The Tale of Two Source-code Analysis Tools

Learning and experiences

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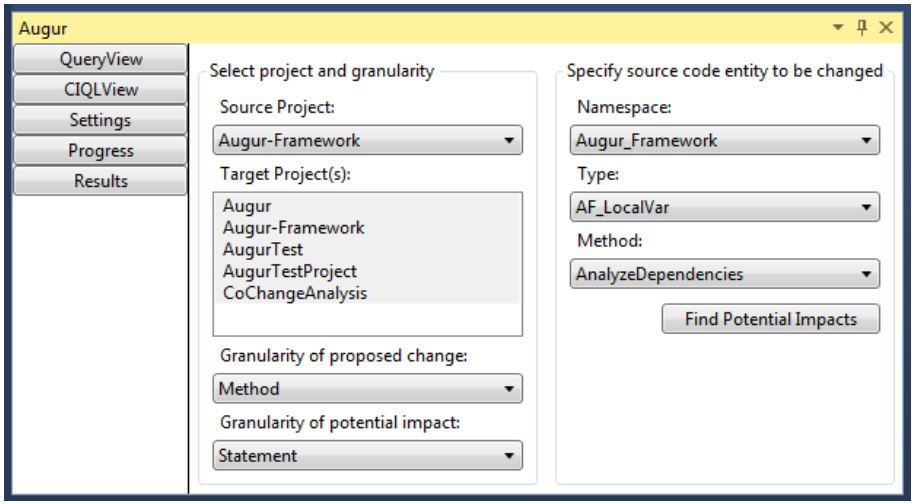
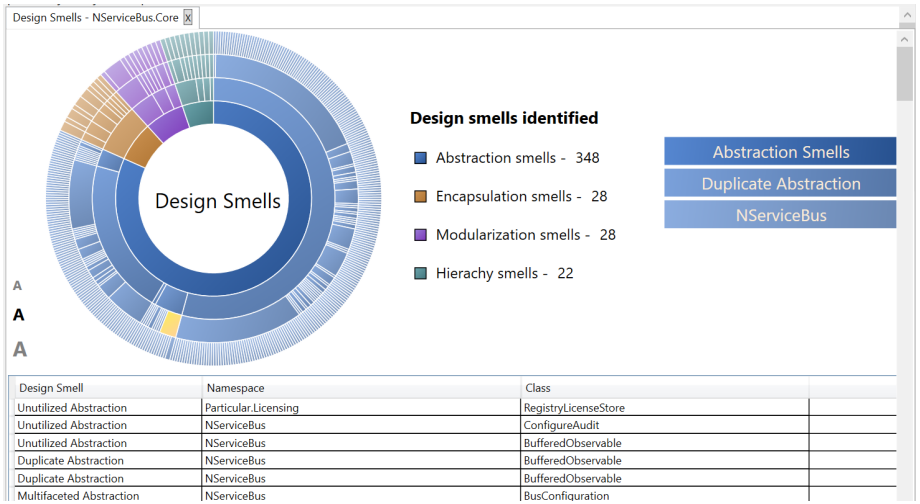
Funded by SENECA project under Marie-Skłodowska Curie Actions

Tools



Augur

A change impact analysis tool

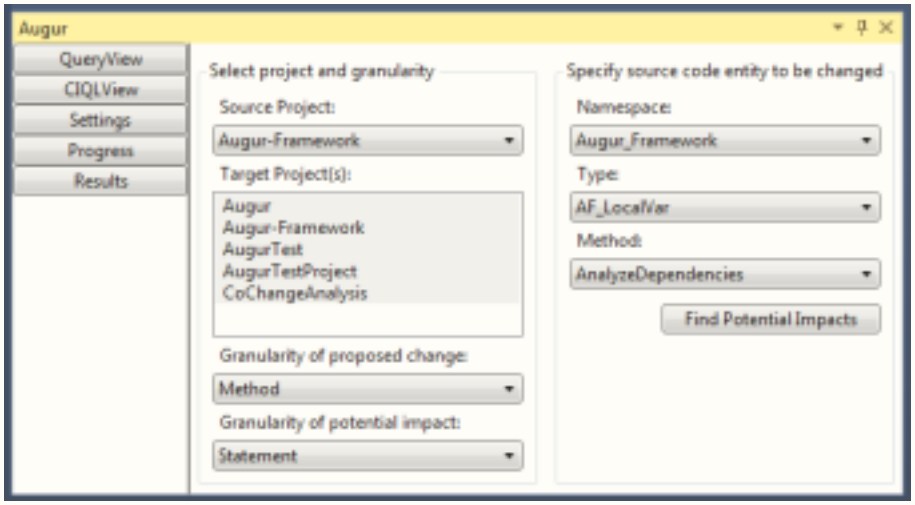


Designite

A software design quality assessment tool

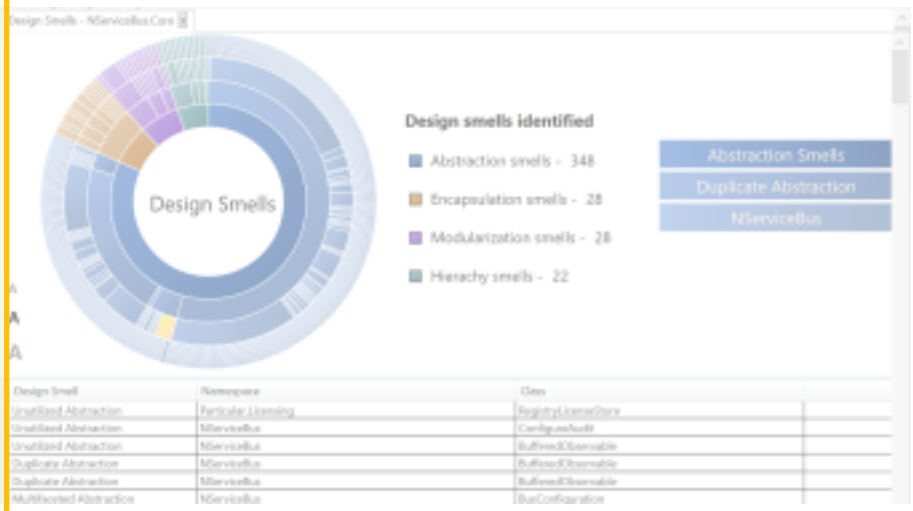
(http://www.designite-tools.com)

