CSU Fresno (Fresno State) in AtlasConnect

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Jay Fowler, Choa-lin Chou, Yongsheng Gao

US ATLAS workshop on distributed computing

University of Arizona,

December 11-12, 2013

Outline

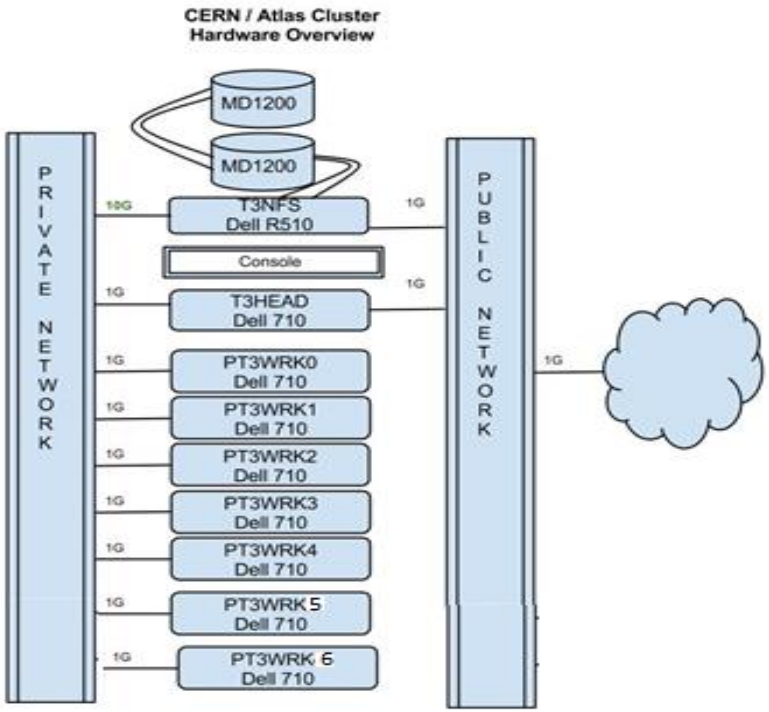
- Introduction of Fresno State ATLAS group
- Introduction of Fresno-T3 computing infrastructure.
- New role in ATLAS Connect.
- Procedure
- Ongoing work
- Testing/Results
- Summary/Future outlook

California State University (CSU)

- Largest system in the US
- 23 campuses, ~430,000 students (Large minority & 1st-generation college student populations)
- Fresno State: only CSU campus on ATLAS or CMS
- CSU Nuclear and Particle Physics Consortium (NUPAC): 14 CSU campuses have joined
- CSU Sacramento will hire new ATLAS faculty in 2014

