DICTO

Architecture Conformance Checking

Andrea Caracciolo
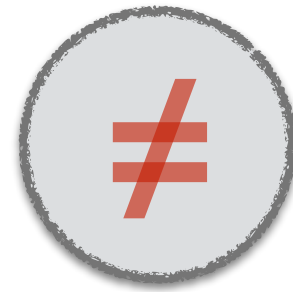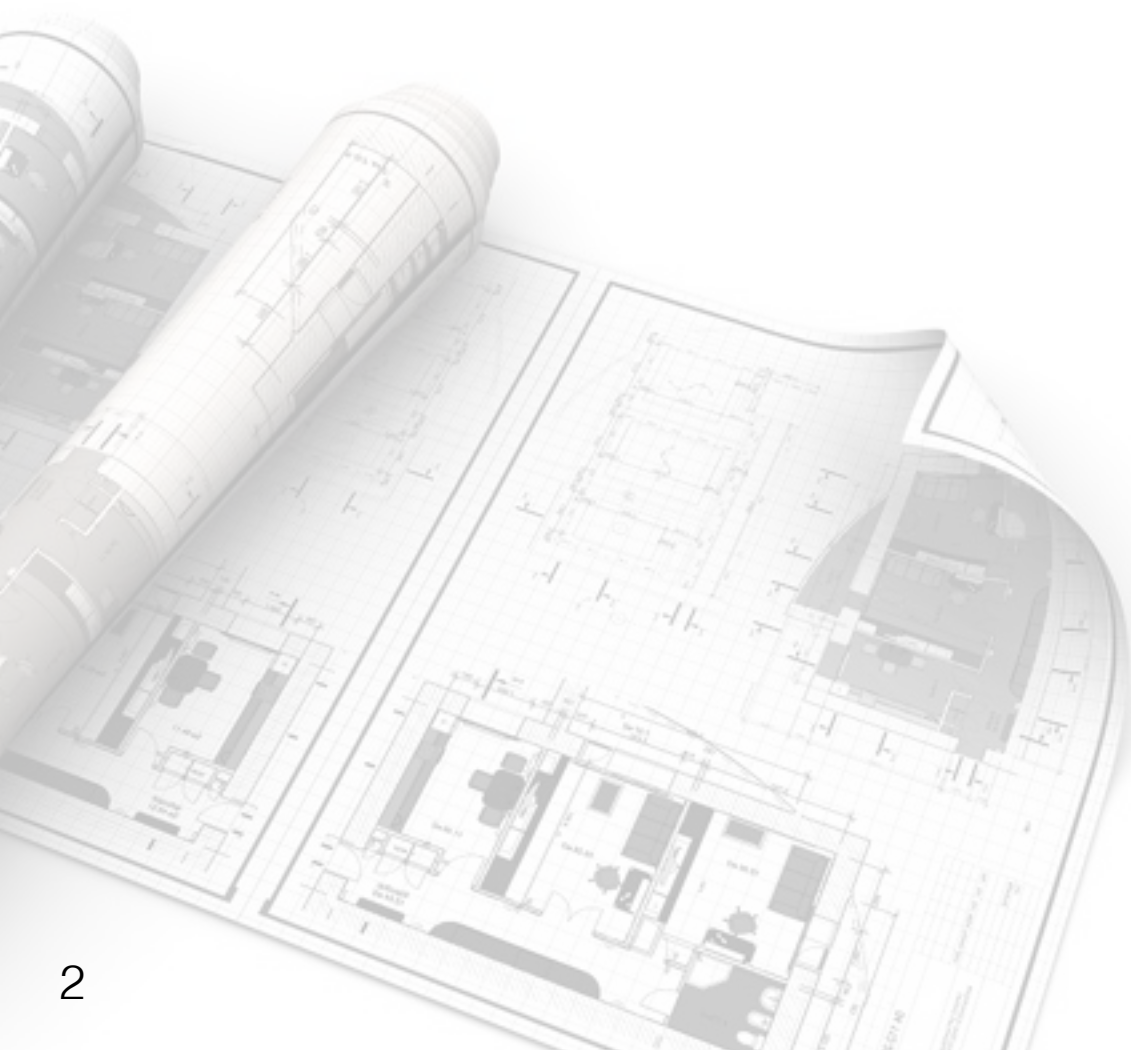
http://scg.unibe.ch/dicto

