

FORUM 4.2 Interface Documentation FORUM Viewer - API FORUM - HIS Interface FORUM - EMR Interface

Service Instructions

Confidential and Proprietary

SM-30-8032-A10 Version 01, 2017-10-19 Order No. -

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This document covers the implementation of Windows Kerberos v5 based Single Sign On and the usage of an LDAP server as the authentication server for FORUM users.

The two methods are based upon fundamentally different principles and are not interdependent in any manner. While the LDAP implementation is connecting to the LDAP/AD server to query for user, groups and authentication, the SSO implementation never directly communicates with the LDAP/AD server. It is important to understand this to begin with.

2 Update information

Version	Comments
01	First Version (2017-10-19)

3 General

3.1 Purpose

This document describes the FORUM Viewer API, the EMR interface and the HIS interface. The FORUM Viewer API enables third-party applications to launch the FORUM Viewer for a specific patient or examination date. The HIS interface enables sending of patient demographics to FORUM via a text file. The EMR interface enables sending of patient demographics plus worklist entries plus result notifications to/from FORUM via an XML file.

The FORUM Viewer API has no return values and does not address third-party applications. The HIS interface for the FORUM Server also offers send only functionality and has no return values to third-party applications. The EMR interface is bidirectional.

3.2 Contact

For questions and support please contact 2nd level service networking in Munich:

support.datamanagement@zeiss.com

3.3 Communication Protocol and Licensing

The FORUM Viewer API is executed on the local machine via command line parameter (executable batch file).

HIS interface: Communication between both applications is text file based, configured via one central directory or folder residing in a network environment. The HIS interface license must be activated.

EMR interface: Communication between both applications is XML file based, configured via two central directories. The EMR interface license must be activated.

4 FORUM Viewer API

The FORUM Viewer provides an API to start the application from another app (EMR/HIS/PMS). The FORUM Viewer can be started to show all examinations of a defined patient. If the FORUM viewer is already open it switches to the called patient.

The API is implemented as shell script using parameters to launch and control certain functions. The start/launch script is located in

- On Windows <ForumViewerInstallPath>\FORUM Viewer\API\launchFORUM.cmd
- On iOS
 ~/Applications/CZM/FORUM Viewer/api/launchFORUM.sh

The command-line options of FORUM Viewer API are as follows

```
- patientId <arg>...... patient ID to open or change to
- issuerOfPatientId <arg>. issuer of patient ID
- password <arg>..... password
- username <arg>..... username
- sopInstanceUid <arg>.... SOP Instance UID to change to
- accessionNumber <arg>... accession number to change to
- examDate <arg>.... yyyy-MM-dd exam date to change to
- help .... show this message
```

Example: EMR/HIS/PMS wants to open the FORUM Viewer for patient ID 454546 and IDissuer NextGen

```
<ForumViewerInstallPath>\FORUM Viewer\API\launchFORUM.cmd -patientID
454546 -username xxx -password ppp
```

It is necessary to enclose each argument within double quotes (") in order to avoid problems with spaces in the argument value.

```
"C:\Program Files\CZM\FORUM Viewer\api\launchFORUM.cmd" -
username "forum" -password "123 pass"
```

In case of trouble, check the log files in %localappdata%\..\locallow\.forumclient\log (Windows)

The command-line options of FORUM Viewer are being transferred using the command line to access the program execution parameters of the FORUM Viewer application, the special characters within the argument values need to be masked in java-style (e. g. with apostrophe \"). Do not forget to mask all other special characters as well, so they can be entered on the command-line or terminal and then passed on, in a valid format, to the FORUM Viewer.

Important: The command line parameters are case sensitive!



Note

After the FORUM Viewer has been started by an EMR/HIS/PMS it may not be visible on your screen but in the taskbar only. Press **ALT + TAB** and make the FORUM Viewer the visible program on your monitor.

