



Integrating Service Grids and Desktop Grids at middleware and application level

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The EDGeS/EDGI projects receive Community research funding





EU FP7 projects on desktop grids: EDGeS → EDGI and DEGISCO

EDGeS

- DG ↔ SG integration:
 - gLite → BOINC, XtremWeb
 - BOINC, XtremWeb → gLite
- Compute intensive applications

2008 - 2010



EDGI

- ARC, Unicore, Clouds
- QoS with Clouds
- Data intensive apps
- SG → DG direction support

DEGISCO

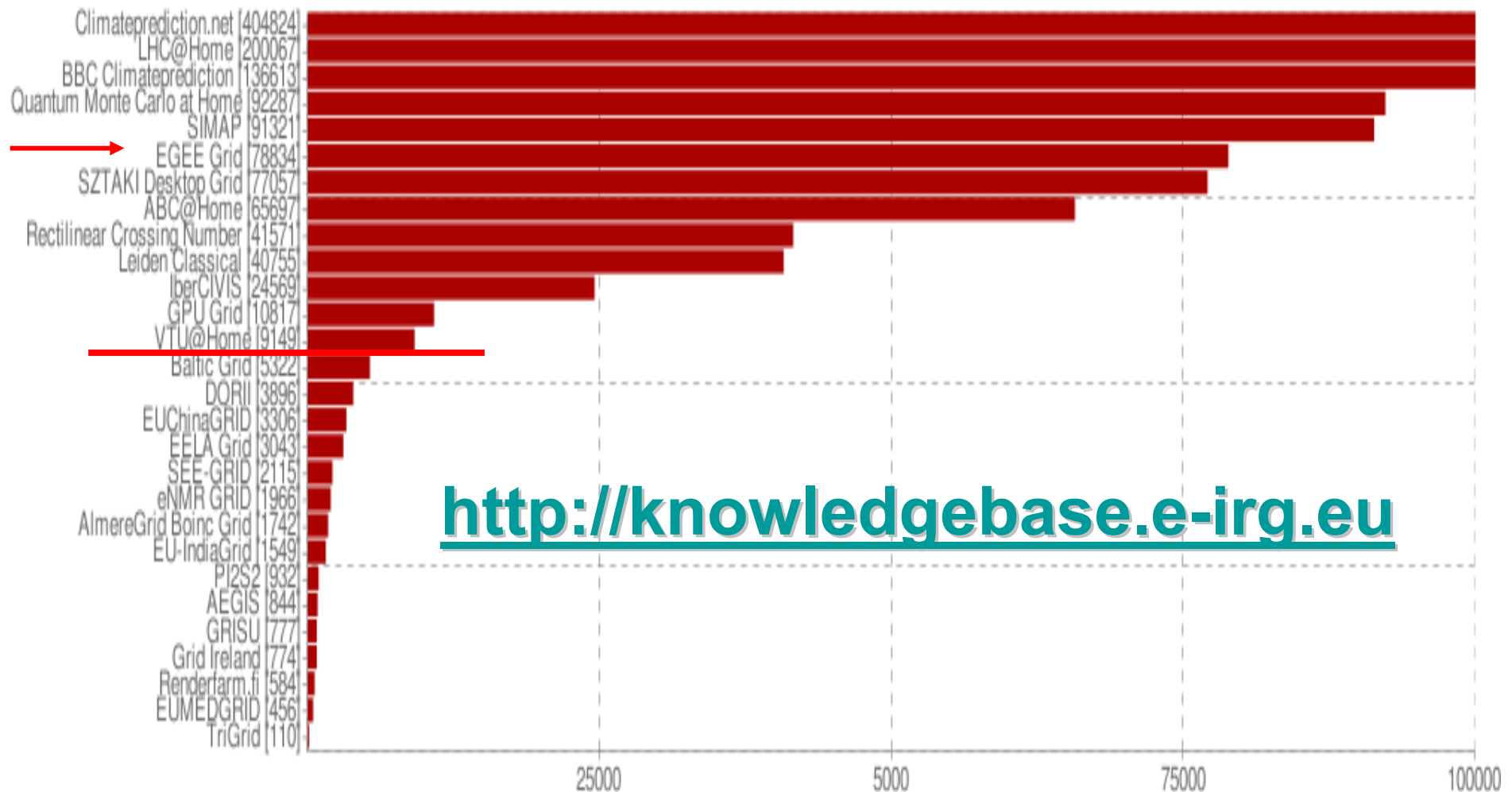
- Disseminate EDGeS results world-wide
- Green IT aspects

2010 - 2012



Why Desktop Grids are important?

