



# Cook Children's Healthcare System Improves Application Experience Using Network Intelligence

## Organization

- Cook Children’s Healthcare is a nationally recognized, not-for-profit pediatric healthcare organization

## Challenges

- End users’ perception of network “slowness”
- Performance problems not identified until customers call with complaints
- Root cause analysis sometimes taking days
- Difficulty obtaining information on network performance

## Solutions

- Keysight Vision 5288 and 5236 network packet brokers
- Riverbed AppResponse appliance for application performance analysis

## Results

- Detailed network intelligence for use in application performance analysis
- Increased monitoring efficiency through packet deduplication
- Proactive monitoring of medical records applications to avoid impact on users
- Ability to identify source of Outlook / Exchange problems

# Pioneer in Pediatric Care

Cook Children’s Healthcare is a nationally recognized, not-for-profit pediatric healthcare organization. It operates a medical center, physician network, hospital, pediatric surgery center, and health plan. Founded in 1918 and based in Fort Worth, Texas, the integrated system has more than 60 primary and specialty care offices throughout North Texas.

# The Challenges: Network Complexity Affected Performance

Fast access to applications, such as electronic medical records (EMR) and electronic health records, is vital for Cook Children's to provide outstanding service to its patients and physicians. Application performance issues began to surface as the organization's network grew more complex. Data began coming in from various wireless medical devices and wearables, as well as remotely hosted applications. The network manager was dealing with a range of problems, which included slow user experience, difficulty monitoring the network end to end, and an inability to proactively identify potential performance issues.

## The Solution: Joint Performance Monitoring Solution

The company wanted a solution that would see deep inside its network and provide intelligence it could use to improve application performance for users delivering primary care to patients. After a careful search, the company implemented an Keysight Vision Series network packet broker (NPB) between key network access points to provide it with detailed packet information. The company chose Riverbed AppResponse from Riverbed to meet its application performance monitoring (APM) requirements. Specific details included the following:

- **Packet aggregation and manipulation:** The network management team implemented the Ixia Vision NPB to aggregate packet traffic from multiple 10G SPAN ports, deduplicate it, and direct it to the AppResponse appliance.
- **APM:** The team chose Riverbed AppResponse solution for its 24x7 application transaction monitoring, packet storage, and performance analysis. AppResponse provides optional modules for web transaction, database, VoIP/video, and Citrix analysis. AppResponse also tightly integrates with Riverbed flow and infrastructure monitoring, which provide dependency mapping, SNMP, WMI, synthetic testing and more.

"The Keysight packet broker makes it extremely easy and efficient to provide our APM system all the traffic it needs from anywhere in our data center," said Ross Jones, network manager at Cook Children's. "Removing unneeded duplicate packets was a huge benefit."

# Keeping up with Growing Traffic Volume

The analysis Riverbed AppResponse provides is only as good as the data it receives. The appliance was receiving input from four 10G SPAN ports on Cook Children's Cisco 6509 and Nexus 7000 routers. However, half the traffic from these SPAN ports consisted of duplicate packets. Keysight can de-duplicate these packets, increasing the usable capacity of AppResponse. Congestion reduces the processing efficiency of monitoring tools and can lead to dropped packets and inaccurate results. Keysight ensures AppResponse gets a clean feed of network traffic for it to analyze. With traffic growth expected to continue, the team needed to reduce congestion at the tool to increase confidence in its results.

The team deployed a Keysight Vision NPB to aggregate data from all four 10G links, remove all duplicate packets, and send a condensed flow of data at line-rate speed to the AppResponse solution. The Keysight NPB filters out-of-band monitoring data packets according to the needs of other monitoring tools. It sends the relevant data to each tool simultaneously, increasing monitoring efficiency. Using an NPB allows the networking team to share traffic packets from the Cisco SPAN ports with the network security manager, who also requires access to network packets.

# The Results: Immediate Impact

The joint data access and performance monitoring solution from Ixia and Riverbed had an immediate impact. It improved application performance and increased the speed of troubleshooting, as illustrated by these two examples:

- Before the APM deployment, the networking team was often unaware of slow response times on the remotely hosted EMR application until a physician would call in to complain. Once the team identified the problem, it took time to determine if the root cause was the application or the network. With the APM solution in place, the team developed a baseline for WAN performance and continuously monitors WAN latency. AppResponse's alert functionality notifies team members when performance does not meet the preset threshold. This advance warning lets the team correct potential issues before users complain or even notice a change. When problems do occur, AppResponse helps the team respond quickly using focused root cause analysis, for a lower mean time to resolution.
- During a conversion from Outlook 2007 to 2010, users in different locations and using different desktop operating systems could not make Outlook client connections to Exchange. Using AppResponse's trace data to contrast good connections with failed ones, the networking team was able to see that the client was connecting to the load balancer, but going no further.

This information from the joint Ixia / AppResponse solution was vital to discovering an exhausted connection table in the load balancer that would not allow any new back-end connections. Without the APM solution, a difficult-to-find problem like this would have taken much longer to diagnose and resolve.

# The Benefits: Troubleshooting, Analysis, and Efficiency

“The joint SteelCentral AppResponse / Ixia solution has cut the time it takes to diagnose performance problems from days to hours,” Jones said. Other important benefits include the following:

- **Faster troubleshooting:** the solution reduced problem isolation from days to hours
- **Proactive monitoring:** the networking team can identify and resolve issues before users notice
- **More accurate analysis:** end-to-end network visibility provides all the relevant data to monitoring tools
- **Greater tool efficiency:** the APM solution works faster with network packets deduplicated and optimized
- **No more data contention:** data can go to multiple monitoring tools at same time

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