE
COVERING CONTROL, INSTRUMENTATION AND AUTOMATION SYSTEMS

OPC UA™

G+1 0

OPC UA: Industry 4.0 glue?

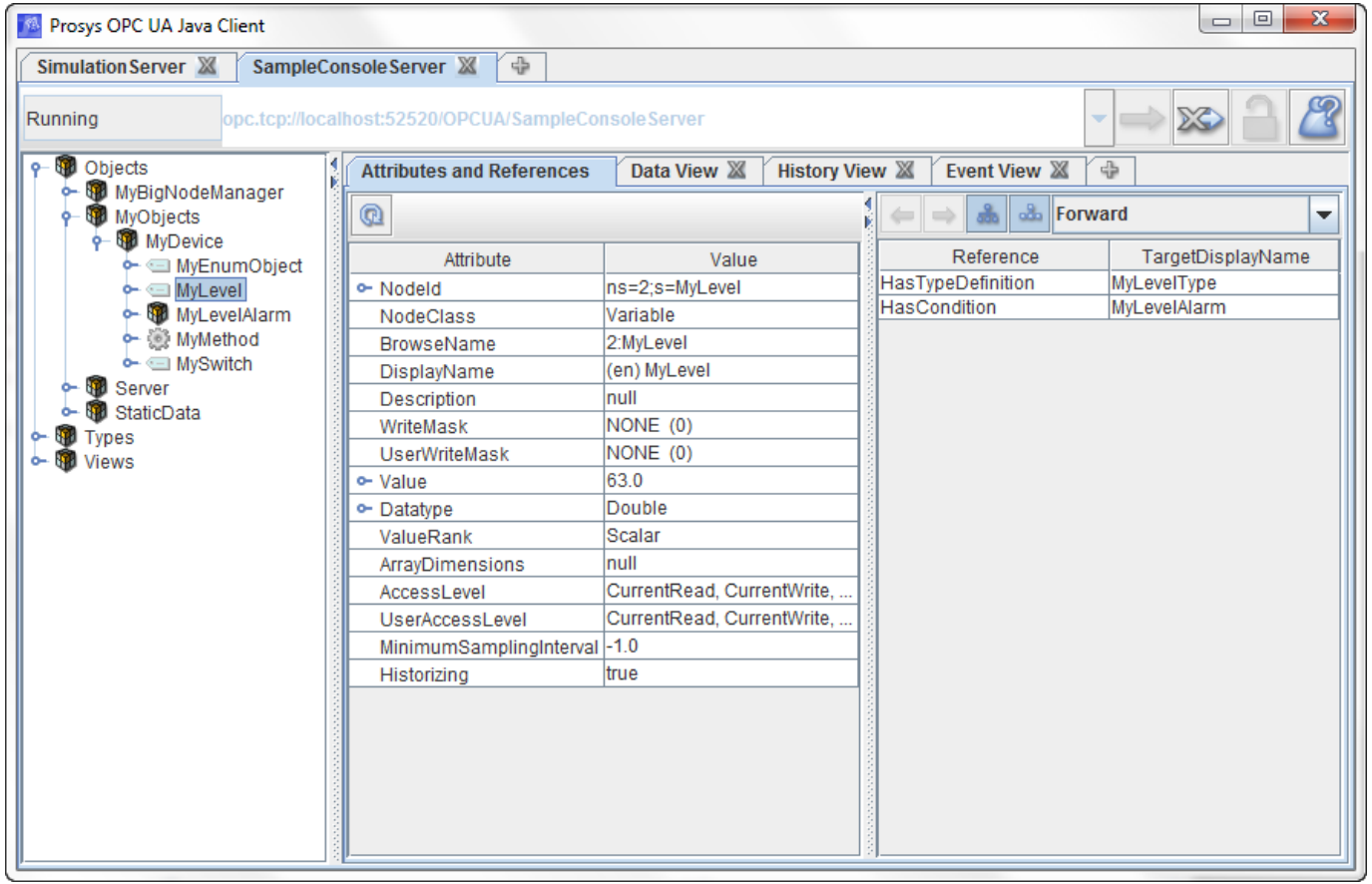
13 March 2017

OPC-UA technologies are developing fast! *Suzanne Gill* caught up with some automation vendors to find out more about their latest OPC-UA technology developments.

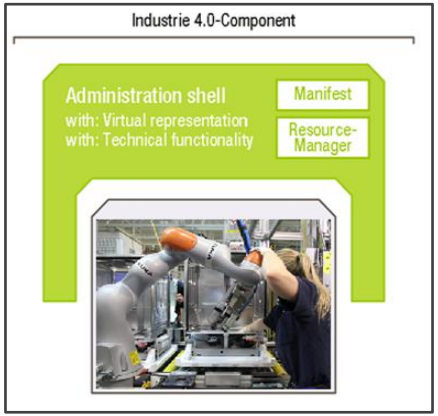
The growth of the Industrial Internet of Things (IIoT) and Industry 4.0 is driving the need for open and secure connectivity between devices. This has resulted in the OPC Foundation's Unified Architecture – OPC UA –increasing being considered as the standard for ensuring that this can take place. Rather than replacing the standards, OPC UA complements them by creating a common layer for exchanging information.

