# Continous architecture analysis

with SonarQube in 3D

# Software visualization

○ Visualization of information about software systems

○ Visualization of classes and components

○ Simplified risk analysis for all stakeholders
- reduce risks and costs
- increase productivity and quality

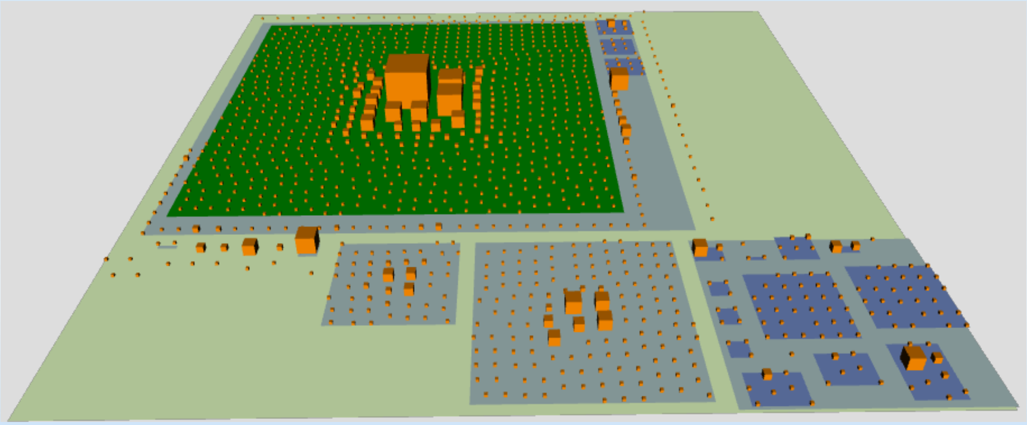
○ Promotes communication about the quality of software between different levels

Why is software visualization so rarely used?

# Master Thesis – 2012

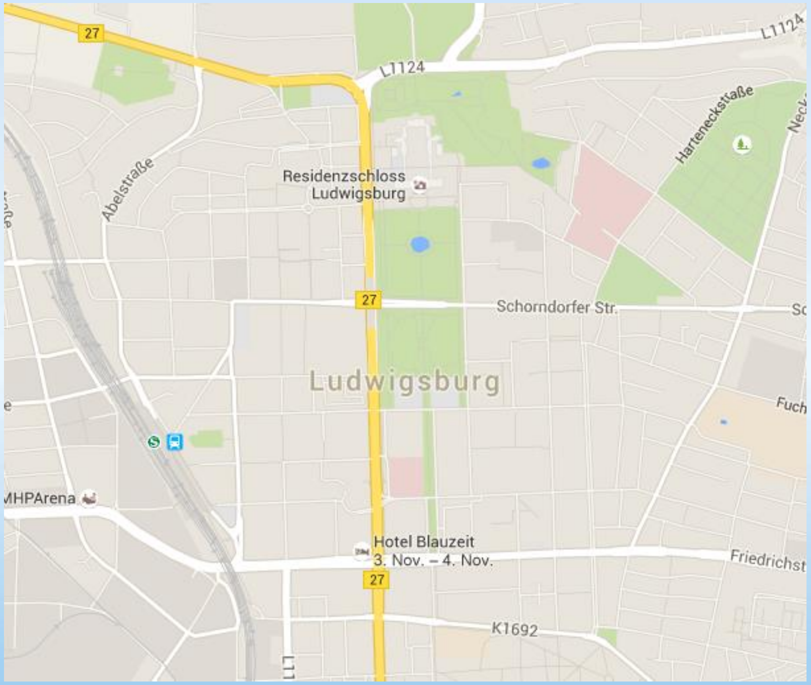
City metapher

- ○ Structure ⇨ Districts
- ○ Metrics ⇨ Building footprint and height

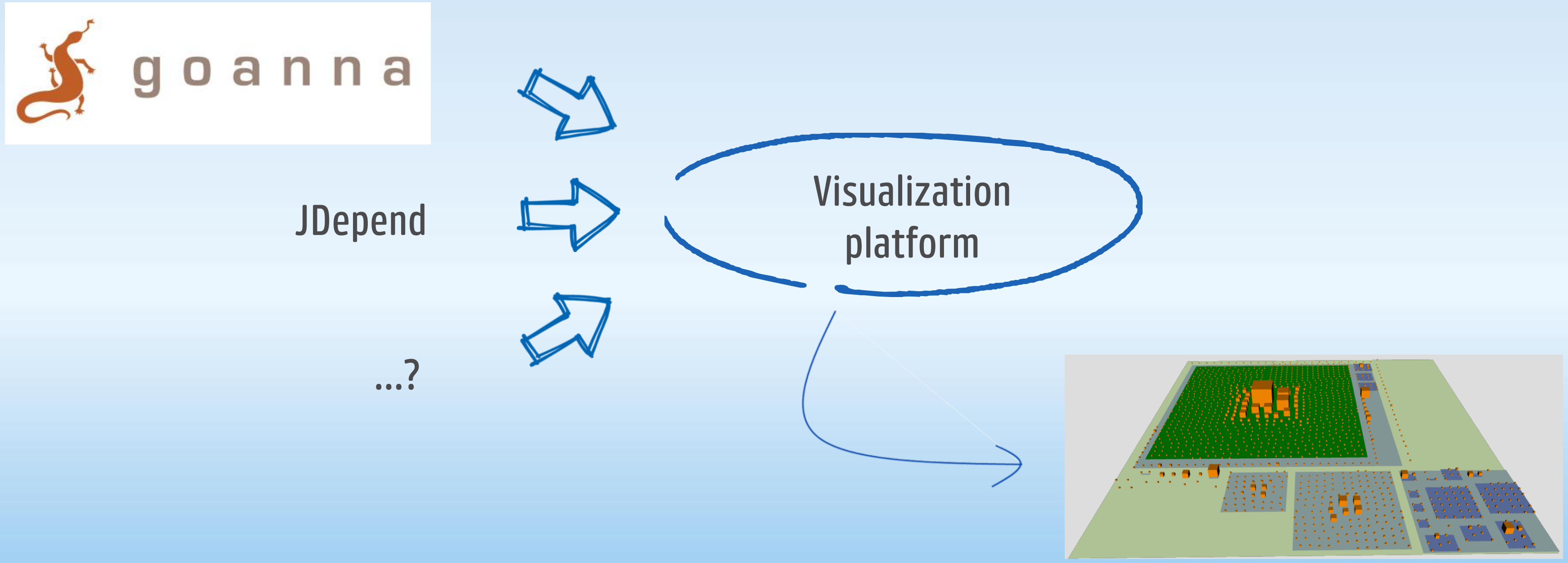


# Challenge 1: Context

Schwerin
Alexandrinenstraße
Wismarsche Str.
Lübecker Str.
Obotritenring
Wittenburger Str.
Sandstraße
Wallstraße
Goethestraße
Schloss Sc
Alter Friedhof
Ostorf



# Challenge 2: Data



goanna

JDepend

...?

