circuits Documentation

Release 3.0

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Contents

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CHAPTER 1

About

circuits is a **Lightweight Event** driven and **Asynchronous Application Framework** for the Python Programming Language with a strong **Component** Architecture.

circuits also includes a lightweight, high performance and scalable HTTP/WSGI compliant web server as well as various I/O and Networking components.

- Visit the Project Website
- Read the Docs
- Download it from the Downloads Page

Examples

Hello

```python
#!/usr/bin/env python

"""circuits Hello World"""

from circuits import Component, Event


class hello(Event):
    """hello Event"""


class App(Component):

    def hello(self):
        """Hello Event Handler"""

        print("Hello World!")

    def started(self, component):
        """Started Event Handler

        This is fired internally when your application starts up and can be used to
        trigger events that only occur once during startup.
        """

        self.fire(hello())  # Fire hello Event

        raise SystemExit(0)  # Terminate the Application

App().run()
```

Download Source Code: `hello.py`:

Echo Server

```python
#!/usr/bin/env python

"""Simple TCP Echo Server

This example shows how you can create a simple TCP Server (an Echo Service)
utilizing the builtin Socket Components that the circuits library ships with.
"""

from circuits import handler, Debugger
from circuits.net.sockets import TCPServer


class EchoServer(TCPServer):

    @handler("read")
    def on_read(self, sock, data):
        """Read Event Handler

        This is fired by the underlying Socket Component when there has been
        new data read from the connected client.

        ..note :: By simply returning, client/server socket components listen
                  to ValueChagned events (feedback) to determine if a handler
                  returned some data and fires a subsequent Write event with
                  the value returned.
        """

        return data

# Start and "run" the system.
# Bind to port 0.0.0.0:9000
app = EchoServer(9000)
Debugger().register(app)
app.run()
```

Download Source Code: `echoserver.py`:

Hello Web

```python
#!/usr/bin/env python

from circuits.web import Server, Controller


class Root(Controller):

    def index(self):
        """Index Request Handler

        Controller(s) expose implicitly methods as request handlers.
        Request Handlers can still be customized by using the ``@expose``
        decorator. For example exposing as a different path.
        """

        return "Hello World!"

app = Server(("0.0.0.0", 9000))
Root().register(app)
app.run()
```

Download Source Code: `helloweb.py`:

More examples...

Features

- event driven
- concurrency support
- component architecture
- asynchronous I/O components
- no required external dependencies
- full featured web framework (circuits.web)
- coroutine based synchronization primitives

Requirements

- circuits has no dependencies beyond the Python Standard Library.

Supported Platforms

- Linux, FreeBSD, Mac OS X, Windows
- Python 2.6, 2.7, 3.2, 3.3, 3.4
- pypy 2.0, 2.1, 2.2

Installation

The simplest and recommended way to install circuits is with pip. You may install the latest stable release from PyPI with pip:

```
> pip install circuits
```

If you do not have pip, you may use easy_install:

```
> easy_install circuits
```

Alternatively, you may download the source package from the PyPi Page or the Downloads Page extract it and install using:

```
> python setup.py install
```

Note: You can install the development version via `pip install circuits==dev`.

License

circuits is licensed under the MIT License.

Feedback

We welcome any questions or feedback about bugs and suggestions on how to improve circuits. Let us know what you think about circuits. @pythoncircuits.

Do you have suggestions for improvement? Then please Create an Issue with details of what you would like to see. I'll take a look at it and work with you to either incorporate the idea or find a better solution.

Community

There is also a small community of circuits enthusiasts that you may find on the #circuits IRC Channel on the FreeNode IRC Network and the Mailing List.

CHAPTER 2

Documentation

Getting Started

Quick Start Guide

The easiest way to download and install circuits is to use the pip command:

```
$ pip install circuits
```

Now that you have successfully downloaded and installed circuits, let's test that circuits is properly installed and working.

First, let's check the installed version:

```
>>> import circuits
>>> print circuits.__version__
```

This should output:

Try some of the examples in the examples/ directory shipped with the distribution.

Have fun :)

Downloading

Latest Stable Release

The latest stable releases can be downloaded from the Downloads page (*specifically the Tags tab*).

Latest Development Source Code

We use Mercurial for source control and code sharing.

The latest development branch can be cloned using the following command:

```
$ hg clone https://bitbucket.org/circuits/circuits/
```

For further instructions on how to use Mercurial, please refer to the Mercurial Book.

Installing

Installing from a Source Package

If you have downloaded a source archive, this applies to you.

```
$ python setup.py install
```

For other installation options see:

```
$ python setup.py --help install
```

Installing from the Development Repository

If you have cloned the source code repository, this applies to you.

If you have cloned the development repository, it is recommended that you use setuptools and use the following command:

```
$ python setup.py develop
```

This will allow you to regularly update your copy of the circuits development repository by simply performing the following in the circuits working directory:

```
$ hg pull -u
```

Note: You do not need to reinstall if you have installed with setuptools via the circuits repository and used setuptools to install in "develop" mode.

Requirements and Dependencies

- circuits has no **required** dependencies beyond the Python Standard Library.
- Python: >= 2.6 or pypy >= 2.0

  Supported Platforms Linux, FreeBSD, Mac OS X, Windows

  Supported Python Versions 2.6, 2.7, 3.2, 3.3

  Supported pypy Versions 2.0

Other Optional Dependencies

These dependencies are not strictly required and only add additional features.

- pydot – For rendering component graphs of an application.

- pyinotify – For asynchronous file system event notifications and the `circuits.io.notify` module.

circuits Tutorials

Tutorial

Overview

Welcome to the circuits tutorial. This 5-minute tutorial will guide you through the basic concepts of circuits. The goal is to introduce new concepts incrementally with walk-through examples that you can try out! By the time you've finished, you should have a good basic understanding of circuits, how it feels and where to go from there.

The Component

First up, let's show how you can use the `Component` and run it in a very simple application.

```
#!/usr/bin/env python

from circuits import Component

Component().run()
```

Download 001.py

Okay so that's pretty boring as it doesn't do very much! But that's okay... Read on!

Let's try to create our own custom Component called `MyComponent`. This is done using normal Python subclassing.

```
#!/usr/bin/env python

from circuits import Component


class MyComponent(Component):
    """My Component"""

MyComponent().run()
```

Download 002.py

Okay, so this still isn't very useful! But at least we can create custom components with the behavior we want.

Let's move on to something more interesting...

Note: Component(s) in circuits are what sets circuits apart from other Asynchronous or Concurrent Application Frameworks. Components(s) are used as building blocks from simple behaviors to complex ones (*composition of simpler components to form more complex ones*).

Event Handlers

Let's now extend our little example to say "Hello World!" when it's started.

```
#!/usr/bin/env python

from circuits import Component


class MyComponent(Component):

    def started(self, *args):
        print("Hello World!")

MyComponent().run()
```

Download 003.py

Here we've created a simple **Event Handler** that listens for the `started` Event.

Note: Methods defined in a custom subclassed `Component` are automatically turned into **Event Handlers**. The only exception to this are methods prefixed with an underscore (_).

Note: If you do not want this *automatic* behavior, inherit from `BaseComponent` instead which means you will **have to** use the `~circuits.core.handlers.handler` decorator to define your **Event Handlers**.

Running this we get:

```
Hello World!
```

Alright! We have something slightly more useful! Whoohoo it says hello!

Note: Press ^C (*CTRL + C*) to exit.

Registering Components

So now that we've learned how to use a Component, create a custom Component and create simple Event Handlers, let's try something a bit more complex by creating a complex component made up of two simpler ones.

Note: We call this **Component Composition** which is the very essence of the circuits Application Framework.

Let's create two components:

- `Bob`
- `Fred`

```
#!/usr/bin/env python

from circuits import Component


class Bob(Component):

    def started(self, *args):
```

```python
        print("Hello I'm Bob!")


class Fred(Component):

    def started(self, *args):
        print("Hello I'm Fred!")

(Bob() + Fred()).run()
```

Download 004.py

Notice the way we register the two components `Bob` and `Fred` together ? Don't worry if this doesn't make sense right now. Think of it as putting two components together and plugging them into a circuit board.

Running this example produces the following result:

```
Hello I'm Bob!
Hello I'm Fred!
```

Cool! We have two components that each do something and print a simple message on the screen!

Complex Components

Now, what if we wanted to create a Complex Component? Let's say we wanted to create a new Component made up of two other smaller components?

We can do this by simply registering components to a Complex Component during initialization.

Note: This is also called **Component Composition** and avoids the classical Diamond problem of Multiple Inheritance. In circuits we do not use Multiple Inheritance to create **Complex Components** made up of two or more base classes of components, we instead compose them together via registration.

```python
#!/usr/bin/env python

from circuits import Component
from circuits.tools import graph


class Pound(Component):

    def __init__(self):
        super(Pound, self).__init__()

        self.bob = Bob().register(self)
        self.fred = Fred().register(self)

    def started(self, *args):
        print(graph(self.root))


class Bob(Component):

    def started(self, *args):
        print("Hello I'm Bob!")

```

```

class Fred(Component):

    def started(self, *args):
        print("Hello I'm Fred!")

Pound().run()
```

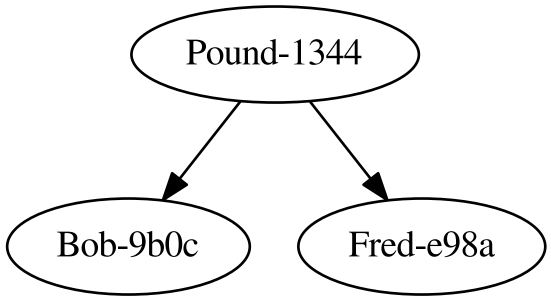
Download 005.py

So now Pound is a Component that consists of two other components registered to it: Bob and Fred

The output of this is identical to the previous:

```
* <Pound/* 3391:MainThread (queued=0, channels=1, handlers=3) [R]>
 * <Bob/* 3391:MainThread (queued=0, channels=1, handlers=1) [S]>
 * <Fred/* 3391:MainThread (queued=0, channels=1, handlers=1) [S]>
Hello I'm Bob!
Hello I'm Fred!
```

The only difference is that Bob and Fred are now part of a more Complex Component called Pound. This can be illustrated by the following diagram:



Note: The extra lines in the above output are an ASCII representation of the above graph (*produced by pydot + graphviz*).

Cool :-)

Component Inheritance

Since circuits is a framework written for the Python Programming Language it naturally inherits properties of Object Orientated Programming (OOP) – such as inheritance.

So let's take our Bob and Fred components and create a Base Component called Dog and modify our two dogs (Bob and Fred) to subclass this.

```
#!/usr/bin/env python

```

```python
from circuits import Component, Event


class woof(Event):
    """woof Event"""


class Pound(Component):

    def __init__(self):
        super(Pound, self).__init__()

        self.bob = Bob().register(self)
        self.fred = Fred().register(self)

    def started(self, *args):
        self.fire(woof())


class Dog(Component):

    def woof(self):
        print("Woof! I'm %s!" % self.name)


class Bob(Dog):
    """Bob"""


class Fred(Dog):
    """Fred"""

Pound().run()
```

Download `006.py`

Now let's try to run this and see what happens:

```
Woof! I'm Bob!
Woof! I'm Fred!
```

So both dogs barked! Hmmm

Component Channels

What if we only want one of our dogs to bark? How do we do this without causing the other one to bark as well?

Easy! Use a separate `channel` like so:

```python
#!/usr/bin/env python

from circuits import Component, Event


class woof(Event):
    """woof Event"""


```

```python
class Pound(Component):

    def __init__(self):
        super(Pound, self).__init__()

        self.bob = Bob().register(self)
        self.fred = Fred().register(self)

    def started(self, *args):
        self.fire(woof(), self.bob)


class Dog(Component):

    def woof(self):
        print("Woof! I'm %s!" % self.name)


class Bob(Dog):
    """Bob"""

    channel = "bob"


class Fred(Dog):
    """Fred"""

    channel = "fred"

Pound().run()
```

Download 007.py

Note: Events can be fired with either the `.fire(...)` or `.fireEvent(...)` method.

If you run this, you'll get:

```
Woof! I'm Bob!
```

Event Objects

So far in our tutorial we have been defining an Event Handler for a builtin Event called `started`. What if we wanted to define our own Event Handlers and our own Events? You've already seen how easy it is to create a new Event Handler by simply defining a normal Python method on a Component.

Defining your own Events helps with documentation and testing and makes things a little easier.

Example:

```python
class MyEvent(Event):
   """MyEvent"""
```

So here's our example where we'll define a new Event called `Bark` and make our `Dog` fire a `Bark` event when our application starts up.

```python
#!/usr/bin/env python

from circuits import Component, Event


class bark(Event):
    """bark Event"""


class Pound(Component):

    def __init__(self):
        super(Pound, self).__init__()

        self.bob = Bob().register(self)
        self.fred = Fred().register(self)


class Dog(Component):

    def started(self, *args):
        self.fire(bark())

    def bark(self):
        print("Woof! I'm %s!" % self.name)


class Bob(Dog):
    """Bob"""

    channel = "bob"


class Fred(Dog):
    """Fred"""

    channel = "fred"

Pound().run()
```

Download 008.py

If you run this, you'll get:

```
Woof! I'm Bob!
Woof! I'm Fred!
```

The Debugger

Lastly...

Asynchronous programming has many advantages but can be a little harder to write and follow. A silently caught exception in an Event Handler, or an Event that never gets fired, or any number of other weird things can cause your application to fail and leave you scratching your head.

Fortunately circuits comes with a `Debugger` Component to help you keep track of what's going on in your application, and allows you to tell what your application is doing.

Let's say that we defined out `bark` Event Handler in our `Dog` Component as follows:

```
def bark(self):
    print("Woof! I'm %s!" % name)
```

Now clearly there is no such variable as `name` in the local scope.

For reference here's the entire example...

```
#!/usr/bin/env python

from circuits import Component, Event


class bark(Event):
    """bark Event"""


class Pound(Component):

    def __init__(self):
        super(Pound, self).__init__()

        self.bob = Bob().register(self)
        self.fred = Fred().register(self)


class Dog(Component):

    def started(self, *args):
        self.fire(bark())

    def bark(self):
        print("Woof! I'm %s!" % name)   # noqa


class Bob(Dog):
    """Bob"""

    channel = "bob"


class Fred(Dog):
    """Fred"""

    channel = "fred"

Pound().run()
```

`Download 009.py`

If you run this, you'll get:

That's right! You get nothing! Why? Well in circuits any error or exception that occurs in a running application is automatically caught and dealt with in a way that lets your application "keep on going". Crashing is unwanted behavior in a system so we expect to be able to recover from horrible situations.

SO what do we do? Well that's easy. circuits comes with a `Debugger` that lets you log all events as well as all errors so you can quickly and easily discover which Event is causing a problem and which Event Handler to look at.

If you change Line 34 of our example...

From:

```
class Fred(Dog):
```

To:

```
from circuits import Debugger

(Pound() + Debugger()).run()
```

Then run this, you'll get the following:

```
<Registered[bob:registered] [<Bob/bob 3191:MainThread (queued=0, channels=2,␣
↪handlers=2) [S]>, <Pound/* 3191:MainThread (queued=0, channels=5, handlers=5) [R]>]
↪{}>
<Registered[fred:registered] [<Fred/fred 3191:MainThread (queued=0, channels=2,␣
↪handlers=2) [S]>, <Pound/* 3191:MainThread (queued=0, channels=5, handlers=5) [R]>]
↪{}>
<Registered[*:registered] [<Debugger/* 3191:MainThread (queued=0, channels=1,␣
↪handlers=1) [S]>, <Pound/* 3191:MainThread (queued=0, channels=5, handlers=5) [R]>]
↪{}>
<Started[*:started] [<Pound/* 3191:MainThread (queued=0, channels=5, handlers=5) [R]>,
↪ None] {}>
<Bark[bob:bark] [] {}>
<Bark[fred:bark] [] {}>
<Error[*:exception] [<type 'exceptions.NameError'>, NameError("global name 'name' is␣
↪not defined",), ['  File "/home/prologic/work/circuits/circuits/core/manager.py",␣
↪line 459, in __handleEvent\n    retval = handler(*eargs, **ekwargs)\n', '  File
↪"source/tutorial/009.py", line 22, in bark\n    print("Woof! I\'m %s!" % name)\n'],
↪<bound method ?.bark of <Bob/bob 3191:MainThread (queued=0, channels=2, handlers=2)␣
↪[S]>>] {}>
ERROR <listener on ('bark',) {target='bob', priority=0.0}> (<type 'exceptions.
↪NameError'>): global name 'name' is not defined
  File "/home/prologic/work/circuits/circuits/core/manager.py", line 459, in __
↪handleEvent
 retval = handler(*eargs, **ekwargs)
  File "source/tutorial/009.py", line 22, in bark
    print("Woof! I'm %s!" % name)

<Error[*:exception] [<type 'exceptions.NameError'>, NameError("global name 'name' is␣
↪not defined",), ['  File "/home/prologic/work/circuits/circuits/core/manager.py",␣
↪line 459, in __handleEvent\n    retval = handler(*eargs, **ekwargs)\n', '  File
↪"source/tutorial/009.py", line 22, in bark\n    print("Woof! I\'m %s!" % name)\n'],
↪<bound method ?.bark of <Fred/fred 3191:MainThread (queued=0, channels=2,␣
↪handlers=2) [S]>>] {}>
ERROR <listener on ('bark',) {target='fred', priority=0.0}> (<type 'exceptions.
↪NameError'>): global name 'name' is not defined
  File "/home/prologic/work/circuits/circuits/core/manager.py", line 459, in __
↪handleEvent
    retval = handler(*eargs, **ekwargs)
  File "source/tutorial/009.py", line 22, in bark
    print("Woof! I'm %s!" % name)

^C<Signal[*:signal] [2, <frame object at 0x808e8ec>] {}>
<Stopped[*:stopped] [<Pound/* 3191:MainThread (queued=0, channels=5, handlers=5) [S]>
↪] {}>
<Stopped[*:stopped] [<Pound/* 3191:MainThread (queued=0, channels=5, handlers=5) [S]>
↪] {}>
```

```
```

You'll notice whereas there was no output before there is now a pretty detailed output with the `Debugger` added to the application. Looking through the output, we find that the application does indeed start correctly, but when we fire our `Bark` Event it coughs up two exceptions, one for each of our dogs (`Bob` and `Fred`).

From the error we can tell where the error is and roughly where to look in the code.

Note: You'll notice many other events that are displayed in the above output. These are all default events that circuits has builtin which your application can respond to. Each builtin Event has a special meaning with relation to the state of the application at that point.

See: *`circuits.core.events`* for detailed documentation regarding these events.

The correct code for the `bark` Event Handler should be:

```
def bark(self):
    print("Woof! I'm %s!" % self.name)
```

Running again with our correction results in the expected output:

```
Woof! I'm Bob!
Woof! I'm Fred!
```

That's it folks!

Hopefully this gives you a feel of what circuits is all about and an easy tutorial on some of the basic concepts. As you're no doubt itching to get started on your next circuits project, here's some recommended reading:

- ../faq
- ../api/index

Telnet Tutorial

Overview

Welcome to our 2nd circuits tutorial. This tutorial is going to walk you through the telnet Example showing you how to various parts of the circuits component library for building a simple TCP client that also accepts user input.

Be sure you have circuits installed before you start:

```
pip install circuits
```

See: *Installing*

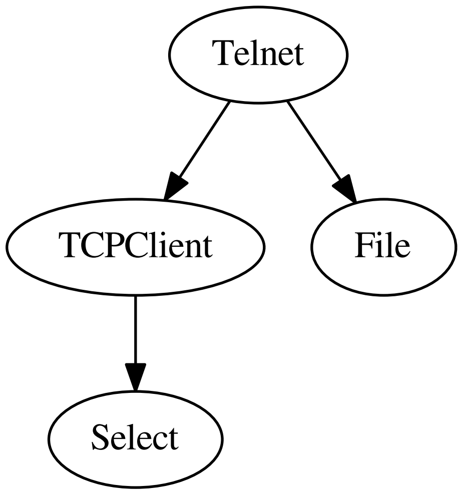
Components

You will need the following components:

1. The *`TCPClient`* Component
2. The *`File`* Component
3. The *`Component`* Component

All these are available in the circuits library so there is nothing for you to do. Click on each to read more about them.

Design



The above graph is the overall design of our Telnet application. What's shown here is a relationship of how the components fit together and the overall flow of events.

For example:

1. Connect to remote TCP Server.
2. Read input from User.
3. Write input from User to connected Socket.
4. Wait for data from connected Socket and display.

Note: The *Select* Component shown is required by our application for Asynchronous I/O polling however we do not need to explicitly use it as it is automatically imported and registered simply by utilizing the *TCPClient* Component.

Implementation

Without further delay here's the code:

```python
#!/usr/bin/env python

import sys


from circuits.io import File
from circuits import handler, Component
from circuits.net.sockets import TCPClient
from circuits.net.events import connect, write
```

```python


class Telnet(Component):

    channel = "telnet"

    def init(self, host, port):
        self.host = host
        self.port = port

        TCPClient(channel=self.channel).register(self)
        File(sys.stdin, channel="stdin").register(self)

    def ready(self, socket):
        self.fire(connect(self.host, self.port))

    def read(self, data):
        print(data.strip())

    @handler("read", channel="stdin")
    def read_user_input(self, data):
        self.fire(write(data))


host = sys.argv[1]
port = int(sys.argv[2])

Telnet(host, port).run()
```

Download `telnet.py`

Discussion

Some important things to note...

1. Notice that we defined a `channel` for out `Telnet` Component?

   This is so that the events of *`TCPClient`* and *`File`* don't collide. Both of these components share a very similar interface in terms of the events they listen to.

```python
class Telnet(Component):

    channel = "telnet"
```

2. Notice as well that in defining a `channel` for our `Telnet` Component we've also "registered" the *`TCPClient`* Component so that it has the same channel as our `Telnet` Component.

   Why? We want our `Telnet` Component to receive all of the events of the *`TCPClient`* Component.

```python
TCPClient(channel=self.channel).register(self)
```

3. In addition to our *`TCPClient`* Component being registered with the same `channel` as our `Telnet` Component we can also see that we have registered a *`File`* Component however we have chosen a different channel here called `stdin`.

   Why? We don't want the events from *`TCPClient`* and subsequently our `Telnet` Component to collide with the events from *`File`*.

