
WRITTEN EXAMINATION
“STANDARD SOFTWARE FOR ENTERPRISE RESOURCE PLANNING”
SUMMER TERM 2005
OCTOBER 20TH, 2005
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Name, Student Id: _____

Name of curriculum: _____

Signature: _____

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Please note:

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 - (a) **Fill out a proviso, which will be given to you by the supervisor. You may not start the exam until you have returned the proviso to the supervisor.**
 - (b) **Also fill out the additional form given to you by the supervisor. Please go to the students office which is responsible for your curriculum and let them sign the form. Personally return the signed form to the STS secretary (Harburger Schloßstr. 20, 2nd floor, Frau Hantschmann); bring your passport for identification as well.**
4. You have **90 minutes** for answering the questions. **Additional resources are not allowed.**
5. There is sufficient space for your solutions on the examination sheets.
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1. Standard software, for instance for Enterprise Resource Planning, is no longer provided as a monolithic application program with a single graphical user interface. Instead standard software is provided as so-called components that can be run in a distributed form on different computers. In this context we distinguished between tightly coupled systems and loosely coupled systems.

(a) Specify one name of a standard architecture for tightly coupled systems and one name for a standard architecture for loosely coupled systems.

(b) For systems designers as well as for managers it is important to understand what problems occur with tightly coupled systems, or what benefits are provided by loosely coupled systems. Name three arguments against tightly coupled systems or for loosely coupled systems and explain.

2. For distributed systems the concept of a transaction is very important. Managers and programmers must understand what services are provided by middleware that supports transaction-oriented processing.

(a) Specify the four main properties that transactions ensure and explain each of them.

(b) For which of the four properties is the correctness criterion "serializability" relevant? Please explain your arguments.

2. (c) If you work in a project where some standard software that does not support transaction-oriented processing has to be integrated, what kind of protocol must the programmers implement to manipulate data (or resources) that are shared among concurrent processes on a single computer processor? Please explain.

(d) Do the problems (see question c) increase if concurrent processes are run on distributed computers? What kind of additional protocol is required. Please explain.

3. Load balancing is a very important idea in modern computer environments. However, in order to provide for non-expensive solutions, load balancers must not be specific to specific applications. Rather, standard software is to be used.

(a) Explain why Web Services, which are based on SOAP/HTTP, are particularly suited for integrating load balancers.

(b) Would it be advantageous if you as a project manager decide to build a system that does the load balancing in a very clever way by interpreting the content of the message body? What are the problems with this approach?

4. An application does not consist of a single web service call. For instance, in e-commerce (or e-business) two different trading partners must first find a way to communicate effectively with web service calls. For e-commerce scenarios ebXML has been defined as the underlying architecture. Explain the main ideas of the ebXML architecture with an example in which one company would (i) like to find a company that sells some goods and (ii) negotiate with this company about the price. Explain the role of the ebXML repository in this process.

5. Explain the main ideas of web service reliability (WS-Reliability). For what kinds of applications are the additional features offered by WS-Reliability of utmost importance?

6. Web service coordination (WS-Coordination) tries to capture the main interaction patterns between two partner processes.

(a) Explain the idea of business agreement patterns (e.g., participant or coordinator completion).

(b) For what kinds of transactions are compensation actions required?

7. In industry business processes are usually not completely automatized. Human decisions are necessary to drive business processes.

(a) Explain the main ideas of a business process execution languages (such as BPEL or BPEL4WS) for specifying the interaction of different automatic or manual subprocesses.

(b) What is the gain of explicitly modeling business processes with BPEL and derivatives?