http://zimmer.csufresno.edu/~yogao/ATLAS

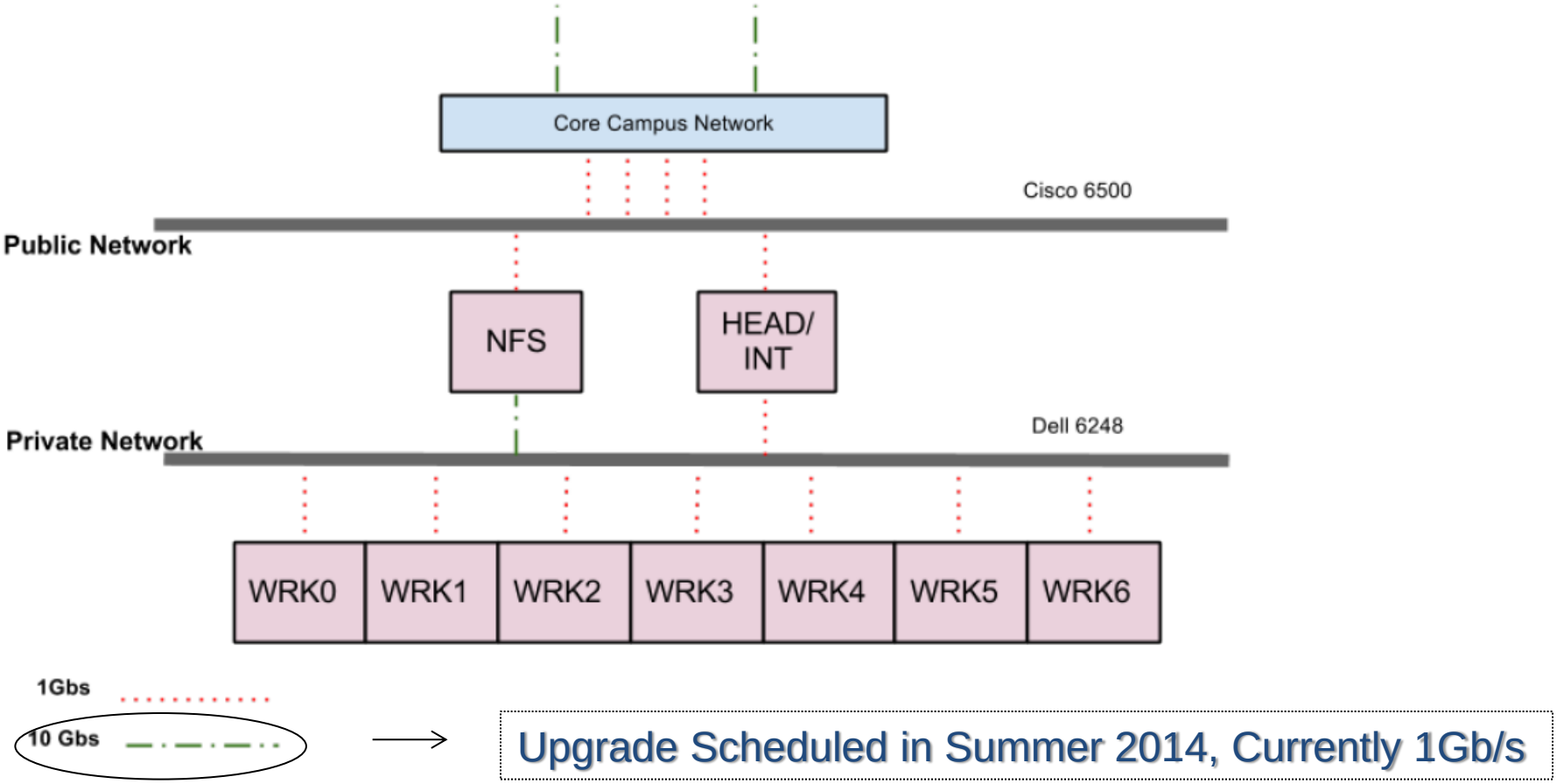
CSUFresno ATLAS Computing Cluster(T3)



Component	Model	Quantity
Switch (private network)	Dell PowerConnect 6248, 48GbE, 10GbE uplink	1
Switch (public network)	Cisco 6500, 48GbE, 4xGb FC uplinks	1
NFS Server / Storage Element	Dell R510 dual socket, X5650 processors @ 2.66GHz, 24 cores, 24GB RAM, 10GbE, 24TB	1
Head / Interactive	Dell R710 dual socket, X5650 processor @ 2.66GHz, 24 cores, 48GB RAM, 6TB	6
Worker / Compute Elements	Dell R510 dual socket X5675 processors @ 3.06GHz, 24 cores, 64GB RAM,8TB	2
Storage	Dell MD1200 24TB	3
KVM	Belkin	1