Visualization platform

# The software visualization obstacle

## How much effort is needed?

○ Platform setup ◔
- Desktop application
- Server application

○ Import your project ◑
- is my language supported?
- security constraints?

○ Analyse your project ◕
- which metrics are available
- integration of specific metrics

○ Report ●
- Who can see the result / visualization

# Continous inspection!

- Structure of the software

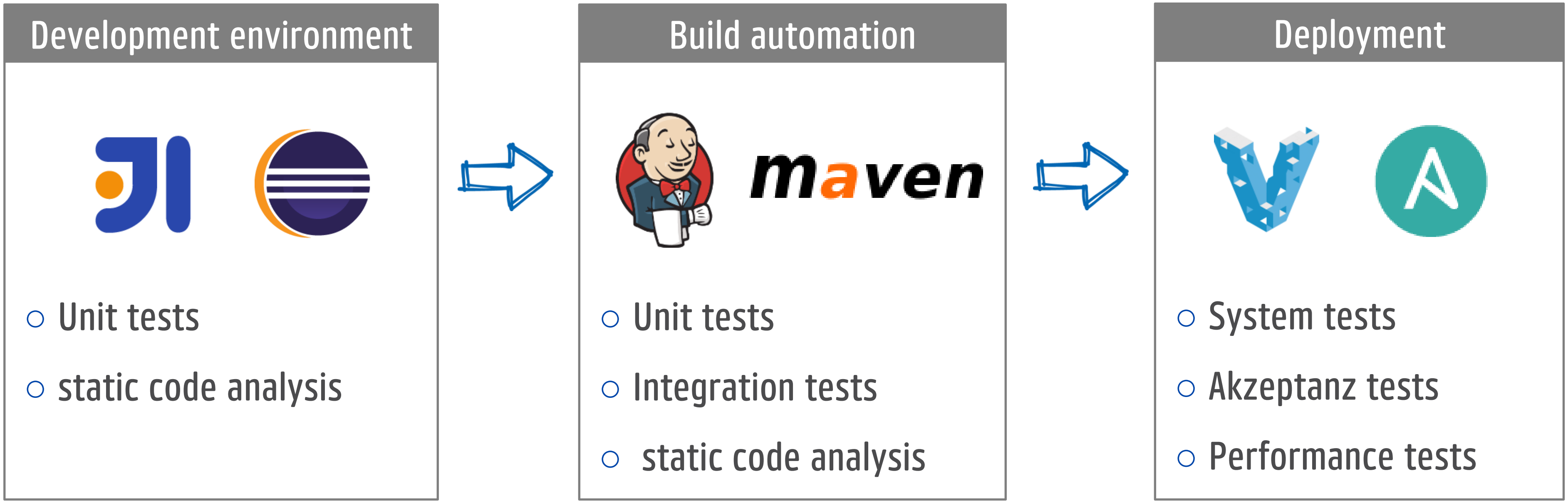
- Static code analysis
  - Lines of code, complexity
  - Checkstyle, PMD, Findbugs

- Test results (unit and integration tests)

- Management of standards and rules

- Analyse the results on a daily basis over a long period

# Software development cycle at Payback



Development environment

- ○ Unit tests
- ○ static code analysis

Build automation

- ○ Unit tests
- ○ Integration tests
- ○ static code analysis

Deployment

- ○ System tests
- ○ Akzeptanz tests
- ○ Performance tests

## Jenkins

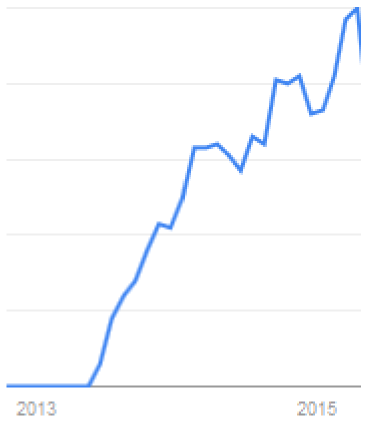
- 👍 Test results
- 👍 Errors and warnings of the static code analysis
- 👎 Code quality and other metrics
- 👎 Risk analysis

## Languages

- ○ Java
- ○ Web
- ○ .NET
- ○ and many more...

## Static code analysis

- ○ Checkstyle
- ○ PMD, Findbugs
- ○ Management and export



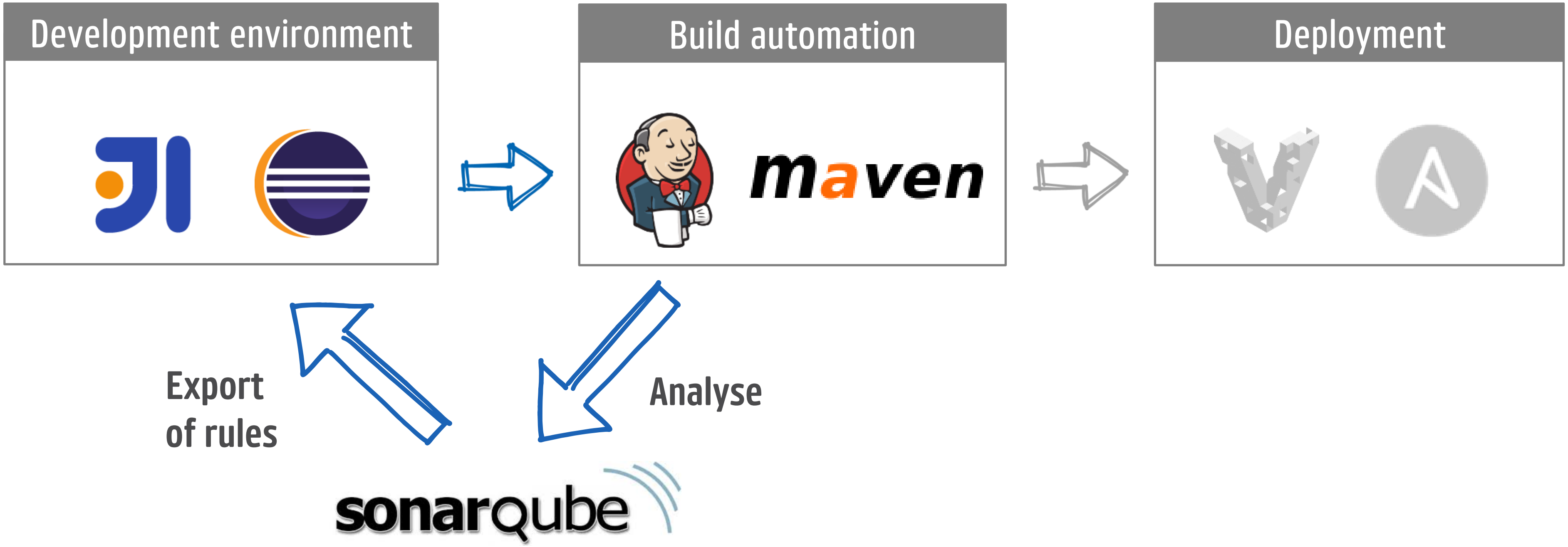
## For everyone !

