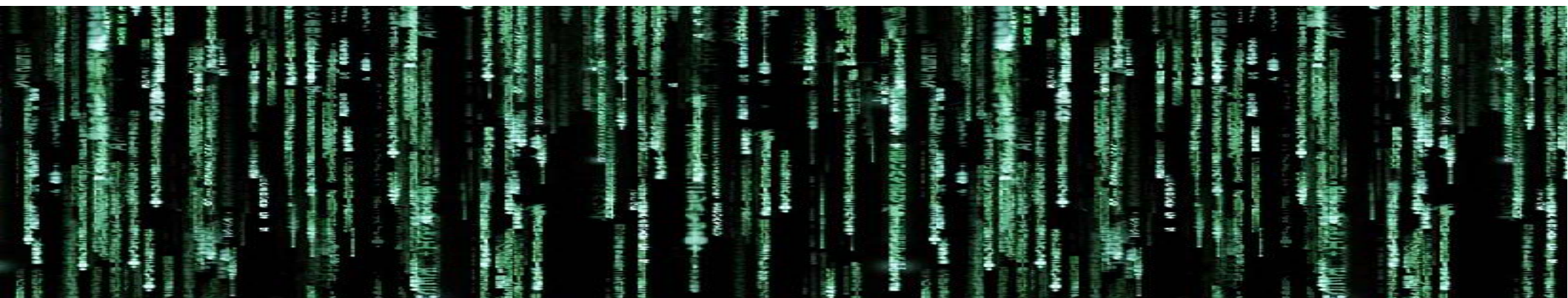
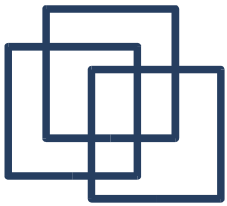


# Grid Backpropagation 101



**José Luis Vázquez Poletti**  
**Redes Neuronales y sus Aplicaciones**  
**Cursos de Doctorado 2004/2005**  
**UCM**

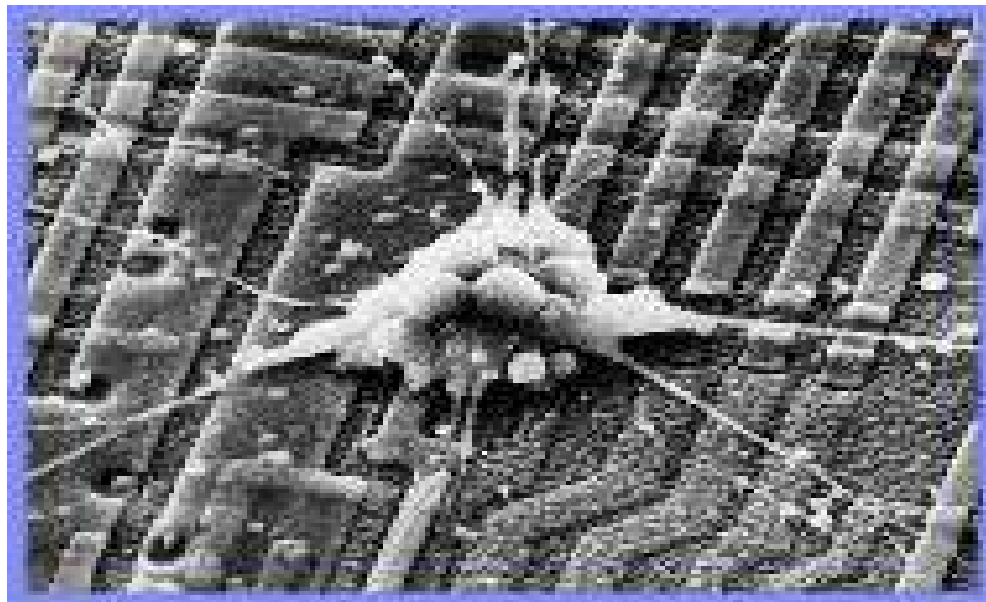


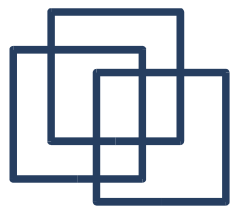


# Índice

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- ¿Grid Computing?
- ¿Grid Computing + Redes Neuronales?
- ¿Cómo? GridWay + DRMAA
- Grid Backpropagation

