NAVAL POSTGRADUATE SCHOOL
ITACS
INFORMATION TECHNOLOGY AND COMMUNICATIONS SERVICES

TECHNOLOGY NEWS JANUARY 2012

HIGH PERFORMANCE COMPUTING

The High Performance Computing (HPC) Center at NPS upgraded its power and heating infrastructure over the summer to accommodate denser computing systems. The original "Hamming" cluster, unveiled in January of 2009, contained 1152 CPU cores. The original system is being replaced with newer hardware, and now consists of over 1400 CPU cores. Over the next few months, it will be expanded to nearly 2,000 CPU cores. The original "Hamming" consisted of 144 nodes of eight core CPUs.

The existing system has replaced one-half of the original system with 16 nodes of 48-core nodes, and will soon be adding 9, 64-core nodes. The new nodes are connected to the old nodes, and all new nodes are interconnected by a "quad-data-rate" Infiniband switch, which allows data to flow across computing nodes at rates up to 40 gigabits per second.

The HPC Center has also invested in GPU (Graphical Processing Unit) technology that allows researchers to perform computationally intensive work on GPUs. The Center has three GPU systems: one with 960 cores, another with 1792 cores, and another to be delivered soon that will provide an additional 3136 cores.

Finally, each Monday at noon, hands-on tutorial and question and answer sessions are provided by the HPC group. For more details, send an email to hpc@nps.edu.

NAGIOS - BACKGROUND AT NPS

Wikipedia states, *Nagios is a popular open source computer system monitor and network monitoring software application. It watches hosts and services, alerting users when things go wrong and again when they get better.*

Nagios was originally introduced to ITACS in the fall of 2010, when it was setup to monitor the Kuali Financial System servers and services. Today Nagios has been utilized to its full potential, monitoring 470 services on 100 servers within ITACS. Nagios offers many useful features, one of its greatest features being its notification system. Through this advanced system, ITACS system administrators are notified immediately when problems occur that affect a specific application or service by sending text messages and emails with detailed information. Examples of a service requiring notification could be disk space and memory being used, checking for a certain string of text on a webpage or if a service has stopped. Additionally, services can be scheduled for maintenance easily, temporarily halting any unnecessary notifications from distributing when the service has been manually stopped.

Along with being alerted of problems, Nagios also generates reports to help administrators provide details on total system availability, as well as see problematic trends before they affect the applications and the customers who use them. Nagios then takes this a step further – recovery actions are performed when certain conditions are detected, automatically restarting services or servers as necessary based on programed artificial intelligence.

Current Architecture and Monitoring

Nagios can be set up to have a master system dashboard that visualizes the entire network, including relational maps and detailed information regarding dependent applications and services, enabling the administrator to easily locate specific

information at a glance. Designed as a fully integrated and distributed system, Nagios enlists a master node and several distributed nodes to monitor the network. The distributed nodes are tasked with monitoring their respective servers and services, and then securely sending the results up to the master node. The master node notifies the administrators when a problem occurs, as well as updates the dashboards and network maps.

This distributed architecture lends itself well to ITACS for several reasons. First, administrators can continue to use their distributed nodes as normal, while the node sends results passively to the master without any impact on performance. Second, the parent/child relationships defined by these distributed nodes are used to detect network outages. Network outages previously caused a massive amount of alerts to be generated, overwhelming administrators. Now outages can be handled more efficiently, without sending a huge amount of emails. Third, communication sent between the monitored services and the distributed and master node is encrypted and transmitted over SSL for security.

FORTINET ON-SITE ENGINEER

We welcomed this month a new addition to the cyberinfrastructure and cybersecurity teams. Andres Herrera joins us as the Fortinet On-site Engineer tasked with assisting us with deploying our new Unified Threat Management architecture using the Fortinet family of tools.

He will be here for the next nine months fine-tuning our cybersecurity capabilities from the replacement of our current firewall architecture to the enhancement of our security log correlation management and threat detection tools.

