

Deploy Apps on NanoCAD Group Page

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February 2025

1 Introduction

This instruction can help you deploy your dash-based applications on our lab server (nanocad.ee.ucla.edu). You can log in to this server with username: **nanocad**, so that you can install the necessary packages as an administrator. ChatGPT can absolutely help a lot during this process. Don't hesitate to ask ChatGPT any questions.

2 Methodology

2.1 Set Up Your Server

Install required packages.

```
1 sudo apt update
2 sudo apt upgrade -y
3 sudo apt install apache2 nginx python3 python3-venv python3-pip -y
```

2.2 Set Up Your Dash Application

2.2.1 Create a Project Directory

For example, my GUI is under this directory ~/APP/YAP_GUI. In this directory, we need to create our own python virtual environment (venv). In this virtual environment, you need to install everything that your application needs in order to execute properly.

```
1 mkdir -p ~/APP/YAP_GUI
2 cd ~/APP/YAP_GUI
3 python3 -m venv venv
4 source venv/bin/activate
```

Then, we need to install dash and gunicorn.

```
1 pip install dash gunicorn
```

2.2.2 Create Your Own Application File

Take my application as an example here. My GUI is implemented in ~/APP/YAP_GUI/YAP_GUI.py. Here is an application file example:

```
1 import dash
2 import dash_html_components as html
3
4 app = dash.Dash(__name__, requests_pathname_prefix="/yap_gui/")
5 # So that your app can be deployed at https://nanocad.ee.ucla.edu/yap_gui
6
7 app.layout = html.Div([
8     html.H1("Hello, this is YAP GUI!"),
9     html.P("This is a Dash application hosted on a lab server.")
10 ])
11
12 server = app.server
13
14 if __name__ == "__main__":
15     # Execute your application at port 8050
16     app.run_server(host="0.0.0.0", port=8050, debug=False)
```

2.3 Configure Gunicorn to Run Dash

2.3.1 Create a Systemd Service

```
1 sudo nano /etc/systemd/system/yap_gui.service
```

Paste the following:

```
1 [Unit]
2 Description=Dash App - YAP GUI
3 After=network.target
4
5 [Service]
6 User=nanocad
7 Group=nanocad
8 WorkingDirectory=/home/nanocad/APP/YAP_GUI
9 ExecStart=/home/nanocad/APP/YAP_GUI/venv/bin/gunicorn -w 4 -b 127.0.0.1:8050 YAP_GUI:
  server
10 Restart=always
11
12 [Install]
13 WantedBy=multi-user.target
```

2.3.2 Start and Enable the Service

This will enable the service just created by you.

```
1 sudo systemctl daemon-reload
2 sudo systemctl start yap_gui
3 sudo systemctl enable yap_gui
```

Verify the service is running.

```
1 sudo systemctl status yap_gui
```

Expected output:

```
1 yap_gui.service - Dash App - YAP GUI
2   Active: active (running)
3   .....
```

2.4 Configure NGINX as a Reverse Proxy

2.4.1 Create an NGINX Configuration

Create the configuration file

```
1 sudo nano /etc/nginx/sites-available/yap_gui
```

Paste the following:

```
1 server {
2     # Here it is 8081 so that it will not overlap with ports currently being used
3     listen 8081;
4     server_name your_lab_server;
5
6     location /yap_gui { # Your app address suffix
7         rewrite ^/yap_gui(/.*)$ $1 break;
8         proxy_pass http://127.0.0.1:8050/;
9         proxy_set_header Host $host;
10        proxy_set_header X-Real-IP $remote_addr;
11        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
12        proxy_set_header X-Forwarded-Proto $scheme;
13    }
14 }
```

2.4.2 Enable the NGINX Configuration

```
1 # Link your nginx configuration file from -available to -enabled
2 sudo ln -s /etc/nginx/sites-available/yap_gui /etc/nginx/sites-enabled/
3 sudo nginx -t # Test for syntax errors
4 sudo systemctl restart nginx
```

Verify NGINX is listening:

```
1 sudo netstat -tulnp | grep nginx
```

Expected Output:

```
1 # 8081 will be the port number specified in the nginx configuration file
2 tcp 0 0 0.0.0.0:8081 0.0.0.0:* LISTEN <nginx_pid>/nginx
```

Test NGINX

```
1 curl -I http://127.0.0.1:8081/yap_gui
```

Expected response:

```
1 HTTP/1.1 200 OK
```

2.5 Configure Apache to Serve the GUI

Apache will proxy requests from `https://nanocad.ee.ucla.edu/yap_gui` to `http://127.0.0.1:8081/yap_gui`. **Notice!** Don't stop Apache service if not necessary or our group page will be down.

2.5.1 Modify 000-default.conf

```
1 sudo nano /etc/apache2/sites-available/000-default.conf
```

Add the following **before** `</VirtualHost>`:

```
1 ProxyPass "/yap_gui" "http://127.0.0.1:8081/yap_gui/"
2 ProxyPassReverse "/yap_gui" "http://127.0.0.1:8081/yap_gui/"
3
4 # Allow WebSockets (for Dash real-time updates)
5 ProxyRequests Off
6 ProxyPreserveHost On
7 <Proxy *>
8     Require all granted
9 </Proxy>
```

2.5.2 Enable Proxy Modules

```
1 sudo a2enmod proxy
2 sudo a2enmod proxy_http
3 sudo a2enmod proxy_wstunnel
4 sudo systemctl restart apache2
```

2.5.3 Test Apache

```
1 curl -I https://nanocad.ee.ucla.edu/yap_gui
```

Expected response:

```
1 HTTP/1.1 200 OK
```

2.6 Verify Everything

Check if all services are running

```
1 sudo systemctl status apache2 nginx yap_gui
```

Expected:

```
1 apache2.service - Active: running
2 nginx.service - Active: running
3 yap_gui.service - Active: running
```

Test in your browser https://nanocad.ee.ucla.edu/yap_gui. You should now see your Dash application online!

3 Maintenance

After updating your GUI code, restart the service by running the following commands:

```
1 source venv/bin/activate
2 sudo systemctl restart yap_gui
3 sudo systemctl restart nginx
```
