

THE COMPUTERWORLD HONORS PROGRAM

CASE STUDY

LOCATION:
*Fort Monmouth, New Jersey,
United States*

YEAR:
2006

STATUS:
Laureate

CATEGORY:
*Government and
Non-Profit Organizations*

NOMINATING COMPANY:
Cisco

ORGANIZATION:

US Army

PROJECT NAME:

Joint Network Node (JNN)

Summary

The communications, collaboration and information-sharing capabilities enabled by the Joint Network Node (JNN) network have enhanced performance of the U.S. Army command structures in Afghanistan and Iraq, aided the global war on terror and Iraqi democratization, and saved civilian and soldier lives. And, yet, probably the most remarkable part of the JNN story is that these unprecedented capabilities were enabled so quickly by so diverse an array of government and commercial organizations.

“It’s the least we could do for the war-fighter who does so much more for us,” said Jim Sintic, one of the original five JNN developers and now Chief Engineer for Tactical Networking Systems with the Army’s Project Manager (PM) Tactical Radio Communications Systems (TRCS), the group which oversaw the project.

The Army planned a methodical, deliberate upgrade from its Cold War-era, legacy communications system to its Warfighter Information Network-Tactical (WIN-T) vision over the course of this decade.

But, with the launches of Operation Enduring Freedom in Afghanistan and Operation Iraqi Freedom, the Army simply had to move more quickly. Working with a team of 200 professionals from Cisco Systems, General Dynamics and other industry leaders, the Army implemented the initial JNN program in just five months, moving to complete, in-theater, trained operational capability within a year.

No longer dependent on aged, line-of-sight and push-to-talk communications technologies, the JNN equipped the Army’s globally dispersed war-fighters with secure, Internet Protocol (IP) voice, video and data communications capabilities via satellite. The JNN network optimizes the performance and benefits of a host of applications such as the Command Post of the Future (CPoF), a tool for enabling dispersed commanders to collaborate and share information in virtual meetings.



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Introductory Overview

The Army's emphasis in the Cold War was on force of tremendous scale – big equipment and plenty of manpower. With the collapse of the Soviet Union, the U.S. Army's challenge evolved. The huge fighting force would need to be broken up into striker-brigade combat teams, equipped to engage in multiple, simultaneous conflicts around the globe. The Army's communications system, not designed for effective, efficient setup or operation outside the division structure, would have to evolve for this new, modular construct, too.

At about the same time, in the early to mid 1990s, the Department of Defense's Research & Development labs found themselves challenged to keep pace with the commercial sector's furious succession of innovations in communications technologies. Instead of merely pioneering communications technologies, the DoD determined it would be better served to also leverage the innovations emanating from the commercial world.

Out of these trends grew WIN-T, a commercial/government off-the-shelf (COTS/GOTS) communications architecture to be implemented gradually over the first decade of the 21st Century. But with the launches of Operation Enduring Freedom in Afghanistan and Operation Iraqi Freedom in 2001 and 2003, respectively, the need for new capabilities became more urgent.

“It came to a head when Gen. William Wallace made the run for Baghdad,” Mr. Sentic said. “The pace of the war outran our ability to communicate, and it revealed a gaping hole in the way we fought. When you outrun your communications, you leave your commander at risk. The communications system provides situation awareness, space awareness, fire support – all of the important warfighting applications.”

In confronting a nontraditional enemy with asymmetrical makeup and methods in vast desert- and mountain-region battlefields, the Army needed to break the bounds of 30-kilometer line-of-sight radio communications. Battalions had to be able to securely communicate with one another and commanders over distances of hundreds or thousands of miles. More bandwidth and new applications needed to be available to the network users who were doing the actual fighting.

Pending full-up availability of WIN-T, the Army deployed JNN, a state-of-the-art communications network that enables the secure exchange of IP voice, video and data communications beyond light of sight. Soldiers on the battlefield are equipped with voice over IP, videoconferencing and greater access to classified and unclassified military networks. JNN leverages commercial satellite technology and Internet networking technology to increase functionality and efficiency while reducing equipment size, weight and power.

Benefits

Information superiority stands to be the critical differentiator in the wars of today and tomorrow; whoever has it will win. Information must flow freely (but securely) among commanders and soldiers.

