



# CONSIDERING AGENCY LEGACY ENVIRONMENTS IN CLOUD MIGRATION TCO ANALYSIS

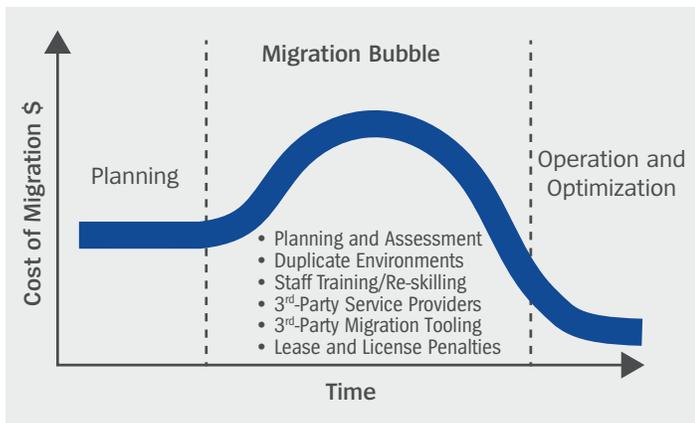
A COMPREHENSIVE FRAMEWORK FOR TOTAL COST OPTIMIZATION (TCO) OF CLOUD ADOPTION

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## The Cloud Means Business

An organization's path to cloud adoption is a journey to improved business results. Unisys asserts that every such journey should begin with at least a directional business case, and that this business case should be refined and become increasingly detailed as experience is gained and lessons are learned. Further, in order to truly address the **total** cost of ownership (TCO) associated with cloud adoption, the business case must address not only the utilization-based comparisons of on-premise computing costs and cloud-based computing costs, but must also address the costs associated with the migration process itself, including those associated with the maintenance of the legacy environments throughout that process. TCO models often under-emphasize this significant cost element and thus tend to understate true TCO.

As you think about migration/transition costs, it is helpful to consider the following model put forward by Amazon Web Services (AWS)<sup>1</sup>.



AWS uses the term “migration bubble” to refer to the time and cost required to transition applications and infrastructure from on-premise data centers to the AWS platform. Although the cloud can provide significant benefits and savings, costs will likely increase as you move through the migration bubble.

Although many CIOs and other leaders of cloud adoption initiatives may instinctively know that this bubble exists, many likely do not know how to best quantify it and to manage it to their benefit.

This document seeks to identify the many different costs that must be considered as part of TCO, including those associated with the migration bubble that are often overlooked and/or understated, and to thus provide a framework for development of a comprehensive TCO model. This model can then be incorporated into the business case to provide a basis for informed decision making about whether and when to undertake a cloud adoption initiative, and—if undertaken—how best to structure and execute that initiative.

## The Costs – Legacy

It is important to first understand your current costs of supporting applications and services running in the legacy development, test, and production environments. Consider the following:

| Consideration     | Key Questions   |
|-------------------|---|
| Servers           | <ul style="list-style-type: none"> <li>• Do you overprovision for peak capacity?</li> <li>• What is your buffer capacity?</li> <li>• Are you able to scale down?</li> <li>• What are your server refresh costs?</li> </ul>  |
| Storage           | <ul style="list-style-type: none"> <li>• Do you overprovision for peak capacity?</li> <li>• What is your buffer capacity?</li> <li>• Are you able to scale down?</li> <li>• What are your server refresh costs?</li> </ul>  |
| Networking        | <ul style="list-style-type: none"> <li>• What is your required bandwidth?</li> <li>• What is your peak-to-average ratio?</li> <li>• What do you spend on network gear, including refresh costs?</li> </ul>  |
| Power             | <ul style="list-style-type: none"> <li>• How much do you spend on utility bills?</li> <li>• What are your average and peak power requirements?</li> </ul>   |
| Cooling           | <ul style="list-style-type: none"> <li>• What are your costs for cooling/HVAC?</li> </ul>   |
| Physical Space    | <ul style="list-style-type: none"> <li>• What are your current and future space constraints?</li> <li>• What are your lease terms?</li> <li>• What are your property capital costs?</li> <li>• What do you pay for physical and software security of your equipment?</li> </ul>                           |
| IT Labor          | <ul style="list-style-type: none"> <li>• What is your level of spend to maintain all required current environments?</li> </ul>  |
| Software Licenses | <ul style="list-style-type: none"> <li>• What do you pay in license fees for middleware, rdbmsware, IT operations monitoring, cyber operations monitoring, security information and event management, etc.?</li> <li>• What are the terms and time constraints associated with these licenses?</li> </ul> |

<sup>1</sup> Amazon Web Services – A Practical Guide to Cloud Migration December 2015

In addition, be sure to also consider all of the above costs for your Disaster Recovery and High Availability resources (e.g., physical space, power, cooling, etc.). As with migration bubble costs, this is a category of costs that is often overlooked and/or understated that can significantly impact your TCO.