- ○ Developer
- ○ Team lead
- ○ Project lead

## Risk analysis

- ○ Analyse results
- ○ Comparable with previous results
- ○ Tables, diagrams, ...

# Software development cycle at Payback



Development environment

Build automation

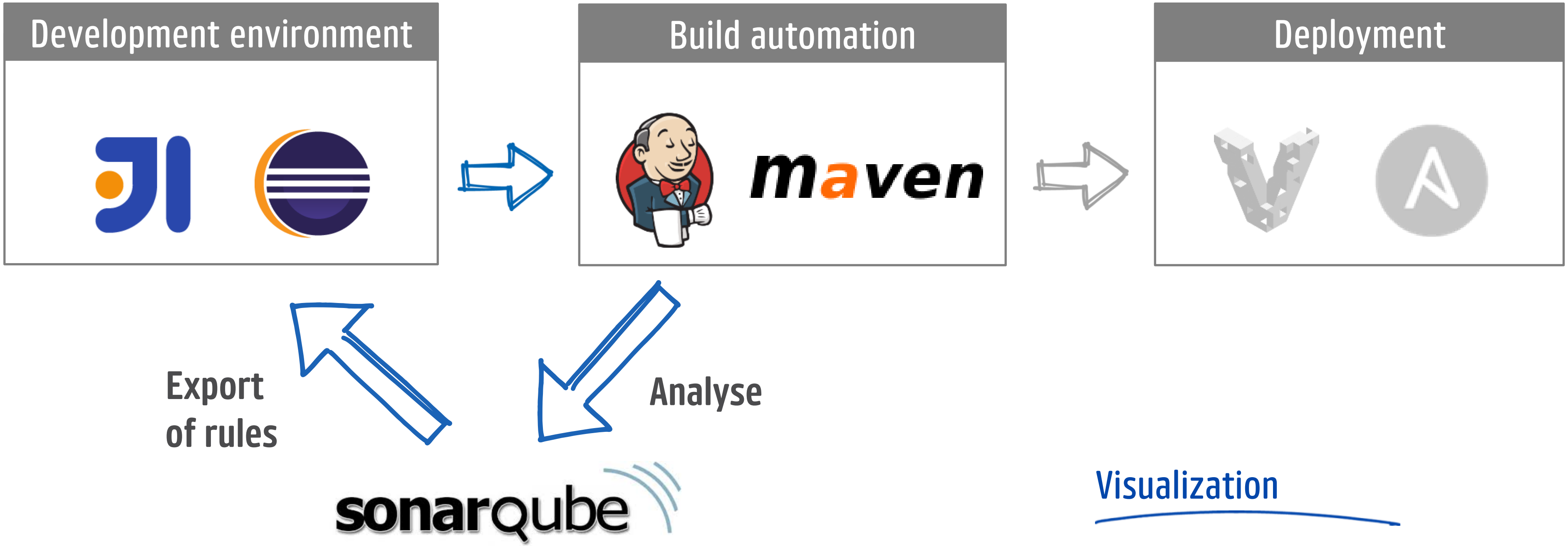
Deployment

Export of rules

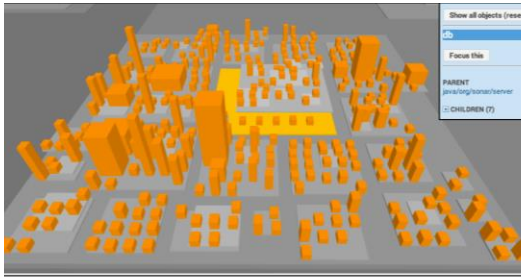
Analyse

- ○ Define rules to check
- ○ Store result over a long period
- ○ Show and analyse results

# Software development cycle at Payback



- ○ Define rules to check
- ○ Store result over a long period
- ○ Show and analyse results



