Prioritizing Site Issues

This talk gives recommendations on how to prioritize issues to investigate on the grid

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Mission Statement

- As Factory Operators, we must ensure the system is maximizing the amount of useful resources delivered to our users when they are requested
- Secondary goal – minimize waste in the process of ensuring the above

Warning

- With ~300 entries and serving ~12 VOs, something is always broken somewhere
- In a given shift there may be N problems, and you may only have time to take care of n things, where n << N
- It is not easy to come up with rules to neatly prioritize every issue on the grid
- But we have a few basic guidelines

Problem Categories Revisited

- Recall the following:
  - Validation
  - Rundiff
  - Held
  - Waiting
  - Pending
  - Unmatched

Problem Categories Revisited

- Entries can fail at the extreme of each category
- When an entry is failing at the extreme, it does not matter the category, the outcome is the same:
- The entry is effectively **broken** for its users

Broken Due to Validation

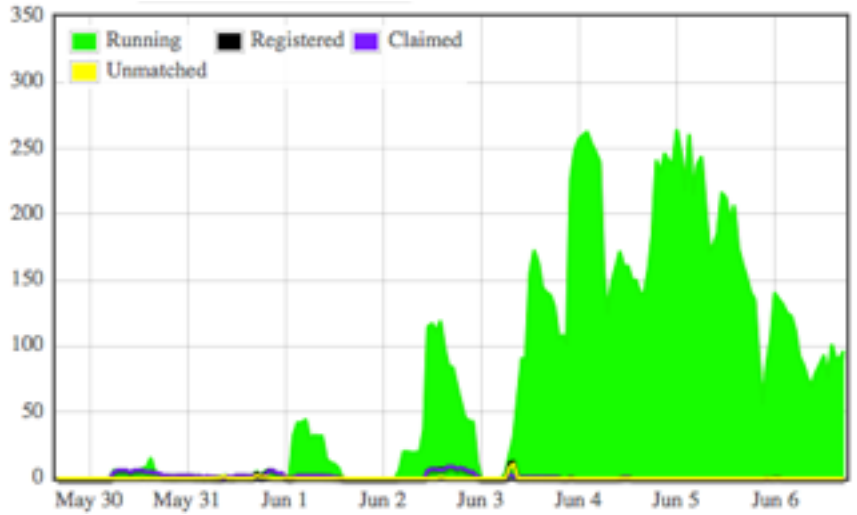
	strt	fval	0job	val	idle	wst	badp	waste	time	total
CMS_T2_US_Purdue_hadoop	100%	100%	100%	100%	0%	100%	100%	72	72	207

- 100% fval, and total is significantly > 0
- If number of glideins is < 10 it cannot be conclusively labeled broken
  - Not enough glideins to sample the entire cluster, e.g. they could have all landed on one or two bad nodes

Broken Due to Rundiff

- 100% rundiff
- Over sustained period of time

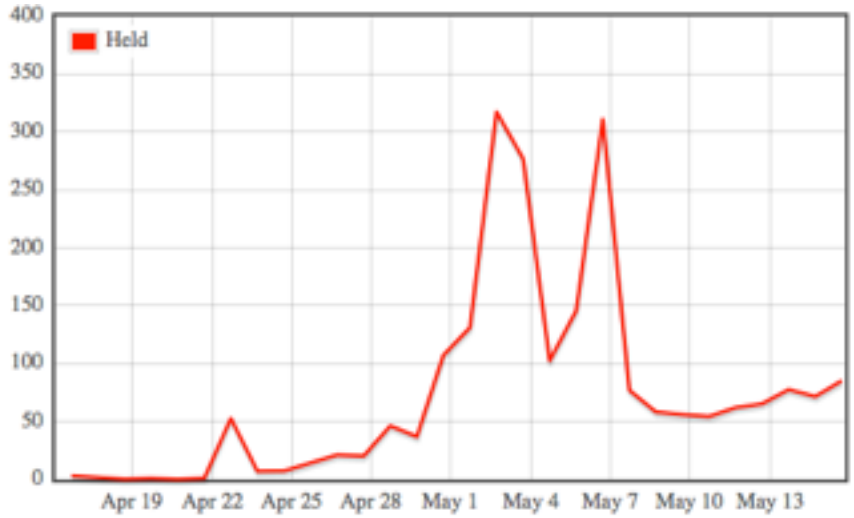
Entry Name		Status: Running	Client: Registered	Diff(Status: Running, Client: Registered)
CMS_T2_UK_London_IC_cetest01	↑	63	0	63

