

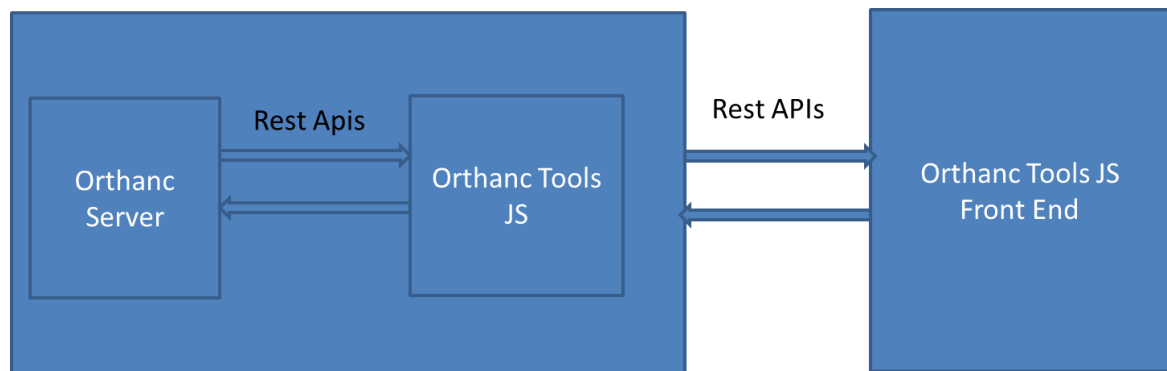
Orthanc-Tools-Js

Documentation Guide

Salim Kanoun

Salim.kanoun@gmail.com

I. Architecture



Orthanc Tools JS software is built on the top of Orthanc and extending its capabilities by:

- Providing a super user-friendly interface to perform complex DICOM operations
- Adding feature to Orthanc such as
 - o Role based access control
 - o Automation in Retrieve, Anonymization to perform batches of DICOM operations
 - o Integration of third party app such as viewers like OHIF or StoneOfOrthanc

Technically, OrthancToolsJS create a Restful API server on the top of Orthanc, this server extends Orthanc capabilities of Orthanc by adding additional high level APIs for some features while it act as a simple reverse proxy for other DICOM features that fully rely on Orthanc built'in features.

The built-in web Front end which is a React web app that can be accessed with any browser, the backend is written on NodeJS/ExpressJS.

OrthancToolsJS licence is Affero General Public Licence v3. This license guarantees the free use of this software for any purpose, without any restrictions (neither time nor number of installations).

Pay attention that according to the license terms

- No warranty are associated with the software
- Modification of the source code **must** be redistributed under the same license and this even if your changes are for your own usage only.
- Software solutions that will be dependent of OrthancToolsJS are prone to be affected by this copyleft licence and **must** also disclose its source code.

More information about licensing is available at <https://www.fsf.org/>

At this stage we do not provide offers of services for OrthancToolsJS, however if you have needs of support service or need of a license exception feel free to contact the maintainer (salim.kanoun@gmail.com)

II. Installation & upgrade

a. Installation

The only supported installation process is through Docker which now have a full support for Windows 10 in addition to the historic Linux support.

The Docker Image name is hosted in DockerHub: `salimkanoun/orthanc-toolsjs:{version_name}`

Orthanc Tools JS needs the following software in the environment

- HTTPS reverse proxy
 - o With a SSL certificate
 - o Add the X-Forwarded-For header for client ip logs
 - o Could be Nginx, Apache, Traefik ...
- Redis
- Postgres database
- Orthanc (obviously)
 - o You can choose to install orthanc through Docker or as standalone app or even in a third party server (All of this doesn't matter as long as OrthancToolsJS can join Orthanc's APIs)
 - o It's recommended to install a database for Orthanc (which will be distinct from OrthancToolsJS database)

A docker compose sample for deployment of Orthanc and OrthancToolsJS is available here: <https://github.com/salimkanoun/Orthanc-Tools-JS/blob/master/docker-compose.yml>

The /data folder need to be mounted to a persistent volume (as it contain the sqlite database, storage for SSL certificate for external upload etc...)

