A lion, a head, and a dash of YAML

Extending Sphinx to automate your documentation

FOSDEM 2018

@stephenfin

reStructuredText, Docutils & Sphinx

1

```
A little reStructuredText
=========================

This document demonstrates some basic features of |rst|. You can use
**bold** and *italics*, along with ``literals``. It’s quite similar
to `Markdown`_ but much more extensible. CommonMark may one day
approach this [1]_, but today is not that day. `docutils`__ does all
this for us.

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The extensibility really comes into play with directives and
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Of course, all the stuff we showed previously *still works!*. The
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A little more reStructuredText

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reStructuredText provides the syntax

Docutils provides the parsing

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Docutils provides the parsing

Sphinx provides the cross-referencing and file generation

Docutils use readers, parsers, transforms, and writers

Docutils works with individual files

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Docutils works with individual files

Sphinx uses readers, writers, transforms, and builders

Sphinx works with multiple, cross-referenced files

Documentation tool

Multiple output formats

Extensive cross-referencing support

Extensions

Documentation tool

Multiple output formats

Extensive cross-referencing support

Extensions

```
sphinx-quickstart

sphinx-build

sphinx-apidoc

sphinx-autogen
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sphinx-quickstart

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sphinx-autogen

Let’s Get To Extending…

2

Current version of Sphinx (1.7.0) - APIs may change

Python knowledge is expected

Some possible references to OpenStack projects

See github.com/stephenfin/fosdem-sphinx-demo for more

Extensions are registered via **`sphinx.application.Application`**

`add_builder`	(Builders)
`add_config_value`	(Config Values)
`add_domain`	(Domains)
`add_event`	(Events)
`add_node`	(docutils Nodes)
`add_directive`	(Directives)
`add_role`	(Interpreted Text Roles, a.k.a. Roles)
`connect, disconnect`	(Hooks)
...	...

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Interpreted Text Roles

(a.k.a. roles)

3

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```python
def xyz_role(name, rawtext, text, lineno, inliner, options={},
             content=[]):
  # code...

def setup(app):
  app.add_role('xyz', xyz_role)
  return {'version': '1.0', 'parallel_read_safe': True}
```

```
Fixes
=====

* #2951: Add ``--implicit-namespaces`` PEP-0420 support to apidoc.
* Add ``:caption:`` option for sphinx.ext.inheritance_diagram.
* #2471: Add config variable for default doctest flags.
* Convert linkcheck builder to requests for better encoding
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* #2463, #2516: Add keywords of "meta" directive to search index
```

source/changes.rst

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source/changes.rst

```python
from docutils import nodes

BASE_URL = 'https://github.com/sphinx-doc/sphinx/issues/{}'

def github_issue(name, rawtext, text, lineno, inliner, options={},
                 content=[]):
  refuri = BASE_URL.format(text)
  node = nodes.reference(rawtext, text, refuri=refuri, **options)
  return [node], []

def setup(app):
  app.add_role('ghissue', github_issue)
  return {'version': '1.0', 'parallel_read_safe': True}
```

ext/issue_role.py

```python
from docutils import nodes

BASE_URL = 'https://github.com/sphinx-doc/sphinx/issues/{}'

def github_issue(name, rawtext, text, lineno, inliner, options={},
                 content=[]):
  refuri = BASE_URL.format(text)
  node = nodes.reference(rawtext, text, refuri=refuri, **options)
  return [node], []

def setup(app):
  app.add_role('ghissue', github_issue)
  return {'version': '1.0', 'parallel_read_safe': True}
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Directives

4

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```

```python
from docutils import nodes
from docutils.parsers.rst import Directive

class XYZDirective(Directive):
  def run(self):
    section = nodes.section(ids=['test'])
    section += nodes.title(text='Test')
    section += nodes.paragraph(text='Hello, world!')
    return [section]

def setup(app):
  app.add_directive('xyz-directive', XYZDirective)
  return {'version': '1.0', 'parallel_read_safe': True}
```

```rst
Issues
======

Add keywords of "meta" directive to search index (#2463)
--------------------------------------------------------

Opened by TimKam ::

    It would be great to have the keywords of `meta` directives
    included in the search index.

    Like this, one can help users who are searching for a synonym
    of the "correct" term through simply adding synonyms as
    keywords to a meta directive on the corresponding page.
```

source/issues.rst

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source/issues.rst

```rst
Issues
======

.. github-issue:: 2463
```

source/issues.rst

```python
from docutils import nodes
from docutils.parsers.rst import Directive
import requests

URL = 'https://api.github.com/repos/sphinx-doc/sphinx/issues/{}'

def get_issue(issue_id):
  issue = requests.get(URL.format(issue_id)).json()
  title = '%s (#%s)' % (issue['title'], issue_id)
  owner = 'Opened by %s' issue['user']['login']

  return issue_id, title, issue['body'], owner

...
```

ext/issue_directive.py

```python
...

class ShowGitHubIssue(Directive):
  required_arguments = 1

  def run(self):
    issue = get_issue(self.arguments[0])

    section = nodes.section(ids=['github-issue-%s' % issue[0]])
    section += nodes.title(text=issue[1])
    section += nodes.paragraph(text='Opened by %s' % issue[3])
    section += nodes.literal_block(text=issue[2])

    return [section]
```

