UNDERSTANDING THE CLOUD

WHAT YOU NEED TO KNOW BEFORE DIVING IN

The Fundamental Concepts and Top Considerations for Potential Cloud Customers
INTRODUCTION

Most industries don’t require IT departments to leverage bleeding-edge technologies—but IT organizations do face a near constant pressure to reduce costs or augment their services. Cloud computing can help companies meet those objectives, while also providing greater opportunity to innovate, adapt to changing conditions, reduce overhead, and gain a competitive advantage.

Unfortunately, the cloud is a complex offering. Unlike many other technologies, cloud providers don’t try to hide the complexity from customers. In fact, the deeper you go, the more complicated it can become. That’s why moving to the cloud should be a progression rather than a one-step process.

Today, cloud providers offer several entry points to help organizations adopt cloud resources. Companies can use these stepping stones to gain familiarity with the products and increase their level of sophistication. Then they can move to more complex services. But there are a few caveats of using public cloud resources that aren’t immediately clear to new users.

Making informed decisions about public cloud providers requires an in-depth understanding of cloud computing—not only its advantages and use cases, but how cloud providers create and market their products and how you can best maximize the benefits and minimize the risks. This document provides a starting point for this process.

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WHAT IS CLOUD?

At the most elementary level, cloud indicates anything that’s not done locally or on premise. Cloud defines “as a Service,” which roughly means “on demand.”

Cloud Advantages

Cloud computing offers a set of highly-efficient services optimized for cost and flexibility. Here are some of the most common ways these services provide companies with an edge over their competitors:

1. **Agility**
   Cloud-based services provide an easy method for scaling up or scaling down infrastructure resources, depending on capacity needs at any given time. There’s no need to procure additional hardware, software, or licenses, so companies can adapt quickly.

2. **Cost-efficiency**
   With the cloud, you only pay for what you use. That means there’s no need to buy equipment, build out a data center, or pay the associated operating expenses—such as power, cooling, or the use of dedicated facilities.

3. **Reduced Overhead**
   By providing the centralized administration of resources, vendor-managed infrastructure, and service level-backed agreements, cloud providers eliminate the need to update and maintain your own IT infrastructure. Since IT personnel are no longer managing the environment, you can redirect those resources towards more strategic initiatives.

4. **Competitive Advantage**
   Public clouds providers supply ongoing access to the latest technologies. In a competitive economy, companies that can more quickly master and leverage the latest technology resources gain a competitive advantage over their peers.

5. **Faster Time-to-Market**
   With readily-available cloud services, you can more easily deploy new initiatives, usually without any upfront costs and minimal provisioning time. New initiatives can go to market faster—in a matter of weeks rather than months—which means you can more quickly realize the business benefits.
Use Cases

To start using cloud resources, you can extend your corporate network into a public cloud, and then adopt the low-effort, high-value services your cloud provider has mastered.

Here are some of the most common ways that enterprises are incorporating public cloud resources into their environments:

Infrastructure Scaling
Many companies, particularly those with fluctuating capacity needs, are using public cloud resources to auto-scale, or dynamically increase or decrease their infrastructure resources, according to demand. During periods of burst capacity, companies can allocate more cloud resources and release them when demand is lower, thereby achieving economies of scale.

Disaster Recovery
Implementing a cloud-based disaster recovery solution is becoming more common, particularly among small to medium businesses (SMBs). Since the secondary infrastructure is idling most of the time, the usage-based cost model of cloud services makes it a cost-effective option. Likewise, it reduces the need for data center space, IT infrastructure, and the associated resources to support them.

Storage/Deduplication
By using public cloud resources for storing data, companies can expand the syncing and sharing capabilities for their files and other static data. This can increase accessibility, ease content distribution, and offer companies a natural backup option without wasting additional resources.

Platform Development
Instead of managing and maintaining development environments themselves, many IT departments are outsourcing those responsibilities to cloud providers that offer developers direct and remote access to applications or platforms. With faster access to these resources, developers can more quickly create and test their applications, which speeds development and time-to-market.

Hosted Services
Today, IT departments routinely outsource the management and administration of common enterprise business applications, such as email, to hosted service providers. These services offer users remote access to applications or tools hosted in the cloud and accessed over the internet. Not only does this help reduce overhead, it can increase team collaboration and expand accessibility to a wider range of users and mobile devices.
WHAT IS CLOUD, REALLY?

Public clouds are essentially remote data centers paired with a proprietary user interface that you use to access the data center resources. You have a lot of choices in the marketplace, so understanding how cloud providers use data centers and how they differ can help you choose services in and between clouds.

1 How Cloud Providers Use Data Centers

How cloud providers use data centers relates directly to their distinct competitive advantages. For example, whether the cloud providers own the data centers directly affects their pricing. Likewise, it’s important to know the locations of the data centers, so you can better leverage the cloud provider’s capabilities to fit your needs.

Most cloud providers use one of the three largest data centers in the US:

- SuperNap (Las Vegas, NV) is 2.2 million square feet
- Lakeside Technology (Chicago, IL) is over 1 million square feet
- QTS Metro Data Center (Atlanta, GA) is just under 1 million square feet

Other cloud providers likely use one of the data center giants like Equinix or Sunguard to deploy their clouds. That’s how they support their cloud services without entering the data center business.

The largest cloud providers do own their own data centers; however, they still use resources from these dedicated data center providers to gain more direct access and closer proximity to the major internet hubs and service carriers.
How Cloud Providers Supply a “Gift-Wrapped” Product

The cloud touches most, if not all, types of technologies, including storage, networking, load balancers, and Domain Name Systems (DNS). Part of the allure of public cloud computing is that providers have already combined these different components for you—and they follow a regular cycle of upgrading the technologies, testing the versions together, and adding new features on a frequent and reliable basis.

