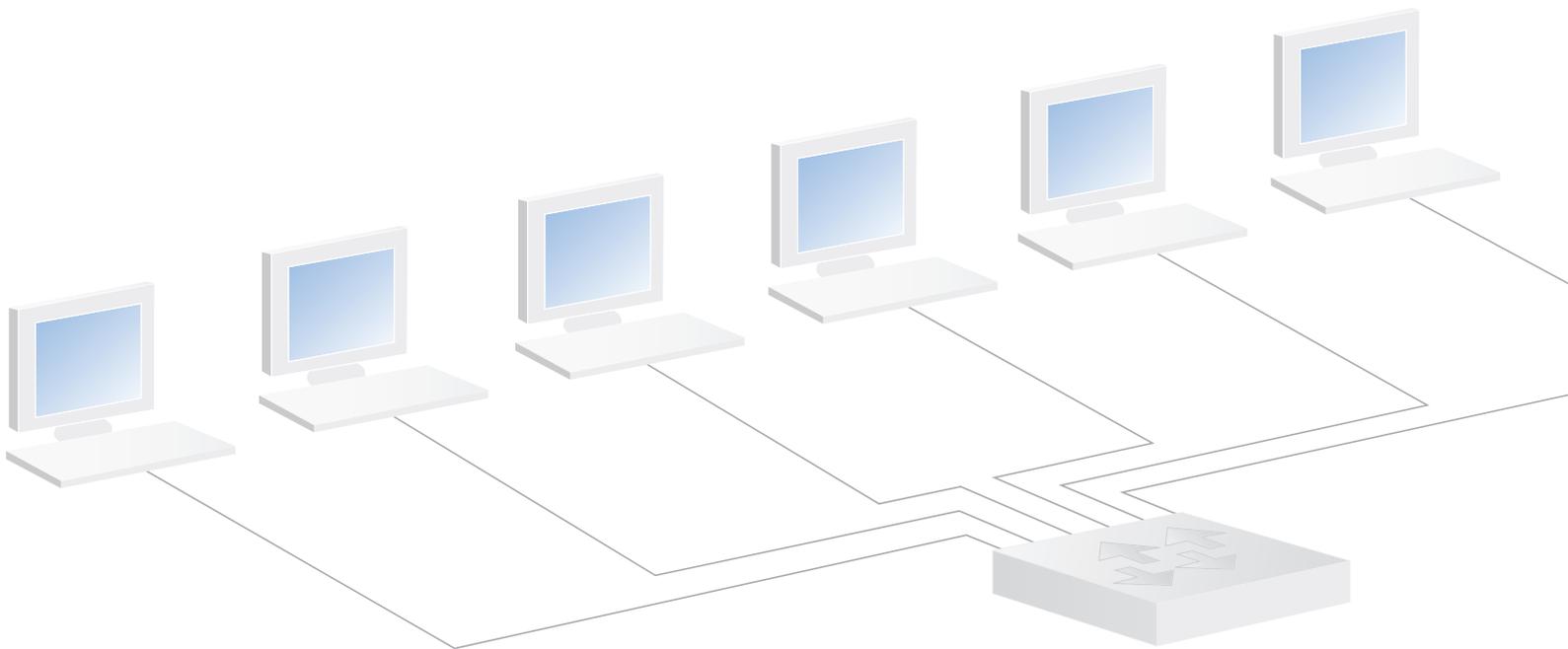


# Analyzing Trunked Gigabit Ports

## Monitoring Traffic in a Load-balanced Environment

Port trunking presents unique challenges for network analysis tools. This white paper examines the types of trunks currently being implemented and the implications for packet capture and analysis.



## Summary

As hunger for bandwidth increases and the price of gigabit hardware drops, “making a bigger pipe” through port trunking is becoming more and more common. Such trunks present unique technical challenges for protocol analysis. This paper describes how Network Instruments’ Gigabit Probes solves these problems.

