CherryPy

A Minimalist Python Web Framework

Contenu

Introduction

https://pypi.python.org/pypi/CherryPy

http://docs.cherrypy.org/en/latest/

http://sametmax.com/utiliser-cherrypy-serveur-web-leger-avec-bottle-framework-leger/

https://mathsp.tuxfamily.org/spip.php?rubrique110

Homepage

http://cherrypy.org/

CherryPy is as easy as…

```
import cherrypy

class HelloWorld(object):
    def index(self):
        return "Hello World!"
    index.exposed = True

cherrypy.quickstart(HelloWorld())
```

CherryPy is a pythonic, object-oriented web framework

CherryPy allows developers to build web applications in much the same way they would build any other object-oriented Python program. This results in smaller source code developed in less time.

CherryPy is now more than ten years old and it is has proven to be very fast and stable. It is being used in production by many sites, from the simplest to the most demanding.

Features

- A reliable, HTTP/1.1-compliant, WSGI thread-pooled webserver.
- Easy to run multiple HTTP servers (e.g. on multiple ports) at once.
- A powerful configuration system for developers and deployers alike.
- A flexible plugin system.
- Built-in tools for caching, encoding, sessions, authentication, static content, and many more.
- Swappable and customizable...everything.
- Built-in profiling, coverage, and testing support.
- Runs on Python 2.7+, 3.1+, PyPy, Jython and Android.

Online tests

Each time we change our codebase, a test runs so you can see the results here.

CherryPy-10.1.1-py2.py3-none-any.whl

https://pypi.python.org/pypi/CherryPy

Welcome to the GitHub repository of CherryPy!

CherryPy is a pythonic, object-oriented HTTP framework.

1. It allows building web applications in much the same way one would build any other object-oriented program.
2. This design results in less and more readable code being developed faster. It's all just properties and methods.
3. It is now more than ten years old and has proven fast and very stable.
4. It is being used in production by many sites, from the simplest to the most demanding.
5. And perhaps most importantly, it is fun to work with :-)

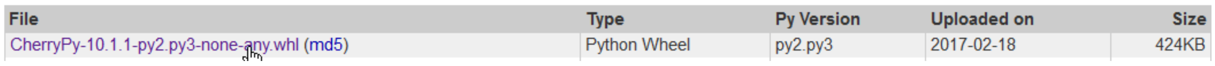
Here's how easy it is to write "Hello World" in CherryPy:

```
import cherrypy

class HelloWorld(object):
    @cherrypy.expose
    def index(self):
        return "Hello World!"

cherrypy.quickstart(HelloWorld())
```

And it continues to work that intuitively when systems grow, allowing for the Python object model to be dynamically presented as a web site and/or API.

While CherryPy is one of the easiest and most intuitive frameworks out there, the prerequisite for understanding the CherryPy documentation is that you have a general understanding of Python and web development. Additionally:

- Tutorials are included in the repository: https://github.com/cherrypy/cherrypy/tree/master/cherrypy/tutorial
- A general wiki at(will be moved to github): https://bitbucket.org/cherrypy/cherrypy/wiki/Home
- Plugins are described at: http://tools.cherrypy.org/



File	Type	Py Version	Uploaded on	Size
CherryPy-10.1.1-py2.py3-none-any.whl (md5)	Python Wheel	py2.py3	2017-02-18	424KB

https://pypi.python.org/packages/04/7e/08857376cdd0302ac4b0167f7a29d089a1b2610f91f368aa83d2bd4e346a/CherryPy-10.1.1-py2.py3-none-any.whl#md5=8b0b9da04d28cf1c270453b75eeb43a2

Utiliser Cherrypy (serveur web léger) avec Bottle

http://sametmax.com/utiliser-cherrypy-serveur-web-leger-avec-bottle-framework-leger/

Pour les sites/app qu'on developpe en une journée, Bottle et Cherrypy sont deux larons en foire qui s'accouplent parfaitement…

Rappel:

Bottle: Framework python light, allez voir "Créer un site avec bottle en 5 minutes"
Cherrypy: Framework python light + serveur web

Une bonne Pip pour commencer:

```
monsieur@fion:~# pip install cherrypy
```

Dans votre fichier start.py:

```
run(host='0.0.0.0', port=80, server='cherrypy')
```

Note: le 0.0.0.0 permet d'acceder à votre site depuis l'extérieur.

Pour lancer en daemon vous pouvez utiliser supervisord **ou** faire un script dans le répertoire où se trouve *start.py* de votre projet et y coller:

```
#! /bin/sh

### Run server in daemon mode
nohup python start.py &
```

Plusieurs serveurs web sur la même machine:
Si vous avez un autre serveur web qui tourne sur votre machine et qui vous empêche de lancer cherrypy sur le port 80 vous pouvez utiliser nginx en proxy. Pour ce faire modifiez le port de cherrypy dans votre fichier *start.py* (voir plus haut) et réglez-le sur 7777 par exemple avec un host 127.0.0.1.
Ouvrez un fichier de conf nginx et copiez ceci:

```
upstream monsite_cherrypy {
    server 127.0.0.1:7777;
}

server {
        listen        80;
        server_name monsite.com www.monsite.com ;

        location /favicon.ico {
            root  /home/monsite/static/img;
        }

        location / {
            proxy_pass http://monsite_cherrypy;
        }

}
```

Relancez Nginx (service nginx restart). Et votre site est en place. C’est ce qu’on utilise pour multiboards par exemple.

C’est rapide et simple et ça peut tenir pas mal de visiteurs. ça évite d’installer des trucs lourds avec 3 tonnes de config.

Les Maths Libres

https://mathsp.tuxfamily.org/spip.php?rubrique110

Cherrypy

Dernier ajout : 29 avril 2016.

Dans cette rubrique vous trouverez le peu de choses que je maîtrise de Cherrypy, une bibliothèque Python permet de créer un mini serveur web et les pages qui vont avec !

Trés léger et incroyable facile pour débuter. Pour le reste, ne m'en demandez pas trop ...

29 avril 2016 CherryPy, pour qui, pour quoi ?

Cherrypy, pour qui ?

- Si comme moi, vous n'y connaissez rien en php.
- Si vous maîtrisez convenablement Python.
- Si vous souhaitez héberger un petit site chez vous.

Cherrypy, pour quoi faire ?

- Faire tourner un site web en local en quelques minutes.
- Le rendre accessible depuis internet si vous voulez.
- Créer des pages web dynamiques en utilisant Python.
- Créer une interface web à vos projets Python.

Ça semble assez incroyable mais c'est pourtant possible. Et le principal intérêt de Cherrypy est d'être accessible aux débutants.

28 avril 2016 uploader un fichier

L'idée

Cet exemple consiste à montrer comment uploader un fichier vers le serveur.

Dans mon cas,

1. on choisit le fichier ;
2. on appuie sur "valider ;
3. les informations sur le fichier s'affiche en bas de cette page ;
4. un lien permet de visualiser le fichier ;
5. un autre lien permet de le télécharger.

En pratique, le programme commence par lire le fichier sélectionné. Ensuite, il le copie dans le serveur dans le dossier "static/upload".

Le code

```
import cherrypy, os


mapageIndex="""
<html>
<head>
<meta http-equiv="content-type" content="text/html; charset=utf-8" />
<title>Illustration d'un upload</title>
</head>
<body>
<h2>
Uploader un fichier
</h2>
<hr>
<form action="index" method="post" enctype="multipart/form-data">
<br>
<input type="file" name="myFile"><br>
<br>
<input type="submit" name=boutonChoisir>
</form>
<hr>
"""

mapageUpload="""

<body>
<h2>
Informations sur le fichier
</h2>
Taille: %s<br>
Nom: %s<br>
Mime-type: %s
<br>
<br>
<a href=%s target="_blank">Visualiser le fichier</a>
<br>
<a href=%s download>T&eacute;l&eacute;charger le fichier</a>
"""

finpage="""
</body>
</html>
"""

class monSite():
      #----------------- index
      @cherrypy.expose
      def index(self,boutonChoisir=None,myFile=None):
            if boutonChoisir :
                  content = myFile.file.read()
                  nomFichier="./static/upload/" + myFile.filename
                  file = open (nomFichier,"wb")
                  file.write(content)
                  file.close()
                  return mapageIndex +mapageUpload % (len(content),
myFile.filename, myFile.content_type,nomFichier,nomFichier) + finpage
```

```
            else :
                  return mapageIndex + finpage

cherrypy.quickstart(monSite())
```

28 avril 2016 somme de deux entiers

Une projet, deux solutions

Je souhaite réaliser un site qui calcule la somme de deux entiers !!!!!!!! Sans commentaire SVP.

