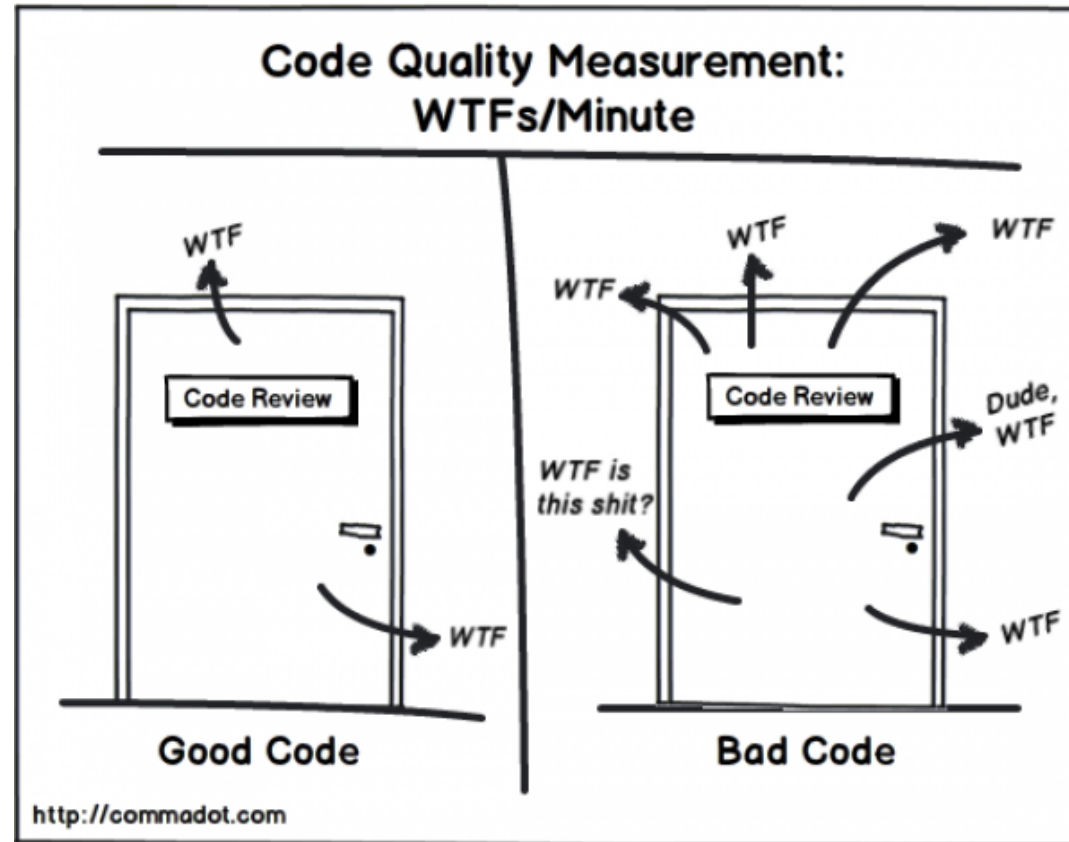


ABL source code analysis

Code quality management with SonarQube

GILLES QUERRET • RIVERSIDE SOFTWARE

Code quality



Audience survey



Why ?

