

# Condor and Cooperative Linux

Honors College Undergraduate Thesis Defense

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# Motives



# Total LSU HPC Capacity

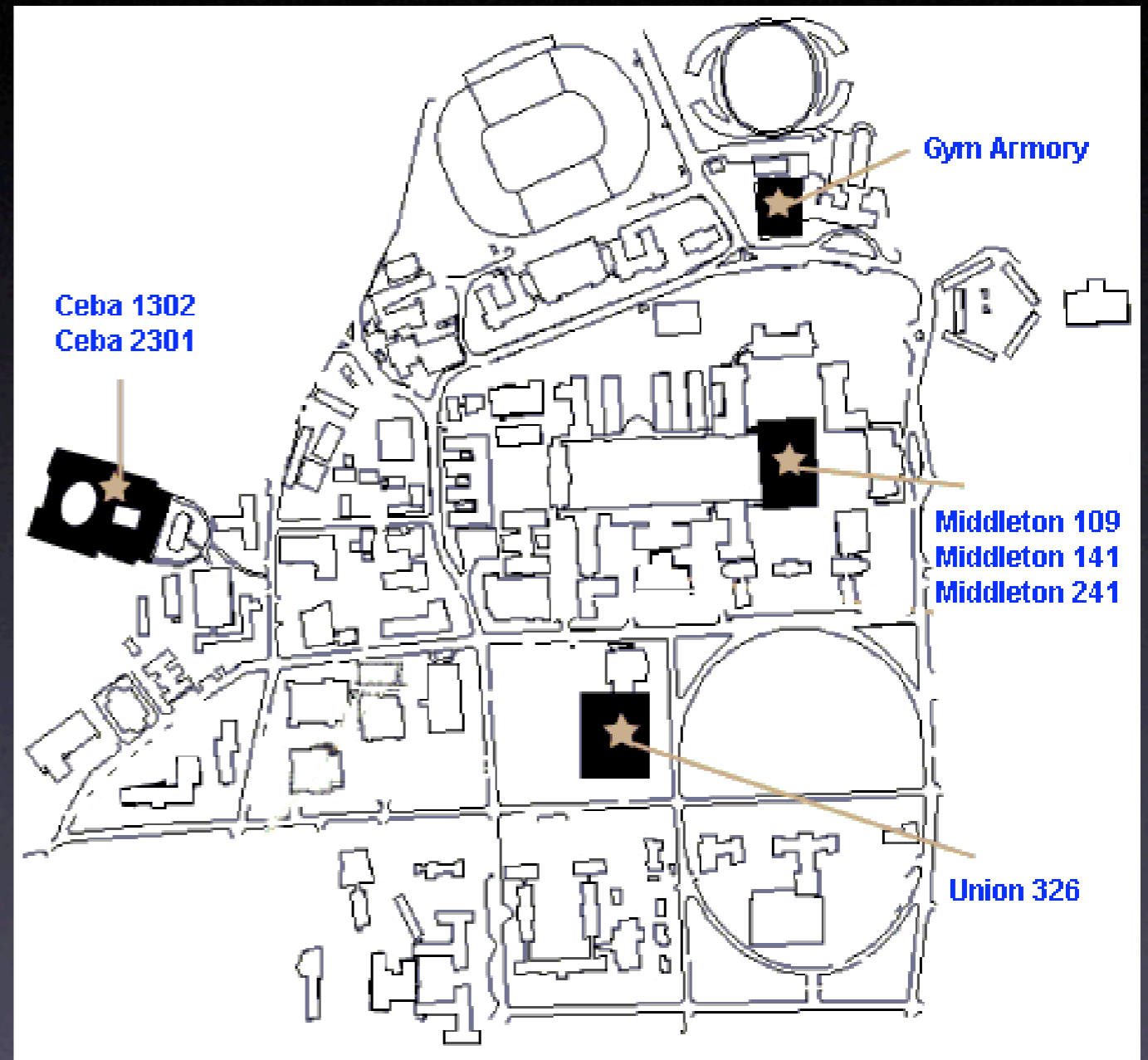
SuperMike	6.267 TFLOPS
SuperHelix	1.024 TFLOPS
Pélican	0.851 TFLOPS
Nemeaux	0.256 TFLOPS
Santaka	0.192 TFLOPS
<b>Total</b>	<b>8.590 TFLOPS</b>

