



Executive insight paper

Commissioned by



and



Fast-Track to Enterprise Cloud

Integrated platforms as a
route to digital readiness

Freeform Dynamics, 2020

IT under more pressure than ever

The accumulation of multiple types and generations of technology over the years, all interconnected with a complex set of dependencies, makes keeping up with rapidly evolving business needs and expectations very difficult.

The industry in which your business operates is undoubtedly changing, and likely significantly quicker than at any time over the last few decades. Whether you call it ‘digital transformation’, ‘digitalization’, or use some other term, we are at a point in history where the use of advanced technology and communications to radically transform the way companies and markets work has reached a tipping point.

Pervasive networks and devices, and associated cultural and behavioural changes, mean you can now design business and engagement models on the assumption that almost everyone is connected and happy to interact and transact electronically. At the same time, cloud computing in its many forms has lowered the cost, resource and skills hurdles to adoption of advanced platform and application capabilities.

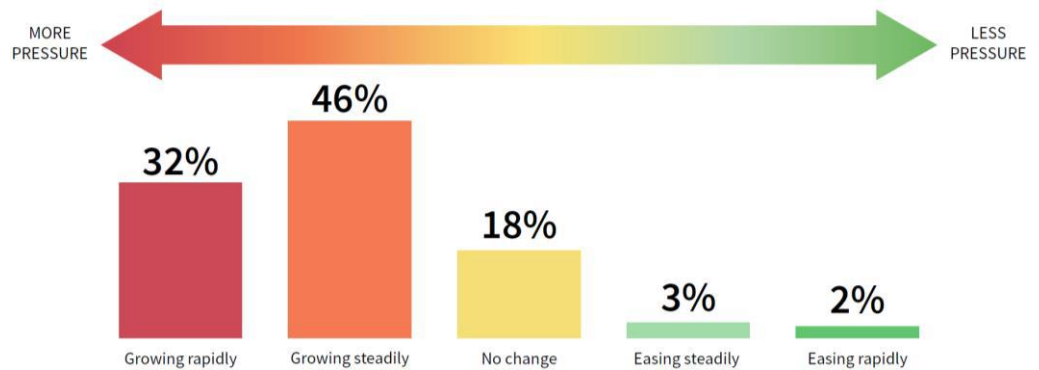
If you are part of a start-up, or have the luxury of otherwise working on a discrete, greenfield digital initiative, all of this is clearly music to your ears. Make the right decisions, and you have everything you need to move the business forward quickly and cost effectively, and to maintain ongoing agility and efficiency thereafter.

Things are often very different, however, if you work in an established IT environment. The accumulation of multiple types and generations of technology over the years, all interconnected with a complex set of dependencies, makes keeping up with rapidly evolving business needs and expectations very difficult. Not surprising, then, that the large majority of IT leaders say the pressure is mounting (Figure 1).

Figure 1

How is pressure on your IT infrastructure and operational processes trending, e.g. in relation to changing business demands and expectations?

Source: Freeform Dynamics¹⁴
Based on in-depth telephone interviews with 156 senior IT professionals



Against the backdrop of an increasingly dynamic digital world, the picture we see here sets the scene for our discussion in this document about the role of modern platforms. In particular, we will explore how the latest platform technologies can enable much needed transformation within IT operations, not just to ease the pressure and enable better service delivery, but also to allow IT teams to play a much more proactive and positive part in driving the organization’s digital agenda.

Along the way, we will be looking at a real-life solution example from the sponsors of this paper - Fujitsu and Nutanix. While nothing we say should be interpreted as an endorsement or recommendation, talking around a specific offering like this enables us to move beyond the theory, and illustrate how some of the key principles translate to practical reality.

Before getting too deeply into platforms and architectures, however, let’s focus our minds by reviewing relevant challenges and objectives in a more precise manner. A useful umbrella for this is the notion of ‘digital readiness’.

The latest platform technologies can enable much needed transformation within IT operations.

Stakeholders frequently express a strong desire to get IT off the critical path to implementing change.

True flexibility and responsiveness, and ultimately digital readiness, can only be achieved if agility is enabled throughout the delivery cycle, including within operations.

The complexity of the core infrastructure, with many dependencies between servers, storage devices, network equipment, platform software and applications, means there is usually no single way of doing anything.

