IT Financial Management for Cloud

Create IT cost transparency, enable better resource allocation decisions, and increase IT spend accountability

VMWARE WHITE PAPER
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Preface

Today’s IT organizations are under increasing pressure to deploy private or hybrid clouds and become a service provider to their business users. In many cases, this change is motivated by the increasing prevalence of business users going outside of corporate IT to procure IT services direct from external cloud vendors. In other cases, IT organizations view cloud as the answer for enabling greater innovation in the business. Whatever the catalyst, those organizations that have started making the move to cloud have already realized real gains in efficiency, agility, and reliability.

Based on its extensive experience working with customers on their implementations, VMware has identified five capabilities that are key to unlocking the efficiency, agility, and reliability benefits of cloud:

- **On-demand services:** Service catalog with standardized offerings and tiered SLAs, actively managed and governed throughout its lifecycle, and with end-user access via a self-service portal.
- **Automated provisioning and deployment:** Automated provisioning, release, and deployment of infrastructure, platform, and end-user compute services.
- **Proactive incident and problem management:** Monitoring and filtering of events, automatic incident resolution, and problem diagnosis.
- **Cloud security, compliance, and risk management:** Security, compliance, and risk management policies embedded into standard configurations enabling policy-aware applications and automation of security, audit, and risk management processes.
- **IT financial management for cloud:** IT cost transparency and service-level usage-based ‘showbacks’ or ‘chargebacks’ using automated metering and billing tools.

This white paper introduces IT financial management (ITFM) for cloud and discusses its business impact and implementation.
Executive Summary

When organizations provide access to IT as a service by deploying a private or hybrid cloud, business units reap the benefits of real-time access to dynamically scalable resources. However, without governance, enabling end-users to provision IT resources at the touch of a button can have costly repercussions. The newfound ease of access often leads to explosive growth in demand for those resources, and commensurate increases in IT expenses. IT financial management (ITFM) for cloud counterbalances this surge in demand by linking IT cost recovery to usage.

ITFM for cloud is a critical capability required for organizations to unlock the full efficiency, agility, and reliability benefits of cloud computing. It facilitates better resource allocation decisions via greater cost transparency, alignment of IT costs with service levels, and increased spend accountability. In addition, ITFM for cloud provides the tools that help IT improve efficiency over time by monitoring usage and improving utilization, capacity planning, and load-balancing. Lastly, it introduces new flexibility around how business units deploy coveted resources; business users are able to scale up IT spend based on success rather than needing to make large up-front investments in advance of demand.

In this paper, we explore the “how” behind successful implementations of ITFM for cloud. A four step roadmap highlights the key decisions organizations will need to make along the way, framing the associated options and tradeoffs. Finally, we highlight the key success factors and changes needed in process, organization, and tools to implement ITFM for cloud.
Context

ITFM for cloud describes the financial operating model that maintains the balance between supply and demand for IT resources in a private or hybrid cloud deployment. It specifies the sources of initial and ongoing funding for new cloud capacity build-out, defines the approach by which costs are associated with service offerings and apportioned back to the business users, describes the mechanics of cloud IT investments and budget cycles, and elevates the role of IT demand forecasting and capacity planning.

ITFM for Cloud and the Cloud Capability Model

As with many other aspects of cloud, there are several levels of capability in ITFM for cloud (Figure 1).

- **Standardization**: In this most basic level of cloud capability, the organization has started to build financial recognition. This entails an understanding and awareness of available assets and capacity as well as associated costs. Such an organization is well on its way toward cost transparency.

- **Service Broker**: At the next capability level, IT has achieved full cost transparency for the cloud services, with granular attribution of costs to the offerings in the service catalog. Prices are associated with each service and tenants’ usage is metered. Cloud tenants, often the lines of business, are either informed of their incurred costs via a ‘showback’ mechanism or directly billed for those costs via a ‘chargeback’ mechanism.

- **Strategic Partner**: At the highest capability level, IT has transitioned to become a true partner to the lines of business. IT and the lines of business share governance responsibilities for the cloud service catalog, jointly assess trade-offs in cost, quality of service, and risk when determining the appropriate service offering to meet business requirements, and collaborate to develop accurate demand forecasts for capacity planning.

The benefits of implementing ITFM for cloud differ depending on the capability level companies aspire to reach. For example, ‘showback’ and ‘chargeback’ mechanisms are very effective at managing demand for well-understood commodity services, but may not be sufficient in driving the right tenant behavior and accountability for more advanced services where the trade-offs go beyond price.
**Difference from Traditional IT**

**Better alignment of IT resources with business value**
ITFM for cloud represents a new financial operating model for most IT organizations. There are several important differences from traditional IT financial management.

**Links cost recovery with actual service consumption**
A key focus of ITFM for cloud is to improve cost transparency by aggregating costs of IT service delivery and attributing those costs to services at a granular level. Those same services are priced on a per-unit basis and charged back to the cloud tenants (i.e., lines of business) based on usage. This tight linkage of cost recovery with actual consumption enables more efficient resource allocation and decision making, while assigning IT spend to the lines of business based on their actual usage. The net result is an improved ability to allocate IT resources in alignment with business value.

**Bases capacity build-out on aggregate demand forecasts**
Traditionally, IT sets up and operates basic shared services (e.g. network) and delivers projects for the lines of business. The lines of business control decision-making and thereby dictate new IT CapEx deployment through the projects being delivered. As a result, in many companies IT infrastructure grows on a project-by-project basis.