4.1 Option: -username <arg> -password <arg>

This option can always be used in conjunction with the additional options below. It automatically logs in the user into the FORUM Viewer. You could specify *-username* alone, but if you select *-password* then both *-username* and *password* are required.

```
"C:\Program Files\CZM\FORUM Viewer\api\launchFORUM.cmd" -
username "xxx" -password "ppp"
```

4.2 Option: -patientId <arg>

This option **opens** the FORUM Viewer or **changes** the already open Viewer to the given patient ID.

With manual login:

"C:\Program Files\CZM\FORUM Viewer\api\launchFORUM.cmd" - patientId "21344"



Note

Manual login –patientId <arg> is the simplest argument to utilize and our recommendation for interfacing third-party applications. In fact, no other argument is required unless developing the full integration.

With automatic login:

```
"C:\Program Files\CZM\FORUM Viewer\api\launchFORUM.cmd" -
username "xxx" -password "ppp" -patientId "21344"
```

4.3 Option: -patientId <arg> -issuerOfPatientId <arg>

Opens the FORUM Viewer or changes the already opened Viewer to the patient with the given patient ID and the matching issuer of patient ID.

```
"C:\Program Files\CZM\FORUM Viewer\api\launchFORUM.cmd" -
patientId "21344" -issuerOfPatientId "5016"
```

4.4 Option: -patientId <arg> -examDate

Opens the FORUM Viewer or changes the already opened viewer to the patient with the given patient ID and the specified examination date. Notice that the examination date argument must be in the format: yyyy-MM-dd

Change to a patient with patient ID 21344 and examination date year=2015, month=july, day=8.

```
"C:\Program Files\CZM\FORUM Viewer\api\launchFORUM.cmd" -
patientId "21344" -examDate "2015-07-08"
```

Important:

The usage of the specified examination date depends on the "Display Mode Patient Directory" setting of the logged in user:

- 1) If the user has chosen "Display Mode Patient Directory" as visit-based, the "Visit Date" filter is used for the specified "-examDate".
- 2) If the user has chosen "Display Mode Patient Directory" as study-based, the "Study Date" filter is used for the specified "-examDate".

4.5 Option: -patientId <arg> -accessionNumber <arg>

Opens the FORUM Viewer or changes the already opened viewer to the patient with the given patient ID and the specified accession number.

```
"C:\Program Files\CZM\FORUM Viewer\api\launchFORUM.cmd" - patientId "21344" -accessionNumber "1244"
```

4.6 Option: -sopInstanceUid <arg>

Opens the FORUM Viewer or changes the already opened viewer to the specified SOP Instance UID.

"C:\Program Files\CZM\FORUM Viewer\api\launchFORUM.cmd" sopInstanceUid "124.334.556"



Note

As points 4.4, 4.5 & 4.6 require knowledge of information contained in the FORUM Archive these command line interface parameters should only be implemented if the full FORUM Archive integration solution is to be developed by the third party's developers.

4.7 Troubleshooting

Internally, the API uses Java Management Extensions (JMX). Therefore please check your firewall-settings. To identify whether the firewall blocks the calls, try disabling the firewall temporarily.

Another problem might be that the JRE was exited abnormally. Try to execute *set* on the command line. Search for the variables *TMP* and *TEMP*. Go into both temp-directories and **delete** the files starting with *hsperfdata*. Normally, the file is named *hsperfdata_username* (replace username with the logged in windows user).

If your FORUM settings file is corrupt, try re-installing the FORUM Viewer.

5 HIS Interface

FORUM provides a very simple interface to receive patient information from a leading patient management system. The exchange of information is initiated via text file located in a shared folder. File name and HIS exchange folder have to be configured in FORUM Service Tool. The "FORUM HIS Interface" license must be active.

This interface can only be used to create missing patient records. Patient data update and deletion are not supported. Please avoid using this interface.

