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# OpenStack/AliEn/ARC Master thesis

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# Alien/ARC: Background

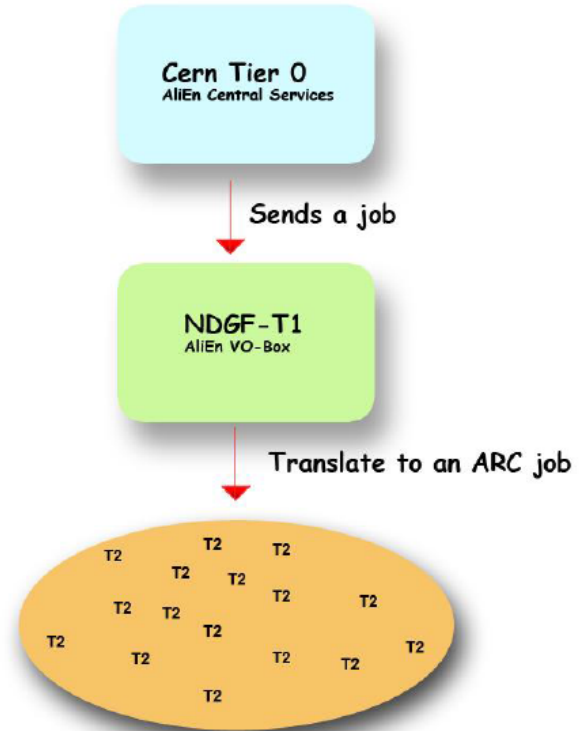
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- NDGF-T1 (the Nordic Tier 1) uses ARC middleware internally.
  - AliEn is run directly on some NDGF-T1 sites, but not all.
  - With an AliEn-ARC interface we might get access to all the NDGF-T1 sites.
  - With an AliEn-ARC interface, we can have a common VO-box for all the NDGF-T1 sites.
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# AliEn - ARC Interface

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Make NDGF-T1  
ARC Computing Elements  
appear as one T1 site for  
AliEn



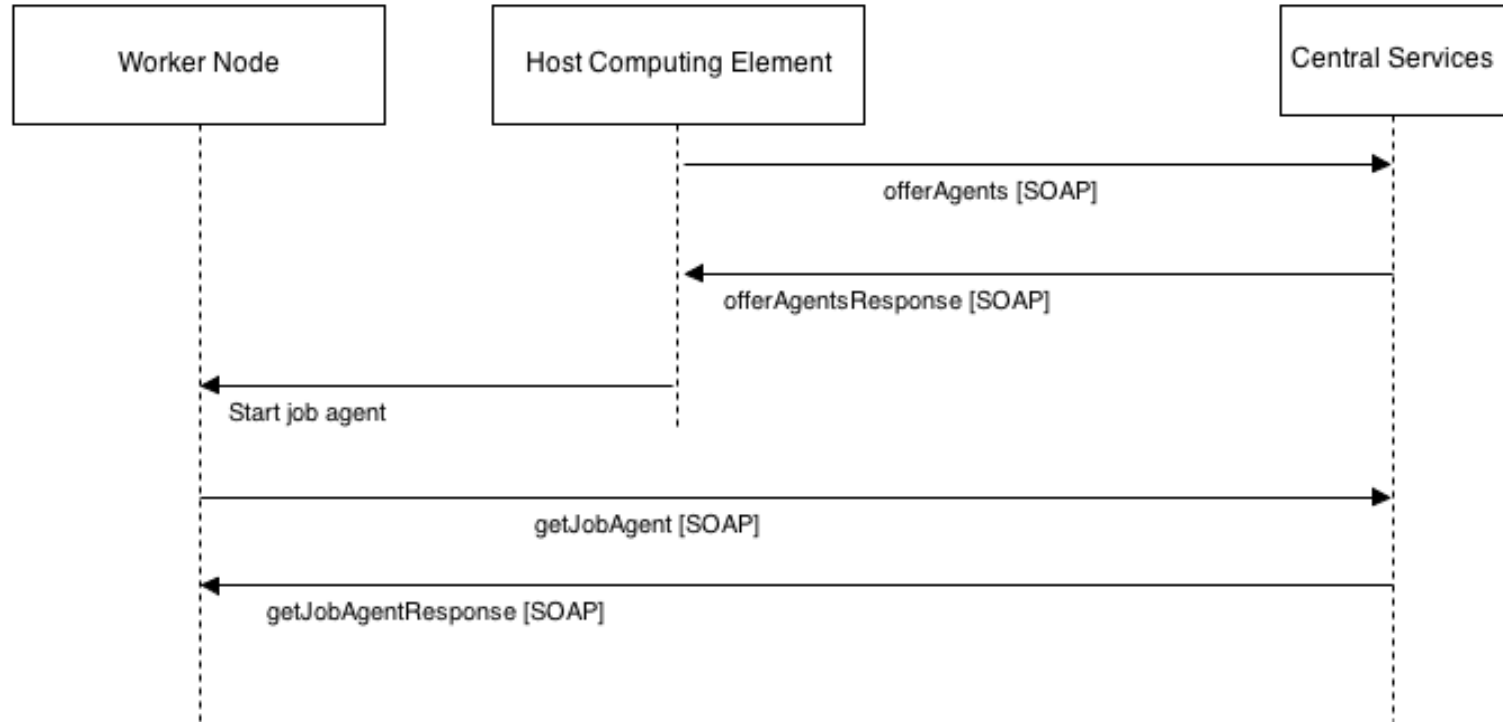
# Project 1: Submit AliEn job to external ARC CE