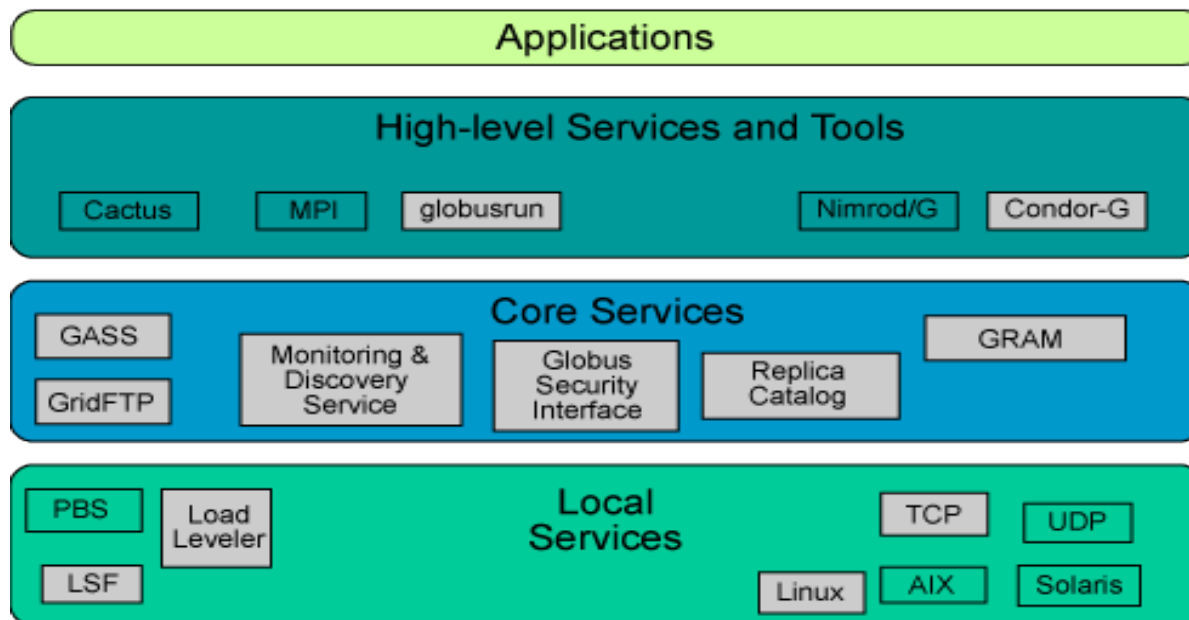


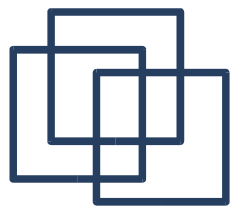


# ¿Grid Computing?

- Grid: “Malla de computadores”
  - Unir recursos heterogéneos
  - Convertir la “Red” en un supercomputador
- Estándar “de facto”: Globus Toolkit

