PETROBRAS

IT-OT-ET Convergence and PETROBRAS IIoT Centre of Excellence

Pedro Vieira

@ Open Group Brazil Conference

São Paulo – November 10, 2022

#tranS4mar

KEY CHALLENGES FOR THE O&G INDUSTRY (1/2)

Safety and security

- *Improve HSE performance*
- *Increase assets security (cybersecurity)*

Costs

- *Increase exploration success rate*
- *Decrease exploration, project and construction times*
- *Faster and lower-cost supply and logistics*

Productivity

- *Improve sustained productivity*
- *Decrease Operations downtime*
- *Faster and top-quality Engineering designs*

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KEY CHALLENGES FOR THE O&G INDUSTRY (2/2)

Integration

- *Improve internal sectors cross-discipline integration*
- *Improve external supply and delivery integration*
- *Decrease vendor technology dependency*

Business

- *More accurate and agile decision taking*
- *Improve leadership and workforce training for a Digital Culture*
- *More efficient business change management model for fast repositioning*

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Outside the plant

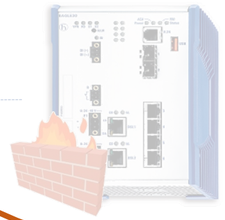
Inside the plant

IT

Telecom

Management

Router



Satellite / Optical fiber

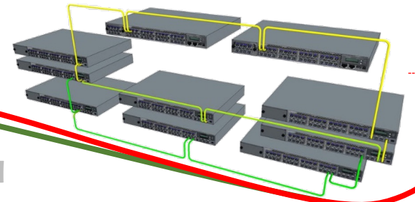
Operation Supervision

Data servers RTDS/HDS

O&M HMIs

?

Switches



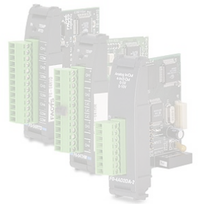
Ethernet

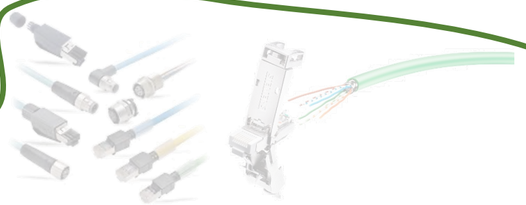
ISA

Control

Industrial controllers (PLCs / DCSs)

I/O Cards



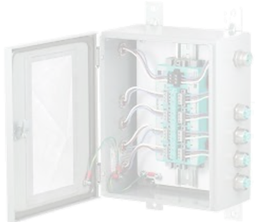


Serial / Industrial Ethernet

Field

Sensors and actuators

Industrial Automation



3-15psi / 4-20mA / *Fieldbuses*

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Outside the plant

Inside the plant

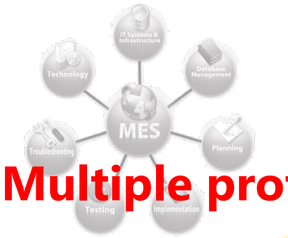
Data silos

Management

Operation Supervision

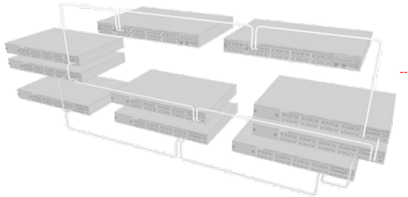
Control

Field



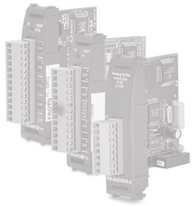
Multiple protocols

Switches



Industrial controllers (PLCs / DCSs)

