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# soco Documentation

*Release 0.14*

**Author**

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SoCo (Sonos Controller) is a high level Python 2/3 library to control your Sonos® speakers with:

```
# Import soco and get a SoCo instance
import soco
device = soco.discovery.any_soco()

# Get all albums from the music library that contains the word "Black"
# and add them to the queue
albums = device.music_library.get_albums(search_term='Black')
for album in albums:
    print('Added:', album.title)
    device.add_to_queue(album)

# Dial up the volume (just a bit) and play
device.volume += 10
device.play()
```

To get up and running quickly with *SoCo*, start by reading the *getting started* page, with *installation instructions* and a small *tutorial* and then wet your appetite with the *micro examples*. Then optionally follow up with any of the advanced topics that pique your interest: *Speaker Topologies*, *Events* and *UPnP Services*. Finally dive into the *the full module reference documentation*.

If you have a question, start by consulting the [FAQ](#). If your question remains unanswered, post a question in the *SoCo* Google group or in the #soco channel on freenode.

If you are interested in participating in the development, please read *the development documentation* and file a bug or make a pull request on Github.





## 1.1 Getting started

This section will help you to quickly get started with *SoCo*.

### 1.1.1 Installation

*SoCo* can be installed either with *pip* (recommended) or *manually*.

#### 1.1.1.1 From PyPi with pip

The easiest way to install *SoCo*, is to install it from [PyPi](#) with the program *pip*. This can be done with the command:

```
pip install soco
```

This will automatically take care of installing any dependencies you need.

#### 1.1.1.2 Manual installation from .tar.gz file

*SoCo* can also be installed manually from the *.tar.gz* file. First, find [the latest version of SoCo on PyPi](#) and download the *.tar.gz* file at the bottom of the page. After that, extract the content and move into the extracted folder. As an example, for *SoCo* 0.11.1 and on a Unix type system, this can be done with the following commands:

```
wget https://pypi.python.org/packages/source/s/soco/soco-0.11.1.tar.gz
↪ #md5=73187104385f04d18ce3e56853be1e0c
tar zxvf soco-0.11.1.tar.gz
cd soco-0.11.1/
```

Have a look inside the `requirements.txt` file. You will need to install the dependencies listed in that file yourself. See the documentation for the individual dependencies for installation instructions.

After the requirements are in place, the package can be install with the command:

```
python setup.py install
```

### 1.1.1.3 After installation check

After installation, open a Python interpreter and check that `soco` can be imported and that your Sonos® players can be discovered:

```
>>> import soco
>>> soco.discover()
set([SoCo("192.168.0.16"), SoCo("192.168.0.17"), SoCo("192.168.0.10")])
```

## 1.1.2 Tutorial

*SoCo* allows you to control your Sonos sound system from a Python program. For a quick start have a look at the [example applications](#) that come with the library.

### 1.1.2.1 Discovery

For discovering the Sonos devices in your network, use `soco.discover()`.

```
>>> import soco
>>> speakers = soco.discover()
```

It returns a `set` of `soco.SoCo` instances, each representing a speaker in your network.

### 1.1.2.2 Music

You can use those `SoCo` instances to inspect and interact with your speakers.

```
>>> speaker = speakers.pop()
>>> speaker.player_name
'Living Room'
>>> speaker.ip_address
u'192.168.0.129'

>>> speaker.volume
10
>>> speaker.volume = 15
>>> speaker.play()
```

See for `soco.SoCo` for all methods that are available for a speaker.

## 1.2 Examples

This page contains collection of small examples to show of the features of *SoCo* and hopefully get you well started with the library.

All examples are shown as if entered in the Python interpreter (as apposed to executed from a file) because that makes it easy to incorporate output in the code listings.

All the examples from *Playback control* and forward assume that you have followed one of the examples in *Getting your devices* and therefore already have a variable named `device` that points to a `soco.SoCo` instance.

## 1.2.1 Getting your devices

### 1.2.1.1 Getting all your devices

To get all your devices use the `soco.discover()` function:

```
>>> import soco
>>> devices = soco.discover()
>>> devices
set([SoCo("192.168.0.10"), SoCo("192.168.0.30"), SoCo("192.168.0.17")])
>>> device = devices.pop()
>>> device
SoCo("192.168.0.16")
```

### 1.2.1.2 Getting any device

To get any device use the `soco.discovery.any_soco()` function. This can be useful for cases where you really do not care which one you get, you just need one e.g. to query for music library information:

```
>>> import soco
>>> device = soco.discovery.any_soco()
>>> device
SoCo("192.168.0.16")
```

### 1.2.1.3 Getting a named device

Getting a device by player name can be done with the `soco.discovery.by_name()` function:

```
>>> from soco.discovery import by_name
>>> device = by_name("Living Room")
>>> device
SoCo("192.168.1.18")
```

## 1.2.2 Playback control

### 1.2.2.1 Play, pause and stop

The normal play, pause and stop functionality is provided with similarly named methods (`play()`, `pause()` and `stop()`) on the `SoCo` instance and the current state is included in the output of `get_current_transport_info()`:

```
>>> device.get_current_transport_info()['current_transport_state']
'STOPPED'
>>> device.play()
>>> device.get_current_transport_info()['current_transport_state']
'PLAYING'
>>> device.pause()
>>> device.get_current_transport_info()['current_transport_state']
'PAUSED_PLAYBACK'
```

### 1.2.2.2 More playback control with next, previous and seek

Navigating to the next or previous track is similarly done with methods of the same name (*next()* and *previous()*) and information about the current position in the queue is contained in the output from *get\_current\_track\_info()*:

```
>>> device.get_current_track_info() ['playlist_position']
'29'
>>> device.next()
>>> device.get_current_track_info() ['playlist_position']
'30'
>>> device.previous()
>>> device.get_current_track_info() ['playlist_position']
'29'
```

Seeking is done with the *seek()* method. Note that the input for that method is a string on the form “HH:MM:SS” or “H:MM:SS”. The current position is also contained in *get\_current\_track\_info()*:

```
>>> device.get_current_track_info() ['position']
'0:02:59'
>>> device.seek("0:00:30")
>>> device.get_current_track_info() ['position']
'0:00:31'
```

## 1.2.3 Seeing and manipulating the queue

### 1.2.3.1 Getting the queue

Getting the queue is done with the *get\_queue()* method:

```
>>> queue = device.get_queue()
>>> queue
Queue(items=[<DidlMusicTrack 'b'Blackened' at 0x7f2237006dd8>, ..., <DidlMusicTrack
↪ 'b'Dyers Eve' at 0x7f2237006828>])
```

The returned *Queue* object is a sequence of items from the queue, meaning that it can be iterated over and its length acquired with *len()*:

```
>>> len(queue)
9
>>> for item in queue:
...     print(item.title)
...
Blackened
..and Justice for All
Eye of the Beholder
One
The Shortest Straw
Harvester of Sorrow
The Frayed Ends of Sanity
To Live Is to Die
Dyers Eve
```

The queue object also has *total\_matches* and *number\_returned* attributes, which are used to figure out whether paging is required in order to get all elements of the queue. See the *ListOfMusicInfoItems* docstring for details.

### 1.2.3.2 Clearing the queue

Clearing the queue is done with the `clear_queue()` method as follows:

```
>>> queue = device.get_queue()
>>> len(queue)
9
>>> device.clear_queue()
>>> queue = device.get_queue()
>>> len(queue)
0
```

## 1.3 Frequently Asked Questions

This page contains answers to a few commonly asked questions.

### 1.3.1 Why can't I play a URI from music service X with the `play_uri()` method?

The `play_uri()` method is only for playing URI's with un-restricted access such as podcasts, certain radion stations or sound clips on webpages. In short, the `play_uri()` method is for anything that will play as a sound file in your browser without authentication.

To play music from a music service, you will need to go via the `music_service` module. Here you can search or browse to obtain music service items, which can be added to the queue and played.

### 1.3.2 Why can't I add a URI from music service X to the queue with the `add_uri_to_queue()` method?

See *Why can't I play a URI from music service X with the `play_uri()` method?*.

### 1.3.3 Can I make my Sonos® speaker play music from my local hard drive with SoCo?

At the face of it, *no*. Sonos® devices can only play music that is available on the network i.e. can be reached via a URI. So you have two options:

1. You can share your local music folder onto the network and add it to the Sonos® library as a part of your music collection, which can then be searched, browsed and played with SoCo.
2. You can cheat and make Python serve the files on the fly and play them as URIs. The [play local files](#) example shows one way in which this can be accomplished.

**Warning:** Note that this example is meant as a convenient way get started, but that no security precautions has been taken to e.g. prevent serving other files out into the local network. Take appropriate actions if this is a concern.

### 1.3.4 How can I save, then restore the previous playing Sonos state ?

This is useful for scenarios such as when you want to switch to radio, an announcement or doorbell sound and then back to what was playing previously. Documentation of the Snapshot *snapshot* module.

SoCo provides a snapshot module that captures the current state of a player and then when requested re-instates that state. Examples of it's use are:

- basic snap example
- multi zone example

## 1.4 Plugins

Plugins can extend the functionality of SoCo.

### 1.4.1 Creating a Plugin

To write a plugin, simply extend the class `soco.plugins.SoCoPlugin`. The `__init__` method of the plugin should accept an `SoCo` instance as the first positional argument, which it should pass to its `super` constructor.

The class `soco.plugins.example.ExamplePlugin` contains an example plugin implementation.

### 1.4.2 Using a Plugin

To use a plugin, it can be loaded and instantiated directly.

```
# create a plugin by normal instantiation
from soco.plugins.example import ExamplePlugin

# create a new plugin, pass the soco instance to it
myplugin = ExamplePlugin(soco, 'a user')

# do something with your plugin
print 'Testing', myplugin.name
myplugin.music_plugin_stop()
```

Alternatively a plugin can also be loaded by its name using `SoCoPlugin.from_name()`.

```
# get a plugin by name (eg from a config file)
myplugin = SoCoPlugin.from_name('soco.plugins.example.ExamplePlugin',
                               soco, 'some user')

# do something with your plugin
print 'Testing', myplugin.name
myplugin.music_plugin_play()
```

### 1.4.3 The SoCoPlugin class

```
class soco.plugins.SoCoPlugin(soco)
    The base class for SoCo plugins.
```

**name**  
human-readable name of the plugin

**classmethod from\_name** (*fullname, soco, \*args, \*\*kwargs*)  
Instantiate a plugin by its full name.

## 1.5 Authors

### 1.5.1 Project Creator

SoCo was created in 2012 at Music Hack Day Sydney by Rahim Sonawalla

### 1.5.2 Maintainers

- Lawrence Akka
- Stefan Kögl
- Kenneth Nielsen
- David Harding

### 1.5.3 Contributors

(alphabetical)

- Petter Aas
- Murali Allada
- Joel Björkman
- Aaron Daubman
- Johan Elmerfjord
- David Harding
- Jeff Hinrichs
- Jeroen Idserda
- Todd Neal
- nixscripter
- Kenneth Nielsen
- Dave O'Connor
- Dennis O'Reilly
- phut
- Dan Poirier
- Jason Ting
- Scott G Waters

## 1.6 Speaker Topologies

Sonos speakers can be grouped together, and existing groups can be inspected.

Topology is available from each `soco.SoCo` instance.

```
>>> my_player.group
ZoneGroup(
  uid='RINCON_000E5879136C01400:58',
  coordinator=SoCo("192.168.1.101"),
  members={SoCo("192.168.1.101"), SoCo("192.168.1.102")}
)
```

A group of speakers is represented by a `soco.groups.ZoneGroup`.

### 1.6.1 Zone Group

Each `ZoneGroup` contains its coordinator

```
>>> my_player.group.coordinator
SoCo("192.168.1.101")
```

which is again a `soco.SoCo` instance

```
>>> my_player.group.coordinator.player_name
Kitchen
```

A `ZoneGroup` also contains a set of members.

```
>>> my_player.group.members
{SoCo("192.168.1.101"), SoCo("192.168.1.102")}
```

For convenience, `ZoneGroup` is also a container:

```
>>> for player in my_player.group:
...     print(player.player_name)
Living Room
Kitchen
```

If you need it, you can get an iterator over all groups on the network:

```
>>> my_player.all_groups
<generator object all_groups at 0x108cf0c30>
```

## 1.7 UPnP Services

Sonos devices offer several UPnP services which are accessible from classes in the `soco.services` module.

- `soco.services.AlarmClock`
- `soco.services.MusicServices`
- `soco.services.DeviceProperties`
- `soco.services.SystemProperties`



- `soco.services.ZoneGroupTopology`
- `soco.services.GroupManagement`
- `soco.services.QPlay`
- `soco.services.ContentDirectory`
- `soco.services.MS_ConnectionManager`
- `soco.services.RenderingControl`
- `soco.services.MR_ConnectionManager`
- `soco.services.AVTransport`
- `soco.services.Queue`
- `soco.services.GroupRenderingControl`

All services take a `soco.SoCo` instance as their first parameter.

### 1.7.1 Inspecting

To get a list of supported actions you can call the service's `soco.services.Service.iter_actions()`. It yields the service's actions with their `in_arguments` (ie parameters to pass to the action) and `out_arguments` (ie returned values).

Each action is an `soco.services.Action` namedtuple, consisting of `action_name` (a string), `in_args` (a list of `soco.services.Argument` namedtuples consisting of name and argtype), and `out_args` (ditto), eg:

### 1.7.2 Events

You can subscribe to the events of a service using the `soco.services.Service.subscribe()` method. See *Events* for details.

## 1.8 Events

You can receive events about changes on the Sonos network.

The `soco.services.Service.subscribe()` method of a service now returns a `soco.events.Subscription` object. To unsubscribe, call the `soco.events.Subscription.unsubscribe()` method on the returned object.

Each subscription has its own queue. Events relevant to that subscription are put onto that queue, which can be accessed from `subscription.events.get()`.

Some XML parsing is done for you when you retrieve an event from the event queue. The `get` and `get_nowait` methods will return a dict with keys which are the evented variables and values which are the values sent by the event.

### 1.8.1 Example

```
try:
    from queue import Empty
except: # Py2.7
    from Queue import Empty
```

(continues on next page)

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```
import soco
from soco.events import event_listener
import logging
logging.basicConfig(level=logging.DEBUG)
# pick a device
device = soco.discover().pop()
# Subscribe to ZGT events
sub = device.zoneGroupTopology.subscribe()

# print out the events as they arise
while True:
    try:
        event = sub.events.get(timeout=0.5)
        print(event)
        print(event.sid)
        print(event.seq)

    except Empty:
        pass
    except KeyboardInterrupt:
        sub.unsubscribe()
        event_listener.stop()
        break
```

## 1.9 The Music Library Data Structures

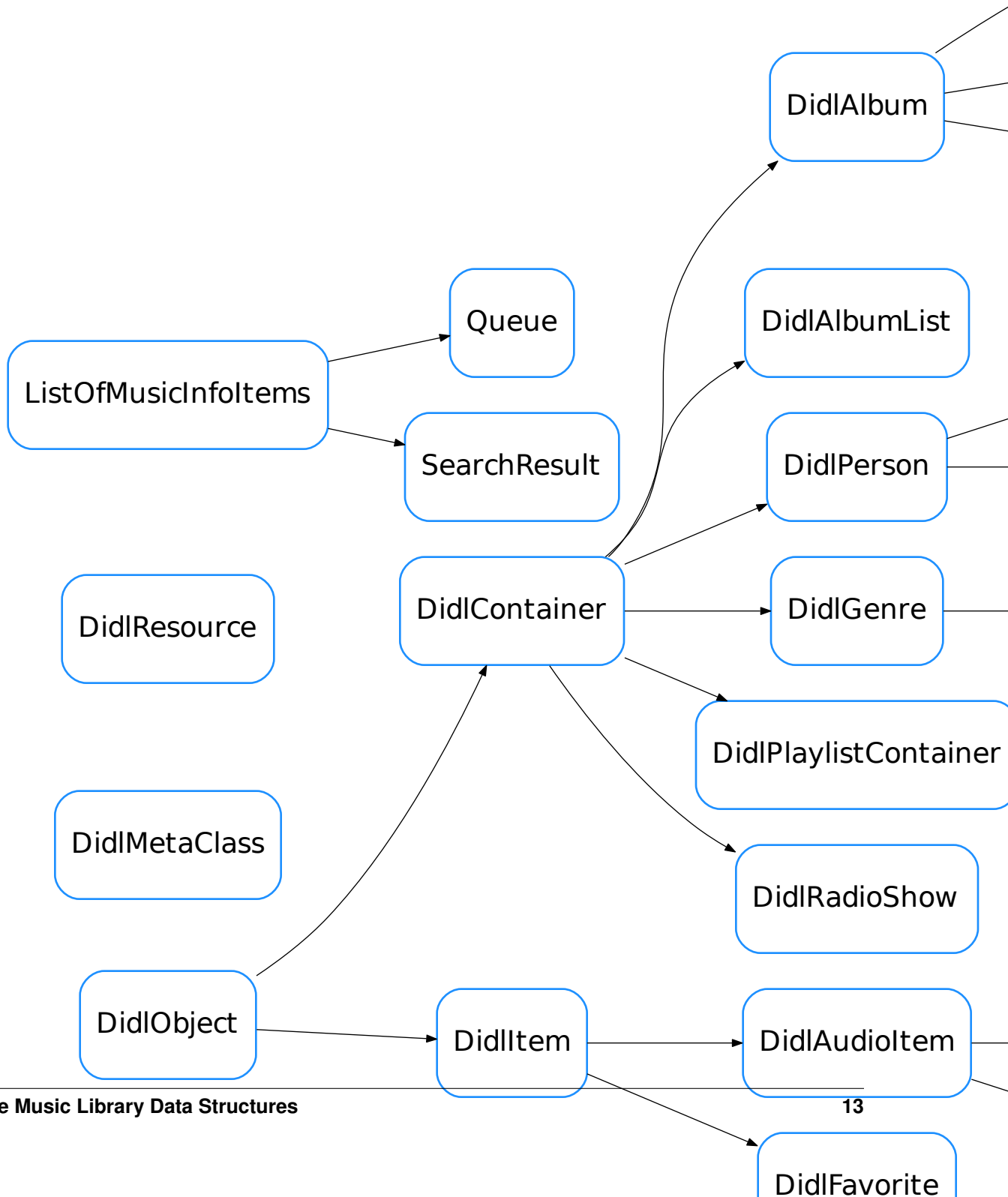
This page contains a thorough introduction to the data structures used for the music library items<sup>1</sup>. The data structures are implemented in the `soco.data_structures` module and they are used to represent the metadata for music items, such as music tracks, albums, genres and playlists.

Many music related items have a lot of metadata in common. For example, a music track and an album may both have artist and title metadata. It is therefore possible and useful to derive a hierarchy of items, and to implement them as a class hierarchy. The hierarchy which Sonos has adopted is represented by the [DIDL Lite xml schema](#) (DIDL stands for 'Digital Item Description Language'. For more details, see the [UPnP specifications \(PDF\)](#).

In the `data_structures` module, each class represents a particular DIDL-Lite object and is illustrated in *the figure below*. The black lines are the lines of inheritance, going from left to right.

---

<sup>1</sup> Text of the first footnote.



All data structures are subclasses of the abstract *Didl Object item* class. You should never need to instantiate this directly. The subclasses are divided into *Containers* and *Items*. In general, *Containers* are things, like playlists, which are intended to contain other items.

At the bottom of the class hierarchy are 10 types of *DIDL items*. On each of these classes, relevant metadata items are available as attributes (though they may be implemented as properties). Each has a `title`, a `URI`, an `item id` and a *UPnP class*. Some have other attributes. For example, *DidlMusicTrack* and *DidlMusicAlbum* have some extra fields such as `album`, `album_art_uri` and `creator`.

One of the more important attributes which each class has is `didl_metadata`. It is used to produce the metadata that is sent to the Sonos® units in the form of XML. This metadata is created in an almost identical way for each class, which is why it is implemented in *DidlObject*. It uses the `URI`, the *UPnP class* and the `title` that the items are instantiated with, along with the two class variables `parent_id` and `_translation`.

## 1.10 soco package

### 1.10.1 Subpackages

#### 1.10.1.1 soco.music\_services package

##### Submodules

##### soco.music\_services.accounts module

This module contains classes relating to Third Party music services.

**class** `soco.music_services.accounts.Account`

An account for a Music Service.

Each service may have more than one account: see the [Sonos release notes for version 5-2](#)

**service\_type = None**

*str* – A unique identifier for the music service to which this account relates, eg '2311' for Spotify.

**serial\_number = None**

*str* – A unique identifier for this account

**nickname = None**

*str* – The account's nickname

**deleted = None**

*bool* – `True` if this account has been deleted

**username = None**

*str* – The username used for logging into the music service

**metadata = None**

*str* – Metadata for the account

**oa\_device\_id = None**

*str* – Used for OpenAuth id for some services

**key = None**

*str* – Used for OpenAuthid for some services

**classmethod** `get_accounts (soco=None)`

Get all accounts known to the Sonos system.

**Parameters** `soco` (*SoCo*, optional) – a *SoCo* instance to query. If `None`, a random instance is used. Defaults to `None`.

**Returns** A dict containing account instances. Each key is the account’s serial number, and each value is the related *Account* instance. Accounts which have been marked as deleted are excluded.

**Return type** `dict`

---

**Note:** Any existing *Account* instance will have its attributes updated to those currently stored on the Sonos system.

---

**classmethod** `get_accounts_for_service` (*service\_type*)

Get a list of accounts for a given music service.

**Parameters** `service_type` (*str*) – The *service\_type* to use.

**Returns** A list of *Account* instances.

**Return type** `list`

## soco.music\_services.music\_service module

Sonos Music Services interface.

This module provides the *MusicService* class and related functionality.

**class** `soco.music_services.music_service.MusicServiceSoapClient` (*endpoint*,  
*timeout*, *music\_service*)

A SOAP client for accessing Music Services.

This class handles all the necessary authentication for accessing third party music services. You are unlikely to need to use it yourself.

### Parameters

- **endpoint** (*str*) – The SOAP endpoint. A url.
- **timeout** (*int*) – Timeout the connection after this number of seconds.
- **music\_service** (*MusicService*) – The *MusicService* object to which this client belongs.

**get\_soap\_header** ()

Generate the SOAP authentication header for the related service.

This header contains all the necessary authentication details.

### Returns

A string representation of the XML content of the SOAP header.

**Return type** `str`

**call** (*method*, *args=None*)

Call a method on the server.

### Parameters

- **method** (*str*) – The name of the method to call.

- **args** (*List[Tuple[str, str]]* or *None*) – A list of (parameter, value) pairs representing the parameters of the method. Defaults to *None*.

**Returns** An `OrderedDict` representing the response.

**Return type** `OrderedDict`

**Raises** `MusicServiceException` – containing details of the error returned by the music service.

**class** `soco.music_services.music_service.MusicService` (*service\_name*, *account=None*)  
The `MusicService` class provides access to third party music services.

## Example

List all the services Sonos knows about:

```
>>> from soco.music_services import MusicService
>>> print(MusicService.get_all_music_services_names())
['Spotify', 'The Hype Machine', 'Saavn', 'Bandcamp',
 'Stitcher SmartRadio', 'Concert Vault',
 ...
]
```

Or just those to which you are subscribed:

```
>>> print(MusicService.get_subscribed_services_names())
['Spotify', 'radioPup', 'Spreaker']
```

Interact with `TuneIn`:

```
>>> tunein = MusicService('TuneIn')
>>> print(tunein)
<MusicService 'TuneIn' at 0x10ad84e10>
```

Browse an item. By default, the root item is used. An `OrderedDict` is returned:

```
>>> from json import dumps # Used for pretty printing ordereddicts
>>> print(dumps(tunein.get_metadata(), indent=4))
{
  "index": "0",
  "count": "7",
  "total": "7",
  "mediaCollection": [
    {
      "id": "featured:c100000150",
      "title": "Blue Note on SONOS",
      "itemType": "container",
      "authRequired": "false",
      "canPlay": "false",
      "canEnumerate": "true",
      "canCache": "true",
      "homogeneous": "false",
      "canAddToFavorite": "false",
      "canScroll": "false",
      "albumArtURI":
        "http://cdn-albums.tunein.com/sonos/channel_legacy.png"
    },
  ],
}
```

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(continued from previous page)

```

    {
        "id": "y1",
        "title": "Music",
        "itemType": "container",
        "authRequired": "false",
        "canPlay": "false",
        "canEnumerate": "true",
        "canCache": "true",
        "homogeneous": "false",
        "canAddToFavorite": "false",
        "canScroll": "false",
        "albumArtURI": "http://cdn-albums.tunein.com/sonos...
        .png"
    },
    ...
]
}

```

Interact with Spotify (assuming you are subscribed):

```
>>> spotify = MusicService('Spotify')
```

Get some metadata about a specific track:

```

>>> response = spotify.get_media_metadata(
... item_id='spotify:track:6NmXV4o6bmp704aPGyTVVG')
>>> print(dumps(response, indent=4))
{
  "mediaMetadata": {
    "id": "spotify:track:6NmXV4o6bmp704aPGyTVVG",
    "itemType": "track",
    "title": "Bøn Fra Helvete (Live)",
    "mimeType": "audio/x-spotify",
    "trackMetadata": {
      "artistId": "spotify:artist:1s1DnVoBDfp3jxjjew8cBR",
      "artist": "Kaizers Orchestra",
      "albumId": "spotify:album:6K8NUknbPh5TGaKeZdDwSg",
      "album": "Mann Mot Mann (Ep)",
      "duration": "317",
      "albumArtURI":
      "http://o.scdn.co/image/7b76a5074416e83fa3f3cd...9",
      "canPlay": "true",
      "canSkip": "true",
      "canAddToFavorites": "true"
    }
  }
}
or even a playlist:

```

```

>>> response = spotify.get_metadata(
... item_id='spotify:user:spotify:playlist:0FQk6BADgIIYd3yTLCThjg')

```

Find the available search categories, and use them:

```

>>> print(spotify.available_search_categories)
['albums', 'tracks', 'artists']
>>> result = spotify.search(category='artists', term='miles')

```

**Note:** Some of this code is still unstable, and in particular the data structures returned by methods such as `get_metadata` may change in future.

---

### Parameters

- **service\_name** (*str*) – The name of the music service, as returned by `get_all_music_services_names()`, eg ‘Spotify’, or ‘TuneIn’
- **account** (*Account*) – The account to use to access this service. If none is specified, one will be chosen automatically if possible. Defaults to `None`.

**Raises** *MusicServiceException*

**classmethod** `get_all_music_services_names()`

Get a list of the names of all available music services.

These services have not necessarily been subscribed to.

**Returns** A list of strings.

**Return type** *list*

**classmethod** `get_subscribed_services_names()`

Get a list of the names of all subscribed music services.

**Returns** A list of strings.

**Return type** *list*

**classmethod** `get_data_for_name(service_name)`

Get the data relating to a named music service.

**Parameters** **service\_name** (*str*) – The name of the music service for which data is required.

**Returns** Data relating to the music service.

**Return type** *dict*

**Raises** *MusicServiceException* – if the music service cannot be found.

**available\_search\_categories**

*list* – The list of search categories (each a string) supported.

May include ‘artists’, ‘albums’, ‘tracks’, ‘playlists’, ‘genres’, ‘stations’, ‘tags’, or others depending on the service. Some services, such as Spotify, support ‘all’, but do not advertise it.

Any of the categories in this list may be used as a value for `category` in `search()`.

### Example

```
>>> print(spotify.available_search_categories)
['albums', 'tracks', 'artists']
>>> result = spotify.search(category='artists', term='miles')
```

**sonos\_uri\_from\_id** (*item\_id*)

Get a uri which can be sent for playing.



**Parameters** `item_id` (*str*) – The unique id of a playable item for this music service, such as that returned in the metadata from `get_metadata`, eg `spotify:track:2qs5ZcLByNTctJKbhAZ9JE`

**Returns** A URI of the form: `soco://spotify%3Atrack%3A2qs5ZcLByNTctJKbhAZ9JE?sid=2311&sn=1` which encodes the `item_id`, and relevant data from the account for the music service. This URI can be sent to a Sonos device for playing, and the device itself will retrieve all the necessary metadata such as title, album etc.

**Return type** `str`

#### **desc**

*str* – The Sonos descriptor to use for this service.

The Sonos descriptor is used as the content of the `<desc>` tag in DIDL metadata, to indicate the relevant music service id and username.

**get\_metadata** (*item='root', index=0, count=100, recursive=False*)

Get metadata for a container or item.

#### **Parameters**

- **item** (*str* or `MusicServiceItem`) – The container or item to browse given either as a `MusicServiceItem` instance or as a `str`. Defaults to the root item.
- **index** (*int*) – The starting index. Default 0.
- **count** (*int*) – The maximum number of items to return. Default 100.
- **recursive** (*bool*) – Whether the browse should recurse into sub-items (Does not always work). Defaults to `False`.

**Returns** The item or container's metadata, or `None`.

**Return type** `OrderedDict`

#### **See also:**

The Sonos `getMetadata` API.

**search** (*category, term="", index=0, count=100*)

Search for an item in a category.

#### **Parameters**

- **category** (*str*) – The search category to use. Standard Sonos search categories are 'artists', 'albums', 'tracks', 'playlists', 'genres', 'stations', 'tags'. Not all are available for each music service. Call `available_search_categories` for a list for this service.
- **term** (*str*) – The term to search for.
- **index** (*int*) – The starting index. Default 0.
- **count** (*int*) – The maximum number of items to return. Default 100.

**Returns** The search results, or `None`.

**Return type** `OrderedDict`

#### **See also:**

The Sonos `search` API

**get\_media\_metadata** (*item\_id*)

Get metadata for a media item.

**Parameters** `item_id (str)` – The item for which metadata is required.

**Returns** The item’s metadata, or `None`

**Return type** `OrderedDict`

**See also:**

The Sonos [getMediaMetadata API](#)

**get\_media\_uri** (`item_id`)

Get a streaming URI for an item.

---

**Note:** You should not need to use this directly. It is used by the Sonos players (not the controllers) to obtain the uri of the media stream. If you want to have a player play a media item, you should add it to the queue using its id and let the player work out where to get the stream from (see [On Demand Playback](#) and [Programmed Radio](#))

---

**Parameters** `item_id (str)` – The item for which the URI is required

**Returns** The item’s streaming URI.

**Return type** `str`

**get\_last\_update** ()

Get last\_update details for this music service.

**Returns** A dict with keys ‘catalog’, and ‘favorites’. The value of each is a string which changes each time the catalog or favorites change. You can use this to detect when any caches need to be updated.

**Return type** `OrderedDict`

**get\_extended\_metadata** (`item_id`)

Get extended metadata for a media item, such as related items.

**Parameters** `item_id (str)` – The item for which metadata is required.

**Returns** The item’s extended metadata or `None`.

**Return type** `OrderedDict`

**See also:**

The Sonos [getExtendedMetadata API](#)

**get\_extended\_metadata\_text** (`item_id`, `metadata_type`)

Get extended metadata text for a media item.

**Parameters**

- `item_id (str)` – The item for which metadata is required
- `metadata_type (str)` – The type of text to return, eg
- or `'ALBUM_NOTES'`. Calling `('ARTIST_BIO',)` –
- for the item will show which extended (`get_extended_metadata`) –
- are available (`metadata_types`) –

**Returns** The item’s extended metadata text or `None`

**Return type** `str`

**See also:**

The Sonos `getExtendedMetadataText` API

`soco.music_services.music_service.desc_from_uri(uri)`

Create the content of DIDL desc element from a uri.

**Parameters** `uri` (*str*) – A uri, eg: `'x-sonos-http:track%3a3402413.mp3?sid=2&flags=32&sn=4'`

**Returns**

The content of a desc element for that uri, eg `'SA_RINCON519_email@example.com'`

**Return type** `str`

### 1.10.1.2 `soco.plugins` package

#### Submodules

#### `soco.plugins.example` module

Example implementation of a plugin.

**class** `soco.plugins.example.ExamplePlugin(soco, username)`

This file serves as an example of a SoCo plugin.

Initialize the plugin.

The plugin can accept any arguments it requires. It should at least accept a `soco` instance which it passes on to the base class when calling `super's __init__`.

**name**

human-readable name of the plugin

**music\_plugin\_play()**

Play some music.

This is just a reimplemention of the ordinary play function, to show how we can use the general `upnp` methods from `soco`

**music\_plugin\_stop()**

Stop the music.

This methods shows how, if we need it, we can use the `soco` functionality from inside the plugins

#### `soco.plugins.spotify` module

The Spotify plugin has been DEPRECATED

The Spotify Plugin has been immediately deprecated (August 2016), because the API it was based on (The Spotify Metadata API) has been ended. Since this rendered the plug-in broken, there was no need to forewarn of the deprecation.

Please consider moving to the new general music services code (in `soco.music_services.music_service`), that makes it possible to retrived information about the available media from all music services. A short intro for how to use the new code is available in the API documentation:

- [http://docs.python-soco.com/en/latest/api/soco.music\\_services.music\\_service.html](http://docs.python-soco.com/en/latest/api/soco.music_services.music_service.html)

and for some information about how to add items from the music services to the queue, see this gist:

- <https://gist.github.com/lawrenceakka/2d21dca590b4fa7e3af2>”

This deprecation notification will be deleted for the second release after 0.12.

### soco.plugins.wimp module

Plugin for the Wimp music service (Service ID 20)

```
class soco.plugins.wimp.Wimp(soco, username, retries=3, timeout=3.0)
    Class that implements a Wimp plugin.
```

---

**Note:** There is an (apparent) in-consistency in the use of one data type from the Wimp service. When searching for playlists, the XML returned by the Wimp server indicates, that the type is an ‘album list’, and it thus suggest, that this type is used for a list of tracks (as expected for a playlist), and this data type is reported to be playable. However, when browsing the music tree, the Wimp server will return items of ‘album list’ type, but in this case it is used for a list of albums and it is not playable. This plugin maintains this (apparent) in-consistency to stick as close to the reported data as possible, so search for playlists returns MSAlbumList that are playable and while browsing the content tree the MSAlbumList items returned to you are not playable.

---

---

**Note:** Wimp in some cases lists tracks that are not available. In these cases, while it will correctly report these tracks as not being playable, the containing data structure like e.g. the album they are on may report that they are playable. Trying to add one of these to the queue will return a SoCoUPnPException with error code ‘802’.

---

Initialize the plugin.

#### Parameters

- **soco** – The soco instance to retrieve the session ID for the music service
- **username** (*str*) – The username for the music service
- **retries** (*int*) – The number of times to retry before giving up
- **timeout** (*float*) – The time to wait for the post to complete, before timing out. The Wimp server seems either slow to respond or to make the queries internally, so the timeout should probably not be shorter than 3 seconds.

**Type** soco.SoCo

---

**Note:** If you are using a phone number as the username and are experiencing problems connecting, then try to prepend the area code (no + or 00). I.e. if your phone number is 12345678 and you are from denmark, then use 4512345678. This must be set up the same way in the Sonos device. For details see [here](#) (In Danish)

---

#### name

Return the human read-able name for the plugin

#### username

Return the username.

#### service\_id

Return the service id.

**description**

Return the music service description for the DIDL metadata on the form 'SA\_RINCON5127\_...self.username...'

**get\_tracks** (*search*, *start=0*, *max\_items=100*)

Search for tracks.

See `get_music_service_information` for details on the arguments

**get\_albums** (*search*, *start=0*, *max\_items=100*)

Search for albums.

See `get_music_service_information` for details on the arguments

**get\_artists** (*search*, *start=0*, *max\_items=100*)

Search for artists.

See `get_music_service_information` for details on the arguments

**get\_playlists** (*search*, *start=0*, *max\_items=100*)

Search for playlists.

See `get_music_service_information` for details on the arguments.

---

**Note:** Un-intuitively this method returns `MSAlbumList` items. See note in class doc string for details.

---

**get\_music\_service\_information** (*search\_type*, *search*, *start=0*, *max\_items=100*)

Search for music service information items.

**Parameters**

- **search\_type** (*str*) – The type of search to perform, possible values are: ‘artists’, ‘albums’, ‘tracks’ and ‘playlists’
- **search** (*str*) – The search string to use
- **start** (*int*) – The starting index of the returned items
- **max\_items** (*int*) – The maximum number of returned items

---

**Note:** Un-intuitively the playlist search returns `MSAlbumList` items. See note in class doc string for details.

---

**browse** (*ms\_item=None*)

Return the sub-elements of item or of the root if item is None

**Parameters** **item** – Instance of sub-class of `soco.data_structures.MusicServiceItem`. This object must have `item_id`, `service_id` and `extended_id` properties

---

**Note:** Browsing a `MSTrack` item will return itself.

---



---

**Note:** This plugin cannot yet set the parent ID of the results correctly when browsing `soco.data_structures.MSFavorites` and `soco.data_structures.MSCollection` elements.

---

**static id\_to\_extended\_id** (*item\_class*)

Return the extended ID from an ID.

**Parameters**

- **item\_id** (*str*) – The ID of the music library item
- **cls** (Sub-class of `soco.data_structures.MusicServiceItem`) – The class of the music service item

The extended id can be something like `00030020trackid_22757082` where the id is just `trackid_22757082`. For classes where the prefix is not known returns `None`.

**static form\_uri** (*item\_class*)

Form the URI for a music service element.

**Parameters**

- **item\_content** (*dict*) – The content dict of the item
- **item\_class** (Sub-class of `soco.data_structures.MusicServiceItem`) – The class of the item

## Module contents

This is the `__init__` module for the plugins.

It contains the base class for all plugins

**class** `soco.plugins.SoCoPlugin` (*soco*)

The base class for SoCo plugins.

**name**

human-readable name of the plugin

**classmethod** `from_name` (*fullname, soco, \*args, \*\*kwargs*)

Instantiate a plugin by its full name.

## 1.10.2 Submodules

### 1.10.2.1 `soco.alarms` module

This module contains classes relating to Sonos Alarms.

`soco.alarms.is_valid_recurrence` (*text*)

Check that `text` is a valid recurrence string.

A valid recurrence string is `DAILY`, `ONCE`, `WEEKDAYS`, `WEEKENDS` or of the form `ON_DDDDDD` where `D` is a number from 0-7 representing a day of the week (Sunday is 0), e.g. `ON_034` meaning Sunday, Wednesday and Thursday

**Parameters** `text` (*str*) – the recurrence string to check.

**Returns** `True` if the recurrence string is valid, else `False`.

**Return type** `bool`

## Examples

```
>>> from socio.alarms import is_valid_recurrence
>>> is_valid_recurrence('WEEKENDS')
True
>>> is_valid_recurrence('')
False
>>> is_valid_recurrence('ON_132') # Mon, Tue, Wed
True
>>> is_valid_recurrence('ON_777') # Sat
True
>>> is_valid_recurrence('ON_3421') # Mon, Tue, Wed, Thur
True
>>> is_valid_recurrence('ON_123456789') # Too many digits
False
```

```
class socio.alarms.Alarm(zone, start_time=None, duration=None, recurrence='DAILY',
                          enabled=True, program_uri=None, program_metadata="",
                          play_mode='NORMAL', volume=20, include_linked_zones=False)
```

A class representing a Sonos Alarm.

Alarms may be created or updated and saved to, or removed from the Sonos system. An alarm is not automatically saved. Call `save()` to do that.

## Example

```
>>> device = discovery.any_soco()
>>> # create an alarm with default properties
>>> alarm = Alarm(device)
>>> print alarm.volume
20
>>> print get_alarms()
set([])
>>> # save the alarm to the Sonos system
>>> alarm.save()
>>> print get_alarms()
set([<Alarm id:88@15:26:15 at 0x107abb090>])
>>> # update the alarm
>>> alarm.recurrence = "ONCE"
>>> # Save it again for the change to take effect
>>> alarm.save()
>>> # Remove it
>>> alarm.remove()
>>> print get_alarms()
set([])
```

## Parameters

- **zone** (*SoCo*) – The socio instance which will play the alarm.
- **start\_time** (*datetime.time*, optional) – The alarm’s start time. Specify hours, minutes and seconds only. Defaults to the current time.
- **duration** (*datetime.time*, optional) – The alarm’s duration. Specify hours, minutes and seconds only. May be *None* for unlimited duration. Defaults to *None*.

- **recurrence** (*str, optional*) – A string representing how often the alarm should be triggered. Can be DAILY, ONCE, WEEKDAYS, WEEKENDS or of the form ON\_DDDDDDD where D is a number from 0-7 representing a day of the week (Sunday is 0), e.g. ON\_034 meaning Sunday, Wednesday and Thursday. Defaults to DAILY.
- **enabled** (*bool, optional*) – True if alarm is enabled, False otherwise. Defaults to True.
- **program\_uri** (*str, optional*) – The uri to play. If None, the built-in Sonos chime sound will be used. Defaults to None.
- **program\_metadata** (*str, optional*) – The metadata associated with *program\_uri*. Defaults to “”.
- **play\_mode** (*str, optional*) – The play mode for the alarm. Can be one of NORMAL, SHUFFLE\_NOREPEAT, SHUFFLE, REPEAT\_ALL, REPEAT\_ONE, SHUFFLE\_REPEAT\_ONE. Defaults to NORMAL.
- **volume** (*int, optional*) – The alarm’s volume (0-100). Defaults to 20.
- **include\_linked\_zones** (*bool, optional*) – True if the alarm should be played on the other speakers in the same group, False otherwise. Defaults to False.

**start\_time = None**

*datetime.time* – The alarm’s start time.

**duration = None**

*datetime.time* – The alarm’s duration.

**enabled = None**

*bool* – True if the alarm is enabled, else False.

**program\_uri = None**

**program\_metadata = None**

*str* – The uri to play.

**include\_linked\_zones = None**

*bool* – True if the alarm should be played on the other speakers in the same group, False otherwise.

**play\_mode**

*str* – The play mode for the alarm.

Can be one of NORMAL, SHUFFLE\_NOREPEAT, SHUFFLE, REPEAT\_ALL, REPEAT\_ONE, SHUFFLE\_REPEAT\_ONE.

**volume**

*int* – The alarm’s volume (0-100).

**recurrence**

*str* – How often the alarm should be triggered.

Can be DAILY, ONCE, WEEKDAYS, WEEKENDS or of the form ON\_DDDDDDD where D is a number from 0-7 representing a day of the week (Sunday is 0), e.g. ON\_034 meaning Sunday, Wednesday and Thursday.

**save ()**

Save the alarm to the Sonos system.

**Raises** *SoCoUPnPException* – if the alarm cannot be created because there is already an alarm for this room at the specified time.

**remove ()**

Remove the alarm from the Sonos system.



There is no need to call `save`. The Python instance is not deleted, and can be saved back to Sonos again if desired.

`soco.alarms.get_alarms (zone=None)`

Get a set of all alarms known to the Sonos system.

**Parameters** `zone` (`SoCo`, optional) – a `SoCo` instance to query. If `None`, a random instance is used.

Defaults to `None`.

**Returns** A set of `Alarm` instances

**Return type** `set`

---

**Note:** Any existing `Alarm` instance will have its attributes updated to those currently stored on the Sonos system.

---

### 1.10.2.2 `soco.cache` module

This module contains the classes underlying SoCo's caching system.

**class** `soco.cache._BaseCache (*args, **kwargs)`

An abstract base class for the cache.

**enabled = None**

`bool` – whether the cache is enabled

**put** (`item, *args, **kwargs`)

Put an item into the cache.

**get** (`*args, **kwargs`)

Get an item from the cache.

**delete** (`*args, **kwargs`)

Delete an item from the cache.

**clear** ()

Empty the whole cache.

**class** `soco.cache.NullCache (*args, **kwargs)`

A cache which does nothing.

Useful for debugging.

**put** (`item, *args, **kwargs`)

Put an item into the cache.

**get** (`*args, **kwargs`)

Get an item from the cache.

**delete** (`*args, **kwargs`)

Delete an item from the cache.

**clear** ()

Empty the whole cache.

**class** `soco.cache.TimedCache (default_timeout=0)`

A simple thread-safe cache for caching method return values.

The cache key is generated by from the given `*args` and `**kwargs`. Items are expired from the cache after a given period of time.

## Example

