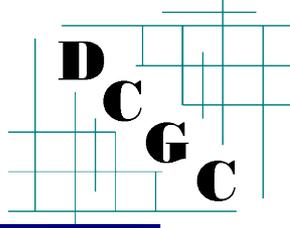


What is a Grid?



Josva Kleist

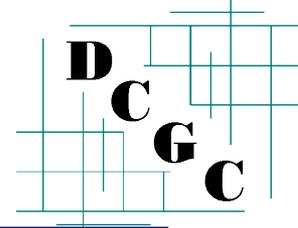
Danish Center for Grid Computing

(www.dcgc.dk)

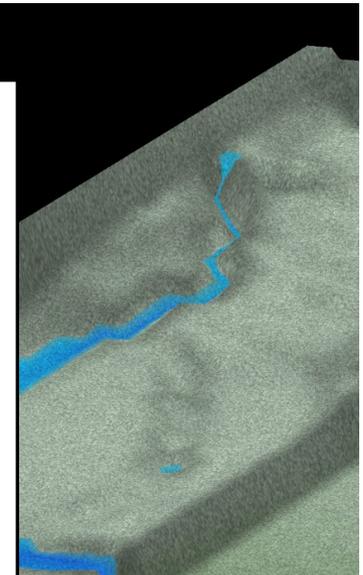
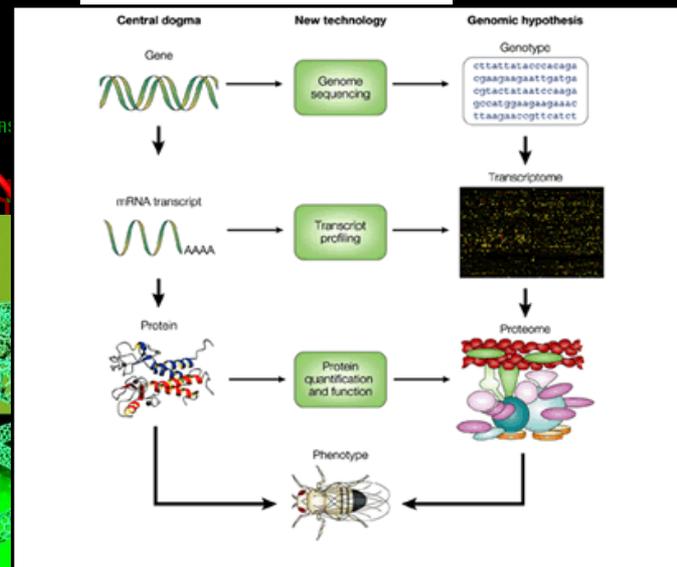
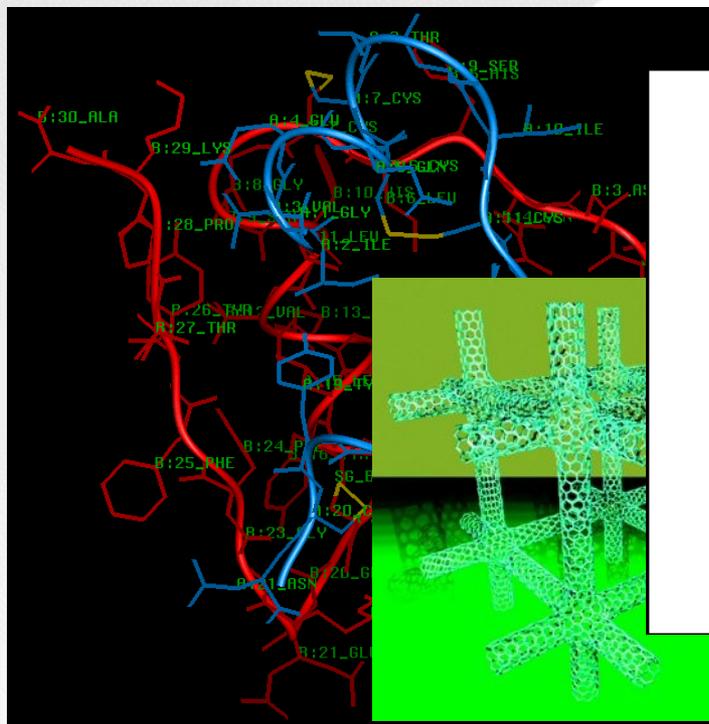
&

