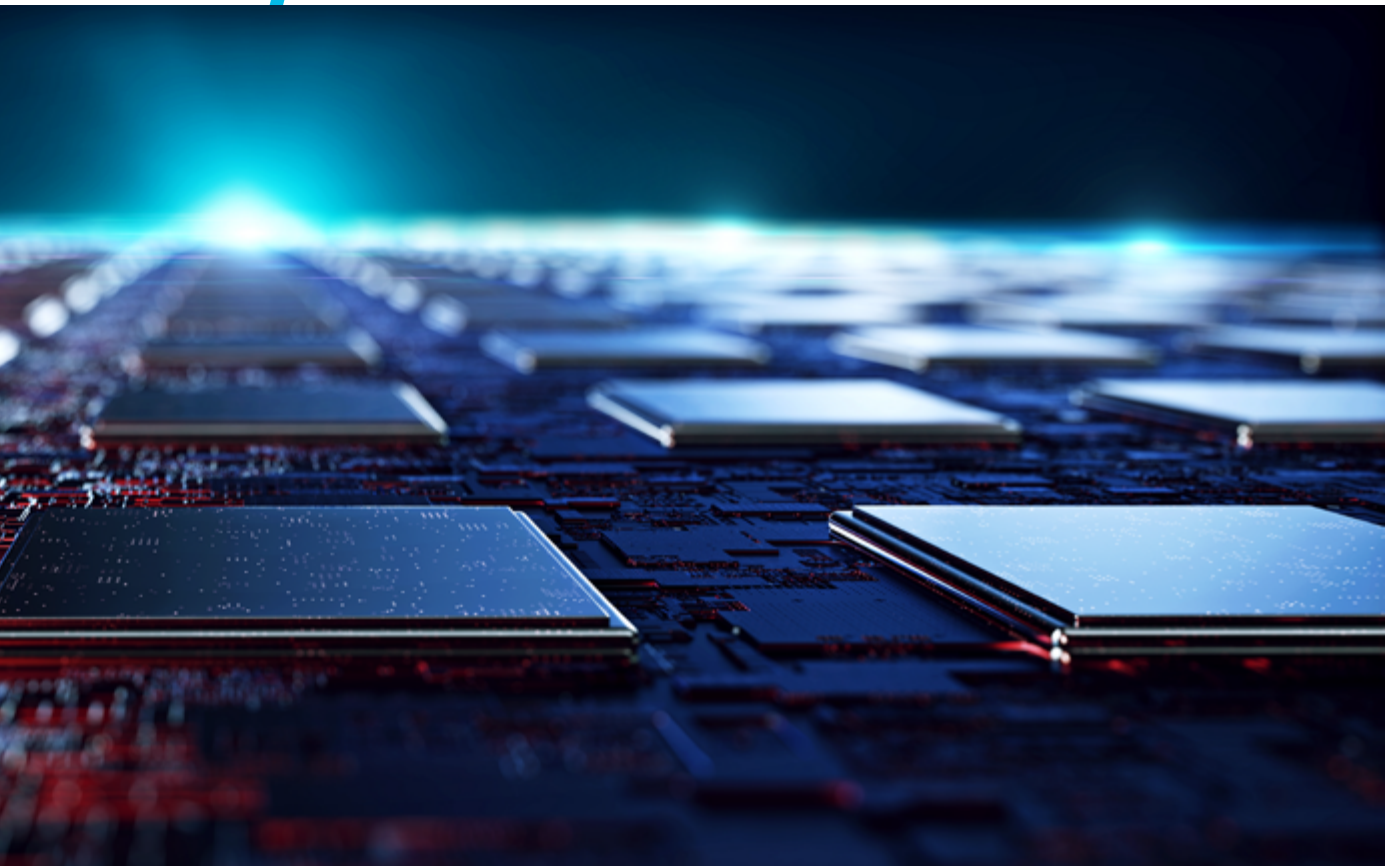


READY TO UNLOCK THE VALUE OF R&D?

PANORAMA 2021 EDITION



| GET THE FUTURE
YOU WANT

MANIFESTO

Unifying the **global capabilities in Engineering R&D** and harnessing the **power of data, connectivity and software** to pioneer the Intelligent Industry, Altran & Capgemini Digital Engineering and Manufacturing Services join forces to become **Capgemini Engineering...** bringing the best of both worlds; together! Through our **cutting-edge innovations**, we are excited to design, develop and delivery tomorrow's **smart products**, create new **customer experiences** and provide **high value** in our clients' **digital transformation journey**.

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INTERVIEW WITH THE CEO:

WILLIAM ROZÉ

With Capgemini's acquisition of Altran, your digital manufacturing expertise comes together with Altran's world-class engineering and R&D services. How does this increase the value proposition for clients across industries?

Convergence between physical and digital worlds has never been so real, disrupting the way clients manage their innovation and playing a key role in their development. To stay ahead of the competition, they must transform and rethink their R&D models. The industry of tomorrow must become intelligent. Since Capgemini and Altran joined forces last year, we have never been more ready to help our clients unleash the potential of their R&D. We will be committed at their side with a strong value proposition leveraging our product and system culture and the best domain and technology expertise to support them as the leader of the intelligent industry.

We have launched now our new brand, Capgemini Engineering and tailored an integrated organization leveraging the expertise of both Capgemini Digital Engineering and Manufacturing Services and Altran, bringing together a unique and unmatched set of skills. We are investing in technological bricks to help our clients accelerate their own time to market with the power of the Group.

Capgemini is one of the trailblazers in the IT world, the agility in the ways the Group engages with cloud and data is unprecedented.

Did COVID-19 pose any challenges or opportunities?

Covid has massively accelerated the trends we were seeing the last years. The world has realised the importance of digital access. During COVID19, we were able to move remotely and accelerate access to the digital world. For example, in 5G we are seeing new access to infrastructures that makes a difference. When we speak about intelligent industry, software and connectivity go hand in hand and we have in-depth expertise in this area.

The intelligent industry is all about how you move into this kind of transition. Every industry is moving into the non-physical world to accelerate. This kind of approach is impacting products, systems, operations (manufacturing) and services, creating more value to the end user.

This transition to the digital world as a result of COVID19 has transpired not just in the B2C areas but also B2B. The 5G access accelerated our position and the shift to cloud is a clear indication of acceleration to an agile environment. Further, there has been acceleration in artificial intelligence, automation and also robotics, and we are creating the extended intelligent path of every product and service across multiple organisations in 10 industries. This kind of extended intelligence dimension adds more complexity but also adds more value across the board to our clients.

On top of that the new ways of working help us leverage easily the experts and talents that we have across the world helping us provide more value to our clients.



