8th International
DSM Conference

**Crossing the Chasm:
Industry Adoption of DSM Technology**

Lattix LDM

Managing System Architectures

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Business Problems in Software Systems

- Change requests cannot be serviced effectively because there is lack of visibility of the impact of change on the system architecture
- Increasing need to manage distributed development without a means to communicate or enforce design intent
- Difficult to migrate, merge or integrate acquired product lines without visibility or a framework
- Quality degrades over time as changes are made and complexity increases

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Software System Architecture

It is the definition of its subsystems, their externally visible properties and how the subsystems relate to each other.

"A common language and shared vision"*

*SEI CMMI Tutorial "How is a Model Used?"

Lattix Approach

Create Initial DSM

- Applications
- Databases
- Diagrams (UML, Visio)
- Workflows

⇩

Create Conceptual Architecture

- Shows “should-be”

⇩

Identify Opportunities for Improvement

- Which dependencies to eliminate
- Add structure
- Improve build order

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Establish and Enforce Rules

- External Dependencies
- Layering/Components

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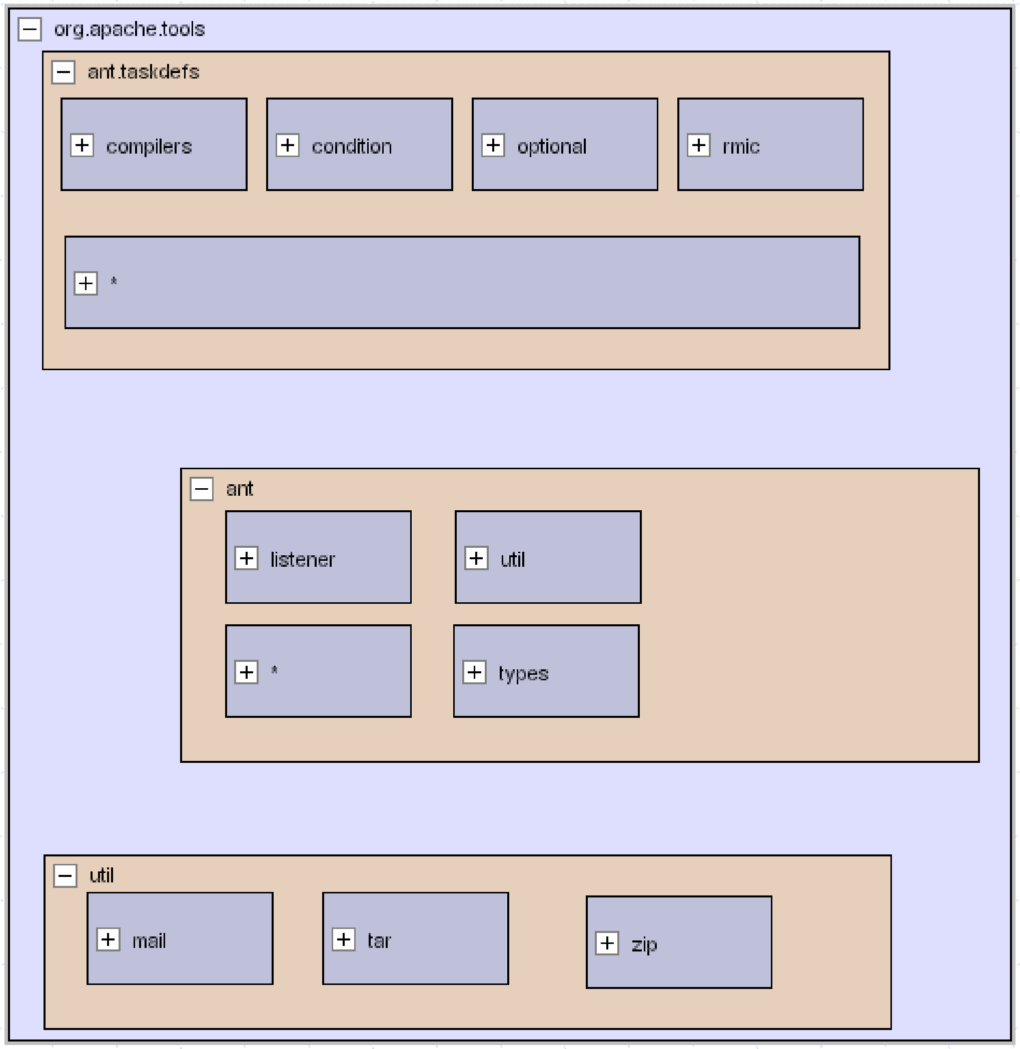
Decomposition of ANT

