cbapi Documentation

Release 1.4.0

Carbon Black Developer Network

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Contents

Release v1.4.0.

cbapi provides a straightforward interface to the Carbon Black products: Cb Protection, Response, and Defense. This library provides a Pythonic layer to access the raw power of the REST APIs of all Cb products, making it trivial to do the easy stuff and handling all of the "sharp corners" behind the scenes for you. Take a look:

```
>>> from cbapi.response import CbResponseAPI, Process, Binary, Sensor
>>> #
>>> # Create our CbAPI object
>>> #
>>> c = CbResponseAPI()
>>> #
>>> # take the first process that ran notepad.exe, download the binary and read the␣
↪first two bytes
>>> #
>>> c.select(Process).where('process_name:notepad.exe').first().binary.file.read(2)
'MZ'
>>> #
>>> # if you want a specific ID, you can put it straight into the .select() call:
>>> #
>>> binary = c.select(Binary, "24DA05ADE2A978E199875DA0D859E7EB")
>>> #
>>> # select all sensors that have ran notepad
>>> #
>>> sensors = set()
>>> for proc in c.select(Process).where('process_name:evil.exe'):
...     sensors.add(proc.sensor)
>>> #
>>> # iterate over all sensors and isolate
>>> #
>>> for s in sensors:
...     s.network_isolation_enabled = True
...     s.save()
```

If you're more a Cb Protection fellow, then you're in luck as well:

```
>>> from cbapi.protection.models import FileInstance
>>> from cbapi.protection import CbProtectionAPI
>>> #
>>> # Create our Cb Protection API object
>>> #
>>> p = CbProtectionAPI()
>>> #
>>> # Select the first file instance
>>> #
>>> fi = p.select(FileInstance).first()
>>> #
>>> # print that computer's hostname. This automatically "joins" with the Computer␣
↪API object.
>>> #
>>> fi.computer.name
u'DOMAIN\\MYHOSTNAME'
>>> #
>>> # change the policy ID
>>> #
>>> fi.computer.policyId = 3
>>> fi.computer.save()
```

As of version 1.2, cbapi now provides support for Cb Defense too!

```
>>> from cbapi.psc.defense import Device
>>> from cbapi.defense import CbDefenseAPI
>>> #
>>> # Create our Cb Defense API object
>>> #
>>> p = CbDefenseAPI()
>>> #
>>> # Select any devices that have the hostname WIN-IA9NQ1GN8OI and an internal IP␣
↪address of 192.168.215.150
>>> #
>>> devices = c.select(Device).where('hostNameExact:WIN-IA9NQ1GN8OI').and_(
↪"ipAddress:192.168.215.150").first()
>>> #
>>> # Change those devices' policy into the Windows_Restrictive_Workstation policy.
>>> #
>>> for dev in devices:
>>>     dev.policyName = "Restrictive_Windows_Workstation"
>>>     dev.save()
```

```
>>> from cbapi.psc.defense import Device
>>> from cbapi.defense import CbDefenseAPI
>>> #
>>> # Create our Cb Defense API object
>>> #
>>> p = CbDefenseAPI()
>>> #
>>> # Select any devices that have the hostname WIN-IA9NQ1GN8OI and an internal IP␣
↪address of 192.168.215.150
>>> #
>>> devices = c.select(Device).where('hostNameExact:WIN-IA9NQ1GN8OI').and_(
↪"ipAddress:192.168.215.150").first()
>>> #
>>> # Change those devices' policy into the Windows_Restrictive_Workstation policy.
>>> #
>>> for dev in devices:
>>>     dev.policyName = "Restrictive_Windows_Workstation"
>>>     dev.save()
```

```
>>> from cbapi.defense.models import Device
>>> from cbapi.psc.defense import CbDefenseAPI
>>> #
>>> # Create our Cb Defense API object
>>> #
>>> p = CbDefenseAPI()
>>> #
>>> # Select any devices that have the hostname WIN-IA9NQ1GN8OI and an internal IP␣
↪address of 192.168.215.150
>>> #
>>> devices = c.select(Device).where('hostNameExact:WIN-IA9NQ1GN8OI').and_(
↪"ipAddress:192.168.215.150").first()
>>> #
>>> # Change those devices' policy into the Windows_Restrictive_Workstation policy.
>>> #
>>> for dev in devices:
>>>     dev.policyName = "Restrictive_Windows_Workstation"
>>>     dev.save()
```

```
>>> from cbapi.defense.models import Device
>>> from cbapi.psc.defense import CbDefenseAPI
>>> #
>>> # Create our Cb Defense API object
>>> #
>>> p = CbDefenseAPI()
>>> #
>>> # Select any devices that have the hostname WIN-IA9NQ1GN8OI and an internal IP␣
↪address of 192.168.215.150
>>> #
>>> devices = c.select(Device).where('hostNameExact:WIN-IA9NQ1GN8OI').and_(
↪"ipAddress:192.168.215.150").first()
>>> #
>>> # Change those devices' policy into the Windows_Restrictive_Workstation policy.
>>> #
>>> for dev in devices:
>>>     dev.policyName = "Restrictive_Windows_Workstation"
>>>     dev.save()
```

```
>>> from cbapi.defense.models import Device
>>> from cbapi.defense import CbDefenseAPI
>>> #
>>> # Create our Cb Defense API object
>>> #
>>> d = CbDefenseAPI()
>>> #
>>> # Select any devices that have the hostname WIN-IA9NQ1GN8OI and an internal IP␣
↪address of 192.168.215.150
>>> #
>>> devices = d.select(Device).where('hostNameExact:WIN-IA9NQ1GN8OI').and_(
↪"ipAddress:192.168.215.150").first()
>>> #
>>> # Change those devices' policy into the Windows_Restrictive_Workstation policy.
>>> #
>>> for dev in devices:
>>>     dev.policyName = "Restrictive_Windows_Workstation"
>>>     dev.save()
```

CHAPTER 1

Major Features

- **Enhanced Live Response API** The new cbapi now provides a robust interface to the Cb Response Live Response capability. Easily create Live Response sessions, initiate commands on remote hosts, and pull down data as necessary to make your Incident Response process much more efficient and automated.
- **Consistent API for Cb Response, Protection and Defense platforms** We now support Cb Response, Protection and Defense users in the same API layer. Even better, the object model is the same for both; if you know one API you can easily transition to the other. cbapi hides all the differences between the three REST APIs behind a single, consistent Python-like interface.
- **Enhanced Performance** cbapi now provides a built in caching layer to reduce the query load on the Carbon Black server. This is especially useful when taking advantage of cbapi's new "joining" features. You can transparently access, for example, the binary associated with a given process in Cb Response. Since many processes may be associated with the same binary, it does not make sense to repeatedly request the same binary information from the server over and over again. Therefore cbapi now caches this information to avoid unnecessary requests.
- **Reduce Complexity** cbapi now provides a friendly - dare I say "fun" - interface to the data. This greatly improves developer productivity and lowers the bar to entry.
- **Python 3 and Python 2 compatible** Use all the new features and modules available in Python 3 with cbapi. This module is compatible with Python versions 2.6.6 and above, 2.7.x, 3.4.x, and 3.5.x.
- **Better support for multiple Cb servers** cbapi now introduces the concept of Credential Profiles; named collections of URL, API keys, and optional proxy configuration for connecting to any number of Cb Protection, Defense, or Response servers.

