Adapt your technology, services, and organization to cloud

HP Converged Cloud Workshop
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Your cloud transformation just got easier

A cloud radically changes the way different infrastructures, software, and business services are sourced and consumed. It enables you to quickly deliver highly scalable and elastic technology-enabled services over the Internet and on a pay-per-use basis. Before you can realize the cloud’s true potential, though, you need to clearly understand what you can do with it.

Getting the most out of cloud computing is not a simple exercise. Many CIOs are still unsure of the best way to begin their cloud journey, and the return on investment and risks that may be associated with transitioning to a cloud. The issues are the same whether you build or buy your cloud, deploy it internally, or use it to drive new sales and revenue.

The HP Converged Cloud Workshop—an overview

This paper presents a small fraction of the concepts discussed during the workshop, summarizing key cloud topics and considerations that span:

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Cloud evolution</strong></td>
<td>which establishes the business reasons for adopting a cloud computing model, along with a few important concepts for discussing cloud computing. The goal is to elicit the business drivers and concepts of specific interest to the organization, using industry trends as a backdrop.</td>
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<tr>
<td><strong>Services</strong></td>
<td>which covers topics such as defining a cloud service, its packaging and pricing, and how it can be managed to provide business value to end users. Because everything in cloud computing is provided as a service, this approach makes it easier for customers present at the workshop to grasp and understand cloud computing.</td>
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<tr>
<td><strong>Technology</strong></td>
<td>which briefly addresses the requirements for cloud computing, including the applications providing the cloud services and physical facilities, such as servers, storage, and networking. This is really an examination of higher-level requirements, such as the need for energy efficiency and adaptability, and a view of services as providing a finer-grained functionality than what is offered by traditional, monolithic applications.</td>
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<tr>
<td><strong>Organization</strong></td>
<td>which addresses key business issues such as security, organizational governance, and culture, and how to manage the transformational journey to cloud computing.</td>
</tr>
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The discussions of a customer’s cloud computing initiatives are further illustrated using a collection of five- to seven-feet high displays with informational graphics that describe all aspects of cloud computing. Each of the 10 displays presents between nine and 15 in-depth concepts for discussion; this paper presents a summary overview of each display.1

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1 An online version of this paper presents a more in-depth look at three of the concepts on each display.
Cloud evolution

Today, your organization may already see cloud services as a key component of its ability to gain access to the right IT services, from the right places, at the right time, at the right cost. In other words, you need to create a hybrid delivery environment. HP believes that the right hybrid delivery strategy is open, standards based, built on a common architecture, with unified management and security, and enables service portability across deployment models. Built on these principles HP Converged Cloud combines private, managed, and public cloud environments with traditional IT infrastructure to deliver seamless experience.

The initial questions any organization should ask itself about cloud computing are: “Why adopt it?” and “Why now?” With the need for greater flexibility and agility on the rise, line of business leaders, engineers, scientists, and developers are already accessing resources from public cloud providers without involving their IT departments. So, IT must embrace cloud computing and give end users an experience that is comparable to than the open Internet’s to prevent Shadow IT service providers from overwhelming the enterprise’s ability to manage costs, complexity, and compliance.

Concepts

The cloud computing model makes service metering and usage tracking and reporting mandatory, bringing service providers and their consumers together in an environment where they can measure and manage their business value to each other.

Cloud-based services are generally available over a network (cellular as well as Internet) that is flexible, scalable, and available through a self-service provisioning interface. Usually, cloud computing services are also provided on a shared infrastructure, whether shared among an organization’s departments or among multiple external customers. Regardless of what kind of service is being consumed, however, the consumer is always responsible for monitoring the consumption to ensure that the provider relationship can be effectively managed.

Services

There are a variety of roles played by service providers in the cloud computing model. Public service providers, such as salesforce.com, are obvious. The role of service aggregators, who collect multiple service providers into a single offering, and service brokers, who collect multiple service consumers together for more attractive pricing and service, is less obvious.

As an organization evolves its cloud computing strategy, the role of the IT organization changes from that of a technology service provider to that of a service aggregator. This helps in making sure that the right services have been fully appraised, efficiently priced, and made available to the enterprise.

The focus in the cloud computing model is on business services. From the service providers’ perspective, the collection of services that are consumed or provided, including the underlying infrastructure services, is the service portfolio. What consumers see, and choose their services from, is the service catalog—a subset of the service portfolio.
There is more to the service portfolio than just the self-service portal and the services being offered, though; the service catalog that end users see is the tip of the iceberg. Behind the scenes, the catalog also includes components such as service-level monitoring and management, authentication and authorization services, and metering. Everything going on behind the scenes has an impact on the service levels provided, regulatory compliance, and other critical but non-functional facets of a service. So consumers can at least understand the “what” of service portfolios, if not the “how.”

There are a variety of subcomponents involved, depending on what kinds of services are being discussed—infrastructure, platform, or application.

