

CSC 4181 – Compiler Construction Software Engineering Lectures

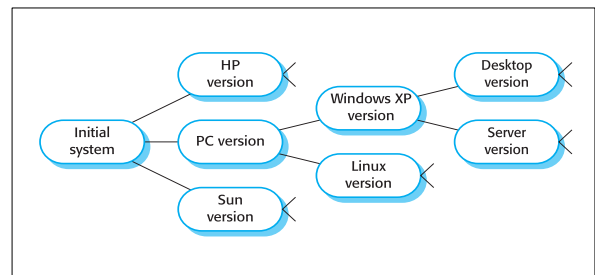
Part 4

Configuration management

Configuration management

- New versions of software systems are created as they change:
 - For different machines/OS;
 - Offering different functionality;
 - Tailored for particular user requirements.
- Configuration management is concerned with managing evolving software systems:
 - System change is a team activity;
 - CM aims to control the costs and effort involved in making changes to a system.

System families



Frequent system building

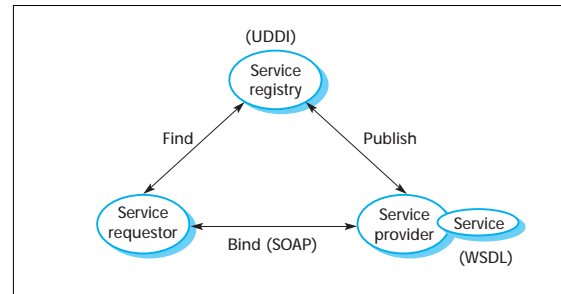
- It is easier to find problems that stem from component interactions early in the process.
- This encourages thorough unit testing - developers are under pressure not to 'break the build'.
- A stringent change management process is required to keep track of problems that have been discovered and repaired.

Service-centric Software Engineering

Service-oriented architectures

- A means of developing distributed systems where the components are stand-alone services
- Services may execute on different computers from different service providers
- Standard protocols have been developed to support service communication and information exchange

Service-oriented architectures



Benefits of SOA

- Services can be provided locally or outsourced to external providers
- Services are language-independent
- Investment in legacy systems can be preserved
- Inter-organisational computing is facilitated through simplified information exchange

Key standards

- SOAP
 - A message exchange standard that supports service communication
- WSDL (Web Service Definition Language)
 - This standard allows a service interface and its bindings to be defined
- UDDI
 - Defines the components of a service specification that may be used to discover the existence of a service
- WS-BPEL
 - A standard for workflow languages used to define service composition

Services as reusable components

- A service can be defined as:
 - *A loosely-coupled, reusable software component that encapsulates discrete functionality which may be distributed and programmatically accessed. A web service is a service that is accessed using standard Internet and XML-based protocols*
- A critical distinction between a service and a component as defined in CBSE is that services are independent
 - Services do not have a 'requires' interface
 - Services rely on message-based communication with messages expressed in XML

Service testing

- Testing is intended to find defects and demonstrate that a system meets its functional and non-functional requirements
- Service testing is difficult as (external) services are 'black-boxes'. Testing techniques that rely on the program source code cannot be used

Project Management

Software project management

- Concerned with activities involved in ensuring that software is delivered on time and on schedule and in accordance with the requirements of the organisations developing and procuring the software.
- Project management is needed because software development is always subject to budget and schedule constraints that are set by the organisation developing the software.

Software management distinctions

- The product is intangible.
- The product is uniquely flexible.
- Software engineering is not recognized as an engineering discipline with the same status as mechanical, electrical engineering, etc.
- The software development process is not standardised.
- Many software projects are 'one-off' projects.

Management activities

- Proposal writing.
- Project planning and scheduling.
- Project costing.
- Project monitoring and reviews.
- Personnel selection and evaluation.
- Report writing and presentations.

Management commonalities

- These activities are not peculiar to software management.
- Many techniques of engineering project management are equally applicable to software project management.
- Technically complex engineering systems tend to suffer from the same problems as software systems.

Project staffing

- May not be possible to appoint the ideal people to work on a project
 - Project budget may not allow for the use of highly-paid staff;
 - Staff with the appropriate experience may not be available;
 - An organisation may wish to develop employee skills on a software project.
- Managers have to work within these constraints especially when there are shortages of trained staff.

Project planning

- Probably the most time-consuming project management activity.
- Continuous activity from initial concept through to system delivery. Plans must be regularly revised as new information becomes available.
- Various different types of plan may be developed to support the main software project plan that is concerned with schedule and budget.