User Manual

EarthCube Integration and Test Environment Hybrid Cloud Platform

AWS Platform

Powered By Dynamic Computing Cloud (DC2)

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Preface

Dynamic Computing Cloud (DC2) is a unique software that manages, simplies, and optimizes secure hybrid clouds interoparably: Amazon AWS, Eucalytus Cloud, and OpenStack Cloud. DC2 uses different roles to control and grant user permissions; projects are also used to manage a group of users. With DC2, cloud consumers can:

1. Associate AWS accounts to projects and track the billing details, manipulate AWS compute, image, stack, VPC, S3 and other resources;

2. Fully operate Eucalyptus and burst into Amazon AWS;

3. Use Openstack with rich and scalable solutions.

This user manual is prepared to guide users to manage their cloud computing resource for both EarthCube funded projects and community technology demonstrations. It is a hands-on, step-by-step introduction to the capabilities of DC2. The first section introduces the basic operation. Sections two to four describe modules and functions for each user role.

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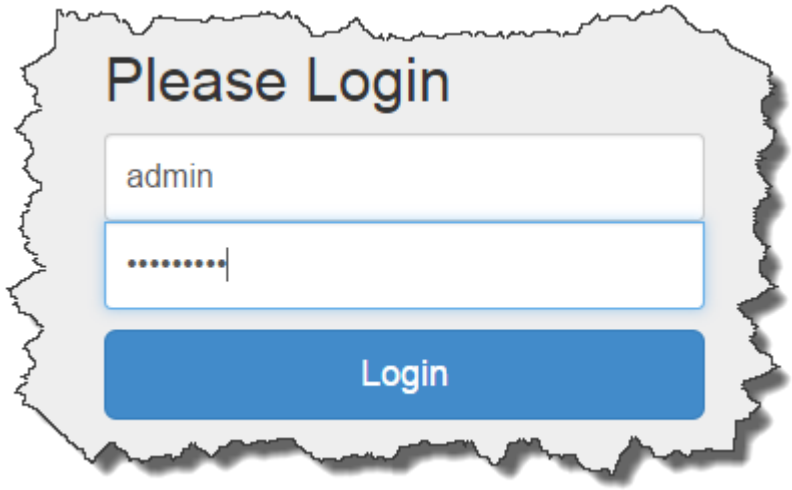
1. Basic Operation

1.1 Login

To access DC2, you can bring up the system's URL (e.g. http://domainname/dc2us) into a web browser (Firefox or Chrome is recommended), the login page will show up as below.



Enter user name and password, and click login will bring up the following DC2 main page.

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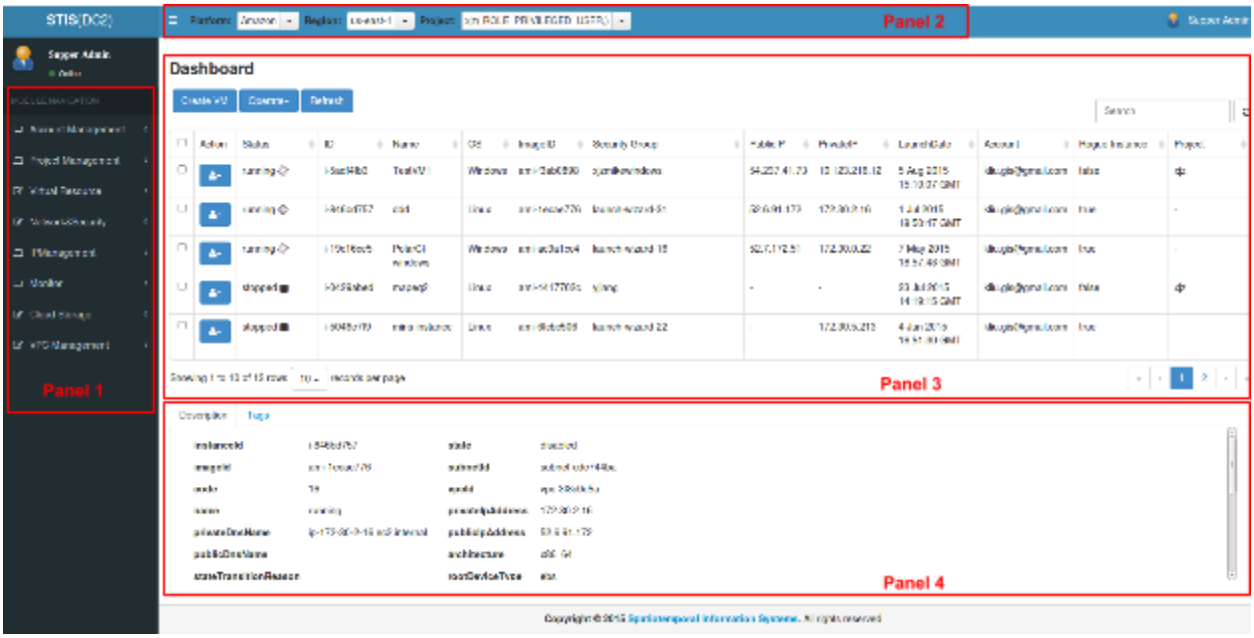

There are three major panels on the main page:

- Panel 1 is a menu that includes all DC2 functionalities available to the current user/role.
- Panel 2 shows the user information. User can change account profile, logout, select cloud platform (currently support Amazon and Eucalyptus), select project, select their project roles and the cloud region.
- Panel 3 is the workspace where the detailed result of each operation is displayed.
- Panel 4 shows the detailed information about a selected resource (if available).

1.2 User and authorization type

This DC2 version is customized according to the requirement of ECITE and includes three user roles:

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- **Cloud Project Manager** is the role that is responsible for a specific project and monitors the project's cloud usage. This is a role designated by the Account Coordinator.
- **Privileged User** is the role responsible for starting/stopping and provisioning cloud instances for a specific project. This role may be fulfilled by either cloud service team member or a person designated by the Cloud Project Manager. This user is created by a cloud system administrator or the Cloud Project Manager. It is suggested that each project has only one privileged user who is technically oriented.
- **End User** is a general role that directly or indirectly accesses or uses a cloud instance and/or cloud services from AIST Cloud. This user has the ability to stop cloud instances.

Each role corresponds to different functional modules in the system, and the corresponding relationship between role and system functions are described in the sections 2 to 4.

1.3 DC2 modules and functions

DC2 functions can be categorized into five major modules:

1. **Project/User Management** is designed to help users manage their information and virtual resources. Project management user can manage users of a project through this module.

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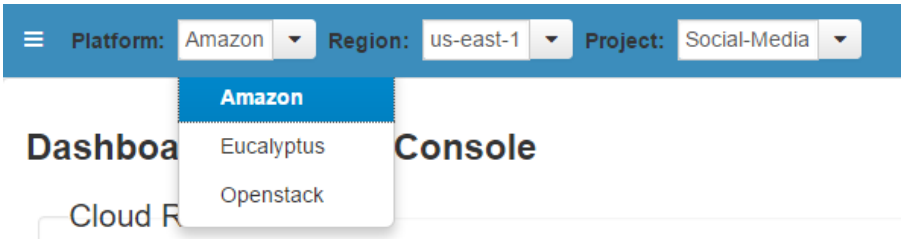
2. **Virtual Resource** is used to manage and monitor virtual resources. All user types have access to this module, but the information they retrieve varies depending on their roles.
3. **Network security** is used to manage security groups and keys, and all users have access to this module for their designated security functions.
4. **Billing/Resource monitoring** is used to monitor the usage of virtual resources, user operation, and billing information on a daily basis.
5. **IP Management** is used to manage the IP for the Eucalyptus cloud.

Sections 2 to 4 describe the operations of the functions under each role.

1.4 Switch between cloud platforms, projects and cloud regions

DC2 allows users to easily switch between different cloud platforms, projects and regions to observe and operate the resources associated with that project/role and region.

Select a cloud platform in the platform list on the upper-right corner. The dashboard will show the function and information for the current cloud platform.



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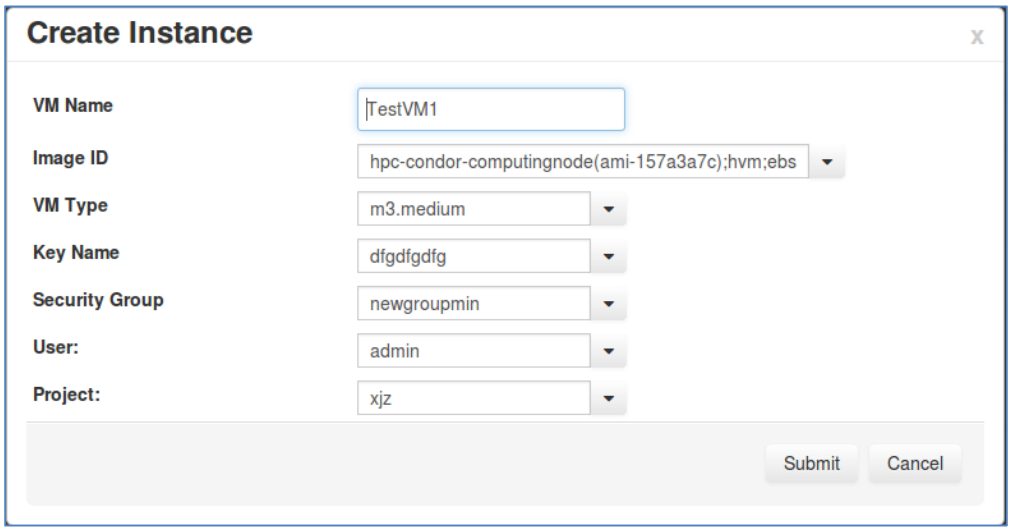
Select a project in the project list on the upper-right corner. If a user logs in as a project role (i.e. Project manager, privilege user or end user), the content in the dashboard will change based on the user's role in the project selected.

For all roles, the virtual resources (e.g. Instance and storage) created, by default, belong to that project selected in the dropdown list. There will be a "project" field in the dialog for creating a virtual resource to indicate the selected project, which the virtual resource is automatically assigned to (as shown in the example dialog below).



Select a region in the region list on the upper-right corner. Generally, the selection of the region will not affect the information displayed in the dashboard, except the image and public-image.

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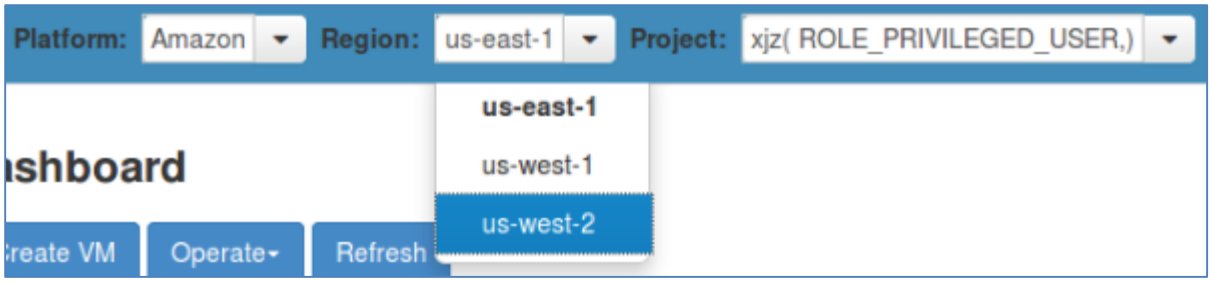
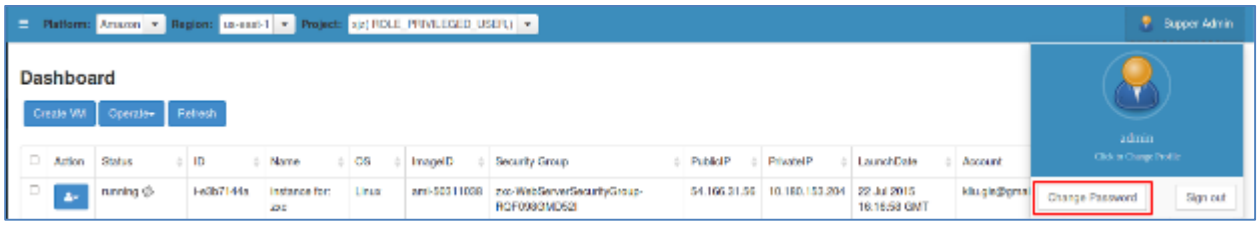


Meanwhile, the virtual resources created, by default, belong to the selected region.

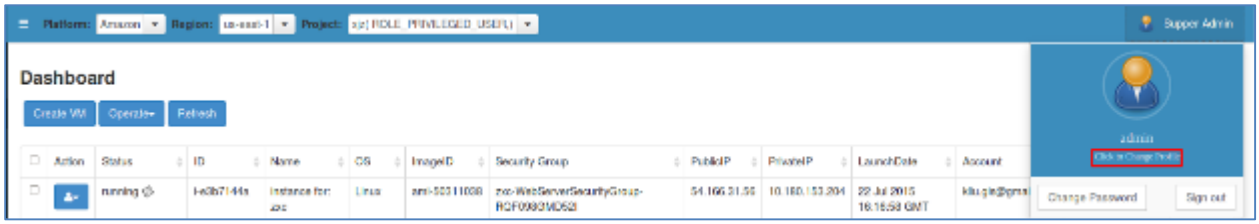
1.5 Edit User Profile and Password

Every user in the system is allowed to change the profile and password of the own user account. In order to change the password, click “Edit User” -> “Change Password” on the right of the header area.



Input the old password and set the new password in the pop-up dialog. Click “Ok” to finish.

In order to change the profile of your own account, click “Edit User” -> “Change Profile” on the right of the header area. In the pop-up window, input your information. Click “OK” to finish.



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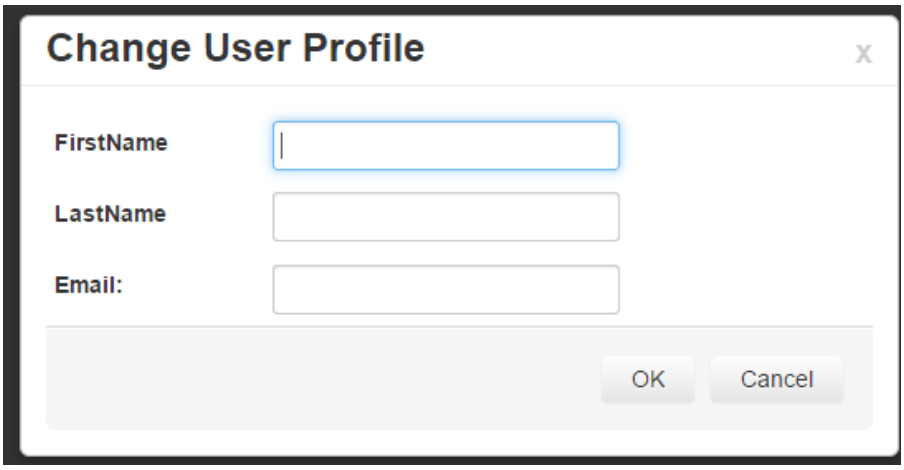
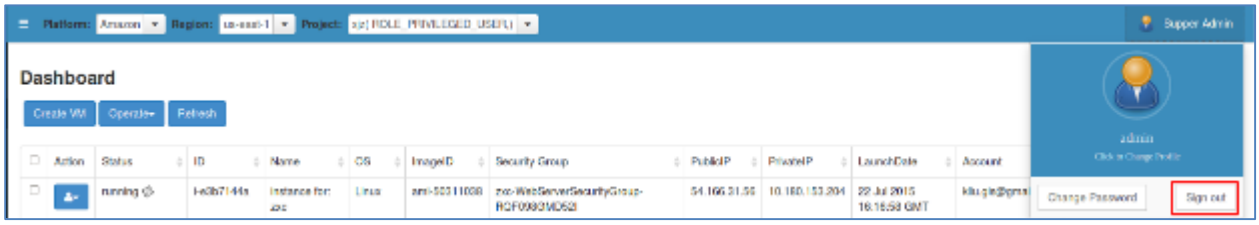


1.6 Logout

Click the Logout button in the upper-right corner will log out the current user.