Aalborg University

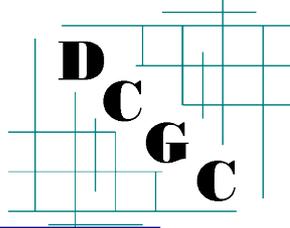
E-science



"Science (increasingly) done through distributed global collaborations enabled by the Internet, using very large data collections, tera-scale computing resources and high performance visualisation."

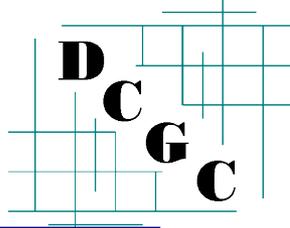


Agenda



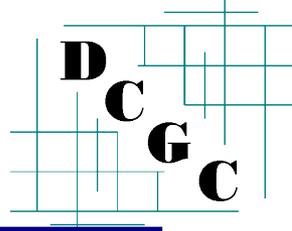
- What is a *Grid* really?
- A 3 point checklist
- What constitutes a *Grid*?
- NorduGrid ARC - a general purpose computational grid.

The grand vision



A huge virtual distributed computer.

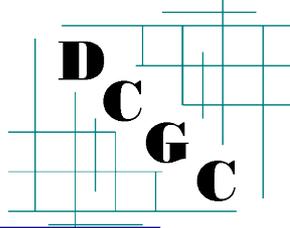
Definition



"A computational grid is a hardware and software infrastructure that provides dependable, consistent, pervasive, and inexpensive access to high-end computational capabilities."

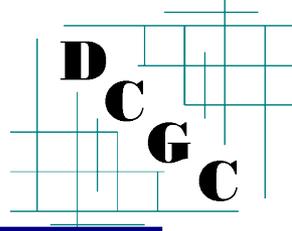
The Grid – a blueprint for a new computing infrastructure, 1998

A Grid Checklist



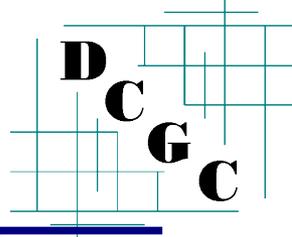
- Coordinates resources that are not subject to centralized control...
- ...using standard, open, general-purpose protocols and interfaces...
- ...to deliver nontrivial qualities of service.

Challenges



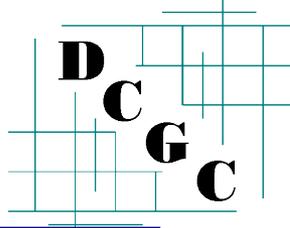
- Make hardware owned by *different* organizations available to *non-members* of that organization.
- In such a way that normal operation of the equipment can continue.
- In such a way that the organization still can control who gets access.
- In such a way that we can control who gets access to specific pieces of data.
- In such a way that operations can be performed anonymously.
- And still charge for the use of hard- and software.

Challenges



- Resource allocation and scheduling
- Authentication and authorization
- Protection
- Control
- Accounting

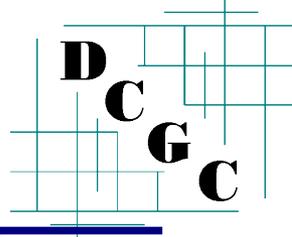
Globus



- An open source software toolkit used for building grids.
- Includes software services and libraries for resource monitoring, discovery, and management, plus security and file management.

