Orthanc – VPI Manual

Introduction

VPI Reveal can import DICOM files from a standard Windows file system. This can be a hard disc, network drive, CD/DVD, USB stick or SD card. DICOM files can be copied to any of these locations before importing into VPI Reveal. However, users prefer to retrieve DICOM files from a PACS server directly. It is possible to configure a PACS server or other modality to *send* the data to the user's location, but it is more convenient for the user to *retrieve* the data via a local PACS client.

Orthanc is a PACS or DICOM server application that can also be used as a PACS client. Orthanc has been developed by the University Hospital of Liège and is Open Source. Information is available from www.orthanc-server.com. Orthanc can be extended by adding plugins.

VPI has written a plugin for Orthanc that is called when each DICOM record is retrieved. Orthanc stores DICOM records in a special index, which is not convenient for VPI Reveal. The Orthanc-VPI plugin writes the DICOM records in a normal Windows readable hierarchy (patient-study-series-DICOM file) at a location called VPIStorage. Files in VPIStorage can then be imported into VPI Reveal.

Installation and configuration

Orthanc

Orthanc must be installed first. This is done by running (double click) *Orthanc-1.1.0-Installer.exe*. Accept the license.

The install folder is set to *C:\Program Files (x86)\Orthanc\Orthanc Server 1.1.0* as default. Change this to *C:\Program Files (x86)\Orthanc\Orthanc Server* to avoid problems when the server software is updated.

The data file location is set to *C:\Orthanc* as default, do not change this.

Complete the installation. The server will be started with the default configuration, which will be changed.

Orthanc-VPI Plugin

Run the Orthanc-VPI Plugin installer *OrthancVPIplugin-1.0.0.x.exe* (double click). The install folder is set to *C:\Program Files (x86)\Orthanc-VPI plugin* as default. Complete the installation.

The Orthanc-VPI Plugin installer create shortcuts on the desktop for:

1. The Orthanc-VPI Plugin manual (PDF)
2. *Update Orthanc configuration*, which will overwrite the default configuration with your choices. Then the Orthanc Server will be stopped and restarted.
3. *Orthanc Explorer*, which is used to open Orthanc in a web browser.

Configuration

Your configuration settings are stored in *C:\Program Files (x86)\Orthanc-VPI plugin\bin\configuration.json* and must be edited by you to set the PACS servers that you wish to use. **Every** PACS server that you wish to access **must** be registered in this configuration file. This PACS client **must also** be registered in the configuration of **every** PACS server that you wish to access.

The nickname of this PACS client is (line 10). You **may** change this.

```
"Name" : "Orthanc-VPI"
```

The Orthanc-VPI Plugin is set to (line 43). Do **not** change this.

```
"Plugins" : [
  "C:/Program Files (x86)/Orthanc-VPI plugin/bin/PluginTest.dll"
],
```

Each PACS server will access this PACS client with this Application Entity Title (line 83). You **may** change this, but it **must** match the entry in each PACS server that you wish to connect to.

```
// The DICOM Application Entity Title
"DicomAet" : "ORTHANC-VPI",
```

Each PACS server will access this PACS client with this port number (line 89). You **may** change this, but it **must** match the entry in each PACS server that you wish to connect to.

```
// The DICOM port
"DicomPort" : 4242,
```

Each PACS server that you wish to access (line 144). **You must change this!**

```
// The list of the known DICOM modalities
"DicomModalities" : {
  /**
   * Uncommenting the following line would enable Orthanc to
   * connect to an instance of the "storescp" open-source DICOM
   * store (shipped in the DCMTK distribution) started by the
   * command line "storescp 2000".
   **/
  // "sample" : [ "STORESCP", "127.0.0.1", 2000 ]
  "OrthancServer"   : [ "ORTHANC-SERVER", "10.0.34.28", 4242 ]

  /**
   * A fourth parameter is available to enable patches for a
   * specific PACS manufacturer. The allowed values are currently
   * "Generic" (default value), "StoreScp" (storescp tool from
   * DCMTK), "ClearCanvas", "MedInria", "Dcm4Chee", "SyngoVia",
   * "AgfaImpax" (Agfa IMPAX), "EFilm2" (eFilm version 2), and
   * "Vitrea". This parameter is case-sensitive.
   **/
```

```
    // "clearcanvas" : [ "CLEARCANVAS", "192.168.1.1", 104, "ClearCanvas" ]
  },
```

The current entry (OrthancServer) is our local test PACS server and can be used as a template. If you add more than one PACS server, add a comma to the end of the previous line. For each PACS server you must enter:

- A nickname (any descriptive name for the PACS server)
- The Application Entity Title (AET) between quotes
- The IP address (between quotes) or its name
- The port number

If you wish to connect to a PACS server that is listed above, you may need to add the fourth parameter. Each connection can be tested through Orthanc. If you have problems here, you should consult your hospital IT services as VPI does not have any information about the PACS servers you choose to connect to.

