**The Pegasus Workflow Planner Properties**

# Property Documentation

V 3.0.0cvs automatically generated at

2010-11-17 17:09

## Contents

# 1 Introduction

This file is the reference guide to all properties regarding the Pegasus Workflow Planner, and their respective default values. Please refer to the user guide for a discussion when and which properties to use to configure various components. Please note that the values rely on proper capitalization, unless explicitly noted otherwise.

Some properties rely with their default on the value of other properties. As a notation, the curly braces refer to the value of the named property. For instance, ${pegasus.home} means that the value depends on the value of the pegasus.home property plus any noted additions. You can use this notation to refer to other properties, though the extent of the subsitutions are limited. Usually, you want to refer to a set of the standard system properties. Nesting is not allowed. Substitutions will only be done once.

There is a priority to the order of reading and evaluating properties. Usually one does not need to worry about the priorities. However, it is good to know the details of when which property applies, and how one property is able to overwrite another.

1. Property definitions in the system property file, usually found in *${pegasus.home.sysconfdir}/properties*, have the lowest priority. These properties are expected to be set up by the submit host's administrator.
2. The properties defined in the user property file *${user.home}/.pegasusrc* have higher priority. These can overwrite settings found in the system's properties. A set of sensible property values to set on a production system is shown below.
3. Commandline properties have the highest priority. Each commandline property is introduced by a -D argument. Note that these arguments are parsed by the shell wrapper, and thus the -D arguments must be the first arguments to any command. Commandline properties are useful for debugging purposes.

The following example provides a sensible set of properties to be set by the user property file. These properties use mostly non-default settings. It is an example only, and will not work for you:

```
pegasus.catalog.provenance InvocationSchema
pegasus.catalog.*.db.driver Postgres
pegasus.catalog.*.db.url jdbc:postgresql:${user.name}
pegasus.catalog.*.db.user ${user.name}
pegasus.catalog.*.db.password XXXXXXXX
pegasus.catalog.replica RLS
pegasus.catalog.replica.url rls://smarty.isi.edu
pegasus.catalog.transformation File
pegasus.catalog.transformation.file   ${pegasus.home}/var/sample.tc.data
pegasus.catalog.site XML
pegasus.catalog.site.file             ${pegasus.home}/etc/sample.sites.xml
```

If you are in doubt which properties are actually visible, a sample application called `show-properties` dumps all properties after reading and prioritizing them.

Property : pegasus.home Systems : all Type : directory location string Default : ""$PEGASUS_HOME""

The property pegasus.home cannot be set in the property file. Any of the shell wrapper scripts for the applications will set this property from the value of the environment variable $PEGASUS_HOME. Knowledge about this property is important for developers who want to invoke PEGASUS classes without the shell wrappers.

pegasus.home ""$PEGASUS_HOME""

# 2 Property Files And Locations

This section describes the property file locations. Please refer to the introduction on issues about precedence of property definitions.

## 2.1 pegasus.properties

| | |
|---|---|
| Systems | all |
| Type | file location string |
| Default | ${pegasus.home.sysconfdir}/properties |

The system-wide properties file will be looked for in its default place. It will usually reside in $PEGASUS_HOME/etc as file named properties.

## 2.2 pegasus.user.properties

| | |
|---|---|
| Systems | all |
| Type | file location string |
| Default | ${user.home}/.pegasusrc |

Each user can overwrite the system-wide properties with his or her own definitions. The user properties rely on the system's notion of the user home directory, as reflected in the JRE system properties. In the user's home directory, a file .pegasusrc will be taken to contain user property definitions. Note that ${user.home} is a system property provided by the Java run-time environment (JRE).

Older version of PEGASUS used to support a dot-chimerarc file. For a while, both files are supported. However, in the presence of both files, precedence will be granted to the dot-pegasusrc file.

# 3 Local Directories

This section describes the GNU directory structure conventions. GNU distinguishes between architecture independent and thus sharable directories, and directories with data specific to a platform, and thus often

local. It also distinguishes between frequently modified data and rarely changing data. These two axis form a space of four distinct directories.

## 3.1 pegasus.home.datadir

| | |
|---|---|
| Systems | all |
| Type | directory location string |
| Default | ${pegasus.home}/share |

The datadir directory contains broadly visiable and possilby exported configuration files that rarely change. This directory is currently unused.

## 3.2 pegasus.home.sysconfdir

| | |
|---|---|
| Systems | all |
| Type | directory location string |
| Default | ${pegasus.home}/etc |

The system configuration directory contains configuration files that are specific to the machine or installation, and that rarely change. This is the directory where the XML schema definition copies are stored, and where the base pool configuration file is stored.

## 3.3 pegasus.home.sharedstatedir

| | |
|---|---|
| Systems | all |
| Type | directory location string |
| Default | ${pegasus.home}/com |

Frequently changing files that are broadly visible are stored in the shared state directory. This is currently unused.

## 3.4 pegasus.home.localstatedir

| | |
|---|---|
| Systems | all |
| Type | directory location string |
| Default | ${pegasus.home}/var |

Frequently changing files that are specific to a machine and/or installation are stored in the local state directory. This directory is being used for the textual transformation catalog, and the file-based replica catalog.

### 3.5 pegasus.dir.submit.logs

| | |
|---|---|
| System | Pegasus |
| Since | 2.4 |
| Type | directory location string |
| Default | false |

By default, Pegasus points the condor logs for the workflow to /tmp directory. This is done to ensure that the logs are created in a local directory even though the submit directory maybe on NFS. In the submit directory the symbolic link to the appropriate log file in the /tmp exists.

However, since /tmp is automatically purged in most cases, users may want to preserve their condor logs in a directory on the local filesystem other than /tmp

## 4 Site Directories

The site directory properties modify the behavior of remotely run jobs. In rare occasions, it may also pertain to locally run compute jobs.

### 4.1 pegasus.dir.useTimestamp

| | |
|---|---|
| System | Pegasus |
| Since | 2.1 |
| Type | Boolean |
| Default | false |

While creating the submit directory, Pegasus employs a run numbering scheme. Users can use this property to use a timestamp based numbering scheme instead of the runxxxx scheme.

### 4.2 pegasus.dir.exec

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | remote directory location string |
| Default | (no default) |

This property modifies the remote location work directory in which all your jobs will run. If the path is relative then it is appended to the work directory (associated with the site), as specified in the site catalog. If the path is absolute then it overrides the work directory specified in the site catalog.

## 4.3 pegasus.dir.storage

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | remote directory location string |
| Default | (no default) |

This property modifies the remote storage location on various pools. If the path is relative then it is appended to the storage mount point specified in the pool.config file. If the path is absolute then it overrides the storage mount point specified in the pool config file.

## 4.4 pegasus.dir.storage.deep

| | |
|---|---|
| System | Pegasus |
| Since | 2.1 |
| Type | Boolean |
| Default | false |
| See Also | pegasus.dir.storage, section 4.3 (page 9) |
| See Also | pegasus.dir.useTimestamp, section 4.1 (page 8) |

This property results in the creation of a deep directory structure on the output site, while populating the results. The base directory on the remote end is determined from the site catalog and the property pegasus.dir.storage.

To this base directory, the relative submit directory structure ( $user/$vogroup/$label/runxxxx ) is appended.

$storage = $base + $relative_submit_directory

Depending on the number of files being staged to the remote site a Hashed File Structure is created that ensures that only 256 files reside in one directory.

To create this directory structure on the storage site, Pegasus relies on the directory creation feature of the Grid FTP server, which appeared in globus 4.0.x

## 4.5 pegasus.dir.create.strategy

| | |
|---|---|
| System | Pegasus |
| Since | 2.2 |
| Type | enumeration |
| Value[0] | HourGlass |
| Value[1] | Tentacles |
| Default | Tentacles |

If the `--randomdir` option is given to the Planner at runtime, the Pegasus planner adds nodes that create the random directories at the remote pool sites, before any jobs are actually run. The two modes determine the placement of these nodes and their dependencies to the rest of the graph.

**HourGlass** It adds a make directory node at the top level of the graph, and all these concat to a single dummy job before branching out to the root nodes of the original/ concrete dag so far. So we introduce a classic X shape at the top of the graph. Hence the name HourGlass.

**Tentacles** This option places the jobs creating directories at the top of the graph. However instead of constricting it to an hour glass shape, this mode links the top node to all the relevant nodes for which the create dir job is necessary. It looks as if the node spreads its tentacleas all around. This puts more load on the DAGMan because of the added dependencies but removes the restriction of the plan progressing only when all the create directory jobs have progressed on the remote pools, as is the case in the HourGlass model.

### 4.6 pegasus.dir.create.impl

| | |
|---|---|
| System | Pegasus |
| Since | 2.2 |
| Type | enumeration |
| Value[0] | DefaultImplementation |
| Value[1] | S3 |
| Default | DefaultImpelmentation |

This property is used to select the executable that is used to create the working directory on the compute sites.

**DefaultImplementation** The default executable that is used to create a directory is the dirmanager executable shipped with Pegasus. It is found at $PEGASUS_HOME/bin/dirmanager in the pegasus distribution. An entry for transformation pegasus::dirmanager needs to exist in the Transformation Catalog or the PEGASUS_HOME environment variable should be specified in the site catalog for the sites for this mode to work.

**S3** This option is used to create buckets in S3 instead of a directory. This should be set when running workflows on Amazon EC2. This implementation relies on s3cmd command line client to create the bucket. An entry for transformation amazon::s3cmd needs to exist in the Transformation Catalog for this to work.

## 5 Schema File Location Properties

This section defines the location of XML schema files that are used to parse the various XML document instances in the PEGASUS. The schema backups in the installed file-system permit PEGASUS operations without being online.

## 5.1 pegasus.schema.dax

| | |
|---|---|
| Systems | Pegasus |
| Since | 2.0 |
| Type | XML schema file location string |
| Value[0] | ${pegasus.home.sysconfdir}/dax-3.2.xsd |
| Default | ${pegasus.home.sysconfdir}/dax-3.2.xsd |

This file is a copy of the XML schema that describes abstract DAG files that are the result of the abstract planning process, and input into any concrete planning. Providing a copy of the schema enables the parser to use the local copy instead of reaching out to the internet, and obtaining the latest version from the GriPhyN website dynamically.

