CGRA Post Mortem from 4/21/11

There was a switch/router upgrade of CGRA on 4/21/11. The NETS team was Teresa Shibao, Bryan Anderson, and Armando Cisneros. The upgrade exceeded the NETS change window of 5 – 7:30am. Below is a summary of the timeline, post mortem, and future F&A switch/router efforts. NETS is happy to meet to discuss this further and discuss any questions or concerns.

- Timeline
  - 4:45am - Arrival and preparations
  - 5:00- Power down cgra
    - Began work following NETS standard switch and chassis upgrade procedures
      - [http://nets.ucar.edu/nets/devices/eswitches/general-upgrades.html](http://nets.ucar.edu/nets/devices/eswitches/general-upgrades.html)
      - [http://netserver.ucar.edu/nets/devices/eswitches/chassis-replace.html](http://netserver.ucar.edu/nets/devices/eswitches/chassis-replace.html)
    - BA and TS begin working on chassis and card swap
      - Supervisors and fiber modules removed, set aside
      - Power supplies and chassis replaced
      - Supervisors and fiber modules reinstalled
      - 10/100 Copper modules are replaced with 1G modules
    - AC begin working on 3 panel upgrades
  - 5:42am - Power is restored to cgra and switch/router is back online
    - TS double checks routing, cdp neighbors, and spanning tree topology
    - Based on these checks, connectivity looks normal
    - Cabling to new modules are upgraded
      - Module 4 is completed first, patch panels replaced, patch cables moved
      - Then module 3, and then module 2
        - We had to work through a couple of cables on the last module to find some slack to reach the new patch panel
      - TS verified that ports that were online 4/20 were back online – all had link
  - 7:41am - After review of port list and basic system connectivity verified, completion notice was sent out
  - 7:45am - TS review of Nagios monitoring indicated some issues with neighboring switch - packet loss occurring on cg2-mr-c2-gs
    - Troubleshooting revealed a bad fiber connection, so fiber between cgra and cg2-mr-c2-gs was reseated
      - Did not clear the issue, so fiber patch was replaced – this cleared the issue
  - 8:10am - TS sent Notifier about the fiber patch cable and stated cg2-mr-c2-gs connectivity was now normal
  - Alex was still having issues with connectivity to F&A web sites within the semi exposed range
    - Traceroute through the vpn indicated that packets were dropping at cgra
Clearing the individual ARP caches for the affected IP addresses solved these issues, ~ 8:35am
- Received a work request from GLOBE to verify 1 port on the upgraded switch
  - VLAN was incorrect and was corrected
- TS stayed on site at CG2 until 10am in case there were other issues

**Post Mortem:** Marla, Teresa, and David Mitchell met on 5/3 to review this switch/router upgrade
- There were some unique things about this upgrade that complicated the upgrade
  - The failover configuration of the F&A servers caused a stale ARP entry, which affected these servers access
    - Stale ARP caches are very difficult to troubleshoot
      - Cisco IOS retains ARP entries for over an hour. Failover configurations should migrate both the IP and MAC between hosts to prevent outages due to stale ARP information. NETS will work with F&A to ensure this is not an issue in the future for these services.
- F&A servers are split between CGRA and cg2-mr-c2-gs so the fiber problem between the switches had a larger impact on F&A
  - For switch upgrades involving core switches (such as CGRA) and/or a number of critical server ports, NETS will make sure there are 2 engineers on site for the upgrade
- NETS had a number of engineers out on 4/21/11 so back up was difficult
  - NETS will ensure there is a back up engineer on call (unless on site per above) for all switch upgrades
- There were 3 modules to upgrade on this switch/router
  - NETS will extend the outage to accommodate the additional time required for the additional module
- The responsible engineer left on vacation the next day
  - No changes will be scheduled if the responsible engineer is on vacation the next day
- There was not a detailed written follow-up on the day of the changes
  - In the event of an upgrade that encounters problems, the NETS engineer(s) will send a detailed summary of the issues the day of the upgrade reviewing the problems and resolutions

**Future F&A related upgrades scheduled in the next few months**
- cg2-mr-c2-gs – full chassis replacement w/ software and 2 modules upgraded - switch has numerous F&A servers
  - NETS will have two engineers on site
  - Jasen wants to do a UPS test in CG2 as well, so we need to meet with F&A to discuss if prefer a weekend outage
- cg4-1980-c1-gs – full chassis replacement w/ software - switch has office systems in CG4 only
  - NETS will have one engineer on site and one engineer on call
- FB switches
  - Software upgrade only
  - NETS will have one engineer on site and one engineer on call