TECHNISCHE UNIVERSITÄT DRESDEN

Fakultät Informatik

# OCL Tools Report based on the IDE4OCL Feature Model

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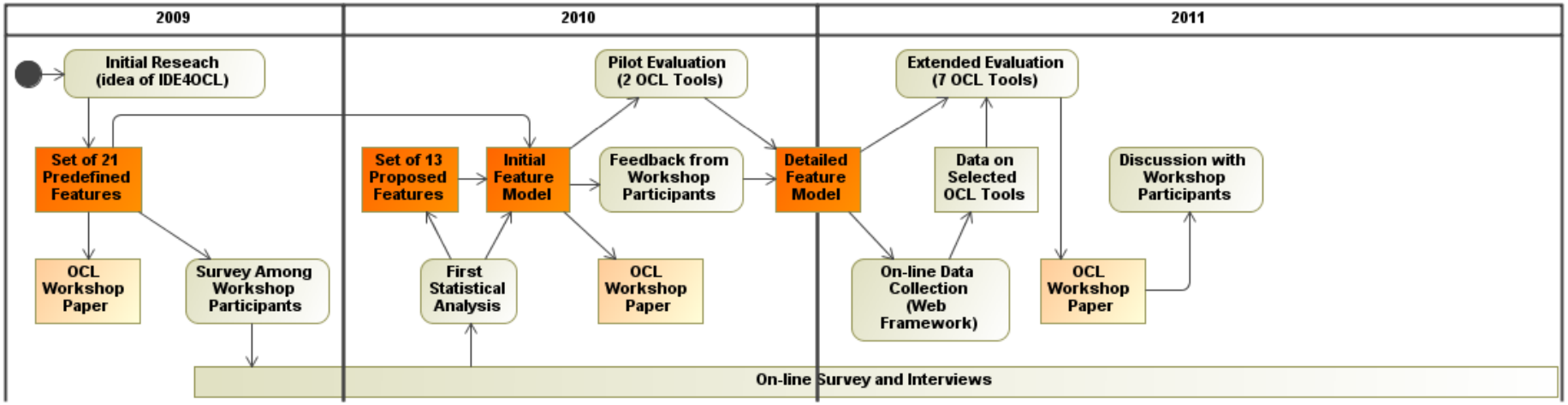
# The Vision of an IDE4OCL (Integrated Development Environment for OCL)

Vision without action is a daydream.

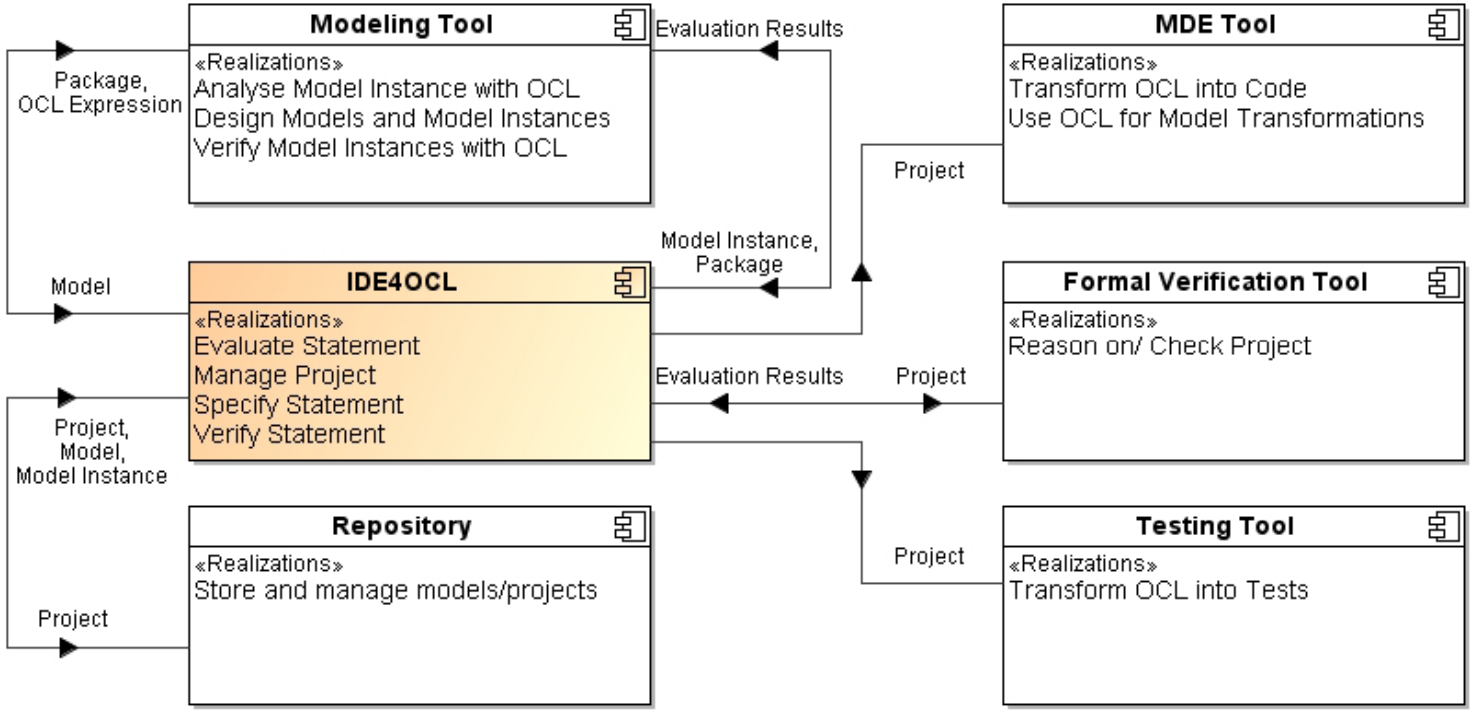
Action without vision is a nightmare.