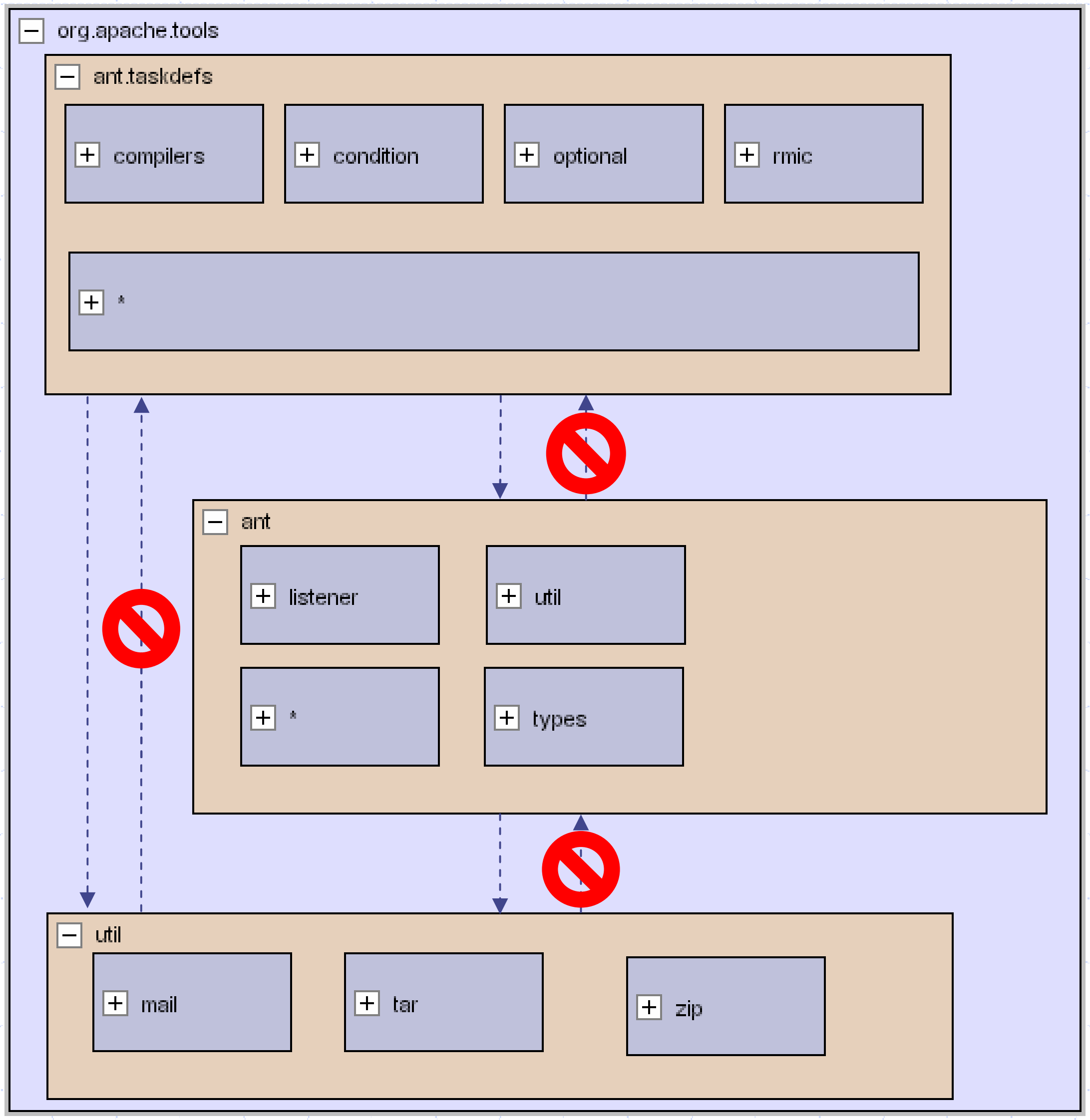


Layered Architecture with three subsystems

Tasks use common infrastructure

Key Goal: Allow independent development of tasks

Design Rules for ANT



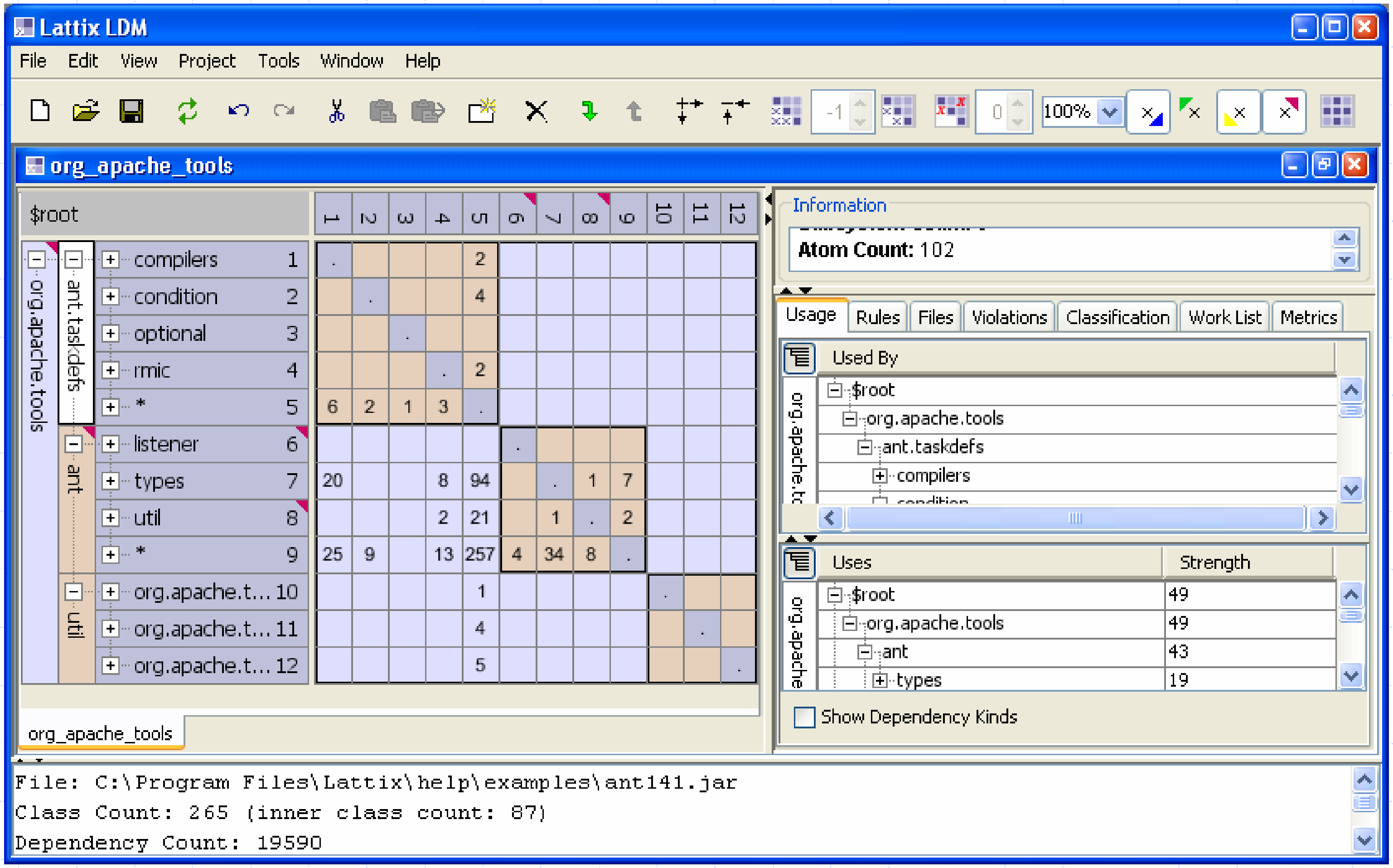
Enforce architectural patterns:

Layering

Private Subsystems

Eliminate change propagators

Lattix LDM Demonstration


Lattix LDM
File Edit View Project Tools Window Help
-1
0
100%
org_apache_tools
Information
Usage Rules Files Violations Classification Work List Metrics
Show Dependency Kinds
org_apache_tools

$root

			1	2	3	4	5	6	7	8	9	10	11	12
org.apache.tools / ant.taskdefs	compilers	1	.				2							
	condition	2		.			4							
	optional	3			.									
	rmic	4				.	2							
	*	5	6	2	1	3	.							
ant	listener	6						.						
	types	7	20			8	94		.	1	7			
	util	8				2	21		1	.	2			
	*	9	25	9		13	257	4	34	8	.			
util	org.apache.t...	10					1					.		
	org.apache.t...	11					4						.	
	org.apache.t...	12					5							.