So we setup a Component for reading user input by using the *File* Component and attaching an event handler to our `Telnet` Component but listening to events from our `stdin` channel.

```
File(sys.stdin, channel="stdin").register(self)
```

```
@handler("read", channel="stdin")
def read_user_input(self, data):
    self.fire(write(data))
```

Here is what the event flow would look like if you were to register the *Debugger* to the `Telnet` Component.

```
from circuits import Debugger
(Telnet(host, port) + Debugger()).run()
```

```
$ python telnet.py 10.0.0.2 9000
<registered[telnet] (<TCPClient/telnet 21995:MainThread (queued=0) [S]>, <Telnet/
↪telnet 21995:MainThread (queued=4) [R]> )>
<registered[stdin] (<File/stdin 21995:MainThread (queued=0) [S]>, <Telnet/telnet␣
↪21995:MainThread (queued=5) [R]> )>
<registered[*] (<Debugger/* 21995:MainThread (queued=0) [S]>, <Telnet/telnet␣
↪21995:MainThread (queued=5) [R]> )>
<started[telnet] (<Telnet/telnet 21995:MainThread (queued=4) [R]> )>
<registered[select] (<Select/select 21995:MainThread (queued=0) [S]>, <TCPClient/
↪telnet 21995:MainThread (queued=0) [S]> )>
<ready[telnet] (<TCPClient/telnet 21995:MainThread (queued=0) [S]> )>
<ready[stdin] (<File/stdin 21995:MainThread (queued=0) [S]> )>
<connect[telnet] ('10.0.0.2', 9000 )>
<_open[stdin] ( )>
<connected[telnet] ('10.0.0.2', 9000 )>
<opened[stdin] ('<stdin>', 'r' )>
Hello World!
<_read[stdin] (<open file '<stdin>', mode 'r' at 0x7f32ff5ab0c0> )>
<read[stdin] ('Hello World!\n' )>
<write[telnet] ('Hello World!\n' )>
<_write[telnet] (<socket._socketobject object at 0x11f7f30> )>
<_read[telnet] (<socket._socketobject object at 0x11f7f30> )>
<read[telnet] ('Hello World!\n' )>
Hello World!
^C<signal[telnet] (2, <frame object at 0x12b0a10> )>
<stopped[telnet] (<Telnet/telnet 21995:MainThread (queued=0) [S]> )>
<close[telnet] ( )>
<close[stdin] ( )>
<disconnected[telnet] ( )>
<closed[stdin] ( )>
```

Testing

To try this example out, download a copy of the echoserver Example and copy and paste the full source code of the `Telnet` example above into a file called `telnet.py`.

In one terminal run:

```
$ python echoserver.py
```

In a second terminal run:

```
$ python telnet.py localhost 9000
```

Have fun!

For more examples see examples.

See also:

- *Frequently Asked Questions*
- *API Documentation*

circuits User Manual

Core Library

Components

The architectural concept of circuits is to encapsulate system functionality into discrete manageable and reusable units, called *Components*, that interact by sending and handling events that flow throughout the system.

Technically, a circuits *Component* is a Python class that inherits (*directly or indirectly*) from `BaseComponent`.

Components can be sub-classed like any other normal Python class, however components can also be composed of other components and it is natural to do so. These are called *Complex Components*. An example of a Complex Component within the circuits library is the `circuits.web.servers.Server` Component which is comprised of:

- `circuits.net.sockets.TCPServer`
- `circuits.web.servers.BaseServer`
- `circuits.web.http.HTTP`
- `circuits.web.dispatchers.dispatcher.Dispatcher`

Note: There is no class or other technical means to mark a component as a complex component. Rather, all component instances in a circuits based application belong to some component tree (there may be several), with Complex Components being a subtree within that structure.

A Component is attached to the tree by registering with the parent and detached by unregistering itself. See methods:

- `register()`
- `unregister()`

Component Registration

To register a component use the `register()` method.

```
from circuits import Component


class Foo(Component):
    """Foo Component"""

```

```

class  App(Component):
    """App Component"""

    def init(self):
        Foo().register(self)


app = App()
debugger = Debugger().register(app)
app.run()
```

Unregistering Components

Components are unregistered via the `unregister()` method.

```
debugger.unregister()
```

Note: You need a reference to the component you wish to unregister. The `register()` method returns you a reference of the component that was registered.

Convenient Shorthand Form

After a while when your application becomes rather large and complex with many components and component registrations you will find it cumbersome to type `.register(blah)`.

circuits has several convenient methods for component registration and deregistration that work in an identical fashion to their `register()` and `unregister()` counterparts.

These convenience methods follow normal mathematical operator precedence rules and are implemented by overloading the Python `__add__`, `__iadd__`, `__sub__` and `__isub__`.

The mapping is as follow:

- `register()` map to `+` and `+=`
- `unregister()` map to> `-` and `-=`

For example the above could have been written as:

```
from circuits import Component


class Foo(Component):
    """Foo Component"""


class  App(Component):
    """App Component"""

    def init(self):
        self += Foo()

```

```

(App() + Debugger()).run()
```

Implicit Component Registration(s)

Sometimes it's handy to implicitly register components into another component by simply referencing the other component instance as a class attribute of the other.

Example:

```
>>> from circuits import Component
>>>
>>> class Foo(Component):
...     """Foo Component"""
...
>>> class App(Component):
...     """App Component"""
...
...     foo = Foo()
...
>>> app = App()
>>> app.components
set([<Foo/* 28599:MainThread (queued=0) [S]>])
>>>
```

The telnet Example does this for example.

Debugger

The `core Debugger` component is the standard way to debug your circuits applications. It services two purposes:

- Logging events as they flow through the system.
- Logging any exceptions that might occurs in your application.

Usage

Using the `Debugger` in your application is very straight forward just like any other component in the circuits component library. Simply add it to your application and register it somewhere (*it doesn't matter where*).

Example:

```
from circuits import Component, Debugger


class App(Component):
    """Your Application"""


app = Appp()
Debugger().register(app)
app.run()
```

Sample Output(s)

Here are some example outputs that you should expect to see when using the *Debugger* component in your application.

Example Code:

```python
from circuits import Event, Component, Debugger


class foo(Event):
    """foo Event"""


class App(Component):

    def foo(self, x, y):
        return x + y


app = App() + Debugger()
app.start()
```

Run with:

```
python -i app.py
```

Logged Events:

```
<registered[*] (<Debugger/* 27098:App (queued=0) [S]>, <App/* 27098:App (queued=2)␣
↪[R]> )>
<started[*] (<App/* 27098:App (queued=1) [R]> )>
>>> app.fire(foo(1, 2))
<Value () result: False errors: False for <foo[*] (1, 2 )>
>>> <foo[*] (1, 2 )>
```

Logged Exceptions:

```
>>> app.fire(foo())
<Value () result: False errors: False for <foo[*] ( )>
>>> <foo[*] ( )>
<exception[*] (<type 'exceptions.TypeError'>, TypeError('foo() takes exactly 3␣
↪arguments (1 given)',), ['  File "/home/prologic/work/circuits/circuits/core/
↪manager.py", line 561, in _dispatcher\n    value = handler(*eargs, **ekwargs)\n']␣
↪handler=<bound method App.foo of <App/* 27098:App (queued=1) [R]>>, fevent=<foo[*]␣
↪( )>)>
ERROR <handler[*.foo] (App.foo)> (<foo[*] ( )>) {<type 'exceptions.TypeError'>}:␣
↪foo() takes exactly 3 arguments (1 given)
  File "/home/prologic/work/circuits/circuits/core/manager.py", line 561, in _
↪dispatcher
      value = handler(*eargs, **ekwargs)
```

Events

Basic usage

Events are objects that contain data (*arguments and keyword arguments*) about the message being sent to a receiving component. Events are triggered by using the `fire()` method of any registered component.

Some events in circuits are fired implicitly by the circuits core like the `started` event used in the tutorial or explicitly by components while handling some other event. Once fired, events are dispatched to the components that are interested in these events (*components whose event handlers match events of interest*).

Events are usually fired on one or more channels, allowing components to gather in "interest groups". This is especially useful if you want to reuse basic components such as a `TCPServer`. A `TCPServer` component fires a `read` event for every package of data that it receives. If we did not have support for channels, it would be very difficult to build two servers in a single process without their read events colliding.

Using channels, we can put one server and all components interested in its events on one channel, and another server and the components interested in this other server's events on another channel.

Components are associated with a channel by setting their `channel` class or instance attribute.

See also:

`Component`

Besides having a name, events carry additional arbitrary information. This information is passed as arguments or keyword arguments to the constructor. It is then delivered to the event handler method that must have exactly the same number of arguments and keyword arguments. Of course, as is usual in Python, you can also pass additional information by setting attributes of the event object, though this usage pattern is discouraged.

Filtering

Events can be filtered by stopping other event handlers from continuing to process the event.

To do this, simply call the `stop()` method.

Example:

```
@handler("foo")
def stop_foo(self, event, *args, **kwargs):
    event.stop()
```

Here any other event handlers also listening to "foo" will not be processed.

Note: It's important to use priority event handlers here in this case as all event handlers and events run with the same priority unless explicitly told otherwise.

Changed in version 3.0: In circuits 2.x you declared your event handler to be a filter by using `@handler(filter=True)` and returned a `True`-ish value from the respective event handler to achieve the same effect. This is **no longer** the case in circuits 3.x Please use `event.stop()` as noted above.

Events as result collectors

Apart from delivering information to handlers, event objects may also collect information. If a handler returns something that is not `None`, it is stored in the event's `value` attribute. If a second (or any subsequent) handler invocation also returns a value, the values are stored as a list. Note that the value attribute is of type `Value` and you must access its property `value` to access the data stored (`collected_information = event.value.value`).

The collected information can be accessed by handlers in order to find out about any return values from the previously invoked handlers. More useful though, is the possibility to access the information after all handlers have been invoked. After all handlers have run successfully (i.e. no handler has thrown an error) circuits may generate an event that indicates the successful handling. This event has the name of the event just handled with "Success" appended. So if the event is called `Identify` then the success event is called `IdentifySuccess`. Success events aren't delivered by default. If you want successful handling to be indicated for an event, you have to set the optional attribute `success` of this event to `True`.

The handler for a success event must be defined with two arguments. When invoked, the first argument is the event just having been handled successfully and the second argument is (as a convenience) what has been collected in `event.value.value` (note that the first argument may not be called `event`, for an explanation of this restriction as well as for an explanation why the method is called `identify_success` see the section on handlers).

```python
#!/usr/bin/env python

from circuits import Component, Debugger, Event


class Identify(Event):
    """Identify Event"""

    success = True


class Pound(Component):

    def __init__(self):
        super(Pound, self).__init__()

        Debugger().register(self)
        Bob().register(self)
        Fred().register(self)

    def started(self, *args):
        self.fire(Identify())

    def Identify_success(self, evt, result):
        if not isinstance(result, list):
            result = [result]
        print "In pound:"
        for name in result:
            print name


class Dog(Component):

    def Identify(self):
        return self.__class__.__name__


class Bob(Dog):
    """Bob"""


class Fred(Dog):
    """Fred"""

Pound().run()
```

Download handler_returns.py

Advanced usage

Sometimes it may be necessary to take some action when all state changes triggered by an event are in effect. In this case it is not sufficient to wait for the completion of all handlers for this particular event. Rather, we also have to wait until all events that have been fired by those handlers have been processed (and again wait for the events fired by those events' handlers, and so on). To support this scenario, circuits can fire a `Complete` event. The usage is similar to the previously described success event. Details can be found in the API description of *`circuits.core.events.Event`*.

Handlers

Explicit Event Handlers

Event Handlers are methods of components that are invoked when a matching event is dispatched. These can be declared explicitly on a *`BaseComponent`* or *`Component`* or by using the *`handler()`* decorator.

```
1  #!/usr/bin/env python
2
3  from circuits import handler, BaseComponent, Debugger
4
5
6  class MyComponent(BaseComponent):
7
8      def __init__(self):
9          super(MyComponent, self).__init__()
10
11         Debugger().register(self)
12
13     @handler("started", channel="*")
14     def system_started(self, component):
15         print "Start event detected"
16
17 MyComponent().run()
```

Download handler_annotation.py

The handler decorator on line 14 turned the method `system_started` into an event handler for the event `started`.

When defining explicit event handlers in this way, it's convention to use the following pattern:

```
@handler("foo")
def print_foobar(self, ...):
    print("FooBar!")
```

This makes reading code clear and concise and obvious to the reader that the method is not part of the class's public API (*leading underscore as per Python convention*) and that it is invoked for events of type `SomeEvent`.

The optional keyword argument "`channel`" can be used to attach the handler to a different channel than the component's channel (*as specified by the component's channel attribute*).

Handler methods must be declared with arguments and keyword arguments that match the arguments passed to the event upon its creation. Looking at the API for *`started`* you'll find that the component that has been started is passed as an argument to its constructor. Therefore, our handler method must declare one argument (*Line 14*).

The `handler()` decorator accepts other keyword arguments that influence the behavior of the event handler and its invocation. Details can be found in the API description of `handler()`.

Implicit Event Handlers

To make things easier for the developer when creating many event handlers and thus save on some typing, the `Component` can be used and subclassed instead which provides an implicit mechanism for creating event handlers.

Basically every method in the component is automatically and implicitly marked as an event handler with `@handler(<name>)` where `<name>` is the name of each method applied.

The only exceptions are:

- Methods that start with an underscore _.
- Methods already marked explicitly with the `handler()` decorator.

Example:

```python
#!/usr/bin/env python


from circuits import handler, Component, Event


class hello(Event):
    """hello Event"""


class App(Component):

    def _say(self, message):
        """Print the given message

        This is a private method as denoted via the prefixed underscore.
        This will not be turned into an event handler.
        """

        print(message)

    def started(self, manager):
        self._say("App Started!")
        self.fire(hello())
        raise SystemExit(0)

    @handler("hello")
    def print_hello(self):
        """hello Event Handlers

        Print "Hello World!" when the ``hello`` Event is received.

        As this is already decorated with the ``@handler``
        decorator, it will be left as it is and won't get
        touched by the implicit event handler creation
        mechanisms.
        """

        print("Hello World!")
    @handler(False)
    def test(self, *args, **kwargs):
        """A simple test method that does nothing

        This will not be turned into an event handlers
        because of the ``False`` argument passed to the
        ``@handler`` decorator. This only makes sense
        when subclassing ``Component`` and you want to
        have fine grained control over what methods
        are not turned into event handlers.
        """

        pass

App().run()
```

Note: You can specify that a method will not be marked as an event handler by passing `False` as the first argument to `@handler()`.

Manager

The *core Manager* class is the base class of all components in circuits. It is what defines the API(s) of all components and necessary machinery to run your application smoothly.

Note: It is not recommended to actually use the *Manager* in your application code unless you know what you're doing.

Warning: A *Manager* **does not** know how to register itself to other components! It is a manager, not a component, however it does form the basis of every component.

Usage

Using the *Manager* in your application is not really recommended except in some special circumstances where you want to have a top-level object that you can register things to.

Example:

```
from circuits import Component, Manager


class App(Component):
    """Your Application"""


manager = Manager()
App().register(manager)
manager.run()
```

Note: If you *think* you need a `Manager` chances are you probably don't. Use a `Component` instead.

Values

The `core Value` class is an internal part of circuits' Futures and Promises used to fulfill promises of the return value of an event handler and any associated chains of events and event handlers.

Basically when you fire an event `foo()` such as:

```
x = self.fire(foo())
```

`x` here is an instance of the `Value` class which will contain the value returned by the event handler for `foo` in the `.value` property.

Note: There is also `getValue()` which can be used to also retrieve the underlying value held in the instance of the `Value` class but you should not need to use this as the `.value` property takes care of this for you.

The only other API you may need in your application is the `notify` which can be used to trigger a `value_changed` event when the underlying `Value` of the event handler has changed. In this way you can do something asynchronously with the event handler's return value no matter when it finishes.

Example Code:

```
#!/usr/bin/python -i


from circuits import handler, Event, Component, Debugger


class hello(Event):
    "hello Event"


class test(Event):
    "test Event"


class App(Component):

    def hello(self):
        return "Hello World!"

    def test(self):
        return self.fire(hello())

    @handler("hello_value_changed")
    def _on_hello_value_changed(self, value):
        print("hello's return value was: {}".format(value))


app = App()
Debugger().register(app)
```

Example Session:

```
$ python -i ../app.py
>>> x = app.fire(test())
>>> x.notify = True
>>> app.tick()
<registered[*] (<Debugger/* 27798:MainThread (queued=0) [S]>, <App/* 27798:MainThread␣
↪(queued=1) [S]> )>
<test[*] ( )>
>>> app.tick()
<hello[*] ( )>
>>> app.tick()
<test_value_changed[<App/* 27798:MainThread (queued=0) [S]>] (<Value ('Hello World!')␣
↪result: True errors: False for <test[*] ( )> )>
>>> app.tick()
>>> x
<Value ('Hello World!') result: True errors: False for <test[*] ( )>
>>> x.value
'Hello World!'
>>>
```

The `Value.notify` attribute can also be set to the name of an event which should be used to fire the `value_changed` event to.

If the form `x.notify = True` used then the event that gets fired is a concatenation of the original event and the `value_changed` event. e.g: `foo_value_changed`.

Note: This is a bit advanced and should only be used by experienced users of the circuits framework. If you simply want basic synchronization of event handlers it's recommended that you try the `circuits.Component.call()` and `circuits.Component.wait()` synchronization primitives first.

Miscellaneous

Tools

There are two main tools of interest in circuits. These are:

- *`circuits.tools.inspect()`*
- *`circuits.tools.graph()`*

These can be found in the *`circuits.tools`* module.

Introspecting your Application

The *`inspect()`* function is used to help introspect your application by displaying all the channels and events handlers defined through the system including any additional meta data about them.

Example:

```
>>> from circuits import Component
>>> class App(Component):
...     def foo(self):
...             pass
...
>>> app = App()
>>> from circuits.tools import inspect
>>> print(inspect(app))
 Components: 0

 Event Handlers: 3
  unregister; 1
   <handler[*.unregister] (App._on_unregister)>
  foo; 1
   <handler[*.foo] (App.foo)>
  prepare_unregister_complete; 1
   <handler[<instance of App>.prepare_unregister_complete] (App._on_prepare_
↪unregister_complete)>
```

Displaying a Visual Representation of your Application

The *graph()* function is used to help visualize the different components in your application and how they interact with one another and how they are registered in the system.

In order to get a image from this you must have the following packages installed:

- networkx
- pygraphviz
- matplotlib

You can install the required dependencies via:

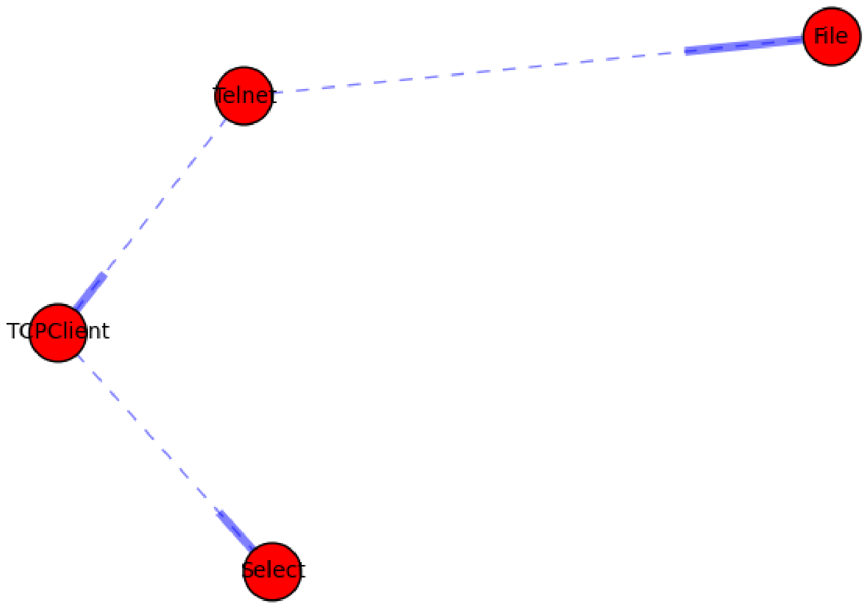
```
pip install matplotlib networkx pygraphviz
```

Example:

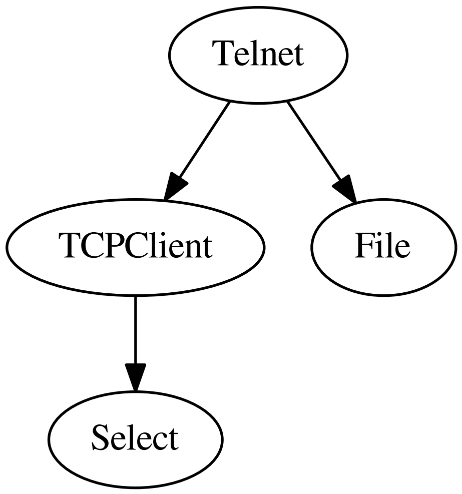
```
>>> from circuits import Component, Debugger
>>> from circuits.net.events import write
>>> from circuits.net.sockets import TCPServer
>>>
>>> class EchoServer(Component):
...     def init(self, host="0.0.0.0", port=8000):
...             TCPServer((host, port)).register(self)
...             Debugger().register(self)
...     def read(self, sock, data):
...             self.fire(write(sock, data))
...
>>> server = EchoServer()
>>>
>>> from circuits.tools import graph
>>> print(graph(server))
* <EchoServer/* 784:MainThread (queued=2) [S]>
 * <TCPServer/server 784:MainThread (queued=0) [S]>
 * <Debugger/* 784:MainThread (queued=0) [S]>
```

An output image will be saved to your current working directory and by called `<name>.png` where **<name>** is the name of the top-level component in your application of the value you pass to the `name=` keyword argument of `~circuits.tools.graph`.

Example output of telnet Example:



And its DOT Graph:



circuits.web User Manual

Introduction

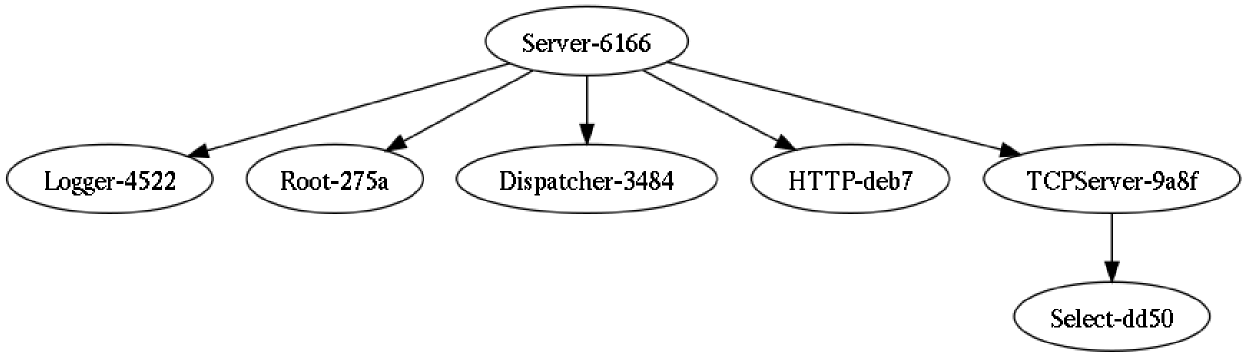
circuits.web is a set of components for building high performance HTTP/1.1 and WSGI/1.0 compliant web applications. These components make it easy to rapidly develop rich, scalable web applications with minimal effort.

circuits.web borrows from

- CherryPy
- BaseHTTPServer (*Python std. lib*)
- wsgiref (*Python std. lib*)

Getting Started

Just like any application or system built with circuits, a circuits.web application follows the standard Component based design and structure whereby functionality is encapsulated in components. circuits.web itself is designed and built in this fashion. For example a circuits.web Server's structure looks like this:



To illustrate the basic steps, we will demonstrate developing your classical "Hello World!" applications in a web-based way with circuits.web

To get started, we first import the necessary components:

```
from circutis.web import Server, Controller
```

Next we define our first Controller with a single Request Handler defined as our index. We simply return "Hello World!" as the response for our Request Handler.

```
class Root(Controller):

   def index(self):
      return "Hello World!"
```

This completes our simple web application which will respond with "Hello World!" when anyone accesses it.

