

Sante Worklist Server

Quick start guide

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Overview

Sante Worklist Server (MWL Server) is a standalone application that receives patient demographic and exam scheduling information from a HIS/RIS system (Hospital Information System / Radiology Information System) via HL7 communication messages. It then transfers this information to any modality or medical scanner using DICOM communication protocols (C-FIND).

The program provides automated, reliable, and error-free data transfer from HL7 nodes (HIS/RIS) to DICOM nodes (medical scanners), without the need for human intervention.

Features and benefits

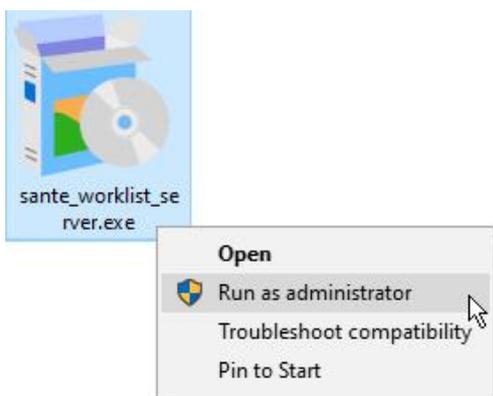
- The server can run as Windows service
- Supports unlimited number of patients/exams (it depends only on hard disk size)
- Supports unlimited number of connections with HL7 nodes
- Supports unlimited number of connections with DICOM nodes
- It can query other DICOM Worklist nodes
- Mapping of HL7 message fields to program's database fields
- 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.).
- Perpetual license that never expires.
- Free updates and free technical support for product's lifetime
- Windows Server 2025/2022/2019/2016/2012/2008 and Windows 11/10/8.1/8/7/Vista (64-bit) compatible
- Easy to use with native Windows "look and feel"

Minimum System Requirements

- Windows Server 2025/2022/2019/2016/2012/2008 or Windows 11/10/8.1/8/7/Vista 64-bit
- Intel Core i3 1.3GHz or greater
- 4 GB memory or more
- Monitor that supports resolution 1366x768 or above
- 100MB free space on hard disk

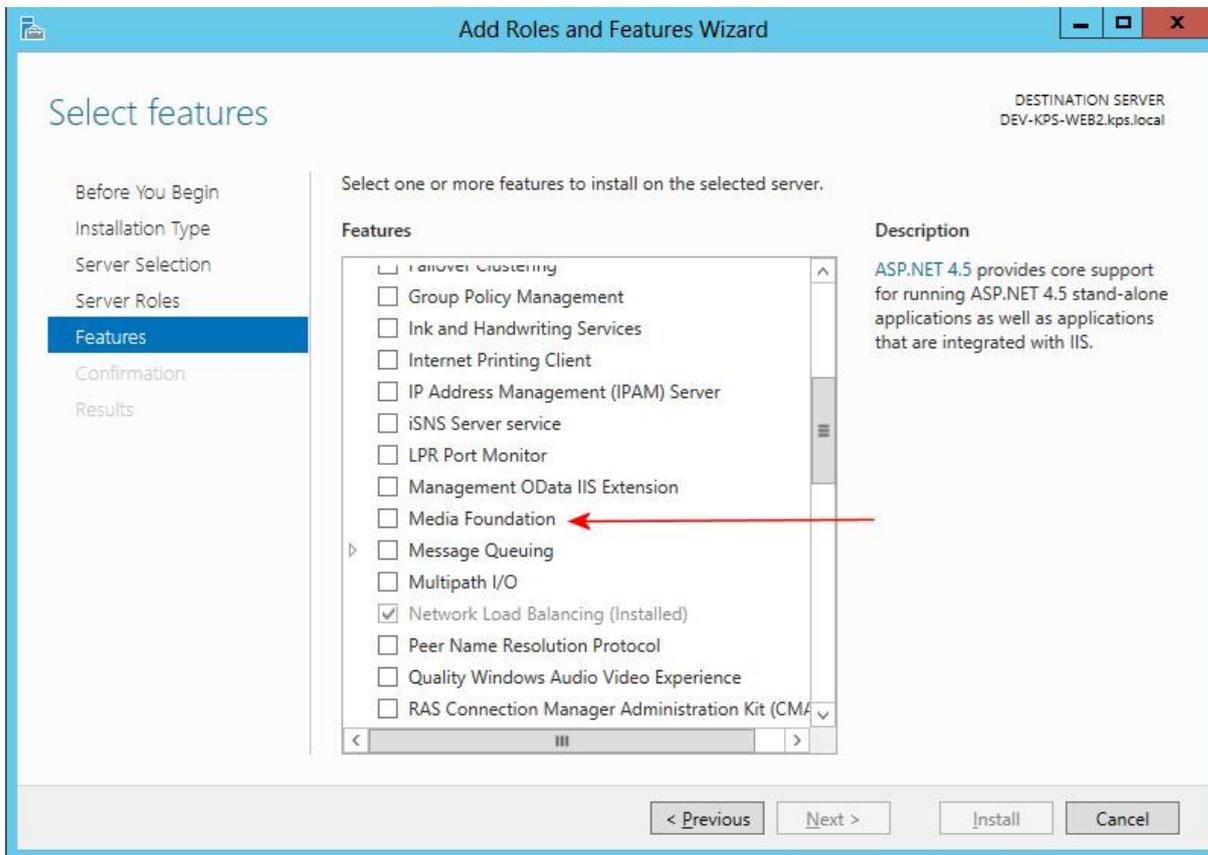
Installing Sante Worklist Server

The user must run the setup file as administrator. After downloading, press the right mouse button and select the menu item "Run as administrator".



Installation on Windows Server 2012

The user must install the "Media Foundation" from "Add Roles and Features" wizard of the Server Manager.



Installation on Windows Server 2008

Before the program installation the user must install this update of Microsoft:

<https://support.microsoft.com/en-us/kb/2117917>

Configuration

Program Configuration

Before using the software for the first time, it must be properly configured by the user.

The program functions as a DICOM Worklist Server and can be queried by medical scanners for scheduled procedures. Therefore, it must be configured as a DICOM node — meaning it needs an AE Title and an IP port for DICOM communications, just like any other DICOM node.

