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5G

THE NEW DIMENSION

Your trusted 5G partner for acceleration, monetization and transformation

Summary

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Why 5G

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5G: Transforming Society, Transforming Telcos

5G is more than just an evolutionary step to a new generation of technology; it represents a **fundamental transformation** of the role that mobile technology plays in society and it will underpin the growth of a truly digital economy.

The 5G standard includes significant technological advances and so promises to **dramatically improve** the experience of using the mobile internet.

But the impact of 5G extends far beyond new high-value services for consumers. The characteristics of much faster download speeds, smaller cells and low latency enable the rapid and widespread adoption of **new use cases for enterprises** in areas such as automated factories, remote medical control, IoT, V2X connected vehicles, extended reality (XR) for health, and many more.

In February 2021, NTT DOCOMO successfully demonstrated 4K and 8K video data transmitted over a 5G connection to a Shinkasen bullet train travelling at 360km/h with no handover issues.

5G will enable telcos to play an enlarged role in the digital economy

Chasing the 5G Pot of Gold

5G is forecast to contribute $2.2 trillion to the global economy over the next 13 years, with manufacturing and utilities the sectors that will generate most value for 5G services.

To capture this value, MNOs are already investing more in 5G infrastructure than in non-5G. By 2023, 15% of worldwide CSPs will operate stand-alone 5G networks, without any reliance on 4G network infrastructure. By 2025, almost all capex budgets will go on 5G infrastructure.

Source: Gartner

Why are they doing this? As CSPs know only too well, the internet and cellular infrastructure they have constructed in the past have brought immense wealth to the shareholders of FAANG (Facebook, Apple, Amazon, Netflix and Google), and other providers of OTT services, and very little to the carriers.

So will it be different this time?

Source: GSMA 5G guide

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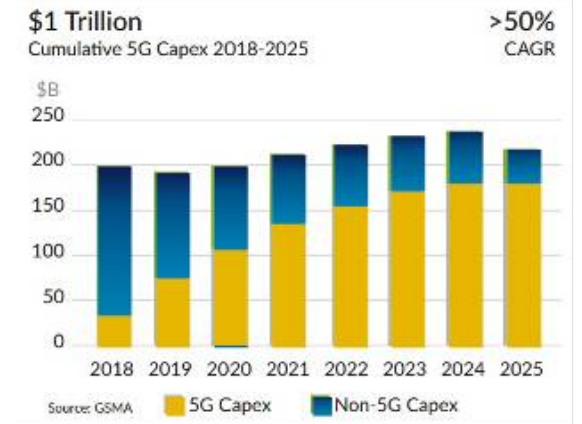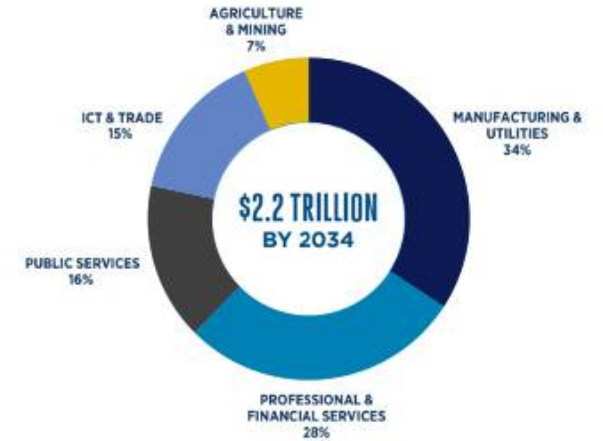
How to Win in 5G

The big attraction of 5G for operators is that it promises a radical break with past technologies and business models that have made it difficult for operators to differentiate their offerings, grow revenues and create a sustainable value proposition for customers.

5G gives operators the ability to rapidly launch many new services and **move beyond connectivity** by offering customized digital experiences that hyperscale cloud providers will struggle to duplicate, even though partnerships with the cloud players will be necessary – and several have already been announced.

The difference between 5G-enabled environments and conventional cloud is that 5G offers the **advantages of a truly programmable network**, with global reach and mobility built in as standard design features.

By offering customers very flexible and scalable high-value services that can be provisioned automatically, operators can offer a "cloud-like" experience and one that is **uniquely tailored to a customer's needs**, so creating a competitive edge that is more difficult to erode.

