



An Insight company

White Paper

## IT and the Cloud: Buy, Build or Both?

By Kent Christensen, Practice Manager, Datalink

July 2012

### **EXECUTIVE SUMMARY**

Running IT as a service (ITaaS) is not necessarily a new concept. But, the era of cloud computing now places a whole new spin on ITaaS. In this white paper, you'll learn why there is so much buzz around cloud services and the role IT should play in this new cloud-based era. You'll also learn a useful model to help transform your company's IT data center into a private cloud that can ultimately manage and oversee the delivery of both internal and external cloud services to the business.

**TABLE OF CONTENTS**

Do All Roads Lead to Cloud? ..... 2

    How the cloud solves a number of needs ..... 2

    Exploring the many flavors of cloud computing ..... 3

    If not you, then who? (Competing with public cloud providers) ..... 5

    How can a private cloud compete with public cloud providers? ..... 6

A Common Path to Private and Hybrid Clouds ..... 6

Working through the Five Stages of Cloud Maturity ..... 7

    Cloud maturity stage 1: Consolidation ..... 8

    Cloud maturity stage 2: Integration ..... 8

    Cloud maturity stage 3: Automation ..... 9

    Cloud maturity stage 4: Self-service ..... 10

    Cloud maturity stage 5: Federation and hybrid clouds ..... 12

Enabling Technologies ..... 13

Adding it All Up ..... 13

About Datalink ..... 14

## Do All Roads Lead to Cloud?

A sea shift is afoot in today's data center environment. Similar to the past emergence of such paradigms as client/server computing, storage consolidation, and server virtualization, the next big paradigm shift for the data center of tomorrow appears to begin with cloud computing.

How do we know cloud computing is destined to be more than just the latest marketing message promoted by vendors to convince you to buy more of their gear? Three proof points from the world of public clouds give credence to the growing importance of cloud computing:

- **Popular consumer cloud services** like the iCloud (with downloadable apps like iTunes<sup>®</sup>), Google Mail<sup>™</sup>, and even Netflix are good examples of how easy it has become to purchase, use, or access just the items, infrastructure, and services you want from an easy self-service, Web-based interface. How many workers and executives in your company today not only use these services themselves but also compare why it's so much harder and more expensive to access and use their own internal IT systems?
- **Business-oriented public cloud services**, such as CRM-focused Salesforce.com or payroll processing apps from companies like ADP and PayCom, have allowed many companies using these services to achieve greater success and cost savings by outsourcing from the cloud. Early successful applications like these accessed from a public cloud infrastructure tend to fall into the categories of either software as a service (SaaS) or business process (BP) services.
- **Surprisingly low-cost, scalable and agile, cloud-based Web services** are now available for things like block storage, database platforms, and virtual server platforms. These tend to fall in the category of infrastructure as a service (IaaS) or, to a lesser degree, platform as a service (PaaS). Popular examples of IaaS come from cloud vendors like Google, or Amazon web services like Amazon EC2<sup>™</sup>.

Public clouds offer great promise to consumers and business users alike. Yet, how does that translate into the need to develop a cloud platform *behind* the firewall of your current IT data center? The next few subsections should shed some light on the matter and will highlight:

- the business benefits to be gained from adopting a cloud computing model for your data center
- the difference between terms like **public clouds**, **private clouds** and **hybrids**
- the drivers prompting IT leaders to move quickly to develop their own cloud strategies and early cloud pilots

It's no longer a question of whether or not you should move into cloud computing. The question becomes whether or not you should build your own cloud, buy into existing cloud services from a third-party provider, or do something in between these two cases.

## How the cloud solves a number of needs

There's no shortage of pundits and cloud providers attempting to share the many benefits of cloud computing. In fact, many of these sources are specifically targeting the education of executives in companies like yours. This is for good reason: Cloud computing offers a number of operational, financial, and business benefits.