In a cloud environment, demand forecasting and capacity planning becomes much more important. IT must be able to anticipate and deploy capacity so it can support the requirements of the lines of business who will only pay for the resources they use when (or shortly after) they use them. IT therefore requires more control over the IT capital planning and investment process.

**Orients lines of business on enforcing service level agreements**
In traditional models, because at least part of the infrastructure is funded on a project-by-project basis, the sponsoring lines of business typically “own” those assets. In a cloud environment, IT infrastructure is a shared resource and lines of business instead manage IT against service level agreements (SLAs). This allows business users to retain control by providing them access to the resources they want, for the duration they want, with the added advantages of shared infrastructure coupled with more responsiveness.
Business Impact

Efficiency
A service catalog with pricing allows IT to align its services with business unit needs and helps business users decide on the service levels that best match their business requirements. Without associating a price tag to a service, it is natural that business users may request higher service levels than needed for their projects. Adding a cost encourages business users to consider the level of reliability that is truly required, and request only that.

Better alignment of IT resources with business value
ITFM for cloud is a critical capability required for organizations to unlock the full efficiency, agility, and reliability benefits of cloud computing.

Increased line of business accountability for IT spend
Business users also become more accountable for their IT spend as they are billed for (or at least made aware of) their actual usage. In traditional IT environments, lines of business that dominate capital investments may be inadvertently subsidized by others, as those who use fewer resources can end up paying the same amount. In creating accountability for actual IT resource consumption, ITFM for cloud can reveal surprising insights into actual profitability of different business lines.

Improved resource utilization
The granular usage data that is collected as part of ITFM for cloud can be used to inform capacity planning, ultimately resulting in improved utilization of IT resources. At setup, IT can help business users right-size their project requirements and provide gradual access to cloud resources as demand grows. This incremental provisioning approach helps manage resource needs over the project and reduces over-provisioning.

IT can also adjust service pricing to smooth demand peaks. After examining typical demand fluctuation (e.g. daily or weekly peak times), IT can improve load balancing and create incentives (e.g. spot pricing) to direct low-priority workloads to off-peak times. On longer cycles, IT can plan for seasonal demand and ensure resource availability without increasing capacity, by supporting the increased demand through an external cloud provider, for example.

Agility
Faster and more flexible access to resources
One of a cloud environment’s key advantages is faster provisioning cycles and the ability to easily increase capacity. Regardless of what financial management model is in place, business users can consume IT services on-demand and accelerate their initial ramp-up times or resource access according to project demand. The ability to consume IT services on-demand without a large upfront investment not only enables but also encourages business users to innovate and experiment.

Pay-as-you-go access to shared resources also gives business users the ability to quickly scale down if the project does not meet initial demand forecasts. IT can likely repurpose the resources for other tenants and business users don’t have to worry about what to do with unutilized capacity.

Reliability
Incentives to adopt standard platforms and configurations
ITFM for cloud enables IT to use pricing to drive adoption of standardized platform configurations. This enables IT to ‘reward’ business users for choosing a standard platform by offering them a lower price. IT is still able to provide custom configurations to those with a business need for it, but at an increased cost. This will increase standardization, and in turn, reliability, by creating a less complex environment for IT to manage.
Process Design and Implementation

This section focuses on the process organizations follow when preparing for and then implementing ITFM for cloud. Major steps include: identifying funding for cloud build-out and engaging stakeholders, defining the cost allocation by service, defining the transfer price and incentive policies, and adjusting related processes accordingly (see Figure 2).

Using a phased rollout approach for each step or starting with a controlled pilot can make the initial transition to ITFM for cloud smoother and build credibility and expertise for the IT organization. IT will discover what works and what does not work without significantly impacting the organization or its reputation. Starting small also increases the amount of attention IT can dedicate to each line of business or future tenant. Early successes, no matter how small, will help establish credibility and confidence throughout the organization. As it scales the pilot, IT can incrementally invest in infrastructure, reducing the need for large up-front investments.

Figure 2. Overall approach to prepare for and implement ITFM for cloud

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**Step 1: Identify Funding for Cloud Build-Out and Engage Stakeholders**

This first step involves engaging sponsors and tenants, defining a funding model, and communicating the strategy to the broader organization.

**Engage the CIO and CFO from the start**

It is critical to involve and gain the early alignment of the CIO and CFO in any implementation of ITFM for cloud. Active sponsorship from these two stakeholders conveys the relevance and importance of the initiative. The CIO should champion the initiative and be its key sponsor, as this transition is a fundamental role change for the IT organization. The CFO needs to be a partner and decision maker because of the significant financial adjustments required, including potential changes in capital and budgeting processes, financial controls, and accounting practices. Active engagement of the CFO is also important to ensure the initiative isn’t perceived as just another IT-driven program with little input from the lines of business.
Decide whether tenant onboarding is mandatory or opt-in
As future tenants for the cloud environment, the lines of business are key stakeholders in any implementation of ITFM for cloud. Identifying early adopters of the new model and requesting their input on the initial design phase is important.

However, there is a broader question around how to scale and eventually ensure wide adoption of the cloud environment. Here, organizations must choose between mandatory participation and a gradual opt-in approach. Mandatory participation helps IT achieve scale more rapidly but can also stress operations if there are difficulties provisioning resources or staffing the team to service the rapid demand growth. In addition, if IT’s credibility within the organization is low, mandatory participation may reduce credibility even further and further stress the relationship between business users and IT.

