BLEKINGE TEKNISKA HÖGSKOLA

Monitoring the Performance of Virtual Machines

TEAM: 'SHIELD'

HARSHINI NEKKANTI

HIMA BINDU NUTALAPATI

JYOTHI SPANDANA PENMETSA

NAVYA UPPALAPATI

PRIYASUBHA CHUNDRU

RAYWON TEJA KARI

SAIPHANI KRISHNA PRIYANKA KOLLURI

SASANK SAI SUJAN ADAPA

SRAVANI KANCHARLA

TULASI PRIYANKA SANABOYINA

VEERAVENKATA NAGA SOMESWARA MANITEJA DARISIPUDI

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CONTENTS

1. Preface

The proposal aims at providing an outline of the project to be implemented in order to meet the requirements of the customer and CEO. The company comprises of the CEO and development team Shield. This is the revised version 1.2.

The remainder of the document is organised as follows. Section 2 defines the technical terms and abbreviations used in the document. Section 3 is the system architecture which includes a high level design of the system and the different modules implemented. Section 4 states the requirements of the user and the system. Finally, section 5 includes the references.

Customer: Patrik Arlos

CEO: Dragos Ilie

Revised version v1.3 on 2015-06-15

-Added reference to reference associated tests.

-Added test for importing data via RESTful API.

Revised version v1.2.1 on 2015-05-28

-Changed sequence diagram for the data storage module. Refer section 3.2.

-Assignee and test fields updated.

Revised version v1.2 on 2015-05-20

- KVM added to the system architecture. Refer section 3.

- REQ-USR_FNL1 updated according to the customer requirements. Refer section 4.1.1.

- RESTful API added as user functional requirement under REQ-USR_FNL8. Refer section 4.1.1.

Revised version v1.1 on 2015-05-08

- Changed the definitions of API, hypervisor, abbreviation of CN in Glossary and Abbreviations.

- Changed block diagram in the system architecture. Refer section 3.

- Added activity diagram for data retrieval unit, sequence diagram for data storage unit and use case diagram for user interface module. Refer section 3.

- Addition and removal of devices are written as separate requirements. Refer section 4.1.1

- Changed descriptions for the user functional requirements. Refer section 4.1.1

- Changed descriptions for the system functional requirements. Refer section 4.2.1

Initial version v1.0 on 2015-04-13

-Initial release.

2. Glossary and abbreviations

API: Application Program Interface

An API is a set of programming instructions and standards for accessing a web based software application.

GUI: Graphical User Interface

Hypervisor:

Hypervisor is a hardware or a software that allows multiple operating systems to share a single host.

