Aneka Platform

Introduction

- Manjasoft's solution for developing, deploying and managing Cloud applications
- Cloud Application Development Platform (CAP): pure PaaS solution
- Aneka software framework provides
  - a middleware for managing and scaling distributed applications
  - an extensible set of APIs for developing them
- 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.

Aneka Framework

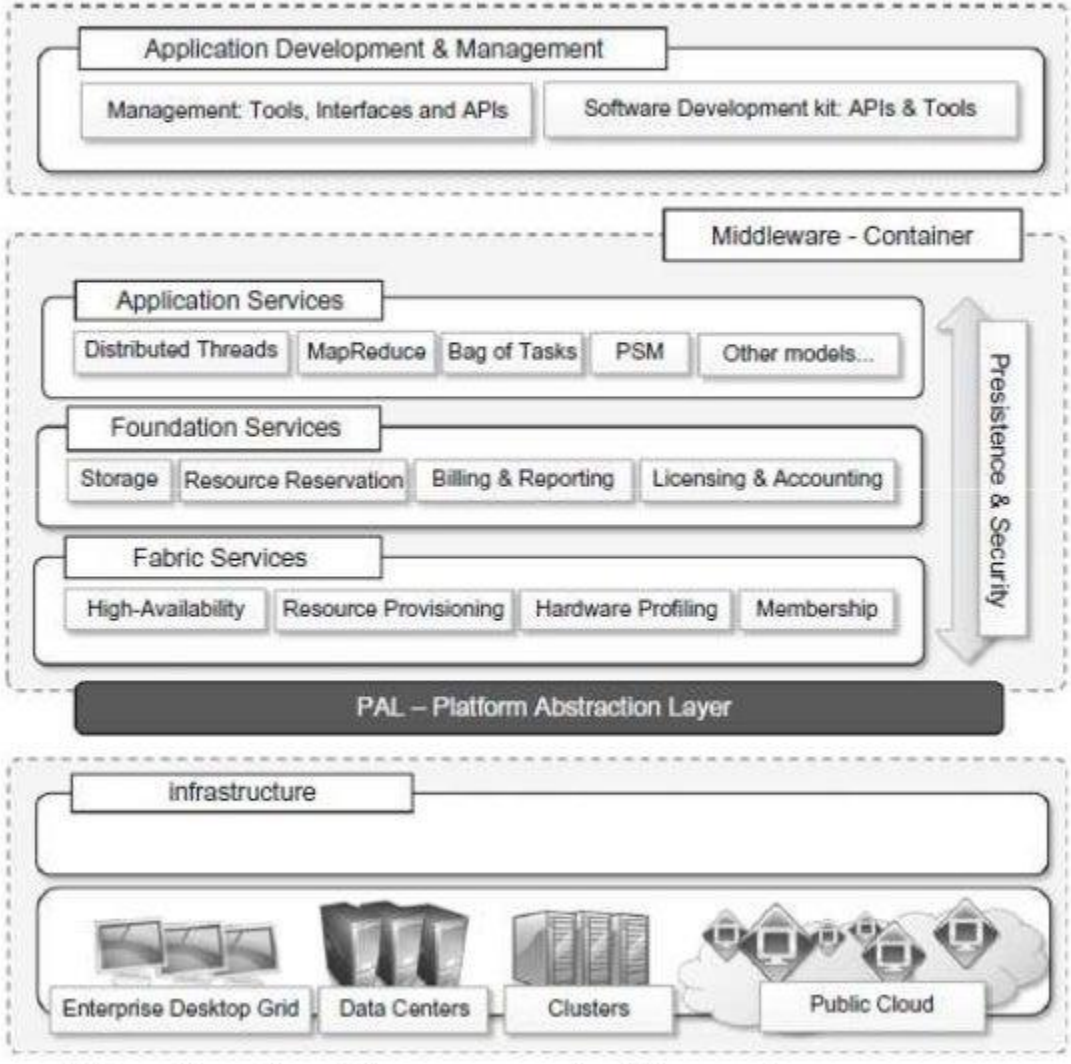

Fig. Aneka Framework Overview

Platform Abstraction Layer(PAL)

- Core infrastructure of the system is based on .NET technology
- PAL provided features:
  - Uniform and platform-independent
    - implementation interface for accessing the hosting platform
    - access to remote nodes
    - management interfaces
  - Uniform access to extended and additional properties of the hosting platform

Fabric Services

- Lowest level of the software stack representing Aneka container
- Consists of
  - A) Profiling and Monitoring Services
  - B) Resource Management Services

Fabric Services contd..

- A) Profiling and Monitoring Services
  - Heartbeat, Monitoring and Reporting services
  - Heartbeat service periodically collects the dynamic information about the node
  - The basic information about memory space, disk space, CPU and operating system are collected.
  - All these information can be stored on RDBMS or a flat file.

Fabric Services contd..

- B) Resource Management Services
  - Comprises tasks: resource membership, resource reservation and resource provisioning service
  - Equivalent services: Index Service(Membership catalogue), Reservation Service, Resource Provisioning Service
  - The Membership catalogue tracks the performance information of nodes
  - The Resource Provisioning Service tracks the provisioning and lifetime information of virtual nodes.

Foundation Services

- Logical management of the distributed system built on top of the infrastructure
- A) Storage management for applications
- B) Accounting, billing, and resource pricing
- C) Resource reservation

Foundation Services contd..

