Software Engineering Institute
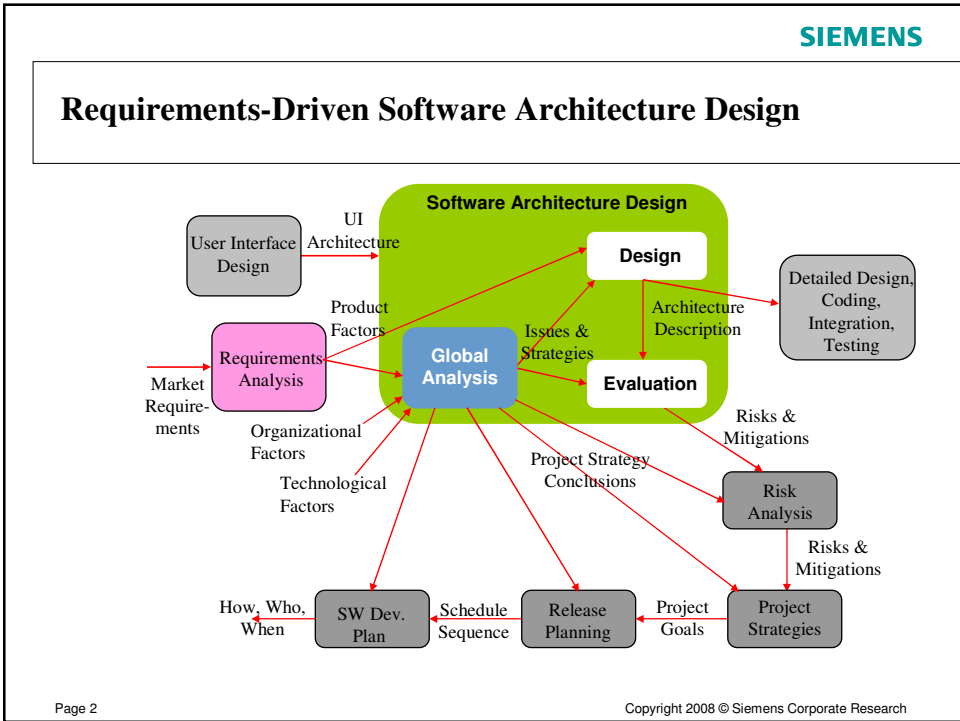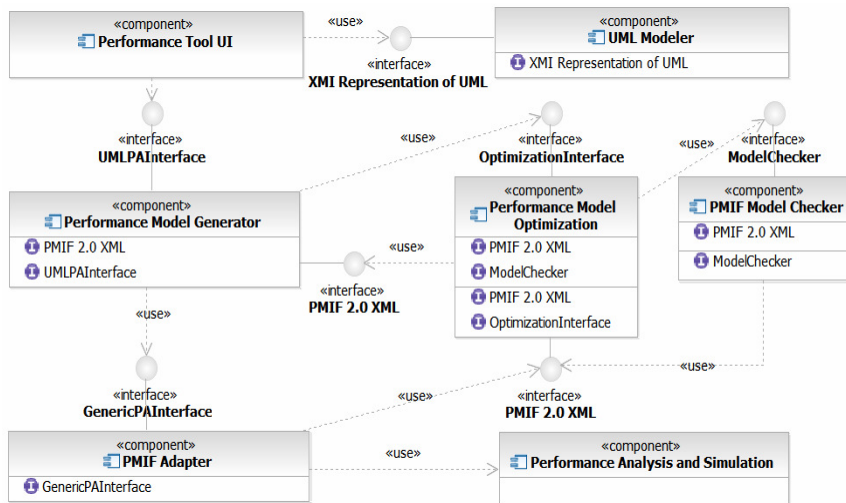Carnegie Mellon

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Architecture From a Manager's Perspective

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Requirements-Driven Software Architecture Design