"WE HAVE NEVER BEEN MORE READY TO PUSH A STRONG VALUE PROPOSITION TO THE MARKET"

Could you share with us a project where Capgemini is currently working on, that spontaneously comes to your mind?

I think one of the projects that excites me the most today is with Siemens Energy and Siemens Gamesa to use digital twin technology. This technology is the future and we can use it for any industry well combined with our system skills. For Siemens, the goal is create automatically and cost effectively, machine specific digital twins of their installed gas turbine, compressor and wind turbine assets.

The initial pilot phases have been successful and proven the achievability to use the existing data without change, producing some stunning interfaces and digital twins of installed power plants with real-time data driven operations. The work is on-going and has turned to exploring the different value propositions when co-creating with their clients to produce federated digital twins that are specific to each customer site.

What is Capgemini Engineering's strategy for the next 5 years?

We are currently seeing a market rebound and with it, new models for global collaboration are ramping up and global engineering delivery platforms are emerging. The lines between digital & physical worlds are blurring. We can see the Softwarization of every Industry. Clients want new types of partnerships and engagement from their ecosystem. We have restructured our E&RD model to shift, speed and scale towards Intelligent Industry using our unique position at the crossing of tech & industries thanks to our Accelerators in Software, Advanced Connectivity, Digital Continuity and Smart factory and also our Industrialized service platform.

We want to be the leaders across the board and we are investing to achieve it thanks to our 52,000 talents and leveraging the power of the Group. We want to be the strategic partner of the Industry CxOs and accelerate across all of our zones!

PROFILE



We are Capgemini's **engineering and R&D powerhouse**. With the combined strengths of the Group, we harness the power of data, connectivity and software to pioneer Intelligent Industry. We unleash the potential of **R&D and innovation** to help our clients create smart products, optimize operations, create new customer experiences and deliver new sources of value.

With 52,000 engineers and scientists worldwide, we grow our clients' engineering capabilities with an unmatched array of skills and a local footprint everywhere on the planet.

WHAT WE OFFER

PRODUCT & SYSTEMS ENGINEERING

We design, engineer and test complex systems as well as products, provide point expertise, assets and services on specific steps of the product development lifecycle, and take responsibility for full product development projects.

- Product Development & Systems Engineering
- Multi-Physics Engineering
- Silicon, Electronics & Embedded Systems

DIGITAL & SOFTWARE

We create new client experiences, build and deploy cutting-edge products, and deliver operational efficiencies at the continuous speed of today's markets.

- Data & Software Product Engineering
- Product Lifecycle Management (PLM)
- Connectivity

INDUSTRIAL OPERATIONS

With combined expertise in manufacturing engineering, industry domain knowledge and hands-on experience in technologies, we transform industrial operations and deliver quantified improvements in performance, flexibility and productivity.

- Manufacturing Engineering & Asset Management
- Supply Chain & Quality Management
- Product Support & Sustenance



GLOBAL PRESENCE

Australia	Japan	Spain
Austria	Luxembourg	Sweden
Belgium	Malaysia	Switzerland
Canada	Mauritius	Taiwan
China	Mexico	Tunisia
Czech Republic	Morocco	United Arab Emirates
Finland	Netherlands	Ukraine
France	Norway	United Kingdom
Germany	Poland	United States of America
India	Portugal	
Ireland	Romania	
Israel	Slovakia	
Italy	South Korea	

52,000
engineers and
scientists

30+ years
expertise in
product engineering

50+ clients
ranked us
strategic partner

Benefits 2/3rd
of top 500 global
R&D spenders

MARKET OVERVIEW

The world is moving beyond recovery to a new landscape of growth, driven by digital acceleration, disrupted sector plays, more globalization and a stronger focus in speed to market and responsible development.

Our ER&D market is bouncing back driven by 5 trends:



INDUSTRY SOFTWAREIZATION

Digital, IT and OT are converging in the intelligent industry playground



DIGITAL TALENT RACE

Competition for talents at scale is getting fiercer and critical



SKIN IN THE GAME

Clients are expecting new types of partnerships and engagement from their ecosystem



DISTRIBUTED AGILE ENGINEERING

New models for global collaboration are ramping up and global engineering delivery platforms emerge



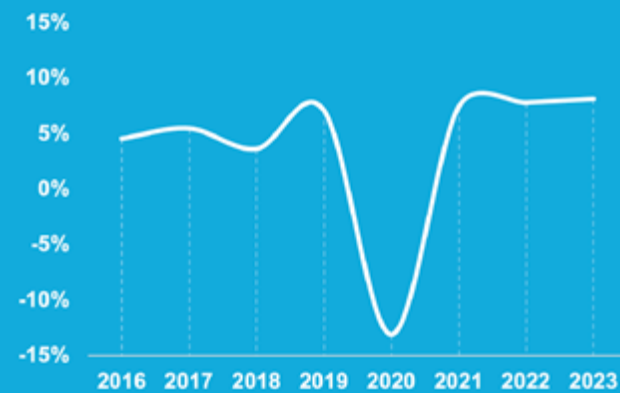
REVISITED ER&D MODELS

Shift, speed and scale towards Intelligent Industry requires a revisited ER&D model

Time to market becomes as crucial as innovation and expansion. This new landscape thus necessitates a revisited E&RD model to shift, speed and scale towards Intelligent Industry.

OUR MARKET IS BOUNCING BACK

Global ER&D service growth (Annual percent change YoY)



Our strategic priorities are aligned with this momentum:

MARKET LEADERSHIP ACROSS THE BOARD

- Establish as the **strategic partner of CxOs** and leverage our expertise in **pivotal industries**
- **Accelerate** across our zones
 - **France:** Shift our positioning towards new **tech domains** and **turnkey** projects
 - **Europe:** further **diversify**, esp. in **Germany**, and support our **clients transformation**
 - **Americas:**
 - **Accelerate** in industrial sectors like Energy, Automotive, Aeronautics & Life Sciences
 - **Reinforce our footprint** in Communications, Semiconductor and the Tech
 - **Asia-Pacific:** Develop in **Japan** and **Australia** and South Korea leveraging the Group

UNIQUE POSITION AT THE CROSSING OF TECH & INDUSTRIES

- Conquer the **Next Gen SW playground**
- Go to the next level in **Digital continuity**, advanced **Connectivity** and **Smart factory**
- Invest in **technology Accelerators** & build the **best of breed alliances**

LEADING INDUSTRIALIZED SERVICE PLATFORM

- Reach **next level of efficiency** through increased delivery industrialization
- Further scale our **Industrialized GlobalShore** platform and Engineering Centers network

INTELLIGENT INDUSTRY

With our Group, we foster synergies between the Digital and the Engineering worlds to help any company build intelligent **products, operations and services** at scale with digital inside everything, digital **continuity** throughout lifecycle and digital convergence with its ecosystem, allowing the rise of a sustainable Intelligent Industry era.