## The Costs – In the Cloud

Once you have defined your current costs, you can begin to assess the costs associated with the target cloud platform required to provide similar functionality and service levels. Start by understanding your Cloud Service Provider (CSP) operational costs, which will be a function of the service mix and service levels required. It is very important to work closely with your CSP and your consulting partners to understand both the range and nature of the services provided by your CSP, as well as the unique requirements and objectives of your organization. This assessment should consider not only your current requirements but also those that are anticipated at some point in the future. As part of this, consider the following:

- Agencies must ensure security compliance across the full stack (not just infrastructure), and this can be an expensive undertaking.

- Understand the potential incentives behind horizontal scaling, per-hour variability, reserved instances, and other potential cost-saving mechanisms provided by the CSP. As part of your assessment, consider that while reserved instances, for example, may help optimize cloud platform spending, some components will be difficult to judge prior to your migration.
- Integration may be required between cloud-based applications and applications that remain on-premise following migration/transition.
- There may be opportunities to reduce or eliminate current license costs for middleware, rdbmsware, IT operations monitoring, cyber operations monitoring, security information and event management, etc. For example, Oracle instances might be easily transitioned to Relational Database Service (RDS), MySQL or PostgreSQL. Plan your migration to capitalize on these opportunities, both in the short term and the longer term.

When considering future-state costs, remember that not all costs will be technology or platform-related. For example, new business processes are often defined, and existing business processes modified as a result of cloud migration. There are operational costs associated with these changes, as well as costs for potential training/re-skilling of personnel, that many TCO analyses fail to consider.



## The Costs – Filling the Gaps

In developing a TCO analysis associated with cloud adoption, the category of costs that are sometimes overlooked and/or understated is that related to the costs of the actual migration itself (i.e., the migration bubble), including those associated with the maintenance of the legacy environments throughout the migration process.

The following are among the categories of potentially significant costs that are likely to be incurred as part of cloud migration:

- **Planning and Assessment** – Staff time will be required to assist in an assessment of the current applications and infrastructure, and to support the development and approval of migration plans.
- **Legacy Environments** – Duplicate environments may be required to keep production applications and infrastructure available while transitioning to the AWS platform, and to enable any required integration between cloud-based applications and on-premise applications. In fact, in some cases, the optimum cloud migration for certain workloads may be no migration at all, thereby resulting in the need to maintain the associated required level of legacy application and infrastructure support. When assessing legacy environment requirements, consider all costs related to servers, storage, networking, power, cooling, physical space, IT labor, and software licenses.
- **Staff Training/Re-skilling** – Current IT staff will require training/re-skilling related to cloud technical skills and competencies, and business staff will require training related to new or modified business processes. This will also likely include establishment of an internal team and/or Cloud Center of Excellence (CCoE).
- **3<sup>rd</sup>-Party Service Providers** – As most organizations do not possess significant levels of cloud expertise—at least not at the beginning of their migration journey—most will need to engage consulting partners and/or systems integration partners that possess the expertise to plan and streamline the execution of the migration/transition of applications and infrastructure.
- **3<sup>rd</sup>-Party Migration Tooling** – Effective and economic cloud migration will require tooling to perform automated discovery of the existing portfolio, to automate the migration of applications, data and virtual machines from on-premises to cloud platforms, and to manage the overall migration/transition program.
- **Lease and License Penalties** – Penalty fees may be incurred for early termination of contracts (facilities, software licenses, etc.) once applications or infrastructure are decommissioned.

Not only are the migration bubble costs significant, but they offer many potential levers that organizations can pull to impact their overall TCO for cloud adoption.

Given the volume and potential impact of the above costs, it is very important to plan your cloud migration to coincide with hardware retirement, license and maintenance expiration, and other opportunities to reduce costs. There are many levers that your organization can pull to effectively reduce your migration bubble costs and, by extension, reduce your overall TCO of cloud migration/transition.

## CloudForte™

Unisys stands ready to enable and support your cloud adoption initiative through our **CloudForte™ solution** that will help you:

- Apply proven comprehensive and business-driven migration methodologies developed jointly by Unisys and partner CPS's (e.g., the AWS Migration Acceleration Program [MAP]) to accelerate your cloud migration journey. This will reduce the costs associated with staff time required to support assessment and planning, new training required to manage new systems and to support duplicate environments.
- Develop the migration plan that is right for your unique combination of business, technical and economic requirements. This includes the definition of application treatments or dispositions (e.g., Rehost, Refactor, Retain, Retire, etc.) for each of the workloads to be migrated, and the subsequent definition of migration waves (i.e., collections of applications that can be migrated simultaneously) that prioritize workloads that will deliver increased return on investment (ROI) through reduced operation costs, or that will otherwise deliver improved business results.
- Use tools and techniques like the AWS Well Architected Framework (WAF) to assess and **optimize** applications and workloads to take advantage of cloud native features of resilience, scalability and cost efficiency while also assuring a continuous cyber security posture.
- Define Landing Zones on the target cloud platform. This helps reduce 3rd-party service provider costs by providing an initial structure and predefined configurations for cloud accounts, networks, identity and billing frameworks, and client-selectable optional packages. This will accelerate subsequent application migrations.
- As part of your overall migration/transition plan, develop an integrated organizational change management (OCM) work stream that includes a communications plan and a training plan. This will help optimize the resources spent on training and re-skilling, and will facilitate a more rapid and effective adoption of the cloud model for your organization.
- Build an internal team with cloud expertise, and perhaps even a cloud Center of Excellence as early in the migration/transition process as possible in order to help minimize subsequent reliance on 3rd-party service providers.
- Plan migration(s) to coincide with hardware retirement, and/or license and maintenance expiration.