For infrastructure, the components include servers, storage, networking, and systems software. When it comes to an application platform, middleware, databases, and integration software play an important role. At the software-as-a-service layer, application management, collaboration software, and specific business applications—such as customer relationship management software—are the relevant components. Requirements for customer care, business continuity, and managing and monitoring the facilities necessary to deliver availability, security, and elastic scalability cut across all these layers.

These categories apply to storage as well, where the infrastructure is the raw disk space, a platform is a database mechanism of some sort (such as Google’s Bigtable), and software is a service like disaster recovery.

Business case and financials

Having established the concept of a cloud service portfolio, the next point of discussion is the financial aspect of cloud computing. The pay-per-use model of cloud computing is critical to influencing service consumers’ behavior by encouraging them to use the right size of resources, and to return resources when they are no longer needed.

Any organization considering the use of public cloud resources must question the financial threshold for sourcing a service from an external provider, as opposed to providing it internally. The answer will depend on the nature of the service workload—the size of the workload, the size (and therefore the efficiency) of the enterprise IT organization, and whether the workload is static or dynamic. For example, highly dynamic workloads are better suited to the scalability and pay-per-use model of cloud computing.

There are crossover points for any combination of a service, demand profile, and IT organization, where it becomes more cost-effective to run the service internally or in the cloud. Knowing these crossover points allows an IT organization to intelligently source services for improved value.

Service management

Measuring, metering, securing, and tracking the billing of services is a responsibility required of service providers and service consumers. All of the service management disciplines applicable to traditional computing apply to cloud computing and hybrid models as well. However, cloud computing requires some unique service management elements—such as cross-service change management—in addition to a disciplined, mature service management capability. Even if an enterprise sources all of its services from external providers, its IT organization must still appraise and manage the services.

While the central discussion is largely about examining service management, it is also about mapping all the service management categories completely. These include:

- **Consumer-facing services:** Some consumer-facing services (like billing and invoicing) may be operated by the service provider, others (like management of a portal that is aggregating services from multiple providers) may be operated by the consumer’s IT organization. One of the challenges facing an IT organization that sources services from a variety of providers—even internally—is coordinating management tools and metrics across all of these services.

- **Infrastructure services:** Infrastructure services are the more traditional IT management categories, including OS and system software management, middleware management, capacity management, automation, and facilities management.

- **Portfolio management:** Portfolio management includes the service provider’s business management categories: portfolio management, legal, finance, organization, architecture, and more.

- **Service-level and cross-service operations management:** The services that the consumer organization must attend to include services common to all compute models, such as continuity and security monitoring. However, some are unique to an organization consuming services from a variety of sources. For example, cross-service change management for a customer-facing service that accesses functionality from more than one provider requires an additional level of coordination.
Technology

While the cloud computing model emphasizes automation as a service, applications and data centers still provide the underlying infrastructure.

Applications

Applications are still the source of service functionality in a cloud computing environment. When it comes to exposing services from existing applications in a cloud environment, some applications—such as those with built-in Web service interfaces—are already adaptable to cloud computing models and can simply be rehosted. A value assessment is required for applications that may need to be rewritten or replaced to take advantage of the cloud. The value is one that can be added to the application through the cloud computing model, vs. the coding effort required to move it to the cloud.

Along with understanding an application’s structure and how easily it can expose its service-oriented functionality, the qualities of service that the application requires—security, availability, its resource footprint, and more—must be taken into account. This helps in deciding which applications can be moved to which kind of computing model. Applications that are most appropriate for a cloud computing model are the ones that can easily expose fine-grained functionality through a Web interface or API and maintain compliance while being hosted in a shared-services environment. They must also have wide variations in resource footprint or demand profile and appropriate requirements for service qualities like latency and availability. Applications that are monolithic, relatively static in terms of resource footprint or have extreme service-level or security requirements are least appropriate.

Facilities and infrastructure

This part of the workshop addresses the low-level server, storage, power, cooling, and other infrastructure issues. While this is important to cloud service providers or enterprises looking to host their own internal cloud, it can also be useful to cloud consumers evaluating the long-range service suitability of potential service providers.

The facility, hardware, and systems software enable the flexibility and efficiency of the cloud computing model and the applications that run it. Unless the capabilities are converged and built in from the very bottom up, the model cannot be managed and operated as efficiently as it should be.

Various industry organizations have defined tiers of data center services, such as redundancy, to provide varying levels of availability and reliability at varying cost levels. Traditionally, entire data centers provide one tier of service, which can lead to overprovisioning when the services hosted in a data center do not require the built-in level of redundancy. By creating a modular facility as a set of shared services, such as power, water chillers, and mechanical, different tiers of service can be supported in the same data center. This allows flexibility in provisioning, as well as efficiencies in capital costs, power, and cooling.

Security and reliability

Security is a primary concern for most CIOs considering the move to a cloud computing model. As far as security is concerned, moving to a cloud computing model changes nothing fundamental.

