Integrated Development Environments

Steven J Zeil

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IDEs

    Integrated Develop Environments (IDEs) are software packages that attempt to provide comprehensive support for programming

- and possible other software development activities

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1   The Components of an IDE

The Components of an IDE (minimal)

    What's the minimum that we expect in an IDE?

- editor

- build

    - maybe no more than compiler invocation
    - with error messages captured/interpreted/walked by editor

- run/execute

- debugger

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The Components of an IDE (optional)

    What would we like to see in an IDE?

- syntax highlighting & aid in editor

- documentation (API) look-up

- flexible/configurable build

- packaging/deployment options

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The Components of an IDE (deluxe)

What makes us giddy in an IDE?

- smart feedback in the editor

    - learns API of new code

    - suggestions

- coding aids in editor

    - templates

    - common refactoring (transformations)

- documentation generation

- test integration

- integration with version ctrl

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2   IDE Examples

emacs

The *nix swiss army knife of editors, *emacs* has long functioned as a basic IDE:

- syntax-highlighting editor

- build support (invokes *nix **make**)

    - parses error messages from compilers & other tools

- debugger interface

- works directly with many version control systems

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References, if you are unfamiliar with this:

- Compiling in emacs

- emacs Debugging mode (CS252)

emacs Strengths and Weaknesses

- highly portable

- supports virtually any language you would have a compiler for

- even in windowed mode, leans toward keyboard rather than mouse

    - (not sure if that's a pro or a con)

- outdated interface

- high learning curve

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Microsoft Visual
Visual Studio

- syntax-highlighting editor

    - background compilation provides quick feedback on simple errors

- built-in build manager

    - limited configurability

- debugger interface

- some designer tools (e.g., design classes in UML)

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Visual Strengths and Weaknesses

- wide variety of languages (but Microsoft processors)

- single-OS

- closely integrated with Microsoft compilers

- modern, mouse-oriented interface

    - What will Windows 8 do to that?

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I've never been fond of Visual, but that comes more from my opinion of the MS compilers. MS C++ had recurring issues with basic standards conformance and `std` library implementation. And MS's support of Java was perpetually luke-warm.

NetBeans

Free IDE originally distributed by Sun as "the" development platform for Java.

- Still largely Java centric, though some support for other languages

    - particularly web-related languages like Javascript, CSS, XSL

- Portable (written in Java)

- Tends to track the trends and hot topics in the Java world promptly

- editor, build manager, debugger

- moderately extensible

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Netbeans and Visual clearly stole interface ideas from one another.

(Then Eclipse came along and stole from them both.)

I have not used NetBeans in a long time. I remember it as being incredibly sluggish even on reasonably high-powered desktops.

My enduring impression is that Eclipse seemed to do everything NetBeans wanted to do, did it about 6 months later, but did it better.

Single-Language IDEs

The open source community has produced numerous single-language IDEs.

Many are focused on educational use.

Examples:

C++ Bloodshed Dev-C++, Code::Blocks

Java BlueJ, Dr. Java, jGrasp

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3   Eclipse

Eclipse

Probably the hottest IDE in the open source world:

- syntax-highlighting editor, multi-language support

    - strong hinting, API, interface aid

    - templates and refactoring

- build support

  - easily configured or switched to other build tools

- background compilation for quick detection of language errors

- integrated *unit testing support

- solid debugger, intuitive handling of threads

- some packaging & deployment support

- integrates with most version control systems

- modular plug-in extensibility with a rich variety available

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Eclipse is available here.