## Why Cloud? The Benefits Side

Of course, there are many potential benefits associated with the adoption of cloud (or utility) computing, and these must be considered when developing your overall business case. CSPs like AWS, Microsoft, IBM and Google tout the scalability, elasticity, availability and fault tolerance of their platforms. Market observers and analysts discuss the innovative, disruptive and collaborative benefits of the cloud model. In the end, the benefits for your organization/agency can be fairly simply categorized as increased ROI and decreased time to market, two benefits that—along with reduced risk—can be argued to be the primary objectives of any business/agency.

Proper adoption of a cloud model can reduce Operations & Maintenance (O&M) expenses by aligning costs with actual consumption of resources, and thereby enabling a greater focus on mission-enhancing development activities. Much of the labor cost associated with hardware and software maintenance (e.g., patching and upgrades) can also be eliminated. Stateless connections and a microservices architecture result in software that promotes resilience to failure, and modular, self-contained components enable solutions that are scalable (up or down) and secure in support of agency-specific security and interoperability requirements (e.g., Joint Worldwide Intelligence Communications System [JWICS], Non-classified Internet Protocol (IP) Router Network [NIPRnet], and the Secret Internet Protocol Router Network [SIPRnet]). In addition, control-based technologies and policies enable adherence to Federal Risk and Authorization Management Program (FedRAMP) and National Institute of Standards and Technology (NIST) compliance mandates, and protect your data, applications and infrastructure. All of this serves to improve your ROI.

Proper adoption of a cloud model can also promote mission agility, as new and changed capabilities can be quickly and easily accommodated without risk of an unintended ripple effect when deployed, and also promotes technical agility whereby each

component of the system can be built with and deployed on the current, best technology for the job. CSPs also provide an ecosystem of services (e.g., Development Security Operations [DevSecOps] continuous integration and continuous delivery [CI/CD] pipeline) and partners that together provide a suite of sustainable development tools to enable rapid development of innovative net-new applications and rapid enhancement of existing applications. All of this serves to reduce time to market.

## The Cost-Benefit Model

When considering your cloud adoption strategy, it is critical to not only **define** the benefits that you hope to achieve, but to also **quantify** them to the extent possible. Through our CloudForte solution, Unisys provides methods and tools to enable this analysis, as well as the quantification of the costs required to achieve your desired level of benefits. The resulting cost-benefit model will clearly identify the break-even point in your cloud migration journey – that is, the point when the benefits of cloud adoption begin to outweigh the migration-related costs, including those associated with the migration bubble. The model will also identify the longer-term and on-going savings and other benefits that you can anticipate as a result of your adoption of cloud.

Once your cost-benefit model has been created, it will be incorporated into your original directional business case, thus yielding a business case that becomes much more than directional. Unisys recommends that you also re-visit your business case at other key points during the migration process (e.g., upon definition of application treatments/dispositions) to define in more detail your expected benefits of cloud migration and their associated costs. The definition of migration waves is also a great point in the process to ensure again that you are planning migration(s) to coincide with hardware retirement, license and maintenance expirations, and the other opportunities to reduce cost that have been discussed above, and to once again add greater detail to your cost-benefit model and your business case.



## Conclusion

In order to minimize the TCO of your cloud migration/transition initiative, it is imperative that you understand the various types of costs that must be identified, defined and managed. This includes the relatively well-understood utilization-based costs for on-premise computing and those for cloud-based computing, but also includes other costs such as those associated with the actual cloud migration process itself, those associated with maintaining legacy environments as part of the migration process, and those associated with changes in business processes and operating procedures introduced by a cloud computing model. Additionally, it is imperative too that you clearly define the benefits that your organization seeks to realize as a result of the adoption of a cloud computing model. This enables you to develop a compelling business case that will likely become essential to maintaining the momentum behind your cloud migration/transition initiative. Cloud adoption can be a challenging undertaking that introduces many unknowns, and will require a strong understanding of—and commitment to—the business benefits that you are seeking to realize in order to be successful.



CloudForte™ is a ground breaking cloud management services offering from Unisys. We are well-known to be an agile innovator, and again we will deliver immediate AWS cloud enhancements and secure migration services to our clients in real time, automatically. As a leading Federal government systems integrator, ranked by IDC as a “leader,” we implement best practices to quickly and effectively train 100% of our SMEs in AWS Certification and provide excellence to support our cloud customers in new and faster ways like no other contractor can. Our differentiator is unique intellectual property in true technology innovation. Our Federal business invests over \$1M annually into revolutionary technology research and development, like CloudForte. With CloudForte, Unisys demonstrates our commitment to enhancing the digital lives of citizens.



Our mission is to build high-performance, security-centric solutions for the most digitally demanding businesses and governments on Earth.



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