I/O Cards

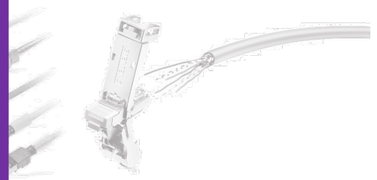


Sensors and actuators

Data from the plant

Actions to the plant

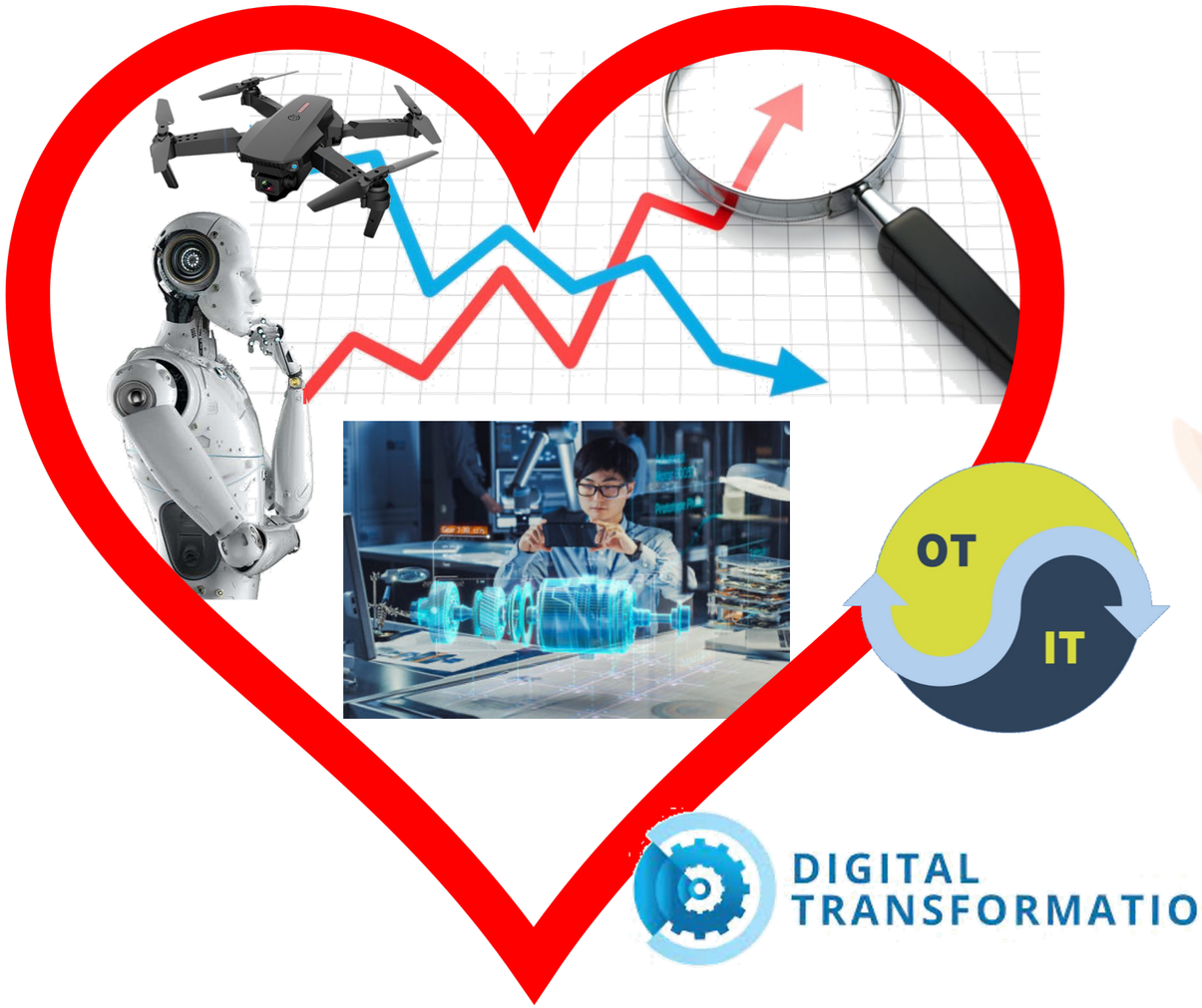
Ethernet



Industrial Ethernet

4-20mA / *Fieldbuses*

DIGITAL TRANSFORMATION → INDUSTRY 4.0



- Data **availability** (including field sensing/actuation)
- Data **standards** → data flow
- Data **feedback** → to plant
- Industrial **cybersecurity** (including pervasive)