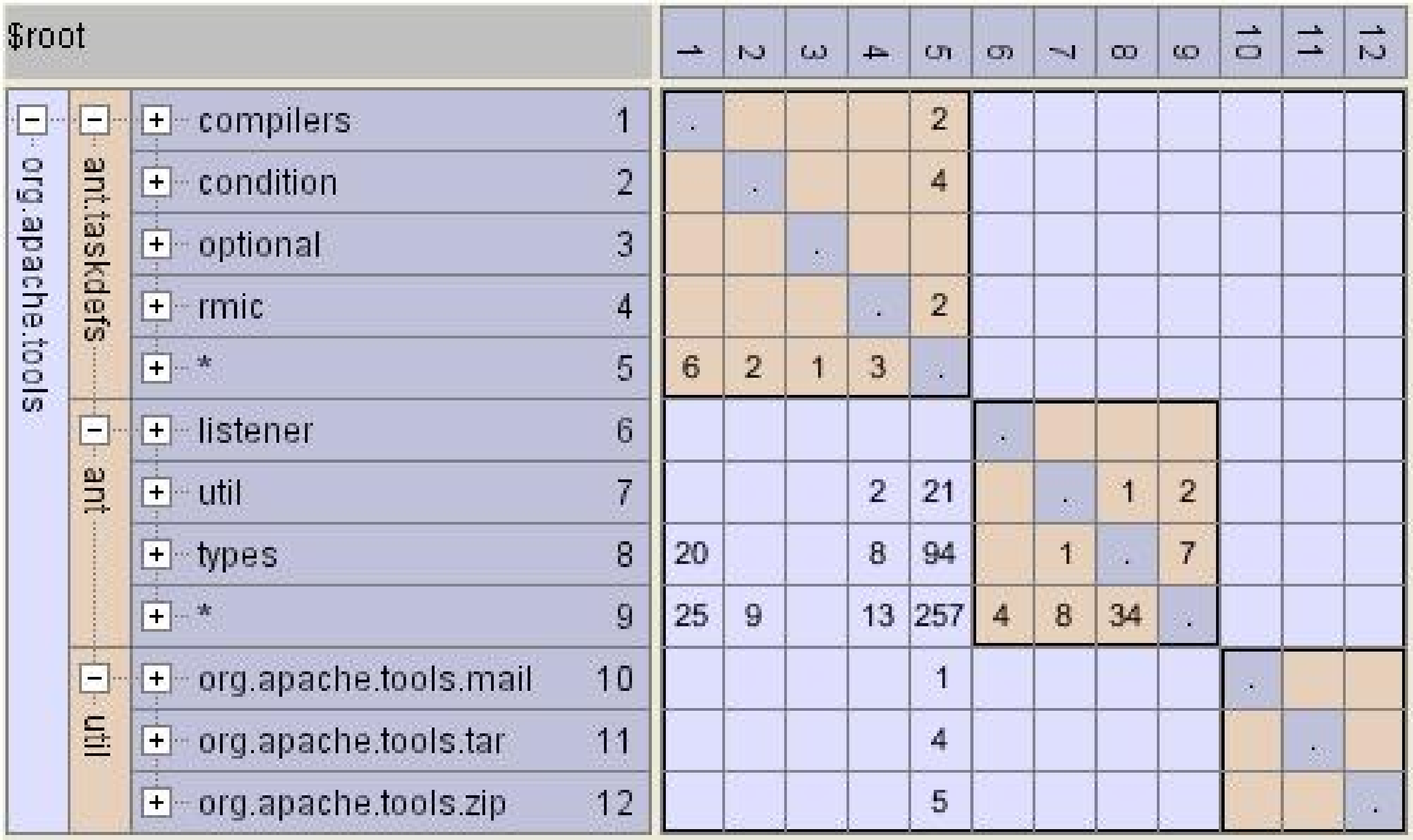
Atom Count: 102

Used By
- $root
  - org.apache.tools
    - ant.taskdefs
      - compilers
      - condition

Uses	Strength
$root	49
org.apache.tools	49
ant	43
types	19

```
File: C:\Program Files\Lattix\help\examples\ant141.jar
Class Count: 265 (inner class count: 87)
Dependency Count: 19590
```