## 5.2 pegasus.schema.pdax

| | |
|---|---|
| Systems | Pegasus |
| Since | 2.0 |
| Type | XML schema file location string |
| Value[0] | ${pegasus.home.sysconfdir}/pdax-2.0.xsd |
| Default | ${pegasus.home.sysconfdir}/pdax-2.0.xsd |

This file is a copy of the XML schema that describes partition dag files that are the result of the partitioning process. Providing a copy of the schema enables the parser to use the local copy instead of reaching out to the internet, and obtaining the latest version from the GriPhyN website dynamically.

## 5.3 pegasus.schema.sc

| | |
|---|---|
| Systems | Pegasus |
| Since | 2.0 |
| Type | XML schema file location string |
| Value[0] | ${pegasus.home.sysconfdir}/sc-3.0.xsd |
| Default | ${pegasus.home.sysconfdir}/sc-3.0.xsd |

This file is a copy of the XML schema that describes the xml description of the site catalog, that is generated as a result of using genpoolconfig command. Providing a copy of the schema enables the parser to use the local copy instead of reaching out to the internet, and obtaining the latest version from the GriPhyN website dynamically.

### 5.4 pegasus.schema.ivr

| | |
|---|---|
| Systems | all |
| Type | XML schema file location string |
| Value[0] | ${pegasus.home.sysconfdir}/iv-2.0.xsd |
| Default | ${pegasus.home.sysconfdir}/iv-2.0.xsd |

This file is a copy of the XML schema that describes invocation record files that are the result of the a grid launch in a remote or local site. Providing a copy of the schema enables the parser to use the local copy instead of reaching out to the internet, and obtaining the latest version from the GriPhyN website dynamically.

## 6 Database Drivers For All Relational Catalogs

### 6.1 pegasus.catalog.*.db.driver

| | |
|---|---|
| System | Pegasus |
| Type | Java class name |
| Value[0] | Postgres |
| Value[1] | MySQL |
| Value[2] | SQLServer2000 (not yet implemented!) |
| Value[3] | Oracle (not yet implemented!) |
| Default | (no default) |
| See also | pegasus.catalog.provenance, section 7.4.1 (page 22) |

The database driver class is dynamically loaded, as required by the schema. Currently, only PostGreSQL 7.3 and MySQL 4.0 are supported. Their respective JDBC3 driver is provided as part and parcel of the PEGASUS.

A user may provide their own implementation, derived from org.griphyn.vdl.dbdriver.DatabaseDriver, to talk to a database of their choice.

For each schema in ptc and tc, a driver is instantiated separately, which has the same prefix as the schema. This may result in multiple connections to the database backend. As fallback, the schema "*" driver is attempted.

The * in the property name can be replaced by a catalog name to apply the property only for that catalog. Valid catalog names are

```
replica
transformation
provenance
work
```

## 6.2 pegasus.catalog.*.db.url

| System | PTC, TC, ... |
|---|---|
| Type | JDBC database URI string |
| Default | (no default) |
| Example | jdbc:postgresql:${user.name} |

Each database has its own string to contact the database on a given host, port, and database. Although most driver URLs allow to pass arbitrary arguments, please use the pegasus.catalog.catalog-name.db.* keys or pegasus.catalog.*.db.* to preload these arguments. THE URL IS A MANDATORY PROPERTY FOR ANY DBMS BACKEND.

```
Postgres : jdbc:postgresql:[//hostname[:port]/]database
MySQL    : jdbc:mysql://[hostname[:port]]/database
SQLServer: jdbc:microsoft:sqlserver://hostname:port
Oracle   : jdbc:oracle:thin:[user/password]@//host[:port]/service
```

The * in the property name can be replaced by a catalog name to apply the property only for that catalog. Valid catalog names are

```
replica
transformation
provenance
work
```

## 6.3 pegasus.catalog.*.db.user

| System | PTC, TC, ... |
|---|---|
| Type | string |
| Default | (no default) |
| Example | ${user.name} |

In order to access a database, you must provide the name of your account on the DBMS. This property is database-independent. THIS IS A MANDATORY PROPERTY FOR MANY DBMS BACKENDS.

The * in the property name can be replaced by a catalog name to apply the property only for that catalog. Valid catalog names are

```
replica
transformation
provenance
work
```

## 6.4 pegasus.catalog.*.db.password

| | |
|---|---|
| System | PTC, TC, ... |
| Type | string |
| Default | (no default) |
| Example | ${user.name} |

In order to access a database, you must provide an optional password of your account on the DBMS. This property is database-independent. THIS IS A MANDATORY PROPERTY, IF YOUR DBMS BACKEND ACCOUNT REQUIRES A PASSWORD.

The * in the property name can be replaced by a catalog name to apply the property only for that catalog. Valid catalog names are

```
replica
transformation
provenance
work
```

## 6.5 pegasus.catalog.*.db.*

| | |
|---|---|
| System | PTC, TC, WORK, RC |

Each database has a multitude of options to control in fine detail the further behaviour. You may want to check the JDBC3 documentation of the JDBC driver for your database for details. The keys will be passed as part of the connect properties by stripping the "pegasus.catalog.catalog-name.db." prefix from them. The catalog-name can be replaced by the following values provenance for Provenance Catalog (PTC) transformation for Transformation Catalog (TC) replica for Replica Catalog (RC) work for Workflow Catalog

Postgres 7.3 parses the following properties:

```
pegasus.catalog.*.db.user
pegasus.catalog.*.db.password
pegasus.catalog.*.db.PGHOST
pegasus.catalog.*.db.PGPORT
pegasus.catalog.*.db.charSet
pegasus.catalog.*.db.compatible
```

MySQL 4.0 parses the following properties:

```
pegasus.catalog.*.db.user
pegasus.catalog.*.db.password
pegasus.catalog.*.db.databaseName
pegasus.catalog.*.db.serverName
pegasus.catalog.*.db.portNumber
pegasus.catalog.*.db.socketFactory
```

```
pegasus.catalog.*.db.strictUpdates
pegasus.catalog.*.db.ignoreNonTxTables
pegasus.catalog.*.db.secondsBeforeRetryMaster
pegasus.catalog.*.db.queriesBeforeRetryMaster
pegasus.catalog.*.db.allowLoadLocalInfile
pegasus.catalog.*.db.continueBatchOnError
pegasus.catalog.*.db.pedantic
pegasus.catalog.*.db.useStreamLengthsInPrepStmts
pegasus.catalog.*.db.useTimezone
pegasus.catalog.*.db.relaxAutoCommit
pegasus.catalog.*.db.paranoid
pegasus.catalog.*.db.autoReconnect
pegasus.catalog.*.db.capitalizeTypeNames
pegasus.catalog.*.db.ultraDevHack
pegasus.catalog.*.db.strictFloatingPoint
pegasus.catalog.*.db.useSSL
pegasus.catalog.*.db.useCompression
pegasus.catalog.*.db.socketTimeout
pegasus.catalog.*.db.maxReconnects
pegasus.catalog.*.db.initialTimeout
pegasus.catalog.*.db.maxRows
pegasus.catalog.*.db.useHostsInPrivileges
pegasus.catalog.*.db.interactiveClient
pegasus.catalog.*.db.useUnicode
pegasus.catalog.*.db.characterEncoding
```

MS SQL Server 2000 support the following properties (keys are case-insensitive, e.g. both "user" and "User" are valid):

```
pegasus.catalog.*.db.User
pegasus.catalog.*.db.Password
pegasus.catalog.*.db.DatabaseName
pegasus.catalog.*.db.ServerName
pegasus.catalog.*.db.HostProcess
pegasus.catalog.*.db.NetAddress
pegasus.catalog.*.db.PortNumber
pegasus.catalog.*.db.ProgramName
pegasus.catalog.*.db.SendStringParametersAsUnicode
pegasus.catalog.*.db.SelectMethod
```

The * in the property name can be replaced by a catalog name to apply the property only for that catalog. Valid catalog names are

```
replica
transformation
provenance
work
```

# 7 Catalog Properties

## 7.1 Replica Catalog

### 7.1.1 pegasus.catalog.replica

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | enumeration |
| Value[0] | RLS |
| Value[1] | LRC |
| Value[2] | JDBCRC |
| Value[3] | SimpleFile |
| Value[4] | File |
| Value[5] | MRC |
| Default | RLS |

Pegasus queries a Replica Catalog to discover the physical filenames (PFN) for input files specified in the DAX. Pegasus can interface with various types of Replica Catalogs. This property specifies which type of Replica Catalog to use during the planning process.

**RLS** RLS (Replica Location Service) is a distributed replica catalog, which ships with GT4. There is an index service called Replica Location Index (RLI) to which 1 or more Local Replica Catalog (LRC) report. Each LRC can contain all or a subset of mappings. In this mode, Pegasus queries the central RLI to discover in which LRC's the mappings for a LFN reside. It then queries the individual LRC's for the PFN's. To use RLS, the user additionally needs to set the property pegasus.catalog.replica.url to specify the URL for the RLI to query. Details about RLS can be found at http://www.globus.org/toolkit/data/rls/

**LRC** If the user does not want to query the RLI, but directly a single Local Replica Catalog. To use LRC, the user additionally needs to set the property pegasus.catalog.replica.url to specify the URL for the LRC to query. Details about RLS can be found at http://www.globus.org/toolkit/data/rls/

**JDBCRC** In this mode, Pegasus queries a SQL based replica catalog that is accessed via JDBC. The sql schema's for this catalog can be found at $PEGASUS_HOME/sql directory. To use JDBCRC, the user additionally needs to set the following properties

1. pegasus.catalog.replica.db.url
2. pegasus.catalog.replica.db.user
3. pegasus.catalog.replica.db.password

**SimpleFile** In this mode, Pegasus queries a file based replica catalog. It is neither transactionally safe, nor advised to use for production purposes in any way. Multiple concurrent instances **will clobber** each other!p. The site attribute should be specified whenever possible. The attribute key for the site attribute is "pool".