1

GSP V3.0 Software Architecture

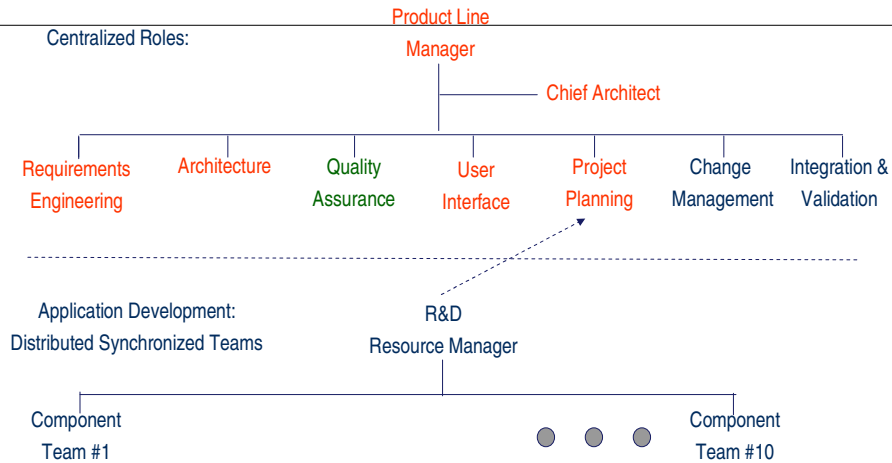# Global Studio Project (GSP)

Experimental global software development project using university student teams and researchers.

Shadows real Siemens global development project, process, & organization.

Document processes, best practices, and understanding of how to successfully execute global projects.

2

Example Organization – Global Development Project

Centralized Roles:

Product Line
Manager

Chief Architect

| Requirements Engineering | Architecture | Quality Assurance | User Interface | Project Planning | Change Management | Integration & Validation |

Application Development:
Distributed Synchronized Teams

R&D
Resource Manager

Component
Team #1

Component
Team #10

QA, architect, and subject matter experts are embedded within the small component teams.
Component teams use agile processes and are synchronized by the centralized team.

The Roles of the Project Manager & Software Architect

	Project Manager	Software Architect
Software Development	organize project, manage resources, budgets, and schedules	organize team around design, manage dependencies
Requirements	negotiate with marketing	review requirements
Technology	introduce new technology	recommend technology, training, tools
Quality	ensure quality of the product	track quality of the design
Metrics	productivity, size, and quality measures	design measures

Module Architecture Design
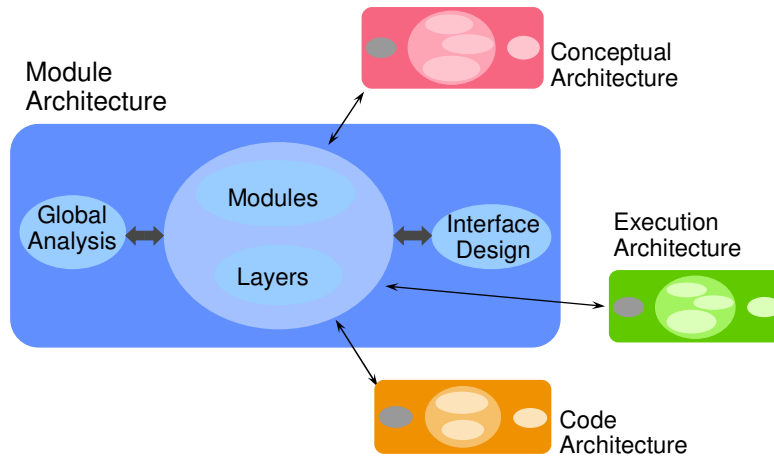
IS2000 Bottom-Up Cost Estimation
Major work packages

