NTT DATA

WHITE PAPER

THE EVOLVING ENTERPRISE

How new generation Cloud drives change, growth and value

ARE WE SEEING A SECOND CLOUD REVOLUTION?

The movement to Cloud is happening at high speed, and it still has a long way to go. Large enterprises have plenty of work to do before they are truly Cloud enabled, and yet… Even while we try to complete the first Cloud revolution, it seems a second and very different revolution is taking shape. How are we to cope with change on such a scale, and with such unpredictable outcomes?

CLOUD MIGRATION AS A MAJOR CHANGE PROCESS

Many large organizations are still at an early stage in moving their operations to the Cloud. They are refining strategies, testing options and building what they hope will be low risk, low disruption roadmaps to Cloud. In most cases, there is a long and sometimes difficult journey ahead.

Let's just look at their expectations about costs. Most enterprises assume that moving to Cloud will rapidly deliver significant financial benefits, but they quickly discover that just isn't true. In fact, costs normally rise during transition. That's because most savings are not made until legacy infrastructure is finally closed down, which cannot happen until transition is complete.

Until then, it is necessary to keep paying for the legacy environment, while funding the target operating model (on Cloud), and also ensuring seamless interoperability between the two, backed by comprehensive security for everything.

COMPLEXITY AND SCALE

For large businesses, moving to Cloud may be the most significant change process they ever undertake. It involves not just "lifting and shifting" existing platforms and applications, but also rethinking them.

And this is not all about technology, of course. It is also about the people and organization. The configuration, the structures, the ways in which ecosystem partners can be used, the types of skill and capability… these factors all determine who you employ, how they interact, where they are based, what is insourced, what is outsourced, and what should be ecosystem-delivered.

You have to rethink fundamental structures to maximize the potential of Cloud, and question many aspects of how you have operated in the past. Cloud is not just about Platform as a Service, Infrastructure as a Service and Software as a Service. It is more important than that. Cloud enables strategically creative organizations to change who they are and how they operate, from the ground up.

You may start the journey to Cloud looking for cost reductions, but you are likely to find that the journey is one of discovery, and not just a path to financial viability.

WHAT DOES THE SECOND CLOUD REVOLUTION MEAN?

There are plenty of "in-flight" change projects taking place, but we believe there is a growing need to rethink some of the plans already agreed, because emerging technology is impacting on the future of Cloud, itself.

In the first Cloud revolution, focus was understandably on data, compute, hosting, access from remote locations, security (a huge issue always) and increasingly on analytics. That is why the idea of Cloud as a better, almost infinitely scalable and cost-effective virtual datacenter, though never completely accurate, could be used as a shorthand explanation of why and how Cloud delivers key business benefits.

In the second Cloud revolution, focus shifts much more towards communication and networking. The full scope of this new definition of Cloud includes Internet of Things, Edge devices and very low latency connectivity between all the connected devices that lubricate the economic and social activity of the world.

Every organization must build the Cloud specification that is most suited to their needs. Figure 1 below shows how we think that enterprise management must move through three stages of development:

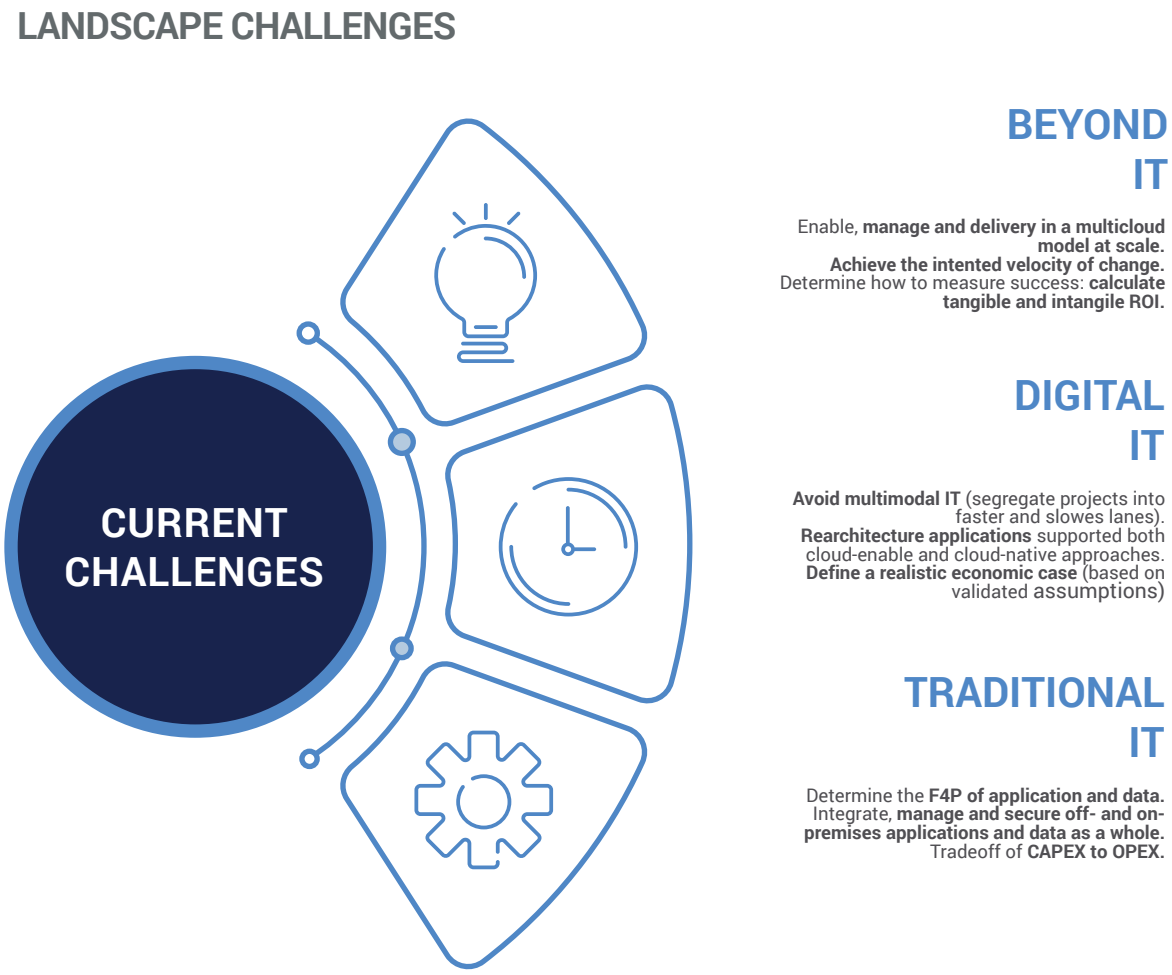


Figure 1: moving from tight focus on how to fix current IT issues; to rethinking IT as a set of digital capabilities; and finally to exploring the new business potential that Cloud offers.

In practice, Cloud can be seen now, not as a series of datacenters with connections between them, but as something much larger: an intelligent, programmable network in its own right. It enables complete disaggregation of components and completely distributed, location-agnostic components and participants.

Low latency connections, increasingly enabled by 5G, also permit bandwidth hungry access and interface devices to become easily available (Extended Reality, for example, in place of orthodox user interfaces).

Hyperautomation is now achievable, using machine intelligence, algorithms and, to a great extent in the near future, AI hosted on Edge devices. Centralization in large facilities becomes less important, except for a select range of very specific industries. Ecosystem working can be transformed and made far more ambitious in scope and scale.

RETHINKING TRANSITION

Cloud-related concepts are always in a state of constant evolutionary change, so the emergence of new concepts should not surprise nor worry us. What matters is to ensure that investments in transition strategies made so far are not wasted. Figure 2 below shows some of the thinking we believe business leaders need to follow as they plan their move to Cloud.

