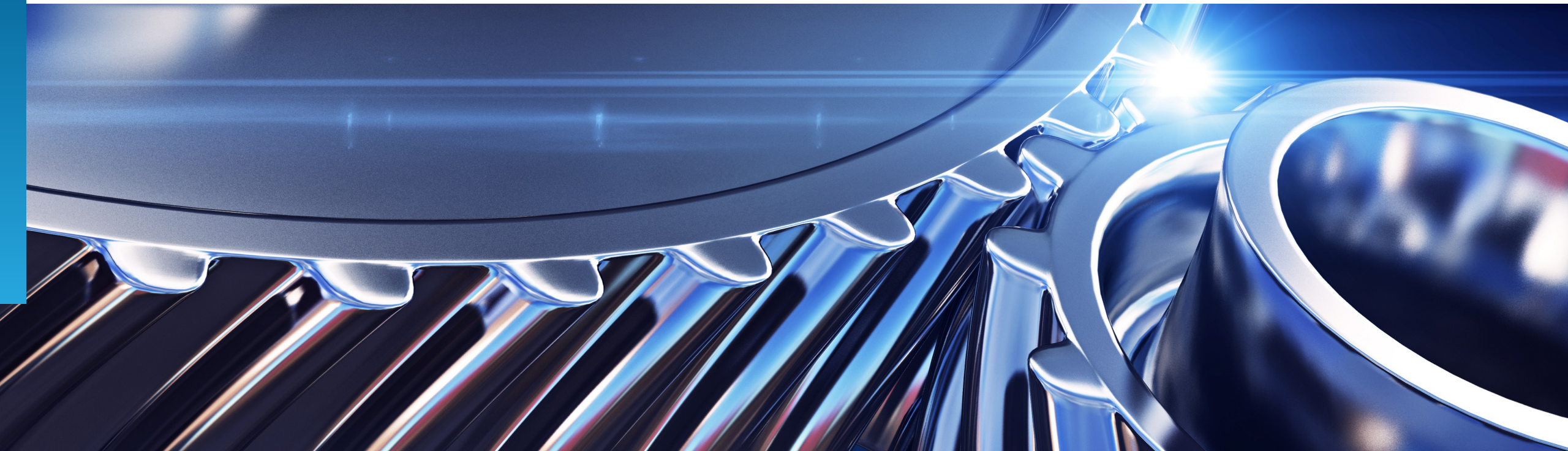


Envisioning the Connected Future: 5G Engineering Service Provider Compendium 2022

December 2021 : Complimentary Abstract / Table of Contents



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Background and introduction of the research

5G is much more than increased speed of data transfer. It has the potential to enable a paradigm shift in the way things work around us. Additionally, it is a key enabler of the fourth industrial revolution. Enterprises have already started preparing themselves for a shift to 5G. Some of the trends in 5G include:

- The low latency and high-speed characteristics of 5G make a variety of (erstwhile impractical) use cases possible, such as remote factory monitoring and maintenance via the Digital Twin concept, education and research using holographic interactions, high speed multi-player gaming, real-time fleet management of autonomous and connected vehicles, amongst others
- Advancements in technology have also led to a variety of developments that work in tandem with and assist 5G in creating an ecosystem capable of exponentially more vis-à-vis the incumbent networks. These include network slicing, Multi-access Edge Computing (MEC), Software Defined Networks (SDN), Network Function Virtualization (NFV), etc.
- Enterprises and institutions are increasingly investing in private 5G networks for Industrial Internet of Things (IIoT), public places such as stadiums and transport terminals, and educational establishments. This allows administrations to enable multi-vertical applications all the while ensuring data security by maintaining control over the data generated
- Since 5G is a new technology, new use cases of the same are conceived regularly in different industry verticals. As such, enterprises require assistance in designing, implementing, and scaling these use cases; service providers are increasingly collaborating with partners for use case engineering services

These developments have fueled the need to establish a compelling ecosystem of partners, and engineering service providers are actively enhancing their capabilities and offerings to help enterprises tackle these challenges in their 5G engineering journey, stay relevant, and create more value by exploring novel applications.

