Development of a web portal for the exchange of medical information using Open Source Software

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Agenda

- Background
- Objectives
- Methods and Materials
- Results
- Conclusions
Background

- We have been running a teleradiology network within the Metropolitan Rhine-Neckar Region for six years now
- Objective of this network is the exchange of medical image data
- Growing network for more than six years
- About 100 partners
- Important partners: University Hospital Heidelberg and University Hospital Mannheim
- Project funded by Ministry for Social Affairs Baden Wuerttemberg
Objectives of the project

Expansion of the existing network
  - Area-wide expansion within the region
    - Connect further partners
    - Development of a web portal for the exchange of medical information to integrate small partners like general practitioners
  - Interdisciplinary expansion
    - Add other disciplines e.g. cardiology, neurology
Open Source and health care

Why Open Source?
Network architecture

The architecture of the Teleradiology Network
Open Source and the Teleradiology network

- Used Open Source Software
  - DBridge: free Java DICOM mail client for different platforms
  - DKON: DICOM mail server
  - StoreSCP-Client: extended OFFIS-DCMTK StoreSCP-Client

Further information: http://www.teleradiologie-rnd.de/
Objectives of the web portal

- Simple user-interface
- Simple exchange of medical information with other partners within the region
- “low frequented” users like general practitioners should be able to use the advantages of the network without any prior software installation
- Fallback option for existing solutions
- The portal must be secure
- Use Open Source software and components
Open Source and the web portal

- Why Open Source? What is the benefit for us?
  - Implement a reference implementation with a minimal cost effort
  - The reference implementation can be adopt by any partner of the network
  - Each partner can install several instances of the portal without any licence fee
Specifications of the portal were discussed with radiologists and medical informatics scientists.

The communication is based on the open DICOM e-mail standard.

Open source tools are used for the development of the portal.

Used technologies and components should be open source.

Integration of the external DocCheck service.
Results

- The development is ongoing
- All components are open source
  - The portal itself was developed in Java, Java Server Pages and Servlets with a MySQL database in the background
- Integration of the external authentication service DocCheck
- Signature and encryption of all patient information on the client side corresponding to the DICOM e-mail standard
The updated network architecture

- The architecture of the network after the portal integration
Portal architecture

- Detailed figure of the portal architecture

[Diagram showing the portal architecture with Heidelberg University Hospital network, Demilitarised zone (DMZ), Internet, MySQL database, DB-Request, DB-Response, Teleradiologie Webserver, Firewall 1, Firewall 2, LDAP-Request, LDAP-Response, HTTPS-Request, HTTPS-Response, DRG user administration server with LDAP interface, DICOM e-mail, Client.]

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Benefit of Open Source

- Cost-effective
- Flexibility
- Various possible applications
- Multiple installations without licence fees
- Adoptability
Conclusions

- The portal offers the possibility to use the advantages of the teleradiology network free of charge and without any effort.
- Each partner of the network can adopt the source code of the portal to special requirements and deploy its own installations.
Thank you for your attention!

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