Navy SBIR/STTR Success

Data Distribution Service (DDS) Performance, Portability, and Security

"The need for a simple and reliable way to communicate real-time information over a network is so fundamental that domains as diverse as command and control systems, traffic monitoring, financial transaction processing, combat systems, and industrial sensing all use it as a core technology."

- Chris Lanfear, VDC Senior Analyst

Topic Number: N05-139

SBIR Investment:
$898,506

Phase III Revenue:
$19,401,035

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About the Technology:

Real-Time Innovations (RTI) Connext™ Data Distribution Service (DDS) is communications middleware for distributed real-time applications. It is the most reliable, flexible and highest performing implementation of the Object Management Group's (OMG) Data Distribution Service for Real-Time Systems standard available today. DDS is field-proven and is used in many time-critical and data-critical applications. DDS directly connects heterogeneous hardware and operating systems over different transports. As DDS is networking middleware, it implements a publish-subscribe model for sending and receiving data, events, and commands among the nodes. Nodes that are producing information (publishers) create "topics" (e.g., temperature, location, pressure) and publish "samples." DDS then delivers the sample to all subscribers that declare an interest in that topic.

Naval Benefit

The key benefit is that system integration is handled at design time by describing the data exchanged between modules. Applications that use RTI Connext DDS are entirely decoupled; designers spend little time handling interactions. DDS automatically handles all aspects of message delivery, without requiring any intervention from the user applications. During the Phase II effort, significant progress was made in terms of performance, portability, and security. These improvements further enhanced the data-oriented approach of DDS, which significantly simplifies life-cycle development of the distributed system.

Transition

RTI Connext DDS has been adopted by many DoD programs, spanning all services and intelligence agencies. Notably, DDS is used by US Air Force C4ISR data communications systems, the US Navy Open Architecture (OA) community and FORCEnet, Future Airborne Capability Environment (FACE™) Consortium and the Joint Air Force, Navy and DISA Net-Centric Enterprise Solutions for Interoperability (NESI). This has resulted in the need for high-performance implementations of DDS that can run in mission-critical defense systems on multiple hardware, network transport, operating system, high-level language, and compiler configurations. SBIR funding greatly helped to mature the DDS product offering in the areas of performance, portability, and security. DDS is also likely to be a technology widely embraced by real time, embedded, and industrial software developers. DDS has been in daily use in operational deployed environments spanning combat, command and control, navigation, telecommunications, transportation, automation, and ISR sensor systems. Other applications include the US Army's use of DDS to tie together VPG simulators to test and evaluate Army vehicles and components. Siemens Energy also employs RTI software to deliver the resilient, high-performance and scalable data distribution capabilities that meet the demands of its supervisory control and data acquisition (SCADA) systems for wind power delivery. RTI messaging software can monitor and control wind farm arrays with up to 500 wind turbines.

Real-Time Innovations

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