Additionally, the program acts as an HL7 client. It can receive HL7 messages containing scheduled procedure information from HIS/RIS systems. For this purpose, it must also be assigned an IP port for communication with other HL7 nodes.

To perform the configuration, the user should select the [Program Setup](#) command from the toolbar. This will open the following dialog box:

Sante Worklist Server

Program Setup

DICOM Configuration

DICOM AE Title: SANTEWL1 DICOM Port: 11131

HL7 Configuration

HL7 Port: 787 IP Address: 192.168.1.131

Sending Application: Santesoft Sending Facility: Santesoft

Send Acknowledgement

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

Default Charset: Hebrew Auto delete HL7 records from DB: Never

Auto-insertion of HL7 messages

Monitoring folder for auto-insertion of HL7 messages (*.txt,*.hl7): Browse...

Erase HL7 messages after insertion

Run the server as service

OK Cancel

DICOM AE Title, DICOM port

Specifies the AE Title and IP port used for DICOM communication with other DICOM nodes.

HL7 Port

The IP port used for communication with other HL7 nodes such as HIS/RIS systems.

IP Address

This address is automatically assigned by the Windows operating system. To change it, the user must modify the TCP/IP settings in Windows.

Sending Application / Sending Facility

If the program sends HL7 messages to other HL7 clients, it uses these values in the MSH.3 and MSH.4 fields of the HL7 message header.

Send Acknowledgement

Some HL7 servers require an acknowledgment message as confirmation that a message was received. When this option is enabled, the program sends an HL7 ACK message back to the server.

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

Some DICOM nodes request the station name. If tag (0040,0001) is empty, the program will use the AE Title of the querying DICOM node as the station name.

Default Charset

If an HL7 message does not specify a character set, the program uses the character set defined in this field.

Auto delete HL7 records

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

Monitoring folder for auto-insertion of HL7 messages

The program monitors a specified folder for HL7 message files with the extensions .txt or .hl7. When a message is successfully inserted into the database, the file is renamed with the extension .DON. If insertion fails, it is renamed with .ERR.

Erase HL7 messages after insertion

If this option is enabled, successfully inserted HL7 message files are deleted instead of being renamed with .DON. Messages that fail to insert are not deleted.

Run the server as service

This option enables the software to run as a windows service.

How it works

Connection with HIS/RIS servers.

The Sante Worklist Server receives messages in HL7 format from one or more HIS/RIS servers and stores them in the database.

IMPORTANT: The Sante Worklist Server cannot request these messages from the HIS/RIS servers; the HIS/RIS servers must send the messages to the HL7 port of the Sante Worklist Server.

Connection with DICOM modalities.

Each DICOM modality sends a C-FIND request to the Sante Worklist Server to retrieve the worklist items stored in the database for that specific modality. The C-FIND request must be sent to the DICOM port of the Sante Worklist Server.

IMPORTANT: The Sante Worklist Server cannot push worklist items to the DICOM modalities without being queried. Each DICOM modality must send a query to the Worklist Server to receive its relevant worklist items.

IMPORTANT! HIS/RIS servers must send their HL7 messages to the HL7 port of the Sante Worklist Server, and DICOM modalities must send their C-FIND requests to the DICOM port of the Sante Worklist Server. These two ports must not be confused with each other.

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|201903150904097|P|2.3.1|
PID||7007|7007||NAME||19731215|M||ADDRESS||6944600091|210778888||8833925||GR||
PV1||I|15076600732||^EOPY^A||15076600732||54847||201903150852||
ORC|NW|54847||IP||^20190315085226|201903150852||201903150852||
OBR|1|54847||21100^CT|R|20190315095000|20190315100000||CT||CTAWP73120||201903150852||
```

```
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 field **ORB.18** 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. This command lets the user to 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 the "Component" is equal to 0 the field gets the whole value of the current position even though it contains '^'

	Segment	Position	Component		Segment	Position	Component
PATIENT ID:	PID	3	1	REQUESTED PROCEDURE DESCRIPTION:	OBR	4	2
PATIENT NAME:	PID	5	0	MODALITY:	OBR	18	1
PATIENT BIRTHDATE:	PID	7	1	START DATE - TIME:	ORC	15	1
PATIENT SEX:	PID	8	1	TECHNICIAN NAME:	OBR	34	1
PATIENT TELEPHONE NUMBER:	PID	13	1	SCHEDULED PROCEDURE STEP ID:	OBR	4	1
PATIENT ADDRESS:	PID	11	1	SCHEDULED STATION AE TITLE:	OBR	21	1
SCHEDULED PROCEDURE STATUS:	ORC	5	1	SCHEDULED STATION NAME:	OBR	24	1
ACCESSION NUMBER:	ORC	2	1	REQUESTED PROCEDURE ID:	OBR	4	1
REQUESTING PHYSICIAN NAME:	OBR	16	1	REQUESTED PROCEDURE PRIORITY:	OBR	27	1
REFERRING PHYSICIAN NAME:	PV1	8	1	STUDY INSTANCE UID:	ZDS	1	0

OK
Import From File...
Export To File...
Load Default
Study UI Setup...
Open HL7 Sample File...
Cancel

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.

Sante Worklist Server ✕

Database To HL7 Field Mapping

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

	Segment	Position	Component		Segment	Position	Component
PATIENT ID:	PID	3	1	REQUESTED PROCEDURE DESCRIPTION:	OBR	4	2
PATIENT NAME:	PID	5	0	MODALITY:	OBR	18	1
PATIENT BIRTHDATE:	PID	7	1	START DATE - TIME:	ORC	15	1
PATIENT SEX:	PID	8	1	TECHNICIAN NAME:	OBR	34	1
PATIENT TELEPHONE NUMBER:	PID	13	1	SCHEDULED PROCEDURE STEP ID:	OBR	4	1
PATIENT ADDRESS:	PID	11	1	SCHEDULED STATION AE TITLE:	OBR	21	1
SCHEDULED PROCEDURE STATUS:	ORC	5	1	SCHEDULED STATION NAME:	OBR	24	1
ACCESSION NUMBER:	ORC	2	1	REQUESTED PROCEDURE ID:	OBR	4	1
REQUESTING PHYSICIAN NAME:	OBR	16	1	REQUESTED PROCEDURE PRIORITY:	OBR	27	1
REFERRING PHYSICIAN NAME:	PV1	8	1	STUDY INSTANCE UID:	ZDS	1	0