- A) Storage management
  - Centralized file storage
    - More suitable for compute-intensive applications
  - Distributed file storage
    - More suitable for data intensive applications
  - FTP is default option installed in Aneka
  - To support different protocols, the concept of *file channel,* is introduced.
  - *File Channel* identifies a pair of components:
    - file channel controller : server part
    - file channel handler : client part
  - Storage service supports the execution of task-based programming

Storage Management contd..

- B) Accounting, Billing, and Resource Pricing
  - Accounting keeps track of the status of applications in the Aneka cloud
  - Shows the usage of infrastructure and the execution of applications
  - Billing service provides detailed information about the resource usage of each user with the associated costs.
  - Each resource can be priced differently according to the different set of services that are available on the corresponding Aneka container or the installed software in the node.

Storage Management contd..

- B) Resource Reservation
  - Supports the execution of distributed applications
  - Allows for reserving resources for exclusive use by specific applications

Application Services

- Manage the execution of applications
- Constitute a layer that differentiates according to the specific programming model
- *Scheduling Service* and *Execution Service*
- *Scheduling Service* tasks:
  - Job-to-node mapping
  - Rescheduling of failed jobs
  - Job status monitoring
  - Application status monitoring

Application Services contd..

- *Execution Service* tasks:
  - Controls the execution of single jobs that compose applications
  - Unpacking the jobs received from the scheduler
  - Retrieval of input files required for the job execution
  - Sandboxed execution of jobs
  - Submission of output files at the end of execution
  - Execution failure management
  - Performance monitoring
  - Packing jobs and sending them back to the scheduler

Application Services contd..

- Currently supported programming model in the Aneka Cloud:
  - Task Model
  - Thread Model
  - MapReduce Model
  - Parameter Sweep Model

Application Development and Management

- Aneka provides developers with a comprehensive and extensible set of APIs
- Provides powerful and intuitive management tools to administrators
- The Aneka SDK provides support for both programming models and services by means of the *Application Model* and *Service Model.*
- The management tools consists of tools for
  - Infrastructure Management
  - Platform Management
  - Application Management
- *Aneka Cloud Management Studio* handles all of these

Building Aneka Cloud

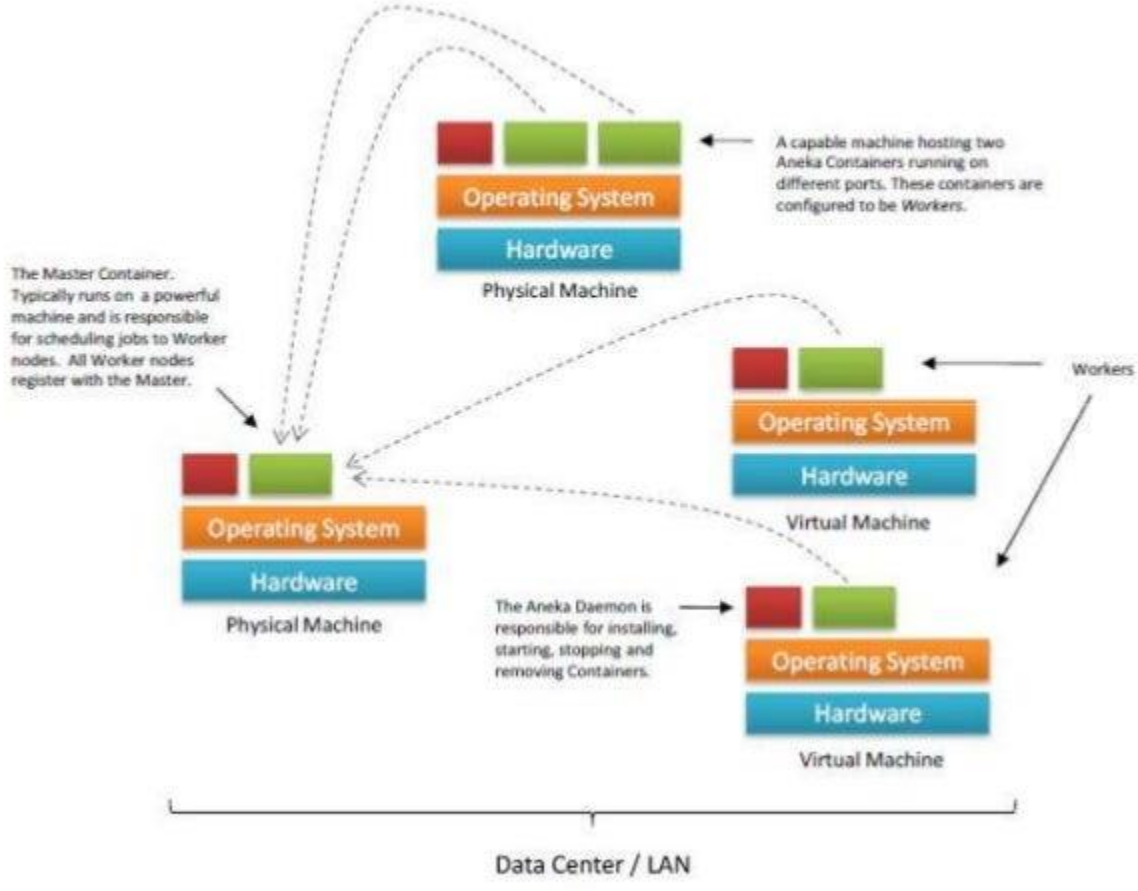

Fig. A high-level view of an Aneka cloud