CHAPTER 2

API Credentials

The new cbapi as of version 0.9.0 enforces the use of credential files.

In order to perform any queries via the API, you will need to get the API token for your Cb user. See the documentation on the Developer Network website on how to acquire the API token for Cb Response, Cb Protection, or Cb Defense.

Once you acquire your API token, place it in one of the default credentials file locations:

- `/etc/carbonblack/credentials.response` (`credentials.protection` for Cb Protection, or `credentials.defense` for Cb Defense)
- `~/.carbonblack/credentials.response`
- (current working directory) `.carbonblack/credentials.response`

Credentials found in a later path will overwrite earlier ones.

The credentials are stored in INI format. The name of each credential profile is enclosed in square brackets, followed by key-value pairs providing the necessary credential information:

```
[default]
url=https://localhost
token=abcdef0123456789abcdef
ssl_verify=False

[prod]
url=https://cbserver.prod.corp.com
token=aaaaaa
ssl_verify=True

[otheruser]
url=https://localhost
token=bbbbbb
ssl_verify=False
```

The possible options for each credential profile are:

- **url**: The base URL of the Cb server. This should include the protocol (https) and the hostname, and nothing else.

- **token**: The API token for the user ID. More than one credential profile can be specified for a given server, with different tokens for each.
- **ssl_verify**: True or False; controls whether the SSL/TLS certificate presented by the server is validated against the local trusted CA store.
- **proxy**: A proxy specification that will be used when connecting to the Cb server. The format is: `http://myusername:mypassword@proxy.company.com:8001/` where the hostname of the proxy is `proxy.company.com`, port 8001, and using username/password `myusername` and `mypassword` respectively.
- **ignore_system_proxy**: If you have a system-wide proxy specified, setting this to True will force cbapi to bypass the proxy and directly connect to the Cb server.

Future versions of cbapi will also provide the ability to "pin" the TLS certificate so as to provide certificate verification on self-signed or internal CA signed certificates.

CHAPTER 3

Backwards & Forwards Compatibility

The previous versions (0.8.x and earlier) of cbapi and bit9Api are now deprecated and will no longer receive updates. However, existing scripts will work without change as cbapi includes both in its legacy package. The legacy package is imported by default and placed in the top level cbapi namespace when the cbapi module is imported on a Python 2.x interpreter. Therefore, scripts that expect to import cbapi.CbApi will continue to work exactly as they had previously.

Since the old API was not compatible with Python 3, the legacy package is not importable in Python 3.x and therefore legacy scripts cannot run under Python 3.

Once cbapi 1.0.0 is released, the old `cbapi.legacy.CbApi` will be deprecated and removed entirely no earlier than January 2017. New scripts should use the *`cbapi.response.rest_api.CbResponseAPI`* (for Cb Response), *`cbapi.protection.rest_api.CbProtectionAPI`* (for Cb Protection), or `cbapi.defense.rest_api.CbDefenseAPI` API entry points.

The API is frozen as of version 1.0; afterward, any changes in the 1.x version branch will be additions/bug fixes only. Breaking changes to the API will increment the major version number (2.x).

CHAPTER 4

User Guide

Let's get started with cbapi. Once you've mastered the concepts here, then you can always hop over to the API Documentation (below) for detailed information on the objects and methods exposed by cbapi.

4.1 Installation

Before installing cbapi, make sure that you have access to a working Cb Response or Cb Protection server. The server can be either on-premise or in the cloud. Cb Response clusters are also supported. Once you have access to a working can use the standard Python packaging tools to install cbapi on your local machine.

Feel free to follow along with this document or watch the Development Environment Setup video on the Developer Network website.

If you already have Python installed, you can skip right down to "Using Pip".

4.1.1 Installing Python

Obviously the first thing you'll need to do is install Python on your workstation or server. We recommend using the latest version of Python 3 (as of this writing, 3.6.4) for maximum performance and compatibility. Linux and Mac OS X systems will most likely have Python installed; it will have to be installed on Windows separately.

Note that cbapi is compatible with both Python 2.7 and Python 3.x. If you already have Python 3 installed on your system, you're good to go!

If you believe you have Python installed already, run the following two commands at a command prompt:

```
$ python --version
Python 3.6.4

$ pip --version
pip 9.0.1 from /usr/local/lib/python3.6/site-packages (python 3.6)
```

If "python" reports back a version of 2.6.x, 2.7.x, or 3.x.x, you're in luck. If "pip" is not found, don't worry, we'll install that shortly.

If you're on Windows, and Python is not installed yet, download the latest Python installer from the python.org website. We recommend using the latest version of Python 3. As of this writing, the latest version available is 3.6.4. The direct link for the Python 3.6.4 installer for Windows 64-bit platforms is https://www.python.org/ftp/python/3.6.4/python-3.6.4-amd64.exe.

Ensure that the "Add Python to PATH" option is checked.

If for some reason you do not have pip installed, follow the instructions at this handy guide.

4.1.2 Using Pip

Once Python and Pip are installed, then open a command prompt and type:

```
$ pip install cbapi
```

This will download and install the latest version of cbapi from the Python PyPI packaging server.

4.1.3 Getting the Source Code

cbapi is actively developed on GitHub and the code is available from the carbonblack GitHub repository. The version of cbapi on GitHub will reflect the latest development version of cbapi and may contain bugs not present in the currently released version. On the other hand, it may contain exactly the goodies you're looking for (or you'd like to contribute back; we are happy to accept pull requests!)

To clone the latest version of the cbapi repository from GitHub:

```
$ git clone https://github.com/carbonblack/cbapi-python.git
```

Once you have a copy of the source, you can install it in "development" mode into your Python site-packages:

```
$ cd cbapi-python
$ python setup.py develop
```

This will link the version of cbapi-python you checked out into your Python site-packages directory. Any changes you make to the checked out version of cbapi will be reflected in your local Python installation. This is a good choice if you are thinking of changing or developing on cbapi itself.

4.2 Getting Started

First, let's make sure that your API authentication tokens have been imported into cbapi. Once that's done, then read on for the key concepts that will explain how to interact with Carbon Black APIs via cbapi.

Feel free to follow along with this document or watch the Development Environment Setup video on the Developer Network website.

4.2.1 API Authentication

Cb Response and Cb Protection use a per-user API secret token to authenticate requests via the API. The API token confers the same permissions and authorization as the user it is associated with, so protect the API token with the same care as a password.

To learn how to obtain the API token for a user, see the Developer Network website: there you will find instructions for obtaining an API token for Cb Response and Cb Protection.

