

Global Agile Integrated Transport (GAIT) Enables Real Time Critical Data Exchange

Envistacom teams with Army to upgrade the tactical network and enable Mission Critical Communications to be more Accessible with no additional cost to government



Overview

The five Regional Hub Nodes (RHN's), that sit on the Army's large tactical network backbone known as PM Tactical Network (formerly Warfighter Information Network-Tactical (WIN-T)), enable the Army to deploy forces anywhere in the world in support of contingency operations, natural disaster, or emergency response. These RHN's are the Army's largest satellite and network transport nodes. They allow home bases to forward mission critical information to tactical units that are on the move and thousands of miles from home base; and provide those tactical users reach back capability to do the same.

When the network was launched the intent was to provide remotely deployed units immediate access to data from their home mission commands that would help them fight in contested environments where they had to operate in small groups and independently, all while on the move. This vision fell short once the realities of operating a smaller tactical network over the PM Tactical Network came into play due to the considerable number of security, firewall and IA requirements defined and required by the Defense Information Systems Agency. Partnering with the PM Tactical RHN Engineering team, Envistacom helped develop a solution, Global Agile Integrated Transport (GAIT), that would provide simple yet substantial upgrades to the RHN network, at a minimal cost; and it would provide full operational capabilities while simplifying and accelerating the rate at which data is moved through the network.

The Regional Hub Node (RHN) Network Before Global Agile Integrated Transport

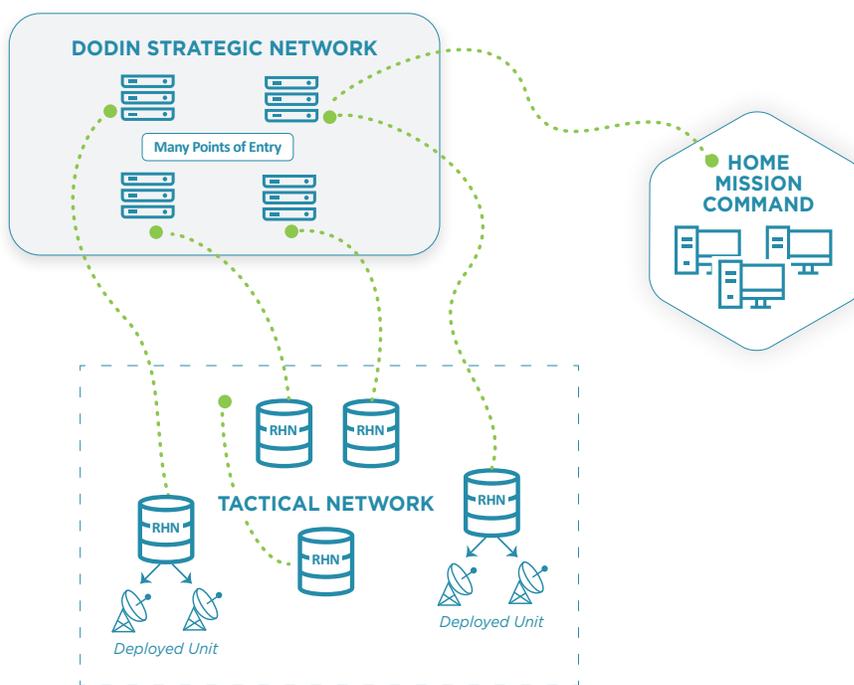
In April 2012 when the fifth and final Regional Hub Node (RHN) came online on the network, this milestone was lauded as a major step in enabling soldiers in the field to achieve full reach back to the Army's global information network anywhere in the world; and allow home commands to communicate with their deployed units in near real time.

The network had five RHN's strategically placed in sanctuary locations around the globe including CONUS East, CONUS West, European Command, Pacific Command and Central Command. The idea was to enable remotely located units to map back to the RHN closest to them for reach back capability to their home base; and to be able to do it immediately with near real time voice, data and video communications via satellite and line-of- site signals on the global network.

In theory, the intent of the program would enable a tactical unit to be operating and connected to a regional hub node (RHN) within hours of arriving on location. The reality, however, was that neither the RHN nor the home mission commands could make those connections in such a short amount of time. It could take months for them to get the permissions needed to connect to the Tactical Network. Why? Because the home mission commands were not connected to the tactical RHN network, but instead to the overlying Department of Defense's strategic network. And therein lay the problem. To connect to the DoD's strategic network, users had to run a gauntlet to obtain a multitude of permissions

to get through various firewalls and ensure IA requirements were met for every portal they would hit on the network. This could take months as all the various hoops to jump through for access to each portal on the strategic network had to be validated as not being an IA risk. Mission Command services hosted at the Division HQ's had to be accessed through the DODIN strategic network; and strategic firewall modifications had to be coordinated with multiple agencies.

