The State of Stratego/XT
Sixth Stratego User Days (SUD 2005)

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0.14

- 3.5 months
- 54 issues
- 231 commits
- --dr new is now default
- hierarchical library
- no bootstrapped sources in svn
- pkg-config
- ...and much more!
People: What are we doing?

Utrecht

- Eelco Visser – Stratego Language and Compiler
- Karina Olmos – Octave, Tiger
- Martin Bravenboer – Dryad, Stratego/XT
- Rob Vermaas – Octave, Dryad, Stratego/XT
- Eelco Dolstra – Nix Buildfarm and all-round guru


Utrecht/Bergen (Norway)

- Magne Haveraaen
- Anya Helene Bagge – MetaStratego, Codeboost
- Karl Trygve Kalleberg – Spoofax, Meta/AspectStratego

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People: What are others doing?

**EPITA (France)**
- Akim Demaille, Valentin David, Clément Vasseur, Julien Roussel, Nicolas Despres, ChoJin, Alexandre Borghi, Renaud Durlin, Olivier Gournet, Thomas Largillier, Nicolas Pouillard, …?
- C and C++, attribute grammars, extended SDF

**Université René Descartes (Paris 5, France)**
- Mikal Ziane and Salima Chantit
- Refactoring, bad smells, Java

**TUE (The Netherlands) / Moskou**
- Yaroslav Usenko and others
- muCRL linearizer

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People: What are others doing?

**Lucent / Bell Labs**
- Daniel Waddington, Bin Yao, Ramesh Viswanathan
- Proteus (C transformation system)
- Harsha Nagesh, Pankaj Risbood – Evaluating

**OGI (Oregon, USA)**
- Dick Kieburtz – Theorem prover for Programmatica

**DIKU (Copenhagen, Danmark)**
- Julia Lawall
- Evaluating Stratego for use in Tarantula (driver evolution)

**University of Waterloo (Canada)**
- Language extension projects by students
Dynamic rules

- scope labels, :+. bagof-\( R \) and bigbagof-\( R \)
- boolean operations, changesets
- dependencies

⇒ talk by Eelco Visser

Modules

- hierarchical module names
- ongoing work: design of module system

Aspect Stratego

⇒ talk by Karl Trygve Kalleberg

Sugar

- if \( s \) then \( s \) (else \( s \))? end
- switch \( s \) (case \( s \) : \( s \))* (otherwise : \( s \))? end
News: Compiler

Separate compilation

- XTC programs
- Fixes for Mac OS X
- Supported by stand-alone compiler
- Detection of redefinition

Usability

- Reporting of parse errors
- Report of ambiguities in concrete object syntax
- Disable heuristic SGLR filters
- --xtc-repo

Ongoing work: strc-core

- Definition of core language
- Representation of annotations
- Refactoring and cleanup

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SSL to Stratego Library

Hierarchical structure

collection
  /hash-table
  /list
  /set
  /tuple

lang

strategy
  /general
  /pack
  /traversal

system
  /io
  /posix

term

util
  /config

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term/string:newname

<newname> "var"  // produces "var_0"
<newname> "var"  // produces "var_1"

collection/hash-table/common

new-hashtable
hashtable-put(|key, value)
hashtable-get(|key)

collection/set/indexed

new-iset
iset-add(|t)
iset-contains(|t)
iset-values

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Concrete Syntax

- Major cleanup and update of SDF in Stratego/XT
- sglri
  fancy error reporting at command-line
- pack-sdf
  usability: module names, include mechanism
- sdf2parenthesizer
  parenthesizer based on associativity and priorities in SDF
- parse-unit
  concrete syntax, usability
- asfix-anno-comments
  comment preserving transformations

Abstract syntax

- Introduction of stratego-regular: rtg
- format-check – visualization, performance
- xml2aterm and aterm2xml – conversion & roundtrip

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News: Development and Deployment

- JIRA issue tracking
- Nix Buildfarm
  - Continuous distribution
  - Nix channels, RPMs
- Cygwin and Mac OS X Support
- Bootstrapping: baseline Stratego/XT
- Separate Stratego/XT Utils
- Shared libraries - Libtool
- pkg-config
  - Forward compatible Makefile.xt
  - Implicit configuration
- Build-time XTC repositories
  - Uninstalled packages (check without install)

