SaaS Maker™ Product Paper

Create, deploy and sell software on the cloud

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Background

As the "buzz" about cloud computing gives way to reality, stakeholders are quickly realizing a large and growing need to bring their mission-critical, commercial, or day-to-day operational software applications to the cloud. While the benefits are evident, the question of how to get there may not be. Therein lies the reason for platform-as-a-service.

Until recently, the terms "cloud computing" and virtualization were nearly synonymous. IT shops everywhere ported their servers to cloud-enabled infrastructure; meanwhile the big software companies and ISVs entered a gold rush to build more data centers. Seemingly everyone wanted to compete against Amazon's EC2 offerings. It was reminiscent of the dotcom boom days of building network infrastructure. As a result of the first wave of cloud, the world now has an abundance of data centers.

Inherently, stakeholders (independent service vendors (ISVs), program managers and organizational IT professionals) recognize the value of infrastructure services for lowering the cost of their IT environment while simultaneously improving their operational efficiency and effectiveness. While data center consolidation saves money, it only represents one piece of the cloud puzzle and merely scratches the surface of potential savings that can be realized. Amidst the hype, many people have forgotten that it's all about software and data. After all, we didn't build all these data centers just for the sake of their cool technologies. The cloud movement was largely inspired by the impending explosion in the number of software applications and vast quantities of data to come, and the need for a new model that provided an alternative to the often costly and time-consuming on-premise model of computing.

In the next few years, desktop applications will be predominately replaced by software on the cloud. Software-as-a-service is becoming the norm rather than exception, both for commercial and internal applications; and Infrastructure-as-a-service is rapidly becoming an acceptable and cost-effective way to avoid cap-ex, achieve rapid scalability, and get up and running quickly. But while the utility of software and infrastructure services are already making big gains, stakeholders are wrestling with how to develop and deploy applications on the cloud. In many cases, IT professionals are stymied by their need to develop new applications faster; or in the case of many government entities, how to migrate their legacy applications to the cloud, particularly in a resources-constrained economic environment.

In the future, software developers will use platform-as-a-service to build and deliver software solutions on the cloud. The biggest issue today is that most developers still don't understand how to use platform-as-a-service to create and deploy software on the cloud.

Platform as a Service

The National Institute of Standards and Technology (NIST) definition of cloud computing describes three service models: software-as-a-service (SaaS), **platform-as-a-service (PaaS)** and infrastructure-as-a-service (IaaS). Whereas SaaS and IaaS have gained popular attention, PaaS may be considered the "third leg of the cloud". It is the least understood, yet it potentially offers the greatest business advantages of any other aspect of cloud computing.

NIST describes PaaS as: "The capability provided to the consumer to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider."[1] In simpler terms, PaaS provides developers (the consumer) with easier ways to create and deploy software on cloud infrastructure. Those "easier ways" may be graphical user interfaces (GUIs), sandboxes, programming languages, shared services, application programming interfaces (APIs) and other online tools for developers. PaaS implementations vary from vendor to vendor.

So why is PaaS so important? Because it speeds development and saves a lot of money.

Using PaaS, developers can create and deploy software faster. Agencies can lower their risks, promote shared services and improve software security via a common security model. Data centers can leverage PaaS to make their infrastructure more valuable. PaaS can lower the skill requirements to engineer new systems and can lower risks by taking advantage of pretested technologies. It has been said that an order-of-magnitude in economics will change an industry.[2] PaaS has been shown to provide those types of improvements in the economics of engineering and deploying custom software. PaaS can cut months off software development projects while allowing for maximum reuse or repurposing of legacy applications, and delivering a development environment that is specific to the cloud. In many cases, it's possible to save millions of dollars and years on a single software development effort.

As demands increase and IT budgets shrink, PaaS will continue to grow in importance. But the question is, "How do stakeholders leverage PaaS to do more with less?" This paper helps provide the answer to that question. It introduces the SaaS Maker™ cloud platform, and explains how companies can leverage SaaS Maker to build and deploy software systems on the cloud in a fraction of the time and cost associated with traditional development.

[1] The NIST Definition of Cloud Computing, Special Publication 800-145
[2] Timothy Chou, PodTech transcript for "The End of Software", Jan 22nd, 2007

Introduction to SaaS Maker™

SaaS Maker is an online toolkit and platform-as-a-service (cloud platform) for rapidly creating and deploying business software systems on the cloud. It features point-and-click tools to rapid prototype, build and deploy applications without programming. The SDK and open API make it easy to write add-on modules for new functionality, and to integrate with open-source, third-party and legacy software systems.

