
sphinxcontrib.traceables

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1.1 Getting started

1.1.1 Overview

This extension provides functionality to define traceable items and relationships between them in documentation generated by *Sphinx*. It also offers visualization of the traceables in various forms, such as relationship graphs.

More information is available here:

- Documentation: <https://sphinxcontrib-traceables.readthedocs.org/en/latest/>
- Download: <https://pypi.python.org/pypi/sphinxcontrib-traceables>
- Development: <https://github.com/t4ngo/sphinxcontrib-traceables>

1.1.2 Installation

Install this package using `pip install sphinxcontrib-traceables`, or from source using `python setup.py install`. Then add it to your project's Sphinx configuration file `conf.py`:

```
extensions = ['sphinxcontrib-traceables']
```

1.1.3 Minimal example

In your project's documentation, you can define a new traceable as shown below. Note that the tag `LOREM-IPSUM` given to the traceable should be unique throughout the documentation, because it is used to reference the traceable.

```
.. traceable:: LOREM-IPSUM
   :title: Lorem ipsum

   Lorem ipsum dolor sit...
```

The traceable defined above can be referenced in line as follows:

```
Lorem ipsum :traceable: LOREM-IPSUM dolor sit...
```

See *Usage* for more information about this and more functionality provided by this extension.

See the `example` directory (available [on GitHub](#)) within this extension's source code for a complete Sphinx project demonstrating various features provided by this extension.

1.2 Usage

1.2.1 Defining traceables

Traceables are defined using the `traceable` directive described below.

.. traceable:: TAG

Create a traceable item. The TAG should be a unique string throughout the documentation, because it is used to reference the traceable.

The traceable can be given attributes, such as a title, a version, and relationships with other traceables. Attributes are specified using the form `:<option-name>: <option-value>`¹. For example, the text below defines a traceable with tag `LOREM-IPSUM`, title “Lorem ipsum”, and content “Lorem ipsum dolor sit...”:

```
.. traceable:: LOREM-IPSUM
   :title: Lorem ipsum

   Lorem ipsum dolor sit...
```

Traceable directives have the following properties:

- A single argument defining the traceable’s tag (`.. traceable:: <TAG>`)
 - The tag must be unique throughout the documentation
 - The tag may not contain spaces
- Zero or more options (`:<option-name>: <option-value>`)
 - The special option `title` defines the traceable’s title
 - Options with a valid relationship name define relationships which this traceable has with other traceable
 - Arbitrary option names and values are allowed; if not special options as listed above, the values are stored as traceable attributes and can be used for filtering/querying traceables
- Optional content
 - If content is given, it will be parsed as regular ReST.

1.2.2 Referencing traceables

Traceables can be referenced using the `traceable` role described below.

:traceable:

Create a reference to a traceable defined elsewhere in the documentation. For example:

```
Lorem ipsum :traceable:`LOREM-IPSUM` dolor sit...
```

1.2.3 Showing traceables matrices

Relationships between traceables can be shown using the `traceable-matrix` directive described below.

.. traceable-matrix::

Generate a traceables matrix. The matrix shows pairs of traceables which are related to each other by a given

¹ The formal specification of reStructuredText directives is documented here: <http://docutils.sourceforge.net/docs/ref/rst/restructuredtext.html#directives>

relationship (see the `:relationship:` option below). Various formats are available for showing the pairs of traceables (see the `:format:` option below).

The following options are available for this directive:

`:relationship:` – name of traceables relationship (*required*) Specify which relationship between traceables to show in the generated matrix.

`:filter-primaries:` – traceable filter expression (*optional*) Specify a filter to limit the primary traceables included in the matrix.

If this option is not given, then all traceables that have one or more relationships of the type specified by `:relationship:` will be included.

`:filter-secondaries:` – traceable filter expression (*optional*) Specify a filter to limit the secondary traceables included in the matrix.

If this option is not given, then all traceables that have one or more relationships of the reverse of the type specified by `:relationship:` will be included.

`:format:` – name of format (*optional*) Specify the matrix format to generate. The following formats are available:

- `:format:` `table` (*default*)

Traditional traceability table format. This format allows the following additional options to be set:

`:split-secondaries:` – positive integer The maximum number of columns to output. If more columns would have been necessary, multiple tables will be generated.

`:split-primaries:` – positive integer The maximum number of rows to output. If more rows would have been necessary, multiple tables will be generated.

- `:format:` `columns`

2-column table of related traceables

- `:format:` `list`

2-level list of related traceables

For example, the directive shown below would generate a table showing all traceables related to each other with the `children` relationship:

```
.. traceable-matrix::
   :relationship: children
   :format: table
```

The directive shown above creates a traceability matrix as shown below. The image below is a screenshot from the latex-PDF generated for the [example project](#) which is part of this extension's source code.

