



# Integration with Sectra PACS

Information systems, speech recognitions systems and clinical applications



## Purpose of this document

The purpose of this document is to provide an overview of the integration possibilities with Sectra PACS. The document is primarily focused on available integration techniques and the individual functions in the interfaces connected to Sectra PACS on different levels. If there is a need to initiate development or further evaluate the interfaces, the technical specifications can be provided by Sectra on request. A non-disclosure agreement is required to acquire such documents.

## Background

Sectra provided the first Application Programmer Interfaces, API, in 1992; a Radiology Information System, RIS, interface for integration with Sectra digital radiology solutions. Sectra installed the first totally film free radiology department integrated with a RIS in 1994. Sectra has added more interfaces and enhanced existing interfaces over the years. Sectra currently offers a wide spectrum of interfaces on various levels and to various applications.

Sectra PACS is the imaging component of the medical enterprise. It is built on client/server architecture with Windows® clients (currently XP or 2000) and Windows or HP-UX Servers. The workstation is called **IDS5**, the database management server **WISE**, and the database **Image Server**.

Sectra PACS has two levels of installation. Sectra PACS Clinical Edition is used in small and medium sized hospitals whereas larger institutions use the Enterprise Edition. The Clinical Edition is Windows-based and the Enterprise Edition is usually HP-UX-based on the server side. See the Sectra PACS Conceptual Overview White paper [1] for more information about the Sectra PACS and its components.

## Integration with Sectra PACS

Sectra PACS is designed to work as the imaging component in various hospital IT environments. The APIs and interfaces available in Sectra PACS make it possible to build a system where the user gains access to relevant information without having to search and click in different applications. Sectra PACS is designed to create “role-based workstations.” The concept “role-based workstations” means that relevant information and diagnostic tools are compiled on the desktop in a variety of ways based on the role of the user (Figure 1).

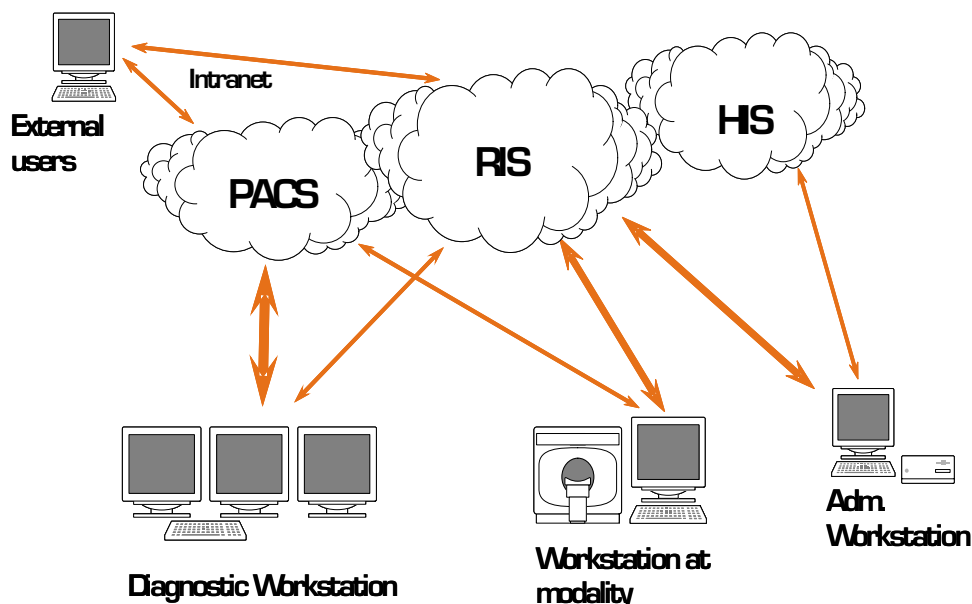


Figure 1: Role based workstations.

Sectra has developed a number of APIs and interfaces, all based on industry standards. The interfaces can be divided into two groups.

- Medical standard interfaces such as DICOM and HL7-based interfaces
- Sectra specific interfaces based on industry standards such as COM, DDE, HTTP, etc.

