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DDS Interoperability Demo March 2012

PrismTech

OpenSplice DDS

Electronics and Telecommunications Research Institute

ETRI
Electronics and Telecommunications Research Institute

Real-Time Innovations

rti

TwinOaks Computing

CoreDX DDS

IBM Corporation

IBM

Object Computing Inc.

OpenDDS

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: http://www.omg.org/spec/DDS/1.2/
  - Adopted in July 2006
  - Revised in July 2007
  - Spec version 2.1: http://www.omg.org/spec/DDS-RTPS/2.1/
- Related specifications
  - DDS Extensible Topics
  - UML Profile for DDS
  - DDS for Light-Weight CCM
- Multiple (9+) Implementations

Who is participating?

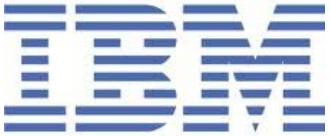
PrismTech

Electronics and Telecommunications Research Institute

Real-Time Innovations

TwinOaks Computing

IBM Corporation



Object Computing Inc.

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!!

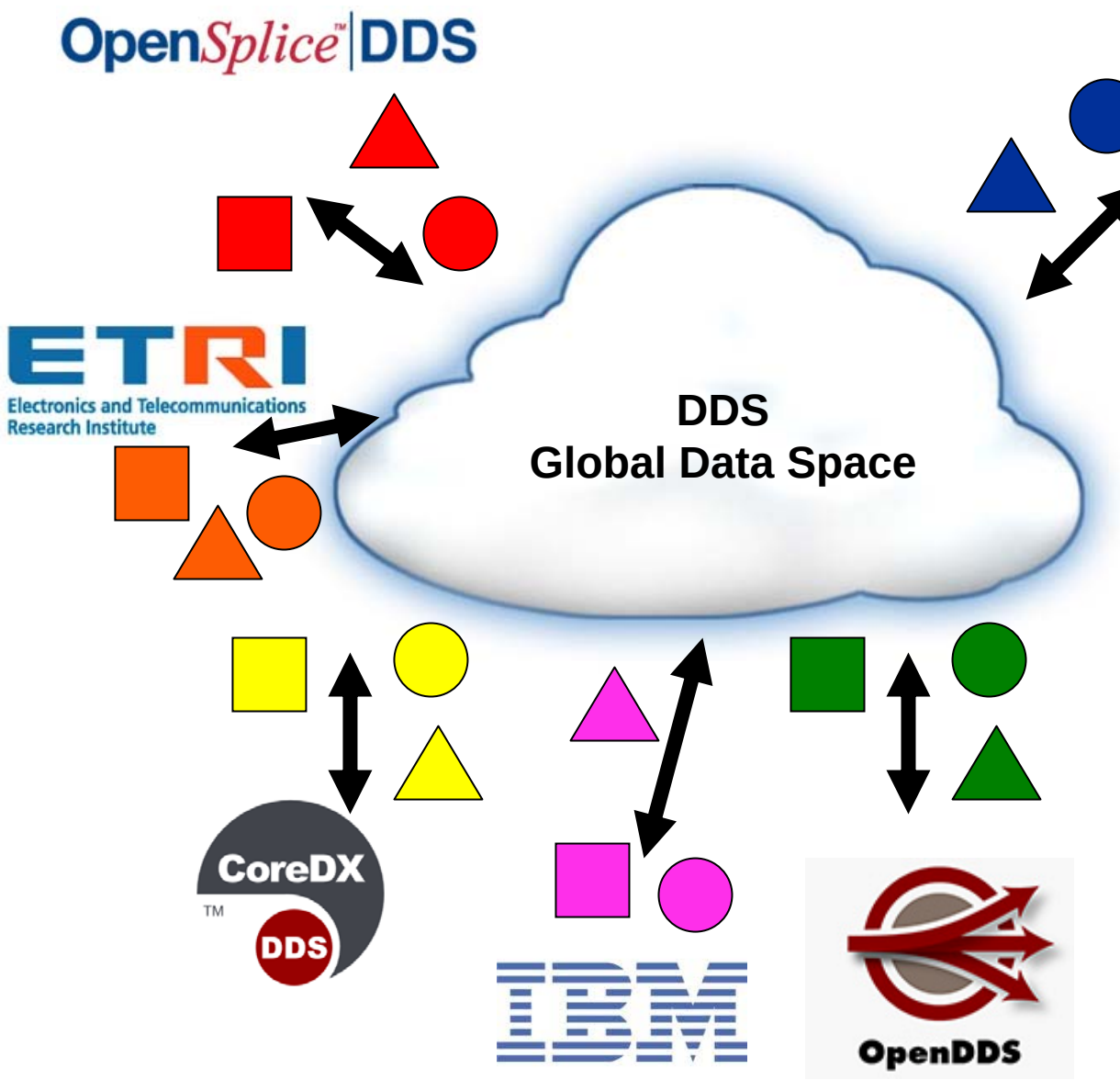
Interoperability between the applications implemented by six different vendors

