

The eXtreme Collaborative Development Environment (XCDE)

*A programmer-oriented real-time
virtual collaboration tool*



Introduction

The traditional Integrated Development Environment (IDE) used by most programmers does not include real-time collaboration tools. To date most programming collaboration takes place using inefficient e-mail and instant messaging (IM) tools that are not incorporated into the development environment.

XCDE is a new tool and methodology that allows programmers to edit a document collaboratively in real-time. It also provides the tools necessary to collaborate effectively with other programmers and manage the collaboration process.

XCDE is a two-part project. It has a communication layer with a well defined API and an extension of the Eclipse IDE. The communication layer allows non-blocking real-time editing of documents while maintaining a consistent global state. The Eclipse IDE integration extends the standard development environment with features to provide contextual awareness, real-time chat, and real-time editing of documents.

The XCDE framework can be extended to add collaboration features to other IDEs and to provide inter-IDE collaboration on development projects.

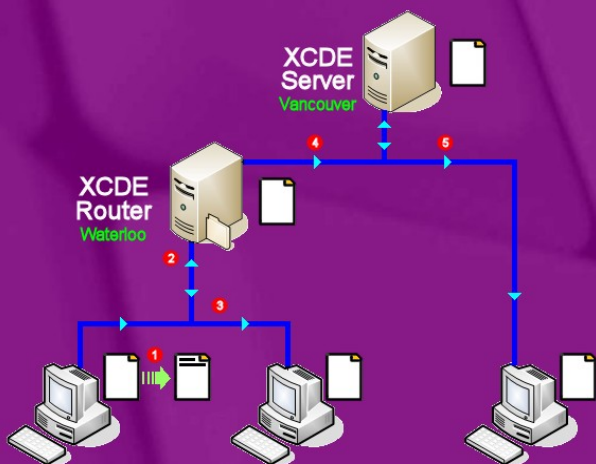
XCDE could have multiple applications including:

- » Programmer education
- » Collaborative Development
- » Collaborative debugging

Communication Framework

The communication layer of the XCDE platform is a client-server architecture which provides a consistent global state for all clients. The layer utilizes asynchronous message passing, but provides a synchronous API so that the communication and synchronization mechanism is completely transparent. Each user sees and makes edits in real-time while the communication layer ensures a consistent global state.

In addition to clients and servers, the XCDE framework also provides what is best described as a router. To reduce the lag visible to a local cluster of clients connected to a remote server, an XCDE router can be introduced between the clients and the server. The router forwards incoming information both to the main server and directly to its clients. This ensures that the communication mechanism scales well geographically and reduces the amount of information that must be transmitted over long distances.



Eclipse Integration

XCDE currently integrates with Eclipse version 3.1.x. Its functionality is contained entirely within a plug-in architecture, except for a few callbacks added to the core Eclipse packages to facilitate integration.

One of the key goals of a collaborative development environment is to provide contextual awareness to developers. XCDE does this in several ways. There is a user list which shows the current location of all users. In addition, there is text chat and multiple cursors displayed in the active document as shown on the reverse of this panel.

XCDE also integrates tightly with the Eclipse workflow. There is an Import Wizard to add projects as well as right-click menu integration.

Features & Advantages

- » Synchronous communication API to asynchronous communication
- » Consistent global state
- » Voice & text chat
- » Edit history replay
- » Extensible to other existing IDE platforms
- » Leverages a mature IDE and toolset including JFace libraries
- » Supports multiple languages
- » Provides collaboration without learning completely new software

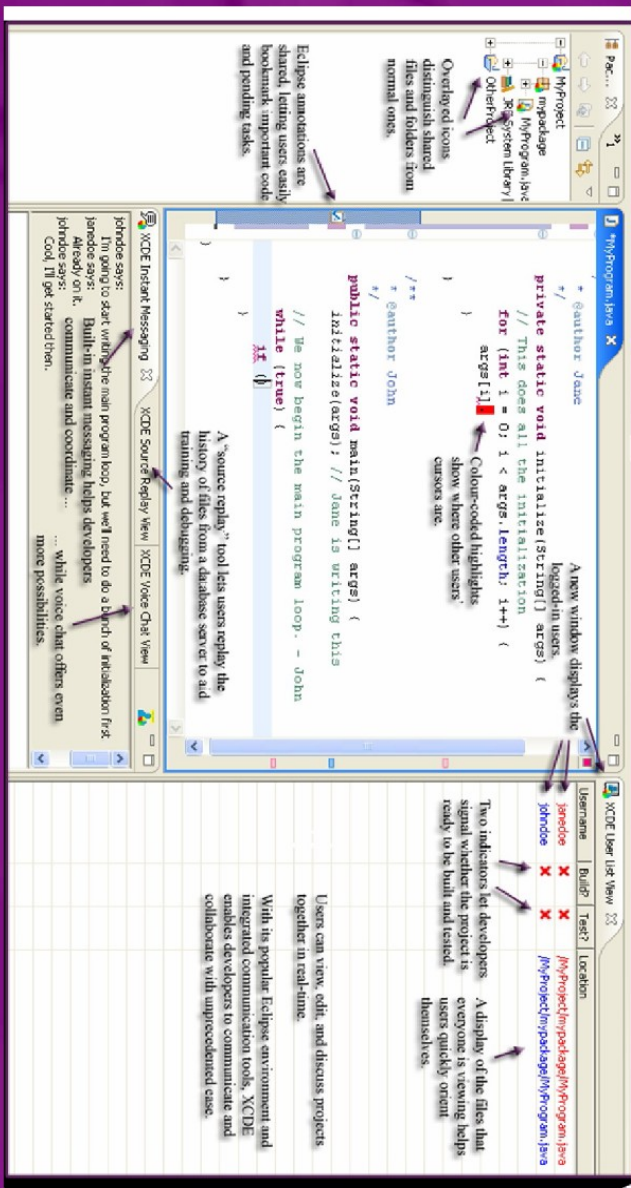


Figure 1 – The XCDE User Interface

Notes:

Contact Details

Should you have any questions or would like to discuss any aspect of this project please feel free to contact any of our group members as outlined below. We are most easily reached by e-mail.

Andrew Craik

Database, Eclipse Views, and UI Graphics

Mailing Address:

1004 – 9715 110 Street NW
Edmonton, AB
T5K 2M1

Email: andrewcraik@gmail.com

Tel: (780) 488-7701

Tristan Schmelcher

Synchronization Protocol and Server

Mailing Address:

1449 Duncan Drive
Delta, BC
V4L 1R5

Email: tpkschme@engmail.uwaterloo.ca

Tel: (519) 573-4748

Tom Levesque

Eclipse Workflow Integration

Mailing Address:

958 Windermere Road
Windsor, ON
N8Y 3E4

Email: tomlevesque@gmail.com

Tel: (519) 589-7798

Larry Chen

TCP/IP Layer and Multiple Cursor GUI Integration

Mailing Address:

6668 Laburnum Street
Vancouver, BC
V6P 5M7

Email: L8chen@engmail.uwaterloo.ca

Tel: (519) 729-6368