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The ARC Job Description

Internal Representation Mapping

M. S. Andersen*

*skou@nbi.dk

Contents

1 Introduction

This document contains information about how XRSL, JDL and the various supported JSDL flavours are mapped to and from the job description internal representation in ARC-lib.

2 Data Structure

The internal representation of the job description is contained in the JobDescription class, which consist of the following objects: JobIdentification, Application, Resources, DataStaging and JobMetaData. JobIdentification contains data used to identify the job description through various types, tags and names. The Application object is used to describe explicitly the executable which should be executed at the Computing Endpoint (CE), environment variables, logging, standard in and out, credential service, etc. The Resources class contains information about requirements and the type of execution node preferred by the user. The DataStaging class contains information about input files and output files/directories created by the job. Finally the job description may contain meta data, describing the context in which the description was generated, and it is stored in the JobMetaData class.

2.1 JobIdentification

2.1.1 JobName

	In	Out
XRSL	`jobname`	`jobname`
JDL	`No matching attribute`	`Not mapped`
JSDL	`JobIdentification/JobName`	`JobIdentification/JobName`
ARC-JSDL		

2.1.2 Description

	In	Out
ARC-JSDL	`JobIdentification/Description`	`JobIdentification/Description`

2.1.3 JobType

	In	Out
ARC-JSDL	`JobIdentification/JobType`	`JobIdentification/JobType`

JDL has a jobtype and a type attribute, however a mapping has not been made.

2.1.4 UserTag

	In	Out
JDL	`usertags`	`usertags`
ARC-JSDL	`JobIdentification/UserTag`	`JobIdentification/UserTag`

2.2 JobVOName

	In	Out
XRSL	`jobname`	`jobname`
ARC-JSDL	`JobIdentification/JobVOName`	`JobIdentification/JobVOName`

2.3 Application

2.3.1 Executable

	In	Out
XRSL	`executable, arguments`	`executable, arguments`
JDL	`Executable, Arguments`	`Executable, Arguments`
Posix-JSDL	`Application/POSIXApplication/Executable, Application/POSIXApplication/Arguments`	`Application/POSIXApplication/Executable, Application/POSIXApplication/Arguments`
HPCP-JSDL	`Application/HPCProfileApplication/Executable, Application/HPCProfileApplication/Arguments`	`Application/HPCProfileApplication/Executable, Application/HPCProfileApplication/Arguments`
ARC-JSDL	`Application/Executable/Path, Application/Executable/Argument`	`Application/Executable/Path, Application/Executable/Argument`

The Executable data member is a composite structure of a string and a list of strings, where the string holds the executable and the list holding the arguments.

2.3.2 Input

	In	Out
XRSL	`stdin`	`stdin, inputFiles`
JDL	`StdInput`	`StdInput, InputSandbox`
Posix-JSDL	`Application/POSIXApplication/Input`	`Application/POSIXApplication/Input`
HPCP-JSDL	`Application/HPCProfileApplication/Input`	`Application/HPCProfileApplication/Input`
ARC-JSDL	`Application/Input`	

If the Input data member does not exist in the file list, it will be added to it.

2.3.3 Output

	In	Out
XRSL	`stdout`	`stdout, outputFiles`
JDL	`StdOutput`	`StdOutput, OutputSandbox, OutputSandboxDestURI`
Posix-JSDL	`Application/POSIXApplication/Output`	
HPCP-JSDL	`Application/HPCProfileApplication/Output`	
ARC-JSDL	`Application/Output`	

If the Output data member does not exist in the File list, it will be added to it.

2.3.4 Error

	In	Out
XRSL	stderr	stderr, outputFiles
JDL	StdError	StdError, OutputSandbox, OutputSandboxDestURI
Posix-JSDL	Application/POSIXApplication/Error	
HPCP-JSDL	Application/HPCProfileApplication/Error	
ARC-JSDL	Application/Error	

If the Error data member does not exist in the File list, it will be added to it.