Typically, an organization must examine its asset values and threat profiles, develop a strategy that affords appropriate levels of protection to its assets, decide on the processes, tools, and technologies to support that strategy, implement the strategy in a trusted environment, and constantly audit and verify the effectiveness of the strategy.

The same issues and diligence are involved, but in a cloud computing model they need to be applied to suppliers in a new way. IT should examine a potential cloud service supplier’s downstream suppliers. A hosted cloud provider may be using another supplier for backups, and the flow of data has to be traced, if issues such as the geographical location of data fall under regulatory compliance.

Organization

Regardless of the amount of automation supporting the cloud computing model, people are ultimately responsible for the execution. Two-thirds of IT projects fail due to people-related issues. Cloud computing requires a change in culture for both service providers and service consumers. There must be a necessary change in the control structure—to move from a dedicated infrastructure to shared services delivered by a range of providers—and that change also requires a change in budgetary control. IT still has a significant role to play, but it is more focused on governance and integration than on directly supplying technology services.

In the cloud computing model, the role of IT changes from a technology provider to a service integrator (through a service provider and service broker). Unless IT makes that transition, the end users, or “informal IT purchasers,” will bypass IT and buy business services directly from public cloud providers as easily as they buy books online.

To avoid this, the portfolio of business services must be aligned to end-user needs, and the services must be sourced for the best value and lowest risk. This can be done internally from traditional outsourcers or from one of many external cloud service providers in a truly hybrid delivery model. The result is a one-stop shop for business users to find services that are fully appraised, monitored, and sourced at the best price.
Your cloud transformation and HP

Having covered the context in which the cloud computing model functions, the packaging, pricing, and management of services, the underlying application and facilities infrastructure, the issues surrounding security and governance, and the final display discusses the means of transforming an organization to realize the benefits of cloud computing. It is essential to have both executive sponsorship at the highest level and the resources necessary to make the transformation to a cloud computing model at the intermediate and lower levels. The transformation cannot be accomplished with a single project. It is a journey that will involve much more than technology—it will involve culture, people, resources, and willingness on the part of the organization.

Over the years, HP has developed a map of capabilities that are crucial to successful IT transformations. These capabilities fall into six categories: technical infrastructure and architecture, service management, governance, finance, security, culture and staff, best practice processes, and service portfolio management.

Each of these categories is mapped to six stages of capabilities: standardized, optimized, service-enabled, differentiated service sourcing, and cloud service supplier. Note that these are not measures of maturity or competence; they are measures of how an organization addresses the demands of the various categories. For example, an organization could be extremely mature at running as a standardized organization, and it can realize the benefits of the cloud computing model at almost any stage.

This mapping of categories and capability levels is key to planning and tracking the organizational developments required for harnessing the cloud computing model. The mapping is also a summary of the HP roadmap service.

Integrate the cloud in your business growth plan today

While cloud computing is an evolutionary change, it still requires a different way of thinking about, sourcing, managing, and providing IT services to support business processes.

As shared throughout this white paper and during the HP Converged Cloud Workshop, the concepts are organized into four broad categories: context, services, organization, and technology. Together, these categories provide a holistic view of what it takes to transform an IT organization from a provider of low-level technology services (such as network administration) to an aggregator and broker that provides the one-stop shop for all of an enterprise’s business process automation.

The HP Converged Cloud Workshop involves discussing a range of cloud computing concepts with customers, followed by questions about where they see themselves in their current as well as future cloud computing plans. With this information, HP consultants can facilitate the development of a strategic roadmap to guide and help customers in making informed IT decisions. HP uses these roadmaps, created by customers for themselves, together with post-workshop research and analysis, to deliver a summary of the conclusions from the workshop. The summary can be used by organizations to clearly articulate the direction and value of their cloud strategy to internal teams.

Technology with a human touch

In a world where everything has to be “always on,” it’s crucial to have complete command over your technology environment. You need a trusted advisor who understands where your business should go and the technology decisions you need to make to get there. Combining technology intelligence and know-how with business intelligence, our service professionals have been helping organizations across the globe meet their evolving needs. They can do the same for you.

It’s about real partnership. Our consultants and support experts can work with you to transform IT, converge infrastructure, and keep technology running.

Connect with our service experts to explore ways to do more with your technology investments; visit [hp.com/go/tsconnect/](http://hp.com/go/tsconnect/).

Take the first step toward defining your cloud future

Visit [hp.com/go/cloud](http://hp.com/go/cloud) to understand what cloud computing can do for your organization.

To sign up for an HP Converged Cloud Workshop, visit [hp.com/services/cloud](http://hp.com/services/cloud).

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2 In the sense of the Software Engineering Institute Capability Maturity Model

3 This could be the equivalent of Capability Maturity Model maturity level 3 or 4, in that the standardized processes are documented, adhered to, and audited for compliance.
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