

# Sante PACS Server

## The Worklist Server Module

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## Overview

The built-in Worklist server module can receive via HL7 communication messages the patients' demographics and scheduling information of exams that are stored in a HIS/RIS system (Hospital Information System / Radiology Information System) and transfer them to any modality/medical scanner via DICOM communication protocols (C-FIND). The program offers an automated, error-free and reliable information transferring way from HL7 nodes (HIS/RIS) to DICOM nodes (medical scanners) without any human reaction.

## The features of Worklist server module

- Supports unlimited number of patients/exams (it depends only on hard disk size)
- Supports unlimited number of connections with HL7 nodes
- Supports unlimited number of connections with DICOM nodes
- It can query other DICOM Worklist nodes
- Mapping of HL7 message fields to program's database fields to cover several HL7 message formats
- Supports all charsets (Latin, Chinese, Japanese, Korean, Cyrillic, Arabic, Greek, Turkish, etc.)
- Supports DICOM network services (C-FIND SCU/SCP, C-ECHO SCU/SCP)
- Compatible with all modalities (CT, MR, NM, US, XA, MG, CR etc.).

## Configuration

### Worklist Server Configuration

Before the first use of the Worklist, the user must configure it. The program can receive HL7 messages about the scheduled procedures from HIS/RIS programs and for that purpose must have an IP port for communication with other HL7 nodes. For the configuration the user must use the menu command **“Network → Worklist Server Setup”**. This command displays the following dialog box:

#### HL7 Port

The IP port for communication with other HL7 nodes like HIS/RIS software. If the number of the HL7 port is equal to 0 the program does not open the HL7 port and the program cannot receive HL7 messages. The port number 0 can be used if the user wants the Worklist server module to be disabled.

#### IP Address

This address is received automatically from Windows OS. The user can change this value only from the TCP/IP configuration of Windows.

#### Sending Application / Sending Facility

The program can send HL7 messages to other HL7 clients. The program will use these values in the corresponding fields MSH.3 and MSH.4 of the HL7 messages.

#### Send Acknowledgement

Some HL7 servers require to receive an acknowledgement as proof that the client received the message. With this option enabled, the program sends this acknowledgement to the server.

#### Default Charset

If the HL7 message does not contain any information about the used charset, the program uses the value of this box.

#### In incoming queries use the Client AE Title when the tag 0040,0001 is empty

Many DICOM nodes ask for station name, if this field does not have any value the program uses the AE Title as station name.

#### Default Charset

If the HL7 message does not contain any information about the used charset, the program uses the value of this box.

**Auto delete HL7 records**

The program can delete automatically from the database old messages that are not useful anymore. The messages to be deleted can be older than 7 days, 14 days, 1 month or 3 months.

**Monitoring folder for auto-insertion of HL7 messages**

The program scans the monitoring folder for HL7 messages and if they exist it inserts them into database. The messages must have the extension .txt or .hl7. After message processing the program adds to the file the extension .DON if the message was inserted successfully into database or the extension .ERR if not.

**Erase HL7 messages after insertion**

If this option is enabled, the program deletes the successfully inserted messages instead of adding in them the extension .DON. The program does not delete messages that were not inserted into the database.

**Enable Message Logging (for debug only)**

By default, the C-FIND requests from medical scanners to worklist are not logged in the log database of the program and they are not displayed in the SCP report lists. That is because many medical scanners send periodically C-FIND requests in a very small time-frame (usually every 15 sec) and this way the log database becomes huge. The user must enable the C-FIND message logging of the worklist for debug reasons only and turn them off again after debugging.

### Mapping HL7 message fields to Database fields

Not all the HL7 applications use the same fields of an HL7 message to store the same piece of information. In the example below the two messages use different position of the OBR segment to store the modality:

```
MSH|^~\&|EUROMEDICA|EUROMEDICA|SYNGO.PLAZA|SYNGO.PLAZA|20190315090409||ORM^O01|20190315090409
7|P|2.3.1|
PID||7007|7007||NAME||19731215|M||ADDRESS||6944600091|2107778888|||8833925|||GR|||
PV1||I|15076600732|||^EOPYY^A|||15076600732|||54847|||2019031508
52|||
ORC|NW|54847||IP||^20190315085226||201903150852|||201903150852|||
OBR|1|54847||21100^CT|R||20190315095000|20190315100000|||CT|||CTAWP73120||20190315
0852|||
```

```
MSH|^~\&|application|application|REC_APP|REC_FAC|201912291543||ORM^O01||P|2.3.1|||
PID||1|1|Patient^Name||19591206|M|||
PV1|||
ORC|NW|||
OBR|||2005-9999|1234^BRAIN||200512301613529400|||CT|||
```

The first message uses the **ORB.18** field to store the modality while the second one uses the field **ORB.21**. For that reason, the user must map the fields of the HL7 message that generates a specific HL7 server to the database fields of Sante Worklist Server. The menu command **“Network Worklist Database To HL7 Field Mapping”** lets the user do this mapping with the following dialog box:

