An Architecture for Integrating Cloud Computing and Process Management

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Abstract

This paper presents an architecture for integrating process management in a cloud computing setting. The public / private approach used in RosettaNet is used as the conceptual basis to capture information about data, documents and processes. The approach is then examined using information in the context of cloud-based software to illustrate different characteristics about the approach.

Introduction

The purpose of this paper is to provide an architecture for integrating cloud computing and process management. In particular, the purpose of that architecture is to provide cloud architectures that meet the minimum process and informational requirements for smaller or less complex user organizations while still allowing larger more complex organizations to add additional processes and data requirements over and above the base processes provided. The approach is based on separating processes into the equivalent of RosettaNet's "public" and "private" processes, where public processes provide some minimal required level of information, documents and work flow, but private processes, generated by the cloud provider (or customers), can be included over and above public processes to provide additional capabilities.

Background - RosettaNet Workflow: Public and Private Processes

RosettaNet was developed as part of a set of efforts to facilitate business to business (B2B) e-business, also referred to as "digitization." The "RosettaNet Consortium," is an independent and nonprofit consortium of some of the major companies in information technology, electronic components, and semiconductor manufacturing. The RosettaNet efforts are designed to create and implement industry-wide, open e-business process standards. Those standardized processes are designed to facilitate the electronic business interfaces used between participating supply chain partners.

In RosettaNet[2], "public" processes define information, documents and data flows that virtually all users must conform to as part of a particular process, for example, one firm ordering goods from another firm, while "private" processes provide specific information, documents and work flow to the user organization processes beyond the public process. This approach promulgates minimizing data and processes specified as part of the "public" process, while still allowing additional data and processes for private use.

As an example, of public and private processes, as seen in figure 1, RosettaNet-based workflows

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[2] A similar set of public and private processes is discussed in McAfee (2001).

process information as follows[3]:

1. A customer private workflow initiates a RosettaNet message. Data is retrieved and formatted into a RosettaNet message structure, and is forwarded to the public workflow that implements the customer role.

The private workflow can generate more information than is required by the public process. The public process does not need to employ all of the information generated in the private process, but could include additional discretionary capabilities. The RosettaNet message requires only certain minimal data that meets the needs of the public workflow.

2. The public workflow process creates the appropriate RosettaNet message. The message is sent to the public workflow implementing the product supplier.

3. The product supplier public workflow receives the message, processes the information, and then passes customer information and message content to the appropriate private workflow process.

4. The product supplier private process resolves the message content and generates a reply that is passed back to the product supplier public process.

The product supplier private workflow process can employ or generate additional information over and above the basic information provided as part of the public workflow. The public process does not need to use all of the information generated by the private process, but could include additional discretionary information that may not be used by the private process.

5. The product supplier public process creates the appropriate RosettaNet reply message and sends it to the customer.

6. The customer public process receives the reply message, the information, and then passes product supplier information and message content to the appropriate private process.

7. The private process resolves content of the reply message.

Cloud Computing Structure

Although RosettaNet provides the historical backdrop base of public and private processes, there is an alternative interpretation of that structure that can be used to interface cloud computing and process management. We will describe a cloud computing structure that provides both the minimal required information and workflow for some process, but also provides organizations with the opportunity for additional capabilities in the same cloud computing environment. That architecture will mirror the public – private RosettaNet structure.

Public Processes

From a cloud computing, architectural design perspective, the public process can represent that portion of the particular process that each firm that uses the cloud software is required to use.

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[3] BEA Systems, BEA Web Logic Integration: Implementing RosettaNet for B2B Integration, Release 7, June 2002, pp. 2-2 to 2-4, http://docs.oracle.com/cd/E13214_01/wli/docs70/pdf/rosnet.pdf.

That public process often is minimal in that it is designed so that virtually every organization needs the data and the information embedded in that portion of the process. Accordingly, this portion of the data and information flow is universally both minimal and "required." As an example, required accounting information or critical decision making information is likely to drive the public processes. Further, the required public information is likely to include necessary legal promulgated information or other transaction information.

