

The Lattice Project

A Computational Grid System

Presented by Adam Bazinet

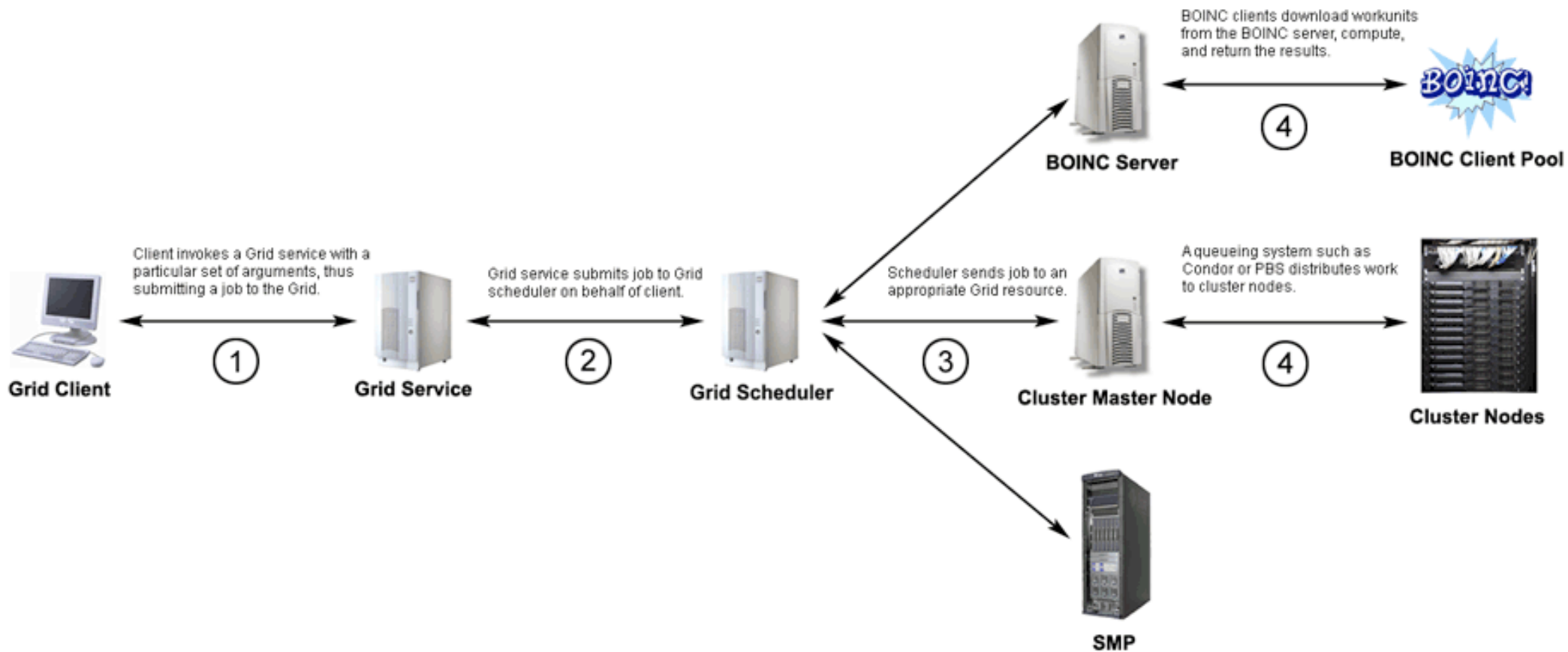
The Lattice Project

- The Lattice Project is primarily aimed at effectively sharing computational resources between departments and institutions, starting with those in the University System of Maryland.
- The Grid is focused on *computation*, and we have not yet made efforts to enable large-scale data access, storage, or replication.
- The Grid has transitioned from a research project which started in 2003 to a production system that has been used by a number of researchers, racking up many hundreds of CPU years in the process.

Grid Software

- The backbone of the Grid system is Globus Toolkit software, which provides mechanisms for job submission, file transfer, and authentication and authorization of entities on the Grid.
- The most novel feature of The Lattice Project is our Globus-BOINC interface, which enables Grid jobs to flow into a BOINC pool. The Lattice BOINC Project (<http://boinc.umiacs.umd.edu>) is our active BOINC project for this purpose. Anyone can participate.
- We also work with scheduling software that controls local resources. Our resource base is currently composed of Condor pools and clusters running variants of PBS.

Grid Architecture



Grid Services

- Applications are Grid-enabled and made into a Grid service. Such trusted applications are then made available to run on Grid resources.
- To date, we have Grid-enabled approximately 25 applications, mostly life science applications, with notable exceptions. Only a subset of these have been run a significant amount.
- We have developed a software stack that allows us to Grid-enable applications quickly and easily. We call this software GSBL (Grid Services Base Library) and GSG (Grid Services Generator).

