Capgemini engineering

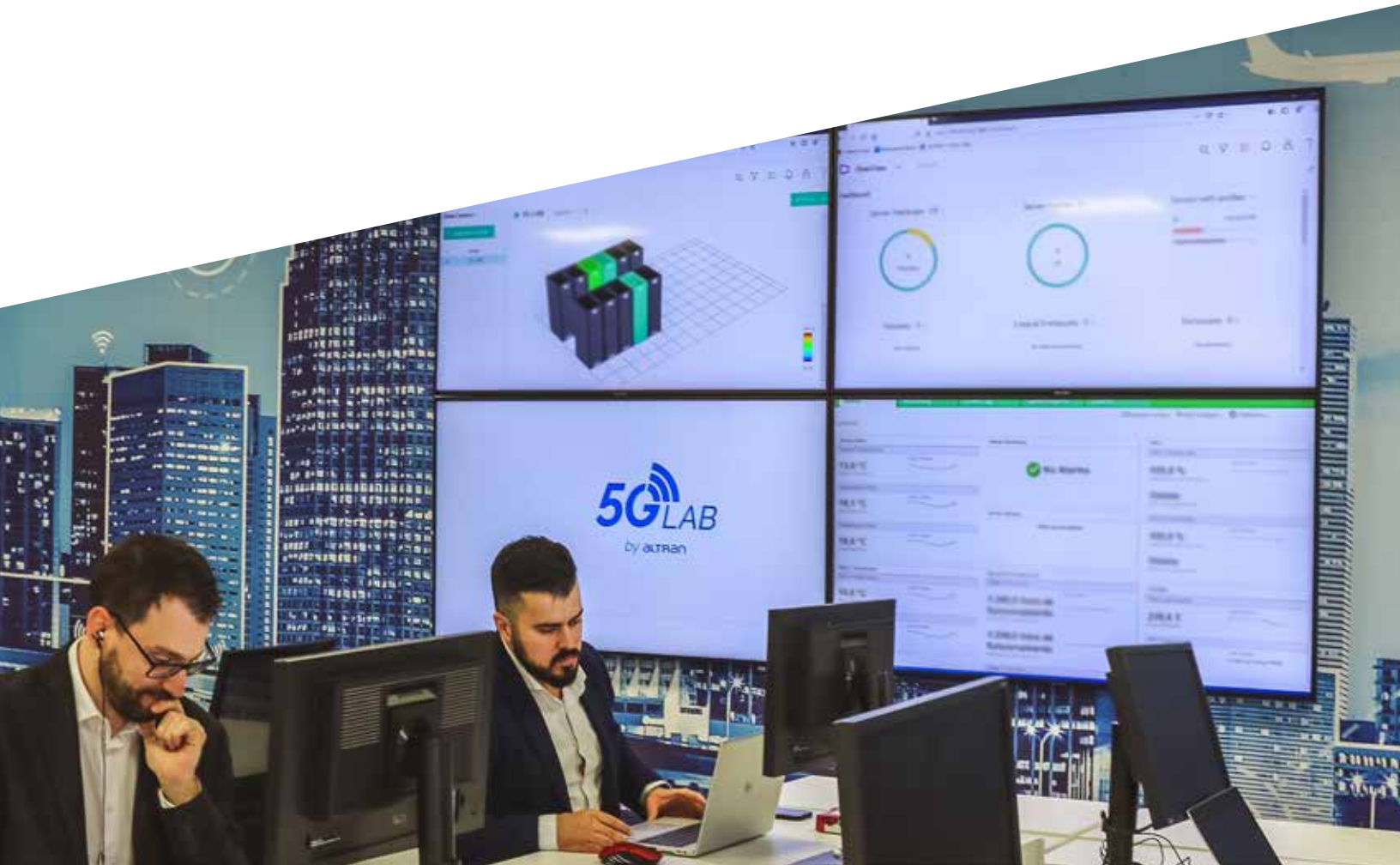
5G LAB AS A SERVICE

Face the 5G and Telco Cloud Introduction Challenges

The Telecommunication Industry is facing major transformation by IT-isation and Cloud-isation of the network, resulting in the introduction of technologies like SDN/NFV. 5G is providing further complexity adding new challenges related to ROI and Monetization of the new investments.

