# *n*TAP™ Product Family

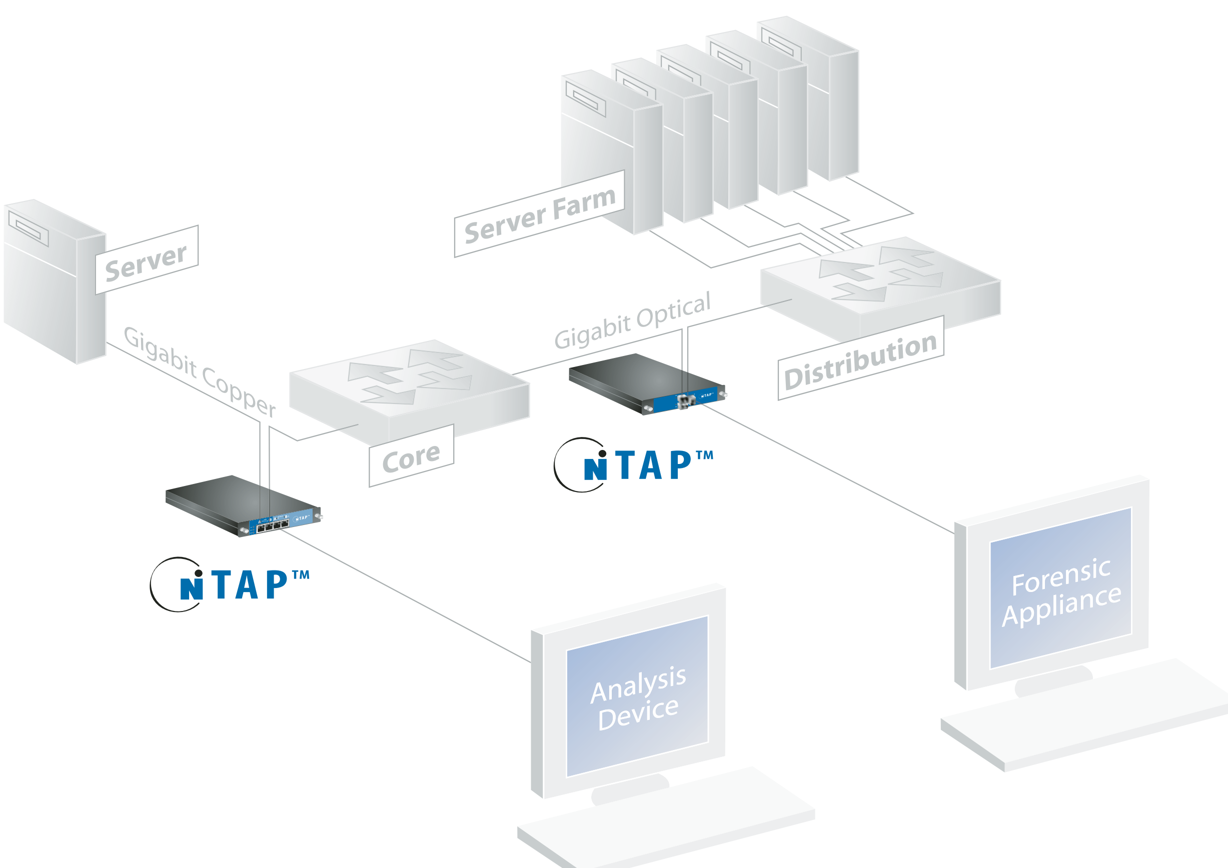
Provides monitoring devices with complete visibility into full-duplex networks

Network Instruments' *n*TAPs copy data from full-duplex links to monitoring devices for analysis. *n*TAPs are a critical component for network management because they guarantee complete and accurate analysis. Without an *n*TAP, a monitoring device may be fed incomplete and misleading information: creating false positives and overlooking problems that actually do exist.

Network Instruments' *n*TAPs ensure complete visibility into high-speed, full-duplex network links without compromising network performance or risking costly downtime. Regardless of link type, device type, or analysis tool, there is an *n*TAP solution that fits your needs and budget.

