



WP9

Resource Management

Current status and plans for future

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GRMS functionality

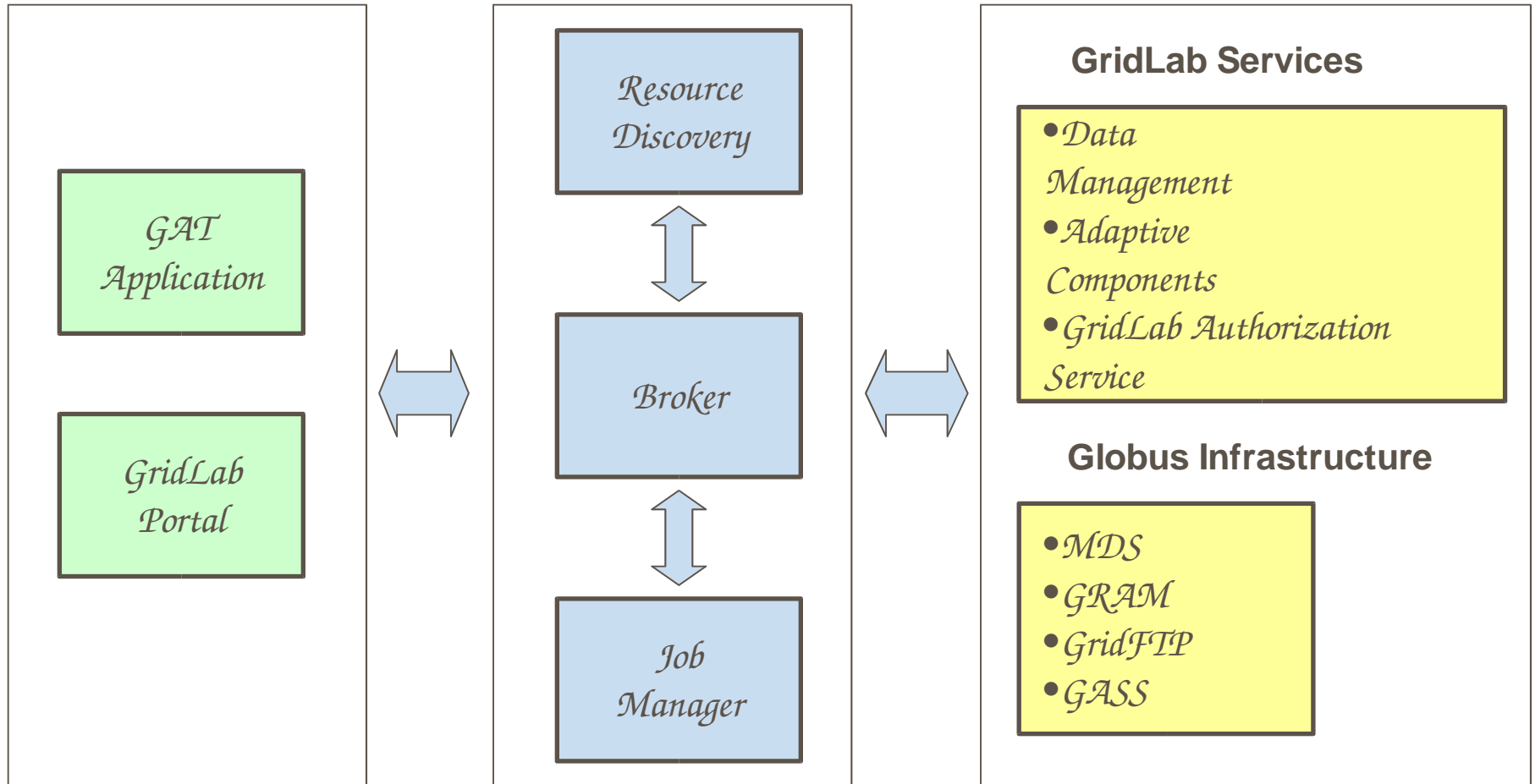
- Ability to choose the best resource for the job execution, according to Job Description and chosen mapping algorithm;
- Ability to submit the GRMS Task according to provided Job Description;
- Ability to migrate the GRMS Task to better resource, according to provided Job Description;
- Ability to cancel the Task;
- Provides information about the Task status;
- Provides other information about Tasks (name of host where the Task is/was running, start time, finish time);