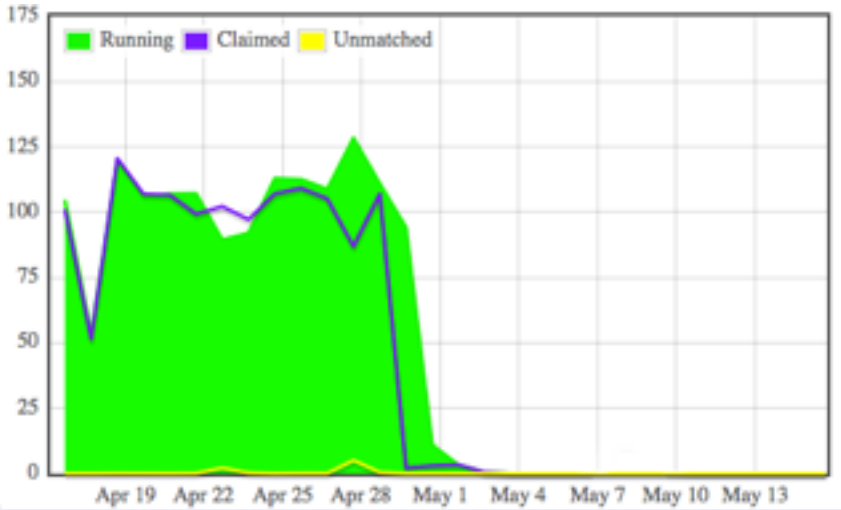


Broken due to Held

		Status:								Requested:	
Entry Name		Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle
CMS_T3_US_UCD_cms	↑	0	0	0	0	0	0	0	75	274	86

- 100% held
- Req Idle > 0
- 0 Running over sustained period of time



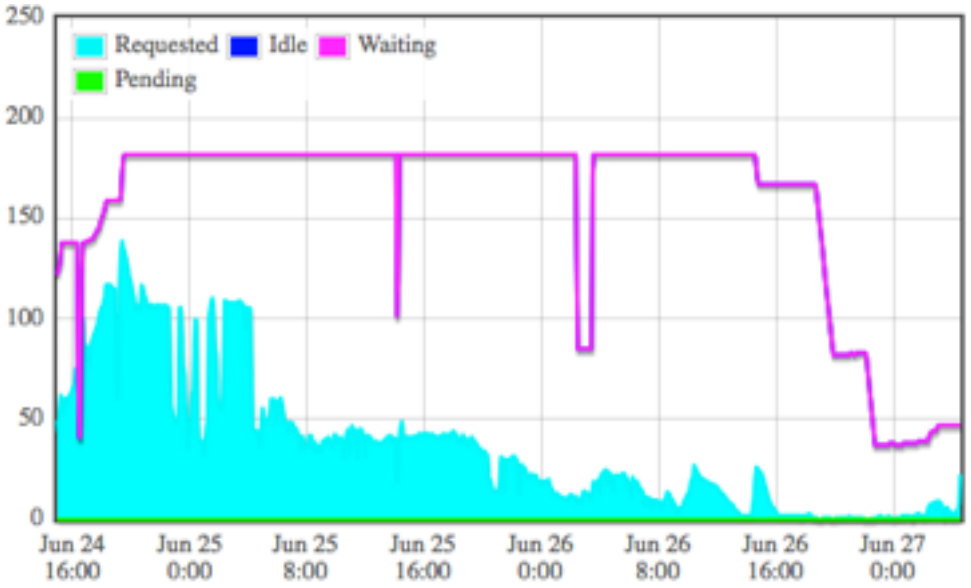


Note on Hold Limits

- Factory stops submitting when a FE gets more than 50 glideins held for a given entry
- Even after problem is fixed, the factory will not resume submitting until # held drops below 50
- Sometimes manual removal of stale held glideins is required

Broken Due to Waiting

- 100% Waiting
- 0 Pending or Running
- Req Idle > 0 over sustained period of time



		Status:								Requested:	
Entry Name		Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle
CMS_T2_US_Purdue_cmstest1	↑	0	44	44	0	0	0	0	0	8	3

