



Sebyone: Connecting the Future of IoT

Italian innovation meets enterprise-grade infrastructure. Founded in 2021, Sebyone delivers cutting-edge DaaS technology for seamless machine-to-machine communication across industries.

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Company Overview

Founded in Innovation

Sebyone is an Italian start-up established in 2021 by industry veterans with over two decades of ICT experience. Our mission: revolutionize how machines and devices communicate through our proprietary DaaS (Device as a Service) technology platform.

We specialize in building interconnected solutions that bridge the gap between physical devices and digital infrastructure, enabling real-time data exchange and intelligent automation.



Visit us: www.sebyone.it

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Multidisciplinary Expertise



Artificial Intelligence & Machine Learning

Neural networks, LLMs, and declarative AI systems



Cybersecurity

Penetration testing, cryptography, and threat detection



Software Development

Full-stack solutions from frontend to embedded systems



IoT & Embedded Systems

MQTT protocols, firmware design, and remote monitoring



Robotics & Automation

Advanced sensing, navigation systems, and microcontroller programming

Our dual expertise in **Electronics Engineering** and **Computer Science** enables us to deliver complete, interconnected solutions with strong capabilities in software engineering, networking infrastructure, and cybersecurity.

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The Challenge of Modern Networking

Today's networking landscape is fragmented across multiple technologies and protocols. High-efficiency solutions excel at short-range, energy-saving communication, whilst expensive technologies handle long-distance interconnection between nodes.

Various paradigms and standards have emerged to address diverse communication needs, but **true continuity and efficiency require seamless integration** across all these technologies.

Sebyone introduces the Device as a Service Overlay Mesh (DaaS) paradigm, leveraging its stack to enable self-organised, data-oriented infrastructures that bridge these technological divides.



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A network that builds itself and never stops

What Is Device as a Service (DaaS)?

Born from Experience

DaaS technology emerged from concrete design experience and in-depth analysis of specific communication challenges in distributed systems.

Innovative Hypothesis

Proposes a revolutionary approach for developing communication infrastructures for Narrowband IoT (Nb-IoT) and wide-band services.

Core Concept

Device-as-a-Service encapsulates the principle of universal reachability—ensuring any device within a distributed system can be accessed seamlessly, regardless of underlying protocols.

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Key Features of the DaaS Project

Sebyone's DaaS Project deploys a new network paradigm with numerous advanced features. This presentation highlights four fundamental capabilities:



Overlay Network

A logical interconnection of nodes, independent of underlying transport protocols and media—effectively a 'network within the network' with its own distinct features and capabilities.



Protocol Channelling

Enables nodes to leverage local interfaces (Wi-Fi, Ethernet, Bluetooth) to establish multiple logical links, evaluated dynamically for availability, performance, and security.



Self-Synchronisation

Ensures nodes share a common time reference by dynamically correcting misalignments through mutual consensus with neighbouring nodes—eliminating server dependencies.



Self-Provisioning

Enabled node to self-configure and collaborate with peers to form a fully operational network – achieving zero-touch deployment and adaptive service integration.

