

5G

**FROM COMMODITY
PROVIDERS TO B2B
LEADERS**

From Commodity Providers to B2B Leaders

Telcos and Mobile Network Operators (MNOs) have not profited as much as they had hoped from the explosive growth in mobile connectivity, nor from the innovations that have transformed user experience and richness of services offered.

Each successive technology advance has made it easier to access rich consumer content and business applications from remote locations and on mobile devices. Content providers and Apps platforms have generated revenue from these advances and from the rapid increase in traffic this has caused, but MNOs have seen their profit margins remain under pressure.

The search for profitability



The B2C revolution, fueled by gaming, social media and streaming video, in particular, has not fed through to high profits for MNOs- on the contrary. Their margins have remained largely static, despite the need for large-scale capital investment to enable the new services transforming the market. While others have profited, MNOs, in particular, have remained commodity providers of connectivity.

Now we are on the brink of the next major revolution, driven by 5G. As MNOs gear up for the huge investments this requires, the key question for them today is how to avoid further commoditization in the future? How to avoid leaving profitable services to others and to ensure that 5G technology helps to drive revenue and profit growth for them.

Moving up the value chain



NTT Data believes the only way to help MNOs and other Telcos to rise up the value chain and improve their margins is to use 5G as the catalyst for building a strong position as service provider and service broker to the enterprise market. This market is changing rapidly, and the appetite for very flexible, scalable and rapid “cloud-like” access to new services is growing fast.

We believe that 5G roll-out represents a vital, perhaps final opportunity for MNOs and Telcos in general to transform their status from connectivity providers alone to becoming major strategic players in the enterprise market.

Cloud-like experience

5G is the next step in a work revolution that started with the arrival of SDN, enabling such radical concepts as network slicing, edge devices and mesh/overlay techniques, and adds new levels of value, speed, scalability and operational efficiency to these emerging concepts.

For enterprises, especially after a year in which the need for environments that can connect flexible working groups based in multiple locations has become a basic necessity, access to the agile scalability offered by 5G will be a critical factor in gaining competitive advantage.

We believe that major changes are coming to the market, and these changes will affect the ways in which enterprises of every size think about and use connectivity. 5G is not the only factor in driving change but it is becoming a key enabler. That makes it an unmissable opportunity for ambitious MNOs as they plan their future strategies.

Technology innovation

5G offers similar advantages for enterprise users as those offered by hyperscale cloud providers. Configuration, provisioning and deployment can take place at very high speed, with no need for major capital investment, while scalability is built-in and the business model is strictly pay per use.

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. A 5G-enabled platform, therefore, permits fast set up of secure, distributed work environments, almost regardless of location, and without the need for long-term commitment, vendor lock-in or conformity to vertical applications. 5G enabled service offers, therefore, provide a cloud like approach, but with an added dimension. That's why it could represent a significant moment for Telcos and MNOs in the enterprise market.



New Vision for Rapid Service Provisioning

A new approach to business service provision

Most business services have traditionally been offered into the market as integrated vertical solutions, closely tied into vendor applications and focused on the specification and requirements of individual market sectors and industries.

In this existing business landscape, Telcos and MNOs generally speaking occupy a well-defined position in which they provide generic services, which are customized and turned into added value solutions by vendors or systems integrators. Telcos of every kind deliver connectivity platforms with relatively little differentiation. The competitive differentiators are provided by others. This is why Telcos and MNOs find it hard to escape the commodity trap.

The search for value

Today, a range of large IT service providers compete for the role as primary strategic partner for business customers. To gain added value for their businesses and permanently change their status in the market, Telcos and MNOs need to have a credible reason for acting as strategic partners to large enterprises in their own right, and not just as an adjunct to another company's solution.

This is where the roll-out and wider adoption of 5G technology could potentially make a big difference. 5G is coming to market right now as part of a package of technology solutions that could potentially change the way that services and working environments are offered directly to large enterprises, and indirectly to smaller companies, via service aggregators and brokers.

The 5G difference

5G enables MNOs to build highly flexible, scalable environments for enterprise customers, built according to "public cloud" rules. That is, by using network slicing, composed of selected (orchestrated) resources based on bandwidth, latency, number of registered devices... This provides secure and private spaces within a public infrastructure, doing so in hours rather than weeks or months, on a pay per use basis and with almost unlimited scalability.

As 5G becomes more widely used, so enterprises will come to value and demand its unique benefit: which is to provide a programmable network, in which public cloud simplicity, scalability and cost-efficiency is matched by inclusion of global reach and mobility services as a basic design feature.

