

Setting up your virtual infrastructure using FIWARE Lab Cloud

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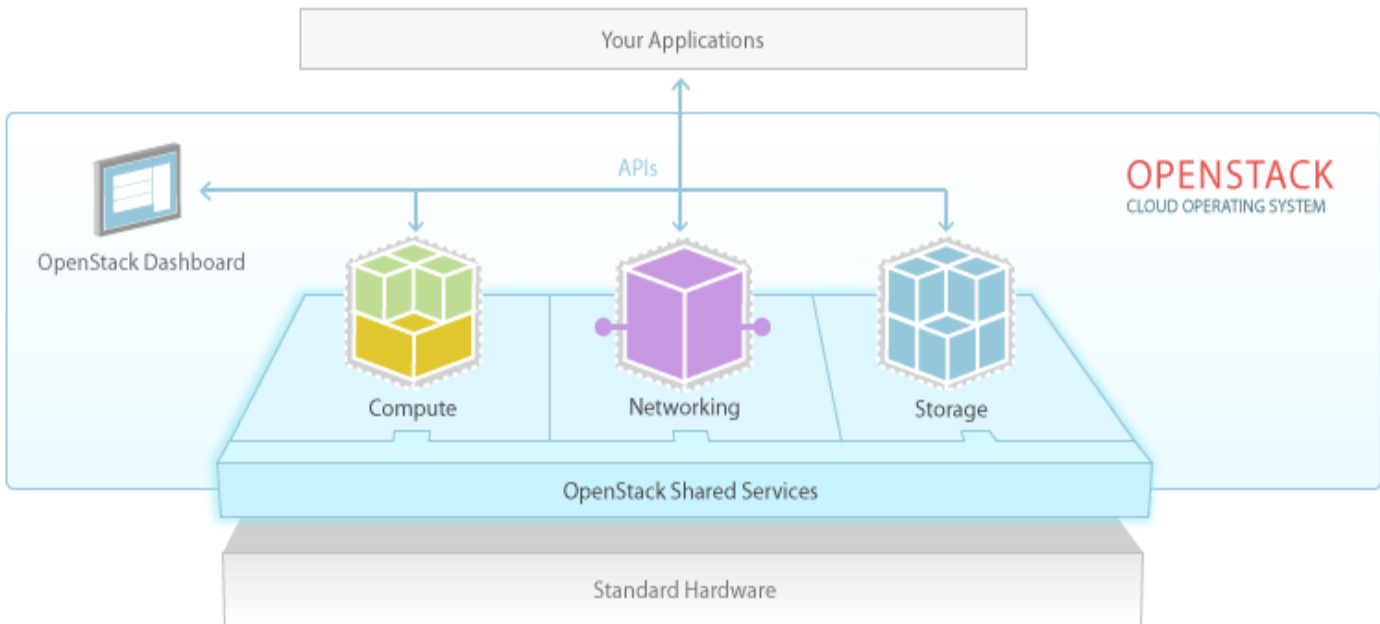


(Slides: <http://tinyurl.com/fiwarelab-cloud>)

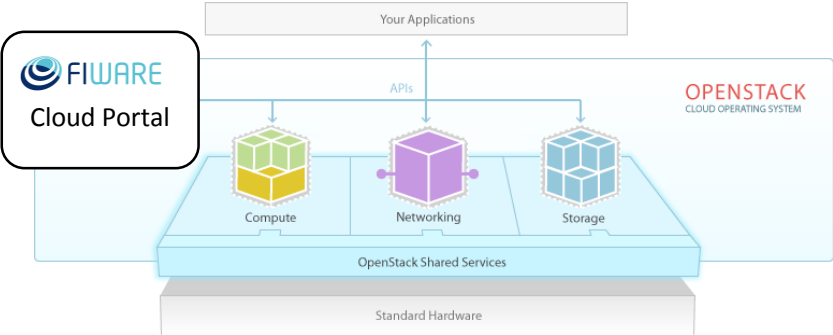
Content

- Introduction to FIWARE Lab Cloud Hosting
- Deploying your first VM
- Working with networks
- Creating Containers and adding objects
- Deploying components for your application
- Reference Information

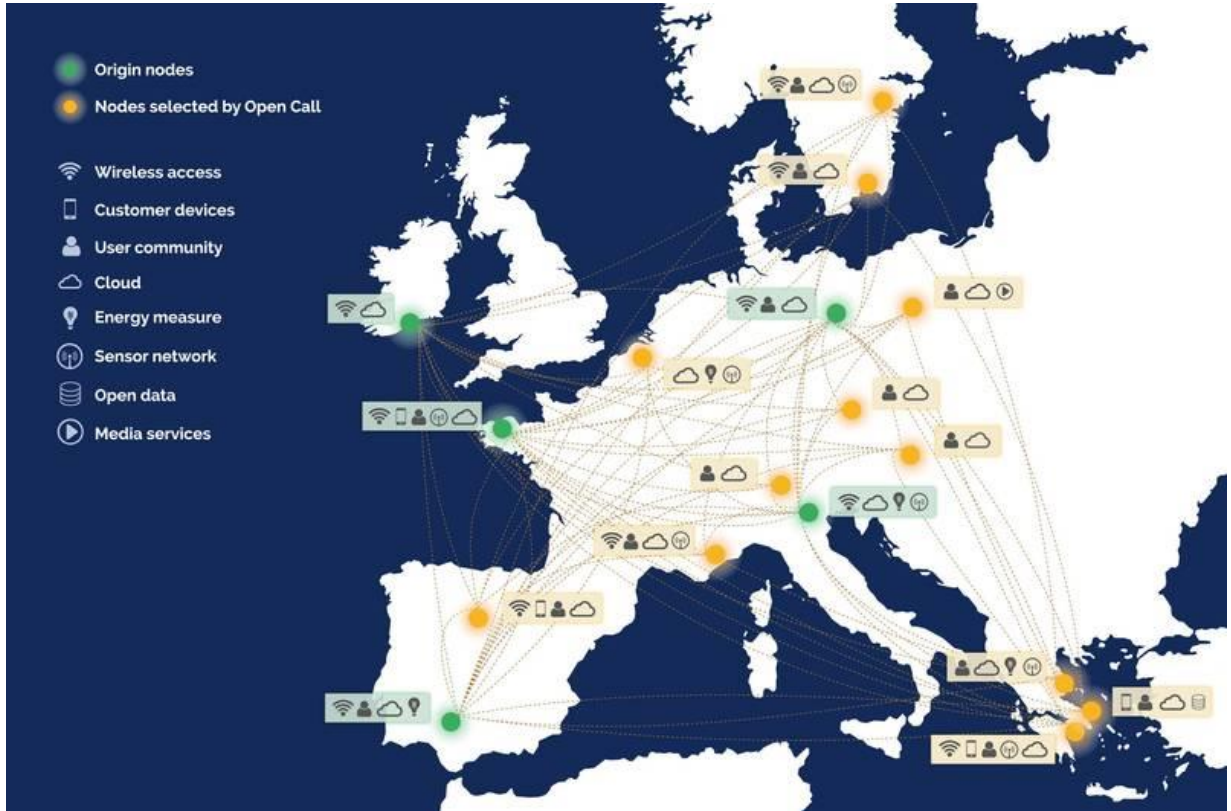
FIWARE Lab Cloud Hosting



FIWARE Lab Cloud Hosting



FIWARE Lab Cloud – Multiregion



Summary

- **Account**
 - Managing your identity and organizations
- **Compute**
 - Creating VMs and accessing them
- **Monitoring**
 - Getting monitoring information from your VMs
- **SDC**
 - Deploying Software in your VMs
- **Storage**
 - Creating and attaching volumes
 - Uploading objects to containers
- **PaaS Manager**
 - Working with regions
 - Creating Tiers and deploying Blueprints
- **Network**
 - Working with Nets and Subnets

Account

- Creating an account
 - <https://account.lab.fi-ware.org>
- Understanding organizations
 - Mapped to OS tenants
- Signing in in Cloud Portal
 - <https://cloud.lab.fi-ware.org>
 - SSO

Basic functionalities

FIWARE Lab Cloud Hosting: basic functionalities

- Create your account in lab.fiware.org
- Enter in the Cloud Portal
- Create your keypair (private key)
- Deploy your instance
- Add a public IP
- Open ports to the VM

Add new user

The screenshot shows a web browser window with the URL <https://account.lab.fi-ware.org>. The page header includes the FIWARE Lab logo and navigation links: Cloud, Store, Mashup, Data, Account, and Help&info. The main content area features a section titled "FIWARE Lab" with the text: "FIWARE Lab is a working instance of FIWARE available for experimentation. You will be able to setup the basic virtual infrastructure needed to run applications that make use of the APIs provided by FIWARE Generic Enablers deployed as a Service either globally or by you (as private instance)." Below this is a "Sign up" button. A sidebar contains four links: "Need Help?" (Ask a question.), "Our GEs" (See our Catalogue.), "FIWARE Lab nodes" (Learn about FIWARE Ops.), and "eLearning" (Train yourself.). On the right, a sign-up form is visible with fields for "Email" and "Password", a "Remember me" checkbox, and a "Sign in" button. Below the form are links for "Sign up", "Forgot you password?", and "Didn't receive confirmation instructions?".

