
Pyitect Documentation

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1	Links	3
1.1	pyitect package	3
1.2	Creating Plugins	12
1.3	Setting up a Plugin system	15
1.4	Useing Events	18
1.5	ChangeLog	20
2	Indices and tables	23
	Python Module Index	25

A [architect](#) inspired plugin framework for Python 3 and Python ≥ 2.6

A simple Framework that Provides the facility to load Component form plugins.

Also binds a simple event system to bind functions to events on the system.

Links

- GitHub: <https://github.com/Ryex/pyitect>
- PyPi: <https://pypi.python.org/pypi/pyitect>
- Travic-CI: <https://travis-ci.org/Ryex/pyitect>
- Docs: <http://pyitect.readthedocs.org/en/latest/>

Contents:

1.1 pyitect package

1.1.1 Submodules

pyitect.imports module

This is the shadow module used as a namespace for providing component to loading plugins during import

1.1.2 Module contents

Pyitect is a pluginframe work

class `pyitect.Version`

Version class imported directly from *semantic_version*

see the [python-semanticversion](#) project for more information.

class `pyitect.Spec`

Spec class imported directly from *semantic_version*

see the [python-semanticversion](#) project for more information.

class `pyitect.System` (*config, enable_yaml=False*)

A plugin system

It can scan dir trees to find plugins and their provided/needed components, and with a simple load call chain load all the plugins needed.

The system includes a simple event system and fires some events internal, here are their signatures:

‘plugin_found’: (**path, plugin**) path (str): the full path to the folder containing the plugin

plugin (str): plugin version string (ie ‘plugin_name:version’)

‘plugin_loaded’: (**plugin, plugin_required, component_needed**) plugin (str): plugin version string (ie ‘plugin_name:version’)

plugin_required (str): version string of the plugin that required the loaded plugin (version string ie ‘plugin_name:version’)

component_needed (str): the name of the component needed by the requesting plugin

‘component_loaded’: (**component, plugin_required, plugin_loaded**) component (str): the name of the component loaded

plugin_required (str, None): version string of the plugin that required the loaded component (version string ie ‘plugin_name:version’) (might be None)

plugin_loaded (str): version string of the plugin that the component was loaded from (version string ie ‘plugin_name:version’)

Pyitect keeps track of all the instances of the System class in *System.systems* which is a map of object id’s to instances of System.

config

dict

A mapping of component names to version requirements

plugins

dict

A mapping of the plugins the system knows about. Maps names to *dicts* of *Version* s mapped to *Plugin* config objects

components

dict

A mapping of *Component.key()* s to loaded component objects

component_map

dict

A mapping of components the system knows about. Maps names to *dicts* of *Version* s mapped to *Component* config objects

loaded_plugins

dict

A mapping of *Plugin.key()* s to loaded plugin module objects

enabled_plugins

list

A list of *Plugin.key()* s of enabled plugins

using

list

A List of *Component.key()* s loaded by the system

events

dict

A mapping of event names to lists of callable objects

add_plugin (path)

Adds a plugin form the provided path

Parameters path (str) – path to a plugin folder

Raises: `PyitectError`: If no plugin exists at path `PyitectDupError`: if you try to add the same plugin twice

bind_event (*event*, *function*)

Bind a callable object to the event name

a simple event system bound to the plugin system, bind a function on an event and when the event is fired all bound functions are called with the **args* and ***kwargs* passed to the fire call

Parameters

- **event** (*str*) – name of event to bind to
- **function** (*callable*) – Boject to be called when event fires

enable_plugins (**plugins*)

Take one or more *Plugin*s and map it's components

Takes a plugins metadata and remembers it's provided components so the system is aware of them

Parameters **plugins** (*plugins*) – One or more plugins to enable. Each argument can it self be a list or map of *Plugin* objects or a plain *Plugin* object

Raises

- `TypeError` – If you try to pass a non *Plugin* object
- `PyitectDupError` – If you try to enable a plugin that provides duplicate component
- `PyitectOnEnableError` – If There was an error in the `on_enable`
- `PyitectLoadError` – If there was an error loading a plugin to call it's `on_enable`

fire_event (*event*, **args*, ***kwargs*)

Call all functions bound to the event name

and pass all extra **args* and ***kwargs* to the bound functions

Parameters **event** (*str*) – name of event to fire

get_plugin_module (*plugin*, *version=None*)

Fetch the loaded plugin module

if *version* is `None` searches for the highest version number plugin with it's module loaded if it can't find anything it raises a runtime error

