Angelo Corsaro, Ph.D.
Product Strategy Manager
OMG DDS SIG Co-Chair
angelo.corsaro@prismtech.com

PRISMTECH
Powering Netcentricity

10 Reasons to Choose OpenSplice DDS as your Messaging Middleware

Q. Why should I choose OpenSplice DDS?

A. That's an easy question as it happens to be much harder to find reasons why not to do so. I am going to give you 10 good reasons to choose OpenSplice DDS -- ready to go?

Reason #1

- Splice, OpenSplice DDS' father, was the technology from which the OMG DDS was most influenced and from which inherited the Data-Centric paradigm

Reason #2

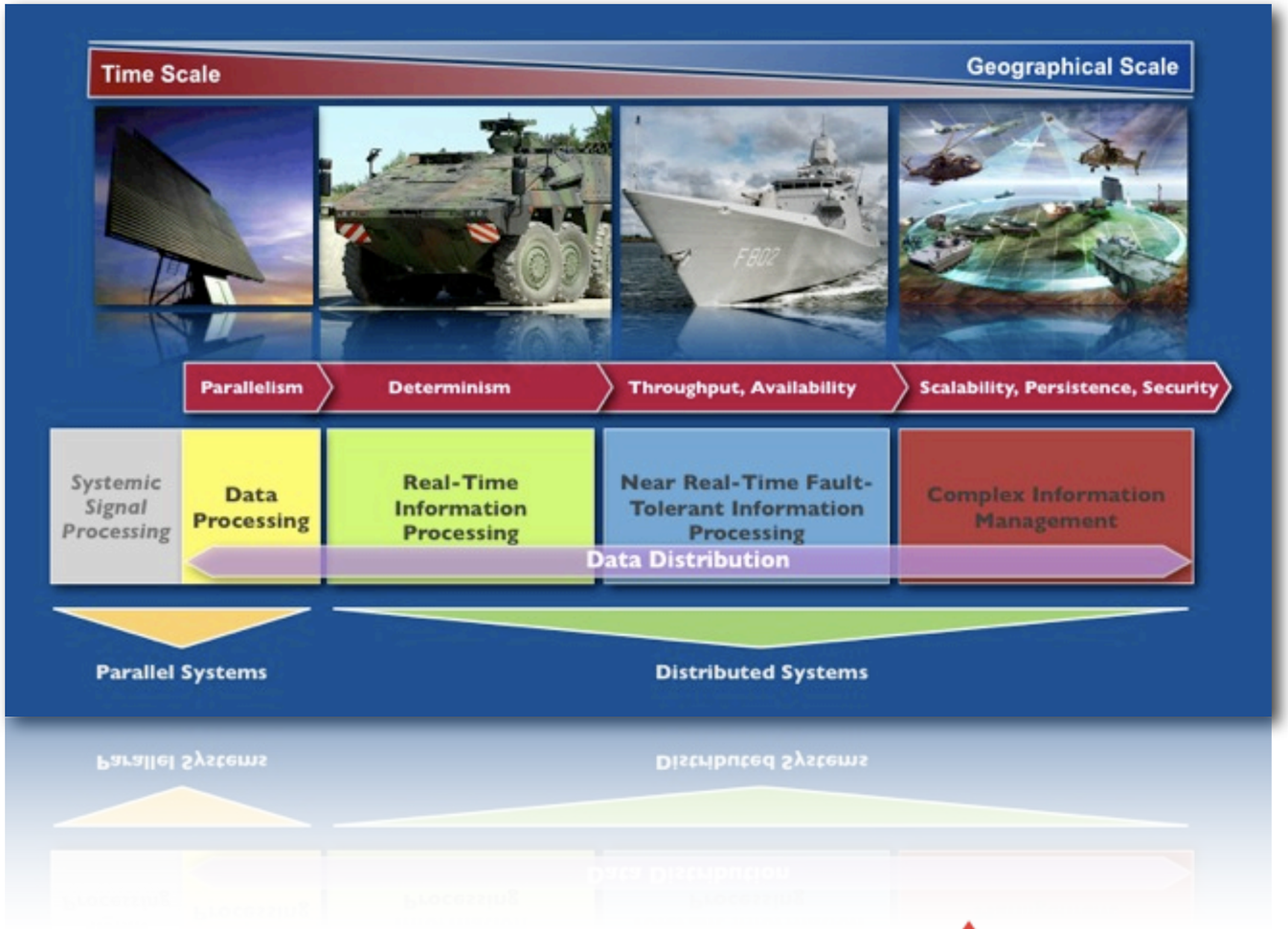
- OpenSplice DDS is the most complete, and strictly compliant, implementation of the OMG DDS Standard on the Market.

Addressing Data Distribution Challenges

The OMG DDS Standard

- Introduced in 2004 to **address the Data Distribution challenges** faced by a wide class of **Defense and Aerospace Applications**
- Key requirement for the standard were its ability to **deliver very high performance** while seamlessly **scaling** from **embedded to ultra-large-scale deployments**
- Today **recommended** by **key administration worldwide** and **widely adopted** across several different application domains, such as, Automated Trading, Simulations, SCADA, Telemetry, etc.

DDS is standard designed to address the data-distribution challenges across a wide class of Defense and Aerospace Applications



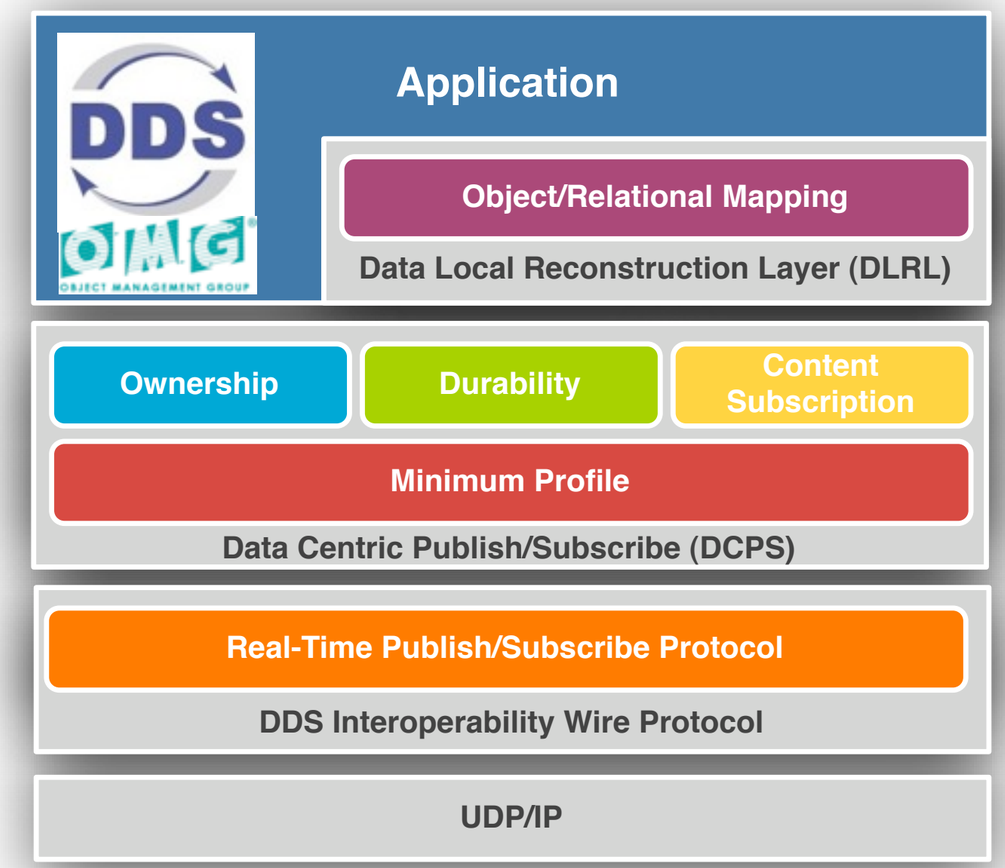
The OMG Data Distribution Service (DDS)

DDS v1.2 API Standard

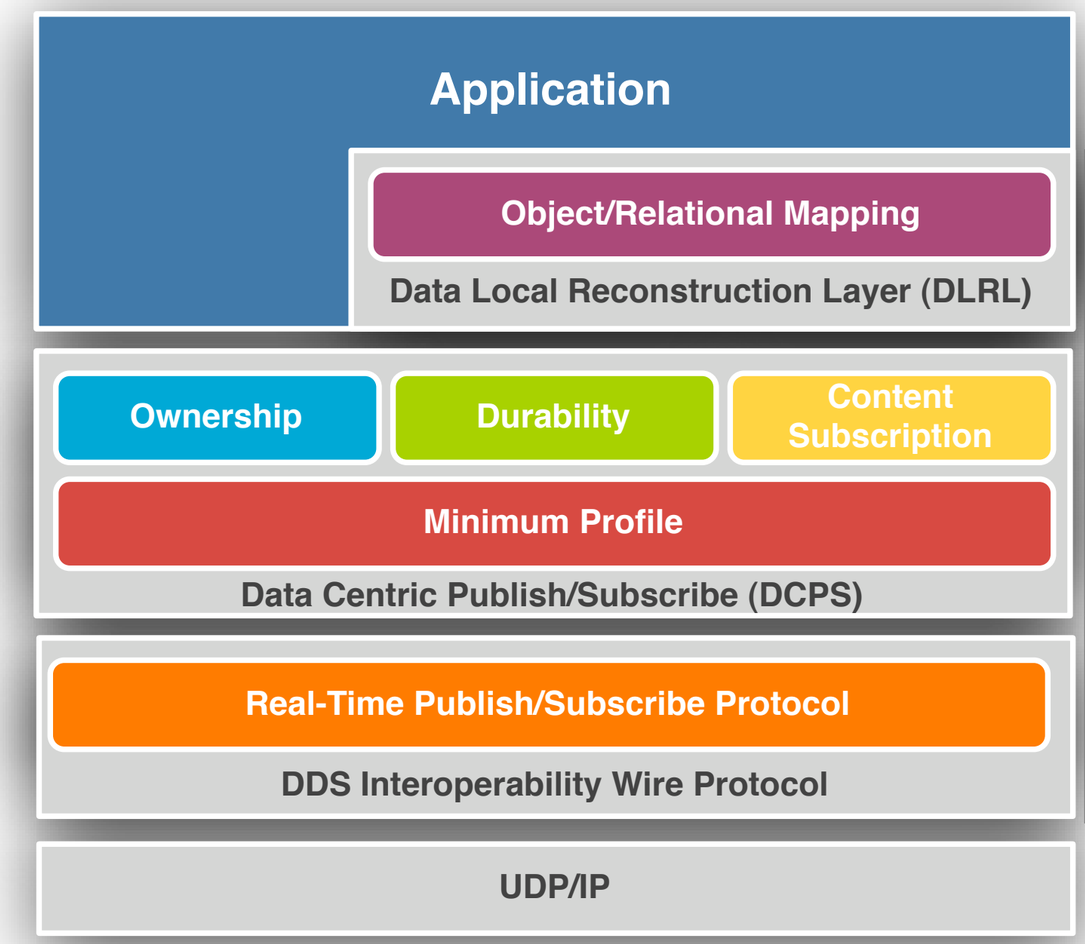
- Language Independent, OS and HW architecture independent
- **DCPS.** Standard API for Data-Centric, Topic-Based, Real-Time Publish/Subscribe
- **DLRL.** Standard API for creating Object Views out of collection of Topics

