Assignment No: 9

Title:

Case study on Manjrasoft Aneka Software.

Problem Definition:

Design an Assignment based on Working with Manjrasoft Aneka Software.

Prerequisite:

Windows 7/8, or Windows Server 2008/2012as your OS environment.

Software Requirements:

Microsoft.Net, Cloud account

Hardware Requirements:

PIV, 2GB RAM, 500 GB HDD

Learning Objectives:

Learn about Manjrasoft Aneka Software.

Outcomes:

After completion of this assignment students are able to understand the use and working of Manjrasoft Aneka Software.

Theory:

A Company named “Manjrasoft” 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.

Aneka is a workload distribution and management platform that accelerates applications in Microsoft .NET framework environments. Some of the key advantages of Aneka over other GRID or Cluster based workload distribution solutions include:

- rapid deployment tools and framework,
- ability to harness multiple virtual and/or physical machines for accelerating application result ·provisioning based on QoS/SLA
- Support of multiple programming and application environments.

- Simultaneous support of multiple run-time environments.
- Built on-top of Microsoft .NET framework, with support for Linux environments through Mono Programming and MapReduce Programming and tools for rapid creation of applications and their seamless deployment on private or public Clouds to distribute applications.

Components of Aneka :

1. **BUILD :**
   Aneka includes a Software Development Kit (SDK)which includes a combination of APIs and Tools to enable you to express your application. Aneka also allows you to build different run-time environments and build new applications. Aneka provides APIs and tools that enable applications to be virtualized over a heterogeneous network.

   Supported APIs include:-
   - Task Model for batch and legacy applications.
   - Thread Model for applications that use object oriented thread.
   - Map Reduce Model for data intensive applications like data mining or analytics.
   - Others such as MPI (Message Passing) and Actors (Distributive Active Objects/Agents) can be customized.

Build different types of Run-time environments:-
- PC Grids (also called Enterprise Grids).
- Data Centres (Clusters).
- MultiCore Computers-Public and/or private networks.
- Virtual Machine or Physical.

Use APIs and Tools tobuild new applications orenable existing applications over different Run-time environments.

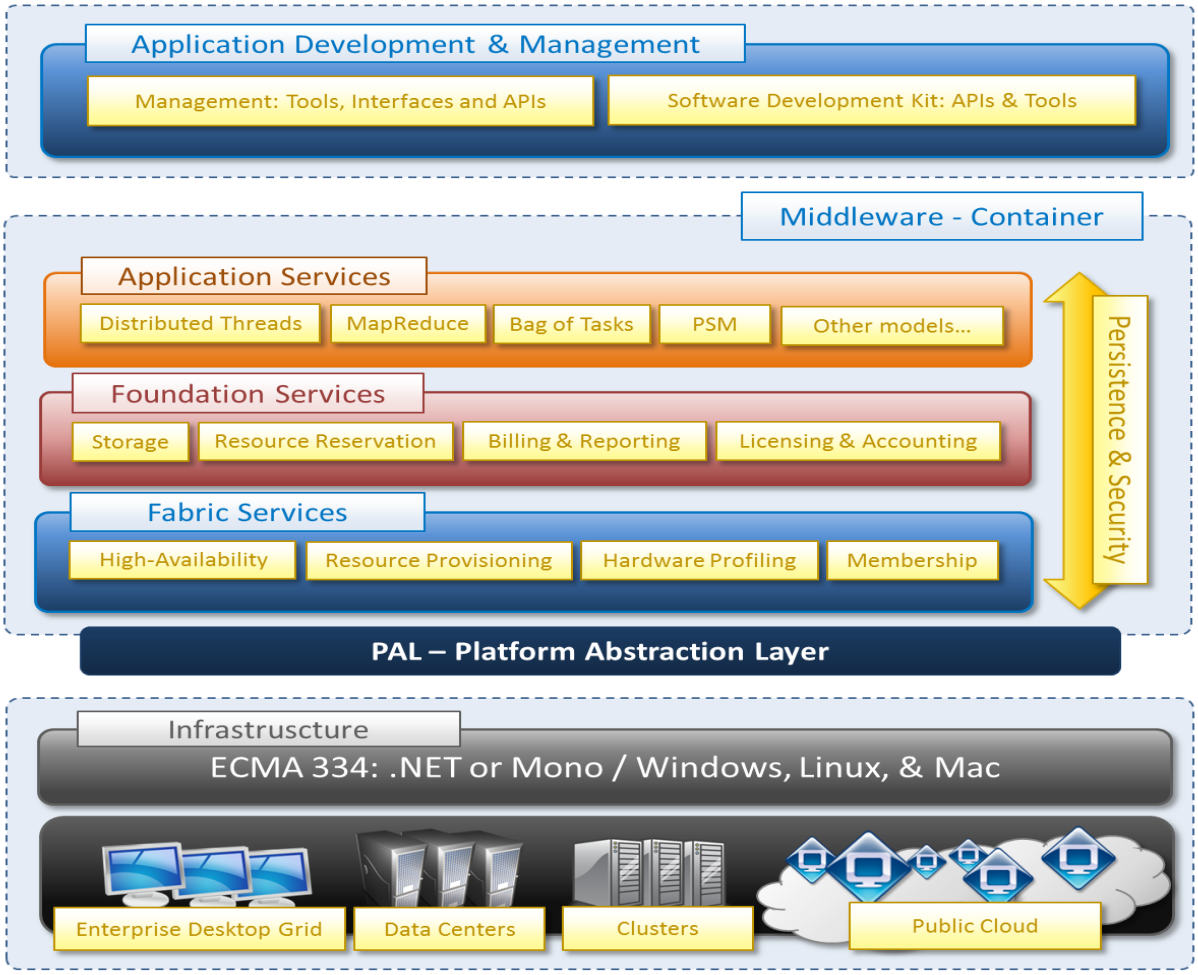
2. **ACCELERATE :**
   Aneka supports Rapid Development andDeploymentof Applications in Multiple Run-Time environments. Aneka uses physical machines as much as possible to achieve maximum utilization in local environment. As demand increases, Aneka provisions VMs via private clouds (Xen or VMWare) or Public Clouds (Amazon EC2).