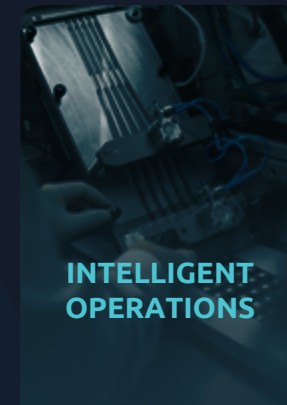
We transform data into insights and actions. We empower companies to manage high complexity and connected technologies in a fast-evolving world.
We pioneer the Intelligent Industry.



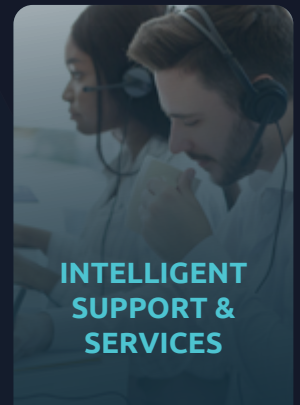
EVERYTHING
BECOMES
INTELLIGENT



INTELLIGENT
PRODUCTS



INTELLIGENT
OPERATIONS



INTELLIGENT
SUPPORT &
SERVICES

DIGITAL INSIDE PRODUCTS & SYSTEMS

DIGITAL CONTINUITY ACROSS THE LIFE CYCLE

DIGITAL CONVERGENCE OF TECHNOLOGIES

POWERED BY DATA & PEOPLE CENTRICITY

**The future of all
Industries
....is Intelligent!**

Intelligent Industry, powered by data, is the evolution of Industry 4.0. The rapid development of key technologies like **5G, Edge computing, Artificial Intelligence (AI), and the Internet of Things (IoT)** means that every type of company, in sectors as diverse as healthcare, automotive, manufacturing, even services, can start to transform their business in a new way.

Capgemini Engineering plays a significant role in this transformation.

WHAT WE OFFER

AUTOMOTIVE

- Driving Assistance
- Mobility Experience
- Sustainable Mobility
- Efficient Engineering
- Efficient Operations



AERONAUTICS

- Optimized Design & Development
- Next Generation Aviation
- Intelligent Operations, Supply Chain, Manufacturing
- Performance Efficiency
- Intelligent Support & Services

SPACE, DEFENSE & NAVAL

- Future-ready Complex Systems
- Efficient & Secure Engineering Transformation
- Advanced Manufacturing
- Intelligent Support & Services

ENERGY

- Sustainable Energy
- Smart Utilities
- Nuclear Excellence
- Mining, Oil & Gas Engineering

LIFE SCIENCES

- Smart Products & Systems Development
- Intelligent Operations
- Agile Compliance

RAIL, INFRASTRUCTURE & TRANSPORTATION

- Intelligent Train
- Rail Signalling, Command & Control Systems
- Intelligent Manufacturing & Operations of Rail Systems
- Smart B2B & B2C Rail Services
- Infrastructure & Transportation Engineering

INDUSTRIAL & CONSUMER

- Product Innovation & System Engineering
- Connectivity & OT Security
- Operations Improvement Services

SEMICONDUCTOR & ELECTRONICS

- Silicon Engineering
- Embedded System & Product Engineering
- Product lifecycle services

COMMUNICATIONS

- Network & Compute Product & Service Development
- Intelligent 5G & Edge For CSP & NEP
- Communications System Integration
- Transformation to Hyper-Scaler & Virtualized Nets & Clouds
- Optimized Engineering & Automation
- Network & Product Support Services/PSS
- Software Framework Solutions/SFS

SOFTWARE & INTERNET

- Software Product Engineering



ADVANCED
ENGINEERING
ANALYTICS & AI



INTELLIGENT
OPERATIONS -
SMART FACTORY



DIGITAL
CONTINUITY



ADVANCED CONNECTIVITY
FOR INDUSTRIES / 5G /
PRIVATE NETWORKS



CLOUD BASED / MACS-BASED
SOFTWARE PRODUCT
ENGINEERING



SOFTWARE PRODUCT
SUPPORT &
TRANSFORMATION / SPST

DIGITAL & SOFTWARE ENGINEERING

Digital & Software Engineering (D&SE) empowers the unique blend of domain and technology expertise to help our clients turbocharge and seize business transformation opportunities at the speed of today's markets.

With Digital & Software Engineering, we develop **future - ready intelligent industries by powering digital value chains around Data & Cloud.** We support our clients to absorb new technologies and compete in the digital market. We engineer the future business processes & products for them.

Digital & Software Engineering addresses the following markets : Industry 4.0++ and Digital Continuity, Data-driven engineering & R&D, 5G & Advanced Connectivity and next generation Software Product Engineering including cloud native development, microservices and serverless architecture.

DIGITAL ENGINEERING & MANUFACTURING

We enable the adoption of digital technologies in the cyber-physical world from design to operations and support through effective implementation of accelerators.

- Advanced Connectivity & 5G
- Data Driven ER&D
- Industry 4.0
- Digital Twin & PLM

SOFTWARE PRODUCT ENGINEERING

We help our clients to capture new markets and business models by accelerating the development of disruptive software products and services.

- Micro services
- Serverless
- APIs
- Cloud native
- SaaS
- X.Tech

SOFTWARE PRODUCT SUPPORT & TRANSFORMATION

We combine our design-led engineering expertise and outcome-driven business model to modernize product life cycles.

- Intelligent automation
- Industrialized models
- Operational transformation



INDUSTRIALIZED GLOBALSHORE

We have one of the best-in-class GlobalShore model; a scalable, end to end supply chain that integrates unique onshore, client focused capabilities, industry specific assets with the best of remote engineering centers at scale, able to incorporate innovation into industrialized delivery.

The premier Engineering and R&D global end-to end delivery model:

- Accelerated, differentiated and disruptive delivery models
- Integrated GPO governance between front office and engineering centers
- Strong intimacy with client organization in their different locations
- Streamline and automate through cross shore leverage, standards, methods and tools
- Proven quality benefits at scale to meet the speed of fast changing markets
- Unmatched cost advantage combined with industry knowledge

25,000+
GlobalShore
Engineers

8
Engineering
Centres





CASE STUDIES





CASE STUDY

HYPERLOOP



The Train of the Future

The race for superfast travel is underway and Capgemini Engineering is working together with the Zeleros team to develop the scalable hyperloop, a **revolutionary ground transport system**.