Parameters **plugin** (*str*) – name of plugin to find version (`None`, *str*, *Version*): if provided load a spesfic version

Returns loaded module object

Raises

- `TypeError` – if provideing a version that is not either a *str* or a *Version*
- `PyitectError` – if the *Plugin* can't be found
- `PyitectLoadError` – plugin module is not loaded yet

is_plugin (*path*)

Test a path to see if it is a *Plugin*

Parameters **path** (*str*) – path to test

Returns: true if there is a plugin in the folder pointed to by path

iter_component_providers (*comp*, *subs=False*, *vers=False*, *reqs=''*)

An iterator function to iterate providers of a component

Takes a component name and yeilds providers of the component

if *subs* is *True* yeilds providers of subtypes too

if *vers* is *True* yeilds all version of the provider not just the highest

reqs is a version requirement for the providers to meet. Defaults to any version

yeilds tuples that look like: (<*component_name*>, <*plugin_name*>, <*version*>)

Examples

```
>>> for t in iter_component_providers("foo", subs=True): print(t);
("foo", "foo_plugin", "0.1.0")
("foo", "foo_plugin2", "1.0.0")
("foo.a", "foo.a_plugin", "0.1.0")
("foo.a.b", "footastic", "10.0.0")
```

Parameters

- **comp** (*str*) – component name to use as a base
- **subs** (*bool*) – should subtypes be yeilded too?
- **vers** (*bool*) – should all version be yeilded not just the highest?
- **reqs** (*str*; *list*, *tuple*) – version spec string or list there of all items are passed to a *Spec*

Raises *TypeError* – if *comp* or *reqs* are passed wrong

iter_component_subtypes (*component*)

An iterator function to iterate all known subtypes of a component

Takes a component name and yeilds all known component names that are subtypes not including the component name

Parameters **component** (*str*) – the component name to act as a base

Raises *TypeError* – if *component* is niether a *Component* instance nor a string

load (*component*, *requires=None*, *request=None*, *bypass=False*, *subs=True*, *key=None*, *reverse=False*)

Load and return a component object

processes loading and returns the component by name, chain loading any required plugins to obtain dependencies. Uses the config that was provided on system creation to load correct versions, if there is a conflict throws a run time error. *bypass* lets the call bypass the system configuration

internaly uses *iter_component_providers()* to create list of viable components. basially calls *sorted(iter_component_providers(component subs=subs), key=key)[0]* to get the component to use.

Parameters

- **component** (*str*) – Name of component to load
- **requires** (*dict*, *None*) – A mapping of component names to version requierments to use during the load
- **request** (*str*; *None*) – The name of the requesting plugin. *None* if not requested
- **bypass** (*bool*) – Ignore the system configured version requierments

- **subs** (*bool*) – should sub components be considered?
- **key** (*func, None*) – Key function to use to compare component provider tuples from `iter_component_providers()` in a *sorted* call. write the key func so that the item you want will be at index 0
- **reverse** (*bool*) – reverse sorting of components

Returns the loaded component object

Raises

- `TypeError` – if things get passed wrong
- `PyitectLoadError` – if there is an exception during load

load_component (*component, plugin, version, requires=None, request=None*)

Loads a component

same end effect as `load()` but requires an explicit name, plugin, and version. no subtypes of the component are explored no other provider is considered

Parameters

- **component** (*str*) – component name to load
- **plugin** (*str*) – plugin name to load from
- **version** (*str, Version*) – Version to load

Raises

- `TypeError` – If things are passed wrong
- `PyitectLoadError` – if there is an exception during load
- `PyitectNotProvidedError` – if the request can not be met

load_plugin (*plugin, version, requires=None, request=None, comp=None*)

Takes a plugin name and version and loads its module

finds the stored Plugin object takes a Plugin object and loads the module recursively loading declared dependencies

Parameters

- **plugin** (*str*) – plugin name
- **version** (*str, Version*) – version to load
- **requires** (*dict, None*) – a mapping of component names to version requirements to use during the load
- **request** (*str, None*) – name of the version string of the plugin that requested a component from this plugin. *None* if not requested.
- **comp** (*str*) – name of the component needed by the requesting plugin. *None* if not requested.