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**UNIVERSITÄT
BERN**

Design ≠ **Code**

Design ≠ **Code**

3
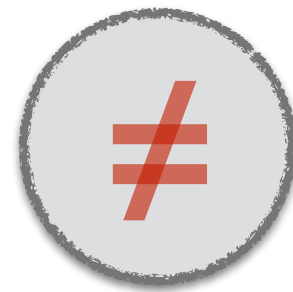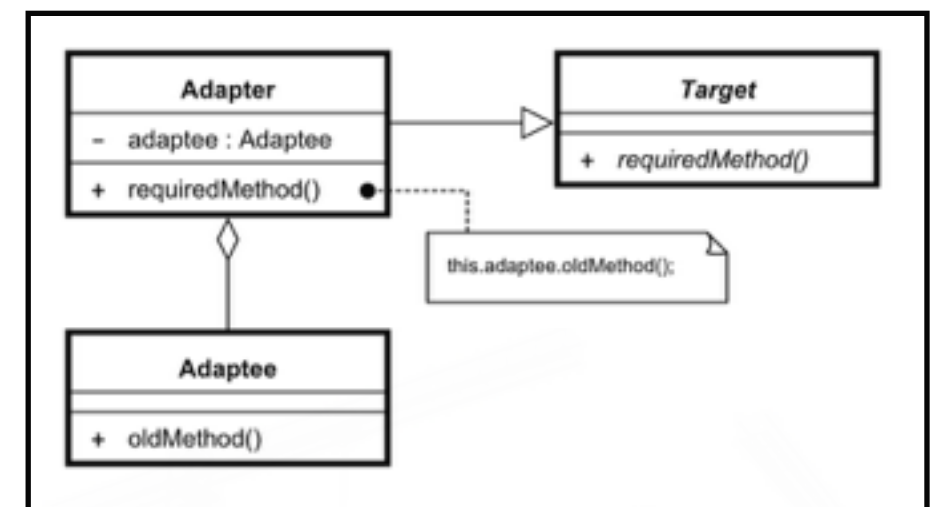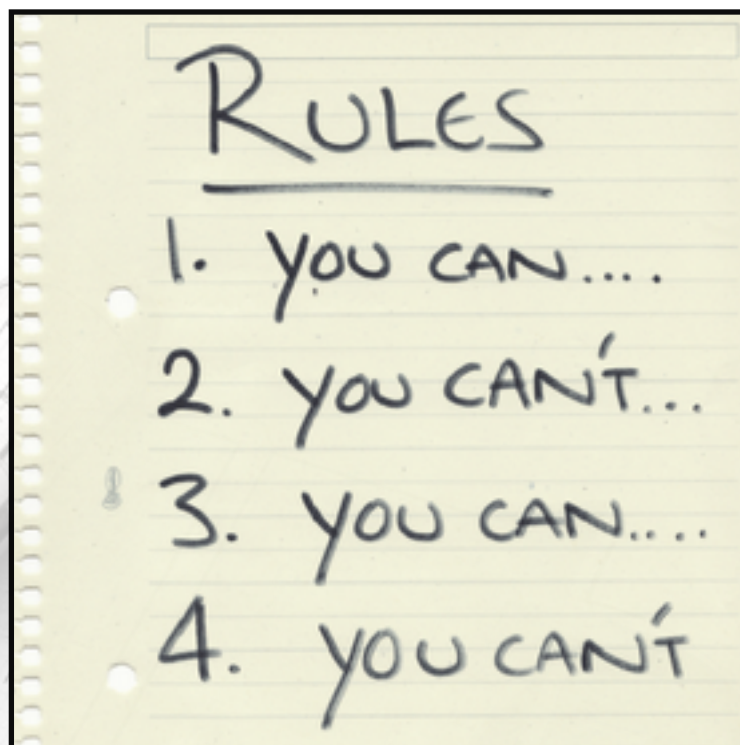
Architect
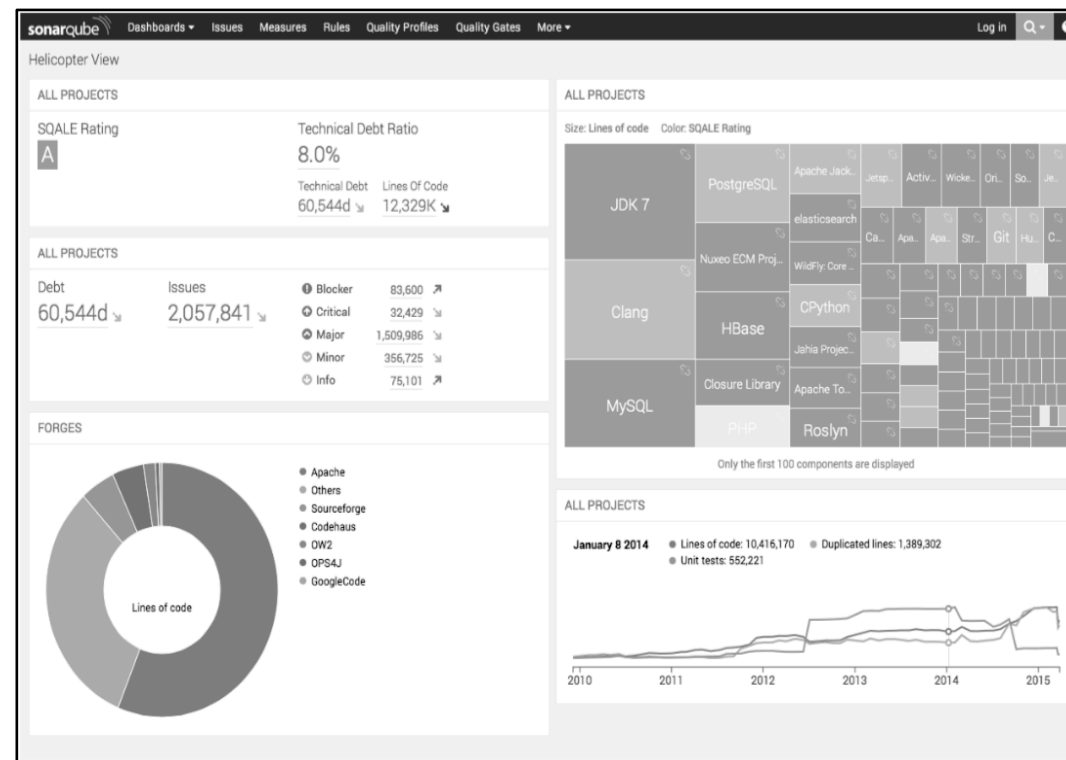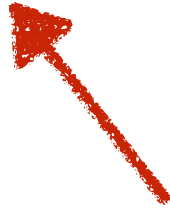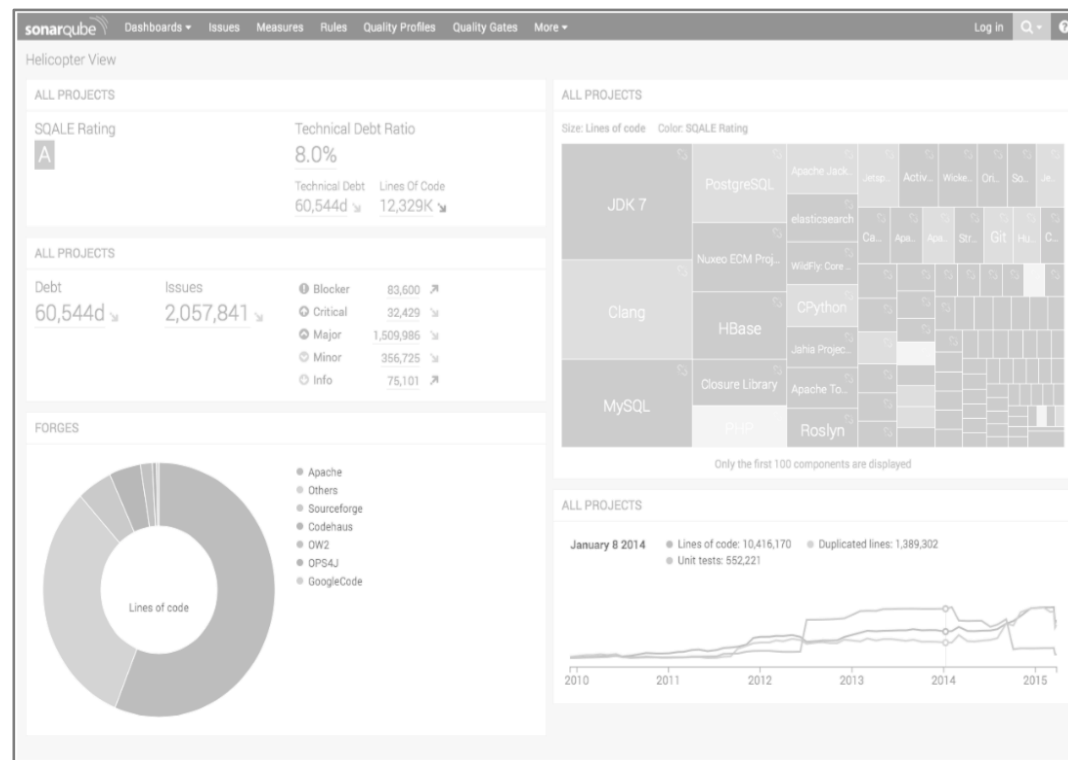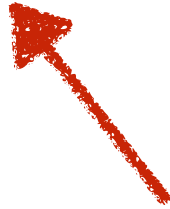
Pre-configured
rule checkers