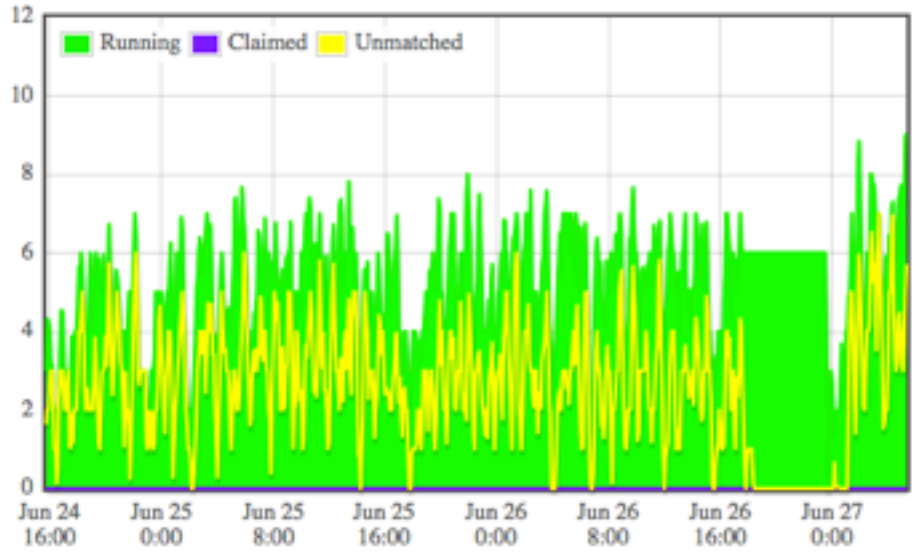
Broken Due to Pending

- In general it is not a problem to have a high amount of Pending because:
  - There is more user demand than resources
  - Some VOs have low priorities relative to others
- On a rare occasion a site will be broken and have only Pending
- Signature similar to previous example, 0 Running, Req Idle > 0
- More likely a real problem if Pending times are unusually long when compared with site's historical statistics

Broken* Due to Unmatched

		Status:								Requested:		Client Monitor:						
Entry Name		Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle	Claimed	User run here	User running	Unmatched	User idle	Registered	Info age
CDF_IT_CNAF_ce01	↑	9	0	0	0	0	0	0	0	10	2	0	0	0	5	20	5	82

- 100% Unmatched
- Req Idle > 0
- 0 Claimed over sustained period of time



* recall that 100% unmatched usually suggests FE is broken, not the site, but outcome is the same: users are unable to utilize resources

Prioritization

- Make debugging broken entries **top priority***
- Make sure you have checked **every** category for broken entries before moving on to debugging semi-working entries
- Note any broken entries you didn't have time to investigate and report them to the other operators at the end of your shift
- Remember, category classifications don't matter for broken entries, the end result is the same:
  - Users are getting **0 resources** at a site they are trying to use

* Exception to this rule described on next slide

Exception to the Rule

- Not all Sites are equal in size. Therefore it is important to look at total impact as well
- Example:

	strt	fval	0job	val	idle	wst	badp	waste	time	total
CMS_T2_US_Florida_iogw1	14%	29%	38%	32%	23%	55%	92%	21231	38601	64417
CMS_T3_US_PuertoRico_grid0	0%	0%	52%	25%	34%	40%	48%	532	1310	374
Gluex_US_NUMEP_grid1	99%	99%	100%	99%	0%	100%	100%	296	296	864
CMS_T2_UK_SGrid_Bristol_lcgce01	14%	6%	86%	8%	46%	53%	69%	258	484	662
CMS_T3_IT_Bologna_ce02	98%	88%	98%	88%	1%	89%	100%	198	222	575

- In this case, Florida clearly wasted the most, even though it was not failing validation 100%
- The absolute value of waste is an indication of how much more the Users could have utilized for that day
- In general, take a look at 100% broken sites first, but keep an eye on absolute impact as well!

