Developing C/C++ Applications with the CDT

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QNX Software Systems
Eclipse CDT Project Lead
What is the CDT?

- Edit/Build/Debug cycle for C and C++ projects
  - Source code editor
  - Build integration with third party build tools
  - Visual debug similar with integration to third party debuggers

- Source parsing and indexing
  - Drives source navigation features
  - Content assist, Search, Outline
CDT Edit Perspective

- Standard JFace Text Editor
  - Keyword highlighting, key bindings
- Outline View
  - Using internal parser
- Content Assist
  - Using internal parser and index
- C/C++ Projects View
  - Showing CDT specific things: includes, binaries
- Build Console Output
C/C++ Perspective

```c
#include <stdio.h>

int global_var = 0;

int main(int argc, char **argv) {
    printf("Hey\n");
    pclose(_sFILE64 *) int
    perror(const char *) void
    # physadr
    pid_t
    popen(const char *,const char _) _sFILE64 *
    printf(const char *,...) int
    * private
    * protected
    pthread_attr_t
```
CDT Search

- Index created on resource change
  - Uses internal parser
- Searches for declarations, definitions & references
- Searches for types, variables, functions, macros
- Search can be invoked from:
  - Search Dialog
  - Context menu on Outline View and C/C++ Project View
  - Action on text selection in editor
C/C++ Search Dialog
Build

- **Standard Build**
  - Calls any external tool to do builds
  - Makefile editor for editing Makefiles
  - Error parsing to mapping errors to Problem markers

- **Managed Build**
  - Extension points for defining tools and options
  - Generated GUI for editing build settings
  - Generate build file
  - Hook up appropriate binary parsers, error parsers
Managed Build Settings


**Debug Perspective**

- Standard Eclipse Debug Extension
  - Breakpoints
  - Execution Control
- Provides a layer to adapt Eclipse API to C-ish Debugger Engines
- Views
  - Register
  - Modules
  - Memory
  - Disassembly
Debug Perspective
## Memory View

![Memory View Screenshot]

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<th>4 - 7</th>
<th>8 - B</th>
<th>C - F</th>
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Disassembly View

```c
int main(int argc, char **argv) {
    push %ebp
    mov %esp,%ebp
    sub $0x8,%esp
    and $0xffffffff,%esp
    mov $0x0,%eax
    add $0xf,%eax
    add $0xf,%eax
    shr $0x4,%eax
    shl $0x4,%eax
    mov %eax,0xffffffff(%ebp)
    mov 0xffffffff(%ebp),%eax
    call 0x401090 <alloca>
    call 0x401120 <__main>
    printf("Hey\n");
    movl $0x402000,(%esp)
    call 0x401130 <printf>
    return global_var;
    mov 0x403010,%eax
}
leave
ret
```
Who uses the CDT?

- Embedded developers
  - Flexible build and debug integrations enable many platforms

- Linux developers
  - Powerful cross-platform tools
  - Built-in support for GNU tools

- High performance computing
  - Basis for Fortran (Photran) and Parallel Tools Platform projects
“We also asked a question to determine which Eclipse projects were being used or planned to be used. No surprise that JDT came out on top with 57.5% but CDT came in second with 47.3%. I think this is amazing and a big congratulations to Doug and the CDT team. Could there be a day when more people are actually using CDT than JDT?”

“Well, IDC has just made available a new research report that estimates there to be 2.27 million Eclipse users worldwide.”

Does that mean 2.27 million x 47.3% CDT users?
CDT 3.1.1 Stats

- CDT 3.1.1 Released Sept 29, 2006

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CDT 3.1.0 Stats

- CDT 3.1.0 Released June 30, 2006

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CDT 3.0.2

- CDT 3.0.2 Released Feb 9, 2006

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Total 216007 98534 33093 347634
CDT Commercial Adoption

- Included in many commercial products (that I know about)
  - QNX Momentics
  - Altera NIOS II IDE
  - IBM Rational Software Architect, Rational Systems Developer
  - Intel C++ Compiler for Linux
  - Texas Instruments Code Composer Essentials
  - Nokia Carbide.c++
  - Timesys LinuxLink Developer Suite
  - MontaVista DevRocket
  - Red Hat, SUSE, Debian Linux
CDT Commercial Adoption

- Mercury Computer Systems MultiCore Plus
- HI-TECH IDE for HI-TIDE 3
- Xilinx Platform Studio SDK
- Tensilica Xtensa Xplorer
- STMicroelectronics
- CoWare ConvergenSC
- KPIT Cummins KPIT Corona
- Etnus TotalView
- HP Remote Development
CDT Commercial Adoption

- Corelis CodeSymphony IDE
- Amontec sdk4arm
- eCosPro Developer’s Kit
- Ultimate Solutions LinuxScope-JTD
- Ronetix Starter Kit for ARM9
- Lattice Semiconductor LatticeMico32 Development Tools
- Xilinx Embedded Development Kit

- And they keep on coming…
Word is spreading…

- Articles
  - http://www.computer.org/portal/site/cise/menuitem.92a12adebee18778161489108bcd45f3/index.jsp?&pName=cise_level1_article&TheCat=1001&path=cise/2006/v8n4&file=sci.xml&

- 11,000 occurrences of cdtproject in Google.
  - http://www.google.ca/search?hl=en&q=cdtproject&meta=
Demo
CDT 4.0

- Part of Europa Release, June 2007
- Managed APIs
- Offline Indexing
  - Pre-generated and sharable indexes for SDKs, etc.
- New views of index information
  - E.g. Call Hierarchy View
- New flexible debug architecture
- Internal Builder for Managed Build
Thank you