Custom rules
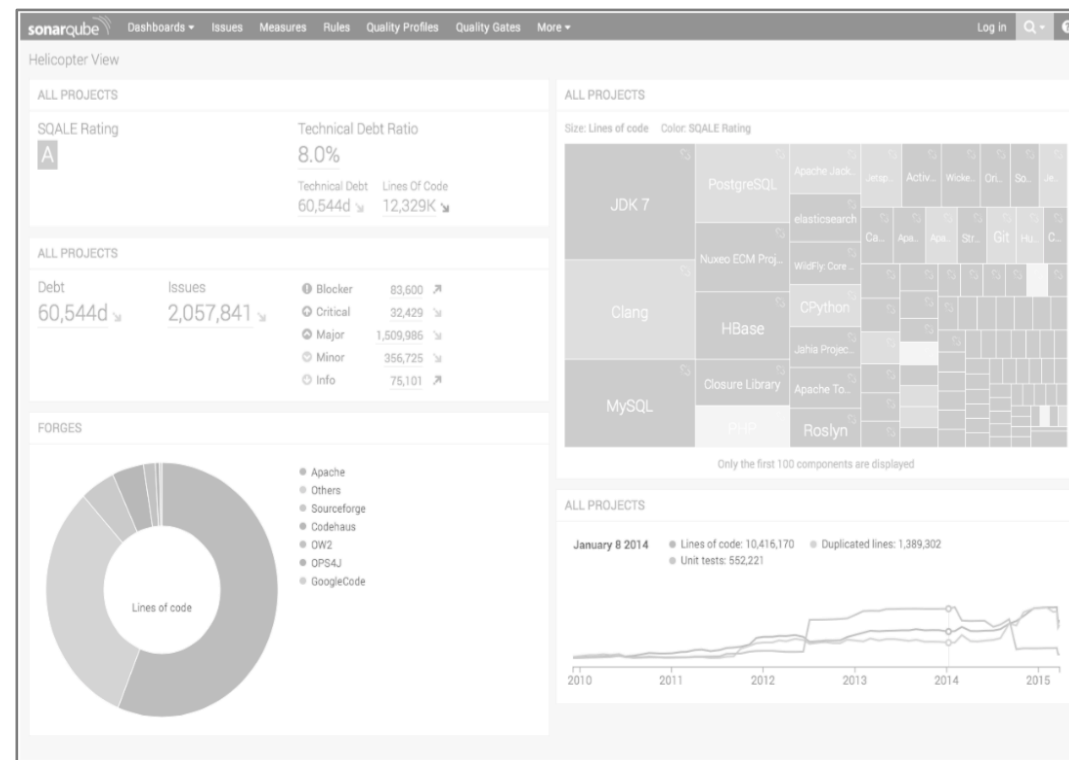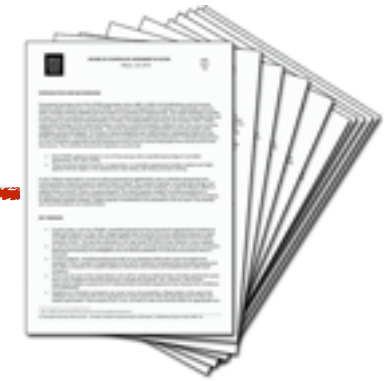
Custom rules