Users will be automatically logged out if no operation occurred for a certain amount of time (10 minutes by default).

2. Modules and Functions for Cloud Project Manager

2.1 Message Console

Cloud Project Managers can receive notifications via the message console regarding billing (exceeds thresholds); golden image (submitted or approved); and/or user related notifications (created or approved). To display the message console, select “Message Management” -> “Message Console” from the module navigation menu.

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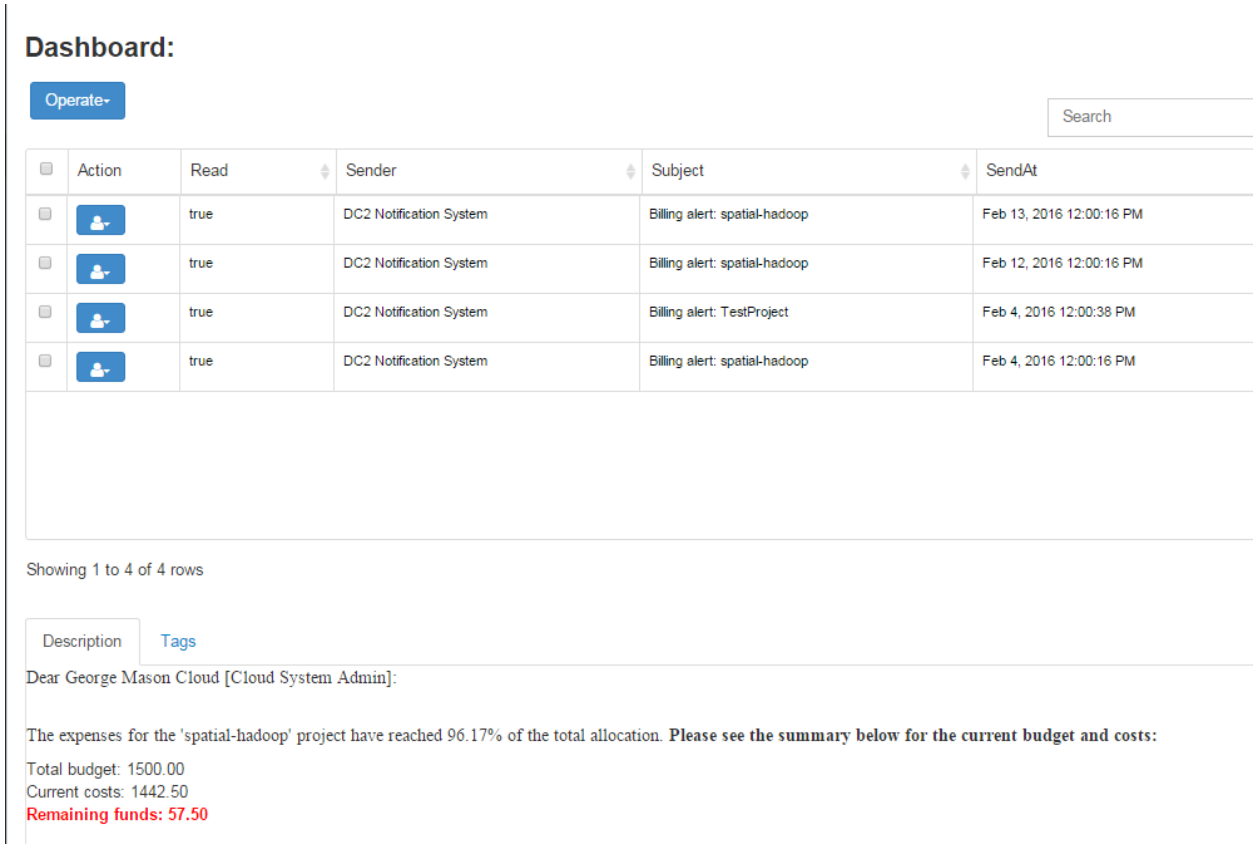

2.2 Display Projects/ Deactivate Projects

"Displaying projects" functionality allow Cloud Project Managers to quickly analyze allocated, remaining, and used funds that are assigned to each of the projects. To display all projects in the cloud, select "Project Management" -> "Project" from the "MODULE NAVIGATION" menu located in the left sidebar, projects will be shown in the "Project" table.

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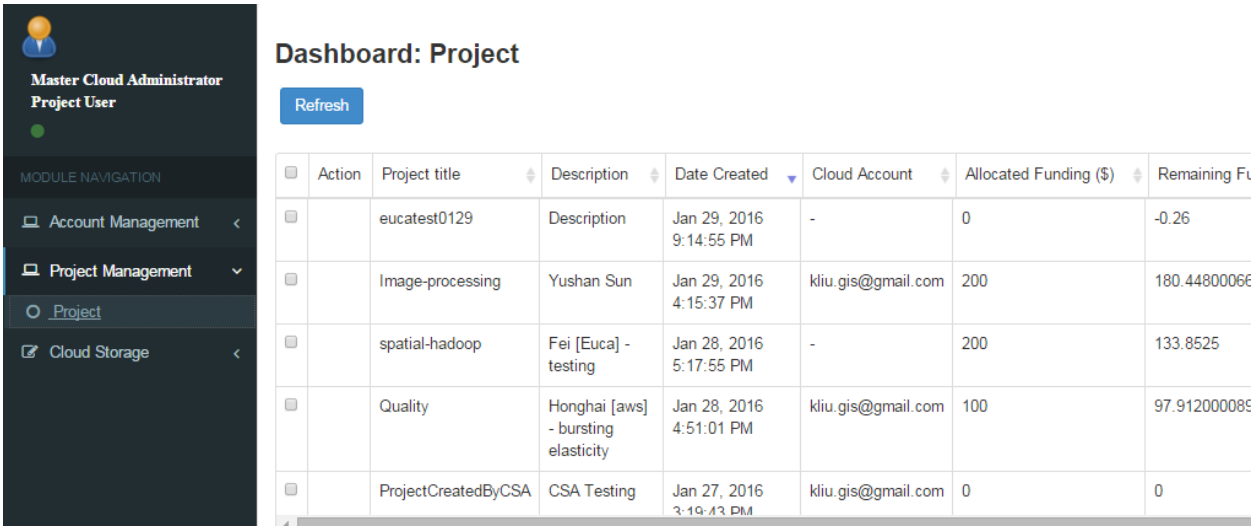
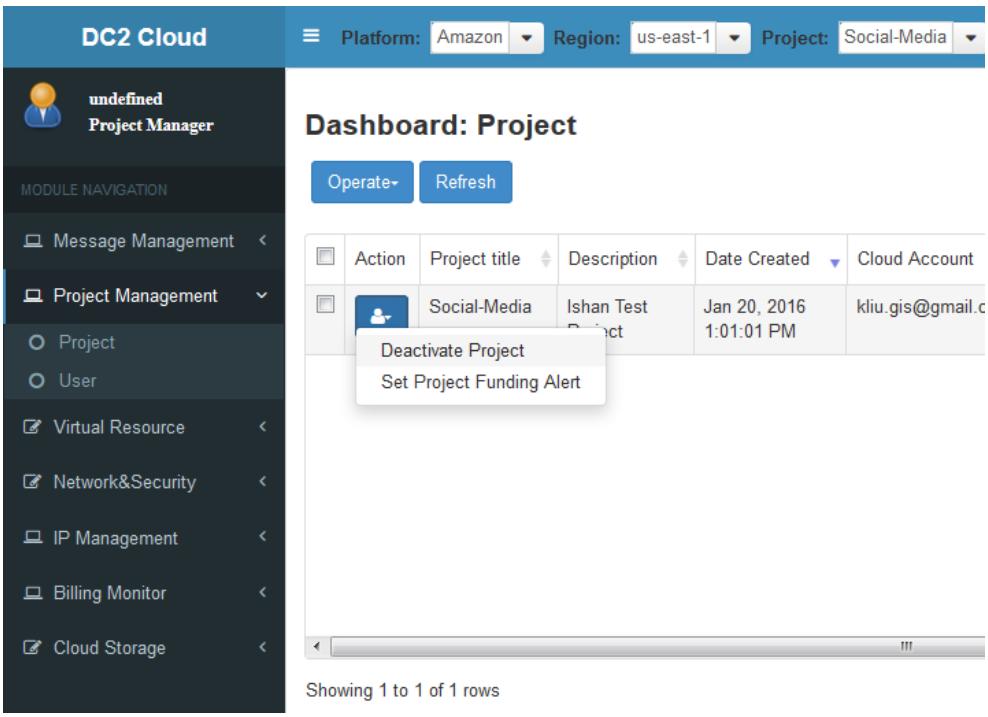


CPMs can also deactivate projects. To deactivate a project, select “Project management” -> “Project” in the left menu, and then select a project in the workspace. Click “Operate” -> “Deactivate Project”, and confirm to deactivate the project in the pop-up dialog by clicking “OK”. Then the “Activated” field for the selected project will be changed to “false”.



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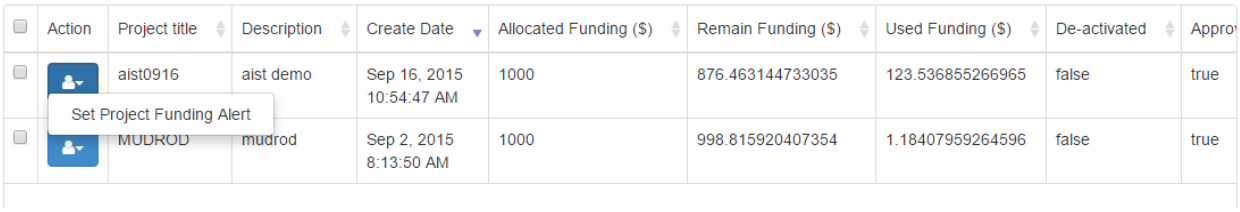
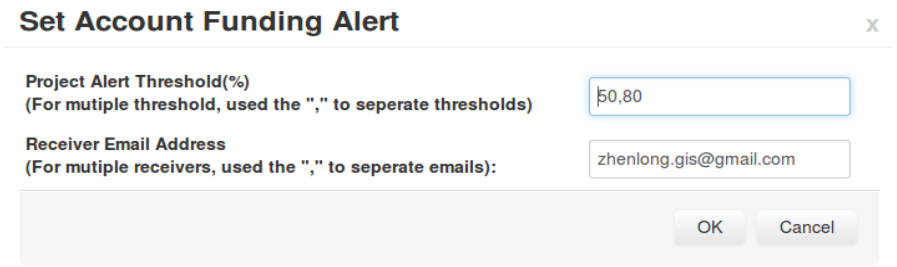
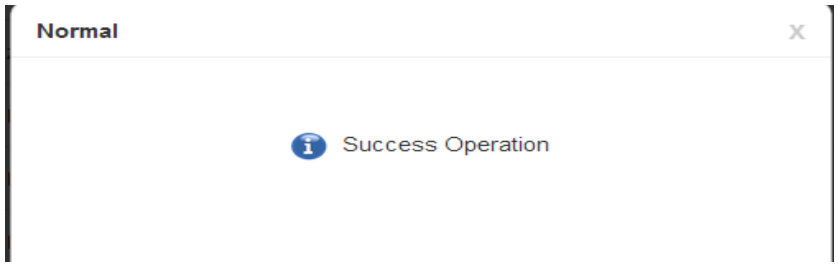
2.3 Set Project Funding Alert

A cloud project manager can also set funding alerts to receive notifications about the remaining funds when the amount of used fund hits the specified threshold value. The platform will monitor the funding usage in real time. To set project funding alert, select “Project Management” -> “Project”, and select one project in the project list. Click “Set Project Funding Alert” in the workspace.



In the popup dialog, set the thresholds (e.g. 50%, 80%) when the alert will be sent. The format of the threshold is shown in the dialog. Put in the email where the alert will be sent to and click “OK”. The operation is completed when the success dialog shows up.





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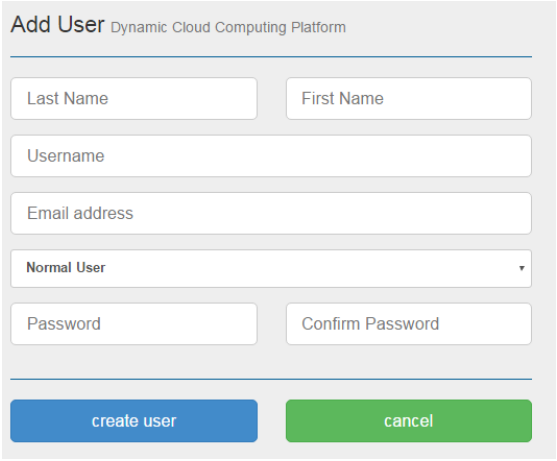
2.4 Create User

One of the core role for a cloud project manager is to lead normal and privileged users and create accounts for them. To create a new user, in the left menu, select “Project Management” -> “User”, and then click “Create User” in the workspace. A new webpage will show up for the information of the new user.



2.5 Approve User

For security purposes, the users created by “Project Manager” are inactive until the “Cybersecurity Admin” approves the user. Contact “Cybersecurity Admin” to approve the newly created End-User

2.6 Activate User

Once the Cybersecurity admin approves the created user accounts, the project managers can activate those accounts to make them functional. To activate a user, select “Project Management” -> “User”, select a user from the user list. Then click “Operate” -> Activate User”.