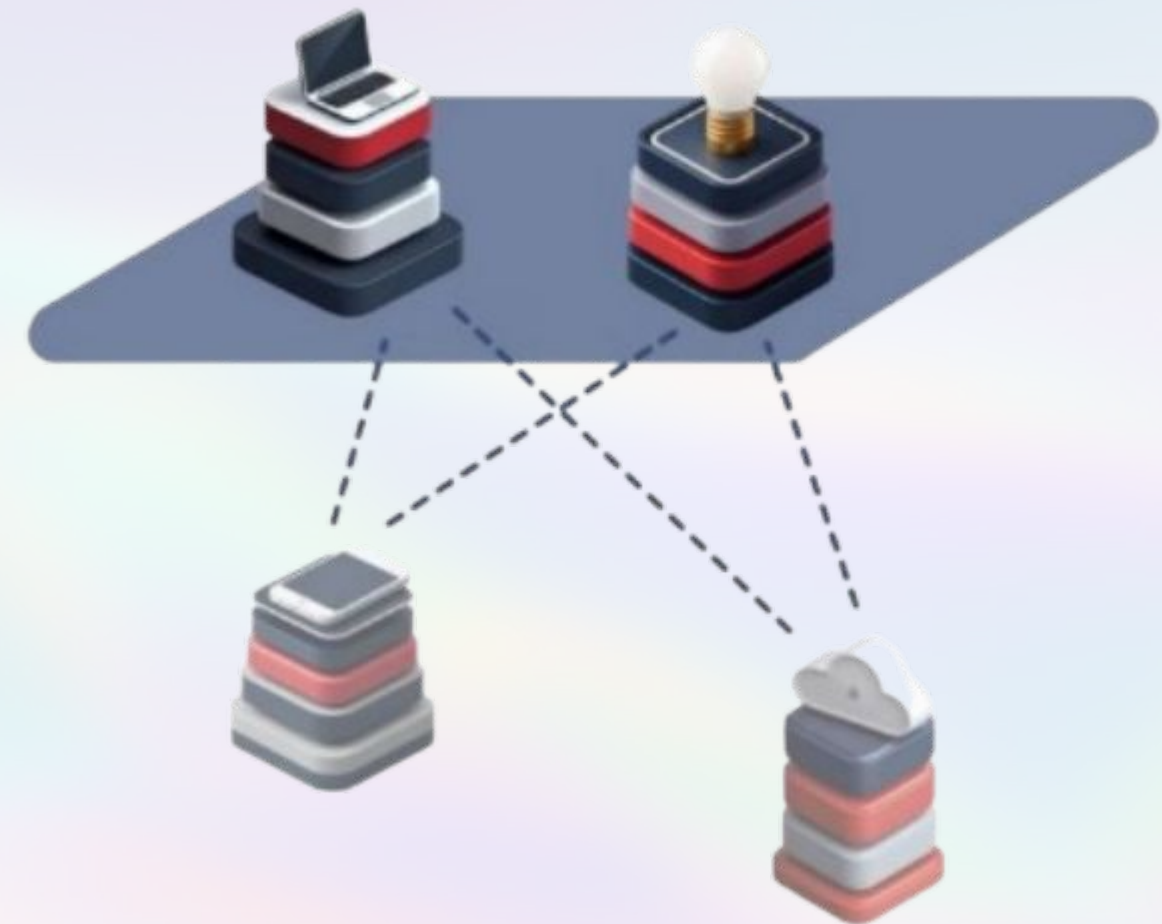
Understanding Overlay Networks

An **overlay network** abstracts the physical infrastructure, enabling multiple virtual networks to coexist on the same hardware through two distinct layers:

Underlay: The physical network infrastructure

Overlay: Virtual layer built on top through software

Software technologies and logical models virtualise access to underlying resources, isolating applications from physical network constraints.



- ❏ **The overlay network distributes services based on connectivity and mobility needs**, isolating endpoints and applications from the real consistency of physical network infrastructures.

Intelligent Protocol Channelling

Nodes utilise **local communication interfaces** (Wi-Fi, Ethernet, Bluetooth) to activate multiple logical connections, continuously evaluated for *availability, performance, and security*.

The protocol intelligently uses the best communication channel available

Devices seamlessly switch between channels, ensuring **signal availability** and reliable **data transmission** to their destinations. Interface-level operations are managed through sophisticated drivers.



Advanced Self-Synchronisation with dATS

DaaS employs the **dATS algorithm**—a sophisticated sub-protocol enabling autonomous and precise time synchronisation across distributed networks. Nodes act as both receivers and transmitters, exchanging data to perform drift and offset compensation of their clocks.



