Study of the First Windows OS Based Cloud Application Software - ANEKA

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Abstract: Cloud computing is a buzzword and it often requires many high end computers for performing large scale experiments. Normally, these requirements have been addressed by using high-performance computing solutions. Sometimes it needs installed facilities such as clusters and super computers, which are difficult to set up, maintain, and operate. Cloud computing provides scientists with a completely new model of utilizing the computing infrastructure. Compute resources, storage resources, as well as applications, can be dynamically provisioned on a pay per use basis. These resources can be released when they are no more needed. Such services are often offered within the context of a Service Level Agreement (SLA), which ensure the desired Quality of Service (QoS). Aneka, is a windows based enterprise Cloud computing solution. Aneka address a variety of different scenarios: from finance applications to computational science. We can transform the existing computer network to Aneka driven network.

Keywords— Aneka, Cloud computing, IaaS, Middleware, PaaS, SaaS

I. INTRODUCTION

With the progress of the modern human society, fundamental and essential services are delivered almost to everyone in a totally transparent manner. Utility services such as water, gas, and electricity have become fundamental for carrying out our daily life. All these services are exploited on a pay per use basis. The existing infrastructures allow delivering such services almost anywhere and any time so that we can simply switch on the light, open the tap, and use the stove. The usage of these utilities is then recharged, according to different policies, to the end user. Newly, a similar idea of utility has been applied to computing and a consistent shift towards this approach has been done with the spread of Cloud Computing. Manjra soft is focused on the creation of innovative software technologies for Simplifying the development and deployment of applications on private or public Clouds. The product Aneka plays the role of Application Platform as a Service for Cloud Computing. Aneka supports various programming models involving Task Programming, Thread Programming and Map Reduce Programming and tools for rapid creation of applications and their seamless deployment on private or public Clouds to distribute applications. Aneka is a software framework based on the .NET technology. This project is initially developed within the Grid bus project and then commercialized by Manjra soft. It simplifies the development of distributed applications by providing a collection of different ways for expressing the logic of distributed applications, a solid infrastructure that takes care of the distributed execution of applications, and a set of advanced features such as the ability to reserve and price computation nodes and to integrate with existing cloud infrastructures such as Amazon EC2[2].

II. CLOUD COMPUTING

As discussed earlier, cloud Computing is a recent technology trend whose aim is to deliver on demand IT resources on a pay per use basis. Previous trends were limited to a specific class of users or focused on making available on demand a specific IT resource. Cloud Computing aims to be global and to provide such services to the masses, ranging from the end user that hosts its personal documents on the Internet, to enterprises outsourcing their entire IT infrastructure to external data centers. Never before an approach to make IT as a real utility been so global and complete: not only computing and storage resources are delivered on demand but the entire stack of computing can be leveraged on the Cloud.

Cloud computing is a type of computing that relies on sharing computing resources rather than having local servers or personal devices to handle applications. Cloud computing is comparable to grid computing, a type of computing where unused processing cycles of all computers in a network are harnesses to solve problems too intensive for any stand-alone machine.
Cloud Computing started with a risk-free concept: let someone else take the ownership of setting up IT infrastructure and let end-users tap into it, paying only for what is been used. From this simple idea, a much more sophisticated, complex market started to develop. Today, businesses can buy computation resources, infrastructure like OS/platform or applications. In the language of this market, the computation resources is frequently referred to as Infrastructure as a Service (IaaS), and the applications as Software as a Service (SaaS). In fact, use of the acronym appears ubiquitously from SaaS to PaaS (Platform as a Service) to XaaS (Anything as a Service) cloud services are shown in fig:1.1

![Cloud Clients](image1)

**Fig: 1.1**

The Internet has its roots in the 1960s, but it wasn’t until the early 1990s that it had any relevance for businesses. The World Wide Web was born in 1991, and in 1993 a web browser called Mosaic was released that allowed users to view web pages that included graphics as well as text. This heralded the first company web sites – and not surprisingly, most of these belonged to companies involved in computing and technology.