Enter your email and password to access to the FIWARE Lab.

If you do not have it or forgot it, sign up or request for a new one.

Create keypair

Security

You must create a keypair to access to the servers.

- Project
 - Project Name
 - fernando-lopez
 - Blueprint
 - Blueprint Instances
 - Blueprint Templates
 - Region
 - Spain
 - Compute
 - Instances
 - Images
 - Flavors
 - Security
 - Snapshots
 - Storage
 - Containers
 - Volumes

Floating IPs Security Groups **Keypairs**

Create Keypair Import Keypair Actions

Name

Fingerprint

Success: Keypair mex deleted.

Create keypair

Security

You must create a keypair to access to the servers.

- Project
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Floating IPs Security Groups Keypairs

Create Keypair Import Keypair Actions

Create Keypair

Keypair Name *

Keypair Name

Description

Keypairs are ssh credentials which are injected into images when they are launched. Creating a new key pair registers the public key and downloads the private key (a .pem file).

Protect and use the key as you would any normal ssh private key.

* Mandatory fields.

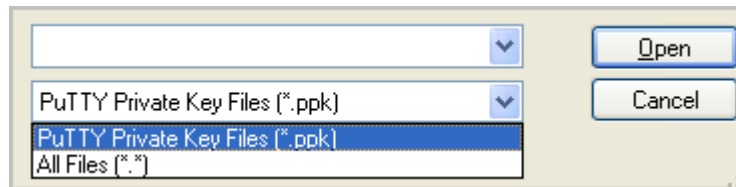
Cancel

Create Keypair

Success: Keypair mex deleted.

How to connect from Windows (I)

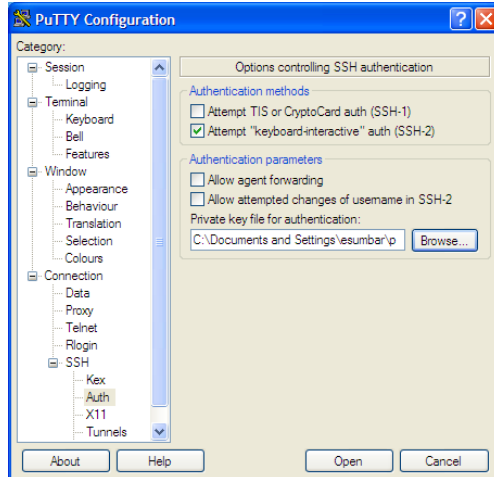
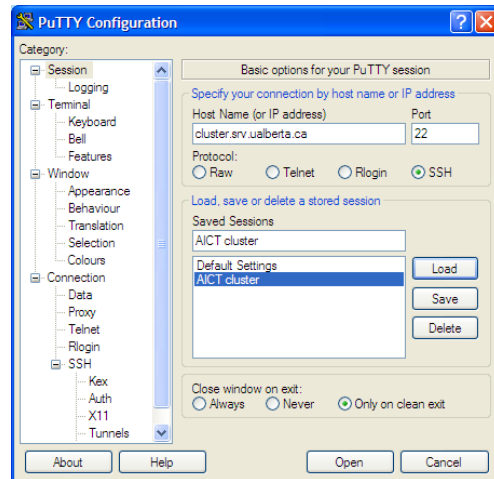
- Install PuTTY and PuTTYgen from <http://www.putty.org/>
- Convert your Keypair to PPK
 - Start PuTTYgen (e.g. From the Start menu, click All Programs > PuTTY > PuTTYgen)
 - Click Load and select the Keypair file (e.g. my_cert.pem). You'll need to display All Files (*.*) to see your Keypair.



- Click Open. And select the destination path and name of your PPK file.

How to connect from Windows (II)

- Connect to your instance
 - Start PuTTY.
 - Put the public IP of your instance (default SSH port is 22).
- Configure it to use your Keypair
 - Open the Auth submenu (Connection > SSH > Auth)
 - Select the recently generated Private key file (PPK file).



How to obtain your public key from pem file

- Secure to have the proper permissions:

```
$ chmod 600 private.pem
```

- Create the public key:

```
$ ssh-keygen -y -f private.pem >> publickey.pub
```

- Add the public key to your system

```
$ cat publickey.pub >> ~/.ssh/id_rsa.pub
```

How to import your public key into OpenStack

Import Keypair

Keypair Name

Public Key

- Just go to the `.ssh` directory and execute `$cat ~/.ssh/id_rsa.pub`
- Copy and Paste the content in the Public Key textarea.
- Assign a keypair name
- Press Import Keypair.

Cancel

Import Keypair

Security groups

Security

- Project
 - Project Name
 - fernando-lopez
 - Blueprint
 - Blueprint Instances
 - Blueprint Templates
 - Region
 - Spain
 - Compute
 - Instances
 - Images
 - Flavors
 - Security**
 - Snapshots
 - Storage
 - Containers
 - Volumes

Floating IPs Security Groups Keypairs

Create a Security Group

Create Security Group Actions

| <input type="checkbox"/> | Name ▾ | Description ▾ |
|--------------------------|---------|---------------|
| <input type="checkbox"/> | default | default |

Displaying 1 item

Success: Keypair mex deleted.

Security groups

Security

- Project
 - Project Name
 - fernando-lopez
 - Blueprint
 - Blueprint Instances
 - Blueprint Templates
 - Region
 - Spain
 - Compute
 - Instances
 - Images
 - Flavors
 - Security
 - Snapshots
 - Storage
 - Containers
 - Volumes

Floating IPs Security Groups Keypairs

Create a Security Group

Create Security Group Actions

Create Security Group

| | | |
|--------------------------|---|--|
| <input type="checkbox"/> | <input type="text" value="hamburg"/> | <input type="text" value="Description"/> |
| <input type="checkbox"/> | <input type="text" value="This is a new security group for Hamburg"/> | <input type="text" value="From here you can create a new security group"/> |

* Mandatory fields.

Cancel Create Security Group

Success: Keypair mex deleted.

Create and edit Security Group rules

Security

Floating IPs Security Groups Keypairs

Create Security Group

Actions

| <input type="checkbox"/> Name | Description |
|---|--|
| <input type="checkbox"/> default | default |
| <input checked="" type="checkbox"/> hamburg | This is a new security group for Hamburg |
| <input type="checkbox"/> sg_hh-template_00000000000000000000000000000104_hh-tier1 | descripcion |
| <input type="checkbox"/> sg_hh-template_00000000000000000000000000000104_hh-tier2 | descripcion |

Edit Rules
Delete Rules

Displaying 4 items

Success: Security group hamburg created.

Waiting for cloud.lab.fi-ware.org... is subject to the acceptance of the [Terms and Conditions](#), [Personal Data Protection Policy](#) and [Cookies Policy](#)

Create and edit Security Group rules

Edit Security Group Rules

Security Group Rules

| IP Protocol ▾ | From Port ▾ | To Port ▾ | Source ▾ | Action ▾ |
|---------------|-------------|-----------|------------------|-------------|
| TCP | 22 | 22 | 0.0.0.0/0 (CIDR) | Delete Rule |
| TCP | 3306 | 3306 | 0.0.0.0/0 (CIDR) | Delete Rule |

Displaying 2 items

Add Rule

| | | | | |
|-------------|-----------------|-----------------|--------------|-----------|
| IP Protocol | From Port * | To Port * | Source Group | CIDR |
| TCP ▾ | Required field. | Required field. | CIDR ▾ | 0.0.0.0/0 |

* Mandatory fields.

Cancel Add Rule

Allocate IP to a project

The screenshot shows the FIWARE Lab interface. At the top, there is a navigation bar with links for Cloud, Store, Mashup, Data, Account, and Help&info. The user's name, Fernando Lopez, is displayed in the top right corner. The main content area is titled 'Security' and contains three tabs: Floating IPs, Security Groups, and Keypairs. The 'Floating IPs' tab is active. A red speech bubble highlights the 'Allocate new IP' button. Below the tabs, there is a table with columns for IP Address, Instance, and Floating IP Pool. The table is currently empty, and a message at the bottom of the table area reads 'Displaying 0 items'. A green success message at the bottom of the page states: 'Success: Released Floating IP 130.206.83.21'.