When your changes are complete and saved, run *Update Orthanc configuration* as administrator on the desktop (double click). This will:

- **copy your configuration to the Orthanc location (*C:\Orthanc*);**
- **stop and restart the Orthanc service;**
- **open the Windows Firewall for Orthanc (if not already open).**

Other settings

If the IT department of the hospital wish to change any other settings, such as for extra security, they should consult the official Orthanc documentation. It is their responsibility to fix any resulting problems! Note that the following has been changed from the Orthanc default (line 118):

```
// Whether remote hosts can connect to the HTTP server
"RemoteAccessAllowed" : true,
```

The Orthanc web screen

The Orthanc client is a web application. To start the Orthanc client run *Orthanc Explorer* (double click the shortcut). Alternatively you can enter http://localhost:8042/app/explorer.html in your browser. This does not run in Microsoft Internet Explorer, so you have to use Chrome or Firefox.

If the Orthanc software and Orthanc-VPI Plugin have been installed correctly, the browser shows a message that the plugin has been loaded.

Full information about using Orthanc is available at http://book.orthanc-server.com/users.html. The information shown below and in the rest of this document is sufficient to use it with the plugin. Other information is available via the Orthanc site. http://book.orthanc-server.com/dicom-guide.html#dicom-guide gives a good overview of DICOM and the functionality of the Orthanc software.

On entering OK the Orthanc web screen will be shown with buttons:

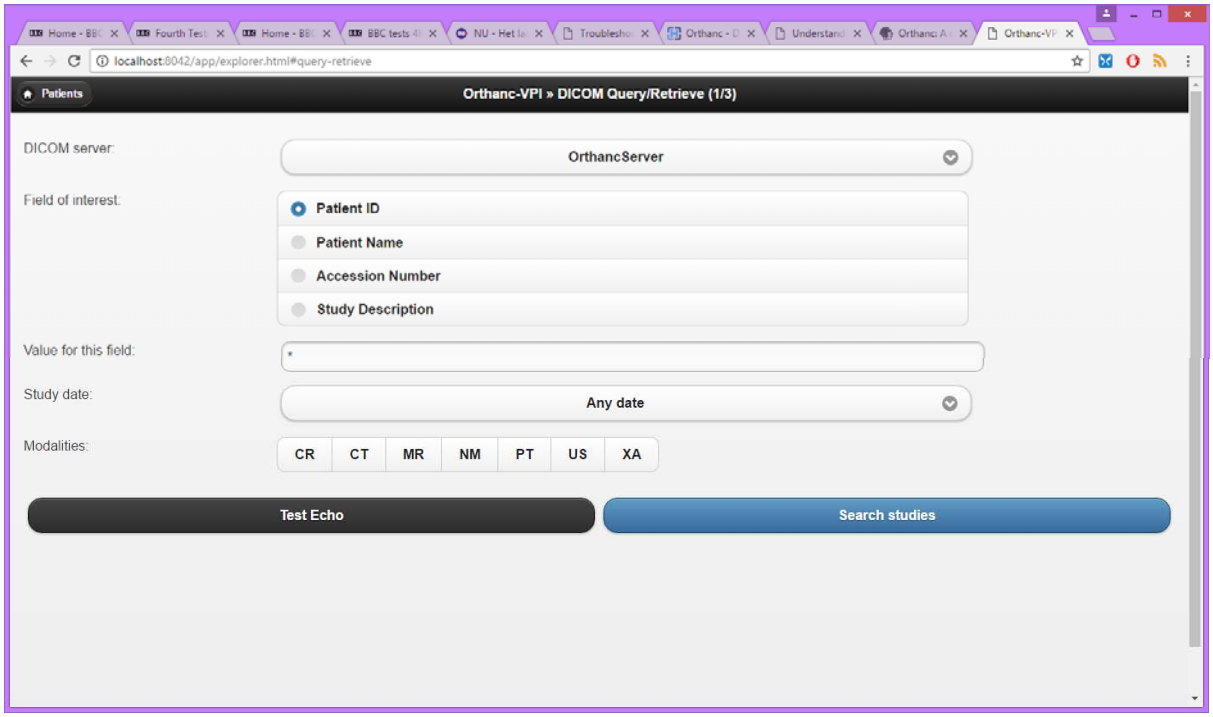
- *Plugins* – for information about loaded plugins.
- *Upload* – to copy local DICOM files to the local Orthanc database. This is not necessary for VPI Reveal users, but may be useful if you wish to look at DICOM parameters in these files.
- *Query/Retrieve* – to copy DICOM files from a PACS server to the local Orthanc database.

