White Paper

Workload and TCO Considerations When Choosing Between Public, Private, and Hybrid Cloud

Sponsored by: Nutanix

Eric Sheppard Paul Maguranis
May 2021

IDC OPINION

The pace and complexity at which businesses must operate in today's world are increasing at an unforgiving rate. Companies of all sizes are being forced to rethink the products they bring to market, how to compete in a world with a changing set of competitors, and how to reach an expanding set of customers. Most organizations understand that the degree to which they can thrive during these dynamic times will be determined by their ability to leverage large volumes of real-time data to support critical business decisions. This has placed increased demands on IT teams to deliver new and enhanced services in order to support today's imperative business goals.

With these in mind, IT teams around the world are transforming datacenter operations (including people, processes, and organizational roles) and shifting infrastructure investments toward highly automated solutions to better focus on application-centric (rather than infrastructure-centric) decisions. For most of these organizations, this means increased adoption of cloud technologies and cloud-centric operating models. This transformation also requires support for a hybrid cloud, and possibly even multicloud, environment that allows IT operations teams to decide the type and location of the infrastructure required (e.g., off-premises public cloud, on-premises private cloud, a truly hybrid cloud, or traditional/legacy infrastructure) based on the need of the workloads rather than the infrastructure deployed or the team's skill set.

IN THIS WHITE PAPER

This IDC White Paper offers important considerations related to the types of infrastructure deployed (cloud versus traditional) and the deployment location of the infrastructure (on premises versus off premises) to support today's enterprise applications, databases, and other workloads. This IDC White Paper also compares the five-year total cost of ownership (TCO) related to the type and location of the infrastructure required to run a predetermined set of enterprise workloads.

May 2021, IDC #US47650221

SITUATION OVERVIEW

Important Considerations When Choosing a Cloud Platform

While the Total Cost of Ownership Results section discusses capex and opex costs that are common across all of infrastructure solutions (public cloud, private cloud, hybrid cloud, or traditional datacenter infrastructure), there are additional considerations worth reviewing for those that have made the decision to move to a cloud environment. These considerations include:

- Determining whether to retain or retire legacy workloads
- Availability of required cloud skill sets
- How best to migrate a workload to a cloud platform
- How easy is it to connect on-prem environment to public cloud

Retaining or Retiring a Legacy Workload

Organizations moving to a private or public cloud platform will, at some point, need to consider the stage of a workload's life cycle and the value to be attained by moving each workload to the cloud. Undoubtedly, this exercise will uncover workloads that may not be a good fit for public or private cloud platforms. When this happens, a decision should be made whether to retain or retire such workloads:

- **Retain:** Workloads that are valuable to the organization but lack support for cloud-based alternatives, or cannot be migrated to the cloud economically, should be retained. In this case, workloads would remain on existing platforms or be migrated to a traditional infrastructure platform. Examples could include some mainframe or Unix-based applications.
- **Retire:** It might make sense to retire some applications upon finding a better private or public cloud-based alternative or because of discontinued support from the vendor.

Cloud Skill Set Availability

Cloud skill set availability refers to the extent to which the organization has readily available access to the skills needed to develop, deploy, and operate applications in the public cloud. This may not necessarily be through internal staff but through a combination of internal skills and services partners. The level of cloud skills an organization has access to will determine the degree to which it can leverage public cloud resources. For organizations with limited cloud skills, it may make sense to start by leveraging public cloud platforms as a data protection target for traditional infrastructure. Skills required to modernize infrastructure to a private cloud platform may not be as difficult to acquire or may actually be fewer in number due to automation, consolidation, and self-service that can be a part of private clouds.