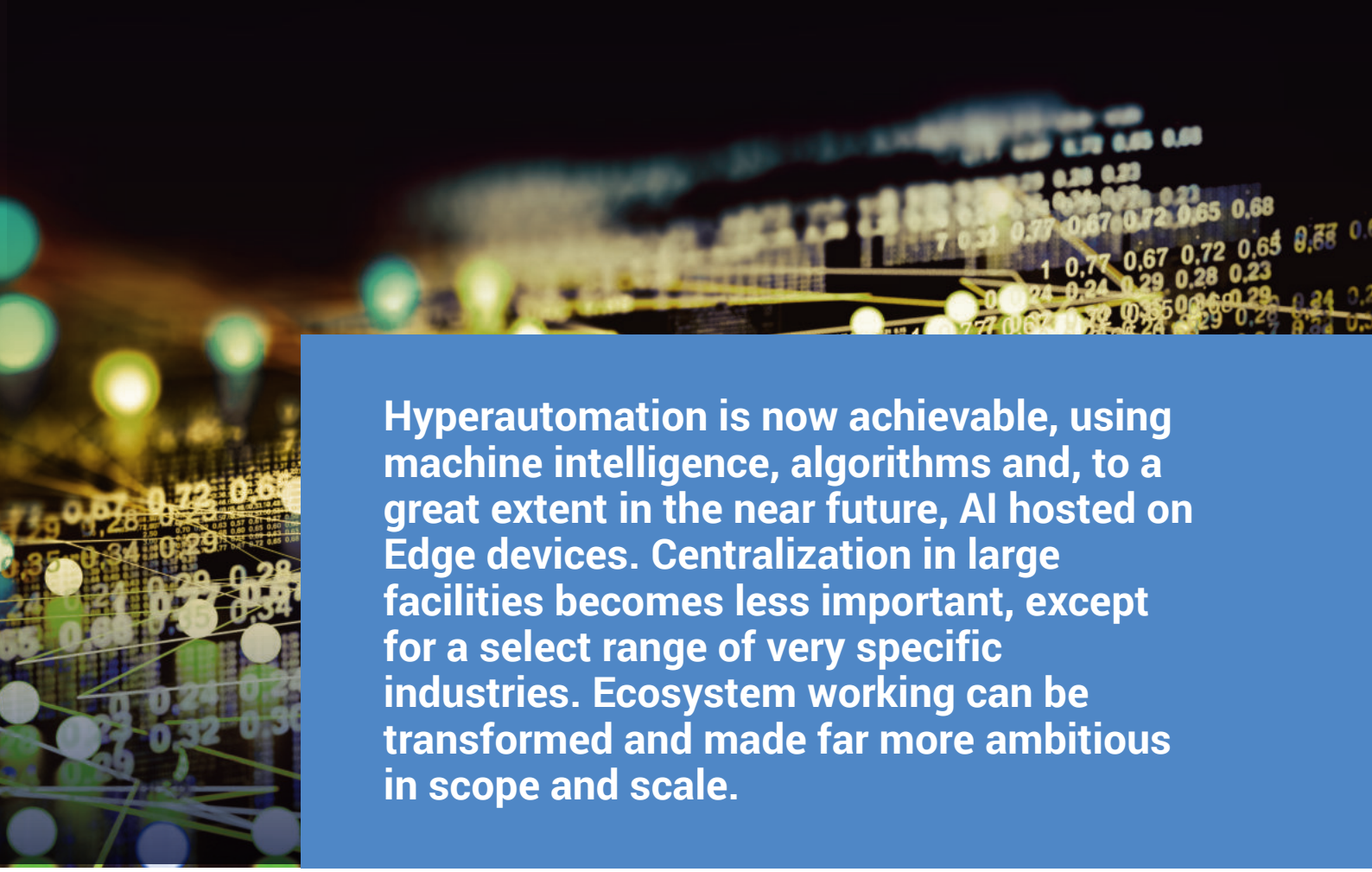
TRANSFORMATION & MATURITY PATHS

TRADITIONAL IT	DIGITAL IT	BEYOND IT
OPTIMIZATION PATH	**AGILIZATION PATH**	**INNOVATION PATH**
The same for less	**The same in another way**	**Something different**
Based on optimization of costs, resource consumption and performance thereof	Based on improving the value offer thanks to the ability to adapt to the changes	Based on offering a new value offer thanks to the ability to anticipate changes
Elasticity in demand management	Improved customer experience	Provide new forms of costumer relationship
Improved quality of service	Access to new markets	Development of new busines smodels
Cost efficiency	Cost model flexibility	Fully automated operation
Increased security	Data as a main active	Maximize the value of the data
Risk reduction	Regulatory compliance	Total independence from the supplier
COST OPTIMIZATION	TIME TO MARKET	ABILITY TO INNOVATE

Figure 2: This builds on the three stage approach we noted in figure 1. The choice is to optimize; become more agile; or transform into an innovation-based organization.

For many, if not most large enterprises, Cloud transition has started with a strategic partnering agreement with one or more of the hyperscale Cloud providers. This leads to transformation mainly at the IT level, including reduction of in-house IT functions.

If enterprises focus only on IT optimization and agility, they can do this without complete business transformation, which implies a dedication to innovation as a way of life.
We believe that moving to Cloud without business transformation will not maximize the potential of next generation Cloud. In the near future, speed of thought and agility of ecosystems will become almost more important than the technology, itself. This is challenging large enterprises (whether they are early adopters or slower-movers) to rethink their vision, strategies and next steps. It is also leading many businesses to ask if their actions and investments to date have been correct.



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THE POWER OF TECHNOLOGY AND BUSINESS CONVERGENCE

There has always been a symbiotic relationship between technology and business. Emerging technologies enable new forms of business to emerge and, conversely, urgent business needs have fostered research and development into new technologies. The New Generation, Networked Cloud concept is the outcome of exactly this kind of relationship.

Drivers for change

As with all major advances, the latest iteration of Cloud has been driven by a remarkable convergence of technologies and capabilities, which are changing, not only the technology landscape, but the ways in which people and organizations interact and collaborate. We are now starting to see what may be an irresistible wave of change, which will transform what we consider to be “normal” working practices and methods across a growing range of industries. They include all of the following examples, and no doubt many more as well.

Mass use of sensors. Some industrial sectors (oil & gas, critical national infrastructure, for example) have always depended on use of sensors to provide alerts and alarms, and to monitor how items of equipment are operating. Now, however, we have moved from basic sensors to more interactive connected devices, defined as the Internet of Things, which bring advanced two-way connectivity and reporting not only into the workplace but the home, as well. IoT devices gather and deliver data in huge quantities, and that process is accelerating.

Machine learning. The ability to analyze data in very large quantities not only leads to operational insights but is also driving a general growth in machine intelligence. Systems can evolve from depending on fixed algorithms to becoming more dynamic systems that learn from their environment. That is the next step towards development of AI, which remains some distance away and must be accompanied by a doctrine of ethics to complement its capabilities. As AI emerges, however, it enables:

- **Hyperautomation**. This permits very fast responses to a range of stimuli, which can be driven by technology, environmental, social or commercial factors. This approach implies a rise in machine decision-making, without advance reference to human actors. For many people it is a troubling concept and requires careful limits and definitions, yet its importance (for example in healthcare, manufacturing, transportation…) is clear.