The LFN may or may not be quoted. If it contains linear whitespace, quotes, backslash or an equality sign, it must be quoted and escaped. Ditto for the PFN. The attribute key-value pairs are separated by an equality sign without any whitespaces. The value may be in quoted. The LFN sentiments about quoting apply.

```
LFN PFN
LFN PFN a=b [..]
LFN PFN a="b" [..]
"LFN w/LWS" "PFN w/LWS" [..]
```

To use SimpleFile, the user additionally needs to specify pegasus.catalog.replica.file property to specify the path to the file based RC.

**File** This mode is an alias for the SimpleFile mode above.

**MRC** In this mode, Pegasus queries multiple replica catalogs to discover the file locations on the grid. To use it set

```
pegasus.catalog.replica MRC
```

Each associated replica catalog can be configured via properties as follows.

The user associates a variable name referred to as [value] for each of the catalogs, where [value] is any legal identifier (concretely [A-Za-z][_A-Za-z0-9]*) For each associated replica catalogs the user specifies the following properties.

```
pegasus.catalog.replica.mrc.[value]       specifies the type of replica catalog
pegasus.catalog.replica.mrc.[value].key   specifies a property name key for a
particular catalog
```

For example, if a user wants to query two lrc's at the same time he/she can specify as follows

```
pegasus.catalog.replica.mrc.lrc1 LRC
pegasus.catalog.replica.mrc.lrc2.url rls://sukhna

pegasus.catalog.replica.mrc.lrc2 LRC
pegasus.catalog.replica.mrc.lrc2.url rls://smarty
```

In the above example, lrc1, lrc2 are any valid identifier names and url is the property key that needed to be specified.

### 7.1.2 pegasus.catalog.replica.url

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | URI string |
| Default | (no default) |

When using the modern RLS replica catalog, the URI to the Replica catalog must be provided to Pegasus to enable it to look up filenames. There is no default.

### 7.1.3 pegasus.catalog.replica.chunk.size

| | |
|---|---|
| System | Pegasus, rc-client |
| Since | 2.0 |
| Type | Integer |
| Default | 1000 |

The rc-client takes in an input file containing the mappings upon which to work. This property determines, the number of lines that are read in at a time, and worked upon at together. This allows the various operations like insert, delete happen in bulk if the underlying replica implementation supports it.

### 7.1.4 pegasus.catalog.replica.lrc.ignore

| | |
|---|---|
| System | Replica Catalog - RLS |
| Since | 2.0 |
| Type | comma separated list of LRC urls |
| Default | (no default) |
| See also | pegasus.catalog.replica.lrc.restrict, section 7.1.5 (page 18) |

Certain users may like to skip some LRCs while querying for the physical locations of a file. If some LRCs need to be skipped from those found in the rli then use this property. You can define either the full URL or partial domain names that need to be skipped. E.g. If a user wants rls://smarty.isi.edu and all LRCs on usc.edu to be skipped then the property will be set as pegasus.rls.lrc.ignore=rls://smarty.isi.edu,usc.edu

### 7.1.5 pegasus.catalog.replica.lrc.restrict

| | |
|---|---|
| System | Replica Catalog - RLS |
| Since | 1.3.9 |
| Type | comma separated list of LRC urls |
| Default | (no default) |
| See also | pegasus.catalog.replica.lrc.ignore, section 7.1.4 (page 18) |

This property applies a tighter restriction on the results returned from the LRCs specified. Only those PFNs are returned that have a pool attribute associated with them. The property "pegasus.rc.lrc.ignore" has a higher priority than "pegasus.rc.lrc.restrict". For example, in case a LRC is specified in both properties, the LRC would be ignored (i.e. not queried at all instead of applying a tighter restriction on the results returned).

### 7.1.6 pegasus.catalog.replica.lrc.site.[site-name]

| | |
|---|---|
| System | Replica Catalog - RLS |
| Since | 2.3.0 |
| Type | LRC url |
| Default | (no default) |

This property allows for the LRC url to be associated with site handles. Usually, a pool attribute is required to be associated with the PFN for Pegasus to figure out the site on which PFN resides. However, in the case where an LRC is responsible for only a single site's mappings, Pegasus can safely associate LRC url with the site. This association can be used to determine the pool attribute for all mappings returned from the LRC, if the mapping does not have a pool attribute associated with it.

The site_name in the property should be replaced by the name of the site. For example

```
pegasus.catalog.replica.lrc.site.isi  rls://lrc.isi.edu
```

tells Pegasus that all PFNs returned from LRC rls://lrc.isi.edu are associated with site isi.

The [site_name] should be the same as the site handle specified in the site catalog.

### 7.1.7 pegasus.catalog.replica.cache.asrc

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | Boolean |
| Value[0] | false |
| Value[1] | true |
| Default | false |
| See also | pegasus.catalog.replica, section 7.1.1 (page 16) |

This property determines whether to treat the cache file specified as a supplemental replica catalog or not. User can specify on the command line to gencdag a comma separated list of cache files using the –cache option. By default, the LFN->PFN mappings contained in the cache file are treated as cache, i.e if an entry is found in a cache file the replica catalog is not queried. This results in only the entry specified in the cache file to be available for replica selection.

Setting this property to true, results in the cache files to be treated as supplemental replica catalogs. This results in the mappings found in the replica catalog (as specified by pegasus.catalog.replica) to be merged with the ones found in the cache files. Thus, mappings for a particular LFN found in both the cache and the replica catalog are available for replica selection.

## 7.2 Site Catalog

### 7.2.1 pegasus.catalog.site

| | |
|---|---|
| System | Site Catalog |
| Since | 2.0 |
| Type | enumeration |
| Value[0] | XML |
| Value[1] | Text |
| Default | XML |

The site catalog file is available in two major flavors:

1. The "XML" format is an XML-based file. It is generated using the genpoolconfig client application program that is shipped with Pegasus. The XML input file for Pegasus can be generated in various ways, that can be used exclusively or combined at your option:

   a) It can also be published by converting the new, easier to read and modify local multiline pool config file. An example is provided in sample.pool.config.new. Use this option if you have no network connectivity, or for tests.

2. The "Text" format is a multiline site catalog format. It is described in the site catalog guide. It can be directly given to Pegasus starting with PEGASUS-1.4

### 7.2.2 pegasus.catalog.site.file

| | |
|---|---|
| System | Site Catalog |
| Since | 2.0 |
| Type | file location string |
| Default | ${pegasus.home.sysconfdir}/sites.xml \| ${pegasus.home.sysconfdir}/sites.txt |
| See also | pegasus.catalog.site, section 7.2.1 (page 20) |

Running things on the grid requires an extensive description of the capabilities of each compute cluster, commonly termed "site". This property describes the location of the file that contains such a site description. As the format is currently in flow, please refer to the userguide and Pegasus for details which format is expected. The default value is dependant on the value specified for the property pegasus.sc . pegasus.sc denotes the type of site catalog being used.

## 7.3 Transformation Catalog

### 7.3.1 pegasus.catalog.transformation

| | |
|---|---|
| System | Transformation Catalog |
| Since | 2.0 |
| Type | enumeration |
| Value[0] | File |
| Value[1] | Database |
| Default | File |
| See also | pegasus.catalog.*.driver, section **??** (page **??**) |
| See also | pegasus.catalog.transformation.file, section 7.3.2 (page 22) |

**File** In this mode, a file format is understood. The file is read and cached in memory. Any modifications, as adding or deleting, causes an update of the memory and hence to the file underneath. All queries are done against the memory representation. The new TC file format uses 6 columns:

1. The resource ID is represented in the first column.
2. The logical transformation uses the colonized format ns::name:vs.
3. The path to the application on the system
4. The installation type is identified by one of the following keywords - all upper case: INSTALLED, STATIC_BINARY, DYNAMIC_BINARY, SCRIPT. If not specified, or `NULL` is used, the type defaults to INSTALLED.
5. The system is of the format ARCH::OS[:VER:GLIBC]. The following arch types are understood: "INTEL32", "INTEL64", "SPARCV7", "SPARCV9". The following os types are understood: "LINUX", "SUNOS", "AIX". If unset or `NULL`, defaults to INTEL32::LINUX.
6. Profiles are written in the format NS::KEY=VALUE,KEY2=VALUE;NS2::KEY3=VALUE3 Multiple key-values for same namespace are seperated by a comma "," and multiple namespaces are seperated by a semicolon ";". If any of your profile values contains a comma you must not use the namespace abbreviator.

**Database** In this mode, the transformation catalog is kept in a relational database. Currently mysql DB and Postgre are supported. To set up the the database, use the schema in $PEGASUS_HOME/sql/create-my-init.sql followed by $PEGASUS_HOME/sql/create-my-tc.sql .

```
The following properties need to be set
pegasus.catalog.transformation.db = MySQL|Postgres
pegasus.catalog.transformation.db.url =
jdbc:mysql://[hostname[:port]]/database |
jdbc:postgres://[hostname[:port]]/database
pegasus.catalog.transformation.db.username = dbusername
pegasus.catalog.transformation.db.password = passoword
```

If the pegasus.catalog.transformation.db.* properties are not defined, the database implementation picks up the properties specified by pegasus.catalog.*.db.* .

Future modifications to the TC may extend the enumeration. To implement your own TC implementation see org.girphyn.cPlanner.tc.TCMechanism. To load the class set pegasus.catalog.transformation to the TC implementation class.

### 7.3.2 pegasus.catalog.transformation.file

| | |
|---|---|
| Systems | Transformation Catalog |
| Type | file location string |
| Default | ${pegasus.home.localstatedir}/tc.data |
| See also | pegasus.catalog.transformation, section 7.3.1 (page 21) |

The transformation catalog is a 6 column textual file that describes in a simple column based format the mapping from a logical transformation for each pool to the physical application, and optional environment settings. All concrete planners (Pegasus and Euryale) use this repository to map the lTR from the abstract DAX into an application invocation. Refer to the user guide for details.

## 7.4 Provenance Catalog

### 7.4.1 pegasus.catalog.provenance

| | |
|---|---|
| System | Provenance Tracking Catalog (PTC) |
| Since | 2.0 |
| Type | Java class name |
| Value[0] | InvocationSchema |
| Value[1] | NXDInvSchema |
| Default | (no default) |
| See also | pegasus.catalog.*.db.driver, section 6.1 (page 12) |

This property denotes the schema that is being used to access a PTC. The PTC is usually not a standard installation. If you use a database backend, you most likely have a schema that supports PTCs. By default, no PTC will be used.