```

>>> from time import sleep
>>> cache = TimedCache()
>>> cache.put("item", 'some', kw='args', timeout=3)
>>> # Fetch the item again, by providing the same args and kwargs.
>>> assert cache.get('some', kw='args') == "item"
>>> # Providing different args or kwargs will not return the item.
>>> assert not cache.get('some', 'otherargs') == "item"
>>> # Waiting for less than the provided timeout does not cause the
>>> # item to expire.
>>> sleep(2)
>>> assert cache.get('some', kw='args') == "item"
>>> # But waiting for longer does.
>>> sleep(2)
>>> assert not cache.get('some', kw='args') == "item"

```

**Warning:** At present, the cache can theoretically grow and grow, since entries are not automatically purged, though in practice this is unlikely since there are not that many different combinations of arguments in the places where it is used in SoCo, so not that many different cache entries will be created. If this becomes a problem, use a thread and timer to purge the cache, or rewrite this to use LRU logic!

### Parameters

- **default\_timeout** (*int*) – The default number of seconds after
- **items will be expired.** (*which*) –

**default\_timeout** = None

*int* – The default caching expiry interval in seconds.

**get** (*\*args*, *\*\*kwargs*)

Get an item from the cache for this combination of args and kwargs.

### Parameters

- **\*args** – any arguments.
- **\*\*kwargs** – any keyword arguments.

**Returns** The object which has been found in the cache, or `None` if no unexpired item is found. This means that there is no point storing an item in the cache if it is `None`.

**Return type** `object`

**put** (*item*, *\*args*, *\*\*kwargs*)

Put an item into the cache, for this combination of args and kwargs.

### Parameters

- **\*args** – any arguments.
- **\*\*kwargs** – any keyword arguments. If `timeout` is specified as one of the keyword arguments, the item will remain available for retrieval for `timeout` seconds. If `timeout` is `None` or not specified, the `default_timeout` for this cache will be used. Specify a `timeout` of 0 (or ensure that the `default_timeout` for this cache is 0) if this item is not to be cached.

**delete** (\*args, \*\*kwargs)

Delete an item from the cache for this combination of args and kwargs.

**clear** ()

Empty the whole cache.

**static make\_key** (\*\*kwargs)

Generate a unique, hashable, representation of the args and kwargs.

#### Parameters

- **\*args** – any arguments.
- **\*\*kwargs** – any keyword arguments.

**Returns** the key.

**Return type** `str`

**class** `soco.cache.Cache` (\*args, \*\*kwargs)

A factory class which returns an instance of a cache subclass.

A `TimedCache` is returned, unless `config.CACHE_ENABLED` is `False`, in which case a `NullCache` will be returned.

**clear** ()

Empty the whole cache.

**delete** (\*args, \*\*kwargs)

Delete an item from the cache.

**get** (\*args, \*\*kwargs)

Get an item from the cache.

**put** (item, \*args, \*\*kwargs)

Put an item into the cache.

### 1.10.2.3 `soco.compat` module

This module contains various compatibility definitions and imports.

It is used internally by SoCo to ensure compatibility with Python 2.

`soco.compat.with_metaclass` (meta, \*bases)

A Python 2/3 compatible way of declaring a metaclass.

Taken from Jinja 2 via `python-future`. License: BSD. Use it like this:

```
class MyClass(with_metaclass(MyMetaClass, BaseClass)):
    pass
```

### 1.10.2.4 `soco.config` module

This module contains configuration variables.

They may be set by your code as follows:

```
from socio import config
...
config.VARIABLE = value
```

`soco.config.SOCO_CLASS`  
alias of `soco.core.SoCo`

`soco.config.CACHE_ENABLED = True`  
Is the cache enabled?

If `True` (the default), some caching of network requests will take place.

**See also:**

The `soco.cache` module.

`soco.config.EVENT_LISTENER_IP = None`  
The IP on which the event listener listens.

The default of `None` means that the relevant IP address will be detected automatically.

**See also:**

The `soco.events` module.

`soco.config.EVENT_LISTENER_PORT = 1400`  
The port on which the event listener listens.

The default is 1400. You must set this before subscribing to any events.

**See also:**

The `soco.events` module.

### 1.10.2.5 soco.core module

The core module contains the `SoCo` class that implements the main entry to the `SoCo` functionality

`soco.core.only_on_master` (*function*)  
Decorator that raises `SoCoSlaveException` on master call on slave.

**class** `soco.core.SoCo` (*ip\_address*)  
A simple class for controlling a Sonos speaker.

For any given set of arguments to `__init__`, only one instance of this class may be created. Subsequent attempts to create an instance with the same arguments will return the previously created instance. This means that all `SoCo` instances created with the same ip address are in fact the *same* `SoCo` instance, reflecting the real world position.

#### Basic Methods

<code>play_from_queue(index[, start])</code>	Play a track from the queue by index.
<code>play()</code>	Play the currently selected track.
<code>play_uri([uri, meta, title, start, force_radio])</code>	Play a URI.
<code>pause()</code>	Pause the currently playing track.
<code>stop()</code>	Stop the currently playing track.
<code>seek(timestamp)</code>	Seek to a given timestamp in the current track, specified in the format of HH:MM:SS or H:MM:SS.
<code>next()</code>	Go to the next track.
<code>previous()</code>	Go back to the previously played track.
<code>mute</code>	<i>bool</i> – The speaker’s mute state.
<code>volume</code>	<i>int</i> – The speaker’s volume.

Continued on next page

Table 1 – continued from previous page

<code>play_mode</code>	<i>str</i> – The queue’s play mode.
<code>cross_fade</code>	<i>bool</i> – The speaker’s cross fade state.
<code>ramp_to_volume(volume[, ramp_type])</code>	Smoothly change the volume.
<code>get_current_track_info()</code>	Get information about the currently playing track.
<code>get_speaker_info([refresh, timeout])</code>	Get information about the Sonos speaker.
<code>get_current_transport_info()</code>	Get the current playback state.

### Queue Management

<code>get_queue([start, max_items, full_album_art_uri])</code>	Get information about the queue.
<code>queue_size</code>	<i>int</i> – Size of the queue.
<code>add_to_queue(queueable_item[, position, as_next])</code>	Add a queueable item to the queue.
<code>add_uri_to_queue(uri[, position, as_next])</code>	Add the URI to the queue.
<code>add_multiple_to_queue(items[, container])</code>	Add a sequence of items to the queue.
<code>remove_from_queue(index)</code>	Remove a track from the queue by index.
<code>clear_queue()</code>	Remove all tracks from the queue.

### Group Management

<code>group</code>	<i>soco.groups.ZoneGroup</i> – The Zone Group of which this device
<code>partymode()</code>	Put all the speakers in the network in the same group, a.k.a Party Mode.
<code>join(master)</code>	Join this speaker to another “master” speaker.
<code>unjoin()</code>	Remove this speaker from a group.
<code>all_groups</code>	set of <i>soco.groups.ZoneGroup</i> – All available groups.
<code>all_zones</code>	set of <i>soco.groups.ZoneGroup</i> – All available zones.
<code>visible_zones</code>	set of <i>soco.groups.ZoneGroup</i> – All visible zones.

### Player Identity and Settings

<code>player_name</code>	<i>str</i> – The speaker’s name.
<code>uid</code>	<i>str</i> – A unique identifier.
<code>household_id</code>	<i>str</i> – A unique identifier for all players in a household.
<code>is_visible</code>	<i>bool</i> – Is this zone visible?
<code>is_bridge</code>	<i>bool</i> – Is this zone a bridge?
<code>is_coordinator</code>	<i>bool</i> – Is this zone a group coordinator?
<code>bass</code>	<i>int</i> – The speaker’s bass EQ.
<code>treble</code>	<i>int</i> – The speaker’s treble EQ.
<code>loudness</code>	<i>bool</i> – The Sonos speaker’s loudness compensation.
<code>night_mode</code>	<i>bool</i> – The speaker’s night mode.
<code>dialog_mode</code>	<i>bool</i> – Get the Sonos speaker’s dialog mode.
<code>status_light</code>	<i>bool</i> – The white Sonos status light between the mute button and the

## Playlists and Favorites

<code>get_sonos_playlists(*args, **kwargs)</code>	Convenience method for <code>get_music_library_information('sonos_playlists')</code> .
<code>create_sonos_playlist(title)</code>	Create a new empty Sonos playlist.
<code>create_sonos_playlist_from_queue(title)</code>	Create a new Sonos playlist from the current queue.
<code>remove_sonos_playlist(sonos_playlist)</code>	Remove a Sonos playlist.
<code>add_item_to_sonos_playlist(queueable_item, ...)</code>	Adds a queueable item to a Sonos' playlist.
<code>reorder_sonos_playlist(sonos_playlist, ...)</code>	Reorder and/or Remove tracks in a Sonos playlist.
<code>clear_sonos_playlist(sonos_playlist[, update_id])</code>	Clear all tracks from a Sonos playlist.
<code>move_in_sonos_playlist(sonos_playlist, ...)</code>	Move a track to a new position within a Sonos Playlist.
<code>remove_from_sonos_playlist(sonos_playlist, track)</code>	Remove a track from a Sonos Playlist.
<code>get_sonos_playlist_by_attr(attr_name, match)</code>	Return the first Sonos Playlist <code>DidiPlaylistContainer</code> that matches the attribute specified.
<code>get_favorite_radio_shows([start, max_items])</code>	Get favorite radio shows from Sonos' Radio app.
<code>get_favorite_radio_stations([start, max_items])</code>	Get favorite radio stations from Sonos' Radio app.
<code>get_sonos_favorites([start, max_items])</code>	Get Sonos favorites.

## Miscellaneous

<code>switch_to_line_in([source])</code>	Switch the speaker's input to line-in.
<code>is_playing_radio</code>	<i>bool</i> – Is the speaker playing radio?
<code>is_playing_line_in</code>	<i>bool</i> – Is the speaker playing line-in?
<code>is_playing_tv</code>	<i>bool</i> – Is the playbar speaker input from TV?
<code>switch_to_tv()</code>	Switch the playbar speaker's input to TV.
<code>set_sleep_timer(sleep_time_seconds)</code>	Sets the sleep timer.
<code>get_sleep_timer()</code>	Retrieves remaining sleep time, if any

**Warning:** Properties on this object are not generally cached and may obtain information over the network, so may take longer than expected to set or return a value. It may be a good idea for you to cache the value in your own code.

**Note:** Since all methods/properties on this object will result in an UPnP request, they might result in an exception without it being mentioned in the Raises section.

In most cases, the exception will be a `soco.exceptions.SoCoUPnPException` (if the player returns an UPnP error code), but in special cases it might also be another `soco.exceptions.SoCoException` or even a `requests` exception.

**ip\_address = None**  
The speaker's ip address

**player\_name**

*str* – The speaker’s name.

#### **uid**

*str* – A unique identifier.

Looks like: 'RINCON\_000XXXXXXXXXX1400'

#### **household\_id**

*str* – A unique identifier for all players in a household.

Looks like: 'Sonos\_asahHKgjjgJGjjgJgjjgJgjjgJG34'

#### **is\_visible**

*bool* – Is this zone visible?

A zone might be invisible if, for example, it is a bridge, or the slave part of stereo pair.

#### **is\_bridge**

*bool* – Is this zone a bridge?

#### **is\_coordinator**

*bool* – Is this zone a group coordinator?

#### **play\_mode**

*str* – The queue’s play mode.

Case-insensitive options are:

- 'NORMAL' – Turns off shuffle and repeat.
- 'REPEAT\_ALL' – Turns on repeat and turns off shuffle.
- 'SHUFFLE' – Turns on shuffle *and* repeat. (It’s strange, I know.)
- 'SHUFFLE\_NOREPEAT' – Turns on shuffle and turns off repeat.

#### **cross\_fade**

*bool* – The speaker’s cross fade state.

True if enabled, False otherwise

#### **ramp\_to\_volume** (*volume*, *ramp\_type*='SLEEP\_TIMER\_RAMP\_TYPE')

Smoothly change the volume.

There are three ramp types available:

- 'SLEEP\_TIMER\_RAMP\_TYPE' (default): Linear ramp from the current volume up or down to the new volume. The ramp rate is 1.25 steps per second. For example: To change from volume 50 to volume 30 would take 16 seconds.
- 'ALARM\_RAMP\_TYPE': Resets the volume to zero, waits for about 30 seconds, and then ramps the volume up to the desired value at a rate of 2.5 steps per second. For example: Volume 30 would take 12 seconds for the ramp up (not considering the wait time).
- 'AUTOPLAY\_RAMP\_TYPE': Resets the volume to zero and then quickly ramps up at a rate of 50 steps per second. For example: Volume 30 will take only 0.6 seconds.

The ramp rate is selected by Sonos based on the chosen ramp type and the resulting transition time returned. This method is non blocking and has no network overhead once sent.

#### **Parameters**

- **volume** (*int*) – The new volume.
- **ramp\_type** (*str*, *optional*) – The desired ramp type, as described above.

**Returns** The ramp time in seconds, rounded down. Note that this does not include the wait time.

**Return type** `int`

**play\_from\_queue** (*index*, *start=True*)

Play a track from the queue by index.

The index number is required as an argument, where the first index is 0.

**Parameters**

- **index** (*int*) – 0-based index of the track to play
- **start** (*bool*) – If the item that has been set should start playing

**play** ()

Play the currently selected track.

**play\_uri** (*uri="*, *meta="*, *title="*, *start=True*, *force\_radio=False*)

Play a URI.

Playing a URI will replace what was playing with the stream given by the URI. For some streams at least a title is required as metadata. This can be provided using the `meta` argument or the `title` argument. If the `title` argument is provided minimal metadata will be generated. If `meta` argument is provided the `title` argument is ignored.

**Parameters**

- **uri** (*str*) – URI of the stream to be played.
- **meta** (*str*) – The metadata to show in the player, DIDL format.
- **title** (*str*) – The title to show in the player (if no meta).
- **start** (*bool*) – If the URI that has been set should start playing.
- **force\_radio** (*bool*) – forces a uri to play as a radio stream.

On a Sonos controller music is shown with one of the following display formats and controls:

- Radio format: Shows the name of the radio station and other available data. No seek, next, previous, or voting capability. Examples: TuneIn, radioPup
- Smart Radio: Shows track name, artist, and album. Limited seek, next and sometimes voting capability depending on the Music Service. Examples: Amazon Prime Stations, Pandora Radio Stations.
- Track format: Shows track name, artist, and album the same as when playing from a queue. Full seek, next and previous capabilities. Examples: Spotify, Napster, Rhapsody.

How it is displayed is determined by the URI prefix: `x-sonosapi-stream:`, `x-sonosapi-radio:`, `x-rincon-mp3radio:`, `hls-radio:` default to radio or smart radio format depending on the stream. Others default to track format: `x-file-cifs:`, `aac:`, `http:`, `https:`, `x-sonos-spotify:` (used by Spotify), `x-sonosapi-hls-static:` (Amazon Prime), `x-sonos-http:` (Google Play & Napster).

Some URIs that default to track format could be radio streams, typically `http:`, `https:` or `aac:`. To force display and controls to Radio format set `force_radio=True`

---

**Note:** Other URI prefixes exist but are less common. If you have information on these please add to this doc string.

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**Note:** A change in Sonos® (as of at least version 6.4.2) means that the devices no longer accepts ordinary `http:` and `https:` URIs for radio stations. This method has the option to replaces these prefixes with

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the one that Sonos® expects: `x-rincon-mp3radio:` by using the “`force_radio=True`” parameter. A few streams may fail if not forced to to Radio format.

---

**pause ()**

Pause the currently playing track.

**stop ()**

Stop the currently playing track.

**seek (*timestamp*)**

Seek to a given timestamp in the current track, specified in the format of HH:MM:SS or H:MM:SS.

**Raises** `ValueError` – if the given timestamp is invalid.

**next ()**

Go to the next track.

Keep in mind that `next()` can return errors for a variety of reasons. For example, if the Sonos is streaming Pandora and you call `next()` several times in quick succession an error code will likely be returned (since Pandora has limits on how many songs can be skipped).

**previous ()**

Go back to the previously played track.

Keep in mind that `previous()` can return errors for a variety of reasons. For example, `previous()` will return an error code (error code 701) if the Sonos is streaming Pandora since you can't go back on tracks.

**mute**

*bool* – The speaker's mute state.

True if muted, False otherwise.

**volume**

*int* – The speaker's volume.

An integer between 0 and 100.

**bass**

*int* – The speaker's bass EQ.

An integer between -10 and 10.

**treble**

*int* – The speaker's treble EQ.

An integer between -10 and 10.

**loudness**

*bool* – The Sonos speaker's loudness compensation.

True if on, False otherwise.

Loudness is a complicated topic. You can find a nice summary about this feature here: <http://forums.sonos.com/showthread.php?p=4698#post4698>

**night\_mode**

*bool* – The speaker's night mode.

True if on, False if off, None if not supported.

**dialog\_mode**

*bool* – Get the Sonos speaker's dialog mode.

True if on, False if off, None if not supported.

**all\_groups**

set of *soco.groups.ZoneGroup* – All available groups.

**group**

*soco.groups.ZoneGroup* – The Zone Group of which this device is a member.

None if this zone is a slave in a stereo pair.

**all\_zones**

set of *soco.groups.ZoneGroup* – All available zones.

**visible\_zones**

set of *soco.groups.ZoneGroup* – All visible zones.

**partymode ()**

Put all the speakers in the network in the same group, a.k.a Party Mode.

This blog shows the initial research responsible for this: <http://blog.travelmarx.com/2010/06/exploring-sonos-via-upnp.html>

The trick seems to be (only tested on a two-speaker setup) to tell each speaker which to join. There's probably a bit more to it if multiple groups have been defined.

**join (master)**

Join this speaker to another “master” speaker.

**unjoin ()**

Remove this speaker from a group.

Seems to work ok even if you remove what was previously the group master from it's own group. If the speaker was not in a group also returns ok.

**switch\_to\_line\_in (source=None)**

Switch the speaker's input to line-in.

**Parameters** **source** (*SoCo*) – The speaker whose line-in should be played. Default is line-in from the speaker itself.

**is\_playing\_radio**

*bool* – Is the speaker playing radio?

**is\_playing\_line\_in**

*bool* – Is the speaker playing line-in?

**is\_playing\_tv**

*bool* – Is the playbar speaker input from TV?

**switch\_to\_tv ()**

Switch the playbar speaker's input to TV.

**status\_light**

*bool* – The white Sonos status light between the mute button and the volume up button on the speaker.

True if on, otherwise False.

**get\_current\_track\_info ()**

Get information about the currently playing track.

**Returns** A dictionary containing information about the currently playing track: playlist\_position, duration, title, artist, album, position and an album\_art link.

**Return type** *dict*

If we're unable to return data for a field, we'll return an empty string. This can happen for all kinds of reasons so be sure to check values. For example, a track may not have complete metadata and be missing an album name. In this case `track['album']` will be an empty string.

---

**Note:** Calling this method on a slave in a group will not return the track the group is playing, but the last track this speaker was playing.

---

**get\_speaker\_info** (*refresh=False, timeout=None*)

Get information about the Sonos speaker.

**Parameters**

- **refresh** (*bool*) – Refresh the speaker info cache.
- **timeout** – How long to wait for the server to send data before giving up, as a float, or a (`connect timeout, read timeout`) tuple e.g. (3, 5). Default is no timeout.

**Returns** Information about the Sonos speaker, such as the UID, MAC Address, and Zone Name.

**Return type** `dict`

**get\_current\_transport\_info** ()

Get the current playback state.

**Returns**

The following information about the speaker's playing state:

- **current\_transport\_state** (PLAYING, TRANSITIONING, PAUSED\_PLAYBACK, STOPPED)
- **current\_transport\_status** (OK, ?)
- **current\_speed**(1, ?)

**Return type** `dict`

This allows us to know if speaker is playing or not. Don't know other states of CurrentTransportStatus and CurrentSpeed.

**get\_queue** (*start=0, max\_items=100, full\_album\_art\_uri=False*)

Get information about the queue.

**Parameters**

- **start** – Starting number of returned matches
- **max\_items** – Maximum number of returned matches
- **full\_album\_art\_uri** – If the album art URI should include the IP address

**Returns** A `Queue` object

This method is heavily based on Sam Soffes (aka soffes) ruby implementation

**queue\_size**

*int* – Size of the queue.

**get\_sonos\_playlists** (*\*args, \*\*kwargs*)

Convenience method for `get_music_library_information('sonos_playlists')`.

Refer to the docstring for that method

**add\_uri\_to\_queue** (*uri*, *position=0*, *as\_next=False*)

Add the URI to the queue.

For arguments and return value see [add\\_to\\_queue](#).

**add\_to\_queue** (*queueable\_item*, *position=0*, *as\_next=False*)

Add a queueable item to the queue.

#### Parameters

- **queueable\_item** (*DidlObject* or *MusicServiceItem*) – The item to be added to the queue
- **position** (*int*) – The index (1-based) at which the URI should be added. Default is 0 (add URI at the end of the queue).
- **as\_next** (*bool*) – Whether this URI should be played as the next track in shuffle mode. This only works if `play_mode=SHUFFLE`.

**Returns** The index of the new item in the queue.

**Return type** `int`

**add\_multiple\_to\_queue** (*items*, *container=None*)

Add a sequence of items to the queue.

#### Parameters

- **items** (*list*) – A sequence of items to be added to the queue
- **container** (*DidlObject*, *optional*) – A container object which includes the items.

**remove\_from\_queue** (*index*)

Remove a track from the queue by index. The index number is required as an argument, where the first index is 0.

**Parameters** **index** (*int*) – The (0-based) index of the track to remove

**clear\_queue** ()

Remove all tracks from the queue.

**get\_favorite\_radio\_shows** (*start=0*, *max\_items=100*)

Get favorite radio shows from Sonos' Radio app.

**Returns:** dict: A dictionary containing the total number of favorites, the number of favorites returned, and the actual list of favorite radio shows, represented as a dictionary with *title* and *uri* keys.

Depending on what you're building, you'll want to check to see if the total number of favorites is greater than the amount you requested (*max\_items*), if it is, use *start* to page through and get the entire list of favorites.

Deprecated since version 0.13: Will be removed in version 0.15. Use `soco.music_library.get_favorite_radio_shows` instead.

**get\_favorite\_radio\_stations** (*start=0*, *max\_items=100*)

Get favorite radio stations from Sonos' Radio app.

See [get\\_favorite\\_radio\\_shows\(\)](#) for return type and remarks.

Deprecated since version 0.13: Will be removed in version 0.15. Use `soco.music_library.get_favorite_radio_stations` instead.

**get\_sonos\_favorites** (*start=0, max\_items=100*)

Get Sonos favorites.

See `get_favorite_radio_shows()` for return type and remarks.

Deprecated since version 0.13: Will be removed in version 0.15. Use `soco.music_library.get_sonos_favorites` instead.

**create\_sonos\_playlist** (*title*)

Create a new empty Sonos playlist.

**Parameters** **title** – Name of the playlist

**Return type** `DidlPlaylistContainer`

**create\_sonos\_playlist\_from\_queue** (*title*)

Create a new Sonos playlist from the current queue.

**Parameters** **title** – Name of the playlist

**Return type** `DidlPlaylistContainer`

**remove\_sonos\_playlist** (*sonos\_playlist*)

Remove a Sonos playlist.

**Parameters** **sonos\_playlist** (`DidlPlaylistContainer`) – Sonos playlist to remove or the `item_id` (str).

**Returns** True if succesful, False otherwise

**Return type** `bool`

**Raises** `SoCoUPnPException` – If `sonos_playlist` does not point to a valid object.

**add\_item\_to\_sonos\_playlist** (*queueable\_item, sonos\_playlist*)

Adds a queueable item to a Sonos' playlist.

**Parameters**

- **queueable\_item** (`DidlObject`) – the item to add to the Sonos' playlist
- **sonos\_playlist** (`DidlPlaylistContainer`) – the Sonos' playlist to which the item should be added

**get\_item\_album\_art\_uri** (*item*)

Get an item's Album Art absolute URI.

**set\_sleep\_timer** (*sleep\_time\_seconds*)

Sets the sleep timer.

**Parameters** **sleep\_time\_seconds** (*int or NoneType*) – How long to wait before turning off speaker in seconds, None to cancel a sleep timer. Maximum value of 86399

**Raises**

- `SoCoException` – Upon errors interacting with Sonos controller
- `ValueError` – Argument/Syntax errors

**get\_sleep\_timer** ()

Retrieves remaining sleep time, if any

**Returns**

**Number of seconds left in timer. If there is no** sleep timer currently set it will return None.

**Return type** `int` or `NoneType`

- get\_artists** (*\*args, \*\*kwargs*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_artists` instead.
- get\_album\_artists** (*\*args, \*\*kwargs*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_album_artists` instead.
- get\_albums** (*\*args, \*\*kwargs*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_music_library_information` instead.
- get\_genres** (*\*args, \*\*kwargs*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_music_library_information` instead.
- get\_composers** (*\*args, \*\*kwargs*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_composers` instead.
- get\_tracks** (*\*args, \*\*kwargs*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_tracks` instead.
- get\_playlists** (*\*args, \*\*kwargs*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_playlists` instead.
- get\_music\_library\_information** (*search\_type, start=0, max\_items=100, full\_album\_art\_uri=False, search\_term=None, subcategories=None, complete\_result=False*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_music_library_information` instead.
- browse** (*ml\_item=None, start=0, max\_items=100, full\_album\_art\_uri=False, search\_term=None, subcategories=None*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.browse` instead.
- browse\_by\_idstring** (*search\_type, idstring, start=0, max\_items=100, full\_album\_art\_uri=False*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.browse_by_idstring` instead.
- library\_updating**  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.library_updating` instead.
- start\_library\_update** (*album\_artist\_display\_option=""*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.start_library_update` instead.
- search\_track** (*artist, album=None, track=None, full\_album\_art\_uri=False*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.search_track` instead.
- get\_albums\_for\_artist** (*artist, full\_album\_art\_uri=False*)  
 Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_albums_for_artist` instead.

**get\_tracks\_for\_album** (*artist, album, full\_album\_art\_uri=False*)

Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.get_tracks_for_album` instead.

**album\_artist\_display\_option**

Deprecated since version 0.12: Will be removed in version 0.14. Use `soco.music_library.album_artist_display` instead.

**reorder\_sonos\_playlist** (*sonos\_playlist, tracks, new\_pos, update\_id=0*)

Reorder and/or Remove tracks in a Sonos playlist.

The underlying call is quite complex as it can both move a track within the list or delete a track from the playlist. All of this depends on what tracks and new\_pos specify.

If a list is specified for tracks, then a list must be used for new\_pos. Each list element is a discrete modification and the next list operation must anticipate the new state of the playlist.

If a comma formatted string to tracks is specified, then use a similar string to specify new\_pos. Those operations should be ordered from the end of the list to the beginning

See the helper methods `clear_sonos_playlist()`, `move_in_sonos_playlist()`, `remove_from_sonos_playlist()` for simplified usage.

update\_id - If you have a series of operations, tracking the update\_id and setting it, will save a lookup operation.

## Examples

To reorder the first two tracks:

```
# sonos_playlist specified by the DidlPlaylistContainer object
sonos_playlist = device.get_sonos_playlists()[0]
device.reorder_sonos_playlist(sonos_playlist,
                              tracks=[0, ], new_pos=[1, ])
# OR specified by the item_id
device.reorder_sonos_playlist('SQ:0', tracks=[0, ], new_pos=[1, ])
```

To delete the second track:

```
# tracks/new_pos are a list of int
device.reorder_sonos_playlist(sonos_playlist,
                              tracks=[1, ], new_pos=[None, ])
# OR tracks/new_pos are a list of int-like
device.reorder_sonos_playlist(sonos_playlist,
                              tracks=['1', ], new_pos=['', ])
# OR tracks/new_pos are strings - no transform is done
device.reorder_sonos_playlist(sonos_playlist, tracks='1',
                              new_pos='')
```

To reverse the order of a playlist with 4 items:

```
device.reorder_sonos_playlist(sonos_playlist, tracks='3,2,1,0',
                              new_pos='0,1,2,3')
```

## Parameters

- **sonos\_playlist** – (*DidlPlaylistContainer*): The Sonos playlist object or the item\_id (str) of the Sonos playlist.

- **tracks** – (list): list of track indices(int) to reorder. May also be a list of int like things. i.e. ['0', '1', ] OR it may be a str of comma separated int like things. "0,1". Tracks are **0**-based. Meaning the first track is track 0, just like indexing into a Python list.
- **new\_pos** (*list*) – list of new positions (int|None) corresponding to track\_list. MUST be the same type as tracks. **0**-based, see tracks above. None is the indicator to remove the track. If using a list of strings, then a remove is indicated by an empty string.
- **update\_id** (*int*) – operation id (default: 0) If set to 0, a lookup is done to find the correct value.

#### Returns

**Which contains 3 elements: change, length and update\_id.** Change in size between original playlist and the resulting playlist, the length of resulting playlist, and the new update\_id.

#### Return type dict

**Raises** SoCoUPnPException – If playlist does not exist or if your tracks and/or new\_pos arguments are invalid.

**clear\_sonos\_playlist** (*sonos\_playlist, update\_id=0*)

Clear all tracks from a Sonos playlist. This is a convenience method for `reorder_sonos_playlist()`.

Example:

```
device.clear_sonos_playlist(sonos_playlist)
```

#### Parameters

- **sonos\_playlist** – (*DidlPlaylistContainer*): Sonos playlist object or the item\_id (str) of the Sonos playlist.
- **update\_id** (*int*) – Optional update counter for the object. If left at the default of 0, it will be looked up.

**Returns** See `reorder_sonos_playlist()`

#### Return type dict

#### Raises

- `ValueError` – If sonos\_playlist specified by string and is not found.
- `SoCoUPnPException` – See `reorder_sonos_playlist()`

**move\_in\_sonos\_playlist** (*sonos\_playlist, track, new\_pos, update\_id=0*)

Move a track to a new position within a Sonos Playlist. This is a convenience method for `reorder_sonos_playlist()`.

Example:

```
device.move_in_sonos_playlist(sonos_playlist, track=0, new_pos=1)
```

#### Parameters

- **sonos\_playlist** – (*DidlPlaylistContainer*): Sonos playlist object or the item\_id (str) of the Sonos playlist.



- **track** (*int*) – 0-based position of the track to move. The first track is track 0, just like indexing into a Python list.
- **new\_pos** (*int*) – 0-based location to move the track.
- **update\_id** (*int*) – Optional update counter for the object. If left at the default of 0, it will be looked up.

**Returns** See `reorder_sonos_playlist()`

**Return type** dict

**Raises** SoCoUPnPException – See `reorder_sonos_playlist()`

**remove\_from\_sonos\_playlist** (*sonos\_playlist, track, update\_id=0*)

Remove a track from a Sonos Playlist. This is a convenience method for `reorder_sonos_playlist()`.

Example:

```
device.remove_from_sonos_playlist(sonos_playlist, track=0)
```

#### Parameters

- **sonos\_playlist** – (*DidlPlaylistContainer*): Sonos playlist object or the `item_id` (str) of the Sonos playlist.
- **track** (*int*) – 0\*-based position of the track to move. The first track is track 0, just like indexing into a Python list.
- **update\_id** (*int*) – Optional update counter for the object. If left at the default of 0, it will be looked up.

**Returns** See `reorder_sonos_playlist()`

**Return type** dict

**Raises** SoCoUPnPException – See `reorder_sonos_playlist()`

**get\_sonos\_playlist\_by\_attr** (*attr\_name, match*)

Return the first Sonos Playlist `DidlPlaylistContainer` that matches the attribute specified.

#### Parameters

- **attr\_name** (*str*) – `DidlPlaylistContainer` attribute to compare. The most useful being: 'title' and 'item\_id'.
- **match** (*str*) – Value to match.

#### Returns

The first matching playlist object.

**Return type** (*DidlPlaylistContainer*)

#### Raises

- (`AttributeError`) – If indicated attribute name does not exist.
- (`ValueError`) – If a match can not be found.

Example:

```
device.get_sonos_playlist_by_attr('title', 'Foo')
device.get_sonos_playlist_by_attr('item_id', 'SQ:3')
```

### 1.10.2.6 soco.data\_structures module

This module contains classes for handling DIDL-Lite metadata.

**DIDL** is the Digital Item Declaration Language, an XML schema which is part of MPEG21. **DIDL-Lite** is a cut-down version of the schema which is part of the UPnP ContentDirectory specification. It is the XML schema used by Sonos for carrying metadata representing many items such as tracks, playlists, composers, albums etc. Although Sonos uses ContentDirectory v1, the [document for v2 \[pdf\]](#) is more helpful.

`soco.data_structures.to_didl_string(*args)`

Convert any number of *DidlObjects* to a unicode xml string.

**Parameters** *\*args* (*DidlObject*) – One or more *DidlObject* (or subclass) instances.

**Returns** A unicode string representation of DIDL-Lite XML in the form '`<DIDL-Lite ...>..</DIDL-Lite>`'.

**Return type** *str*

**class** `soco.data_structures.DidlResource` (*uri*, *protocol\_info*, *import\_uri=None*, *size=None*, *duration=None*, *bitrate=None*, *sample\_frequency=None*, *bits\_per\_sample=None*, *nr\_audio\_channels=None*, *resolution=None*, *color\_depth=None*, *protection=None*)

Identifies a resource, typically some type of a binary asset, such as a song.

It is represented in XML by a `<res>` element, which contains a uri that identifies the resource.

**Parameters**

- **uri** (*str*) – value of the `<res>` tag, typically a URI. It **must** be properly escaped (percent encoded) as described in [RFC 3986](#)
- **protocol\_info** (*str*) – a string in the form `a:b:c:d` that identifies the streaming or transport protocol for transmitting the resource. A value is required. For more information see section 2.5.2 of the [UPnP specification \[ pdf\]](#)
- **import\_uri** (*str*, *optional*) – uri locator for resource update.
- **size** (*int*, *optional*) – size in bytes.
- **duration** (*str*, *optional*) – duration of the playback of the res at normal speed (`H*:MM:SS:F*` or `H*:MM:SS:F0/F1`)
- **bitrate** (*int*, *optional*) – bitrate in bytes/second.
- **sample\_frequency** (*int*, *optional*) – sample frequency in Hz.
- **bits\_per\_sample** (*int*, *optional*) – bits per sample.
- **nr\_audio\_channels** (*int*, *optional*) – number of audio channels.
- **resolution** (*str*, *optional*) – resolution of the resource (`X*Y`).
- **color\_depth** (*int*, *optional*) – color depth in bits.
- **protection** (*str*, *optional*) – statement of protection type.

---

**Note:** Not all of the parameters are used by Sonos. In general, only `uri`, `protocol_info` and `duration` seem to be important.

---

**uri = None**

(*str*) – a percent encoded URI

**protocol\_info = None**  
(*str*) – protocol information.

**duration = None**  
*str* – playback duration

**classmethod from\_element** (*element*)  
Set the resource properties from a <res> element.

**Parameters** **element** (*Element*) – The <res> element

**to\_element** ()  
Return an ElementTree Element based on this resource.

**Returns** an Element.

**Return type** *Element*

**to\_dict** (*remove\_nones=False*)  
Return a dict representation of the *DidlResource*.

**Parameters** **remove\_nones** (*bool*, *optional*) – Optionally remove dictionary elements when their value is *None*.

**Returns** a dict representing the *DidlResource*

**Return type** *dict*

**classmethod from\_dict** (*content*)  
Create an instance from a dict.

An alternative constructor. Equivalent to *DidlResource* (\*\**content*).

**Parameters** **content** (*dict*) – a dict containing metadata information. Required. Valid keys are the same as the parameters for *DidlResource*.

**class** *soco.data\_structures.DidlMetaClass*  
Meta class for all Didl objects.

Create a new instance.

**Parameters**

- **name** (*str*) – Name of the class.
- **bases** (*tuple*) – Base classes.
- **attrs** (*dict*) – attributes defined for the class.

**class** *soco.data\_structures.DidlObject* (*title*, *parent\_id*, *item\_id*, *restricted=True*, *resources=None*, *desc='RINCON\_AssociatedZPUDN'*, \*\**kwargs*)

Abstract base class for all DIDL-Lite items.

You should not need to instantiate this. Its XML representation looks like this:

```
<DIDL-Lite xmlns="urn:schemas-upnp-org:metadata-1-0/DIDL-Lite/"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:r="urn:schemas-rinconnetworks-com:metadata-1-0/"
xmlns:upnp="urn:schemas-upnp-org:metadata-1-0/upnp/">
  <item id="...self.item_id..." parentID="...cls.parent_id..."
  restricted="true">
    <dc:title>...self.title...</dc:title>
    <upnp:class>...self.item_class...</upnp:class>
    <desc id="cdudn"
```

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```

    namespace="urn:schemas-rinconnetworks-com:metadata-1-0/">
    RINCON_AssociatedZPUDN
  </desc>
</item>
</DIDL-Lite>

```

**Parameters**

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = `'object'`

*str* - the DIDL Lite class for this object.

**tag** = `'item'`

*str* - the XML element tag name used for this instance.

**\_translation** = `{'creator': ('dc', 'creator'), 'write_status': ('upnp', 'writeStatus')}`

*dict* - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (*namespace, tag*) tuple.

**classmethod from\_element** (*element*)

Create an instance of this class from an `ElementTree` xml Element.

An alternative constructor. The element must be a DIDL-Lite `<item>` or `<container>` element, and must be properly namespaced.

**Parameters** *xml* (*Element*) – An `Element` object.

**classmethod from\_dict** (*content*)

Create an instance from a dict.

An alternative constructor. Equivalent to `DidlObject(**content)`.

**Parameters** *content* (*dict*) – a dict containing metadata information. Required. Valid keys are the same as the parameters for `DidlObject`.

**to\_dict** (*remove\_nones=False*)

Return the dict representation of the instance.

**Parameters** *remove\_nones* – Optionally remove dictionary elements when their value is `None`.

**to\_element** (*include\_namespaces=False*)

Return an `ElementTree` Element representing this instance.

**Parameters** `include_namespaces` (*bool*, *optional*) – If True, include xml namespace attributes on the root element

**Returns** an Element.

**Return type** Element

**get\_uri** (*resource\_nr=0*)

Return the uri to use for playing this item.

**Parameters** `resource_nr` (*int*) – The index of the resource. Note that there is no known object with more than one resource, so you can probably keep the default value (0).

**Returns** The uri.

**Return type** str

**set\_uri** (*uri*, *resource\_nr=0*, *protocol\_info=None*)

Set a resource uri for this instance. If no resource exists, create a new one with the given protocol info.

**Parameters**

- **uri** (*str*) – The resource uri.
- **resource\_nr** (*int*) – The index of the resource on which to set the uri. If it does not exist, a new resource is added to the list. Note that by default, only the uri of the first resource is used for playing the item.
- **protocol\_info** (*str*) – Protocol info for the resource. If none is given and the resource does not exist yet, a default protocol info is constructed as '[uri prefix]::\*'

```
class soco.data_structures.DidlItem(title, parent_id, item_id, restricted=True, resources=None, desc='RINCON_AssociatedZPUDN', **kwargs)
```

A basic content directory item.

**Parameters**

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list*, *optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default 'RINCON\_AssociatedZPUDN'. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.item'
```

str - the DIDL Lite class for this object.

```
tag = 'item'
```

str - the XML element tag name used for this instance.

```
_translation = {'album_art_uri': ('upnp', 'albumArtURI'), 'creator': ('dc', 'creator
```

dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlAudioItem(title, parent_id, item_id, re-
                                         stricted=True, resources=None,
                                         desc='RINCON_AssociatedZPUDN', **kwargs)
```

An audio item.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.item.audioItem'
```

*str* - the DIDL Lite class for this object.

```
tag = 'item'
```

*str* - the XML element tag name used for this instance.

```
_translation = {'album_art_uri': ('upnp', 'albumArtURI'), 'creator': ('dc', 'creator
```

*dict* - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlMusicTrack(title, parent_id, item_id, re-
                                          stricted=True, resources=None,
                                          desc='RINCON_AssociatedZPUDN',
                                          **kwargs)
```

Class that represents a music library track.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.item.audioItem.musicTrack'
```

*str* - the DIDL Lite class for this object.