DDSI/RTPS v2.1 Wire Protocol Standard

- Standard wire protocol allowing interoperability between different implementations of the DDS standard
- Interoperability demonstrated among key DDS vendors in March 2009



Standard Coverage



Yes	No
Yes	Partial
Yes	Yes

Best Case for other DDS

OpenSplice DDS

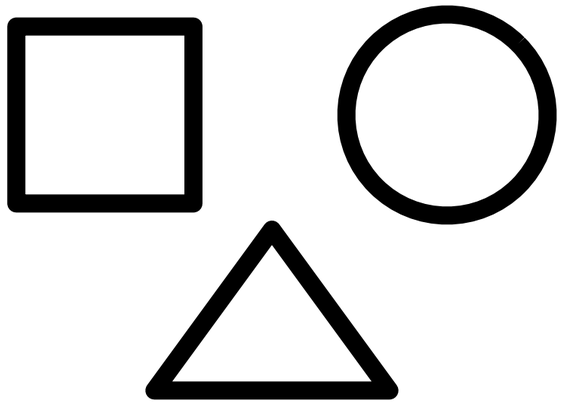
DCPS

- No other DDS implementation provides support for local queries
- This impedes to fully exploit the Data-Centric Approach

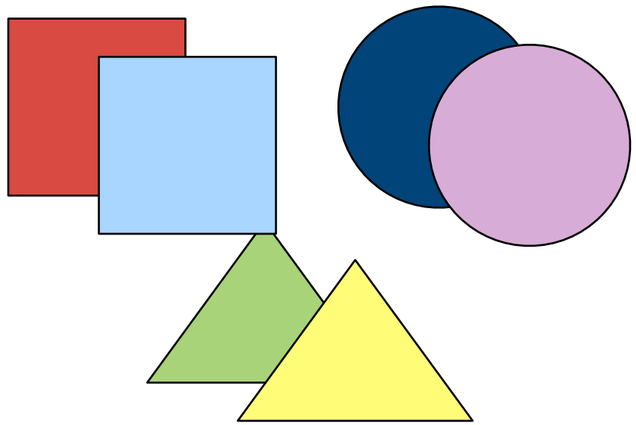
Topic/Instances/Samples

```
struct ShapeType {
    long    x;
    long    y;
    long    shapesize;
    string color;
};
#pragma keylist ShapeType color
```

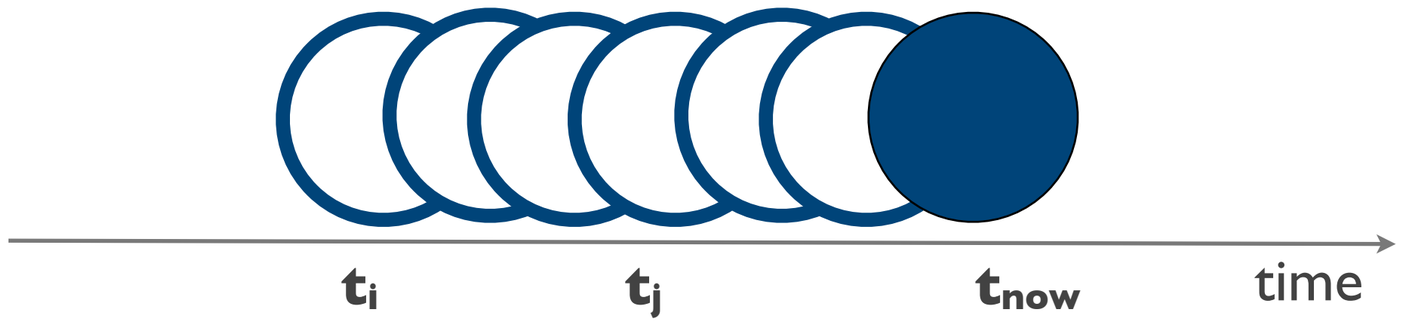
Topics



Instances

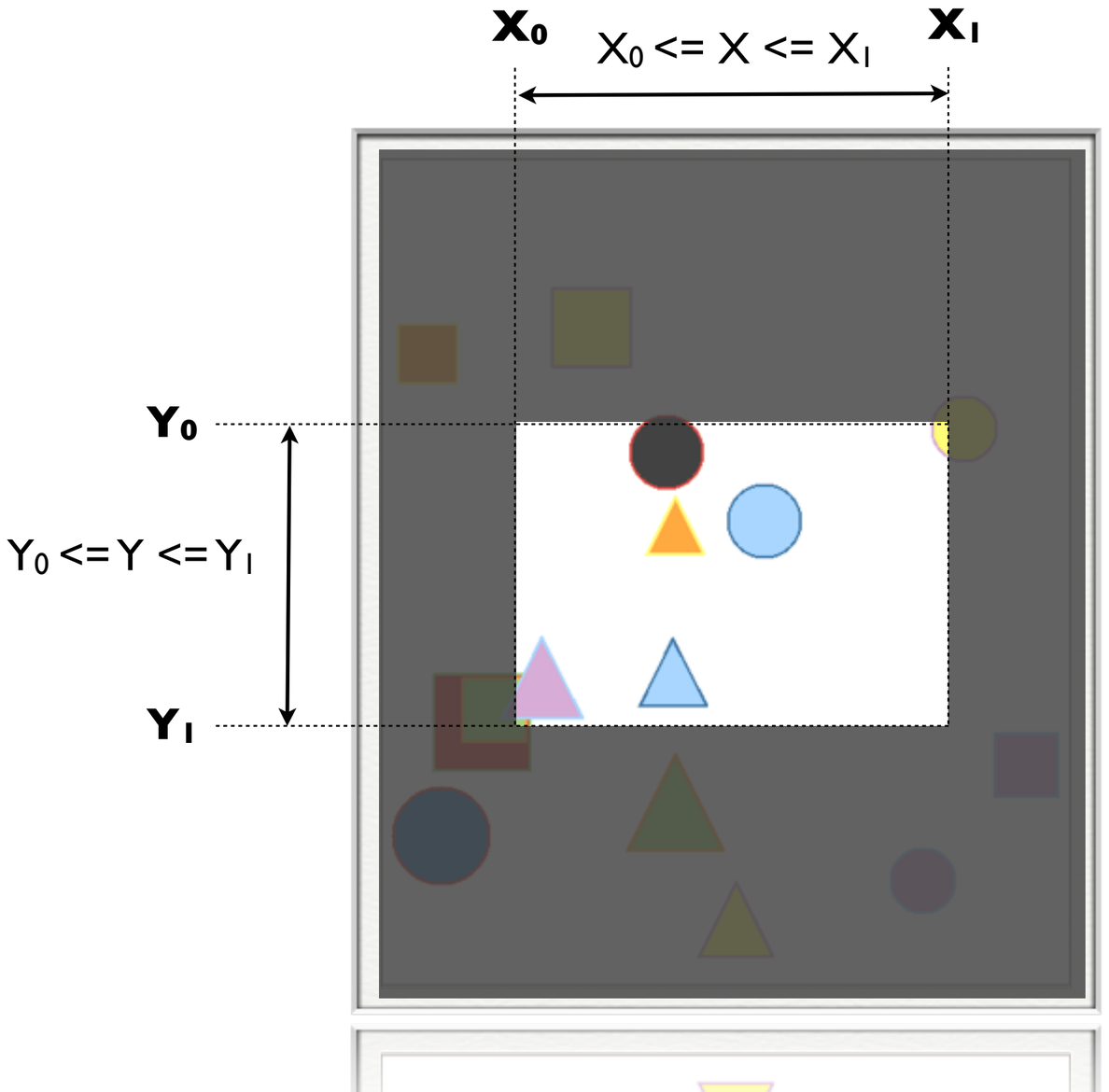


Samples



Content Filtering

- DDS allows to specify **content-filtered Topics** for which a a subset of SQL92 is used to express the filter condition
- Content filters can be applied on the entire content of the Topic Type
- Content filters are applied by DDS each time a new sample is produced/delivered



