Jarifa: supporting the social Extremadurathome.org project

Daniel Lombraña González  Francisco Fernández de Vega
Extremadurathome.org, Spain

April 16, 2009
1. Background
2. Motivation
3. Proposal
4. Jarifa
   - University of Extremadura
   - Extremadurathome.org
5. Conclusions
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.).
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.
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

Motivation

D. Lombraña, F. Fernández

Jarifa and Extremadurathome.org, Asia@home 2009
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.
Proposal

Resource Based BOINC Model

D. Lombraña, F. Fernández
Jarifa and Extremadurathome.org, Asia@home 2009
An 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.
- Statistics Retrieval.

With this goal, a software tool has been created to support the new model: Jarifa.
New Resource Based BOINC Model Difficulties

- Remote PC attaching to BOINC projects.
  - Master-Slave.
  - NAT, Firewalls or Proxy problems.
  - **SOLUTION:** To employ BOINC’s Account Manager mechanism.
It is an official and well documented protocol.
Based on Web RPCs.
It uses XML for interchange data.
The tool
The tool: Different Roles

Root
Supplier
Volunteer
Allocator
The tool: Multilanguage
The tool: Multiplatform
The Blog: http://jarifa.unex.es

Extremadurathome on regional tv channel
April 2nd, 2009

Extremadurathome en Canal Extremadura

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» About
» Download
» Logo and banners
» Who uses jarifa
» Wiki

Meta
» Log in
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» WordPress.org

BOINC News
» BOINC news March 30, 2009
VTU@home, a project from the Vilnius Gediminas Technical University, is now listed on the Choose Projects page. VTU@home serves Lithuanian scientists. It is
Jarifa (a.k.a OGM) is a system for grid computing on organizational resources, using BOINC.

Jarifa is designed for situations where some entities that own computers (Suppliers) have decided to let another entities (the Allocator) decide how their computer time is to be divided among a set of BOINC projects. With Jarifa, Suppliers are able to control the usage of their computers (for example, the hours during which it does BOINC computation). However, they have no control over which BOINC projects their computers contribute to; the Allocator makes that decision.

The BOINC projects to which computing power is given need not be related to either Suppliers or Allocator; they might be public projects like Climateprediction.net or Rosetta@home.

Remark: Jarifa uses the 'weak authentication' feature of BOINC. You can only allocate projects, that support this feature (depends on the server version they use).

Jarifa is also designed for situations where the Suppliers' computers are in a public place, or are used by people not trusted by the Supplier: the users have no control over BOINC on the computer.

For example, Suppliers might be different departments in a university, each of which owns a set of desktop and laboratory PCs, and the Allocator might be a campus-wide committee that divides the resources among BOINC projects internal to the university. Or the Suppliers might be different companies, who have agreed to volunteer their PC resources to a philanthropic organization that divides them among public BOINC projects.

Jarifa is implemented using BOINC's Account Manager mechanism. The Allocator runs the Jarifa software on a server. The Suppliers run the BOINC client on their computers, and attach each client to the Allocator's account manager. The BOINC client on the computer periodically communicates with the Jarifa, which instructs it which projects to attach to, and the resource share for each attachment. For further details see Implementation.

Who uses Jarifa?

The installation process is described here.

If you want to download the Jarifa source code, check the following link.

If you want to contact us, check the following link.

Jarifa is licensed under GNU Affero General Public License, version 3.

A Quickstart document is here and here for the BOINC client.

Published papers.

Developers drafts and proposals are here.
Different Roles

Welcome volunteer

Welcome supplier

Welcome allocator

Welcome root

Choose an action from the left panel
Bienvenido daniel

### Equipos disponibles

<table>
<thead>
<tr>
<th>Equipos</th>
<th>Grupo</th>
<th>Proveedor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informática 2A</td>
<td>Mérida</td>
<td></td>
</tr>
<tr>
<td>Informática 2A</td>
<td>Mérida</td>
<td></td>
</tr>
<tr>
<td>Informática 2A</td>
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<tr>
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<tr>
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<td>Mérida</td>
<td></td>
</tr>
</tbody>
</table>
### Editando equipo

