OSG Area Coordinators

Network Monitoring Update: **February 22, 2017**

Shawn McKee

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)

Review: The Slipped Milestones

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

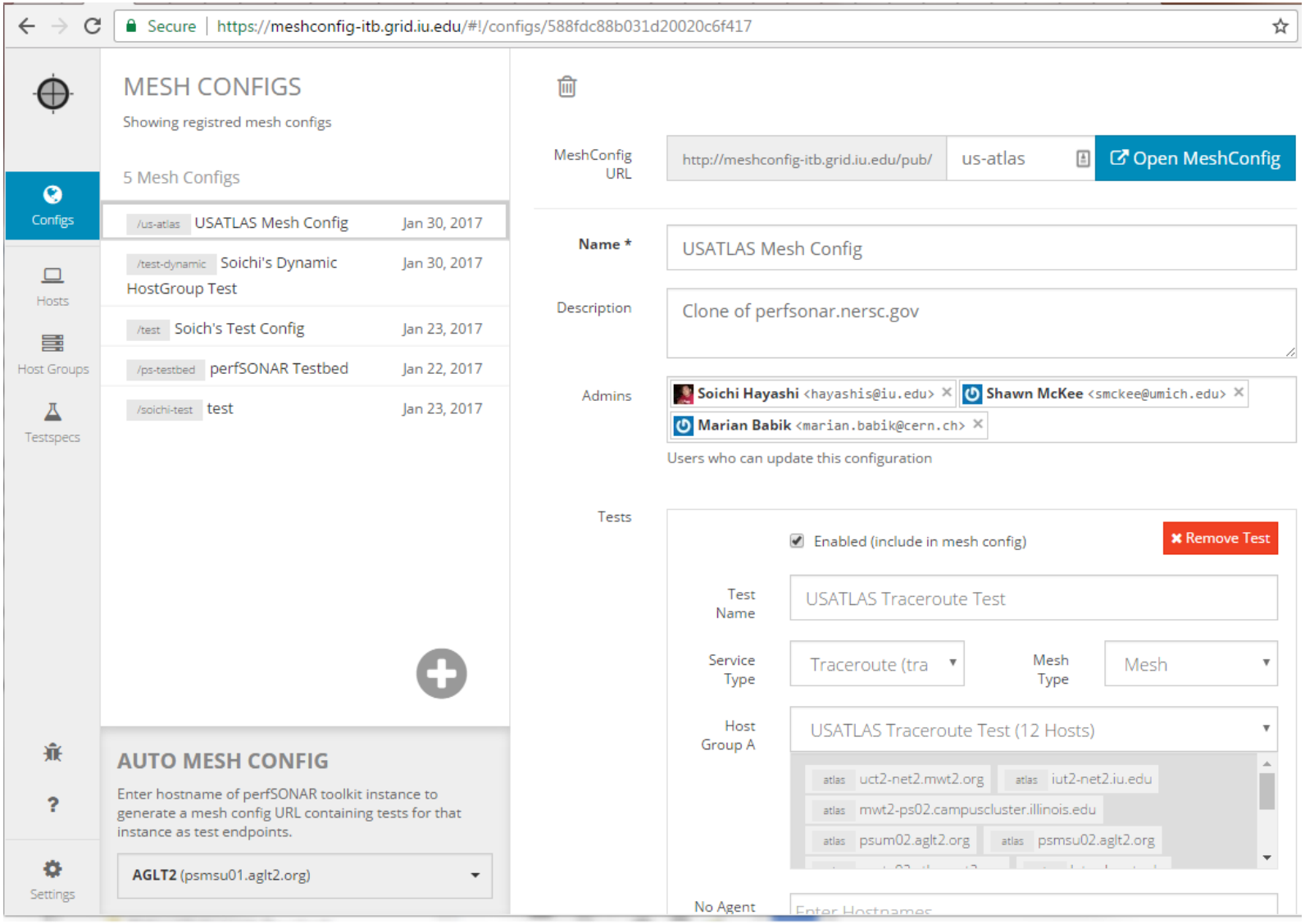
Recruiting non-WLCG Sites

- 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: still waiting for the standalone meshconfig 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
  - Started in January
  - **Great progress since then**
- Documentation at http://docs.perfsonar.net/mca and at https://github.com/soichih/meshconfig-admin
- Issues tracked at https://github.com/soichih/meshconfig-admin/issues (14 open, 7 closed)
- OSG instance running at https://meshconfig-itb.grid.iu.edu/ (create an account to play with this)
  - Now 257 hosts imported from OIM/GOCDB
  - New API available https://meshconfig-itb.grid.iu.edu/apidoc/
  - **Close to being ready to use for production**

