

**Quarterly R&D HPCS Summary Report  
For The HPC Board**

**Submitted by: R&D HPCS Implementation Team**

**Q2 FY 10**

**Utilization By Site and Project**

	Princeton				
	Planned Hours	Hours made available	Hours used	% EMP Allocation	Allocation used
<b>EMP Project</b>					
Advanced Data Assimilation R&D					
Air Quality					
BLDR-Climate					
BLDR-Grants					
Climate Model Calibration					
Climate Scenario Analysis	1,536,284	1,523,854	824,590	10.0%	5.41%
Climate Scenario Generation	3,072,569	3,047,708	7,527,494	20.0%	49.40%
Climate Test Bed					
Climate Prediction Center					
DTC					
DTC-Grants					
ESMF and Software Infrastructure Development	768,142	761,927	325,558	5.0%	2.14%
Global Reanalysis					
HMTB					
Infrastructure					
JCSDA					
CFS Reanalysis					
Next Generation Global Model Dev.					
Next-generation Ocean Model R & D	2,304,427	2,285,781	1,472,274	15.0%	9.66%
Observing Systems R&D					
Rapid Refresh					
Reforecasting Research and Development					
Regional Reanalysis					
Seasonal Climate Modeling R & D	1,536,284	1,523,854	915,638	10.0%	6.01%
Long-term Climate Model R & D	6,145,138	6,095,415	3,369,926	40.0%	22.11%
Hurricane Forecast Improvement					
<b>Totals</b>	<b>15,362,844</b>	<b>15,238,538</b>	<b>14,435,479</b>	<b>100.0%</b>	<b>94.7%</b>
Total Planned hours	15,362,844				
Total actual hours	15,238,538				
Cores	7970				
Hours per quarter	2,208				
Planned utilization	90%				
Null time (hrs)	0.00				
Downtime (hrs)	889.70				
Actual availability	96.22%				
<b>Variances</b>					
Hrs available Vs planned	-124,306.74				
Hrs used Vs available	-803,058.74				
EMP allocation not used	-5.27%				
Currency	61%				
Variables					
Constants					

	Boulder				
	Planned Hours	Hours made available	Hours used	% EMP Allocation	Allocation used
<b>EMP Project</b>					
Advanced Data Assimilation R&D					
Air Quality	480,421	494,818	659,224	8.0%	10.66%
BLDR-Climate	960,842	989,635	681,005	16.0%	11.01%
BLDR-Grants	1,020,895	1,051,487	1,023,616	17.0%	16.55%
Climate Model Calibration					
Climate Scenario Analysis					
Climate Scenario Generation					
Climate Test Bed					
Climate Prediction Center					
DTC	480,421	494,818	899	8.0%	0.01%
DTC-Grants	480,421	494,818	1,110	8.0%	0.02%
ESMF and Software Infrastructure Development					
Global Reanalysis					
HMTB	60,053	61,852	382,441	1.0%	6.18%
Infrastructure			23,100		
JCSDA	180,158	185,557	0	3.0%	0.00%
CFS Reanalysis					
Next Generation Global Model Dev.	480,421	494,818	1,280,197	8.0%	20.70%
Next-generation Ocean Model R & D					
Observing Systems R&D	300,263	309,261	8,481	5.0%	0.14%
Rapid Refresh	1,080,947	1,113,340	1,503,085	18.0%	24.30%
Reforecasting Research and Development					
Regional Reanalysis	480,421	494,818	68,252	8.0%	1.10%
Seasonal Climate Modeling R & D					
Long-term Climate Model R & D					
Hurricane Forecast Improvement					
Totals	6,005,262	6,185,220	5,631,411	100.0%	90.7%
Total Planned hours	6,005,262				
Total actual hours	6,185,220				
Cores	3372				
Hours per quarter	2,160				
Planned utilization	85%				
Null time (hrs)	0				
Downtime (hrs)	3,396				
Actual availability	99.95%				
Variances					
Hrs available Vs planned	179,957.57				
Hrs used Vs available	-553,809.08				
EMP allocation not used	-9.33%				
Currency	11.65%				
Variables					
Constants					

	Gaithersburg				
	Planned Hours	Hours made available	Hours used	% EMP Allocation	Allocation used
<b>EMP Project</b>					
Advanced Data Assimilation R&D					
Air Quality					
BLDR-Climate					
BLDR-Grants					
Climate Model Calibration					
Climate Scenario Analysis					
Climate Scenario Generation					
Climate Test Bed	653,501	671,597	696,793	12.0%	12.45%
Climate Prediction Center	108,917	111,933	0	2.00%	0.00%
DTC					
DTC-Grants					
ESMF and Software Infrastructure Development					
Global Reanalysis					
HMTB	653,501	671,597	248,429	12.0%	4.44%
Infrastructure					
JCSDA	653,501	671,597	577,057	12.0%	10.31%
CFS Reanalysis	2,940,756	3,022,185	2,903,040	54.0%	51.87%
Next Generation Global Model Dev.					
Next-generation Ocean Model R & D					
Observing Systems R&D					
Rapid Refresh					
Reforecasting Research and Development					
Regional Reanalysis					
Seasonal Climate Modeling R & D	108,917	111,933	269,991	2.0%	4.82%
Long-term Climate Model R & D					
Hurricane Forecast Improvement	326,751	335,798	45,224	6.00%	0.81%
Totals	5,445,844	5,596,639	4,740,534	100.0%	84.7%
Total Planned hours	5,445,844				
Total actual hours	5,596,639				
Cores	2736				
Hours per quarter	2,160				
Planned utilization	95%				
Null time (hrs)	12.00				
Downtime (hrs)	25.00				
Actual availability	99.69%				
Variances					
Hrs available Vs planned	150,795.50				
Hrs used Vs available	-856,105.50				
EMP allocation not used	-15.30%				
Currency	27.35%				
Variables					
Constants					