# SoftVis3D Sonar plugin - technology

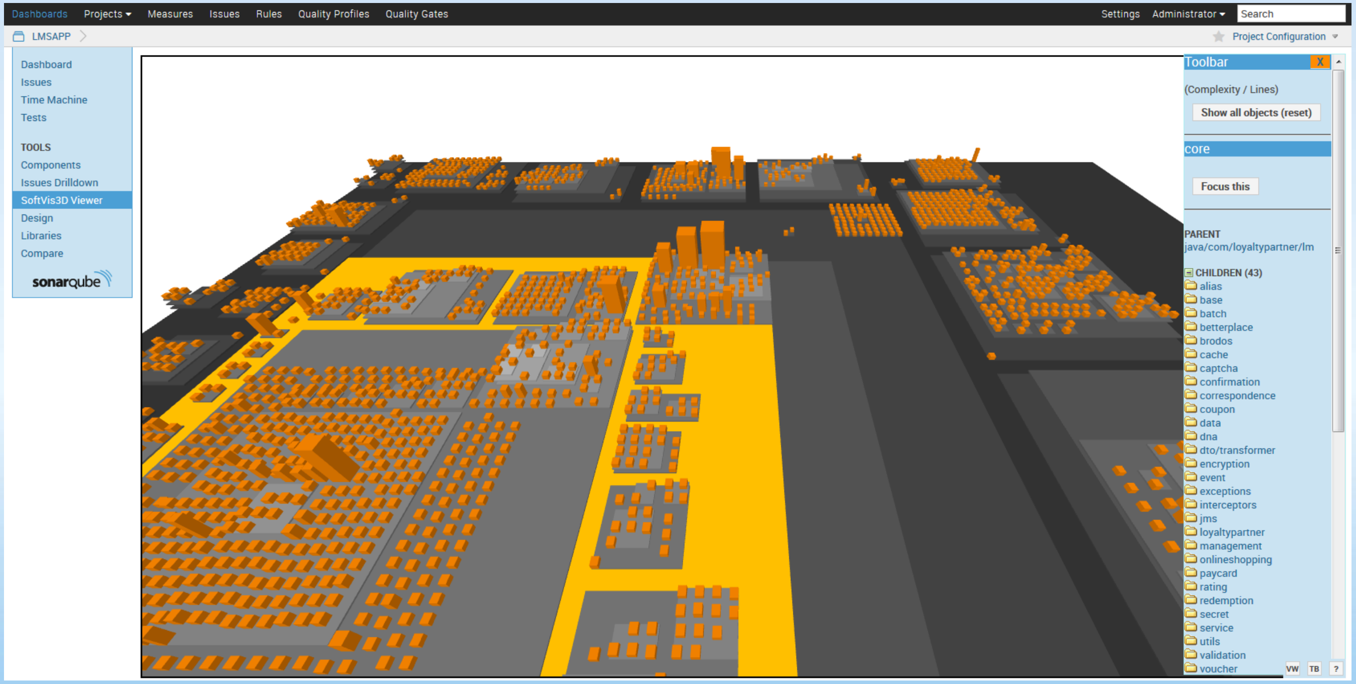
- Webpage plugin for SonarQube
  - Java backend connected via webservice

- AngularJS for the frontend (menu / navigation / interaction)

- GraphViz for the layout

- threeJS as 3D framework

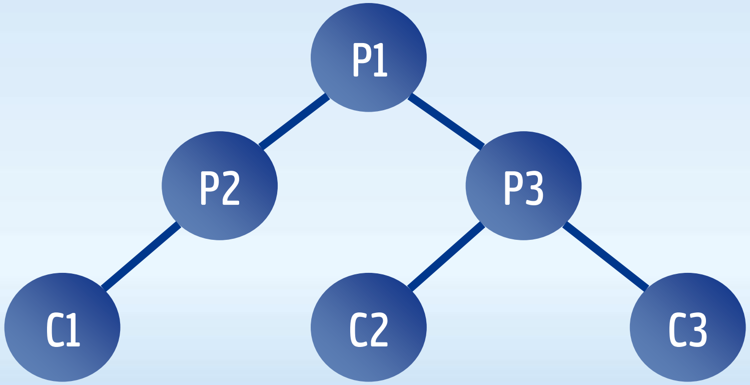
# DEMO SoftVis3D



# Software architecture = structure ?

Package "1"

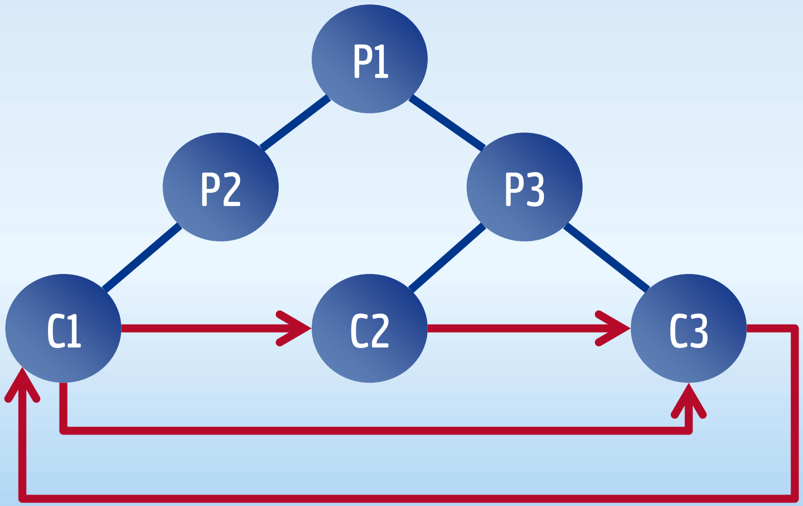
- ○ Package "2"
  - C1class.java
- ○ Package "3"
  - C2class.java
  - C3class.java



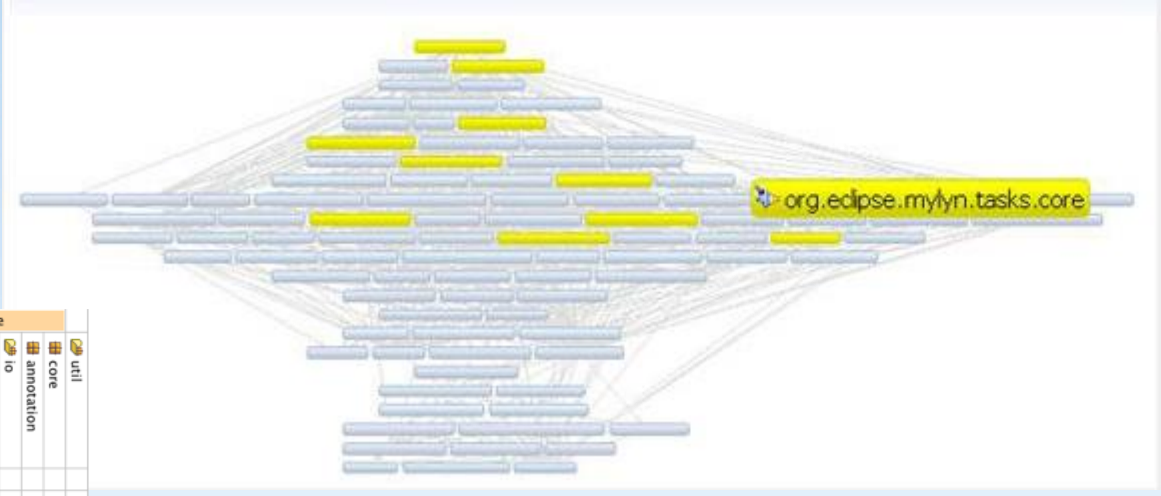
# Software architecture = structure + dependencies !

