Survey Paper on Analysis of XaaS

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ABSTRACT

Abstract. Recently, Cloud Computing has become an emerging research topic in response to the shift from product-oriented economy to service-oriented economy and the move from focusing on software/system development to addressing business-IT alignment. From the IT perspectives, there is a proliferation of methods for cloud application development. Such methods have clearly shown considerable shortcomings to provide an efficient solution to deal with major aspects related to cloud applications. One of these major aspects is the multi-tenancy of the Softwareas-a-Service (SaaS) components used to compose ServiceBased Applications (SBAs) on the cloud. Current SaaS offerings are often provided as monolithic one-size-fits-all solutions and give little or no opportunity for further customization. Monolithic SaaS offerings are more likely to show failure in meeting the business requirements of several consumers. In this paper, we analyze the state-of-the-art of the standardization, methodology; software and product support for SBA development on the cloud, identify some shortcomings, and point out the need of a novel approach for breaking down the monolithic stack of cloud service offerings and providing an effective and flexible solution for SBA designers to select, customize, and aggregate cloud service offerings coming from different providers.

Keywords:

Cloud Computing, Service-based Application (SBA), Service-oriented Architecture (SOA), Cloud Development methodology.

II. INTRODUCTION

XaaS refers to one or a combination of SaaS, infrastructure as a service (IaaS), platform as a service (PaaS), communications as a service (CaaS) or monitoring as a service (MaaS), as depicted. **:** is the delivery of hardware (server, storage and network **IaaS**), and associated software (operating System virtualization technology, file system), as a service. It is an evolution of traditional hosting that does not require any long-

term commitment and allows users to provision resources on-demand. IaaS incorporates the capability to abstract resources as well as deliver physical and logical connectivity to those resources and provides a set of APIs that support the interaction with the infrastructure by consumers. The full power of IaaS can only be used if the flexibility of IaaS deployment and resource allocation has already been considered during the design and development of service-based applications; something that is not possible with today's IaaS approaches. Amazon Web Services Elastic Compute Cloud (EC2) and Secure Storage Service (S3) are well-known examples of current IaaS offerings.

- **PaaS:** is an application development and deployment platform delivered as a service to developers over the Web. PaaS facilitates development and deployment of applications without the cost and complexity of buying and managing the underlying infrastructure. PaaS offerings comprise of infrastructure software, and typically include a database, middleware and development tools for delivering Web applications and services from the Internet. The consumer's application, however, usually cannot access the infrastructure underneath the platform.

- *Sa*aS: is an —on-demand‖ application delivery model over the Internet built upon the underlying IaaS and PaaS stacks. It provides a self-contained operating environment used to deliver the entire user experience including the content, its presentation, the application(s), and management capabilities. The SaaS consumer can only access the exposed functions of the application. A typical example is SalesForce.com that offers CRM applications accessible by subscription over the Web. SaaS provides the most integrated functionality built directly into the offering with no option for consumers' extensibility. It cannot handle application variability's and does not follow the —true‖ spirit of the SOA paradigm.

Xaas: The Subscription Business Model: All companies, especially enterprises, are increasingly wary of allocating huge up-front capital costs to computing – be it business applications, utility software or good old data centers. They are increasingly turning to the cloud and software as a service (SaaS): subscription-based offerings that allow customers to fund IT investments as operational expenditures, with no up-front capital spend. These subscription-based business models are what we see driving the adoption of XaaS. Technology companies are at various stages of adopting subscription-based business models to deliver their products as cloud or SaaS offerings.

XaaS key characteristics include:

- High scalability.
- Multi-tenancy.
- Online and automated provisioning.
- Try and buy.
- Device independence that enables users to access software regardless of what device they are using.
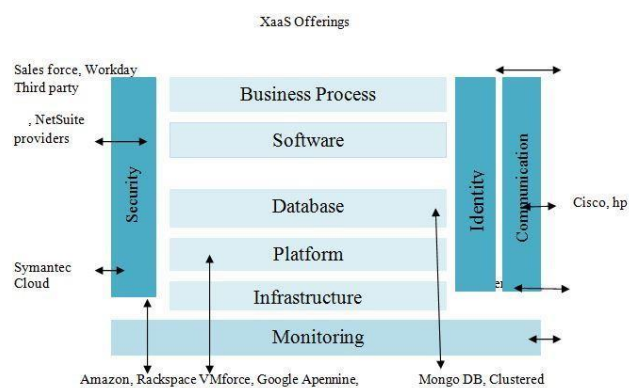- Location independence

Defining XaaS:

Fig 1: Defining XaaS:

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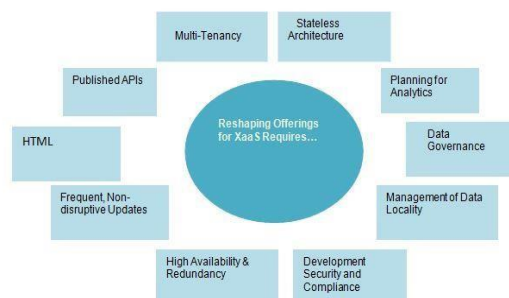**Making the XaaS Segue:**