Tools



Augur

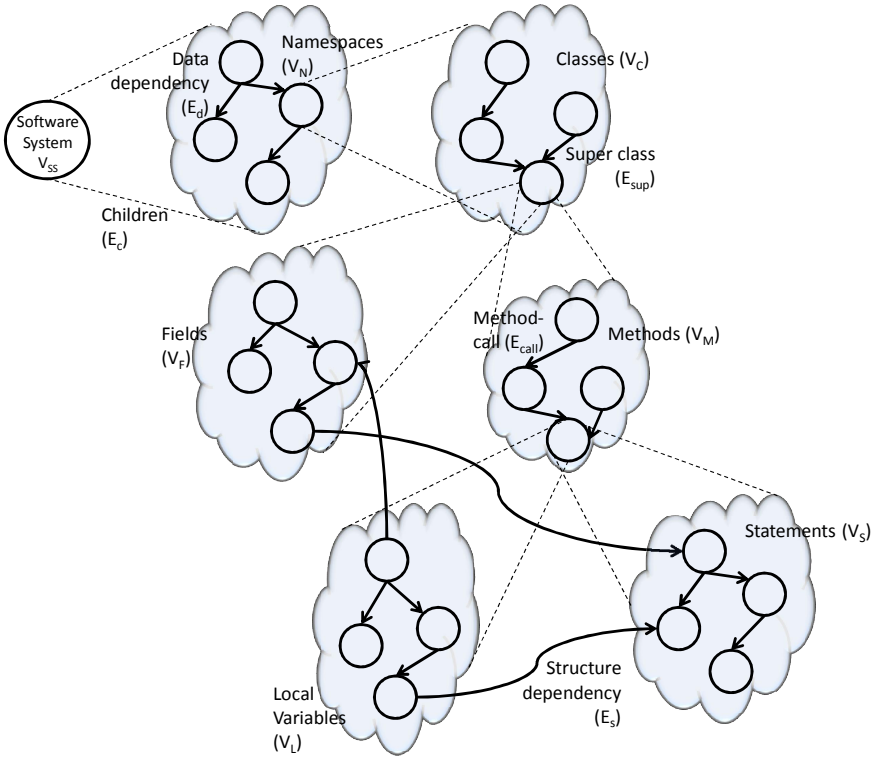
A change impact analysis tool



Designite

A software design quality assessment tool

Features



- **Change impact analysis with multiple granularity support**
  - Cutting across projects, namespaces, classes, methods, fields, and statements
- **Intra-granular queries**
  - Supporting a query where a change and the associated impact could be on different granularities

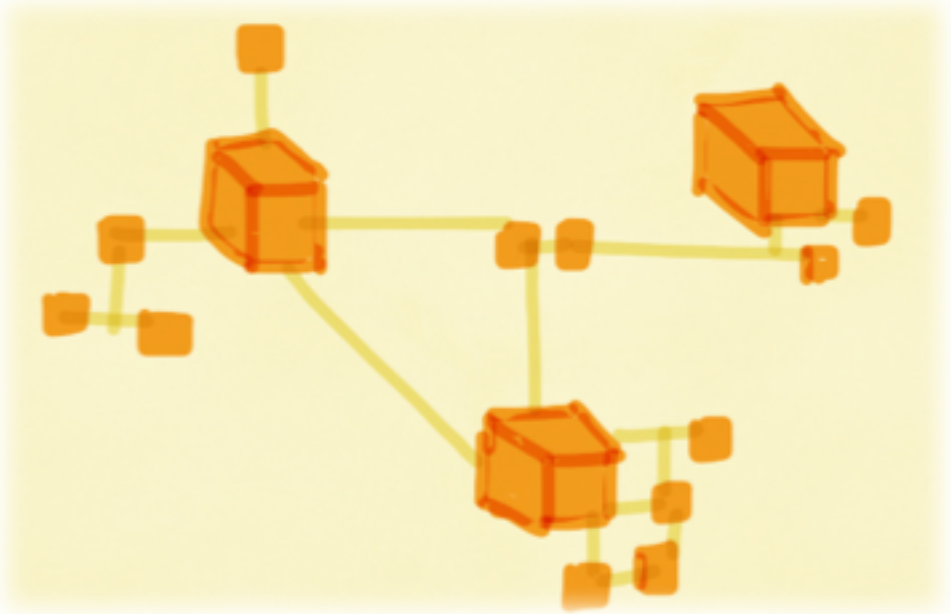
Features

- **Change Impact Query Language (CIQL)**
  - For large scale batch querying – opening a new set of applications of CIA

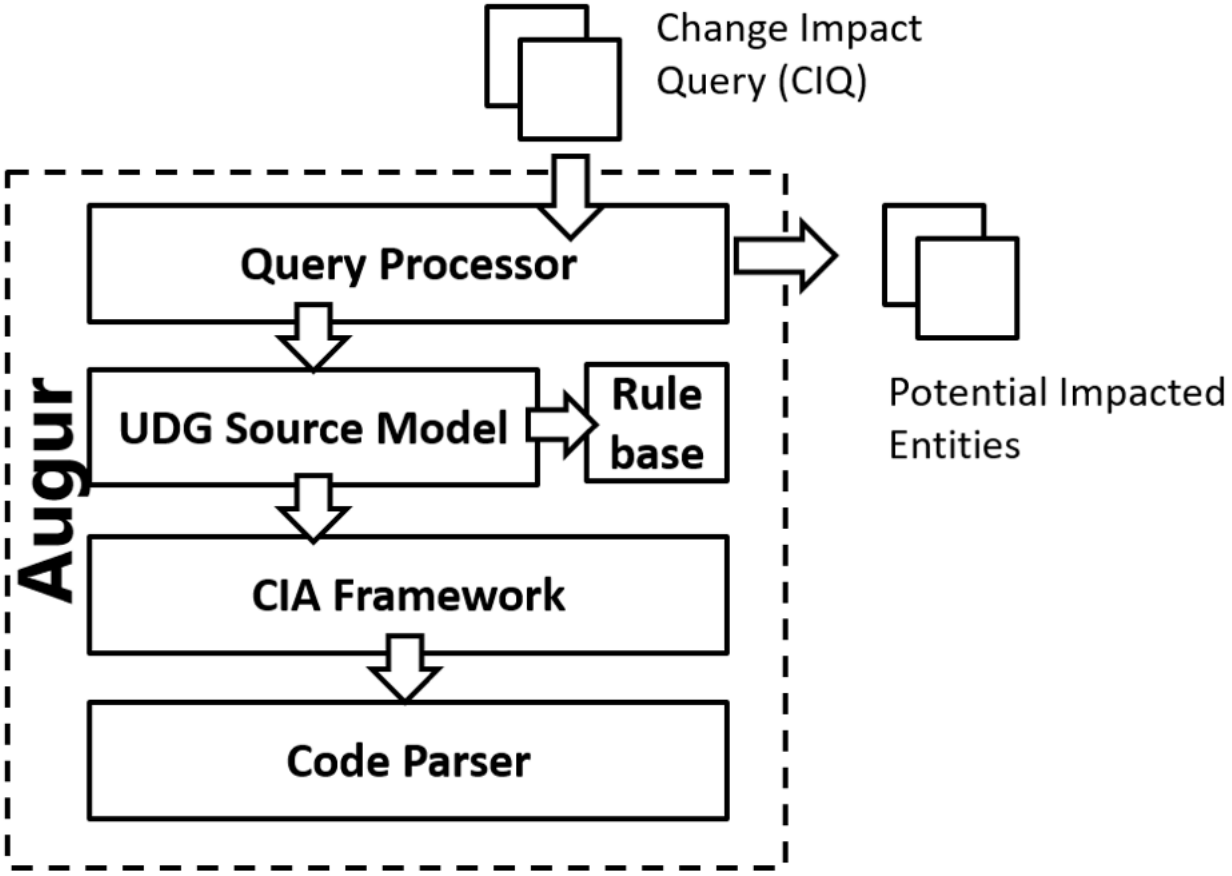
CIQL::get "<Granularity (Impact)>"
[within *"<Scope>"]*
[with "<Depth>"] where
"<Entity>" is
"<Granularity>".

