Application Note:

Comparison of OPC and RTI Data Distribution Service (DDS)

OPC (OLE for Process Control) is a client/server standard for the exchange of industrial and process information. The standard is maintained by the OPC Foundation. Many companies are using OPC in their production lines and are now interested in knowing the differences between DDS and OPC.

RTI Data Distribution Service is high-performance networking middleware for distributed, real-time applications. Its publish-subscribe communications model allows distributed processes to share data without concern for the actual physical location or architecture of their peers. It is multi-platform, and available on over 70 hardware, operating system, and compiler combinations. See http://www.rti.com/products/data_distribution/RTIDDS.html.

The original OPC specification is based on Microsoft COM/DCOM technology. Therefore, OPC is not platform independent. To overcome this limitation the OPC Foundation created a new standard called OPC Unified Architecture (OPC UA) that uses web services technologies. It is expected that OPC UA will replace OPC in the future.

The following table shows the fundamental differences between OPC, OPC-UA and RTI Data Distribution Service.

	RTI-DDS	OPC	OPC-UA
Standard Based / Standard Wire Protocol	Yes/Yes	Yes/Yes	Yes/Yes
Fundamental Players	Publishers/Subscribers	Clients-Servers	Clients-Servers
Addressing	Decoupled/Anonymous (Smart Push)	Client-Server	Client-Server (Pull)
Platform Independent Language binding independent	Yes (70+ Windows, Linux, Solaris, AIX and all major RTOS's)/Yes	No/No	Yes/No

	RTI-DDS	OPC	OPC-UA
Discovery/Location Transparency	P2P/Yes (No Central Server Required)	COM Server/No	Discovery Services/No
Software Portability and Re-use	Yes	No – API not standardized	No – API not standardized
Communication Model/Network Load	P2P (connectionless)/Unicast or Multicast	Request/Reply (connection oriented)/Unicast only -TCP	Request/Reply (connection oriented)/Unicast Only - TCP
Real-Time/Scalable (Reliable Multicast)	Deterministic (low latency)/Yes	Non-deterministic/No	Non-deterministic/No
QoS	Transport and App Layer (20+ attributes)	No QoS-Very limited (Single Quality ENUM)	No QoS/Very limited
Meta-data Model/Data Encapsulation	Yes/CDR	Yes/NDR	Yes/XML-Binary
Redundancy/Dynamic Network Topologies	Yes/Yes	Yes/No	Yes/No
WAN/Security Model	Yes/Yes via TLS	DCOM tunnels/DCOM Security	Yes/Yes
Transport Protocol	UDPv4/UDPv6/Shared Memory – TCP in Fall '09	DCOM over TCP	SOAP/HTTP over TCP

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