BROCADE

SUCCESS STORY

Royal Caribbean Cruises Ltd.

EXECUTIVE SUMMARY

Challenge

Upgrading the SAN infrastructure with minimal disruption to support 10-fold data growth.

Solution

- Brocade DCX 8510 Backbones in Virginia data center
- Brocade DCX-8 Backbones in Florida data center
- Brocade 300 SAN Switches on ships in fleet
- Brocade 7800 Extension Switches connect two data centers
- Brocade Network Advisor

Results

- Expanded SAN capabilities without adding complexity
- Maintained worry-free high reliability for even the most mission-critical systems
- Implemented 16 Gbps readiness for quantum-level storage performance

A Storage Network Makes Customers say "WOW"

At Royal Caribbean International, a cruise brand owned and operated by Royal Caribbean Cruises Ltd., innovation and imagination reign supreme. From the very beginning, the company has been guided by the principles of designing ships and creating itineraries that deliver unforgettable cruising experiences. Royal Caribbean's 23-ship fleet sails to more than 280 destinations worldwide, and its new Quantum of the Seas "smartship" set the cruising bar at new heights in 2014. Creating and delivering a "WOW" customer experience is Royal Caribbean's mission, and supporting the mission is a storage network infrastructure that must be uncompromising in its reliability, scalability, and flexibility.

Supporting Global Growth

Cruising is the fastest-growing category in the leisure travel market, according to the Florida-Caribbean Cruise Association, and demand is outstripping supply. Larger, more diversified ships, more destinations, and an explosion of exciting on-board and on-shore activities are attracting more than 22 million passengers per year, according to Cruise Market Watch. As a result, industry growth dramatically affects cruise lines' data center operations.

"Everything that our passengers see, touch, and use runs through our SAN," said Jorge L. Gonzalez, architect in Royal Caribbean's Enterprise SAN and Storage organization. "In the past two to three years, data volumes have grown 10-fold, and they will accelerate as we continue to expand our fleet and services." The company's global reservations system, customer relationship management system, data warehouses, internal human resources applications, file sharing, printing, and virtual environments all rely on the Storage Area Network (SAN). Continuous global health and security monitoring also require SAN resources.

Each ship in the fleet is also a floating data center. To date, there are 95 SAN switches deployed on Royal Caribbean ships worldwide. Each older ship requires support for approximately 25 terabytes (TB) of data, not including security and video data. The new Quantum of the Seas smartship requires SAN resources for more than 60 TB, and five more smartships are being built. To cope with this data deluge, Royal Caribbean recently expanded its Florida data center to a collocated facility in Virginia.

"We needed to scale our existing infrastructure to support 16 Gbps speeds and enable us to easily add storage resources as needed," said Gonzalez. "As we considered solutions for the new data center, the vendors' roadmaps were critical. We needed to know that

WHY BROCADE

"Our new Quantum class of ships is the most technologically advanced to ever set sail. From planning their cruise, SMART Check-in, and SMART Concierge, to enjoying the world's first true robotic bar, 270-degree entertainment, and the video, interactive, and kinetic smart art collection, our passengers interact with our SAN the entire time. Brocade helps us deliver a 'wow' experience every time."

—Leonardo Irastorza, Information Technology SAN & Storage Manager

the vendor we chose would deliver on its milestones. And of course, product reliability was essential."

Brocade Floats Their Boat

Royal Caribbean has been a long-term Brocade customer for its storage solutions. For this decision, the SAN team evaluated several competing solutions. The server team had chosen IBM and Cisco UCS servers, and it made sense to consider a Cisco solution for the SAN switches. However, after reviewing roadmaps and considering the reliability of their existing Brocade® switches, the SAN team chose Brocade DCX® 8510 Backbones for the new data center.

"Brocade had the better roadmap," said Gonzalez. "It is well-defined and they consistently meet their milestones. We made our decision based on the strong roadmap and our long experience of superior reliability from Brocade products."

A Top-Deck Data Center

Royal Caribbean deployed redundant Brocade DCX 8510 Backbones with Gen 5 Fibre Channel to build its SAN foundation in the new data center. The Brocade DCX 8510 Backbones with Gen 5 Fibre Channel deliver unmatched reliability, simplicity, and 16 Gbps performance. The Brocade DCX 8510 Backbones complement the Brocade DCX-8 Backbones already installed in the Florida data center, as shown in Figure 1, allowing Royal Caribbean to consolidate its SAN infrastructures to simplify management and reduce operating costs.

Both data centers rely on combinations of IBM, HP, and Cisco UCS servers. Brocade 7800 Extension Switches connect the two data centers to provide data replication. Today, Royal Caribbean migrates systems between the two data centers, but soon the company will use its Brocade 7800 Extension Switches to handle live data replication.