Features

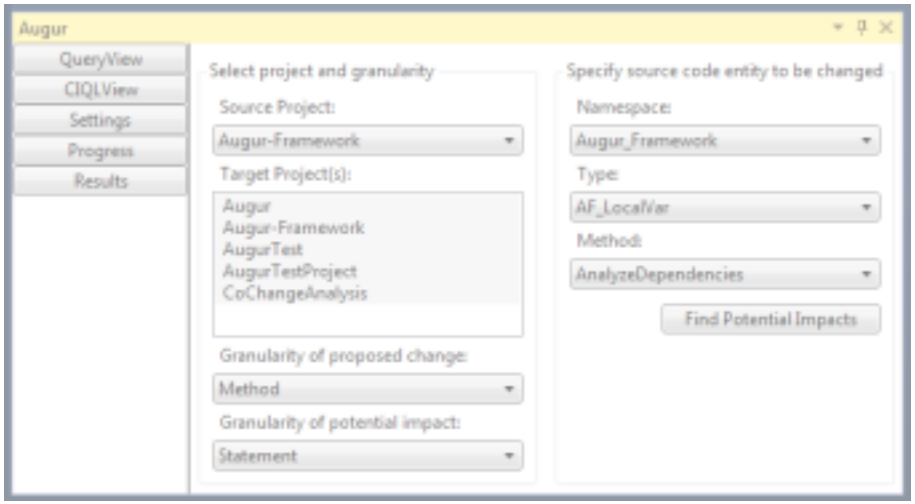
- **Support for extended dependencies**
  - Data
  - Control
  - Semantic
  - Environment



Architecture



Tools



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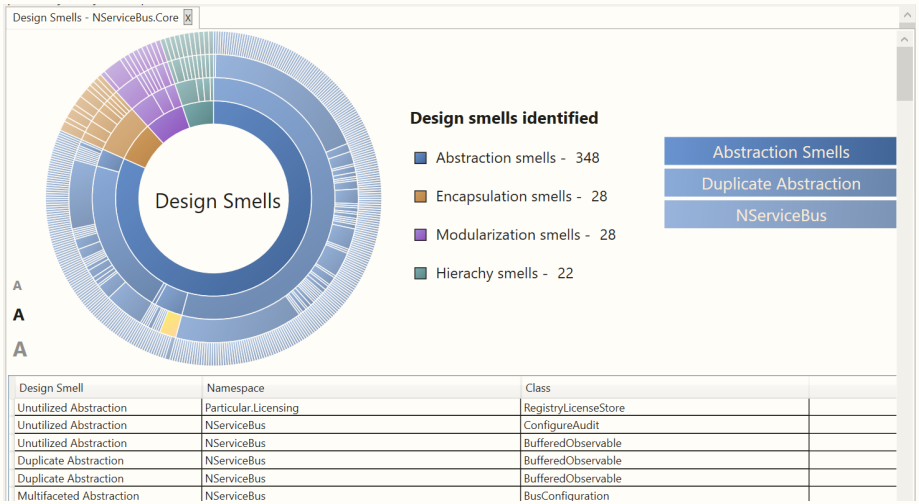
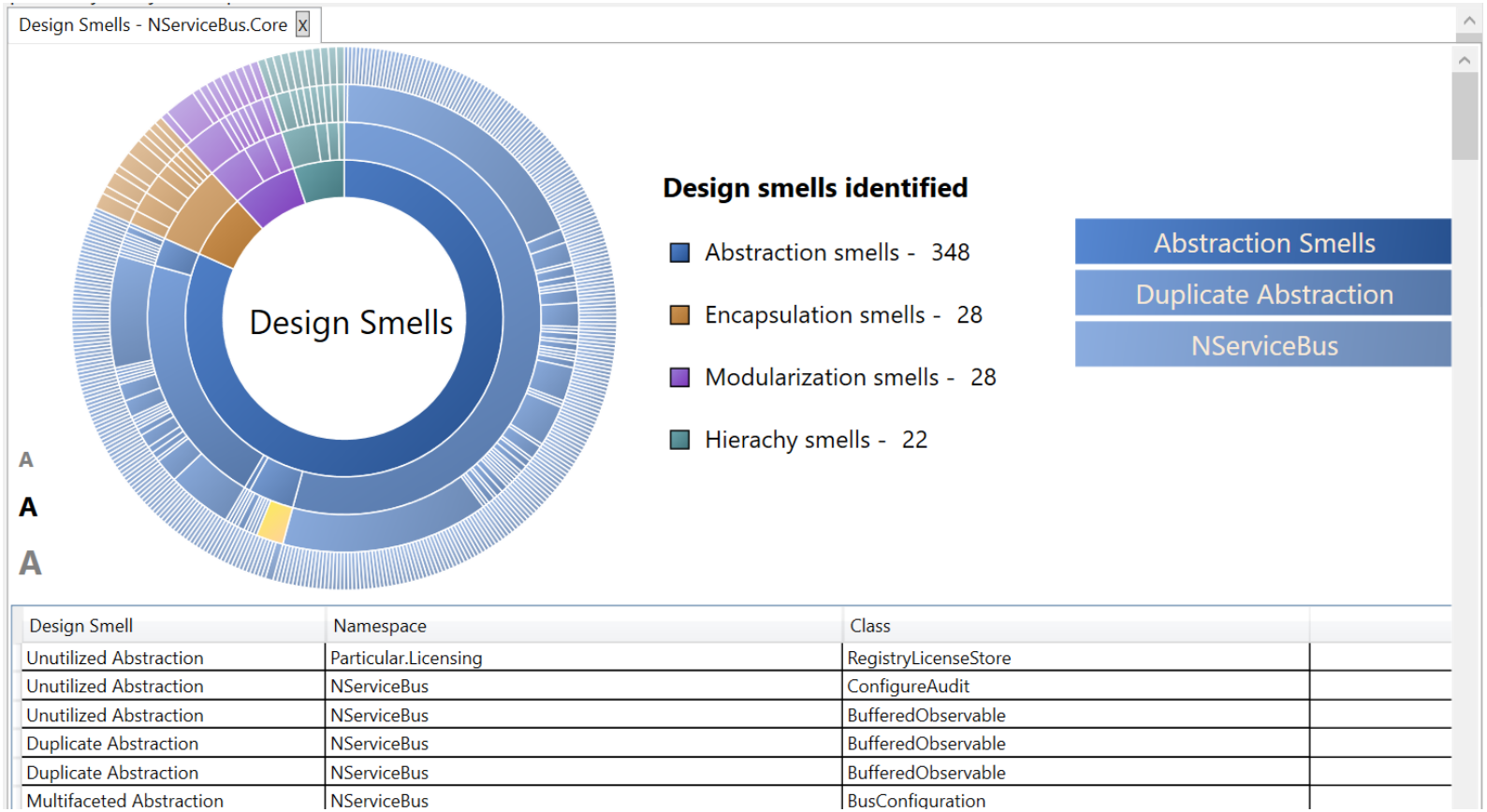


