National Nuclear Security Administration

ASC

ASC Alliance Center Visits 2006
Lawrence Livermore National Laboratory

Oct 12: Stanford – Center for Integrated Turbulence Research
Oct 13: Caltech – Center for Simulating the Dynamic Response of Materials
Oct 17: Utah - Center for the Simulation of Accidental Fires and Explosions
Oct 19: Illinois - Center for Simulation of Advanced Rockets
Oct 20: Chicago - Center for Astrophysical Thermonuclear Flashes

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UCRL-PRES-208318

Overview

- LLNL Alliance Compute Resources
- Usage Stats
- Accounts & Access
- DATs
- Queues
- Support & Training
- Known Issues, New Issues?
- The Future
- SC06 ASC Research Exhibit Booth

Please feel free to ask questions…

Add your input…

Or provide a reality check!

LLNL Alliance Compute Resources

- UP
- ALC
- Thunder
- MCR

LLNL Alliance Compute Resources - UP

- **UP Configuration**
  - IBM POWER5 p5-575
  - 6.6 TFlop system
  - 108 nodes; 8 cpus/node @ 1.9 GHz
  - 32 GB memory per node
  - Federation (HPS) switch
  - 64-bit architecture running AIX operating system
  - 140 TB GPFS parallel I/O file system
- **Alliance Resource**
  - Alliance allocation @ 35% of the machine
  - DAT usage frequent
- **Tutorial:** **www.llnl.gov/computing/tutorials/purple**

LLNL Alliance Compute Resources - ALC

- **ALC Configuration**
  - Intel Xeon
  - 9.2 TFlop system
  - 960 nodes; 2 cpus/node @ 2.4 GHz
  - 4 GB memory per node
  - Quadrics Elan3 switch
  - 32-bit architecture running CHAOS operating system
  - 238 TB Lustre parallel I/O file system
- **Alliance Resource**
  - 1/2 of ALC is devoted to Alliance use; 1/2 remains in testing and development mode for the Lustre file system
  - DAT usage frequent - including full system
- **Tutorial:** **www.llnl.gov/computing/tutorials/linux_clusters**

LLNL Alliance Compute Resources - Thunder

- **Thunder Configuration**
  - Intel Itanium
  - 23 TFlop system
  - 1024 nodes; 4 cpus/node @ 1.4 GHz
  - 8 GB memory per node
  - Quadrics Elan4 switch
  - 64-bit architecture running CHAOS operating system
  - 185 TB Lustre parallel I/O file system

- **Alliance Resource**
  - Institutional resource – not ASC
  - Primarily for DAT runs
- **Tutorial:** **www.llnl.gov/computing/tutorials/linux_clusters/thunder.html**

