# OSG Area Coordinators

Network Monitoring Update: **January 4 2017**

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# Review Networking Goals Year 5

1. **Maintain / update the OSG networking services / documentation.**
2. **Reach out to non-WLCG OSG sites; Integrate those interested:**
   - Advertise that OSG is ready to help sites with networking issues via:
     - OSG web pages
     - Targeted email (Cyberinfrastructure list, perfSONAR user list, etc)
     - Via interactions with sites at conferences and meetings.
   - Encourage as many NSF CC*xxx sites as possible to integrate their perfSONAR instances into OSG networking; OSG will provide them a mesh-configuration and gather their data.
   - Provide Soichi's standalone mesh-configuration tool for use by campuses and VOs.
3. **OSG will create a network alerting service to find "obvious" network problems**
   - This will involve the creation of a suitable analysis pipeline such that perfSONAR data can be analyzed on a timescale of every 1-2 hours.
   - Obvious problems include significant decrease in bandwidth between a source and destination or continuing significant packet loss along a path or correlated with a specific site.
   - Actual alerts will be issued by GOC staff based upon alarms they receive.
4. **Enable automated alerting (email, SMS) on well identified alarms.**
   - This is a "reach" goal for the year but I think it should be feasible
   - Requires accurate, synchronized mapping of sites to contacts
   - Tunable pattern of alerts (e.g., 1 alert, wait 1 day and alert if problem continues, then every 3 days until fixed)

# The Slipped Milestones

- Recruiting of 10 new sites for OSG networking -- **October 31, 2016 (slipped)**
  - Side tracked waiting for MCA and pS v4.0
- Initial release of Soichi's standalone mesh-configuration utility packaged and available --- **September 30, 2016 (Moved)**
  - See later slide
- Initial Alarming system into production --- December 1, 2016 (partial)

# Recruiting non-WLCG Sites

- One passed set of milestones was to recruit 10 (or more) non-WLCG sites who have perfSONAR instances to "join" OSG
  - This means they use the OSG mesh-configuration to define tests
  - OSG will gather metrics from their instances
  - Our dashboard and check_mk will display their metrics and monitor their perfSONAR services
- Delayed waiting for the standalone mechconfig and perfSONAR v4.0
  - Makes sense to recruit when those are ready
- Plan a target email campaign soon.
  - Operations + User Support help?
  - Suggestions needed and welcome.

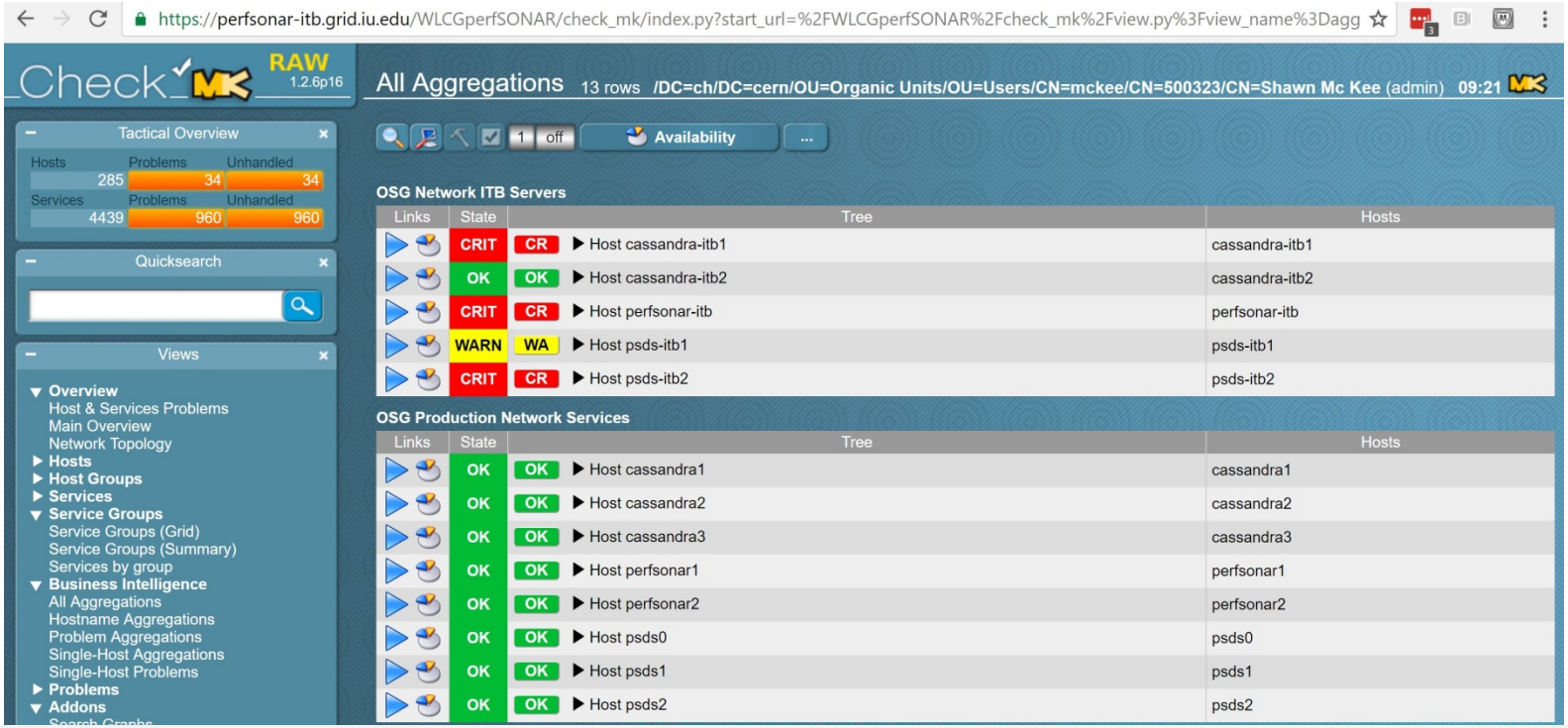
# Standalone Mesh-config (MCA)

