



OpenSplice|DDS

Delivering Performance, Openness, and Freedom

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The OpenSplice DDS Revolution Explained

Speaker Bio

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Dr. Angelo Corsaro is the OpenSplice DDS Product Strategy & Marketing Manager at PrismTech, a market leader in the field of high performance middleware. His responsibilities include product strategy, competitive positioning, technology evolution, and technology evangelism. He is also responsible for strategic standardization at the Object Management Group (OMG), where is co-chair of the Data Distribution Service (DDS) Special Interest Group, and the Real-Time Embedded and Specialized Services Task Force.

Angelo received a Ph.D. and a M.S. in Computer Science from the Washington University in St. Louis, and a Laurea Magna cum Laude in Computer Engineering from the University of Catania, Italy.

Agenda

▶ The Big News

▶ The Value of Open Source

▶ OpenSplice DDS v4.1

▶ Product Structure

▶ Licensing

▶ Services

▶ Community

▶ Concluding Remarks

The Big News: In Summary

- ▶ PrismTech embrace the perspective that “**The Future of Software is Open Source**” and in alignment with its vision, strategy, and pedigree, releases **OpenSplice | DDS** as Open Source Software
- ▶ This release, provides the Open Source Community with access to the most advanced and field proven extreme performance data distribution technology.
- ▶ This Release, marks a landmark in middleware history!

Agenda

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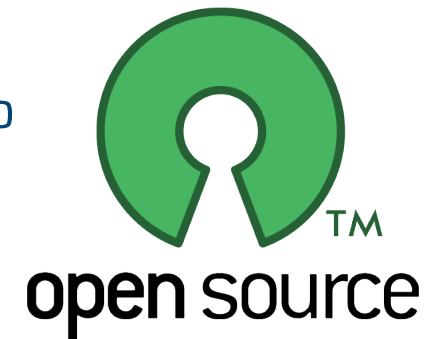
▶ Community

▶ Concluding Remarks

The Future is Open Source

Winning Aspects of the Open Source Model

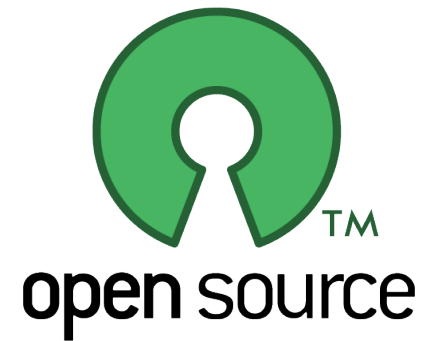
- ▶ The Open Source Model establishes a **virtuous cycle based on generosity** with a **non-linear return** for community members who donate their time, skills, ideas, money, etc.
- ▶ The Open Source Model **empower users**
- ▶ The Open Source Model **removes boundaries** and is able to “pick the brain” of the smartest people around the world that are willing to contribute
- ▶ The Open Source Model **removes adoptions barriers**
- ▶ The Open Source Model is able to benefit even from **free-riders**



The Future is Open Source

Market Evidences

- ▶ Open Source software is being increasingly adopted and chosen in place of proprietary software by corporate and administrations
 - ▶ Government EU/US/China
 - ▶ DoD ACT HR 5659
- ▶ The Open Source Software consistently delivering better quality and more innovative software when compared to closed proprietary software
 - ▶ Ex. GNU Software, Linux OS, Firefox, etc.
- ▶ Open Source Software market share is consistently growing, and will be further propelled by the Financial Crisis



The Value of Open Source

...A User Perspective

Open Source Software provides the following key benefits to Users:

- ▶ No Technology Adoption Barriers
- ▶ Larger Pool of Talent
- ▶ Better Support
- ▶ A Platform for User-Driven Innovation
- ▶ Security of Supply
- ▶ Better TCO when compared with Proprietary SW

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OpenSplice DDS

A High Performance Real-Time Data-Centric Publish/Subscribe Middleware

- ▶ The right data, at the right place, at the right time – All the Time
- ▶ Fully distributed, multicast-enabled, high performance, highly scalable, and high availability, hot-swap/hot-hot architecture

Perfect Blend of Data-Centric and Real-Time Publish/Subscribe Technologies

- ▶ Object/Relational Mapping, Content based subscriptions, queries, filters, and windows
- ▶ Fine grained tuning of resource usage and data delivery and availability QoS
- ▶ Optimal networking and computing resources usage

Loosely coupled

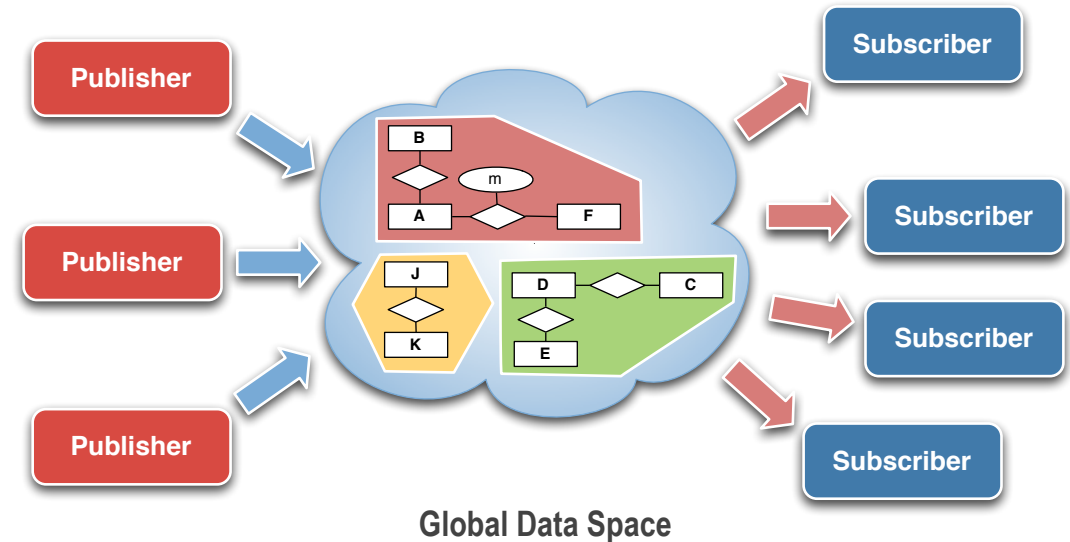
- ▶ Plug and Play Architecture with Dynamic Discovery
- ▶ Time and Space Decoupling

Open Standard

- ▶ API Standard (DDS v1.2)
- ▶ Wire Protocol Standard (DDSI v2.1)

Technology Ecosystem

- ▶ Tools, Security, DBMS/SOAP Connector, etc.



Use Cases

Defense

- ▶ **Combat Management Systems**
- ▶ **Flycatcher system**
- ▶ **Tactical Links**
- ▶ **Radar Processing**
- ▶ **Submarine Systems**
- ▶ **Future Combat Systems**

SCADA/Utilities

- ▶ **Industrial Automation**
- ▶ **Power Grids**
- ▶ **Rocket Launch Systems**

OpenSplice|DDS



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 **PRISMTECH**

Use Cases

Transportation

- ▶ Air Traffic Management/Control
- ▶ Metropolitan Traffic Management
- ▶ Underground Metropolitan Transportation

Financial Services

- ▶ Automated Trading Firms
- ▶ Compliance Systems
- ▶ Market Data Platforms

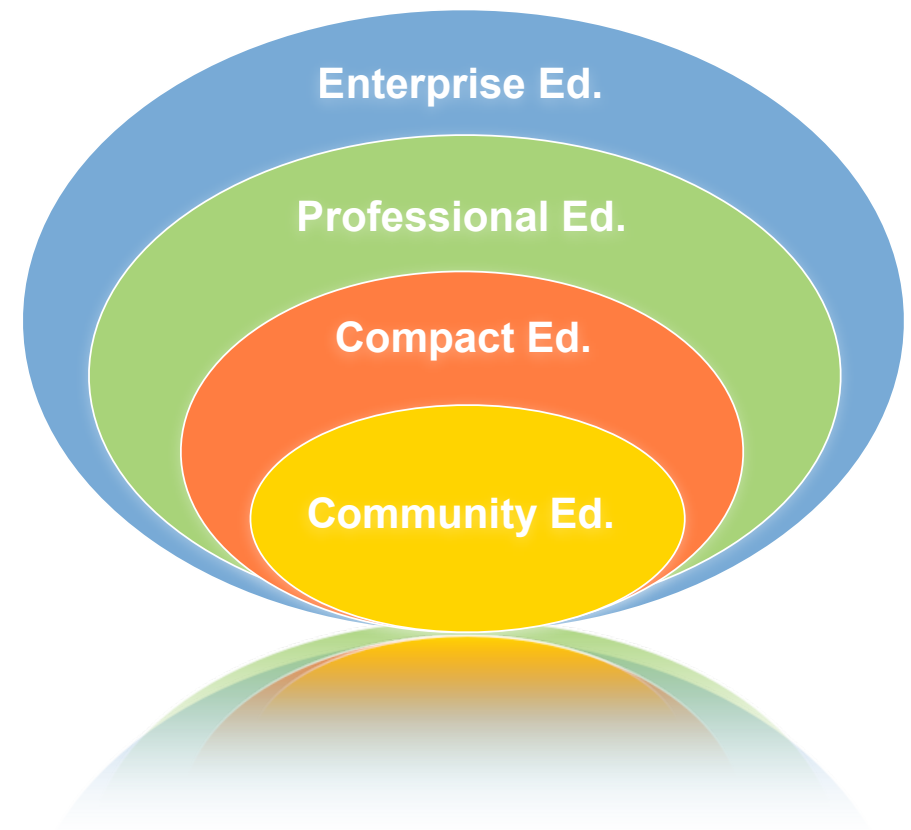


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OpenSplice DDS v4.1

- ▶ Product reorganized into Editions
 - ▶ Community Edition
 - ▶ Compact Edition
 - ▶ Professional Edition
 - ▶ Enterprise Edition
- ▶ Product Editions provide a growing set of functionality to address the needs of increasingly more sophisticated users
- ▶ The Community Edition is Open Source
- ▶ Compact, Enterprise and Professional Edition are available only through Commercial Subscriptions