Rule examples
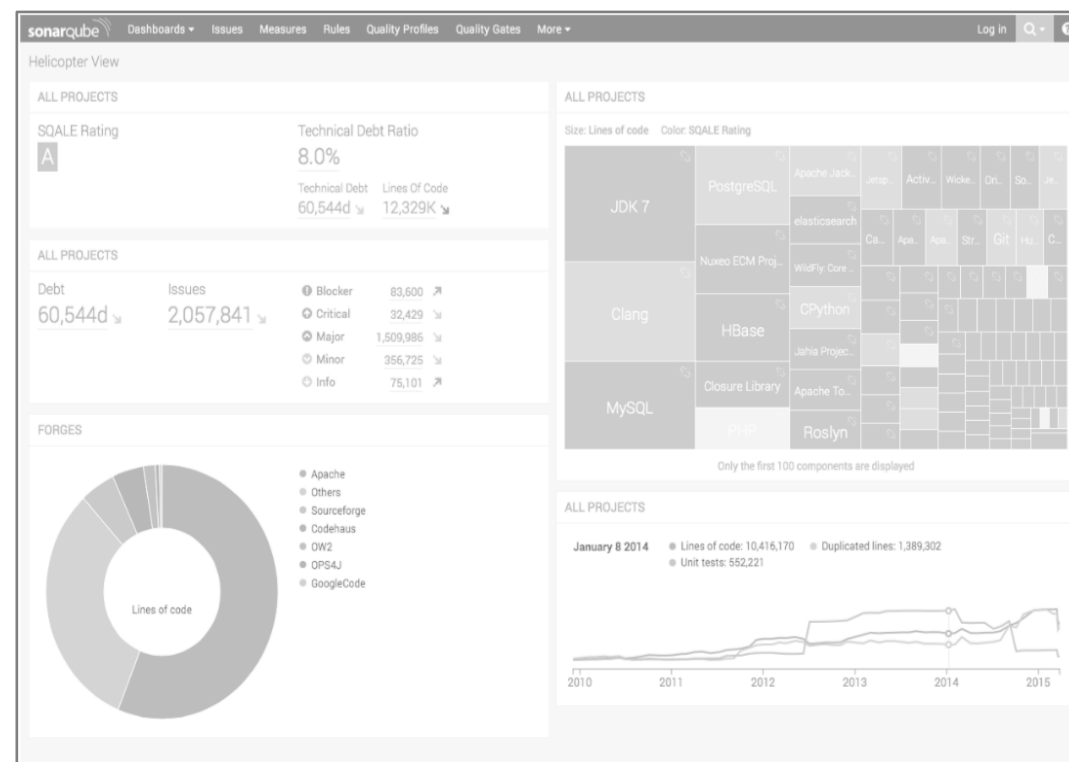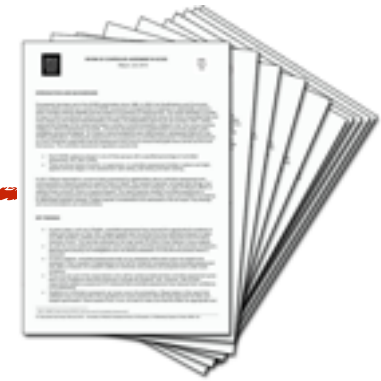
Structure

Controller, Model, Dao must **be layered**

ServiceMethods must **have annotation "@*Transactional"**

PojoMethods can only **be named** "get*", "set*"

