Software Requirements Specification
Bin-packing VM Consolidation Algorithm

Atchutuni Bhavana
Terli Venkatesh
Surineni Sampath Kumar

March 30, 2014

Contents

1 INTRODUCTION

1.1 Product overview

This project takes as input

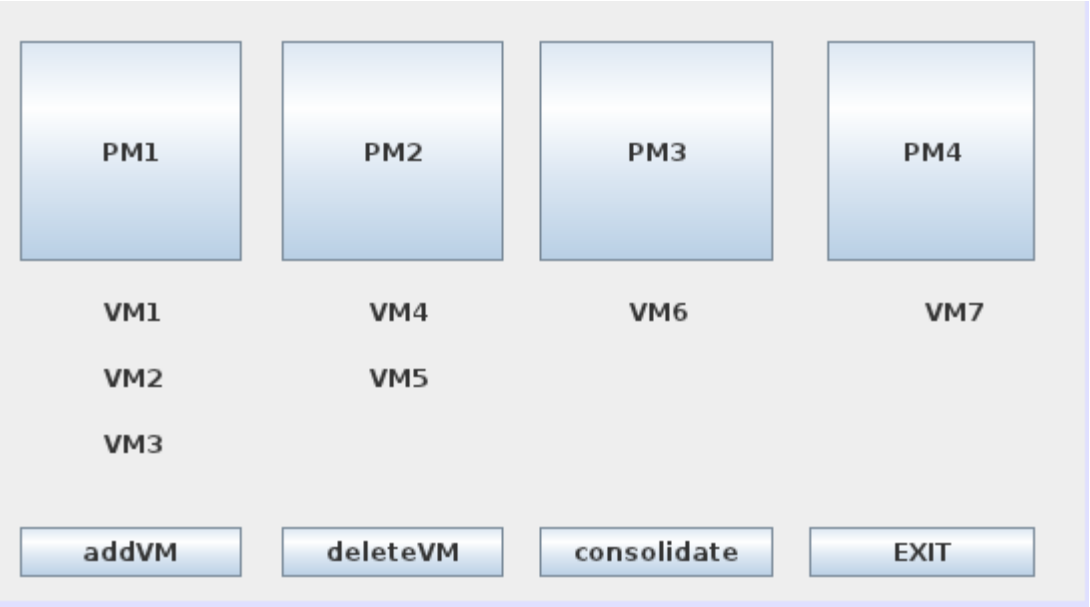
- Physical machines and their capacities
- Virtual machines and their capacity requirements

It computes the residual capacity in each physical machine after adding the virtual machines. The physical machines are sorted in ascending order of their residual capacity. The project provides the feature of consolidating the virtual machines in different physical machines into minimum number of physical machines. Other features provided by this project are to switch off a physical machine by migrating the virtual machines in that physical machine into others and switch on a physical machine. This project uses greedy bin packing algorithm.

2 SPECIFIC REQUIREMENTS

2.1 External Interface Requirements

2.1.1 User Interfaces



The GUI displays

- All the physical machines

- Virtual Machines in each physical machine
- Buttons for adding a vm, deleting a vm, consolidation and to exit

2.1.2 Hardware Interfaces

No specific hardware module is being used for this project

2.1.3 Software Interfaces

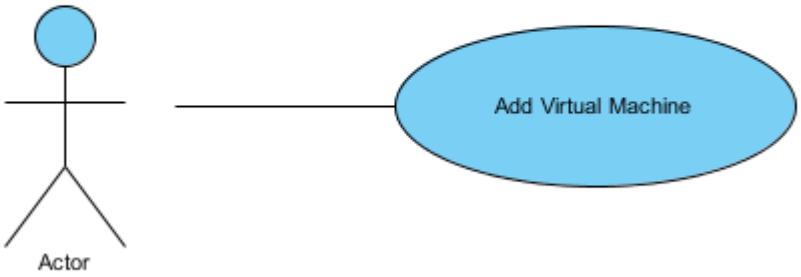
No specific software module is being used for this project

2.1.4 Communication Protocols

This project doesnt use any communication protocols

2.2 Software Product Features

1. **Provides the ability to add a vm**



This action is triggered by user clicking **Add VM** Button. A new window appears with fields for

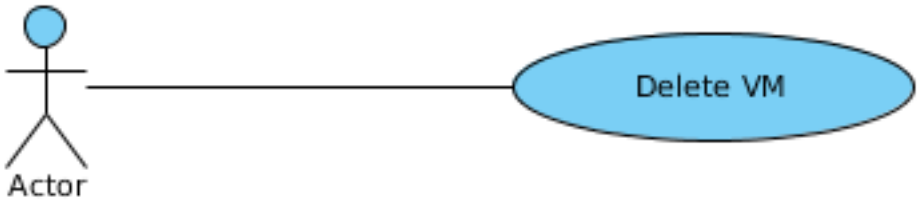
- VM ID
- VM capacity

This would return

On Success:
The GUI will be updated showing that new VM that is added to existing PM. The residual capacity of the PM is calculated and updated to reflect in GUI