Multiple demo scenarios

- Discovery & 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

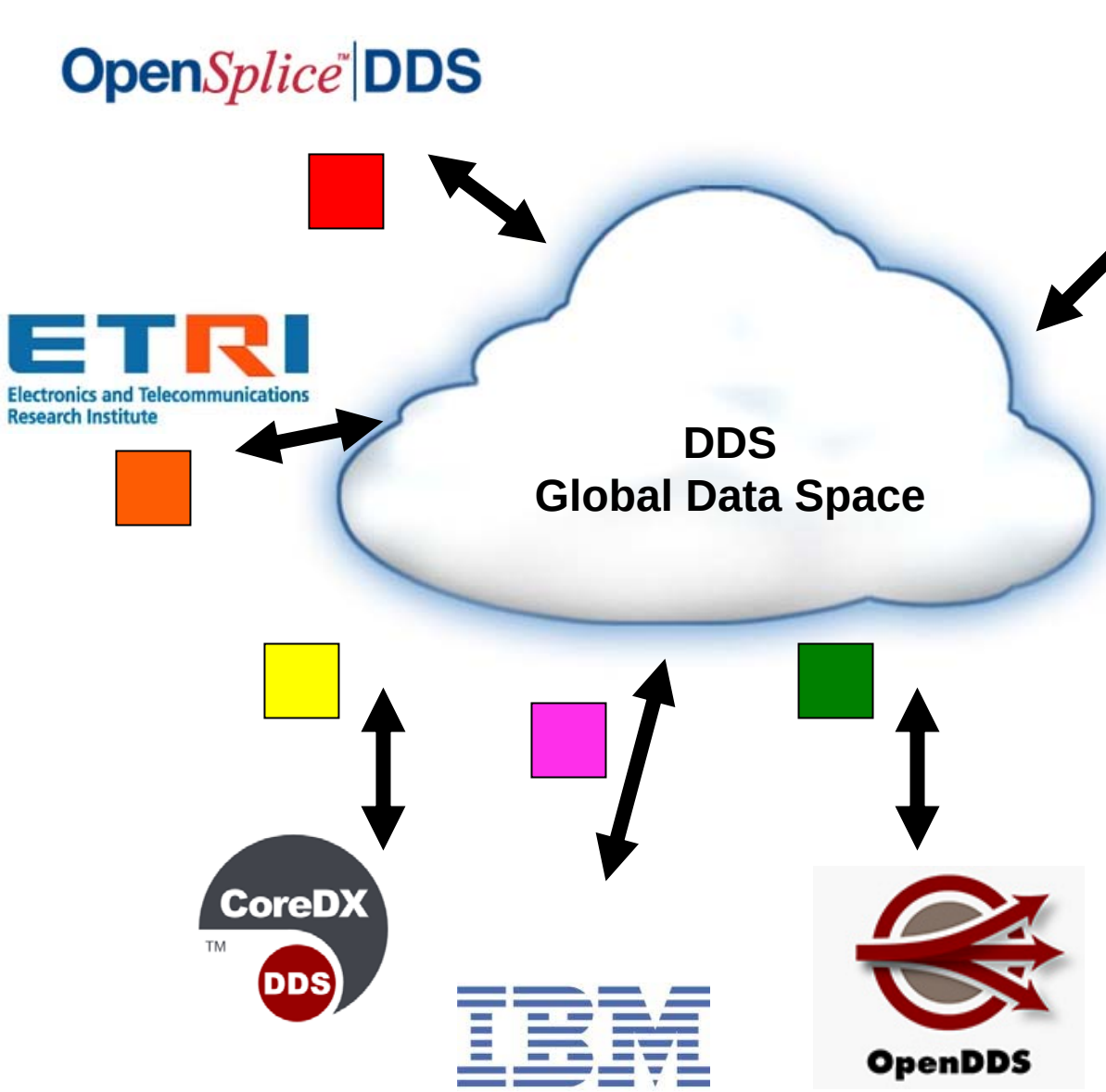


Three DDS Topics:
- Square, Circle, Triangle

DDS Data type:
Shape:
- color : string
- x : long
- y : long
- size : long
  - Color is instance ***Key***

QoS:
- Deadline, Liveliness
- Reliability, Durability
- History, Partition
- Ownership

