

the **Availability Digest**

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Royal Bank of Scotland Offline for Two Weeks

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On Tuesday, June 19, 2012, operations at the Royal Bank of Scotland, NatWest, and Ulster Bank came to a halt. Millions of bank customers were affected. They could not receive their salaries or pension payments. They could not pay their bills or use the banks' online services.

The outage spilled over to customers of other banks when expected payments could not be made.

The problem was a software upgrade that had gone terribly wrong. It was two weeks before operations returned to normal.

The Royal Bank of Scotland Group

The Royal Bank of Scotland Group (the "bank") is a holding company whose assets include the Royal Bank of Scotland, the National Westminster Bank (NatWest), and Ulster Bank in Ireland. It holds other assets throughout Europe, Asia, and North America (it owns Citizen's Financial Group, the eighth largest bank in the U.S.).

The RBS Group is headquartered in Edinburgh, Scotland. Its U.K. banks service over 17 million customers through 2,500 branches.

An Upgrade Gone Wrong

Every night, the RBS Group processes over twenty million transactions in a massive batch run. A primary function of the batch run is to transfer monies between accounts based on transactions that occurred during the last 24 hours.

In order to properly manage the thousands of batch jobs, the bank uses the CA 7 Workload Automation product from CA Technologies (formerly Computer Associates). Batch management software such as CA 7 is used to process routine jobs on a computer without the need for manual input. Jobs are prioritized, scheduled and performed automatically, saving staff time and using computer resources more efficiently.

Over the weekend of June 16th and 17th, during a period of little transaction activity, the bank undertook to upgrade its batch management CA 7 facility from CA 7 v11.1 to CA 7 11.3. However, on Monday, June 18th, a problem was noticed with the new version; and the upgrade was backed out on Tuesday, June 19th. That is when things came to a crashing halt for RBS, NatWest, and Ulster Bank.

During the batch run on Tuesday with the restored original version of CA 7, one of the batches failed. Further batch jobs in the sequence could not be initiated until the failed batch job was corrected. Unfortunately, the operations staff could not determine at what point in the batch stream the failure had

occurred. It had to determine the point at which transactions had been properly processed before it could continue the processing of other transactions.

Even with the help of CA Technologies, it took until Friday, June 22, to pinpoint the cause of the failure and to resume batch processing at the point where it had prematurely terminated. Though the bank has not released details of the cause of the outage, industry information points to the deletion of a critical scheduling file needed by CA 7 that occurred during the backout of the failed upgrade.

While the operations staff was attempting to correct the problem, a huge backlog of unprocessed transactions had accumulated. Each transaction represented some customer who did not get expected money or whose bill went unpaid. Online banking services were negatively impacted. Seventeen million customers were affected, and Irish customers were the last to be returned to service.

Funds that were to be transferred to accounts in other banks did not get processed, so the problems propagated to other banks outside of the RBS Group.

In mid-July, when operations had returned to normal, the bank issued an apology and provided some information concerning the cause of the outage. In released statements and letters to the authorities, it said:

“The initial reviews we have carried out indicate that the problem was created when maintenance on systems, which are managed and operated by our team in Edinburgh, caused an error in our batch scheduler.

“This error caused the automated batch processing to fail on the night of Tuesday 19 June. The knock-on effects were substantial and required significant manual interventions from our team, compounded because the team could not access the record of transactions that had been processed up to the point of failure.

“The need to establish at what point processing had stopped delayed subsequent batches and created a substantial backlog.

“In order to be able to recommence automated batch processing and to move towards a normal state, the batches had to be brought back into sequence.

“Unfortunately for our customers in Ireland, Ulster Bank payments follow in sequence after those of NatWest and RBS. This is because of the way the technology was set up at the time the three banks were integrated.

“It in no way reflects the priority we attach to our Ulster Bank customers.”

The Financial Services Authority, the U.K. banking regulator, has asked for details of the outage. The RBS Group is undertaking a detailed investigation by independent experts to determine what went wrong and what can be done in the future to prevent such disasters.

The Aftermath

As a result of the outage, businesses were unable to pay their staff. Pensioners could not get their pension payments. Tenants could not pay rent to their landlords. Shoppers were left stranded at checkout counters. Home closings were delayed. There was even a case of a defendant spending an extra weekend in jail because his bail bond did not clear.

To help resolve issues, the bank extended branch banking hours for 1,200 branches, even taking the unprecedented move of keeping some of them open on Sundays. The bank doubled its call center staff. In Ireland alone, the call center handled 70,000 calls in the first week following the outage.

The bank notified customers that they could withdraw up to £100 over their credit limit on bank-issued credit cards with no overdraft penalty.

The bank made it clear that it will ensure that no customer is out-of-pocket for any expenses incurred as a result of the outage. It will reimburse customers for late credit-card fees and for the costs of telephone calls, and it will resolve any problems with the credit-rating agencies because of reports of late payments caused by the outage.

Help came from other sources. The Social Security Agency directed pensioners to go to a local bank branch where they could receive funds up to a limit if they missed receiving their pension payments. The Cumberland Building Society offered to pay emergency salary and pension payments to affected bank customers. However, other U.K. banks were not so cooperative, taking the position that this was not their problem.

By Friday, June 29th, ten days after the outage, the bank said that service had been restored to 99% of its customers. But the bank's Irish customers, who were at the end of the batch processing cycle, saw no such improvement. The bank was still working through uncompleted transactions for Ulster Bank. Up to 100,000 customers across Ireland were still experiencing difficulty in accessing their money. Many would not receive their wages or pension benefits until the following week. By Monday, July 2nd, it appeared that the bank had finally worked through its transaction backlog.

The costs of this outage to the bank have been variously estimated to be between £50 million and £100 million. They include the costs of keeping 1,200 bank branches open for several days, of doubling the call center staff, of reimbursing customers for a range of fees and penalties, and of working with the credit-rating agencies to resolve erroneous credit degradations.

Whodunit?

There was a lot of confusion concerning where to place the blame for the problems associated with the failure of the known-working version of CA 7 following the upgrade backout. Fingers initially pointed to India.

The RBS Group had recently outsourced much of its software support and management to its Indian subsidiary, Technology Services India. It was rumored that a junior IT staff member in India had made an error during the backout of the upgrade, perhaps accidentally deleting a critical schedule file needed by CA 7.

However, during the outage, the bank issued a statement indicating that it was, in fact, Edinburgh-based IT staff that were responsible for the failure.

Lessons Learned

One common cause of data-center outages is that upgrades are attempted with no fallback plan in place. If an upgrade fails, the application is down.

However, in this case, RBS did have a fallback plan. The problem was that it didn't work. Was it a problem with proper documentation? Proper training? Proper testing? We don't know, but we're sure that the bank now knows.

One major lesson learned from this experience is the importance of a flexible customer-service model. The fact that the bank could immediately engineer the opening of 1,200 branch offices for extended hours and could rapidly double its call-center capacity certainly helped in serving customers during this time of crisis.

There was one other casualty of the outage. NatWest was named by Keynote Competitive Research as the most reliable banking website in 2010. It's a shame that this honor is now relegated to the dustbin of history.

Acknowledgements

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