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THE ARC JOB DESCRIPTION

Internal Representation Mapping

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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
JSDL	JobIdentification/JobName	JobIdentification/JobName
ARC-JSDL	JobIdentification/JobName	JobIdentification/JobName

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

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

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	Application/POSIXApplication/Output
HPCP-JSDL	Application/HPCProfileApplication/Output	Application/HPCProfileApplication/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	Application/POSIXApplication/Error
HPCP-JSDL	Application/HPCProfileApplication/Error	Application/HPCProfileApplication/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 mapped
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

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

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 ProcessingStartTime

	In	Out
ARC-JSDL	Application/ProcessingStartTime	Application/ProcessingStartTime

2.4.4 Notification

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

2.4.5 CredentialService

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

2.4.6 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/CPUArchitecture/CPUArchitectureName	Resources/CPUArchitecture/CPUArchitectureName
ARC-JSDL	Resources/Platform	Resources/Platform

2.5.3 NetworkInfo

	In	Out
JSDL	Resources/IndividualNetworkBandwidth	Resources/IndividualNetworkBandwidth
ARC-JSDL	Resources/NetworkInfo	Not mapped

2.5.4 NodeAccess

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

2.5.5 IndividualPhysicalMemory

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

2.5.6 IndividualVirtualMemory

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

2.5.7 DiskSpaceRequirement

DiskSpace

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

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

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

2.5.10 TotalCPUTime

	In	Out
XRSL	cpuTime, gridtime, benchmark	cpuTime
JSDL	Resources/TotalCPUTime*	Resources/TotalCPUTime
Posix-JSDL	Application/POSIXApplication/CPUTimeLimit*	Application/POSIXApplication/CPUTimeLimit
ARC-JSDL	Resources/TotalCPUTime	Resources/TotalCPUTime

The XRSL attribute `cputime` is mapped to the Range part of TotalCPUTime, where as for the `gridtime` attribute the pair ("ARC-gridtime", 1800) will be added to the benchmark part. The JSDL and POSIX-JSDL elements is mapped to the Range part of TotalCPUTime.

2.5.11 IndividualWallTime

	In	Out
ARC-JSDL	Resources/IndividualWallTime	Resources/IndividualWallTime

2.5.12 TotalWallTime

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

2.5.13 CEType

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

2.5.14 SlotRequirement

NumberOfSlots

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

ProcessPerHost

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

ThreadsPerProcesses

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

SPMDVariation

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

2.5.15 CandidateTarget

EndPointURL

	In	Out
XRSL	cluster	Not mapped
JSDL	Resources/CandidateHosts/HostName	Not mapped
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

2.5.16 RunTimeEnvironment

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

2.6 DataStaging

2.6.1 File

Name

	In	Out
XRSL	inputFiles, outputFiles	inputFiles, outputFiles
JDL	InputSandbox, OutputSandbox	InputSandbox, OutputSandbox
JSDL	DataStaging/File/FileName	DataStaging/File/FileName

Source

URI

	In	Out
XRSL	inputFiles	inputFiles
JDL	InputSandbox, InputSandboxURI	InputSandbox, InputSandboxURI
JSDL	DataStaging/File/Source/URI	DataStaging/File/Source/URI

Threads

	In	Out
XRSL	ftpThreads	ftpThreads

Target

URI

	In	Out
XRSL	outputFiles	outputFiles
JDL	OutputSandbox, OutputSandboxDestURI	OutputSandbox, OutputSandboxDestURI
JSDL	DataStaging/File/Target/URI	DataStaging/File/Target/URI

Threads

	In	Out
XRSL	ftpThreads	ftpThreads

KeepData

	In	Out
JDL	OutputSandboxDestURI	OutputSandboxDestURI
JSDL	DataStaging/File/DeleteOnTermination	DataStaging/File/DeleteOnTermination

IsExecutable

	In	Out
XRSL	executables	executables
ARC-JSDL	DataStaging/File/IsExecutable	DataStaging/File/IsExecutable

DownloadToCache

	In	Out
XRSL	cache	cache in URL-option
ARC-JSDL	DataStaging/File/DownloadToCache	DataStaging/File/DownloadToCache

