



# DDS Interoperability Demo December 2010

**PrismTech** 

**Real-Time Innovations** 





TwinOaks Computing

**Gallium Visual Systems** 







### **History:**

### **DDS the Standards**



- Data Distribution Service for Real-Time Systems (DDS)
  - API for Data-Centric Publish-Subscribe distributed systems
  - Adopted in June 2003
  - Finalized in June 2004
  - Revised June 2005, June 2006
  - Spec version 1.2: <a href="http://www.omg.org/spec/DDS/1.2/">http://www.omg.org/spec/DDS/1.2/</a>
  - Adopted in July 2006
  - Revised in July 2007
  - Spec version 2.1: <a href="http://www.omg.org/spec/DDS-RTPS/2.1/">http://www.omg.org/spec/DDS-RTPS/2.1/</a>
- Related specifications
  - DDS Extensible Topics
  - UML Profile for DDS
  - DDS for Light-Weight CCM
- Multiple (9+) Implementations







### **PrismTech**

### **Real-Time Innovations**





### TwinOaks Computing Gallium Visual Systems







### **About RTI**





- We are the DDS company
  - 100% focused on DDS
- Founded 1991 by researchers from Stanford Aerospace Robotics Lab
- Real-time middleware since 1996
- Over 500 unique applications
- Solid financials
  - Bootstrapped, no VC
  - History of profitability and growth
- http://www.rti.com







### **PrismTech Corporation**

# The World Leader in Open Source High Performance Middleware

- Global presence with active business in 50+ countries
- Supporting some of the most critical deployments around the globe, in Telco, Defense & Aerospace, Transportation, and Financial
- 110 Tech Jedi, including several Internationally acknowledged Middleware Experts, working hard to deliver you Performance, Openness, and Freedom!



**HQ Sites** 

USA: Burlington, MA EMEA: Edinburgh, Scotland

#### **Engineering Centres**

Newcastle, UK | Fort Wayne, IN Berlin, Germany | Paris, France Hengelo, Netherlands

#### **Field Offices / Distributors**

London, UK | Saddle Brook, NJ Houston, TX | San Francisco, CA Seoul, South Korea | Beijing, China

Helsinki, Finland

PRISMTECH

### **Gallium Visual Systems**





### **Defense, Security & Air Traffic Control Applications**

- Supplier of software tools, turn key applications and services
  - DoD Common Operating Environment
  - Navy Open Architecture compliant
  - ISO 9001:2008 Certified
- Focused on mission-critical software applications
  - Pioneered mapping and tracking systems in early 1980s
  - Visualization products and services
  - Middleware Communications Software
- 20+ Year focus on COTS software for
  - Command & Control / Situational Awareness
  - Air and Missile Defense
  - Air Traffic Control
  - Security



### **About Twin Oaks Computing**



- Small business based in Colorado
- Specializing in high-performance data communications
  - DDS, RTPS
  - Networking protocols
  - Device drivers
  - Embedded computing environments
  - Tactical data links
- CoreDX DDS implementation
  - Targeted at high-performance, space-constrained, embedded environments
- Staff with over 30 years experience developing and supporting DoD systems
- http://www.twinoakscomputing.com



Practical Middleware Expertise





### What you will see today



- #1 Interoperability works!
- #2 Multiple scenarios
  - You will see interoperability along many dimensions:
    - Discovery
    - Different platforms (Linux, Windows)
    - Not-trivial Data-Types with Keys
    - Unicast & Multicast, both reliable and best efforts
    - One to Many and Many to one communications
    - Different Topics
    - Different Qos: RELIABILITY, OWNERSHIP, DURABILITY
    - Filters: time, content, ...
- #3 Interoperability does not compromise performance
  - Direct communication. No bridges!!

