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# **decisionengine**

***Release 1.1.1***

**Fermi Research Alliance, LLC.**

**Nov 10, 2020**



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The decisionengine\_modules package contains provider specific implementations of base classes provided by the decision engine framework.



## RELEASE NOTES

### 1.1 Release 1.4.1

In this release:

- Bug fixes to 1.4.0 release

#### 1.1.1 Issues fixed in this release

- [281](#) : New exception in NERSC newt get\_usage ([4d1301e](#))

#### 1.1.2 Full list of commits since version 1.4.0

[4d1301e](#) : decisionengine\_modules/NERSC/util: Added more 5xx codes to retry (#285)

### 1.2 Release 1.4.0

In this release:

- Works with python3 glideinWMS package
- Uses new AWS bill calculator
- Improved Jenkins CI pipeline

#### 1.2.1 Issues fixes in this release

- [59](#) : Replace AWS Billing and GCE Billing modules with revamped bill Calculator code ([71f25ea](#))
- [246](#) : Modify NERSCAllocation main() so that it can be run standalone ([11ce772](#))
- [263](#) : Python3 encodes hex strings differently, resulting in malformed htcondor classads ([13a24e4](#))
- [255](#) : Add option to config of condor/sources/job\_q.py and slots.py ([6f65af4](#))

## **1.2.2 Full list of commits since version 1.3.0**

42f62d3 : remove py3 from package name  
6e56c4d : bump version number  
6433dba : Add support to test any branch in Jenkins for DE modules repo (#276)  
60db1b3 : Accommodate breaking changes to framework's configuration system. (#273)  
13a24e4 : Fix263 (#272)  
a866e47 : Correct 'file\_cache is unavailable when using oauth2client >= 4.0.0' (#267)  
2c82064 : Fix requirements.txt for #266 (#268)  
6f65af4 : A more generic solution for the issue 255 (#265)  
df08cb4 : Speed up tests. (#264)  
057e578 : Update Jenkins pipeline to properly test closing PR (#262)  
a28f272 : Adding Jenkins pipeline documentation (#261)  
71f25ea : T59 (#258)  
90b6580 : Updating Jenkins pipeline configuration (#260)  
b4bd759 : dealing with 2 columnsindividually (#257)  
11ce772 : decisionengine\_modules/NERSC: Can run NerscAllocationInfo.py without (#256)  
4a70465 : doc: add release notes

## **1.3 Release 1.3.0**

In this release:

- Introduced Jsonnet based configuration system
- Improved error handling

### **1.3.1 Full list of commits since version 1.2.0**

e8c8e24 : Update to split a tuple key into two separate keys, this allows python config file to be JSON compliant config file (#254)  
fbb5d28 : add jsonnet dependency in build/scripts/utlis.sh for unit tests (#252)  
95a0a32 : decisionengine\_modules/glideinwms: Added retry to factory queries (#250)  
77f894a : Aws (#249)  
3be5be1 : Set theme jekyll-theme-slate  
a73e7f8 : Doc (#247)  
f8aa96d : Adding editor config file, see <https://editorconfig.org/> (#248)  
1ab1720 : Issue no. 237 (#245)  
5edc8f9 : Issue 227 (#243)  
e6047f2 : GCE channel goes OFFLINE on a timeout (#242)



63e3627 : Aws billing (#241)  
c3626b9 : 1.1.3/fix (#239)  
ae7c5a6 : Jenkins pipeline improvements (#236)  
310befd : T198 (#235)  
a65886d : Fix import as reported in : <https://github.com/HEPCloud/decisionengine...> (#232)  
93711cc : Run coveralls even if tests fail (#229)  
03d763a : Jenkins pipeline improvements (#230)  
f48d30f : Fix/223 (#228)  
c8aa262 : github ticket 199 (#222)  
0323bda : Address : [https://github.com/HEPCloud/decisionengine\\_modules/issues/224](https://github.com/HEPCloud/decisionengine_modules/issues/224) (#226)  
62e4df6 : Add support to run CI on Jenkins (#221)  
5ab1541 : bump master version to 1.2.0 (for now) (#219)  
bc19c65 : decisionengine\_modules/NERSC: Added retry loop for NERSC API Calls (#220)  
41a50de : Sync up pep8speaks and run\_pylint.sh with decisionengine settings (#218)  
db4634f : silence pylint error (#217)  
1b95141 : Fix whitespace around operator error  
746ea38 : ignore W503  
8a8b5f4 : remove unused variable  
a6668bf : fix PEP8 warnings  
13773ee : address pep8 warnings  
6bea4ca : silence pylint error  
f589895 : Pass sort=True parameter to fix future warning (#215)  
a1d0507 : fixing pep8 warning  
a10bd17 : debugging one import error  
ec501ad : make coveralls.io links work  
deab1a7 : T201 (#204)  
69f2645 : Add coveragerc  
6d8a5f5 : decisionengine\_modules/NERSC: Make Nersc API call backward-compatible with old config (#196)  
a7e0af9 : Only run Github Actions for python3.6 (#24)

