

Optimize Your Network Monitoring Strategy

White Paper



Packet aggregation switching streamlines data center operation, improves performance and reliability, reduces costs, and prepares enterprises for inevitable data growth.

More than ever, enterprise-class companies must rely on their data networks to serve customers and maintain their competitive edge in the marketplace. From banking and investment to travel and entertainment, most business today is conducted at least partly online. Network speed and reliability has gone from a side issue to the critical path, where resolving issues quickly is simply not good enough. Network outages must be prevented from occurring at all.

A robust network monitoring program that provides complete end-to-end network visibility enables your network engineers to stay a step ahead – scrutinizing the network and addressing performance and reliability issues before they escalate to costly downtime.

Enhance Visibility, Simplify Your Infrastructure and Provide Secure, Remote Access to Your Data Center

A comprehensive network monitoring strategy that provides a competitive advantage to your data center includes the ability to:

- Monitor any point on the network at will
- Collect data streams from a variety of sources and merge them into a continuous flow
- Multicast that flow to a variety of network monitoring tools
- Filter the flow to each tool to provide only the data that tool needs.

Each point in the list above is central to a comprehensive and cost-effective monitoring strategy because it gathers all available data from all points of the network, and maximizes the efficiency and duty cycle of expensive network monitoring tools. A strategic monitoring program must see the entire network and be capable of capturing any or all transactions, and yet not flood monitoring tools with irrelevant information.

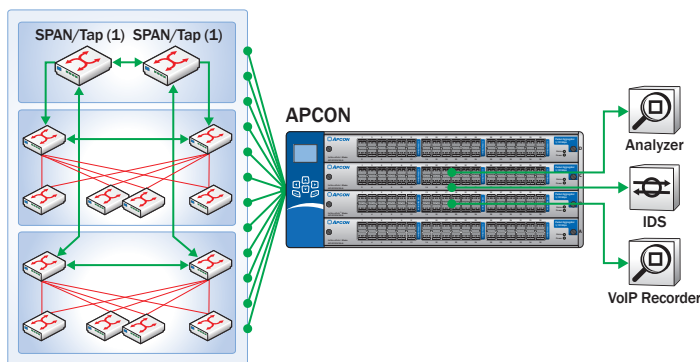
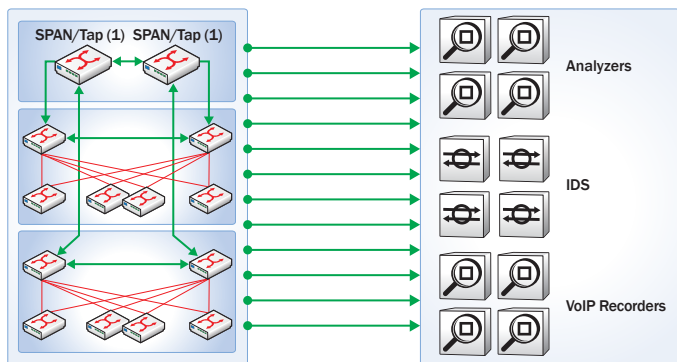
The solution to provide this level of visibility and control is an APCON intelligent network monitoring switch. APCON switches differ from a standard network switch in that they feature packet aggregation, multicast, data rate conversion, and data filtering on every switch, with additional advanced services such as packet slicing, packet deduplication, and time stamping available if needed. Furthermore, advanced network monitoring switches are housed in a scalable, fault-tolerant, highly available chassis to meet enterprise-grade uptime requirements.

By taking advantage of these features, enterprise-level data centers can extend the ability of any tool or set of tools to monitor network traffic from any point in the data center. There are four key benefits to this approach:

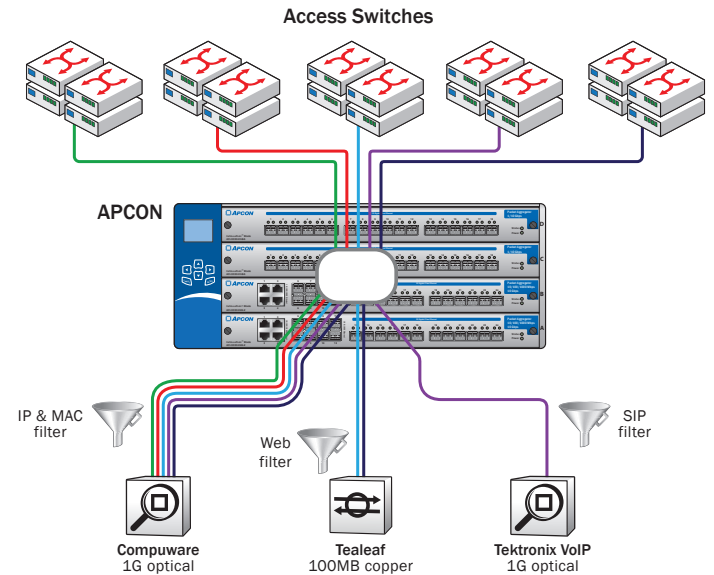
- Reduced cost in redundant monitoring tools
- Improved application performance
- Increased efficiency of staff time
- Enhanced physical security of the network

