# IBM Storage Networking b-type family

## Presales Training Module

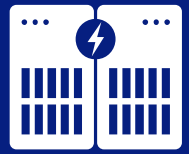

## Using SAN Analytics to Enhance Your IBM Storage Solutions

# Objectives

In this training we will cover the following items:

- What is IBM b-type SAN Analytics Architecture
- How does IBM b-type SAN transform knowledge into actionable intelligence
- How does IBM SANnav management application assist with application monitoring and troubleshooting

# The New Realities of the Storage Infrastructure in the 2020's



## >Flash

over 70% of enterprise storage arrays are all-flash

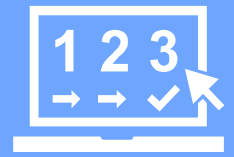
## >NVMe

is becoming a requirement for storage in 2020

**PERFORMANCE**

## >Agile

infrastructure must support multiple protocols, seamless migration and next-gen workloads



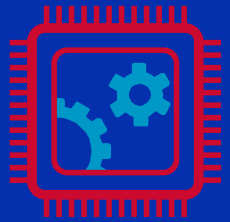

## >Simple

IT needs simpler management, analytics, and automated capabilities

**MANAGEMENT**

# Advanced SAN Technology

The **Condor 5** ASIC



**50%**

Lower latency for NVMe workloads (460ns)

**2x**

the Encryption and Compression capacity

**50% more buffers**

per ASIC to support distance, burst workloads and congestion management

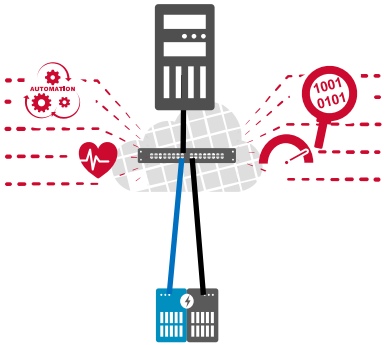
Ability to

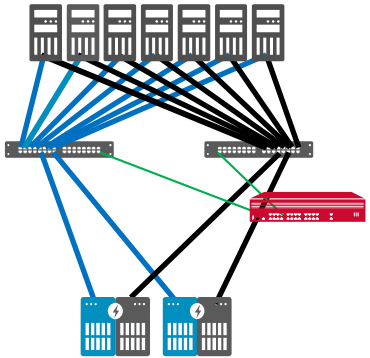
**learn, measure, and monitor**

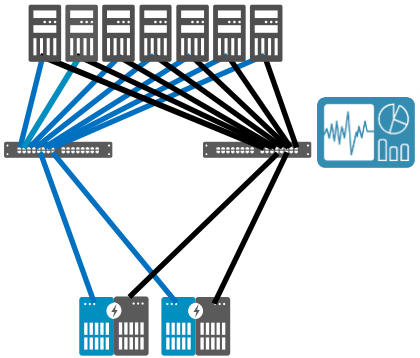
fabric wide latency of flows

# The SAN Analytics Journey for IBM b-type

## Transforming information into knowledge





### Gen 5/6 Fabric Vision (2011/2016)

Embedded millions of network sensors that monitor everything in the network

### Analytics Monitoring Platform (2015)

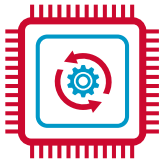
Developed an appliance with more processing power to monitor and analyze end-to-end application performance

### Advanced Analytics (2020)

Application and IO visibility integrated directly into the hardware, software, management and services

**IBM b-type is continuing to invest heavily in SAN analytics**

# How does IBM b-type Gen 7 Accomplish This?
*The Autonomous SAN Architecture*



## Integrated Network Sensors

- Gather comprehensive telemetry data
- Monitor at the fabric, device, protocol, I/O and application level
- Streams real time analytics metadata

## Powerful Analytics

- Process and correlate diverse telemetry data
- Baseline network behavior and the impact of problems
- Identify root cause impacting performance or health

## Advanced Automation

- Provide recommended actions/suggestions
- Automate problem mitigation or resolution
- Prioritize critical traffic automatically

# Fibre Channel Telemetry Architecture

**Network Health**

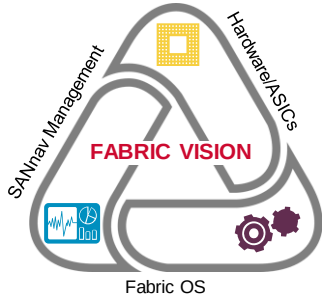
**PHYSICAL LAYER**
- SFPs
- Link
- Sync Loss
- Switch/Port