	Confidence	Complexity	Code Size	Total Effort hours	Total Effort staff-yr
Versioned Object	3	5	2000	720	0.3938731
Study Management	3.2	3.4	600	1280	0.7002188
Check In & Check Out	3.7	3.3	1800	1320	0.7221007
Templates	3	5	1000	2400	1.3129103
Schedule Maker	1	5	19500	2920	1.5973742
GUI	2.8	3.6	18300	4960	2.7133479
Communication Syst.	3	4	500	640	0.3501094
Probe Interface	3	3	11500	1580	0.8643326
HW Diagnostics	4	3	400	250	0.1367615
Flat Panel Display	4	3	700	800	0.4376368
All other functions			20000	3500	1.9146608
Totals			76300	20370	11.143326

4

Coordination Matrices

(A) May 04, 2007

(B) May 18, 2007
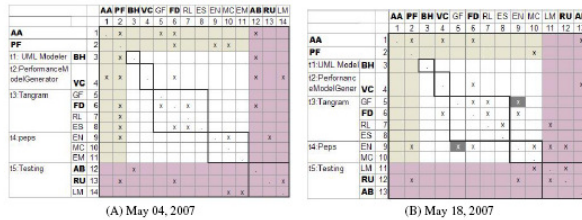
Figure 3. The Communication Structure During the First and Second Development Stages

(A) June 08, 2007

(B) June 28, 2007
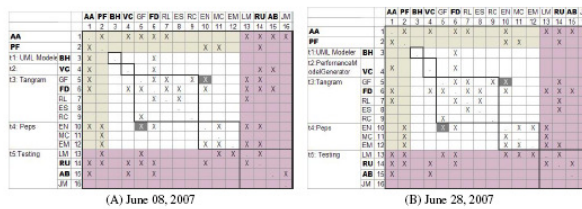
Figure 4. The Communication Structure During the Third and Fourth Development Stages

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Example Build Plan

	ER1	ER2	ER3	R1	R2+
Schedule Maker					
Search Consumer Tree for Scheduled Events	√			√	
Create a Schedule	√			√	
Handle Report Events	√			√	
Handle Acquisition Events		√		√	
Optimize Acquisitions					√
Handle set Parameter Scheduled Events		√		√	
Display and manual Update of Schedules			√	√	

5

Social Network Analysis (SNA)

Affiliations (Sites)
- SCR Central Team
- Tech. Univ. Munich
- CMU Sapphire
- IIITB
- Monmouth #5
- Monmouth Codicons
- Monmouth TCT
- Limerick ArdnaCroise

Roles
- ○ Developer
- □ Team Leader
- △ Function Manager
- ⊠ Remote Supp. Manager
- ▽ Central Supp. Manager
- ◇ Executive

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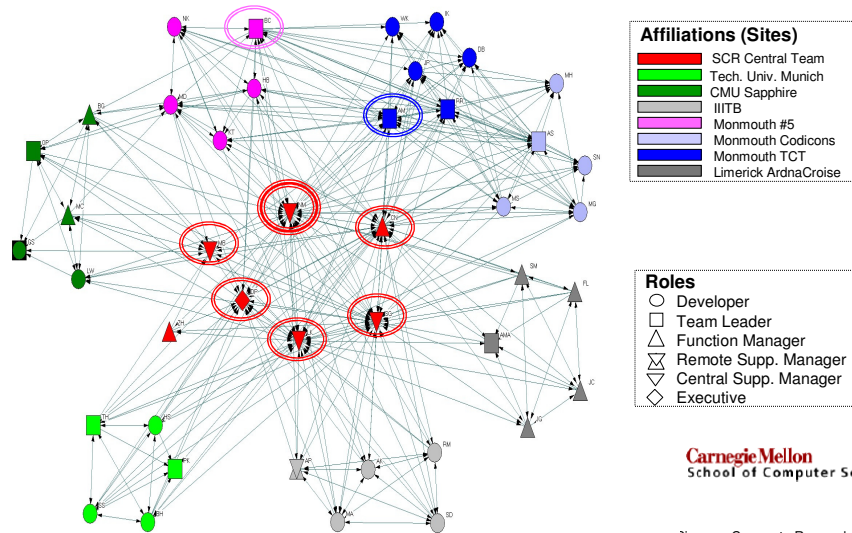
Thank you!

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