FIWARE Lab

Cloud Store Mashup Data Account Help&info

Fernando Lopez

Security

Allocate new IP

Allocate IP to Project Actions

| <input type="checkbox"/> | IP Address ▾ | Instance ▾ | Floating IP Pool ▾ |
|--------------------------|--------------|------------|--------------------|
| Displaying 0 items | | | |

Success: Released Floating IP 130.206.83.21

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Launch Instances

Images

- Project
 - Project Name
 - fernando-lopez
 - Blueprint
 - Blueprint Instances
 - Blueprint Templates
 - Region
 - Spain
 - Compute
 - Instances
 - Images**
 - Flavors
 - Security
 - Snapshots
 - Storage
 - Containers
 - Volumes

| Name | Status | Visibility | Container Format | Disk F | Actions |
|--------------------------|--------|------------|------------------|--------|------------------------|
| BoINC | active | public | OVF | | Launch |
| CentOS-6.3-sdc | active | public | OVF | QCOW2 | Launch |
| CentOS-6.3-x86_64 | active | public | OVF | QCOW2 | Launch |
| CentOS-6.5-x64 | active | public | OVF | QCOW2 | Launch |
| CentOS6.3.init | active | public | OVF | QCOW2 | Launch |
| CentOS65init | active | public | OVF | QCOW2 | Launch |
| LPCI-internal | active | public | OVF | QCOW2 | Launch |
| MIWi-POI server | active | public | OVF | QCOW2 | Launch |
| MIWi-POI server | active | public | OVF | QCOW2 | Launch |
| Snapshot_orion_citysense | active | public | OVF | QCOW2 | Launch |

Displaying 40 items

Success: Released Floating IP 130.206.83.21

Launch new instance

Launch Instances

Launch Instances

1. Details 2. Access & Security 3. Post-Creation 4. Summary

Instance Name *

Flavor

m1.tiny

Instance Count *

Description

Specify the details for launching an instance. The chart below shows the resources used by this project in relation to the project's quotas.

Flavor Details

| | |
|----------------|---------|
| Name | m1.tiny |
| VCPU | 1 |
| Root Disk | 0 GB |
| Ephemeral Disk | 0 GB |
| Total Disk | 0 GB |
| RAM | 512 MB |

Project Quotas

| | |
|--------------------|--------------------|
| Instance Count (3) | 0 Available |
| VCPU (3) | 3 Available |
| Disk (20 GB) | 980 GB Available |
| Memory (4608 MB) | 20392 MB Available |

* Mandatory fields.

Cancel Next

Launch Instances

Launch Instances

1. Details — 2. Access & Security — 3. Post-Creation — 4. Summary

Keypair
hamburg

Security Groups
 default
Add new Security Group

Description
Control access to your instance via keypairs, security groups, and other mechanisms.

* Mandatory fields.

Back Next

Launch Instances

Launch Instances ✕

1. Details — 2. Access & Security — 3. Post-Creation — 4. Summary

Customization Script

Description

You can customize your instance after it's launched using the options available here. The "Customization Script" field is analogous to "User Data" in other systems.

* Mandatory fields.

Back Next

Launch Instances

Launch Instances

1. Details — 2. Access & Security — 3. Post-Creation — 4. Summary

Instance Name: HHI
Image: CentOS65init
Flavor: m1.tiny
Instance Count: 1
Keypair: hamburg
Security Group: hamburg

To access the instance:

You need to include a security group with port 22 opened to access via SSH.
You need to assign a floating IP to access from a external network.

* Mandatory fields.

Back Launch Instance

Associate IP

Security

Floating IPs Security Groups Keypairs

Allocate IP to Project

Actions

| <input type="checkbox"/> | IP Address | Instance | Floating IP Pool |
|-------------------------------------|---------------|----------|------------------|
| <input checked="" type="checkbox"/> | 130.206.83.21 | - | net8300 |

- Associate IP
- Dissociate Floating IP
- Release Floating IPs

Displaying 1 Item

Success: Successfully allocated floating IP

Allocate Floating IP

Security

Project

Project Name

fernando-lop

Blueprint

Blueprint Ins

Blueprint Te

Region

Spain

Compute

Instances

Images

Flavors

Security

Snapshots

Storage

Containers

Volumes

Associate Floating IP

Associate Floating IP:

130.206.83.21

to instance:

HH1

and to IP Address:

Select IP to associate with

Description

Associate a floating ip with an instance.

Cancel

Associate IP

Actions

Floating IP

Floating IPs

Displaying 1 Item

Success: Successfully allocated floating IP

Instances Overview

Instances

Project

Project Name

fernando-lopez

Blueprint

- Blueprint Instances
- Blueprint Templates

Region

Spain

Compute

- Instances**
- Images
- Flavors
- Security
- Snapshots
- Storage
- Containers
- Volumes

Overview Log Connection Monitoring

Info

Name: HH1
ID: 125cd18e-fa14-4f5a-8d4e-14a524b5dafe
Status: ACTIVE

Specs

RAM: 512MB
VCPUs: 1 VCPU
Disk: 0GB

IP Addresses

private: 10.0.4.209

Security Groups

default

Meta

Key name: hamburg
Image Name: CentOS65init
region: Spain

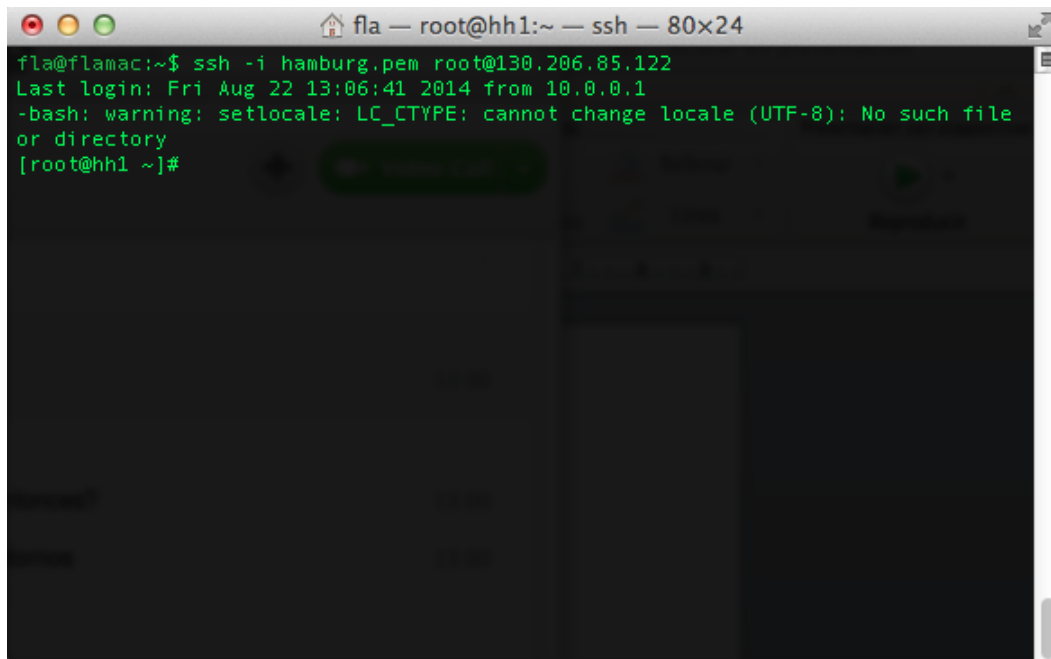
Volumes

Installed Software

Edit

Success: Successfully allocated floating IP

Access to the instance



```
fla — root@hh1:~ — ssh — 80x24
fla@flamac:~$ ssh -i hamburg.pem root@130.206.85.122
Last login: Fri Aug 22 13:06:41 2014 from 10.0.0.1
-bash: warning: setlocale: LC_CTYPE: cannot change locale (UTF-8): No such file
or directory
[root@hh1 ~]#
```

Network functionalities

FIWARE Lab Cloud Hosting: networks functionalities

- Create your own network
- Create your subnet associate to the previous network
- Create a router
- Set gateway
- Assign subnet
- Deploy your instance
- Assign public IP to your instance
- Check the new instance.

FIWARE Lab Cloud Hosting: working with networks

- Multi-tenancy
 - High or Low?
- Do I need to isolate tenants?
 - Even if you trust them, you might want isolation.
 - Tenant creates his own network(s) and router(s) allowing complex network topologies for multi-tier applications.

Create your own network

FIWARE Lab Cloud Store Mashup Data Account Help&info Fernando Lopez

Networks

Create Network Actions

| <input type="checkbox"/> | Name ▾ | Subnets associated ▾ | Shared ▾ | Admin State ▾ |
|--------------------------|-----------------|--------------------------------------|----------|---------------|
| <input type="checkbox"/> | private2 | subnet_private2 10.0.2.0/24 | No | DOWN |
| <input type="checkbox"/> | shared_unsecure | shared_unsecure_101 192.168.101.0/24 | Yes | DOWN |