Local Queries

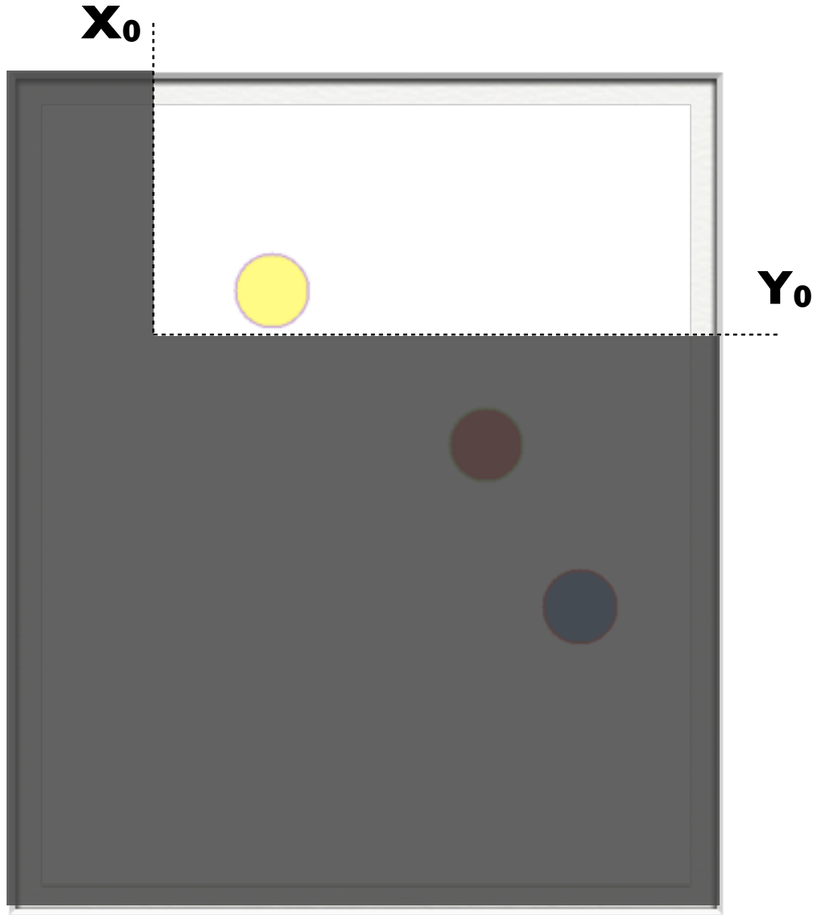
- Subscribed Topics can be seen locally as “Tables”
- A subset of SQL92 can be used for performing queries on multiple topics as well as natural joins
- Queries are performed under user control and provide a result that depends on the current snapshot of the system, e.g., samples currently available

Circle Topic

color	x	y	shapesize
red	57	62	50
blue	90	85	50
yellow	30	25	50

SELECT * FROM ShapeType s
WHERE s.x > 25 AND s.y < 55

color	x	y	shapesize
yellow	30	25	50

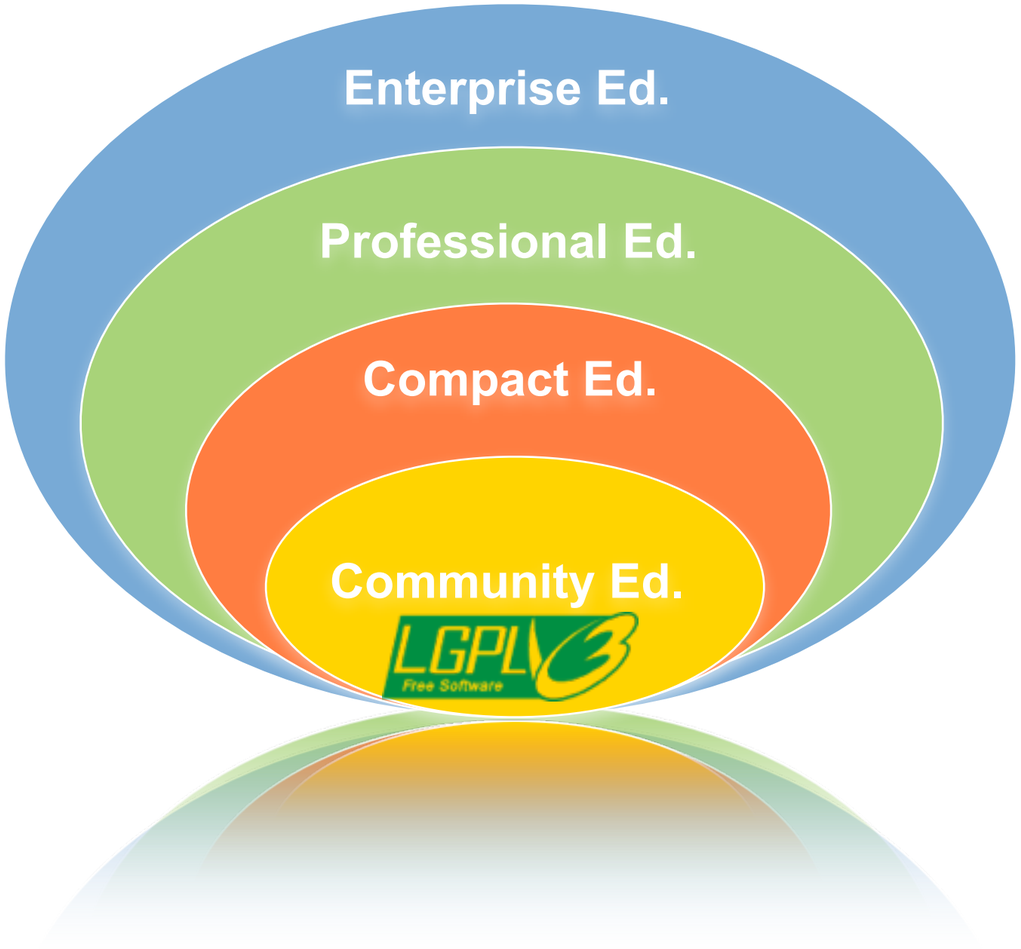


Reason #3

- OpenSplice DDS comes into a set of Editions tailored around the most typical use cases.
- In addition, OpenSplice DDS Editions provides you with the best-value-per-{dollar|euro|pound} when compared to equivalent-level editions from other vendors

OpenSplice DDS

- Product reorganized into Editions
  - Community Edition
  - Compact Edition
  - Professional Edition
  - Enterprise Edition
- Product Editions provide a 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



Edition	Good to know
OpenSplice DDS Community Edition	• Freely available at no cost • Open Source under LGPL license • Full DDS Implementation! • Interoperability Wire Protocol (DDSI/RTPS) • Real-Time Networking. • CORBA Co-habitation • More features than any other DDS implementation
OpenSplice DDS Compact Edition	*All features included in the Community Edition, plus:* • Eclipse-based Model Driven Tools, to improve your productivity up to 10x • Rich set of tools for inspecting your DDS applications • Available via PrismTech through Commercial Subscriptions
OpenSplice DDS Professional Edition	*All the features included in the Compact Edition, plus:* • Full implementation of the OMG DDS-DLRL Standard to natively integrates DDS into C++ and Java • Web connectors • Available via PrismTech through Commercial Subscriptions
OpenSplice DDS Enterprise Edition	*All the features included in the Professional Edition, plus:* • Secure DDS Extension • Connector to any ODBC 3.0 DBMS (e.g. MySQL, Oracle, etc.)

Standing on Giant Shoulders

	OMG DDS Standard Compliance					
	DCPS Profiles				DLRL	DDSI/ RTPS
	Minimum	*Content*	*Ownership*	*Durability*		
OpenSplice DDS Community Ed.	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**
Other DDS (Best Case)	**Yes**	**Partial**	**Yes**	**No***	**No**	**Yes**

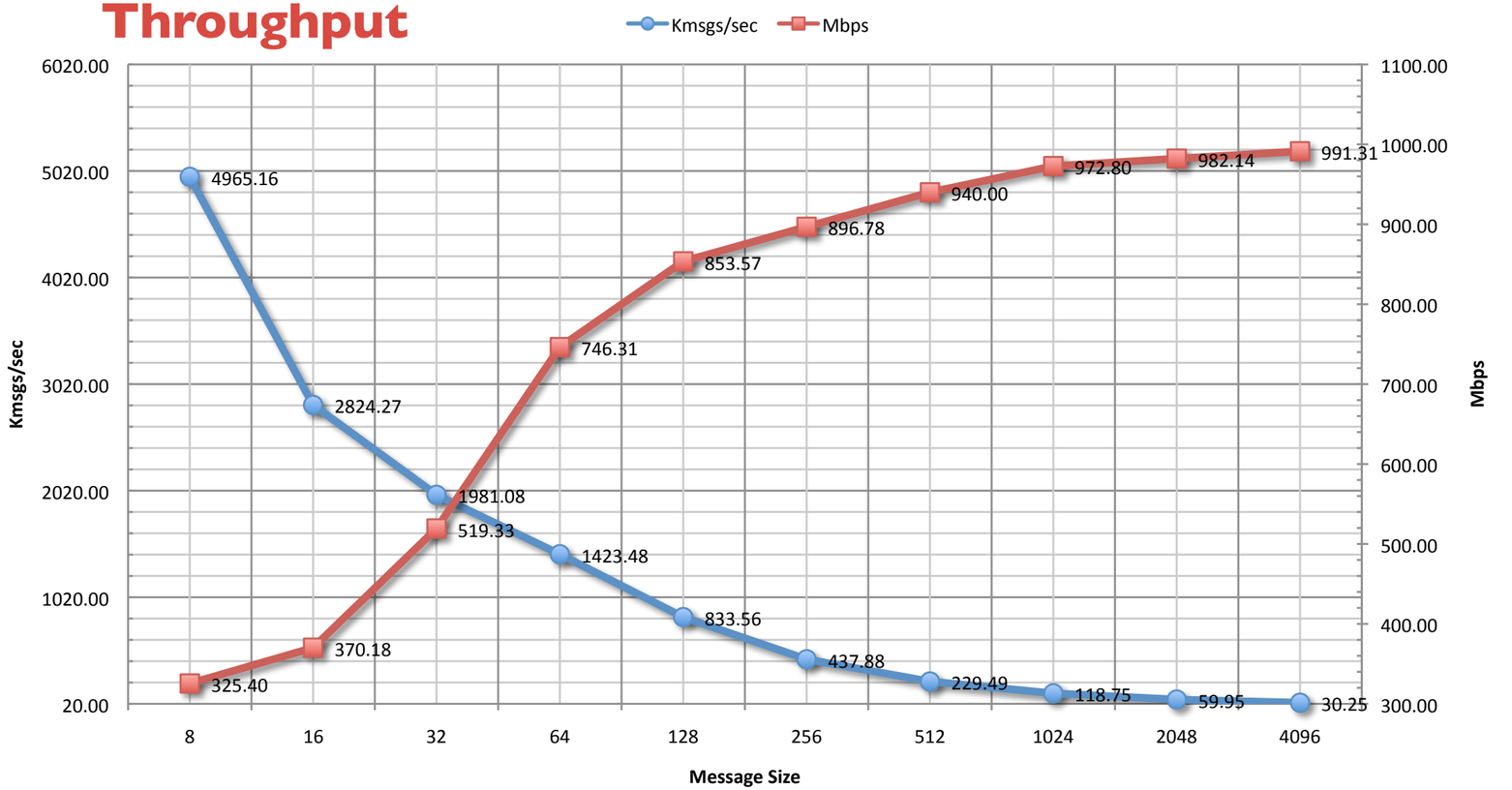
OpenSplice DDS provides far more than any other DDS implementation

Reason #4

- Simply Top Performance.

