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15 Reasons Not to Migrate Your Data Center to Public Cloud Infrastructure as a Service

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CIOs should be aware that while public cloud IaaS can be used for most virtualizable workloads, their organizations could have business or technical circumstances that make migrating their data centers to the cloud inadvisable.

Key Challenges

- CIOs and business leaders may fall into the trap of believing that public cloud infrastructure as a service (IaaS) will always be better and less expensive than running their own data centers. Consequently, they may consider migrating existing workloads from their data centers into cloud IaaS, when in reality they gain little benefit from doing so.
- Although cloud IaaS — especially when combined with integrated platform as a service (PaaS) — often delivers significantly more functionality than internal IT infrastructure, the expense of such higher-quality solutions may not be cost-efficient for organizations that prefer to minimize IT expenditures and that will not benefit from more feature-rich solutions.

Recommendations

CIOs evaluating migration of existing Mode 1 workloads to public cloud IaaS should:

- Be skeptical of the benefits of Mode 1 (safety- and efficiency-oriented) cloud IaaS migration if the business is relatively static, with little need for IT agility. Mode 1 infrastructure and applications rarely change, new applications are rarely brought into the data center, or the Mode 1 existing estate is running in an efficient steady state, and the IT organization needs to concentrate on Mode 2 (agility-oriented) and other new projects.
- Carefully consider the implementation challenges if: the business has many users in locations that have poor WAN connectivity to cloud IaaS providers; the business has geographic locale requirements that are not well-served by leading cloud IaaS providers; or a significant number of applications have on-premises location requirements that would create integration complexities.

- Discuss IT and business priorities at the board of directors level, with the recognition that data center migration projects are disruptive, and that there may be limited benefit to the business if there is not significant IT transformation.
- Place individual Mode 1 and Mode 2 workloads in public cloud IaaS when there are compelling technical or business benefits to do so, even if a decision is made not to do a large-scale migration.

Introduction

This research examines "showstoppers" — key reasons to not migrate, or to significantly delay migrating Mode 1 workloads to public cloud IaaS. This is not a full examination of the benefits and drawbacks of migrating to public cloud IaaS. Rather, it is a list of circumstances that CIOs can quickly consult. If a circumstance is applicable to your organization, there is a strong likelihood that you should not conduct a large-scale data center migration to public cloud IaaS.

While public cloud IaaS is technically suitable for a broad range of workloads that can run well on virtualized x86 servers, there are a wide variety of reasons that it might not be the right choice to replace the data centers of a particular business.

Most businesses will choose hybrid IT — some applications will run on-premises, while other applications will run in the cloud. However, the balance will differ between organizations. In addition, an increasing number of CIOs are considering whether or not it makes sense to migrate Mode 1 (safety- and efficiency-oriented) workloads from their existing data centers, into public cloud IaaS. (See "Best Practices for Planning a Cloud Infrastructure-as-a-Service Strategy — Bimodal IT, Not Hybrid Infrastructure" for a deeper exploration of bimodal infrastructure strategy.)

While many businesses — especially those where technology is a key competitive advantage, those who are exploiting digital business opportunities, and those who strongly prioritize time to market and the ability to manage the business flexibly and to take risks — may benefit greatly from making extensive use of public cloud IaaS, including migrating existing data centers to the cloud, this approach is not right for all organizations.

However, even if you have a "showstopper" preventing a large-scale migration of an entire data center, you may still derive significant benefit from placing Mode 2 (agility-oriented) workloads into public cloud IaaS, as well as selectively placing certain Mode 1 workloads into public cloud IaaS.

This research only addresses public cloud IaaS, although many of these points are also applicable to hosted private cloud IaaS. Broadly, however, the benefits of adopting integrated IaaS and PaaS from one of the two market leaders — Amazon Web Services and Microsoft Azure — are significantly greater than adopting pure cloud IaaS from other providers, due to the sizable delta in available functionality. The cautions here apply to these best-in-class providers, and should be stressed even further if you are considering using other providers.