1. Discovery & Basic Connectivity



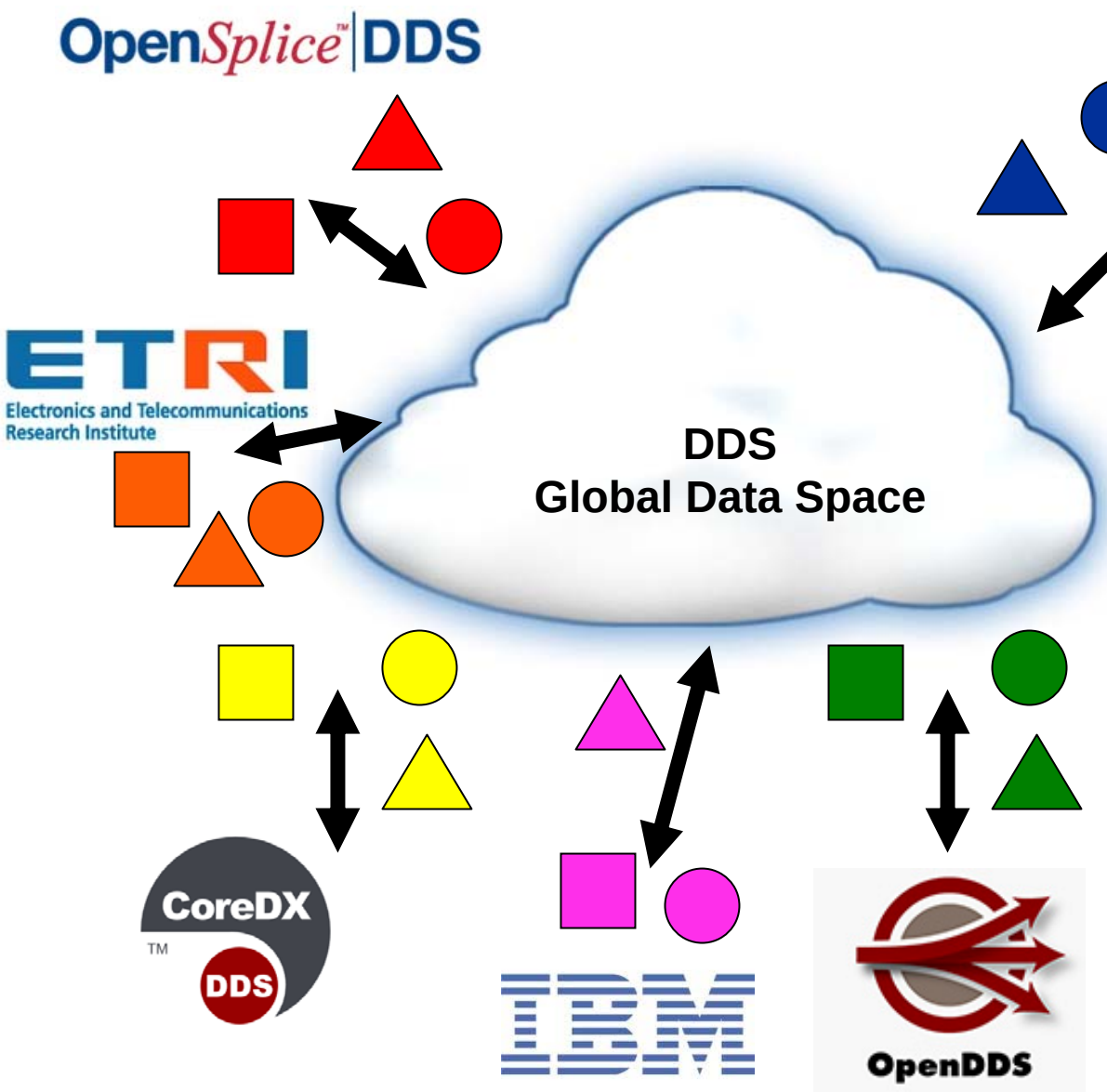
Each vendor publishes one instance (color)

All vendors subscribe to Square and receive from everyone

You will see:

- Discovery
- Multi Platform
- Data Interoperability

2. Request/Offered QoS (RELIABILITY)



Each vendor publishes one instance of each Topic

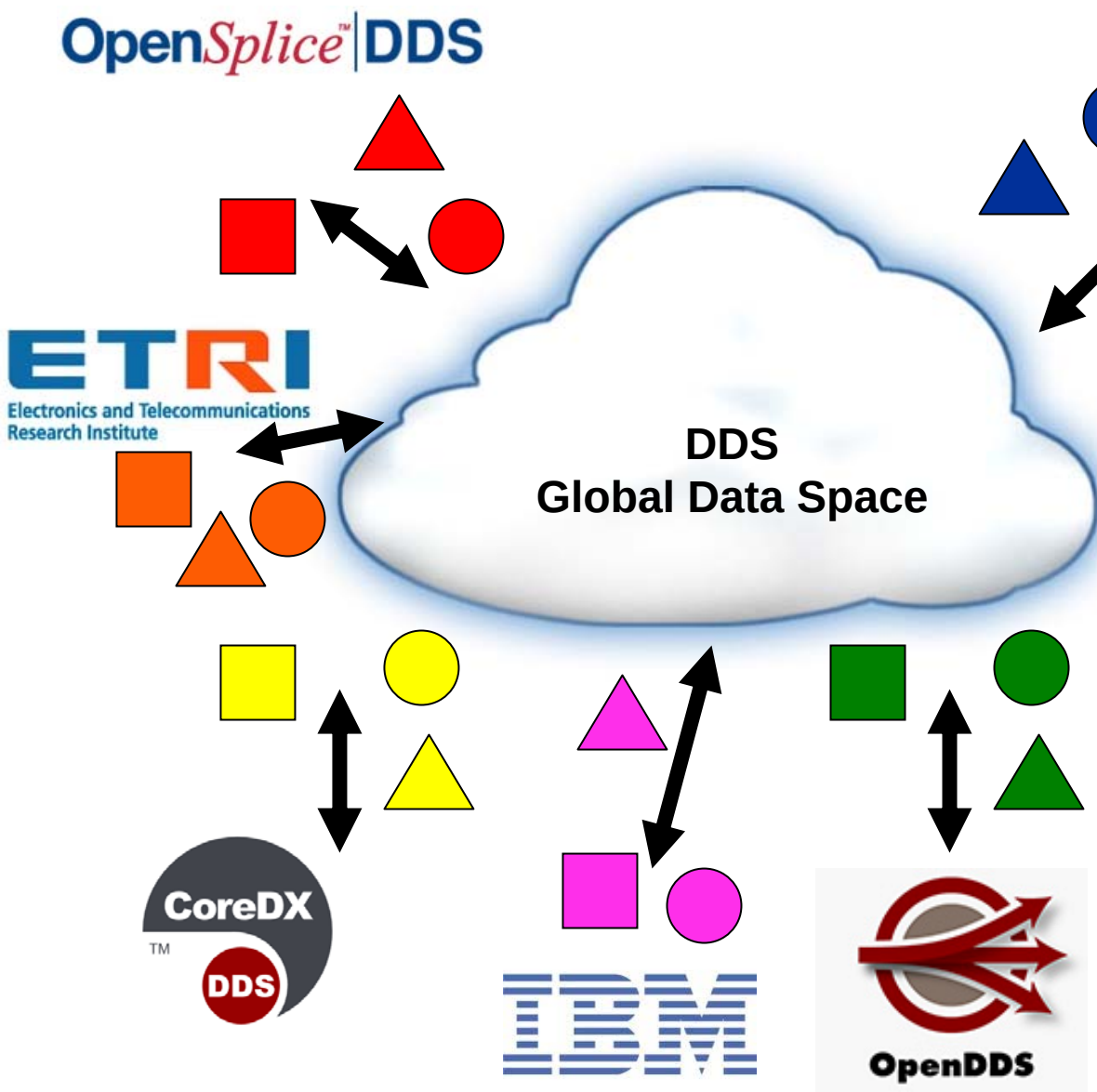
Square RELIABLE
Circle BEST_EFFORT
Triangle BEST_EFFORT