# LSU ITS Desktops

Labs: 369

Classrooms: 176

ITS + testing total: 1400





# Augmented LSU HPC

Labs + Classrooms	1.09 Tflops	13%
ITS	2 Tflops	23%
ITS + Testing	2.8 Tflops	33%
Estimations	4 Tflops	47%

# Methods



# Condor

- Scheduler: sends jobs to idle machines
- Embarrassingly parallel: no communication between nodes, no MPI
- Relevant features: checkpointing, idle time measurement, centralized authentication, parameter sweeping

# Typical Commands

```
mnoel@dsl-condor:~/condortest — 1
[mnoel@dsl-condor condortest]$ condor_stat
-bash: condor_stat: command not found
[mnoel@dsl-condor condortest]$ condor_status

Name           OpSys      Arch      State      Activity    LoadAv Mem  ActvtyTime
dsl-turtle01.  LINUX     INTEL     Claimed    Busy        1.000  250  0+16:00:01
dsl-condor.cs  LINUX     X86_64    Owner      Idle        0.000  1000  0+00:00:04
dsl-stork.csc  LINUX     X86_64    Claimed    Busy        0.310  1001  0+00:00:25
dsl-turkey.cs  LINUX     X86_64    Unclaimed  Idle        0.060  1000  0+03:13:44
dsl-turtle05  WINNT51   INTEL     Unclaimed  Idle        0.010  511  0+02:52:02

                Total Owner Claimed Unclaimed Matched Preempting Backfill
                -----
                INTEL/LINUX      1      0      1      0      0      0      0
                INTEL/WINNT51     1      0      0      1      0      0      0
                X86_64/LINUX      3      1      1      1      0      0      0
                Total            5      1      2      2      0      0      0

[mnoel@dsl-condor condortest]$ condor_q

-- Submitter: dsl-condor.csc.lsu.edu : <130.39.225.155:32824> : dsl-condor.csc.lsu.edu
ID      OWNER      SUBMITTED      RUN_TIME ST PRI SIZE CMD
10.0    emrah      10/21 11:50     0+00:00:00 H 0  9.8 simple 4 10
59.0    mnoel      12/4  11:04     0+00:00:30 R 0  9.8 condortest /

2 jobs; 0 idle, 1 running, 1 held
[mnoel@dsl-condor condortest]$
```



# Binary Compatibility

- Condor works best with Windows and Linux
- Linux programs can't run in Windows and vice versa: different executable formats
- Re-compile programs for each architecture?
  - Libraries: source? exist on target platform?
  - Time? Feasibility?

# Dual Boot?

- Run Windows and Linux one at a time
- Best option for compatibility and speed
- Summer 2004 - Summer 2005
- Failure
  - Lack Linux administrators
  - Too much change on Windows side



# VMWare vs. coLinux

General-purpose	Kernel as coroutine
Multi-core	Single processor
77% native speed	79.3% native speed
87 MB overhead	100 MB overhead
Commercial	GPL

# Implementation Issues

- coLinux immaturity: networking support
- Breadth of experience: Windows services, C programming, Linux administration + scripting
- Politics
  - Passwords and administrative access
  - Disrupted policies
  - User experience degradation



Results: Demo

Upcoming



- On-boot service for idle times and startup
- Self-extracting installer or .msi
- Users: UCoMS, Cactus TFM, researchers
- Flocking with LIGO
- Simultaneous Condor on Windows and Linux
- PBS and Condor unification

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