



DDS Enabling Global Data

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Agenda – Enabling Global Data

- What is DDS?
- DDS in Action!
- What makes DDS different?
- The Future
 - Enabling Unified Global Data
 - A Real-Time “Service” Bus

What is DDS?

DDS the Standard

- Data Distribution Service for Real-Time Systems
 - Adopted in June 2003
 - Finalized in June 2004
 - Revised June 2005
 - Joint submission (RTI, THALES, OIS)
 - Specification of API for Data-Centric Publish-Subscribe in real-time distributed systems.
- Multiple Implementations
 - 3 commercial
 - 3 open source
 - Several more in-house
- Interoperability in progress at OMG
 - Expected adoption June 06

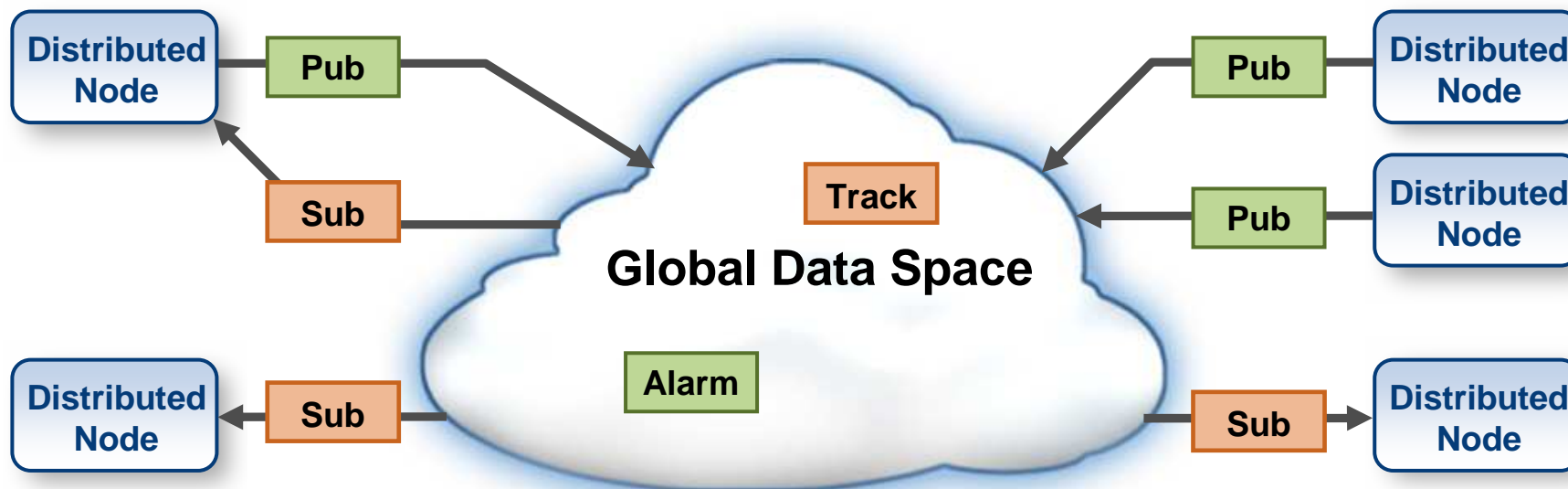


What is DDS?

DDS/DCPS

Provides a “Global Data Space” that is accessible to all interested applications.

- Data objects addressed by **Topic** and **Key**
- Subscriptions are **decoupled** from Publications
- Contracts established by means of **QoS**
- Automatic discovery and configuration

