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BIRO WP 9
Communication Software

Technology Selection and

Results from Pilot Implementation

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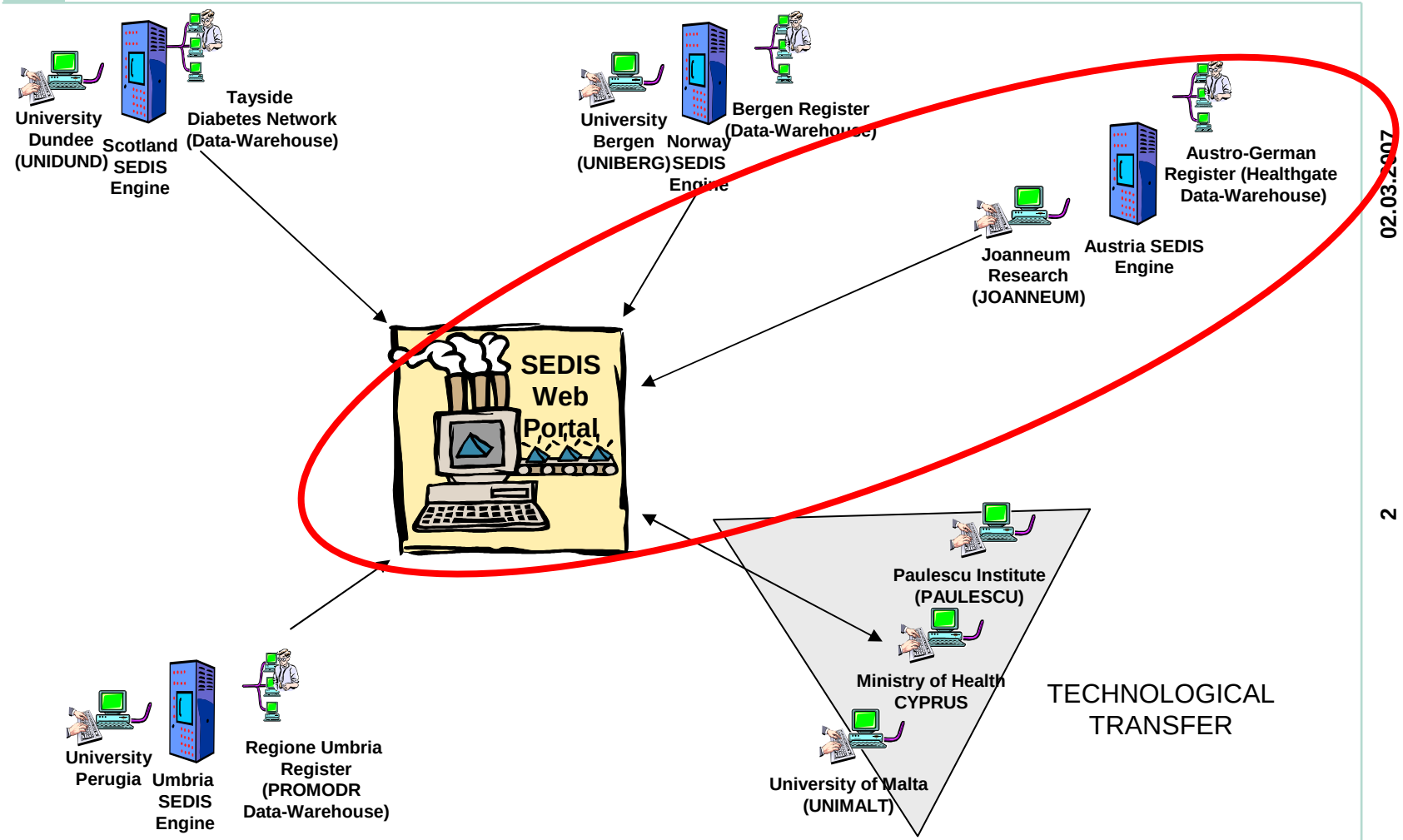
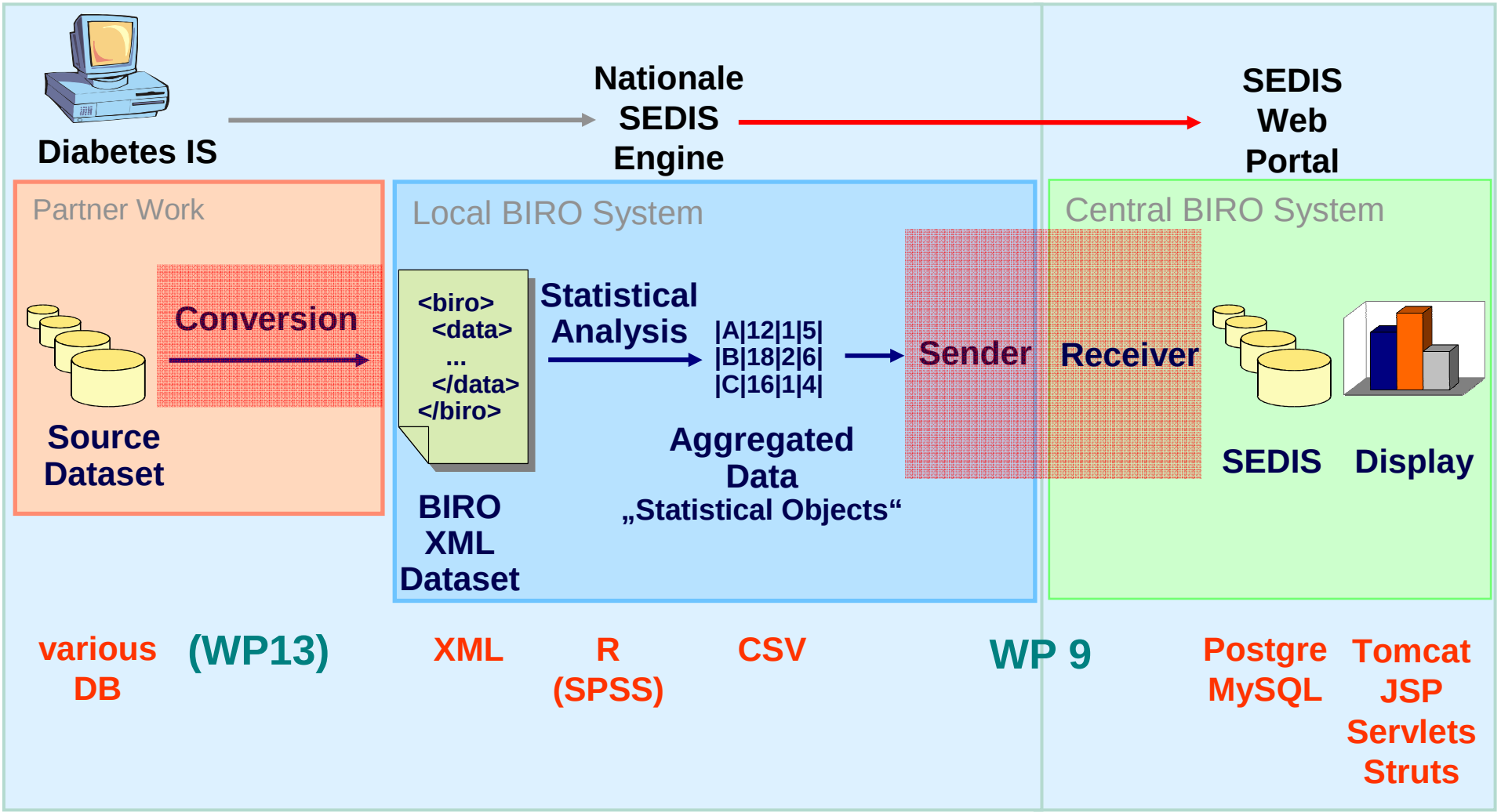
B.I.R.O. Architecture



