

## The Federated Cloud Maturity Model<sup>®</sup>: Charting the Path to Cloud Computing

With the intense hype and uncertainty around cloud computing, it can be difficult for organizations to understand the path and steps required to move forward. As a cloud services user and provider, OnX has developed a specialized maturity model that outlines the major milestones along the journey to cloud computing. The Federated Cloud Maturity Model<sup>®</sup> allows organizations to map where they fit in the journey, and helps focus activities on components which further progress towards maturity.

### Defining Cloud Computing

In 2011, cloud computing ranked at the very top of CIOs' technology priorities, according to Gartner.<sup>1</sup> However, despite all the hype around cloud computing, there is still a fundamental lack of common understanding among both IT and business professionals on the components which make up cloud computing and, more importantly, what cloud *doesn't* mean. For example, many people understand the concepts of Infrastructure as a Service (*IaaS*), Platform as a Service (*PaaS*), and Software as a Service (*SaaS*), but few can distinguish the characteristics that differentiate specifics of cloud computing versus basic virtualization technologies, such as server or storage virtualization. As a result, one organization which has virtualized components of their IT infrastructure may not consider themselves as using "private cloud" technologies, while another organization in the same position would publicize that they are already using cloud computing in their environment.

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*How is Cloud defined? According to the National Institute of Standards and Technology (NIST), Cloud Computing is defined as follows:*

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*"Cloud computing is a pay-per-use model for enabling available, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction."*

Because of the many facets of cloud computing, it is helpful to define some of the major terms:

- **Private cloud** – The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.
- **Public cloud** – The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.
- **Hybrid cloud** – The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).
- **Federated cloud** – Bringing together of all three components of cloud and leveraging them as a single offering as it makes sense to a client. This implies several ways to connect clouds and legacy, such as backup vaulting to cloud recovery, DR scenarios, load burst and cloud archive.

**Beyond virtualization.** A private cloud environment is comprised of a great deal more than merely streamlining an organization's current approach to IT management. Private clouds are built on a foundation of virtualization in which servers, storage, and networks behave as a single pool of resources able to respond on demand to workload requests. But what distinguishes a private cloud from simple virtualization is the cloud's ability to *orchestrate* and *automate* the use of many different kinds of IT resources to support the needs of the business as these needs arise in real-time.

When the fast resource turnaround offered by this sort of automated orchestration, or agile provisioning, gets combined with virtualization, it becomes a whole new paradigm for IT.

This isn't just because agile provisioning enables IT managers to deliver IT capabilities much more quickly and efficiently with comparatively little manual labor; it's not even that users can select IT capabilities via self-service catalogs or by programming API's. It's because a private cloud fundamentally changes the way you utilize your IT assets. Your IT infrastructure becomes a managed resource pool allocated on demand where and when needed in accordance with user policies. When services are turned off, resources are returned to the pool so they're available to respond to other demands. Deployment of resources is not only vastly more productive, it can be measured in real time — and what can be measured can be billed back to business units.

**More competitive.** A private cloud can boost your organization's competitiveness and profitability by making better use of IT assets — to benefit from economies of scale, exploit asset-sharing opportunities, and improve resource agility. You'll experience much faster delivery of the technology and business process capabilities users need without those users having to bog themselves down in the details of implementation. The accelerated time-to-market for an organization's products and services that rely on IT means great opportunity to gain market share.

The result: Your organization becomes significantly more responsive, flexible, and efficient while enabling you to reduce costs.

The purpose of this White Paper is to establish a baseline cloud computing model which can provide clarity on what technology and business components make up cloud computing, and how the journey to cloud computing follows a logical progression which can be mapped to an organization's evolution to a true cloud computing environment.

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*Tell me again: What's a private cloud?*

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*An organization-controlled IT infrastructure/architecture that leverages virtualization as well as resource orchestration and automation techniques to provide an organization's users and/or customers with self service, pay-as-you-use IT services/capabilities that can be turned on or off as needed*

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*Orchestration – agile provisioning*