Telcos and MNOs can now deliver slices, provided as complete solutions, with segments provided by different operators, brokering resources and capabilities from a range of third parties, rapidly delivered as customized solutions. MNOs can offer this kind of vertically-focused service through applications Mash-up service orchestration, which enables them, quickly and with minimal risk, to become key service providers to enterprises and potentially "owners" of primary, added value business relationships.

The programmable nature of the 5G enabled network permits a high level of automation in provisioning and dynamic resource allocation. End user customers can configure a customized service for their exact needs, apply business rules and access right to create a specific use case, and then have this service implemented automatically with a few clicks. This effectively scales up the now familiar advantages of public cloud provisioning and adds even greater ease of use, security and reach.



5G in a new world of work

The importance of these characteristics has been revealed very clearly during 2020, as most enterprises have become more distributed in their own working methods, and are likely to remain so.

The need for connectivity between fixed points, representing offices, branches, development centers, partner locations, is being replaced by constantly varying, integrated environments, uniting contributions and inputs from different work centers and a huge, variable number of connected locations.

We are at the start of what might eventually be seen as “the 5G Revolution”. It is not possible to be sure how this will evolve or where it will take us.

One thing is certain: there is great deal of opportunity opening up for MNOs over the next few years. Now we need to understand how to maximize this opportunity, while minimizing risk.

The true significance of 5G

In the public mind, 5G is about the next step forward in mobile telephony and streaming. Yet the main benefits of 5G will be measured in the business market, as we have already stated above. 5G has the potential to drive a revolution in business services as profound as the emergence of Cloud a decade ago. There are many similarities, as this is a cloud native technology, with the same potential for rapid provisioning and agility.

5G also supports a great variety of business use cases, based on vendor and open source applications, or both in combination, acting as service provider, working directly with enterprises via a customer portal. In effect, an extended communications network, owned and operated by a conventional telco or MNO becomes a form of extended cloud, in which private spaces can be defined and offered at speed and with great flexibility. The difference, compared with conventional hyperscale cloud, is that 5G enabled networks are, by definition, distributed in nature, so the ability to integrate as many remote (and mobile) sites as required is a basic design feature.

The New 5G Enabled Landscape

We have seen how the ability of 5G to enable development of a programmable network facilitates rapid design, configuration, provisioning and deployment of complex business services, to a vast number of locations, worldwide. Let’s now take a closer look at the underlying technologies, and how they can be integrated to deliver the scalable, secure and flexible businesses services that enterprises want, and do this in a fast, agile and highly secure manner.

Core components

To understand the changes that 5G enabled networks can offer, we need to begin with a simple overview of the functionality the technology offers, and show how all parties to service definition, provision and delivery interact within this very new landscape.

Let’s begin with a simplified view of the environment and then look at it from the viewpoint of customer, network operator, cloud provider and applications vendor: the four major players in this arena.

The Customer needs to have a simplified view of the technical scenario, as said. The demand of specific use cases for the Customer should be collected through a presentation layer, where they can have a choice among a list of available services (use cases).