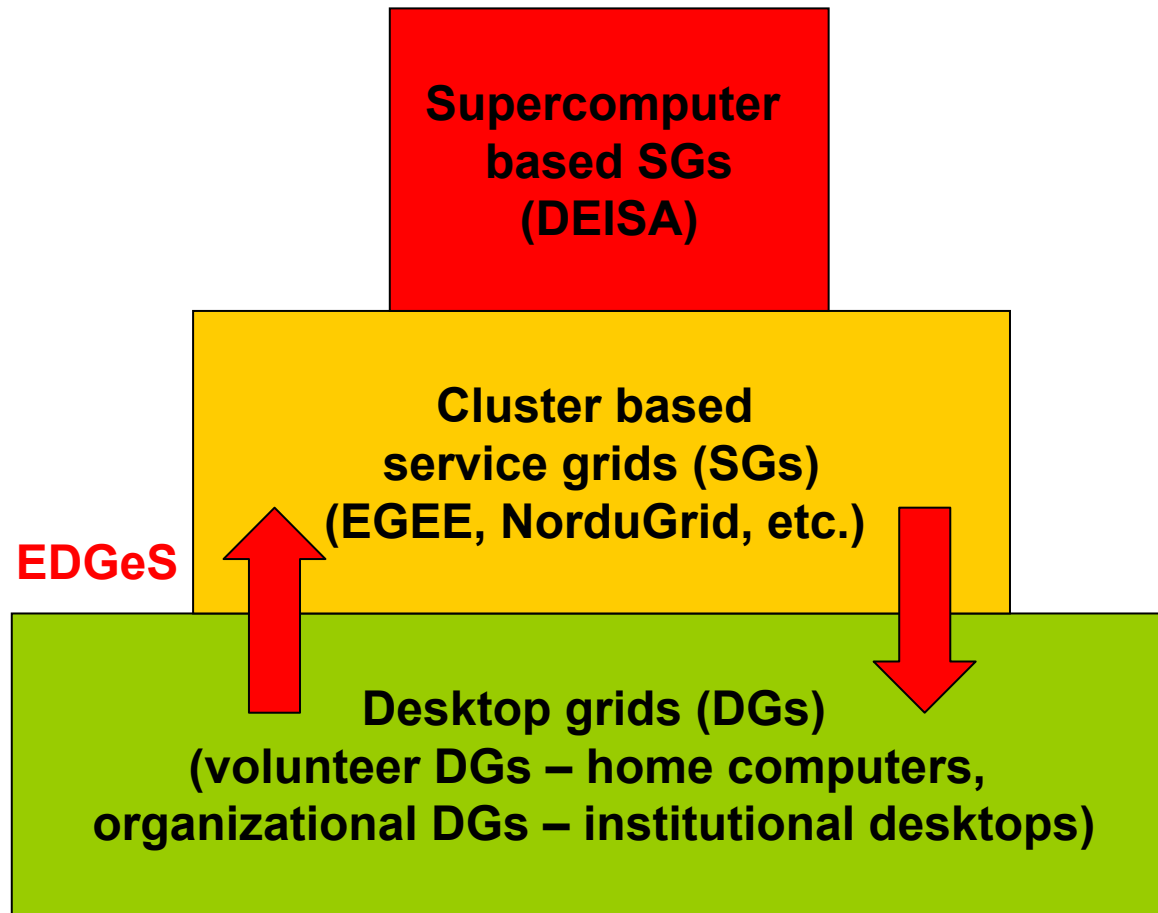
Number of Computers per Grid



<http://knowledgebase.e-irg.eu>



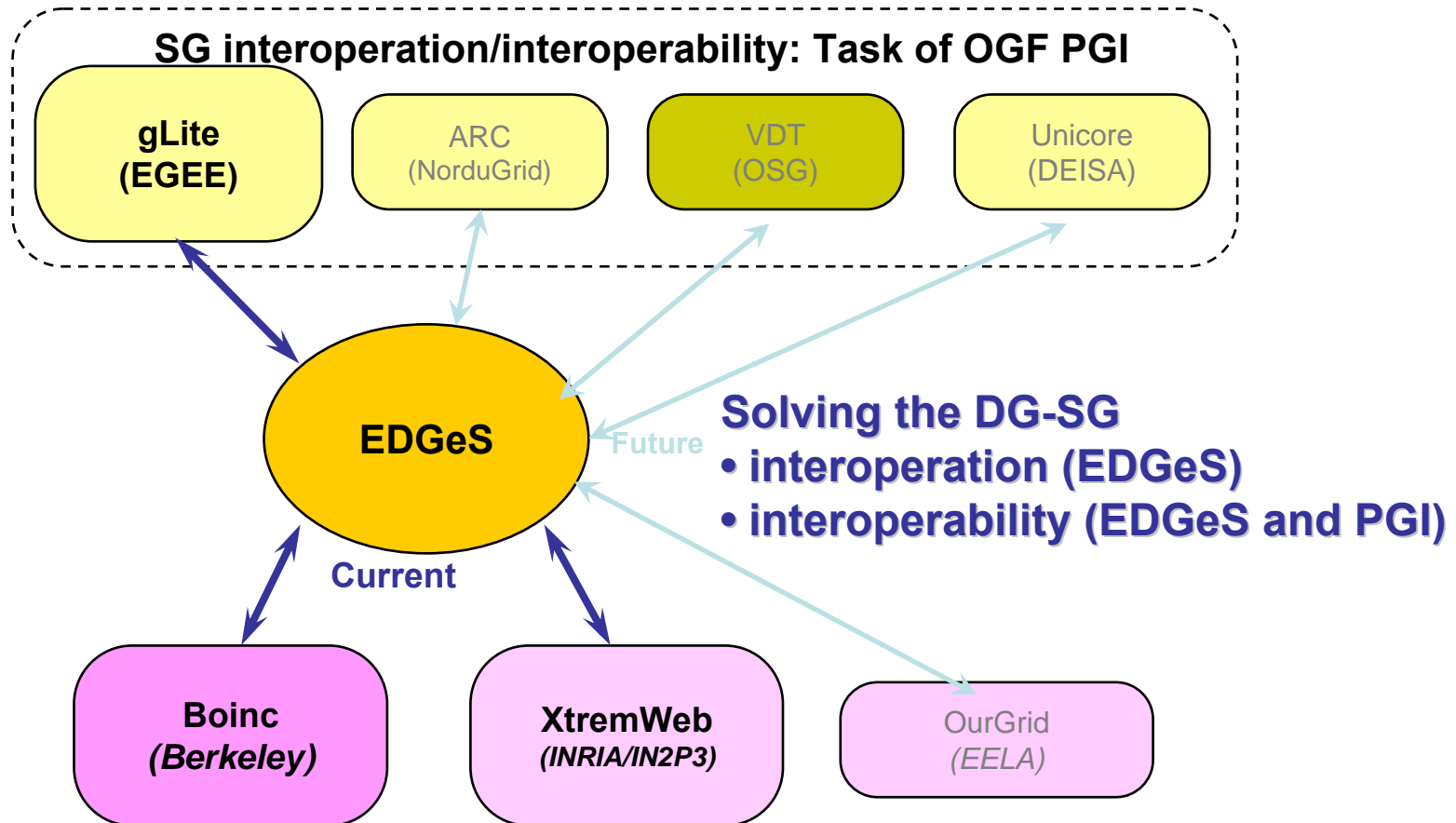
The European Grid Ecosystem



- Very expensive,
- small number of sites and very large number of cores
- MPI appls
- Moderately expensive,
- moderate number of sites and CPUs
- any appls
- Inexpensive,
- very large number of CPUs (~10K – 1M)
- Bag of task appls