```
tag = 'item'
```

str - the XML element tag name used for this instance.

```
_translation = {'album': ('upnp', 'album'), 'album_art_uri': ('upnp', 'albumArtURI')}
```

dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlAudioBroadcast(title, parent_id, item_id, re-
                                             stricted=True, resources=None,
                                             desc='RINCON_AssociatedZPUDN',
                                             **kwargs)
```

Class that represents an audio broadcast.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default 'RINCON\_AssociatedZPUDN'. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.item.audioItem.audioBroadcast'
```

str - the DIDL Lite class for this object.

```
tag = 'item'
```

str - the XML element tag name used for this instance.

```
_translation = {'album_art_uri': ('upnp', 'albumArtURI'), 'channel_nr': ('upnp', 'ch
```

dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlAudioBroadcastFavorite(title, parent_id, item_id,
                                                      restricted=True,
                                                      resources=None,
                                                      desc='RINCON_AssociatedZPUDN',
                                                      **kwargs)
```

Class that represents an audio broadcast Sonos favorite.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None**. (*Default*) –

- **desc** (*str*) – A DIDL descriptor, default 'RINCON\_AssociatedZPUDN'. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = 'object.item.audioItem.audioBroadcast.sonos-favorite'  
str - the DIDL Lite class for this object.

**tag** = 'item'  
str - the XML element tag name used for this instance.

**\_translation** = {'album\_art\_uri': ('upnp', 'albumArtURI'), 'channel\_nr': ('upnp', 'ch')}  
dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlFavorite(title, parent_id, item_id, re-
                                     stricted=True, resources=None,
                                     desc='RINCON_AssociatedZPUDN', **kwargs)
```

Class that represents a Sonos favorite.

Note that the favorite itself isn't playable in all cases, please use the object returned by `favorite` reference instead.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default 'RINCON\_AssociatedZPUDN'. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = 'object.itemobject.item.sonos-favorite'  
str - the DIDL Lite class for this object.

**tag** = 'item'  
str - the XML element tag name used for this instance.

**\_translation** = {'album\_art\_uri': ('upnp', 'albumArtURI'), 'creator': ('dc', 'creator')}  
dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

#### reference

The `Didl` object this favorite refers to.

```
class soco.data_structures.DidlContainer(title, parent_id, item_id, re-
                                       stricted=True, resources=None,
                                       desc='RINCON_AssociatedZPUDN', **kwargs)
```

Class that represents a music library container.

#### Parameters



- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None.** (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = `'object.container'`  
*str* - the DIDL Lite class for this object.

**tag** = `'container'`  
*str* - the XML element tag name used for this instance.

**\_translation** = `{'creator': ('dc', 'creator'), 'write_status': ('upnp', 'writeStatus')}`  
 dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlAlbum(title, parent_id, item_id, restricted=True, resources=None, desc='RINCON_AssociatedZPUDN',
                                    **kwargs)
```

A content directory album.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None.** (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = `'object.container.album'`  
*str* - the DIDL Lite class for this object.

**tag** = `'container'`  
*str* - the XML element tag name used for this instance.

**\_translation** = `{'contributor': ('dc', 'contributor'), 'creator': ('dc', 'creator')}`  
 dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlMusicAlbum(title, parent_id, item_id, re-  
stricted=True, resources=None,  
desc='RINCON_AssociatedZPUDN',  
**kwargs)
```

Class that represents a music library album.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list*, *optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.container.album.musicAlbum'  
str - the DIDL Lite class for this object.
```

```
tag = 'container'  
str - the XML element tag name used for this instance.
```

```
_translation = {'album_art_uri': ('upnp', 'albumArtURI'), 'artist': ('upnp', 'artist')  
dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.
```

```
class soco.data_structures.DidlMusicAlbumFavorite(title, parent_id, item_id, re-  
stricted=True, resources=None,  
desc='RINCON_AssociatedZPUDN',  
**kwargs)
```

Class that represents a Sonos favorite music library album.

This class is not part of the DIDL spec and is Sonos specific.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list*, *optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.container.album.musicAlbum.sonos-favorite'
```

str - the DIDL Lite class for this object.

```
tag = 'item'
```

str - the XML element tag name used for this instance.

```
_translation = {'contributor': ('dc', 'contributor'), 'creator': ('dc', 'creator'),
```

dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlMusicAlbumCompilation(title, parent_id, item_id,
                                                    restricted=True,
                                                    resources=None,
                                                    desc='RINCON_AssociatedZPUDN',
                                                    **kwargs)
```

Class that represents a Sonos favorite music library compilation.

This class is not part of the DIDL spec and is Sonos specific.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None.** (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.container.album.musicAlbum.compilation'
```

str - the DIDL Lite class for this object.

```
tag = 'container'
```

str - the XML element tag name used for this instance.

```
_translation = {'contributor': ('dc', 'contributor'), 'creator': ('dc', 'creator'),
```

dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlPerson(title, parent_id, item_id, restricted=True, re-
                                     sources=None, desc='RINCON_AssociatedZPUDN',
                                     **kwargs)
```

A content directory class representing a person.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`

- **resources** (*list, optional*) – a list of resources for this object.
- **None.** (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default 'RINCON\_AssociatedZPUDN'. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = 'object.container.person'  
 str - the DIDL Lite class for this object.

**tag** = 'item'  
 str - the XML element tag name used for this instance.

**\_translation** = {'creator': ('dc', 'creator'), 'language': ('dc', 'language'), 'write': ('dc', 'write')}  
 dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlComposer(title, parent_id, item_id, re-
    stricted=True, resources=None,
    desc='RINCON_AssociatedZPUDN', **kwargs)
```

Class that represents a music library composer.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None.** (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default 'RINCON\_AssociatedZPUDN'. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = 'object.container.person.composer'  
 str - the DIDL Lite class for this object.

**tag** = 'item'  
 str - the XML element tag name used for this instance.

**\_translation** = {'creator': ('dc', 'creator'), 'language': ('dc', 'language'), 'write': ('dc', 'write')}  
 dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlMusicArtist(title, parent_id, item_id, re-
    stricted=True, resources=None,
    desc='RINCON_AssociatedZPUDN',
    **kwargs)
```

Class that represents a music library artist.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None.** (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = `'object.container.person.musicArtist'`  
str - the DIDL Lite class for this object.

**tag** = `'item'`  
str - the XML element tag name used for this instance.

**\_translation** = `{'artist_discography_uri': ('upnp', 'artistDiscographyURI'), 'creator'`  
dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlAlbumList (title,          parent_id,          item_id,          re-
                                         stricted=True,          resources=None,
                                         desc='RINCON_AssociatedZPUDN', **kwargs)
```

Class that represents a music library album list.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None.** (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = `'object.container.albumlist'`  
str - the DIDL Lite class for this object.

**tag** = `'container'`  
str - the XML element tag name used for this instance.

**\_translation** = `{'creator': ('dc', 'creator'), 'write_status': ('upnp', 'writeStatus'`  
dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlPlaylistContainer(title, parent_id, item_id, re-  
stricted=True, resources=None,  
desc='RINCON_AssociatedZPUDN',  
**kwargs)
```

Class that represents a music library play list.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None.** (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.container.playlistContainer'  
str - the DIDL Lite class for this object.
```

```
tag = 'item'  
str - the XML element tag name used for this instance.
```

```
_translation = {'artist': ('upnp', 'artist'), 'contributor': ('dc', 'contributor')},  
dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.
```

```
item_class = 'object.container.playlistContainer'
```

```
class soco.data_structures.DidlSameArtist(title, parent_id, item_id, re-  
stricted=True, resources=None,  
desc='RINCON_AssociatedZPUDN',  
**kwargs)
```

Class that represents all tracks by a single artist.

This type is returned by browsing an artist or a composer

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None.** (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.container.playlistContainer.sameArtist'
```

str - the DIDL Lite class for this object.

```
tag = 'item'
```

str - the XML element tag name used for this instance.

```
_translation = {'artist': ('upnp', 'artist'), 'contributor': ('dc', 'contributor')},
```

dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlPlaylistContainerFavorite(title, parent_id, item_id,
                                                         restricted=True,
                                                         resources=None,
                                                         desc='RINCON_AssociatedZPUDN',
                                                         **kwargs)
```

Class that represents a Sonos favorite play list.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default 'RINCON\_AssociatedZPUDN'. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

```
item_class = 'object.container.playlistContainer.sonos-favorite'
```

str - the DIDL Lite class for this object.

```
tag = 'item'
```

str - the XML element tag name used for this instance.

```
_translation = {'artist': ('upnp', 'artist'), 'contributor': ('dc', 'contributor')},
```

dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlGenre(title, parent_id, item_id, restricted=True, re-
                                     sources=None, desc='RINCON_AssociatedZPUDN',
                                     **kwargs)
```

A content directory class representing a general genre.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.

- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default 'RINCON\_AssociatedZPUDN'. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = 'object.container.genre'  
str - the DIDL Lite class for this object.

**tag** = 'container'  
str - the XML element tag name used for this instance.

**\_translation** = {'creator': ('dc', 'creator'), 'description': ('dc', 'description')},  
dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlMusicGenre(title, parent_id, item_id, re-
                                         stricted=True, resources=None,
                                         desc='RINCON_AssociatedZPUDN',
                                         **kwargs)
```

Class that represents a music genre.

#### Parameters

- **title** (*str*) – the title for the item.
- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default 'RINCON\_AssociatedZPUDN'. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = 'object.container.genre.musicGenre'  
str - the DIDL Lite class for this object.

**tag** = 'item'  
str - the XML element tag name used for this instance.

**\_translation** = {'creator': ('dc', 'creator'), 'description': ('dc', 'description')},  
dict - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

```
class soco.data_structures.DidlRadioShow(title, parent_id, item_id, re-
                                         stricted=True, resources=None,
                                         desc='RINCON_AssociatedZPUDN', **kwargs)
```

Class that represents a radio show.

#### Parameters

- **title** (*str*) – the title for the item.



- **parent\_id** (*str*) – the parent ID for the item.
- **item\_id** (*str*) – the ID for the item.
- **restricted** (*bool*) – whether the item can be modified. Default `True`
- **resources** (*list, optional*) – a list of resources for this object.
- **None**. (*Default*) –
- **desc** (*str*) – A DIDL descriptor, default `'RINCON_AssociatedZPUDN'`. This is not the same as “description”. It is used for identifying the relevant third party music service.
- **\*\*kwargs** – Extra metadata. What is allowed depends on the `_translation` class attribute, which in turn depends on the DIDL class.

**item\_class** = `'object.container.radioShow'`  
*str* - the DIDL Lite class for this object.

**tag** = `'container'`  
*str* - the XML element tag name used for this instance.

**\_translation** = `{'creator': ('dc', 'creator'), 'write_status': ('upnp', 'writeStatus')}`  
*dict* - A dict used to translate between instance attribute names and XML tags/namespaces. It also serves to define the allowed tags/attributes for this instance. Each key an attribute name and each key is a (namespace, tag) tuple.

**class** `soco.data_structures.ListOfMusicInfoItems` (*items, number\_returned, total\_matches, update\_id*)

Abstract container class for a list of music information items.

Instances of this class are returned from queries into the music library or to music services. The attributes `total_matches` and `number_returned` are used to ascertain whether paging is required in order to retrieve all elements of the query. `total_matches` is the total number of results to the query and `number_returned` is the number of results actually returned. If the two differ, paging is required. Paging is typically performed with the `start` and `max_items` arguments to the query method. See e.g. the `get_music_library_information()` method for details.

**number\_returned**  
*str* – the number of returned matches.

**total\_matches**  
*str* – the number of total matches.

**update\_id**  
*str* – the update ID.

**class** `soco.data_structures.SearchResult` (*items, search\_type, number\_returned, total\_matches, update\_id*)

Container class that represents a search or browse result.

Browse is just a special case of search.

**search\_type**  
*str* – the search type.

**class** `soco.data_structures.Queue` (*items, number\_returned, total\_matches, update\_id*)  
 Container class that represents a queue.

### 1.10.2.7 soco.discovery module

This module contains methods for discovering Sonos devices on the network.

`soco.discovery.discover` (*timeout=5, include\_invisible=False, interface\_addr=None*)

Discover Sonos zones on the local network.

Return a set of *SoCo* instances for each zone found. Include invisible zones (bridges and slave zones in stereo pairs if `include_invisible` is `True`. Will block for up to `timeout` seconds,

Unexpected indentation.

after which return `None` if no zones found.

#### Parameters

- **timeout** (*int, optional*) – block for this many seconds, at most. Defaults to 5.
- **include\_invisible** (*bool, optional*) – include invisible zones in the return set. Defaults to `False`.
- **interface\_addr** (*str or None*) – Discovery operates by sending UDP multicast datagrams. `interface_addr` is a string (dotted quad) representation of the network interface address to use as the source of the datagrams (i.e. it is a value for `socket.IP_MULTICAST_IF`). If `None` or not specified, the system default interface for UDP multicast messages will be used. This is probably what you want to happen. Defaults to `None`.

#### Returns

a set of *SoCo* instances, one for each zone found, or else `None`.

**Return type** `set`

---

**Note:** There is no easy cross-platform way to find out the addresses of the local machine's network interfaces. You might try the `netifaces` module and some code like this:

```
>>> from netifaces import interfaces, AF_INET, ifaddresses
>>> data = [ifaddresses(i) for i in interfaces()]
>>> [d[AF_INET][0]['addr'] for d in data if d.get(AF_INET)]
['127.0.0.1', '192.168.1.20']
```

This should provide you with a list of values to try for `interface_addr` if you are having trouble finding your Sonos devices

---

`soco.discovery.any_soco` ()

Return any visible *soco* device, for when it doesn't matter which.

Try to obtain an existing instance, or use `discover` if necessary. Note that this assumes that the existing instance has not left the network.

#### Returns

A *SoCo* instance (or subclass if `config.SOCO_CLASS` is set, or `None` if no instances are found

**Return type** *SoCo*

`soco.discovery.by_name` (*name*)

Return a device by name.

**Parameters** `name` (*str*) – The name of the device to return.

#### Returns

The first device encountered among all zone with the given player name. If none are found `None` is returned.

**Return type** `SoCo`

### 1.10.2.8 `soco.events` module

Classes to handle Sonos UPnP Events and Subscriptions.

`soco.events.parse_event_xml(xml_event)`

Parse the body of a UPnP event.

**Parameters** `xml_event` (*bytes*) – bytes containing the body of the event encoded with utf-8.

**Returns**

A dict with keys representing the evented variables. The relevant value will usually be a string representation of the variable's value, but may on occasion be:

- a dict (eg when the volume changes, the value will itself be a dict containing the volume for each channel: {'Volume': {'LF': '100', 'RF': '100', 'Master': '36'}})
- an instance of a *DidlObject* subclass (eg if it represents track metadata).

**Return type** `dict`

### Example

Run this code, and change your volume, tracks etc:

```
from __future__ import print_function
try:
    from queue import Empty
except: # Py2.7
    from Queue import Empty

import soco
from pprint import pprint
from soco.events import event_listener
# pick a device at random
device = soco.discover().pop()
print (device.player_name)
sub = device.renderingControl.subscribe()
sub2 = device.avTransport.subscribe()

while True:
    try:
        event = sub.events.get(timeout=0.5)
        pprint (event.variables)
    except Empty:
        pass
    try:
        event = sub2.events.get(timeout=0.5)
        pprint (event.variables)
    except Empty:
        pass
```

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```

except KeyboardInterrupt:
    sub.unsubscribe()
    sub2.unsubscribe()
    event_listener.stop()
break

```

**class** `soco.events.Event` (*sid, seq, service, timestamp, variables=None*)

A read-only object representing a received event.

The values of the evented variables can be accessed via the `variables` dict, or as attributes on the instance itself. You should treat all attributes as read-only.

#### Parameters

- **sid** (*str*) – the subscription id.
- **seq** (*str*) – the event sequence number for that subscription.
- **timestamp** (*str*) – the time that the event was received (from Python’s `time.time` function).
- **service** (*str*) – the service which is subscribed to the event.
- **variables** (*dict, optional*) – contains the {names: values} of the evented variables. Defaults to `None`.

**Raises** `AttributeError` – Not all attributes are returned with each event. An `AttributeError` will be raised if you attempt to access as an attribute a variable which was not returned in the event.

#### Example

```

>>> print event.variables['transport_state']
'STOPPED'
>>> print event.transport_state
'STOPPED'

```

**class** `soco.events.EventServer` (*server\_address, RequestHandlerClass, bind\_and\_activate=True*)

A TCP server which handles each new request in a new thread.

Constructor. May be extended, do not override.

**class** `soco.events.EventNotifyHandler` (*request, client\_address, server*)

Handles HTTP NOTIFY Verbs sent to the listener server.

**do\_NOTIFY** ()

Serve a NOTIFY request.

A NOTIFY request will be sent by a Sonos device when a state variable changes. See the [UPnP Spec §4.3 \[pdf\]](#) for details.

**log\_message** (*fmt, \*args*)

Log an arbitrary message.

This is used by all other logging functions. Override it if you have specific logging wishes.

The first argument, `FORMAT`, is a format string for the message to be logged. If the format string contains any `%` escapes requiring parameters, they should be specified as subsequent arguments (it’s just like `printf!`).

The client ip and current date/time are prefixed to every message.

**class** `soco.events.EventServerThread` (*address*)

The thread in which the event listener server will run.

**Parameters** `address` (*tuple*) – The (ip, port) address on which the server should listen.

**stop\_flag** = `None`

`threading.Event` – Used to signal that the server should stop.

**address** = `None`

*tuple* – The (ip, port) address on which the server is configured to listen.

**run** ()

Start the server on the local IP at port 1400 (default).

Handling of requests is delegated to an instance of the `EventNotifyHandler` class.

**class** `soco.events.EventListener`

The Event Listener.

Runs an http server in a thread which is an endpoint for NOTIFY requests from Sonos devices.

**is\_running** = `None`

`bool` – Indicates whether the server is currently running

**start** (*any\_zone*)

Start the event listener listening on the local machine at port 1400 (default)

Make sure that your firewall allows connections to this port

**Parameters** `any_zone` (`SoCo`) – Any Sonos device on the network. It does not matter which device. It is used only to find a local IP address reachable by the Sonos net.

---

**Note:** The port on which the event listener listens is configurable. See `config.EVENT_LISTENER_PORT`

---

**stop** ()

Stop the event listener.

**class** `soco.events.Subscription` (*service, event\_queue=None*)

A class representing the subscription to a UPnP event.

**Parameters**

- **service** (`Service`) – The SoCo `Service` to which the subscription should be made.
- **event\_queue** (`Queue`) – A queue on which received events will be put. If not specified, a queue will be created and used.

**sid** = `None`

`str` – A unique ID for this subscription

**timeout** = `None`

`int` – The amount of time in seconds until the subscription expires.

**is\_subscribed** = `None`

`bool` – An indication of whether the subscription is subscribed.

**events** = `None`

`Queue` – The queue on which events are placed.

**requested\_timeout = None**

*int* – The period (seconds) for which the subscription is requested

**subscribe** (*requested\_timeout=None, auto\_renew=False*)

Subscribe to the service.

If *requested\_timeout* is provided, a subscription valid for that number of seconds will be requested, but not guaranteed. Check *timeout* on return to find out what period of validity is actually allocated.

---

**Note:** SoCo will try to unsubscribe any subscriptions which are still subscribed on program termination, but it is good practice for you to clean up by making sure that you call *unsubscribe()* yourself.

---

#### Parameters

- **requested\_timeout** (*int, optional*) – The timeout to be requested.
- **auto\_renew** (*bool, optional*) – If `True`, renew the subscription automatically shortly before timeout. Default `False`.

**renew** (*requested\_timeout=None*)

Renew the event subscription.

You should not try to renew a subscription which has been unsubscribed, or once it has expired.

**Parameters** **requested\_timeout** (*int, optional*) – The period for which a renewal request should be made. If `None` (the default), use the timeout requested on subscription.

**unsubscribe** ()

Unsubscribe from the service's events.

Once unsubscribed, a Subscription instance should not be reused

**time\_left**

*int* – The amount of time left until the subscription expires (seconds)

If the subscription is unsubscribed (or not yet subscribed), *time\_left* is 0.

### 1.10.2.9 soco.exceptions module

Exceptions that are used by SoCo.

**exception** `soco.exceptions.SoCoException`

Base class for all SoCo exceptions.

**exception** `soco.exceptions.UnknownSoCoException`

An unknown UPnP error.

The exception object will contain the raw response sent back from the speaker as the first of its args.

**exception** `soco.exceptions.SoCoUPnPException` (*message, error\_code, error\_xml, error\_description=""*)

A UPnP Fault Code, raised in response to actions sent over the network.

#### Parameters

- **message** (*str*) – The message from the server.
- **error\_code** (*str*) – The UPnP Error Code as a string.
- **error\_xml** (*str*) – The xml containing the error, as a utf-8 encoded string.

- **error\_description** (*str*) – A description of the error. Default is ""

**exception** `soco.exceptions.CannotCreateDIDLMetadata`  
 Deprecated since version 0.11: Use `DIDLMetadataError` instead.