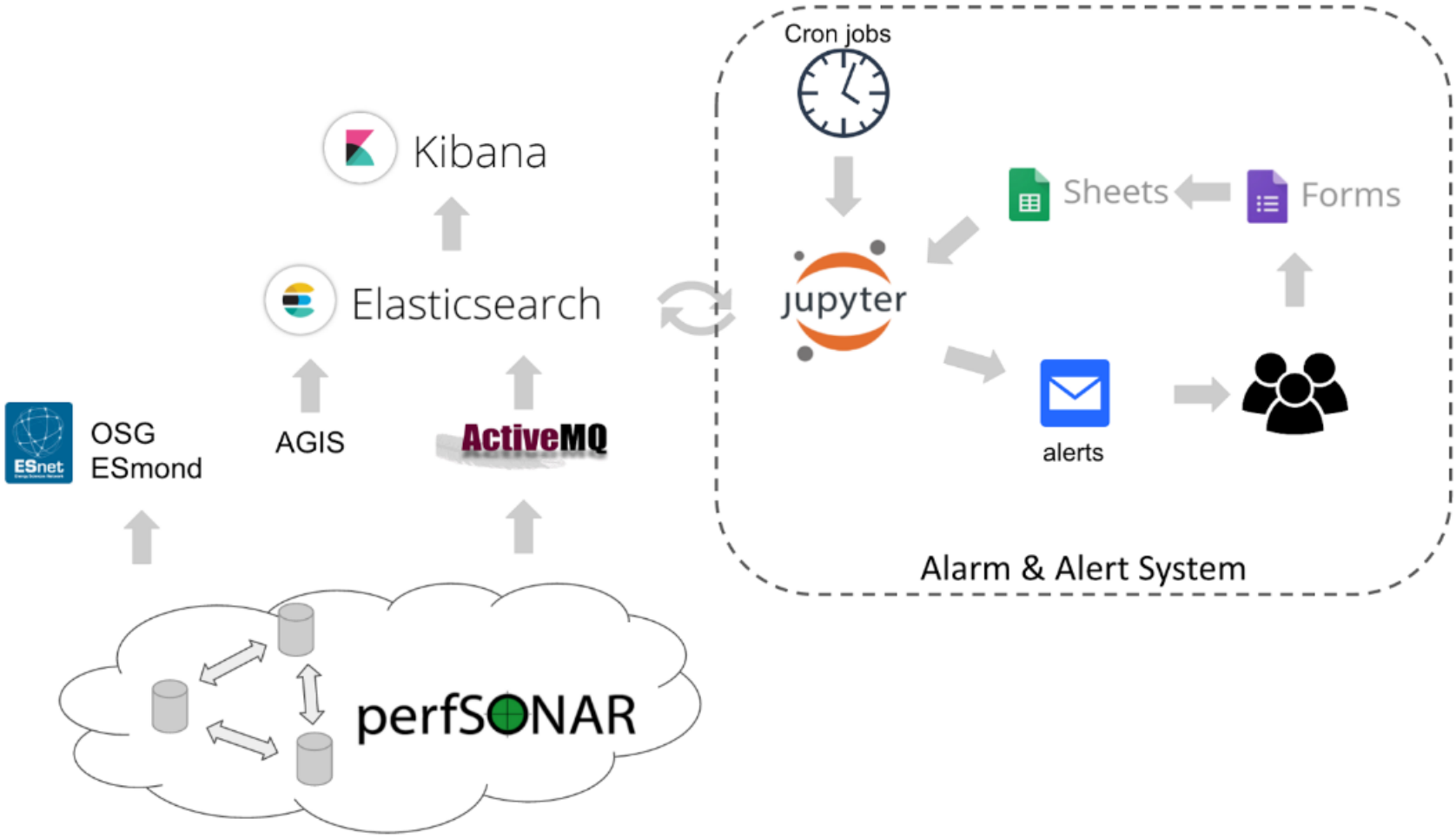
MCA Screenshot



Enabling Alarming

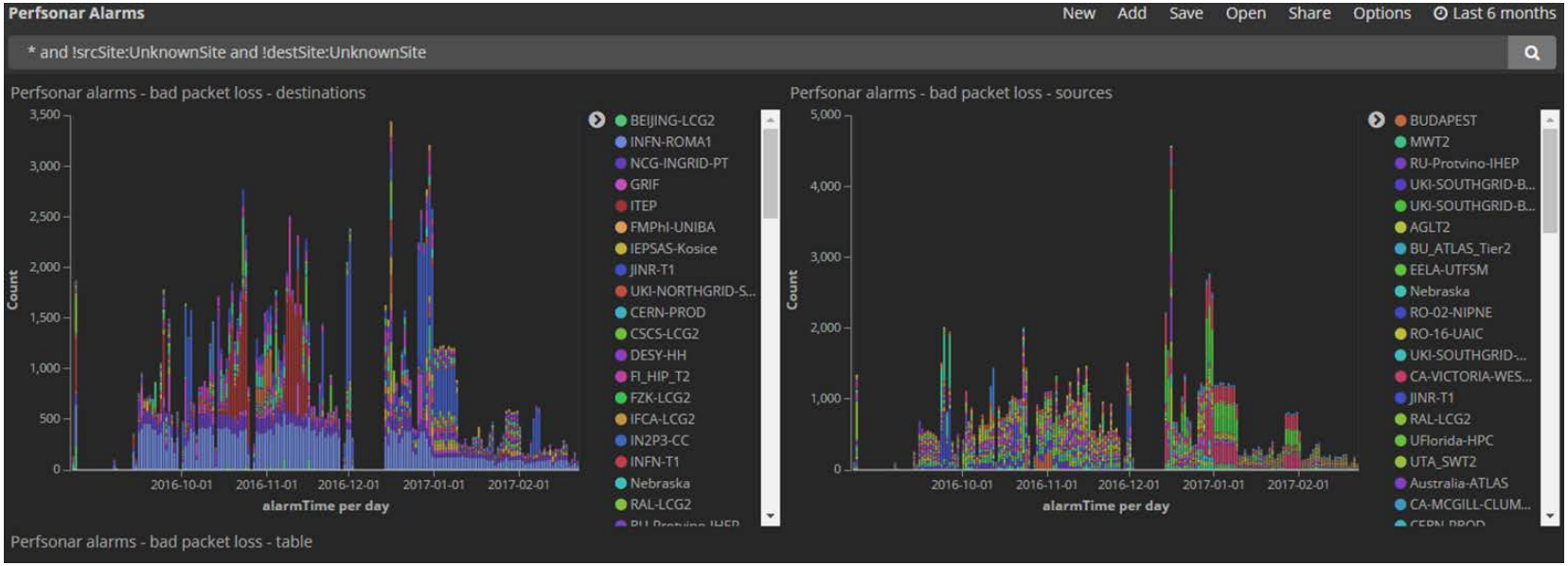
- We have a longer term goal of alerting and alarming on network issues.
- Milestone completed: technical design of a suitable analysis system based upon existing time-series technologies
- Current operating implementation gathers all perfSONAR data OSG sends to CERN and puts it in ElasticSearch.
- Jupyter instance regularly runs cron tasks to analyze data
  - Anyone can subscribe to simple alert-emails.
  - http://tiny.cc/RegATLASAlarm
  - Not "production" yet. Will need lots of packaging for end-user use.