The SaaS Maker platform manages challenging tasks that would otherwise need to be engineered at great expense into every software application: single sign-on, application multi-tenancy, federated search, role-based security, workflow, reporting and other shared services. The 'One-click Sell' feature makes it easy to publish apps for sale; developers merely need to set a price, click a button and their app is instantly available to the world.

A SaaS Maker Factory guides software developers through the steps to instantiate an enterprise-class cloud computing architecture that provides much the target software's

functionality. In some cases, SaaS Maker delivers 100% of development functionality with no additional programming needed, saving months or years of writing code from scratch. Based on user experience to date, software developers can typically build and deploy software in a 30% (saving 70%) of the time and cost associated with traditional software development.

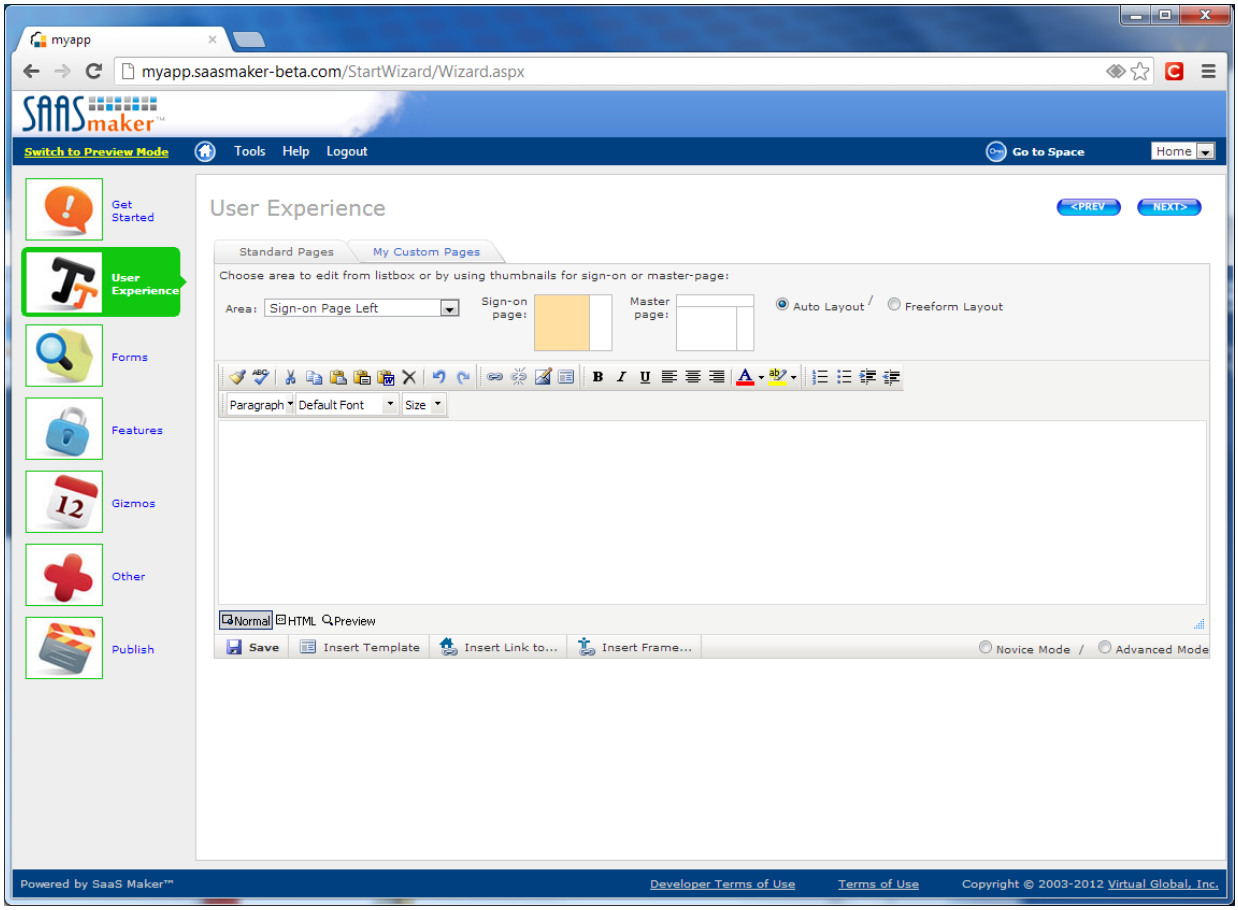
SaaS Maker is offered "*as-a-service*", meaning that you can use it on-demand over the Internet or intranet with no need to ever install, upgrade or host an application. The platform manages underlying complexities of applications, so there is no need for developers to provision and configure hardware or databases. SaaS Maker aligns with NIST's definition for platform-as-a-service: "The capability provided to the consumer to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider." Stated another way, SaaS Maker makes it significantly easier for developers to build and deploy business applications on a public or private cloud infrastructure. SaaS Maker helps developers get their apps to completion much faster and easier by avoiding labor intensive system development and integration efforts.

