

Sharing DICOM studies with Orthanc

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Community:

- Public support + doc
- Orthanc dev
- Plugin dev
- ~~Stone Viewer plugin~~

Funding:

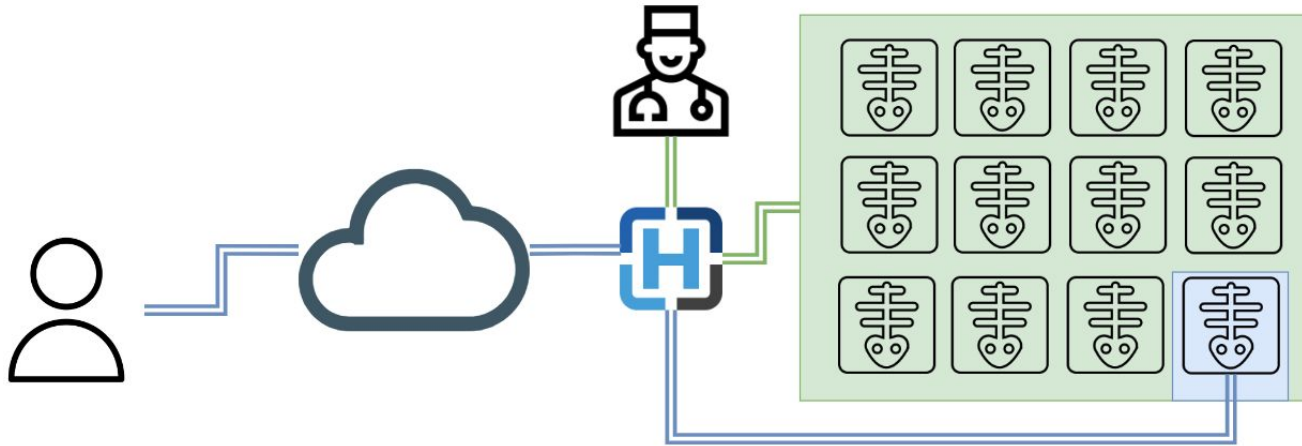
- Osimis
- Open Collective
- Customers

Customers:

- Dedicated support
- Orthanc + plugin dev
- Inter-hospitals transfers + CD-ROM importer
- Orthanc as a mini-pacs - including ability to share studies