Logical Diagram: Alarm/Alert System

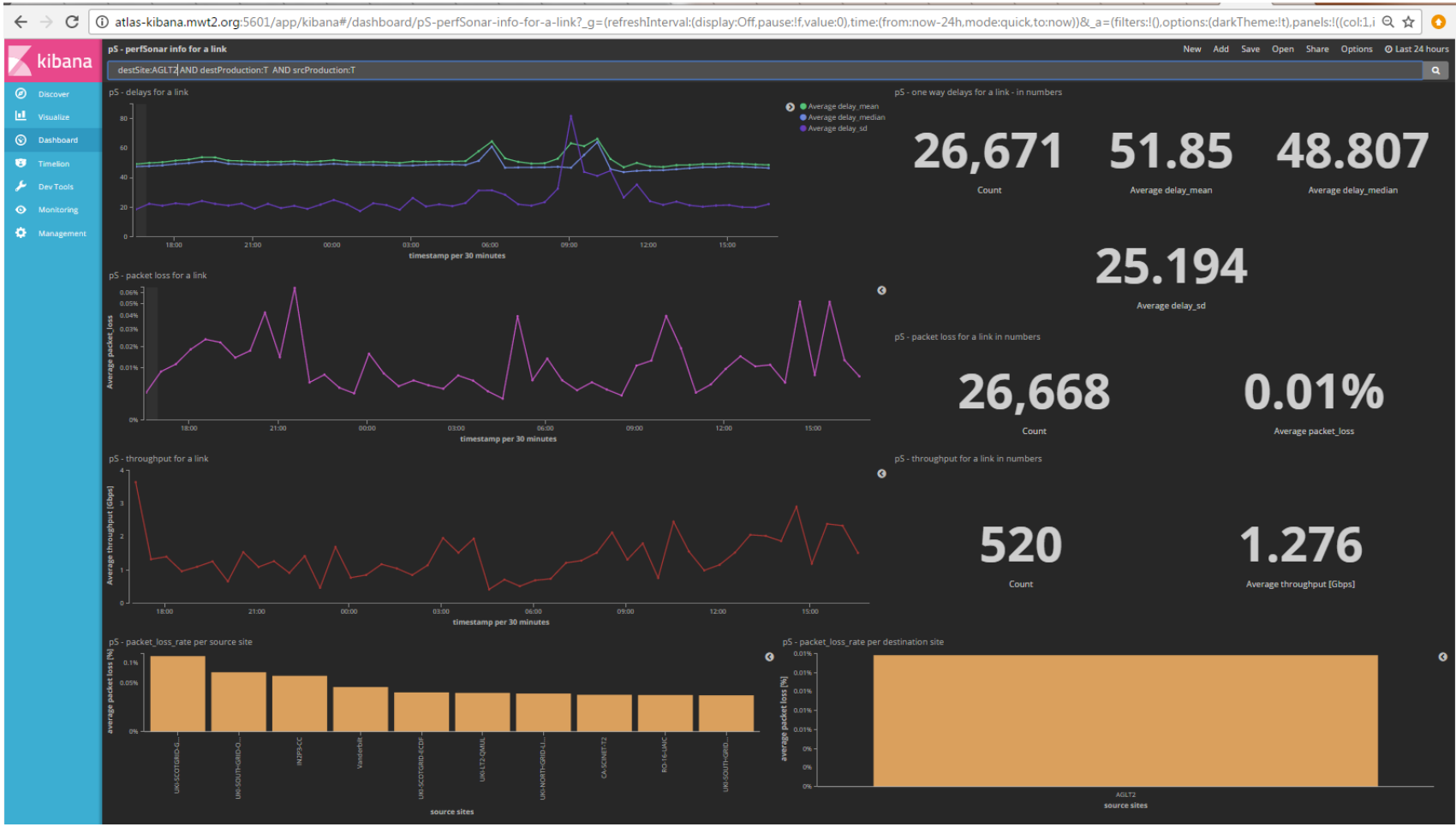


Examples of Network Analytics

- Using the ELK setup from Ilija Vukotic/UC we can look at some of the network data results
- This link shows the last 6 months of packet loss results by source/destination: http://tiny.cc/PktLossNoUnknown