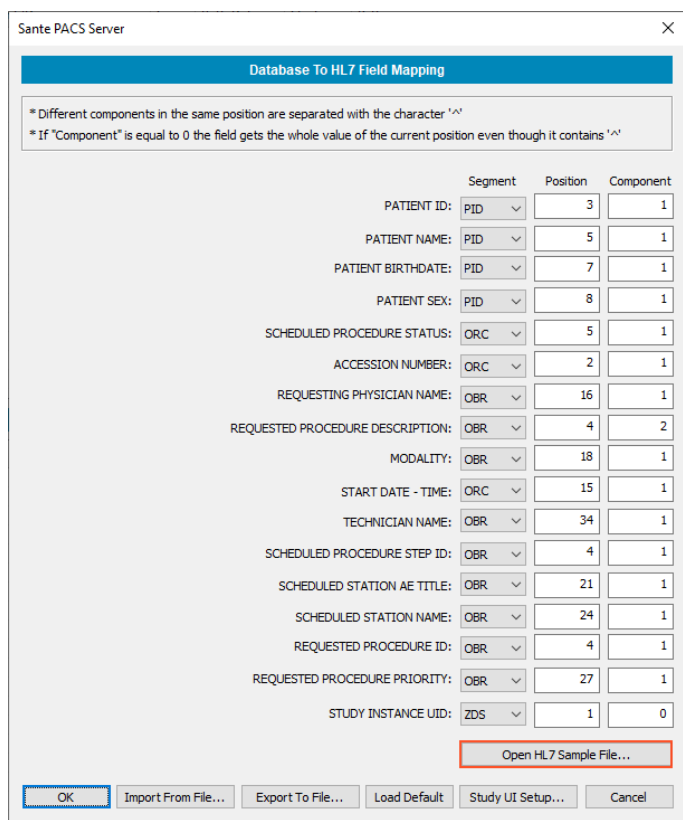
Database To HL7 Field Mapping

\* Different components in the same position are separated with the character '^'  
 \* If "Component" is equal to 0 the field gets the whole value of the current position even though it contains '^'

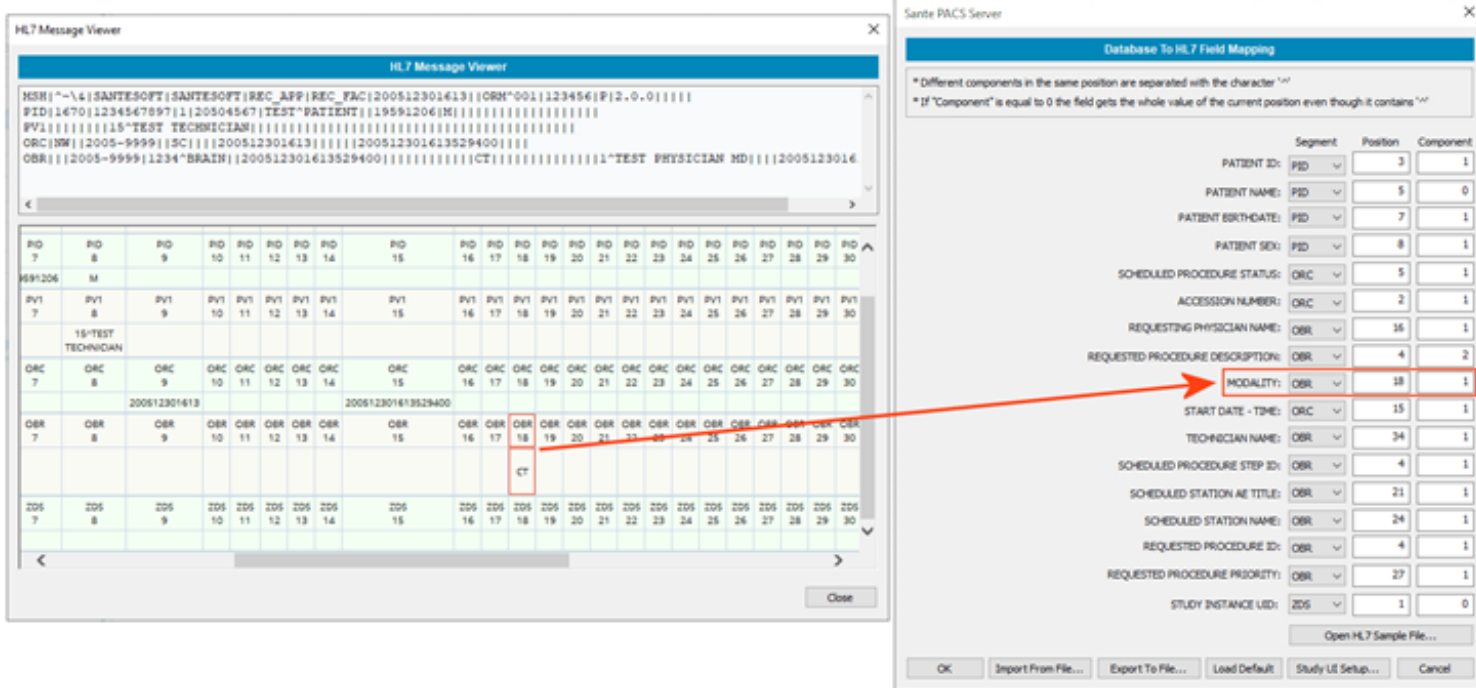
	Segment	Position	Component
PATIENT ID:	PID	3	1
PATIENT NAME:	PID	5	0
PATIENT BIRTHDATE:	PID	7	1
PATIENT SEX:	PID	8	1
SCHEDULED PROCEDURE STATUS:	ORC	5	1
ACCESSION NUMBER:	ORC	2	1
REQUESTING PHYSICIAN NAME:	OBR	16	1
REQUESTED PROCEDURE DESCRIPTION:	OBR	4	2
MODALITY:	OBR	18	1
START DATE - TIME:	ORC	15	1
TECHNICIAN NAME:	OBR	34	1
SCHEDULED PROCEDURE STEP ID:	OBR	4	1
SCHEDULED STATION AE TITLE:	OBR	21	1
SCHEDULED STATION NAME:	OBR	24	1
REQUESTED PROCEDURE ID:	OBR	4	1
REQUESTED PROCEDURE PRIORITY:	OBR	27	1
STUDY INSTANCE UID:	ZDS	1	0