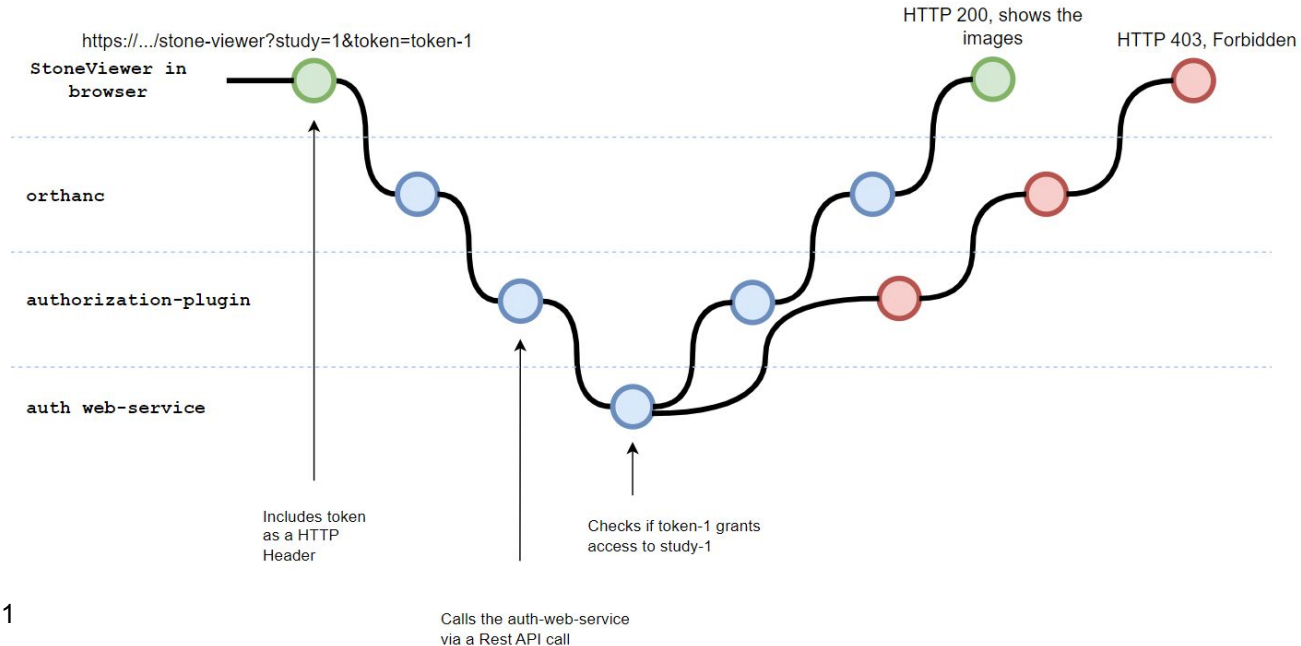
Sharing DICOM studies

- Share a secure link granting access to a single study
- Do not expose your full Orthanc to the world



Orthanc Authorization plugin

- Replaces basic authentication
- Based on HTTP headers
- Identifies the resource being accessed
- Delegates authorization to an external web-service



Authorization web-service

```
@app.post("/auth/validate")
def validate_authorization(validation_request: AuthValidationRequest, auth_header = Header(default=None)):
    granted = False

    if validation_request.dicom_uid == "1" and validation_request.token_value == "token-1":
        granted = True

    response = AuthValidationResponse(
        granted=granted,
        validity=60
    )

    return response
```

More security: Json Web Token (JWT)

Encoded PASTE A TOKEN HERE

```
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJkaWVudS1pZCI6IjEiLCJmcm9udCI6ImVudC1Zbnkh3JtcBCKAtNhXH6FSr4ZQHM
```

Decoded EDIT THE PAYLOAD AND SECRET

HEADER: ALGORITHM & TOKEN TYPE

```
{  "alg": "HS256",  "typ": "JWT"}
```

PAYLOAD: DATA

```
{  "dicom-id": "1"}
```

VERIFY SIGNATURE

```
HMACSHA256(  base64UrlEncode(header) + "." +  base64UrlEncode(payload),  my-secret-key)  secret base64 encoded
```

 Signature Verified

SHARE JWT

More security: token validation

```
@app.post("/auth/validate")
def validate_authorization(validation_request: AuthValidationRequest, auth_header = Header(default=None)):
    granted = False

    token_payload = jwt.decode(validation_request.token_value, "my-secret-key", algorithms="HS256")
    granted = validation_request.dicom_uid == token_payload["dicom-id"]

    response = AuthValidationResponse(
        granted=granted,
        validity=60
    )

    return response
```

More security: token generation

```
@app.post("/generate-token")
def generate_token(dicom_uid: str):
    token_payload = {
        "dicom-id": dicom_uid
    }

    token = jwt.encode(token_payload, "my-secret-key", algorithms="HS256")

    return token
```

Do not expose this web-service !!!!

Need something more user friendly to generate tokens: OE2

ORT ^H ANC MyOrthanc		Patient Birt...	Patient Name	Patient ID	Description	Study Date	Modalities	Accession Number	# ser...
Local studies 75 / 75		19740815	John^Doe	1234	Chest	20220130	☰	1234	
Upload		19440409	SEAN^SANDERSON	ID-SEA-SAN-00000169	Study # 00000677	20061015	CR,CT,DX		3
DICOM Modalities			Anonymized1	e7bed471-33ec-4d10...	PUNHO		CR		1
> findscu		19521007	PIPPA^SKINNER	ID-PIP-SKI-00000053	Study # 00000201	20120418	DX		1
> orthanc-debug		19860411	DIANE^WRIGHT	ID-DIA-WRI-00000347	Study # 00001358	20200518	CR,DX		6
> orthanc4243		19401012	VIRGINIA^MORGAN	ID-VIR-MOR-00000278	Study # 00001083	20101006	CR,DX		2
> orthanc4244		19660715	ALEXANDRA^DAVIDSON	ID-ALE-DAV-00000122	Study # 00000475	20040121	CR,CT,D...		5
> radiant		19750523	BERNADETTE^WALLACE	ID-BER-WAL-00000039	Study # 00000150	20131026	CR,DX		2
> storescu		19521206	LAUREN^FRASER	ID-LAU-FRA-00000409	Study # 00001572	20071104	CR,DX		6
Settings		20030828	FRANK^ROSS	ID-FRA-ROS-00000448	Study # 00001719	20001207	CR		1
Legacy UI		19291213	FIONA^CHURCHILL	ID-FIO-CHU-00000096	Study # 00000375	20211211	CR,DX,MR		5
		20190414	HANNAH^CORNISH	ID-HAN-COR-000000...	Study # 00000076	20040814	CT,MR		2
		19680224	TREVOR^OLIVER	ID-TRE-OLI-00000236	Study # 00000917	20000616	CR		2
		19580331	JOSEPH^MORGAN	ID-JOS-MOR-00000175	Study # 00000697	20171202	CR,DX		2
			Anonymized1	b6a45b55-6441-4993...	MRI LUMBAR SPINE WO		MR		5

