Experience from industry

Advanced Programming Concepts

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DESY – 11.10.2012

Programming in Industry

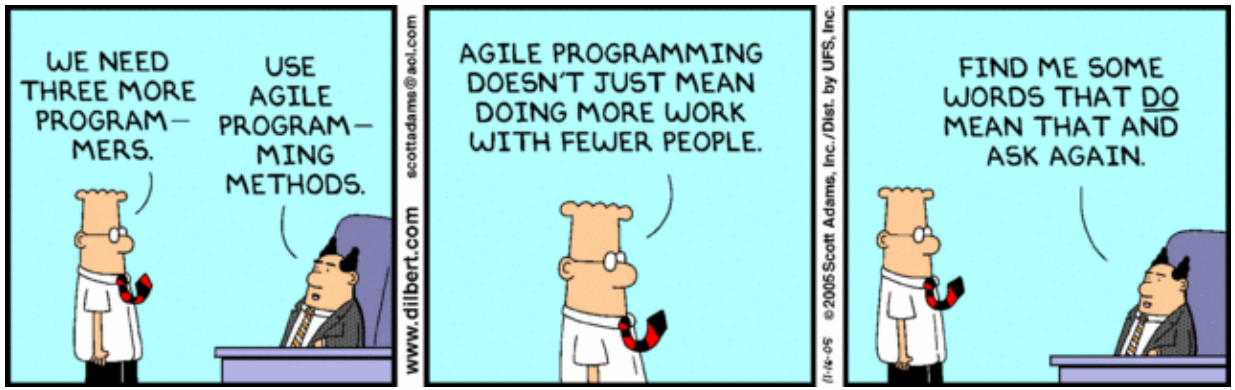
- Software at Basler
  - Who we are
  - What we do
- Technical
  - Platform – component reuse
  - Architecture Patterns
  - Basis – library reuse
  - Tools
- Process
  - Continuous integration
  - Waterfall and Project Management
  - Scrum
- Testing
  - Functional testing
  - Usability testing
- What I haven't mentioned
  - Unicode, Threading, …

Software at Basler

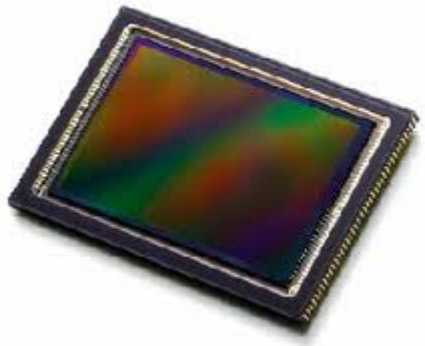
30 Software developers.
… and growing.

Languages used:

- **C++**
- **C**
- **C#**
- **Javascript**
- **Java**
- **Python**
- **HTML**
- **XML**
- **…**



Software at Basler



No Operating System or embedded linux

C/C++

GigE/USB3/ CL/1394

Application SDK
C/C++/VB6/C#.Net
Windows XP/Vista/7/8
Linux/Embedded Linux

Driver layer
Windows XP/Vista/7/8
C/C++

BASLER

Technical: Platform and Architecture

How can you control complexity?
Abstraction.

UML is good but low level.

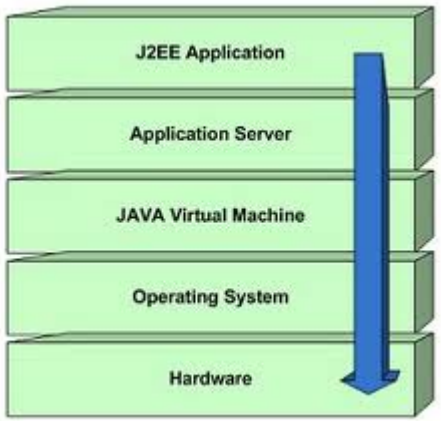
Abstract until it fits on one page.

