

OrgGrid: A Centralized BOINC Resource Manager for Institutional Networks

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Computing Resources in Institutions

- Institutions like Universities have a large number of desktop PCs.
- These PCs are usually underemployed.
- However, the computing power is really good (multi-cores, 1GB of RAM, etc.).

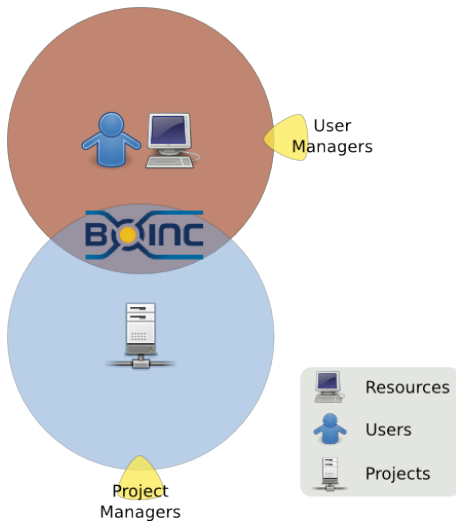
Computing Resources in Institutions

- These resources can be harnessed by means of BOINC.
- BOINC is a middleware widely used by researchers:
 - 1,154,833 users
 - 2,364,170 PCs
 - 703.040 TeraFLOPS
- Nevertheless, BOINC is thought and focused around users.

Standard BOINC Model

- BOINC relies on users:
 - The users decide with which project they collaborate.
 - The users decide how much of their resources are donated.
- On the other hand, institutional PCs do not belong to users.

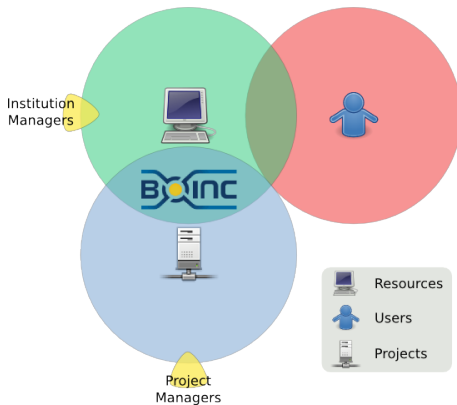
Standard BOINC Model



Resource Based BOINC Model

- Our proposal is a new model where the institution has the power of choice.
- In this model, the user is removed from the decision process and the institution decides.

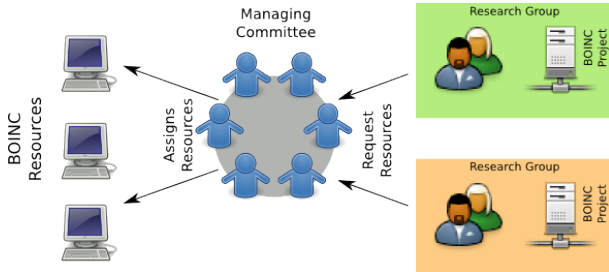
Resource Based BOINC Model



Resource Based BOINC Model

- A institution, which employs this model, has to be able to do remotely the following tasks:
 - Creation of PC pools.
 - Allocation of BOINC projects to PC pools.
 - BOINC Clients Upgrade.
 - Statistics Retrieval.
- With this goal, a software tool has been created to support the new model.

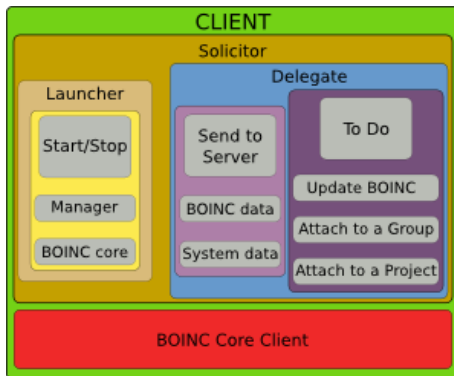
BOINC Resource Managing Committee



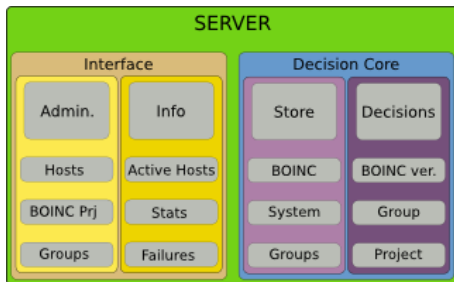
New Resource Based BOINC Model Difficulties

