RFO (Reason for Outage) Report

Event Description: Partial Network Outage
Event Date: 10/25/2013
RFO Issue Date: 10/28/2013
Ticket Number: 64035

Scope of Impact Summary

Services Impacted:

Affected customers experienced a loss of connectivity for select IP blocks on the ColoSpace network.

Background Information

For much of 2013 ColoSpace has been planning and implementing a network overhaul project to dramatically increase the capacity of and reliability of the IP services that we deliver to our customers. This project entails the complete replacement of the network cabling plant as well as all of our core, access, and distribution switching and routing infrastructure.

Over the past several months, during several planned maintenance windows, ColoSpace successfully transitioned elements of our network to this new infrastructure. This work was done methodically and was designed to have as little impact on our customers’ operations as possible.

In order to reduce the impact to a minimum, the migration process involves multiple steps. One of which is the migration of IP announcements to the seven Internet carriers that are part of the new network design. Over the past month, we successfully completed this task at multiple facilities without customer impact.

On the evening of Thursday October 24, 2013 ColoSpace migrated a group of twelve network blocks over to the new network infrastructure according to the process that we have followed historically. This maintenance was successful and there was no impact to customer operations.

At approximately 10:00 am on Friday October 25, 2013, a group of customers that receive services within those blocks detected issues of sporadic timeouts and restricted ability to transfer large files via certain network protocols (FTP, SFTP, etc).

Our network team immediately enacted our Critical Situation procedure to troubleshoot this issue. They were unable to solve the issue within one hour and made the determination to roll back the changes that had been made the previous evening using the predetermined roll-back procedure.
During the efforts to roll-back the maintenance a routing condition emerged that prevented the propagation of certain network blocks between our network hardware and those of our upstream providers. The issue first manifested itself through a delay in having routes propagate between ourselves and upstream providers and then the routes dropped from the routing tables altogether.

ColoSpace and DSCI network engineers re-traced all steps taken during the rollback and identified a routing anomaly and restored the routing fully and customers’ service was restored.

During an emergency maintenance window on Saturday October 26, ColoSpace engineers isolated a network element at the Somerville, MA facility and determined that this element was the source of the latency and packet loss that was first reported Friday morning. The root cause of the fault was hardware that deteriorated Friday morning after additional traffic was fed over the link.

**Event Timeline**
Please note that all times listed in the timeline below are in 24-hour clock format, and refer to Eastern Daylight Time.

10:00  ColoSpace Network Operations Center receives calls indicating increase in latency and packet loss from their devices and services. Packet loss and latency is limited to a small subset of customers whose IP addresses were part of the maintenance scheduled on Thursday October 24.

10:15  ColoSpace completes initial research and compilation of customer feedback.

10:30  Critical Situation bridge established with ColoSpace technical management and DSCI and ColoSpace network engineering to review a go forward or roll back strategy.

11:00  Decision made to roll back previous maintenance BGP advertisements to force traffic down original paths.

13:55  First report of network being unavailable from the outside world.

15:08  Multiple affected customers confirm service restoration. Actual restoration time dependent upon upstream provider route propagation.

**Current Operational Status**
The network has been restored to its previous state. All data centers have active redundant connections available.
**Root Cause Analysis**

The root cause of the original issue that materialized as latency and packet loss was a faulty network element caused by deteriorating failed hardware. The hardware that failed was stress tested prior to being put into service and was new equipment implemented specifically for this network upgrade. The system did not fail over to redundant paths since connectivity was still present and the majority of traffic was passing without issue.

The cause of the loss of connectivity for the affected customers was an internal routing issue that materialized during the roll-back of network maintenance performed on Thursday October 24.

**Corrective/Preventative Actions**

The network element that proved to be faulty was taken out of service and the hardware was replaced. ColoSpace will provide additional detailed feedback and scheduling of all future maintenance necessary to complete this network project. ColoSpace will also review its rollback process and procedures to determine if any modifications are necessary.