On Failure:
Reason: No enough residual capacity to accomodate a VM
The user will get an error message that there is no enough space to add the given VM

2. **Provides the ability to delete a vm**



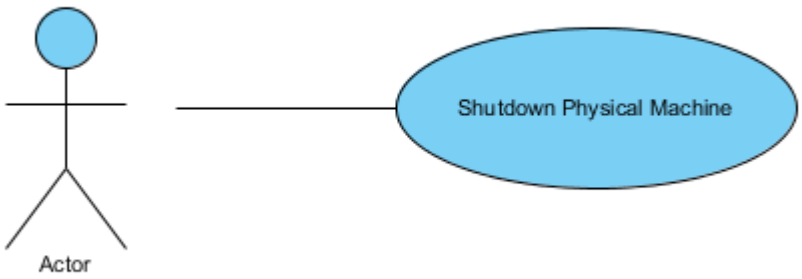
This action is triggered by user clicking **Delete VM** Button.

- A new window appears with a drop down list of all the VM_ID that are present in the system.

This would return

On Success:
The GUI will be updated showing that VM is deleted from the PM. The residual capacity of the PM is calculated and update to reflect in GUI

3. **Ability to switch off a physical machine**



This action is triggered by user clicking on the PM which he wants to switch off.

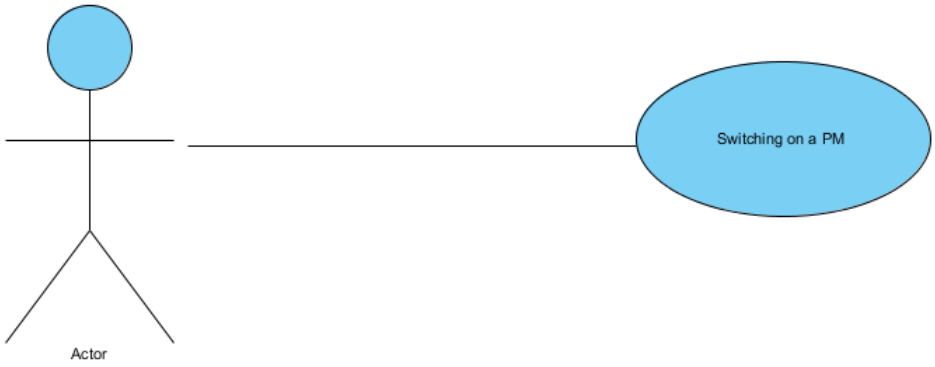
This would result in

On Success:
The software moves all the VM's into other PM's with sufficient residual capacity. Then the physical machine is shutdown.

The GUI will be updated and the color of specified PM is changed showing that the selected PM is switched off.

On Failure:
Reason: VM's in the selected PM cannot be accomodated in other PM's
The user will get a message stating that the VM's in the selected PM cannot be accomodated in other PM's.

4. **Ability to switch on a physical machine**

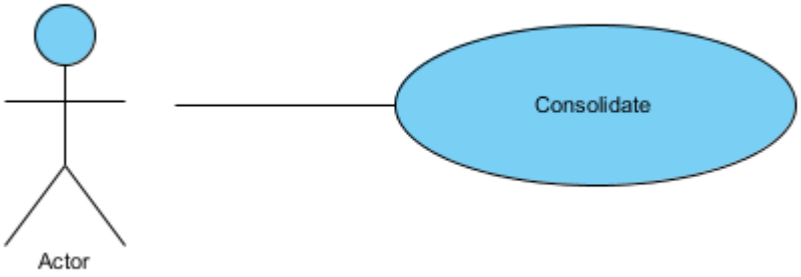


This action is triggered by user clicking on the PM which he wants to switch on.

This would result in

On Success:
The PM will be switched on. The color of the PM is changed from red to green to reflect the on status of PM in GUI

5. **Provides the ability to consolidate all VM's in minimum number of PM's**



This action is fired by user clicking the **consolidate** Button.

This would result in

On Success:
The software runs Bin packing algorithm. Moves the VMs into as few PMs as possible. Updates the GUI

6. **Ability to exit the program**

   This action is triggered by user clicking on the **Exit** button.

   This would result in

   On Success:
   All the resources are released and the system is exited.