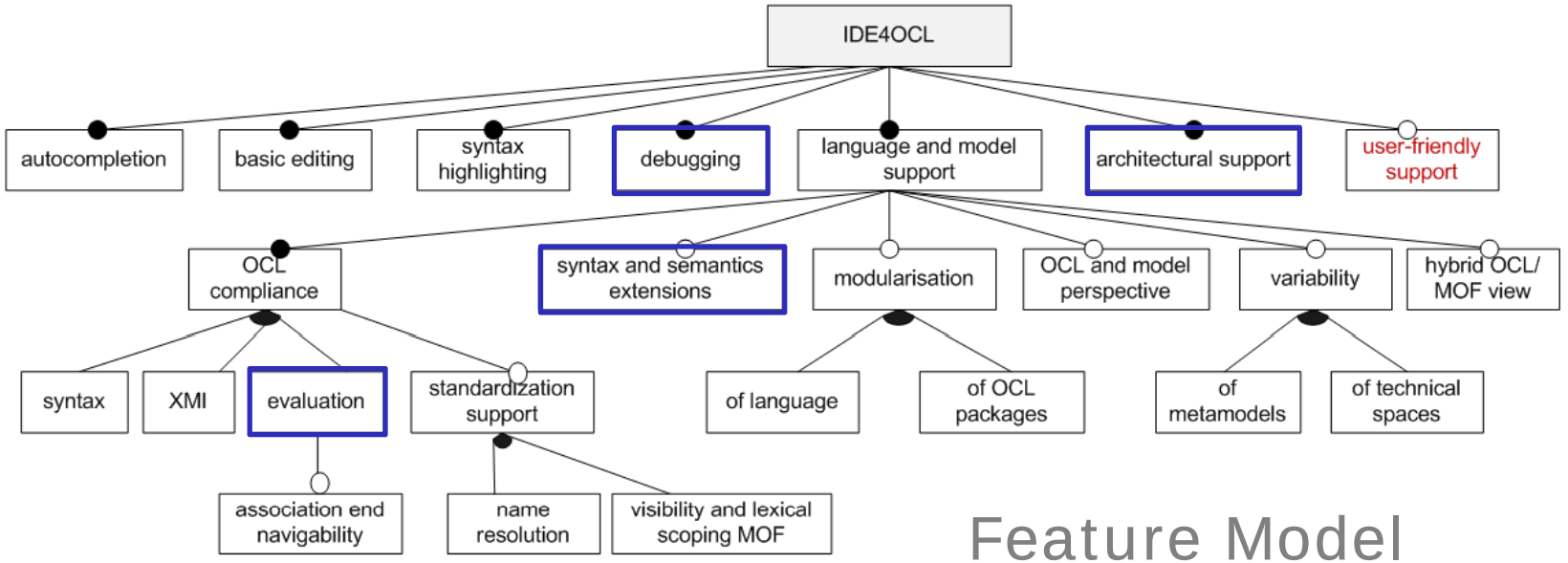
*Japanese proverb*

# IDE4OCL Research



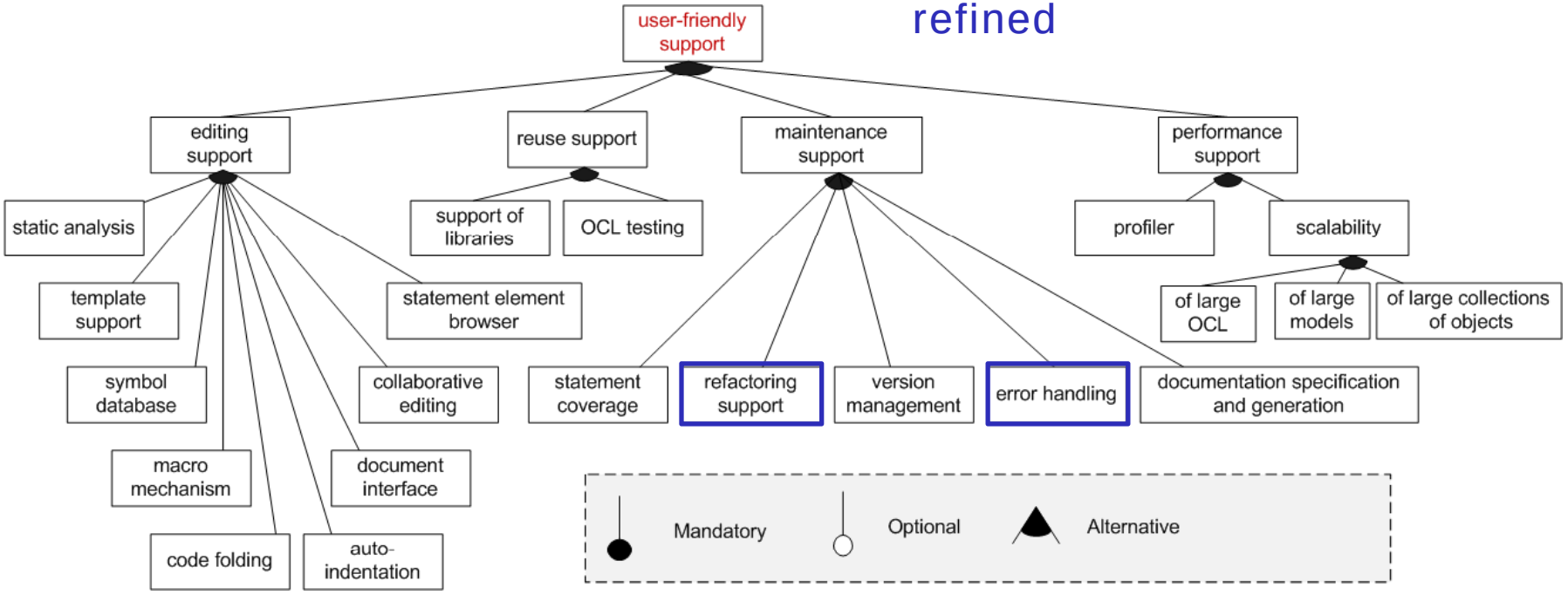
# The OCL Tool Landscape






# Feature Model

## refined

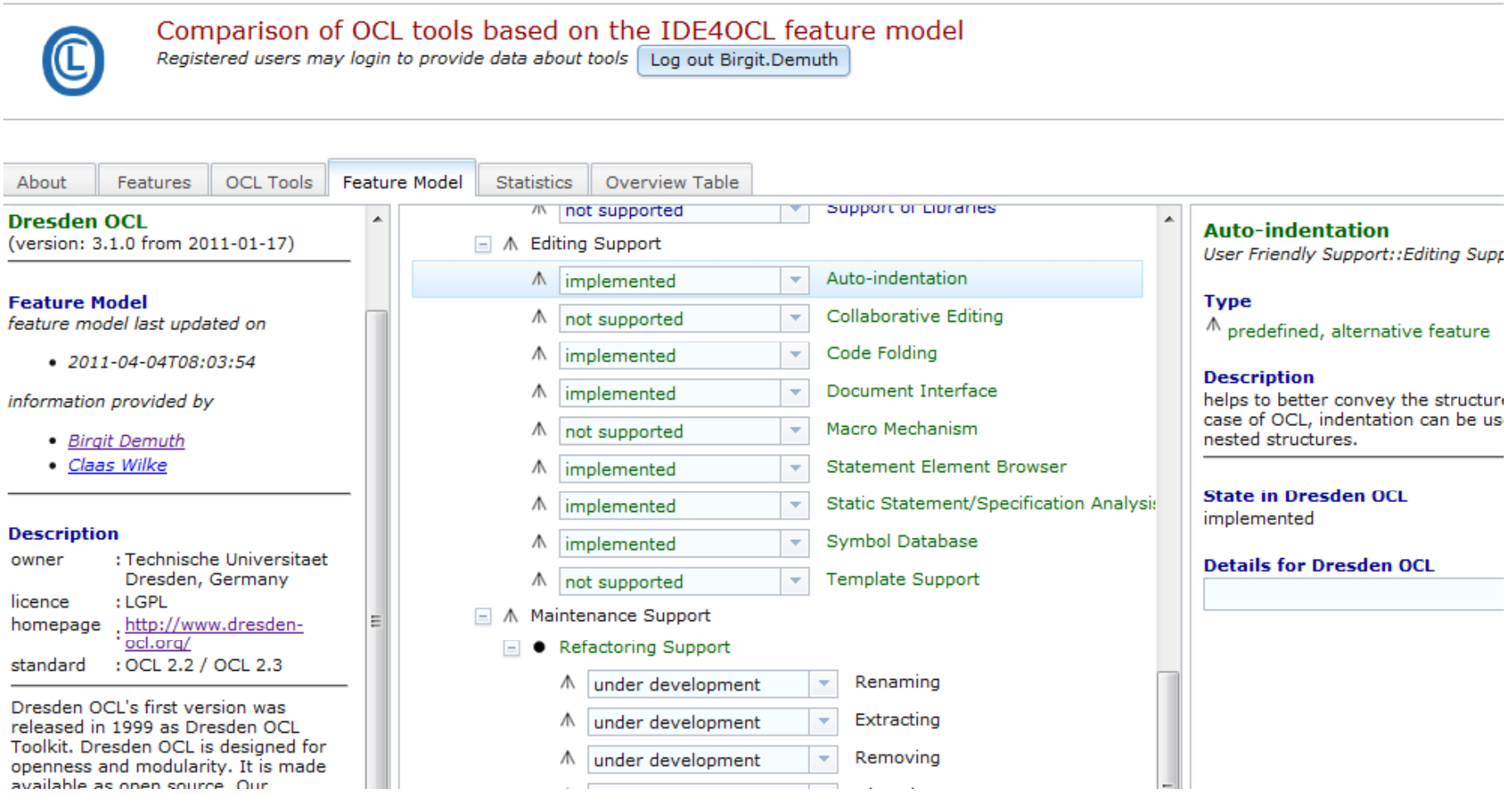


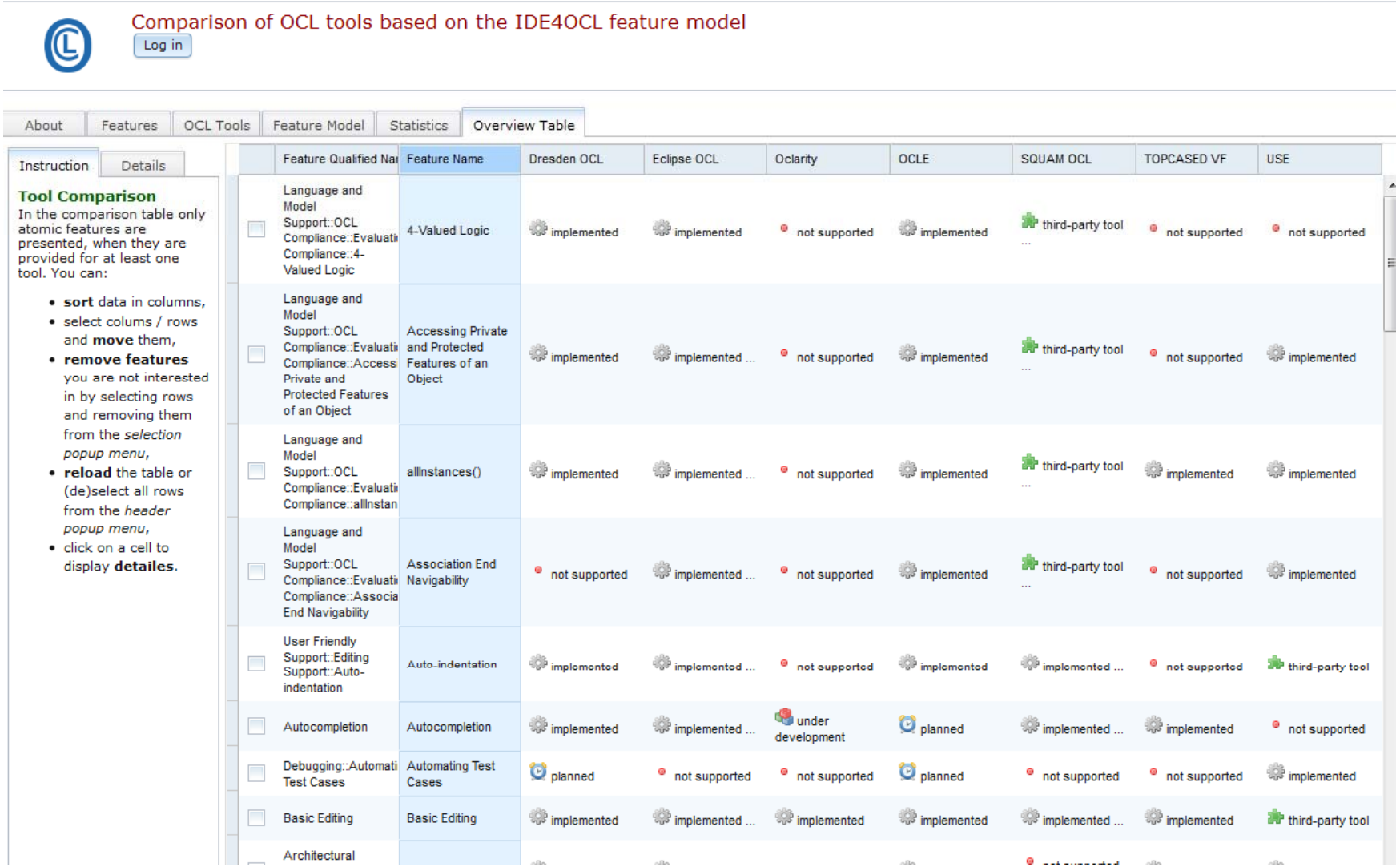
## Selected OCL Tools

- Dresden OCL
- Eclipse OCL
- Oclarity
- OCLE
- SQUAM OCL
- TOPCASED VF
- USE

## Feature Evaluation

- implemented
- third-party tool
- under development
- planned