   How we accelerateDevelopment and Deployment:
   - Rapid Deployment includes support of Parameter Sweep using Design Explorer Tool. Parameter sweep takes existing applications that are controlled by a set of parameters passed as a command line and produces multiple distributed executions of the same application with different parameter sets.

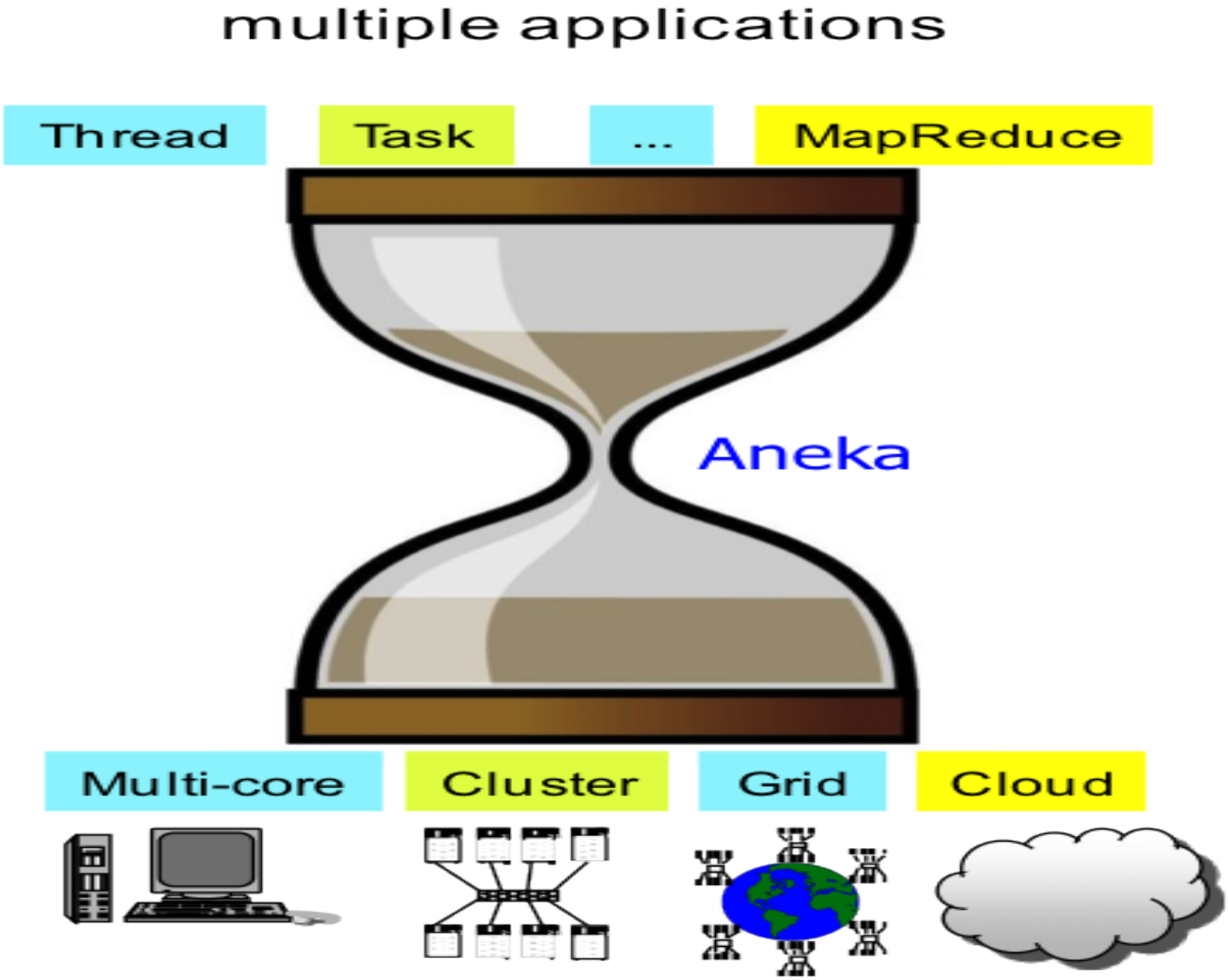
- Building on-top of Microsoft .NET framework allows multiple programming languages to be supported, thereby making it faster to get existing applications running.
- Develop Application once and run in multiple environments simultaneously. Support for Multiple Run-time environments saves you time in programming your applications. Aneka supports Virtual Machine and Physical hardware in private and public networks.
- Optimized for networked multi-core computers, Aneka effectively virtualizes your application which allows you to harness the power of multiple computers for the same workload. This gives you results in near real-time allowing you to make faster decisions.
- Aneka Scheduler allows you to run multiple applications on same Run-time environment either concurrently (simultaneously) or in a queue arrangement.

