

Research Center in Integrational Software Engineering

Inauguration

Dr. Uwe Aßmann

Linköping Universitet, IDA, PELAB

Dec 10, 2001



The Essence of the 60s-90s: LEGO Software



Modular Systems

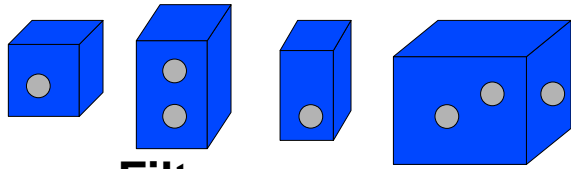
Object-oriented Technology

Design Patterns

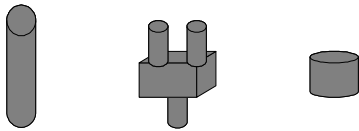
Component-based Programming

CORBA, DCOM, Beans, EJB

Architecture languages



**Filter
Components**



Composition connectors

pipe, tee, flange

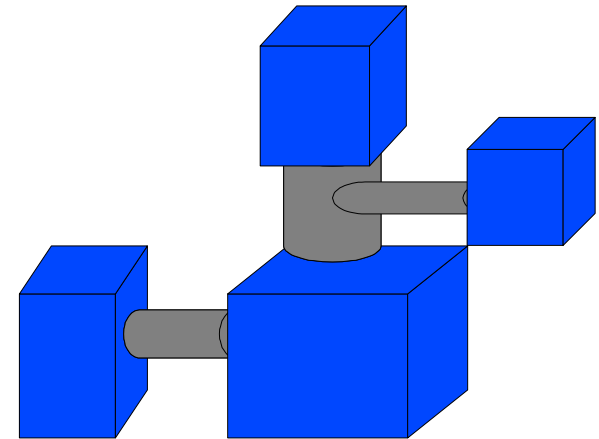


make, shell

**Black-box
composition**



Component-based Programming



**Component-based
applications**

LEGO Software

Integrational Systems

**Dynamic
Composition Systems**

Dynamic Architectures

**Uniform XML
Composition Systems**

XML Composition

XML-Compost

**Software
Composition Systems**

**Composition
Language**

**Invasive Composition
! N, ! -calculus**

View Systems

**Composition
Operators**

**Hyperslices
SOP**

Aspect Systems

Aspect Separation

Aspect/J

Architecture Systems

Architecture as Aspect

**Darwin
Aesop**

**Classical
Component Systems**

Standard Components

**DCOMCORBA
Beans/EJB**

Object-Oriented Systems

**Objects as
Run-Time Components**

**C++ Java
Sather**

Modular Systems

**Modules as Compile-
Time Components**

**Modula Ada-85
C..**

Component-based Systems

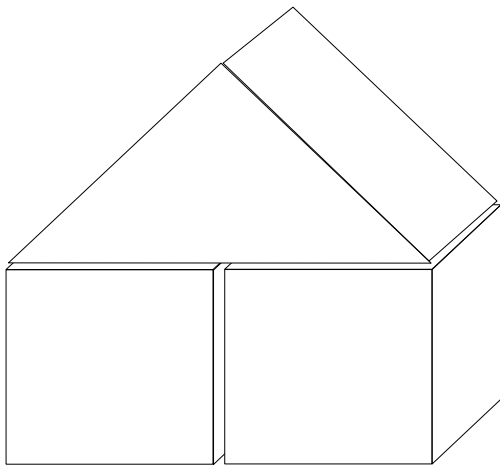
The Last 5 Years



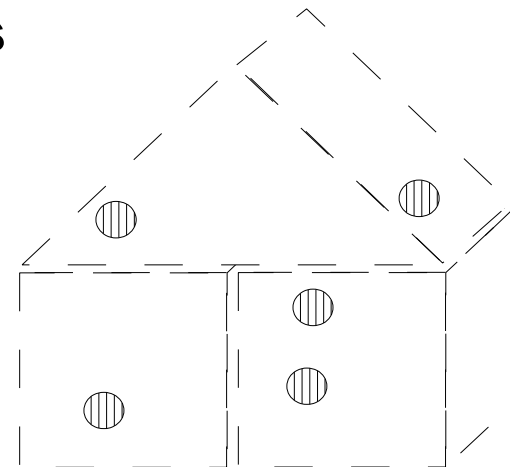
Aspect-oriented Programming
View-based Programming