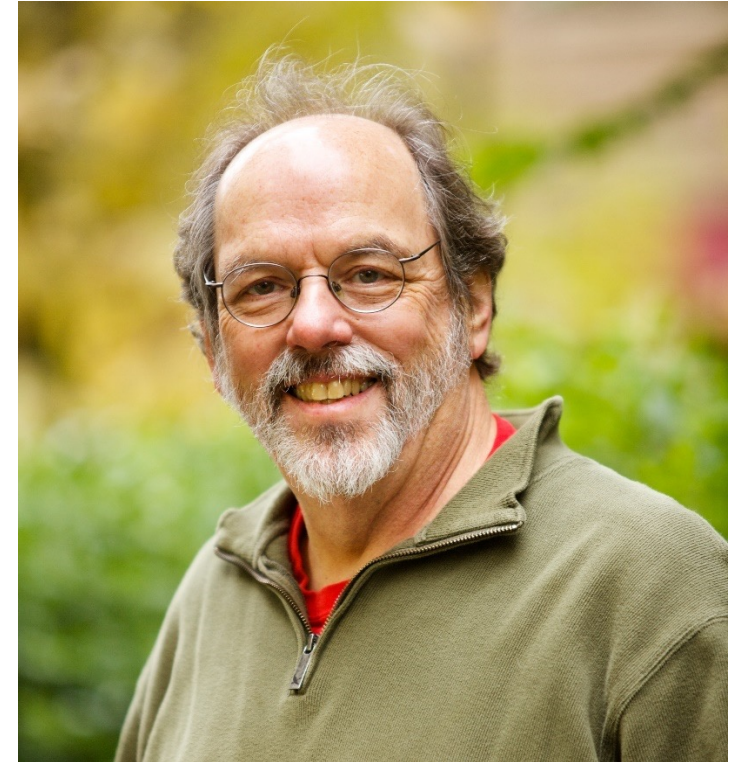
- Because you have to maintain your code
 - Low quality code is harder to maintain and to improve
- And you want to maximize profit !
- Unless you're working by the hour **and** your customers are happy with bad code, it will cost money on the long term

Technical debt

Term coined by Ward Cunningham in 1992

Metaphor around the time it takes to work with low quality code :

- If technical debt is high, you'll pay high interest (in terms of time spent) each time you work on the project
- Pay down the principal by refactoring code
- Increase the debt if you add quick and dirty code



SonarQube



- Code quality management platform
- Open source
- Extensible
- Over 20 languages (from COBOL to Javascript)

SonarQube



Apache Commons Collections May 23, 2016 4:51 AM Version 4.2-SNAPSHOT

Issues Measures Code Dashboards

Quality Gate **Failed**

last 30 days
42.9% Technical Debt Ratio on New Code
> 5.0%

Bugs & Vulnerabilities

Leak Period: last 30 days
started a month ago

221 Bugs	1 Vulnerabilities	0 New Bugs	0 New Vulnerabilities
-------------	----------------------	---------------	--------------------------

Code Smells

started 3 years ago

1.3k Code Smells	30d Debt	307 New Code Smells	7d New Debt
---------------------	-------------	------------------------	----------------

Coverage

82.9% Coverage	16k Unit Tests	100.0% Coverage on 1 New Lines of Code
-------------------	-------------------	--

Duplications

4.5% Duplications	180 Duplicated Blocks	+0.0% Duplications
----------------------	--------------------------	-----------------------

Size

Java 29k	29k Lines of Code	+3 Lines of Code
XML 671		
Web 94		

The Apache Commons Collections package contains types that extend and augment the Java Collections Framework.

- Bug Tracker
- Continuous integration
- Developer connection
- Home
- Sources

Key
org.apache.commons:commons-collections4

Quality Gate
(Default) SonarQube way

Quality Profiles
(Java) Sonar way
(Web) Sonar way
(XML) Sonar way

Events

Version: 4.2-SNAPSHOT
May 23, 2016

Quality Gate: Red (was Green) [?](#)
May 21, 2016

Quality Profile: Changes in 'Sonar way' (Java)
May 19, 2016

Quality Profile: Changes in 'Sonar way' (Java)
April 28, 2016

Quality Profile: Changes in 'Sonar way' (Java)
April 23, 2016

Show All

SonarQube



Apache Commons Collections May 23, 2016 4:51 AM Version 4.2-SNAPSHOT

Issues Measures Code Dashboards

Issues Effort

Type

- Bug 221
- Vulnerability 1
- Code Smell 1,301

Resolution

Unresolved	221	Fixed	26
False Positive	0	Won't fix	0
Removed	0		

Severity

Status

New Issues

Rule

Tag

Module

Directory

File

Assignee

Author

Language

Apache Commons Collections src/main/java/org/apache/commons/collections4/IteratorUtils.java

This loop's stop condition tests "iterator" but the incrementer updates "index". [...](#) a year ago L1306 No tags

Bug Major Open Not assigned 20min effort

Apache Commons Collections src/main/java/org/apache/commons/collections4/ListUtils.java

Add a nested comment explaining why this method is empty, throw an UnsupportedOperationException or complete the implementation. [...](#) 3 years ago L590 No tags