Server-less

Time alignment without centralized synchronisation servers



Resilient

Maintains high reliability in changing network conditions



Robust

Tolerates latency and noise in shared channel networks



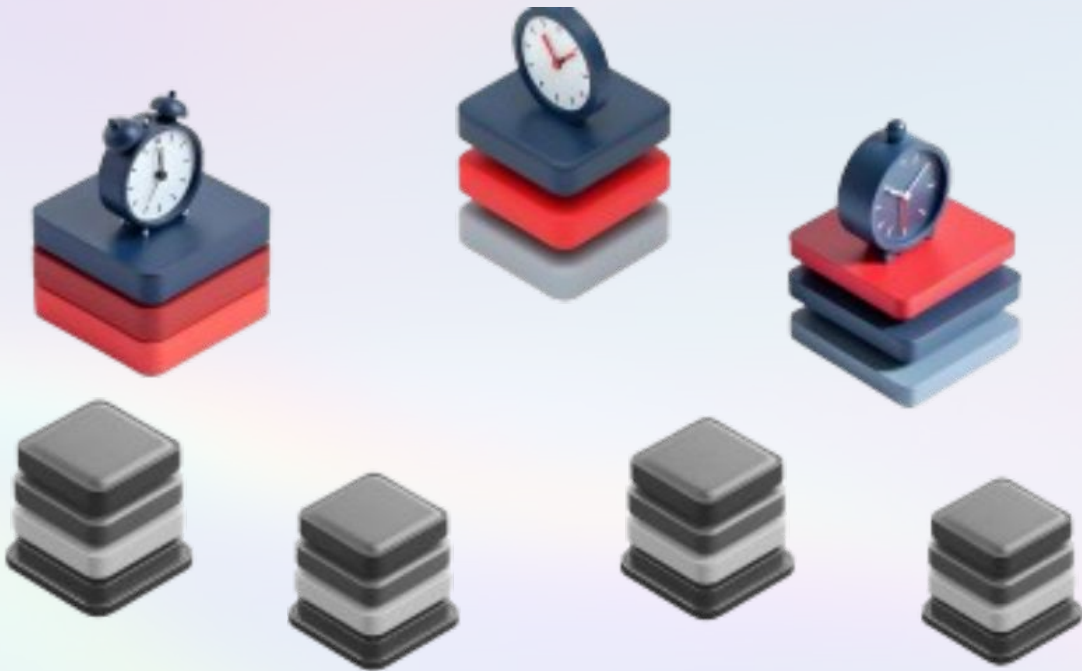
Scalable

Effective in multi-hop and large-scale distributed networks



Precise

Achieves time alignment with estimable approximation factors



dATS enables precise clock synchronisation across multiple devices, despite substantial communication delays

Self-Provisioning and Discovery

New DaaS nodes connect to the network **fully autonomously**, with no manual configuration required



Auto-discovery

Of nearby nodes and existing topology



Secure

And controlled onboarding through distributed mechanisms



Dynamic

The network dynamically adapts to new devices joining



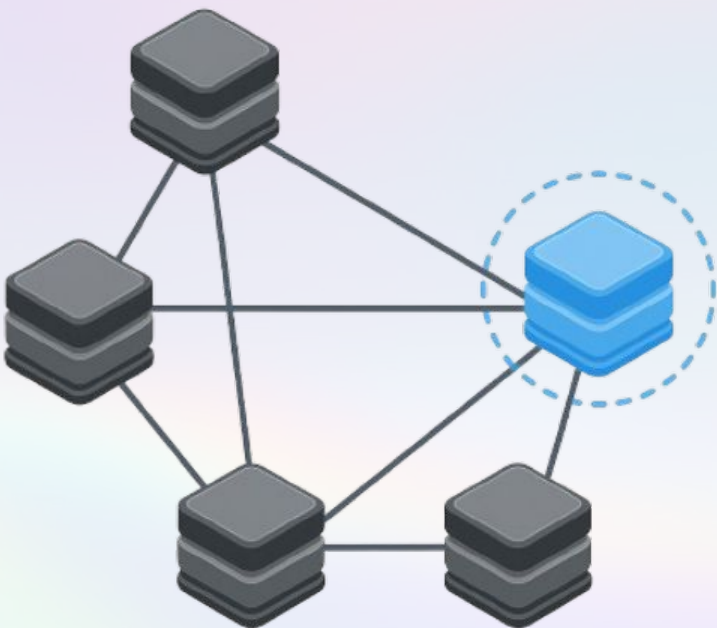
Fast and scalable

Even at large scale



Zero-touch provisioning

for instant integration – less complexity, more automation

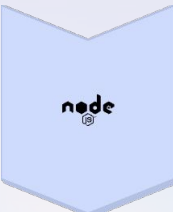


Just connect. The network adapts.



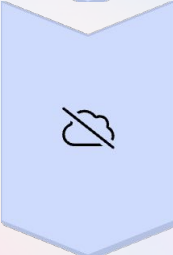
Plug in, discover, connect – seamlessly.