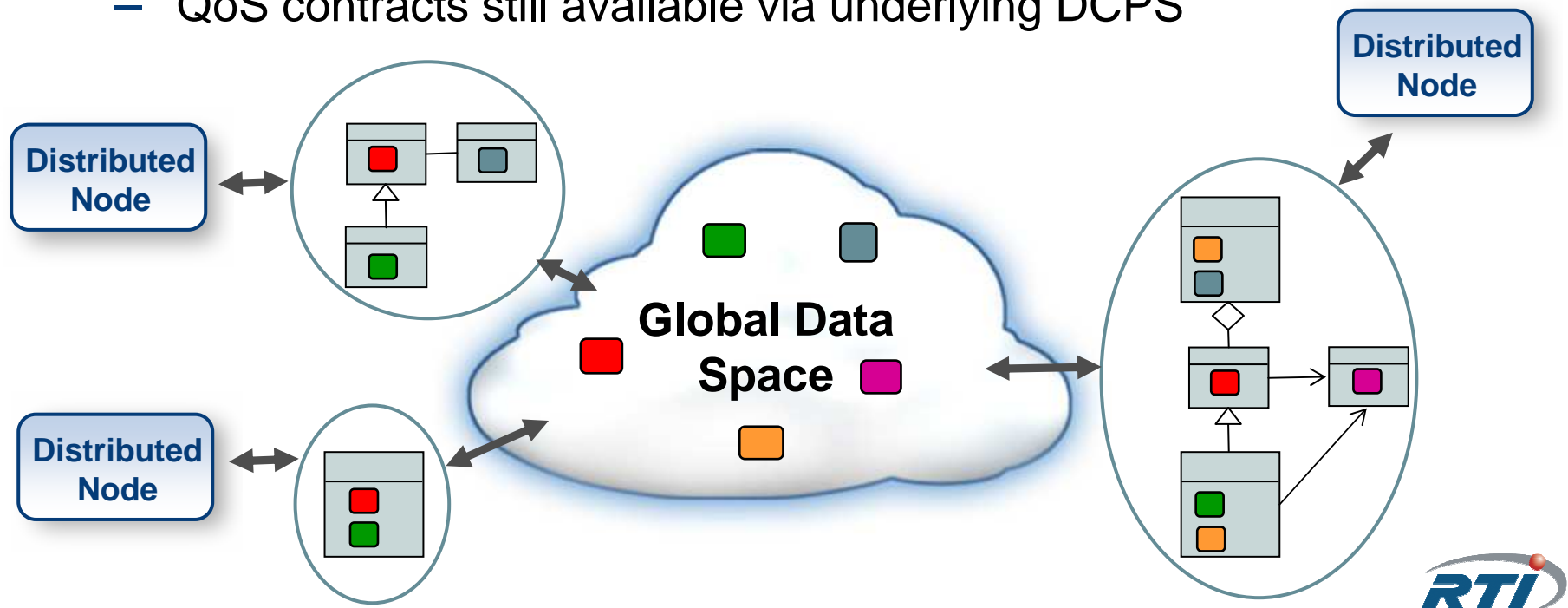


What is DDS?

DDS/DLRL

Provides “**Local Object Caches**” built from the Global Data Space.

- Objects manipulated with a “natural” language binding
 - Inheritance, Object Graphs, supported as language objects
- Actions on **local objects** cause **updates to DCPS Global Data**
- No need for a “global” object model
- QoS contracts still available via underlying DCPS



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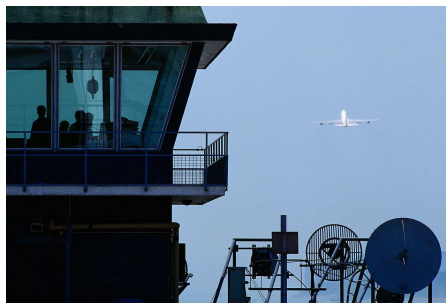
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DDS Adoption

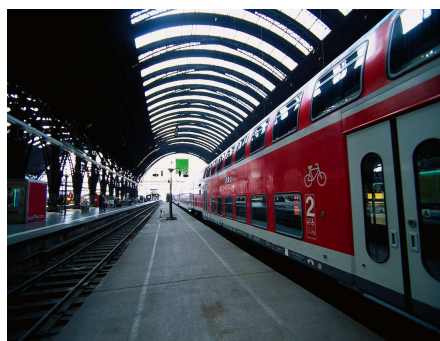
- DISR (formerly JTA)
 - DoD Information Technology Standards Registry
- Navy Open Architecture
- FCS SOSCOE
 - Future Combat System – System of System Common Operating Environment
- RETF
 - Railroad Electronics Task Force
- Navy FORCEnet



DDS Adoption



UK Air
Traffic Control



RETF (USA)
Train Communications



Tokyo Japan
Traffic Control

Boeing Army Future
Combat System



Boeing AWACS
program



US Navy, DD(X)
LCS, LPD-17
SeaSlice
and 13 other Navies



DDS Adoption

- Aerospace & Defense

- BAE (Joint Strike Fighter avionics)
- USA, CAE, NADS, Boeing (Simulators)
- TCG, Lincoln Labs, General Dynamics (C4ISR)
- Boeing, Lockheed, Northrop (Navy OA)
- SAIC (Ground vehicle control)