Currently only the InvocationSchema is available for storing the provenance tracking records. Beware, this can become a lot of data. The values are names of Java classes. If no absolute Java classname is given, "org.griphyn.vdl.dbschema." is prepended. Thus, by deriving from the DatabaseSchema API, and implementing the PTC interface, users can provide their own classes here.

Alternatively, if you use a native XML database like eXist, you can store data using the NXDInvSchema. This will avoid using any of the other database driver properties.

### 7.4.2 pegasus.catalog.provenance.refinement

| | |
|---|---|
| System | PASOA Provenance Store |
| Since | 2.0.1 |
| Type | Java class name |
| Value[0] | Pasoa |
| Value[1] | InMemory |
| Default | InMemory |
| See also | pegasus.catalog.*.db.driver, section 6.1 (page 12) |

This property turns on the logging of the refinement process that happens inside Pegasus to the PASOA store. Not all actions are currently captured. It is still an experimental feature.

The PASOA store needs to run on localhost on port 8080 https://localhost:8080/prserv-1.0

## 7.5 Work Catalog

### 7.5.1 pegasus.catalog.work

| | |
|---|---|
| System | Work Catalog |
| Since | 2.0 |
| Type | Java class name |
| Value[0] | Database |
| Default | Database |
| See also | pegasus.catalog.*.db.driver, section 6.1 (page 12) |

This property denotes the schema that is being used to store workflow monitoring entries. This catalog is populated at the end of the planning process by pegasus-plan and at workflow execution by the tailstatd daemon.

# 8 Replica Selection Properties

## 8.1 pegasus.selector.replica

| | |
|---|---|
| System | Replica Selection |
| Since | 2.0 |
| Type | URI string |
| Default | default |
| See also | pegasus.replica.*.ignore.stagein.sites, section **??** (page **??**) |
| See also | pegasus.replica.*.prefer.stagein.sites, section **??** (page **??**) |

Each job in the DAX maybe associated with input LFN's denoting the files that are required for the job to run. To determine the physical replica (PFN) for a LFN, Pegasus queries the replica catalog to get all

the PFN's (replicas) associated with a LFN. Pegasus then calls out to a replica selector to select a replica amongst the various replicas returned. This property determines the replica selector to use for selecting the replicas.

**Default** If a PFN that is a file URL (starting with file:///) and has a pool attribute matching to the site handle of the site where the compute is to be run is found, then that is returned. Else,a random PFN is selected amongst all the PFN's that have a pool attribute matching to the site handle of the site where a compute job is to be run. Else, a random pfn is selected amongst all the PFN's.

**Restricted** This replica selector, allows the user to specify good sites and bad sites for staging in data to a particular compute site. A good site for a compute site X, is a preferred site from which replicas should be staged to site X. If there are more than one good sites having a particular replica, then a random site is selected amongst these preferred sites.

A bad site for a compute site X, is a site from which replica's should not be staged. The reason of not accessing replica from a bad site can vary from the link being down, to the user not having permissions on that site's data.

The good | bad sites are specified by the properties

```
pegasus.replica.*.prefer.stagein.sites
pegasus.replica.*.ignore.stagein.sites
```

where the * in the property name denotes the name of the compute site. A * in the property key is taken to mean all sites.

The pegasus.replica.*.prefer.stagein.sites property takes precedence over pegasus.replica.*.ignore.stagein.sites property i.e. if for a site X, a site Y is specified both in the ignored and the preferred set, then site Y is taken to mean as only a preferred site for a site X.

**Regex** This replica selector allows the user allows the user to specific regex expressions that can be used to rank various PFN's returned from the Replica Catalog for a particular LFN. This replica selector selects the highest ranked PFN i.e the replica with the lowest rank value.

The regular expressions are assigned different rank, that determine the order in which the expressions are employed. The rank values for the regex can expressed in user properties using the property.

```
pegasus.selector.replica.regex.rank.[value]   regex-expression
```

The value is an integer value that denotes the rank of an expression with a rank value of 1 being the highest rank.

Please note that before applying any regular expressions on the PFN's, the file URL's that dont match the preferred site are explicitly filtered out.

**Local** This replica selector prefers replicas from the local host and that start with a file: URL scheme. It is useful, when users want to stagin files to a remote site from your submit host using the Condor file transfer mechanism.

## 8.2 pegasus.selector.replica.*.ignore.stagein.sites

| | |
|---|---|
| System | Replica Selection |
| Type | comma separated list of sites |
| Since | 2.0 |
| Default | no default |
| See also | pegasus.selector.replica, section 8.1 (page 23) |
| See also | pegasus.selector.replica.*.prefer.stagein.sites, section 8.3 (page 25) |

A comma separated list of storage sites from which to never stage in data to a compute site. The property can apply to all or a single compute site, depending on how the * in the property name is expanded.

The * in the property name means all compute sites unless replaced by a site name.

For e.g setting pegasus.selector.replica.*.ignore.stagein.sites to usc means that ignore all replicas from site usc for staging in to any compute site. Setting pegasus.replica.isi.ignore.stagein.sites to usc means that ignore all replicas from site usc for staging in data to site isi.

## 8.3 pegasus.selector.replica.*.prefer.stagein.sites

| | |
|---|---|
| System | Replica Selection |
| Type | comma separated list of sites |
| Since | 2.0 |
| Default | no default |
| See also | pegasus.selector.replica, section 8.1 (page 23) |
| See also | pegasus.selector.replica.*.ignore.stagein.sites, section 8.2 (page 25) |

A comma separated list of preferred storage sites from which to stage in data to a compute site. The property can apply to all or a single compute site, depending on how the * in the property name is expanded.

The * in the property name means all compute sites unless replaced by a site name.

For e.g setting pegasus.selector.replica.*.prefer.stagein.sites to usc means that prefer all replicas from site usc for staging in to any compute site. Setting pegasus.replica.isi.prefer.stagein.sites to usc means that prefer all replicas from site usc for staging in data to site isi.

## 8.4 pegasus.selector.replica.regex.rank.[value]

| | |
|---|---|
| System | Replica Selection |
| Type | Regex Expression |
| Since | 2.3.0 |
| Default | no default |
| See also | pegasus.selector.replica, section 8.1 (page 23) |

Specifies the regex expressions to be applied on the PFNs returned for a particular LFN. Refer to

```
http://java.sun.com/javase/6/docs/api/java/util/regex/Pattern.html
```

on information of how to construct a regex expression.

The [value] in the property key is to be replaced by an int value that designates the rank value for the regex expression to be applied in the Regex replica selector.

The example below indicates preference for file URL's over URL's referring to gridftp server at example.isi.edu

```
pegasus.selector.replica.regex.rank.1 file://.*
pegasus.selector.replica.regex.rank.2 gsiftp://example\.isi\.edu.*
```

# 9 Site Selection Properties

## 9.1 pegasus.selector.site

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | enumeration |
| Value[0] | Random |
| Value[1] | RoundRobin |
| Value[2] | NonJavaCallout |
| Value[3] | Group |
| Value[4] | Heft |
| Default | Random |
| See also | pegasus.selector.site.path, section 9.2 (page 28) |
| See also | pegasus.selector.site.timeout, section 9.4 (page 28) |
| See also | pegasus.selector.site.keep.tmp, section 9.5 (page 29) |
| See also | pegasus.selector.site.env.*, section **??** (page **??**) |

The site selection in Pegasus can be on basis of any of the following strategies.

**Random** In this mode, the jobs will be randomly distributed among the sites that can execute them.

**RoundRobin** In this mode. the jobs will be assigned in a round robin manner amongst the sites that can execute them. Since each site cannot execute everytype of job, the round robin scheduling is done per level on a sorted list. The sorting is on the basis of the number of jobs a particular site has been assigned in that level so far. If a job cannot be run on the first site in the queue (due to no matching entry in the transformation catalog for the transformation referred to by the job), it goes to the next one and so on. This implementation defaults to classic round robin in the case where all the jobs in the workflow can run on all the sites.

**NonJavaCallout** In this mode, Pegasus will callout to an external site selector.In this mode a temporary file is prepared containing the job information that is passed to the site selector as an argument while invoking it. The path to the site selector is specified by setting the property pegasus.site.selector.path. The environment variables that need to be set to run the site selector can be specified using the properties with a pegasus.site.selector.env. prefix. The temporary file contains information about the job that needs to be scheduled. It contains key value pairs with each key value pair being on a new line and separated by a =.

The following pairs are currently generated for the site selector temporary file that is generated in the NonJavaCallout.

| | |
|---|---|
| version | is the version of the site selector api,currently 2.0. |
| transformation | is the fully-qualified definition identifier for the transformation (TR) namespace::name:version. |
| derivation | is teh fully qualified definition identifier for the derivation (DV), namespace::name:version. |
| job.level | is the job's depth in the tree of the workflow DAG. |
| job.id | is the job's ID, as used in the DAX file. |
| resource.id | is a pool handle, followed by whitespace, followed by a gridftp server. Typically, each gridftp server is enumerated once, so you may have multiple occurances of the same site. There can be multiple occurances of this key. |
| input.lfn | is an input LFN, optionally followed by a whitespace and file size. There can be multiple occurances of this key,one for each input LFN required by the job. |
| wf.name | label of the dax, as found in the DAX's root element. wf.index is the DAX index, that is incremented for each partition in case of deferred planning. |
| wf.time | is the mtime of the workflow. |
| wf.manager | is the name of the workflow manager being used .e.g condor |
| vo.name | is the name of the virtual organization that is running this workflow. It is currently set to NONE |
| vo.group | unused at present and is set to NONE. |

**Group** In this mode, a group of jobs will be assigned to the same site that can execute them. The use of the PEGASUS profile key group in the dax, associates a job with a particular group. The jobs that do not have the profile key associated with them, will be put in the default group. The jobs in the default group are handed over to the "Random" Site Selector for scheduling.