INDUSTRY 4.0

IT-OT-ET CONVERGENCE – AS IS: 3 SEPARATED DOMAINS

Information Technology

- ERP & Business Apps
- Cloud
- Software design
- Databases
- Workstations & Servers
- Networking
- Cybersecurity
- IT architecture
- Data Science
- Business data

Operations Technology

- Field devices
- Process Control systems
- Safety systems
- Supervisory systems
- Engineering systems
- Technical documentation
- Asset management systems
- Workstations & Servers
- Networking
- Industrial cybersecurity
- Automation architecture
- Optimization systems
- Operations data

Engineering Technology

- Process simulation systems
- 3D modelling
- Engineering systems
- Technical documentation
- Asset management systems
- Engineering databases
- Engineering data
- Data handovers

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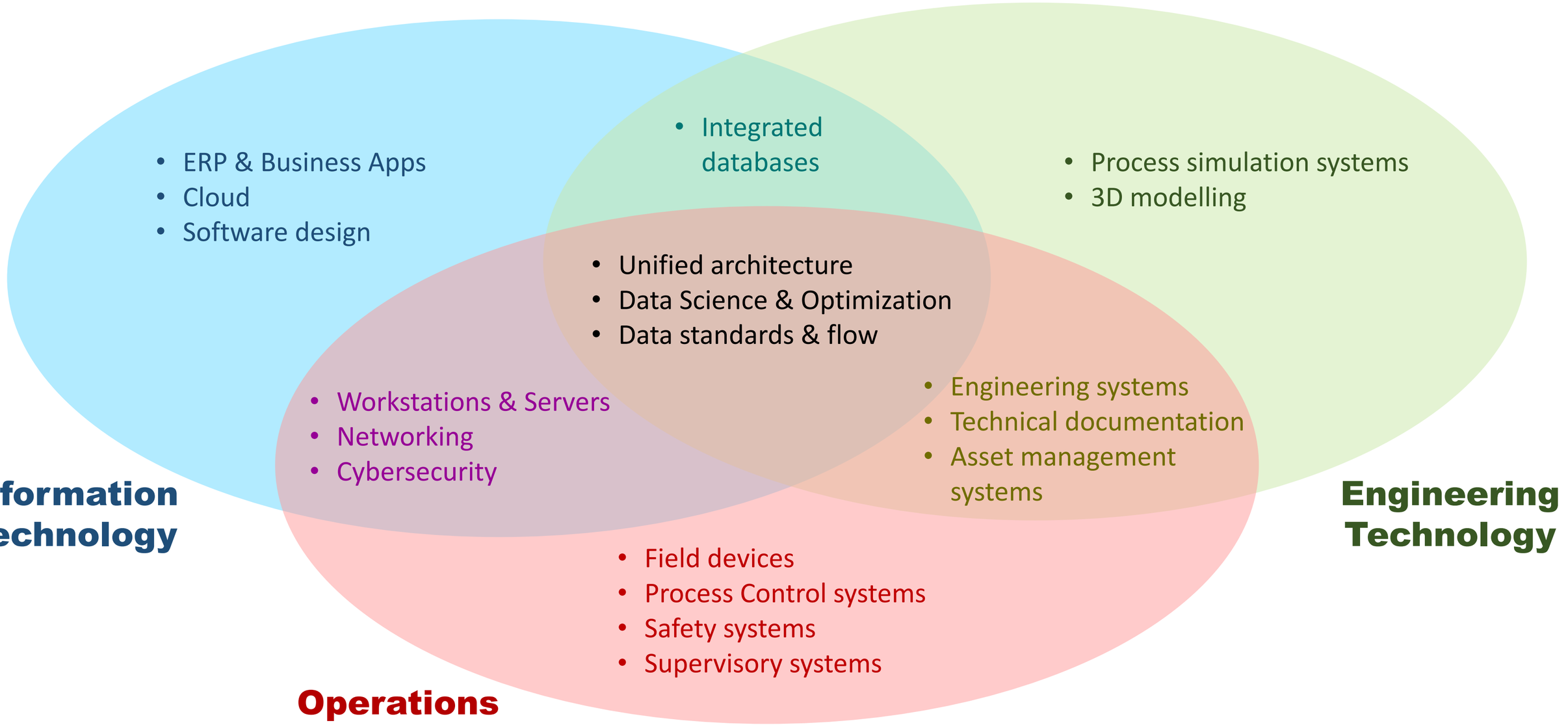
IT-OT-ET CONVERGENCE – TO BE: INTEGRATED DOMAINS