<table>
<thead>
<tr>
<th>Características</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Procesador</strong></td>
<td><code>default-&gt;Sevilla</code></td>
</tr>
<tr>
<td><strong>Localización</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Número de CPUs</strong></td>
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</tr>
<tr>
<td><strong>Marca del procesador</strong></td>
<td>GenuineIntel</td>
</tr>
<tr>
<td><strong>Modelo del procesador</strong></td>
<td><code>{Intel(R) Pentium(R) Dual CPU E2200 @ 2.20GHz [Family 6 Model 15 Stepping 13]}</code></td>
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</tr>
<tr>
<td><strong>IOPS</strong></td>
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<tr>
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</tr>
<tr>
<td><strong>Borrar</strong></td>
<td></td>
</tr>
</tbody>
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Enviar consulta
### Bienvenido daniel

#### Grupos disponibles

<table>
<thead>
<tr>
<th>Nombre</th>
<th>Equipos</th>
<th>Ejecutar siempre</th>
<th>Inicio</th>
<th>Fin</th>
<th>Subida</th>
<th>Descarga</th>
<th>Espacio máximo</th>
<th>Espacio remanente</th>
<th>Activos Max.</th>
<th>Maximo inactivo</th>
<th>Proveedor</th>
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</thead>
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<td>0 KB/s</td>
<td>100 GB</td>
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<td>00:00:00</td>
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<td>0 KB/s</td>
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<td>0 KB/s</td>
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<td>0.001 GB</td>
<td>50 %</td>
<td>90 %</td>
<td>Sevilla</td>
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<tr>
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<td>00:00:00</td>
<td>00:00:00</td>
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<td>0 KB/s</td>
<td>100 GB</td>
<td>0.001 GB</td>
<td>50 %</td>
<td>90 %</td>
<td>Cáceres</td>
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<tr>
<td>default</td>
<td>4</td>
<td>No</td>
<td>00:00:00</td>
<td>00:00:00</td>
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<td>0 KB/s</td>
<td>100 GB</td>
<td>0.001 GB</td>
<td>50 %</td>
<td>90 %</td>
<td>Granada</td>
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<tr>
<td>default</td>
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<td>0.001 GB</td>
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<td>90 %</td>
<td>Voluntier</td>
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<tr>
<td>default</td>
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<td>No</td>
<td>00:00:00</td>
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<td>100 GB</td>
<td>0.001 GB</td>
<td>50 %</td>
<td>90 %</td>
<td>UNED</td>
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<tr>
<td>Pedro</td>
<td>3</td>
<td>No</td>
<td>00:00:00</td>
<td>00:00:00</td>
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<td>0 KB/s</td>
<td>100 GB</td>
<td>0.001 GB</td>
<td>50 %</td>
<td>90 %</td>
<td>Granada</td>
</tr>
</tbody>
</table>
### Pool Features

<table>
<thead>
<tr>
<th>Pool Name</th>
<th>default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier</td>
<td>berkeley</td>
</tr>
</tbody>
</table>

### Processor usage

- **Suspend work while computer is on battery power?**
  - (matters only for portable computers)
  - Yes [ ]
  - No [ ]

- **Suspend work while computer is in use?**
  - Yes [ ]
  - No [ ]

- **'In use' means mouse/keyboard activity in last**
  - [ ] minutes

- **Suspend work if no mouse/keyboard activity in last**
  - (Needed to enter low-power mode on some computers)
  - Enforced by version 5.10.14+
  - [ ] minutes

- **Do work only between the hours of**
  - (no restriction if equal)
  - [ ] and [ ]

- **Leave applications in memory while suspended?**
  - (suspended applications will consume swap space if 'yes')
  - Yes [ ]
  - No [ ]

- **Switch between applications every**
  - (recommended: 60 minutes)
  - [ ] minutes

- **On multiprocessors, use at most**
  - Enforced by version 5.10 and earlier
  - [ ] processors
## Bienvenido daniel

### Proyectos BOINC disponibles

<table>
<thead>
<tr>
<th>Nombre</th>
<th>Compartir</th>
<th>Quitar</th>
<th>Actualizar</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET homo</td>
<td>50</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>EINSTEIN HOME</td>
<td>50</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