Returns the loaded module object

Raises

- `TypeError` – if things get passed wrong
- `PyitectLoadError` – if there is an exception during the load

resolve_highest_match (*component, plugin, spec*)

resolves the latest version of a component with requirements,

takes in a component name and some requierments and gets a valid plugin name and its highest version

Parameters

- **component** (*str*) – a component name
- **plugin** (*str*) – a plugin name if it's empty we default to alphabetical order
- **spec** (*Spec*) – a SemVer version spec

Raises `TypeError` – if somthing isn't the right type

resolve_providers (*component, subs=True, key=None, reverse=False*)

Resolve what avabile component is used

will create a lost of a component and it's subcomponents to sorted with *sorted(component key=key)* and return the first item

the default, and possibly undesierable behavior, is alphabetical order of component names

Parameters **key** (*func, None*) – a key function to sort the componet types and subtypes that are valid so you can select the correct one

search (*path*)

Search a path (dir or file) for a plugin in the case of a file it searches the containing dir.

Parameters **path** (*str*) – the path to search

systems = []

A list of all *System* instances

unbind_event (*event, function*)

Remove a function from an event

removes the function object from the list of callables to call when event fires. does nothing if function is not bound

Parameters

- **event** (*str*) – name of event bound to
- **function** (*callable*) – object to unbind

class `pyitect.Plugin` (*config, path*)

An object that can hold the metadata for a plugin

like its name, author, verison, and the file to be loaded ect. also stores the path to the plugin folder and provideds functionality to load the plugin module and run its *on_enable* function

name

str

plugin name

author

str

plugin author

version

Version

plugin vesion

file*str*

relative path to the file to import to load the plugin

consumes*dict*

a listing of the components consumed

provides*dict*

a listing of the components provided

on_enable*None, str*

either *None* or a str dotted name of a function in the module

path*str*

an absolute path to the plugin folder module (*None*, object): either *None* or the module object if the plugin has been loaded already

get_version_string()

returns a version string

has_on_enable()

returns *True* if it has an *on_enable* attribute that's not *None*

key()

return a key that can be used to identify the plugin

Returns (name, author, version, path)

Return type tuple

load()

loads the plugin file and returns the resulting module

Raises

- *PyitectLoadError* – If there was a problem loading a plugin module
- *PyitectNotProvidedError* – If component is not provided

run_on_enable()

runs the function in the 'on_enable' if set

Raises

- *TypeError* – if the on_enable property is set wrong
- *PyitectOnEnableError* – if there is an exception
- **accessing or calling the on_enable function** –
- *PyitectLoadError* – If the module object is not loaded yet

class `pyitect.Component` (*name, plugin, author, version, path*)

An object to hold metadata for a specific instance of a component

Holds the metadata needed to identify an instance of a component provided by a plugin

name*str*

the component name provided

plugin*str*

the name of the providing plugin

author*str*

the author of the providing plugin

version*Version*

the version of the providing plugin

path*str*

a dotted name path to the component object from the top of the plugin module

key()

returns a key to identify this component

Returns (name, plugin, author, version, path)**Return type** tuple`pyitect.get_system()`

Fetch the global system instance

Raises *PyitectError* – If the system isn't built yet`pyitect.build_system(config, enable_yaml=False)`

Build a global system instance

Parameters

- **config** (*dict*) – A mapping of component names to version requirements
- **enable_yaml** (*bool*) – Should the system support yaml config files?

Raises *PyitectError* – if the system is already built`pyitect.destroy_system()`

destroy the global system instance

does nothing if the system isn't built

`pyitect.issubcomponent(comp1, comp2)`

Check if comp1 is a subtype of comp2

Returns whether the Component passed as comp1 validates as a subtype of the Component passed as comp2.

if strings are passed as either parameter they are treated as Component names. if a Component instance is passed its *name* property is pulled.**Parameters**

- **comp1** (*str, Component*) – The Component or component name to check
- **comp2** (*str, Component*) – The Component or component name to compare to

`pyitect.get_unique_name(*parts)`

Generate a fixed length unique name from parts

takes the parts turns them into strings and uses them in a sha1 hash

used internally to ensure module object for plugins have unique names like so

```
get_unique_name(plugin.author, plugin.get_version_string())
```

Returns name hash

Return type str

`pyitect.gen_version(version_str)`

Generates an *Version* object

takes a SemVer string and returns a *Version* if not a proper SemVer string it coerces it

Parameters *version_str* (str) – version string to use

`pyitect.expand_version_req(requires)`

Take a requierment and return the Spec and the plugin name

takes a requierment and pumps out a plugin name and a SemVer Spec requires is either a string of the form (“”, “*”, “plugin_name”, plugin_name:version_spec)

or a mapping with *plugin* and *spec* keys like so {“plugin”: “plugin_name”, “spec”: “>=1.0.0”} the spec key’s value can be a string of comma seperated version requierments or a list of strings of the same