**Operational benefits of cloud services include:**

- Agile — The ability to get what you want instantaneously
- Elastic — Services can be applied to multiple initiatives
- Reusable — Infrastructure that can be re-provisioned when a task is complete
- Multipurposed — Infrastructure designed for multiple initiatives
- Service-oriented — Business can subscribe in a *self-service* manner
- Automated — Significantly reduces manual provisioning of services
- Hyper-standardized — Comes with a defined catalog of services
- Pay-as-you-go — Pay only for what you use (in a metered usage capacity)

**Financial and business benefits of cloud services include:**

- The option to use more affordable OPEX dollars vs. a large CAPEX expenditure
- Less to maintain and operate
- An optimized infrastructure with higher utilization thus lower cost per application
- The ability to focus more on initiatives and less on infrastructure

As IT organizations look at cloud attributes and benefits, many will focus first on the top two or three attributes and benefits they find most desirable to their business needs. Early cloud adopters will then customize these aspects of cloud computing to fit their unique business model.

**Exploring the many flavors of cloud computing**

In its early days, the definition and attributes associated with cloud computing were a moving target. According to the National Institute of Standards and Technology (NIST), cloud computing will continue to be defined and evolve over time in both the public and private sectors.

Based on Datalink's experience with enterprise and mid-tier companies in the area of advanced virtualization and cloud computing, we've assembled the following definitions as a guide.

**Table 1 – Defining cloud computing**

Cloud computing	<p>The ability to:</p> <ul style="list-style-type: none"> <li>• deliver computing <i>as a service</i></li> <li>• leverage a <i>shared infrastructure</i></li> <li>• deliver IT services in a <i>metered (pay-as-you-go) manner</i></li> <li>• be <i>agile</i> and grow or change quickly</li> </ul>
Public cloud	<p>Cloud computing provided by a third party. Common examples that may ultimately be used by your organization:</p> <ul style="list-style-type: none"> <li>• IaaS - Infrastructure as a service, provided by companies like Amazon, Rackspace, Terremark, or regional service providers</li> <li>• SaaS - Software as a service from key business applications</li> </ul>
Private cloud	<p>Cloud computing focused on serving businesses (or business units) within an organization.</p>
Hybrid cloud (see Figure 1)	<p>Usage of some services within your organization's private cloud environment combined with services from an external, third party (public) cloud provider.</p>

The title of this white paper poses a very specific question about your journey to cloud computing: "Buy, Build or Both?"

To answer that question, we estimate most organizations will first adopt a private cloud paradigm which then morphs over time into a hybrid cloud model, as shown in Figure 1. A common hybrid cloud of the future might outsource and use some public cloud functions like IaaS and SaaS in conjunction with a company's own private cloud/internal IT service infrastructure. In effect, the hybrid cloud has aspects of both: Building the private cloud while buying into services from a public cloud environment.

**Figure 1 – Hybrid cloud example**



## If not you, then who? (Competing with public cloud providers)

There are obvious benefits to cloud computing, but how important is it to start on this journey now for your data center? From Datalink's viewpoint, waiting is not necessarily the best option.

**CEOs are hearing a lot about the cloud today.** Increasingly, many IT organizations may now be called upon to defend their existence in the face of some very compelling public cloud use cases in circulation and being promoted directly to their company's own executive team. The article "What Every CEO Needs to Know about the Cloud," published in the November 2011 edition of *Harvard Business Review*, is just one example. The article implies that executives outside of IT need to take the reins themselves in order to successfully usher their company into cloud computing. The article goes on to state that oversight of the move to cloud computing shouldn't be delegated to a company's traditional IT teams who often have a vested interest in keeping with the status quo: i.e., maintaining the old way of doing things.

**The CIO as chief of innovation, not just information.** Cloud computing offers one big sign of the changing landscape not just for today's IT data center but also for today's IT leaders themselves. While in the past it was sufficient for the CIO and team to save money and reduce costs while increasing efficiency and asset utilization, today's business expectations now demand more from the CIO.

It's no longer enough to be a cost-saver. The future of IT organizations is now increasingly focused on how *relevant* you are to the specific needs of the business. The future health of your IT organization may well depend on how successful it is at:

- Increasing employee productivity
- Enabling or promoting innovation and access to best services, whether those are internal or external
- Being more agile in terms of ability to deliver *services* to the business, not just *technologies*
- Increasing the company's competitive advantage
- Offering solutions to attract new customers while retaining current customers
- Being open to business unit inspection

If your executive team sees the public cloud as a way to achieve the above goals faster, cheaper, and more effectively, your IT organization could run the risk of becoming increasingly irrelevant. Added to that is the large amount of money and time public cloud providers are investing to convince CEOs about how much they can save through outsourcing key IT functions and services to an external cloud.