		Children							
Parents		AQUILA	AURIGA	CORVUS	CYGNUS	LACERTA	LYRA	PEGASUS	VULPECULA
	AQUILA			✓	✓				
	AURIGA							✓	
	CEPHEUS		✓						
	CYGNUS								✓
	PEGASUS					✓			
	SAGITTA	✓					✓		

1.2.4 Showing traceables graphs

This section is yet to be written...

1.3 Extension internals

1.3.1 Logical architecture

Behavioral architecture model

When Sphinx is run, this extension performs the steps listed below.

1. Initialization

- Sphinx calls `setup()`, which registers the extension's directives, roles, event handlers, etc.

2. Parsing source files

- When Sphinx encounters a traceables directive or role while parsing input, it calls the associated class.
- The directive or role class processes its input and creates one or more nodes which are then inserted into the resulting doctree; these will be processed later after all source files have been parsed.
- A directive that defines a new traceable item adds that item to the traceables cache that this extension maintains, so that later processing logic knows about all traceable items.

3. Processing doctrees

- During initialization, this extension registered a handler for the `event-doctree-resolved` event; that handler is called after all source files have been parsed into doctrees.
- The event handler calls the `ProcessorManager` to process the given doctree; it in turn calls classes derived from `ProcessorBase` to perform the various traceables functionalities.

4. Maintaining state information

- During initialization, this extension registered a handler for the `event-env-purge-doc` event; that handler is called to clean up any state this extension may keep related to a given source file.

- The event handler calls the `TraceablesStorage` to remove all information stored in its cache related to the given source file.

During parsing of source files

This extension adds the following directives and roles which are used by Sphinx during parsing of source.

Traceable directive

When Sphinx encounters a traceable directive during parsing, a `TraceableDirective` is called to process the directive. It creates a target node, so that the traceable can be referenced from elsewhere in the documentation, and a presentation node, to show the traceable's definition at the directive's location in the documentation.

The attributes defined in the traceable directive may contain references to other traceables which cannot be resolved until the entire doctree has been resolved. The attributes are therefore stored in a `traceable_attribute_list` node for later processing.

Traceable role

When Sphinx encounters a traceable role during parsing, a `traceable_xref` cross reference node is created. Later on that node will be replaced by an appropriate final node.

After doctree has been resolved

This extension registers the `process_traceables_in_doctree()` to be called when the `doctree-resolved` event fires. That callback function invokes the `TraceablesProcessor` to process the main business logic of this extension.

The `TraceablesProcessor` performs the following activities:

1. Collect all traceables defined throughout the documentation
2. Analyze relationships between traceables; this is done with help from the `RelationshipManager` class
3. Process `traceable_attribute_list` nodes; these are part of traceable directives
4. Resolve `traceable_xref` cross reference nodes; these are created by traceable roles, amongst other possible sources

Purging of old state

This extension registers the `purge_traceables()` to be called when the `env-purge-doc` event fires. That callback function removes the relevant data from the `TraceablesStorage`.

autodoc: failed to import module u'sphinxcontrib.traceables.infrastructure'; the following exception was raised: Traceback (most recent call last): File "/home/docs/checkouts/readthedocs.org/user_builds/sphinxcontrib-traceables/envs/latest/local/lib/python2.7/site-packages/sphinx/ext/autodoc.py", line 385, in import_object __import__(self.modname) ImportError: No module named sphinxcontrib.traceables.infrastructure

autodoc: failed to import module u'sphinxcontrib.traceables.traceables'; the following exception was raised: Traceback (most recent call last): File "/home/docs/checkouts/readthedocs.org/user_builds/sphinxcontrib-traceables/envs/latest/local/lib/python2.7/site-packages/sphinx/ext/autodoc.py", line 385, in import_object __import__(self.modname) ImportError: No module named sphinxcontrib.traceables.traceables

autodoc: failed to import module u'sphinxcontrib.traceables.matrix'; the following exception was raised: Traceback (most recent call last): File "/home/docs/checkouts/readthedocs.org/user_builds/sphinxcontrib-traceables/envs/latest/local/lib/python2.7/site-packages/sphinx/ext/autodoc.py", line 385, in import_object __import__(self.modname) ImportError: No module named sphinxcontrib.traceables.matrix

autodoc: failed to import module u'sphinxcontrib.traceables.graph'; the following exception was raised: Traceback (most recent call last): File "/home/docs/checkouts/readthedocs.org/user_builds/sphinxcontrib-traceables/envs/latest/local/lib/python2.7/site-packages/sphinx/ext/autodoc.py", line 385, in import_object __import__(self.modname) ImportError: No module named sphinxcontrib.traceables.graph

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Date January 2004

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