Publication link from OE2

ORT_HANC
Orthanc for Admin

Local studies 1 / 2
Upload
Settings
Legacy UI

Patient Birt...	Patient Name	Patient ID	Description	Study Date	Modalities	Accession Number	# ser...
19740815	ORT			20220130		1234	
19720405	ORTHO			20130812	CR		1

Study Date:
Study Time:
Study Description:
Accession Number:
Study ID:
Study Instance U... 1.2.276.0.7230010.3.1...
RequestingPhysician:
ReferringPhysicianNa...
InstitutionName:

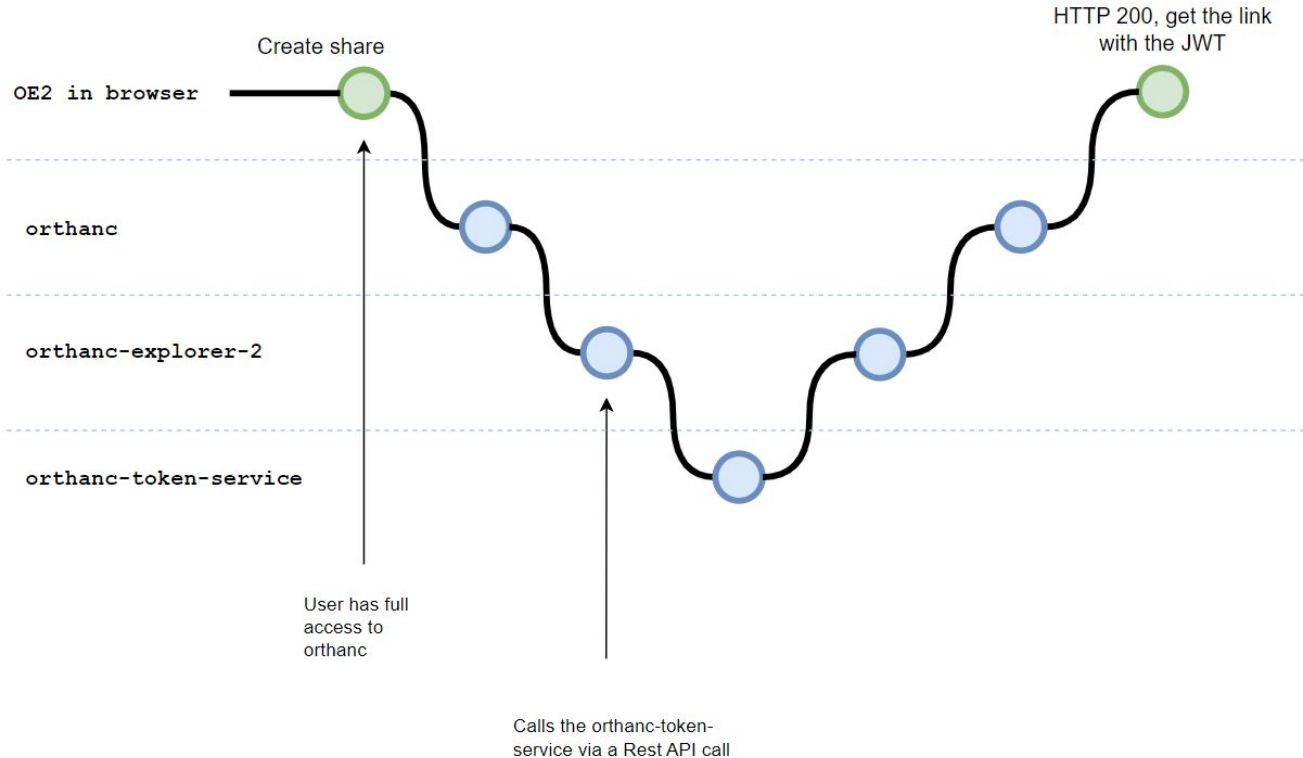
2345