Once you have the API token, cbapi helps keep your credentials secret by enforcing the use of a credential file. To encourage sharing of scripts across the community while at the same time protecting the security of our customers, cbapi strongly discourages embedding credentials in individual scripts. Instead, you can place credentials for several Cb Response or Cb Protection servers inside the API credential file and select which "profile" you would like to use at runtime.

To create the initial credential file, a simple-to-use script is provided. Just run the `cbapi-response`, `cbapi-protection`, or `cbapi-defense` script with the `configure` argument. On Mac OS X and Linux:

```
$ cbapi-response configure
```

Alternatively, if you're using Windows (change `c:\python27` if Python is installed in a different directory):

```
C:\> python c:\python27\scripts\cbapi-response configure
```

This configuration script will walk you through entering your API credentials and will save them to your current user's credential file location, which is located in the `.carbonblack` directory in your user's home directory.

4.2.2 Your First Query

Now that you have cbapi installed and configured, let's run a simple query to make sure everything is functional:

```
$ python
Python 2.7.10 (default, Jun 22 2015, 12:25:23)
[GCC 4.2.1 Compatible Apple LLVM 6.1.0 (clang-602.0.53)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> from cbapi.response import *
>>> c = CbResponseAPI()
>>> print(c.select(Process).first().cmdline)
C:\Windows\system32\services.exe
```

That's it! Now on to the next step, learning the concepts behind cbapi.

4.3 Concepts

There are a few critical concepts that will make understanding and using the cbapi easier. These concepts are explained below, and also covered in a slide deck presented at the Carbon Black regional User Exchanges in 2016. You can see

the slide deck here.

At a high level, the cbapi tries to represent data in Cb Response or Cb Protection as Python objects. If you've worked with SQL Object-relational Mapping (ORM) frameworks before, then this structure may seem familiar – cbapi was designed to operate much like an ORM such as SQLAlchemy or Ruby's ActiveRecord. If you haven't worked with one of these libraries, don't worry! The concepts will become clear after a little practice.

4.3.1 Model Objects

Everything in cbapi is represented in terms of "Model Objects". A Model Object in cbapi represents a single instance of a specific type of data in Cb Response or Protection. For example, a process document from Cb Response (as seen on an Analyze Process page in the Web UI) is represented as a *cbapi.response.models.Process* Model Object. Similarly, a file instance in Cb Protection is represented as a *cbapi.protection.models.FileInstance* Model Object.

Once you have an instance of a Model Object, you can access all of the data contained within as Python properties. For example, if you have a Process Model Object named `proc` and you want to print its command line (which is stored in the `cmdline` property), you would write the code:

```
>>> print(proc.cmdline)
```

This would automatically retrieve the `cmdline` attribute of the process and print it out to your screen.

The data in Cb Response and Protection may change rapidly, and so a comprehensive list of valid properties is difficult to keep up-to-date. Therefore, if you are curious what properties are available on a specific Model Object, you can print that Model Object to the screen. It will dump all of the available properties and their current values. For example:

```
>>> print(binary)
cbapi.response.models.Binary:
-> available via web UI at https://cbserver/#binary/08D1631FAF39538A133D94585644D5A8
host_count           : 1
digsig_result        : Signed
observed_filename    : [u'c:\\windows\\syswow64\\appwiz.cpl']
product_version      : 6.2.9200.16384
legal_copyright      : © Microsoft Corporation. All rights reserved.
digsig_sign_time     : 2012-07-26T08:56:00Z
orig_mod_len         : 669696
is_executable_image  : False
is_64bit             : False
digsig_publisher     : Microsoft Corporation
...
```

In this example, `host_count`, `orig_mod_len`, etc. are all properties available on this Binary Model Object. Sometimes, properties are not available on every instance of a Model Object. In this case, you can use the `.get()` method to retrieve the property, and return a default value if the property does not exist on the Model Object:

```
>>> print(binary.get("product_version", "<unknown>"))
6.2.9200.16384
```

In summary, Model Objects contain all the data associated with a specific type of API call. In this example, the *cbapi.response.models.Binary* Model Object reflects all the data available via the `/api/v1/binary` API route on a Cb Response server.

4.3.2 Joining Model Objects

Many times, there are relationships between different Model Objects. To make navigating these relationships easy, cbapi provides special properties to "join" Model Objects together. For example, a *cbapi.response.models.Process* Model Object can reference the *cbapi.response.models.Sensor* or *cbapi.response.models.Binary* associated with this Process.

In this case, special "join" properties are provided for you. When you use one of these properties, cbapi will automatically retrieve the associated Model Object, if necessary.

This capability may sound like a performance killer, causing many unnecessary API calls in order to gather this data. However, cbapi has extensive Model Object caching built-in, so multiple requests for the same data will be eliminated and an API request is only made if the cache does not already contain the requested data.

For example, to print the name of the Sensor Group assigned to the Sensor that ran a specific Process:

```
>>> print(proc.sensor.group.name)
Default Group
```

Behind the scenes, this makes at most two API calls: one to obtain the Sensor associated with the Process, then another to obtain the Sensor Group that Sensor is part of. If either the Sensor or Sensor Group are already present in cbapi's internal cache, the respective API call is not made and the data is returned directly from the internal cache.

In summary, some Model Objects have special "join" properties that provide easy access to related Model Objects. A list of "join" properties is included as part of the documentation for each Model Object.

4.3.3 Queries

Now that we've covered how to get data out of a specific Model Object, we now need to learn how to obtain Model Objects in the first place! To do this, we have to create and execute a Query. cbapi Queries use the same query syntax accepted by Cb Response or Protection's APIs, and add a few little helpful features along the way.

To create a query in cbapi, use the `.select()` method on the CbResponseAPI or CbProtectionAPI object. Pass the Model Object type as a parameter to the `.select()` call and optionally add filtering criteria with `.where()` clauses.

Let's start with a simple query for Cb Response:

```
>>> from cbapi.response import *
>>> cb = CbResponseAPI()
>>> cb.select(Process).where("process_name:cmd.exe")
<cbapi.response.rest_api.Query object at 0x1068815d0>
```

This returns a prepared Query object with the query string `process_name:cmd.exe`. Note that at this point no API calls have been made. The cbapi Query objects are "lazy" in that they are only evaluated when you use them. If you create a Query object but never attempt to retrieve any results, no API call is ever made (I suppose that answers the age-old question; if a Query object is created, but nobody uses it, it does not make a sound, after all).

What can we do with a Query? The first thing we can do is compose new Queries. Most Query types in cbapi can be "composed"; that is, you can create a new query from more than one query string. This can be useful if you have a "base" query and want to add additional filtering criteria. For example, if we take the query above and add the additional filtering criteria `(filemod:*.exe or filemod:*.dll)`, we can write:

```
>>> base_query = cb.select(Process).where("process_name:cmd.exe")
>>> composed_query = base_query.where("(filemod:*.exe or filemod:*.dll")
```

Now the `composed_query` is equivalent to a query of `process_name:cmd.exe (filemod:*.exe or filemod:*.dll)`. You can also add sorting criteria to a query:

```
>>> sorted_query = composed_query.sort("last_update asc")
```

Now when we execute the `sorted_query`, the results will be sorted by the last server update time in ascending order.