**Now: paradigm shift towards
integrational systems**

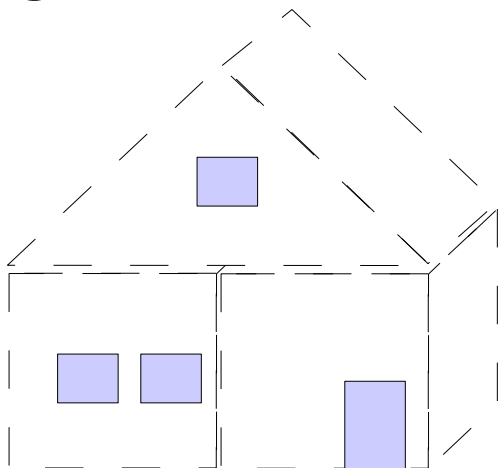
Structure



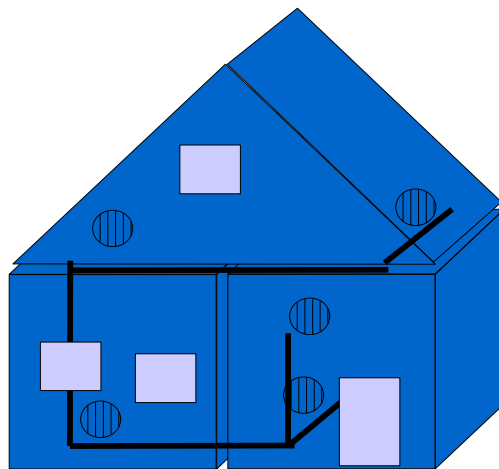
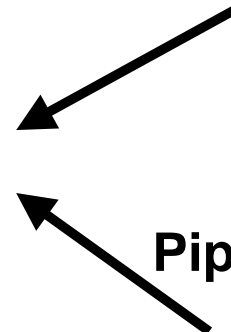
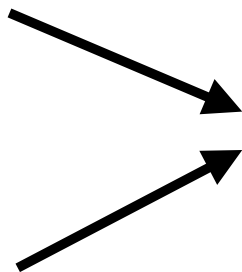
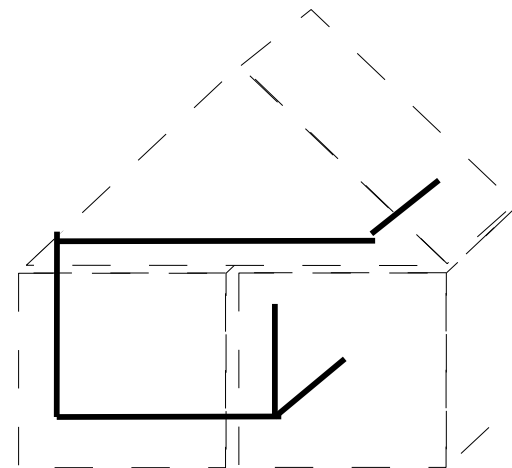
Interfaces