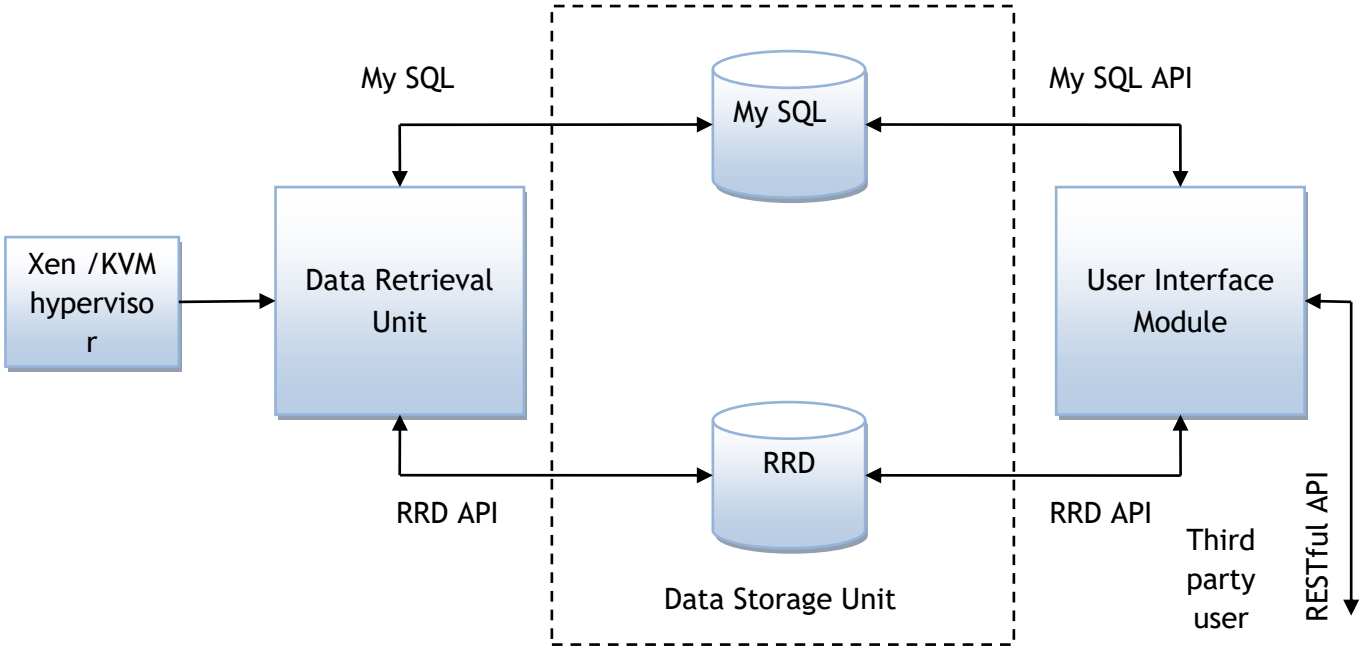
Monitoring:

Use of systems or processes that constantly oversee computer or network resources for the purpose of alerting personnel in case of outages, alarms, or other predefined events.

VM: Virtual Machine

Virtual machine is an operating system or an application environment that is installed on a hypervisor.