Speed: 1200+ km/h



Generates more energy than it consumes



Immune to weather conditions

150
ENGINEERS

Madrid, Spain
Toulouse, France

Revolutionary Travel

Hyperloop is conceived as the train of the future. It is a futuristic way to move people and freight between cities at airplane speeds and zero direct emissions. Hyperloop is energy-efficient, and is bringing airplane speeds to the ground safely and sustainably. The system uses electric propulsion systems to accelerate and decelerate levitated pods through a network of low-pressure tubes. The vehicles will glide silently for miles with no turbulence. Using this state-of-the-art technology, the journey from Paris to Madrid could take no more than 90 minutes.

Acceleration with Capgemini

We have been providing technological support and R&D expertise since 2016 to the team of Zeleros hyperloop, that are developing a revolutionary ground transportation system in Valencia (Spain). Its disruptive approach minimizes infrastructure costs and shortens path to market thanks to its propulsion and levitation technologies integrated in the vehicle and the operation at safe pressure levels similar to aviation.



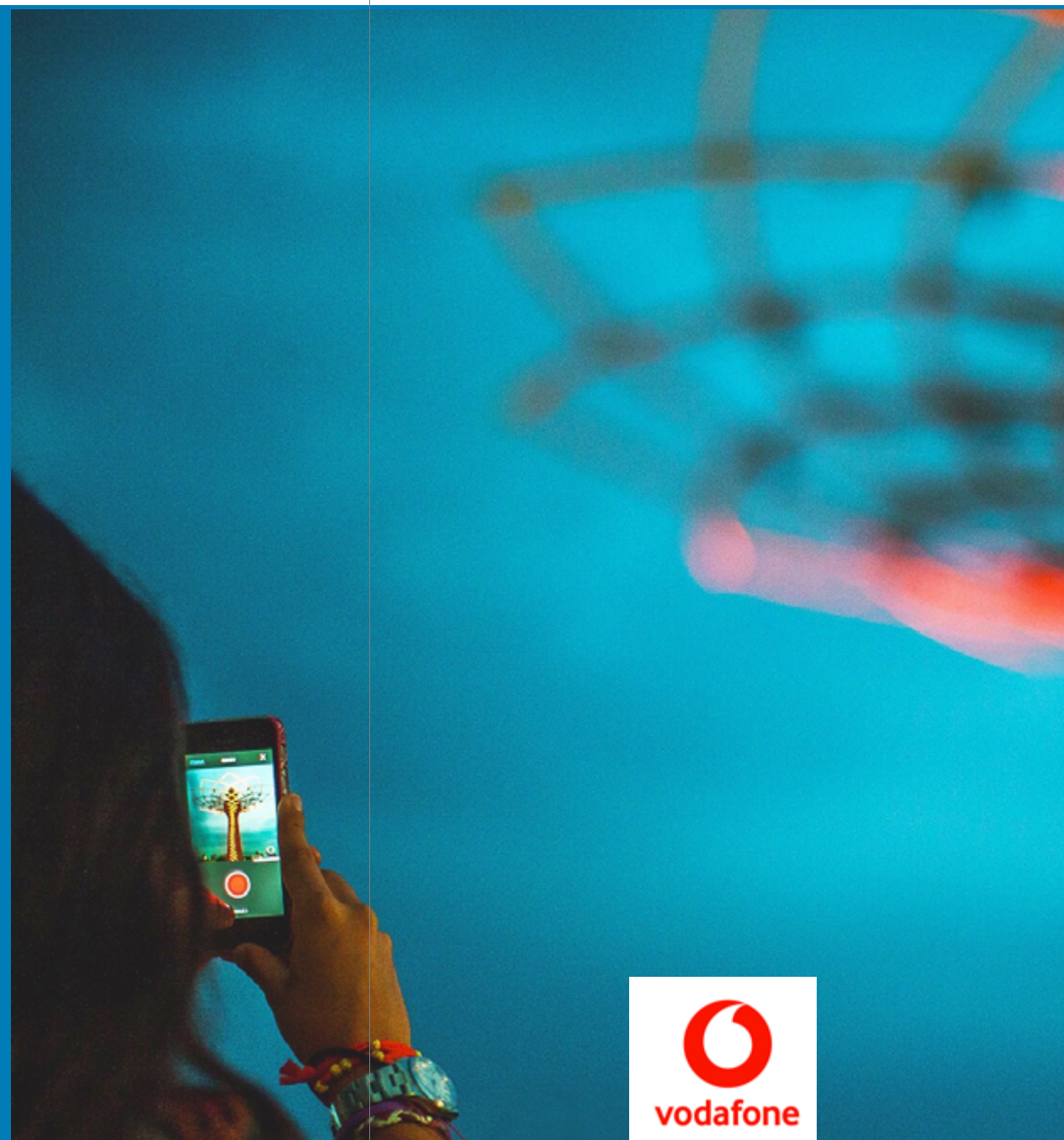
CASE STUDY

VODAFONE

Transformation through 5G

Capgemini Engineering was given the opportunity to develop and test applications and services for the Vodafone 5G trial in Milan that exploits the potential of next-generation 5G technology.