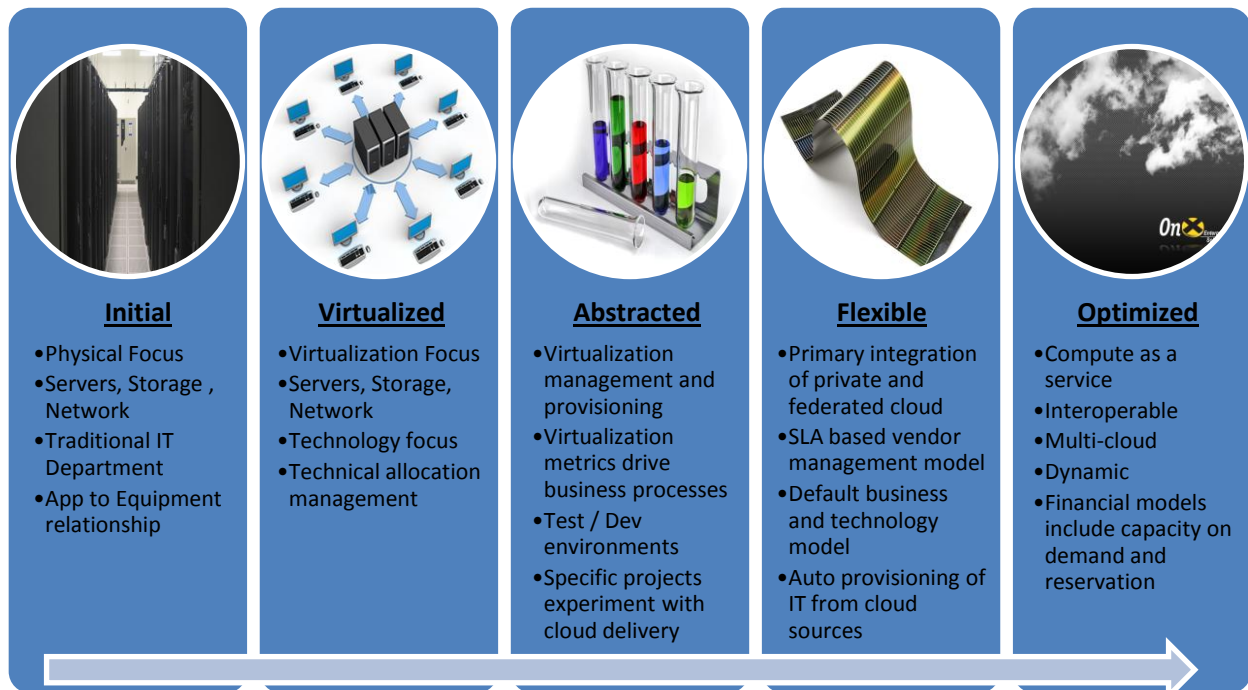
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*Coordination and automation of the provisioning of a range of resources — such as processors, networks, and storage — so that a single command triggers an integrated resource request that's responded to in minutes instead of days or weeks.*

## The Migration to Cloud Computing

Gartner estimates that enterprises will spend \$112 billion over the next six years on various cloud-related technologies<sup>2</sup> — a sure sign that cloud computing has begun to transform enterprise IT infrastructures.

Underlying the concept of cloud computing is the understanding that implementing a cloud solution is as much about the business processes and financial approach as it is about the fundamental technology. As a result, the movement to cloud computing is not something that can be “purchased”; it requires a migration following a specific path. Through our experience OnX has developed the Federated Cloud Maturity Model<sup>®</sup> as a mechanism to track where organizations currently fit within their migration path, and where the next logical step resides. A summary of the five primary migration milestones is shown below:



To understand the model's approach there are four primary characteristics which are evaluated and scored in baselining an organization's current position. These are:

- **Infrastructure:** An organization's underlying infrastructure must be reviewed as the first step. Measurement is taken on the level of physical vs. virtual infrastructure for servers, storage, networks, desktop devices, etc. Fundamentally, cloud computing requires at its core an abstraction away from physical components to function. As a result, if an organization has not made this abstraction a core component of its cloud computing strategy, there will need to be a basic shift in the baseline components.
- **Applications:** In similar fashion to the infrastructure, an organization's application suite must be evaluated to understand the ability for the applications to be virtualized and abstracted from its underlying support infrastructure. The closer applications are tied to the infrastructure, whether through technology requirements or through a policy requirements (such as data security), the more difficult it will be for the organization to progress to a cloud computing model.
- **IT Business Processes:** As noted above, the migration to cloud computing is as much about the business as it is about technology. The next area of investigation involves the business processes for IT. If the business processes of IT are focused on asset management and operational budgets, then there is little opportunity to migrate to an SLA-based, services catalog-oriented cloud computing environment.
- **Financial Model:** Ultimately, cloud computing provides for a new way to financially support the expansion, contraction and allocation of IT resources. If the IT function of the organization is focused on capital and operational budgets, or there is no mechanism for implementing usage based financial models, then there must be changes to the financial operation to support a cloud computing paradigm before migrating to the next phase of cloud adoption.

