

Kickstarting Cloud ROI

Many enterprises are quick to leap into cloud relationships. Very often, they do so without any analysis—formal or informal—of the value they expect to get in return. From a governance perspective, this is dangerous. To most efficiently meet stakeholder needs and goals, it is important to understand why an activity is undertaken and to make sure that the decisions are based on facts. Calculating the return on investment (ROI) for cloud computing provides an estimate of how favorable an enterprise's potential investment in cloud computing will be. It is a useful tool to help understand the value proposition for employing a new cloud service.

The ROI calculation considers the costs of the investment and its expected gains (benefits). Therefore, identifying and quantifying, as much as possible, the value of all benefits (the return) and all expected and unexpected potential costs are important to accurately calculate the ROI so that it is a meaningful factor in the enterprise's decision on whether to proceed with a cloud solution. This article presents a framework that an enterprise can use to kickstart its evaluation of ROI for cloud computing projects and cuts through the confusion of determining the actual benefits, costs and business challenges by providing the most common cloud computing benefits and costs that should be included in the ROI calculation and common business challenges to consider.

transition such as the user satisfaction associated with transitioning from a difficult-to-use legacy application to a state-of-the-art and universally accessible interface delivered via the web. However, looking just at the financials in this way can help to bolster a business case—or understand what those other desirable factors are costing.

Figure 1—Calculating Simple ROI

$$\text{ROI} = \frac{(\text{Gain From Investment} - \text{Cost of Investment})}{\text{Cost of Investment}}$$

For example, the ROI for a new Software as a Service (SaaS) cloud-based application that is expected to have an investment of US \$600,000 over a period of five years and provide benefits (cost savings and new revenue) of \$900,000 over the same period of time will yield a return of 50 percent.

$$\text{ROI} = \frac{\$900,000 - \$600,000}{\$600,000} = 50\%$$

If ROI calculations are the only financial measurement for decision making, they do not help to predict the likelihood of realizing the return or the risk that is involved with a particular investment. Ideally, the enterprise uses multiple financial metrics to decide whether to adopt cloud computing services, including ROI and the following:

- **Total cost of ownership (TCO)**—Accounts only for the cost that is associated with an acquisition for its entire life span or a predetermined period of time
- **Net present value (NPV)**—Compares anticipated benefits and costs over a predetermined time period using a rate that helps to calculate the present value of future cash flow transactions
- **Internal rate of return (IRR)**—Finds the discount rate that would make the NPV of the investment equal to zero

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Calculating ROI

Calculating simple ROI entails subtracting the cost of the investment from the gain (return) of the investment, and then dividing that difference by the cost of the investment (**figure 1**). This calculation results in a percentage or ratio. In most cases, a ratio greater than zero means the return is greater than the cost,¹ and the investment may be considered beneficial (how beneficial depends on the enterprise's investment objectives or its corporate standards). This does not account for other factors that might be desirable in a cloud

The TCO, NPV and IRR are more complex calculations than simple ROI. The simplicity of ROI makes it a more popular calculation to use in project analysis and marketing materials.

The ROI calculation is simple for investments that have clear and quantifiable benefits and costs that are easily known. However, for more complex investments, such as cloud computing services, the ROI calculation can be complex and, sometimes, misleading. Generating a meaningful ROI result is dependent on accounting for all quantifiable variables and defining a clear and consistent time period. Intangible benefits and risk are not included

in the calculation unless the enterprise is able to assign to them a value that is based on historical or statistical data. For justifying investments that are based solely on enterprise objectives, a business case that is supported by multiple financial metrics may be a better method than ROI calculation.