sedis …. Shared Evidence-based Diabetes Information System

Putting Knowledge to Work

B.I.R.O. Architecture II



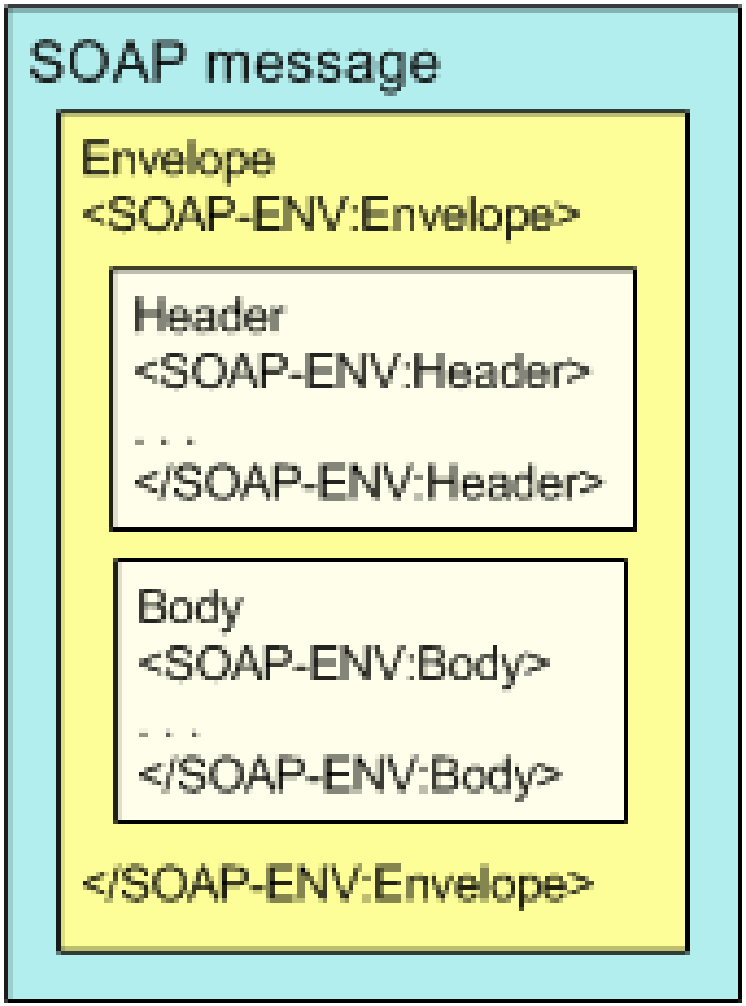
sedis…shared evidence-based information system