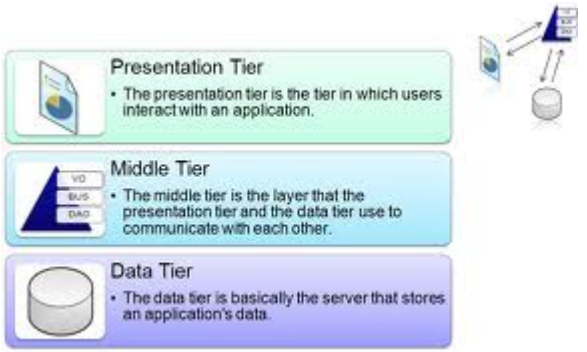
And then break it down.

(similarities to particle physics here are not purely coincidental)

My definitions:

The high level abstraction is architecture.
Reuse of architecture is platform.

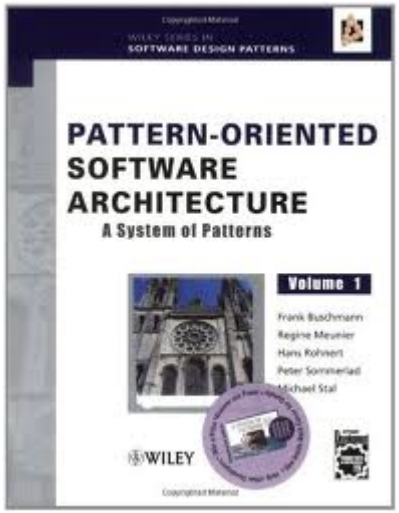


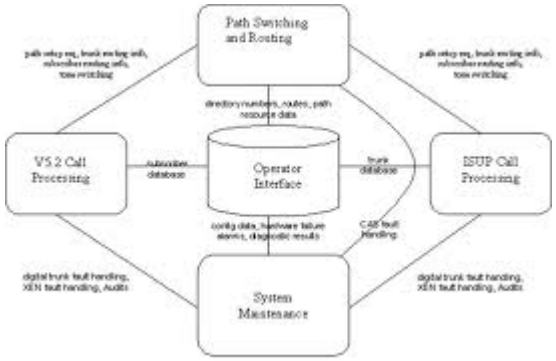


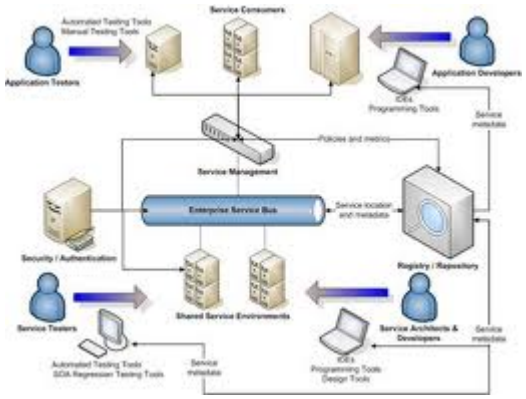
Technical: Architecture Patterns

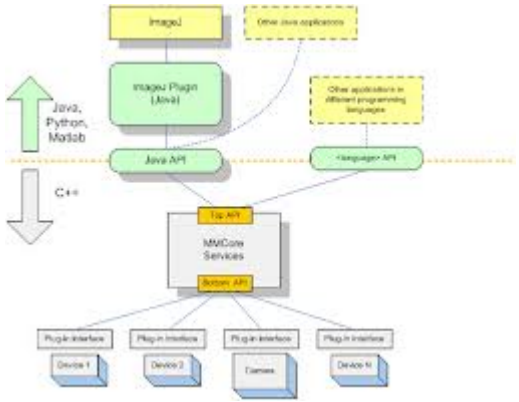
A pattern system provides, on one level, a pool of proven solutions to many recurring design problems.

On another it shows how to combine individual patterns into heterogeneous structures and as such it can be used to facilitate a constructive development of software systems.









