# Platform-as-a-Service: What ISVs Need for World-Class Cloud Offerings

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## About this Report

This report is based on independent research developed and conducted by Saugatuck Technology Inc., who is solely responsible for the analysis, conclusions and recommendations presented in this report. The publication of this report was funded by IBM.

## About Saugatuck Technology

Saugatuck Technology, Inc., provides subscription research and management consulting services focused on the key market trends and disruptive technologies driving change in enterprise IT, including Software-as-a-Service (SaaS), Cloud Infrastructure, Social Computing, Mobility and Advanced Analytics, among others. Founded in 1999, Saugatuck is headquartered in Westport, CT, with offices in Falmouth, MA, Santa Clara, CA and in Frankfurt, Germany. For more information, please visit [www.saugatucktechnology.com](http://www.saugatucktechnology.com) or call +1.203.454.3900.
INTRODUCTION: THE CLOUD NEED IS NOW

“We believe it will be mandatory that we be in the Cloud by the end of 2012, which means that we need to make our decisions before the end of 2011.”

– ISV CEO

With IT buyers and users obviously and aggressively moving toward Cloud-based solutions for business, the choice of Cloud development and deployment platforms and providers becomes a critical decision for developers and Independent software vendors (ISVs).

ISVs want, and need, to capitalize on Cloud-driven growth. But transitioning traditional solutions to Cloud-based offerings can require significant effort, technology, and resources. Partnering with the right Cloud partner (or partners) will make the difference between getting to the Cloud, and getting to the Cloud profitably. In helping hundreds of ISVs since 2004 plan and manage transitions to Cloud-based business and technology models, Saugatuck Technology has developed and refined a framework that lays out the critical components that ISVs need for Cloud-based solution development and success.

This research paper uses the latest version of Saugatuck’s Cloud development framework, and more than 100 interviews with ISV executives facing real Cloud transition challenges, to identify key areas where ISVs need help moving to the Cloud, and where Cloud-based development and deployment services and platforms will help them.

DEFINING PLATFORM-AS-A-SERVICE (PaaS)

One key trend enabling the ISV transition from on-premise to the Cloud is Platform as a Service (PaaS). PaaS offerings enable building a Cloud business solution, deploying a solution to the Cloud and running it there, and integrating a Cloud business solution with other solutions either in the Cloud or on-premise, behind the firewall. Perhaps the best known of these PaaS offerings is Force.com, but Saugatuck believes that the most important PaaS offerings also include IBM, Microsoft, and other traditional software Master Brands. PaaS offerings not only enable development, testing and deployment of Cloud business solutions, but may also include the middleware necessary to operate them, charging on a usage basis for data base, storage and other services. Alternatively, PaaS providers may partner with one or more Infrastructure as a Service (IaaS) providers to enable the efficient operation of Cloud solutions through middleware and services offerings.

ISVs’ COMPETITIVE ADVANTAGE IS IN THE CLOUD

“Our vision is to build solutions on Cloud-compatible tools, but we aren’t clear on exactly what this entails in detail yet. We want to move all development into the Cloud, and need to adjust our current methods and tools to achieve this.”

– CTO, large ISV serving transportation markets

According to current research by Saugatuck Technology, most ISVs learn quickly that the development and deployment of Cloud-enabled business software requires knowledge, technologies, resources, and ecosystems beyond what most ISVs and developers are prepared to invest in themselves. Thus, more and more are looking to Cloud platform providers to help them step up to the Cloud.
Finding and working with the right Cloud platform and partner becomes a critical business and technology choice for ISVs.

When it comes to moving from a traditional ISV business to a Cloud-enabled business and technology model, and a Cloud-inclusive portfolio, the twin themes of development and deployment define what ISVs need. They also help provide the raw scope of choices and decisions to be made. Practically every aspect of what the ISV already has used and built, from development language(s) to product architecture to security schema to DBMS support needs to be reconsidered in a Cloud-enabled context for development, delivery, use, and payment. Thus we can see how few, if any ISVs are prepared, or have the resources needed, to make the step to Cloud on their own.