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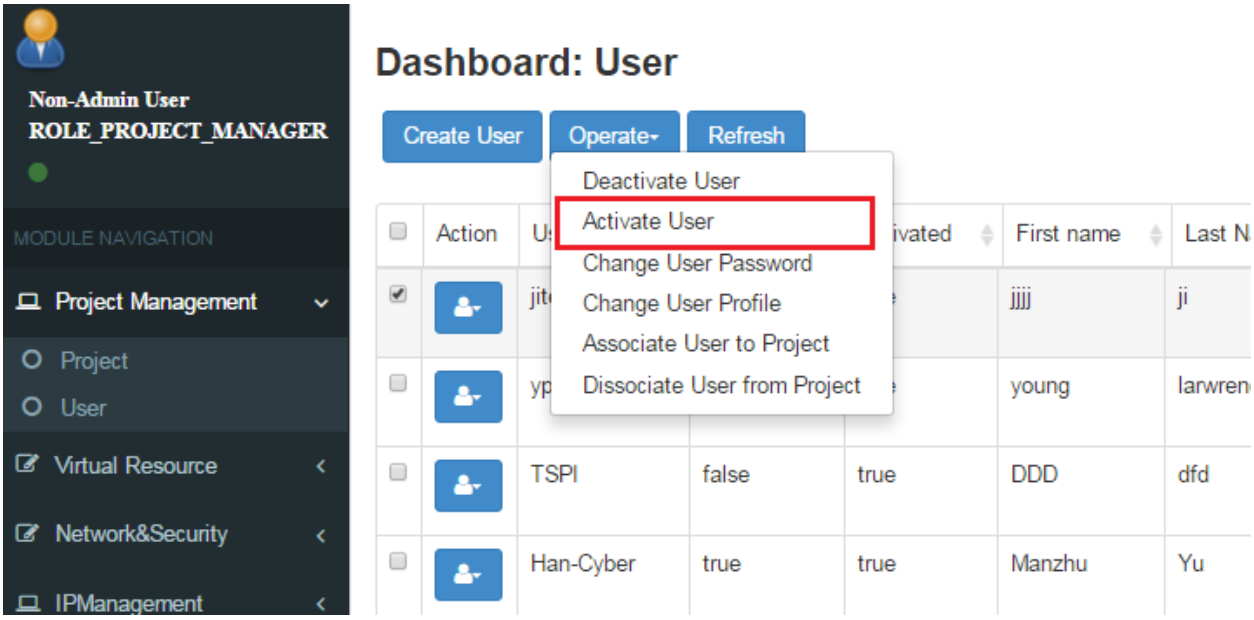
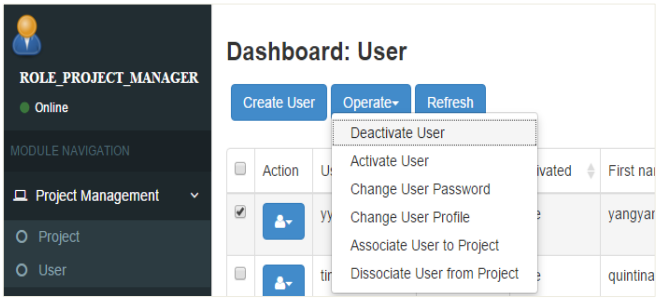
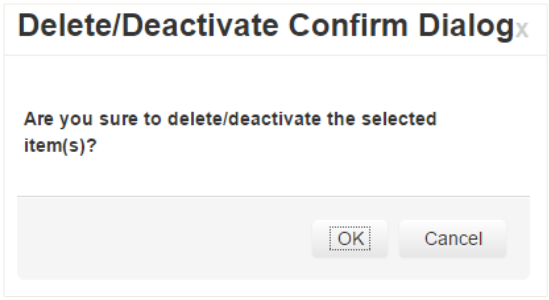


2.7 Deactivate User

Project managers may deactivate user accounts temporarily for a number of reasons. Deactivation gives the flexibility to deactivate and activate whenever it is necessary. To delete a user, select “Project Management” -> “User”, and select a user from the user list. Then click “Operate” -> “Deactivate User”, and then click ”OK” in the pop-up window called “Delete/Deactivate Confirm Dialog”, After confirmation, the selected user will be removed from the user list.





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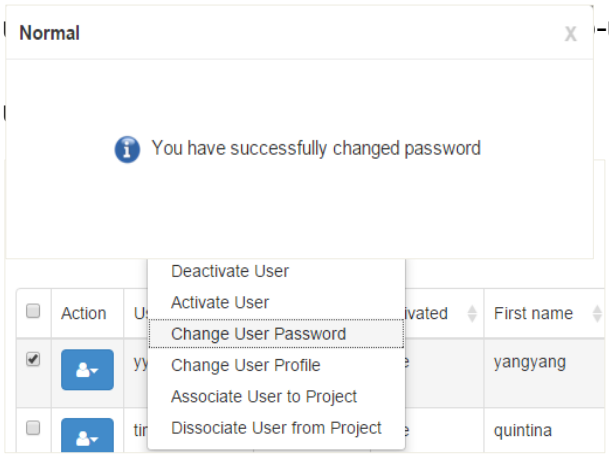
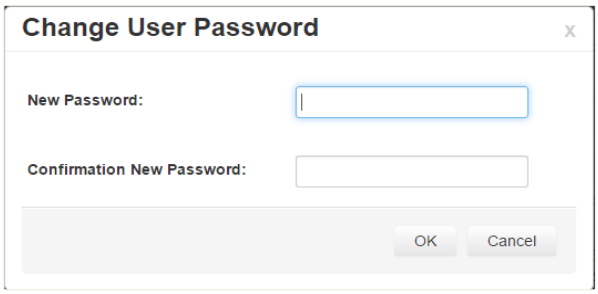
2.8 Change User Password

Besides users themselves, the cloud project manager is able to change the password of all the users associated with this project. To change user password, in the left menu, select “Project Management” -> “Change user password”, and then select a user in the



-up window and click “OK”, the selected



2.9 Change User Profile

Same as the “Change password” function, the cloud project manager is able to change the password of all the users associated with this project. The “change user profile” functionality allows users to change their first and last name, and email address. To change user profile, in the left menu, select “Project Management” -> “Change user profile”, and select a user from the user list. Specify new user information in the pop-up window.

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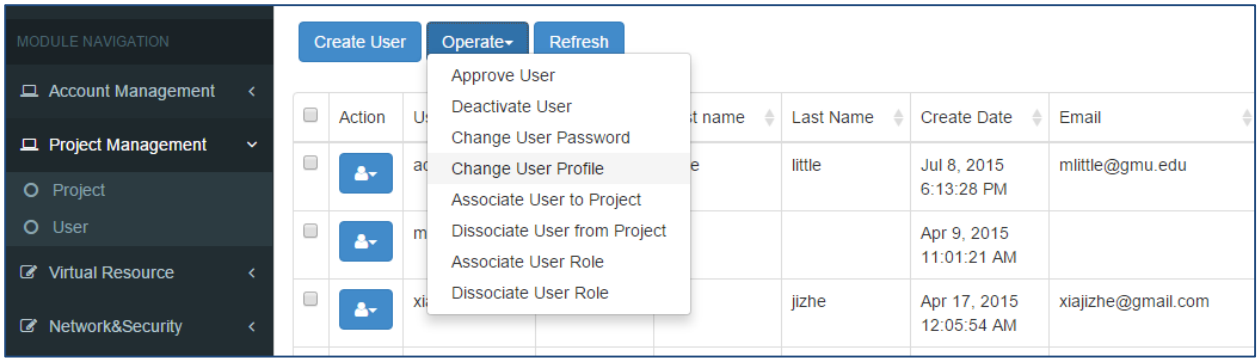
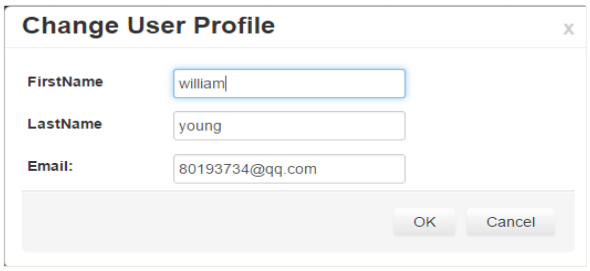
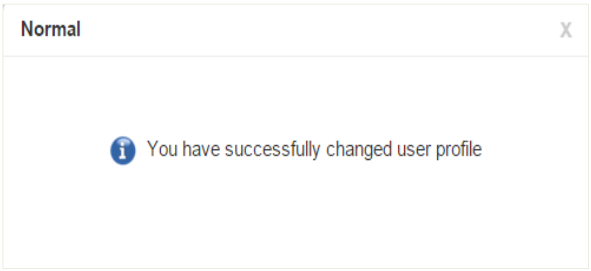
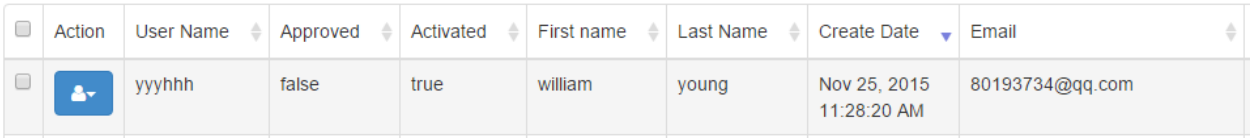






Click “OK”, then the selected user’s profile would be updated.



2.10 Associate/Disassociate user role in project

Associate/Disassociate user role gives project managers the flexibility of adding/removing normal and privileged user to project(s). To associate user role in the project, click “Project/User Management” and select a user from the user list. Click “Operate User”-> “Associate User to project”, and then specify the parameters in the pop-up dialog. After that, the information about the user will be updated in the user list.

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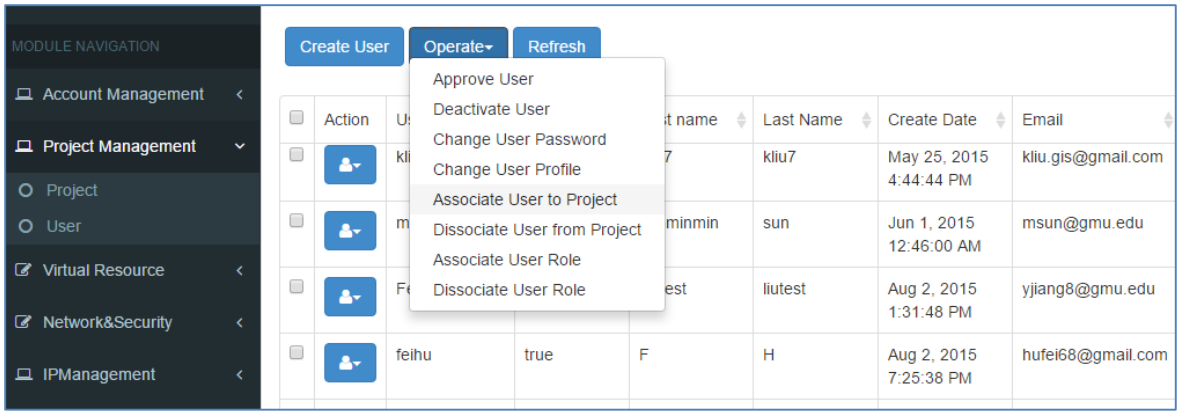

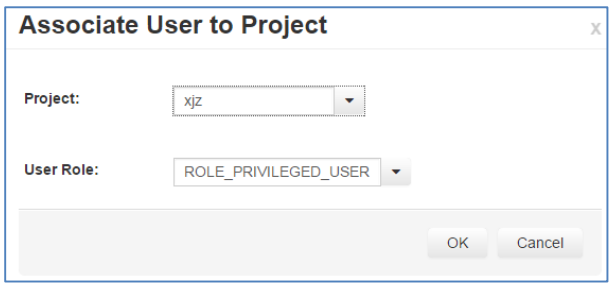

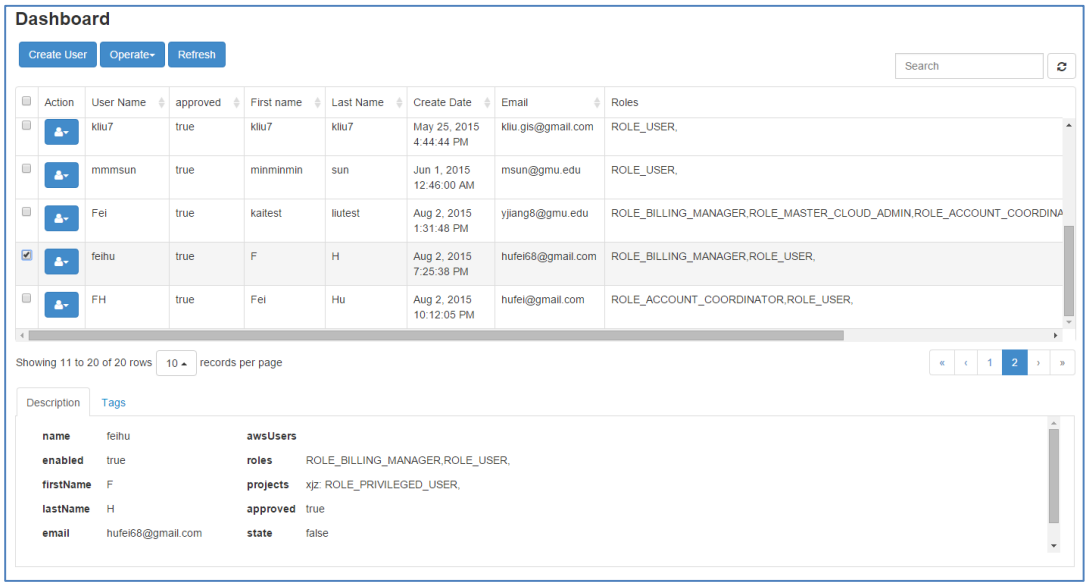

Similar to “Associate User to project”, select a user from the user list, and click on “Disassociate user from project”. Specify the parameters and the information will be updated.

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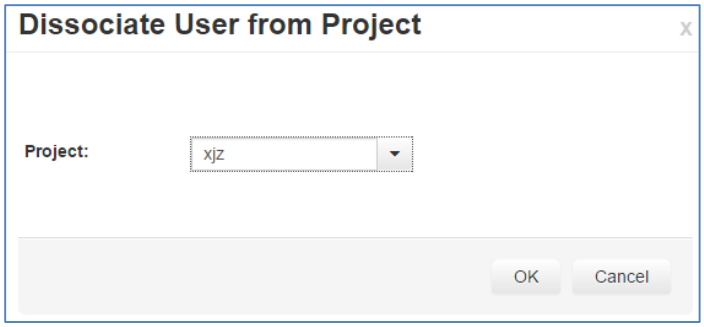

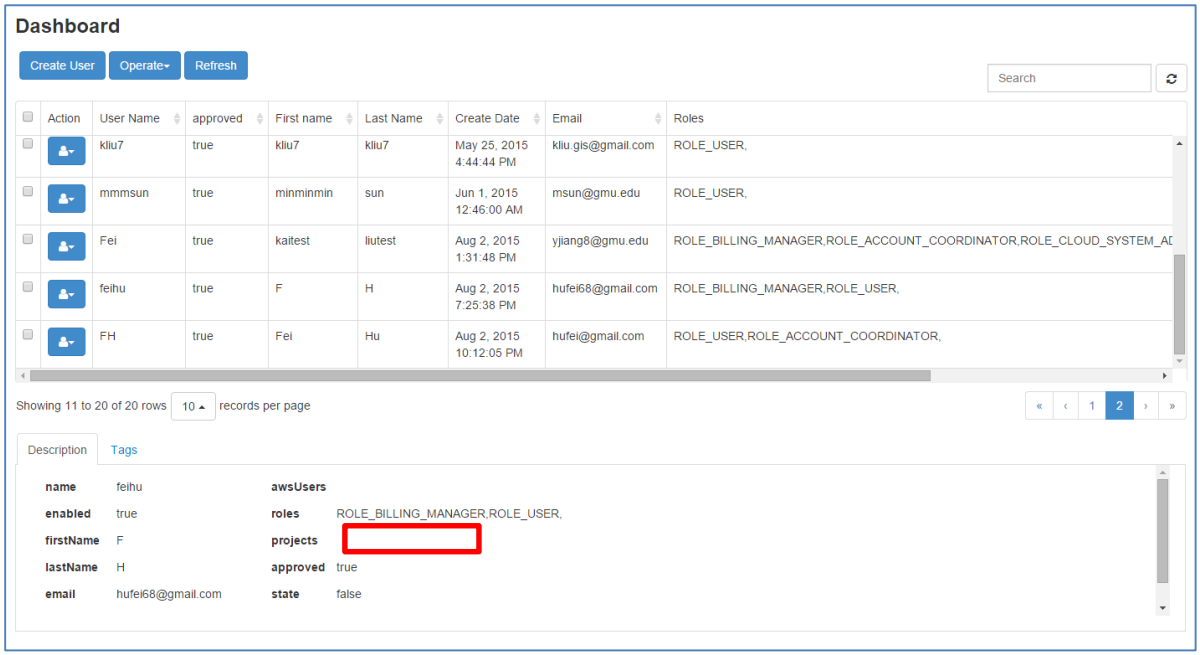

2.11 Display Instances

This functionality allows project managers to view the list of instances that can be accessed by users under their supervision. To display the list of instance, select “Virtual Resource” -> Instance. The list will be shown in the instance table.