3. System Architecture

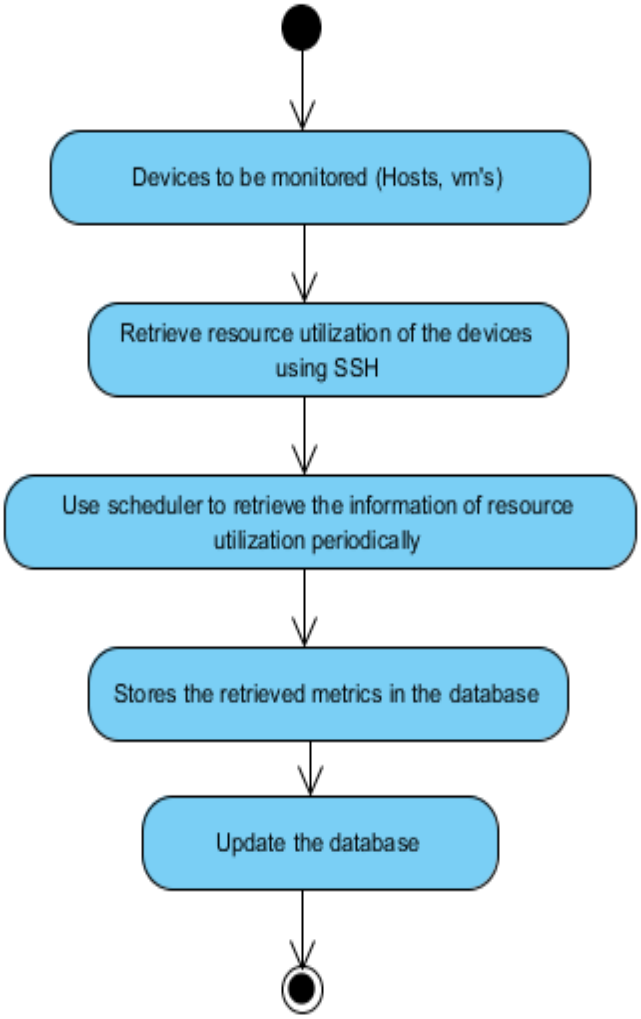


The product can be implemented as three modules namely

- data retrieval unit
- data storage unit
- user interface module

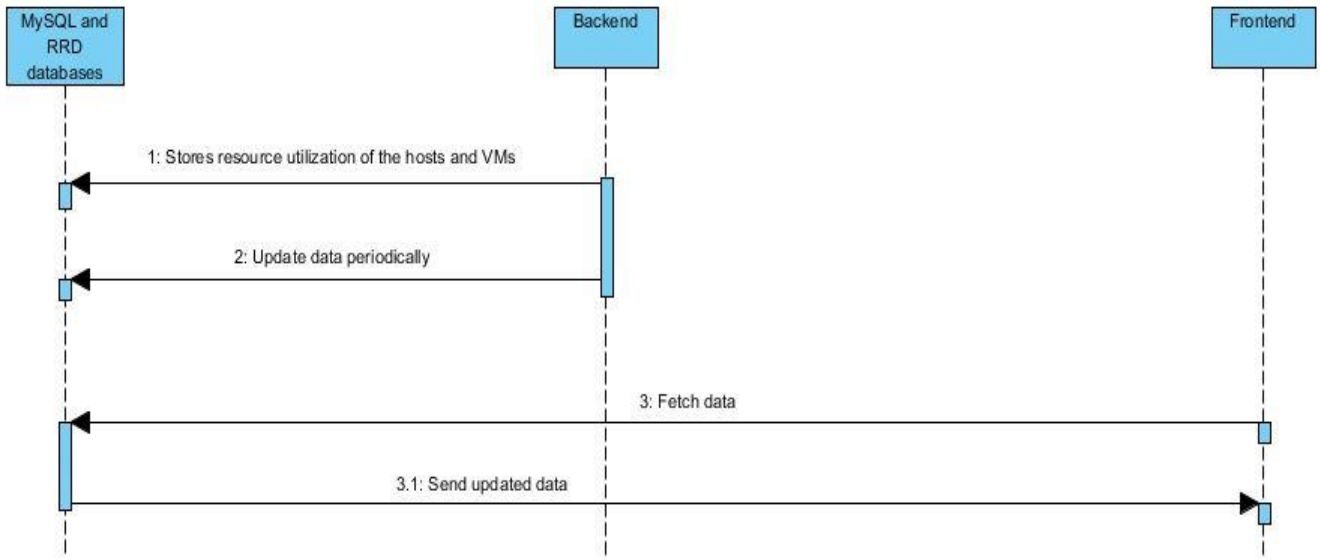
3.1. Data Retrieval Unit:

The data retrieval unit is used to retrieve the CPU load and utilization, I/O usage, network usage, memory usage and disk usage of the devices to be monitored. SSH is used to retrieve the information and the retrieved information is stored into the database. When the product is installed, the retrieval unit gets the information and stores into the database periodically.