Parameters *requires* (str, mapping) – string or mapping object with *plugin* and *spec* keys

Examples

```
>>> expand_version_req("")
('', <Spec: (<SpecItem: * '>,>)>)
>>> expand_version_req("*")
('', <Spec: (<SpecItem: * '>,>)>)
>>> expand_version_req("plugin_name")
('plugin_name', <Spec: (<SpecItem: * '>,>)>)
>>> expand_version_req("plugin_name:>=1.0.0")
('plugin_name', <Spec: (<SpecItem: >= Version('1.0.0')>,>)>)
>>> expand_version_req("plugin_name:>=1.0.0,<2.0.0")
('plugin_name', <Spec: (SpecItems... >= 1.0.0, < 2.0.0 )>)>)
>>> expand_version_req({"plugin": "plugin_name", "spec": ">=1.0.0"})
('plugin_name', <Spec: (<SpecItem: >= Version('1.0.0')>,>)>)
```

Raises

- `ValueError` – when the requierment is of a bad form
- `TypeError` – when the requiers objt is not a string or mapping

exception `pyitect.PyitectError(*args, **kwargs)`

Wraps Exceptions for Chained trace backs

As Pyitect is intended for use across pyhton 2 and 3 a way was needed to Ensure that exceptions caused during the import of plugin modules tell *why* that import failed insed of just *failed to import 'bla'*

This code is a modified version of a *CausedException* class posed to ActiveState back in Sep. 2012 Licensed under MIT license

the ability handle trees of exceptions was removed

<http://code.activestate.com/recipes/578252-python-exception-chains-or-trees/?in=user-4182236>

exception `pyitect.PyitectNotProvidedError (*args, **kwargs)`

Raised if a component is not provided

exception `pyitect.PyitectNotMetError (*args, **kwargs)`

Raised if requierments are not met

exception `pyitect.PyitectLoadError (*args, **kwargs)`

Raises if a plugins module is not yet loaded or fais to load

exception `pyitect.PyitectOnEnableError (*args, **kwargs)`

Raised if and on_enable call failes

exception `pyitect.PyitectDupError (*args, **kwargs)`

Raised if you try to add a duplicate plugin or duplicate component provider

1.2 Creating Plugins

Contents:

1.2.1 What is a Plugin?

A plugin to pyitect is simply a folder with a `.json` config file of the same name as the folder inside. If you have yaml support enabled the extensions `.yaml` and `.yml` are also available

```
/Im-A-Plugin
  Im-A-Plugin.json
  file.py
```

```
/Im-A-Plugin2
  Im-A-Plugin2.yaml
  file.py
```

```
/Im-A-Plugin3
  Im-A-Plugin3.yml
  file.py
```

A plugin has a name, a version, an author, a module or package, and it provides Components used to build your application. a component is simply an object which can be accessed from the imported module a plugin's config file provides information about the plugin as well as lists components it provides and components it needs on load

Here's an example, most fields are mandatory but the consumes and provides CAN be left as empty containers

```
{
  "name": "Im-A-Plugin",
  "author": "author_name",
  "version": "0.0.1",
  "file": "file.py",
  "on_enable": "on_enable_func",
  "consumes": {
    "foo" : "*"
  },
  "provides": {
    "Bar": ""
  }
}
```

Here is the same file in yaml

```
name: Im-A-Plugin
author: author_name
version: 0.0.1
file: file.py
on_enable: on_enable_func # optional, runs this function when the plugin is enabled
consumes:
  foo: '*'
provides:
  Bar: ''
```

Version numbers should conform to conformed to [Semantic Versioning](#) meaning that they should have a major, minor, and patch number like so: *major.minor.patch-prerelease+buildifo*

- **name** -> the name of the plugin (No spaces)
- **author** -> the author of the plugin
- **version** -> a version for the plugin, a string that conformes to [SemVer](#)
- **file** -> a path to a function that will be called form the imported module after the plugin is loaded
- **consumes** -> a mapping of needed component names to version requierments, empty string = no requirement
- **provides** -> a mapping of provided component names to paths from the imported module, empty string = path is component name

1.2.2 Version Requirements

A plugin can provide version requirements for the components it's importing. they take two forms, a version string or a version mapping.

