Software Requirements Specification
Bin-packing VM Consolidation Algorithm

Atchutuni Bhavana

Terli Venkatesh

Surineni Sampath Kumar

February 4, 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. Another feature provided by this project is to shutdown a physical system by migrating the virtual machines in that physical machine into other physical machines. This project uses greedy bin packing algorithm for this purpose.

2   SPECIFIC REQUIREMENTS

2.1   External Interface Requirements

2.1.1   User Interfaces
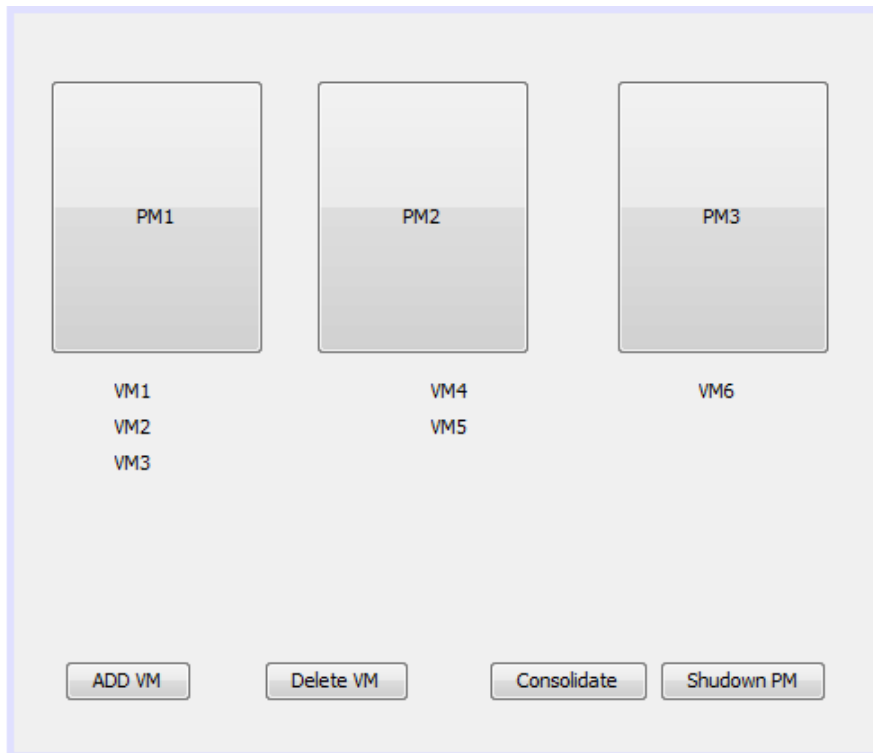
The GUI displays

- All the physical machines

- Virtual Machines in each physical machine

- Buttons for adding a vm, deleting a vm, for consolidation and turning off the physical machine

2.1.2   Hardware Interfaces

No specific hardware module is being used for this project

2.1.3   Software Interfaces
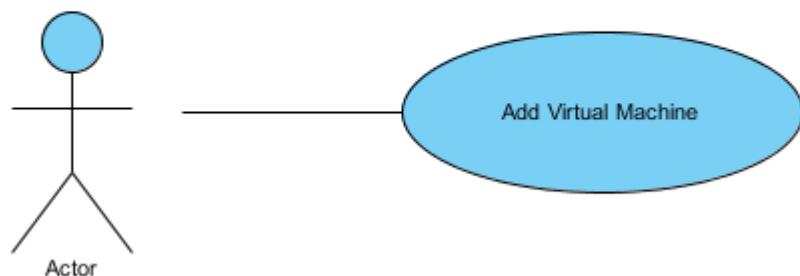
No specific software module is being used for this project