Digital readiness

Looked at through a business lens, cost control and quality of service have historically been the primary points of focus. Today, however, stakeholders are at least as likely to highlight speed of delivery, frequently expressing a strong desire to get IT off the critical path to implementing change. No one likes waiting for IT to deliver before they can go live with their latest digital initiative. Neither do they want to wait days, let alone weeks, to have a simple change implemented in response to customer feedback or a new competitive threat. You could argue that this has always been the case, but the responsiveness imperative moves from desirable to essential in a digital context.

Agile from end-to-end

Looked at through an IT lens, these dynamics point to a need for agility. If you develop software in-house, 'agile methods' represent one part of the equation. But unless the infrastructure upon which the application runs is change-friendly, you just shift the change-bottleneck downstream. The same can be said of operational processes, which represent another pinch-point in terms of getting things done.

Considered at a strategic level, true flexibility and responsiveness, and ultimately digital readiness, can only be achieved if agility is enabled throughout the delivery cycle. This means putting at least as much emphasis on 'agile operations' as you might have done on agile development, while at the same time not losing sight of the more familiar requirements for robustness, security, efficiency and scalability.

The typical starting point

In order to enhance agility within IT operations, we first need to be clear on what typically impedes flexibility and responsiveness at the moment. An important clue here is the considerable time IT staff currently spend on routine ops activities. In a recent Freeform Dynamics study^[1], for example, 73% of participants highlighted the issue of having to dedicate so much time to infrastructure or platform admin, with 80% calling out the application management-level burden.

So why are these numbers so high? Well, whether it's rolling out new applications, dealing with day-to-day change management, or performing general housekeeping and administration, there are a couple of obvious causes:

- The complexity of the core infrastructure, with many dependencies between servers, storage devices, network equipment, platform software and applications, means there is usually no single way of doing anything. There's a lack of repeatability and predictability, and a heavy reliance on IT staff having to understand and deal with the peculiarities of individual application stacks.
- Operations staff are often relying on manual processes, home-grown scripts and/or a fragmented and disjointed set of systems management tools. With a separate approach, and range of utilities, often required to deal with equivalent infrastructure components from different manufacturers, another dimension of complexity and inconsistency exists at a system infrastructure level.

Beyond consuming the time of IT teams, it's easy to make mistakes working in such an environment. This creates even more work to remediate problems, as well as risking delays, outages and other issues that negatively impact service levels.

Why not just introduce more automation?

Even if you replace manual processes with automated ones, at one level or another you are still explicitly managing lots of individual components and dependencies.

In response to some of the challenges we have discussed, you could simply automate more of your existing operational processes. There are lots of IT vendors who will sell you tools to do this, plus a whole range of open source options.

The trouble is that you often still end up with silos - one set of tools to automate storage management, another for servers, and so on, not to mention manufacturer specific solutions, and overarching orchestration tools to tie it all together. Despite management tool vendors striving to deliver 'single pane of glass' administration across complex, heterogeneous environments, so far, they have fallen short of this objective. The best that can usually be achieved is a better-integrated 'tool-chain'.

Most importantly when considering tool-chains of point solutions, however, is the fact that it's arguably just working around infrastructure complexity, rather than tackling this underlying cause of inefficiency, fragility and inflexibility head on. Even if you replace manual processes with automated ones, at one level or another you are still explicitly managing lots of individual components and dependencies.

Of course, this might be the best you can do for much of your infrastructure and application estate, as you clearly can't rip and replace a lot of what's in place at the moment. But for the systems and solutions that underpin your digital transformation agenda – which will include some new and some existing applications – traditional approaches to designing and managing infrastructure and application platforms are fundamentally inadequate, no matter how much automation you throw into the mix.

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Think simplification, think cloud

If you really want to achieve a state of digital readiness within IT operations, it helps to redefine the goal from a platform perspective as one of 'simplification'.

The first requirement here is to break some old habits. Rather than continue to build tailored, dedicated stacks to support individual applications, start thinking in terms of constructing a general-purpose platform that can serve the needs of multiple applications and workloads in a dynamic, flexible and scalable manner.

