

the **Availability Digest**

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2010 NonStop Availability Award October 2010

Every year since 1995, the NonStop Availability Award is given to the NonStop user that has demonstrated superior high availability practices. The award is determined based on four criteria:

- Outage Minutes
- Configuration and Operational Complexity
- Use of Best Practices for Outage Prevention
- Quality of Outage Data

The NonStop Availability Award is a user-group sponsored award started years ago by ITUG, the International Tandem User Group. It is now sponsored by Connect, the HP Business Technology Community.

And the Winner Is –

The 2010 NonStop Availability Award was presented this year at the closing session of the 2010 NonStop Symposium held in San Jose, California, from September 26th to September 29th.

Congratulations to this year's winner, Bank-Verlag Zahlungssysteme of Germany.

Congratulations also to the two runner-ups – Belgacom of Belgium and VocaLink of the U.K.

Bank-Verlag

Bank-Verlag has been featured as a case study in the Availability Digest.¹ Bank-Verlag was perhaps the first company ever to use NonStop servers in an active/active configuration.² In 1986, Bank-Verlag was tasked by a group of German banks to create a system to manage the new technology of debit cards that was just being offered to the German public. It built a debit-card authorization system using an IBM 370 donated to it by one of the banks.

Shortly after the inauguration of the new debit-card system, the use of debit cards became very popular in Germany. Bank-Verlag recognized a need for greater availability and set out to investigate other platforms. It was impressed by the fact that Tandem bragged about two 9s to the right of the decimal point whereas other systems bragged about two 9s to the left of the

¹ *Bank-Verlag – An Update*, *Availability Digest*, August 2010.
http://www.availabilitydigest.com/public_articles/0508/bank_verlag_update.pdf

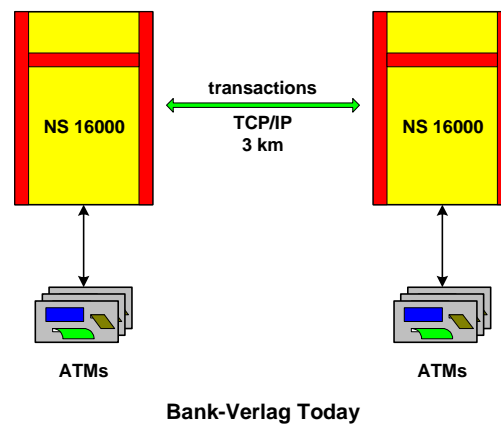
² *What is Active/Active?*, *Availability Digest*, October 2006.
http://www.availabilitydigest.com/public_articles/0101/what_is_active-active.pdf

decimal point. Tandem was chosen, and an existing debit-card package that ran on the NonStop system was acquired and modified for Bank-Verlag's use.

This left the problem of migrating from the IBM 370 to the Tandem VLX without denying service to debit-card users. To solve this problem, Bank-Verlag were configured what would come to be known as an active/active configuration between the IBM system and the Tandem system. The first step was to modify both the IBM and Tandem applications to send processed transactions to the other system. The IBM database was copied to the Tandem, and a few ATMs were connected to the Tandem.

At this point, both systems were processing transactions and sending their transactions to the other system for processing to keep the databases in synchronism. In just a few days, Bank-Verlag had migrated all of the ATMs to the Tandem system; and transaction replication was kept in place to keep the IBM system as a hot-standby.

In 1989, with the continued explosive growth in the use of debit cards, the capacity of the authorization system had to be expanded. Because of the increasing importance of debit cards to the German economy, Bank-Verlag also wanted to achieve a degree of disaster tolerance. It therefore revisited its earlier active/active success and purchased a second Tandem system, installing it in a separate data center three kilometers away (Germany is not plagued by hurricanes and earthquakes). The application was modified so that only the updates created by a transaction were replicated to the other system, thus improving processing efficiency. The ATMs were distributed between the two systems, and both actively processed debit-card transactions. A Tandem (now HP NonStop) active/active system was thus born in 1989.



To our knowledge, the Bank-Verlag system has suffered only one outage in its 21 years of operation due either to planned or unplanned downtime. Early on, an operator error took down both systems. Operational procedures were quickly improved to prevent such occurrences in the future.

VocaLink

The VocaLink Faster Payments Service (FPS) system has also been the subject of an Availability Digest case study.³ In May, 2008, when VocaLink inaugurated its Faster Payments Service, it introduced the first new payments service in the U.K. in twenty years. For the first time, phone, Internet, and standing-order payments moved in real time between customer banks.

On a peak day, the VocaLink automated payment platform processes over 90 million transactions. The switching platform connects the world's busiest ATM network of over 63,000 ATMs. Its HP NonStop Real-Time Payments platform provides the central infrastructure for FPS.