ORTHO
19720405

Expiration: 15 days
Anonymize ?
Link: <http://localhost/welcome/?token=eyJ0e...>

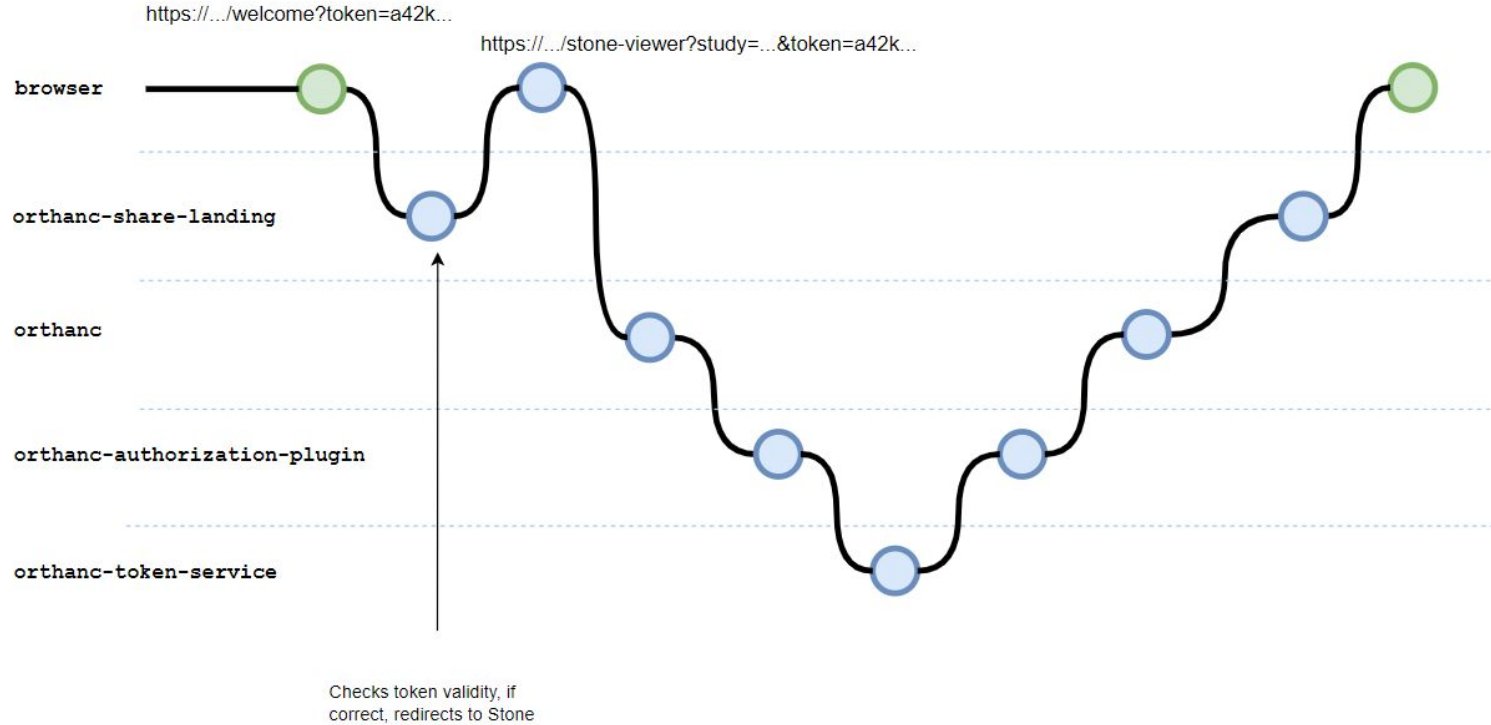
Cancel Copy and close

Series Number	Series Desc...	Modality	# instances
1002	CHEVILLE droite	CR	1

Behind the scene: token generation



Behind the scene: token validation

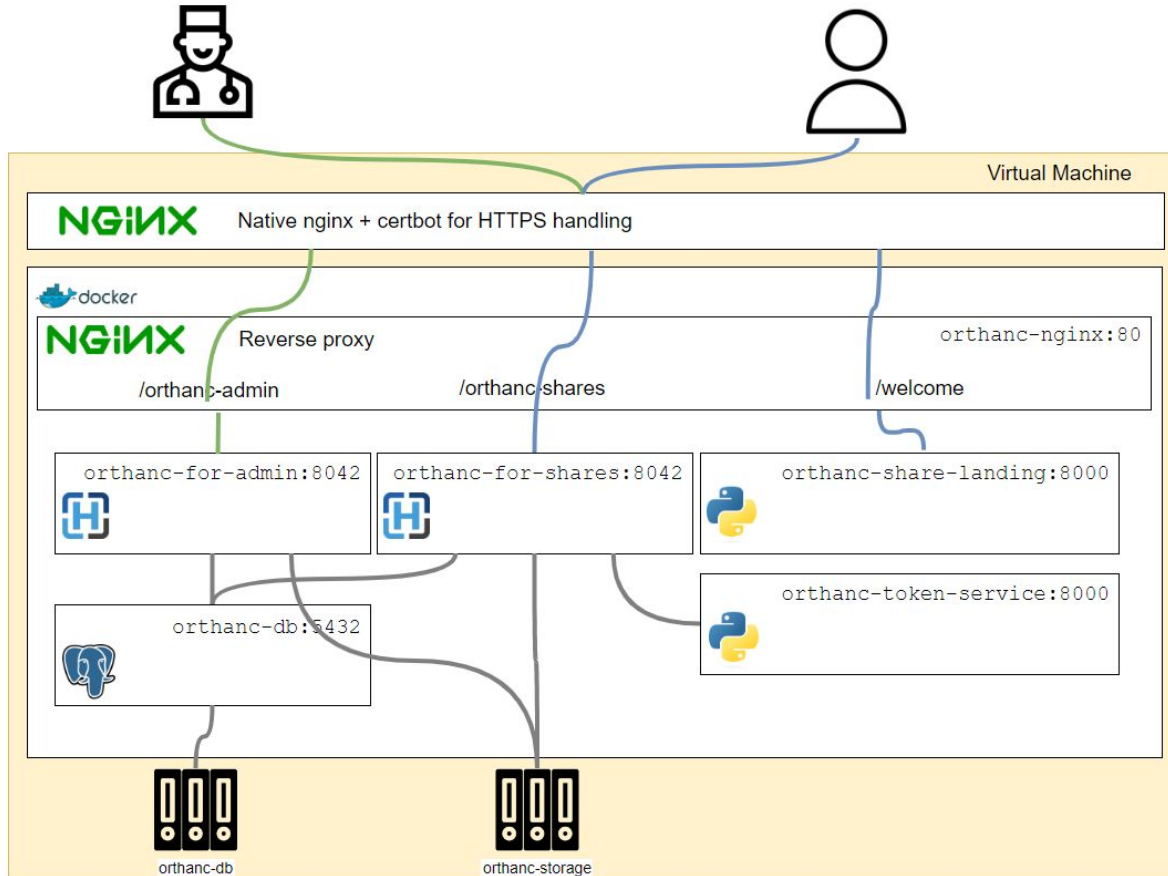


<https://github.com/orthanc-team/orthanc-share>

Complete set of web-services:

- `orthanc-token-service` to generate & validate tokens
- `orthanc-share-landing` to display user friendly messages if tokens are invalid
- **Generates publication links for:**
 - Stone Viewer
 - Osimis Viewer
 - MedDream Viewer (commercial - CE approved)
- **Handles expiration date**
- `orthanc-anonymizer` to handle anonymized publications (still experimental, only works with the Osimis Viewer)
- Full demo setup including integration with Orthanc Explorer 2
- Boilerplate `docker-compose.yml` to bootstrap a setup
- Used in production