### **Eight demo scenarios**

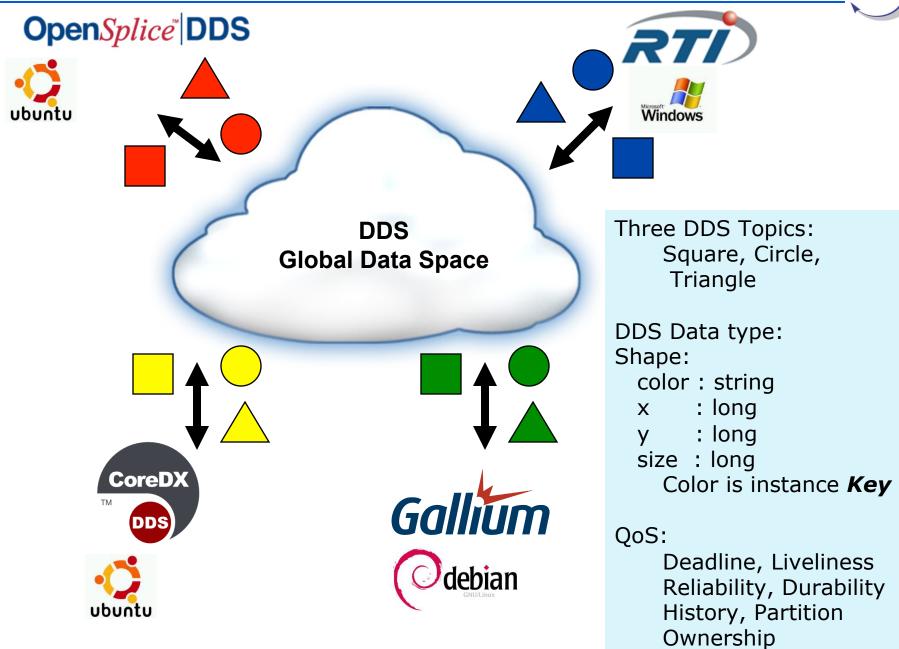


- Basic connectivity
- Request / Offered QoS (RELIABILITY, OWNERSHIP)
- Network Interruption
- Multiple Topics & Instances
- Exclusive Ownership
- Time and Content Filters