VocaLink's SLA is interesting. It calls for 100% availability (no 9s) from midnight to 6 AM when standing orders are processed. Its overall availability must be greater than 99.75%. To achieve

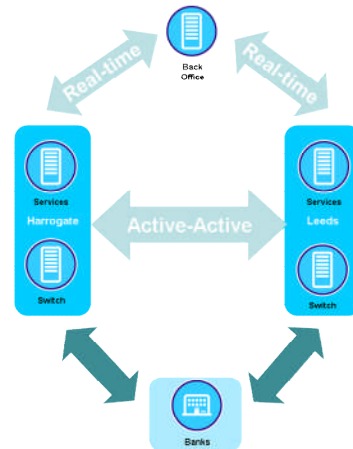
³ Damian Ward, *Faster Payments - Bringing Payment Processing Into the 21st Century*, *Availability Digest*, June 2010. http://www.availabilitydigest.com/public_articles/0506/vocalink.pdf

this, VocaLink has implemented FPS using an active/active architecture, with HP NonStop servers distributed between two data centers, one in Harrogate and one in Leeds.

In each data center, there are two eight-processor NonStop servers. One handles the ATM network, and the other provides the FPS functions. This gives VocaLink a two-to-one expansion capability by adding up to eight more processors to each system. The databases of the two data centers are kept in synchronism via data replication.

Each user of the FPS system maintains connections to both data centers. A user will round-robin its transactions between the two data centers, sending one transaction to one data center and the next transaction to the other data center. This procedure provides two benefits. First, a system fault is rapidly detected should a response not be received in response to a transaction. In this case, the user will simply route all transactions to the surviving system until the failed system is restored.

Furthermore, transfers between banks can all be accomplished within one data center since all banks connect to both data centers. When a bank executes a transaction with another bank, it is assured that the recipient bank is connected to the data center to which the transaction is routed. In the rare case of an outgoing link failure to a bank, FPS will route the transaction to the other data center for execution.



From an availability viewpoint, the FPS system has had zero downtime due either to unplanned outages or planned outages for upgrades since its inception.

Belgacom

Belgacom, headquartered in Brussels, is the largest telecommunications provider in Belgium. Created in 1991, Belgacom is an outgrowth of the Belgium national telephone and telegraph company (RTT) that dates back to 1930.

Belgacom has implemented its Customer Oriented Billing (COB) on a NonStop NS16000 with 1.7 terabytes of disk storage. COB provides several functions, including:

- customer order processing
- billing
- payments and refunds
- complaints
- reminders
- usage processing

COB supports 3,200 terminals and processes a peak load of 2,200 transactions per second.

The downtime cost to Belgacom for COB outages is estimated to be 70,000€ per day for a one-day outage, escalating to over 1 million euros per day for a 30-day outage. The COB SLA therefore calls for 24x7 operation with 100% availability except for two five-hour planned maintenance outages per year for major application releases. The result is an overall availability of 99.88%, or almost three 9s.

These outages are taken at night when activity is at a minimum. Though application upgrades can be made online, the planned maintenance outages gives Belgacom the ability to make

complex upgrades to several applications that interact with each other and that therefore must be synchronized. Other application upgrades are made online throughout the year.

All hardware maintenance and database reorganizations are made online with no downtime.

The COB system is backed up with a disaster recovery site 35 kilometers away. The DR site is kept synchronized with the production site via asynchronous replication using NonStop RDF (Remote Database Facility). The backup site has already proven its value with a successful failover.

The Criteria for Winning

There are four criteria for winning the NonStop Availability Award:

- The number of minutes that the system has been down in the reporting period.
- The system configuration and its operational complexity.
- The use of best practices for outage prevention.
- The quality of outage data.

Typical best practices reported by entrants have been summarized earlier in the Availability Digest (see *Availability Best Practices*, *Availability Digest*, January 2007, which can be found at http://www.availabilitydigest.com/private/0201/availability_best_practices.pdf).

The quality of outage data is very important. The selection team, headed by Wendy Bartlett of HP, looks for application availability statistics both within the governing SLA and calculated on a 24x7 basis. If there have been no user-perceptible outages, scheduled or unscheduled, beyond one-off failures of client devices such as ATMs or POS devices, this qualifies as 100% availability. Otherwise, availability is reported relative to the SLA and also on a 7x24 basis.

Another Criterion?

Based on major failures that we have seen and have reported in our Never Again series, it seems that there might be one more criterion for an availability award. That is customer communication during an outage.

When a system goes down, the end user has no idea what has happened. Is it his system? Is it a network problem? Is it a data center problem? Who should he call? How long will he be out of service?

There have been too many cases in which an outage created such havoc in the data center that the call center was overwhelmed and did not answer calls or respond to emails. Status was often planned to be posted to the company's web site, but the web site was down. Frustrated customers were left totally in the dark. This has happened to many major companies, such as Amazon, PayPal, Salesforce.com, Hostway, and WestHost, as reported in the archives of the *Availability Digest's* Never Again series.

On the other hand, several companies managed to maintain good customer communications during major outages, including Google, Rackspace, and The Planet. Several have implemented independent digital dashboards showing in real time the status of all of their services. They include Google's Google Apps Dashboard, Amazon's Service Health Dashboard, and Salesforce.com's trustsalesforce.com. Both Amazon and Salesforce.com implemented their status dashboards in response to outraged demand by their users. Kudos go to these companies for caring about their users.

Poor customer communication during outages is no longer hidden. When this happens, Twitter tweets ensure that everyone knows. Should not high availability include customer support when the system is unavailable?

Summary

The NonStop community is focused on high availability – that is what HP NonStop systems are all about. The NonStop Availability Award is a recognition of those companies that have carried this technology to the extreme – often zero downtime - with availability best practices.