Everybody Subscribes to
Square RELIABLE
Circle BEST_EFFORT
Triangle RELIABLE

You will see:

- Square MATCH
- Circle MATCH
- Triangle no MATCH

3. Request/Offered QoS (OWNERSHIP)



Each vendor publishes one instance of Square, Circle, and Triangle

Squares SHARED
Circles EXCLUSIVE
Triangle EXCLUSIVE

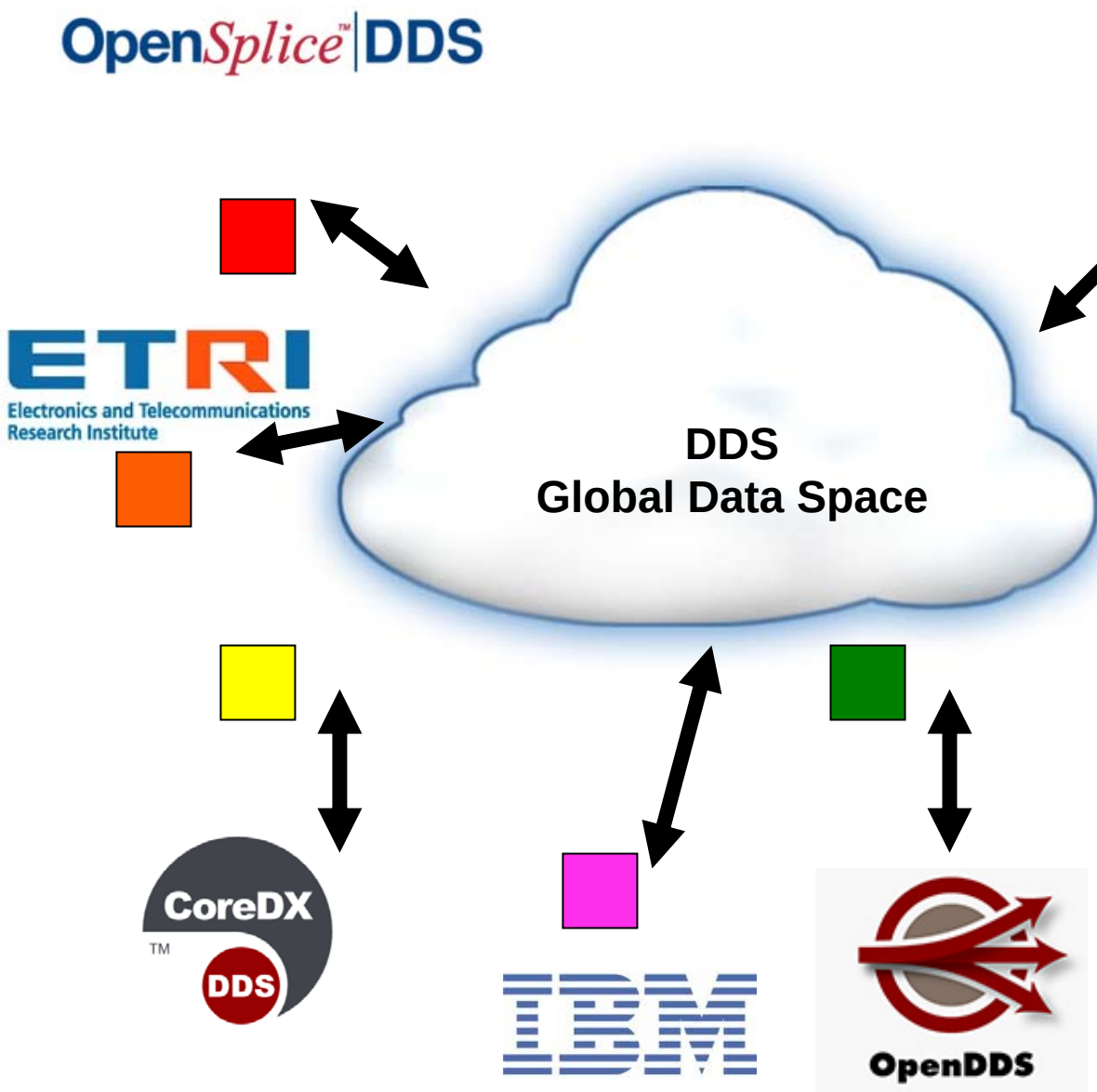
Everybody Subscribes to
Square SHARED
to Circle EXCLUSIVE
to Triangle SHARED