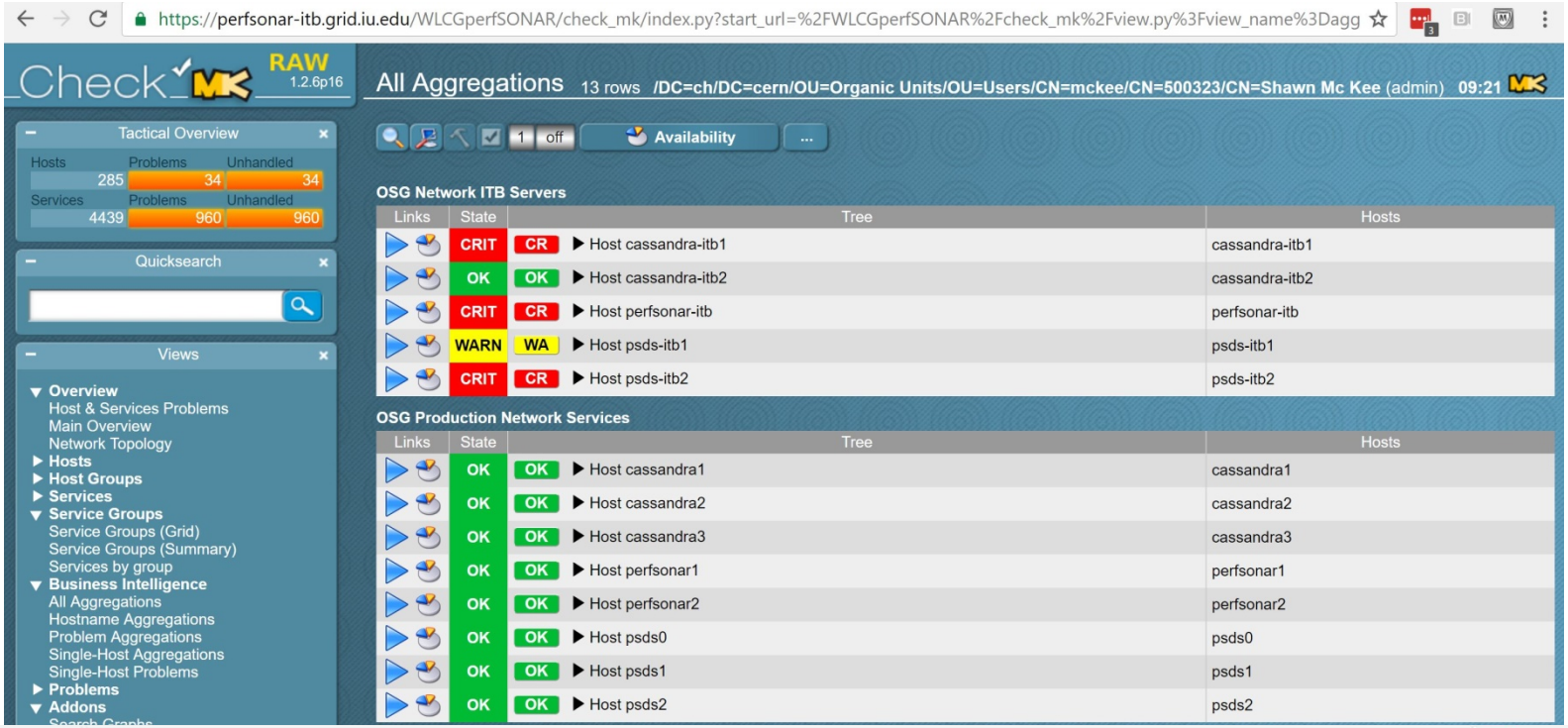


- We can analyze in the context of a specific site or link. Example http://tiny.cc/pSLink

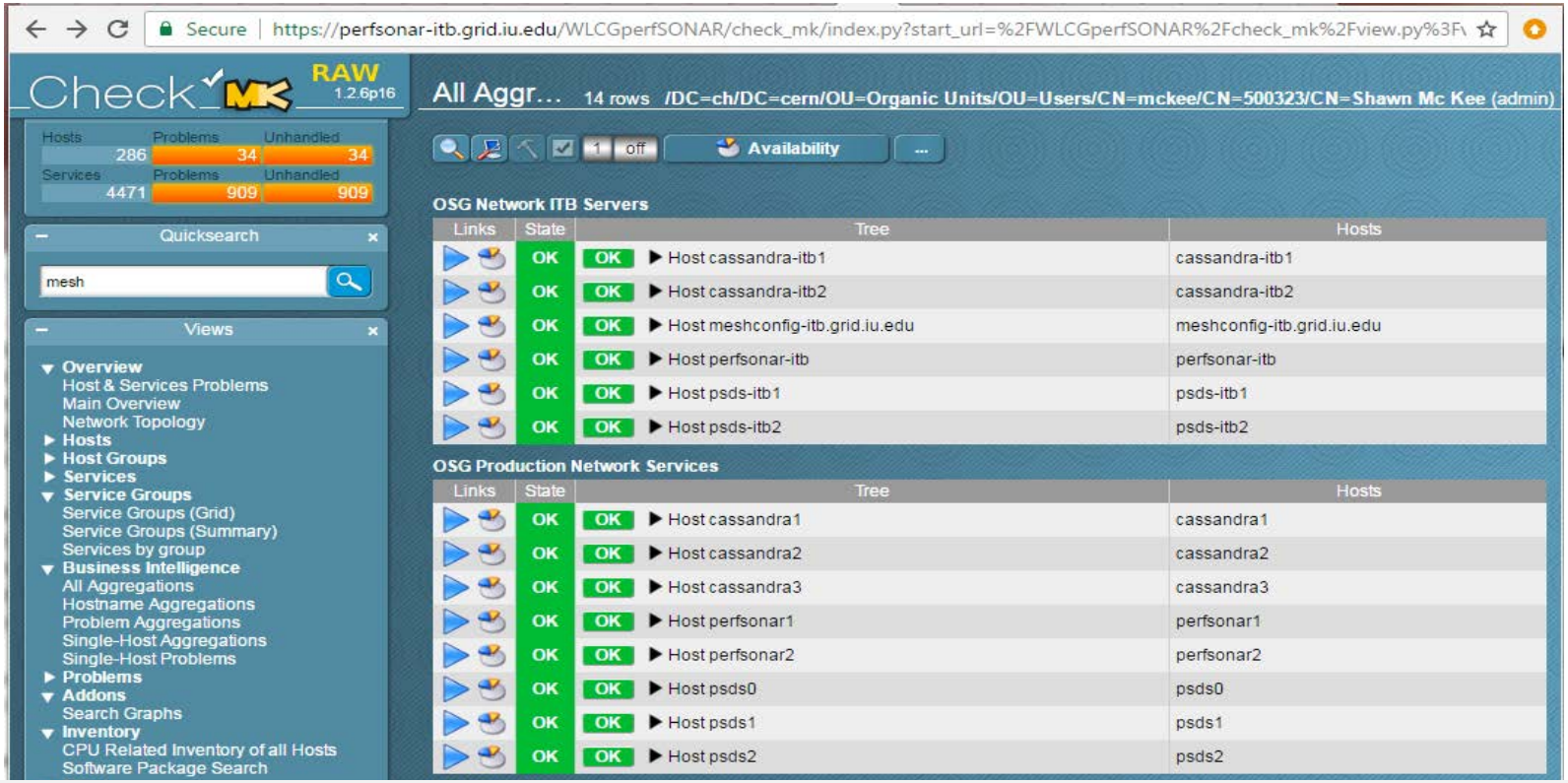


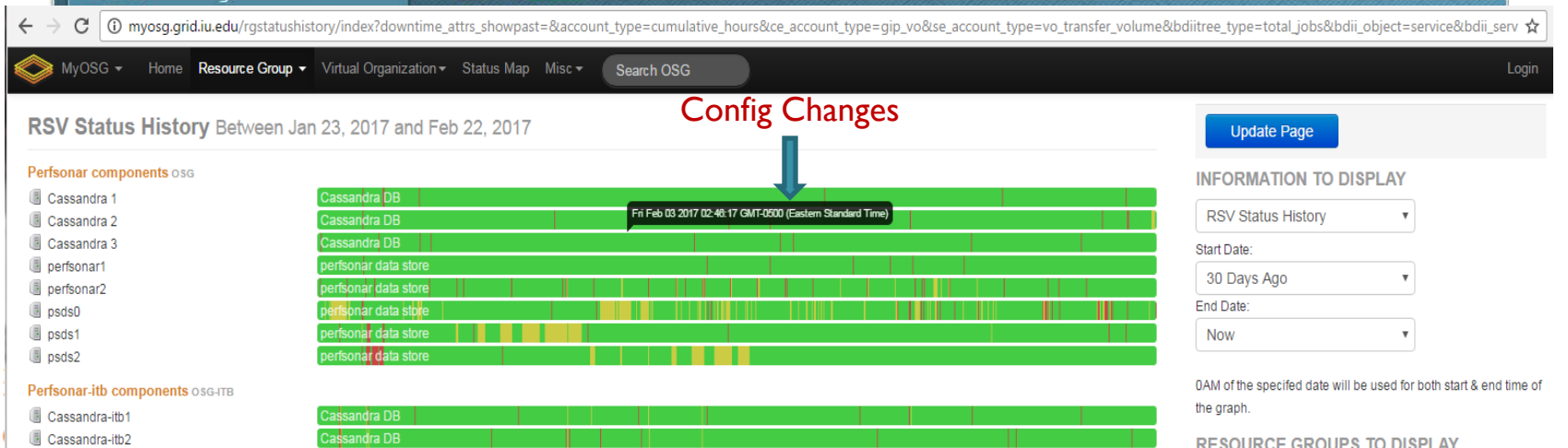
- This example shows measurements being made and captured by OSG http://tiny.cc/pSDash

