

## CU\*ANSWERS HIGH AVAILABILITY PROGRAM REVIEW

EVENT DATE: 9/15/2013 – 9/18/2013

### SUMMARY

As part of a robust business continuity program, CU\*Answers actively maintains a high availability (HA) core-processing environment with real-time CU\*BASE/GOLD data replication between identical hosts located at the state-of-the-art primary and secondary datacenters. A minimum of twice each year, an event is scheduled to rollover core-processing and operations to the secondary datacenter (located in Muskegon, MI) for a minimum period of three business days. At the completion of the event, core-processing is rolled back and operations resumed at the primary datacenter (located in Kentwood, MI). These events are invaluable in our effort to validate our procedures and ensure our ability of recovering CU\*BASE/GOLD core processing in an effective and timely manner.

Back in June of this year, a project was completed that included the replacement of the IBM Power systems that host CU\*BASE/GOLD core-processing at both datacenters. As part of our corporate strategic technology plan to ensure system performance and capacity, IBM server equipment is evaluated and upgraded on a 36-month rotation. Once the new systems were migrated into production, a target goal was set to complete a high availability rollover exercise on the new equipment within the first 90 days. The event documented in this report fulfilled that goal and provided the following successes:

1. Given that this was the first 'live' production rollover to be performed on two newly installed host systems (new hardware running on a new operating system), the replication of member databases and CU\*BASE/GOLD applications (using iTERA software) was without fail. The primary issues and challenges experienced were related to system hardware settings and network configurations.
2. This was the first rollover exercise conducted using a new Operator's Dashboard that allowed recovery team members to bring down subsystems on the old host and bring up subsystems on the new host with a single menu command (performed individually during previous exercises). This is another step on the path to automation and effectiveness of the rollover process, whether planned or unplanned.
3. Perhaps the most significant success is the organization-wide learning experience received throughout this event.
  - o By performing the rollover during non-peak hours, recovery teams were able to use troubleshooting skills to press through to resolution.
  - o The issues that surfaced during the morning hours after the rollover identified opportunities for improved communication with clients (in addition to event announcements) that provide instructions for procedures available for pre-roll connectivity testing. This step alone may help prevent a repeat of many of the connectivity issues observed.
  - o The opportunity to fine-tune our documentation for daily system/network change procedures that can have an effect on network traffic during rollover events.

This report identifies any challenges observed, lessons learned, and recommendations for consideration related to this event.

## EVENT DETAILS

On Sunday, September 15, at 10 PM ET, the production host was taken offline and rollover procedures initiated. By 10:45 PM, core processing was brought up at the secondary datacenter and recovery team personnel began a series of tests prior to bringing all services back online. System and application issues surfaced (as identified below under CHALLENGES) that required troubleshooting from all recovery teams. All known issues were resolved and internal tests and checks confirmed and completed by 2:30 AM.

At the beginning of the business day, once client credit unions began to access CU\*BASE/GOLD, support teams received calls from clients who were experiencing difficulty connecting to the host at the Muskegon datacenter. These were corrected throughout the morning hours.

To recap the timeline of events of September 15-16, 2013 (Eastern Time):

- 10:00 PM - CU\*BASE application taken off-line and system services on CUAPROD brought down at primary datacenter. Splash page published for ItsMe247 application.
- 10:45 PM – System services on CUAHA1 brought up and CU\*BASE application brought online at secondary datacenter.
- 10:50 PM – Recovery Teams begin system checks and troubleshooting issues as they are uncovered.
- 1:15 AM – ItsMe247 and CU\*TALK application issues resolved.
- 1:30 AM – Communications issue with third party vendor (FIS) resolved.
- 1:40 AM – Communications issue with third party vendors (Fiserv and Metavante) resolved.
- 2:25 AM – Communications issue with third party vendor (CUSC) resolved.
- 2:30 AM – All application and system checks confirmed.
- 8:15 AM – Communications issues reported by some clients (DNS and network configuration changes required, some on a case-by-case basis).
- 8:56 AM - Posted status alert to all clients.

On Wednesday, September 18, at 10:00 PM, the roll-back process was initiated bringing CU\*BASE/GOLD core processing back to the primary datacenter. This process was completed and systems back online by 10:48 PM.