## 1.4 Release 1.2.0

In this release:

- Switched to python3
- NERSC newt interface adapted to changed NERSC RESTful API
- Improved unit tests
- Added Jenkins CI pipeline

## 1.5 Patches:

30d928b : clone version 1.2.0 of decisionengine

ae7c5a6 : Jenkins pipeline improvements (#236)

310befd : T198 (#235)

a65886d : Fix import as reported in : <https://github.com/HEPCloud/decisionengine...> (#232)

93711cc : Run coveralls even if tests fail (#229)

03d763a : Jenkins pipeline improvements (#230)

f48d30f : Fix/223 (#228)

c8aa262 : github ticket 199 (#222)

0323bda : Address : [https://github.com/HEPCloud/decisionengine\\_modules/issues/224](https://github.com/HEPCloud/decisionengine_modules/issues/224) (#226)

62e4df6 : Add support to run CI on Jenkins (#221)

5ab1541 : bump master version to 1.2.0 (for now) (#219)

bc19c65 : decisionengine\_modules/NERSC: Added retry loop for NERSC API Calls (#220)

41a50de : Sync up pep8speaks and run\_pylint.sh with decisionengine settings (#218)

db4634f : silence pylint error (#217)

1b95141 : Fix whitespace around operator error

746ea38 : ignore W503

8a8b5f4 : remove unused variable

a6668bf : fix PEP8 warnings

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6bea4ca : silence pylint error

f589895 : Pass sort=True parameter to fix future warning (#215)

a1d0507 : fixing pep8 warning

a10bd17 : debugging one import error

ec501ad : make coveralls.io links work

deab1a7 : T201 (#204)

69f2645 : Add coveragerc

6d8a5f5 : decisionengine\_modules/NERSC: Make Nersc API call backward-compatible with old config (#196)

[a7e0af9](#) : Only run Github Actions for python3.6 (#24)



## DEVELOPER DOCUMENTATION

First command `cd` is just to make sure that you end up in a directory that will contain two subdirectory `decisionengine` and `decisionengine_modules`. Of course this can be done in any directory, not necessarily home directory.

### 2.1 Decisionengine\_modules

#### 2.1.1 Prerequisites:

In Addition to above installed packages

```
yum install condor
pip3 install htcondor boto boto3 google_auth google-api-python-client gcs-oauth2-boto-
↳ plugin
```

#### 2.1.2 Test

```
cd

git clone https://github.com/HEPCloud/decisionengine_modules
python3 -m pytest decisionengine_modules
```

Current status:

```
[root@fermicloud371 tmp]# python3 -m pytest decisionengine_modules
===== test session starts
↳ =====
platform linux -- Python 3.6.8, pytest-5.3.5, py-1.8.1, pluggy-0.13.1
rootdir: /root/junjk
collected 85 items

decisionengine_modules/AWS/tests/test_AWSInstancePerformance.py ..
↳ [ 2%]
decisionengine_modules/AWS/tests/test_AWSJobLimits.py ..
↳ [ 4%]
decisionengine_modules/AWS/tests/test_AWSOccupancyWithSourceProxy.py ..
↳ [ 7%]
decisionengine_modules/AWS/tests/test_AWSSpotPriceWithSourceProxy.py ..
↳ [ 9%]
decisionengine_modules/AWS/tests/test_AWS_figure_of_merit_publisher.py ..
↳ [ 11%]
```

