National Production Grid Initiative: The Hungarian ClusterGrid Infrastructure Project

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Agenda

- Grid development goals.
- Grid infrastructure projects.
- Brief history and background of the Hungarian ClusterGrid.
- Internal structure.
- Statistics.
- The users.
- Concluding remarks.

What is a grid?

- Broader definition: a set of open services.
- It is a collaboration tool to the research community working on the same scientific field.
- A tool that enables data sharing, resource sharing (compute resource or an instruments) in a secure way.
- Internet: a network level connection.
- Grid: a service level connection.

Grid infrastructure projects

- Grid infrastructure projects aim at developing a fully functional grid system.
- It is difficult, usually span over different institutions, administrative domains.
- The Hungarian ClusterGrid Infrastructure project:
  - lasts from 2002,
  - builds a virtual "country-wide" "virtual supercomputer" from ordinary PC-labs as well as real supercomputers.
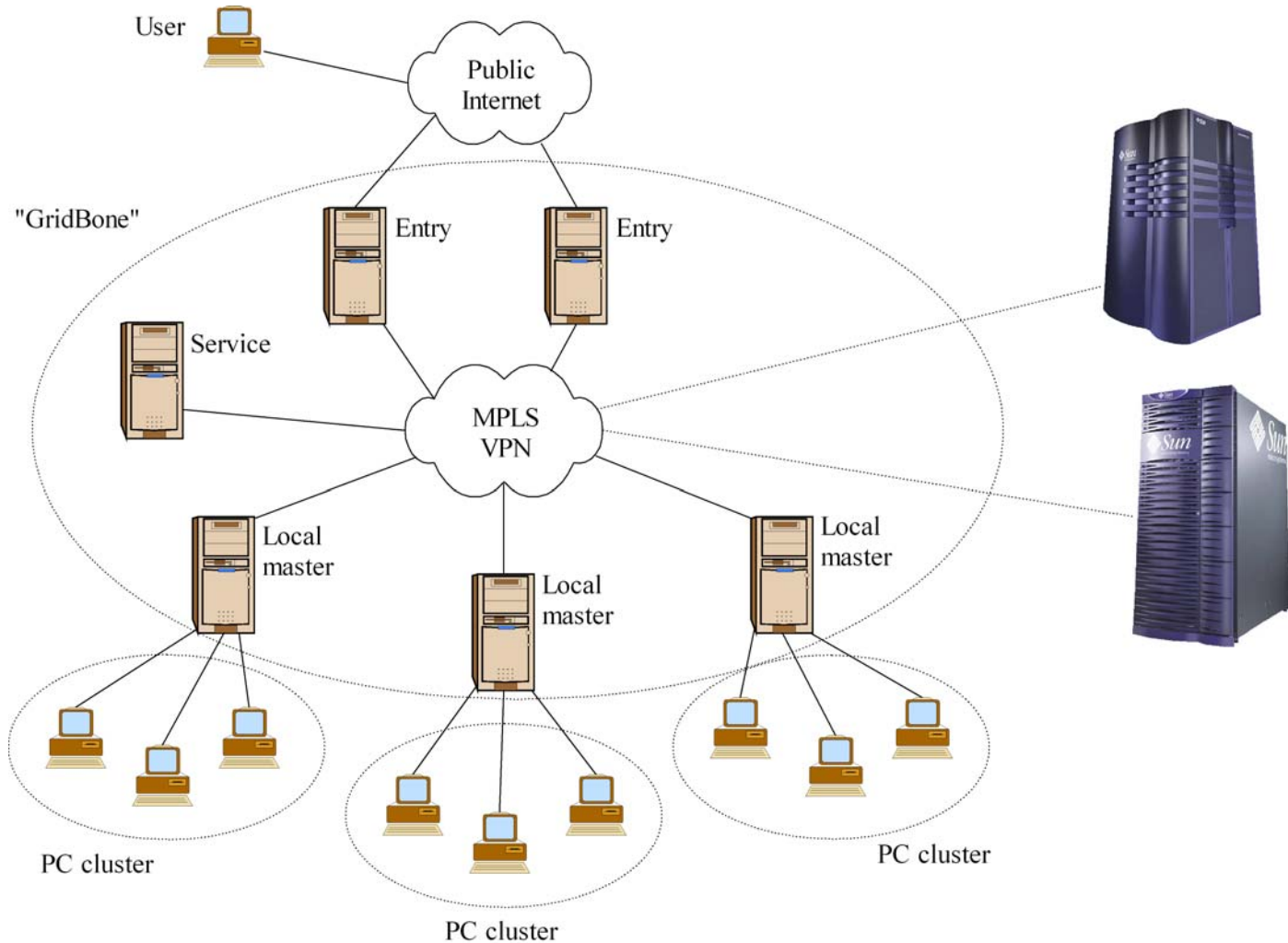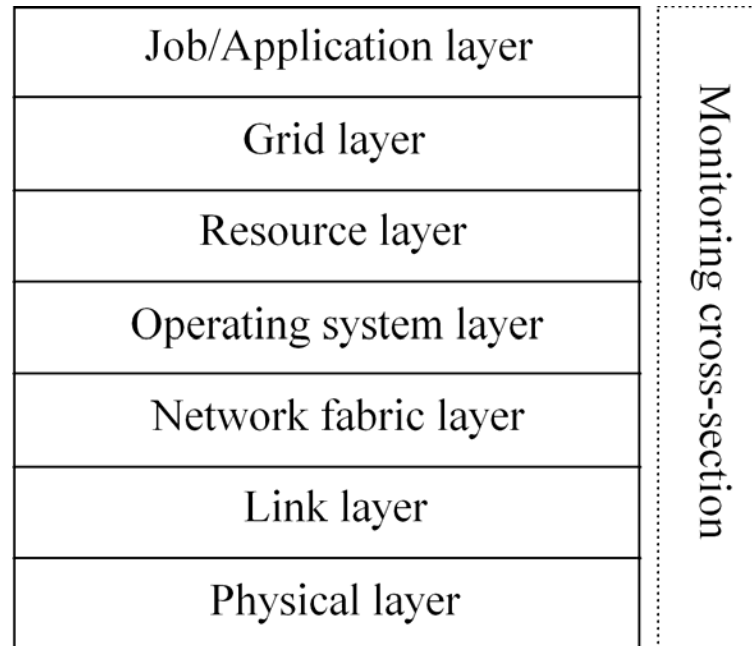
Building blocks

