



# Enabling Computing Resources to Support Grid Jobs and Cluster Jobs Simultaneously



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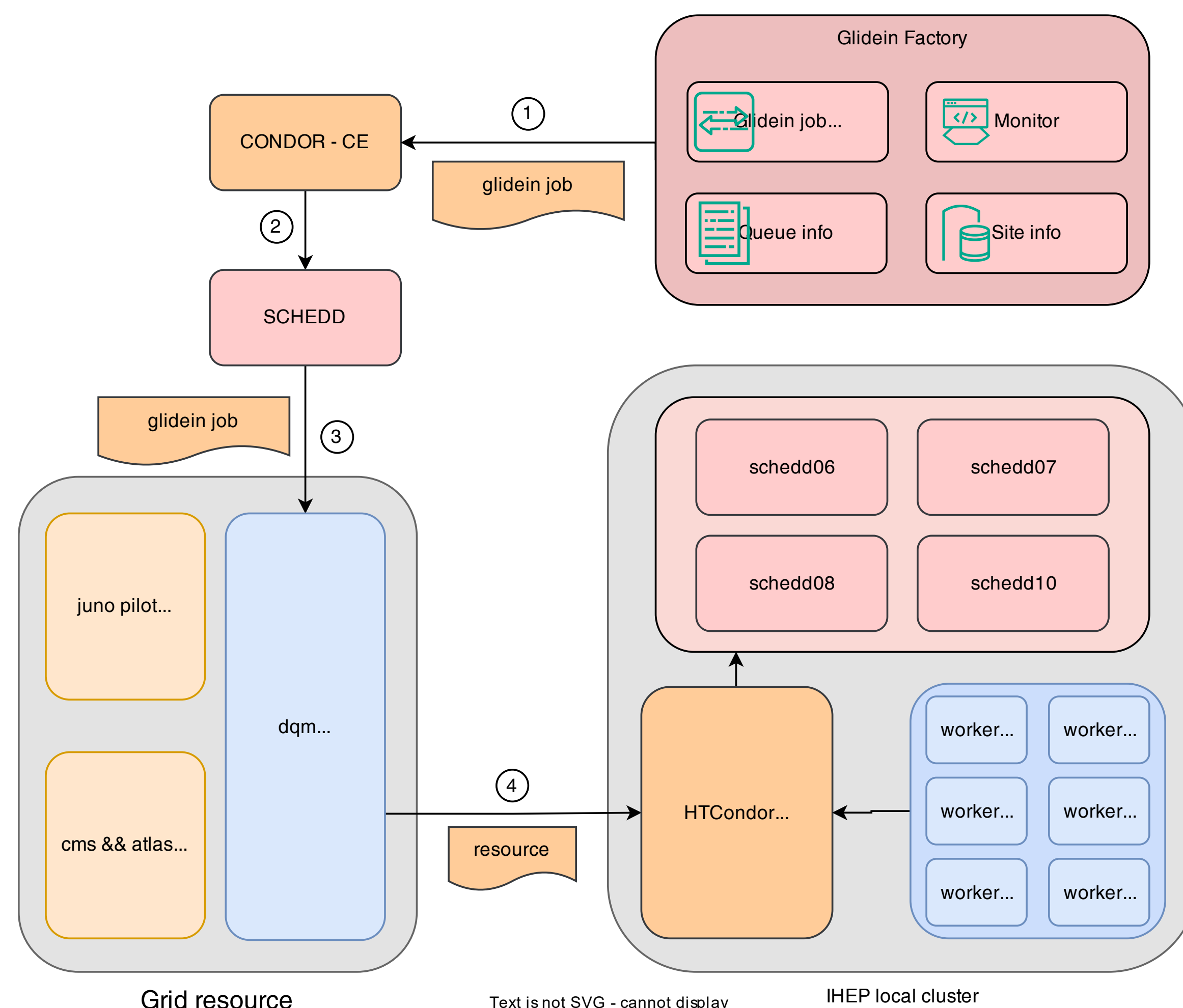
## Motivation

IHEP runs grid site and local HTCcondor cluster separately depend on the requirement of the different experiments.