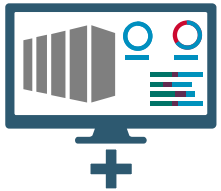
**Network Performance/ Behavior**

**FC LAYER**
- CRCs
- ITWs
- Queue Latency

**Device & Application Performance/ Behavior**

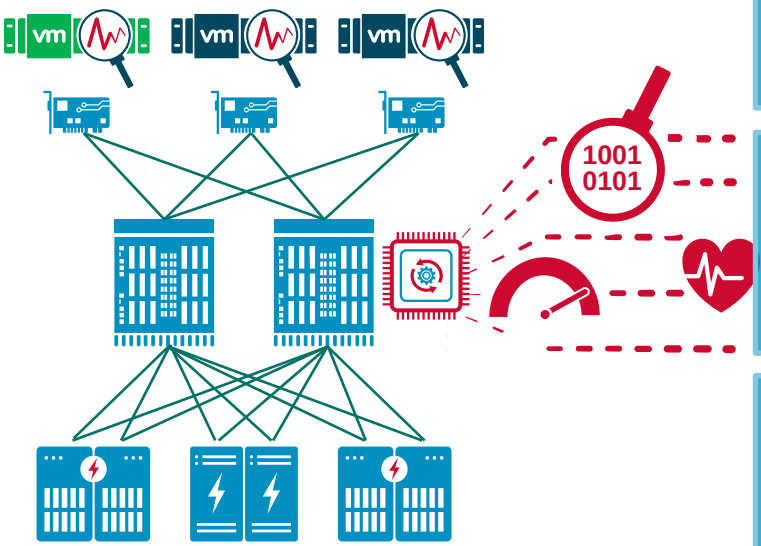
**FCP/SCSI/NVME LAYER**
- Latency (FRT/ECT)
- Queue Depths
- SCSI Protocol



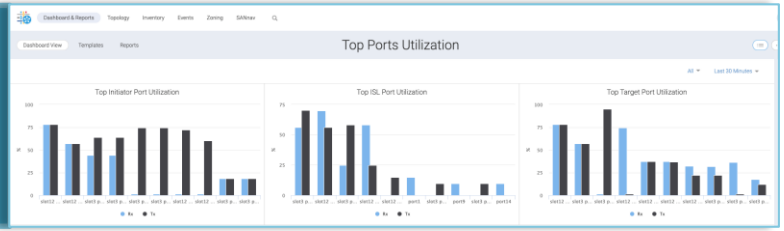
GEN7
FIBRE CHANNEL

# Transform Data into Actionable Intelligence

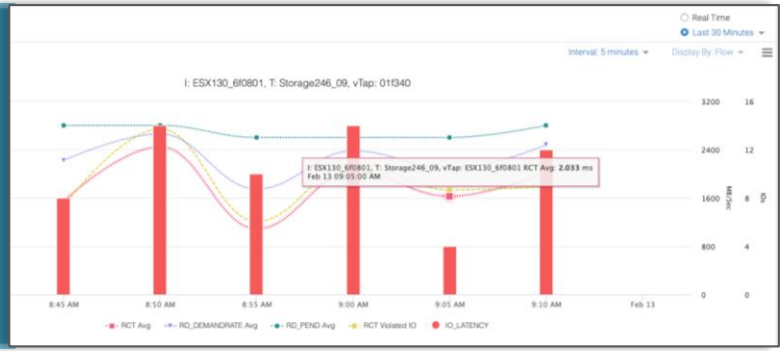



Instantly correlates data into health scores


Summarizes critical data into easy to read dashboards



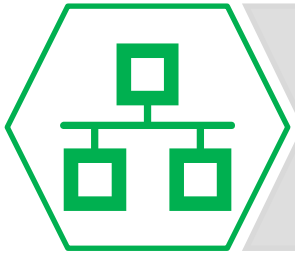

Powerful troubleshooting capabilities to identify the root cause of issues



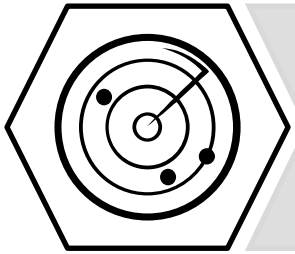
# How does b-type SAN address most Customer Questions?

**How can I know instantly what is happening?**

**How can I identify where an issue is coming from?**



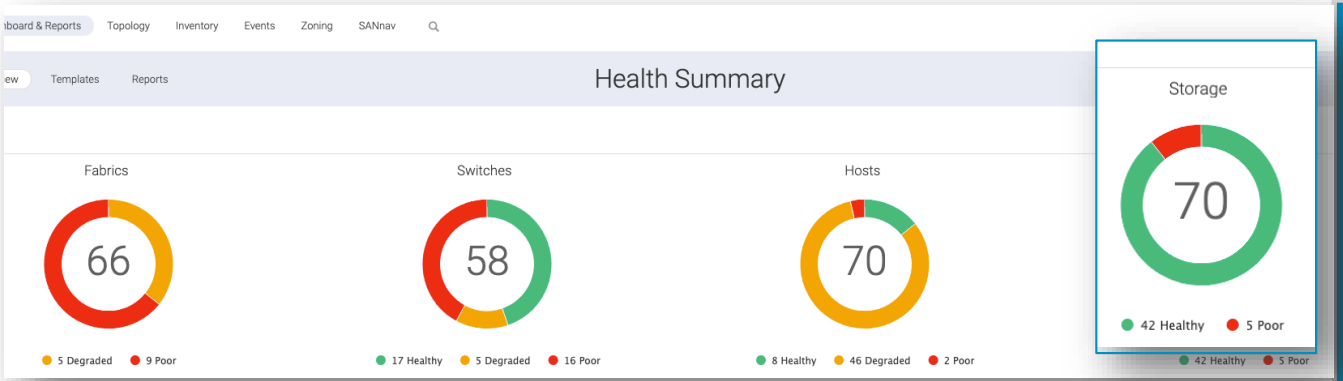
**How can I see the application traffic from host to storage?**