See the docker-compose to set the environment variable

To Benefit for AET/Peers declaration from OrthancToolsJS and to benefit for OHIF integration, edit the following settings in orthanc JSON

- `ORTHANC__DICOM_MODALITIES_IN_DATABASE: "true"`
- `ORTHANC__ORTHANC_PEERS_IN_DATABASE: "true"`
- *`ORTHANC__DICOM_WEB__ENABLE: "true"`*
- *`ORTHANC__DICOM_WEB__ROOT: "/dicom-web/"`*
- *`ORTHANC__DICOM_WEB__ENABLEWADO: "true"`*
- *`ORTHANC__DICOM_WEB__WADOROOT: "/wado"`*
- *`ORTHANC__DICOM_WEB__STUDIESMETADATA: "MainDicomTags"`*
- *`ORTHANC__DICOM_WEB__SERIESMETADATA: "Full"`*

Italicized item are for OHIF integration

b. Upgrade

Until we will reach a stable version >1.0.0 the database schema will not be stable nor upgradable, so you will need to wipe all previous install and do a fresh install (in practice, wipe the persistence storage of OrthancToolsJS)

To upgrade simply upgrade the container version.

c. Other kind of installations

It would be theoretically possible to run Orthanc Tools JS in Windows, Linux, MacOS without docker.

However we choose do to not support these install as it will rely on unofficial port of some component (such as windows version of Redis).

If you have skills to package software for this OS you are more than welcome to contribute by building those packages and / or writing documentation for these installs.

III. Login

Default Access :

Login : admin

Password : admin



IV. Orthanc Server declaration

By default the Orthanc server connexion settings is set to <http://localhost:8042>, with no login or password.
If you have a different Orthanc location or if you add login / password, go to Options -> General and fill the form accordingly, click “update” to apply new connexion settings.
Press “test connexion” to check that your Orthanc server can be correctly reached

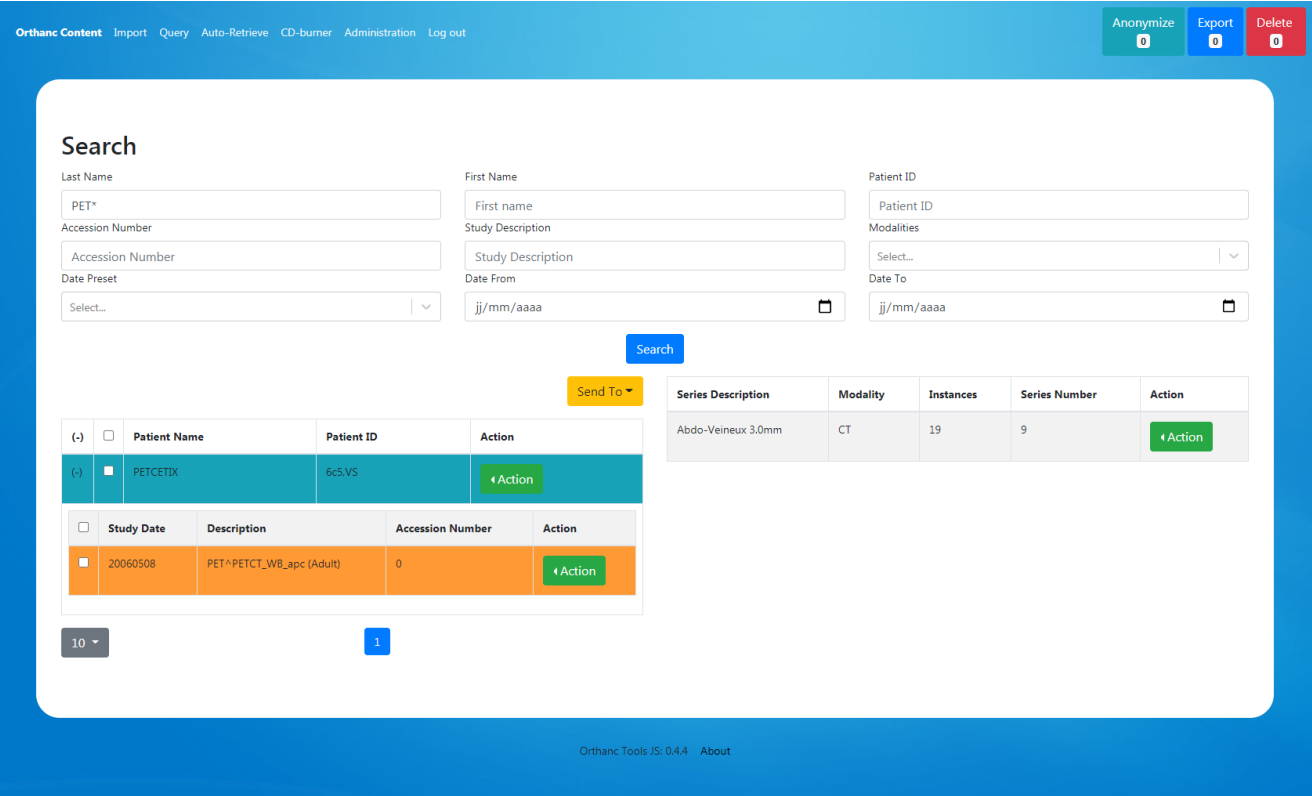
V. Main features

a. Orthanc Content

The Orthanc Content tab, allows you to search for resources in your Orthanc Server.