## CHALLENGES

Although we strive for near-perfection with minimal impact for each rollover scheduled, the results of this event reinforce the need to repeat them on a regular basis. As we continue to grow and expand, offering new and improved products and services to a growing client network, systems and environments experience an increased number of changes at a rapid pace. Performing these rollover exercises in a planned, controlled setting during non-peak business hours is a small investment to best prepare us should the need arise under less optimal conditions to perform a true recovery during an unplanned disruption.

For a project of this scope and complexity, some issues and challenges are anticipated. Recovery and support teams were on hand to tackle them as they surfaced. These challenges included:

1. TCP port generation (affecting ItsMe247, CU\*TALK, CUSC, ISOFIS, and Indirect Lending)
  - a. This issue was related to the new host equipment. A small number of errors and omissions were discovered (i.e. case-sensitive coding) within system tables and CL scripts that are used in the creation of the TCP ports used for specific client/server applications. The issue was resolved and changes required documented in the procedures for integrating new IBM host hardware during equipment lease renewals.
2. Communication issues for select third party vendors (affecting ISOFIS and ISOMET)
  - a. During the time between this and the previous rollover exercise to the secondary datacenter, configuration changes were made to perimeter firewalls for production traffic involving these two vendors at the primary datacenter. These changes did not reflect the requirements of communicating in a post-roll scenario at the secondary datacenter. The issue was resolved and procedures for performing firewall configuration changes modified to include confirmation of access to the secondary datacenter.
3. Intermittent DNS (domain name server) issues created some connectivity issues to CU\*BASE/GOLD
  - a. This issue was resolved by correcting an error in an outdated copy of a DNS zone file at the alternate DNS host provided by Qwest/CenturyLink. CU\*Answers no longer uses CenturyLink DNS servers for the affected records. After the rollback, a few clients reported difficulty connecting to CUAPROD at the primary datacenter. A DNS server at the secondary datacenter had not updated to the correct settings causing the affected clients to attempt to connect to CUAHA1. This was corrected by 9:00 AM and procedures for the rollback process updated.
4. Non-standard client network configuration settings (at the clients' site) prevented connectivity for some to CU\*BASE/GOLD at the secondary datacenter.
  - a. This issue was reported on the morning of the rollover by some clients with self-managed networks or networks that are managed by a third party other than CU\*Answers. During the time between this and the previous rollover exercise to the secondary datacenter, network configuration changes at the client's site were made that did not conform to the posted standard network configuration documentation for CU\*BASE/GOLD connectivity. [\[https://kb.cuanswers.com/cuanswers/ext/kbdetail.aspx?kbid=3572\]](https://kb.cuanswers.com/cuanswers/ext/kbdetail.aspx?kbid=3572) These were resolved on a one-by-one basis with the client engaging the third party vendor support where needed. (See "Continuing Efforts and Recommendations")
5. SAVE file job as part of EOD process failed on 9/16 after the rollover to the secondary datacenter
  - a. The software application, 'Recover Now', is installed on CUAPROD but not on the CUAHA1. This SAVE file job was configured to look for the file libraries associated with this application. The process was corrected with a program change and procedures during rollover exercises updated to confirm proper operation.
6. Daily reports (affecting CU\*SPY and in-house eDOC clients) not imported during normal overnight processing
  - a. During the nightly automated process to generate daily reports, a check file (EOT) is generated and appended to the last record to inform the document server that the transfer of daily reports had completed and that importation may begin. The program logic which generates the EOT file had not been added after the upgrade to the new CUAHA1 host. Once the program logic was added, all reports imported as expected for the remainder of the event.
7. Access to files stored on IFS drive slow during rollover event

- a. This affected internal staff only (Operations Team) accessing files stored on the IFS partition on CUAHA1; no impact to core-processing. Initial troubleshooting did not produce a reliable solution. This issue will be researched and revisited during the next scheduled rollover.

## CONTINUING EFFORTS AND RECOMMENDATIONS

With each recovery test and high availability rollover exercise we schedule and perform, we continually seek to improve the process and adjust our procedures. The best way to accomplish this is to “Practice. Learn. Repeat”. The following is a list of action items and projects that we are pursuing to get us closer to that goal:

1. Refine the pre-roll audit (system and network configurations) process no later than 12/30/2013.
2. Design an improved communications campaign (in addition to the standard event announcements) to better educate clients on the requirements and importance of complying with standard network configuration settings for connecting to CU\*BASE/GOLD.