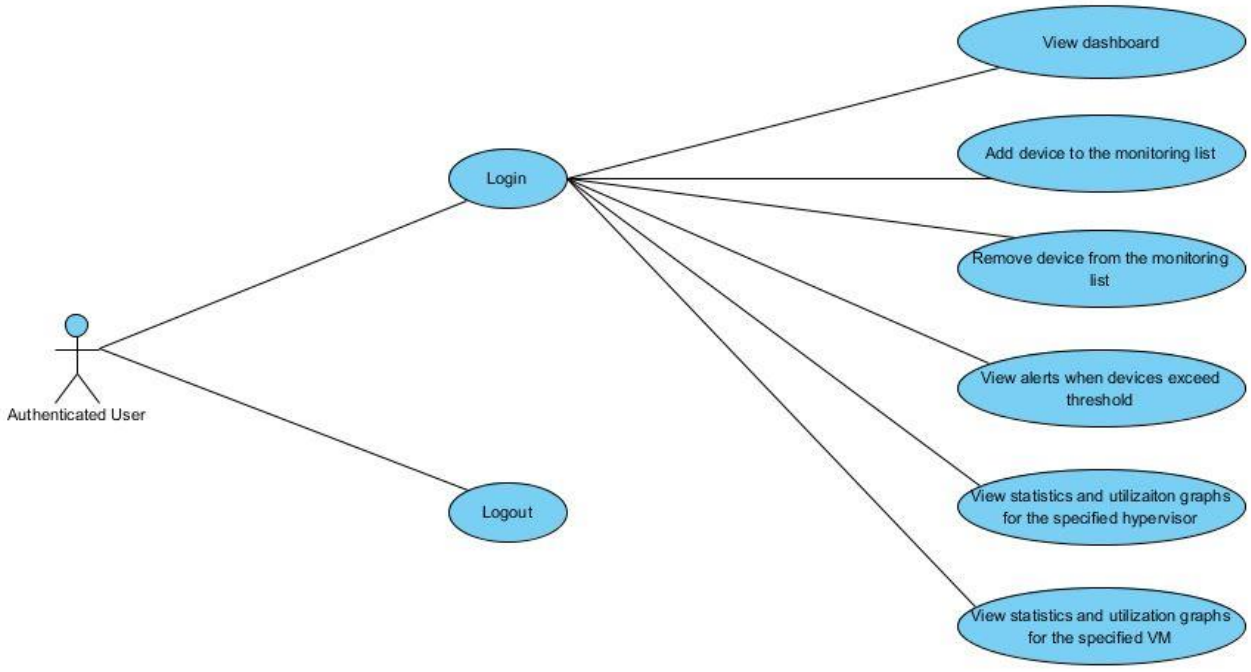
3.2. Data Storage Unit:

The data storage module is a database used to store the information retrieved by the retrieval module. The data stored in the database can be accessed by the user interface module. MySQL database is used to store the login credentials and the details of the devices and RRD database is used to store the aggregate of the data required to produce the utilization graphs.



3.3. User Interface Module:

The user interface module is placed in the frontend of the high level architecture. The frontend is a graphical user interface which can be accessed by a web browser. The user is provided with login credentials and once logged in, the user can add or delete devices, view the status of the devices, view the performance of the VMs with respect to time. The graphs will be generated using RRD tool.



4. Requirements

The requirements can be categorized as user requirements and system requirements.

4.1. User requirements

The user requirements specify the services the system is expected to provide to the users. The user requirements can be classified as functional and non-functional requirements.

4.1.1. Functional requirements

REQ-USR_FNL1:

Requirement	REQ-USR_FNL1
Creation date	2015-04-24
Change date	2015-05-20
Type	Functional
Test	MOD3-TST_1, MOD3-TST_2, MOD3-TST_3
Assignee	Sasank, Priya Subha
Description	The data retrieval module must retrieve the CPU utilization, network I/O usage, memory usage and disk usage of the hypervisor.

REQ-USR_FNL2:

Requirement	REQ-USR_FNL2
Creation date	2015-05-20
Change date	
Type	Functional
Test	MOD3-TST_1, MOD3-TST_2, MOD3-TST_4
Assignee	Sasank, Priya Subha
Description	The data retrieval module must retrieve the CPU utilization, network I/O usage, memory usage and disk usage of the

	virtual machines

REQ-USR_FNL3:

Requirement	REQ-USR_FNL3
Creation date	2015-04-24
Change date	2015-05-05
Type	Functional
Test	MOD1-TST_1, MOD1-TST_2
Assignee	Sasank, Priya Subha
Description	The software product must provide access to the user to add a device to the monitoring list.