Dans la première solution, la page initiale contiendra un formulaire.
Son action associée créera une autre page pour le résultat.

Dans la deuxième solution, le résultat apparaîtra sur la page initiale.

Première solution

```
import cherrypy, os

class monSite:

      #----------------index
      @cherrypy.expose
      def index(self) :
            output="""
            <form action="somme" method="GET">
            <input type=number name="a" value=0> +
            <input type=number name="b" value=0>
            <input type="submit" value="=">
            </form>
            """
            return output



      #-------------- somme
      @cherrypy.expose
      def somme(self,a,b):
            output=str(int(a)+int(b))
            return output

cherrypy.quickstart(monSite())
```

Deuxième solution

```
import cherrypy, os

#----------------------------------
mapage="""
<h1>Somme de deux nombres</h1>
<p>Choisir vos deux entiers et cliquer sur le bouton.</p>
<form action="index" method="GET">
<input type=number name="a" value= %s> +
<input type=number name="b" value= %s>
<input type=submit name=bouton value="="> %s
</form>
```

```
<br>
<hr>
"""

class monSite:

	#---------------index
	@cherrypy.expose
	def index(self,a=None,b=None,bouton=None):
		if bouton:
			# on calcule la somme
			r = str(int(a)+int(b))
			output = mapage%(a,b,r)

		else:
			# questionnaire initiale
			output = mapage%("0","0","0")

		return output


cherrypy.quickstart(monSite())
```

27 avril 2016 Un début de configuration pour Cherrypy

Une arborescence

L'exemple de base tient en un fichier. mais pour un site plus complet, d'autres fichiers vont venir se rajouter.
Pour cela, une arborescence est utile pour s'y retrouver.

Supposons que mon dossier principal soit "/home/dlefur/Cherrypy/".
Dedans se trouve mon fichier **main.py**, mon fichier python à exécuter.

On peut au moins commencer par trois sous-dossiers :

- **config/** : contiendra le fichier de configuration **server.conf**.
- **favicon/** : contiendra **favicon.ico**.
- **public/** :contiendra d'autres sous-dossiers :
  - **css/**
  - **images/**
  - **pdf/**

Le fichier server.conf

```
[global]
server.socket_host : "0.0.0.0"  # pour rendre le site accessible à la fois
en local ou en public
server.socket_port : 2016       # le port choisi

[/]
tools.sessions.on : True
tools.staticdir.root: "/home/dlefur/Cherrypy/"

[/favicon.ico]
tools.staticfile.on : True
tools.staticfile.filename : "/home/dlefur/Cherrypy/favicon/favicon.ico"


[/style.css]
tools.staticfile.on : True
tools.staticfile.filename : "/home/dlefur/Cherrypy/static/css/style.css"

[/static]
tools.staticdir.on : True
tools.staticdir.dir : "static/"
```

Le css pourra être apelé par une commande :

```
<link rel="stylesheet" type="text/css" href="/style.css"
type="text/css"></link>
```

Mon nouveau Hello World

```
import cherrypy, os

#---------------- le site
class HelloWorld :
    #--------------------- la page par defaut
    @cherrypy.expose     # pour rendre la page disponible
    def index(self):
        return "Hello world!"

#----------------- lance le site en utilisant le fichier de configuration
configfile=os.path.join(os.path.dirname(__file__),"config/server.conf")
cherrypy.quickstart(HelloWorld(),config=configfile)
```

Cette fois-ci, le port a changé. C'est celui indiqué dans le fichier server.conf.
Dans le navigateur, l'adresse à utiliser sera : http://localhost:2016/.

Installation de Cherrypy

L'installation

Cherrypy est une bibliothèque Python. Son installation peut se faire par le paquet **pip** qu'il faut donc commencer par installer.

```
sudo-apt-get install python-pip
```

On peut alors installer Cherrypy :

```
pip install cherrypy
```

L’exemple de base

Il suffit de créer un fichier **hello.py** :

```
import cherrypy

#----------------- le site
class HelloWorld :
    #---------------------- la page par defaut
    @cherrypy.expose     # pour rendre la page disponible
    def index(self):
        return "Hello world!"

#------------------ lance le site
cherrypy.quickstart(HelloWorld())
```

Dans un terminal, se placer dans le dossier contenant le fichier **hello.py** et lancer la commande :

```
python hello.py
```

Dans un navigateur, rentrer l’adresse : http://localhost:8080/.
Et puis c’est tout !

Doc.cherrypy.org

http://docs.cherrypy.org/en/latest/intro.html

Foreword

Why CherryPy?

CherryPy is among the oldest web framework available for Python, yet many people aren't aware of its existence. One of the reason for this is that CherryPy is not a complete stack with built-in support for a multi-tier architecture. It doesn't provide frontend utilities nor will it tell you how to speak with your storage. Instead, CherryPy's take is to let the developer make those decisions. This is a contrasting position compared to other well-known frameworks.

CherryPy has a clean interface and does its best to stay out of your way whilst providing a reliable scaffolding for you to build from.

Typical use-cases for CherryPy go from regular web application with user frontends (think blogging, CMS, portals, ecommerce) to web-services only.

Here are some reasons you would want to choose CherryPy:

1. Simplicity

   Developing with CherryPy is a simple task. "Hello, world" is only a few lines long, and does not require the developer to learn the entire (albeit very manageable) framework all at once. The framework is very pythonic; that is, it follows Python's conventions very nicely (code is sparse and clean).

   Contrast this with J2EE and Python's most popular and visible web frameworks: Django, Zope, Pylons, and Turbogears. In all of them, the learning curve is massive. In these frameworks, "Hello, world" requires the programmer to set up a large scaffold which spans multiple files and to type a lot of boilerplate code. CherryPy succeeds because it does not include the bloat of other frameworks, allowing the programmer to write their web application quickly while still maintaining a high level of organization and scalability.

   CherryPy is also very modular. The core is fast and clean, and extension features are easy to write and plug in using code or the elegant config system. The primary components (server, engine, request, response, etc.) are all extendable (even replaceable) and well-managed.

   In short, CherryPy empowers the developer to work with the framework, not against or around it.

2. Power

   CherryPy leverages all of the power of Python. Python is a dynamic language which allows for rapid development of applications. Python also has an extensive built-in API which simplifies web app development. Even more extensive, however, are the third-party libraries available for Python. These range from object-relational mappers to form libraries, to an automatic Python optimizer, a Windows exe generator, imaging libraries, email support, HTML templating engines, etc. CherryPy applications are just like regular Python applications. CherryPy does not stand in your way if you want to use these brilliant tools.

   CherryPy also provides tools and plugins, which are powerful extension points needed to develop world-class web applications.

3. Maturity

   Maturity is extremely important when developing a real-world application. Unlike many other web frameworks, CherryPy has had many final, stable releases. It is fully bugtested, optimized, and proven reliable for real-world use. The API will not suddenly change and break backwards compatibility, so your applications are assured to continue working even through subsequent updates in the current version series.

   CherryPy is also a “3.0” project: the first edition of CherryPy set the tone, the second edition made it work, and the third edition makes it beautiful. Each version built on lessons learned from the previous, bringing the developer a superior tool for the job.

4. Community

   CherryPy has an devoted community that develops deployed CherryPy applications and are willing and ready to assist you on the CherryPy mailing list or IRC (#cherrypy on OFTC). The developers also frequent the list and often answer questions and implement features requested by the end-users.

5. Deployability

   Unlike many other Python web frameworks, there are cost-effective ways to deploy your CherryPy application.

   Out of the box, CherryPy includes its own production-ready HTTP server to host your application. CherryPy can also be deployed on any WSGI-compliant gateway (a technology for interfacing numerous types of web servers): mod_wsgi, FastCGI, SCGI, IIS, uwsgi, tornado, etc. Reverse proxying is also a common and easy way to set it up.

   In addition, CherryPy is pure-python and is compatible with Python 2.3. This means that CherryPy will run on all major platforms that Python will run on (Windows, MacOSX, Linux, BSD, etc).

   webfaction.com, run by the inventor of CherryPy, is a commercial web host that offers CherryPy hosting packages (in addition to several others).

6. It’s free!

   All of CherryPy is licensed under the open-source BSD license, which means CherryPy can be used commercially for ZERO cost.

7. Where to go from here?

   Check out the tutorials to start enjoying the fun!