2.12 Display Images

An image is private and belongs to a certain amazon account user. To display the list of images, select “Virtual Resource” -> Image. The list will be shown in the image table.

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2.13 Display Public Image

This functionality allows users to display the list of public images that can accessed by all amazon account users. To display the list of public images, select “Virtual Resources” -> Image-Public. The list will be shown in the image-public table.

2.14 Volume

Cloud Project Managers can view the list of volumes initiated by the other users, and this feature is helpful for analytics. To display the list of volumes, select “Virtual Resources” -> Volume. The list will be shown in the volume table.

2.15 Snapshot

Snapshot allows users to backup volumes, so after users write data to an EBS volume, user can create snapshots for data backup. To display the list of snapshots, select “Virtual Resources” -> Snapshot. The list will be shown in the snapshot table.

2.16 Recurring Snapshot

This functionality allows user to set recurring snapshot to every (some) hours. To display the list of recurring snapshots, select “Virtual Resources” -> “Recurring Snapshot”. The list will be shown in the recurring snapshot table table.

2.17 Display Key Pair/Security Group

Key Pairs and Security Groups are important aspects of the system, therefore it is vital to understand their functionality. If your security group is wide open, hackers could attempt to break into the virtual machines, and if the key pair is not safe, then other

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uses could log in to your VM. To display the list of key pairs, select “Network&Security” -> Key Pair. The list will be shown in the key-pair table.

To display the list of security groups, select “Security Group” from Network&Security. The list will be shown in the Security Group dashboard.

2.18 Display IP

The cloud project managers can also display the list of IPs allocated to their projects. To display IP, select “IP Management” -> IP. The list will be shown in the IP dashboard.

2.19 Monitor Funding Usage

This rich and robust function allows users to review usage by projects, users, cloud accounts, and etc. Users can either choose to view the graph online on the dashboard or download it to view later. To monitor resource usage, select “Monitor” -> “Resource usage” in the left menu, and specify the monitoring time period. Click “Submit”, and a cost chart will be shown in the workspace.

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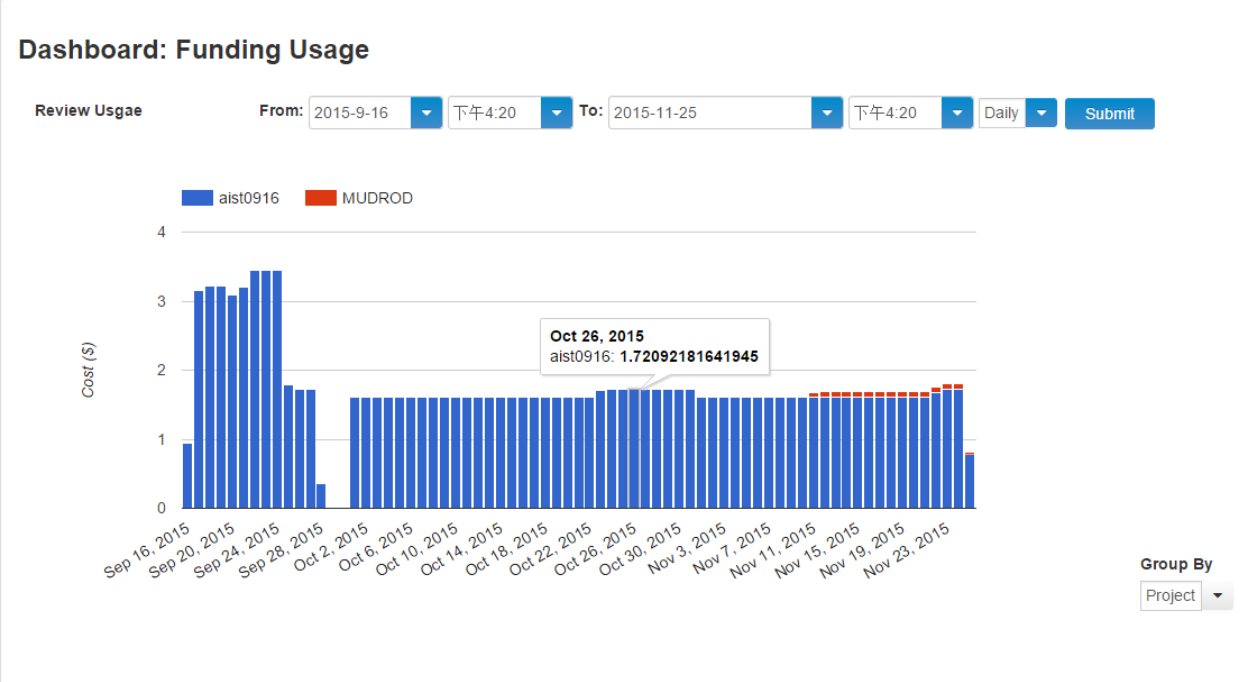

The cost chart will be updated based on the attribute chosen from “Group By” list and the current user role. There are three ways to group cost: Project, Available Zone, and Users.

2.20 Display Cloud Storage

This functionality allows users to view the storage buckets. To display Cloud Storage, select “Cloud Storage” -> S3 from Module Navigation located in the left sidebar. The list of storage bucket will be shown in the S3 dashboard.

3. Modules and Functions for Privileged User

3.1 Message Console

Privileged Users can receive notifications via the message console regarding account, billing, and golden image information. To display the message console, select “Message Management” -> “Message Console” from the module navigation menu.

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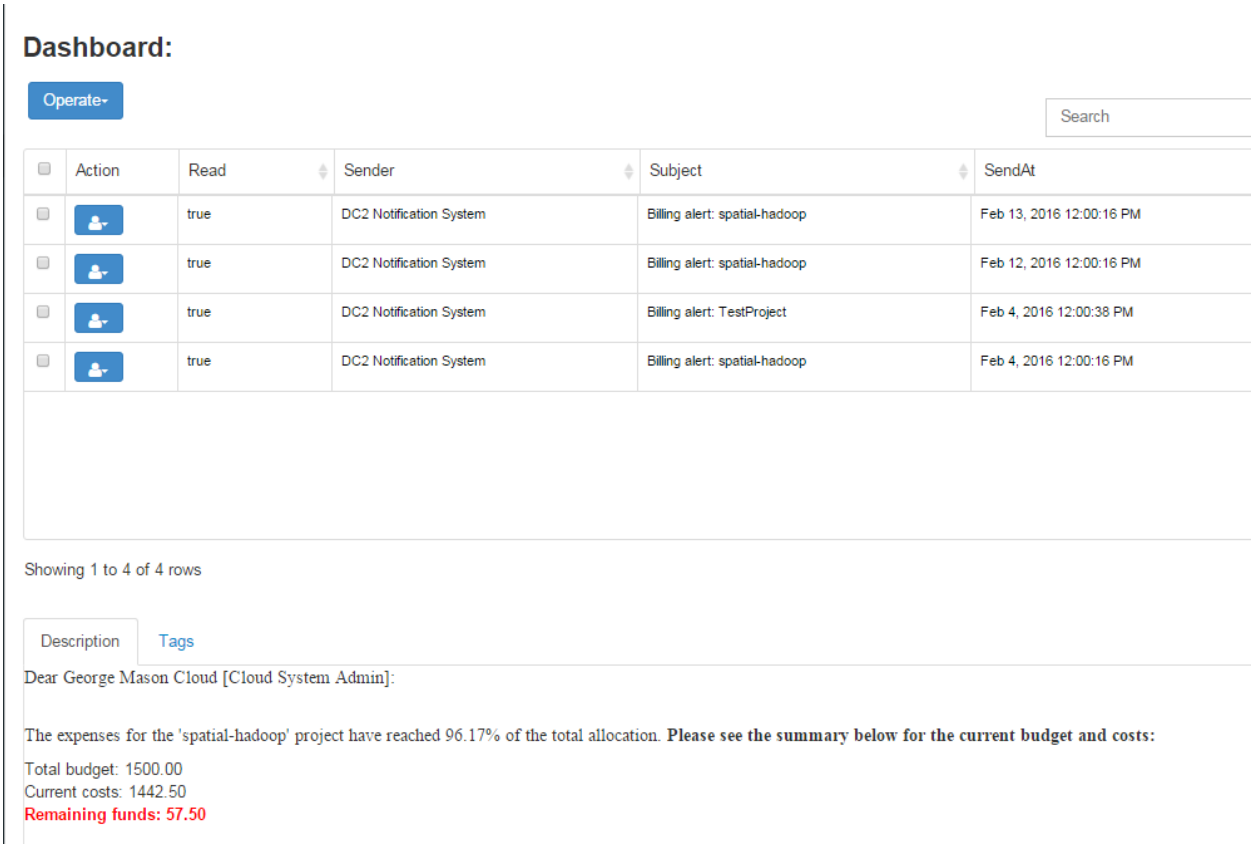

3.2 Create Virtual Machine/Instance

Creating instances allows user to access virtual machines. To create a virtual machine, from left menu, select “Virtual Resource” -> “Instance”. Then click on “Create Instance” and specify parameters on the tab such as instance configuration, Network Pair Access, Project & User and User Data item in the pop-up dialog.

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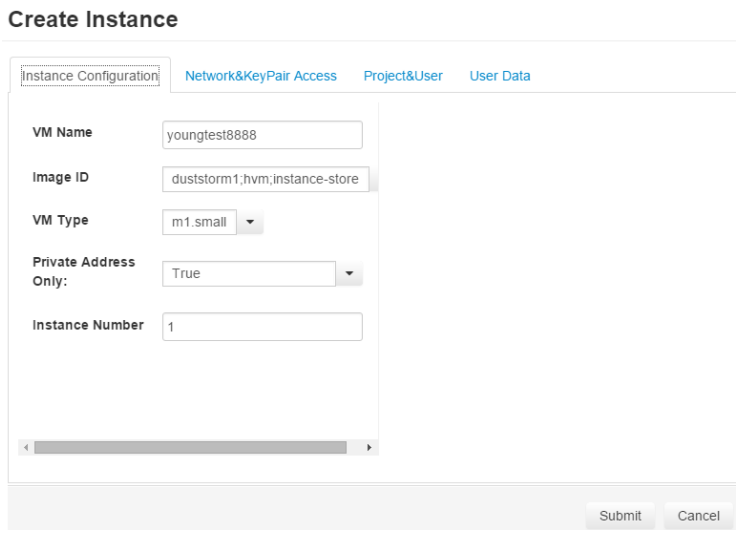
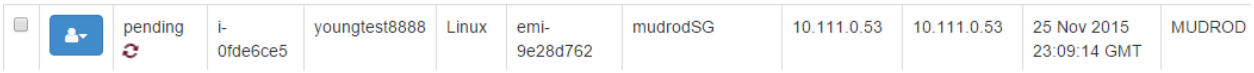
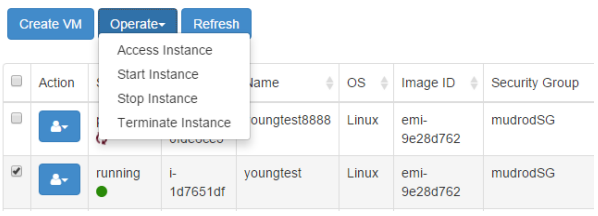


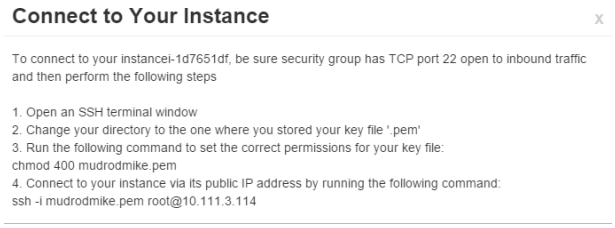
After submission, the system will take about 1 minute to create the VM, a “pending” indicator will be shown in the table, and it cannot be used until the status changes to “running”.



3.3 Access Instance

Once an instance is created, a user can an instance with either SSH terminal or remote desktop assistant. To access a virtual machine, in the left menu, select “Virtual Resource” -> “Instance”. Click on “access instance” in the drop-down list and select a virtual machine in the list, a dialog as below





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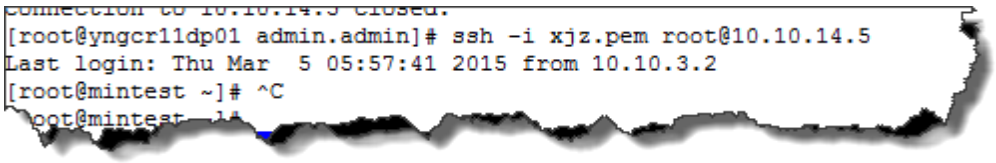
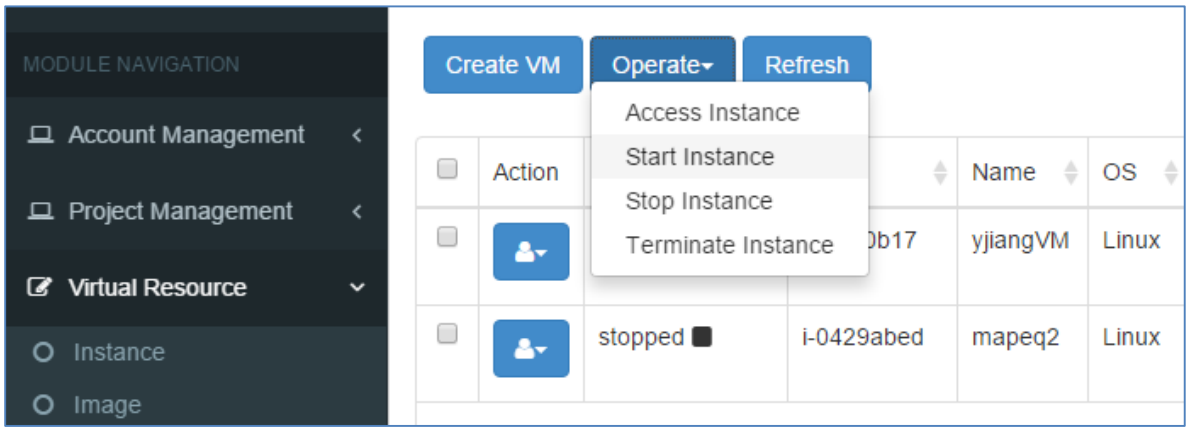
Based on the information in this dialog, you can access virtual machine using SSH. Below is an example of what you would get after accessing the virtual machine correctly.