A middle option is to institute a ‘corporate cloud first’ policy in which key entry points (like Finance) assume the project request will be implemented in the corporate cloud, unless the line of business has a very compelling reason to do otherwise. This approach follows directly from the “virtualization-first” policy that has been used very successfully by customers in the virtualization space.

Determine source of initial and long-term funding
As previously mentioned, IT will have more responsibility in forecasting demand and planning capacity to support its catalog of services. There are several options around the source of funding for the initial setup (i.e., the initial build-out of cloud infrastructure capacity) and on-going growth (i.e., adding incremental capacity to address new demand). Exhibit 1 discusses these options and their trade-offs in detail.

Involve future tenants in decision process and communicate roadmap
Once the initial objectives and setup model are agreed, the next step is to develop the roadmap for implementation and communicate it to the organization. The communication should clearly specify the objective of the effort and articulate the value proposition for the business. It should also outline the project governance. Ensuring sponsors and future tenants participate in design decisions early on will promote buy-in. Finally, leadership should also share the initiative milestones and timeline. Communication should continue throughout the entire process.
**EXHIBIT 1**

**Initial funding options**

IT needs financing to build a starting infrastructure and onboard its first few tenants. It must make a decision about where initial funding will come from, even if a pilot or phased rollout approach reduces the amount needed.

- **Corporate funds the initial start-up costs:** The corporate budget funds IT to build an infrastructure with some flex capacity.
  - **Benefits:** Removes the initial cost burden from both IT and the lines of business, speeding deployment of the initial environment. Lines of business can immediately adopt a pure OpEx model, separating CapEx decisions from projects. IT can also use the funding to build a buffer of capacity, increasing flexibility by reducing the need for longer term resource commitments from tenants.
  - **Drawbacks:** Neither IT nor lines of business have skin in the game at this point—corporate pays the price of IT and line of business decisions.

- **Tenants pay the startup costs:** The first lines of business to take advantage of the environment supply IT with the assets or CapEx injection required to build the minimum infrastructure.
  - **Benefits:** Lines of business are motivated to work closely with IT to get the model and implementation right because their resources are on the line.
  - **Drawbacks:** Lines of business must continue to pay both CapEx and OpEx until IT can accumulate enough capital to fund future infrastructure expansion. Creates a negative incentive as early-adopting lines of business are subsidizing future tenants. If the opt-in method of tenant onboarding is used, this funding approach could be a non-starter.

- **IT uses its existing maintenance capital budget:** IT can initially use a part of its maintenance budget to stand-up the new cloud infrastructure.
  - **Benefits:** Maintains existing corporate IT spend envelop and removes the setup costs from the lines of business and corporate.
  - **Drawbacks:** Because it is a limited budget that must also cover maintenance, new tenants must be on-boarded much more slowly, resulting in a longer path to the cloud environment and IT financial operating model achieving scale.

**Initial funding: If IT has funding from other sources, time to implement ITFM for cloud decreases**

*Figure 3. Trade-offs in options for initial funding*
EXHIBIT 1 (CONTINUED)

**Long-term funding options**

Long-term, steady funding is required to support new projects and growth while maintaining flexibility and low up-front commitment levels for tenants. IT has two options for obtaining this funding.

- **Fund CapEx investments via “revenue” from tenants**: IT is set up as a line of business. Tenants pay for IT services using OpEx, which IT treats as revenue. IT uses the “revenue” to make CapEx investments, funding growth and maintaining a level of flex capacity to support new projects/users.
  - **Benefits**: Centralizes CapEx budgeting for IT within the IT organization and simplifies accounting for lines of business with OpEx-only model.
  - **Drawbacks**: Can require changes to corporate financial governance models and a new IT accounting system.

- **Use central CapEx funding for investments**: If IT does not have its own line item on the organization’s financials, it may not be able to use OpEx payments for new CapEx investments. In this case, IT should estimate its required CapEx budget based on upcoming projects/demand forecasts and request the CapEx funding from corporate. Tenants will pay IT for the OpEx required for them to run the projects.
  - **Benefits**: Minimizes disruption if IT is not already set up as a line of business
  - **Drawbacks**: Requires advanced capabilities in demand forecasting and capacity planning

**Step 2: Define Cost Allocation by Service**

This second step in implementing ITFM for cloud includes building an inventory of all cloud-related costs, creating the bill of materials for each cloud service and mapping associated costs, and defining the cost attribution model to calculate per-unit service costs.

**Build inventory of cloud-related costs**

The objective here is to develop a detailed and granular understanding of all costs that can be attributed to cloud services or end users. The inventory of costs should account for all IT resources supporting the cloud-based service catalog (e.g., IT-supported mobile devices would not be part of this step). If no current inventory exists or if it is outdated, this step may require significant upfront effort.

A functional IT inventory should consider all relevant hardware and software license spend. Labor, network, facilities and any other shared spend should also be accounted for. If a recurring process to update the inventory when provisioning or de-provisioning capacity does not exist, it should be created.

**Create bill of materials for services and map costs**

This step creates the bill of materials for all IT services in the catalog and maps cost items to relevant cloud services. The inventory of costs developed previously now needs to be mapped to the services being delivered from the cloud environment. A service catalog is essential for this step and needs to be created if it does not already exist. The service catalog should exist in a format that can be easily shared with business stakeholders and services should be defined to facilitate comparison against external benchmarks.