*The implied threat to IT data centers is very real:  
Without adapting you run the risk being outsourced.*

At the least, the rising tide of cloud popularity now demands a *reactive* response from IT. At the most, it demands IT's *proactive* efforts to start moving to a cloud computing paradigm today—ahead of the coming onslaught.

Many IT organizations may be more ready to make the transition than they realize. In fact, with little up-front work, many could even complete a few of their own cloud projects in the next 12 months. These projects might include: Developing a cloud roadmap; sponsoring a private cloud (ITaaS-related) initiative; or completing a private cloud pilot or private cloud use case. In terms of pilots or use cases, the end goal is to demonstrate the benefits of using a private cloud to internal business units.

The following section offers some insights about the good and the not-so-good aspects of public clouds. It will also offer some ammunition to help you become versed quickly in the language of cloud computing. This should allow your IT team to take more of an active role in your company's future move toward cloud computing.

## How can a private cloud compete with public cloud providers?

The answer to the above question is relatively simple. While a cloud provider might appear to offer very favorable up-front pricing and outstanding benefits to using its services, Datalink's experience often tells a different story.

Based on our work with IT organizations at various stages of cloud readiness, we've found that when a private cloud environment is successfully deployed for use by strategic applications, the applications usually end up running much more efficiently (often between 25 – 40 percent more) than if they were outsourced to an external cloud provider.

How is this possible? This "gap" between perceived benefits and actual benefits typically comes down to the level of company "IP" already built into the internal data center environment. These are areas that are unique to your company's business, such as:

- Specific security and compliance requirements linked to your application or application data
- Unique management and application dependencies, such as how to best:
  - Scale your applications
  - Patch your applications
  - Protect your applications
  - Build disaster recovery around your applications
- The service levels needed for key applications or internal customers
- Risk (If I outsource an application, do I have predictable outcomes?)
- Cost (Most efficient, internal IT infrastructures can compete with comparable external providers who are also under pressure to make a profit.)

While many external cloud providers have made great progress in these areas, nobody knows as much about the needs of your company or your specific application dependencies than your own internal IT team.

One of the popular drivers in early private cloud projects is to define and deliver a service while benchmarking the results and costs. Benchmarking allows you to ultimately compare the results to some of your public cloud counterparts. In this way, you can move closer to the goal of effective cloud service management — whether the cloud service comes from inside or outside your organization.

## A COMMON PATH TO PRIVATE AND HYBRID CLOUDS

With so many different types of cloud architectures to consider, where do you start on your organization's own road to cloud computing? How long will it take? Should you wait or start now?

At Datalink, we recognize the need to evaluate each company's requirements, its unique business model, and its own path to the cloud on a case-by-case basis. There is simply no "one-size-fits-all" when you're talking about moving to the cloud.

However, there is a common pathway and methodology to move to the cloud that we've seen work successfully for many of our clients. While your mileage may vary, this common path usually involves the following:

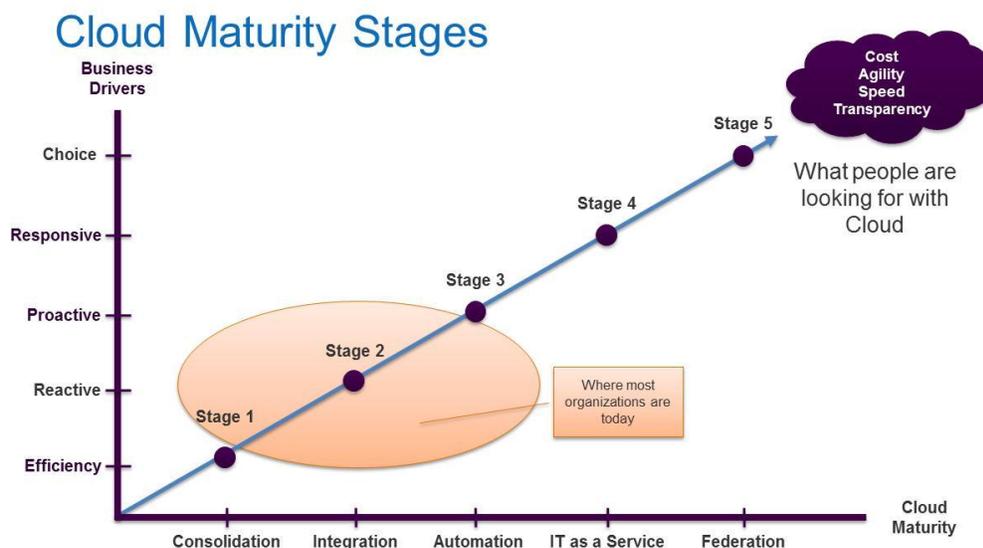
- A progression along five stages of cloud maturity. Each stage of Datalink's cloud maturity model covers technological, political, and organizational milestones you'll often hit along the way.
- A common data center evolution: Beginning with consolidation, basic server virtualization, and more advanced dynamic data center virtualization; then soon advancing from there to a private cloud environment. The caveat here is that the private cloud environment needs to be built with enough management and oversight functionality so that it can help you achieve two important goals:
  - 1) Effective delivery of IT as a service (ITaaS) to internal business units
  - 2) Effective management, monitoring, and benchmarking of the performance of not just your own private cloud, but also the performance of any *outsourced* infrastructure or services handed off to an external, public cloud provider.

This second point has much to do with emerging technologies that fall under the category of "orchestration." (This will be discussed later in this paper when we describe Stage 4 in our evolutionary cloud maturity model.)

## WORKING THROUGH THE FIVE STAGES OF CLOUD MATURITY

Datalink has identified five stages of cloud maturity or cloud "readiness" that organizations can follow to see where they currently fall on the continuum. This cloud maturity model also shares some of the drivers, investments, and technologies that need to be addressed as an organization progresses on its own journey to the cloud. Figure 2 offers a high-level overview of the five stages.

Figure 2 – Datalink's five stages of cloud maturity



In the above figure, the **x-axis** shows the overall technological state you've achieved at each stage of cloud maturity. The **y-axis** shows the common business drivers or challenges propelling you at each stage.

**Cloud maturity stage 1: Consolidation**

For many data center environments, stage 1 is focused on the consolidation of servers and storage resources. This stage consolidates assets in order to minimize the overuse (or underutilization) of servers and storage systems. Table 2 describes the primary focus at this stage.

**Table 2 – Cloud maturity stage 1: Key areas of focus**

Characteristics:	Your organization’s focus at this stage:
Cloud maturity	<ul style="list-style-type: none"> <li>• Consolidation of servers and storage</li> </ul>
Challenges	<ul style="list-style-type: none"> <li>• Low utilization</li> <li>• Growing costs</li> </ul>
Business drivers	<ul style="list-style-type: none"> <li>• Efficiency</li> </ul>
Technology focus	<ul style="list-style-type: none"> <li>• Server virtualization</li> <li>• Storage virtualization</li> <li>• Consolidation</li> </ul>
Investments	<ul style="list-style-type: none"> <li>• Server and storage consolidation</li> <li>• Cloud roadmap</li> <li>• Cloud business case</li> <li>• ROI analysis to validate next steps</li> </ul>

For many organizations, consolidation already began sometime in the mid-2000s. In recent years, this process has progressed to incorporate server and storage virtualization platforms like that of VMware, Microsoft® Hyper-V, etc. Successful deployment of these technologies often helps organizations achieve even greater consolidation, more efficiencies, and smaller physical footprints. It can also set the stage for the data center's evolution to a more dynamic, strategic role.

At that point, a natural progression often occurs as the data center moves into a private cloud infrastructure. It should be noted here that virtualization and private cloud environments can also exist separately. While a natural progression can exist between the two, you don't necessarily *need* virtualization to develop a private cloud environment, nor do you need the development of a private cloud environment before you can take full advantage of virtualization. Virtualization is an enabling technology, while the private cloud is a set of concepts that move the data center toward delivery of ITaaS.

(The evolution of virtualization in the data center is described further in another Datalink white paper, "Moving toward a Virtual Data Center.")

**Cloud maturity stage 2: Integration**

Cloud maturity stage 2 is where we find the majority of IT organizations in terms of their challenges, business drivers, and the technologies either typically under investigation or currently being deployed.