**THE SAUGATUCK CLOUD DEVELOPMENT AND DEPLOYMENT MODEL**

Saugatuck has developed a Cloud Development and Deployment framework model to assist ISVs in visualizing and understanding the scope of typical Cloud development and deployment needs. The model is meant to summarize and explain the typical choices required and available to ISVs. Not every aspect will be equally relevant to every ISV. But the framework can, and should, be used as a structure for identifying ISV Cloud needs, and for qualifying ISV Cloud partners. Figure 1 presents the core framework and its key layers. Within each layer are multiple components critical to enabling efficient Cloud development and deployment. Each layer is dissected and explained following Figure 1.

**Figure 1: Saugatuck’s Cloud Development and Deployment Framework**

Bear in mind that all of these components at every layer may not be available from a single provider today. ISVs may have to make do with composite offerings that sometimes span multiple partner Clouds to bring all of the necessary elements together. The most suitable platform partner will have both the most critical elements, and the widest/deepest/strongest ecosystem of its own partners to fill important gaps for ISVs.
The Infrastructure Services Layer

This layer includes the most basic of IaaS capabilities: The supporting hardware, software and associated infrastructure upon which development may be executed, and upon which the deployed Cloud solution will run. It must be at least as powerful, secure, robust, reliable and available as any physical infrastructure within a development or ISV organization. Most ISVs will want (and need) platform capabilities.

Several existing, Cloud-native IaaS providers (e.g., Amazon, Rackspace, Savvis) have physical infrastructures of sufficient size and capabilities. Many others, including key traditional, Master Brand IT providers with extensive, “long-tail” ecosystems have added to and refined their already-significant infrastructure capabilities and services into Cloud development offerings for themselves and their partners. Still other traditional software Master Brands (e.g. IBM, Microsoft) are building out extensive Cloud platform services to include infrastructure capabilities.

The Middleware Services Layer

“Every business solution deployed in the Cloud needs some kind of DB and apps server to run on. The question is how to leverage these middleware components; then how to use data from other sources in the Cloud solutions, and how to manage and control data, especially security and redundancy.”

– Chief Architect, large ISV serving financial services firms

This layer is the “glue” that cements ISV development with other applications, data types and sources, environment, and technologies. Saugatuck characterizes this as the “enablement” layer for Cloud development, as the capabilities offered by the Middleware Services layer, typically via APIs, will enable and shape the capabilities of the result from the development effort. Figure 2 identifies the core components of the Middleware layer that must be included in any move to Cloud-based offerings; these are examined briefly following Figure 2.

Figure 2: Key Middleware Services Layer Components

Source: Saugatuck Technology Inc.
- **Multi-tenancy.** Multi-tenancy enables ISVs to deliver and deploy “write once” changes, improvements, upgrades, *et al.* to multiple customers simultaneously. The costs of application and technology management are thus significantly reduced for the ISV.

- **Virtualization.** Virtualization enables the development of single-tenant, multiple-instance solutions without the need for prolonged re-development by the ISV. The short-term advantages include rapid deployment of solutions without re-architecting for multi-tenancy, as well as the customization of distinct instances for individual tenants – a potentially powerful value proposition for some customers. However, the longer-term support costs for the ISV tend to be much higher when using this approach.

- **Security.** ISVs need a Cloud platform partner that can help them build solutions that mitigate buyer security concerns about Cloud-based solutions and data. Identity management and encryption are the most important components, because Cloud-based solutions often enable multiple categories of users with varying access rights.

- **DBMS Access.** In general, the more database types supported and enabled, the better, but of course every ISV or developer is going to have preferences based on which db engine is at the core of its solution, and its own ecosystem. The critical need in this is consistency, as inconsistencies require the maintenance of multiple code bases. Platform choices that enable ISV leverage of existing DBMS (and other middleware layer components) will tend to deliver more value for the ISV.

- **Storage.** Multiple types of content will be used, stored, accessed, and transmitted. This makes Storage capabilities (and management) an important consideration. ISVs should look for abilities to manage structured and unstructured...
content, data storage for straight DBMS solutions, and baseline document storage for text-based content solutions. Note: even the most advanced Cloud platform partners may not yet include all storage capabilities.