Web: www.globus.org

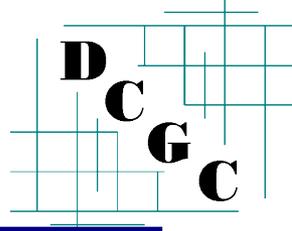
NorduGrid



- NorduGrid is a collaboration between a number of universities mostly located in the Nordic countries.
- NorduGrid **Advanced Resource Connector** is:
 - A Globus-based Grid middleware solution
- NorduGrid is a production Grid
 - Approximately 5000 CPUs
 - Approximately 75 TB of storage

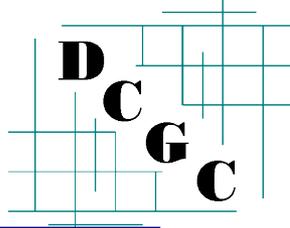
Web: www.nordugrid.org

ARC Assumptions

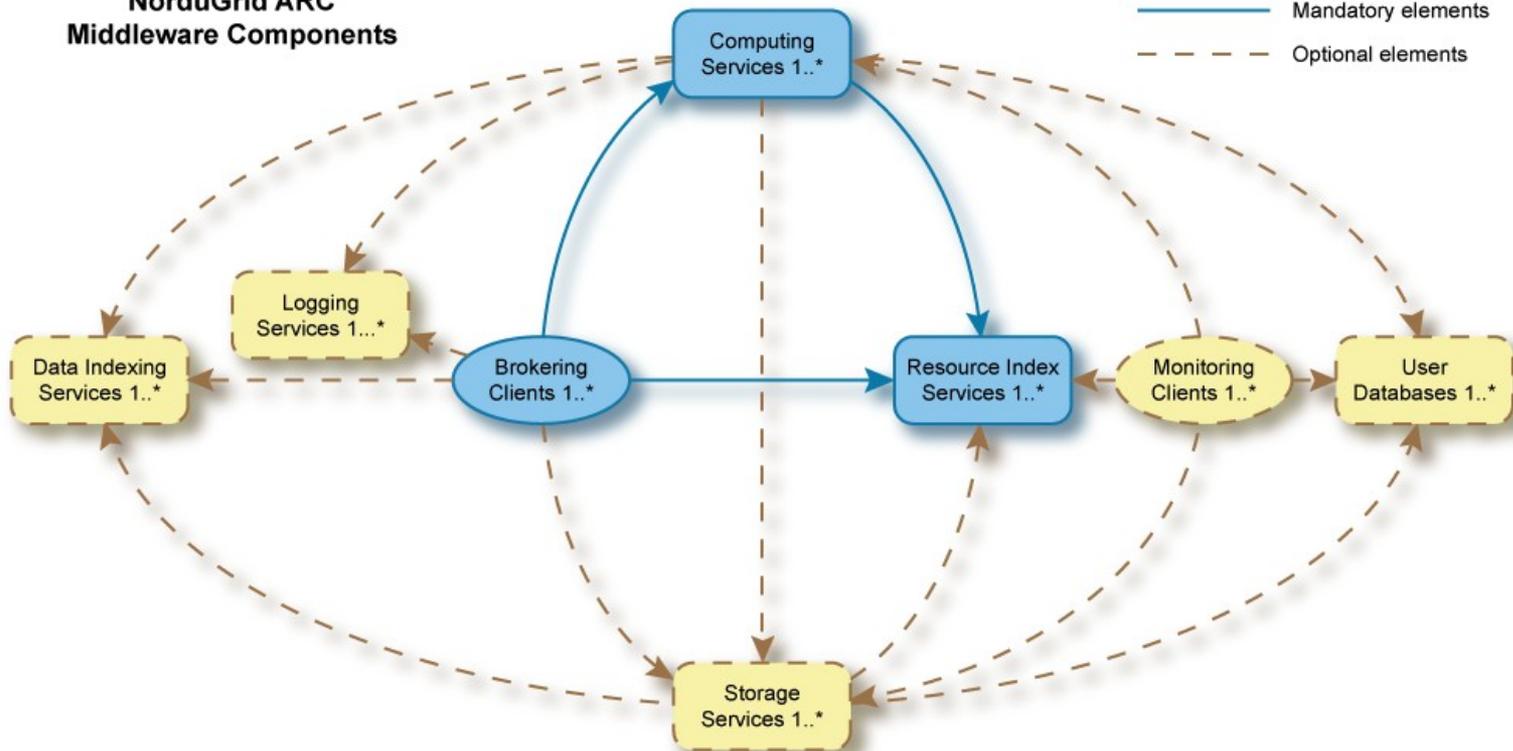


- It should only be necessary to install Grid software on a single *front-end* machine.
- No/few modifications to the existing hardware/software configuration should be necessary.
- Bottlenecks known to exist in other Grid solutions should be avoided.