Cloud Migration Considerations

This section provides an overview of the broad paths that organizations can take when migrating workloads to a cloud platform. These migration paths vary in complexity, cost, risk, and benefit. While these are very important considerations, it can be difficult to provide a standardized cost due to a high degree of variability. As such, IDC has excluded cloud migration from the Total Cost of Ownership Results section of this paper. The paths to migrating existing workloads to a cloud platform are rehosting, refactoring, re-architecting, and replacing. An overview of each follows:

- **Rehosting.** For workloads that are monolithic and self-contained, with tight coupling between compute and data, consider rehosting the workloads to cloud-based infrastructure. Rehosting,

commonly referred to as the "lift and shift" of workloads, is the easiest way to migrate workloads from traditional infrastructure to cloud-based infrastructure. Most of technology suppliers offering a cloud platform also offer tools and services to rehost workloads easily. The key consideration here is that the rehosted application is not re-architected in any way when moved to a cloud platform.

- **Refactoring.** For workloads that have a relatively higher level of internal decoupling and modularity (such as a dedicated component for data management and storage), refactoring provides an easy path to a cloud platform and to leverage services that are easily consumable from within that cloud platform. For example, workloads can change their internal data store to leverage a cloud-based database-as-a-service offering, immediately making the data store more easily scalable. Workloads such as content applications and structured/unstructured data analytics are typically good candidates for this type of migration. Refactoring could also include moving parts of a workload from a siloed SAN-based infrastructure solution or file storage to an hyperconverged infrastructure–based private cloud. This could allow users to attain the full benefits of a private cloud while keeping infrastructure on premises. Whether it's public or private clouds, refactoring workloads constitute a popular method of application modernization. It also provides an opportunity to migrate specific components of workloads to a public or private cloud platform instead of migrating the entire application. Importantly, refactored workloads continue to function in exactly the same manner as before.
- **Re-architecting.** For loosely coupled and highly modular workloads, organizations can consider redesigning the workloads into more distributed, cloud-native applications by following cloud-native design paradigms and microservices-based architectures. Cloud-native applications are distributed and more fault-tolerant and consist of a collection of smaller services that typically allows a scale-out approach to deal with growth. Re-architecting a workload is an important aspect of application modernization. With innovations in containerization and serverless technologies and the proliferation of open source–based tools, application modernization enables developers to convert traditional, monolithic applications into cloud-native applications. Re-architecting workloads also opens opportunities to invest in more agile application development/delivery processes. As discussed previously, the re-architecting of applications and operations of cloud-native applications requires a certain level of skill sets and familiarity with cloud-native approaches. These are often the gating factors to the adoption of a re-architect path for the initial migration into a cloud platform. One of two patterns seen among early adopters is to leverage on-premises private clouds that can holistically support a mix of cloud-native and virtualized workloads on a unified platform. The second pattern seen would be to initially move workloads to a cloud platform with minimal or no changes, followed by a gradual in-place re-architecting of the workloads once it is successfully running in the public cloud.
- **Replacing.** In this path, the application is replaced with an equivalent SaaS offering with similar capabilities. Examples include the migration from an on-premises, hosted email server to an Office 365–delivered exchange. In all other migration paths, aside from replacement, the user is responsible for managing the application after migration. In the case of replacing a workload with a SaaS-based offering, the end user is relieved from the responsibility of managing both the application and the supporting infrastructure.

COMPARING TOTAL COST OF OWNERSHIP FOR EACH TYPE OF INFRASTRUCTURE

Infrastructure Solutions Compared

This section of the paper focuses on providing a five-year total cost of ownership for four types of infrastructure solutions that encompass public cloud platforms, private cloud platforms, hybrid (public and private) cloud platforms, and traditional/noncloud enterprise infrastructure.