Status of OSG Net Services(last)



Status of OSG Net Services

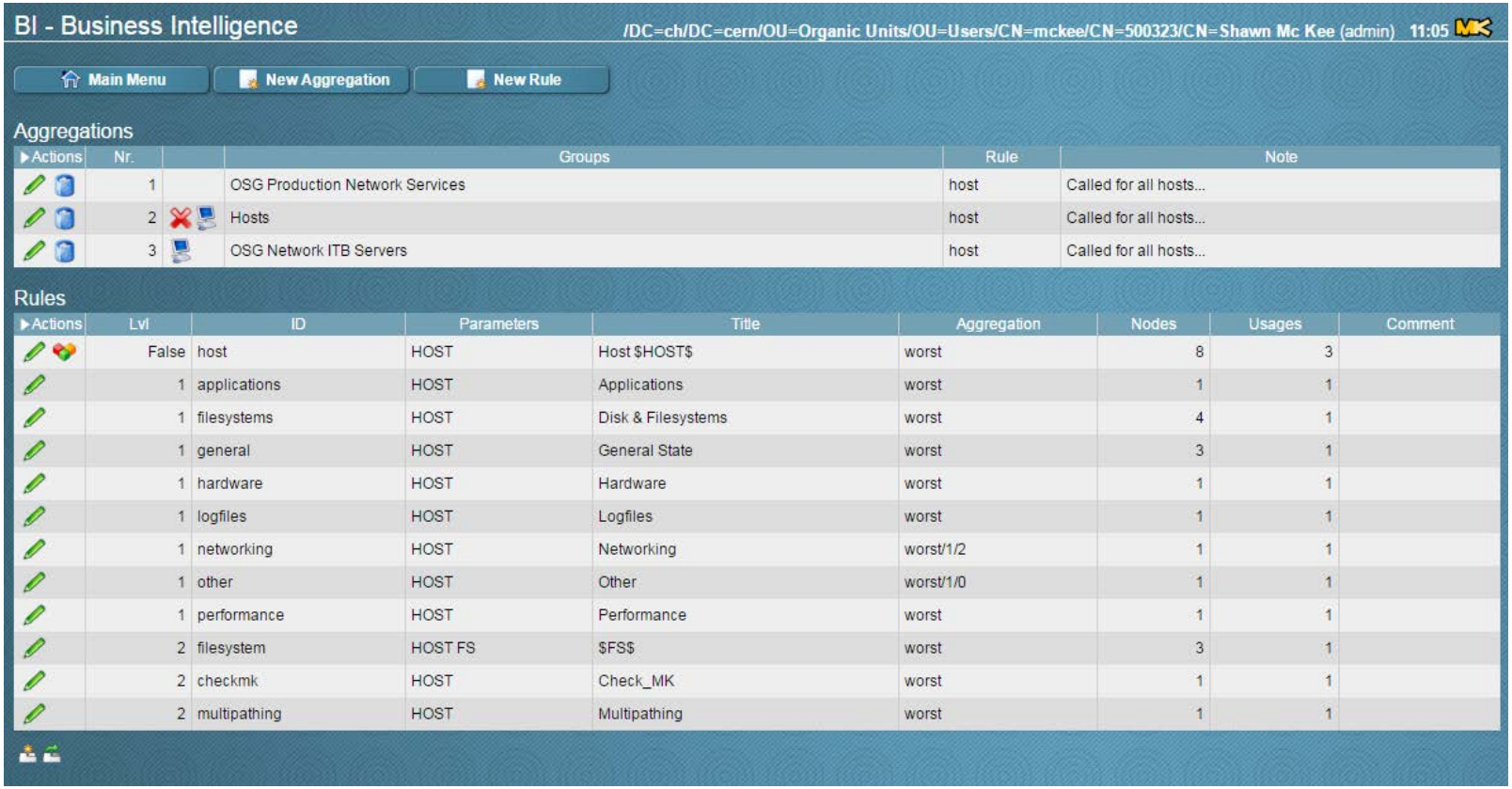




Service "Challenges"

- As you can see on the previous 30 day RSV status we have had some occasional problems with some services
  - MaDDash mitigation with cron restart script from Scott working
  - New issues with publishing data to CERN ActiveMQ.
    - Two events where publishing stopped: around 10:25 PM on Saturday Feb 11 and Feb 18. Investigation pointed out some problems with lack of needed log access
    - See ongoing ticket https://ticket.opensciencegrid.org/32653
- Scott noted the Business Intelligence summary was indicating too many problems…should only go critical when a response is needed
  - Next few slides show remediation/configuration changes
- The ITB instances have had problems. Full /var, MaDDash up/down, intermittent load issues. Not critical because it's ITB. Mostly working
- Would still like to get check_mk monitoring on the virtualization hosts.
  - Useful to understand resource use and possible conflicts
  - Is opening a ticket the best way to get this?