**exception** `soco.exceptions.DIDLMetadataError`  
 Raised if a data container class cannot create the DIDL metadata due to missing information.

For backward compatibility, this is currently a subclass of `CannotCreateDIDLMetadata`. In a future version, it will likely become a direct subclass of `SoCoException`.

**exception** `soco.exceptions.MusicServiceException`  
 An error relating to a third party music service.

**exception** `soco.exceptions.UnknownXMLStructure`  
 Raised if XML with an unknown or unexpected structure is returned.

**exception** `soco.exceptions.SoCoSlaveException`  
 Raised when a master command is called on a slave.

**exception** `soco.exceptions.NotSupportedException`  
 Raised when something is not supported by the device

### 1.10.2.10 `soco.groups` module

This module contains classes and functionality relating to Sonos Groups.

**class** `soco.groups.ZoneGroup` (*uid, coordinator, members=None*)  
 A class representing a Sonos Group. It looks like this:

```
ZoneGroup(
  uid='RINCON_000FD584236D01400:58',
  coordinator=SoCo("192.168.1.101"),
  members={SoCo("192.168.1.101"), SoCo("192.168.1.102")}
)
```

Any `SoCo` instance can tell you what group it is in:

```
>>> device = socio.discovery.any_soco()
>>> device.group
ZoneGroup(
  uid='RINCON_000FD584236D01400:58',
  coordinator=SoCo("192.168.1.101"),
  members={SoCo("192.168.1.101"), SoCo("192.168.1.102")}
)
```

From there, you can find the coordinator for the current group:

```
>>> device.group.coordinator
SoCo("192.168.1.101")
```

or, for example, its name:

```
>>> device.group.coordinator.player_name
Kitchen
```

or a set of the members:

```
>>> device.group.members
{SoCo("192.168.1.101"), SoCo("192.168.1.102")}
```

For convenience, `ZoneGroup` is also a container:

```
>>> for player in device.group:
...     print player.player_name
Living Room
Kitchen
```

If you need it, you can get an iterator over all groups on the network:

```
>>> device.all_groups
<generator object all_groups at 0x108cf0c30>
```

A consistent readable label for the group members can be returned with the `label` and `short_label` properties.

#### Parameters

- **uid** (*str*) – The unique Sonos ID for this group, eg RINCON\_000FD584236D01400:5.
- **coordinator** (*SoCo*) – The *SoCo* instance representing the coordinator of this group.
- **members** (*Iterable[SoCo]*) – An iterable containing *SoCo* instances which represent the members of this group.

#### **uid = None**

The unique Sonos ID for this group

#### **coordinator = None**

The *SoCo* instance which coordinates this group

#### **members = None**

A set of *SoCo* instances which are members of the group

#### **label**

*str* – A description of the group.

```
>>> device.group.label
'Kitchen, Living Room'
```

#### **short\_label**

*str* – A short description of the group.

```
>>> device.group.short_label
'Kitchen + 1'
```

### 1.10.2.11 `soco.ms_data_structures` module

This module contains all the data structures for music service plugins.

`soco.ms_data_structures.get_ms_item(xml, service, parent_id)`

Return the music service item that corresponds to xml.

The class is identified by getting the type from the 'itemType' tag

`soco.ms_data_structures.tags_with_text(xml, tags=None)`

Return a list of tags that contain text retrieved recursively from an XML tree.



**class** `soco.ms_data_structures.MusicServiceItem` (\*\*kwargs)

Class that represents a music service item.

**classmethod** `from_xml` (*xml*, *service*, *parent\_id*)

Return a Music Service item generated from xml.

#### Parameters

- **xml** (`xml.etree.ElementTree.Element`) – Object XML. All items containing text are added to the content of the item. The class variable `valid_fields` of each of the classes list the valid fields (after translating the camel case to underscore notation). Required fields are listed in the class variable by that name (where ‘id’ has been renamed to ‘item\_id’).
- **service** (Instance of sub-class of `soco.plugins.SoCoPlugin`) – The music service (plugin) instance that retrieved the element. This service must contain `id_to_extended_id` and `form_uri` methods and `description` and `service_id` attributes.
- **parent\_id** (*str*) – The parent ID of the item, will either be the extended ID of another `MusicServiceItem` or of a search

For a track the XML can e.g. be on the following form:

```
<mediaMetadata xmlns="http://www.sonos.com/Services/1.1">
  <id>trackid_141359</id>
  <itemType>track</itemType>
  <mimeType>audio/aac</mimeType>
  <title>Teacher</title>
  <trackMetadata>
    <artistId>artistid_10597</artistId>
    <artist>Jethro Tull</artist>
    <composerId>artistid_10597</composerId>
    <composer>Jethro Tull</composer>
    <albumId>albumid_141358</albumId>
    <album>MU - The Best Of Jethro Tull</album>
    <albumArtistId>artistid_10597</albumArtistId>
    <albumArtist>Jethro Tull</albumArtist>
    <duration>229</duration>
    <albumArtURI>http://varnish01.music.aspiro.com/sca/
      imscale?h=90&w=90&img=/content/music10/prod/wmg/
      1383757201/094639008452_20131105025504431/resources/094639008452.
      jpg</albumArtURI>
    <canPlay>true</canPlay>
    <canSkip>true</canSkip>
    <canAddToFavorites>true</canAddToFavorites>
  </trackMetadata>
</mediaMetadata>
```

**classmethod** `from_dict` (*dict\_in*)

Initialize the class from a dict.

**Parameters** `dict_in` (*dict*) – The dictionary that contains the item content. Required fields are listed class variable by that name

**to\_dict**

Return a copy of the content dict.

**didl\_metadata**

Return the DIDL metadata for a Music Service Track.

The metadata is on the form:

```
<DIDL-Lite xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns:upnp="urn:schemas-upnp-org:metadata-1-0/upnp/"
  xmlns:r="urn:schemas-rinconnetworks-com:metadata-1-0/"
  xmlns="urn:schemas-upnp-org:metadata-1-0/DIDL-Lite/">
  <item id="...self.extended_id..."
    parentID="...self.parent_id..."
    restricted="true">
    <dc:title>...self.title...</dc:title>
    <upnp:class>...self.item_class...</upnp:class>
    <desc id="cdudn"
      namespace="urn:schemas-rinconnetworks-com:metadata-1-0/"
      self.content['description']
    </desc>
  </item>
</DIDL-Lite>
```

**item\_id**

Return the item id.

**extended\_id**

Return the extended id.

**title**

Return the title.

**service\_id**

Return the service ID.

**can\_play**

Return a boolean for whether the item can be played.

**parent\_id**

Return the extended parent\_id, if set, otherwise return None.

**album\_art\_uri**

Return the album art URI if set, otherwise return None.

**class** `soco.ms_data_structures.MSTrack` (*title, item\_id, extended\_id, uri, description, service\_id,*  
*\*\*kwargs*)

Class that represents a music service track.

Initialize MSTrack item.

**album**

Return the album title if set, otherwise return None.

**artist**

Return the artist if set, otherwise return None.

**duration**

Return the duration if set, otherwise return None.

**uri**

Return the URI.

**class** `soco.ms_data_structures.MSAlbum` (*title, item\_id, extended\_id, uri, description, service\_id,*  
*\*\*kwargs*)

Class that represents a Music Service Album.

**artist**

Return the artist if set, otherwise return None.

**uri**

Return the URI.

**class** `soco.ms_data_structures.MSAlbumList` (*title, item\_id, extended\_id, uri, description, service\_id, \*\*kwargs*)

Class that represents a Music Service Album List.

**uri**

Return the URI.

**class** `soco.ms_data_structures.MSPlaylist` (*title, item\_id, extended\_id, uri, description, service\_id, \*\*kwargs*)

Class that represents a Music Service Play List.

**uri**

Return the URI.

**class** `soco.ms_data_structures.MSArtistTracklist` (*title, item\_id, extended\_id, uri, description, service\_id, \*\*kwargs*)

Class that represents a Music Service Artist Track List.

**uri**

Return the URI.

**class** `soco.ms_data_structures.MSArtist` (*title, item\_id, extended\_id, service\_id, \*\*kwargs*)

Class that represents a Music Service Artist.

**class** `soco.ms_data_structures.MSFavorites` (*title, item\_id, extended\_id, service\_id, \*\*kwargs*)

Class that represents a Music Service Favorite.

**class** `soco.ms_data_structures.MSCollection` (*title, item\_id, extended\_id, service\_id, \*\*kwargs*)

Class that represents a Music Service Collection.

### 1.10.2.12 `soco.music_library` module

Access to the Music Library.

The Music Library is the collection of music stored on your local network. For access to third party music streaming services, see the `music_service` module.

**class** `soco.music_library.MusicLibrary` (*soco=None*)

The Music Library.

**Parameters** `soco` (*SoCo*, optional) – A *SoCo* instance to query for music library information. If *None*, or not supplied, a random *SoCo* instance will be used.

**get\_artists** (*\*args, \*\*kwargs*)

Convenience method for `get_music_library_information` with `search_type='artists'`. For details of other arguments, see *that method*.

**get\_album\_artists** (*\*args, \*\*kwargs*)

Convenience method for `get_music_library_information` with `search_type='album_artists'`. For details of other arguments, see *that method*.

**get\_albums** (*\*args, \*\*kwargs*)

Convenience method for `get_music_library_information` with `search_type='albums'`. For details of other arguments, see *that method*.

**get\_genres** (\*args, \*\*kwargs)  
 Convenience method for `get_music_library_information` with `search_type='genres'`.  
 For details of other arguments, see *that method*.

**get\_composers** (\*args, \*\*kwargs)  
 Convenience method for `get_music_library_information` with `search_type='composers'`. For details of other arguments, see *that method*.

**get\_tracks** (\*args, \*\*kwargs)  
 Convenience method for `get_music_library_information` with `search_type='tracks'`.  
 For details of other arguments, see *that method*.

**get\_playlists** (\*args, \*\*kwargs)  
 Convenience method for `get_music_library_information` with `search_type='playlists'`. For details of other arguments, see *that method*.

---

**Note:** The playlists that are referred to here are the playlists imported from the music library, they are not the Sonos playlists.

---

**get\_sonos\_favorites** (\*args, \*\*kwargs)  
 Convenience method for `get_music_library_information` with `search_type='sonos_favorites'`. For details of other arguments, see *that method*.

**get\_favorite\_radio\_stations** (\*args, \*\*kwargs)  
 Convenience method for `get_music_library_information` with `search_type='radio_stations'`. For details of other arguments, see *that method*.

**get\_favorite\_radio\_shows** (\*args, \*\*kwargs)  
 Convenience method for `get_music_library_information` with `search_type='radio_stations'`. For details of other arguments, see *that method*.

**get\_music\_library\_information** (*search\_type*, *start=0*, *max\_items=100*,  
*full\_album\_art\_uri=False*, *search\_term=None*, *subcategories=None*, *complete\_result=False*)

Retrieve music information objects from the music library.

This method is the main method to get music information items, like e.g. tracks, albums etc., from the music library with. It can be used in a few different ways:

The `search_term` argument performs a fuzzy search on that string in the results, so e.g calling:

```
get_music_library_information('artists', search_term='Metallica')
```

will perform a fuzzy search for the term 'Metallica' among all the artists.

Using the `subcategories` argument, will jump directly into that subcategory of the search and return results from there. So. e.g knowing that among the artist is one called 'Metallica', calling:

```
get_music_library_information('artists',
                             subcategories=['Metallica'])
```

will jump directly into the 'Metallica' sub category and return the albums associated with Metallica and:

```
get_music_library_information('artists',
                             subcategories=['Metallica', 'Black'])
```

will return the tracks of the album 'Black' by the artist 'Metallica'. The order of sub category types is: Genres->Artists->Albums->Tracks. It is also possible to combine the two, to perform a fuzzy search in a sub category.

The `start`, `max_items` and `complete_result` arguments all have to do with paging of the results. By default the searches are always paged, because there is a limit to how many items we can get at a time. This paging is exposed to the user with the `start` and `max_items` arguments. So calling:

```
get_music_library_information('artists', start=0, max_items=100)
get_music_library_information('artists', start=100, max_items=100)
```

will get the first and next 100 items, respectively. It is also possible to ask for all the elements at once:

```
get_music_library_information('artists', complete_result=True)
```

This will perform the paging internally and simply return all the items.

### Parameters

- **search\_type** (*str*) – The kind of information to retrieve. Can be one of: 'artists', 'album\_artists', 'albums', 'genres', 'composers', 'tracks', 'share', 'sonos\_playlists', or 'playlists', where playlists are the imported playlists from the music library.
- **start** (*int*, *optional*) – starting number of returned matches (zero based). Default 0.
- **max\_items** (*int*, *optional*) – Maximum number of returned matches. Default 100.
- **full\_album\_art\_uri** (*bool*) – whether the album art URI should be absolute (i.e. including the IP address). Default `False`.
- **search\_term** (*str*, *optional*) – a string that will be used to perform a fuzzy search among the search results. If used in combination with subcategories, the fuzzy search will be performed in the subcategory.
- **subcategories** (*str*, *optional*) – A list of strings that indicate one or more subcategories to dive into.
- **complete\_result** (*bool*) – if `True`, will disable paging (ignore `start` and `max_items`) and return all results for the search.

**Warning:** Getting e.g. all the tracks in a large collection might take some time.

**Returns** an instance of `SearchResult`.

**Return type** `SearchResult`

---

### Note:

- The maximum number of results may be restricted by the unit, presumably due to transfer size consideration, so check the returned number against that requested.
  - The playlists that are returned with the 'playlists' search, are the playlists imported from the music library, they are not the Sonos playlists.
- 

**Raises** `SoCoException` upon errors.

**browse** (*ml\_item=None*, *start=0*, *max\_items=100*, *full\_album\_art\_uri=False*, *search\_term=None*, *subcategories=None*)

Browse (get sub-elements from) a music library item.

**Parameters**

- **ml\_item** (*DidlItem*) – the item to browse, if left out or `None`, items at the root level will be searched.
- **start** (*int*) – the starting index of the results.
- **max\_items** (*int*) – the maximum number of items to return.
- **full\_album\_art\_uri** (*bool*) – whether the album art URI should be fully qualified with the relevant IP address.
- **search\_term** (*str*) – A string that will be used to perform a fuzzy search among the search results. If used in combination with subcategories, the fuzzy search will be performed on the subcategory. Note: Searching will not work if `ml_item` is `None`.
- **subcategories** (*list*) – A list of strings that indicate one or more subcategories to descend into. Note: Providing sub categories will not work if `ml_item` is `None`.

**Returns** A *SearchResult* instance.

**Raises**

- `AttributeError` – if `ml_item` has no `item_id` attribute.
- `SoCoUPnPException` – with `error_code='701'` if the item cannot be browsed.

**browse\_by\_idstring** (*search\_type, idstring, start=0, max\_items=100, full\_album\_art\_uri=False*)  
Browse (get sub-elements from) a given music library item, specified by a string.

**Parameters**

- **search\_type** (*str*) – The kind of information to retrieve. Can be one of: 'artists', 'album\_artists', 'albums', 'genres', 'composers', 'tracks', 'share', 'sonos\_playlists', and 'playlists', where playlists are the imported file based playlists from the music library.
- **idstring** (*str*) – a term to search for.
- **start** (*int*) – starting number of returned matches. Default 0.
- **max\_items** (*int*) – Maximum number of returned matches. Default 100.
- **full\_album\_art\_uri** (*bool*) – whether the album art URI should be absolute (i.e. including the IP address). Default `False`.

**Returns** a *SearchResult* instance.

**Return type** *SearchResult*

---

**Note:** The maximum number of results may be restricted by the unit, presumably due to transfer size consideration, so check the returned number against that requested.

---

**library\_updating**

*bool* – whether the music library is in the process of being updated.

**start\_library\_update** (*album\_artist\_display\_option=""*)

Start an update of the music library.

**Parameters** **album\_artist\_display\_option** (*str*) – a value for the album artist compilation setting (see *album\_artist\_display\_option*).

**search\_track** (*artist, album=None, track=None, full\_album\_art\_uri=False*)

Search for an artist, an artist's albums, or specific track.

**Parameters**

- **artist** (*str*) – an artist’s name.
- **album** (*str*, *optional*) – an album name. Default `None`.
- **track** (*str*, *optional*) – a track name. Default `None`.
- **full\_album\_art\_uri** (*bool*) – whether the album art URI should be absolute (i.e. including the IP address). Default `False`.

**Returns** A `SearchResult` instance.

**get\_albums\_for\_artist** (*artist*, *full\_album\_art\_uri=False*)

Get an artist’s albums.

**Parameters**

- **artist** (*str*) – an artist’s name.
- **full\_album\_art\_uri** – whether the album art URI should be absolute (i.e. including the IP address). Default `False`.

**Returns** A `SearchResult` instance.

**get\_tracks\_for\_album** (*artist*, *album*, *full\_album\_art\_uri=False*)

Get the tracks of an artist’s album.

**Parameters**

- **artist** (*str*) – an artist’s name.
- **album** (*str*) – an album name.
- **full\_album\_art\_uri** – whether the album art URI should be absolute (i.e. including the IP address). Default `False`.

**Returns** A `SearchResult` instance.

**album\_artist\_display\_option**

*str* – The current value of the album artist compilation setting.

Possible values are:

- 'WMP' - use Album Artists
- 'ITUNES' - use iTunes® Compilations
- 'NONE' - do not group compilations

**See also:**

The Sonos [FAQ](#) on compilation albums.

To change the current setting, call `start_library_update` and pass the new setting.

**1.10.2.13 soco.services module**

Classes representing Sonos UPnP services.

```
>>> import soco
>>> device = soco.SoCo('192.168.1.102')
>>> print(RenderingControl(device).GetMute([('InstanceID', 0),
...     ('Channel', 'Master')]))
{'CurrentMute': '0'}
```

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```

>>> r = ContentDirectory(device).Browse([
...     ('ObjectID', 'Q:0'),
...     ('BrowseFlag', 'BrowseDirectChildren'),
...     ('Filter', '*'),
...     ('StartingIndex', '0'),
...     ('RequestedCount', '100'),
...     ('SortCriteria', '')
...     ])
>>> print(r['Result'])
<?xml version="1.0" ?><DIDL-Lite xmlns="urn:schemas-upnp-org:metadata ...
>>> for action, in_args, out_args in AlarmClock(device).iter_actions():
...     print(action, in_args, out_args)
...
SetFormat [Argument(name='DesiredTimeFormat', vartype='string'), Argument(
name='DesiredDateFormat', vartype='string')] []
GetFormat [] [Argument(name='CurrentTimeFormat', vartype='string'),
Argument(name='CurrentDateFormat', vartype='string')] ...

```

**class** `soco.services.Action` (*name, in\_args, out\_args*)

A UPnP Action and its arguments.

**in\_args**

Alias for field number 1

**name**

Alias for field number 0

**out\_args**

Alias for field number 2

**class** `soco.services.Argument` (*name, vartype*)

A UPnP Argument and its type.

**name**

Alias for field number 0

**vartype**

Alias for field number 1

**class** `soco.services.Service` (*soco*)

A class representing a UPnP service.

This is the base class for all Sonos Service classes. This class has a dynamic method dispatcher. Calls to methods which are not explicitly defined here are dispatched automatically to the service action with the same name.

**Parameters** `soco` (*SoCo*) – A *SoCo* instance to which the UPnP Actions will be sent

**soco = None**

*SoCo* – The *SoCo* instance to which UPnP Actions are sent

**service\_type = None**

*str* – The UPnP service type.

**version = None**

*str* – The UPnP service version.

**base\_url = None**

*str* – The base URL for sending UPnP Actions.



**control\_url = None**

*str* – The UPnP Control URL.

**scpd\_url = None**

*str* – The service control protocol description URL.

**event\_subscription\_url = None**

*str* – The service eventing subscription URL.

**cache = None**

A cache for storing the result of network calls. By default, this is a *TimedCache* with a default timeout=0.

**static wrap\_arguments ()**

Wrap a list of tuples in xml ready to pass into a SOAP request.

**Parameters** *args* (*list*) – a list of (name, value) tuples specifying the name of each argument and its value, eg [ ('InstanceID', 0), ('Speed', 1) ]. The value can be a string or something with a string representation. The arguments are escaped and wrapped in <name> and <value> tags.

### Example

```
>>> from soco import SoCo
>>> device = SoCo('192.168.1.101')
>>> s = Service(device)
>>> print(s.wrap_arguments([('InstanceID', 0), ('Speed', 1)]))
<InstanceID>0</InstanceID><Speed>1</Speed>
```

**static unwrap\_arguments ()**

Extract arguments and their values from a SOAP response.

**Parameters** *xml\_response* (*str*) – SOAP/xml response text (unicode, not utf-8).

**Returns** a dict of {argument\_name, value} items.

**Return type** dict

**build\_command (action, args=None)**

Build a SOAP request.

**Parameters**

- **action** (*str*) – the name of an action (a string as specified in the service description XML file) to be sent.
- **args** (*list, optional*) – Relevant arguments as a list of (name, value) tuples.

**Returns**

a tuple containing the POST headers (as a dict) and a string containing the relevant SOAP body. Does not set content-length, or host headers, which are completed upon sending.

**Return type** tuple

**send\_command (action, args=None, cache=None, cache\_timeout=None)**

Send a command to a Sonos device.

**Parameters**

- **action** (*str*) – the name of an action (a string as specified in the service description XML file) to be sent.

- **args** (*list, optional*) – Relevant arguments as a list of (name, value) tuples.
- **cache** (*Cache*) – A cache is operated so that the result will be stored for up to `cache_timeout` seconds, and a subsequent call with the same arguments within that period will be returned from the cache, saving a further network call. The cache may be invalidated or even primed from another thread (for example if a UPnP event is received to indicate that the state of the Sonos device has changed). If `cache_timeout` is missing or `None`, the cache will use a default value (which may be 0 - see `cache`). By default, the cache identified by the service's `cache` attribute will be used, but a different cache object may be specified in the `cache` parameter.

**Returns** a dict of {`argument_name, value`} items.

**Return type** `dict`

**Raises**

- `SoCoUPnPException` – if a SOAP error occurs.
- `UnknownSoCoException` – if an unknown UPnP error occurs.
- `requests.exceptions.HTTPError` – if an http error.

**handle\_upnp\_error** (*xml\_error*)

Disect a UPnP error, and raise an appropriate exception.

**Parameters** `xml_error` (*str*) – a unicode string containing the body of the UPnP/SOAP Fault response. Raises an exception containing the error code.

**subscribe** (*requested\_timeout=None, auto\_renew=False, event\_queue=None*)

Subscribe to the service's events.

**Parameters**

- **requested\_timeout** (*int, optional*) – If `requested_timeout` is provided, a subscription valid for that number of seconds will be requested, but not guaranteed. Check `Subscription.timeout` on return to find out what period of validity is actually allocated.
- **auto\_renew** (*bool*) – If `auto_renew` is `True`, the subscription will automatically be renewed just before it expires, if possible. Default is `False`.
- **event\_queue** (*Queue*) – a thread-safe queue object on which received events will be put. If not specified, a (`Queue`) will be created and used.

**Returns**

an instance of `Subscription`, representing the new subscription.

**Return type** `Subscription`

To unsubscribe, call the `unsubscribe` method on the returned object.

**iter\_actions** ()

Yield the service's actions with their arguments.

**Yields** `Action` – the next action.

Each action is an Action namedtuple, consisting of `action_name` (a string), `in_args` (a list of Argument namedtuples consisting of name and argtype), and `out_args` (ditto), eg:

```
Action(
    name='SetFormat',
    in_args=[
```

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```

        Argument (name='DesiredTimeFormat', vartype='string'),
        Argument (name='DesiredDateFormat', vartype='string')],
    out_args=[]
)

```

**iter\_event\_vars ()**

Yield the services eventable variables.