Bug Major Open Not assigned 5min effort

Add a nested comment explaining why this method is empty, throw an UnsupportedOperationException or complete the implementation. [...](#) 3 years ago L593 No tags

Bug Major Open Not assigned 5min effort

Override this superclass "equals" method. [...](#) a year ago L608 No tags

Bug Major Open Not assigned 30min effort

Override this superclass "equals" method. [...](#) a year ago L665 No tags

Bug Major Open Not assigned 30min effort

Apache Commons Collections src/main/java/org/apache/commons/collections4/bidimap/AbstractDualBidimap.java

Make "parent" transient or serializable. [...](#) 2 years ago L348 cw.serialization

Bug Critical Open Not assigned 30min effort

Override this superclass "equals" method. [...](#) a year ago L677 No tags

Bug Major Open Not assigned 30min effort

Apache Commons Collections src/main/java/org/apache/commons/collections4/bidimap/DualTreeBidimap.java

Override this superclass "equals" method. [...](#) a year ago L55 No tags

Bug Major Open Not assigned 30min effort

Apache Commons Collections src/main/java/org/apache/commons/collections4/bidimap/TreeBidimap.java

Override this superclass "equals" method. [...](#) a year ago L1463 No tags

Bug Major Open Not assigned 30min effort

Add a "NoSuchElementException" for iteration beyond the end of the collection. [...](#) a year ago L1748 No tags

Bug Major Open Not assigned 5min effort

Add a "NoSuchElementException" for iteration beyond the end of the collection. [...](#) a year ago L1794 No tags

Bug Major Open Not assigned 5min effort

SonarQube



Apache Commons Collections May 23, 2016 4:51 AM Version 4.2-SNAPSHOT

Issues Measures Code Dashboards ▾

All Reliability Security Maintainability Coverage Duplications Size Complexity Documentation Issues Leak Period: last 30 days

Reliability

221	0	E	Reliability Remediation Effort	9d
Bugs	New Bugs	Reliability Rating	Reliability Remediation Effort on New Code	0

Security

1	0	B	Security Remediation Effort	5min
Vulnerabilities	New Vulnerabilities	Security Rating	Security Remediation Effort on New Code	0

Maintainability

1,301	307	A	Technical Debt	30d
Code Smells	New Code Smells	Maintainability Rating	Added Technical Debt	7d 5h
			Technical Debt Ratio	1.7%
			Technical Debt Ratio on New Code	42.9%
			Effort to Reach Maintainability Rating A	0

Coverage

82.9%	100.0%	16,066	Line Coverage	85.1%
Coverage	Coverage on New Code	Unit Tests	Line Coverage on New Code	100.0%
			Condition Coverage	78.1%
			Condition Coverage on New Code	100.0%
			Uncovered Lines	1,938
			Uncovered Lines on New Code	0
			Uncovered Conditions	1,334
			Uncovered Conditions on New Code	0
			Lines to Cover on New Code	1
			Lines to Cover	13,011

SonarQube



Apache Commons Collections May 23, 2016 4:51 AM Version 4.2-SNAPSHOT

Issues Measures Code **Dashboards**

Custom Time changes...

Unit Tests Coverage 82.9%	Unit Test Success 100.0%
Line Coverage: 85.1% Condition Coverage: 78.1%	Failures: 0 Errors: 0 Tests: 16,066 Execution Time: 31 sec

Lines Of Code 29,298	Files 321	Functions 4,011
Java: 28,533 XML: 671 Web: 94	Directories: 36 Lines: 69,683	Classes: 470 Statements: 11,369 Accessors: 72

Duplications 4.5%
Lines: 3,169 Blocks: 180 Files: 66

Documentation 97.2%	Comments 40.4%
Public API: 1,477 Pub. Undoc. API: 41	Comment Lines: 19,876

Issues 1,523	Technical Debt 30d	Blocker 2
	Reliability Remediation Effort 9d	Critical 162
	Security Remediation Effort 5min	Major 601
		Minor 732
		Info 26

April 6, 2016 ● Lines of Code: 29,295
Changes in 'Sonar way' (Java)