A version string is formatted like so

```
plugin_name:<version_requirements>
```

Both parts are optional and an empty string or a string containing only a '*' means no requirement. If there is no requirement specified then the highest available version will be selected from the first provider in alphabetical order.

if the version requirement is not give or given as * but the plugin name is then the highest available version will be selected from the names plugin

A version requirement is a logical operator paired with a version number. Any number of requirements can be grouped with commas.

Version numbers in requirements should also follow [Semantic Versioning](#)

Version requirement support is provided by the [python-semanticversion](#) project. specifically the *Spec* class. More documentation can be found [here](#).

Here are some examples of a version string

```
" " // no requirement
"*" // no requirement
"FooPlugin" // from this plugin and no other, but any version
"FooPlugin:*" // from this plugin and no other, but any version
"FooPlugin:==1" // from this plugin and no other, version 1.x.x
"FooPlugin:==1.0" // 1.0.x
"FooPlugin:==1.0.1" // version 1.0.1 or any post release
"FooPlugin:==1.0.1-pre123" // 1.0.1-pre123 -> this exact version
"FooPlugin:==1.2" // 1.2.x and any pre/post/dev release
```

```
"FooPlugin:>1.0" // greater than 1.0
"FooPlugin:>=1.2.3" // greater than or equal to 1.2.3
"FooPlugin:<=2.1.4" // less than or equal to 2.1.4
"FooPlugin:>1.0,<2.3" // greater than 1.0 and less than 2.3
"FooPlugin:>1.0,<=2.0,!1.3.17" // between V1.0.x and V2.0.x but not V1.3.17
```

Version requirements can also be given a mapping. The mapping must contain the keys *plugin* and *spec* but this can allow for your requirement specification to be more clear.

Here is an example:

```
{
  "name": "Im-A-Plugin2",
  "author": "author_name",
  "version": "0.0.1",
  "file": "file.py",
  "consumes": {
    "foo" : {
      "plugin": "special_plugin_name",
      "spec": ">1.0,<=2.0,!1.3.17"
    }
  },
  "provides": {
    "Bar": ""
  }
}
```

The *spec* key can also be a list of version specifications

```
{
  "consumes": {
    "foo" : {
      "plugin": "special_plugin_name",
      "spec": [ ">1.0", "<=2.0,!1.3.17" ]
    }
  }
}
```

1.2.3 Letting Plugins Access Consumed Components

inside your plugin files you need to get access to your consumed components right? Here's how you do it.

The plugin can pull it's declared components from *pyitect.imports* during the import of the module or package. *pyitect.imports* gets cleared after the import is done. So, the component imports from *pyitect.imports* should be in the top level of the module, not on demand imports in the code.

if a plugin author needs access to components not declared in the config file for run time use - ie. to load component on the fly - then they will need the system author to provide access to the plugin system instance.

1.2.4 Writing a Plugin

Writing a plugin for pyitect is simple.

First Create a folder to hold your plugin

Second Create a configuration file with the same name as the folder but with an extension. *.json* for a JSON config or *.yaml/.yml* for a YAML config

Third Create your python module or package. Your plugin folder can even be your package folder

Forth Write up your config for the plugin

Point the file attribute to your module file or package. If it's a package point it to the `__init__.py`. It doesn't matter if your module is pure python, byte-code compiled (`.pyc`) or a native extension (`.pyd`, `.so`)

A working plugin looks something like the following:

Folder Structure

```
/Im-A-Plugin
  Im-A-Plugin.json
  file.py
```

Im-A-Plugin.json

```
{
  "name": "plugin_name",
  "author": "author_name",
  "version": "0.1.0",
  "file": "<relative_path>",
  "on_enable": "<optional_function_path>",
  "consumes": {
    "foo" : "*"
  },
  "provides": {
    "Bar": ""
  }
}
```

file.py

```
#file.py
from pyitect.imports import foo

class Bar(object):
    def __init__():
        foo("it's a good day to be a plugin")
```

1.3 Setting up a Plugin system

Setting up a plugin system is dead simple.

First create an instance of the `System` class

```
from pyitect import System
system = System()
```

The system class constructor takes two arguments, a configuration mapping and a `yaml` flag

The config mapping allows you to provide default requirements for components so if a call is made to `system.load()` with no requirements of it's own the requirements from the passed config are used.

The `yaml` flag of course enables `yaml` support for the plugin system. allowing configuration file to be written in `yaml`. `yaml` support is not enabled by default because it requires the [PyYAML](#) library.

Next add some plugins to the system.

This can be done either by using the `system.search()` function to recursively search a directory for plugins.

