# US LHC Tier2 Activity for September 2011

## Overview

This report shows USLHC Tier2 reliability and usage during September 2011 as measured by OSG tools.

|  | **Reliability** | **Availability** | **CPU Wallclock hours for Owner VO** | **CPU efficiency for Owner VO** | **CPU hours for Owner VO** | **MoU**  **Pledge** | **Wallclock hours delivered to all OSG VOs** | **HEPSPEC06** | **Total Online**  **Storage**  **(GB)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ATLAS T2 Federations** |  |  | ATLAS | ATLAS | ATLAS |  |  |  |  |
| US-AGLT2\* | 87% | 87% | 21,544,447 | 86% | 18,571,266 | 5,900,716.80 | 21,544,449 | 36,163 | 1,910,000 |
| US-MWT2 | 100% | 100% | 19,387,241 | 90% | 17,489,719 | 5,900,716.80 | 24,913,921 | 37,298 | 1,302,100 |
| US-NET2 | 100% | 100% | 10,810,184 | 89% | 9,661,150 | 5,900,716.80 | 10,887,446 | 19,035 | 1,100,000 |
| US-SWT2 | 100% | 100% | 18,441,432 | 94% | 17,296,068 | 5,900,716.80 | 18,577,143 | 23,250 | 1,261,500 |
| US-WT2 | 98% | 98% | 14,744,691 | 91% | 13,367,171 | 5,900,716.80 | 14,749,283 | 15,816 | 1,664,000 |
| **CMS T2s** |  |  | CMS | CMS | CMS |  |  |  |  |
| T2\_US\_Caltech | 100% | 100% | 7,439,046 | 79% | 5,864,072 | 7,236,000 | 9,137,083 | 13,960 | 675,000 |
| T2\_US\_Florida | 100% | 100% | 11,594,031 | 93% | 10,729,915 | 7,236,000 | 13,052,760 | 10,655 | 709,000 |
| T2\_US\_MIT | 99% | 99% | 7,561,007 | 92% | 6,988,681 | 7,236,000 | 8,663,931 | 15,000 | 750,000 |
| T2\_US\_Nebraska | 100% | 100% | 7,491,652 | 92% | 6,912,396 | 7,236,000 | 13,685,618 | 15,000 | 900,000 |
| T2\_US\_Purdue\* | 100% | 89% | 10,019,186 | 69% | 6,872,513 | 7,236,000 | 19,075,493 | 15,000 | 900,000 |
| T2\_US\_UCSD | 99% | 99% | 9,812,434 | 80% | 7,858,408 | 7,236,000 | 14,154,732 | 15,000 | 760,000 |
| T2\_US\_Wisconsin\* | 100% | 100% | 17,030,701 | 54% | 9,254,863 | 7,236,000 | 17,249,532 | 15,000 | 900,000 |

\* Denotes a federation with month-specific notes below

Column header definitions are given below.

## September specifics:

* Overall, the reliability and availability numbers are all within the MoU commitments on all the sites except for US-AGLT2.
* US-AGLT2 had lower availability and reliability.
* T2\_US\_Purdue had lower availability due to machine re-racking and deployment of pool accounts.
* Several CMS sites had CPU hours below the MoU pledge hours, which were caused by reduced demand. Capacity was present, as evident by hours given to other VOs.
* T2\_US\_Wisconsin had artificially low CPU efficiency due to a combination of Gratia accounting for Wallclock and not CPU hours of preempted jobs, and a large number of long-running jobs being preempted. Wisconsin revised their scheduling policies in early October to help improve efficiency.

## Column Definitions:

* **Reliability**. The percentage of time the site was functional excluding scheduled downtimes.
* **Availability**. The percentage of time the site was functional out of the entire month (including downtimes)
  + Both the Reliability and Availability cells are colored to match the WLCG: green indicate a score between 90% and 100%; yellow indicate a score between 60% and 90%; orange indicate a score between 30% and 60%; red indicate a score between 0% and 30%
  + The WLCG MoU states that Tier 2 sites should have a reliability of 95%. The availability and reliability of a site is measured by the WLCG availability algorithm, which allows us to effectively compare numbers between OSG sites and EGEE sites.
* **CPU Wallclock hours for owner VO**. This is the sum of all “wall clock hours” for the owner VO at a site. The “owner VO” is either CMS or ATLAS. A wall clock hour is the number of hours elapsed between job start and finish, regardless of CPU utilization. This number is normalized for CPU power.
* **CPU efficiency for owner VO**. This is the average CPU utilization per job at each site for the owner VO.
* **CPU hours for the owner VO**. This is simply the wall clock hours column multiplied by the CPU efficiency. This number is normalized for CPU power.
* **MOU Pledge.** The normalized CPU hours per month pledged to the owner VO, assuming an 80% CPU efficiency. Sites should be able to provide this number of hours to the VO, but the VO may not utilize all of them.
  + The usage at sites is limited by the number of CPUs available and/or by the amount of work that the VOs need to have done. During “off-peak” months, or between major software releases, it is common to see VOs committing effort elsewhere besides running jobs.
* **Wallclock hours delivered to all OSG VOs**. This is the sum of all wall clock hours performed at the site, regardless of VO.
  + On OSG, sites can (but are not required to) allow other VOs to opportunistically use their resources. Sharing of resources is typically affected by whether there are members of another VO at the university or institution itself (e.g. CDF at MIT) and the availability of effort for configuration and support.

## Units of Measurement

The WLCG measures job usage in CPU hours (the amount of time the CPU was active); OSG reports show the elapsed, or “wall” time. As jobs occupy batch slots regardless of the application’s CPU usage, we report this relevant measurement. The WLCG management has agreed that this is a relevant measure and will be including this sometime in the future.

The WLCG has moved to a new unit of measuring performance of a CPU, changing from SpectInt2000 (SI2K) to SpectInt2006 (SI2006). We report figures in HEPSPEC06 to match the WLCG.

We also report the CPU efficiency, the ratio between CPU hours and wall hours.

All the usage numbers are multiplied by a normalization factor that accounts for the average relative difference in CPU power. The normalization factor used by the WLCG varies from site to site; for September 2011, this constant varies between 6.14 and 15.68.