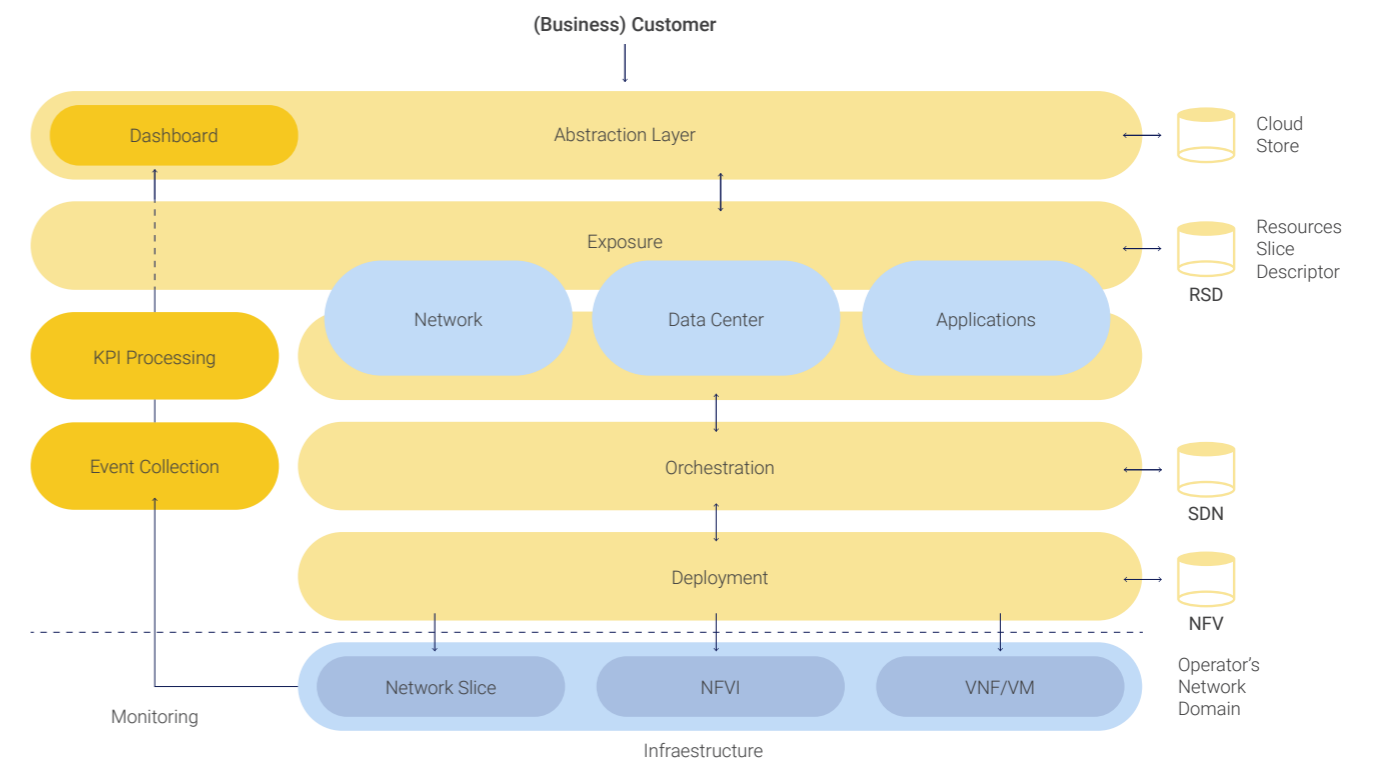


Figure 1: the 5G enabled service landscape

In this environment, the customer (and their authorized users) can access a customer portal, which provides a simple user interface for configuration of services. The portal corresponds to the typical “cloud store” interface that exists for public cloud, SaaS applications and even in many cases consumer services.

Use of a portal in this way is clearly nothing new, therefore, and most customer end users will be familiar with how this approach works. What is new, however, is the broad scope of the service components on offer to users. Because the entire 5G network is programmable, this means users have an extra service dimension at their disposal: they are now defining customized service characteristics in space and time, as well as functionality, business rules and access privileges.

Orchestration and deployment are managed by using open source tools, based on Software Defined Networking (SDN) for orchestration, and Network Function Virtualization (NFV) for deployment.

These toolsets are used currently in hybrid environments to enable a general move away from MPLS dependent networks, which depend on point to point tunnels to fixed (or partially fixed) end points for distributed working. OpenStack software is the normal choice for deployment, which removes the risk of vendor lock-in and enhances the agile, open nature of the solutions offered.

The network operator, normally an MNO or other Telco, will deploy management and QoS tools across its own environment. They will use network slicing to provide dedicated bandwidth for specific customer needs, while dynamically scaling for “burst” capacity as needed. The general approach used for delivering services is highly automated.

Once a use case has been defined, the allocation of resources and dynamic deployment across the best available route to the authorized users takes place automatically, with quality and security monitored continuously, and preventive intervention used to avoid outages or respond to negative trends or security threats.

The abstraction layer decouples the customer portal (and thus service configuration) from the resources needed to build the service, the network needed to deliver it, and the management tools needed to keep it secure, while ensuring Quality of Service (QoS).

Once again, this offers users something extra, when compared with current service provisioning, because the resources exist within an intelligent, highly distributed network environment, so there are no obvious restrictions on access to resources (which can be held on cloud or datacenter environments anywhere), and on availability to users (who can be based anywhere, or can be on the move).



Enabling technologies

The simplified framework described here shows how the customer will experience the new kind of service provision that 5G enablement offers. A series of core underlying technologies deliver a higher level of quality, security and agility across the entire service landscape.

The most important factor is the higher bandwidth and lower latency offered by 5G, itself, which enables a further shift in the locations where business intelligence is held. In the past, an enterprise depended on customized applications delivered on premise, with leased connections to enable working from different business locations. Security, Quality of Service and redundancy still remain significant issues, with an ongoing need to have application instances running locally and a great deal of engineering work required to fine tune business solutions to specific enterprise requirements.