Or added manually by providing the path to a plugin folder to the `system.add_plugin()` function of your system instance.

```
system.search("path/to/your/plugins/tree")
system.add_plugin("path/to/a/plugin/folder")
```

Now that you have some plugin you still have to enable them.

Enabling a plugin maps out the components it provides and make them available for loading by the plugin system. It does not load the plugin module or package unless there is an 'on_enable' property in its configuration.

In which case, after the component are mapped and the plugin is enabled, the plugin module or package is loaded and an attempt is made to follow the path given to the `on_enable` configuration property to a callable object (ie. function) from the top level of the module or package and it is called passing only the `Plugin` configuration object for the plugin.

To enable a plugin you need its `Plugin` instance. these can be accessed from `system.plugins`
a simple way to get a list of them would be.

```
plugins = [system.plugins[n][v] for n in system.plugins for v in system.plugins[n]]
```

After you have your list of Plugin objects you can filter it how you want to enable only the plugins you want to. When you're ready.

```
system.enable_plugins(plugins)
```

`enable_plugins` can take multiple objects and any individual can be by a iterable or map of `Plugin` objects.

After you have some plugins enabled loading a provided component is as easy as

```
Bar = system.load("Bar")
```

The general idea is to create a system, search some path or paths for plugins and then enable them.

A plugin system can not be created without first creating an instance of the System class.

1.3.1 Global System

If you don't want to manage your plugin system instance yourself it is possible to have the pyitect module manage your plugin system for you. Simply use the `pyitect.build_system()` function to construct your plugin system inside pyitect. To later fetch your plugin system instance use `pyitect.get_system()`. To clean up and remove the existing system use `pyitect.destroy_system()`.

1.3.2 'on_enable' Property

plugins can specify an `on_enable` property in their configuration. This is a dotted name path to a function that is executed right after a plugin is enabled and its components have been mapped. This allows for special cases where enabling a plugin requires more than just making its components available to be imported. For example if there is some system setup to be done.

```
pyitect.build_system(config, enable_yaml=False)
system = pyitect.get_system()
# ... do stuff
# end program / need fresh system?
pyitect.destroy_system()
```

1.3.3 Loading Components at run-time

Components are loaded at runtime via the `system.load` method or the `system.load_component` method the second method requires you to explicitly state a plugin a version to load from this is not a common use can and is intended mostly for use with `system.iter_component_providers`.

The first method only needs the name of a component and will load any matching provider even if it is a subtype. This is the most common usecase

```
# if "a" is not available will also load a "a.b" or "a.c"
a = system.load("a")
```

If the subtype matching is undesirable then it can be explicitly prevented with a key word argument

```
# will only load a "a" not a "a.b"
a = system.load("a", subs=False)
```

The default mode for selecting from among subtype is to sort alphanumerically and pick the first one. This is often not a desirable behavior in more complex situations. As such a *key* parameter can be used

```
def key(prov):
    return (0 if prov[0] == "a.b" else 1)

# results in the loading of an "a.b"
a = system.load("a", key=key)
```

your key function can be as complex or as simple as you want. they are sorting the results of a call to `system.iter_component_providers`. which yields tuples that look like (*<component_name>*, *<plugin_name>*, *<version>*)

if necessary there is a reverse keyword parameter to reverse the results of the sort

```
# results in the load of the latest and highest subtype
a = system.load("a", reverse=True)
```

1.3.4 Loading Plugins

Plugins are loaded on demand when a component is loaded via

```
system.load("<component name>")
```

a plugin can also be explicitly loaded via

```
system.load_plugin(plugin, version)
```

where *plugin* is the plugin name and *version* is the version

1.3.5 Tracking loaded Components

Pyitect tracks used components at anytime `system.using` can be inspected to find all components that have been requested and from what plugins they have been loaded along with versions.

`system.using` is a list of `component.key()` s

```
>>> system.using
{
    'component1' : {
```

```
    'plugin1': ['1.0.2']
},
'special_component1': {
    'special_plugin1': ['0.1.3'],
    'special_plugin2': ['0.2.4', '1.0.1-pre3']
}
}
```

Pyitect also tracks enabled plugins `system.enabled_plugins` is a mapping of plugin names to a mapping of versions to *Plugin* objects.

Like so

```
>>> system.enabled_plugins
{
    "special_plugin1" : {
        "Version('1.0.0')": Plugin('special_plugin1:1.0.0')
    }
}
```

1.4 Using Events

The plugin system also includes a simple event system bound to the *system* object, it simply allows one to register a function to an event name and when *system.fire_event* is called it calls all registered functions passing the extra **args* and ***kwargs* to them.

pyitect fires some events internally so that you can keep track of when the system finds and loads plugins.