DataBean must **have attribute** *"destroy-method"*

XMLServletClass must **have text** "[..].DispatcherServlet"

Flaws

only *TestPackage* can **contain dead methods**

Model cannot **contain contain cycles**

Model cannot **have empty catch block**

Behaviour

ModelClasses cannot **lead to deadlock**

CustAPI must **have latency <** *100* **ms**

CustAPI must **handle load from** *30* **users**

Rule examples

Entity Definition

Tests = Class with **name:**"*test_*"

*PojoMethods = Method with **containingClass:**"*.pojos.*"*

*DeprecatedMethods = Method with **annotation:**"@Deprecated"*

*JunitSetup = Method with **annotation:**"@Before", **name:**"setUp"*

50K LOC

Persistence = Package with name:"**.*persistence.***",

name!:"**.*service.***"

Service = Class with superClass:"*.*IService*"

ImplClasses = Class with name:"*Impl*"

Persistence cannot **depend on** **Service**

only **ImplClasses** can **have annotation** "@XXService"

System cannot **contain cycles**

analysis: **30 sec**

Persistence = Package with name:"**.*persistence.***",

name!:"**.*service.***"

Service = Class with superClass:"*.*IService*"

ImplClasses = Class with name:"**Impl*"

4 **Persistence** cannot **depend on Service**

16 only **ImplClasses** can **have annotation** "@XXService"

19 **System** cannot **contain cycles**

project B

12
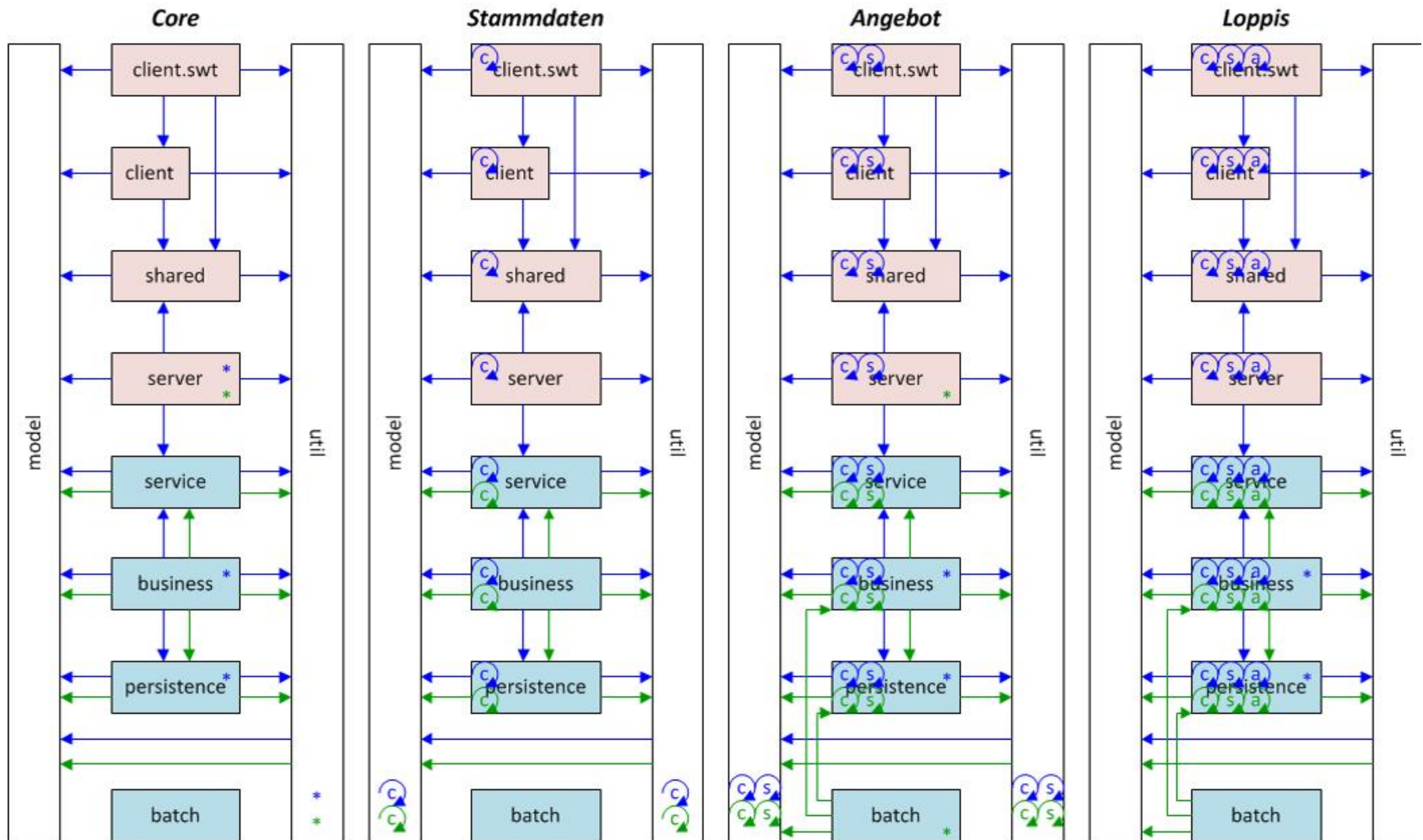
0.5M LOC

ClientScoutPackage can only **depend on** **SharedScoutPackage**

ServerScoutPackage can only **depend on** **SharedScoutPackage, ServicePackage**

ServicePackage can only **depend on** **BusinessPackage**

BusinessPackage can only **depend on** **ServicePackage, PersistencePackage**

FosBatch cannot **depend on** **ForUiImpl**

FosBatch cannot **depend on** **ForPublicImpl**

Persistence cannot **depend on** **Service**

Batch cannot **depend on** **Persistence**

[…]