*n*TAPs are ideal for enterprises using analysis tools such as:

- Network analyzers
- Protocol analyzers
- RMON probes
- Forensic appliances
- Remote monitoring appliances
- Intrusion detection systems
- Security monitoring devices



## Different Methods to Access Network Traffic

Ensuring complete visibility of network data is the first critical component of analysis. There are two common ways for a monitoring device to access network traffic: using a switch's SPAN session (also known as port mirroring) or a network TAP (Test Access Port).

### SPAN Session

In a SPAN session, the switch copies both the send and receive data from each port of interest and constructs an integrated data stream from the channels. It then routes the integrated signal through the send channel of the SPAN port to a monitoring device. Because both channels are integrated into a single send channel, the SPAN port can only support a maximum of 50 percent of link utilization. This is because a full-duplex data stream can reach 2000 Mbps on a fully saturated link (1000 Mbps in each direction) and a SPAN port can only transfer a total of 1000 Mbps to the monitoring device at a time. Once utilization crosses 1000 Mbps, packets destined for the analyzer would be dropped. This is why a SPAN session is inappropriate for analysis of highly utilized links.

A SPAN session also presents the following risks:

- A switch filters out physical layer errors, which may cause inaccurate analysis
- There is an extra burden on a switch's CPU to copy all data passing through the ports, potentially affecting timestamping accuracy
- A SPAN port hides jitter from the monitoring device, critical to VoIP analysis

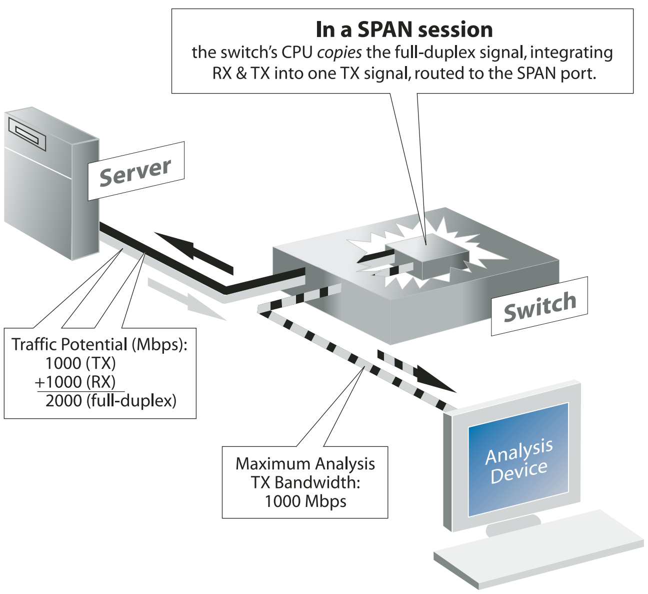
Typically, a SPAN session is the best method to access traffic on lower-utilized links that do not support business-critical or VoIP traffic.

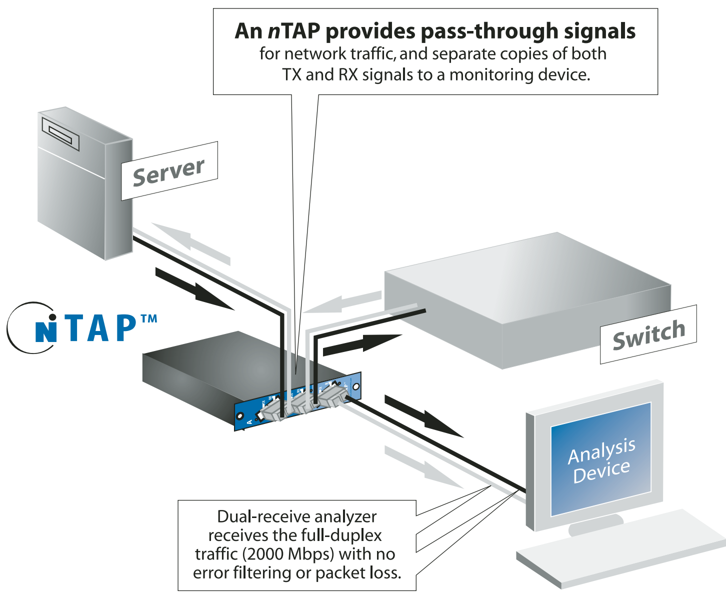
### TAP

A TAP is a passive mechanism installed between a "device of interest" and the network. TAPs transmit both the send and receive data streams simultaneously on separate dedicated channels, ensuring that all full-duplex data (up to 2000 Mbps) arrives at the monitoring device in real time. For that reason, the monitoring device must be equipped with a dual-receive capture card capable of aggregating the two data streams.