Ok, now we're ready to actually execute a query and retrieve the results. You can think of a Query as a kind of "infinite" Python list. Generally speaking, you can use all the familiar ways to access a Python list to access the results of a cbapi query. For example:

```
>>> len(base_query)     # How many results were returned for the query?
3

>>> base_query[:2]      # I want the first two results
[<cbapi.response.models.Process: id 00000003-0000-036c-01d2-2efd3af51186-00000001> @␣
↪https://cbserver,
<cbapi.response.models.Process: id 00000003-0000-07d4-01d2-2efcd4949dfc-00000001> @␣
↪https://cbserver]

>>> base_query[-1:]     # I want the last result
[<cbapi.response.models.Process: id 00000002-0000-0f2c-01d2-2a57625ca0dd-00000001> @␣
↪https://cbserver]

>>> for proc in base_query:  # Loop over all the results
>>>     print(proc.cmdline)
"C:\Windows\system32\cmd.exe"
"C:\Windows\system32\cmd.exe"
"C:\Windows\system32\cmd.exe"

>>> procs = list(base_query) # Just make a list of all the results
```

In addition to using a Query object as an array, two helper methods are provided as common shortcuts. The first method is `.one()`. The `.one()` method is useful when you know only one result should match your query; it will throw a `MoreThanOneResultError` exception if there are zero or more than one results for the query. The second method is `.first()`, which will return the first result from the result set, or None if there are no results.

Every time you access a Query object, it will perform a REST API query to the Carbon Black server. For large result sets, the results are retrieved in batches- by default, 100 results per API request on Cb Response and 1,000 results per API request on Cb Protection. The search queries themselves are not cached, but the resulting Model Objects are.

4.3.4 Retrieving Objects by ID

Every Model Object (and in fact any object addressable via the REST API) has a unique ID associated with it. If you already have a unique ID for a given Model Object, for example, a Process GUID for Cb Response, or a Computer ID for Cb Protection, you can ask cbapi to give you the associated Model Object for that ID by passing that ID to the `.select()` call. For example:

```
>>> binary = cb.select(Binary, "CA4FAFFA957C71C006B59E29DFE3EB8B")
>>> print(binary.file_desc)
PNRP Name Space Provider
```

Note that retrieving an object via `.select()` with the ID does not automatically request the object from the server via the API. If the Model Object is already in the local cache, the locally cached version is returned. If it is not, a "blank" Model Object is created and is initialized only when an attempt is made to read a property. Therefore, assuming an empty cache, in the example above, the REST API query would not happen until the second line (the `print` statement). If you want to ensure that an object exists at the time you call `.select()`, add the `force_init=True`

keyword parameter to the `.select()` call. This will cause cbapi to force a refresh of the object and if it does not exist, cbapi will throw a `ObjectNotFoundError` exception.

4.3.5 Creating New Objects

The Cb Response and Protection REST APIs provide the ability to insert new data under certain circumstances. For example, the Cb Response REST API allows you to insert a new banned hash into its database. Model Objects that represent these data types can be "created" in cbapi by using the `create()` method:

```
>>> bh = cb.create(BannedHash)
```

If you attempt to create a Model Object that cannot be created, you will receive a `ApiError` exception.

Once a Model Object is created, it's blank (it has no data). You will need to set the required properties and then call the `.save()` method:

```
>>> bh = cb.create(BannedHash)
>>> bh.text = "Banned from API"
>>> bh.md5sum = "CA4FAFFA957C71C006B59E29DFE3EB8B"
>>> bh.save()
```

If you don't fill out all the properties required by the API, then you will receive an `InvalidObjectError` exception with a list of the properties that are required and not currently set.

Once the `.save()` method is called, the appropriate REST API call is made to create the object. The Model Object is then updated to the current state returned by the API, which may include additional data properties initialized by Cb Response or Protection.

4.3.6 Modifying Existing Objects

The same `.save()` method can be used to modify existing Model Objects if the REST API provides that capability. If you attempt to modify a Model Object that cannot be changed, you will receive a `ApiError` exception.

For example, if you want to change the "jgarman" user's password to "cbisawesome":

```
>>> user = cb.select(User, "jgarman")
>>> user.password = "cbisawesome"
>>> user.save()
```

4.3.7 Deleting Objects

Simply call the `.delete()` method on a Model Object to delete it (again, if you attempt to delete a Model Object that cannot be deleted, you will receive a `ApiError` exception).

Example:

```
>>> user = cb.select(User, "jgarman")
>>> user.delete()
```

4.3.8 Tracking Changes to Objects

Internally, Model Objects track all changes between when they were last refreshed from the server up until `.save()` is called. If you're interested in what properties have been changed or added, simply `print` the Model Object.

You will see a display like the following:

```
>>> user = cb.create(User)
>>> user.username = "jgarman"
>>> user.password = "cbisawesome"
>>> user.first_name = "Jason"
>>> user.last_name = "Garman"
>>> user.teams = []
>>> user.global_admin = False
>>> print(user)
User object, bound to https://cbserver.
 Partially initialized. Use .refresh() to load all attributes
--------------------------------------------------------------------------------

(+)                email: jgarman@carbonblack.com
(+)           first_name: Jason
(+)         global_admin: False
                    id: None
(+)            last_name: Garman
(+)             password: cbisawesome
(+)                teams: []
(+)             username: jgarman
```

Here, the `(+)` symbol before a property name means that the property will be added the next time that `.save()` is called. Let's call `.save()` and modify one of the Model Object's properties:

```
>>> user.save()
>>> user.first_name = "J"
>>> print(user)
print(user)
User object, bound to https://cbserver.
 Last refreshed at Mon Nov  7 16:54:00 2016
--------------------------------------------------------------------------------

              auth_token: 8b2dcf9d59b7da1a0b2b4ec50a77d8ca3d7dcb9c
                   email: jgarman@carbonblack.com
(*)           first_name: J
            global_admin: False
                      id: jgarman
               last_name: Garman
                   teams: []
                username: jgarman
```

The `(*)` symbol means that a property value will be changed the next time that `.save()` is called. This time, let's forget about our changes by calling `.reset()` instead:

```
>>> user.reset()
>>> print(user.first_name)
Jason
```

Now the user Model Object has been restored to the original state as it was retrieved from the server.

4.4 Logging & Diagnostics

The cbapi provides extensive logging facilities to track down issues communicating with the REST API and understand potential performance bottlenecks.

