

RISPad:

Radiological Information System – notePad

Implementation of a RIS-PACS compatible handout

Documentation system Into An Existing Examination.

Ganster Barbara and Nasel Christian

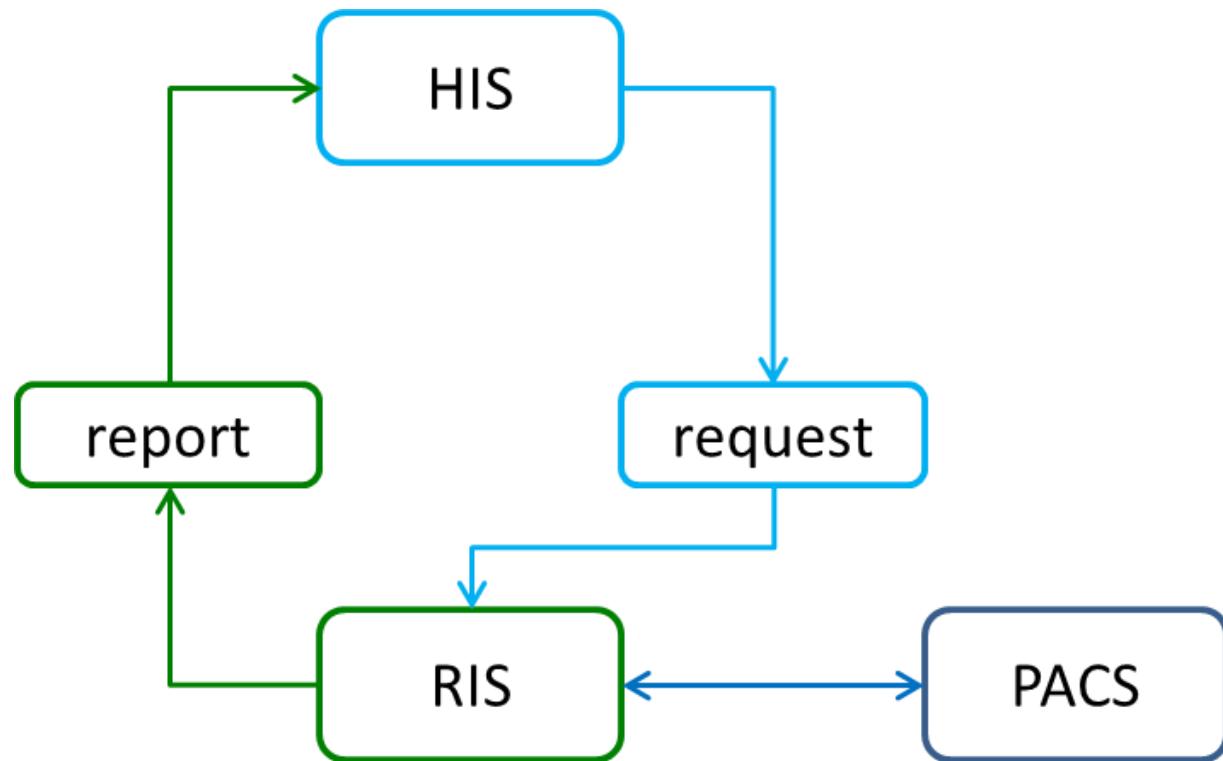
Master Course Digital Healthcare (supervisor: Ritschel H.)



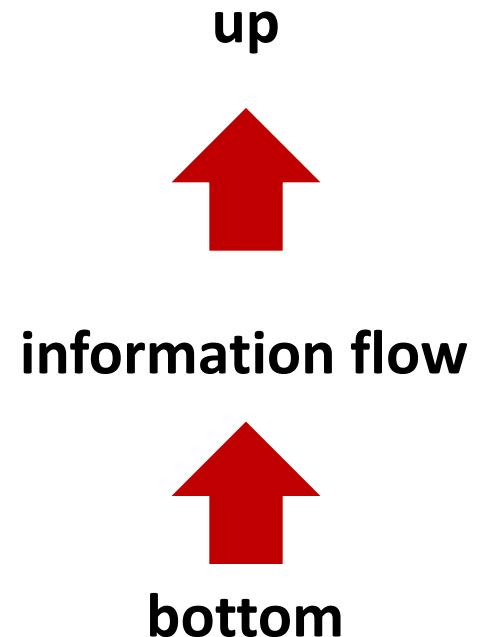
St. Pölten University of Applied Sciences

Functionality of the RIS/PACS – HIS interface:

1) *unidirectional*

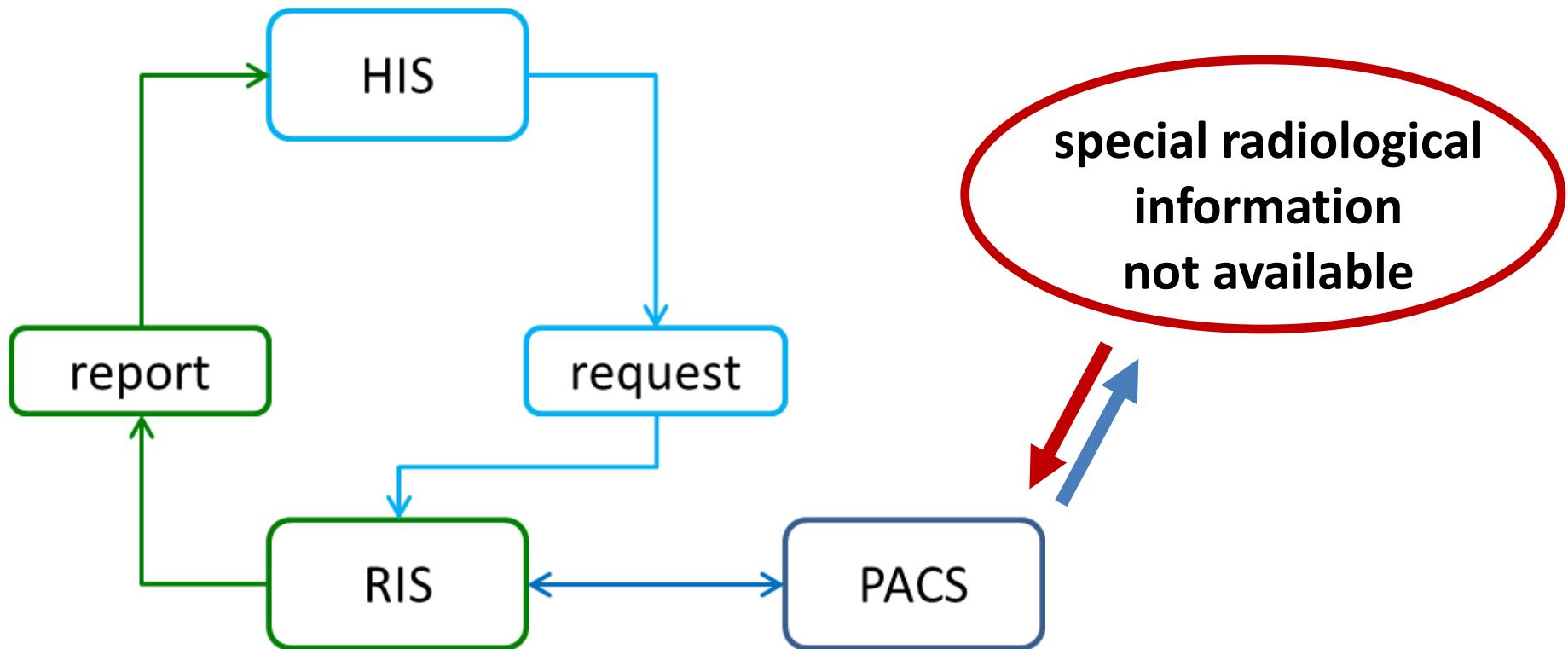


2) *bottom-up*

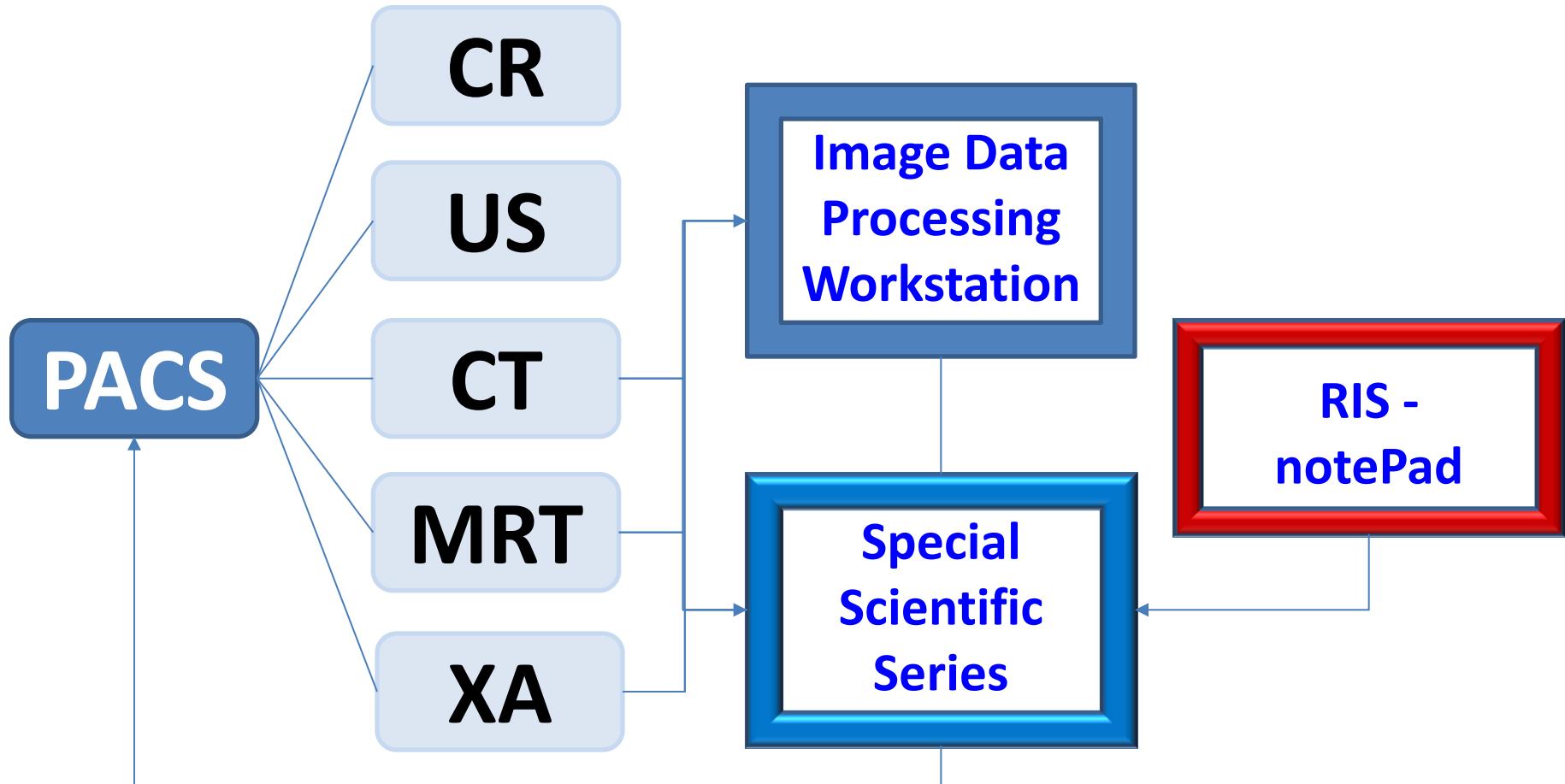


Due to legal regulations some situations would require storing special information along with the image data:

- informed consent
- study-data (numeric or image data)



RisPaD simply implements an interface between the PACS and the study/science specific framework:



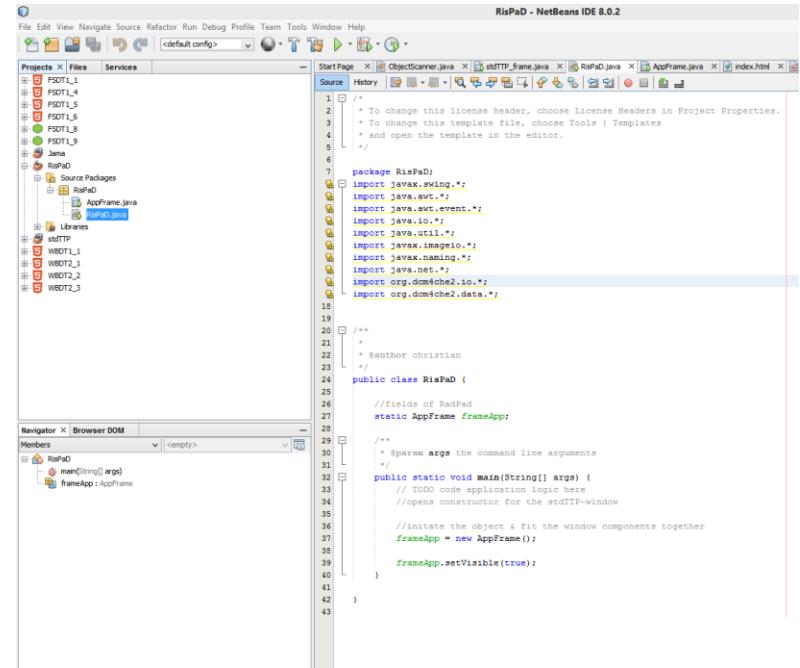
jPerfusionModule (role: SCU && dicom-ties-demon):

DICOM-send implementation:

JAVA (SE & SDK 7 - 64Bit) → cross platform support

JAVA-IDE: NetBeans (available: <https://netbeans.org>)
professional developer environment also integrates
JAVA, HTML5 and node.js

JAVA-DICOM-library:
dcm4che.org
(available: <http://www.dcm4che.org>)



The screenshot shows the NetBeans IDE interface with the title "RisPad - NetBeans IDE 8.0.2". The left side features a "Projects" panel containing several Java files (FSDT1_1, FSDT1_4, FSDT1_5, FSDT1_6, FSDT1_8, FSDT1_9, Jena, RisPad, stdITP, WBDT1_1, WBDT1_2, WBDT2_1, WBDT2_2, WBDT2_3) and a "Libraries" section. The right side is the "Source" editor window displaying Java code for the "RisPad" class. The code includes imports for java.awt, java.io, java.util, javax.imageio, javax.swing, and org.dcm4chee.io and org.dcm4chee.data. It contains comments about changing license headers and author information. The code defines a static AppFrame variable and a main method that creates and displays the frame.

```
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
RisPad - NetBeans IDE 8.0.2
Projects Files Services default config Start Page ObjectScanner.java stdITP_frame.java RisPad.java AppFrame.java index.html
Source History
1 /*
2  * To change this license header, choose License Headers in Project Properties.
3  * To change this template file, choose Tools | Templates
4  * and open the template in the editor.
5 */
6
7 package RisPad;
8
9 import java.awt.*;
10 import java.awt.event.*;
11 import java.io.*;
12 import java.util.*;
13 import javax.imageio.*;
14 import javax.swing.*;
15 import org.dcm4chee.io.*;
16 import org.dcm4chee.data.*;
17
18 /**
19  * 
20  * Author Christian
21  */
22
23 public class RisPad {
24
25     //fields of RadPad
26     static AppFrame frameApp;
27
28     /**
29      * @param args the command line arguments
30     */
31     public static void main(String[] args) {
32         // TODO code application logic here
33         //opens constructor for the stdITP-window
34
35         //initiate the object & fit the window components together
36         frameApp = new AppFrame();
37
38         frameApp.setVisible(true);
39     }
40
41 }
42
43
```

RISPad-dicom link server: *nodeJS*

integrates:

socket.io [real time message and stream engine]

express [web framework]

daikon [dicom parser]

fs [node's file system]

RISPad-dicom link client: *HTML5-web app*

integrates:

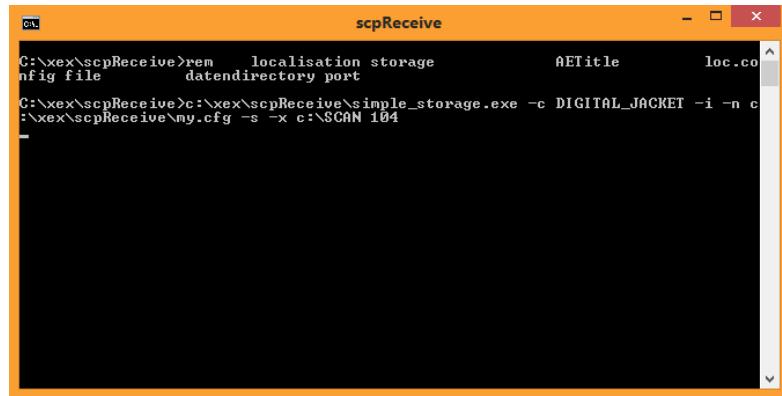
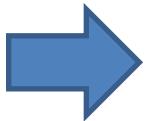
java script – runables for web-DocumentCam

jquery - jDataTable for jquery

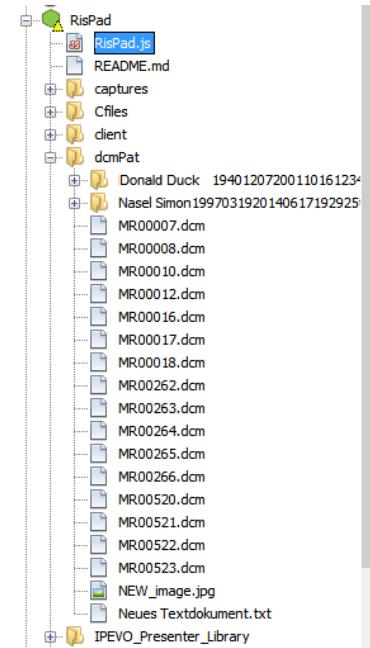
C#-stuff, whenever I did not know what else to do....