- Remote PC attaching to BOINC projects.
 - Master-Slave.
 - NAT, Firewalls or Proxy problems.
 - **SOLUTION:** To employ HTTP exclusively for all communications.
- BOINC PCs Management.
 - 2 Management Policies:
 - *Dedicated Time*
 - *Student/Worker WakeOnLAN*

Client



Server



Experiments & Results

- *Goal:* To prove the validity of the model.
 - Client Side:
 - The Clients contact the Server.
 - The Clients upgrade the BOINC core client.
 - The Clients are attached to BOINC projects to produce results.
 - Server Side:
 - Creation of PC pools.
 - Allocation of clients to PC pools.
 - Allocation of BOINC projects to PC pools.

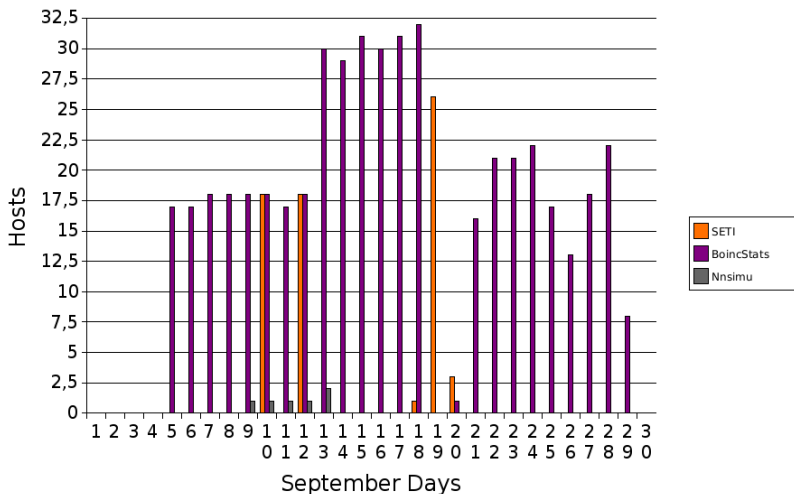
Experiments & Results

- 3 Campuses from the University of Extremadura.
 - Cáceres, Faculty of Law.
 - Badajoz, Faculty of Engineering.
 - Mérida, Computer Science.
- 1 Laboratory per campus.
 - 20 GNU/Linux PCs per laboratory.
- 3 BOINC Projects:
 - SETI@HOME
 - Nnsimu
 - BoincStats

