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Altran presentation to SWISSED16

➤ Smart, Safe and Secure Platform
(S3P)

Software execution platforms for dependable applications

➤ Industrial Internet of Objects and Operators (2IDO)

Industrial telecom network fitting for industrial constraints

Smart, Safe and Secure Platform (S3P)

Challenges

- Thanks to always smaller and cheaper electronics, software is about to be embedded into tenths of billions devices every year
 - Compared to a total of few billions, cumulated over the past 15 years
- This is not a seamless evolution, this is a revolution
 - Impacting all industrial sectors: consumer, home automation, transport, energy, healthcare, ...
 - Providing software vendors with a combination of technical challenges and business opportunities
- Dependability (including security and privacy) remains a major concern
 - If not properly addressed, can be a showstopper

Software execution platform: key enabler

➤ Basically 2 solutions at the moment:

- Google (Android) in a quasi-monopolistic position
- A myriad of proprietary, non-interoperable solutions addressing niche markets

➤ S3P aims at providing an alternative by creating an ecosystem of providers, at national then at European level, cooperating for stronger positions in the worldwide competition

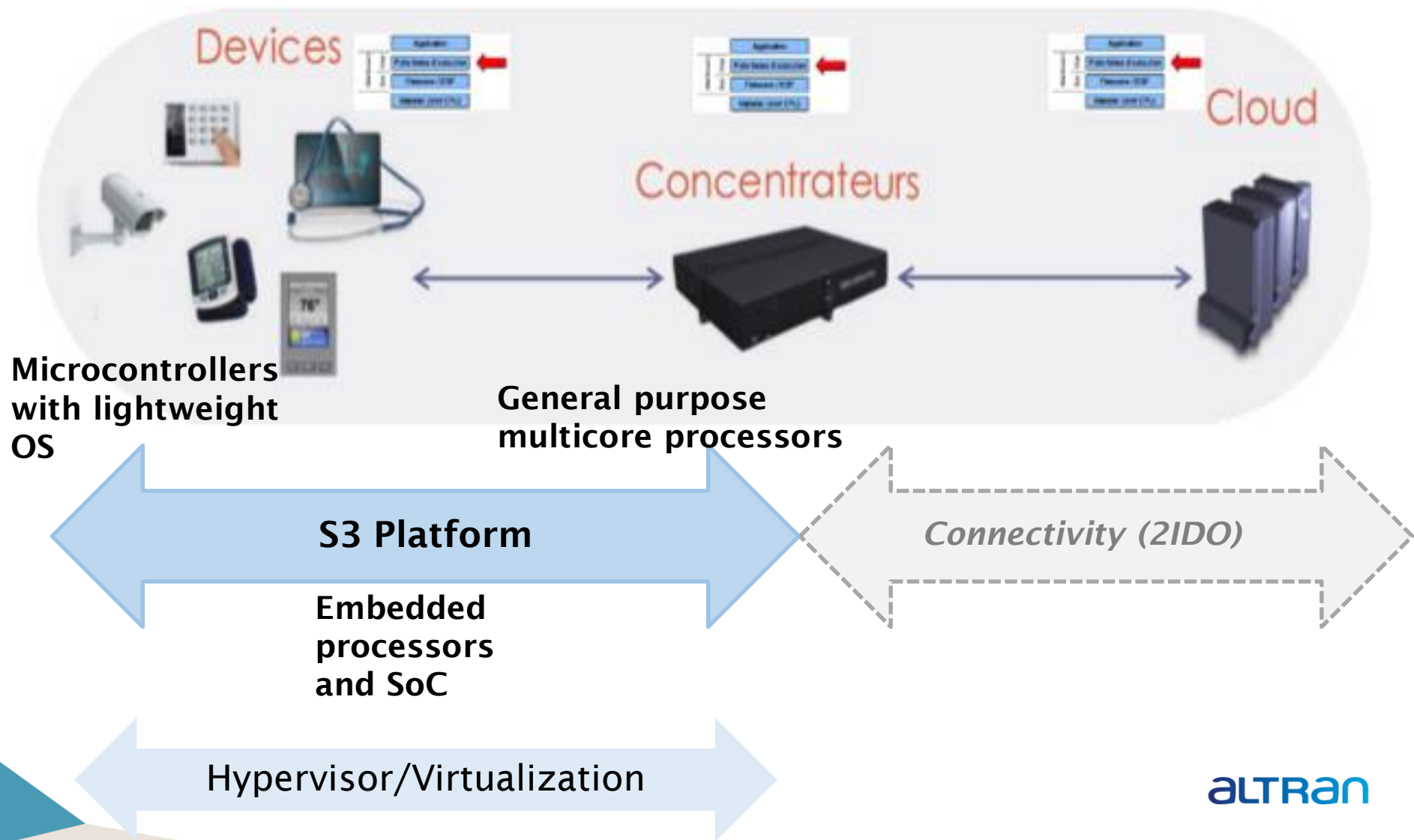
S3P Software Platform

- Smart: technically and economically efficient
- Safe & Secure: compatible with system integrators safety/security requirements, ensuring privacy and trust to end-users
- Platform: a consistent set of run-time software stacks and design tools