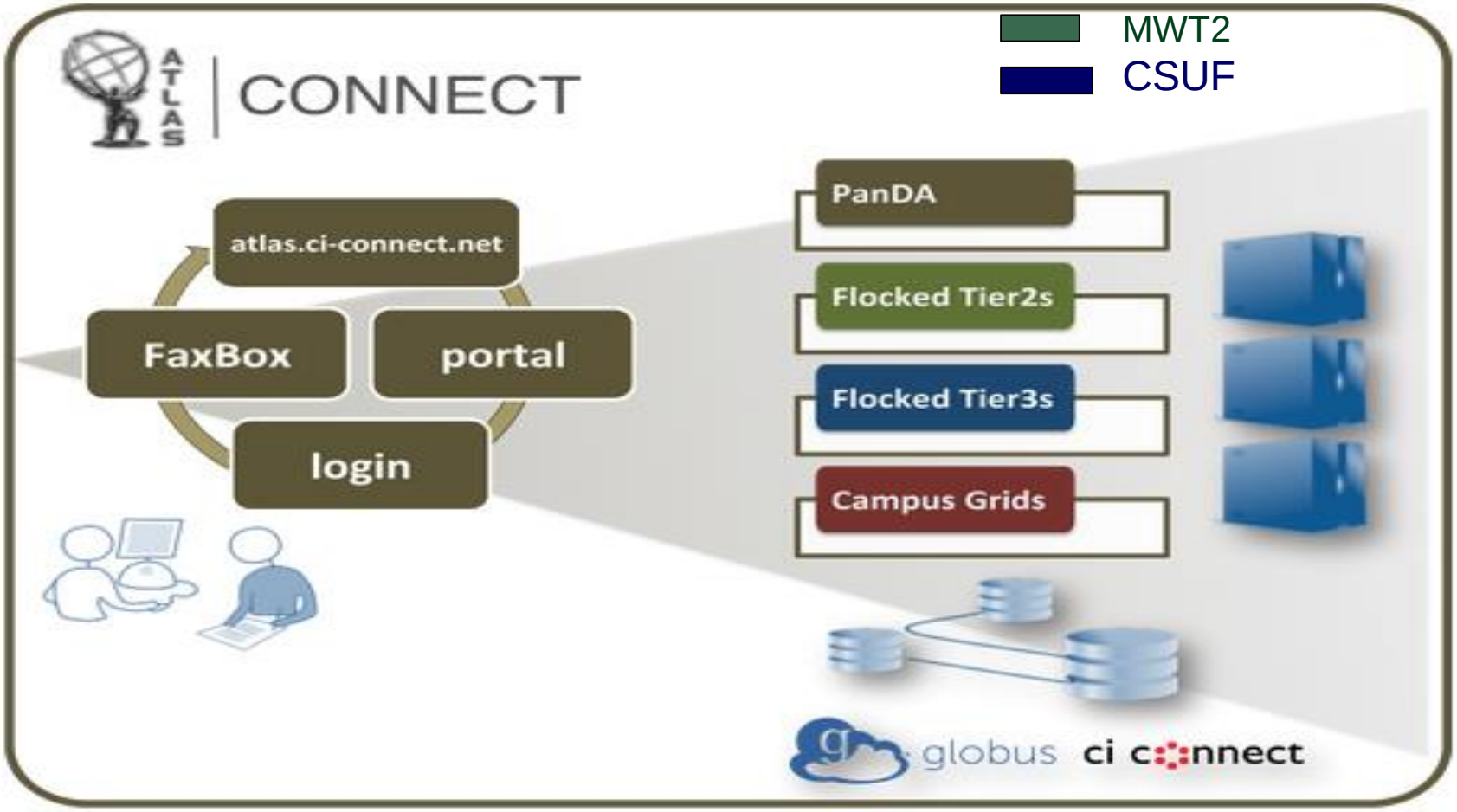
- 176 Cores &110 TB funded by $620K NSF MRI grant (3/2010 to 8/2013)
- Typical Tier-3 which has Grid connectivity such that it is able to get ATLAS data from the Grid & jobs running on condor batch system.
- **~100 Cores & ~45 TB to be added soon (funded by Fresno State)**

CSUFresno Network Map



- Strong Support from Fresno State IT: Jay, Choa-lin, Mike Garvey, etc.

AtlasConnect: http://atlas.ci-connect.net/



- Set of computing services designed to use the existing resources used by US ATLAS people, focusing on batch processing.

Registrations and logins steps

- Sign-in to the identity management system http://atlas.ci-connect.net/
- InCommon Registration
- This allows you to enroll using your existing campus identifier and credentials, provided that your home institution is a member of the InCommon Federation
- Globus Online Registration
- you'll only need to provide your name, email address, a username you want to use, and a password. You will also need to validate your email address.
- Linking a Globus Online account
- This will link your account information together, allowing you to sign in using your InCommon.