Reconfiguring Business Intelligence



BI - Business Intelligence

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Main Menu | New Aggregation | New Rule

Aggregations

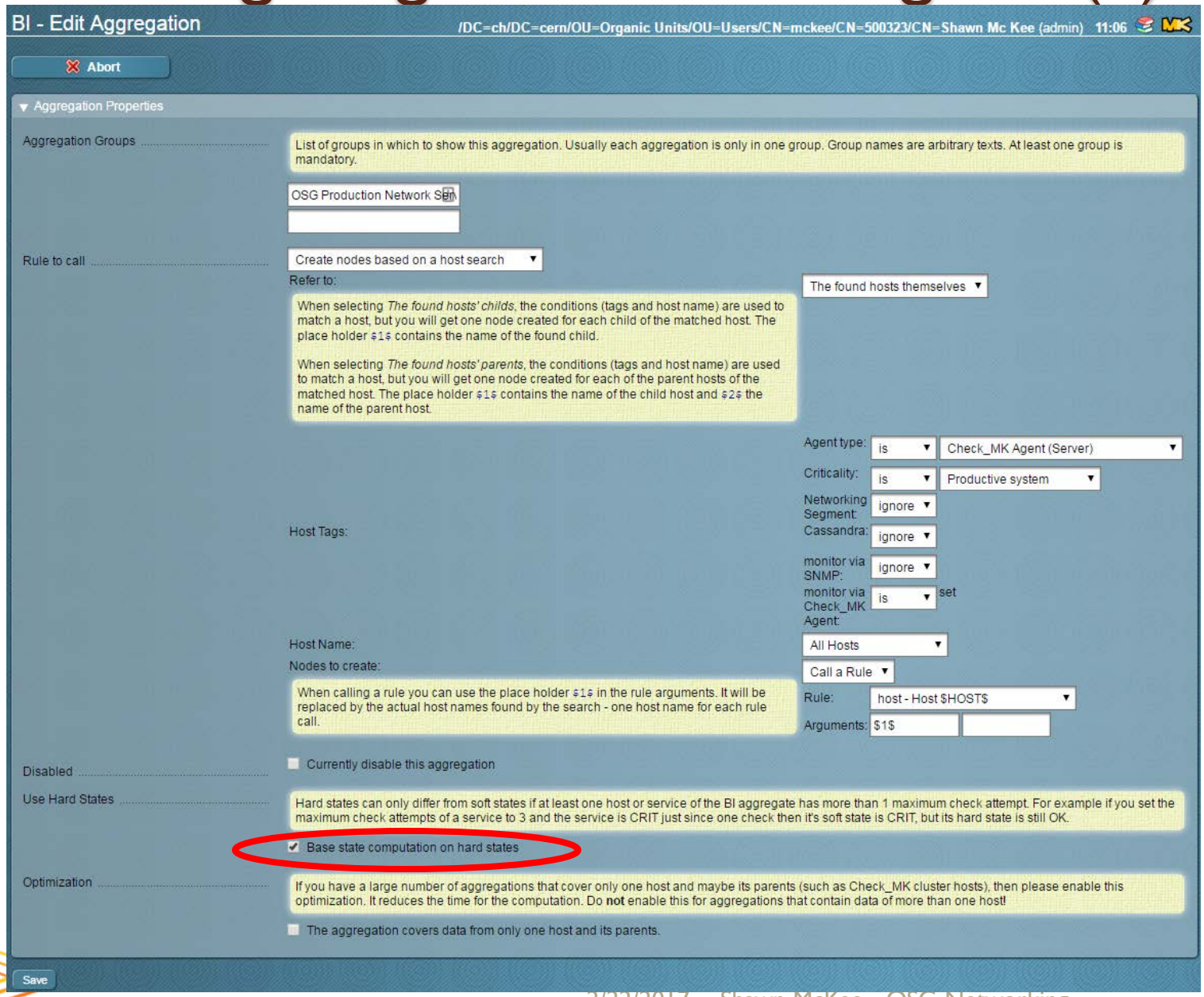
Actions	Nr.		Groups	Rule	Note
	1		OSG Production Network Services	host	Called for all hosts...
	2		Hosts	host	Called for all hosts...
	3		OSG Network ITB Servers	host	Called for all hosts...

Rules

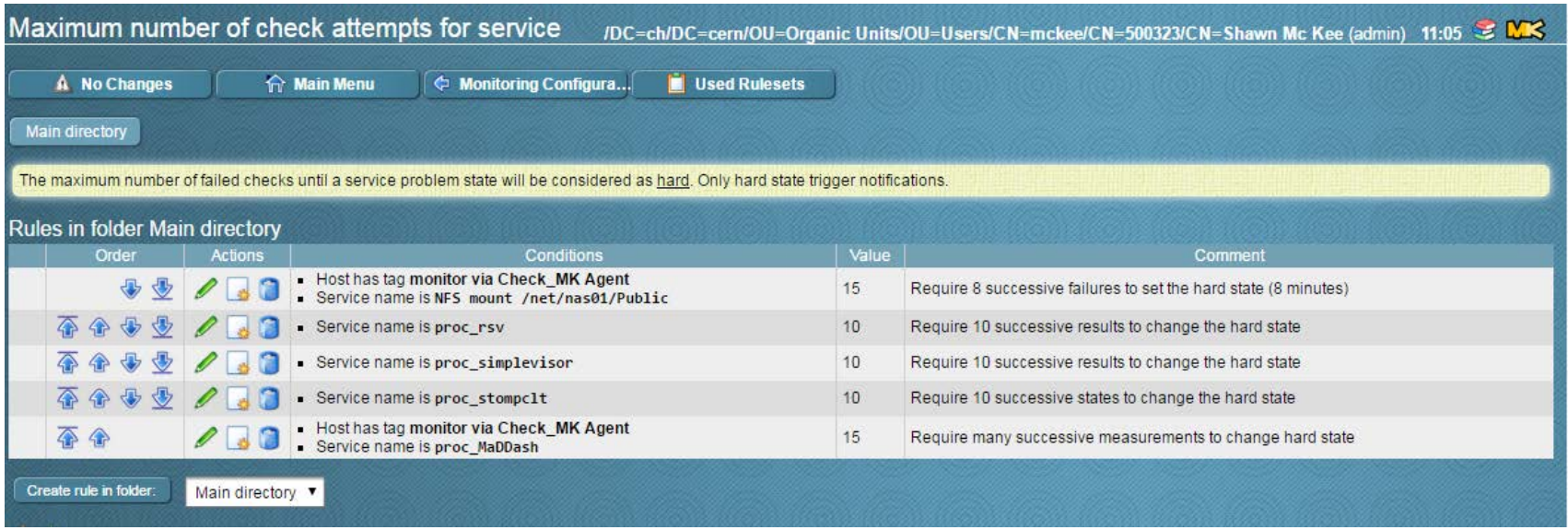
Actions	Lvl	ID	Parameters	Title	Aggregation	Nodes	Usages	Comment
	False	host	HOST	Host $HOST$	worst	8	3	
	1	applications	HOST	Applications	worst	1	1	
	1	filesystems	HOST	Disk & Filesystems	worst	4	1	
	1	general	HOST	General State	worst	3	1	
	1	hardware	HOST	Hardware	worst	1	1	
	1	logfiles	HOST	Logfiles	worst	1	1	
	1	networking	HOST	Networking	worst/1/2	1	1	
	1	other	HOST	Other	worst/1/0	1	1	
	1	performance	HOST	Performance	worst	1	1	
	2	filesystem	HOST FS	FS	worst	3	1	
	2	checkmk	HOST	Check_MK	worst	1	1	
	2	multipathing	HOST	Multipathing	worst	1	1	