Freed from the need to run on a specific OS, the open data connectivity that OPC UA embodies can be offered on virtually any networked platform. It supports interoperability between a range of manufacturing processes and equipment, protecting legacy of investment for many companies. There are security benefits too – the OPC UA standard was designed from ground up with security in mind.

OPC-UA: Orientación a objetos y seguridad

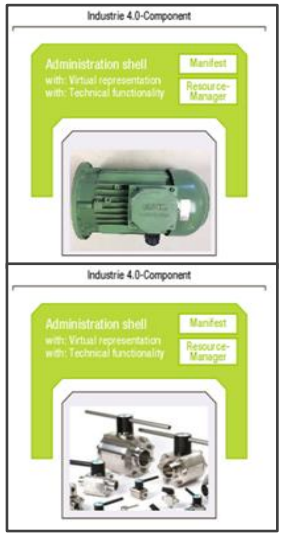


Grupos de trabajo de la Comissió Indústria 4.0



Robòtica

Intralogística



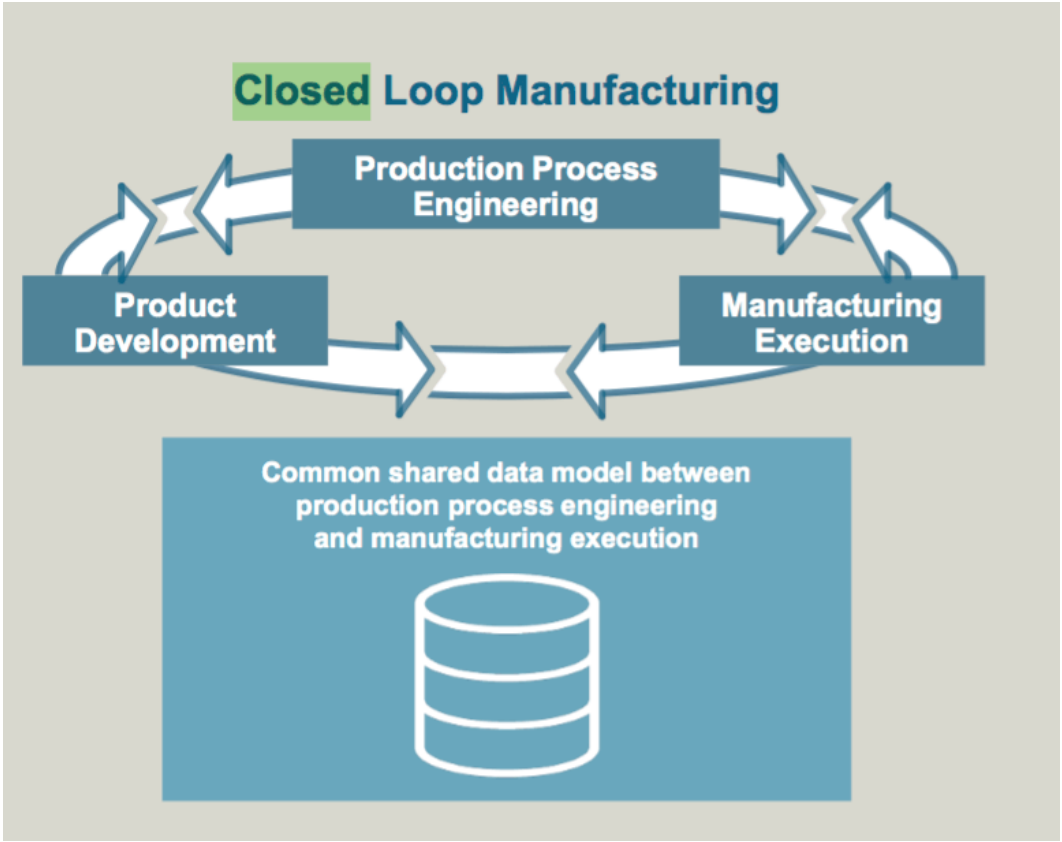
Embedded Systems & IoT

Impressió 3D i Manufactura avançada

Software i integració

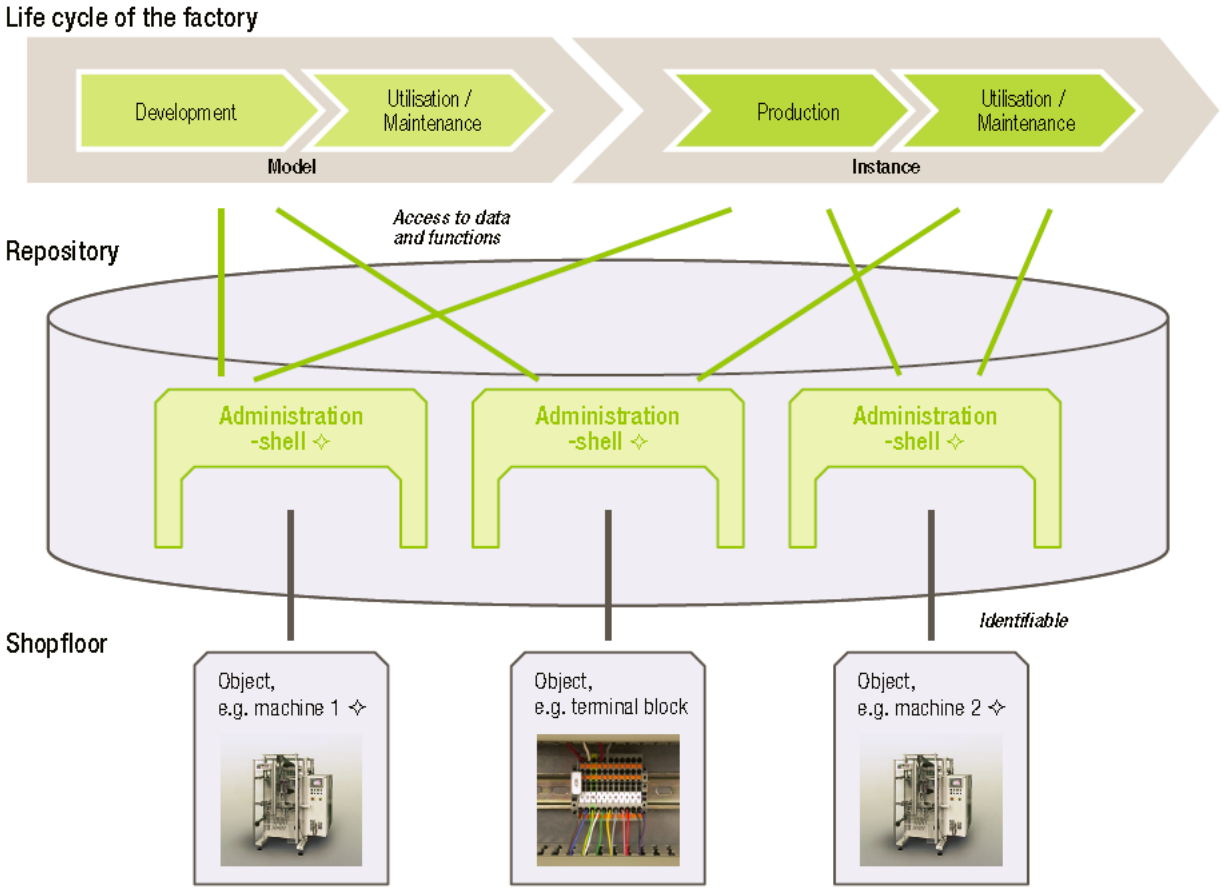
Status report de la Comissió Indústria 4.0

