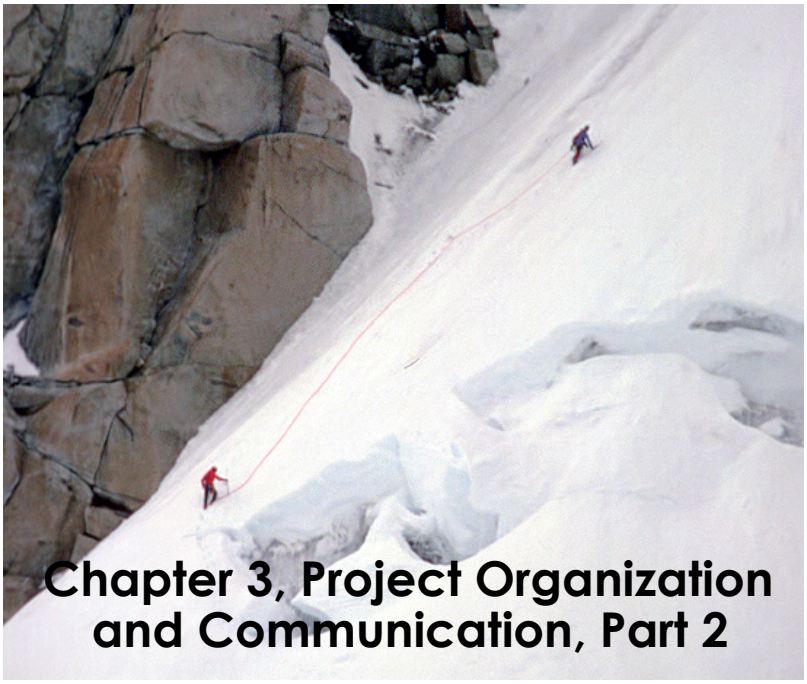
Object-Oriented Software Engineering
Using UML, Patterns, and Java



Chapter 3, Project Organization and Communication, Part 2

Outline

- Concepts and terminology
- Communication events
  - Planned communication
  - Unplanned communication
- Communication mechanisms
  - Synchronous communication
  - Asynchronous communication
- Communication activities

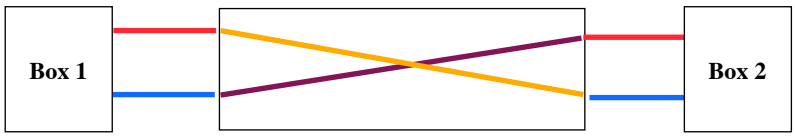
A Communication Example

From an Airplane Crash report:

"Two missile electrical boxes manufactured by different contractors were joined together by a pair of wires."

A Communication Example (continued)

Thanks to a particular thorough preflight check, it was discovered that the wires had been reversed."

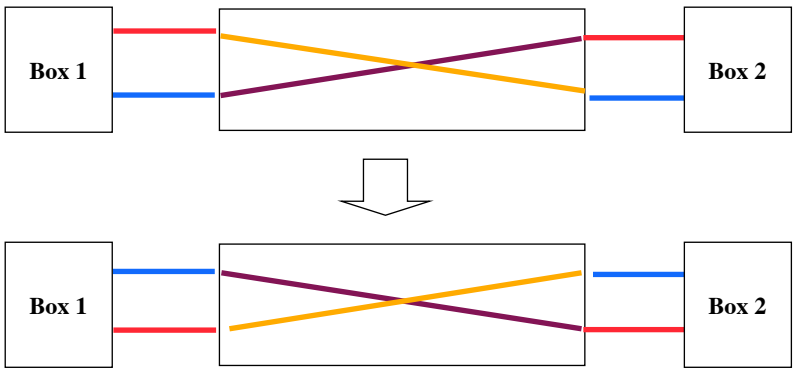


After the Crash...

...

"The postflight analysis revealed that the contractors had indeed corrected the reversed wires as instructed."

"In fact, both of them had."



Communication is critical

- In large system development efforts, you will spend more time communicating than coding
- A software engineer needs to learn the so-called soft skills:
  - Collaboration
    - Negotiate requirements with the client and with members from your team and other teams
  - Presentation
    - Present a major part of the system during a review
  - Management
    - Facilitate a team meeting
  - Technical writing
    - Write part of the project documentation.

Communication Event vs. Mechanism

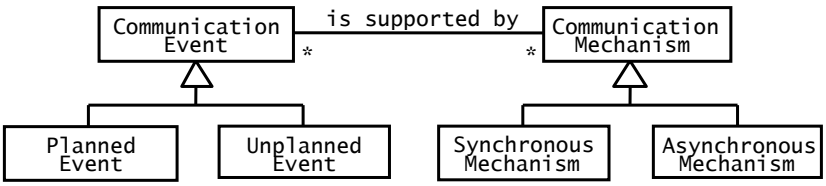
Communication event

- Information exchange with defined objectives and scope
- *Scheduled*: Planned communication
  - Examples: weekly team meeting, review
- *Unscheduled*:Event-driven communication
  - Examples: problem report, request for change, clarification

Communication mechanism

- Tool or procedure that can be used to transmit information
- *Synchronous*: Sender and receiver are communicating at the same time
- *Asynchronous*: Sender and receiver are not communicating at the same time.

