DDS Interoperability Demo

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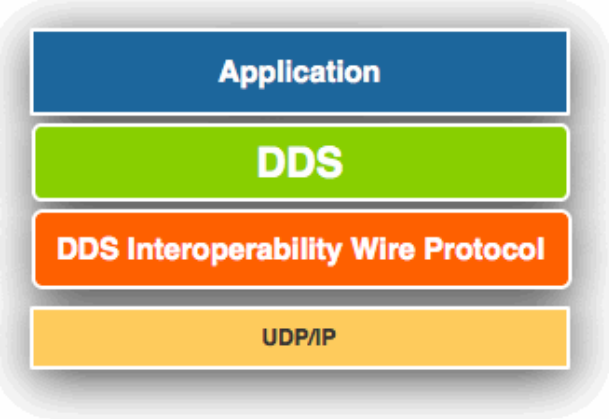
The DDS the Standards History

- Data Distribution Service for Real-Time Systems
  - 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: formal/07-07-01
- DDS-RTPS Interoperability Wire Protocol
  - Adopted in July 2006
  - Revised in July 2007
  - Spec version 2.1: formal/2009-01-05
- Related specifications
  - UML Profile for DDS
  - DDS for Light-Weight CCM
- Multiple (7+) Implementations



Exec Summary

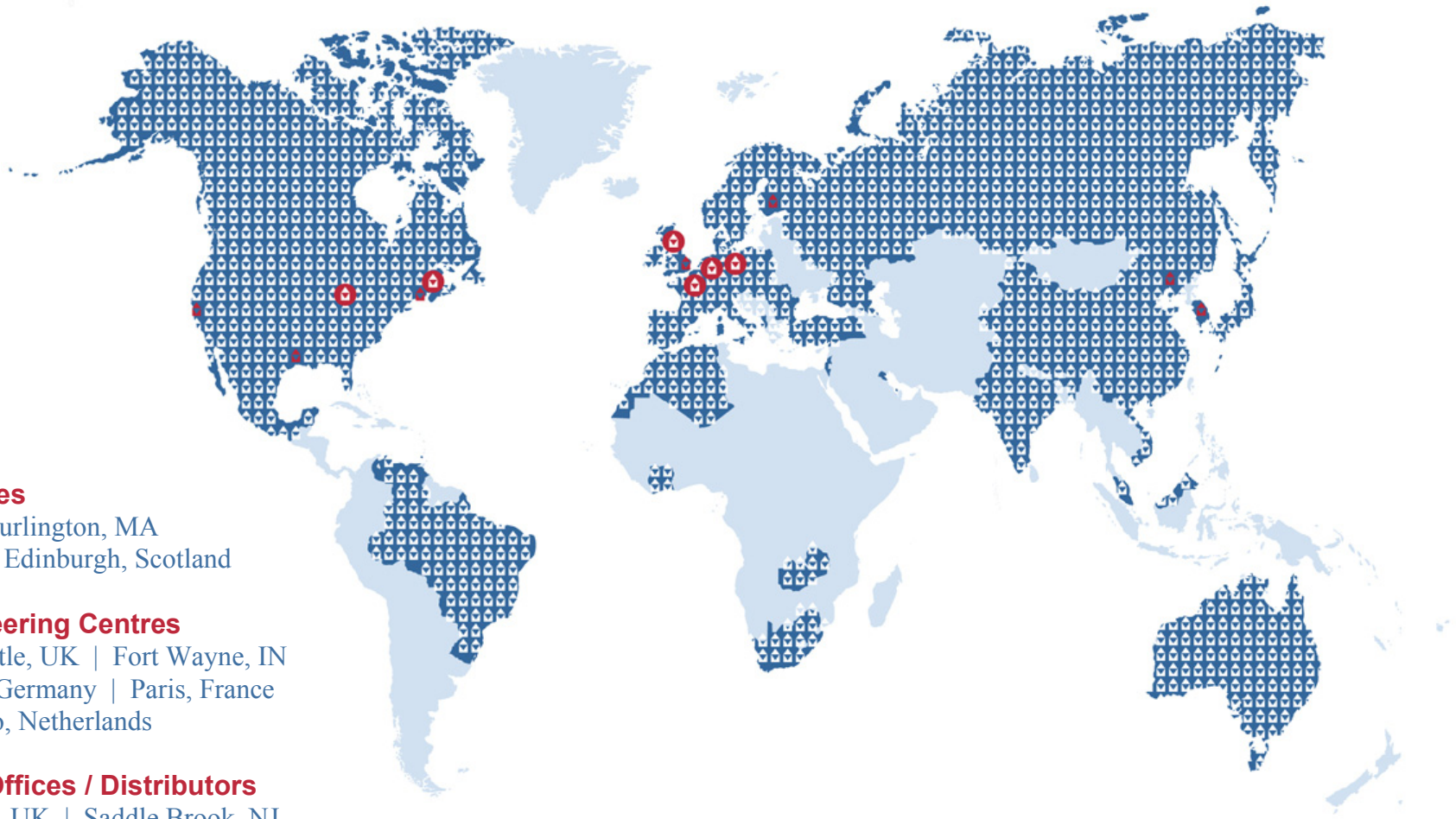
- Three vendors: PrismTech, RTI, and TwinOaks, have independently implemented the DDS-RTPS Interoperability Wire Protocol 2.1 Specification.
- Interoperability has been achieved across the vendors without any issues.
- DDS is a good specification that achieves the goal of interoperability and is easy to understand