User Interfaces

- Our primary Grid interface is command-line based. Grid users log on to a specific machine, upload their input data, and then submit and monitor jobs using our tools.
- We also provide a Web interface for monitoring job status, which is located on The Lattice Project intranet.
- Future work might see job *submission* and other operations take place via a Web interface or portal of sorts. We may also make the command-line interface more widely available.

Job Search

Search for a job or set of jobs containing any of the parameters below.

Job ID	Job Name	Start Time	Finish Time
<input type="text"/>	<input type="text"/>	Within the last <input type="text"/> days <input type="text"/> hours	Within the last <input type="text"/> days <input type="text"/> hours (<input checked="" type="checkbox"/> Show unfinished)
User Name	Job Status	Grid Service	Resource
<ul style="list-style-type: none"> gt4admin freed hollym fushman pknut777 gridtest demo 	<ul style="list-style-type: none"> Idle Running Removed Finished Failed Retrieved Failed Retrieve 	<ul style="list-style-type: none"> GARLI Complab MDIV HMMPFam Gsi MARXAN 	<ul style="list-style-type: none"> PBS BOINC Condor Fork
Architecture	Operating System	Scheduler	
<ul style="list-style-type: none"> INTEL PPC 	<ul style="list-style-type: none"> LINUX WIN OSX 	<ul style="list-style-type: none"> https://128.8.115.115:8443/wsrp/services/ManagedJobFactoryService https://128.8.120.35:8443/wsrp/services/ManagedJobFactoryService https://131.118.1.37:8443/wsrp/services/ManagedJobFactoryService https://128.8.10.42:8443/wsrp/services/ManagedJobFactoryService 	
<input type="button" value="Search Jobs"/>			

Job Status

[Modify Search](#)[New Search](#)

This page is intended to help you monitor jobs that have been submitted to the Grid. Click the column header to sort the table.

Job ID	Job Name	User ID	Grid Service	Job Status	Start Time	Finish Time
55318610.8734852526449487	NoDDCobtect122_batch1	lepusers	GARLI	Idle	2007-10-05 15:27:15	Not Finished
192021490.5563047721797734	NoDDCobtect122_batch4	lepusers	GARLI	Idle	2007-10-05 15:32:51	Not Finished
25274230.663135556083446	NoDDCobtect122_batch7	lepusers	GARLI	Idle	2007-10-05 15:38:34	Not Finished
300903930.4232310049235042	NoENOobtect122_batch1	lepusers	GARLI	Idle	2007-10-05 15:46:04	Not Finished
285851500.28441392065741633	NoENOobtect122_batch2	lepusers	GARLI	Idle	2007-10-05 15:47:59	Not Finished
319745870.7450886906716563	NoENOobtect122_batch5	lepusers	GARLI	Idle	2007-10-05 15:53:36	Not Finished
155012760.3862041884114237	NoENOobtect122_batch6	lepusers	GARLI	Idle	2007-10-05 15:55:25	Not Finished
120185750.6712593397034693	NoENOobtect122_batch7	lepusers	GARLI	Idle	2007-10-05 15:57:16	Not Finished
193890030.38653957104439485	NoENOobtect122_batch9	lepusers	GARLI	Idle	2007-10-05 16:01:08	Not Finished
125525010.27238711016874495	NoPERobtect122_batch1	lepusers	GARLI	Running	2007-10-06 20:27:50	Not Finished
67296680.7323232439232642	NoPERobtect122_batch2	lepusers	GARLI	Running	2007-10-06 20:33:57	Not Finished
54608600.7151218753272369	NoPERobtect122_batch6	lepusers	GARLI	Running	2007-10-06 20:58:26	Not Finished
120959170.9505456979838497	NoWGobtect122_batch2	lepusers	GARLI	Running	2007-10-06 21:35:29	Not Finished
263348430.7646646780565017	linsi_batch40	gridtest	GARLI	Running	2007-10-10 18:16:17	Not Finished
287884860.8681602501952815	linsi_batch41	gridtest	GARLI	Running	2007-10-10 18:38:47	Not Finished
169915760.6209327852586667	linsi_batch42	gridtest	GARLI	Running	2007-10-10 18:40:51	Not Finished
2812810.01971095155635405	linsi_batch43	gridtest	GARLI	Running	2007-10-10 18:42:57	Not Finished
111714820.841011800995614	linsi_batch44	gridtest	GARLI	Running	2007-10-10 18:45:07	Not Finished

UMIACS Condor Pool

24.29 CPU Years

Lattice Jobs

Arch. & OS	Idle	Running	Free CPUs
INTEL_LINUX	0	0	154
INTEL_WIN	0	0	1
SUN4u_SOLARIS28	0	0	9