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Infinera
Solutions For Optical Networks

BOEING

- Industrial Automation

- Schneider (Factory automation)
- Applied Materials, Nikon (Semiconductor equipment)
- Ferag (Post printing assembling and binding)
- Schilling (Robotics)
- Max Planck (Power research)

NORTHROP GRUMMAN

Raytheon

Silver Arrow

CAE

- Telecomm/Datacomm

- Accom (Digital video control)
- Tekelec (Network test equipment)
- IPC (Telecomm equipment)
- Infinera (Optical switch control)

TCG
Tactical Communications Group, LLC

MITSUBISHI ELECTRIC

Schneider Electric

THALES

BAE SYSTEMS

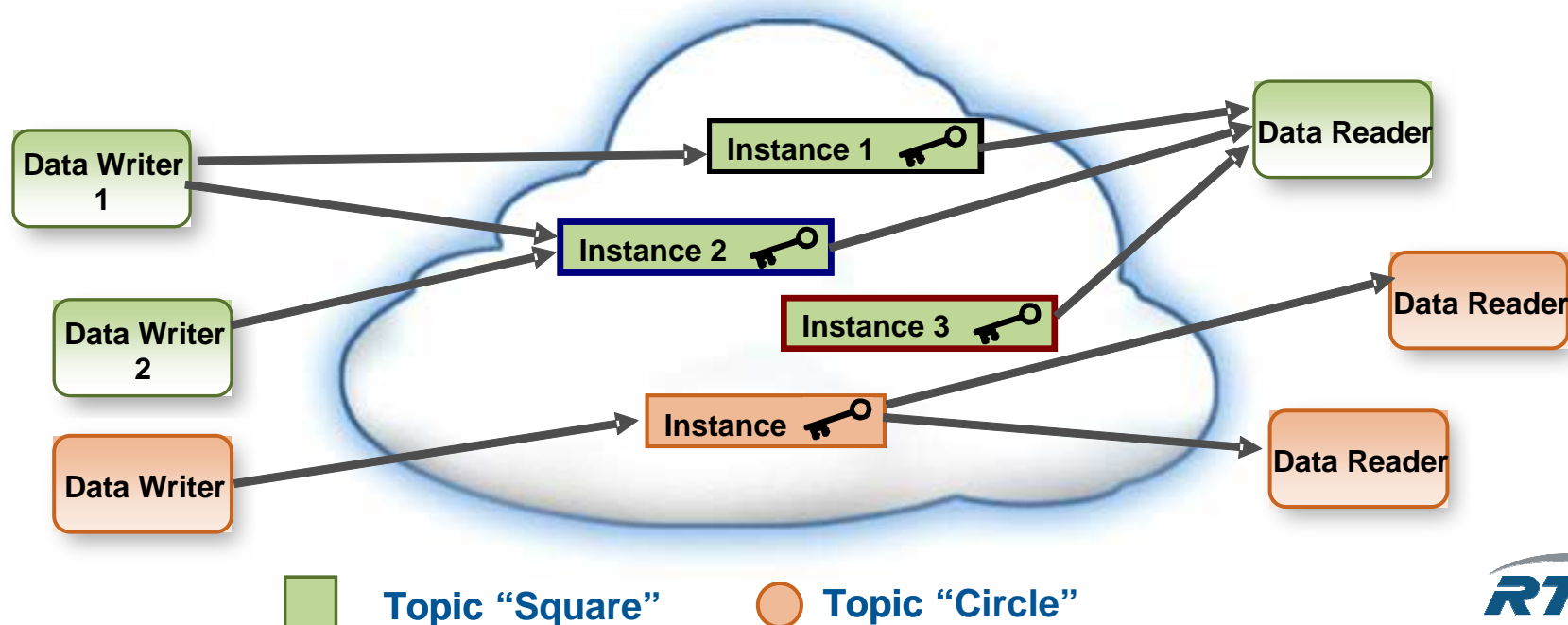
RTI

Agenda – Enabling Global Data

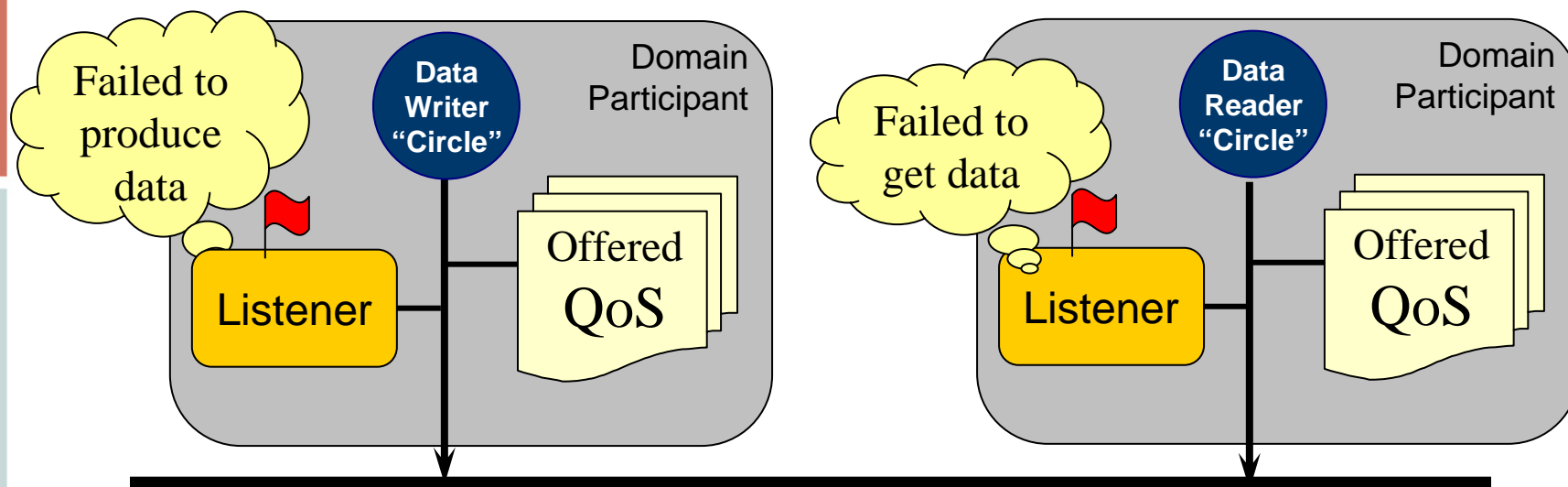
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DDS Global Data

- Address in Global Data Space = (Topic, Key)
 - Each topic corresponds to a multiple data instances
 - Each DataWriter can write to multiple instances of a single topic
 - Multiple DataWriters may write to the same instance
 - Each DataReader can receive updates from multiple instances of a single topic
 - Multiple DataReaders may read from the same instances