DaaS Network Architecture



Network Composition

A DaaS network comprises at least two interconnected nodes hosting the DaaS stack



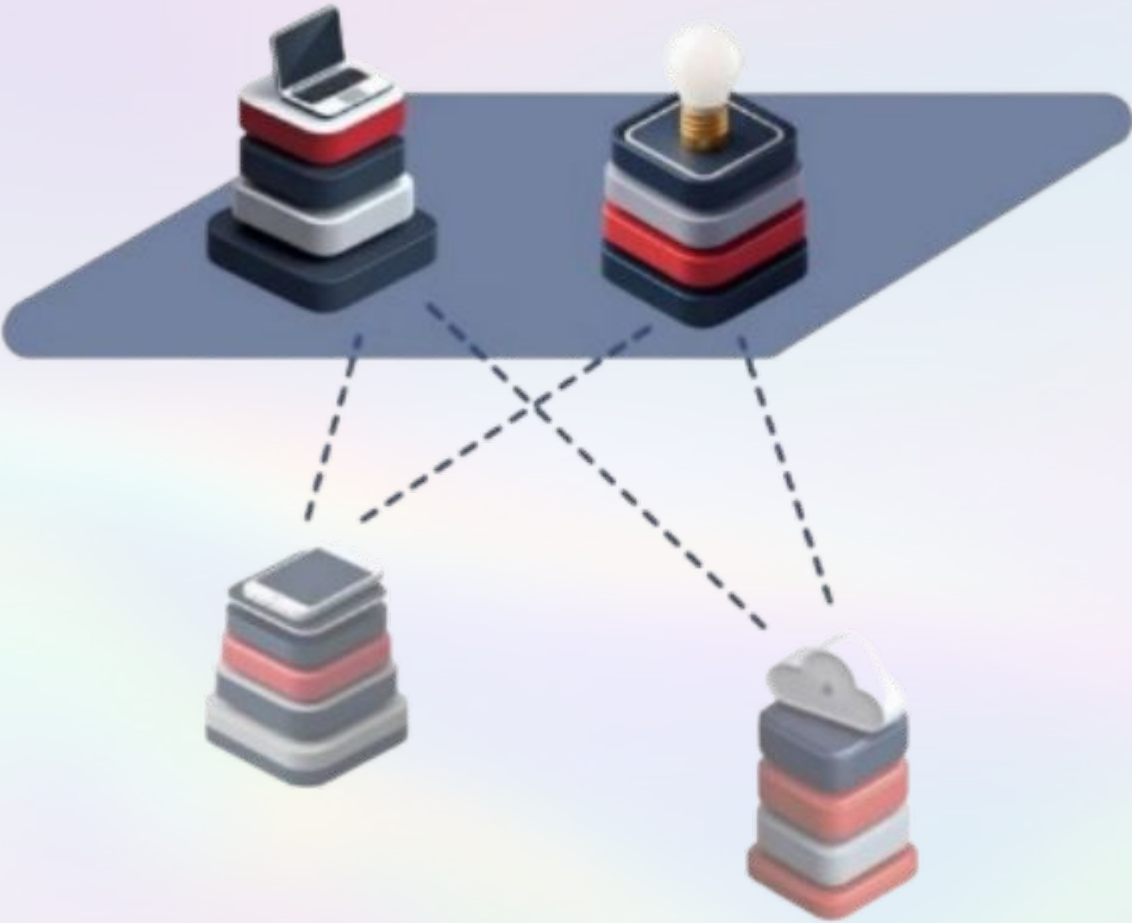
Connected State

A node is 'connected' when at least one communication channel exists to reach another network node



Node Identification

Each node is defined by a tuple: **DIN** (DaaS IdeNtifier) for the instance and **SID** (System IDentifier) for the distributed system



DaaS Network Architecture

High-Performance, Cross-Platform Networking Layer



Resilient

If a channel or node fails, communication automatically reroutes through alternative paths—ensuring uninterrupted connectivity.



Low Traffic

Global data encoding achieves up to **80% traffic reduction**, optimizing bandwidth and reducing operational costs.



Extendable

Developed in ANSI C with modular architecture based on channel drivers—easily scalable and customizable for any use case.



High Performance

Optimized protocol reduces overhead dramatically. Latency converges to physical network time for near-instantaneous response.



Portable

Node code is just a few kilobytes—runs seamlessly in the cloud and on low-power embedded devices without modification.

DaaS creates parametric overlay-mesh networks where nodes use different technologies and protocols to form a unified, intelligent communication layer.

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Why Industrial IoT?

The Industrial Internet of Things (IIoT) is driving the digital transformation of manufacturing and production environments worldwide. By seamlessly connecting machines, sensors, and control systems across the shop floor, IIoT enables real-time monitoring, predictive maintenance capabilities, and autonomous operations that were previously impossible.