Ingeniería consistente

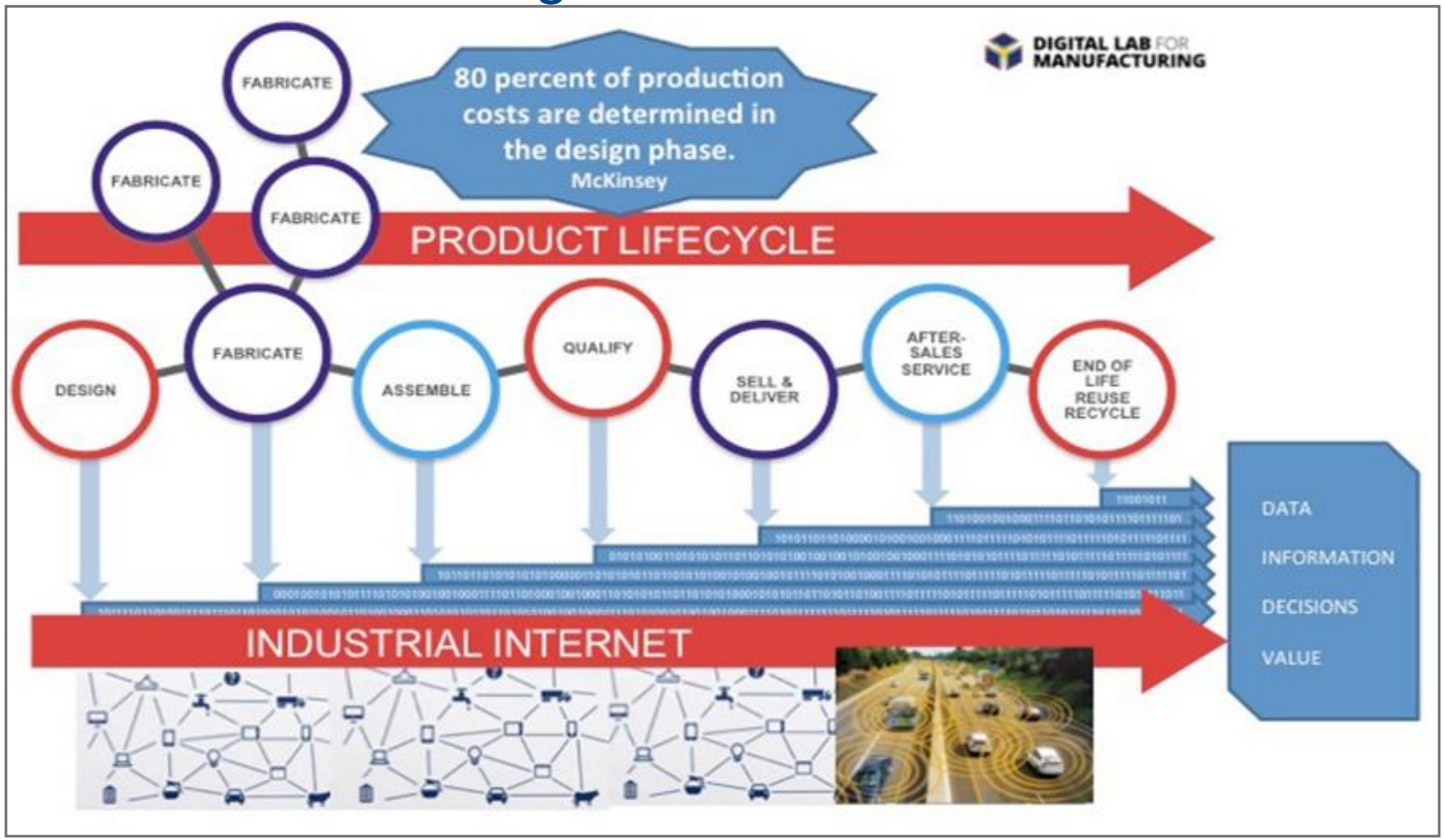


Fuente: Siemens

RAMI 4.0


Life cycle of the factory
Development
Utilisation / Maintenance
Production
Utilisation / Maintenance
Model
Instance
Repository
Access to data and functions
Administration -shell
Administration -shell
Administration -shell
Shopfloor
Identifiable
Object, e.g. machine 1
Object, e.g. terminal block
Object, e.g. machine 2