To provide this product to customers, cloud providers need a large set of software to automate their services. That’s the menu pulldowns, GUI clicks, and automation APIs with which we conceptualize the cloud. Amazon Web Services (AWS) has been building its proprietary software for over 10 years, but other cloud providers are quickly catching up with proprietary software of their own.

This is an important consideration because it means you’ll be investing significant time learning to navigate and use proprietary software, and this knowledge won’t necessarily transfer to other clouds.
TOP CONSIDERATIONS

Aside from proprietary interfaces, there are a few caveats of using public cloud resources that aren’t clear to new users. These considerations don’t necessarily represent barriers to the cloud, but knowing which issues you can and cannot accept will affect your decision-making process.

1 Controlling Vulnerable Accounts

When you sign up for their services, public cloud providers generate account credentials for you with full rights. Never use these accounts for anything except making additional accounts with appropriate rights. If an unauthorized person ever gains access to your primary account credentials, you’ll have a hard time regaining control of it.

2 Managing Keys

Every server, service, user account, and scripted account uses security keys. This can quickly spiral out of control, so most companies use the same keys for everything. While that does simplify key management, it’s a dangerous approach to take with an automated account. For example, automated users (scripts that call cloud functions) require authentication, which developers frequently embed in their scripts for convenience. Developers often have accounts on GitHub where they might publish the code—with the embedded authentication keys—for the GitHub community. Hackers scour GitHub for this very scenario, and when they find your keys, they won’t waste any time running up your bill.

3 Paying More

Public cloud resources can help you convert capital expenses (CapEx), such as private cloud hardware and software, into operating expenses (OpEx) that you pay on a monthly or pay-per-use basis. However, it takes a lot of planning to make this conversion work. Most savings from the cloud come from shrewdly using software and platforms as a service (SaaS and PaaS), and then designing the remaining infrastructure as a service (IaaS) to minimize costs.
Losing Data

Virtual machines don’t behave as you might expect in public clouds. For example, if you move a database server into AWS, run it for a week, and experience an issue, you reboot. If that fails, you’ll stop the VM. But when you spin it back up, you’ll find you’ve lost that weeks’ worth of data on the disk. That’s because Elastic Block Storage (EBS) is ‘ephemeral’ storage—when you stop a VM, the storage is automatically reclaimed into the pool. The data only exists while the virtual machine is on. If you want that data, you need to make a snapshot, send it to the Simple Storage Service (S3), and use database services like Relational Database Services (RDS) to keep your database data safe.

Becoming Cloud Ready

For cloud providers, “cloud readiness” refers to your ability to rebuild servers quickly. For example, if you build a server in the cloud and something goes wrong, cloud providers expect you to destroy it and build a new one. Conversely, administrators in traditional environments prefer a certain familiarity with their servers. They’re accustomed to investing time into their servers by installing their favorite software, tools, and scripts and by changing their configurations over the years. This operating model simply doesn’t work in the cloud.
Managing a Virtual Infrastructure

When you use public cloud resources, you still need a network design—web servers in the front, databases in the back, failover within and across regions. You also need to know how the servers will interface with persistent storage and platforms, such as authentication and security keys. Likewise, you need to determine how the first line will distribute data and how you will implement DNS, load balancers, and autoscaling.

Getting Hacked

It’s not uncommon for people frustrated with all the security keys, security groups, and access control lists (ACLs) to experiment with things they may not understand. This is acceptable in a private cloud, because the firewalls are robust—but public clouds don’t have advanced firewalls. Furthermore, hackers know the IP address ranges for public clouds, and they’re constantly scanning for vulnerable openings. If you don’t know the rules, it’s easy to inadvertently expose your sensitive information to the Internet.

Surrendering Visibility

In traditional environments, you know the precise locations of your servers and data centers. You can see what services are running on which hardware. Public cloud providers simply don’t offer this same kind of visibility. Even if you have a security auditor that demands it, public cloud providers will never reveal the specific locations of their servers or data centers (although they can provide you with the proper security certification documents).
Realizing cost savings from the cloud requires a thorough understanding of the products and pricing systems. Unfortunately, few people examine the minutiae of what their systems need before deploying them on public cloud resources. They simply choose default settings and hope for the best. It will be worth your while to invest in properly sizing your VMs and investigate how you can best optimize your costs.

Going Without Service Guarantees

Public cloud providers only offer “best-effort service levels.” So if you pay for a load balancer, for example, that goes down for a couple hours, the cloud providers won’t charge you for that downtime. But they also won’t reimburse you for the revenue, time, or business value you lost as a result of the outage.

Overwhelming Costs
GETTING THE MOST FROM PUBLIC CLOUDS

Each cloud provider has its own competitive advantage, which it passes along to you, as its customer. How cloud providers extend these advantages to you is more difficult to determine. Not only are there significant nuances between pricing models, it’s also hard to know how you can get the most value from a cloud service with your business’ particular workload and data flow.

Whatever decisions you make, be sure to plan ahead—do what you can to avoid the common cloud traps, carefully consider your options, and develop contingency plans for all scenarios. If you don’t have the skills in-house, work with an advisor or consultant who can help you develop a roadmap for your cloud transformation.

To learn more about how you can transition to the new cloud computing model, consider a Cloud Strategy and IT Transformation Workshop from Advanced Systems Group (ASG). This isn’t a PowerPoint presentation. It’s a collaborative, interactive discussion that will give you a better understanding of the marketplace and leave you with ideas on how you can integrate the cloud into your own environment.

Contact ASG or go to virtual.com/cloud-transformation to learn more.