5G represents a unique opportunity for MNOs to provide more than connectivity
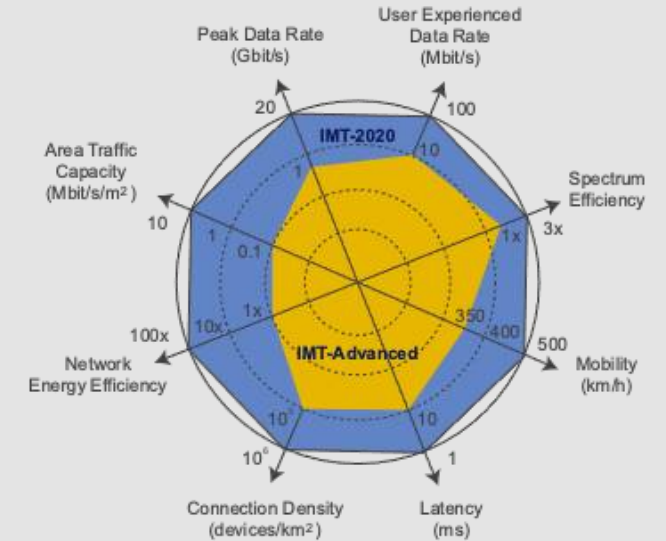
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How Is 5G Better Than 4G?

Peak data rate	20Gbit/s down / 10Gbit/s up
User experienced data rate	100Mbit/s down / 50Mbit/s up
Latency	1ms
Mobility	500 km/h max for seamless handoff
Connection density	1m devices per sq km
Energy efficiency	1/100 Joule/bit
Area traffic density	10 Mbit/s per sq m
Spectrum efficiency	3 times better than LTE

ITU 5G standard (IMT-2020) compared to 4G standard (IMT-Advanced)

In key performance areas such as connection density, data rates, energy efficiency and latency, 5G promises significant improvements over predecessor networks.

It is not possible to achieve all these improvements at the same time, so to accommodate usage scenarios with different performance requirements, 5G introduces the concept of network slicing.

Instead of the one-fits-all network architecture of 4G, the network architecture of 5G uses network slicing to create end-to-end logical private networks optimized for specific requirements.

Three Major 5G Application Areas

Enhanced Mobile Broadband (eMBB) offers faster connections, higher throughput and more capacity to support applications like 4K / 8K UHD video, XR or cloud gaming.

Massive Machine Type Communication (mMTC) use cases include Narrowband Internet of Things (NB-IoT), environmental monitoring in smart cities and other applications with low power requirements, low data volumes and intensivity to delay.