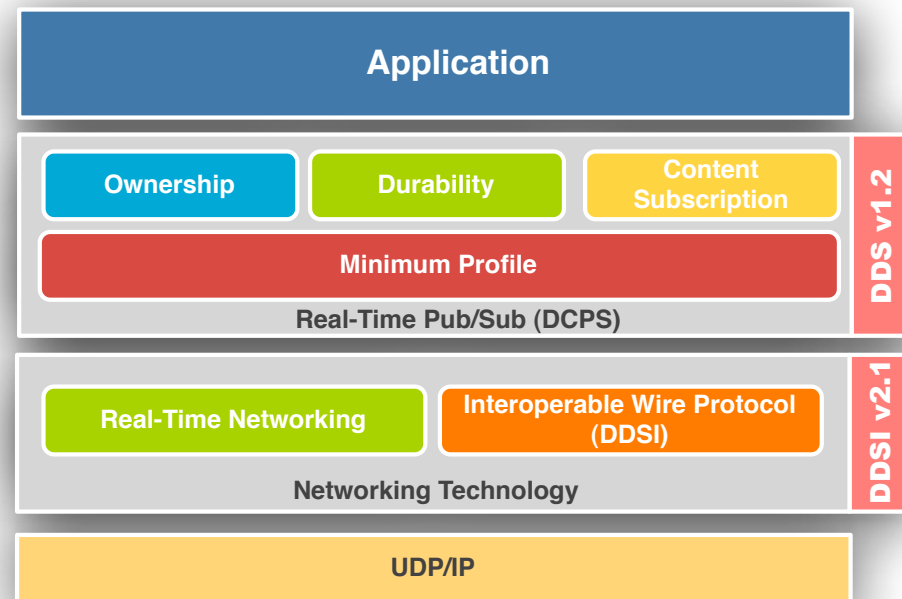
Community Edition

Features

- ▶ **OMG DDS v1.2 DCPS**
 - ▶ Minimum Profile
 - ▶ Content Subscription Profile
 - ▶ Durability Profile
- ▶ **Networking**
 - ▶ DDSI v2.1 Implementation
 - ▶ Real-Time Networking Implementation

Licensing

- ▶ **LGPL**



Open Source LGPL Licensed Edition -- The Best Way to Get Started with DDS

Technical Highlights

Networking

Real-Time Networking Technology

Architecture

- ▶ **Network-channels**
 - ▶ Priority bands
- ▶ **Network-partitions**
 - ▶ Multicast Groups
- ▶ **Traffic-shaping**
 - ▶ Burst/Throughput

Scalability and Efficiency

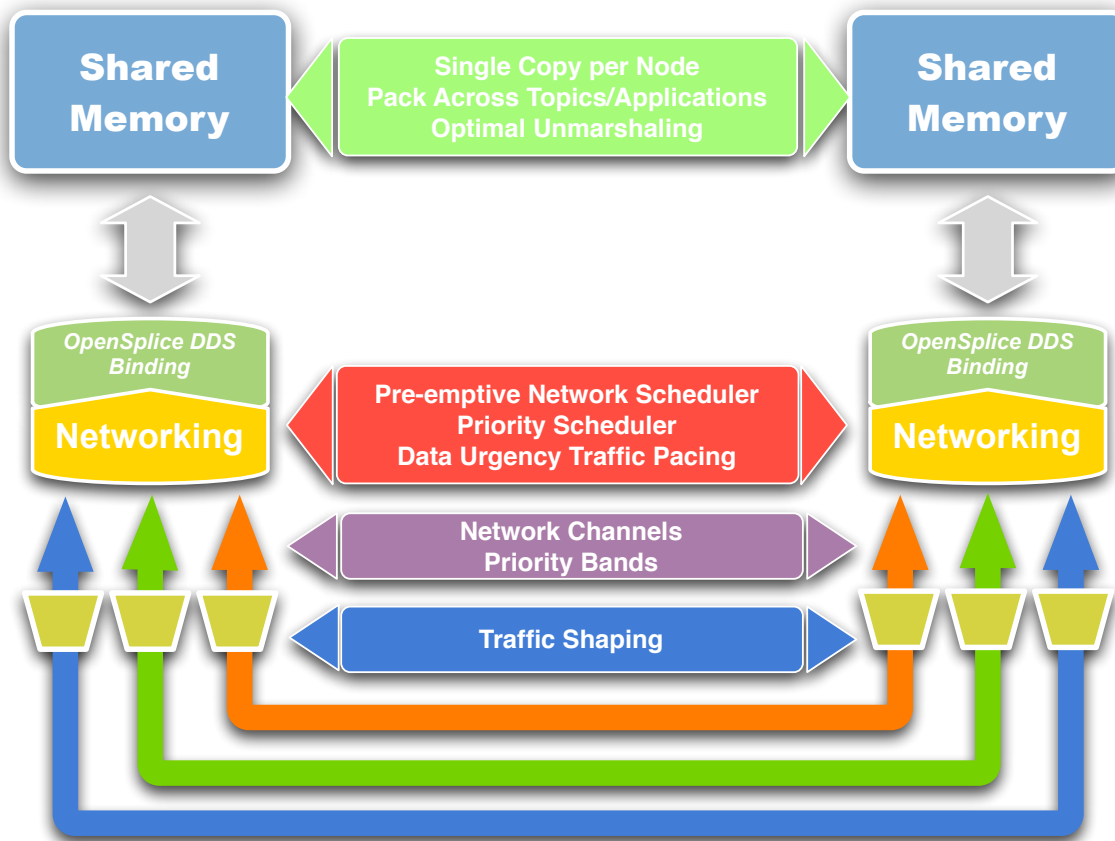
- ▶ Single shared library for applications & services
- ▶ Ring-fenced shared memory segment
- ▶ Data urgency driven network-packing

Determinism & Safety

- ▶ Preemptive network-scheduler
- ▶ Data importance based network-channel selection
- ▶ Partition based multicast-group selection
- ▶ Managed critical network-resource

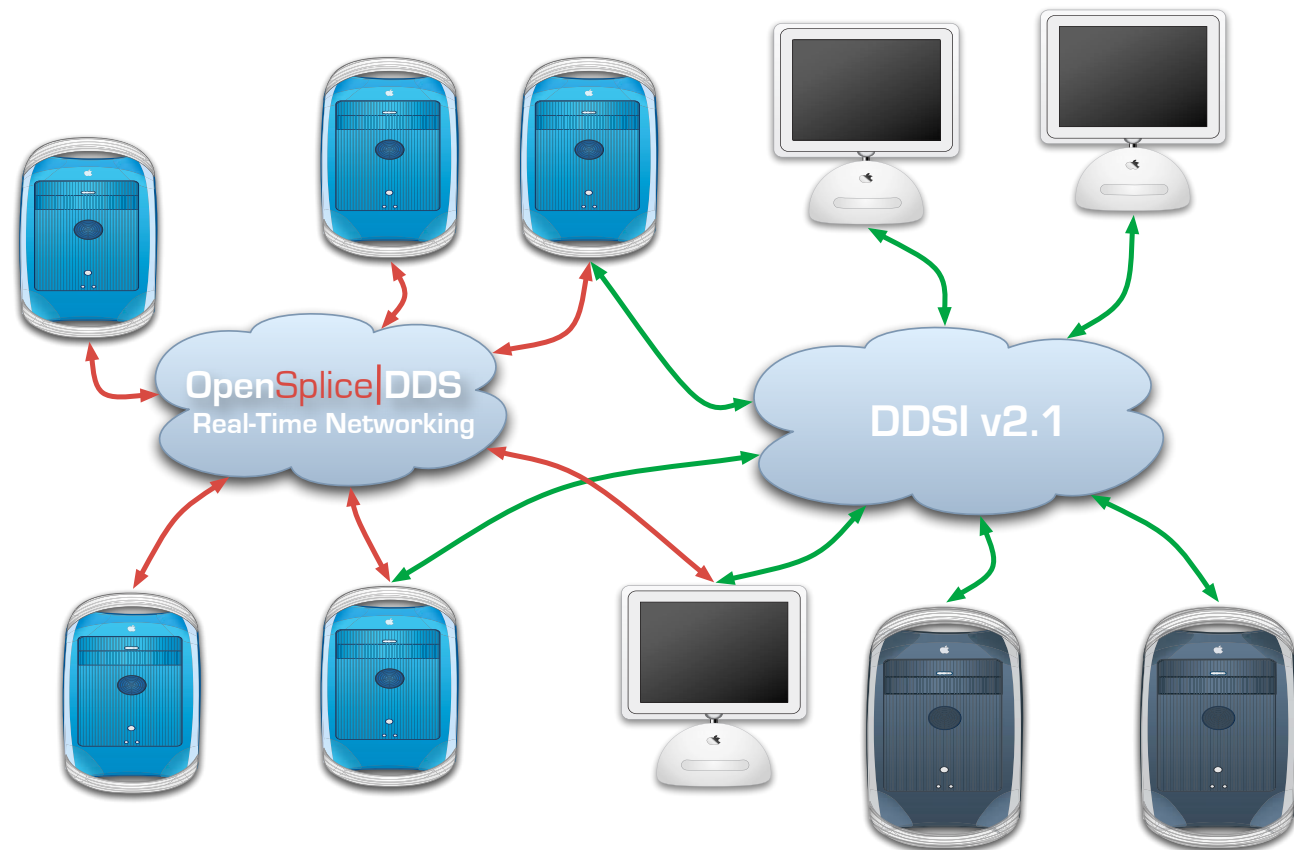
Fault-Tolerance

- ▶ Active Channels
- ▶ Fall back on next highest priority active channel



The Power of Choice

- ▶ With OpenSplice DDS you can choose whether to use the Real-Time Networking Protocol or the DDSI Interoperability Protocol based on your system requirements w.r.t. real-time behavior, scalability and interoperability
- ▶ OpenSplice DDS can simultaneously run over its Native Protocol as well as DDSI thus allowing you to choose what best works for you