2.3.5 Join

	In	Out
XRSL	join	Not mappedTODO
ARC-JSDL	Application/Join	Application/Join

2.3.6 Environment

Name

	In	Out
XRSL	environment*	environment*
JDL	Environment**	Environment**
Posix-JSDL	Application/POSIXApplication/Environment.name	Application/POSIXApplication/Environment.name
HPCP-JSDL	Application/HPCProfileApplication/Environment.name	Application/HPCProfileApplication/Environment.name
ARC-JSDL	Application/Environment/Name	

The XRSL attribute environment is a list of pairs. The first element of each pair is mapped to the Name data member. The JDL attribute Environment is a list of equalities.

Value

	In	Out
XRSL	environment*	environment*
JDL	Environment**	Environment**
JSDL	No matching attribute	Not mapped
Posix-JSDL	Application/POSIXApplication/Environment	Application/POSIXApplication/Environment
HPCP-JSDL	Application/HPCProfileApplication/Environment	Applicaion/HPCProfileApplication/Environment
ARC-JSDL	Application/Environment/Value	

2.3.7 Prologue

	In	Out
JDL	`Prologue, PrologueArgument`	`Prologue, PrologueArgument`
ARC-JSDL	`Application/Prologue/Path, Application/Prologue/Argument`	`Application/Prologue/Path, Application/Prologue/Argument`

2.3.8 Epilogue

	In	Out
JDL	`Epilogue, EpilogueArgument`	`Epilogue, EpilogueArgument`
ARC-JSDL	`Application/Epilogue/Path, Application/Epilogue/Argument`	`Application/Epilogue/Path, Application/Epilogue/Argument`

2.3.9 LogDir

	In	Out
XRSL	`gmlog`	`gmlog outputFiles`
ARC-JSDL	`Application/LogDir`	`Application/LogDir`

2.4 RemoteLogging

	In	Out
XRSL	`jobreport`	`jobreport`
ARC-JSDL	`Application/RemoteLogging`	`Application/RemoteLogging`

2.4.1 Rerun

	In	Out
XRSL	`rerun`	`rerun`
JDL	`RetryCount ShallowRetryCount*`	`RetryCount ShallowRetryCount**`
ARC-JSDL	`Application/Rerun`	`Application/Rerun`

* Only the maximum value between RetryCount and ShallowRetryCount is stored.

** Both RetryCount and ShallowRetryCount will be set if Rerun is set, and they will both have the value of Rerun.

2.4.2 ExpiryTime

	In	Out
JDL	`ExpiryTime`	`ExpiryTime`
ARC-JSDL	`Application/ExpiryTime`	`Application/ExpiryTime`

2.4.3 StartOnHold

In	Out

2.4.4 ProcessingStartTime

	In	Out
ARC-JSDL	`Application/ProcessingStartTime`	`Application/ProcessingStartTime`

2.4.5 Notification

	In	Out
XRSL	`notify`	`notify`
ARC-JSDL	`Application/Notification`	`Application/Notification`

2.4.6 CredentialService

	In	Out
XRSL	`credentialserver`	`credentialserver`
JDL	`MyProxyServer`	`MyProxyServer`
ARC-JSDL	`Application/CredentialService`	`Application/CredentialService`

2.4.7 AccessControl

	In	Out
XRSL	`acl`	`acl`
ARC-JSDL	`Application/AccessControl`	`Application/AccessControl`

2.5 Resources

2.5.1 OperatingSystem

	In	Out
XRSL	`opsys`	`opsys`
ARC-JSDL	`Resources/OperatingSystem`	`Resources/OperatingSystem`

2.5.2 Platform

	In	Out
XRSL	`architecture`	`architecture`
JSDL	`Resources/CPUAchitecture/CPUArchitectureName`	
ARC-JSDL	`Resources/Platform`	

2.5.3 NetworkInfo

	In	Out
JSDL	`Resources/IndividualNetworkBandwidth`	
ARC-JSDL	`Resources/NetworkInfo`	