Sectra specific interfaces are offered because certain functionalities, e.g. advanced desktop integration on the examination level between RIS and PACS, are not supported by the medical standards. Specific techniques are thus a prerequisite for achieving optimum integration for the user.

Integration with Sectra PACS is done on the server level, with or without desktop synchronization.

At the **server level** (Figure 2) the following four types of integration are possible:

- DICOM-based communication
- Sectra message based RIS/PACS interface
- Interface based on HL7 messaging
- Broker integration via a PACS broker

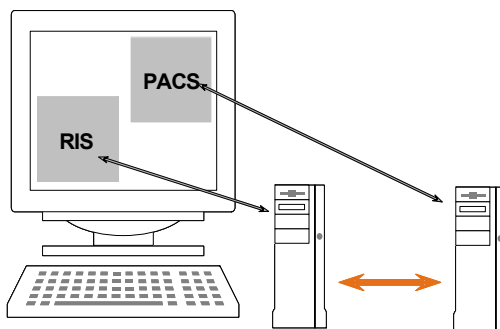


Figure 2: Server integration –synchronization only at the server level

**Desktop integration** (Figure 3) can be provided to toggle and synchronize between the information system and the PACS.

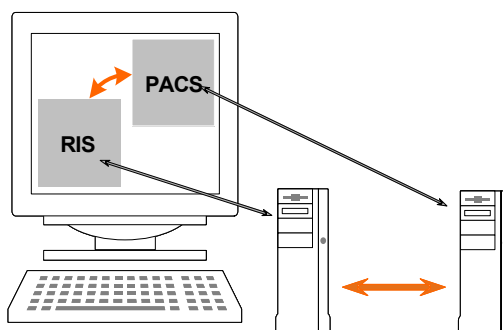


Figure 3: Desktop integration – synchronization also on the desktop

The following methods are supported by Sectra PACS:

- COM, (Microsoft Common Object Model based integration)
- DDE (Microsoft Dynamic Data Exchange)
- URL (For IDS5/web only)
- CCOW (Common Context Object Working Group, a part of HL7)

*The drawback with the CCOW standard is that it currently does not support integration on the examination level and allows integration only on the patient ID level. This does not suffice for RIS integration, as users normally want an integrated view on the examination level, e.g. looking at an examination with priors in the PACS while reporting on the corresponding request in RIS. Sectra's CCOW implementation support is currently limited to single sign-on.*

**Desktop integration** (Figure 4) is provided for speech recognition and clinical applications. The application can be launched directly from the user interface with the appropriate connections to patient information accessible.

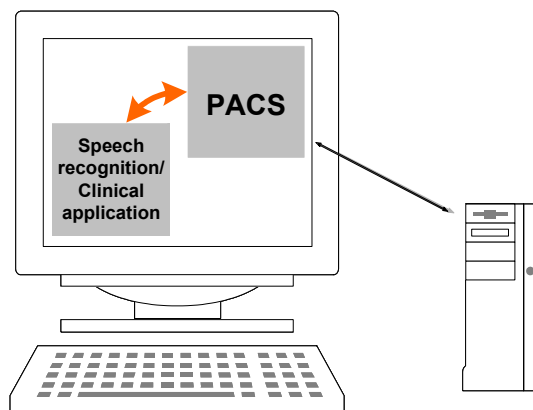


Figure 4: Speech recognition and Clinical applications integrated with the Sectra IDS5

The COM technique is applied for these two interfaces.

## Server integration with information systems

### DICOM-based communication

Most parts of the DICOM standard handle integration between imaging equipment, but some can also be used for integrating other systems with PACS. The obvious parts that can be used for this purpose are:

- DICOM Study Notification
- DICOM Worklist
- DICOM Query Retrieve – this method is primarily intended to be used for retrieving images but can also be used to query for other information related to an examination.

For a full description of the Sectra PACS DICOM support please see Sectra DICOM Conformance Statement [2].