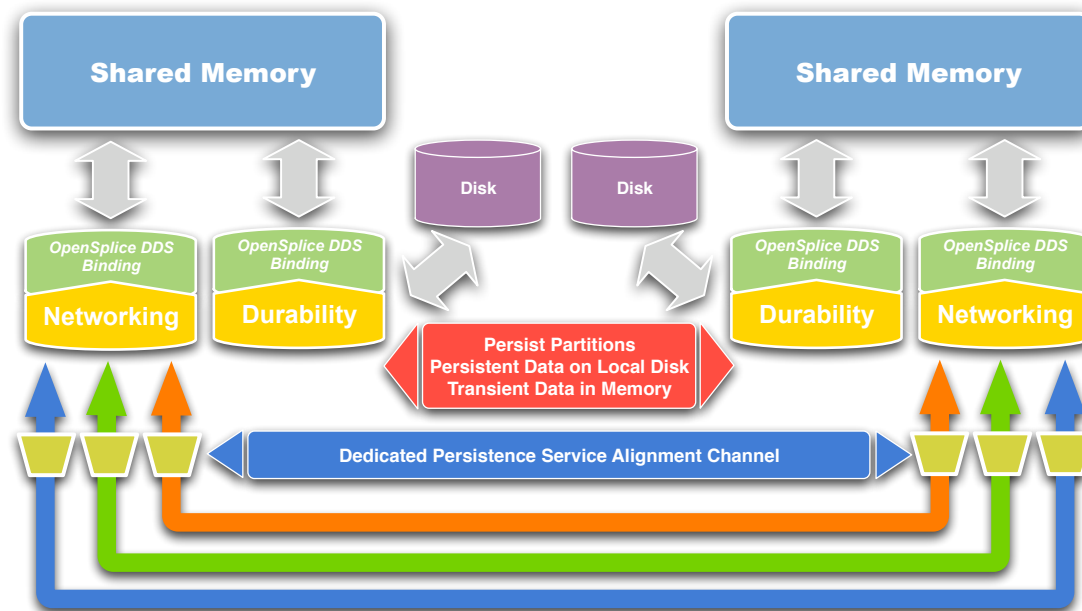
Technical Highlights

Services

Durable Data Technology

Architecture

- ▶ **Fault-Tolerant Data Availability**
 - ▶ Transient – on memory
 - ▶ Persistent – on disk
- ▶ **Partitioning**
 - ▶ DDS Partitions
- ▶ **Alignment**
 - ▶ Dedicated Channels



Goal

- ▶ **Transient QoS.** Keep **state-data** outside the scope/lifecycle of its publishers
- ▶ **Persistence QoS.** Keep **persistent settings** to outlive the system downtime

Features

- ▶ **Fault-tolerant availability** of non-volatile data
- ▶ Efficient delivery of initial data to **late-joining applications**
- ▶ **Pluggable** Durability Service
- ▶ **Automatic alignment** of replicated durability-services

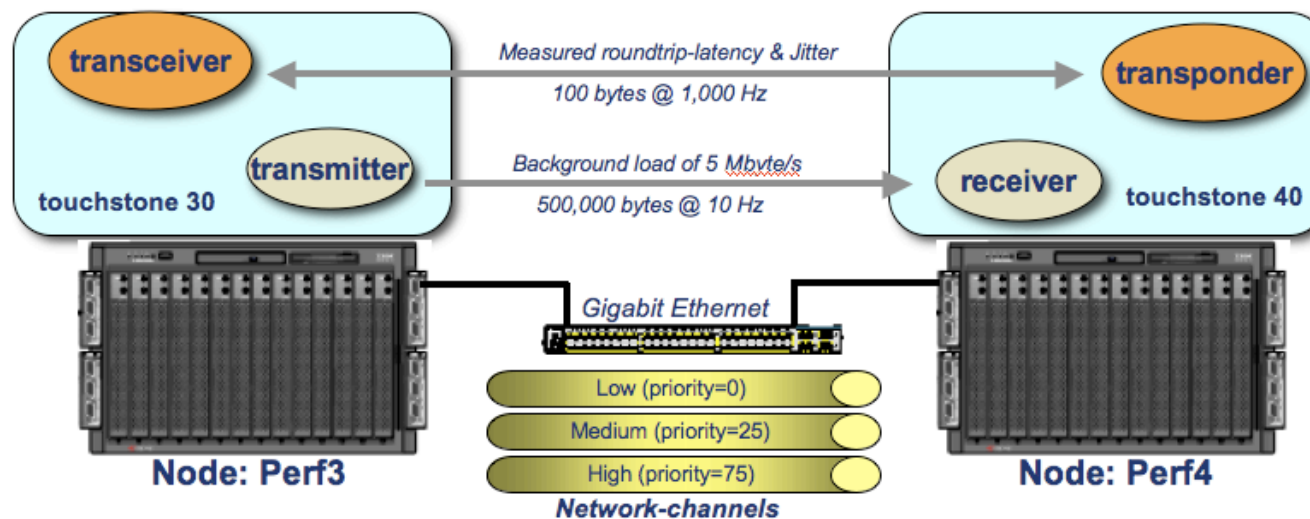
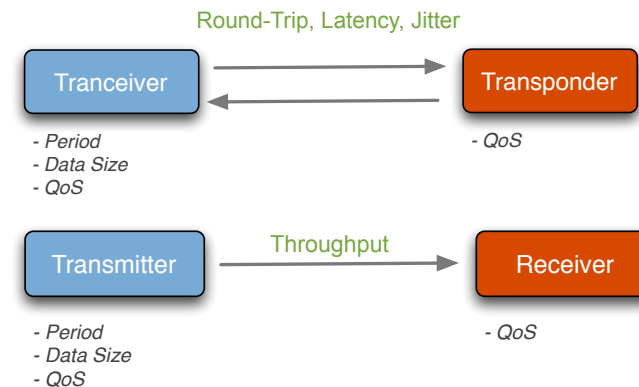
Technical Highlights

Performance

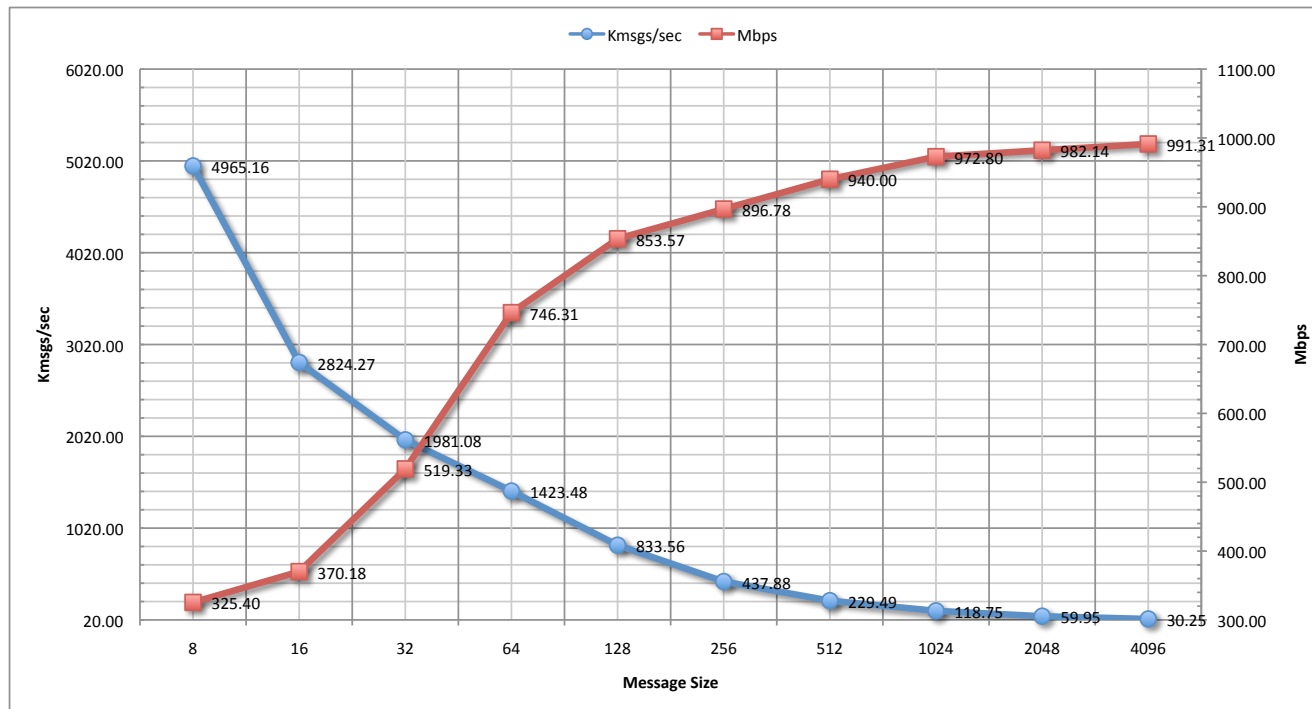
DDS TouchStone

Measure what you care, where you care!