RISPAD: components

dicom-SCP:
puts dicom-images
from various modalities
into assessment-folder



```
rem localisation storage
localisation storage
AEtitle loc.co
C:\>rem datendirectory port
C:\>rem -c DIGITAL_JACKET -i -n c
C:\>rem -s -x c:\SCAN 104
```



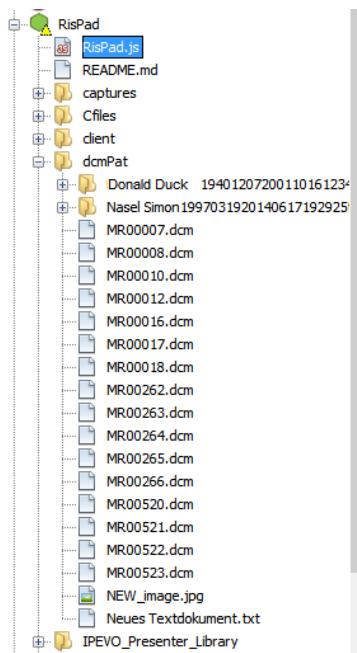
dicom-ties-demon-SCU



dicom-link-server



RISPAD: components



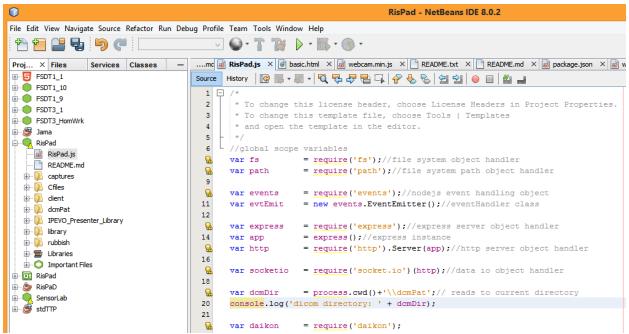
dicom-link-server:
scans assessment-
folder for new
patient-entries

A screenshot of the NetBeans IDE interface. The left pane shows the project structure with nodes like 'FSDT_1', 'Jama', and 'RisPad'. The right pane is a code editor displaying 'RisPad.js' with the following content:

```
1  /*  
2   * To change this license header, choose License Headers in Project Properties.  
3   * To change this template file, choose Tools | Templates  
4   * and open the template in the editor.  
5   */  
6 //global scope variables  
7 var fs      = require('fs');//file system object handler  
8 var path    = require('path');//file system path object handler  
9  
10 var events  = require('events');//nodejs event handling object  
11 var evtEmit = new events.EventEmitter();//eventHandler class  
12  
13 var express = require('express');//express server object handler  
14 var app     = express(); //express instance  
15 var http   = require('http').Server(app);//http server object handler  
16  
17 var socketio = require('socket.io')(http);//data io object handler  
18  
19 var dcmDir = process.cwd()+'\\dcmPat';// reads to current directory  
20 console.log('dicom directory: '+ dcmDir);  
21  
22 var daikon  = require('daikon');
```

dicom-link-server:
creates new ties for
encapsulation and
dicom-send to PACS

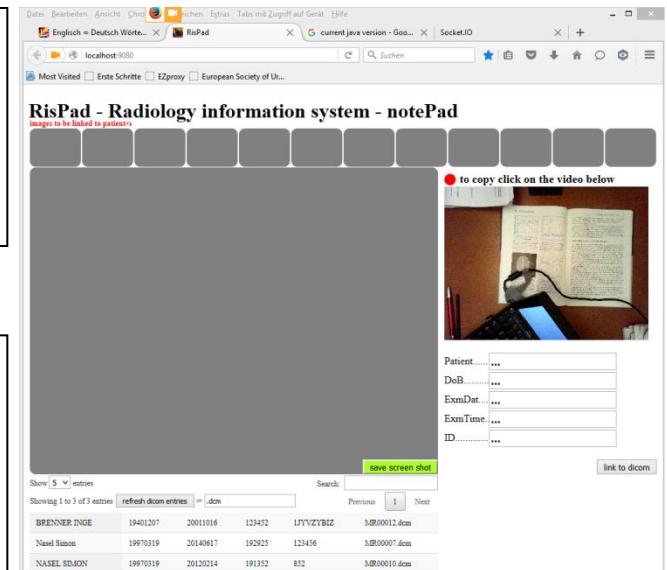
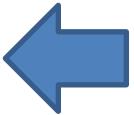
RISPAD: components



dicom-link-client:
receives patients' entries



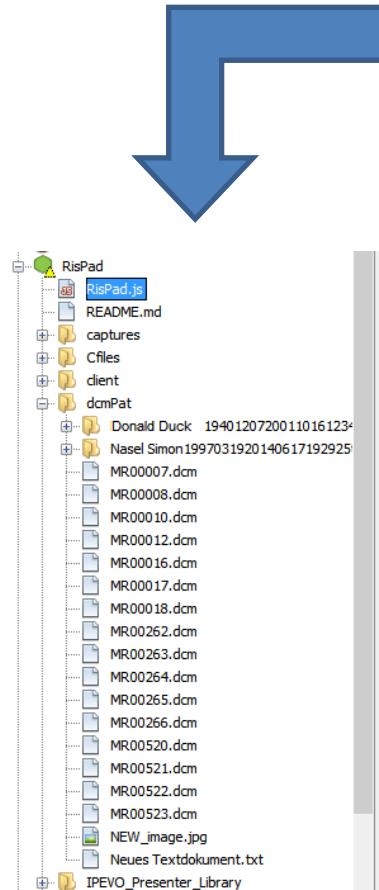
dicom-link-client:
sends doc-images
with dicom link