SaaS Maker offers several strategic advantages to stakeholders:

- **Rapid prototype software on the cloud** – Create concept business apps quickly without writing code. Rapid prototyping can serve as a way to gain customer buy-in or feedback earlier in the software development process;
- **Faster time-to-market** – Dramatically reduce time-to-market by using the platform as a launch pad for software engineering efforts. Deliver to customers faster. Software companies can enter new markets faster and accelerate ongoing efforts;
- **Return on Investment** – Software developers can deliver more for substantially lessto customers, and improve margins on fixed price contracts;
- **Lower costs and risks** – Reduce risks because common functions are already tested over a period of several years;
- **Higher security and interoperability** – SaaS Maker provides a common security model. If cloud software uses the platform, then it is inherently secured by the platform's security implementations, such as role-based access control;
- **Cloud ready** – SaaS Maker applications are all inherently ready for the cloud. Applications can be deployed easily, as part of the end-to-end offering, in either a public or private cloud.

The SaaS Maker Factory

The SaaS Maker Factory is an online toolkit for developing business applications without programming. The point-and-click approach of SaaS Maker Factory may appear simple, yet it is customizable and extensible to support the specialized requirements of the complex organizations. The SaaS maker Factory includes tools for designing a user interface, data-driven forms, workflow and bold-on modules. With zero programming, developers can "turn on" features for the end users, such as for searching or designing reports. The platform manages many of the more difficult functions on behalf of developers, such as authentication, federated search, role-based access control and application multi-tenancy.



The SaaS Maker Factory includes several functions for building robust applications:

1. **User Experience:** Create rich user experiences using a WYSIWYG editor, including look-and-feel, help files, email notifications and more without programming;

2. **Workflow:** With a mouse click, developers can give their users an integrated workflow designer, workspace management or federated full-text search capabilities;
3. **Remote Administration:** The Admin Control panel makes it easy to administer users, security, bolt-on modules and other system-wide and workshop-wide settings;
4. **Data-driven Forms:** The Tenant Manager automatically integrates data entry forms into the security and reporting engines;
5. **SDK / Open API:** Easy addition of third-party web services as reusable modules. Examples include Java, .NET and PHP platforms for applications such as collaboration, video, mapping, geospatial, remote desktop and more;
6. **Security:** Integrated user management system via Role-based Security engine for improved security and privacy in multi-tenant environments;
7. **Workshop Management:** Quickly implement multi-tenant applications for virtual organizations and sub-organizations;
8. **Reporting and Business Intelligence:** Integrated Report Designer and Business Intelligence engine to deliver data in more meaningful ways;
9. **Subscription Commerce:** The ability to publish apps for subscription-based revenues, with integrated e-commerce capabilities. SaaS Maker handles the trials, subscription management, email notifications and back-end commerce.

The SaaS Maker Factory implements a unique "Idea to Revenue" approach that guides developers through the steps from rapid prototyping through deployment for subscription-based revenues. The SaaS Maker Factory allows developers to focus on developing mission-critical functions instead of getting distracted with mundane development activities; and without getting caught up in the complexities that are typically associated with runaway SOA projects. On the surface, the SaaS Maker Factory may appear easy, however it implements a sophisticated business application architecture behind the scenes.

The SaaS Maker Architecture

SaaS Maker works by providing a prefabricated enterprise architecture on demand, which serves as a launchpad for software development. To better understand the notion of "*prefabricated enterprise architecture*", consider that traditional system integration is comparable to building a car from a pile of parts: very labor-, cost-, and time-intensive. In comparison, SaaS Maker's prefabricated enterprise architecture is analogous to building a car from an online catalog. The "chassis and interfaces" preexist, so that you can choose the look-and-feel and feature you want: forms, features, workflows, reports, etc. But this modular approach still delivers variety, choice, and customizability. Developers need not feel limited for choice—SaaS Maker includes a wide array of choices and available features, and it is fully customizable, so no matter what it is you want to build for the cloud, you can do it with SaaS Maker, whether it's a simple data entry form or an enterprise-class ERP system serving tens of thousands of users. With the SaaS Maker Factory (point-and-click wizard), software developers can use online tools to adapt the architecture for their special needs.