Note: A non-OMG vendor was able to use the OMG standard documents and produce an interoperable DDS product

Demo Participants

Our Company

Where we do business – in over 50 countries worldwide



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
Helsinki, Finland | Seoul, South Korea | Beijing, China

PRISMTECH

Our Product Lines

OpenFusion CORBA

Innovative, Dependable, Affordable CORBA

- Simply the broadest, most advanced, best supported and most cost-effective range of CORBA-compliant middleware available.
- Since 2001 OpenFusion has been widely deployed in defense, telecoms and finance systems by leading integrators and network equipment providers.

OpenSplice DDS

The Real-Time Event-Driven Middleware

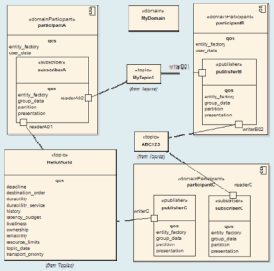
- Leading Real-time Event-Driven Middleware.
- Unmatched support for real-time, low-latency, and high-throughput, information management
- Technology at the foundation of advanced business and mission-critical systems, such as, Air Traffic Control, Combat Management Systems, Automated Trading.

SPECTRA SDR

The Software in Software-Defined Radio

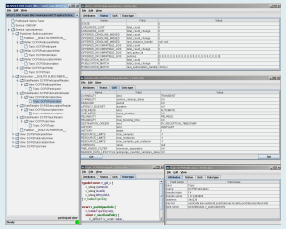
- Recognized as the most advanced, optimized, complete and productive suite of COTS products for developers of SCA-compliant software radios.
- Launched in 2005 and widely used by leading radio vendors, certification authorities and collaborative R&D initiatives.

Information Modelling



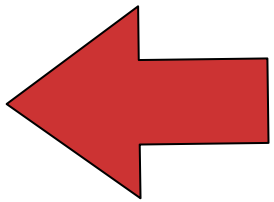
Application Modelling

Deployment Modelling



PRISMTECH

Demo Participants



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

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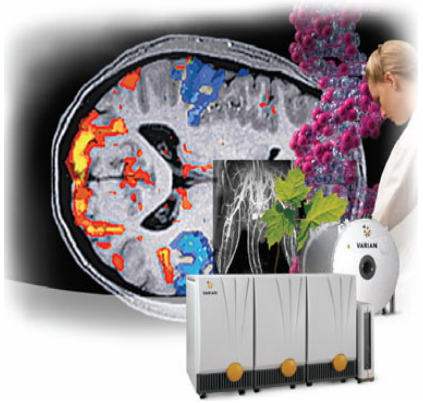
RTI DDS is a broadly used and field-proven COTS

- *500 unique designs*
- *Many mission critical, life sustaining*

- Defense
- Finance
- Unmanned Vehicles
- Transportation
- Simulation
- Medical
- Industrial Automation
- Communications



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Demo Participants

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

What you will see today

- #1 Interoperability works!
- #2 This is not a "trivial" scenario or "toy" demo!
  - You will see interoperability along many dimensions:
    - Discovery
    - Different platforms (Linux, Windows)
    - Different Data-Types
    - Different Topics
    - Different Qos
    - Unicast & Multicast, both reliable and best efforts
    - One to Many and Many to one communications
    - Filters: time, content, …
- #3 Interoperability does not compromise performance
  - Direct communication. No bridges!!