Cadena de valor digital

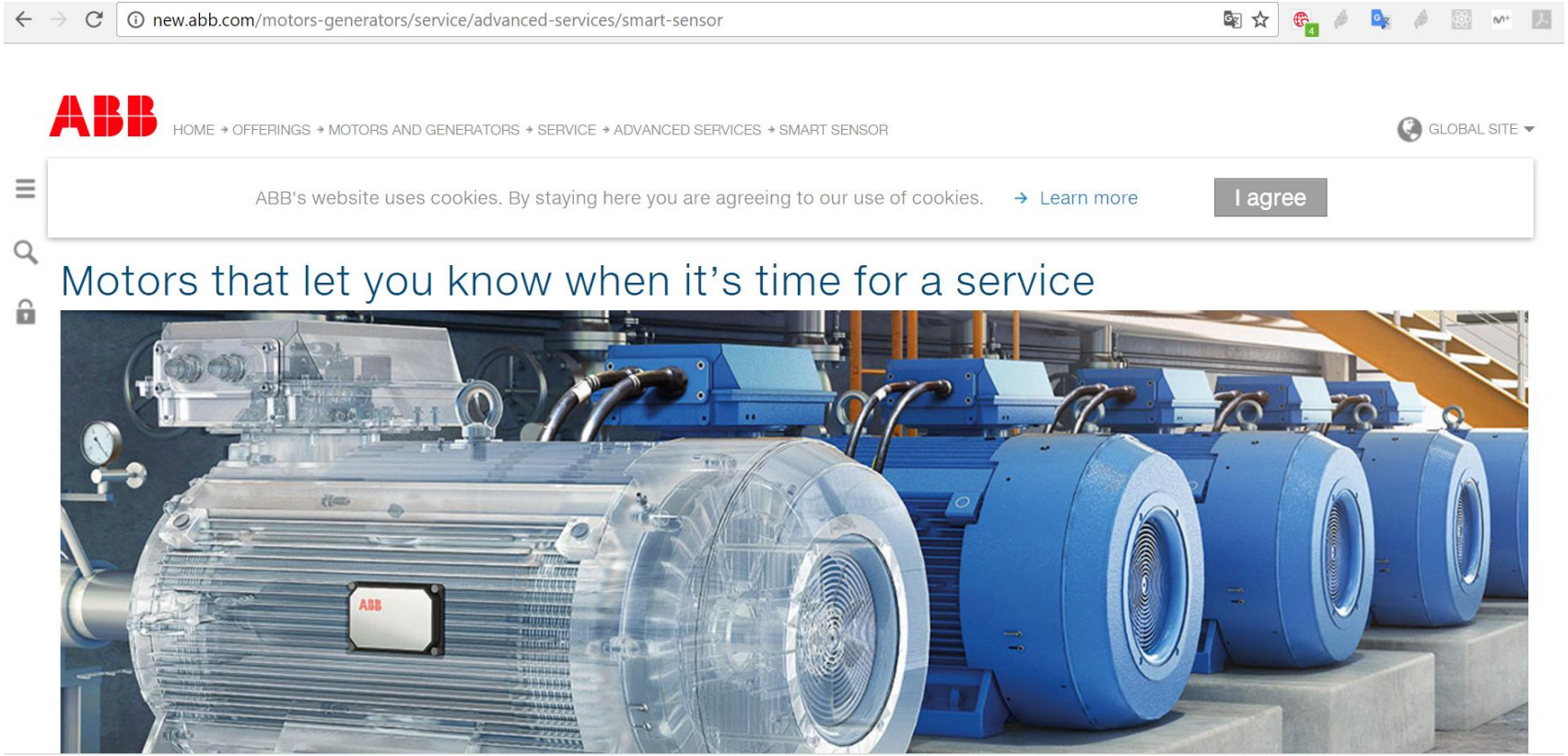


Timing

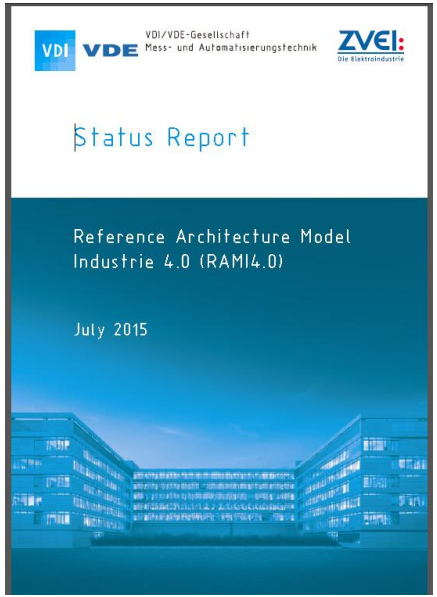
Source: ZVEI