Internet capability for a small platoon on the ground, the ability for a commander to remotely monitor the progress of brigades, simultaneous information sharing among multiple users ... the consensus across users of the JNN is that the system provides tremendous and literally unprecedented capabilities. Among those are:



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- Connectivity of the Warfighter to the Global Information Grid (GIG),
- Internet-based connectivity to Defense Information Systems Network (DISN) per division,
- DISN connectivity down to battalion level,
- Enhanced mobility and communications at the “quick halt,”
- Joint and Coalition connectivity,
- Interface to legacy systems,
- “Black” Internet Backbone with Type 1 encryption,
- Satellite communications and terrestrial connectivity and
- Support for autonomous brigade operations.

“I’ve received numerous e-mails from commanders in the field, and they all basically say the same thing: JNN allows us to do things we’ve never done before,” Mr. Sintic said. “We can better collaborate in planning and executing missions. We can push streaming video to or from a battalion in the field. We can do video teleconferencing. Soldiers and commanders in different locations can look at the same maps of terrain and collaborate and draw on them for enhanced battle-space awareness. We can use CPoF, which is basically an all-in-one collaboration tool. Soldiers can use VoIP headsets.

“And it’s all done over the same pipe. Everything rides over the same JNN backbone.”

The Importance of Technology

JNN relies on Cisco Systems IP routers, switches, voice over IP call processing software and telephones, as well as net.com Promina Multiplexers, Redcom Laboratories public branch exchange (PBX) switches and Juniper Networks NetScreen firewalls. Cisco equipment is the backbone of the Joint National Training Capability (JNTC) Army Enterprise Network.

“Ninety percent of the equipment used by the JNN is commercially available,” Mr. Sintic said. “... We wanted to be cutting edge but couldn’t be bleeding edge because of the risks involved. We had so little time to turn on the capabilities, so we had to know that the gear would be interoperable with each other. And we expect these networks to be in use for a long time, so supportability was an issue. We had to go with proven technologies from industry leaders who were comfortable in the tactical arena. We just couldn’t take the risk of partnering with unproven vendors or startups who might get gobbled up by larger players.”

General Dynamics, along with DataPath Incorporated Satellite Communications Systems, led the integrated JNN response because of its experience with the Army’s legacy Tri-Tac and Mobile Subscriber Equipment (MSE) communications systems, domain knowledge, training regimens and logistical infrastructure. Not only did the General Dynamics team deliver the technology, it had to ensure that the troops were properly trained. Troops were trained sequentially, with lessons learned, updates and refinements incorporated in subsequent training for other units.



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Originality

While the capabilities of JNN are revolutionary in terms of helping the Army more efficiently and effectively execute its missions, the model is evolutionary – part of the Army's increasing reliance on more industry-standard, commercially-available technologies.

“JNN is a fully interoperable bridge to WIN-T,” Mr. Sintic said.

He identified time and teamwork as the two most exceptional aspects of the project. JNN was implemented very quickly and required integration across a diverse team of public and private entities – work coordinated by the Army's five-member PM TRCS group in Fort Monmouth, N.J.

“The synergy of the teams involved was incredible, and I, frankly, think patriotism had a lot to do with it,” Mr. Sintic said. “Our industry partners had to work hand in hand with one another to make this happen, and there was significant debate about the architecture – plenty of disagreements among really smart people. But they were willing to make impressive sacrifices for the greater good, and that was extraordinary.”

Success

The JNN was launched in just five months. In-theater, trained, complete operational capability was achieved within a year. Today, the JNN is in use across the Army's Third Infantry Division, 101st Airborne Division, 10th Mountain Division, 4th Infantry Division, 1st Cavalry Division and 25th Infantry Division, as well as three brigade combat teams (1/34th Infantry Division, 3/82nd Airborne Division and 2/1 Infantry Division).

“One of the good, strong trends for us is that the soldiers coming up today were born with computers,” Mr. Sintic said. “IP is something they are very comfortable with. They are very adaptable to the capabilities that JNN offers.”

On Jan. 18, 2006, the JNN was announced as a first-place winner of an Institute for Defense and Government Advancement (IDGA) 2006 Network Centric Warfare (NCW) Award in the category of Best Contributions to the Development of NCW Theory.

Difficulty

Given the life-and-death stakes, there is an understandable resistance to severe change in the way the Army operates. JNN represented a significant departure from tried-and-true communications methods, and yet the need became apparent with Gen. Wallace's outrunning of communications coverage on the march to Baghdad in the early stages of Operation Iraqi Freedom.

The most challenging obstacles overcome in JNN implementation were the tight timeframe, the requirement for the infrastructure to be compatible with the longer-range WIN-T vision, ensuring interoperability with legacy communications systems, and the synchronicity to be achieved among diverse public and private entities.