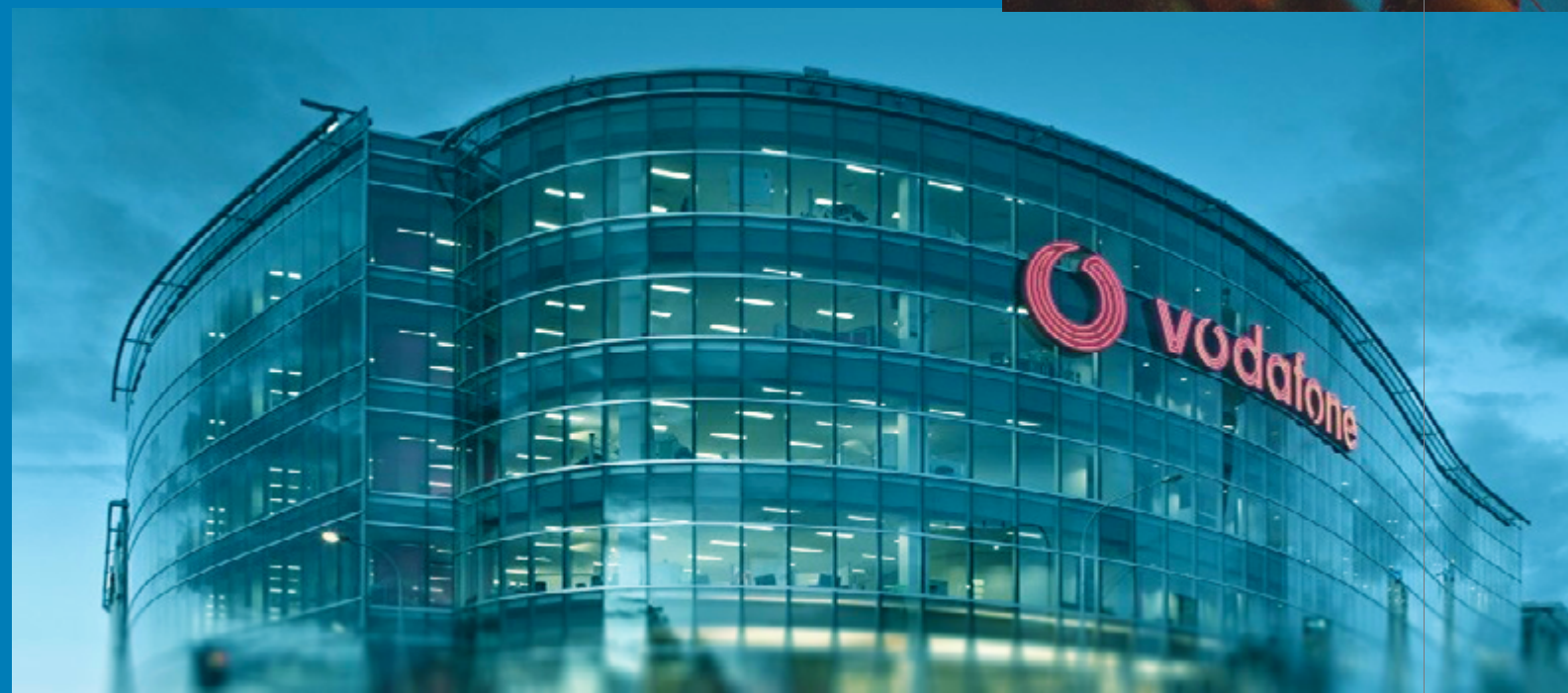
The goal was to demonstrate concretely how ubiquitous **ultra-fast 5G connectivity can enhance healthcare, traffic, tourism and emergency services** in Milan, an international hub with smart city ambitions.



Approach

Vodafone selected Capgemini Engineering as a partner for its strong know-how in system integration and software development, its drive towards innovation, its huge experience in such industries such as automotive and entertainment and its long track record for successful project implementations.

Capgemini Engineering put its hard skills as well as soft skills into play to deliver not just the power of 5G but also the potential application of what Vodafone is building for the community, which in turn transformed Milan into the capital of 5G in Europe



Competitive Advantage

Capgemini Engineering helps communication players optimize their investments in 5G technologies. We link Network Equipment Providers, Communication Service Providers and vertical enterprises using Next Gen Connectivity. We enable Network Equipment Providers to accelerate their 5G strategy through accelerators and by building, customizing, integrating and managing their 5G solutions for their Communication Service Provider clients.

5G is offering new ways to connect people and things, allowing the telecommunications industry to play a reinforced role in the digital transformation across industries. We engineer, build, integrate, deploy, monetize and manage 5G solutions.

CASE STUDY AIRBUS

Imagine a future where pilots may no longer be required to fly helicopters, and the helicopter can be controlled by **automatic systems** instead.

Capgemini and Airbus, a global leader in aeronautics, space and related services, joined hands to work towards a future where this may be possible.

Airbus provides the most efficient civil and military rotorcraft solutions worldwide in helicopters. Capgemini partnered with Airbus to develop a **robotic arm that allows automation of testing phases** on helicopter avionics.



Approach

These collaborative robots can work alongside humans to enhance performance testing. The robotic arm has a number of uses, for example, it can do a demonstration of an operational procedure in programming a destination.

Thanks to the arm, trials can now be performed with other equipment which was not possible before. This led to expansion of equipment capabilities in trials, including touchscreen options, allowing Airbus to move a step closer to the future of helicopters.

Competitive Advantage

Customers benefit from better quality and a huge increase in productivity was observed as all the formalized and non-regression testing is handled by robots.

CASE STUDY

ALSTOM

ALSTOM

Capgemini has built an award-winning Virtual Train solution with Alstom. The Smart Engineering solution leverages **Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR)** for validation of train systems.

The digital transition from paper documentation to immersive technologies is necessary for productivity and reliability. Integration of virtual and augmented reality technologies into existing systems is not an easy task, especially since the stability of AR engines for satisfactory production use across industries is still work in progress.



Approach

Capgemini's approach has made it possible to develop a solution linking mixed reality and Alstom's test resources through the modeling and animation of embedded systems in virtual and/or real environments. This significantly accelerates and streamlines the interpretation of the tests by the operators to validate the scenarios at a glance.

During the initial test phases on the system benches, the application demonstrated a gain of about 30% in the time taken to analyze the observed glitches. The real-time, direct visibility of the state of the

systems allows Alstom's operators to interact with the equipment and change parameters in the database, opening up the possibility of playing the most advanced test scenario models on a control screen with 3D visualization of equipment movements such as door movements, changes in ambient light, display of computer frame interpretations, etc.

The Virtual Train accurately presents a simulated view of the entire system, ensuring reliability of the final delivery of Alstom trains.

Competitive Advantage

The Virtual Train solution won Capgemini the 2019 ERCI Innovation Award in the Best Large Enterprise category at SIFER, one of the most important international rail exhibitions. The jury recognized Capgemini not only for the best innovation, but also for the significant economic advantage of its Virtual Train solution.

CASE STUDY

DAFNI



Increasing data capture, and the ability to build predictive models with it, brings considerable benefits to **infrastructure planning**. Smart meter data helps match energy use to supply; sensor data optimises train schedules and fuel efficiency; climate and environmental data tells us where to build flood defences.

Individually these models provide tangible insights, but most are developed in isolation. Big infrastructure decisions need to bring many diverse considerations together: for example, a new rail line must consider demographic trends, the changing environment, future power supply and myriad other factors. To support the UK's future infrastructure planning, the government has embarked upon an ambitious project to bring

together relevant infrastructure data and models - including, population demographics, energy supply and demand, transportation utilities, and environmental - in one place. The resulting Data & Analytics Facility for National Infrastructure, or DAFNI, implemented and hosted by STFC on behalf of the EPSRC-funded UKCRIC, will become a cloud-based 'digital twin' of the UK's national infrastructure.

Approach

To ensure the £8m investment delivers its promised value, diverse dataset and models must all work together to provide a trusted and transparent platform that allows repeatable research.

Due to Tessella's unique combination of technical understanding of data and modelling, and experience delivering infrastructure data projects, we were invited to support two significant aspects of the project.