Export To File button

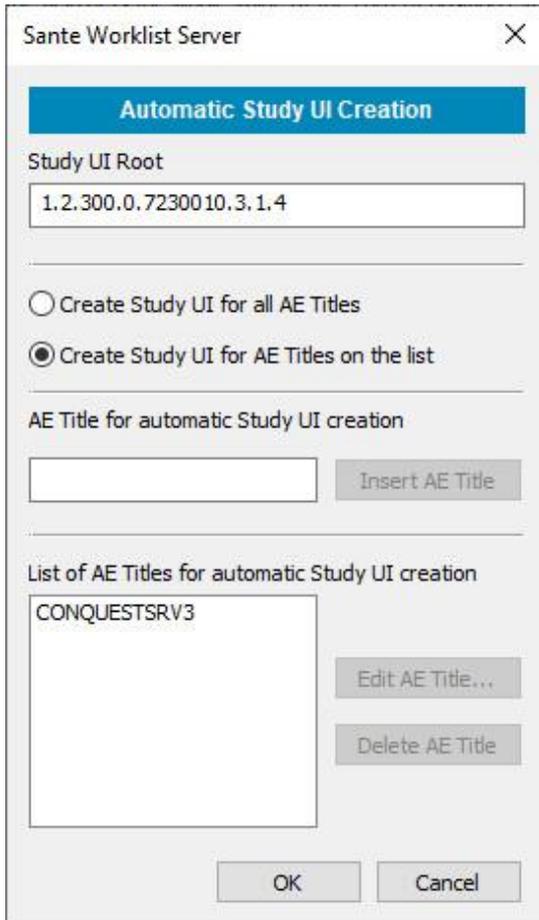
The user can save the mapping to a disk file for backup and for use in another installation of the program.

Import From File button

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 Worklist 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 "1.2.300.0.7230010.3.1.4". Below this, there are two radio button options: "Create Study UI for all AE Titles" (which is unselected) and "Create Study UI for AE Titles on the list" (which is selected). 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 list box containing the text "CONQUESTSRV3". To the right of the list box are two buttons: "Edit AE Title..." and "Delete AE Title". At the bottom of the dialog 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.

Evaluation

The program without a registration key can run for 90 days for evaluation purposes. After that period, a valid registration key is required.

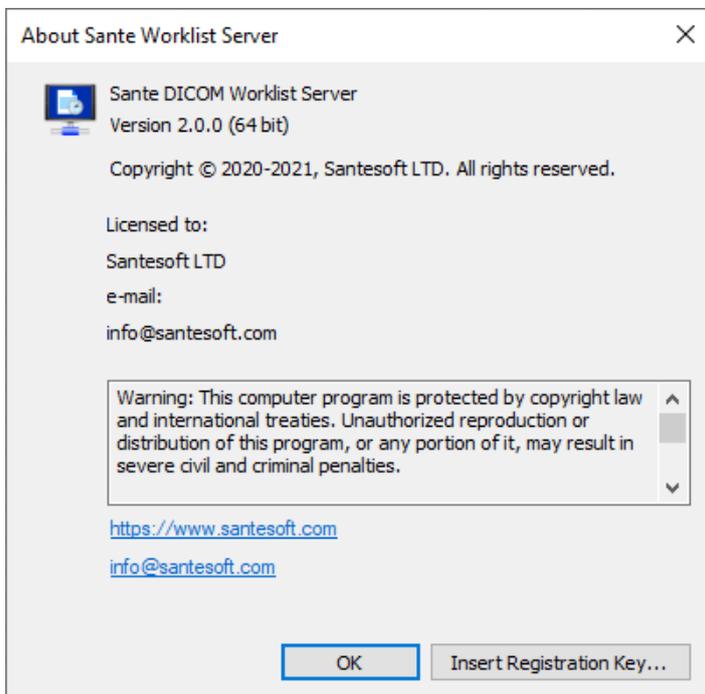
Purchasing

The program can be purchased from our online store at:

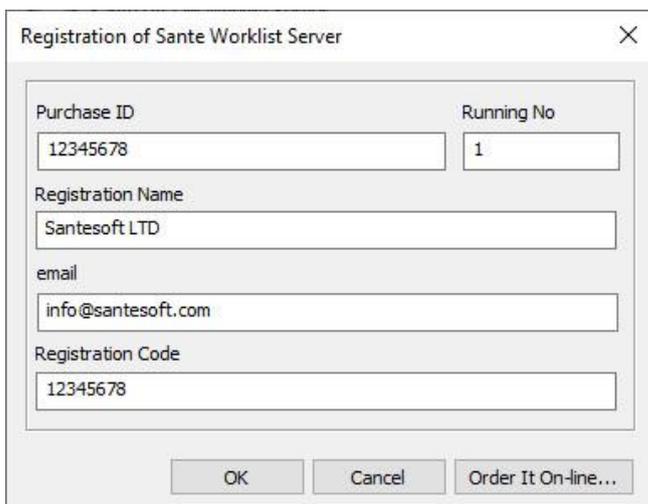
<https://santesoft.com/win/sante-worklist-server/order.html>