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

- Capacity of the VM
- The PM in which to add the VM into

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
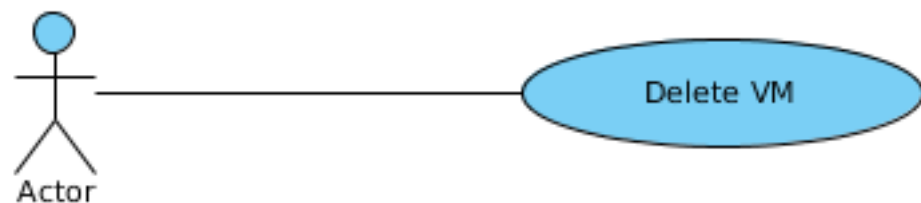
On Failure:
Reason: No enough residual capacity to accomodate a VM
The user will get an error message that there is no enough space to add the given VM
Reason: User has chosen a PM that is switched off
The user will get an error message that the selected PM is switched off

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

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

- Choosing the PM in which the VM we want to delete resides. Then a drop down list will be updated with list of VM's in the chosen PM.

- The user has to select the ID of the VM that we want to delete from the drop down list. Only VM's that are alive will be displayed in the list.
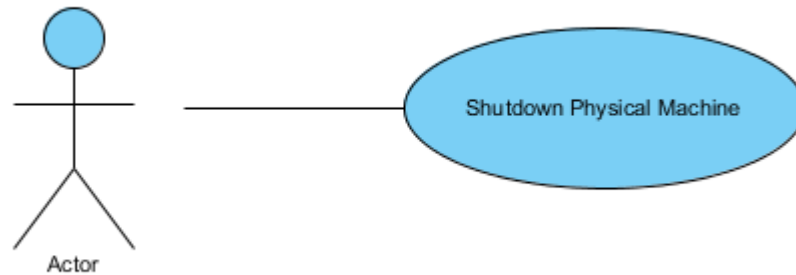
This would return
On Success:
The GUI will be updated showing that new VM that is deleted from the PM. The residual capacity of the PM is calculated and update to reflect in GUI

On Failure:
Reason: The selected PM is empty or switched off
The user will get an error message that the particular PM which you have selected is empty or switched off

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

This action is triggered by user clicking on the PM which he wants to shutdown.
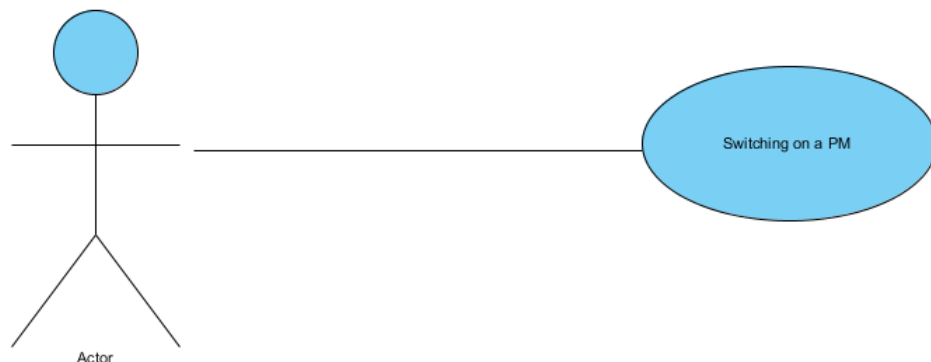
This would result in

On Success:
The software moves all the VM's into other PM's with sufficient residual capacity. Then the system is shutdown. The GUI will be updated showing that the PM selected 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.
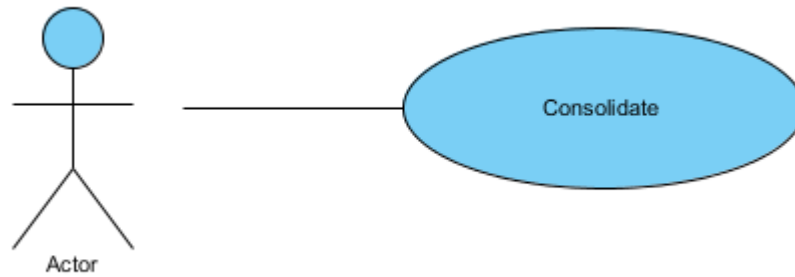
4. **Ability to switch on a physical machine**

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