

Sat4j Hands On Practice Session

A few words about Sat4j

Daniel Le Berre
Emmanuel Lonca, Anne Parrain, Stéphanie Roussel, Romain
Wallon

Université d'Artois, CNRS

SAT+SMT 19, Mumbai, 10 December 2019

Initial objectives of the project

- ▶ 100% Java SAT library
- ▶ Open Source
- ▶ Flexible to experiment new idea
- ▶ Efficient enough to be useful on real problems
- ▶ Designed both for academia and Java developers
- ▶ To solve a wide range of problems over Boolean variables

Initial objectives of the project

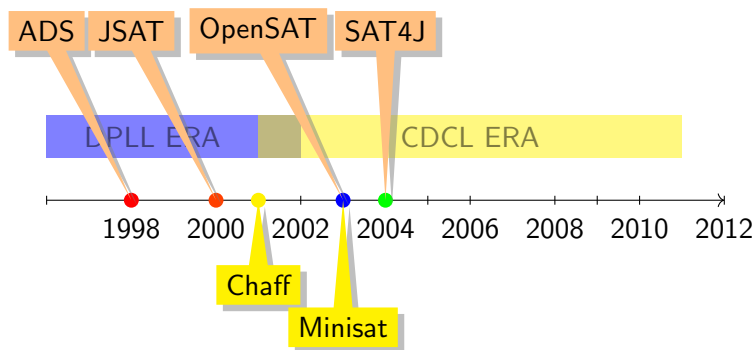
- ▶ 100% Java SAT library
- ▶ Open Source
- ▶ Flexible to experiment new idea
- ▶ Efficient enough to be useful on real problems
- ▶ Designed both for academia and Java developers
- ▶ To solve a wide range of problems over Boolean variables
- ▶ Experimental platform for my software engineering practices

Initial objectives of the project

- ▶ 100% Java SAT library
- ▶ Open Source
- ▶ Flexible to experiment new idea
- ▶ Efficient enough to be useful on real problems
- ▶ Designed both for academia and Java developers
- ▶ To solve a wide range of problems over Boolean variables

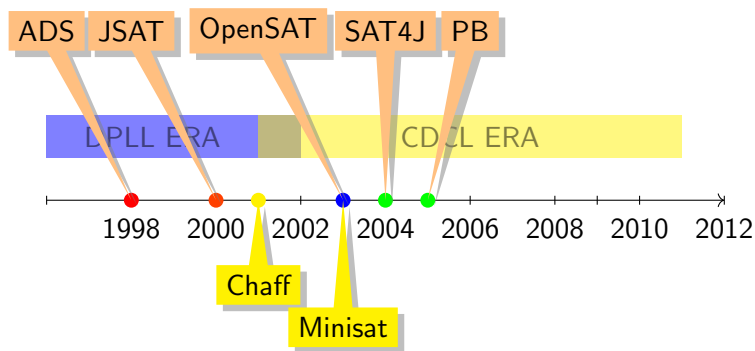
Took some time to take off

From ADS to Sat4j



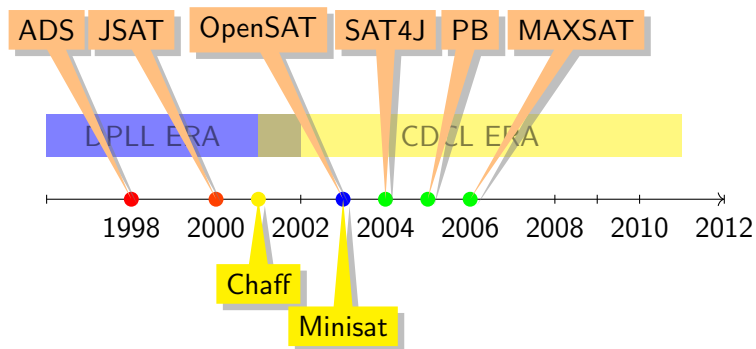
- ▶ Start of SAT4J, Java implementation of Minisat.
- ▶ Open Source GNU LGPL.