Specifically, the five-year TCO is calculated for each of the following four types of solutions:

- Private cloud built on Nutanix Cloud Platform (own datacenter or colocation)
- Hybrid cloud architecture built using the Nutanix Cloud Platform running both private cloud and public cloud infrastructure resources
- Native public cloud infrastructure resources built using an average of multiple public cloud solutions
- Traditional on-premises virtualized server and shared storage solutions (aka three-tier infrastructure)

Enterprise Applications Compared

Each solution type listed previously was configured to meet typical resource and service-level requirements of three enterprise application environments that make up a representative IT department for an organization:

- 340 virtual machines (VMs) running general business applications and databases broken down as follows:
  - 203x small VMs (60%): 4vCPU, 8GB memory, and 60GB storage
  - 102x medium-sized VMs (30%): 8vCPU, 16GB memory, and 240GB storage
  - 24x large VMs (7%): 16vCPU, 32GB memory, and 1.2TB storage
  - 11x extra-large VMs (3%): 16vCPU, 64GB memory, and 1.2TB storage
  - 20TB of file-based shared storage
- 750 persistent virtual desktops:
  - All desktops supporting full-time users
  - Resources allocated per user/desktop: 2vCPU, 4GB memory, and 30GB storage
- 750 seasonal virtual desktops:
  - Desktops running only 30% of the year
  - Resources allocated per user/desktop: 2vCPU, 4GB memory, and 30GB storage
- Additional assumptions made for all scenarios:
  - On-demand prices used for public cloud resources and support fees
  - Infrastructure hardware and accompanied support based on list prices
  - Infrastructure software based on list prices for licenses, maintenance, and subscriptions
  - Infrastructure software including hypervisors, management, and orchestration software
  - Costs of applications and operating systems assumed comparable and excluded for all scenarios

    - Hardware deployment and support services included for Nutanix and three-tier infrastructure
    - Initial infrastructure resources scaled during the five years to support growth
- All scenarios include the following costs:
    - Infrastructure hardware, software, support, and services as outlined previously
    - Facilities, power, cooling, and full-time employees required to manage the hardware (as required)
- TCO results shown in the document are split between persistent and variable workloads:
    - Persistent workloads, represent the 340 business apps and the 750 persistent virtual desktops
    - Variable workloads, represent the 750 seasonal virtual desktops

Total Cost of Ownership Results

Private Cloud on Nutanix Cloud Platform

IDC configured and priced this private cloud environment based on the following Nutanix infrastructure:

- **Infrastructure supporting general business applications:**
    - 9x NX-8055-G7 Nutanix 2U appliances
    - 2x Intel Xeon Gold 5220R 24C CPUs (per appliance)
    - 12x 64GB memory modules (per appliance)
    - 6x 3.84TB SATA SSDs (per appliance)
    - 1x dual 10GbE SFP+
    - Nutanix AOS and Prism Pro software subscriptions
    - Deployment services and hardware support
- **Infrastructure supporting persistent VDI users:**
    - 5x NX-3060-G7
    - 2x Intel Xeon Gold 5218R 20C processors (per appliance)
    - 16x 64GB memory modules (per appliance)
    - 2x 1.92TB SATA SSDs (per appliance)
    - 1x dual 10GbE SFP+
    - Nutanix AOS and Prism Pro software subscriptions
    - Deployment services and hardware support
- **Infrastructure supporting seasonal VDI users:**
    - Seasonal cluster is configured identically to the persistent VDI cluster
    - This cluster is in use only 30% of the year; cluster available for other workloads during 70% of the year

Overview of Nutanix Private Cloud TCO Findings

Table 1 shows the five-year TCO results for the on-premises (datacenter or collocated) private cloud solution built on Nutanix as configured. Results are itemized by category of resources. Results are also shown split between persistent versus variable workloads as defined previously. Total five-year cost of

ownership for the Nutanix private cloud solution was $5,738,864, with 74.3% of the resource costs attributable to persistent workloads. The bulk (89.5%) of total costs comes from infrastructure software, which is where most of the solution's value resides. Hardware accounts for just 6.7% of total costs, which is a clear indication of the value of moving toward a scale-out, software-defined solution that leverages commodity x86 servers as the hardware building blocks. Costs related to supplier support and services, plus the costs related to facilities, power, cooling, and managing the infrastructure (in-house labor) accounted for just 3.8% of the five-year TCO. This amount is considerably lower than the comparable costs associated with three-tier infrastructure solutions (shown later in this section). This is an important comparison as it is consistent with multiple IDC business value studies conducted in recent years. Indeed, *Organizations Leverage Nutanix Enterprise Cloud as Scalable, High-Performing, and Cost-Effective Infrastructure Foundation* (IDC #US45666419, January 2020) found private clouds using Nutanix solutions, on average, reduce cost of operations by 62% when compared with traditional three-tier infrastructure solutions.