REQ-USR_FNL4:

Requirement	REQ-USR_FNL4
Creation date	2015-04-24
Change date	2015-05-05
Type	Functional
Test	MOD1-TST_1, MOD1-TST_3
Assignee	Sasank, Priya Subha
Description	The software product must provide access to the user to delete a device from the monitoring list.

REQ-USR_FNL5:

Requirement	REQ-USR_FNL5
Creation date	2015-04-24
Change date	2015-05-05
Type	Functional
Test	MOD1-TST_4
Assignee	Sasank, Priya Subha
Description	The user interface module must display the graphs for CPU load and utilization, I/O usage, network usage, memory usage and disk usage of the hypervisors.

REQ-USR_FNL6:

Requirement	REQ-USR_FNL6
Creation date	2015-05-05
Change date	
Type	Functional
Test	MOD1-TST_4
Assignee	Sasank, Priya Subha
Description	The user interface module must display the graphs for CPU load and utilization, I/O usage, network usage, memory usage and disk usage of the virtual machines.

REQ-USR_FNL7:

Requirement	REQ-USR_FNL7
Creation date	2015-04-24

Change date	2015-05-18
Type	Functional
Test	MOD1-TST_5
Assignee	Sasank, Priya Subha
Description	The software must allow the user to monitor the resource utilization and view alerts on the dashboard when any device in the monitoring list exceeds threshold.

REQ-USR_FNL8:

Requirement	REQ-USR_FNL8
Creation date	2015-05-25
Change date	
Type	Functional
Test	MOD1-TST_8
Assignee	Sasank, Priya Subha
Description	The software must have a RESTful API to export data using a URL. The data can be either in XML, JSON or plain-text format.

REQ-USR_FNL9:

Requirement	REQ-USR_FNL9
Creation date	2015-06-15
Change date	
Type	Functional

Test	MOD1-TST_9
Assignee	Sasank, Priya Subha
Description	The software must have a RESTful API to import data using a URL. The data imported is printed on the frontend page in a table.

4.1.2. Non-functional requirements

REQ-USR_NFL1:

Requirement	REQ-USR_NFL1
Creation date	2015-04-24
Change date	
Type	Non-Functional
Test	MOD1-TST_7
Assignee	Sasank, Priya Subha
Description	The product must be able to handle a large number of devices simultaneously.

4.2. System requirements

The system requirements give the technical information about the services and functions of the system. They provide information for the design and implementation of the product.

4.2.1. Functional requirements

REQ-SYS_FNL1:

Requirement	REQ-SYS_FNL1
Creation date	2015-04-24

Change date	
Type	Functional
Description	The operating system required is Ubuntu 14.04 with atleast 1GB RAM

REQ-SYS_FNL2:

Requirement	REQ-SYS_FNL2
Creation date	2015-04-24
Change date	
Type	Functional
Description	Hypervisor is to be installed to manage the virtual machines.

REQ-SYS_FNL3:

Requirement	REQ-SYS_FNL3
Creation date	2015-04-24
Change date	2015-05-05
Type	Functional
Description	MySQL database and RRD database must be installed to store the data to be monitored.

REQ-SYS_FNL4:

Requirement	REQ-SYS_FNL3
Creation date	2015-05-05
Change date	

Type	Functional
Description	Programming language packages and libraries such as perl, php must be installed.

4.2.2. Non-Functional requirements

REQ-SYS_NFL1:

Requirement	REQ-SYS_NFL1
Creation date	2015-04-24
Change date	
Type	Non-Functional
Description	Access requirement: Access to the tool will be provided to authorised personnel only.

REQ-SYS_NFL2:

Requirement	REQ-SYS_NFL2
Creation date	2015-04-24
Change date	
Type	Non-Functional
Description	Access restriction: Addition and deletion of the devices will be limited to authorized users only.

5. References

- Sommerville, Ian. *Software Engineering*, 9th ed. Addison-Wesley, 2011