CU*ANSWERS HIGH AVAILABILITY PROGRAM REVIEW

EVENT DATE(S): 9/17/2017 – 9/20/2017

SUMMARY

As part of an ongoing business continuity program, CU*Answers actively maintains a high-availability (HA) core processing environment with near real-time data replication between identical hosts located at two geographically dispersed, state-of-the-art data centers. A minimum of twice each year, live HA rollover events are scheduled to redirect core processing CU*BASE production and operations to the HA data center (located in Yankton, SD) for a period of 72 hours or more. At the conclusion of the rollover event, 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 previous HA rollover, performed earlier this year (March 12-13), was shortened to 24 hours due to a limited number of credit union branch locations unable to establish print session with the CU*BASE/GOLD host at the secondary data center. One of the goals of this September rollover was to validate the changes made to correct the previous print session problem. That goal was accomplished with no reported issues.

An additional goal of this HA rollover was to increase the scope of the event and include the recovery of the GoAnywhere application from the secondary host at the Muskegon, MI data center. The GoAnywhere environment consists of a production server at the primary data center, and a stand-by (disaster recovery) server at the secondary data center. Data is not replicated between servers like those in a high-availability environment. Rather configuration changes are performed manually to each host separately.

On the morning following the rollover, unresolved connectivity issues between the GoAnywhere secondary server and EBN-VPN group providers forced recovery teams to restore the GoAnywhere environment back at the primary data center. To correct the connectivity problem, teams will re-evaluate the information obtained during the recovery test and seek to re-engineer the GoAnywhere environment to more closely reflect that of the HA environment for CU*BASE/GOLD.

The HA rollover began at 10:19 PM ET on Sunday, September 17th, when recovery teams began the role-swap process to bring CU*BASE/GOLD online at the Site-Four data center in Yankton, SD. Production of CU*BASE/GOLD continued from the Site-Four data center until the scheduled roll-back process, beginning at 10:00 PM on the evening of Wednesday, September 20th.

Notable characteristics of this event include:

- The recovery of the GoAnywhere application on the stand-by (DR) host at the Muskegon data center.
- Application of manufacturer PTF and firmware updates on both IBM PROD and HA servers (required multiple system IPL/Reboots to complete the process).
- Replacement of UPS batteries at the primary production data center in Kentwood, MI.

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, September 17th** at 10:19 PM ET and completed by 11:21 PM. The start of the event was delayed due to the creation of two, large training libraries earlier in the day on the PROD host that were in the process of replicating to the HA host. The procedure to suspend the task resulted in some additional required file system maintenance to ensure that both hosts were ready for the role swap procedures. The rollover completion time was extended by approximately 15 minutes due to efforts to troubleshoot connectivity of the GoAnywhere secondary host to the CU*BASE HA host (an objective added to the scope of this rollover event).

All third-party EFT vendor networks were restored by 11:27 PM with one exception. One of the applications that communicate with the Fiserv host required additional attention to recycle one of the TCP/IP ports required. Once the port was identified and subsystems restarted, transactions between the local and remote hosts were confirmed. During each 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).

Once all post-roll application testing was completed, the Operations Team performed normal EOD/BOD processing to prepare for the new business day.

During the early morning hours on **Monday**, **September 18**, connectivity issues continued to surface for the secondary GoAnywhere server (located at the Muskegon data center) including connectivity to self-processor hosts and third-party vendors. At 12:58 PM, the decision was made to take the secondary GoAnywhere server offline and redirect network traffic back to the production GoAnywhere server at the primary data center in Kentwood, MI. This redirection was completed by 1:24 PM and connectivity restored. The impact of the GoAnywhere disruption was limited to internal operations and not to credit unions or their members.

On **Tuesday**, **September 19**, hardware manufacturer PTF and firmware updates were applied to the production server at the Kentwood data center. (Identical PTF and firmware updates were applied to the high-availability host in Yankton, SD the week prior to the rollover). Also on that same day, maintenance was performed on the primary data center's UPS which included the replacement of batteries.

On the evening of **Wednesday**, **September 20**, beginning at 10:00 PM, recovery teams began the process to roll-back CU*BASE production to the primary data center. This was completed by 10:40 PM.

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 behind the scenes. Every recovery team member gives their all to minimize the impact to clients and members, while performing their job with an intense focus.

- In addition to complying with our policy of two HA rollovers each year, a stated objective of this particular rollover was to test live production of the **GoAnywhere** application on the secondary host located at the Muskegon data center. (The GoAnywhere application is used to schedule and automate the secure transmission of files between hosts over both private and public networks). Two issues surfaced that prompted our decision to move the production of the application back to the primary data center prior to the planned rollback date. Those included:
    - Connectivity issues from the secondary GoAnywhere server to self-processor hosts over the Extended Business Network (EBN-VPN). Due to the routing and network address translation of hosts required to comply with the inherent security of the GoAnywhere application (certificates, IP address whitelisting, etc.), the configuration of the primary and secondary hosts on the network will be modified based on what was learned during this HA rollover event.
        - For this recovery test, rather than declare an actual disaster with our vendors, teams attempted to re-route traffic for the application to/from the secondary server at the Muskegon data center. To accomplish this, network configurations were modified to appear as if the traffic was coming from the production data center. While this was successful for many file transmissions, there were a limited number that were unsuccessful.
    - Slow transmission speeds for large file transfers were observed during this HA rollover event between the GoAnywhere host and servers at credit union locations. Files that had taken 5-6 minutes were now taking 55-60 minutes or longer; and in some cases, timing out before the transmission had completed.
    - Teams will meet to discuss and determine an action/testing plan within one month and be prepared to confirm the changes during the next HA rollover event in early 2018.

- On the Monday morning, following the rollover to the HA host, three credit union locations reported the inability to log in to CU*BASE/GOLD. Support teams assisted the credit unions in making corrections on their networks to enable connectivity to the HA environment located in Yankton, SD.
    - Two announcements were sent via Email to all online credit unions informing them of the planned HA rollover with instructions to test connectivity to the HA host prior to the rollover event. We will continue to communicate (and encourage) the need to test connectivity from each credit union branch location to minimize the risk of connectivity issues during future rollover events.

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. The GoAnywhere application has grown over the years to become a vital component of our daily operations. The interdependencies for this environment need to be understood at a deeper level and network configuration re-evaluated and re-engineered to provide a repeatable recovery process. System and application configuration changes to the GoAnywhere primary and secondary hosts should be synchronized and automated if possible, rather than manually performed (subject to errors and omissions).

a. As noted above, teams will be meeting to develop an action plan (including a testing schedule) to accomplish this prior to the next rollover event. The plan and progress will be communicated to the Executive Council through regular meetings and board reports.

2. Re-evaluate the efforts used to inform and instruct credit unions of the need to test connectivity prior to planned (or unplanned) HA rollover events.
    a. During each rollover event, there continue to be two to three branch locations (out of 200+) that experience connectivity issues to the high-availability data center on the morning after. These are not the same locations each time. Teams will continue to seek methods to automate and monitor connectivity to achieve an even higher percentage.

Report submitted by Jim Lawrence, CBCP | CU*Answers | Vice President of Business Continuity