This research is the first edition of Everest Group's **5G Engineering Services PEAK Matrix® Assessment 2021**. It evaluates 18 engineering service providers, positions them on the PEAK Matrix®, and shares insights into enterprise sourcing considerations. The study is based on RFI responses from service providers, interactions with their 5G engineering leadership, client reference checks, and an ongoing analysis of the engineering services market.

This report includes detailed profiles of the following 18 leading engineering service providers featured on the 5G engineering PEAK Matrix®:

- **Leaders:** Accenture, Capgemini, HCL Technologies, Infosys, TCS, and Tech Mahindra
- **Major Contenders:** Cognizant, Cyient, DXC Luxoft, HARMAN Connected Services, L&T Technology Services, NTT DATA, Tata Elxsi, Virtusa, and Wipro
- **Aspirants:** GS Lab, TietoEVRY, and VVDN Technologies

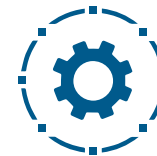
Scope of this report:



Geography
Global



Service providers
18 leading broad-based and pure-play engineering service providers



Services
5G engineering services

The 5G engineering service provider compendium report has profiles and buyer case studies for 18 leading engineering service providers

Service Provider | 5G engineering services profile (page 1 of 3)

Overview

Vision & strategy

Service Provider's 5G vision is to drive enterprise digital transformation by engineering innovative products, and solutions in collaboration with the ecosystem partners.

Its strategy is based on the following six pillars of open source and open forums: collaborate forums for hardened solutions for ORAN, TIP, ONF, ONAP; ecosystem integration (build end-to-end ecosystem) - product/device, hyper scalers, platform providers, niche service vendors; as service from bespoke to as a service for solutions - private network, security, MEC, IoT, IIoT, edge computing; flexible platforms (co-develop & own open platforms) - open hardware, virtualization, cloud-native; use cases (develop vertically integrated use cases) - media, retail, health, manufacturing, auto, & connected enterprises (provide digitization roadmap to enterprises) - AI-powered, autonomous, remote, fully cloud enabled, and omnichannel connected. This is aligned with the SCALE framework for engineering services unit of the service provider.

5G engineering services revenue (April 2020–March 2021)

<US\$100 million	US\$100-250 million	US\$250-500 million	>US\$500 million
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YoY growth rate in 5G engineering services revenue (April 2020–March 2021)

<10%	10-20%	20-30%	>30%
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Service Provider | 5G engineering services profile (page 2 of 3)

Investments and partnerships

Key alliances and partnership (representative list)

Company	Details
Partnership 1	Partnership to deliver service assurance services to communicate Service Provider's service assurance platform, to provide communication services.
Partnership 2	Partnership with IBM's hybrid cloud ecosystem, an initiative to streamline and modernize workloads with Red Hat OpenShift for any cloud environment.
Partnership 3	Collaboration to build a future-ready reference architecture for distributed cloud native, software-defined networks, artificial intelligence, and automation.
Partnership 4	Partnership that helps customers run enterprise applications with cloud native, enterprise systems cloud readiness, to a complete migration of the application landscape with shorter development cycles, reduced operational costs, and improved user experience.
Partnership 5	Partnership for Software Defined Infrastructure (SDI) solutions, including cloud workplace virtualization solution, and a mature, comprehensive SDI solution.

Recent 5G engineering services investments/acquisitions (representative list)

Investment/Target	Company description
Investment 1	Acquisition to add critical Intellectual Property (IP) to Service Provider's portfolio, enhancing Service Provider's Mode 3 offerings in data management.
Investment 2	Investments in CoEs covering leading technological areas such as AI, cloud native, and automation, who are focused on technological development, and who opt for best of breed solutions.
Investment 3	Investments in setting up labs dedicated to 5G technology to build and test. Additionally, Service Provider has set up and is managing 5G Testbeds at semiconductor companies.
Investment 4	Investments in training academy programs to build competency in 5G technology for customers.