Designite

A software design quality assessment tool

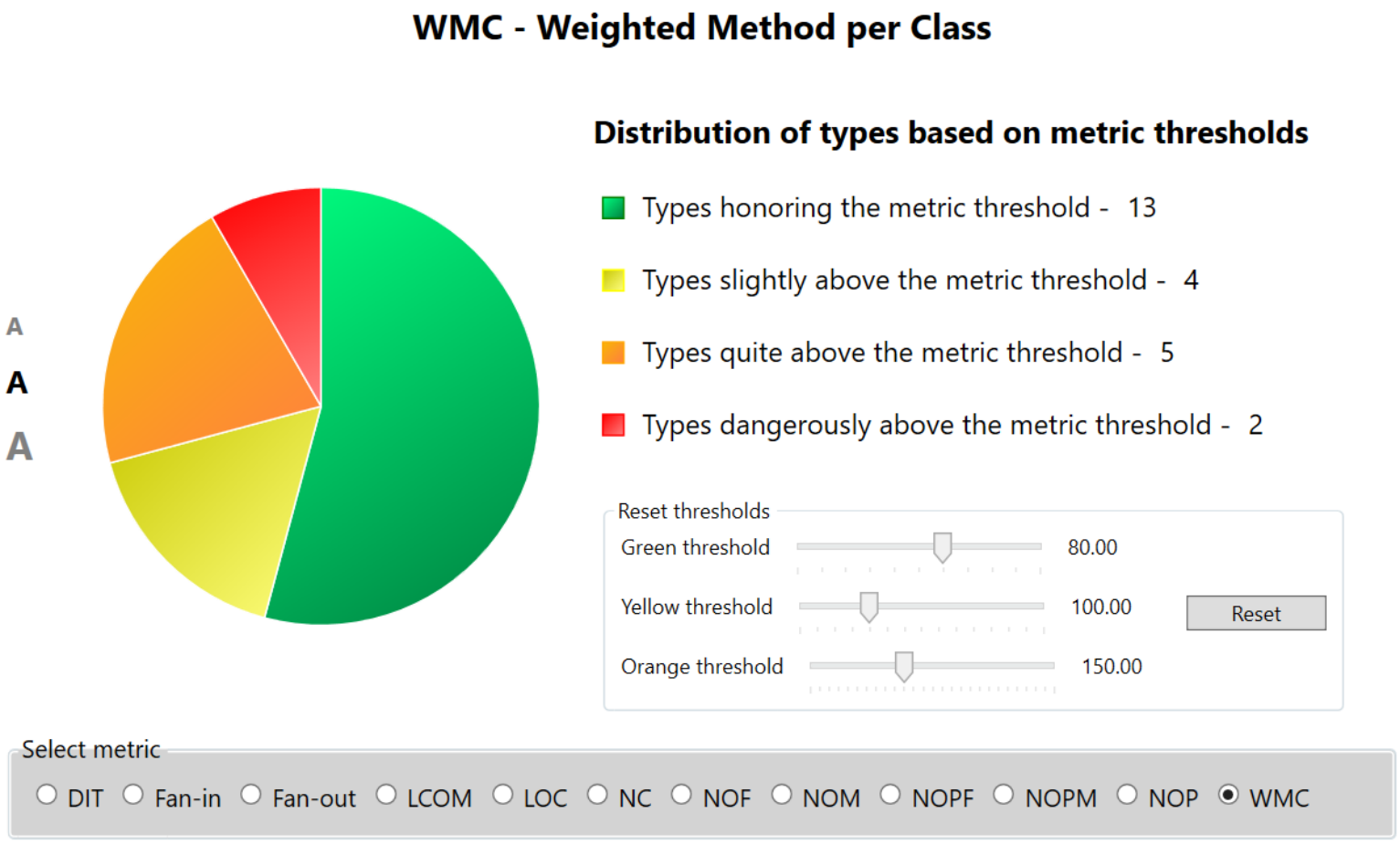
Features

- **Supports detection of 19 design smells and 11 implementation smells**



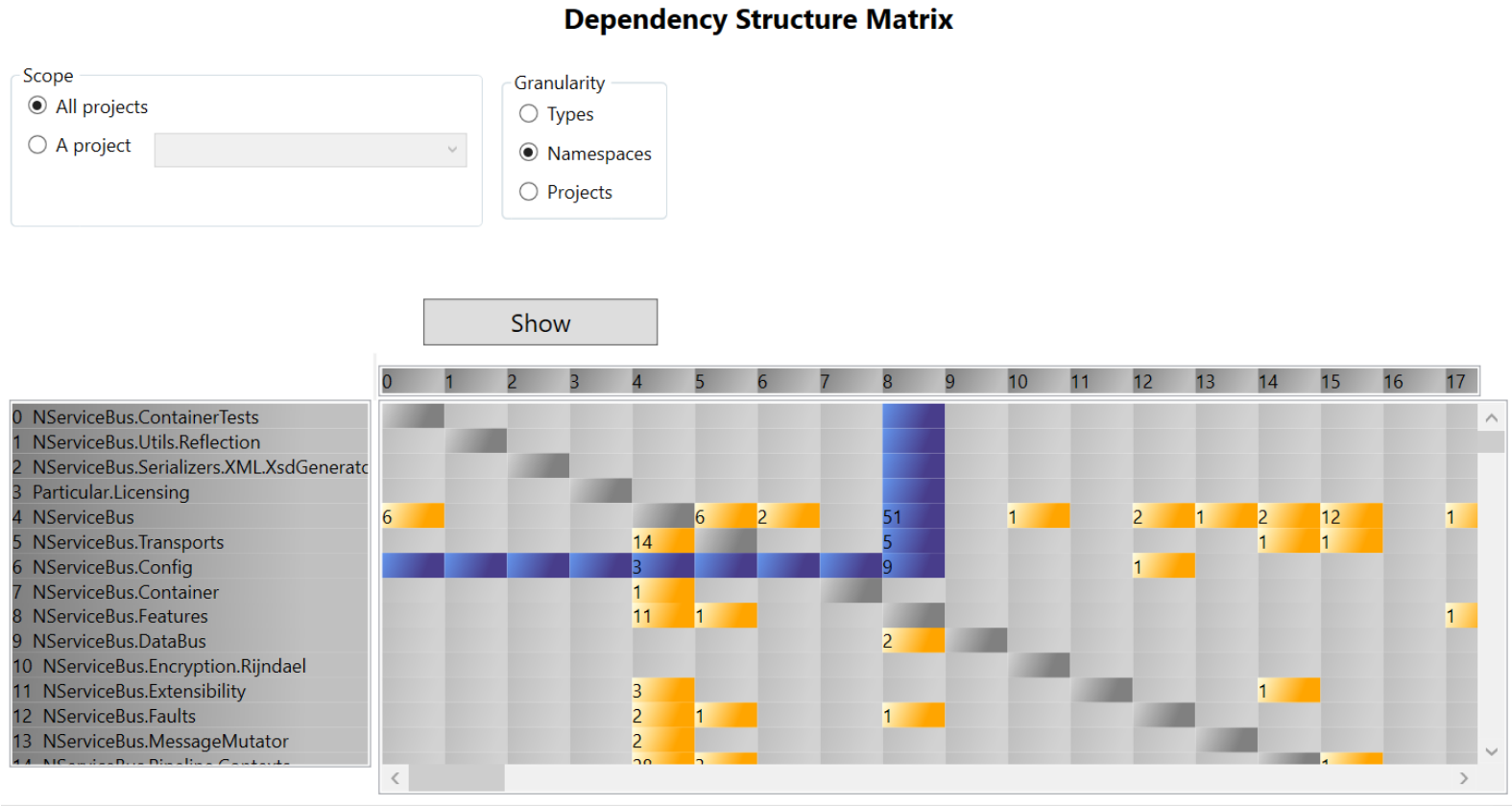
Features

- **Supports computation of various metrics with custom thresholds**



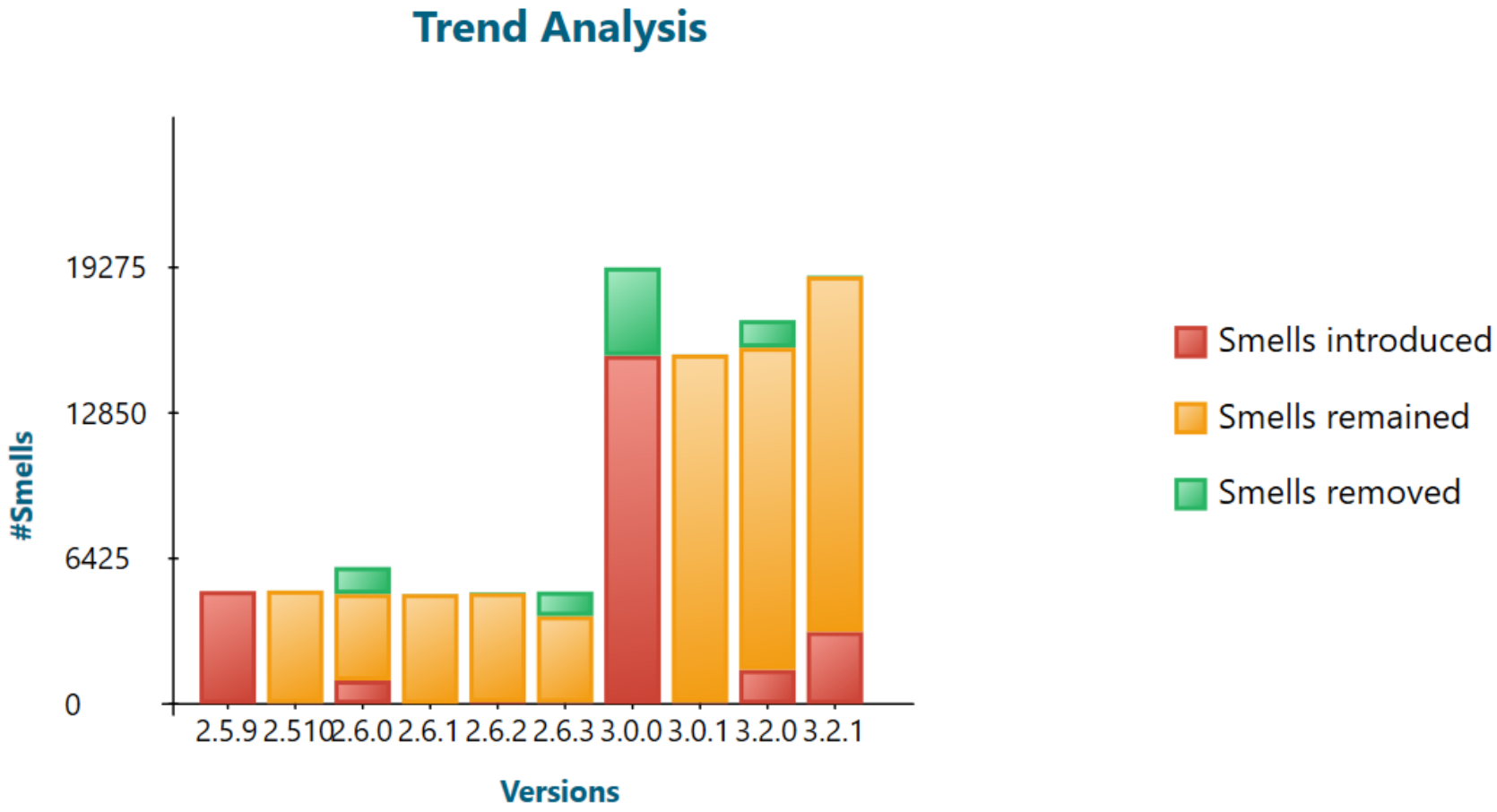
Features