**Yields** *tuple* – a tuple of (variable name, data type).

**class** `soco.services.AlarmClock (soco)`

Sonos alarm service, for setting and getting time and alarms.

**class** `soco.services.MusicServices (soco)`

Sonos music services service, for functions related to 3rd party music services.

**Parameters** `soco (SoCo)` – A `SoCo` instance to which the UPnP Actions will be sent

**class** `soco.services.DeviceProperties (soco)`

Sonos device properties service, for functions relating to zones, LED state, stereo pairs etc.

**Parameters** `soco (SoCo)` – A `SoCo` instance to which the UPnP Actions will be sent

**class** `soco.services.SystemProperties (soco)`

Sonos system properties service, for functions relating to authentication etc.

**Parameters** `soco (SoCo)` – A `SoCo` instance to which the UPnP Actions will be sent

**class** `soco.services.ZoneGroupTopology (soco)`

Sonos zone group topology service, for functions relating to network topology, diagnostics and updates.

**Parameters** `soco (SoCo)` – A `SoCo` instance to which the UPnP Actions will be sent

**GetZoneGroupState (\*args, \*\*kwargs)**

Overrides default handling to use the global shared zone group state cache, unless another cache is specified.

**class** `soco.services.GroupManagement (soco)`

Sonos group management service, for services relating to groups.

**Parameters** `soco (SoCo)` – A `SoCo` instance to which the UPnP Actions will be sent

**class** `soco.services.QPlay (soco)`

Sonos Tencent QPlay service (a Chinese music service)

**Parameters** `soco (SoCo)` – A `SoCo` instance to which the UPnP Actions will be sent

**class** `soco.services.ContentDirectory (soco)`

UPnP standard Content Directory service, for functions relating to browsing, searching and listing available music.

**class** `soco.services.MS_ConnectionManager (soco)`

UPnP standard connection manager service for the media server.

**class** `soco.services.RenderingControl (soco)`

UPnP standard rendering control service, for functions relating to playback rendering, eg bass, treble, volume and EQ.

**class** `soco.services.MR_ConnectionManager (soco)`

UPnP standard connection manager service for the media renderer.

**class** `soco.services.AVTransport` (*soco*)

UPnP standard AV Transport service, for functions relating to transport management, eg play, stop, seek, playlists etc.

**class** `soco.services.Queue` (*soco*)

Sonos queue service, for functions relating to queue management, saving queues etc.

**class** `soco.services.GroupRenderingControl` (*soco*)

Sonos group rendering control service, for functions relating to group volume etc.

### 1.10.2.14 `soco.snapshot` module

Functionality to support saving and restoring the current Sonos state.

This is useful for scenarios such as when you want to switch to radio or an announcement and then back again to what was playing previously.

**Warning:** Sonos has introduced control via Amazon Alexa. A new cloud queue is created and at present there appears no way to restart this queue from snapshot. Currently if a cloud queue was playing it will not restart.

**Warning:** This class is designed to be created used and destroyed. It is not designed to be reused or long lived. The init sets up defaults for one use.

**class** `soco.snapshot.Snapshot` (*device, snapshot\_queue=False*)

A snapshot of the current state.

**Note:** This does not change anything to do with the configuration such as which group the speaker is in, just settings that impact what is playing, or how it is played.

List of sources that may be playing using root of `media_uri`:

```
x-rincon-queue: playing from Queue
x-sonosapi-stream: playing a stream (eg radio)
x-file-cifs: playing file
x-rincon: slave zone (only change volume etc. rest from coordinator)
```

---

#### Parameters

- **device** (*SoCo*) – The device to snapshot
- **snapshot\_queue** (*bool*) – Whether the queue should be snapshotted. Defaults to `False`.

**Warning:** It is strongly advised that you do not snapshot the queue unless you really need to as it takes a very long time to restore large queues as it is done one track at a time.

**snapshot** ()

Record and store the current state of a device.

**Returns**

**True** if the device is a coordinator, **False** otherwise. Useful for determining whether playing an alert on a device will ungroup it.

**Return type** `bool`

**restore** (*fade=False*)

Restore the state of a device to that which was previously saved.

For coordinator devices restore everything. For slave devices only restore volume etc., not transport info (transport info comes from the slave's coordinator).

**Parameters** **fade** (*bool*) – Whether volume should be faded up on restore.

### 1.10.2.15 soco.soap module

Classes for handling SoCo's basic SOAP requirements.

This module does not handle anything like the full [SOAP Specification](#), but is enough for SoCo's needs. Sonos uses SOAP for UPnP communications, and for communication with third party music services.

**exception** `soco.soap.SoapFault` (*faultcode, faultstring, detail=None*)

An exception encapsulating a SOAP Fault.

**Parameters**

- **faultcode** (*str*) – The SOAP faultcode.
- **faultstring** (*str*) – The SOAP faultstring.
- **detail** (`Element`) – The SOAP fault detail, as an `ElementTree Element`. Defaults to `None`.

**class** `soco.soap.SoapMessage` (*endpoint, method, parameters=None, http\_headers=None, soap\_action=None, soap\_header=None, namespace=None, \*\*request\_args*)

A SOAP Message representing a remote procedure call.

Uses the [Requests](#) library for communication with a SOAP server.

**Parameters**

- **endpoint** (*str*) – The SOAP endpoint URL for this client.
- **method** (*str*) – The name of the method to call.
- **parameters** (*list*) – A list of (name, value) tuples containing the parameters to pass to the method. Default `None`.
- **http\_headers** (*dict*) – A dict in the form {'Header': 'Value,...'} containing http headers to use for the http request. Content-type and SOAPACTION headers will be created automatically, so do not include them here. Use this, for example, to set a user-agent.
- **soap\_action** (*str*) – The value of the SOAPACTION header. Default 'None'.
- **soap\_header** (*str*) – A string representation of the XML to be used for the SOAP Header. Default `None`.
- **namespace** (*str*) – The namespace URI to use for the method and parameters. `None`, by default.

- **\*\*request\_args** – Other keyword parameters will be passed to the Requests request which is used to handle the http communication. For example, a timeout value can be set.

**prepare\_headers** (*http\_headers*, *soap\_action*)

Prepare the http headers for sending.

Add the SOAPACTION header to the others.

**Parameters**

- **http\_headers** (*dict*) – A dict in the form {‘Header’: ‘Value,..} containing http headers to use for the http request.
- **soap\_action** (*str*) – The value of the SOAPACTION header.

**Returns** headers including the SOAPACTION header.

**Return type** *dict*

**prepare\_soap\_header** (*soap\_header*)

Prepare the SOAP header for sending.

Wraps the soap header in appropriate tags.

**Parameters** **soap\_header** (*str*) – A string representation of the XML to be used for the SOAP Header

**Returns** The soap header wrapped in appropriate tags.

**Return type** *str*

**prepare\_soap\_body** (*method*, *parameters*, *namespace*)

Prepare the SOAP message body for sending.

**Parameters**

- **method** (*str*) – The name of the method to call.
- **parameters** (*list*) – A list of (name, value) tuples containing the parameters to pass to the method.
- **namespace** (*str*) – The XML namespace to use for the method.

**Returns** A properly formatted SOAP Body.

**Return type** *str*

**prepare\_soap\_envelope** (*prepared\_soap\_header*, *prepared\_soap\_body*)

Prepare the SOAP Envelope for sending.

**Parameters**

- **prepared\_soap\_header** (*str*) – A SOAP Header prepared by *prepare\_soap\_header*
- **prepared\_soap\_body** (*str*) – A SOAP Body prepared by *prepare\_soap\_body*

**Returns** A prepared SOAP Envelope

**Return type** *str*

**prepare** ()

Prepare the SOAP message for sending to the server.

**call** ()

Call the SOAP method on the server.

**Returns**

the decapsulated SOAP response from the server, still encoded as utf-8.

**Return type** `str`

**Raises**

- `SoapFault` – if a SOAP error occurs.
- `HTTPError` – if an http error occurs.

### 1.10.2.16 `soco.utils` module

This class contains utility functions used internally by SoCo.

`soco.utils.really_unicode` (*in\_string*)

Make a string unicode. Really.

Ensure *in\_string* is returned as unicode through a series of progressively relaxed decodings.

**Parameters** `in_string` (*str*) – The string to convert.

**Returns** Unicode.

**Return type** `str`

**Raises** `ValueError`

`soco.utils.really_utf8` (*in\_string*)

Encode a string with utf-8. Really.

First decode *in\_string* via `really_unicode` to ensure it can successfully be encoded as utf-8. This is required since just calling `encode` on a string will often cause Python 2 to perform a coerced strict auto-decode as `ascii` first and will result in a `UnicodeDecodeError` being raised. After `really_unicode` returns a safe unicode string, encode as utf-8 and return the utf-8 encoded string.

**Parameters** `in_string` – The string to convert.

`soco.utils.camel_to_underscore` (*string*)

Convert camelcase to lowercase and underscore.

Recipe from <http://stackoverflow.com/a/1176023>

**Parameters** `string` (*str*) – The string to convert.

**Returns** The converted string.

**Return type** `str`

`soco.utils.prettify` (*unicode\_text*)

Return a pretty-printed version of a unicode XML string.

Useful for debugging.

**Parameters** `unicode_text` (*str*) – A text representation of XML (unicode, *not* utf-8).

**Returns** A pretty-printed version of the input.

**Return type** `str`

`soco.utils.show_xml` (*xml*)

Pretty print an `ElementTree` XML object.

**Parameters** `xml` (`ElementTree`) – The `ElementTree` to pretty print

---

**Note:** This is used a convenience function used during development. It is not used anywhere in the main code base.

---

**class** `soco.utils.deprecated` (*since*, *alternative=None*, *will\_be\_removed\_in=None*)

A decorator for marking deprecated objects.

Used internally by SoCo to cause a warning to be issued when the object is used, and marks the object as deprecated in the Sphinx documentation.

#### Parameters

- **since** (*str*) – The version in which the object is deprecated.
- **alternative** (*str*, *optional*) – The name of an alternative object to use
- **will\_be\_removed\_in** (*str*, *optional*) – The version in which the object is likely to be removed.

#### Example

```
@deprecated(since="0.7", alternative="new_function")
def old_function(args):
    pass
```

`soco.utils.url_escape_path` (*path*)

Escape a string value for a URL request path.

**Parameters** *str* – The path to escape

**Returns** The escaped path

**Return type** *str*

```
>>> url_escape_path("Foo, bar & baz / the hackers")
u'Foo%2C%20bar%20%26%20baz%20%2F%20the%20hackers'
```

#### 1.10.2.17 soco.xml module

This class contains XML related utility functions.

`soco.xml.NAMESPACES` = {'': 'urn:schemas-upnp-org:metadata-1-0/DIDL-Lite/', 'dc': 'http://

Commonly used namespaces, and abbreviations, used by `ns_tag`.

`soco.xml.ns_tag` (*ns\_id*, *tag*)

Return a namespace/tag item.

#### Parameters

- **ns\_id** (*str*) – A namespace id, eg "dc" (see `NAMESPACES`)
- **tag** (*str*) – An XML tag, eg "author"

**Returns** A fully qualified tag.

**Return type** *str*

The `ns_id` is translated to a full name space via the `NAMESPACES` constant:



```
>>> xml.ns_tag('dc', 'author')
'{http://purl.org/dc/elements/1.1/}author'
```

## 1.11 SoCo releases

### 1.11.1 SoCo 0.14 release notes

**SoCo 0.14** is a new version of the SoCo library. This release adds new features and fixes several bugs.

SoCo (Sonos Controller) is a simple Python class that allows you to programmatically control Sonos speakers.

#### 1.11.1.1 New Features and Improvements

- Add support for Sonos favorites, which can now be browsed and played through the usual methods. (#478)
- Revised the `play_local_files` examples including a off-by-one bug fix, configuration as command line argument, IP address auto detection and more robust Sonos player selection. (#570)
- Handle default value / allowed value range in `Service.iter_actions` and format the resulting actions (#573)
- Allow keyword arguments in Service commands (#573)
- Handle QueueID properly in event xml. (#546)
- Further documentation updates (#540, #569)

#### 1.11.1.2 Bugfixes

- Small bugfix to stop an error where `None` would be returned by `metadata.findtext`. Instead, an empty string is returned. (#539)
- Fix a race that could lead to events being missed shortly after a subscription was started. (#533)
- Don't throw exceptions when parsing metadata with missing/empty tags, to fix event errors. (#467)

#### 1.11.1.3 Backwards Compatability

- Removed the deprecated methods which were moved in 0.12 from `core.py` to `music_library.py` (#542)

### 1.11.2 SoCo 0.13 release notes

**SoCo 0.13** is a new version of the SoCo library. This release adds new features and fixes several bugs.

SoCo (Sonos Controller) is a simple Python class that allows you to programmatically control Sonos speakers.

#### 1.11.2.1 New Features and Improvements

- The IP address used by the events listener can be configured (#444)
- Add support for night mode (#421) and dialog mode (#422) on devices supporting the respective feature.
- Add queue-able data structures for the music service items (#455)

- Add a method for queuing multiple items with a single request (#470)
- Add methods to get and set the uri(s) of a `DidlObject`. (#482)
- Add support for line in from other speakers (#460)
- Enhance `add_to_queue()` to with optional position argument (#471)
- Added `by_name` function to discovery to be able to get a device by `player_name` (#487)
- allow choice of how to play streams in `play_uri` (override Sonos default with `force_radio=True`) (#491)
- Added `ramp_to_volume()` method to smoothly change the volume (#506)
- Added FAQ, documentation and two examples to explain using SoCo's Snapshot function (#493)
- Update documentation for `add_uri_to_queue` (#503)
- Added a FAQ section to the docs with `play_uri` and play local files answers (#481)
- A few queue related micro examples was added to the examples page in the docs (#484)
- Further documentation updates (#435, #436, #459, #476, #489, #496, #522)

### 1.11.2.2 Bugfixes

- Fixes an issue where restarting an application that had subscribed to events sometimes causes an error when the events are delivered to the new instance (#437)
- Fixes an issue where multiple threads trying to subscribe to events in parallel would sometimes cause SoCo to attempt to create multiple event listener servers and fail on `socket.bind()`. (#437)
- Fixes an issue where SoCo would not recognize `object.container.playlistContainer.sonos_favorite` when receiving events (#438).
- Fixes a bug in `play_uri` where it would not play a http or https prefixed radio stream due to a change in the Sonos API (issue #434). This change fixes it by replacing the two http type prefixes with Sonos' `x-rincon-mp3radio://` prefix (#434, #443)
- Fixes an exception being raised on Windows with `discover`. The error was caused by `socket.getsockname` raising an exception on Windows with and unconnected unbound socket. Fixed by now simply logging the sockets. (#445)
- Change to use SoCo method to determine coordinator in Snapshot (#529, #519)
- Prevent error when queue started from Alexa and using snapshot. Currently there is no way to restart a cloud queue from SoCo, this PR just prevents Snapshot causing an error. (#530, #521)
- Fix `add_multiple_to_queue` fails with too many items (#488)
- Fixed log level (#534)

### 1.11.2.3 Backwards Compatability

- Dropped support for Python 2.6 (#325, #526) and added support for 3.6 (#528)

## 1.11.3 SoCo 0.12 release notes

**SoCo 0.12** is a new version of the SoCo library. This release adds new features and fixes several bugs.

**SoCo** (Sonos Controller) is a simple Python class that allows you to programmatically control Sonos speakers.

### 1.11.3.1 New Features and Improvements

- New `MusicService` class for access to all the music services known to Sonos. Note that some of this code is still unstable, and in particular the data structures returned by methods such as `get_metadata` may change in future. (#262, #358)
- Add information to the docs about how to put SoCo in the Python path, for test execution (#327, #319)
- added `to_dict()` / `from_dict()` to `DidlResource` (#330, #318)
- All tests have been moved from the `unittests` directory to the `tests` directory (#336)
- For developers, more `make` targets, and a better `sdist` build (#346)
- Added `discovery.any_soco()`, for when you need a `SoCo` instance, but you don't care which. This is slightly better than the traditional `device = soco.discover().pop()` since it will return an existing instance if one is available, without sending discovery packets (#262)
- Modified `DidlObject.to_dict()` so that any associated resources list will be also returned as a list of dictionaries instead of returning a list of `DidlResource` objects. (#340, #338)
- Added a `sonosdump` tool in `dev_tools`, which can print out the various UPnP methods which Sonos uses (#344)
- Added methods for sonos playlist management: `reorder_sonos_playlist`, `clear_sonos_playlist`, `move_in_sonos_playlist`, `remove_from_sonos_playlist`, `get_sonos_playlist_by_attr` (#352, #348, #353) and `remove_sonos_playlist` (#341, #345)
- Support playmodes `repeat-one` (`REPEAT_ONE`) and `shuffle-repeat-one` (`SHUFFLE_REPEAT_ONE`) introduced by Sonos 6.0 (#387)
- Better discovery: SoCo tries harder to find devices on the local network, particularly where there are multiple network interfaces. The default discovery timeout is also increased to 5 seconds (#395, #432)
- Large work package on the docs, which contains a new front page, more sections, some advanced topics and an example page (#406, #360, #368, #362, #326, #369).
- Added optional timeout argument to be passed onto requests when getting speaker info (#302)
- Ignore `.#` specified subclasses in Didl xml. Several music services seem to use an out-of-spec way to make sub classes in Didl, by specifying the subclass name or function after a `#`. This caused our implementation of Didl to reject it. This has now been fixed by simple ignoring these un-official subclasses (#425)
- Added methods to manipulate sonos sleep functionality: `set_sleep_timer`, `get_sleep_timer` (#413)
- Various cleanups (#351)
- Extended `get_speaker_info` to return more information about the Sonos speakers (#335, #320)

### 1.11.3.2 Bugfixes

- Clear zone group cache and reparse zone group information after join and unjoin to prevent giving wrong topology information. (#323, #321)
- Fix typo preventing SoCo from parsing the audio metadata object used when a TV is playing. (#331)
- Fix bug where SoCo would raise an exception if music services sent metadata with invalid XML characters (#392, #386)
- Event lister was (incorrectly) responding to GET and HEAD requests, which could result in local files being served (#430)
- Minor fix because `ordereddict.values` in py3 return `ValuesView` (#359)

- Fixed bugs with parsing events (#276)
- Fixed unit tests (#343, #342)
- Fix in MusicLibrary constructor (#370)

### 1.11.3.3 Backwards Compatability

- Dropped support for Python 3.2 (#324)
- Methods relating to the music library (`get_artists`, `get_album_artists`, `get_albums` and others) have been moved to the `music_library` module. Instead of `device.get_album_artists()`, please now use `device.music_library.get_album_artists()` etc. Old code will continue to work for the moment, but will raise deprecation warnings (#350)
- Made a hard deprecation of the Spotify plugin since the API it relied on has been deprecated and it therefore no longer worked (#401, #423)
- Dropped pylint checks for Python 2.6 (#363)

### 1.11.4 SoCo 0.11.1 release notes

**SoCo 0.11.1** is a new version of the SoCo library. This release fixes a bug with the installation of SoCo.

SoCo (Sonos Controller) is a simple Python class that allows you to programmatically control Sonos speakers.