TABLE 1

Private Cloud on Nutanix Cloud Platform ($)

Resources	Persistent	Variable	Five-Year TCO
Infrastructure hardware	302,634	79,959	382,593
Infrastructure software	3,774,618	1,362,400	5,137,018
Support and services*	55,853	12,810	68,663
Labor, facilities, power, and cooling	129,487	21,103	150,590
Total five-year cost of ownership	4,262,592	1,476,272	5,738,864

*Support includes hardware warranty, hardware deployment, and professional services.

Source: Nutanix, 2021

Hybrid Cloud with Nutanix

IDC configured and priced this hybrid cloud environment based on the following Nutanix infrastructure and public cloud resources:

- **Infrastructure supporting general business applications:**
  - 9x NX-8055-G7 Nutanix 2U appliances
  - 2x Intel Xeon Gold 5220R 24C CPUs (per appliance)
  - 12x 64GB memory modules (per appliance)
  - 6x 3.84TB SATA SSDs (per appliance)
  - 1x dual 10GbE SFP+
  - Nutanix AOS and Prism Pro software subscriptions
  - Deployment services and hardware support

- **Infrastructure supporting persistent VDI users:**
  - 5x NX-3060-G7
  - 2x Intel Xeon Gold 5218R 20C processors (per appliance)
  - 16x 64GB memory modules (per appliance)
  - 2x 1.92TB SATA SSDs (per appliance)
  - 1x dual 10GbE SFP+
  - Nutanix AOS and Prism Pro software subscriptions
  - Deployment services and hardware support
- **Public cloud infrastructure and Nutanix software supporting seasonal VDI users:**
  - 8x SSD-optimized, bare-metal public cloud instances and production workload support tier
  - 3.6x monthly data transfers of 10,300GB egress and 4,600GB ingress
  - Nutanix Clusters (PAYG) for AOS Pro Edition and Nutanix Prism Pro software subscriptions
  - Nutanix deployment services

Overview of Nutanix-Based Hybrid Cloud TCO Findings

Table 2 shows the five-year TCO results for a Nutanix-based hybrid cloud solution as configured. Results are itemized by category of resources, which includes private and public cloud resources. Results are also shown split between persistent versus variable workloads as defined previously. Total five-year cost of ownership for the Nutanix-based hybrid cloud solution was $5,332,995. Absolute cost for persistent workloads is unchanged from the previous configurations but now accounts for 79.9% of the cost of ownership. Total cost for the Nutanix hybrid cloud configuration is 7.1% lower than the previous configuration for a Nutanix-based private cloud. The lower costs are attributable to where the variable workloads (i.e., seasonal VDI) are running. In this configuration, these workloads are deployed using Nutanix Clusters software within a public cloud rather than a Nutanix-based private cloud. Here we see the benefits of leveraging public cloud infrastructure for variable workloads (in this case, seasonal) and thus do not require dedicated private cloud platform 100% of the year. At $1,070,403, resources supporting variable workloads have been reduced by 27.5% by leveraging Nutanix software and public cloud infrastructure rather than deploying a dedicated private cloud cluster, as was the case in the previous configuration. Here we can see the true value Nutanix Cloud Platform can add to organizations willing to take a hybrid cloud approach to their enterprise infrastructure environment.

TABLE 2

Nutanix-Based Hybrid Cloud ($)

Resources	Persistent	Variable	Five-Year TCO
Infrastructure hardware	302,634	0	302,634
Infrastructure software	3,774,618	291,256	4,065,874
Public cloud resources	0	543,191	543,191
Support and services*	55,853	54,319	110,172
Labor, facilities, power, and cooling	129,487	6,717	136,204
Total five-year cost of ownership	4,262,592	1,070,403	5,332,995

*Support includes hardware warranty, hardware deployment, and professional services.