UNRESOLVED ISSUES	
Total	1.5k
January 1, 2016 – May 23, 2016	338
January 1, 2015 – December 31, 2015	335
January 1, 2014 – December 31, 2014	465
January 1, 2013 – December 31, 2013	385

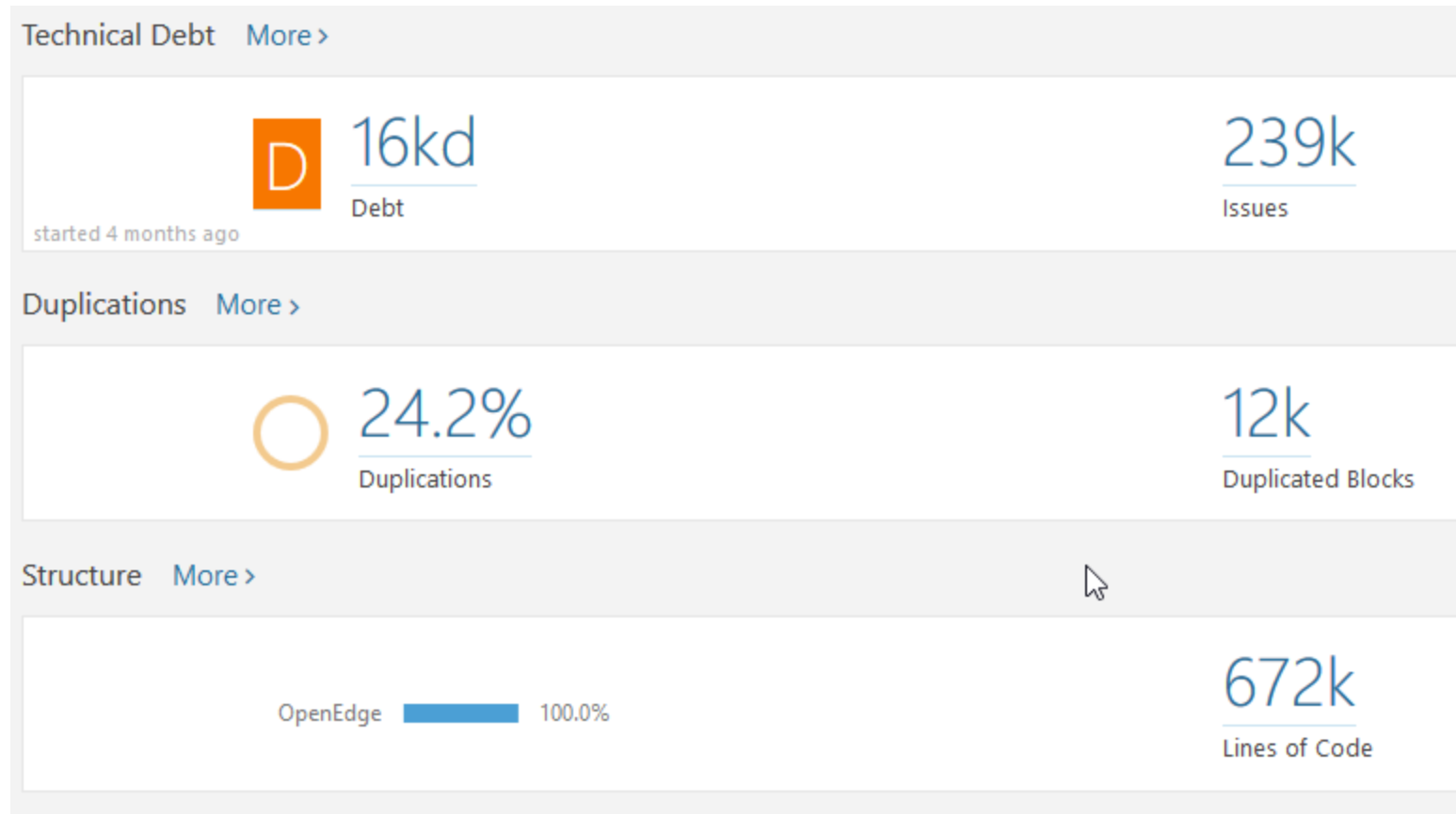
OpenEdge plugin

- Open source plugin written by Riverside Software
- Common metrics (LOC, comments, complexity, ...)
- Code duplication
- Code coverage
- XREF and code parsing
- Extensible