Cloud Benefits

Figure 2 shows the numerous benefits that make using cloud services enticing, including shifting cost from capital to operational expenses, lower overall cost and greater agility. The figure groups the benefits into tangible (quantifiable) and intangible (strategic)

Figure 2—Cloud Benefits	
Benefit	Description
Tangible	
Cost reduction	Computing cost is shifted from a capital expenditure to an operational cost because the cloud provider supplies the underlying infrastructure as part of the service bundle. The cloud promises additional cost reductions in the following areas: <ul style="list-style-type: none"> • Labor—IT system administration hours/head count • Application software (SaaS only) • Licensing purchase and maintenance • Technical support and user support • Maintenance (i.e., upgrades, updates, patches) • Hosting (i.e., physical building, power, cooling)
Enhanced productivity	User mobility and ubiquitous access can increase productivity. Collaborative applications increase productivity and reduce rework.
Optimized resource utilization	Enterprises use only the computing resources they need, thus reducing system idle time waste.
Improved security/compliance	Cloud providers may offer robust security controls as a market differentiator.
Access to skills and capabilities	Customers benefit from top-notch skills and capabilities while avoiding employment costs (i.e., recruiting, salary, benefits, training).
Scalability	On-demand provisioning or computing resources eliminate the cost of capacity planning.
Agility	Agility contributes to cost reduction and productivity enhancement due to faster provisioning of systems: <ul style="list-style-type: none"> • Faster application deployment (SaaS) • Faster application development/testing (Platform as a Service [PaaS])
Customer satisfaction	Effective utilization of cloud applications can increase collaboration between the enterprise and its customers or reduce response time to customer inquiries.
Reliability	Cloud providers have redundant sites that can address business continuity and disaster recovery in a more efficient manner.
Performance	Better performance and uptime can result from continuous and consistent operations monitoring by the cloud provider.
Intangible	
Avoidance of missed business opportunities	A cloud application (SaaS) may be the critical element to land a new business or expand into new markets.
Focus on core business	IT resources can be allocated to support core business functions.
Employee satisfaction/innovation	Mobility and faster performance can improve employee satisfaction and boost innovation.
Collaboration	Real-time collaboration can increase quality and innovation.
Risk transfer	Some risk can be transferred to the cloud service provider (CSP), e.g., security breaches, data loss, disaster recovery. Risk transfer can be a tangible or intangible benefit.

benefits. The strategic benefits are often subjective and difficult to include in financial calculations; therefore, they may require additional analysis to measure their financial impact over the duration of investment.

Cloud Costs

Cloud solution costs include many more elements than the obvious hardware and software costs. The three types of cloud costs are start-up

(up-front costs), operational (recurring costs) and one-time (change or termination costs). **Figure 3** describes the most common costs in each of the three cost types.

Business Challenges to Consider

Cloud computing presents the enterprise with new challenges it should consider while it evaluates cloud ROI for a possible cloud solution implementation.

Figure 4 describes the common cloud challenges.

Figure 3—Cloud Costs

Cost	Description
Start-up Costs	
Technical readiness	Some investment in bandwidth may be necessary to accommodate the new demand for network/Internet access. Other infrastructure components may need to be upgraded to integrate with cloud services.
Implementation	Professional services may be needed for managing the transition to the cloud.
Integration	Professional services may be needed for integrating in-house and cloud services.
Configuration/customization	This applies to customer-based configuration for SaaS applications.
Training	IT resources may require training to manage cloud vendors and services. Users may need training on new applications.
Organizational change	Processes may require some reengineering to accommodate cloud-specific needs (e.g., change management, resource utilization monitoring, user access provisioning, internal audit).
Operational Costs	
Subscription fees	These comprise agreed-on periodic fees (monthly, quarterly, yearly) for the use of cloud services.
Change management	These may comprise the cost associated with the change management process and any cost incurred when requesting system changes.
Vendor management	These are costs associated with monitoring CSP activities, contract management, service level agreement (SLA) monitoring and enforcement, or any other activity that is geared to manage service delivery and evaluation.
Cloud coordination	For enterprises running more than one cloud service, a cloud coordination group is necessary to ensure integration and consistency.
End-user support and administration	Some of these costs are part of the subscription fee while some may be retained by the enterprise.
Risk mitigation	Countermeasures need to be implemented to control any risk that is introduced by cloud computing.
Downsize/upsized	Unless otherwise specified in the contract, some vendors may charge for downsizing or upsizing computing resources.
One-time Costs	
Revert to on premises or transfer to a different provider	<p>The enterprise may need to revert to an in-house model if new regulations or economic problems render the cloud impractical. Some of the possible costs are:</p> <ul style="list-style-type: none"> • Extracting data from the cloud and validating their accuracy and completeness • Sanitizing or shredding data from cloud storage and processing hardware • Configuring and provisioning in-house systems to replace cloud services • Penalties for early termination • Reallocating or recruiting IT resources to support services being reverted • Reallocating or procuring physical resources to host services that are being reverted