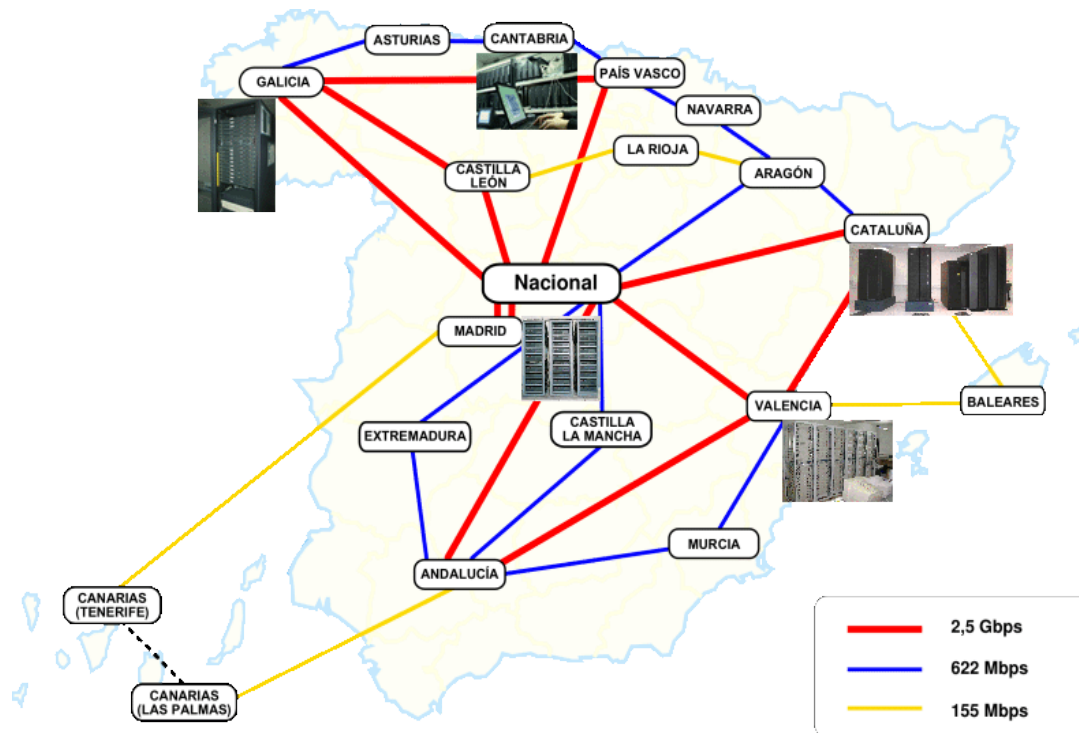
## Globus Architecture

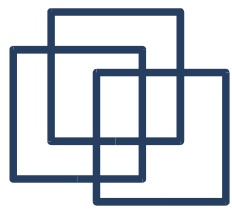




# ¿Grid Computing + RRNN?

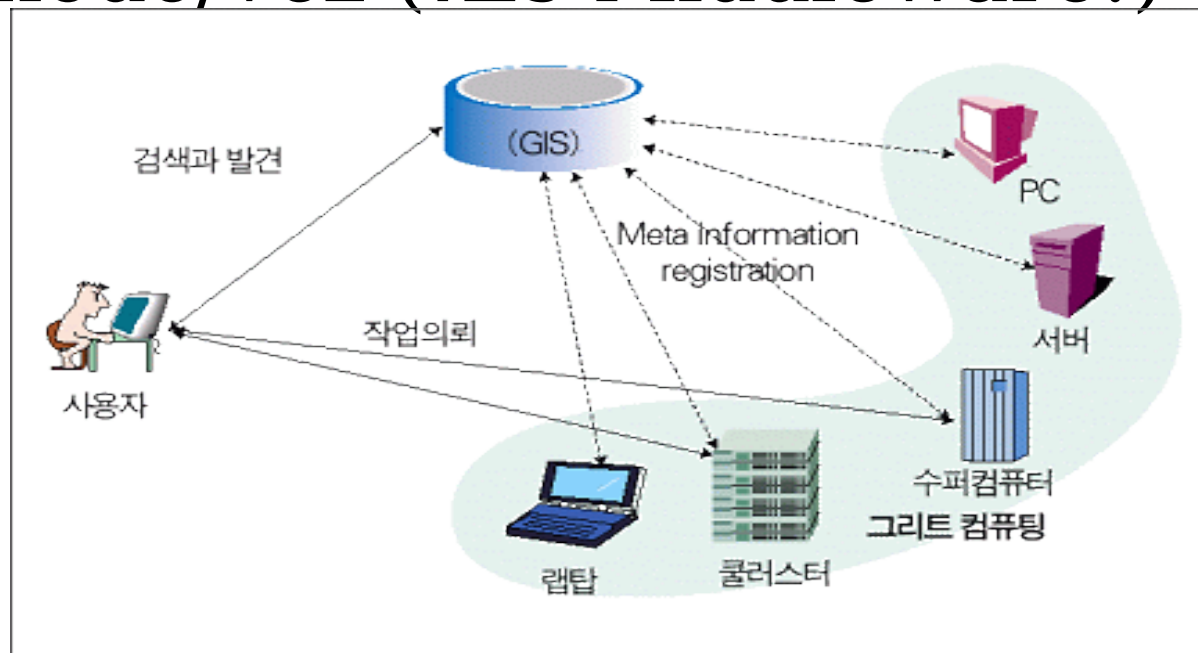
- Ventajas del Grid Computing:
  - Mayor velocidad de cálculo
  - Reparto de carga
  - Escalable “hasta el infinito”