Whereas stage 1 focused on consolidation, a concerted effort is made at stage 2 to integrate technologies and, often, their correlated IT groups.

**Table 3 – Cloud maturity stage 2: Key areas of focus**

<b>Characteristics:</b>	<b>Your organization’s focus at this stage:</b>
Cloud maturity	<ul style="list-style-type: none"> <li>• Integration</li> </ul>
Challenges	<ul style="list-style-type: none"> <li>• Fragmentation</li> <li>• Technical</li> <li>• Politics</li> </ul>
Business drivers	<ul style="list-style-type: none"> <li>• Reactive</li> </ul>
Technology focus	<ul style="list-style-type: none"> <li>• Zones</li> <li>• Storage integration</li> <li>• Network integration</li> <li>• Unified solutions</li> <li>• Mission critical</li> <li>• Standardization</li> </ul>
Investments	<ul style="list-style-type: none"> <li>• Architecture blueprint</li> <li>• Total cost of ownership (TCO)</li> <li>• Private cloud or virtual data center blueprint</li> </ul>

For instance, this is where servers may start to be more tightly coupled with related networking systems and their underlying storage.

IT may also be in the process of setting up security zones or QoS zones while also making efforts to standardize operations and procedures, especially in regards to enhancing mission-critical workflows. More interest may be placed here on unified solutions that closely connect the server/network/storage layers together.

In terms of challenges, integration must also be broached both politically and as an IT organization. This may involve moves to restructure IT staff in a more holistic way. Server teams may need to be combined with network teams or storage teams, etc.

Typical early investment in cloud storage may take the form of an early cloud initiative or cloud roadmap, as well as one or more cloud pilots. Other key investments may involve TCO studies and formalized blueprints of the emergent architecture. You may also choose to benchmark results of any early pilots in order to help cement the future role IT plays in tomorrow's cloud service-oriented architecture.

### **Cloud maturity stage 3: Automation**

This midway point in cloud maturity is associated with automation and unified data centers. This is where organizations start to see significant benefits from all of their prior work to streamline, virtualize, and automate their data center operations. Instead of being *reactive* in nature, the primary business driver is *proactive* at this stage. The proactive approach takes a more holistic view of the IT infrastructure and the associated architecture needed to deliver applications to the business. This view aggregates server, storage, network, and virtualization into unified/optimized architectures that are both highly efficient and more readily automated.

**Table 4 – Cloud maturity stage 3: Key areas of focus**

<b>Characteristics:</b>	<b>Your organization's focus at this stage:</b>
Cloud maturity	<ul style="list-style-type: none"> <li>• Automation</li> </ul>
Challenges	<ul style="list-style-type: none"> <li>• Unification</li> <li>• Shared resources</li> <li>• Leadership</li> </ul>
Business drivers	<ul style="list-style-type: none"> <li>• Proactive</li> </ul>
Technology focus	<ul style="list-style-type: none"> <li>• Automated provisioning</li> <li>• Infrastructure-in-a-box (Architectural bundles, blocks or pods like Vblock<sup>®</sup>, FlexPod<sup>™</sup>, VSPEX<sup>™</sup> and others)</li> <li>• Fabric architectures</li> <li>• Resource pools</li> </ul>
Investments	<ul style="list-style-type: none"> <li>• Operational assessment</li> <li>• Operating model</li> <li>• Organizational impact</li> </ul>

Technologies in use at this stage are typically those that help you perform more automated provisioning of your data center's virtual resources. These move you to more of a service orientation with growing agility to meet sudden shifts in business or application priorities.

At this stage, you're likely to be using or investing in fabric-based architectures, grid technologies, resource pools, and more pre-integrated, pre-tested solutions similar to what we've called "infrastructure-in-a-box" or pods in the above table (with trade names like VCE Vblock<sup>™</sup>, NetApp's FlexPod<sup>®</sup>, EMC's VSPEX<sup>™</sup>, Hitachi Data Systems Storage Replication Adapter, Datalink V-Scape<sup>™</sup>, and others). These pre-built, pre-integrated solutions typically offer server/network/storage building blocks for your infrastructure, similar in concept to many pre-built automobile parts now used for highly efficient auto assembly lines worldwide.