Modeling Communication



Planned Communication Events

Problem Definition

- Objective:Present goals, requirements and constraints
- Example: Client presentation
- Usually scheduled at the beginning of a project

Project Review: Focus on system models

- Objective: Assess status and review the system model
- Examples: Analysis review, system design review
- Scheduled around project milestones and deliverables

Client Review: Focus on requirements

- Objective: Brief the client, agree on requirements changes
- The first client review is usually scheduled after analysis phase.

Planned Communication Events (cont'd)

Walkthrough (Informal)

- Objective: Increase quality of subsystem
- Example
  - Developer informally presents subsystem to team members ("peer-to-peer")
- Scheduled by each team

Inspection (Formal)

- Objective: Compliance with requirements
- Example
  - Demonstration of final system to customer (Client acceptance test)
- Scheduled by project management

Planned Communication Events (cont'd)

Status Review

- Objective: Find deviations from schedule and correct them or identify new issues
- Example
  - Status section in regular weekly team meeting

Brainstorming

- Objective: Generate and evaluate large number of solutions for a problem
- Example
  - Discussion section in regular weekly team meeting.

Planned Communication Events (cont' d)

Release

- Objective: Baseline the result of each software development activity
- Examples:
  - Software Project Management Plan
  - Requirements Analysis Document
  - System Design Document
  - Beta version of software
  - Final version of software
  - User Manual
- Usually scheduled after corresponding activity ("phase")

Postmortem Review

- Objective: Describe Lessons Learned
- Scheduled at the end of the project

Unplanned Communication Events

Request for clarification

- The bulk of communication among developers, clients and users
- Example: A developer may request a clarification about an ambiguous sentence in the problem statement.

```
From: Alice
Newsgroups: vso.discuss
Subject: SDD
Date: Wed, 2 Nov 9:32:48 -0400

When exactly would you like the System Design Document? There
is some confusion over the actual deadline: the schedule
claims it to be October 22, while the template says we have
until November 7.
Thanks,-Alice
```

Unplanned Communication Events

Request for change

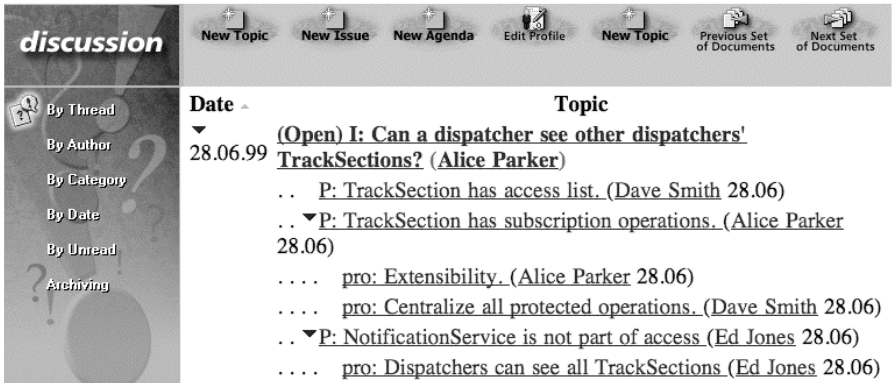
- A participant reports a problem and proposes a solution
- Change requests are often formalized when the project size is substantial
- Example: Request for additional functionality

```
Report number: 1291   Date: 5/3  Author: Dave
Synopsis: The STARS form should have a galaxy field.
Subsystem: Universe classification
Version: 3.4.1
Classification: missing functionality
Severity: severe
Proposed solution: …
```


Unplanned Communication Events

Issue resolution

- Selects a single solution to a problem for which several solutions have been proposed
- Uses issue base to collect problems and proposals.



Synchronous Communication Mechanisms

- Smoke signals
- Hallway conversation
  - Supports: Unplanned conversations, Request for clarification, request for change
  - \+ Cheap and effective for resolving simple problems
  - – Information loss, misunderstandings are frequent
- Meeting (face-to-face, phone, video conference)
  - Supports: Planned conversations, client review, project review, status review, brainstorming, issue resolution
  - \+ Effective for issue resolution and consensus building
  - – High cost (people, resources), low bandwidth.

Asynchronous Communication Mechanisms

- E-Mail
  - Supports: Release, change request, brainstorming
  - \+ Ideal for planned communication and announcements
  - – E-mail taken out of context can be misunderstood, sent to the wrong person, or lost
- Newsgroup
  - Supports: Release, change request, brainstorming
  - \+ Suited for discussion among people who share a common interest; cheap (shareware available)
  - – Primitive access control (often, you are either in or out)
- World Wide Web (Portal)
  - Supports: Release, change request, inspections
  - \+ Provide the user with a hypertext metaphor: Documents contain links to other documents.
  - – Does not easily support rapidly evolving documents.