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```

decisionengine_modules/AWS/tests/test_AWS_price_performance_publisher.py ..
↳ [ 14%]
decisionengine_modules/AWS/tests/test_FigureOfMerit.py ...
↳ [ 17%]
decisionengine_modules/tests/test_AwsBurnRate.py ..
↳ [ 20%]
decisionengine_modules/tests/test_GCEBillingInfo.py ..
↳ [ 22%]
decisionengine_modules/tests/test_GCEFigureOfMerit_publisher.py ..
↳ [ 24%]
decisionengine_modules/tests/test_GCEInstancePerformanceInfo.py ..
↳ [ 27%]
decisionengine_modules/tests/test_GCEPricePerformance_publisher.py ..
↳ [ 29%]
decisionengine_modules/tests/test_GCEResourceLimits.py ..
↳ [ 31%]
decisionengine_modules/tests/test_GceBurnRate.py ..
↳ [ 34%]
decisionengine_modules/tests/test_GceFigureOfMerit.py ..
↳ [ 36%]
decisionengine_modules/tests/test_GceOccupancy.py ..
↳ [ 38%]
decisionengine_modules/tests/test_NerscAllocationInfo.py ..
↳ [ 41%]
decisionengine_modules/tests/test_NerscFigureOfMerit.py ..
↳ [ 43%]
decisionengine_modules/tests/test_NerscFigureOfMerit_publisher.py ..
↳ [ 45%]
decisionengine_modules/tests/test_NerscInstancePerformance.py ..
↳ [ 48%]
decisionengine_modules/tests/test_NerscJobInfo.py ..
↳ [ 50%]
decisionengine_modules/tests/test_factory_client.py ....
↳ [ 55%]
decisionengine_modules/tests/test_factory_entries.py ....
↳ [ 60%]
decisionengine_modules/tests/test_factory_global.py ....
↳ [ 64%]
decisionengine_modules/tests/test_fomorderplugin.py ....
↳ [ 69%]
decisionengine_modules/tests/test_grid_figure_of_merit.py .
↳ [ 70%]
decisionengine_modules/tests/test_htcondor_query.py ....
↳ [ 75%]
decisionengine_modules/tests/test_job_clustering.py .....
↳ [ 81%]
decisionengine_modules/tests/test_job_clustering_publisher.py ..
↳ [ 83%]
decisionengine_modules/tests/test_job_q.py ...
↳ [ 87%]
decisionengine_modules/tests/test_slots.py ..
↳ [ 89%]
decisionengine_modules/tests/glideinwms/publishers/test_decisionenginemonitor.py ...
↳ [ 92%]
decisionengine_modules/tests/glideinwms/publishers/test_fe_group_classads.py ...
↳ [ 96%]
decisionengine_modules/tests/glideinwms/publishers/test_glideclientglobal.py ...
↳ [100%]

```

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```
===== warnings summary
↳=====
/usr/local/lib/python3.6/site-packages/boto/plugin.py:40
  /usr/local/lib/python3.6/site-packages/boto/plugin.py:40: DeprecationWarning: the_
↳imp module is deprecated in favour of importlib; see the module's documentation for_
↳alternative uses
    import imp

-- Docs: https://docs.pytest.org/en/latest/warnings.html
===== 85 passed, 1 warning in 9.73s_
↳=====
```