- ▶ OpenSplice DDS ships with DDS TouchStone, a Benchmarking Framework that allows to **set-up, with a few clicks, a benchmarking application** and to **measure latencies and throughputs**
- ▶ All the most important characteristic of an application can be **controlled**, such as **data size, generation frequency, QoS, scheduling, and middleware configuration**
- ▶ DDS TouchStone provides a time-effective and meaningful way of assessing OpenSplice DDS suitability for a specific application



Performance



Test Scenario

- ▶ Single Threaded Application (multi-threaded networking service)
- ▶ 8192 bit message batches

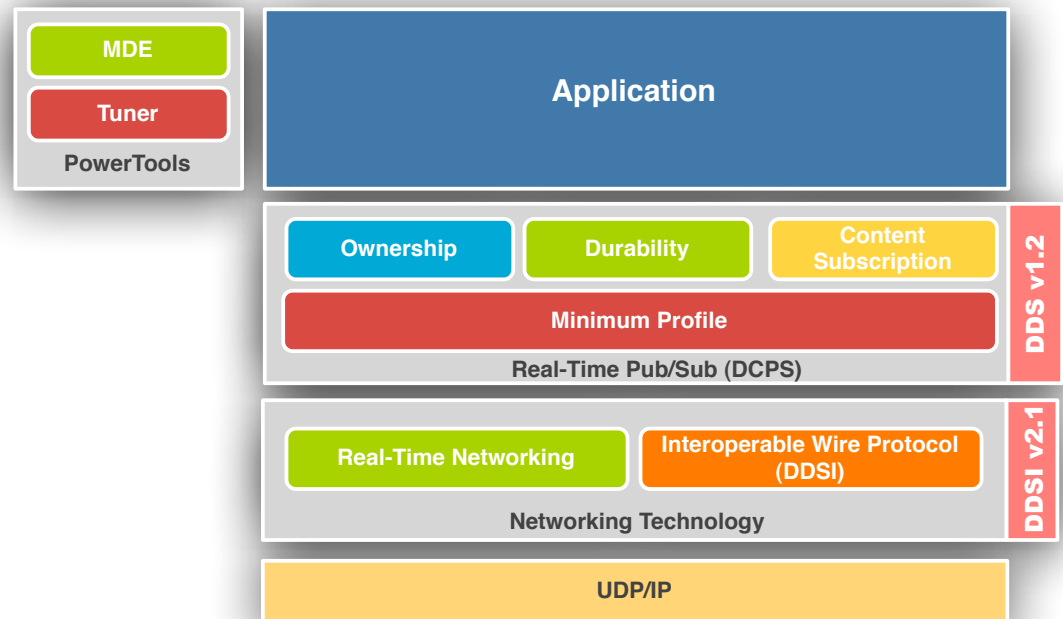
Compact Edition

Features

- ▶ OMG DDS v1.2 DCPS
 - ▶ Minimum Profile
 - ▶ Content Subscription Profile
 - ▶ Durability Profile
- ▶ Networking
 - ▶ DDSI v2.1 Implementation
 - ▶ Real-Time Networking Implementation
- ▶ PowerTools
 - ▶ MDE PowerTools
 - ▶ Tuner

Licensing

- ▶ LGPL/Commercial

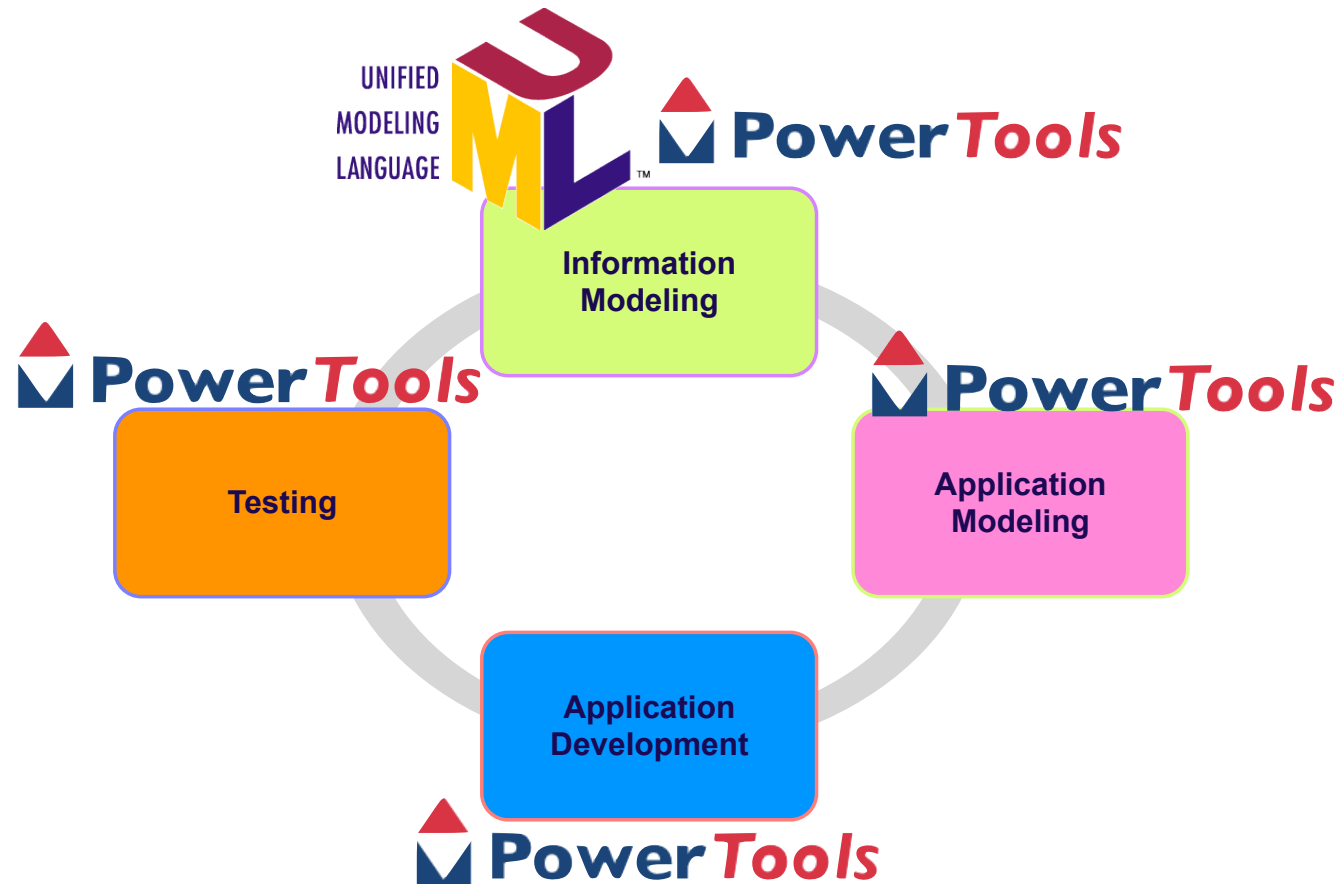


Commercially Supported, Boosting Your Development with PowerTools

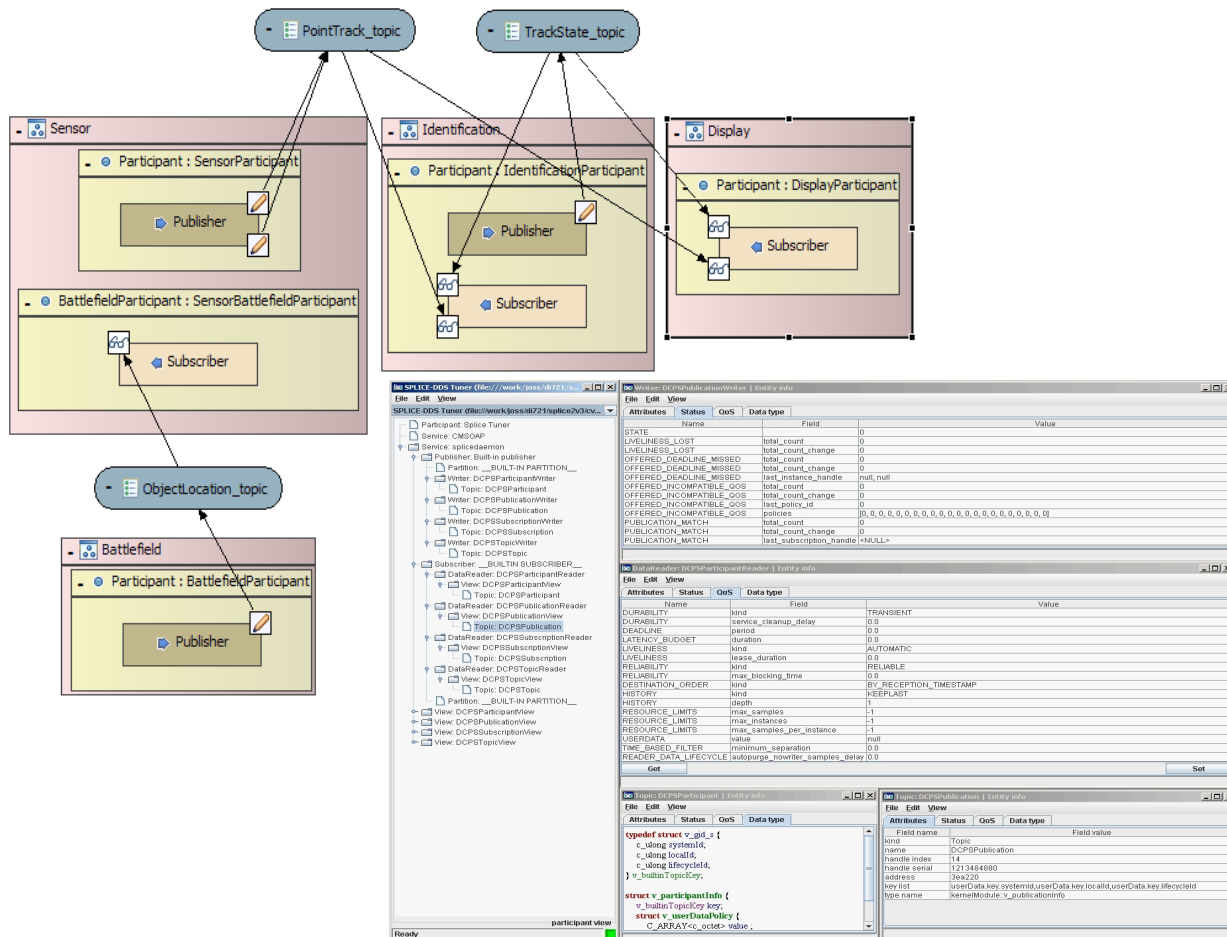
Technical Highlights

PowerTools

Boosting Your Productivity



PowerTools



End-to-End System Design cycle

- ▶ **Information, Application, and Deployment** Modeling
- ▶ Productive and correctness-enforcing modeling environment

