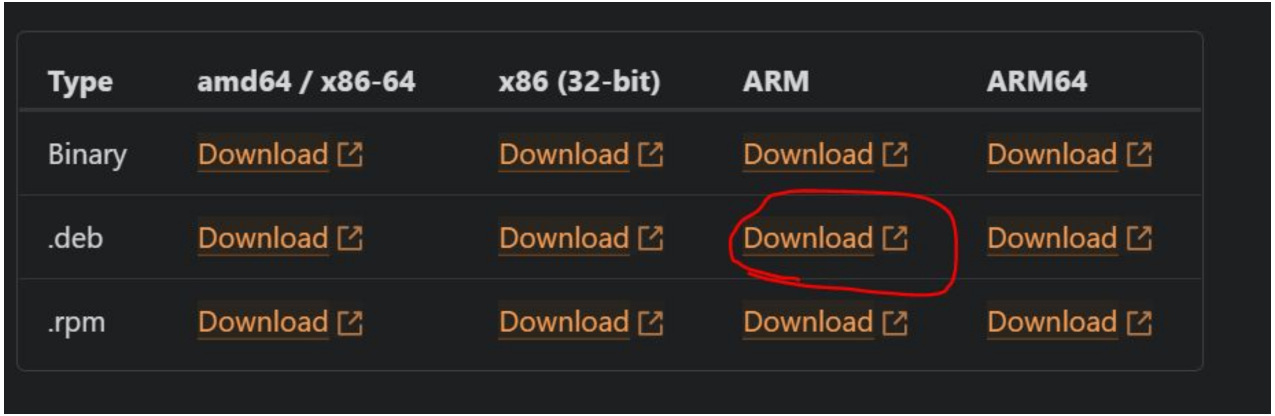
Cloudflared setup on PYNQ

Simplified

Install Cloudflared on PYNQ

- Download the 32 bit .deb package

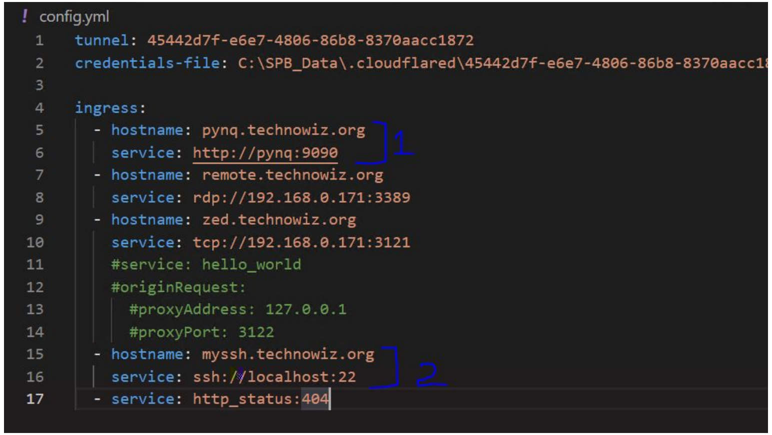


Type	amd64 / x86-64	x86 (32-bit)	ARM	ARM64
Binary	Download	Download	Download	Download
.deb	Download	Download	[✓ Download]	Download
.rpm	Download	Download	Download	Download

- `dpkg -I package_name.deb   //Get the Architecture of the package`
- `dpkg --add-architecture arm`
- `dpkg -i package_name.deb`

Configure Cloudflared on PYNQ

- `cloudflared tunnel login`
    - Copy the URL from the terminal and open it in a browser (on a PC) and authenticate the login
    - Once authenticated a cert.pem file will be downloaded to the Board
- `cloudflared tunnel create pynq1`
    - Create a tunnel for the PYNQ Board by giving a name
    - This will create a JSON file with a unique ID for the tunnel
- Create a config.yml file with the following configuration



config.yml

```yaml
tunnel: 45442d7f-e6e7-4806-86b8-8370aacc1872
credentials-file: C:\SPB_Data\.cloudflared\45442d7f-e6e7-4806-86b8-8370aacc18

ingress:
  - hostname: pynq.technowiz.org
    service: http://pynq:9090
  - hostname: remote.technowiz.org
    service: rdp://192.168.0.171:3389
  - hostname: zed.technowiz.org
    service: tcp://192.168.0.171:3121
    #service: hello_world
    #originRequest:
      #proxyAddress: 127.0.0.1
      #proxyPort: 3122
  - hostname: myssh.technowiz.org
    service: ssh://localhost:22
  - service: http_status:404
```

- - [1] exposes the pynq:9090 on pynq.technowiz.org

- [2] exposes the terminal of the machine running rphax on myssh.technowiz.org

Using [2] the user can generate the bitstream using the RPHAX flow, and use the same in the jupyter notebook [1]

Note: [1] and [2], can be added in the cloudflare instance of PYNQ, or even on a PC or any device connected to the same local network.