- **Edge devices.** These are the natural complement to a truly connected, networked and geography agnostic Cloud, as they permit intelligence within the Cloud to be devolved for a range of purposes. These can include such actions as responding instantly to signals from locally based IoT devices, supporting compute and data capability for executing centrally-driven and managed commands (for remote management of local systems, such as local smart manufacturing hubs or handling systems), and for interrogation of locally gathered data.

- **Immersive systems.** These are the natural adjunct to intelligent devices that need to have a certain level of autonomy (driven by AI based on Edge devices) but can also be fully managed from very remote locations. By enabling a combination of virtual and augmented reality, we can develop shared virtual working spaces that add depth and richness to ecosystem working, and also permit deeper interaction between local systems and remote operators.

- **Low latency connectivity.** We have touched on this already: it is in some ways the most important enabling development of all, as it enables us to share virtual spaces without regard to location or distance.

Taken together, these technology changes permit new forms of working practice, which will impact sectors as different from each other as smart cities, healthcare (individualized, based on a combination of on-site devices and personalized medicines), entertainment, manufacturing (moving away from large central factories to local hubs, all connected and driven by the same business strategy).

Emerging technology change is driving the second Cloud revolution, and this, in turn, implies and mandates wider operational, structural and people-related change.

Building a new form of business Cloud

Once we start to view Cloud as comprising all connected technologies and systems, seamlessly combining communications, compute and data, this opens new possibilities in all operational areas, some of which we have addressed at a top level already.

Figure 3 below shows a very high level view of what the Next Generation Networked Cloud looks like together with, the components and capabilities required to build it.

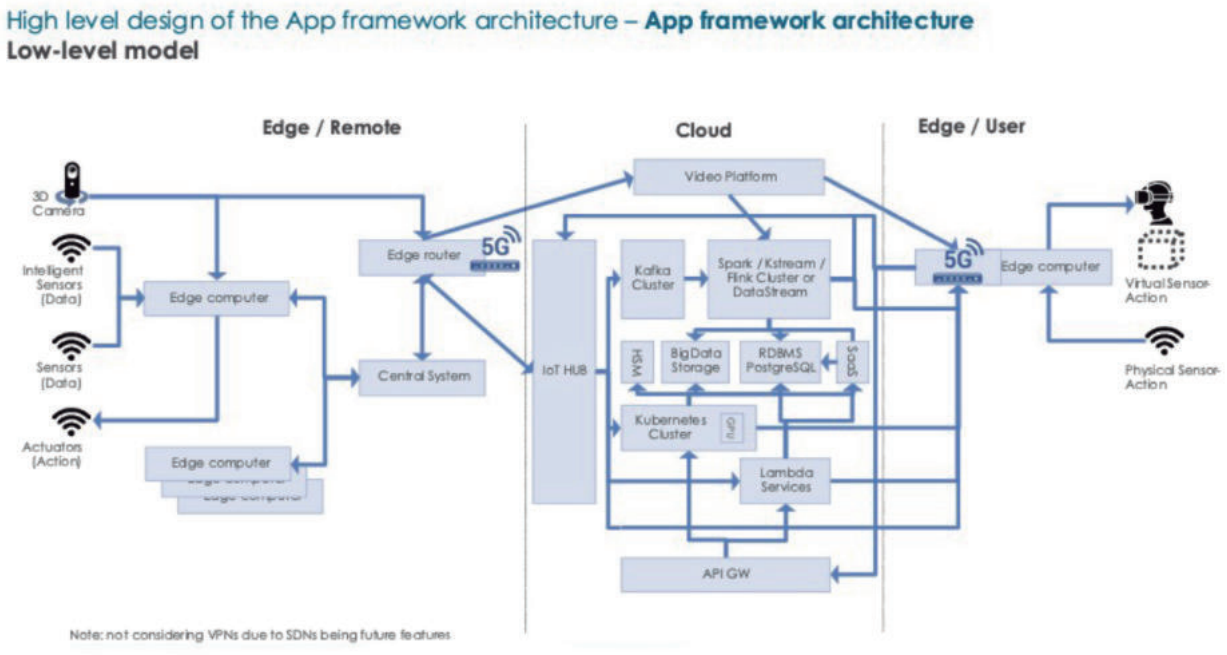


Figure 3: This is our equation for the future. Cloud plus Edge plus low latency connectivity plus advanced communication and interface technologies = Next Generation Networked Cloud.

Here are just a few of the emerging use cases that are made possible by Next Gen Cloud:

01. **Use of XR and low latency connections,** supported by intelligence based on Edge devices, makes it possible for expert personnel to manage systems that are based thousands of kilometers from where they sit. This will have transformational implications for freight handling and logistics, healthcare management, automotive, energy production and distribution and many other industries.