However, cloud computing needs to allow more than just the minimal required workflow and process information, otherwise they unnecessarily limit their base of users or the capabilities of those users. Although potentially many users will need just the required information, other potential users may need to include more information and workflow in their processes, in order to allow for additional capabilities. As a result, public processes could include information that is "optional." For example, the public process could allow the user multiple additional data capabilities.

Private Processes

Private processes, that supplement public processes, can be used to provide additional depth. Since the cloud provider has deep knowledge of the public process they are in a position to build addition capabilities into private processes that can be made available to users as software as a service, over and above the base public process. The cloud provider can use their knowledge of the base public process and requirements of other users to generate additional private capabilities that interface with the public processes

Such private processes can take at least two forms. First, the cloud computing provider can provide alternatives and add-ons to the public process. In particular, "private" processes can be developed that multiple users can employ to supplement existing public processes, but that are not required. Second, individual firms can build their own private processes to interface with either public processes or cloud provider private processes.

Relationship of Private Processes to Public Processes

As illustrated in figure 2, there are a number of different types of relationships that can be captured by integrating public and private processes. For example, in part B of figure 2, the private process provides additional follow-on capabilities, while in part C, the private process encompasses the public process and provides additional capabilities.

Cloud Computing Providers

This architectural approach can be used in either public or private cloud settings. If the concern is a public cloud then the provider potentially is offering services to multiple external clients. If the concern is a private cloud then the provider generates solutions potentially for different branches, divisions or departments of an organization. In either case, the user base is likely to include disparate information consumers and process users.

Case Study: Workday

In order to illustrate these issues, this paper will briefly investigate requirements established by the cloud-based software firm, Workday. Workday has argued that they try to "…keep things simple for our customers."[4] However, they also advocate that "… continuous change is the 'new normal' for enterprise software."[5]

One approach to keeping things "simple" is to develop some key processes that "require" minimal data, documents and process support, but that can allow discretionary capabilities. Such an approach can be done using public processes that have minimal requirements but supplemental capabilities. Since there is a need for almost continuous change, there needs to be a means to "deliver" the software changes. Replacing a public process with another public process or another version of that process provides a means of rapidly adapting to change.

Further, cloud-based software firms need to be able to make wide-scale changes to the software without disrupting use. For example, as noted by Workday

> When we started the company we thought "easier to change" meant two things. First, we envisioned cloud applications that our customers could configure without breaking our ability to upgrade their changes. Second, we wanted a platform that allowed us to continuously deliver new innovations to our customers.

Having all customers on public-based processes and private-processes that Workday generated, would allow Workday to make such changes easily and be able to make changes in those processes without disrupting their users.

Further, public processes can be developed to provide users with the ability to employ supplemental discretionary capabilities. As an example,[6] "Workday captures transactions as business events in order to create a comprehensive financial and operational view of a customer's business. Customer-defined Worktags are tagged to transactional data and used to identify the key dimensions of the business that management would like to track and analyze, such as customer, product, region, and project." Customers do not need to provide the data but it is built into processes that all users have access to (e.g., public processes) if they determine to use it.

In addition, cloud-based firms can provide the equivalent of private processes that interface with their public processes (so not all users need to employ such processes). For example,[7] in what would be equivalent to a public process, Workday users can "… add custom fields to Workday objects, and create validations associated with custom fields. Customers also can now create their own labels. A simple example of this is a label that might better fit their brand or culture than what we offer as standard in Workday—such as 'team member' instead of 'worker.' "

Summary

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[4]Swete, S., Applications first at workday, August 29, 2011, http://blogs.workday.com/Blog/applications_first_at_workday.html
[5]Swete, S., Embracing Continuous Change at Workday, September 11, 2013,
http://blogs.workday.com/Blog/embracing_continuous_change_at_workday.html
[6]Nittler, M., The surprisingly sexy chart of accounts, March 8, 2012,
http://blogs.workday.com/Blog/surprisingly_sexy_chart_of_accounts.html
[7]Swete, S., How we've reimagined software customization at Workday, April 16, 2013,
http://blogs.workday.com/Blog/reimagined_software_customization.html

A public process can be used to delineate those processes and data that must be used or provided by each customer of some cloud application. Since all organizations that subscribe to the cloud must use these information flows and data, the public processes must be virtually universally used by large and small organizations and by some set of industries. Accordingly, the public process is effectively required by all organizations. The public process provides "minimal" data, workflows and capabilities. Because they are of universal interest, virtually all organizations that consider the cloud software find a portion of their required needs met in this public approach.