Each of these benefits is detailed below:

Reduced cost in redundant tools – when the need for redundant tools scattered across the network is eliminated and each tool can be used at maximum efficiency, fewer tools must be purchased to implement comprehensive network monitoring. Purchasing decisions can be data-driven, rather than topology-driven.



Improved application performance – with a comprehensive network monitoring system in place, engineers can proactively monitor service levels, bottlenecks, and spikes in network activity and accurately allocate resources for maximum network efficiency. With utilization tracking in APCON's TITAN EP multi-switch management software, detailed reports can show utilization statistics for each tool in inventory.

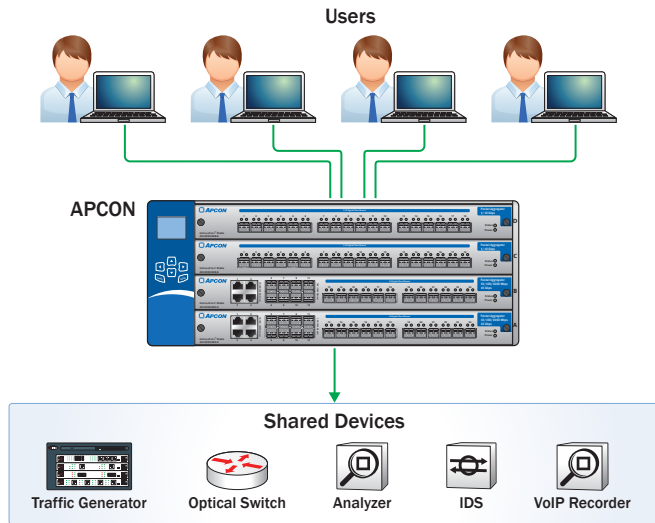


By using aggregation, multicast and filtering, each tool receives only the data required to perform its particular function. Application performance monitoring is more efficient with a focused data stream.

In a traditional reactive network monitoring system, multiple redundant tools are required to monitor every network segment.

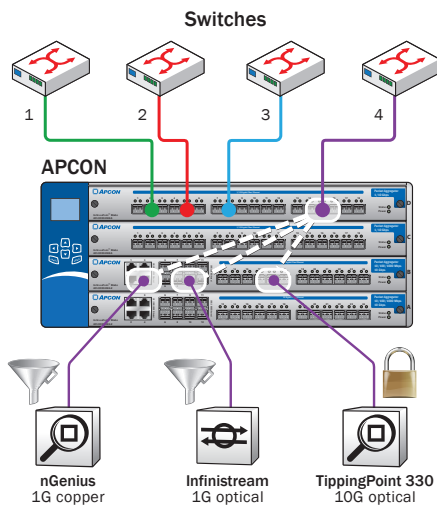
With an APCON intelligent network monitoring switch, expensive tools are efficiently shared for maximum utilization and cost savings.

Increased efficiency of staff time – enterprise-level data centers have many stakeholders who require access to the inventory of network monitoring tools. By consolidating the tool inventory and virtualizing the connection path between a network data source and the tool, users can create necessary connections and conduct monitoring sessions conveniently from their desktops, avoiding the need to physically move and repatch portable monitoring tools during scheduled monitoring periods.



APCON intelligent network monitoring switches allow multiple users to share tools efficiently.

Enhanced physical security of the network – when network stakeholders can create connections between data sources and tools remotely, physical access to the data center and manual repatching of cables is not required. The fewer people who have access to the data center hardware, the more secure the network will be.



With an APCON intelligent network monitoring switch, physical access and repatching requirements are reduced or eliminated, enhancing physical security in the data center.