5.1 HIS Interface Configuration

The configuration can be found in the FORUM Service Tool

Settings → Import/Export Interfaces → HIS Interface Configuration



Input fields

HIS Folder Storage folder for text files dropped by the EMR/HIS/PMS system

Activate HIS Interface If this checkbox is checked, the HIS interface is activated.

5.2 HIS Text File Format

The HIS text file must include the following information;

File Format Example File

last=Surname	last=Citizen
Tast-suffialle	Tast-Citizen
dob=YYYYMMDD	dob=19360925
first=Christian Name	first=John
id=id number	id=28435
gender=M/F/O	gender=M



Note

M = Male, F = Female, O = Other (O is required as option for DICOM compliance)

The HIS text file naming must be identical for every new patient. FORUM processes and deletes each HIS text file sent from the third-party application. You can only drop one HIS file into the HIS folder.

6 EMR Interface

FORUM provides a bidirectional XML text file interface to communicate with an EMR/HIS/PMS. The information exchange takes place via shared folder. The shared folder for EMR exchange including two subfolders must be configured in the FORUM Service Tool. The "FORUM EMR Interface" license must be active.

The inbound interface (emr_worklist) can be used to create/update patient records and to create/modify/delete generic orders (worklists). It is not possible to create instrument-specific worklists, only ones that apply to all instruments. The XML format must exactly match the described XML scheme. Empty tags must not be omitted. See format description below.

The outbound interface (emr_storage) can be used to notify the EMR/HIS/PMS that new examination results are available in FORUM.

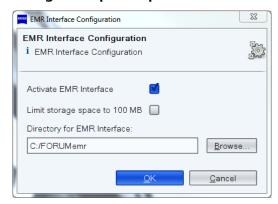
6.1 Simplified Workflow

- 1. EMR/HIS/PMS sends a patient/order create request to FORUM and drops an XML file into the <EMR>\EMR_worklist folder
- 2. FORUM reads, processes and deletes the file
- 3. FORUM creates or updates the patient record and places a "generic" order (for all instruments)
- 4. Instrument(s) perform the examination and send results to FORUM
- 5. FORUM stores DICOM files and drops the extracted JPG or PDF (if possible) and a XML description file into the <EMR>\EMR_storage folder
- 6. EMR/HIS/PMS polls and reads/processes/deletes received JPG/PDF/XML

6.2 EMR Interface Configuration

The configuration can be found in the FORUM Service Tool

Settings → Import/Export Interfaces → EMR Interface Configuration



Input fields

EMR Interface Folder

Top path to the import and export folders for EMR interface.



Note

Create 2 subfolders "emr_worklist" and "emr_storage" manually.

Activate EMR Interface

If this checkbox is checked, the EMR interface is activated. If FORUM is updated, the EMR interface must be reactivated.

Limit storage space to 100MB If this checkbox is activated, the storage space managed by FORUM is limited to 100 MB. FORUM will then save the documents according to the FIFO principle.



Note

The EMR interface is a licensable option. Please order a license from your local Carl Zeiss affiliate

6.3 From EMR/HIS/PMS to FORUM

FORUM expects incoming XML files in the subfolder "emr_worklist" which must be located under the folder configured in EMR Interface Configuration. The XML format and contents are described in the following chapters.

FORUM auto-creates a patient based on the received information if one does not already exist. For this patient a requested procedure with one scheduled procedure step (Worklist) is created for each connected remote

Application Entity (device) which has the setting Modality Worklist User enabled (in the AET configuration).

The inbound XML interface (EMR_worklist) supports three types of XML files

- Generate Patient and Worklist Orders for all instruments
- Delete all Worklist Orders for a selected order number
- Change Patient Demographic Data

6.4 From FORUM to EMR

FORUM provides plain PDF and JPG files after the according DICOM object has been stored. FORUM puts them into the emr_storage subfolder. Additionally an XML description file is created for every report or picture file.

The EMR_storage directory shall be under control of the EMR. The EMR shall consume and delete all files from this directory.