Building blocks

The internal structure of the grid

Internal structure

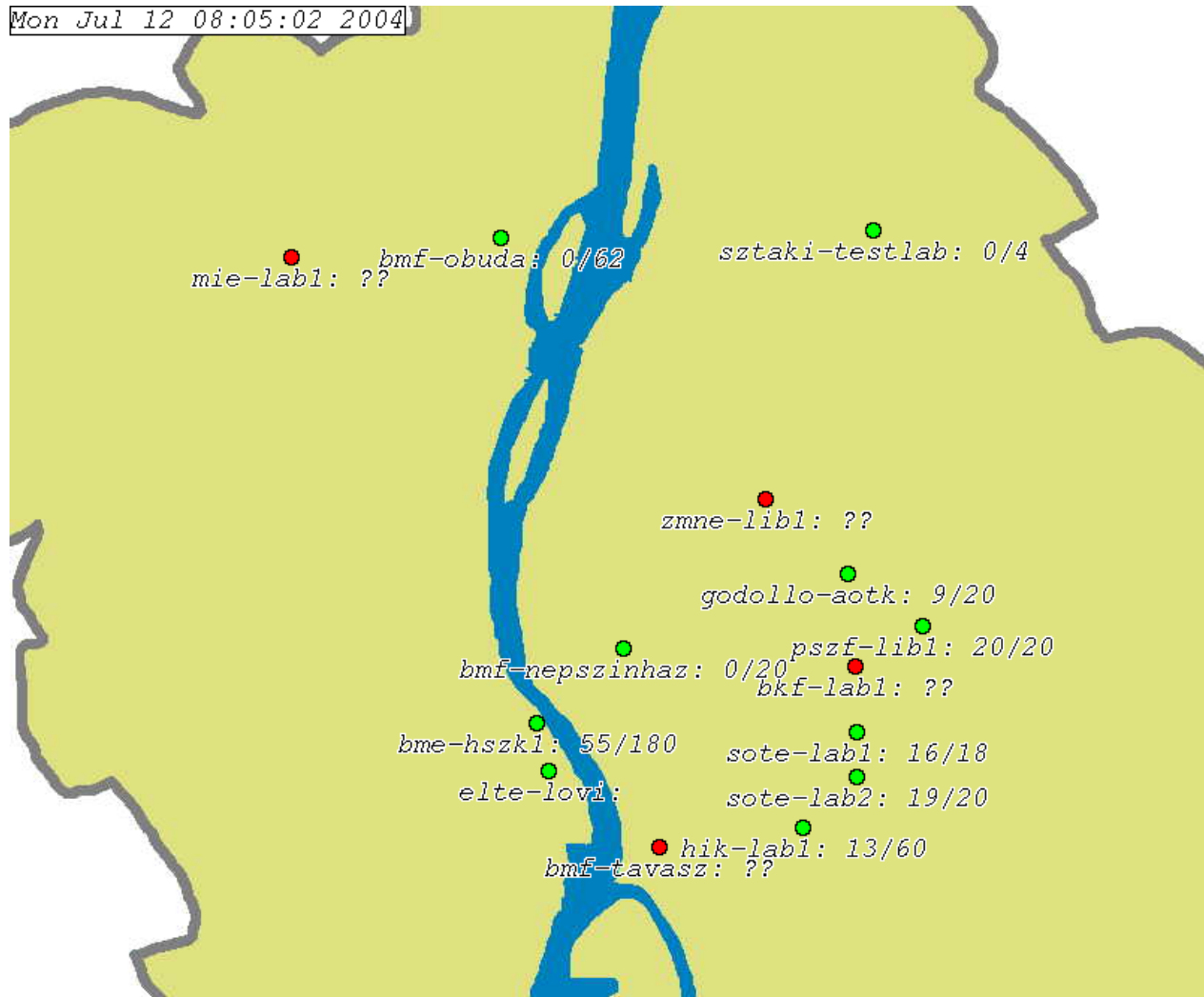| Job/Application layer |
|---|
| Grid layer |
| Resource layer |
| Operating system layer |
| Network fabric layer |
| Link layer |
| Physical layer |