**Define cost attribution model to calculate per-unit service costs**

The final step is to aggregate the direct costs associated with each service, including allocations of indirect costs (e.g., data center or network infrastructure), and divide by some logical unit of demand (e.g., VMs, GBs of storage) for that service. The key here is defining the right unit of demand, such that tenants can be “charged” for consumption they directly control. If business users cannot adjust their consumption (e.g., reducing number of VMs, downgrading SLAs), the financial model’s relevance is severely diminished. It is also important to consider tradeoffs between simplicity and effort of reporting, the fairness of the model, the predictability of demand, and tenants’ level of control over demand and thus overall service cost.

Exhibit 2 provides more insight into the available options for cost attribution model.
### EXHIBIT 2

**Cost attribution models**

Depending on the current cloud capability level, different models make sense for different organizations. While the variable cost option is the most advanced in terms of the Cloud Capability Model, and will certainly help capture the benefits promised by cloud, other usage-based models may be more attractive given various tradeoffs.

- **Weighted based on consumption proxies**: Total costs are divided among tenants based on an IT-related proxy for consumption (e.g. number of network IDs used).
  - **Benefits**: It is simple to set up / maintain and costs are highly predictable.
  - **Drawbacks**: It does not offer much cost transparency or fairness, as the unit of cost only indirectly maps to usage. In addition, while tenants can control costs to some extent by managing their consumption (e.g. reduce the number of IDs), overall demand is not directly tied to their charges.
  - **Other considerations**: This model works best when fixed costs contribute heavily to overall IT costs. For example, if shared services are the biggest cost drivers (e.g. compute and storage are low compared to hardware costs) and/or usage is fairly consistent across tenants, this simple allocation method may be sufficient to link costs to business users.

- **Fixed cost per service and time period**: This model has tenants pay a one-time cost for a period of time/ fixed set of resources before usage. Tenants select a service from the catalog and pay up-front for the entire set of resources defined by the offering, regardless of which portions they actually use. For example, if the tenant purchased 100 GB of storage service and only used 80 GB, it would still have to pay for the 100 GB.
  - **Benefits**: Although more complex than the weighted based on consumption proxies model, this approach is still relatively simple to execute, requiring no granular measurements. IT can also charge tenants before supporting them.
  - **Drawbacks**: Lack of usage data can lead to inaccurate demand forecasts and under-utilization of cloud resources.
  - **Other considerations**: This is a good option when a robust service catalog is in place and the offerings are well-aligned with the core services demanded by the lines of business. By familiarizing tenants with the concept of charges based on use of a service over a specified time period, it can serve as a stepping stone toward the fixed unit cost per service model.

- **Fixed unit cost per service**: This model attributes all costs based on direct usage.
  - **Benefits**: Fairest of the models and offers the highest level of cost transparency.
  - **Drawbacks**: More difficult to implement than the other models. Also runs the risk of creating billing reports that are too detailed for tenants to understand and take action against. Because IT charges the tenants after usage, this model requires that IT find a way to fund the initial investment in the cloud build-out. Finally, this model can reduce the predictability of IT expenses for tenants as it tightly couples charges with demand / usage.
  - **Other considerations**: This model works best when IT has a good understanding of its total cost of ownership, and it can accurately attribute all costs to usage and the primary drivers of costs are easily measured services (e.g. units of data transferred).

A variant of the fixed cost per service model is ‘pay to play’. In ‘pay to play’, tenants pay a small up-front fee to gain access to IT resources. All other charges are fully usage-based. IT has some flexibility while attributing costs correctly and gets a portion of payment in advance of usage. However, tenants end up paying a higher price.
Step 3: Define Transfer Price and Incentive Policies

Setting the transfer price is the next critical step in implementing ITFM for cloud. It involves measuring per-unit service costs over time to establish a stable cost baseline, defining the transfer pricing strategy, and establishing a ‘showback’ or ‘chargeback’ mechanism.

Measure per-unit service costs to establish stable cost baseline

A major challenge with the more granular cost attribution models is that per-unit service costs can vary substantially over time depending on demand for or utilization of the underlying resources. Thus, the first step toward establishing the right transfer price is tracking demand and resource utilization to establish a stable cost baseline.

In a cloud environment, management tools can track IT infrastructure utilization and the impact on associated per-unit service costs. Once these tools are in place, the organization should measure resource consumption for a few cycles and use the data to inform the design of the pricing model.

Define transfer pricing strategy

Setting the right transfer price is an essential part of ITFM for cloud. A well-defined pricing strategy serves several purposes: motivates tenants to onboard (e.g. by providing subsidies); smooths demand (e.g. directs non-critical workloads away from high demand periods); promotes the technology strategy (e.g. makes non-standard platforms/ high-touch support costly); and supports development of IT services (e.g. treats incoming spend as IT revenue, incorporates a margin to fund future improvements and growth).

Exhibit 3 discusses some of the options and benefits of different pricing strategies.
### Pricing strategies

While many options exist for the high-level pricing strategy, each comes with a set of tradeoffs that have strong implications for tenant behavior and overall sustainability. Organizations are not limited to using only one of these pricing strategies; they could choose to employ different pricing methods for different services. However, if an organization chooses to use multiple methods, it should ensure that the overall pricing scheme does not become too complex for tenants to easily understand and predict or for IT to implement.

- **At cost:** Services are priced at the true cost of delivery.
  - **Benefits:** Done right, this strategy allows IT to fully recover the costs of providing the cloud services and makes it easy for tenants to agree that they are being charged fairly.
  - **Drawbacks:** The cost attribution model must be predictable and reliable so that tenants’ costs are not constantly changing. This may rule out some of the more granular cost attribution options. In addition, this strategy makes it tough to get the initiative off the ground unless a centralized source of funding provides a margin for growth.
  - **Other considerations:** This strategy works well when both businesses and IT understand total costs and IT is not providing services to third parties.