USB-camera
document scanner:
3264 x 2448 pixel
webcam interface
IPEVO ziggy-HDplus



RISPAD: components

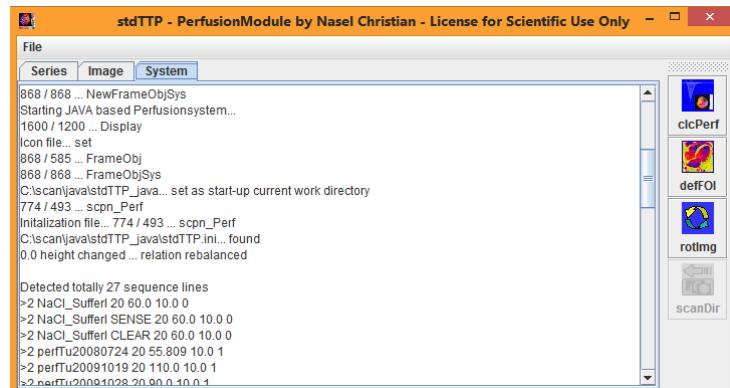


dicom-link-server:
creates new ties for
encapsulation and
dicom-send to PACS

A screenshot of the NetBeans IDE interface. The title bar says 'RisPad - NetBeans IDE 8.0.2'. The left pane shows the project structure with files like 'RisPad.js', 'README.md', 'captures', 'Cfiles', 'client', 'dcmPat', 'IPEVO_Presenter_Library', and 'Important Files'. The right pane shows the code editor with the following JavaScript code:

```
/* To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
//global scope variables
var fs = require('fs');//file system object handler
var path = require('path');//file system path object handler
var events = require('events');//nodejs event handling object
var evtEmitt = new events.EventEmitter();//eventHandler class
var express = require('express');//express server object handler
var app = express()//express instance
var http = require('http').Server(app)//http server object handler
var socketio = require('socket.io')(http);//data io object handler
var dcmDir = process.cwd()+'\dcmPat';// reads to current directory
console.log('dicom directory: ' + dcmDir);
var daikon = require('daikon');
```

dicom-ties-demon-SCU:
scans assessment folder
for ties, encapsulates
and performs dicom-
send



PACS

RISPAD: client - GUI

RisPad - Radiology information system - notePad

images to be linked to patient ↗



● to copy click on the video below



Patient.....

DoB.....

ExmDat.....

ExmTime.....

ID.....

save screen shot

link to dicom

Show 5 entries

Search:

Showing 1 to 3 of 3 entries

refresh dicom entries = .dcm

Previous 1 Next

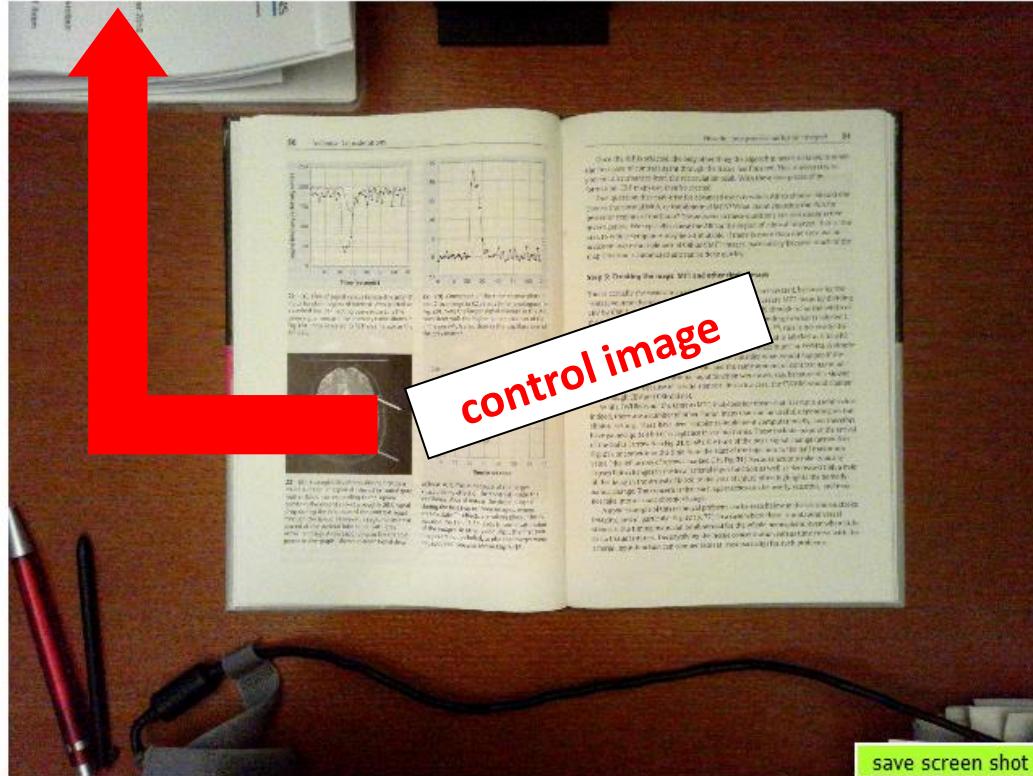
Donald Duck	19401207	1JYVZYBIZ	MR00012.dcm
Nasel Simon	19510717	192925	123456 MR00007.dcm
NASEL SIMON	19510719	20120214	191352 852 MR00010.dcm

interactive table

RisPAD: client - GUI

RisPad - Radiology information system - notePad

images to be linked to patient ↗



Show 5 entries

Search:

Showing 1 to 3 of 3 entries

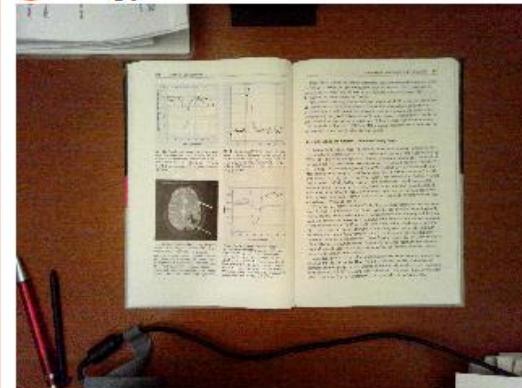
refresh dicom entries

= .dcm

Previous 1 Next

Donald Duck	19401207	20011016	123452	1JYVZYBIZ	MR00012.dcm
Nasel Simon	19970319	20140617	192925	123456	MR00007.dcm
NASEL SIMON	19970319	20120214	191352	852	MR00010.dcm

to copy click on the video below



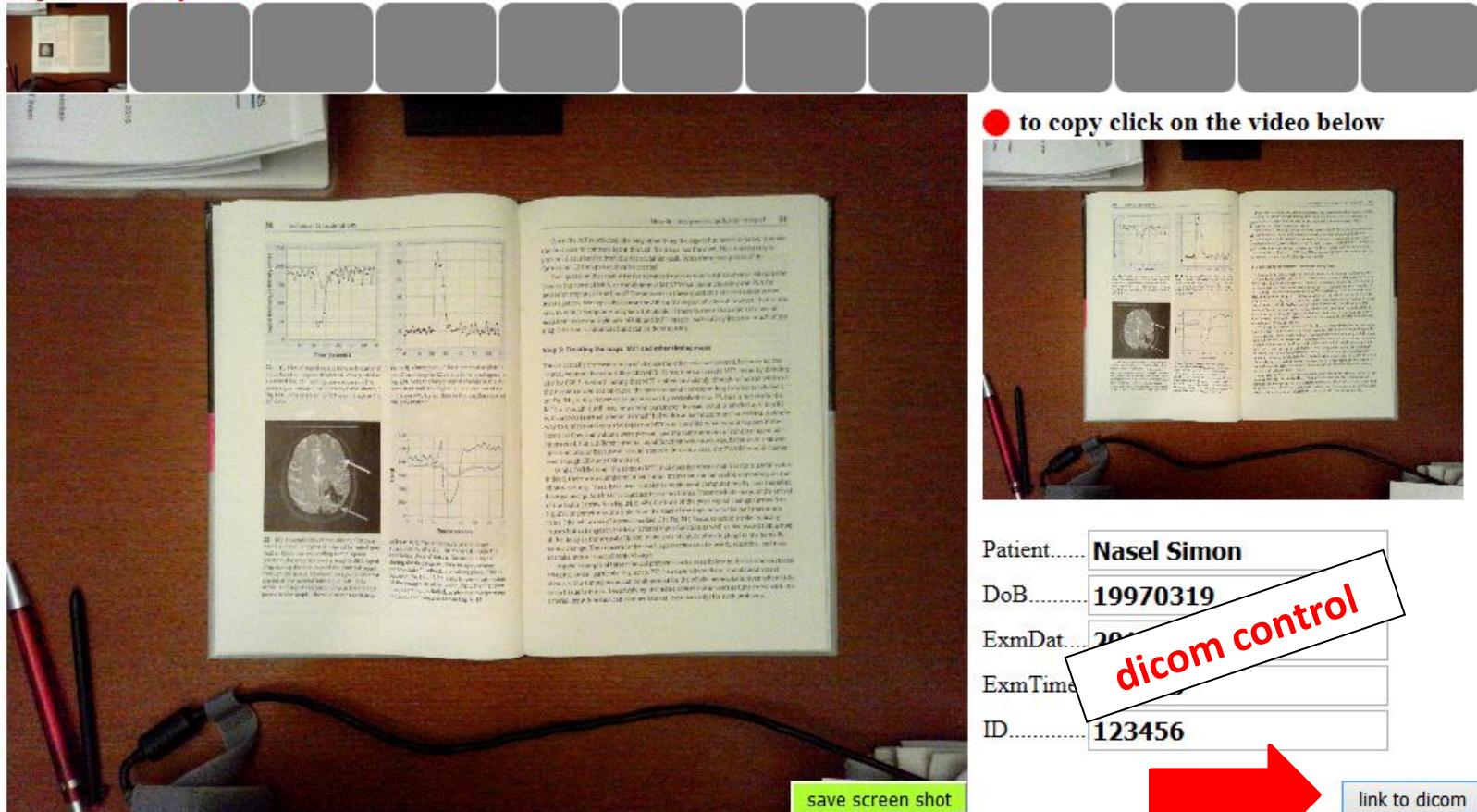
Patient..... Nasel Simon
DoB..... 19970319
ExmDat... 20140617
ExmTime.. 192925
ID..... 123456

link to dicom

RisPAD: client - GUI

RisPad - Radiology information system - notePad

images to be linked to patient ↗



Show 5 entries

Showing 1 to 3 of 3 entries

refresh dicom entries

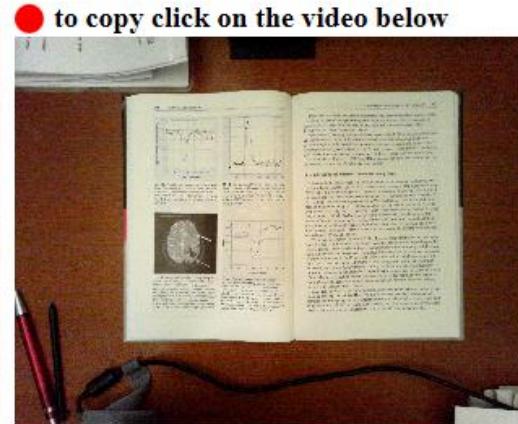
= .dcm

Search:

Previous 1 Next

Donald Duck	19401207	20011016	123452	1JYVZYBIZ	MR00012.dcm
Nasel Simon	19970319	20140617	192925	123456	MR00007.dcm
NASEL SIMON	19970319	20120214	191352	852	MR00010.dcm

save screen shot



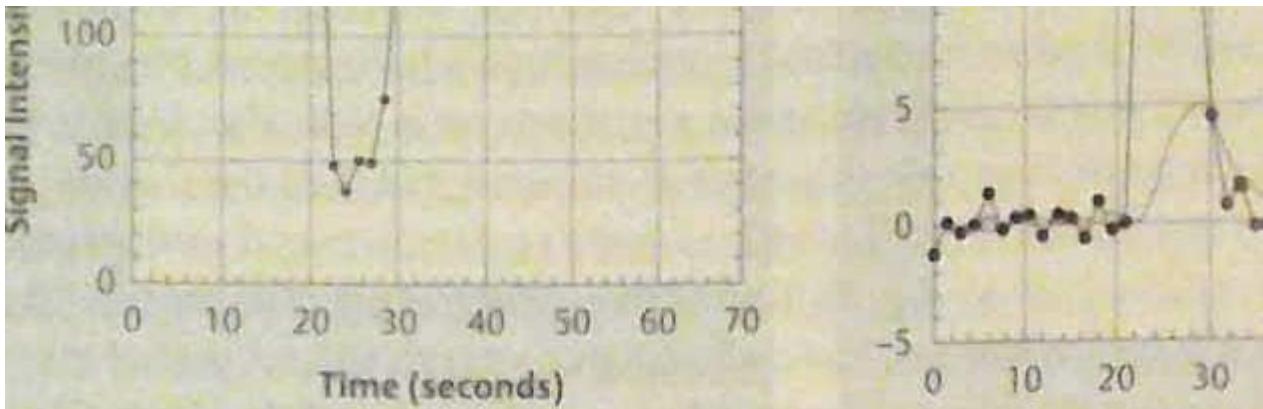
Patient..... Nasel Simon
DoB..... 19970319
ExmDat.... 20
ExmTime...
ID..... 123456