Source: IDC and Nutanix List Prices, 2021

Native Public Cloud Resources

IDC configured and priced this native public cloud environment based on the following public cloud resources:

- **Public cloud resources supporting general business applications:**
  - 2,408 vCPUs
  - 4,816GiB of memory
  - 78,660GB of block storage
  - Monthly data transfer: 41,300GB egress and 15,900GB ingress
  - Production workload support tier
- **Public cloud resources supporting persistent VDI users:**
  - 1,500 vCPUs
  - 3,000GiB of memory
  - 22,500GB of block storage
  - Monthly data transfer: 10,300GB egress and 4,600GB ingress
  - Production workload support tier
- **Public cloud resources supporting seasonal VDI users:**
  - Seasonal VDI resources configured identically to persistent VDI, with only 30% of the annual use
  - Monthly data transfer: 10,300GB egress and 4,600GB ingress
  - Production workload support tier

- **Fully managed file storage capacity:**
  - 40,480GB of managed file storage shared across all VMs listed previously
  - 30% deduplicated and 500MBps throughput

Overview of Native Public Cloud TCO Findings

Table 3 shows the five-year TCO results for the public cloud solution as configured previously. Results are itemized by category of resources. Results are also split between persistent versus variable workloads. Total five-year cost of ownership for the public cloud solution was $10,816,986. This amount is 88.5% higher than the total costs for the Nutanix-based private cloud and 102.8% higher than the Nutanix-based hybrid cloud solution. Costs attributable to the variable workloads were $1,038,373 over the five-year period, which is comparable to the hybrid cloud solution (down just 3%). Public cloud costs attributable to persistent workloads account for more than 90% of the total five-year costs of this solution. The elastic nature of public cloud infrastructure helps drive down total costs for workloads with variable or seasonal infrastructure requirements. This was certainly true for hybrid and full public cloud solutions in our configurations. That said, large-scale persistent workloads experience far higher five-year costs than the private cloud solutions as configured for this paper.

TABLE 3

Public Cloud Resources ($)

Resources	Persistent	Variable	Five-Year TCO
Compute and block storage	8,710,276	970,494	9,680,770
Shared file storage	196,514	0	196,514
Data transfer	297,603	18,432	316,035
Support	574,220	49,446	623,666
Total five-year cost of ownership	9,778,613	1,038,373	10,816,986

Source: IDC and Average Public Cloud On-Demand Pricing, 2021

Three-Tier Infrastructure Solutions

IDC configured and priced this environment based on the following traditional, on-premises virtualized server and shared storage resources:

- **Infrastructure supporting general business applications:**
  - 8x standard 2U rack-optimized servers
  - 2x Intel Xeon Gold 5220R 24C CPUs (per server)
  - 12x 64GB memory modules (per server)
  - 2x 480GB SATA SSDs (per server)
  - 1x dual-port 16Gb Fibre Channel HBA

    - 1x dual-port 10Gb Ethernet adapter
    - 1x four-controller all-flash storage array and 177TB of raw capacity
    - 2x 48-port Fibre Channel switch and SFP+
    - OEM management software and maintenance
    - Virtual infrastructure management/orchestration software and maintenance
    - Deployment services and hardware support
- **Infrastructure supporting persistent VDI users:**
    - 6x standard 2U rack-optimized servers
    - 2x Intel Xeon Gold 5220R 24C CPUs (per server)
    - 8x 64GB memory modules (per server)
    - 2x 480GB SATA SSDs (per server)
    - 1x dual-port 16Gb Fibre Channel HBA
    - 1x dual-port 10Gb Ethernet adapter
    - 1x dual-controller all-flash storage array and 42TB of raw capacity
    - 2x 12-port Fibre Channel switch and SFP+
    - OEM management software and maintenance
    - Virtual infrastructure management/orchestration software and maintenance
    - Deployment services and hardware support
- **Infrastructure supporting seasonal VDI users:**
    - Seasonal three-tier infrastructure configured identically to the persistent VDI solution
    - This solution is in use only 30% of the year; cluster available for other workloads during 70% of the year