Monitoring cross-section

Statistics

- Currently involves about 1100 nodes (unfortunately not all operate), 26 clusters.

- A rough measurement on the total compute capacity is about 500 Gflops.

- There are 70 users, more than 20 projects, and 50000 jobs executed so far.

- There is a nice 60-node cluster here at Kempelen Farkas Student Information Center (thanks to Péter Garzó and István Czakó ☺).
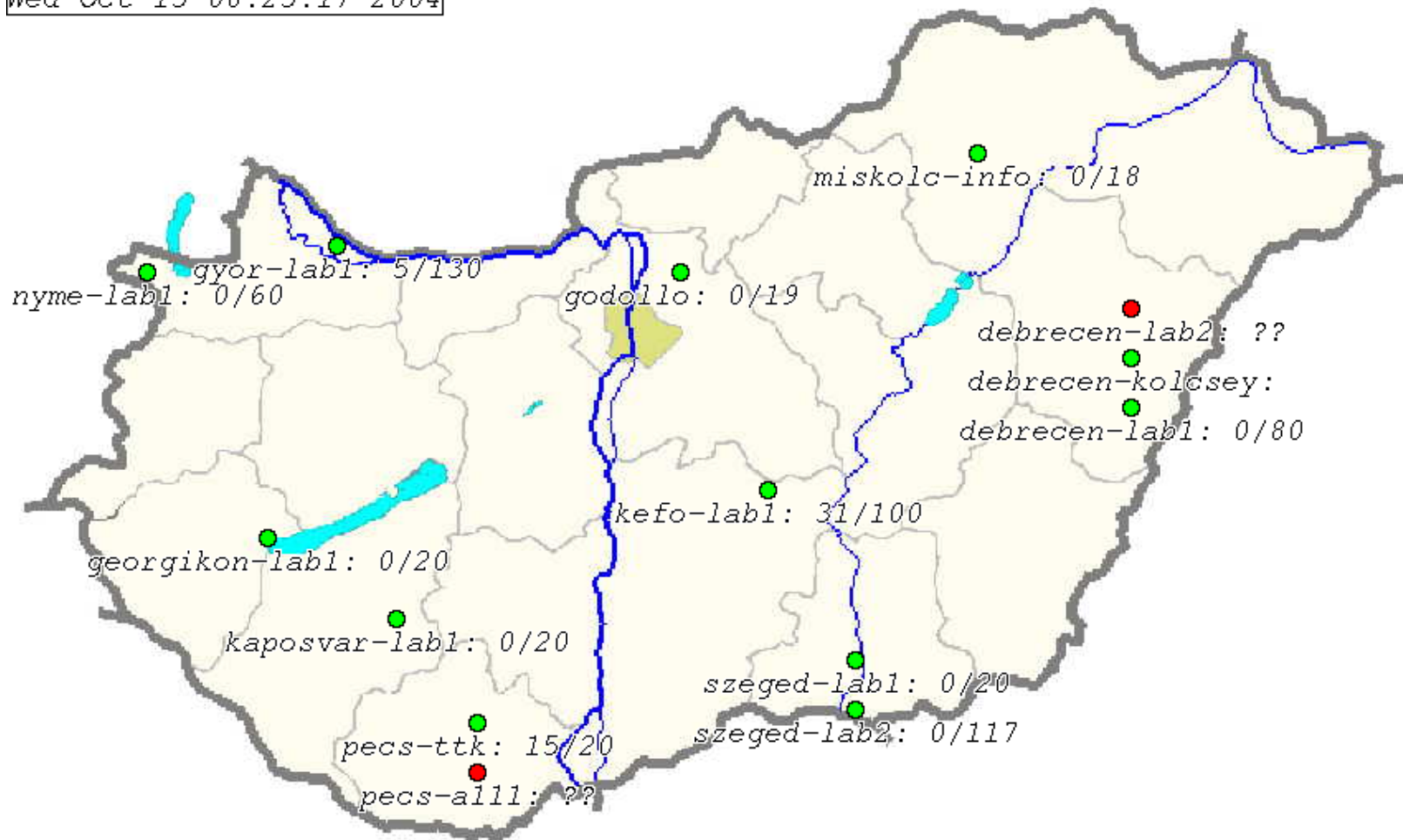
Statistics

