



HA-AP APPLIANCE SUCCESS STORY

A Commodity Exchange in China Guaranteeing Zero-downtime Continuity for Trading Center

KEY HIGHLIGHTS

Industry: Financial

The Challenge

- Provide high-availability access and protection of trading center database on 2 EMC VNX5150 storage systems; support multiple physical servers and VMware virtual clients.
- Support trading center demands of high IOPS and 7*24 operations, by ensuring storage performance and availability of data.

HA-AP 8G Benefits

- Real time hot-swappable protection for critical data.
- Continuous availability of mission-critical trading system for around-the-clock operations.
- Affordable, high-availability, easy-to-manage solution that protects against failures of FC fabric and primary RAID storage.
- Simple, centralized administration.

HA-AP 8G Versatility

- HA-AP engines can be clustered over Fibre Channel to create local or remote mirroring.

The Customer

Our case subject is a commodity exchange located at a Pilot Free Trade Zone in the South China Region. To protect its privacy, our customer has requested that we write this story under a disguised name. We honor that request and from here on out, will simply refer to it as CSCE, short for Case Study Commodity Exchange.

CSCE's commodity businesses primarily include: actuals auction trading and information publication of all kinds of industrial products, agricultural products, forest products, chemical products and machineries, etc.; warehouse and logistics services; imports and exports; information consultation and services; Internet technology application research and development, consultation and services.

Background: Commodity Exchange

A commodity is a reasonably interchangeable good or material, bought and sold freely as an article of commerce. Commodities include agricultural products, fuels, and metals and are traded in bulk on a commodity market.

Most commodity markets across the world trade in agricultural products and other raw materials (like wheat, barley, sugar, maize, cotton, cocoa, coffee, milk products, pork bellies, oil, metals, etc.) and contracts based on them.

A commodity exchange is an entity, usually an incorporated non-profit association, which determines and enforces rules and procedures for the trading of commodities and related investments; where various commodities and derivative products are traded.

Challenge: Provide High-Availability Trading System

Based on e-commerce technologies, the CSCE trading platform combines commerce with trading, it facilitates transactions such as inquiry, order, order match, clearing, settlement, and delivery, which requires interaction with various banking systems, logistics systems, risk management systems, information publication systems, just to name a few.

The commodity trading system operates on a real time basis through online means. Farmers, exporters, importers, and traders are the main participants on this platform. These and other transactions are mission-critical to CSCE, they generate and utilize large volume of data around the clock on daily basis, and they rely on a dependable system that is available 7*24.



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Guaranteeing Zero-downtime Continuity
for Trading Center

The system's high availability (HA) must be addressed at all levels, including application, host, network, and storage. A sound HA system should deploy software-clustered hosts and virtual host technology, to ensure the availability of hosts and continuity of applications; as well as fully redundant SAN switches to ensure the availability of network paths. In addition, the storage must be enabled to deliver equivalent availability, so that an end-to-end redundancy from hosts through network to storage may be achieved.

While the applications of host virtualization and networking technologies for HA purpose have largely reached maturity, the same could not be said about storage HA. Therefore selecting a best-fit HA SAN architecture was identified as one of the key requirements for the project team.

Solution: HA-AP HA SAN Architecture

The project team considered the Loxoll's HA-AP Appliance, EMC VPLEX and IBM SVC solutions. Upon further examination, the team found that although all three solutions provide storage HA function by mirroring data, however in more ways than one, the HA-AP and the other solutions are actually based on two very different designs and technologies:

1. **Solution Type.** The VPLEX/SVC is a virtual storage solution that also offers HA function, the storage virtualization nature dictates that the original LUN is either "stamped" or re-packaged before it is mapped and presented to the servers. Since servers do not see the original LUN, the LUN would become inaccessible if the gateway should fail.

On the other hand, the HA-AP is a physical hardware data router built to perform only HA function. HA-AP retains LUN data in its unmodified, native format on disk. If necessary, direct storage system access could be restored by simply removing HA-AP from the data path.

2. **Hardware Configuration.** The VPLEX/SVC is a clustered Linux x86 PC system with multi-core high-power processor, large high-speed cache memory, and 8GB/sec. HBA card. This type of system structure is complex, requires dedicated administrative server and metadata LUN. It would seem that longer installation cycle, more tedious setup and configuration tasks, more complicated maintenance procedures, and higher stability and security risks are all valid concerns it.

Instead, the HA-AP's single-purpose, modular enterprise-grade integral design and embedded operating system can deliver reliable HA SAN without any of these drawbacks.