Global vs Specific Issues

- It is important to note global aggregates in our monitoring can be misleading!
- Global stats in analyze_entries:

	strt	fval	0job	val	idle	wst	badp	waste	time	total
Total/Average	7%	0%	28%	0%	3%	4%	25%	19874	439669	62341
---	---	---	---	---	---	---	---	---	---	---
CMS_T2_US_Nebraska_Red	0%	0%	16%	0%	3%	3%	19%	357	9234	1112
CMS_T2_US_Nebraska_Red_gw1	1%	0%	15%	0%	3%	3%	20%	338	8775	1098
CMS_T2_US_Nebraska_Red_gw2	0%	0%	19%	0%	3%	4%	22%	327	7962	1022

- For a single frontend (Fermilab):

	strt	fval	0job	val	idle	wst	badp	waste	time	total
Total/Average	19%	20%	100%	22%	79%	100%	100%	184	184	459
---	---	---	---	---	---	---	---	---	---	---
CMS_T2_US_Nebraska_Red	0%	0%	100%	0%	100%	100%	100%	10	10	27
CMS_T2_US_Nebraska_Red_gw1	0%	0%	100%	0%	100%	100%	100%	17	17	45
CMS_T2_US_Nebraska_Red_gw2	0%	0%	100%	0%	100%	100%	100%	16	16	43

Global vs Specific Issues

	strt	fval	0job		val	idle	wst	badp		waste	time	total
CMS_T2_US_Nebraska_Red	0%	0%	16%		0%	3%	3%	19%		357	9234	1112

- Factory-wide waste at Nebraska looks negligible but in reality one frontend is 100% Unmatching:

CMS_T2_US_Nebraska_Red	0%	0%	100%		0%	100%	100%	100%		10	10	27

- The moral is: don't forget to check per-frontend stats, and pay attention to what is happening at the entry level instead of relying on aggregated totals