Admittedly this is a stupidly simple web application! But circuits.web is very powerful and plays nice with other tools.

Now we need to run the application:

```
(Server(8000) + Root()).run()
```

That's it! Navigate to: http://127.0.0.1:8000/ and see the result.

Here's the complete code:

```python
from circuits.web import Server, Controller

class Root(Controller):

   def index(self):
      return "Hello World!"

(Server(8000) + Root()).run()
```

Have fun!

Features

circuits.web is not a **Full Stack** or **High Level** web framework, rather it is more closely aligned with CherryPy and offers enough functionality to make quickly developing web applications easy and as flexible as possible.

circuits.web does not provide high level features such as:

- Templating
- Database access
- Form Validation
- Model View Controller
- Object Relational Mapper

The functionality that circutis.web **does** provide ensures that circuits.web is fully HTTP/1.1 and WSGI/1.0 compliant and offers all the essential tools you need to build your web application or website.

To demonstrate each feature, we're going to use the classical "Hello World!" example as demonstrated earlier in *Getting Started*.

Here's the code again for easy reference:

```python
from circuits.web import Server, Controller


class Root(Controller):

    def index(self):
        return "Hello World!"


(Server(8000) + Root()).run()
```

Logging

circuits.web's *Logger* component allows you to add logging support compatible with Apache log file formats to your web application.

To use the `Logger` simply add it to your application:

```
(Server(8000) + Logger() + Root()).run()
```

Example Log Output:

```
127.0.0.1 - - [05/Apr/2014:10:13:01] "GET / HTTP/1.1" 200 12 "" "curl/7.35.0"
127.0.0.1 - - [05/Apr/2014:10:13:02] "GET /docs/build/html/index.html HTTP/1.1" 200␣
↪22402 "" "curl/7.35.0"
```

Cookies

Access to cookies are provided through the *Request* Object which holds data about the request. The attribute `cookie` is provided as part of the *Request* Object. It is a dict-like object, an instance of `Cookie.SimpleCookie` from the python standard library.

To demonstrate "Using Cookies" we'll write a very simple application that remembers who we are:

If a cookie **name** is found, display "Hello <name>!". Otherwise, display "Hello World!" If an argument is given or a query parameter **name** is given, store this as the **name** for the cookie. Here's how we do it:

```
from circuits.web import Server, Controller


class Root(Controller):

    def index(self, name=None):
        if name:
            self.cookie["name"] = name
        else:
            name = self.cookie.get("name", None)
            name = "World!" if name is None else name.value

        return "Hello {0:s}!".format(name)


(Server(8000) + Root()).run()
```

Note: To access the actual value of a cookie use the `.value` attribute.

Warning: Cookies can be vulnerable to XSS (*Cross Site Scripting*) attacks so use them at your own risk. See: http://en.wikipedia.org/wiki/Cross-site_scripting#Cookie_security

Dispatchers

circuits.web provides several dispatchers in the *dispatchers* module. Most of these are available directly from the circuits.web namespace by simply importing the required "dispatcher" from circuits.web.

Example:

```
from circuits.web import Static
```

The most important "dispatcher" is the default `Dispatcher` used by the circuits.web `Server` to dispatch incoming requests onto a channel mapping (*remember that circuits is event-driven and uses channels*), quite similar to that of CherryPy or any other web framework that supports object traversal.

Normally you don't have to worry about any of the details of the *default* `Dispatcher` nor do you have to import it or use it in any way as it's already included as part of the circuits.web `Server` Component structure.

Static

The `Static` "dispatcher" is used for serving static resources/files in your application. To use this, simply add it to your application. It takes some optional configuration which affects it's behavior.

The simplest example (*as per our Base Example*):

```
(Server(8000) + Static() + Root()).run()
```

This will serve up files in the *current directory* as static resources.

Note: This may override your **index** request handler of your top-most (`Root`) `Controller`. As this might be undesirable and it's normally common to serve static resources via a different path and even have them stored in a separate physical file path, you can configure the Static "dispatcher".

Static files stored in `/home/joe/www/`:

```
(Server(8000) + Static(docroot="/home/joe/www/") + Root()).run()
```

Static files stored in `/home/joe/www/` **and** we want them served up as `/static` URI(s):

```
(Server(8000) + Static("/static", docroot="/home/joe/www/") + Root()).run()
```

Dispatcher

The `Dispatcher` (*the default*) is used to dispatch requests and map them onto channels with a similar URL Mapping as CherryPy's. A set of "paths" are maintained by the Dispatcher as Controller(s) are registered to the system or unregistered from it. A channel mapping is found by traversing the set of known paths (*Controller(s)*) and successively matching parts of the path (*split by /*) until a suitable Controller and Request Handler is found. If no Request Handler is found that matches but there is a "default" Request Handler, it is used.

This Dispatcher also included support for matching against HTTP methods:

- GET
- POST
- PUT
- DELETE.

Here are some examples:

```
class Root(Controller):

    def index(self):
        return "Hello World!"

    def foo(self, arg1, arg2, arg3):
        return "Foo: %r, %r, %r" % (arg1, arg2, arg3)

    def bar(self, kwarg1="foo", kwarg2="bar"):
        return "Bar: kwarg1=%r, kwarg2=%r" % (kwarg1, kwarg2)

    def foobar(self, arg1, kwarg1="foo"):
        return "FooBar: %r, kwarg1=%r" % (arg1, kwarg1)
```

With the following requests:

```
http://127.0.0.1:8000/
http://127.0.0.1:8000/foo/1/2/3
http://127.0.0.1:8000/bar?kwarg1=1
http://127.0.0.1:8000/bar?kwarg1=1&kwarg=2
http://127.0.0.1:8000/foobar/1
http://127.0.0.1:8000/foobar/1?kwarg1=1
```

The following output is produced:

```
Hello World!
Foo: '1', '2', '3'
Bar: kwargs1='1', kwargs2='bar'
Bar: kwargs1='1', kwargs2='bar'
FooBar: '1', kwargs1='foo'
FooBar: '1', kwargs1='1'
```

This demonstrates how the Dispatcher handles basic paths and how it handles extra parts of a path as well as the query string. These are essentially translated into arguments and keyword arguments.

To define a Request Handler that is specifically for the HTTP `POST` method, simply define a Request Handler like:

```
class Root(Controller):

    def index(self):
        return "Hello World!"


class Test(Controller):

    channel = "/test"

    def POST(self, *args, **kwargs): #***
        return "%r %r" % (args, kwargs)
```

This will handles `POST` requests to "/test", which brings us to the final point of creating URL structures in your application. As seen above to create a sub-structure of Request Handlers (*a tree*) simply create another `Controller` Component giving it a different channel and add it to the system along with your existing Controller(s).

Warning: All public methods defined in your `If you don't want something exposed either subclass from :class:`~BaseController` whereby you have to explicitly use `expose()` or use `@expose(False)` to decorate a public method as **NOT Exposed** or simply prefix the desired method with an underscore (e.g: `def _foo(...):`).

VirtualHosts

The `VirtualHosts` "dispatcher" allows you to serves up different parts of your application for different "virtual" hosts.

Consider for example you have the following hosts defined:

```
localdomain
foo.localdomain
bar.localdomain
```

You want to display something different on the default domain name "localdomain" and something different for each of the sub-domains "foo.localdomain" and "bar.localdomain".

To do this, we use the VirtualHosts "dispatcher":

```python
from circuits.web import Server, Controller, VirtualHosts


class Root(Controller):

    def index(self):
        return "I am the main vhost"


class Foo(Controller):

    channel = "/foo"

    def index(self):
        return "I am foo."


class Bar(Controller):

    channel = "/bar"

    def index(self):
        return "I am bar."


domains = {
    "foo.localdomain:8000": "foo",
    "bar.localdomain:8000": "bar",
}


(Server(8000) + VirtualHosts(domains) + Root() + Foo() + Bar()).run()
```

With the following requests:

```
http://localdomain:8000/
http://foo.localdomain:8000/
http://bar.localdomain:8000/
```

The following output is produced:

```
I am the main vhost
I am foo.
I am bar.
```

The argument **domains** pasted to VirtualHosts' constructor is a mapping (*dict*) of: domain -> channel

XMLRPC

The `XMLRPC` "dispatcher" provides a circuits.web application with the capability of serving up RPC Requests encoded in XML (XML-RPC).

Without going into too much details (*if you're using any kind of RPC "dispatcher" you should know what you're doing...*), here is a simple example:

```
from circuits import Component
from circuits.web import Server, Logger, XMLRPC


class Test(Component):

    def foo(self, a, b, c):
        return a, b, c


(Server(8000) + Logger() + XMLRPC() + Test()).run()
```

Here is a simple interactive session:

```
>>> import xmlrpclib
>>> xmlrpc = xmlrpclib.ServerProxy("http://127.0.0.1:8000/rpc/")
>>> xmlrpc.foo(1, 2, 3)
[1, 2, 3]
>>>
```

JSONRPC

The `JSONRPC` "dispatcher" is Identical in functionality to the `XMLRPC` "dispatcher".

Example:

```
from circuits import Component
from circuits.web import Server, Logger, JSONRPC


class Test(Component):

    def foo(self, a, b, c):
        return a, b, c


(Server(8000) + Logger() + JSONRPC() + Test()).run()
```

Interactive session (*requires the 'jsonrpclib <https://pypi.python.org/pypi/jsonrpc>'_ library*):

```
>>> import jsonrpclib
>>> jsonrpc = jsonrpclib.ServerProxy("http://127.0.0.1:8000/rpc/")
>>> jsonrpc.foo(1, 2, 3)
{'result': [1, 2, 3], 'version': '1.1', 'id': 2, 'error': None}
>>>
```

Caching

circuits.web includes all the usual **Cache Control**, **Expires** and **ETag** caching mechanisms.

For simple expires style caching use the `expires()` tool from *circuits.web.tools*.

Example:

```
from circuits.web import Server, Controller


class Root(Controller):

    def index(self):
        self.expires(3600)
        return "Hello World!"


(Server(8000) + Root()).run()
```

For other caching mechanisms and validation please refer to the *circuits.web.tools* documentation.

See in particular:

- `expires()`
- `validate_since()`

Note: In the example above we used `self.expires(3600)` which is just a convenience method built into the *Controller*. The *Controller* has other such convenience methods such as `.uri`, `.forbidden()`, `.redirect()`, `.notfound()`, `.serve_file()`, `.serve_download()` and `.expires()`.

These are just wrappers around *tools* and *events*.

Compression

circuits.web includes the necessary low-level tools in order to achieve compression. These tools are provided as a set of functions that can be applied to the response before it is sent to the client.

Here's how you can create a simple Component that enables compression in your web application or website.

```
from circuits import handler, Component

from circuits.web.tools import gzip
from circuits.web import Server, Controller, Logger


class Gzip(Component):

    @handler("response", priority=1.0)
    def compress_response(self, event, response):
        event[0] = gzip(response)


class Root(Controller):

    def index(self):
        return "Hello World!"


(Server(8000) + Gzip() + Root()).run()
```

Please refer to the documentation for further details:

- *tools.gzip()*
- *utils.compress()*

Authentication

circuits.web provides both HTTP Plain and Digest Authentication provided by the functions in *circuits.web.tools*:

- *tools.basic_auth()*
- *tools.check_auth()*
- *tools.digest_auth()*

The first 2 arguments are always (*as with most circuits.web tools*):

- `(request, response)`

An example demonstrating the use of "Basic Auth":

```
from circuits.web import Server, Controller
from circuits.web.tools import check_auth, basic_auth


class Root(Controller):

    def index(self):
        realm = "Test"
        users = {"admin": "admin"}
        encrypt = str

        if check_auth(self.request, self.response, realm, users, encrypt):
            return "Hello %s" % self.request.login

        return basic_auth(self.request, self.response, realm, users, encrypt)


(Server(8000) + Root()).run()
```

For "Digest Auth":

```
from circuits.web import Server, Controller
from circuits.web.tools import check_auth, digest_auth


```

```python
class Root(Controller):

    def index(self):
        realm = "Test"
        users = {"admin": "admin"}
        encrypt = str

        if check_auth(self.request, self.response, realm, users, encrypt):
            return "Hello %s" % self.request.login

        return digest_auth(self.request, self.response, realm, users, encrypt)


(Server(8000) + Root()).run()
```

Session Handling

Session Handling in circuits.web is very similar to Cookies. A dict-like object called **.session** is attached to every Request Object during the life-cycle of that request. Internally a Cookie named **circuits.session** is set in the response.

Rewriting the Cookie Example to use a session instead:

```python
from circuits.web import Server, Controller, Sessions


class Root(Controller):

    def index(self, name=None):
        if name:
            self.session["name"] = name
        else:
            name = self.session.get("name", "World!")

        return "Hello %s!" % name


(Server(8000) + Sessions() + Root()).run()
```

Note: The only Session Handling provided is a temporary in-memory based one and will not persist. No future Session Handling components are planned. For persistent data you should use some kind of Database.

How To Guides

These "How To" guides will steer you in the right direction for common aspects of modern web applications and website design.

How Do I: Use a Templating Engine

circuits.web tries to stay out of your way as much as possible and doesn't impose any restrictions on what external libraries and tools you can use throughout your web application or website. As such you can use any template language/engine you wish.

Example: Using Mako

This basic example of using the Mako Templating Language. First a TemplateLookup instance is created. Finally a function called `render(name, **d)` is created that is used by Request Handlers to render a given template and apply data to it.

Here is the basic example:

```python
#!/usr/bin/env python

import os


import mako
from mako.lookup import TemplateLookup


from circuits.web import Server, Controller


templates = TemplateLookup(
    directories=[os.path.join(os.path.dirname(__file__), "tpl")],
    module_directory="/tmp",
    output_encoding="utf-8"
)


def render(name, **d): #**
    try:
        return templates.get_template(name).render(**d) #**
    except:
        return mako.exceptions.html_error_template().render()


class Root(Controller):

    def index(self):
        return render("index.html")

    def submit(self, firstName, lastName):
        msg = "Thank you %s %s" % (firstName, lastName)
        return render("index.html", message=msg)


(Server(8000) + Root()).run()
```

Other Examples

Other Templating engines will be quite similar to integrate.

How Do I: Integrate with a Database

> **Warning:** Using databases in an asynchronous framework is problematic because most database implementations don't support asynchronous I/O operations.
>
> Generally the solution is to use threading to hand off database operations to a separate thread.

Here are some ways to help integrate databases into your application:

1. Ensure your queries are optimized and do not block for extensive periods of time.
2. Use a library like SQLAlchemy that supports multi-threaded database operations to help prevent your circuits.web web application from blocking.
3. *Optionally* take advantage of the `Worker` component to fire `task` events wrapping database calls in a thread or process pool. You can then use the `call()` and `wait()` synchronization primitives to help with the control flow of your requests and responses.

Another way you can help improve performance is by load balancing across multiple backends of your web application. Using things like haproxy or nginx for load balancing can really help.

How Do I: Use WebSockets

Since the `WebSocketDispatcher` id a circuits.web "dispatcher" it's quite easy to integrate into your web application. Here's a simple trivial example:

```python
#!/usr/bin/env python

from circuits.net.events import write
from circuits import Component, Debugger
from circuits.web.dispatchers import WebSockets
from circuits.web import Controller, Logger, Server, Static


class Echo(Component):

    channel = "wsserver"

    def read(self, sock, data):
        self.fireEvent(write(sock, "Received: " + data))


class Root(Controller):

    def index(self):
        return "Hello World!"


app = Server(("0.0.0.0", 8000))
Debugger().register(app)
Static().register(app)
Echo().register(app)
Root().register(app)
Logger().register(app)
WebSockets("/websocket").register(app)
app.run()
```

See the circuits.web examples.

How do I: Build a Simple Form

circuits.web parses all POST data as a request comes through and creates a dictionary of kwargs (Keyword Arguments) that are passed to Request Handlers.

Here is a simple example of handling form data:

```python
#!/usr/bin/env python

from circuits.web import Server, Controller


class Root(Controller):

    html = """\
<html>
 <head>
  <title>Basic Form Handling</title>
 </head>
 <body>
  <h1>Basic Form Handling</h1>
  <p>
   Example of using
   <a href="http://code.google.com/p/circuits/">circuits</a> and it's
   <b>Web Components</b> to build a simple web application that handles
   some basic form data.
  </p>
  <form action="submit" method="POST">
   <table border="0" rules="none">
    <tr>
     <td>First Name:</td>
     <td><input type="text" name="firstName"></td>
    </tr>
    <tr>
     <td>Last Name:</td>
     <td><input type="text" name="lastName"></td>
    </tr>
     <tr>
      <td colspan=2" align="center">
       <input type="submit" value="Submit">
     </td>
     </tr>
   </table>
  </form>
 </body>
</html>"""


    def index(self):
        return self.html

    def submit(self, firstName, lastName):
        return "Hello %s %s" % (firstName, lastName)


(Server(8000) + Root()).run(
```

How Do I: Upload a File

You can easily handle File Uploads as well using the same techniques as above. Basically the “name” you give your <input> tag of type=”file” will get passed as the Keyword Argument to your Request Handler. It has the following two attributes:

```
.filename - The name of the uploaded file.
.value - The contents of the uploaded file.
```

Here’s the code!

```
#!/usr/bin/env python

from circuits.web import Server, Controller


UPLOAD_FORM = """
<html>
 <head>
  <title>Upload Form</title>
 </head>
 <body>
  <h1>Upload Form</h1>
  <form method="POST" action="/" enctype="multipart/form-data">
   Description: <input type="text" name="desc"><br>
   <input type="file" name="file">
   <input type="submit" value="Submit">
  </form>
 </body>
</html>
"""

UPLOADED_FILE = """
<html>
 <head>
  <title>Uploaded File</title>
 </head>
 <body>
  <h1>Uploaded File</h1>
  <p>
   Filename: %s<br>
   Description: %s
  </p>
  <p><b>File Contents:</b></p>
  <pre>
  %s
  </pre>
 </body>
</html>
"""


class Root(Controller):

    def index(self, file=None, desc=""):
        if file is None:
            return UPLOAD_FORM
        else:
            filename = file.filename
            return UPLOADED_FILE % (file.filename, desc, file.value)


(Server(8000) + Root()).run()
```

circuits.web automatically handles form and file uploads and gives you access to the uploaded file via arguments to the request handler after they've been processed by the dispatcher.

How Do I: Integrate with WSGI Applications

Integrating with other WSGI Applications is quite easy to do. Simply add in an instance of the *Gateway* component into your circuits.web application.

Example:

```
#!/usr/bin/env python

from circuits.web.wsgi import Gateway
from circuits.web import Controller, Server


def foo(environ, start_response):
    start_response("200 OK", [("Content-Type", "text/plain")])
    return ["Foo!"]


class Root(Controller):
    """App Rot"""

    def index(self):
        return "Hello World!"


app = Server(("0.0.0.0", 10000))
Root().register(app)
Gateway({"/foo": foo}).register(app)
app.run()
```

The `apps` argument of the *Gateway* component takes a key/value pair of `path -> callable` (*a Python dictionary*) that maps each URI to a given WSGI callable.

How Do I: Deploy with Apache and mod_wsgi

Here's how to deploy your new Circuits powered Web Application on Apache using mod_wsgi.

Let's say you have a Web Hosting account with some provider.

- Your Username is: "joblogs"
- Your URL is: http://example.com/~joeblogs/
- Your Docroot is: /home/joeblogs/www/

Configuring Apache

The first step is to add in the following .htaccess file to tell Apache hat we want any and all requests to http://example.com/~joeblogs/ to be served up by our circuits.web application.

Created the .htaccess file in your **Docroot**:

```
ReWriteEngine On
ReWriteCond %{REQUEST_FILENAME} !-f
ReWriteCond %{REQUEST_FILENAME} !-d
RewriteRule ^(.*)$ /~joeblogs/index.wsgi/$1 [QSA,PT,L]
```

Running your Application with Apache/mod_wsgi

The get your Web Application working and deployed on Apache using mod_wsgi, you need to make a few changes to your code. Based on our Basic Hello World example earlier, we modify it to the following:

```python
#!/usr/bin/env python

from circuits.web import Controller
from circuits.web.wsgi import Application


class Root(Controller):

    def index(self):
        return "Hello World!"


application = Application() + Root()
```

That's it! To run this, save it as index.wsgi and place it in your Web Root (public-html or www directory) as per the above guidelines and point your favorite Web Browser to: http://example.com/~joeblogs/

Note: It is recommended that you actually use a reverse proxy setup for deploying circuits.web web application so that you don't loose the advantages and functionality of using an event-driven component architecture in your web apps.

In **production** you should use a load balance and reverse proxy combination for best performance.

Miscellaneous

Writing Tools

Most of the internal tools used by circuits.web in circuits.web.tools are simply functions that modify the Request or Response objects in some way or another... We won't be covering that here... What we will cover is how to build simple tools that do something to the Request or Response along it's life-cycle.

Here is a simple example of a tool that uses the pytidylib library to tidy up the HTML output before it gets sent back to the requesting client.

Code:

```
#!/usr/bin/env python
from tidylib import tidy_document

from circuits import Component

class Tidy(Component):

    channel = "http"

    def response(self, response):
        document, errors = tidy_document("".join(response.body))
        response.body = document
Usage:

(Server(8000) + Tidy() + Root()).run()
```

How it works:

This tool works by intercepting the Response Event on the "response" channel of the "http" target (*or Component*). For more information about the life cycle of Request and Response events, their channels and where and how they can be intercepted to perform various tasks read the Request/Response Life Cycle section.

Writing Dispatchers

In circuits.web writing a custom "dispatcher" is only a matter of writing a Component that listens for incoming Request events on the "request" channel of the "web" target. The simplest kind of "dispatcher" is one that simply modifies the request.path in some way. To demonstrate this we'll illustrate and describe how the !VirtualHosts "dispatcher" works.

VirtualHosts code:

```
class VirtualHosts(Component):

    channel = "web"

    def __init__(self, domains):
        super(VirtualHosts, self).__init__()

        self.domains = domains

    @handler("request", filter=True, priority=1)
    def request(self, event, request, response):
        path = request.path.strip("/")

        header = request.headers.get
        domain = header("X-Forwarded-Host", header("Host", ""))
        prefix = self.domains.get(domain, "")

        if prefix:
            path = _urljoin("/%s/" % prefix, path)
            request.path = path
```

The important thing here to note is the Event Handler listening on the appropriate channel and the request.path being modified appropriately.