[Nuevo proyecto]
Bienvenido daniel

Usuarios disponibles

<table>
<thead>
<tr>
<th>Identificador de usuario</th>
<th>Rol</th>
<th>Proveedor</th>
</tr>
</thead>
<tbody>
<tr>
<td>root</td>
<td>root</td>
<td>root</td>
</tr>
<tr>
<td>daniel</td>
<td>root</td>
<td>Mérida</td>
</tr>
<tr>
<td>cum</td>
<td>supplier</td>
<td>Madrid</td>
</tr>
<tr>
<td>madrid</td>
<td>supplier</td>
<td>Madrid</td>
</tr>
<tr>
<td>francisco</td>
<td>root</td>
<td>Mérida</td>
</tr>
<tr>
<td>miguel tardo</td>
<td>supplier</td>
<td>Mérida</td>
</tr>
<tr>
<td>pedro</td>
<td>supplier</td>
<td>Granada</td>
</tr>
<tr>
<td>sara rodrigues hernandez</td>
<td>volunteer</td>
<td>Volunteer</td>
</tr>
<tr>
<td>antonio gutierrez gonzales</td>
<td>volunteer</td>
<td>Volunteer</td>
</tr>
<tr>
<td>lourdes cebra</td>
<td>supplier</td>
<td>UNED</td>
</tr>
<tr>
<td>il jimenec</td>
<td>supplier</td>
<td>Granada</td>
</tr>
<tr>
<td>german caleano</td>
<td>supplier</td>
<td>Junta de Extremadura</td>
</tr>
<tr>
<td>im fernandez</td>
<td>supplier</td>
<td>Junta de Extremadura</td>
</tr>
</tbody>
</table>
Bienvenido voluntario

Rellene el siguiente formulario para convertirse en un usuario de Jarifa

<table>
<thead>
<tr>
<th>Identificador de usuario</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contraseña</td>
<td></td>
</tr>
<tr>
<td>Repita contraseña</td>
<td></td>
</tr>
<tr>
<td>Correo electrónico</td>
<td></td>
</tr>
<tr>
<td>Ciudad</td>
<td></td>
</tr>
<tr>
<td>Autonomía</td>
<td></td>
</tr>
<tr>
<td>País</td>
<td></td>
</tr>
<tr>
<td>Código postal</td>
<td></td>
</tr>
</tbody>
</table>

Enviar consulta
Red de voluntarios
Red de voluntarios
Statistics: Total Credit

Total Credit for project SETI@HOME

Sep 2008  |  Apr 2009
Statistics: GFlops

Total GFLOPS for project SETI@HOME

Sep 2008  |  Apr 2009
Who uses Jarifa?

- Educational Council, Regional Government of Extremadura, Spain.
- Extremadurathome.org project.
- International Potato center.
- Innovation Interligare Institute on Intelligence I4.
- CES Felipe II, Complutense University of Madrid.
- Science and Computer Center of Andalucía, Spain.
- University of Extremadura, Spain.
Two of the presented institutions are going to be analyzed:

- University of Extremadura, Spain; and
- Extremadurathome.org project.
The server is a virtual machine (Xen) with 1 GB of RAM and 1 core Intel Xeon at 2.0 GHz.

The server is also dedicated to other project: Extremadurathome.org.

The running OS is a Debian Etch version (LAMP server).
Numbers

- 10 Suppliers:
  - Computer and Science Center of Andalucía, Spain.
  - University of Granada, Spain.
  - Regional Government of Extremadura, Spain.
  - Politechnique University of Valencia, Spain.
  - National University of Distance learning, Spain.
  - Complutense University of Madrid, Spain.
  - International Potato Center, Perú.

- 14 Volunteers.

- 355 Computers.
Bienvenido daniel

Proyectos BOINC disponibles

<table>
<thead>
<tr>
<th>Nombre</th>
<th>Compartir</th>
<th>Quitar</th>
<th>Actualizar</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETI@HOME</td>
<td>50</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>EINSTEIN@HOME</td>
<td>50</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Nuevo proyecto
### Clasificación de voluntarios

<table>
<thead>
<tr>
<th>Posición</th>
<th>Usuario</th>
<th>Crédito total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>antonio.gutierrez.gonzalez</td>
<td>6047.331</td>
</tr>
<tr>
<td>2</td>
<td>kiko</td>
<td>2137.120</td>
</tr>
<tr>
<td>3</td>
<td>i.gutierrez</td>
<td>312.1248</td>
</tr>
<tr>
<td>4</td>
<td>seeds</td>
<td>57.3685</td>
</tr>
</tbody>
</table>
Two type of statistics can be checked:

1. Jarifa statistics: Total credit and GFLops based on BOINC credit.
2. Official BOINC statistics in BOINC statistics web pages like:
   - BOINCstats.com.
   - The Knights Who Say ’Ni’ stats.
   - etc.
Jarifa Statistics: Total credit for SETI@home

Total Credit for project SETI@HOME

Sep 2008 - Apr 2009
Jarifa Statistics: Total credit for Einstein@home
Boincstats.com data

Total Credit, last months

- Jarifa - University of Extremadura

BOINC combined Total Credit

- Sep 2008
- Oct 2008
- Nov 2008
- Dec 2008
- Jan 2009
- Feb 2009
- Mar 2009
- Apr 2009

boincstats.com
Credit per day, Last 60 days (based on the daily update numbers)
Credit divided over projects
Jarifa - University of Extremadura

- Einstein@Home (67.79%)
- SETI@Home (32.21%)
Boincstats.com data

RAC divided over projects
Jarifa - University of Extremadura

- Einstein@Home (61.37%)
- SETI@Home (38.63%)
Boincstats.com data
Recent average credit RAC, Last 60 days (based on the daily update numbers)
The goal

- It is a popular science web page.
- The aim is to make citizens participants of science through BOINC.
- The core is a CMS and Jarifa.
EXTREMADURATHOME

Xtrelan dibulga la Computación Voluntaria

El pasado domingo, 29 de marzo a las 10.30, en Xtrelan se desarrolló una charla sobre Computación Voluntaria. Los asistentes conocieron de cerca esta herramienta a su alcance para convertirse en voluntarios científicos a través de sus ordenadores.

Otra charla sobre Computación Voluntaria también tuvo cabida en Xtrelan con Botas, el día 5 de marzo en Mérida. Eventos de difusión semejantes serán publicados en www.extremadurathome.org y en su grupo de Facebook.

Xtrelan es un Lan-party que se viene celebrando en Cáceres desde el 2007.

Cibermix difunde la Computación Voluntaria a través del proyecto Extremadura at Home

CIBERMIX es un evento tecnológico que pretende divulgar de forma demostrativa las virtudes de la banda ancha y las Tecnologías de la Información y la Comunicación. El factor de cercanía y humanización de las herramientas tecnológicas y de la Red es uno de los atractivos principales. En esta edición 2009 CIBERMIX Extremadura trae como novedad talleres y demostraciones sobre Computación Voluntaria a través del proyecto Extremadura AT home que darán a conocer qué es la computación voluntaria y cómo participar para hacerse voluntario/a científico.
Engaging volunteers
Promoting the project on regional TV and Radio

D. Lombraña, F. Fernández

Jarifa and Extremadurathome.org, Asia@home 2009
Numbers

- 167 Volunteers.
- 45 Suppliers: Regional literacy campaign on technology and open source.
- 427 Computers.
Projects

- Projects are voted by participants.
- The most voted projects enter Jarifa.
- Right now there is an open poll.
- Two initial projects have been selected:
  - SETI@Home, and
  - Einstein@Home.
Jarifa Statistics: Total credit for SETI@home

Total Credit for project seti@home

Dec 2008

Apr 2009
Jarifa Statistics: Total credit for Einstein@home
Jarifa Statistics: GFlops for SETI@Home

Total GFLOPS for project seti@home

Dec 2008
Apr 2009
Jarifa Statistics: GFlops for Einstein@Home

![Graph showing total GFLOPS for project Einstein@Home from December 2008 to April 2009.]
BOINCStats.com data

Total Credit, Last 60 days (based on the daily update numbers)

D. Lombraña, F. Fernández
Jarifa and Extremadurathome.org, Asia@home 2009
Boincstats.com data

![Bar chart showing Total Credit, last months](image)
Boincstats.com data

Credit per day, Last 60 days (based on the daily update numbers)
Credit divided over projects extremadurathome.org

Einstein@Home (79.33%)
SETI@Home (20.67%)
Boincstats.com data

RAC divided over projects
extremadurathome.org

Einstein@Home (78.80%)
SETI@Home (21.20%)

78.80%
21.20%
World Position (by RAC) History, lower is better, Last 60 days (based on the daily update numbers)
Boincstats.com data
Boincstats.com data

Recent average credit RAC, Last 60 days (based on the daily update numbers)
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.
- Two successful projects have been presented.
- The new tool is an on-going work.
Conclusions

Questions

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