2.5.4 NodeAccess

	In	Out
XRSL	`nodeAccess`	`nodeAccess`
ARC-JSDL	`Resources/NodeAccess`	

2.5.5 IndividualPhysicalMemory

	In	Out
XRSL	`memory`	`memory`
Posix-JSDL	`Application/POSIXApplication/MemoryLimit`	
ARC-JSDL	`Resources/IndividualPhysicalMemory`	

2.5.6 IndividualVirtualMemory

	In	Out
Posix-JSDL	`Application/POSIXApplication/VirtualMemoryLimit`	
ARC-JSDL	`Resources/IndividualVirtualMemory`	

2.5.7 DiskSpaceRequirement

DiskSpace

	In	Out
XRSL	`disk`	`disk`
JSDL	`Application/FileSystem/DiskSpace`	
ARC-JSDL	`Resources/DiskSpaceRequirement/DiskSpace`	

CacheDiskSpace

	In	Out
ARC-JSDL	`Resources/CacheDiskSpace`	`Resources/CacheDiskSpace`

SessionDiskSpace

	In	Out
ARC-JSDL	`Resources/SessionDiskSpace`	`Resources/SessionDiskSpace`

2.5.8 SessionLifetime

	In	Out
XRSL	`lifeTime`	`lifeTime`
ARC-JSDL	`Resources/SessionLifeTime`	`Resources/SessionLifeTime`

2.5.9 SessionAccessMode

In	Out

2.5.10 IndividualCPUTime

	In	Out
JSDL	`Resources/IndividualCPUTime*`	
ARC-JSDL	`Resources/IndividualCPUTime`	

* The JSDL element is mapped to the Range part of IndividualCPUTime.

2.5.11 TotalCPUTime

	In	Out
XRSL	`cpuTime`	`cpuTime`
JSDL	`Resources/TotalCPUTime*`	
Posix-JSDL	`Application/POSIXApplication/CPUTimeLimit*`	
ARC-JSDL	`Resources/TotalCPUTime`	

* The JSDL and POSIX-JSDL elements is mapped to the Range part of TotalCPUTime.

2.5.12 IndividualWallTime

	In	Out
ARC-JSDL	`Resources/IndividualWallTime`	

2.5.13 TotalWallTime

	In	Out
XRSL	`wallTime`	`wallTime`
Posix-JSDL	`Application/POSIXApplication/WallTimeLimit`	
ARC-JSDL	`Resources/TotalWallTime`	

2.5.14 Homogeneous

In	Out

2.5.15 Benchmark

Type

In	Out

Value

In	Out

2.5.16 CEType

	In	Out
XRSL	`middleware`	`middleware`
ARC-JSDL	`Application/CEType`	`Application/CEType`

2.5.17 SlotRequirement

NumberOfSlots

	In	Out
Posix-JSDL	`Application/POSIXApplication/ProcessCountLimit`	
ARC-JSDL	`Resources/SlotRequirement/NumberOfSlots`	

ProcessPerHost

	In	Out
XRSL	`count`	`count`
JSDL	`Resources/TotalCPUCount`	
ARC-JSDL	`Resources/SlotRequirement/ProcessPerHost`	

ThreadsPerProcesses

	In	Out
Posix-JSDL	`Application/POSIXApplication/ThreadCountLimit`	
ARC-JSDL	`Resources/SlotRequirement/ThreadsPerProcesses`	

SPMDVariation

	In	Out
ARC-JSDL	`Resources/SlotRequirement/SPMDVariation`	

2.5.18 CandidateTarget

EndPointURL

	In	Out
XRSL	`cluster`	`Not mapped`
JSDL	`Resources/CandidateHosts/HostName`	
ARC-JSDL	`Resources/CandidateTarget/EndPointURL`	`Resources/CandidateTarget/EndPointURL`

QueueName

	In	Out
XRSL	`queue`	`queue`
JDL	`QueueName`	`QueueName`
ARC-JSDL	`Resources/CandidateTarget/QueueName`	`Resources/CandidateTarget/QueueName`

2.5.19 RunTimeEnvironment

	In	Out
XRSL	`runTimeEnvironment`	`runTimeEnvironment`
ARC-JSDL	`Application/RunTimeEnvironment`	`Application/RunTimeEnvironment`

