

The Open Cloud Manifesto

A call to action for the worldwide cloud community



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Introduction

The buzz around cloud computing has reached a fever pitch. Some believe it is a disruptive trend representing the next stage in the evolution of the internet. Others believe it is hype, as it uses long established computing technologies. As with any new trend in the IT world, organizations must figure out the benefits and risks of cloud computing and the best way to use this technology.

One thing is clear: The industry needs an objective, straightforward conversation about how this new computing paradigm will impact organizations, how it can be used with existing technologies, and the potential pitfalls of proprietary technologies that can lead to lock-in and limited choice.

This document is intended to initiate a conversation that will bring together the emerging cloud computing community (both cloud users and cloud providers) around a core set of principles. We believe that these core principles are rooted in the belief that cloud computing should be as open as all other IT technologies.

This document does not intend to define a final taxonomy of cloud computing or to charter a new standards effort. Nor does it try to be an exhaustive thesis on cloud architecture and design. Rather, this document speaks to CIOs, governments, IT users and business leaders who intend to use cloud computing and to establish a set of core principles for cloud providers. Cloud computing is still in its early stages, with much to learn and more experimentation to come. However, the time is right for the members of the emerging cloud computing community to come together around the notion of an open cloud.

What is Cloud Computing and Why is it Important?

In order to understand the core principles of an open cloud, we need to first level set on some basic definitions and concepts of cloud computing itself. First, what is the cloud? The architecture and terminology of cloud computing is as clearly and precisely defined as, well, a cloud. Since cloud computing is really a culmination of many technologies such as grid computing, utility computing, SOA, Web 2.0, and other technologies, a precise definition is often debated.

While definitions, taxonomies and architectures are interesting, it is more important to understand the value propositions for cloud computing. We need to understand how suppliers of cloud technology will come together to deliver on the promise of cloud computing.

The key characteristics of the cloud are the ability to scale and provision computing power dynamically in a cost efficient way and the ability of the consumer (end user, organization or IT staff) to make the most of that power without having to manage the underlying complexity of the technology. The cloud architecture itself can be private (hosted within an organization's firewall) or public (hosted on the Internet). These characteristics lead to a set of core value propositions:

Scalability on Demand

All organizations have to deal with changes in their environments. The ability of

cloud computing solutions to scale up and down is a major benefit. If an organization has periods of time in which their computing resource needs are much higher or lower than normal, cloud technologies (both private and public) can deal with those changes. The organization pays for the IT resources it actually uses; it does not have to maintain multiple sets of artificially high levels of resources to handle peak demands.

Streamlining the Data Center

An organization of any size will have a substantial investment in its data center. That includes buying and maintaining the hardware and software, providing the facilities in which the hardware is housed and hiring the personnel who keep the data center running. An organization can streamline its data center by taking advantage of cloud technologies internally or by offloading workload into the public.

Improving Business Processes

The cloud provides an infrastructure for improving business processes. An organization and its suppliers and partners can share data and applications in the cloud, allowing everyone involved to focus on the business process instead of the infrastructure that hosts it.

Minimizing Startup Costs

For companies that are just starting out, organizations in emerging markets, or even “Skunk Works” groups in larger organizations, cloud computing greatly reduces startup costs. The new organization starts with an infrastructure already in place, so the time and other resources that would be spent on building a data center are borne by the cloud provider, whether the cloud is private or public.

Challenges and Barriers to Adoption

Although the cloud presents tremendous opportunity and value for organizations, the usual IT requirements (security, integration, and so forth) still apply. In addition, some new issues come about because of the multi-tenant nature (information from multiple companies may reside on the same physical hardware) of cloud computing, the merger of applications and data, and the fact that a company’s workloads might reside outside of their physical on-premise datacenter. This section examines five main challenges that cloud computing must address in order to deliver on its promise.

Security

Many organizations are uncomfortable with storing their data and applications on systems they do not control. Migrating workloads to a shared infrastructure increases the potential for unauthorized exposure. Consistency around authentication, identity management, compliance, and access technologies will become increasingly important. To reassure their customers, cloud providers must offer a high degree of transparency into their operations.

Data and Application Interoperability

It is important that both data and applications systems expose standard interfaces. Organizations will want the flexibility to create new solutions enabled by data and applications that interoperate with each other regardless of where they reside (public clouds, private clouds that reside within an organization's firewall, traditional IT environments or some combination). Cloud providers need to support interoperability standards so that organizations can combine any cloud provider's capabilities into their solutions.