Stage 1: Defining requirements for a UK Infrastructure Digital Twin

Tessella leads a joint academic-industry engagement with potential end users – identifying the key capabilities the platform must deliver to realise the aspirations of the diverse community it supports and ensure the final system meets their demands now and for many years to come.

Interoperability was identified as one of the biggest challenges. More established models have evolved over 10-20 years and were created according to the best judgement of their creators at the time. Many used different programming languages and input/output formats. For the system to work, these diverse models need to be able to talk to each other in a consistent language.

Security of data was another major concern. Similar scientific research platforms go big on open data to make access easier. But infrastructure data can be highly sensitive and poses a significant risk to the UK in the wrong hands. Ensuring security is vital to getting people to share data, whilst balancing this with ease of access was vital to encourage use.

The output of the consultancy was a requirements specification and implementation roadmap, and a set of technical, engagement and utilisation KPIs, to assess how well intended value was being generated as the project progressed.

Stage 2: Getting different models to talk the same language

DAFNI users need to select models they need for their research and have confidence that their specified combination of models will work together to produce a trustable output.

With implementation underway, Tessella, in collaboration with STFC, has been developing the software architecture to link the different models together, and hook them into bigger modelling and simulation networks. This is done through containerisation.

The work also develops intelligent systems to scale in the cloud responsively.

Competitive Advantage

Through DAFNI, researchers and planners will be able to access diverse datasets and models – such as those on population growth, rail network demand and flood risk - and run analytics, modelling and simulations. They can study the interplay of factors within complex infrastructure systems and model ambitious ideas in silico in low cost, low-risk ways, helping develop infrastructure plans – such as where to build railways, or expand energy capacity - fit for a rapidly changing world.



CASE STUDY LSHTM

Standardizing Disparate Data Sets with AI

To collect data from separate regional repositories, the LSHTM built an R package – a set of computer code – for data collection and preparation. However, this new incoming data was hard to compare, due to inconsistent reporting formats, different systems for case reporting, and changes in testing over time.

Recognizing the importance of getting the fundamentals right, and lacking the capacity to do it themselves, LSHTM looked for help through the Royal Society's Rapid Assistance in Modelling the Pandemic (RAMP) initiative. This called for volunteers to support modeling the pandemic and guide the UK's response.

Keen to help in the fight against COVID, we offered our AI and data science expertise pro bono.

London School of Hygiene and Tropical Medicine's Effective Model for COVID-19

The London School of Hygiene and Tropical Medicine (LSHTM) built a **model to track the virus' reproduction rate** around the world. The model was based on data from the European Centre for Disease Prevention and Control.

Presented on their website via a simple dashboard, the model quickly became a valuable tool for policymakers and journalists, as well as a resource for other researchers. As its value became clear, LSHTM wanted to expand the model to provide detail at sub-national levels, including individual regions and states.

Approach

Tessella helped develop code, built around advanced AI algorithms, to make sense of the different data sources available to the LSHTM.

Our first challenge was to standardize incoming data variables. This proved challenging since raw data varied hugely and was often presented in different formats. Some countries published cases and mortality rates only, while others provided more granular detail such as figures related to hospitalizations and patient recovery.

To make things even trickier, the definition of "COVID-related deaths" differed from country to country. Some restricted their figures to deaths caused directly by COVID-19, whereas others included any deaths following a positive COVID diagnosis – regardless of the ultimate cause.

Competitive Advantage

The challenges presented by this project are far from uncommon. Although researchers have the data they need to build usable models, they don't always have the time and technical expertise required to optimize them. Especially when complex technologies like AI are needed to process large and disparate volumes of data. Tessella was able to provide expert insights in these trying times.

Using our knowledge and experience of data science and AI in life science projects, we worked with the LSHTM to explore how complete the data was and agree the most useful parameters. This involved trade-offs between using fewer parameters where there was good data around the world and more parameters with lots of missing values.

Eventually, we agreed on standard parameters (cases, deaths, recoveries, hospitalizations, tests), stratified by date and region. We updated the R package to adhere to these new data standards, which allowed the LSHTM to:

- Classify different data sets
- Account for differences in reporting
- Feed data into the model in a consistent format

Finally, we leveraged AI technology to make the package more robust and "production-ready" through better tests, documentation, and IT infrastructure.

CASE STUDY

OKTA

For every business to connect and manage their employees and customers, securing identities is of utmost importance and enables people to sign in to their day jobs, go about their office work, run organizations or even do banking. Okta is a secure identity company that focusses on single sign on, multi-factorial authentication, user management, lifecycle management – to name a few.

Developing **integrations with different modern web services** and maintaining these integrations is crucial to ensuring reliability of the platform. Additionally, for Okta, finding and hiring the right esoteric specialists in the Bay Area is difficult, as many talented engineers are hired by the largest tech companies, leaving few resources for other companies.



Approach

Lohika, part of Capgemini Engineering, formed joint teams with Okta and developed Okta plugin for IE users, extended Apps catalog from a few hundred to 3000+ using various authentication types, implemented numerous integrations with provisioning features for different services (such as Concur, WebEx, ServiceNow, Yammer, Jira, Confluence, etc), developed RADIUS agent from scratch. provided full maintenance for existing LDAP and AD agents as well as performed functional, regression and load testing with newly-created automated tests.

Competitive Advantage

From managing metadata to building mobile SDKs to full integration and maintenance of servers, Lohika has offered end-to-end solutions to ensure that Okta stays Always On!



CASE STUDY

QUALCOMM

The global small-cell 5G network market is projected to reach \$28 billion USD by 2027, according to a report by Grand View Research, growing at a compounded annual rate of 78%. To ride this tide, there is a need to demonstrate the **potential of 5G to transform industries** of all types and address both telecom operators' and private 5G networks' need for better indoor coverage so as to begin monetising investments in the network.



Approach

Capgemini Engineering tied up with Qualcomm Technologies to provide a mature 5G platform to address these needs along with usage for CBRS (Citizens Broadband Radio Service) across multiple vertical markets, public safety and defense tactical communications scenarios.

Building on a successful partnership in 4G and leveraging the in-depth expertise that both companies bring to the table, Capgemini Engineering software and the Qualcomm 5G RAN platform empowers customers to unlock the full potential of 5G mmWave and sub-6 networks.