2.6 DataStaging

2.6.1 File

Name

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

Source

URL

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

Threads

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

DataIndexingService

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

Target

URL

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

Threads

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

Mandatory

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

DataIndexingService

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

NeededReplica

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

KeepData

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

IsExecutable

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

DownloadToCache

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

2.6.2 Directory

2.7 JobMetaData

2.7.1 Author

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

2.7.2 DocumentExpiration

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

2.7.3 Rank

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

2.7.4 FuzzyRank

	In	Out
XRSL		
JDL		
JSDL		
Posix-JSDL		
HPCP-JSDL		
ARC-JSDL		

3 XRSL mapping

4 JDL mapping

5 JSDL mapping

6 POSIX-JSDL mapping

7 HPCProfile-JSDL mapping

XRSL input	Internal representaion	XRSL output
executable	Application.Executable.Name	executable
arguments	Application.Executable.Arguments	arguments
inputFiles	DataStaging.File.Name DataStaging.File.Source	inputFiles
executables	DataStaging.File.IsExecutable	executables
cache	TODO	TODO
outputFiles	DataStaging.File.Name DataStaging.File.Target	outputFiles
cpuTime	Resources.TotalCPUTime	cpuTime
wallTime	Resources.TotalWallTime	wallTime
gridTime	Not mapped	Not mapped
benchmarks	Not mapped	Not mapped
memory	Resources.IndividualPhysicalMemory	memory
disk	Resources.DiskSpaceRequirement.DiskSpace	disk
runTimeEnvironment	Resources.RunTimeEnvironment	runTimeEnvironment
middleware	Resources.CEType	middleware
opsys	Resources.OperatingSystem	opsys
stdin	Application.Input	stdin
stdout	Application.Output	stdout outputFiles
stderr	Application.Error	stderr outputFiles
join	Application.Join	Not mapped
gmlog	Application.LogDir	gmlog
jobName	Identification.JobName	jobName
ftpThreads	DataStaging.File.Source.Threads DataStaging.File.Target.Threads	Not mapped
acl	Application.AccessControl	acl
cluster	Resources.CandidateTarget.EndPointURL	Not mapped
queue	Resources.CandidateTarget.QueueName	queue
startTime	Application.ProcessingStartTime	Not mapped
lifeTime	Resources.SessionLifeTime	lifeTime
notify	Application.Notification	notify
replicaCollection	DataStaging.File.DataIndexingService	Not mapped
rerun	Application.Rerun	rerun
architecture	Resources.Platform	architecture
nodeAccess	Resources.NodeAccess	Not mapped
dryRun	Not mapped	Not mapped
rsl_substitution	Processed internally by the parser	Not mapped
environment	Application.Environment	environment
count	Resources.SlotRequirement.ProcessPerHost	count
jobreport	Application.RemoteLogging	jobreport
credentialserver	Application.CredentialService	credentialserver