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- The existing AliEn-ARC interface submit jobs into a local ARC environment.
  - A new solution:
    - Find ARC site
    - Start JobAgent at external ARC site
    - AliEn software is retrieved using torrent install method or CernVMFS
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# Project 1: Submit AliEn job to external ARC CE

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# Project 1: Submit AliEn job to external ARC CE

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- Enables use of more ARC resources
  - Could use resources more efficiently if job is run on a site close to the data
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# dCache lookup web service

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- Currently runs on dCache in NDGF
    - Service on port 2290 on ftp1.ndgf.org
  - Input
    - File name using GET request
  - Output
    - Site(s) who has the file
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# Selecting best ARC site using dCache

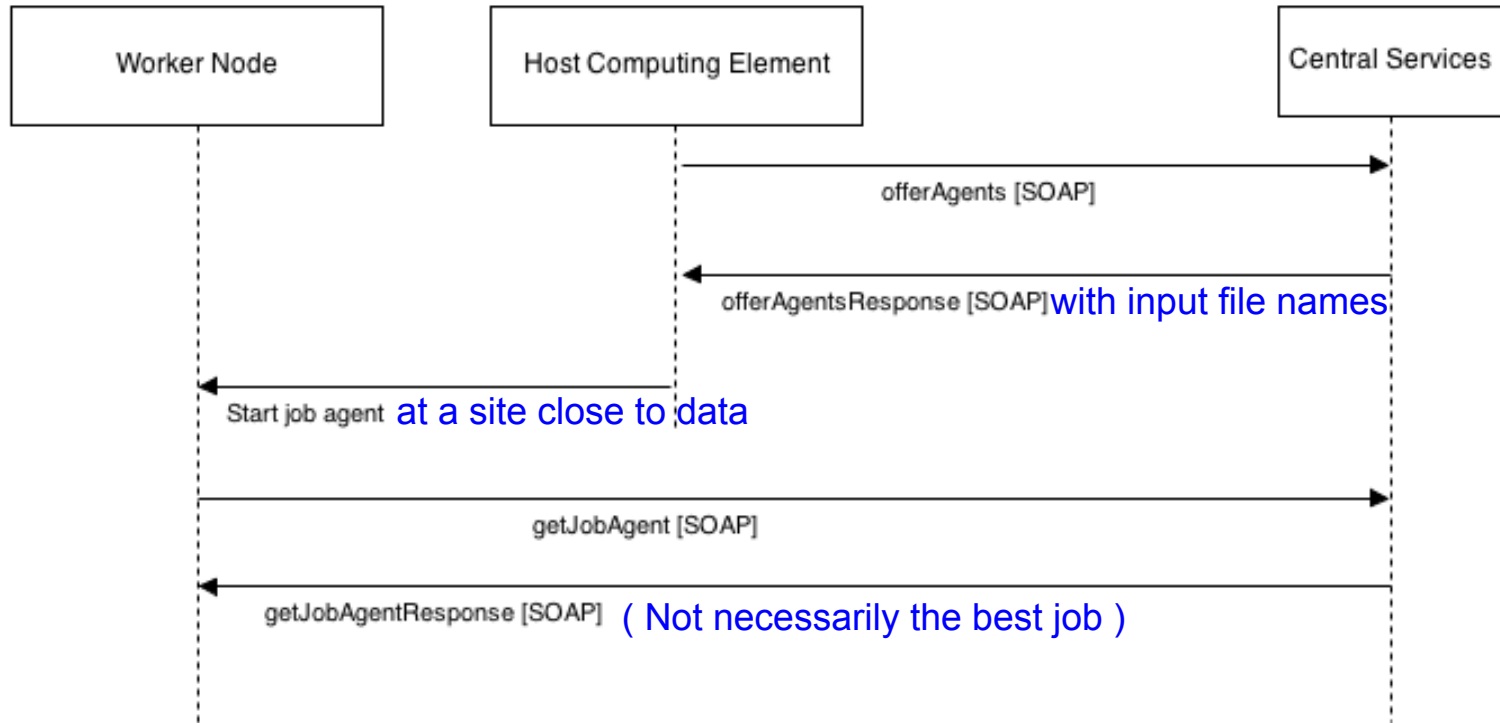
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- Definition of “best site”
    - Already has majority of input files in its SE
  - Check the input files in the job
  - Find physical location of the files
    - Using dCache lookup web service
  - Start JobAgent at best site
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# Job work flow

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# Starting JobAgent on best site

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- We need to know path to input files before starting JobAgent
    - offerAgentResponse does not contain any information about the input files
  - VO could use dCache lookup web service
    - Not VOs job to match sites
  - Possibility for the JobAgent getting the right job for the site.
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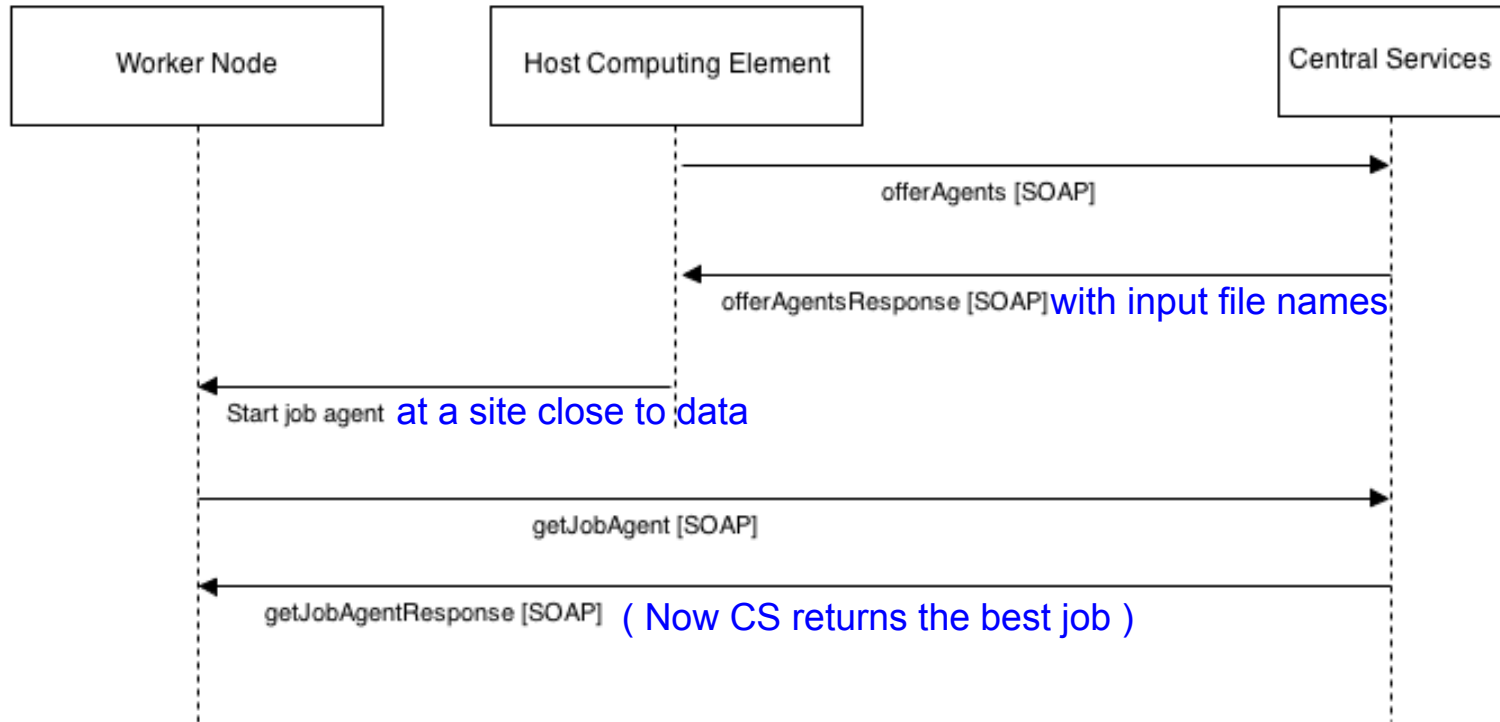
# WN also gets best Job