dicom control



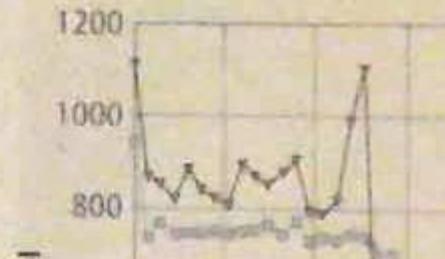
link to dicom

final image quality:
readable copy of
document

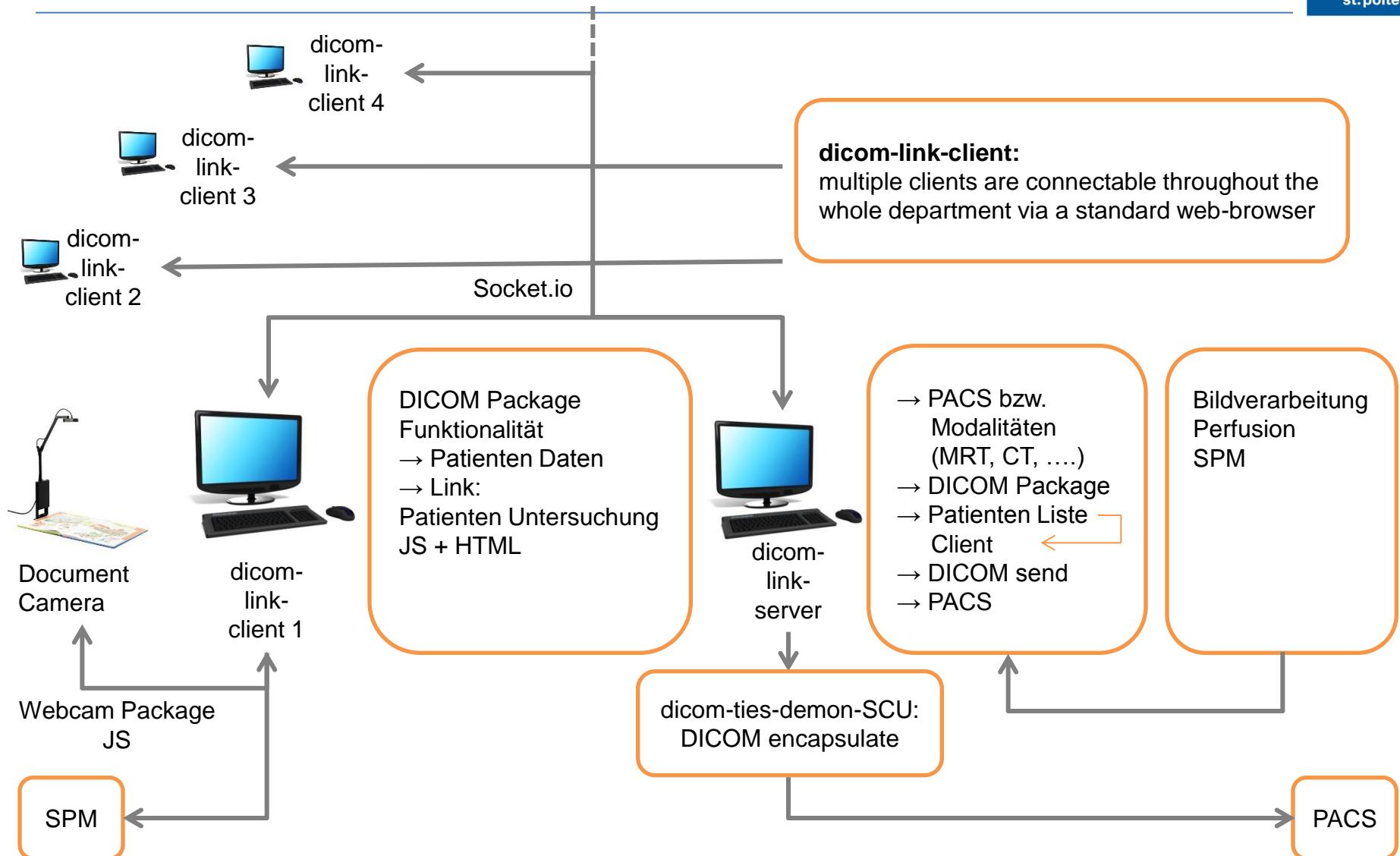


22 (C) Plot of signal versus time in the arterial input function region of interest. Also plotted as dashed line connecting open squares is the same signal versus time intensity curve shown in Fig. 19 C, now rescaled to fit the same axis as the IIF data.

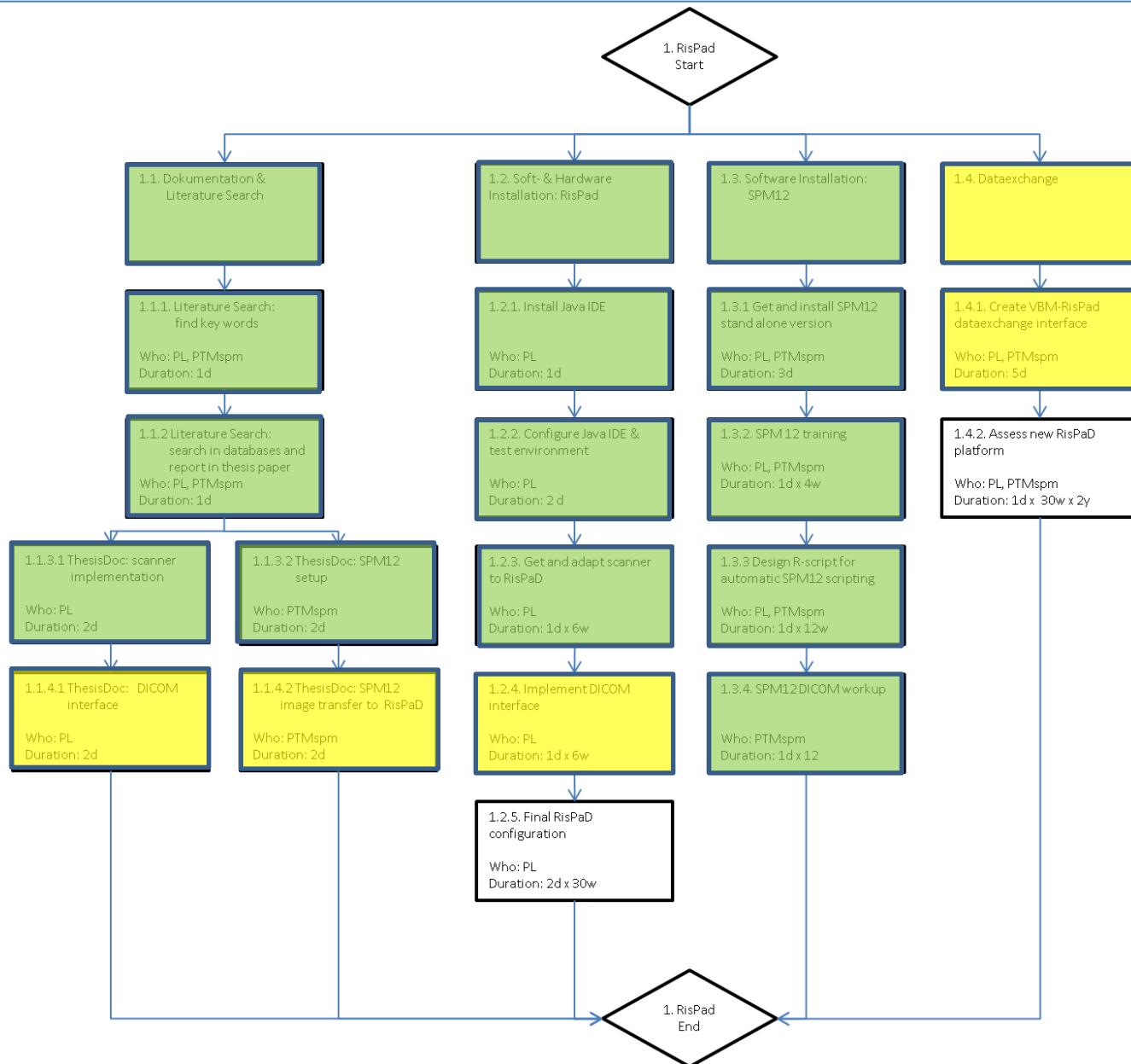
22 (D) Conversion of the part C to change in R2 versus Fig. 20. Note the larger signal change in the peri-MCA area than in the gray matter.



RISPAD: network structure



VBM – RISPAD: Project Plan



The RISPAD – Project

Demonstrating the Implementation of a **RIS-PACS** compatible handout Documentation system.

Thank You for Your Attention

Ganster Barbara and Nasel Christian

Master Course Digital Healthcare (supervisor: Ritschel H.)



St. Pölten University of Applied Sciences