Integration of SG and DG systems

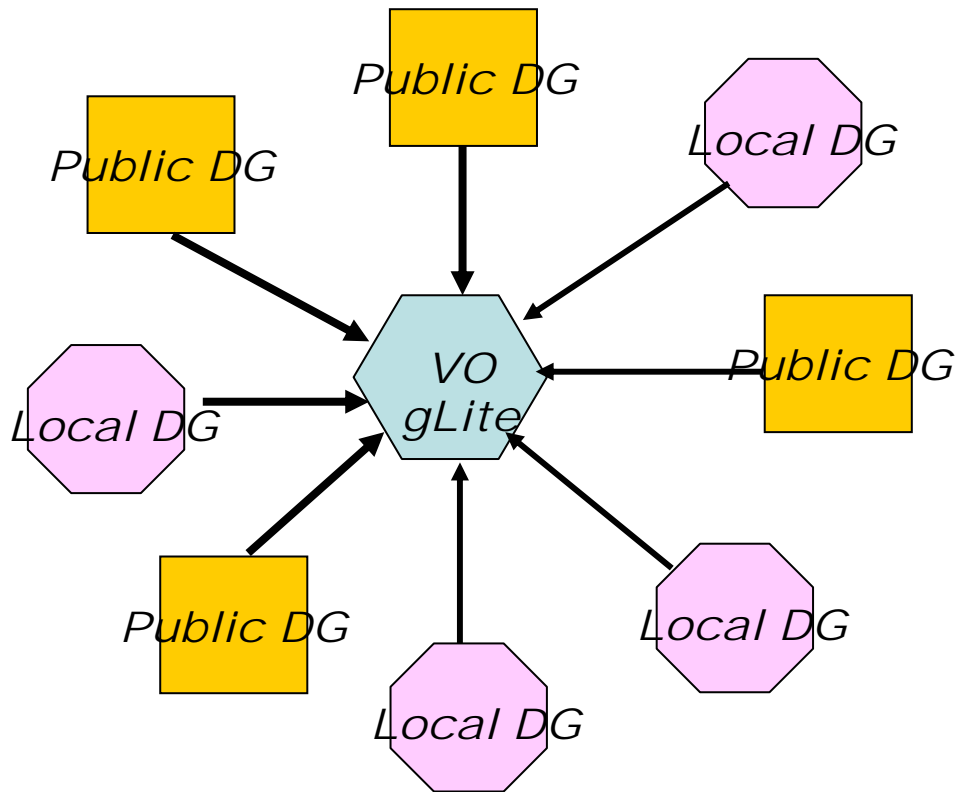




Integrating Service and Desktop Grids at middleware level in EDGeS



Target 1: DG⇒EGEE Infrastructure

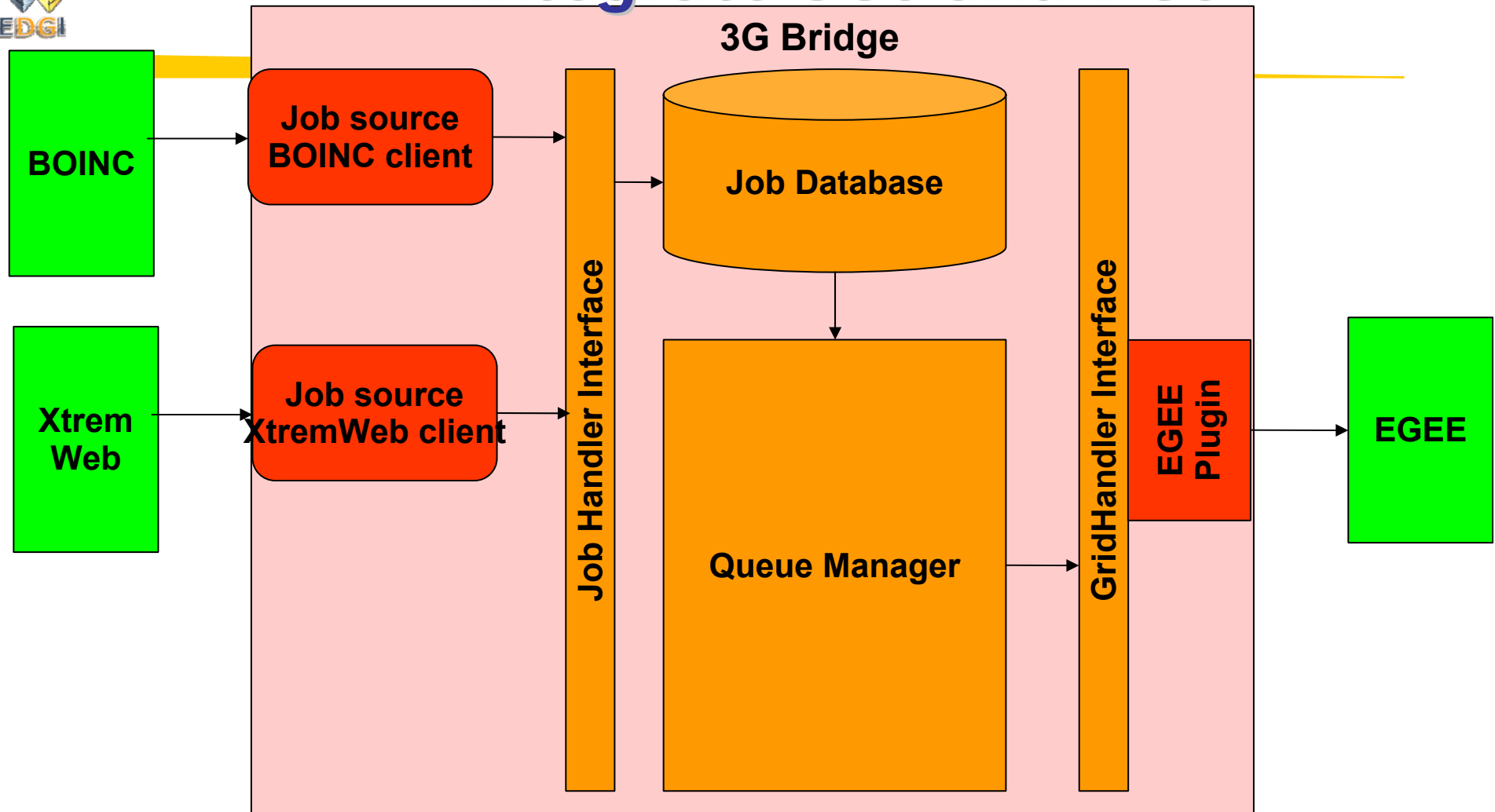


EDGeS

**connects the
largest SG with
many public and
local DGs**

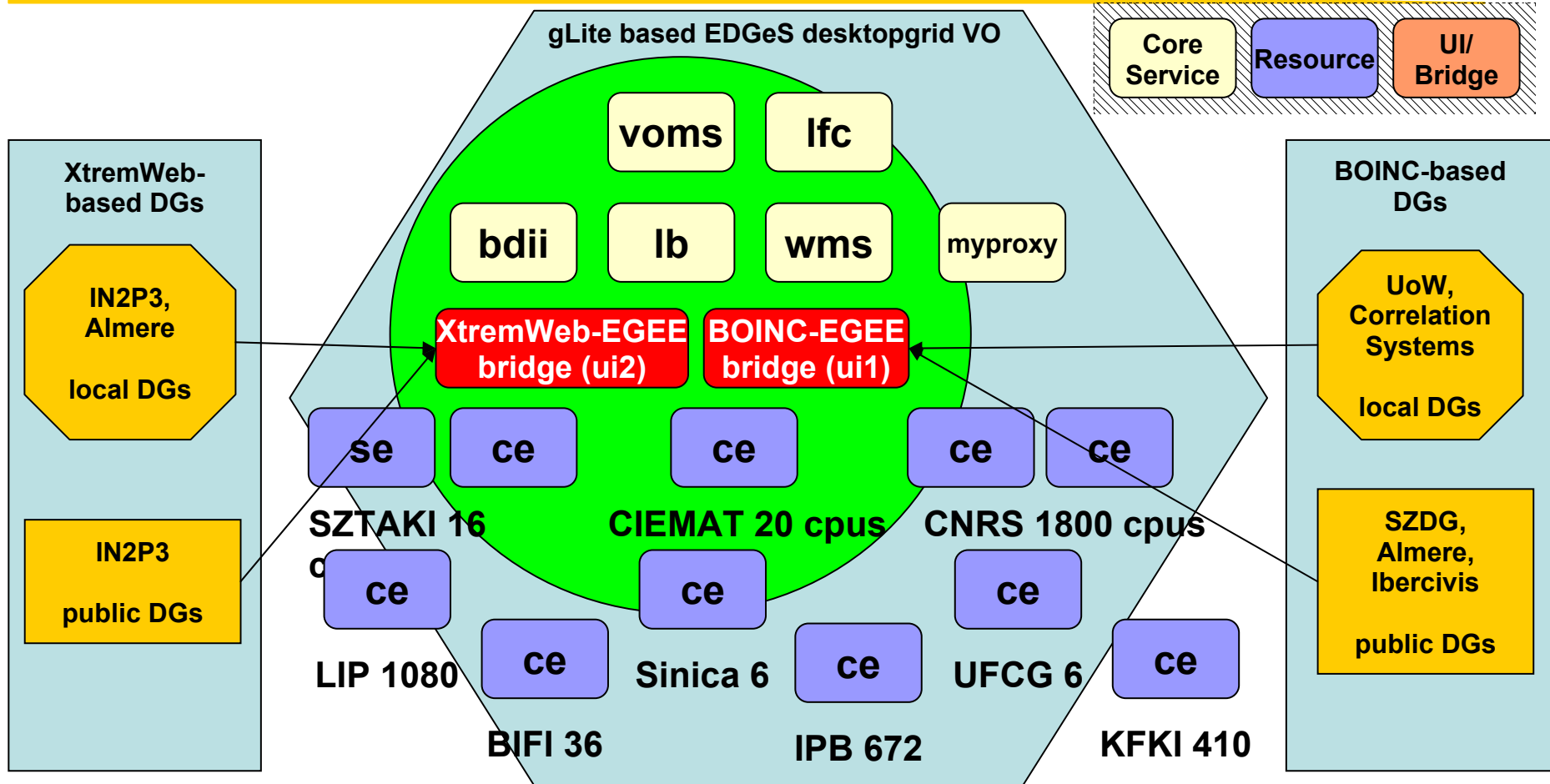


Generic Grid-Grid (3G) Bridge to integrate SGs and DGs





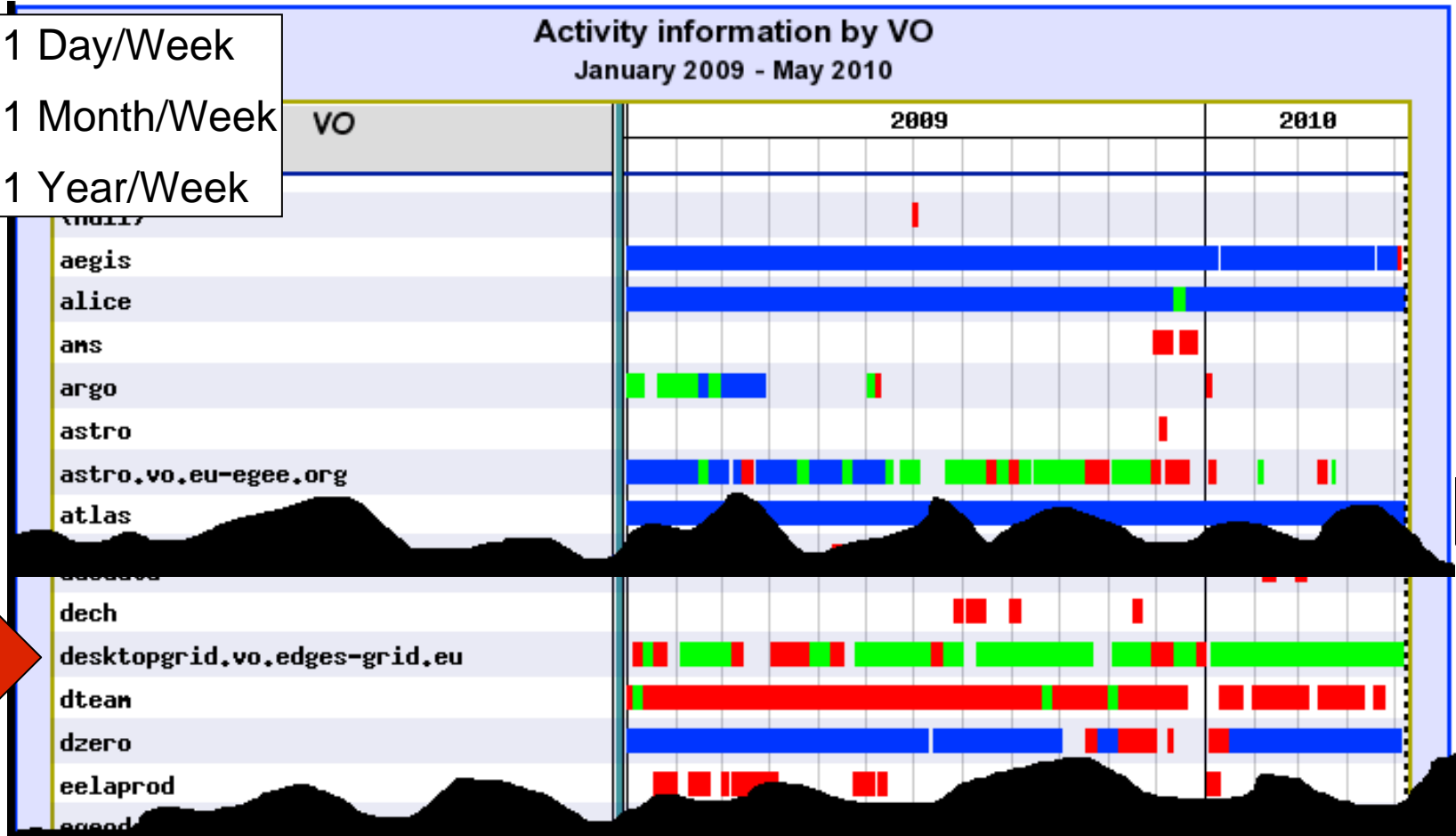
Production DG⇒EGEE Infrastructure





EDGeS VO activity on EGEE accounting portal

- CPU > 1 Day/Week
- CPU > 1 Month/Week
- CPU > 1 Year/Week



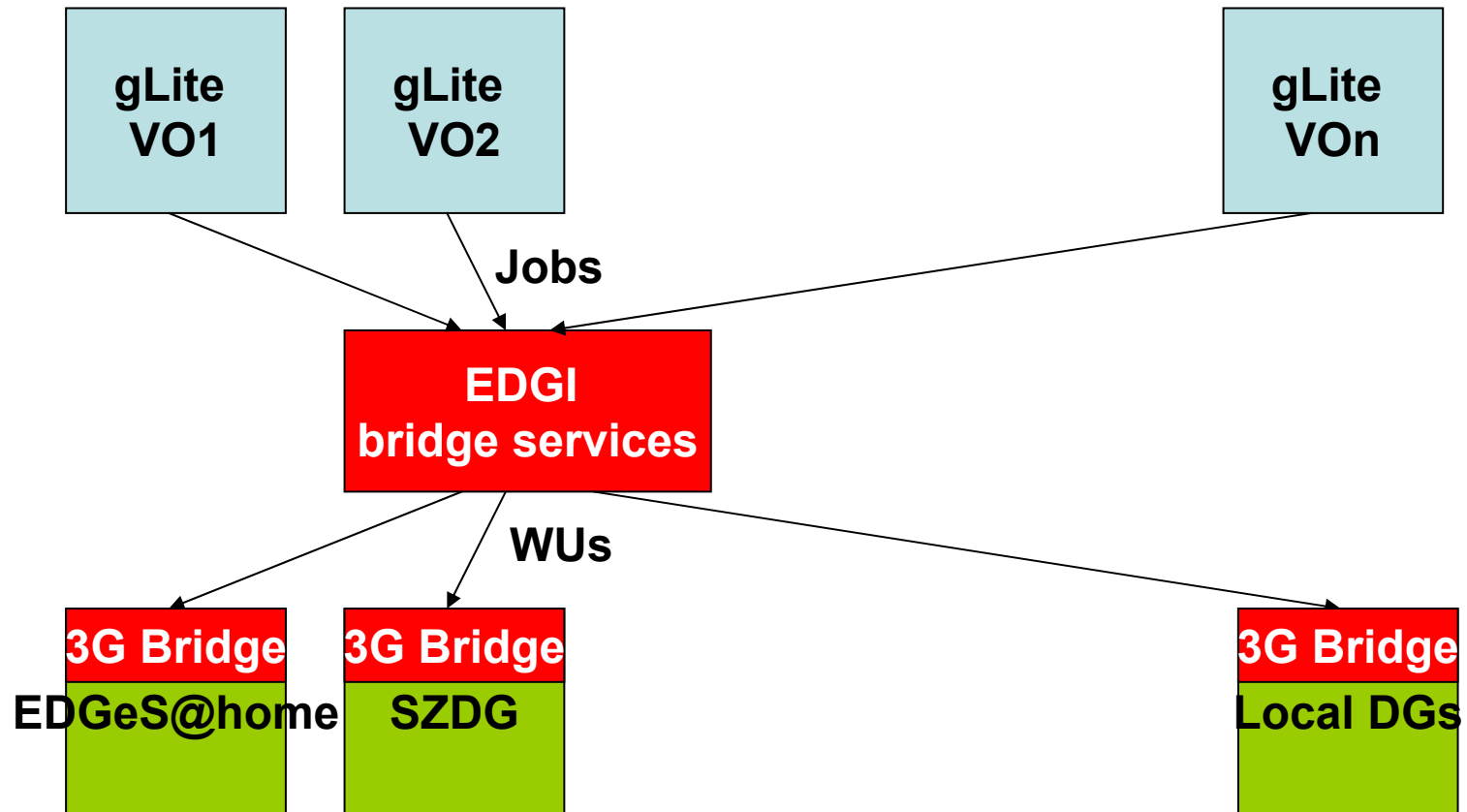


Objectives from the SG user's perspective

- To execute parameter sweep (PS) applications
 - On the largest possible number of resources
 - In the cheapest possible way
- Option 1:
 - Submit the PS application into a single grid
 - Enable this grid to transfer the PS jobs to other connected grids or clouds
- Option 2:
 - Use high level workflow environment (WE) where nodes of the workflow can be PS applications
 - The WE should be able to distribute the PS jobs among accessible grids, desktop grids and clouds

