NAVAL POSTGRADUATE SCHOOL
ITACS
INFORMATION TECHNOLOGY AND COMMUNICATIONS SERVICES

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4K-8K CINEGRID STREAMING VIDEO EXPERIMENT

At the IT Task Force meeting in January, Mr. Jeff Weekley, Research Associate at the MOVES Institute, recapped the special demonstration "Project 8K" — the world's first dual synchronized 4K streaming video — using two JVC prototype 4K cameras from which two 3840x2160 pixels images were streamed live from the Monterey Bay Aquarium (MBA) to NPS and to the California Institute for Telecommunications and Information Technology (Calit2) at the University of California San Diego, and from there to NTT Network Innovations Laboratory in Yokosuka, Japan. The demonstration was part of the 2009 CineGrid International Workshop held at CalIT2 in December. CineGrid is a non-profit consortium that seeks to build an interdisciplinary community focused on the research, development and demonstration of networked collaborative tools, enabling the production, use and exchange of very high-quality digital media over high-speed photonic networks. Laurin Herr, President of CineGrid, was instrumental in arranging the experiment and providing the technical guidance.

Admitting that it is difficult to describe, Mr. Weekley showed the Task Force one 4K image which was streamed at the Cinegrid event, and told the group that 4K video is both spatially and temporally higher quality than High Definition video. In fact, dual 4K streams are 18 times as many pixels as HD. At 60 frames per second, images are projected at 2.5 times the rate of film or IMAX movies. A local screening, using the NPS Sony XSRD 4K projector will be announced soon.

To produce the streamed images, NTT lent their JVC cameras, Mark I and Mark II (of only three in the world), high-quality video recorders and a variety of Nikon F-mount style lenses to NPS to stream and record the underwater habitat. With the support of Mr. Fred Cohn of the city of Monterey, Mr. Doug Weismann, ITACS' Network Engineer, the team prepared and tested the network which required network upgrades at the Aquarium and an accelerated timetable for planned upgrades to the City's network infrastructure. Alignment of the dual 4K images was rehearsed in the Dark Mirror Lab in Halligan Hall, so that the field recordings and the live streams could be aligned in real-time.

At CineGrid, the 8K images streamed from the MBA involved synchronizing two JPEG2000-compressed images from the Crevice Dwellers exhibit over the network at 400-450 megabits per second per stream viewed simultaneously in San Diego and in Japan. The scientific and interpretive narration was delivered by Mr. James Covel, head of Interpretative Programs at the MBA.

The Cinegrid event demonstrated not only the use of cutting-edge technology but also the networking capabilities at NPS, factors which can be used to strengthen partnerships with peers and to forge new initiatives.

NTT will loan the JVC cameras and equipment to NPS again, so that this aspect of scientific inquiry can be further documented. A demonstration will also be presented to the CENIC participants who will be visiting NPS on March 8, 2010. Many partners and collaborators have expressed interest in the technology: NASA's United Space Alliance, Naval Undersea Warfare Center, NPS Center for Autonomous Vehicle Research, JIEDDO, and others. With this technology, NPS is institutionally

positioned for maximum impact in remote sensing, telepresence, image analysis and cutting-edge optical network applications.

For further information on Calit2, please see the site located at: www.calit2.net.

TECHNOLOGY ENHANCED ACTIVE LEARNING CLASSROOM PROJECT (TEAL)

At the EDUCAUSE Conference last year, Mr. Jon Russell of ITACS attended a session by the University of Minnesota in which the university adapted for its non-science classes a template developed by MIT for its physics classes called the Technology Enhanced Active Learning Classroom (TEAL). The purpose of the TEAL room is to create an environment that facilitates active collaborative learning in a studio-like setting where students are situated in groups, each with its own dedicated audio-visual system, whiteboard and workspace.

When Dr. Ron Fricker and Chair Rob Dell of Operations Research learned about TEAL, and visited the SCALE-UP website (http://scaleup.ncsu.edu/) hosted at North Caroline State, which outlines the design and research results using the TEAL concept as well as the 50 universities that have adopted the model, they partnered with ITACS to create a TEAL classroom at NPS. Glasgow 128, the former war gaming lab, was converted into a TEAL classroom, and celebrated its opening with a ribbon-cutting on January 6, 2010. Inside the classroom are specially built 8.5 diameter tables with laptop and wireless capabilities for 3-9 students; two projectors; and 4 flat-screens. Classes are currently booked to capacity in the room for the current quarter.

As the schedule of tours of the new classroom become available, they will be posted on the campus sites.

RESEARCH COMPUTING UPDATE

ITACS extends its thanks Dr. Karl van Bibber and the Research Council for their support in providing recap funds to help secure some of the $400K in procurements in FY09 specifically earmarked for Research Computing.

As a result of the funding, an upgrade to InfiniBand was installed on hamming, increasing communication between nodes from 1 gigabit to 20 gigabits per second and reducing latency between nodes to microseconds.

Data Direct Network storage, used on seven of the top ten supercomputers in the world, was another major procurement. The system, which contains 100 terabytes of storage and is capable of reads and writes at 5/6 gigabytes per second, can scale to 1.2 petabytes.

A Spectralogic tape system, which can accommodate up to 950 terabytes of uncompressed data that can be expanded to store several petabytes of data, was also procured. The system is shared with the Server Management group and will eventually be used to back up data within the entire enterprise.