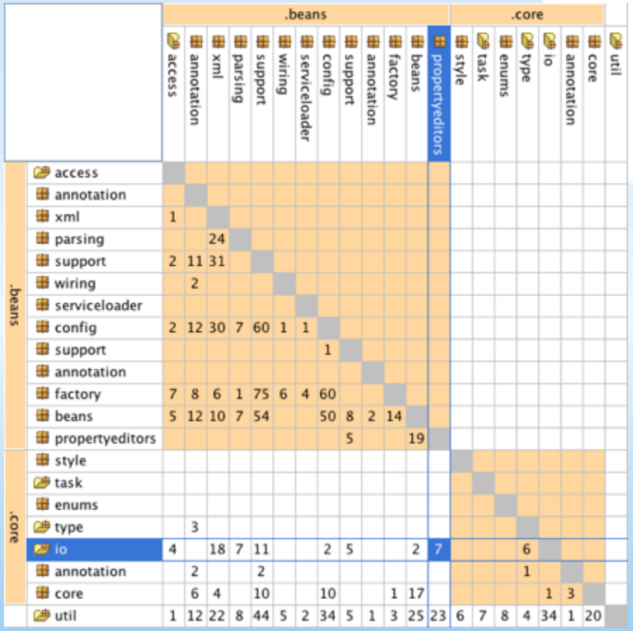
Package "1"

- ○ Package "2"
  - C1class.java
- ○ Package "3"
  - C2class.java
  - C3class.java



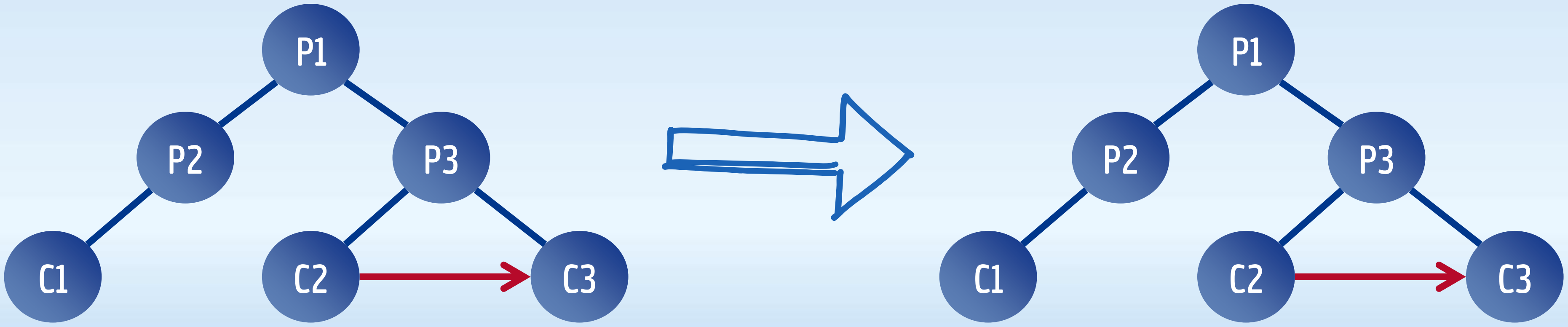
# Overflow !



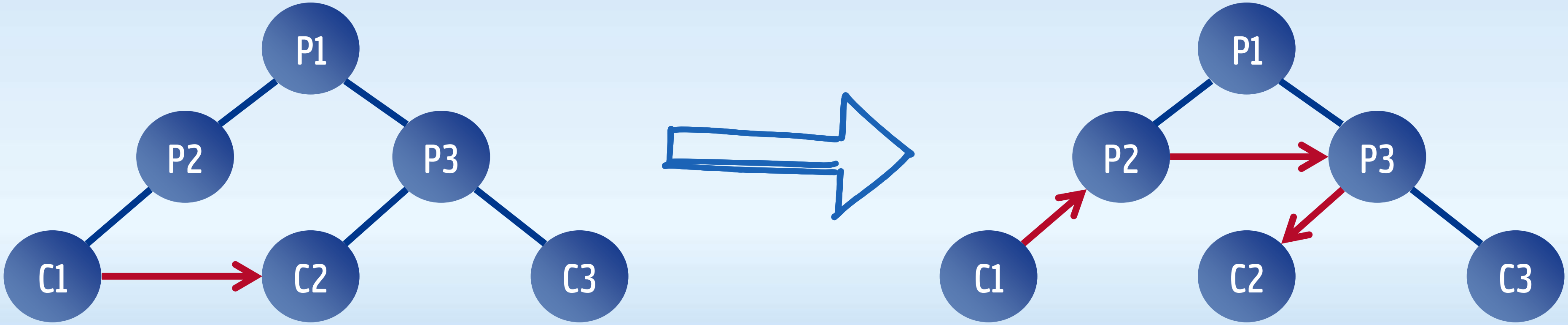


| | | .beans | | | | | | | | | | | | | .core | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | access | annotation | xml | parsing | support | wiring | serviceloader | config | support | annotation | factory | beans | propertyeditors | style | task | enums | type | io | annotation | core | util |
| .beans | access | | | | | | | | | | | | | | | | | | | | | |
| | annotation | | | | | | | | | | | | | | | | | | | | | |
| | xml | 1 | | | | | | | | | | | | | | | | | | | | |
| | parsing | | | 24 | | | | | | | | | | | | | | | | | | |
| | support | 2 | 11 | 31 | | | | | | | | | | | | | | | | | | |
| | wiring | | 2 | | | | | | | | | | | | | | | | | | | |
| | serviceloader | | | | | | | | | | | | | | | | | | | | | |
| | config | 2 | 12 | 30 | 7 | 60 | 1 | 1 | | | | | | | | | | | | | | |
| | support | | | | | | | | 1 | | | | | | | | | | | | | |
| | annotation | | | | | | | | | | | | | | | | | | | | | |
| | factory | 7 | 8 | 6 | 1 | 75 | 6 | 4 | 60 | | | | | | | | | | | | | |
| | beans | 5 | 12 | 10 | 7 | 54 | | | 50 | 8 | 2 | 14 | | | | | | | | | | |
| | propertyeditors | | | | | | | | | 5 | | | 19 | | | | | | | | | |
| .core | style | | | | | | | | | | | | | | | | | | | | | |
| | task | | | | | | | | | | | | | | | | | | | | | |
| | enums | | | | | | | | | | | | | | | | | | | | | |
| | type | | 3 | | | | | | | | | | | | | | | | | | | |
| | io | 4 | | 18 | 7 | 11 | | | 2 | 5 | | | 2 | 7 | | | | 6 | | | | |
| | annotation | | 2 | | | 2 | | | | | | | | | | | | 1 | | | | |
| | core | | 6 | 4 | | 10 | | | 10 | | | 1 | 17 | | | | | | 1 | 3 | | |
| | util | 1 | 12 | 22 | 8 | 44 | 5 | 2 | 34 | 5 | 1 | 3 | 25 | 23 | 6 | 7 | 8 | 4 | 34 | 1 | 20 | |