Analysis

Question the Benefits of Migrating Static Environments

The less dynamic the business and IT environment, the lower the likelihood of significant benefits from migrating existing data centers to public cloud IaaS. The following circumstances should be considered potential "showstoppers":

- **The business is relatively static, with no need for IT agility.** Cloud IaaS typically empowers developers and other technical end users, enabling them to be more productive. This allows the business to exploit IT-enabled capabilities more quickly. If the business has little interest in new or improved IT capabilities, there may be few reasons to use cloud IaaS for anything at all. The business is likely to prefer maintaining the existing status quo with minimal investment.
- **The Mode 1-related infrastructure and applications rarely change.** If the IT environment is relatively static, with little more than maintenance required, cloud IaaS brings few benefits. Moreover, the business is unlikely to want to tolerate the disruption and upfront investment required to achieve long-term cost savings from a migration, unless such an upheaval is already inevitable — for instance, if there will be a merger, acquisition or spinout, or if there will be a change in IT outsourcers.
- **The IT organization does not do any Mode 1 software development.** Developers are usually the primary beneficiaries of cloud IaaS, so if there is little internal software development, then the organization only has potential operational and cost-saving benefits. If software development is outsourced, these third-party system integrators (SIs) may benefit from being able to work in public cloud IaaS, but that is unlikely to be sufficient reason to do a large-scale migration into public cloud IaaS.
- **New applications are rarely brought into the data center.** If new applications are only rarely hosted within the data center (regardless of whether they are developed internally or by external SIs) — for instance, the business simply doesn't consume many new applications, or has shifted to a SaaS-based application strategy — then there is little benefit from the greater agility brought by cloud IaaS.
- **Existing Mode 1 applications are running in an efficient steady state, and the IT organization needs to concentrate on Mode 2 and other new projects.** Migrating a data center to public cloud IaaS is a time-consuming project, requiring excellent project management and the involvement of personnel that have intimate knowledge of the infrastructure and applications. In resource-constrained IT organizations, the people who can drive such a project to a successful conclusion may be needed for other business-critical projects. The cost savings and other benefits of a migration may be of significantly lower priority than bringing success to the business in other areas.
- **Most applications are hosted on a mainframe, a midrange system or non-x86-based servers.** If most applications are not on x86-based servers, then most of the data center cannot be migrated to cloud IaaS, calling into question the usefulness of migrating the x86-based estate. However, if all newer applications and future application development will be x86-based,

it may make sense to migrate all such workloads to cloud IaaS, and use cloud-exchange-based colocation for the legacy systems in order to minimize network latency.

- **Most of the x86-based applications do not perform well under virtualization, or have architectures that are not well-suited to a cloud IaaS environment.** If many applications rely on bare-metal servers, it will not be possible to use a market-leading cloud IaaS provider; though there are providers who offer cloud-inspired dedicated hosting, these offerings do not provide the full agility and abstraction benefits of cloud IaaS. Some applications may also demand hardware architectures that may not be readily available in a market-leading cloud IaaS offering, or, in rare cases, may require refactoring in order to scale well, perform well, or be adequately reliable or secure in a cloud IaaS environment. If such applications are the majority of the environment (rather than exceptions), a migration may be too resource-intensive for the cost-benefit analysis to be attractive.
- **Most applications rely on operating systems other than Linux and Microsoft Windows.** Most cloud IaaS providers only provide support for Linux and Windows, though they might offer customers the ability to use other x86-based operating systems at their own risk. Some customers using a proprietary Unix — such as AIX or Solaris — sometimes consider doing an operating system migration to Linux as part of a cloud IaaS migration project, but this complicates the project and increases the risks.
- **The data center's hardware is fully depreciated and the business does not intend to refresh the hardware until it becomes unusable.** Some businesses have exceptionally long hardware refresh cycles, and in some static environments, hardware is only replaced when it breaks irreparably. Most cloud IaaS cost comparisons assume a hardware refresh cycle of no more than five years. It is very difficult to cost-justify the use of public cloud IaaS in environments where the hardware is "free" because it has been depreciated and nothing new is being bought.
- **A hardware refresh was just completed and the organization will not need to buy new hardware for at least three years.** If the data center uses large-scale hardware refreshes rather than continual gradual replacement, few businesses have the appetite to "waste" new hardware by migrating workloads to public cloud IaaS. In these situations, gradual migrations can still be considered — whenever servers are due to be refreshed, workloads can be migrated so that new hardware does not need to be bought in the future.