Even with the many developments of the past two decades, distributed working remains complex, slow-moving and (in many cases) somewhat inflexible. 5G enabled networks have the potential to remove the need for local application instances and permit secure agility of a kind that has never been possible for enterprise customers before. The key technologies within this new landscape include:

The most important factor is the higher bandwidth and lower latency offered by 5G



Network slicing, enabling dedicated parts of the overall global network to be allocated to specific customers and services for their own use.

- Access can be as fast and scalable as commercial requirements allow, because there are no technical constraints on instant, flexible access.
- Slicing is the direct equivalent of private space on a hyperscale cloud platform. Security is not in any way compromised through use of a shared environment, but the costs are greatly reduced and speed of access increased.
- Customer management is delivered via their own portal, which enables configuration to exact customer specifications

Applications mash-up, which makes it possible for customers to define and access a highly customized and targeted business service at speed.

A Mash-up service orchestrator accesses and blends applications and modules from both open source and proprietary apps stored at any point within the network, the mash-up service is able to configure and provision highly customized and user-specific services from a large number of standard components.

This is the key to enabling customers and authorized users to select use cases and know that their specific solution will then be automatically generated and deployed.

An Abstraction layer, as noted already, enables highly distributed multi-client working across the entire network. This permits multiple users to share the network and its resources, while inhabiting their own, dedicated and secure space at all times. This is the key to delivering the combination of shared service low cost and scalability, with dedicated service targeting.

5G core components (as VNF modules) are deployed and virtualized in MNO owned datacenter environments to manage network access, QoS and security.

Edge devices may be used on multiple sites as and when needed to enable flexible working from mobile devices. Joint working with hyperscale cloud providers also means that Edge computing is available at a locally-sited datacenter within radio-connectivity range of the user devices.

Radio Access Networking (RAN) can also be utilized to provide ultra low latency access and massive use of IoT devices as required (up to 100,000 devices per square kilometer).

Radio Access Networking (RAN) can be utilized to provide ultra low latency access

Building the value proposition

5G enablement permits Telcos and MNOs to play a more prominent role in the continued evolution of business services that are easy to access, based on Cloud principles, and provide virtualized environments in which location will eventually become irrelevant.

The proposition is similar to that promoted by hyperscale cloud providers, but with one additional benefit: the services delivered will become ubiquitous as a basic function of the architecture. Any location with basic connectivity, including any mobile device on the move, will keep the user connected to their essential services.

Within the limits of their agreed service scope, authorized customer personnel will be able to:

The architecture of the 5G enabled environment means it is distributed by design. There is no single point of failure and the service is available with no compromise on quality and capability to any location that can access the network. In practice, that means everywhere. In the way the services described here are set up and accessed, the experience for customers is “cloud-like”, with all the same advantages of cost, speed and scaling to demand. Unlike classic hyperscale cloud, however, connectivity across multiple remote sites is a normal feature, not an add-on.

This helps to explain why 5G represents such a remarkable opportunity for MNOs as a way of redefining their relationships with B2B customers. In establishing secure, distributed, location agnostic, vendor agnostic work environments, MNOs will have a built-in advantage for the first time in the past two decades, where business services are concerned. They need to make it count.

Define a specific use case,

which will include a bundle of applications and enabling services (connectivity, security, scope of services, range of locations or mobile access points) properly dimensioned as per users demand.

Apply their own business rules

(defining which roles have access to which services, ability to scale with changing demand, QoS parameters, monitoring and reporting requirements...).

Go live within hours,

where appropriate, or a few days, based on business and contractual requirements.

Monitor performance and usage

in real-time, making dynamic changes to scope and scale of the service, according to business priorities.



Building a Roadmap to the Future

In this paper we have highlighted the ways in which Telcos and MNOs can use the design characteristics of a 5G enabled architecture to develop a unique positioning in the business marketplace. This may prove to be the key to avoiding further commoditization and to developing a strong competitive value proposition for their go to market strategies.

We have to accept, however, that a lot of work needs to be done before MNOs, in particular, can start to monetize this critically important new technology. 5G roll-out is at a comparatively early stage, and it represents a very large capital investment for telecom companies. Before making the large commitment required to achieve true 5G enablement, they need to understand how their investment can be turned into a good return for them in an acceptable time scale.