Overview of Three-Tier Infrastructure TCO Findings

Table 4 shows the five-year TCO results for the three-tier infrastructure solution as configured previously. Results are itemized by category of resources. Results are also split between persistent versus variable workloads. Total five-year cost of ownership for three-tier infrastructure solution was $6,488,745. The mix of resources contributing to the costs is more evenly attributed to hardware and software than the private and hybrid cloud solutions. Here we see hardware accounting for 38.9% of total five-year costs, or $2,522,319. Software accounts for 46% of total costs, or $2,975,368. As configured, it becomes clear that infrastructure suppliers offering traditional three-tier infrastructure solutions place a considerable amount of value attributable to their features and capabilities into the cost of hardware. In fact, many suppliers will include management features with the hardware-based solutions or tie these features to support agreement. Interestingly, the five-year costs associated with software are almost entirely attributable to third-party infrastructure management and orchestration software. Total three-tier infrastructure costs related to support and services and labor, facilities, power, and cooling was $991,058 over the five-year period, or 15.3% of total costs for this solution. As noted previously, this was far higher than the comparable resources for Nutanix-based solutions. In fact, it was 4.5 times higher than comparable resources for the Nutanix-based private cloud solution and 4 times higher than comparable resources for the Nutanix-based hybrid cloud solutions, as configured. This aligns with the broader market trend of enterprise infrastructure costs shifting toward software and support, which is partly driven by demand for software-defined infrastructure and by technology suppliers attaching features and functionality to the core of their hardware offerings.

TABLE 4

Three-Tier Infrastructure Solution ($)

Resources	Persistent	Variable	Five-Year TCO
Infrastructure hardware	2,169,277	353,042	2,522,319
Infrastructure software	2,081,488	893,880	2,975,368
Support and services*	566,192	190,239	756,430
Labor, facilities, power, and cooling	191,954	42,674	234,628
Total five-year cost of ownership	5,008,910	1,479,835	6,488,745

*Support includes deployment and professional services, hardware warranty, and software maintenance.

Source: IDC and Average List Prices, 2021

Summary of TCO Results

Table 5 and Figure 1 show a summary of each solution type reviewed previously, with results split between persistent and variable workloads. Solutions are sorted in ascending order by the five-year total cost of ownership. Nutanix-based hybrid cloud returned the lowest TCO results for this exercise, edging out the Nutanix-based private cloud by 7.1%. Our Nutanix-based hybrid cloud configuration achieved its cost advantage by taking advantage of the elastic nature of public clouds for the variable workloads. Indeed, TCO results for variable workloads were 27.5% lower for the hybrid cloud solution when compared with the private cloud offering. Leveraging Nutanix Clusters and public cloud resources allowed hybrid cloud solutions to consume only the resources required to run the variable workloads during the times when the applications were required (just 30% of the year). When reviewing the variable workloads, the TCO difference between Nutanix Clusters and public cloud was just 3%, as previously noted. Thus infrastructure costs for these workloads were avoided during 70% of the year that they were not needed. It should be noted that, unlike the private cloud and three-tier infrastructure solutions, this hybrid cloud approach means users will not have excess infrastructure on which they can run additional workloads during the months it is unused. For some companies, the benefits of lower TCO will need to be balanced against their desire for excess infrastructure capacity. The three-tier infrastructure solutions configured for these workloads returned a $6,488,745 five-year total cost of ownership. This was just 60% of the public cloud TCO but 21.7% and 13.1% higher than the hybrid and private cloud solutions, respectively. Based on our TCO calculations, three-tier infrastructure hardware costs were 11 times higher than the private cloud solution. Total three-tier infrastructure costs related to support and services and labor, facilities, power, and cooling was 4.5 times higher than comparable resources for the Nutanix-based private cloud solution. The native public cloud solution that was configured for this paper returned a five-year TCO of $10,816,986. As shown in Table 5, this was far higher than any of the other four solutions. The higher costs are entirely attributable to the cost of resources supporting our persistent workloads, where public cloud's TCO was more than 2 times greater than Nutanix-based solutions and 1.95 times greater than our three-tier infrastructure solution.