Installation

CherryPy is a pure Python library. This has various consequences:

- It can run anywhere Python runs
- It does not require a C compiler
- It can run on various implementations of the Python language: CPython, IronPython, Jython and PyPy

Contents

Requirements

CherryPy does not have any mandatory requirements. However certain features it comes with will require you install certain packages. To simplify installing additional dependencies CherryPy enables you to specify extras in your requirements (e.g. `cherrypy[json,routes_dispatcher,ssl]`): - doc – for documentation related stuff - json – for custom JSON processing library - routes_dispatcher – routes for declarative URL mapping dispatcher - ssl – for OpenSSL bindings, useful in Python environments not having the builtin `ssl` module - testing - memcached_session – enables memcached backend session - xcgi

Supported python version

CherryPy supports Python 2.7 through to 3.5.

Installing

CherryPy can be easily installed via common Python package managers such as setuptools or pip.

```
$ easy_install cherrypy
$ pip install cherrypy
```

You may also get the latest CherryPy version by grabbing the source code from Github:

```
$ git clone https://github.com/cherrypy/cherrypy
$ cd cherrypy
$ python setup.py install
```

Test your installation

CherryPy comes with a set of simple tutorials that can be executed once you have deployed the package.

```
$ python -m cherrypy.tutorial.tut01_helloworld
```

Point your browser at http://127.0.0.1:8080 and enjoy the magic.

Once started the above command shows the following logs:

```
[15/Feb/2014:21:51:22] ENGINE Listening for SIGHUP.
[15/Feb/2014:21:51:22] ENGINE Listening for SIGTERM.
[15/Feb/2014:21:51:22] ENGINE Listening for SIGUSR1.
[15/Feb/2014:21:51:22] ENGINE Bus STARTING
[15/Feb/2014:21:51:22] ENGINE Started monitor thread 'Autoreloader'.
[15/Feb/2014:21:51:22] ENGINE Started monitor thread '_TimeoutMonitor'.
[15/Feb/2014:21:51:22] ENGINE Serving on http://127.0.0.1:8080
[15/Feb/2014:21:51:23] ENGINE Bus STARTED
```

We will explain what all those lines mean later on, but suffice to know that once you see the last two lines, your server is listening and ready to receive requests.

Run it

During development, the easiest path is to run your application as follow:

```
$ python myapp.py
```

As long as *myapp.py* defines a *"__main__"* section, it will run just fine.

cherryd

Another way to run the application is through the `cherryd` script which is installed along side CherryPy.

Note

This utility command will not concern you if you embed your application with another framework.

Command-Line Options

`-c, --config`

Specify config file(s)

`-d`

Run the server as a daemon

`-e, --environment`

Apply the given config environment (defaults to None)

`-f`

Start a FastCGI server instead of the default HTTP server

`-s`

Start a SCGI server instead of the default HTTP server

`-i, --import`

Specify modules to import

`-p, --pidfile`

Store the process id in the given file (defaults to None)

`-P, --Path`

Add the given paths to sys.path

Doc.cherrypy.org : Tutorials

This tutorial will walk you through basic but complete CherryPy applications that will show you common concepts as well as slightly more advanced ones.

Contents

Tutorial 1: A basic web application

The following example demonstrates the most basic application you could write with CherryPy. It starts a server and hosts an application that will be served at request reaching http://127.0.0.1:8080/

```
import cherrypy


class HelloWorld(object):
    @cherrypy.expose
    def index(self):
        return "Hello world!"


if __name__ == '__main__':
    cherrypy.quickstart(HelloWorld())
```

Store this code snippet into a file named *tut01.py* and execute it as follows:

```
$ python tut01.py
```

This will display something along the following:

```
[24/Feb/2014:21:01:46] ENGINE Listening for SIGHUP.
[24/Feb/2014:21:01:46] ENGINE Listening for SIGTERM.
```

```
[24/Feb/2014:21:01:46] ENGINE Listening for SIGUSR1.
[24/Feb/2014:21:01:46] ENGINE Bus STARTING
CherryPy Checker:
The Application mounted at '' has an empty config.

[24/Feb/2014:21:01:46] ENGINE Started monitor thread 'Autoreloader'.
[24/Feb/2014:21:01:46] ENGINE Started monitor thread '_TimeoutMonitor'.
[24/Feb/2014:21:01:46] ENGINE Serving on http://127.0.0.1:8080
[24/Feb/2014:21:01:46] ENGINE Bus STARTED
```

This tells you several things. The first three lines indicate the server will handle `signal` for you. The next line tells you the current state of the server, as that point it is in *STARTING* stage. Then, you are notified your application has no specific configuration set to it. Next, the server starts a couple of internal utilities that we will explain later. Finally, the server indicates it is now ready to accept incoming communications as it listens on the address *127.0.0.1:8080*. In other words, at that stage your application is ready to be used.

Before moving on, let's discuss the message regarding the lack of configuration. By default, CherryPy has a feature which will review the syntax correctness of settings you could provide to configure the application. When none are provided, a warning message is thus displayed in the logs. That log is harmless and will not prevent CherryPy from working. You can refer to the documentation above to understand how to set the configuration.

Tutorial 2: Different URLs lead to different functions

Your applications will obviously handle more than a single URL. Let's imagine you have an application that generates a random string each time it is called:

```
import random
import string

import cherrypy


class StringGenerator(object):
    @cherrypy.expose
    def index(self):
        return "Hello world!"

    @cherrypy.expose
    def generate(self):
        return ''.join(random.sample(string.hexdigits, 8))


if __name__ == '__main__':
    cherrypy.quickstart(StringGenerator())
```

Save this into a file named *tut02.py* and run it as follows:

```
$ python tut02.py
```

Go now to http://localhost:8080/generate and your browser will display a random string.

Let's take a minute to decompose what's happening here. This is the URL that you have typed into your browser: http://localhost:8080/generate

This URL contains various parts:

- *http://* which roughly indicates it's a URL using the HTTP protocol (see **RFC 2616**).
- *localhost:8080* is the server's address. It's made of a hostname and a port.
- */generate* which is the path segment of the URL. This is what CherryPy uses to locate an exposed function or method to respond.

Here CherryPy uses the *index()* method to handle */* and the *generate()* method to handle */generate*

Tutorial 3: My URLs have parameters

In the previous tutorial, we have seen how to create an application that could generate a random string. Let's now assume you wish to indicate the length of that string dynamically.

```
import random
import string

import cherrypy


class StringGenerator(object):
    @cherrypy.expose
    def index(self):
        return "Hello world!"

    @cherrypy.expose
    def generate(self, length=8):
        return ''.join(random.sample(string.hexdigits, int(length)))


if __name__ == '__main__':
    cherrypy.quickstart(StringGenerator())
```

Save this into a file named *tut03.py* and run it as follows:

```
$ python tut03.py
```

Go now to http://localhost:8080/generate?length=16 and your browser will display a generated string of length 16. Notice how we benefit from Python's default arguments' values to support URLs such as http://localhost:8080/generate still.

In a URL such as this one, the section after *?* is called a query-string. Traditionally, the query-string is used to contextualize the URL by passing a set of (key, value) pairs. The format for those pairs is *key=value*. Each pair being separated by a *&* character.

Notice how we have to convert the given *length* value to an integer. Indeed, values are sent out from the client to our server as strings.

Much like CherryPy maps URL path segments to exposed functions, query-string keys are mapped to those exposed function parameters.

Tutorial 4: Submit this form

CherryPy is a web framework upon which you build web applications. The most traditional shape taken by applications is through an HTML user-interface speaking to your CherryPy server.

Let's see how to handle HTML forms via the following example.

```
import random
import string

import cherrypy


class StringGenerator(object):
    @cherrypy.expose
    def index(self):
        return """<html>
          <head></head>
          <body>
            <form method="get" action="generate">
              <input type="text" value="8" name="length" />
              <button type="submit">Give it now!</button>
            </form>
          </body>
        </html>"""

    @cherrypy.expose
    def generate(self, length=8):
        return ''.join(random.sample(string.hexdigits, int(length)))


if __name__ == '__main__':
    cherrypy.quickstart(StringGenerator())
```

Save this into a file named *tut04.py* and run it as follows:

```
$ python tut04.py
```

Go now to http://localhost:8080/ and your browser and this will display a simple input field to indicate the length of the string you want to generate.

Notice that in this example, the form uses the *GET* method and when you pressed the *Give it now!* button, the form is sent using the same URL as in the previous tutorial. HTML forms also support the *POST* method, in that case the query-string is not appended to the URL but it sent as the body of the client's request to the server. However, this would not change your application's exposed method because CherryPy handles both the same way and uses the exposed's handler parameters to deal with the query-string (key, value) pairs.