Tracking the jobs: Condor

```
-- Schedd: login.atlas.ci-connect.net : <128.135.158.156:43304?PrivAddr=%3c10.1.5.82:4330
 ID       OWNER          . SUBMITTED     RUN_TIME HOST(S)
  34.7000 hbawa         12/9  15:57   0+00:01:34 23941@pt3wrk4.atlas.csufresno.edu
  34.7001 hbawa         12/9  15:57   0+00:01:34 23932@pt3wrk4.atlas.csufresno.edu
  34.7002 hbawa         12/9  15:57   0+00:01:34 23907@pt3wrk4.atlas.csufresno.edu
  34.7003 hbawa         12/9  15:57   0+00:01:34 23929@pt3wrk4.atlas.csufresno.edu
  34.7004 hbawa         12/9  15:57   0+00:01:34 14568@t3head.atlas.csufresno.edu
  34.7005 hbawa         12/9  15:57   0+00:01:34 14573@t3head.atlas.csufresno.edu
  34.7006 hbawa         12/9  15:57   0+00:01:34 3064@pt3wrk2.atlas.csufresno.edu
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  34.7008 hbawa         12/9  15:57   0+00:01:34 14563@t3head.atlas.csufresno.edu
  34.7102 hbawa         12/9  15:57   0+00:01:27 16650@pt3wrk1.atlas.csufresno.edu
  34.7109 hbawa         12/9  15:57   0+00:01:27 3031@pt3wrk2.atlas.csufresno.edu
  34.7110 hbawa         12/9  15:57   0+00:01:27 3041@pt3wrk2.atlas.csufresno.edu
  34.7111 hbawa         12/9  15:57   0+00:01:27 3009@pt3wrk2.atlas.csufresno.edu
  34.7226 hbawa         12/9  15:57   0+00:01:18 400@t3nfs.atlas.csufresno.edu
  34.7227 hbawa         12/9  15:57   0+00:01:18 15012@pt3wrk1.atlas.csufresno.edu
  34.7228 hbawa         12/9  15:57   0+00:01:18 15042@pt3wrk1.atlas.csufresno.edu
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  34.7230 hbawa         12/9  15:57   0+00:01:18 15022@pt3wrk1.atlas.csufresno.edu
  34.7231 hbawa         12/9  15:57   0+00:01:18 15032@pt3wrk1.atlas.csufresno.edu
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  34.7233 hbawa
  34.7236 hbawa
  34.7237 hbawa
  34.7241 hbawa
  34.7242 hbawa
  34.7243 hbawa
  34.7244 hbawa
  34.7245 hbawa
  34.7246 hbawa
  34.7247 hbawa
  34.7248 hbawa
  34.7249 hbawa         12/9  15:57   0+00:01:14 slot18@uc3-c016.mwt2.org
  34.7250 hbawa         12/9  15:57   0+00:01:14 slot18@uc3-c012.mwt2.org
  34.7251 hbawa         12/9  15:57   0+00:01:14 slot17@uc3-c008.mwt2.org
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```

```
[hbawa@login example-simple]$ histogram
Val             |Ct (Pct)     Histogram
mwt2.org        |534 (88.26%)
csufresno.edu|71 (11.74%)
```