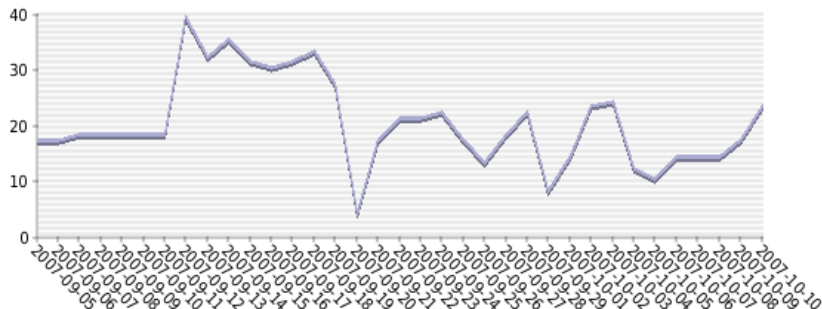
Infrastructure



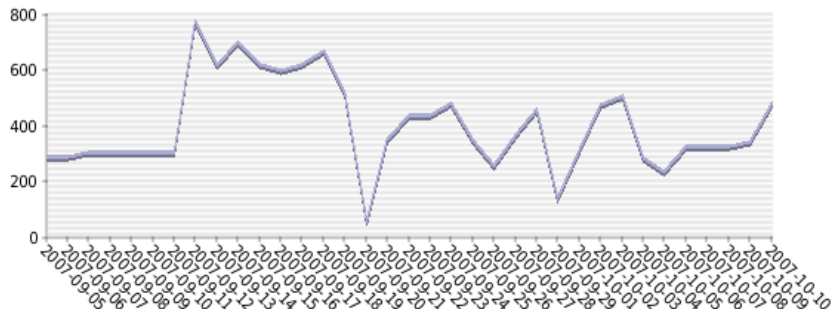
Project Evolution for One Month



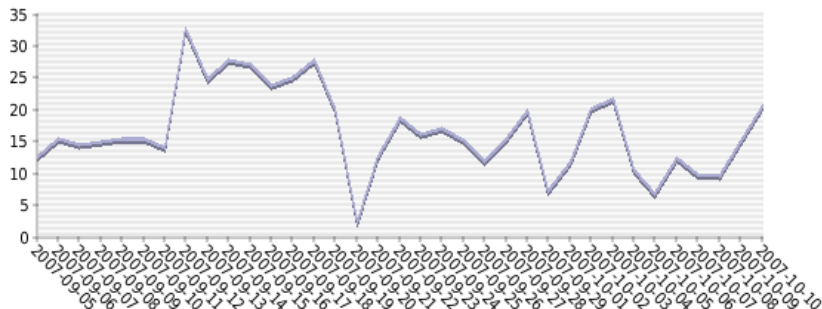
Active Hosts Evolution for One Month



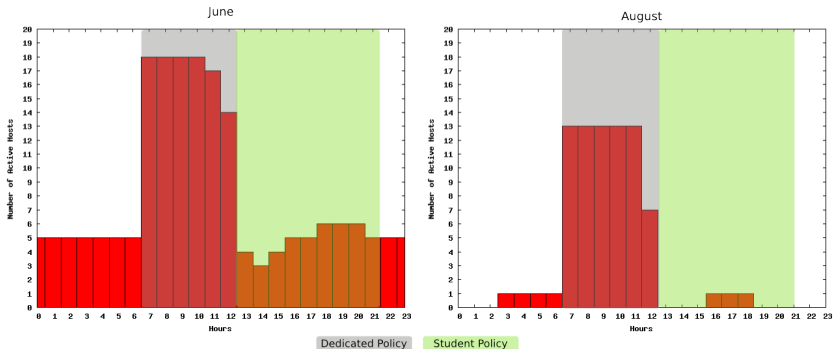
Total Free Hard Disk Space Evolution for One Month



Total Free RAM Space Evolution for One Month



Laboratory Evolution for Two Months



Future Work

- A New Tool:
 - Start from scratch a new tool: PHP5.
 - Multiplatform: Ms. Windows & GNU/Linux.
 - Multiuser.
 - Multilanguage.

The New Version: OrgGrid

- Written from scratch.
- Coded in PHP5.
- Based on BOINC Account's Manager Protocol.
- Multiuser (different roles):
 - Root.
 - Supplier.
 - Allocator.
- Multilanguage (by default English).
- Multiplatform: Ms. Windows, GNU/Linux and MacOSX.

Figure: Login Screen



OGM

User

Password

W3C CSS AIGPLV 

Figure: Different Roles



Figure: Hosts

Wellcome root

- [Start](#)
- [Projects](#)
- [Hosts](#)
- [Pools](#)
- [Users](#)
- [Statistics](#)
- [Log Out](#)

Available Hosts

Host	Pool	Supplier
	default	berkeley

W3C CERN AGPL 3

Figure: Host Features

Hosts

- [Start](#)
- [Projects](#)
- [Hosts](#)
- [Pools](#)
- [Users](#)
- [Statistics](#)
- [Log Out](#)

Editing host

	Features
Supplier	default->badajoz
Venue	
Number of CPUS	2
Processor Vendor	GenuineIntel
Processor Model	Intel(R) Core(TM)2 Duo CPU T8300 @ 2.40GHz [Family 6 Model 23 Stepping 6]
FLOPS	8.93911e+08
IOPS	2.45488e+09
OS	Linux
Total Credit	0
RAC	0
OS Version	2.6.24-19-generic
Delete	<input type="checkbox"/>

Enviar consulta

W3C CSS AGPLv3

Figure: Pools



Wellcome root

- [Start](#)
- [Projects](#)
- [Hosts](#)
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- [Users](#)
- [Statistics](#)
- [Log Out](#)