**How can I identify what metrics are being impacted?**

## Does the tool troubleshoot for me?

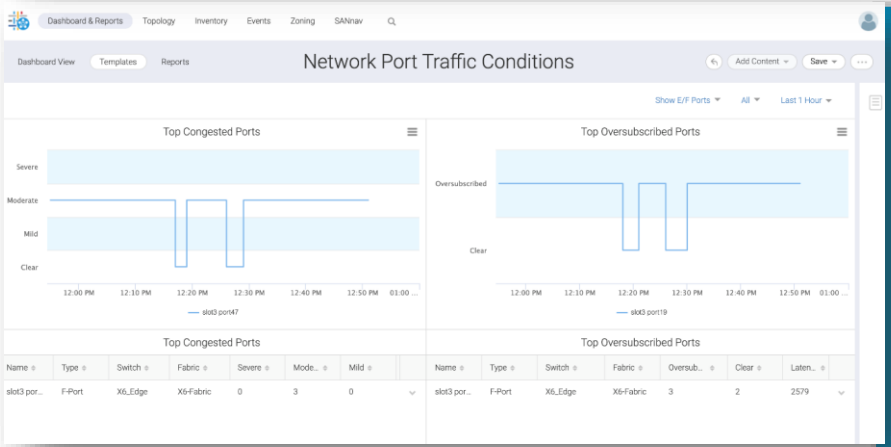
# How can I know what is happening in an instant?




Health Summary score of Fabrics, Switches, Hosts and Storage

Customizable dashboards to show:

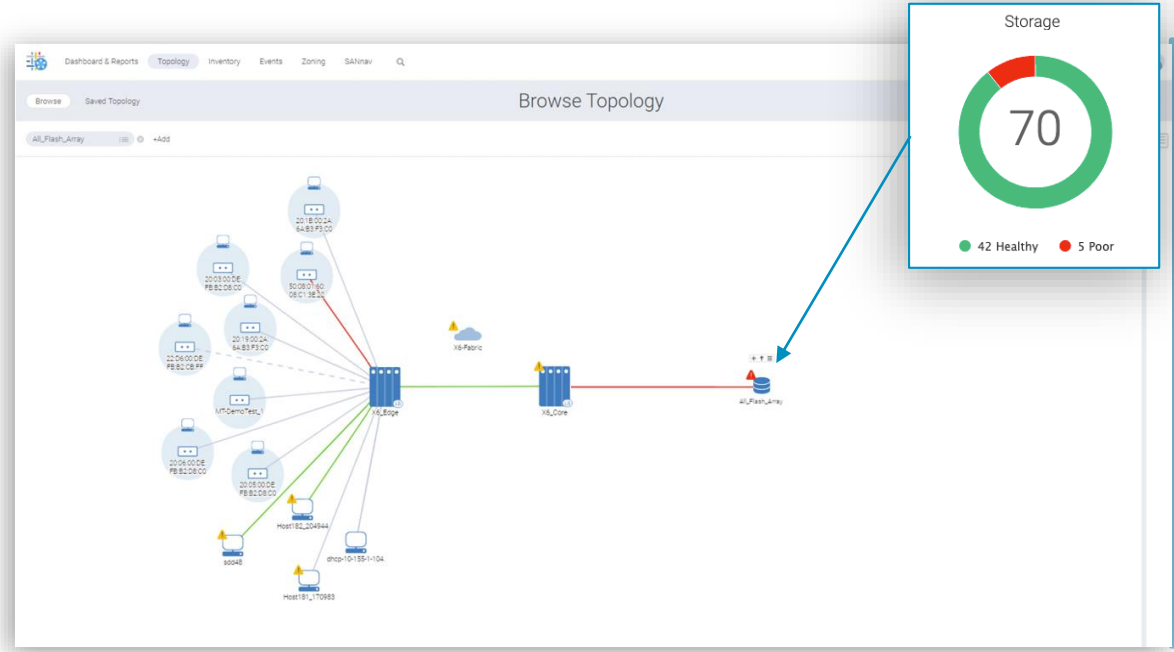
- Performance
- Port utilization
- Top port traffic
- Top congested ports
- Inventory
- Security
- Violations
- And more….