- **Provides Dependency Structure Matrix**



Features

- **Performs Trend Analysis**

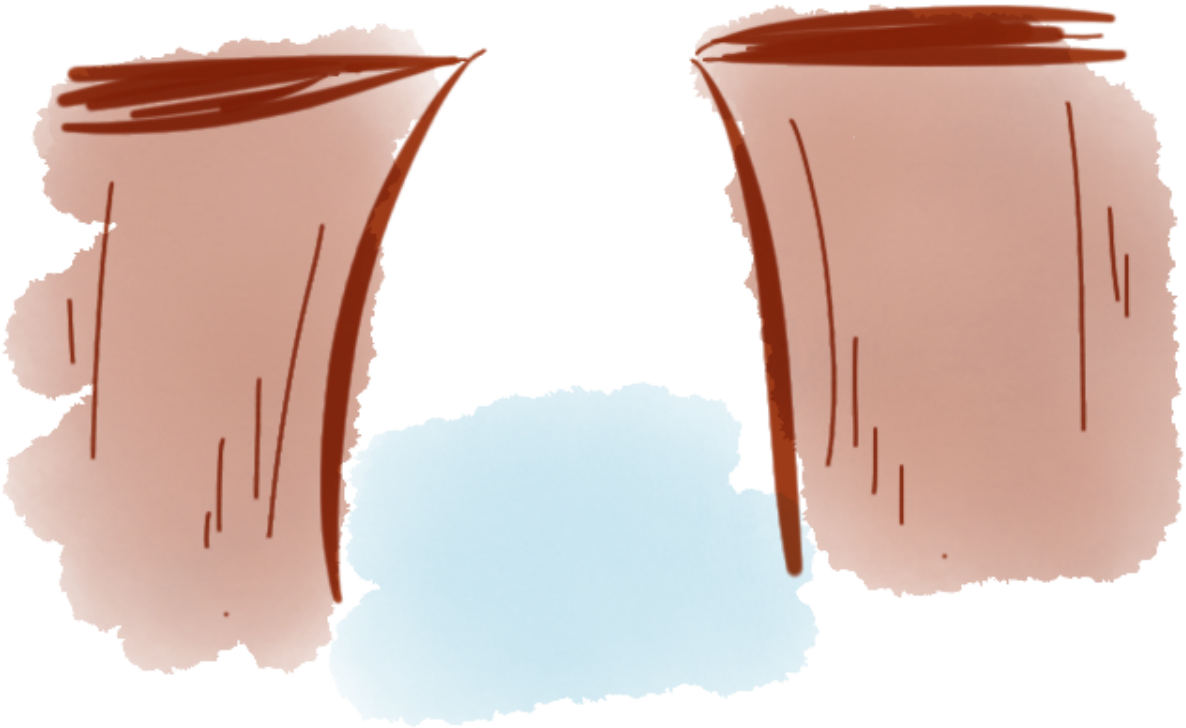


Learning and experiences

The Big Gap

between Academics and Industry

Proposing a new research program in a corporate research organization is not easy!



The Big Gap
between Academics and Industry

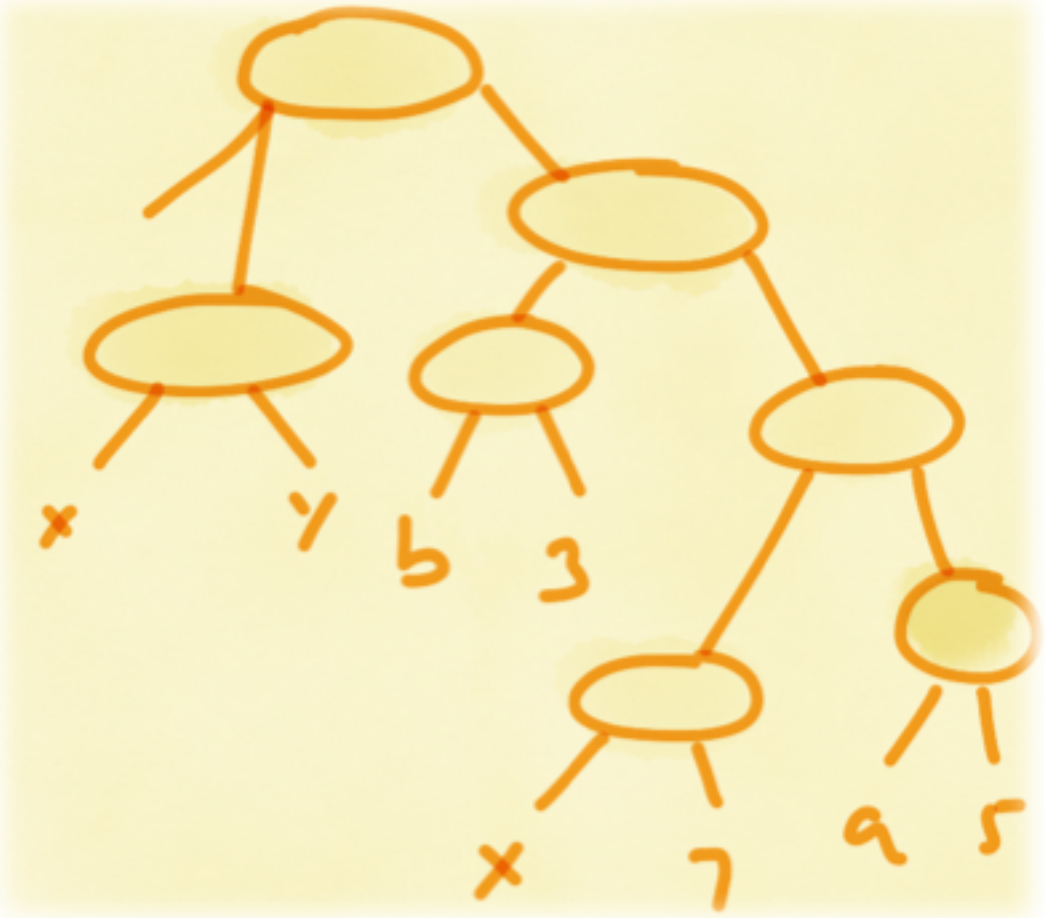