OpenEdge plugin - Requirements

- Automated build process
 - PCT is strongly recommended
- Analysis triggered by Java
 - Continuous integration server is strongly recommended

Analyzing legacy projects



OpenEdge plugin - Integration

SonarTech commented on the diff 40 minutes ago

```
...nar/server/util/MetricWorkDurationTypeValidation.java
```

```
30 + private final Durations durations;
31 +
32 + public MetricWorkDurationTypeValidation(Durations durations) {
33 +     this.durations = durations;
34 + }
35 +
36 + @Override
37 + public String key() {
38 +     return PropertyType.METRIC_WORK_DURATION.name();
39 + }
40 +
41 + @Override
42 + public void validate(String value, @Nullable List<String> options) {
43 +     try {
44 +         durations.decode(value);
45 +     } catch (IllegalArgumentException e) {
```

SonarTech added a note 40 minutes ago

Either log or rethrow this exception.

Add a line note

SonarTech commented 40 minutes ago

SonarCube analysis reported 7 issues:

- 3 critical
- 3 major
- 1 minor

Watch the comments in this conversation to review them.

Add more commits by pushing to the `feature/ws_measures_create` branch on `SonarSource/sonarcube`.

Failed — 1 errored and 2 successful checks

- sonarcube** — SonarCube reported 7 issues, with 3 critical
- continuous-integration/travis-ci/push** — The Travis CI build passed
- continuous-integration/travis-ci/pr** — The Travis CI build passed

Merge with caution!

You can also merge branches on the command line.

Merge pull request

Project 1 commons-lang

Pull request #1 OPEN develop → trunk

Develop

Overview Diff Commits

Details

Issues Merging the Pull Request

⚠ Sonar for Stash detected violations against the configured thresholds

- **Technical debt:** Max. increase allowed: 1%, actual 9%
- **Sonar issues with severity >= MAJOR:** Max. increase allowed: 3, actual 25
- **Duplicate code lines:** Max. increase allowed: 1%, actual 6%
- **Test coverage:** Min. coverage threshold: 99%, actual 92.6%

Please go through the code, fix the marked violations, push the changes and try to merge again.

Close

Metric	develop	trunk
Tech. debt	63d	58d
All issues	2325	2288
Dupl. lines	1245	1178
Coverage	92.6%	92.8%

Unwatch this pull request

Learn more

Administrator commented on a file 1 hour ago

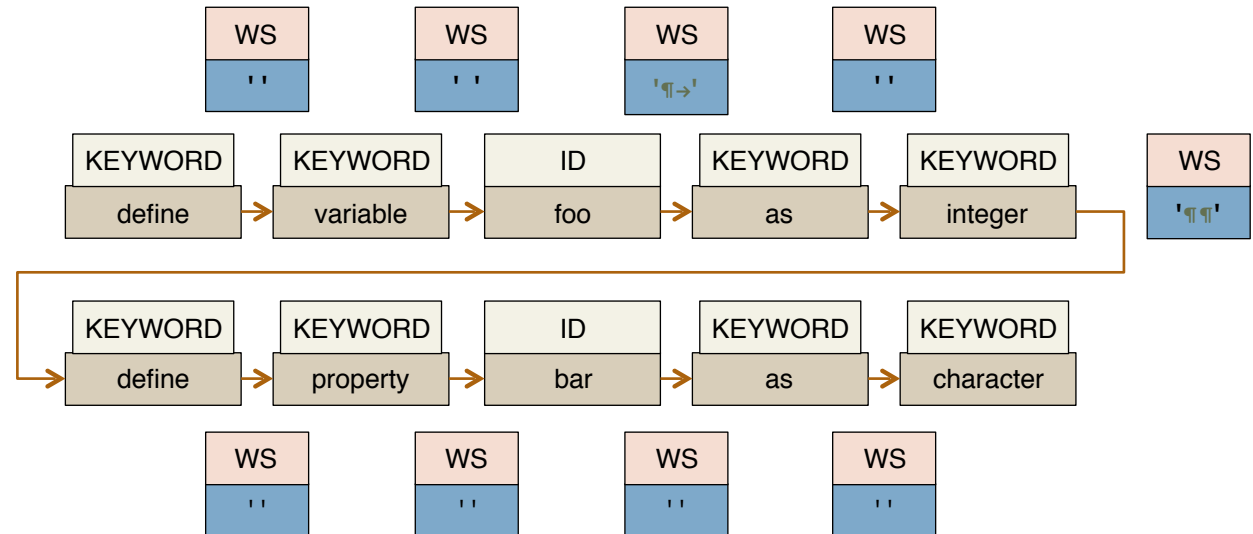
```
src / main / java / org / apache / commons / lang3 / builder / EqualsBuilder.java
```

