

CU*ANSWERS HIGH AVAILABILITY PROGRAM REVIEW

EVENT DATE(S): 3/12/2017 – 3/13/2017

SUMMARY

As part of an ongoing business continuity program, CU*Answers actively maintains a high-availability (HA) core processing environment with real-time CU*BASE data replication between identical hosts located at two geographically dispersed, state-of-the-art data centers. A minimum of twice each year, HA rollover events are scheduled to redirect core processing and operations to the HA data center for a period of 72 hours or more. At the conclusion of the rollover event, CU*BASE core processing is redirected back and operations resumed at the primary data center (located in Kentwood, MI). These HA rollover events are invaluable in an effort to validate procedures and ensure the ability to recover CU*BASE/GOLD core processing in an effective and timely manner.

The first rollover event for 2017 was scheduled for Sunday, March 12 through Wednesday, March 15. On the evening of 3/12, beginning at 10:00 PM ET, recovery teams brought CU*BASE/GOLD offline and began the role-swap process, bringing core-processing online at the Site-Four data center by 11:10 PM. Post-roll application tests were completed successfully and normal EOD/BOD procedures were performed by the Operations Team.

The next morning, when credit union branches opened, support teams began receiving calls regarding a problem establishing print sessions at a limited number of locations. GOLD workstation sessions were not affected. During the troubleshooting process, information was collected and initial solutions implemented without success. The condition resulted in approximately 5% of branch locations unable to print documents from CU*BASE/GOLD. This included receipts, loan forms, checks, etc. At 3:00 PM ET, the decision was made (and announcement published) to move up the roll-back date for that evening, instead of the scheduled roll-back on Wednesday evening (in effect scaling back the rollover period from 72 to 24 hours). A solution to the print session issue was identified and successfully tested at three affected branch locations, during the hours between the credit union close of business and the roll-back process.

At 10:00 PM on Monday evening, March 13, the roll-back process was initiated. By 10:50 PM, core-processing was once again online at the primary production data center and print session capabilities restored to all branch locations.

Based on the successful testing and strong confidence in the solution to the print session issue, a follow-up rollover event has not been scheduled. The next planned HA rollover event will follow the normal six-month rotation (tentatively set for September 17-20, 2017).

Notable characteristics of this event include:

- This was the first HA rollover event scheduled following the unplanned rollover in December that was performed as a result of system log errors caused by a third-party application software bug.
 - Details of the December rollover can be reviewed at:
<https://www.cuanswers.com/solutions/business-continuity/auditing-and-testing/>

- This was the first HA rollover to use the newly created VPN tunnels from each credit union branch to the HA environment at Site-Four.
 - A late 2016 project was completed to relocate the HA environment from Muskegon, MI to Yankton, SD.
 - An initial rollover was performed in October, 2016, to certify the new HA environment at the Site-Four data center. For the purpose of the initial rollover, existing VPN tunnels were used, back-hauling connectivity through both the Kentwood and Muskegon data centers.
 - For the March, 2017 rollover, new VPN tunnels were created from each branch location to the HA environment at Site-Four.

- The decision to roll-back was made at 3:00 PM on Monday, shortening the rollover period, originally scheduled for Wednesday evening.
 - The impact to operations for the 5% of credit union branch locations experiencing the printer session communications issue warranted an early roll-back decision.

The following sections identify challenges observed, lessons learned, and recommendations for consideration related to this event.

EVENT DETAILS

As identified in the Summary section above, the planned HA rollover began on Sunday evening, **March 12** at 10:00 PM EDT and completed at 11:10 PM. All third-party EFT vendor networks were restored with the exception of FIS/Certegy, which required a reset on the remote host at the vendor's data center. Connectivity to FIS/Certegy was restored at 11:37 PM. During the rollover process, all third-party EFT vendors function in "stand-in" mode adhering to predefined settings on transaction types and amounts (set by the credit union). All post-roll application testing was completed successfully. After completion, Operations performed normal EOD/BOD processing to prepare for the new business day.

On the morning of Monday, **March 13**, support teams began receiving calls from select credit unions reporting a problem establishing print sessions within CU*BASE. The standard method of troubleshooting was followed without a quick resolution. By 12:00 noon, the list of credit union branch locations experiencing the problem grew to 15. Complicating efforts to troubleshoot the root cause was the ability for workstation sessions to establish connectivity over the new VPN tunnels but not printer sessions. Two credit unions experienced the problem at some but not all branch locations.

At **3:00 PM**, without a clear solution in hand, the decision was made to move up the roll-back date to that evening, rather than risk another business day without print sessions for those branch locations impacted. A breakthrough occurred at approximately **5:30 PM**, when support teams identified a potential solution after analyzing and comparing several captured network packets from both working and non-working printer session conversations. This proposed resolution was successfully tested after-hours at three of the affected branch locations. However, given the amount of time required to apply the resolution across the entire network, the decision to roll-back that evening remained.