- Two separated parts of the resources are belong to grid site and local cluster
- The local cluster operates over 95% job slot utilization rate, and still with the significant queuing
- Grid site utilization is below 80%
- Developing a model enabling worker nodes to handle both grid and local cluster jobs

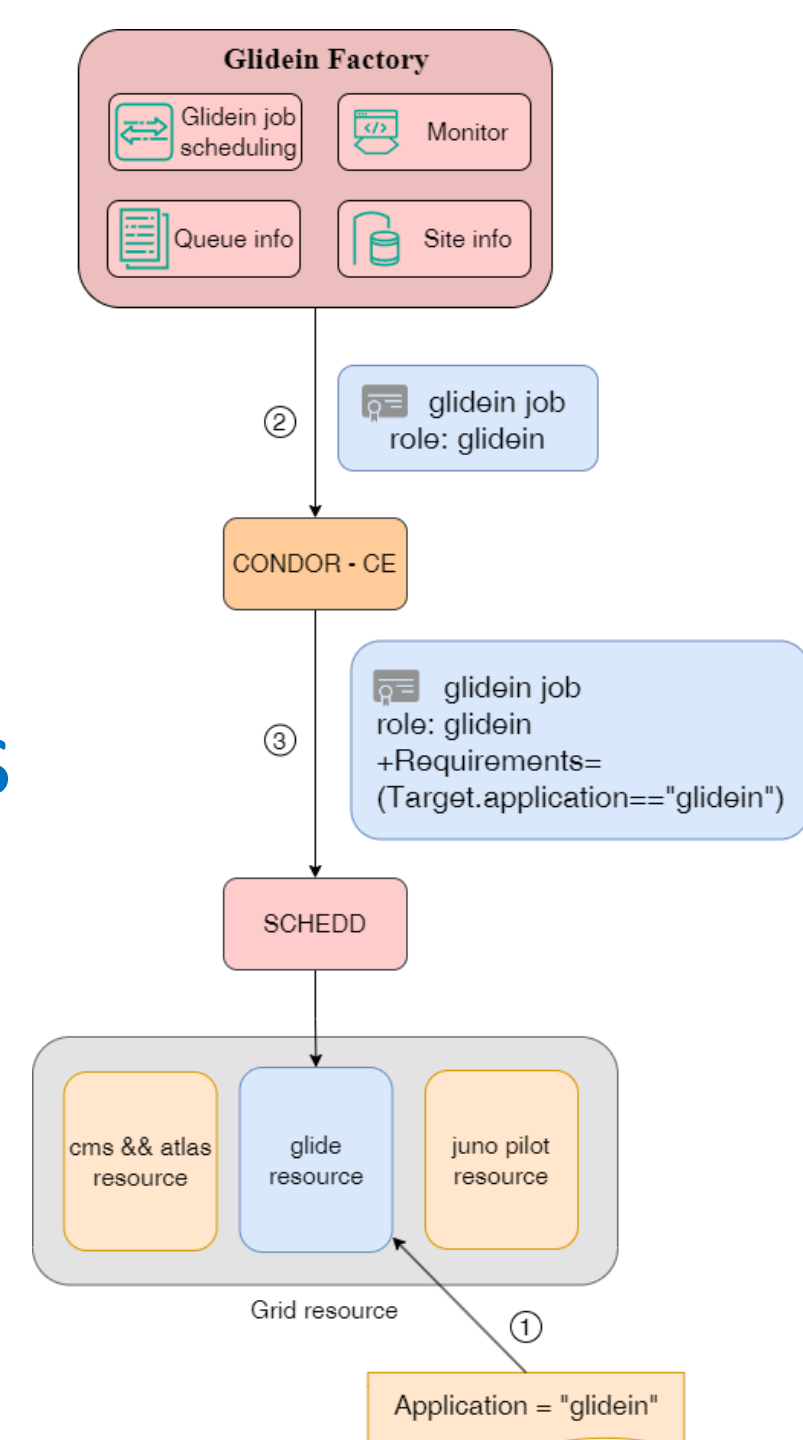
## Workflow of Resource Transition

- Create “glidein job”
  - ❑ Contain the details and configuration information of the schedme for connection Grid nodes to the IHEP local cluster
- Submit a grid job to run the “glidein job” to the CE of the grid site
  - ❑ CE configures relevant parameters for the glidein job
    - ❑ Set the requirement attributes of the job
- Run the glidein job on the worker nodes of the gride side
  - ❑ Start a computing service for IHEP local cluster
    - ❑ Ensure environmental consistency through the specific containers
- Report the resource to the resource pool of the local cluster
  - ❑ Local cluster jobs can be scheduled to the glidein job slots running on the grid worker node



## Specific Nodes Selection

- Submit glidein within grid job to the specific grid node
  - ❑ Add a special attribute to ALL specific grid worker node
- Add a new role “glidein” in the grid voms
  - ❑ When the CE matches the job with role of “glidein”
    - ❑ Map the job owner to glidein01

