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An Architectural Framework of Cloud Computing behind Platform Layer (PaaS)

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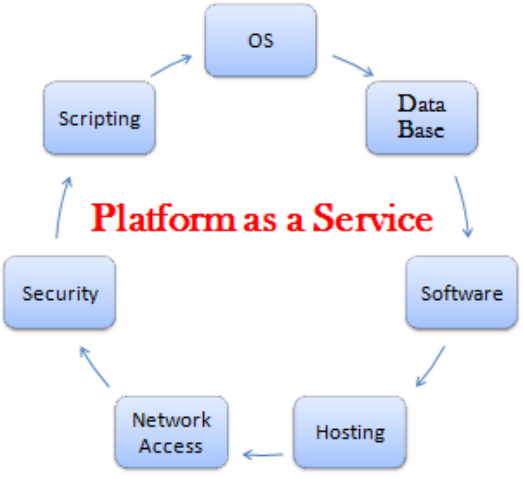
ABSTRACT

Cloud computing is a technique that provides freedom of access to shared resources of any remote computer which is located anywhere in the world. Cloud computing relies on sharing of resources to achieve coherence and economies of scale, similar to a utility. In the Cloud Computing Technology, different kinds of deployment services are available which are also known as Platform as a Service (PaaS), provide a computing platform or solution for the better utilization of the cloud computing. However, Cloud is a collection of computer resources and provides a million of services to its user simultaneously. A Cloud provides a friendly environment to its user and various service such Software as a service (SaaS), platform as a service (PaaS), and Infrastructure as a Service (IaaS). These services are used in Public Cloud, Private Cloud, Hybrid Cloud and Community Cloud. Cloud computing is model of computing that use the internet for sharing of information, software and resources to computer and other devices [1]. This paper discusses the working model and its benefits of the services. In this paper, we aim to pinpoint the challenges and issues of cloud computing with platform as a service (PaaS). We identified several loopholes from the cloud computing adoption perspective and we highlighted the cloud interoperability issue that deserves substantial further research and development. In this paper, we investigate several cloud computing system providers about their concerns on platform or deployment models.

Keywords : Platform as a service(PaaS),Deployment Model,SaaS,IaaS,Service Architecture,SLA,Cloud Platforms and Working Technology,Security,Internet,Deployment Tools

I. INTRODUCTION

Platform as a service (PaaS) is a cloud-computing model in which a third-party provider delivers hardware and software tools -- usually those needed for application development -- to users over the internet. A PaaS provider hosts the hardware and software on its own infrastructure. As a result, PaaS frees users from having to install in-house hardware and software to develop or run a new application. Platform as a Service, often simply referred to as PaaS, is a category of cloud computing that provides a platform and environment to allow developers to build applications and services over the internet. We can easy to utilize cloud resources along with



platform as a service including variety of hardware and software tools. Platform as a Service (PaaS) is an application development and deployment platform delivered as a service to developers over the Web. Compared with the SaaS (Software-as-Service) to end-user, PaaS is more flexibility [2]. Google App engine is a typical PaaS platform, which allows developers to write and run their own applications on the platform. It also helps developers store data and manage the server.

II. TRADTIONAL MODEL

Building and running on premise applications has always been complex, expensive, and risky. Each application required hardware, an operating system, a database, middleware, Web servers, and other software. In the earlier model of the Cloud Computing with Paas, There is only client-server architecture is used for sharing system resources from one to another hand. It has no ability to use cloud features including elastic scalability, self-service, resource pooling and multi tenants. To re-invent the platform and achieve benefits, new Cloud Native platform architectural components and services are required. In traditional approach, there are mixed hardware environment, multiple management tools, frequent application patching and updating, complex workloads and multiple software architecture. However, comparatively in cloud data centre far better approach like homogeneous environment, standardize management tools, minimal application patching and updating, simple workloads and single standard software architecture [3].

A. Working Issues

In the PaaS model, however, control and security of the application is moved to the user, while the provider secures the underlying cloud infrastructure (i.e., firewalls, servers, operating systems, etc). The primary focus of this model is on protecting data. This is especially important in the case of storage as a service. An important element to consider within PaaS is the ability to plan against the possibility of an outage from a Cloud provider. The security operation needs to consider providing for the ability to load balance across providers to ensure fail over of services in the event of an outage.

B. Deployment Issues

Deployment of the cloud computing and its services that is one of the more tedious task for the cloud service providers. At the time of cloud deployment, we face problem regarding to the cloud deployment with paas including licensing, processing requirements, bandwidth requirements, communication protocol and data security. All these issues does play main role in the deployment of the cloud service.

III. ARCHITECTURAL FRAMEWORK

We proposed a robust architecture of the cloud computing with PaaS technology that gives developers to develop, test and deploy their software in one comprehensive environment. Distribution takes place on the same platform on which it is developed, avoiding software and hardware conflicts for clients. Also, this single platform environment frees the developer from the need to tailor their applications to work on various OS and hardware. In this architecture, we can add on numerous features for the secure cloud including licensing, processing, requirements, bandwidth requirements, and communication protocol and data security [4].

We can easy to deploy cloud application along with architectural framework of the cloud's platform as a service(PaaS).PaaS provides independent platform which has deployment capabilities and multi-tenancy (capable of running many application on single platform concurrently) architecture. The client has the freedom to create his own applications, which

run on the provider's infrastructure. PaaS providers offer a predefined arrangement of OS and application servers.