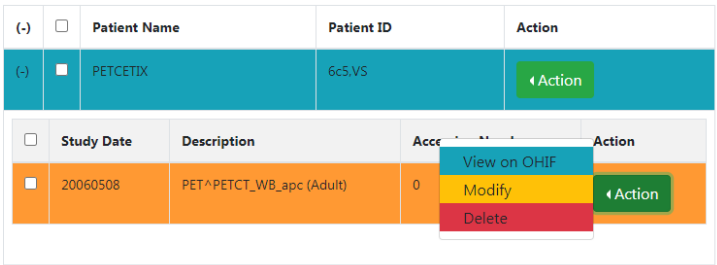
You can use the search form to search for specific queries (done at Study level).

The results appears in dynamic table, the left column displays the Patient / Study level, at a study click the right column displays the series level.



At each Level an “Action” button gives you access to additional functionalities such as:

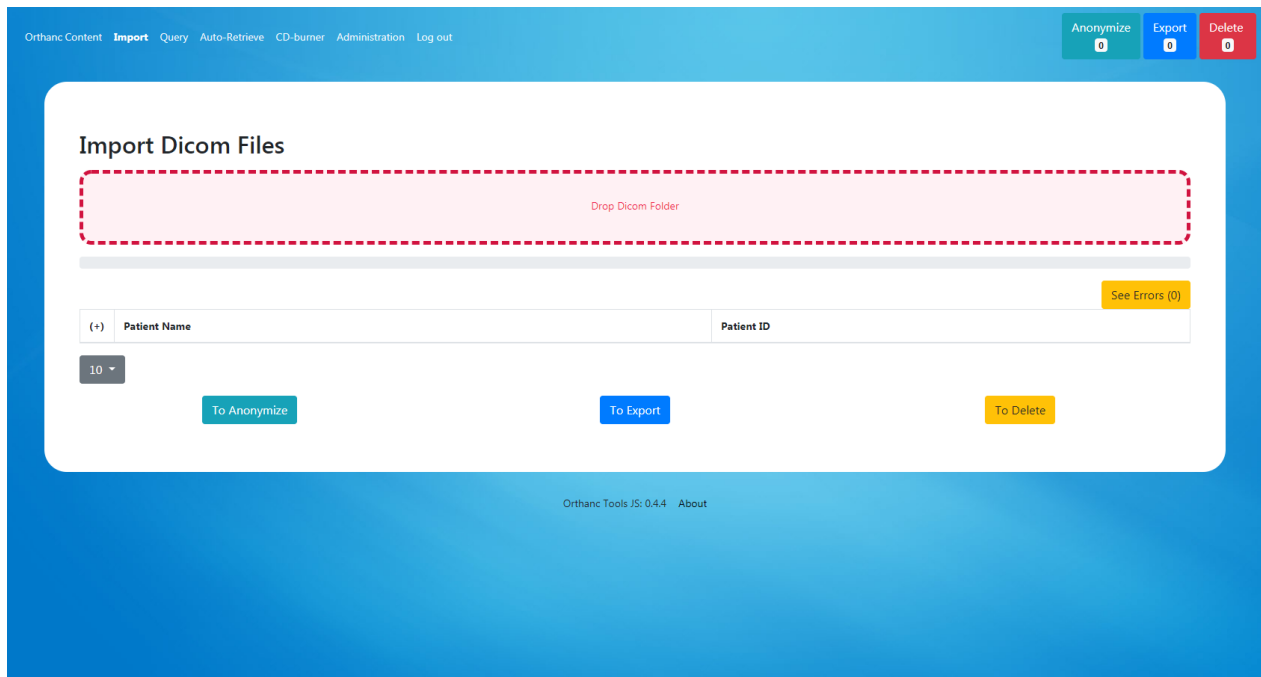
- Modify (Dicom Edition, all levels)
- Delete (all levels)
- View on OHIF (Study level)
- Metadata (Series level)



b. Import Dicom files

To import local dicom in Orthanc Server, simply drag and drop the dicoms files and folder in the dropzone.

The import is recursive in all folders and non dicoms files will not break import.



c. Anonymize / Export / Delete

At the right upper corner of Orthanc Tools JS you will see three tools: Anonymize, Export, Delete.

These tools can be seen as “baskets” to perform the anonymization, export or deletion action on a batch of resources.

You can add ressources (patients, studies) from many other modules of Orthanc Tools JS using the “To Anon List”, “To Export List”, “To Delete List” that you will find in several place of the software, allowing the dicom ressources to jump from a tool to another.

i. Anonymize

You can define a list of anonymisation, the anonymization is done at study level.