Based on these four factors, the following table outlines the major characteristics of the Federated Cloud Maturity Model<sup>®</sup>:

	Traditional	Virtualized	Abstracted	Flexible	Optimized
Infrastructure	<ul style="list-style-type: none"> <li>- Physical focus</li> <li>- Characterized by dedicated servers, storage and network</li> </ul>	<ul style="list-style-type: none"> <li>- Mix of Physical and Virtual infrastructure.</li> <li>- Characterized by implementations of VMware, Hyper-V, Citrix.</li> <li>- Possibly storage virtualization.</li> <li>- Technology Focused</li> </ul>	<ul style="list-style-type: none"> <li>- Virtual is the primary goal</li> <li>- Pools of resources</li> <li>- Unable to “point and identify” infrastructure for specific applications or projects</li> <li>- Highly standardized</li> </ul>	<ul style="list-style-type: none"> <li>- Some workloads are moved to shared or hybrid cloud</li> <li>- Cloud services used for non-core</li> <li>- Actively engaged in IaaS, PaaS, and SaaS offerings</li> </ul>	<ul style="list-style-type: none"> <li>- Infrastructure is standardized</li> <li>- Auto-provisioning of services</li> <li>- Shared, federated and private cloud intermixed</li> <li>- Open cloud marketplace</li> </ul>
Applications	<ul style="list-style-type: none"> <li>- Tied to physical resources</li> <li>- May have hard-coded IP addresses</li> <li>- No elasticity</li> <li>- High demand for disk</li> </ul>	<ul style="list-style-type: none"> <li>- Virtualized hosts</li> <li>- May have physical Database or DMZ characteristics</li> <li>- Limited elasticity</li> </ul>	<ul style="list-style-type: none"> <li>- Major migrations underway or targeted</li> <li>- Selected cloud adoptions</li> <li>- Beginning use of PaaS or SaaS offerings</li> <li>- Migration to a federated identity management model</li> </ul>	<ul style="list-style-type: none"> <li>- Selected cloud delivery of applications</li> <li>- All components are abstracted</li> <li>- Thin or web delivery</li> <li>- Full federated identity management</li> </ul>	<ul style="list-style-type: none"> <li>- Multi cloud vendor</li> <li>- Shared, federated and private cloud intermixed</li> <li>- Mixture of SaaS, PaaS and IaaS</li> <li>- Open cloud marketplace</li> <li>- Cloud based applications can auto-provision required infrastructure</li> </ul>
IT Business Processes	<ul style="list-style-type: none"> <li>- Focus is on the uptime of infrastructure</li> <li>- Traditional 80% budget on operations</li> </ul>	<ul style="list-style-type: none"> <li>- Focus on technology as a means of efficiency</li> <li>- Capacity utilization</li> <li>- Virtualization is a layer on ITSM operations management</li> </ul>	<ul style="list-style-type: none"> <li>- Technology is a business model</li> <li>- Shift in focus to vendor and SLA management</li> <li>- Self-service focus for user support and capacity management</li> </ul>	<ul style="list-style-type: none"> <li>- IT is auto-provisioned internally or with cloud supplier</li> <li>- IT operations is relationship based</li> <li>- Cloud is the business model</li> </ul>	<ul style="list-style-type: none"> <li>- IT is auto-provisioned as the application requires capacity</li> <li>- Business processes bridge internal IT and cloud suppliers</li> <li>- IT operations is SLA and relationship based</li> <li>- Capacity is managed elastically</li> </ul>
Financial Model	<ul style="list-style-type: none"> <li>- Major expenses for staff, H/W, S/W and Maintenance</li> <li>- Capital intensive</li> </ul>	<ul style="list-style-type: none"> <li>- Virtual infrastructure is treated similar to physical infrastructure</li> <li>- Some elements of capacity planning</li> <li>- IT economies of scale focus</li> </ul>	<ul style="list-style-type: none"> <li>- Funded by capacity requirements</li> <li>- Operations metrics are SLA’s</li> <li>- Business cases are ROI driven, including productivity and growth targets</li> </ul>	<ul style="list-style-type: none"> <li>- Components are usage based</li> <li>- Cloud metered financials</li> <li>- Departmental chargeback models</li> </ul>	<ul style="list-style-type: none"> <li>- Usage based</li> <li>- Billing and metrics on availability of cloud services</li> <li>- SLA’s are risk-reward shared with cloud provider</li> <li>- Variety of payment methods; pay as you go, partial and full reservation</li> </ul>

Currently, many organizations are still in the early stages of migration to cloud computing, with the majority operating in the “Traditional” or “Virtualized” maturity stages. Based on where your organization resides, your next actions will vary. For organizations in the “Virtualization” phase, the next actions involve moving to the “Abstracted” level, where virtualization becomes pervasive from an Infrastructure level, and the IT business models shift to becoming a service provider to the organization with SLA’s based on delivery of on-demand capacity. This also tends to include the implementation of automated management and provisioning tools into the environment. Similarly, the financial funding model for IT shifts to a more operational and holistic view of how IT supports the business instead of a capital and / or project asset based view. Likewise, for those residing in the “virtualized” maturity stage, attempting to move beyond “abstraction” to “flexible” by implementing a cloud metering chargeback model for large IT components will not work because the underlying IT business processes are not going to be able to support leaping forward two stages.