02. **Ecosystem working will now become more agile and seamless,** because Cloud as an intelligent, programmable network permits creation of an almost infinite number of shared workspaces, which can be instantly reconfigured to include the appropriate personnel for any specific task. Traditional corporate structures will be challenged as never before by this emerging capability.

03. **New business structures can also be developed that address a number of urgent and growing concerns.** These include the desire to repatriate some manufacturing activities (from centralized facilities in “low cost” countries), developing smaller and more localized hubs, which use emerging techniques (such as 3D printing) to enable “market of one” manufacturing, very close to where the products will be used. This is critical for reducing carbon emissions by cutting transportation requirements.

These developments require changes to the kinds of people employed, the ecosystems used for collaborative agile working, the rate of new product and service introduction, together with the convergence in services across traditional industry sector boundaries. This presents huge opportunities to businesses with the vision and agility to recognize and exploit them, but it is also a source of major challenges to those unable to change quickly enough.

Cloud as a driver for transformation

To put it simply, it is possible for an organization to migrate to “traditional” Cloud and still keep the same basic structures and business offers as before. It is not possible for an organization to transition to the new forms of Cloud, Cloud as intelligent, programmable network, without complete transformation of almost everything it does and, more important, ***everything it is***.

It is not productive to ask whether the technology is catalyst for transformational change or whether the business drivers accelerate take-up of new technologies. In reality, the line between technology possibilities and business imperatives is too blurred for that.

Smart businesses do not transform themselves merely because it is now possible to do so. They transform because the entire world is going through a process of multi-dimensional change, driven by environmental, social and political processes as much as by technology potential. The one thing we can be sure about is that transformation in all dimensions will accelerate across markets and individual organizations in the near future.

RAPID ADOPTION

Two major developments in changing to Cloud

Let’s focus on two factors that are playing a vital part in determining whether the journey to Cloud is successful or not.

First, we need to use a larger number of standard modules, components and products to derisk and accelerate the move. The paradox here is that, as the networked Cloud permits much greater diversity in the solutions businesses develop, they will certainly be using a higher proportion of COTS (Commercial Off The Shelf) components in their solutions.

This is the key to reducing risk, to avoid reinventing the wheel and to separate development of original solutions from the need to build every individual piece of the puzzle from the ground up.

Second, there must and will be a major change in the human side of this equation. This is not just about employing fewer people, or building ecosystems of specialist capabilities that can be mobilized faster than ever: it is about fundamental choices concerning the shape, size and composition of the central unit that constitutes your business as a permanent entity. Let’s look at both these topics in a little more detail.

First Change Element: standard modules

The key to successful Cloud adoption is Applications Modernization rather than “classic” migration. The logic of Next Generation Cloud as intelligent, programmable network is to focus on cloud-native applications that are able to function with high efficiency, for diverse groups of end users, worldwide, and that do not require a highly customized hosting environment to operate successfully. The most important requirement for Cloud transformation, therefore, is not so much the form of migration undertaken when moving from one hosting environment to another, but a new approach to cloud apps, running on low-cost platforms, and capable of continuous improvement and evolution into the future.

Figure 4 below gives a high level view of how standards-based, fully interoperable solutions, available as “products” off the shelf, can accelerate monetization of Cloud.

Figure 4: this is the NTT DATA “Syntphony” solution family, which brings together horizontal and vertical solutions, plus consulting capability and privileged access to strategic partners as a “package” designed to offer fast development of go to market, profitable offers.

This is a big conceptual change. At the moment, most change processes are unique. They involve taking an organization from Point A to Point B, and each organization is, by definition, not quite like any other. Though they may be moving towards a Target Operating Model that is shared between many users and built from standard components, the journey taken by each individual organization will be unique to them. This is one factor in making migration to Cloud so costly and complex.

In a “classic” change program, in other words, though standard methodologies may be used, the plan itself will be created on a blank sheet of paper, from the ground up, and will be managed with acute attention to detail by a centralized management team.

As we have already seen, the initial business goal of moving to Cloud, which is securing cost reduction, cannot be achieved until migration is complete, if we use traditional methods. Today, however, we see that organizations on the road to Cloud expect to achieve a higher proportion of “quick wins” than in the past, and to cover the costs of transformation (or most of them) from monetization of these rapid breakthroughs.

Using standard packages, it is possible to build complete business platforms and solutions, to customize and then launch them quickly and at very low risk. This is also the key to faster creation and launch of cloud-native applications, leading to rapid unlocking of potential benefits.

Options include, for example, transaction platforms (for financial services companies, retailers and other customer-facing businesses), communication systems to connect existing services and solutions (creating, for example, a “smart city in a box”), and blockchain based tracking systems to build CSR, ePedigree and supply chain solutions.

These and many other options like them enable Cloud-based solutions to start delivering business and cost benefits fast, while reducing the risks involved in building solutions from the ground up.

We are already starting to see rapid implementation of standard platforms and offers, which are technology agnostic; naturally multi-Cloud, so are not tied to any single provider; provide a bedrock of always current best practice standard; and which enable rapid customization and long-term evolution.