```
  34.7611 hbawa         12/9  15:57   0+00:00:44 14417@uct2-c277.mwt2.org
  34.7612 hbawa         12/9  15:57   0+00:00:44 7731@uct2-c258.mwt2.org
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  34.7614 hbawa         12/9  15:57   0+00:00:44 2270@uct2-c239.mwt2.org
  34.7615 hbawa         12/9  15:57   0+00:00:42 324@uct2-c265.mwt2.org
  34.7616 hbawa         12/9  15:57   0+00:00:42 17570@iut2-c119.iu.edu
  34.7617 hbawa         12/9  15:57   0+00:00:42 slot3@uc3-c017.mwt2.org
  34.7618 hbawa         12/9  15:57   0+00:00:42 14450@uct2-c277.mwt2.org
  34.7619 hbawa         12/9  15:57   0+00:00:42 4133@iut2-c150.iu.edu
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  34.7628 hbawa         12/9  15:57   0+00:00:42 12019@iut2-c183.iu.edu
  34.7629 hbawa         12/9  15:57   0+00:00:42 22723@iut2-c171.iu.edu
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  34.7644 hbawa         12/9  15:57   0+00:00:42 26680@iut2-c192.iu.edu
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  34.7657 hbawa         12/9  15:57   0+00:00:41 15109@iut2-c198.iu.edu
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```
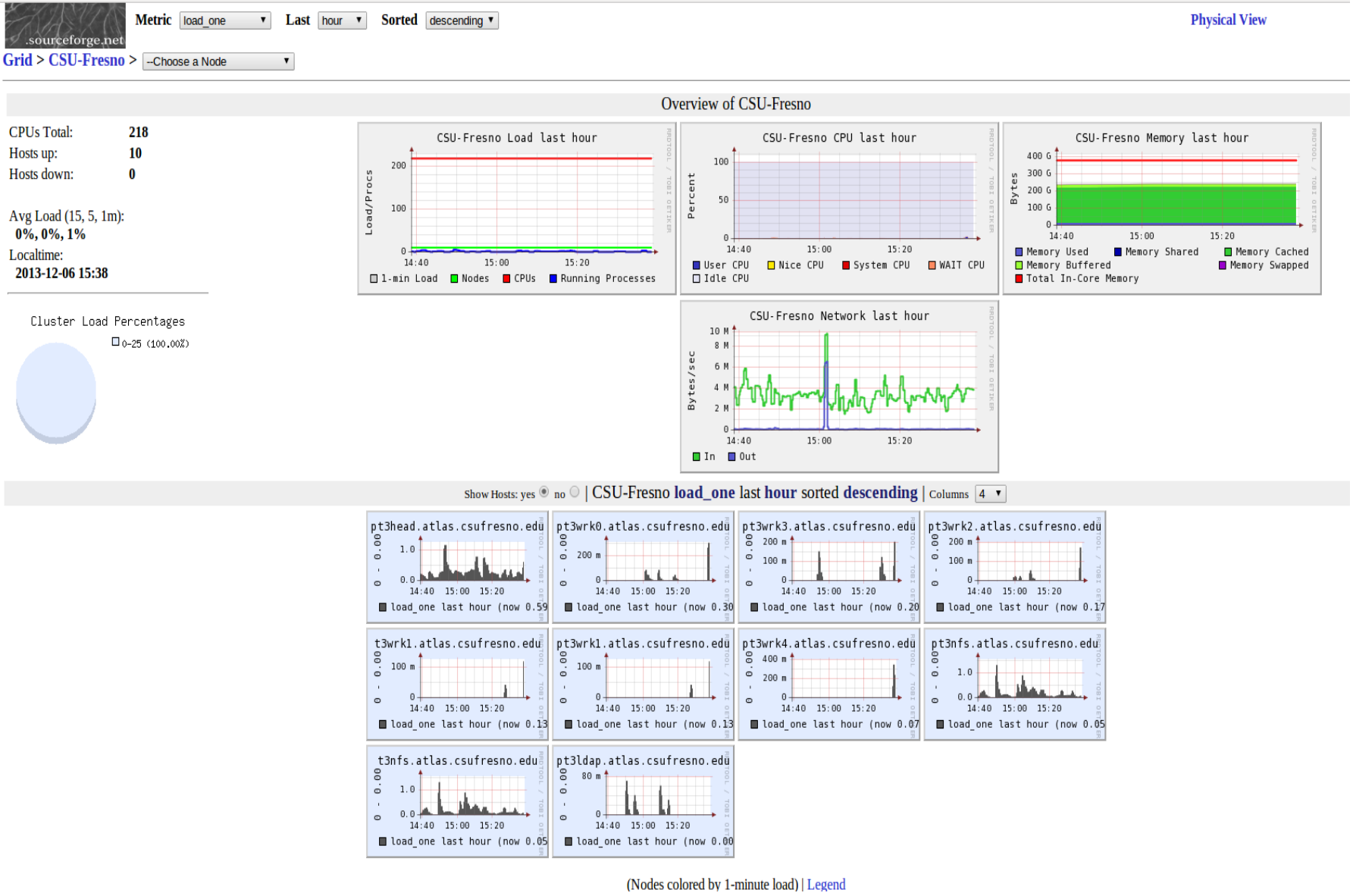

Ganglia Monitor: http://129.8.242.180/ganglia/



Ongoing work

- Hardware upgrade:
  - ~100 Cores & ~45 TB to be added soon (funded by Fresno State)

- Testing the new setup(Atlas Connect):
  - Aim to test the system with i/o storage and we plan to test the system with jobs:
    - cpu intensive only
    - cpu with minimal input and output data requirements
    - cpu with heavy input but minimal output
    - cpu with both heavy input and output
- Any other tests/suggestions?