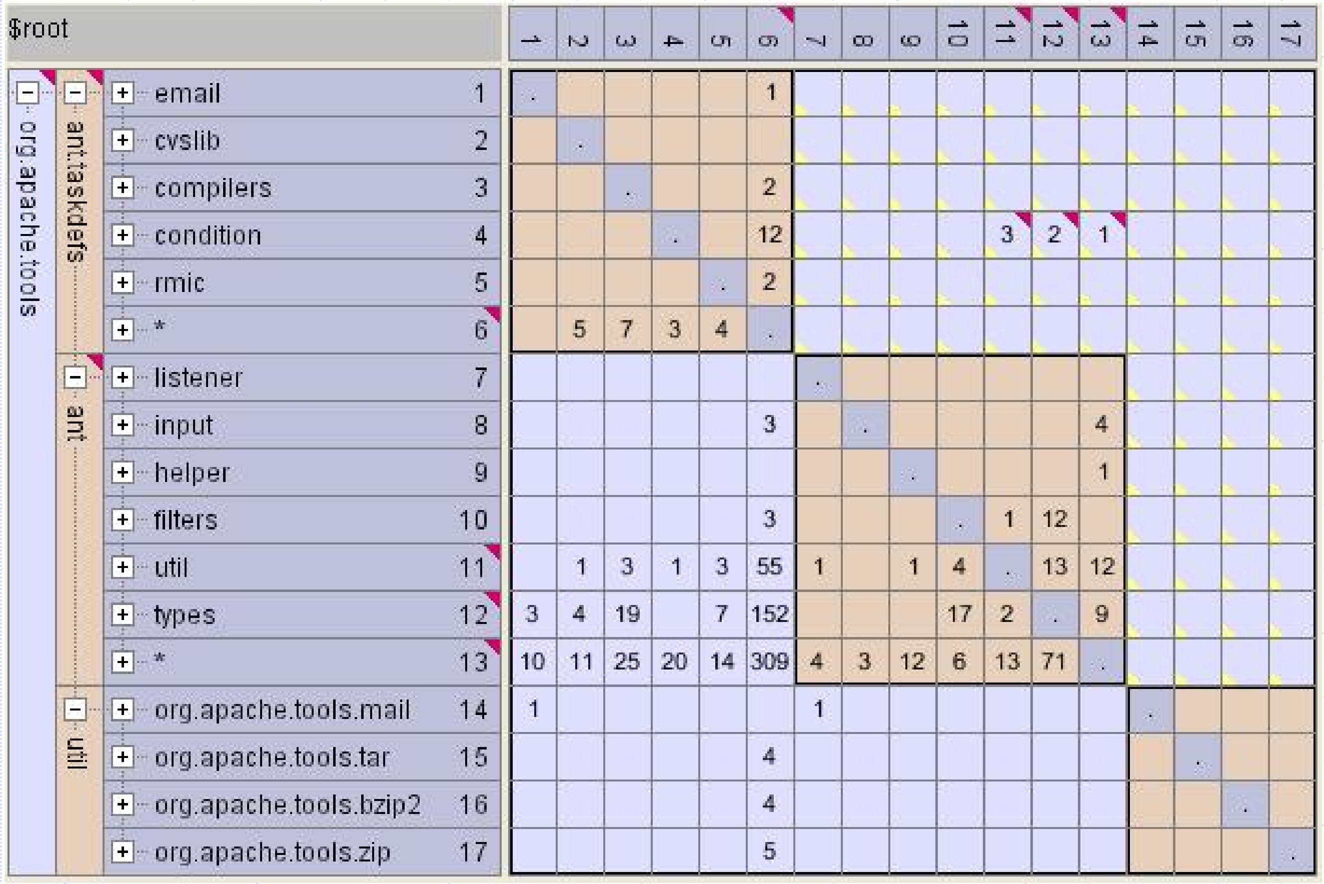
Architecture degrades over its lifecycle



$root				1	2	3	4	5	6	7	8	9	10	11	12
org.apache.tools	ant.taskdefs	compilers	1	.				2							
		condition	2		.			4							
		optional	3			.									
		rmic	4				.	2							
		*	5	6	2	1	3	.							
	ant	listener	6						.						
		util	7				2	21		.	1	2			
		types	8	20			8	94		1	.	7			
		*	9	25	9		13	257	4	8	34	.			
	util	org.apache.tools.mail	10					1					.		
		org.apache.tools.tar	11					4						.	
		org.apache.tools.zip	12					5							.