If that sounds a bit like the platforms offered by cloud service providers, that's no coincidence. Indeed, what we are talking about is the idea of putting your own private cloud infrastructure in place to deliver a similar level of simplicity, flexibility, and convenience, and in turn allow you to focus on what really matters – the applications themselves that deliver value to the business.

The principles that are important here include:

- **Software defined:** Let software take control of individual server, storage and other components, and manage how they work together. The idea is that most aspects of physical infrastructure and resource management will take place automatically under a virtual abstraction layer according to policies you set.
- **Hyper-converged:** Look for systems that distribute work and spread/replicate data across a cluster of 'nodes' that each contains compute, storage and networking capacity. In a mixed-workload environment, this enables consistent performance and better data protection, at the same time reducing complexity.

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Experience with public cloud has stimulated more interest in creating similar environments on-premise.

- **Linear scalability:** Enabled by distributed architectures such as hyper-converged, capacity growth is achieved via a building block approach. The aim is for smooth and predictable scalability, without a significant overhead penalty as you add more nodes into individual racks, or more racks into the overall system.
- **Open and versatile:** Applications vary in terms of their stack and resource requirements, so build a platform that’s open in relation to hypervisors, operating systems, hooks into other systems, etc, and that can cope with the needs of a dynamic and ever-changing set of workloads, while preserving quality of service.
- **Robust and resilient:** The objective is a single platform that enables simplicity and agility across a range of workloads, including business critical applications. As the impact of a failure (compared to a dedicated stack) is much broader, robustness and resilience need to be baked-in at every level, right down to the hardware.
- **Supported as a solution:** If the quest is for simplicity, it arguably defeats the object if you buy the pieces you need separately and build and maintain the environment yourself. In most cases, it will make more sense to acquire your ‘building blocks’ as pre-integrated, fully supported units from a single supplier.

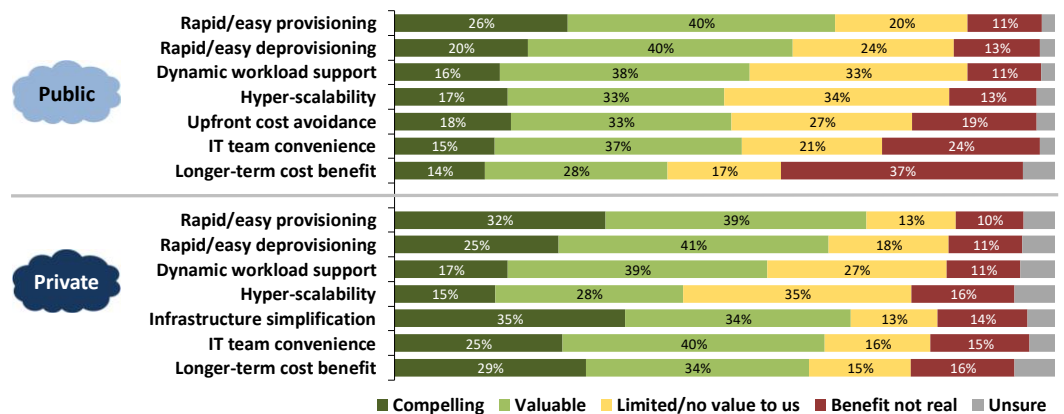
Before looking at how some of these principles translate into practical solutions, let’s address a likely elephant in the room – the question of whether the rise of public cloud is rendering the private cloud discussion moot.

Public vs Private Cloud

We are not going to spend long on this as a huge amount has been written on the topic of public vs private cloud. Suffice it to say that for the purposes of our discussion here, the short answer is that, if anything, experience with public cloud has stimulated more interest in creating similar environments on-premise. Here, for example, are some findings from a recent research study^[2] which summarize perceptions in this area in relation to key considerations (Figure 2).

Figure 2
How would you sum up the following commonly cited benefits (or potential benefits) of cloud options in the context of your business?

Source: Freeform Dynamics^[2]
Survey of 668 senior IT professionals



Other Freeform Dynamics research has consistently corroborated the view we see here. Another recent study^[3], for example, told us that organizations within which IT supports the business particularly well tend to prioritize data center modernization much more than others, with private cloud firmly on the agenda.

If we were to sum up what we are hearing from those involved in IT planning and decision-making, it’s that public cloud has a lot to offer, but it’s not a panacea^[4], and when it comes to long-term cost benefit, the private option is often more attractive.