Technical: Basis

A good stable basis, e.g.
- Boost (C++)
- STL (C++)

A good framework, e.g.
- .Net (C#, etc)
- MFC (C++)
- Qt (C++)
- Spring (Java)

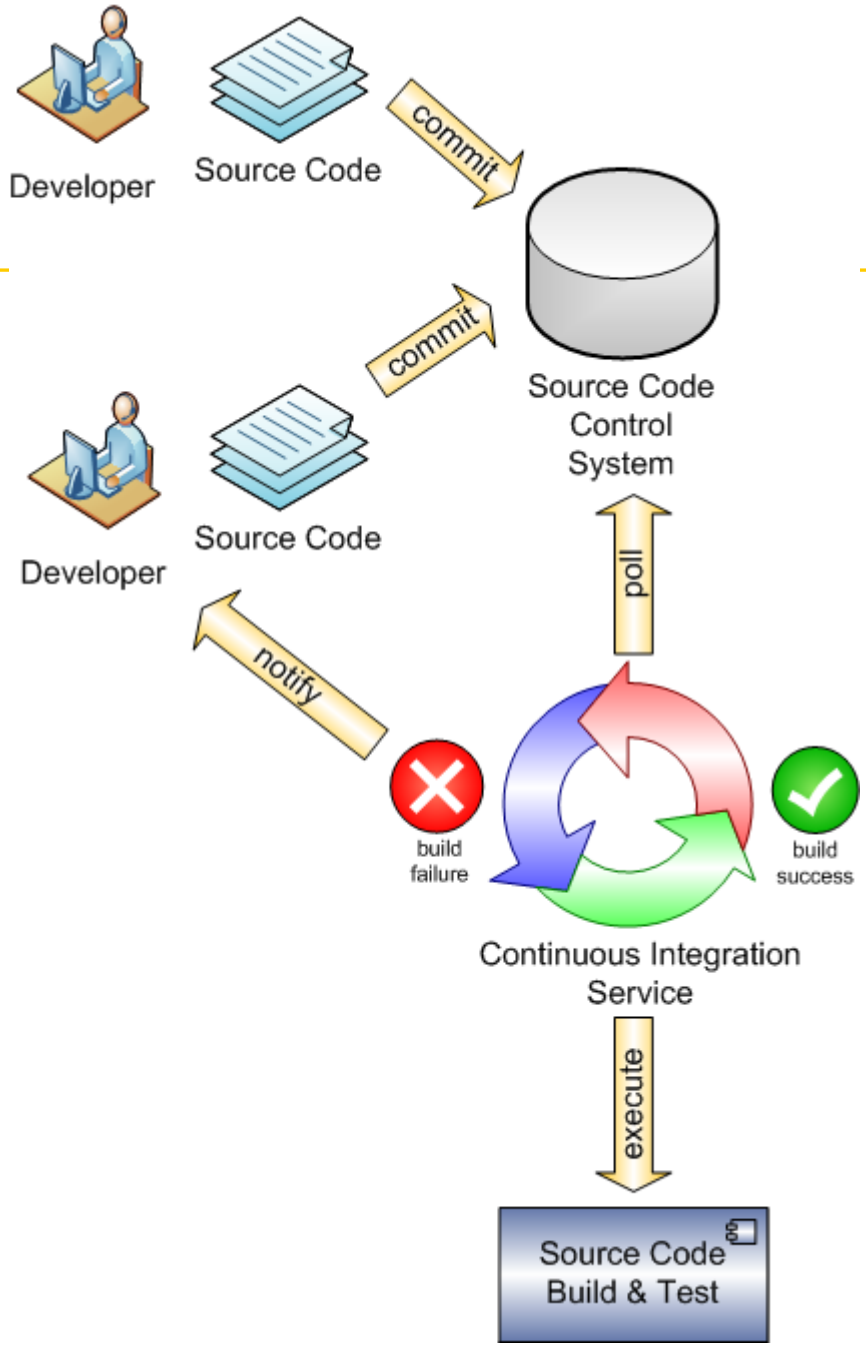
And there's more…

Google is your friend.