3. **MANAGE :**
   Aneka Management includes a Graphical User Interface (GUI) and APIsto set-up, monitor, manage and maintain remote and global Aneka compute clouds. Aneka also has an accounting mechanism and manages priorities and scalability based on SLA/QoS which enables dynamic provisioning.
   Briefly, the set of operations that are performed through the Management Studio are the following:
   - Quick setup of computing clouds;
   - Remote installation and configuration of nodes;
   - System load monitoring and tuning.
   - Monitor aggregate dynamic statistics and probing individual nodes for CPU and memory load
   - Extensible framework –add new features and services by implementing management plug-ins.

Aneka Architecture:



Aneka is a platform and a framework for developing distributed applications on the Cloud. It harnesses the spare CPU cycles of a heterogeneous network of desktop PCs and servers or data centers on demand. Aneka provides developers with a rich set of APIs for transparently exploiting such resources and expressing the business logic of applications by using the preferred programming abstractions. System administrators can leverage on a collection of tools to monitor and control the deployed infrastructure. This can be a public cloud available to anyone through the Internet, or a private cloud constituted by a set of nodes with restricted access. The Aneka based computing cloud is a collection of physical and virtualized resources connected through a network, which are either the Internet or a private intranet.



One of the key features of Aneka is the ability of providing different ways for expressing distributed applications by offering different programming models; execution services are mostly concerned with providing the middleware with an implementation for these models. Additional services such as persistence and security are transversal to the entire stack of services that are hosted by the Container. At the application level, a set of different components and tools are provided to:
1) simplify the development of applications (SDK);
2) porting existing applications to the Cloud; and
3) monitoring and managing the Aneka Cloud.

Advantages of Aneka :

- Rapid deployment tools and framework.
- Ability to harness multiple virtual and/or physical machines for accelerating application result .
- Provisioning based on QoS/SLA .
- Support of multiple programming and application environments.

- Simultaneous support of multiple run-time environments.
- Built on-top of Microsoft .NET framework, with support for Linux environments through Mono .

Applications :

- Support for Heterogeneity- integrate additional cloud service providers (IaaS) without major changes to the entire system.
- Support for Dynamic and Open Systems- plugging new components and rapidly integrating new features.
- Support for Basic VM Operation Management- software frameworks that support hypervisor-based execution should implement a minimum set of operations.
- Support for Workload Monitoring- To lease a subset of resources and dismiss resources if they are no longer necessary.

Conclusion:

After successful completion of this assignment we have learned about the Manjrasoft Aneka Software.