GOVERNMENT-OWNED, CLOUD-READY, SCALABLE, AND CROSS-PLATFORM SOLUTION FOR RAPID DISSEMINATION OF DATA ACROSS WIDE AREA NETWORKS (WANs) THAT SPAN LARGE GEOGRAPHICAL DISTANCES

The Data Dissemination Element (DDE) rapidly transfers data across networks with high latency. The software is a completely Government-owned solution managed by the DoD's Air Force Distributed Common Ground Station (AF-DCGS). The system uses industry standard algorithms along with COTS equipment to exponentially decrease transfer times and provide zero bit loss assurance for mission critical information. This enables analysts to receive data faster and make timelier decisions to enable the warfighter’s mission.

THE SCIENCE

Typical network data transfers use TCP based protocols. As network latency and packet loss increase, TCP transfer times increase due to the three-way handshakes built into the protocol. DDE overcomes this by using a User Datagram Protocol (UDP) along with a Forward Error Correction (FEC) algorithm to ensure data integrity. This enables DDE to achieve 99% bandwidth usage on 1 GigE networks and 95% bandwidth usage on 10 GigE networks with zero bit loss. DDE can be tuned for 56Kbps links up to 100 Gigabit links.

THE TECHNOLOGY

DDE was developed using the Defense Intelligence Information Enterprises (DI2E) Open Systems Architecture (OSA) methodologies. Data transfers are controlled through a web-based interface. Access is controlled to this interface using industry standard Identity and Access Management (IdAM) systems. Transfers between DDE systems can be prioritized to enable efficient management of bandwidth resources. User-defined alarms can be set to notify of anomalous network conditions. TCP based protocols, such as SFTP, FTPS, GridFTP, and Network File Copy, are also supported by the DDE software. DDE supports the auditing and logging requirements required by ICD-503 and ICS 500-27 and is able to be accredited on Government networks. Historical reports of data transfers can be generated in Microsoft Excel (.xlsx) and Comma Separated Value (.csv) format.

EXISTING HARDWARE USAGE

DDE can be deployed on x86 and x64 compatible hardware and in virtualized environments. It has successfully been deployed in several Infrastructure as a Service (IaaS) environments including the Amazon EC2 and DI2E Developer Tools environments. DDE is designed to run under Red Hat Enterprise Linux (RHEL), Community Enterprise Operating System (CentOS), and Windows Operating Systems. In the AF DCGS configuration, the DDE hardware is a Dell R820 server and a Hitachi HUS 130 controller.
FEATURES

• Data transfer acceleration on Long Fat Networks (LFNs)
• 99% Bandwidth usage on 1 GigE networks
• 95% Bandwidth usage on 10 GigE networks via GridFTP
• Bandwidth usage prioritization
• Integration with Identity and Access Management (IdAM) frameworks
• OpenSSO/OpenAM
• LDAP
• ICD-503 and ICS 500-27 compliant
• Able to be accredited on Government networks
• Will install on existing x86/x64 compatible hardware
• Cloud-ready, tested on existing IaaS platforms
• Virus scanning of incoming data
• User-friendly interface
• Fully documented with computer-based training for rapid user training
• Can scale vertically and horizontally to accommodate different sizes of network pipes

AF-DCGS HARDWARE SPECIFICATIONS

Dell R820 Server
• Quad Intel Xeon E5-4600 v2 processors
• 256 GB of ram
• Two 10 GigE ports
• Support of dual port QDR and FDR Infiniband
• Four 1 GigE ports
• 2U of rack space required
• 2130 BTU/hr of cooling required
• Power: 624W
• Weight: 65 lbs

Hitachi HUS130
• 30 TB of storage comprised of 72 600GB SAS drives
• RAID 6 with two hot spares and two cold spares
• 6U of rack space required
• Weight: 426 lbs
• Power: 1244 W
• Cooling 4236 BTU/hr