High-Performance on Commodity HW

Throughput



Test Scenario

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

Latency

Inter-Node Latency

- 60 usec

Inter-Core Read-Latency

- 2 usec

Inter-Core Latency

- <10 usec

HW:

- Dell blade-server
- Dual-core, Dual-CPU, AMD Opteron 2.4 Ghz

OS

- Linux 2.6.21-1.3194.fc7

Network

- Gigabit Ethernet cards
- Dell PowerConnect 5324 switch

OpenSplice DDS

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Reason #5

- OpenSplice DDS is Open Source Software.

The Value of Open Source

- No surprises, the code is under your eyes
- No Technology Adoption Barriers
- Better Support
- Better Quality
- Larger Pool of Talent
- A Platform for User-Driven Innovation
- Security of Supply
- Better TCO when compared with Proprietary SW

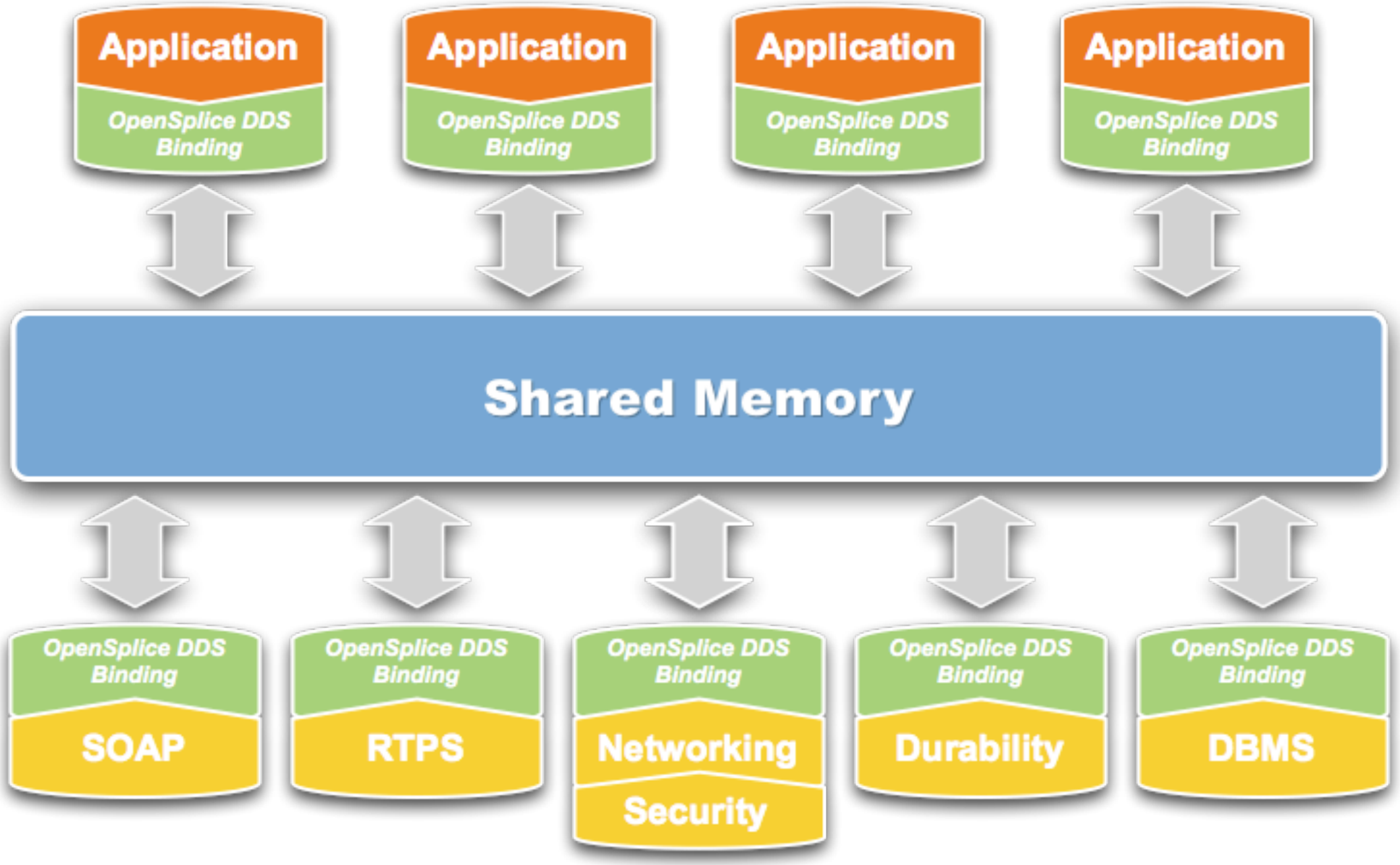
Reason #6

- OpenSplice DDS is Highly Innovative!

Multi-Core Ready Architecture

Architectural Highlights

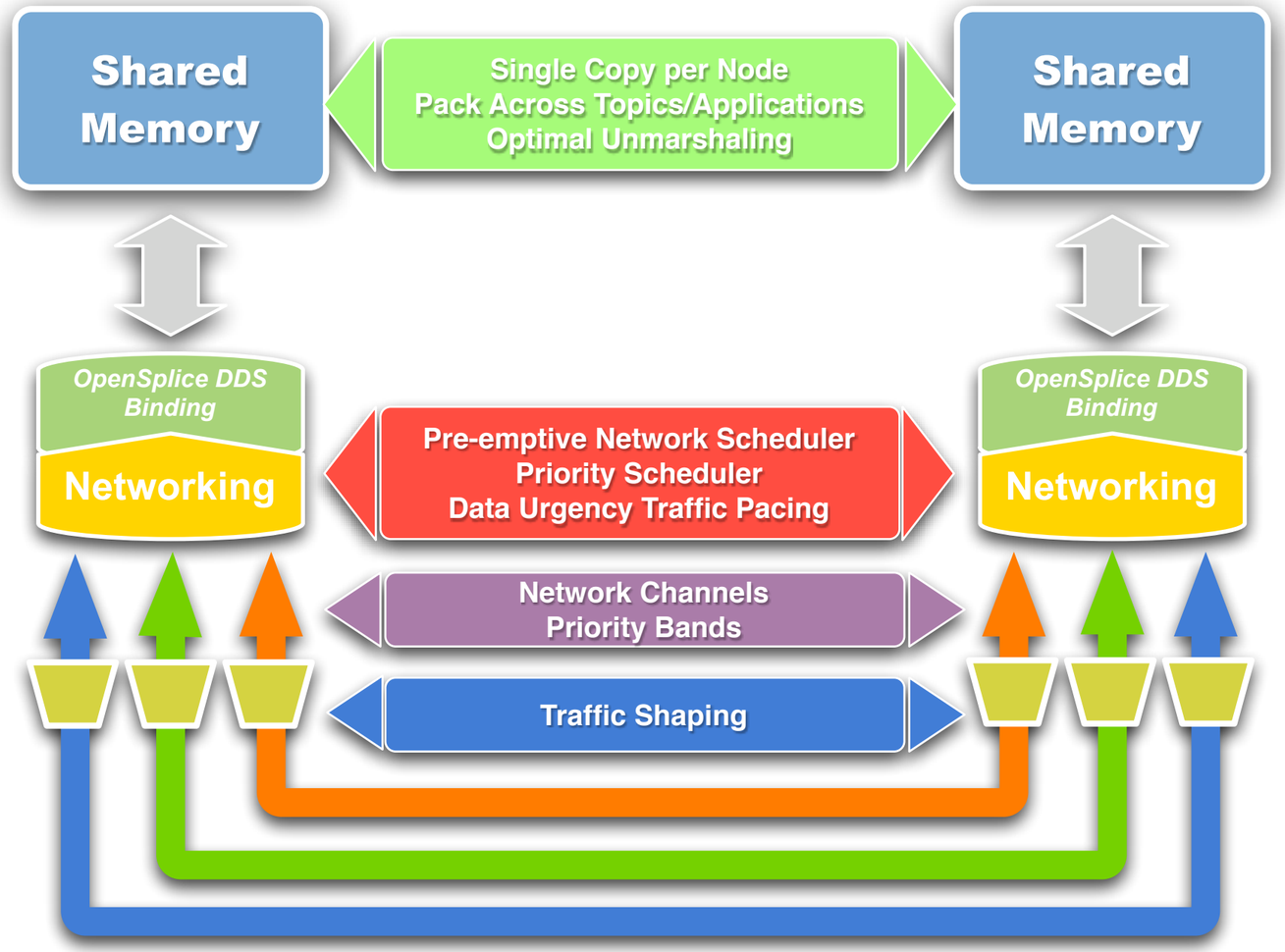
- Shared-Memory based architecture for minimizing intra-nodal latency, as well as maximizing nodal scalability
- Plugglable Service Architecture
- Full control over network scheduling