ModelClasses, DTOClasses must **implement interface** "java.io.Serializable"

ServiceUiMethods, ServicePublicMethods must **throw** **CisiServiceException**

ServiceImplClasses must **have annotation** "@XXXRemoteService"

27 **ClientScoutPackage** can only **depend on SharedScoutPackage**

ServerScoutPackage can only **depend on SharedScoutPackage, ServicePackage**

22 **ServicePackage** can only **depend on BusinessPackage**

BusinessPackage can only **depend on ServicePackage, PersistencePackage**

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[…]

12 **ModelClasses, DTOClasses** must **implement interface "java.io.Serializable"**

7 **ServiceUiMethods, ServicePublicMethods** must **throw CisiServiceException**

8 **ServiceImplClasses** must **have annotation "@XXXRemoteService"**

```
1  WholeIliasCodebase cannot invoke triggerError
2  WholeIliasCodebase cannot invoke exitOrDie
3  WholeIliasCodebase cannot invoke
       SetErrorOrExceptionHandler
4  WholeIliasCodebase cannot invoke eval
5  WholeIliasCodebase cannot depend on SuppressErrors
6  ilExceptionsWithoutTopLevelException can only depend
       on ilExceptions
7  GUIClasses cannot depend on ilDBClass
8  GUIClasses cannot depend on ilDBGlobal
9  only GUIClasses can depend on ilTabsClass
10 only GUIClasses can depend on ilTabsGlobal
11 only GUIClasses can depend on ilTemplateClass
12 only GUIClasses can depend on ilTemplateGlobal
13 IliasTemplateFile cannot contain text "on(blur|
       change|click|dblclick|focus|keydown|keypress|
       keyup|load|mousemove|mouseup|mousedown|
       mouseenter|mouseleave|mouseout|mouseover|
       mousewheel|resize|select|submit|unload|wheel|
       scroll)"
14 IliasTemplateFile cannot contain text "<script*>"
15 WholeIliasCodebase cannot invoke raiseError
16 IliasTemplateFile cannot contain text "javascript*:"
```

Main project

+/-0 ⚡

✏️ **WholeIliasCodebase cannot invoke exitOrDie**

Exit and die are a bad idea in both development and production: In development you have no idea what went wrong and in production the user receives a white page and has no idea whats going on. The implemented exception handling does not work if you use exit or die.

If you want to send a file consider using: Services/FileDelivery.

Exception: Currently if you want to output json you most likely have to use exit() at the moment.