3.4 Start/stop Instance

Note that, Start/stop instance only works for instances created on EBS.

To access an instance, a user must start the instance first. To start an instance, in the left menu, select “Virtual Resource” -> “Instance”, select an instance created on EBS and click on “start instance” in the drop-down list.



The status of the instance will turn to “pending”, and change to “running” after the instance is running.

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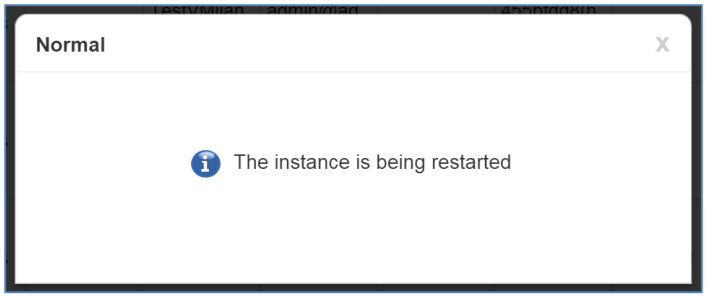
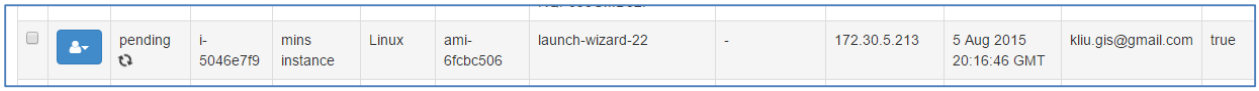
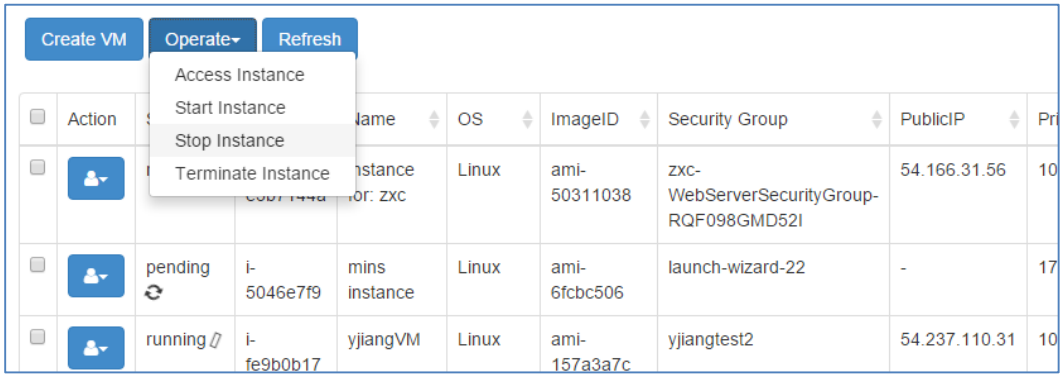




Once, the user has finished using the running instance, he should stop it, otherwise the running instance will charge unnecessary fees. In the panel of “virtual machine”, select an instance created on EBS and click on “stop instance” in the drop-down list.



The status of the instance will turn into “stopping”, and change to “stopped” after the instance is stopped.

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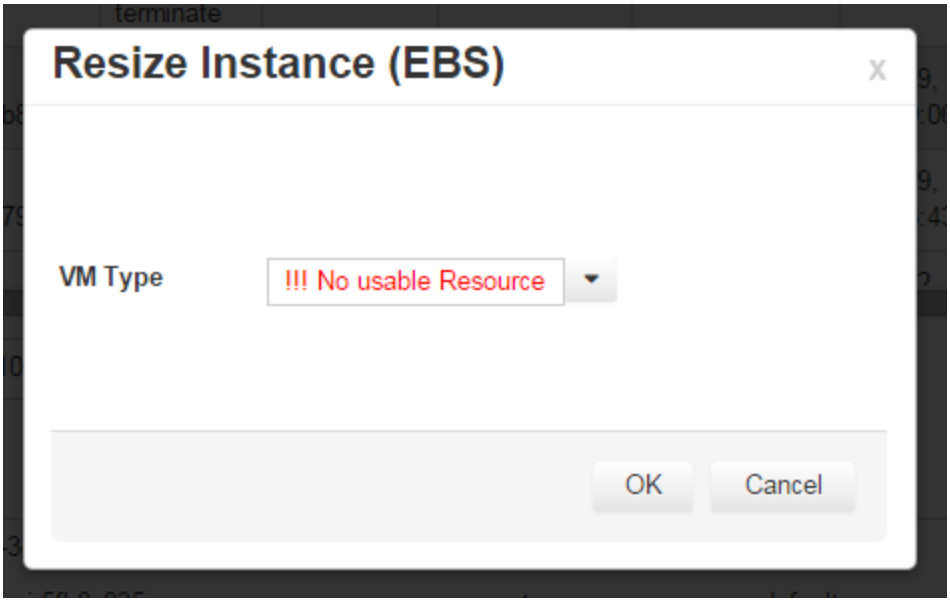
3.5 Resize Instance

Sometimes, privileged users may find out that the current instance type is not enough for their application. Then, the user will need to resize the instance to a different instance type. To resize an instance, select the desired image, click on “Operate” -> “Resize Instance”. A dialog box will pop up, select a VM type from the drop down menu, and then click on “OK”.



3.6 Terminate Instance

Sometimes, an instance may not have the correct settings required by the users, therefore privileged users may terminate those types of instances to create new ones from scratch according to their requirements. To terminate an instance, in the left menu, select “Virtual Resource” -> “Instance”, select an instance you would like to terminate and click on “terminate instance” in the drop-down list, a dialog will pop up and ask for confirmation.

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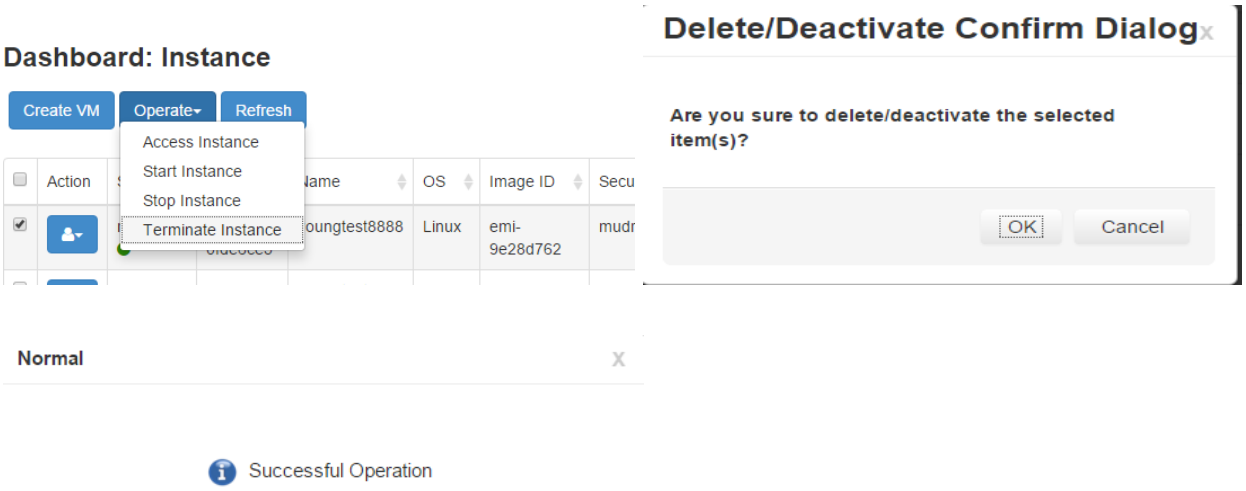
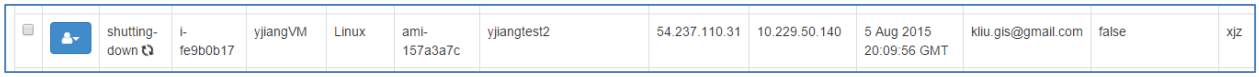


Then click OK button in the pop-up window, once confirmed, the status of the instance will turn to “shutting-down”. After around half a minute, the instance would be removed from instance list.



3.7 Create Image

Before creating instances, privileged users must create images. To create an Image, select “Virtual Resource” -> Image, then click on “Create Image”. A new pop up window will appear, specify the required parameters, and click “OK.

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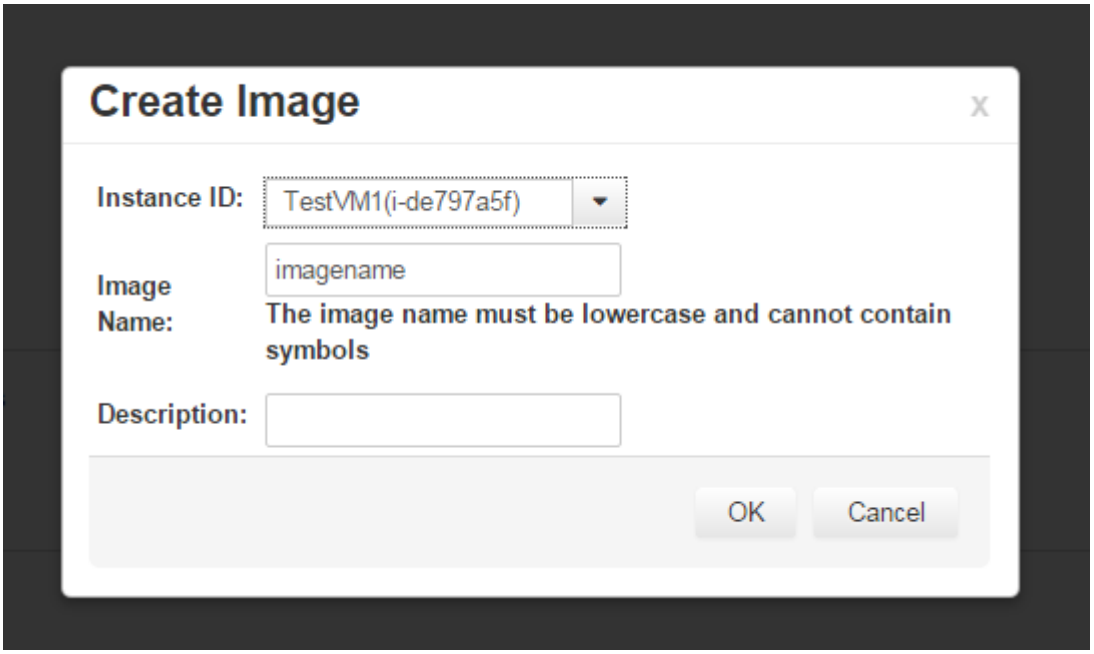
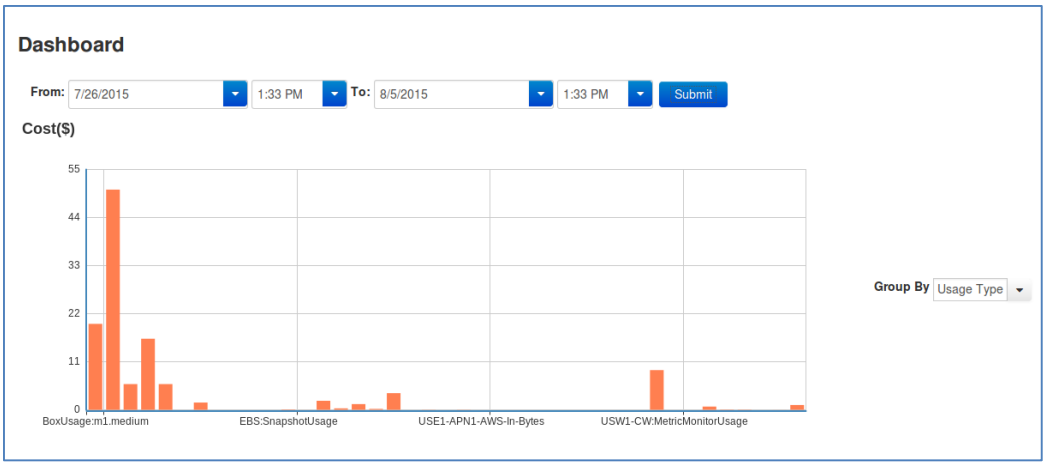


3.8 Monitor Funding Usage

This rich and robust function allows users to review usage by projects, users, cloud accounts, and etc. Users can either choose to view the graph online on the dashboard or download it to view later. To monitor resource usage, select “Billing Monitor” -> “Funding usage” in the left menu, and specify the monitoring time period. Click “Submit”, and a cost chart will be shown in the workspace.



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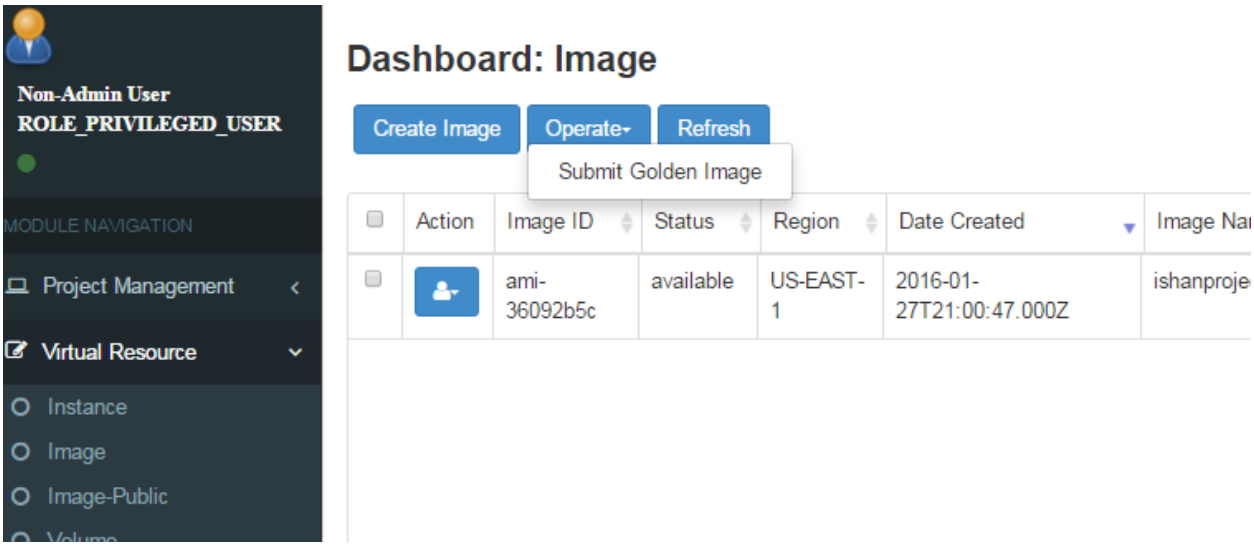
3.9 Submit Golden Image

Golden images are the images that have passed security evaluation. A privileged user has the permission to submit golden images. To submit a golden image, in the left menu, select “Virtual Resource” -> “Image” and select an image. Click “Operate Image”-> “Submit Golden Image”.