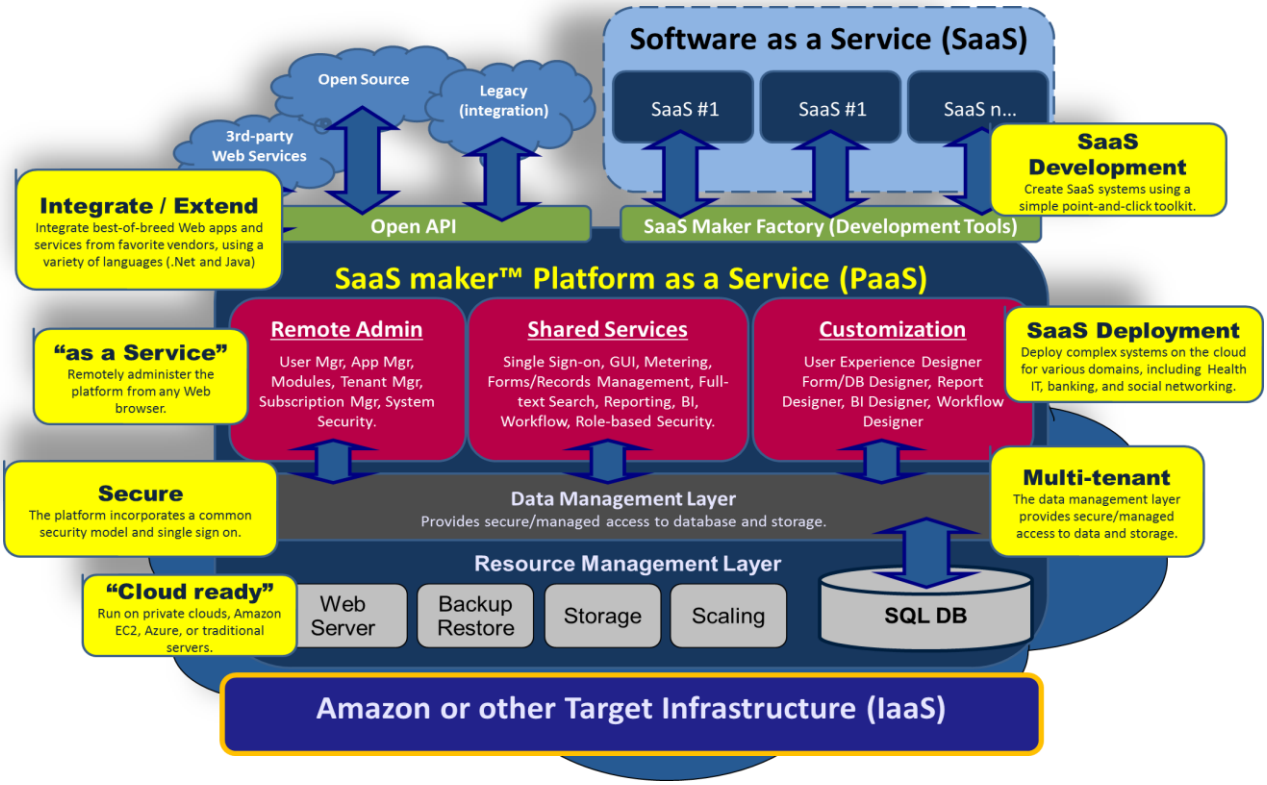


Figure 1. The SaaS Maker architecture encapsulates common functionality of federal systems and provides an open API for integrating with legacy software systems and data sources.

THE SAAS MAKER ARCHITECTURE

Alignment with National Institute of Standards and Technology

The SaaS Maker architecture aligns closely with the National Institute of Standards and Technology (NIST) Reference Architecture for Cloud Computing. Virtual Global worked closely as an industry partner with NIST to develop the Cloud Computing Reference Architecture working group, thus gaining a solid understanding of federal and national goals which are reflected in SaaS Maker's capabilities. If you build cloud software on top of the SaaS Maker cloud platform, your solution is inherently "cloud-ready", taking advantage of underlying cloud infrastructure, elasticity and as-a-service models. In this way, vendors can offer their customers the fastest path to "Cloud First" readiness.

