



# FUTEBOL

Federated Union of Telecommunications Research  
Facilities for an EU-Brazil Open Laboratory

## FUTEBOL VTT User Manual

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<b>Abstract</b>	This document is a manual for the end-users of the FUTEBOL VTT testbed. It describes how to reserve the resources available at the VTT testbed, and also presents simple experiments that can be performed using those resources. Using those examples, the user will be able to build his/her own experiments.



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### Document Revision History

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# 1 - Introduction

This document serves as a user guide for experimenters wishing to make an experiment in the FUTEBOL VTT testbed. This document describes the resources available in the testbed and how to reserve those resources for experiments.

The reader is assumed to be familiar with jFed, hold an account in jFed,, and know how to book resources using the GUI. A short tutorial is available at [http://futebol.dcc.ufmg.br/jfed\\_account.html#getaccount](http://futebol.dcc.ufmg.br/jfed_account.html#getaccount).



## 2 Overall Description of the Testbed

VTT Testbed is set up in Willab, Oulu. Underlying platform is Openstack, but the testbed itself is built upon it with KVM/QEMU. The Testbed consist of a virtual server that runs the hypervisor for other virtual machines. See the layers in 2.3.

### 2.1 Testbed resources

The resources made available to experimenters in the VTT Testbed include:

- Dell M630 (Xeon E5-2660 v3, 64GB, FC8) \* 4 – running OpenStack (Pike)
  - 1 controller
  - 1 storage
  - 2 for computing
- Base stations

### 2.3 Functional Layers of the Testbed

Maybe some depiction of layers, raw/openstack on bottom, mid layer with KVM/QEMU - testbed and the Vms (LSA server eNB controller on top).

The testbed consists of four layers: The bottom layer consist of the physical elements i.e. servers and SAN. The main server is running on top of these. In the server lies also the hypervisor that is able to run the actual testbed. The next layer corresponds to the virtualized testbed, comprising VMs. The top layer are the experiments by the users, utilizing the controller nodes communicating with the LSA Server.

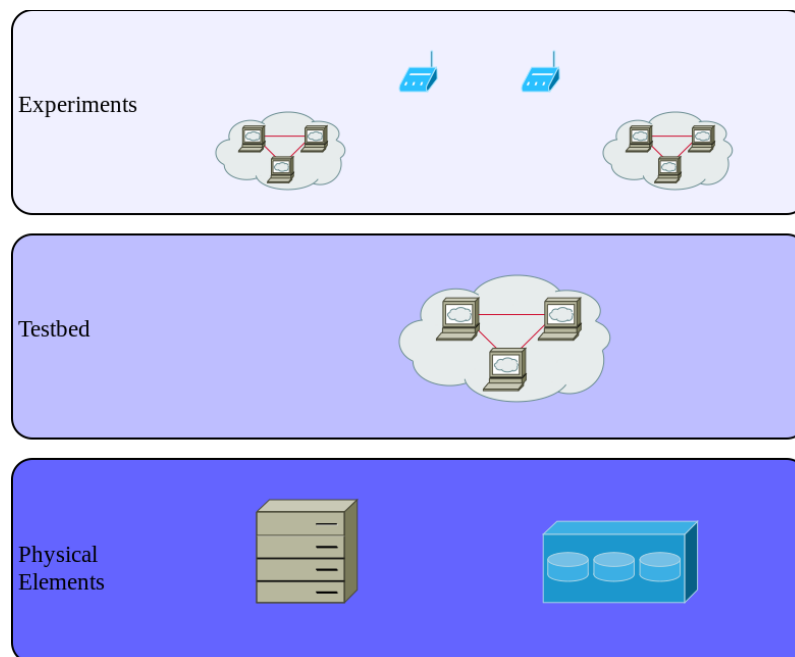


Fig 2. Functional layers



## 3. Setting up an Experiment

Users will be able to setup an experiment using [jFed](#). After the user sends the login information, the AM will authenticate the user, tell him/her which resources will be available to them through RSpecs, and interact with the CBTM on behalf of the user in order to instantiate the available resources. The AM uses the [GENI v3 API](#) which is written as a wrapper of the reference AM.

### 3.1 Federation and Rspec Description

```
<node client_id="controller1" exclusive="true"
component_manager_id="urn:publicid:IDN+futebol.willab.fi+authority+am">
  <sliver_type name="vm">
    <disc_image name="urn:publicid:IDN+futebol.willab.fi+image+controller"/>
  </sliver_type>
</node>
```

## 4. LSA server and base station controllers

LSA Server (IP 192.168.122.8) is running in the Testbed all the time. Only the base station controllers are created and started as requested by the users.

### 4.1 Configuring an eNB controller

The eNB controller software is written in Java and it can be configured with an .ini-file.

```
[TCP_SERVER]
IP = 192.168.122.8
SECURED = FALSE
PORT = 8089

[ENB_CONTROL_SERVICE]
ENB_IP = ? . ? . ? . ?
SECURED = FALSE
CELL_ID = 29291
FREQ_LOW_MHZ = 3545
FREQ_HIGH_MHZ = 3555
# CWC 65.057838, 25.468986
# Centria 64.073712, 24.514855
LATITUDE = 65.057838
LONGITUDE = 25.468986
#//TODO:
SIMULATION_MODE = OFF
WORK_FOLDER = ~/TBD
#not used, only storage:
CWC_WORK_FOLDER = ~/TBD
```



```
[SECURITY]
METHOD = AES
AES_KEY = 1234567890abcdef
```

Execution of eNB controller:

```
cd /opt/Futebol/Client/
./startClient
```

The controller software will run as a daemon.