**EMP Projects Normalized Across all of the R&D HPC Sub-Systems**

	Normalized	
	% EMP Allocation	Allocation used
<b>EMP Project</b>		
Advanced Data Assimilation R&D		
Air Quality	0.93%	1.24%
BLDR-Climate	1.86%	1.28%
BLDR-Grants	1.98%	1.93%
Climate Model Calibration		
Climate Scenario Analysis	6.10%	2.76%
Climate Scenario Generation	12.20%	33.52%
Climate Test Bed	3.28%	3.41%
Climate Prediction Center	0.55%	0.00%
DTC	0.93%	0.00%
DTC-Grants	0.93%	0.00%
ESMF and Software Infrastructure Development	3.05%	0.98%
Global Reanalysis		
HMTB	3.40%	1.93%
Infrastructure	0.00%	0.00%
JCSDA	3.63%	2.82%
CFS Reanalysis	14.77%	14.19%
Next Generation Global Model Dev.	0.93%	2.41%
Next-generation Ocean Model R & D	9.15%	6.39%
Observing Systems R&D	0.58%	0.02%
Rapid Refresh	2.10%	2.83%
Reforecasting Research and Development		
Regional Reanalysis	0.93%	0.13%
Seasonal Climate Modeling R & D	6.65%	4.23%
Long-term Climate Model R & D	24.40%	11.25%
Hurricane Forecast Improvement	1.64%	0.22%
Totals	100%	91.54%

Discussion
<p><b>Princeton:</b>  <b>Boulder:</b>  <b>Gaithersburg:</b></p>

Summary

Utilization of Storage Resources			
	Disk (TB)	Tape Archive (TB)	
	Available	Available	Used
<b>Princeton</b>	717	22,955	17,775
<b>Boulder</b>	800	N/A	89
<b>Gaithersburg</b>	38.25	1,800	1,300

Discussion
<p><b>Princeton:</b> archive disk capacity = 112TB  Fast scratch file system = 59TB  Long term scratch file system = 60TB  Concern regarding growing data storage due to use of ORNL systems</p> <p><b>Boulder:</b>  <b>Gaithersburg:</b> Concern regarding the risk of running out of tape capacity before new system at site B becomes available in 2011.</p>

Summary

System Availability (for SLTs)				
	Q1	Q2	Q3	Q4
<b>Princeton</b>	96.25%	98.47%		
<b>Gaithersburg</b>	99.37%	99.69%		
<b>Boulder</b>	100%	99.95%		

Planned HPC Availability is 97%

Scientific Data Availability				
	Q1	Q2	Q3	Q4
<b>Princeton (HSMS)</b>	98.39%	99.36%		
<b>Gaithersburg</b>	99.46%	99.74%		
<b>Boulder</b>	99.99%	99.43%		

Planned Scientific Data Availability is 99%

Discussion
$Availability = \frac{TimePerMonth - NullTime - DownTime}{TimePerMonth - NullTime}$ <p><b>Princeton:</b></p> <p><b>Boulder:</b></p> <p><b>Gaithersburg:</b></p>

Summary

System Life Throughput			
	Planned	Delivered	Variance
WS-1A	2,574	3,936	1,362
WS-2A	2,611	4,206	1,595
WS-3A	9,363	14,317	4,954
WS-3B	12,979	20,000	7,021
WS-4	17,116	26,818	9,702
WS-5	2,061	3,330	1,269
WS-6	10,967	16,900	5,933
WS-7	8,096	18,443	10,347
WS-8	4,706	8,214	3,508
WS-9	2,610	4,656	2,046

Discussion	
$SLT_j = \sum_i \frac{T_{i,j} A_{i,j}}{B_{i,j}}$ <p>Princeton: Boulder: Gaithersburg:</p>	<p><i>SLT</i> = System Life Throughput  <i>T</i> = total wall-clock Time during system configuration <i>j</i>  <i>A</i> = Availability  <i>B</i> = workstream Benchmark time  <i>i</i> = WS number  <i>j</i> = system configuration period</p>

Summary

User Experience
<b>Princeton:</b> <b>Boulder:</b>  <b>Gaithersburg:</b>

## Appendix

*August 4, 2006, edited by Ron Bewtra*



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Measure Categori