Technical: Tools

You need (as well as a compiler):

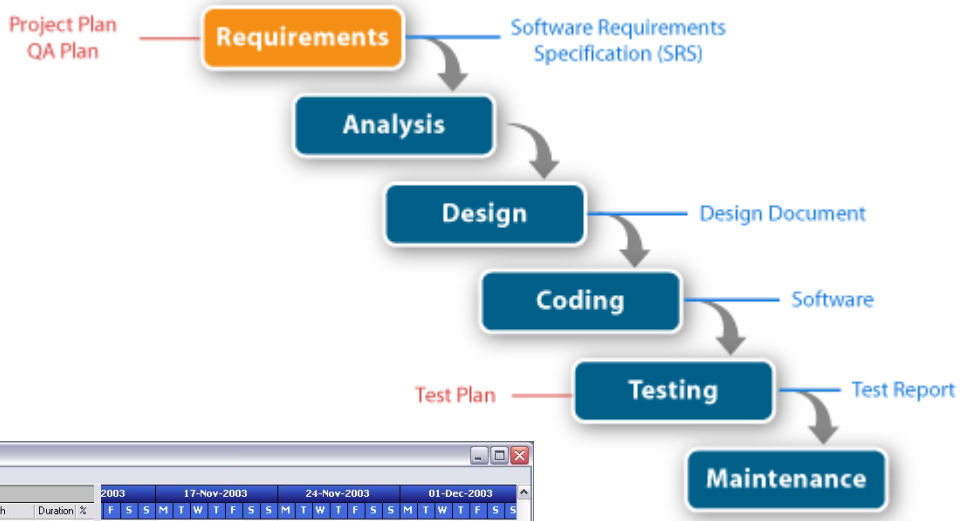
- A good IDE: Visual Studio or eclipse
- A good debugger (depends on the target system)
- A good remote debugger (to save shoe rubber)
- A Source Code management system
- A Bugtracker