Figure 4—Cloud Challenges

Challenge	Description
Incompatibility	Cloud services may not be compatible with the existing IT infrastructure or specific systems that must be integrated.
Uptime	Cloud vendors may not be able to guarantee agreed-on uptime. In addition, uptime may be impacted by other factors, including the customer's Internet service providers.
Performance	Multitenant models can degrade performance over time if capacity is not properly planned. Internet speed can also negatively impact performance.
Security	Cloud computing represents traditional and new risk that must be accounted for and mitigated accordingly (either by the CSP or the customer).
Compliance	The ubiquitous and abstract nature of the cloud can cause an enterprise's transition from compliance to noncompliance without any notice.
Pay-as-you-go	The enterprise must implement controls to avoid overage charges incurred when systems stay connected after a demand spike is over.
Lock-in (hardware or vendor)	Customers may become locked into a specific technology or a specific cloud vendor, which can prevent portability.
Cloud consumerization	Business units may be able to procure cloud services without involving IT. To prevent this situation, the enterprise must adapt its governance framework to control cloud services procurement.
Limited customization (Black Box)	Cloud applications may not be customized every time the business process changes, making the business process a "Black Box" due to costs associated with each modification or application limitations.

A Practical Approach to Measuring Cloud ROI

Calculating ROI for cloud services requires an understanding of business requirements/drivers, organizational maturity, control considerations and regulatory requirements. The three-phase approach for ROI that is presented in this section suits an enterprise that has reasonably mature operations

(i.e., existing systems and business processes) and is considering moving to the cloud primarily to achieve cost savings. The concepts in this approach can also be applied to other scenarios; some steps may need more or less emphasis to suit the circumstances.

Figure 5 outlines the three phases of estimating cloud ROI and suggests questions to address in each step.

Figure 5—Cloud Phases and Steps

Phase/Step	Guidance/Key Questions to Answer
Phase 1—Determine Cloud Costs and Benefits for Optimal Cloud Solution	
a. Define high-level business (functional) requirements.	<ul style="list-style-type: none"> • What business functions need to be covered? • What are the business drivers for adopting cloud-based services? • How can cloud-based services support business processes? • What compliance requirements (e.g., US Sarbanes-Oxley Act 2002, US Health Insurance Portability and Accountability Act [HIPAA], Payment Card Industry Data Security Standards [PCI DSS]) are relevant?
b. Define initial/baseline cloud service model.	<ul style="list-style-type: none"> • What type of cloud service model (Infrastructure as a Service [IaaS], PaaS or SaaS) is needed? • What type of deployment model (public, private, community or hybrid) is most appropriate? • Where will services be physically located (e.g., on premises, off premises, specific geographic location)? • Who will deliver the services (e.g., third party, in-house, mix or cloud broker)? • For this baseline, start with a model that is simple and low-cost (e.g., public SaaS), but rule out options that will not meet major compliance requirements (e.g., focus on in-country providers if use of foreign providers is prohibited). • The baseline solution may not be the optimal one or may fall outside of the enterprise's risk tolerance, but later steps should address these concerns.

Figure 5—Cloud Phases and Steps (cont.)