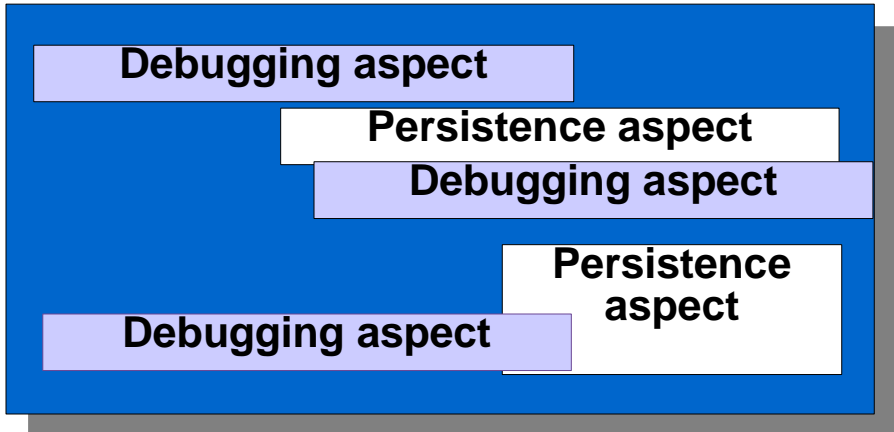
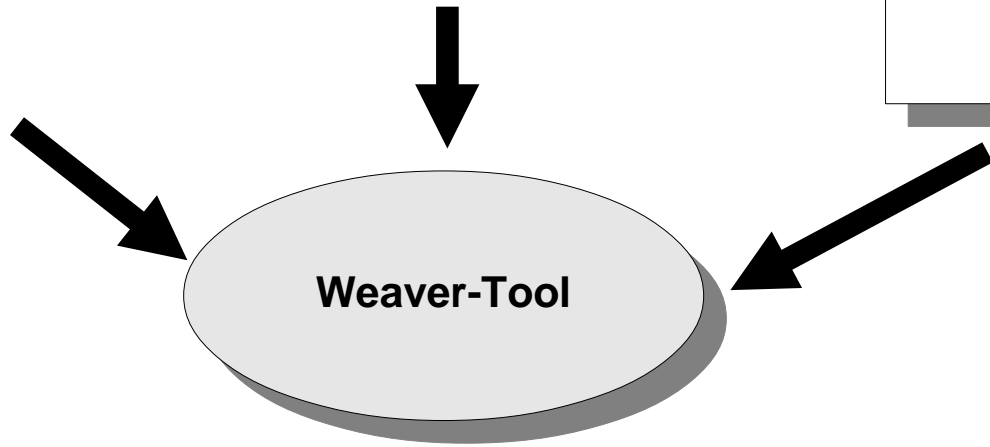
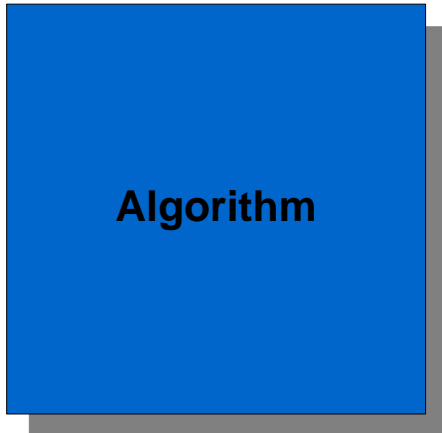
Light Plan

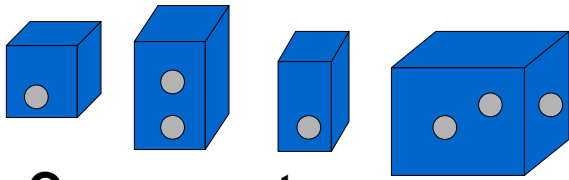


Pipe Plan

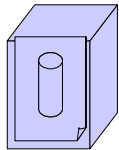


Integrated House





Components

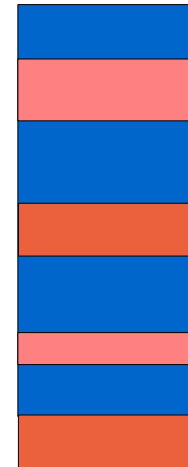


Weaver



**Composition
recipe**

**Aspect-
oriented
composition**



**System constructed in an
aspect-oriented
architecture**

Integrational Systems

**Dynamic
Composition Systems**

Dynamic Architectures

**Uniform XML
Composition Systems**

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XML-Compost

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Modular Systems

**Modules as Compile-
Time Components**

**Modula Ada-85
C..**

Entering the Era of Integration: The Essence of the 2010s



Software Composition Systems

- Composition Languages

- Merge Architecture Systems and Aspect Systems

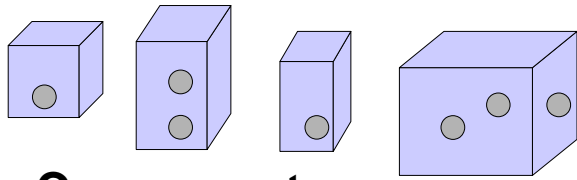
Uniform XML Composition Systems

- Everything will be an active document in XML

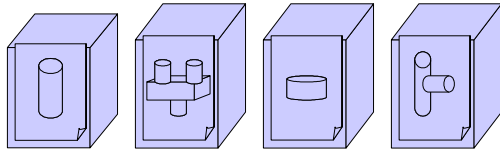
- Software and documents will be composed uniformly with composition languages