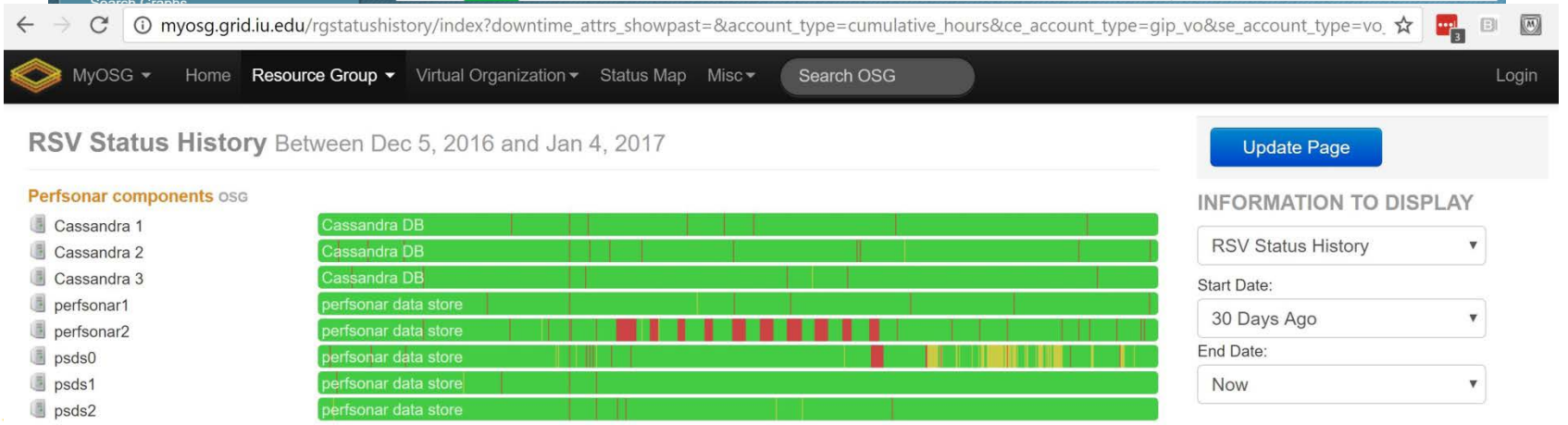
- Soichi was approved Nov 16 to work 20% on this for 4 months followed by 10% for 2 months
- Ticket 31359 open on getting OSG "pre-production" version running (Chris Pipes)
- Documentation at http://docs.perfsonar.net/mca_configuration.html
- Issues tracked at https://github.com/soichih/meshconfig-admin/issues (12 open, 2 closed)
- OSG instance running at https://meshconfig.grid.iu.edu/meshconfig/ (create an account to play with this)
  - Currently missing many hosts. Needs ability to get data from OIM/GOCDB.