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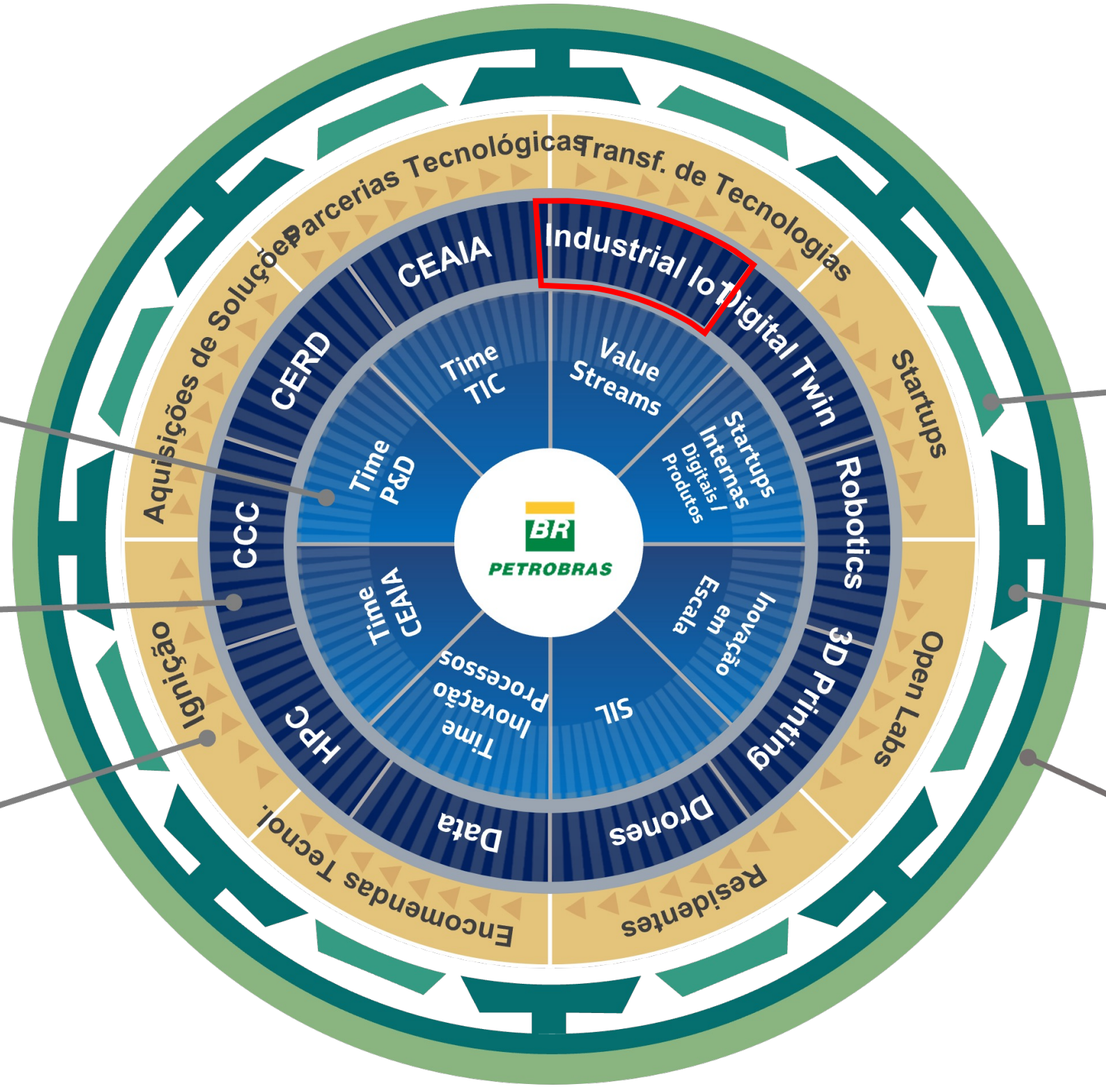
PETROBRAS INNOVATION MOTOR

"Rotor"

- **Innovation Teams**
- **Centres of Exxcellence**
- **Connections for innovation**



"Housing"

- **Structuring**
- **Support**
- **Protection**

PETROBRAS IIoT CoE – THE 4 SQUADS AND CURRENT OKRs

1 IT-OT Integration

Identify Industry 4.0 gaps.