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...

class ShowGitHubIssue(Directive):
  required_arguments = 1

  def run(self):
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    return [section]
```

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    section += nodes.title(text=issue[1])
    section += nodes.paragraph(text='Opened by %s' % issue[3])
    section += nodes.literal_block(text=issue[2])

    return [section]
```

ext/issue_directive.py

```python
...

def setup(app):
  app.add_directive('github-issue', ShowGitHubIssue)
  return {'version': '1.0', 'parallel_read_safe': True}
```

ext/issue_directive.py

```
Issues
======

.. github-issue:: 2463
```

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    return [section]
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    return [section]
```

ext/issue_directive.py

```python
class ShowGitHubIssue(Directive):
  required_arguments = 1

  def run(self):
    issue = get_issue(self.arguments[0])

    result = statemachine.ViewList()
    for line in format_issue(issue):
      result.append(line, '<' + __name__ + '>')
      node = nodes.section(document=self.state.document)
      nested_parse_with_titles(self.state, result, node)

    return node.children
```

ext/issue_directive.py

```python
class ShowGitHubIssue(Directive):
  required_arguments = 1

  def run(self):
    issue = get_issue(self.arguments[0])

    result = statemachine.ViewList()
    for line in format_issue(issue):
      result.append(line, '<' + __name__ + '>')
      node = nodes.section(document=self.state.document)
      nested_parse_with_titles(self.state, result, node)

    return node.children
```

ext/issue_directive.py

```python
def format_issue(issue):
  num, title, body, owner = issue

  yield title
  yield '=' * len(title)
  yield ''
  yield '%s ::' % owner
  yield ''
  for line in body.splitlines():
    yield '    %s' % line if line else ''
```

ext/issue_directive.py

Issues

Add keywords of “meta” directive to search index (#2463)

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```

Events

5

builder-inited(app)

config-inited(app, config)

source-read(app, docname, source)

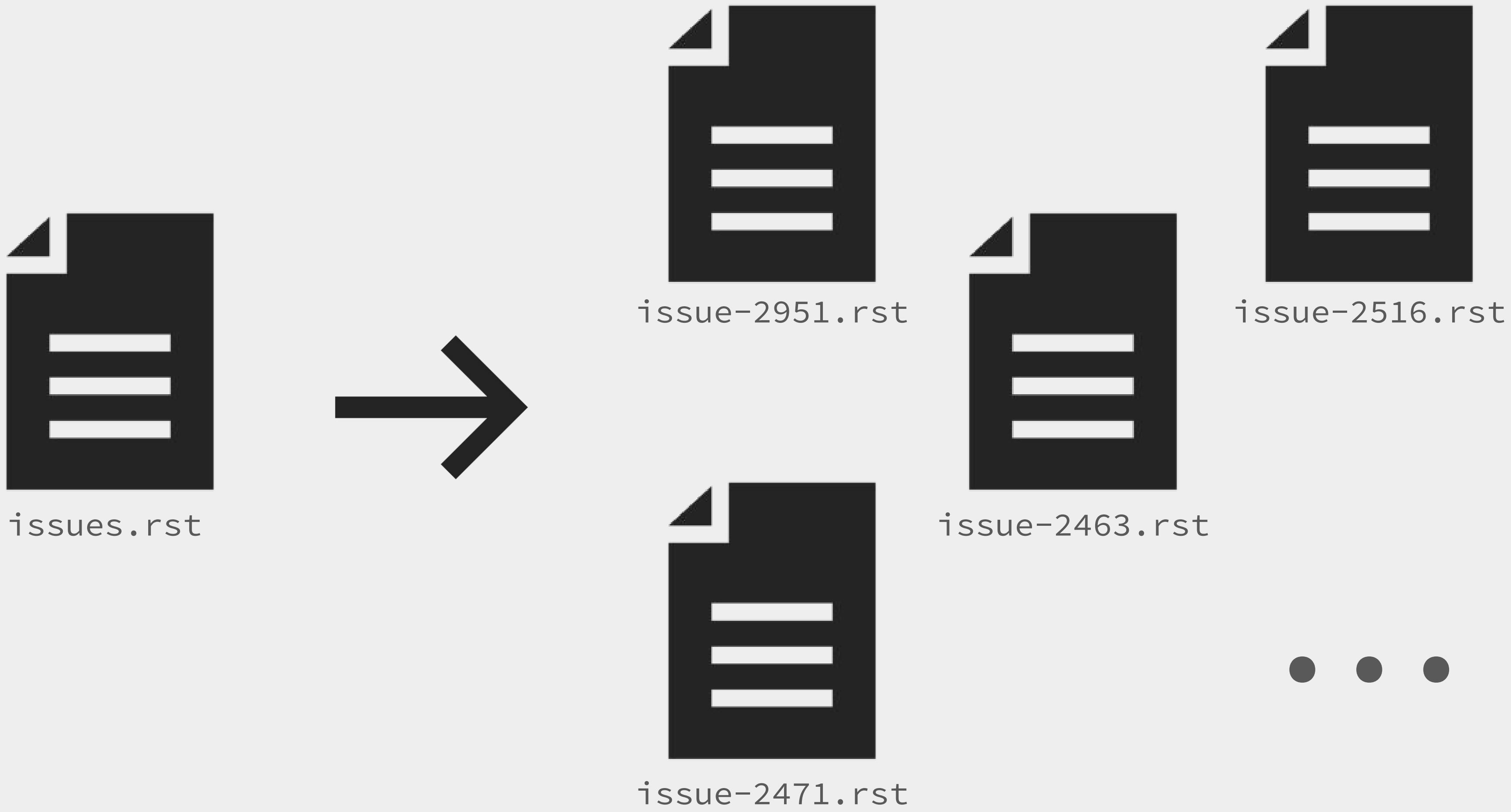
doctree-read(app, doctree)

...