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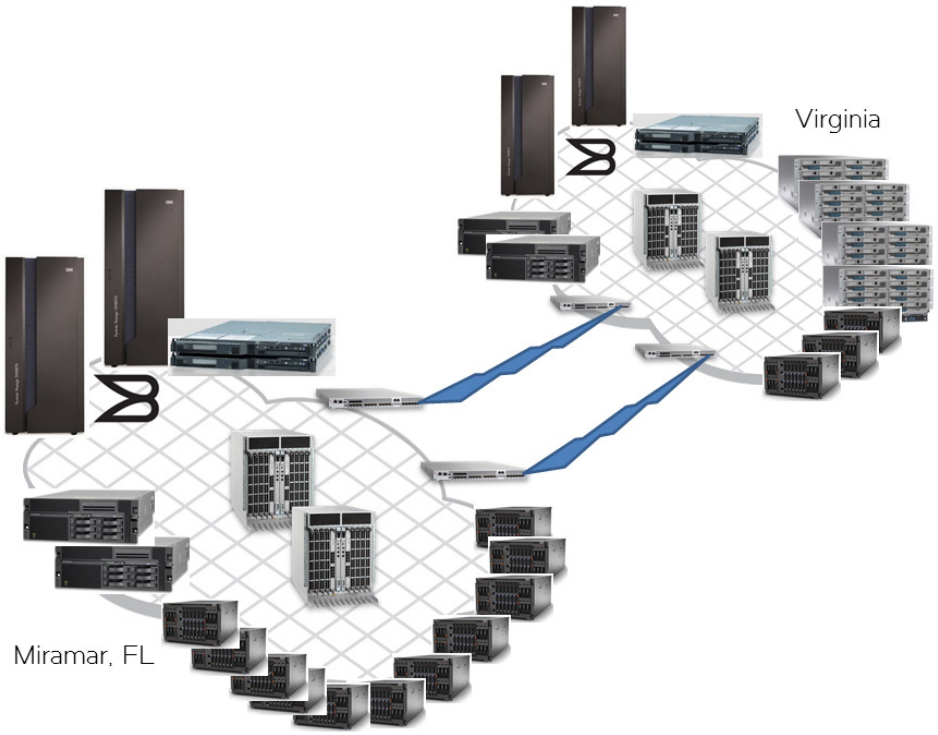

Figure 1: Brocade data center deployment

Fleet ships have either a single data center, with a pair of smaller 24-port Brocade SAN switches, or a redundant data center with four switches. Royal Caribbean's SAN team uses Brocade Network Advisor (BNA) to manage end-to-end SAN infrastructure, including the remote on-ship switches.

It Just Works

"Brocade just works," said Gonzalez. "I started using Brocade more than 10 years ago and never looked back. We are not staffed for emergencies, so we need reliable solutions. Sometimes we forget the Brocade switches are there."

Implementation with the IBM and UCS servers was a non-issue and BNA makes it easy for the small SAN team to manage more than three petabytes of data. Gonzalez reports that BNA is so easy to use that Royal Caribbean was able to hire a person with no networking background and have him actively manage important functions within two weeks.

The Brocade Backbones also help Royal Caribbean effortlessly process high-intensity workloads. On an average day, its servers already exceed 400,000 to 500,000 I/Os per second. Now with 16 Gbps capacity available, Royal Caribbean is planning to implement 16 Gbps server blades to drive performance even higher. The Brocade DCX 8510 Backbones also include UltraScale chassis connectivity for a flatter low-latency fabric which simplifies Royal Caribbean's SAN while unleashing the full potential of high-performance private cloud storage.

"Our new Quantum class of ships is the most technologically advanced to ever set sail," said Leonardo Irastorza, Information Technology SAN & Storage Manager. "From planning their cruise, SMART Check-in, and SMART Concierge, to

enjoying the world's first true robotic bar, 270-degree entertainment, and the video, interactive, and kinetic smart art collection, our passengers interact with our SAN the entire time. Brocade helps us deliver a 'wow' experience every time."

Next Steps

Royal Caribbean is already planning to implement Brocade DCX 8510 Backbones in a third data center, which will support more high-intensity applications, such as high-growth data warehouses and advanced analytics capabilities. The new Quantum of the Seas was launched in November 2014, followed by sister-smartship Anthem of the Seas in April 2015. A third smartship Ovation of the Seas will launch in 2016. And each ship will place more demand on the company's SANs. But the SAN team is confident that whether the SAN is processing operations for RipCord by iFLY, the first skydiving experience at sea, or transforming the technology-infused Two70 lounge, the result will be the same. WOW.

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