ARC Compute Resource Management Interface

Technical Description, DRAFT!!!

NorduGrid Collaboration[*]

Refers to ARC release series 0.4 and up

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1 Introduction

The document describes the available methods and channels for clients to interact with Grid-enabled computing resources running the ARC middleware. Client interactions with data management systems (e.g. data indexing services, grid storages) and resource indices (resource registries) are out of the scope of this document.

2 ARC Computing Resource

what is assumed about a computing resource, what services are required, what are the open channels, etc. what are the capabilities of a CR,....

An ARC computing resource is capable of

- accepting job submission requests of clients and 'forwarding' those to the local batch system
- acting actively in the stage-in process of grid job, collecting input data
- altering the grid kjob's execution in the local batch system
- providing information about itself
- providing information about grid jobs running on the resource
- providing access to the grid job's session directory
- assisting in the stage-out process of the grid jobs

3 ARC grid job

what is a grid job in an ARC system, what can be done with a job, etc..

3.1 Formulating a grid job request: XRSL ARC job description language

XRSL is used to:

- describe the stage-in process
- specify requirements with respect to computing resource: XRSL attributes are matched against the information system attributes during the brokering process.
- describe the stage-out process

description of the ARC specific attributes, ...

4 ARC Clients

Clients in ARC are individual agents, everything can be a client which is capable speaking the language of ARC grid resources. Clients interact with different type of grid components, such as computing resource, data and resource indexing services. This document focuses only on the computing resource interaction.

The client tasks within ARC are the following

- interpret the user's job request formulated in XRSL: a sort of client - user interaction

- find Grid resources by contacting the resource index services: resource discovery

- obtain information about discovered grid resources: information collection

- select the best suitable resource by comparing the collected information and the user's job request: brokering

- submit a job to the selected grid computing resource: job submission

- find input data by contacting data indexing services

- handle the input data required by the grid job: grid data stage-in

- interaction with active grid jobs (kill, delete, resubmit): job management

- checking job-related information: job status monitoring

- handle the job's output data: grid data stage-out

The next sections expand those client tasks where computing resources are involved. Please notice that client tasks of XRSL interpretation, resource discovery, resource selection (or brokering) do not involve interaction with computing resources.

5   Client - Computing resource interactions

This section gives a detailed overview of those client tasks where the client interacts with the computing resource. Figure **??** shows a schematic view of the different interactions between ARC client and Computing resource.

5.1   Information collection

the interface to the local ldap information tree, what sort of info is collected, resource representation via nordugrid schema.

5.2   job submission

how is it done, what is moved/exchanged among the client/computing resource

5.3   job management

cancellation, resubmission, etc...

5.4   job status monitoring

job monitoring via ldap, job states, job info schema

5.5   input data management

how is the input data managed, what is done by the client and what is done by the computing resource: ngsub's upload and the "inputfile" xrsl attribute

5.6   output data management

how is the output of the grid job handled, what is needed by the client side, what is provided by the computing resource: ngget and the "outputfile" xrsl attribute

6 Next Generation ARC interface

here we present our future plans, which is basically our list of requirements

References

[1] NorduGrid project. `http://www.nordugrid.org`