Ultra-Reliable Low Latency Communications (URLLC) use cases include manufacturing, automated vehicles, robotics and IoT applications for which data capacity and low latency are particularly important.
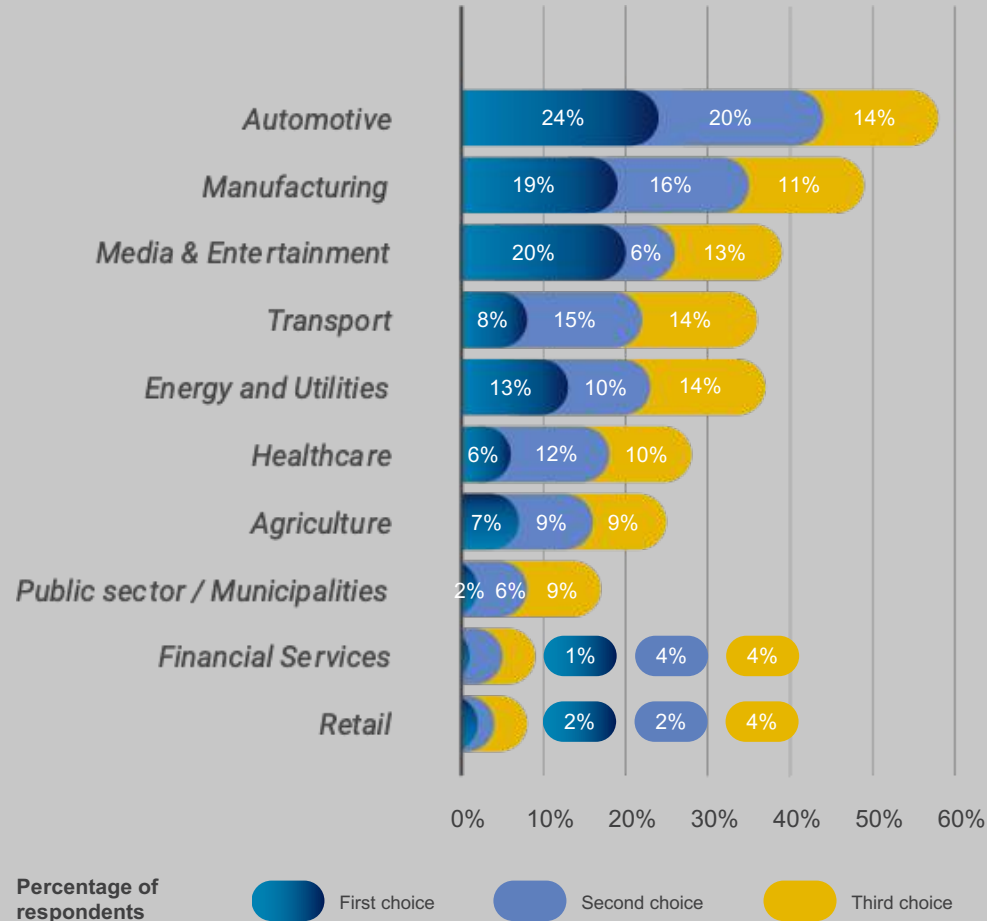
Looking Beyond Mobile Broadband

To maximize the value from 5G, operators will need to look beyond the mass-market eMBB services and develop innovative new use cases for vertical industries that leverage mMTC and URLLC.
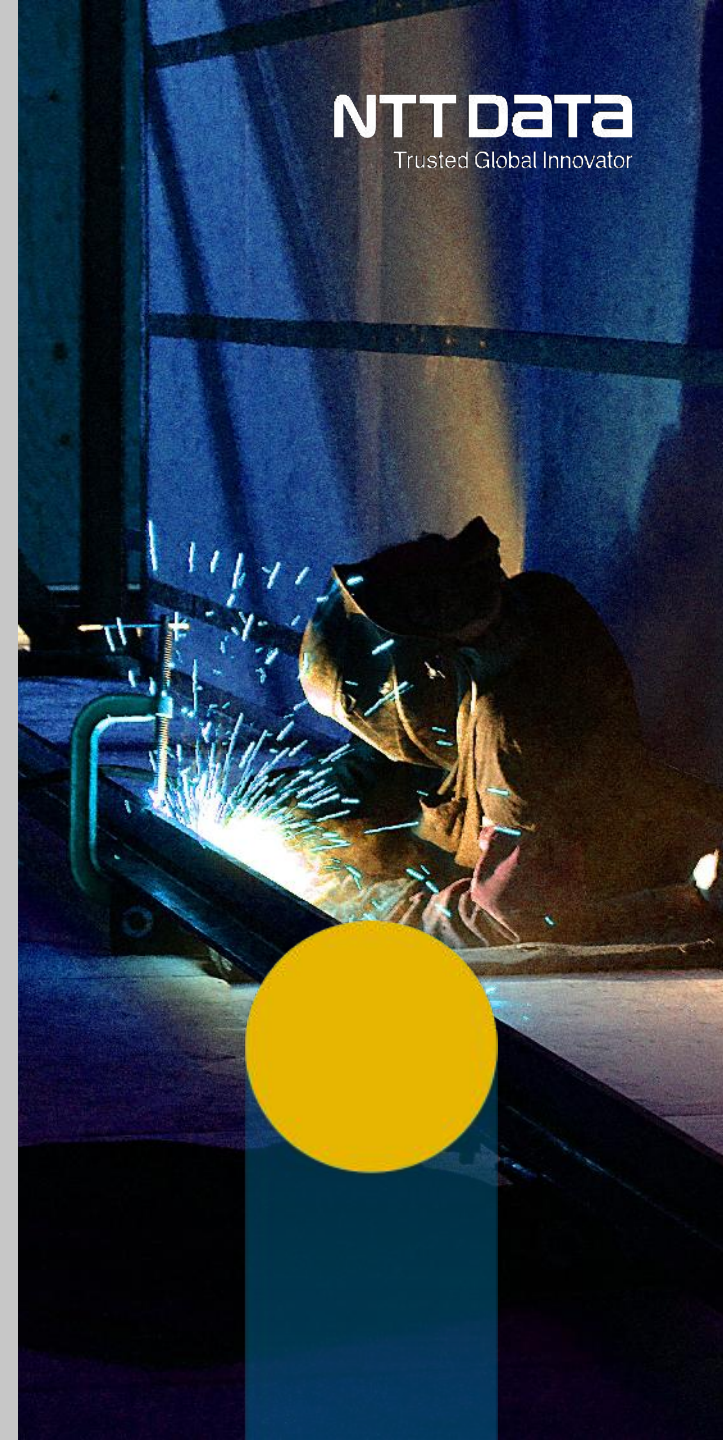
According to a GSMA survey, 39% of respondents think these new use cases could account for between 15% and 20% of revenues in the next five years.