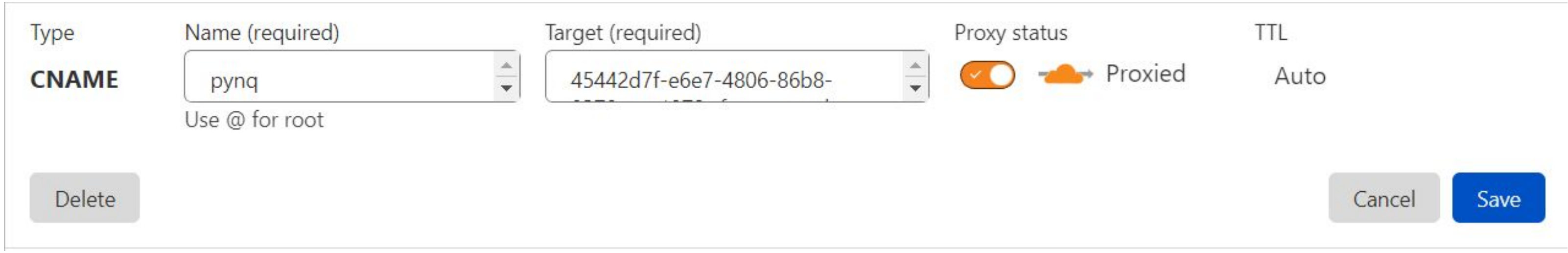
Install cloudflare as a service on PYNQ

- cloudflared service install
- systemctl start cloudflared
- systemctl status cloudflared

- Cloudflared is installed, and the board just needs to be powered up and connected to the internet to be accessed from mysubdomian.mydomain.com

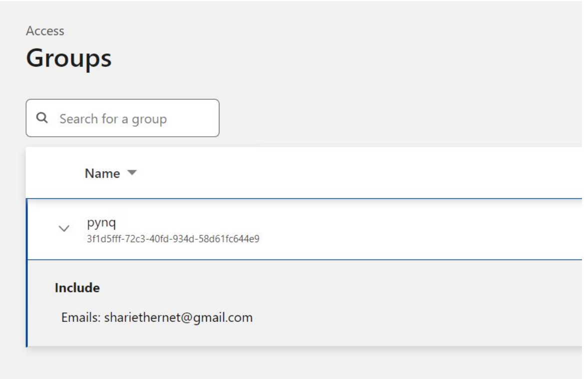
Configurations on Cloudflare Dashboard

- Add CNAME record that points mysubdomain.mydomain.com to tunnelid.cfargotunnel.com



Type	Name (required)	Target (required)	Proxy status	TTL
CNAME	pynq Use @ for root	45442d7f-e6e7-4806-86b8-	Proxied	Auto

- To enable authentication add Access Policies, and set email as the authentication option



Access

Groups

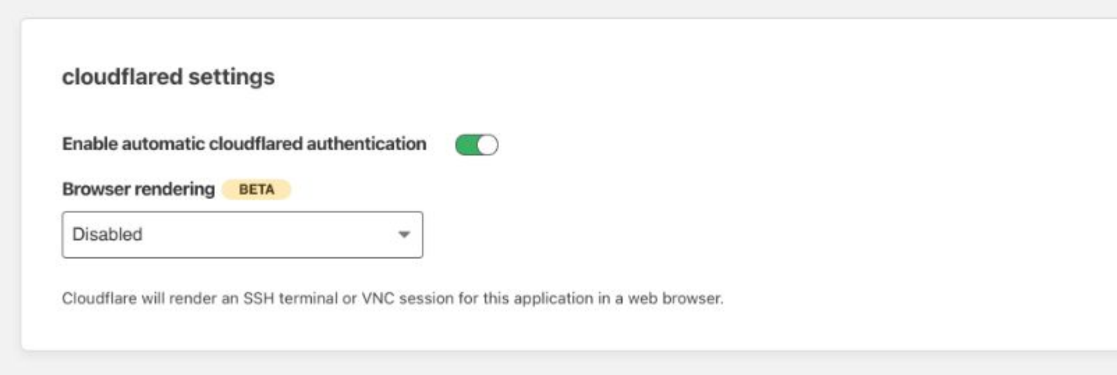
pynq
3f1d5fff-72c3-40fd-934d-58d61fc644e9

Include

Emails: shariethernet@gmail.com

RPHAX on Cloudflared

- Machine/Container running RPHAX must be associated with a subdomain
- On the client side -ssh configuration
  - Host myssh.technowiz.org
  - ProxyCommand /usr/local/bin/cloudflared access ssh --hostname %h
- To render the terminal on browser
  - Enable browser rendering in Cloudflared Zero Trust