Seven demo scenarios

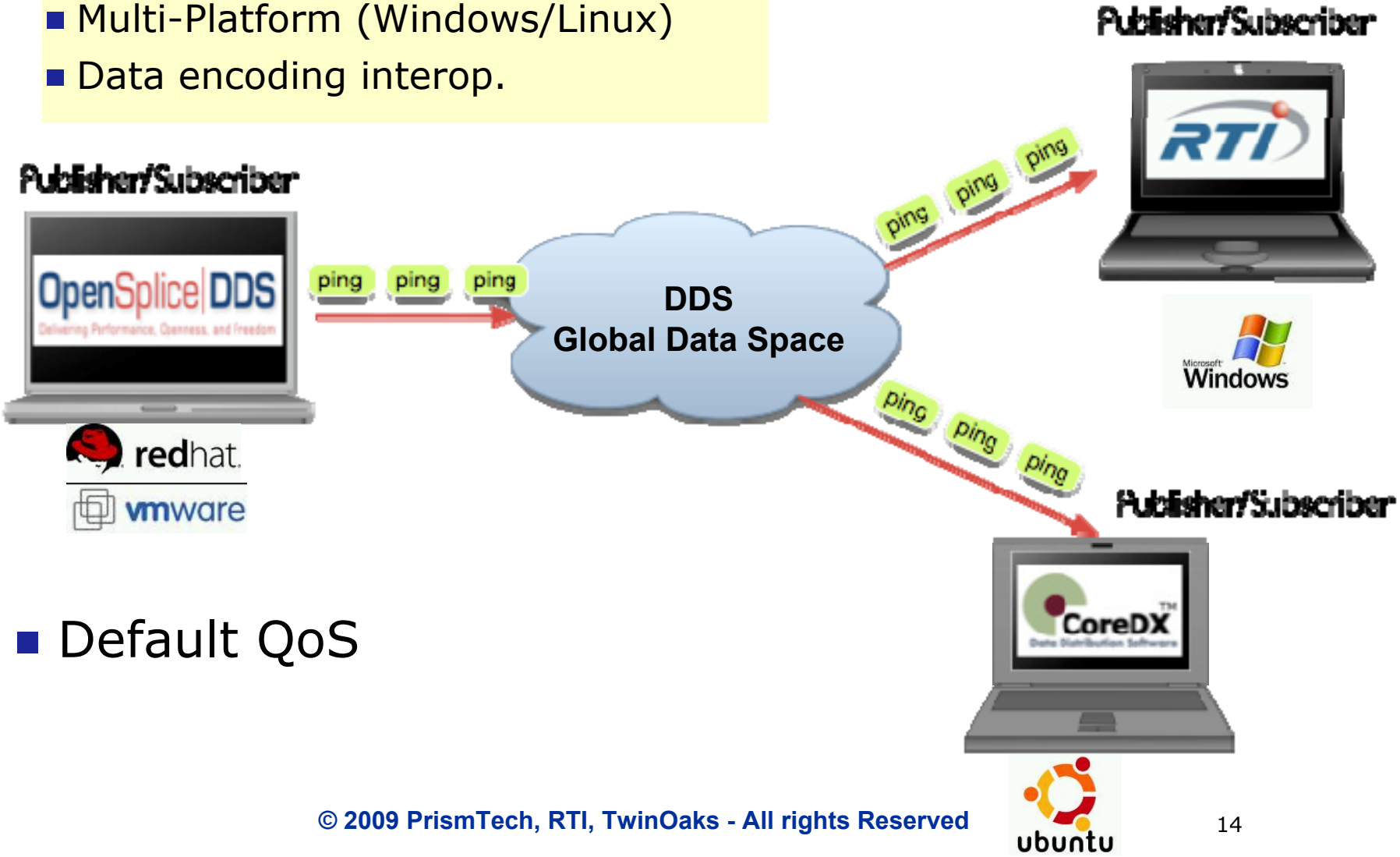
- Basic interoperability
- QoS Matching
- Quality of Service: DURABILITY
- Time Based Filters
- Quality of Service: RELIABILITY
- Intermittent Connectivity
- Multiple Topics, Keys & Content Filters

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

Scenario I - Basic Interoperability

Key Highlights

- Dynamic Discovery
- Multi-Platform (Windows/Linux)
- Data encoding interop.

