

Center for Information Technology Integration
Memorandum of Understanding
December 22, 2004

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

Statement of Work

CITI's previous work, performed under a CITI/ITCOM MOU dated October 2, 2003, extended the Network Testing and Deployment (NTAP) framework for secure invocation of network testing tools on remote platforms. The extensions included automatic mapping of network test segments to PMPs, hardening the testbed code for production use, deployment of the NTAP code in the ITCOM lab, recording of test data in a central database, and display of test results (for a summary of this work see <http://www.citi.umich.edu/projects/ntap/>).

The primary goals of the partnership for FY 2004-2005 are to provide a complete end-to-end automated NTAP framework, deploy it widely, integrate it with components of other institutions, and investigate 10 Gbps operations.

These goals are implemented in the following tasks.

Task 1: Deploy

Deploy NTAP PMPs and portal hosts at ITCOM and selected Merit and Internet2 sites. Moving to production at ITCOM is a primary project goal. Deploying at Merit and Internet2 allows direct inter-institutional performance measurement and enables the investigation of cross-domain authentication and authorization issues and solutions. Successful deployment depends on the availability of ITCOM, Merit, and Internet2 equipment and staff.

Task 2: Host Endpoint Testing

Building on previous investigation, CITI will implement host endpoint testing, enabling performance testing on the "first mile" segment from source host to PMP. CITI plans to employ the Network Diagnostic Tool (NDT) written by Richard Carlson and available from the Internet2 End-To-End Performance Initiative chaired by Shawn McKee (see <http://e2epi.internet2.edu/ndt/>). CITI will implement one or more of the following solutions: a scaled-down resource manager, installed manually on the end host, which participates as a PMP in the existing performance infrastructure; a web page similar to <http://e2epi.internet2.edu/ndt/ndt-server-list.html> which performs a standard NDT test to a user-selected server; or a Java WebStart based solution, which loads a signed NDT binary onto the requesting user's workstation, invokes a hop test to the nearest PMP, and reports results to the output database.

Task 3: Automated Testing

With some additional work, CITI can enable automated, periodic generation of network statistics for storage and retrospective analysis of network performance over time. Changes to the GARA client and portal code are required to allow the periodic re-execution of the performance test programs and the storage and later display of the resulting data. CITI will investigate the use of renewable credentials, leveraging work currently being considered for MGRID. Olga Kornievskaia, author of the GARA client, will serve in a consulting role (at no charge) in our initial work.

Task 4: New Features

Integrate New Per-Segment Performance Tools

Extend the current built-in pilot script to allow the invocation of arbitrary per-segment performance monitoring tools such as NDT. This involves changes to the existing pilot script, Web interface, and output database.

Path specification

Generalize the current built-in `traceroute` mechanism for path discovery to invoke an arbitrary script. In addition to `traceroute`, this approach supports similar tools such as `tcptraceroute` as well as user-specified paths.

Additional path testing

Develop and deploy additional path testing methods, including:

- A new anchor type, which permits incremental path testing, e.g. in a router path `R1->R2->R3->R4`, the testing sequence would be `R1->R2`, `R1->R3`, `R1->R4`
- A path testing option that performs a final `R1->Rn` test for any anchor type

Improved database storage and reporting

Improve the storage of data in and presentation of results from the performance database. This includes saving and reporting of bi-directional test results, investigating Internet2-style reporting, and user interface improvements. This task is dependent on timely requirements from ITCOM. Specifically:

- What data are to be saved in the database
- What views of the data are to be presented to the user
- What user interface features are to be improved

Task 5: Integrate

Investigate the integration of selected other tools with the NTAP framework, such as the NLANR Network Performance Advisor components, Internet2's "worst 1%" testing model, and the OWAMP tool. This task is dependent on further discussion with ITCOM staff regarding the specific tools to be integrated into the NTAP framework.

Task 6: Investigate

Initial performance tests have shown that a Dell 2650 platform can drive data at somewhat over 2 Gbps through the local loopback interface. To meet the challenge of testing 10 Gbps links adequately, CITI will investigate strategies for operating PMPs at higher speeds, including faster commodity hardware, multiple NICs, operating system tuning, or, possibly, special-purpose hardware.

Milestones and Deliverables

August 1, 2004

Task 1 begin

Task 2 begin

November 1, 2004

Task 1 deliverable: NTAP deployed at ITCOM, Merit, and Internet2.

Task 1 end

Task 4 begin

January 1, 2005

Task 2 deliverable: Host endpoint testing

Task 2 end

Task 3 begin

Task 5 begin

April 1, 2004

Task 3 deliverable: Automated testing

Task 4 deliverable: Features: Path specification, additional path testing methods, improved database storage and reporting

Task 3 end

Task 4 end

Task 6 begins

June 30, 2004

Task 5 deliverable: Integration of additional tools

Task 5 end

Task 6 deliverable: Report on 10 Gbps investigation

Task 6 end