Information Modeling

- ▶ Graphical system-wide **Information** and **QoS Modeling**
- ▶ OpenSplice DDS code-generation
- ▶ Support for libraries of reusable Information Model

Application Modeling

- ▶ Graphical application modeling
- ▶ Pattern-oriented code-generation

Deployment Modeling

- ▶ Modeling of DDS-configuration Service configuration (networking, durability)
- ▶ Runtime control (& round-trip engineering) by OpenSplice DDS Tuner™

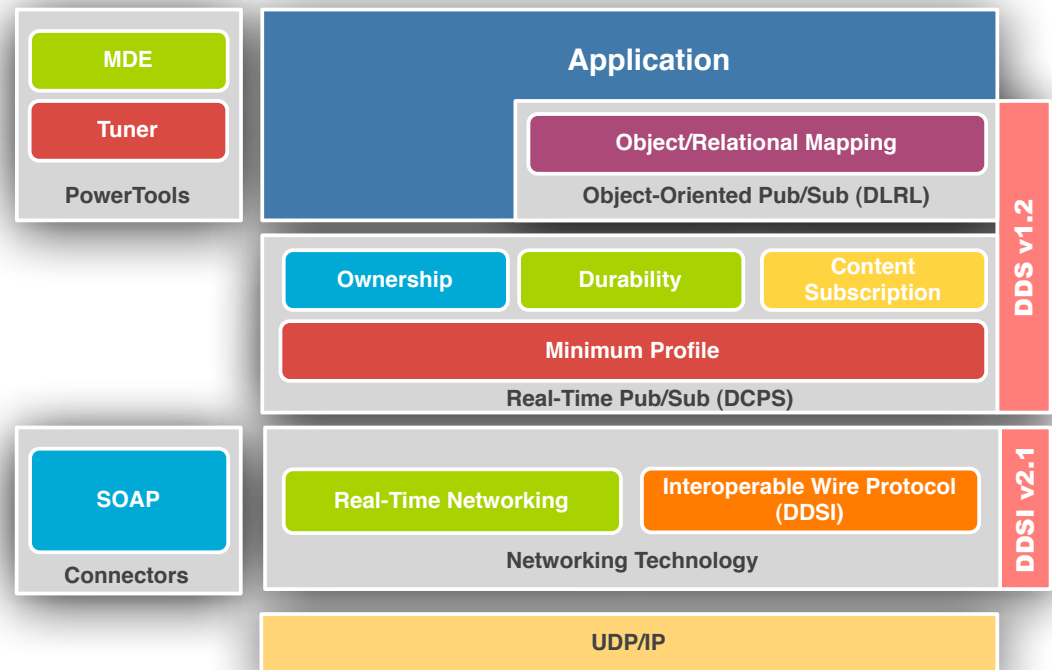
Professional Edition

Features

- ▶ **OMG DDS v1.2 DCPS+DLRL**
 - ▶ Minimum Profile
 - ▶ Content Subscription Profile
 - ▶ Durability Profile
 - ▶ Data Local Reconstruction Layer
- ▶ **Networking**
 - ▶ DDSI v2.1 Implementation
 - ▶ Real-Time Networking Implementation
- ▶ **PowerTools**
 - ▶ MDE Power Tools
 - ▶ Tuner
- ▶ **Connectors**
 - ▶ SOAP Connector

Licensing

- ▶ LGPL/Commercial

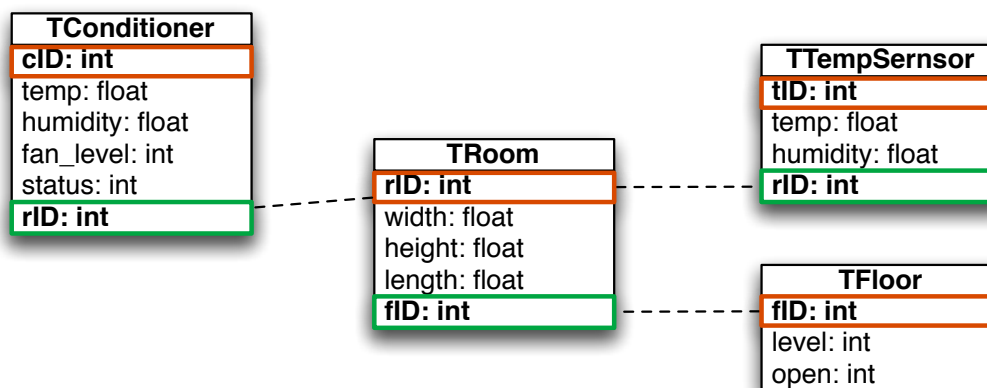


Technical Highlights

Object/Relational Mapping

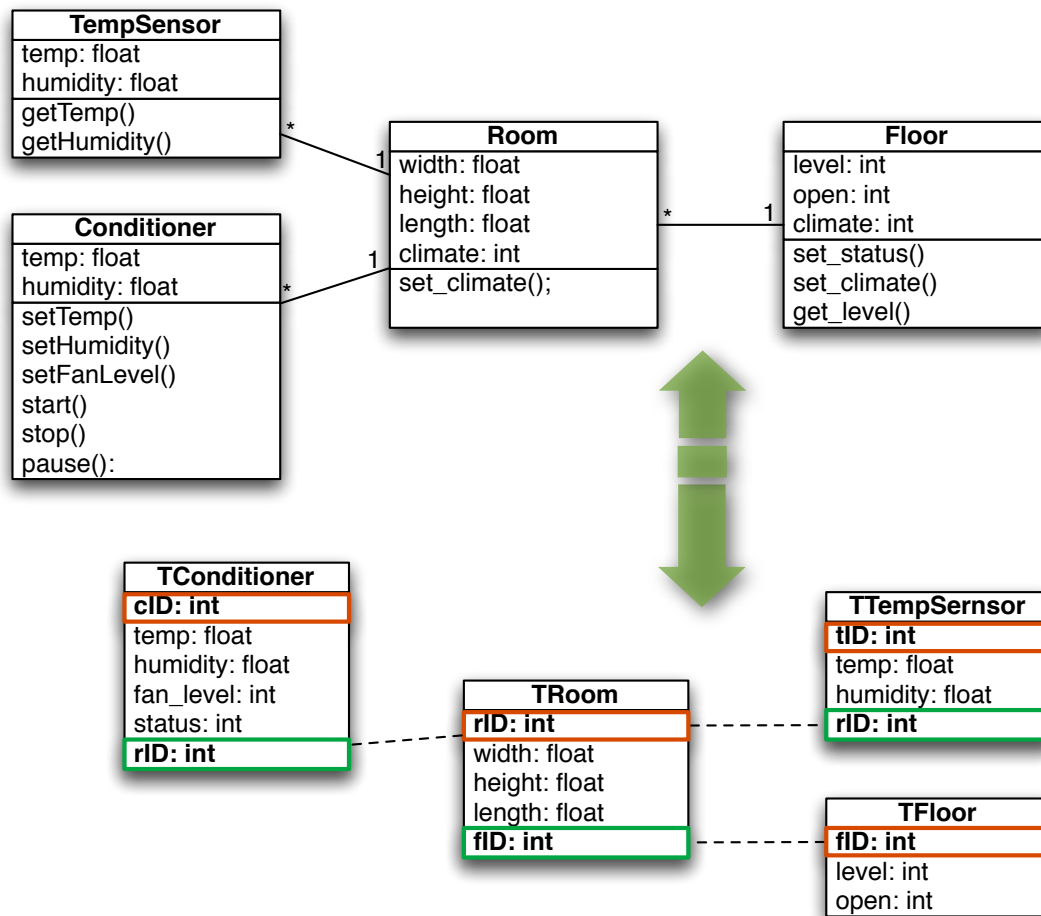
Relational Information Modeling

- ▶ Topic **Keys** can be used to identify **instances** as well as **relationships**
- ▶ **Relationships** can be **navigated** by relying on a subset of **SQL 92**
- ▶ **Keys** can be represented by an **arbitrary number of Topic fields**



Object/Relational Mapping

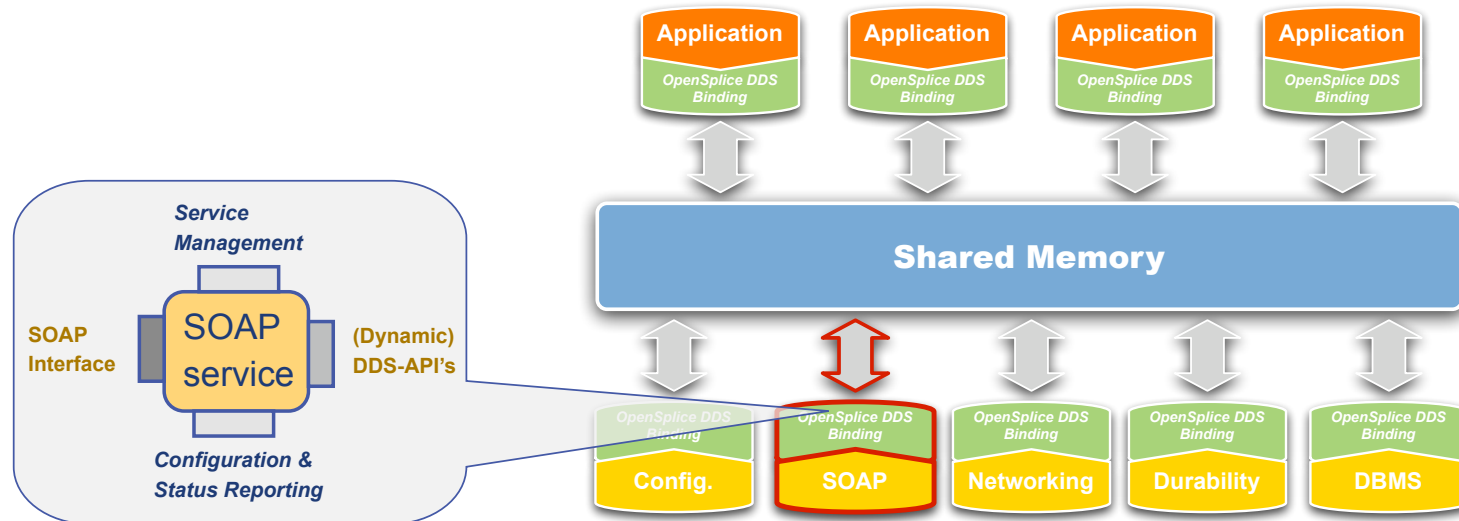
- ▶ Arbitrary object reconstructions
- ▶ Automatic Relationships Management
- ▶ Inheritance
- ▶ Local Operations
- ▶ Local/Distributed State