This screen shows a list of patients stored in the local Orthanc database. You may view them in more detail by clicking on a patient and then in the hierarchy on a study, series or DICOM instance (slice). There are more buttons here that are not relevant for VPI Reveal, but may be useful (you can search the Orthanc Book at http://book.orthanc-server.com/dicom-guide.html#id13).

If you go to another screen, you can return to this screen by selecting the button *Patients*.

Query and retrieve

On selecting *Query/Retrieve*, the following screen is displayed.



Your first DICOM (PACS) server will be shown instead of ours (*OrthancServer*). Select a DICOM server and click on Test Echo to make sure that the server is connected and correctly configured in the configuration file.

You can search on one of the entries in *Field of interest* with the value in *Value for this field*. You can choose a date. You **must** select at least one modality in the list of *Modalities*. Then click on *Search studies*.

The result of the search (Query) will be listed. If you click on a patient/study and then on a series, you will be able to read more information.

If you click on the arrow on the right ('v') the selected series will be retrieved and stored in the local Orthanc database. If you click on the arrow at patient/study level, all underlying series will be

retrieved. The data will be added to the *Patients* screen. If you select large series containing many slices, it will obviously take longer to download the data.

You can always click the Back button in your browser to go to the previous screen. If you get lost, click the Reload button in your browser and you will return to the initial screen of patients.

VPI Reveal

Whenever you retrieve a series, Orthanc stores the slices in its local database in a structure that is not convenient for VPI Reveal. The Orthanc-VPI Plugin is called during a retrieve to store a second copy of the slices in a usable structure with the following folder names:

- *C:\Orthanc\VPI_Storage*
    - Patient name
        - Study name
            - Series number – Series name

If you run VPI Reveal and select *Import*, you can navigate to *C:\Orthanc\VPI_Storage* and then down to the information that you wish to import. All underlying studies, series and/or instances (DICOM slices) will be imported and copied to your *My Patients* location. You can then load and view these images in VPI Reveal as normal.

In the future, the Orthanc-VPI Plugin may be integrated with VPI Reveal so that the retrieved data is directly imported into VPI Reveal.

Local data storage

Orthanc stores its local patients under *C:\Orthanc\OrthancStorage-v6*. You can delete patient data via the Orthanc client.

The Orthanc-VPI Plugin stores a copy of the retrieved data under *C:\Orthanc\VPI_Storage*. You can delete part or all of this data if your hard disc is getting full; it is only useful for importing into VPI Reveal.

Problem solving

Here is a list of common problems and their likely cause and solution.

1. The PACS or DICOM server is not in the list. Check if it is in the configuration file and that multiple servers are separated by commas. Did you run *Update Orthanc configuration* as administrator on the desktop (double click)?
2. The PACS or DICOM server fails *Test Echo* (under Query/Retrieve). Check if it is correctly specified in the configuration file. See http://book.orthanc-server.com/dicom-guide.html#c-echo-testing-connectivity. Did you run *Update Orthanc configuration* as administrator on the desktop (double click)?
3. Search doesn't find what I expect. See http://book.orthanc-server.com/dicom-guide.html#c-find-browsing-the-content-of-a-server.

4. The retrieve didn't retrieve what I expected. Check that the server has the data that you expect. Press *Refresh* in the browser and try again.
5. The screen doesn't show what I expect. Maybe you pressed *Back* in the browser and Orthanc can't go back (e.g. you can't un-retrieve). Press *Refresh* in the browser and try again.
6. Something crashed and you want to report it. Run *Update Orthanc configuration* as administrator on the desktop (double click). This will make sure the log file is closed. Go to *C:\Orthanc\Logs* and send us the last 3 log files. If you feel emboldened, you can have a look in the last or second last log file to see if something obvious is mentioned, such as a filename with strange characters or a server closing down unexpectedly.