SOA approach for integration of departmental systems

Case Satakunta
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Agenda

- Departmental applications, need for integration
- Business processes and business services
- Web services, identification and implementation
- Enterprise service bus
- Discussion
Satakunta health district, project

- Satakunta Health District
  - Specialized care services
  - Owned by the municipalities
  - Area: 275,000 inhabitants

- SerAPI Tekes Finnwell research project

- Oct 2006 - Aug 2007
THE RESEARCH QUESTION

Can we use Service Oriented Architecture (SOA) for integration of the departmental applications?

Reusable solution?
Functions, processes and (departmental) applications

Patient Admin: MUSTI, Seniori
Patient Record: WebKert, Seniori

Scheduling Personnell Material
Reporting, BI

Patient Record: WebKert, Seniori
THE METHOD

Can we use Service Oriented Architecture (SOA) for integration of the departmental applications?
The Method: Top-Down and Bottom-Up

- Care Processes
- Diagnostic services
- Generic services
- Enterprise service bus
- Applications with interfaces
THE RESULTS

SOA approach for integration of departmental systems
The care process within specialized care

- Care process: tasks related to the care itself
- A generic model: all different cases are covered
- The model of the care process
  - Process consist of activities and their sequence
  - Process is triggered by an event
  - The customer of the process is the patient
  - The owner of the process: The doctor in charge
- The instance of the care process: An episode of a patient

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The care process plans, executes and assesses the care
The care process is a consumer of several services
Any activity can make request for a service

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The care process and services

- Service requests are made by the doctor
  - Lab tests, radiology tests, endoscopy tests etc...
  - Medication orders, therapies etc are requested services
  - Visit to outpatient clinic can be seen as a service which is requested by the receiving doctor himself
  - Inpatient episode can be seen as a service
  - A care process consists of multiple services

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A care process, a service process and a task

Orders:
Referral, test orders

Assessment:
Results, Dictation

Delivery of care
Bookings, Work lists, Registration, Procedures, Recording the results, Transcription

Tasks
Capture an image, Record findings
Example: Endoscopy

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Task: An examination

Examinations:
- Endoscopy
- Capsule camera
- Retinal image screening
- Video and still imaging in operating theatre
- Audiogram
- Dermatology
- EKG
- etc...
An examination task: Endoscopy

Care Process
Referral for diagnosis

Assessment:
The doctor makes a request for an endoscopy examination

Care Service Process
Booking for the examination
Registration at the reception

Task
Capture an image, Record findings
Example: Endoscopy

Endoscopy Examination
Capture an image, Record findings

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Can we use SOA for integration of the departmental applications?
Identifying web services

Service: **RequestExamination**
Operation: **SendRequestMessage**

Service: **ExecuteExamination**
Operations: **ReceiveRequestMessage**
**SendEndoscopyRequestMessage**
**ReceiveEndoscopyResultMessage**
**SendExaminationResultMessage**

Service: **ExecuteEndoscopyExamination**
Operations: **ReceiveEndoscopyRequestMessage**
**SendEndoscopyResultMessage**

Service: **PatientRecord**
Operations: **ReceiveExaminationResultMessage**

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Description of web services

WSDL – Web Service Description Language
- Data Types
- Messages
- Services (portType) and their operations
- Binding: Transmission
- Location of services (Endpoint)

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Implementing web services

Notification
- Request Examination

Control
- Execute Examination

Action
- Execute Endoscopy Examination

Entity
- Patient Record

WSDL
- BPEL

Orchestration

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ENTERPRISE SERVICE BUS (ESB)
Transport layer

- All departmental applications are connected to LAN
- Message broker (Ensemble)
Enterprise Service Bus (ESB)

- ESB
  - Message Oriented Middleware
  - Web Services
  - Intelligent Routing based on Content
  - XML Data transformation
  - Endpoint = WSDL Port:Operation

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Bottom-Up, Transport: Message broker

Ensemble message broker

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Satakunta ESB

- Enterprise Service Bus will connect all applications together and hide the technical details
- Orchestration service will execute the processes

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DISCUSSION

SOA approach for integration of departmental systems
Generic integration of departmental applications

- Service Oriented Architecture: Integrating a departmental application
  - Departmental applications are integrated using their native interfaces
  - Departmental applications are described as web services using WSDL descriptions
  - Directory of examination services is updated
  - BPEL code is updated and tested
  - GoLive

- Benefits
  - Standardization of the integration of departmental applications
  - Reusable processes are created
  - Standardization of processes
Future research

- Data model
  - ESB confirmed data, unique identifiers

- Service Directories
  - How to build, use and maintain?

- Naming standards
  - Services, operations, messages, data items

- Testing procedures
  - Services and processes
  - Faults, exceptions and recovery routines
  - Load and stress testing

- Versioning
  - Version control
  - Environment control
  - Agreements, SLAs
THANK YOU!

Questions