This enables large organizations to drive change rapidly and adapt fast to emerging business priorities more effectively than in the past. The net effect of this growing use of standard modules is to provide a “change toolkit” for business leaders, enabling them to transform conventional migration processes into organic, evolutionary developments. Businesses can then capture quick wins, reduce risks, change direction comparatively easily and place business needs front and center of every change activity.

Second Change Element: rethinking human capital

The second major driver for Next Generation Cloud adoption will be development of new business models, with innovation and creativity the key factor. The intelligent networked cloud provides an ideal environment in which creativity (with no boundaries related to time and place, and greater emphasis on ecosystem working) can deliver maximum benefit.

Yet if networked Cloud helps create the opportunity, it is people who need to step up their performance, make best use of the opportunity and deliver new operational models that have a transformational impact on performance.

Using standard packages, it is possible to build complete business platforms and solutions, to customize and then launch them quickly and at very low risk.

Most organizations understand that their pre-Cloud workforce may not include the right blend of talents needed for the post-Cloud world. In the past, business leaders tended to see this need to change their employee profile as a function of alterations in departmental structures.

For example, moving IT infrastructure from on-premise datacenters to virtual datacenters in the Cloud makes it unnecessary to employ certain types of IT expertise in-house. It is comparatively simple to review requirements according to what you need to keep and what you can safely outsource. This has led to major realignments in corporate structures, wholesale redundancies in certain areas and acquisition of new project leadership skills.

Identifying quick wins and identifying priorities is essential, and expert consultancy support can be vital in the early stages of Cloud migration planning. Figure 5 below shows the rapid and highly compressed consulting timeline proposed by NTT DATA for this preparatory work.

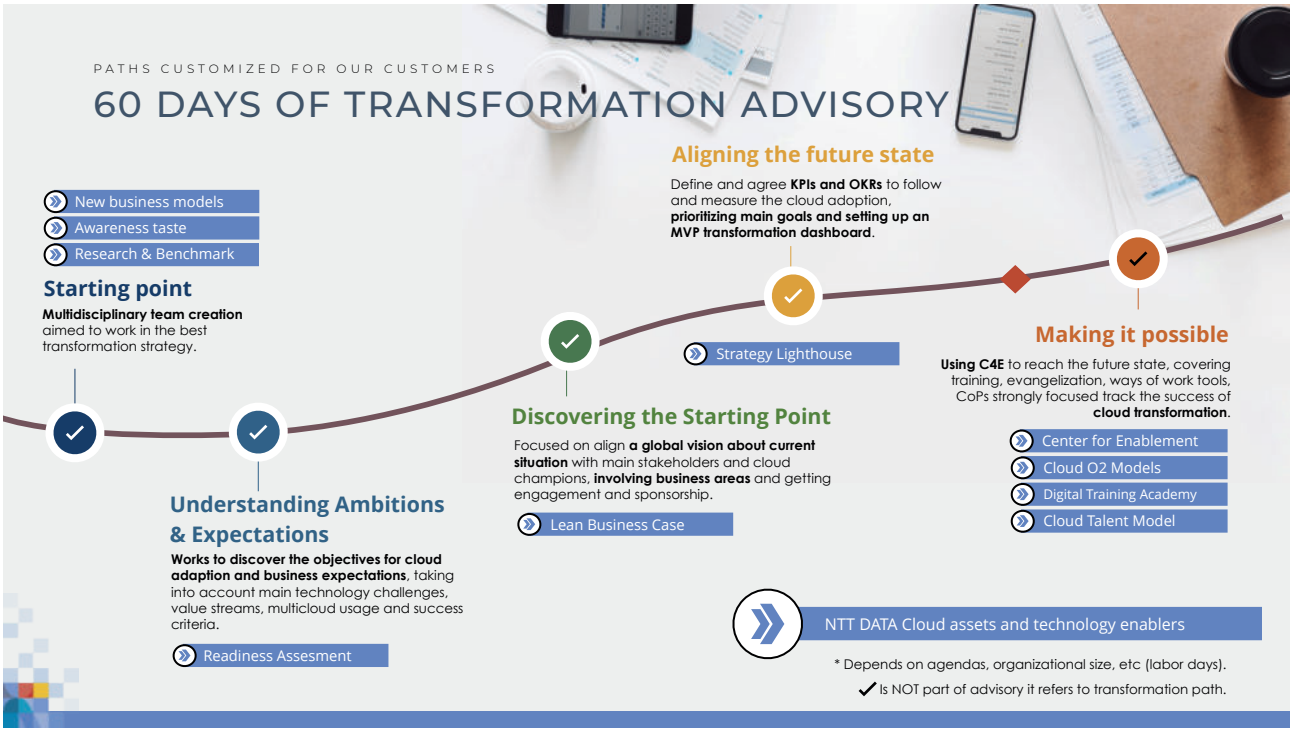


Figure 5: mobilizing all relevant resources to focus on business priorities, as-is status, practical steps and tested, proven strategic plan for migration to Cloud.