**Heft** In this mode, a version of the HEFT processor scheduling algorithm is used to schedule jobs in the workflow to multiple grid sites. The implementation assumes default data communication costs when jobs are not scheduled on to the same site. Later on this may be made more configurable.

The runtime for the jobs is specified in the transformation catalog by associating the pegasus profile key runtime with the entries.

The number of processors in a site is picked up from the attribute idle-nodes associated with the vanilla jobmanager of the site in the site catalog.

## 9.2 pegasus.selector.site.path

| | |
|---|---|
| System | Site Selector |
| Since | 2.0 |
| Type | String |

If one calls out to an external site selector using the NonJavaCallout mode, this refers to the path where the site selector is installed. In case other strategies are used it does not need to be set.

## 9.3 pegasus.site.selector.env.*

| | |
|---|---|
| System | Pegasus |
| Since | 1.2.3 |
| Type | String |

The environment variables that need to be set while callout to the site selector. These are the variables that the user would set if running the site selector on the command line. The name of the environment variable is got by stripping the keys of the prefix "pegasus.site.selector.env." prefix from them. The value of the environment variable is the value of the property.

e.g pegasus.site.selector.path.LD_LIBRARY_PATH /globus/lib would lead to the site selector being called with the LD_LIBRARY_PATH set to /globus/lib.

## 9.4 pegasus.selector.site.timeout

| | |
|---|---|
| System | Site Selector |
| Since | 2.0 |
| Type | non negative integer |
| Default | 60 |

It sets the number of seconds Pegasus waits to hear back from an external site selector using the NonJava-Callout interface before timing out.

### 9.5 pegasus.selector.site.keep.tmp

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | enumeration |
| Value[0] | onerror |
| Value[1] | always |
| Value[2] | never |
| Default | onerror |

It determines whether Pegasus deletes the temporary input files that are generated in the temp directory or not. These temporary input files are passed as input to the external site selectors.

A temporary input file is created for each that needs to be scheduled.

## 10 Transfer Configuration Properties

### 10.1 pegasus.transfer.*.impl

| | |
|---|---|
| System | Pegasus |
| Type | enumeration |
| Value[0] | Transfer3 |
| Value[1] | GUC |
| Default | Transfer3 |
| See also | pegasus.transfer.refiner, section 10.2 (page 30) |
| Since | 2.0 |

Each compute job usually has data products that are required to be staged in to the execution site, materialized data products staged out to a final resting place, or staged to another job running at a different site. This property determines the underlying grid transfer tool that is used to manage the transfers.

The * in the property name can be replaced to achieve finer grained control to dictate what type of transfer jobs need to be managed with which grid transfer tool.

Usually,the arguments with which the client is invoked can be specified by

```
- the property pegasus.transfer.arguments
- associating the PEGASUS profile key transfer.arguments
```

The table below illustrates all the possible variations of the property.

| Property Name | Applies to |
|---|---|
| pegasus.transfer.stagein.impl | the stage in transfer jobs |
| pegasus.transfer.stageout.impl | the stage out transfer jobs |
| pegasus.transfer.inter.impl | the inter pool transfer jobs |
| pegasus.transfer.setup.impl | the setup transfer job |
| pegasus.transfer.*.impl | apply to types of transfer jobs |

Note: Since version 2.2.0 the worker package is staged automatically during staging of executables to the remote site. This is achieved by adding a setup transfer job to the workflow. The setup transfer job by default uses GUC to stage the data. The implementation to use can be configured by setting the property `pegasus.transfer.setup.impl` property. However, if you have pegasus.transfer.*.impl set in your properties file, then you need to set pegasus.transfer.setup.impl to GUC

The various grid transfer tools that can be used to manage data transfers are explained below

**Transfer3** This results in pegasus-transfer to be used for transferring of files. It is a python based wrapper around various transfer clients like globus-url-copy, lcg-copy, wget, cp, ln . pegasus-transfer looks at source and destination url and figures out automatically which underlying client to use. pegasus-transfer is distributed with the PEGASUS and can be found at $PEGASUS_HOME/bin/pegasus-transfer.

For remote sites, Pegasus constructs the default path to pegasus-transfer on the basis of PEGASUS_HOME env profile specified in the site catalog. To specify a different path to the pegasus-transfer client , users can add an entry into the transformation catalog with fully qualified logical name as pegasus::pegasus-transfer

**GUC** This refers to the new guc client that does multiple file transfers per invocation. The globus-url-copy client distributed with Globus 4.x is compatible with this mode.

## 10.2 pegasus.transfer.refiner

| | |
|---|---|
| System | Pegasus |
| Type | enumeration |
| Value[0] | Default |
| Value[1] | Bundle |
| Value[2] | Chain |
| Value[3] | Condor |
| Value[4] | Cluster |
| Default | Bundle |
| Since | 2.0 |
| See also | pegasus.transfer.*.impl, section 10.1 (page 29) |

This property determines how the transfer nodes are added to the workflow. The various refiners differ in the how they link the various transfer jobs, and the number of transfer jobs that are created per compute jobs.

**Default** This is the default refinement strategy for the transfer tools that can handle multiple file transfers per invocation. In this, all files required by a particular transfer job will be attempted to be transferred with just one transfer job. This also takes care of file clobbering while stageing in data to a remote grid site. File Clobbering can occur when two jobs scheduled on the same site require the same input file to be staged.

**Bundle** In this refinement strategy, the number of stage in transfer nodes that are constructed per execution site can vary. The number of transfer nodes can be specified, by associating the pegasus profile "bundle.stagein". The profile can either be associated with the execution site in the site catalog or with the "transfer" executable in the transformation catalog. The value in the transformation catalog overrides the one in the site catalog. This refinement strategy extends from the Default refiner, and thus takes care of file clobbering while staging in data.

**Chain** In this refinement strategy, chains of stagein transfer nodes are constructed. A chain means that the jobs are sequentially dependant upon each other i.e. at any moment, only one stage in transfer job will run per chain. The number of chains can be specified by associating the pegasus profile "chain.stagein". The profile can either be associated with the execution site in the site catalog or with the "transfer" executable in the transformation catalog. The value in the transformation catalog overrides the one in the site catalog. This refinement strategy extends from the Default refiner, and thus takes care of file clobbering while staging in data.

**Condor** In this refinement strategy, no additional staging transfer jobs are added to the workflow. Instead the compute jobs are modified to have the transfer_input_files and transfer_output_files set to pull the input data. To stage-out the data a separate stage-out is added. The stage-out job is a /bin/true job that uses the transfer_input_file and transfer_output_files to stage the data back to the submit host. This refinement strategy is used workflows are being executed on a Condor pool, and the submit node itself is a part of the Condor pool.

**Cluster** In this refinement strategy, clusters of stage-in and stageout jobs are created per level of the workflow. It builds upon the Bundle refiner. The differences between the Bundle and Cluster refiner are as follows.

```
- stagein is also clustered/bundled per level. In Bundle it was
for the whole workflow.
- keys that control the clustering ( old name bundling are )
cluster.stagein and cluster.stageout
```

This refinement strategy also adds dependencies between the stagein transfer jobs on different levels of the workflow to ensure that stagein for the top level happens first and so on.

An image of the workflow with this refinement strategy can be found at

```
http://vtcpc.isi.edu/pegasus/index.php/ChangeLog#Added_a_Cluster_Transfer_Refin
```

## 10.3 pegasus.transfer.sls.*.impl

| | |
|---|---|
| System | Pegasus |
| Type | enumeration |
| Value[0] | Transfer3 |
| Value[1] | S3 |
| Default | Transfer3 |
| Since | 2.2.0 |
| See also | pegasus.execute.*.filesystem.local, section 15.6 (page 50) |

This implementation specifies the transfer tool to be used for Second Level Staging (SLS) of input and output data between the head node and worker node filesystems.

Currently, the * in the property name CANNOT be replaced to achieve finer grained control to dictate what type of SLS transfers need to be managed with which grid transfer tool.

The various grid transfer tools that can be used to manage SLS data transfers are explained below

**Transfer3** This results in pegasus-transfer to be used for transferring of files. It is a python based wrapper around various transfer clients like globus-url-copy, lcg-copy, wget, cp, ln . pegasus-transfer looks at source and destination url and figures out automatically which underlying client to use. pegasus-transfer is distributed with the PEGASUS and can be found at $PEGASUS_HOME/bin/pegasus-transfer.

For remote sites, Pegasus constructs the default path to pegasus-transfer on the basis of PEGASUS_HOME env profile specified in the site catalog. To specify a different path to the pegasus-transfer client , users can add an entry into the transformation catalog with fully qualified logical name as pegasus::pegasus-transfer

**S3** This implementation refers to the s3cmd transfer client that is used for second level staging of data in the cloud. The data can be staged between the filesystem on the worker nodes and the workflow specific bucket on S3.

There should be an entry in the transformation catalog with the fully qualified name as amazon::s3cmd for the site corresponding to the cloud.

## 10.4 pegasus.transfer.arguments

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | String |
| Default | (no default) |
| See also | pegasus.transfer.sls.arguments, section 10.5 (page 33) |

This determines the extra arguments with which the transfer implementation is invoked. The transfer executable that is invoked is dependant upon the transfer mode that has been selected. The property can

be overloaded by associated the pegasus profile key transfer.arguments either with the site in the site catalog or the corresponding transfer executable in the transformation catalog.

## 10.5 pegasus.transfer.sls.arguments

| | |
|---|---|
| System | Pegasus |
| Since | 2.4 |
| Type | String |
| Default | (no default) |
| See also | pegasus.transfer.arguments, section 10.4 (page 32) |
| See also | pegasus.transfer.sls.*.impl, section 10.3 (page 32) |

This determines the extra arguments with which the SLS transfer implementation is invoked. The transfer executable that is invoked is dependant upon the SLS transfer implementation that has been selected.