Statistics

Wed Oct 13 08:25:17 2004

miskolc-info: 0/18

gyor-lab1: 5/130

nyme-lab1: 0/60

godollo: 0/19

debrecen-lab2: ??

debrecen-kolcsey:

debrecen-lab1: 0/80

kefo-lab1: 31/100

georgikon-lab1: 0/20

kaposvar-lab1: 0/20

szeged-lab1: 0/20

szeged-lab2: 0/117

pecs-ttk: 15/20

pecs-all1: ??

Statistics

🟩 number of 'claimed' machines from Condor	🟦 number of 'all' machines from Condor	🟦 number of working machines from the monitoring system	
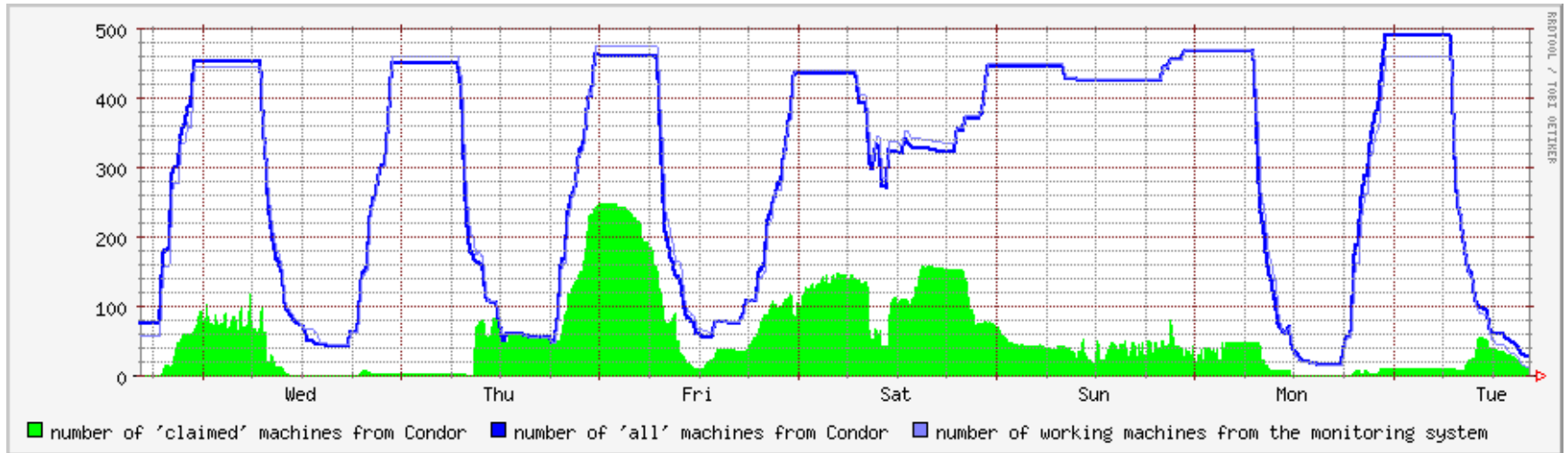
The users

- The system is free to use within the Hungarian research and education community and for their research partners.
- Scientific projects from different application areas such as:
  - Astronomy (exo catalogue),
  - Biology (protein reactions),
  - Physics (non-equilibrium phase transitions),
  - Chemistry (investigating C60 molecule),
  - Nuclear physics (simulating radiation within the reactor),
  - Information Science (video file processing).

Why it is important?

- National grid research is of extremely large importance. Why?
- Hungarian grid research and grid infrastructure development have gained good reputation.
- It is good to have a large compute resource, but we may not stop here!!!
  - Further development in quality and quantity.
  - Good national grid research and development coordination (and funding).
  - Deepening the relationships in Europe and also all over the world.

Thank you for your kind attention!

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