Advanced Networking Features

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

Fault-Tolerance

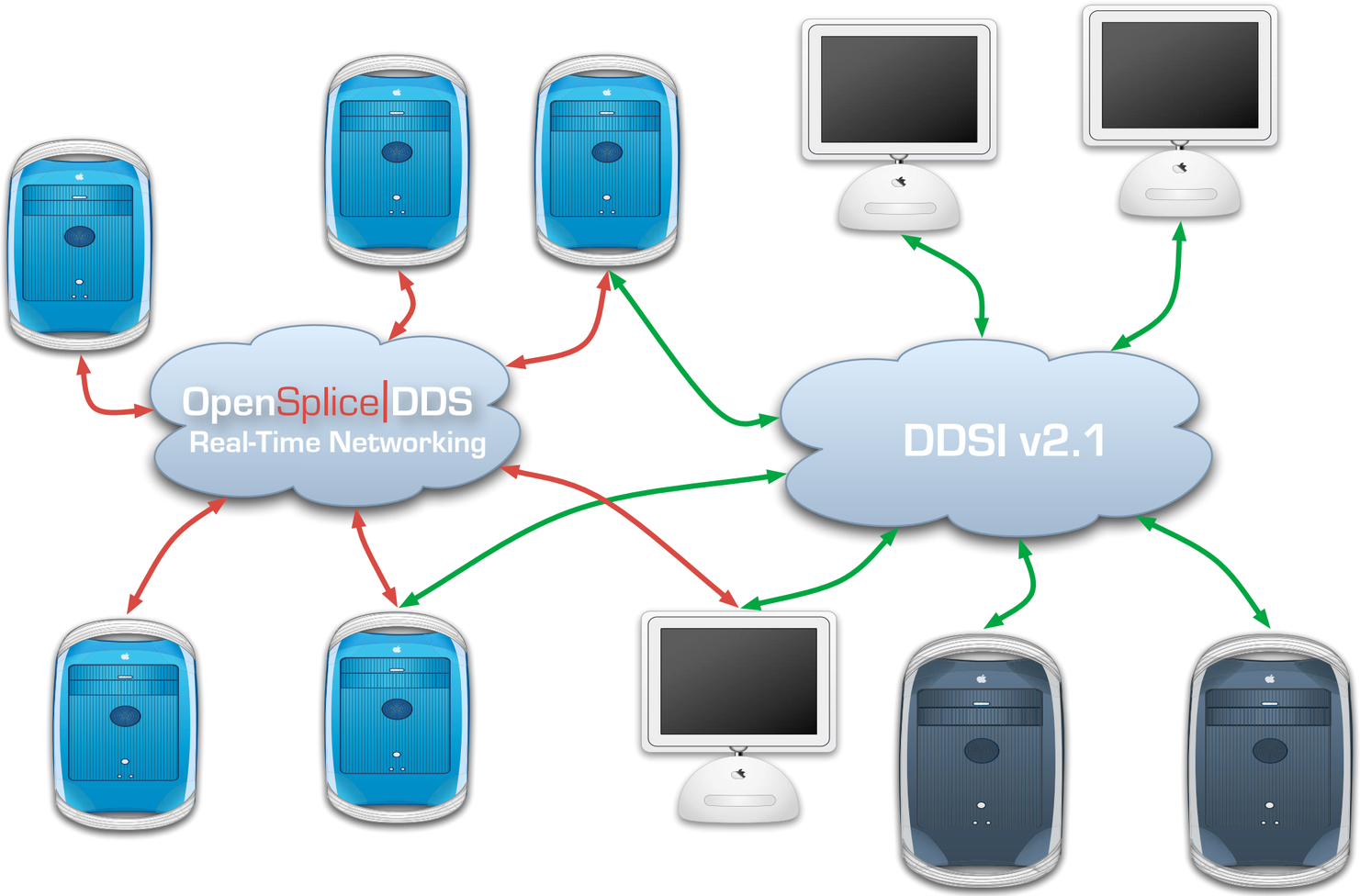
- Active Channels
- Fall back on next highest priority active channel

Determinism & Safety

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

Multi-Protocol

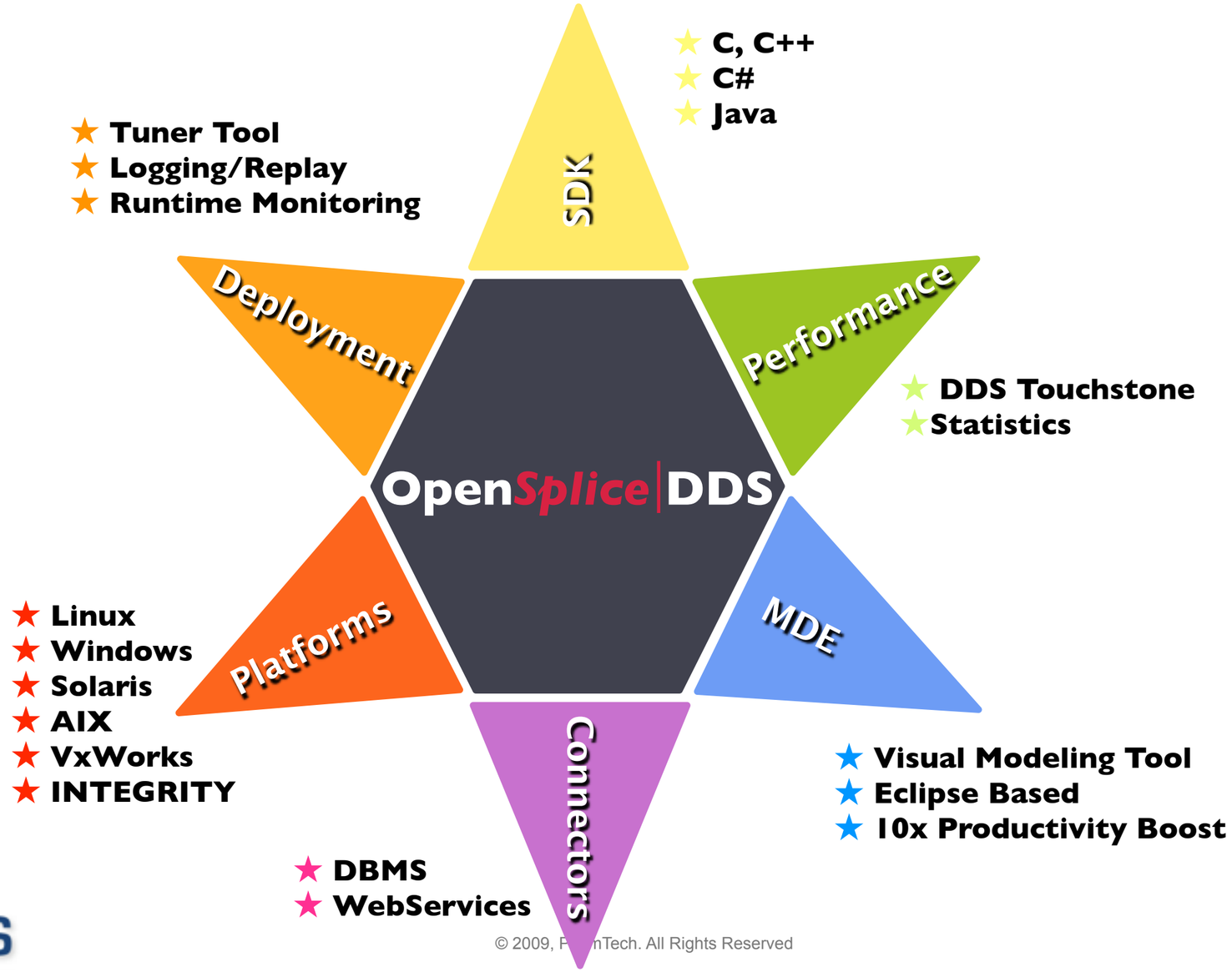
- With OpenSplice DDS you can choose wether to use the Real-Time Networking Protocol or the DDSI Interoperability Protocol based on your system requirements w.r.t. real-time behavior, scalability and interoperability
- OpenSplice DDS can simultaneously run over its Native Protocol as well as DDSI thus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