Dynamic Composition Systems

- Architecture is reified and composed at run time



Components

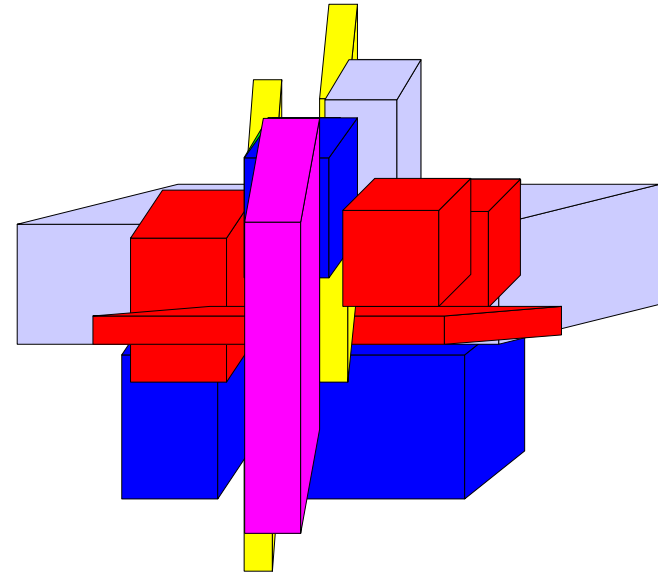


Composition Language



**Composition
recipe**

**Software
Integration**



**System constructed in a
integration-based
architecture**

Integrational Systems

Dynamic Composition Systems Dynamic Architectures

Uniform XML Composition Systems XML Composition XML-Compost

**Software Composition Systems Composition Language Invasive Composition
! N, ! -calculus**

**View Systems Composition Operators Hyperslices
SOP**

Aspect Systems Aspect Separation Aspect/J

Component-based Systems

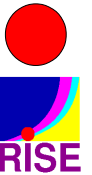
**Architecture Systems Architecture as Aspect Darwin
Aesop**

**Classical Component Systems Standard Components DCOMCORBA
Beans/EJB**

**Object-Oriented Systems Objects as Run-Time Components C++ Java
Sather**

**Modular Systems Modules as Compile-Time Components Modula Ada-85
C..**

RISE: Integrational Software Engineering



Software Composition

- Composition and Decomposition Technologies

Uniform XML Composition

- XML Components

- Uniform treatment of XML Semantics (Semantic Web)

- XML Refactoring

Dynamic Composition

- Dynamic class loading

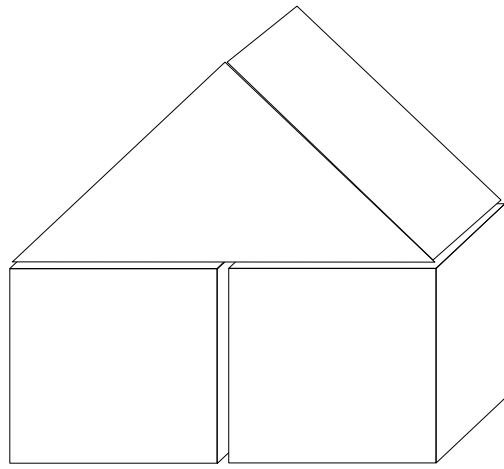
Integrational Software Process

- Requirements Evolution

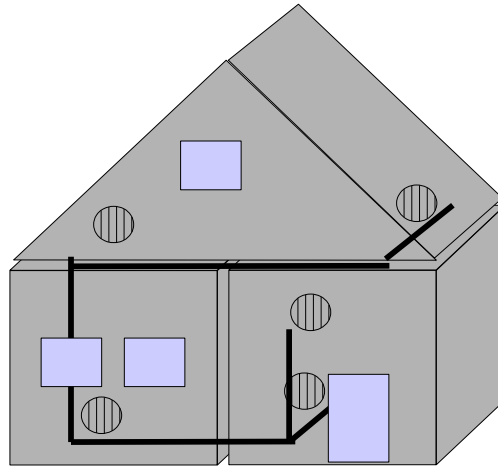
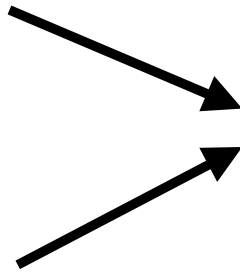
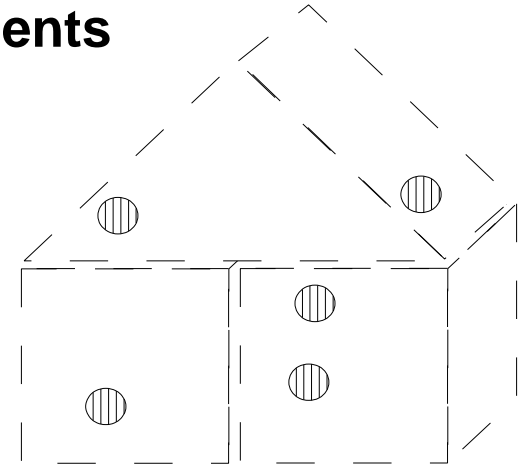
- Integration Testing