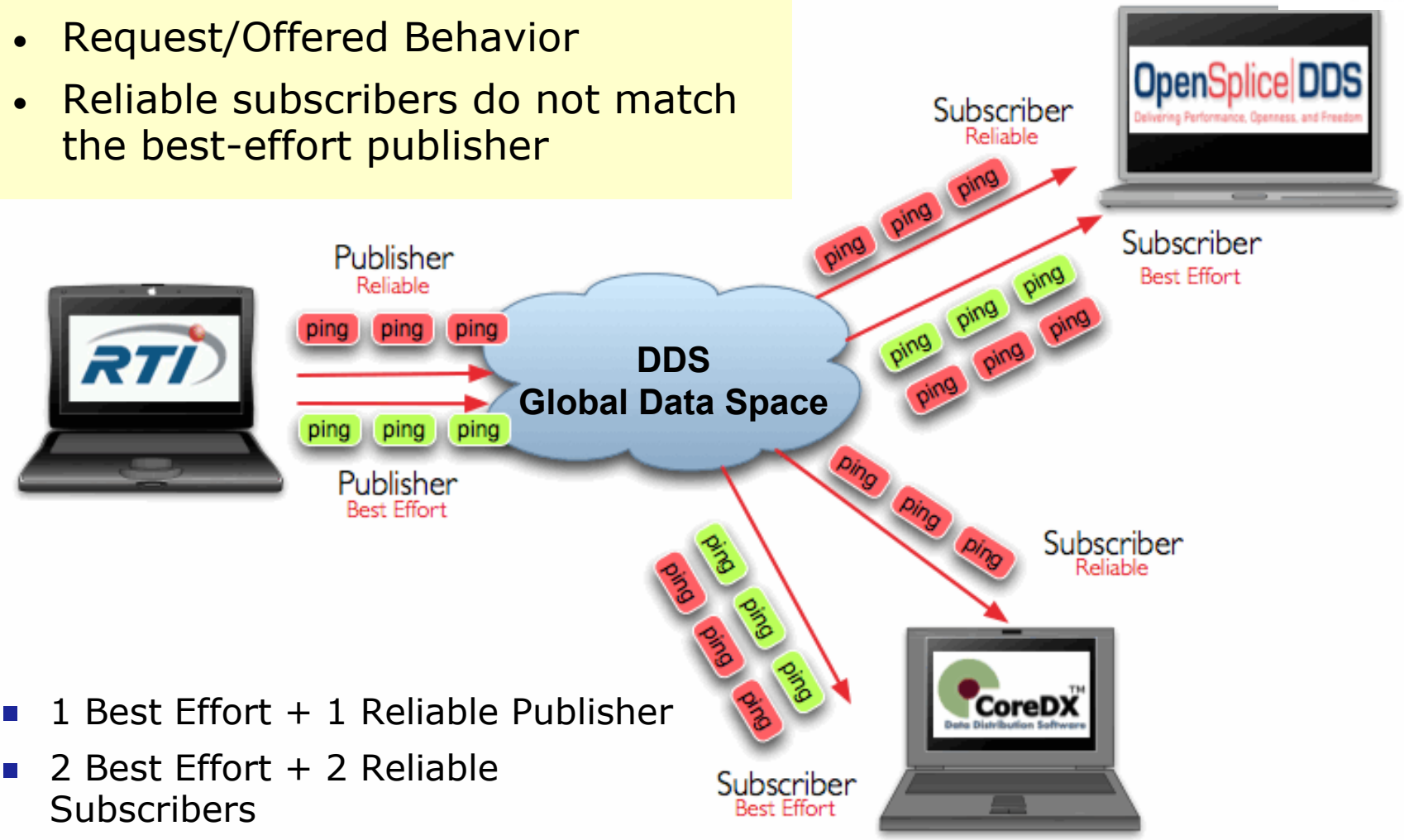


- Default QoS

Scenario II - QoS Matching

Key Highlights

- Request/Offered Behavior
- Reliable subscribers do not match the best-effort publisher