### Getting help on HL7 to Database field mapping

With the "Open HL7 Sample File" button, the program allows the user to open an HL7 message "side-by-side" with the "Database To HL7 Field Mapping" dialog box.



The user can view the position of a field in the HL7 message and put the correct value on corresponding field of the "Database To HL7 Field Mapping" dialog box.



### Segment Position Component fields

If an HL7 field does not contain the character "^", the value of the "Component" must be equal to 1. If an HL7 field contains the character "^", e.g. "1234^BRAIN", for the first part of the value (1234) the "Component" must be equal to 1 and for the second part of the value (BRAIN) the "Component" must be equal to 2. If the value of "Component" is equal to 0, the program uses the whole value (1234^BRAIN), without splitting it into its parts.

**Export To File** button

The user can save the mapping to a disk file for backup and for use in another installation of the program.

**Import From File** button

It lets the user load from the disk drive a previously saved mapping.

**Study UI Setup** button

Some medical scanners do not accept worklist responses if those responses do not contain Study UI value and this field in the response is blank. With this button, the program can create Study UIs automatically for those scanners:

The screenshot shows a dialog box titled "Sante PACS Server" with a close button (X) in the top right corner. The dialog has a blue header bar with the text "Automatic Study UI Creation". Below the header, there is a section labeled "Study UI Root" with a text input field containing the IP address "1.2.300.0.7230010.3.1.3". Below this, there are two radio button options: "Create Study UI for all AE Titles" (which is selected) and "Create Study UI for AE Titles on the list". Below the radio buttons, there is a section labeled "AE Title for automatic Study UI creation" with a text input field and a button labeled "Insert AE Title". At the bottom of the dialog, there is a section labeled "List of AE Titles for automatic Study UI creation" with an empty list box, a button labeled "Edit AE Title...", and a button labeled "Delete AE Title". At the very bottom of the dialog, there are two buttons: "OK" and "Cancel".

The program will create Study UIs only if the received HL7 message from HIS/RIS software does not contain any value for this field, as well as the target scanner exists in the list of the above dialog box.

## The User Interface

The window of the program is divided to 3 parts:

1. In the left part of the window there are the controls that let the user query the local database and view the records.
2. In the middle part of the window is the list that contains the records that the database engine returns after a query of the user of the program.
3. In the right of the window there are the controls for handling the results of a query.














The screenshot displays the user interface of the Santesoft - Sante PACS Server. It is divided into three main sections:

- Search Database (Left Panel):** Contains search filters for 'Study date from' (Today, Yesterday, Last 7 days), 'Study date to', and 'Search All'/'Search Dates' buttons. Below this is the 'Search Criteria (Optional)' section with input fields for Patient Name, Patient ID, Accession Number, and Date of birth, along with a 'Clear Fields' button. At the bottom is the 'Modality' dropdown menu set to 'All'.
- Worklist Database (Middle Panel):** A table displaying search results. The table has the following columns: #, Patient Name, Patient ID, Birth Date, Sex, Accession Number, Requesting Physician, Requested Procedure, Modality, Start Date, Start Time, Status, Scheduled AE Title, Scheduled Station Name, and Requested Procedure ID. The first row contains the following data: 1, TEST, 15650160026, 1978/04/05, M, 333, [blank], LOW DOSE MAMMOGRAPHY B..., MG, 2019/06/18, 19:12, IP, FUSION2279-2, 5355.
- Search Results (Right Panel):** A vertical toolbar with icons for actions: View Record, Edit Record, Duplicate Record, Send Record To HL7 Node, Export Record, Copy Record To Clipboard, and Delete Record. Below this is the 'Worklist Data' section with icons for: Create New Record, Import HL7 Data From File, Query Other DICOM Worklist, Database To HL7 Field Mapping, Compose And Send HL7 Message, and Compare HL7 Messages.

The bottom of the window shows a taskbar with icons for Database, Network, Worklist, and Activity.



## The Command Buttons

	<a href="#">View Record</a>
	<a href="#">Edit Record</a>
	<a href="#">Duplicate Record</a>
	<a href="#">Send Record To HL7 Node</a>
	<a href="#">Export Record</a>
	<a href="#">Copy Record To Clipboard</a>
	<a href="#">Delete Record</a>
	<a href="#">Create New Record</a>
	<a href="#">Import HL7 Message From File</a>
	<a href="#">Query DICOM Worklist Node</a>
	<a href="#">Database To HL7 Field Mapping</a>
	<a href="#">Compose And Send HL7 Message</a>
	<a href="#">Compare HL7 Messages</a>

## View Record



This command lets the user review a database entry. The command is enabled when one record at least has been selected in the list of the records of the database. Otherwise, the command is grayed out.

