



CAC and Northrop Grumman

Scaling Video Surveillance and Network Applications to Prevent Terrorist Attacks

How do you secure computer networks and physical facilities from terrorist attacks?

Finding the Answer

Northrop Grumman believes that the answer lies in the strategic use of information technology. Northrop Grumman IT collaborated with CAC on systems design for a lab to test new technologies and on the scaling of data-intensive applications for homeland security.

Scaling Video Surveillance and Network Applications

Northrop Grumman recognized that CAC consultants were uniquely qualified in deploying HPC systems using multiple operating systems and integrating very large-scale databases. This experience was valuable in effectively testing and scaling homeland security applications.

Improved R&D and IT Solutions

Metrics

- Multiple platforms: develop a distributed test facility with multiple system architectures
- Rapid data analysis: increase the speed and amount of useful data available for human analysis
- Scalability: scale applications to high-performance levels

Challenge

Securing networks and physical facilities requires significant processing power. To be effective, large volumes of network traffic must be monitored and thousands of surveillance cameras must collect terabytes of data that lie useless if not analyzed in a timely manner.

“You cannot have people staring at cameras or poring over computer screens,” said Dr. Robert Brammer, Vice President and CTO for Northrop Grumman. “The process needs to be automated to detect telling patterns, and the data needs to be archived so that histories can be tracked. Because of the computational power required to accomplish this, cluster architecture is a natural infrastructure. You need many processors, and you need them to be cost effective.

In addition, research was required to determine how to best sort through the volumes of data and pick out the pieces of interest. Although all processing has to be automatic, some

small fraction of the data still requires the attention of an expert human. Northrop Grumman needed to know how best to extract this data from the mass and get it in front of the right person.

“Most of the traffic you see is perfectly normal, benign traffic that you want,” said Brammer. “It is just a small fraction of the data that counts from this point of view. We are looking for a needle in a stack of needles, and we need to know how to cut through data of that magnitude in what needs to be as close to real time as possible.”

Solution

Northrop Grumman worked with CAC to find the solution. CAC systems consultants helped Northrop Grumman create a Distributed Enterprise Security Lab (DESL) that allows Northrop Grumman to test products designed to enhance the security of cyberspace and physical facilities. The lab includes a variety of HPC architectures from suppliers such as Dell and Unisys and servers running databases such as SQL Server.

With the DESLs in place, CAC application and database consultants worked with Northrop Grumman to scale and optimize video and network surveillance applications for HPC environments. With HPC technologies, it is possible to successfully operate on billions of records every day.

Northrop Grumman surveillance systems are in operation in locations around the country, including a location in Washington, DC where video inputs from over 1,000 cameras are processed.

These HPC systems use pattern recognition technologies to assess traffic and personnel data in order to rapidly detect threats.



Northrop Grumman's Distributed Enterprise Security Labs provide a nationwide virtual laboratory for investigating new technologies and developing security solutions

The Client

Northrop Grumman Information Technology

- Global leader in advanced IT, engineering, and business solutions
- 18,500 employees worldwide with headquarters in McLean, VA
- Top-tier integrator of large-scale information systems for federal agencies
- Largest computer hardware contractor to the federal government
- Operating a network of 5 Distributed Enterprise Security Labs over the Internet

The Collaborative Relationship

Northrop Grumman Information Technology works with CAC to find optimal IT solutions for homeland security. Other collaborations between Cornell University and Northrop Grumman include computational materials research and the broadband mobile wireless network for New York City's first responders.

"Although the threat of terrorism will never be erased and we are just getting started, we have made clear productivity improvements. We are better equipped to deal with network security issues and to reduce the risk of terrorism. New technology has allowed us to uncover opportunities and strengths. There is no limit to the amount of computational power that could be applied to these issues. It is a definite arms race: is your defense better than their offense?"

*Dr. Robert F. Brammer
Vice President and Chief Technology Officer
Northrop Grumman Information Technology*