The industries that will benefit most from 5G are automotive, manufacturing, media and entertainment, transportation and utilities.

Which Industries Will Benefit Most from 5G in Next Two Years? [top three choices ranked]

Industry	First choice	Second choice	Third choice
Automotive	24%	20%	14%
Manufacturing	19%	16%	11%
Media & Entertainment	20%	6%	13%
Transport	8%	15%	14%
Energy and Utilities	13%	10%	14%
Healthcare	6%	12%	10%
Agriculture	7%	9%	9%
Public sector / Municipalities	2%	6%	9%
Financial Services	1%	4%	4%
Retail	2%	2%	4%

Percentage of respondents

First choice   Second choice   Third choice

Source: GSMA

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Challenges

The Three Challenges for MNOs

For MNOs to capture the most value from the move to 5G, they need to leverage the new revenue-generating opportunities made possible by innovative use cases that only 5G can support.

That will require not just sustained and heavy investment in infrastructure but also new ways of engaging with enterprise clients, new investment models, and new ways of working and collaborating with partners and systems integrators.

The journey from 4G to 5G will be non-linear and progress will be conditioned by the development of technologies, ideas, business models and use cases. To successfully move forward, MNOs must embrace three challenges:

01
Accelerate Business Transformation and Monetization

02
Reduce Costs

03
Focus on the Enterprise Customer

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Accelerate Business Transformation and Monetization

01

MNOs need to accelerate the process of business transformation, adopt new business models, and look at a broader set of monetization opportunities if they are to move beyond connectivity and **expand and redefine their role** in a crowded marketplace.

02

5G will **accelerate their transformation** from traditional network operators to IT companies as network virtualization and the move to cloud-native technology oblige them to refocus away from physical infrastructure to a services-led business model.

03

The introduction of software technologies such as open radio access network (OpenRAN) in the network allows operators to deploy innovative solutions and develop **new monetization opportunities**, such as campus 5G networks, edge computing or partnerships with cloud compute providers.

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To take maximum advantage of these opportunities will require a major **skills and cultural transformation** and a new operational model.

Cost Reduction

To ensure the investment in new infrastructure is sustainable and to **maximize returns**, MNOs need to unlock savings on both CapEx and OpEx spending.

Big operational efficiencies can be achieved using AI and machine learning to optimize network performance and **automate operations and maintenance** (O&M) functions that rely heavily on manual processes, especially for network roll-out and field maintenance.

Virtualization technologies such as OpenRAN can help reduce CapEx requirements by increasing vendor competition and encouraging **greater interoperability** in the radio access network, traditionally one of the costliest parts of network infrastructure.

Finally, sales and customer support, activities that consume the largest share of OpEx, are areas where technologies such as RPA and intelligent assistants can **improve efficiency and optimize productivity.**

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Focus on the Enterprise Market

Experience with earlier generation mobile technologies shows how difficult it is to create and sustain a differential service proposition with consumer mobile services, which quickly suffer from competition and margin erosion.

While the provision of eMBB services to the consumer market will be the core proposition in early 5G deployments, 69% of operators view the **enterprise segment as the most important** opportunity for the mobile industry in the 5G era*.