DDS communications model



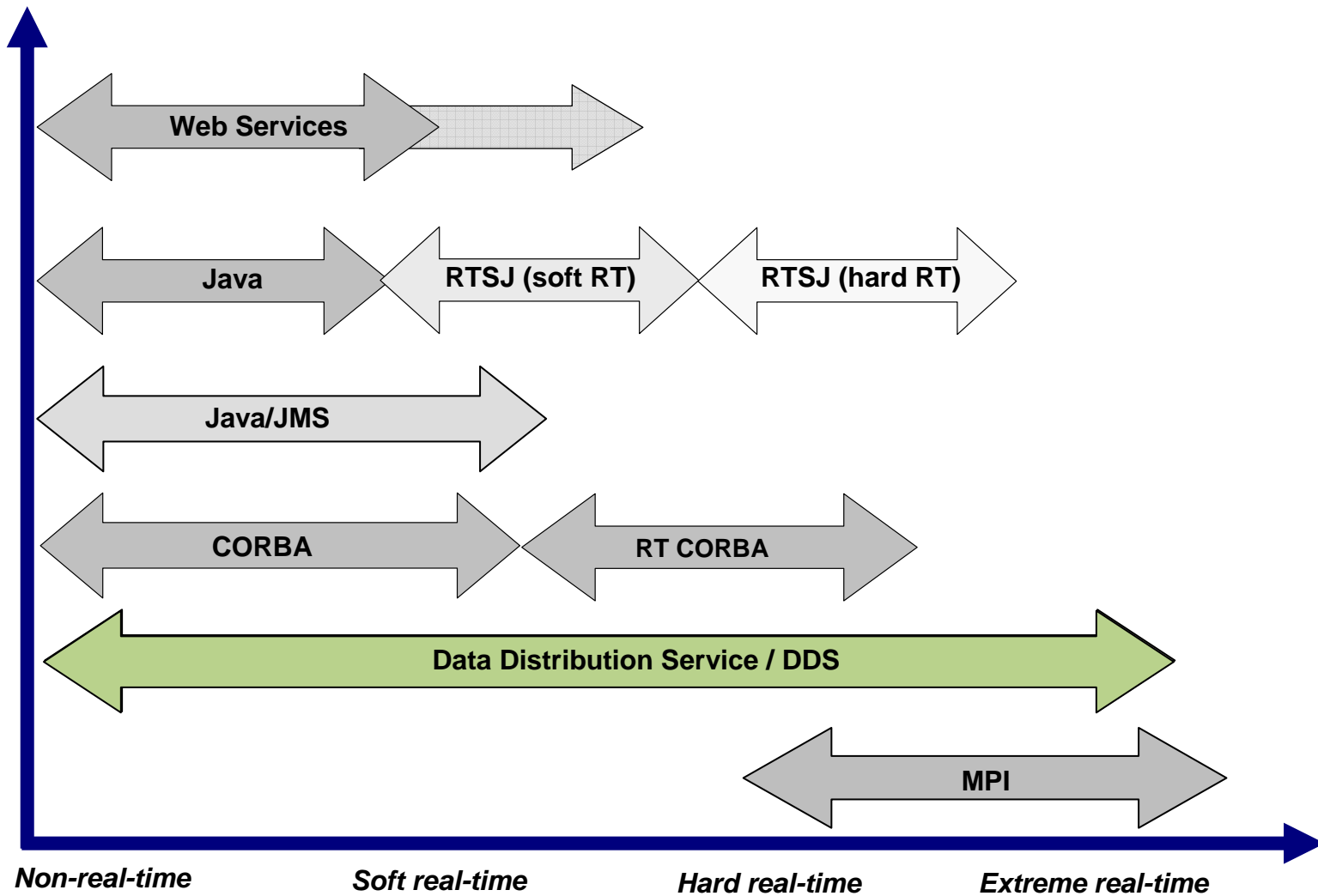
- Publisher declares information it has and specifies the Topic
 - and the offered QoS contract
 - and an associated listener to be alerted of any significant status changes
- Subscriber declares information it wants and specifies the Topic
 - and the requested QoS contract
 - and an associated listener to be alerted of any significant status changes
- DDS automatically discovers publishers and subscribers
 - DDS ensures QoS matching and alerts of inconsistencies

QoS: Quality of Service

	QoS Policy	QoS Policy	
Volatility	DURABILITY	USER DATA	User QoS
	HISTORY	TOPIC DATA	
	READER DATA LIFECYCLE	GROUP DATA	
	WRITER DATA LIFECYCLE	PARTITION	
Infrastructure	LIFESPAN	PRESENTATION	Presentation
	ENTITY FACTORY	DESTINATION ORDER	
	RESOURCE LIMITS	OWNERSHIP	
	RELIABILITY	OWNERSHIP STRENGTH	
Delivery	TIME BASED FILTER	LIVELINESS	Redundancy
	DEADLINE	LATENCY BUDGET	
	CONTENT FILTERS	TRANSPORT PRIORITY	
			Transport

Data-Distribution and Real-Time

Messaging Technologies and Standards



What makes DDS different?

- Data-centricity

- High level of data abstraction: Topic, Key
- Proven scalable model for RT systems
- “Smart” services such as:
 - Ownership, ContentFilteredTopics, KeepLast History
- Automatic discovery
- Directly supports state propagation/caching

- Configurability by QoS

- Wide range of applicability: Enterprise to real-time
- P2P infrastructure:
 - High-performance and scalability
 - Fault-tolerance
 - Scalability
- Subsumes message-oriented and data-centric