Added Violations	0
Resolved Violations	0
All Violations	235

Search... 🔍

No added violations

+/-0 ⚡

✏️ **WholeIliasCodebase cannot invoke SetErrorOrExceptionHandler**

+/-0 ⚡

✏️ **ilExceptionsWithoutTopLevelException can only depend on ilExceptions**

+/-0 ⚡

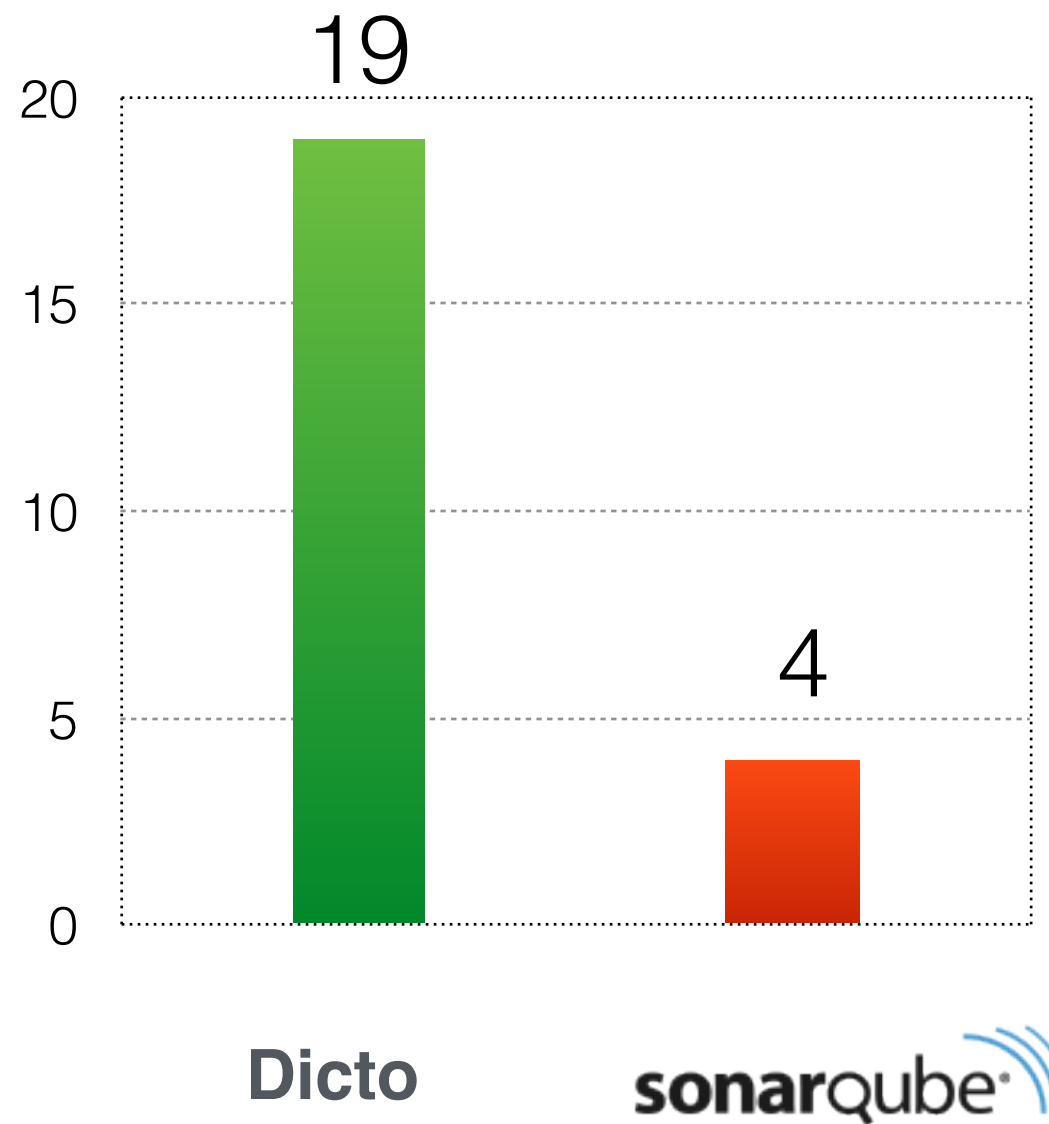✏️ **only GUIClasses can depend on ilTemplateGlobal**

+/-0 ⚡

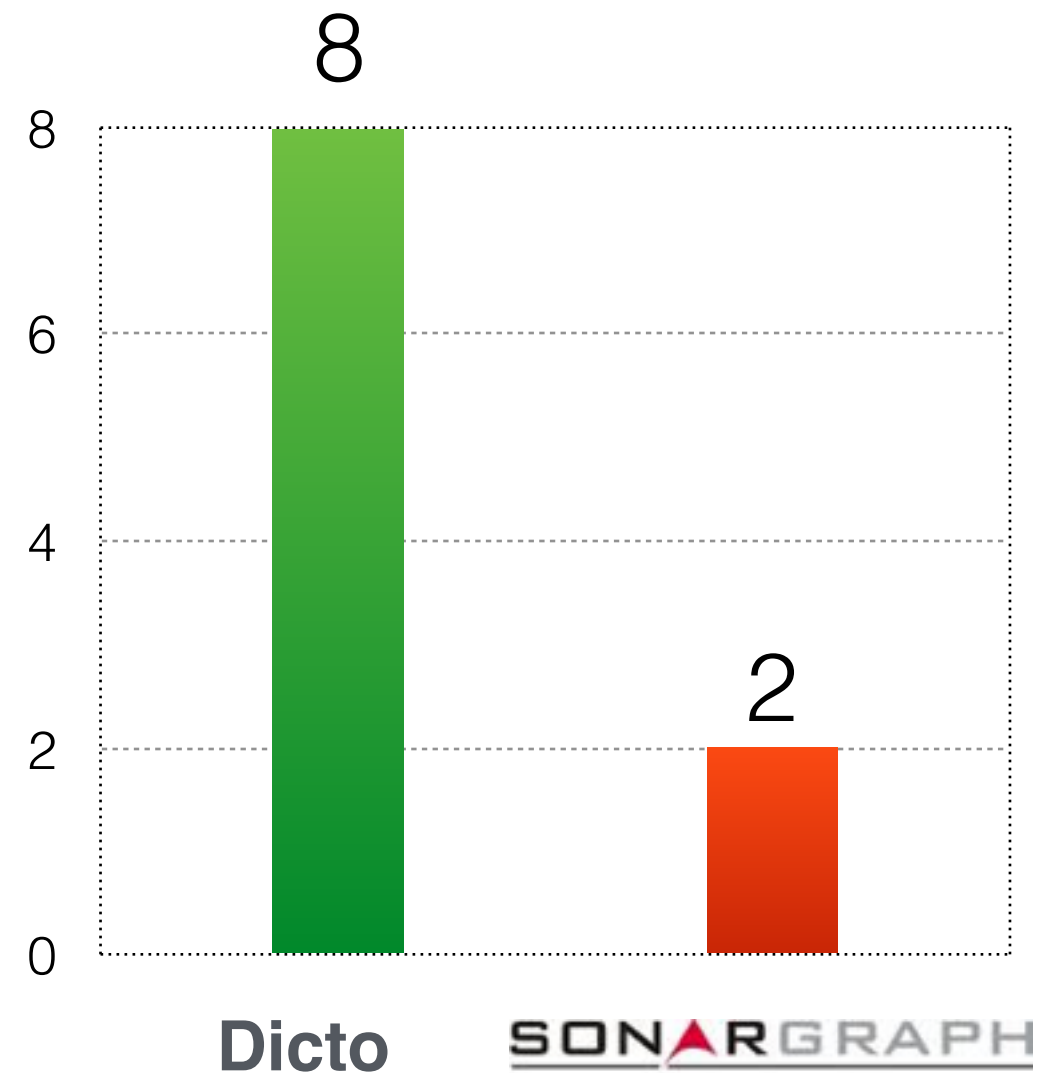✏️ **IliasTemplateFile cannot contain text "javascript*:"**