Source: GSMA

But many enterprises take a pragmatic approach to technology, they are followers rather than leaders, and do not yet see 5G as essential to running their business. To change this perception, MNOs must work harder at educating the market on the benefits of 5G and better articulate their value proposition for enterprise customers.

That will require MNOs to develop **compelling use cases for different verticals** which will, in turn, oblige them to build competences and expertise in areas such as cloud platforms, software, developer communities and customer relationships

How NTT DATA Can Help

Helping MNOs Overcome the Three Challenges

NTT DATA understands how to prioritize and best leverage 5G technologies to enable MNOs to **accelerate monetization and business transformation,** thus capturing more of the opportunity that 5G will generate. We can help operators go beyond connectivity and move up to play a bigger role in the enterprise value chain.

NTT DATA can help operators decide on the most cost-effective strategies for integrating and rolling out innovative technologies such as OpenRAN in their networks, which is essential in

launching commercial offerings at a **lower cost base,** particularly when competing with cloud platform providers.

Finally, NTT DATA serves 70 of the world's largest companies, ideally positioning us to help operators **focus on the enterprise market**. We can advise MNOs on how best to design and tailor new service offerings, such as private 5G networks, adapting them to the complex needs of enterprise customers, and developing go-to-market strategies that reduce time to value and maximize operator revenues.

AW3D, an advanced 3D digital map package created specifically by NTT DATA to help operators optimize planning of 5G networks by reducing interference from buildings and other objects

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NTT DATA Strengths

A Commitment to Open Standards

NTT DATA believes passionately in open standards and works with others to shape the future of 5G through active participation in various industry forums, including the TM Forum, the Telecom Infra Project, Open Network Foundation, the Broadband Forum, ETSI, and the Cloud Native Computing Forum.

Partnerships Add Value and Are Built on Trust

NTT DATA partners with carriers, equipment suppliers and other specialist providers across the value chain and around the globe to create innovative solutions to the big challenges facing society today. No one company can singlehandedly solve these challenges so we recognize the importance of building strategic relationships that are mutually beneficial, leverage the respective strengths of both parties, and are built on trust.

Adaptability and Vendor

Our 5G solutions take into account where a customer is in their 5G journey, enabling operators to continue extracting value from legacy infrastructure while giving them a well-defined evolutionary path to a fully cloud-native 5G network that minimizes risk and matches cost to opportunity. In addition, NTT DATA is technology agnostic so operators can specify a flexible combination of suppliers, eliminating vendor lock-in and alleviating possible supply-chain risks.

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5G Solutions

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Trio of 5G Solutions

5G Enabling Fabric

5GEF is a cloud-based environment designed to help MNOs and third-party service providers rapidly deploy new 5G services for their enterprise customers.

5G NaaS

Enables MNOs to offer enterprise customers highly personalized services while ensuring cost-effective end-to-end management of the network services lifecycle.

5G Campus

Virtualization technologies such as OpenRAN can help reduce CapEx requirements by increasing vendor competition and encouraging **greater interoperability** in the radio access network, traditionally one of the costliest parts of network infrastructure.

5G
is much more than a faster version of 4G

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5G Enabling Fabric

5GEF is a cloud-based platform specifically designed for configuring and delivering business services to enterprise customers. NTT DATA's solution provides Telcos and MNOs with a modular platform for deploying business applications provided by any relevant vendor to virtually any location worldwide.

For business users, 5GEF is the key to a highly intuitive, simple and cloud-like experience, as it empowers them to define and implement the services to meet their own, often highly-specific needs.

