Deploying Orthanc as a secured cloud PACS

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Summary

● Orthanc Team presentation
● Goal
● Prerequisites
● Machine configuration
● “A” record
● Nginx, Certbot and Let’s Encrypt
● Setup configuration
● Run and test
● Default passwords change
● Labels
● Shares
● Q/A
Community:
- Public support + doc
- Orthanc dev
- Plugin dev
- Stone Viewer plugin

Funding:
- Open Collective
- Customers

Customers:
- Dedicated support/training
- Orthanc + plugin dev
- Inter-hospitals transfers + CD-ROM importer
- Orthanc as a mini-pacs - including:
  - Ability to share studies
  - Ability to modify studies
  - Ability to manage users
  - Ability to manage permissions (labels)
Goal: Deploy a secured Orthanc in the cloud

- Dedicated domain name
- https
- Access control
- Permissions

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Prerequisites

Cloud server
- Debian 11
- 2 cores CPU, 16GB RAM
- HD: 120GB + storage (SSD)
- Admin rights
- Open ports: 443, 80, 22
- Use LVM
- Fix IP

Domain name
- orthanc.team
Machine configuration

- `apt update && apt upgrade`
- `apt install git`
- Install Docker: [https://docs.docker.com/engine/install/debian/#install-using-the-repository](https://docs.docker.com/engine/install/debian/#install-using-the-repository)
Modify (or create) this file:

/etc/docker/daemon.json

And insert this:

```json
{
  "log-driver": "journald"
}
```

Then, restart Docker daemon:

```bash
systemctl restart docker
```
"A" record

- Get the public IP address of your cloud server:

```
curl httpbin.org/ip
```

- Add an "A record" in the configuration tool of your registrar:
Nginx, Certbot and Let’sEncrypt

- `apt install nginx`

![Welcome to nginx!](image)

⚠️ 24 hours could be needed
Nginx, **Certbot** and Let’sEncrypt

- `apt install certbot python3-certbot-nginx`
- `certbot --nginx -d orthanc-con-2023.orthanc.team`

```
Account registered.
Requesting a certificate for orthanc-con-2023.orthanc.team
Performing the following challenges:
http-01 challenge for orthanc-con-2023.orthanc.team
Waiting for verification...
Cleaning up challenges
Deploying Certificate to VirtualHost /etc/nginx/sites-enabled/default
Redirecting all traffic on port 80 to ssl in /etc/nginx/sites-enabled/default

Congratulations! You have successfully enabled https://orthanc-con-2023.orthanc.team
```
Nginx, Certbot and Let’s Encrypt

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.
Nginx, Certbot and Let’sEncrypt (reverse proxy config)

- Clean `/etc/nginx/sites-available/default`

```nginx
server {

    server_name orthanc-con-2023.orthanc.team; # managed by Certbot

    location / {
        proxy_pass http://127.0.0.1:8080;
        proxy_set_header Host $http_host;
       (proxy_request_buffering off;
        proxy_max_temp_file_size 0;
        client_max_body_size 0;
    }

    listen [::]:443 ssl ipv6only=on; # managed by Certbot
    listen 443 ssl; # managed by Certbot

    ssl_certificate /etc/letsencrypt/live/orthanc-con-2023.orthanc.team/fullchain.pem; # managed by Certbot
    ssl_certificate_key /etc/letsencrypt/live/orthanc-con-2023.orthanc.team/privkey.pem; # managed by Certbot
    include /etc/letsencrypt/options-ssl-nginx.conf; # managed by Certbot
    ssl_dhparam /etc/letsencrypt/ssl-dhparams.pem; # managed by Certbot
}

server {

    if ($host = orthanc-con-2023.orthanc.team) {
        return 301 https://$host$request_uri; # managed by Certbot
    }

    listen 80 ;
    listen [::]:80 ;

    server_name orthanc-con-2023.orthanc.team;

    return 404; # managed by Certbot
}
```

- Restart Nginx:

```
systemctl restart nginx
```
Nginx, Certbot and Let’sEncrypt