The outbound XML interface (EMR_storage) supports two types of XML files

- JPG received
- PDF received
- Other (RAW) received

6.5 Generate Patient and Worklist Orders for All Instruments

The following sample XML string will add a patient and additionally add a worklist order for all configured instruments inside FORUM. This XML file should be generated from the EMR's appointment book so that every patient booked in for an appointment is automatically added to FORUM as a new patient if there is not already an existing entry, plus adding a worklist order so that all DICOM connected instruments are ready to scan the patient on the day they are scheduled to attend. Each instrument will import the patient via their DICOM worklist.

```
<?xml version="1.0" encoding="utf-8"?>
<emr:EMR XML xmlns:emr="http://www.meditec.zeiss.com/czm/emr_xml">
 <emr:worklist entry>
   <emr:patients name>
     <emr:family_name>Zeiss/emr:family_name>
     <emr:given name>Test/emr:given name>
     <emr:middle name />
     <emr:name_prefix />
     <emr:name suffix />
   </emr:patients name>
   <emr:patient_id>1375</emr:patient id>
   <emr:issuer of patient id>1234567890/emr:issuer of patient id>
   <emr:patients_birth_date>19391230</emr:patients_birth_date>
   <emr:patients sex>M</emr:patients sex>
   <emr:accession number>ACN1</emr:accession number>
   <emr:referring_physicians_name>
     <emr:family name></emr:family name>
     <emr:given_name></emr:given_name>
     <emr:middle name />
     <emr:name prefix />
     <emr:name suffix></emr:name suffix>
   </emr:referring_physicians_name>
   <emr:requesting physicians name>
     <emr:family name></emr:family name>
     <emr:given name></emr:given name>
     <emr:middle name />
     <emr:name_prefix></emr:name_prefix>
     <emr:name suffix />
   </emr:requesting_physicians_name>
   <emr:start date>20110326
   <emr:start time>111000
 </emr:worklist entry>
</emr:EMR XML>
```



Note

Every Accession Number must be unique. The EMR must increment this number for each new XML file generated. It is also recommended to name each file differently so that it is not possible to overwrite two differing EMR XML files. A feasible solution is using the Accession Number as the file name. When FORUM is initially to an EMR, there should be a option to batch send all future appointments to FORUM via multiple XML file send.



Note

Information from the EMR will trigger an action within FORUM. The Date-Format accepted by FORUM is YYYYMMDD and the Time-Format is hhmmss. Non-conformance will lead to a parsing error within FORUM.

6.6 Delete all Worklist Orders for Selected Patient

The following sample XML string will delete all worklist orders for all configured instruments inside FORUM for any desired patient. This is used to cancel any worklist order no longer required, created by an XML file as per previous section 6.5, page 12 – e.g. if a patient cancels or reschedules their appointment.

```
<?xml version="1.0" encoding="utf-8"?>
<emr:EMR_XML xmlns:emr="http://www.meditec.zeiss.com/czm/emr_xml">
        <emr:worklist_entry_delete>
        <emr:patient_id>1375</emr:patient_id>
        <emr:issuer_of_patient_id>1234567890</emr:issuer_of_patient_id>
        <emr:accession_number>ACN1</emr:accession_number>
        </emr:worklist_entry_delete>
</emr:EMR_XML>
```



Note

Cancellation of worklist orders, while possible, is not required.



Note

Information from the EMR will trigger an action within FORUM. The Date-Format accepted by FORUM is YYYYMMDD and the Time-Format is hhmmss. Non-conformance will lead to a parsing error within FORUM.

