

# IRI-Easy: A Distance Education Software System

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## Extended Abstract

### Introduction

The Interactive Remote Instruction (IRI) project is an ongoing project for several years in the Department of Computer Science at Old Dominion University. We have completely redesigned and re-implemented the system twice in response to the advances in network technologies and protocols, multimedia technologies and increased computing power of desktop and laptop computers, and based on repeated teaching experiences using IRI [3]. The second generation version of IRI, IRI-h, provided support for heterogeneous network environments, heterogeneous platforms, and introduced the notion of a commonly shared view of any shared activities among all participants [1]. The most recent version of IRI, IRI-Easy, is an ongoing effort which extends IRI-h functionality to allow simple on-the-fly set up and joining of collaborative sessions, and is suitable for groups of participants located in isolated multicast-enabled Intranets through an efficient “group of groups” communication paradigm, as well as individual multicast-disabled participants such as home users. In this paper, we present an overview of IRI-Easy and its new features and functionalities in details.

### IRI-Easy Overview

The older version of IRI used configuration files to start several servers required in a session. Session setup and most of the parameters of a session are defined in these configuration files. Users have no means to change most of the parameters once they join a session. The requirements for IRI-Easy were a move away from the heavy administrative burden in setting up a session and moves to support spontaneous group meetings as frequently occurs in higher graduate seminars and PhD courses.

We designed IRI-Easy to have almost all functionalities obtained with only two or three clicks. The new interface also simplifies the operations to conduct a session. Sessions can be started with two button clicks (if all defaults are acceptable) after which people can join the session with a simple button click. While IRI-Easy keeps the user operation simple, it still provides the key functions that previous version of IRI had developed, such as audio, video conferencing, tool sharing [2], gateway, white board, and pointer service. The current version, IRI-Easy, is implemented completely in Java, it uses inexpensive audio and video components and runs in both Windows and UNIX environments, and adjusts to different network bandwidths for different participants by use of an IRI gateway. We have successfully tested IRI-Easy on virtual private network connections as a solution for users at home with high bandwidth internet connection or users situated behind firewalls.

### IRI-Easy Features

IRI-Easy provides support for heterogeneous network environments, heterogeneous platforms, and introduced the notion of a common shared view of any shared activities across all participants. Support for network heterogeneity is provided through an application-level gateway that performs packet forwarding between multicast-enabled sites and individual multicast-disabled participants, and rate control services for video and tool sharing streams [4]. IRI-Easy features a sharing tool service which allows a participant to share any running application with other participants. At the sender side, images of

the windows in the application being shared are captured, compared to previous images to detect change, compressed, and transmitted over a group communication channel. At the receiver side, the images are received, decompressed, and displayed. Moreover, a floor control facility is provided to enable receiver side participants to take control of the shared tool. This tool was completely redesigned and adapted to function with home users behind NATs and possibly low bandwidth networks.

Figure. 1 shows the new IRI-Easy user agent interface. The interface and operations are much simplified than previous versions. Once a user signs in, all users (online/offline) are listed on Start panel, by selecting one or more users on the list, the user can start an instant session or send instant messages. On Join panel, all available sessions are listed, the user can select one to join or invite others to a session, or close a session if he/she is the owner who started the session. With this user agent interface, user can setup lots of parameters for audio, video and networks in real-time.

Once a user joins a session, the IRI-Easy client shows up. In figure 2(a), the presenter can be seen in the large video image along with two smaller student videos. In figure. 2(b), a shared presentation is partially covered by a list of participants along with status of the IRI-Easy software running on their machines.

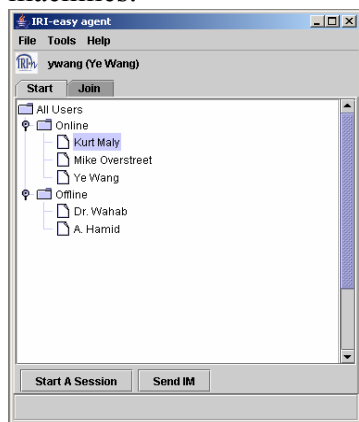


Figure 1. a. IRI-Easy user agent Start panel

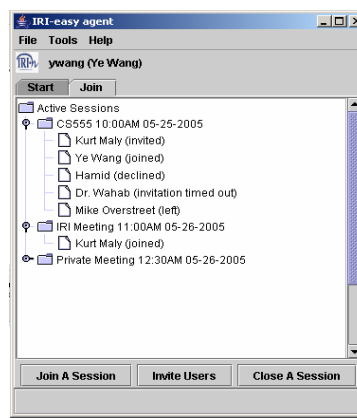


Figure 1. b. IRI-Easy user agent Join panel

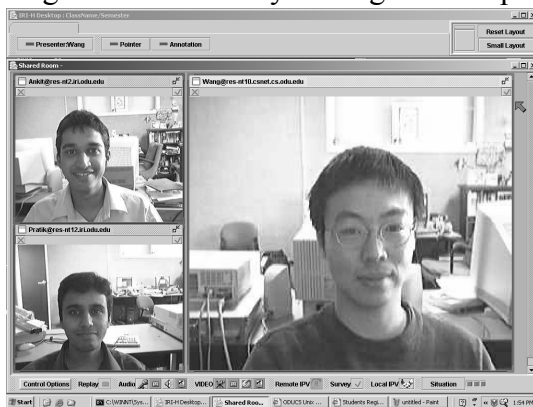


Figure 2. a. The IRI-Easy discussion mode.



Figure 2. b. Tool sharing and status information

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