In addition, the 5G introduction and readiness roadmap require further evolution to the digitization of the Network services with further exploitation of the telco Cloud technologies and industrialization of the 5G service's deployment. Ultimately, Communication Service Providers (CSPs) need to differentiate with fast go-to-market strategies for new services and use cases enabled by 5G service platforms, microservices, edge computing, automation and open source.

To help its clients face those new market needs, Capgemini Engineering is complementing its telco engineering portfolio with a strategic asset: the 5G Lab and 5G Lab-as-a-Service (LaaS) offering, to provide prototyping, development, test and validation environments, innovative solutions and services for the new 5G ecosystems, supporting all steps of the client journey and accelerating time to market.



The new LaaS capabilities will enable CSPs to develop innovative solutions and services while also drawing on Capgemini Engineering's expertise in building frameworks and go-to-market accelerators for telcos, enterprises and original equipment manufacturers (OEMs).

The lab features dedicated datacenter infrastructure, hardware, network components, software frameworks, service platforms, tools ecosystem, and client portals. All of which are used to create environments that are flexible, scalable, multi-tenant, secure and globally accessible so solutions can be developed, trialed and tested before rollout to ensure success.

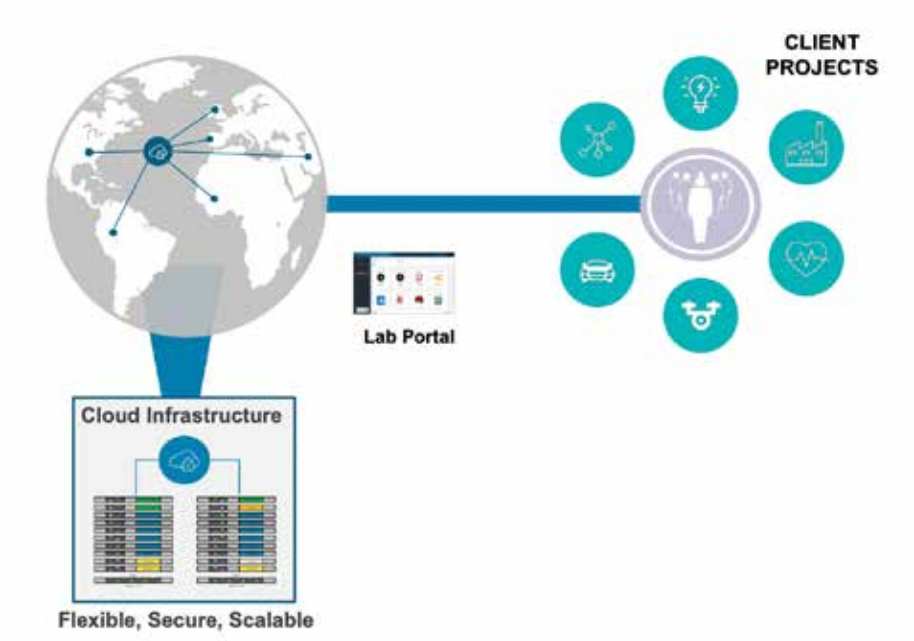


Figure 1: 5G LAAS for Global Services Available in Cloud

Capgemini Engineering's 5G Lab-as-a-Service provides a number of benefits to users, including:

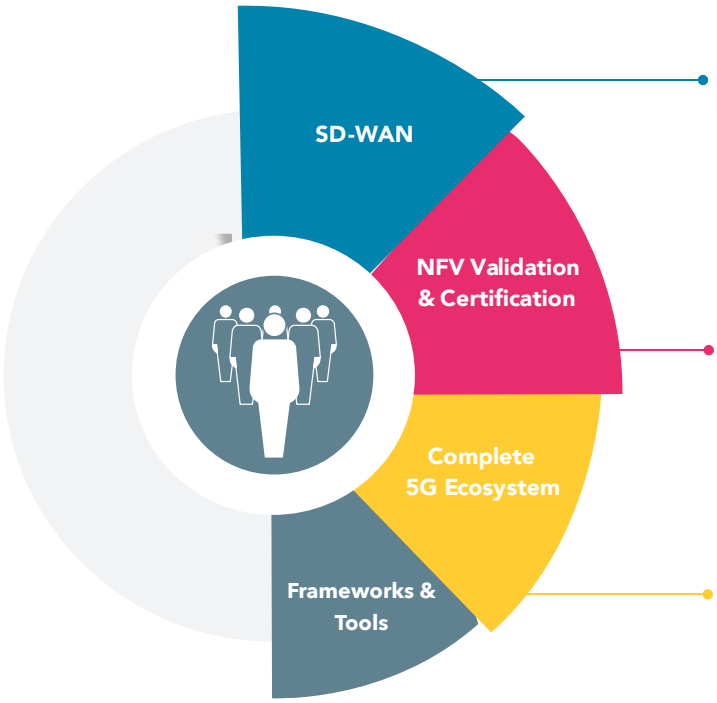
- Improve time to market through ready to use, flexible development and testing environments
- Serve as an innovation engine that provides early access to niche skills and solutions
- Accelerate time to market for new products and solutions by supporting all steps of the journey within a complete 5G ecosystem
- Demonstration platform that simulates scenarios and showcases solutions for proof of concept (PoC) and pilots
- Creation of a 5G Industry applications Incubator that provides dedicated environments to prototype design and develop innovative industry specific services and applications within a complete 5G ecosystem
- Enable testing and integration of enterprise solutions in an independent telco grade infrastructure
- Provide a customized environment for tests and trials for any user application, thereby enabling CSPs to take advantage of Capgemini Engineering's vertical market expertise, enterprise services and enterprise applications

The result is a rapid and cost effective path to roll out next-gen product and services and a major improvement in terms of cost profile for project and operational readiness.

5G Lab As A Service (LAAS): A Flexible and Modular Multi-Technology Design and Testing Environment

5G LaaS offer covers the complete value chain of end to end solutions to support testing, validation and lifecycle management in key domains:

- NFV and telco cloud infrastructure and test environment
- Orchestration, SDN, SD-WAN, automation
- 5G ecosystem including network (5G Next Gen Core, Transport, RAN), Platforms (Edge Computing, Service Platform Enablement)
- Use cases/application
- Security



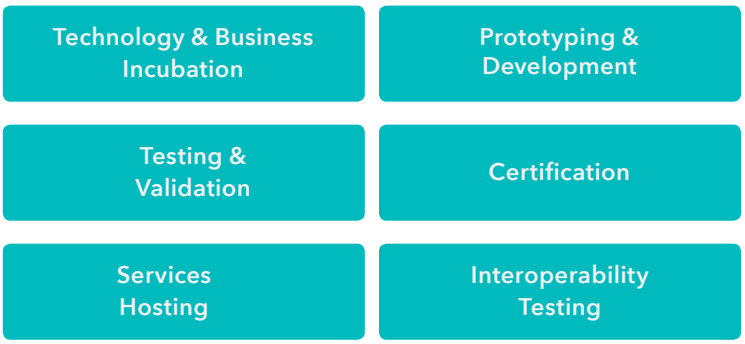
- Integrating and validating performance and functionality of multi vendor and multi carrier SD-WAN solutions for CSPs and NEPs/Integrators
- Verifying Operations components including Orchestrators and Portals for Enterprises and CSPs
- Designing and developing Next Generation Intent Based Networking solutions

- Automating on boarding of multi vendor virtualized network functions
- Development of continuous build and deploy pipelines including Product development and interoperability with carrier reference architecture
- Validating new technologies, network components and applications prior to going to production
- NFV Testing, Validation and Certification on specific virtual environment provided by Vendors and/or O.S. based