- **Cost plus margin:** Services are priced somewhat higher than the cost of delivery.
  - **Benefits:** This method builds in a margin for IT to fund growth and creates breathing room within the cost attribution model.
  - **Drawbacks:** Tenants need to buy-in to the extra charges beyond the cost of using the service.
  - **Other considerations:** This strategy works well when IT needs to prove services delivered for tax accountability and deductibility and/or when IT is providing services to third parties.

- **Market based:** Services are priced at what they can be bought for from an external vendor.
  - **Benefits:** This strategy helps IT remain competitive with external vendors and builds IT’s credibility with the lines of business.
  - **Drawbacks:** Prices of external vendors may have no resemblance to the cost of the services provided by IT and the quality of service may not be comparable either. For this strategy to work, IT needs either corporate subsidies, the scale that will enable them to operate as efficiently as external vendors, or the ability to alter service quality to match that of external vendors. Given this, market-based pricing may be better for steady-state rather than initial launch.
  - **Other considerations:** This strategy works best with variable cost per service cost attribution model or a service catalog that matches well with that of external vendors so that tenants can easily compare unit cost components.

- **Current pricing:** Cloud services are initially priced so that tenants pay what they pay today.
  - **Benefits:** This strategy motivates tenants to on-board.
  - **Drawbacks:** Tenants must already be paying something for the IT services they are accessing. If costs for cloud services are higher than what tenants generally see, especially early on, this strategy requires corporate subsidies.
  - **Other considerations:** This strategy is only viable during the initial setup of ITFM for cloud, or when onboarding a new tenant, as prices will eventually need to be adjusted to reflect costs.

Once the basic pricing strategy has been set, IT should set the transfer price on the services offered, market the offerings, and test pricing with tenants to determine elasticity. Price can be further adjusted to influence:

- **Demand smoothing:** IT can direct low-priority workloads to off-peak times via dynamic spot pricing. For example, if utilization levels are high on Mondays and low on Fridays, prices can be set so that usage is more expensive on Mondays.

- **Platform standardization:** Access to one-off or customized services can be priced higher, rewarding tenants for choosing the standard platform unless there is a true business need. A standardized platform allows IT to load balance more effectively and lower their maintenance costs, but tenants have less flexibility.

- **Adoption of new technologies:** IT can also steer demand via price towards new technologies it wants to adopt. Setting the right price point can help motivate adoption of new technologies.
Implement a ‘Showback’ or ‘Chargeback’ Mechanism

This part of the implementation closes the loop and provides feedback to business users, who receive a report on their consumption.

Two options exist for the report, based on the financial model’s objective:

1. ‘Showback’: Tenants receive reports on their IT service consumption without actually being charged for this usage. ‘Showback’ increases cost transparency, educates users about the benefits of ITFM for cloud, and motivates self-correcting behaviors in the company.

2. ‘Chargeback’: Tenants receive a formal invoice that details levels of service consumption and transfer prices for each service consumed. ‘Chargebacks’ hold business users fully accountable for their consumption and move IT closer to a true service provider. A phased approach works well when implementing ‘chargebacks’. Organizations often begin by charging users for their directly measurable consumption, then slowly add other fixed cost components as tenants become more comfortable with chargebacks and IT’s cost attribution improves.

‘Showback’ is most frequently used as a stepping stone to ‘chargeback’, as it educates tenants about their usage costs before actually charging them for it. It also buys IT time to fine tune financial management policies and cost allocations. However, ‘showback’ can also be a viable end-state. For example, if IT has only a few tenants and implementing an IT ‘chargeback’ billing system is costly, ‘showback’ may be sufficient. Similarly, if IT’s CapEx and OpEx are coming from a central source on behalf of the lines of business, there is no need to modify financial systems to bill directly to individual business users. In this case, ‘showback’ is a good solution, providing corporate a view into the IT costs incurred by each line of business.

Regardless of which option it chooses, IT must educate tenants on the contents of their billing report. In traditional IT, costs are often hidden throughout the organization, leaving lines of business in the dark to current IT costs and service levels. With cloud, IT consolidates these costs and makes them transparent, which can create sticker shock when compared to what third parties are offering. In order to prevent sticker shock based on perceived high prices, IT needs to commit a material amount of time to tenant education (i.e., walking tenants through the report and showing them where the numbers came from and how they compare with current costs). Only then can ‘showback’ and ‘chargeback’ mechanisms encourage changes in business user behavior.

Step 4: Adjust Related Processes to Align with New Model

The final step in implementing ITFM for cloud revisits other corporate processes and governance to ensure alignment with the new model, including accounting practices, budgeting, and demand forecasting and capacity planning.

Modify accounting practices to enable IT ownership of CapEx

Introducing a ‘chargeback’ model usually requires changes to existing financial accounting practices. One of the biggest challenges IT may face is to integrate the ‘chargeback’ system into the financial system. In addition, business users that traditionally controlled their own IT CapEx budget will now need to find OpEx to access IT’s resources. Finance may need to establish new accounting rules or revise corporate governance structures to enable IT to use OpEx from the lines of business for capital investments. Ideally, IT would be responsible for capital investments; these could be funded centrally or via tenant OpEx payments and should be based on aggregated demand projections from the cloud tenants.