Lexer and parsers

- KEYWORD : 'define' | 'variable' | 'property' | 'as' | 'character' | 'integer'
- WS : (' ' | '\t' | '\n')* -> HIDDEN
- ID : [a-zA-z]*
- EOS : '.'

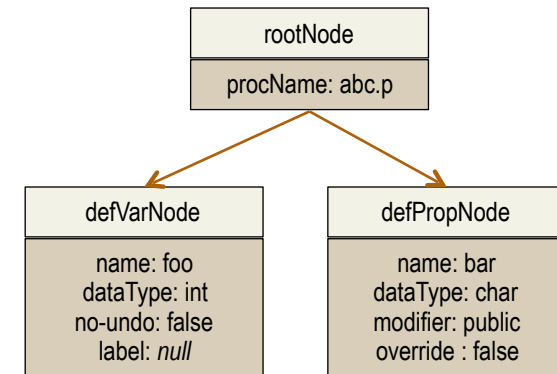
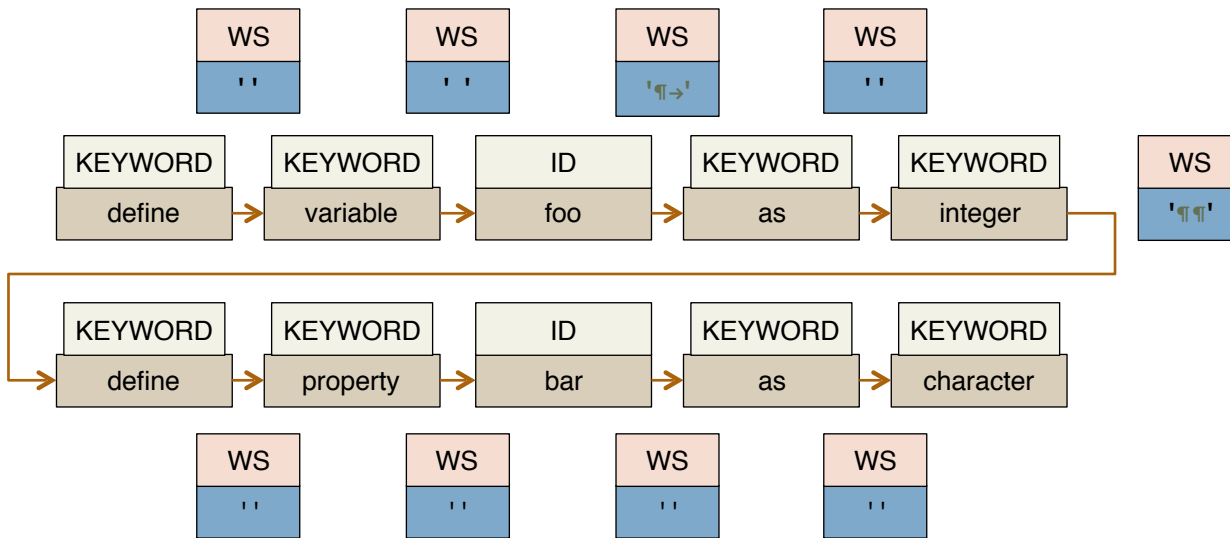
```
define_variable__foo¶  
→ as_integer.¶
```

```
¶  
define_property_bar_as_character.
```