4.4.1 Enabling Logging

The cbapi uses Python's standard `logging` module for logging. To enable debug logging for the cbapi, you can do the following:

```
>>> import logging
>>> root = logging.getLogger()
>>> root.addHandler(logging.StreamHandler())
>>> logging.getLogger("cbapi").setLevel(logging.DEBUG)
```

All REST API calls, including the API endpoint, any data sent via POST or PUT, and the time it took for the call to complete:

```
>>> user.save()
Creating a new User object
Sending HTTP POST /api/user with {"email": "jgarman@carbonblack.com", "first_name":
↪"Jason", "global_admin": false, "id": null, "last_name": "Garman", "password":
↪"cbisawesome", "teams": [], "username": "jgarman"}
HTTP POST /api/user took 0.079s (response 200)
Received response: {u'result': u'success'}
HTTP GET /api/user/jgarman took 0.011s (response 200)
```

4.5 Cb Response API Examples

Now that we've covered the basics, let's step through a few examples using the Cb Response API. In these examples, we will assume the following boilerplate code to enable logging and establish a connection to the "default" Cb Response server in our credential file:

```
>>> import logging
>>> root = logging.getLogger()
>>> root.addHandler(logging.StreamHandler())
>>> logging.getLogger("cbapi").setLevel(logging.DEBUG)

>>> from cbapi.response import *
>>> cb = CbResponseAPI()
```

With that boilerplate out of the way, let's take a look at a few examples.

4.5.1 Download a Binary from Cb Response

Let's grab a binary that Cb Response has collected from one of the endpoints. This can be useful if you want to send this binary for further automated analysis or pull it down for manual reverse engineering. You can see a full example with command line options in the examples directory: `binary_download.py`.

Let's step through the example:

```
>>> import shutil
>>> md5 = "7FB55F5A62E78AF9B58D08AAEEAEF848"
>>> binary = cb.select(Binary, md5)
>>> shutil.copyfileobj(binary.file, open(binary.original_filename, "wb"))
```

First, we select the binary by its primary key: the MD5 hash of the binary contents. The third line requests the binary file data by accessing the `file` property on the Binary Model Object. The `file` property acts as a read-only, Python file-like object. In this case, we use the Python `shutil` library to copy one file object to another. The advantage of

using `shutil` is that the file is copied in chunks, and the full file does not have to be read into memory before saving it to disk.

Another way to use the `file` property is to call `.read()` on it just like any other Python file object. The following code will read the first two bytes from the Binary:

```
>> binary.file.read(2)
"MZ"
```

4.5.2 Ban a Binary

Now let's take this binary and add a Banning rule for it. To do this, we create a new BannedHash Model Object:

```
>>> bh = cb.create(BannedHash)
>>> bh.md5hash = binary.md5
>>> bh.text = "Banned from API"
>>> bh.enabled = True
>>> bh.save()
Creating a new BannedHash object
Sending HTTP POST /api/v1/banning/blacklist with {"md5hash":
↪"7FB55F5A62E78AF9B58D08AAEEAEF848", "text": "banned from API"}
HTTP POST /api/v1/banning/blacklist took 0.035s (response 200)
Received response: {u'result': u'success'}
HTTP GET /api/v1/banning/blacklist/7FB55F5A62E78AF9B58D08AAEEAEF848 took 0.039s␣
↪(response 200)
```

Note that if the hash is already banned in Cb Response, then you will receive a *ServerError* exception with the message that the banned hash already exists.

4.5.3 Isolate a Sensor

Switching gears, let's take a Sensor and quarantine it from the network. The Cb Response network isolation functionality allows administrators to isolate endpoints that may be actively involved in an incident, while preserving access to perform Live Response on that endpoint and collect further endpoint telemetry.

To isolate a sensor, we first need to acquire its Sensor Model Object:

```
>>> sensor = cb.select(Sensor).where("hostname:HOSTNAME").first()
```

This will select the first sensor that matches the hostname `HOSTNAME`. Now we can isolate that machine:

```
>>> sensor.isolate()
Updating Sensor with unique ID 4
Sending HTTP PUT /api/v1/sensor/4 with {"boot_id": "0", "build_id": 5, "build_version_
↪string": "005.002.000.61003", ...}
HTTP PUT /api/v1/sensor/4 took 0.129s (response 204)
HTTP GET /api/v1/sensor/4 took 0.050s (response 200)
...
True
```

The `.isolate()` method will keep polling the Cb Response server until the sensor has confirmed that it is now isolated from the network. If the sensor is offline or otherwise unreachable, this call could never return. Therefore, there is also a `timeout=` keyword parameter that can be used to set an optional timeout that, if reached, will throw a `TimeoutError` exception. The `.isolate()` function returns True when the sensor is successfully isolated.

When you're ready to restore full network connectivity to the sensor, simply call the `.unisolate()` method:

```
>>> sensor.unisolate()
Updating Sensor with unique ID 4
Sending HTTP PUT /api/v1/sensor/4 with {"boot_id": "0", "build_id": 5, "build_version_
↪string": "005.002.000.61003", ...}
HTTP PUT /api/v1/sensor/4 took 0.077s (response 204)
HTTP GET /api/v1/sensor/4 took 0.020s (response 200)
...
True
```

Again, once the sensor is back on the network, the `.unisolate()` method will return True. Just like `.isolate()`, you can optionally specify a timeout using the `timeout=` keyword parameter.

4.5.4 Querying Processes and Events

Now, let's do some queries into the Cb Response database. The true power of Cb Response is its continuous recording and powerful query language that allows you to go back in time and track the root cause of any security incident on your endpoints. Let's start with a simple query to find instances of a specific behavioral IOC, where our attacker used the built-in Windows tool `net.exe` to mount an internal network share. We will iterate over all uses of `net.exe` to mount our target share, printing out the parent processes that led to the execution of the offending command:

```
>>> query = cb.select(Process).where("process_name:net.exe").and_(r
↪"cmdline:\\test\blah").group_by("id")
>>> def print_details(proc, depth):
...     print("%s%s: %s ran %s" % (" "*depth, proc.start, proc.username, proc.
↪cmdline))
...
>>> for proc in query:
...     print_details(proc, 0)
...     proc.walk_parents(print_details)
...
HTTP GET /api/v1/process?cb.urlver=1&facet=false&q=process_name%3Anet.exe+cmdline%3A
↪%5C%5Ctest%5Cblah&rows=100&sort=last_update+desc&start=0 took 0.462s (response 200)
2016-11-11 20:59:31.631000: WIN-IA9NQ1GN8OI\bit9rad ran net  use y: \\test\blah
HTTP GET /api/v3/process/00000003-0000-036c-01d2-2efd3af51186/1/event took 0.036s␣
↪(response 200)
2016-10-25 20:20:29.790000: WIN-IA9NQ1GN8OI\bit9rad ran "C:\Windows\system32\cmd.exe"
HTTP GET /api/v3/process/00000003-0000-0c34-01d2-2ec94f09cae6/1/event took 0.213s␣
↪(response 200)
 2016-10-25 14:08:49.651000: WIN-IA9NQ1GN8OI\bit9rad ran C:\Windows\Explorer.EXE
HTTP GET /api/v3/process/00000003-0000-0618-01d2-2ec94edef208/1/event took 0.013s␣
↪(response 200)
  2016-10-25 14:08:49.370000: WIN-IA9NQ1GN8OI\bit9rad ran␣
↪C:\Windows\system32\userinit.exe
HTTP GET /api/v3/process/00000003-0000-02ec-01d2-2ec9412b4b70/1/event took 0.017s␣
↪(response 200)
   2016-10-25 14:08:26.382000: SYSTEM ran winlogon.exe
HTTP GET /api/v3/process/00000003-0000-02b0-01d2-2ec94115df7a/1/event took 0.012s␣
↪(response 200)
    2016-10-25 14:08:26.242000: SYSTEM ran \SystemRoot\System32\smss.exe 00000001␣
↪00000030
HTTP GET /api/v3/process/00000003-0000-0218-01d2-2ec93f813429/1/event took 0.021s␣
↪(response 200)
     2016-10-25 14:08:23.590000: SYSTEM ran \SystemRoot\System32\smss.exe
HTTP GET /api/v3/process/00000003-0000-0004-01d2-2ec93f7c7181/1/event took 0.081s␣
↪(response 200)
      2016-10-25 14:08:23.559000: SYSTEM ran c:\windows\system32\ntoskrnl.exe
```

