

Tier 2 Procurement and Milestones

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Introduction

- This talk will discuss organization of the Tier 2 work and cover:
 - The existing milestones
 - Proposed new milestones
 - Procurement
- As part of the discussion, we need to think about how we communicate with each other and coordinate the tier 2 effort.
 - I am used to the detector construction model of:
 - Make a plan with actions to be completed by certain milestone dates.
 - Have periodic meetings and reporting to track progress.
 - Actively monitor the work looking for issues.
 - Follow up individually with efforts that are having trouble.
 - To my mind, we need to take a holistic approach and follow all issues hardware and software - anything that goes into operating the sites reliably.

Milestones

- I have divided the milestones into categories:
 - All site milestones used to coordinate the project overall
 - Creating FY23 procurement plans (focus of this talk November 22)
 - Completing the procurement plan with new equipment online (September 2023)
 - Identifying the Linux version/flavor after CentOS7/EL7 (June 2023)
 - A proposed all site milestone on operations (next slide Feb/Mar 2023)
 - Site milestones which deal with specific local issues
 - Infrastructure, software, virtualization, storage
 - These allow sites to inform the project and the project to track site issues/work
 - NET2.1 is an extreme case of local issues and the project will work closely with the UMass team to insure a successful launch.
- The full list of milestones is in the backup materials

Proposed Milestones

- I had Shawn enter these milestones as priority 0 proposed because we have not formally agreed among ourselves to do this and what would be included.
- We have propose 5 milestones for operations (mostly software):
 - One for each site to create an operations plan (February 2023)
 - One for me to create an agreed to global operations plan (March 2023)
 - This final milestone would produce a schedule of updates that would be tracked
- Examples what could be tracked:
 - Linux version and Linux kernel updates
 - Queuing system updates (e.g. HTCondor, SLURM)
 - Storage software version (e.g. dCache, XRootD)
 - ADC/WLCG requests (e.g. CRIC data, Panda Queue names, IPV6, Rucio Mover)
 - Networking (e.g. firmware upgrades, perfSONAR, lifecycle hardware repl.)
 - Monitoring/Security (e.g. Grafana, ES, Zeek, Security Patches)

Procurement

- Parameters driving the procurement process
 - CPU/Disk balance
 - Nominal goal 200% of CPU /120% of Disk WLCG pledges but we are way over that
 - Purchase timing
 - We need to strategize about the purchasing schedule given the following factors:
 - Funding level fluctuations (e.g. will the equipment fund reduction be restored?)
 - Whether we think that prices will continue to rise or return to their former levels.
 - Supply chain delay time (e.g. if something is needed in June and delivery is 6 months, we can't wait for a better price in March)
 - According to Dell often inability to obtain a single part (e.g. a power supply) will delay the delivery of an entire group of servers.
 - I have repeatedly heard that there is a risk is of having next FY funding reduced by the amount of unspent funds at the end of the current FY but is that really an issue?
 - How to coordinate the purchasing to maximize our our buying power.
 - Whether the individual university purchasing offices will continue let us sole source Dell
 - The purchasing office aversion to sole sourcing is correct: being locked-in to a single vendor does not usually get the best price.

FY22 Current Status

- This year's (2022) pledges (C-RSG):
 - CPU: 81.2 kHS06 / 121.7 kHS (MWT2) US T2 pledge: 365.24 kHS06 Actual: 1376.69 kHS06
 - Disk: 7.26 PB / 10.89 PB (MWT2) US T2 pledge: 32.66 PB Actual: **46.64 PB**
- Current actual situation for amount of compute:

Site	kHS06	Pledge %	PB	Pledge %	Comment
AGLT2	225.11	278	12.00	165	5 purchases total exactly 12 PB
MWT2	589.59	484	15.47	142	1.5 x other US ATLAS tier 2 sites
NET2.0			4.36	55	Legacy BU Site
SWT2	310.00	382	13.80	193	Includes undeployed OU servers

- NSF wants compute at 200% of pledge and storage at 120% of pledge

FY23 Compare current status to 2023 pledges

- Next year's (2023) pledges (C-RSG):
 - CPU: 89.3 kHS06 / 133.9 kHS (MWT2) US T2 pledge: 401.81 kHS06 Actual: 1376.69 kHS06
 - Disk: 8.59 PB / 12.88 PB (MWT2) US T2 pledge: 38.64 PB Actual: **46.64 PB**
- Current comparison of current status to FY23 pledge:

Site	kHS06	Pledge %	PB	Pledge %	Comment
AGLT2	225.11	253	12.00	165	5 purchases total exactly 12 PB
MWT2	589.59	484	15.47	120	1.5 x other US ATLAS tier 2 sites
NET2.0			4.36	50	Legacy BU site
SWT2	310.00	347	13.80	163	Includes undeployed OU servers

- NSF wants compute at 200% of pledge and storage at 120% of pledge

Funds available and compute/storage balance

Ratio of % over FY23
CPU to % over FY23
disk.

- Remaining FY22 eq funds and estimate FY23 equipment funds

Site	FY22	FY23	CPU Age	Disk Age	CPU/Disk	Comment
AGLT2	\$193k	\$221k	2018.2	2018.7	1.53	Balanced
MWT2	\$400k	\$516k	2019.5	2018.9	4.03	More CPU
NET2						Still planning
SWT2	\$150k	\$270k	2018.8	2019.4	2.13	Includes undeployed OU servers

- Funding levels are as reported in the draft procurement reports.
- The FY23 equipment funding is taken as 3 x the first 4 month increment.
- NET2 is left blank due to the disruption of going from NET2.0 to NET2.1.