Tutorial 5: Track my end-user’s activity

It’s not uncommon that an application needs to follow the user’s activity for a while. The usual mechanism is to use a session identifier that is carried during the conversation between the user and your application.

```
 1 import random
 2 import string
 3
 4 import cherrypy
 5
 6
 7 class StringGenerator(object):
 8     @cherrypy.expose
 9     def index(self):
10         return """<html>
11           <head></head>
12           <body>
13             <form method="get" action="generate">
14               <input type="text" value="8" name="length" />
15               <button type="submit">Give it now!</button>
16             </form>
17           </body>
18         </html>"""
19
20     @cherrypy.expose
21     def generate(self, length=8):
22         some_string = ''.join(random.sample(string.hexdigits, 
   int(length)))
23         cherrypy.session['mystring'] = some_string
24         return some_string
25
26     @cherrypy.expose
27     def display(self):
28         return cherrypy.session['mystring']
29
30
31 if __name__ == '__main__':
32     conf = {
33         '/': {
34             'tools.sessions.on': True
35         }
36     }
37     cherrypy.quickstart(StringGenerator(), '/', conf)
```

Save this into a file named *tut05.py* and run it as follows:

```
$ python tut05.py
```

In this example, we generate the string as in the previous tutorial but also store it in the current session. If you go to http://localhost:8080/, generate a random string, then go to http://localhost:8080/display, you will see the string you just generated.

The lines 30-34 show you how to enable the session support in your CherryPy application. By default, CherryPy will save sessions in the process’s memory. It supports more persistent backends as well.

Tutorial 6: What about my javascripts, CSS and images?

Web applications are usually also made of static content such as javascript, CSS files or images. CherryPy provides support to serve static content to end-users.

Let’s assume, you want to associate a stylesheet with your application to display a blue background color (why not?).

First, save the following stylesheet into a file named *style.css* and stored into a local directory *public/css*.

```
body {
  background-color: blue;
}
```

Now let’s update the HTML code so that we link to the stylesheet using the http://localhost:8080/static/css/style.css URL.

```
import os, os.path
import random
import string

import cherrypy


class StringGenerator(object):
    @cherrypy.expose
    def index(self):
        return """<html>
          <head>
            <link href="/static/css/style.css" rel="stylesheet">
          </head>
          <body>
            <form method="get" action="generate">
              <input type="text" value="8" name="length" />
              <button type="submit">Give it now!</button>
            </form>
          </body>
        </html>"""

    @cherrypy.expose
    def generate(self, length=8):
        some_string = ''.join(random.sample(string.hexdigits,
int(length)))
        cherrypy.session['mystring'] = some_string
        return some_string

    @cherrypy.expose
    def display(self):
        return cherrypy.session['mystring']


if __name__ == '__main__':
    conf = {
        '/': {
            'tools.sessions.on': True,
            'tools.staticdir.root': os.path.abspath(os.getcwd())
        },
        '/static': {
            'tools.staticdir.on': True,
            'tools.staticdir.dir': './public'
        }
    }
    cherrypy.quickstart(StringGenerator(), '/', conf)
```

Save this into a file named *tut06.py* and run it as follows:

```
$ python tut06.py
```

Going to http://localhost:8080/, you should be greeted by a flashy blue color.

CherryPy provides support to serve a single file or a complete directory structure. Most of the time, this is what you'll end up doing so this is what the code above demonstrates. First, we indicate the *root* directory of all of our static content. This must be an absolute path for security reason. CherryPy will complain if you provide only relative paths when looking for a match to your URLs.

Then we indicate that all URLs which path segment starts with */static* will be served as static content. We map that URL to the *public* directory, a direct child of the *root* directory. The entire sub-tree of the *public* directory will be served as static content. CherryPy will map URLs to path within that directory. This is why */static/css/style.css* is found in *public/css/style.css*.

Tutorial 7: Give us a REST

It's not unusual nowadays that web applications expose some sort of datamodel or computation functions. Without going into its details, one strategy is to follow the REST principles edicted by Roy T. Fielding.

Roughly speaking, it assumes that you can identify a resource and that you can address that resource through that identifier.

"What for?" you may ask. Well, mostly, these principles are there to ensure that you decouple, as best as you can, the entities your application expose from the way they are manipulated or consumed. To embrace this point of view, developers will usually design a web API that expose pairs of *(URL, HTTP method, data, constraints)*.

Note

You will often hear REST and web API together. The former is one strategy to provide the latter. This tutorial will not go deeper in that whole web API concept as it's a much more engaging subject, but you ought to read more about it online.

Lets go through a small example of a very basic web API mildly following REST principles.

```
import random
import string

```

```
 4 import cherrypy
 5
 6
 7 @cherrypy.expose
 8 class StringGeneratorWebService(object):
 9
10     @cherrypy.tools.accept(media='text/plain')
11     def GET(self):
12         return cherrypy.session['mystring']
13
14     def POST(self, length=8):
15         some_string = ''.join(random.sample(string.hexdigits,
16 int(length)))
17         cherrypy.session['mystring'] = some_string
18         return some_string
19
20     def PUT(self, another_string):
21         cherrypy.session['mystring'] = another_string
22
23     def DELETE(self):
24         cherrypy.session.pop('mystring', None)
25
26
27 if __name__ == '__main__':
28     conf = {
29         '/': {
30             'request.dispatch': cherrypy.dispatch.MethodDispatcher(),
31             'tools.sessions.on': True,
32             'tools.response_headers.on': True,
33             'tools.response_headers.headers': [('Content-Type',
34 'text/plain')],
35         }
       }
       cherrypy.quickstart(StringGeneratorWebService(), '/', conf)
```

Save this into a file named *tut07.py* and run it as follows:

```
$ python tut07.py
```

Before we see it in action, let’s explain a few things. Until now, CherryPy was creating a tree of exposed methods that were used to match URLs. In the case of our web API, we want to stress the role played by the actual requests’ HTTP methods. So we created methods that are named after them and they are all exposed at once by decorating the class itself with *cherrypy.expose*.

However, we must then switch from the default mechanism of matching URLs to method for one that is aware of the whole HTTP method shenanigan. This is what goes on line 27 where we create a `MethodDispatcher` instance.

Then we force the responses *content-type* to be *text/plain* and we finally ensure that *GET* requests will only be responded to clients that accept that *content-type* by having a *Accept: text/plain* header set in their request. However, we do this only for that HTTP method as it wouldn’t have much meaning on the other methods.

For the purpose of this tutorial, we will be using a Python client rather than your browser as we wouldn’t be able to actually try our web API otherwise.

Please install requests through the following command:

```
$ pip install requests
```

Then fire up a Python terminal and try the following commands:

```
   >>> import requests
 1 >>> s = requests.Session()
 2 >>> r = s.get('http://127.0.0.1:8080/')
 3 >>> r.status_code
 4 500
 5 >>> r = s.post('http://127.0.0.1:8080/')
 6 >>> r.status_code, r.text
 7 (200, u'04A92138')
 8 >>> r = s.get('http://127.0.0.1:8080/')
 9 >>> r.status_code, r.text
10 (200, u'04A92138')
11 >>> r = s.get('http://127.0.0.1:8080/', headers={'Accept':
12 'application/json'})
13 >>> r.status_code
14 406
15 >>> r = s.put('http://127.0.0.1:8080/', params={'another_string':
16 'hello'})
17 >>> r = s.get('http://127.0.0.1:8080/')
18 >>> r.status_code, r.text
19 (200, u'hello')
20 >>> r = s.delete('http://127.0.0.1:8080/')
21 >>> r = s.get('http://127.0.0.1:8080/')
22 >>> r.status_code
   500
```

The first and last *500* responses stem from the fact that, in the first case, we haven't yet generated a string through *POST* and, on the latter case, that it doesn't exist after we've deleted it.

Lines 12-14 show you how the application reacted when our client requested the generated string as a JSON format. Since we configured the web API to only support plain text, it returns the appropriate HTTP error code.

Note

We use the Session interface of *requests* so that it takes care of carrying the session id stored in the request cookie in each subsequent request. That is handy.

Important

It's all about RESTful URLs these days, isn't it?

It is likely your URL will be made of dynamic parts that you will not be able to match to page handlers. For example, `/library/12/book/15` cannot be directly handled by the default CherryPy dispatcher since the segments `12` and `15` will not be matched to any Python callable.