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```
HTTP GET /api/v3/process/00000003-0000-0000-01d2-2ec93f6051ee/1/event took 0.011s␣
↪(response 200)
       2016-10-25 14:08:23.374000:  ran c:\windows\system32\ntoskrnl.exe
HTTP GET /api/v3/process/00000003-0000-0004-01d2-2ec93f6051ee/1/event took 0.011s␣
↪(response 200)
2016-11-11 20:59:25.667000: WIN-IA9NQ1GN8OI\bit9rad ran net  use z: \\test\blah
2016-10-25 20:20:29.790000: WIN-IA9NQ1GN8OI\bit9rad ran "C:\Windows\system32\cmd.exe"
 2016-10-25 14:08:49.651000: WIN-IA9NQ1GN8OI\bit9rad ran C:\Windows\Explorer.EXE
  2016-10-25 14:08:49.370000: WIN-IA9NQ1GN8OI\bit9rad ran␣
↪C:\Windows\system32\userinit.exe
   2016-10-25 14:08:26.382000: SYSTEM ran winlogon.exe
    2016-10-25 14:08:26.242000: SYSTEM ran \SystemRoot\System32\smss.exe 00000001␣
↪00000030
     2016-10-25 14:08:23.590000: SYSTEM ran \SystemRoot\System32\smss.exe
      2016-10-25 14:08:23.559000: SYSTEM ran c:\windows\system32\ntoskrnl.exe
       2016-10-25 14:08:23.374000:  ran c:\windows\system32\ntoskrnl.exe
```

That was a lot in one code sample, so let's break it down part-by-part.

First, we set up the `query` variable by creating a new `Query` object using the `.where()` and `.and_()` methods. Next, we define a function that will get called on each parent process all the way up the chain to the system kernel loading during the boot process. This function, `print_details`, will print a few data points about each process: namely, the local endpoint time when that process started, the user who spawned the process, and the command line for the process.

Finally, we execute our query by looping over the result set with a Python for loop. For each process that matches the query, first we print details of the process itself (the process that called `net.exe` with a command line argument of our target share `\\test\blah`), then calls the `.walk_parents()` helper method to walk up the chain of all parent processes. Each level of parent process (the "depth") is represented by an extra space; therefore, reading backwards, you can see that `ntoskrnl.exe` spawned `smss.exe`, which in turn spawned `winlogon.exe`, and so on. You can see the full backwards chain of events that ultimately led to the execution of each of these `net.exe` calls.

Remember that we have logging turned on for these examples, so you see each of the HTTP GET requests to retrieve process event details as they happen. Astute observers will note that walking the parents of the second `net.exe` command, where the `\\test\blah` share was mounted on the `z:` drive, did not trigger additional HTTP GET requests. This is thanks to cbapi's caching layer. Since both `net.exe` commands ran as part of the same command shell session, the parent processes are shared between the two executions. Since the parent processes were already requested as part of the previous walk up the chain of parent processes, cbapi did not re-request the data from the server, instead using its internal cache to satisfy the process information requests from this script.

New Filters: Group By, Time Restrictions

In the query above, there is an extra `.group_by()` method. This method is new in cbapi 1.1.0 and is part of five new query filters available when communicating with a Cb Response 6.1 server. These filters are accessible via methods on the `Process` Query object. These new methods are:

- `.group_by()` - Group the result set by a field in the response. Typically you will want to group by `id`, which will ensure that the result set only has one result per *process* rather than one result per *event segment*. For more information on processes, process segments, and how segments are stored in Cb Response 6.0, see the Process API Changes for Cb Response 6.0 page on the Developer Network website.
- `.min_last_update()` - Only return processes that have events after a given date/time stamp (relative to the individual sensor's clock)
- `.max_last_update()` - Only return processes that have events before a given date/time stamp (relative to the individual sensor's clock)

- `.min_last_server_update()` - Only return processes that have events after a given date/time stamp (relative to the Cb Response server's clock)
- `.max_last_server_update()` - Only return processes that have events before a given date/time stamp (relative to the Cb Response server's clock)

Cb Response 6.1 uses a new way of recording process events that greatly increases the speed and scale of collection, allowing you to store and search data for more endpoints on the same hardware. Details on the new database format can be found on the Developer Network website at the Process API Changes for Cb Response 6.0 page.

The `Process` Model Object traditionally referred to a single "segment" of events in the Cb Response database. In Cb Response versions prior to 6.0, a single segment will include up to 10,000 individual endpoint events, enough to handle over 95% of the typical event activity for a given process. Therefore, even though a `Process` Model Object technically refers to a single *segment* in a process, since most processes had less than 10,000 events and therefore were only comprised of a single segment, this distinction wasn't necessary.

However, now that processes are split across many segments, a better way of handling this is necessary. Therefore, Cb Response 6.0 introduces the new `.group_by()` method.

More on Filters

Querying for a process will return *all* segments that match. For example, if you search for `process_name:cmd.exe`, the result set will include *all* segments of *all* `cmd.exe` processes. Therefore, Cb Response 6.1 introduced the ability to "group" result sets by a field in the result. Typically you will want to group by the internal process id (the `id` field), and this is what we did in the query above. Grouping by the `id` field will ensure that only one result is returned per *process* rather than per *segment*.

Let's take a look at an example:

```
>>> from datetime import datetime, timedelta
>>> yesterday = datetime.utcnow() - timedelta(days=1)       # Get "yesterday" in GMT
>>> for proc in c.select(Process).where("process_name:cmd.exe").min_last_
↪update(yesterday):
...     print proc.id, proc.segment
DEBUG:cbapi.connection:HTTP GET /api/v1/process?cb.min_last_update=2017-05-21T18%3A41
↪%3A58Z&cb.urlver=1&facet=false&q=process_name%3Acmd.exe&rows=100&sort=last_
↪update+desc&start=0 took 2.164s (response 200)
00000001-0000-0e48-01d2-c2a397f4cfe0 1495465643405
00000001-0000-0e48-01d2-c2a397f4cfe0 1495465407157
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463680155
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463807694
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463543944
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463176570
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463243492
```

Notice that the "same" process ID is returned seven times, but with seven different segment IDs. Cb Response will return *every* process event segment that matches a given query, in this case, any event segment that contains the process command name `cmd.exe`.

That is, however, most likely not what you wanted. Instead, you'd like a list of the *unique* processes associated with the command name `cmd.exe`. Just add the `.group_by("id")` filter to your query:

```
>>> for proc in c.select(Process).where("process_name:cmd.exe").min_last_
↪update(yesterday).group_by("id"):
...     print proc.id, proc.segment
DEBUG:cbapi.connection:HTTP GET /api/v1/process?cb.group=id&cb.min_last_update=2017-
↪05-21T18%3A41%3A58Z&cb.urlver=1&facet=false&q=process_name%3Acmd.exe&rows=100&
↪sort=last_update+desc&start=0 took 2.163s (response 200)
```

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```
00000001-0000-0e48-01d2-c2a397f4cfe0 1495465643405
```

4.5.5 Feed and Watchlist Maintenance

The cbapi provides several helper functions to assist in creating watchlists and

Watchlists are simply saved Queries that are automatically run on the Cb Response server on a periodic basis. Results of the watchlist are tagged in the database and optionally trigger alerts. Therefore, a cbapi Query can easily be converted into a watchlist through the Query `.create_watchlist()` function:

```
>>> new_watchlist = query.create_watchlist("[WARN] Attempts to mount internal share")
Creating a new Watchlist object
Sending HTTP POST /api/v1/watchlist with {"id": null, "index_type": "events", "name":
↪"[WARN] Attempts to mount internal share", "search_query": "facet=false&q=process_
↪name%3Anet.exe+cmdline%3A%5C%5Ctest%5Cblah&cb.urlver=1&sort=last_update+desc"}
HTTP POST /api/v1/watchlist took 0.510s (response 200)
Received response: {u'id': 222}
Only received an ID back from the server, forcing a refresh
HTTP GET /api/v1/watchlist/222 took 0.034s (response 200)
```

This helper function will automatically create a watchlist from the Query object with the given name.

If you have a watchlist that already exists, the Watchlist Model Object can help you extract the human-readable query from the watchlist. Just select the watchlist and access the `.query` property on the Watchlist Model Object:

```
>>> my_watchlist = cb.select(Watchlist).where("name:[WARN] Attempts to mount internal␣
↪share").one()
>>> print(my_watchlist.query)
process_name:net.exe cmdline:\\test\blah
```

You can also execute the query straight from the Watchlist Model Object:

```
>>> len(my_watchlist.search())
HTTP GET /api/v1/process?cb.urlver=1&facet=false&q=process_name%3Anet.exe+cmdline%3A
↪%5C%5Ctest%5Cblah&rows=0&start=0 took 0.477s (response 200)
2
```

And finally, you can of course enable and disable Watchlists:

```
>>> my_watchlist.enabled = False
>>> my_watchlist.save()
Updating Watchlist with unique ID 222
Sending HTTP PUT /api/v1/watchlist/222 with {"alliance_id": null, "date_added": "2016-
↪11-15 23:48:27.615993-05:00", "enabled": false, "from_alliance": false, "group_id":␣
↪-1, "id": "222", "index_type": "events", "last_hit": "2016-11-15 23:50:08.448685-
↪05:00", "last_hit_count": 2, "name": "[WARN] Attempts to mount internal share",
↪"readonly": false, "search_query": "facet=false&q=process_name%3Anet.exe%20cmdline
↪%3A%5C%5Ctest%5Cblah&cb.urlver=1", "search_timestamp": "2016-11-16T04:50:01.750240Z
↪", "total_hits": "2", "total_tags": "2"}
HTTP PUT /api/v1/watchlist/222 took 0.036s (response 200)
Received response: {u'result': u'success'}
HTTP GET /api/v1/watchlist/222 took 0.029s (response 200)
```

You can see more examples of Feed and Watchlist maintenance in the `feed_operations.py` and `watchlist_operations.py` example scripts.

4.5.6 Managing Threat Reports & Alerts

The cbapi provides helper functions to manage alerts and threat reports in bulk. The Query objects associated with the ThreatReport and Alert Model Objects provide a few bulk operations to help manage large numbers of Threat Reports and Alerts, respectively.

To mark a large number of Threat Reports as false positives, create a query that matches the Reports you're interested in. For example, if every Report from the Feed named "SOC" that contains the word "FUZZYWOMBAT" in the report title should be considered a false positive (and no longer trigger Alerts), you can write the following code to do so:

```
>>> feed = c.select(Feed).where("name:SOC").one()
>>> report_query = feed.reports.where("title:FUZZYWOMBAT")
>>> report_query.set_ignored()
```

Similar actions can be taken on Alerts. The AlertQuery object exposes three helper methods to perform bulk operations on sets of Alerts: `.set_ignored()`, `.assign_to()`, and `.change_status()`.

4.5.7 Joining Everything Together

Now that we've examined how to request information on binaries, sensors, and processes through cbapi, let's chain this all together using the "join" functionality of cbapi's Model Objects. Let's just tweak the `print_details` function from above to add a few more contextual details. Our new function will now include the following data points for each process:

- The hostname the process was executed on
- The sensor group that host belongs to
- **If the binary was signed, also print out:**
  - The number of days between when the binary was signed and it was executed on the endpoint
  - The verified publisher name from the digital signature

We can transparently "join" between the Process Model Object and the Sensor, Sensor Group, and Binary Model Objects using the appropriately named helper properties. Here's the new function:

```
>>> import pytz

>>> def print_details(proc, depth):
...     print("On host {0} (part of sensor group {1}):".format(proc.hostname, proc.
↪sensor.group.name))
...     print("- At {0}, process {1} was executed by {2}".format(proc.start, proc.
↪cmdline, proc.username))
...     if proc.binary.signed:
...         # force local timestamp into UTC, we're just looking for an estimate here.
...         utc_timestamp = proc.start.replace(tzinfo=pytz.timezone("UTC"))
...         days_since_signed = (utc_timestamp - proc.binary.signing_data.sign_time).
↪days
...         print("- That binary ({0}) was signed by {1} {2} days before it was␣
↪executed.".format(proc.process_md5,
...             proc.binary.signing_data.publisher, days_since_signed))
```

Now if we run our for loop from above again:

```
>>> for proc in query:
...     print_details(proc, 0)
```

