ChatGPT

**Ryu SDN Controller Installation Guide (Python 3.10 Environment)**

This guide provides step-by-step instructions for installing the Ryu SDN controller in an isolated Python 3.10 virtual environment on a Ubuntu/Debian-based Linux system.

---

### 1. System Update & Required Packages

```
sudo apt update && sudo apt upgrade -y
sudo apt install -y git python3.10 python3.10-venv python3.10-dev build-
essential \
    libffi-dev libssl-dev libxml2-dev libxslt1-dev zlib1g-dev \
    libjpeg-dev libpq-dev libevent-dev libyaml-dev \
    libsqlite3-dev libreadline-dev libbz2-dev libncursesw5-dev libgdbm-dev \
    curl wget nano net-tools
```

### 2. Clone the Ryu Repository

```
cd ~
git clone https://github.com/faucetsdn/ryu.git
```

### 3. Create and Activate Python 3.10 Virtual Environment

```
python3.10 -m venv ryu-env
source ryu-env/bin/activate
```

### 4. Upgrade pip, setuptools, wheel

```
pip install --upgrade pip setuptools wheel
```

### 5. Fix the Build Hook (Required for Python 3.12+)

If you're on Python 3.12+, create this file. If using Python 3.10, this step is not required.

```
nano ~/ryu/ryu/hooks.py
```

**Paste the following minimal stub code:**

```
# Minimal stub to avoid build errors in Python 3.12+
def save_orig():
    pass

def setup_hook(config):
    pass
```

Save and close (`Ctrl + O`, Enter, then `Ctrl + X`).

### 6. Install Ryu Inside Virtual Environment

```
cd ~/ryu
pip install .
```

### 7. Verify Ryu Installation

```
ryu-manager --version
```

Expected output:

```
ryu-manager 4.34
```

### 8. Run a Ryu Application

```
ryu-manager ryu.app.simple_switch
```

---

### 9. Using Mininet to Connect to Ryu

Install Mininet (if not installed):

```
sudo apt install mininet -y
```

Start a basic topology:

```
sudo mn --controller=remote --topo single,3,3
```

Mininet commands:

- `pingall` — to test connectivity
- `net` or `dump` — to view topology
- `exit` — to stop Mininet

---

## Notes

- Always activate the virtual environment before running `ryu-manager`:

```
source ~/ryu-env/bin/activate
```

- You can add your own Ryu apps in `ryu/ryu/app/` and load them with `ryu-manager your_app.py`

---

**Ryu is now ready and integrated with Mininet for your SDN experiments!**