- Object model built as local cache

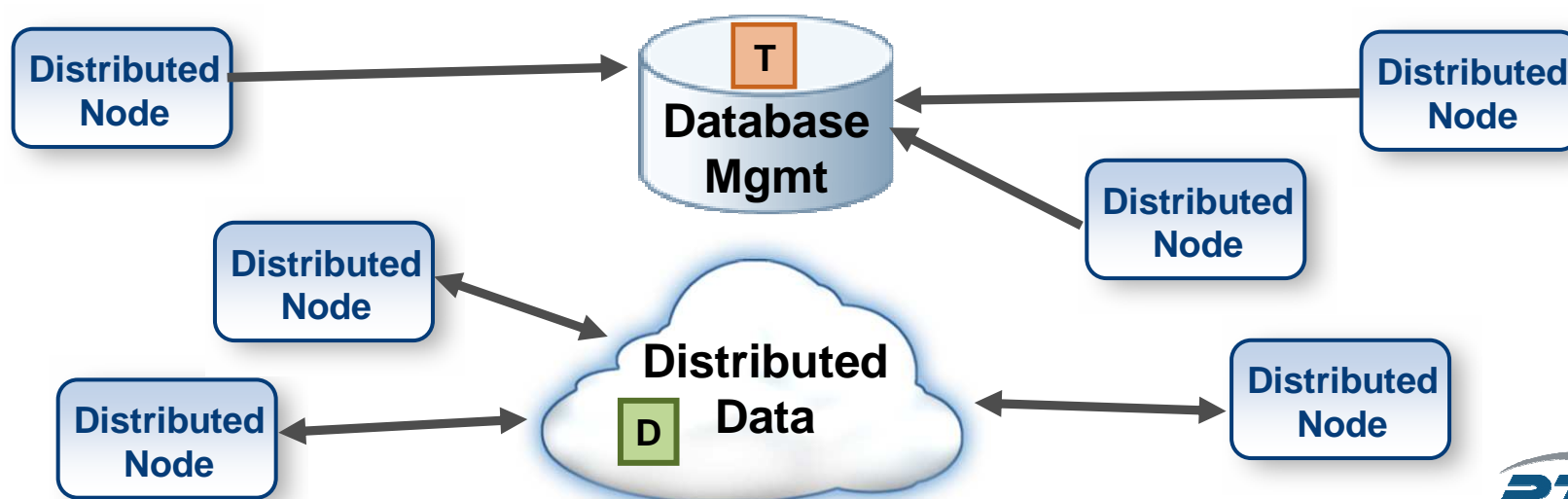


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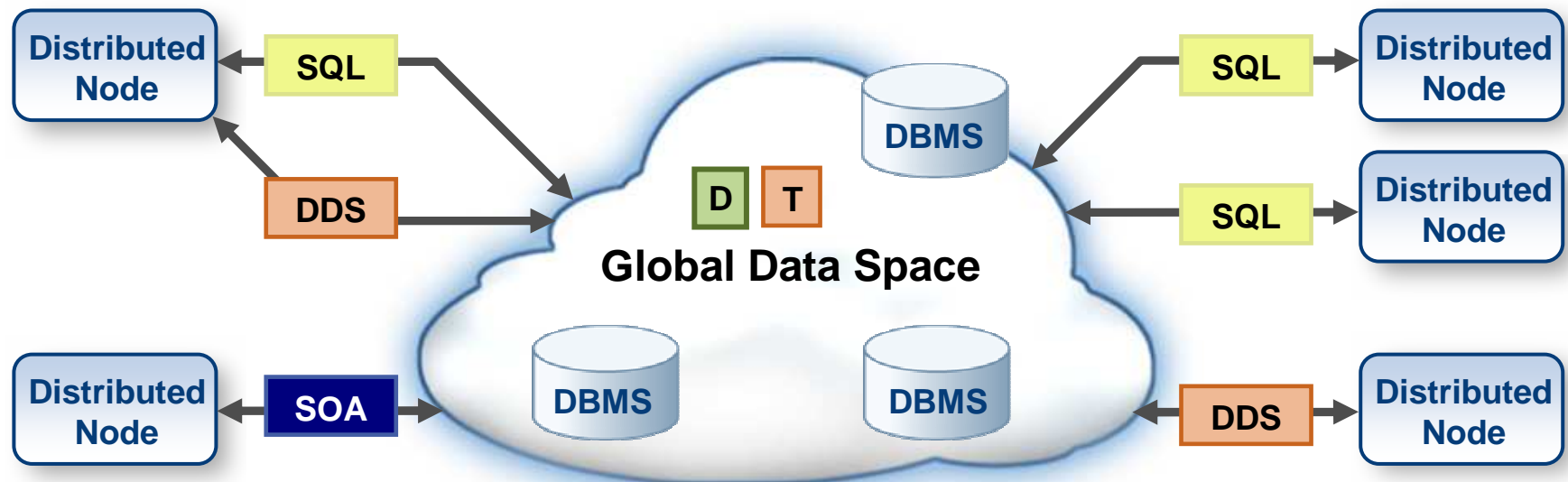
Until now: Different Data Solutions

- Database Management Systems
 - Good for: Complex queries, dynamic sorting, standard SQL I/F, enterprise solution
 - But... No RT performance, centralized, non-distributed
- Data Distribution Services
 - Good for: High performance, dynamic architectures, real-time solution
 - But... what do you do with the data once you get it there?



