



Medstrat EMR Interface

Introduction

There are two (2) options available for interfacing a third-party EMR with a Medstrat PACS:

1. A command-line with customizable flags
2. An API available via XML-RPC over HTTPS from the server

This document provides details about these two options and, for Option 2, details the common remote procedure calls (RPC) and the common workflow to use.

Option 1

If you use choose this option, then you may skip the rest of the sections in this document.

This option allows you to provide full-featured access to the Medstrat PACS using only a single command-line which can be generated using information about the patient currently being viewed within the EMR. In most cases, the command-line is run via a button in the EMR's GUI. When the command-line is run, it will open up a study list that shows all studies on the local server and in off-site storage that match the criterion given in the command-line's flags.

Please note that the echoes software must be present on the same computer as the EMR software invoking this command-line. This option is available on both Windows and Macintosh. Note that you will find **echoes** (where X.Y is the version of **echoes** installed on the local computer) in:

Windows: C:\Program Files\Medstrat\echoes X.Y\echoes.exe
Mac: /Applications/Medstrat/echoes-X.Y/echoes.app



A command-line is formatted as:

Windows: `echoes.exe FLAGS`

Mac: `echoes.app/Contents/MacOS/JavaApplicationStub FLAGS`

Where the `FLAGS` are the following (fill in as many as possible):

<code>-u=</code>	<code>--user=USERNAME</code>	Username to sign in as
<code>-p=</code>	<code>--pass=PASSWORD</code>	Password to sign in with
<code>-f=</code>	<code>--fname=FIRSTNAME</code>	Patient's first name
<code>-l=</code>	<code>--lname=LASTNAME</code>	Patient's last name
<code>-i=</code>	<code>--mi=MIDDLEINITIAL</code>	Patient's middle initial [OPTIONAL]
<code>-s=</code>	<code>--suffix=SUFFIX</code>	Patient's suffix (Sr.) [OPTIONAL]
<code>-d=</code>	<code>--pid=PATIENTID</code>	Patient's ID
<code>-b=</code>	<code>--birthday=YYYY-MM-DD</code>	Patient's date of birth
<code>-g=</code>	<code>--gender=[M F O]</code>	Patient's gender

The `-u/--user` and `-p/--pass` flags are required for version 2.2 and lower. For version 2.4 and higher, the flags are only necessary if an instance of the application is not already running.

If giving the patient name then the `-f/--fname` and `-l/--lname` flags are required. The middle initial `-i/--mi` and suffix `-s/--suffix` to the patient name are optional.

If giving the patient ID, the `-d/--pid` is required.

One or the other or both patient name and patient ID must be flagged.



Option 2

In addition to the simple command-line interface available in Option 1, there is also a low-level API. If you choose this option, you will write an XML-RPC client (in any language that you prefer) and use it to access our XML-RPC server. Your XML-RPC client can then query for study lists and query for URLs to image files. Our command-line client can then be used to open URLs in our viewer.

The XML-RPC server interface is over HTTPS on port 443 which is accessible via the URL:

```
https://192.168.10.123/cgi-bin2/echoes-interface.cgi
```

Note, that you must replace *192.168.10.123* above with the actual IP address of the customer's **echoes** server.

Typical Workflow in Option 2

This section refers only to the low-level API in Option 2 that is provided by the server and its use in conjunction with the viewer in the **echoes** executable.

A typical workflow is as follows:

1. The third-party software fetches a list of studies for a patient by using **studyList** and setting the *pname* and/or *pid* arguments to the first few letters and/or digits of the patient name and/or patient ID.
2. A list of lists will be returned in the form described above. The results may be displayed in the third-party software via whatever GUI is preferred.
3. The user then selects one of the studies. At that point, the third-party software uses the *studyInstanceUID* (siuid or Study Instance UID) value from the selected study row and calls **studyURLs** with a *filetype* of type "dcm" or "jpg". A list of strings containing URLs is then returned.



4. The URLs are used to download the desired study's images using the **echoes** executable. Simply pass the URL to **echoes** on its command-line using a system call.

Windows: `echoes.exe URL1 URL2 URL3`
Mac: `open -a echoes.app URL1 URL2 URL3`

You may pass as many or as few URL parameters as you like to **echoes**.

Interface Security

There are three items to be aware of concerning our current requirements for security:

First, the CGI script is protected by basic HTTP authentication. The third-party software should prompt its user for a username and password which should then be stored in an encrypted configuration file in the EMR's possession for future use.

Secondly, although we use HTTPS, we do not use certificates at this time; however, if you use Option 2, you should be aware that they may be introduced in future versions of the software and will thus be required for the XML-RPC API to operate correctly. We will contact vendors in advance when this comes closer to fruition.

Thirdly, the first required parameter of any XML-RPC is the *clientKey*. The *clientKey* is different for every **echoes** server and thus the third-party software should store this value in an encrypted configuration file along with the username and password. The *clientKey*'s value will be provided to a third-party software vendor at the time of installation of the customer's **echoes** server when Medstrat and the third-party vendor have the customer in-common.



Common Remote Procedure Calls

Most EMR interfaces using Option 2 are created using only the following two RPCs.

Note that some parameters are optional. In this case, reducing the number of arguments to the RPC will result in a correct procedure call whereby default values will be substituted for the missing parameters. The optional parameters will be marked as “optional keyword” in the parameter description.

studyList (*clientKey, pname, pid, sdate, mod, refphys*)

Get all matching rows filtered by the given parameters. Using an empty string for all parameters will result in at most 250 rows returned (for sake of performance).

Parameters:

	<i>clientKey</i>	The client key to authorize
	<i>pname</i>	The patient name to search on (optional keyword)
	<i>pid</i>	The patient ID to search on (optional keyword)
	<i>sdate</i>	The study date (optional keyword)
	<i>mod</i>	The modality (optional keyword)
	<i>refphys</i>	The physician (optional keyword)

Returns:

A list of rows from the study table where each row is of the form:

Version 2.2: [patientName, patientSex, patientID, studyDate, studyTime, modality, referringPhysician, siteName, status, numberOfDCMs, numberOfJPGs, studyDescription, dateOfBirth, studyInstanceUID, index]

Version 2.4: [patientName, patientSex, patientID, studyDate, studyTime, modality, referringPhysician, siteName, status, numberOfDCMs, numberOfJPGs, studyDescription, dateOfBirth, studyInstanceUID, index, institutionName, bodyArea]



studyURLs (*clientKey*, *siuid*, *filetype*)

Get URLs for files of type filetype archived under the given Study Instance UID

Parameters:

	<i>clientKey</i>	The client key to authorize
	<i>siuid</i>	The study instance UID this request refers to
	<i>filetype</i>	The file type interested in (choose one: "dcm" or "jpg")

Returns:

A list of URLs for files of type filetype in the requested study

For a complete list of supported RPCs, please contact Medstrat.

References

For more information on XML-RPC see www.xmlrpc.com.