Full setup with Docker



Boilerplate docker-compose.yml

```
1 version: "3"
2 services:
3
4   nginx:
5     image: orhancteam/orhanc-nginx:22.11.3
6     depends_on: [orthanc-for-admin, orthanc-for-shares, orthanc-token-service]
7     restart: unless-stopped
8     ports: ["80:80"]
9     environment:
10      ENABLE_ORTHANC_FOR_ADMIN: "true"
11      ENABLE_ORTHANC_FOR_SHARES: "true"
12      ENABLE_ORTHANC_TOKEN_SERVICE: "false"
13
14   orthanc-for-admin:
15     image: osimis/orthanc:22.11.2
16     volumes:
17     - orthanc-storage:/var/lib/orthanc/db
18     depends_on: [orthanc-db]
19     restart: unless-stopped
20     environment:
21     STONE_WEB_VIEWER_PLUGIN_ENABLED: "true"
22     DICOM_WEB_PLUGIN_ENABLED: "true"
23     ORTHANC_POSTGRESQL_HOST: "orthanc-db"
24     ORTHANC_JSON: |
25     {
26       "Name": "Orthanc for Admin",
27       "OrthancExplorer2": {
28         "IsDefaultUI": true,
29         "UiOptions": {
30           "EnableShares": true,
31           "DefaultShareDuration": 0,
32           "ShareDurations": [0, 7, 15, 30, 90, 365]
33         },
34       "Shares": {
35         "TokenService": {
36           "Url": "http://orthanc-token-service:8000/shares"
37         },
38         "Type": "stone-viewer-publication",
39         "EnableStandardShares": true
40       }
41     },
42     "RegisteredUsers": {
43       "admin": "admin"
44     }
45   }
46
47   orthanc-for-shares:
48     image: osimis/orthanc:22.11.2
49     volumes:
50     - orthanc-storage:/var/lib/orthanc/db
51     depends_on: [orthanc-db]
52     restart: unless-stopped
53     environment:
54     ORTHANC_NAME: "Orthanc for shares"
55     ORTHANC_POSTGRESQL_HOST: "orthanc-db"
56     STONE_WEB_VIEWER_PLUGIN_ENABLED: "true"
57     DICOM_WEB_PLUGIN_ENABLED: "true"
58
59     # disable basic auth since we use the auth plugin
60     ORTHANC_AUTHENTICATION_ENABLED: "false"
61     ORTHANC_AUTHORIZATION_STANDARD_CONFIGURATIONS: |
62     ["stone-webviewer"]
63     ORTHANC_AUTHORIZATION_CHECKED_LEVEL: "studies"
64     ORTHANC_AUTHORIZATION_WEB_SERVICE: "http://orthanc-token-service:8000/share"
65
66   orthanc-token-service:
67     image: orhancteam/orthanc-token-service:22.11.3
68     restart: unless-stopped
69     environment:
70     SECRET_KEY: "change-me-I-am-a-secret-key"
71     PUBLIC_ORTHANC_ROOT: "http://localhost/shares/"
72     PUBLIC_LANDING_ROOT: "http://localhost/welcome/"
73
74   orthanc-share-landing:
75     image: orhancteam/orthanc-share-landing
76     restart: unless-stopped
77     environment:
78     SECRET_KEY: "change-me-I-am-a-secret-key"
79     PUBLIC_ORTHANC_ROOT: "http://localhost/shares/"
80     PUBLIC_LANDING_ROOT: "http://localhost/welcome/"
81
82   orthanc-db:
83     image: postgres:14
84     restart: unless-stopped
85     volumes: ["orthanc-db:/var/lib/postgresql/data"]
86     environment:
87     POSTGRES_HOST_AUTH_METHOD: "trust"
88
89   volumes:
90     orthanc-storage:
91     orthanc-db:
```


Future steps for orthanc-share project

- Add extra validations when opening the link: password, patient birth-date
- Generates access codes that human can type (requires an additional DB)
- Reduce the number of web-services to ease deployment. 2 Orthanc on same DB -> can not use SQLite
- Include LetsEncrypt certificate renewal in `orthanc-nginx`
- Send mail with the publication link

Future steps for Orthanc Explorer 2

- Multi-language support
- Actions on multiple selections
- Edit DICOM Tags, split & merge
- Handle predefined user roles
- Handle external users (from KeyCloack ?)
- Edit modalities, peers, dicomweb-servers
- Labels

Questions ?

Using Orthanc as part of your commercial activity ?

Why not support us on



<https://opencollective.com/orthanc>