Info: Switched to region Waterford

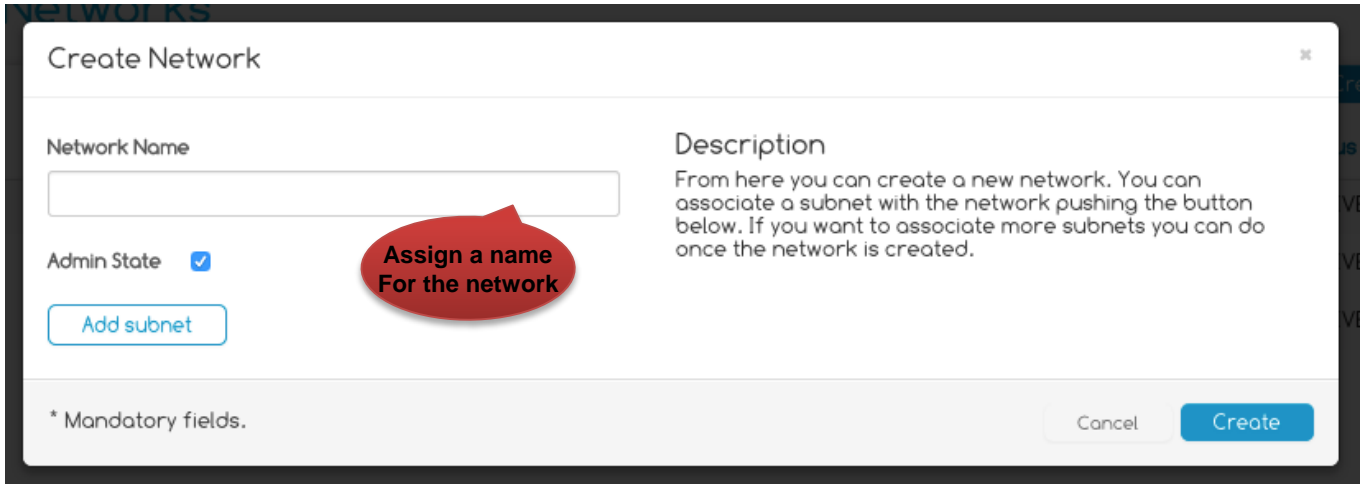
Displaying 2 items

Project Name: fernando-lopez
Blueprint: Blueprint Instances, Blueprint Templates
Region: Waterford
Compute: Instances, Images, Flavors, Security, Snapshots
Storage: Containers, Volumes
Network: Networks, Routers

Create a new Network

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Create your own network



Create Network

Network Name

Admin State

[Add subnet](#)

Assign a name For the network

Description
From here you can create a new network. You can associate a subnet with the network pushing the button below. If you want to associate more subnets you can do once the network is created.

* Mandatory fields.

[Cancel](#) [Create](#)

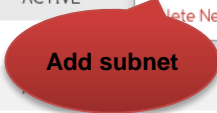
Add subnet associate to the previous network

Networks

| <input type="checkbox"/> Name ▾ | Subnets associated ▾ | Shared ▾ | Status ▾ | Actions ▾ |
|--|--------------------------------------|----------|----------|---|
| <input checked="" type="checkbox"/> demo-net | | No | ACTIVE | <ul style="list-style-type: none">Edit NetworkAdd SubnetDelete Networks |
| <input type="checkbox"/> federation-int-net-01 | federation-int-sub-01 10.100.10.0/24 | Yes | | |
| <input type="checkbox"/> node-int-net-01 | node-int-sub-01 10.101.10.0/24 | Yes | | |
| <input type="checkbox"/> private2 | subnet_private2 10.0.2.0/24 | No | ACTIVE | UP |

Displaying 4 items

Success: Network demo-net created.



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Add subnet associate to the previous network

Networks

Create Subnet

| | |
|--|---|
| Subnet Name | Gateway IP |
| <input type="text" value="demo-subnet"/> | <input type="text"/> |
| Network Address* | DNS Name Servers |
| <input type="text" value="192.168.194.0/24"/> | <input type="text" value="8.8.8.8"/> |
| Allocation Range | DNS Servers |
| <input type="text" value="<start_ip>,<end_ip>"/> | <input type="text" value="<server>,<nexthop>"/> |
| Enable DHCP <input checked="" type="checkbox"/> | |

* Mandatory fields.

Cancel

Displaying 4 items

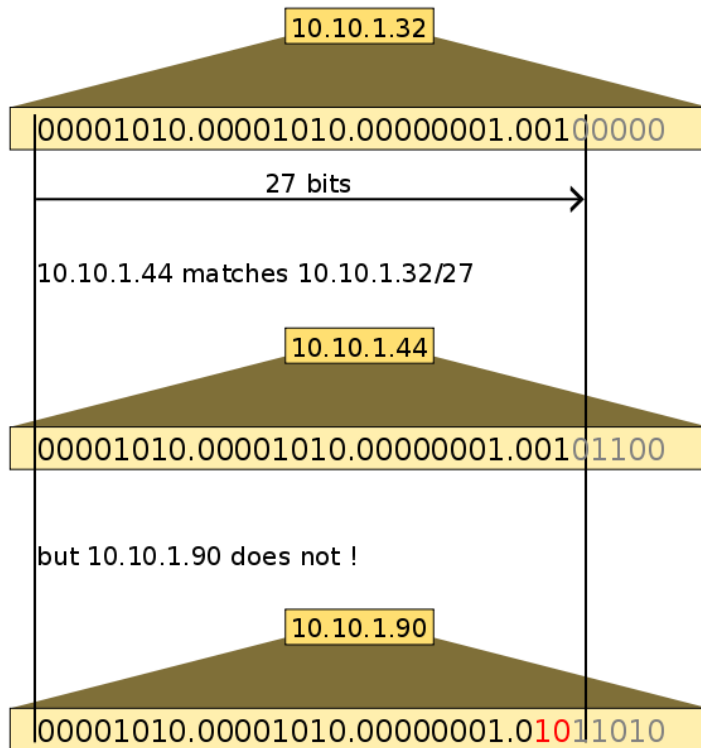
Success: Network demo-net created.

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CIDR notation

10.10.1.32/27 represents:

- The given IPv4 address and its associated routing prefix 10.10.1.32, or equivalently.
- Its subnet mask 255.255.255.224, which has 27 leading 1-bits.



Create a router

The screenshot shows the FIWARE Lab interface with a 'Routers' page. A 'Create Router' dialog box is open, featuring a 'Router Name*' input field. A red callout bubble with the text 'Assign router name' points to this field. The dialog also includes a 'Cancel' button and a 'Create router' button. Below the dialog, a green notification bar displays the message 'Success: Router t deleted.'.

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Set gateway

FIWARE Lab Cloud Store Mashup Data Account Help&info Fernando Lopez

Routers

Create Router Actions

| <input type="checkbox"/> | Name ▾ | Status ▾ | External Net |
|-------------------------------------|-------------|----------|--------------|
| <input checked="" type="checkbox"/> | demo-router | ACTIVE | - |

Assign a gateway to the router

- Set Gateway
- Clear Gateway
- Delete Routers

Displaying 1 item

Success: Router demo-router created.

Project Name: fernando-lopez

Blueprint: Blueprint Instances, Blueprint Templates

Region: Waterford

Compute: Instances, Images, Flavors, Security, Snapshots

Storage: Containers, Volumes

Network: Networks, Routers

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Set gateway

The screenshot shows the FIWARE Lab interface with the 'Routers' section active. A 'Set Gateway' dialog box is open, allowing the user to configure an external network for a router. The dialog includes a dropdown menu for 'External Network' with two options: 'federation-ext-net-01' (selected) and 'public-ext-net-01'. A red callout bubble highlights the dropdown with the text 'Select the network'. The 'Set Gateway' button is highlighted in blue. A success message at the bottom reads 'Success: Router demo-router created.'

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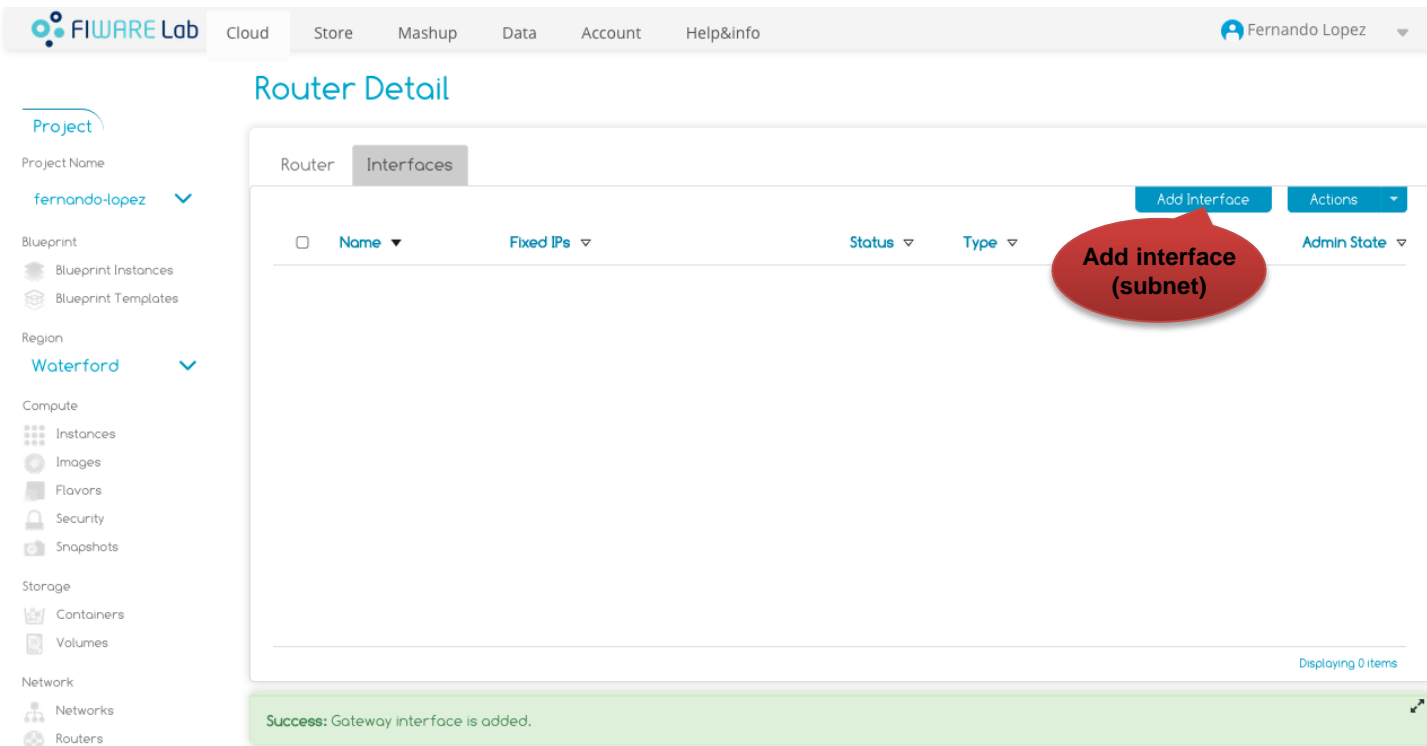
Assign subnet