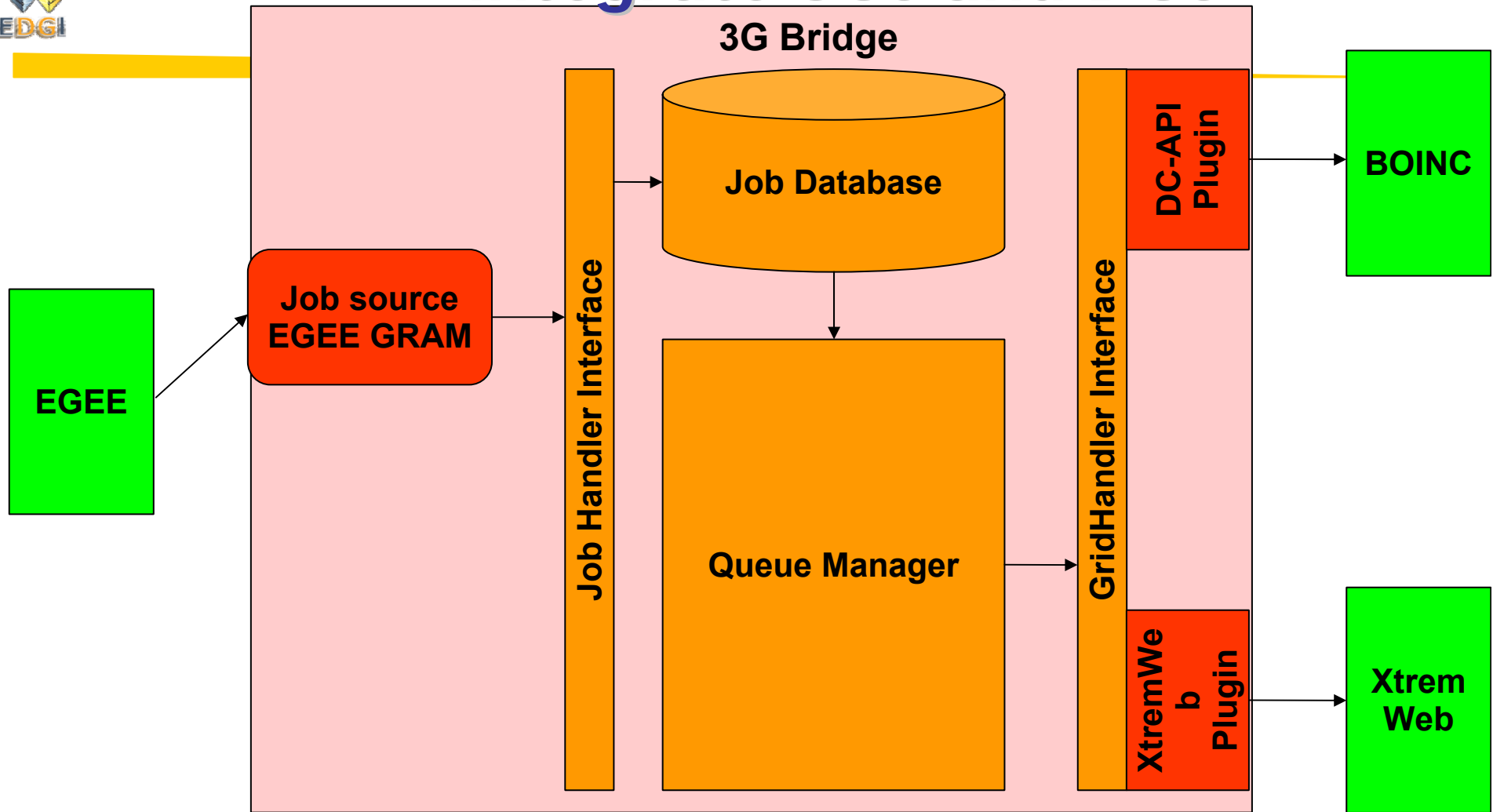


Target 2: EGEE->DG infrastructure

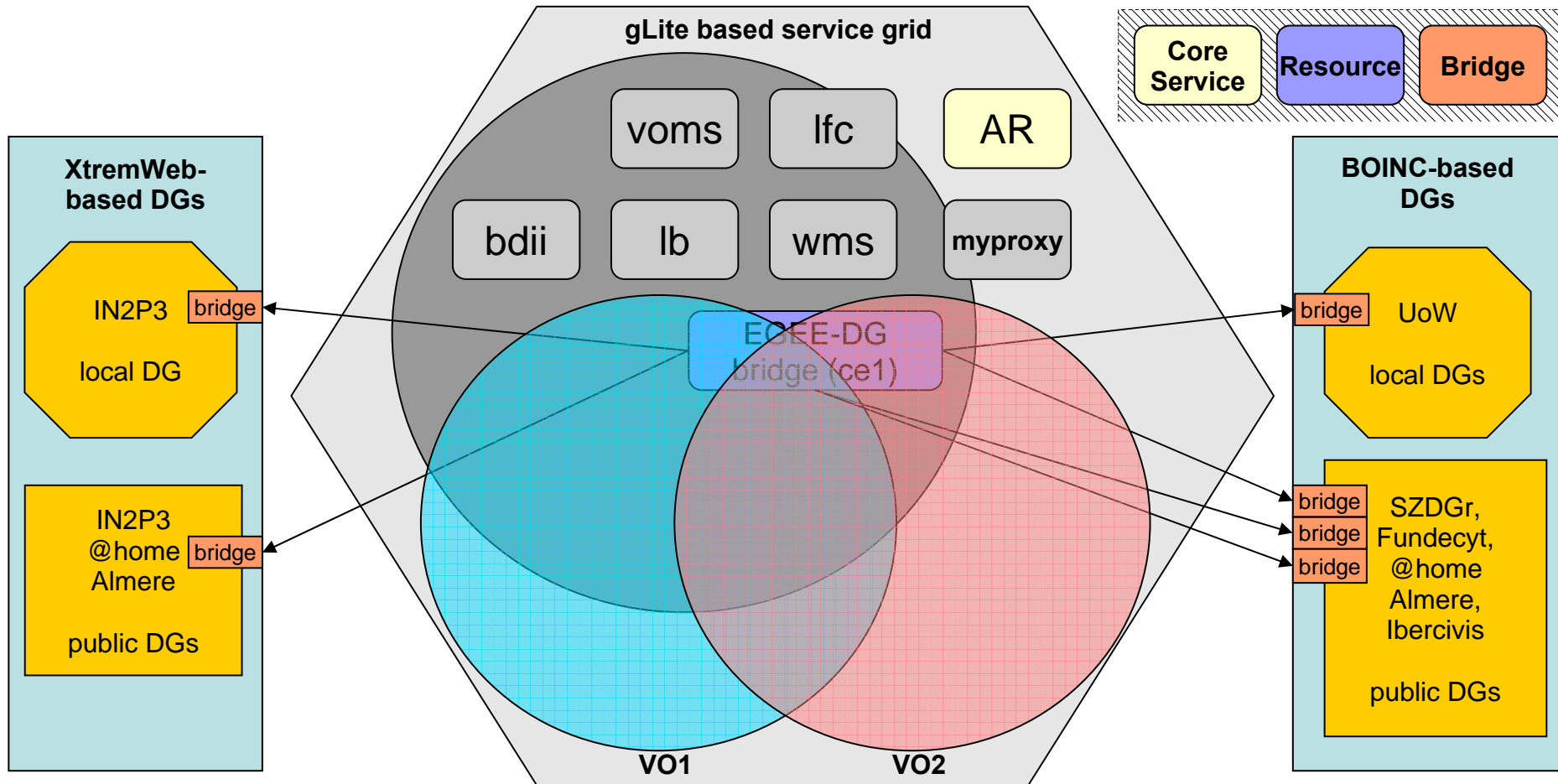




Generic Grid-Grid (3G) Bridge to integrate SGs and DGs

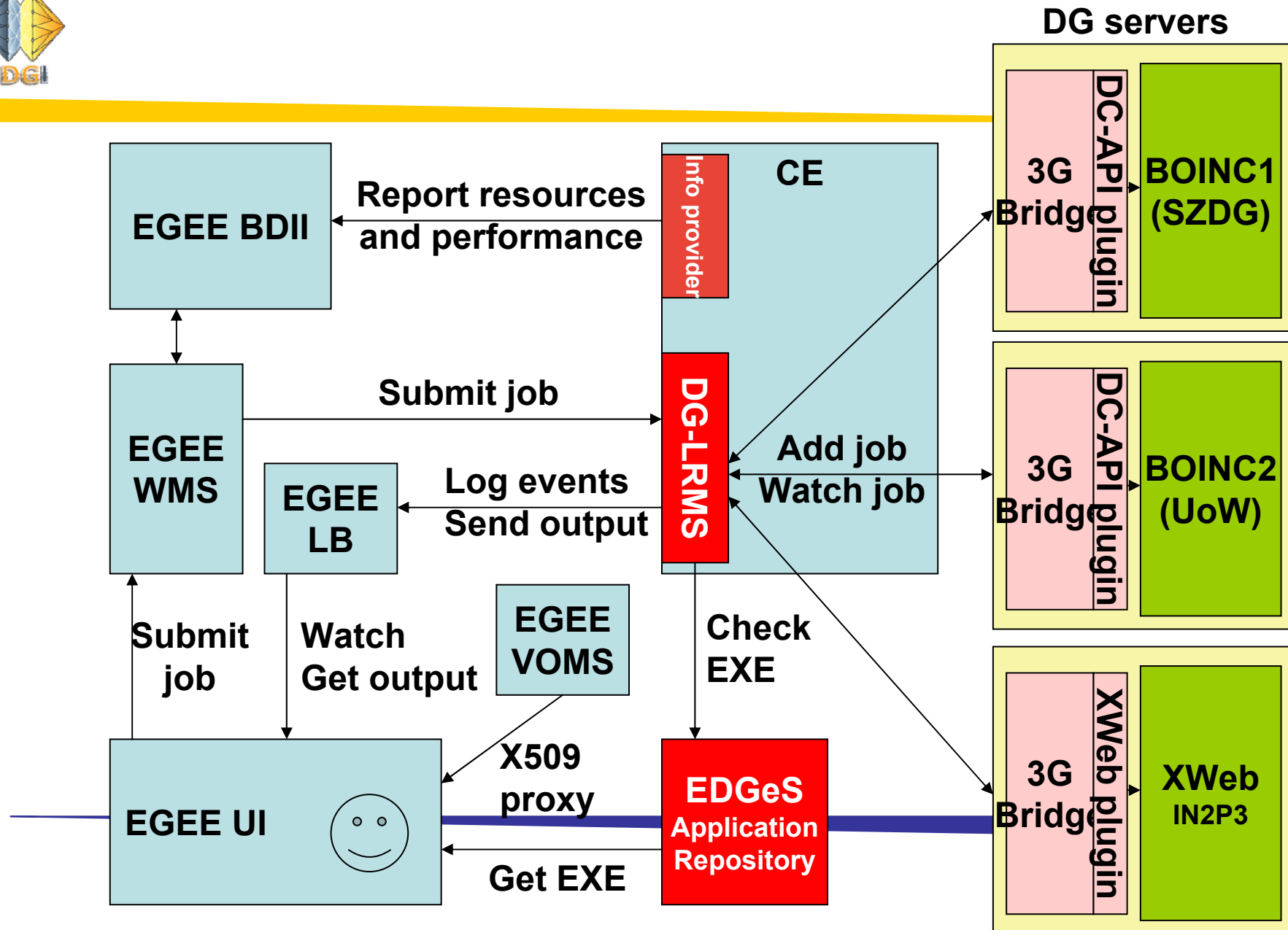


Production EGEE \Rightarrow DG Infrastructure



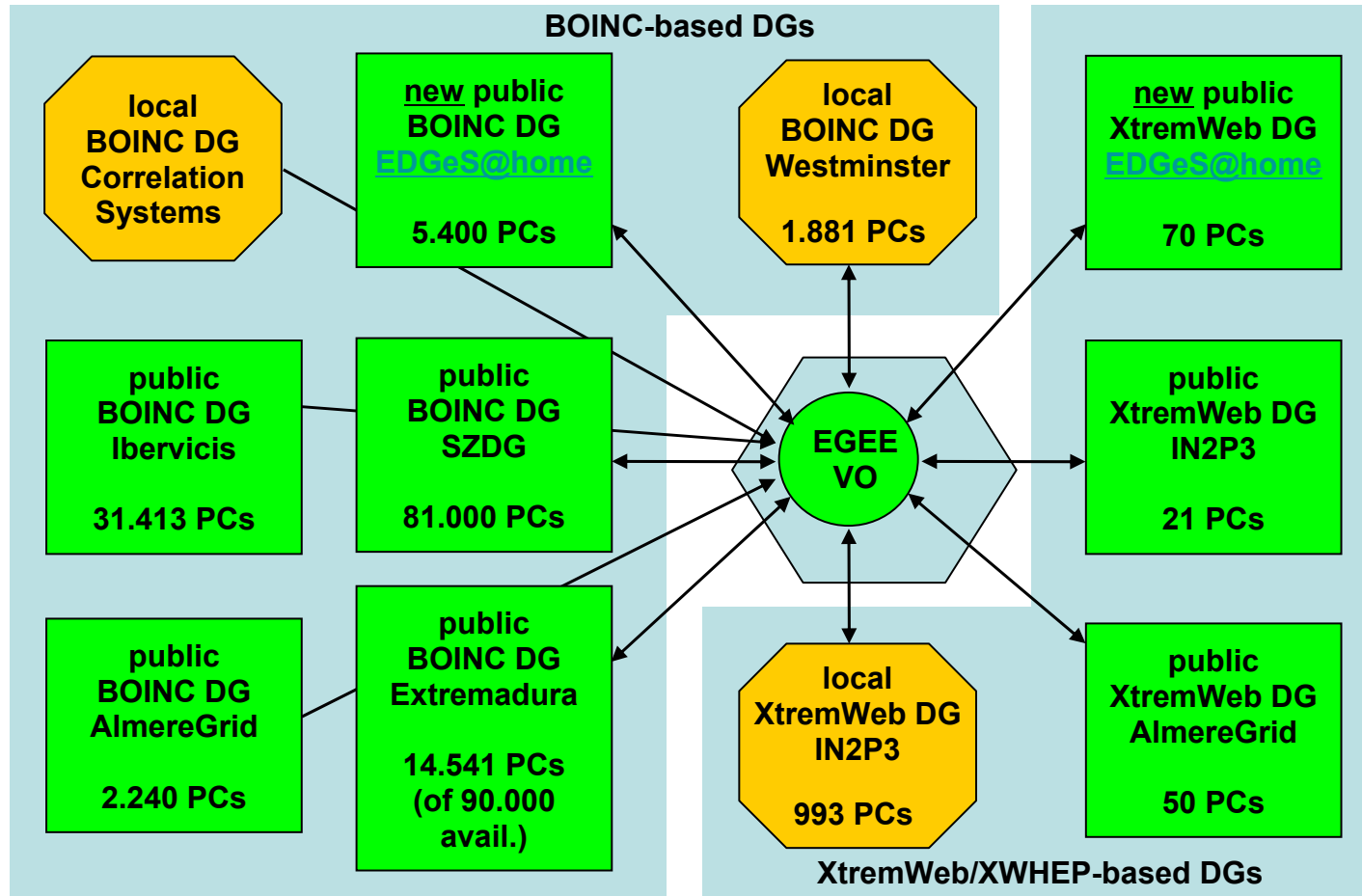


EGEE VO → DG system





The EDGeS Integrated SG-DG Infrastructure



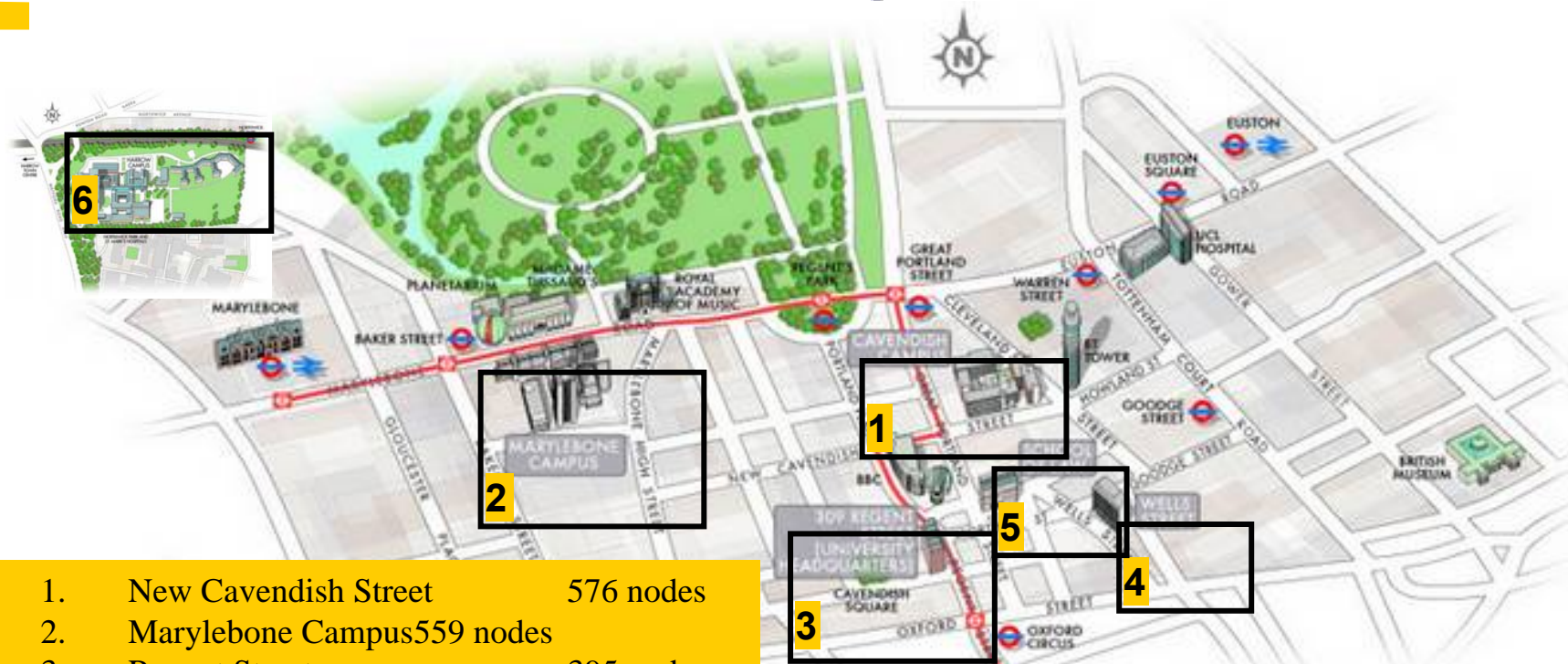
**Total
~140.000
processors**



Desktop Grid types to support SG VOs

- Volunteer desktop grids:
 - Edges@home
 - City grid: Almeregrid
- School Grid:
 - Extremadura School Grid
- Local University Grid:
 - University of Westminster
 - (Portsmouth University)
 - (ETH Zurich)

Local DGs in practice – University of Westminster as an example



1.	New Cavendish Street	576 nodes
2.	Marylebone Campus	559 nodes
3.	Regent Street	395 nodes
4.	Wells Street	31 nodes
5.	Little Tichfield Street	66 nodes
6.	Harrow Campus	254 nodes