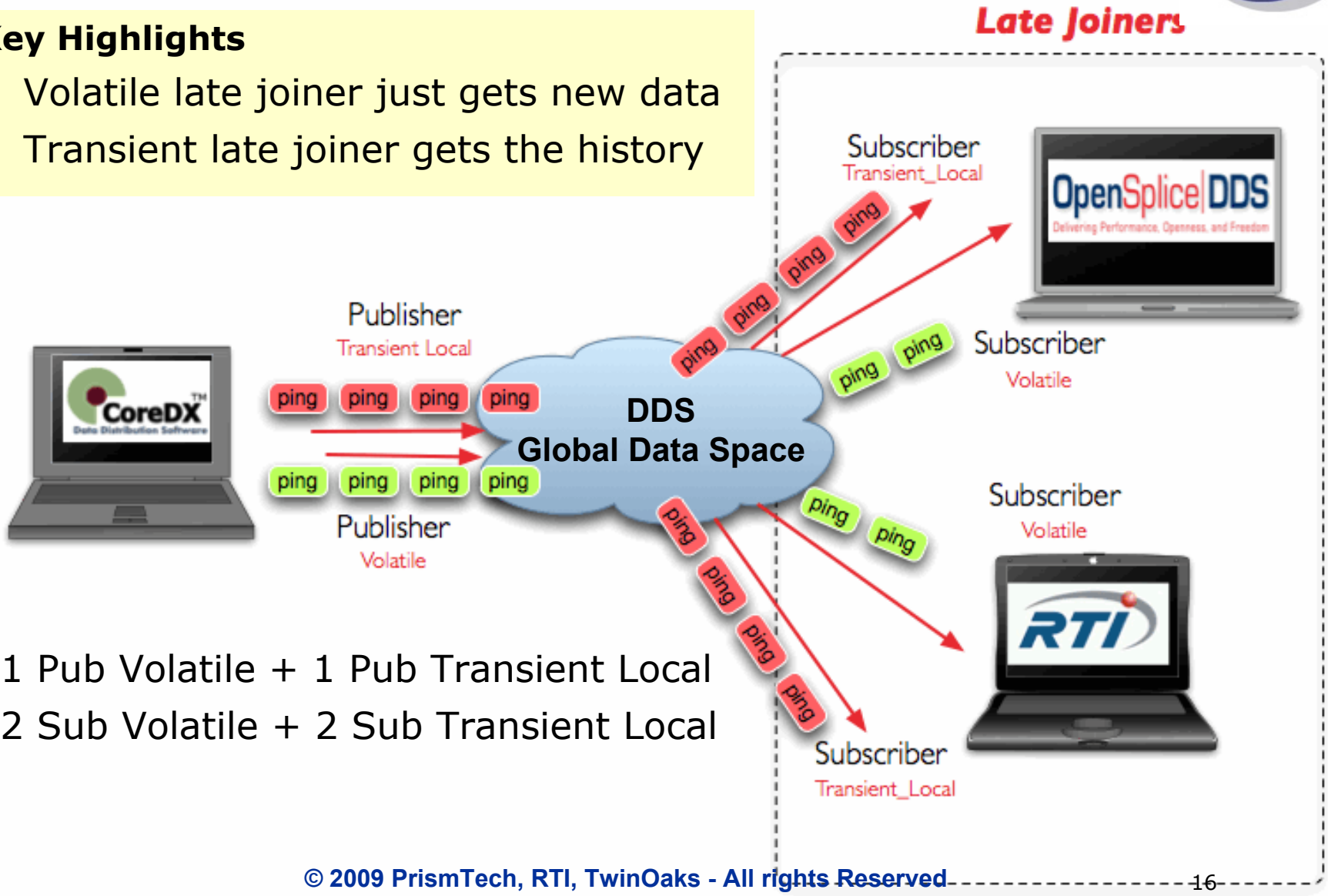


- 1 Best Effort + 1 Reliable Publisher
- 2 Best Effort + 2 Reliable Subscribers

Scenario III - Durabilty

Key Highlights

- Volatile late joiner just gets new data
- Transient late joiner gets the history