They do not start from square one, of course, because some enabling technologies are already in place today, and will deliver key benefits to customers, even without the added value in terms of capacity, availability and speed that 5G offers. These include:

Network slicing, which is an established service, largely taken to market at this moment either by SIs or specialist intermediaries.

Orchestration, which is a basic requirement for all SDN-enabled business services.

Monitoring and security solutions, managing QoS, latency, jitter and other key performance indicators.

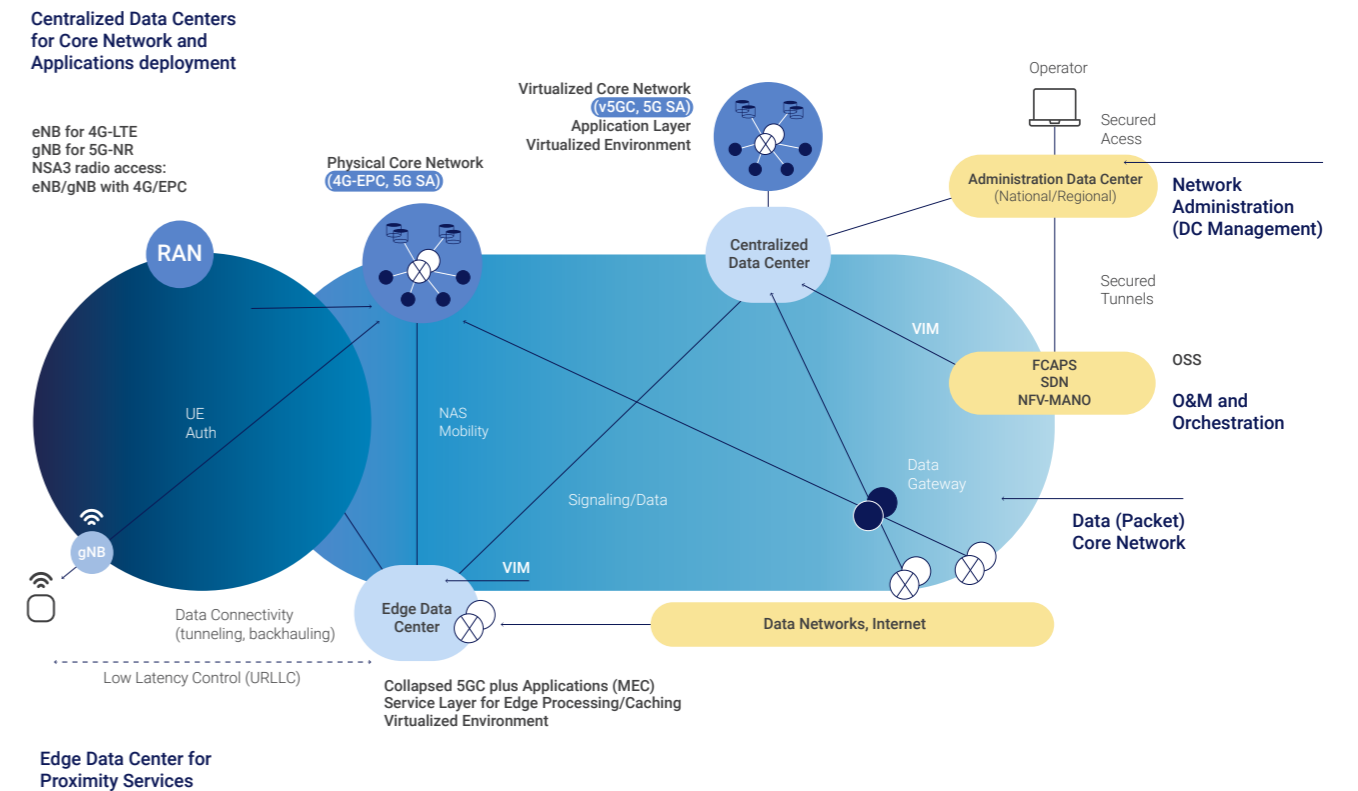
NFV capability within virtualized datacenters, which manage business services across multi-user WAN.

Earlier mobile technologies, such as 3GPP, have the ability to use such capabilities already, even though the bandwidth, speed and latency advantages of 5G may not be present.

These and other capabilities can be packaged into customer business services right now and offered to business customers as part of a long term relationship-building strategy, aiming to upgrade initial services progressively as 5G capability becomes more widely available.

In our opinion, it is important to begin socializing the capabilities of distributed business services as fast as possible, and working with hyperscale cloud providers and local partners means that many of the advantages we have been describing can be offered in easy to use business services now. The key to achieving this is hybrid connectivity, using 5G where available, but with Edge computing provided by locally sited cloud datacenters and 4G connectivity for mobile access.