TABLE 5

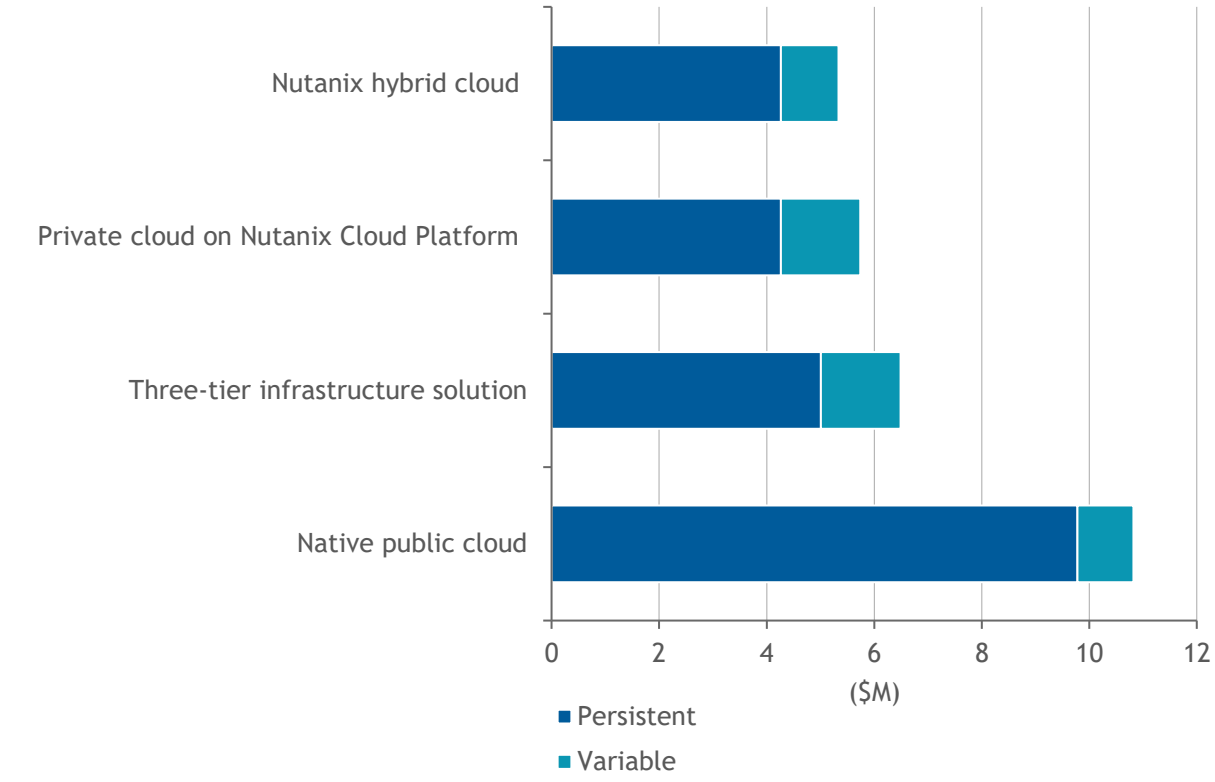
Summary of TCO Results ($)

Solution	Persistent	Variable	Five-year TCO
Nutanix hybrid cloud	4,262,592	1,070,403	5,332,995
Private cloud on Nutanix Cloud Platform	4,262,592	1,476,272	5,738,864
Three-tier infrastructure solution	5,008,910	1,479,835	6,488,745
Native public cloud	9,778,613	1,038,373	10,816,986