5GEF Key Components

Customer Portal

Highly-intuitive GUI offers end-users a familiar cloud-like experience.
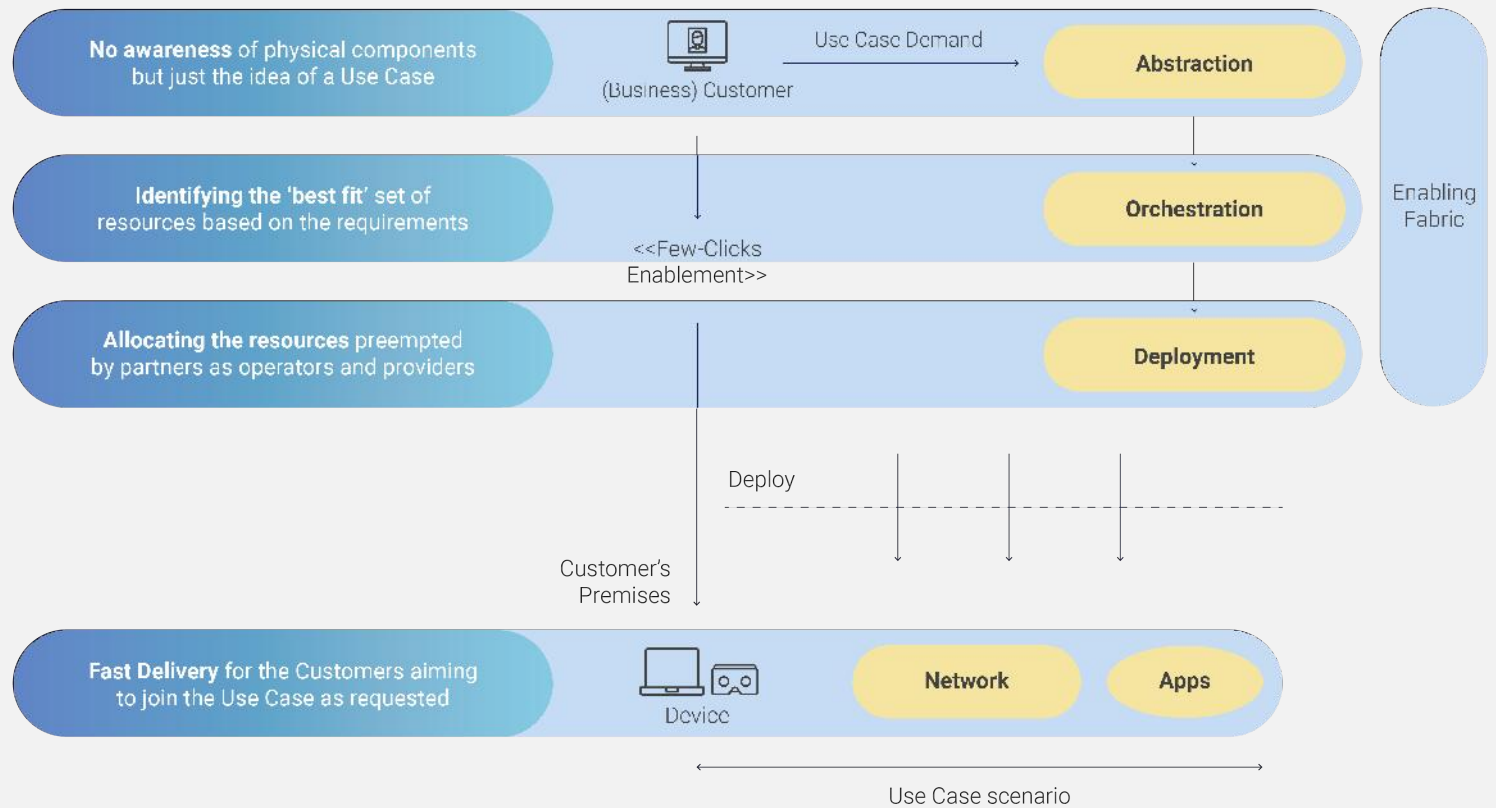
Orchestration

Orchestration layer includes dynamic inventory, selection algorithm, resources monitoring and service order management.

Deployment

Network slicing delivers secure environments for each business customer. Connectivity is brokered via SDN / NFV coordination.

5GEF Functional Diagram

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5G Enabling Fabric Benefits

Cloud-like Experience

Enterprises will find the intuitive user interface within the NTT DATA-provided customer portal easy to use and highly secure. Operators will be able to deliver a complete end-to-end experience for customers with just a few clicks, building on their own and partner owned infrastructure.

Cost Effective

5GEF removes an entire layer of capital investment from end-user customers, cutting software licensing costs, as open source and third party licensed applications are combined, with the number of instances greatly reduced.