The GUI shows the patient level at the left table and study level in the right table.

The tables are editable to define, new patient name, patient ID, study description.

The Anonymization process follows the NEMA 2017c Guideline.

Two anonymization profiles are predefined in Orthanc Tools JS:

- Full Anonymization will follow the full Nema 2017c guideline
- Default Anonymization will keep body characteristics (weight, height...) and dates (acquisition date ...) this profile is recommended to anonymize nuclear medicine procedures (NM and PT).

| Original Name | Original ID | New Name | New ID | Remove |
|---------------|-------------|----------------------|----------------------|-------------------------|
| PETCETIX | 6c5.VS | <input type="text"/> | <input type="text"/> | <button>Remove</button> |

10 ▾ 1

prefix AutoFill Empty List

Anon Profile : ▾ Anonymize

| Study Date | Description | New Description | Accession Number | New Accession Number | Remove |
|------------|--------------------------|--------------------------|------------------|----------------------|-------------------------|
| 20060508 | PET^PETCT_WB_apc (Adult) | PET^PETCT_WB_apc (Adult) | 0 | OrthancToolsJS | <button>Remove</button> |

10 ▾ 1

Orthanc Tools JS: 0.4.4 About

Once done, a result table will be shown allowing pushing anonymized resources to Export / Delete tool.

ii. Export

The export is a list of resources that can be export to:

- A simple browser download with transcoding capabilities
- To an AET
- To an Orthanc Peer
- To a FTP/SFTP/WebDav server (not yet ready)

Orthanc Content
Import
Query
Auto-Retrieve
CD-burner
Administration
Log out

Anonymize
0
Export
3
Delete
0

Export

| Patient Name | Patient ID | Study Date | Description | Accession Number | Anonymized ? |
|---|---------------|------------|-------------|------------------|--------------|
| gfhgh0 | gfhgh0 | 20180713 | | OrthancToolsJS | Yes |
| gfhgh0 | gfhgh0 | 20180713 | | OrthancToolsJS | Yes |
| Femoral trombenarterectomy^Case Report: | Case Report 1 | 20110824 | | | No |

| Series Description | Modality | Instances | Series Number | Remove |
|--------------------|----------|-----------|---------------|--------|
| | MR | 1200 | 11 | Remove |

10

1

Empty List

Download

Send To Modality

Send To Peer

Send To FTP

Send To WebDav

Implicit VR Endian

Orthanc Tools JS: 0.4.4 About

iii. Delete

The deletion tool is a simple list a resource that will be deleted when the deletion process will be triggered.

Delete List

Delete
1

Empty List

| (+) | Patient Name | Patient ID | Remove |
|-----|--------------|------------|--------|
| (+) | Anonyme | 3682 | Remove |

10

1

Delete List

d. Query / Retrieve

Using a similar way to Orthanc Content you can do Query / Retrieve in your declared AETs.

The Study results are expandable to display related series.

The screenshot shows the 'Query' tab in the Orthanc Tools application. The interface includes a top navigation bar with links to 'Orthanc Content', 'Import', 'Query', 'Auto-Retrieve', 'CD-burner', 'Administration', and 'Log out'. On the right, there are buttons for 'Anonymize', 'Export', and 'Delete', each with a counter (0, 0, 0 respectively).

The 'Query' section contains several input fields for filtering results:

- Last Name: g*
- Accession Number: (empty)
- Date Preset: Select...
- First Name: First name
- Study Description: (empty)
- Date From: jj/mm/aaaa
- Patient ID: Patient ID
- Modalities: Select...
- Date To: jj/mm/aaaa

A 'PACS' button is located below the filters.

The results are displayed in a table with the following columns: Patient Name, Patient ID, Accession Number, Acquisition Date, Study Description, Modalities, Series, Instances, and Retrieve. The first row shows results for 'GLIROPAD1' with 1 series and 1200 instances. A 'Retrieve' button is available for each row.

Below the table, there is a 'Serie Description' section with a table showing 'Modality' (MR), 'Serie Number' (11), and 'Instances' (1200). A 'Retrieve' button is also present here.

At the bottom, there is a pagination bar showing '10' items per page and a total of '1' page.

e. Auto Retrieve

This feature allows you to make mass retrieve of DICOM from a PACS.

You can predefine a list of query to be done and retrieved and schedule it to be started outside working hour.

A robot will retrieve resources one by one to your Orthanc Server.

