BROCADE
A Broadcom Company

Case Study

Brocade® BSL Fabric Analytics Case Study

Large Financial Institution

Customer

- Top 20 largest global bank
- Retail banking, wealth management, capital markets, insurance, investor, and treasury services
- 80,000+ employees serving millions of clients worldwide in ~30+ countries
- Market leader in personal lending, mutual funds, small business loans, and business deposits

Environment

A large bank is at the cutting edge of digital transformation. To empower consumers with instant information and better solutions, the large bank deploys a complex set of software tools to support internal banking operations. In order for everything to work together seamlessly, the large bank adopted a DevOps culture by deploying over 4800 developers to manage Agile software development and automation across 160 consumer applications that support many facets of their business. The following is a quick overview of the environment:

- Services
  - Brocade® Premier Supplemental Support
  - Brocade Support Link (BSL) with Fabric Analytics report
- Hardware
  - Brocade X6/8510 Directors and G620 Switches in dual fabrics (A, B)
  - Brocade Analytics Monitoring Platform
  - IBM SVC and DS8800 Storage
  - Dell EMC - VPlex and VMAX
  - Pure Storage
- Supporting
  - .NET development
  - Windows development
  - Web development service for user-facing systems

Issue

Recently, a problematic storage array I/O card, which services hundreds of virtual hosts on top of multiple physical servers, was experiencing credit stalls that periodically affected many of the hosts. The large bank had the Brocade Fabric Vision® Slow Drain Device Quarantine (SDDQ) feature enabled, so Brocade software was able to help temporarily avoid the disruption but not resolve the root cause of the weekly impacts. The disruption was avoided because Brocade switching has multiple ASIC-level counters that identify when a device is not returning credit. The Fabric OS® (FOS) software monitors these counters and generates alerts when credit delays by the end device are detected. Once these credit delays are identified, the Brocade SDDQ feature isolates the credit-stalled device and moves it to a different virtual channel pathway so that it does not disrupt other traffic flows. Still, without root-cause identification, the large bank contacted its infrastructure vendors, which ultimately led to traditional finger-pointing without remediation.

Solution

The large bank began piloting a new Brocade support offering called Brocade Support Link (BSL) during this time. The pilot program provided the large bank with weekly Fabric Analytics (FA) reports that not only helped them identify the root cause but also provided them with reports to share with their infrastructure vendors for resolution. The Brocade BSL technology combined with Fabric Analytics enables automatic proactive monitoring and analytics for congestion. FA reports not only help you identify and resolve congestion issues before impact occurs but also provide event and impact analysis to quickly identify the root cause and recommended actions to take.