LLNL Alliance Compute Resources - MCR

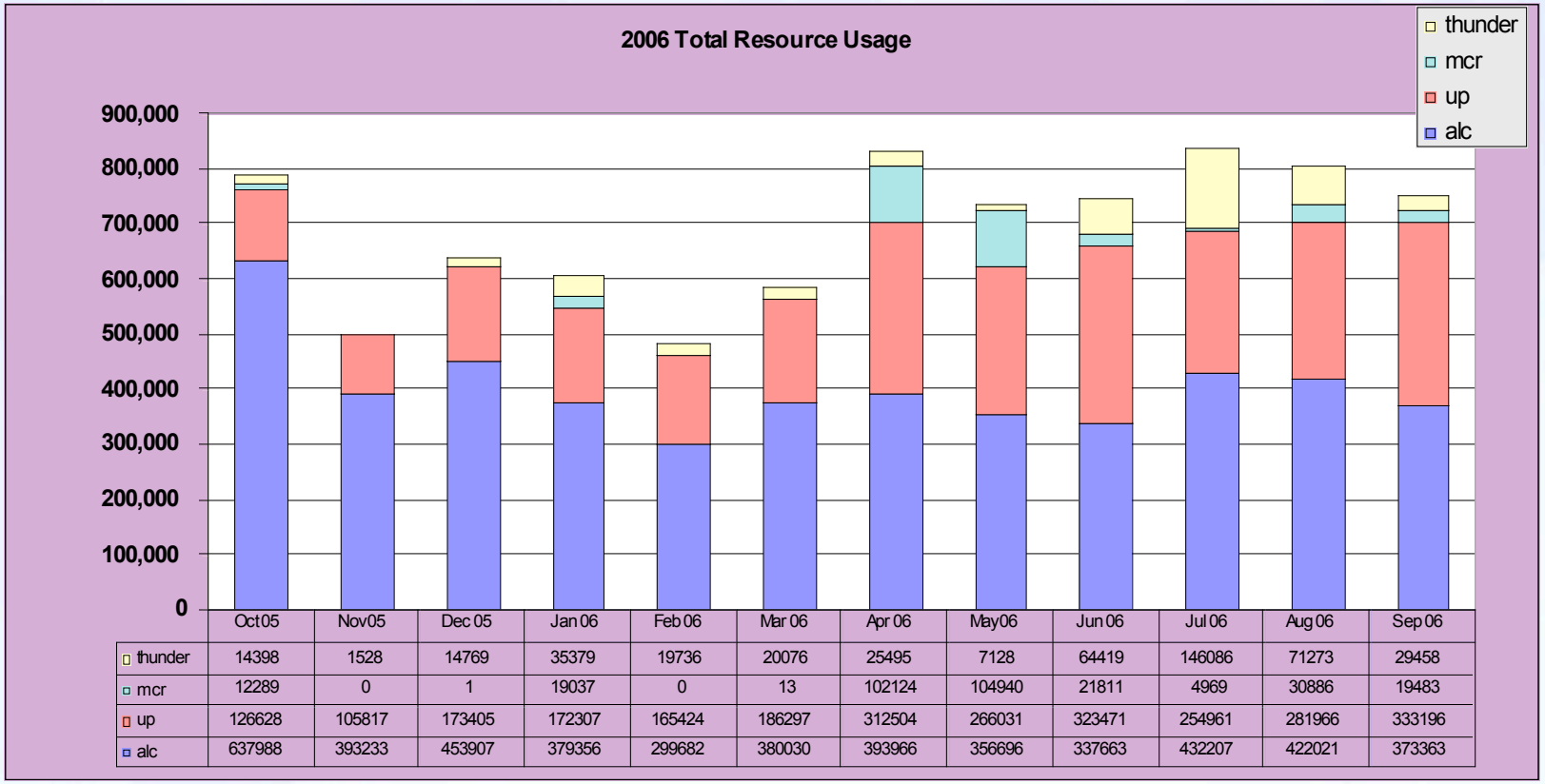
- **MCR Configuration**
  - Intel Xeon
  - 11.2 TFlop system
  - 1154 nodes; 2 cpus/node @ 2.4 GHz
  - 4 GB memory per node
  - Quadrics Elan3 switch
  - 32-bit architecture running CHAOS operating system
  - 238 TB Lustre parallel I/O file system

- **Alliance Resource**
  - Institutional resource – not ASC
  - Primarily for DAT runs
- **Tutorial:** **www.llnl.gov/computing/tutorials/linux_clusters**

Software Environment

- **UP**
  - AIX OS
  - SLURM scheduler
- **ALC**
  - CHAOS OS
  - SLURM scheduler
- **Compilers, Tools**
  - http://www.llnl.gov/computing/hpc/code/software_tools.html
- **Alliance installations in /usr/gapps**
- **What are we missing?**