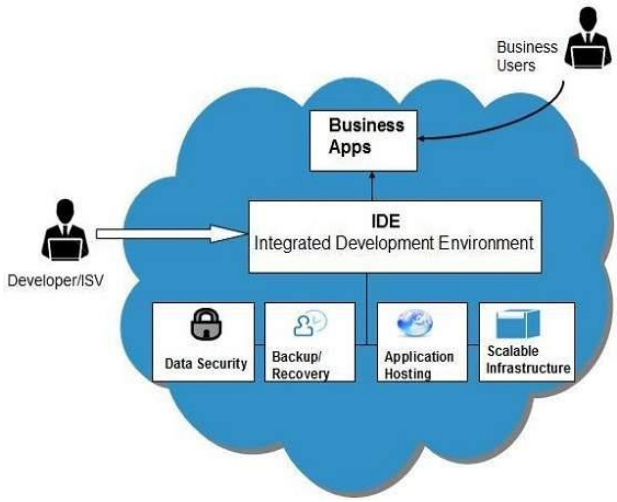


Figure 1 : Architectural framework of cloud computing with paas

A. Benefits of the Architectural Framework

With this architectural framework of the cloud computing and paas, the business determines the benefits the business entity can reap. Using this framework, we can get following benefits:

Fast Testing and Deployment: Development teams have the bandwidth to work on different configurations, with different machines, across several locations. They can also run stress tests, determine performance, and assess responses that otherwise may not be feasible in local environments.

Quick Innovation: It is understood that opportunities made available by the market exist for only a brief period and within this time span, it becomes critical to deploy applications quicker. Time can be allocated to the creation of more innovative uses of the application.

Reduced TCO : Total Cost of Ownership or TCO is minimized to a large extent, there is no need to buy all software, platforms, system, tools and kits, to run or deploy an application.

Quick Development Applications: Applications in the cloud can be rapidly built, as all necessary elements are a part of its inherent structure. Operating system features can also be modified and upgraded very quickly. This structure also facilitates the setting up of remote teams.

Efficient Scalability: Regardless of load and usage; the service offers the same efficiency and experience at increasing scales and capacity as well.

Best Technology: PaaS helps businesses get better and efficient technology at a lower cost. More importantly, the service enables businesses to stay up to date.

B. Components of Architectural Framework

As PaaS services in the cloud become popular, it becomes important to understand some significant components and aspects of such services [5].

Elastic Load Balancer: It balances load in the cloud or across on-premise cloud service instances. To deal with load characteristics that change dynamically, the ELB should provide fail-over, multi-tenancy, and auto-scaling of services.

Service Load Monitor: This component uses multiple sources (such as load balancers, app servers etc) to acquire load information, and communicates performance and utilization information to an ELB responsible for distributing requests to the most favourable instances, based on load balancing policies, tenant association, partitioning policies, and SLAs.

Cloud Controller: Based on the input of Service Load Monitor, this component creates and removes cloud instances (Linux containers or virtual machines). It makes the instance number satisfy shifting demands, and matches instance scaling with quota and

reservation thresholds (such as maximum/minimum instance count).

Artifact Distribution Server: It maintains a versioned pool of run-time artifacts and their connection with cloud service definitions. It takes complete applications (i.e. services, application code, mediation flows, APIs and business rules) and breaks the combined bundle into per-instance constituents, which are then loaded into instances using a Deployment Synchronizer.

Deployment Synchronizer: It examines and deploys the right code for each cloud application platform instance (e.g. Enterprise Service Bus, application server, API Gateway). With the use of a Cloud Native PaaS Management Console, control of services, tenant partitions, quality of service, and code deployment by either command-line tooling or web-based user interface is made possible.

This solutions and architecture speeds up innovation, improves operational efficiency, and decreases cost. Therefore, by creating such a PaaS environment, you can offer your teams a platform that would help them rapidly develop solutions to deal with associated business use cases (i.e. ecosystem development, contextual business delivery, mobile interactions etc).

C. Platform as a Service for Development

A common misunderstanding for developers is that cloud computing applies only to network administrators. However, this misconception overlooks the many possibilities that cloud computing brings to development and quality assurance teams [6]. Consider some of the things that are often problematic during the software development life cycle. In my experience, the process of setting up the server environment that will host the Web application the development team has been assigned to build can be a huge hassle. Even in the largest enterprises, there is typically a single network administrator resource assigned to several developments teams. When PaaS is not being used, setting up a development or test environment typically requires the following tasks:

- Acquire and deploy the server
- Install the operating system, run time environments, source control repository, and any other required middleware.
- Configure the operating system, run time environments, repository, and additional middleware.
- Move or copy existing code.
- Test and run the code to make sure everythingworks.

IV. CONCLUSION

Thus, architectural framework of cloud with Platform-as-a-Service is an ideal solution to reduce infrastructure setup cost and allows for easy and quick expansions. Most of the existing PaaS solutions target only public cloud, which results in many enterprises not moving to PaaS. PaaS applications are referred to as on-demand, Web-based, or software as a service (or SaaS) solutions. PaaS (Platform-as-a-Service) is a business model in the cloud-computing era, which provide a server platform or development environment for developers. To fully benefit from all PaaS capabilities, developers need to adapt their applications to be able to react to changing conditions, which may require them to invoke the appropriate IaaS and PaaS services via API calls from within their applications. PaaS solutions have particular appeal for start-ups, projects with ambitious deadlines, and organizations with a limited budget for capital expenditures. This are beneficial for the large business organization who wants to acquire cloud service with PaaS model.

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