You'll also note that in [source:circuits/web/dispatchers.py] all of the dispatchers have a set priority. These priorities are defined as:

```
$ grin "priority" circuits/web/dispatchers/
circuits/web/dispatchers/dispatcher.py:
   92 :     @handler("request", filter=True, priority=0.1)
circuits/web/dispatchers/jsonrpc.py:
   38 :     @handler("request", filter=True, priority=0.2)
circuits/web/dispatchers/static.py:
   59 :     @handler("request", filter=True, priority=0.9)
circuits/web/dispatchers/virtualhosts.py:
   49 :     @handler("request", filter=True, priority=1.0)
circuits/web/dispatchers/websockets.py:
   53 :     @handler("request", filter=True, priority=0.2)
circuits/web/dispatchers/xmlrpc.py:
   36 :     @handler("request", filter=True, priority=0.2)
```

in web applications that use multiple dispatchers these priorities set precedences for each "dispatcher" over another in terms of who's handling the Request Event before the other.

Note: Some dispatchers are designed to filter the Request Event and prevent it from being processed by other dispatchers in the system.

API Documentation

circuits package

Subpackages

circuits.app package

Submodules

circuits.app.daemon module

Daemon Component

Component to daemonize a system into the background and detach it from its controlling PTY. Supports PID file writing, logging stdin, stdout and stderr and changing the current working directory.

class `circuits.app.daemon.`**`daemonize`**(**args*, ***kwargs*)

Bases: *`circuits.core.events.Event`*

daemonize Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.
- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

`name` **= 'daemonize'**

class `circuits.app.daemon.`**`deletepid`**`(`**args*, ***kwargs*`)`

Bases: *`circuits.core.events.Event`*

"deletepid Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.
- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'deletepid'

class `circuits.app.daemon.`**writepid**(**args*, ***kwargs*)

Bases: *circuits.core.events.Event*

"writepid Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'writepid'

class `circuits.app.daemon.`**Daemon**(**args*, ***kwargs*)

Bases: *circuits.core.components.Component*

Daemon Component

Parameters

- **pidfile** (*str or* unicode) – .pid filename

- **stdin** (*str or* unicode) – filename to log stdin
- **stdout** (*str or* unicode) – filename to log stdout
- **stderr** (*str or* unicode) – filename to log stderr

initializes x; see x.__class__.__doc__ for signature

channel = 'daemon'

init (*pidfile*, *path='/'*, *stdin=None*, *stdout=None*, *stderr=None*, *channel='daemon'*)

deletepid()

writepid()

daemonize()

registered(*component*, *manager*)

on_started(*component*)

Module contents

Application Components

Contains various components useful for application development and tasks common to applications.

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class circuits.app.**Daemon**(**args*, ***kwargs*)
Bases: *circuits.core.components.Component*

Daemon Component

Parameters

- **pidfile** (*str or* unicode) – .pid filename
- **stdin** (*str or* unicode) – filename to log stdin
- **stdout** (*str or* unicode) – filename to log stdout
- **stderr** (*str or* unicode) – filename to log stderr

initializes x; see x.__class__.__doc__ for signature

channel = 'daemon'

daemonize()

deletepid()

init (*pidfile*, *path='/'*, *stdin=None*, *stdout=None*, *stderr=None*, *channel='daemon'*)

on_started(*component*)

registered(*component*, *manager*)

writepid()

circuits.core package

Submodules

circuits.core.bridge module

Bridge

The Bridge Component is used for inter-process communications between processes. Bridge is used internally when a Component is started in "process mode" via `circuits.core.manager.start()`. Typically a Pipe is used as the socket transport between two sides of a Bridge (*there must be a :class:'~Bridge' instnace on both sides*).

class `circuits.core.bridge.`**`Bridge`**(**args*, ***kwargs*)

Bases: *`circuits.core.components.BaseComponent`*

initializes x; see x.__class__.__doc__ for signature

`channel` **= 'bridge'**

`ignore` **= ['registered', 'unregistered', 'started', 'stopped', 'error', 'value_changed', 'generate_events', 'read', 'write', 'c**

`init`(*socket*, *channel='bridge'*)

`send`(*event*)

circuits.core.components module

This module defines the BaseComponent and its subclass Component.

class `circuits.core.components.`**`prepare_unregister`**(**args*, ***kwargs*)

Bases: *`circuits.core.events.Event`*

This event is fired when a component is about to be unregistered from the component tree. Unregistering a component actually detaches the complete subtree that the unregistered component is the root of. Components that need to know if they are removed from the main tree (e.g. because they maintain relationships to other components in the tree) handle this event, check if the component being unregistered is one of their ancestors and act accordingly.

Parameters **`component`** – the component that will be unregistered

`complete` **= True**

`in_subtree`(*component*)

Convenience method that checks if the given *component* is in the subtree that is about to be detached.

`name` **= 'prepare_unregister'**

class `circuits.core.components.`**`BaseComponent`**(**args*, ***kwargs*)

Bases: *`circuits.core.manager.Manager`*

This is the base class for all components in a circuits based application. Components can (and should, except for root components) be registered with a parent component.

BaseComponents can declare methods as event handlers using the handler decoration (see *`circuits.core.handlers.handler()`*). The handlers are invoked for matching events from the component's channel (specified as the component's `channel` attribute).

BaseComponents inherit from *`circuits.core.manager.Manager`*. This provides components with the *`circuits.core.manager.Manager.fireEvent()`* method that can be used to fire events as the result of some computation.

Apart from the `fireEvent()` method, the Manager nature is important for root components that are started or run.

Variables **`channel`** – a component can be associated with a specific channel by setting this attribute. This should either be done by specifying a class attribute *channel* in the derived class or by passing a keyword parameter *channel="..."* to *__init__*. If specified, the component's handlers receive events on the specified channel only, and events fired by the component will be sent on the specified channel (this behavior may be overridden, see `Event`, `fireEvent()` and `handler()`). By default, the channel attribute is set to "*", meaning that events are fired on all channels and received from all channels.

initializes x; see x.__class__.__doc__ for signature

`channel` = '*'

`register`(*parent*)

Inserts this component in the component tree as a child of the given *parent* node.

Parameters **`parent`** (`Manager`) – the parent component after registration has completed.

This method fires a `Registered` event to inform other components in the tree about the new member.

`unregister`()

Removes this component from the component tree.

Removing a component from the component tree is a two stage process. First, the component is marked as to be removed, which prevents it from receiving further events, and a `prepare_unregister` event is fired. This allows other components to e.g. release references to the component to be removed before it is actually removed from the component tree.

After the processing of the `prepare_unregister` event has completed, the component is removed from the tree and an `unregistered` event is fired.

`unregister_pending`

classmethod **`handlers`**()

Returns a list of all event handlers for this Component

classmethod **`events`**()

Returns a list of all events this Component listens to

classmethod **`handles`**(**names*)

Returns True if all names are event handlers of this Component

class `circuits.core.components.`**`Component`**(**args*, ***kwargs*)

Bases: `circuits.core.components.BaseComponent`

If you use Component instead of BaseComponent as base class for your own component class, then all methods that are not marked as private (i.e: start with an underscore) are automatically decorated as handlers.

The methods are invoked for all events from the component's channel where the event's name matches the method's name.

circuits.core.debugger module

Debugger component used to debug each event in a system by printing each event to sys.stderr or to a Logger Component instance.

class `circuits.core.debugger.`**`Debugger`**(*errors=True*, *events=True*, *file=None*, *logger=None*, *prefix=None*, *trim=None*, ***kwargs*)

Bases: `circuits.core.components.BaseComponent`

Create a new Debugger Component

Creates a new Debugger Component that listens to all events in the system printing each event to sys.stderr or a Logger Component.

Variables

- ***`IgnoreEvents`*** – list of events (str) to ignore
- ***`IgnoreChannels`*** – list of channels (str) to ignore
- **`enabled`** – Enabled/Disabled flag

Parameters **`log`** – Logger Component instance or None (*default*)

initializes x; see x.__class__.__doc__ for signature

`IgnoreEvents` = **['generate_events']**

`IgnoreChannels` = **[]**

circuits.core.events module

This module defines the basic event class and common events.

class `circuits.core.events.`**`EventType`**
Bases: `type`

class `circuits.core.events.`**`Event`**(**args*, ***kwargs*)
Bases: `object`

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.
- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

`channels` **= ()**
The channels this message is sent to.

`parent` **= None**

`notify` **= False**

`success` **= False**

`failure` **= False**

`complete` **= False**

`alert_done` **= False**

`waitingHandlers` **= 0**

classmethod `create`(*name*, **args*, ***kwargs*)

`child`(*name*, **args*, ***kwargs*)

`name` **= 'Event'**

`cancel`()
Cancel the event from being processed (if not already)

`stop`()
Stop further processing of this event

class `circuits.core.events.`**`exception`**(*type*, *value*, *traceback*, *handler=None*, *fevent=None*)
Bases: *`circuits.core.events.Event`*

exception Event

This event is sent for any exceptions that occur during the execution of an event Handler that is not SystemExit or KeyboardInterrupt.

Parameters

- **`type`** (*`type`*) – type of exception
- **`value`** (*`exceptions.TypeError`*) – exception object
- **`traceback`** (`traceback`) – traceback of exception
- **`handler`** (*`@handler(<method>)`*) – handler that raised the exception
- **`fevent`** (*`event`*) – event that failed

`name` **= 'exception'**

class `circuits.core.events.`**`started`**(*manager*)
Bases: *`circuits.core.events.Event`*

started Event

This Event is sent when a Component or Manager has started running.

Parameters **`manager`** (`Component` *or* `Manager`) – The component or manager that was started

name = 'started'

class `circuits.core.events.`**`stopped`**(*manager*)

Bases: *`circuits.core.events.Event`*

stopped Event

This Event is sent when a Component or Manager has stopped running.

Parameters **`manager`** (`Component` *or* `Manager`) – The component or manager that has stopped

name = 'stopped'

class `circuits.core.events.`**`signal`**(*signo*, *stack*)

Bases: *`circuits.core.events.Event`*

signal Event

This Event is sent when a Component receives a signal.

Parameters

- **`signo`** – The signal number received.
- **`stack`** – The interrupted stack frame.

name = 'signal'

class `circuits.core.events.`**`registered`**(*component*, *manager*)

Bases: *`circuits.core.events.Event`*

registered Event

This Event is sent when a Component has registered with another Component or Manager. This Event is only sent if the Component or Manager being registered which is not itself.

Parameters

- **`component`** (`Component`) – The Component being registered
- **`manager`** (`Component` *or* `Manager`) – The Component or Manager being registered with

name = 'registered'

class `circuits.core.events.`**`unregistered`**(**args*, ***kwargs*)

Bases: *`circuits.core.events.Event`*

unregistered Event

This Event is sent when a Component has been unregistered from its Component or Manager.

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'unregistered'

class `circuits.core.events.`**generate_events**(*lock*, *max_wait*)

Bases: *circuits.core.events.Event*

generate_events Event

This Event is sent by the circuits core. All components that generate timed events or events from external sources (e.g. data becoming available) should fire any pending events in their "generate_events" handler.

The handler must either call `stop()` (*preventing other handlers from being called in the same iteration) or must invoke *reduce_time_left()* with parameter 0.

Parameters max_wait – maximum time available for generating events.

Components that actually consume time waiting for events to be generated, thus suspending normal execution, must provide a method `resume` that interrupts waiting for events.

time_left

The time left for generating events. A value less than 0 indicates unlimited time. You should have only one component in your system (usually a poller component) that spends up to "time left" until it generates an event.

reduce_time_left(*time_left*)

Update the time left for generating events. This is typically used by event generators that currently don't want to generate an event but know that they will within a certain time. By reducing the time left, they make sure that they are reinvoked when the time for generating the event has come (at the latest).

This method can only be used to reduce the time left. If the parameter is larger than the current value of time left, it is ignored.

If the time left is reduced to 0 and the event is currently being handled, the handler's *resume* method is invoked.

lock

name = 'generate_events'

circuits.core.handlers module

This module define the @handler decorator/function and the HandlesType type.

`circuits.core.handlers.`**`handler`**`(`**names*, ***kwargs*`)`

Creates an Event Handler

This decorator can be applied to methods of classes derived from *`circuits.core.components.BaseComponent`*. It marks the method as a handler for the events passed as arguments to the `@handler` decorator. The events are specified by their name.

The decorated method's arguments must match the arguments passed to the *`circuits.core.events.Event`* on creation. Optionally, the method may have an additional first argument named *event*. If declared, the event object that caused the handler to be invoked is assigned to it.

By default, the handler is invoked by the component's root *`Manager`* for events that are propagated on the channel determined by the BaseComponent's *channel* attribute. This may be overridden by specifying a different channel as a keyword parameter of the decorator (`channel=...`).

Keyword argument `priority` influences the order in which handlers for a specific event are invoked. The higher the priority, the earlier the handler is executed.

If you want to override a handler defined in a base class of your component, you must specify `override=True`, else your method becomes an additional handler for the event.

Return value

Normally, the results returned by the handlers for an event are simply collected in the *`circuits.core.events.Event`*'s `value` attribute. As a special case, a handler may return a `types.GeneratorType`. This signals to the dispatcher that the handler isn't ready to deliver a result yet. Rather, it has interrupted it's execution with a `yield None` statement, thus preserving its current execution state.

The dispatcher saves the returned generator object as a task. All tasks are reexamined (i.e. their `next()` method is invoked) when the pending events have been executed.

This feature avoids an unnecessarily complicated chaining of event handlers. Imagine a handler A that needs the results from firing an event E in order to complete. Then without this feature, the final action of A would be to fire event E, and another handler for an event `SuccessE` would be required to complete handler A's operation, now having the result from invoking E available (actually it's even a bit more complicated).

Using this "suspend" feature, the handler simply fires event E and then yields `None` until e.g. it finds a result in E's `value` attribute. For the simplest scenario, there even is a utility method *`circuits.core.manager.Manager.callEvent()`* that combines firing and waiting.

class `circuits.core.handlers.`**`Unknown`**

Bases: `object`

Unknown Dummy Component

`circuits.core.handlers.`**`reprhandler`**`(`*handler*`)`

class `circuits.core.handlers.`**`HandlerMetaClass`**`(`*name*, *bases*, *ns*`)`

Bases: `type`

circuits.core.helpers module

class `circuits.core.helpers.`**`FallBackGenerator`**`(`**args*, ***kwargs*`)`

Bases: *`circuits.core.components.BaseComponent`*

`resume``()`

Implements the resume method as required from components that handle `GenerateEvents`.

class `circuits.core.helpers.`**`FallBackErrorHandler`**(**args*, ***kwargs*)

Bases: *`circuits.core.components.BaseComponent`*

If there is no handler for error events in the component hierarchy, this component's handler is added automatically. It simply prints the error information on stderr.

initializes x; see x.__class__.__doc__ for signature

class `circuits.core.helpers.`**`FallBackSignalHandler`**(**args*, ***kwargs*)

Bases: *`circuits.core.components.BaseComponent`*

If there is no handler for signal events in the component hierarchy, this component's handler is added automatically. It simply terminates the system if the signal is SIGINT or SIGTERM.

initializes x; see x.__class__.__doc__ for signature

circuits.core.loader module

This module implements a generic Loader suitable for dynamically loading components from other modules. This supports loading from local paths, eggs and zip archives. Both setuptools and distribute are fully supported.

class `circuits.core.loader.`**`Loader`**(*auto_register=True*, *init_args=None*, *init_kwargs=None*, *paths=None*, *channel='loader'*)

Bases: *`circuits.core.components.BaseComponent`*

Create a new Loader Component

Creates a new Loader Component that enables dynamic loading of components from modules either in local paths, eggs or zip archives.

initializes x; see x.__class__.__doc__ for signature

`channel` **= 'loader'**

`load`(*name*)

circuits.core.manager module

This module defines the Manager class.

exception `circuits.core.manager.`**`UnregistrableError`**

Bases: `exceptions.Exception`

Raised if a component cannot be registered as child.

exception `circuits.core.manager.`**`TimeoutError`**

Bases: `exceptions.Exception`

Raised if wait event timeout occurred

class `circuits.core.manager.`**`CallValue`**(*value*)

Bases: `object`

class `circuits.core.manager.`**`ExceptionWrapper`**(*exception*)

Bases: `object`

`extract`()

class `circuits.core.manager.`**`Manager`**(**args*, ***kwargs*)

Bases: `object`

The manager class has two roles. As a base class for component implementation, it provides methods for event and handler management. The method `fireEvent()` appends a new event at the end of the event queue for later execution. `waitEvent()` suspends the execution of a handler until all handlers for a given event have been invoked. `callEvent()` combines the last two methods in a single method.

The methods `addHandler()` and `removeHandler()` allow handlers for events to be added and removed dynamically. (The more common way to register a handler is to use the `handler()` decorator or derive the class from `Component`.)

In its second role, the `Manager` takes the role of the event executor. Every component hierarchy has a root component that maintains a queue of events. Firing an event effectively means appending it to the event queue maintained by the root manager. The `flush()` method removes all pending events from the queue and, for each event, invokes all the handlers. Usually, `flush()` is indirectly invoked by `run()`.

The manager optionally provides information about the execution of events as automatically generated events. If an `Event` has its `success` attribute set to True, the manager fires a `Success` event if all handlers have been executed without error. Note that this event will be enqueued (and dispatched) immediately after the events that have been fired by the event's handlers. So the success event indicates both the successful invocation of all handlers for the event and the processing of the immediate follow-up events fired by those handlers.

Sometimes it is not sufficient to know that an event and its immediate follow-up events have been processed. Rather, it is important to know when all state changes triggered by an event, directly or indirectly, have been performed. This also includes the processing of events that have been fired when invoking the handlers for the follow-up events and the processing of events that have again been fired by those handlers and so on. The completion of the processing of an event and all its direct or indirect follow-up events may be indicated by a `Complete` event. This event is generated by the manager if `Event` has its `complete` attribute set to True.

Apart from the event queue, the root manager also maintains a list of tasks, actually Python generators, that are updated when the event queue has been flushed.

initializes x; see x.__class__.__doc__ for signature

name
Return the name of this Component/Manager

running
Return the running state of this Component/Manager

pid
Return the process id of this Component/Manager

getHandlers(*event*, *channel*, ***kwargs*)

addHandler(*f*)

removeHandler(*method*, *event=None*)

registerChild(*component*)

unregisterChild(*component*)

fireEvent(*event*, **channels*, ***kwargs*)
Fire an event into the system.

Parameters

- **event** – The event that is to be fired.
- **channels** – The channels that this event is delivered on. If no channels are specified, the event is delivered to the channels found in the event's `channel` attribute. If this attribute is not set, the event is delivered to the firing component's channel. And eventually, when set neither, the event is delivered on all channels ("*").

fire (*event*, **channels*, ***kwargs*)
Fire an event into the system.

Parameters

- **event** – The event that is to be fired.
- **channels** – The channels that this event is delivered on. If no channels are specified, the event is delivered to the channels found in the event's `channel` attribute. If this attribute is not set, the event is delivered to the firing component's channel. And eventually, when set neither, the event is delivered on all channels ("*").

registerTask (*g*)

unregisterTask (*g*)

waitEvent (*event*, **channels*, ***kwargs*)

wait (*event*, **channels*, ***kwargs*)

callEvent (*event*, **channels*, ***kwargs*)
Fire the given event to the specified channels and suspend execution until it has been dispatched. This method may only be invoked as argument to a `yield` on the top execution level of a handler (e.g. "`yield self.callEvent(event)`"). It effectively creates and returns a generator that will be invoked by the main loop until the event has been dispatched (see `circuits.core.handlers.handler()`).

call (*event*, **channels*, ***kwargs*)
Fire the given event to the specified channels and suspend execution until it has been dispatched. This method may only be invoked as argument to a `yield` on the top execution level of a handler (e.g. "`yield self.callEvent(event)`"). It effectively creates and returns a generator that will be invoked by the main loop until the event has been dispatched (see `circuits.core.handlers.handler()`).

flushEvents ()
Flush all Events in the Event Queue. If called on a manager that is not the root of an object hierarchy, the invocation is delegated to the root manager.

flush ()
Flush all Events in the Event Queue. If called on a manager that is not the root of an object hierarchy, the invocation is delegated to the root manager.

start (*process=False*, *link=None*)
Start a new thread or process that invokes this manager's `run()` method. The invocation of this method returns immediately after the task or process has been started.

join ()

stop ()
Stop this manager. Invoking this method causes an invocation of `run()` to return.

processTask (*event*, *task*, *parent=None*)

tick (*timeout=-1*)
Execute all possible actions once. Process all registered tasks and flush the event queue. If the application is running fire a GenerateEvents to get new events from sources.

This method is usually invoked from `run()`. It may also be used to build an application specific main loop.

Parameters **timeout** (*float, measuring seconds*) – the maximum waiting time spent in this method. If negative, the method may block until at least one action has been taken.

run (*socket=None*)
Run this manager. The method fires the `Started` event and then continuously calls *tick()*.

The method returns when the manager's *stop()* method is invoked.

If invoked by a programs main thread, a signal handler for the `INT` and `TERM` signals is installed. This handler fires the corresponding `Signal` events and then calls *stop()* for the manager.

circuits.core.pollers module

Poller Components for asynchronous file and socket I/O.

This module contains Poller components that enable polling of file or socket descriptors for read/write events. Pollers: - Select - Poll - EPoll

class `circuits.core.pollers.`**BasePoller** (*channel=None*)
Bases: *circuits.core.components.BaseComponent*

channel = None

resume ()

addReader (*source*, *fd*)

addWriter (*source*, *fd*)

removeReader (*fd*)

removeWriter (*fd*)

isReading (*fd*)

isWriting (*fd*)

discard (*fd*)

getTarget (*fd*)

class `circuits.core.pollers.`**Select** (...) → new Select Poller Component
Bases: *circuits.core.pollers.BasePoller*

Creates a new Select Poller Component that uses the select poller implementation. This poller is not recommended but is available for legacy reasons as most systems implement select-based polling for backwards compatibility.

channel = 'select'

class `circuits.core.pollers.`**Poll** (...) → new Poll Poller Component
Bases: *circuits.core.pollers.BasePoller*

Creates a new Poll Poller Component that uses the poll poller implementation.

channel = 'poll'

addReader (*source*, *fd*)

addWriter (*source*, *fd*)

removeReader (*fd*)

removeWriter (*fd*)

discard (*fd*)

class `circuits.core.pollers.`**`EPoll`**(...) → new EPoll Poller Component
Bases: *`circuits.core.pollers.BasePoller`*

Creates a new EPoll Poller Component that uses the epoll poller implementation.

`channel` **= 'epoll'**

`addReader`(*source*, *fd*)

`addWriter`(*source*, *fd*)

`removeReader`(*fd*)

`removeWriter`(*fd*)

`discard`(*fd*)

class `circuits.core.pollers.`**`KQueue`**(...) → new KQueue Poller Component
Bases: *`circuits.core.pollers.BasePoller`*

Creates a new KQueue Poller Component that uses the kqueue poller implementation.