.sourceforge.net

Metric load_one | Last hour | Sorted descending | Physical View

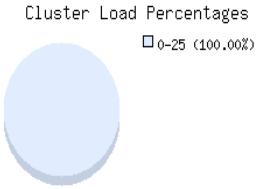
Grid > CSU-Fresno > --Choose a Node

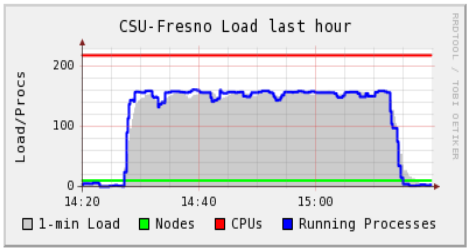
Overview of CSU-Fresno

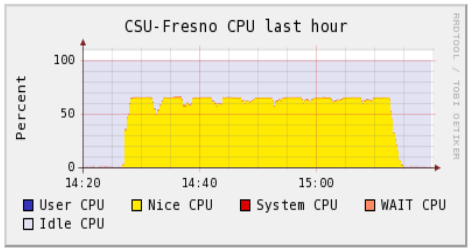
CPUs Total: **218**
Hosts up: **10**
Hosts down: **0**

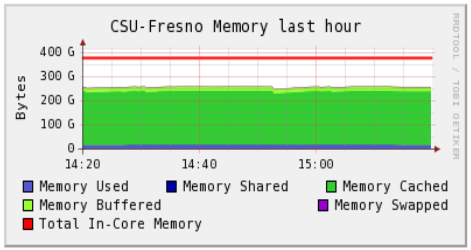
Avg Load (15, 5, 1m):
46%, 23%, 1%
Localtime:
2013-12-09 15:19

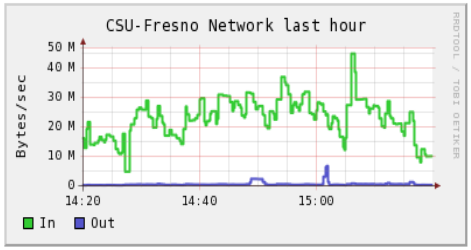
Cluster Load Percentages



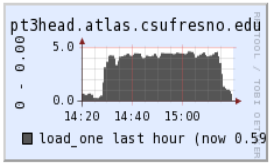


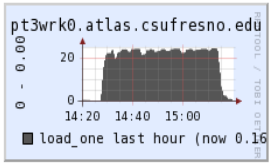


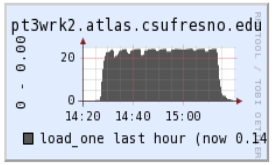


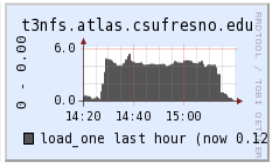


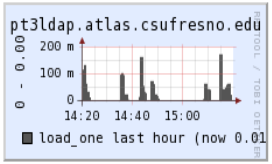
Show Hosts: yes no | CSU-Fresno **load_one** last **hour** sorted **descending** | Columns 4