Then the submitted field of the selected image would be changed to “true”.

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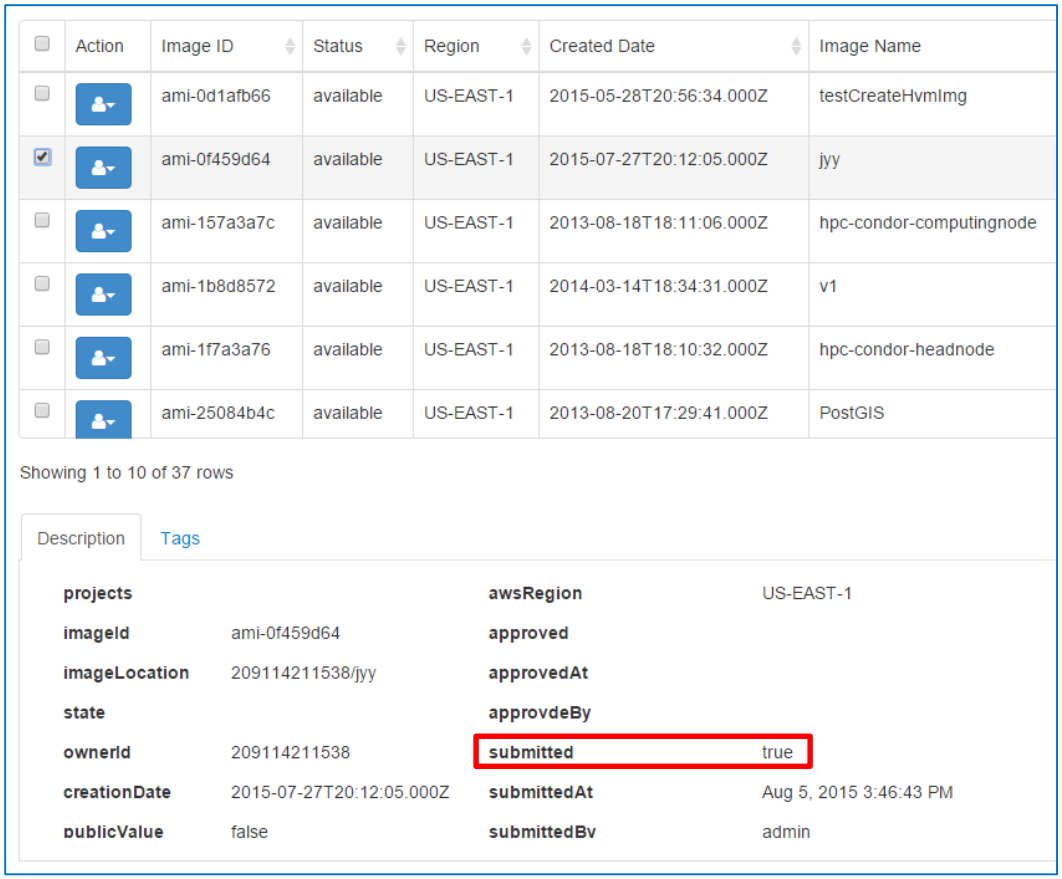


Action	Image ID	Status	Region	Created Date	Image Name
	ami-0d1afb66	available	US-EAST-1	2015-05-28T20:56:34.000Z	testCreateHvmImg
	ami-0f459d64	available	US-EAST-1	2015-07-27T20:12:05.000Z	jyy
	ami-157a3a7c	available	US-EAST-1	2013-08-18T18:11:06.000Z	hpc-condor-computingnode
	ami-1b8d8572	available	US-EAST-1	2014-03-14T18:34:31.000Z	v1
	ami-1f7a3a76	available	US-EAST-1	2013-08-18T18:10:32.000Z	hpc-condor-headnode
	ami-25084b4c	available	US-EAST-1	2013-08-20T17:29:41.000Z	PostGIS

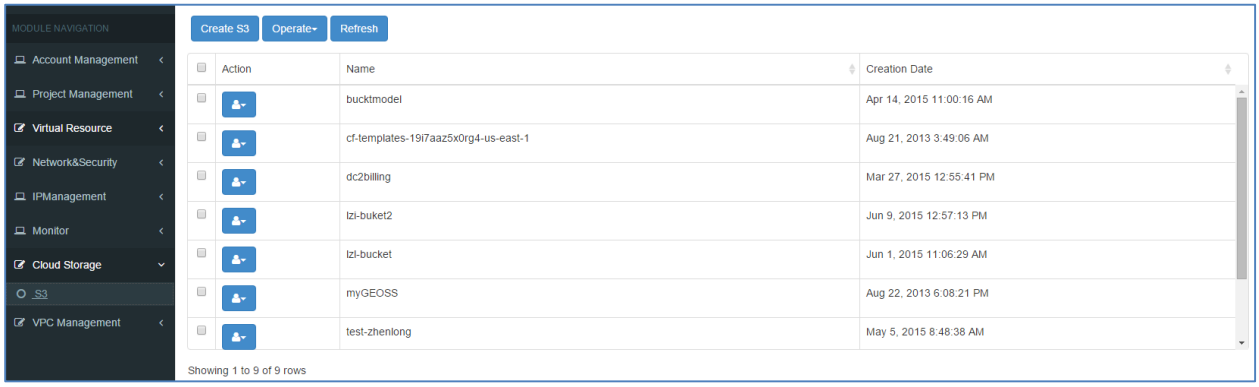
Showing 1 to 10 of 37 rows

Description Tags

projects		**awsRegion**	US-EAST-1
imageId	ami-0f459d64	**approved**	
imageLocation	209114211538/jyy	**approvedAt**	
state		**approvdeBy**	
ownerId	209114211538	**submitted**	true
creationDate	2015-07-27T20:12:05.000Z	**submittedAt**	Aug 5, 2015 3:46:43 PM
publicValue	false	**submittedBy**	admin

3.10 Create and S3 buckets

Privileged users can allocate space and create virtual storage using s3 buckets.To create a S3 bucket, click “Storage” -> “S3” in the left menu, and then click on “Create S3 bucket” in the workspace.



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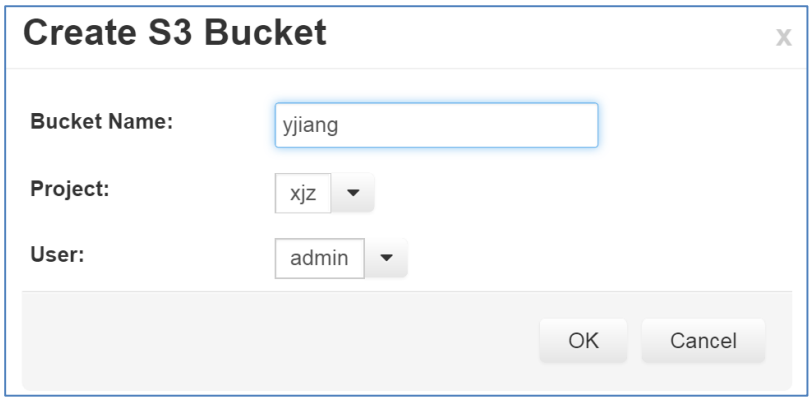
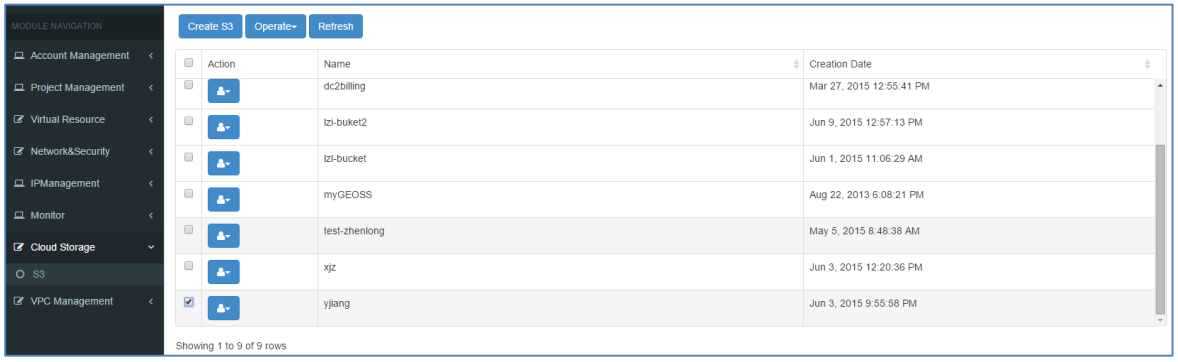
After setting the information for the new S3 bucket, click “OK” and the new bucket will be shown in the bucket list.





3.11 Upload/download file to/from S3 bucket

A user can upload and download files using the S3 functionalities. To upload a file to the bucket, click “Storage” -> “S3” in the left menu, and then you need to enter a bucket by double-clicking a bucket in the bucket list. Click “Operate S3” -> “Upload File to S3”.

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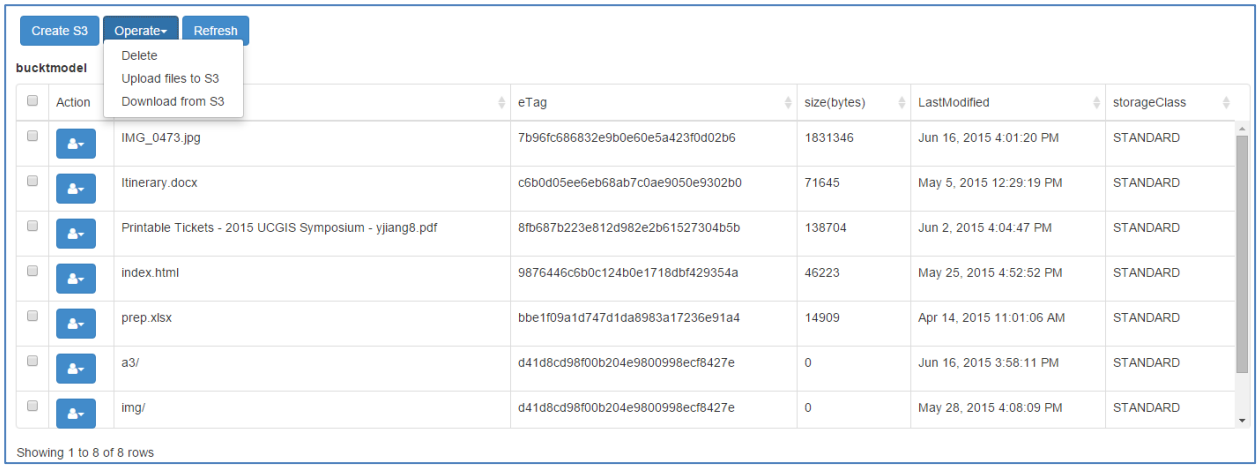
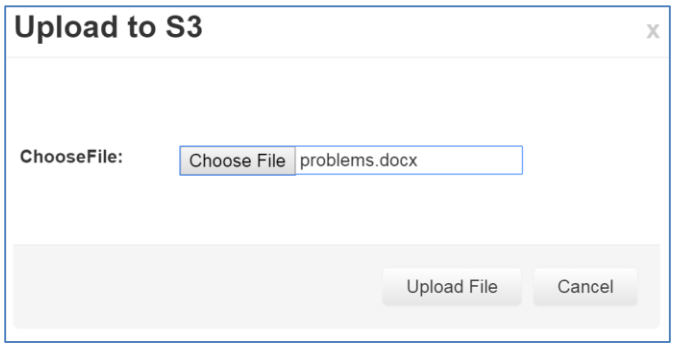
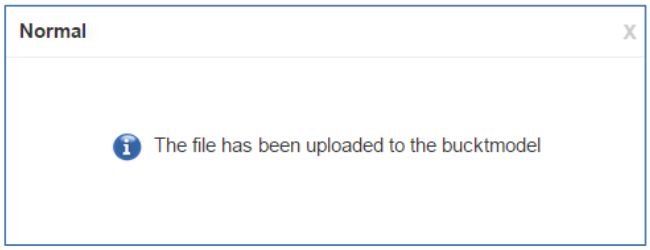


In the pop-up window, choose the file you want to upload from the local computer and click ‘Upload File’, and the system will tell you whether the file has been successfully uploaded or not.





To download a file from the bucket, click “Storage” -> “S3” in the left menu, and then you need to enter a bucket by double-clicking a bucket in the bucket list. Click “Operate

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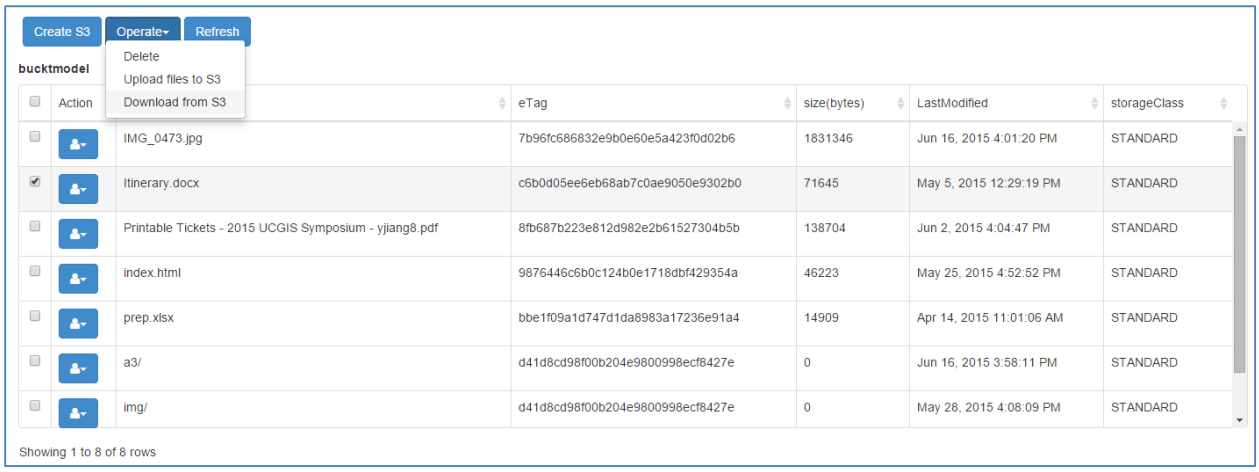
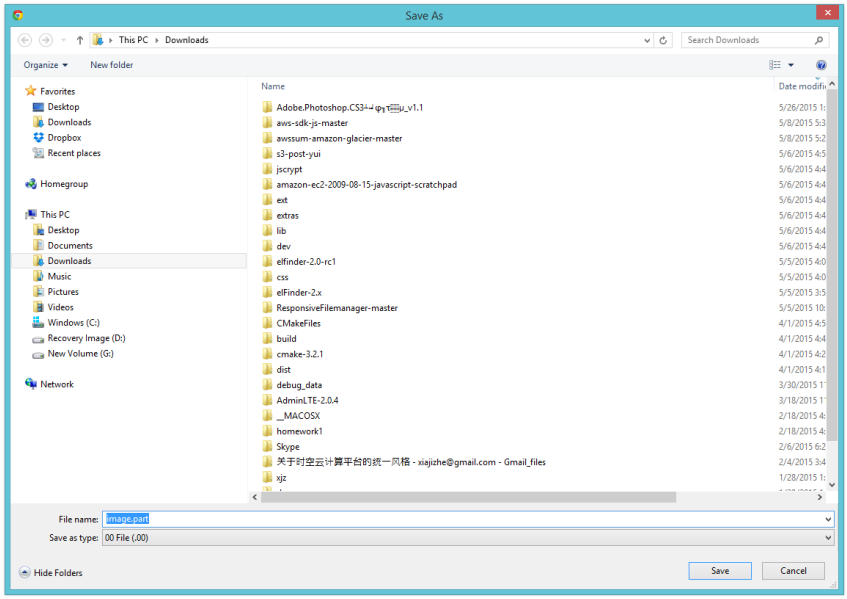
S3” -> “download from S3”. And then choose the file you would like to download in the pop-up window. After that, a download link will pop up for downloading the selected file.