This can be easily workaround with two handy CherryPy features explained in the advanced section.

Tutorial 8: Make it smoother with Ajax

In the recent years, web applications have moved away from the simple pattern of “HTML forms + refresh the whole page”. This traditional scheme still works very well but users have become used to web applications that don’t refresh the entire page. Broadly speaking, web applications carry code performed client-side that can speak with the backend without having to refresh the whole page.

This tutorial will involve a little more code this time around. First, let’s see our CSS stylesheet located in *public/css/style.css*.

```
body {
  background-color: blue;
}

#the-string {
  display: none;
}
```

We’re adding a simple rule about the element that will display the generated string. By default, let’s not show it up. Save the following HTML code into a file named *index.html*.

```
<!DOCTYPE html>
<html>
  <head>
    <link href="/static/css/style.css" rel="stylesheet">
    <script src="http://code.jquery.com/jquery-2.0.3.min.js"></script>
    <script type="text/javascript">
      $(document).ready(function() {

        $("#generate-string").click(function(e) {
          $.post("/generator", {"length":
$("input[name='length']").val()})
            .done(function(string) {
              $("#the-string").show();
              $("#the-string input").val(string);
          });
          e.preventDefault();
        });

        $("#replace-string").click(function(e) {
          $.ajax({
            type: "PUT",
            url: "/generator",
            data: {"another_string": $("#the-string input").val()}
          })
          .done(function() {
            alert("Replaced!");
          });
          e.preventDefault();
        });

        $("#delete-string").click(function(e) {
          $.ajax({
            type: "DELETE",
            url: "/generator"
          })
          .done(function() {
            $("#the-string").hide();
          });
          e.preventDefault();
        });

      });
    </script>
  </head>
  <body>
    <input type="text" value="8" name="length"/>
    <button id="generate-string">Give it now!</button>
    <div id="the-string">
      <input type="text" />
      <button id="replace-string">Replace</button>
      <button id="delete-string">Delete it</button>
    </div>
  </body>
</html>
```

We’ll be using the jQuery framework out of simplicity but feel free to replace it with your favourite tool. The page is composed of simple HTML elements to get user input and display the generated string. It also contains client-side code to talk to the backend API that actually performs the hard work.

Finally, here’s the application’s code that serves the HTML page above and responds to requests to generate strings. Both are hosted by the same application server.

```
import os, os.path
import random
import string

import cherrypy


class StringGenerator(object):
    @cherrypy.expose
    def index(self):
        return open('index.html')


@cherrypy.expose
class StringGeneratorWebService(object):

    @cherrypy.tools.accept(media='text/plain')
    def GET(self):
        return cherrypy.session['mystring']

    def POST(self, length=8):
        some_string = ''.join(random.sample(string.hexdigits,
int(length)))
        cherrypy.session['mystring'] = some_string
        return some_string

    def PUT(self, another_string):
        cherrypy.session['mystring'] = another_string

    def DELETE(self):
        cherrypy.session.pop('mystring', None)
```

```


if __name__ == '__main__':
    conf = {
        '/': {
            'tools.sessions.on': True,
            'tools.staticdir.root': os.path.abspath(os.getcwd())
        },
        '/generator': {
            'request.dispatch': cherrypy.dispatch.MethodDispatcher(),
            'tools.response_headers.on': True,
            'tools.response_headers.headers': [('Content-Type',
'text/plain')],
        },
        '/static': {
            'tools.staticdir.on': True,
            'tools.staticdir.dir': './public'
        }
    }
    webapp = StringGenerator()
    webapp.generator = StringGeneratorWebService()
    cherrypy.quickstart(webapp, '/', conf)
```

Save this into a file named *tut08.py* and run it as follows:

```
$ python tut08.py
```

Go to http://127.0.0.1:8080/ and play with the input and buttons to generate, replace or delete the strings. Notice how the page isn't refreshed, simply part of its content.

Notice as well how your frontend converses with the backend using a straightfoward, yet clean, web service API. That same API could easily be used by non-HTML clients.

Tutorial 9: Data is all my life

Until now, all the generated strings were saved in the session, which by default is stored in the process memory. Though, you can persist sessions on disk or in a distributed memory store, this is not the right way of keeping your data on the long run. Sessions are there to identify your user and carry as little amount of data as necessary for the operation carried by the user.

To store, persist and query data you need a proper database server. There exist many to choose from with various paradigm support:

- relational: PostgreSQL, SQLite, MariaDB, Firebird
- column-oriented: HBase, Cassandra
- key-store: redis, memcached
- document oriented: Couchdb, MongoDB
- graph-oriented: neo4j

Let's focus on the relational ones since they are the most common and probably what you will want to learn first.

For the sake of reducing the number of dependencies for these tutorials, we will go for the `sqlite` database which is directly supported by Python.

Our application will replace the storage of the generated string from the session to a SQLite database. The application will have the same HTML code as tutorial 08. So let’s simply focus on the application code itself:

```
import os, os.path
import random
import sqlite3
import string
import time

import cherrypy

DB_STRING = "my.db"


class StringGenerator(object):
    @cherrypy.expose
    def index(self):
        return open('index.html')


@cherrypy.expose
class StringGeneratorWebService(object):

    @cherrypy.tools.accept(media='text/plain')
    def GET(self):
        with sqlite3.connect(DB_STRING) as c:
            cherrypy.session['ts'] = time.time()
            r = c.execute("SELECT value FROM user_string WHERE session_id=?",
                          [cherrypy.session.id])
            return r.fetchone()

    def POST(self, length=8):
        some_string = ''.join(random.sample(string.hexdigits, int(length)))
        with sqlite3.connect(DB_STRING) as c:
            cherrypy.session['ts'] = time.time()
            c.execute("INSERT INTO user_string VALUES (?, ?)",
                      [cherrypy.session.id, some_string])
        return some_string

    def PUT(self, another_string):
        with sqlite3.connect(DB_STRING) as c:
            cherrypy.session['ts'] = time.time()
            c.execute("UPDATE user_string SET value=? WHERE session_id=?",
                      [another_string, cherrypy.session.id])

    def DELETE(self):
        cherrypy.session.pop('ts', None)
        with sqlite3.connect(DB_STRING) as c:
            c.execute("DELETE FROM user_string WHERE session_id=?",
                      [cherrypy.session.id])


def setup_database():
    """
    Create the `user_string` table in the database
    on server startup
```

```
57     """
58     with sqlite3.connect(DB_STRING) as con:
59         con.execute("CREATE TABLE user_string (session_id, value)")
60
61
62 def cleanup_database():
63     """
64     Destroy the `user_string` table from the database
65     on server shutdown.
66     """
67     with sqlite3.connect(DB_STRING) as con:
68         con.execute("DROP TABLE user_string")
69
70
71 if __name__ == '__main__':
72     conf = {
73         '/': {
74             'tools.sessions.on': True,
75             'tools.staticdir.root': os.path.abspath(os.getcwd())
76         },
77         '/generator': {
78             'request.dispatch': cherrypy.dispatch.MethodDispatcher(),
79             'tools.response_headers.on': True,
80             'tools.response_headers.headers': [('Content-Type',
81 'text/plain')],
82         },
83         '/static': {
84             'tools.staticdir.on': True,
85             'tools.staticdir.dir': './public'
86         }
87     }
88
89     cherrypy.engine.subscribe('start', setup_database)
90     cherrypy.engine.subscribe('stop', cleanup_database)

       webapp = StringGenerator()
       webapp.generator = StringGeneratorWebService()
       cherrypy.quickstart(webapp, '/', conf)
```

Save this into a file named *tut09.py* and run it as follows:

```
$ python tut09.py
```

Let's first see how we create two functions that create and destroy the table within our database. These functions are registered to the CherryPy's server on lines 85-86, so that they are called when the server starts and stops.

Next, notice how we replaced all the session code with calls to the database. We use the session id to identify the user's string within our database. Since the session will go away after a while, it's probably not the right approach. A better idea would be to associate the user's login or more resilient unique identifier. For the sake of our demo, this should do.

Important

In this example, we must still set the session to a dummy value so that the session is not discarded on each request by CherryPy. Since we now use the database to store the generated string, we simply store a dummy timestamp inside the session.

Note

Unfortunately, sqlite in Python forbids us to share a connection between threads. Since CherryPy is a multi-threaded server, this would be an issue. This is the reason why we open and close a connection to the database on each call. This is clearly not really production friendly, and it is probably advisable to either use a more capable database engine or a higher level library, such as SQLAlchemy, to better support your application's needs.