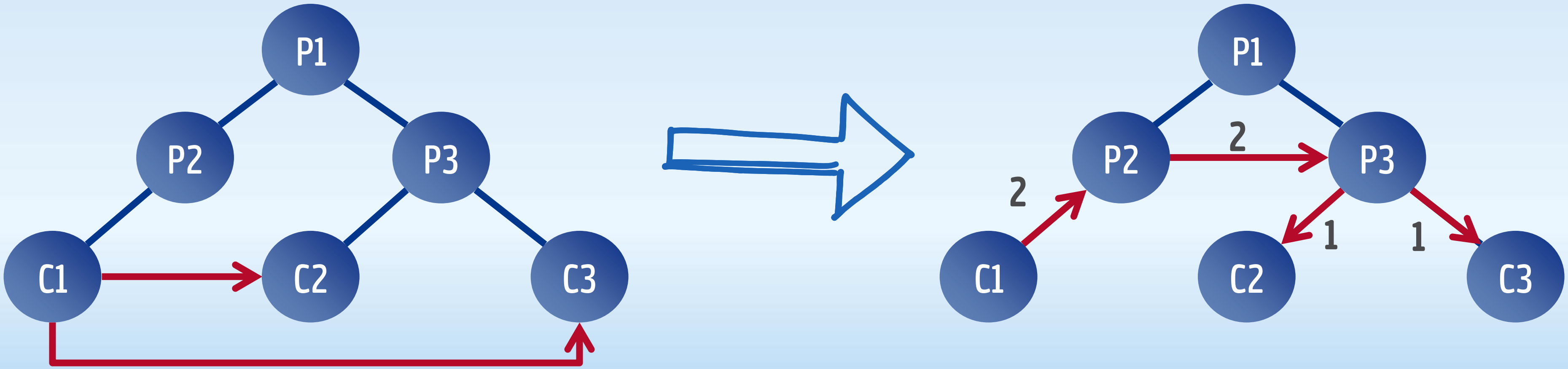
# Transformation of dependencies I



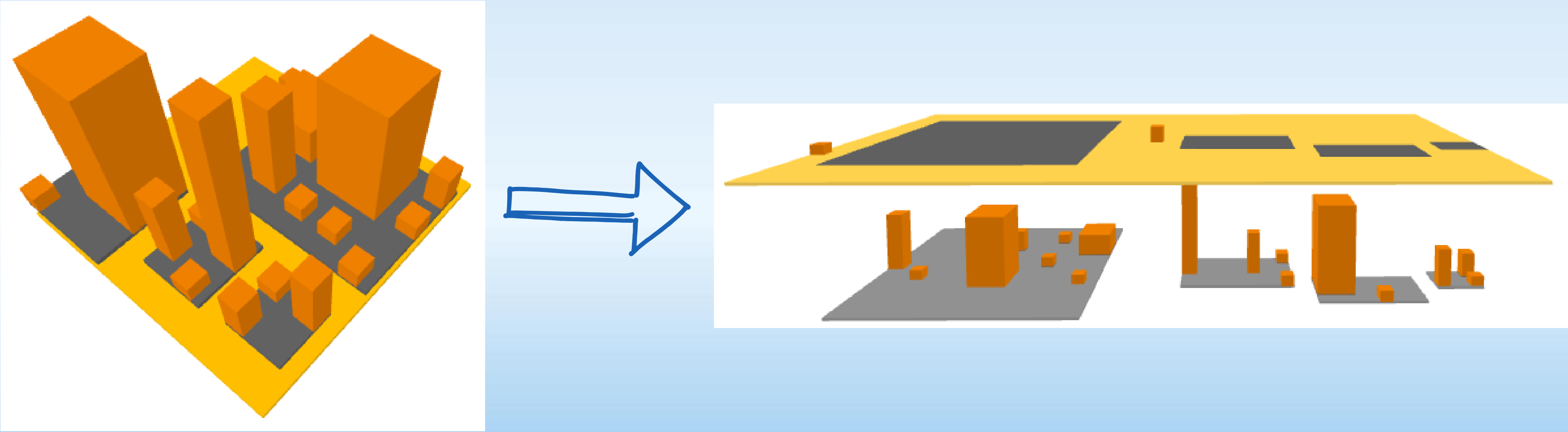
# Transformation of dependencies II



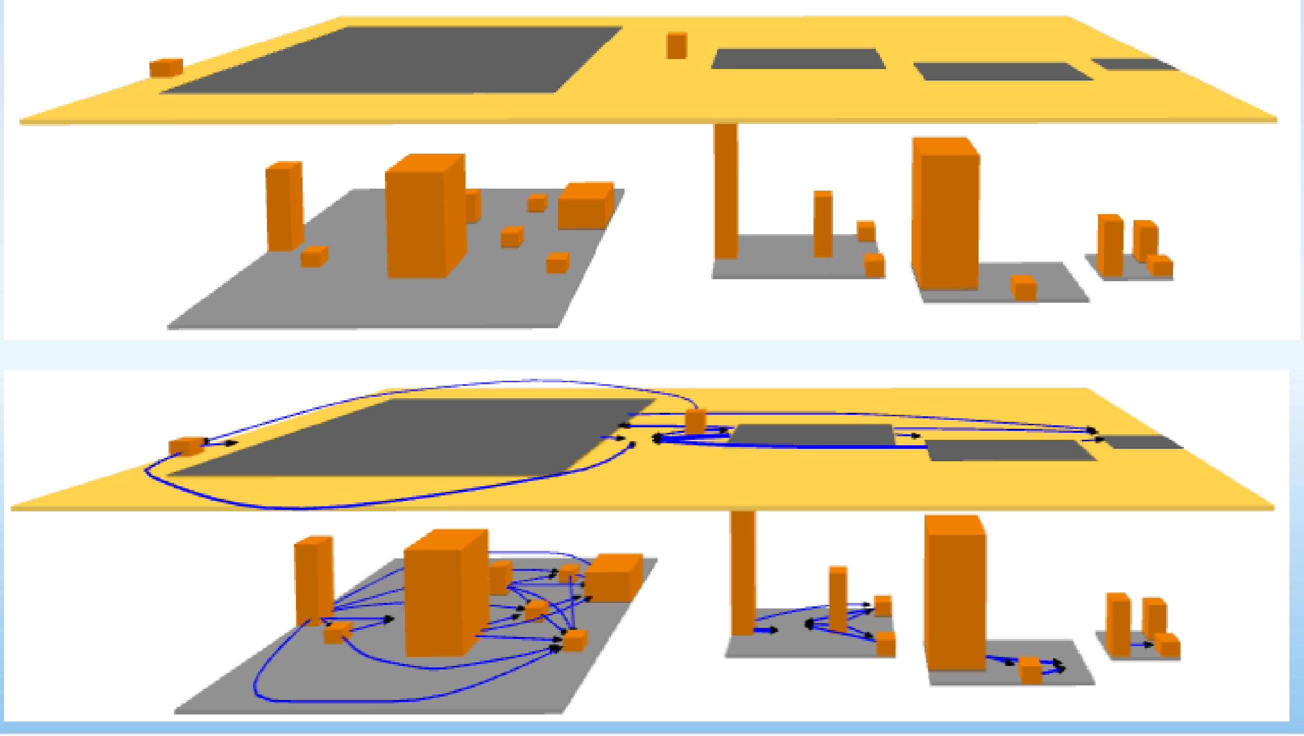
# Transformation of dependencies III



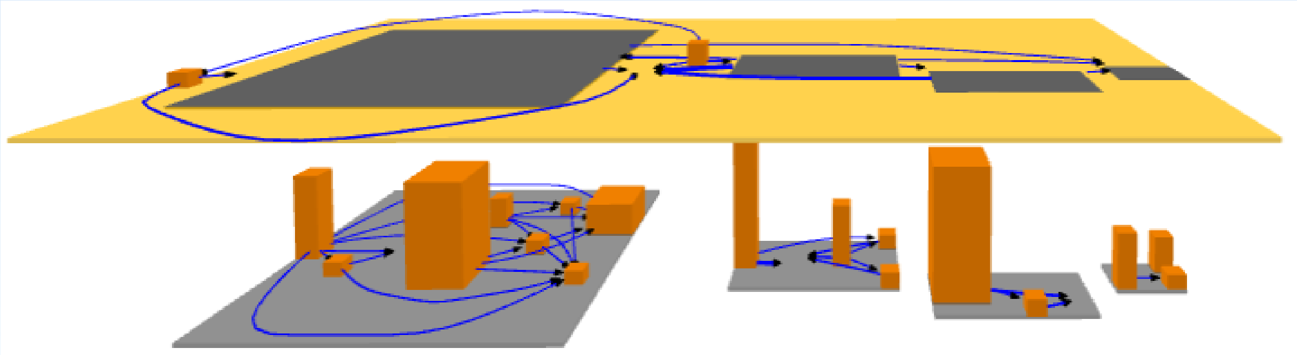