Sebyone's innovative **DaaS overlay technology** provides the critical infrastructure needed for true industrial connectivity:



Secure Connectivity

Low-latency, encrypted connections designed specifically for demanding industrial environments



Hybrid Protocols

Native support for multiple communication protocols across diverse industrial systems



High Resilience

Fault-tolerant architecture ensures continuous operations on the shop floor



Full Interoperability

Seamless integration between Operational Technology and Information Technology systems

"DaaS enables the convergence of Operational Technology and Information Technology — the foundation of Industry 5.0."

Why Cyber-Physical Production System?

The evolution from **Industrial IoT** to **Cyber-Physical Production Systems** marks a new are in manufacturing.

CPPS tightly integrate physical machinery, embedded sensors, control software, and intelligent-decision making systems – creating adaptive, self-organizing factories.

Sebyone's **DaaS overlay technology** provides the secure, distributed communication fabric needed for this transformation.



Real-time synchronization

Across machines and control systems



Scalable mesh architecture

For dynamic production environments



Edge-to-cloud

Interoperability and resilience



Industry 5.0

Foundation for Industry 5.0 and human-centric automation

"From connected machines to intelligent ecosystems – DaaS empowers the rise of CPPS."

DaaS for IIoT — Key Enablers

Our DaaS overlay mesh network architecture has been specifically engineered to address the unique challenges of mission-critical industrial environments. This robust foundation delivers the reliability and performance that modern manufacturing demands.



Interoperability

Seamlessly connects heterogeneous devices and integrates legacy systems without requiring costly replacements



Resilience

Self-healing overlay network architecture ensures uninterrupted operations even during component failures



Scalability

Supports dense, multi-hop industrial networks that can grow with your operational needs



Security

Native encryption and isolation at the node level protects critical industrial data and operations



Precision

Distributed time synchronisation with dATS protocol enables microsecond-level coordination



From sensor to edge to cloud — a unified communication fabric that spans your entire industrial ecosystem.

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Use Cases in Smart Manufacturing

DaaS technology empowers a new generation of connected industrial systems, transforming fragmented operations into unified, intelligent manufacturing ecosystems. These real-world applications demonstrate the transformative potential of our overlay network architecture.



01

Smart Shop Floor

Real-time communication between machines, sensors, and control systems for optimised production

02

Predictive Maintenance

Continuous monitoring with synchronised event streams to prevent downtime before it occurs

03

Energy & Resource Optimisation

Distributed sensing enables more efficient operations and reduced environmental impact

04

Autonomous Material Handling

Coordination of AGVs and robots through low-latency mesh networking

05

Retrofit of Legacy Systems

Enable connectivity without replacing existing infrastructure investments

"Transforming fragmented systems into a unified, intelligent manufacturing ecosystem."

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Interoperability & Standards

Our DaaS technology integrates seamlessly with established industrial standards and communication protocols, acting as an intelligent connectivity layer between heterogeneous networks. This flexibility ensures that your existing investments remain valuable whilst enabling next-generation capabilities.

Protocol Bridging

OPC-UA and MQTT bridging enables communication across diverse industrial systems

Hybrid Architectures

Edge-cloud hybrid designs balance local processing with centralised intelligence

Multi-Standard Support

Compatible with Ethernet, Wi-Fi, Bluetooth, NB-IoT, and emerging protocols

Brownfield Integration

Secure integration of existing brownfield infrastructures without disrupting current operations. Our approach preserves your legacy system investments whilst unlocking modern IIoT capabilities.

Flexible data routing adapts to your network topology

Automatic device discovery simplifies deployment

Zero-trust security model protects critical assets

📌 **DaaS acts as an intelligent glue between heterogeneous networks** — enabling seamless data flow across your entire industrial ecosystem.