If you have a static environment, you might still consider migrating existing data centers to public cloud IaaS in order to achieve cost savings. If you currently use data center outsourcing, or are considering doing so, a migration to public cloud IaaS could also be considered in that context. However, unless your existing environment is highly inefficient, a migration is unlikely to result in significant cost savings, because the lowered cost of change activities drives much of the operational cost savings in cloud IaaS.

Respect Physical Constraints

There are several circumstances under which data center migration to public cloud IaaS is usually inadvisable due to physical constraints:

- **The business has key geographic locale requirements that cannot be served by a major cloud IaaS provider.** If the business's primary data centers must be located in countries where there are no market-leading public cloud IaaS providers, a migration is likely to have a higher level of risk and fewer benefits. Therefore, such a migration should be delayed until an appropriate provider can be used, or the business needs to pursue a different infrastructure strategy. It is not necessary for the cloud IaaS provider to have a presence in every location where the business might need a data center presence, since most organizations will pursue a hybrid strategy.
- **Most users are in locations with poor WAN connectivity to public cloud IaaS providers.** While it is possible to use the Internet as the primary form of network connectivity to a public cloud IaaS provider, most businesses that migrate entire data centers will choose to obtain private WAN connectivity via their carriers instead — for instance, using the AT&T NetBond or Verizon Secure Cloud Interconnect products to make the cloud data centers part of their MPLS mesh. However, this does not solve fundamental problems with network latency or bandwidth constraints, and organizations that are unable to provide high-quality high-speed WAN connectivity are unlikely to be able to deliver adequate cloud-hosted application performance to their users.
- **Many applications have on-premises location requirements.** If your applications are locale-dependent, those applications obviously cannot move to the cloud. Examples include hospital systems, factory control, and utility control systems that must be resident on-premises and cannot have a dependence upon network connectivity, as well as military, government and banking systems that must be located in specialized secure facilities. In some cases, these applications may be only loosely coupled to other applications within the data center, in which case, a migration to the cloud can still be done for those other applications. However, if these applications require low-latency connectivity to other applications or drive regulatory requirements that are difficult to meet in the cloud, it is likely that they will anchor all the other applications to an on-premises data center.

Obtain Executive Buy-In for Transformation

Obtaining benefits, including cost savings, from migrating an existing data center to public cloud IaaS is not a simple matter of "lifting and shifting" workloads. A transformational approach is frequently required. While a radical IT organization transformation brings the greatest benefits, businesses that are only looking for cost savings may be able to achieve them by just implementing a greater degree of automation in IT processes (see "Three Journeys Define Migrating a Data Center to Cloud Infrastructure as a Service"). However, even that degree of automation typically results in changes in IT operations and application development processes and the skills that employees must possess.

Consequently, migrating existing data centers to public cloud IaaS is likely inadvisable in the following circumstances:

- **Business and IT leadership are unwilling to invest upfront or tolerate a disruptive migration in order to reap benefits later on.** A migration is distracting and disruptive to day-

to-day operations, and like all data center migrations, it carries some risks. Business management needs to understand and accept the impact of the migration, how it changes the trajectory of other IT projects, and the risks. Business leadership needs to firmly believe that the long-term benefits are worth the short-term pain, and commit to fully funding the migration project. IT leadership and practitioners must also be incentivized to make the transformation successful, since the outcome of the transformation may be personally negative for the careers of individuals.

- **Executive management and the board of directors are not willing to support an IT transformation effort.** A significant percentage of the cost savings in cloud migration come from the elimination of personnel whose jobs have been automated away. In some cases, these individuals are replaced by new employees (or an outsourcing provider) that have the skills necessary to operate and exploit the benefits of public cloud IaaS. This may alter the structure of the IT organization as well as the career paths within it, requiring HR support to help manage the organizational change, funds for severance packages, funds for retraining of personnel and other organizational transformation support.

CIOs should not underestimate the impact of a migration to public cloud IaaS upon their organizations — not just in infrastructure and operations, but also in application development, procurement, and other departments with technical end users such as researchers, scientists and engineers. It is vital that business leaders understand this impact and cooperate with the CIO in order to drive a successful migration project. If only the CIO is advocating such a migration, the project is unlikely to eventually be seen as an overall success for the business.

Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Three Steps to Establishing an Enterprisewide, Cloud IaaS Strategy"

"The Three Data Center Personalities Necessary for Your Digital Business"

"How to Select the Correct Data Center Option for the Digital World"

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