View Worklist Record
✕

View Worklist Record

Field	Value
PATIENT ID	12590260483
PATIENT NAME	
PATIENT BIRTHDATE	24/02/1951
PATIENT SEX	F
ACCESSION NUMBER	108551
MEDICAL ALERTS	
ALLERGIES	
STUDY INSTANCE UID	
REQUESTING PHYSICIAN NAME	
REQUESTED PROCEDURE DESCRIPTION	ADMINISTRATION OF IODINATED CONTRAST MEDIA
MODALITY	CT
REQUESTED CONTRAST AGENT	
SCHEDULED STATION AE TITLE	CT111115
START DATE	
START TIME	
TECHNICIAN NAME	
SCHEDULED PROCEDURE STEP DESCRIPTION	
SCHEDULED PROCEDURE STEP ID	5555^ADMINISTRATION OF IODINATED CONTRAST MEDIA^BODY^0
SCHEDULED STATION NAME	CT111115
SCHEDULED PROCEDURE STEP LOCATION	
PRE MEDICATION	
SCHEDULED PROCEDURE STEP COMMENTS	
STATUS	IP
REQUESTED PROCEDURE ID	5555
REQUESTED TIMING	11/08/2020 16:25

### Edit Record



This command lets the user edit and modify a database entry. The fields that are pointed out with a star (\*) are mandatory fields and they cannot be deleted. The command is enabled when one record at least has been selected in the list of the records of the database. Otherwise, the command is grayed out.

**Edit Worklist Record**
✕

Field	Value
PATIENT ID (*)	12590260483
PATIENT NAME (*)	[REDACTED]
PATIENT BIRTHDATE	24/02/1951
PATIENT SEX	F
ACCESSION NUMBER	108551
MEDICAL ALERTS	
ALLERGIES	
STUDY INSTANCE UID	
REQUESTING PHYSICIAN NAME	
REQUESTED PROCEDURE DESCRIPTION	ADMINISTRATION OF IODINATED CONTRAST MEDIA
MODALITY	CT
REQUESTED CONTRAST AGENT	
SCHEDULED STATION AE TITLE	CT111115
START DATE	
START TIME	
TECHNICIAN NAME	
SCHEDULED PROCEDURE STEP DESCRIPTION	
SCHEDULED PROCEDURE STEP ID	5555^ADMINISTRATION OF IODINATED CONTRAST MEDIA^BODY^0
SCHEDULED STATION NAME	CT111115
SCHEDULED PROCEDURE STEP LOCATION	
PRE MEDICATION	
SCHEDULED PROCEDURE STEP COMMENTS	
STATUS	IP
REQUESTED PROCEDURE ID (*)	5555
REQUESTED TIMING	11/08/2020 16:25

(\*) = required field

OK
Cancel

### Duplicate Record



This command lets the user create a second instance of a record and it is useful when the user wishes to create a new record that has many common fields with another record. The command is enabled when one record at least has been selected in the list of the records of the database. Otherwise, the command is grayed out.

### Send Record



This command lets the user send to a specific HL7 node a database entry, in the form of an HL7 message. The command is enabled when one record at least has been selected in the list of the records of the database. Otherwise, the command is grayed out.

Sante PACS Server

**Send To HL7 Host**

Receiving Application  
Santesoft

Receiving Facility  
Santesoft

IP Address / Hostname      Port  
127.0.0.1      788

OK      Cancel

### Export Record



This command lets the user save in a disk file a database entry in the form of HL7 message. The command is enabled when one record at least has been selected in the list of the records of the database. Otherwise, the command is grayed out.

### Copy Record To Clipboard



This command lets the user copy to clipboard a database entry in the form of HL7 message. The command is enabled when one record at least has been selected in the list of the records of the database. Otherwise, the command is grayed out.

### Delete Record



This command lets the user delete one or more database entries that are not useful anymore. The command is enabled when one record at least has been selected in the list of the records of the database. Otherwise, the command is grayed out.

### Create New Record



Although the HL7 data are usually created by HIS/RIS software and they are sent to Worklist server via an HL7 message, the program offers to use the ability to create new worklist records from scratch. The fields that are pointed out with a star (\*) are mandatory fields.

