

Review: Estimation and Scheduling

- LOC: Lines of Code
- FP: Function Points
- Counting FP
 - FP ^(0.43) → calendar months → Schedule-Effort Equation → effort → team size
 - FP → LOC → Schedule Tables → effort, calendar months
- Applying estimation-convergence graph yields a ranged-estimation

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Schedule compression equations

$$\text{Schedule Compression Factor} = \frac{\text{Desired Schedule}}{\text{Initial Schedule}}$$

$$\text{Compressed schedule effort} = \frac{\text{Initial effort}}{\text{Schedule compression factor}}$$

Initial schedule estimate: 12
Initial effort estimate: 78 man-months

Want compress schedule to 10 → SCF = 10/12 = 0.83
Compressed schedule effort: 78/SCF = 94 (man-months)

Some researches conclude that it is impossible to have SCF < 0.75 or 0.80
These equations can also be used to "uncompress" a schedule

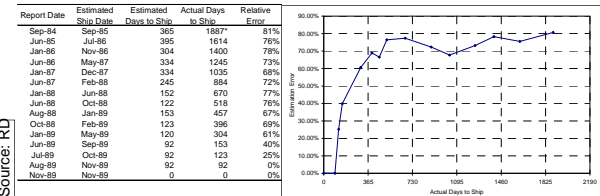
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Scheduling

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WinWord 1.0

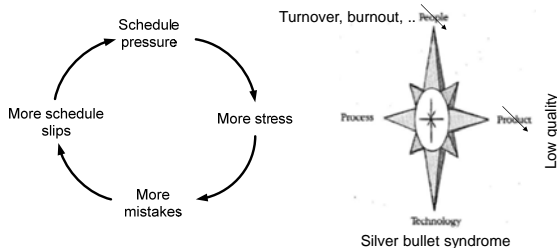
- Microsoft Word for Windows 1.0
 - Example of overly optimistic schedule
 - 5 years in development, 660 man-months, 249,000 lines of code
 - check schedule tables →
 - The final 5-year schedule was approximately five times as long as originally planned.



Source: RD

Scheduling Problems

- Developers underestimate their projects by 20 – 30%.
- Average small-project estimate is off by > 100%.

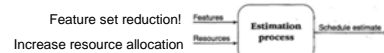


40% of software errors are due to schedule pressure

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Schedule Pressure

- Cause
 - wishful thinking by customers, managers, ...
 - Little awareness of the software estimation methods
 - Poor negotiating skills
 - 75% developers are introverts (where only 33% of general population are)
 - Managers tend to be 10 years older and negotiate for a living
 - Developers oppose negotiating tricks (e.g. high initial estimates)
- Resolution
 - Principled Negotiation
 - Separate people from the problem (cooperate, explore options)
 - Focus on interests, not positions (find underlying needs)
 - Find options for mutual gain (phasing, fewer features, add resources)
 - Insist on using objective criteria (don't negotiate the estimate itself)



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Feature Set Control

- Early project: feature set reduction
 - Minimal specification
 - Requirement scrubbing
 - Versioned development
- Mid-project: feature creep control
 - Setup a change-control board (to review/accept/reject changes)
 - Versioned development
 - Sort development cycles
- Late project: feature cuts
 - Eliminate low priority features
- Keep in mind:
 - 50% cut in project size yields a 75% reduction in resources and ~50% reduction in schedule

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Lecture 5

Technology Selection Server Virtualization UML

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Outline

- Technology selection
- Architectural Design
- Detailed Design
- Coding & Testing environment setup
- Server Virtualization
- UML

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Phases in Waterfall Model

- Software concept
- Requirement analysis
- Life-cycle planning & technology selection
- Architectural Design
- Detailed Design
- Coding & Testing
- System testing

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Technology selection

- During planning for life-cycle models (e.g. design to tools) and size/schedule estimation, technology should be selected. It is somewhat affected by the selected life-cycle model, and it also affects size/schedule estimation.
- Technology includes:
 - Target operating system
 - Target program execution environment (e.g. platform API)
 - Target related systems (e.g. database, web server, ...)
 - Development Tools
 - Integrated development environment (IDE)
 - External / 3rd party programming libraries
 - Configuration management tools (e.g. version control, backup, ...)

