Setting up your virtual infrastructure using FIWARE Lab Cloud

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(Slides: http://tinyurl.com/fiwarelab-cloud)
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• Deploying your first VM
• Working with networks
• Creating Containers and adding objects
• Deploying components for your application
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FIWARE Lab Cloud Hosting
FIWARE Lab Cloud Hosting

- Cloud Portal
- APIs
- Your Applications
- OpenStack Cloud Operating System
- Compute
- Networking
- Storage
- OpenStack Shared Services
- Standard Hardware
- PaaS
- Account
- SDC
- Monitoring
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

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

You must create a keypair to access to the servers.
Create keypair

You must create a keypair to access to the servers.

Create Keypair

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.
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

- 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.
Security groups

Create a Security Group

- Name: default
  - Description: default

Success: Keypair mex deleted.
Security groups

Create a Security Group

Create Security Group

Name *
- hamburg

Description *
- This is a new security group for Hamburg

* Mandatory fields.

Success: Keypair mex deleted.

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Create and edit Security Group rules

Security

- Floating IPs
- Security Groups
- Keypairs

Create Security Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>default</td>
</tr>
<tr>
<td>hamburg</td>
<td>This is a new security group for Hamburg</td>
</tr>
<tr>
<td>sg_hh-template_00000000000000000000104_hh-tier1</td>
<td>description</td>
</tr>
<tr>
<td>sg_hh-template_00000000000000000000104_hh-tier2</td>
<td>description</td>
</tr>
</tbody>
</table>

Success: Security group hamburg created.

Waiting for cloud.lab.fiware.org...
Create and edit Security Group rules

### Security Group Rules

<table>
<thead>
<tr>
<th>IP Protocol</th>
<th>From Port</th>
<th>To Port</th>
<th>Source</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP</td>
<td>22</td>
<td>22</td>
<td>0.0.0.0/0 (CIDR)</td>
<td>Delete Rule</td>
</tr>
<tr>
<td>TCP</td>
<td>3306</td>
<td>3306</td>
<td>0.0.0.0/0 (CIDR)</td>
<td>Delete Rule</td>
</tr>
</tbody>
</table>

**Add Rule**

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

* Mandatory fields.
Allocate IP to a project

Security

Allocate new IP

Success: Released Floating IP 130.206.83.21
Launch Instances

Images

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Visibility</th>
<th>Container Format</th>
<th>Disk Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>BoINC</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
<tr>
<td>CentOS-6.3-sdc</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
<tr>
<td>CentOS-6.3-x86_64</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
<tr>
<td>CentOS-6.5-x64</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
<tr>
<td>CentOS6.3.init</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
<tr>
<td>CentOS65init</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
<tr>
<td>LPCI-internal</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
<tr>
<td>MiWi-POI server</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
<tr>
<td>MiWi-POI server</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
<tr>
<td>Snapshot_orion_citysense</td>
<td>active</td>
<td>public</td>
<td>OVF</td>
<td>QCOW2</td>
</tr>
</tbody>
</table>

Launch new instance

Success: Released Floating IP 130.206.83.21
Launch Instances

### Launch Instances

**1. Details**

<table>
<thead>
<tr>
<th>Instance Name *</th>
<th>Flavor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m1.tiny</td>
</tr>
</tbody>
</table>

**2. Access & Security**

**3. Post-Creation**

**4. Summary**

**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**

<table>
<thead>
<tr>
<th>Name</th>
<th>m1.tiny</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCPUs</td>
<td>1</td>
</tr>
<tr>
<td>Root Disk</td>
<td>0 GB</td>
</tr>
<tr>
<td>Ephemeral Disk</td>
<td>0 GB</td>
</tr>
<tr>
<td>Total Disk</td>
<td>0 GB</td>
</tr>
<tr>
<td>RAM</td>
<td>512 MB</td>
</tr>
</tbody>
</table>

**Project Quotas**

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

* Mandatory fields.
Launch Instances

1. Details

2. Access & Security

3. Post-creation

4. Summary

Keypair

hamburg

Security Groups

Add new Security Group

* Mandatory fields.