Additionally, a deployed unit's access to an RHN was tied to the region closest to where they were performing their mission; while the home mission command was always connected to the same RHN, and not necessarily the one that their unit was connected to. So, for example, if the 3rd Infantry Division was deployed to the Republic of Georgia, they would use the RHN at European Command, but their home mission command might be connected to a different RHN. The complexity compounded if the home mission command had multiple deployed units in multiple locations around the globe. Each unit was mapped to the RHN closest to them; and there was no interconnectivity between the RHN's. Since there were multiple ports of entry for each RHN onto the strategic network, each RHN had to independently connect to the Strategic Network. Additionally, since the RHN's were not connected to each other, there was no service redundancy. If one went down, the deployed units attached to it could not get access to another RHN to retain their connectivity to the home mission command.



Need a caption to summarize this diagram.

Issues with near real time seamless connectivity began to manifest almost immediately as the realities of accessing the global network within the parameters and requirements of Defense Information Systems Agency (DISA) came to full light. The network topography with all the accompanying firewalls, information assurance requirements, cybersecurity and monitoring software plus a host of other DISA network essential tools added additional administrative, security and operational layers. This became the roadblock to slowing down network communications and operations and denying near real time connectivity, or even connectivity in days for that matter.

Introducing GAIT

Five years after the RHN's were completed multiple access issues remained that prevented them from being able to achieve near real time reach back to the home mission command. Data and information transfer was slow and the RHN network, being heavily burdened with all the infrastructure and security requirements of DISA, made it virtually impossible to achieve the functionality and robustness that was originally intended to provide remote units and home base with fast communications and easy information exchange from anywhere in the world. Having already invested billions into the WIN-T network, the challenge was how to accomplish those goals and do it without incurring significant additional expenditures and network infrastructure.

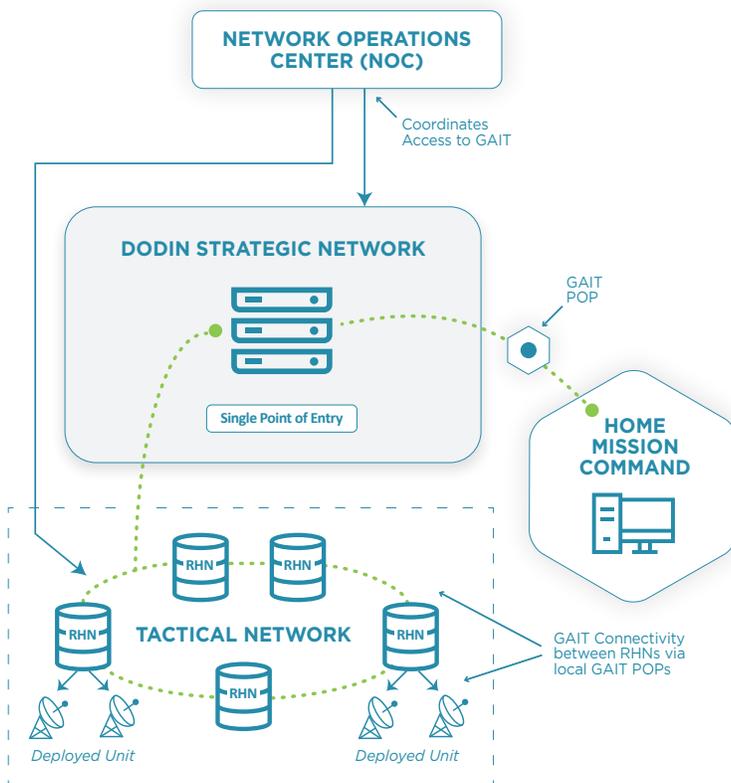


The RHN team came up with highly effective workaround solution that leveraged what was already in the network with a new way to transport data. This relatively simple “fix” would flatten the network, simplify and streamline the way data and voice communications were transmitted over it, provide robust redundancy and resiliency, and cut back on the number of support personnel needed for network operations.