Key components of the holistic architecture include, but are not limited to:

1. **Cloud Service Models (Provider):** Virtual Global implements SaaS, PaaS and IaaS as a stack relationship, in which the platform serves as a middle layer between the software and infrastructure layers:
    - **SaaS:** Virtual Global's PaaS developer tools are available to rapidly prototype and deploy custom SaaS solutions that support government and private enterprise mission requirements.
    - **PaaS:** In addition to developer tools, the SaaS Maker platform exposes open APIs for integrating with web services from a variety of vendors. The PaaS provides shared services for single sign-on, workflow and reporting. The PaaS is portable across infrastructures so that users can host their own solutions.
    - **IaaS:** SaaS uses Amazon EC2 for rapid prototyping. It leverages Amazon's infrastructure and Elastic Beanstalk for scaling your applications.
2. **Cloud Service Management:** The SaaS Maker architecture makes use of software provisioning, metering and a billing engine. Virtual Global also offers professional service to support cloud service management functions.
3. **Security:** Security is implemented throughout. For example, SaaS Maker is implementing multi-factor authentication interfacing with federated identity services. It delivers role-based access control (RBAC), multi-tenancy and other application security. Amazon EC2 provides infrastructure-level security: physical security, video surveillance firewall, signed API calls, and other mechanisms. As for application security, SaaS Maker applications inherently support authentication, user administration, security, workgroup management, records management, business intelligence and dozens of other features with zero programming. It also manages the sophisticated intricacies of role-based security and multi-tenant data management.

4. **Privacy:** Virtual Global's platform makes available "Role-based Workflow", a patented NIST invention that provides order-of-magnitude improvements in record privacy in certain situations.

Shared Services to Knock Down Stovepipes

SaaS Maker provides major advantages over ground-up development, because it consolidates common functionality into reusable shared services to reduce stovepipes. In doing so, it dramatically lowers development costs and promotes security by offering a common security model for all the applications in the cloud platform.

Stakeholders have long sought to save money, improve operational efficiencies and reduce risks by sharing IT services. The Federal Information Technology Shared Services Strategy describes how commodity, support, and mission services can be delivered and shared using cloud (or legacy) infrastructures. The cloud brings new possibilities, but it also brings new complexities.

Today if you examine a hundred stovepipe software systems, you will likely discover a hundred different ways to manage key functions such as role-based security, workflow and reporting. The Federal CIO Council addresses the problem in its 25 Point Implementation Plan to Reform Federal IT: "Too often, agencies build large standalone systems from scratch, segregated from other systems." Ironically, many organizations are still paying for ground-up development in an effort to seemingly avoid a proprietary platform dependency, yet stovepipes are the greatest of all proprietary dependencies. They are "one offs", often costing millions of dollars and years of effort, resulting in vendor dependencies and cost overruns.

SaaS Maker can help solve these problems and others because it serves to consolidate common software functions into a common architecture that can be shared across software applications. Imagine building dozens of software applications on a common platform: each will have one way to sign on, one way to search, one way to report, etc. Now, take it a step further and imagine migrating and consolidating legacy applications on the SaaS Maker platform. In the end, SaaS Maker can serve to consolidate applications in a similar way that IaaS served to consolidate data centers. The long-term cost savings across industry is noteworthy.

SaaS Maker Open Platform API

Early cloud rollouts were often made in isolation, sometimes as “proof of concept” designs, with the idea that the enterprise had to be all-or-nothing. This led to an early resistance of the cloud, giving rise to the idea that every app and data store would have to be converted and rewritten. SaaS Maker overcomes this objection, and allows cloud applications to exist in harmony with the entire enterprise, including legacy apps.

SaaS Maker’s open platform API allows software companies, government agencies and other developers to integrate SaaS Maker apps with their existing solutions and stacks. Furthermore, ISVs can deliver solutions on the platform using a variety of vendor-independent languages and technologies; and in doing so, they will lower the long-term costs of ownership for their customers.

As cloud platforms gain market traction, openness will gain relevance. That's why open platforms are important as the cloud unfolds. The term “open” has many meanings, and some “open” platforms may still have limitations. In truth, platforms usually have degrees of openness, rather than an “all or nothing” openness. For example, Microsoft Windows is an excellent example of an open platform, especially in its earliest incarnations, because any vendor could develop on Windows. At the same time, you couldn't run a Windows program on an Apple computer. You needed to run it on Windows. This is the most common type of open platform—open, but with some inherent limitations.