Mechanisms for planned events

	Problem definition/ Brainstorm	Project/ Client Review	Status Review	Inspection/ Walkthrough	Release
Hallway	✔		✔		
Meeting	✔	✔	✔	✔	
Email					
Newsgroup	✔				
WWW				✔	✔

Mechanisms for unplanned events

	Request for clarification	Change request	Issue resolution
Hallway	✔		✔
Meeting	✔		✔
Email	✔	✔	
Newsgroup	✔	✔	
WWW		✔	

Outline

- Concepts and terminology
- Communication events
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  - Unplanned communication
- Communication mechanisms
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  - Asynchronous communication
- Communication activities

Typical Initial Communication Activities in a Software Project

- Understand problem statement
- Join a team
- Schedule and attend team status meetings
- Join the communication infrastructure.

Understand the Problem Statement

- The problem statement is developed by the client
  - Also called scope statement
- A problem statement describes
  - The current situation
  - The functionality the new system should support
  - The environment in which the system will be deployed
  - Deliverables expected by the client
  - Delivery dates
  - Criteria for acceptance test.

Join a Team

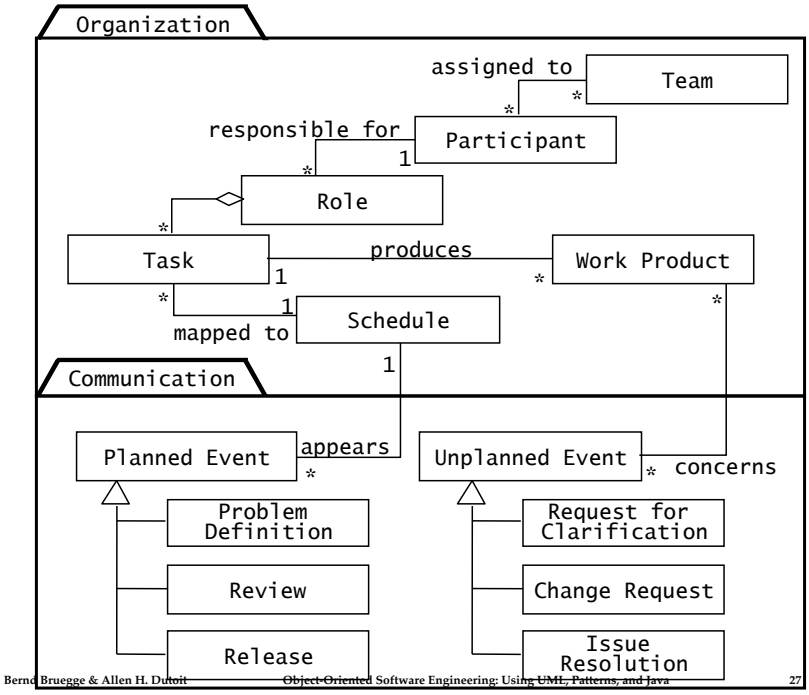
- During the project definition phase, the project manager forms a team for each subsystem
- Additional cross-functional teams are formed to support the subsystem teams
- Each team has a team leader
- Other roles can include
  - Configuration manager
  - API-Liaison
  - Technical writer
  - Web master
- The responsibilities of the team and the responsibilities each member must be defined to ensure the team success.

Attending Team Status Meetings

- Important part of a software project: The regular team meeting (weekly, daily,…)
- Meetings are often perceived as pure overhead
- Important task for the team leader:
  - Train the teams in meeting management
    - Announce agendas
    - Write minutes
    - Keep track of action items
  - Show value of status meeting
  - Show time-saving improvements.

Join the Communication Infrastructure

- A good communication infrastructure is the backbone of any software project
  - Web-Portal, e-mail, Newsgroups, Lotus Notes
- Learn to use the appropriate communication mechanism for the information at hand
  - The appropriateness of mechanisms may depend on the organizational culture.
- Register for each communication mechanism which is used by the software project
  - Get an account, get training
- Questions to ask:
  - Are meetings scheduled in a calendar?
  - Does the project have a problem reporting system?
  - Do team members provide peer reviews in meetings or in written form?



Summary

- Communication Events
  - Planned (stipulated by the schedule)
  - Unplanned (driven by unexpected events)
- Communication Mechanisms
  - Asynchronous communication mechanisms
  - Synchronous communication mechanisms
- Important events and mechanisms in a software project
  - Weekly meeting
  - Project reviews
  - Online communication mechanisms:
    - Discussion forum, email, web (Wiki)

Backup Slides

Ingredients of a Problem Statement

- Current situation
  - The problem to be solved
  - Description of one or more scenarios
- Requirements
  - Functional and nonfunctional requirements
  - Constraints (“pseudo requirements”)
- Target environment
  - The environment in which the delivered system has to perform a specified set of system tests
- Project schedule
  - Major milestones that involve interaction with the client including deadline for delivery of the system
- Client acceptance criteria
  - Criteria for the system tests.