- not supported


Comparison of OCL tools based on the IDE4OCL feature model
Registered users may login to provide data about tools
Log out Birgit.Demuth
About
Features
OCL Tools
Feature Model
Statistics
Overview Table
Dresden OCL
(version: 3.1.0 from 2011-01-17)
Feature Model
feature model last updated on
2011-04-04T08:03:54
information provided by
Birgit Demuth
Claas Wilke
Description
owner : Technische Universitaet Dresden, Germany
licence : LGPL
homepage : http://www.dresden-ocl.org/
standard : OCL 2.2 / OCL 2.3
Dresden OCL's first version was released in 1999 as Dresden OCL Toolkit. Dresden OCL is designed for openness and modularity. It is made
not supported
Editing Support
implemented
Auto-indentation
not supported
Collaborative Editing
implemented
Code Folding
implemented
Document Interface
not supported
Macro Mechanism
implemented
Statement Element Browser
implemented
Static Statement/Specification Analysis
implemented
Symbol Database
not supported
Template Support
Maintenance Support
Refactoring Support
under development
Renaming
under development
Extracting
under development
Removing
Auto-indentation
User Friendly Support::Editing Supp
Type
predefined, alternative feature
Description
helps to better convey the structur
case of OCL, indentation can be us
nested structures.
State in Dresden OCL
implemented
Details for Dresden OCL