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Statistics: Size of Sources

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API documentation
  - xDoc
    - Usability of API docs
    - Hierarchical modules
  - Continuous update
    - Stratego Library, XTC, Dryad

Stratego/XT Manual
  - DocBook
  - More structure than Wiki
  - Mixture of languages, examples, tools
  - Contiguously build

Publications
  - Dynamic rules, Concrete Object Syntax, Aspect Stratego
Language

- Program Transformation with Scoped Dynamic Rewrite Rules.
  *Fundamenta Informaticae: Special Issue on Program Transformation*

- Composing Source-to-Source Data-Flow Transformations with Rewriting Strategies and Dependent Dynamic Rewrite Rules.
  *International Conference on Compiler Construction (CC’05)*

- Combining Aspect-Oriented and Strategic Programming.
  *International Workshop on Rule-Based Programming (RULE’05)*

Surveys

- A Survey of Strategies in Rule-Based Program Transformation Systems.
  *Journal of Symbolic Computation special issue on Strategies in Rewriting and Programming*
Applications

- Transformers: a C++ program transformation framework
  *Technical report – EPITA Research & Development Laboratory*

- Concrete Syntax for Objects. Domain-Specific Language Embedding and Assimilation without Restrictions
  *Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA’04)*

- Retrofitting the AutoBayes Program Synthesis System with Concrete Object Syntax.
  *Domain-Specific Program Generation: International Seminar, Dagstuhl (LNCS)*
News: Program Transformation Course

Master course on program transformation using Stratego/XT

- 10 weeks, 2 lectures per week
- 5 weeks: learn Stratego/XT
- 5 weeks: project

Challenging projects:

- Java refactoring: extract method
- Java bytecode obfuscation
- Java inner class lifting (lambda lifting)
- Driver evolution (Tarantula)
- SubJ – Subject Oriented Java Composition
- Compilation of embedded XPath (Java)
News: Main Projects in XT Orbit

- **Transformers** – C and C++
- **Codeboost** – C++
- **Dryad & Java Front** – Java
- **Octave Compiler** – Octave
- **Tiger Compiler** – Tiger compiler and examples

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Program transformation framework for the C and C++

- Transformers 0.3 (for Stratego/XT 0.14)
- ISO standard grammars
- C syntax definition and disambiguation tools, based on attribute grammars.
- C++ syntax definition and partial disambiguation
- Extensions of SDF (ast, pp, attributes)
- Talks later todays
Java-front (stable)

- Upgraded to full 1.5
- Extensive support for concrete syntax

Dryad (beta)

- Disambiguation, qualification and reclassification
- Type checker
- Java bytecode interface
- Unified model for classes in bytecode and Java

AspectJ (alpha)

- SDF syntax definition (SGLR!)
- Pretty-printer
- Both extend Java-front

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News: Embedding of DSLs

- Concrete Syntax for Objects (OOPSLA)
  - Embedding of DSL in Java
  - JavaBorg

- René de Groot (master student):
  - Swul (user-interface language)
  - Regular expressions
  - Talk later today

- Waterloo & Utrecht (PT): XPath embedding

- Demo and paper at GTTSE (Portugal)

- Continuing work on Java code generation

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News: Spoofax Stratego Editor

Later today: demo by Karl Trygve Kalleberg

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Other Projects

**Octave**
- Wednesday: Octave talk by Rob Vermaas
- Master project: Octave vectorizer

**Tiger**
- Mostly demonstration and experiments

**Transformation Tool Composition (XTC)**
- XTC2 (Eelco Visser)
  - Namespaces and scoped bindings (plugins)
- XTC3 (Niels Janssen)
  - Component definition, contracts, abstraction

**Stratego Shell**
- Released
- Bug fixes and usability
**Conclusion**

**2004-2005**
- Stratego/XT is becoming mature
- More language-specific support
  - e.g. Dryad & Transformers
- Many contributors

**2005-2006 (Utrecht)**
- Stratego
  - Compiler: strc-core
  - Language: module system
- Maybe Stratego/XT 1.0 in 2006?
- Dryad
  - Complete type-checker for 1.5
  - High-level transformation
  - JVM bytecode backend

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