Delivering High-Performance, Scalable and Safe Data Distribution in Next Generation Air Traffic Control and Management

OpenSplice DDS is a Standard-Based Open Source extreme-performance, real-time, and highly scalable data-distribution middleware that provides next generation mission- and safety-critical applications with the ideal platform for addressing complex real-time information distribution and management challenges such as those posed by Air Traffic Control and Management.

Air-Traffic Control and Management Systems pose unique challenges in terms of the volume of data that has to be processed and distributed in real-time at various geographical scales while ensuring high availability, scalability and safety.

OpenSplice DDS has been designed to optimally address the real-time information distribution and management challenges posed by large-scale high performance real-time data-processing systems, as well as next generation net-centric systems, such as SESAR and Next-Gen. It has a proven success record of scaling from systems ranging from multi-processor single-board computer, to large scale net-centric system of systems.

A Field-Proven Technology

OpenSplice DDS has many proven production deployments that demonstrate its unique strengths in supporting complex mission-critical systems in a range of application domains, such as defense, aerospace, transportation, telecommunication, and financial services.

OpenSplice DDS, is compliant with the EUROCAE recommendations for inter-center Interoperability, and is at the foundation of next generation European Flight Data Processor, CoFlight, where it is applied to distributed Flight Data Plans among all the components of the FDP down to the most safety critical SWAL-2 subsystems.
Setting Higher Standards for Data Distribution Technologies

With its extraordinary support for QoS and data-centricity, OpenSplice DDS is the future of Data Distribution technologies.

Real-Time Data-Centric Publish/Subscribe

OpenSplice DDS perfectly blends and extends the most useful features found in real-time messaging middleware and relational data-bases. From real-time messaging middleware, OpenSplice DDS inherits the efficiency in distributing data, the predictability, and the throughput. From relational data-bases, it inherits the ability to define relational data models and operate on them via SQL92 expressions to specify content-based subscriptions, join, projection, filters, and queries. These capabilities are provided via a fully distributed architecture that ensures performance, predictability and scalability, and are enhanced with a rich set of QoS properties that allow traffic prioritization, traffic shaping, hardware and software filtering, and persistence.

Standards Based

OpenSplice DDS is fully compliant with the Object Management Group (OMG) “Data Distribution Service for Real-Time Systems v1.2” (DDS) Specification and DDSI v2.1 interoperability wire protocol. The OMG DDS is the standard recommended by EUROCAE for exchanging Flight-Objects between air-traffic control centers across Europe.

Architectural Highlights

OpenSplice DDS achieves efficiency, scalability, and determinism via a shared-memory architecture that

- Fosters highly-optimized information sharing and communication across cores in modern multi-core processors.
- Features node-wide network scheduling thereby achieving fine-grained control over networking resources, scalability and discovery, and communication performance.

OpenSplice DDS is built as a modular collection of pluggable services that provide a rich set of features, such as advanced networking, security, database integration with any ODBC 3.0-compliant DBMS, and web services integration.
Designed for Performance, Predictability and Scalability

OpenSplice DDS handles millions of messages per second, ensuring high determinism and ultra low latencies. Its advanced support for network traffic engineering ensures that the system remains stable and predictable even under the most extreme overload conditions.

Advanced Networking Technology

The OpenSplice DDS networking service is one of its most distinguishing features. The networking service fetches the data from the shared memory segment and ships it to interested parties, thereby making optimal use of resources whilst enforcing the required QoS levels. By employing a shared memory architecture, the networking service can optimize network utilization by bundling information across topics and applications. The networking service also supports any user-defined number of partitions and of network channels. Partitions are mapped to IP multicast addresses to segregate different traffic flows, while network channels are dedicated to handle traffic for specified priority range’s. Network channels help enforce messages priority even on non-priority-preserving transports, such as the TCP/IP or UDP/IP. Another important feature provided by the OpenSplice DDS’s networking service is traffic shaping. For every channel it is possible to define the traffic profile, and ensure that the network utilization never exceeds a user-specified value. In summary, the OpenSplice DDS’s networking service allows users to (1) fine-tune the use of network resources by means of partitions and channels, (2) prioritize data for every single node to ensure that the more important data always preempts less important data, and (3) bundle data across topics and applications to ensure optimal throughput and reduce CPU utilization.

Unparalleled Productivity

OpenSplice DDS is available on all major operating systems (OS) including AIX, Linux, Solaris, Windows, Integrity and VxWorks. Language bindings are available for C/C++, C#, Java and XML. Its rich support for platforms and language bindings enables software developers to select the most appropriate development language and target OS for use in various parts of their systems. The OpenSplice DDS Power Tools further enhance productivity by a factor of 10x, via an Eclipse-based information, application, and deployment, model-driven engineering tools, as well as tools for runtime monitoring and system tuning.
Who is using OpenSplice DDS?

**Transportation**
OpenSplice DDS powers some of the most challenging transportation programs, such as next generation European Air Traffic Control System, and several Metro Systems throughout Europe.

**SCADA**
OpenSplice DDS has been applied with great success to wide variety of SCADA and Utility applications ranging from industrial control to telemetry.

**Defense & Aerospace**
Some of the most advanced, next-generation, defense and aerospace systems are currently powered by OpenSplice DDS. For instance, the TACTICOS Combat Management System (CMS), one of the most successful CMS available on the market, uses OpenSplice DDS to achieve its renowned performance, scalability and availability.

**Financial Services**
OpenSplice DDS is the technology of choice for next generation Financial Applications. It currently powers some of the most innovative Automated Trading Systems, providing capabilities well beyond those of traditional ultra-low-latency technologies.

Technical Specification

**Licensing**
- LGPL/Commercial

**Operating Systems**
- AIX
- Linux
- Solaris
- Windows
- INTEGRITY
- VxWorks

**Language Support**
- C/C++
- C#
- Java
- Real-Time Specification for Java

**OMG DDS Compliance**
OpenSplice DDS is compliant with the full OMG DDS v1.2 specification, including the Data Centric Publish/Subscribe(DCPD) and the Data Local Reconstruction Layer (DLRL) profiles.

About PrismTech

Founded in 1992 with offices in the USA and Europe, PrismTech is a privately held software products company. PrismTech serves international Fortune 500 customers in the telecommunications, data communications, defense and aerospace, transportation and financial sectors.

PrismTech is an acknowledged leader in middleware and software productivity tools, with solutions ranging from embedded real-time systems to wide-scale integration, supporting applications from operations support systems through to software-defined radio.

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OpenSplice DDS
Delivering Performance, Openness, and Freedom

Online Resources
http://www.opensplice.com
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