```python
from docutils import nodes
from docutils.parsers.rst import Directive


def builder_inited_handler(app):
    # code here...


def setup(app):
    app.connect('builder-inited', builder_inited_handler)
```


issues.rst
issue-2951.rst
issue-2516.rst
issue-2463.rst
issue-2471.rst

```python
from docutils import nodes
from docutils.parsers.rst import Directive
import requests

URL = 'https://api.github.com/repos/sphinx-doc/sphinx/issues/'

def get_issues():
  issues = requests.get(URL).json()

  for issue in issues:
    title = '%s (#%s)' % (issue['title'], issue['number'])
    owner = 'Opened by %s' % issue['user']['login']
    yield issue['number'], title, issue['body'], owner
```

ext/issue_event.py

```python
...

def generate_issue_docs(app):
  for num, title, body, owner in get_issues():
    filename = os.path.join(app.srcdir, 'issues', '%s.rst' % num)

    with io.open(filename, 'w') as issue_doc:
      print(title, file=issue_doc)
      print('=' * len(title), file=issue_doc)
      print('', file=issue_doc)
      print('%s ::' % owner, file=issue_doc)
      print('', file=issue_doc)
      for line in body.splitlines():
        print('    %s' % line if line else '', file=issue_doc)
```

```python
...

def setup(app):
  app.connect('builder-inited', generate_issue_docs)
  return {'version': '1.0', 'parallel_read_safe': True}
```

```
Issues
======

.. toctree::
   :maxdepth: 1
   :glob:

   issues/*
```

source/index.rst

Issues

- Drop special support for rst2pdf (#4463)
- Proposal: Integrate source_suffix and source_parsers (#4474)
- [RFC] Implement delayed resolution in TOC (#4475)
- Not possible to update individual ‘po’ files (#4476)
- Build fails during eclim (aur) build: Babel data files not available (#4481)
- Proposal: Allow to switch parsers on parsing document (#4482)
- Integrate source suffix and source parsers (#4483)
- …

Enabling Your Extensions

5

```python
import os
import sys

sys.path.insert(0, os.path.abspath('../ext'))

extensions = [
  'issue_role',
  'issue_directive',
  'issue_event',
]
```

source/conf.py

```python
import os
import sys

sys.path.insert(0, os.path.abspath('../ext'))

extensions = [
  'issue_role',
  'issue_directive',
  'issue_event',
  'oslo_config.sphinxext',
]
```

source/conf.py

Wrap Up

6

Extensions are registered via **`sphinx.application.Application`**

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Builder-specific Extensions (HTML themes, LaTeX templates, …)

(Post) Transforms

Translators

Parsers

Search languages

...

Fin

A lion, a head, and a dash of YAML

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FOSDEM 2018

@stephenfin

References

- Quick reStructuredText
- Docutils Reference Guide
  - reStructuredText Markup Specification
  - reStructuredText Directives
  - reStructuredText Interpreted Text Roles
- Docutils How-Tos
  - Creating reStructuredText Interpreted Text Roles
  - Creating reStructuredText Directives
- Docutils Hacker’s Guide
- Sphinx Tutorial: Writing a simple extension

References

- Defining Custom Roles in Sphinx -- Doug Hellmann
- The Power of Sphinx - Integrating Jinja with RST -- Eric Holscher
- Docutils Snippets -- Aurélien Gâteau
- OpenStack + Sphinx In A Tree -- Stephen Finucane (💥)