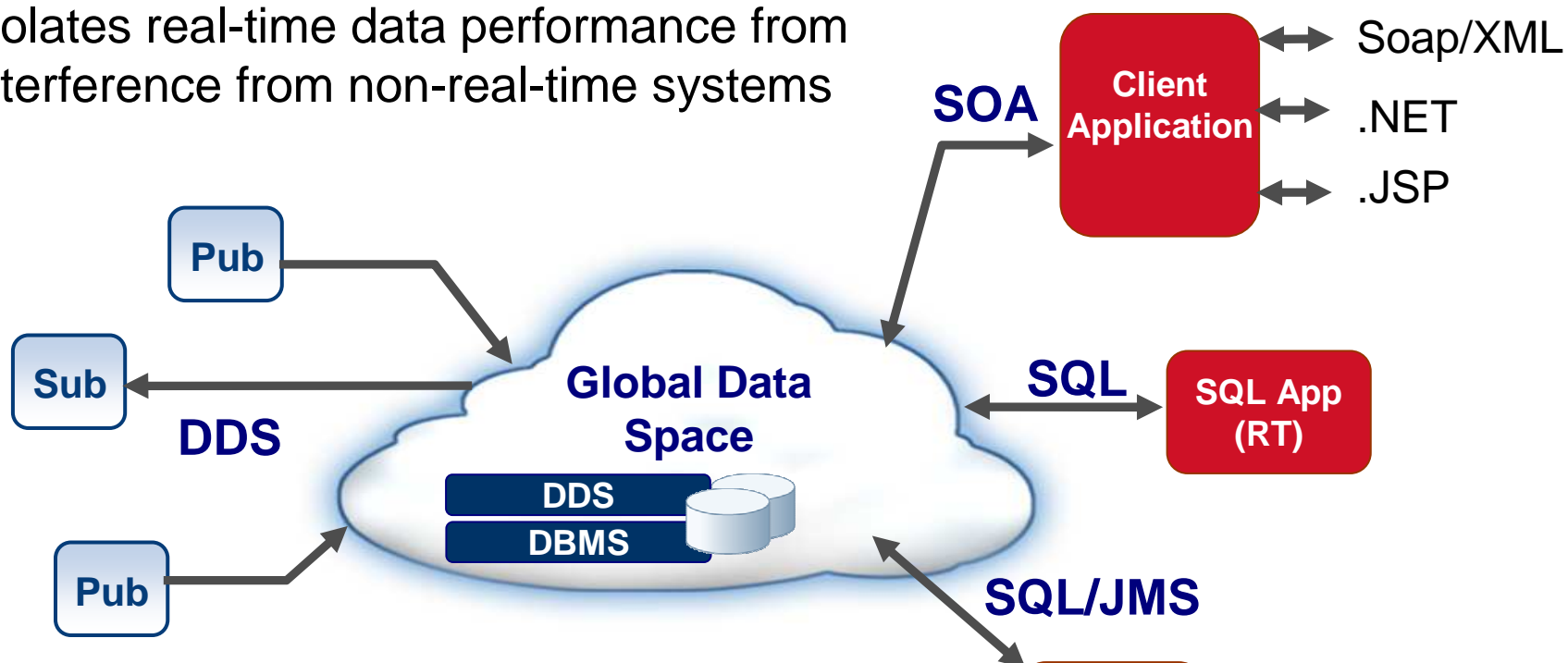
A new model is possible: Standards-Based Global Data Space

- Data accessible to all interested applications:
 - Data distribution (publishers and subscribers): **DDS**
 - Data management (storage, retrieval, queries): **SQL**
 - Rich QoS, automatic discovery and configuration
 - Real-time and/or high-performance access to data