In the Query tab, define the list of queries you want to do:

- Click the "Add" button to open a new line and edit the wanted filed
- The table can be saved / imported using CSV file

Orthanc Content
Import
Query
Auto-Retrieve
CD-burner
Administration
Log out

Anonymize
0
Export
0
Delete
0

Query List
Results
My Retrieve Robot

Drop CSV File

Add
Delete Selected
Empty Table
Export CSV

| | Patient Name | Patient ID | Accession Number | Date From | Date To | Study Description | Modalities | AET |
|--------------------------|---|--|--|-------------------------------------|-------------------------------------|--|---|---|
| <input type="checkbox"/> | <input type="text" value="Enter Patient Name"/> | <input type="text" value="Enter Patient ID..."/> | <input type="text" value="Enter Accession A"/> | <input type="text" value="jj/mm/"/> | <input type="text" value="jj/mm/"/> | <input type="text" value="Enter Study"/> | <input type="text" value="Enter Modality"/> | <input type="text" value="Enter AET..."/> |
| <input type="checkbox"/> | Modify | Modify | Modify | Modify | Modify | Modify | Modify | Modify |
| <input type="checkbox"/> | Patient1 | | | | | | | PACS |
| <input type="checkbox"/> | | ID2 | | | | | | Click To Choose |

10
1
Query

Orthanc Tools JS: 0.4.4
About

By clicking the “Query” Button, the defined queries will be done and results shown in the “results” tab.

Orthanc Content
Import
Query
Auto-Retrieve
CD-burner
Administration
Log out

Anonymize
0
Export
0
Delete
0

Query List
Results
My Retrieve Robot

Export CSV
Delete Selected
Empty Table
Filter Series

| | Patient Name | Patient ID | Accession Number | Acquisition Date | Study Description | Modalities | AET | Series | Instances |
|--------------------------|---|--|--|-------------------------------------|----------------------------------|--|--|--------|-----------|
| <input type="checkbox"/> | <input type="text" value="Select..."/> | <input type="text" value="Select..."/> | <input type="text" value="Select..."/> | <input type="text" value="jj/mm/"/> | <input type="text" value="x x"/> | <input type="text" value="Select..."/> | <input type="text" value="Select..."/> | | |
| <input type="checkbox"/> | Reverse Filter | Reverse Filter | Reverse Filter | | Reverse Filter | Reverse Filter | Reverse Filter | | |
| <input type="checkbox"/> | GLIOPA01 | GLIOPA01 | | 20180713 | | MR | PACS | 1 | 1200 |
| <input type="checkbox"/> | Femoral trombenarterectomy^Case Report: | Case Report 1 | | 20110824 | | US | PACS | 1 | 1 |

10
1

Project Name :
Add To Robot

Orthanc Tools JS: 0.4.4
About

If you want to see series level click “filter series”, each query will be reprocessed at series level.

You can use the filters, search function of this table to search for your wanted resources. Remove all unwanted results, using the “delete selected” button.

At the bottom of this table you can define a project name and click “Add to Robot” the resources listed in the results table will be scheduled for automatic retrieve.

Orthanc Content
Import
Query
Auto-Retrieve
CD-burner
Administration
Log out

Anonymize
0
Export
0
Delete
0

Query List
Results
My Retrieve Robot

Robot for user salim, project : myRobot

Progress : 0%

| | level | Patient Name | Patient ID | Study Date | Modality | Study Description | Series Description | Accession Number | AET | Validated | Status | Remove Query | View in OHIF |
|--------------------------|-------|--|---------------|---------------------------|----------|-------------------|--------------------|------------------|-------|-----------|---------|--------------|--------------|
| | | Enter Patient Name... | Enter F... | <div> <div> </div> </div> | Enter | Enter S... | Enter S... | Enter | Enter | Enter | Enter | | |
| <input type="checkbox"/> | study | GLIOPA01 | GLIOPA01 | 20180713 | MR | | | | PACS | false | Pending | Remove | View on OHIF |
| <input type="checkbox"/> | study | Femoral trombenarterectomy^Case Report | Case Report 1 | 20110824 | US | | | | PACS | false | Pending | Remove | View on OHIF |

10
1

To Anonymize
To Export
To Delete

Orthanc Tools JS: 0.4.4
About

You retrieve robot is scheduled. It needs to be validated by the administration (see administration panel).

It will start at the time set by the administrator.

Once retrieved the resources status will be marked “Retrieved” and you will be allowed to send retrieved resources to the anonymization / export tools of Orthanc Tools JS

f. CD Burner – Epson / Primera DiscProducers

This feature allows you to automatically trigger CD/DVD burning in commercial DiscProducers such as Epson (PP100, PP100N...) or Primera (SE, SE-3, II, Pro...)



The software can send burning request at the study (1 study per CD/DVD) or Patient level (multiple Study of a patient per CD/DVD). The burning request is automatically triggered when the dicom is stored in Orthanc (60 seconds after the last Dicom reception, see “StableAge” in Orthanc configuration if needed).

