Evolution and Maintenance of Web Services

SERVIAM Maintenance Framework

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SERVIAM (co-operation with Skövde University and 14 software organisations)
Protests against this designation of life-cycle phases

- Corrective maintenance
- Perfective maintenance
- Adaptive maintenance
- Preventive maintenance
Remedying interoperability problems

- Predelivery Maintenance Stage.
- Postdelivery Maintenance Stage.
- Transition (Handover) Stage
A roadmap of evolution and maintenance
Support Line levels

Customer Process

Front-end support
Help Desk
Product Support

Back-end support
Development, Evolution and Maintenance

Support Line 1
Support Line 2
Support Line 3
Problems within Research

- Choice of the right name for maintenance
- Determination of a definition of software maintenance
- Drawing a dividing line between development and maintenance
- Choice of appropriate maintenance categories
- No proper specialisations of maintenance process models for each maintenance category
- Difficult to measure individual maintenance categories

Problems within Industry

- Industrial maintenance processes are on a too coarse granularity level
- Too little visibility into the maintenance process
- Processes do not provide enough feedback for making process improvements
SERVIAM Maintenance Framework

- Suggests changes to the existing evolution and maintenance
Method

- Up-the-slope phase
  - Literature study
  - Panel (ICSM 2004)
  - Comparative study

- Down-the-slope phase
  - Construction
  - Evaluation of the SERVIAM Framework
  - Study a subset of industrial processes
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Product
Organisation
Roles
Processes

Business perspective
Architectural perspective
A very simple example of a business process
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- Complete, self-contained, self-describing, and modular applications
- Loosely coupled,
- Implemented in different programming languages,
- Executed on different platforms
- Published, invoked and executed across the network
- Communicate via well-defined interfaces
- Building blocks in many different applications
- Can be reused within and outside the organisation

Architectural perspective
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- Globalisation of today’s business.
  - The borders of businesses and business systems supporting them have moved towards the outer world.
- New business model for selling, using and paying for Web services
- Service market
- Ownership
- Dynamic, on the fly collaboration
- Multi-customer model
- Faster response to new business needs
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- **Architectural perspective**
  - Program understanding
    - 40-60% of the total modification effort
  - Web services are highly distributed
  - Components may come from various organisations
  - No clear-cut borders between systems and subsystems
  - Limited insight into the product structure
  - Understanding of WS systems will be more difficult.

- **Business perspective**

Product

Evolution

Business perspective

Architectural perspektive
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- Global maintenance organisation
- Evolution and maintenance will be out of the scope of one organization.
- The new business model will change the way one views maintenance organizations
- additional resources to manage the collaboration effort.
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- Traditional roles
  - module or system ownership
- WS roles
  - WS are not always owned
  - WE NEED ROLES RESPONSIBLE FOR BUSINESS PROCESSES
  - Requirements on the competence development of the roles involved.
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Almost all processes will become affected. Greater reuse, high business volatility, limited process visibility.

Greater reuse will accelerate the processes. The high business volatility introduces more dynamics and complexity.

The multi-customer model will lead to more and contradicting change requests. Limited process visibility will lead to limited process control and increased dependence on other organisations.

Process out of scope of one organisation.

Emergency processes
Enhancements
Problems
SLA processes

Support
Release Management
Testing
Configuration Management
Obstacles

- Limited insight into a product structure
- Limited insight into the evolution and maintenance processes
- Increased complexity of evolution and maintenance work
- Unclear ownership
- Dependence on other organisations
- Ineffective team structure
How should we collaborate?

Should we fuss with all these organisations?
The high distribution of Web services and their owners should be tackled using Primary Contractors.
Framework’s scope

Primary Contractors

isa

Cooperating business partners

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General providers
Organisation and roles

Internal Web services
External Web services
Middleware
Legacy systems

Web service maintenance team

Traditional maintenance team

Front-end support
Support Line 1
Support Line 2

Back-end support
Support Line 3
Roles

Front-end support

Support Line 1
- Support Personnel

Support Line 2
- Business Process Support Engineer

Back-end support

Support Line 3
- Business Process Architecture Administrator
- Business Process Architecture Manager

Business Process Team
- Business Process Manager
- Business Process Analyst
- ServiceManager

Traditional role
Co-operation

Organisation 1

SLA documents
Contractor Profiles
Historical process data

SLA process

Organisation 2
Emergency process model

Alert phases

Alert Level 1
Normal Operation
Owner: Emergency Administrator

Alert Level 2
Increased Attention
Owner: Emergency Administrator

Alert Level 3
Emergency Situation
Owner: Task Force Leader

Post-Alert phases

Emergency Closure
Owner: Task Force Leader

Emergency Follow-Up
Owner: Task Force Leader

Operational Level 1
Emergency Administrator
- owns the problem
- administers the problem
- disseminates information

Emergency Manager
- no duties

Task Force Leader - Group
- no duties

Operational Level 2
Emergency Administrator
- owns the problem
- administers the problem
- disseminates information

Emergency Manager
- no duties

Task Force Leader - Group
- no duties
- makes preparations

Operational Level 3
Emergency Administrator
- owns the problem
- administers the problem
- disseminates information

Emergency Manager
- supports Task Force Leader

Task Force Leader - Group
- supports Task Force Leader
- reports on the problem resolution

End User Reactions

Application
Middleware
System SW
Operation
Task Force
Other Systems
Comms.
All partners running their emergency processes
Future

- Pilot study
  - Implement the SERVIAM Framework.
  - Study effects.
  - Revise and evolve the framework.