Usage Stats - Total

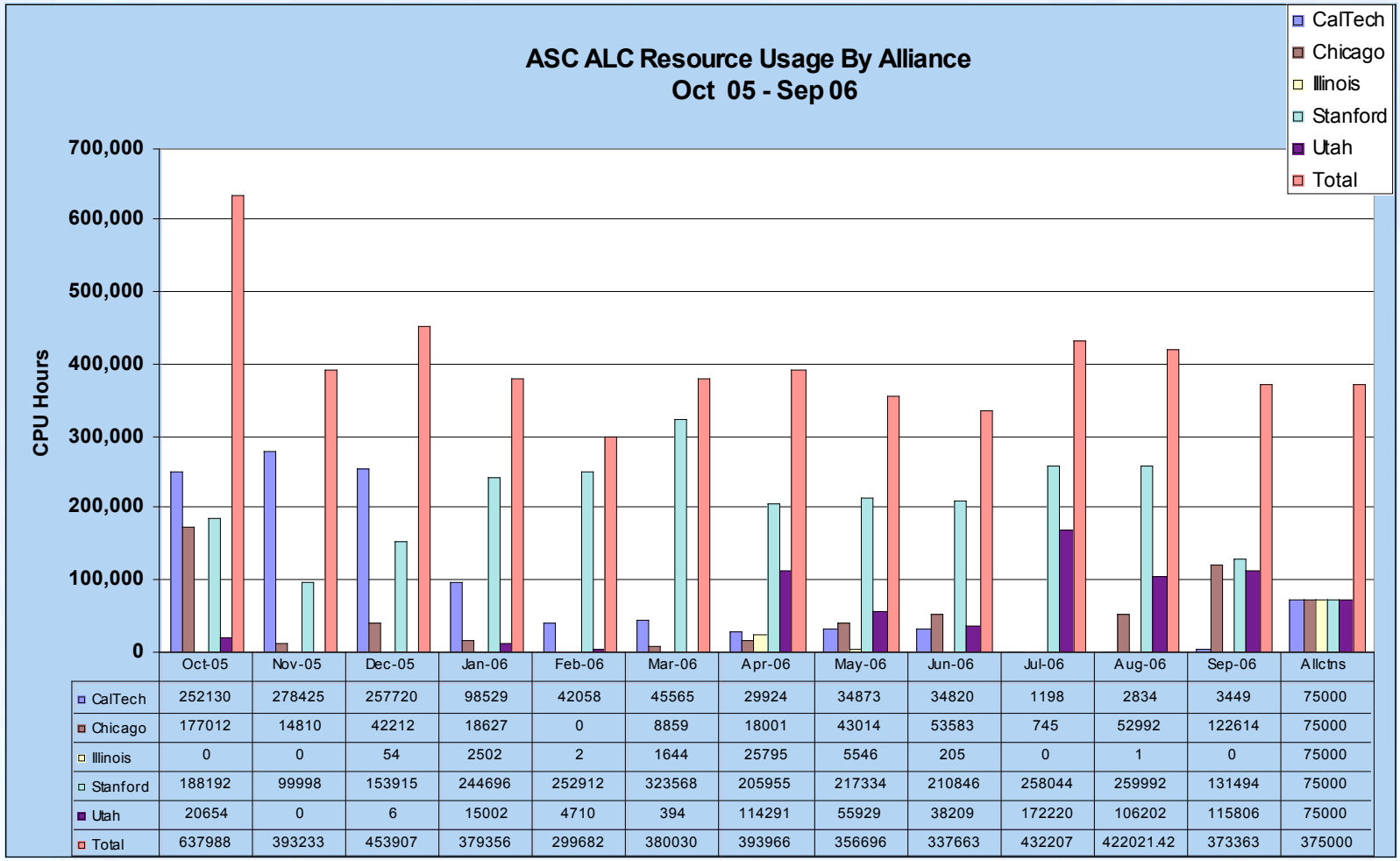


	Oct 05	Nov 05	Dec 05	Jan 06	Feb 06	Mar 06	Apr 06	May 06	Jun 06	Jul 06	Aug 06	Sep 06
thunder	14398	1528	14769	35379	19736	20076	25495	7128	64419	146086	71273	29458
mcr	12289	0	1	19037	0	13	102124	104940	21811	4969	30886	19483
up	126628	105817	173405	172307	165424	186297	312504	266031	323471	254961	281966	333196
alc	637988	393233	453907	379356	299682	380030	393966	356696	337663	432207	422021	373363

```
TOTALS
Oct05 791,303
Nov05 500,578
Dec05 642,082
Jan06 606,079
Feb06 484,842
Mar06 586,416
Apr06 834,089
May06 734,795
Jun06 747,364
Jul06 838,223
Aug06 806,146
Sep06 755,500
```