3.12 Allocate/Release and Associate/Disassociate IP Addresses

Privileged users are allowed to allocate IP addresses. To allocate IP to a user of a particular project, select “IP Management”-> “IP” in the left menu. Click on “Allocate Elastic IP” in the workspace, and then specify the parameters in the dialog.

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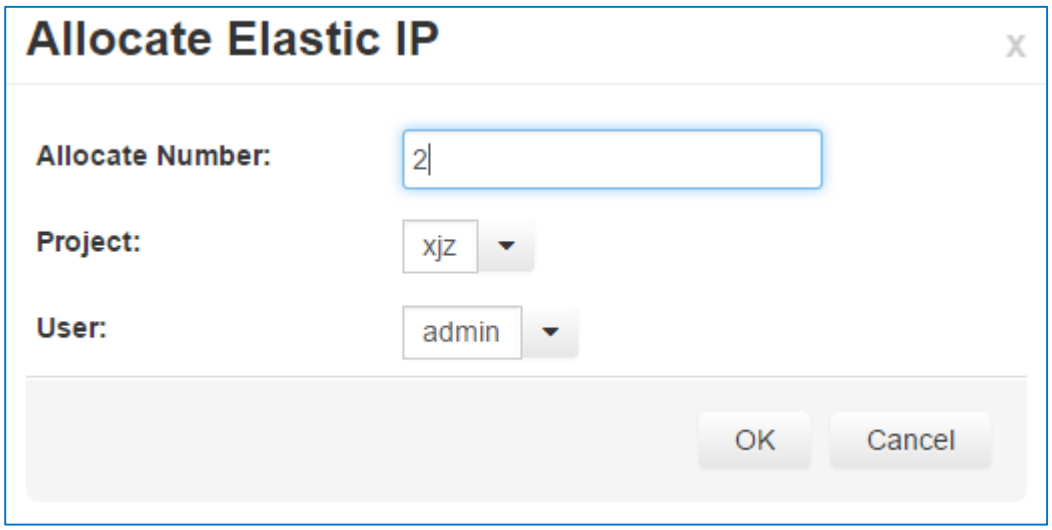

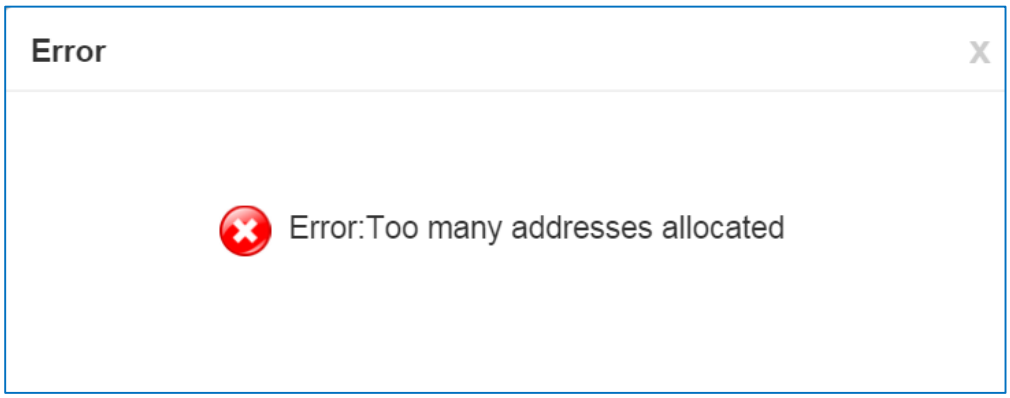

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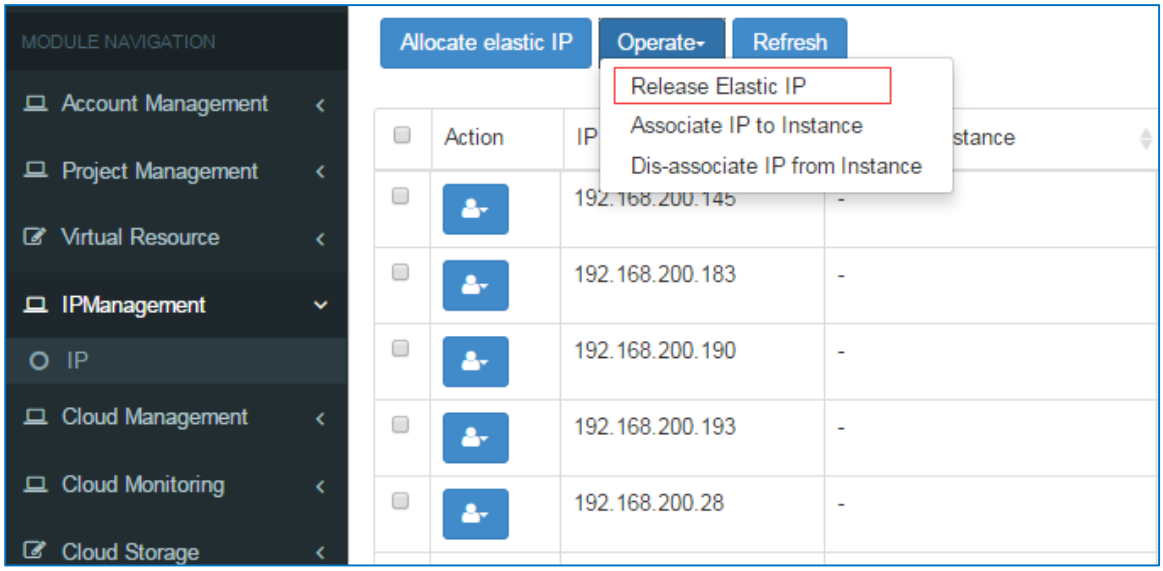
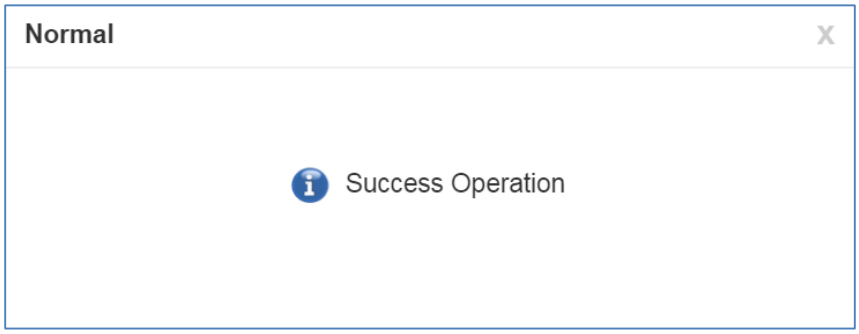
To release a particular IP, select it from the IP list and then click on “Operate IP”->“Allocate Elastic IP” in the workspace. Once it is done, a confirmation dialog will pop up.





To associate a particular IP to an instance, select it from the IP list and then click on “Operate IP”->“Associate IP to Instance” in the workspace. Once it is done, a confirmation dialog will pop up.

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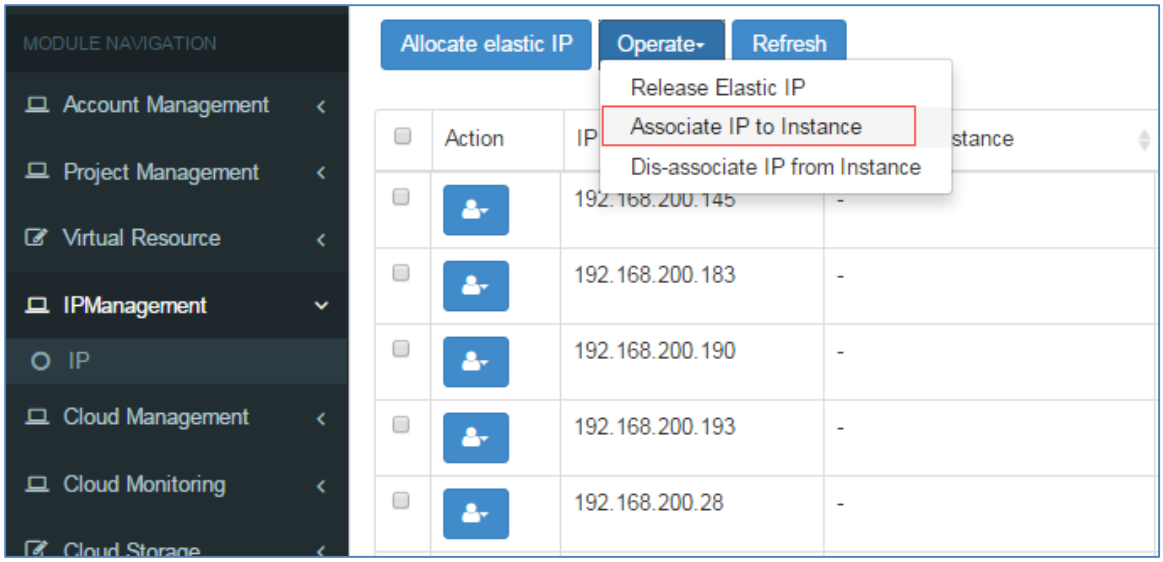

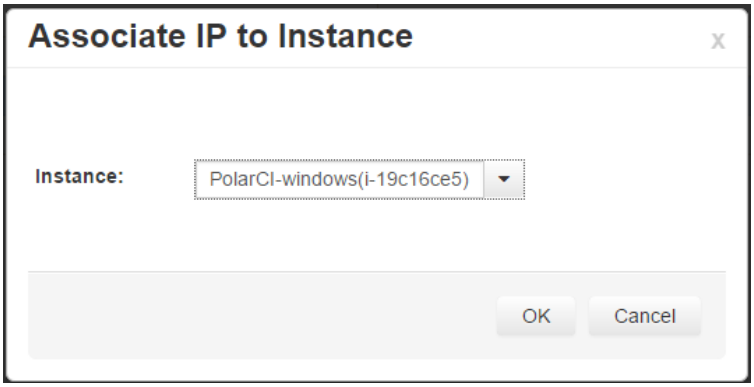

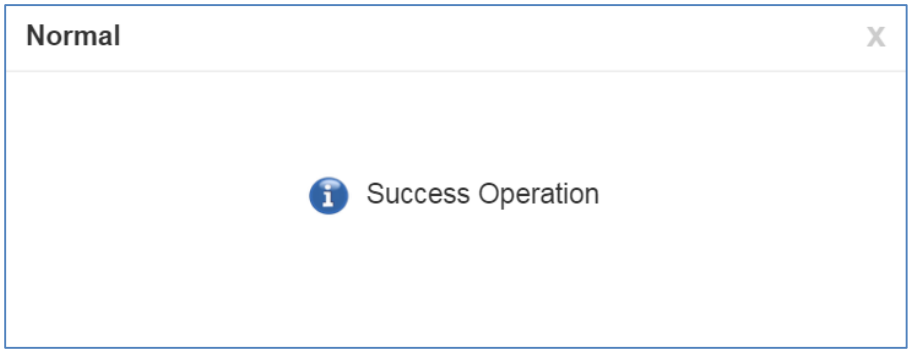

To disassociate a particular IP to an instance, select it from the IP list and then click on "Operate IP"->"Dis-associate IP to Instance" in the workspace. Once it is done, a confirmation dialog will pop up.

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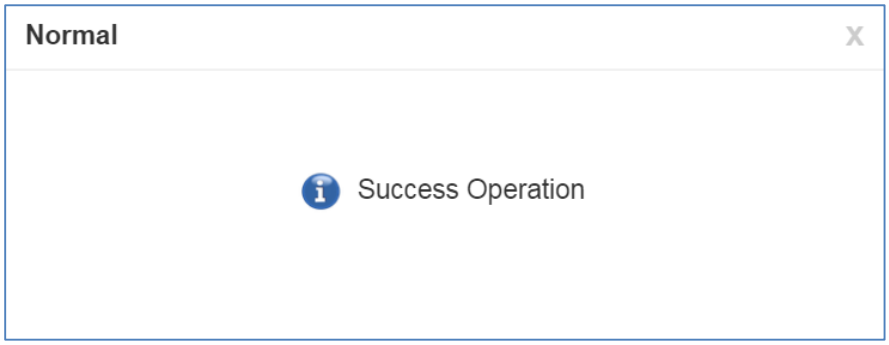

3.13 Creating a Key Pair/Security Group

Key Pairs and Security Groups are important aspects of the system, therefore it is vital to understand their functionality. If your security group is wide open, hackers could attempt to break into the virtual machines, and if the key pair is not safe, then other uses could log in to your VM. Key Pair / Security Group functionalities are described down below:

3.13.1 Create Key Pair

To create a Key Pair, select “Network&Security” -> “Key Pair”, and then click on “Create Key”. The dialog box will prompt to enter the Key Name, Description, and to select the desired Project Name.