This is a good point in your data center's evolution to take stock and assess the effectiveness and level of automation within your environment. Investments here will help you see how your IT organization's role may also be changing from one of specialized operations (e.g. the prior need to provision networking or storage assets) to a higher level function (architecting a platform for delivery of unified services, etc.). Through these types of assessments, an IT organization that existed before in silos can become more streamlined in the ways it both designs and deploys technology and new services.

### **Cloud maturity stage 4: Self-service**

At stage 4 of our cloud maturity model, your IT organization is really beginning to take shape with many of the facets of a private cloud environment. These include agility, elasticity, self-service, metered use, and greater automation.

This is where your service-oriented architecture begins to shine as your IT infrastructure responds with greater ease to changing needs of business units and their applications. ITaaS is now a reality at this stage. Typically, this is where investments in orchestration occur. Such investments are intended to more fully automate infrastructure provisioning and the brokering of applications.

**Table 5 – Cloud maturity stage 4: Key areas of focus**

<b>Characteristics:</b>	<b>Your organization’s focus at this stage:</b>
Cloud maturity	<ul style="list-style-type: none"> <li>• Self-service or ITaaS</li> </ul>
Challenges	<ul style="list-style-type: none"> <li>• Business case</li> <li>• Integration</li> <li>• Management</li> </ul>
Business drivers	<ul style="list-style-type: none"> <li>• Service-based or responsive</li> </ul>
Technology focus	<ul style="list-style-type: none"> <li>• Service brokers</li> <li>• Management</li> <li>• Service-oriented</li> <li>• Metered usage</li> </ul>
Investments	<ul style="list-style-type: none"> <li>• Service catalog</li> </ul>

IT resources now become outward-facing to the internal business units. Both the mindset and infrastructure of the IT data center are service-based and service-oriented.

Prioritizing here might present some challenges. Which business case(s) can your IT organization best support with its internal cloud services?

At this stage, many organizations start demonstrating their ITaaS capabilities with a relatively easy test case. This might be services provided to an internal testing or development group to showcase IT’s ability to deliver an initial service offering and highlight its respective benefits.

At stage 4, IT may still need to further shape and define the boundaries of its service orientation. This includes ironing out the best way to manage service delivery to key business groups. Based on each group’s individual needs, some may do better with IaaS (infrastructure services), SaaS (internal software services built on the infrastructure), or PaaS support services (platform services). Some groups may require all three types of services.

The next logical step is to move into the role of being a service broker to the internal business community. This is a good point to invest in developing a service catalog to start showcasing available private cloud services for the internal business community. This catalog might even go so far as to tie potential chargeback costs or metered usage costs to use of specific services.

Technologies that help IT perform the role of service broker or cloud management are key. These could be higher level management tools focused on managing cloud resources or the management of an overall service-oriented architecture.

Not all detail surrounding the definition of these services is covered in this paper. This includes how to map business, technical, and operational requirements back to a service level to be supported by the cloud infrastructure, as well as implications to financial models, and operational or organizational role changes. The specifics on aligning cloud services to process and business requirements will be covered in a future white paper.

## Cloud maturity stage 5: Federation and hybrid clouds

This final stage of cloud maturity shows your organization *marrying* both private cloud and public cloud resources into a *hybrid cloud* environment.

Here, the IT organization can knowledgeably choose which type of cloud resource (internal, external, or hybrid) will best support an application, platform, or infrastructure need within the company.

**Table 6 – Cloud maturity stage 5: Key areas of focus**

Characteristics:	Your organization's focus at this stage:
Cloud maturity	<ul style="list-style-type: none"><li>• Federation</li></ul>
Challenges	<ul style="list-style-type: none"><li>• Management</li><li>• Partners</li></ul>
Business drivers	<ul style="list-style-type: none"><li>• Value-based</li><li>• Choice</li></ul>
Technology focus	<ul style="list-style-type: none"><li>• Hybrid</li><li>• Cloud services</li><li>• Service brokers</li><li>• SLA-driven dynamic runtime environment</li></ul>
Investments	<ul style="list-style-type: none"><li>• Integrated business and IT management</li></ul>

Stage 5 also involves brokering of services, but here it may encompass service brokering within either a private or public cloud environment.