You will see:

- QoS mis-match
- QoS agreement

For OWNERSHIP

4. Durability



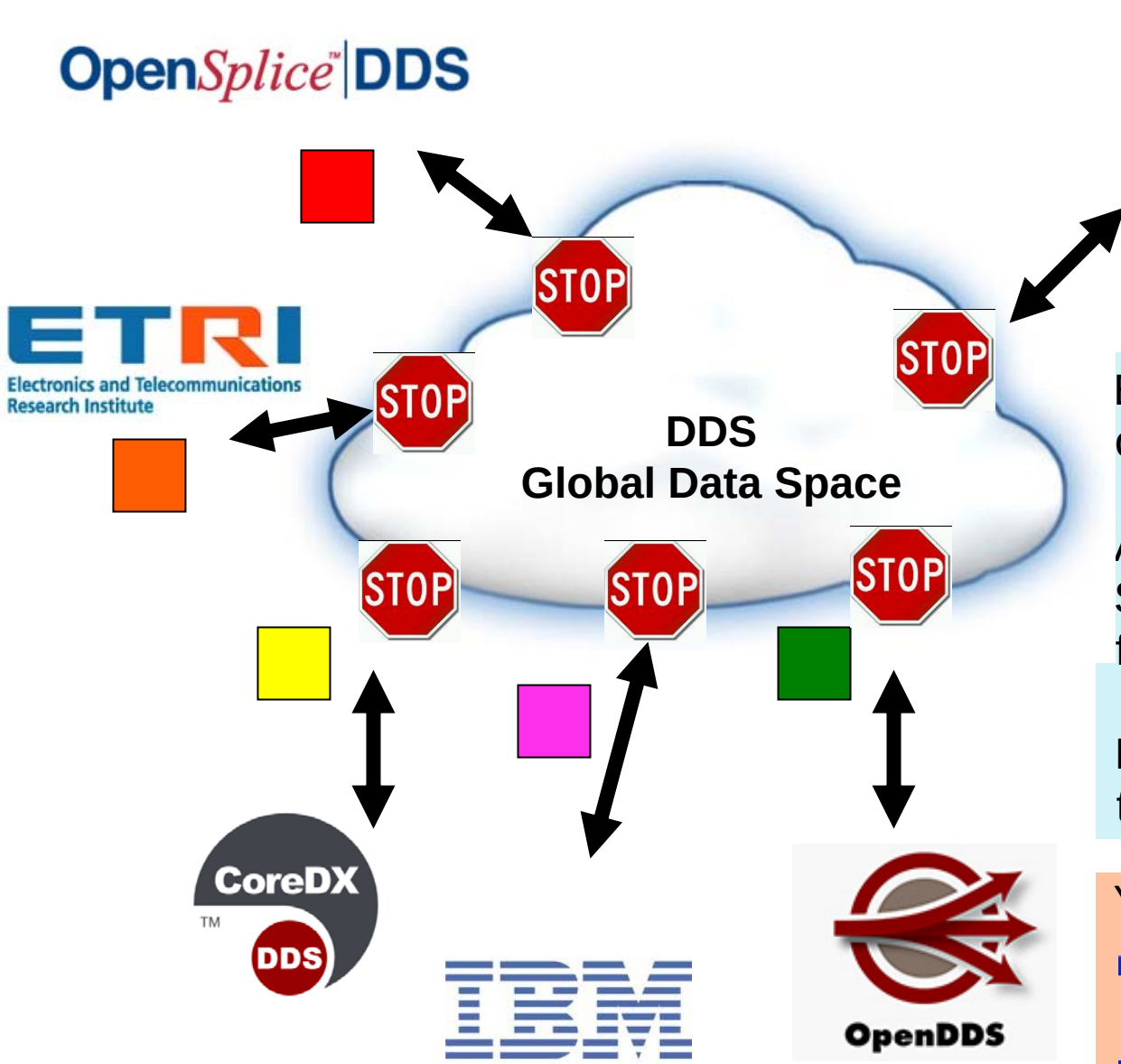
All publish instance of
- Square with DURABILITY TRANSIENT, HISTORY 100

Everybody else Subscribes HISTORY 100
to Square TRANSIENT

You will see:

- Historical data for TRANSIENT

5. Robustness to network interruption



Each vendor publishes one instance (color)