- The check_mk BI rolls-up the summary state of a number of groups of checks
- For OSG we track Production and ITB groups
- Within each group we summarize the state of each host

Reconfiguring Business Intelligence(2)

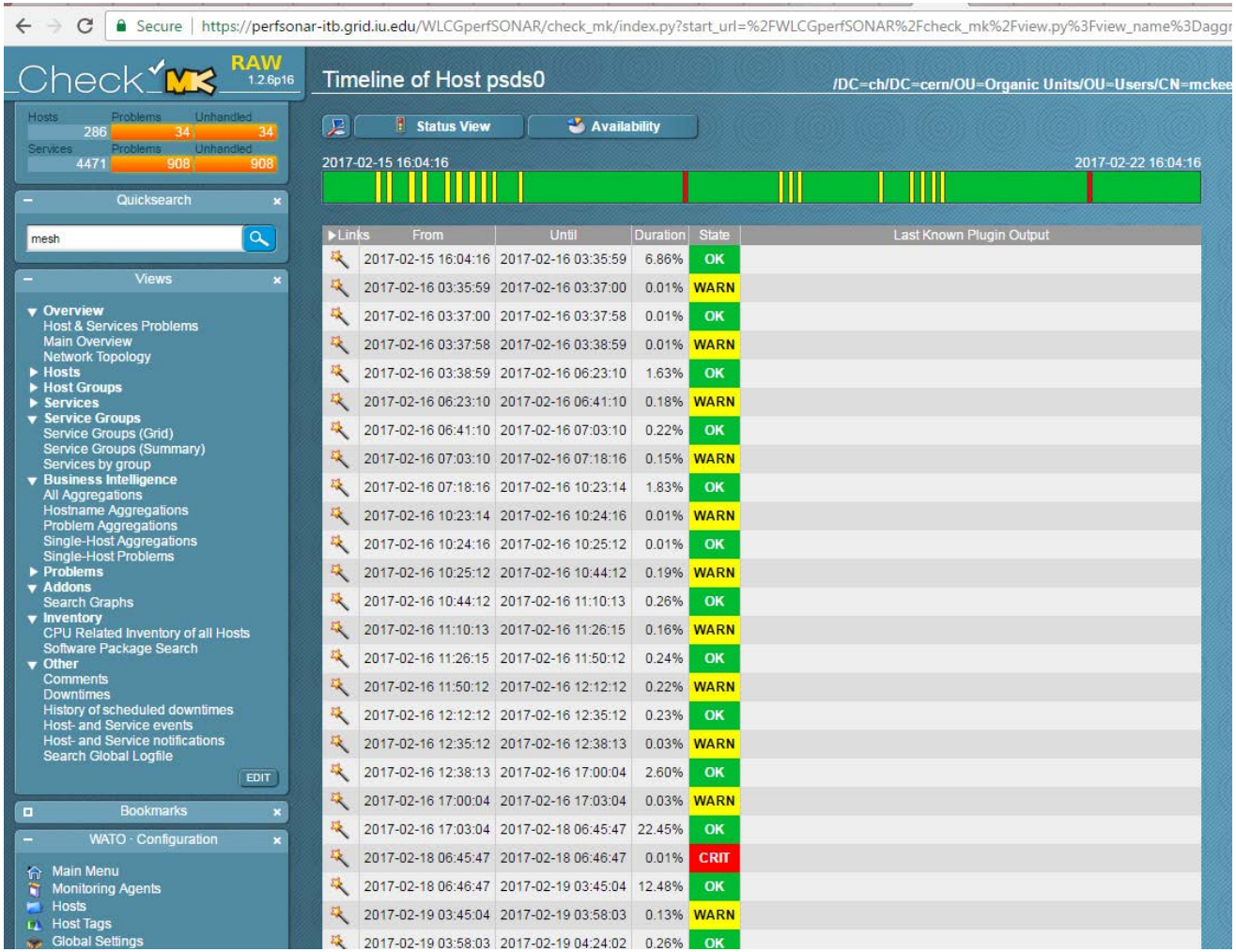


Reconfiguring Rules for Hard State



- Some services have transitions or intermittent glitches we don't want to signal on.
- Check_mk supports both hard and soft service states.
  - Hard states only change after the soft state has changed and stayed changed for N measurements
- Set limits to match typical observed glitch-level

