Center for Information Technology Integration
Memorandum of Understanding
October 2, 2002

This memorandum of understanding constitutes the joint understanding of CITI and ITCom in pursuing a research and development partnership.

Statement of Work

The primary goal of the partnership for FY 2002-2003 is to identify and enhance network test and performance tools that can help ITCom staff build and maintain a more secure and functional network at the University of Michigan. The first focus is on Iperf, an open source network measurement tool from the University of Illinois, with the goal of developing an authenticated Iperf service running on multihomed servers placed strategically in a VLANed network.

Task 1: Globus integration

In this task, CITI will make a Globus service that provides remote network test and measurement to authorized users. ITCom is currently deploying measurement stations throughout the network. This task will enhance the test bed by providing a web interface, authorized access, and strong authentication. This task leverages CITI's prior efforts in Authenticated Quality of Service and KX.509.

The initial implementation will build on Iperf; later enhancements that allow extended functionality within the Globus framework are anticipated. Authorization can be based on environmental and Iperf parameters such as user identity and group membership, CPU load on the test harness, time-of-day, TOS, TTL, TCP or UDP, bandwidth (UDP only), etc.

Task 2: Multihomed Iperf stations

An Iperf platform that supports multiple interfaces can be situated at a nexus of networks and used to test them all. For example, such a platform could be used to send test data out one interface, into the Internet, and collect it on another. However, ordinary UNIX routing specifies a default route per host, not per interface. Consequently, test data arriving on one interface may be returned on another, which interferes with the goal of multihomed Iperf stations. This task will extend the Linux kernel routing framework so that interfaces can support routing behaviors that are more complex.

Task 3: Performance of multihomed test stations

Network tool performance is tied to a number of parameters, such as aggregate bandwidth and CPU speed. In this task, we will model and measure the multihomed network test station to determine the limits of its performance as interfaces are added. With this understanding in hand, we will determine the feasibility of using a multihomed network test station as both source and sink of test data.

Task 4: Remote testing

This task develops a user-friendly application that authorized users can run on their desktops to test and measure network performance, both end-to-end and segment-by-segment. This application will take parameters such as TCP or UDP port number, TOS/Diffserv code point, bandwidth, destination, etc. The application will find test stations along the path to the destination and run end-to-end and segment-by-segment tests on them.

Milestones and Deliverables

September 2002

Task 1 begin

Task 2 begin

November 2002

Task 1 deliverable: Globus service that provides remote Iperf network test and measurement to authorized users.

Task 1 continue

Task 4 begin

January 2003

Task 2 deliverable: Extend the Linux kernel routing framework so that complex routing behavior can be set for each interface.

Task 2 end

Task 3 begin

May 2003

Task 1 deliverable: Enhanced Globus service that provides remote network test and measurement to authorized users.

Task 3 deliverable: Report on performance of multihomed network test station performance when used as both source and sink of test data.

Task 3 end

June 2003

Task 4 deliverable: User-oriented Linux application that authorized users can run on their desktops to test and measure end-to-end and segment-by-segment network performance.

Task 4 end