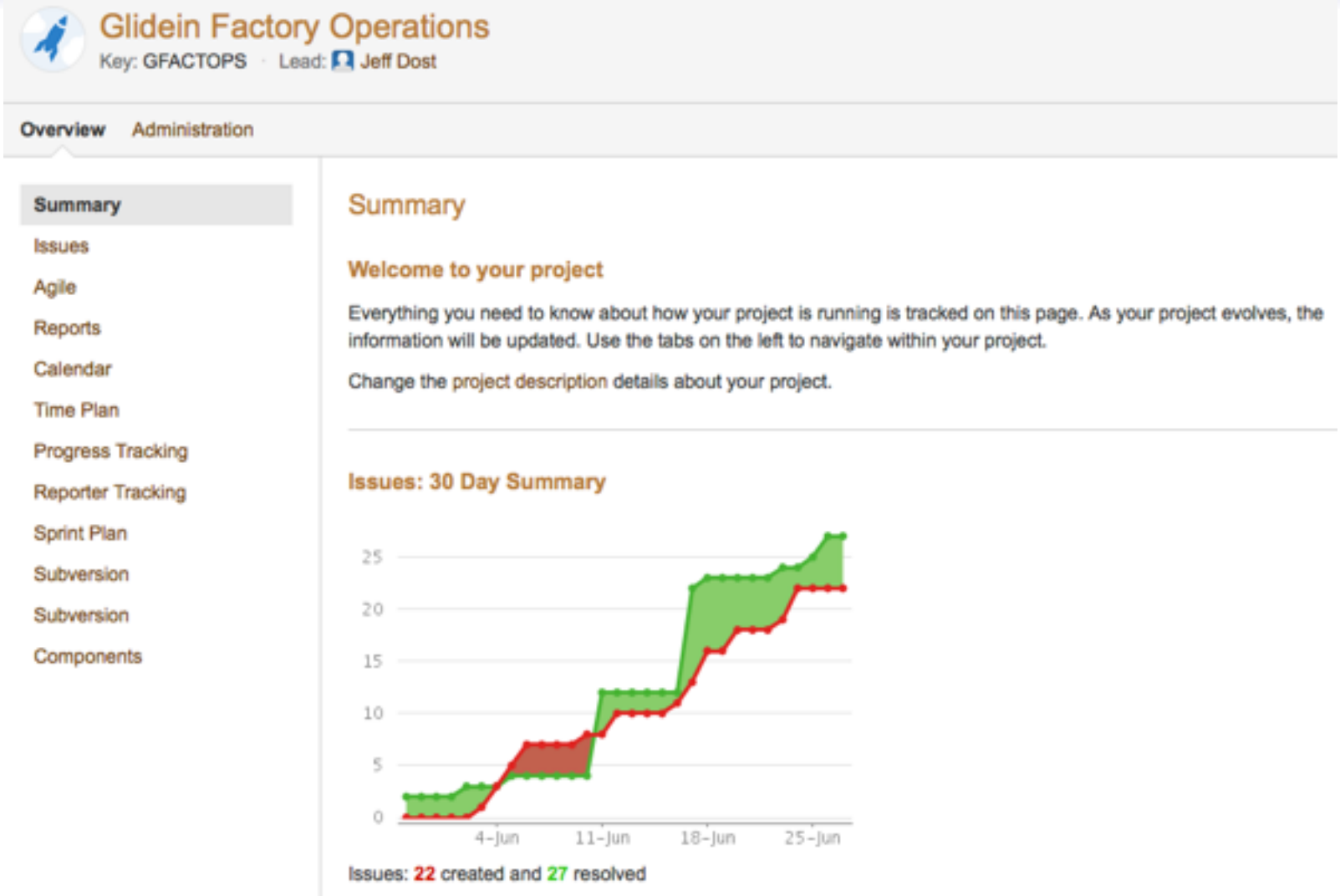
Prioritizing Semi-Working Entries

- This is where it gets difficult
- The best we can recommend is:

  1. Use your best judgement
  2. Try not to focus too much on one Category

- The following slides introduce a tool to help us keep track of 2.

Intro to Factory Ops Jira



https://jira.opensciencegrid.org/browse/GFACTOPS

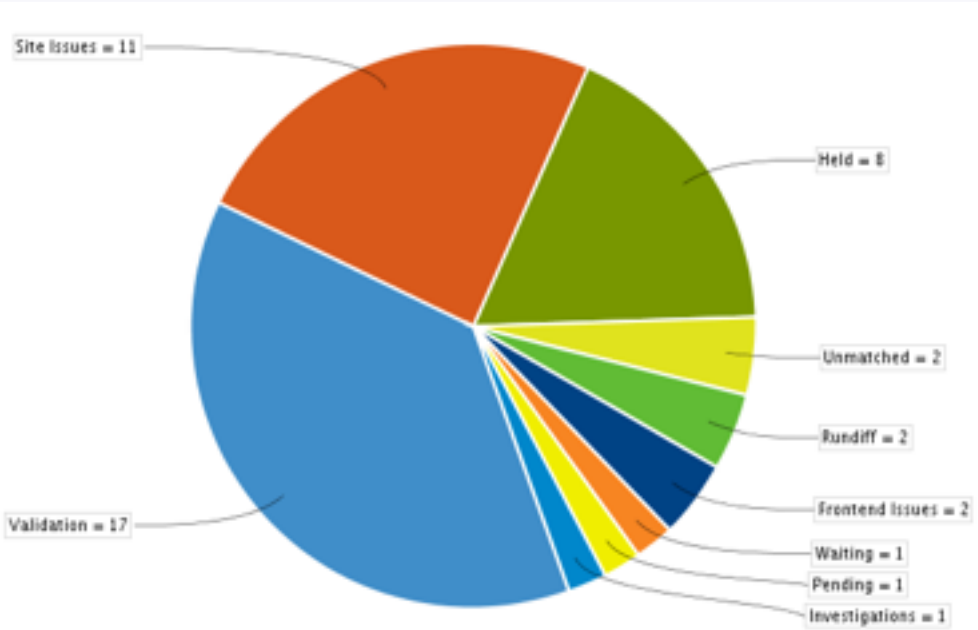
Intro to Factory Ops Jira

- We use Jira to track any ongoing investigations opened by Factory Ops
- We catagorize every Jira ticket by problem type (Validation, Held, etc.)
- This allows us to generate reports to track how much time we spend in each catagory

Sample Jira Report

Data Table

	Issues	%
Validation	17	38%
Site Issues	11	25%
Held	8	18%
Unmatched	2	4%
Rundiff	2	4%
Frontend Issues	2	4%
Waiting	1	2%
Pending	1	2%
Investigations	1	2%



- Types of issues worked on over the last 2 weeks for the Factory Ops team
- You can alternatively generate a report from your own tickets

Prioritizing Semi-Working Entries

- Jira reports are a good way to decide which category to focus on
- Pick a category that has been less popular recently

Prioritizing by Site Size

- We don't have a definitive way to prioritize sites by importance
- If short on time, focus on big sites (T1's and T2's in the case of CMS)
- Fixing problems at larger sites potentially give the greatest return in providing cycles to Users
  - Recall the example of high absolute waste