- **Other Services.** This includes any and all middleware capabilities required to make the ISV solution work in the Cloud, such as BPMS and other workflow engines, Content Management Systems, Runtimes, and Data Services (e.g., Data Transfer In and Out). *One critical capability for Cloud deployment and management is a monitoring and automated scaling console based on business parameters or SLAs, ideally linked to the metering and analytics facility.*

### The Development Services Layer

> "Re-engineering our existing applications was a big technical challenge. Having the right platform with the right development environment and tools would have saved us millions."

— Founder and CEO, ISV serving engineering and design firms

This layer is where the “hard” work is done by ISVs and partners. The Development Services Layer is critical to creating value in the marketplace for developers, ISVs and platform providers. **Within five years, most Cloud development solutions will migrate the Development Services Layer to the Cloud.**

This is by far the most complex layer within the model, as it must include all the critical components, tools, languages, and libraries required by ISVs and developers to develop, test, refine, and maintain their offerings. Figure 3 summarizes the components that should be included in a Developer Services Layer; these are briefly defined in the section following Figure 3.

**Figure 3: Key Developer Services Layer Components**

- **Methodology Tools.** Many Cloud development solutions today lack support for development methodology, but this is a key element as we move toward a more Cloud-centric ISV future. Agile development (e.g., dynamic systems) is the primary method of software development today, with data-driven design a close second. Examples of methodologies that should be supported include the
following: Business Modeling, Cleanroom (Box Structure Method), Data Modeling / Data Design (Top Down, Bottom Up), Dynamic Systems Development Method (DSDM), Iterative Development, Jazz, Prototyping (especially for user interfaces), Rapid Application Development (RAD), Rational Unified Process (RUP), Scrum, Spiral Development, Test-driven Development (TDD), and V-Model (an extension of the Waterfall Method).

- **Analysis & Design Tools.** Key tools that should be included here: Business Process Modeling Notation (BPMN) tools, Modeling and Analysis of Real-Time and Embedded systems (MARTE), Unified Modeling Language (UML) tools (a no-brainer), and 3D Modeling Tools.

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**A MASTER BRAND IN THE MODEL - IBM**

The growth in demand for Cloud-based software is not only driving ISVs to the Cloud, but has also spawned tremendous growth in the number and ranges of Cloud-based services providers. Most such providers address one, sometimes two or more, layers of Saugatuck’s Cloud Development Stack model, and many focus on a specific technology “stack” or ecosystem, forcing ISVs to find and partner with multiple providers in order to address critical needs.

Among those few provider partners that address the entire Saugatuck stack model for ISVs, IBM stands out as bridging the traditional software model with the emergent Cloud IT and business reality, and providing an example of the breadth and depth of offerings and capabilities needed by ISVs. Within the Saugatuck model, IBM offers a number of projects that an ISV can undertake to design, deploy, or consume capabilities and services at each layer:

- **Cloud Applications.** IBM offerings at this layer include LotusLive and Coremetrics. A key new offering in this layer is the IBM Intelligent Operations Center for Smarter Cities.

- **Developer Services.** Here, IBM’s Rational software portfolio is critical to many ISVs. A new IBM offering in this layer is the Rational Integrated Collaborative Lifecycle Management on the Cloud.

- **Middleware Services.** IBM’s presence here is led by its Workload Deployer. The company has recently announced a beta offering, IBM SmartCloud Application Services, to help ISVs build and deploy web applications.

- **Infrastructure Services.** IBM’s SmartCloud Enterprise and Cloudburst offerings help ISVs build on, consolidate, virtualize and manage key infrastructure capabilities. New offerings in this layer include IBM SmartCloud Enterprise+ and IBM Starter Kit for Cloud.

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- **Build Tools and SDKs.** Code libraries and platform SDKs are a must, along with HTML/Web Development Tools, Integrated Development Environments (IDEs, e.g. Eclipse), Compilers, DBMS Tools, Debuggers, Emulators, Graphic Development Tools, Mobile Development Tools, Multi-Tenancy Development Tools, Runtimes, Scripting Tools, Visual Development Tools (Drag and Drop), and finally 4/5GL tools.
**Workflow & Integration Tools.** ISVs in the real world will want to enable customers to link to other systems or even entire portfolios, whether on-premise, or in other Clouds. Thus the Developer Services Layer should provide APIs, data cleansing tools, data mapping tools and widgets, Data Migration Tools, Extract/Transform/Load (ETL) Tools, Orchestration Tools, and XML Tools.