ANT 1.4.1 – Small & Clean

Architecture degrades over its lifecycle

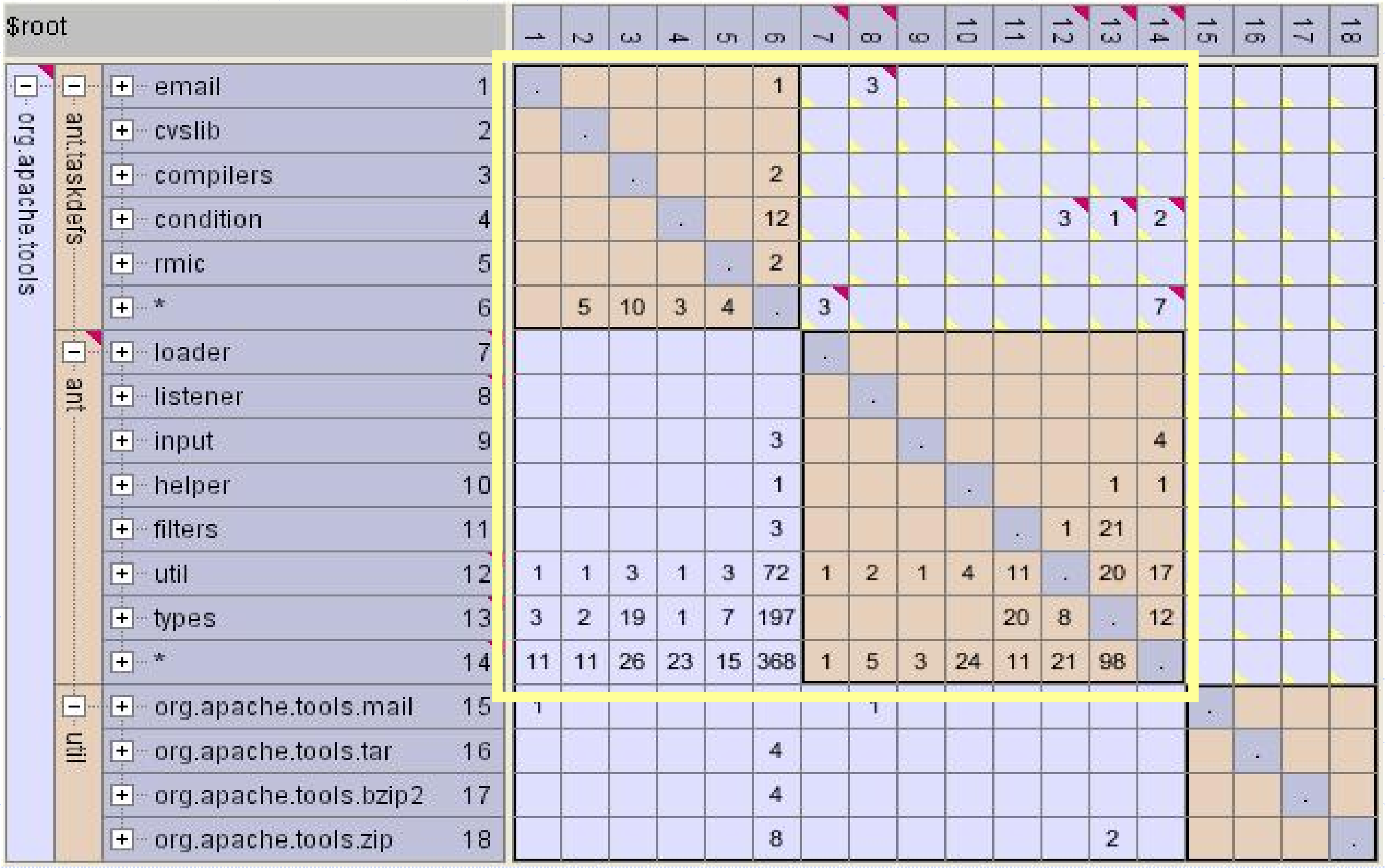


$root

				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
org.apache.tools	ant.taskdefs	email	1	.					1											
		cvslib	2		.															
		compilers	3			.			2											
		condition	4				.		12					3	2	1				
		rmic	5					.	2											
		*	6		5	7	3	4	.											
	ant	listener	7							.										
		input	8						3		.					4				
		helper	9									.				1				
		filters	10						3				.	1	12					
		util	11		1	3	1	3	55	1		1	4	.	13	12				
		types	12	3	4	19		7	152				17	2	.	9				
		*	13	10	11	25	20	14	309	4	3	12	6	13	71	.				
	util	org.apache.tools.mail	14	1						1							.			
		org.apache.tools.tar	15						4									.		
		org.apache.tools.bzip2	16						4										.	
		org.apache.tools.zip	17						5											.