Improved Collaboration

Most enterprises now depend on an ecosystem of partners and collaborators, and breaking the barriers between working across corporate boundaries is always an issue for agile working. Virtual collaborative workspaces, scalable, flexible and rapidly evolving, are a design feature of 5GEF, enabling more secure, agile joint working, everywhere.

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Network as a Service (NaaS)

5G NaaS gives carriers the abiity to configure and deliver connectivity services built upon network slices that can link any locatioN to any other. This allows them to offer highly customizable services for business customers who requires specific network capabilities but do not want to deploy their own infrastructure.

Services can be configured to very precise specifications and be ready for use in hours, not weeks or months, with no special design, engineering or other preparation work required. NaaS delivers network slices dynamically, while meeting demanding Quality of Service (QoS) requirements, using AIOps.

5G NaaS Key Features

Cloud-like experience

Customers configure their own services and set the business rules that define scope and permissions.
The customer is in control at all times and only pays for services used.

Virtual Tunnels

Tunnels can be configured across any network component, utilizing third-party connectivity, fixed line as well as 5G, public internet or a telco's existing MPLS WAN.

Open Standards

Compliance with TM Forum Open Digital Architecture (ODA) ensures customer-facing service componentsare decoupled from the network platform.

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NaaS Functional Diagram

The discrete functional layers of 5G NaaS decouple components and capabilities, enabling speed and flexibility of a kind that has previously only be seen in hyperscale cloud services.

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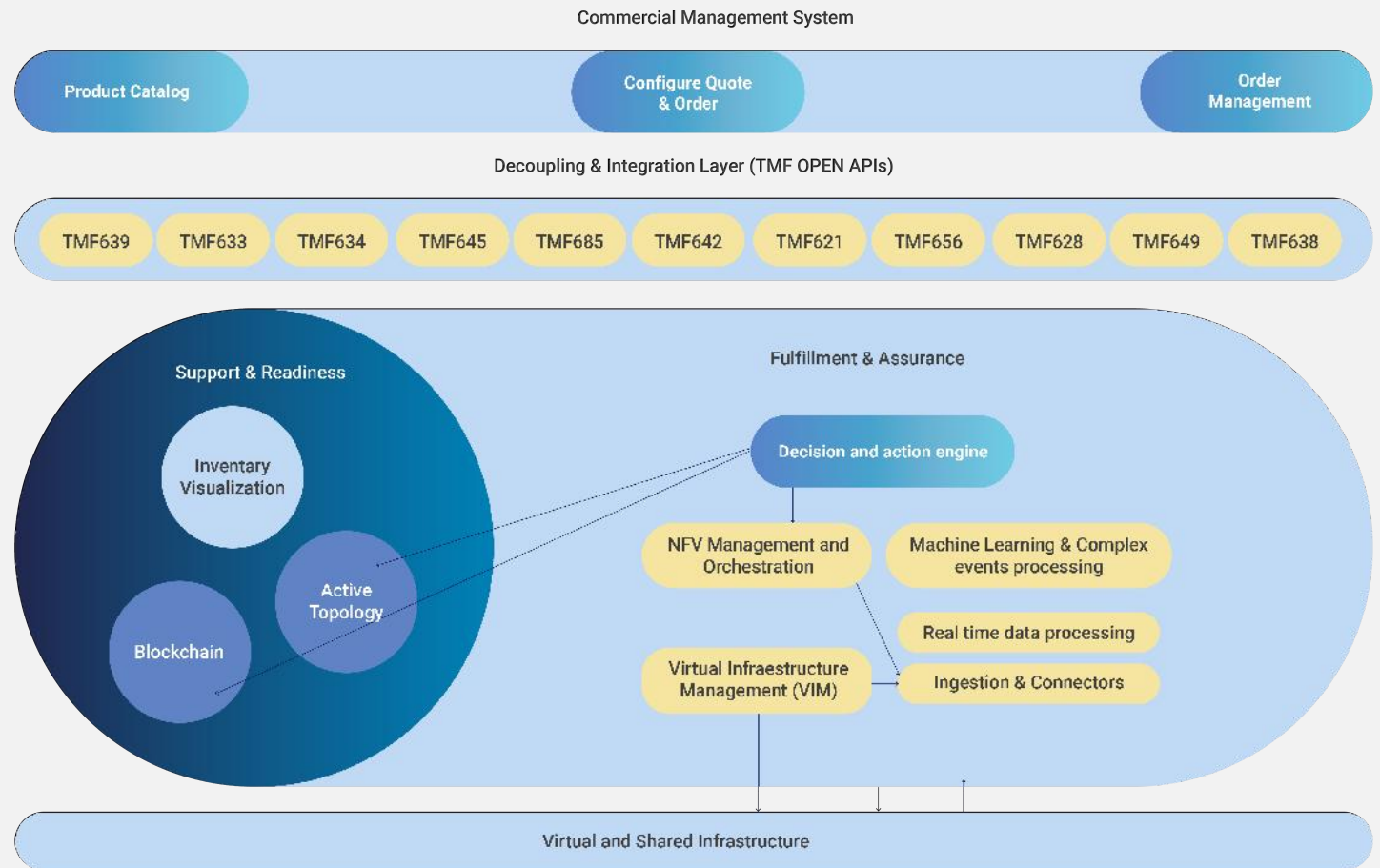
5G NaaS Benefits