Comparison of OCL tools based on the IDE4OCL feature model

Log in

About | Features | OCL Tools | Feature Model | Statistics | Overview Table

Instruction | Details

**Tool Comparison**

In the comparison table only atomic features are presented, when they are provided for at least one tool. You can:

- **sort** data in columns,
- select colums / rows and **move** them,
- **remove features** you are not interested in by selecting rows and removing them from the *selection popup menu*,
- **reload** the table or (de)select all rows from the *header popup menu*,
- click on a cell to display **detailes**.

| Feature Qualified Nai | Feature Name | Dresden OCL | Eclipse OCL | Oclarity | OCLE | SQUAM OCL | TOPCASED VF | USE |
|---|---|---|---|---|---|---|---|---|
| Language and Model Support::OCL Compliance::Evaluati Compliance::4-Valued Logic | 4-Valued Logic | implemented | implemented | not supported | implemented | third-party tool ... | not supported | not supported |
| Language and Model Support::OCL Compliance::Evaluati Compliance::Access Private and Protected Features of an Object | Accessing Private and Protected Features of an Object | implemented | implemented ... | not supported | implemented | third-party tool ... | not supported | implemented |
| Language and Model Support::OCL Compliance::Evaluati Compliance::allInstan | allInstances() | implemented | implemented ... | not supported | implemented | third-party tool ... | implemented | implemented |
| Language and Model Support::OCL Compliance::Evaluati Compliance::Associa End Navigability | Association End Navigability | not supported | implemented ... | not supported | implemented | third-party tool ... | not supported | implemented |
| User Friendly Support::Editing Support::Auto-indentation | Auto-indentation | implemented | implemented ... | not supported | implemented | implemented ... | not supported | third-party tool |
| Autocompletion | Autocompletion | implemented | implemented ... | under development | planned | implemented ... | implemented | not supported |
| Debugging::Automati Test Cases | Automating Test Cases | planned | not supported | not supported | planned | not supported | not supported | implemented |
| Basic Editing | Basic Editing | implemented | implemented ... | implemented | implemented | implemented ... | implemented | third-party tool |
| Architectural | | | | | | | | |

# OCL Tool Landscape Coverage

| OCL Tool | Core | Additional Components | | | | |
|---|---|---|---|---|---|---|
| **Dresden OCL** | IDE4OCL | Modeling Tool | Repository | MDE Tool | FV Tool | Testing Tool |
| **Eclipse OCL** | IDE4OCL | Modeling Tool | Repository | MDE Tool | FV Tool | Testing Tool |
| **Oclarity** | IDE4OCL | Modeling Tool | Repository | MDE Tool | FV Tool | Testing Tool |
| **OCLE** | IDE4OCL | Modeling Tool | Repository | MDE Tool | FV Tool | Testing Tool |
| **SQUAM** | IDE4OCL | Modeling Tool | Repository | MDE Tool | FV Tool | Testing Tool |
| **TOPCASED-VF** | IDE4OCL | Modeling Tool | Repository | MDE Tool | FV Tool | Testing Tool |
| **USE** | IDE4OCL | Modeling Tool | Repository | MDE Tool | FV Tool | Testing Tool |

# Native IDE4OCL Components

reuses

| | Dresden OCL | Eclipse OCL | Oclarity | OCLE | SQUAM OCL | TOPCASED-VF | USE |
|---|---|---|---|---|---|---|---|
| OCL Parser | + | + | + | + | Eclipse OCL | Eclipse OCL | + |
| OCL Evaluator | + | + | | + | + | + | + |
| OCL Editor | + | + | + | + | + | + | |
| Impact Analyser | | + | | | | | |
| OCL Libraries | | | | | + | | |
| OCL Doc | | | | | + | | |
| OCL Extensions | | | | | + | | + |
| OCL Checker | | | | | | + | |
| OCL Reporting | | | | | | + | |