- Ecosystem to enable ISVs, NEPs, CSPs and Enterprises to accelerate deployment of next generation services
- Development, Testing and Validation of 5G Use cases, Applications and Services
- Include Access, Core, Transport, OSS, Edge and Application Enablement
- Creation of various reference architectures to reflect use cases for specific verticals

Figure 2: Lab Target Offering - Overview

The 5G Lab will therefore enable key areas of services for 5G validation and readiness:



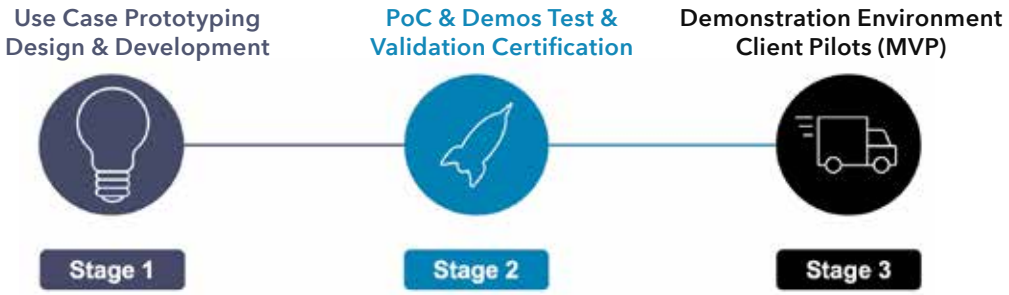
A Complete Value Chain of Solutions Tailored to Support Key Telco Players