## 10.6 pegasus.transfer.stage.sls.file

| | |
|---|---|
| System | Pegasus |
| Since | 3.0 |
| Type | Boolean |
| Default | (no default) |
| See also | pegasus.gridstart, section 11.1 (page 36) |
| See also | pegasus.execute.*.filesystem.local, section 15.6 (page 50) |

For executing jobs on the local filesystem, Pegasus creates sls files for each compute jobs. These sls files list the files that need to be staged to the worker node and the output files that need to be pushed out from the worker node after completion of the job. By default, pegasus will stage these SLS files to the shared filesystem on the head node as part of first level data stagein jobs. However, in the case where there is no shared filesystem between head nodes and the worker nodes, the user can set this property to false. This will result in the sls files to be transferred using the Condor File Transfer from the submit host.

## 10.7 pegasus.transfer.links

| | |
|---|---|
| System | Pegasus |
| Type | boolean |
| Default | false |
| Since | 2.0 |
| See also | pegasus.transfer, section **??** (page **??**) |
| See also | pegasus.transfer.force, section **??** (page **??**) |

If this is set, and the transfer implementation is set to Transfer i.e. using the transfer executable distributed with the PEGASUS. On setting this property, if Pegasus while fetching data from the RLS sees a pool

attribute associated with the PFN that matches the execution pool on which the data has to be transferred to, Pegasus instead of the URL returned by the RLS replaces it with a file based URL. This supposes that the if the pools match the filesystems are visible to the remote execution directory where input data resides. On seeing both the source and destination urls as file based URLs the transfer executable spawns a job that creates a symbolic link by calling ln -s on the remote pool. This ends up bypassing the GridFTP server and reduces the load on it, and is much faster.

## 10.8 pegasus.transfer.*.remote.sites

| | |
|---|---|
| System | Pegasus |
| Type | comma separated list of sites |
| Default | no default |
| Since | 2.0 |

By default Pegasus looks at the source and destination URL's for to determine whether the associated transfer job runs on the submit host or the head node of a remote site, with preference set to run a transfer job to run on submit host.

Pegasus will run transfer jobs on the remote sites

```
- if the file server for the compute site is a file server i.e url prefix file://
- symlink jobs need to be added that require the symlink transfer jobs to
be run remotely.
```

This property can be used to change the default behaviour of Pegasus and force pegasus to run different types of transfer jobs for the sites specified on the remote site.

The table below illustrates all the possible variations of the property.

| Property Name | Applies to |
|---|---|
| pegasus.transfer.stagein.remote.sites | the stage in transfer jobs |
| pegasus.transfer.stageout.remote.sites | the stage out transfer jobs |
| pegasus.transfer.inter.remote.sites | the inter pool transfer jobs |
| pegasus.transfer.*.remote.sites | apply to types of transfer jobs |

In addition * can be specified as a property value, to designate that it applies to all sites.

## 10.9 pegasus.transfer.staging.delimiter

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | String |
| Default | : |
| See also | pegasus.transformation.selector, section **??** (page **??**) |

Pegasus supports executable staging as part of the workflow. Currently staging of statically linked executables is supported only. An executable is normally staged to the work directory for the workflow/partition on the remote site. The basename of the staged executable is derived from the namespace,name and version of the transformation in the transformation catalog. This property sets the delimiter that is used for the construction of the name of the staged executable.

## 10.10 pegasus.transfer.disable.chmod.sites

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | comma separated list of sites |
| Default | no default |

During staging of executables to remote sites, chmod jobs are added to the workflow. These jobs run on the remote sites and do a chmod on the staged executable. For some sites, this maynot be required. The permissions might be preserved, or there maybe an automatic mechanism that does it.

This property allows you to specify the list of sites, where you do not want the chmod jobs to be executed. For those sites, the chmod jobs are replaced by NoOP jobs. The NoOP jobs are executed by Condor, and instead will immediately have a terminate event written to the job log file and removed from the queue.

## 10.11 pegasus.transfer.proxy

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | Boolean |
| Default | false |

By default, CondorG transfers a limited proxy to the remote site, while running jobs in the grid universe. However, certain grid ftp servers (like those in front of SRB) require a fully user proxy. In this case, the planners need to transfer the proxy along with the transfer job using Condor file transfer mechanisms. This property triggers Pegasus into creating the appropriate condor commands, that transfer the proxy from the submit host to the remote host. The source location is determined from the value of the X509_USER_KEY env profile key , that is associated with site local in the site catalog.

## 10.12 pegasus.transfer.setup.source.base.url

| | |
|---|---|
| System | Pegasus |
| Type | URL |
| Default | no default |
| Since | 2.3 |

This property specifies the base URL to the directory containing the Pegasus worker package builds. During Staging of Executable, the Pegasus Worker Package is also staged to the remote site. The worker packages are by default pulled from the http server at pegasus.isi.edu. This property can be used to override the location from where the worker package are staged. This maybe required if the remote computes sites don't allows files transfers from a http server.

# 11 Gridstart And Exitcode Properties

## 11.1 pegasus.gridstart

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | enumeration |
| Value[0] | Kickstart |
| Value[1] | None |
| Value[2] | SeqExec |
| Default | Kickstart |
| See also | pegasus.execute.*.filesystem.local, section 15.6 (page 50) |

Jobs that are launched on the grid maybe wrapped in a wrapper executable/script that enables information about about the execution, resource consumption, and - most importantly - the exitcode of the remote application. At present, a job scheduled on a remote site is launched with a gridstart if site catalog has the corresponding gridlaunch attribute set and the job being launched is not MPI.

Users can explicitly decide what gridstart to use for a job, by associating the pegasus profile key named gridstart with the job.

**Kickstart** In this mode, all the jobs are lauched via kickstart. The kickstart executable is a light-weight program which connects the stdin,stdout and stderr filehandles for PEGASUS jobs on the remote site. Kickstart is an executable distributed with PEGASUS that can generally be found at ${pegasus.home.bin}/kickstart.

**None** In this mode, all the jobs are launched directly on the remote site. Each job's stdin,stdout and stderr are connected to condor commands in a manner to ensure that they are sent back to the submit host.

**SeqExec** In this mode, all the jobs are launched on the remote site via SeqExec clustering executable. This is useful when user wants to run on the local filesystem of the worker nodes. The generated input file to seqexec contains commands to create the directory on the worker node, pull data from the head node, execute the job , push data to the head node, and remove the directory on the worker node. This is still an experimental mode and will be refined more for 3.1.

Support for a new gridstart (K2) is expected to be added soon.

## 11.2 pegasus.gridstart.kickstart.set.xbit

| | |
|---|---|
| System | Pegasus |
| Since | 2.4 |
| Type | Boolean |
| Default | false |
| See also | pegasus.transfer.disable.chmod.sites, section 10.10 (page 35) |

Kickstart has an option to set the X bit on an executable before it launches it on the remote site. In case of staging of executables, by default chmod jobs are launched that set the x bit of the user executables staged to a remote site.

On setting this property to true, kickstart gridstart module adds a -X option to kickstart arguments. The -X arguments tells kickstart to set the x bit of the executable before launching it.

User should usually disable the chmod jobs by setting the property pegasus.transfer.disable.chmod.sites , if they set this property to true.

## 11.3 pegasus.gridstart.kickstart.stat

| | |
|---|---|
| System | Pegasus |
| Since | 2.1 |
| Type | Boolean |
| Default | false |
| See also | pegasus.gridstart.generate.lof, section 11.4 (page 37) |

Kickstart has an option to stat the input files and the output files. The stat information is collected in the XML record generated by kickstart. Since stat is an expensive operation, it is not turned on by on. Set this property to true if you want to see stat information for the input files and output files of a job in it's kickstart output.

## 11.4 pegasus.gridstart.generate.lof

| | |
|---|---|
| System | Pegasus |
| Since | 2.1 |
| Type | Boolean |
| Default | false |
| See also | pegasus.gridstart.kickstart.stat, section 11.3 (page 37) |

For the stat option for kickstart, we generate 2 lof ( list of filenames ) files for each job. One lof file containing the input lfn's for the job, and the other containing output lfn's for the job. In some cases, it maybe beneficial to have these lof files generated but not do the actual stat. This property allows you to generate the lof files without triggering the stat in kickstart invocations.

### 11.5 pegasus.gridstart.invoke.always

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | Boolean |
| Default | false |
| See also | pegasus.gridstart.invoke.length, section 11.6 (page 38) |

Condor has a limit in it, that restricts the length of arguments to an executable to 4K. To get around this limit, you can trigger Kickstart to be invoked with the -I option. In this case, an arguments file is prepared per job that is transferred to the remote end via the Condor file transfer mechanism. This way the arguments to the executable are not specified in the condor submit file for the job. This property specifies whether you want to use the invoke option always for all jobs, or want it to be triggered only when the argument string is determined to be greater than a certain limit.

### 11.6 pegasus.gridstart.invoke.length

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | Long |
| Default | 4000 |
| See also | pegasus.gridstart.invoke.always, section 11.5 (page 38) |

Gridstart is automatically invoked with the -I option, if it is determined that the length of the arguments to be specified is going to be greater than a certain limit. By default this limit is set to 4K. However, it can overriden by specifying this property.

## 12 Interface To Condor And Condor Dagman

The Condor DAGMan facility is usually activate using the condor_submit_dag command. However, many shapes of workflows have the ability to either overburden the submit host, or overflow remote gatekeeper hosts. While DAGMan provides throttles, unfortunately these can only be supplied on the command-line. Thus,PEGASUS provides a versatile wrapper to invoke DAGMan, called pegasus-submit-dag. It can be configured from the command-line, from user- and system properties, and by defaults.

### 12.1 pegasus.condor.logs.symlink

| | |
|---|---|
| System | Condor |
| Type | Boolean |
| Default | true |
| Since | 3.0 |

By default pegasus has the Condor common log dagname-0.log in the submit file as a symlink to a location in /tmp . This is to ensure that condor common log does not get written to a shared filesystem. If the user knows for sure that the workflow submit directory is not on the shared filesystem, then they can opt to turn of the symlinking of condor common log file by setting this property to false.

## 12.2 pegasus.condor.arguments.quote

| | |
|---|---|
| System | Condor |
| Type | Boolean |
| Default | true |
| Since | 2.0 |
| Old Name | pegasus.condor.arguments.quote |

This property determines whether to apply the new Condor quoting rules for quoting the argument string. The new argument quoting rules appeared in Condor 6.7.xx series. We have verified it for 6.7.19 version. If you are using an old condor at the submit host, set this property to false.