Available Pools

Name	Hosts	Run Always	Time		Network		Hard Disk Usage		Memory Usage		Supplier
			Start	End	Upload	Download	Max Space	Left Space	Max Active	Max Idle	
default	0	Yes	00:00	00:00	0 KB/s	0 KB/s	100 GB	0.001 GB	50 %	50 %	badajoz
default	1	Yes	00:00	00:00	0 KB/s	0 KB/s	100 GB	0.001 GB	50 %	50 %	berkeley
prueba	0	Yes	20:00	21:00	0 KB/s	0 KB/s	100 GB	0.001 GB	50 %	50 %	berkeley
default	0	Yes	00:00	00:00	0 KB/s	0 KB/s	100 GB	0.001 GB	50 %	90 %	merida

[New Pool](#)

W3C    

Figure: Pool Options

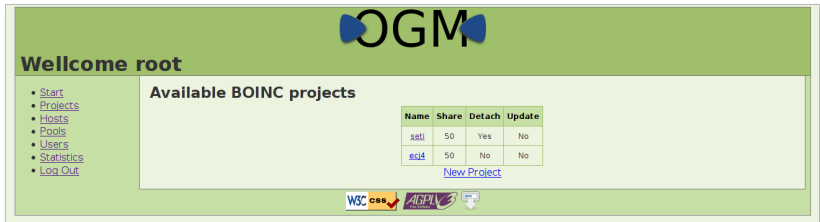
Pools

- [Start](#)
- [Projects](#)
- [Hosts](#)
- [Pools](#)
- [Users](#)
- [Statistics](#)
- [Log Out](#)

Editing pool

Pool Features	
Pool Name	<input type="text" value="default"/>
Supplier	<input type="text" value="badajoz"/>
Processor usage	
Suspend work while computer is on battery power? (matters only for portable computers)	Yes <input type="radio"/> No <input type="radio"/>
Suspend work while computer is in use?	Yes <input checked="" type="radio"/> No <input type="radio"/>
'In use' means mouse/keyboard activity in last	<input type="text" value="3"/> minutes
Suspend work if no mouse/keyboard activity in last (Needed to enter low-power mode on some computers) Enforced by version 5.1.0.14+	<input type="text" value="0"/> minutes
Do work only between the hours of (no restriction if equal)	<input type="text" value="0:00"/> and <input type="text" value="0:00"/>
Leave applications in memory while suspended? (suspended applications will consume swap space if 'yes')	Yes <input type="radio"/> No <input checked="" type="radio"/>
Switch between applications every (recommended: 60 minutes)	<input type="text" value="60"/> minutes
On multiprocessors, use at most Enforced by version 5.1.0 and earlier	<input type="text" value="16"/> processors
On multiprocessors, use at most	<input type="text" value="100"/> % of the processors

Figure: Projects



The screenshot shows the OrgGrid website interface. At the top, there is a green header with the 'OGM' logo. Below the header, the text 'Wellcome root' is displayed. On the left side, there is a navigation menu with links: Start, Projects, Hosts, Pools, Users, Statistics, and Log Out. The main content area is titled 'Available BOINC projects' and contains a table with the following data:

Name	Share	Detach	Update
seti	50	Yes	No
escl	50	No	No

Below the table, there is a link for [New Project](#). At the bottom of the page, there are logos for W3C, CSS, and AGPL, along with a download icon.

Figure: Projects Options



The screenshot displays the OrgGrid interface. At the top center is the logo "OGM" with blue arrows pointing outwards. Below the logo, the word "Projects" is written in a bold, black font. On the left side, there is a vertical list of navigation links: Start, Projects, Hosts, Pools, Users, Statistics, and Log Out. The main content area is titled "Editing project" and contains a table with the following structure:

Name	Share	Detach	Update	Delete
seti	<input type="text" value="50"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Below the table is a button labeled "Enviar consulta". At the bottom of the page, there are logos for W3C, CSS, AGPL, and a Creative Commons license icon.

Figure: Users

Wellcome root

- [Start](#)
- [Projects](#)
- [Hosts](#)
- [Pools](#)
- [Users](#)
- [Statistics](#)
- [Log Out](#)

Available users

User ID	Role	Supplier
root	root	root
david	root	berkeley
daniel	supplier	badajoz
berkeley@unex.es	supplier	berkeley
allocator	allocator	merida

[New User](#)

W3C CSS AGPL

Conclusions

- We have presented a new BOINC Resource based model.
- The new model replaces the final user for an Institution.
- We have shown a new tool which enables the model.
- The new tool is an on-going work.

Questions

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Icons from Tango Desktop project and Gnome Desktop (Creative Commons & GPL License)

