

# Software Requirements Specification

## Bin-packing VM Consolidation Algorithm

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# 1 INTRODUCTION

## 1.1 Product overview

This project takes as input

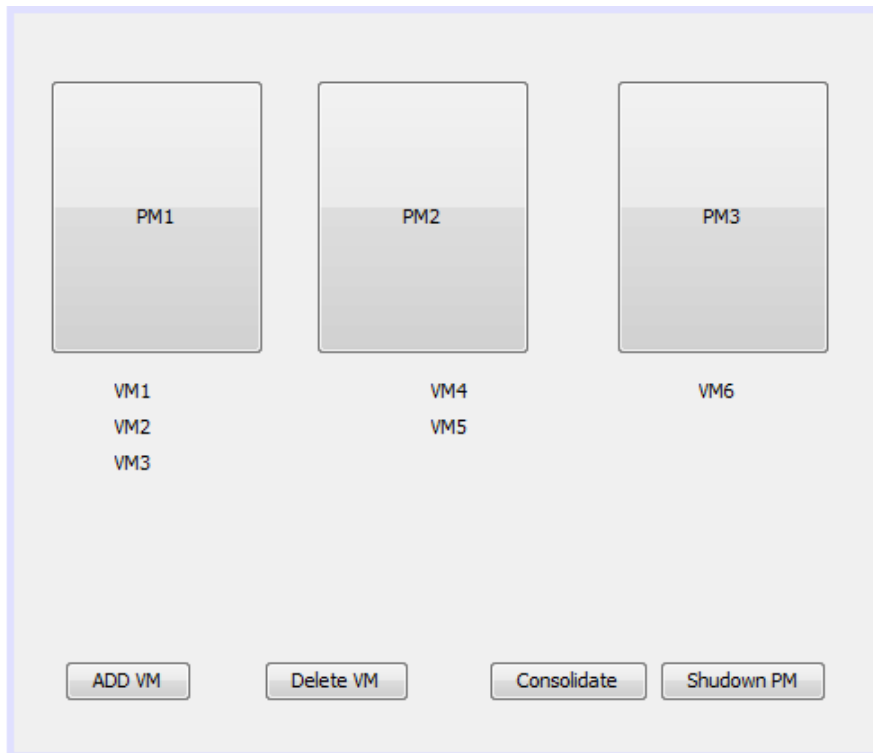
- Physical machines and their capacities
- Virtual machines and their capacity requirements

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

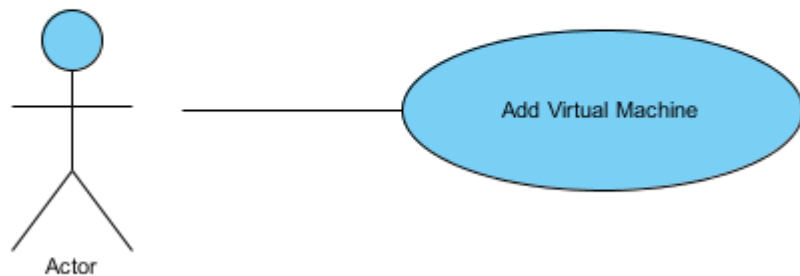
No specific hardware module is being used for this project

### 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:**

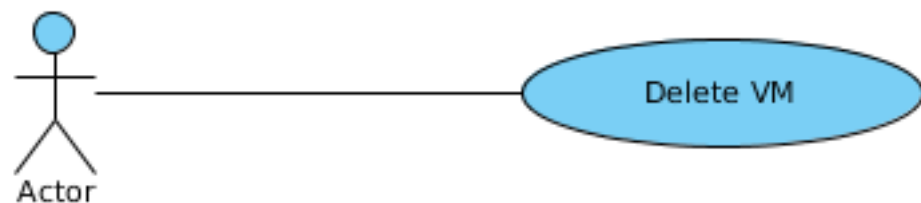
**Reason: No enough residual capacity to accomodate a VM**

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
- The ID of the VM that we want to delete

This would return

**On Success:**

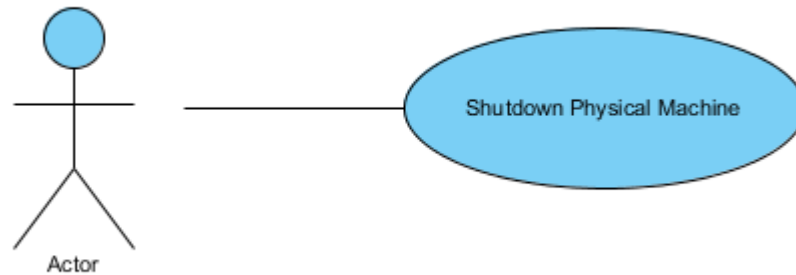
The GUI will be updated showing that new VM that is deleted from the PM. The residual capacity of the PM is calculated and update to reflect in GUI

**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:**

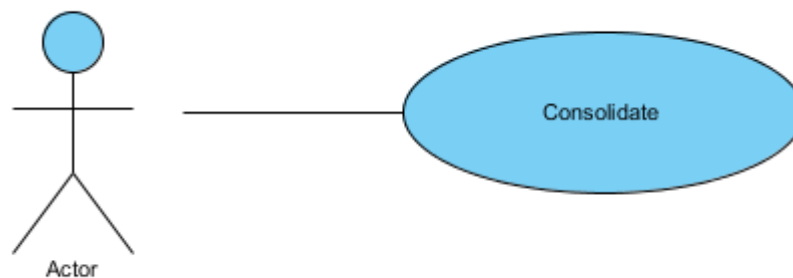
The software moves all the VM's into other PM's with sufficient residual capacity. Then the system is shutdown. The GUI will be updated showing that the PM selected is switched off

#### **On Failure:**

**Reason: VM's in the selected PM cannot be accommodated in other PM's**

The user will get a message stating that the VM's in the selected PM cannot be accommodated in other PM's.

### 4. 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