SaaS Maker is an open platform (with an open API) for integrating 3rd-party, open source and legacy web services and data sources from a wide variety of vendors, and using a variety of programming languages including Java, .Net and PHP. SaaS Maker developers are free to take advantage of the millions of emerging and existing web services, without being limited by any single vendor or technology to support its mission requirements.

The SaaS Maker platform may optionally be installed on traditional servers for “cloud readiness”. Architectural highlights include a point-and-click-wizard for rapid prototyping and building business applications without programming; scalable design to accommodate large datasets; integrated security model for authentication, Role-based Access Control and data protection; an open API and modular architecture for integrating with legacy systems; remote administrative consoles for managing users, security and system configuration; integrated Firebird database for affordable scaling; available for SQL Server and Oracle databases; and a robust feature-set for building and deploying mission-critical applications.

The Future: PaaS as Operating Systems

Cloud platforms are evolving into "*operating systems for the data center*".

The role of operating systems is traditionally described as managing resources. For example, desktop operating systems manage CPU, storage, memory, printers, etc. In time, operating systems evolved to also consolidate common software functionality, such as authentication and security models, and to provide graphical user interfaces that shield users from behind-the-scenes functionality.

As with desktop operating systems, cloud platforms provide a common user interface, common security model, core functionality (workflow, reporting, etc.), and manage resources, while shielding users from underlying complexities.

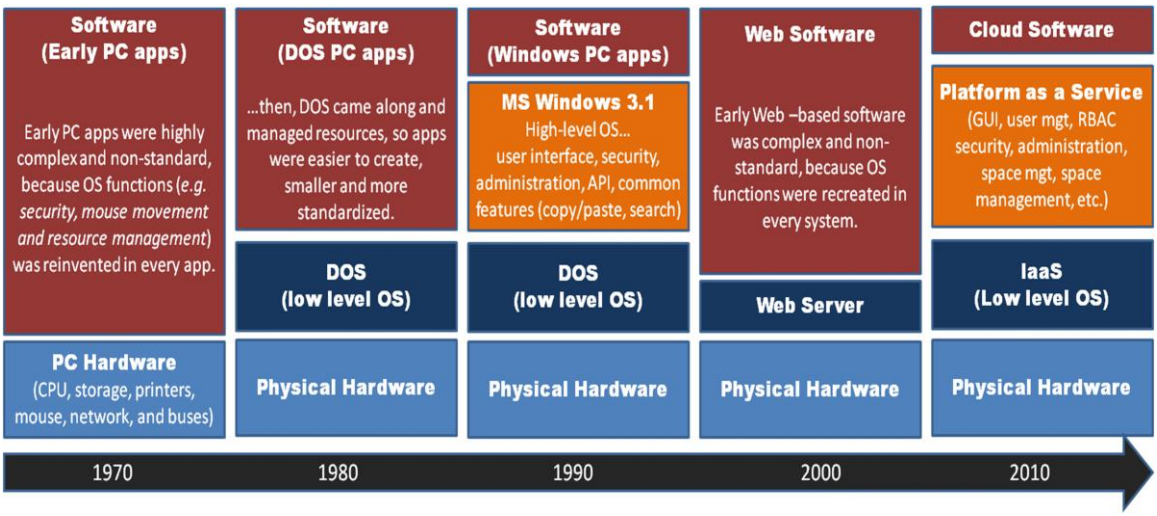


Figure 4 - Cloud platforms are evolving in the same way as prior computing platforms

The "data center as a platform" is evolving in similar ways as the desktop computing platform. The cloud platform is likened to an operating system for a data center.

	Integration Platform	
	Desktop	Data Center
Year	1990	2010
Infrastructure	PC (Intel/Seagate)	IaaS (Amazon)
OS	Windows	PaaS
Apps	Desktop Apps	SaaS
Interface	Platform API	Platform API
Functions	Subroutines	Web services
Modules	Custom Controls	J2EE Components
RAD Tools	VisiCalc	Cloud IDE

Figure 5 - Cloud platforms are evolving into operating systems

SaaS Maker Deployment Model

A true platform-as-a-service, by definition, is not just a set of development tools; it is—or should be—an end-to-end solution that also incorporates deployment and post-deployment functionality.