Total:		1881 nodes

Lifecycle of a node:

1. PCs basically used by students/staff
2. If unused, switch to Desktop Grid mode
3. No more work from DG server -> shutdown (green solution)



EDGeS@Home

[English][Español][Français][Magyar][Nederlands]

EDGeS
EDG2

WELCOME PAGE

E-BOINC

E-XW

CONTACT

PROJECTS

ABOUT

BOINC Page

EDGeS@Home Statistics

Users	2.730
Computers.	5.668
Performance. (Gflop/s)	1.704

BOINC News *Weekend downtime again*

Mon, 08 Mar 2010
15:30:00 GMT, The site's
downtime was caused by
hardware issues again
during this weekend. We
are sorry for the
inconvenience!

New applications

Mon, 01 Mar 2010
16:20:00 GMT, There will
be new applications
announced this week. For
more information please
check the forum.

EDGeS@Home - BOINC Grid

With EDGeS@Home BOINC you can donate your unused computing time to science. EDGeS@Home comes in two flavours. The other flavour is EDGeS@Home - XtremWeb^{HEP-E}.

Join EDGeS@Home BOINC

If you are new to BOINC:

- [Download BOINC.](#)
- Install BOINC on your system.
- When prompted for the project to attach to, enter **<http://home.edges-grid.eu/home/>**
- Congratulations: Your computer will now download and execute scientific programmes.

If your are already using BOINC:

- Select "Attach to Project" in BOINC
- When prompted, enter **<http://home.edges-grid.eu/home/>**
- If you're running a command-line or pre-5.0 version of BOINC, [create an account](#) first.
- If you have any problems with BOINC, [get help here.](#)

Returning participants

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

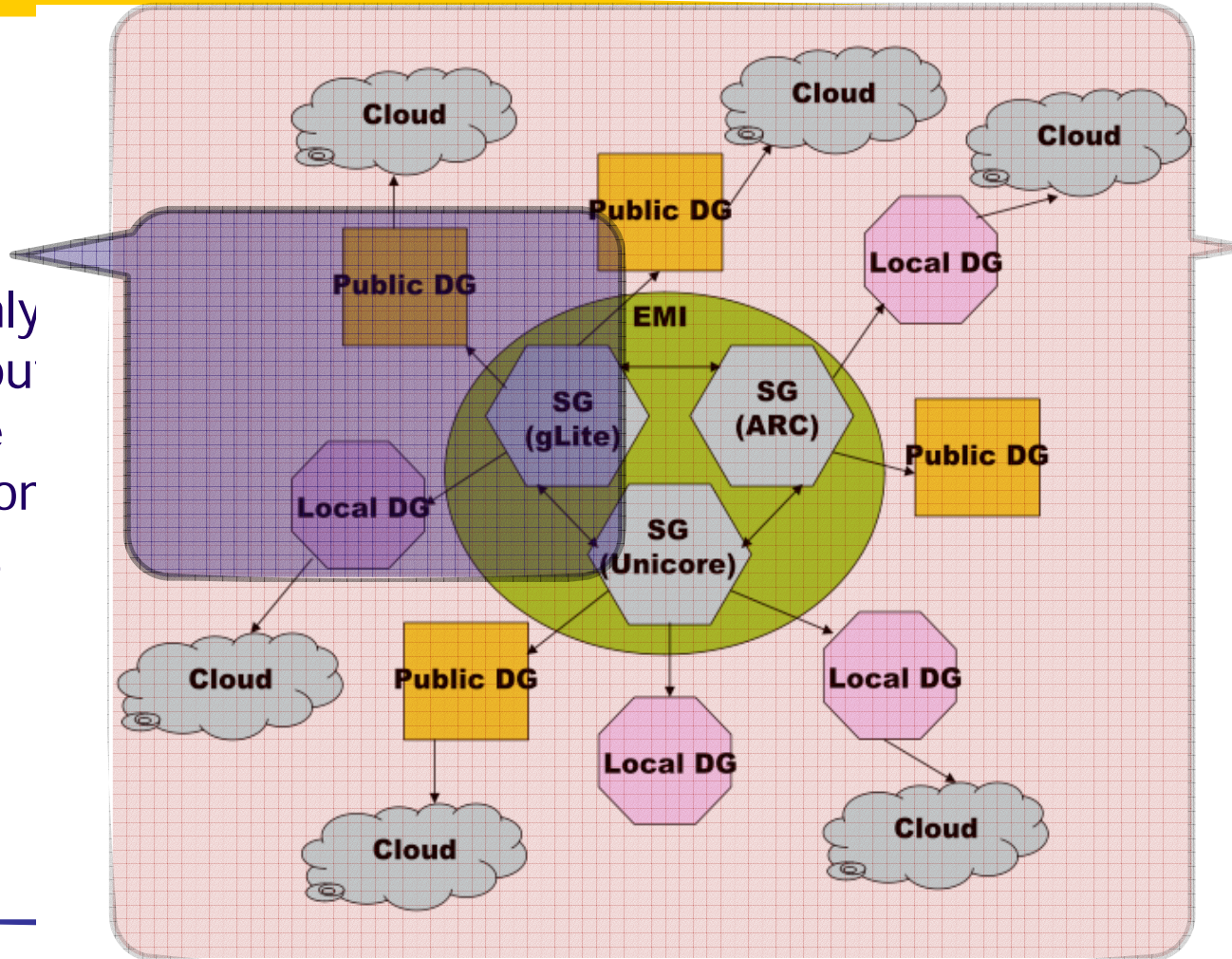
Community

- [Profiles](#)

Done

Plans for EDGI

EDGeS scope only for compute intensive application for EGEE (gLite)



EDGI scope for both compute and data intensive applications for EMI/EGI (gLite, ARC, Unicore)

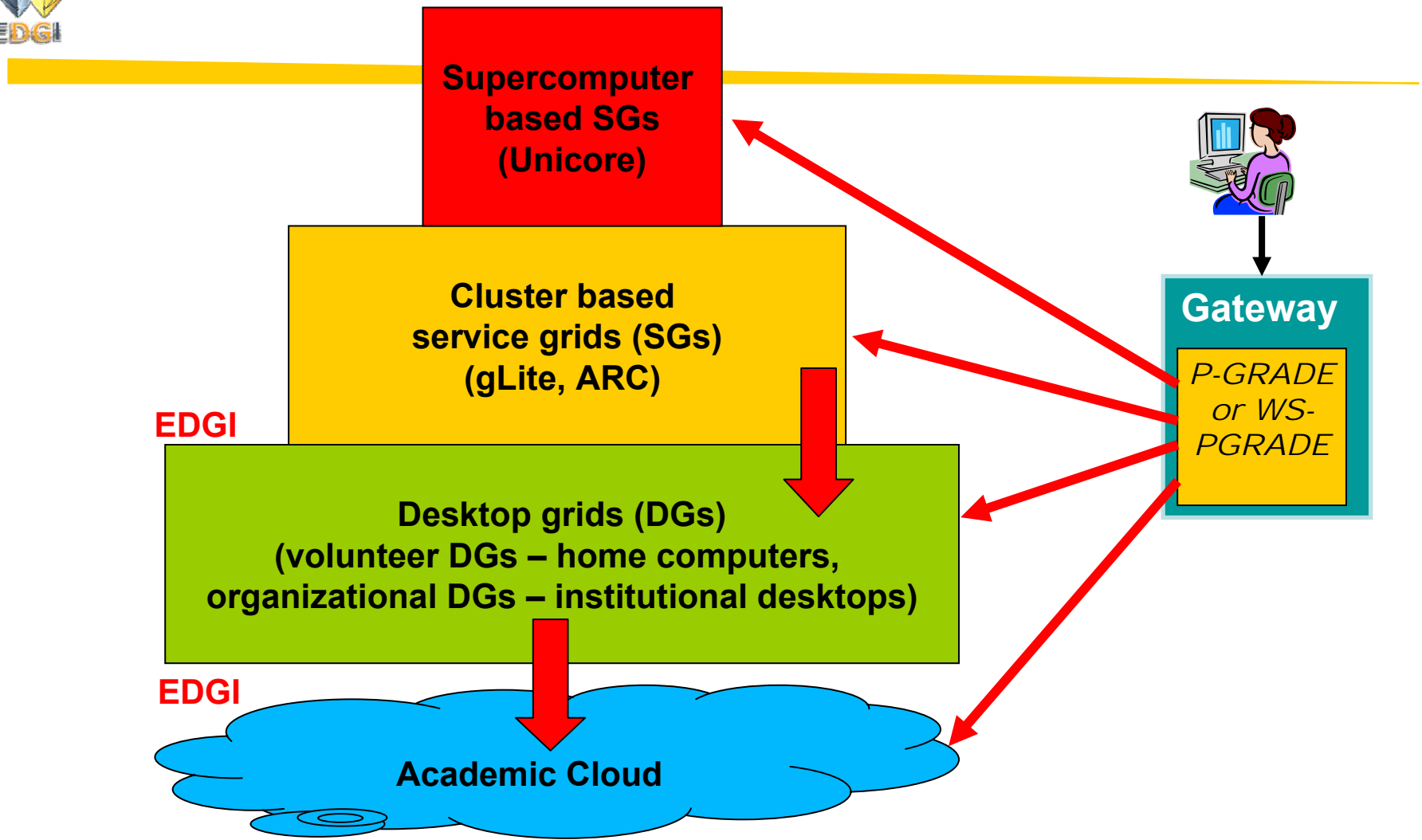
Extend Desktop Grids with Clouds for QoS



