

Unicon
Development
Team
Technical
Presentation
Spring 2015

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MacPhereson,
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Shea Newton

What is Unicon?

Project
Overview

Problem
Definition

Constraints

Recommendation
/ Discussion

Unicon Development Team Technical Presentation Spring 2015

Serendel MacPhereson, Ian Westrope, Shea Newton

University of Idaho Engineering Expo 2015

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- Unicon is the signature programming language of the University of Idaho's Computer Science Department (<http://unicon.org>).

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- Language enhancements to become part of Unicon's open-source public distribution.

Process

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November 2014	(Team) Source familiarity
November 2014	(IDE) Report if cursor is on a procedure
November 2014	(UNICONC) Compile with concurrency without error
December 2014	(IDE) Generate table for builtin lookup
January 2015	(IDE) Merge Builtin table with user procedures table
February 2015	(UNICONC) Compiles & links threaded Unicon program
February 2015	(IDE) Bring up documents on builtins
March 2015	(UNICONC) Executes threaded Unicon programs
March 2015	(IDE) Jump to user defined procedures
April 2015	(IDE) Right-click functionality
April 2015	(UNICONC) Executes Unicon Benchmark Suite
May 2015	(UNICONC) Supplement Unicon Technical Reports 12 and 14

Deliverables

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- This project's deliverables include:
 - IDE enhancement to provide context-sensitive help in the form of hyperlinks or reference documentation.
 - An extended optimizing compiler that supports concurrency features build using POSIX-threads.
 - Supplements to existing Unicon Technical Reports, UTR-14 and UTR-12

Problem Definition

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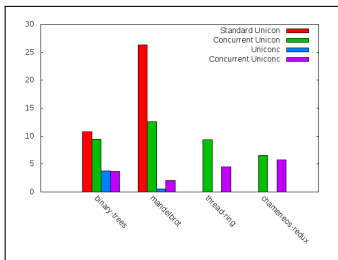
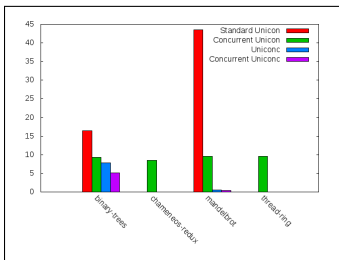
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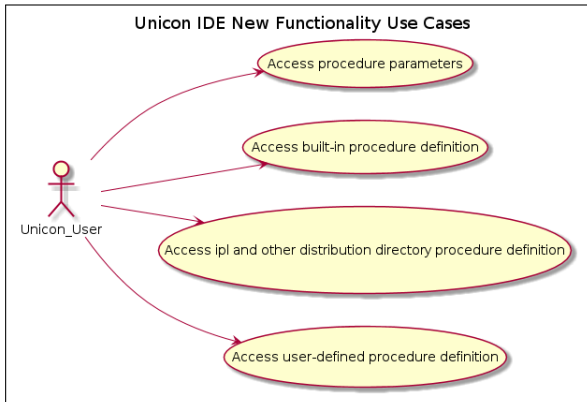
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Concurrent Unicon: Goals vs. Results



Ratios presented reflect averages of three run-times

- Unicon IDE: Hyperlink to documentation / source code



What is Unicon?

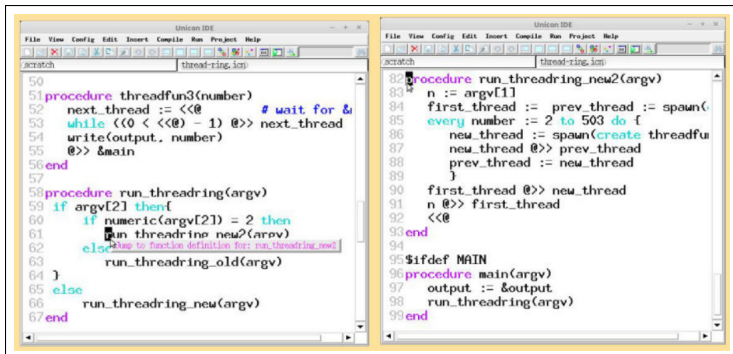
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● Unicon IDE: Results



The image displays two side-by-side screenshots of the Unicon IDE. The left window shows a file named 'thread-ring.icn' with code defining 'threadfun3' and 'run_threadring' procedures. The right window shows a file named 'thread-ring.icn' with code defining 'run_threadring_new2' and 'main' procedures. Both windows have a menu bar with 'File', 'View', 'Config', 'Edit', 'Insert', 'Compile', 'Run', 'Project', and 'Help'. The code is color-coded with syntax highlighting.

```
50
51 procedure threadfun3(number)
52   next_thread := <<@ # wait for &
53   while ((0 < <<@) - 1) @>> next_thread
54   write(output, number)
55   @>> &main
56 end
57
58 procedure run_threadring(argv)
59   if argv[2] then
60     if numeric(argv[2]) = 2 then
61       run_threadring_new2(argv)
62     else
63       run_threadring_old(argv)
64     }
65   else
66     run_threadring_new(argv)
67 end
```

```
82 procedure run_threadring_new2(argv)
83   n := argv[1]
84   first_thread := prev_thread := spawn(
85   every number := 2 to 503 do {
86     new_thread := spawn(create threadfun
87     new_thread @>> prev_thread
88     prev_thread := new_thread
89   }
90   first_thread @>> new_thread
91   n @>> first_thread
92   <<@
93 end
94
95 $ifdef MAIN
96 procedure main(argv)
97   output := &output
98   run_threadring(argv)
99 end
```


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- Goals were met with regards to our constraints in that new functionality does not:
 - Impose significant performance penalties.
 - Break backward compatibility.
 - Introduce new dependencies

Recommendation / Discussion

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- Both of these projects represent new groundwork for future development.
- IDE
 - This may include features such as code refactoring tools or “find usage” capabilities.
- Uniconc
 - This may include tuning concurrent garbage collection and rtl code. Additionally Uniconc might be ported to event monitoring or graphics facilities.