Public cloud has a lot to offer, but it’s not a panacea.

Putting the principles into practice

“PRIMEFLEX for Nutanix Enterprise Cloud”, is an example of a pre-integrated cloud stack, which has been brought to market by Fujitsu.

In recognition of the importance of private cloud, many mainstream vendors are now delivering solutions in this space. One of these is an offering known as “PRIMEFLEX for Nutanix Enterprise Cloud”, which is a pre-integrated cloud stack brought to market by Fujitsu.

As the name suggests, the product incorporates software from Nutanix, running on Fujitsu’s premium family of integrated x86 server-based hardware products that go by the name “PRIMERGY”. Let’s take a closer look at each part of the solution in turn, and see how their capabilities map onto the six key principles highlighted earlier.

Nutanix ‘Enterprise Cloud Platform’

Key to the Nutanix proposition is the notion of making infrastructure invisible. This refers to the way in which the Nutanix platform takes care of everything concerned with detailed provisioning, configuration, management, and optimization of physical system components under the covers. It’s an example of a platform that hides everything beneath a virtual abstraction layer in the way we previously described.

Key to the Nutanix proposition is the notion of making infrastructure invisible.

The platform actually has its roots in the company’s initial entry onto the market as a hyper-converged infrastructure vendor. Early incarnations of the Nutanix technology put the emphasis on scale-out, software-defined compute and storage, in which the server and networking elements were a convenient means to an end. As customer demands evolved, however, Nutanix was able to build on its sound, early architectural decisions to more directly surface the virtualization as well as the management element to enable the creation of full-blown private clouds.

If you are still unsure of how this architecture differs from the usual virtual server or virtual storage environment, the clue is in the term ‘native convergence’, which Nutanix uses in its mission statement. In the following schematic, the difference is clear between a traditional virtualization stack, in which individual devices are still the concern of the operator, and the ‘black box’ approach used by Nutanix (Figure 3).

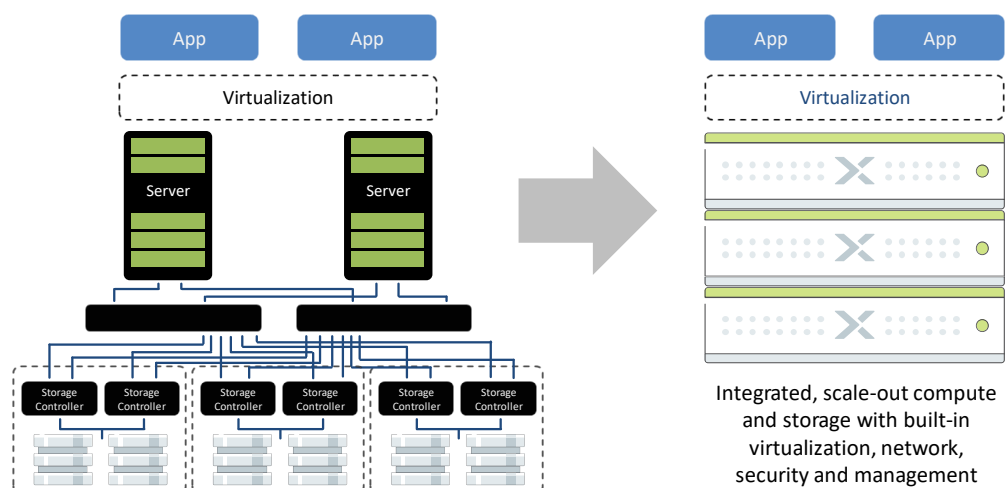


Figure 3
From traditional virtualization stacks to a scale-out converged architecture approach