Data and Application Portability

Without standards, the ability to bring systems back in-house or choose another cloud provider will be limited by proprietary interfaces. Once an organization builds or ports a system to use a cloud provider's offerings, bringing that system back in-house will be difficult and expensive.

Governance and Management

As IT departments introduce cloud solutions in context of their traditional datacenter, new challenges arise. Standardized mechanisms for dealing with lifecycle management, licensing, and chargeback for shared cloud infrastructure are just some of the management and governance issues cloud providers must work together to resolve.

Metering and Monitoring

Business leaders will want to use multiple cloud providers in their IT solutions and will need to monitor system performance across these solutions. Providers must supply consistent formats to monitor cloud applications and service performance and make them compatible with existing monitoring systems.

It is clear that the opportunity for those who effectively utilize cloud computing in their organizations is great. However, these opportunities are not without risks and barriers. It is our belief that the value of cloud computing can be fully realized only when cloud providers ensure that the cloud is open.

The Goals of an Open Cloud

Customers expect that the cloud services they use will be as open as the rest of their IT choices. As mentioned earlier, there are significant barriers to the adoption of cloud computing. As cloud providers ask their potential customers to accept a loss of control over their resources, hiding vendor lock-in behind the benefits of cloud computing will lead to long-term damage to the cloud computing industry. As an open cloud becomes a reality, business leaders will benefit in several ways.

Choice

As an organization chooses a provider or architecture or usage model, an open cloud will make it easy for them to use a different provider or architecture as the business

environment changes. If the organization needs to change providers because of new partnerships, acquisition, customer requests or government regulations, they can do so easily. If the organization deploys a private cloud, they can choose between providers as they extend their capacity and/or functional capabilities. Resources that would have been spent on a difficult migration can instead be spent on innovation.

Flexibility

No matter which cloud provider and architecture an organization uses, an open cloud makes it easy for them to work with other groups, even if those other groups choose different providers and architectures. An open cloud will make it easy for organizations to interoperate between different cloud providers.

Speed and Agility

One of the value propositions of cloud computing is the ability to scale hardware and software as needed. Using open interfaces allows organizations to build new solutions that integrate public clouds, private clouds and current IT systems. As the conditions of the organization change, an open cloud lets the organization respond with speed and agility.

Skills

A side effect of an open cloud is the availability of skilled professionals. If there are many proprietary programming models, a given IT professional is unlikely to know more than a few of them. In an open cloud, there is a small set of new technologies to learn (especially when existing technologies are utilized), greatly enhancing the chances that the organization can find someone with the necessary skills.

Principles of an Open Cloud

Of course, many clouds will continue to be different in a number of important ways, providing unique value for organizations. It is not our intention to form standards for every capability in the cloud and create a single homogeneous cloud environment. Rather, as cloud computing matures, there are several key principles that must be followed to ensure the cloud is open and delivers the choice, flexibility and agility organizations demand:

1. Cloud providers must work together to ensure that the challenges to cloud adoption (security, integration, portability, interoperability, governance/management, metering/monitoring) are addressed through open collaboration and the appropriate use of standards.
2. Cloud providers must not use their market position to lock customers into their particular platforms and limiting their choice of providers.
3. Cloud providers must use and adopt existing standards wherever appropriate. The IT industry has invested heavily in existing standards and standards organizations; there is no need to duplicate or reinvent them.
4. When new standards (or adjustments to existing standards) are needed, we must be judicious and pragmatic to avoid creating too many standards. We must ensure

that standards promote innovation and do not inhibit it.

5. Any community effort around the open cloud should be driven by customer needs, not merely the technical needs of cloud providers, and should be tested or verified against real customer requirements.
6. Cloud computing standards organizations, advocacy groups, and communities should work together and stay coordinated, making sure that efforts do not conflict or overlap.

Conclusion

This document is meant to begin the conversation, not define it. Many details (taxonomies, definitions and scenarios, for example) will be filled in as the cloud computing community comes together.

We have outlined the challenges facing organizations that want to use the cloud. These issues lead to a call to action for the IT industry around a vision of an open cloud. We as industry participants must work together to ensure that the cloud remains as open as all other IT technologies. Some might argue that it is too early to discuss topics such as standards, interoperability, integration and portability. Although this is a time of great innovation for the cloud computing community, that innovation should be guided by the principles of openness outlined in this document. We argue that it is exactly the right time to begin the work to build the open cloud.

Companies that support the open cloud manifesto are listed at www.opencloudmanifesto.org.