Fig 2: Making the XaaS Segue

STATE-OF-THE-ART AND EVALUATION. An SOA

Promotes loosely-coupled and interoperable service components that are easily shared within and between enterprises via published and discoverable interfaces [29]. It has been suggested by many experts both in the academia and industry that the SOA paradigm promises many advantages over the other architecture paradigms in terms of reusability, business, flexibility and agility, and interoperability. However, current SBA development following the SOA paradigm usually leads to a vendor lockin approach, where the constituting monolithic service components are predominantly tethered to proprietary platforms and infrastructure of a vendor and thus not customizable, extendable and interoperable,cf. the left side of Fig. That is because current SOA developments do not usually put focus on the deployment environment of the constituent service components.
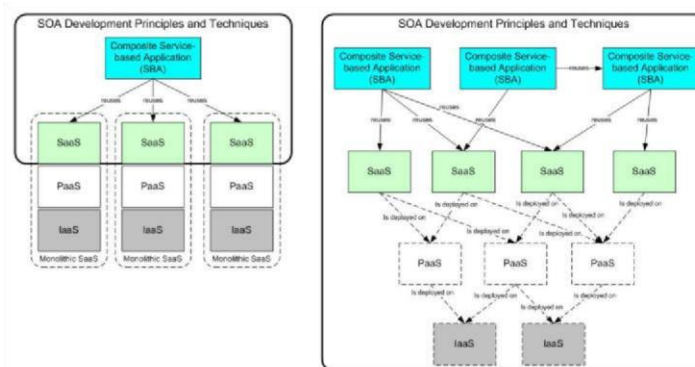
Fig 3: SOA Development principles & Technique

XaaS Adoption, Optimization Techniques

Traditionally, high-technology companies built perpetual-license products, upon which their existing business operating models are based. Moving to a subscription model presents operational complexity challenges to many technology companies. From our experience, the launch of new XaaS businesses outpaces a company's operational ability to deliver and scale. The reality is that building the new XaaS capabilities required to embrace and succeed in a services-centric environment is hard work — it touches every major business function, from sales and marketing through customer support and product management, etc.

Anything as a service (XaaS) XaaS *or 'anything as a service'* refers to any feature provided to customers through cloud rather than depending on in-house technologies. A few XaaS services include Storage as a Service, Unified Communications as a Service (UCaaS), Network as a Service (NaaS), Desktop as a Service (DaaS) etc.

Resent Trends in Cloud-Computing

The present availability of high-capacity networks, low-cost computers and storage devices as well as the widespread adoption of hardware virtualization, service-oriented architecture, and autonomic and utility computing have led to a growth in cloud computing. Cloud vendors are experiencing growth from a variety of cloud providers to create what has been rates of 50% per annum. termed a cloud ecosystem. This type of integration supports the tailoring of SBAs to specific business needs using a *A. Open Source / Open Stack Cloud Computing* mixture of SaaS, PaaS and IaaS.

B. *Mobile cloud computing*
C. *BYOD* —Bring your own device (BYOD)‖

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   Perspective

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Based SBA Development. While developing
   Gunho Lee, David A. Patterson, Ariel Rabkin, and Matei

SBAson the cloud, the absence of standardization across cloud vendors, results in unnecessary complexity to obtain interoperability, high switching costs and potential vendor lock-in. The main concerns of cloud-based SBA development are how to deal with the standardization and interoperability between different cloud platforms [33],since cloud computing promises to allow SBA developers to design and develop elastic and

inexpensive applications independent of platforms [3]. However, current cloud vendors have different application models, many of which are proprietary, vertically integrated cloud stacks that limit the customizations of the underlying platform and infrastructure resources. There is currently little effort in supporting tools, techniques, procedures or standard data formats or service interfaces that could guarantee data, application and service portability. In [24] the vendor lockin problem that prevents the interchangeability and interoperability between the SaaSs has been addressed and subsequently a state-of-the-art in both standardization efforts and on-going projects has been presented. Document [34] points out that concerning the vendor lock-in there are still many unsolved compatibility issues beside the API compatibility, such as the data format, billing, metering, error handling, logging, or cloud management and administration. In general, the current situation makes it difficult for SBA developers to migrate their data and service components from one cloud vendor to another or back to an in-house IT environment.

III. CONCLUSION

This paper provided a survey on existing support for Service-based Application development on the cloud. As a summary, the survey has shown that the current cloud solutions are mainly fraught with shortcomings:

•   They introduce a monolithic SaaS/PaaS/IaaS stack architecture where a one-size-fits-all mentality prevails. They do not allow SBA developers to mix and match functionalities and services from multiple application, platform and infrastructure providers and configure it dynamically to address their application needs.

•   They introduce rigid service orchestration practices tied to a specific resource/infrastructure configuration for the cloud services at the application level. The above points hamper the (re)-configuration and customization of cloud-based SBAs on demand to reflect evolving inter-organizational collaborations. There is clearly a need to mash up services Zaharia, Above the clouds: A berkeley view of cloud computing, Tech. report, 2009.

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