Most existing PaaS vendors deliver PaaS in one of two models:

1. A hosting and deployment platform with auto-scaling and runtime services; and

2. A software development platform.

Both of the above services are important, but existing tools offer them in isolation—and therefore do not take the form of a true end-to-end PaaS solution. Most existing PaaS offerings in fact take the form of the first category; offering a type of advanced hosting environment with cloud-specific features for deploying and scaling cloud software. This still leaves some challenges in trying to implement SaaS applications with infinite scalability. The greatest limitation however, is that these types of environments (such as Google AppEngine, Amazon Elastic Beanstalk, and Microsoft Azure) are BYOC (Bring Your Own Code) only; and do not incorporate a cloud-specific development platform.

The second category mentioned does offer the online development tools for both developing and deploying SaaS, often with an easy push-button approach to deployment without server-side configuration. It may also co-exist with other hosting or runtime environments. The few tools that exist in this category include Force.com for example, which offer tools for creating apps on the Salesforce infrastructure. As a proprietary system though, it is still limited, and requires a long-term commitment to Salesforce—and it lacks the ability to publish apps as a true on-demand cloud service for subscription-based revenues.

SaaS Maker, as one of the only true platforms-as-a-service, takes the entire lifecycle of the cloud application into account. Deployment onto a public cloud is readily available and simple to execute as part of the package. In most cases, a public cloud deployment, particularly given the fact that robust security and administration is built into each SaaS Maker application inherently, is eminently suitable. The security of the public cloud is without question robust, and often superior than most private deployments.

There are cases however, especially for ultra-secure environments relating to some government or defense agencies, where a public cloud is not an option. In such cases, SaaS Maker applications can be easily deployed as private cloud versions across data centers; something that no other major PaaS vendor offers.

Economic Impact and Business Models

As stated earlier, the current cloud focus has been on infrastructure-as-a-service. Software shops can "rent" a virtual server for a fraction of the cost of buying and maintaining a physical server. This in itself has already led to an economic boom that continues to grow, simply by allowing smaller and startup companies to organize without having the capital expense burden of building a data center from scratch.

However, despite the advantages of IaaS, software companies and ISVs stand to gain significantly more market share by adopting cloud platforms, because software development represents the majority of IT costs. Cisco sponsored a report in May of 2011 released by a division of Frost and Sullivan makes the point this way: "*As the cloud matures, providers who have invested in cloud infrastructure will look to evolve today's Infrastructure-as-a-service (IaaS) offerings into new sources of revenue and competitive differentiators.* ***They will leverage their current cloud infrastructure, services, systems, and expertise to take on the next great opportunity in cloud services: Platform-as-a-service.***"[3]

SaaS Maker includes point-and-click development tools that make it easy for developers to build and deploy apps, and to publish their apps for revenues. The platforms will support multiple business models, such as subscription based revenues, utility computing (pay for usage), component development, advertising, etc.

The economic model of bringing a new software product to market has until recently been prohibitive. Besides the development costs themselves, the traditional deployment and marketing model have presented significant barriers to software entrepreneurs, with the cost of new product launch often being prohibitively high—often running into the millions of dollars to bring a single software product to market.

SaaS Maker helps entrepreneurs in two ways. First of all, the development environment reduces the development cycle, allows for rapid prototyping and cuts development costs significantly. Second, Virtual Global also gives software developers provides a platform for publishing and developing apps quickly, and without a significant marketing investment. Virtual Global's "Idea to Revenue" model doesn't stop after the product is developed. First of all, developer accounts are available at no cost. Using a popular business model that has been used successfully in many of the popular smartphone stores, Virtual Global works on a percentage model rather than assessing large up-front fees before a single copy is sold. Developers, once they have built their apps, can publish and market them, and with the help of Virtual Global, start generating revenue immediately.

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[3] http://www.cisco.com/en/US/prod/collateral/routers/ps9853/platform_as_a_service.pdf

APPENDIX A: SaaS Maker Features and Services

The following is feature list is included to illustrate platform maturity.

Platform features and modules are tightly integrated as part of "platform instances" that are delivered on demand.