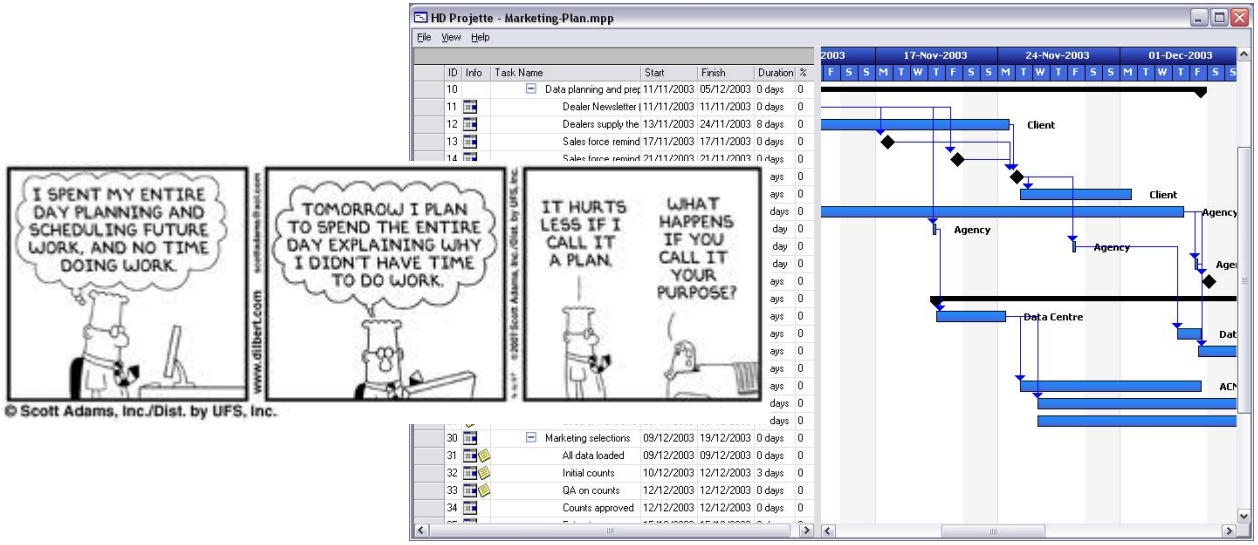


Process: Continuous Integration

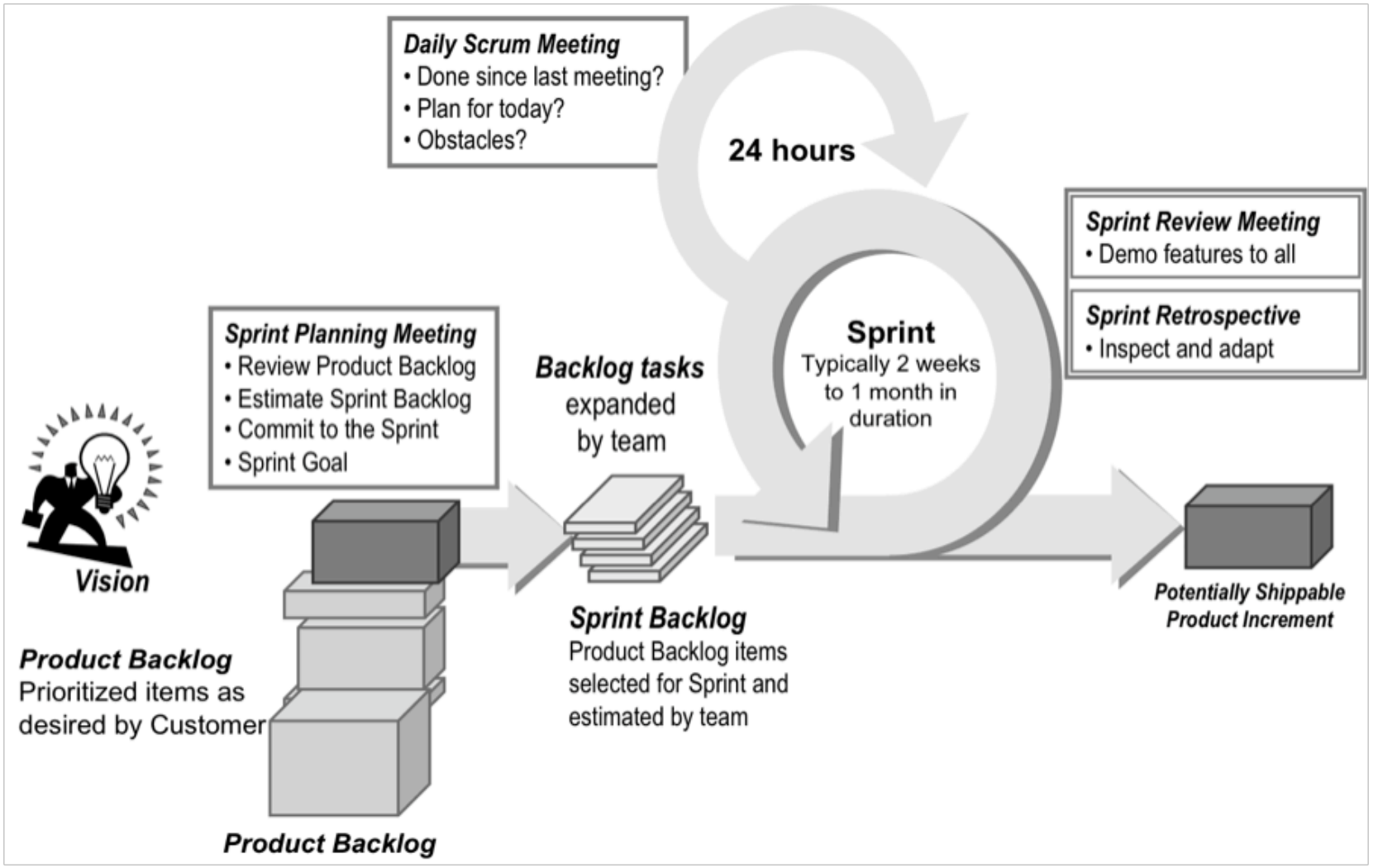
Process: Waterfall and Projects

Simple leads to complicated project plans (the Gantt Diagram)