The team introduced the Global Agile Integrated Transport (GAIT). This new framework leveraged the existing Worldwide Information Network-Tactical RHNS by seamlessly sewing them together into one global architecture. Ultimately, it allowed mission command services hosted at the Division HQ's to assimilate into the same IA boundary and no strategic firewall modifications were needed. How did they do this? They did it by implementing the Colorless network. Working with Envistacom, PM Tactical Network nodes use a dedicated network for transport referred to as the “Colorless Network”.

GAIT connects each of the RHNs with the DoD Teleports and uses Multi-Protocol Label Switching (MPLS) to extend the Colorless transport network globally. This global extension is achieved by using what are called GAIT Points of Presence (POPs). These POPs can be set up in any geographical location, for instance a Home Station Mission Command (HSMC). Once set up, a POP can be connected to any of the other GAIT POPs anywhere in the world. This connection allows for near real time information exchange between the home mission command and any of its geographically dispersed units, as long as those units that have access to the RHNs Colorless network. In other words, wherever the unit may be in the world, commands can now maintain full Mission Control System (MCS).

Home commanders can maintain MCS connectivity from garrison HQ to any geographically dispersed unit pulling services from any RHN globally. Commercial internet access can also be provided to National Guard units, non-government organizations (NGO's) and any other third-party support organizations such as FEMA, Red Cross, local first responders including fire and police departments, etc.



Need a caption to summarize this diagram.

GAIT Facilitates Emergency Relief Services During 2017 Hurricane Season

GAIT was put through its paces in the aftermath of monster hurricanes Harvey, Irma and Maria that hit the US mainland and its island territories in 2017. With communications infrastructure in several areas damaged or destroyed, the Army was the point agency for the coordination, management and execution of disaster relief efforts by providing massive interagency collaboration activities and communication assets for relief efforts. By establishing a robust tactical network backbone, they could provide a full range of data, voice and video communications.

Through the Army's worldwide tactical network RHNs they can relay information anywhere in the world and in the case of disaster relief efforts for these hurricanes, they enabled the coordination and organization of first responders, supplies and equipment across various civil, humanitarian, and military organizations. The two RHN's located in the United States not only enabled communications between Army units within the military network but also delivered vital commercial internet and phone services to non-governmental entities.

Puerto Rico, was particularly hard hit when Hurricane Maria devastated the island wiping out all communications in addition to water, electricity, airports, internet and logistics. Damage sustained at Rafael Hernandez Airport in Aguadella, Puerto Rico, a joint military-civilian airport, was so bad that the air traffic control tower could not communicate with inbound flights and the airport only managed to bring in one



inbound flight every 20 hours. As soon as the Army set up their equipment and tapped into the RHN network, the airport re-opened and sustained an average of 400 flights per day, far more than their average of 443 flights per day pre-hurricane. This allowed many relief activities to be carried out including medevacs, supply and water deliveries from the US, and the evacuation of citizens, not to mention opening and maintain a communications network.

Network Operations Centers (NOC's)

The final phase of the Global Agile Integrated Transport architecture that brings the whole solution full circle is the introduction of the Network Operations Center (NOC), completed in October 2017. The NOC takes on all the network planning and frees up the RHN's operators to facilitate operations and mission planning. The NOC coordinates all access to GAIT. It sets up the access between the mission home commands, the RHNs and the deployed units via the GAIT Points of Presence. It determines what hardware is needed, how it will be configured, identifies the routing capability and if every entity involved has the correct IP address. It will also determine which RHN's the home mission command will have access to. If an RHN goes down due to network issues, equipment failure or natural disaster, the NOC will figure out a workaround solution including a new route and access to a new RHN. This provides the redundancy that was missing pre-GAIT. Restoration Terminals are being co-located with each RHN to provide additional backup to the large RHN terminals should there be any type of catastrophic failure with them.

Summary

The GAIT methodology is a compelling success story. By creatively re-using equipment and infrastructure that had been implemented in a previous round of upgrades to the RHN network, they add substantial capability without creating additional costs to the Army. It provides the first steps towards a true "cloud based" mission command server environment and it flattens the network and simplifies data and voice transmissions on the tactical network without adding additional layers. Senior commanders at home bases have near real time mission control and can see the same screens their soldiers are seeing on the battlefield allowing them to provide critical mission essential information and direction as a result. Additionally, it can be used in times of civil crisis making it a highly cost effective and efficient network solution. The net-net is that Global Agile Integrated Transport capability helps the mission commands to make better, quicker decisions. They don't have to speculate as much because there aren't any gaps in the data. GAIT enables our warfighters to be more flexible, quicker to react and ultimately greatly improves their chances towards a successful mission resolution.