

# Setting up the Backhaul Controller

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## Hardware Requirements

One PC running a recent Linux distribution. There are no particular hardware requirements. Any reasonably recent laptop/desktop should be able to run the controller.

The reference operating system for this guide is Ubuntu 18.04

## Software Requirements

The following commands will update the package repository and install some dependencies:

```
sudo add-apt-repository universe
sudo apt-get update
sudo apt-get install python3-pip git
```

We recommend to use pip to install all python packages:

```
sudo pip3 install netaddr eventlet oslo_config routes \
tinyrpc webob websocket-client
```

## Running the Controller

Checkout the Ryu Controller repository:

```
git clone https://github.com/5g-empower/empower-ryu.git
```

The Ryu Controller must be executed from a central server that can be reached from all CPPs. From the main repository enter the controller directory:

```
cd empower-ryu
```

and start the controller:

```
PYTHONPATH=./ python3 ./bin/ryu-manager --observe-links ryu.app.intent
```

If all the python dependencies are satisfied you should see an output like this:

```
loading app ryu.app.intent
loading app ryu.controller.ofp_handler
loading app ryu.topology.switches
loading app ryu.controller.ofp_handler
creating context wsgi
instantiating app ryu.app.intent of Intent
Trying to connect to controller ws://127.0.0.1:4444/
```

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### Acknowledgements

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```
Socket ws://127.0.0.1:4444/ closed...
Unable to connect, trying again in 2s
instantiating app ryu.controller.ofp_handler of OFPHandler
instantiating app ryu.topology.switches of Switches
(5650) wsgi starting up on http://0.0.0.0:8080
```

Clone this wiki locally

<https://github.com/clicknf/clicknf.github.io/wiki/Setting-up-the-Backhaul-Controller>



## Configuration Process

No configuration is needed for EmPOWER Controller which will automatically discover the Ryu controller if they both run on the same machine.