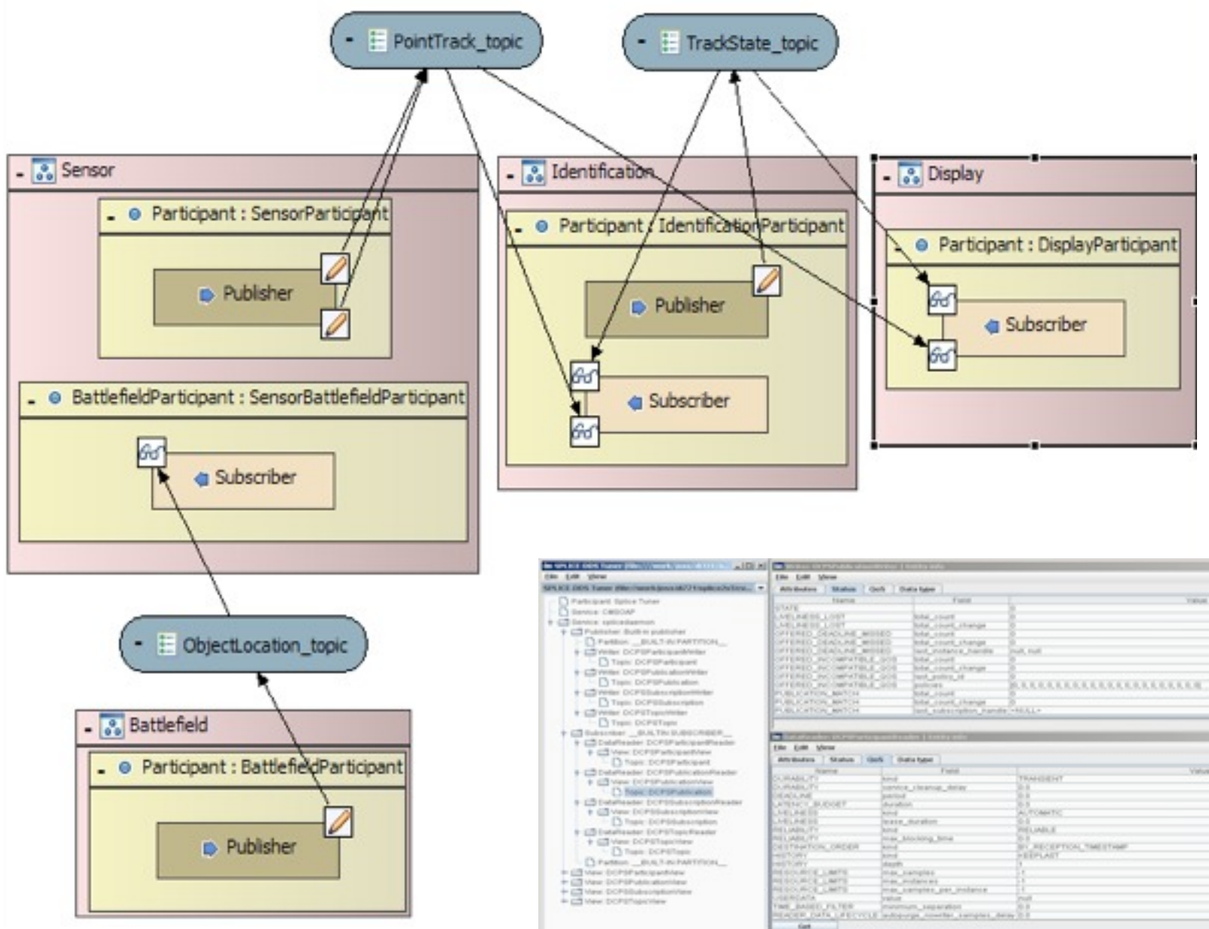
Reason #6

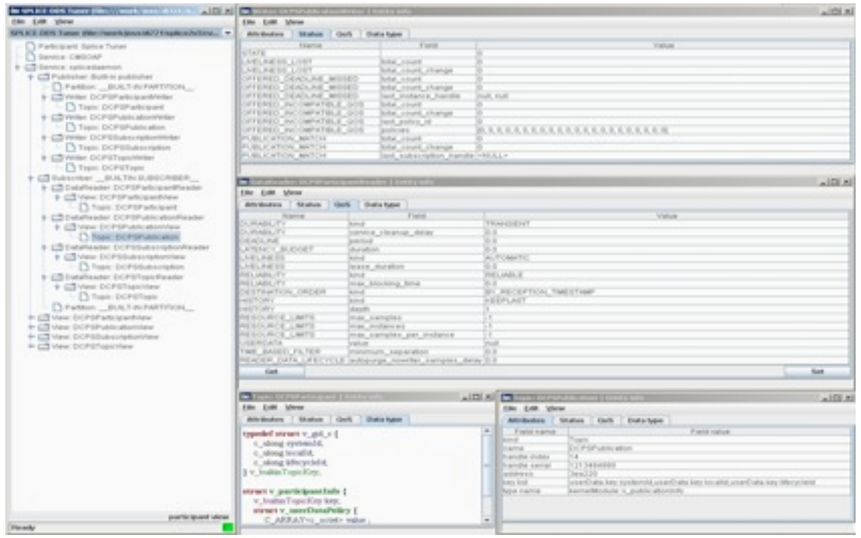
- Most Productive DDS Environment

A Technology Ecosystem



Productivity Tools





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

Application Modeling

- Graphical application modeling
- Pattern-oriented code-generation

Deployment Modeling

- Modeling of DDS-configuration Service configuration (networking, durability)
- Runtime control with the OpenSplice DDS Tuner

Reason #7

- The DDS Implementation powering the most challenging Mission Critical Applications!
- Totaling thousands of users among Open Source and Commercial adopters, it is the most widely used DDS Implementation

Some OpenSplice DDS Users

OpenSplice DDS

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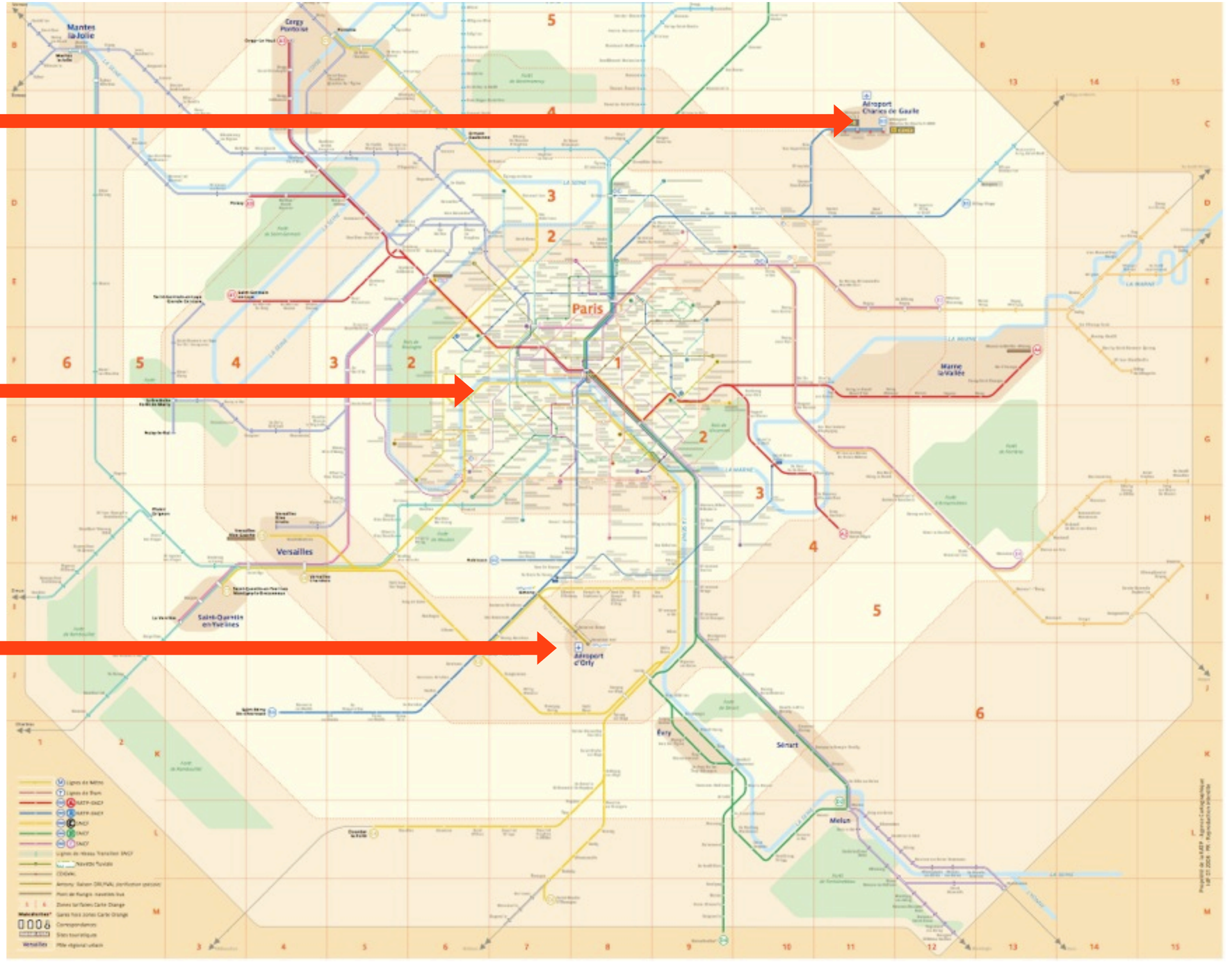
Paris Metro

- Very large scale Monitoring and Control Application
- OpenSplice DDS used to monitor and control all the Metro Stations controlled by RATP

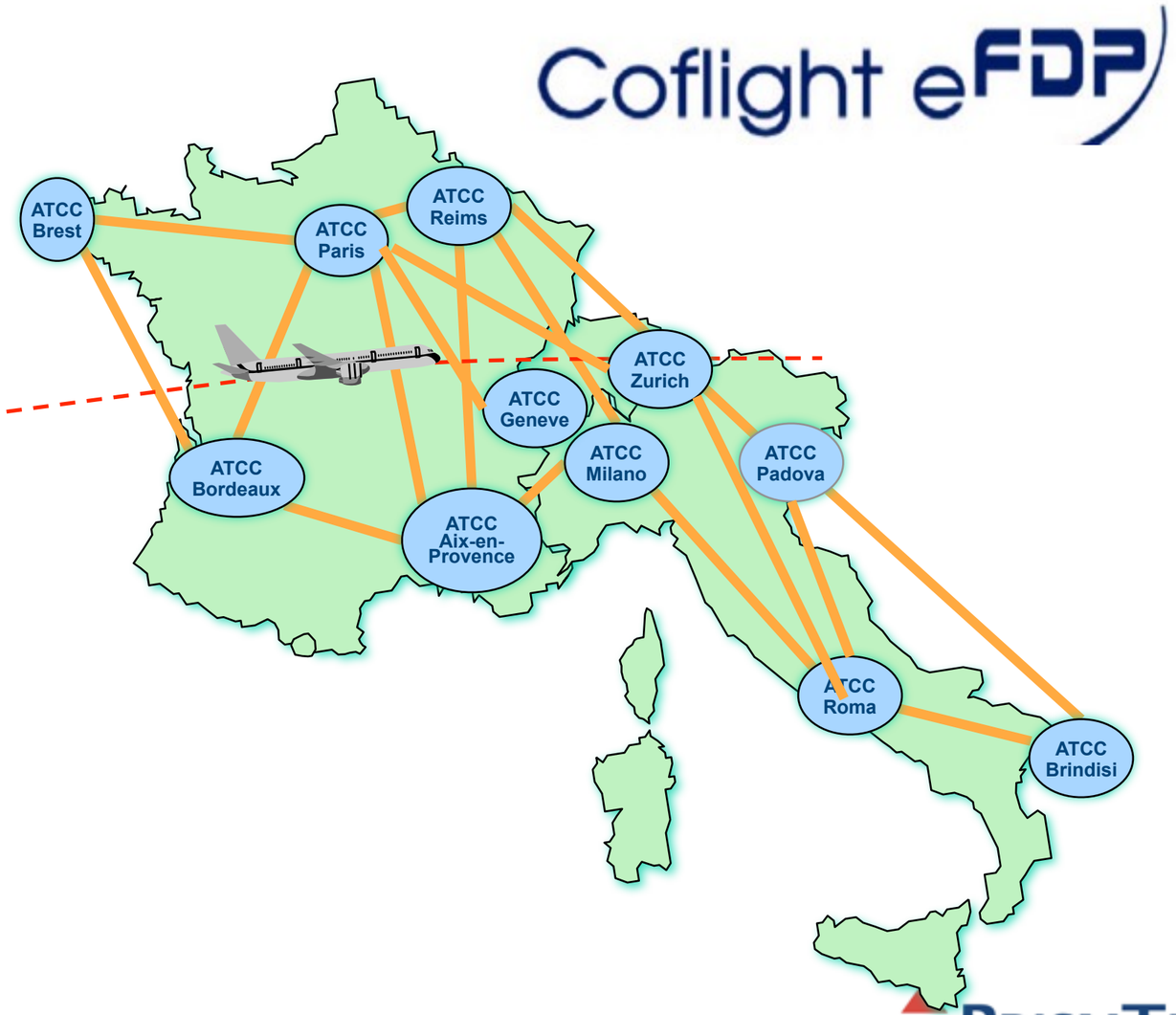

Aéroport
Charles de Gaulle
Aéroport
Charles de Gaulle 1
CDG1–3
B3
Aéroport
Charles de Gaulle 2–TGV
CDG2
Terminal 1
Parc PR
Terminal 3
Roissypole
Parc PX
Terminal 2