Dr. Gabriele Jost will remain with Research Computing at NPS, funded by the DoD HPC Modernization Program Office.

STREAMING MEDIA PORTAL

At the IT Task Force meeting in January, Mr. Jon Russell demonstrated the new streaming media portal, which is slated for final design review with

Institutional Advancement and Web Operations by early February. Created by Mr. Todd Wyatt and Mr. Cullen Jones, the one-year project involved extensive design elements to leverage the power of streaming at NPS by producing a high-quality portal with centralized storage, flexible delivery mechanisms, public and private access, automatic editing capabilities, branding signatures, specific channels which are all linked, and can be branded, RSS capabilities, automated tag cloud, and the capacity to stream in flash media and Apple formats.

The entire process, from development to implementation, was also documented, including the open source products used as well as an installation guide. Flash Media Server 3.5 application was written by Mr. Wyatt.

ITACS will notify the campus when the portal goes live.

WHAT IS FAOWEB?

ITACS, SIGS Joint Foreign Area Officer Skill Sustainment Program and CED_3 have partnered to build a collaboration and skill sustainment web portal — FAOweb — specifically designed to meet the needs of Foreign Area Officers.

Designed to bring together various information sources together into one single sign-on portal, FAOweb resources will build over time, but initially will provide information from the following sources:

- Language resources for 55 distinct languages from the Defense Language Institute
- Cultural information from the Defense Language Office, the Naval Postgraduate School, and DLI
- News feeds from the military times network, army.mil, navy.mil, airforce.mil, mnarines.mil and defense.gov
- News feeds from various foreign news sources
- Operations, Policy and regional specific links, news and videos
- Upcoming NPS FAO specific courses and events

In addition, information such as documents, images, videos and links to the portal can be uploaded and made available to all FAOs or a subset of FAOs based on region, language or branch of service. The combination of live web links and the ability for FAOs to add their own documents and links will ensure that the information in FAOweb is up-to-date.

FAOweb will also serve a skill sustainment role by providing self-paced learning modules in the areas of policy, operations, region-specific areas, culture and language, as well as access to the full suite of DLI language tools including the language survival kits and the GLOSS database — from any Internet connected computer over an encrypted web connection.

In a typical training website, information flows one-way; however, FAOweb embraces web 2.0 and social networking technologies, making FAOweb not only a content *delivery* mechanism, but also a content *creation* mechanism. To leverage every FAO's unique set of skills, experiences and knowledge, and to support the sharing of each, FAOweb contains a number of collaboration tools including:

- An internal email system
- Text chat
- A suite of discussion boards
- Various document and image file sharing libraries
- Wiki's
- Blogs
- Desktop Video Chat (coming soon)
- Site specific announcements
- A learning module evaluation system
- Shared events calendars

With the support of the NPS PAO office, FAOweb can eventually develop into a main information resource for all current and future FAOs.

AN OVERVIEW OF PASSWORDS

Passwords or PINs are used for a variety of purposes including giving users access to web and e-mail accounts, and voicemail. Important to computer security, passwords are also the first line of defense in protecting NPS information resources.

Because a poorly chosen password could result in the compromise or unauthorized access to NPS systems, all users with access to NPS systems are responsible for taking the appropriate steps to select and secure strong passwords.

Passwords on the NPS Educational Research Network (.edu) must be set to a minimum of 9 characters, not contain a word in any language and have at least two each of the following:

- Lowercase letters (a, b, c . . .)
- Uppercase letters (A, B, C . . .)
- Numbers (1, 2, 3 . . .)
- Special Characters (#, *, & . . .)

Avoid these common password practices including:

- Sharing your personal passwords with other users
- Not changing default, publicly known, or compromised passwords
- Writing your password down in a place that can be seen by others.

SHORT COURSE IN GPU PROGRAMMING

On Wednesday January 20, 2010, Dr. Jeff Haferman of Research Computing invited Dr. Massimiliano Fatica, a Senior Scientist from NVIDIA Corporation, to conduct a one-day course on graphics processing unit (GPU) programming, standard hardware in desktop computers, the development of which has largely been driven by advances in the gaming community. GPUs typically offload graphics computation to lighten the burden on central processing units (CPUs), and generally have been used strictly for rendering of video images; however, in the last few years, computational scientists have begun to perform other types of numerically intensive problems by offloading them from CPUs to GPUs.

GPU programming is a cutting-edge technology in the high-performance computing arena, and several NPS faculty, including those who attended Dr. Fatica's short course, are looking forward to taking advantage of the technology to speed up computational modeling in such areas as solving the Navier-Stokes equation and the acceleration of Fast Fourier Transform computations.

TECHNOLOGY ASSISTANCE CENTER

From January 1 through January 28, 2010, the Technology Assistance Center (TAC) received

2,289 requests for assistance, 1,709 of which were resolved by the Tier 1/Tier 2 areas. The remaining 580requests were escalated to groups outside of TAC for specialized assistance. This number represents a 1% increase in requests for assistance from January 2009.

Requests for assistance were categorized as follows:

Phone: 930
Email: 816
Walk-in: 457
Web: 28
Technician: 58

This month, 96% of all calls were resolved within the Service Level Agreement (SLA). Those that were carried over are awaiting parts, pending information from the customers, etc.

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