From ADS to Sat4j



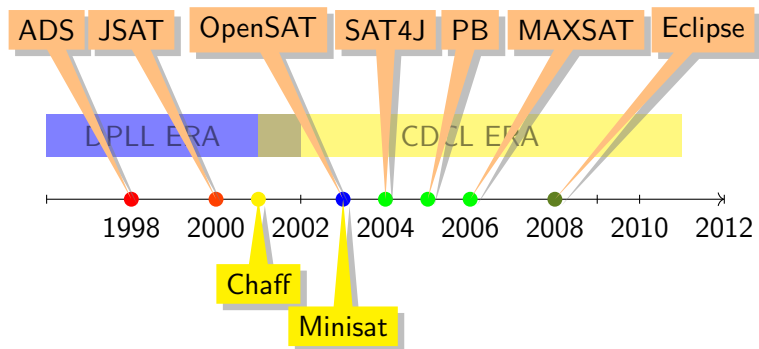
- ▶ With INESC → PB evaluation + Sat4j PB
- ▶ First CSP competition → Sat4j CSP

From ADS to Sat4j



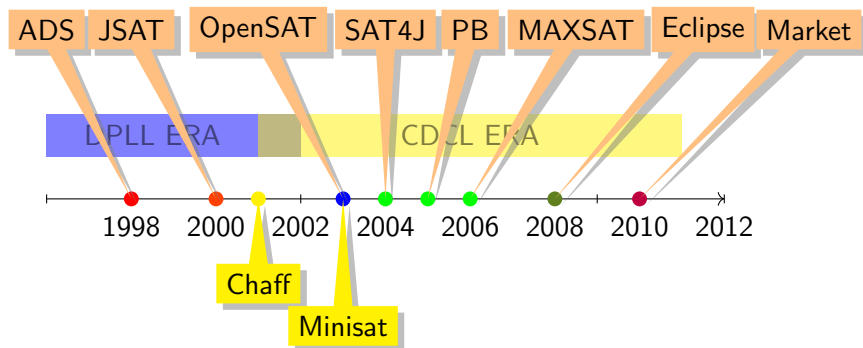
- ▶ First MaxSAT evaluation
- ▶ Sat4j MaxSAT

From ADS to Sat4j



- ▶ Integration within Eclipse
- ▶ Sat4j dual licensing EPL et GNU LGPL

From ADS to Sat4j



► Eclipse Marketplace

SAT4J in a few facts

- ▶ The slowest SAT solver of the SAT community (unless counting is needed)
- ▶ 44k lines of Java code
- ▶ Mainly used by the software Engineering (as solver or case study)
- ▶ Used to teach SAT in many universities
- ▶ Used everyday in Eclipse to maintain it's plugin dependencies

Eclipse Plugin Dependency Problem

IU: org.eclipse.swt v 3.2.0

Capabilities:

```
{namespace=package, name=a, version=1.0.0}
{namespace=foo, name=b, version=1.3.0}
{namespace=package, name=c, version=4.1.0}
```

Requirement expressions

```
(true) ->
  {namespace=package, name=r1, range=[1.0.0, 2.0.0]}
  and
  {namespace=foo, name=r1, range=[3.2.0, 4.0.0]}
(& (os=linux) (ws=gtk)) ->
  {namespace=package, name=r2, range=[1.0.0, 2.0.0]}
  or
  {namespace=foo, name=bar, range=[3.2.0, 4.0.0]}
```

Why using Sat4j in p2 (Eclipse)

Plugin Hell

L'approche gloutonne utilisée par Eclipse pour gérer les dépendances ne passe pas à l'échelle avec l'augmentation du nombre de plugins.

- ▶ Software Dependency is NP-complete just like SAT
- ▶ Theoretical results known (European Project EDOS for Linux)
- ▶ Need for a Java SAT/PBO solver
- ▶ Open Source
- ▶ Maintained/supported (forge Objectweb/OW2)

Fun fact : Sat4j has always been developed with Eclipse!

Eclipse Marketplace (launched in 2010)



My Marketplace Add Content More

Home / Marketplace / New and Updated Solutions

MARKETS

- Eclipse Project (42)
- Tools (1603)
- IoT (149)
- RCP Applications (95)
- Training & Consulting (58)
- Long Term Support (11)

TOP MPC DOWNLOADS

Darkest Dark Theme with DevStyle	44456
Spring Tools 4 - for Spring Boot (aka Spring Tool Suite 4)	32303
Subclipse	26252
SonarLint	18362

37,419,744 solutions installed directly from Eclipse!

1710 Solutions and counting.



All Solutions Categories

All Markets

Search

Advanced Search

SPOTLIGHT



☆ 303 🗨 22

Install



CodeMix 3

Updated! Integrate anything from Vue to React in your daily development. eLearning courses right inside your IDE get you going fast. Replaces & enhances JavaScript, HTML and CSS developme...



☆ 246 🗨 11

Install

Vaadin Plugin for Eclipse

Vaadin is an open source Java UI library for creating rich web user interfaces. Using its component-based API developers can create stunning web applications in plain Java.

<https://github.com/danielleberre/satsmt19handson>

Thanks for your attention. Questions ?