502 Bad Gateway

nginx/1.18.0
Architecture
Setup configuration

- Clone the repo
  ```
git clone https://github.com/orthanc-team/orthanc-con-2023.git
  ```
- Modify the passwords in the 2 files located in the `secret` folder:
  
  `KEYCLOAK_ADMIN_PASSWORD` → Will be needed to manage the users

  `SECRET_KEY` → must have a very high entropy (but never typed)
Setup configuration

- Edit `docker-compose.yml`:
Run and test

- Run `docker compose up -d`
- Wait until all the containers are started:

```
[+] Running 9/9
[+] Running 9/9
   Orthanc-Con-2023_default Creating
   Network orthanc-con-2023_default Created
   Volume "orthanc-con-2023_keycloak-db" Created
   Volume "orthanc-con-2023_orthanc-db" Created
   Container orthanc-con-2023-keycloak-db-1 Started
   Container orthanc-con-2023-orthanc-1 Started
   Container orthanc-con-2023-orthanc-db-1 Started
   Container orthanc-con-2023-orthanc-1 Started
   Container orthanc-con-2023-keycloak-1 Started
   Container orthanc-con-2023-orthanc-auth-service-1 Started
   Container orthanc-con-2023-nginx-1 Started
```

💡 Even if Keycloak container is started, Keycloak itself could take some time to load… be patient!
Run and test

- Try: https://orthanc-con-2023.orthanc.team/
  orthanc change-me
Most important step: change the passwords

From Orthanc itself:

Via Keycloak:

- https://orthanc-con-2023.orthanc.team/keycloak/
- Administration Console
<table>
<thead>
<tr>
<th>Study Date</th>
<th>Accession number</th>
<th># series</th>
</tr>
</thead>
<tbody>
<tr>
<td>20230118</td>
<td>1234</td>
<td>1</td>
</tr>
<tr>
<td>20160203</td>
<td>CR</td>
<td>1</td>
</tr>
<tr>
<td>20130812</td>
<td>CR</td>
<td>1</td>
</tr>
</tbody>
</table>

- **Labels**
  - Labels to add, press Enter to create a new one

- **Study Date**
  - 20230118
  - 20160203
  - 20130812

- **Accession number**
  - 1234
  - CR
  - 2345

- **# series**
  - 1
  - 1
  - 19

**Patient**
- **Patient Name**: John Doe
- **Patient ID**: 1234
- **Study Description**: Chest, 1.2.250.1.439.0.1 ELBOW (L)
- **Modality**: CT

**Series**
- **Series number**: 16
- **Series Description**: ANKLE (R) - fracture suspect
- **Modality**: CT
- **# Instances**: 19
Labels - Permissions

```json
{
  "roles": {
    "admin-role": {
      "permissions": ["all"],
      "authorized_labels": ["*" Steering]}
    },
    "doctor-role": {
      "permissions": ["view", "download", "share", "send"],
      "authorized_labels": ["*" Steering]
    },
    "external-role": {
      "permissions": ["view", "download"],
      "authorized_labels": ["external"]
    }
  }
}
```
Labels (external)
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Shares

Expiration: 7 days
Link: https://orthanc-con-2023.orthanc.tea
NiIsInR5cCI6IkpXVCJ9.eyJpZCI6bnVsbCwicmVzb3VyY2VzIjp0cnVl.eyJkYXRhIjoiMQIiLCJpc3MiOiJ0cnVl
InR5cCI6IkpXVCJ9.eyJpZCI6bnVsbCwicmVzb3VyY2VzIjpcIjIwMjMwNTUwMzUwNDA1NTQ2IiwiaHR0cHM6Ly93d3cu
YnVjaGFtQG1uZXN0cy5wYXJhLmNvbS8iLCJleHBpcmF0aW9uX2R1cmF0aW9uIjo2MjM0MDM9.1ygngp9YWD2Yv7BQi8BRLG2b2Nm_7Dy6opNqODxdGil
 Shares
Questions?

Using Orthanc as part of your commercial activity?

Why not support us on

https://opencollective.com/orthanc