The screenshot shows the FIWARE Lab Cloud interface. The top navigation bar includes 'Cloud', 'Store', 'Mashup', 'Data', 'Account', and 'Help&info'. The user 'Fernando Lopez' is logged in. The main content area is titled 'Routers' and features a 'Create Router' button and an 'Actions' dropdown. A table lists routers with columns for Name, Status, and External Network. One router, 'demo-router', is shown with a status of 'ACTIVE' and an external network of 'public-ext-net-01'. A red callout bubble highlights the router name with the instruction 'Double Click on the router name'. A green success message at the bottom states 'Success: Gateway interface is added.'

| <input type="checkbox"/> | Name ▾ | Status ▾ | External Network ▾ |
|--------------------------|-------------|----------|--------------------|
| <input type="checkbox"/> | demo-router | ACTIVE | public-ext-net-01 |

<https://cloud.lab.fiware.org/#neutron/routers/6ede42a2-0b3e-4321-8354-5e2d6> is subject to the acceptance of the [Terms and Conditions](#), [Personal Data Protection Policy](#) and [Cookies Policy](#)

Assign subnet



The screenshot shows the FIWARE Lab interface. The top navigation bar includes 'Cloud', 'Store', 'Mashup', 'Data', 'Account', and 'Help&info'. The user 'Fernando Lopez' is logged in. The main content area is titled 'Router Detail' and has two tabs: 'Router' and 'Interfaces'. The 'Interfaces' tab is active, showing a table with columns: Name, Fixed IPs, Status, Type, and Admin State. A red callout bubble points to the 'Add Interface' button, with the text 'Add interface (subnet)'. Below the table, a green success message reads: 'Success: Gateway interface is added.' The bottom right of the table area says 'Displaying 0 Items'.

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Assign subnet

Add Interface

Subnet
(demo-net): 192.168.194.0/24 (demo-subnet)


Router Name
demo-router

Router ID
6ede42a2-0b3e-4321-8354-5e2d64bec85f

Description
You can connect a specified external network to the router. The external network is regarded as a default route of the router and the router acts as a gateway for external connectivity.

* Mandatory fields.

Cancel Add Interface



Deploy a new instance: Details

Launch Instances

1. Details — 2. Access & Security — 3. Networking — 4. Post-Creation — 5. Summary

Instance Name *

Flavor

Instance Count *

Description
Specify the details for launching an instance. The chart below shows the resources used by this project in relation to the project's quotas.

Flavor Details

| | |
|----------------|---------|
| Name | m1.tiny |
| VCPUs | 1 |
| Root Disk | 0 GB |
| Ephemeral Disk | 0 GB |
| Total Disk | 0 GB |
| RAM | 512 MB |

Project Quotas

| | |
|---------------------------|--------------------|
| Instance Count (0) | 6 Available |
| VCPUs (0) | 6 Available |
| Disk (0 GB) | NaN GB Available |
| Memory (0 MB) | 51200 MB Available |

* Mandatory fields.

Deploy a new instance: Access & Security

Launch Instances

1. Details — 2. Access & Security — 3. Networking — 4. Post-Creation — 5. Summary

Keypair
waterford

Description
Control access to your instance via keypairs, security groups, and other mechanisms.

Security Groups

- default
- demo-sg

[Add new Security Group](#)

* Mandatory fields.

[Back](#) [Next](#)

Deploy a new instance: Networking

Launch Instances

1. Details — 2. Access & Security — 3. Networking — 4. Post-Creation — 5. Summary

Selected Networks

nic:1 demo-net

Available Networks

- private2
- node-int-net-01
- federation-int-net-01

Description

Control access to your instance via keypairs, security groups, and other mechanisms.

* Mandatory fields.

Back Next

Select the network to connect

Deploy a new instance: connect to VM display

Instances

The screenshot shows the OpenStack Instances management interface. At the top right, there are buttons for 'Launch New Instance' and 'Actions'. Below these is a table with columns for Instance Name, IP Address, Size, Keypair, Status, and Task. One instance, 'demo-instance', is listed with IP 192.168.194.3, size 512 MB RAM | 1 VCPU | 0GB Disk, and keypair 'waterford'. Its status is 'ACTIVE'. An 'Actions' dropdown menu is open for the 'demo-instance' row, listing various actions. The 'Connect to Instance' option is highlighted with a red callout bubble containing the text 'Select connect to Interface'. At the bottom of the interface, a green success message states: 'Success: Instance demo-instance launched.'

| Instance Name | IP Address | Size | Keypair | Status | Task |
|---|---------------|--------------------------------|-----------|--------|------|
| <input checked="" type="checkbox"/> demo-instance | 192.168.194.3 | 512 MB RAM 1 VCPU 0GB Disk | waterford | ACTIVE | None |

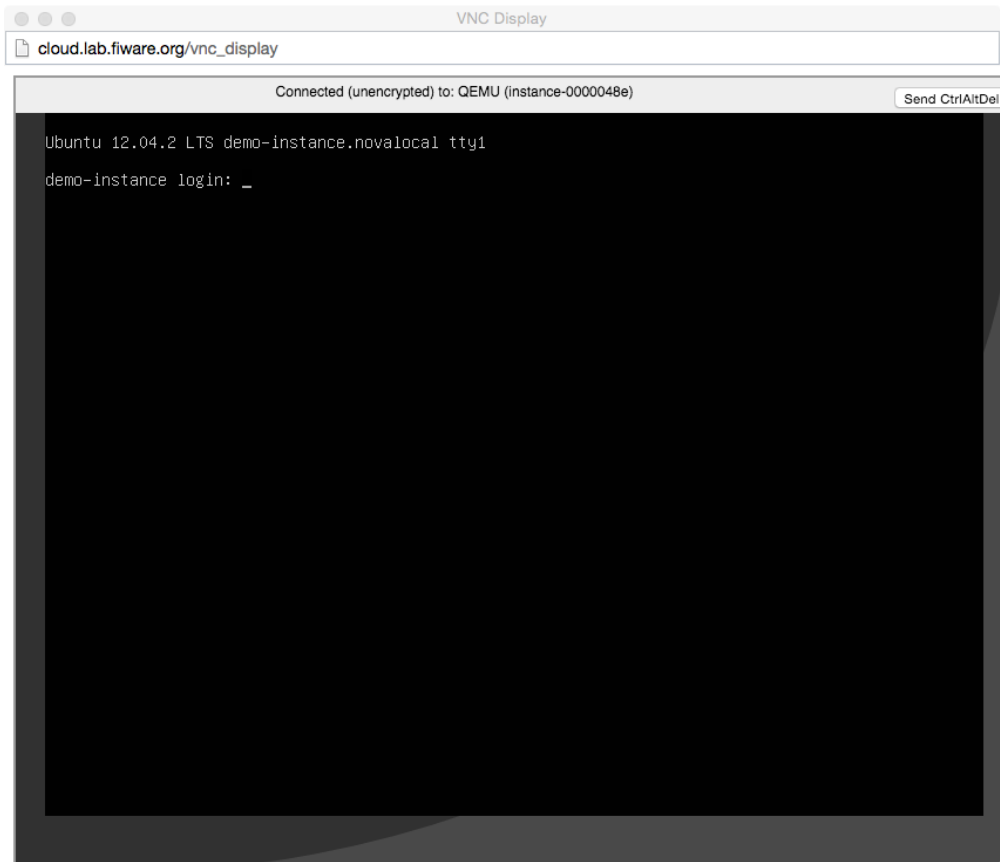
- Edit Instance
- Connect to Instance
- View Log
- Snapshot Instance
- Unpause Instance
- Suspend Instance
- Resume Instance
- Change Password
- Reboot Instance
- Terminate Instance

Displaying 1 item

Success: Instance demo-instance launched.