- Provides list of candidate resources for the Task execution (according to provided Job Description);
- Provides a list of Tasks submitted by given user;
- Ability to transfer input and output files (GridFTP, GASS, WP8 Data Management System);
- Ability to contact Adaptive Components Services to get additional information about resources
- Ability to register a GAT Application callback information
- Ability to submit a set of tasks with precedence constraints (work-flow of tasks and input/output files)

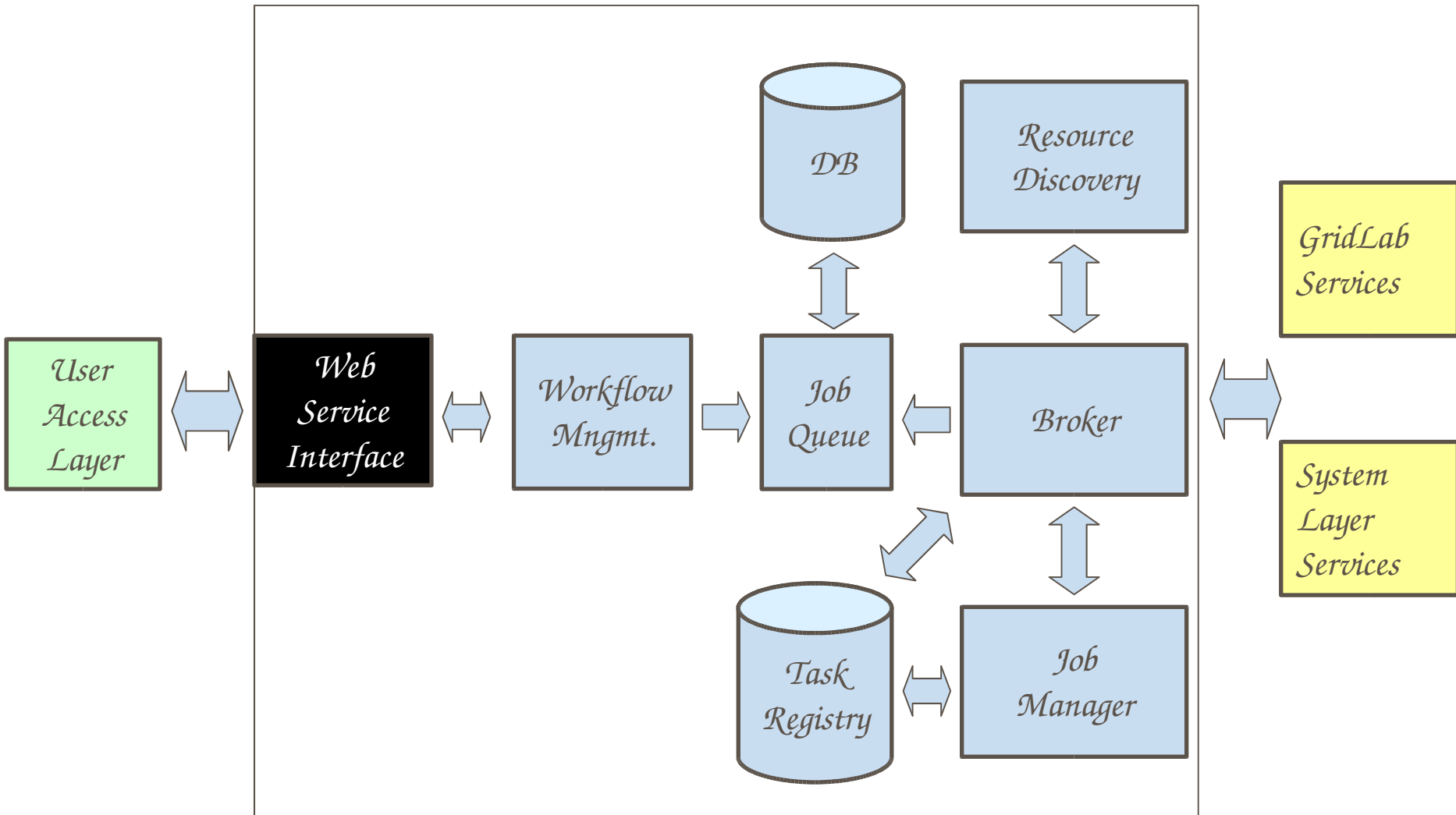
User Access Layer

**Resource Management
System**

Grid Environment



GRMS – detailed view



- **Broker Module**
 - Steers process of job submission
 - Chooses the best resources for job execution (scheduling algorithm)
 - Transfers input and output files for job's executable

- **Resource Discovery Module**
 - Finds resources that fulfill requirements described in Job Description
 - Provides information about resources, required for job scheduling

● Job Manager Module

- Ability to check current status of job
- Ability to cancel running job
- Monitors for status changes of running job

● Workflow Management Module

- Creates workflow graph of tasks from Job Description
- Put tasks to Job Queue
- Controls of tasks execution according to precedence constraints

- **Web Service Interface**
 - Provides GSI enabled web service interface for Clients (GAT Application, GridLab Portal)
- **Job Queue**
 - Allows putting Task into queue
 - Provides way for getting tasks from queue according to configured algorithm (FIFO)
- **Task Registry**
 - Stores information about Task execution (start time, finish time, machine where executed, current status, Job Description)

- Task executable
 - file location
 - arguments
 - file argument (files which have to be present in working directory of running executable)
 - environment variables
 - standard input
 - standard output
 - standard error
 - checkpoint files

- Resource requirements of executable
 - name of host for job execution (if provided no scheduling algorithm is used)
 - operating system
 - required local resource management system
 - minimum memory required
 - minimum number of cpus required
 - minimum speed of cpu
 - other parameter passed directly to Globus GRAM



Job Description – new elements



- Job Description consists of one or more descriptions of the Task
- Each Task can have a section which denotes parent tasks