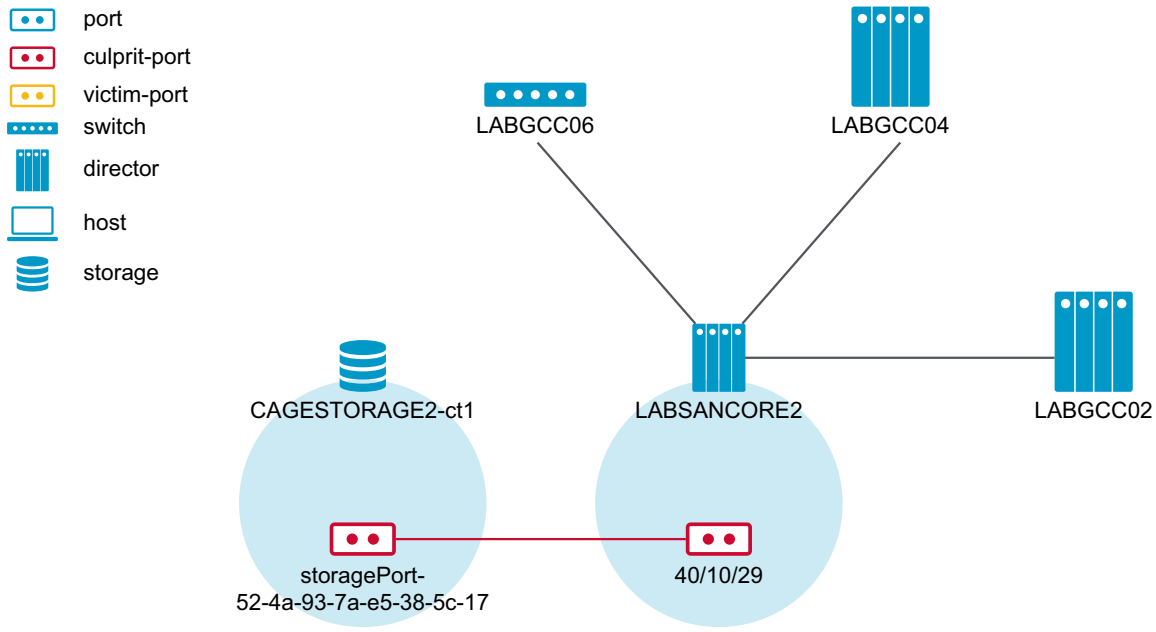
In the case for the large bank, the FA reports provided them with an analysis on performance issues found in their SAN and recommendations to fix the issues. Here are the summary findings from their analysis report and the highlighted areas to focus on.

- **Two** high-priority SAN-impacting issues were identified in the fabric **DEV_FabricB** in the current day data.
  - Refer to the High Priority Issues section for more details and recommended actions.
  - **Three** high-priority SAN-impacting issues were identified in the previous three days in the fabric **DEV_FabricB**. Refer to the Appendix for more details.
- **Physical-layer errors** were seen in the fabric **DEV_FabricB**.
  - Refer to the Fabric Health section for more details and recommended actions.

In the High Priority Issues section of the report, the large bank was able to quickly see that they had a storage I/O card being flagged weekly as a credit-stalled device. The following table summarizes the root-cause analysis of the identified high-priority issues and the recommended actions.

Root Cause	Credit latency caused by a credit-stalled device.	
Impact	The impact is isolated to the port mentioned below. No other ports or devices were impacted.	
Issue Occurrence	This issue was observed three times between Thursday, September 19, 2019, 21:15 UTC and Friday, September 20, 2019, 18:24 UTC.	
Switch Port Connected to the Credit-Stalled Device Port	Fabric:	DEV_FabricB
	Switch:	LABSANCORE2
	Domain/Slot/Port:	40/10/29
	Port Alias:	CAGESTORAGE2_CT1_FC7
	Domain/Index:	40/221
	PWWN:	20:dd:c4:f5:7c:72:02:40
Credit-Stalled Device	Server Name:	CAGESTORAGE2-ct1
	Device PWWN:	52:4a:93:7a:e5:38:5c:17
	Device PID:	0x28dd00
Recommendation	Refer to the Mitigating Credit-Stalled Devices section in the Appendix for further details.	

The report also identified how many times the misbehaving storage port was placed into quarantine via SDDQ, and it recognized all the hosts and ports that may have been impacted by the misbehaving storage port. It provided a summarized topology to easily understand the impacted landscape. In addition, the FA report provided recommendations to resolve the issue and suggested FOS features to help mitigate the impact.



In the end, a final root-cause report was delivered to the storage array vendor, who in turn scheduled a replacement I/O card to resolve the issue.

Benefits

The large bank was provided with a concise report that highlighted their issue in a simple format and the ability to cut through the finger-pointing. They were also able to leverage the report to expedite the replacement of the misbehaving storage array I/O card and resolve the issue permanently. Overall, the benefit of the Brocade Support Link BPA and FA reports allows even the most beginner-level SAN admins to pinpoint which devices are the source of an issue and to outline the actions that will resolve the problem. These reports can be shared with internal teams and management to clarify which teams can best address the issue to quickly resolve problems.

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