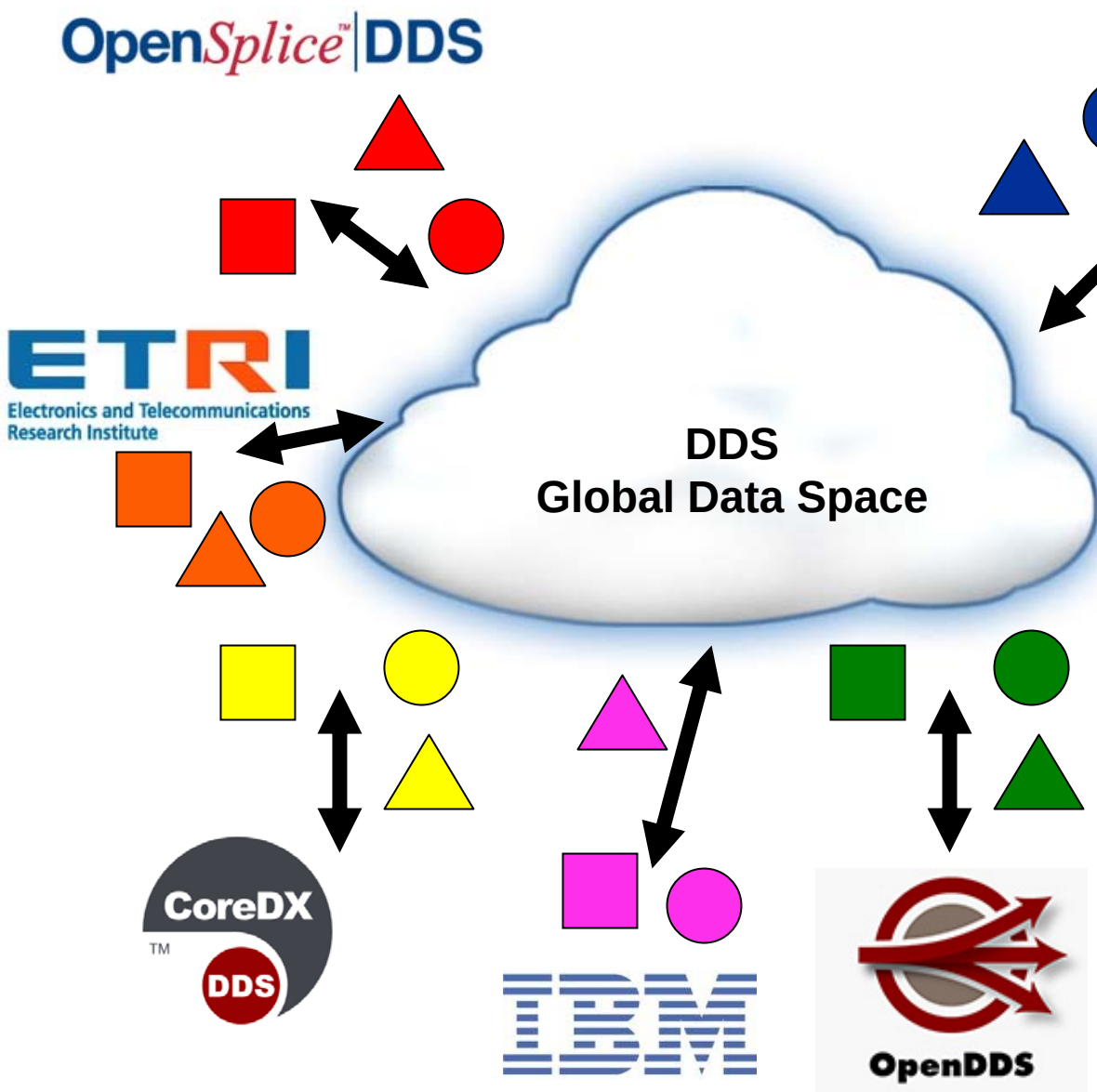
All vendors subscribe to Square and receive from everyone

Disconnect 2 nodes and then reconnect

You will see:

- Connected nodes keep communicating
- Recovery after reconnect

6. PARTITION QoS



Each vendor publishes one instance of Square, Circle, and Triangle

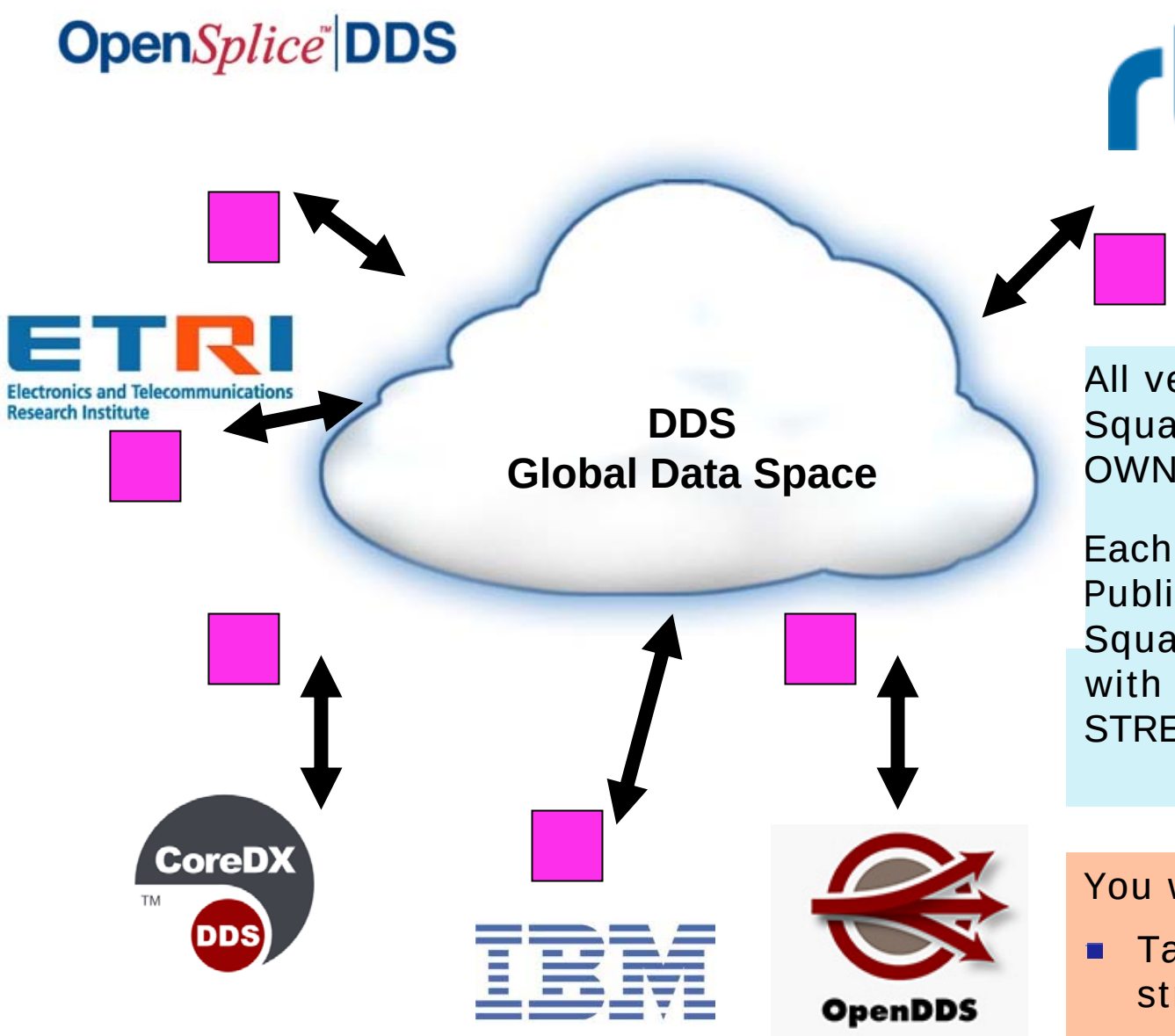
Squares PARTITION “A”
Circles PARTITION “B”
Triangle PARTITION “*”

Everybody Subscribes to Square, Circle, Triangle all on PARTITION “A”

You will see:

- Square on ALL
- Circle on NONE
- Triangle on ALL

7. OWNERSHIP



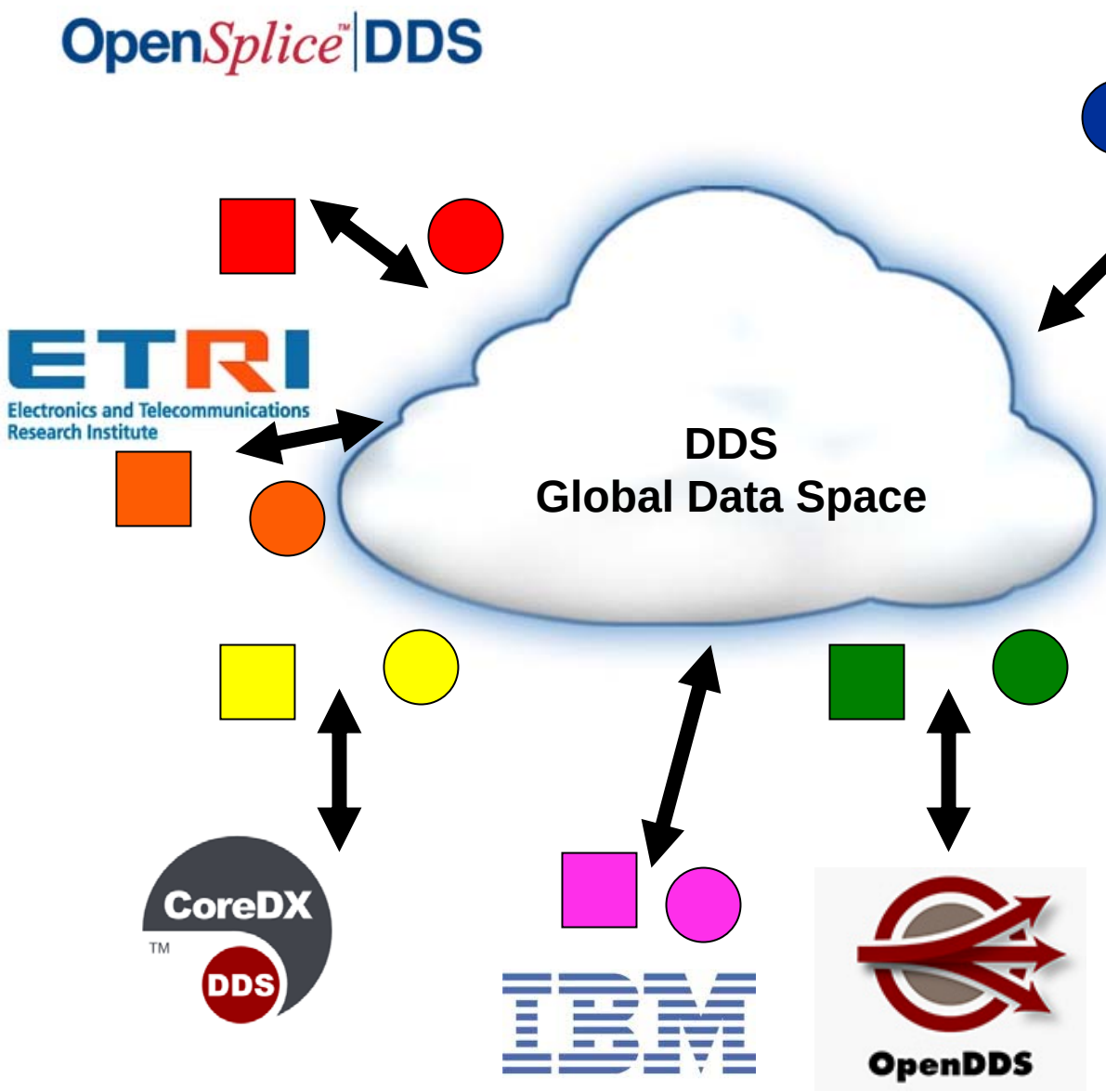
All vendors subscribe to Square OWNERSHIP EXCLUSIVE