Key at this final stage of cloud maturity is federated management. This includes the use of the right type of management solutions and the right public cloud partners. By moving to a form of federated management, you ensure the enterprise IT organization still maintains control, cost, and provisioning oversight of the overall hybrid environment.

Many vendors are now beginning to provide orchestration-type solutions to help manage internal or external cloud environments. It's important to maintain control of orchestration within IT itself. This lets you more readily find the best use of internal or external resources. You'll also be able to apply buying power to external services, such as the ability to field bids for external IaaS services based on specific characteristics you identify surrounding performance and cost.

## ENABLING TECHNOLOGIES

In our five-stage cloud maturity model, several technologies may be incorporated to evolve the data center along into first a private cloud, then a hybrid cloud architecture.

Among these include new (but now familiar) entrants in recent years, such as the purveyors of server virtualization technology like VMware, Microsoft Hyper-V, etc. Within this group are also relative newcomers in the area of:

- **Data center virtualization** (involving the virtualization of not just server resources, but also virtualizing the network and underlying storage resources). Solutions used here allow you to operate your data center assets as more fluid, virtual resource pools made available to support the higher level needs of business unit applications. (*The Datalink paper "Moving Toward a Virtual Data Center" offers more insight on the use of these technologies.*)
- **Unified solutions, infrastructure bundles or PODs.**
- **Higher level software layers that focus on cloud management, automation, and orchestration.** Choosing the right orchestration layer and management suite will become increasingly important on your journey to cloud computing. Solutions from vendors offer great promise here, but some may restrict your choice to the vendor's specific cloud-related services or vendor-specific cloud partners. Some early solutions in these areas include:
  - VMware's cloud strategy with its vCloud offering
  - Cisco's CIAC strategy
  - Microsoft Systems Center
  - Citrix
  - Openstack
  - Traditional IT management offerings from one of the "Big Four"
  - Offerings from "everyone else" -- now totaling over 100 startups

Caution should be used here to select a solution that allows you to focus on your unified data center and build standards around relatively open environments. The future offers the possibility of various cloud migration paths. Several vendors may offer one path, based on a specific vendor's cloud offering.

There are also various efforts being expended to develop a more vendor-neutral, open framework for hybrid cloud development and migration. This more open framework could offer greater choices in the future. A caveat here, however, is that some of the underlying APIs and interconnects currently being proposed are still in development and may not yet be commercially available.

## ADDING IT ALL UP

One thing you'll hear repeated from Datalink is the importance of *owning your cloud*. This is as much about your attitude and approach to becoming a cloud provider as it is about maintaining control and credibility, as well as benchmarking the value of either internal or external IT services.

Each of these areas deserves a much richer treatment and deeper discussion than what this white paper allows. To learn more about a recommended direction, approaches, set of steps, or the specific vendor technologies to watch, we encourage readers to contact Datalink directly.

## ABOUT DATALINK

A complete data center solutions and services provider for Fortune 500 and mid-tier enterprises, Datalink transforms data centers so they become more efficient, manageable, and responsive to changing business needs. Datalink helps leverage and protect storage, server, and network investments with a focus on long-term value, offering a full lifecycle of services, from consulting and design to implementation, management, and support. Datalink solutions span virtualization and consolidation, data storage and protection, advanced networks, and business continuity. Each delivers measureable performance gains and maximizes the business value of IT. To learn more about how Datalink can help your organization use deduplication technologies to improve the overall efficiency of your data center and deliver dramatic ROI to your organization, contact Datalink at (800) 448-6314 or visit [www.datalink.com](http://www.datalink.com).

**To view the latest white papers, please visit <http://www.datalink.com/Library/WhitePapers.aspx>.**

**To receive insight into data center technologies and practices, follow Datalink online at the sites below.**

<http://twitter.com/datalinkcorp>

<http://blog.datalink.com/>

<http://www.facebook.com/datalinkcorp>



An Insight company

[www.datalink.com](http://www.datalink.com)  
[www.insight.com](http://www.insight.com)

© 2017 Datalink, an Insight company. All rights reserved.

No portions of this document may be reproduced without prior written consent of Datalink Corporation. Datalink, the Datalink logo, OneCall, and V-Scape are trademarks or registered trademarks of Datalink Corporation.

WP-ITC-2.0.03.17