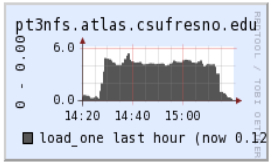


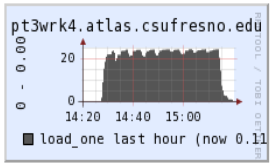


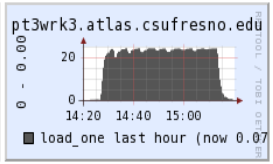


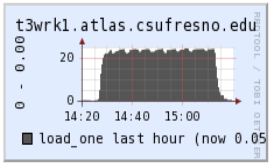


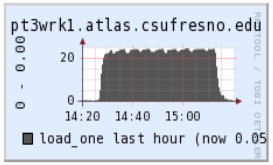








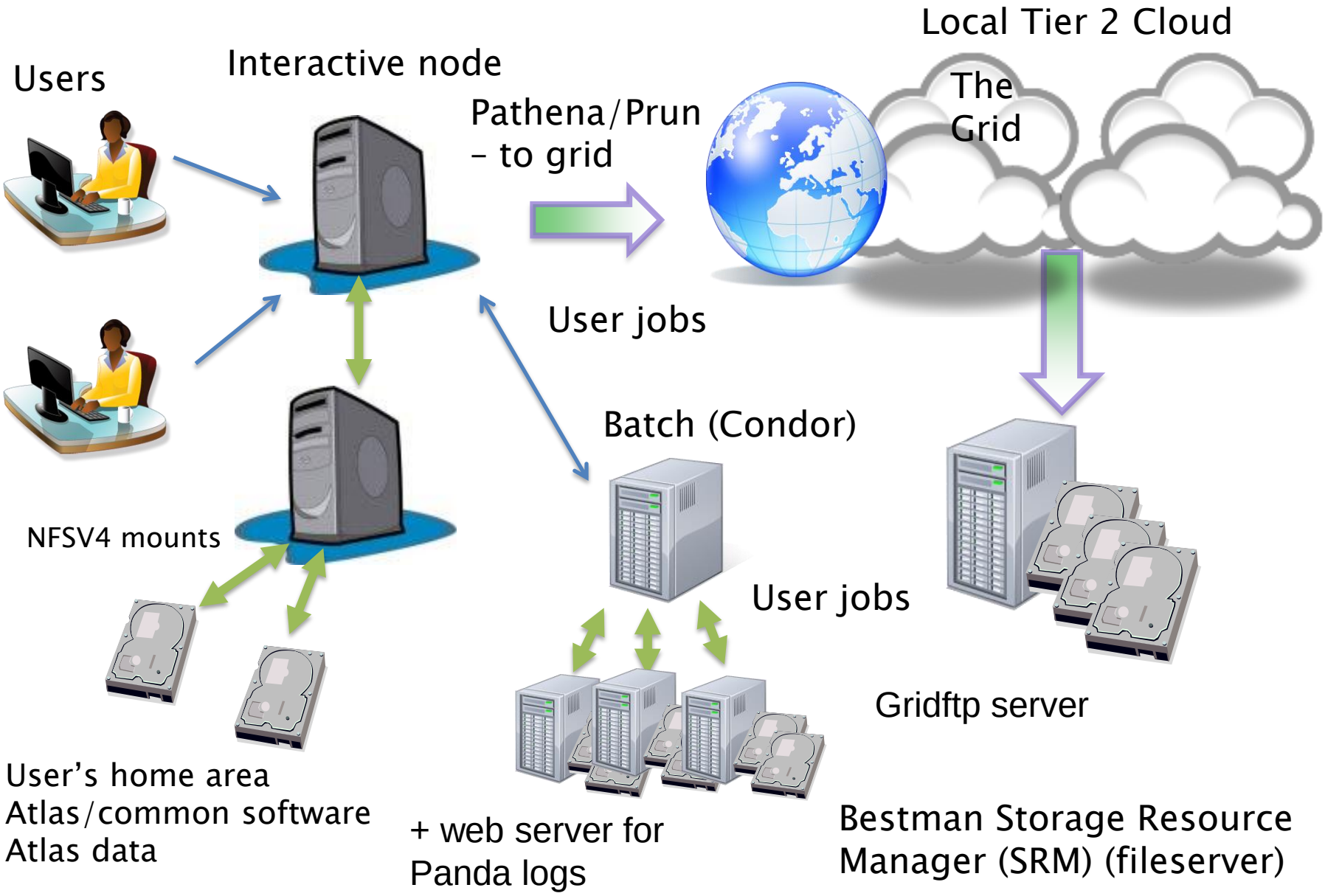




(Nodes colored by 1-minute load) | Legend

Summary/Future Outlook

- Fresno State's Tier-3 has been working since 2011. Hardware/10 Gb network upgrades soon
- Goal: Provide these computing resources to ATLAS using ATLAS Connect
- Test-bed for ATLAS Connect configuration (Thanks Rob, Lincoln, and others for help!)
- Will work closely with ATLAS Connect people to validate the idea and provide the experience/documentation for other Tier-3's to follow

THANKS

Tier 3g configuration