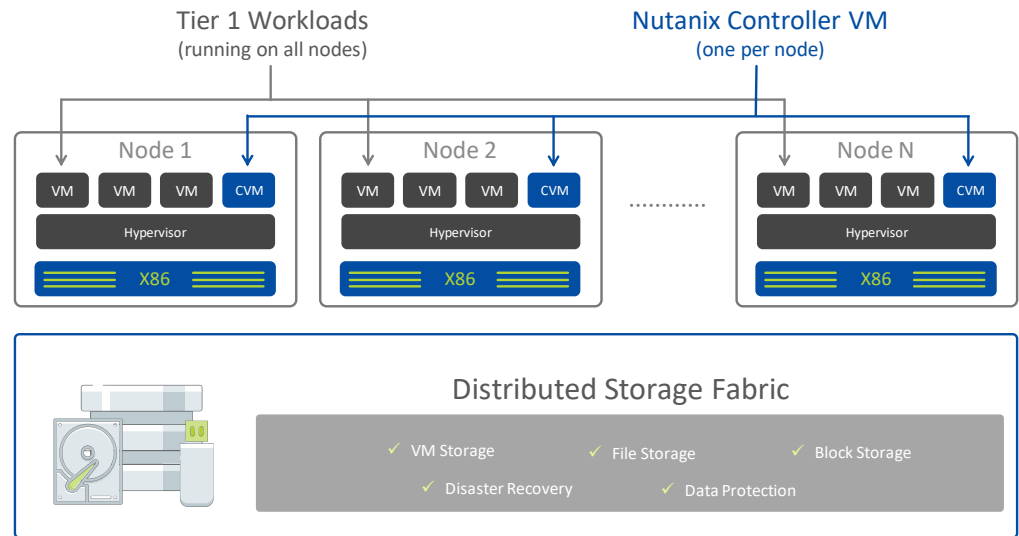
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Of course, like all solutions that take something inherently complex and difficult, and make it look easy, there’s a lot going on behind the scenes, and those simple building blocks hide an extremely sophisticated, flexible and robust set of capabilities. It is beyond the scope of this document to go into much technical detail, but a quick look

at the anatomy of 'Acropolis', the Nutanix hyper-converged, scale-out execution environment, provides a feel for what's going on (Figure 4).

Figure 4
The Nutanix Acropolis
Scale-out execution
environment

Reproduced with the
permission of Nutanix



As with most scale-out environments, we can see the concept of nodes that do the work in a distributed, collaborative manner, with run-time execution coordinated and continually optimized by node-resident controllers. Data is dynamically distributed and cloned across the cluster to optimize storage and retrieval, and to prevent data loss. And in terms of resilience, the whole cluster is 'self-healing', meaning that it will failover at a component level and rebalance with no interruption in service.

From an operations perspective, one of the most significant attributes of the Acropolis architecture is the concept of automated discovery and integration of resources into the cluster. When a new node (or block of nodes) is added, the system takes care of how the new capacity is configured and exploited with no manual intervention. One way to think of this is Nutanix simply asking you to give it access to a resource 'pool', then it takes whatever you put into that pool and makes sure it is optimally deployed.

In addition to these core capabilities, Nutanix Acropolis offers a range of additional attributes to enable flexibility and open integration. These include:

- Hypervisor choice, with support for Microsoft Hyper-V and VMware vSphere, as well as the Nutanix AHV native hypervisor, with one-click hypervisor conversion.
- Stateless container support and VM migration capability (including to/from public clouds) to facilitate agility at an application and workload management level.
- Comprehensive storage options, including VM image management and hooks into public cloud services to support remote backup and enhanced DR scenarios.

This list is far from exhaustive, but it provides a flavor of the enterprise class nature of Acropolis, which in turn is augmented by advanced management, orchestration and analytics functionality delivered via Prism, the other main solution in the Nutanix 'Enterprise Cloud' portfolio. Beyond infrastructure management that cuts right across compute, storage, networking and security, Prism provides application-centric modelling to support the deployment process, and has an inbuilt application catalogue to assist with higher level planning and management on an ongoing basis. A customizable console and dashboard then allows rich policy driven administration and monitoring of the whole environment.

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One of the most significant attributes of the Nutanix Acropolis architecture is the concept of automated discovery and integration of resources into the cluster.

For serious enterprise requirements, the need is for hardware solutions that have been designed to meet the requirements of specific use cases and deployment scenarios.

More recently Nutanix announced its new 'Calm' application lifecycle management and cloud orchestration software. Calm simplifies the set-up and management of custom enterprise applications by incorporating all elements of each app, including relevant VMs, configurations and related binaries, into an easy-to-use-blueprint that is managed by the infrastructure team. By making the deployment and lifecycle management of common applications both automated and easily repeatable, it's possible to speed delivery times, and achieve a significant reduction in operational overhead, cost and risk.