2.7 JobMetaData

2.7.1 Rank

	In	Out
JDL	Rank	Rank

2.7.2 FuzzyRank

	In	Out
JDL	FuzzyRank	FuzzyRank

3 XRSL 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	DataStaging.File.DownloadToCache	cache in URL-option
outputFiles	DataStaging.File.Name, DataStaging.File.Target	outputFiles
cpuTime	Resources.TotalCPUTime	cpuTime

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wallTime	Resources.TotalWallTime	wallTime
gridTime	Resources.TotalCPUTime	Not mapped
benchmarks	Resources.TotalCPUTime	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	Not mapped	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

4 JDL mapping

JDL input	Internal representaion	JDL output
JobType	Not mapped	Not mapped

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Executable	Application.Executable.Name	Executable, InputSandbox
Arguments	Application.Executable.Arguments	Arguments
StdInput	Application.Input	StdInput, InputSandbox
StdOutput	Application.Output	StdOutput, OutputSandbox, OutputSandboxDestURI
StdError	Application.Error	StdError, OutputSandbox, OutputSandboxDestURI
InputSandbox	DataStaging.File.Name, DataStaging.File.Source	InputSandbox
InputSandboxBaseURI	DataStaging.File.Source.URI	InputSandbox
OutputSandbox	DataStaging.File.Name, DataStaging.File.Target.URI	OutputSandbox, OutputSandboxDestURI
OutputSandboxDestURI	DataStaging.File.Target, DataStaging.File.KeepData	OutputSandbox, OutputSandboxDestURI
Prologue	Application.Prologue.Name	Prologue
PrologueArguments	Application.Prologue.Arguments	PrologueArguments
Epilogue	Application.Epilogue.Name	Epilogue
EpilogueArguments	Application.Epilogue.Arguments	EpilogueArguments
AllowZippedISB	Stored internally, not processed	AllowZippedISB
ZippedISB	Stored internally, not processed	ZippedISB
ExpiryTime	Application.ExpiryTime	ExpiryTime
Environment	Application.Environment	Environment
PerusalFileEnable	Stored internally, not processed	PerusalFileEnable
PerusalTimeInterval	Stored internally, not processed	PerusalTimeInterval
PerusalFilesDestURI	Stored internally, not processed	PerusalFilesDestURI
InputData (Deprecated)	Not mapped	Not mapped
OutputData (Deprecated)	Not mapped	Not mapped
StorageIndex (Deprecated)	Not mapped	Not mapped
DataCatalog (Deprecated)	Not mapped	Not mapped
DataRequirements	Stored internally, not processed	DataRequirements
DataAccessProtocol	Stored internally, not processed	DataAccessProtocol
OutputSE	Stored internally, not processed	OutputSE
VirtualOrganisation	Identification.JobVOName	VirtualOrganisation
RetryCount	Application.Rerun	RetryCount ShallowRetryCount
ShallowRetryCount	Application.Rerun	RetryCount ShallowRetryCount
LBAddress	Stored internally, not processed	LBAddress
MyProxyServer	Application.CredentialService	MyProxyServer
HLRLocation	Stored internally, not processed	HLRLocation
JobProvenance	Stored internally, not processed	JobProvenance
NodeNumber	Stored internally, not processed	NodeNumber
JobSteps (Deprecated)	Not mapped	Not mapped

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CurrentStep (Deprecated)	Not mapped	Not mapped
JobState (Deprecated)	Not mapped	Not mapped
ListenerPort	Stored internally, not processed	ListenerPort
ListenerHost	Stored internally, not processed	ListenerHost
ListenerPipeName	Stored internally, not processed	ListenerPipeName
Requirements	Stored internally, not processed	Requirements
Rank	JobMeta.Rank	Rank
FuzzyRank	JobMeta.FuzzyRank	FuzzyRank
UserTags	Identification.UserTag	UserTags
BatchSystem	Stored internally, not processed	BatchSystem
QueueName	Resources.CandidateTarget.QueueName	QueueName