1.4.1 Using Events

Pyitect supplies three methods for dealing with events

System.bind_event

```
system.bind_event('name', Function)
```

Binds *Function* to the event '*name*'. when an event of '*name*' is fired the function will be called with all extra parameters passed to the *fire_event* call.

System.unbind_event

```
system.unbind_event('name', Function)
```

Removes *Function* from the list of functions to be called when the event is fired

System.fire_event

```
system.fire_event('name', *args, **kwargs)
```

Fires the event '*name*', calling all bound functions with **args* and ***kwargs*

1.4.2 Events Fired Internally

`plugin_found`

A function bound to this event gets called every time a plugin is found during a search called an example is provided.

Example function to bind:

```
def onPluginFound (path, plugin):
    """
    path (str): the full path to the folder containing the plugin
    plugin (str): plugin version string (ie 'plugin_name:version')
    """
    print("plugin `%s` found at `%s`" % (plugin, path))
```

component_mapped

When a plugin is enabled it's components are mapped out, this event is fired every time that happens.

Example function to bind:

```
def onComponentMapped (component, plugin, version):
    """
    component (str): the component name
    plugin (str): plugin name
    version (Version): the plugin version string less the plugin name
    """
    print("component `%s` mapped from `%s@%s`" % (component, plugin, version))
```

plugin_loaded

A function bound to this event is called every time a new plugin is loaded during a component load.

Example function to bind:

```
def onPluginLoad (plugin, plugin_required, component_needed):
    """
    plugin (str): plugin version string (ie 'plugin_name:version')
    plugin_required (str): version string of the plugin that required the loaded plugin (version string)
    component_needed (str): the name of the component needed by the requesting plugin
    """
    print("plugin `%s` was loaded by plugin `%s` during a request for the `%s` component" % (plugin,
```

component_loaded

A function bound to this event is called every time a component is successfully loaded example:

Example function to bind:

```
def onComponentLoad (component, plugin_required, plugin_loaded):
    """
    component (str): the name of the component loaded
    plugin_required (str): version string of the plugin that required the loaded component (version string)
    plugin_loaded (str): version string of the plugin that the component was loaded from (version string)
    """
    print("Component `%s` loaded, required by `%s`, loaded from `%s`" % (component, plugin_required,
```

1.5 ChangeLog

1.5.1 v2.0.1 (2015-8-25)

Bugfix:

- bug fix with `issubcomponent`
- `System.load` will not actually consider subcomponent

New:

- expose `load_component` in the `System` class
- use `key` function to choose component ins `System.load`

1.5.2 v2.0.0 (2015-8-25)

- Large API incompatible update
- supports Python 2.6+
- now uses *pyitect.imports* for import time plugin loading
- version postfixes are replaced with component subtypes
- Uses SemVer processing via [python-semanticversion](#) project
- module overlap is prevented with unique model names in *sys.modules*
- no import modes, uses *imp* module for everything ≥ 3.3 and *importlib* for 3.4+
- ability to store global system instance in *pyitect* module
- support YAML for plugin configuration files
- Custom Exception classes with exception chain support
- fully fledged docs

1.5.3 v1.1.0 (2015-7-17)

- readme cleanup
- `gen_version` generates a version 2 tuple
- change `on_enable` to a callable path in the imported plugin module

1.5.4 v1.0.1 (2015-6-10)

- change out Version mechanism for a local parse method based off of `LooseVersion`
- update tests to proper unit tests

1.5.5 v1.0.0 (2015-6-9)

- change from `parse_version` from `setuptools` to `LooseVersion` in `distutils`

1.5.6 v0.9.2 (2014-9-28)

- Ensure plugin configuration json file is closed @svisser

1.5.7 v0.9.1 (2014-9-28)

- files loaded with *exec* give proper file path
- proper trace back given when component fail to load (even when it's a recursion error)
- add *component_mapped* event

1.5.8 v0.9.0 (2014-9-27)

- add *get_plugin_module* method

1.5.9 v0.8.0 (2014-9-27)

- Added ability to run code when a plugin is enabled via “*on_enable*” property

1.5.10 v0.7.2 (2014-9-23)

- Fix name error in unbind and fire event commands

1.5.11 v0.7.0 (2014-9-21)