Tutorial 10: Make it a modern single-page application with React.js

In the recent years, client-side single-page applications (SPA) have gradually eaten server-side generated content web applications's lunch.

This tutorial demonstrates how to integrate with React.js, a Javascript library for SPA released by Facebook in 2013. Please refer to React.js documentation to learn more about it.

To demonstrate it, let's use the code from tutorial 09. However, we will be replacing the HTML and Javascript code.

First, let's see how our HTML code has changed:

```
<!DOCTYPE html>
<html>
   <head>
     <link href="/static/css/style.css" rel="stylesheet">
     <script src="https://cdnjs.cloudflare.com/ajax/libs/react/0.13.3/react.js"></script>
     <script src="http://code.jquery.com/jquery-2.1.1.min.js"></script>
     <script src="https://cdnjs.cloudflare.com/ajax/libs/babel-core/5.8.23/browser.min.js"></script>
   </head>
   <body>
     <div id="generator"></div>
     <script type="text/babel" src="static/js/gen.js"></script>
   </body>
</html>
```

Basically, we have removed the entire Javascript code that was using jQuery. Instead, we load the React.js library as well as a new, local, Javascript module, named `gen.js` and located in the `public/js` directory:

```
var StringGeneratorBox = React.createClass({
  handleGenerate: function() {
    var length = this.state.length;
    this.setState(function() {
      $.ajax({
        url: this.props.url,
        dataType: 'text',
        type: 'POST',
        data: {
          "length": length
        },
        success: function(data) {
          this.setState({
            length: length,
            string: data,
            mode: "edit"
          });
        }.bind(this),
        error: function(xhr, status, err) {
          console.error(this.props.url,
            status, err.toString()
          );
        }.bind(this)
      });
    });
  },
  handleEdit: function() {
    var new_string = this.state.string;
    this.setState(function() {
      $.ajax({
        url: this.props.url,
        type: 'PUT',
        data: {
          "another_string": new_string
        },
        success: function() {
          this.setState({
            length: new_string.length,
            string: new_string,
            mode: "edit"
          });
        }.bind(this),
        error: function(xhr, status, err) {
          console.error(this.props.url,
            status, err.toString()
          );
        }.bind(this)
      });
    });
  },
  handleDelete: function() {
    this.setState(function() {
      $.ajax({
        url: this.props.url,
        type: 'DELETE',
        success: function() {
          this.setState({
            length: "8",
            string: "",
            mode: "create"
          });
        }.bind(this),
        error: function(xhr, status, err) {
          console.error(this.props.url,
            status, err.toString()
          );
        }.bind(this)
      });
    });
  },
  handleLengthChange: function(length) {
    this.setState({
      length: length,
      string: "",
      mode: "create"
    });
  },
  handleStringChange: function(new_string) {
    this.setState({
      length: new_string.length,
      string: new_string,
      mode: "edit"
    });
  },
  getInitialState: function() {
    return {
      length: "8",
      string: "",
      mode: "create"
    };
  },
  render: function() {
    return (
      <div className="stringGenBox">
            <StringGeneratorForm onCreateString={this.handleGenerate}
                                 onReplaceString={this.handleEdit}
                                 onDeleteString={this.handleDelete}

onLengthChange={this.handleLengthChange}

onStringChange={this.handleStringChange}
                                 mode={this.state.mode}
                                 length={this.state.length}
                                 string={this.state.string}/>
      </div>
    );
  }
});

var StringGeneratorForm = React.createClass({
  handleCreate: function(e) {
    e.preventDefault();
    this.props.onCreateString();
  },
  handleReplace: function(e) {
    e.preventDefault();
    this.props.onReplaceString();
  },
  handleDelete: function(e) {
    e.preventDefault();
    this.props.onDeleteString();
  },
  handleLengthChange: function(e) {
    e.preventDefault();
    var length = React.findDOMNode(this.refs.length).value.trim();
    this.props.onLengthChange(length);
  },
  handleStringChange: function(e) {
    e.preventDefault();
    var string = React.findDOMNode(this.refs.string).value.trim();
    this.props.onStringChange(string);
  },
  render: function() {
    if (this.props.mode == "create") {
      return (
        <div>
           <input  type="text" ref="length" defaultValue="8"
value={this.props.length} onChange={this.handleLengthChange} />
           <button onClick={this.handleCreate}>Give it now!</button>
        </div>
      );
    } else if (this.props.mode == "edit") {
      return (
        <div>
           <input type="text" ref="string" value={this.props.string}
onChange={this.handleStringChange} />
           <button onClick={this.handleReplace}>Replace</button>
           <button onClick={this.handleDelete}>Delete it</button>
        </div>
      );
    }

    return null;
  }
});

React.render(
  <StringGeneratorBox url="/generator" />,
  document.getElementById('generator')
);
```

Wow! What a lot of code for something so simple, isn't it? The entry point is the last few lines where we indicate that we want to render the HTML code of the `StringGeneratorBox` React.js class inside the `generator` div.

When the page is rendered, so is that component. Notice how it is also made of another component that renders the form itself.

This might be a little over the top for such a simple example but hopefully will get you started with React.js in the process.

There is not much to say and, hopefully, the meaning of that code is rather clear. The component has an internal state in which we store the current string as generated/modified by the user.

When the user changes the content of the input boxes, the state is updated on the client side. Then, when a button is clicked, that state is sent out to the backend server using the API endpoint and the appropriate action takes places. Then, the state is updated and so is the view.

Tutorial 11: Organize my code

CherryPy comes with a powerful architecture that helps you organizing your code in a way that should make it easier to maintain and more flexible.

Several mechanisms are at your disposal, this tutorial will focus on the three main ones:

- dispatchers
- tools
- plugins

In order to understand them, let's imagine you are at a superstore:

- You have several tills and people queuing for each of them (those are your requests)
- You have various sections with food and other stuff (these are your data)
- Finally you have the superstore people and their daily tasks to make sure sections are always in order (this is your backend)

In spite of being really simplistic, this is not far from how your application behaves. CherryPy helps you structure your application in a way that mirrors these high-level ideas.

Dispatchers

Coming back to the superstore example, it is likely that you will want to perform operations based on the till:

- Have a till for baskets with less than ten items
- Have a till for disabled people
- Have a till for pregnant women
- Have a till where you can only using the store card

To support these use-cases, CherryPy provides a mechanism called a dispatcher. A dispatcher is executed early during the request processing in order to determine which piece of code of your application will handle the incoming request. Or, to continue on the store analogy, a dispatcher will decide which till to lead a customer to.

Tools

Let's assume your store has decided to operate a discount spree but, only for a specific category of customers. CherryPy will deal with such use case via a mechanism called a tool.

A tool is a piece of code that runs on a per-request basis in order to perform additional work. Usually a tool is a simple Python function that is executed at a given point during the process of the request by CherryPy.

Plugins

As we have seen, the store has a crew of people dedicated to manage the stock and deal with any customers' expectation.

In the CherryPy world, this translates into having functions that run outside of any request life-cycle. These functions should take care of background tasks, long lived connections (such as those to a database for instance), etc.

Plugins are called that way because they work along with the CherryPy engine and extend it with your operations.

Doc.cherrypy.org : Basics

The following sections will drive you through the basics of a CherryPy application, introducing some essential concepts.

Contents

The one-minute application example

The most basic application you can write with CherryPy involves almost all its core concepts.

```
import cherrypy

class Root(object):
    @cherrypy.expose
    def index(self):
        return "Hello World!"

```

```
8 if __name__ == '__main__':
9    cherrypy.quickstart(Root(), '/')
```

First and foremost, for most tasks, you will never need more than a single import statement as demonstrated in line 1.

Before discussing the meat, let's jump to line 9 which shows, how to host your application with the CherryPy application server and serve it with its builtin HTTP server at the '/' path. All in one single line. Not bad.

Let's now step back to the actual application. Even though CherryPy does not mandate it, most of the time your applications will be written as Python classes. Methods of those classes will be called by CherryPy to respond to client requests. However, CherryPy needs to be aware that a method can be used that way, we say the method needs to be exposed. This is precisely what the `cherrypy.expose()` decorator does in line 4.

Save the snippet in a file named *myapp.py* and run your first CherryPy application:

```
$ python myapp.py
```

Then point your browser at http://127.0.0.1:8080. Tada!

Note

CherryPy is a small framework that focuses on one single task: take a HTTP request and locate the most appropriate Python function or method that match the request's URL. Unlike other well-known frameworks, CherryPy does not provide a built-in support for database access, HTML templating or any other middleware nifty features.