`channel` **= 'kqueue'**

`addReader`(*source*, *sock*)

`addWriter`(*source*, *sock*)

`removeReader`(*sock*)

`removeWriter`(*sock*)

`discard`(*sock*)

`circuits.core.pollers.`**`Poller`**
alias of *`Select`*

circuits.core.timers module

Timer component to facilitate timed events.

class `circuits.core.timers.`**`Timer`**(*interval*, *event*, **channels*, ***kwargs*)
Bases: *`circuits.core.components.BaseComponent`*

Timer Component

A timer is a component that fires an event once after a certain delay or periodically at a regular interval.

Parameters

- **`interval`** (`datetime` or number of seconds as a `float`) – the delay or interval to wait for until the event is fired. If interval is specified as datetime, the interval is recalculated as the time span from now to the given datetime.
- **`event`** (*`Event`*) – the event to fire.
- **`persist`** (`bool`) – An optional keyword argument which if `True` will cause the event to be fired repeatedly once per configured interval until the timer is unregistered. **Default:** `False`

`reset`(*interval=None*)
Reset the timer, i.e. clear the amount of time already waited for.

`expiry`

circuits.core.utils module

Utils

This module defines utilities used by circuits.

`circuits.core.utils.`**`flatten`**(*root*, *visited=None*)

`circuits.core.utils.`**`findchannel`**(*root*, *channel*, *all=False*)

`circuits.core.utils.`**`findtype`**(*root*, *component*, *all=False*)

`circuits.core.utils.`**`findcmp`**(*root*, *component*, *all=False*)

`circuits.core.utils.`**`findroot`**(*component*)

`circuits.core.utils.`**`safeimport`**(*name*)

circuits.core.values module

This defines the Value object used by components and events.

class `circuits.core.values.`**`Value`**(*event=None*, *manager=None*)

Bases: `object`

Create a new future Value Object

Creates a new future Value Object which is used by Event Objects and the Manager to store the result(s) of an Event Handler's exeuction of some Event in the system.

Parameters

- **event** (*Event instance*) – The Event this Value is associated with.
- **manager** (*A Manager/Component instance.*) – The Manager/Component used to trigger notifications.

Variables

- **result** – True if this value has been changed.
- ***errors*** – True if while setting this value an exception occured.
- ***notify*** – True or an event name to notify of changes to this value

This is a Future/Promise implementation.

`inform`(*force=False*)

`getValue`(*recursive=True*)

`setValue`(*value*)

`value`

Value of this Value

circuits.core.workers module

Workers

Worker components used to perform "work" in independent threads or processes. Worker(s) are typically used by a Pool (circuits.core.pools) to create a pool of workers. Worker(s) are not registered with a Manager or another

Component - instead they are managed by the Pool. If a Worker is used independently it should not be registered as it causes its main event handler `_on_task` to execute in the other thread blocking it.

class `circuits.core.workers.`**`task`** (*f*, **args*, ***kwargs*)

Bases: *`circuits.core.events.Event`*

task Event

This Event is used to initiate a new task to be performed by a Worker or a Pool of Worker(s).

Parameters

- **`f`** (*`function`*) – The function to be executed.
- **`args`** (*`tuple`*) – Arguments to pass to the function
- **`kwargs`** (*`dict`*) – Keyword Arguments to pass to the function

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`success` **= True**

`failure` **= True**

`name` **= 'task'**

class `circuits.core.workers.`**`Worker`** (**args*, ***kwargs*)

Bases: *`circuits.core.components.BaseComponent`*

A thread/process Worker Component

This Component creates a Worker (either a thread or process) which when given a `Task`, will execute the given function in the task in the background in its thread/process.

Parameters **`process`** (*`bool`*) – True to start this Worker as a process (Thread otherwise)

initializes x; see x.__class__.__doc__ for signature

`channel` **= 'worker'**

`init` (*process=False*, *workers=None*, *channel='worker'*)

Module contents

Core

This package contains the essential core parts of the circuits framework.

`circuits.core.`**`handler`** (**names*, ***kwargs*)

Creates an Event Handler

This decorator can be applied to methods of classes derived from *`circuits.core.components.BaseComponent`*. It marks the method as a handler for the events passed as arguments to the `@handler` decorator. The events are specified by their name.

The decorated method's arguments must match the arguments passed to the *`circuits.core.events.Event`* on creation. Optionally, the method may have an additional first argument named *event*. If declared, the event object that caused the handler to be invoked is assigned to it.

By default, the handler is invoked by the component's root *`Manager`* for events that are propagated on the channel determined by the BaseComponent's *channel* attribute. This may be overridden by specifying a different channel as a keyword parameter of the decorator (`channel=...`).

Keyword argument `priority` influences the order in which handlers for a specific event are invoked. The higher the priority, the earlier the handler is executed.

If you want to override a handler defined in a base class of your component, you must specify `override=True`, else your method becomes an additional handler for the event.

Return value

Normally, the results returned by the handlers for an event are simply collected in the *`circuits.core.events.Event`*'s `value` attribute. As a special case, a handler may return a `types.GeneratorType`. This signals to the dispatcher that the handler isn't ready to deliver a result yet. Rather, it has interrupted it's execution with a `yield None` statement, thus preserving its current execution state.

The dispatcher saves the returned generator object as a task. All tasks are reexamined (i.e. their `next()` method is invoked) when the pending events have been executed.

This feature avoids an unnecessarily complicated chaining of event handlers. Imagine a handler A that needs the results from firing an event E in order to complete. Then without this feature, the final action of A would be to fire event E, and another handler for an event `SuccessE` would be required to complete handler A's operation, now having the result from invoking E available (actually it's even a bit more complicated).

Using this "suspend" feature, the handler simply fires event E and then yields `None` until e.g. it finds a result in E's `value` attribute. For the simplest scenario, there even is a utility method *`circuits.core.manager.Manager.callEvent()`* that combines firing and waiting.

class `circuits.core.`**`BaseComponent`**(**args*, ***kwargs*)
Bases: *`circuits.core.manager.Manager`*

This is the base class for all components in a circuits based application. Components can (and should, except for root components) be registered with a parent component.

BaseComponents can declare methods as event handlers using the handler decoration (see *`circuits.core.handlers.handler()`*). The handlers are invoked for matching events from the component's channel (specified as the component's `channel` attribute).

BaseComponents inherit from *`circuits.core.manager.Manager`*. This provides components with the *`circuits.core.manager.Manager.fireEvent()`* method that can be used to fire events as the result of some computation.

Apart from the `fireEvent()` method, the Manager nature is important for root components that are started or run.

Variables ***`channel`*** – a component can be associated with a specific channel by setting this attribute. This should either be done by specifying a class attribute *channel* in the derived class or by passing a keyword parameter *channel="..."* to *__init__*. If specified, the component's handlers receive events on the specified channel only, and events fired by the component will be sent on the specified channel (this behavior may be overridden, see *`Event`*, *`fireEvent()`* and *`handler()`*). By default, the channel attribute is set to "*", meaning that events are fired on all channels and received from all channels.

initializes x; see x.__class__.__doc__ for signature

`channel` = '*'

classmethod **`events`**()
Returns a list of all events this Component listens to

classmethod **`handlers`**()
Returns a list of all event handlers for this Component

classmethod **`handles`**(**names*)
Returns True if all names are event handlers of this Component

`register`(*parent*)
Inserts this component in the component tree as a child of the given *parent* node.

Parameters **`parent`** (*`Manager`*) – the parent component after registration has completed.

This method fires a `Registered` event to inform other components in the tree about the new member.

`unregister`()

Removes this component from the component tree.

Removing a component from the component tree is a two stage process. First, the component is marked as to be removed, which prevents it from receiving further events, and a *`prepare_unregister`* event is fired. This allows other components to e.g. release references to the component to be removed before it is actually removed from the component tree.

After the processing of the `prepare_unregister` event has completed, the component is removed from the tree and an *`unregistered`* event is fired.

`unregister_pending`

class `circuits.core.`**`Component`**(**args*, ***kwargs*)

Bases: *`circuits.core.components.BaseComponent`*

initializes x; see x.__class__.__doc__ for signature

class `circuits.core.`**`Event`**(**args*, ***kwargs*)

Bases: `object`

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.

- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.

- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.

- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

`alert_done` = **False**

cancel()
Cancel the event from being processed (if not already)

channels = ()

child(*name*, **args*, ***kwargs*)

complete = False

classmethod **create**(*name*, **args*, ***kwargs*)

failure = False

name = 'Event'

notify = False

parent = None

stop()
Stop further processing of this event

success = False

waitingHandlers = 0

class circuits.core.**task**(*f*, **args*, ***kwargs*)
Bases: *circuits.core.events.Event*

task Event

This Event is used to initiate a new task to be performed by a Worker or a Pool of Worker(s).

Parameters

- **f** (*function*) – The function to be executed.
- **args** (*tuple*) – Arguments to pass to the function
- **kwargs** (*dict*) – Keyword Arguments to pass to the function

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

failure = True

name = 'task'

success = True

class circuits.core.**Worker**(**args*, ***kwargs*)
Bases: *circuits.core.components.BaseComponent*

A thread/process Worker Component

This Component creates a Worker (either a thread or process) which when given a `Task`, will execute the given function in the task in the background in its thread/process.

Parameters **process** (*bool*) – True to start this Worker as a process (Thread otherwise)

initializes x; see x.__class__.__doc__ for signature

channel = 'worker'

init(*process=False*, *workers=None*, *channel='worker'*)

class circuits.core.**Bridge**(**args*, ***kwargs*)
Bases: *circuits.core.components.BaseComponent*

initializes x; see x.__class__.__doc__ for signature

channel = 'bridge'

ignore = ['registered', 'unregistered', 'started', 'stopped', 'error', 'value_changed', 'generate_events', 'read', 'write', 'c

init (*socket*, *channel='bridge'*)

send (*event*)

class circuits.core.**Debugger** (*errors=True*, *events=True*, *file=None*, *logger=None*, *prefix=None*, *trim=None*, ***kwargs*)

Bases: `circuits.core.components.BaseComponent`

Create a new Debugger Component

Creates a new Debugger Component that listens to all events in the system printing each event to sys.stderr or a Logger Component.

Variables

- **IgnoreEvents** – list of events (str) to ignore
- **IgnoreChannels** – list of channels (str) to ignore
- **enabled** – Enabled/Disabled flag

Parameters **log** – Logger Component instance or None (*default*)

initializes x; see x.__class__.__doc__ for signature

IgnoreChannels = []

IgnoreEvents = ['generate_events']

class circuits.core.**Timer** (*interval*, *event*, **channels*, ***kwargs*)

Bases: `circuits.core.components.BaseComponent`

Timer Component

A timer is a component that fires an event once after a certain delay or periodically at a regular interval.

Parameters

- **interval** (`datetime` or number of seconds as a `float`) – the delay or interval to wait for until the event is fired. If interval is specified as datetime, the interval is recalculated as the time span from now to the given datetime.
- **event** (`Event`) – the event to fire.
- **persist** (`bool`) – An optional keyword argument which if `True` will cause the event to be fired repeatedly once per configured interval until the timer is unregistered. **Default:** `False`

expiry

reset (*interval=None*)

Reset the timer, i.e. clear the amount of time already waited for.

class circuits.core.**Manager** (**args*, ***kwargs*)

Bases: `object`

The manager class has two roles. As a base class for component implementation, it provides methods for event and handler management. The method `fireEvent()` appends a new event at the end of the event queue for later execution. `waitEvent()` suspends the execution of a handler until all handlers for a given event have been invoked. `callEvent()` combines the last two methods in a single method.

The methods *addHandler()* and *removeHandler()* allow handlers for events to be added and removed dynamically. (The more common way to register a handler is to use the *handler()* decorator or derive the class from *Component*.)

In its second role, the *Manager* takes the role of the event executor. Every component hierarchy has a root component that maintains a queue of events. Firing an event effectively means appending it to the event queue maintained by the root manager. The *flush()* method removes all pending events from the queue and, for each event, invokes all the handlers. Usually, *flush()* is indirectly invoked by *run()*.

The manager optionally provides information about the execution of events as automatically generated events. If an *Event* has its `success` attribute set to True, the manager fires a `Success` event if all handlers have been executed without error. Note that this event will be enqueued (and dispatched) immediately after the events that have been fired by the event's handlers. So the success event indicates both the successful invocation of all handlers for the event and the processing of the immediate follow-up events fired by those handlers.

Sometimes it is not sufficient to know that an event and its immediate follow-up events have been processed. Rather, it is important to know when all state changes triggered by an event, directly or indirectly, have been performed. This also includes the processing of events that have been fired when invoking the handlers for the follow-up events and the processing of events that have again been fired by those handlers and so on. The completion of the processing of an event and all its direct or indirect follow-up events may be indicated by a `Complete` event. This event is generated by the manager if *Event* has its `complete` attribute set to True.

Apart from the event queue, the root manager also maintains a list of tasks, actually Python generators, that are updated when the event queue has been flushed.

initializes x; see x.__class__.__doc__ for signature

addHandler(*f*)

call(*event*, **channels*, ***kwargs*)
Fire the given event to the specified channels and suspend execution until it has been dispatched. This method may only be invoked as argument to a `yield` on the top execution level of a handler (e.g. "`yield self.callEvent(event)`"). It effectively creates and returns a generator that will be invoked by the main loop until the event has been dispatched (see *circuits.core.handlers.handler()*).

callEvent(*event*, **channels*, ***kwargs*)
Fire the given event to the specified channels and suspend execution until it has been dispatched. This method may only be invoked as argument to a `yield` on the top execution level of a handler (e.g. "`yield self.callEvent(event)`"). It effectively creates and returns a generator that will be invoked by the main loop until the event has been dispatched (see *circuits.core.handlers.handler()*).

fire(*event*, **channels*, ***kwargs*)
Fire an event into the system.

Parameters

- **event** – The event that is to be fired.
- **channels** – The channels that this event is delivered on. If no channels are specified, the event is delivered to the channels found in the event's `channel` attribute. If this attribute is not set, the event is delivered to the firing component's channel. And eventually, when set neither, the event is delivered on all channels ("*").

fireEvent(*event*, **channels*, ***kwargs*)
Fire an event into the system.

Parameters

- **event** – The event that is to be fired.
- **channels** – The channels that this event is delivered on. If no channels are specified, the event is delivered to the channels found in the event's `channel` attribute. If this attribute

is not set, the event is delivered to the firing component's channel. And eventually, when set neither, the event is delivered on all channels ("*").

flush()
Flush all Events in the Event Queue. If called on a manager that is not the root of an object hierarchy, the invocation is delegated to the root manager.

flushEvents()
Flush all Events in the Event Queue. If called on a manager that is not the root of an object hierarchy, the invocation is delegated to the root manager.

getHandlers(*event*, *channel*, ***kwargs*)

join()

name
Return the name of this Component/Manager

pid
Return the process id of this Component/Manager

processTask(*event*, *task*, *parent=None*)

registerChild(*component*)

registerTask(*g*)

removeHandler(*method*, *event=None*)

run(*socket=None*)
Run this manager. The method fires the `Started` event and then continuously calls `tick()`.

The method returns when the manager's `stop()` method is invoked.

If invoked by a programs main thread, a signal handler for the `INT` and `TERM` signals is installed. This handler fires the corresponding `Signal` events and then calls `stop()` for the manager.

running
Return the running state of this Component/Manager

start(*process=False*, *link=None*)
Start a new thread or process that invokes this manager's `run()` method. The invocation of this method returns immediately after the task or process has been started.

stop()
Stop this manager. Invoking this method causes an invocation of `run()` to return.

tick(*timeout=-1*)
Execute all possible actions once. Process all registered tasks and flush the event queue. If the application is running fire a GenerateEvents to get new events from sources.

This method is usually invoked from `run()`. It may also be used to build an application specific main loop.

Parameters **timeout** (*float, measuring seconds*) – the maximum waiting time spent in this method. If negative, the method may block until at least one action has been taken.

unregisterChild(*component*)

unregisterTask(*g*)

wait(*event*, **channels*, ***kwargs*)

waitEvent(*event*, **channels*, ***kwargs*)

exception `circuits.core.`**`TimeoutError`**

Bases: `exceptions.Exception`

Raised if wait event timeout occurred

circuits.io package

Submodules

circuits.io.events module

I/O Events

This module implements commonly used I/O events used by other I/O modules.

class `circuits.io.events.`**`eof`**`(`**args*, ***kwargs*`)`

Bases: *`circuits.core.events.Event`*

eof Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.

- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.

- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.

- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

`name` **= 'eof'**

class `circuits.io.events.`**`seek`**`(`**args*, ***kwargs*`)`

Bases: `circuits.core.events.Event`

seek Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a `name` attribute that is used for matching the event with the handlers.

Variables

- **`channels`** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- **`value`** – this is a `circuits.core.values.Value` object that holds the results returned by the handlers invoked for the event.
- **`success`** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- **`complete`** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

`name` **= 'seek'**

class `circuits.io.events.`**`read`**`(`**args*, ***kwargs*`)`

Bases: `circuits.core.events.Event`

read Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a `name` attribute that is used for matching the event with the handlers.

Variables

- **`channels`** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'read'

class circuits.io.events.**close**(**args*, ***kwargs*)

Bases: *circuits.core.events.Event*

close Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.

- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'close'

class `circuits.io.events.`**`write`**`(*args, **kwargs)`
Bases: *`circuits.core.events.Event`*

write Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.

- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.

- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.

- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'write'

class `circuits.io.events.`**`error`**`(*args, **kwargs)`
Bases: *`circuits.core.events.Event`*

error Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'error'

class `circuits.io.events.`**`open`**(**args*, ***kwargs*)

Bases: *circuits.core.events.Event*

open Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.

- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'open'

class `circuits.io.events.`**`opened`**`(`**args*, ***kwargs*`)`

Bases: *`circuits.core.events.Event`*

opened Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.
- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'opened'

class `circuits.io.events.`**`closed`**`(`**args*, ***kwargs*`)`

Bases: *`circuits.core.events.Event`*

closed Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a `name` attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a `circuits.core.values.Value` object that holds the results returned by the handlers invoked for the event.

- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.

- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.

- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'closed'

class `circuits.io.events.`**`ready`**(**args*, ***kwargs*)

Bases: `circuits.core.events.Event`

ready Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a `name` attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'ready'

class `circuits.io.events.`**`started`**(**args*, ***kwargs*)

Bases: *circuits.core.events.Event*

started Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'started'

class `circuits.io.events.`**`stopped`**`(`**args*, ***kwargs*`)`

Bases: *`circuits.core.events.Event`*

stopped Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.

- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.

- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.

- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'stopped'

class `circuits.io.events.`**`moved`**`(`**args*, ***kwargs*`)`

Bases: *`circuits.core.events.Event`*

moved Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'moved'

class `circuits.io.events.`**`created`**`(*args, **kwargs)`

Bases: *circuits.core.events.Event*

created Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'created'

class circuits.io.events.**deleted**(**args*, ***kwargs*)

Bases: *circuits.core.events.Event*

deleted Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'deleted'

class circuits.io.events.**accessed**(**args*, ***kwargs*)

Bases: *circuits.core.events.Event*

accessed Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a `name` attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***`value`*** – this is a `circuits.core.values.Value` object that holds the results returned by the handlers invoked for the event.
- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

`name` **= 'accessed'**

class `circuits.io.events.`**`modified`**`(`**args*, ***kwargs*`)`

Bases: `circuits.core.events.Event`

modified Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a `name` attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***`value`*** – this is a `circuits.core.values.Value` object that holds the results returned by the handlers invoked for the event.

- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'modified'

class `circuits.io.events.`**`unmounted`**(**args*, ***kwargs*)

Bases: *`circuits.core.events.Event`*

unmounted Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***value*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'unmounted'

circuits.io.file module

File I/O

This module implements a wrapper for basic File I/O.

class `circuits.io.file.`**`File`**`(`**args*, ***kwargs*`)`
Bases: *`circuits.core.components.Component`*

initializes x; see x.__class__.__doc__ for signature

`channel` = **'file'**

`init``(`*filename*, *mode='r'*, *bufsize=4096*, *encoding=None*, *channel='file'*`)`

`closed`

`filename`

`mode`

`close``()`

`seek``(`*offset*, *whence=0*`)`

`write``(`*data*`)`

circuits.io.notify module

circuits.io.process module

Process

This module implements a wrapper for basic `subprocess.Popen` functionality.

class `circuits.io.process.`**`Process`**`(`**args*, ***kwargs*`)`
Bases: *`circuits.core.components.BaseComponent`*

initializes x; see x.__class__.__doc__ for signature

`channel` = **'process'**

`init``(`*args*, *cwd=None*, *shell=False*`)`

`start``()`

`stop``()`

`kill``()`

`signal``(`*signal*`)`

`wait``()`

`write``(`*data*`)`

`status`

circuits.io.serial module

Serial I/O

This module implements basic Serial (RS232) I/O.

class `circuits.io.serial.`**`Serial`**(*port*, *baudrate=115200*, *bufsize=4096*, *timeout=0.2*, *channel='serial'*)

Bases: *`circuits.core.components.Component`*

`channel` = **'serial'**

`close`()

`write`(*data*)

Module contents

I/O Support

This package contains various I/O Components. Provided are a generic File Component, StdIn, StdOut and StdErr components. Instances of StdIn, StdOut and StdErr are also created by importing this package.

circuits.net package

Submodules

circuits.net.events module

Networking Events

This module implements commonly used Networking events used by socket components.

class `circuits.net.events.`**`connect`**(**args*, ***kwargs*)

Bases: *`circuits.core.events.Event`*

connect Event

This Event is sent when a new client connection has arrived on a server. This event is also used for client's to initiate a new connection to a remote host.

Note: This event is used for both Client and Server Components.

Parameters

- **`args`** (*`tuple`*) – Client: (host, port) Server: (sock, host, port)
- **`kwargs`** (*`dict`*) – Client: (ssl)

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`name` = **'connect'**

class `circuits.net.events.`**`disconnect`**(**args*)

Bases: *`circuits.core.events.Event`*

disconnect Event

This Event is sent when a client connection has closed on a server. This event is also used for client's to disconnect from a remote host.

Note: This event is used for both Client and Server Components.

Parameters **`args`** – Client: () Server: (sock)

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`name` **= 'disconnect'**

class `circuits.net.events.`**`connected`**(*host*, *port*)

Bases: *`circuits.core.events.Event`*

connected Event

This Event is sent when a client has successfully connected.

Note: This event is for Client Components.

Parameters

- **`host`** – The hostname connected to.
- **`port`** – The port connected to

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`name` **= 'connected'**

class `circuits.net.events.`**`disconnected`**

Bases: *`circuits.core.events.Event`*

disconnected Event

This Event is sent when a client has disconnected

Note: This event is for Client Components.

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`name` **= 'disconnected'**

class `circuits.net.events.`**`read`**(**args*)

Bases: *`circuits.core.events.Event`*

read Event

This Event is sent when a client or server connection has read any data.

Note: This event is used for both Client and Server Components.

Parameters **`args`** – Client: (data) Server: (sock, data)

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`name` **= 'read'**

class `circuits.net.events.`**`error`**(**args*)

Bases: *`circuits.core.events.Event`*

error Event

This Event is sent when a client or server connection has an error.