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Deploy a new instance: connect to VM display



Assign public IP to your instance

Security

Floating IPs Security Groups Keypairs

Allocate IP to Project Actions

| <input type="checkbox"/> | IP Address ▼ | Instance ▼ | Floating IP Pool ▼ |
|-------------------------------------|----------------|---------------|--------------------|
| <input checked="" type="checkbox"/> | 130.206.112.26 | demo-instance | ext-net |

- Associate IP
- Dissociate Floating IP
- Release Floating IPs

Displaying 1 item

Check the new instance

```
Downloads — ssh — 80x24
fla@flamac:~/Downloads$ ssh -i fla.pem root@130.206.112.26
$ ifconfig eth0
eth0      Link encap:Ethernet  HWaddr FA:16:3E:AC:C5:B5
          inet addr:192.168.194.3  Bcast:192.168.194.255  Mask:255.255.255.0
          inet6 addr: fe80::f816:3eff:feac:c5b5/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1400  Metric:1
          RX packets:26089  errors:0  dropped:0  overruns:0  frame:0
          TX packets:29832  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2814601 (2.6 MiB)  TX bytes:4032556 (3.8 MiB)

$ █
```

Storage functionalities

FIWARE Lab Cloud Hosting: storage functionalities

- Create volumes
- Attach volume to servers
- Configure the instance to detect the new volume
- Create containers in the object storage
- Upload objects into your containers
- Object Storage API

Create a volume

Create Volume ✕

Volume Name *

Description
Volumes are block devices that can be attached to instances.

Description

Size (GB) *

* Mandatory fields.

[Cancel](#) [Create Volume](#)

Attach a volume to an instance

volumes

Manage Volume Attachments

Attachments

Detach Volumes

| Instance | Device | Actions |
|----------|--------|---------|
|----------|--------|---------|

Displaying 0 items

Attach To Instance

Attach to Instance *

Device Name *

* Mandatory fields.

Cancel

Volume attached

Volumes

| | | | | Create Volume | Actions |
|-------------------------------------|---------|---------------|-------------|---------------|---------------|
| <input type="checkbox"/> | Name ▾ | Description ▾ | Size (GB) ▾ | Status ▾ | Attachments ▾ |
| <input checked="" type="checkbox"/> | volume1 | A volume | 1 | In-use | 1 |

Displaying 1 item

See the new volume with fdisk

```
$ sudo fdisk -l

Disk /dev/vda: 21.5 GB, 21474836480 bytes
255 heads, 63 sectors/track, 2610 cylinders, total 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

   Device Boot      Start         End      Blocks   Id  System
/dev/vda1 *         16065      41929649    20956792+  83  Linux

Disk /dev/vdb: 64.4 GB, 64424509440 bytes
16 heads, 63 sectors/track, 124830 cylinders, total 125829120 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

Disk /dev/vdb doesn't contain a valid partition table
```

Create a partition table on our new volume.

Execute `sudo fdisk /dev/vdb`

```
e1
Building a new DOS disklabel with disk identifier 0x512b2302.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.

Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)

Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
Select (default p): p
Partition number (1-4, default 1):
Using default value 1
First sector (2048-125829119, default 2048):
Using default value 2048
Last sector, +sectors or +size(K,M,G) (2048-125829119, default 125829119):
Using default value 125829119

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
$
```

Create a ext3 file system

```
Syncing disks.  
$ sudo mkfs -t ext3 /dev/vdb1  
mke2fs 1.42.2 (27-Mar-2012)  
Filesystem label=  
OS type: Linux  
Block size=4096 (log=2)  
Fragment size=4096 (log=2)  
Stride=0 blocks, Stripe width=0 blocks  
3932160 inodes, 15728384 blocks  
786419 blocks (5.00%) reserved for the super user  
First data block=0  
Maximum filesystem blocks=4294967296  
480 block groups  
32768 blocks per group, 32768 fragments per group  
8192 inodes per group  
Superblock backups stored on blocks:  
    32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,  
    4096000, 7962624, 11239424  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (32768 blocks): done  
Writing superblocks and filesystem accounting information: done
```

```
$ _
```

Mounting our new volume.

- Now, we have to create a mount point called /data and mount /dev/vdb1.
`$ sudo mkdir /data`
`$ sudo mount /dev/vdb1 /data`
- At this point, the volume's storage is accessible to Linux.
- We'll also modify /etc/fstab to insure that our instance remounts the volume on restarts.

```
# /etc/fstab: static file system information.
#
# <file system> <mount pt> <type> <options> <dump> <pass>
/dev/root / auto rw,noauto 0 1
proc /proc proc defaults,gid=5,mode=620 0 0
devpts /dev/pts devpts defaults,gid=5,mode=620 0 0
tmpfs /dev/shm tmpfs mode=0777 0 0
sysfs /sys sysfs defaults 0 0
tmpfs /run tmpfs rw,nosuid,relatime,size=200k,mode=755 0 0
/dev/vdb1 /data ext3 defaults 0 0
```

Check the created volume

```
# <file system> <mount pt> <type> <options> <dump> <pass>
/dev/root / auto rw,noauto 0 1
proc /proc proc defaults 0 0
devpts /dev/pts devpts defaults,gid=5,mode=620 0 0
tmpfs /dev/shm tmpfs mode=0777 0 0
sysfs /sys sysfs defaults 0 0
tmpfs /run tmpfs rw,nosuid,relatime,size=200k,mode=755 0 0
/dev/vdb1 /data ext3 defaults 0 0
```

```
$ cd /data
$ ls
lost+found
$ _
```

Object Storage: Create a container

Create Container ✕

Container Name *

Description

A container is a storage compartment for your data and provides a way for you to organize your data. You can think of a container as a folder in Windows® or a directory in UNIX®. The primary difference between a container and these other file system concepts is that containers cannot be nested. You can, however, create an unlimited number of containers within your account. Data must be stored in a container so you must have at least one container defined in your account prior to uploading data.

* Mandatory fields.

Cancel Create Container

Upload an object into the container

Containers

Upload Object To Container: HamburgContainer

Object Name *

File *

No file chosen

Description

An object is the basic storage entity and any optional metadata that represents the files you store in the OpenStack Object Storage system. When you upload data to OpenStack Object Storage, the data is stored as-is (no compression or encryption) and consists of a location (container), the object's name, and any metadata consisting of key/value pairs.

* Mandatory fields.

Object Storage API

- **http://forge.fi-ware.org/plugins/mediawiki/wiki/fiware/index.php/Object_Storage_-_User_and_Programmers_Guide**

- **Authentication to get initial token**

```
username='email@company.com' password='mypassword' curl -d '{"auth": {"passwordCredentials": {"username":"$username", "password":"$password"}}}' \ -H 'Content-type: application/json' \ http://cloud.lab.fi-ware.org:4730/v2.0/tokens \ -vvv
```

- **Use initial token to get tenant**

```
curl -H 'x-auth-token: '$token http://cloud.lab.fi-ware.org:4730/v2.0/tenants
```

- **Authenticate tenant to get token for Object Storage**

```
curl -d '{"auth": {"passwordCredentials": {"username":"$username", "password":"$password"}, "tenantId":"$tenantId"}}' \ -H 'Content-type: application/json' \ http://cloud.lab.fi-ware.org:4730/v2.0/tokens
```

- **Object Storage URL**

```
http://130.206.82.9:8080/v1/AUTH\_tenantId
```


Blueprint functionalities

FIWARE Lab Cloud Hosting

- Deploying components for your application.
- Create blueprint templates.
- Create Tiers on a blueprint template.
- Launch blueprint templates -> create blueprint instances
- See details of the blueprint instance
- Check the SW installed on the blueprint instance.

Real scenario

- Users want to define lots of parameters.
 - Password, ports, default installation.
- Users want to install several things in the same server.
 - Tomcat + git, tomcat + java + git, ...
- Users need to deploy complex environment.
 - One server for Tomcat, another for MySQL, ...
- Some parameters are unknown before instantiate the system.

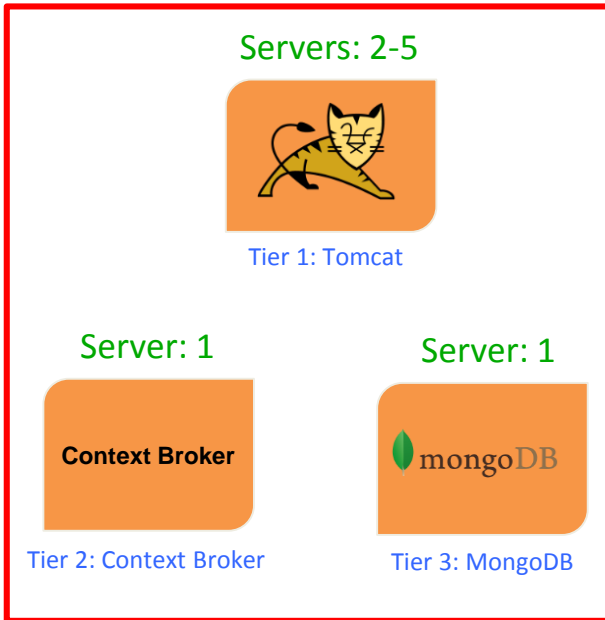
Deploying components for your application

- Deploying applications and not only Servers.
 - Ad hoc installation (not template usage).
- Managing applications in Servers (install, uninstall, configure, snapshot...).
- Deploying different environments for that applications.