Fujitsu PRIMERGY

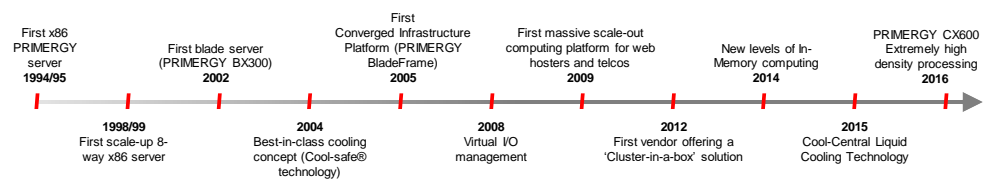
There's a common misconception that private cloud software environments relegate hardware to the status of commodity. If you are serious about robustness, resilience, manageability, performance, and cost of ownership over the longer term, however, not to mention keeping the level of operational overhead and distraction to a minimum, then you need your enterprise cloud to sit on enterprise-class hardware.

Fujitsu's PRIMERGY line of server-based hardware solutions leverage the company's decades of experience building, delivering and supporting data center solutions to enable the most mission-critical of applications. As an early mover in the x86 server space, Fujitsu claims that its latest x86 PRIMERGY solutions build on a track record of 'firsts' in this arena (Figure 5).

Figure 5

Fujitsu's track record in x86 server computing

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We have shown this lineage not to promote Fujitsu's prowess, but to illustrate that x86 server design is not simply about throwing the latest chipsets, storage and networking technologies into a system and pushing it out onto the market. For serious enterprise requirements, the need is for hardware solutions that have been designed to meet the requirements of specific use cases and deployment scenarios.

The construction of a cost-effective, general-purpose computing environment such as an enterprise cloud platform is one such use case. With this in mind, the x86 solution that underpins PRIMEFLEX for Nutanix Enterprise Cloud has the following attributes:

- **Flexible scalability:** With a modular, scalable design, and availability of combined compute and storage nodes, systems can start small and grow smoothly in line with business requirements in a hyper-converged/cloud platform context.
- **Low energy, low heat:** Two key attributes of genuine enterprise-class x86 servers are power efficiency and effective heat management. Direct energy consumption costs are significantly reduced, as are the often-considerable costs of cooling.
- **Fail-safe and reliable operation:** Fujitsu claims 99.997% availability for even its entry-level systems, enabled by high-manufacturing standards, redundant hot-pluggable components, and remote monitoring with pre-emptive remediation.
- **Usability and serviceability:** Often overlooked, but key for ongoing maintenance is the ease with which systems can be physically assessed and worked on. Things like clear front panel indicators and screw-less component removal really matter.

Fujitsu’s ServerView complements the higher-level orchestration and management capabilities of Nutanix Prism and Calm.

All PRIMERGY set-ups are delivered with Fujitsu’s system-level management environment known as ‘ServerView’. This complements the higher-level orchestration and management capabilities of Nutanix Prism and Calm by allowing direct hardware administration, e.g. in relation to patching, power management, physical resource configuration, etc. By hooking into the ‘Integrated Remote Management Controller’ embedded in PRIMERGY servers, ServerView can also be used to monitor and manage the health of server components, e.g. via pre-failure detection and analysis functions.

The above illustrates well what ‘enterprise class’ means in relation to x86 servers.

Pulling it all together

When it comes to solutions intended to perform effectively and efficiently over the longer term, growing and flexing along the way as requirements evolve, it’s not just about the technology but also how it is delivered. This is particularly true if you are driving for simplification and digital readiness as previously discussed, and it’s where suppliers with a broad set of capabilities and the right mindset come into their own.

Fujitsu is a good example of this. Despite its aforementioned technology prowess, it is first and foremost a customer-focused solutions and services company. From running mission-critical infrastructure for large enterprises, to working intimately with clients on highly-differentiating digital initiatives, Fujitsu has accumulated deep insights into all aspects of enterprise IT delivery over many decades.