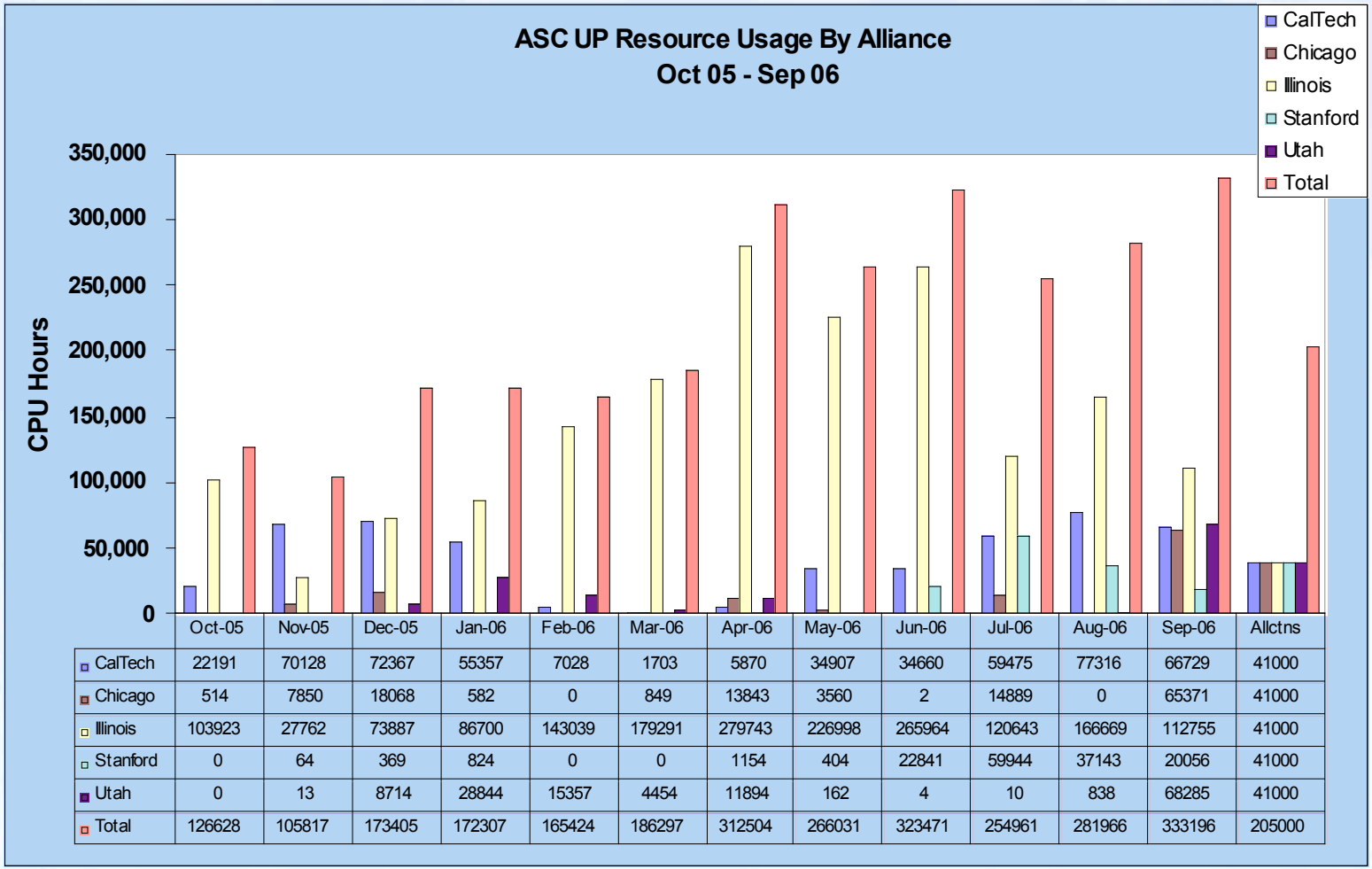
Note: BG/L usage was 25,793,424 hrs in Jan 06 and 686,870 hrs in Feb 06

Usage Stats - ALC



	Oct-05	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Allctns	Alliance Total
CalTech	252130	278425	257720	98529	42058	45565	29924	34873	34820	1198	2834	3449	75000	1,081,525
Chicago	177012	14810	42212	18627	0	8859	18001	43014	53583	745	52992	122614	75000	552,469
Illinois	0	0	54	2502	2	1644	25795	5546	205	0	1	0	75000	35,749
Stanford	188192	99998	153915	244696	252912	323568	205955	217334	210846	258044	259992	131494	75000	2,546,946
Utah	20654	0	6	15002	4710	394	114291	55929	38209	172220	106202	115806	75000	643,423
Total	637988	393233	453907	379356	299682	380030	393966	356696	337663	432207	422021.42	373363	375000	4,860,112