WP9 – Communication Software
Local - Central BIRO Server

- **Selection Criteria**
  - ➔ Open, platform independent standard
  - ➔ XML-based communication
  - ➔ Use over Internet protocol(s)
  - ➔ Availability of open source implementations
  - ➔ Security (encryption, digital signatures)

WP9 – Communication Software
Chosen Technology

- **Web-Services**
  - ➔ Use SOAP Message Standard
    - *Open W3C standard*
  - ➔ SOAP messages are XML files
  - ➔ Transport protocol is HTTP(S)
  - ➔ Open Source SOAP frameworks exist for J2EE platform
    - *Apache Axis2*
  - ➔ Implementation of XML encryption (XMLenc) and XML signature (XMLsig) standards
    - *Apache Rampart*
  - ➔ Web-Services are an open, platform independent Standard (e.g. available as well on .NET platform)


SOAP message
Envelope
<SOAP-ENV:Envelope>
Header
<SOAP-ENV:Header>
. . .
</SOAP-ENV:Header>
Body
<SOAP-ENV:Body>
. . .
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>

WP9: Communication Software
Technology Evaluation

- **Design and Implementation**
  - ➔ Setup of two J2EE Applications (Sender and Receiver)
  - ➔ Sample services implementation
    - *Sender and receiver services (utilizing code generation)*
  - ➔ Axis2 Configuration
    - *Encryption*
    - *Signature*
  - ➔ Tests
    - *Secure data transmission using sample service*
    - *Performance measurements*

WP9: Communication Software
Tools and Libraries used in pilot

- Java 2 Enterprise Edition
- Apache Tomcat (Servlet engine)
- Apache XMLBeans (Object to XML mapping)
- Apache AXIS2, Apache Rampart (SOAP + Security)
- WSDL2Java (Code Generation)
- Apache Struts (Sample frontend for BIRO dataset upload)

WP9: Communication Software
Preliminary Results

- **Technology suitable for application in BIRO**
  - ➔ Secure, open standard, platform-independent
- **Sender and receiver pilot applications are set up**
- **Pilot service for secure data transmission successfully set up**
- **Performance**
  - ➔ Remarkable communication overhead
  - ➔ Implications for use in BIRO?
    NO, due to low frequency of uploads

WP9: Communication Software
Security

- **Authentication / Authorization**
  - ➔ Public Key Certificates
- **Confidentiality**
  - ➔ Encryption HTTPS / SSL
  - ➔ Encrypting XML content before submission using XMLenc
- **Integrity and Non-Repudiation**
  - ➔ Provided by signing the content before submission using XMLsig by sender

WP9: Communication Software
Next Steps

- **Integration with**
  - ➔ local BIRO services on the sender side
  - ➔ central BIRO services (SEDIS) on the receiver side
- **Further extensions and tests of pilot systems**

WP9: Communication Software
ToDo

- **Specification of data exchange format**
- **Platform selection**
  - ➔ Will local/central BIRO systems be J2EE applications?
    - *YES: easy integration*
    - *NO: interface specification required*
- **Workflow implementation**
  - ➔ Data import / data input (WP 8)
  - ➔ Local data analysis (WP 8)
  - ➔ Data transmission (WP 9)
  - ➔ Data analysis update on central system (WP 10)

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WP13 – Technology Transfer

Import of local data to local BIRO System

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Problem Description

- **Each partner has to**
  - ➔ extract data from local system(s)
  - ➔ transform data to an XML format compliant with the BIRO specification (WP 3/4)

- **Mapping of “flat” CSV or XLS files to XML elements may be difficult for some partners.**

Proposed Solution

- **Support transformation to the BIRO XML format**
  - ➔ Import CSV or XLS file
  - ➔ Transform data to BIRO XML format
  - ➔ Result: XML File including relevant Data for import in Local BIRO System
- **Integration in data upload procedure in local BIRO system**

Next Steps

- Specify level of flexibility
- XML / CSV format specification
- Design
- Implementation
- Test (involving exports by partners)
- Integration in final information system