Yet there is a fundamental difference between moving “as-is” business to conventional Cloud and the kind of transformation needed to prosper within the emerging intelligent, networked Cloud.

Becoming a “Digital Native” business means needing to employ digital natives in key positions and roles. That leaves many important questions to be answered:

How to attract Digital Native talent? This means, of course, people who are not normally interested in working for large enterprises of any kind.

How to prioritize creativity without compromising professional standards?

How to develop true ecosystems, building the skills needed to mix and match capabilities in a very agile way?

How to build ultra-flexible yet completely secure collaborative, virtual working spaces?

How to manage distributed working, with a combination of central oversight and remote working?

Above all, how to manage the changing dynamic of human and artificial intelligence, including who does what and under which circumstances?

We can start this whole discussion by asking how a traditional organization can attract non-traditional people, but that is not really the correct question. What matters is to make sure that, when you rethink the technology foundations of your business, you devote as much time and effort to rethinking the kind of human community needed to inhabit this new type of organization. Figure 6 below shows some of the key steps we believe are needed to attract and develop the right digital talent.

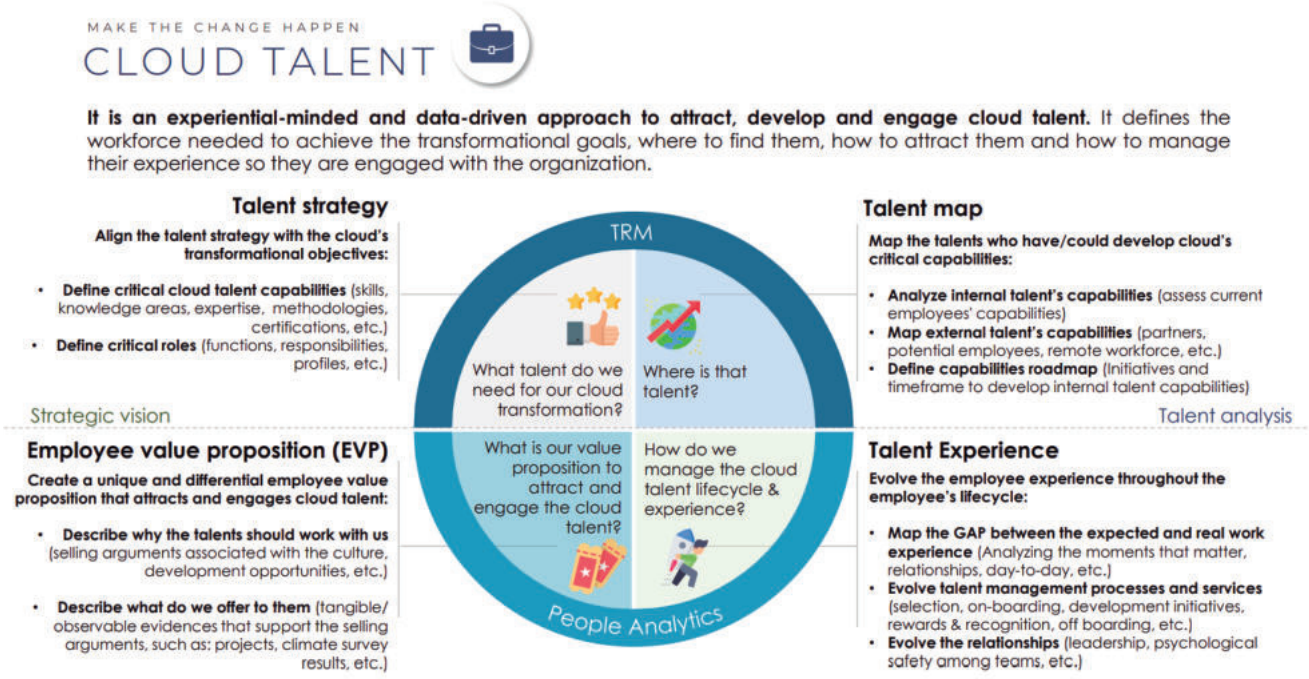


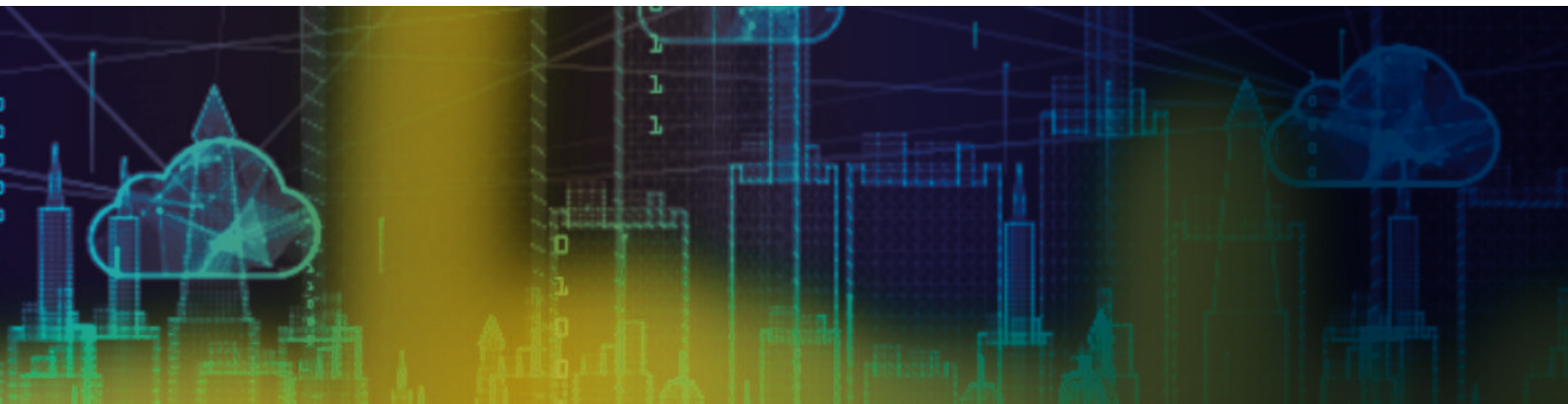
Figure 6: the 4 steps to success with digital talent. Strategy; Mapping Capabilities; Offering an excellent Value Proposition to the right people; delivering a Superior Experience.

How can we summarize the differences between conventional migration to Cloud and unconventional transformation within networked, intelligent Cloud? Our view is this:

Change and migration programs will look very different in the future. They will use more standard components, including off the shelf "products", which can be inhabited and evolved to suit more precise business requirements.

Applications modernization is the single top priority for successful change, and new business models will be needed in order to turn transformational potential into profitable reality here and now.

A new approach to people, informed by a better understanding of how they contribute to change, will also influence future journeys to Cloud. A higher focus on people will make the process more fluid, evolutionary and flexible.



OPPORTUNITIES, CHALLENGES AND ACTIONS

We believe that organizations of every kind need to be as ambitious in their strategic thinking as possible, when they consider what Cloud means for them and how they can continuously evolve within Cloud. Here are some final thoughts to help guide next steps.

Sustainability

The latest IPCC report makes for very difficult reading. For businesses in every sector, it is clear that being sustainable must be their top priority goal. To be sustainable means being greener in every way, making their footprint on the world much lighter. It also means having the capability to evolve, with business models and operational structures that are agile enough to flex and change as conditions develop.

Future Cloud, comprising intelligent, programmable networks, provides a working environment that makes evolutionary change comparatively painless, and that reduces business impact (cutting the need for travel, reducing high carbon transportation through greater localization, enabling geographically distributed, efficient collaboration…).