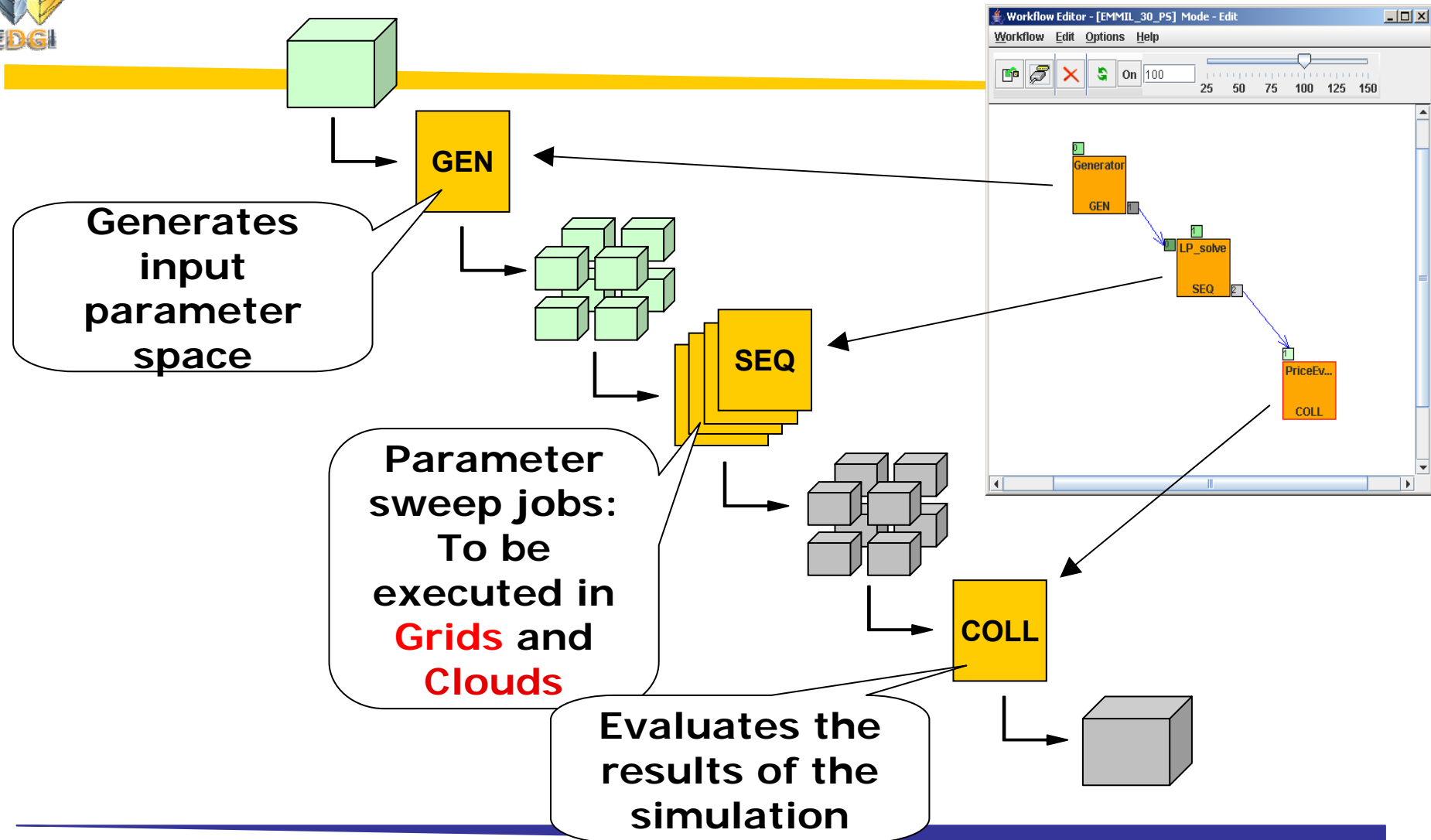
Option 2: Integrating Service and Desktop Grids at application level in EDGeS