OnX Enterprise Solutions is a global enterprise data center solutions provider with a suite of end-to-end solutions including the industry’s leading Federated cloud solution offerings. The company designs, builds and manages complete data center environments comprised of multi-vendor offerings in four core areas – Hardware & Software Solutions, Cloud & Managed Services, Digital & Application Services, and Professional Services. Over the past 28 years, OnX has helped clients achieve exceptional business results that accelerate their growth and value. Headquartered in Toronto, Canada, OnX has a team of more than 500 IT professionals with offices throughout North America and Europe.

### **Benefits of using the Federated Cloud Maturity Model<sup>®</sup>**

IT often struggles with aligning their activities to the business requirements of the organization. Using the Federated Cloud Maturity Model<sup>®</sup> provides a mechanism for IT organizations to investigate and map initiatives to more than just IT requirements; it considers the evolution of the business and financial components to provide a logical path. It also clearly identifies the next steps for the organization to take to move to the next phase of maturity.

Cloud computing is already a major force in the marketplace. For those wondering how soon cloud computing will impact their organization, if Gartner’s predictions are correct, the answer for many is “Sooner than you think.”

Fortunately, getting your organization cloud ready — whether or not your company is in phase 1 or 5 of the model — is easier now than ever before, thanks to OnX Enterprise Solutions approach to cloud services. OnX can help you determine your current stage of cloud readiness and to how best to move forward on your cloud journey. More than just a consulting company, OnX is unique in that we have experience in going through this process several times in establishing our clouds. This practical experience in making cloud computing a reality is one of the key components which has driven the development of this Federated Cloud Maturity Model<sup>®</sup>.



## About OnX

A leading provider of innovative IT solutions, OnX not only understands virtualization and private clouds — it also works with the world’s foremost virtualization and private cloud vendors, including VMware, Cisco, EMC, IBM, HP, and Oracle, among others.

OnX marshals the power of these forward-looking vendor solutions with its own deep expertise in virtualization and private cloud deployments to help organizations virtualize their IT infrastructures, add the agile provisioning necessary for private cloud computing, and deals with the challenges posed by such issues as platform-dependent legacy apps, firewall virtualization, and cloud performance optimization. Furthermore, our experience designing, building, deploying and operating multi-tenanted cloud services within our data centers in a competitive marketplace can assist our clients in building their own private cloud services.

## OnX Cloud Solutions

OnX experts understand that, potent as today’s vendor solutions may be, one solution size cannot fit the myriad of diverse client requirements.

**Beginning with an assessment.** That’s why OnX prefers to begin every customer engagement with a vendor-independent assessment. “An assessment not only shows you what you have in your environment, but helps define what will work” says Ted Hall, OnX Senior Solution Architect.

Hall notes that the most successful and best-performing projects OnX has done over the last few years have been the ones that began with an infrastructure and/or business case assessment.