# All this and more between multiple vendors across different platforms!!

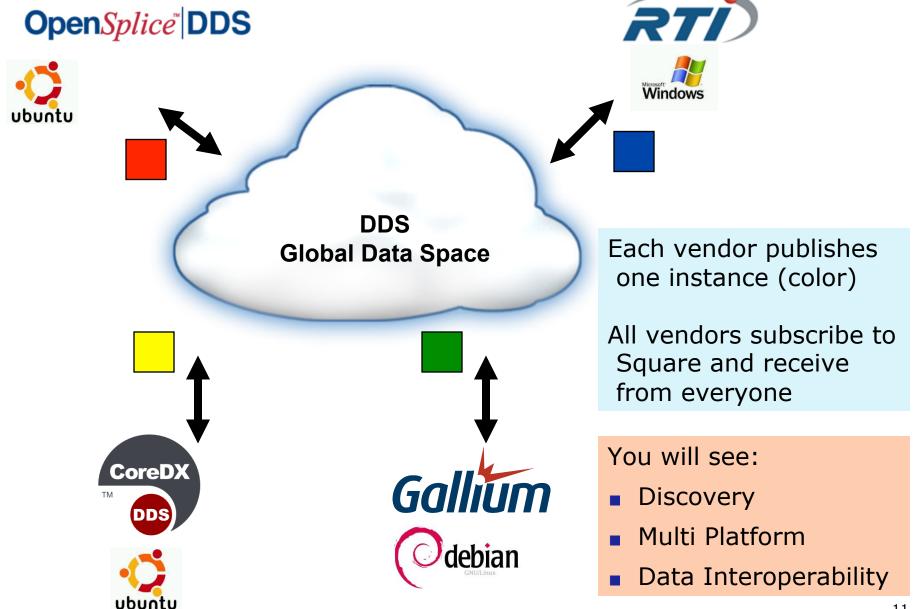
### **Demo Setup**





### 1. Basic Connectivity

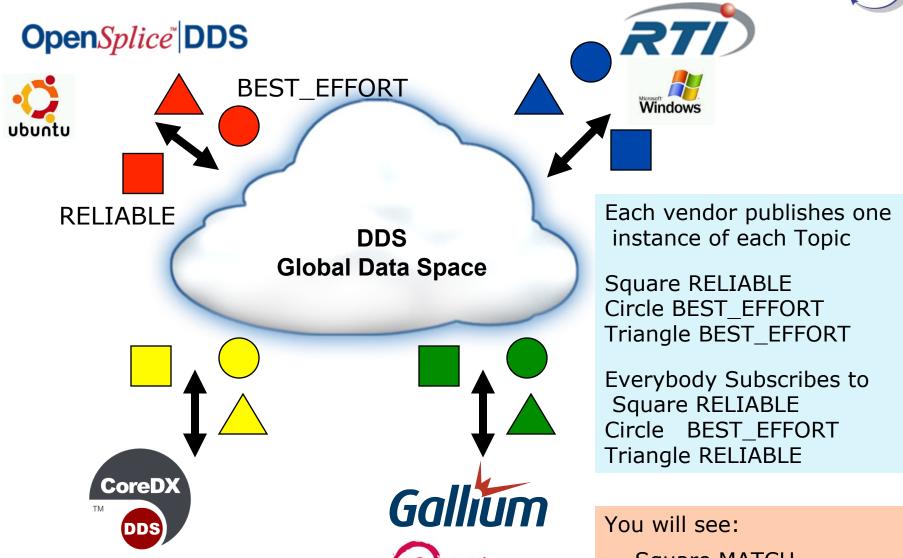