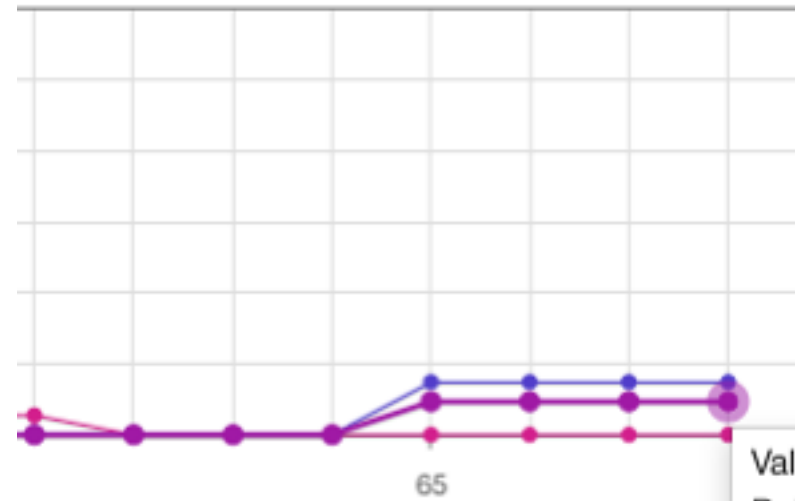# Accuracy

cycles

Dependencies

Integration

Dicto Metricss All None

- ☑ ● Dicto Added Violations
- ☑ ● Dicto Resolved Violations
- ☑ ● Dicto Violation Index

Value: **468**
Build: #68 ✔ Tests failed: 76, passed: 182
Started: 22 Apr 15 16:28
Branch: continuous_integration
Series: Dicto Added Violations

http://ci.ilias.de/

TC | **Projects** |▽ | **Changes** | **Agents** 1 ☐ | **Build Queue** 0 | Guest user |

📁 ILIAS > ☐ ILIASBuildConfig > ✔ #68 (22 Apr 15 16:28) |▽

Overview Changes Tests Build Log Dependencies Artifacts **Dicto**   « ✔ #67 |

⚙ Dicto
Automated Architectural Tests. With emphasis on the Diff. What's this?

- Repository: https://github.com/studer-raimann/ILIAS
- Commit: ec5aff7e96c6ab3efbfca0e5461d7dd0815b833a
- Compared to Commit: 1d8c0bc57f2f7ac02a0df2a5ab82a541dec10e46

742 Total Violations   **468** Added Violations   **0** Resolved Violations

✏ only GUIClasses can depend on ilLanguage   +275 ⚡

✏ WholeIliasCodebase cannot depend on SuppressErrors   +182 ⚡

Integration

Issues   New Search

Project: All   Severity: All   Status: All   Assignee: All   Resolution: Unresolved   + More Criteria   Search

Ordered by Update Date ▾   Found: 8

☐ Simple Dicto project
☐ Simple Dicto project

10	41min	4		0.0%
Lines of code	Debt	Issues		Duplicated lines (%)

🔴 Major ○ Open   14 minutes

only Application can depend on Util

Simple Dicto project
Simple Dicto project

»

🔴 only Application can depend on Util

○ Open

Rule   Changelog

only Application can depend on Util

Rule evaluated on: 2015-02-24 10:05:01 CET
Failing constraints:

```
• only Application can depend on Util
```

🔴 Major ○ Open   13 minutes

Test cannot depend on Application

Simple Dicto project
Simple Dicto project

- *cause* : org.jhotdraw.util.collections.jdk11 dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.test.util dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.contrib.html dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.test.util.collections.jdk11 dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.contrib.dnd dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.test.samples.javadraw dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.samples.javadraw dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.applet dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.test.contrib dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.figures dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.samples.pert dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.framework dependOn org.jhotdraw.util = True
- *cause* : org.jhotdraw.application dependOn org.jhotdraw.util = True

---

🔴 Major ○ Open   13 minutes

Application can only depend on Test

Simple Dicto project
Simple Dicto project

🟢 Minor ○ Open   17 minutes

Move this trailing comment on the previous empty line.

Simple Dicto project
src/Helloworld.java

🔴 Critical ○ Open   17 minutes

Remove this exit() call or ensure it is really required.

Summary

Persistence cannot **depend on** Service

Service must **have annotation** "@Service"

System cannot **contain cycles**

- **Enforce guidelines**

- **Check NFRs**

- **Readable & executable specification**

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