Visualize congestion ports by category:

- Top congestion
- Oversubscription
- Quarantined ports

# How can I see the application traffic from host to storage?



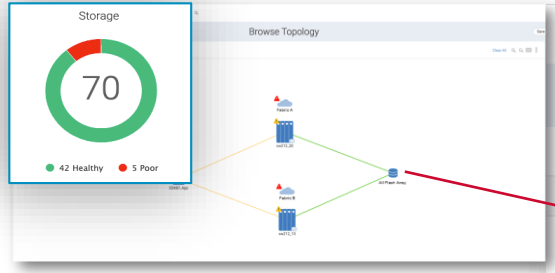


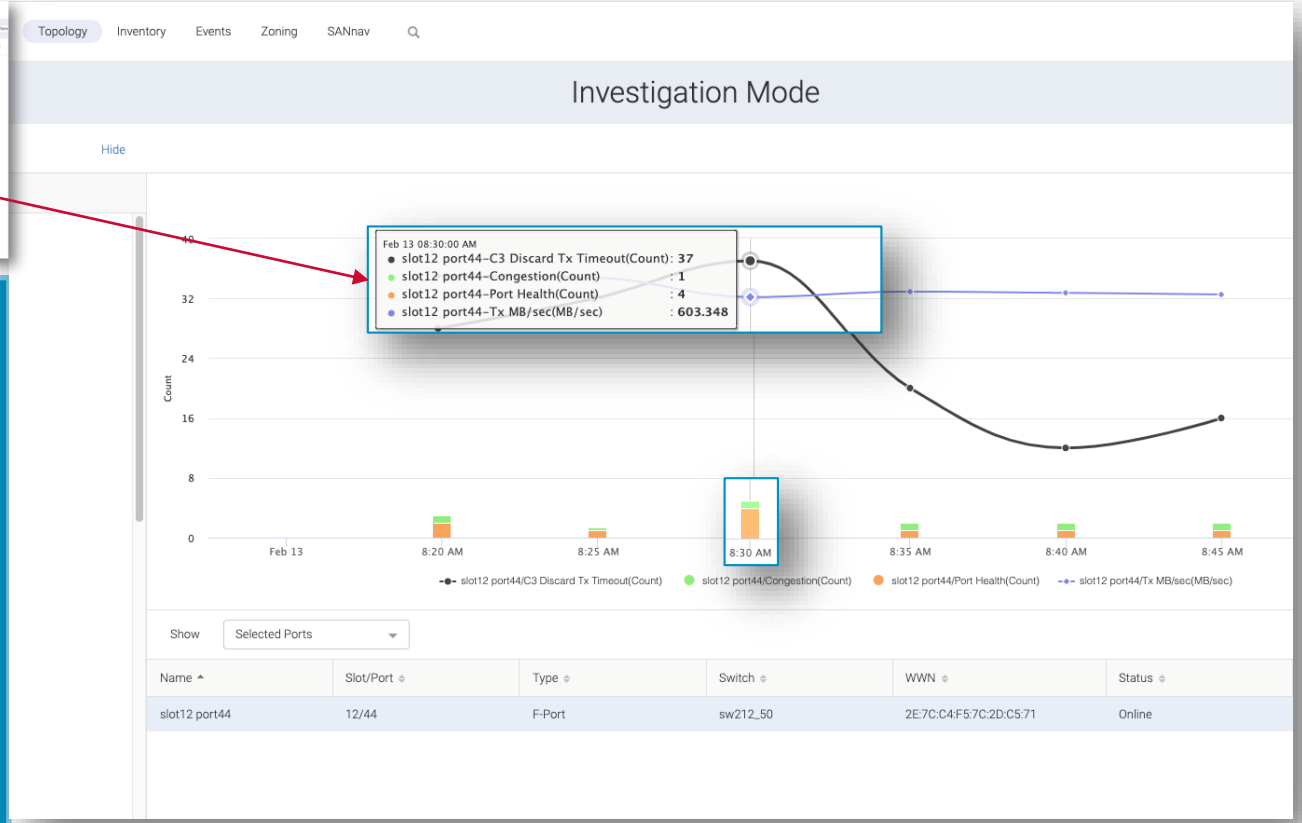


- Select the context view of interest
  - Zones
  - Fabric
  - Storage
  - Hosts
- Drill down to the port level
- Click on points of interest to investigate

- Easily see connection devices impacted
- See where to focus

# How can I identify where an issue is coming from?



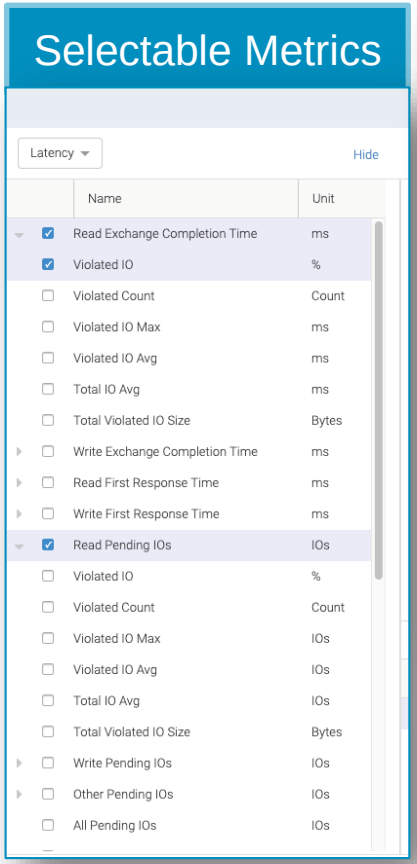

Single click to identify the issue in Investigation Mode

- **Location:** slot12-port 44
- **Issue:** Low port health causing C3 discard timeouts

The result is the application will need to wait for a time out and request a retransmission