Competitive Advantage

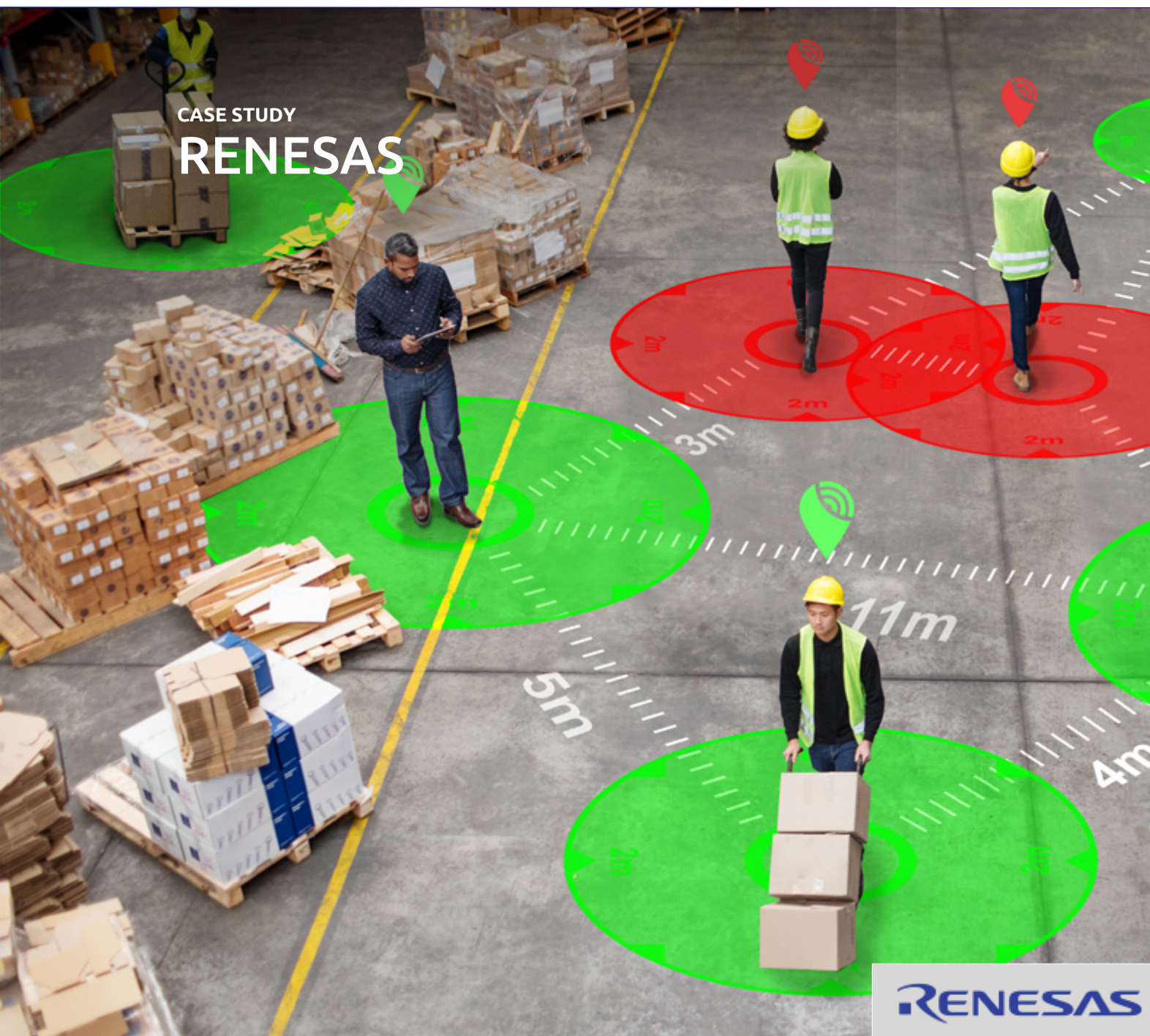
This solution not only accelerates development time but also lowers development cost for original equipment manufacturers (OEMs) building high-speed, low-latency private and public 5G small cells and radio units.

Additionally, Capgemini Engineering's 5G software framework helps OEMs accelerate their 5G RAN solution development and provides a choice to the original device manufacturer (ODM) community to integrate Capgemini Engineering 5G software as an independent software solution into their disaggregated open RAN hardware for telecommunications, enterprise and industrial solutions.

Capgemini Engineering also provides end-to-end solution for both enterprises and telecom operators by offering its edge computing software as part of its 5G private network offering.

CASE STUDY

RENESAS



Since the spring of 2020, social distancing and mask-wearing have been important defenses against the spread of the COVID-19 virus. In response, Capgemini Engineering and Renesas – a premier supplier of advanced semiconductor solutions – teamed up in 2020 to develop an intelligent IoT localization platform and prototype for a social distancing wearable. The solution showcases a Renesas Synergy™ microcontroller (MCU) and an ultra-wideband low-rate pulse (UWB LRP) chipset from their partner, 3db Access AG.



Challenge

Social distancing guidance by global health authorities is clear that a 'safe' distance is 6 feet/2 meters or more. But designing personal devices to assist with social distancing has proved challenging because their core functionality relies on capturing distance measurements with sufficient accuracy and reliability to judge safe versus unsafe distances.

In Phase 1 of this collaboration, Capgemini Engineering designed and developed an IoT localization platform and designed and manufactured a wristband prototype to demonstrate social distancing functionality. Here's how it works:

- Watchlike-wristbands are worn by two or more users.
- When a wristband detects the presence of nearby wristbands, it measures the distance to the other(s), and alerts the wearer if unsafe via LED and haptic feedback.
- Alerts are transmitted and stored on a mobile app.
- Phase 2, to be completed in 2021, combines additional assets and features for contact tracing functionality.

UWB was selected for its unique ability to produce reliable, accurate distance measurements (down to 5-10 cm), it performs well indoors and outdoors, and it is minimally impacted by its physical operating environment compared to other protocols, such as Wi-Fi, cellular/5G, or Bluetooth LE. Its low latency ensured the needed response time between threat detection and user alert, and using the UWB LRP variant delivered the power efficiency critical for a battery-operated, wearable device.

In Phase 2 (2021) support for contact tracing is being added, including:

- Unique user location and user identity (masked for privacy) enabling tracking of cumulative exposure for a specific person/event
- A network of Wi-Fi anchors to collect user-specific, location-aware alert data and dispatch to a cloud-based real-time location-based services (RLBS) platform
- Centralized, cloud-based RLBS platform and dashboard for monitoring, remediation, and reporting of exposure events.

Client Value

By partnering to develop solutions for social distancing, Capgemini Engineering is helping Renesas showcase their MCU and UWB technologies in proven, highly targeted, in-demand use cases. In addition, as co-developer and system integrator, we will also leverage the IoT and RLBS platforms along with other internal assets to develop additional solutions for a wide range of high-precision, location-based applications – both COVID and non-COVID – across vertical industries.