Note: This event is used for both Client and Server Components.

Parameters **args** – Client: (error) Server: (sock, error)

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

name = 'error'

class `circuits.net.events.`**`broadcast`**`(*args)`
Bases: *`circuits.core.events.Event`*

broadcast Event

This Event is used by the UDPServer/UDPClient sockets to send a message on the `<broadcast>` network.

Note:

- This event is never sent, it is used to send data.
- This event is used for both Client and Server UDP Components.

Parameters **args** – (data, port)

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

name = 'broadcast'

class `circuits.net.events.`**`write`**`(*args)`
Bases: *`circuits.core.events.Event`*

write Event

This Event is used to notify a client, client connection or server that we have data to be written.

Note:

- This event is never sent, it is used to send data.
- This event is used for both Client and Server Components.

Parameters **args** – Client: (data) Server: (sock, data)

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

name = 'write'

class `circuits.net.events.`**`close`**`(*args)`
Bases: *`circuits.core.events.Event`*

close Event

This Event is used to notify a client, client connection or server that we want to close.

Note:

- This event is never sent, it is used to close.

•This event is used for both Client and Server Components.

Parameters **`args`** – Client: () Server: (sock)

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`name` **= 'close'**

class `circuits.net.events.`**`ready`**(*component*, *bind=None*)

Bases: *`circuits.core.events.Event`*

ready Event

This Event is used to notify the rest of the system that the underlying Client or Server Component is ready to begin processing connections or incoming/outgoing data. (This is triggered as a direct result of having the capability to support multiple client/server components with a single poller component instance in a system).

Note: This event is used for both Client and Server Components.

Parameters

- **`component`** – The Client/Server Component that is ready.
- **`bind`** – The (host, port) the server has bound to.

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`name` **= 'ready'**

class `circuits.net.events.`**`closed`**(**args*, ***kwargs*)

Bases: *`circuits.core.events.Event`*

closed Event

This Event is sent when a server has closed its listening socket.

Note: This event is for Server components.

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'closed'

circuits.net.sockets module

Socket Components

This module contains various Socket Components for use with Networking.

class `circuits.net.sockets.`**`Client`**(*bind=None*, *bufsize=4096*, *channel='client'*)
Bases: *circuits.core.components.BaseComponent*

channel = 'client'

parse_bind_parameter(*bind_parameter*)

connected

close()

write(*data*)

class `circuits.net.sockets.`**`TCPClient`**(*bind=None*, *bufsize=4096*, *channel='client'*)
Bases: *circuits.net.sockets.Client*

socket_family = 2

connect(*host*, *port*, *secure=False*, ***kwargs*)

class `circuits.net.sockets.`**`TCP6Client`**(*bind=None*, *bufsize=4096*, *channel='client'*)
Bases: *circuits.net.sockets.TCPClient*

socket_family = 10

parse_bind_parameter(*bind_parameter*)

class `circuits.net.sockets.`**`UNIXClient`**(*bind=None*, *bufsize=4096*, *channel='client'*)
Bases: *circuits.net.sockets.Client*

ready(*component*)

connect(*path*, *secure=False*, ***kwargs*)

class `circuits.net.sockets.`**`Server`**(*bind*, *secure=False*, *backlog=5000*, *bufsize=4096*, *channel='server'*, ***kwargs*)
Bases: *circuits.core.components.BaseComponent*

channel = 'server'

parse_bind_parameter(*bind_parameter*)

connected

host

port

close(*sock=None*)

write(*sock*, *data*)

class circuits.net.sockets.**TCPServer**(*bind*, *secure=False*, *backlog=5000*, *bufsize=4096*, *channel='server'*, ***kwargs*)

Bases: *circuits.net.sockets.Server*

socket_family = 2

parse_bind_parameter(*bind_parameter*)

circuits.net.sockets.**parse_ipv4_parameter**(*bind_parameter*)

circuits.net.sockets.**parse_ipv6_parameter**(*bind_parameter*)

class circuits.net.sockets.**TCP6Server**(*bind*, *secure=False*, *backlog=5000*, *bufsize=4096*, *channel='server'*, ***kwargs*)

Bases: *circuits.net.sockets.TCPServer*

socket_family = 10

parse_bind_parameter(*bind_parameter*)

class circuits.net.sockets.**UNIXServer**(*bind*, *secure=False*, *backlog=5000*, *bufsize=4096*, *channel='server'*, ***kwargs*)

Bases: *circuits.net.sockets.Server*

class circuits.net.sockets.**UDPServer**(*bind*, *secure=False*, *backlog=5000*, *bufsize=4096*, *channel='server'*, ***kwargs*)

Bases: *circuits.net.sockets.Server*

socket_family = 2

close()

write(*address*, *data*)

broadcast(*data*, *port*)

circuits.net.sockets.**UDPClient**

alias of *UDPServer*

class circuits.net.sockets.**UDP6Server**(*bind*, *secure=False*, *backlog=5000*, *bufsize=4096*, *channel='server'*, ***kwargs*)

Bases: *circuits.net.sockets.UDPServer*

socket_family = 10

parse_bind_parameter(*bind_parameter*)

circuits.net.sockets.**UDP6Client**

alias of *UDP6Server*

circuits.net.sockets.**Pipe**(**channels*, ***kwargs*)

Create a new full duplex Pipe

Returns a pair of UNIXClient instances connected on either side of the pipe.

Module contents

Networking Components

This package contains components that implement network sockets and protocols for implementing client and server network applications.

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circuits.node package

Submodules

circuits.node.client module

Client

...

class `circuits.node.client.`**`Client`**(*host*, *port*, *channel='node'*)

> Bases: *`circuits.core.components.BaseComponent`*
>
> ...
>
> **`channel`** **= 'node'**
>
> **`close`**()
>
> **`connect`**(*host*, *port*)
>
> **`send`**(*event*, *e*)

circuits.node.events module

Events

...

class `circuits.node.events.`**`packet`**(**args*, ***kwargs*)

> Bases: *`circuits.core.events.Event`*
>
> packet Event
>
> An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.
>
> All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.
>
> Every event has a *`name`* attribute that is used for matching the event with the handlers.
>
> **Variables**
>
> - ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.
- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***`complete`*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

`name` = **'packet'**

class `circuits.node.events.`**`remote`**(*event*, *node*, *channel=None*)

Bases: *`circuits.core.events.Event`*

remote Event

...

`name` = **'remote'**

circuits.node.node module

Node

...

class `circuits.node.node.`**`Node`**(*bind=None*, *channel='node'*)

Bases: *`circuits.core.components.BaseComponent`*

...

`channel` = **'node'**

`add`(*name*, *host*, *port*)

circuits.node.server module

Server

...

class `circuits.node.server.`**`Server`**(*bind*, *channel='node'*)

Bases: *`circuits.core.components.BaseComponent`*

...

`channel` = **'node'**

send(*v*)

host

port

circuits.node.utils module

Utils

...

circuits.node.utils.**load_event**(*s*)

circuits.node.utils.**dump_event**(*e*, *id*)

circuits.node.utils.**dump_value**(*v*)

circuits.node.utils.**load_value**(*v*)

Module contents

Node

Distributed and Inter-Processing support for circuits

circuits.protocols package

Submodules

circuits.protocols.http module

class circuits.protocols.http.**request**(**args*, ***kwargs*)

Bases: `circuits.core.events.Event`

request Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a `name` attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a `circuits.core.values.Value` object that holds the results returned by the handlers invoked for the event.

- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'request'

class `circuits.protocols.http.`**`response`**`(`**args*, ***kwargs*`)`

Bases: *`circuits.core.events.Event`*

response Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***value*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'response'

class `circuits.protocols.http.`**`ResponseObject`**(*headers*, *status*, *version*)

Bases: `object`

`read`()

class `circuits.protocols.http.`**`HTTP`**(*encoding='utf-8'*, *channel='web'*)

Bases: *`circuits.core.components.BaseComponent`*

`channel` **= 'web'**

circuits.protocols.irc module

Internet Relay Chat Protocol

This package implements the Internet Relay Chat Protocol or commonly known as IRC. Support for both server and client is implemented.

circuits.protocols.line module

Line Protocol

This module implements the basic Line protocol.

This module can be used in both server and client implementations.

`circuits.protocols.line.`**`splitLines`**(*s*, *buffer*) → lines, buffer

Append s to buffer and find any new lines of text in the string splitting at the standard IRC delimiter CRLF. Any new lines found, return them as a list and the remaining buffer for further processing.

class `circuits.protocols.line.`**`line`**(**args*, ***kwargs*)

Bases: *`circuits.core.events.Event`*

line Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *`name`* attribute that is used for matching the event with the handlers.

Variables

- ***`channels`*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***`value`*** – this is a *`circuits.core.values.Value`* object that holds the results returned by the handlers invoked for the event.

- ***`success`*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.

- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'line'

class `circuits.protocols.line.`**`Line`**(**args*, ***kwargs*)

Bases: *`circuits.core.components.BaseComponent`*

Line Protocol

Implements the Line Protocol.

Incoming data is split into lines with a splitter function. For each line of data processed a Line Event is created. Any unfinished lines are appended into an internal buffer.

A custom line splitter function can be passed to customize how data is split into lines. This function must accept two arguments, the data to process and any left over data from a previous invocation of the splitter function. The function must also return a tuple of two items, a list of lines and any left over data.

Parameters **splitter** (*function*) – a line splitter function

This Component operates in two modes. In normal operation it's expected to be used in conjunction with components that expose a Read Event on a "read" channel with only one argument (data). Some builtin components that expose such events are: - circuits.net.sockets.TCPClient - circuits.io.File

The second mode of operation works with circuits.net.sockets.Server components such as TCPServer, UNIXServer, etc. It's expected that two arguments exist in the Read Event, sock and data. The following two arguments can be passed to affect how unfinished data is stored and retrieved for such components:

Parameters **getBuffer** (*function*) – function to retrieve the buffer for a client sock

This function must accept one argument (sock,) the client socket whoose buffer is to be retrieved.

Parameters **updateBuffer** (*function*) – function to update the buffer for a client sock

This function must accept two arguments (sock, buffer,) the client socket and the left over buffer to be updated.

@note: This Component must be used in conjunction with a Component that exposes Read events on a "read" Channel.

initializes x; see x.__class__.__doc__ for signature

circuits.protocols.websocket module

class `circuits.protocols.websocket.`**`WebSocketCodec`**(*sock=None*, *data=bytearray(b'')*, **args*, ***kwargs*)

Bases: *`circuits.core.components.BaseComponent`*

WebSocket Protocol

Implements the Data Framing protocol for WebSocket.

This component is used in conjunction with a parent component that receives Read events on its channel. When created (after a successful WebSocket setup handshake), the codec registers a handler on the parent's channel that filters out these Read events for a given socket (if used in a server) or all Read events (if used in a client). The data is decoded and the contained payload is emitted as Read events on the codec's channel.

The data from write events sent to the codec's channel (with socket argument if used in a server) is encoded according to the WebSocket Data Framing protocol. The encoded data is then forwarded as write events on the parents channel.

Creates a new codec.

Parameters **`sock`** – the socket used in Read and write events (if used in a server, else None)

`channel` **= 'ws'**

Module contents

Networking Protocols

This package contains components that implement various networking protocols.

circuits.tools package

Module contents

Circuits Tools

circuits.tools contains a standard set of tools for circuits. These tools are installed as executables with a prefix of "circuits."

`circuits.tools.`**`tryimport`**(*modules*, *obj=None*, *message=None*)

`circuits.tools.`**`walk`**(*x*, *f*, *d=0*, *v=None*)

`circuits.tools.`**`edges`**(*x*, *e=None*, *v=None*, *d=0*)

`circuits.tools.`**`findroot`**(*x*)

`circuits.tools.`**`kill`**(*x*)

`circuits.tools.`**`graph`**(*x*, *name=None*)
Display a directed graph of the Component structure of x

Parameters

- **`x`** (`Component or Manager`) – A Component or Manager to graph
- **`name`** (*`str`*) – A name for the graph (defaults to x's name)

@return: A directed graph representing x's Component structure. @rtype: str

`circuits.tools.`**`inspect`**(*x*)
Display an inspection report of the Component or Manager x

Parameters **`x`** (`Component or Manager`) – A Component or Manager to graph

@return: A detailed inspection report of x @rtype: str

`circuits.tools.`**`deprecated`**(*f*)

circuits.web package

Subpackages

circuits.web.dispatchers package

Submodules

circuits.web.dispatchers.dispatcher module

Dispatcher

This module implements a basic URL to Channel dispatcher. This is the default dispatcher used by circuits.web

`circuits.web.dispatchers.dispatcher.`**`resolve_path`**(*paths*, *parts*)

`circuits.web.dispatchers.dispatcher.`**`resolve_methods`**(*parts*)

`circuits.web.dispatchers.dispatcher.`**`find_handlers`**(*req*, *paths*)

class `circuits.web.dispatchers.dispatcher.`**`Dispatcher`**(***kwargs*)

Bases: `circuits.core.components.BaseComponent`

`channel` = **'web'**

circuits.web.dispatchers.jsonrpc module

JSON RPC

This module implements a JSON RPC dispatcher that translates incoming RPC calls over JSON into RPC events.

class `circuits.web.dispatchers.jsonrpc.`**`rpc`**(**args*, ***kwargs*)

Bases: `circuits.core.events.Event`

RPC Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a `name` attribute that is used for matching the event with the handlers.

Variables

- **`channels`** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- **`value`** – this is a `circuits.core.values.Value` object that holds the results returned by the handlers invoked for the event.

- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'rpc'

class `circuits.web.dispatchers.jsonrpc.`**`JSONRPC`**(*path=None*, *encoding='utf-8'*, *rpc_channel='*'*)

Bases: *circuits.core.components.BaseComponent*

channel = 'web'

circuits.web.dispatchers.static module

Static

This modStatic implements a Static dispatcher used to serve up static resources and an optional apache-style directory listing.

class `circuits.web.dispatchers.static.`**`Static`**(*path=None*, *docroot=None*, *defaults=('index.html', 'index.xhtml')*, *dirlisting=False*)

Bases: *circuits.core.components.BaseComponent*

channel = 'web'

circuits.web.dispatchers.virtualhosts module

VirtualHost

This module implements a virtual host dispatcher that sends requests for configured virtual hosts to different dispatchers.

class `circuits.web.dispatchers.virtualhosts.`**`VirtualHosts`**(*domains*)

Bases: *circuits.core.components.BaseComponent*

Forward to anotehr Dispatcher based on the Host header.

This can be useful when running multiple sites within one server. It allows several domains to point to different parts of a single website structure. For example: - http://www.domain.example -> / - http://www.domain2.example -> /domain2 - http://www.domain2.example:443 -> /secure

Parameters **domains** (*dict*) – a dict of {host header value: virtual prefix} pairs.

The incoming "Host" request header is looked up in this dict, and, if a match is found, the corresponding "virtual prefix" value will be prepended to the URL path before passing the request onto the next dispatcher.

Note that you often need separate entries for "example.com" and "www.example.com". In addition, "Host" headers may contain the port number.

channel = **'web'**

circuits.web.dispatchers.xmlrpc module

XML RPC

This module implements a XML RPC dispatcher that translates incoming RPC calls over XML into RPC events.

class `circuits.web.dispatchers.xmlrpc.`**`rpc`**(**args*, ***kwargs*)

Bases: `circuits.core.events.Event`

rpc Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a `name` attribute that is used for matching the event with the handlers.

Variables

- **`channels`** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- **`value`** – this is a `circuits.core.values.Value` object that holds the results returned by the handlers invoked for the event.

- **`success`** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.

- **`success_channels`** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- **`complete`** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.

- **`complete_channels`** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = **'rpc'**

class `circuits.web.dispatchers.xmlrpc.`**`XMLRPC`**(*path=None*, *encoding='utf-8'*, *rpc_channel='*'*)

Bases: `circuits.core.components.BaseComponent`

channel = **'web'**

Module contents

Dispatchers

This package contains various circuits.web dispatchers By default a `circuits.web.Server` Component uses the `dispatcher.Dispatcher`

circuits.web.parsers package

Submodules

circuits.web.parsers.http module

exception `circuits.web.parsers.http.`**`InvalidRequestLine`**
Bases: `exceptions.Exception`

error raised when first line is invalid

exception `circuits.web.parsers.http.`**`InvalidHeader`**
Bases: `exceptions.Exception`

error raised on invalid header

exception `circuits.web.parsers.http.`**`InvalidChunkSize`**
Bases: `exceptions.Exception`

error raised when we parse an invalid chunk size

class `circuits.web.parsers.http.`**`HttpParser`**(*kind=2*, *decompress=False*)
Bases: `object`

`get_version`()

`get_method`()

`get_status_code`()

`get_url`()

`get_scheme`()

`get_path`()

`get_query_string`()

`get_headers`()

`recv_body`()
return last chunk of the parsed body

`recv_body_into`(*barray*)
Receive the last chunk of the parsed bodyand store the data in a buffer rather than creating a new string.

`is_upgrade`()
Do we get upgrade header in the request. Useful for websockets

`is_headers_complete`()
return True if all headers have been parsed.

`is_partial_body`()
return True if a chunk of body have been parsed

is_message_begin()
return True if the parsing start

is_message_complete()
return True if the parsing is done (we get EOF)

is_chunked()
return True if Transfer-Encoding header value is chunked

should_keep_alive()
return True if the connection should be kept alive

execute(*data*, *length*)

circuits.web.parsers.multipart module

Parser for multipart/form-data

This module provides a parser for the multipart/form-data format. It can read from a file, a socket or a WSGI environment. The parser can be used to replace cgi.FieldStorage (without the bugs) and works with Python 2.5+ and 3.x (2to3).

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class circuits.web.parsers.multipart.**MultiDict**(**a*, ***k*)
Bases: _abcoll.MutableMapping

A dict that remembers old values for each key

keys()

append(*key*, *value*)

replace(*key*, *value*)

getall(*key*)

get(*key*, *default=None*, *index=-1*)

iterallitems()

`circuits.web.parsers.multipart.`**`tob`**`(`*data*, *enc='utf8'*`)`

`circuits.web.parsers.multipart.`**`copy_file`**`(`*stream*, *target*, *maxread=-1*, *buffer_size=32*`)`
Read from :stream and write to :target until :maxread or EOF.

`circuits.web.parsers.multipart.`**`header_quote`**`(`*val*`)`

`circuits.web.parsers.multipart.`**`header_unquote`**`(`*val*, *filename=False*`)`

`circuits.web.parsers.multipart.`**`parse_options_header`**`(`*header*, *options=None*`)`

exception `circuits.web.parsers.multipart.`**`MultipartError`**
Bases: `exceptions.ValueError`

class `circuits.web.parsers.multipart.`**`MultipartParser`**`(`*stream*, *boundary*, *content_length=-1*, *disk_limit=1073741824*, *mem_limit=1048576*, *memfile_limit=262144*, *buffer_size=65536*, *charset='latin1'*`)`
Bases: `object`

Parse a multipart/form-data byte stream. This object is an iterator over the parts of the message.

Parameters

- **`stream`** – A file-like stream. Must implement `.read(size)`.
- **`boundary`** – The multipart boundary as a byte string.
- **`content_length`** – The maximum number of bytes to read.

`parts``()`
Returns a list with all parts of the multipart message.

`get``(`*name*, *default=None*`)`
Return the first part with that name or a default value (None).

`get_all``(`*name*`)`
Return a list of parts with that name.

class `circuits.web.parsers.multipart.`**`MultipartPart`**`(`*buffer_size=65536*, *memfile_limit=262144*, *charset='latin1'*`)`
Bases: `object`

`feed``(`*line*, *nl=''*`)`

`write_header``(`*line*, *nl*`)`

`write_body``(`*line*, *nl*`)`

`finish_header``()`

`is_buffered``()`
Return true if the data is fully buffered in memory.

`value`
Data decoded with the specified charset

`save_as``(`*path*`)`

`circuits.web.parsers.multipart.`**`parse_form_data`**`(`*environ*, *charset='utf8'*, *strict=False*, ***kw*`)`
Parse form data from an environ dict and return a (forms, files) tuple. Both tuple values are dictionaries with

the form-field name as a key (text_type) and lists as values (multiple values per key are possible). The forms-dictionary contains form-field values as text_type strings. The files-dictionary contains `MultipartPart` instances, either because the form-field was a file-upload or the value is to big to fit into memory limits.

Parameters

- **`environ`** – An WSGI environment dict.
- **`charset`** – The charset to use if unsure. (default: utf8)
- **`strict`** – If True, raise `MultipartError` on any parsing errors. These are silently ignored by default.

circuits.web.parsers.querystring module

class `circuits.web.parsers.querystring.`**`QueryStringToken`**

Bases: `object`

`ARRAY` = **'ARRAY'**

`OBJECT` = **'OBJECT'**

`KEY` = **'KEY'**

class `circuits.web.parsers.querystring.`**`QueryStringParser`**(*data*)

Bases: `object`

`process`(*pair*)

`parse`(*key*, *value*)

`tokens`(*key*)

Module contents

circuits.web parsers

circuits.web.websockets package

Submodules

circuits.web.websockets.client module

class `circuits.web.websockets.client.`**`WebSocketClient`**(*url*, *channel='wsclient'*, *wschannel='ws'*, *headers={}*)

Bases: `circuits.core.components.BaseComponent`

An RFC 6455 compliant WebSocket client component. Upon receiving a `circuits.web.client.Connect` event, the component tries to establish the connection to the server in a two stage process. First, a `circuits.net.events.connect` event is sent to a child `TCPClient`. When the TCP connection has been established, the HTTP request for opening the WebSocket is sent to the server. A failure in this setup process is signaled by raising an `NotConnected` exception.

When the server accepts the request, the WebSocket connection is established and can be used very much like an ordinary socket by handling `read` events on and sending `write` events to the channel specified as the `wschannel` parameter of the constructor. Firing a `close` event on that channel closes the connection in an orderly fashion (i.e. as specified by the WebSocket protocol).

Parameters

- **url** – the URL to connect to.
- **channel** – the channel used by this component
- **wschannel** – the channel used for the actual WebSocket communication (read, write, close events)
- **headers** – additional headers to be passed with the WebSocket setup HTTP request

channel = 'wsclient'

close()

connected

circuits.web.websockets.dispatcher module

class circuits.web.websockets.dispatcher.**WebSocketsDispatcher**(*path=None*, *wschannel='wsserver'*, **args*, ***kwargs*)

Bases: *circuits.core.components.BaseComponent*

This class implements an RFC 6455 compliant WebSockets dispatcher that handles the WebSockets handshake and upgrades the connection.

The dispatcher listens on its channel for `Request` events and tries to match them with a given path. Upon a match, the request is checked for the proper Opening Handshake information. If successful, the dispatcher confirms the establishment of the connection to the client. Any subsequent data from the client is handled as a WebSocket data frame, decoded and fired as a `Read` event on the `wschannel` passed to the constructor. The data from *write* events on that channel is encoded as data frames and forwarded to the client.

Firing a `Close` event on the `wschannel` closes the connection in an orderly fashion (i.e. as specified by the WebSocket protocol).