# Summary

- Refined feature model
- Feature model in a web framework online
  - http://ide4ocl.opoki.com/featuremodel/
- 7 publicly documented OCL tools in this framework
  - First comparative and quantitative evaluation of these tools
  - Qualitative comparison could not achieved
- Top-level architecture of the OCL tools in terms of the OCL tools landscape

# Outlook

- Qualitative evaluation of OCL tools
- Discussion of the feature evaluation values such as extending by **partially implemented** and **fully tested**
- Involve further OCL tools
- Develop feature model as **reference model** for OCL tools?
- Discuss cooperation in further development of OCL tool support

# Thank You for Coming and Keeping Together!

Coming together is a beginning.
Keeping together is progress.
Working together is success.

*Henry Ford (1863 – 1947)*

# Backup Slides

# Further OCL Tools to Involve?

- EOS (Manuel Clavel et al.)
- ECO/Gaffr for Visual Studio (Jonas Hogstrom, Hans Karlsen@CapableObjects)
- Kent OCL Library (Dave Akehurst et al.)
- MIP OCL2 Parser (Steve Wartik) supporting Enterprise Architect
- OSLO (Christian Hein@Fraunhofer Berlin) – Open Source Library for OCL
- ... ?

- HOL-OCL (Achim Brucker, Burkhart Wolff)
- KeY Tool (Reiner Hähnle)
- UMLtoCSP (Jordi Cabot)
- ... ?

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# OCL Portal

st.inf.tu-dresden.de/oclportal/

## List of modeling tools with OCL support

Sunday, 25 July 2010 13:32 Birgit Demuth

Here you find a list of UML and MDE tools in alphabetic order that provide OCL support by different manner and power (parsing, static checking, evaluation, code generation, ... ). Note that many UML tools provide only an OCL constraint specification feature. But OCL expressions should be at least able to be parsed. Otherwise this tool is not worth to be called as a "tool with OCL support".

An overview about UML tools can be found at umltools.freebase.com

Please let me know if you know further modeling tools with OCL and/or write own OCL Portal entries with more detailed information about OCL tools.

- Arcstyler by Interactive Objects
- ArgoUML (Open Source)
- Borland Together
- Eclipse Model Development Tools (MDT)
- ECO for Visual Studio by CapableObjects
- Enterprise Architect by Sparx Systems
- Fujaba (Open Source)
- Innovator by MID
- Magic Draw UML by NoMagic
- Oclarity for Rational Rose
- Papyrus UML (Open Source)
- TOPCASED (Open Source)

# Debugging Features

- Tracing
- Variable Watching
- Breakpoints
- Step by Step Execution
- Value Insertion
- Automating Test Cases

# Evaluation Compliance Features

- Association end navigability
- 4-valued-logic (mandatory)
- Semantics as defined in the specification (mandatory)
- allInstances()
- Pre-values and oclIsNew() in postconditions
- OclMessages
- Accessing private and protectes features of an object

# Syntax and Semantics Extension Features

- OCL embedding
- OCL extending
- Alternative concrete syntax
  - Parsing support
  - Printing support

# Refactoring support

- Renaming
- Extracting
- Removing
- Changing OCL context
- Co-refactoring and co-evolution
- Further refactorings

# Dresden OCL Refactoring Support

- Renaming
- Extract variable
- Inline Variable
- Remove unused variable
- Remove redundant brackets
- Split expressions
- Separate context classifiers
- Split expression atomic
- Merge expressions
- Merge context classifiers
- Merge atomic expressions
- Split conditional rules
- Remove/materialize self
- Remove/materialize type

# Error Handling Features

- Static semantics
- Dynamic semantics

# Architectural Support Features

- Batch mode
- Interfaces to other components from the OCL landscape
  - Modeling tool
  - MDE tool
    - Code generation
    - Model Transformation
  - Formal verification tool
  - Repository
    - Version management
      - File-based version management
      - Model-based version management
  - Testing tool

## Features in all tools

- Basic editing
- Document interface
- Syntax highlighting
- Syntax compliance

## Further most wanted features

- Auto-completion
- Debugging
- Refactoring support