CASE STUDY

SNCF RÉSEAU

Capgemini is partnering with SNCF Réseau, the service provider that manages railway infrastructure in France, to develop the “New Generation Supervision”—an innovative application to optimize the monitoring and maintenance across 30,000 kilometres of lines on which it ensures maintenance, modernization and safety. This digital solution has been in service since July 2020 in the Auvergne Rhône-Alpes region. It will be deployed in all regions by 2022.

SNCF Réseau’s teams are alerted and activated in real time using a mobile application that precisely geolocates any incidents including technical failures in the tracks, signalling, catenaries, level crossings or switches. The tool will improve the regularity of traffic flows, as well as passenger information.



Approach

Different systems work together to detect anomalies and warn maintenance staff, enabling installations to be restored as quickly as possible. In the event of a hazard, the application makes it possible to communicate data relating to the maintenance operation concerned (travel times, arrival times on site, response times, etc.) in real time. This data is instantly accessible to rail operators, who can keep passengers informed.

A user-centric approach was adopted and the solution was built in agile mode to facilitate user adoption: with supervision and maintenance agents to understand needs, an engineering team in charge of real-time data collection from the industrial systems, and with IT teams to design and operate a tool operating 24/7 in the cloud.

In terms of safety, real-time knowledge of infrastructure condition will enable SNCF Réseau to react and intervene more quickly

to incidents involving tracks, power lines, signalling, etc. The aim is to improve service quality for passengers.

Four supervision centres across the country are capable of managing alerts from various sources, and build corrective and conditional maintenance needs on a national scale.

The first tests of advanced processing of monitoring data on the Lyon-Marseille axis were successful thanks to the use of software that analyzed in detail the history of failures and the state of the installations in order to anticipate and carry out a conditional maintenance operation prior to the incident.

The ultimate aim is to establish a comprehensive information system on rail infrastructure and to assist in decision-making for appropriate maintenance.

Competitive Advantage

The New Generation Supervision has made the management of track operations more efficient. The deployment of New Generation Supervision improves incident management, traffic regularity and user information.

The application brings SNCF Réseau into the era of predictive maintenance, which is both a source of efficiency and economic performance. The application also enables the move from systematic maintenance to maintenance that is closely adapted to needs, more precision and delivered in real time.

Capgemini has all the necessary skills, such as management, architecture, development, consulting, expertise and roll-out, to handle the project from start to finish through an Intelligent Industry approach. Capgemini team members have been designing and deploying end-to-end digital solutions that are based on its expertise in software engineering, supervision and hypervision, IoT, digital transformation, mobility, and augmented operations.

GLOBAL LEADER

ZINNOV ZONES

ENGINEERING R&D RATINGS 2020
IoT TECHNOLOGY RATINGS 2020

Capgemini acquired Altran last year and has emerged as a global leader for ER&D services, IT services in the Zinnov Zones 2020 assessment. The complementary nature in scale of the combined businesses positions the firm as a strategic partner of choice for enabling end-to-end transformation in the intelligent industry space, underpinned by strong next generation capabilities across cloud, edge computing, IoT, artificial intelligence and 5G. The combined entity has the largest global delivery network with a presence across all major engineering hubs.

Sidhant Rastogi
Managing Partner, Zinnov

#1

Everest Group
Industry 4.0 Services
PEAK Matrix®
Assessment 2020

#1

Everest Group
Engineering Services
Top 50™ 2021

Altran's* strategic investments in software product engineering over the last few years have helped it emerge as a market leader. Its acquisitions of companies such as Aricent, Lohika, and frog have augmented its capabilities and have allowed it to drive scale, especially in product design and development, while its IP portfolio covering such themes as DevOps and analytics have helped it create a strong differentiator against competition. Additionally, its delivery footprint with optimal presence across onshore, offshore, and nearshore regions, enables it to serve clients with proximity and cost-effectiveness.

Akshat Vaid
Vice President,
Engineering Services,
Everest Group

Everest Group Software Product
Engineering Services PEAK Matrix™
Assessment 2019

*Altran is now Capgemini Engineering

OUR PEOPLE



Marie Hélène Vercaemer
CHIEF HUMAN RESOURCES OFFICER
Capgemini Engineering

Our employees are our most valuable asset. We offer them the opportunity to work at the cutting edge of technology in partnership with the leading players in their fields. Our **52,000 employees in more than 30 countries** are driven by a shared energy and a passion for innovation.

They help the largest innovators in the world engineer the products and services of tomorrow. They work on game-changing projects, and **build the future they want.** At the same time, they create their own futures: working at Capgemini Engineering is an opportunity to develop and to hone their skills to the highest level and to realize their full potential.

We value this diverse collective of free-thinkers, entrepreneurs and industry experts.

We believe in **the power of innovative minds working together to create the future.**

I work as **Product Insurance Manager for the French Operation Center for Science and Exploration (FOCSE)** at CNES (National Centre for Space Studies) in France: I am in charge of the payloads development Quality Assurance, from specification to expedition through their inspection and the data package elaboration required by the European Space Agency.

I am currently working on the 12 CNES experiments for Thomas Pesquet's second mission on the International Space Station, Alpha.

The whole team works hard to deliver the experiments kits on time for launch. I am proud to be part of this project: it is very exciting to contribute to an inspection of a payload to be launched to the ISS in order to run experiments in microgravity.



Curiosity, rigor and precision are important skills I use on a daily basis to succeed in this mission. However, cooperation within the Quality core team and payload developers, managers, experts, technicians, partners and space agencies is the key success factor.

Alone, I go faster;
together, we go further!

Nicolas Guignard
PRODUCT INSURANCE
MANAGER



Ottavia Mirra
CONSULTANT
AUTOMOTIVE INDUSTRY

I joined Capgemini Engineering two years ago. In the System Engineering team, I deal with the technical documentation concerning the powertrain of hybrid vehicles for a global automotive player.

I feel proud and lucky to have the chance to work in this industry: I'm passionate about cars!



Pauline Turlotte
KEY ACCOUNT MANAGER

As **Key Account Manager**, my job is to bring back as much commercial information as possible to the operational teams . It is also to understand my client s (Sanofi) challenges and positioning to link them with ours in order to offer a common approach.

I recently worked on supporting Sanofi through a project related to the current health context, by securing a technology transfer from a US site to a French one in Paris.

This is a new and exciting position for me, I hope to share more successes with you in the near future!

I joined Capgemini Engineering seven years ago, and I feel really glad about my professional journey here. I love the flexibility at work, which helps me achieve better creative output and productivity. I also like the overall environment and working with my colleagues. Each of them have been quite helpful throughout my journey. When I look back, I can proudly see the amazing growth in my career.



Shivani Sood
ASSISTANT MANAGER
MARKETING
ERND MARKETING

GOVERNANCE



William ROZÉ
CEO



Arnaud MAURY
FRANCE



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