Global Data & End-to-End Integration

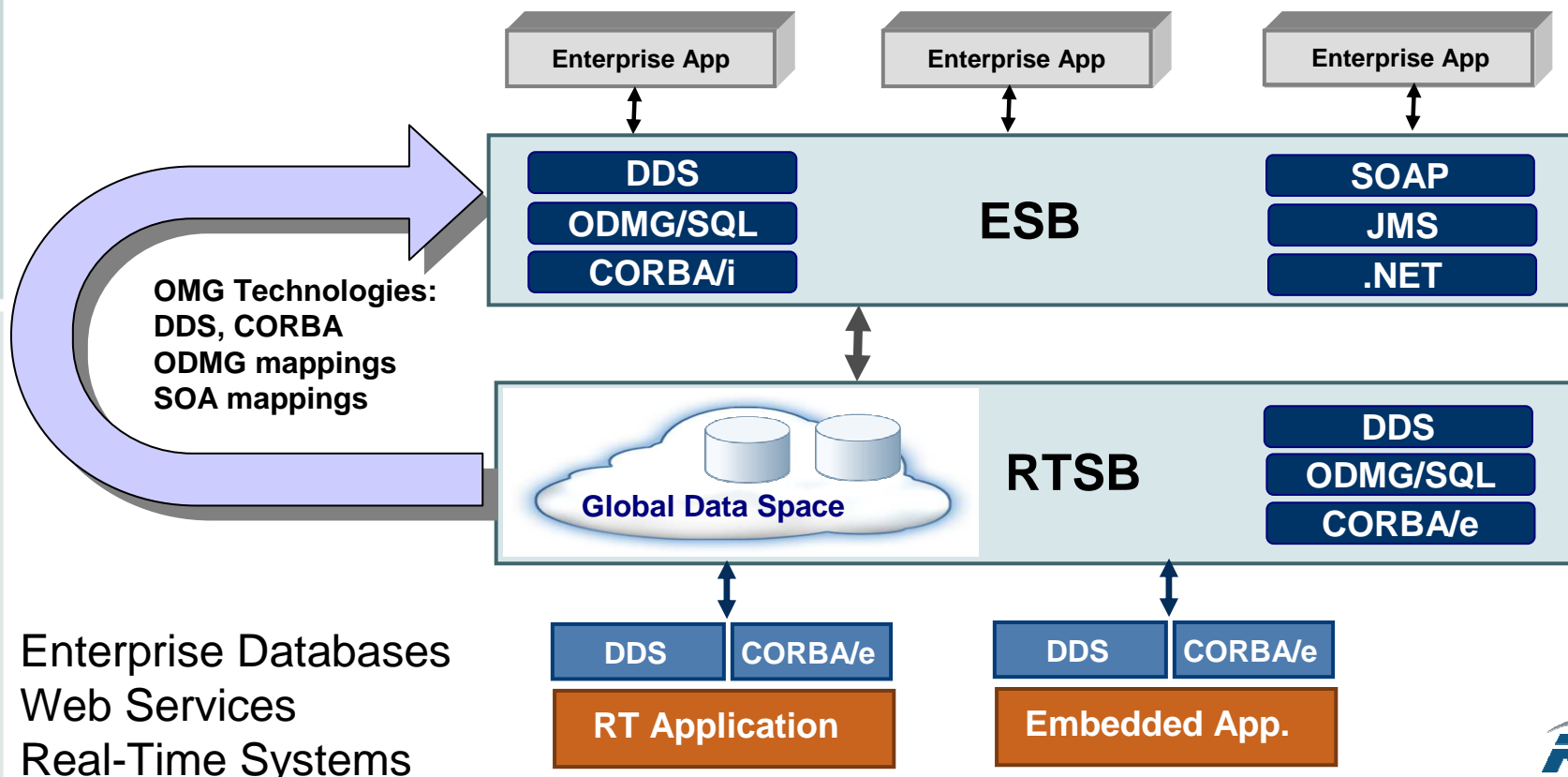
Isolates real-time data performance from interference from non-real-time systems



- Data access from the Web Services or Enterprise networks does not hinder the real-time performance Network
- Additional portals to other systems can be added dynamically

OMG Opportunity

- Open, Standard Platform Enabling Integration
 - from the Enterprise Service Bus (ESB)
 - to the Real-Time Service Bus (RTSB)





CONNECTING MULTIPLE
SOURCES OF DATA

Thank you

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