Anuncio en la Feria de Hannover 2016

Salida al mercado en 2017



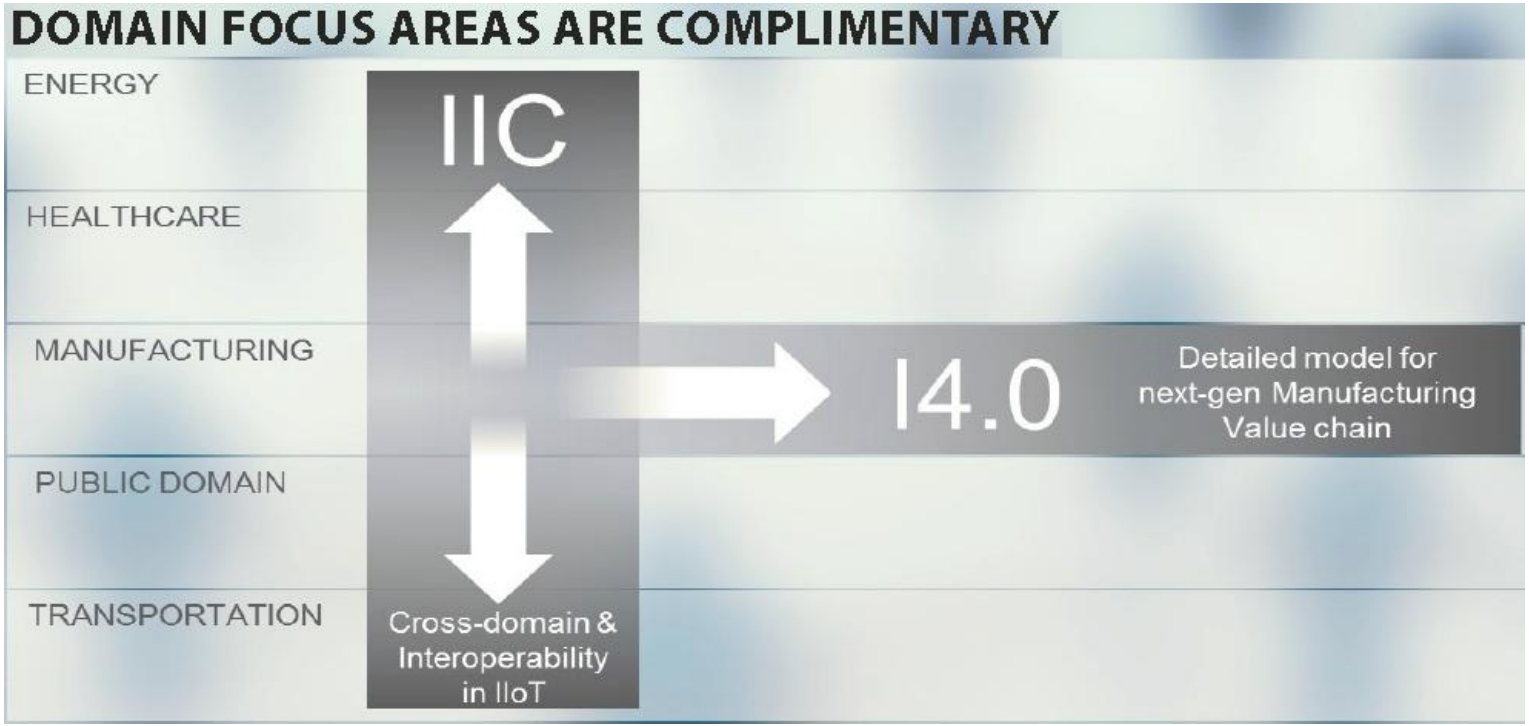
Las dos arquitecturas de referencia: RAMI 4.0 e IIRA