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Technology selection Platform

- Hardware
- Operating System (OS)
 - Kernel (memory management, file system management, ...)
 - Shell (interface between user & kernel)
 - e.g. Windows, Linux, Solaris, AIX, ...
- Program execution environment
 - System API (application programming interface)
 - Defines how applications/programs interact with OS
 - e.g. Create user interface elements, creating files, ...
 - 3rd party API
- Does program need to run on different platforms?
- Limits selections of other technologies ...

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Architectural Design

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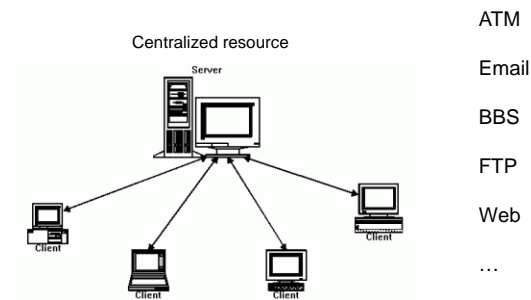
Architectural Design

- Structures of the software system
 - software components (interfaces, functions)
 - externally visible properties of those components
 - the relationships between them
 - e.g. client-server architecture, peer-to-peer architecture, many other possibilities.
- Today, UML (to be covered next) is the standard for documenting architectural designs.

http://en.wikipedia.org/wiki/Software_architecture

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Client-server architecture



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Detailed Design

- Internals of each software component
 - Algorithms,
 - Data structures
 - Programming language
 - It is possible that previously determined components to be changed in detailed design to apply design patterns or refactoring, etc.

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Coding & Testing

- Before coding & testing take places, setting up testing environment is necessary.
- The testing environment simulates clients' production environment for programmers to code and to test against.

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Server Virtualization

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What is it?

- Server virtualization virtualizes servers
 - Virtual computers inside a computer
 - One physical server machine (host) may host several virtualized servers (guest)
- Virtualizes computer hardware so that it can run on supported physical hardware

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How ?

- Through virtualization software (Windows)
 - VMWare (<http://www.vmware.com>)
 - Oracle VirtualBox (<http://www.virtualbox.org>)
 - Microsoft VirtualPC (<http://www.microsoft.com/windows/virtual-pc/>)
 - Many others ...

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Why ?

- Enterprises
 - Better server utilization
- Developers
 - Develop application for different platform without multiple computers or multi-boot.
- Regular users
 - Run applications written for old operating systems
- Virtualized machines make great testing environments ..
 - Clean (clean room)
 - Easy to restore, deploy, replicate
 - Test dangerous software (e.g. virus)

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Assignment #3

1. Download and install VirtualBox on one of your computer.
2. Create a virtual machine using the software, and install Windows XP in the virtual machine you created. (contact me if you need XP iso images)
3. In the Windows XP you installed in the virtual machine, setup:
 - a) IIS (Information Information Service, included with Windows XP)
 - b) SQL Server Express 2008 R2 (<http://www.microsoft.com/express/sql/default.aspx>)
4. Please make screen dumps during your setup of Windows XP, IIS, and SQL Server Express...
5. You may download the user manual of VirtualBox and check Chapter 6 "[Configuring port forwarding with NAT](#)" to configure port forwarding with NAT to expose services running on the guest as if they are running on the host.
6. You need to get IIS & SQL Server up & running inside the virtual machine setup...

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Assignment #3

- **Due: 11/02/2011 (two weeks)**
- Deliver: A Word document (or PDF) that contains a series of screen dumps (ALT-PrintScr) that show:
 - The process of installing Windows XP
 - The process of installing IIS
 - Show that the installed IIS is working inside the virtual machine
 - Extra credit: Expose IIS to the Internet so that people can access it through your physical machine.
 - The process of installing SQL Server 2008 R2
 - Show that the installed SQL Server 2008 R2 is working
- This virtual machine will become your database server & web server for the rest of your term ...

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