



# Exploration and Analysis of Source Code Changes

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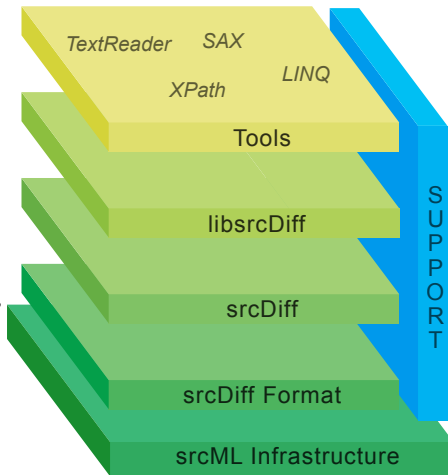


## Overview

- Infrastructure to support syntactic differencing, exploration, and analysis
- Enable tools to support evolution of software

## srcDiff Infrastructure

- **Tools** - Set of tools built upon libsrcDiff/srcDiff format to support software development and the evolution of software
- **libsrcDiff** - Library to compute the difference between an original and modified version of code (i.e. the delta) and to explore and analyze changes
- **srcDiff** - Efficient rule-based technique for computing the source-code delta
- **srcDiff Format** - Representation of source code and delta with all original information intact, including whitespace, comments, and preprocessing statements.
- **srcML Infrastructure** - Existing infrastructure; basis for srcDiff infrastructure
- **Support** - A multi-university team currently supports the infrastructure.



## Sample Source Code Change

Original	Modified
<pre>void setImage(Image image) {   widget-&gt;setImage(image); }</pre>	<pre>void setImage(Image image) {   if (options) {     options-&gt;setImage(image);   } }</pre>

## Line Difference vs srcDiff Unified View

Line Difference	srcDiff
<pre>void setImage(Image image) { - widget-&gt; setImage(image); + if (options) { + options-&gt;setImage(image); + } }</pre>	<pre>void setImage(Image image) {   if (options) {     widgetoptions-&gt;setImage(image);   } }</pre>

## Conversion of for to while

Original	Modified
<pre>int itemCount = d.items.count(); for(int i = itemCount-1; i &gt;= 0; --i) {   Item &amp;sblItem = d.items[i];   if (sblItems.widget() == widget) {     // several common lines   } }</pre>	<pre>int itemCount = d.items.count() - 1; while(i &gt;= 0) {   Item &amp;sblItem = d.items[i];   if (sblItems.widget() == widget) {     // several common lines   }   --i; }</pre>
srcDiff	
<pre>int itemCount = d.items.count() - 1; <b>forwhile</b>(int i = itemCount-1; i &gt;= 0; <b>-i</b>) {   Item &amp;sblItem = d.items[i];   if (sblItems.widget() == widget) {     // several common lines   }   <b>--i;</b> }</pre>	

## Infrastructure Product Goals

- Additional language support
  - Java
  - C#
- Library libsrcDiff
  - Computes delta
  - Support exploration & analysis
  - C library with additional bindings (e.g., Python)
- Tools supporting software development/evolution
  - Automatic merge resolution
  - Developer alert tool for changes to specific code entities
  - Change Metrics for Management

## Community Outreach

- Technical Briefings at major software engineering conferences
  - Most recently at ICSME'23
- Community of developers to contribute to infrastructure
  - Differencing Rules
  - Tools
- Advisory Board
- [www.srcDiff.org](http://www.srcDiff.org)