## SOURCE CODE

### 3.1 Welcome to decisionengine\_modules's documentation!

#### 3.1.1 decisionengine\_modules package

##### Subpackages

decisionengine\_modules.AWS package

##### Subpackages

decisionengine\_modules.AWS.publishers package

##### Submodules

decisionengine\_modules.AWS.publishers.AWS\_burn\_rate module

decisionengine\_modules.AWS.publishers.AWS\_figure\_of\_merit module

decisionengine\_modules.AWS.publishers.AWS\_generic\_publisher module

decisionengine\_modules.AWS.publishers.AWS\_price\_performance module

##### Module contents

decisionengine\_modules.AWS.sources package

##### Submodules

decisionengine\_modules.AWS.sources.AWSBurnRateSourceProxy module

decisionengine\_modules.AWS.sources.AWSInstancePerformance module

decisionengine\_modules.AWS.sources.AWSJobLimits module

decisionengine\_modules.AWS.sources.AWSOccupancy module

decisionengine\_modules.AWS.sources.AWSOccupancyWithSourceProxy module

decisionengine\_modules.AWS.sources.AWSSpotPrice module

decisionengine\_modules.AWS.sources.AWSSpotPriceWithSourceProxy module

decisionengine\_modules.AWS.sources.BillingInfo module

decisionengine\_modules.AWS.sources.BillingInfoSourceProxy module

decisionengine\_modules.AWS.sources.DEAccountContants module

This data is taken from billing and arranged as dictionary of AccountConstants instead of separate class for each billing class. This way is more convenient to use in programmes.

```
class decisionengine_modules.AWS.sources.DEAccountContants.AccountConstants (constants={})  
    Bases: object
```

```
    info ()
```

```
decisionengine_modules.AWS.sources.DEAccountContants.load_constants (constants_file)  
    Load constants from file.
```

```
    Parameters constants_file (file) – configuration file as python dict
```

```
    Return type AccountConstants
```

decisionengine\_modules.AWS.sources.FigureOfMeritSourceProxy module

decisionengine\_modules.AWS.sources.FinancialParameters module

decisionengine\_modules.AWS.sources.occupancy\_config\_sample module

decisionengine\_modules.AWS.sources.spot\_price\_config\_sample module

Module contents

decisionengine\_modules.AWS.transforms package

Submodules

decisionengine\_modules.AWS.transforms.AwsBurnRate module

decisionengine\_modules.AWS.transforms.FigureOfMerit module

Module contents

## Submodules

decisionengine\_modules.AWS.AWSSpotPrice module

decisionengine\_modules.AWS.CloudBudget module

decisionengine\_modules.AWS.CloudRequests module

decisionengine\_modules.AWS.HPCAllocation module

decisionengine\_modules.AWS.HTCondorJobQ module

decisionengine\_modules.AWS.LocalCapacity module

decisionengine\_modules.AWS.ProvisionerResourceList module

decisionengine\_modules.AWS.pandas\_scratch\_pad module

decisionengine\_modules.AWS.pandas\_scratch\_pad.**load\_data\_frame** (*list\_of\_dicts*)

## Module contents

decisionengine\_modules.GCE package

## Subpackages

decisionengine\_modules.GCE.publishers package

## Submodules

decisionengine\_modules.GCE.publishers.GCEBurnRatePublisher module

decisionengine\_modules.GCE.publishers.GCEFigureOfMerit\_publisher module

decisionengine\_modules.GCE.publishers.GCEPricePerformance\_publisher module

## Module contents

decisionengine\_modules.GCE.sources package

## Submodules

decisionengine\_modules.GCE.sources.GCEBillingInfo module

decisionengine\_modules.GCE.sources.GCEBillingInfoSourceProxy module

**decisionengine\_modules.GCE.sources.GCEInstancePerformance module**

**decisionengine\_modules.GCE.sources.GCEResourceLimits module**

**decisionengine\_modules.GCE.sources.GceBurnRateSourceProxy module**

**decisionengine\_modules.GCE.sources.GceFigureOfMeritSourceProxy module**

**decisionengine\_modules.GCE.sources.GceOccupancy module**

**Module contents**

**decisionengine\_modules.GCE.transforms package**

**Submodules**

**decisionengine\_modules.GCE.transforms.GceBurnRate module**

**decisionengine\_modules.GCE.transforms.GceFigureOfMerit module**

**Module contents**

**Module contents**

**decisionengine\_modules.NERSC package**

**Subpackages**

**decisionengine\_modules.NERSC.publishers package**

**Submodules**

**decisionengine\_modules.NERSC.publishers.NerscFigureOfMerit\_publisher module**

**Module contents**

**decisionengine\_modules.NERSC.sources package**

**Submodules**

**decisionengine\_modules.NERSC.sources.NerscAllocationInfo module**

**decisionengine\_modules.NERSC.sources.NerscAllocationInfoSourceProxy module**

**decisionengine\_modules.NERSC.sources.NerscFigureOfMeritSourceProxy module**

decisionengine\_modules.NERSC.sources.NerscInstancePerformance module

decisionengine\_modules.NERSC.sources.NerscJobInfo module

Module contents

decisionengine\_modules.NERSC.transforms package

Submodules

decisionengine\_modules.NERSC.transforms.CompareNerscFactoryJobs module

decisionengine\_modules.NERSC.transforms.CompareNerscUserpoolSlots module

decisionengine\_modules.NERSC.transforms.NerscFigureOfMerit module

Module contents

decisionengine\_modules.NERSC.util package

Submodules

decisionengine\_modules.NERSC.util.newt module

Newt API interface

```
class decisionengine_modules.NERSC.util.newt.Newt (password_file,  
                                                newt_base_url=None,  
                                                num_retries=0,  
                                                retry_backoff_factor=0)
```