Terminal Ouest
Terminal Sud
orlyval
Aéroport
d'Orly


Mantes
la Jolie
Cergy
Pontoise
Paris
Versailles
Saint-Quentin
en Yvelines
Aéroport
d'Orly
Aéroport
Charles de Gaulle
Marne
la Vallée
Melun
Sénart
Évry

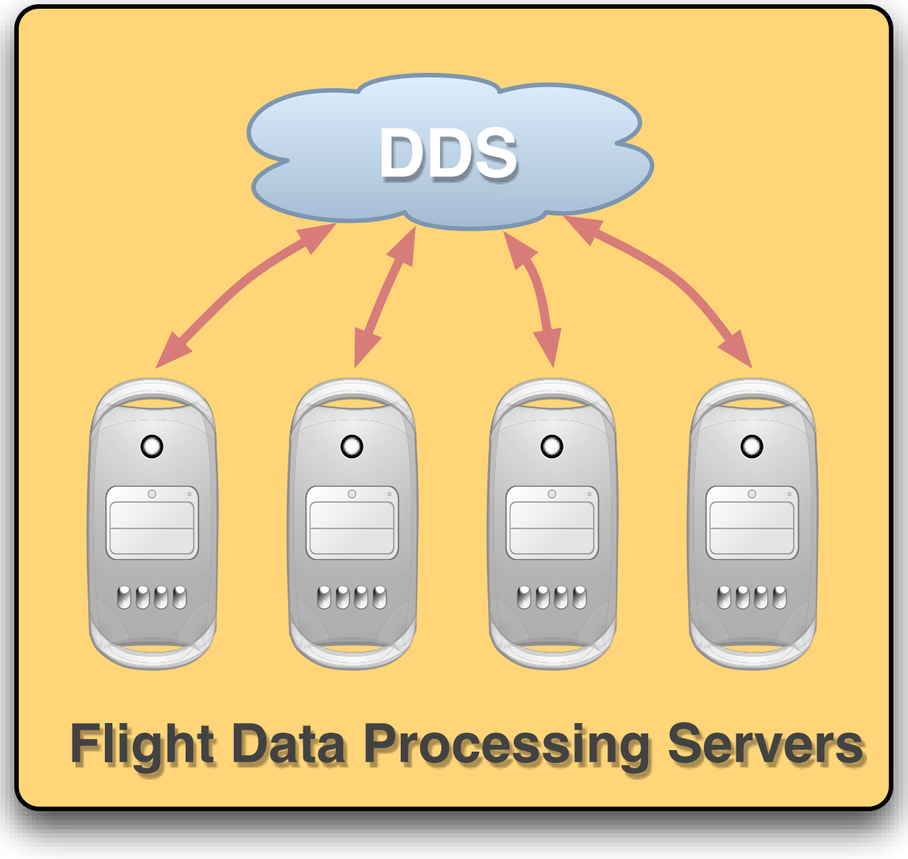
European Flight Data Processor

- Large program to replace existing Flight Data Processors (FDPs)
  - 5 Centers in France
  - 4 Centers in Italy
  - 2 Centers in Switzerland



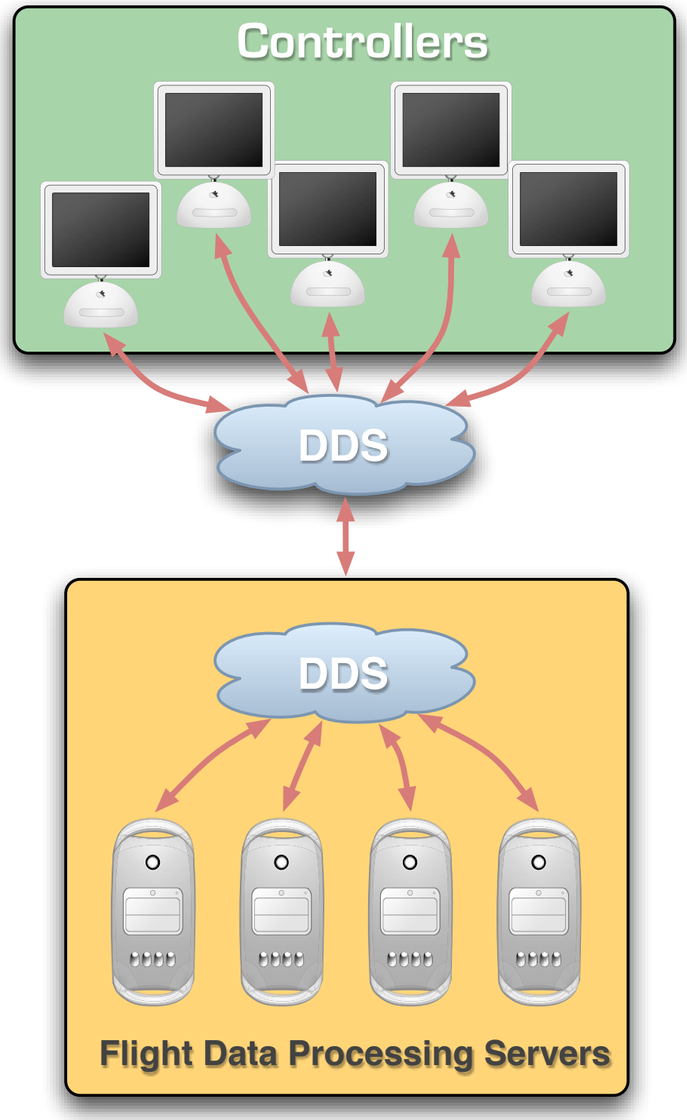
DDS in CoFlight -- FDP Core

- OpenSplice DDS glues together the most critical components of the CoFlight FDP running at a SWAL-2 (same as DO-178B Level B) assurance level
- In this context OpenSplice DDS distributes flights data plans of redundant LANs



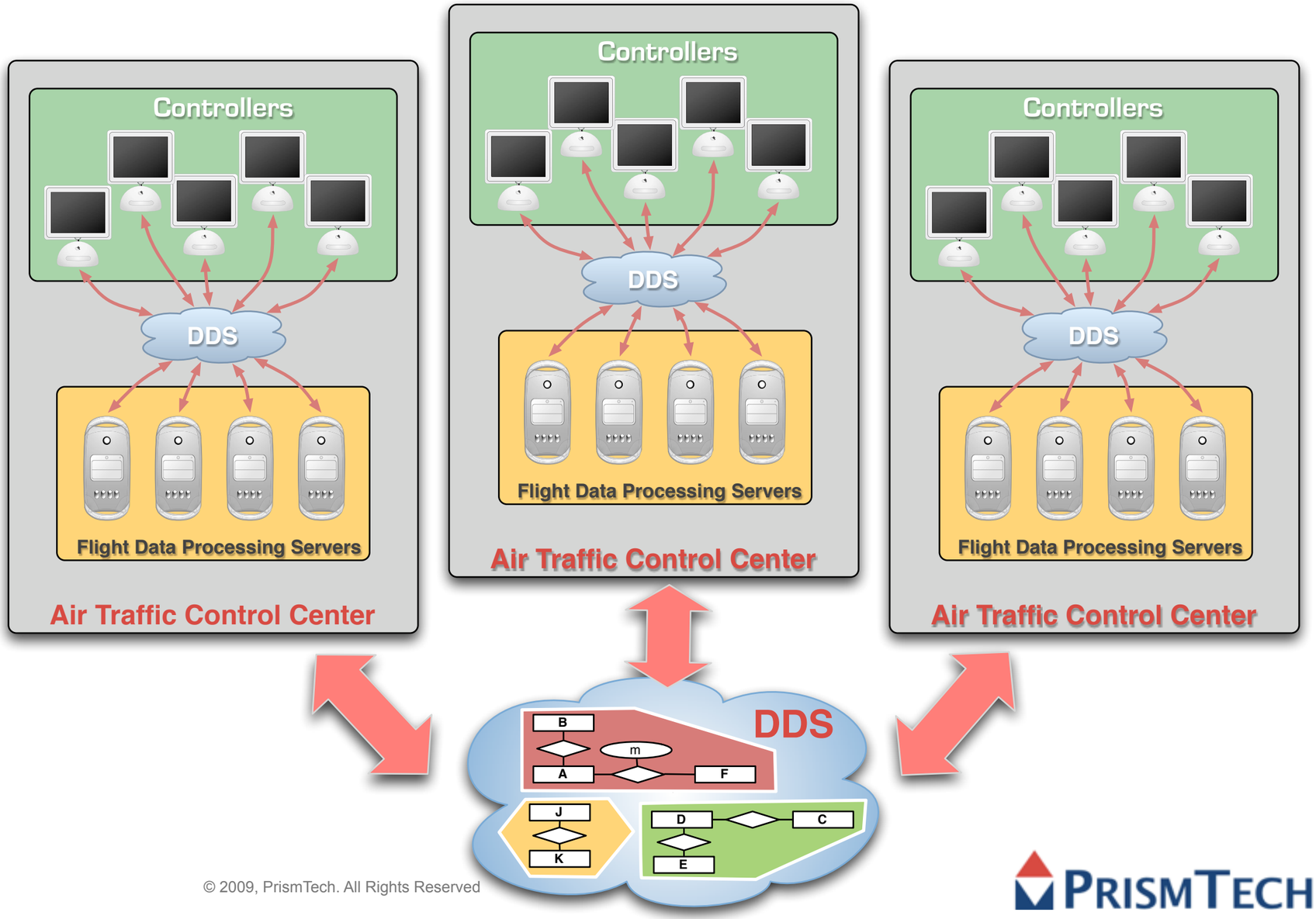
DDS in CoFlight -- CWP

- OpenSplice DDS is used within CoFlight to distribute the “external” Flight Data Plan to Controller Working Positions