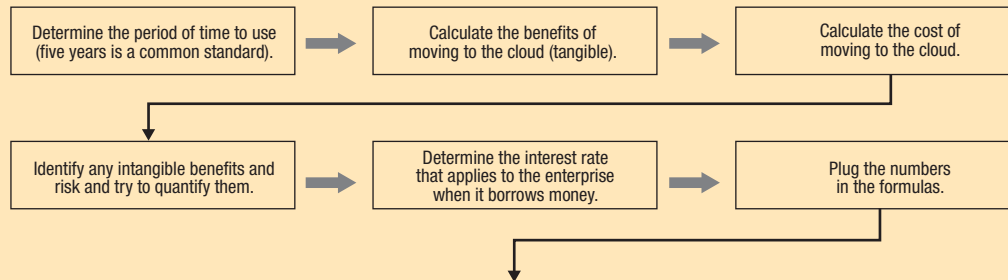
Phase/Step	Guidance/Key Questions to Answer
Phase 1—Determine Cloud Costs and Benefits for Optimal Cloud Solution (cont.)	
c. Risk-assess initial/baseline cloud model.	<ul style="list-style-type: none"> • Identify the risk areas to be considered, for example: <ul style="list-style-type: none"> – Multitenancy – Network dependency – Abstraction – Data usage limitations – Security – Privacy – Up-front migration cost – Cross-border data location – Vendor lock-in – Hardware lock-in – Data ownership – In-house skills required to manage the cloud • Determine countermeasures to mitigate the areas of risk outside of the enterprise risk tolerance. • Examples of risk mitigation measures include: <ul style="list-style-type: none"> – Data encryption/tokenization managed by the customer to protect against unauthorized data access by cloud provider staff – A revert-back strategy to protect against potential failure of the cloud provider business – Backups/audit trailing housed on customer premises to protect against loss of access to cloud services – Clear and comprehensive SLAs that include a right-to-audit clause – Implementation of in-house disaster recovery plan (DRP)
d. Estimate costs.	<p>The costs may include:</p> <ul style="list-style-type: none"> • Cost of migrating from the current model to a cloud-based model, for example: <ul style="list-style-type: none"> – Rewriting applications to operate in a virtualized environment – Reformatting data to suit SaaS provider formats – Setting up federated identity and access management – Implementing processes to manage the cloud • Cost of operating the cloud-based model, for example: <ul style="list-style-type: none"> – Cloud provider fees – Software licensing and support fees – Data communication fees – Cloud system administration • Cost of implementing and operating countermeasures to mitigate risk, for example: <ul style="list-style-type: none"> – Data encryption tools – Planning and testing revert-back strategies – Maintenance of backups and audit logs offline from provider <p>The calculations must also include the following factors:</p> <ul style="list-style-type: none"> • Estimate tangible benefits, for example: <ul style="list-style-type: none"> – Increased sales due to improved availability, scalability of systems, increased revenue from sales representatives having better access to information while traveling, reduced head count supporting traditional IT systems • Assess intangible costs/benefits. These may include such considerations as: <ul style="list-style-type: none"> – Ability to react quickly to changing markets through rapid product release and/or scaling – Potential that cloud providers will be able to support introduction of new technical innovations faster than a traditional IT function – Risk that tightening of regulations (e.g., privacy) may make cloud services nonviable in the future, forcing systems to return to in-house – Loss of internal IT skills/knowledge that can be a strategic differentiator – Risk of being locked in to particular cloud providers/proprietary service models, potentially impeding future adoption of open standards based services as they emerge

Figure 5—Cloud Phases and Steps (cont.)