Description

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

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.
Launch Instances

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.
Associate IP

Security

Floating IPs

IP Address: 130.206.83.21
Instance: -
Floating IP Pool: net8300

Actions:
- Associate IP
- Dissociate Floating IP
- Release Floating IPs

Success: Successfully allocated floating IP
Allocate Floating IP

Associate Floating IP

Associate Floating IP:
130.206.83.21

Description
Associate a floating ip with an instance.

to instance:
HH1

and to IP Address:
Select IP to associate with

Success: Successfully allocated floating IP
## Instances Overview

### Instances

#### Info

<table>
<thead>
<tr>
<th>Name</th>
<th>HHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>125a18e-1a14-4f5a-8d4e-14a524b5daff</td>
</tr>
<tr>
<td>Status</td>
<td>ACTIVE</td>
</tr>
</tbody>
</table>

#### Specs

| RAM   | 512MB |
| VCPUs | 1V CPU |
| Disk  | 0GB |

#### IP Addresses

| IP Address | private: 10.0.4.209 |

#### Security Groups

| Group | default |

#### Meta

| Key Name | hamburg |
| Image Name | CentOS65init |
| Region   | Spain |

#### Installed Software

| Status | Successfully allocated floating IP |

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Access to the instance

```
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

**Networks**

<table>
<thead>
<tr>
<th>Name</th>
<th>Subnets associated</th>
<th>Shared</th>
</tr>
</thead>
<tbody>
<tr>
<td>private2</td>
<td>subnet_private2 10.0.2.0/24</td>
<td>No</td>
</tr>
<tr>
<td>shared_unsecure</td>
<td>shared_unsecure_101 192.168.101.0/24</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Create a new Network

---

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Create your own network

Assign a name For the network
Add subnet associate to the previous network

### Networks

<table>
<thead>
<tr>
<th>Name</th>
<th>Subnets associated</th>
<th>Shared</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>demo-net</td>
<td></td>
<td>No</td>
<td>ACTIVE</td>
</tr>
<tr>
<td>federation-int-net-01</td>
<td>federation-int-sub-01</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>node-int-net-01</td>
<td>node-int-sub-01</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>private2</td>
<td>subnet_private2</td>
<td>No</td>
<td>ACTIVE</td>
</tr>
</tbody>
</table>

**Success:** Network demo-net created.
Add subnet associate to the previous network

Add Network Address (CIDR)

Define DNS server

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.

10.10.1.44 matches 10.10.1.32/27 but 10.10.1.90 does not!
Create a router

Assign router name

* Mandatory fields.

Success: Router t deleted.
Set gateway

Assign a gateway to the router
Set gateway

Select the network

External Network

- Select network
- federation-ext-net-01
- public-ext-net-01

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.
Assign subnet

Double Click on the router name
Assign subnet

Router Detail

Add interface (subnet)
Assign subnet

Select the network to connect
Deploy a new instance: Details

Launch Instances


**Instance Name** *
- demo-instance

**Flavor**
- ml.tiny

**Instance Count** *
- 1

**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**

<table>
<thead>
<tr>
<th>Name</th>
<th>ml.tiny</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCPUs</td>
<td>1</td>
</tr>
<tr>
<td>Root Disk</td>
<td>0 GB</td>
</tr>
<tr>
<td>Ephemeral Disk</td>
<td>0 GB</td>
</tr>
<tr>
<td>Total Disk</td>
<td>0 GB</td>
</tr>
<tr>
<td>RAM</td>
<td>512 MB</td>
</tr>
</tbody>
</table>

**Project Quotas**

<table>
<thead>
<tr>
<th>Instance Count (0)</th>
<th>6 Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCPUs (0)</td>
<td>6 Available</td>
</tr>
<tr>
<td>Disk (0 GB)</td>
<td>NaN GB Available</td>
</tr>
<tr>
<td>Memory (0 MB)</td>
<td>51200 MB Available</td>
</tr>
</tbody>
</table>

* Mandatory fields.
Deploy a new instance: Access & Security

Launch Instances


Keypair

- waterford

Security Groups

- default
- demo-sg

Add new Security Group

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

* Mandatory fields.
Deploy a new instance: Networking

Select the network to connect

Selected Networks

- nic: demo-net

Available Networks

- private2
- node-int-net-01
- federation-int-net-01
Deploy a new instance: connect to VM display

Instances

- **Instance Name**: demo-instance
- **IP Address**: 192.168.194.3
- **Size**: 512 MB RAM | 1 VCPU | 0 GB Disk
- **Keypair**: waterford
- **Status**: ACTIVE

Select connect to Interface

Success: Instance demo-instance launched.

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Deploy a new instance: connect to VM display

Ubuntu 12.04.2 LTS demo-instance.novalocal tty1

demo-instance login: _
Assign public IP to your instance

**Security**

<table>
<thead>
<tr>
<th>IP Address</th>
<th>Instance</th>
<th>Floating IP Pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>130.206.112.26</td>
<td>demo-instance</td>
<td>ext-net</td>
</tr>
</tbody>
</table>

Actions:
- Associate IP
- Dissociate Floating IP
- Release Floating IPs

Displaying 1 item
Check the new instance
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 *
volume1

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

A volume

Size (GB) *
1 8

* Mandatory fields.
Attach a volume to an instance