WINDOWS POWERSHELL TRAINING

One of the side issues of an upgrade for systems and applications is training. During the upgrade of the Exchange email system and the underlying Windows servers to Windows 2008, ITACS identified the need for additional systems-level training so we could fully utilize and replace capabilities in the older systems. The changes touched on almost all areas of ITACS, requiring training for 14 personnel.

A query into classes for Windows PowerShell found an individual cost of $2,995 dollars per student plus travel for the five-day training class. ITACS shifted the effort to bringing an instructor to Monterey for an individual savings per student of $1,775 (an overall cost avoidance of $24,850, not including travel costs). Staff members had the opportunity to learn together how each area of ITACS can use PowerShell. The cost savings allowed ITACS to use training dollars elsewhere.

SECURITY+ TRAINING AND CERTIFICATION

There is a growing demand for IT security professionals and increasing requirements for IT staff to have certain professional certifications to qualify for their positions within IT departments. NPS' IT staff, both civilian and military, are required to obtain and maintain professional designations as part of their job qualifications. From 23 – 26 January, ITACS hosted two three-day training classes each followed by a certification exam to allow 26 civilian staff and four military staff to obtain their Security+ certification. Security+ is an international, vendor-

neutral certification that demonstrates competency in: network security; compliance and operational security; threats and vulnerabilities; application, data, and host security; access control and identity management; and cryptography. All 30 ITACS personnel successfully completed the course and earned their Security+ professional designation.

Individual training and certification examination for the three day program at vendors' facilities was about $1,600 per student, plus travel and per-diem expenses. ITACS negotiated with Unitek Education to bring the class to the NPS campus, which brought the cost per student down to $850 and allowed ITACS to enroll 30 personnel. This equated to a savings of $22,500, plus avoided travel and per-diem costs – all of which allowed ITACS to reinvest training dollars to other priorities.

BROCADE RESIDENT FIELD ENGINEER

ITACS' Cyberinfrastructure team has gained additional capabilities with the arrival of Sean Stitt, a Senior Brocade Resident Field Engineer. Sean brings a wealth of experience to our team, which will be essential as ITACS conducts a review of the current NPS network architecture and explores ways to improve portions of the networking infrastructure. Sean will also provide advanced training to ITACS staff on our Brocade equipment.

PARTNERSHIPS AND OUTREACH

Dr. Christine Haska visited USC to discuss network support for a research project between Dr. Ron Brown and Dr. Priya Vashishta. Meetings with the entire research group at USC were attended as well as with the Vice President of Information Technology, Dr. Ilee Rhimes.

Dr. Christine Haska also visited UCSB to see demonstrations of the latest upgrade of the AlloSphere, a shared visualization facility in the College of Engineering at UCSB. Dr. Kuchera-Morin, director of the facility, and Dr. Matt Wright, provided several demonstrations of a range of research projects using the immersive virtual environment facility. One of the demonstrations included visualization of network traffic, something NPS may consider using in establishing its Regional Security Operations Center.

On January 25, a ribbon-cutting ceremony was held to celebrate the launch of the .edu initiative at the Defense Language Institute-Foreign Language Center. The event was attended by over 50 military and academic leaders to announce the ground-breaking of the DLI .edu academic network. NPS President Oliver, DLI-FLC Commandant Colonel Dino Pick, NPS Executive Vice President and Provost Leonard Ferrari, Mr. Tim Clayton from the Office of Undersecretary of Defense for Intelligence and Mr. Alec Arago (Congressman Sam Farr's regional director) all commented on the importance of this collaborative initiative and its strategic value for future innovations in partnership.

TECHNOLOGY ASSISTANCE CENTER

From 1 – 31 January 2012, the Technology Assistance Center (TAC) received 5,696 requests for assistance, 4,191 of which were resolved by the Tier 1 and Tier 2 areas. The remaining 1,505 requests were escalated to groups outside of TAC for specialized assistance. There has been a 29% increase in requests for assistance since December 2010.

Requests for assistance were categorized as follows:

Phone: 2,840
E-Mail: 2,364
Walk-in: 453
Web: 2
Technician: 37

This month, 90% of all calls were resolved within the Service Level Agreement (SLA). Those that were carried over are awaiting parts, pending information from customers.