Selecting a Network Monitoring Switch

There are a variety of network monitoring switches on the market today, and each design is optimized for certain factors. At the enterprise data center level, network monitoring switches should possess the following attributes:

1. Capacity/Density

In a modern data center, an intelligent network monitoring switch must be efficiently designed to deliver maximum throughput capacity and port density in the minimum amount of rack space possible. Here's how the APCON IntellaPatch stacks up:

1G/10G Port Density – With up to 288 ports of configurable 1G or 10G ports in just 8RU, APCON leads in high-bandwidth port density.

Range of Chassis – The APCON INTELLAPATCH series offers 5 chassis sizes from 1RU to 8RU, each compatible with all blades.

Native 10G Backplane – The INTELLAPATCH Series 3000 Extended Capacity backplane supports bit rates of up to 11.5 Gbps over every input/output lane.

40G Support – APCON supports up to 64 ports of 40G together with 192 ports of 10G in 8RU.

2. High Availability

To serve the needs of an enterprise-scale data center, a network monitoring switch must maximize uptime. Here's how an APCON switch achieves that level of performance:

Redundant Power Supplies – A switch needs at least two (or more) power supplies capable of operating the switch under any circumstances. When the primary supply fails, the backup must already be online to prevent even a momentary interruption of service.

Redundant Switch Controllers – Multiple controller boards with automatic failover maintain the ability of network engineers to configure the switch and report the failure to the engineers for quick replacement with no loss of uptime.

Independent Switch Controllers – If a switch controller is located on the data port blade, loss of that controller means the loss of functioning ports on that blade or across the switch. An enterprise-grade switch uses a “latching” design so that existing switch connections persist and operate seamlessly even in the event of total controller failure.

Signal regeneration – All Ethernet-based networks can experience signal degradation due to the length of connections, dirty connectors, old cable infrastructure and other hardware issues. If the incoming signal (copper or fiber) has low signal strength, an enterprise-grade switch will fully regenerate each connection to full signal strength, optimizing network connectivity.

3. Scalability

To serve the needs of an enterprise-scale data center, a network monitoring switch must be scalable. True scalability is a function of several qualities that combine to make expanding switch capabilities both straightforward and economical:

Expandable platform – A switch should allow for partial population of its chassis, thereby leaving room for future expansion. By installing a larger switch chassis and partially populating it, enterprise data centers can reduce the number of chassis to manage – and pay for at one time – and allow for future growth.

Interchangeable components – Critical components such as controller boards, power supplies, and port blades that are interchangeable across switch chassis create flexibility in blade deployment across a growing network.

Range of chassis sizes – Additionally, a range of compatible chassis sizes from single blade to many blades supports true scalability. With this feature, purchasing additional switch capacity preserves and enhances existing hardware investment.

Multi-switch software interface – To facilitate maintenance, switch firmware should be the same across the range of switch chassis and blades. Additionally, the software solution for a given switch family should be capable of administering multiple switches.

4. Flexibility

Enterprise-grade switches must possess flexibility to allow the switch to be reconfigured to serve the data center's needs under changing conditions. APCON switches offer the following features:

Heterogeneous Port Formats – Network engineers should be able to mix and match blades in the same chassis, supporting interfaces from 10/100 to 1G, 10G, and 40G in both copper and fiber as appropriate. Fiber optic blades should accept both Single Mode and Multimode Small Form-Factor Pluggable (SFP) and Small Form-Factor Pluggable + (SFP+) transceivers.

Data-Rate Selection – Both copper and optical Ethernet ports should support a range of data rates. For example, copper Ethernet blades should have the ability to set to data rates on a per-port basis to 10/100/1000 Mbps. 10G blades should allow ports to be configured to 1G with the appropriate SFP/SFP+.

Media Conversion – The best switch products provide the ability to connect a copper port to a fiber port. They also provide the flexibility of connecting a single mode fiber port to a multi-mode fiber port. Neither of these connections requires a media conversion device, as this function can be performed internally with the appropriate blades resident on the switch.

Inter-Switch Trunking – Network monitoring switch scalability is enhanced when 40G ports can be configured to “trunk” large volumes of data between chassis.

5. Security

A network monitoring switch is a critical component in your network security program. Make sure your enterprise-class network monitoring switch incorporates these features:

Secure, Remote Access – An intelligent network monitoring switch should support multiple user IDs with password protection, and should support limited capabilities through a system such as LDAP, RADIUS or TACACS+.