It is quite possible that the sustainability benefits of Cloud may prove to be its greatest contribution to our future. Businesses of every kind need to develop the ability to think and act flexibly in order to maximize these potential benefits.

Breadth of capabilities

The emerging Cloud we are talking about here, comprising secure connectivity, low latency and distributed working is based on a broad set of capabilities and ambitious strategic thinking. This is not about IT alone but about intelligent networking, so the kind of partnerships required to profit from Cloud must of necessity be as much about networking as data and compute.

NTT DATA is able to combine the exceptional consulting capability of NTT DATA with its own heritage as one of the world's largest telecommunications businesses. This union of strengths brings together leadership in secure networking, proven capability in business consulting, together with a range of advanced technologies that are transforming Cloud (such as 5G for low latency connectivity and XR for added value user interfaces).

NTT DATA can deploy the specific capabilities that are driving emergence of the new, Intelligent, Networked Cloud. This is important, because it is beyond the scope of conventional IT and IT services businesses to deliver a safe and rapid journey to new generation Cloud. We know how to do it because we can seamlessly integrate all of the different technology and business capabilities required.

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What next?

All journeys to Cloud will be different, as they are determined by individual business goals and strategies, and made unique because every organization is different and starts from its own specific position. There is no right and wrong here, no accredited, certified approach and no approved method.

We are at a period of unprecedented fluidity, caused by rapidly converging technologies, extraordinary political and social change, and the emergence of digital native people, who do not see the world, business or their own futures in the same way as their parents did.

There is much that we do not, and cannot know, but there are some factors that we believe will be increasingly important, as businesses develop their roadmaps to the future.

Partnerships

Of course it is important to partner with hyperscalers, but this is not enough in itself. You also need access to networking expertise, cybersecurity excellence and networks of innovation.

People

You need to be more attractive to creative, digital native individuals and teams, including smart start-ups, who have an intuitive “feel” for how Cloud enables agile and flexible partnering. One of the key questions in the future is are you seen as a good place for digital natives to work?

Evolution

Traditional migrations have a beginning, middle and end, and are capable of measurement according to set criteria. This is different. We are setting out on an evolutionary path that has no end point. You need to be prepared for that.

OUR CONCLUSION?

Successful businesses in the emerging networked Cloud will become more and more digital native in everything they do. That may be quite a culture shock for many of them. We will help you get over the difficult early stages and learn, not just to gain competitive advantage, but to enjoy the process, as well.