SaaS Maker Factory Tools / Cloud IDE
SaaS Maker Factory is an online toolkit to help developers build and deploy custom SaaS solutions on top of the platform, without programming: • Ability to create a custom user experience, including Web pages, store-front, help file, license file, custom email notifications, etc. • Ability to create custom data entry forms • Ability to enable/disable platform features based on needs • Ability to install/uninstall reusable modules • Ability to customize reports, workflows, etc. • Ability to publish SaaS apps for B2B, B2C, or end-user SaaS, for multi-user sale, consumer sale, or ad-supported model.
Consolidated Platform Services
Forms/Record Management - Ability to create data entry forms; route, track and report on form data, with integrated support for attachments and workflow. The forms engine is integrated with the RBAC, search and reporting engines for deploying multi-tenant apps.
Presence Awareness - Ability for users to see who's logged on.
Search Services - Ability to search by full text, content type (record, task, contact, etc.), content owner, workspace, or global search or search by date range.
Workflow Services - Ability to implement custom business processes.
Historical Audit Trail - Track changes to records by user, date, etc.
File Manager (Repository Services) - Integrated file manager, with version tracking.
Common Security Model
Authentication Services - User ID/password authentication, password retrieval, change passwords and timeouts; Allow the administrator to specify authentication type (strong passwords, optional RSA token support, etc.), and password reset.
Global Role-based Access Control (RBAC) Services – User-defined role/privilege pairs for controlling access to tools and system features.
Workspace RBAC Services – Separate Role-based Security for each workspace in a multi-tenant environment.
Row-level security – Ability to control read/modify/delete privileges at the record level.
Workspace (Tenant) Management Services
Incorporates a logical separation of user groups within a multi-user implementation, such that no

one user (or group of users) can access data or functions that "belong" to another user, except as explicitly granted.
Data Management Services
Ensures that no SaaS Maker module can be created that uses the API to wrongfully interact with the underlying SQL database. That is, SaaS Maker modules are not permitted direct access to the underlying database without "going past" the data management layer, which serves as a gatekeeper.
Remote Administration Console
Instance Management – Allows for platform instances to be created and destroyed on demand.
Workspace Management – Allows for workspaces to be created, destroyed, customized and otherwise managed.
User Management – Allows for users to be added, modified and disabled; including password management.
Security Management (RBAC/Row-level Security) – Allows for role/user/privileges to be added and managed.
Platform Utilities
Report Designer – Ability to create business intelligence reports, which are integrated and controlled by the security model; and which are accessible by the records management engine.
BI Designer - Ability to create business intelligence reports, which are integrated and controlled by the security model; and which are accessible by the records management engine.
Workflow Designer – Ability to create workflows, which are integrated and controlled by the security model; and which are accessible by the records management engine.
Forms/DB Designer – Ability to create and manage database-driven forms, which are integrated and controlled by the security model; and which are accessible by the reporting and BI engines.
Graphical User Interface
Graphical User Interface – A portal-like user interface for accessing Admin functions; and for "running" SaaS Maker modules as a visually integrated system. The SaaS Maker GUI provides a common user experience that makes resulting software easier to use.
Open Platform
Browser Independence - The platform works with Firefox 4.x, Safari 5.x, Internet Explorer 6 and later, and Google Chrome 10 and later.
Open API - Incorporates a programmable interface for "*tightly integrating*" existing Web apps and services. To "tightly integrate" allows for the creation of systems, versus simple portals, and requires functions for interfacing with other plug-ins and data within the system, as defined by the security definitions. The interface should NOT rely on Microsoft "User Controls", "Web Parts", "COM", or other proprietary object technologies. Rather, it should work over regular Web services from a variety of software languages.
Integrated Modules - Includes a core set of default modules for team management, collaboration and document repository. Include integrated modules for chat, calendar, discussion, mail, task

management, etc. Includes integrated web services to demonstrate the API, such as Google language translation service, VNC remote desktop, and Alfresco document repository.
Enterprise Enabled
Back-end Scalability - Scalable to accommodate large numbers of users and heavy usage loads with 100s of thousands of SaaS systems, millions of end users and large record sets.
Front-end Scalability – Implement "paging", drilldowns and lookups for lists.
Cost Scalability – Available for free Firebird SQL. SQL Server or Oracle database also available.
Desktop Integration
SaaS Maker also includes features for MS Outlook, MS Project sync and MS Windows Desktop integration.

APPENDIX A: SAAS MAKER FEATURES AND SERVICES

ABOUT VIRTUAL GLOBAL

Virtual Global is a cloud platform engineering company in West Virginia. Its SaaS Maker™ platform-as-a-service makes it easier to rapidly build and deploy complex business systems on Amazon EC2, Azure public clouds, private Xen-based clouds, or private cloud data centers for "cloud ready" implementations. The SaaS Maker™ architecture includes an open API for integrating open source, 3rd-party and legacy systems.

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