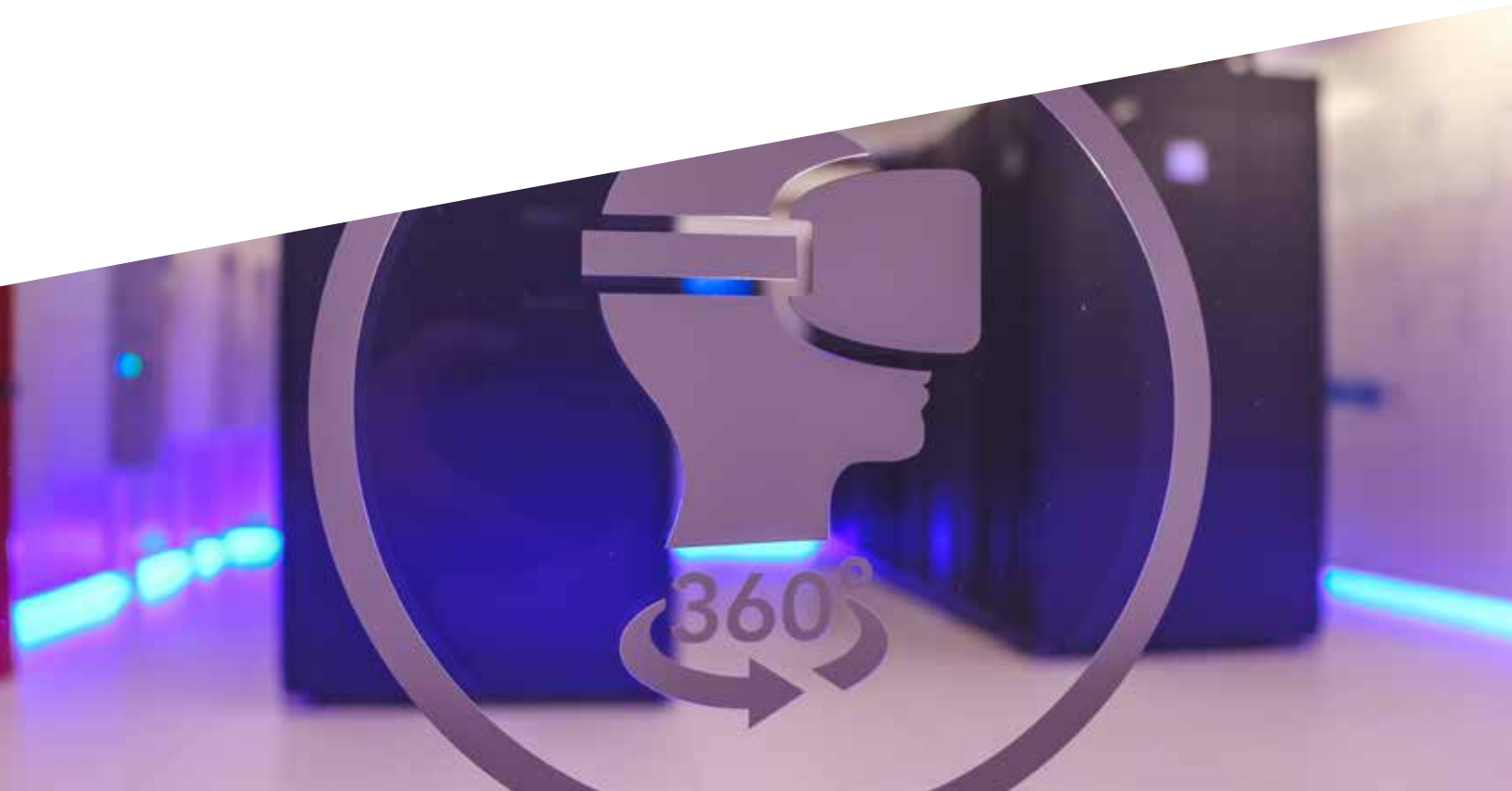
- **Communication Service Providers (CSPs):** It improves and accelerates their innovation and engineering activities. Thanks to a flexible and technologically advanced environment with a complete portfolio of advisory and engineering services. It offers ready to use flexible development and complex testing environments, alongside professional services. It enables dedicated environments to address non-priority activities/projects or capacity shortage in client's Labs. Finally, it also offers a capability extension at an optimized cost
- **Network Equipment Providers (NEPs):** It enables to accelerate time to market of new products and solutions, supporting all steps of the journey, within a complete 5G ecosystem. The lab offers a solution to test, customize and validate vendor solutions into multiple operator infrastructure scenarios. In addition, it provides demonstration platforms, simulates scenarios and showcases solutions to deliver successful PoCs and pilots to clients
- **Industries:** It offers dedicated environments to prototype, design and develop innovative connectivity services within a complete 5G ecosystem, coming with a complete portfolio of advisory and engineering services. It will also enable the testing and integration of enterprise solutions in an independent telco grade infrastructure

Transition to 5G

The highest potential of 5G technology will be unlocked if the current mutualism of vertical industry companies and telcos evolve towards a more symbiotic relationship that is being experimented with in several 5G joint initiatives. These are preliminarily focused on developing and deploying initial use cases and services.