In a nutshell, once CherryPy has found and called an exposed method, it is up to you, as a developer, to provide the tools to implement your application's logic.

CherryPy takes the opinion that you, the developer, know best.

Warning

The previous example demonstrated the simplicty of the CherryPy interface but, your application will likely contain a few other bits and pieces: static service, more complex structure, database access, etc. This will be developed in the tutorial section.

CherryPy is a minimal framework but not a bare one, it comes with a few basic tools to cover common usages that you would expect.

Hosting one or more applications

A web application needs an HTTP server to be accessed to. CherryPy provides its own, production ready, HTTP server. There are two ways to host an application with it. The simple one and the almost-as-simple one.

Single application

The most straightforward way is to use `cherrypy.quickstart()` function. It takes at least one argument, the instance of the application to host. Two other settings are optionals. First, the base path at which the application will be accessible from. Second, a config dictionary or file to configure your application.

```
cherrypy.quickstart(Blog())
cherrypy.quickstart(Blog(), '/blog')
cherrypy.quickstart(Blog(), '/blog', {'/': {'tools.gzip.on': True}})
```

The first one means that your application will be available at http://hostname:port/ whereas the other two will make your blog application available at http://hostname:port/blog. In addition, the last one provides specific settings for the application.

Note

Notice in the third case how the settings are still relative to the application, not where it is made available at, hence the *{'/': ... }* rather than a *{'/blog': ... }*

Multiple applications

The `cherrypy.quickstart()` approach is fine for a single application, but lacks the capacity to host several applications with the server. To achieve this, one must use the `cherrypy.tree.mount` function as follows:

```
cherrypy.tree.mount(Blog(), '/blog', blog_conf)
cherrypy.tree.mount(Forum(), '/forum', forum_conf)

cherrypy.engine.start()
cherrypy.engine.block()
```

Essentially, `cherrypy.tree.mount` takes the same parameters as `cherrypy.quickstart()`: an application, a hosting path segment and a configuration. The last two lines are simply starting application server.

Important

`cherrypy.quickstart()` and `cherrypy.tree.mount` are not exclusive. For instance, the previous lines can be written as:

```
cherrypy.tree.mount(Blog(), '/blog', blog_conf)
cherrypy.quickstart(Forum(), '/forum', forum_conf)
```

Note

You can also host foreign WSGI application.

Logging

Logging is an important task in any application. CherryPy will log all incoming requests as well as protocol errors.

To do so, CherryPy manages two loggers:

- an access one that logs every incoming requests
- an application/error log that traces errors or other application-level messages

Your application may leverage that second logger by calling `cherrypy.log()`.

```
cherrypy.log("hello there")
```

You can also log an exception:

```
try:
   ...
except:
   cherrypy.log("kaboom!", traceback=True)
```

Both logs are writing to files identified by the following keys in your configuration:

- `log.access_file` for incoming requests using the common log format
- `log.error_file` for the other log

See also

Refer to the `cherrypy._cplogging` module for more details about CherryPy's logging architecture.

Disable logging

You may be interested in disabling either logs.

To disable file logging, simply set a en empty string to the `log.access_file` or `log.error_file` keys in your global configuration.

To disable, console logging, set `log.screen` to *False*.

```
cherrypy.config.update({'log.screen': False,
                        'log.access_file': '',
                        'log.error_file': ''})
```

Play along with your other loggers

Your application may obviously already use the `logging` module to trace application level messages. Below is a simple example on setting it up.

```
import logging
import logging.config
import cherrypy

logger = logging.getLogger()
db_logger = logging.getLogger('db')

LOG_CONF = {
    'version': 1,

    'formatters': {
        'void': {
            'format': ''
        },
        'standard': {
            'format': '%(asctime)s [%(levelname)s] %(name)s: %(message)s'
        },
    },
    'handlers': {
        'default': {
            'level':'INFO',
            'class':'logging.StreamHandler',
            'formatter': 'standard',
            'stream': 'ext://sys.stdout'
        },
        'cherrypy_console': {
            'level':'INFO',
            'class':'logging.StreamHandler',
            'formatter': 'void',
            'stream': 'ext://sys.stdout'
        },
        'cherrypy_access': {
            'level':'INFO',
            'class': 'logging.handlers.RotatingFileHandler',
            'formatter': 'void',
            'filename': 'access.log',
            'maxBytes': 10485760,
            'backupCount': 20,
            'encoding': 'utf8'
        },
        'cherrypy_error': {
            'level':'INFO',
            'class': 'logging.handlers.RotatingFileHandler',
            'formatter': 'void',
            'filename': 'errors.log',
            'maxBytes': 10485760,
            'backupCount': 20,
            'encoding': 'utf8'
        },
    },
    'loggers': {
        '': {
            'handlers': ['default'],
            'level': 'INFO'
        },
        'db': {
            'handlers': ['default'],
            'level': 'INFO' ,
            'propagate': False
        },
        'cherrypy.access': {
            'handlers': ['cherrypy_access'],
            'level': 'INFO',
            'propagate': False
        },
        'cherrypy.error': {
            'handlers': ['cherrypy_console', 'cherrypy_error'],
            'level': 'INFO',
            'propagate': False
        },
    }
}

class Root(object):
    @cherrypy.expose
    def index(self):

        logger.info("boom")
        db_logger.info("bam")
        cherrypy.log("bang")

        return "hello world"

if __name__ == '__main__':
    cherrypy.config.update({'log.screen': False,
                            'log.access_file': '',
                            'log.error_file': ''})
cherrypy.engine.unsubscribe('graceful', cherrypy.log.reopen_files)
    logging.config.dictConfig(LOG_CONF)
    cherrypy.quickstart(Root())
```

In this snippet, we create a configuration dictionary that we pass on to the `logging` module to configure our loggers:

- the default root logger is associated to a single stream handler
- a logger for the db backend with also a single stream handler

In addition, we re-configure the CherryPy loggers:

- the top-level `cherrypy.access` logger to log requests into a file
- the `cherrypy.error` logger to log everything else into a file and to the console

We also prevent CherryPy from trying to open its log files when the autoreloader kicks in. This is not strictly required since we do not even let CherryPy open them in the first place. But, this avoids wasting time on something useless.

Configuring

CherryPy comes with a fine-grained configuration mechanism and settings can be set at various levels.

See also

Once you have the reviewed the basics, please refer to the in-depth discussion around configuration.

Global server configuration

To configure the HTTP and application servers, use the `cherrypy.config.update()` method.

```
cherrypy.config.update({'server.socket_port': 9090})
```

The `cherrypy.config` object is a dictionary and the update method merges the passed dictionary into it.

You can also pass a file instead (assuming a *server.conf* file):

```
[global]
server.socket_port: 9090
cherrypy.config.update("server.conf")
```

Warning

`cherrypy.config.update()` is not meant to be used to configure the application. It is a common mistake. It is used to configure the server and engine.

Per-application configuration

To configure your application, pass in a dictionary or a file when you associate your application to the server.

```
cherrypy.quickstart(myapp, '/', {'/': {'tools.gzip.on': True}})
```

or via a file (called *app.conf* for instance):

```
[/]
tools.gzip.on: True
cherrypy.quickstart(myapp, '/', "app.conf")
```

Although, you can define most of your configuration in a global fashion, it is sometimes convenient to define them where they are applied in the code.

```
class Root(object):
    @cherrypy.expose
    @cherrypy.tools.gzip()
    def index(self):
        return "hello world!"
```

A variant notation to the above:

```
class Root(object):
    @cherrypy.expose
    def index(self):
        return "hello world!"
    index._cp_config = {'tools.gzip.on': True}
```

Both methods have the same effect so pick the one that suits your style best.

Additional application settings

You can add settings that are not specific to a request URL and retrieve them from your page handler as follows:

```
[/]
tools.gzip.on: True

[googleapi]
key = "..."
appid = "..."
class Root(object):
    @cherrypy.expose
    def index(self):
        google_appid = cherrypy.request.app.config['googleapi']['appid']
        return "hello world!"

cherrypy.quickstart(Root(), '/', "app.conf")
```

Cookies

CherryPy uses the `Cookie` module from python and in particular the `Cookie.SimpleCookie` object type to handle cookies.

