

# Safeguard your SAN against congestion challenges

See how Brocade® Gen 7 Autonomous SAN technology resolves common causes of congestion.



INTERACTIVE GUIDE

## **Protect against congestion**

### Application availability and performance starts with a resilient SAN.

Applications are the cornerstone of the modern enterprise. For businesses that truly want to outperform the competition, consistent and reliable application performance and availability is non-negotiable.

Compute, network, and storage resources all play a part in ensuring application availability and performance. With All-Flash arrays, NVMe storage and storageclass memory (SCM) now being common in the data center, the speed of these data center components is no longer the limiting factor. Today, enterprises face a different application performance bottleneck.

In high-performance storage networks, congestion happens from time to time and can become a barrier to business efficiency, reliable application performance, and in extreme cases application availability.

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In this guide you will learn more about common types of congestion that can arise in your data center and how Fibre Channel is equipped to protect against it when it occurs.

### Specifically you'll learn:

- How Brocade Gen 7 can pinpoint performance issues and resolve them.
- The importance of early intervention and proactive monitoring and maintenance.
- How Autonomous SAN technology can help you solve congestion challenges before they impact your applications.

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## Contents

## **Common causes of congestion**

Whenever buffer credits aren't returned in a timely fashion somewhere in the SAN, frames start backing upeventually leading to congestion. But what exactly causes this to happen in the first place?

### Buffer credits can be affected by a range of issues, including:

- Problems at the physical layer
- Oversubscription
- A speed mismatch between server and storage
- Multiple devices overloading a single device
- Bugs in the device firmware or driver

This can occur across the SAN fabric, in ports connected to the host, storage, or inter switch links (ISLs). Depending on what's affecting your application performance, you may need to take one of three corrective actions:

- 1. Fix issues caused by mismatched device speeds
- 2. Identify and correct application slowdown issues
- 3. Solve issues from sick but not dead links

While your SAN administrators could mitigate the impacts of these common types of congestion, they don't have to. In practice, when more than one or two issues occur at the same time, your admins end up spending all their time manually combing for signs of congestion and then resolving the issues. That means they have no time to contribute to more strategic, value-adding activities.

That's where an automated solution can help. By automating congestion detection and resolution, you can instantly mitigate impacts on your applications while you free up valuable admin time to resolve issues much faster. That's exactly where Brocade® Gen 7 technology comes in.



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## Fix issues caused by mismatched device speeds

When the rate at which a storage or host port sends or receives data is higher than the device's ability to take frames off the wire, the storage or host port becomes oversubscribed. This condition is common, particularly when a host's storage workload includes large numbers of read operations, such as a database table scan or data restore. In these situations, devices can receive data from multiple AFA storage ports at a rate the host can't match.

Brocade Gen 7 solutions can help.



## **Resolve application slowdown issues**

When a host or storage device doesn't return credits, it leads to a cause of congestion called credit stall. This issue can be caused by defective host bus adapter hardware or driver defects, and often leads to severe application performance degradation. In extreme cases, it can even cause I/O failure across the culprit and any other flows sharing the same path in the SAN.

Gen 7 tools reduce the impact of credit-stalled devices and the slowdown they can create in your SAN.



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## **Rapidly solve physical-layer issues**

Issues with physical-layer infrastructure in your SAN such as faulty media (SFPs) or HBAs can result in lost credits. While this condition is rare, continuous lost credits can result in the link becoming sick and completely running out of credits. At this point all transfer between endpoints stops.

Using powerful new tools, a Brocade Gen 7 SAN can automatically detect lost credits, recover, and alert SAN admins.

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## Ready to modernize your SAN?

Enable a resilient network that protects your SAN from congestion. Brocade Gen 7 will minimize downtime, increase application performance, and automatically resolve some of the most common forms of congestion. And it can also autonomously learn, optimize, and repair your fabric to reduce risk and save valuable administrator time.



Don't delay upgrading. Find out why.

For more information, visit Brocade Gen 7 to learn more.

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## WANT TO FIND OUT MORE?



Technical experts, Blayne Rawsky and Marcus Thordal, further explore the key features behind Brocade Gen 7 congestion management capabilities.



7