Bases: object

**\_add\_retries\_to\_session()**

Adds retries to requests Session for requests to NEWT URLs :return: void

**\_login()**

Establishes newt Session :return: void

**get\_queue(system, query=None)**

Returns information about queues controlled by optional query name parameter :param system: string system name (like 'cori', 'edison' ..) :param query: string query (optional) :return: json containing queue information

**get\_status(system=None)**

Returns system status for a given system (if provided) or all systems :param system: string name of the system (optional) :return: json containing system status

**get\_usage(username)**

Returns allocation and usage for the given user using NEWT IRIS API :param username: string username :return: json containing allocation and usage information for a given user

**Module contents**

**Module contents**

**decisionengine\_modules.graphite package**

**Subpackages**

**decisionengine\_modules.graphite.publishers package**

**Submodules**

**decisionengine\_modules.graphite.publishers.generic\_publisher module**

**Module contents**

**Module contents**

**decisionengine\_modules.htcondor package**

**Subpackages**

**decisionengine\_modules.htcondor.publishers package**

**Submodules**

**decisionengine\_modules.htcondor.publishers.publisher module**

**Module contents**

**decisionengine\_modules.htcondor.sources package**

**Submodules**

**decisionengine\_modules.htcondor.sources.job\_q module**

**decisionengine\_modules.htcondor.sources.job\_q\_source\_proxy module**

**decisionengine\_modules.htcondor.sources.slots module**

**decisionengine\_modules.htcondor.sources.slots\_source\_proxy module**

**decisionengine\_modules.htcondor.sources.source module**

**Module contents**

## Submodules

### decisionengine\_modules.htcondor.htcondor\_query module

## Module contents

### decisionengine\_modules.util package

## Submodules

### decisionengine\_modules.util.figure\_of\_merit module

Calculate figure of merit

```
decisionengine_modules.util.figure_of_merit.figure_of_merit (performance,
                                                             running,          al-
                                                             lowed,    idle=None,
                                                             max_idle=None)
```

### decisionengine\_modules.util.retry\_function module

```
decisionengine_modules.util.retry_function.retry_on_error (nretries=1,
                                                            retry_interval=2,
                                                            backoff=True)

decisionengine_modules.util.retry_function.retry_wrapper (f,          nretries=1,
                                                            retry_interval=2,  back-
                                                            off=True)
```

Retry on error with parameters of how many times (nretries) and interval in seconds (retry\_interval). If the function to be decorated is an instance method and the values come from a configuration, then this decorator can retrieve these two parameters from instance attributes with the same name. Otherwise, use the default values or pass new values to the decorator.

### decisionengine\_modules.util.test\_retry\_function module

```
class decisionengine_modules.util.test_retry_function.Dummy (name='Dummy')
    Bases: object
    _func_failure (foo, input2=3)
    _func_success (foo, input2=3)
    func_failure (foo, input2=3)
    func_success (foo, input2=3)

decisionengine_modules.util.test_retry_function.test_all()
```

## decisionengine\_modules.util.testutils module

### Module contents

### Submodules

## decisionengine\_modules.graphite\_client module

```
class decisionengine_modules.graphite_client.Graphite (host='fjfmomdata.fnal.gov',  
                                                    pickle_port=2004)  
    Bases: object  
    send_dict (namespace, data, debug_print=True, send_data=True)  
        send data contained in dictionary as {k: v} to graphite dataset $namespace.k with current timestamp  
decisionengine_modules.graphite_client.sanitize_key (key)
```

## decisionengine\_modules.load\_config module

```
decisionengine_modules.load_config.load (python_file, retries=0, timeout=0)  
    Load constants from file.  
    Parameters constants_file (file) – configuration file as python dict  
    Return type object
```

### Module contents

## 3.2 Indices and tables

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## INDICES AND TABLES

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