TAPs are ideal for accessing highly utilized full-duplex links because:

- A TAP never drops packets, regardless of speed or utilization
- A TAP does not filter out physical layer errors from the monitoring device
- A TAP is completely passive; it does not interfere with full-duplex networks




## The *n*TAP Advantage

*n*TAPs are economical to install

*n*TAPs support redundant failover links on the network

*n*TAPs offer complete visibility regardless of traffic levels

*n*TAPs offer a more compact design for more efficient use of rack space

*n*TAPs can connect to and disconnect from monitoring devices without interrupting the network

*n*TAPs provide access to all full-duplex network traffic, including errors found in the physical layer

*n*TAPs have no address on the network, and therefore cannot be the target of a hack or virus attack

*n*TAPs are available in a variety of models and configuration options to meet the needs of nearly every network

## *n*TAPs for Copper Links

Copper *n*TAPs provide a complete copy of data from full-duplex copper links at line rate for monitoring devices.

### 10/100 Copper *n*TAP

- Transfers a copy of 10 Mb or Fast Ethernet traffic from a full-duplex copper link to a copper monitoring device
- Connects to the full-duplex link under test and an analyzer equipped with a dual-receive capture card

### 10/100/1000 Copper *n*TAP

- Transfers a copy of gigabit traffic from a full-duplex copper link to a copper monitoring device
- Auto-negotiates to also support 10 Mb and Fast Ethernet networks
- Connects to the full-duplex link under test and an analyzer equipped with a dual-receive capture card

### 10/100/1000 Copper to Optical Conversion *n*TAP

- Transfers and converts a copy of gigabit traffic from a full-duplex copper link to SFP-based ports to connect to a copper or optical device
- Connects to the full-duplex link under test, and a copper or optical analyzer equipped with a dual-receive capture card
- SFP-based technology allows outputs to be switched in the future