Program activation

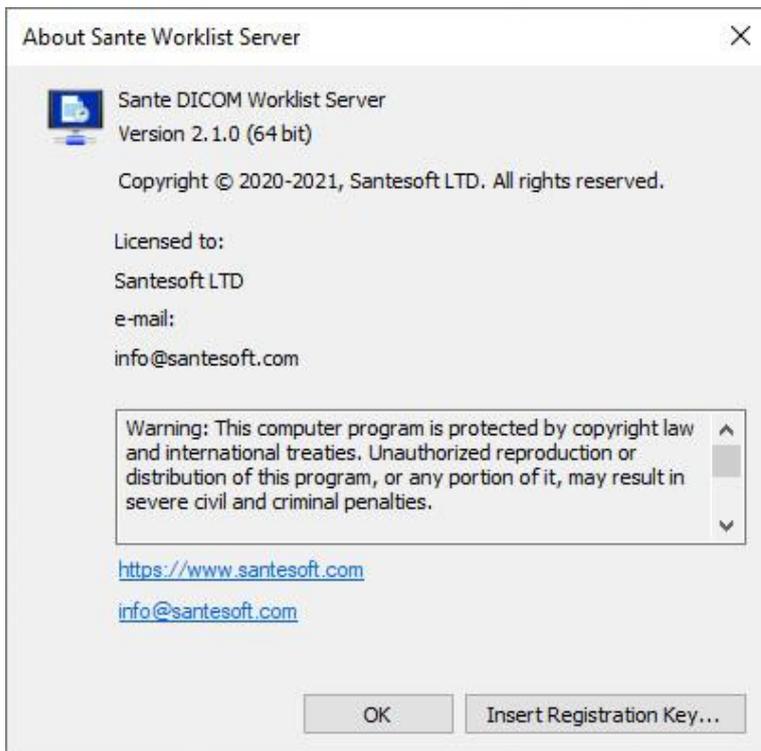
After the purchase the user will receive an email with the registration key. To activate the program, the user must select the [Program](#) Information command and in the dialog box appears the button **“Insert Registration Key”**.



This button displays a dialog box that allows the user to activate the program. The information of the registration key is case sensitive and the user must insert it exactly as is in the email.

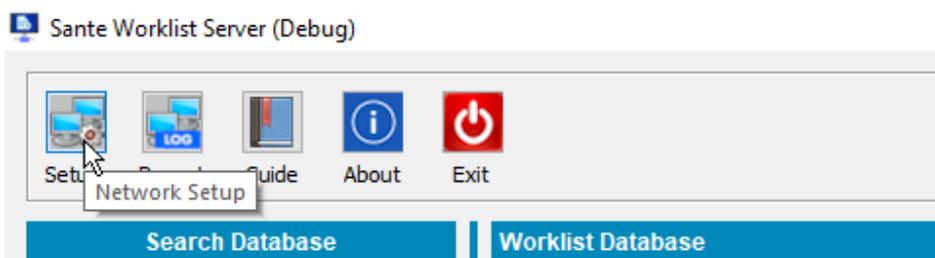


The User Interface



The window of the program is divided to 4 parts:

1. On the top part of the window there is the command toolbar that contains the commands of the program. When the user holds the mouse pointer over a command for a moment, the program displays a help text that describe that command:



2. In the left part of the window there are the controls that let the user query the local database and view the records.
3. 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.
4. In the right of the window there are the controls for manipulation of the results of a query

The Command Buttons

	Program Setup
	DICOM Network Log
	Quick Start Guide
	Program Information
	Exit
	View Record
	Edit Record
	Duplicate Record
	Send Record To HL7 Node
	Export Record
	Copy Record To Clipboard
	Delete Record
	Create New Record
	Import HL7 Message From File
	Query DICOM Worklist Node
	Database To HL7 Field Mapping
	Compose And Send HL7 Message
	Compare HL7 Messages

Toolbar Commands

Program Setup



Before the first use of the software, the user must configure it. The program acts as a DICOM worklist server and it can be queried by medical scanners about the scheduled procedures, thus it must be configured as a DICOM node. That is, it must receive an AE Title and an IP port for DICOM communications as every other DICOM node. The program acts also as an HL7 client, it can receive HL7 messages about the scheduled procedures from HIS/RIS programs and for that purpose must receive an IP port for the communication with other HL7 nodes. This command lets user to configure the server with the following dialog box:

Sante Worklist Server
✕

Program Setup

DICOM Configuration

DICOM AE Title	DICOM Port
<input type="text" value="SANTEWL1"/>	<input type="text" value="11131"/>

HL7 Configuration

HL7 Port	IP Address
<input type="text" value="787"/>	<input type="text" value="192.168.1.131"/>

Sending Application	Sending Facility
<input type="text" value="Santesoft"/>	<input type="text" value="Santesoft"/>

Send Acknowledgement

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

Default Charset	Auto delete HL7 records from DB
<input type="text" value="Hebrew"/>	<input type="text" value="Never"/>

Auto-insertion of HL7 messages

Monitoring folder for auto-insertion of HL7 messages (*.bt,*.hl7)

Erase HL7 messages after insertion

Run the server as service

DICOM AE Title, DICOM port

The AE Title and IP port for DICOM communications with the other DICOM nodes.

HL7 Port

The IP port for communication with other HL7 nodes like HIS/RIS software.

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.

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 a 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 is 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.

Run the server as service

This option enables the software to run as a windows service.

DICOM Network Log



This command displays the DICOM network activity.

Network Report

Network Report								
AE Title	Service ID	Service	Role	Peer AE Title	Service Result	Service Date	Service Time	Service Duration
SANTEWL1	0003H	C-FIND	SCP	SANTEWL1	Succeeded	21/08/2020	12:29:54	0 sec
SANTEWL1	0002H	C-FIND	SCU	SANTEWL1	Succeeded	21/08/2020	12:29:53	0 sec

Today Yesterday Last 7 Days All Delete Close

With a double-click over a row, the user can view details of that activity.

Network Log (Service ID:0003H)

Network Log

```
# Connected with peer 127.0.0.1
# Receiving A-ASSOCIATE-RQ...
# A-ASSOCIATE-RQ was received from AE Title "SANTEWL1"
- Presentation Context 1: 1.2.840.10008.5.1.4.31
- Proposed transfer syntax 1: 1.2.840.10008.1.2
- Proposed transfer syntax 2: 1.2.840.10008.1.2.1

# Sending A-ASSOCIATE-AC...
- Presentation Context 1: 1.2.840.10008.5.1.4.31
- Accepted transfer syntax 1: 1.2.840.10008.1.2

- A-ASSOCIATE-AC was sent

# Waiting for service request...
# C-FIND service request received
- C-FIND-RQ was received from AE Title "SANTEWL1"
- Message Contents:
Group  Elem  VR    Size  Data
0000  0000  UL     4     70
0000  0002  UI    22    1.2.840.10008.5.1.4.31
0000  0100  US     2     20H
0000  0110  US     2     1H
0000  0700  US     2     0H
0000  0800  US     2    102H

- Message Contents:
Group  Elem  VR    Size  Data
0008  0050  SH     0
0010  0010  PN     0
0010  0020  LO     0
0010  0030  DA     0
0010  0040  CS     0
0032  1032  PN     0
0032  1060  LO     0
0040  0100  SQ    64
0008  0060  CS     0
0040  0001  AE     0
```