Process: Scrum (agile processes)

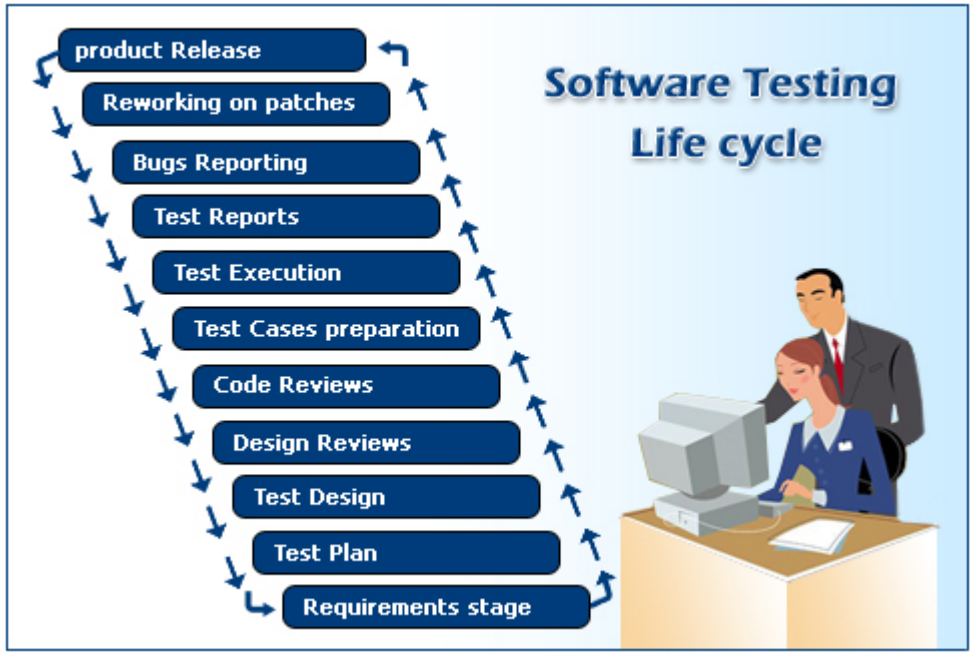


Testing

30% to 60% of development budget should go to testing.

Normally it‘s about 10%.

Everyone does it differently, everyone does not enough. (how often does your mobile get a firmware update?)



Testing: Basler

- Automatic daily tests (continuous integration)
- 3rd Party Tests
- Image Quality Tests
- Usability Tests
- Production Tests

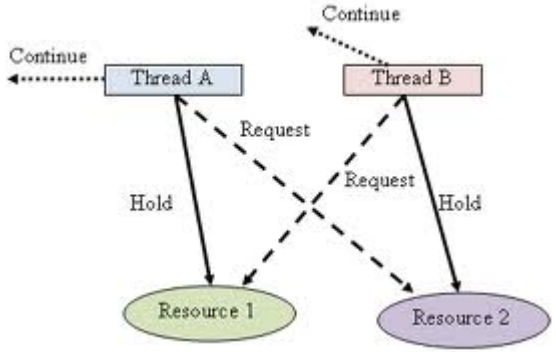
Front-illuminated structure

Back-illuminated structure

Developer watching videotape of usability test.

What I haven't mentioned:

- Specification Management
- Unicode
- Threading/Deadlocking
- Debugging Embedded Systems
- Lint
- ...



Thank you for your attention!

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