Job Description - example



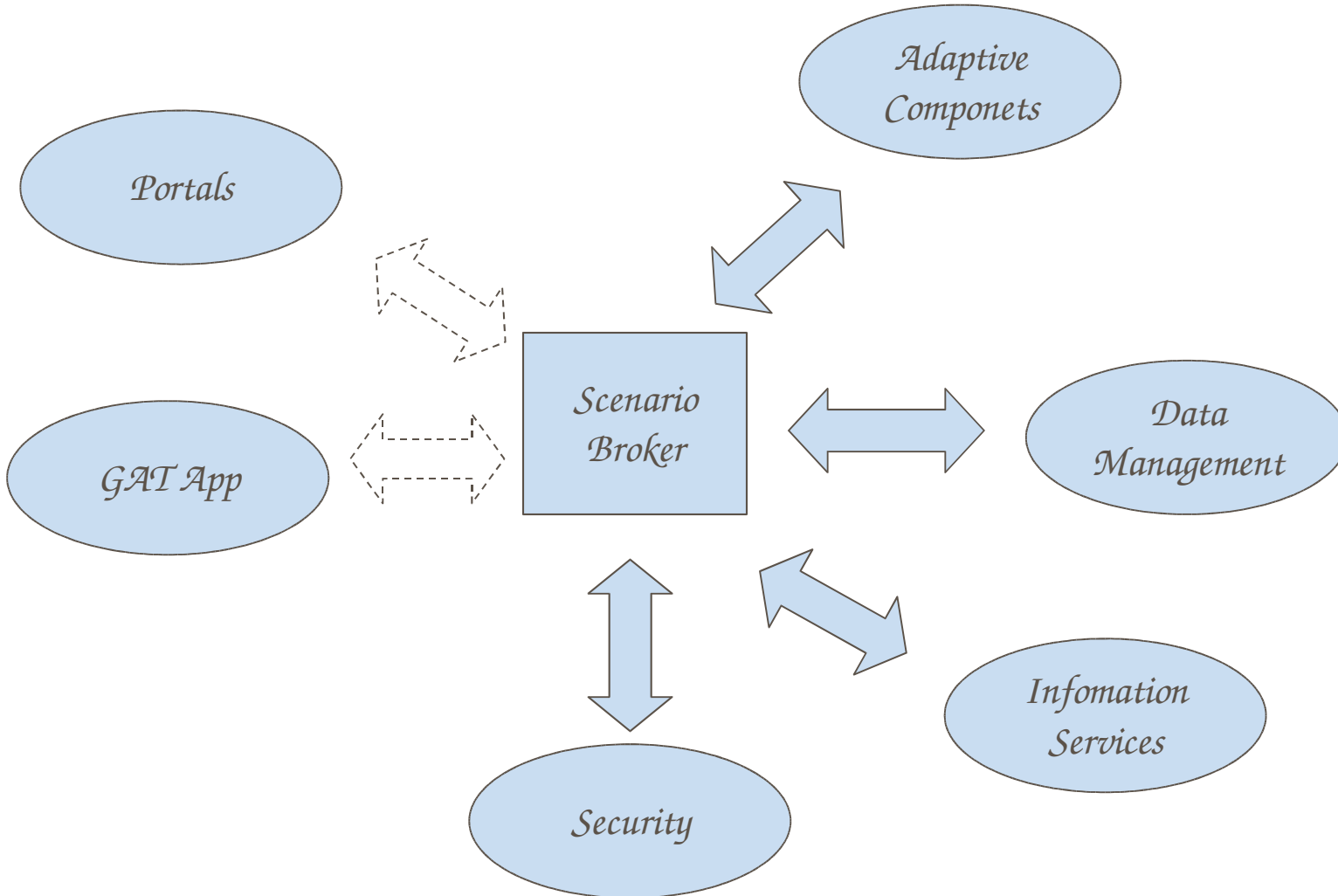
```
< grmsjob appid = MyApplication>
<task id=1>
  <resource>
    <osname> Linux </osname>
    <memory> 128 </memory>
    <cpucount> 2 </cpucount>
  </resource>
  <executable type="single" count="1">
    <file name="String" type="in">
      <url> gsiftp://rage.man.poznan.pl/~Apps/MyApp </url>
    </file>
    <arguments>
      <value> 12 </value>
      <value> abc </value>
    </arguments>
    <stdin>
      <url> gsiftp://rage.man.poznan.pl/~Apps/appstdin.txt </url>
    </stdin>
    <stdout>
      <url> gsiftp://rage.man.poznan.pl/~Apps/appstdout.txt </url>
    </stdout>
  </ executable >
</task>
</grmsjob >
```



Job Description – example 2



```
< grmsjob appid = MyApplication>
  <task id=task1>
    <resource>
      ...
    </resource>
    <executable type="single" count="1">
      ...
    </ executable >
  </task>
  <task id=task2>
    <resource>
      ...
    </resource>
    <executable type="single" count="1">
      ...
    </ executable >
    <workflow>
      <parent>task1</parent>
    </workflow>
  </task>
</grmsjob >
```



- Krzysztof Kurowski – scheduling algorithms, mapping strategies
- Tomek Piontek – Web Service interface, configuration
- Bogdan Ludwiczak – testbed configuration, MDS
- Jarek Nabrzyski – complaints :)