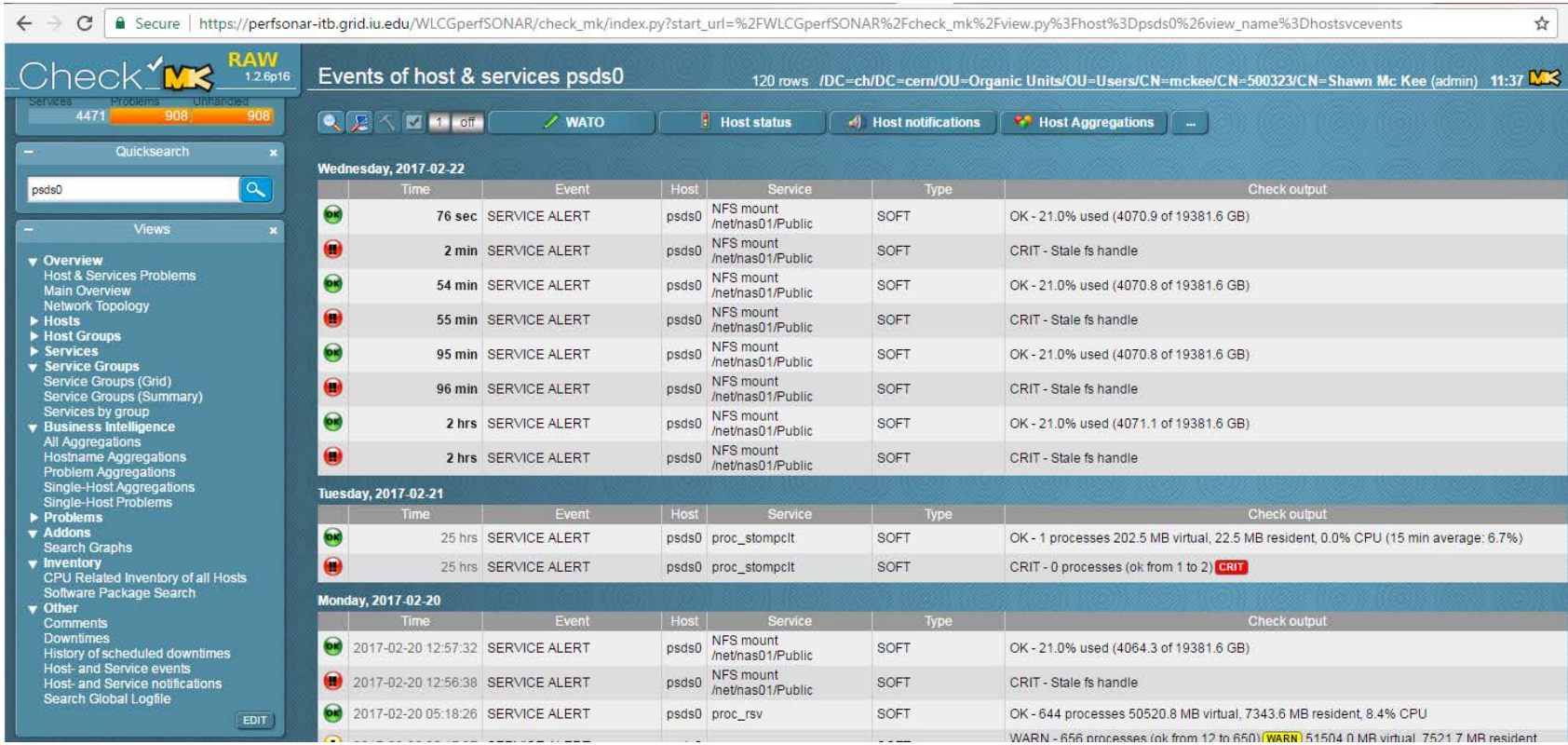
Timelines of psds0 Example



Open Science Grid

Tracking Service History

- We can provide a "service history" view
- Useful to understand behavior in time
- **Need to iterate with Ops to track RSV status and tweak sensitivity**



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…still not out yet ☹
  - **Targeting ~March, 2017 for RC3**
  - **Release in April?!?**
- MaDDash 2.0 is close to ready.
- Once these are released we will want to update ITB and then Production
  - Will need a global campaign to get sites updated
  - Details on upcoming OSG "upgrades" on next slide

Supporting 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 need to support all possible perfSONAR metric types
  - Required changes to the RSV probes and ActiveMQ configurations
- Since the last report on January 4th this work has been successfully completed and in ITB.
  - Edgar enabled support and corresponding configuration options in the software. New perfSONAR RSV out.
  - **Thanks to Edgar, OSG Operations and the CERN AMQ team!**

Needed Updates

- Once perfSONAR v4.0 and MaDDash v2.0 are released we will need to do some updates:
  - MaDDash 2.0 to perfsonar-itb, then psmad
  - Deploy MCA to production (currently on meshconfig-itb => meshconfig.grid.iu.edu)
    - **Replace existing OIM version and cut-over** (DNS alias), e.g., https://myosg.grid.iu.edu/pfmesh/mine/hostname/ to refer to http://meshconfig.grid.iu.edu/pub/auto/
  - Update check_mk agents to use 1.2.8p17 (all OSG service hosts)
  - Update check_mk server to use 1.2.8p17
  - perfSONAR RSV to production https://ticket.opensciencegrid.org/31257
  - Updates to Esmond (Cassandra/Postgresql)?

Status: Plan to Address Storage Space

- Discussed in detail last time including hardware upgrade plan
- 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
- The near-term plan is to buy ~8 disks and incrementally swap them for smaller disks, minimizing downtime.
  - Rob Quick can summarize current status

Talks and Papers (Outreach)

- There are at least 5 CHEP 2016 **submitted** referencing OSG Networking
  - *The OSG Network Service*
  - *Scaling the PuNDIT project for wide area deployments*
  - *Networks in ATLAS*
  - *Networking – the view from HEP (Plenary)*
  - *Big Data Analytics Tools as Applied to ATLAS Event Data*
- January 10th was the Pre-GDB on Networking at CERN
  - OSG's role in gathering network metrics and alerting and alarming are central items for near-term work
- The 2017 ICFA-SCIC Network Monitoring report was submitted http://icfa-scic.web.cern.ch/ICFA-SCIC/meetings.html
- Upcoming presentation on Networking
  - OSG AHM March 8
  - ATLAS Software and Computing week March 13-17th

Concerns (Much as last time)

- Operation of services
  - OSG production network service still seeing issues
  - Monitoring was significantly 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)
  - In limbo because we want new release, new meshconfig and some level of alarming available to use to recruit with
- Long-term data lifecycle management
  - **Must implement additional storage**
- Convergence ongoing on "alarming" system.
  - Needed components are in place and being played with
  - Need to harden this and move to broader testing
    - Build the user-facing interface and verify 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:
  - Packet-loss: http://tiny.cc/PktLossNoUnknown (6 month view)
  - perfSONAR dashboard: http://tiny.cc/pSDash
  - perfSONAR link details: http://tiny.cc/pSLink
- Mesh-config in OSG https://oim.grid.iu.edu/oim/meshconfig
- Pre-Production Meshconfig https://meshconfig-itb.grid.iu.edu/meshconfig/
- MadAlert: http://madalert.aglt2.org/madalert/diff.html
- perfSONAR homepage: http://www.perfsonar.net/