# How can I identify what metrics are being impacted?

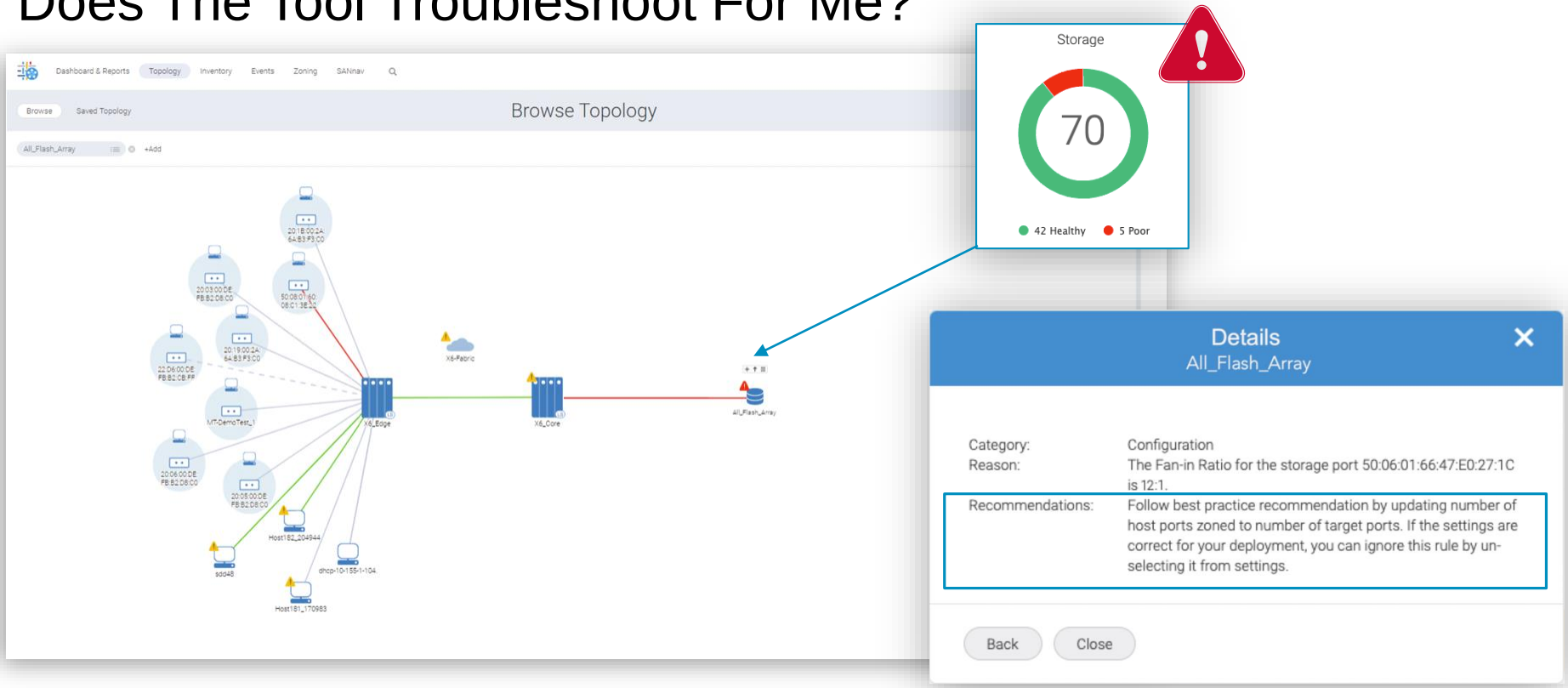
## Selectable Metrics




## Investigation mode


- Scroll and select the items of interest and then graph it!
  - Investigate down to 10 sec granularity if required
  - Easily identify what metrics are being impacted
- Auto populate selectable metrics from **Network Port Traffic Conditions**

# Does The Tool Troubleshoot For Me?



Putting Everything Together

# IBM SANnav Application Monitoring

# IBM SANnav notifies you when something is wrong

## Via Email

sjlab@broadcom.com

SANnav Collection ESX87 violated the rule: RD_STATUS_TIME > 0.6 with value 0.879.

To: Jane Customer

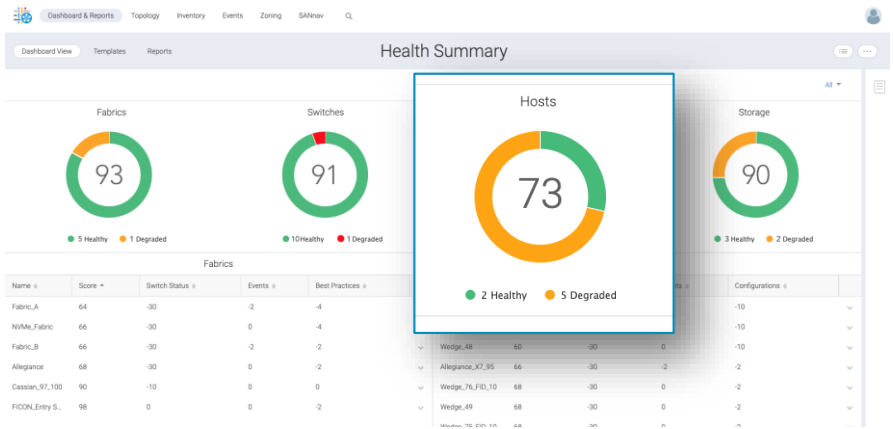
Reply-To: No Reply

Dear Customer
The event is generated from the SANnav for the following application