### Sectra message based RIS/PACS interface

This is a Sectra specific interface. It is a bi-directional interface that currently offers the tightest integration with Sectra PACS. It consists of a set of commands that are easy to implement on a RIS/HIS. The commands are sent as simple text messages, and their structure is independent of the data model used in the systems. The interface is straightforward and the commands can be executed from a command line. This makes the integration easy to test.

Example of commands supported:

Initiated from the RIS/HIS:

- Update patient information in PACS
- Update status for an examination (or change examination type)
- Schedule pre-fetch of examination(s) from image archives
- Fetch examination(s) from image archives

Initiated from the PACS:

- Send a report to the RIS/HIS from Sectra PACS
- Tell whether or not the examination is stored in digital format
- Retrieve data pertaining to one or more examinations
- Retrieve all examination data for a request or a patient
- Retrieve data pertaining to a specific patient
- Retrieve the report text for a specific request or all reports for a patient
- Retrieve data for one or more requests

Return values from the commands sent are error messages, confirmations, or information depending on the commands. The return messages and information, as well as more information about the individual commands, are further described in the interface specification [3].

## HL7

Sectra's HL7 interface includes a subset of the HL7 standard. It can be used to implement standards-based broker less integration. The subset that has been implemented consists of the parts that are relevant when integrating PACS with patient information systems. (Most parts of the HL7 standard are not applicable to PACS integration). Unfortunately, there are many variations in HL7 messaging. The sender is usually required to map certain HL7 attributes to those required by the receiver. Even though HL7 is a widely applied standard, it is far from being plug and play. Sectra PACS can handle the following commands with our HL7 interface:

Initiated from RIS/HIS:

- Notify the PACS a procedure has been scheduled
- Update a procedure which is already scheduled
- Update a patient's information
- Merge patient records
- Send a copy of a report

Message acknowledgements are sent for each message according to the HL7 standard to indicate whether the message was successfully processed or not. For a description of this interface and the integration over HL7, please see [4].

## Broker integration via a PACS broker

A broker can always be used for integration. A broker usually solves some integration problems, but there are some drawbacks to such a solution:

- When a broker is used, the installation is dependent on a costly intermediate
- New features in the interfaces implemented on either side of the integration entities may not be implemented in the broker
- There will be an additional database that stores duplicate entries of data, which needs to be kept consistent

## Desktop integration with information systems

### Direct integration

Integration on the desktop can be done directly with the IDS5 workstation by using the Sectra specific interfaces built on COM or DDE technology. The two interface techniques provide the same level of integration, but are implemented using different techniques. This interface supports switching between windows from both PACS and RIS and initiates some synchronization. For a full description of the interfaces, please contact Sectra to request the DDE Interface document and the Sectra Desktop Sync (COM version) document [5, 6].

### Web integration

The IDS5/web clinical review station can be integrated and launched from a web application using a URL. This integration technique was developed mainly for Electronic Patient Record (EPR) integrated image review and result distribution, but may also be used for other purposes. The interface supports interfacing on several levels, e.g. on patient level, request level or on examination level.

Passed in the URL is a key that is an encrypted password calculated from a cryptographic checksum based on the components of the URL (user, timestamp, time, patient ID, accession number, examination ID, and system password). This fully protects patient privacy and impedes attempts to cache or capture a URL for later use.

The web product is normally integrated with EPRs and using their log-in procedures, thus ensuring privacy of use. The web product can also be used in stand alone mode from third party EPR software, using regular log-in procedures.

For a full description of the interface please see [7]

## CCOW and Context server integration

Currently several parts of the CCOW standard have been implemented. The Sectra CCOW implementation supports “single sign-on” compatible with CCOW User Link. When the CCOW standard is extended to more fully support integration between PACS and RIS, Sectra will also extend its implementation.