OK Refresh Export To Text File... Copy to clipboard Kill Connection

Quick Start Guide

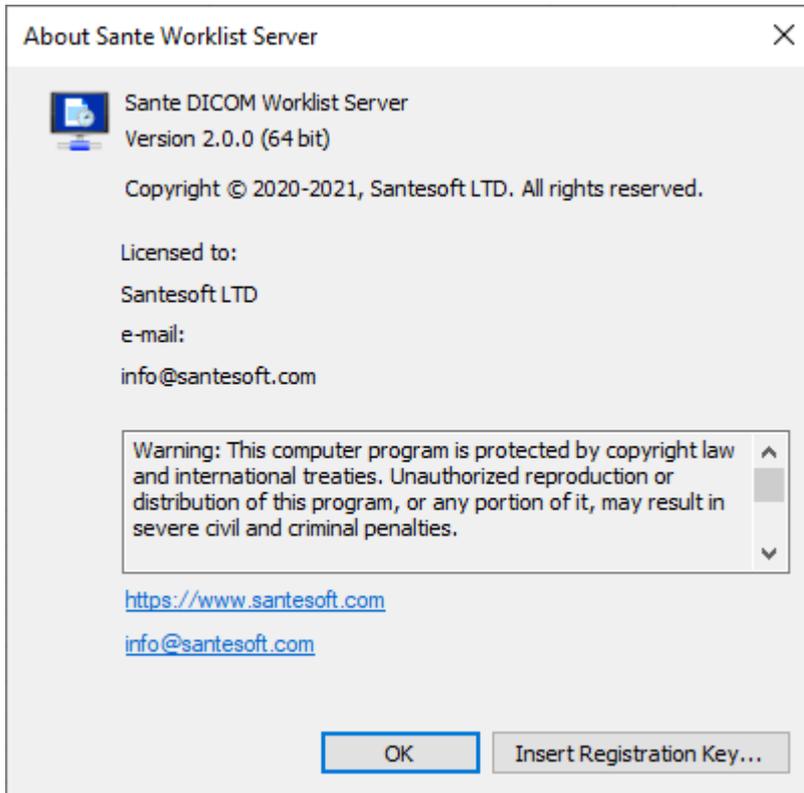


This command displays this document.

Program Information

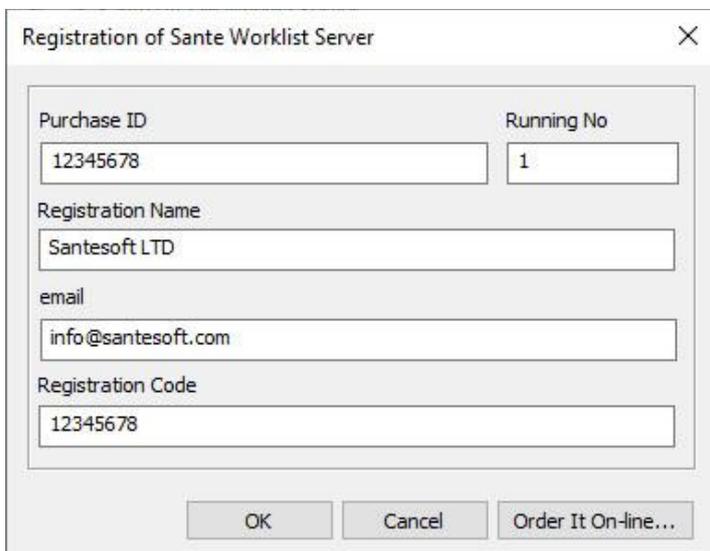


This command displays information about the program and the register user.



Insert Registration Key button

After the purchase the user will receive an email with the registration key. This button displays a dialog box that allows the user to activate the program. The information of the registration key is case sensitive and the user must insert it exactly as is in the email.



Exit



Use this command to terminate the program end exit.

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

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 (*)	
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

Duplicate Record

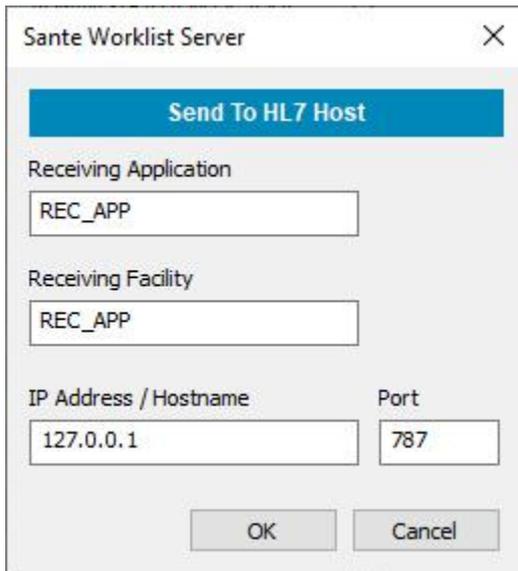


This command lets the user create a second instance of a record and it is useful when the user wishes to create a new record that has many common fields with another record.