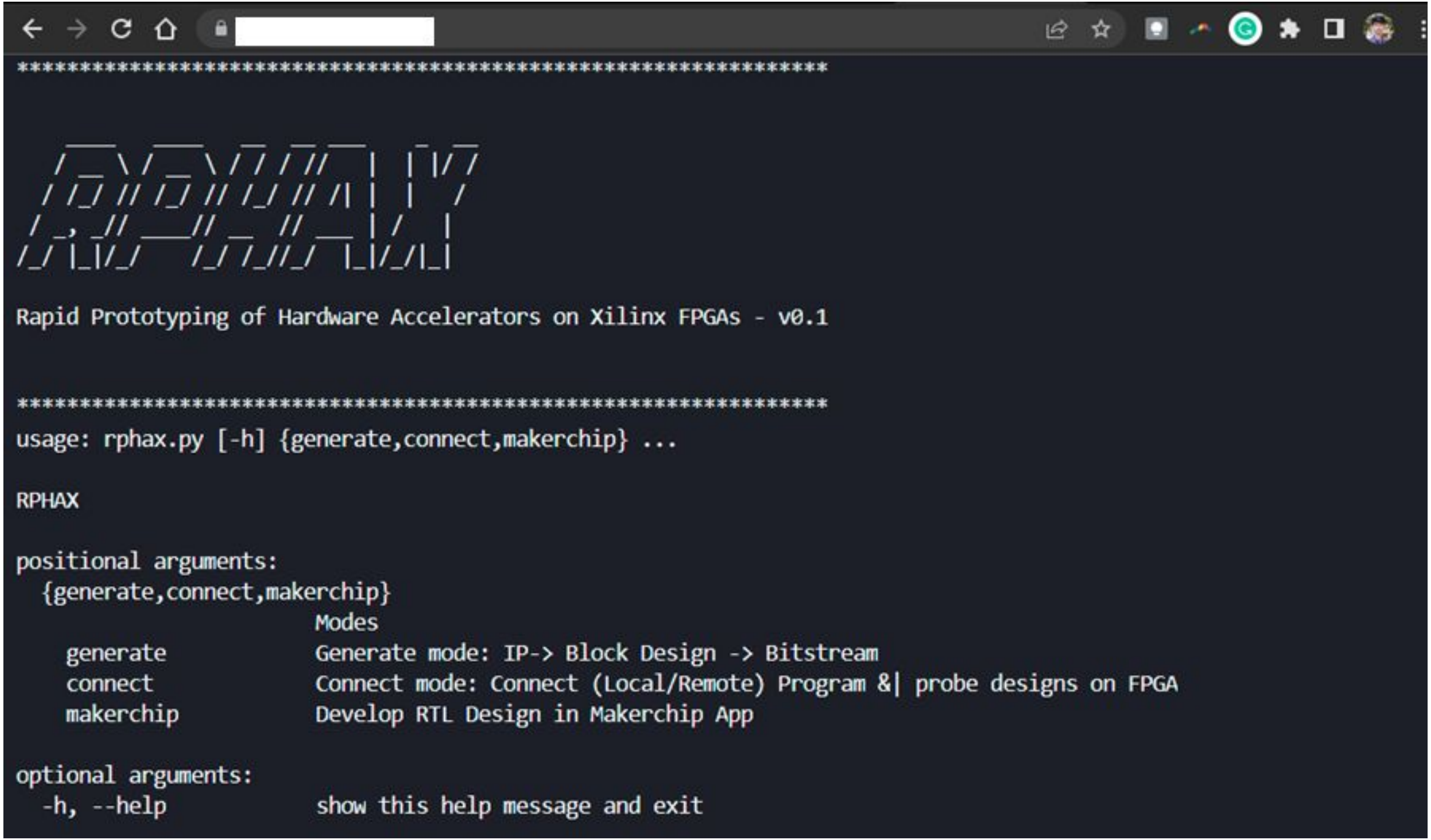
cloudflared settings

Enable automatic cloudflared authentication ●

Browser rendering BETA

Disabled ▾

Cloudflare will render an SSH terminal or VNC session for this application in a web browser.



```
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Rapid Prototyping of Hardware Accelerators on Xilinx FPGAs - v0.1


*****************************************************************
usage: rphax.py [-h] {generate,connect,makerchip} ...

RPHAX

positional arguments:
  {generate,connect,makerchip}
                        Modes
    generate            Generate mode: IP-> Block Design -> Bitstream
    connect             Connect mode: Connect (Local/Remote) Program &| probe designs on FPGA
    makerchip           Develop RTL Design in Makerchip App

optional arguments:
  -h, --help            show this help message and exit
```

Proposed use model

- Encapsulate cloudflared setup on PYNQ and interaction with cloudflare dashboard to assign a domain
  - Usage of sub-domain can be eliminated if <tunnelid>.cfargotunnel.com is chosen
  - However, cloudflare account with domain is required to setup tunnels
- Owner of PYNQ (Citizen) plugins in the board, runs the “rphax connect” and the terminal provides the subdomain/URL to access the notebook
- This URL can be shared with any user to remotely access PYNQ
- RPHAX can be run locally at the user end or remotely, but accessed through the browser.

Thanks!