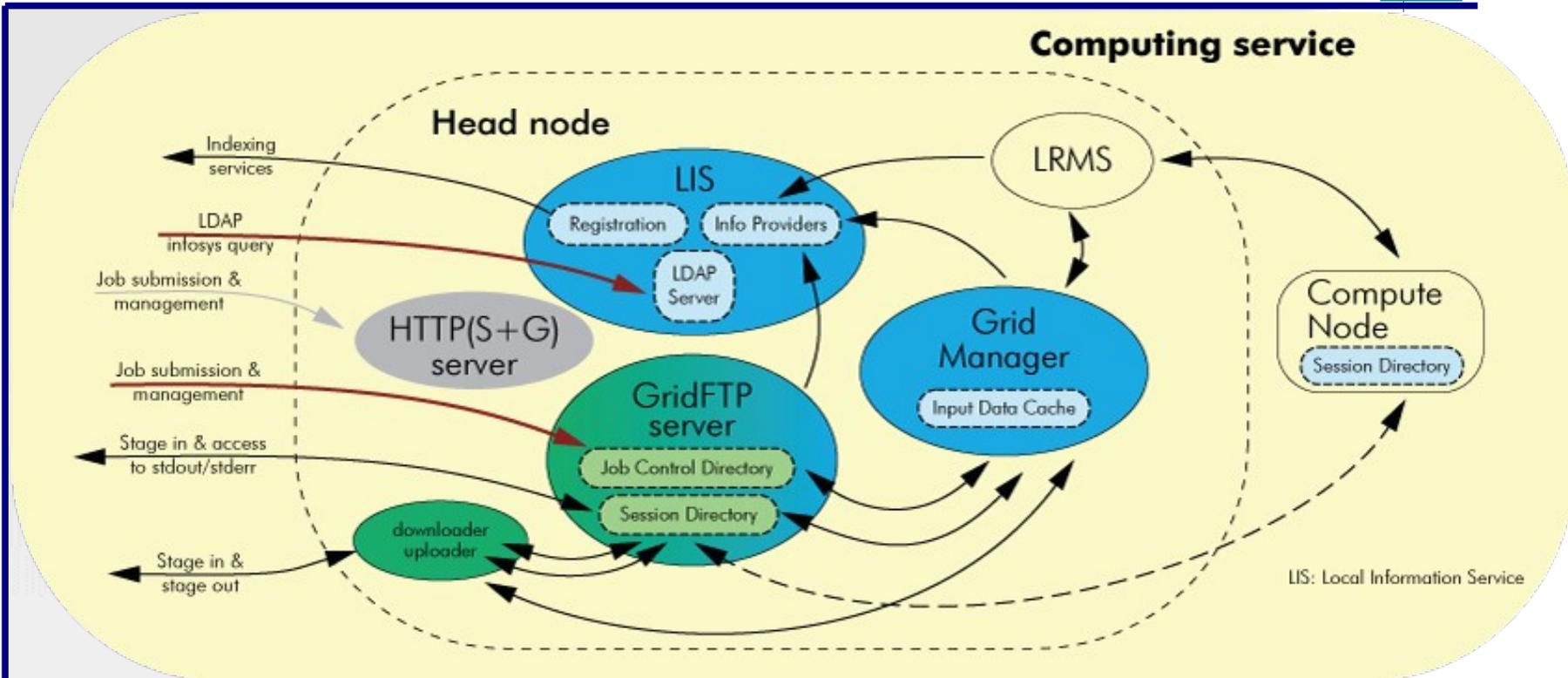
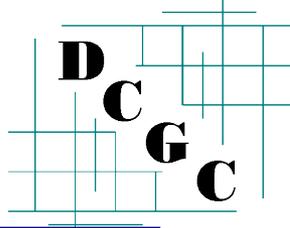
ARC overview