Source: IDC and Nutanix, 2021

FIGURE 1

Summary of TCO Results



Source: IDC and Nutanix, 2021

CONSIDERING NUTANIX SOLUTIONS FOR PRIVATE AND HYBRID CLOUD

Nutanix is a leader in hyperconverged infrastructure–based solutions offering a true hybrid and multicloud architecture to manage applications on premises or off premises from small to very large scale. The Nutanix Cloud Platform was designed to provide a resilient pool of abstracted x86 server resources, located on premises, on public cloud bare metal, or on managed or hosted service provider locations, that allow IT administrators to run mission-critical applications and databases and other workloads efficiently and cost effectively. Whether on premises or in the cloud, Nutanix's core software unifies infrastructure services, management, and operations with the goal to introduce new levels of operational simplicity, automation, and high availability. Its cloud platform also provides unified storage, VM and container options, database management, security, cost governance, end-user computing (EUC), and business continuity solutions with interoperability across private and public clouds. The company's portfolio is designed to maximize choice of hardware platform, virtualization, and public cloud. Nutanix solutions can be purchased as turnkey appliances with all required software and hardware packaged together from OEMs and partners and as a software-only option that can be deployed on pre-certified general-purpose servers or on public cloud or service provider infrastructure. Some capabilities are also offered as SaaS-based solutions.

The Nutanix Cloud Platform is built on hyperconverged infrastructure — which consists of AOS and Prism. AOS is the core software-based distributed storage fabric that provides Nutanix's enterprise-class data, networking, and virtualization services for all workloads running on the solution (Clusters is the name for AOS running on public cloud infrastructure). Prism is the single pane of management that greatly simplifies all aspects of running Nutanix deployments at scale — including virtual machines, hosts and clusters, networking, and data protection. Prism also provides customers with predictive analytics that leverages machine learning algorithms and insights needed to understand their infrastructure, fix issues, and plan for new workloads, data, and users. It provides customers with the ability to automate and optimize everyday tasks and remediation of anomalies or performance problems within their Nutanix environments. AHV is Nutanix's own enterprise-class hypervisor that is included at no additional license cost with AOS and can be deployed as a company's standard hypervisor to further reduce costs and simplify management and operation. Nutanix also supports VMware ESXi and Microsoft Hyper-V. Additional cloud services can easily be added as needed to address demands for DevOps and IT automation; cost governance; security compliance; consolidated file, block, and object storage; database as a service; VDI and DaaS; and disaster recovery.

CHALLENGES AND CONCLUSIONS

Public and private cloud solutions have become a critical part of the mainstream enterprise IT environment. Although their benefits will vary depending on many factors (most notably the types of workloads hosted), enterprises of all sizes are actively seeking out public and private cloud architectures as a way to modernize operations and drive new levels of datacenter efficiencies. As this paper shows, there are multiple paths an organization can take as it introduces (and increases its use of) cloud technologies and cloud-centric operating models to its organization. IT teams must take the time to review their infrastructure options and understand and select the mix of private, public, and hybrid cloud technologies that best fit the needs of their unique portfolio of applications.

With the exception of small companies that were "born in the cloud," today's businesses rely on a considerable number of existing software and applications that cannot simply be set aside in favor of cloud-native alternatives. As such, technology suppliers such as Nutanix must remain empathetic to

their customers' need to maintain an existing estate of applications and provide a range of infrastructure options that allow each customer to leverage a mix of cloud technologies that best suits their unique needs. At the same time, IT suppliers and their partners are likely going to be among the first to see when a customer's inability to successfully leverage cloud technologies has become a competitive disadvantage. When such cases arise, IT suppliers and partners will need to provide real-world examples of the degree to which truly cloud-enabled companies are creating an ever-widening competitive gap between themselves and those that cling to outdated technology and operating models. This may become an unpleasant conversation, but the right message and support will help create an outcome that is rewarding for all stakeholders involved.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

Global Headquarters

140 Kendrick Street
Building B
Needham, MA 02494
USA
508.872.8200
Twitter: @IDC
blogs.idc.com
www.idc.com