```
Attachments
- Detach Volumes

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

Attach To Instance
- Attach to Instance *
  - demo-instance
- Device Name *
  - /dev/vdb

* Mandatory fields.
```
Volume attached

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Size (GB)</th>
<th>Status</th>
<th>Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td>volume1</td>
<td>A volume</td>
<td>1</td>
<td>in-use</td>
<td>1</td>
</tr>
</tbody>
</table>
See the new volume with fdisk
Create a partition table on our new volume.

Execute `sudo fdisk /dev/vdb`
Create a ext3 file system

```
$ 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, 360448, 425984, 491520, 557056, 622592
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.
Check the created volume
Object Storage: Create a container

Create Container

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.
Upload an object into the container

**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


- **Authentication to get initial token**

  ```bash
  username='email@company.com' password='mypassword' curl -d '{"auth":
  {"passwordCredentials": {"username":"$username", "password":"$password"}}}' \
  -H 'Content-type: application/json' \n  http://cloud.lab.fi-ware.org:4730/v2.0/tokens
  
  curl -H 'x-auth-token: $token' http://cloud.lab.fi-ware.org:4730/v2.0/tenants
  
  **Authenticate tenant to get token for Object Storage**

  ```bash
  curl -d '{"auth": {"passwordCredentials": {"username":"$username",
  "password":"$password"}, "tenantId":"$tenantId"}}' \
  -H 'Content-type: application/json' \n  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.

- **Tier 1:** Tomcat
  - **Servers:** 2-5
  - **Server:** 1

- **Tier 2:** Context Broker
  - **Server:** 1

- **Tier 3:** MongoDB
  - **Server:** 1

- **Context Broker**
- **mongoDB**
Create a new blueprint template

Press the option “Blueprint Templates” from menu

You can open the Catalog of Blueprint Template or create one from the scratch.
Create a new blueprint template

You should introduce the "Name" and the "Description".
Add tiers

Blueprint Templates

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Tiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>hh-template</td>
<td>description</td>
<td>0</td>
</tr>
</tbody>
</table>

To add new Tier, press “hh-template” name.

Success: Blueprint hh-template created.

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Add tiers

After press “Add Tier” you see this window to define the servers of this tier.

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

Install software pressing the mouse right click.

<table>
<thead>
<tr>
<th>Software in Catalog</th>
</tr>
</thead>
<tbody>
<tr>
<td>apache2 4.0</td>
</tr>
<tr>
<td>cep 3.2.0</td>
</tr>
<tr>
<td>django 1.5.5</td>
</tr>
<tr>
<td>git 1.7</td>
</tr>
<tr>
<td>marketplace 3.2.1</td>
</tr>
<tr>
<td>mediawiki 1.17.0</td>
</tr>
<tr>
<td>mongodbconfig 2.2.3</td>
</tr>
</tbody>
</table>

* Mandatory fields.
Add software in tier

Edit special attributes like default port.
Add software in tier
Connect network

1. Details
2. Install Software
3. Connect Network

Connected to Networks
Available Networks

Connect to Networks

Enter the alias of a new network...

Internet

Internet

* Mandatory fields.

(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.

Success: Tier hh-vm2 created.

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Launch a Blueprint Template -> Blueprint Instance

You should specify the “Name” and “Description” for your blueprint.
Firstly, the deployment of infrastructure.
Secondly, the installation of the software.
Finally, if all was ok.

Pressing the name you can see the tiers of this blueprint.
Press it to get information of your server.
# Demo

## Blueprint Instances / HHBlueInstance / hh-tier1

<table>
<thead>
<tr>
<th>Instance Name</th>
<th>IP Address</th>
<th>Size</th>
<th>PaaS Status</th>
<th>Task</th>
<th>Power State</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHBlueInstance-hh-tier1-1-000104</td>
<td>10.0.5.82, 130.206.85.124</td>
<td></td>
<td>INSTALLED</td>
<td>None</td>
<td>RUNNING</td>
</tr>
</tbody>
</table>

Success: Security group hamburg created.
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](http://www.apache.org/) 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](http://www.apache.org/) for general questions related to configuring and using Tomcat
- [tomcat-dev](http://www.apache.org/) for developers working on Tomcat

Thanks for using Tomcat!
Demo

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

mysql>
Documentation

• FIWARE Cloud Portal:

• FIWARE Cloud Infrastructure

• 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!

www.fiware.org
@Fiware

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