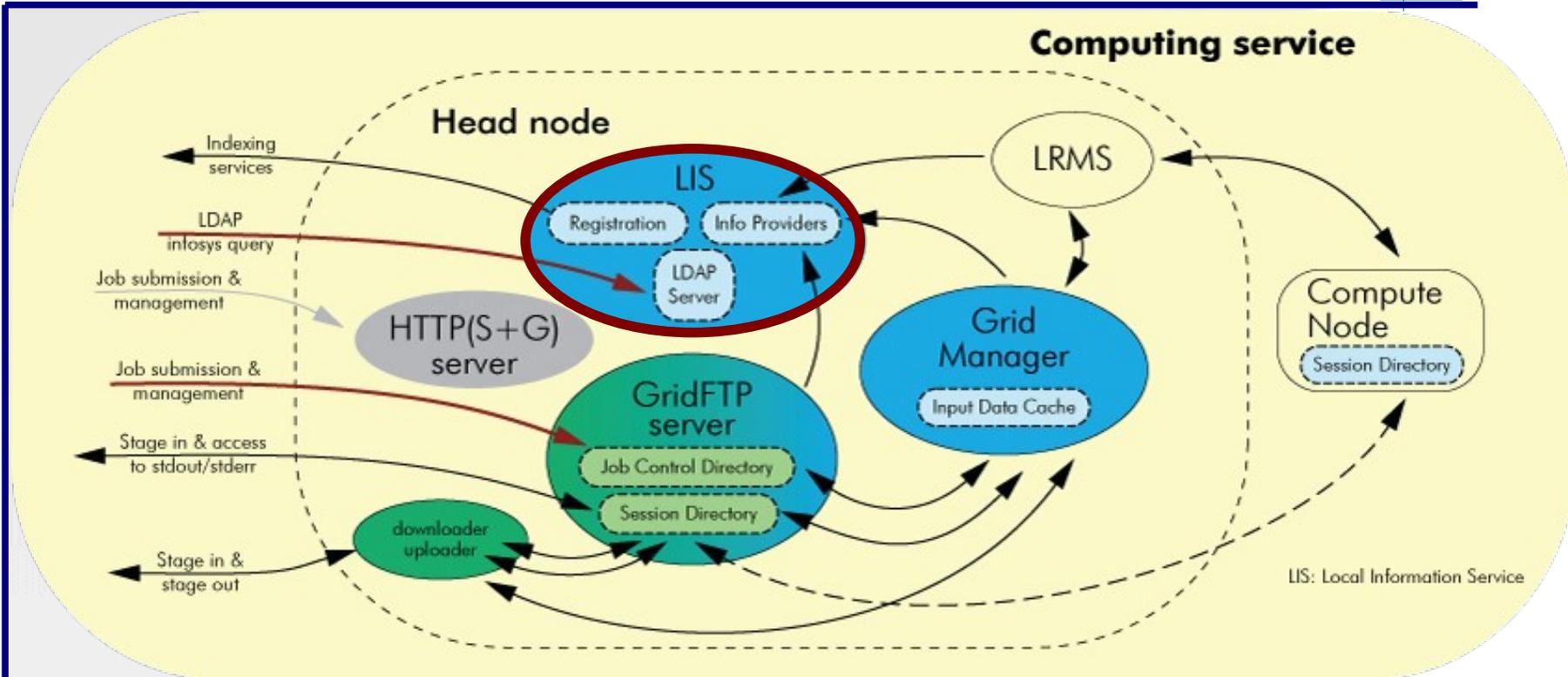
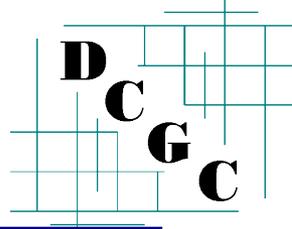
NorduGrid ARC Middleware Components