Phase/Step	Guidance/Key Questions to Answer
Phase 1—Determine Cloud Costs and Benefits for Optimal Cloud Solution (cont.)	
e. Consider other cloud models.	<ul style="list-style-type: none"> • Will it be more cost effective to change the cloud service/deployment model? For example: <ul style="list-style-type: none"> – Instead of a public cloud, will private, community or hybrid cloud remove the need for some of the security controls required for a public cloud? – Instead of SaaS, will PaaS or IaaS be more cost effective to mitigate some of the lock-in risk? • Test each of the available key alternatives against the baseline model to determine if another model is a more optimal cloud model for the circumstances.
f. Reevaluate costs/benefits to align to optimal model.	<ul style="list-style-type: none"> • After an optimal model is determined, update the costs and benefits (migration costs, operating costs, risk mitigation costs, intangible costs/benefits) to reflect this model.
Phase 2—Evaluate Costs and Benefits for Identical Requirements for Current Service Model	
a. Estimate current service model costs and benefits.	<ul style="list-style-type: none"> • Using the same definition of business requirements used in phase 1, define the current service model to meet the same functional and compliance requirements.
b. Perform (or review if one already exists) a risk assessment of the current service model.	<ul style="list-style-type: none"> • Are there any risk areas that fall outside of the enterprise risk tolerance that need to be mitigated? For example: <ul style="list-style-type: none"> – The current system is locked in to a particular technology or provider, and moving to the cloud may require considerable time, effort and money. – The current system contains intellectual property that requires high levels of security and compartmentalization. – The cloud provider may not meet current service levels, leading to degradation in service to customers and loss of business. • Determine countermeasures/mitigations that are required to bring risk to an acceptable level (e.g., use a private cloud to avoid multitenancy, assess vendor performance, assess vendor certifications and compliance profile). • To ensure an apples-to-apples comparison, review the risk areas that are considered in the optimal cloud solution assessment to ensure that they have all been considered in the current service model assessment, and <i>vice versa</i>.
c. Estimate costs/benefits.	<p>These may include:</p> <ul style="list-style-type: none"> • Ongoing operation/maintenance costs (TCO) • Risk mitigation costs • Intangible costs/benefits
Phase 3—Estimate ROI	
a. Compare current service model and optimal cloud solution costs and benefits.	<ul style="list-style-type: none"> • The simplest way to do this is to prepare a table comparing the quantified costs and benefits for the current service model and optimal cloud solution options over a period of up to five years. A longer period is not recommended due to the speed with which the IT industry changes. • For each year, calculate the net incremental cost/benefit of moving to the optimal cloud solution.
b. Calculate ROI.	<ul style="list-style-type: none"> • Several methods can be used. Engage the enterprise finance team and apply the organizational standard. • If the enterprise does not have a standard, the most direct approach is to use the simple ROI calculation, supported by a simple NPV calculation. To calculate NPV, take the net cost-benefit for each year and discount it back to the present using an approved interest rate (i.e., the rate at which the organization borrows). This should result in the total cost-benefit in present-day value.
c. Factor in intangibles.	<ul style="list-style-type: none"> • Cloud computing initiatives can involve significant intangible benefits (e.g., increased ability to release new products rapidly) and costs (e.g., potential loss of internal IT technical skills). • If these intangibles cannot be quantified reliably, they need to be described as clearly as possible and included in the ROI assessment to ensure that the final decision is based on a holistic set of factors.

Figure 5—Cloud Phases and Steps (cont.)

ROI Framework in Practice



TCO = Upfront cost + Recurring cost + Termination cost

$$ROI = \frac{(Tangible\ benefits + Intangible\ benefits) - (Upfront\ cost + Recurring\ cost + Termination\ cost)}{(Upfront\ cost + Recurring\ cost + Termination\ cost)}$$

$$NPV = - Upfront\ cost + \frac{Recurring\ cost\ year\ 1}{(1 + borrowing\ rate)} + \frac{Recurring\ cost\ year\ 2}{(1 + borrowing\ rate)^2} + \frac{Recurring\ cost\ year\ 3}{(1 + borrowing\ rate)^3} + \frac{Recurring\ cost\ year\ 4}{(1 + borrowing\ rate)^4} + \frac{Recurring\ cost\ year\ 5}{(1 + borrowing\ rate)^5}$$

To maximize the three-phase approach:

- **Focus quickly on the optimal cloud solution—** Start with an initial/baseline cloud model, e.g., public SaaS, and then iteratively identify the model that is best suited to enterprise needs (cost, risk, compliance, etc.) to make the selection process faster and more effective.
- **Make an apples-to-apples comparison—** Evaluate a holistic and comparable set of costs for the current service model and the optimal cloud solution alternatives to make a fair comparison between two solutions that are potentially very different (either comparing two different cloud solutions or comparing cloud with traditional IT). Measuring monetary values in a consistent manner increases ROI accuracy and reliability.
- **Stay within the enterprise risk tolerance—** Perform a risk assessment of the current service model and the optimal cloud solution options to help ensure that they are within the enterprise's risk tolerance and the costs of mitigating unacceptable risk are factored into the calculations. Knowing the enterprise risk appetite before the calculations begin is a must.