**Simulation & Testing Tools.** The growth of the hybrid, on-premise-plus-Cloud business and IT environment requires a portfolio of tools optimized over time to develop and test for, and within, such Cloud and hybrid environments. This portfolio includes, but is not limited to, the following: Black box/white box testing tools, database testing tools, GUI testing tools, hybrid systems simulation tools (really useful/critical for hybrid environments), Integration testing tools (ditto – how does the whole environment work together), load testing tools, mobile device testing tools, network simulation tools, QA and optimization tools, stress test tools, test automation frameworks, and Web testing tools.

**Deployment Tools.** Finally, the developed Cloud solution must be deployed in a manageable fashion, sometimes within a private Cloud, multiple public Clouds, hybrid Cloud-plus-on-premise, mobile, and environments combining these. Thus there is an emergent need for tools that enable not only Cloud deployment, but mobile solution deployment, and multi-Cloud deployment. *Few Cloud platform partners today can deliver all such tools on their own.*

### The Application Layer

“We’re going to continue to develop our applications the way we are comfortable, so we need a partner that can work within our comfort zone.”

– VP development/CTO, ISV serving large government agencies

At the top of Saugatuck’s model lies the Application Layer. As illustrated on the previous page, this layer consists of two types of applications developed for (or in) and deployed via the Cloud: Native Cloud Applications and Ported Cloud Applications (ISV or enterprise applications migrated to the Cloud). ISVs need to ascertain for themselves which approach they are best suited for, and which will get them to the Cloud most efficiently and cost-effectively. Figure 4 summarizes these in Saugatuck’s model.

**Figure 4: Key Application Layer Components**
• **Native Cloud Applications** are Cloud Solutions developed for the Cloud, in the Cloud, using one or more Cloud development environments.

• **Ported Cloud Applications** are traditional-style, on-premise application solutions re-engineered to run in the Cloud. These are usually migrated, single-tenant, virtualized applications re-architected to some degree in order to call to the middleware.

Many mid-sized and larger ISVs will follow both approaches, at least until they find it necessary and cost-effective to re-architect legacy offerings to be Cloud-native. *Ideal Cloud platform partners will be able to cost-effectively host, deliver, and support both.*

**USING THE FRAMEWORK TO ASSESS AND EVALUATE**

Saugatuck’s framework is just that – a framework to show how, and where, key pieces and capabilities needed by ISVs fit into a Cloud platform partner model. It will be three to five years before most of today’s leading Cloud platform providers can adequately address each piece at each layer. Therefore, using the framework by itself as a strict checklist for platform partner selection and evaluation is likely to result in some frustration for those seeking a single provider/partner right now.

The best approach today is to use the framework as follows:

1. **Identify own needs and strengths.** The framework can be used by ISVs as a checklist to identify what they have today, versus what types of tools, technologies, and capabilities are needed to move to the Cloud. This enables a relatively quick and simple identification and assessment of areas of critical need. This needs to be developed and refined within the context of the ISV’s own technology base, and its approach to developing and delivering Cloud-based offerings. *An ISV’s path, and its best choice of PaaS platform partner, can change significantly depending upon whether ISV plans to build on existing core code, middleware, tools, and technologies, or to pursue entirely new development.* ISVs with multiple product lines may need to do both. Only a few providers today can support such endeavors.

2. **Assess breadth and depth of platform provider capabilities & offerings.** Once an ISV compares itself and its capabilities against the framework, the framework can be used to “sort” potential platform providers against critical current and future areas of need. ISVs should focus on providers and platforms that enable offering development and extension that leverages as much existing code and knowledge as possible.