# Enabling Alarming

- We have a longer term goal of alerting and alarming on network issues.
- Milestone completed: technical design of a suitable analysis system based upon existing time-series technologies
  - **Worked with Ilija Vukotic to enable ActiveMQ to ElasticSearch at UC: ELK stack + Jupyter seems to be suitable**
  - Very effective so far using attached Jupyter instance (Python workbook) to do analytics and graphs
  - Anyone can subscribe to simple alert-emails.
    - Currently can alert when >50% of paths to/from a site show >2% packet-loss for 3 hrs OR when any one path has packet loss >50% for 3 hrs
  - OSG could benefit from such an analytics system...other use-cases?
  - Not "production" yet.
- Marian Babik and I are looking into check_mk rule-based notifications as a future means of implementing the alerting component. Not yet enabled but Marian is working on ETF implementation (now ~end of January)

# Status of OSG Net Services



# Service "Challenges"

- As you can see on the previous 30 day RSV status we have had some occasional problems with some services
  - MaDDash (on perfsonar2) had nightly stops at around 9:30 and would stay down for 12 hrs
  - No reason identified…mitigated with cron restart script from Scott
- The psds0 system has more RSV probes than expected recently. I increased the warning/critical thresholds but it may need more study
- The ITB instances have problems. Full /var, MaDDash not running, intermittent load issues
- Would like to get check_mk monitoring on the virtualization host.
  - Sent email to Thom to see if that might be possible
  - Useful to understand resource use and possible conflicts

# perfSONAR v4.0 / MaDDash 2.0

- The perfSONAR v4.0 release was delayed from the nominal Dec 1 2016 date
  - Needed an RC3 release to follow-up on more issues found in RC2
  - **Targeting ~Feb 1, 2017**
- MaDDash 2.0 is close to ready.
  - I believe an official release should happen at the same time as perfSONAR?
  - **Fix the issues we have seen in OSG?**
- Once these are released we will want to update ITB and then Production
  - Will need a global campaign to get sites updated

# Getting ALL perfSONAR Metrics

- When we initial setup the perfSONAR RSV probes and ActiveMQ message queue at CERN we only supported part of all the possible data metrics perfSONAR can measure.
  - Both the RSV probes and Stompctl/ActiveMQ systems needed to support whatever data types we wanted
- Now we want to make sure we are getting all the data possible and allow for new future tests that may be needed
  - Opened a ticket to add this support (31257)
  - Also fixing event size issue we saw which crashed things
  - ActiveMQ updated already
  - Next is to get update RSV perfSONAR
  - Will increase the amount of data we gather but not expected to be more than about 25% increase
  - We will be able to customize the event types gathered in perfSONAR RSV and limit the maximum message size.

# OSG Net Data Lifecycle Mgmt

- We are running out of storage space for the OSG network data
  - We had originally said we would keep data "indefinitely" (we gather ~5TB/year)
- Document written up describing the problem and possible solutions related to OSG Network Data-Lifecycle Management
  - Not certain about long-term MA technology
  - No reliable data migration tool in place
  - No long-term repository space identified

# OSG Net Service Hardware

- All our **Production OSG network services** run on a dedicated **Dell R730xd** with 18 drive bays (12 external 3.5", 4 internal 3.5", 2 internal 2.5")
  - The 2 internal 2.5" bays are occupied by 1TB HDDs that are in RAID-1
- **All bays are currently occupied:**
  - 4 internal bays are occupied by 4TB HDDs that are in RAID-10.
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  - 4 bays are occupied by 512GB SSDs that are in RAID-10.
- **Configuration of the disks**
  - One 8TB RAID-10 (7.28 TiB) is partitioned into:
    - 4 TB (3.64 TiB): Directly mounted as /usr/local for cassandra1 VM
    - 4 TB (3.64 TiB): LVM PV, contributes to general host space for VM virtual drives
  - One 8TB RAID-10 (7.28 TiB) is partitioned into:
    - 4 TB (3.64 TiB): Directly mounted as /usr/local for cassandra2 VM
    - 4 TB (3.64 TiB): LVM PV, contributes to general host space for VM virtual drives
  - One 8TB RAID-10 (7.28 TiB) is partitioned into:
    - 4 TB (3.64 TiB): Directly mounted as /usr/local for cassandra3 VM
    - 4 TB (3.64 TiB): LVM PV, contributes to general host space for VM virtual drives
  - The four SSDs are organized into a 1TB RAID-10 that is visible to the host system as a block device, but has **not been partitioned/formatted/mounted yet.**