Technical Highlights

Connectors

SOAP Connector



Pluggable Service Framework

- ▶ **Service-management.** Automatic start/stop, liveness-monitoring, restart policy
- ▶ **Maintenance.** Common status and error reporting
- ▶ **Configuration.** XML-based configuration with matching deployment tooling ('OpenSplice DDS configurator')
- ▶ **Dynamic OpenSplice API's.** Untyped readers/writers, dynamic type-support, C&M (discovery/control/monitoring)

Web Services Interface

- ▶ **XML-based SOAP interface** (remote 'connect' via HTTP/URL)
- ▶ **XML-based Discovery of DDS-entities:** Topics/Partitions, Subscribers/Readers, Publishers/Writers
- ▶ **XML-based Type-support:** runtime creation of topics/readers/writers
- ▶ **XML-based C&M:** control and monitor of any DDS-entity (QoS, Resource-usage), especially for OpenSplice Tuner™

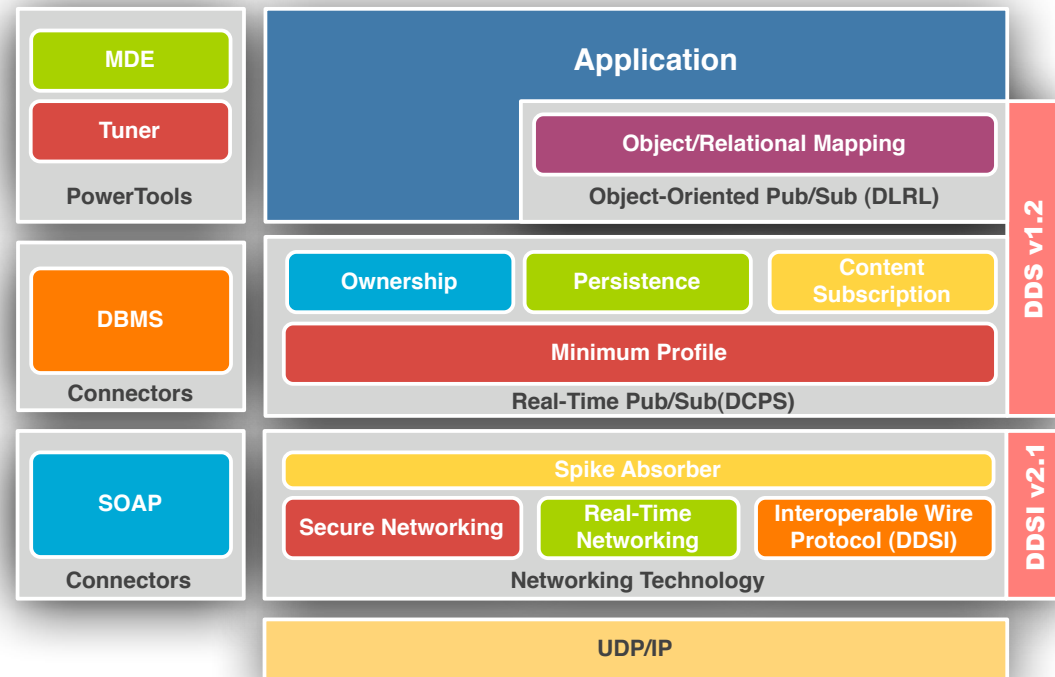
Enterprise Edition

Features

- ▶ **OMG DDS v1.2 (DCPS+DLRL)**
 - ▶ Minimum Profile
 - ▶ Content Subscription Profile
 - ▶ Durability Profile
 - ▶ Data Local Reconstruction Layer
- ▶ **Networking**
 - ▶ DDSI v2.1 Implementation
 - ▶ Real-Time Networking Implementation
 - ▶ Spiked Absorber
 - ▶ Secure Networking
- ▶ **PowerTools**
 - ▶ MDE Power Tools
 - ▶ Tuner
- ▶ **Connectors**
 - ▶ SOAP Connector
 - ▶ DBMS Connector

Licensing

- ▶ LGPL/Commercial



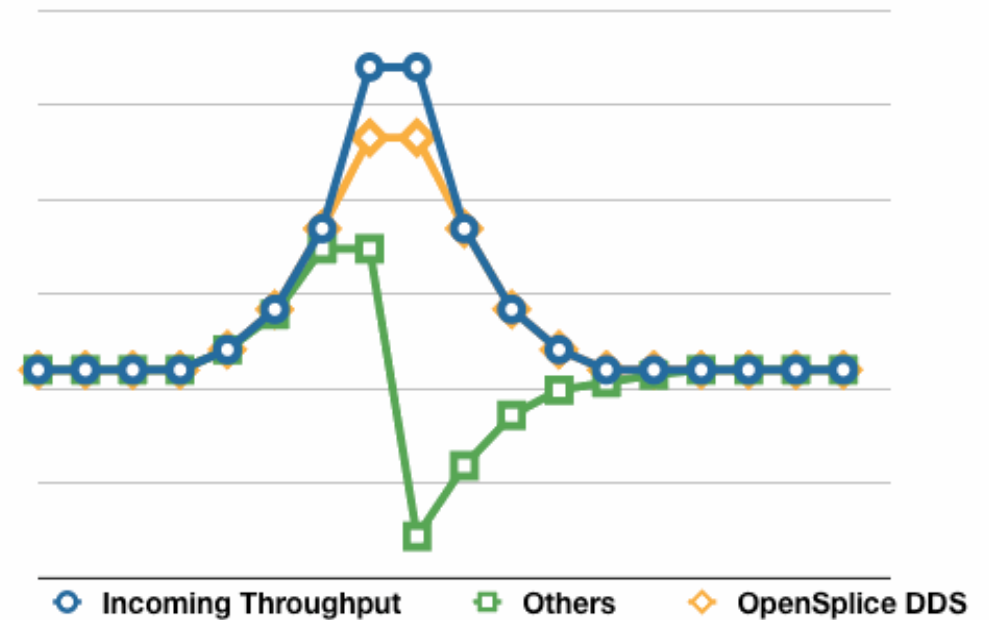
Technical Highlights

Networking

Spike Absorber

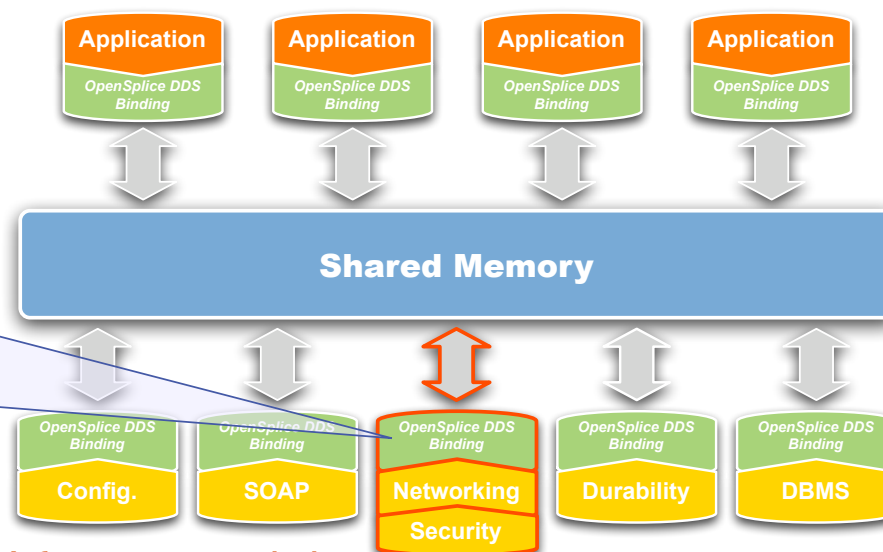
- ▶ Guarantees reliability while ensuring that the publisher does not slow down under traffic spikes
- ▶ Based on three configurable levels of spike absorption
- ▶ Delegated Reliability Servers deployed throughout your network offload the publisher from retransmissions

Advanced Traffic Spikes-Absorption Technology



Secure Networking

- ▶ **Channel encryption** between nodes
 - ▶ secure information distribution
 - ▶ over untrusted networks
 - ▶ between nodes of different security level
 - ▶ enforcement of need-to-know principle
- ▶ **Integrity and data origin authentication** for information distribution over the network



A dedicated crypto channel per network partition

- ▶ **Ensures** that information received via the network (or eavesdropped on the network) can only be retrieved in its RED (unencrypted) form on nodes that are **accredited** or have a **need-to-know**
- ▶ **Authentication of data origin**
- ▶ **Integrity** preservation of information exchanged between nodes

Infrastructure solution

- ▶ **Security enforcement** part of the information backbone (transparent to applications)
- ▶ **Secured Infrastructure**

Secure networking is first building block for complete IA

- ▶ End-to-end security, incl. mandatory access control per application, over the networked DDS backbone is next