6.7 Change Patient Demographic Data

The following sample XML string will update an existing patient demographic in FORUM to match the change performed to patient demographic data in the EMR – e.g. patient surname change due to marriage.

```
<?xml version="1.0" encoding="utf-8"?>
<emr:EMR_XML xmlns:emr="http://www.meditec.zeiss.com/czm/emr_xml">
 <emr:worklist entry>
   <emr:patients name>
     <emr:family_name>Zeiss1</emr:family_name>
     <emr:given name>Test/emr:given name>
     <emr:middle name />
     <emr:name_prefix />
     <emr:name suffix />
   </emr:patients name>
   <emr:patient id>1375/emr:patient id>
   <emr:issuer of patient id>1234567890</emr:issuer of patient id>
   <emr:patients birth date>19391230/emr:patients birth date>
   <emr:patients_sex>M</emr:patients_sex>
   <emr:accession number>ACN2</emr:accession number>
   <emr:referring_physicians_name>
     <emr:family_name></emr:family_name>
     <emr:given name></emr:given name>
     <emr:middle_name />
     <emr:name prefix />
     <emr:name suffix></emr:name suffix>
   </emr:referring_physicians_name>
   <emr:requesting_physicians_name>
     <emr:family name></emr:family name>
     <emr:given name></emr:given name>
     <emr:middle name />
     <emr:name prefix></emr:name prefix>
     <emr:name suffix />
   </emr:requesting_physicians_name>
   <emr:start date>20110326</emr:start date>
   <emr:start time>111000
 </emr:worklist_entry>
</emr:EMR XML>
```



Note

Information from the EMR will trigger an action within FORUM. The Date-Format accepted by FORUM is YYYYMMDD and the Time-Format is hhmmss. Non-conformance will lead to a parsing error within FORUM.

6.8 PDF Received

This XML is generated by FORUM. It contains all relevant patient data and order data. A reference to the according PDF file is available. XML and PDF filename are identical (except suffix).

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<emr:EMR XML xmlns:emr="http://www.meditec.zeiss.com/czm/emr xml">
   <emr:report storage entry>
       <emr:patients name>
           <emr:family name>Oezlük/emr:family name>
           <emr:given name>Mahmut
           <emr:middle_name/>
           <emr:name prefix/>
           <emr:name_suffix/>
       </emr:patients_name>
       <emr:patient id>20191</emr:patient id>
       <emr:issuer_of_patient_id>E2F</emr:issuer_of_patient_id>
       <emr:patients_sex>M</emr:patients_sex>
       <emr:patients birth date>19390801/emr:patients birth date>
       <emr:study instance uid>2.25.90152026876/emr:study instance uid>
       <emr:study date>20100715
       <emr:study_time>110500.000
       <emr:study id/>
       <emr:accession number>49</emr:accession number>
       <emr:referring physicians name>
           <emr:family_name/>
           <emr:given name/>
           <emr:middle name/>
           <emr:name_prefix/>
           <emr:name suffix/>
       </emr:referring_physicians_name>
       <emr:series instance uid>2.25.1534370instance uid>
       <emr:modality>OPM</emr:modality>
       <emr:manufacturer>Humphrey Systems/emr:manufacturer>
       <emr:manufacturer_model_name>IOLMaster500/emr:manufacturer_model_name>
       <emr:sop instance_uid>2.25.29995/emr:sop_instance_uid>
       <emr:instance number>1/emr:instance number>
       <emr:content_date>20100715</emr:content date>
       <emr:content time>110500.000
       <emr:file reference>.\pdfFake.pdf</emr:file reference>
       <emr:document title>Topography</emr:document title>
   </emr:report_storage_entry>
</emr:EMR XML>
```

6.9 Jpeg Received

This XML is generated by FORUM. It contains all relevant patient data and order data. A reference to the corresponding image file is available. XML and picture filename are identical (except suffix).

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<emr:EMR_XML xmlns:emr="http://www.meditec.zeiss.com/czm/emr_xml">
   <emr:fundus_image_storage_entry>
       <emr:patients name>
           <emr:family name>demir/emr:family name>
           <emr:given name>yusuf</emr:given name>
           <emr:middle name/>
           <emr:name_prefix/>
           <emr:name suffix/>
       </emr:patients name>
       <emr:patient id>CZMI191640396/emr:patient id>
       <emr:issuer_of_patient_id>966167929802</emr:issuer_of_patient_id>
       <emr:patients_sex>M</emr:patients_sex>
       <emr:patients birth date>19771104/emr:patients birth date>
       <emr:study instance uid>1.2.276.0.75.2.5.30.25.1. /emr:study instance uid>
       <emr:study date>20100715</emr:study date>
       <emr:study_time>103738.000
       <emr:study_id>403
       <emr:accession number>48</emr:accession number>
       <emr:referring_physicians_name>
           <emr:family name/>
           <emr:given name/>
           <emr:middle name/>
           <emr:name_prefix/>
           <emr:name suffix/>
       </emr:referring physicians name>
       <emr:series instance uid>1.2.276.0.75.2.1.20.0.230436/emr:series instance uid>
       <emr:modality>OP</emr:modality>
       <emr:manufacturer>Carl Zeiss Meditec AG</emr:manufacturer>
       <emr:manufacturer_model_name>VISUCAM</emr:manufacturer_model_name>
       <emr:sop instance uid>1.2.276.0.75.2.1.20.0.3. /emr:sop instance uid>
       <emr:instance number>1356</emr:instance number>
       <emr:content date>20100715</emr:content date>
       <emr:content_time>104045.859
       <emr:file_reference>.\jpgFake.jpg</emr:file_reference>
       <emr:image type>ORIGINAL\PRIMARY\\COLOR</emr:image type>
       <emr:laterality>R</emr:laterality>
       <emr:angle>45.0
       <emr:contrast start time/>
   </emr:fundus_image_storage_entry>
</emr:EMR XML>
```