We recommend a systematic, carefully planned and step by step approach. It begins with establishment of a 5G enabling fabric architecture, shown in a very top level form below.



This diagram shows how partner capabilities can be embraced within the overall service offer that Telcos provide directly to business customers. That's because, once key technology components are in place (Mash-up orchestrator, Abstraction layer, cloud store, customer portal) it becomes possible to start offering effective and high quality services, even with minimal 5G capability in place.

A number of dedicated services, with limited scope but proven effectiveness, are available today, each delivering clear business benefits and each of them capable of integration to form a wider service scope in the future.



Network as a Service,

sometimes known as Connectivity as a Service, provides network slices to enterprise customers, which delivers secure bandwidth for their own dedicated use on a pay as you go, fast access, fast scale basis. In this service, the application access and other business services are provided by the customer or another supplier.

The Campus service,

by contrast, enables enterprises to take a first step into the world of cloud-like commissioning of distributed work environments, initially focused on development work that requires inputs from widely distributed team members, moving to rapid prototyping at exceptional speed.

Operators can establish private workplaces, connecting multiple locations and users, at high speed, as and when needed. This enables enterprise work teams to pull in all resources and personnel (internal and external) needed (subject only to their own

business rules) for long-term requirements or short term projects, customized to exact needs and ready at high speed.

In these and other use cases we demonstrate how self-serve configuration and “few clicks” automated provisioning and deployment bring unprecedented speed and ease of use to definition and delivery of business services. Full 5G roll-out simply adds a new dimension of speed, quality and reliability to what is already a powerful concept.

Building for the future requires two streams of activity, and although these should be closely integrated, they do remain distinct.

- Develop the capability to provide business services with a cloud-like customer experience, cost base and speed of access.
- Roll-out 5G capacity in a measured way, progressively implementing the new technology and embedding it at the heart of your business model.

Once competitive service provision meets the technology advantages of 5G, network operators will not only be able to compete effectively with SIs, consultancies and other specialist service providers, they will have a built-in competitive advantage.



Strategic Partnership for Long-Term

5G alone is not the answer. 5G adds value to a strategy that has to be developed separately and is based on the ambition to become a serious player in the business services field. As you plan your route into the future, this is the first step: and it should not be delayed any further. Most MNOs, however, are likely to find that they will need access to specialized skills in architectural design, IT management and service development before they can take full advantage of the opportunities that are now open to them. That means strategic partnership is likely to be a key requirement for rapid progress.

Key questions they need to answer include:

Skills

How to acquire a range of new skills and immediate access to business service experience and credibility? For many MNOs this will be a challenge. Delivering complex business services to demanding clients is not in most cases their core business, but we believe it must become an integral part of their business models in the future, if they are to monetize the potential that 5G offers.

Partnerships

How to create partnerships that enable all parties to contribute appropriately and also to benefit in the right ways? For MNOs to develop and successfully market business services to large enterprises, for example, they need access to service design capability, integration skills and a strong track record of combining IT and telecom experience in a seamless offer.

Innovation

How to share risk and cost of innovation, monetizing as fast as possible, while keeping their own exposure to a manageable level? This means sharing out the costs of service development with partners, and building on established track record and capability wherever possible.

Working relationship

How to develop a form of working relationship that enables all parties to contribute and profit appropriately, accessing original R&D and building on strong customer relationships across an ecosystem?

Generic IT and systems integration capabilities will not be enough to qualify for strategic partnership in this market. This requires deep and long-term knowledge of the telecommunications and mobile data markets, combined with expertise in developing effective business services.

NTT, the parent company of NTT DATA, started life as a telecom provider and remains the third largest telecoms company in the world. We also own and operate one of the world's leading MNOs (NTT Docomo). Telecoms and connectivity is very much core business for us, which is why around \$2 billion of NTT's annual R&D spend is focused on the convergence of IT and Telecoms to create the distributed business services marketplace of the future.

We are also one of the strongest supporters and proponents of open-source technology in the world, and have actively contributed to key open technologies, such as OpenStack and O-RAN, which are at the heart of the distributed business environments we are now helping to develop.

Our vision for the future is one based on open technologies, no vendor lock in and customer-focused business environments. This paper represents a first contribution to what will be an active and creative debate. Further input, leading to multi-sided dialogue, is welcomed.

We are one of the strongest supporters of open-source technology in the world



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