Consortium

- **Software vendors** addressing safety/security markets with high-quality, highly innovative solutions:
 - Esterel Technologies, IS2T, Krono-Safe, PrismTech, Prove&Run, SYSGO, TrustInSoft
- **End-users** from different domains:
 - Airbus, Alstom, Altran, AXA, Continental Automotive, Eolane, Safran, Schneider Electric, Sorin, SurTec, Thales, Withings (Nokia)
 - Advisory board including more major potential customers
- **Contribution from hardware providers**
 - ST Microelectronics, Freescale
- **Industrial valorization of academic contributions**
 - CEA (design tools), TelecomParisTech (run-time support)

Technical Scope



Technical challenges

- Proven separation mechanisms for programs and data
- Remote administration and update
- Re-usable secure components
- High-level application models and consistent programming paradigms
- Deterministic behavior and latency bounds
- Support across hardware evolutions
- Hardware platform heterogeneity

Planned results

- Agreed architectural principles and interfaces: the S3P « label » and open de-facto standard
- Mature (TRL7) software building blocks from different vendors, compliant with the S3P label
- Demonstration on 15 industrial test cases:
 - Of the maturity and integration of the building blocks
 - Of the innovation potential for applications

Expected impact

- Strong S3P ecosystem (not only at national but also at European level)
- Competitive, perennial European alternative to dominant software execution platform, with native support for safety and/or security
- Significant increase of worldwide market shares for this software execution platform
- Competitiveness in traditional industrial application domains (e.g., transportation)
- Emergence of new actors bringing new trustable services, from the cloud to the sensors/actuators, (e.g., home automation)

S3P Use Cases



ATC on distributed platform



Rail signaling on new generation platform



Connected control platform for airborne equipment



Smart Speed Drive



Secured multi-domain gateway

Real-time, distributed, reconfigurable systems

Legacy code migration



E-Health platform

Platform for digital, virtual and resources efficient factories



Secured automotive entertainment system

Multipurpose multiservice box for cars

Secured gateway for 3D printing



Smart home monitoring and alert system



Multiprotocol gateway

Smartwatch

Industrial Internet of Objects and Operators (2IDO)

Challenges

- Thanks to always smaller and cheaper electronics, industries have the capacity to address major concerns:
 - Monitoring and geo-location of key assets
 - Protection of operators
 - Improvement of processes

- Transportation of data in industrial constraints requires a dedicated “industrial internet”
 - Efficient
 - Robust
 - Economically accessible