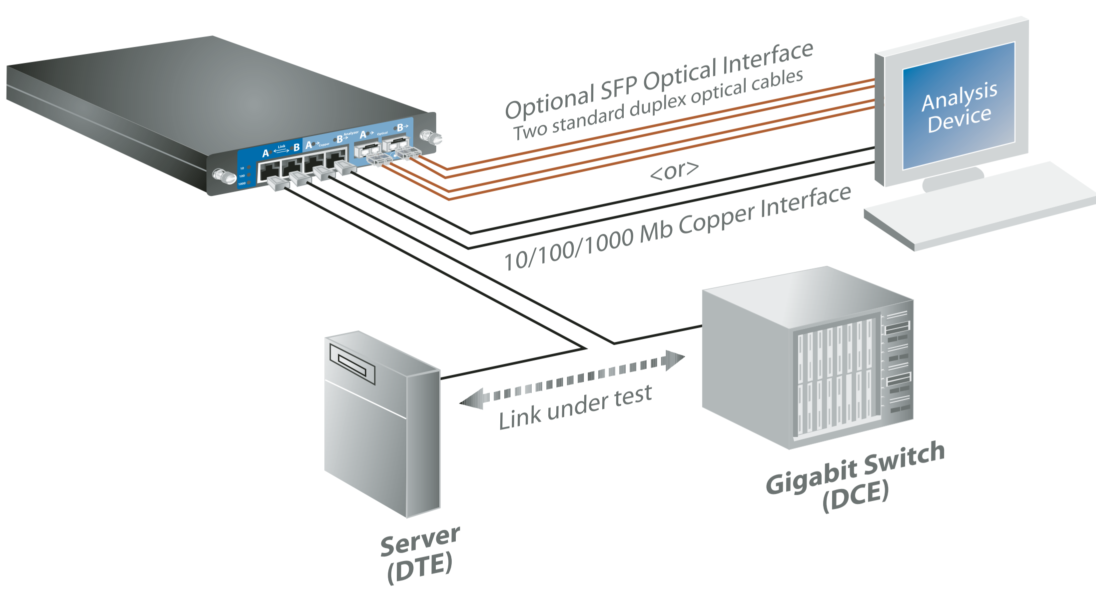
#### Redundant Power Supply

A redundant power supply is available for all copper *n*TAPs. By utilizing a secondary power supply, an *n*TAP will continue to send data to the analysis device if the primary power supply fails. If both power sources fail, the analysis device will not receive any data—but network traffic will continue to pass through the *n*TAP.

#### Supports Redundant Failover Links

All copper *n*TAPs have the ability to support redundant failover links. Therefore, if the link on one side of the *n*TAP goes down, the *n*TAP will automatically bring down the other link, allowing the corresponding device to switch over to a redundant link.

### Example of a Copper to Optical Conversion *n*TAP deployment



## *n*TAPs for Optical Links

Optical *n*TAPs provide a complete copy of data from full-duplex optical links at line rate for monitoring devices.

### One-Channel Optical *n*TAP

### Two-Channel Optical *n*TAP

### Three-Channel Optical *n*TAP

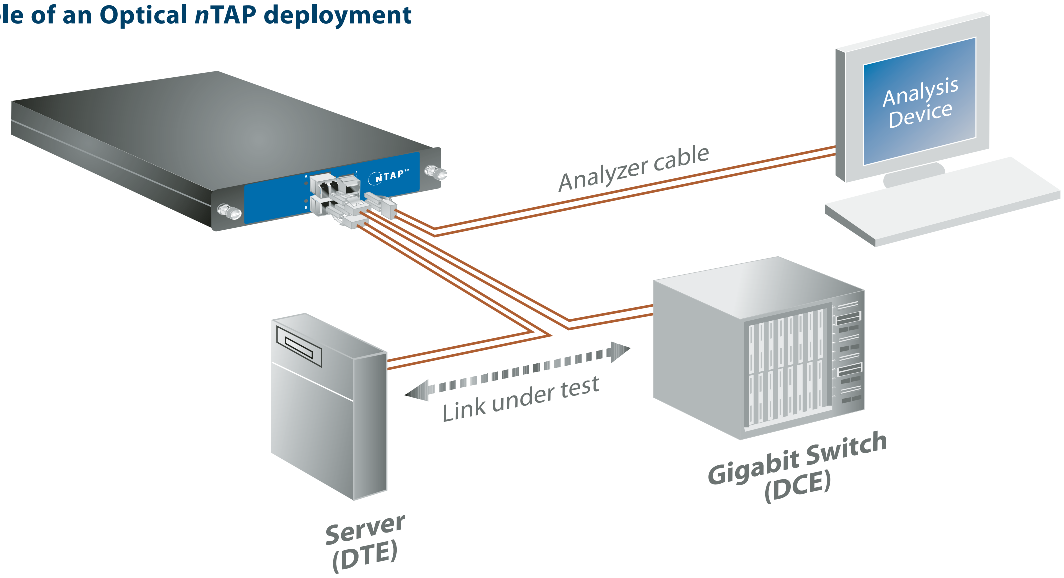
### 1U *n*TAP Rack-Mount Configuration

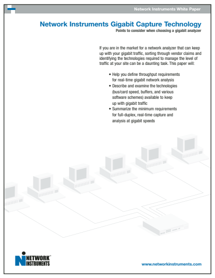
**Configuration**
Optical *n*TAPs support gigabit single-mode, gigabit multimode, and 10 Gb multimode traffic. Split ratios are available in 50:50, 60:40, 70:30, 80:20, and 90:10 to meet the needs of any network.