### 2. Request/Offered QoS (RELIABILITY)

ubuntu

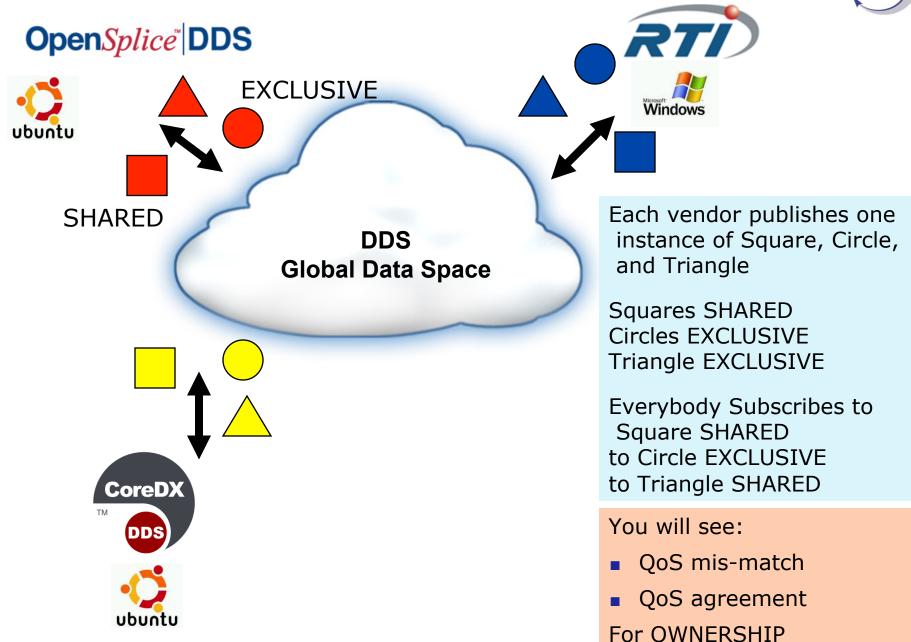




- Square MATCH
- Circle MATCH
- Triangle no MATCH

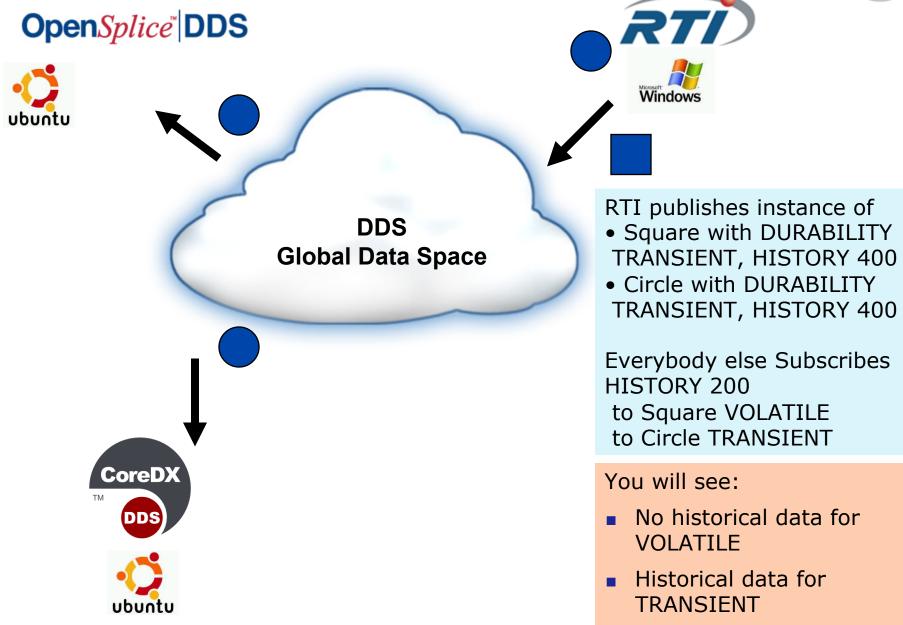
### 3. Request/Offered QoS (OWNERSHIP)