JDL input	Internal representaion	JDL outpu
JobType	Not mapped	Not mappe
Executable	Application.Executable.Name	Executable Input
Arguments	Application.Executable.Arguments	Argument
StdInput	Application.Input	StdInput InputS
StdOutput	Application.Output	StdOutput OutputSandbox Ou
StdError	Application.Error	StdError OutputSandbox Out
InputSandbox	DataStaging.File.Name DataStaging.File.Source	InputSandb
InputSandboxBaseURI	DataStaging.File.Source.URI	InputSandb
OutputSandbox	DataStaging.File.Name DataStaging.File.Target.URI	OutputSandbox OutputS
OutputSandboxDestURI	DataStaging.File.Target DataStaging.File.KeepData	OutputSandbox OutputS
OutputSandboxBaseDestURI	DataStaging.File.Target.URI	OutputSandbox OutputS
Prologue	Application.Prologue.Name	Prologue
PrologueArguments	Application.Prologue.Arguments	PrologueArgur
Epilogue	Application.Epilogue.Name	Epilogue
EpilogueArguments	Application.Epilogue.Arguments	EpilogueArgur
AllowZippedISB	Stored internally, not processed	AllowZipped
ZippedISB	Stored internally, not processed	ZippedISE
ExpiryTime	Application.ExpiryTime	ExpiryTim
Environment	Application.Environment	Environme
PerusalFileEnable	Stored internally, not processed	PerusalFileEn
PerusalTimeInterval	Stored internally, not processed	PerusalTimeIn
PerusalFilesDestURI	Stored internally, not processed	PerusalFilesDe
InputData (Deprecated)	Not mapped	Not mappe
OutputData (Deprecated)	Not mapped	Not mappe
StorageIndex (Deprecated)	Not mapped	Not mappe
DataCatalog (Deprecated)	Not mapped	Not mappe
DataRequirements	Stored internally, not processed	DataRequirem
DataAccessProtocol	Stored internally, not processed	DataAccessPro
OutputSE	Stored internally, not processed	OutputSE
VirtualOrganisation	Identification.JobVOName	VirtualOrganis
RetryCount	Application.Rerun	RetryCount Shallowl
ShallowRetryCount	Application.Rerun	RetryCount Shallowl
LBAddress	Stored internally, not processed	LBAddres
MyProxyServer	Application.CredentialService	MyProxySer
HLRLocation	Stored internally, not processed	HLRLocati
JobProvenance	Stored internally, not processed	JobProvenar
NodeNumber	Stored internally, not processed	NodeNumb
JobSteps (Deprecated)	Not mapped	Not mappe
CurrentStep (Deprecated)	Not mapped	Not mappe
JobState (Deprecated)	Not mapped	Not mappe
ListenerPort	Stored internally, not processed	ListenerPo
ListenerHost	Stored internally, not processed	ListenerHo
ListenerPipeName	Stored internally, not processed	ListenerPipeN
Requirements	Stored internally, not processed	Requiremer
Rank	JobMeta.Rank	Rank
FuzzyRank	JobMeta.FuzzyRank	FuzzyRan
UserTags	Identification.UserTag	UserTags
BatchSystem	Stored internally, not processed	BatchSyste
QueueName	Resources.CandidateTarget.QueueName	QueueNam

JSDL input	Internal representaion	JSDL output
JobIdentification		
JobName		
JobAnnotation		
JobProject		
Application		
ApplicationName		
ApplicationVersion		
Resources		
CandidateHosts/HostName		
FileSystem/FileSystemType		
FileSystem/Description		
FileSystem/MountPoint		
FileSystem/DiskSpace		
ExclusiveExecution		
OperatingSystem/OperatingSystemType/OperatingSystemName		
OperatingSystem/OperatingSystemVersion		
CPUArchitecture/CPUArchitectureName		
IndividualCPUSpeed		
IndividualCPUTime		
IndividualCPUCount		
IndividualNetworkBandwidth		
IndividualPhysicalMemory		
IndividualVirtualMemory		
IndividualDiskSpace		
TotalCPUTime		
TotalCPUCount		
TotalPhysicalMemory		
TotalVirtualMemory		
TotalDiskSpace		
TotalResourceCount		
DataStaging	--	--
FileName		
FileSystemName		
CreationFlag		
DeleteOnTermination		
Source/URI		
Target/URI		

POSIX-JSDL input	Internal representation	POSIX-JSDL output
Executable		
Argument		
Input		
Output		
Error		
WorkingDirectory		
Environment		
WallTimeLimit		
FileSizeLimit		
CoreDumpLimit		
DataSegmentLimit		
LockedMemoryLimit		
OpenDescriptorsLimit		
PipeSizeLimit		
StackSizeLimit		
CPUTimeLimit		
ProcessCountLimit		
VirtualMemoryLimit		
ThreadCountLimit		
UserName		
GroupName		

HPCProfile-JSDL input	Internal representaion	HPCProfile-JSDL output
Executable		
Argument		
Input		
Output		
Error		
WorkingDirectory		
Environment		
UserName		