Rapid Market Entry

The global reach provided by NaaS, using shared resources around the world, enables multiple locations to be managed through the same secure network. That makes it possible, for example, for a business or CSP to enter a new market and minimize investment risk by foregoing the need to make investment in infrastructure.

Security and Partnering

NaaS is designed for collaboration, at every level, from shared resources and design, through to environments that share network resources, enabled by blockchain, to make the network deployment more efficient. Security is built into the service from the ground up, with multiple systems to identify issues, eliminate threats and avoid outages.

Future proof

The open architecture ensures that services delivered to customers can evolve naturally, as network architecture develops, and vendor lock-in is avoided.

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5G Campus

5G Campus uses the speed, scalability and quality of 5G networks to create distributed development, test and prototyping environments for new industry use cases. By using 5G technology to create private networks for solution development, 5G Campus permits telcos and their enterprise partners to create virtual industry showrooms for new solutions.

5G Campus uses SDN and NFV technologies to provision hybrid platforms that provide secure, multi-location development and test platforms. Local private 5G networks can be used to run instances of the solution under development, with IP and SDN connectivity providing access to development laboratories, anywhere in the world.

5G Campus Principal Design Characteristics

Disaggregation

- SDN/NFV architecture

- Self-serve and self-configure capabilities

Cloudification

- Rapid provisioning

- Same processes and methods as hyperscale cloud

Open Standards

- Technology agnostic so no vendor lock-in

- Lower cost and risk

Automation

- Rapid configuration and provisioning

- Fast introduction of new features and updates

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5G Campus Benefits

Faster Product and Service Development

5G private networks can be created, flexed and interconnected as needed to create extended, location-agnostic virtual development platforms. This enables a more agile process of collaborative design, development and testing. The result will be more robust, better prepared solutions, built to a shorter, tighter schedule.

Accelerated Time to Market

Faster development, prototyping and testing means the move to production will also happen more quickly than today. That will enable enterprises to take products and solutions to market faster than before, and develop new versions and variants faster, too. It also makes it easier to open up new marketplaces around the world, and at lower risk.

More Flexible Partnering

In many verticals competitive advantage depends on the ability to access specialist skills very quickly, with low set up costs and at low risk. 5G Campus permits secure shared development platforms to be created, evolved and closed almost instantly, with virtually no risk and no upfront costs.

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Why Choose NTT DATA for 5G

NTT DATA – a part of NTT Group – is a trusted global innovator of IT and business services headquartered in Tokyo. We help clients transform through consulting, industry solutions, business process services, IT modernization and managed services. NTT DATA enables clients, as well as society, to move confidently into the digital future. We are committed to our clients' long-term success and combine global reach with local client attention to serve them in over 50 countries.

NTT DOCOMO, sister company to NTT DATA in the NTT Group, is Japan's leading mobile operator with over 81m subscribers and plans to invest almost $10bn in 5G technologies between 2019 and 2023. NTT DOCOMO has actively contributing to 5G standardization and has applied for more than 2,500 patents relating to the 5G standard, while 3,500 companies have already participated in NTT DOCOMO's 5G Open Partner Program.

Visit us at nttdata.com

References