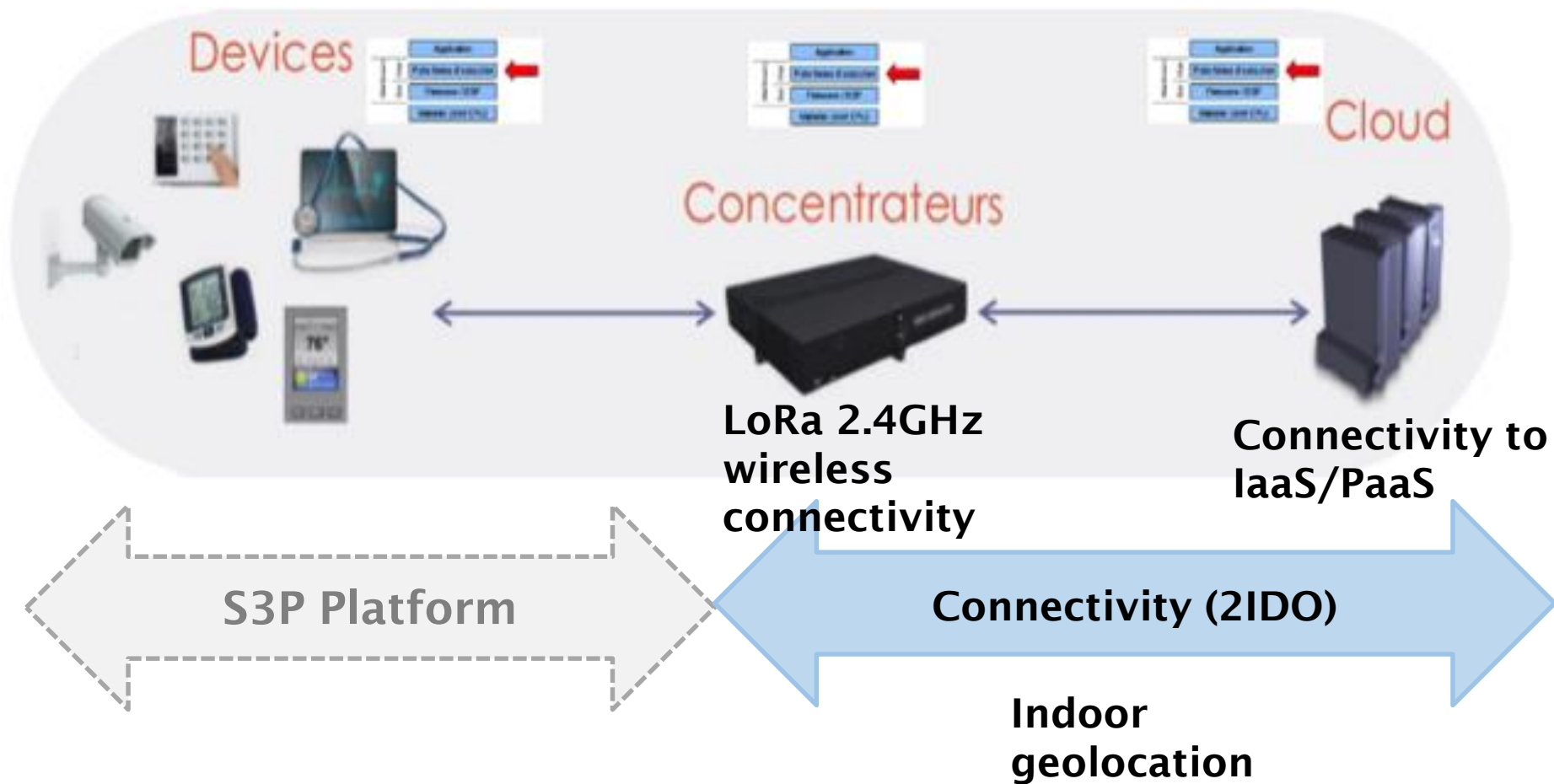
2IDO Network

- Industrial Internet: new radio network consistent with industrial constraints
- Objects: compatible with a wide range of sensors, S3P concentrators, connected machines
- Operators: connected/augmented operators thanks to a set of sensors and additional capacities

Consortium

- **Network vendors** developing LoRa modulation based network elements:
 - Altran Connected Solutions, Idosens
- **End-users** from different domains:
 - Airbus Safran Launcher, Altran, Areva, Arkema, Safran, Total
 - Advisory board including more major potential customers
- **Industrial valorization of academic contributions**
 - CEA LAAS (battery life)

Technical Scope



Technical challenges



Planned results

- 2IDO introduces a new standard based on LoRa modulation and international 2.4GHz frequency
- The main advantages of using this network are:
 - High penetrability rate
 - Long range indoor (tested in nuclear power plants).
 - 2.4GHz is free and international
 - Low cost chipsets allowing various and wide deployments
 - Compatible with LoRaWan, Sigfox, 3/4G, IP based networks
 - Compatible with RFID
- Multiple applications can be addressed:
 - Precise indoor asset tracking (a few meters) thanks to ToF technology
 - Geo-fencing
 - Real time inventory management

2IDO use cases



Real time tools monitoring Assembly line efficiency monitoring

EtoE real time geo location of tools between the factories and inside the factory
Measurement of assembly line time cycles to improve efficiency and reduce wasted time

Assets geo location (tools) Operators emergency geolocation Open/closed valves monitoring

Real time geo location of assets inside the factory/oil rig
Monitoring of operators in case of emergency/evacuation
Planning and monitoring of valves closing and opening



Connected operator Predictive maintenance Objects traceability

Monitoring of operators to reduce muskulo-skeletal disorders
Optimization of machines availability thanks to extended predictive maintenance
Tracing R&D samples inside the factory

Operators emergency geolocation Open/closed valves monitoring Transmission of text messages through heavy walls

Monitoring and geo location of operators in case of emergency/evacuation
Planning and monitoring of valves closing and opening
Sending text messages (procedures, alerts, events) to operators working in NPPs