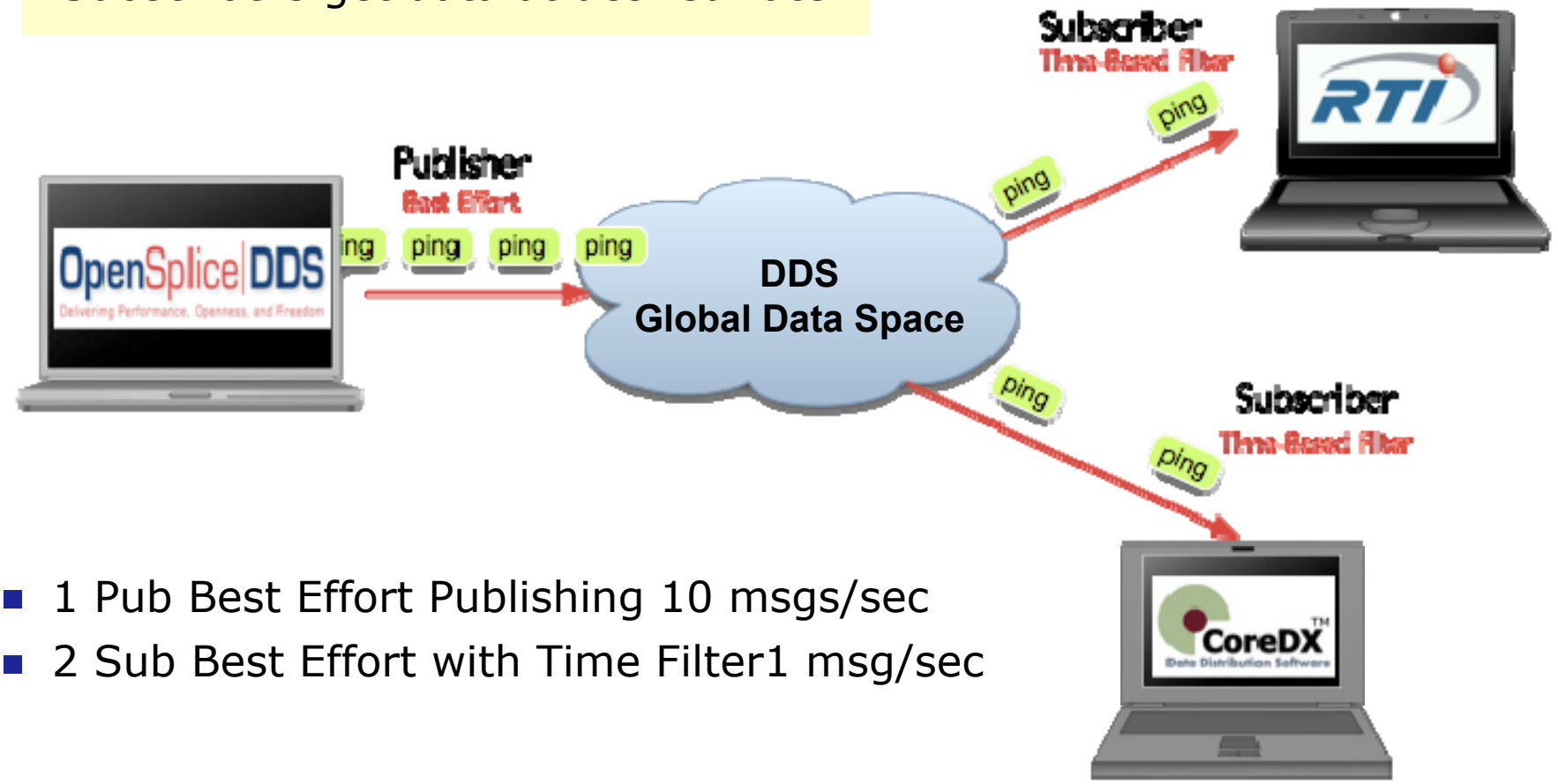


- 1 Pub Volatile + 1 Pub Transient Local
- 2 Sub Volatile + 2 Sub Transient Local