ARC Components

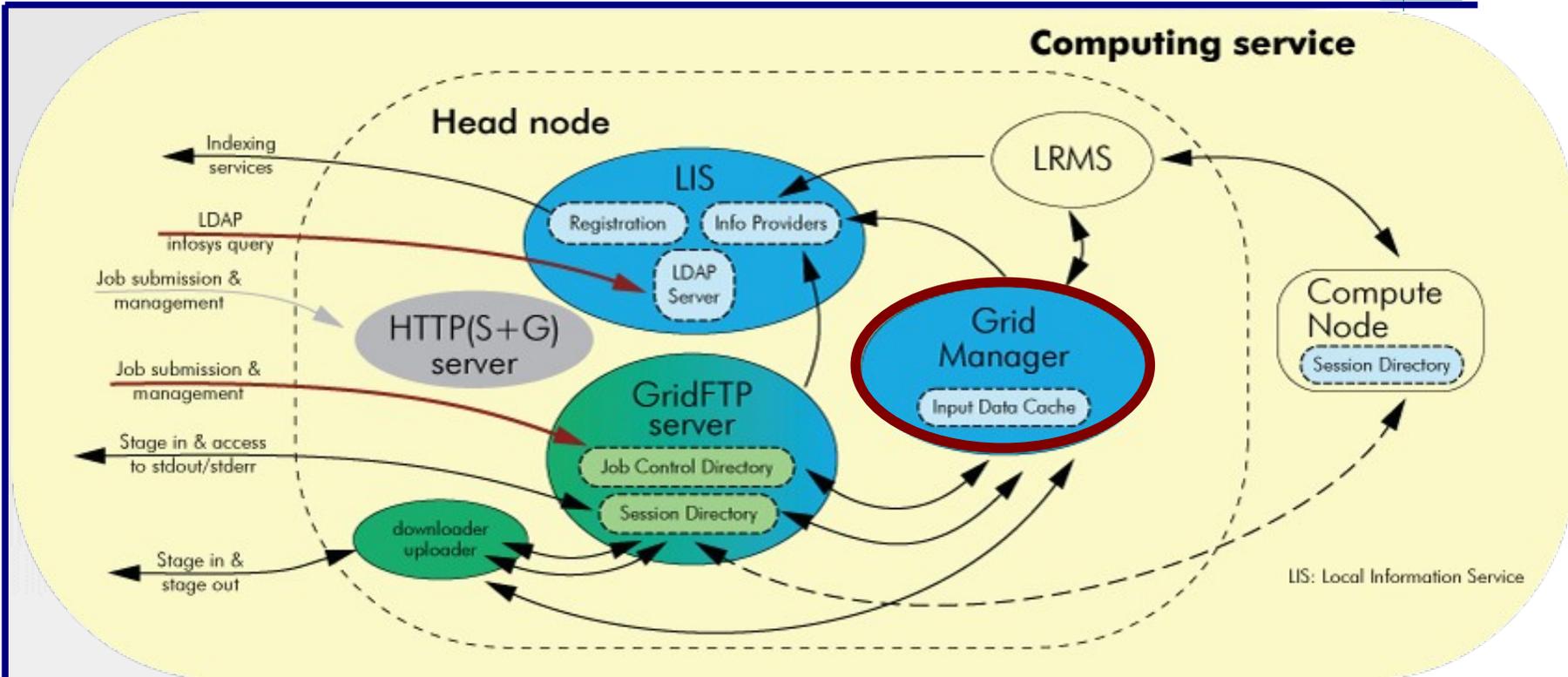
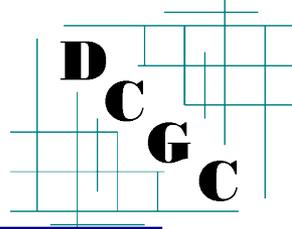