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 Worklist Server

Send To HL7 Host

Receiving Application
REC_APP

Receiving Facility
REC_APP

IP Address / Hostname Port
127.0.0.1 787

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

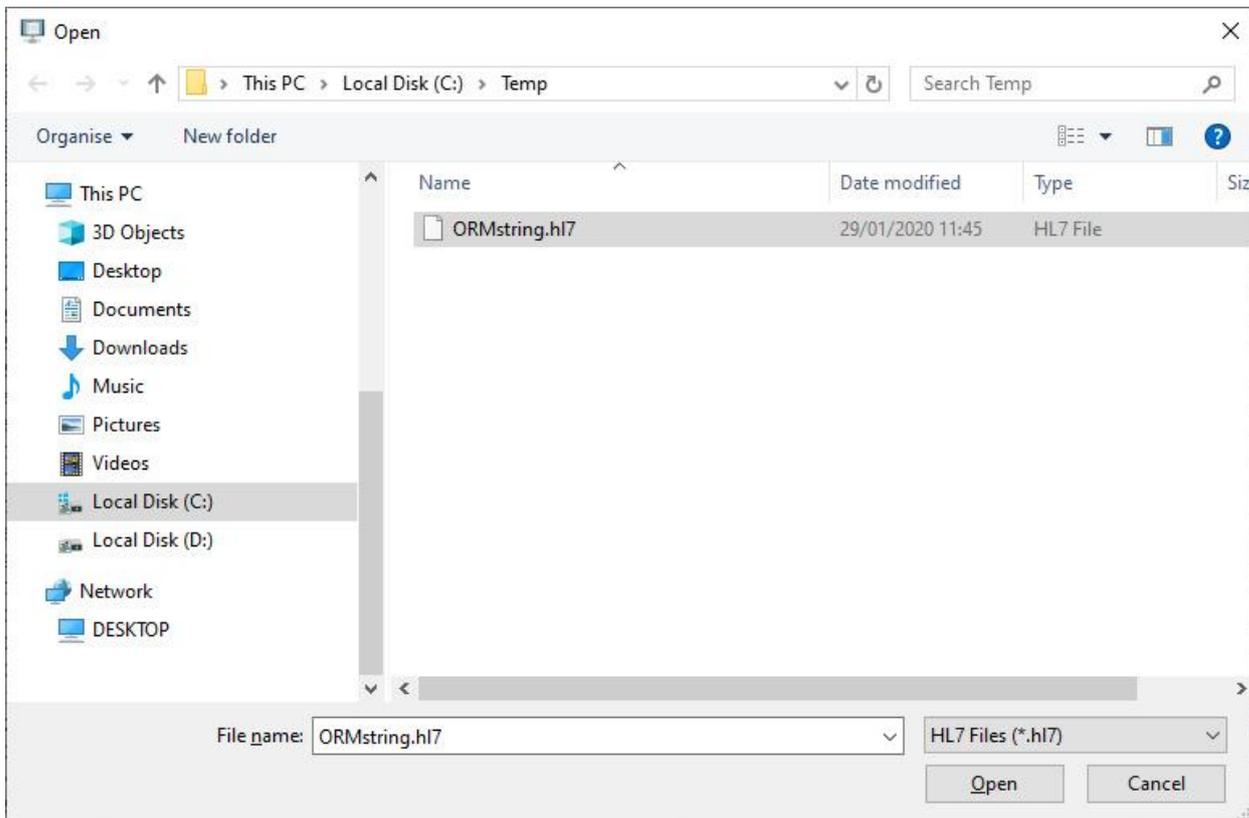
Field	Value
PATIENT ID (*)	
PATIENT NAME (*)	
PATIENT BIRTHDATE	
PATIENT SEX	
ACCESSION NUMBER	
MEDICAL ALERTS	
ALLERGIES	
STUDY INSTANCE UID	
REQUESTING PHYSICIAN NAME	
REQUESTED PROCEDURE DESCRIPTION	
MODALITY	
REQUESTED CONTRAST AGENT	
SCHEDULED STATION AE TITLE	
START DATE	
START TIME	
TECHNICIAN 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|201903150904097|P|2.3.1|
PID||7007|7007||NAME||19731215|M||ADDRESS||6944600091|210778888|||8833925|||GR||
PV1||I|15076600732|||^EOPYY^A|||15076600732|||54847|||201903150852|||
ORC|NW|54847||IP||^20190315085226|201903150852|||201903150852|||
OBR|1|54847||21100^CT|R|20190315095000|20190315100000|||CT|||CTAWP73120||201903150852|||
```

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.

Query DICOM Node

Worklist AE Title

IP Address / Hostname

Port

Search Database

Query Results

Study date from

Study date to

Query Options

Patient Name

Patient ID

Accession Number

Date of birth

Modality

Modality AE Title

Modality Type

#	Patient Name	Patient ID	Birth Date	Sex	Accession Number	Requesting Physician	Requested Pro
1	[REDACTED]	700700	1973/12/15	M	54847		AJONIKH TOMI
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		AJONIKH TOMI
5	[REDACTED]	700700	1973/12/15	M	54847		AJONIKH TOMI
6	[REDACTED]	700700	1973/12/15	M	54847		AJONIKH TOMI

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|201903150904097|P|2.3.1|
PID||7007|7007||NAME||19731215|M||ADDRESS||6944600091|2107778888||8833925|||||GR||
PV1||I|15076600732||||^EOPYY^A||||15076600732||||54847|||||201903150852|||||
ORC|NW|54847||IP||^20190315085226|201903150852||||201903150852|||||
OBR|1|54847||21100^CT|R|20190315095000|20190315100000|||||CT||||CTAWP73120||201903150852|||||
```

```
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 to do this mapping:

Sante Worklist Server ✕

Database To HL7 Field Mapping

* Different components in the same position are separated with the character '^'

* If the "Component" is equal to 0 the field gets the whole value of the current position even though it contains '^'

	Segment	Position	Component		Segment	Position	Component
PATIENT ID:	PID	3	1	REQUESTED PROCEDURE DESCRIPTION:	OBR	4	2
PATIENT NAME:	PID	5	0	MODALITY:	OBR	18	1
PATIENT BIRTHDATE:	PID	7	1	START DATE - TIME:	ORC	15	1
PATIENT SEX:	PID	8	1	TECHNICIAN NAME:	OBR	34	1
PATIENT TELEPHONE NUMBER:	PID	13	1	SCHEDULED PROCEDURE STEP ID:	OBR	4	1
PATIENT ADDRESS:	PID	11	1	SCHEDULED STATION AE TITLE:	OBR	21	1
SCHEDULED PROCEDURE STATUS:	ORC	5	1	SCHEDULED STATION NAME:	OBR	24	1
ACCESSION NUMBER:	ORC	2	1	REQUESTED PROCEDURE ID:	OBR	4	1
REQUESTING PHYSICIAN NAME:	OBR	16	1	REQUESTED PROCEDURE PRIORITY:	OBR	27	1
REFERRING PHYSICIAN NAME:	PV1	8	1	STUDY INSTANCE UID:	ZDS	1	0

OK
Import From File...
Export To File...
Load Default
Study UI Setup...
Open HL7 Sample File...
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

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 Worklist 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 "1.2.300.0.7230010.3.1.4". Below this, there are two radio button options: "Create Study UI for all AE Titles" (which is unselected) and "Create Study UI for AE Titles on the list" (which is selected). 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 list box containing the text "CONQUESTSRV3". To the right of the list box are two buttons: "Edit AE Title..." and "Delete AE Title". At the bottom of the dialog 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.

Sante Worklist Server
✕

Send HL7 Message

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

HL7 Message