5 JSDL mapping

JSDL input	Internal representaion	JSDL output
JobIdentification		
JobName	Application.JobName	JobName
JobAnnotation	Not mapped	Not mapped
JobProject	Not mapped	Not mapped
Application		
ApplicationName	Not mapped	Not mapped
ApplicationVersion	Not mapped	Not mapped
Resources		
CandidateHosts/HostName	Resources.CandidateTarget.EndPointURL	Not mapped
FileSystem/FileSystemType	Not mapped	Not mapped
FileSystem/Description	Not mapped	Not mapped
FileSystem/MountPoint	Not mapped	Not mapped
FileSystem/DiskSpace	Resources.DiskSpaceRequirement.DiskSpace	FileSystem/DiskSpace
ExclusiveExecution	Not mapped	Not mapped
OperatingSystem/ OperatingSystemType/ OperatingSystemName	Resources.OperatingSystem	OperatingSystem/ OperatingSystemType/ OperatingSystemName
OperatingSystem/ OperatingSystemVersion	Resources.OperatingSystem	OperatingSystem/ OperatingSystemVersion
CPUArchitecture/ CPUArchitectureName	Resources.Platform	CPUAchitecture/ CPUAchitectureName
IndividualCPUSpeed	Not mapped	Not mapped

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IndividualCPUTime	job.Resources.IndividualCPUTime	IndividualCPUTime
IndividualCPUCount	Not mapped	Not mapped
IndividualNetworkBandwidth	Resources.NetworkInfo	IndividualNetworkBandwidth
IndividualPhysicalMemory	job.Resources.IndividualPhysicalMemory	IndividualPhysicalMemory
IndividualVirtualMemory	job.Resources.IndividualVirtualMemory	IndividualVirtualMemory
IndividualDiskSpace	Not mapped	Not mapped
TotalCPUTime	job.Resources.TotalCPUTime.range	TotalCPUTime
TotalCPUCount	job.Resources.SlotRequirement.ProcessPerHost	TotalCPUCount
TotalPhysicalMemory	Not mapped	Not mapped
TotalVirtualMemory	Not mapped	Not mapped
TotalDiskSpace	Not mapped	Not mapped
TotalResourceCount	Not mapped	Not mapped

DataStaging

FileName	DataStaging.File.FileName	FileName
FileSystemName	Not mapped	Not mapped
CreationFlag	Not mapped	Not mapped
DeleteOnTermination	DataStaging.File.KeepData	DeleteOnTermination
Source/URI	DataStaging.File.Source.URI	Source/URI
Target/URI	DataStaging.File.Target.URI	Target/URI

6 POSIX-JSDL mapping

POSIX-JSDL input	Internal representation	POSIX-JSDL output
Executable	Application.Executable.Name	Executable, DataStaging.File.Name, DataStaging.File.Source
Argument	Application.Executable.Arguments	Argument
Input	Application.Input	Input, DataStaging.File.Name, DataStaging.File.Source
Output	Application.Output	Output, DataStaging.File.Name, DataStaging.File.Target
Error	Application.Error	Error, DataStaging.File.Name, DataStaging.File.Target
WorkingDirectory	Not mapped	Not mapped
Environment	Application.Environment	Environment
WallTimeLimit	job.Resources.TotalWallTime.range.max	WallTimeLimit
FileSizeLimit	Not mapped	Not mapped

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CoreDumpLimit	Not mapped	Not mapped
DataSegmentLimit	Not mapped	Not mapped
LockedMemoryLimit	Not mapped	Not mapped
OpenDescriptorsLimit	Not mapped	Not mapped
PipeSizeLimit	Not mapped	Not mapped
StackSizeLimit	Not mapped	Not mapped
CPUTimeLimit	job.Resources.TotalCPUTime.range.max	CPUTimeLimit
ProcessCountLimit	job.Resources.SlotRequirement.NumberOfSlots.max	ProcessCountLimit
VirtualMemoryLimit	job.Resources.IndividualVirtualMemory.max	VirtualMemoryLimit
ThreadCountLimit	job.Resources.SlotRequirement.ThreadsPerProcesses.max	ThreadCountLimit
UserName	Not mapped	Not mapped
GroupName	Not mapped	Not mapped

7 HPCProfile-JSDL mapping

HPCProfile-JSDL input	Internal representaion	HPCProfile-JSDL output
Executable	Application.Executable.Name	Executable, DataStaging.File.Name, DataStaging.File.Source
Argument	Application.Executable.Arguments	Argument
Input	Application.Input	Input, DataStaging.File.Name, DataStaging.File.Source
Output	Application.Output	Output, DataStaging.File.Name, DataStaging.File.Target
Error	Application.Error	Error, DataStaging.File.Name, DataStaging.File.Target
WorkingDirectory	Not mapped	Not mapped
Environment	Application.Environment	Environment
UserName	Not mapped	Not mapped