A complete overview of the desktop synchronization actions supported in our interfaces:

Action from RIS	Supported in DDE IF	Supported in COM IF	Supported in CCOW IF	Supported in IDS5/web (URL)
Bring forward IDS5	X	X		X
Display images in IDS5	X	X		X
Close IDS5 image windows	X	X		X
Get attributes from current examination from PACS	X	X		
Get current patient from PACS	X	X		
Get current request displayed in PACS	X	X		

Action from PACS				
Activate RIS	X	X		
Show RIS request	X	X		
Show RIS examination information	X	X		
Show RIS reports	X	X		

Single log-in				
Log in			X (*)	X
Log out			X (*)	X

(\*) Compatible with user link according to the CCOW standard

## Integration with speech recognition systems

The Sectra dictation interface makes it possible to initiate dictation directly from the IDS5 workstation. The report is delivered back to the RIS and is accessible in the PACS from the RIS PACS interface described earlier. The dictation interface is built on COM technology and acts as an in-process COM server that makes it possible to access information parameters when initiating speech recognition. When initiating a dictation session, the Sectra PACS provides the COM object with PACS user information and accession number for the examination.

The required interface must be implemented to initiate the integration. They integrate with the IDS5 workstation and the user interface, which are called the speech integration interfaces. They are the connection between the workstation and the application.

There are also optional interfaces that could enhance the integration if desired. The speech visibility interface handles “show” and “hide” functionality of the speech application, the speech results box interface handles indicators of dictations in progress and the speech monitors interface controls the monitors on which it should be launched. The three latter interfaces are optional.

For further information about the interfaces please see the specification [8].

## Integration with clinical applications

The Clinical Application Interface, CAI, enables the building of clinical applications on the Sectra workstation platform. The CAI can be used for clinical application development or integration of existing clinical applications. The Clinical Application Interface is built on COM technology and can be used by C/C++ programmers and Visual Basic programmers. A Sectra PACS clinical application can be either an in-process or an out-of-process application running on the workstation. With the Active X components provided in the API, the application can be integrated seamlessly using the Sectra PACS as an Active X control container. The tools provided by Sectra can be used to cut development time of the clinical application.



Using the PACS object model passed on from the common object, the clinical application can access information on patients, reports, and examinations, read image data, import new images, etc. A wizard is available to help build the necessary interfaces and libraries and give developers using this interface a head start.

To build a clinical application for Sectra PACS, only one interface needs to be implemented by the clinical application: the Extensibility interface. The Extensibility interface provides the PACS with menu entries, defines what to do when the application is launched, and tells when to clean up.

Functions and operations are also provided through the interface to get patient information and pixel data, etc. This is a large set of operations and a detailed description is outside the scope of this document. Please see the reference manual [9] for further information.

## References

Please note that some documents may be confidential and a non-disclosure agreement is required to gain access to such documents.

- [1] Sectra PACS Conceptual Overview, White paper
- [2] [http://www.sectra.se/medical/pacs/products/dicom\\_conformance/index.html](http://www.sectra.se/medical/pacs/products/dicom_conformance/index.html)
- [3] RIS-PACS Interface Specification
- [4] HL7 Interface Overview
- [5] DDE Interface
- [6] Sectra Desktop Sync (COM Version)
- [7] Sectra PACS Viewer Integration (IDS5/web)
- [8] Developer's Guide Speech API
- [9] IDS API SDK: API Reference Manual



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Sectra PACS is a concept consisting of workstation products, server products and recommended hardware solutions. Workstation products are included in the medical device family of Sectra IDS5 Radiology Workstations. Server products are included in the medical device Sectra PACS Core. Recommended hardware solutions are compliant with the specifications of the device.

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# SECTRA

**Sectra World Headquarters:**

Sectra Imtec AB  
Teknikringen 20  
SE-583 30 Linköping, Sweden  
Phone: +46 13 23 52 00 | Fax: +46 13 21 21 85

**Sectra North American Headquarters:**

Sectra North America, Inc.  
2 Enterprise Dr, Suite 507  
Shelton, CT 06484, USA  
Phone: +1 203 925 0899 | Fax: +1 203 925 0906

Email: [info.imtec@sectra.se](mailto:info.imtec@sectra.se) | Home Page: [www.sectra.com](http://www.sectra.com)