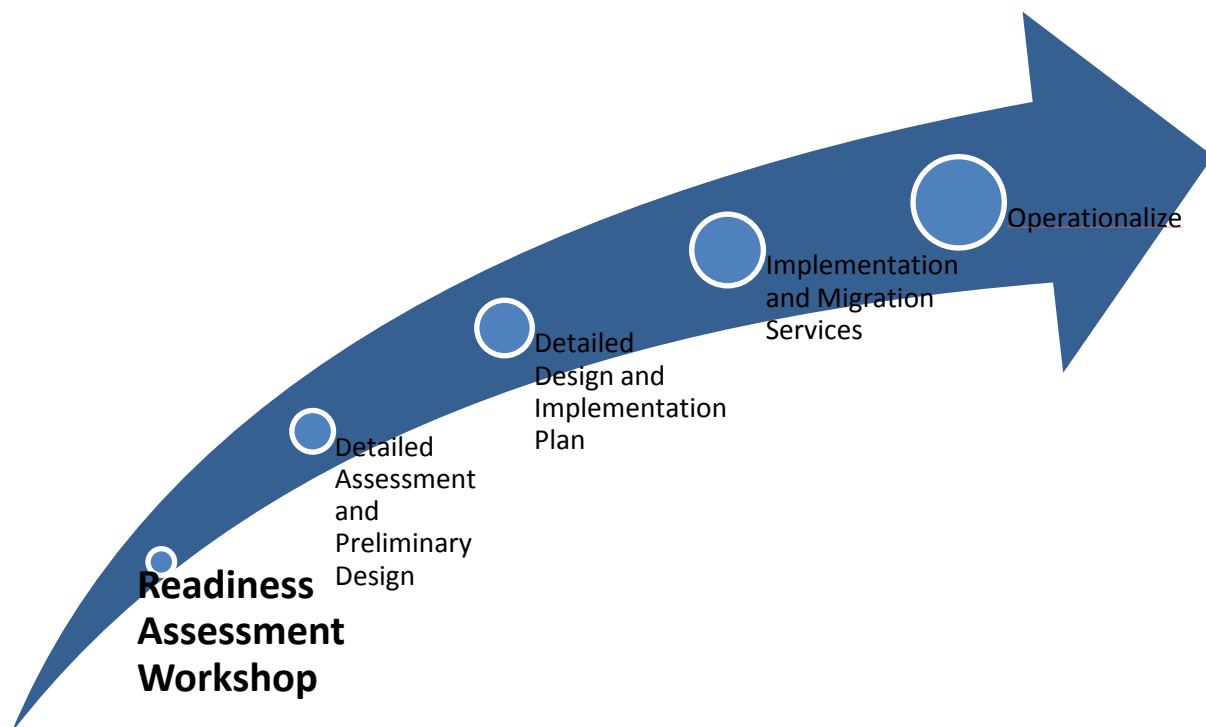
Experience so far suggests that private clouds work well for frequently-requested services that do not continuously use resources, such as virtual desktop computing, development environments, and certain collaboration, database, and web environments. OnX professionals will work with you to identify where a private cloud can benefit your organization and to establish a strong business case, emphasizing return on investment — that is, increasing value, not just reducing costs.

This customer-centric approach also means OnX experts will make sure they thoroughly understand your IT environment as they assess, design and deploy cloud capabilities that can best serve your organization. Because our experts have taken the time to understand your existing environment, they will spot — and design for — any weaknesses in key infrastructure areas, such as storage, network, clustering, security, business continuity, or staff capabilities. Plus they’ll make sure your infrastructure includes the provisioning and configuration management functionality necessary for a private cloud — including server provisioning, patching, server configuration baselining and auditing, application provisioning and configuration management, application release automation, and redeployment of assets.

## OnX Cloud Readiness Assessment Workshops

An OnX Cloud Readiness Assessment Workshop is a collaborative, proven, and structured approach that enables our technical experts to gain a deeper understanding of our customer's business as well as their challenges. In this workshop our experts determine where you are on the path to an optimized, automated, and business-aligned IT resource pool.

Through this phased methodology, OnX is able to identify your organization's position on the Federated Cloud Maturity Model<sup>®</sup>, and use this as a mechanism to align the appropriate solutions that will not only meet your information technology requirements, but the corporate business goals as well.



***The importance of trusted partnership.*** Unless your organization can carry truly extensive staff expertise in all aspects of virtualization, versed in multiple vendor platforms, as well as agile provisioning and a number of other technical skills, designing and deploying a successful private cloud can be intimidating.

But you don't have to be intimidated. With a trusted partner able to offer the right skillsets, vendor relationships, and certifications, you can get a private cloud capability that has been expertly designed for the particular needs of your organization and deployed in keeping with your organization's policies and culture.

At OnX, we maintain deep expertise as well as close connections with, and certifications from, the leading cloud technology solution providers. But we *always* remains focused first and foremost on each of our customer's particular requirements so we can recommend what you need, not what a vendor



wants to sell. Additionally, we're experienced at integrating products and services from multiple vendors, so you don't have to worry about vendor lock-in.

When you're ready to take a step toward your cloud future, call us. Our accomplished team has the know-how to combine the right products and services to meet your cloud business requirements and the ability to work with your staff and your existing technologies, tools, and procedures.

OnX is always there whenever you need us. Because that's what a trusted partner does.

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- 1 <http://www.gartner.com/it/page.jsp?id=1526414>
  - 2 <http://www.ciainsight.com/c/a/Infrastructure/Gartners-Cloud-Computing-Outlook-2011-521057/?kc=CIOMINEPNL05122011STR4>

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