Academic grid/cloud ecosystem

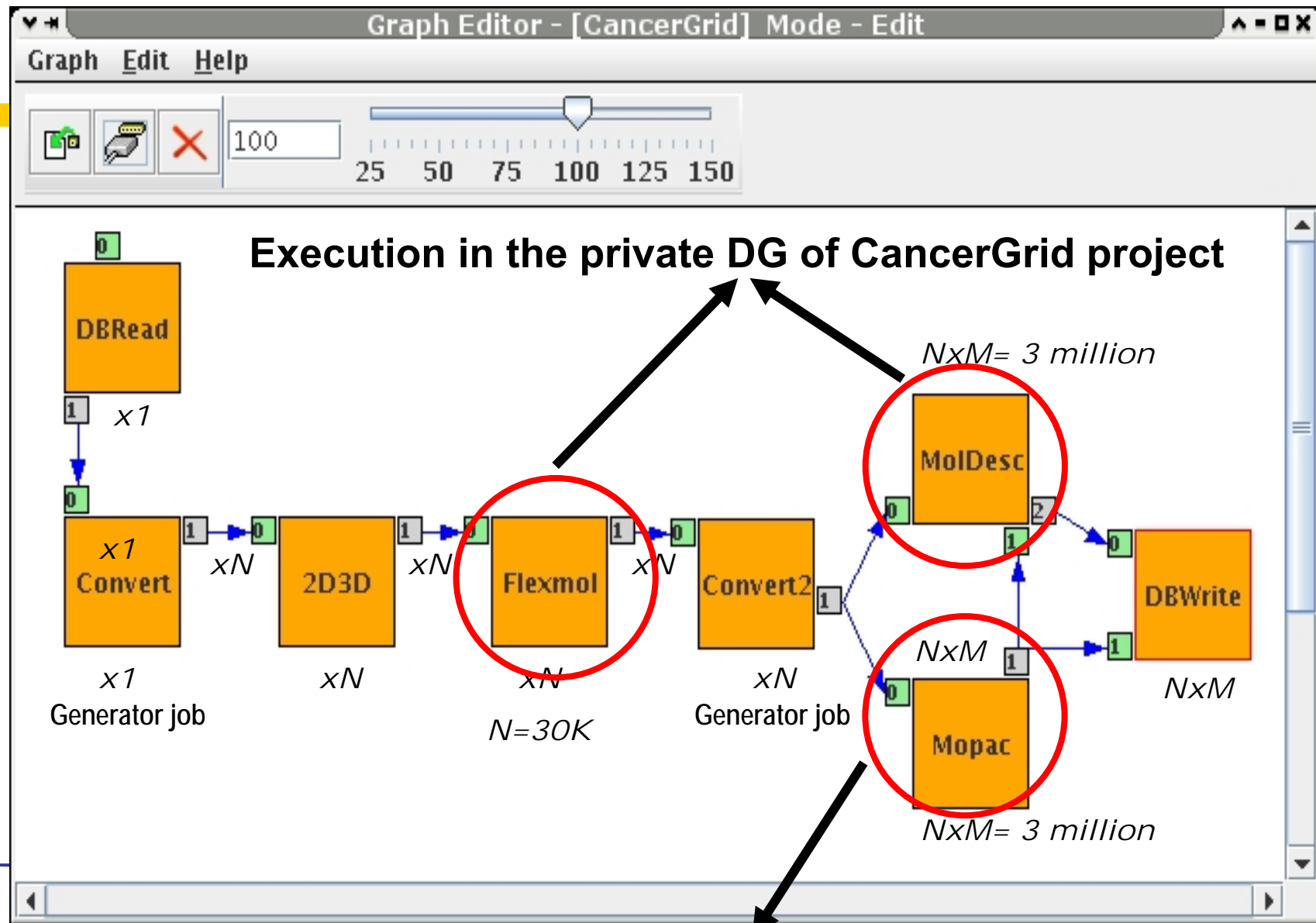


Parameter study workflow execution support in P-GRADE portal





CancerGrid WF application in WS-PGRADE

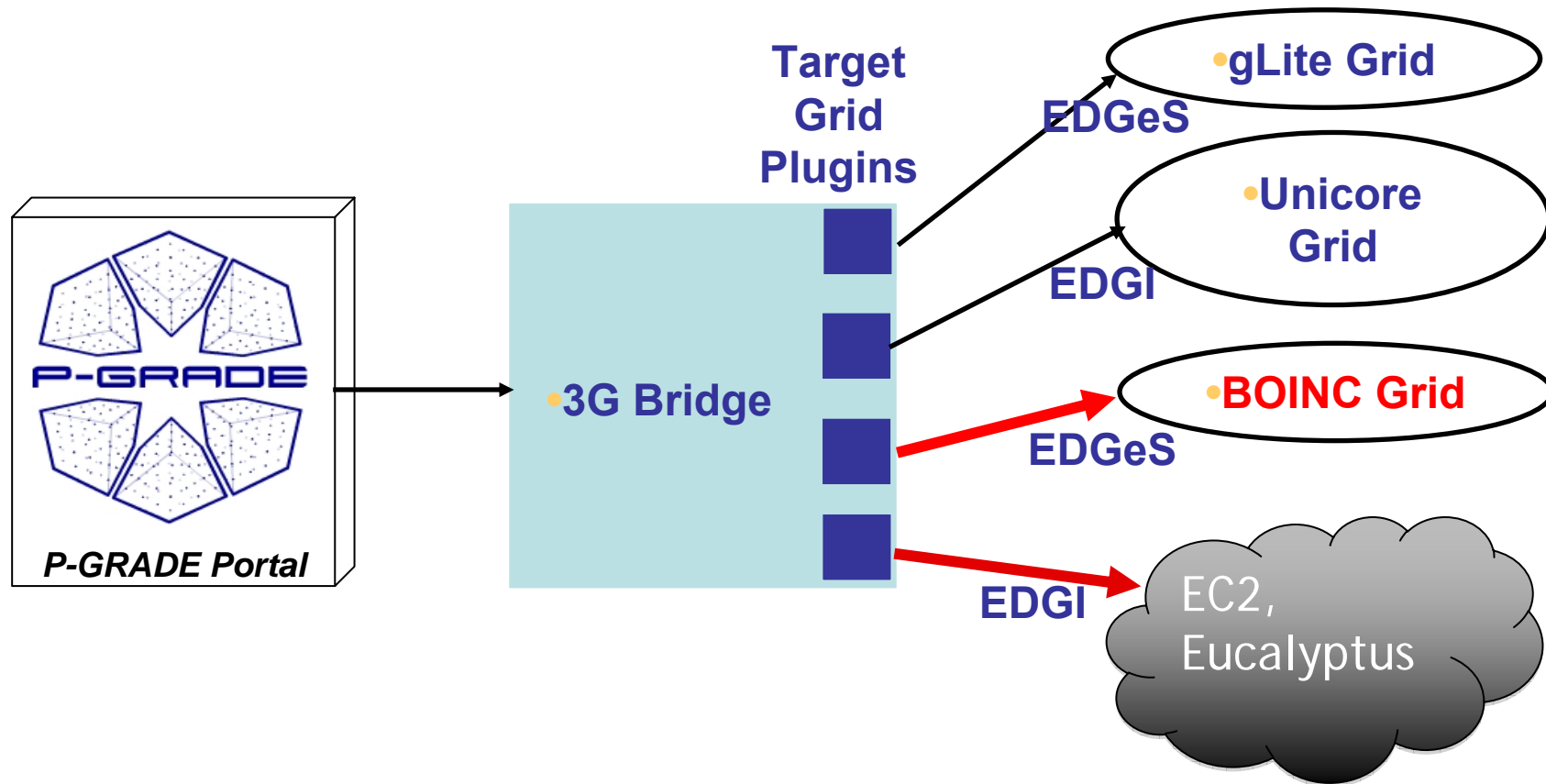


Execution in the private DG of CancerGrid project

Execution in EGEE VO

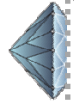


PS job execution in Grids by P-GRADE





EDGeS



ED

P-Grade Portal

P-GRADE portal supporting Clouds

Host A

3G-Bridge

Queue 1

Queue 2

Scheduler

...

...

BOINC Plugin

Cloud Plugin

BOINC Master

Amazon/ Eucalyptus Cloud Interface

Cloud Resource N (BOINC Worker)

...

Cloud Resource 2 (BOINC Worker)

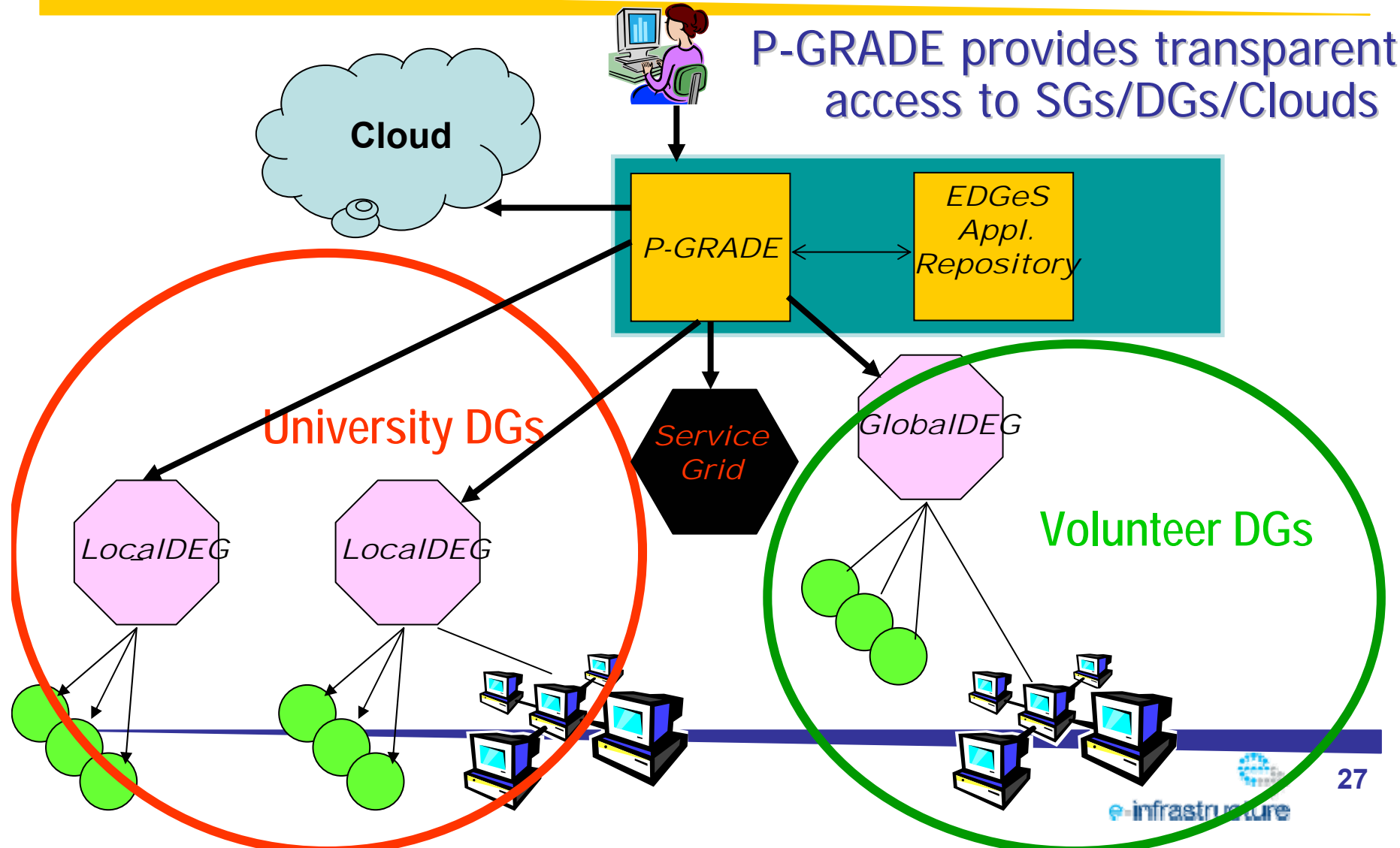
Cloud Resource 1 (BOINC Worker)

Legend

Job	
Command	
Information	

1. Job is submitted from **P-Grade Portal** to the **3G-Bridge**.
2. **3G-Bridge** submits the job to a **BOINC DG** using the **BOINC Plugin** (Queue 1).
 - The BOINC DG consists of workers running in the cloud.
3. The **Scheduler** keeps track of the number of jobs in the BOINC queue and of the number of the running **Cloud Resources** (workers).
4. If the BOINC DG is overcommitted, the Scheduler starts new workers by submitting a job to the 3G-Bridge queue of the **Cloud Plugin** (Queue 2).
5. If the cluster is underutilized, the Scheduler stops some workers (cloud resources) by cancelling some jobs in the Cloud Plugin Queue (Queue 2).

Accessing every type of grids at application level





EDGI/DEGISCO: Establishment of Desktop Grid Federation

- ▶ Support those NGIs that want to extend their VO with DGs
- ▶ Support those universities, institutes, companies who want to set up local desktop grid
- ▶ Run dissemination campaign to attract more volunteers to donate their computer resources
- ▶ Federation is open for organisations and individuals in research and industry
- ▶ PC vendors are invited to extend their OS with BOINC client
 - ▶ This will make simple to establish institutional DG systems
 - ▶ Good promotion and advertisement opportunity for the company



Summary

- Infrastructures like HPC, cluster grids, desktop grids and cloud have their own roles which are complementary
- They should go hand in hand and collaborate instead of compete

Thank you for your attention ...

Any
questions?



For more information please visit the
EDGeS and EDGI Websites:

<http://www.edges-grid.eu/>

<http://edgi-project.eu>

and/or send e-mail to me:

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