Scenario IV - Filtering / Time Base Filter

Key Highlights

- Subscribers get data at desired rate

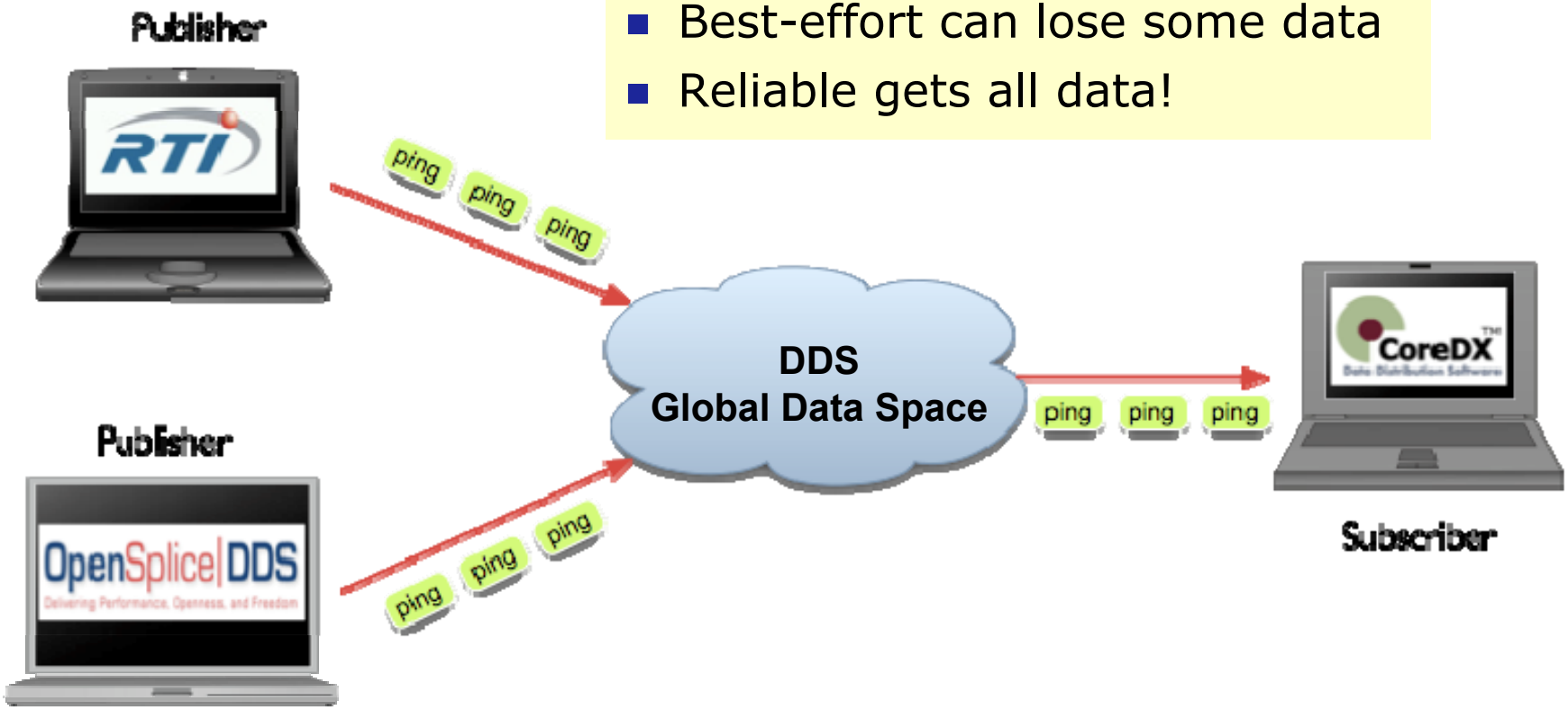


- 1 Pub Best Effort Publishing 10 msgs/sec
- 2 Sub Best Effort with Time Filter1 msg/sec