At **10:00 PM**, the roll-back process was initiated and completed by **10:50 PM**, bringing CU*BASE/GOLD core-processing back online at the Kentwood, MI data center. Post-roll application tests were successful as were testing of print sessions at the affected branch locations.

CHALLENGES

Every rollover event, planned or unplanned, provides an opportunity for a valuable learning experience. Even those that appear relatively smooth on the surface, often require decisions to be made and resolutions to apply under the waterline. Every recovery team member gives their all to minimize the impact to clients and members, while performing their job admirably. Every now and then, the impact cannot be contained, and the discomfort is felt in the form of full or partial disruption of service. It is during these times when we learn, adjust, and improve.

In addition to complying with our policy of two HA rollovers every year, a stated objective of this particular rollover was to test the newly created VPN tunnels from each credit union branch location to the Site-Four data center. Prior to the rollover, multiple announcements were issued to credit unions with instructions to test connectivity to the HA data center over the newly created VPN tunnels. These pre-roll connectivity tests were successful, even for those branch locations that experienced the print session issues.

We are reminded that due to the nature of these 'live' rollover exercises (redirecting production traffic from 250+ credit union locations to systems at the HA data center in Yankton, SD), potentially significant challenges and issues are to be expected, such as those observed in this event as detailed below:

- On Monday morning, March 13, the support teams received calls indicating that transactions over the Vantiv third-party EFT network were not posting. Although connectivity to the Vantiv network was confirmed during the post-roll audits, an error at the application level was preventing the transactions to process.
 - It was determined that a damaged object on the HA host was preventing an application sequence file from updating and replicating properly, creating a mismatch between hosts at the vendor. The object was restored and communication reset to bring the application back online.
- Also on Monday morning, March 13, support teams began receiving calls from select branch locations unable to establish print session connectivity with the HA host (described above).
 - This print session communications error was the result of an incorrect variable in the newly created VPN configuration file, resulting in the ability to establish workstation sessions but not establishing printer sessions.
 - A standard (default) value was used in the creation of the script template. While this value was correct for the majority of branch locations, a number of them use a value other than the default setting, resulting in a communications failure for CU*BASE print sessions.
 - Recovery teams have analyzed all VPN configurations at the HA data center and compared the settings with those at the production data center. From this, a list of those networks requiring modification have been identified. A project to push required VPN configuration changes out to each branch location has been initiated with a target completion date of March 28.
 - Given the confidence in the solution, backed by successful testing and validation on the evening of March 13 prior to the roll-back process, an additional HA rollover event, relative to the print session communications issue, will not be scheduled. The next planned HA rollover event is tentatively set for September 17-20.

- On Tuesday morning, March 14, an announcement was issued indicating the postponement of FIS maintenance daily reports due to the rescheduled HA rollover on the evening before.
 - By rescheduling the HA roll-back event to Monday evening, the daily batch maintenance task to generate these reports was postponed until after the completion of the rollover process.
 - Reports were processed and made available the following morning (March 15).

CONTINUING EFFORTS AND RECOMMENDATIONS

Whether planned or unexpected, each recovery test and high-availability rollover exercise provides the opportunity to continually improve the process and adjust procedures. The following is a list of action items and projects relative to this rollover event that will be pursued in an attempt to draw closer to that goal:

1. On the morning following the HA rollover, calls were received from a limited number of credit union branches that were not able to establish print session with the HA host.
 - a. Troubleshooting was complicated by the fact that this issue only affected print sessions. Workstation sessions were not affected. The focus turned to the software on each client (version, build, etc.). Also significant was the fact that this issue only impacted approximately 5% of branch locations. In some cases, credit unions had some branch locations where staff were able to print and other locations where they were not.
 - b. By 5:30 PM, teams had narrowed the search and were able to identify a configuration mismatch in a variable setting for the VPN connection at the affected branch locations between the primary and secondary data centers.
 - c. The solution was tested and confirmed on three affected branch locations prior to the roll-back process.
 - i. As a result, teams will debrief and review the process and procedures that were followed to create and test the VPN configuration files to identify areas where improvements can be made to ensure effectiveness and accuracy.
 - ii. Also, teams will debrief and review the communications strategy used within the organization and throughout the credit union network in an effort to improve our response and keep key stakeholders informed throughout the event.
2. Celebrate success, then press forward.
 - a. It is during the times of troubleshooting when events do not go as expected that we gain a deeper level of understanding of the complexities and interdependencies and of each connected device and the applications they use to communicate. These opportunities for growth are not to be avoided, but embraced. We will learn from them and move forward, rather than be forced to repeat them.
 - b. When stepping back and evaluating all of the planning and effort invested over the years to achieve the level of preparedness the CU*Answers network has obtained through rigorous HA rollover exercises, a level of confidence is gained, helpful to continue building the networks and systems that will meet the demands of tomorrow.