Create New Worklist Record

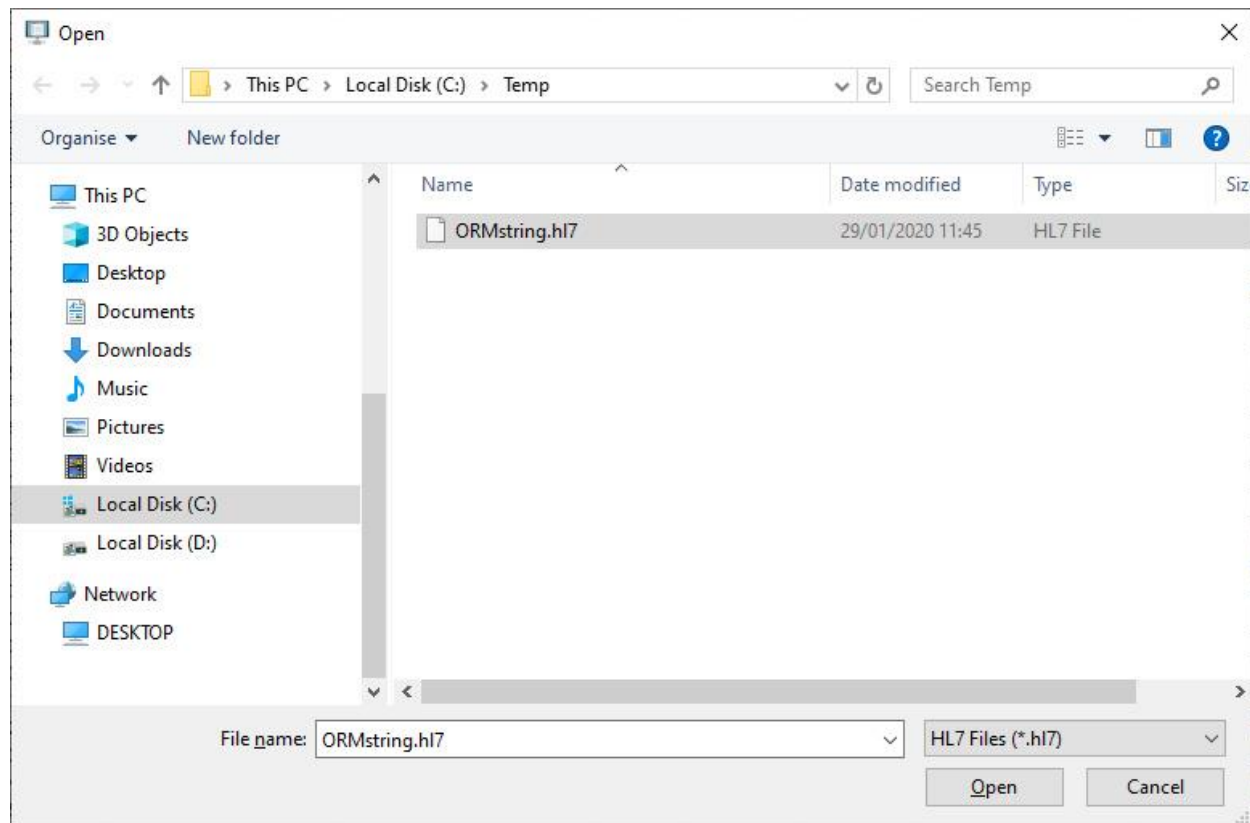
Field	Value
PATIENT ID (*)	
PATIENT NAME (*)	
PATIENT BIRTHDATE	
PATIENT SEX	
ACCESSION NUMBER	
MEDICAL ALERTS	
ALLERGIES	
STUDY INSTANCE UID	
REQUESTING PHYSICIAN NAME	
REQUESTED PROCEDURE DESCRIPTION	
MODALITY	
REQUESTED CONTRAST AGENT	
SCHEDULED STATION AE TITLE	
START DATE	
START TIME	
TECHNICIAN NAME	
SCHEDULED PROCEDURE STEP DESCRIPTION	
SCHEDULED PROCEDURE STEP ID	
SCHEDULED STATION NAME	
SCHEDULED PROCEDURE STEP LOCATION	
PRE MEDICATION	
SCHEDULED PROCEDURE STEP COMMENTS	
STATUS	
REQUESTED PROCEDURE ID (*)	
REQUESTED TIMING	

(\*) = required field

## Import HL7 Message From File



This command lets the user insert into database an HL7 message that has been saved in a text file.



The file must be a text file that contains an HL7 formatted message like this example:

```
MSH|^~_&|EUROMEDICA|EUROMEDICA|SYNGO.PLAZA|SYNGO.PLAZA|20190315090409||ORM^O01|20190315090409
7|P|2.3.1|
PID||7007|7007||NAME||19731215|M||ADDRESS||6944600091|2107778888|||8833925|||GR|||
PV1||I|15076600732|||^EOPYY^A|||15076600732|||54847|||2019031508
52|||
ORC|NW|54847|||IP||^20190315085226||201903150852|||201903150852|||
OBR|1|54847||21100^CT|R||20190315095000|20190315100000|||CT|||CTAWP73120||20190315
0852|||
```

### Query DICOM Worklist Node



With this command, the program lets the user query other Worklist Servers of the network and import their records into the database of the program.

Sante PACS Server ✕

Query DICOM Node

Worklist AE Title:  IP Address / Hostname:  Port:

Search Database

Query Results

Study date from:

Study date to:

#	Patient Name	Patient ID	Birth Date	Sex	Accession Number	Requesting Physician	Requested Pro
1	[REDACTED]	700700	1973/12/15	M	54847		AJONDGH TOM
2	[REDACTED]	156501600...	1976/04/05	M	333		LOW DOSE MA
3	[REDACTED]	156501600...	1976/04/05	M	333		LOW DOSE MA
4	[REDACTED]	700700	1973/12/15	M	54847		AJONDGH TOM
5	[REDACTED]	700700	1973/12/15	M	54847		AJONDGH TOM
6	[REDACTED]	700700	1973/12/15	M	54847		AJONDGH TOM

Query Options

Patient Name:

Patient ID:

Accession Number:

Date of birth:

Modality

Modality AE Title:  Modality Type:

### Database To HL7 Field Mapping



Not all the HL7 applications use the same fields of an HL7 message to store the same piece of information. In the example below the two messages use different position of the OBR segment to store the modality:

```
MSH|^~\&|EUROMEDICA|EUROMEDICA|SYNGO.PLAZA|SYNGO.PLAZA|20190315090409||ORM^O01|20190315090409
7|P|2.3.1|
PID||7007|7007||NAME||19731215|M||ADDRESS||6944600091|2107778888|||8833925|||GR||
PV1||I|15076600732|||^EOPYY^A|||15076600732|||54847|||2019031508
52|||
ORC|NW|54847||IP|^20190315085226|201903150852|||201903150852|||
OBR|1|54847|21100^CT|R|20190315095000|20190315100000|||CT|||CTAWP73120||20190315
0852|||
```

```
MSH|^~\&|application|application|REC_APP|REC_FAC|201912291543||ORM^O01||P|2.3.1|||
PID||1|1|Patient^Name||19591206|M|||
PV1|||
ORC|NW|||
OBR||2005-9999|1234^BRAIN||200512301613529400|||CT|||
```

The first message uses the **ORB.18** field to store the modality (CT) while the second one uses the field **ORB.21**. For that reason, the user must map the fields of the HL7 message that generates a specific HL7 server to the database fields of Sante Worklist Server. This can be done with use of command **“Database To HL7 Field Mapping”**. This command displays the following dialog box that lets the user do this mapping:

Sante PACS Server X

Database To HL7 Field Mapping

\* Different components in the same position are separated with the character '^'  
 \* If "Component" is equal to 0 the field gets the whole value of the current position even though it contains '^'

	Segment	Position	Component
PATIENT ID:	PID	3	1
PATIENT NAME:	PID	5	1
PATIENT BIRTHDATE:	PID	7	1
PATIENT SEX:	PID	8	1
SCHEDULED PROCEDURE STATUS:	ORC	5	1
ACCESSION NUMBER:	ORC	2	1
REQUESTING PHYSICIAN NAME:	OBR	16	1
REQUESTED PROCEDURE DESCRIPTION:	OBR	4	2
MODALITY:	OBR	18	1
START DATE - TIME:	ORC	15	1
TECHNICIAN NAME:	OBR	34	1
SCHEDULED PROCEDURE STEP ID:	OBR	4	1
SCHEDULED STATION AE TITLE:	OBR	21	1
SCHEDULED STATION NAME:	OBR	24	1
REQUESTED PROCEDURE ID:	OBR	4	1
REQUESTED PROCEDURE PRIORITY:	OBR	27	1
STUDY INSTANCE UID:	ZDS	1	0

Open HL7 Sample File...

OK
Import From File...
Export To File...
Load Default
Study UI Setup...
Cancel



**Export To File** button

The user can save the mapping to a disk file for backup and for use in another installation of the program.

**Import From File** button

It lets the user load from the disk drive a previously saved mapping.

**Study UI Setup** button

Some medical scanners do not accept worklist responses if those responses do not contain Study UI value and this field in the response is blank. With this button, the program can create Study UIs automatically for those scanners:

The screenshot shows a dialog box titled "Sante PACS Server" with a close button (X) in the top right corner. The dialog has a blue header bar with the text "Automatic Study UI Creation". Below the header, there is a section labeled "Study UI Root" with a text input field containing the value "1.2.300.0.7230010.3.1.3". Below this, there are two radio button options: "Create Study UI for all AE Titles" (which is selected) and "Create Study UI for AE Titles on the list". Below the radio buttons, there is a section labeled "AE Title for automatic Study UI creation" with a text input field and a button labeled "Insert AE Title". Below this, there is a section labeled "List of AE Titles for automatic Study UI creation" with a large empty list box, a button labeled "Edit AE Title...", and a button labeled "Delete AE Title". At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

The program will create Study UIs only if the received HL7 message from HIS/RIS software does not contain any value for this field, as well as the target scanner exists in the list of the above dialog box.

### Compose And Send HL7 Message



This command lets the user compose or load an HL7 message from a file, edit it and send it to a specific HL7 node.

Send HL7 Message

IP Address / Hostname	Port	Receiving Facility	Receiving Application
127.0.0.1	787	REC_APP	REC_APP

HL7 Message

```

MSH|^~&|EUROMEDICA 1|EUROMEDICA 2|SYNGO.PLAZA|SYNGO.PLAZA|20190315090409||ORM^O01|20190315
PID||700700|700700||XXXXXXXXXX^XXXXXXXXXX^XXXXXXXXXX||19731215|M||XXXXXXXXXX^XXXXXXXXXX^BYRONAS^^16231|
PV1||I|15076600732^XXXXXXXXXX^XXXXXXXXXX^|||||^EOPYY^A|||||15076600732^XXXXXXXXXX^XXXXXXXXXX^|||||5-
ORC|NW|54847^EUROMEDICA||IP|^XXXXXXXXXX^XXXXXXXXXX^20190315085226||201903150852|||||201903150852|||||
OBR|1|54847^EUROMEDICA||21100^AJONIKH TOMOGRAFIA UVRAKOS^^0|R||20190315095000|201903151000
NTE|1|Notes|||
NTE|2|Remarks|||
                    
```

Send
Load From File...
Paste From Clipboard
Close

### Compare HL7 Messages



This command lets the user compare two HL7 messages. It is useful in cases where one message works fine with the current field mapping of the program and another does not, and the user wishes to find the differences between the two messages.

