

Limited-Bandwidth Plug-ins

for RTI Data Distribution Service

RTI's Limited-Bandwidth Plug-ins—an add-on option for RTI Data Distribution Service—address the challenges of constrained network communication. They are designed to overcome situations where the network is constrained by low or limited bandwidth, intermittent connections or related issues.

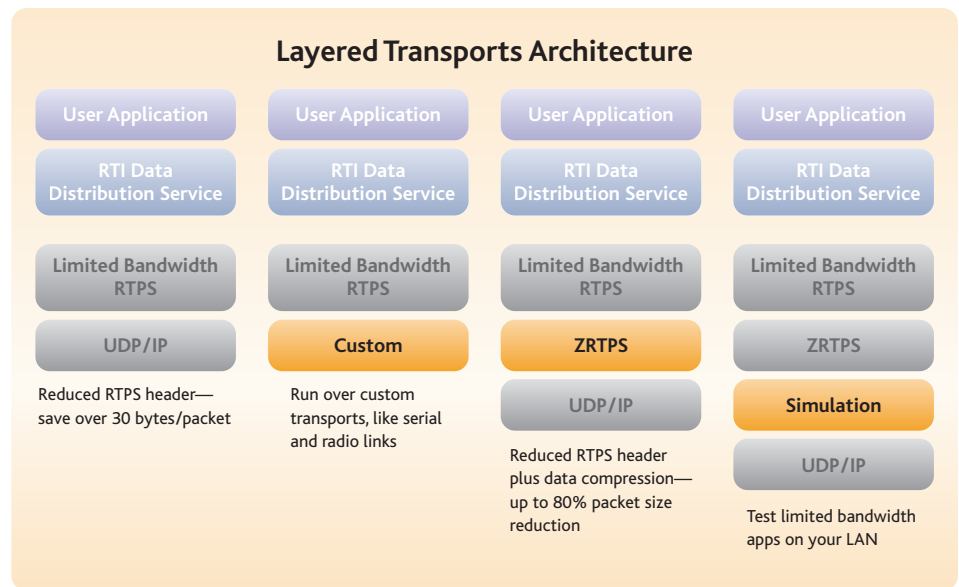
Constrained Networks

There are a number of factors that can affect and constrain network communication, such as:

- Low bandwidth, e.g. HF radio links with speeds as low as 1200 baud
- High signal latency, e.g. satellite links with round-trip latency measured on the order of seconds
- Limited bandwidth, e.g. when otherwise adequate bandwidth is constrained during peak load times

Additional constraints might be caused by highly error-prone networks, such as Disconnected, Intermittent and Limited (DIL) networks (for example radio data links to unmanned vehicles); variable bandwidth networks; receive-only devices whereby a receiver does not wish to broadcast, usually in order to avoid location detection; and Simplex communication, where the radio or other device is unable to receive data while transmitting.

These constraints are commonly found in a wide range of applications, for example advanced combat net radio systems, asset tracking systems, air traffic management systems, unmanned vehicles, and WAN-based applications, such as those using satellite communications.



Overcoming Network Inefficiencies

Whether your planned network has low or limited bandwidth, high latencies or all three, the additional requirement upon your application is to place the minimum strain upon the communication links. Meeting this requirement implies a system design that carefully combines more efficient messaging mechanisms, reduced meta-data traffic, minimized packet overheads and maximized data to packet size ratio.

RTI efficiently addresses these requirements out of the box with its bundle of Limited-Bandwidth Plug-in components. This bundle includes:

Limited-Bandwidth RTPS Transport Plug-in (LBRTPS)

The LBRTPS plug-in augments RTI's implementation of the OMG standard DDS wire protocol: Real-Time Publish Subscribe (RTPS). RTPS is designed for distributed real-time applications and is

highly efficient on the wire. With the LBRTPS plug-in, RTI has optimized the RTPS transport to further maximize data to packet ratios. Configurable options reduce the standard 56-byte RTPS header, saving over 30 bytes (53%). Using layered transport architecture, you can stack LBRTPS on any transport protocol, including UDP/IP, TCP/IP, and custom transports such as PR4G for tactical radios.

Compression Transport Plug-in (ZRTPS)

The ZRTPS plug-in further optimizes data to packet ratios. It reduces packet size by up to 80%, with minimal computation and latency increases. ZRTPS compression is configurable based on packet size, and supports multiple configuration algorithms, including Zlib, Bzip2, (which is generally more effective than Zlib but more compute-intensive) and custom, user-defined algorithms. You can also layer ZRTPS on other transports. For example, you can apply ZRTPS in combination with LBRTPS for maximum data to packet ratios.



Quasi-Static Discovery Plug-in

The Quasi-Static Discovery plug-in optimizes discovery of network nodes and applications, significantly reducing meta-data traffic, and providing much faster system setup and reconnect. It assumes that applications are known a priori and the QoS parameters will not vary, yet the availability of nodes and applications at startup may vary, and may change over time. It uses these assumptions to achieve a highly optimal discovery phase for DDS with minimal meta-data traffic, which is particularly beneficial in constrained and low bandwidth networks, or networks requiring very fast boot-up.

Simulation Transport Plug-in (LBSP)

The LBSP plug-in allows you to easily test constrained network applications on your local area network (LAN). It simulates low-bandwidth networks such as radio and satellite links to uncover problems early in the development cycle. LBSP includes a simulation manager to configure properties of shared communication channels. These properties include bandwidth (bps); latency, including random jitter; packet loss



probability; and advanced properties such as frame size and burst traffic.

The Limited-Bandwidth Plug-Ins are compatible with other RTI core features, such as multicast, message prioritization, latency-aware packet batching, and link aggregation. In combination with the Limited-Bandwidth Plug-ins these features provide a complete solution for building highly efficient applications in constrained network environments.

For More Information

For a detailed explanation of the Limited-Bandwidth Plug-ins, the problems they solve and the way they are implemented, please see the whitepaper: *Integrating Applications over Low Bandwidth, Unreliable and Constrained Networks using RTI Data Distribution Service* at www.rti.com/resources/whitepapers.html.

ABOUT RTI RTI delivers fast and scalable messaging software. It serves as the foundation for a range of mission-critical applications from military systems to stock trading to medical imaging. With over 70 percent market share, RTI Data Distribution Service dramatically improves system performance while slashing costs.

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