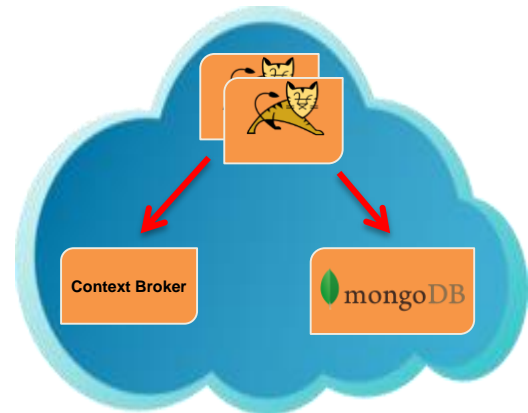


Deploy example

Blueprint template: fiware1



- **Blueprint Template:** platform specification to be deployed.
- **Tier:** Each kind of software and server to be deployed.
- Each Tier can be deployed in one or **several servers** (e.g. tomcat, 2-5 servers).
- **Blueprint Instance:** Deployed in the testbed.



Create a new blueprint template

FIWARE Lab Cloud Store Mashup Data Account Help&info Fernando Lopez

Blueprint Templates

Project Name: fernando-lopez

Blueprint: Blueprint Instances, **Blueprint Templates**

Region: Spain

Compute: Instances, Images, Flavors, Security, Snapshots

Storage: Containers, Volumes

Open Catalog Create New Template Actions

| Name | Description | Tiers |
|------|-------------|-------|
| p1 | p1 | |

Displaying 1 item

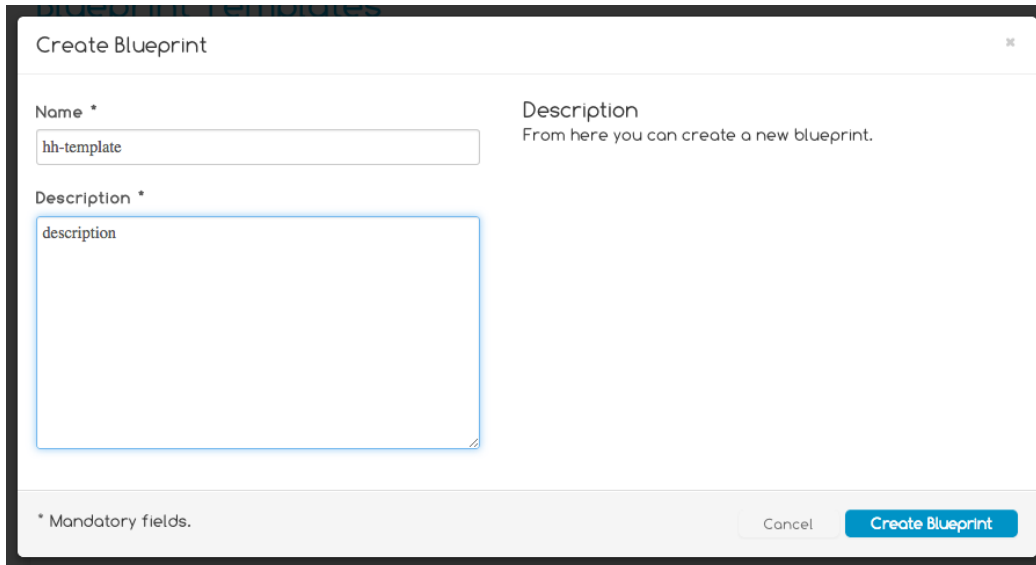
Success: Container HamburgContainer created.

Press the option "Blueprint Templates" from menu

You can open the Catalog of Blueprint Template or create one from the scratch.

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Create a new blueprint template



The screenshot shows a web form titled "Create Blueprint" with a close button (X) in the top right corner. The form contains two mandatory fields: "Name" and "Description". The "Name" field is a text input containing "hh-template". The "Description" field is a larger text area containing "description". To the right of the "Description" field, there is a text label "Description" and a sub-label "From here you can create a new blueprint." At the bottom left, there is a note: "* Mandatory fields." At the bottom right, there are two buttons: "Cancel" and "Create Blueprint".

Create Blueprint

Name *

hh-template

Description *

description

Description
From here you can create a new blueprint.

* Mandatory fields.

Cancel Create Blueprint

Add tiers

Blueprint Templates

Open Catalog Create New Template Actions

| <input type="checkbox"/> Name | Description | Tiers |
|--------------------------------------|-------------|-------|
| <input type="checkbox"/> hh-template | description | 0 |

To add new Tier, press "hh-template" name.

Displaying 1 item

Success: Blueprint hh-template created.

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Add tiers

After press "Add Tier" you see this windows to define the servers of this tier.

The screenshot shows a 'Create Tier' form with three steps: 1. Details, 2. Install Software, and 3. Connect Network. The 'Details' step is active. On the left, there are input fields for a maximum number of servers (4) and a minimum number (0), with a circular icon containing a question mark and a '1' in a circle. On the right, there are fields for Name, Region (Spain2), Flavor (m1.tiny), Image (CentOS-6.5init), Icon (with a View button), and Keypair (fla). A 'Next' button is at the bottom right. Annotations in red speech bubbles provide additional instructions.

4 0

Name *:

Region: Spain2

Flavor *:

Image *:

Icon: View

Keypair: fla

* Mandatory fields.

Next

You should specify the maximum, minimum and current number of servers

You must select a Keypair to access to those servers.

Add software in tier

The screenshot shows a web interface for creating a tier, titled "Create Tier". It features a progress bar with three steps: "1. Details", "2. Install Software" (which is the active step), and "3. Connect Network". Below the progress bar, there are two main sections: "Software in Tier" on the left, which is currently empty, and "Software in Catalog" on the right, which contains a list of software packages. A red callout bubble with the text "Install software pressing the mouse right click." points to the software list. At the bottom of the interface, there is a note "* Mandatory fields." and two buttons: "Back" and "Next".

Create Tier

1. Details — 2. Install Software — 3. Connect Network

Software in Tier

Software in Catalog

- apache2 4.0
- cep 3.2.0
- django 1.5.5
- git 1.7
- marketplace 3.2.1
- mediawiki 1.17.0
- mongodbconfig 2.2.3

* Mandatory fields.

Back Next

Add software in tier

The screenshot shows a web interface titled "Update Tier" with a progress bar indicating three steps: "1. Details", "2. Install Software", and "3. Connect Network". The "2. Install Software" step is currently active. The interface is divided into two main sections: "Software in Tier" and "Software in Catalogue".

Software in Tier

- git 1.7

A context menu is open over the "git 1.7" entry, showing two options: "Remove" and "Edit Attributes". A red callout bubble points to the "Edit Attributes" option with the text: "Edit special attributes like default port."

Software in Catalogue

- apache2 4.0
- ceph 3.2.0
- django 1.5.5
- git 1.7
- marketplace 3.2.1
- mediawiki 1.17.0
- mongodbconfig 2.2.3

At the bottom left, there is a note: "* Mandatory fields." At the bottom right, there are "Back" and "Next" buttons.

Add software in tier

Update Tier ✕

1. Details — 2. Install Software 3. Connect Network

| Attribute | Value | Description |
|---------------------|-------|-------------|
| No items to display | | |

* Mandatory fields.

Connect network

Create Tier

1. Details — 2. Install Software — 3. Connect Network

Connected to Networks

Internet

Available Networks

Enter the alias of a new network... +

Internet

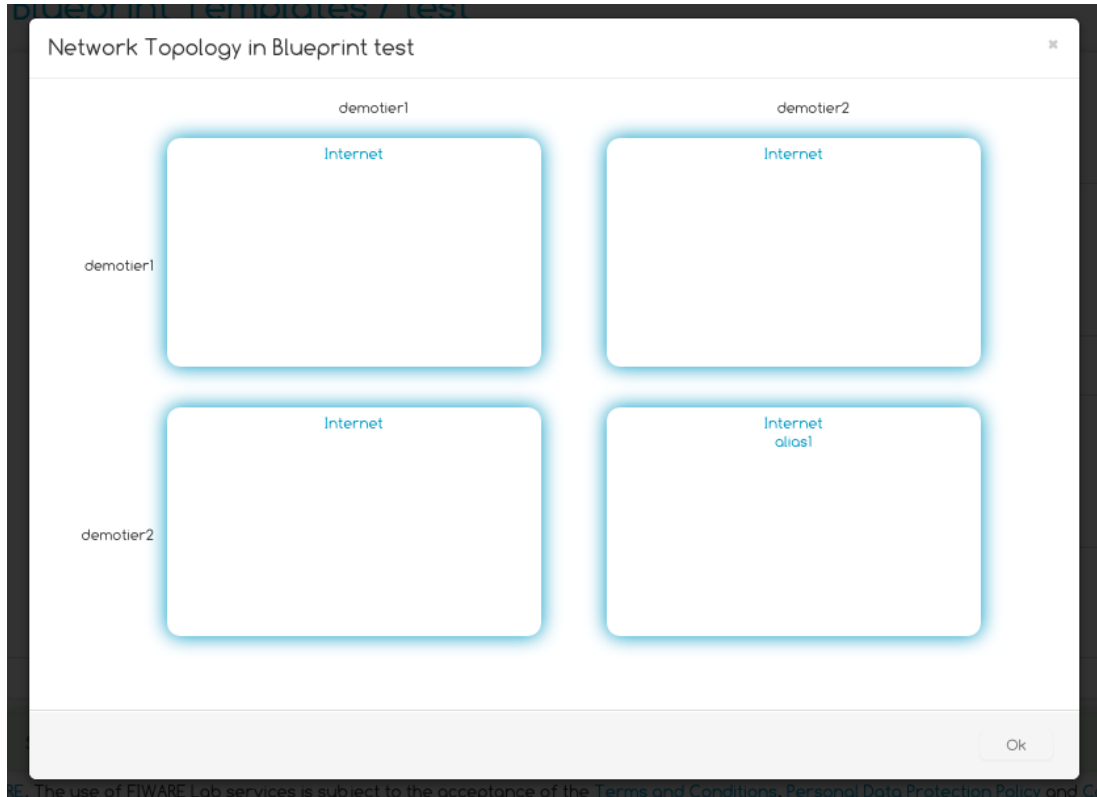
* Mandatory fields.