Fewer Trips To The Data Center – Companies that use mobile tools and a manual repatching process that requires employees to access a data center with each monitoring change are exposed to potential patching errors. One benefit of an enterprise network monitoring switch is to reduce the possibility of cabling errors. Enterprise-grade intelligent network monitoring switches increase security and reduce MTTR (Mean-Time-To-Repair) in data centers by eliminating the need to access the facility to move a monitoring tool to a different SPAN or Tap port.

SPAN Port Safety Logic – SPAN port safety logic prevents users from accidentally connecting SPAN ports with duplex connections, or creating an infinite network loop.

Port Locking – Port locking allows users to lock ports while performing packet capture between SPAN ports and monitoring tools. Locked ports prevent other users from accidentally taking down a connection. This is helpful when multiple users are accessing the same SPAN ports at the same time. Users have the flexibility of locking down both the SPAN port and the monitoring tool, or just the monitoring tool. This allows other users to take data from that same SPAN port and multicast the traffic to another tool to separately analyze the traffic for other information.

6. State-of-the-Art Software Interface

A state-of-the-art software interface for an intelligent network monitoring switches has these features:

Remote connectivity – An enterprise-grade network monitoring switch offers a software interface embedded in the switch control plane, so there is no software to install and maintain on each user's desktop. This saves staff time and eliminates the need to upgrade each user with every new bug fix and product enhancement. By simply upgrading the embedded software once on the switch, every user who accesses the switch will be certain of working with the latest interface.

Web browser access – Web-based interaction eliminates compatibility issues between different operating systems and desktop revision levels. Stakeholders can simply launch a web browser and enter the switch IP address to be granted secure, remote access. In a case where the IP network is down, an enterprise-grade switch also offers a console port by which users may securely and remotely access the switch using an SSH connection.



DEFINITION: INTELLIGENT NETWORK MONITORING SWITCH

An intelligent network monitoring switch is an Ethernet switch designed for enterprise-level data center networks. These switches collect input from multiple SPAN and tap sources and aggregate these data streams into a single output flow, which can then be multicast to several ports attached to various network monitoring tools. Data packet flows may be filtered according to a standard syntax as they enter the network monitoring switch or as they exit the switch. In this way, multiple streams may be converged and then sorted to provide exactly the right level of detail and amount of data to maximize the utilization of each network monitoring tool.

Advanced network monitoring switches also feature the ability to convert 10G Ethernet traffic to 1G Ethernet traffic, preserving investments in 1G network tools as the overall network evolves to 10G operation.

Digital diagnostics – Enterprise-grade switches provide visual diagnostic information for each port through the software interface. Required diagnostic information includes Tx and Rx signal strength, current bias, temperature, voltage, data rates and protocols supported, fiber type, part numbers, and serial numbers.

Multi-switch management – Enterprise-level data centers will benefit from a single software interface that controls all intelligent monitoring switches in the network. APCON's TITAN EP provides a centralized configuration, scheduling, and reporting portal for the entire enterprise monitoring system, and automatically configures services between switches.

Cost Savings with an Enterprise Network Monitoring Switch

Enterprise-grade network monitoring switches from APCON deliver cost and time savings in large data centers for the following reasons:

Fewer Switches To Manage – Network monitoring switches that scale to 288 ports in a single chassis can significantly reduce the number of switches to manage. With smaller, low-density matrix switches, customers need to purchase additional tools each time they exceed the port capacity of an existing switch.

Reduction in Monitoring Tools – Data centers are able to set the number of monitoring tools required based on network traffic levels, rather than the number of locations to be monitored. Intelligent network monitoring switches provide the ability to remotely connect and share expensive monitoring devices across an entire network.

Reduced Power Consumption – Power consumption and heating/cooling efficiency is a critical factor in large-scale data centers. Enterprise-grade switches help data centers utilize power more efficiently by optimizing network devices – reducing the number of devices necessary to achieve complete end-to-end monitoring goals. Reducing the number of switches and tools also reduces rack plug count.

Summary

Network monitoring systems in enterprise data centers are becoming increasingly complex, with multiple layers of technology required to work hand-in-glove. Increased physical security concerns also make remote access a priority. Intelligent network monitoring switches from APCON provide increased flexibility and connectivity, as well as scalability for future expansion. Data centers that implement intelligent network monitoring have the opportunity to experience an ROI conservatively estimated in hundreds of thousands of dollars, plus increased efficiency in staff time and enhanced security.