Usage Stats - UP



	Oct-05	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Allctns	Alliance Total
CalTech	22191	70128	72367	55357	7028	1703	5870	34907	34660	59475	77316	66729	41000	507,731
Chicago	514	7850	18068	582	0	849	13843	3560	2	14889	0	65371	41000	125,528
Illinois	103923	27762	73887	86700	143039	179291	279743	226998	265964	120643	166669	112755	41000	1,787,374
Stanford	0	64	369	824	0	0	1154	404	22841	59944	37143	20056	41000	142,799
Utah	0	13	8714	28844	15357	4454	11894	162	4	10	838	68285	41000	138,575
Total	126628	105817	173405	172307	165424	186297	312504	266031	323471	254961	281966	333196	205000	2,702,007

Usage Stats

- **ALC Usage vs Allocation of 75,000 hrs/month**
  - Caltech = 120%
  - Chicago = 61%
  - Illinois = 4%
  - Stanford = 283%
  - Utah = 71%

  = 108% of total allocation
- **UP Usage vs Allocation of 41,000 hrs/month**
  - Caltech = 103%
  - Chicago = 26%
  - Illinois = 363%
  - Stanford = 29%
  - Utah = 28%

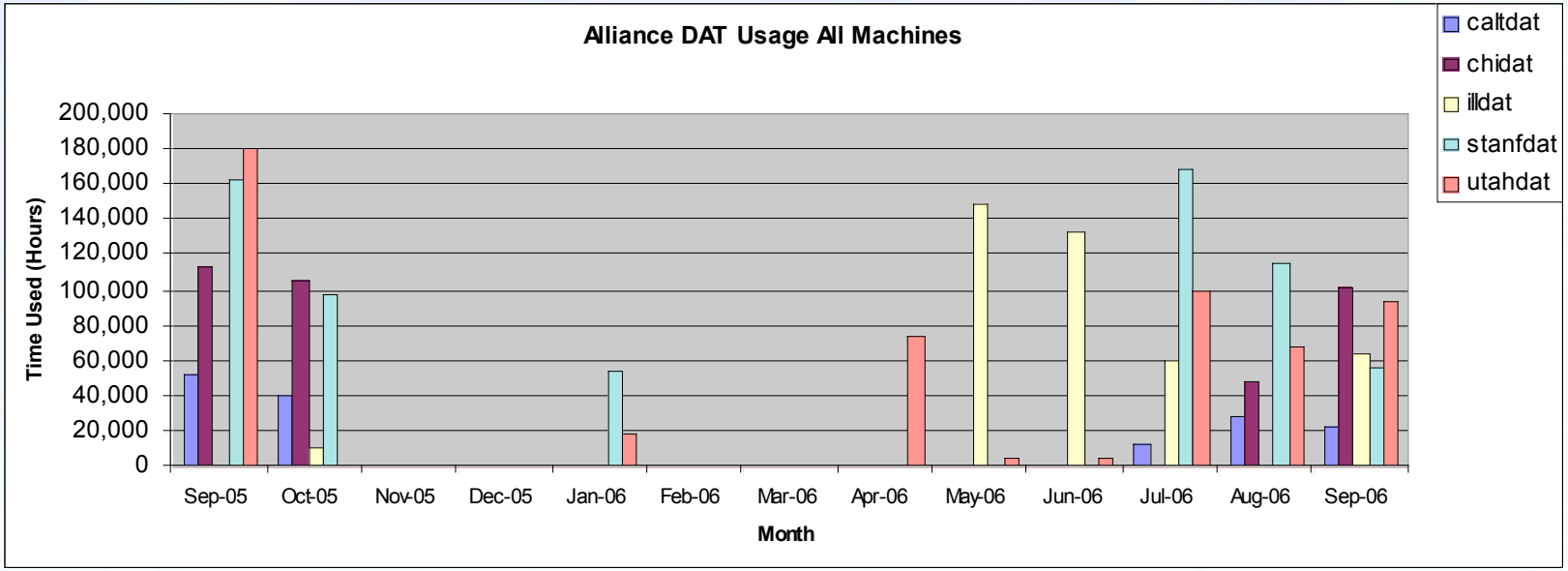
  = 110% of total allocation

Accounts & Access

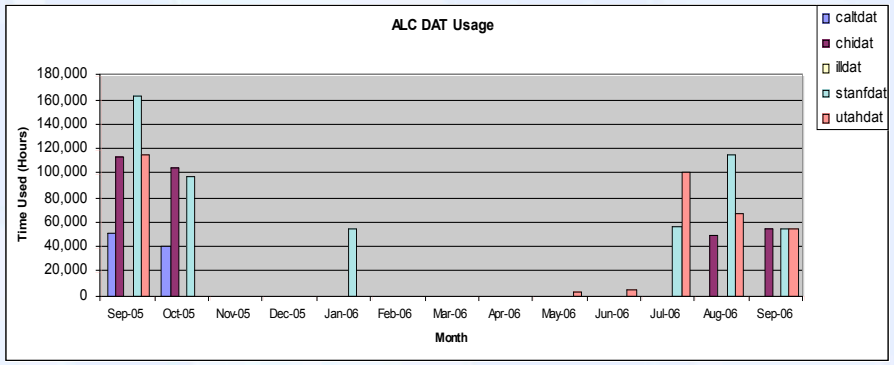
- **Nothing much new to report here**
- **VPN-C still required – with some IPA exceptions**
- **VPN Linux still not supported by LLNL, but non-SMP Linux VPN "should" work:**
  - Install software available at access.llnl.gov
- **Future of VPN/IPA on non-government machines?**
  - Status-quo for now
- **Any problems with VPN-C?**
  - Random disconnects reported by several recently
  - Others say no problems
  - Needs more investigation

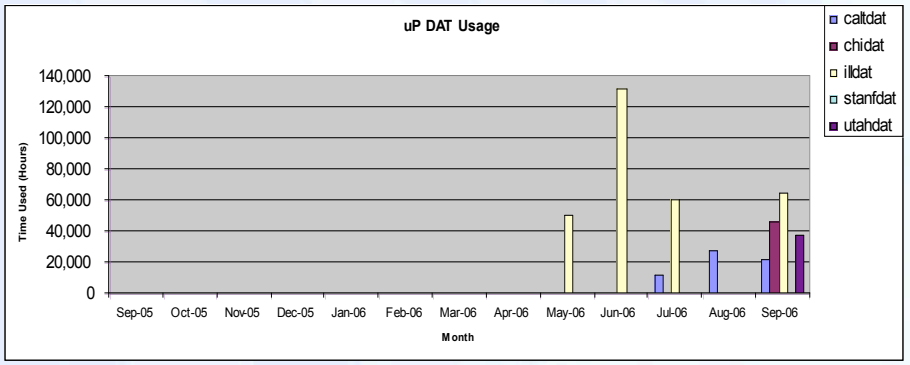
DATs

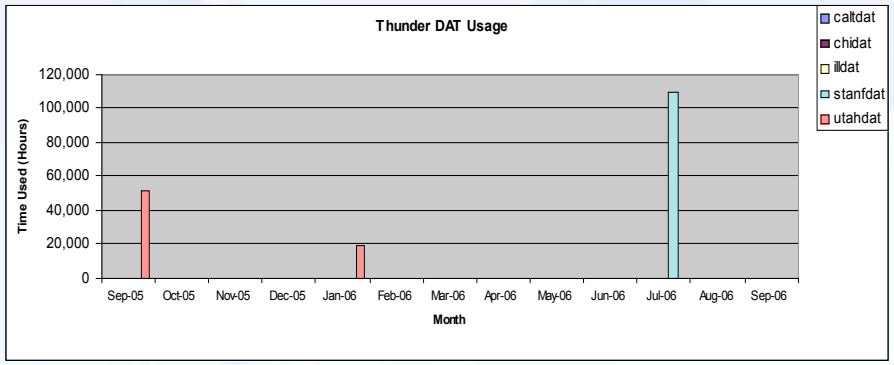
- All Alliances making use of DATs
- DAT requests: https://www.llnl.gov/lcforms/ASC_dat_form.html
- DAT calendar: http://www.llnl.gov/casc/calendar.shtml (choose calendar list and then ASC Alliance calendar)