Parameters

- **path** – the path to handle. Requests that start with this path are considered to be WebSocket Opening Handshakes.
- **wschannel** – the channel on which `read` events from the client will be delivered and where *write* events to the client will be sent to.

channel = 'web'

Module contents

circuits.web websockets

Submodules

circuits.web.client module

circuits.web.client.**parse_url**(*url*)

exception circuits.web.client.**HTTPException**

Bases: `exceptions.Exception`

exception `circuits.web.client.`**`NotConnected`**
Bases: *`circuits.web.client.HTTPException`*

class `circuits.web.client.`**`request`**(*method*, *path*, *body=None*, *headers={}*)
Bases: *`circuits.core.events.Event`*

request Event

This Event is used to initiate a new request.

Parameters

- **`method`** (*`str`*) – HTTP Method (PUT, GET, POST, DELETE)
- **`url`** (*`str`*) – Request URL

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`name` **= 'request'**

class `circuits.web.client.`**`Client`**(*channel='client'*)
Bases: *`circuits.core.components.BaseComponent`*

`channel` **= 'client'**

`write`(*data*)

`close`()

`connect`(*event*, *host=None*, *port=None*, *secure=None*)

`request`(*method*, *url*, *body=None*, *headers={}*)

`connected`

`response`

circuits.web.constants module

Global Constants

This module implements required shared global constants.

circuits.web.controllers module

Controllers

This module implements ...

`circuits.web.controllers.`**`expose`**(**channels*, ***config*)

class `circuits.web.controllers.`**`ExposeMetaClass`**(*name*, *bases*, *dct*)
Bases: `type`

class `circuits.web.controllers.`**`BaseController`**(**args*, ***kwargs*)
Bases: *`circuits.core.components.BaseComponent`*

initializes x; see x.__class__.__doc__ for signature

`channel` **= '/'**

uri
Return the current Request URI

See also:

circuits.web.url.URL

forbidden (*description=None*)
Return a 403 (Forbidden) response

Parameters **description** (*str*) – Message to display

notfound (*description=None*)
Return a 404 (Not Found) response

Parameters **description** (*str*) – Message to display

redirect (*urls, code=None*)
Return a 30x (Redirect) response

Redirect to another location specified by urls with an optional custom response code.

Parameters

- **urls** (*str or list*) – A single URL or list of URLs
- **code** (*int*) – HTTP Redirect code

serve_file (*path, type=None, disposition=None, name=None*)

serve_download (*path, name=None*)

expires (*secs=0, force=False*)

class circuits.web.controllers.**Controller** (**args, **kwargs*)
Bases: *circuits.web.controllers.BaseController*

initializes x; see x.__class__.__doc__ for signature

circuits.web.controllers.**exposeJSON** (**channels, **config*)

class circuits.web.controllers.**ExposeJSONMetaClass** (*name, bases, dct*)
Bases: type

class circuits.web.controllers.**JSONController** (**args, **kwargs*)
Bases: *circuits.web.controllers.BaseController*

initializes x; see x.__class__.__doc__ for signature

circuits.web.errors module

Errors

This module implements a set of standard HTTP Errors.

class circuits.web.errors.**httperror** (*request, response, code=None, **kwargs*)
Bases: *circuits.core.events.Event*

An event for signaling an HTTP error

The constructor creates a new instance and modifies the *response* argument to reflect the error.

contenttype = 'text/html'

name = 'httperror'

code = 500

description = ‘’

sanitize()

class circuits.web.errors.**forbidden**(*request*, *response*, *code=None*, ***kwargs*)
Bases: *circuits.web.errors.httperror*

An event for signaling the HTTP Forbidden error

The constructor creates a new instance and modifies the *response* argument to reflect the error.

code = 403

name = ‘forbidden’

class circuits.web.errors.**unauthorized**(*request*, *response*, *code=None*, ***kwargs*)
Bases: *circuits.web.errors.httperror*

An event for signaling the HTTP Unauthorized error

The constructor creates a new instance and modifies the *response* argument to reflect the error.

code = 401

name = ‘unauthorized’

class circuits.web.errors.**notfound**(*request*, *response*, *code=None*, ***kwargs*)
Bases: *circuits.web.errors.httperror*

An event for signaling the HTTP Not Fouond error

The constructor creates a new instance and modifies the *response* argument to reflect the error.

code = 404

name = ‘notfound’

class circuits.web.errors.**redirect**(*request*, *response*, *urls*, *code=None*)
Bases: *circuits.web.errors.httperror*

An event for signaling the HTTP Redirect response

The constructor creates a new instance and modifies the *response* argument to reflect a redirect response to the given *url*.

name = ‘redirect’

circuits.web.events module

Events

This module implements the necessary Events needed.

class circuits.web.events.**request**(*Event*) → request Event
Bases: *circuits.core.events.Event*

args: request, response

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

success = True

failure = True

complete = True

name = 'request'

class `circuits.web.events.`**response**(*Event*) → response Event

Bases: *circuits.core.events.Event*

args: request, response

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.

- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to True, an associated event success (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to True, an associated event complete (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

success = True

failure = True

complete = True

name = 'response'

class circuits.web.events.**stream**(*Event*) → stream Event

Bases: *circuits.core.events.Event*

args: request, response

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to True, an associated event success (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

success = True

failure = True

complete = True

name = 'stream'

class `circuits.web.events.`**terminate**(**args*, ***kwargs*)

Bases: *circuits.core.events.Event*

terminate Event

An event is a message send to one or more channels. It is eventually dispatched to all components that have handlers for one of the channels and the event type.

All normal arguments and keyword arguments passed to the constructor of an event are passed on to the handler. When declaring a handler, its argument list must therefore match the arguments used for creating the event.

Every event has a *name* attribute that is used for matching the event with the handlers.

Variables

- ***channels*** – an optional attribute that may be set before firing the event. If defined (usually as a class variable), the attribute specifies the channels that the event should be delivered to as a tuple. This overrides the default behavior of sending the event to the firing component's channel.

  When an event is fired, the value in this attribute is replaced for the instance with the channels that the event is actually sent to. This information may be used e.g. when the event is passed as a parameter to a handler.
- ***value*** – this is a *circuits.core.values.Value* object that holds the results returned by the handlers invoked for the event.
- ***success*** – if this optional attribute is set to `True`, an associated event `success` (original name with "_success" appended) will automatically be fired when all handlers for the event have been invoked successfully.
- **success_channels** – the success event is, by default, delivered to same channels as the successfully dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.
- ***complete*** – if this optional attribute is set to `True`, an associated event `complete` (original name with "_complete" appended) will automatically be fired when all handlers for the event and all events fired by these handlers (recursively) have been invoked successfully.
- **complete_channels** – the complete event is, by default, delivered to same channels as the initially dispatched event itself. This may be overridden by specifying an alternative list of destinations using this attribute.

name = 'terminate'

circuits.web.exceptions module

Exceptions

This module implements a set of standard HTTP Errors as Python Exceptions.

Note: This code is mostly borrowed from werkzeug and adapted for circuits.web

exception `circuits.web.exceptions.`**`HTTPException`**`(`*description=None*, *traceback=None*`)`
Bases: `exceptions.Exception`

Baseclass for all HTTP exceptions. This exception can be called by WSGI applications to render a default error page or you can catch the subclasses of it independently and render nicer error messages.

`code` **= None**

`description` **= None**

`traceback` **= True**

`name`
The status name.

exception `circuits.web.exceptions.`**`BadRequest`**`(`*description=None*, *traceback=None*`)`
Bases: *`circuits.web.exceptions.HTTPException`*

400 Bad Request

Raise if the browser sends something to the application the application or server cannot handle.

`code` **= 400**

`description` **= '<p>The browser (or proxy) sent a request that this server could not understand.</p>'**

exception `circuits.web.exceptions.`**`UnicodeError`**`(`*description=None*, *traceback=None*`)`
Bases: *`circuits.web.exceptions.HTTPException`*

raised by the request functions if they were unable to decode the incoming data properly.

exception `circuits.web.exceptions.`**`Unauthorized`**`(`*description=None*, *traceback=None*`)`
Bases: *`circuits.web.exceptions.HTTPException`*

401 Unauthorized

Raise if the user is not authorized. Also used if you want to use HTTP basic auth.

`code` **= 401**

`description` **= "<p>The server could not verify that you are authorized to access the URL requested. You either suppli**

exception `circuits.web.exceptions.`**`Forbidden`**`(`*description=None*, *traceback=None*`)`
Bases: *`circuits.web.exceptions.HTTPException`*

403 Forbidden

Raise if the user doesn't have the permission for the requested resource but was authenticated.

`code` **= 403**

`description` **= "<p>You don't have the permission to access the requested resource. It is either read-protected or not r**

exception `circuits.web.exceptions.`**`NotFound`**`(`*description=None*, *traceback=None*`)`
Bases: *`circuits.web.exceptions.HTTPException`*

404 Not Found

Raise if a resource does not exist and never existed.

code = 404

description = ‘<p>The requested URL was not found on the server.</p><p>If you entered the URL manually please c

exception circuits.web.exceptions.**MethodNotAllowed**(*method*, *description=None*)

Bases: *circuits.web.exceptions.HTTPException*

405 Method Not Allowed

Raise if the server used a method the resource does not handle. For example *POST* if the resource is view only. Especially useful for REST.

The first argument for this exception should be a list of allowed methods. Strictly speaking the response would be invalid if you don’t provide valid methods in the header which you can do with that list.

code = 405

exception circuits.web.exceptions.**NotAcceptable**(*description=None*, *traceback=None*)

Bases: *circuits.web.exceptions.HTTPException*

406 Not Acceptable

Raise if the server can’t return any content conforming to the *Accept* headers of the client.

code = 406

description = ‘<p>The resource identified by the request is only capable of generating response entities which have co

exception circuits.web.exceptions.**RequestTimeout**(*description=None*, *traceback=None*)

Bases: *circuits.web.exceptions.HTTPException*

408 Request Timeout

Raise to signalize a timeout.

code = 408

description = “<p>The server closed the network connection because the browser didn’t finish the request within the

exception circuits.web.exceptions.**Gone**(*description=None*, *traceback=None*)

Bases: *circuits.web.exceptions.HTTPException*

410 Gone

Raise if a resource existed previously and went away without new location.

code = 410

description = ‘<p>The requested URL is no longer available on this server and there is no forwarding address.</p><p

exception circuits.web.exceptions.**LengthRequired**(*description=None*, *traceback=None*)

Bases: *circuits.web.exceptions.HTTPException*

411 Length Required

Raise if the browser submitted data but no `Content-Length` header which is required for the kind of processing the server does.

code = 411

description = ‘<p>A request with this method requires a valid <code>Content-Length</code> header.</p>’

exception circuits.web.exceptions.**PreconditionFailed**(*description=None*, *traceback=None*)

Bases: *circuits.web.exceptions.HTTPException*

412 Precondition Failed

Status code used in combination with `If-Match`, `If-None-Match`, or `If-Unmodified-Since`.

`code` **= 412**

`description` **= '<p>The precondition on the request for the URL failed positive evaluation.</p>'**

exception `circuits.web.exceptions.`**`RequestEntityTooLarge`**(*description=None*, *traceback=None*)

Bases: *`circuits.web.exceptions.HTTPException`*

413 Request Entity Too Large

The status code one should return if the data submitted exceeded a given limit.

`code` **= 413**

`description` **= '<p>The data value transmitted exceeds the capacity limit.</p>'**

exception `circuits.web.exceptions.`**`RequestURITooLarge`**(*description=None*, *traceback=None*)

Bases: *`circuits.web.exceptions.HTTPException`*

414 Request URI Too Large

Like *413* but for too long URLs.

`code` **= 414**

`description` **= '<p>The length of the requested URL exceeds the capacity limit for this server. The request cannot be p**

exception `circuits.web.exceptions.`**`UnsupportedMediaType`**(*description=None*, *traceback=None*)

Bases: *`circuits.web.exceptions.HTTPException`*

415 Unsupported Media Type

The status code returned if the server is unable to handle the media type the client transmitted.

`code` **= 415**

`description` **= '<p>The server does not support the media type transmitted in the request.</p>'**

exception `circuits.web.exceptions.`**`RangeUnsatisfiable`**(*description=None*, *traceback=None*)

Bases: *`circuits.web.exceptions.HTTPException`*

416 Range Unsatisfiable

The status code returned if the server is unable to satisfy the request range

`code` **= 416**

`description` **= '<p>The server cannot satisfy the request range(s).</p>'**

exception `circuits.web.exceptions.`**`InternalServerError`**(*description=None*, *traceback=None*)

Bases: *`circuits.web.exceptions.HTTPException`*

500 Internal Server Error

Raise if an internal server error occurred. This is a good fallback if an unknown error occurred in the dispatcher.

`code` **= 500**

`description` **= '<p>The server encountered an internal error and was unable to complete your request. Either the serv**

exception `circuits.web.exceptions.`**`NotImplemented`**(*description=None*, *traceback=None*)

Bases: *`circuits.web.exceptions.HTTPException`*

501 Not Implemented

Raise if the application does not support the action requested by the browser.

code = 501

description = '<p>The server does not support the action requested by the browser.</p>'

exception circuits.web.exceptions.**BadGateway**(*description=None*, *traceback=None*)

Bases: *circuits.web.exceptions.HTTPException*

502 Bad Gateway

If you do proxying in your application you should return this status code if you received an invalid response from the upstream server it accessed in attempting to fulfill the request.

code = 502

description = '<p>The proxy server received an invalid response from an upstream server.</p>'

exception circuits.web.exceptions.**ServiceUnavailable**(*description=None*, *traceback=None*)

Bases: *circuits.web.exceptions.HTTPException*

503 Service Unavailable

Status code you should return if a service is temporarily unavailable.

code = 503

description = '<p>The server is temporarily unable to service your request due to maintenance downtime or capacity

exception circuits.web.exceptions.**Redirect**(*urls*, *status=None*)

Bases: *circuits.web.exceptions.HTTPException*

code = 303

circuits.web.headers module

Headers Support

This module implements support for parsing and handling headers.

circuits.web.headers.**header_elements**(*fieldname*, *fieldvalue*)

Return a sorted HeaderElement list.

Returns a sorted HeaderElement list from a comma-separated header string.

class circuits.web.headers.**HeaderElement**(*value*, *params=None*)

Bases: object

An element (with parameters) from an HTTP header's element list.

static parse(*elementstr*)

Transform 'token;key=val' to ('token', {'key': 'val'}).

classmethod from_str(*elementstr*)

Construct an instance from a string of the form 'token;key=val'.

class circuits.web.headers.**AcceptElement**(*value*, *params=None*)

Bases: *circuits.web.headers.HeaderElement*

An element (with parameters) from an Accept* header's element list.

AcceptElement objects are comparable; the more-preferred object will be "less than" the less-preferred object. They are also therefore sortable; if you sort a list of AcceptElement objects, they will be listed in priority order; the most preferred value will be first. Yes, it should have been the other way around, but it's too late to fix now.

classmethod **`from_str`**(*elementstr*)

`qvalue`
The qvalue, or priority, of this value.

class `circuits.web.headers.`**`CaseInsensitiveDict`**(**args*, ***kwargs*)
Bases: `dict`

A case-insensitive dict subclass.

Each key is changed on entry to str(key).title().

`get`(*key*, *default=None*)

`update`(*E*)

classmethod **`fromkeys`**(*seq*, *value=None*)

`setdefault`(*key*, *x=None*)

`pop`(*key*, *default=None*)

class `circuits.web.headers.`**`Headers`**(**args*, ***kwargs*)
Bases: `circuits.web.headers.CaseInsensitiveDict`

`elements`(*key*)
Return a sorted list of HeaderElements for the given header.

`get_all`(*name*)
Return a list of all the values for the named field.

`append`(*key*, *value*)

`add_header`(*_name*, *_value*, ***_params*)
Extended header setting.

_name is the header field to add. keyword arguments can be used to set additional parameters for the header field, with underscores converted to dashes. Normally the parameter will be added as key="value" unless value is None, in which case only the key will be added.

Example:

h.add_header('content-disposition', 'attachment', filename='bud.gif')

Note that unlike the corresponding 'email.Message' method, this does *not* handle '(charset, language, value)' tuples: all values must be strings or None.

circuits.web.http module

Hyper Text Transfer Protocol

This module implements the server side Hyper Text Transfer Protocol or commonly known as HTTP.

class `circuits.web.http.`**`HTTP`**(*server*, *encoding='utf-8'*, *channel='web'*)
Bases: `circuits.core.components.BaseComponent`

HTTP Protocol Component

Implements the HTTP server protocol and parses and processes incoming HTTP messages, creating and sending an appropriate response.

The component handles `Read` events on its channel and collects the associated data until a complete HTTP request has been received. It parses the request's content and puts it in a `Request` object and creates a corresponding `Response` object. Then it emits a `Request` event with these objects as arguments.

The component defines several handlers that send a response back to the client.

channel = **'web'**

version

protocol

scheme

base

circuits.web.loggers module

Logger Component

This module implements Logger Components.

`circuits.web.loggers.`**`formattime`**()

class `circuits.web.loggers.`**`Logger`**(*file=None*, *logger=None*, ***kwargs*)

Bases: `circuits.core.components.BaseComponent`

channel = **'web'**

format = **'%(h)s %(l)s %(u)s %(t)s "%(r)s" %(s)s %(b)s "%(f)s" "%(a)s"'**

log_response(*response_event*, *value*)

log(*response*)

circuits.web.main module

Main

circutis.web Web Server and Testing Tool.

`circuits.web.main.`**`parse_options`**()

class `circuits.web.main.`**`Authentication`**(*channel='web'*, *realm=None*, *passwd=None*)

Bases: `circuits.core.components.Component`

channel = **'web'**

realm = **'Secure Area'**

users = **{'admin': '21232f297a57a5a743894a0e4a801fc3'}**

request(*event*, *request*, *response*)

class `circuits.web.main.`**`HelloWorld`**(**args*, ***kwargs*)

Bases: `circuits.core.components.Component`

initializes x; see x.__class__.__doc__ for signature

channel = **'web'**

request(*request*, *response*)

class `circuits.web.main.`**`Root`**(**args*, ***kwargs*)

Bases: `circuits.web.controllers.Controller`

initializes x; see x.__class__.__doc__ for signature

hello(*event*, **args*, ***kwargs*)

`circuits.web.main.`**`select_poller`**(*poller*)

`circuits.web.main.`**`parse_bind`**(*bind*)

`circuits.web.main.`**`main`**()

circuits.web.processors module

`circuits.web.processors.`**`process_multipart`**(*request*, *params*)

`circuits.web.processors.`**`process_urlencoded`**(*request*, *params*, *encoding='utf-8'*)

`circuits.web.processors.`**`process`**(*request*, *params*)

circuits.web.servers module

Web Servers

This module implements the several Web Server components.

class `circuits.web.servers.`**`BaseServer`**(*bind*, *encoding='utf-8'*, *secure=False*, *certfile=None*, *channel='web'*)

Bases: `circuits.core.components.BaseComponent`

Create a Base Web Server

Create a Base Web Server (HTTP) bound to the IP Address / Port or UNIX Socket specified by the 'bind' parameter.

Variables ***`server`*** – Reference to underlying Server Component

Parameters **`bind`** (*`Instance of int, list, tuple or str`*) – IP Address / Port or UNIX Socket to bind to.

The 'bind' parameter is quite flexible with what valid values it accepts.

If an int is passed, a TCPServer will be created. The Server will be bound to the Port given by the 'bind' argument and the bound interface will default (normally to "0.0.0.0").

If a list or tuple is passed, a TCPServer will be created. The Server will be bound to the Port given by the 2nd item in the 'bind' argument and the bound interface will be the 1st item.

If a str is passed and it contains the ':' character, this is assumed to be a request to bind to an IP Address / Port. A TCpServer will thus be created and the IP Address and Port will be determined by splitting the string given by the 'bind' argument.

Otherwise if a str is passed and it does not contain the ':' character, a file path is assumed and a UNIXServer is created and bound to the file given by the 'bind' argument.

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

`channel` = **'web'**

`host`

`port`

`secure`

class `circuits.web.servers.`**`Server`**(*bind*, ***kwargs*)

Bases: `circuits.web.servers.BaseServer`

Create a Web Server

Create a Web Server (HTTP) complete with the default Dispatcher to parse requests and posted form data dispatching to appropriate Controller(s).

See: circuits.web.servers.BaseServer

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

class `circuits.web.servers.`**`FakeSock`**

`getpeername``()`

class `circuits.web.servers.`**`StdinServer`**`(`*encoding='utf-8'*, *channel='web'*`)`
Bases: `circuits.core.components.BaseComponent`

`channel` **= 'web'**

`host`

`port`

`secure`

`read``(`*data*`)`

`write``(`*sock*, *data*`)`

circuits.web.sessions module

Session Components

This module implements Session Components that can be used to store and access persistent information.

`circuits.web.sessions.`**`who`**`(`*request*, *encoding='utf-8'*`)`
Create a SHA1 Hash of the User's IP Address and User-Agent

`circuits.web.sessions.`**`create_session`**`(`*request*`)`
Create a unique session id from the request

Returns a unique session using `uuid4()` and a `sha1()` hash of the users IP Address and User Agent in the form of `sid/who`.

`circuits.web.sessions.`**`verify_session`**`(`*request*, *sid*`)`
Verify a User's Session

This verifies the User's Session by verifying the SHA1 Hash of the User's IP Address and User-Agent match the provided Session ID.

class `circuits.web.sessions.`**`Sessions`**`(`*name='circuits.session'*, *channel='web'*`)`
Bases: `circuits.core.components.Component`

`channel` **= 'web'**

`load``(`*sid*`)`

`save``(`*sid*, *data*`)`
Save User Session Data for sid

`request``(`*request*, *response*`)`

circuits.web.tools module

Tools

This module implements tools used throughout circuits.web. These tools can also be used within Controlelrs and request handlers.

`circuits.web.tools.`**`expires`**(*request*, *response*, *secs=0*, *force=False*)

Tool for influencing cache mechanisms using the 'Expires' header.

'secs' must be either an int or a datetime.timedelta, and indicates the number of seconds between response.time and when the response should expire. The 'Expires' header will be set to (response.time + secs).

If 'secs' is zero, the 'Expires' header is set one year in the past, and the following "cache prevention" headers are also set: - 'Pragma': 'no-cache' - 'Cache-Control': 'no-cache, must-revalidate'

If 'force' is False (the default), the following headers are checked: 'Etag', 'Last-Modified', 'Age', 'Expires'. If any are already present, none of the above response headers are set.

`circuits.web.tools.`**`serve_file`**(*request*, *response*, *path*, *type=None*, *disposition=None*, *name=None*)

Set status, headers, and body in order to serve the given file.

The Content-Type header will be set to the type arg, if provided. If not provided, the Content-Type will be guessed by the file extension of the 'path' argument.

If disposition is not None, the Content-Disposition header will be set to "<disposition>; filename=<name>". If name is None, it will be set to the basename of path. If disposition is None, no Content-Disposition header will be written.

`circuits.web.tools.`**`serve_download`**(*request*, *response*, *path*, *name=None*)

Serve 'path' as an application/x-download attachment.