Along with Dicom files you can specify a viewer folder distribution to be associated with DICOM (such as Radiant for instance), and you can specify your own label to be printed in the CD/DVD which can include tags such as PatientName etc...

i. Setting up burning solution

To setup your burning solution, first go into the options tab and define:

- The Monitored Folder (Folder monitored by Epson or Primera application)
- The Viewer Folder containing viewer files to be included with Dicoms
- The Label File (see Epson/Primera template editor)
- The Transfer Syntax of Dicoms (if you want to burn a specific Dicom transfert syntax)
- The CD Burner Manufacturer (Epson or Primera)
- The monitoring Level (Study or Patient level)
- The Support Type (CD/DVD/Auto)
- If you want to automatically delete resources from Orthanc once sent to CD/Burner (to avoid infinity usage of disk space in Orthanc Server)

Orthanc Content Import Query Auto-Retrieve CD-burner **Administration** Log out

Anonymize 0 Export 0 Delete 0

General
Aets
Peers
Robots
Jobs
CD Burner
Plugins
User Management

CD/DVD Burner Options

Monitored Folder :
C:\Users\kanoun_s\Documents\cdBurner

Viewer Folder :
C:\Users\kanoun_s\Documents\Viewer

Label Path :
C:\Users\kanoun_s\Documents\label.ext

Transfer Syntax :
JPEG Lossless

Manufacturer :
Epson

Monitoring Level :
Patient

Support Type :
Auto

Delete Original Images From Orthanc ☒

Send

Orthanc Tools JS: 0.4.1 About

For CD/DVD labels templates:

Use Epson / Primera software to generate your CD/DVD printing and save it (.tdd file for Epson, .std for Primera) you can include the following tags (for Epson) or their respective position (for Primera)

“{patientName}” - Position 1

“{patientId}” – Position 2

“{studyDate}” - Position 3

“{studyDescription}” – Position 4

“ {patientDOB}” – Position 5

“ {accessionNumber}” – Position 6

to automatically print their respective value in the label.

ii. Starting burning service

Go do “CD-Burner” main tab and Start CD Burner Service, each time Orthanc will receive a Study / Patient, a burning request will be triggered and will appear in the interface (the burning service will continue to run even if the browser is closed)

Orthanc Content Import Query Auto-Retrieve **CD-burner** Administration Log out

Anonymize 0 Export 0 Delete 0

CD Burner Service

☒ ☐

| Patient Name | Patient ID | Patient Birth Date | Study Date | Study Description | CD Status | Cancel |
|--------------|------------|--------------------|------------|-------------------|-----------|--------|
| 10 | | | | | | |