Review budget cycles and establish governance

ITFM for cloud increases visibility on demand for IT resources. This information enables business users to plan their demand for resources with greater accuracy. In addition, moving to a usage-based model gives business units more flexibility and agility. Projects can now ramp-up gradually, reducing the need for large upfront resource commitments, and scale-down when needed. In order to take the greatest advantage of this information and flexibility, organizations should consider shorter budget cycles (e.g. quarterly) for IT investments.
Another process that can be impacted by ITFM for cloud is budgeting and sign-offs for new IT project investments. For large projects, business units may have to go through an additional gating process to assess incremental capacity requirements to the shared infrastructure and if the project should bear some or all of these incremental costs. For smaller projects, business users will increasingly manage consumption directly through the service catalog. Establishing quotas for cloud service consumption offers a mechanism for projecting overall spend, which could otherwise vary widely.

**Mature demand forecasting and capacity planning processes**

As IT builds its centralized cloud infrastructure, IT is responsible for evaluating future capacity requirements and provisioning according to business demand. To acquire this information, ITFM for cloud provides the process to regularly (e.g. monthly) review projected demand from the lines of business. The input is adjusted for prior consumption patterns (e.g. seasonal vs. regular workload). This produces an aggregate view of demand for cloud services, which IT can then use to deploy the appropriate amount of cloud capacity.

**Adapt performance management practices and update KPIs**

ITFM for cloud represents a new relationship between IT and the lines of business; IT takes on the role of an internal service provider and service broker, with new goals that should be monitored and evaluated. Service-level agreements (SLAs) provide an objective set of metrics to regularly evaluate performance (e.g. service availability, incident support response time). In addition, IT should be accountable for efficiency targets across the entire IT infrastructure, both cloud and legacy.

KPIs should evaluate performance across the dimensions of efficiency, agility, and reliability. Example metrics include total cost per compute instance, percent of IT labor cost spent on application development, average time to provision new infrastructure resources, percent of overall capacity procured on a variable basis, percent of time SLAs are met, and downtime per application.
## EXHIBIT 4

### Running IT like a business (as a service provider)

Though in most cases, IT will never be a profit-seeking organization, the goal of ITFM for cloud is to hold IT accountable for delivering the same level of service and cost management as an external vendor would provide. The following set of decisions will best achieve this result:

- **Institute an opt-in model for tenant onboarding:** Unlike the mandated participation option, the opt-in model forces IT to remain competitive with alternative options in order to attract lines of business as ‘customers’ or tenants. As IT gains credibility, this model can be adjusted to the ‘corporate cloud first’ approach.

- **Increase collaboration with business leaders:** ITFM for cloud is built around a service catalog. IT needs to collaborate with business leaders to ensure this service catalog meets their needs, but is practical to maintain.

- **Follow a market-based pricing strategy:** Offering prices that are competitive with those of external vendors ensures sustained demand for the cloud service offerings. Even if lines of business are prohibited from procuring cloud services directly from external vendors, following a market-based pricing strategy will help build IT’s credibility in the eyes of the business leaders and decision makers.

- **Create a marketing strategy to attract tenants:** With an opt-in model for tenant onboarding, IT needs to create a marketing strategy to educate and motivate the lines of business to use internal cloud services rather than go directly to external vendors or build their own solutions. The marketing message should highlight parity in price (for a given service level), SLA flexibility, and the increased support and security offered by an internal solution.

- **Focus on achieving continuous cost efficiencies:** In order for IT to sustain a market-based pricing strategy and remain competitive with external vendors, it needs to focus continually on driving down its costs (e.g. improve procurement, streamline operations processes).

- **Implement ‘chargeback’ to automate billing:** ‘Chargeback’ is a key component to running IT like a business. Tenants pay IT only for the services they consume. IT needs to be able to explain charges and to audit them.

- **Create a ‘CFO of IT’ role:** Like any business, IT needs a strong leader in financial management. This role would handle all cost accounting and attribution, oversee demand forecasting and capacity planning, and have approval on investments and growth projects.

- **Establish a tenant operations/customer support group:** IT also needs a tenant operations / customer support group to market this initiative and be the primary interface with the lines of business. This group would educate customers (i.e., tenants), respond to billing inquiries, and assist during onboarding and service selection.

- **Update KPIs:** IT also needs to measure itself against a balanced scorecard as if it were a business. KPIs should evaluate performance across the dimensions of efficiency, agility, and reliability.

- **Set IT up as a separate line of business:** This enables IT to treat tenant payments as revenue. Once IT views incoming capital as revenue, it is responsible for making the same types of investment decisions and tradeoffs that an external vendor or business unit would need to make.
Organizational Considerations

The people strategy is another pillar of Cloud Operations. Establishing two new roles is a recommended best practice to enable the successful transition to ITFM for cloud.