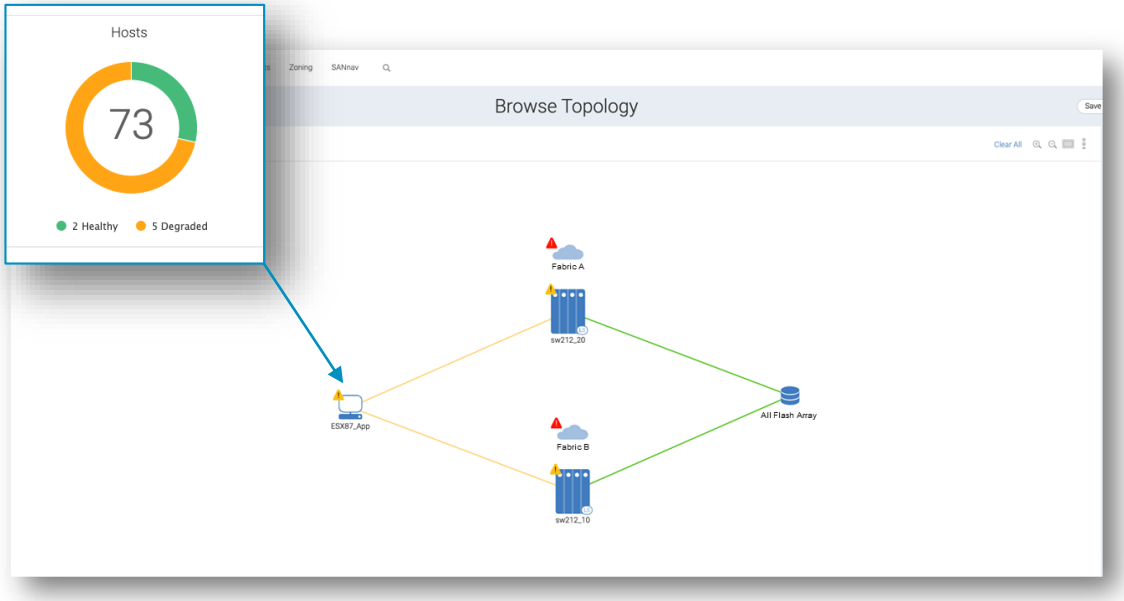
From: sannav195 [10.155.5.195]
Correlation Event
Severity: Warning
Date: Thu Feb 06 08:50:01 PST 2020
Description: Collection ESX87 violated the rule: RD_STATUS_TIME > 0.6 with value 0.879.
Source Address : 10.155.5.195
Source Name : sannav195
Product Address : NA
Port Details: N/A

Or

## Through the Dashboard



# Visualize what infrastructure is impacted




- Host impacted
- Connection fabrics impacted

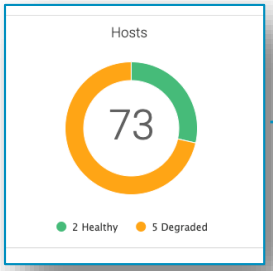
Details
ESX87_App

| | |
|---|---|
| Category: | Event |
| Reason: | Fabric Performance Impact : MAPS System notification - Rule defALL_PORTS_IO_PERF_IMPACT violated on slot3 port8 |
| Recommendations: | Isolate the devices causing the latency impact and disable the impacted switch ports. |
| Category: | Event |
| Reason: | Network Port Traffic Condition state is medium for one or more F-Ports. |
| Recommendations: | Check for any congestion conditions in the links. Also you may consider adding more paths or links with higher speed to reduce the severity of the condition. |