3. **Roadmap and growth path articulated for near and long-term future.** Any gaps found when assessing platform providers’ offerings and capabilities against the framework should be used by ISVs to start conversations with those providers about their longer-term direction and roadmaps for offerings. Ask if the provider lacks certain capabilities today, does it plan to fill those gaps, when, and in what manner? As noted earlier, platforms with services to enable deployment across multiple types of public and private Clouds—and increasingly, hybrid environments—will deliver more long-term value.
4. **Breadth and depth of partner ecosystem(s).** We encourage ISVs to use the framework as well to identify capabilities that are available through their existing partner providers, but also to identify the likely costs of utilizing those – especially if it will take multiple partner providers with differing technologies to enable and deliver needed capabilities. ISVs in such situations may prefer to look to a single platform provider that can coalesce critical capabilities, and get the ISV’s business and offerings moving toward Cloud now.

The Saugatuck Cloud development and deployment framework is a tool that will be useful for ISVs to start building realistic Cloud migration plans; articulating roadmaps of required change, investment, and partnership; and identifying and comparing Cloud platform partner needs and capabilities. As we stated at the beginning of this report, no vendor or provider, regardless of size, can make it to, and stay successful in, the Cloud on their own. Finding and working with the right partners, especially Cloud platform partners, is the critical success factor for any ISV.
**SPONSOR PERSPECTIVE: THE IBM SMARTCLOUD AND ISV ADVANTAGE**

As the adoption of cloud continues to revolutionize the delivery of IT and business services, ISVs are increasingly interested in moving their existing applications and/or creating their new business applications in the cloud. This interest is being driven by both the desire of many organizations to consume business solutions as a cloud service as well as the inherent distribution and support advantages that a SaaS delivery model provides.

However, the transition to a SaaS delivery model or creation of new cloud-native applications poses several challenges to ISVs, including a different revenue model, a new go-to-market model and a new operational model. This operational model is a particular challenge for ISVs since their expertise typically lies with their business solution – and not the infrastructure, shared services, delivery tools and support systems required for a SaaS delivery model.

To address these needs, IBM is introducing **IBM SmartCloud Application Services**, a platform-as-a-service offering that will enable organizations – both ISVs and enterprises – to design, deploy, manage and integrate their applications in the cloud. All of these services are delivered on IBM's SmartCloud platform that is specifically designed for business critical enterprise applications. Key capabilities include:

- **Application Lifecycle** – provide development departments with flexible access to rapidly activated and team-based development environments on the cloud. Application Lifecycle services provide a real-time collaborative platform for software delivery as a completely managed cloud service that includes agile planning, change management and software configuration management. These essential development capabilities allow teams to focus on developing applications without the burden of deploying and managing application tool environments.

- **Application Resources** – leverage shared services to reduce the cost and simplify the development and delivery of cloud applications. Application resources provide a central, shared service for common application resources (e.g. database as a service; message routing), saving the cost and complexity of managing and operating these services, while providing immediate availability and elastic scalability.

- **Application Environments** – accelerate with certainty the deployment of your applications with purpose built services. Multiple environments provide for different application types. Each environment enables application deployment without worrying about infrastructure and middleware details. The environment provides policy based automated scaling and management of the application.

- **Packaged Application Management** – support effective management of leading packaged applications with purpose built services. These services allow effective deployment of key packaged applications and comprehensive array of automated and managed services to more efficiently handle complicated tasks like change management, cloning for upgrade and rapid back-up of the entire installation and data.

- **Integration** – integrate cloud-delivered applications with other applications or resources, on-premises or in the cloud. Confidently synchronize data and processes by leveraging a set of standard or custom application connectors that are used by a central, configurable integration engine that will ensure application integration happens without the need for custom coding or manual processes.
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Our Mission is to help our clients make better business decisions and create new business value through trusted and objective insights into the key market trends and emerging technologies driving real change.

Over the last few years, this has included a major focus on Software-as-a-Service (SaaS), Cloud Infrastructure, and Social Computing, among other key trends.

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SAUGATUCK LOCATIONS:

US Headquarters:  
Westport, CT 06880  
+1.203.454.3900

Silicon Valley:  
Santa Clara, CA  
+1.408.727.9700

Germany:  
Eltville, DE  
+49.6123.630285