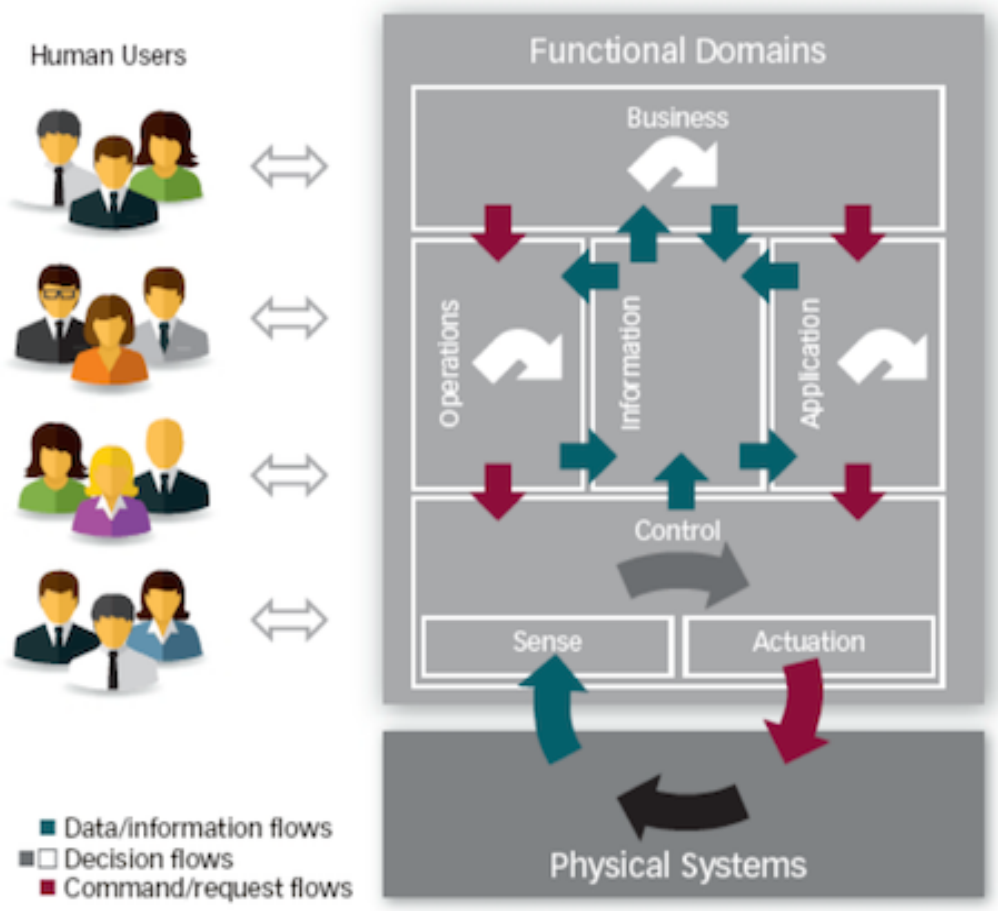
PLATTFORM INDUSTRIE 4.0
Standardization Council i4.0
I4.0 Plattform

