WHITE PAPER

SaaS SERVICE PROVISIONING

PROGRESS
SOFTWARE

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1. INTRODUCTION

This paper is one of a series of papers that explore and discuss the technical architectural components of the Software-as-a-Service (SaaS) model.

SaaS shares the distinction of being both a business model and an application delivery model. SaaS enables customers to utilize an application on a pay-as-you-go basis and eliminates the need to install and run the application on the customer's own hardware. Customers generally access the application via a web browser or thin client over the Internet. SaaS is most often subscription based and all ongoing support, maintenance, and upgrades are provided by the software vendor as part of the service. Application customization capabilities, if available at all, are generally provided to all customers in a consistent manner. From the perspective of the software vendor, the SaaS model provides stronger protection of its intellectual property, operational control of the environment running the software, and generally a repeatable revenue stream from the service subscription fees. Software vendors have varying capabilities and applications can come in varying flavors but SaaS applications most typically support many unique customers using a single instance of that application - also known as multi-tenancy. Service provisioning is a critical aspect of delivering software as a service (SaaS). From a Service Oriented Architecture (SOA) perspective, service provisioning generally falls within the Contracts and Policies concepts of the reference model (see the OASIS SOA Reference Model[1]). While these concepts are generalized in the reference model, in the context of a real world SaaS offering one must define the specific details that will be covered by service provisioning.

For the purposes of this paper, we will define service provisioning as encompassing the full life cycle of an account, from initial provisioning (legal contract execution) through discontinuation of service (legal contract termination). The paper will discuss industry trends regarding service provisioning as well as cover relevant topics in both account setup and ongoing account management. After reviewing this paper the user will have a fairly comprehensive framework for implementing a service provisioning system for a commercial SaaS environment. The end goal here is to automate as many of the provisioning aspects as possible using a standards-based implementation. This will enable your SaaS operation to function in an efficient and scalable manner.

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2. INDUSTRY TRENDS

OASIS has taken a lead in defining standards for service provisioning via the Provisioning Services Technical Committee (PSTC), whose purpose is to define an XML-based framework for exchanging user, resource, and service provisioning information. To date, this committee has produced the Service Provisioning Markup Language (SPML[2]) specification. This generalized specification defines a requester, provider and target and allows for some standardized methods of interaction, but actual provisioning functionality is implemented by the SaaS provider in the target.

Aside from the SPML specification, current thinking in the service provisioning area seems to be focused on security and federated services for identity management. Numerous approaches are being worked on including NTLM (NT LAN Manager) and its more modern counterpart Active Directory Federation Services (ADFS), Security Assertion Markup Language (SAML), Directory Service Markup Language (DSML[3]), Provisioner[4] and OpenSSO[5]. Service provisioning includes much more than identity management as we will discuss below.

3. ACCOUNT SETUP

Account setup encompasses steps taken after a client has entered into a contractual arrangement to subscribe to the SaaS offering. At some point in the process, the sales team (or possibly the legal team) passes the client on to the administrative side of the business.

3.1 Adding to the Administrative System

Ideally the pass off from sales is done electronically, although it can also be done manually. Regardless, it kicks off a subsequent set of processes including setting up the client in the billing, operations, support and monitoring systems. Each of these will be addressed in order.

3.1.1 Billing

The first step is to provision the client in the billing system so the payment process can begin immediately. Delivering software as a service is different than delivering a physical product because once the service is consumed it cannot be taken back. Therefore, it makes sense to bill and collect for a SaaS account in advance before a client is given access to the service, with appropriate discounts offered for longer terms of service paid for in advance.

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It should be noted that the sales process for SaaS often includes some type of trial account, which is usually provided at no cost, so a prospective client can try out the service on their own to ensure the functionality meets their needs before committing to a service contract. In order to be efficient, the trial account should be designed so it can be easily transitioned to a production account. Even if trials are setup in an environment separate from production, an automated process for moving the account from one environment to the other should be considered, including the option of bringing along any data setup in the trial or starting fresh. The trial account can also be leveraged to keep the process moving forward while payment details are worked out. Once a client has contractually committed to the service, they can proceed to train the initial set of users in the trial account until payment can be made and a full production account provisioned.

3.1.2 Operations

Once the payment requirements are fulfilled, the process moves on to the Operations group. This group is responsible for provisioning the actual production account and transitioning the client's trial account if appropriate. The portion of the administrative system used by operations helps that group to keep track of the existing production clients so that service level agreements (SLA) can be maintained, proper controls can be exerted over storage and backup of individual client data, etc. Once the client has been provisioned for service by the operations group it becomes their responsibility to keep that client up and running seamlessly throughout the term of the contract.