Close

# See what applications are impacted

## Application Flow Collections

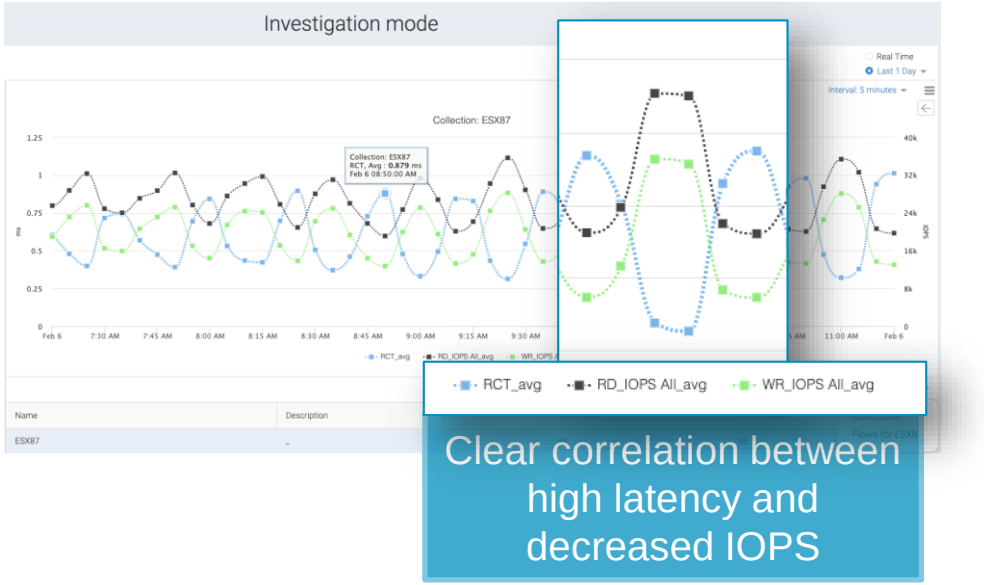




- Simplify monitoring and management of application traffic by aggregating all of the traffic flows together
- Apply custom MAPS policies to the collection
- Displays aggregated metrics for each flow collection
- Troubleshoot the collection made up of distributed flows and drill down to the individual flow of interest

# Investigate traffic flows by application

**Problem identified through the correlation between application latency spikes and read/write IOPS decrease**



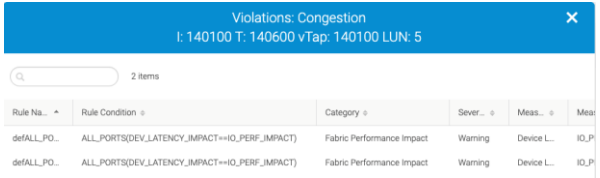

## Collection investigation:

- RCT (Read Exchange completion Time)
- Read IOPS
- Write IOPS

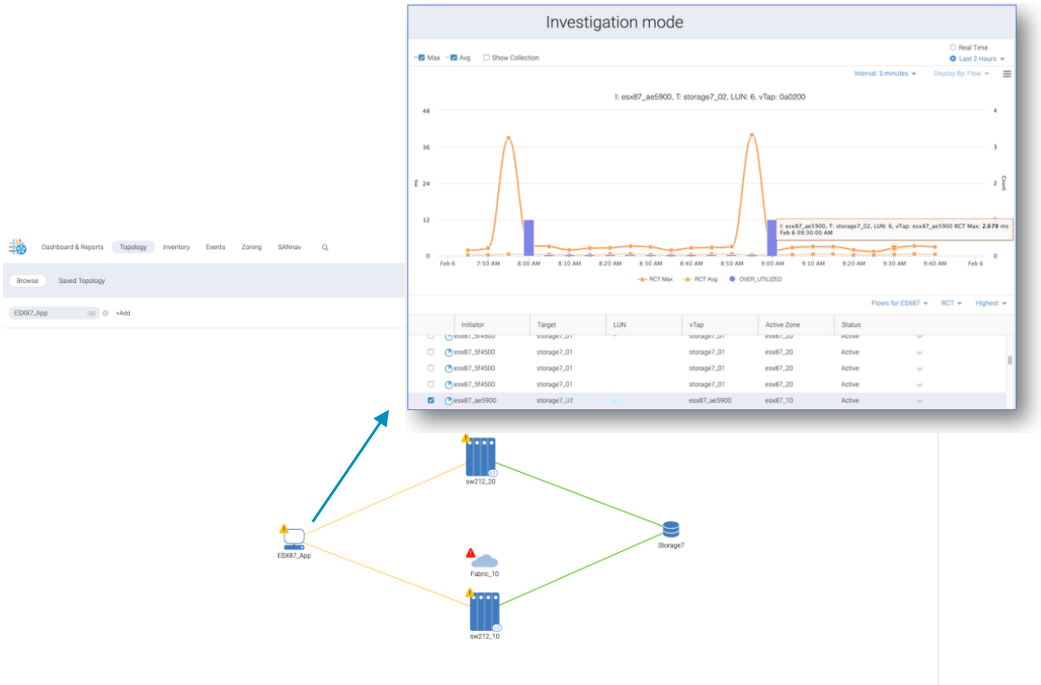
# Separate individual traffic flows for investigation

## Flow investigation:

- Target a particular flow for further investigation
- See the average and max latency all the way to 5 mins
- See what server port caused the congestion
- Clicking on the bar to see the actual violations:




# Quickly resolve the issue



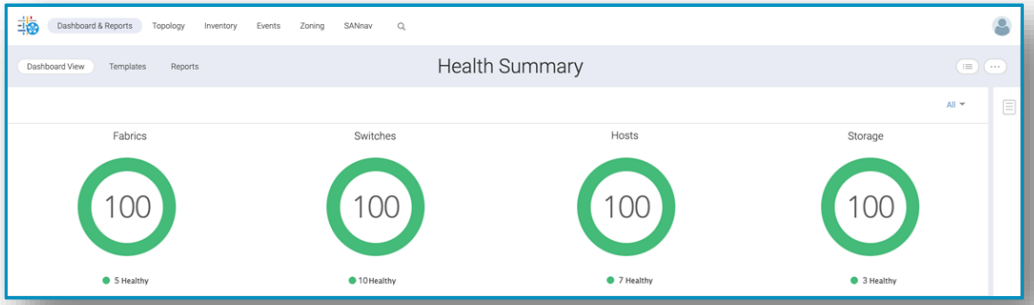

## Identify the Root Cause

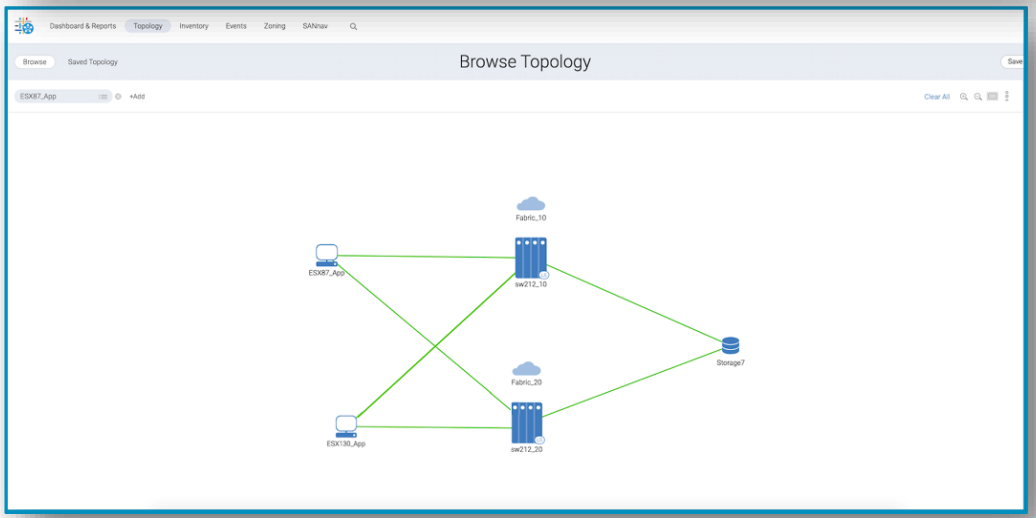
- The server ports that are used for this application are congested and overutilized

## Take Corrective Action

- Add a hypervisor or replace HBA or change multi-pathing
- Migrate some traffic to other servers to rebalance traffic
- Check the physical connectivity of the server

# Resolved and back to business

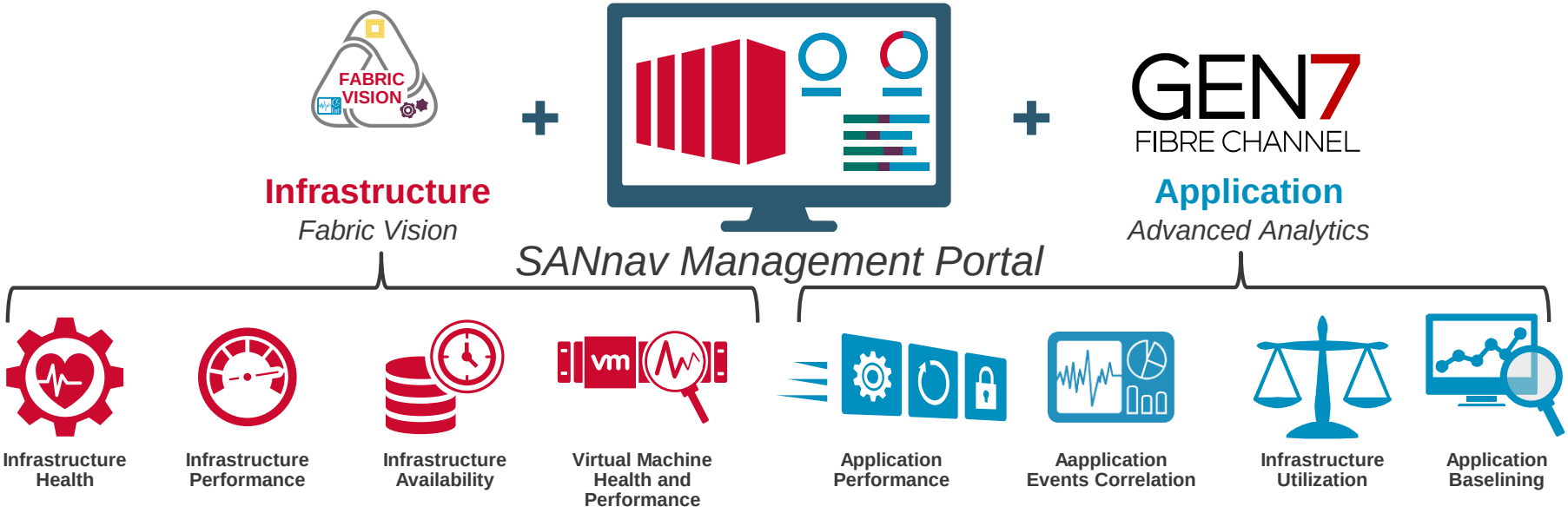



## Results:

- Faster time to resolution
- Improved application latency and performance
- Save money on third-party tools

# Summary




- Increase operational efficiency with **75% less time spent on administrative tasks**
- Deliver actionable insights and **reduce troubleshooting by 50%**


IBM