Service Provider | 5G engineering services profile (page 3 of 3)

Case studies and solutions

Case study 1 Assisting a client with the management of disaggregated RAN

Business challenge

The client needed the 5G disaggregated RAN with multi-vendor equipment to provide services comparable to legacy monolithic single-vendor systems. This involved the defining of the management system for the disaggregated RAN and evaluating the performance of the network.

Solution and impact

Service Provider defined the overall architecture, assessed vendor compliance for ORAN standards, defined the life cycle of use cases, and customized open source software (ONAP) for managing the 5G RAN including 5G RAN element provisioning, performance assurance control, fault supervision, and file management. This led to the customization of open source components for the adoption in product networks, thereby removing vendor lock in for management & orchestration components.

Case study 2 Development of a 5G Android smartphone along with its validation and verification

Business challenge

The project involved the development of a 5G android smartphone and its certification for protocol compliance and interoperability against the evolving 5G specifications across FR1 and FR2.

Solution and impact

Service Provider supported the 5G smartphone device development involving Android OS porting onto ODM provided hardware, and integration of Service Provider's carrier specification compliant OMA-DM and RCS client IPs. The project also involved pre-certification, carrier acceptance, and field tests along with the creation of android OS security patches and version upgrades. Service Provider also reduced costs with extreme automation including stability tests and in-country testing and utilized a proprietary engagement model aligned to multiple cycles of testing required for a new technology device.

Proprietary solutions (representative list)

Solution	Details
Asset management operations center	Solution to manage and monitor connected assets
NetOps.Ai	CI CD framework for vRAN solution deployment
OpenWRT	Reusable components for configuration and customization of OpenWRT-based CPE devices (5G/Wi-Fi Routers, 5G Hotspot, etc.)
OMADM/LWM2M Stack	Native OMA-DM and FOTA stack for Android and Linux devices
Packet core for private networks	Ready to deploy Packet Core in a Box solution for private networks and for PNaaS systems
RCS	RCS stack enhancement solution for TMO carrier compliance and UP2.0 support
TAF	Open source (ROBO)-based framework for continuous testing of 5G RAN and core network elements
Unified management system	Next-generation management system for open networks
Zero touch provisioning	A standards-based automated onboarding solution, providing security, scalability, accuracy, and speed

Research calendar

Engineering Services

■ Published
 ■ Planned
 ■ Current release

Flagship reports

Release date

Semiconductor Engineering Services PEAK Matrix® Assessment 2021: Enabling the Hyper-connected Intelligent World	March 2021
A Transformational Leap in Cyber-physical Convergence – Industry 4.0 State of the Market Report 2021	April 2021
Exploring the Future of Mobility: Autonomous, Connected, Electric, and Shared (ACES) Mobility Automotive Engineering Services PEAK Matrix® Assessment 2021	September 2021
Reaching New Frontiers in Experience-centricity and Resilience – Software Product Engineering Services State of the Market Report 2021	September 2021
Envisioning the Connected Future: 5G Engineering Services PEAK Matrix® Assessment 2021	September 2021
Enabling the Hyper - connected Intelligent World – Semiconductor Engineering State of the Market Report 2021	November 2021
Envisioning the Connected Future: 5G Engineering Service Provider Compendium 2022	December 2021
Medical Devices IoT Services PEAK Matrix® Assessment 2022	Q4 2021
Digital Engineering Services PEAK Matrix® Assessment 2022	Q1 2022
Digital Twin Services PEAK Matrix® Assessment 2021	Q1 2022

Thematic reports

Release date

Engineering Services Enterprise Pulse: Are Engineering Enterprises Truly Happy with Their Service Providers?	April 2020
Engineering Services Top 50	June 2020
Extended Reality and its Applications Across Industries	August 2020
Leading the Pack: Trends for the Top 200 Engineering Research & Development (ER&D) Enterprises 2021	September 2020
Engineering Services Enterprise Sourcing Handbook	Q4 2021
Trailblazers: Cloud Engineering Service Providers	Q4 2021

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