industrial internet CONSORTIUM
IIC

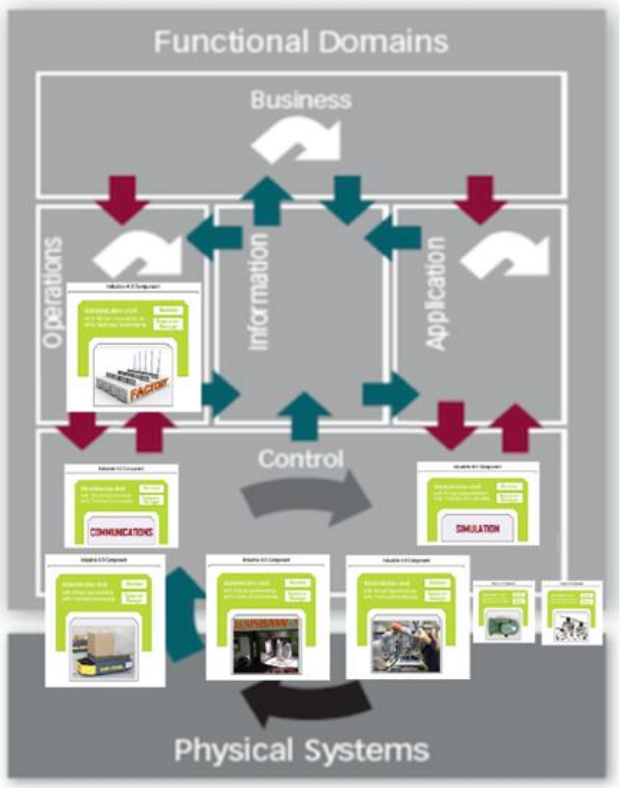
Formalización y estandarización de la i4.0

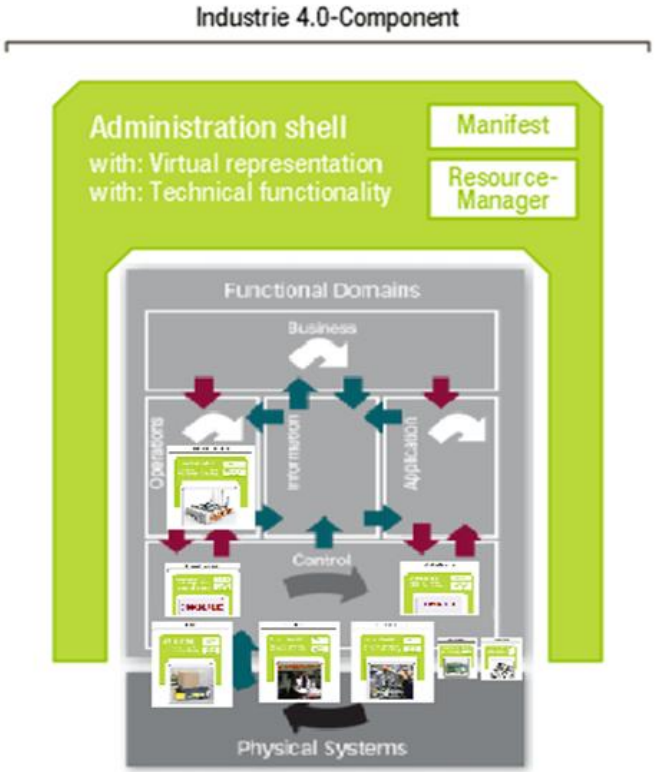


IIRA


Human Users
Functional Domains
Business
Operations
Information
Application
Control
Sense
Actuation
Physical Systems
Data/information flows
Decision flows
Command/request flows