Each vendor successively Publishes MAGENTA Square EXCLUSIVE, each with increasing size and STRENGHT

You will see:

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

8. TIME_BASED Filter



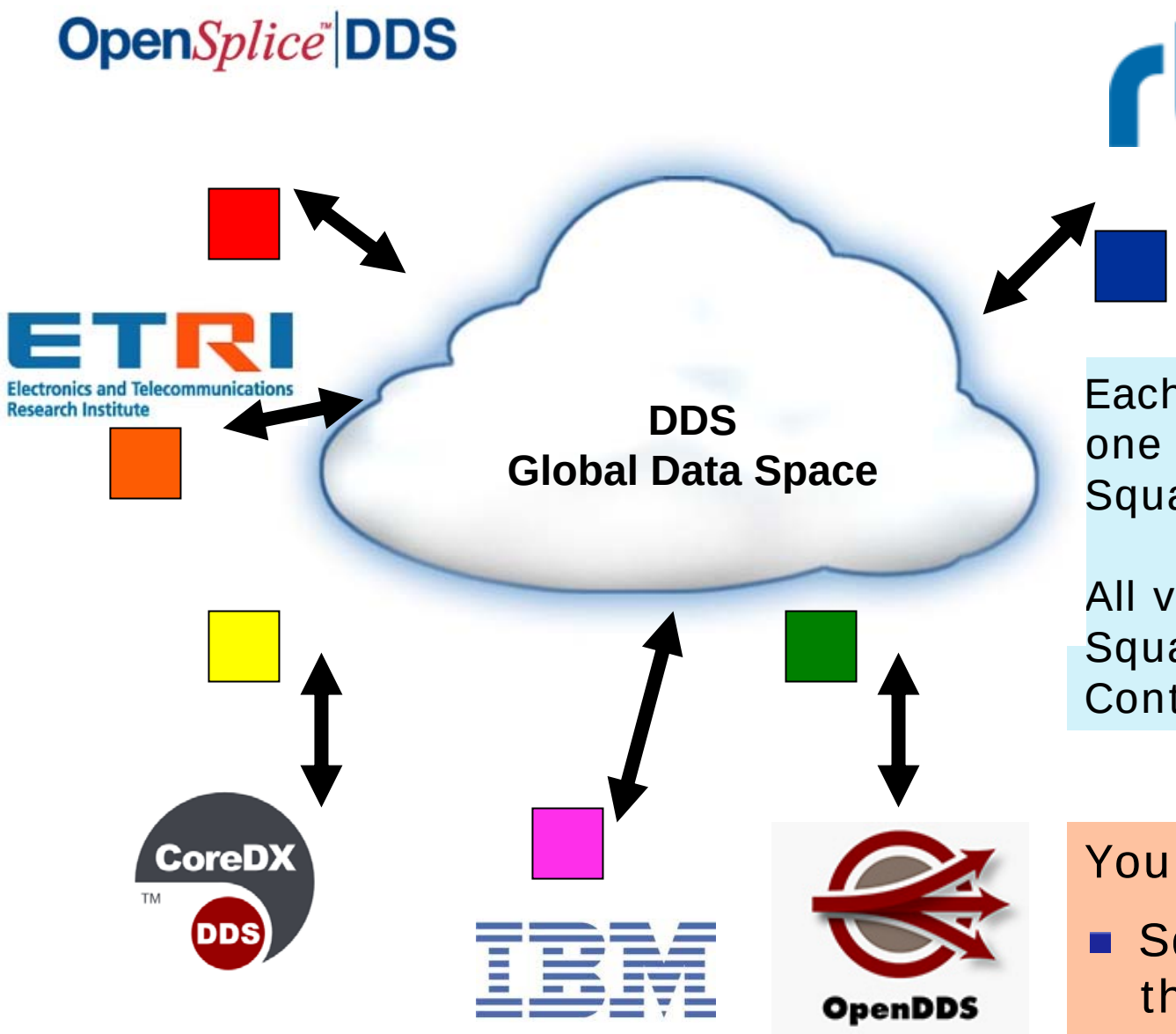
Each vendor publishes one instance (color) of Square and Circle

All vendors subscribe to Square without FILTER
Circle with TIME_BASED filter

You will see:

- All Square samples
- Sub-sampled Circle

9. Content-Based Filter



Each vendor publishes one instance (color) of Square

All vendors subscribe to Square with ContentBased Filter

You will see:

- Squares that pass the filter

Interoperability demonstrated along many dimensions

Today we demonstrated interoperability between 6 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!

The demo team