# Visualization of dependencies I

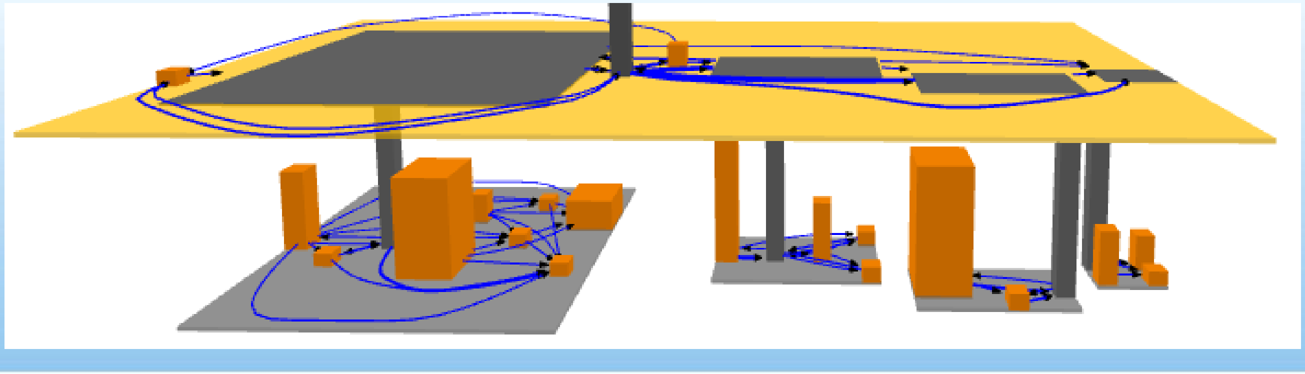


# Visualization of dependencies II



# Visualization of dependencies III





# Wrap up dependencies

○ Inner dependencies
  - direct connection

○ Dependencies to outside packages
  - via "shortest path" transformed and aggragated