Orthanc Tools JS: 0.4.1 About

VI. Administration of Orthanc-Tools-JS

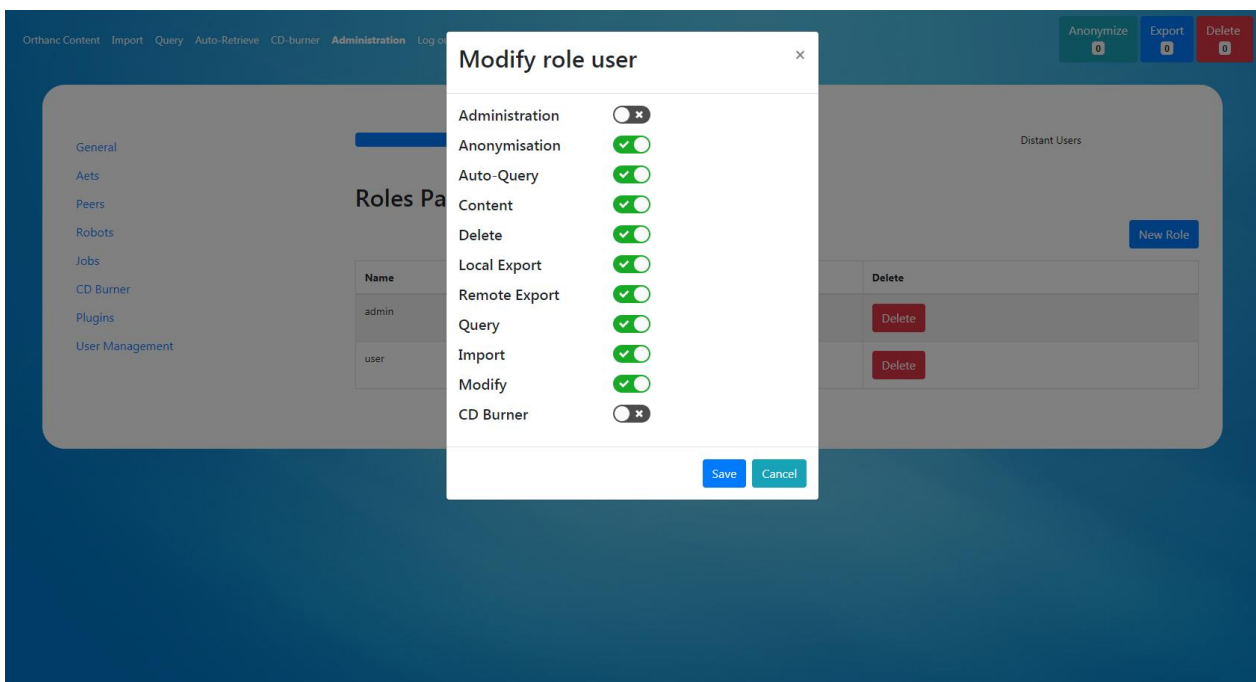
a. User Access

Two kinds of user definitions can be used

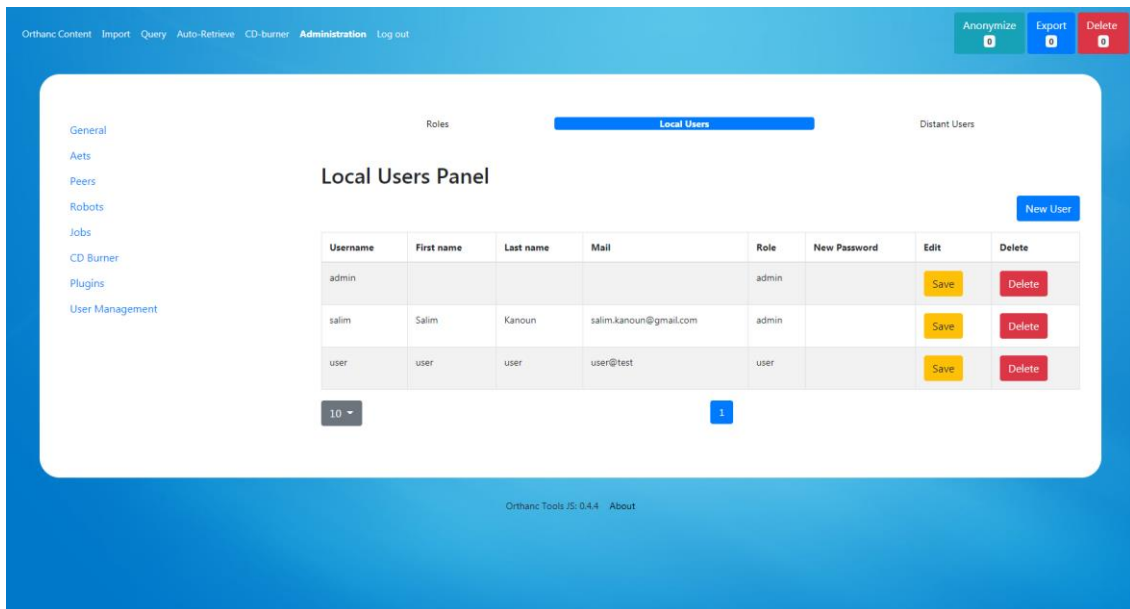
- Local users defined in the local database
- Distant users defined in an Active Directory

For each user a Role needs to be defined.

You can create how many Roles you want in the Role panel, each role is attached with a set of permission for each functionality of Orthanc-Tools-JS