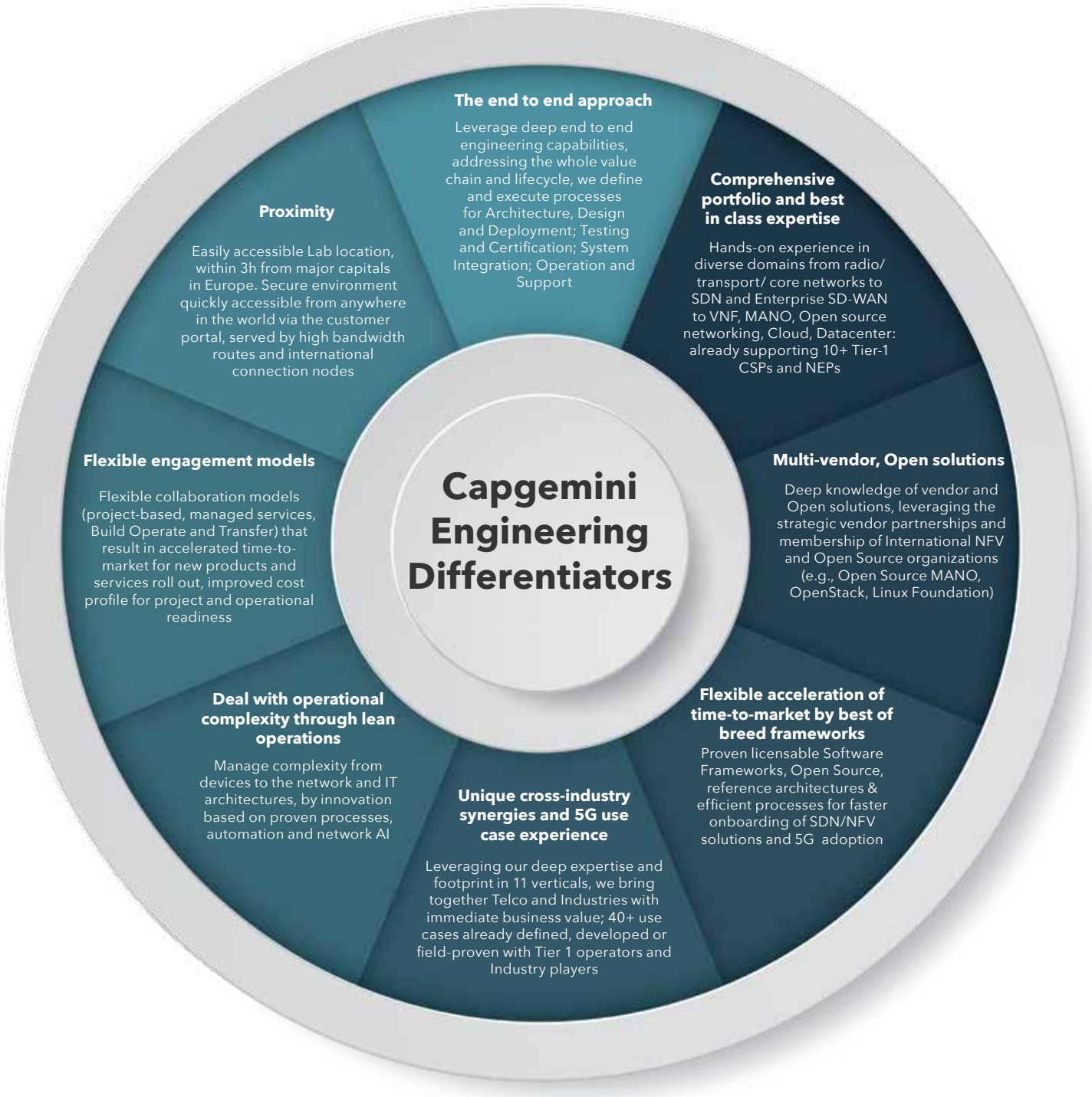
In a phase that is testing the maturity and the actual interest of several industries on innovative 5G services, the next urgent question to address is how industrializing the design and deployment of 5G services/use case development along with continuous engineering of networking solutions seamlessly from the connectivity to the application layers. In this case, the 5G LAAS offer a unique developing, testing and validation ecosystem.





Why Capgemini Engineering

We offer a unique combination of technology expertise, multi-industry knowledge and innovative mindset.



About Capgemini Engineering

Capgemini Engineering combines, under one brand, a unique set of strengths from across the Capgemini Group: the world leading engineering and R&D services of Altran - acquired by Capgemini in 2020 - and Capgemini's digital manufacturing expertise. With broad industry knowledge and cutting edge technologies in digital and software, Capgemini Engineering supports the convergence of the physical and digital worlds. It helps its clients unleash the potential of R&D, a key component of accelerating their journey towards Intelligent Industry. Capgemini Engineering has more than 52,000 engineer and scientist team members in over 30 countries across sectors including aeronautics, space and defense, automotive, railway, communications, energy, life sciences, semiconductors, software & internet and consumer products.

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