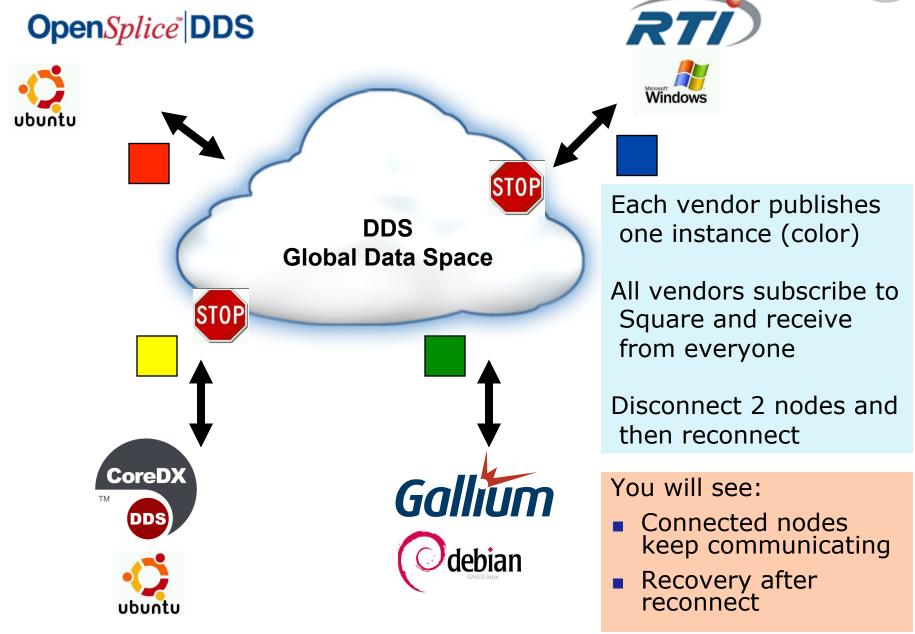
### 4. Durability





### 5. Robustness to network interruption





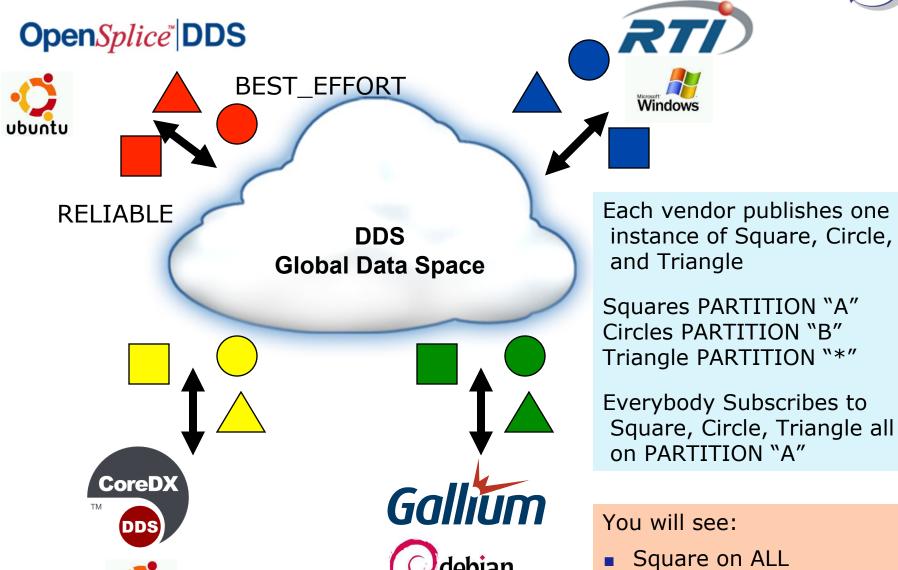
### 6. PARTITION QoS

ubuntu



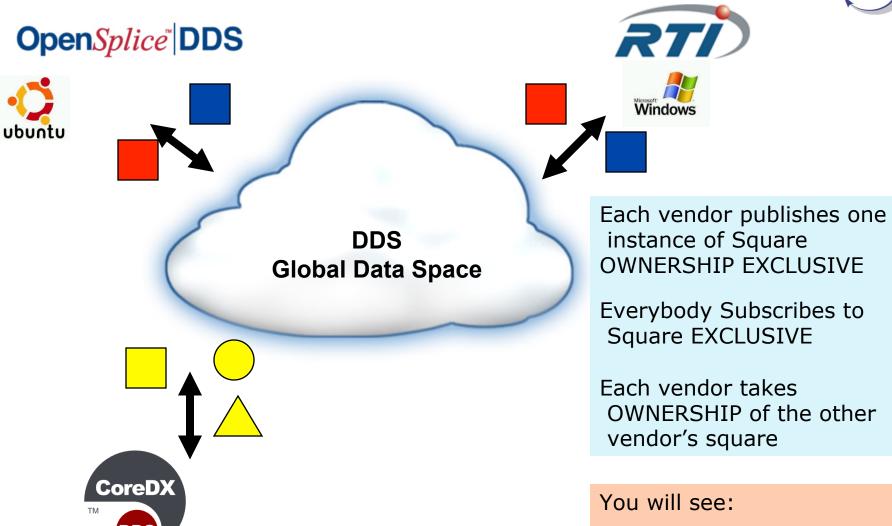
Circle on NONE

Triangle on ALL



### 7. OWNERSHIP

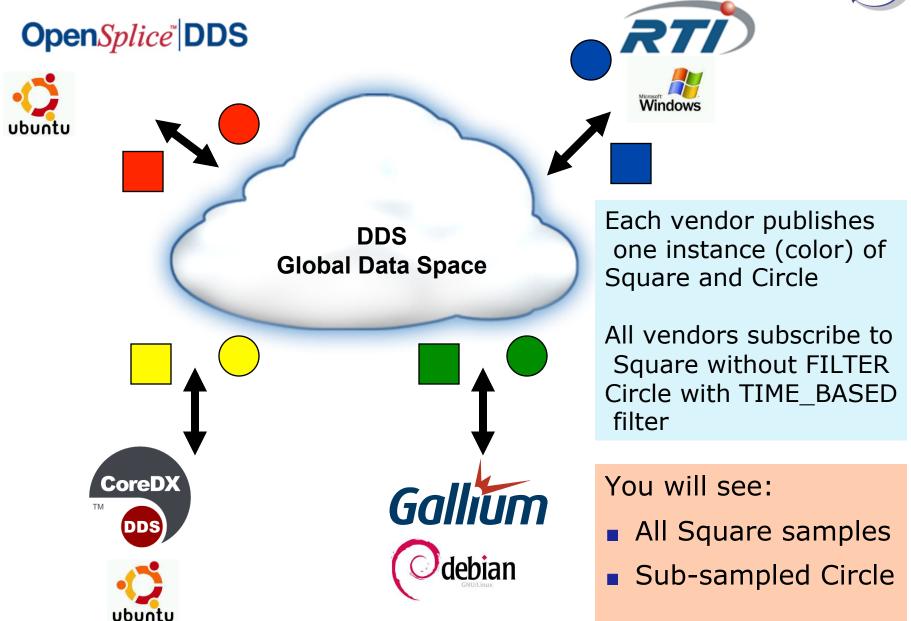




- Take over when stronger writer appears
- Failover when stronger writer goes away

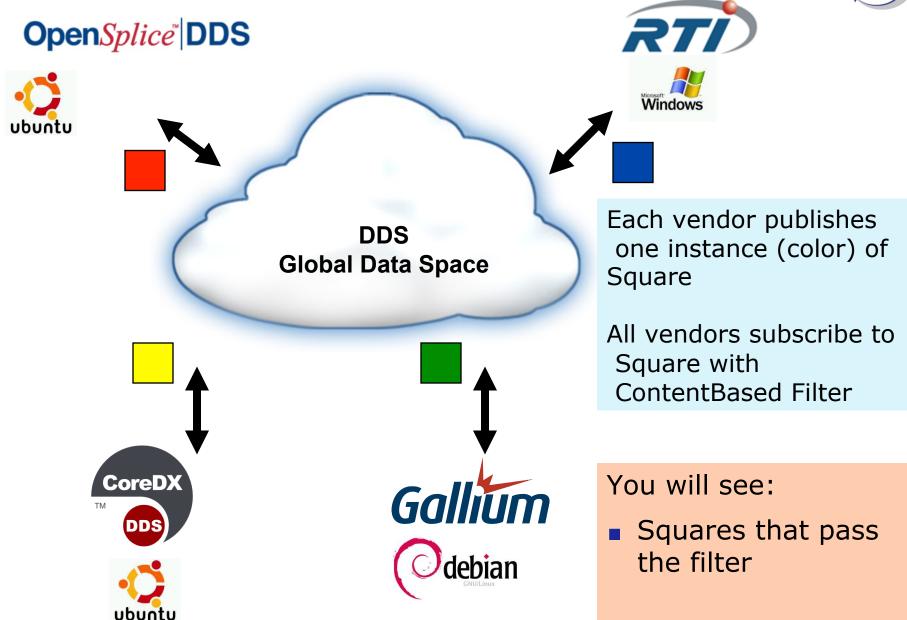
### 8. TIME\_BASED Filter





### 9. Content-Based Filter





### Interoperability demonstrated along many dimensions



## Today we demonstrated interoperability between 4 vendors for:

- Discovery
- Different platforms (Windows, several Linux distros)
- Different Topics and Data-Types
- Different Qos (RELIABILITY, DURABILITY, OWNERSHIP)
- Unicast & Multicast, both reliable and best efforts
- One to Many and Many to one communications
- Robustness to network interruption
- Time Based Filters
- Content Based Filter

#### **Conclusions**



- DDS Interoperability Works
  - We will continue working on additional scenarios
  - Vendors are committed to interoperability
- The DDS Standard and DDS-RTPS Interoperability standards are complete and usable
  - Two non-OMG vendors were able to use the OMG standard documents and produce interoperable DDS products
- DDS is the only portable and interoperable publish-subscribe infrastructure
- Come see more at the booths!