- plugins found with *System.search* are no longer auto enabled
- use *System.enable_plugins(<mapping>|<iterable>|<Plugin>)* to enable plugins from *System.plugins*
- added *Plugin* class to main namespace

1.5.12 v0.6.2 (2014-9-13)

- relative imports now work so long as the target file for loading is named *__init__.py* to trigger python to treat the plugin folder as a package

1.5.13 v0.6.1 (2014-9-13)

- re-factored *System.load* out to make use of two smaller functions, easier to maintain
- added plugin loading modes, import for py3.4+ and exec for support of previous python version

1.5.14 v0.5.1 (2014-8-30)

- added ability to provide more than one version of a component in the same plugin with potfix mapping
- event system added, system fire events
- made requirement overwrite system defaults, removed bypass peram
- itrPluginsByComponent lists potfix mappings too.
- tests updates to test all features
- README update
- This changelog added

1.5.15 v0.1.15 (2014-8-26)

- added itrPluginsByComponent
- added bypass peram to System.load to bypass system default

1.5.16 v0.1.10 (2014-8-25)

- First public release

Indices and tables

- `genindex`
- `modindex`
- `search`

p

`pyitect`, [3](#)
`pyitect.imports`, [3](#)

A

`add_plugin()` (`pyitect.System` method), 4
`author` (`pyitect.Component` attribute), 10
`author` (`pyitect.Plugin` attribute), 8

B

`bind_event()` (`pyitect.System` method), 5
`build_system()` (in module `pyitect`), 10

C

`Component` (class in `pyitect`), 9
`component_map` (`pyitect.System` attribute), 4
`components` (`pyitect.System` attribute), 4
`config` (`pyitect.System` attribute), 4
`consumes` (`pyitect.Plugin` attribute), 9

D

`destroy_system()` (in module `pyitect`), 10

E

`enable_plugins()` (`pyitect.System` method), 5
`enabled_plugins` (`pyitect.System` attribute), 4
`events` (`pyitect.System` attribute), 4
`expand_version_req()` (in module `pyitect`), 11

F

`file` (`pyitect.Plugin` attribute), 8
`fire_event()` (`pyitect.System` method), 5

G

`gen_version()` (in module `pyitect`), 11
`get_plugin_module()` (`pyitect.System` method), 5
`get_system()` (in module `pyitect`), 10
`get_unique_name()` (in module `pyitect`), 10
`get_version_string()` (`pyitect.Plugin` method), 9

H

`has_on_enable()` (`pyitect.Plugin` method), 9

I

`is_plugin()` (`pyitect.System` method), 5
`issubcomponent()` (in module `pyitect`), 10
`iter_component_providers()` (`pyitect.System` method), 5
`iter_component_subtypes()` (`pyitect.System` method), 6

K

`key()` (`pyitect.Component` method), 10
`key()` (`pyitect.Plugin` method), 9

L

`load()` (`pyitect.Plugin` method), 9
`load()` (`pyitect.System` method), 6
`load_component()` (`pyitect.System` method), 7
`load_plugin()` (`pyitect.System` method), 7
`loaded_plugins` (`pyitect.System` attribute), 4

N

`name` (`pyitect.Component` attribute), 9
`name` (`pyitect.Plugin` attribute), 8

O

`on_enable` (`pyitect.Plugin` attribute), 9

P

`path` (`pyitect.Component` attribute), 10
`path` (`pyitect.Plugin` attribute), 9
`Plugin` (class in `pyitect`), 8
`plugin` (`pyitect.Component` attribute), 10
`plugins` (`pyitect.System` attribute), 4
`provides` (`pyitect.Plugin` attribute), 9
`pyitect` (module), 3
`pyitect.imports` (module), 3
`PyitectDupError`, 12
`PyitectError`, 11
`PyitectLoadError`, 12
`PyitectNotMetError`, 12
`PyitectNotProvidedError`, 12
`PyitectOnEnableError`, 12

R

`resolve_highest_match()` (pyitect.System method), 7
`resolve_providers()` (pyitect.System method), 8
`run_on_enable()` (pyitect.Plugin method), 9

S

`search()` (pyitect.System method), 8
`Spec` (class in pyitect), 3
`System` (class in pyitect), 3
`systems` (pyitect.System attribute), 8

U

`unbind_event()` (pyitect.System method), 8
`using` (pyitect.System attribute), 4

V

`Version` (class in pyitect), 3
`version` (pyitect.Component attribute), 10
`version` (pyitect.Plugin attribute), 8