```
MSH|^~&|EUROMEDICA1|EUROMEDICA2|SYNGO.PLAZA|SYNGO.PLAZA|20190315090409||ORM^O01|20190315
PID||700700|700700||^|19731215|M||^BYRONAS^^16231|
PV1||I|15076600732^|^|^EOPYY^A|^|^15076600732^|^|^5-
ORC|NW|54847^EUROMEDICA||IP|^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 Worklist Server
✕

HL7 Message Comparison

Select First File

Select Second File

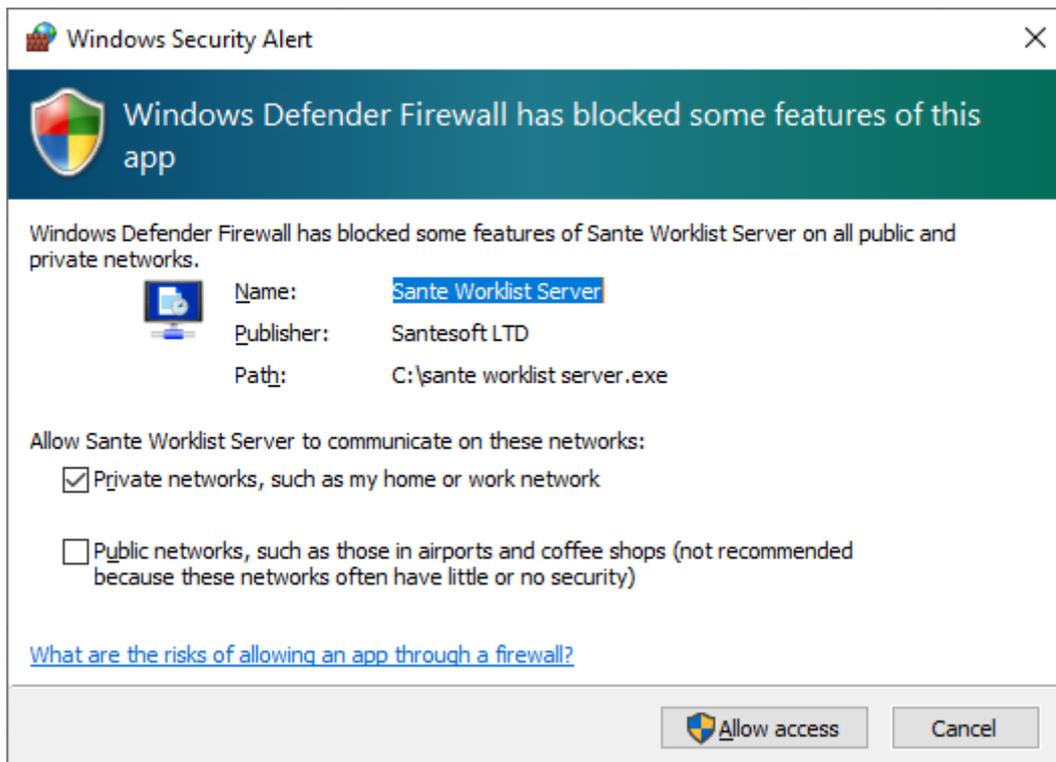
Position ----- File	MSH 0	MSH 1	MSH 2	MSH 3	MSH 4	MSH 5	MSH 6	M
ORMstringParadeigmaDataDesign.hl7	MSH	^--&	YGEIA AMPELOKIPON	YGEIA AMPELOKIPON	PACS	PACS	201906181514	
ORMstringParadeigmaSiemens.hl7	MSH	^--&	EUROMEDICA1	EUROMEDICA2	SYNGO.PLAZA	SYNGO.PLAZA	20190315090409	
Position ----- File	PID 0	PID 1	PID 2	PID 3	PID 4	PID 5	PID 6	P
ORMstringParadeigmaDataDesign.hl7	PID		15650160026	15650160026				1976
ORMstringParadeigmaSiemens.hl7	PID		700700	700700				1973
Position ----- File	PV1 0	PV1 1	PV1 2	PV1 3	PV1 4	PV1 5	PV1 6	P
ORMstringParadeigmaDataDesign.hl7	PV1		O					
ORMstringParadeigmaSiemens.hl7	PV1		I	15076600732^				
Position ----- File	ORC 0	ORC 1	ORC 2	ORC 3	ORC 4	ORC 5	ORC 6	O
ORMstringParadeigmaDataDesign.hl7	ORC	NW	333^YGEIA AMPELOKIPON			IP		^^^2019

Export to HTML file...
Close

Connection Troubleshooting

If the program cannot communicate with other DICOM or HL7 nodes, please check the following checklist:

- Ensure that the ports of the program are not used by any other program.
- Ensure that the ports of the program are not blocked from a firewall or an antivirus.
- When the program starts it asks for to be added in firewall exception list. If you answered no you must add it manually.



- If the two nodes (server and client) belong to different subnetworks, ensure that the ports of the program are forwarded by the router.
- If the PC has more than one network card (physical, logical or virtual network cards) and thus more than one IP address, ensure that the client and server use IP addresses of the same sub-network. E.g. If the server has two IP addresses, the addresses 192.168.1.1 and 172.91.1.1 and the client has the IP address 192.168.1.* the client must use the address 192.168.1.1 as the IP address of the server. If the client has the IP address 172.91.1.* it must use the address 172.91.1.1 as the IP address of the server. That means that the server and client must belong to the same sub-network. In case that the PC has more than one IP address, the program displays only one IP address, the first one, although it opens its IP ports in all the available network interfaces and not only in the indicated IP address. Use the command **ipconfig** in the command prompt to get a list of all the IP addresses of the PC.