3.1.3 Support

After the Operations group has provisioned service for the client in the production environment, the Support group can proceed to provision them in the help desk/ticketing system as well as in any other support services provided. These can include authorizing access to client-only support sites, threaded discussion groups and ongoing user group meetings. The Support group is also likely to be the most appropriate to contact the new client with their initial access information (possibly along with the account manager), show them how to get into the system and get started, as well as explain how to access all support services.

An important point to consider in the setup of any help desk/ticketing systems is that ideally they will be seamlessly integrated with the SaaS application itself. When clients can submit support requests right from the same user interface and also track the handling and responses to these requests, it provides an efficient way to drive higher levels of client satisfaction.

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3.1.4 Monitoring

Monitoring your SaaS environment is critical to smooth ongoing operation as well as maintaining the SLA you contractually commit to with your clients. Provisioning should be made in your monitoring environment for the new client as soon as the production account is initialized. This should include the monitoring system(s) that are looking at the health of the overall environment, tracking things such as server CPU, RAM and disk usage. In addition, your intrusion detection system (IDS) may need to be provisioned for the new account in the event any IP access restrictions or allowances are necessary.

3.2 Provisioning the Application

In some instances the SaaS application runs in a single application tier such that a new customer only needs to be given authentication credentials to access their specific data set. However, in other cases unique application servers are setup for each client. Whichever approach is chosen, it is important to consider what provisioning and setup is required at the application tier in order to provision a new customer for service.

3.3 Creating the Database Instance

The terms database and database management system are complex and require distinguishing and defining the components that make them up in order to have a clear conversation about them. This will be done in a separate technical brief on application tenancy. For the purposes of this paper, we will define database instance simply as an allocation of data storage for a given customer. Once the customer is added to the administrative system, the operations group needs to create the database instance so the customer can begin to use the application and store their data in such a way as to keep it segregated from other customers that share the multi-tenancy environment.

So, the creation of the database instance for a new client is an important part of the overall provisioning process. These procedures should be automated and provide the operations staff with the flexibility to create a new empty database, create a new instance with a copy of the data already in another instance (handy if a client has special training or testing needs), or create a new instance already populated with template data (useful for industry vertical solutions with pre-loaded content). When implemented properly, creating a new client database instance can be completed in seconds.

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3.4 Granting Access

The next step in the service provisioning process is to grant the client access to their production instance. This is often done by creating a new administrative user account with a temporary password and sending that information to the designated client contact. For security purposes the user ID and password for the account should always be sent in separate messages. The client administrative user will then be able to access the application and setup access and authorization for other users as appropriate.

In some cases, authorization will be granted from another system, such as a client's existing Active Directory or other LDAP repository. If this approach is used, setup and configuration for that solution needs to be done. This will often involve a dialog between the operations staff and the appropriate client LDAP administrator to create the appropriate access to the repository. Access to directory services is by nature tightly controlled and is often an impediment to implementing this type of authorization solution. However, newer developments such as ADFS and OpenSSO have made great strides in providing standardized and secure solutions to this problem.

3.5 Configuration

An advanced SaaS solution often has many configuration options which provide flexibility for different clients to implement their existing policies. This can include password and other security policies, corporate contact information and company defaults for things such as common output headings, time zones and language/currency preferences.

Generally the Support staff will handle taking the client through the various configuration options as part of the initial setup once the production instance has been created and proper access granted. This is usually done prior to allowing general access for the client's users so that the environment is properly configured when they do get in.

3.5.1 Security

Security setup and configuration is a critical part of the overall service provisioning process. The list of things to be handled during initial setup can include setting keys for data encryption and overall configuration of the application to conform to the client's own security policies as described in 3.4 above (see also separate paper on Security and Privacy).

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One thing a SaaS provider can do to alleviate some of the security concerns of clients and prospects is to provide and maintain a Security Policy document that can be made available for client review. It is recommended that this document conform to the ISO 27002[6] standard for purposes of consistency and completeness. Once created, this document must be updated to reflect policies and controls as they continue to be developed and improved.

3.5.2 User Interface

Some SaaS solutions provide flexibility in the way the user interface appears to different clients. This can encompass everything from allowing the client to provide a corporate logo for the header of all pages, to the way certain screens behave or even if they appear at all. An example of this might be the paradigm used to display certain information for a given client. If a type of hierarchical data will likely only contain a limited number of items, a tree display maybe appropriate. However, if a given client may store a large number of these items a more efficient display may list the items in tabular form with a paged interface and search criteria.

These types of options should be configured during the initial service provisioning. Depending on the complexity of choices to be made, the client may best be led through these options by members of the Support team.