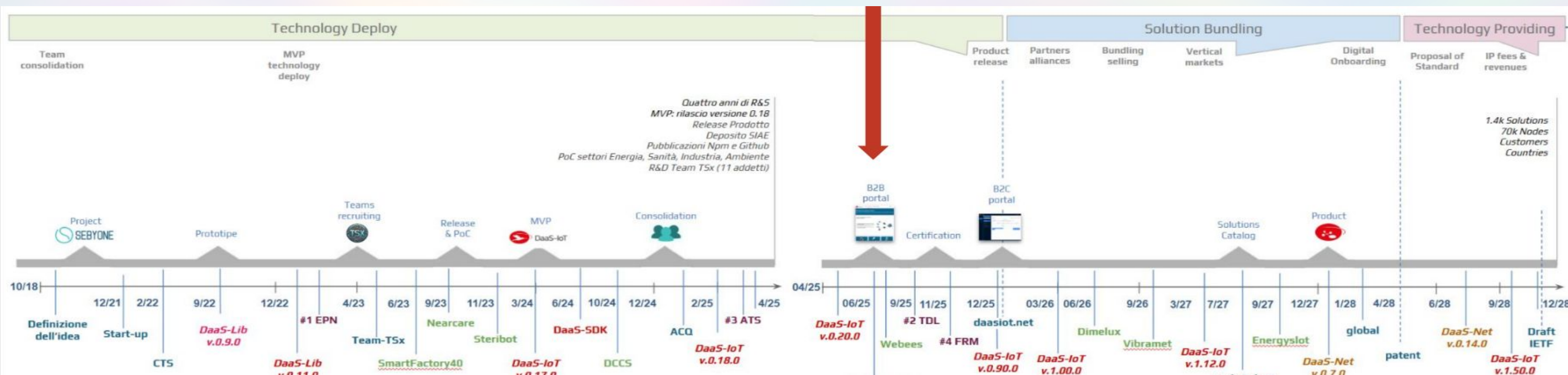
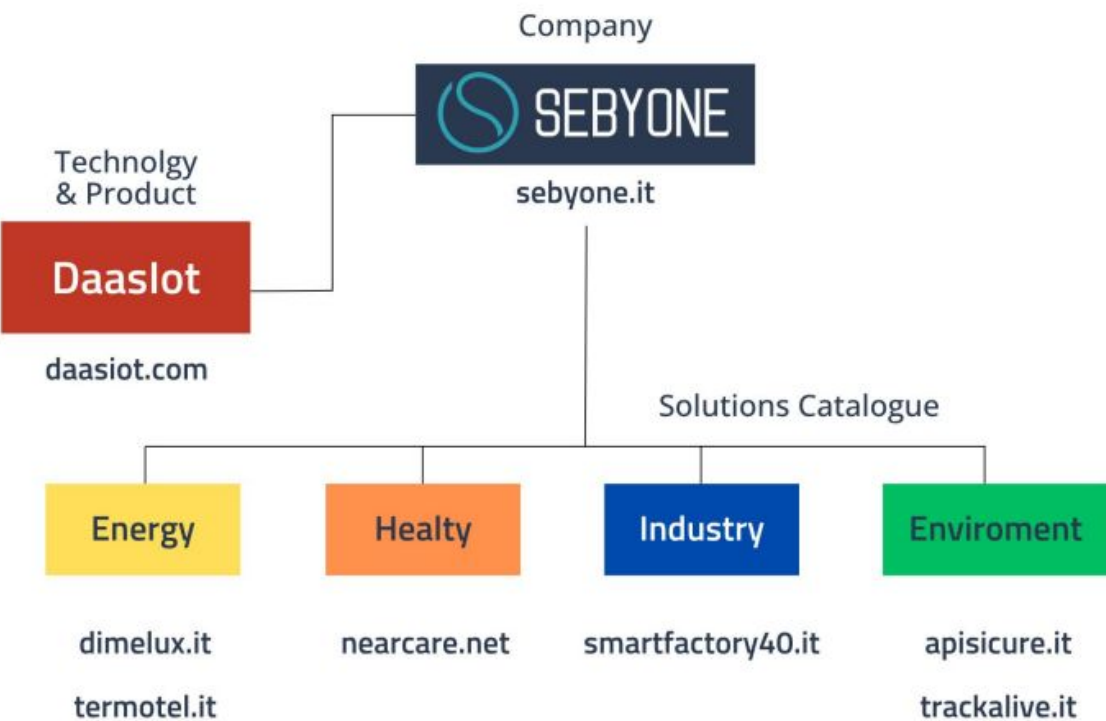
The Future of Intelligent Networks

The DaaS Project is **very ambitious**, but as history teaches, many technical solutions to real problems were born and evolved into forms we could only dream of.

We believe that now, more than ever, we are ready to change the **way we think about digital communication**.

We imagine **totally decentralized and intelligent networks**, active and distributed systems capable of reorganizing themselves autonomously to redesign the communications landscape.

Contact us with any questions. We will be happy to share our work with anyone interested in the project.



Let's build the future of connectivity **together**



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