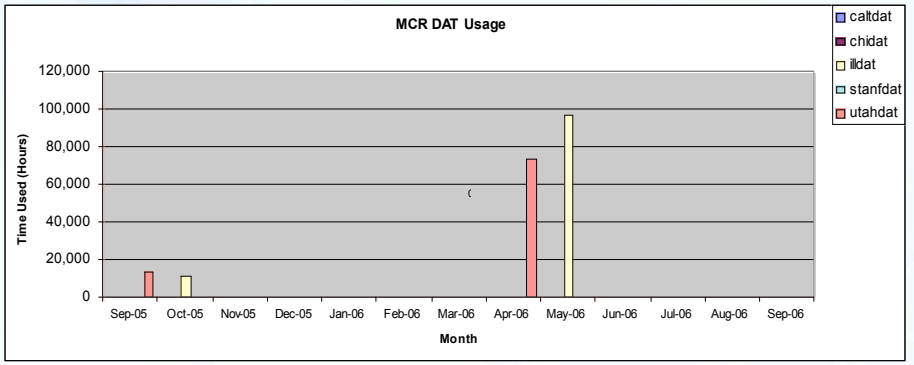


DATs


ALC DAT Usage
caltdat
chidat
illdat
stanfdat
utahdat
Time Used (Hours)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Sep-05
Oct-05
Nov-05
Dec-05
Jan-06
Feb-06
Mar-06
Apr-06
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Month


uP DAT Usage
caltdat
chidat
illdat
stanfdat
utahdat
Time Used (Hours)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Sep-05
Oct-05
Nov-05
Dec-05
Jan-06
Feb-06
Mar-06
Apr-06
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Month


Thunder DAT Usage
caltdat
chidat
illdat
stanfdat
utahdat
Time Used (Hours)
120,000
100,000
80,000
60,000
40,000
20,000
0
Sep-05
Oct-05
Nov-05
Dec-05
Jan-06
Feb-06
Mar-06
Apr-06
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Month


MCR DAT Usage
caltdat
chidat
illdat
stanfdat
utahdat
Time Used (Hours)
120,000
100,000
80,000
60,000
40,000
20,000
0
Sep-05
Oct-05
Nov-05
Dec-05
Jan-06
Feb-06
Mar-06
Apr-06
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Month

Queues

- **UP**
  - Comments?
- **ALC**
  - 8 hr weekday queue a result of last year's comments…
  - New comments?

System	Batch Pool	Shift	Max Time	Max Nodes	Max Jobs
UP	pbatch	All shifts	12 hr	100	TBD
	pdebug	All shifts	2 hr	2	TBD
ALC	pbatch	All shifts	8 hr (weekday) 24 hr (weekend)	TBD	TBD
	pdebug	All shifts	30 min (weekdays) 2 hr (off-hours)	8	TBD

Support & Training

- **LC Hotline**
  - Phone: 925-422-4531; Email: lc-hotline@llnl.gov
  - 7:30am – 4:45pm PST weekdays
  - In-depth consulting referrals
  - Remedy database: (over 550 pages for Alliances since 1/06)
- **Web pages**
  - www.llnl.gov/computing (or computing.llnl.gov)
  - News, user documentation, accounts, forms, much more…
- **Workshops**
  - www.llnl.gov/computing/training
  - Intro to advanced
  - LLNL, Tri-lab, or at your location
  - Suggestions welcome

Known Issues, New Issues?

- **Large pages on UP**
  - Link with the **-blpdata** flag
  - Or use the **ldedit -blpdata *executable*** command
- **File systems**
- **Dumping core to home directory**
- **TotalView leaving unkillable processes on UP**
- **Memory issues on UP?** **(shared memory collectives?)**
- **GridFTP server at LLNL:** **sorry, too many security gotchas**
- **C++ compiler bug on ALC**
- **VPN disconnects**
- **New naming scheme for parallel file systems**

The Future

- **MCR going away 1/07…but…**
- **Peloton Systems**
  - Opteron / Infiniband “Scalable Units”; 11 – 44 Tflops
  - Classified systems + unclassified systems
  - DAT runs will be available to Alliances
  - Stay tuned…
- **MOAB**
  - You’ve heard of the Maui Scheduler?
  - Tri-lab common scheduler now being implemented
  - Stay tuned some more…
- **Question: did your BG/L experience (if you had one) help with your future plans?**

SC06 ASC Research Exhibition Booth

- Join us in Tampa! Nov 11-17
- Participant applications at:
  http://www.lanl.gov/conferences/sc06/
- Alliance meeting Tue 11/14 9am-11am?