`circuits.web.tools.`**`validate_etags`**(*request*, *response*, *autotags=False*)

Validate the current ETag against If-Match, If-None-Match headers.

If autotags is True, an ETag response-header value will be provided from an MD5 hash of the response body (unless some other code has already provided an ETag header). If False (the default), the ETag will not be automatic.

WARNING: the autotags feature is not designed for URL's which allow methods other than GET. For example, if a POST to the same URL returns no content, the automatic ETag will be incorrect, breaking a fundamental use for entity tags in a possibly destructive fashion. Likewise, if you raise 304 Not Modified, the response body will be empty, the ETag hash will be incorrect, and your application will break. See http://www.w3.org/Protocols/rfc2616/rfc2616-sec14.html#sec14.24

`circuits.web.tools.`**`validate_since`**(*request*, *response*)

Validate the current Last-Modified against If-Modified-Since headers.

If no code has set the Last-Modified response header, then no validation will be performed.

`circuits.web.tools.`**`check_auth`**(*request*, *response*, *realm*, *users*, *encrypt=None*)

Check Authentication

If an Authorization header contains credentials, return True, else False.

Parameters

- **`realm`** (*`str`*) – The authentication realm.
- **`users`** (*`dict or callable`*) – A dict of the form: {username: password} or a callable returning a dict.

- **encrypt** (*callable*) – Callable used to encrypt the password returned from the user-agent. if None it defaults to a md5 encryption.

`circuits.web.tools.`**`basic_auth`**(*request*, *response*, *realm*, *users*, *encrypt=None*)
Perform Basic Authentication

If auth fails, returns an Unauthorized error with a basic authentication header.

Parameters

- **realm** (*str*) – The authentication realm.
- **users** (*dict or callable*) – A dict of the form: {username: password} or a callable returning a dict.
- **encrypt** (*callable*) – Callable used to encrypt the password returned from the user-agent. if None it defaults to a md5 encryption.

`circuits.web.tools.`**`digest_auth`**(*request*, *response*, *realm*, *users*)
Perform Digest Authentication

If auth fails, raise 401 with a digest authentication header.

Parameters

- **realm** (*str*) – The authentication realm.
- **users** (*dict or callable*) – A dict of the form: {username: password} or a callable returning a dict.

`circuits.web.tools.`**`gzip`**(*response, level=4, mime_types=['text/html', 'text/plain']*)
Try to gzip the response body if Content-Type in mime_types.

response.headers['Content-Type'] must be set to one of the values in the mime_types arg before calling this function.

No compression is performed if any of the following hold:

- The client sends no Accept-Encoding request header
- No 'gzip' or 'x-gzip' is present in the Accept-Encoding header
- No 'gzip' or 'x-gzip' with a qvalue > 0 is present
- The 'identity' value is given with a qvalue > 0.

circuits.web.url module

This is a module for dealing with urls. In particular, sanitizing them.

`circuits.web.url.`**`parse_url`**(*url*, *encoding='utf-8'*)
Parse the provided url string and return an URL object

class `circuits.web.url.`**`URL`**(*scheme*, *host*, *port*, *path*, *params=''*, *query=''*, *fragment=''*)
Bases: `object`

For more information on how and what we parse / sanitize: http://tools.ietf.org/html/rfc1808.html

The more up-to-date RFC is this one: http://www.ietf.org/rfc/rfc3986.txt

classmethod **`parse`**(*url*, *encoding*)
Parse the provided url, and return a URL instance

`equiv`(*other*)
Return true if this url is equivalent to another

canonical()
Canonicalize this url. This includes reordering parameters and args to have a consistent ordering

defrag()
Remove the fragment from this url

deparam(*params=None*)
Strip any of the provided parameters out of the url

abspath()
Clear out any '..' and excessive slashes from the path

lower()
Lowercase the hostname

sanitize()
A shortcut to abspath, escape and lowercase

escape()
Make sure that the path is correctly escaped

unescape()
Unescape the path

encode(*encoding*)
Return the url in an arbitrary encoding

relative(*path*, *encoding='utf-8'*)
Evaluate the new path relative to the current url

punycode()
Convert to punycode hostname

unpunycode()
Convert to an unpunycoded hostname

absolute()
Return True if this is a fully-qualified URL with a hostname and everything

unicode()
Return a unicode version of this url

utf8()
Return a utf-8 version of this url

circuits.web.utils module

Utilities

This module implements utility functions.

circuits.web.utils.**average**(*xs*)

circuits.web.utils.**variance**(*xs*)

circuits.web.utils.**stddev**(*xs*)

circuits.web.utils.**parse_body**(*request*, *response*, *params*)

circuits.web.utils.**parse_qs**(*query_string*) → dict
Build a params dictionary from a query_string. If keep_blank_values is True (the default), keep values that are blank.

`circuits.web.utils.`**`dictform`**(*form*)

`circuits.web.utils.`**`compress`**(*body*, *compress_level*)
Compress 'body' at the given compress_level.

`circuits.web.utils.`**`get_ranges`**(*headervalue*, *content_length*)
Return a list of (start, stop) indices from a Range header, or None.

Each (start, stop) tuple will be composed of two ints, which are suitable for use in a slicing operation. That is, the header "Range: bytes=3-6", if applied against a Python string, is requesting resource[3:7]. This function will return the list [(3, 7)].

If this function returns an empty list, you should return HTTP 416.

class `circuits.web.utils.`**`IOrderedDict`**(**args*, ***kwds*)
Bases: `dict`, `_abcoll.MutableMapping`

Dictionary that remembers insertion order with insensitive key

Initialize an ordered dictionary. Signature is the same as for regular dictionaries, but keyword arguments are not recommended because their insertion order is arbitrary.

`clear`() → None. Remove all items from od.

`get`(*key*, *default=None*)

`setdefault`(*k*[, *d*]) → D.get(k,d), also set D[k]=d if k not in D

`update`([*E*], ***F*) → None. Update D from mapping/iterable E and F.
If E present and has a .keys() method, does: for k in E: D[k] = E[k] If E present and lacks .keys() method, does: for (k, v) in E: D[k] = v In either case, this is followed by: for k, v in F.items(): D[k] = v

`pop`(*k*[, *d*]) → v, remove specified key and return the corresponding value.
If key is not found, d is returned if given, otherwise KeyError is raised.

`keys`() → list of D's keys

`values`() → list of D's values

`items`() → list of D's (key, value) pairs, as 2-tuples

`popitem`() → (k, v), return and remove a (key, value) pair.
Pairs are returned in LIFO order if last is true or FIFO order if false.

`copy`() → a shallow copy of od

classmethod `fromkeys`(*S*[, *v*]) → New ordered dictionary with keys from S
and values equal to v (which defaults to None).

`circuits.web.utils.`**`is_ssl_handshake`**(*buf*)
Detect an SSLv2 or SSLv3 handshake

circuits.web.wrappers module

Request/Response Wrappers

This module implements the Request and Response objects.

`circuits.web.wrappers.`**`file_generator`**(*input*, *chunkSize=4096*)

class `circuits.web.wrappers.`**`Host`**(*ip*, *port*, *name=None*)
Bases: `object`

An internet address.

name should be the client's host name. If not available (because no DNS lookup is performed), the IP address should be used instead.

`ip` = '0.0.0.0'

`port` = 80

`name` = 'unknown.tld'

class `circuits.web.wrappers.`**`HTTPStatus`**(*status=200*, *reason=None*)

Bases: `object`

`status`

`reason`

class `circuits.web.wrappers.`**`Request`**(*sock*, *method='GET'*, *scheme='http'*, *path='/'*, *protocol=(1, 1)*, *qs=''*, *headers=None*, *server=None*)

Bases: `object`

Creates a new Request object to hold information about a request.

Parameters

- **`sock`** (*`socket.socket`*) – The socket object of the request.
- **`method`** (*`str`*) – The requested method.
- **`scheme`** (*`str`*) – The requested scheme.
- **`path`** (*`str`*) – The requested path.
- **`protocol`** (*`str`*) – The requested protocol.
- **`qs`** (*`str`*) – The query string of the request.

initializes x; see x.__class__.__doc__ for signature

`index` = None

`script_name` = ''

`login` = None

`handled` = False

`scheme` = 'http'

`protocol` = (1, 1)

`server` = None

Cvar A reference to the underlying server

`remote` = Host('', 0, '')

`local` = Host('127.0.0.1', 80, '127.0.0.1')

`host` = ''

class `circuits.web.wrappers.`**`Body`**

Bases: `object`

Response Body

class `circuits.web.wrappers.`**`Status`**

Bases: `object`

Response Status

class `circuits.web.wrappers.`**`Response`**`(`*sock*, *request*`)` → new Response object
Bases: `object`

A Response object that holds the response to send back to the client. This ensure that the correct data is sent in the correct order.

initializes x; see x.__class__.__doc__ for signature

`body`
Response Body

`status`
Response Status

`done` **= False**

`close` **= False**

`stream` **= False**

`chunked` **= False**

`prepare``()`

circuits.web.wsgi module

WSGI Components

This module implements WSGI Components.

`circuits.web.wsgi.`**`create_environ`**`(`*errors*, *path*, *req*`)`

class `circuits.web.wsgi.`**`Application`**`(`**args*, ***kwargs*`)`
Bases: *`circuits.core.components.BaseComponent`*

initializes x; see x.__class__.__doc__ for signature

`channel` **= 'web'**

`headerNames` **= {'CONTENT_LENGTH': 'Content-Length', 'REMOTE_HOST': 'Remote-Host', 'CONTENT_TYPE':**

`init``()`

`translateHeaders``(`*environ*`)`

`getRequestResponse``(`*environ*`)`

`response``(`*event*, *response*`)`

`host`

`port`

`secure`

class `circuits.web.wsgi.`**`Gateway`**`(`**args*, ***kwargs*`)`
Bases: *`circuits.core.components.BaseComponent`*

initializes x; see x.__class__.__doc__ for signature

`channel` **= 'web'**

`init``(`*apps*`)`

Module contents

Circuits Library - Web

circuits.web contains the circuits full stack web server that is HTTP and WSGI compliant.

Submodules

circuits.six module

Utilities for writing code that runs on Python 2 and 3

`circuits.six.`**`byteindex`**(*data*, *index*)

`circuits.six.`**`iterbytes`**(*data*)

class `circuits.six.`**`MovedModule`**(*name*, *old*, *new=None*)
  Bases: `circuits.six._LazyDescr`

class `circuits.six.`**`MovedAttribute`**(*name*, *old_mod*, *new_mod*, *old_attr=None*, *new_attr=None*)
  Bases: `circuits.six._LazyDescr`

`circuits.six.`**`add_move`**(*move*)
  Add an item to six.moves.

`circuits.six.`**`remove_move`**(*name*)
  Remove item from six.moves.

`circuits.six.`**`create_bound_method`**(*function*, *instance*)

`circuits.six.`**`get_unbound_function`**(*unbound*)
  Get the function out of a possibly unbound function

class `circuits.six.`**`Iterator`**
  Bases: `object`

  `next`()

`circuits.six.`**`iterkeys`**(*d*)
  Return an iterator over the keys of a dictionary.

`circuits.six.`**`itervalues`**(*d*)
  Return an iterator over the values of a dictionary.

`circuits.six.`**`iteritems`**(*d*)
  Return an iterator over the (key, value) pairs of a dictionary.

`circuits.six.`**`b`**(*s*, *encoding='utf-8'*)
  Byte literal

`circuits.six.`**`u`**(*s*, *encoding='utf-8'*)
  Text literal

`circuits.six.`**`bytes_to_str`**(*s*)

`circuits.six.`**`reraise`**(*tp*, *value*, *tb=None*)
  Reraise an exception.

`circuits.six.`**`exec_`**(*code*, *globs=None*, *locs=None*)
  Execute code in a namespace.

`circuits.six.`**`print_`**(**args*, ***kwargs*)
  The new-style print function.

`circuits.six.`**`with_metaclass`**(*meta*, *base=<type 'object'>*)

Create a base class with a metaclass.

circuits.version module

Version Module

So we only have to maintain version information in one place!

Module contents

Lightweight Event driven and Asynchronous Application Framework

circuits is a **Lightweight Event** driven and **Asynchronous Application Framework** for the Python Programming Language with a strong **Component** Architecture.

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Developer Docs

So, you'd like to contribute to circuits in some way? Got a bug report? Having problems running the examples? Having problems getting circuits working in your environment?

Excellent. Here's what you need to know.

Development Introduction

Here's how we do things in circuits...

Communication

- IRC Channel on the FreeNode IRC Network
- Developer Mailing List
- Issue Tracker

Note: If you are familiar with IRC and use your own IRC Client then connect to the FreeNode Network and `/join #circuits`.

Standards

We use the following coding standard:

- pep8

We also lint our codebase with the following tools:

- pyflakes

- pep8
- mccabe

Please ensure your Development IDE or Editor has the above linters and checkers in place and enabled.

Alternatively you can use the following command line tool:

- flake8

Tools

We use the following tools to develop circuits and share code:

- **Code Sharing:** Mercurial
- **Code Hosting and Bug Reporting:** BitBucket GitHub (*Mirror Only*)
- **Issue Tracker:** Issue Tracker
- **Documentation Hosting:** Read the Docs
- **Package Hosting:** Python Package Index (PyPi)
- **Continuous Integration:** Drone

Contributing to circuits

Here's how you can contribute to circuits

Share your story

One of the best ways you can contribute to circuits is by using circuits. Share with us your story of how you've used circuits to solve a problem or create a new software solution using the circuits framework and library of components.

Submitting Bug Reports

We welcome all bug reports. We do however prefer bug reports in a clear and concise form with repeatable steps. One of the best ways you can report a bug to us is by writing a unit test (//similar to the ones in our tests//) so that we can verify the bug, fix it and commit the fix along with the test.

To submit a bug report, please use: http://bitbucket.org/circuits/circuits/issues

Writing new tests

We're not perfect, and we're still writing more tests to ensure quality code. If you'd like to help, please Fork circuits, write more tests that cover more of our code base and submit a Pull Request. Many Thanks!

Adding New Features

If you'd like to see a new feature added to circuits, then we'd like to hear about it~ We would like to see some discussion around any new features as well as valid use-cases. To start the discussions off, please either:

- Chat to us on #circuits on the FreeNode IRC Network

  or

- Submit a **New** Issue

Development Processes

We document all our internal development processes here so you know exactly how we work and what to expect. If you find any issues or problems please let us know!

Software Development Life Cycle (SDLC)

We employ the use of the SCRUM Agile Process and use our Issue Tracker to track features, bugs, chores and releases. If you wish to contribute to circuits, please familiarize yourself with SCRUM and *BitBucket <https://bitbucket.org/>*'s Issue Tracker.

Bug Reports

- New Bug Reports are submitted via: http://bitbucket.org/circuits/circuits/issues
- Confirmation and Discussion of all New Bug Reports.
- Once confirmed, a new Bug is raised in our Issue Tracker
- An appropriate milestone will be set (*depending on current milestone's schedule and resources*)
- A unit test developed that demonstrates the bug's failure.
- A fix developed that passes the unit test and breaks no others.
- A New Pull Request created with the fix.

  This must contains: - A new or modified unit test. - A patch that fixes the bug ensuring all unit tests pass. - The Change Log updated. - Appropriate documentation updated.
- The Pull Request is reviewed and approved by at least two other developers.

Feature Requests

- New Feature Requests are submitted via: http://bitbucket.org/circuits/circuits/issues
- Confirmation and Discussion of all New Feature Requests.
- Once confirmed, a new Feature is raised in our Issue Tracker
- An appropriate milestone will be set (*depending on current milestone's schedule and resources*)
- A unit test developed that demonstrates the new feature.
- The new feature developed that passes the unit test and breaks no others.
- A New Pull Request created with the fix.

  This must contains: - A new or modified unit test. - A patch that implements the new feature ensuring all unit tests pass. - The Change Log updated. - Appropriate documentation updated.
- The Pull Request is reviewed and approved by at least two other developers.

Writing new Code

- Submit a New Issue
- Write your code.
- Use flake8 to ensure code quality.
- Run the tests:

  ```
  $ tox
  ```

- Ensure any new or modified code does not break existing unit tests.
- Update any relevant doc strings or documentation.
- Update the Change Log updated.
- Submit a New Pull Request.

Running the Tests

To run the tests you will need the following installed:

- tox installed as well as
- pytest-cov
- pytest

All of these can be installed via `easy_install` or `pip`.

Please also ensure that you you have all supported versions of Python that circuits supports installed in your local environment.

To run the tests:

```
$ tox
```

Development Standards

We use the following development standards:

Cyclomatic Complexity

- Code Complexity shall not exceed `10`

  See: Limiting Cyclomatic Complexity

Coding Style

- Code shall confirm to the PEP8 Style Guide.

Note: This includes the 79 character limit!

- Doc Strings shall confirm to the PEP257 Convention.

Note: Arguments, Keyword Arguments, Return and Exceptions must be documented with the appropriate Sphinx‘Python Domain <http://sphinx-doc.org/latest/domains.html#the-python-domain>‘_.

Revision History

- Commits shall be small tangible pieces of work. - Each commit must be concise and manageable. - Large changes are to be done over smaller commits.
- There shall be no commit squashing.
- Rebase your changes as often as you can.

Unit Tests

- Every new feature and bug fix must be accompanied with a unit test. (*The only exception to this are minor trivial changes*).

Change Log

- #94: Modified the `circuits.web.Logger` to use the `response_success` event.
- #98: Dockerized circuits. See: https://docker.io/
- #99: Added Digest Auth support to the `circuits.web` CLI Tool
- #103: Added the firing of a `disconnect` event for the WebSocketsDispatcher.
- #108: Improved server support for the IRC Protocol.
- #112: Improved Signal Handling
- #37: Fixed a typo in `File`
- #38: Guard against invalid headers. (circuits.web)
- #46: Set `Content-Type` header on response for errors. (circuits.web)
- #48: Allow `event` to be passed to the decorated function (*the request handler*) for circuits.web
- #45: Fixed use of `cmp()` and `__cmp__()` for Python 3 compatibility.
- #56: circuits.web HEAD request send response body web
- #62: Fix packaging and bump circuits 1.5.1 for @dsuch (*Dariusz Suchojad*) for Zato
- #53: WebSocketClient treating WebSocket data in same TCP segment as HTTP response as part the HTTP response. web
- #67: web example jsontool is broken on python3 web
- #77: Uncaught exceptions Event collides with sockets and others core
- #81: “index” method not serving / web
- #76: Missing unit test for DNS lookup failures net
- #66: web examples jsonserializer broken web
- #59: circuits.web DoS in serve_file (remote denial of service) web

- #91: Call/Wait and specific instances of events
- #89: Class attribtues that reference methods cause duplicate event handlers core
- #47: Dispatcher does not fully respect optional arguments. web
- #97: Fixed `tests.net.test_tcp.test_lookup_failure` test for Windows
- #100: Fixed returned Content-Type in JSON-RPC Dispatcher.
- #102: Fixed minor bug with WebSocketsDispatcher causing superflusous `connect()` events from being fired.
- #104: Prevent other websockets sessions from closing.
- #106: Added `__format__` method to circuits.web.wrappers.HTTPStatus.
- #107: Added `__le__` and `__ge__` methods to `circuits.web.wrappers.HTTPStatus`
- #109: Fixed `Event.create()` factory and metaclass.
- #111: Fixed broken Digest Auth Test for circuits.web
- #63: typos in documentation docs
- #60: meantion @handler decorator in tutorial docs
- #65: Update tutorial to match circuits 3.0 API(s) and Semantics docs
- #69: Merge #circuits-dev FreeNode Channel into #circuits
- #75: Document and show examples of using circuits.tools docs
- #70: Convention around method names of event handlers
- #72: Update Event Filtering section of Users Manual docs
- #73: Fix duplication in auto generated API Docs. docs
- #78: Migrate Change Log maintenance and build to Releases
- #71: Document the value_changed event docs
- #92: Update circuitsframework.com content docs
- #88: Document the implicit registration of components attached as class attributes docs
- #87: A rendered example of `circuits.tools.graph()`. docs
- #85: Migrate away from ShiningPanda
- #61: circuits.web documentation enhancements docs
- #86: Telnet Tutorial
- #95: Updated Developer Documentation with corrections and a new workflow.

Older Change Logs

For older Change Logs of previous versions of circuits please see the respective PyPi page(s):

- circuits-2.1.0
- circuits-2.0.1
- circuits-2.0.0
- circuits-1.6
- circuits-1.5

Road Map

Here's a list of upcoming releases of circuits in order of "next release first".

Each bullet point states a high level goal we're trying to achieve for the release whilst the "Issues List" (*linked to our Issue Tracker*) lists specific issues we've tagged with the respective milestone.

Note: At this stage we don't have any good estimates for our milestones but we hope we can improve this with future releases and start adding estimates here.

circuits 3.0

- Improved Documentation
- Improved Test Suite
- More regular release cycle

See also:

circuits 3.0 milestone

circuits 3.1

- Improved circuits.web

See also:

circuits 3.1 milestone

Contributors

circuits was originally designed, written and primarily maintained by James Mills (http://prologic.shortcircuit.net.au/).

The following users and developers have contributed to circuits:

- Alessio Deiana
- Dariusz Suchojad
- Tim Miller
- Holger Krekel
- Justin Giorgi
- Edwin Marshall
- Alex Mayfield
- Toni Alatalo
- Michael Lipp

Anyone not listed here (*apologies as this list is taken directly from Mercurial's churn command and output*). We appreciate any and all contributions to circuits.

Frequently Asked Questions

General

... What is circuits? circuits is an event-driven framework with a high focus on Component architectures making your life as a software developer much easier. circuits allows you to write maintainable and scalable systems easily

... Can I write networking applications with circuits? Yes absolutely. circuits comes with socket I/O components for tcp, udp and unix sockets with asynchronous polling implementations for select, poll, epoll and kqueue.

... Can I integrate circuits with a GUI library? This is entirely possible. You will have to hook into the GUI's main loop.

... What are the core concepts in circuits? Components and Events. Components are maintainable reusable units of behavior that communicate with other components via a powerful message passing system.

... How would you compare circuits to Twisted? Others have said that circuits is very elegant in terms of it's usage. circuits' component architecture allows you to define clear interfaces between components while maintaining a high level of scalability and maintainability.

... Can Components communicate with other processes? Yes. circuits implements currently component bridging and nodes

... What platforms does circuits support? circuits currently supports Linux, FreeBSD, OSX and Windows and is currently continually tested against Linux and Windows against Python versions 2.6, 2.7, 3.1 and 3.2

... Can circuits be used for concurrent or distributed programming? Yes. We also have plans to build more distributed components into circuits making distributing computing with circuits very trivial.

Got more questions?

- Send an email to our Mailing List.
- Talk to us online on the #circuits IRC Channel

Glossary

VCS Version Control System, what you use for versioning your source code

Hello

Download Source Code: `hello.py`:

Echo Server

Download Source Code: `echoserver.py`:

Hello Web

Download Source Code: `helloweb.py`:

More examples...

CHAPTER 3

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