# Plan to Address Storage Space

- The long term solution for data life-cycle mgmt depends upon the choice of measurement archive (MA), the creation of suitable tools for that MA and identification of long-term storage
  - Won't happen in time for OSG needs
- For now we can fix things for the next couple years by purchasing eight 10TB datacenter disks for about $570 each
  - Will add **24TB** additional storage
  - Needs careful implementation…

# Draft Plan (for Discussion)

- Purchase 8 WD Gold Datacenters 10TB disks
- Since current R730xd is full we need to move things to deploy the new space
  1. Uninstall SSDs; replace with 4 x 10TB R10
  2. Pick existing R10(old) and move/stop services
  3. Copy all data to R10(new); restore services
  4. Remove R10(old) and replace with new 10TB R10
  5. Pick second R10(old); move/stop services
  6. Copy all data to R10(new); restore services
  7. Remove 2nd R10(old) and replace with SSDs

**Need to discuss partitioning & space use**

# Talks and Papers (Outreach)

- There are 3 CHEP 2016 papers covering CHEP talks that are due Feb 6, 2017 with OSG components that I know of
  - Networks in ATLAS (done)
  - The OSG Network Service
  - HEP Networking
- In addition, next week is the Pre-GDB on Networking at CERN

# Pre-GDB on Networking

- Next week is the Pre-GDB on Networking at CERN
  - https://indico.cern.ch/event/571501
- The goal is to bring together the experiments, sites and network operators to discuss what the near, mid and long-term work required in networking
  - This is relevant for OSG.
  - **OSG's role in gathering network metrics and alerting and alarming are likely to be central items for near-term work**

# Concerns (Much as last time)

- Operation of services
  - OSG production network service still seeing some issues
  - Monitoring being tweaked to be less noisy
  - **MaDDash v1 has had issues. Maybe v2 will fix things?**
  - Challenging to identify root cause/fixes with indirect access
  - Significant set of updates coming in 30-45 days…need to prep
- Identifying suitable non-WLCG sites to benefit from OSG networking services (need ~5 sites identified to recruit)
- Long-term data lifecycle management
  - Details earlier in talk. **Must implement additional storage**
  - Need MA choice, corresponding tools and long-term storage
- Convergence on "alarming" system.
  - Needed components are in place and being played with
  - Need to build the user-facing interface and enable continuous operation

# Questions or Comments?

Thanks!

# URLs of Relevance

- OSG Network Datastore Documents
  - Operations https://docs.google.com/document/d/11144BSo-88M0cLMMjKcKMIE-Q5s21X-w3lYl-0Pn_08/edit#
  - SLA https://twiki.grid.iu.edu/bin/view/Operations/PSServiceLevelAgreement
  - Data lifecycle https://docs.google.com/document/d/1mJ1kf43nZf6gvKoNtiTOc0g0MYDv_wSfSm7YdiMs3Lo/edit#
- Current OSG network documentation https://www.opensciencegrid.org/bin/view/Documentation/NetworkingInOSG
- OSG networking year-5 goals and milestones: https://docs.google.com/document/d/1FzmXZinO4Pb8NAfd5SWUzaAFYOL23dt66hQsDmaP-WI/edit
- perfSONAR adoption tracking: http://grid-monitoring.cern.ch/perfsonar_coverage.txt
- Deployment documentation for both OSG and WLCG hosted in OSG (migrated from CERN) https://twiki.opensciencegrid.org/bin/view/Documentation/DeployperfSONAR
- ATLAS Analytics: http://cl-analytics.mwt2.org:5601/
- Mesh-config in OSG https://oim.grid.iu.edu/oim/meshconfig
- Beta Mesh-config: https://ps-test.sca.iu.edu/meshconfig/
- Pre-Production Meshconfig https://meshconfig.grid.iu.edu/meshconfig/
- MadAlert: http://madalert.aglt2.org/madalert/diff.html
- perfSONAR homepage: http://www.perfsonar.net/