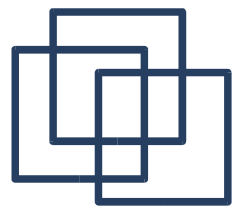




# ¿Grid Computing + RRNN?

- Entrenamiento Redes Backpropagation
  - Metodología: Paralelizar cálculo modificación pesos y sumar al final
- Globus Toolkit sólo permite envío a un solo nodo/vez (¡Es Middleware!)





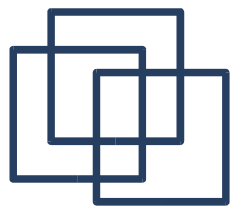
# ¿Como? GridWay + DRMAA

```
ruben@aquila:~/Huedo/NGB/VP - Shell No. 3 - Konsole
Session Edit View Bookmarks Settings Help
aquila:VP> gwps
JID AID TID DM SM GSM STIME ETIME EXETIME XFRTIME EXIT TEMPLATE HOST
3 -- -- zomb done -- 20:48:31 20:51:30 0:01:53 0:01:06 0 FT2.A.job.4862 hydrus.dacya.ucm.es/jobmanager-fork
4 -- -- subm subm actv 20:51:45 ---:---:-- 0:00:54 0:00:42 -- MG4.A.job.4862 cygnus.dacya.ucm.es/jobmanager-fork
5 -- -- subm subm actv 20:52:39 ---:---:-- 0:00:25 0:00:17 -- BT6.A.job.4862 ramses.dsic.upv.es/jobmanager-pbs
aquila:VP> █
```

- GridWay

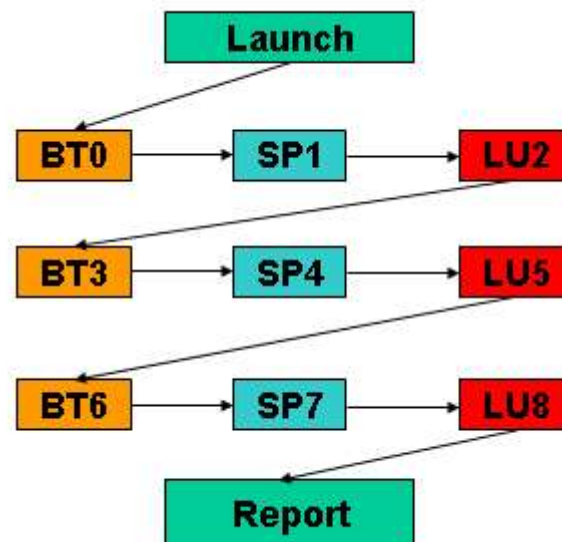
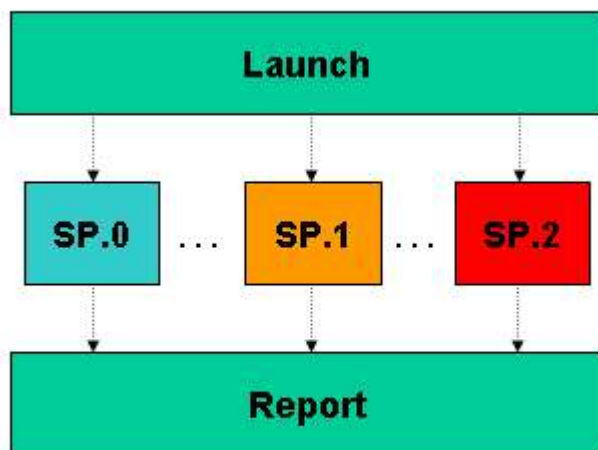
- Framework que planifica y envía trabajos a diferentes nodos Grid
- Diferentes políticas
- Dinámico