Establish ‘CFO of IT’ Role

As IT transitions into a cloud service provider and service broker, it is helpful to establish a ‘CFO of IT’ role. The position should have strong relationships with and accountability to both the CIO and the corporate CFO. The role would have responsibilities that extend well those of a traditional IT financial controller, including:

• Maintain an accurate inventory of IT costs
• Provide input into the design of the cloud service catalog, particularly insight into where there is true budget-backed demand for services
• Establish and continually refine the cost attribution model and per-unit cloud service costs, accounting for the unique financial practices of the organization (e.g. policies around compliance, depreciation)
• Oversee demand forecasting and capacity planning processes
• Define pricing strategy and set price levels for cloud services
• Generate reports (for ‘showback’) and / or invoices (for ‘chargeback’)
• Manage IT cost recovery and budgeting cycles
• Approve new capital investments to expand cloud capacity
• Sign-off on any other IT growth projects

Establish a Tenant Operations / Customer Support Group

To enhance service delivery, IT should establish a specialized group that is the primary point of contact for business users. This group will include customer relationship managers, and is responsible for all customer interactions beyond simple transactions (e.g. open a trouble ticket, request a simple service), which will still be handled by a service desk or self-service portal. Key responsibilities of the tenant operations / customer support group include:

• Market to internal customers
• Educate and onboard new tenants
• Help business users select standard offerings from the service catalog
• Support project evaluation and facilitate as business units develop budgets and prioritize projects
• Communicate chargebacks and resolve billing issues
• Serve as a point of escalation for major incidents or recurring problems
• Capture feedback to improve the service catalog, including new service requirements
• Collect service demand projections from tenants
Technology / Tool Considerations

An important aspect of cloud operations is establishing the right tools and technologies to support the process. In the case of ITFM, tools are required for IT to evaluate its internal costs and for IT to measure business usage and charge back costs. Today, there are integrated toolsets that can handle a number of the activities outlined; the more integrated the toolset, the easier it will be to use. This section outlines some specific functionality these tools should offer.

Internally-Facing Tools: Taking Inventory and Determining Costs

Asset management / inventory
An asset management / inventory tool maintains an accurate list of IT resources. It needs to easily track all available hardware and software resources that will be associated with the services in the catalog. It should also track which portions of shared resources tenants have “leased.” Lastly, this tool should be flexible enough to track provisioning and de-provisioning of physical (e.g. hardware installs) and virtual (e.g. “lease” renewals) resources from the inventory.

Service costing and modeling
A tool for service costing and modeling should have access to the asset management / inventory tool for costs and depreciation. This tool takes the hardware and software tracked in the inventory and disaggregates them into unit components at the organization’s chosen level of granularity (e.g. units of storage, number of licenses). It should then assign a cost to each component, using the organization’s chosen accounting method. For example, an organization could assume that all inventory was purchased at the same price and has the same cost, or it could track the actual cost paid for each item. In addition, the tool should assign any appropriate incremental cost of facilities and labor to the unit components. Lastly, it should be able to package the individual cost units into the units of charge based on the chosen cost attribution method and the services offered in the catalog. The more flexible this costing and modeling tool is at collecting cost data and allocating it as needed, the easier it will be to mature ITFM for cloud processes.

Externally-Facing Tools: Measuring Consumption, Billing, and Planning and Forecasting

Consumption measurement
In order to charge tenants, IT needs a tool to measure consumption. This tool should meter usage for all measureable components of usage (e.g. compute, storage, data transfers). The IT organization should be able to choose which components it wants to measure. It should also be able to split the total usage of components up by tenant. This tool should then be able to aggregate the per component usage for each tenant into a full usage report.

‘Showback’ / ‘chargeback’ reporting
This tool should create reports that match the cost allocation method and consumption measurement data for each tenant with prices set by the IT organization. The report should provide the overall charge to the tenant at the service level and a breakdown of charges at the unit level. This tool also needs to maintain some history of billing reports and have an auditing capability, should a tenant inquire about charges.

General ledger (GL) and data source integration
The IT organization must be able to pull information from multiple data sources. Procurement data, general ledger and cost center data, labor data and asset data to start. After collecting, processing and presenting the data the tool should be capable of preparing the GL amounts / entries to move funds from the tenant’s accounts into IT’s account if chargeback is desired.
Planning and forecasting
In order to plan future capacity requirements, IT needs a tool that keeps track of aggregate demand and available resources. This tool should support an easy way for service demand forecasts to be entered and modified as needed for a given time period. IT then uses this information to aggregate and optimize service demand across multiple tenants if applicable. For example, IT can determine total resource needs across tenants for a given time period, evaluate this against available capacity and make adjustments to supply the aggregate demand in the most efficient and cost-effective way. This gives IT the ability to manage and plan for capacity based on the aggregate demand.

Automation
While many of the above capabilities can be provided using spreadsheets and people, the cost of manually collecting and processing the information quickly becomes prohibitive. With weekly and monthly data feeds, the ability to automatically collect, validate and process regular data feeds becomes critical to providing relevant service costs information and ‘showback’ / ‘chargeback’ reports.
Key Success Factors

If implemented well, ITFM for cloud enables an organization to fully capture the efficiency, agility and reliability benefits of cloud computing. Experience suggests the following key success factors.

Align on a Clear Objective for the Transformation at the Executive Level

Executive sponsors need to agree on the objective for implementing ITFM for cloud within the organization. This clear objective will aid in making many of the decisions outlined within the implementation section and prevent confusion and disputes within the company. For example, if the sponsors decide that the main goal is to gain visibility into line of business IT spend, they may agree that implementing ‘chargeback’ is not necessary.

Some typical objectives for corporations undertaking such transformations include: to be able to better analyze line of business P&Ls; to enable IT to offer the same level of service that lines of business can get from external vendors; and to be able to benchmark IT costs.

Introduce Strong IT Finance Leadership and Business Office

Many of the implementation steps of ITFM for cloud require review and iteration on an on-going basis. These activities are typically incremental to existing financial practices within IT and require a new role be created – the ‘CFO of IT’ – to take them on. Given the scope of responsibilities, it is critical that this new position receives commensurate legitimacy of title and reporting lines, dedicated resources, and decision-making authority.