Preliminary thoughts on the purchasing plans

- These are first impressions of the plans:
 - AGLT2 well balanced
 - MWT2 lower in storage
 - NET2.1 to early to draw conclusions
 - I think we need to revisit NET2.1 once they have their initial CE and SE in production
 - Things seem to be on track but I think we should defer until more has been done.
 - SWT2 CPB higher in storage.
 - SWT2 OU still does not have the last 17 servers ordered in production
 - We should pause OU procurement until the recently purchased servers are put online.
- I suggest discussing the global procurement plan at the next facility management meeting once we have all had time to review the plans.
 - I will circulate a draft final procurement plan after that.

**Backup including list
of milestones**

Current All Site milestones - 1

<u>Priority</u>	<u>WBS No.</u>	<u>Milestone #</u>	<u>Milestone</u>	<u>Baseline Date</u>
2 Active	2.3.2	197	All Tier-2s have completed their FINAL, agreed upon procurement plans and they are stored in the facility Google drive	Dec 2023
2 Active	2.3.2.1	198	AGLT2 has completed its draft FY23 procurement plans	Nov 2022
2 Active	2.3.2.2	199	MWT2 has completed its draft FY23 procurement plans	Nov 2022
2 Active	2.3.2.3	200	NET2 has completed its draft FY23 procurement plans	Nov 2022
2 Active	2.3.2.4	201	SWT2 has completed its draft FY23 procurement plans	Nov 2022
2 Active	2.3.2.1	207	AGLT2 identifies next operating system version and flavor	Jun 2023
2 Active	2.3.2.2	208	MWT2 identifies next operating system version and flavor	Jun 2023
2 Active	2.3.2.3	209	NET2 identifies next operating system version and flavor	Jun 2023
2 Active	2.3.2.4	210	SWT2 identifies next operating system version and flavor	Jun 2023

Current All Site Milestones - 2

<u>Priority</u>	<u>WBS No.</u>	<u>Milestone #</u>	<u>Milestone</u>	<u>Baseline Date</u>
2 Active	2.3.2.1	211	AGLT2 has completed its FY23 procurement plans	Sep 2023
2 Active	2.3.2.2	212	MWT2 has completed its FY23 procurement plans	Sep 2023
2 Active	2.3.2.3	213	NET2 has completed its FY23 procurement plans	Sep 2023
2 Active	2.3.2.4	214	SWT2 has completed its FY23 procurement plans	Sep 2023
0 Proposed	2.3.2	202	All Tier-2s have completed their FINAL, agreed upon operations and milestone plans and they are stored in the facility Google drive	Mar 2023
0 Proposed	2.3.2.1	203	AGLT2 has completed its draft operations and milestones plan for the coming year	Feb 2023
0 Proposed	2.3.2.2	204	MWT2 has completed its draft operations and milestones plan for the coming year	Feb 2023
0 Proposed	2.3.2.3	205	NET2 has completed its draft operations and milestones plan for the coming year	Feb 2023
0 Proposed	2.3.2.4	206	SWT2 has completed its draft operations and milestones plan for the coming year	Feb 2023

AGLT2 Milestones

<u>Priority</u>	<u>WBS No.</u>	<u>Milestone #</u>	<u>Milestone</u>	<u>Baseline Date</u>
2 Active	2.3.2.1	215	AGLT2 - Complete addition of MSU TrueNAS storage for VMware	Dec 2022
2 Active	2.3.2.1	216	AGLT2 - Implement WLCG Security Operations Center at AGLT2 (each site)	Apr 2023
2 Active	2.3.2.1	217	AGLT2 - Transition to new VMware version, moving off EOL v6.7	Dec 2022
2 Active	2.3.2.1	218	AGLT2 - Enable UEFI boot provisioning since future OSes won't support BIOS	Jan 2023
2 Active	2.3.2.1	219	AGLT2 - Document and test ZFS JBOD dCache configs	Jun 2023

MWT2 Milestones

<u>Priority</u>	<u>WBS No.</u>	<u>Milestone #</u>	<u>Milestone</u>	<u>Baseline Date</u>
2 Active	2.3.2.2	220	MWT2 - Update Apptainer, HTCondor to v10, Condor-CE to v6	Mar 2023
2 Active	2.3.2.2	221	MWT2 - Implement WLCG Security Operations Center at MWT2 (UC)	May 2023

NET2.1 Milestones

<u>Priority</u>	<u>WBS No.</u>	<u>Milestone #</u>	<u>Milestone</u>	<u>Baseline Date</u>
0 Proposed	2.3.2.3	222	NET2 - Provide 1500+ computing slots with 25 kHS06	Jan 2023
0 Proposed	2.3.2.3	223	NET2 - Provide 5500+ computing slots with 110 kHS07 + 10.3 PB of storage	Mar 2023
0 Proposed	2.3.2.3	224	NET2 - Provide 9500+ computing slots with 160 kHS08	May 2023
0 Proposed	2.3.2.3	225	NET2 - Provide 11500+ computing slots with 190 kHS09	Jul 2023

SWT2 Milestones

<u>Priority</u>	<u>WBS No.</u>	<u>Milestone #</u>	<u>Milestone</u>	<u>Baseline Date</u>
2 Active	2.3.2.4	226	SWT2 - Upgrade internal network with 100G TOR switches and new core	Dec 2022
2 Active	2.3.2.4	227	SWT2 - Redistribute compute nodes among racks to accommodate higher density servers	Jan 2023
2 Active	2.3.2.4	228	SWT2 - Deploy WLCG pledged resources for FY23	Mar 2023
2 Active	2.3.2.4	229	SWT2 - Place equipment orders for FY23	Jul 2023