6.10 RAW Data Received

This XML is generated by FORUM. It contains all relevant patient and order data. The RAW data file is not made available. No reference to the according raw date file is available.

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<emr:EMR XML xmlns:emr="http://www.meditec.zeiss.com/czm/emr xml">
   <emr:other storage entry>
       <emr:patients name>
           <emr:family_name>DEMO GWP 2.x
           <emr:given name>00</emr:given name>
           <emr:middle name/>
           <emr:name_prefix/>
           <emr:name suffix/>
       </emr:patients_name>
       <emr:patient id>CZMI75599690</emr:patient id>
       <emr:issuer_of_patient_id>FORUM</emr:issuer_of_patient_id>
       <emr:patients_sex>M</emr:patients_sex>
<emr:patients birth date>19660101/emr:patients birth date>
<emr:study instance uid>1.2.276.0.75.2.2.30.2.1.20131.730.1013// cmr:study instance uid>
        <emr:study_date>20131023</emr:study_date>
       <emr:study_time>085347.000</emr:study_time>
       <emr:study_id>OPV_20131023
        <emr:accession number/>
       <emr:referring physicians name>
           <emr:family_name/>
           <emr:given_name/>
           <emr:middle_name/>
           <emr:name prefix/>
           <emr:name suffix/>
       </emr:referring_physicians_name>
       <emr:series instance uid>1.2.276.0.75.80.25.2.15079107.2379006/emr:series instance uid>
       <emr:modality>OPV</emr:modality>
       <emr:manufacturer>Carl Zeiss Meditec/emr:manufacturer>
       <emr:manufacturer_model_name>FORUM Glaucoma Workplace/emr:manufacturer model name>
       <emr:sop instance uid>1.2.276.0.75.2.3..58166056836940.2379007/emr:sop instance uid>
       <emr:instance_number>1</emr:instance_number>
       <emr:content date/>
       <emr:content_time/>
       <emr:acquisition date time>20131023085347/emr:acquisition date time>
       <emr:laterality>R</emr:laterality>
        <emr:file reference/>
    </emr:other_storage_entry>
</emr:EMR XML>
```