Phase 1 Considerations

Following are some points to consider when applying phase 1 of this ROI approach:

- Evaluating a simple and cost-effective baseline cloud model for the proof of concept enables an enterprise to quickly demonstrate the model's features, benefits and risk. With low sign-up and operating costs, many public cloud solutions can be very helpful for this purpose.
- If the enterprise is certain that it has already identified its optimal cloud option, it may be possible to skip the steps in phase 1 that are related to evaluating an initial/baseline model. However, if the ROI of the optimal model is not yet estimated, and these phase 1 steps are skipped, the question may be raised as to how it was determined that the model is the optimal model.
- Gaining a firm understanding of the risk that is related to cloud services can be challenging due to the wide variety of services offered, the lack of transparency around controls and the difficulties in comparing across providers.

Phase 2 Considerations

When applying phase 2 of this ROI approach, the steps may be relatively straightforward, depending on how much documentation and analysis exist for the current service model and associated costs. The ease of these steps depends on whether a full assessment of the current service model has been completed. If not, and unknown areas of risk exist, the enterprise could be significantly underestimating the costs of the current service model and/or the benefits of the optimal cloud solution.

Phase 3 Considerations

When applying phase 3 of this ROI approach, it is worthwhile to note that many enterprises that are moving to cloud services are redirecting a significant portion of IT operating cost savings toward managing cloud-related risk and management. This redirection is because the cloud is introducing new types of risk and the methods to manage that risk can be quite different from the approaches that are used for traditional IT (e.g., vendor management, change management, usage management). This redirection of savings to cloud-related costs may be reflected in current service model and optimal cloud solution costs.

Conclusion

Decision making around use of cloud services can be complex, and estimating the ROI is a critical part of ensuring that the path taken is the right one. Some key points to consider include:

- **Estimating ROI does not need to be complex**—ROI is just an estimate. A simple, but effective ROI calculation enables the enterprise to support an investment decision and measure whether the expected costs and benefits occur. An overly complex calculation can make it hard to understand why a decision was made and/or measure its effects, essentially defeating the purpose of performing the ROI calculation in the first place.
- **Cloud is not right for every organizational need**—The type of cloud service an enterprise selects is critical. How the cloud service is

managed is also critical. Thinking strategically about benefits, costs and risk is paramount and must be done up front, before any contract is signed.

- **Many costs may be hidden and are not obvious from the cloud provider fee schedule**—For example, while there may not be any up-front service provisioning costs from the provider, the time and effort that is spent migrating existing systems into the cloud can be expensive. The same can be said of pulling systems or data back in-house or porting them to another provider. The lesson is that selecting the right CSP can result in cost savings, but selecting the wrong CSP can be very expensive.
- **It is far easier and cheaper to change a decision (e.g., different service model or provider) when it is still on the drawing board or perhaps in the proof-of-concept stage**—It can be far more difficult and expensive to change a decision when the service is up and running, interfacing with other systems and processes, and using live customer data. With so many cloud service options available, the time the enterprise spends considering the respective ROIs and selecting the best fit for its needs is time well spent.

Author's Note

This article is based on the ISACA white paper *Calculating Cloud ROI: From the Customer Perspective*.²

Endnotes

- 1 Schmidt, Marty J.; "Encyclopedia of Business Terms and Methods: Return on Investment," Solution Matrix Ltd., USA, 2011
- 2 ISACA, *Calculating Cloud ROI: From the Customer Perspective*, USA, 2012, www.isaca.org/Knowledge-Center/Research/ResearchDeliverables/Pages/Calculating-Cloud-ROI-From-the-Customer-Perspective.aspx