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- Better solution
    - CS also responds with best Job to WN
  - Match jobs on subdivided SEs job when returning JobAgentReponse to WN
    - CS ask VO for best site based on input files for the Job
    - VO uses dCache lookup web service
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# Job work flow

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# What has been done:

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Set up testbed system consisting of

- AliEn Central Services running on a local machine
  - A machine acting as VO for our test setup
  - Configured CEs:
    - ARC
    - AliEn/Torque
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# Next

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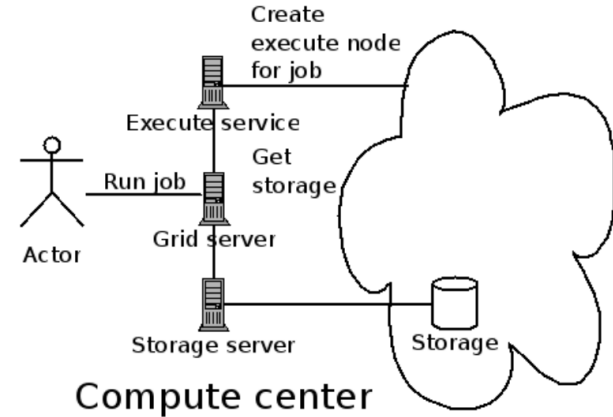
- Starting JobAgent at remote ARC site
  - Investigate different ways to send the JobAgent to best site
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# On-Demand AliEn with OpenStack/EC2

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## Quick recap

- Use Amazon EC2 API to acquire Grid resources when needed
- Free the resources when done
- OpenStack, CernVM and AliEn



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## Central Services

Any jobs?

Yes

### AliEn VO-Box

JobAgent:  
Requests job

Start new Virtual Machine

Return job

### OpenStack

WN1

WN2

...

WNn

Shutdown VM  
after Job Agent  
is done

Virtual Worker Nodes

## Site



# OAO: What has been done

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- Gathering knowledge of OpenStack, the EC2 API and AliEn
  - Looking into CernVM
    - Prologue, epilogue, context
  - Have set up an OpenStack testbed
  - Started implementing an AliEn VO module which can launch EC2 CernVM instances
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# OAO: Status and TODO

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- Finish implementation
  - Testing and measuring
    - uCernVM vs CernVM 2.7
    - Different instance types
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