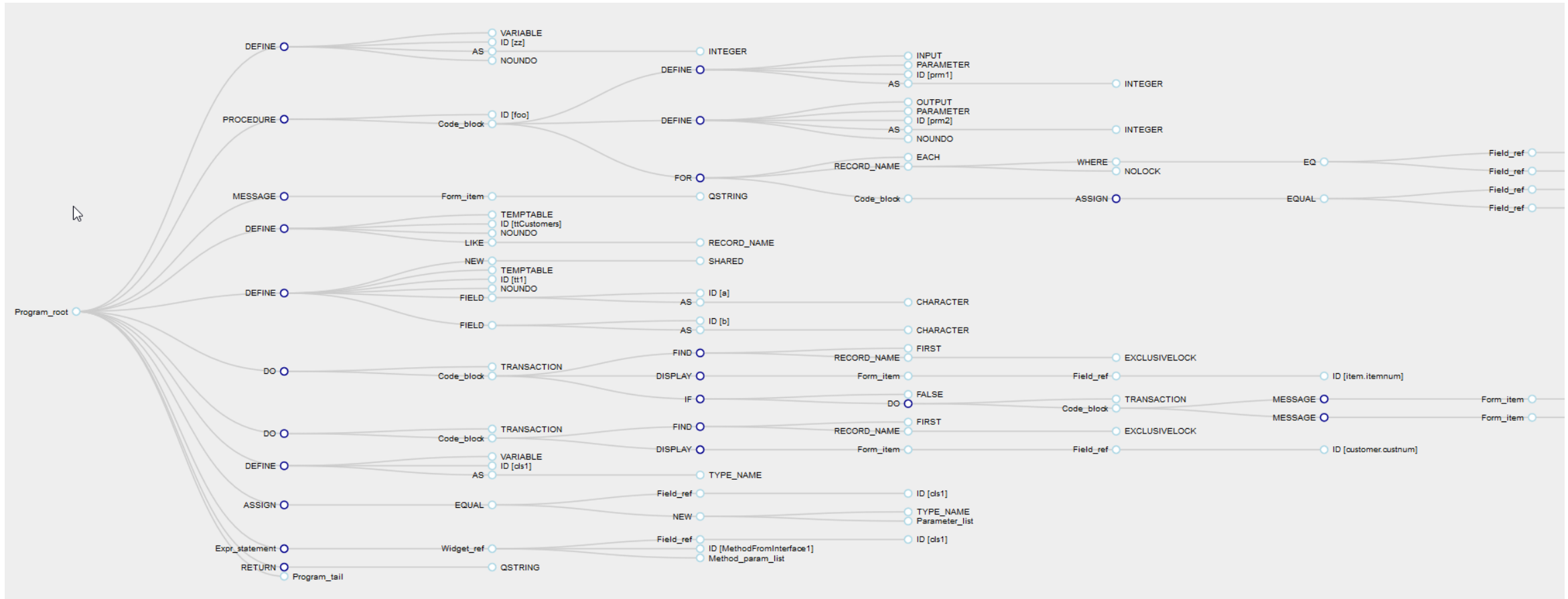


Lexer and parsers

- defVar: KW_DEFINE KW_VARIABLE ID KW_AS DATATYPE KW_NO_UNDO? (KW_LABEL QUOTED_STRING)?
- defProp: KW_DEFINE (KW_PUBLIC | KW_PROTECTED | KW_PRIVATE)? (KW_STATIC | KW_ABSTRACT)? KW_OVERRIDE? KW_PROPERTY ID KW_AS (DATATYPE | CLASSNAME)



Lexer and parsers



Beta period

- Full support until end of June 2016
- Rules available for free
- Looking for feedback in terms of metrics, rules and bugs

- Try it !
 - <https://github.com/Riverside-Software/sonar-openedge>

Under the hood

- SonarQube is (almost) entirely written in Java
- ABL Parser based on Proparse
- Extensible rules engine (Java only)
- Much faster than Prolint
- Other parsers based on ANTLR4

Questions ?

Reference ?

- Sonar Source : <http://www.sonarsource.com>
- Sonar OE plugin demo site : <http://sonar.riverside-software.fr>

- Riverside Software : <http://riverside-software.fr>
- Contact : contact@riverside-software.fr