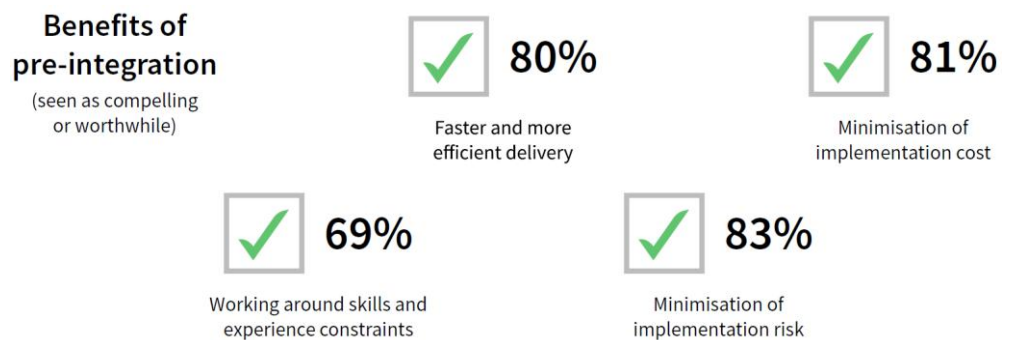
The PRIMEFLEX for Nutanix Enterprise Cloud offering represents the coming together of this kind of hard-core enterprise heritage with the value of an innovative specialist software player like Nutanix, all backed by cutting-edge hardware solutions. The end result is a proposition which can take the customer from initial requirements analysis, through scoping and sizing, to delivery of a pre-integrated solution designed to fast-track them to enterprise cloud, and support them on their journey thereafter. And from what we hear, this appears to be the right approach at the right time (Figure 6).

The PRIMEFLEX for Nutanix Enterprise Cloud offering represents the coming together of a hard-core enterprise heritage with the value of an innovative specialist software player.

Figure 6

Pre-integrated solutions are acknowledged as delivering value in a number of key areas

Source: Freeform Dynamics^[1] Survey of 156 senior IT pros



We can’t talk pricing and contract terms here in relation to PRIMEFLEX for Nutanix Enterprise Cloud, but what we can say is that Fujitsu is pretty flexible in how it works with clients from a commercial perspective. It is geared up to provide pay-as-you-grow options if that’s what you need, and/or even to host your enterprise cloud in a secure and dedicated manner in one of its data centers, then deliver it back to you as a service. Whatever the acquisition or consumption model used, Fujitsu can provide global world-class support, and also make available as much or as little as you need in terms of assessment, planning, design, integration and migration services.

As we said at the outset, nothing in this paper should be taken as Freeform Dynamics recommending or endorsing any particular supplier or solution. Indeed, both Fujitsu

Fujitsu offers global world-class support, and a range of assessment, planning, design, integration and migration services.

The thinking behind the joint proposition aligns well with what we are hearing from IT leaders, architects and data center operations specialists.

and Nutanix would be wary of positioning PRIMEFLEX for Nutanix Enterprise Cloud as the universal answer for every situation - they each work with other partners in the hyper-converged and cloud arenas, and understand that things like existing customer investments and skill-bases will impact decisions. Nevertheless, we can confirm that the thinking behind the joint proposition we have been discussing aligns well with what we are hearing from IT leaders, architects and data center operations specialists.

With that, we hope that our discussion in this paper has illustrated how enterprise cloud solutions are now very accessible and have a clear role to play in the quest for digital readiness within your own IT organization.

References and further reading

The following reports are available free of charge from www.freeformdynamics.com:

- 1. The Impact of Automation on IT Operations**
Are you ready for the software-defined datacentre?
- 2. The Enterprise Cloud Imperative**
Time to shake things up a bit?
- 3. Application Platforms Matter**
But how do you take the pain out of designing and building optimised systems?
- 4. Managing Cloud Complexity**
The emerging role of converged services

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About Nutanix

Nutanix makes infrastructure invisible, elevating IT to focus on the applications and services that power their business. The Nutanix enterprise cloud platform leverages web-scale engineering and consumer-grade design to natively converge compute, virtualization and storage into a resilient, software-defined solution with rich machine intelligence. The result is predictable performance, cloud-like infrastructure consumption, robust security, and seamless application mobility for a broad range of enterprise applications.

Learn more at www.nutanix.com or follow us on Twitter @nutanix.

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Under the theme Business Centric Data Center, Fujitsu provides servers, storage systems, data protection appliances, converged and hyper-converged integrated systems. For more information, please see:

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