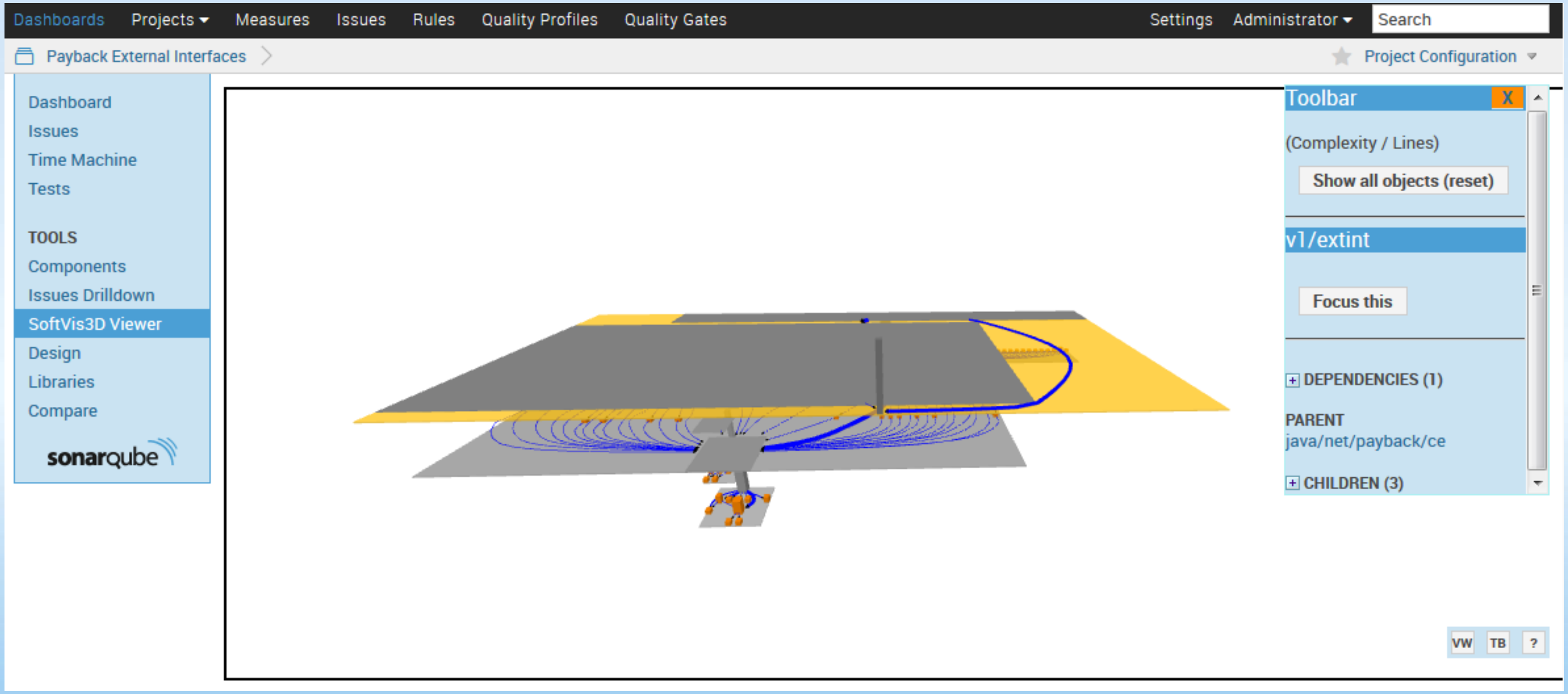
○ Districts are build to the bottom and will be represented in the upper layer

○ "Elevator-Buildings" are the connections between the layers / platforms
  - Includes all incoming and outgoing dependencies of the package

○ Aggregated / abstract view on the dependencies

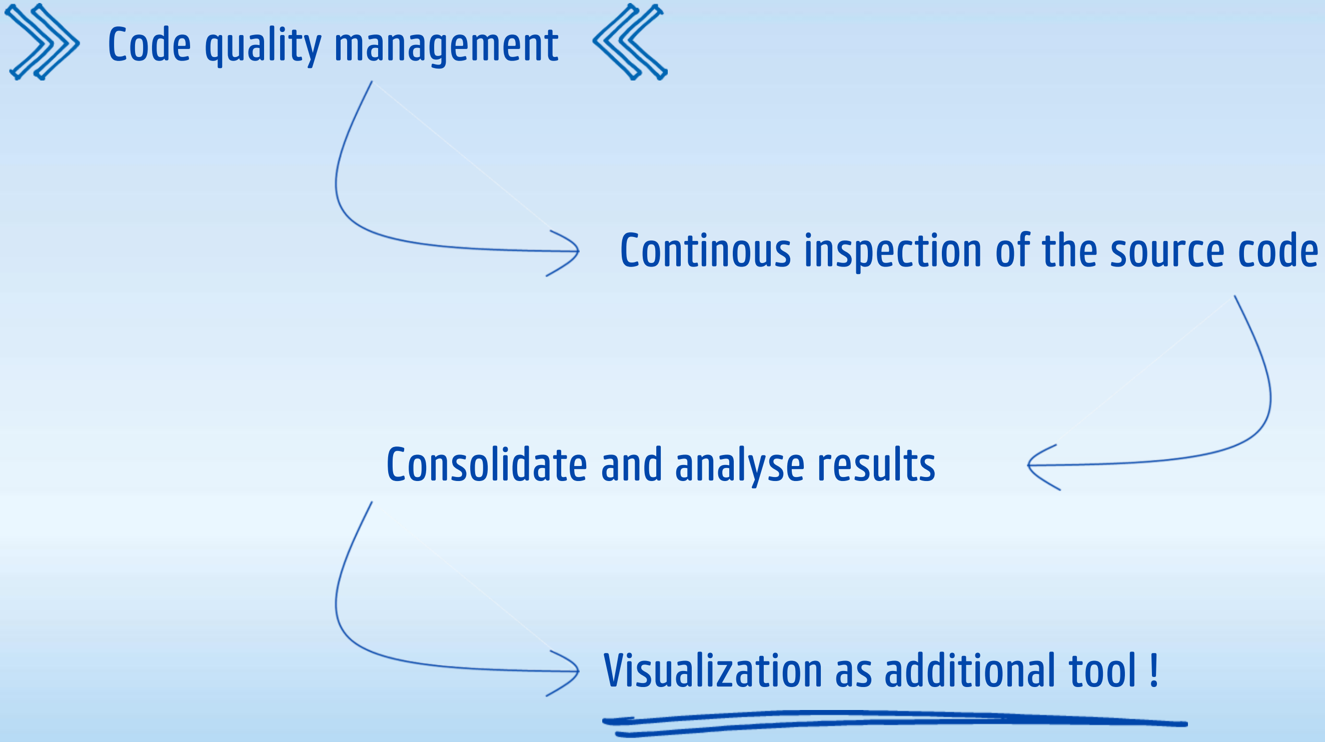
○ Explorative analysis enabled

# DEMO



Dashboards
Projects
Measures
Issues
Rules
Quality Profiles
Quality Gates
Settings
Administrator
Search
Payback External Interfaces
Project Configuration
Dashboard
Issues
Time Machine
Tests
TOOLS
Components
Issues Drilldown
SoftVis3D Viewer
Design
Libraries
Compare
sonarqube
Toolbar
X
(Complexity / Lines)
Show all objects (reset)
v1/extint
Focus this
DEPENDENCIES (1)
PARENT
java/net/payback/ce
CHILDREN (3)
VW
TB
?

# Wrap up



Code quality management

Continous inspection of the source code

Consolidate and analyse results

Visualization as additional tool !

# SoftVis3d Sonarqube plugin

- Easy installationn as SonarQube Plugin
- Open source: https://github.com/stefanrinderle/sonar-softvis3d-plugin

- Visualization of all existing Metrics in SonarQube
- City view / Dependency view
- Explorative user interface

- Details: http://softvis3d.com

# Thanks

softvis3d.com

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