Check a 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:

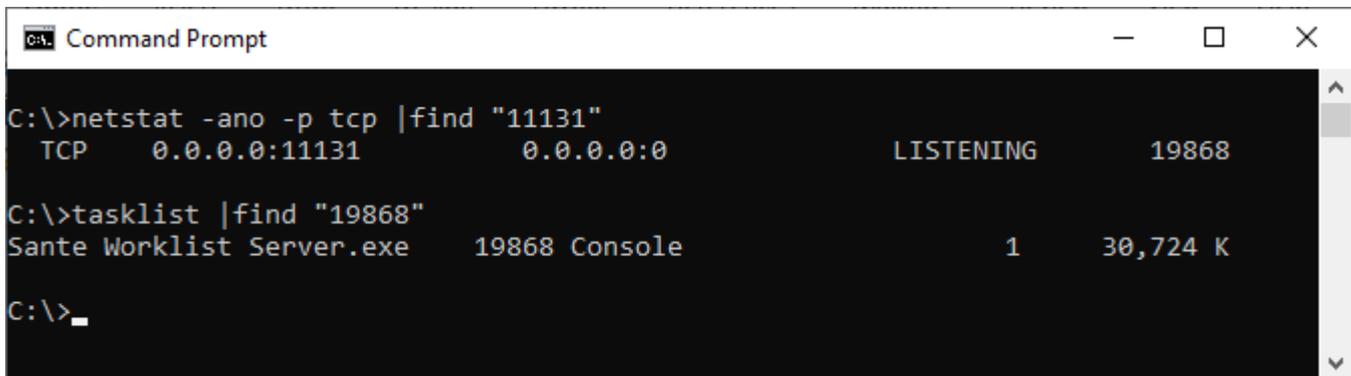
```
C:\>netstat -ano -p tcp |find "11131"
```

to check if port 11131 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:

```
C:\>tasklist |find "19868"
```

to find which is this application.



```
Command Prompt
C:\>netstat -ano -p tcp |find "11131"
TCP    0.0.0.0:11131    0.0.0.0:0      LISTENING      19868

C:\>tasklist |find "19868"
Sante Worklist Server.exe    19868 Console    1    30,724 K

C:\>_
```

With these commands you can check the port of the Worklist server module as well.

The Message Format

The HL7 messages that are transferred via a network connection and the HL7 port of the program, must start with the (non-printable) character 0B (hexadecimal) and they must end with the (non-printable) characters 1C and 0D (hexadecimal). The messages that are inserted via the interface of the program and not via the network do not need these characters.

Example

A HL7 text message:

```
testfile.hl7 - Notepad
File Edit Format View Help
MSH|^~\&|Santesoft|Santesoft|REC_APP|REC_APP|202211091932||ORM^001||P|2.3.1|||||
PID|||700700||KANELLOPOULOS^MANOS||19731215|M|||||
PV1|||||
ORC|NW|54847||IP|||||201903150852|||||
OBR|||21100^AJONIKH TOMOGRAFIA UVRAKOS|||||CT||||CTAWP73120|||201903150852|||||
```

The hexadecimal view of the message in which the start and end characters are highlighted:

The screenshot shows the 'Sante DICOM Editor' window with a 'HEX Editor' tab. The file path is 'C:\Temp\testfile.hl7'. The hexadecimal view shows the message content with the following highlights:

- Address 00000000H: 0B (highlighted in yellow)
- Address 00000160H: 1C (highlighted in yellow)
- Address 00000170H: 0D (highlighted in yellow)

The right-hand pane shows the data type for the selected byte (0B) as 'Char'. Below the hex view, the file size is indicated as 'Size : 369'. At the bottom, there are buttons for 'Save', 'Cancel', and 'Help...'.

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:

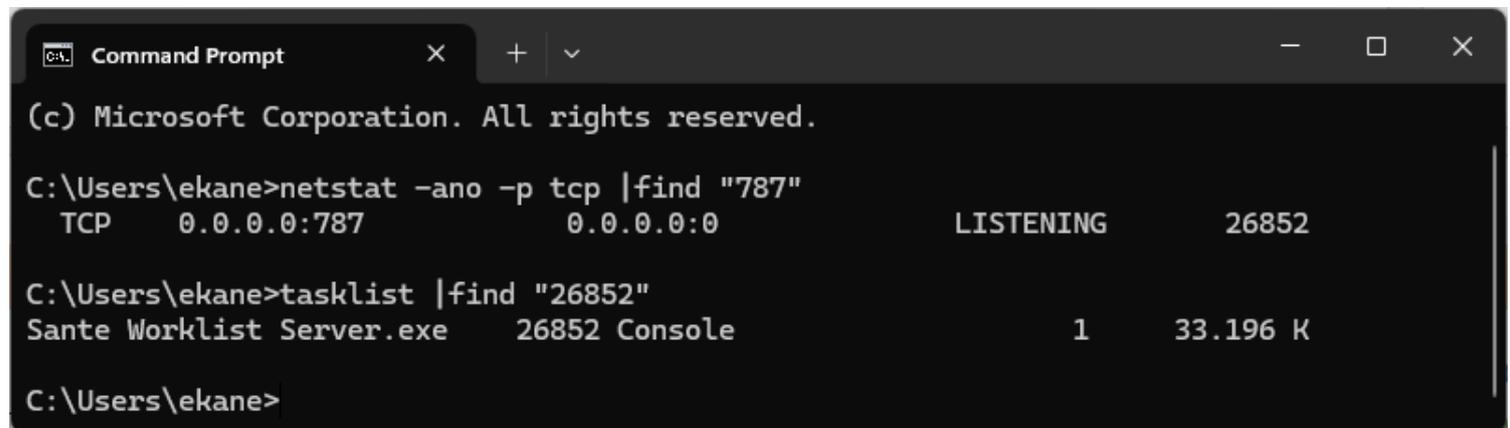
```
C:\>netstat -ano -p tcp |find "787"
```

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 26852)



```
Command Prompt
(c) Microsoft Corporation. All rights reserved.
C:\Users\ekane>netstat -ano -p tcp |find "787"
TCP    0.0.0.0:787          0.0.0.0:0          LISTENING        26852
C:\Users\ekane>tasklist |find "26852"
Sante Worklist Server.exe    26852 Console        1    33.196 K
C:\Users\ekane>
```