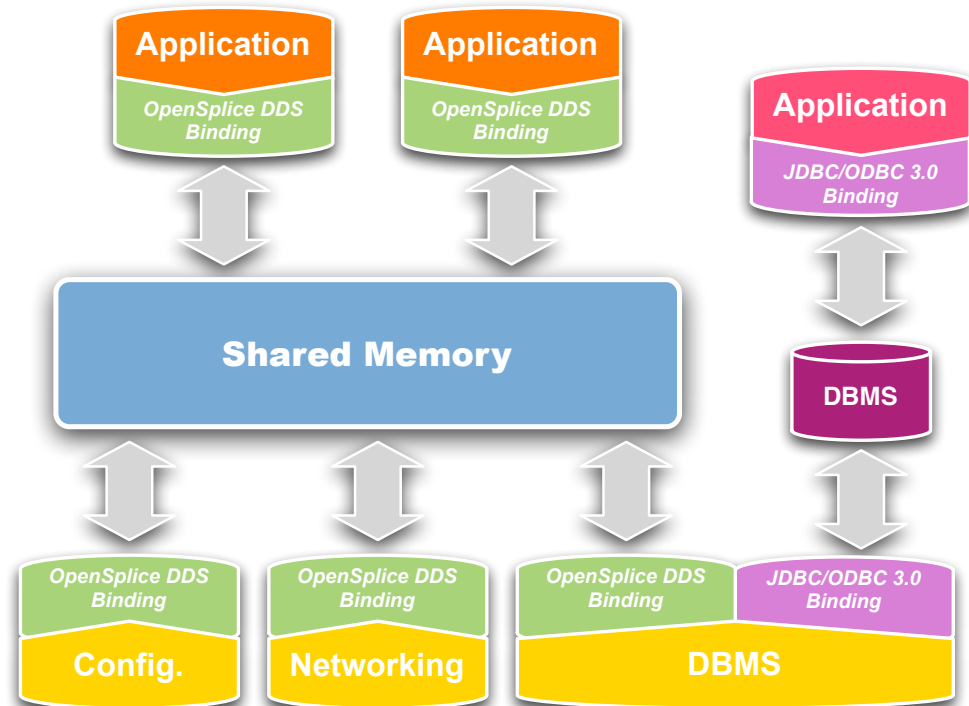
Technical Highlights

Connectors

DBMS Connector

Features

- ▶ **Transparently 'connect'** OpenSplice DDS 'Real-time information-space' to the enterprise **DBMS** space
- ▶ **Share/access data** in the most 'natural way' between **Real-Time** and **Enterprise applications**
- ▶ Standards based (ODBC/JDBC) and optimized performance for the ANTs™ data-server
- ▶ **Seamless two-way data exchange**
- ▶ OpenSplice DDS persistence-profile support for QoS-driven replication/persistence, even for DBMS users
- ▶ **Highly configurable** for maximum performance



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Licensing Terms

OpenSplice DDS v4.1 adopts a simple and generous licensing model to facilitate adoption and avoid “Fear Uncertainty and Doubts”

Open Source Licensing

- ▶ The OpenSplice DDS Community Edition code base—along with any code generated by tools distributed with it—is licensed under LGPLv3. Unlike the GPL, the LGPLv3 makes it possible for proprietary and commercially licensed applications to safely use OpenSplice DDS Community Edition without incurring license contamination.

Commercial Licensing

- ▶ OpenSplice DDS Compact, Professional, and Enterprise Editions, are available under the PrismTech Commercial License.

Editions and Commercial Support

Commercial Support

- ▶ Available only for Compact, Professional and Enterprise
- ▶ Supported SLA are:
 - ▶ Standard (8x5)
 - ▶ Silver (12x5)
 - ▶ Gold (24x7x365)

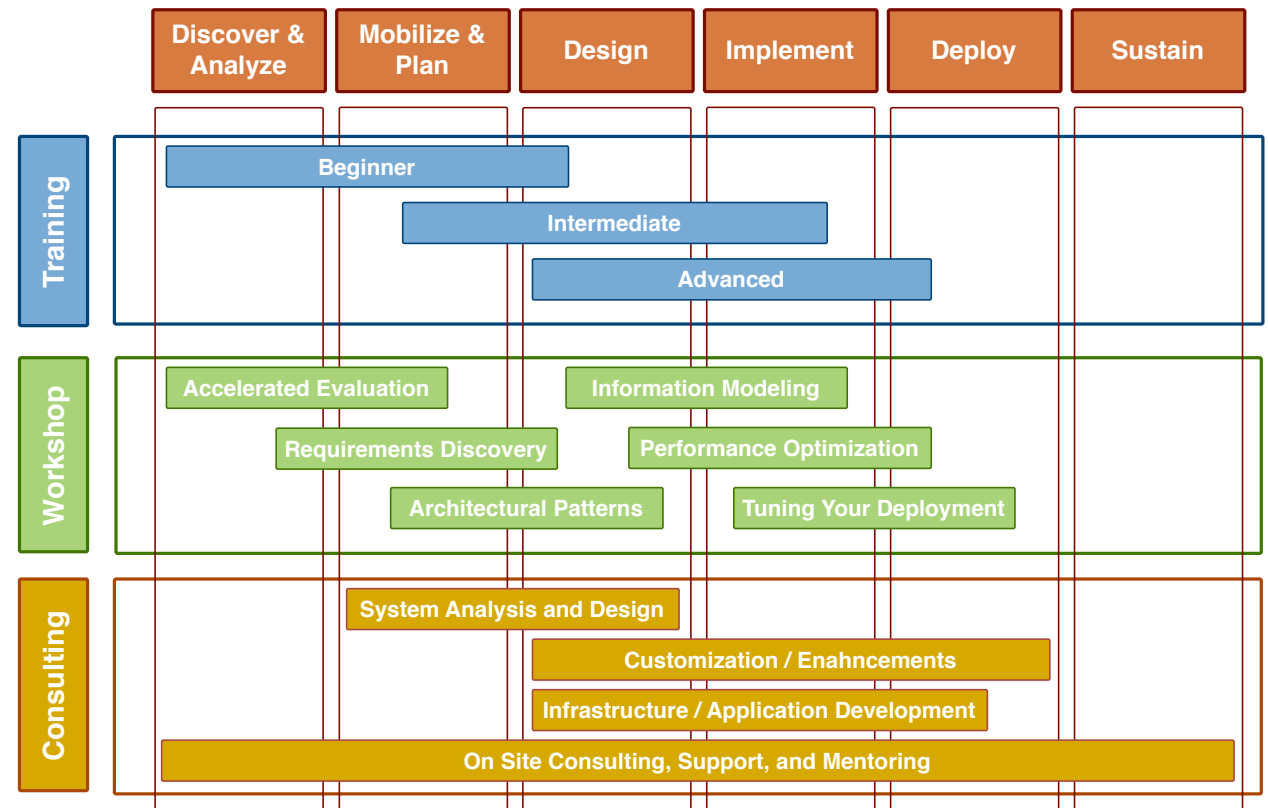
	Community	Compact	Professional	Enterprise
SOFTWARE				
Real-Time Pub/Sub (DCPS)	x	x	x	x
Interoperable Wire Protocol (DDSI)	x	x	x	x
Object Oriented Pub/Sub (DLRL)			x	x
Spike Absorber				x
Security				x
CONNECTORS				
SOAP-Connector			x	x
DBMS-Connector				x
TOOLS				
MDE PowerTool		x	x	x
Tuner		x	x	x
DDS TouchStone	x	x	x	x
Operating Systems				
Linux	x	x ⁽¹⁾	x ⁽¹⁾	x ⁽¹⁾
Windows	x	x ⁽¹⁾	x ⁽¹⁾	x ⁽¹⁾
Solaris			x ⁽¹⁾	x ⁽¹⁾
AIX			x ⁽¹⁾	x ⁽¹⁾
VxWorks		x ⁽¹⁾	x ⁽¹⁾	x ⁽¹⁾
INTEGRITY		x ⁽¹⁾	x ⁽¹⁾	x ⁽¹⁾
LynxOS		x ⁽¹⁾	x ⁽¹⁾	x ⁽¹⁾
Language Binding				
C	x	x	x	x
C++	x	x	x	x
Java	x	x	x	x
C#	x	x	x	x
LICENSE	LGPL	Commercial	Commercial	Commercial

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Service Offering

- ▶ Enable our customers and partners to deliver innovative solutions “on-time”, “on-budget”, and “on-quality”.
- ▶ Methodology covering the entire life-cycle of all customer projects, regardless of size, scope, and duration
- ▶ Provides all you need for supporting and catalyzing each stage of your project by means of training, workshops, and consulting.
- ▶ Services are delivered by highly-valued world-class consultants, including world-renowned technology and domain experts, and are available in 6 languages (English, French, German, Italian, Dutch, and Arabic).



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Consulting

- ▶ Unique combination of technical excellence and in depth knowledge of one or more application domains
- ▶ Our Consultant can "speak" the language of your target domain, deeply understand its challenges and constraints, and ensure that technology is best applied toward solving the problem at hand