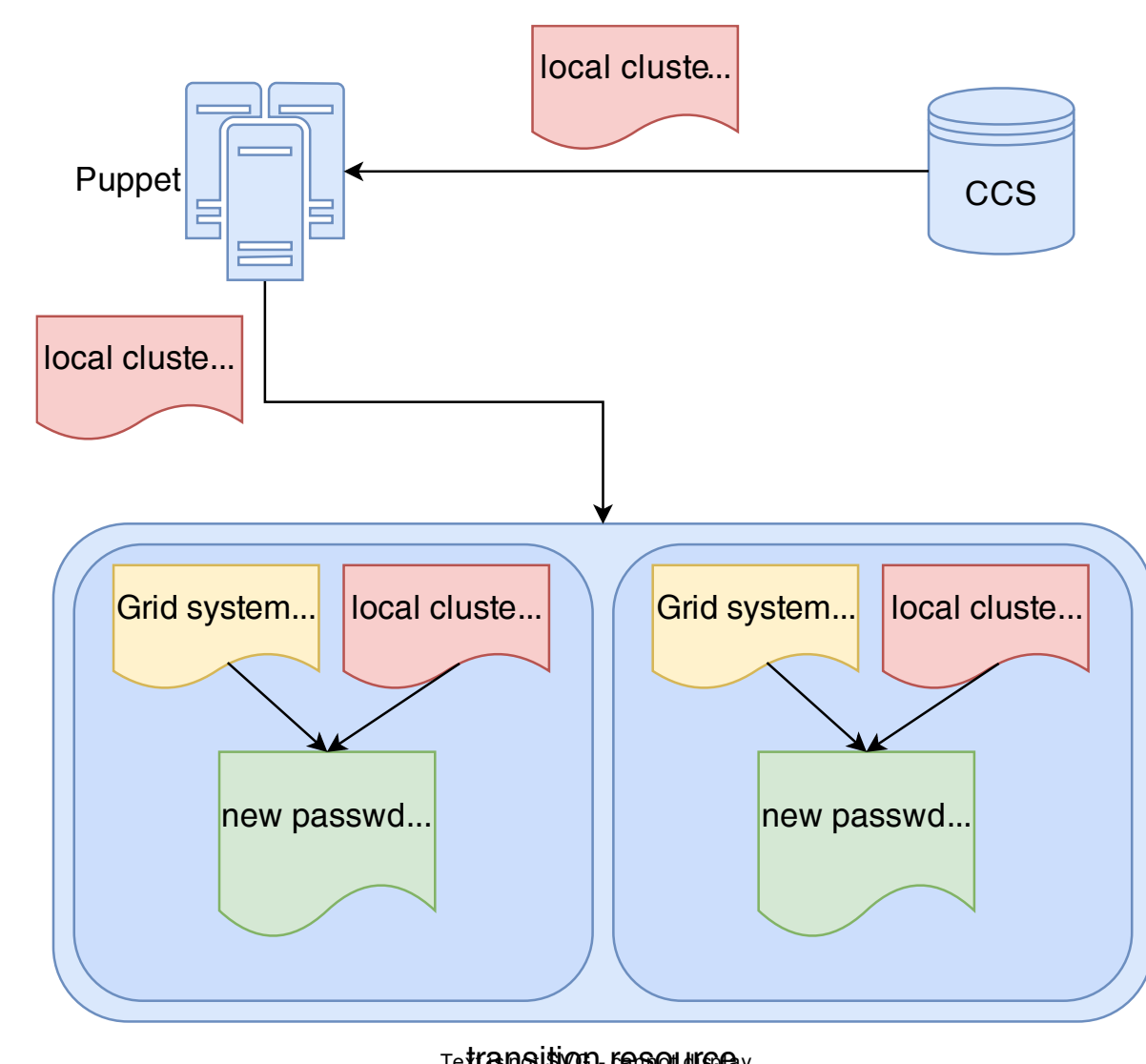


## Authorization

- User “glidein01” is specifically used to run glidein jobs
  - ❑ Used only for CE account mapping
  - ❑ The Account is set “no login” for the security reason
- “sudo /bin/appcontainer” is granted to “glidein01”
  - ❑ The owner of the container is root
  - ❑ Mounting a shared file system needs to start contain with root privilege
- The new passwd/group files are readable and writable by “root” only

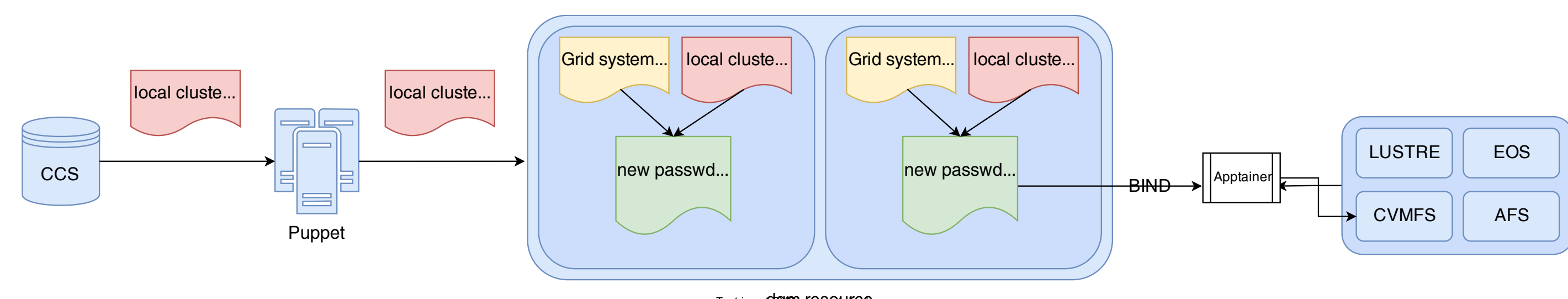
## User Namespace Consistency

- Generate new passwd/group file to ensure user consistency with the local cluster
- Local user/group info is saved in the database
- Deploy software and user/group info to the worker node
- New passwd/group file include:
  - Local cluster user info
  - Grid system users info
- Automatic updating of user information by Puppet



## Local Cluster Environment

- Build container image based on the local worker node
  - ❑ Consistent OS version and system configuration
  - ❑ Necessary file systems mounted
  - ❑ Redirect /etc/passwd and /etc/group of the container
  - ❑ Bind the generated new passwd/group file to the aptainer



## Glidein Factory

- Transition Scheduling Policy
  - Executed by the administrator manually
  - Executed by the glidein factory automatically

Worker node transition between grid and local cluster has been provide to JUNO and more works for more efficient usage need to be done