3.5.3 Loading Data

In some cases a SaaS solution will be populated with existing client data. In order to get the client up and running with the solution, there may be options the client will have for loading this data. One option is to provide formats for flat file (i.e., CSV) data uploads. Another is to provide application programming interfaces (API) so the client can put in place real time integration with their source systems. In either case, getting the client's data loaded can be an important part of the initial service provisioning process and must therefore be considered for implementation.

3.6 Adding or Removing Services

An important aspect of the SaaS model is that once a client is acquired it becomes possible to easily cross sell and up sell additional services. This must be taken into account when the service provisioning processes are developed. Consideration must be given to the potential impact to the customers' account from additional or different services. The removal of services is also a possibility so this must not be overlooked. In the case of an added service, some or all of the processes described above may come into play. If a service is removed, it is possible that client data may need to be extracted and provided to the client for their own retention policies or for use in other systems. All of these possibilities need to be analyzed so that the service provisioning system can handle them efficiently.

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4. ACCOUNT MANAGEMENT

There is an often overlooked account management function that should be considered as part of service provisioning. Unfortunately, provisioning is usually only discussed in the context of setting up new accounts. However, in the complete account lifecycle there are natural stages that include dealing with contract expiration and renewal, delinquent accounts and possible suspension of service, and final account termination. Each of these must be addressed when looking at the overall service provisioning model.

4.1 Managing Pending Expirations

It is important that the administrative system notify account managers and sales management well in advance of contract expiration so the process of selling renewals can begin early. This can help avoid surprise terminations and also provide ample opportunity to rectify any concerns the client may have prior to account expiration, so renewal becomes more likely.

The service provisioning system should allow flexibility in defining time frames for pending expirations on an account by account basis. For instance, the renewal process on a contract with a three-year term may need to begin 12-18 months prior to expiration whereas a one-year contract may only need a three month period. It is helpful to have email expiration notices go out automatically to the appropriate sales personnel, beginning at a certain date and then repeating at a definable frequency. It is also helpful to provide ongoing management reporting showing pending expirations per month and per contract type.

4.2 Managing Delinquent Accounts

Depending on how payment policies are handled, it may be necessary to deal with delinquent accounts and possible suspension of service. The service provisioning system should take this into account and allow for easy suspension and resumption of service. Policies must be established to determine how long an account will be allowed to remain in a suspended/delinquent status before complete removal from the system.

4.3 Account Termination

Account termination can occur for many reasons that have nothing at all to do with the quality of service provided by the SaaS vendor. Corporate mergers and buyouts, management changes and market downturns leading to budgetary constraint are only some examples. It is also possible to have clients terminate because of failure to meet contractual SLAs, other service difficulties or even the emergence of alternative competitive offerings that win market share. Regardless of the reason, the service provisioning system needs to allow for clean and orderly account termination.

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Ideally, operations and support staff will be notified in advance of pending terminations. The provisioning system should allow them to schedule these dates so that account access can be revoked automatically at the appropriate time. In the case of unexpected termination, this access may need to be revoked in real time. Policies for account retention, removal and data extraction and distribution to the client for terminated accounts must be developed and the appropriate systems implemented to efficiently support these policies.

5. SUMMARY

Service provisioning is a deep and wide topic that truly encompasses the entire account lifecycle. In order for a SaaS business to operate profitably it is critical to put systems in place that will allow the provisioning process to be managed effectively and efficiently. It is important to consider not only account setup but also account management over the lifecycle when designing and implementing these systems. An effective service provisioning system can not only go a long way toward providing a very positive customer experience for your client but it can also allow you to manage your business efficiently and without unnecessary staff overhead.

6. REFERENCES

[1]OASIS Reference Model for Service Oriented Architecture 1.0 – http://www.oasis-open.org/committees/download.php/19679/soa-rm-cs.pdf.

[2]OASIS SPML v2.0 specification – http://www.oasis-open.org/committees/download.php/17708/pstc-spml-2.0-os.zip.

[3]OASIS DSML – http://www.oasis-open.org/committees/dsml/docs/DSMLv2.doc

[4]Provisioner (open source identity and services provisioning) – http://identitymngr.sourceforge.net/.

[5]OpenSSO – https://opensso.dev.java.net/.

[6]ISO 27K Standards – http://www.iso27001security.com/html/iso27000.html.

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7. GLOSSARY

Term	Description
ADFS	Active Directory Federation Services
API	Application Programming Interface
DSML	Directory Service Markup Language
IDS	Intrusion Detection System
NTLM	NT LAN Manager
OASIS	Organization for the Advancement of Structured Information Standards
PSTC	OASIS Provisioning Services Technical Committee
SaaS	Software as a Service
SAML	Security Assertion Markup Language
SLA	Service Level Agreement
SOA	Service Oriented Architecture
SPML	Service Provisioning Markup Language

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