Learning (as a researcher)

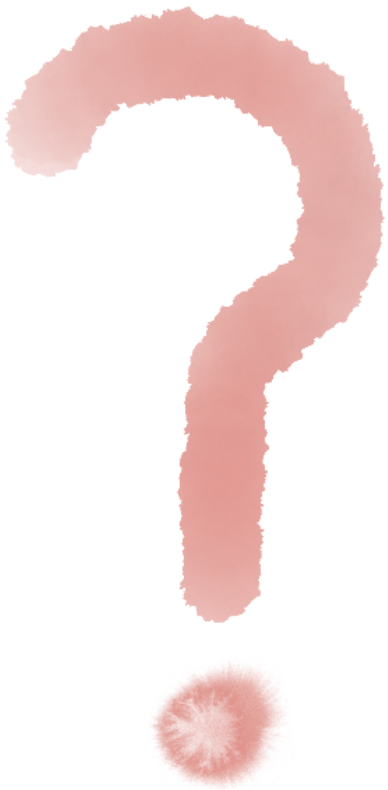
- Make sure the availability of artifacts and their broader applicability

Parsing mechanism

Various options for collecting source code information

- String manipulation
- Reflection
- AST
- Byte code analysis





Which AST library?

CSParser

Metaspec

MS Roslyn

#Recognize!