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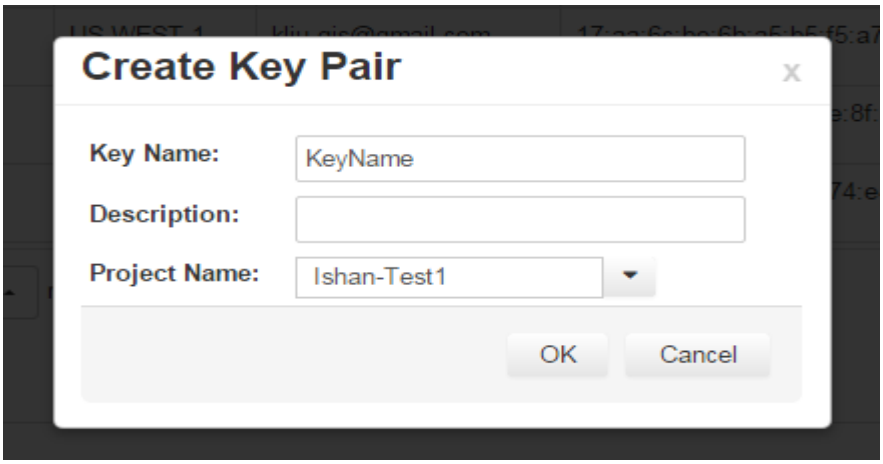
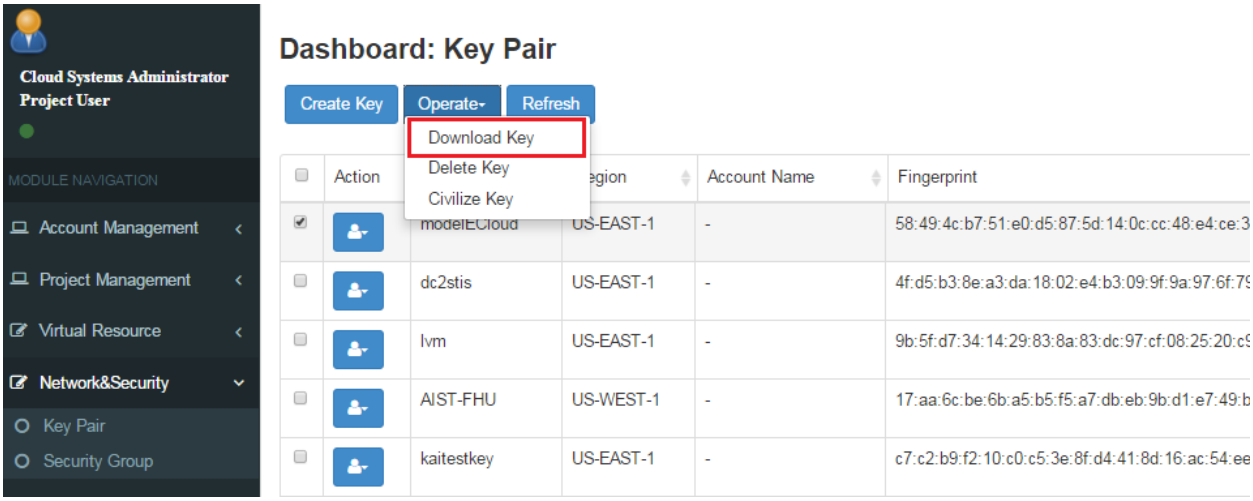


3.13.2 Download Key

To download a key, select “Network&Security” -> “Key Pair” from the Module Navigation located in the left sidebar of the page, click on the row that contains the desired key, then click on “Operate”, and select “Download Key”.



3.13.3 Delete Key

To delete a key, select “Network&Security” -> “Key Pair” from the Module Navigation located in the left sidebar of the page, select the row that you want to delete, then click on “Operate”, and select “Delete Key”.

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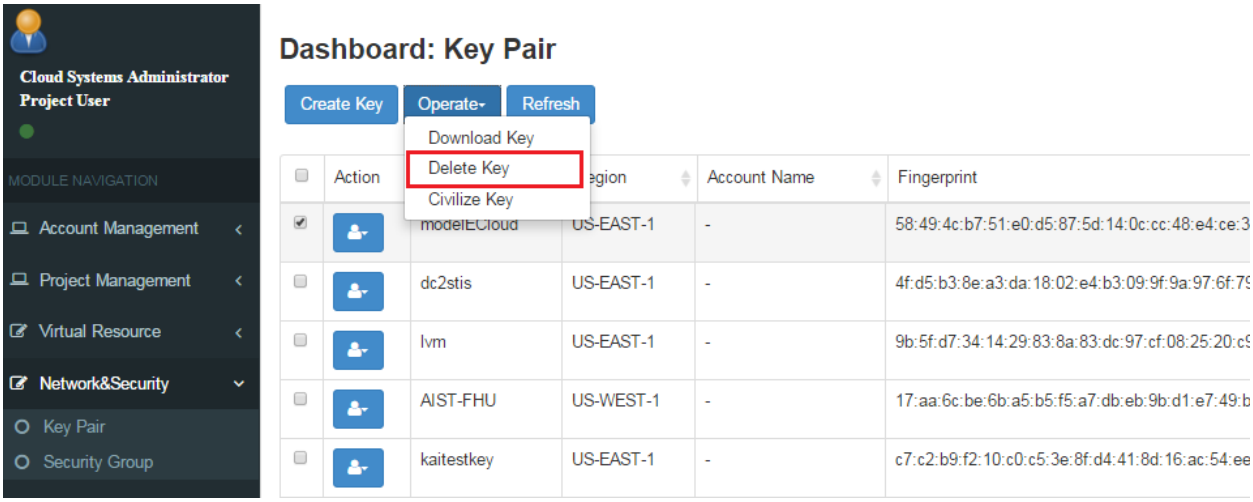
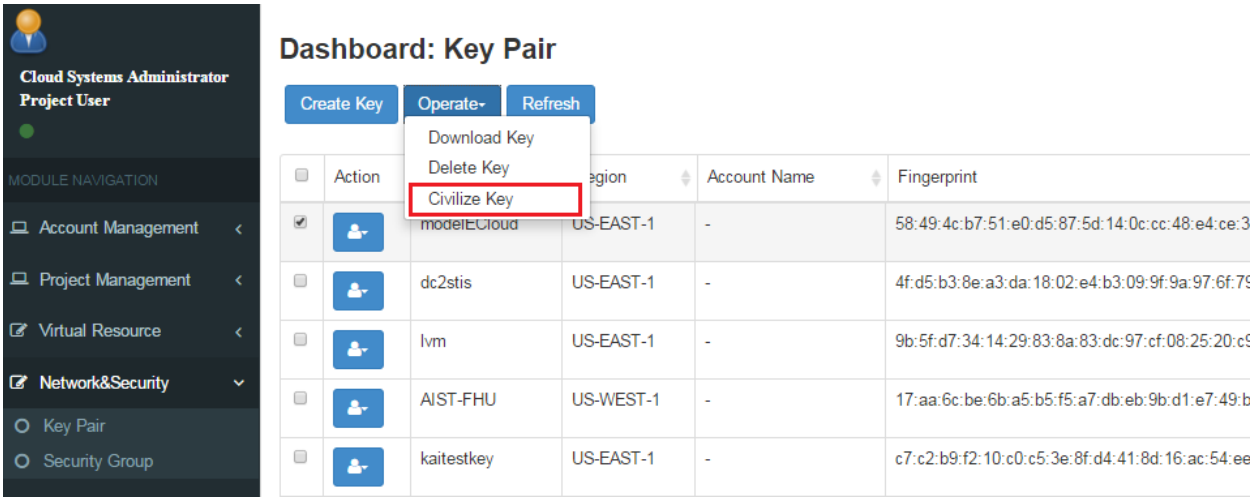


3.13.4 Civilize Key

To civilize a key, select “Network&Security” -> “Key Pair” from the Module Navigation located in the left sidebar of the page, click on the row that you want to civilize, then click on “Operate”, and then select “Civilize Key”.



3.13.5 Display Security Group

To display the list of Security Group, select “Network & Security” -> “Security Group”, from the module navigation located in the left sidebar.

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4. Modules and Functions for End User

A lot of the end user functionalities are similar to Cloud Project Manager accounts and Privileged User account's functionalities. Therefore, please refer to the overlapping functions from section 2 and 3.

4.1 Message Console

Please refer to section 3.1

4.1 Display Projects

Please refer to section 2.2

4.2 Display Users

End users can view the list of users that are associated to a specific project. To view the list of users, select "Project Management" -> "Users".

4.3 Display Instances

Please refer to section 2.11

4.4 Display Images

Please refer to section 2.12

4.5 Display Public Image

Please refer to section 2.13

4.6 Display Volume

Please refer to section 2.14

4.7 Key Pair/Security Group

Please refer to section 2.15

4.9 Display IP

Please refer to section 2.16

4.10 Cloud Storage

Please refer to section 2.20

4.11 Access Instance

An end user can an instance with either SSH terminal or remote desktop assistant. To access a virtual machine, in the left menu, select "Virtual Resource" -> "Instance". Click

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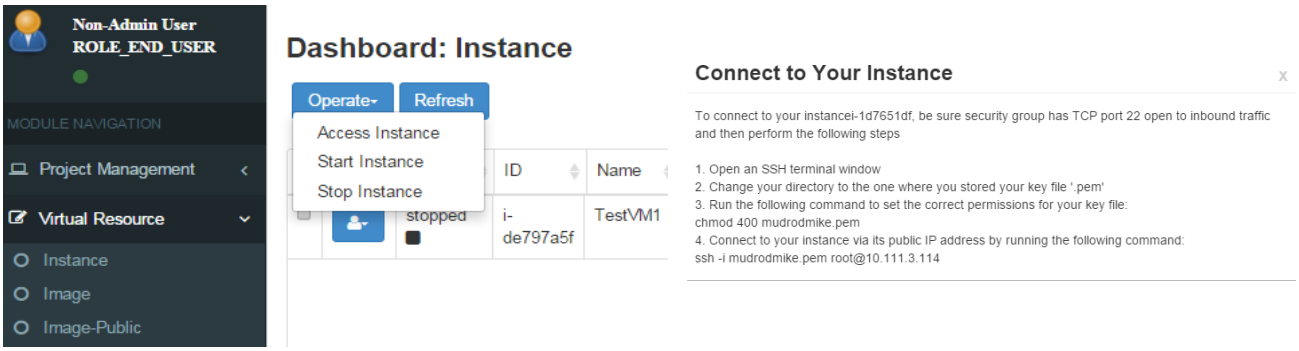
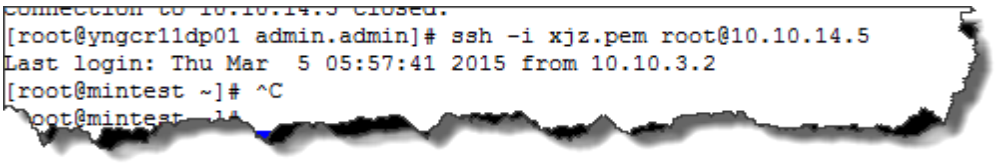
on “access instance” in the drop-down list and select a virtual machine in the list, a dialog as below will show up just like below right figure.



Based on the information in this dialog, you can access virtual machine using SSH. Below is an example of what you would get after accessing the virtual machine correctly.



4.12 Start/stop Instance

Note that, Start/stop instance only works for instances created on EBS.

To access an instance, a user must start the instance first. To start an instance, in the left menu, select “Virtual Resource” -> “Instance”, select an instance created on EBS

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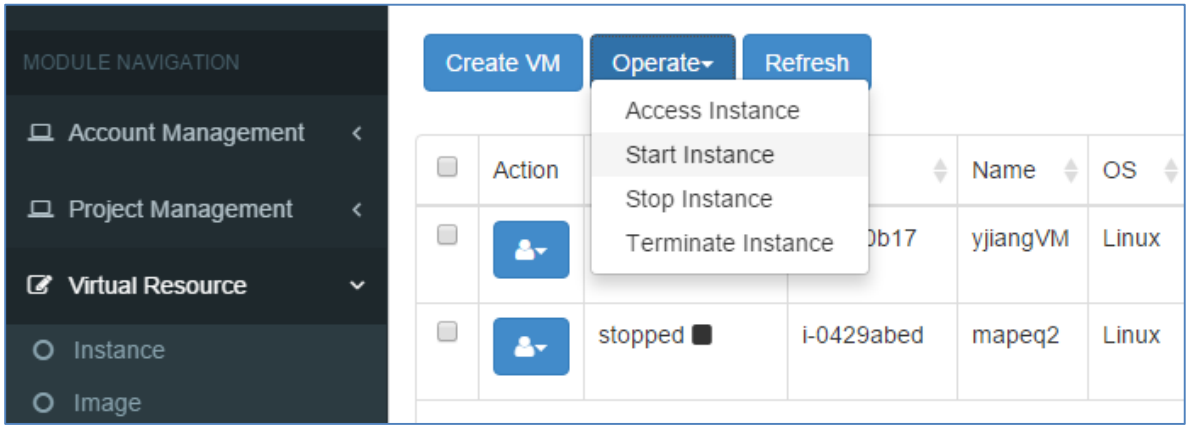
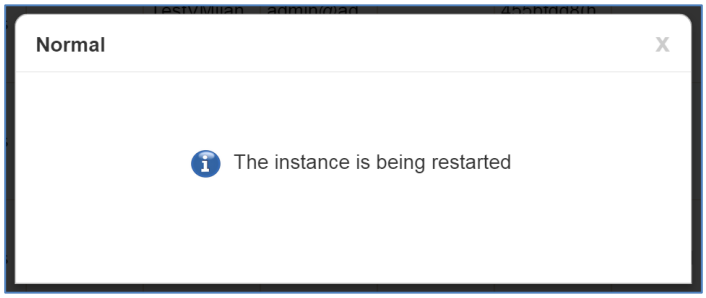
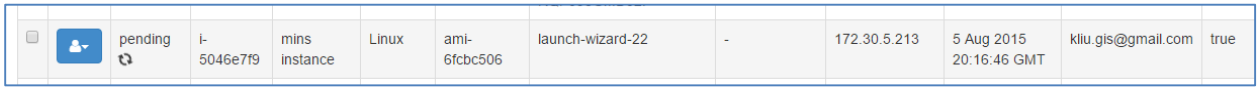
and click on “start instance” in the drop-down list.



The status of the instance will turn to “pending”, and change to “running” after the instance is running.





In the panel of “virtual machine”, select an instance created on EBS and click on “stop instance” in the drop-down list.

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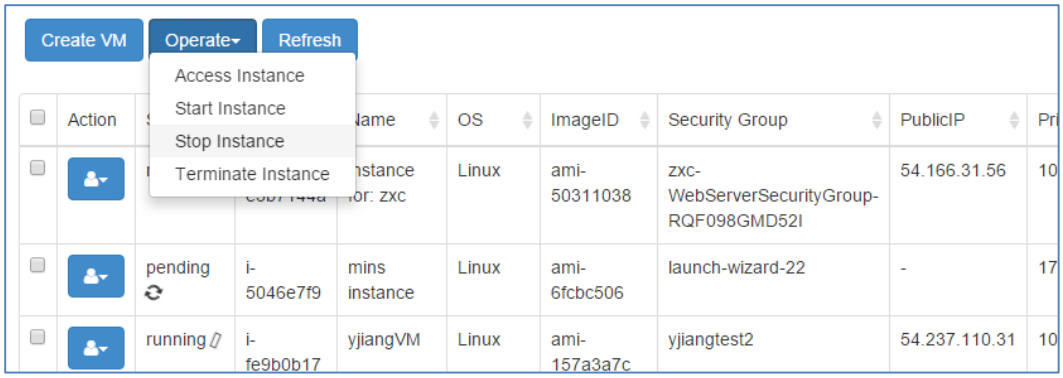

The status of the instance will turn into “stopping”, and change to “stopped” after the instance is stopped.

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