Sante PACS Server X

HL7 Message Comparison

Select First File

Select Second File

Position File	MSH 0	MSH 1	MSH 2	MSH 3	MSH 4	MSH 5	MSH 6	M
ORMstringParadeigmaDataDesign.hi7	MSH	^~&	YGEIA AMPELOKIPON	YGEIA AMPELOKIPON	PACS	PACS	201906181514	
ORMstringParadeigmaSiemens.hi7	MSH	^~&	EUROMEDICA1	EUROMEDICA2	SYNGO.PLAZA	SYNGO.PLAZA	20190315090409	
Position File	PID 0	PID 1	PID 2	PID 3	PID 4	PID 5	PID 6	P
ORMstringParadeigmaDataDesign.hi7	PID		15650160026	15650160026				1970
ORMstringParadeigmaSiemens.hi7	PID		700700	700700				1970
Position File	PV1 0	PV1 1	PV1 2	PV1 3	PV1 4	PV1 5	PV1 6	P
ORMstringParadeigmaDataDesign.hi7	PV1		0					
ORMstringParadeigmaSiemens.hi7	PV1		1	15076600732				
Position File	ORC 0	ORC 1	ORC 2	ORC 3	ORC 4	ORC 5	ORC 6	O
ORMstringParadeigmaDataDesign.hi7	ORC	NW	333^YGEIA AMPELOKIPON			IP		^^^2019

Export to HTML file... Close

## Integration with HIS/RIS software

The program lets the HIS/RIS programs open the studies of a patient to Sante DICOM Web Viewer for reviewing. The HIS/RIS software must query Sante PACS Server to get the tokens of the study and then must open Sante DICOM Web Viewer with these tokens as command line parameter.

### Retrieve the token of a study

The HIS/RIS software must send to **HL7 port** of Sante PACS Server a message that contains the Study Instance UID of the desired study. The message must start with the character 10H and it must finish with the character ODH. Sante PACS Server will answer with a message that contains the token of the study. This message will start with character 10H and it will finish with the character ODH as well. The token of a study is permanent and it can be stored from HIS/RIS software for later use.

#### Examples

The HIS/RIS software sends the message that contains the Study Instance UID:

**10H1.2.826.0.1.3748527.1.4.2.0.20181120.185921.384642ODH**

and it receives from Sante PACS Server the answer that contains the token of the study:

**10HJHJ89ZQBkySrgt9f38OYic5wyC8YVO41pLPNesa5shYnmsl1DOXVF9eNK5SVwlg6ODH**

### Retrieve the token of the studies of a patient

The HIS/RIS software must send to **HL7 port** of Sante PACS Server a message that contains the Patient ID of the desired patient. The message must start with the character 10H and it must finish with the character ODH. Sante PACS Server will answer with a message that contains the Study Instance UID, the study date, the study description and the token of every study of the patient. Every Study Instance UID, study date, study description and every study token in the list ends with the character ODH. This message will start with character 10H and it will finish with the character ODH as well. Because every token ends with the character ODH, the message ends with **two ODH characters**.

#### Examples

The HIS/RIS software sends the message that contains the Patient UID:

**10HID200631zw609ODH**

and it receives from Sante PACS Server the answer that contains the Study Instance UID, the study date, the study description and the token of the studies:

**10H1.2.840.113619.2.55.3.2831173124.78.1375418120.812ODH**  
**20190603ODH**  
**THORAXODH**  
**H4sTZJQ7OqsxO9M633kSm9ES8wUexlW5aaoZqJuuot88Cu1QLkYe38fR4R42lR4ODH**  
**1.2.840.113619.2.55.3.2831173124.78.1375418120.813ODH**  
**20190603ODH**  
**THORAXODH**  
**H0QHlKw2RbpyVCTsrmp4xni2U0lGcEfogLK5bKaEV6Gg655ru1Kr76X770eIRhhLODH**  
**1.2.840.113619.2.55.3.2831173124.78.1375418120.814ODH**  
**20190603ODH**  
**THORAXODH**  
**HKx1erewwPpyBhAygMTmKHBfVlWcuqkT78r3fjiVUcM4gbB9XhsojgOA15Qj9MWMODHODH**

### Usage of a token for loading of the study in Sante DICOM Web Viewer

Sante DICOM Web Viewer accepts in the command line a parameter of the form:

**sante://download?url=[server url]:[server port]&ssl=[yes|no]&token=[token of the study]**

#### where:

**server url:** it can be an IP address like 127.0.0.1, 192.168.1.2, or a valid ICANN name like [mycompany.com](http://mycompany.com)

**server port:** the port of the built-in web server of Sante PACS Server, the default port is 3000

**ssl:** this parameter can have one of two values, **yes** if the server supports ssl connections or **no** if it does not

**token:** the token of the study

### Examples of usage of the token:

#### Direct call of Sante DICOM Web Viewer:

"C:\Program Files\Santesoft\Sante DICOM Web Viewer\Sante DICOM Web Viewer.exe"

"sante://download?url=127.0.0.1:3000&ssl=no&token=rXplcx6FHk9KlrZs18j1p77rGy881TAOmsjAyLwSW3gRauyKNGwrVvhagXaK69Gs"