Convergencia IT/OT: Perfiles profesionales híbridos





Las personas, eje director de la cadena de valor

Press release

BOSCH

National IT Summit, November 18-19, Berlin

November 18, 2015

PI 9117 RB Res/Sekr

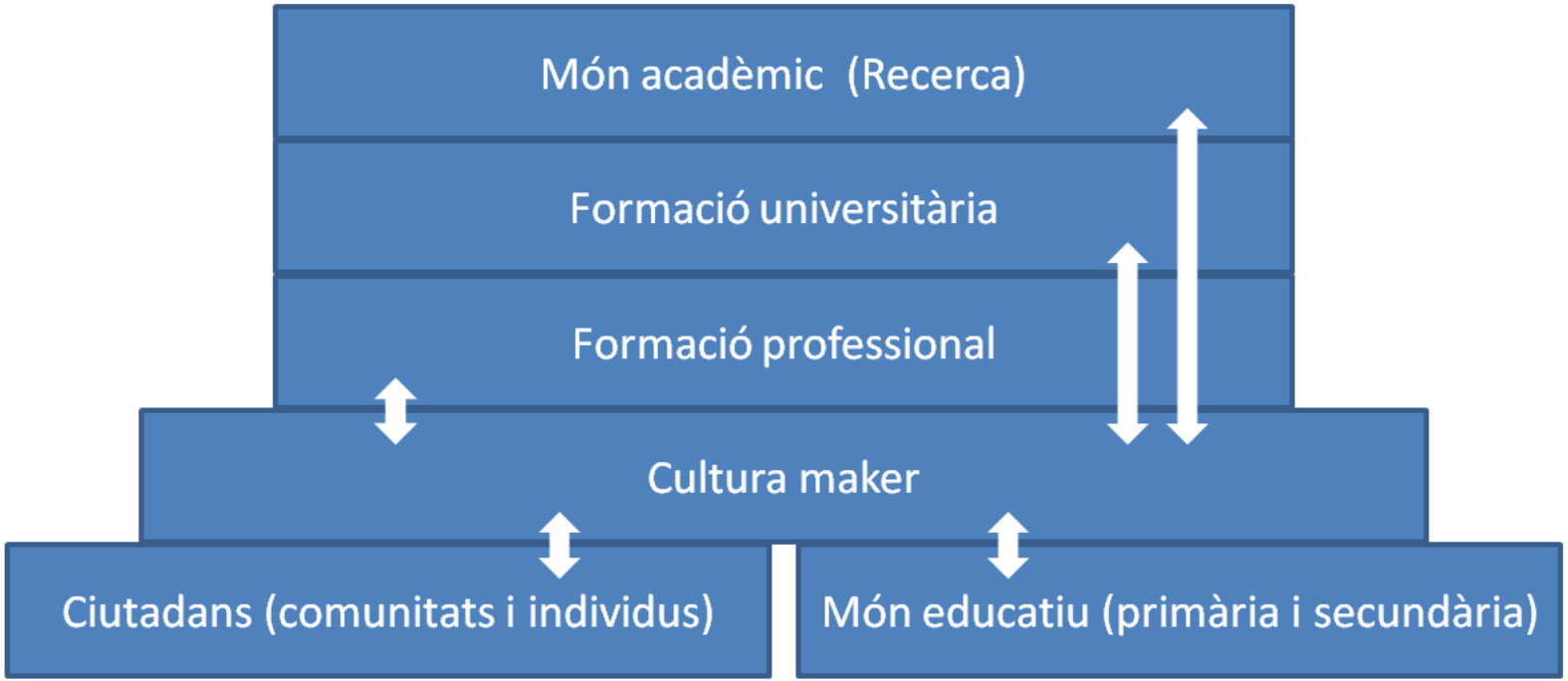
Bosch board of management member Struth on the IT Summit:

Industry 4.0 needs an education offensive

15 Bosch projects featured on new Industry 4.0 map

- Schools should be supported with better technical equipment
- Sensors enable valuable analysis of production data
- Hundreds of millions of euros can be saved annually

Espais de formació



Safety vs Security

IEC 61508 SIL LEVELS

SIL: *"The Safety Integrity Level is a measure for the effectiveness of the risk reduction that each individual Safety Function is expected to provide"*

Safety Integrity Level	Risk Reduction Factor	PFD_{AVG}: Average Probability of Failure on Demand (Demand Mode)
SIL 4	100,000 – 10,000	$>=10^{-5}$ to $<10^{-4}$
SIL 3	10,000 - 1,000	$>=10^{-4}$ to $<10^{-3}$
SIL 2	1,000 - 100	$>=10^{-3}$ to $<10^{-2}$
SIL 1	100 to 10	$>=10^{-2}$ to $<10^{-1}$

Source: Exida

ISA 99 / IEC 62443 SEGURITY LEVELS

- SL 1 – PROTECTION AGAINST CASUAL OR COINCIDENTAL VIOLATION (I.e. changing a setpoint to a value outside engineering defined conditions, interception of a password send over the network in clear text.)
- SL 2 – PROTECTION AGAINST INTENTIONAL VIOLATION USING SIMPLE MEANS (I.e. virus infection, exploiting commonly known vulnerabilities of DMZ hosts)
- SL 3 – PROTECTION AGAINST INTENTIONAL VIOLATION USING SOPHISTICATED MEANS (I.e. exploits in operating systems, protocols. Attacker requires advanced security knowledge, advanced domain knowledge, advanced knowledge of the target system. I.e. password cracking.)
- SL 4 – PROTECTION AGAINST INTENTIONAL VIOLATION USING SOPHISTICATED MEANS WITH EXTENDED RESOURCES (Similar to SAL 3 but attacker now has extended resources to their disposal. I.e. StuxNet attack)

Source: Honeywell

Gracias

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