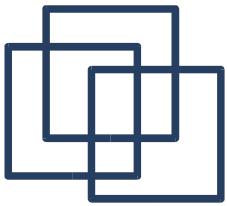




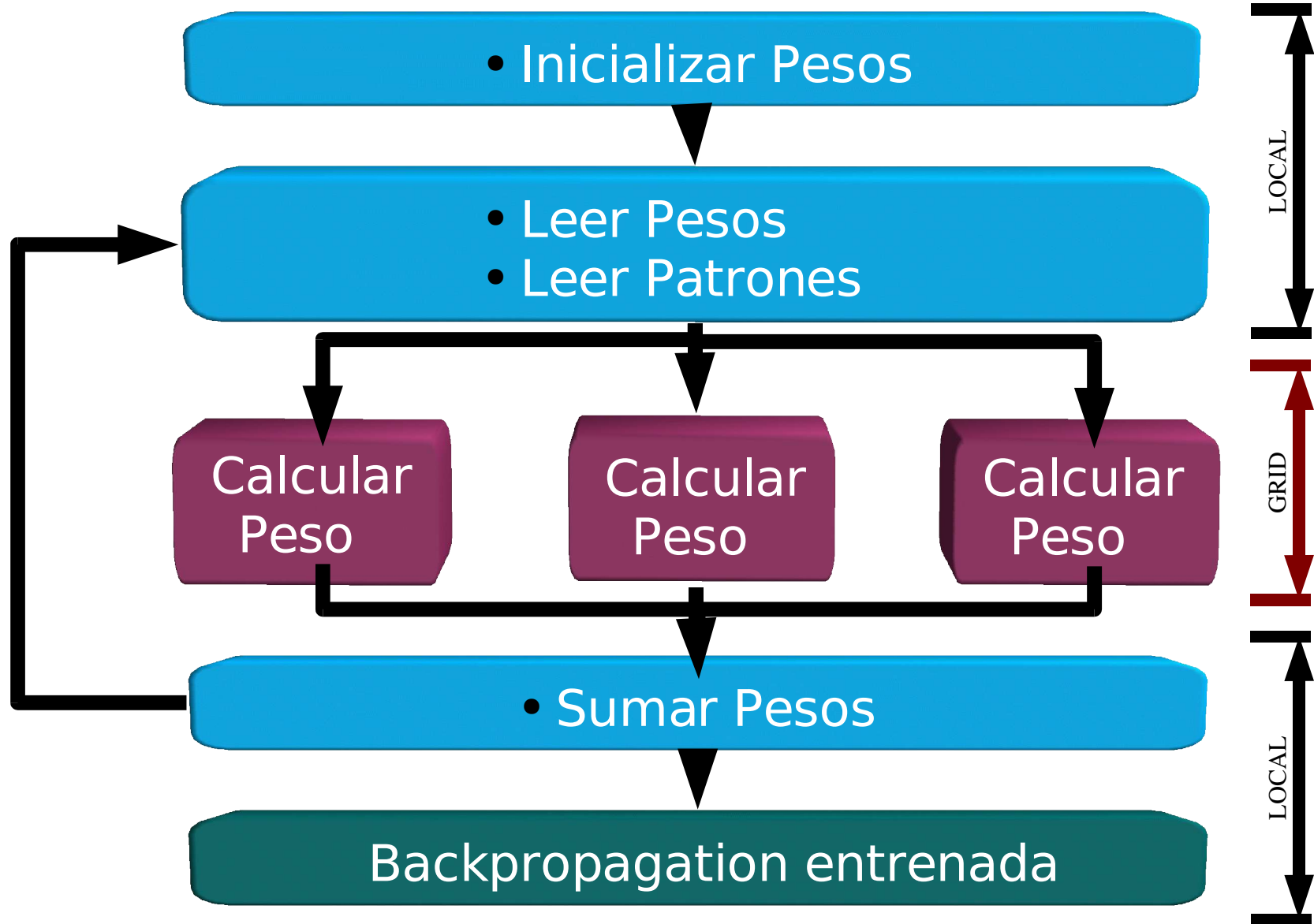
- DRMAA

- “Distributed Resource Management Application API”
- API de Grid
- GridWay tiene implementación (desarrollo)

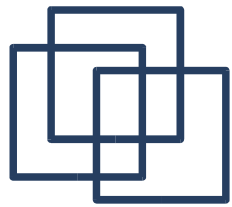




# Grid Backpropagation





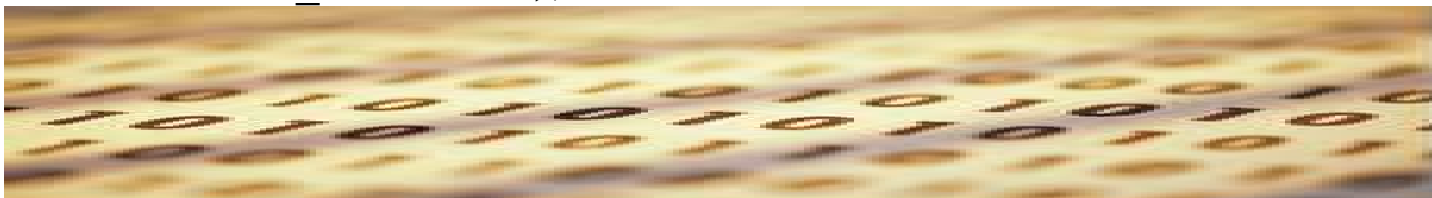


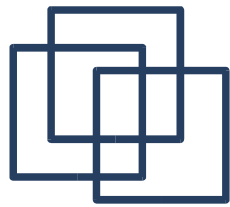
- **Ingredientes:**

- Programa que realice cálculo individual de pesos/patrón

- Programa “central” usando DRMAA

- `void setup_job_template( drmaa_job_template_t **jt)`
- `rc = drmaa_run_bulk_jobs`  
`(&jobids,jt,0,end,1,error,DRMAA_ERROR_STRING_BUFFER);`
- `rc = drmaa_get_next_job_id(jobids, value,`  
`DRMAA_ATTR_BUFFER);`
- `rc = drmaa_synchronize(job_ids,`  
`DRMAA_TIMEOUT_WAIT_FOREVER,1,error,DRMAA_ERROR_`  
`STRING_BUFFER);`





## Referencias

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- Globus Toolkit: <http://www.globus.org/>
- GridWay: <http://www.gridway.org/>
- Especificación DRMAA: <http://www.drmaa.org/>
  
- J.L. Vázquez-Poletti , Eduardo Huedo Cuesta, Rubén Santiago Montero, Ignacio Martín Llorente: Una visión global de la tecnología Grid. Enlaces, CES Felipe II (Adscrito a UCM), No.7, Diciembre 2004.
- E. Huedo, R. S. Montero and I. M. Llorente: A Framework for Adaptive Execution on Grids. Software - Practice & Experience, Vol. 34, No. 7, pp. 631-651, June 2004.
- J. Herrera, E. Huedo, R.S. Montero and I.M. Llorente: Execution of Typical Scientific Applications on Globus-based Grids. International Symposium on Parallel and Distributed Computing (ISPDC 2004), June 2004.