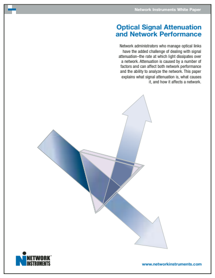
**Design**
Optical *n*TAPs are designed with LC connectors that are far more compact than the older SC connectors. As a result, a single *n*TAP unit can support one, two, or three channels. Up to nine full-duplex links can be supported in a single 1U rack panel. *n*TAPs supporting different media types can be conveniently mixed and matched within a 1U panel.

**Connection**
An optical *n*TAP connects to the full-duplex link(s) under test and an analyzer equipped with a dual-receive capture card. Analyzer cables are available to ensure this connection is made without error.

### Example of an Optical *n*TAP deployment






**Learn more about TAP technology with these white papers.**

Analyzing Full-Duplex Networks Through SPANs, Port Aggregators, and TAPs
There are a number of ways to access full-duplex traffic on a network for analysis: SPAN ports, port aggregators, and TAPs are the most common. This paper discusses the technical issues to understand before deciding which type of technology to deploy in various places on a network.

Optical Signal Attenuation and Network Performance
Network administrators who manage optical links have the added challenge of dealing with signal attenuation—the rate at which light dissipates over a network. Attenuation is caused by a number of factors and can affect both network performance and the ability to analyze the network. This paper explains what signal attenuation is, what causes it, and how it affects a network.

Download either of these whitepapers from:
www.networkinstruments.com/products/white_papers.html

## FAQ

**Q: Does an *n*TAP require power?**

**A:** **Copper *n*TAPs require power** to copy the data stream and send it to the monitoring device. However, the data stream continues to pass through the *n*TAP to the network even if power to the *n*TAP fails.

Optical *n*TAPs do not require power to operate.

**Q: Can I use a full-duplex *n*TAP to monitor a half-duplex connection?**

**A:** **Yes,** as long as your monitoring device is equipped with a dual-receive capture card.
An *n*TAP sends copies of the TX and RX of a half-duplex signal out through separate "send" ports to the monitoring device. If your monitoring device is equipped with a dual-receive capture card, you will be able to view both streams of data. However, if your monitoring device is equipped with only one receive port, it will only be able to view one stream of data at a time.

**Q: The NIC in my analysis device has a single "receive" port. Can I use an *n*TAP to monitor a full-duplex connection?**

**A:** **Yes,** but you will only be able to view one side of the full-duplex link at a time. This is not recommended.
An *n*TAP sends copies of the TX and RX of a full-duplex signal out through separate "send" ports to the monitoring device. If your monitoring device is equipped with a dual-receive capture card, you will be able to view both streams of data. However, if your monitoring device is equipped with only one receive port, it will only be able to view one stream of data. To view the entire full-duplex stream for analysis, the monitoring device should have two receive ports and the ability to aggregate the TX and RX streams into a single stream.

**Q: What split ratio do I need when deploying an optical *n*TAP?**

**A:** While we recommend that you always test the strength of your optical signal with a meter, if all devices between the connections are within 30 meters of the *n*TAP, **a 50/50 split ratio is ideal**. For longer hauls, it may be necessary to choose a split ratio that diverts more of the signal to the distant device. You should first determine the signal strength capabilities and requirements of your monitoring equipment, as well as the send power and receive sensitivity for the devices on either side of the link being monitored.

**Q: Can I use standard cables with my *n*TAP?**

**A:** **Yes.**
*To connect a monitoring device to an optical nTAP:*
Split a duplex cable (or use two simplex cables) and connect one end of each of those sides of the cable to the "send" ports on the *n*TAP, and the other end of each of those sides of the cable to the "receive" ports on the monitoring device's NIC. We offer a convenient analyzer (splitter) cable to ensure this connection can be made without error.

*To connect a monitoring device to a copper nTAP:*
Connect both of the "send" ports on the *n*TAP to both of the "receive" ports on the monitoring device with a standard copper 10/100/1000 BaseT Ethernet cable with RJ45 connectors.