Define OT-IT processes integration roadmap.

Identify opportunities for use of Services DMZ.

2 Data & Analytics

Define industrial data governance model.

Create/define integrated and standardized data model.

3 Architecture & Design guidelines

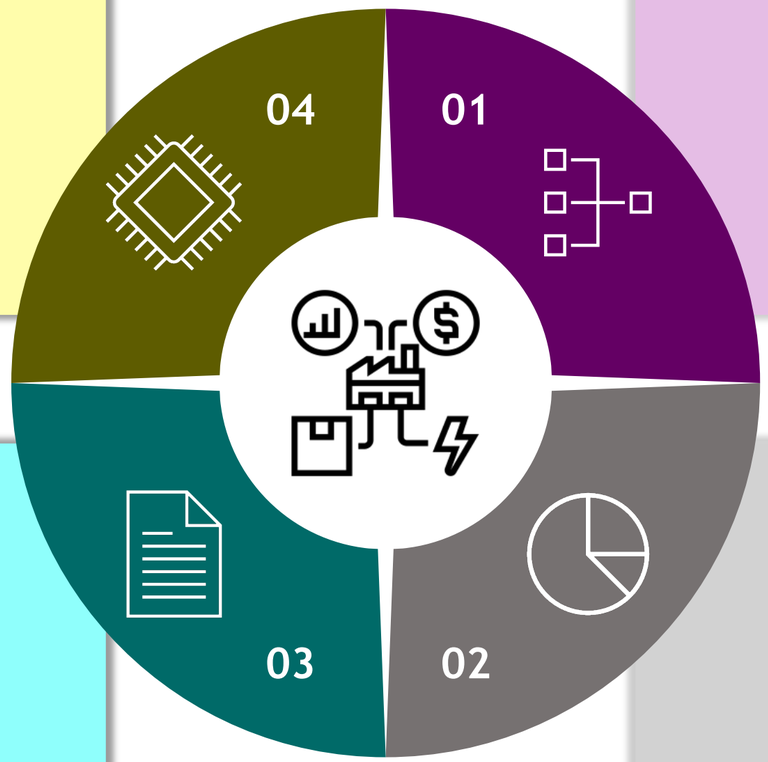
Define unified architecture model.

Deliver integrated design guidelines.

4 ET-OT Integration & Standardization

Define roadmap for O-PAS™ adoption.

Integrate architecture with Engineering Technology



PETROBRAS IIoT CoE – MAIN BUSINESS OUTCOMES EXPECTED

- Increased data and plant visibility
- Integrated operators training

- Anticipation of plant startup
- Reduced downtime due to increased availability

- Core for *phygital* solutions
- IIoT solutions
- Pervasive cybersecurity

- On-time information-based decision support
- Transparent Engineering to Operations data handover

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CONCLUSIONS, LESSONS LEARNED, WARNINGS AND OTHER FINAL WORDS

- (*First*) **Strategy** ➔ **Processes** ➔ **Technology** (*Last*)
- Do not forget to train **people**. **Digital practitioners** are very – *VERY* – rare!
- **Link** the initiatives to **business KPIs** and **strategic guidelines** and … **report**
- **Balance** and give **visibility** to the **deliverables**
  - ✓ **Value** your deliverables
  - ✓ Divide into **short-term** (low effort / quick gain) and **long-term** (structuring)
- Plan **intermediate deliveries** to keep the enthusiasm alive
- **Start**!

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THANKS & CONTACT

- **Thanks** to
  - ✓ **The Open Group** for the invitation
  - ✓ **PETROBRAS IIoT CoE** for learning opportunity and support

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