However, because this public portion is not likely to meet all of the requirements for all users, public processes may need to have some discretionary capabilities. Since the cloud provider has deep knowledge of the public process they are in a position to provide additional private applications to interface with and provide greater depth. Those private applications can be generated to provide a range of capabilities to meet the requirements of larger and more complex organizations.

References

McAfee, A., Extricity, Harvard Business School, March 13, 2003, 9-601-113

Oracle Solutions, "Introducing RosettaNet Solutions," http://docs.oracle.com/cd/E13214_01/wli/docs102/tpintro/rosettanet.html#wp1056112

Oracle Solutions, "Using Workflows with RosettaNet," http://docs.oracle.com/cd/E13214_01/wli/docs70/rosnet/workflow.htm#1324261
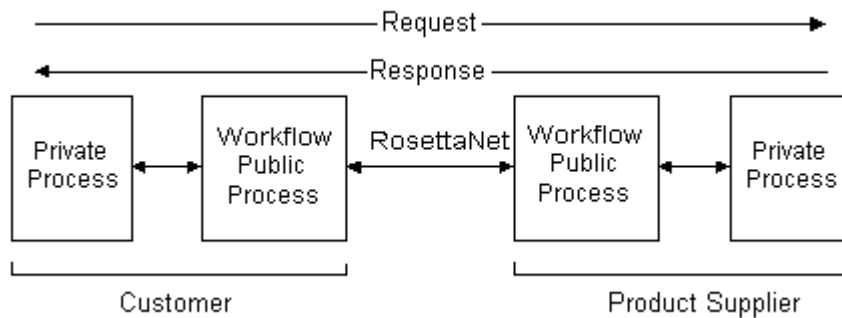
Figure 1: RosettaNet Flow of Information

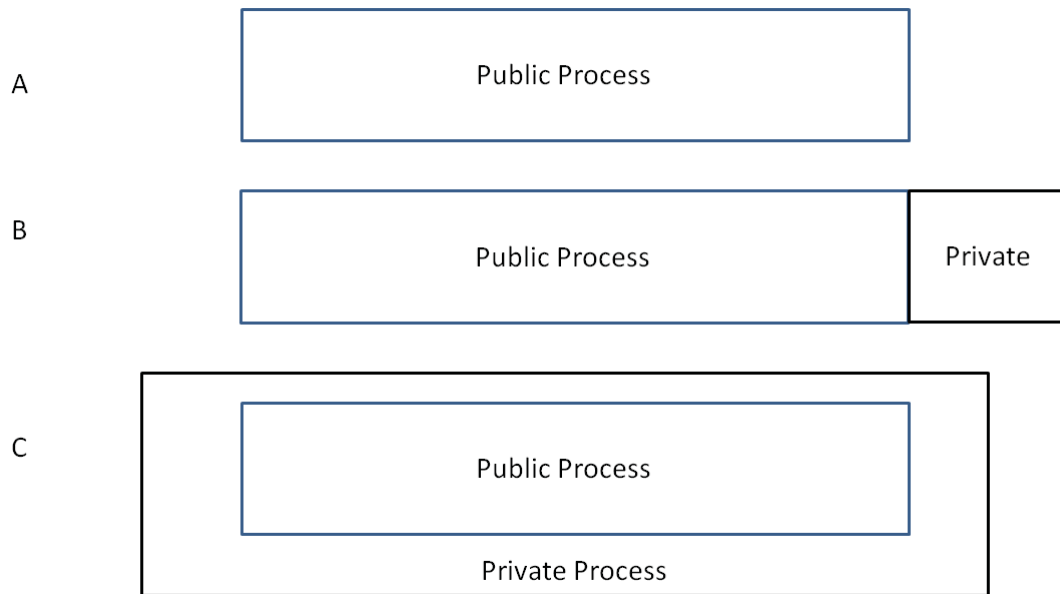(http://docs.oracle.com/cd/E13214_01/wli/docs70/rosnet/workflow.htm#1324261)

Figure 2: Sample Public/Private Process Configurations