[show/hide condor_status](#)

Gridiron Condor Pool

25.69 CPU Years

Lattice Jobs

Arch. & OS	Idle	Running	Free CPUs
INTEL_LINUX	0	0	28
INTEL_WIN	0	0	87
PPC_OSX	0	0	1

[show/hide condor_status](#)

CLFS Condor Pool

8.62 CPU Years

Lattice Jobs

Arch. & OS	Idle	Running	Free CPUs
PPC_OSX	0	0	78
INTEL_WIN	0	0	36
INTEL_LINUX	0	0	2

[show/hide condor_status](#)

Terpcondor Condor Pool

105.40 CPU Years

Lattice Jobs

Arch. & OS	Idle	Running	Free CPUs
INTEL_WIN	0	0	197

[show/hide condor_status](#)

Lattice on BOINC

820.32 CPU Years

Lattice Jobs

Arch. & OS	Idle	Running	Free CPUs
INTEL_LINUX	900	2500	29
PPC_OSX	0	0	33
INTEL_WIN	0	0	503

[Lattice on BOINC Web Site](#)

USM Condor Pool

0.14 CPU Years

Lattice Jobs

Arch. & OS	Idle	Running	Free CPUs
INTEL_WIN	0	0	4
SUN4u_SOLARIS28	0	0	0

[show/hide condor_status](#)

Deepthought

3.15 CPU Years

Lattice Jobs

Arch. & OS	Idle	Running	Free CPUs
INTEL_LINUX	0	0	116

[view cluster status](#) | [view cluster stats](#)

SEIL

23.33 CPU Years

Lattice Jobs

Arch. & OS	Idle	Running	Free CPUs
INTEL_LINUX	0	0	308

[view cluster status](#) | [view cluster stats](#)

Bluegrit

1.56 CPU Years

Lattice Jobs

Arch. & OS	Idle	Running	Free CPUs
PPC_LINUX	0	0	44

[Bluegrit Web Site](#)

Total Lattice Jobs Idle 900 Running 2500

Total Free CPUs* Linux 681 Windows 828 Mac OS X 112 Solaris 9 **Grand Total** 1630

The Lattice BOINC Project

- BOINC - Berkeley Open Infrastructure for Network Computing
- A platform for volunteer computing (public computing) or desktop grid computing
- A thin client pulls down work from a server, crunches it, and returns the results
- Users are compensated in the form of credit (not redeemable for cash prizes)
- We are the first to use the framework as part of a general purpose Grid system
- A potentially huge and valuable resource



The Lattice Project

Center for Bioinformatics and Computational Biology

- Lattice Project**
- at Lattice
- ications
- te Account
- age Boards
- le Zone
- tions & Answers
- arch Projects
- s and Policies
- stics
- ns
- Computers
- Participants
- Teams
- Account

The Lattice Project

About The Lattice Project

- [Background and Introduction](#)

Join The Lattice Project

1. [Rules and Policies](#) **[Please read first!]**
2. [Getting Started](#)
3. [Create Account](#)
4. [Download BOINC](#) - we require a core client >= 5.5.1!
5. When prompted, enter <http://boinc.umiacs.umd.edu/>

Returning participants

- [Your account](#) - view stats, modify preferences
- [Teams](#) - create or join a team
- [Applications](#)

Community

- [Participant profiles](#)
- [Message boards](#)
- [Questions and answers](#)

Project totals and leader boards

- [Top participants](#)
- [Top computers](#)
- [Top teams](#)
- [Other statistics](#)



User of the Day



[AF> France> Ouest> Midi-Pyrenees]Sebastien
Je suis technicien de laboratoire et membre de l'Allia

Status - The project currently has no work available

Server Status:
Globus Server: running
Scheduler: running
File Server: running
Feeder: running

Results:
Workunits: 7167
Results ready to send:
Results in progress: 3

Detailed Status

News

October 10, 2007 [Choosing Applications](#)
Some had asked for the ability to choose which applications they run. Well, now you can. If your system meets the [minimum requirements](#) to run an application, you will decide which work to take control over the work they receive.

October 8, 2007 [Server Upgrade](#)
The server upgrade is essentially complete, save for one feature. Please report any

October 4, 2007 [Research Projects](#)
A new page describes types of analyses run on The Lattice BOINC Project, application work in progress! Head on over to [Research Projects](#)

Old News

More Information

- The Lattice Project web site: <http://lattice.umiacs.umd.edu/>
- The Lattice BOINC Project web site: <http://boinc.umiacs.umd.edu/>
- Look on the site for publications about The Lattice Project and previous presentations, among other things.
- Please sign up for the Lattice BOINC Project and support your local University researchers!
- Please contact me for more information: pknut777@umiacs.umd.edu