#### 1.11.4.1 Bugfixes

- Installation fails on systems where the default encoding is not UTF-8 (#312, #313)

### 1.11.5 SoCo 0.11 release notes

**SoCo 0.11** is a new version of the SoCo library. This release adds new features and fixes several bugs.

SoCo (Sonos Controller) is a simple Python class that allows you to programmatically control Sonos speakers.

#### 1.11.5.1 New Features and Improvements

- The new properties `is_playing_tv`, `is_playing_radio` and `is_playing_line_in` have been added (#225)
- A method `get_item_album_art_uri` has been added to return the absolute album art full uri so that it is easy to put the album art in user interfaces (#240).
- Added support for satellite speaker detection in network topology parsing code (#245)
- Added support to search the music library for tracks, an artists' albums and an artist's album's tracks (#246)
- A fairly extensive re-organisation of the DIDL metadata handling code, which brings SoCo more into line with the DIDL-Lite spec, as adopted by Sonos. DIDL objects can now have multiple URIs, and the interface is much simpler. (#256)
- Event objects now have a timestamp field (#273)
- The IP address (ie network interface) for discovering Sonos speakers can now be specified (#277)
- It is now possible to trigger an update of the music library (#286)

- The event listener port is now configurable (#288)
- Methods that can only be executed on master speakers will now raise a `SoCoSlaveException` (#296)
- An example has been added that shows how to play local files by setting up a temporary HTTP server in python (#307)
- Test cleanup (#309)

#### 1.11.5.2 Bugfixes

- The value of the `IP_MULTICAST_TTL` option is now ensured to be one byte long (#269)
- Various encoding issues have been fixed (#293, #281, #306)
- Fix bug with browsing of imported playlists (#265)
- The `discover` method was broken in Python 3.4 (#271)
- An unknown / missing UPnP class in event subscriptions has been added (#266, #301, #303)
- Fix `add_to_queue` which was broken since the data structure refactoring (#308, #310)

#### 1.11.5.3 Backwards Compatability

- The exception `DidlCannotCreateMetadata` has been deprecated. `DidlMetadataError` should be used instead. (#256)
- Code which has been deprecated for more than 3 releases has been removed. See previous release notes for deprecation notices. (#273)

### 1.11.6 SoCo 0.10 release notes

**SoCo 0.10** is a new version of the SoCo library. This release adds new features and fixes several bugs.

SoCo (Sonos Controller) is a simple Python class that allows you to programmatically control Sonos speakers.

#### 1.11.6.1 New Features

- Add support for taking a snapshot of the Sonos state, and then to restore it later (#224, #251)
- Added `create_sonos_playlist_from_queue`. Creates a new Sonos playlist from the current queue (#229)

#### 1.11.6.2 Improvements

- Added a `queue_size` property to quickly return the size of the queue without reading any items (#217)
- Add metadata to return structure of `get_current_track_info` (#220)
- Add option to `play_uri` that allows for the item to be set and then optionally played (#219)
- Add option to `play_uri` that allows playing with a URI and title instead of metadata (#221)
- Get the item ID from the XML responses which enables adding tracks for music services such as Rhapsody which do not have all the detail in the item URI (#233)
- Added `label` and `short_label` properties, to provide a consistent readable label for group members (#228)
- Improved documentation (#248, #253, #259)

- Improved code examples (#250, #252)

### 1.11.6.3 Bugfixes

- Fixed a bug where `get_ml_item()` would fail if a radio station was played (#226)
- Fixed a timeout-related regression in `soco.discover()` (#244)
- Discovery code fixed to account for closing of multicast sockets by certain devices (#202, #201)
- Fixed a bug where sometimes zone groups would be created without a coordinator (#230)

### 1.11.6.4 Backwards Compatability

The metadata classes (ML\*) have all been renamed (generally to `Didl*`), and aligned more closely with the underlying XML. The Music Services data structures (MS\*) have been moved to their own module, and metadata for radio broadcasts is now returned properly (#243).

The URI class has been removed. As an alternative the method `soco.SoCo.play_uri()` can be used to enqueue and play an URI. The class `soco.data_structures.DIDLObject` can be used if an object is required.

Work is still ongoing on the metadata classes, so further changes should be expected.

## 1.11.7 SoCo 0.9 release notes

### 1.11.7.1 New Features

- Alarm configuration (#171)

```
>>> from soco.alarms import Alarm, get_alarms
>>> # create an alarm with default properties
>>> # my_device is the SoCo instance on which the alarm will be played
>>> alarm = Alarm(my_device)
>>> print alarm.volume
20
>>> print get_alarms()
set([])
>>> # save the alarm to the Sonos system
>>> alarm.save()
>>> print get_alarms()
set([<Alarm id:88@15:26:15 at 0x107abb090>])
>>> # update the alarm
>>> alarm.recurrence = "ONCE"
>>> # Save it again for the change to take effect
>>> alarm.save()
>>> # Remove it
>>> alarm.remove()
>>> print get_alarms()
set([])
```

- Methods for browsing the Music library (#192, #203, #208)

```
import soco
soc = soco.SoCo('...ipaddress..')
some_album = soc.get_albums()['item_list'][0]
tracks_in_that_album = soc.browse(some_album)
```

- Support for full Album Art URIs (#207)
- Support for music queues (#214)

```
queue = soco.get_queue()
for item in queue:
    print item.title

print queue.number_returned
print queue.total_matches
print queue.update_id
```

- Support for processing of LastChange events (#194)
- Support for write operations on Playlists (#198)

### 1.11.7.2 Improvements

- Improved test coverage (#159, #184)
- Fixes for Python 2.6 support (#175)
- Event-subscriptions can be auto-renewed (#179)
- The SoCo class can be replaced by a custom implementation (#180)
- The cache can be globally disabled (#180)
- Music Library data structures are constructed for DIDL XML content (#191).
- Added previously removed support for PyPy (#205)
- All music library methods (`browse`, `get_tracks` etc. #203 and `get_queue` #214) now returns container objects instead of dicts or lists. The metadata is now available from these container objects as named attributes, so e.g. on a queue object you can access the size with `queue.total_matches`.

### 1.11.7.3 Backwards Compatibility

- Music library methods return container objects instead of dicts and lists (see above). The old way of accessing that metadata (by dictionary type indexing), has been deprecated and is planned to be removed 3 releases after 0.9.

## 1.11.8 SoCo 0.8 release notes

### 1.11.8.1 New Features

- Re-added support for Python 2.6 (#154)
- Added `Soco.get_sonos_playlists()` (#114)
- Added methods for working with speaker topology
- `soco.Soco.group` retrieves the `soco.groups.ZoneGroup` to which the speaker belongs (#132). The group itself has a `soco.groups.ZoneGroup.member` attribute returning all of its members. Iterating directly over the group is possible as well.
- Speakers can be grouped using `soco.Soco.join()` (#136):

```
z1 = SoCo('192.168.1.101')
z2 = SoCo('192.168.1.102')
z1.join(z2)
```

- `soco.SoCo.all_zones` and `soco.SoCo.visible_zones` return all and all visible zones, respectively.
- `soco.SoCo.is_bridge` indicates if the SoCo instance represents a bridge.
- `soco.SoCo.is_coordinator` indicates if the SoCo instance is a group coordinator (#166)
- A new `soco.plugins.spotify.Spotify` plugin allows querying and playing the Spotify music catalogue (#119):

```
from socio.plugins.spotify import Spotify
from socio.plugins.spotify import SpotifyTrack
# create a new plugin, pass the socio instance to it
myplugin = Spotify(device)
print 'index: ' + str(myplugin.add_track_to_queue(SpotifyTrack('
    spotify:track:20DfkHC5grnKNJCzZQB6KC')))
print 'index: ' + str(myplugin.add_album_to_queue(SpotifyAlbum('
    spotify:album:6a50SaJpvdWDp13t0wUcPU')))
```

- A `soco.data_structures.URI` item can be passed to `add_to_queue` which allows playing music from arbitrary URIs (#147)

```
import socio
from socio.data_structures import URI

soc = socio.SoCo('...ip_address...')
uri = URI('http://www.noiseaddicts.com/samples/17.mp3')
soc.add_to_queue(uri)
```

- A new `include_invisible` parameter to `soco.discover()` can be used to retrieve invisible speakers or bridges (#146)
- A new `timeout` parameter to `soco.discover()`. If no zones are found within `timeout` seconds `None` is returned. (#146)
- Network requests can be cached for better performance (#131).
- It is now possible to subscribe to events of a service using its `subscribe()` method, which returns a `Subscription` object. To unsubscribe, call the `unsubscribe` method on the returned object. (#121, #130)
- Support for reading and setting crossfade (#165)

### 1.11.8.2 Improvements

- Performance improvements for speaker discovery (#146)
- Various improvements to the Wimp plugin (#140).
- Test coverage tracking using `coveralls.io` (#163)

### 1.11.8.3 Backwards Compatability

- Queue related use 0-based indexing consistently (#103)
- `soco.SoCo.get_speakers_ip()` is deprecated in favour of `soco.discover()` (#124)



## 1.11.9 SoCo 0.7 release notes

### 1.11.9.1 New Features

- All information about queue and music library items, like e.g. the title and album of a track, are now included in data structure classes instead of dictionaries (the classes are available in the *The Music Library Data Structures* sub-module). This advantages of this approach are:
  - The type of the item is identifiable by its class name
  - They have useful `__str__` representations and an `__equals__` method
  - Information is available as named attributes
  - They have the ability to produce their own UPnP meta-data (which is used by the `add_to_queue` method).

See the Backwards Compatibility notice below.

- A webservice analyzer has been added in `dev_tools/analyse_ws.py` (#46).
- The commandline interface has been split into a separate project `socos`. It provides an command line interface on top of the SoCo library, and allows users to control their Sonos speakers from scripts and from an interactive shell.
- Python 3.2 and later is now supported in addition to 2.7.
- A simple version of the first plugin for the Wimp service has been added (#93).
- The new `soco.discover()` method provides an easier interface for discovering speakers in your network. `SonosDiscovery` has been deprecated in favour of it (see Backwards Compatability below).
- SoCo instances are now singletons per IP address. For any given IP address, there is only one SoCo instance.
- The code for generating the XML to be sent to Sonos devices has been completely rewritten, and it is now much easier to add new functionality. All services exposed by Sonos zones are now available if you need them (#48).

### 1.11.9.2 Backwards Compatability

**Warning:** Please read the section below carefully when upgrading to SoCo 0.7.

#### Data Structures

The move to using **data structure classes** for music item information instead of dictionaries introduces some **backwards incompatible changes** in the library (see #83). The `get_queue` and `get_library_information` functions (and all methods derived from the latter) are affected. In the data structure classes, information like e.g. the title is now available as named attributes. This means that by the update to 0.7 it will also be necessary to update your code like e.g:

```
# Version < 0.7
for item in socio.get_queue():
    print item['title']
# Version >=0.7
for item in socio.get_queue():
    print item.title
```

### SonosDiscovery

The `SonosDiscovery` class has been deprecated (see #80 and #75).

Instead of the following

```
>>> import soco
>>> d = soco.SonosDiscovery()
>>> ips = d.get_speaker_ips()
>>> for i in ips:
...     s = soco.SoCo(i)
...     print s.player_name
```

you should now write

```
>>> import soco
>>> for s in soco.discover():
...     print s.player_name
```

### Properties

A number of methods have been replaced with properties, to simplify use (see #62 )

For example, use

```
soco.volume = 30
soco.volume -=3
soco.status_light = True
```

instead of

```
soco.volume(30)
soco.volume(soco.volume()-3)
soco.status_light("On")
```

## 1.11.10 SoCo 0.6 release notes

### 1.11.10.1 New features

- **Music library information:** Several methods has been added to get information about the music library. It is now possible to get e.g. lists of tracks, albums and artists.
- **Raise exceptions on errors:** Several *SoCo* specific exceptions has been added. These exceptions are now raised e.g. when *SoCo* encounters communications errors instead of returning an error codes. This introduces a **backwards incompatible** change in *SoCo* that all users should be aware of.

### 1.11.10.2 For SoCo developers

- **Added plugin framework:** A plugin framework has been added to *SoCo*. The primary purpose of this framework is to provide a natural partition of the code, in which code that is specific to the individual music services is separated out into its own class as a plugin. Read more about the plugin framework in *the docs*.

- **Added unit testing framework:** A unit testing framework has been added to *SoCo* and unit tests has been written for 30% of the methods in the `SoCo` class. Please consider supplementing any new functionality with the appropriate unit tests and fell free to write unit tests for any of the methods that are still missing.

### 1.11.10.3 Coming next

- **Data structure change:** For the next version of *SoCo* it is planned to change the way *SoCo* handles data. It is planned to use classes for all the data structures, both internally and for in- and output. This will introduce a **backwards incompatible** change and therefore users of *SoCo* should be aware that extra work will be needed upon upgrading from version 0.6 to 0.7. The data structure changes will be described in more detail in the release notes for version 0.7.

## 1.12 Unit and integration tests

There are two sorts of tests written for the `SoCo` package. Unit tests implement elementary checks of whether the individual methods produce the expected results. Integration tests check that the package as a whole is able to interface properly with the Sonos hardware. Such tests are especially useful during re-factoring and to check that already implemented functionality continues to work past updates to the Sonos units' internal software.

### 1.12.1 Setting up your environment

To run the unit tests, you will need to have the `py.test` testing tool installed. You will also need a copy of `Mock`. `Mock` comes with Python  $\geq 3.3$ , but has been backported for Python 2.7

You can install them and other development dependencies using the `requirements-dev.txt` file like this:

```
pip install -r requirements-dev.txt
```

### 1.12.2 Running the unit tests

There are different ways of running the unit tests. The easiest is to use `py.test`'s automatic test discovery. Just change to the root directory of the `SoCo` package and type:

```
py.test
```

For others, see the [py.test documentation](#)

---

**Note:** To run the unittests in this way, the `soco` package must be importable, i.e. the folder that contains it (the root folder of the git archive) must be in the list of paths that Python can import from (the `PYTHONPATH`). The easiest way to set this up, if you are using a virtual environment, is to install `SoCo` from the git archive in editable mode. This is done by executing the following command from the git archive root:

```
pip install -e .
```

### 1.12.3 Running the integration tests

At the moment, the integration tests cannot be run under the control of `py.test`. To run them, enter the `unittest` folder in the source code checkout and run the test execution script `execute_unittests.py` (it is required that the *SoCo* checkout is added to the Python path of your system). To run all the unit tests for the *SoCo* class execute the following command:

```
python execute_unittests.py --modules soco --ip 192.168.0.110
```

where the IP address should be replaced with the IP address of the Sonos® unit you want to use for the unit tests (NOTE! At present the unit tests for the *SoCo* module requires your Sonos® unit to be playing local network music library tracks from the queue and have at least two such tracks in the queue). You can get a list of all the units in your network and their IP addresses by running:

```
python execute_unittests.py --list
```

To get the help for the unit test execution script which contains a description of all the options run:

```
python execute_unittests.py --help
```

### 1.12.4 Unit test code structure and naming conventions

The unit tests for the *SoCo* code should be organized according to the following guidelines.

#### 1.12.4.1 One unit test module per class under test

Unit tests should be organized into modules, one module, i.e. one file, for each class that should be tested. The module should be named similarly to the class except replacing CamelCase with underscores and followed by `_unittest.py`.

Example: Unit tests for the class `FooBar` should be stored in `foo_bar_unittests.py`.

#### 1.12.4.2 One unit test class per method under test

Inside the unit test modules the unit test should be organized into one unit test case class per method under test. In order for the test execution script to be able to calculate the test coverage, the test classes should be named the same as the methods under test except that the lower case underscores should be converted to CamelCase. If the method is private, i.e. prefixed with 1 or 2 underscores, the test case class name should be prefixed with the word `Private`.

Examples:

Name of method under test	Name of test case class
<code>get_current_track_info</code>	<code>GetCurrentTrackInfo</code>
<code>__parse_error</code>	<code>PrivateParseError</code>
<code>_my_hidden_method</code>	<code>PrivateMyHiddenMethod</code>

### 1.12.5 Add an unit test to an existing unit test module

To add a unit test case to an existing unit test module `Foo` first check with the following command which methods that does not yet have unit tests:

```
python execute_unittests.py --modules foo --coverage
```

After having identified a method to write a unit test for, consider what criteria should be tested, e.g. if the method executes and returns the expected output on valid input and if it fails as expected on invalid input. Then implement the unit test by writing a class for it, following the naming convention mentioned in section *One unit test class per method under test*. You can read more about unit test classes in the [reference documentation](#) and there is a good introduction to unit testing in [Mark Pilgrim's "Dive into Python"](#) (though the aspects of test driven development, that it describes, is not a requirement for *SoCo* development).

### 1.12.5.1 Special unit test design consideration for *SoCo*

*SoCo* is developed purely by volunteers in their spare time. This leads to some special consideration during unit test design.

First of, volunteers will usually not have extra Sonos® units dedicated for testing. For this reason the unit tests should be developed in such a way that they can be run on units in use and with people around, so e.g it should be avoided settings the volume to max.

Second, being developed in peoples spare time, the development is likely a recreational activity, that might just be accompanied by music from the same unit that should be tested. For this reason, that unit should be left in the same state after test as it was before. That means that the play list, play state, sound settings etc. should be restored after the testing is complete.

### 1.12.6 Add a new unit test module (for a new class under test)

To add unit tests for the methods in a new class follow the steps below:

1. Make a new file in the unit test folder named as mentioned in section *One unit test module per class under test*.
2. (Optional) Define an `init` function in the unit test module. Do this only if it is necessary to pass information to the tests at run time. Read more about the `init` function in the section *The init function*.
3. Add test case classes to this module. See *Add an unit test to an existing unit test module*.

Then it is necessary to make the unit test execution framework aware of your unit test module. Do this by making the following additions to the file `execute_unittests.py`:

1. Import the class under test and the unit test module in the beginning of the file
2. Add an item to the `UNITTEST_MODULES` dict located right after the `### MAIN SCRIPT` comment. The added item should itself be a dictionary with items like this:

```
UNITTEST_MODULES = {
    'soco': {'name': 'SoCo', 'unittest_module': soco_unittest,
            'class': soco.SoCo, 'arguments': {'ip': ARGS.ip}},
    'foo_bar': {'name': 'FooBar', 'unittest_module': foo_bar_unittest,
               'class': soco.FooBar, 'arguments': {'ip': ARGS.ip}}
}
```

where both the new imaginary `foo_bar` entry and the existing `soco` entry are shown for clarity. The arguments dict is what will be passed on to the `init` method, see section *The init function*.

3. Lastly, add the new module to the help text for the `modules` command line argument, defined in the `__build_option_parser` function:

```
parser.add_argument('--modules', type=str, default=None, help='
    the modules to run unit test for can be '
    '\soco\', \'foo_bar\' or \'all\')
```

The name that should be added to the text is the key for the unit test module entry in the `UNITTEST_MODULES` dict.

### 1.12.6.1 The `init` function

Normally unit tests should be self-contained and therefore they should have all the data they will need built in. However, that does not apply to *SoCo*, because the IP's of the Sonos® units will be required and there is no way to know them in advance. Therefore, the execution script will call the function `init` in the unit test modules, if it exists, with a set of predefined arguments that can then be used for unit test initialization. Note that the function is to be named `init`, not `__init__` like the class initializers. The `init` function is called with one argument, which is the dictionary defined under the key `arguments` in the unit test modules definition. Please regard this as an exception to the general unit test best practices guidelines and use it only if there are no other option.

## 1.13 Release Procedures

This document describes the necessary steps for creating a new release of SoCo.

### 1.13.1 Preparations

- Assign a version number to the release, according to [semantic versioning](#). Tag names should be prefixed with `v`.
- Create a GitHub issue for the new version (eg [Release 0.7 #108](#)). This issue can be used to discuss included changes, the version number, etc.
- Create a milestone for the planned release (if it does not already exist). The milestone can be used to track issues relating to the release. All relevant issues should be assigned to the milestone.
- Create the release notes in `release_notes.html`.

### 1.13.2 Create and Publish

- Verify that all tests pass.
- Update the version number in `__init__.py` (see [example](#)).
- Tag the current commit, eg

```
git tag -a v0.7 -m 'release version 0.7'
```

- Push the tag. This will create a new release on GitHub.

```
git push --tags
```

- Update the [GitHub release](#) using the release notes from the documentation. The release notes can be abbreviated if a link to the documentation is provided.
- Upload the release to PyPI.

```
python setup.py sdist bdist_wheel upload
```

- Enable doc builds for the newly released version on [Read the Docs](#).

### 1.13.3 Wrap-Up

- Create the milestone for the next release (with the most likely version number) and close the milestone for the current release.
- Share the news!





## CHAPTER 2

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