## Optical *n*TAP Technical Specifications

| **Dimensions** | | |
|---|---|---|
| Depth | 7.66 in / 19.46 cm | |
| Width (faceplate) | 5.85 in / 14.86 cm | |
| Width (box) | 4.55 in / 11.56 cm | |
| Height (faceplate) | 1.10 in / 2.79 cm | |
| **Environmental Requirements** | | |
| Temperature Range (operating) | -40° to 185° F / -40° to 85° C | |
| Temperature Range (storage) | -52° to 185° F / -47° to 85° C | |
| **Supported Media** | | |
| Fiber Type | Multimode | Single-mode |
| Connector | LC | LC |
| Fiber Diameter(s) | 50 µm or 62.5 µm | 9 µm Fiber |
| Wavelengths Supported | 850 nm or 1300 nm | 1310 nm |

**Maximum Insertion Loss by Split Ratio (dB)**

| | Multimode 62.5 µm | | Multimode 50 µm | | Single-mode 9 µm |
|---|---|---|---|---|---|
| | 1300 nm | 850 nm | 1300 nm | 850 nm | 1310 nm |
| 50/50 | 3.9/3.9 | 4.7/4.7 | 4.5/4.5 | 5.5/5.5 | 3.6/3.6 |
| 60/40 | 3.0/5.0 | 3.8/5.7 | 3.7/5.6 | 4.7/6.6 | 2.8/4.8 |
| 70/30 | 2.3/6.3 | 3.0/7.0 | 2.9/7.0 | 3.9/8.0 | 2.0/6.1 |
| 80/20 | 1.7/8.3 | 2.4/9.0 | 2.3/9.0 | 3.2/10.0 | 1.3/8.0 |
| 90/10 | 1.2/12 | 1.9/12.5 | 1.8/12.8 | 2.7/13.5 | .8/12.0 |

## Copper *n*TAP Technical Specifications

| **Dimensions** | | |
|---|---|---|
| Depth | 7.66 in / 19.46 cm | |
| Width (front) | 5.85 in / 14.86 cm | |
| Width (back) | 4.55 in / 11.56 cm | |
| Height | 1.10 in / 2.79 cm | |
| **Power Requirements** | | |
| AC Input | 90 V to 264 V, 4 Hz to 63 Hz | |
| Operational Voltage | 5 V (+10% to -5%, < 100 mV ripple) | |
| Operational Current | Typical: ≤ 1.8 amps | Max: ≤ 2.8 amps |
| Power Dissipation | Typical: 8 W | Max: 14 W |
| **Supported Media** | | |
| **Copper Interface** | | |
| Link A / Link B (link under test) | RJ45 Ethernet | |
| Copper Analyzer Interface | RJ45 Ethernet | |
| **SFP Interface** (conversion *n*TAP only) | | |
| SX | 850 nm, 1000BaseSX, Multimode, LC connector | |
| LX | 1310 nm, 1000BaseLX, Multimode or Single-mode, LC connector | |
| ZX | 1550 nm, 1000BaseZX, Single-mode, LC connector | |
| **Environmental Requirements** (All Copper *n*TAPs) | | |
| Temperature Range (operating) | 32º to 120º F / 0º to 55º C | |
| Temperature Range (storage) | 32º to 167º F / 0º to 75º C | |
| Humidity | 35% to 85% (non-condensing) | |
| **Regulatory Compliance** (All Copper *n*TAPs) | | |
| Emissions | FCC Part 15 Class B | |
| CE Mark | EN61000-3-2, EN55024, EN55022A | |

**About Network Instruments**

Network Instruments is the industry-leading developer of distributed, user-friendly and affordable network management, analysis and troubleshooting solutions. The award-winning Observer family of products combines a comprehensive management and analysis console with high-performance Probes and TAPs to provide integrated monitoring and management for the entire network (LAN, 802.11 a/b/g, gigabit, WAN). All Network Instruments products are designed utilizing a Distributed Network Analysis (NI-DNA™) architecture. With NI-DNA, the Observer solution set simplifies network troubleshooting and management, optimizes network and application performance and scales to meet the needs of any organization. Founded in 1994, Network Instruments is headquartered in Minneapolis, Minnesota with offices in London, Munich, Paris, Toronto, and multiple cities throughout the United States with distributors in over 50 countries. More information about the company, products, innovation, technology, NI-DNA, becoming a partner, and NI University can be found at www.networkinstruments.com.

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