## 12.3 pegasus.dagman.nofity

| | |
|---|---|
| System | DAGman wrapper |
| Type | Case-insensitive enumeration |
| Value[0] | Complete |
| Value[1] | Error |
| Value[2] | Never |
| Default | Error |
| Document | http://www.cs.wisc.edu/condor/manual/v6.9/condor_submit_dag.html |
| Document | http://www.cs.wisc.edu/condor/manual/v6.9/condor_submit.html |

The pegasus-submit-dag wrapper processes properties to set DAGMan commandline arguments. The argument sets the e-mail notification for DAGMan itself. This information will be used within the Condor submit description file for DAGMan. This file is produced by the the condor_submit_dag. See notification within the section of submit description file commands in the condor_submit manual page for specification of value. Many users prefer the value NEVER.

## 12.4 pegasus.dagman.verbose

| | |
|---|---|
| System | DAGman wrapper |
| Type | Boolean |
| Value[0] | false |
| Value[1] | true |
| Default | false |
| Document | http://www.cs.wisc.edu/condor/manual/v6.9/condor_submit_dag.html |

The pegasus-submit-dag wrapper processes properties to set DAGMan commandline arguments. If set and true, the argument activates verbose output in case of DAGMan errors.

### 12.5 pegasus.dagman.[category].maxjobs

| | |
|---|---|
| System | DAGman wrapper |
| Type | Integer |
| Since | 2.2 |
| Default | no default |
| Document | http://vtcpc.isi.edu/pegasus/index.php/ChangeLog#Support_for_DAGMan_node_categories |

DAGMan now allows for the nodes in the DAG to be grouped in category. The tuning parameters like maxjobs then can be applied per category instead of being applied to the whole workflow. To use this facility users need to associate the dagman profile key named category with their jobs. The value of the key is the category to which the job belongs to.

You can then use this property to specify the value for a category. For the above example you will set pegasus.dagman.short-running.maxjobs

## 13 Workflow Partitioning And Job Clustering Properties

### 13.1 pegasus.partitioner.parser.dax.callback

| | |
|---|---|
| System | Partitioner |
| Type | String |
| Default | DAX2Graph |
| Since | 2.4.0 |

While partitioning the workflow, different partitioners may require different DAX callbacks to be loaded. These callbacks determine how the graph structure that is used by the partitioner is loaded.

Users will rarely need to specify this property , unless plugging in their own partitioner that requires implementation of a new DAX callback.

In case of label based partitioning DAX2LabelGraph callback is automatically loaded by the DAXCallbackFactory class.

## 13.2 pegasus.partitioner.label.key

| | |
|---|---|
| System | Partitioner |
| Type | String |
| Default | label |
| Since | 2.0 |
| See also | pegasus.clusterer.label.key, section 13.9 (page 44) |

While partitioning the workflow into partitions, you can optionally label your graph to control how partitioning happens using a label based partitioning scheme. This is done by associating a profile key in the PEGASUS namespace with the jobs in the DAX. Each job that has the same value/label for this profile key, is put in the same partition.

This property allows you to specify the PEGASUS profile key that you want to use for label based partitioning.

## 13.3 pegasus.partitioner.horziontal.collapse.[txname]

| | |
|---|---|
| System | Partitioner |
| Type | Integer |
| Default | no default |
| Since | 2.0 |
| See also | pegasus.partitioner.horziontal.bundle.[txname], section 13.4 (page 42) |

In case of horizontal partitioning, you can specify a "collapse" factor for transformations. The collapse factor for a transformation specifies the number of jobs referring to that transformation at a level that go into a single partition.

This property allows you to specify the collapse factors transformations where the [txname] in the property has to be replaced by the logical name of the transformation.

For example, if in a workflow you have 10 jobs referring to a transformation with a logical name txA at a particular level(l) of the workflow, and you have properties set as follows

```
pegasus.partitioner.horizontal.collapse.txA 4
```

The above would result 3 partitions being created, 2 having 4 jobs each and one having 2 jobs for that level (l).

## 13.4 pegasus.partitioner.horziontal.bundle.[txname]

| | |
|---|---|
| System | Partitioner |
| Type | Integer |
| Default | no default |
| Since | 2.0 |
| See also | pegasus.partitioner.horziontal.collapse.[txname], section 13.3 (page 41) |

In case of horizontal partitioning, you can specify a "bundle" factor for transformations. The bundle factor for a transformation specifies the number of partitions that are created for each level of the workflow containing jobs that refer to that transformation.

This property allows you to specify the bundle factors transformations where the [txname] in the property has to be replaced by the logical name of the transformation.

For example, if in a workflow you have 10 jobs referring to a transformation with a logical name txA at a particular level(l) of the workflow, and you have properties set as follows

```
pegasus.partitioner.horizontal.bundle.txA 4
```

The above would result 4 partitions being created, 2 having 2 jobs each and 2 having 3 jobs for that level (l).

## 13.5 pegasus.clusterer.job.aggregator

| | |
|---|---|
| System | Job Clustering |
| Since | 2.0 |
| Type | String |
| Value[0] | seqexec |
| Value[1] | mpiexec |
| Default | seqexec |

A large number of workflows executed through the Virtual Data System, are composed of several jobs that run for only a few seconds or so. The overhead of running any job on the grid is usually 60 seconds or more. Hence, it makes sense to collapse small independent jobs into a larger job. This property determines, the executable that will be used for running the larger job on the remote site.

**seqexec** In this mode, the executable used to run the merged job is seqexec that runs each of the smaller jobs sequentially on the same node. The executable "seqexec" is a PEGASUS tool distributed in the PEGASUS worker package, and can be usually found at {pegasus.home}/bin/seqexec.

**mpiexec** In this mode, the executable used to run the merged job is mpiexec that runs the smaller jobs via mpi on n nodes where n is the nodecount associated with the merged job. The executable "mpiexec" is a PEGASUS tool distributed in the PEGASUS worker package, and can be usually found at {pegasus.home}/bin/mpiexec.

## 13.6 pegasus.clusterer.job.aggregator.seqexec.log

| | |
|---|---|
| System | Job Clustering |
| Type | Boolean |
| Default | false |
| Since | 2.3 |
| See also | pegasus.clusterer.job.aggregator, section 13.5 (page 42) |
| See also | pegasus.clusterer.job.aggregator.seqexec.log.global, section 13.7 (page 43) |

Seqexec logs the progress of the jobs that are being run by it in a progress file on the remote cluster where it is executed.

This property sets the Boolean flag, that indicates whether to turn on the logging or not.

## 13.7 pegasus.clusterer.job.aggregator.seqexec.log.global

| | |
|---|---|
| System | Job Clustering |
| Type | Boolean |
| Default | true |
| Since | 2.3 |
| See also | pegasus.clusterer.job.aggregator, section 13.5 (page 42) |
| See also | pegasus.clusterer.job.aggregator.seqexec.log, section 13.6 (page 43) |
| Old Name | pegasus.clusterer.job.aggregator.seqexec.hasgloballog |

Seqexec logs the progress of the jobs that are being run by it in a progress file on the remote cluster where it is executed. The progress log is useful for you to track the progress of your computations and remote grid debugging. The progress log file can be shared by multiple seqexec jobs that are running on a particular cluster as part of the same workflow. Or it can be per job.

This property sets the Boolean flag, that indicates whether to have a single global log for all the seqexec jobs on a particular cluster or progress log per job.

## 13.8 pegasus.clusterer.job.aggregator.seqexec.firstjobfail

| | |
|---|---|
| System | Job Clustering |
| Type | Boolean |
| Default | true |
| Since | 2.2 |
| See also | pegasus.clusterer.job.aggregator, section 13.5 (page 42) |

By default seqexec does not stop execution even if one of the clustered jobs it is executing fails. This is because seqexec tries to get as much work done as possible.

This property sets the Boolean flag, that indicates whether to make seqexec stop on the first job failure it detects.

### 13.9 pegasus.clusterer.label.key

| | |
|---|---|
| System | Job Clustering |
| Type | String |
| Default | label |
| Since | 2.0 |
| See also | pegasus.partitioner.label.key, section 13.2 (page 41) |

While clustering jobs in the workflow into larger jobs, you can optionally label your graph to control which jobs are clustered and to which clustered job they belong. This done using a label based clustering scheme and is done by associating a profile/label key in the PEGASUS namespace with the jobs in the DAX. Each job that has the same value/label value for this profile key, is put in the same clustered job.

This property allows you to specify the PEGASUS profile key that you want to use for label based clustering.

## 14 Logging Properties

### 14.1 pegasus.log.manager

| | |
|---|---|
| System | Pegasus |
| Since | 2.2.0 |
| Type | Enumeration |
| Value[0] | Default |
| Value[1] | Log4j |
| Default | Default |
| See also | pegasus.log.manager.formatter, section 14.2 (page 45) |

This property sets the logging implementation to use for logging.

**Default** This implementation refers to the legacy Pegasus logger, that logs directly to stdout and stderr. It however, does have the concept of levels similar to log4j or syslog.

**Log4j** This implementation, uses Log4j to log messages. The log4j properties can be specified in a properties file, the location of which is specified by the property

```
pegasus.log.manager.log4j.conf
```

## 14.2 pegasus.log.manager.formatter

| | |
|---|---|
| System | Pegasus |
| Since | 2.2.0 |
| Type | Enumeration |
| Value[0] | Simple |
| Value[1] | Netlogger |
| Default | Simple |
| See also | pegasus.log.manager.formatter, section 14.2 (page 45) |

This property sets the formatter to use for formatting the log messages while logging.