ANT 1.5.1 – Bigger with Violations

Architecture degrades over its lifecycle



$root

org.apache.tools				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	ant.taskdefs	email	1	.					1		3										
		cvslib	2		.																
		compilers	3			.			2												
		condition	4				.		12						3	1	2				
		rmic	5					.	2												
		*	6		5	10	3	4	.	3							7				
	ant	loader	7							.											
		listener	8								.										
		input	9						3			.					4				
		helper	10						1				.			1	1				
		filters	11						3					.	1	21					
		util	12	1	1	3	1	3	72	1	2	1	4	11	.	20	17				
		types	13	3	2	19	1	7	197					20	8	.	12				
		*	14	11	11	26	23	15	368	1	5	3	24	11	21	98	.				
	util	org.apache.tools.mail	15	1							1							.			
		org.apache.tools.tar	16						4										.		
		org.apache.tools.bzip2	17						4											.	
		org.apache.tools.zip	18						8							2					.

ANT 1.6.1 – Becoming Monolithic

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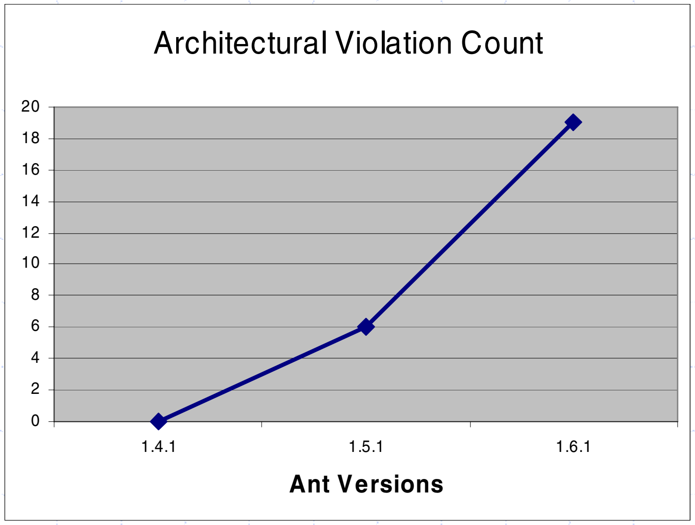
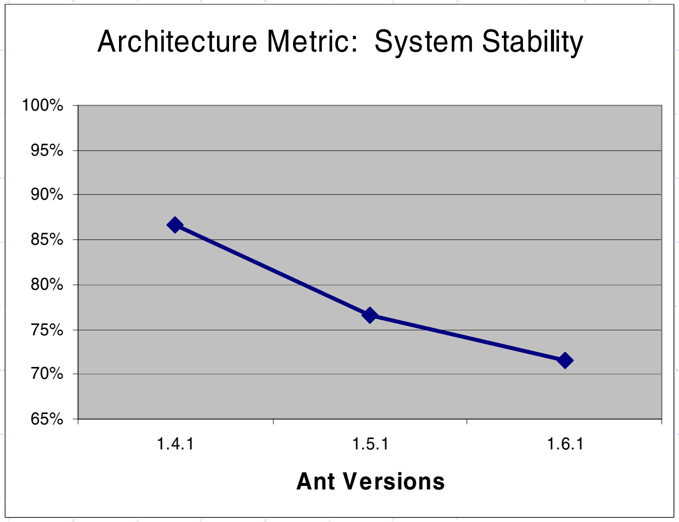
Metrics for Monitoring Change

- Instability, Abstractness and Distance (Robert Martin)
- System Stability - average impact of change (IBM)
- Deviation from Conceptual (Lattix)





What’s New?

- More languages (C/C++ and .NET)
- Other systems (such as databases)
- Integrations with development environments (Eclipse, NetBeans, Visual Studio)
- Other sources of dependencies (such as those in Excel files)
- Enhancements to the Design Rules