DDS in CoFlight -- IOP

- OpenSplice DDS is used to integrate CoFlight-based Centers
- OpenSplice DDS is used to provide interoperability with other Interoperable Centers (as per ICOG-2)



Some Other Use Cases

Defense & Aerospace

- Combat Management Systems
  - e.g. THALES, Northrop Grumman
- Vetronics
  - e.g. European SI
- Tactical Links
  - e.g. ULTRA
- Simulation
  - e.g. MIT Lincoln Labs

SCADA/Utilities

- Industrial Automation
  - e.g. Chemtech
- Rocket Launch Systems (Telemetry)
  - e.g. NASA

Some Use Cases

Transportation

- Drones
  - e.g. Navcom

Financial Services

- Automated Trading Firms
  - e.g. ThinkTrade

Reason #8

- A Great Team to work with
  - The OpenSplice DDS team has Customer Focused, Tech-Jedi Culture
  - A team counting some of the most referenced author and experts in the area of Middleware technologies at your service

Tech Sith vs Tech Jedi

Tech-Sith

- Proprietary SW
- Lock-in
- Want Customer $$$
- Red

closed source

Microsoft®

Tech-Jedi (OpenSplice DDS Team)

- Open Source
- Openness & Interoperability
- Want Customer Success
- Green

open source

OpenSplice DDS

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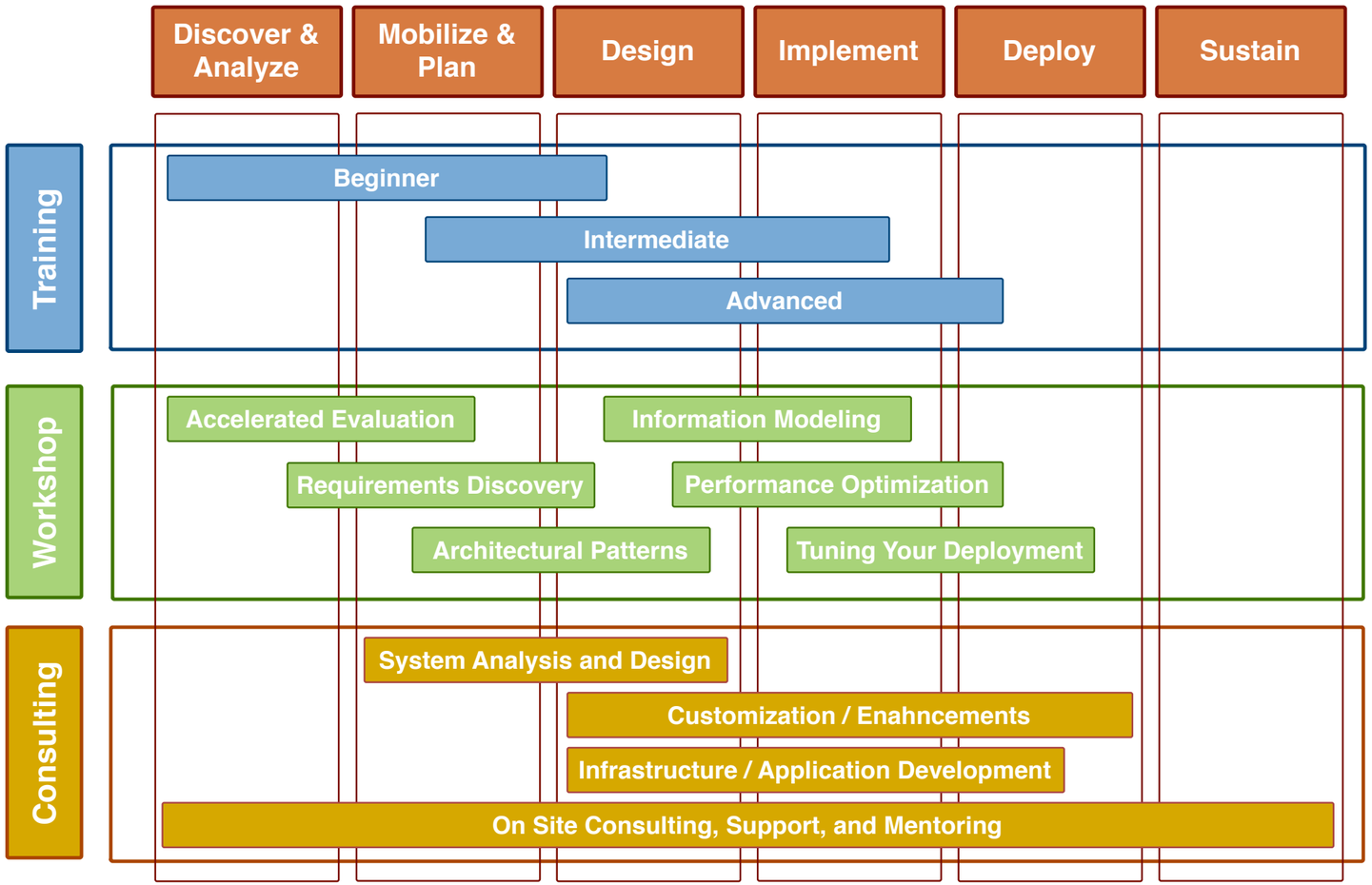
At Your Service

- 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).



OpenSplice DDS

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Reason #9

- Best Commercial Terms

Subscription Model

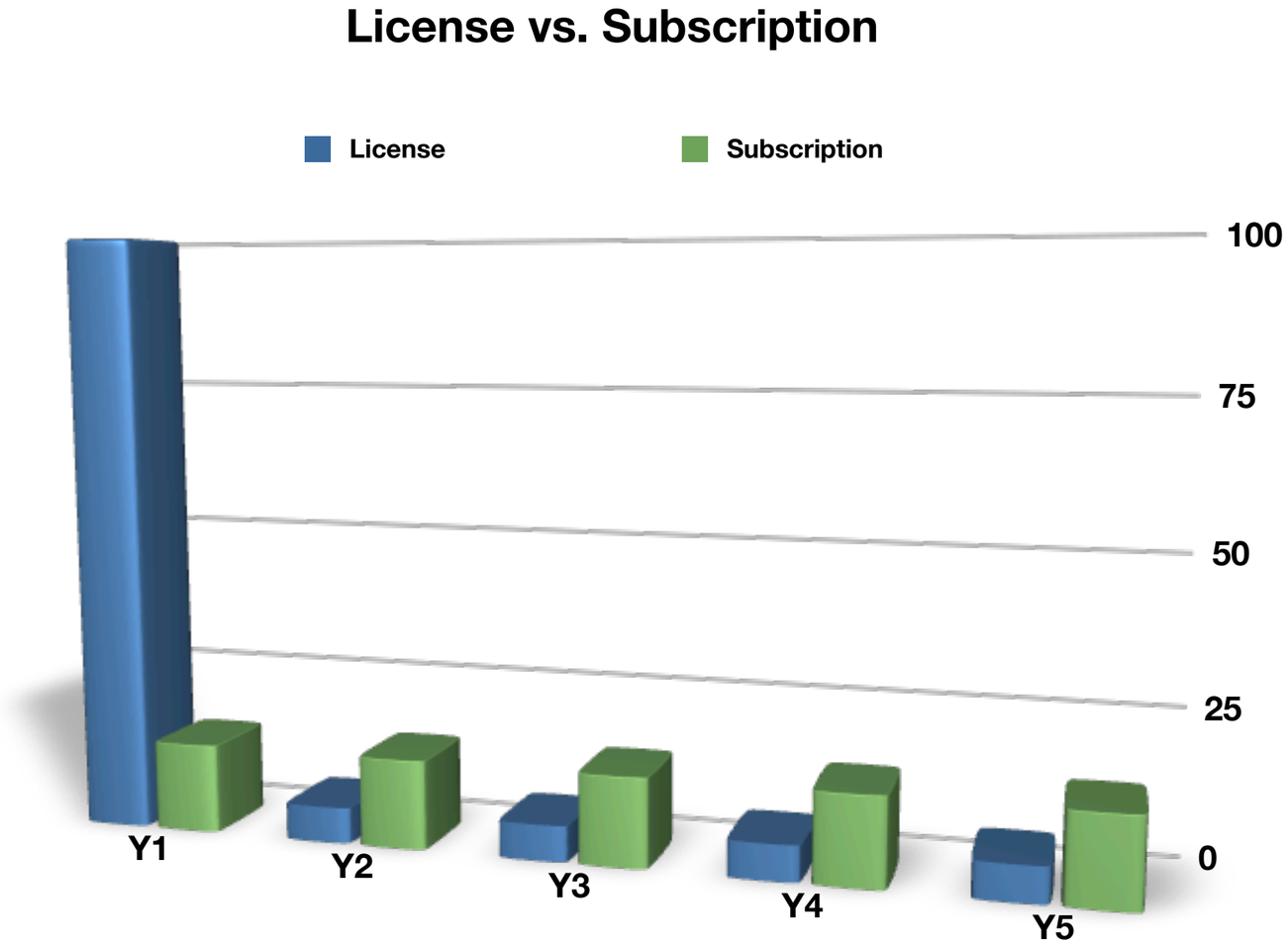
OpenSplice DDS subscriptions provide several key commercial advantages, namely they minimize TCO, and are cash-flow friendly

Community Edition

- Free like free beer!

Commercial Editions

- Cash/Flow Friendly
- Lower Total Cost of Ownership (TCO)
- Flexible model to tune needs vs. subscription



Reason #10

- Because there are no good reasons for not choosing OpenSplice DDS!

Online Resources

OpenSplice DDS

Delivering Performance, Openness, and Freedom

- http://www.opensplice.com/
- emailto:opensplicedds@prismtech.com

twitter

- http://twitter.com/acorsaro/

webex™

- http://bit.ly/1Sreg

Blogger

- http://opensplice.blogspot.com

YouTube

- http://www.youtube.com/OpenSpliceTube

OMG OBJECT MANAGEMENT GROUP DDS

- http://www.dds-forum.org
- http://portals.omg.org/dds