3. **Synchronized Write Caching.** The VPLEX/SVC's virtualization approach requires high CPU power and large cache memory to process data. The most critical technical challenge is that in order to avoid data corruption, data consistency of cache memory amongst all engines must be maintained at all times.

In comparison, the HA-AP's data-routing approach accomplishes LUN synchronization through analyzing standard SCSI3 read/write commands, and dispatching/re-directing data accordingly. Engine cache memory is used for command queuing purpose only, no write-caching is performed and therefore no cache synchronization is necessary, so there is no concern for data integrity.

4. **Failover.** Upon system component failure, the VPLEX/SVC's clustered Linux structure requires the analysis of various factors in reaction to failure. It usually takes 40 seconds or more to complete the failover, which is more than likely to have a negative impact on the applications.



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Because HA-AP does not utilize synchronized writing caching, in all cases of failure caused by storage, FC connection, or HA-AP engine, failover simply involves switching over to a healthy data path, which can be accomplished instantaneously and without forcing application downtime.

The project team carefully evaluated these findings, visited existing HA-AP client site to confirm their findings, and chose the Loxoll HA-AP Appliance solution:

- Two EMC VNX5150 storage systems at the back-end
- A trading database (JYDB) and various applications on the front-end
- Multiple physical servers and VMware-based virtual clients
- A clustered dual-engine Loxoll HA-AP Appliance connecting the front and back ends

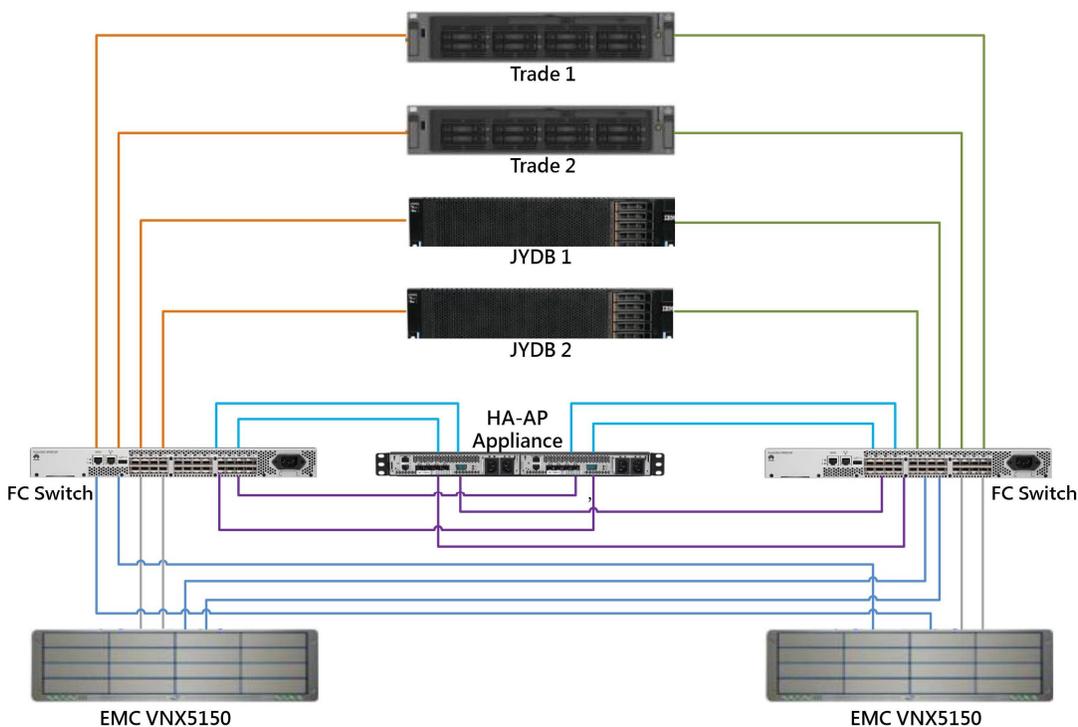


Figure 1. CSCE System Configuration

Benefits: Affordable Zero-downtime Business Continuity

The system has been installed, tested, and in production with highly satisfactory results. The SI's manager-in-charge, Mr. Zhang, passed on these customer comments, "The Loxoll HA-AP Appliance satisfies our need perfectly. It enables a mirrored active-active storage HA architecture, where upon detecting failure, the real-time automatic failover/failback do not affect the applications. It helps us achieve sustained business continuity."

Mr. Zhang also drew his own conclusion, "The Loxoll HA-AP Appliance is a purpose-built hardware HA SAN solution. We strongly recommend it to our customers who demand business continuity."

Loxoll Inc.

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