NRefactory

Parsing mechanism

Selection criteria

- License
- Features
- Cost
- Community support
- Future proof-ness

Architecture

Plug-in
or
Independent application

Console application

Options

- Use conditional compilation (using ConditionalAttribute)
- Duplicate the code-base
- Perform architecture refactoring

Console application

Experience:

- Architecture refactoring is expensive but effective!
- Support for architecture refactoring within IDEs is not sufficient

Extensibility

Smell detection logic must be extensible

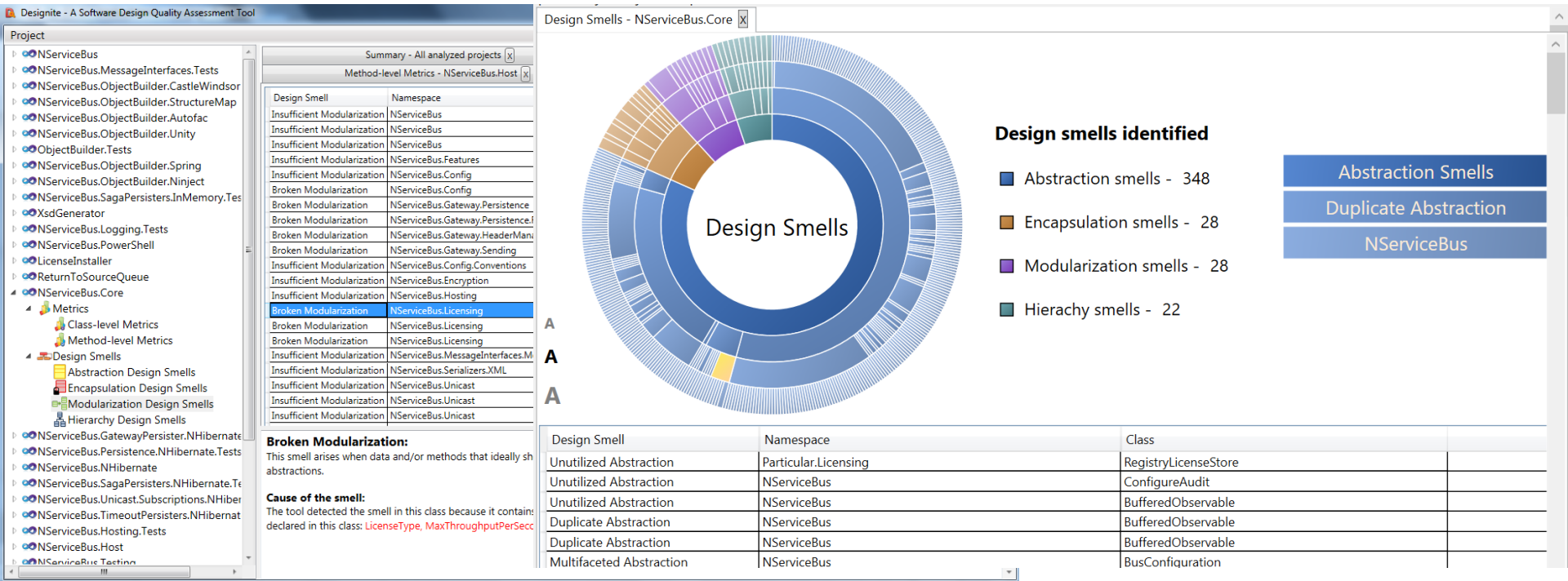
i.e. new rules can be added without any change in source code analysis logic and user interface

Learning:

- The role of appropriate design is important

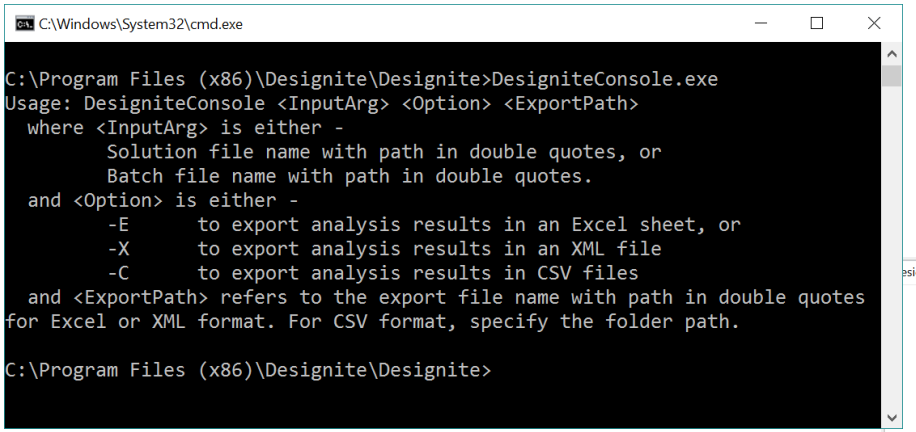
Information dissemination

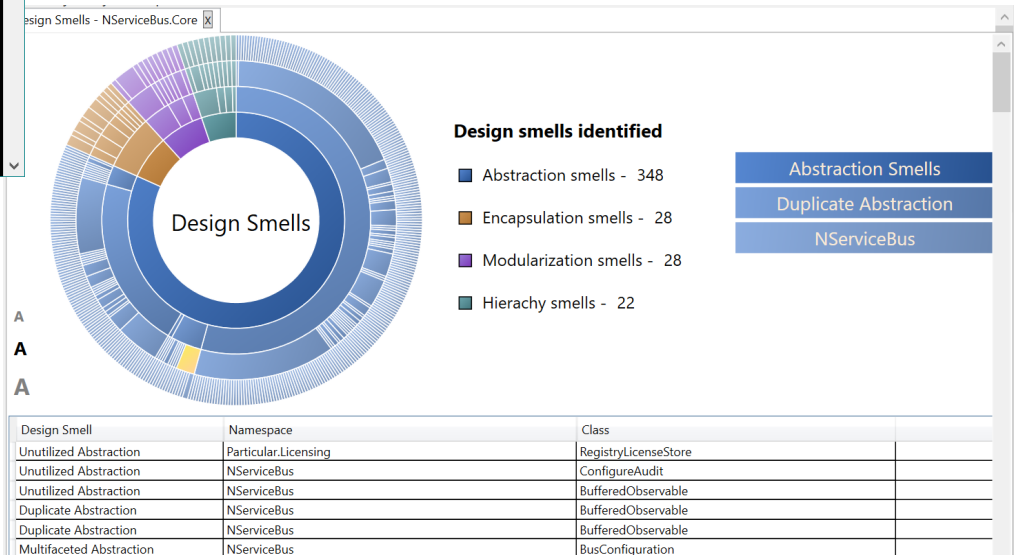
Producing useful information is desirable; presenting it well to the user is the extra mile.



Information dissemination

Different types of users, different requirements.

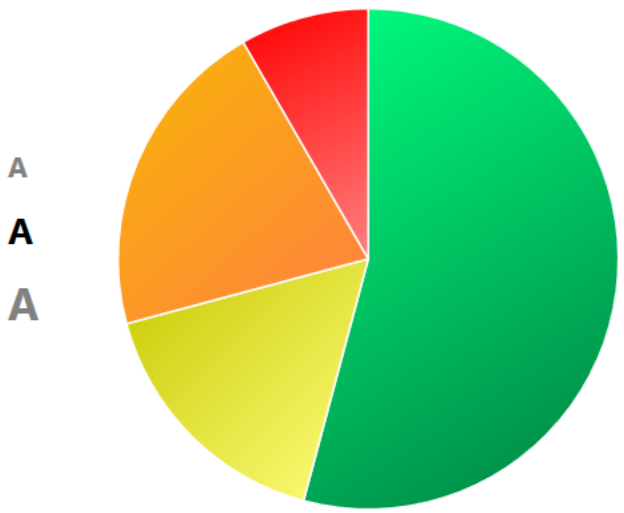




Paying attention to user requirements

WMC - Weighted Method per Class

Distribution of types based on metric thresholds



- Types honoring the metric threshold - 13
- Types slightly above the metric threshold - 4
- Types quite above the metric threshold - 5
- Types dangerously above the metric threshold - 2