- Integrational Design

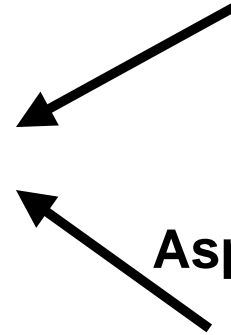
Architecture



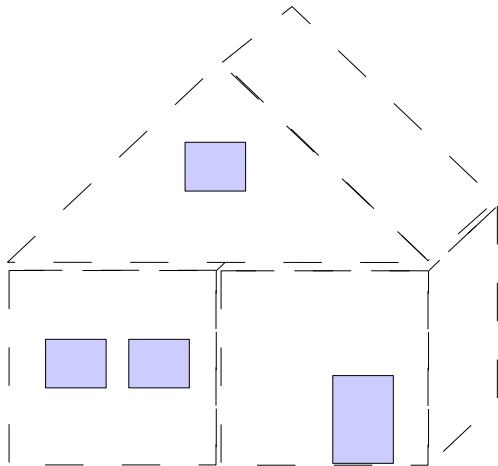
Requirements



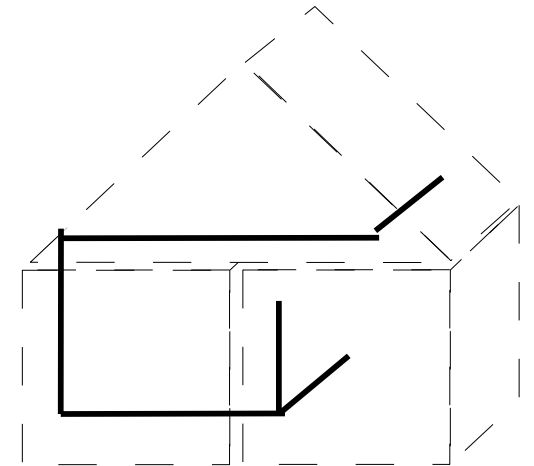
Aspects



Testing



Integrated Software Engineering



Industrial Collaboration



Transfer technology to interested parties

RISE Seminars

About every 4-6 months

International speakers in Integrational Software Engineering

RISE Training seminars at interested parties

Integrational Software Engineering (1-2 days)

Semantic Web Techniques (1-2 days)

Advanced Software Engineering (1 day)

Design Patterns (1-2 days)

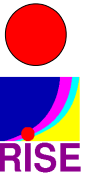
Reengineering

Compiler Construction, Analysis and Optimization

RISE Transfer projects

„visiting PhD students“

Industrial Collaboration



RISE Research projects

Dynamic Application Provisioning (Ellipsus, Sun)

RISE-I Research in Integrational Engineering (SSF)

European projects

EASYCOMP www.easycomp.org

HIDOORS www.hidoors.org High Integrity Object-Oriented Real-Time Systems

Contact Points



Book „*Invasive Software Composition*“ (Springer, Heidelberg), Februari 2002

COMPOST system

PIKE scripting language, fastest in the world

Tuesday, Dec 10, 13.15-17.00



Seminarium „Java, C#, and .NET“

Prof. Judy Bishop, Pretoria

Comparison Java & C#

XML based GUI builders in C#

New book out next year

Visionen Lecture Hall, IDA, House B, near Cafe Java

Cost: 500 SEK

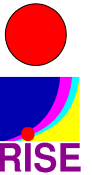
The END



<http://www.ida.liu.se/~rise>

Uwe.Assmann@ida.liu.se

How to Join RISE?



RISE Member

Receive newsletter

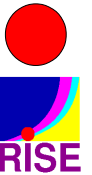
RISE Friend

For a regular contribution, get reduced participation fees for seminars

RISE Partner

Do a project together with us!

Student Opportunities



Advanced Courses

Seminar Semantic Web, Period III

Advanced Software Engineering, Period IV

Design Patterns, Period I

Course Semantic Web, Period I

Master's Thesis

3 d composition language

Invertible composition

Aspect oriented requirements engineering / testing

XML based composition language

Pike composition

Amanuens