"C:\Program Files\Santesoft\Sante DICOM Web Viewer\Sante DICOM Web Viewer.exe"

"sante://download?url=192.168.1.2:3000&ssl=no&token=rXplcx6FHk9KlrZs18j1p77rGy881TAOmsjAyLwSW3gRauyKNGwrVvhagXaK69Gs"

"C:\Program Files\Santesoft\Sante DICOM Web Viewer\Sante DICOM Web Viewer.exe"

"sante://download?url=mycompany.com:3000&ssl=yes&token=rXplcx6FHk9KlrZs18j1p77rGy881TAOmsjAyLwSW3gRauyKNGwrVvhagXaK69Gs"

#### As a link within a web page

<a

href="sante://download?url=127.0.0.1:3000&ssl=no&token=rXplcx6FHk9KlrZs18j1p77rGy881TAOmsjAyLwSW3gRauyKNGwrVvhagXaK69Gs">Open this study</a>

<a

href="sante://download?url=192.168.1.2:3000&ssl=no&token=rXplcx6FHk9KlrZs18j1p77rGy881TAOmsjAyLwSW3gRauyKNGwrVvhagXaK69Gs">Open this study</a>

<a

href="sante://download?url=mycompany.com:3000&ssl=yes&token=rXplcx6FHk9KlrZs18j1p77rGy881TAOmsjAyLwSW3gRauyKNGwrVvhagXaK69Gs">Open this study</a>

## Troubleshooting

### Starting and ending characters of a message

HL7 messages, when they are transferred with a socket, they must start with the character 0B (HEX) and they must end with the characters 1C 0D (HEX). Please ensure that you use these characters in your messages.

### Check the HL7 port of the program

You can use the netstat utility in the command prompt to check if the port of the program is opened and at which IP address.

In the command prompt, use the command:

```
C:\>netstat -ano -p tcp |find "3001"
```

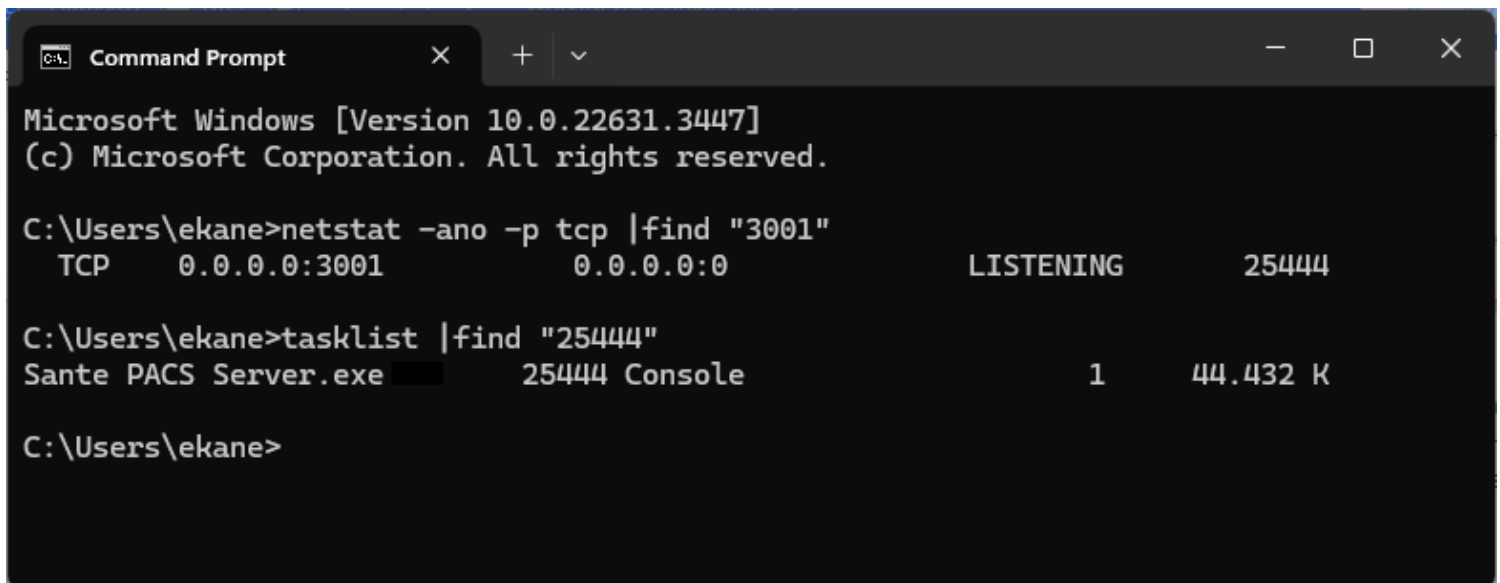
to check if the HL7 port 3001 of the program is opened and at which IP Address.

The last number that the program prints is the PID of the application that has opened the port.

In the command prompt, use the command to find which is this application:

```
C:\>tasklist |find "<PID>"
```

(where <PID> is the actual number of the application, in this example it is 25444)



```
Command Prompt
Microsoft Windows [Version 10.0.22631.3447]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ekane>netstat -ano -p tcp |find "3001"
TCP    0.0.0.0:3001          0.0.0.0:0          LISTENING          25444

C:\Users\ekane>tasklist |find "25444"
Sante PACS Server.exe 25444 Console           1           44.432 K

C:\Users\ekane>
```