- To send a cookie to a browser, set `cherrypy.response.cookie[key] = value`.
- To retrieve a cookie sent by a browser, use `cherrypy.request.cookie[key]`.
- To delete a cookie (on the client side), you must *send* the cookie with its expiration time set to *0*:

```
cherrypy.response.cookie[key] = value
cherrypy.response.cookie[key]['expires'] = 0
```

It's important to understand that the request cookies are **not** automatically copied to the response cookies. Clients will send the same cookies on every request, and therefore `cherrypy.request.cookie` should be populated each time. But the server doesn't need to send the same cookies with every response; therefore, `cherrypy.response.cookie` will usually be empty. When you wish to "delete" (expire) a cookie, therefore, you must set `cherrypy.response.cookie[key] = value` first, and then set its `expires` attribute to 0.

Extended example:

```
import cherrypy

class MyCookieApp(object):
    @cherrypy.expose
    def set(self):
        cookie = cherrypy.response.cookie
        cookie['cookieName'] = 'cookieValue'
        cookie['cookieName']['path'] = '/'
        cookie['cookieName']['max-age'] = 3600
        cookie['cookieName']['version'] = 1
        return "<html><body>Hello, I just sent you a cookie</body></html>"

    @cherrypy.expose
    def read(self):
        cookie = cherrypy.request.cookie
        res = """<html><body>Hi, you sent me %s cookies.<br />
                Here is a list of cookie names/values:<br />""" %
len(cookie)
        for name in cookie.keys():
            res += "name: %s, value: %s<br>" % (name, cookie[name].value)
        return res + "</body></html>"

if __name__ == '__main__':
    cherrypy.quickstart(MyCookieApp(), '/cookie')
```

Using sessions

Sessions are one of the most common mechanism used by developers to identify users and synchronize their activity. By default, CherryPy does not activate sessions because it is not a mandatory feature to have, to enable it simply add the following settings in your configuration:

```
[/]
tools.sessions.on: True
cherrypy.quickstart(myapp, '/', "app.conf")
```

Sessions are, by default, stored in RAM so, if you restart your server all of your current sessions will be lost. You can store them in memcached or on the filesystem instead.

Using sessions in your applications is done as follows:

```
import cherrypy

@cherrypy.expose
def index(self):
    if 'count' not in cherrypy.session:
       cherrypy.session['count'] = 0
    cherrypy.session['count'] += 1
```

In this snippet, everytime the the index page handler is called, the current user’s session has its *‘count’* key incremented by *1*.

CherryPy knows which session to use by inspecting the cookie sent alongside the request. This cookie contains the session identifier used by CherryPy to load the user’s session from the storage.

See also

Refer to the `cherrypy.lib.sessions` module for more details about the session interface and implementation. Notably you will learn about sessions expiration.

Filesystem backend

Using a filesystem is a simple to not lose your sessions between reboots. Each session is saved in its own file within the given directory.

```
[/]
tools.sessions.on: True
tools.sessions.storage_class = cherrypy.lib.sessions.FileSession
tools.sessions.storage_path = "/some/directory"
```

Memcached backend

Memcached is a popular key-store on top of your RAM, it is distributed and a good choice if you want to share sessions outside of the process running CherryPy.

Requires that the Python memcached package is installed, which may be indicated by installing `cherrypy[memcached_session]`.

```
[/]
tools.sessions.on: True
tools.sessions.storage_class = cherrypy.lib.sessions.MemcachedSession
```

Other backends

Any other library may implement a session backend. Simply subclass `cherrypy.lib.sessions.Session` and indicate that subclass as `tools.sessions.storage_class`.

Static content serving

CherryPy can serve your static content such as images, javascript and CSS resources, etc.

Note

CherryPy uses the `mimetypes` module to determine the best content-type to serve a particular resource. If the choice is not valid, you can simply set more media-types as follows:

```
import mimetypes
mimetypes.types_map['.csv'] = 'text/csv'
```

Serving a single file

You can serve a single file as follows:

```
[/style.css]
tools.staticfile.on = True
tools.staticfile.filename = "/home/site/style.css"
```

CherryPy will automatically respond to URLs such as *http://hostname/style.css*.

Serving a whole directory

Serving a whole directory is similar to a single file:

```
[/static]
tools.staticdir.on = True
tools.staticdir.dir = "/home/site/static"
```

Assuming you have a file at *static/js/my.js*, CherryPy will automatically respond to URLs such as *http://hostname/static/js/my.js*.

Note

CherryPy always requires the absolute path to the files or directories it will serve. If you have several static sections to configure but located in the same root directory, you can use the following shortcut:

```
[/]
tools.staticdir.root = "/home/site"

[/static]
tools.staticdir.on = True
tools.staticdir.dir = "static"
```

Specifying an index file

By default, CherryPy will respond to the root of a static directory with an 404 error indicating the path '/' was not found. To specify an index file, you can use the following:

```
[/static]
tools.staticdir.on = True
tools.staticdir.dir = "/home/site/static"
tools.staticdir.index = "index.html"
```

Assuming you have a file at *static/index.html*, CherryPy will automatically respond to URLs such as *http://hostname/static/* by returning its contents.

Allow files downloading

Using `"application/x-download"` response content-type, you can tell a browser that a resource should be downloaded onto the user's machine rather than displayed.

You could for instance write a page handler as follows:

```
from cherrypy.lib.static import serve_file

@cherrypy.expose
def download(self, filepath):
    return serve_file(filepath, "application/x-download", "attachment")
```

Assuming the filepath is a valid path on your machine, the response would be considered as a downloadable content by the browser.

Warning

The above page handler is a security risk on its own since any file of the server could be accessed (if the user running the server had permissions on them).

Dealing with JSON

CherryPy has built-in support for JSON encoding and decoding of the request and/or response.

Decoding request

To automatically decode the content of a request using JSON:

```
class Root(object):
    @cherrypy.expose
    @cherrypy.tools.json_in()
    def index(self):
        data = cherrypy.request.json
```

The *json* attribute attached to the request contains the decoded content.

Encoding response

To automatically encode the content of a response using JSON:

```
class Root(object):
    @cherrypy.expose
    @cherrypy.tools.json_out()
    def index(self):
        return {'key': 'value'}
```

CherryPy will encode any content returned by your page handler using JSON. Not all type of objects may natively be encoded.

Authentication

CherryPy provides support for two very simple authentication mechanisms, both described in RFC 2617: Basic and Digest. They are most commonly known to trigger a browser's popup asking users their name and password.

Basic

Basic authentication is the simplest form of authentication however it is not a secure one as the user's credentials are embedded into the request. We advise against using it unless you are running on SSL or within a closed network.

```
from cherrypy.lib import auth_basic

USERS = {'jon': 'secret'}

def validate_password(realm, username, password):
    if username in USERS and USERS[username] == password:
       return True
    return False

conf = {
   '/protected/area': {
       'tools.auth_basic.on': True,
       'tools.auth_basic.realm': 'localhost',
       'tools.auth_basic.checkpassword': validate_password
    }
}

cherrypy.quickstart(myapp, '/', conf)
```

Simply put, you have to provide a function that will be called by CherryPy passing the username and password decoded from the request.

The function can read its data from any source it has to: a file, a database, memory, etc.

Digest

Digest authentication differs by the fact the credentials are not carried on by the request so it's a little more secure than basic.

CherryPy's digest support has a similar interface to the basic one explained above.

```
from cherrypy.lib import auth_digest

USERS = {'jon': 'secret'}

conf = {
   '/protected/area': {
        'tools.auth_digest.on': True,
        'tools.auth_digest.realm': 'localhost',
        'tools.auth_digest.get_ha1': auth_digest.get_ha1_dict_plain(USERS),
        'tools.auth_digest.key': 'a565c27146791cfb'
   }
}

cherrypy.quickstart(myapp, '/', conf)
```

Favicon

CherryPy serves its own sweet red cherrypy as the default favicon using the static file tool. You can serve your own favicon as follows:

```
import cherrypy

class HelloWorld(object):
   @cherrypy.expose
   def index(self):
       return "Hello World!"

if __name__ == '__main__':
    cherrypy.quickstart(HelloWorld(), '/',
        {
            '/favicon.ico':
            {
                'tools.staticfile.on': True,
                'tools.staticfile.filename': '/path/to/myfavicon.ico'
            }
        }
    )
```

Please refer to the static serving section for more details.

You can also use a file to configure it:

```
[/favicon.ico]
tools.staticfile.on: True
tools.staticfile.filename: "/path/to/myfavicon.ico"
import cherrypy

class HelloWorld(object):
   @cherrypy.expose
   def index(self):
       return "Hello World!"

if __name__ == '__main__':
    cherrypy.quickstart(HelloWorld(), '/', app.conf)
```