Back Create tier

Introduce an alias to connect together several tiers.

Drag&Drop the network to connect the tier..

Topology



Launch a Blueprint Template -> Blueprint Instance

Press "Action" and select "Launch Template" to launch the Instance.

Blueprint Templates

- Project
 - Project Name
 - fernando-lopez
 - Blueprint
 - Blueprint Instances
 - Blueprint Templates**
 - Region
 - Spain
 - Compute
 - Instances
 - Images
 - Flavors
 - Security
 - Snapshots
 - Storage
 - Containers
 - Volumes

Open Catalog

Create New Template

Actions

| <input type="checkbox"/> | Name | Description | Tiers |
|--------------------------|-------------|-------------|-------|
| <input type="checkbox"/> | hh-template | description | 2 |

Displaying 1 item

Success: Tier hh-vm2 created.

Launch a Blueprint Template -> Blueprint Instance

Launch Blueprint Instance

Name *

HHBlueInstance

Description

From here you can launch a new blueprint instance.

Description *

An deployed instance

You should specify the "Name" and "Description" for your blueprint.

* Mandatory fields.

Cancel Launch Blueprint Instance

Demo

Blueprint Instances

Project Name: fernando-lopez

Blueprint: **Blueprint Instances**

Region: Spain

Compute: Instances, Images, Flavors, Security, Snapshots

Storage: Containers, Volumes

Launch New Blueprint | Actions

| Name | Description | Tiers | Status |
|----------------|----------------------|-------|-----------|
| HHBlueInstance | An deployed instance | 2 | DEPLOYING |

Success: Blueprint HHBlueInstance launched.

Deploying 1 item

Firstly, the deployment of infrastructure.

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Demo

Blueprint Instances

Project Name: fernando-lopez

Blueprint: HHBlueInstance

Region: Spain

Compute: Instances, Images, Flavors, Security, Snapshots

Storage: Containers, Volumes

Launch New Blueprint | Actions

| Name | Description | Tiers | Status |
|----------------|----------------------|-------|------------|
| HHBlueInstance | An deployed instance | 2 | INSTALLING |

Deploying 1 item

Secondly, the installation of the software.

Success: Blueprint HHBlueInstance launched.

Demo

Blueprint Instances

- Project
- Project Name
- fernando-lopez
- Blueprint
- Blueprint Instance
- Blueprint Template
- Region
- Spain
- Compute
- Instances
- Images
- Flavors
- Security
- Snapshots
- Storage
- Containers
- Volumes

Launch New Blueprint Actions

| Name | Description | Tiers | Status |
|----------------|----------------------|-------|-----------|
| HHBlueInstance | An deployed instance | 2 | INSTALLED |

Pressing the name you can see the tiers of this blueprint.

Finally, if all was ok.

Success: Blueprint HHBlueInstance launched.

Blueprint Instances / HHBlueInstance

Project

Project Name

fernando-lopez

Blueprint

Blueprint Instances

Blueprint Templates

Region

Spain

Compute

Instances

Images

Flavors

Security

Snapshots

Storage

Containers

Volumes

[Back to instances](#)



Name: hh-ter1
Flavor: m1.small
Image: CentOS6.3.init
Keypair: hamburg



Software in Tier

tomcat 6



Name: hh-ter2
Flavor: m1.small
Image: CentOS6.3.init
Keypair: hamburg



Software in Tier

mysql 1.2.4

Press it to get information of your server.

Displaying 2 items

Info: Connected to project fernando-lopez [ID 000000000000000000000000000000104]

Demo

Blueprint Instances / HHBlueInstance / hh-tier1

Project
Project Name
fernando-lopez

Blueprint
Blueprint Instances
Blueprint Templates

Region
Spain

Compute
Instances
Images
Flavors
Security
Snapshots

Storage
Containers
Volumes

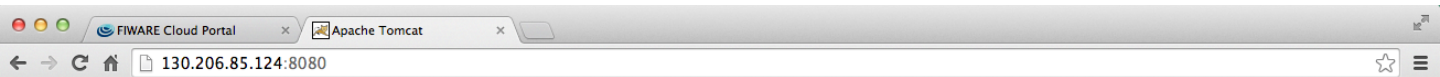
Back to Tiers Add Instances Actions

| Instance Name | IP Address | Size | PaaS Status | Task | Power State |
|--------------------------------|-----------------------------|------|-------------|------|-------------|
| HHBlueInstance-hh-tier1-000104 | 10.0.5.82 130.206.85.124 | | INSTALLED | None | RUNNING |

Success: Security group hamburg created.

Waiting for cloud.lab.fi-ware.org... is subject to the acceptance of the Terms and Conditions, Personal Data Protection Policy and Cookies Policy

Demo



Apache Tomcat



If you're seeing this page via a web browser, it means you've setup Tomcat successfully. Congratulations!

As you may have guessed by now, this is the default Tomcat home page. It can be found on the local filesystem at:

```
 catalina_home/webapps/ROOT/index.html
```

where "\$CATALINA_HOME" is the root of the Tomcat installation directory. If you're seeing this page, and you don't think you should be, then you're either a user who has arrived at new installation of Tomcat, or you're an administrator who hasn't got his/her setup quite right. Providing the latter is the case, please refer to the [Tomcat Documentation](#) for more detailed setup and administration information than is found in the INSTALL file.

NOTE: For security reasons, using the manager webapp is restricted to users with certain roles such as "manager-gui". Users are defined in `catalina_home/conf/tomcat-users.xml`.

Included with this release are a host of sample Servlets and JSPs (with associated source code), extensive documentation, and an introductory guide to developing web applications.

Tomcat mailing lists are available at the Tomcat project web site:

- [tomcat-users](#) for general questions related to configuring and using Tomcat
- [tomcat-dev](#) for developers working on Tomcat

Thanks for using Tomcat!

Administration

- [Status](#)
- [Tomcat Manager](#)

Documentation

- [Release Notes](#)
- [Change Log](#)
- [Tomcat Documentation](#)

Tomcat Online

- [Home Page](#)
- [FAQ](#)
- [Bug Database](#)
- [Users Mailing List](#)
- [Developers Mailing List](#)
- [IRC](#)

Miscellaneous

- [Servlets Examples](#)
- [JSP Examples](#)
- [Specifications](#)



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Demo

```
fernandolopezaguilar — root@ab:~ — ssh — 80x24
[root@ab ~]# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 12
Server version: 5.1.71-log Source distribution

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affiliates. Other names may be trademarks of their respective
owners.

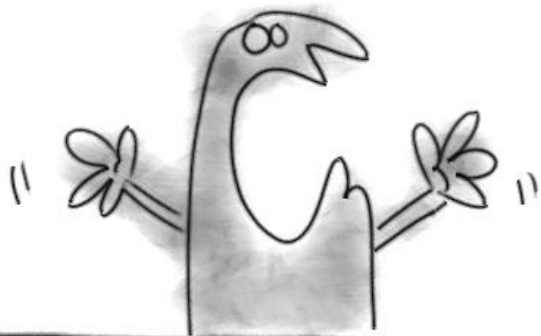
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

Documentation

- FIWARE Cloud Portal:
 - Documentation: <http://catalogue.fi-ware.org/enablers/self-service-interfaces-cloud-portal-upm>
- FIWARE Cloud Infrastructure
 - Account: <http://catalogue.fi-ware.org/enablers/identity-management-keyrock>
 - SDC: <http://catalogue.fi-ware.org/enablers/software-deployment-configuration-sagitta>
 - PaaS Manager: <http://catalogue.fi-ware.org/enablers/paas-manager-pegasus>
- FIWARE eLearning Platform
 - <http://edu.fi-ware.org/>

Now What?!!



If you have any question or problem
contact to

fiware-lab-help@lists.fi-ware.org

You can go to stackoverflow and ask
question with the tag [fiware](#) and/or
[filab](#).

Thanks!



OPEN APIs FOR OPEN MINDS

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(Slides: <http://tinyurl.com/fiwarelab-cloud>)