**Simple** This formats the messages in a simple format. The messages are logged as is with minimal formatting. Below are sample log messages in this format while ranking a dax according to performance.

```
event.pegasus.ranking dax.id se18-gda.dax  - STARTED
event.pegasus.parsing.dax dax.id se18-gda-nested.dax  - STARTED
event.pegasus.parsing.dax dax.id se18-gda-nested.dax  - FINISHED
job.id jobGDA
job.id jobGDA query.name getpredicted performace time 10.00
event.pegasus.ranking dax.id se18-gda.dax  - FINISHED
```

**Netlogger** This formats the messages in the Netlogger format , that is based on key value pairs. The netlogger format is useful for loading the logs into a database to do some meaningful analysis. Below are sample log messages in this format while ranking a dax according to performance.

```
ts=2008-09-06T12:26:20.100502Z event=event.pegasus.ranking.start \
msgid=6bc49c1f-112e-4cdb-af54-3e0afb5d593c \
eventId=event.pegasus.ranking_8d7c0a3c-9271-4c9c-a0f2-1fb57c6394d5 \
dax.id=se18-gda.dax prog=Pegasus

ts=2008-09-06T12:26:20.100750Z event=event.pegasus.parsing.dax.start \
msgid=fed3ebdf-68e6-4711-8224-a16bb1ad2969 \
eventId=event.pegasus.parsing.dax_887134a8-39cb-40f1-b11c-b49def0c5232\
dax.id=se18-gda-nested.dax prog=Pegasus

ts=2008-09-06T12:26:20.100894Z event=event.pegasus.parsing.dax.end \
msgid=a81e92ba-27df-451f-bb2b-b60d232ed1ad \
eventId=event.pegasus.parsing.dax_887134a8-39cb-40f1-b11c-b49def0c5232

ts=2008-09-06T12:26:20.100395Z event=event.pegasus.ranking \
msgid=4dcecb68-74fe-4fd5-aa9e-ea1cee88727d \
eventId=event.pegasus.ranking_8d7c0a3c-9271-4c9c-a0f2-1fb57c6394d5 \
job.id="jobGDA"

ts=2008-09-06T12:26:20.100395Z event=event.pegasus.ranking \
msgid=4dcecb68-74fe-4fd5-aa9e-ea1cee88727d \
eventId=event.pegasus.ranking_8d7c0a3c-9271-4c9c-a0f2-1fb57c6394d5 \
job.id="jobGDA" query.name="getpredicted performace" time="10.00"

ts=2008-09-06T12:26:20.102003Z event=event.pegasus.ranking.end \
msgid=31f50f39-efe2-47fc-9f4c-07121280cd64 \
```

```
eventId=event.pegasus.ranking_8d7c0a3c-9271-4c9c-a0f2-1fb57c6394d5
```

## 14.3 pegasus.log.*

| | |
|---|---|
| System | Pegasus |
| Since | 2.0 |
| Type | String |
| Default | No default |

This property sets the path to the file where all the logging for Pegasus can be redirected to. Both stdout and stderr are logged to the file specified.

## 14.4 pegasus.log.metrics

| | |
|---|---|
| System | Pegasus |
| Since | 2.1.0 |
| Type | Boolean |
| Default | true |
| See also | pegasus.log.metrics.file, section 14.5 (page 46) |

This property enables the logging of certain planning and workflow metrics to a global log file. By default the file to which the metrics are logged is ${pegasus.home}/var/pegasus.log.

## 14.5 pegasus.log.metrics.file

| | |
|---|---|
| System | Pegasus |
| Since | 2.1.0 |
| Type | Boolean |
| Default | ${pegasus.home}/var/pegasus.log |
| See also | pegasus.log.metrics, section 14.4 (page 46) |

This property determines the file to which the workflow and planning metrics are logged if enabled.

# 15 Miscellaneous Properties

## 15.1 pegasus.file.cleanup.strategy

| | |
|---|---|
| System | Pegasus |
| Since | 2.2 |
| Type | enumeration |
| Value[0] | InPlace |
| Default | InPlace |

This property is used to select the strategy of how the the cleanup nodes are added to the executable workflow.

**InPlace** This is the only mode available .

## 15.2 pegasus.file.cleanup.impl

| | |
|---|---|
| System | Pegasus |
| Since | 2.2 |
| Type | enumeration |
| Value[0] | Cleanup |
| Value[1] | RM |
| Value[2] | S3 |
| Default | Cleanup |

This property is used to select the executable that is used to create the working directory on the compute sites.

**Cleanup** The default executable that is used to delete files is the dirmanager executable shipped with Pegasus. It is found at $PEGASUS_HOME/bin/dirmanager in the pegasus distribution. An entry for transformation pegasus::dirmanager needs to exist in the Transformation Catalog or the PEGASUS_HOME environment variable should be specified in the site catalog for the sites for this mode to work.

**RM** This mode results in the rm executable to be used to delete files from remote directories. The rm executable is standard on *nix systems and is usually found at /bin/rm location.

**S3** This mode is used to delete files/objects from the buckets in S3 instead of a directory. This should be set when running workflows on Amazon EC2. This implementation relies on s3cmd command line client to create the bucket. An entry for transformation amazon::s3cmd needs to exist in the Transformation Catalog for this to work.

## 15.3 pegasus.file.cleanup.scope

| | |
|---|---|
| System | Pegasus |
| Since | 2.3.0 |
| Type | enumeration |
| Value[0] | fullahead |
| Value[1] | deferred |
| Default | fullahead |

By default in case of deferred planning InPlace file cleanup is turned OFF. This is because the cleanup algorithm does not work across partitions. This property can be used to turn on the cleanup in case of deferred planning.

**fullahead** This is the default scope. The pegasus cleanup algorithm does not work across partitions in deferred planning. Hence the cleanup is always turned OFF , when deferred planning occurs and cleanup scope is set to full ahead.

**deferred** If the scope is set to deferred, then Pegasus will not disable file cleanup in case of deferred planning. This is useful for scenarios where the partitions themselves are independant ( i.e. dont share files ). Even if the scope is set to deferred, users can turn off cleanup by specifying –nocleanup option to pegasus-plan.

## 15.4 pegasus.catalog.transformation.mapper

| | |
|---|---|
| System | Staging of Executables |
| Since | 2.0 |
| Type | enumeration |
| Value[0] | All |
| Value[1] | Installed |
| Value[2] | Staged |
| Value[3] | Submit |
| Default | All |
| See also | pegasus.transformation.selector, section **??** (page **??**) |

Pegasus now supports transfer of statically linked executables as part of the concrete workflow. At present, there is only support for staging of executables referred to by the compute jobs specified in the DAX file. Pegasus determines the source locations of the binaries from the transformation catalog, where it searches for entries of type STATIC_BINARY for a particular architecture type. The PFN for these entries should refer to a globus-url-copy valid and accessible remote URL. For transfer of executables, Pegasus constructs a soft state map that resides on top of the transformation catalog, that helps in determining the locations from where an executable can be staged to the remote site.

This property determines, how that map is created.

**All** In this mode, all sources with entries of type STATIC_BINARY for a particular transformation are considered valid sources for the transfer of executables. This the most general mode, and results in the constructing the map as a result of the cartesian product of the matches.

**Installed** In this mode, only entries that are of type INSTALLED are used while constructing the soft state map. This results in Pegasus never doing any transfer of executables as part of the workflow. It always prefers the installed executables at the remote sites.

**Staged** In this mode, only entries that are of type STATIC_BINARY are used while constructing the soft state map. This results in the concrete workflow referring only to the staged executables, irrespective of the fact that the executables are already installed at the remote end.

**Submit** In this mode, only entries that are of type STATIC_BINARY and reside at the submit host (pool local), are used while constructing the soft state map. This is especially helpful, when the user wants to use the latest compute code for his computations on the grid and that relies on his submit host.

## 15.5 pegasus.selector.transformation

| | |
|---|---|
| System | Staging of Executables |
| Since | 2.0 |
| Type | enumeration |
| Value[0] | Random |
| Value[1] | Installed |
| Value[2] | Staged |
| Value[3] | Submit |
| Default | Random |
| See also | pegasus.catalog.transformation, section 7.3.1 (page 21) |

In case of transfer of executables, Pegasus could have various transformations to select from when it schedules to run a particular compute job at a remote site. For e.g it can have the choice of staging an executable from a particular remote pool, from the local (submit host) only, use the one that is installed on the remote site only.

This property determines, how a transformation amongst the various candidate transformations is selected, and is applied after the property pegasus.tc has been applied. For e.g specifying pegasus.tc as Staged and then pegasus.transformation.selector as INSTALLED does not work, as by the time this property is applied, the soft state map only has entries of type STAGED.

**Random** In this mode, a random matching candidate transformation is selected to be staged to the remote execution pool.

**Installed** In this mode, only entries that are of type INSTALLED are selected. This means that the concrete workflow only refers to the transformations already pre installed on the remote pools.

**Staged** In this mode, only entries that are of type STATIC_BINARY are selected, ignoring the ones that are installed at the remote site.

**Submit** In this mode, only entries that are of type STATIC_BINARY and reside at the submit host (pool local), are selected as sources for staging the executables to the remote execution pools.

## 15.6 pegasus.execute.*.filesystem.local

| | |
|---|---|
| System | Pegasus |
| Type | Boolean |
| Default | false |
| Since | 2.1.0 |

Normally, Pegasus transfers the data to and from a directory on the shared filesystem on the head node of a compute site. The directory needs to be visible to both the head node and the worker nodes for the compute jobs to execute correctly.

In the case, where the worker nodes cannot see the filesystem of the head node there needs to be a Second Level Staging (SLS) process that transfers the data from the head node to a directory on the worker node tmp. To achieve this, Pegasus uses the pre-job and post-job feature of kickstart to pull the input data from the head node and push back the output data of a job to the head node.

Even though we do SLS, Pegasus still relies on the existence of a shared file system due to the following two reasons

```
a) for the transfer executable to pick up the proxy, that we
transfer from the submit host to the head node.

b) to access sls input and output files that contain the file
transfer urls to manage the transfer of data to worker node and
back to headnode.
```

Additionally, if you are running your workflows on a Condor pool, one can bypass the use of kickstart to do the SLS. Please contact pegasus@isi.edu for more details of this scenario. In this case, the workflows generated by Pegasus have been shown to run in total non shared filesystem environment.

## 15.7 pegasus.parser.dax.preserver.linebreaks

| | |
|---|---|
| System | Pegasus |
| Type | Boolean |
| Default | false |
| Since | 2.2.0 |

The DAX Parser normally does not preserve line breaks while parsing the CDATA section that appears in the arguments section of the job element in the DAX. On setting this to true, the DAX Parser preserves any line line breaks that appear in the CDATA section.

# Index