## Keywords

Gigabit, full duplex, real-time statistics, trunks

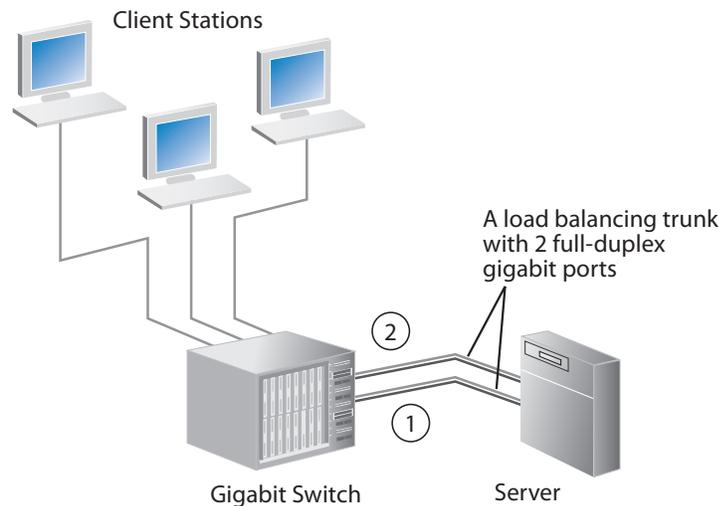
## What is a trunk?

A trunk is a logical link consisting of multiple physical connections between network devices. Multiple connections increase bandwidth, and, more importantly, may provide failover redundancy. Trunks ensure the high availability of critical servers and inter-switch connections.

### There are several methods to create trunks:

- Trunks implemented on Layer 2, such as Cisco Fast EtherChannel and Sun Trunking 1.0, depend on coordination with the switch to assign a single MAC address to multiple connections. This method is completely transparent to the rest of the network, and is easily configured to actively balance traffic load to make most efficient use of all connections.
- Trunks implemented on Layer 3, such as Balance.nlm, depend on specialized protocols that map a single network address to multiple MAC addresses. Layer 3 trunks can only balance the load in one direction without deploying a custom network protocol stack.
- Trunks implemented on Layer 1 (such as ISDN bonding) bond links at the physical layer, and require complex packet fragmentation and reassembly to perform load balancing.

Although Network Instruments Probes can be configured to analyze trunks implemented on Layers 1, 2, and 3, this paper focuses on load balanced layer 2 trunks, by far the most common configuration.

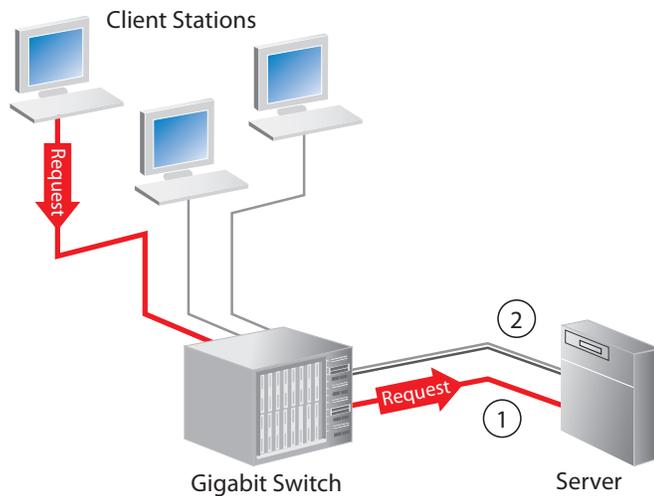


In client/server conversations, a packet going in either direction could travel on either port of the trunk.

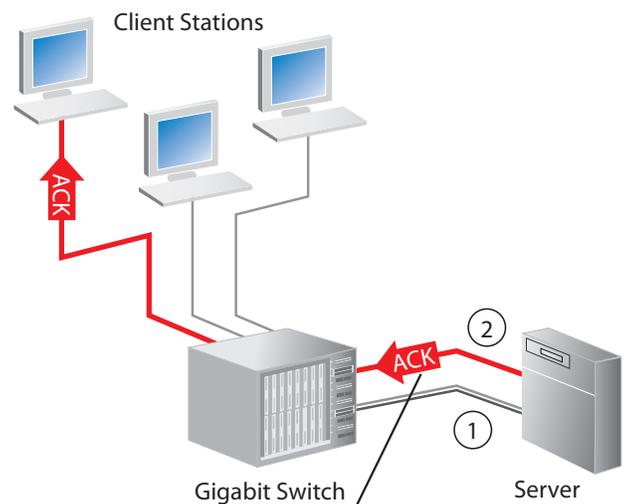
## How does load balancing affect your ability to monitor traffic?

Load balancing makes it impossible for a “non-trunk” aware gigabit probe (or even multiple probes) to provide the analyzer console with a coherent view of the traffic because any piece of traffic can travel through any connection. For example, a client request to the server and the server’s response could be routed through different connections. While this is all transparent to the client and server, it is not transparent to the analyzer, which must collect the data stream from each full-duplex connection separately.