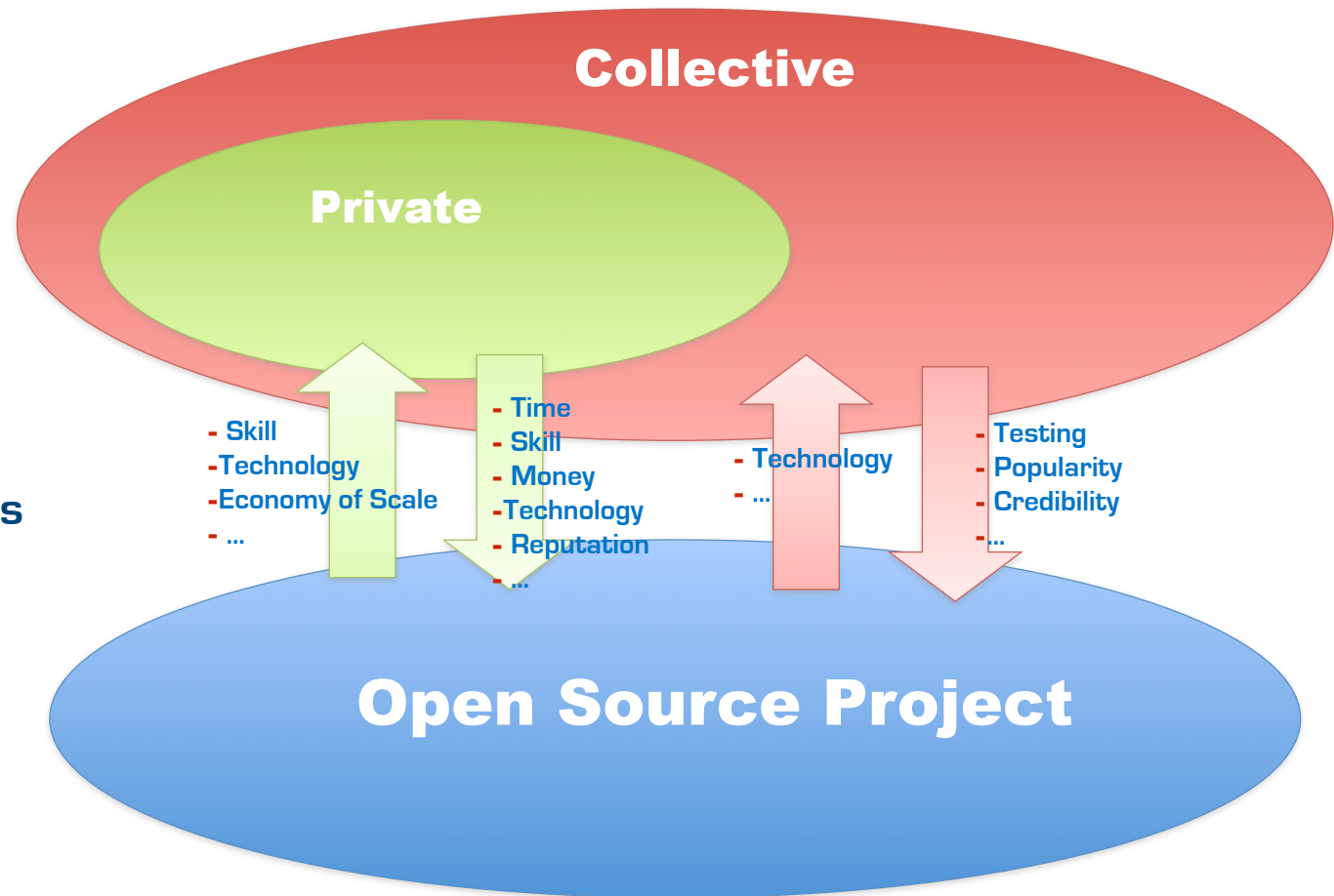


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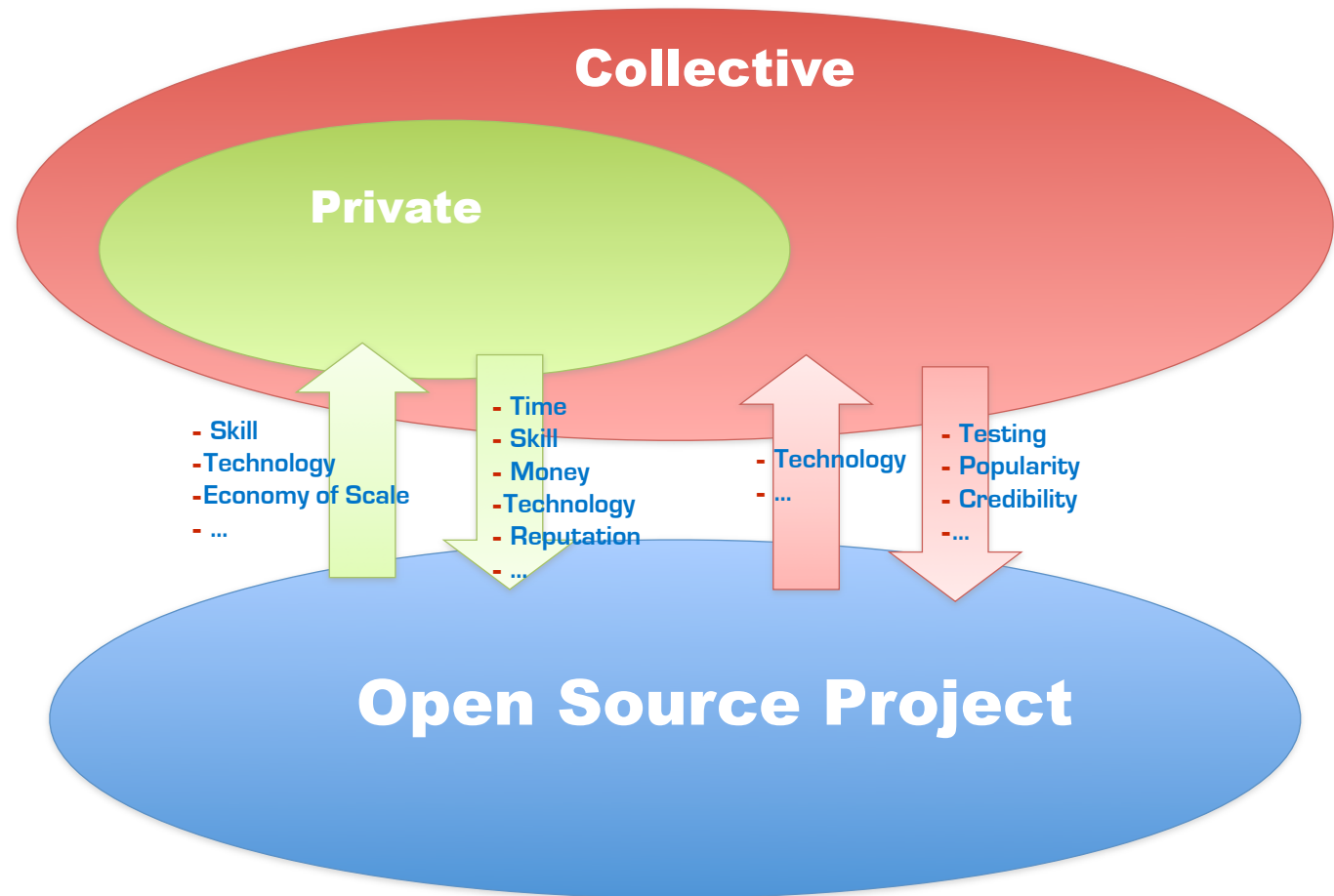
Community, Innovation, and Open Source

- ▶ The Open Source Model has changed the rule of Innovation, establishing what is now known as the **Private/Collective Innovation Model**
- ▶ The Private/Collective Innovation Model enabled by Open Source is a key strategic enabler for **Lead-Users Innovations**
- ▶ Innovations release into Open Source furthers adoption, catalyze other innovations, and “secures its supply”



Community, Innovation, and Open Source

- ▶ PrismTech is committed to the establishment of a vibrant and active community, that will create the perfect environment for a **Private/Collective Innovation Model**
- ▶ The **Developer Community** with full **Code Access** will be available beginning **Q2 2009**
- ▶ If you are interested in joining the community please contact us at:
 - ▶ OpenSpliceDDS@PrismTech.com



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Concluding Remarks

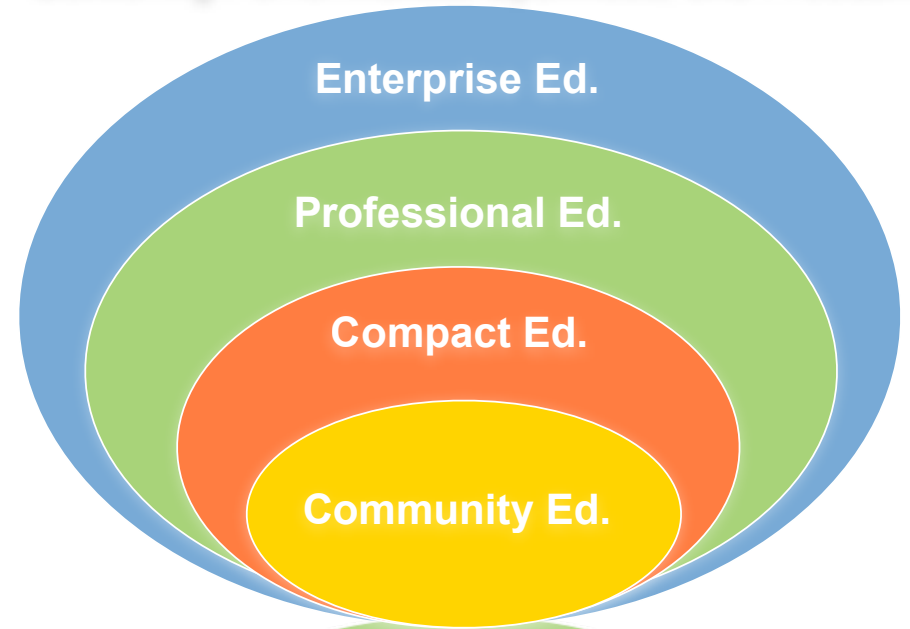
- ▶ OpenSplice DDS is now available as Open Source Software under LGPL Licensing
- ▶ This release provide users with access to the most powerful extreme performance data distribution technology available on the market
- ▶ A set of added value Editions along with a very rich set of Services is available through PrismTech
- ▶ A vibrant and innovative community is swiftly being established around OpenSplice DDS, thus...

**Embrace Performance, Openness and Freedom.
Join the OpenSplice DDS Community**

OpenSplice|DDS

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OpenSplice|DDS
Delivering Performance, Openness, and Freedom



 **PRISMTECH**

Upcoming Webcasts

OpenSplice | DDS Webcast Series
February 4th, 2009

Choose Freedom, Openness, and Performance: Move to OpenSplice DDS

Why Should I Attend?

- Understand why you should be using OpenSplice DDS as your data distribution middleware
- Discover what it takes to adopt OpenSplice DDS.
- Understand the steps involved in migrating from other technologies to OpenSplice DDS

Online Resources



OpenSplice|DDS

Delivering Performance, Openness, and Freedom

* <http://www.opensplice.com/>

* [emailto:sales@prismtech.com](mailto:sales@prismtech.com)



* <http://www.opensplice.com/webex>



* <http://www.youtube.com/OpenSpliceTube>



* <http://dds4u.blogspot.com>



* <http://www.dds-forum.org>

* <http://portals.omg.org/dds>

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