Scenario V - Reliability

Key Highlights

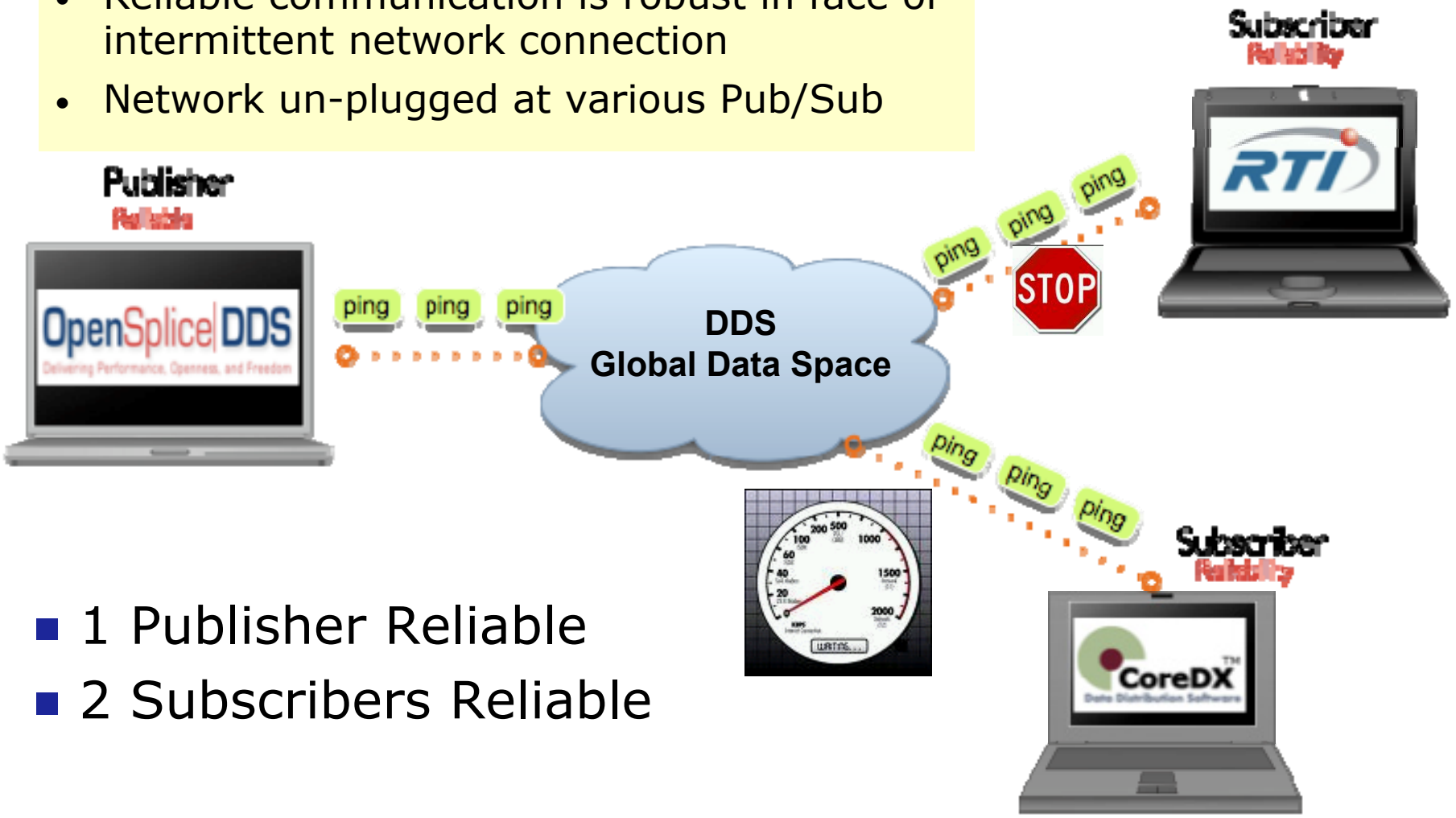
- High data rate
- Best-effort can lose some data
- Reliable gets all data!



Scenario VI - Intermittent Connectivity

Key Highlights

- Reliable communication is robust in face of intermittent network connection
- Network un-plugged at various Pub/Sub



- 1 Publisher Reliable
- 2 Subscribers Reliable

Scenario VII – Multiple Topics, Content Filters, …

Key Highlights

- Multiple Topics
- Multiple Keys
- Filter data by Content

Publisher/Subscriber

Publisher/Subscriber

DDS
Global Data Space

Publisher/Subscriber

Interoperability demonstrated along many dimensions

Today we demonstrated:

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

Conclusions

- DDS Interoperability Works!!
  - This was first demo. We will continue working on additional scenarios
  - Vendors are committed to interoperability
- The DDS Standard and DDS-RTPS Interoperability Wire Protocol standards are complete and usable
  - A non-OMG vendor was able to use the OMG standard documents and produce an interoperable DDS product
- DDS truly is the most open interoperable publish-subscribe communications infrastructure
- Come see more at the booths!