Plan for a Sub-Scale Launch and Ramp Up

To be viable long-term, IT needs to manage the initial launch well. This is especially important because it is unlikely that enough tenants will be onboard to achieve cost benefits in the initial stages. Therefore, IT needs to plan the launch and the subsequent ramp-up very carefully. First, it needs to create an accurate inventory, determine the maximum demand it can support and decide what to do with resources it cannot repurpose. Second, it should carefully choose the initial tenants so that it only on-boards those it can adequately support. It should obtain demand forecasts from these tenants and plan capacity, leaving some buffer to ensure it can support actual initial demand. Initially, this may require longer commitments and capacity “reservations” from tenants. As IT builds up the data and capability to more accurately forecast aggregate demand, it can transition to shorter commitments, eventually moving to a fully on-demand model.

In addition, IT must make tradeoffs between the level of customization available in the service catalog and the flexibility offered to tenants. Initially, it may make sense to offer only a small set of standard services, slowly expanding this as IT gains scale. Lastly, IT needs to make sure it can absorb the extra cost of running sub-scale. It can do this by requesting funding from a centralized source and rolling out a small pilot program that phases users in before embarking on the full transformation.

Educate Business Leaders on Total Costs and Transfer Prices

Business leaders need to not only understand, but also buy-in to how and how much they are billed. If they agree with the methodology and amount, they are more likely to onboard and maintain a lasting behavior change. IT can work toward this with a few important measures:

• At the most basic level, IT must make sure to communicate with lines of business early and often. Communication about the status of the initiative, explanation of cost attribution methods and price, and guidance around the individual tenants’ bills are all crucial for building trust and gaining buy-in.
• Because tenants need to understand and buy-in to these concepts, the cost and price models need to be easily explained in business terms. IT should also broadcast any changes to price and service offerings in a timely manner.
• Education about corporate-wide costs has to occur at the executive level; this enables executives to provide governance, and reinforce the message that “no one subsidizes anyone” if one line of business finds itself paying a higher price than another (or than it used to).

• Lastly, IT needs a compelling, cohesive marketing message that educates and excites potential tenants on and about the value of the internal IT solutions.

Supplement Demand Forecasting and Capacity Planning Groups

IT needs to more accurately predict demand and plan for capacity accordingly. Having the right capacity means IT is able to support tenant demand and maintain promised service levels while it controls capital spend, thus building its credibility with the lines of business and keeping costs down. To do this, IT needs to gather and analyze historical usage data, collect tenant demand predictions, and correlate these to future usage expectations and resulting capacity requirements. It should supplement existing forecasting and planning groups and build a robust demand data analysis and forecasting capability.

Go in with an Active Learning Mindset

Given the number of design decisions and range of options in an ITFM for cloud implementation, it’s important that the organization, both IT and the lines of business, embark on the transformation with an active learning mindset. Finding the right model that suits the practices and culture of the organization can take iteration.
Next Steps

Once an organization has decided that implementing ITFM for cloud is a priority and it understands the necessary changes and decisions it has to make during design, it needs to prepare for the transformation.

Establish Perequisites

The first step IT leaders need to take before implementing ITFM for cloud is to evaluate whether the correct prerequisites are in place or in progress. They need to ensure that a minimal cloud infrastructure has been, or is being, set up. This means that the organization should have plans to set aside at least a portion of its resources for multi-tenant shared use. In addition, the company needs to have created, or be planning to create, a service catalog to offer tenants on-demand access to the shared resources. If these prerequisites are not yet in place when they start ITFM for cloud, IT leaders should ensure that they are implemented in parallel.

Determine Degree of Change Needed

Once progress on the prerequisites is underway, IT leaders should assess the current state to understand the degree of change required across the processes, organization, and tools and technology. As it relates to process, they should understand what the impact of ITFM for cloud will be on the different business users. Examining if and how costs are currently being allocated to lines of business will help determine how far the organization is from where it wants to be, the effort required to get there, and the level of help that will be necessary. IT should also take into consideration budget cycles to assess how those might be impacted as well as how the ITFM initiative might be accelerated by aligning implementation with corporate CapEx investment milestones.

When assessing the degree of change required across the organization, IT leaders should research the tenant landscape. Going into tenant on-boarding, IT leaders should know which lines of business would benefit from the change in the cost model, and which would end up paying more. They also should determine which groups within IT will require additional support and whether to create new roles.

Lastly, they need to assess the set of tools they currently have and identify gaps to enabling an ITFM for cloud capability.

Prepare the Organization for Change

IT leaders should then test the waters to see how ready the organization is for the change. Both the CIO and CFO have to align on the vision for the effort. IT needs to put a team in place that is capable of rolling out a large change across both IT and the lines of business. Lastly, the entire organization has to see the value of ITFM for cloud. If any of these are not in place, IT needs to market the value of the transformation to its key stakeholders even more and build capabilities within its organization.
Why VMware for IT Transformation?

The move to the cloud is a foregone conclusion for many organizations today, but the path forward is often unclear. What is the current state of my infrastructure? How do we begin to move forward? What are the right technology choices for implementing our cloud? Most importantly, who can help us achieve our goals?

VMware has built some of the largest and most successful public and private clouds in the world. Now VMware is using that experience to bring to market a complete solution that includes a full suite of software products as well as the services you need to gain the maximum benefit from cloud computing. This combination of software and expertise, delivered via services and education to customers of all sizes across all industries, is unique to VMware and its global ecosystem of partners.

To learn more about the VMware cloud solution, visit www.vmware.com/cloud