ARC Components



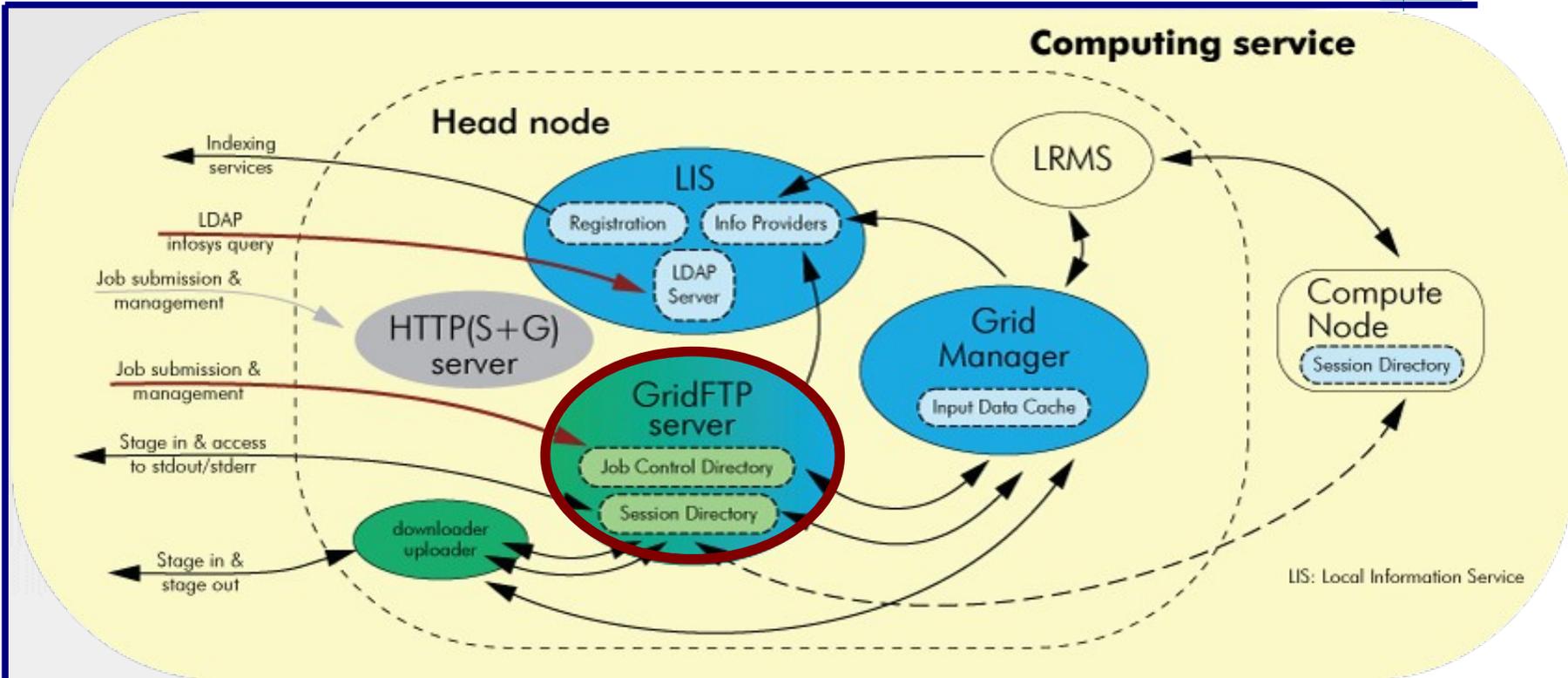
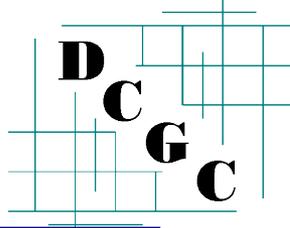
Local Information System publishes resource and job information via LDAP

ARC Components



GridManager handles job management upon client request, interfaces to LRMS

ARC Components



GridFTP server for all the communications