For example, imagine a two-connection trunk. If you TAP into each connection with separate probes, the console would not be able to integrate the two data streams for a coherent view of traffic. In this case, the analyzer could show invalid errors such as missing ACKs because it would be incapable of putting the independent data streams together in the correct sequence. Accurately analyzing network conversations is entirely dependent on seeing the sequence of packets as well as their contents.



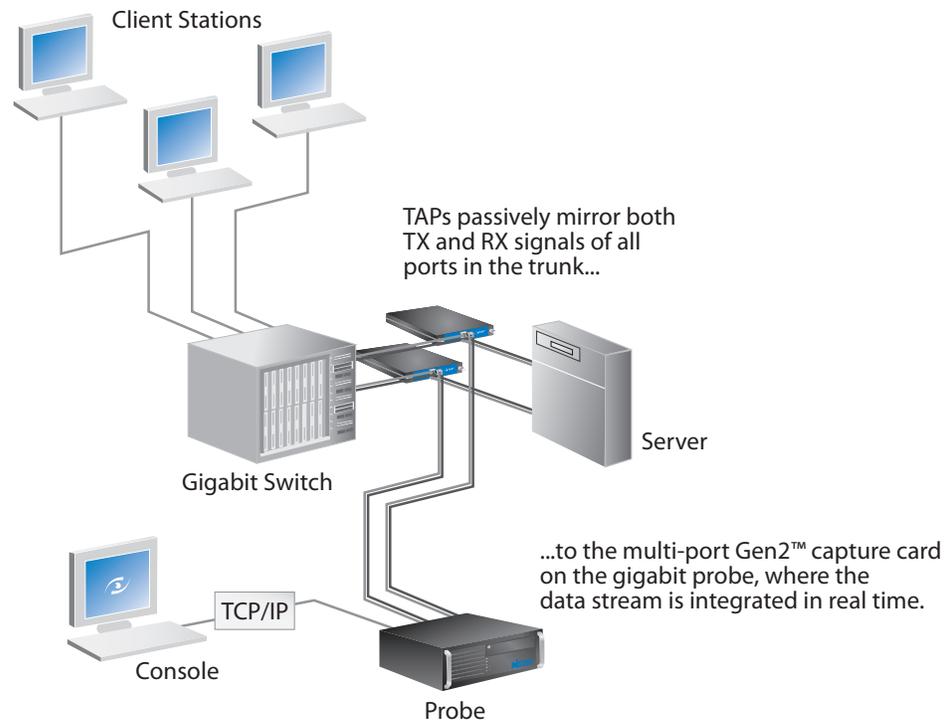
Though the client’s request for data is routed through port 1...



...the server’s acknowledgement of the request may be routed through port 2.

## Network Instruments Gigabit Probes

Network Instruments' Gigabit Probe Appliances are high-performance rack mount systems engineered for all types of gigabit analysis, including trunks. Through firmware-based virtual port assignments, the Probe can integrate up to 4 full-duplex connections. The Observer console can therefore analyze a coherent, correctly-sequenced stream of network traffic from all of the TX and RX connections that form a trunk.



## Network Instruments' Gigabit Probe Appliances plus Observer: Putting the Pieces Together for You

Network Instruments has engineered the high-performance solution you need to dependably monitor the trunked connections in your mission critical network infrastructure. As a result, all Network Instruments' gigabit probes fully support trunking. And, it's part of Network Instruments' Distributed Network Architecture (NI-DNA™), meaning that it works seamlessly with Observer's family of software and hardware based network analysis solutions.

### About Network Instruments

Network Instruments provides in-depth network intelligence and continuous network availability through innovative analysis solutions. Enterprise network professionals depend on Network Instruments' Observer product line for unparalleled network visibility to efficiently solve network problems and manage deployments. By combining a powerful management console with high-performance analysis appliances, Observer simplifies problem resolution and optimizes network and application performance. The company continues to lead the industry in ROI with its advanced Distributed Network Analysis (NI-DNA™) architecture, which successfully integrates comprehensive analysis functionality across heterogeneous networks through a single monitoring interface. Network Instruments is headquartered in Minneapolis with sales offices worldwide and distributors in over 50 countries. For more information about the company, products, technology, NI-DNA, becoming a partner, and NI University please visit [www.networkinstruments.com](http://www.networkinstruments.com).

### Solution Bundles

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