### III. ANEKA

Aneka is Manjrasoft Pvt Ltd.’s solution for developing, deploying, and managing cloud applications. Aneka consists of a scalable cloud middleware that can be deployed on top of heterogeneous computing resources. It offers an extensible collection of services coordinating the execution of applications, helping administrators monitor the status of the cloud, and providing integration with existing cloud technologies. One of Aneka’s key advantages is its extensible set of application programming interfaces (APIs) associated with different types of programming models—such as task, thread, and Map Reduce—used for developing distributed applications, integrating new capabilities into the cloud, and supporting different types of cloud deployment models: public, private, and hybrid. These features differentiate Aneka from infrastructure management software and characterize it as a platform for developing, deploying, and managing execution of applications on various types of clouds.

### IV. ANEKA HIGHLIGHTS

#### Technical Value
1) Support of multiple programming and application environments
2) Simultaneous support of multiple run-time environments
3) Rapid deployment tools and framework
4) Simplicity in developing applications on Cloud
5) Dynamic Scalability
6) Ability to harness multiple virtual and/or physical machines for accelerating application result
7) Provisioning based on QoS/SLA

#### Business Value
1) Improved reliability
2) Simplicity
3) Faster time to value
4) Operational Agility
5) Definite application performance enhancement
6) Optimizing the capital expenditure and operational expenditure

All these features make Aneka a winning solution for enterprise customers in the Platform-as-a-Service scenario

#### Application Development

Aneka is a platform for developing applications that leverage Clouds for their execution. It then provides a runtime infrastructure for creating public and private Clouds and a set of abstractions and APIs through which developers can design and implement their applications. More specifically Aneka provides developers with a set of APIs for representing the Cloud application and controlling their execution, and a set of Programming Models that are used to define the logic of the distributed application itself. These components are part of the Aneka Software Development Kit. Aneka [4] is a platform for developing resource-intensive and elastic applications and their deployment on CSI Communications [8].

Cloud is network that can support a huge variety of physical and virtual resources, ranging from desktops, clusters, to virtual datacenters to provide a single logical application execution layer. The key components of the platform are depicted in Figure 1.2, which gives an overall view of Aneka.
from its foundations to the applications and the end user services.

The Aneka platform is based on an extensible service Oriented Architecture (SOA), which makes the integration of new components, incremental development of new features, and infrastructure deployment and configuration seamless tasks.

Middleware is a platform features a homogeneous distributed runtime environment for applications. Such environment is built by aggregating together physical and virtual nodes hosting the Aneka container. The container is lightweight layer that interfaces with the hosting environment and manages the services deployed on a node. Services constitute the core logic of Aneka Clouds and each container hosts three different classes of services:

- Fabric services implement the fundamental operations of the infrastructure of the Cloud. These services include: high-availability and failover for improved reliability, node membership and directory, resource provisioning, performance monitoring and hardware profiling.
- Foundation services constitute the core functionalities of the Aneka middleware. They provide a basic set of capabilities that enhance application execution in the Cloud. These services provide the infrastructure with added value and are both of use for system administrators and developers. Within this category we can list: storage management, resource reservation, reporting, accounting, billing, services monitoring, and licensing. Services in this level operate across all the range of supported application models.
- Application services deal directly with the execution of applications and are in charge of providing the appropriate runtime environment for each application model. At this level Aneka expresses its true potential in supporting different application models and distributed programming patterns. Aneka provides support for the most known application programming patterns such as distributed threads, bag of tasks, and MapReduce.

IV. CONCLUSION

This paper shows the usefulness of a Windows based .NET framework application. This is the first cloud application in the Windows platform. The cloud adoption is becoming a standard practice in many business sectors to scale IT infrastructure on demand. Despite this, the development of elastic and scalable applications is a complex task. Cloud application development platforms offer huge cost savings by reducing the cost of software engineering and enabling intelligent use of Cloud infrastructures. The true benefits of the Cloud application development will become apparent when developing and deploying application on solutions such as Aneka.

REFERENCES