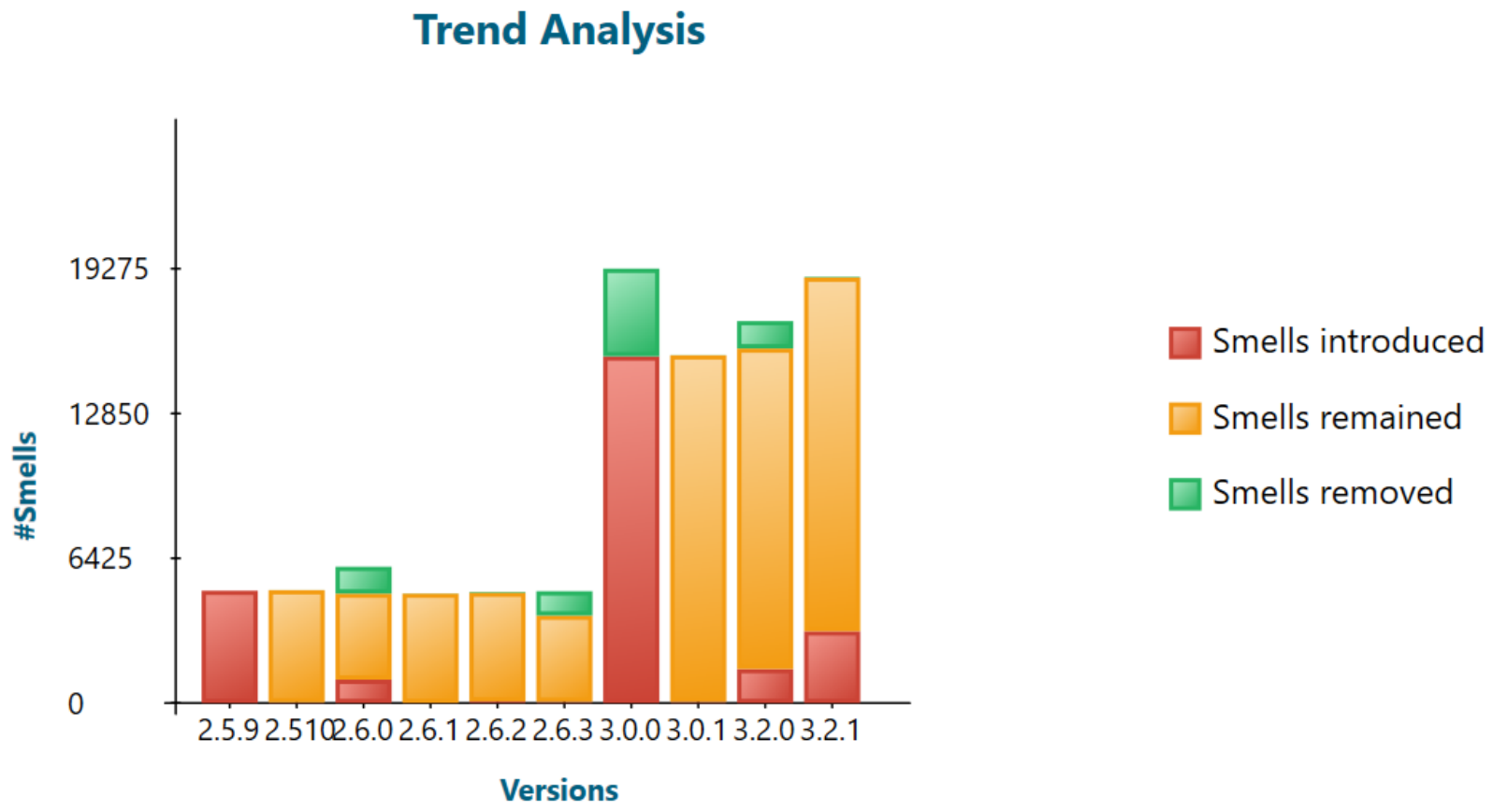
Reset thresholds

Green threshold	80.00	
Yellow threshold	100.00	Reset
Orange threshold	150.00	

Select metric

DIT | Fan-in | Fan-out | LCOM | LOC | NC | NOF | NOM | NOPF | NOPM | NOP | WMC

Paying attention to user requirements

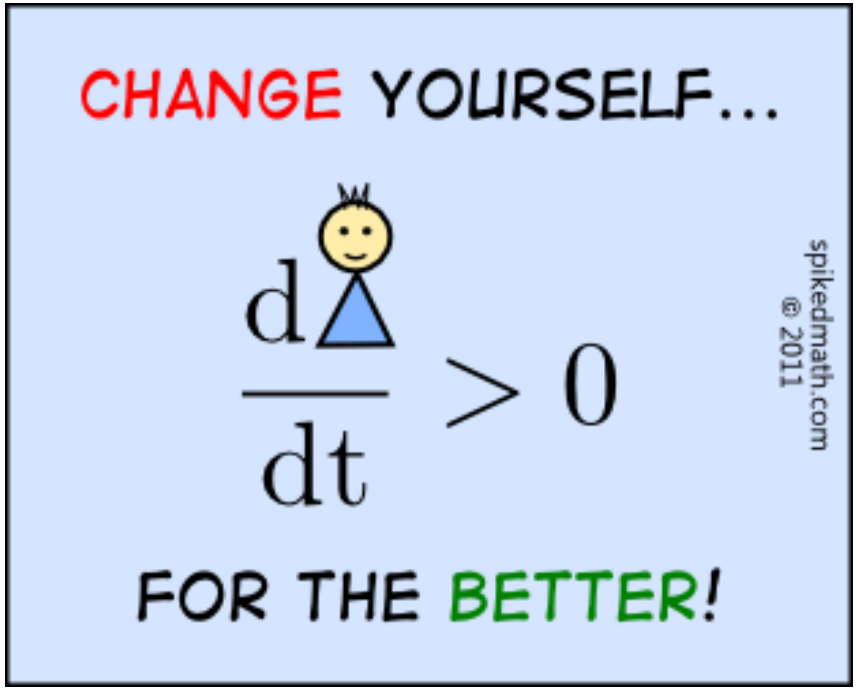


References

[1] Tushar Sharma, Pratibha Mishra, and Rohit Tiwari. 2016. Designite: a software design quality assessment tool. In *Proceedings of the 1st International Workshop on Bringing Architectural Design Thinking into Developers' Daily Activities* (BRIDGE '16). ACM, New York, NY, USA, 1-4. DOI: http://dx.doi.org/10.1145/2896935.2896938

2] Tushar Sharma, Girish Suryanarayana. Augur: Incorporating Hidden Dependencies and Variable Granularity in Change Impact Analysis. Submitted at SCAM 2016, waiting for the decision.

Thank you!!



Courtesy: spikedmath.com

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