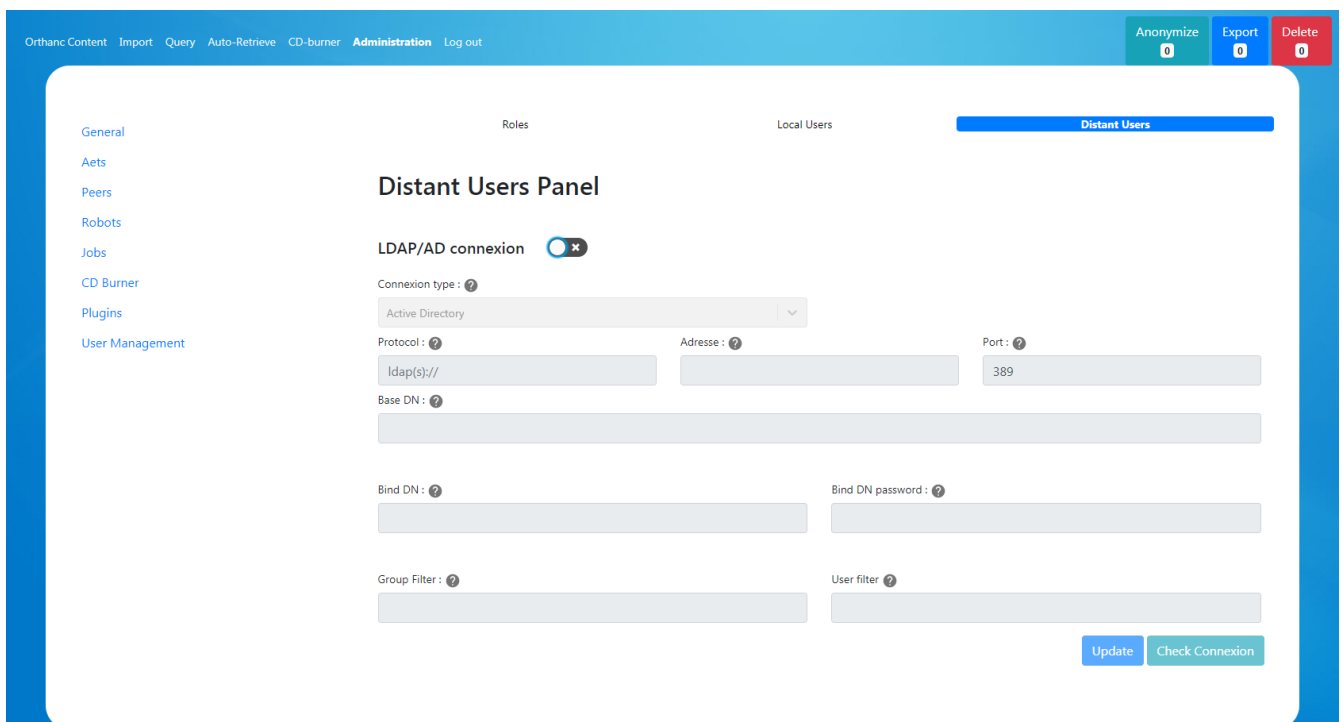
In the “Local User” tab you can define your local user, declared in database



Last you can declare an Active Directory server, from with user will be granted access.

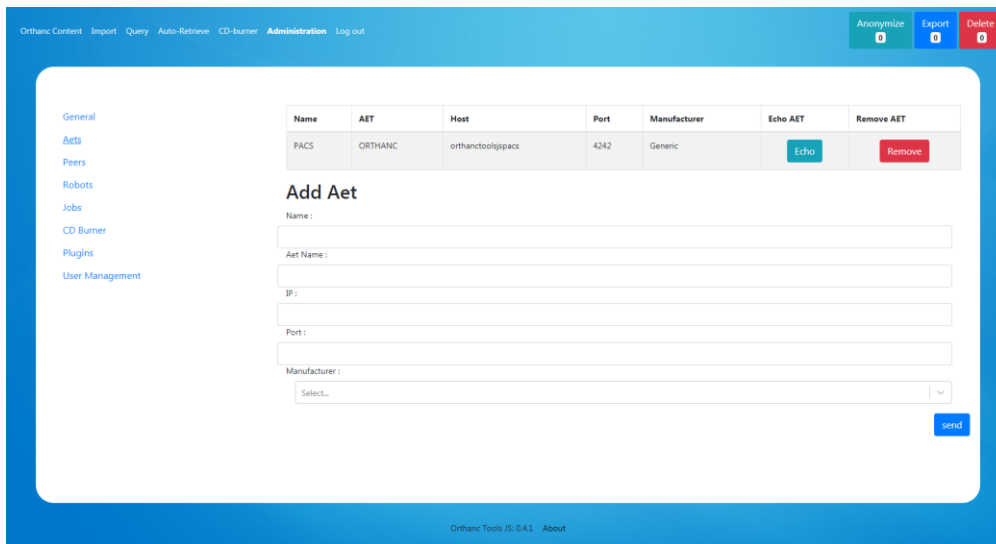
The Role definition is made by mapping the “Group Name” of the AD to one of your defined Role in Orthanc Tools JS.

In the case of an user identified in multiple LDAP groups having a OrthancToolsJS role correspondence, the union of the permissions of these roles will be granted when the user sign in.



b. AET / Orthanc Peers Declaration

You can simply define / remove AET and Orthanc Peer in the Orthanc Server using the administration panel



c. Orthanc Jobs / Plugins

This interface allows you to see Orthanc asynchronous Jobs (and pause / cancel / resubmit them)

The plugin page list the available plugin in the current orthanc installation

d. Auto Retrieve Robot

You can see robot request for automatic retrieve, asked by users.

The robot needs to be validated to be executed, during the validation, OrthancToolsJS will check that each query request provide only 1 answer in the PACS (to avoid too general queries that could lead to infinite retrieve).

You can see the robot query details and modify it if needed. You can also erase a retrieve job.

Last you can define the schedule hour in which the retrieve procedure will start (the retrieve are sequential)