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```
...     proc.walk_parents(print_details)
...
HTTP GET /api/v1/process?cb.urlver=1&facet=false&q=process_name%3Anet.exe+cmdline%3A
↪%5C%5Ctest%5Cblah&rows=100&sort=last_update+desc&start=0 took 0.487s (response 200)
HTTP GET /api/v1/sensor/3 took 0.037s (response 200)
HTTP GET /api/group/1 took 0.022s (response 200)
On host WIN-IA9NQ1GN8OI (part of sensor group Default Group):
- At 2016-11-11 20:59:31.631000, process net  use y: \\test\blah was executed by WIN-
↪IA9NQ1GN8OI\bit9rad
HTTP GET /api/v1/binary/79B6D4C5283FC806387C55B8D7C8B762/summary took 0.016s␣
↪(response 200)
- That binary (79b6d4c5283fc806387c55b8d7c8b762) was signed by Microsoft Corporation␣
↪1569 days before it was executed.
HTTP GET /api/v3/process/00000003-0000-036c-01d2-2efd3af51186/1/event took 0.045s␣
↪(response 200)
On host WIN-IA9NQ1GN8OI (part of sensor group Default Group):
- At 2016-10-25 20:20:29.790000, process "C:\Windows\system32\cmd.exe"  was executed␣
↪by WIN-IA9NQ1GN8OI\bit9rad
HTTP GET /api/v1/binary/BF93A2F9901E9B3DFCA8A7982F4A9868/summary took 0.015s␣
↪(response 200)
- That binary (bf93a2f9901e9b3dfca8a7982f4a9868) was signed by Microsoft Corporation␣
↪1552 days before it was executed.
```

Those few lines of Python above are jam-packed with functionality. Now for each process execution, we have added contextual information on the source host, the group that host is part of, and details about the signing status of the binary that was executed. The magic is performed behind the scenes when we use the `.binary` and `.sensor` properties on the Process Model Object. Just like our previous example, cbapi's caching layer ensures that we do not overload the Cb Response server with duplicate requests for the same data. In this example, multiple redundant requests for sensor, sensor group, and binary data are all eliminated by cbapi's cache.

4.5.8 Facets

The cbapi also provides functionality to pull facet information from the database. You can use the `.facet()` method on a Query object to retrieve facet (ie. "group") information for a given query result set. Here's an example that pulls the most common process names for our sample host:

```
>>> def print_facet_histogram(facets):
...     for entry in facets:
...         print("%15s: %5s%% %s" % (entry["name"][:15], entry["ratio"], u"\u25A0
↪"*(int(entry["percent"])/2)))
...

>>> facet_query = cb.select(Process).where("hostname:WIN-IA9NQ1GN8OI").and_(
↪"username:bit9rad")
>>> print_facet_histogram(facet_query.facets("process_name")["process_name"])

HTTP GET /api/v1/process?cb.urlver=1&facet=true&facet.field=process_name&facet.
↪field=username&q=hostname%3AWIN-IA9NQ1GN8OI+username%3Abit9rad&rows=0&start=0 took␣
↪0.024s (response 200)
     chrome.exe:  23.4% ==================================================
thumbnailextrac:  15.4% ================================
   adobearm.exe:   8.6% ==================
   taskhost.exe:   6.0% ============
    conhost.exe:   4.7% =========
```

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```
      ping.exe:    4.0% ========
    wermgr.exe:    3.5% =======
```

In the above example, we just pulled one facet: the `process_name`; you can ask the server for faceting on multiple fields in one query by simply listing the fields in the call to `.facet()`: for example, `.facet("username", "process_name")` will produce a dictionary with two top-level keys: `username` and `process_name`.

4.5.9 Administrative Tasks

In addition to querying data, you can also perform various administrative tasks using cbapi.

Let's create a user on our Cb Response server:

```
>>> user = cb.create(User)
>>> user.username = "jgarman"
>>> user.password = "cbisawesome"
>>> user.first_name = "Jason"
>>> user.last_name = "Garman"
>>> user.email = "jgarman@carbonblack.com"
>>> user.teams = []
>>> user.global_admin = False
Creating a new User object
Sending HTTP POST /api/user with {"email": "jgarman@carbonblack.com", "first_name":
↪"Jason", "global_admin": false, "id": null, "last_name": "Garman", "password":
↪"cbisawesome", "teams": [], "username": null}
HTTP POST /api/user took 0.608s (response 200)
Received response: {u'result': u'success'}
```

How about moving a sensor to a new Sensor Group:

```
>>> sg = cb.create(SensorGroup)
>>> sg.name = "Critical Endpoints"
>>> sg.site = 1
>>> sg.save()
Creating a new SensorGroup object
Sending HTTP POST /api/group with {"id": null, "name": "Critical Endpoints", "site_id
↪": 1}
HTTP POST /api/group took 0.282s (response 200)
Received response: {u'id': 2}
Only received an ID back from the server, forcing a refresh
HTTP GET /api/group/2 took 0.011s (response 200)
>>> sensor = cb.select(Sensor).where("hostname:WIN-IA9NQ1GN8OI").first()
>>> sensor.group = sg
>>> sensor.save()
Updating Sensor with unique ID 3
Sending HTTP PUT /api/v1/sensor/3 with {"boot_id": "2", "build_id": 2, "build_version_
↪string": "005.002.000.60922", ...
HTTP PUT /api/v1/sensor/3 took 0.087s (response 204)
HTTP GET /api/v1/sensor/3 took 0.030s (response 200)
```

4.6 CbAPI and Live Response

Working with the Cb Live Response REST API directly can be difficult. Thankfully, just like the rest of Carbon Black's REST APIs, cbapi provides Pythonic APIs to make working with the Live Response API much easier.

In addition to easy-to-use APIs to call into Live Response, cbapi also provides a "job-based" interface that allows cbapi to intelligently schedule large numbers of concurrent Live Response sessions across multiple sensors. Your code can then be notified when the jobs are complete, returning the results of the job if it succeeded or the Exception if it failed.

4.6.1 Getting Started with Live Response

The cbapi Live Response API is built around establishing a `cbapi.response.live_response.LiveResponseSession` object from a *`cbapi.response.models.Sensor`* Model Object. Then you can call methods on the `LiveResponseSession` object to perform Live Response actions on the target host. These calls are synchronous, meaning that they will wait until the action is complete and a result is available, before returning back to your script. Here's an example:

```
>>> from cbapi.response import *
>>> cb = CbResponseAPI()
>>> sensor = cb.select(Sensor).where("hostname:WIN-IA9NQ1GN8OI").first()
>>> with sensor.lr_session() as session:
...     print(session.get_file(r"c:\test.txt"))

this is a test
```

Since the Live Response API is synchronous, the script will not continue until either the Live Response session is established and the file contents are retrieved, or an exception occurs (in this case, either a timeout error or an error reading the file).

As seen in the example above, the `.lr_session()` method is context-aware. Cb Response has a limited number of concurrent Live Response session slots (by default, only ten). By wrapping the `.lr_session()` call within a `with` context, the session is automatically closed at the end of the block and frees that slot for another concurrent Live Response session in another script or user context.

A full listing of methods in the cbapi Live Response API is available in the documentation for the *`cbapi.live_response_api.CbLRSessionBase`* class.

4.6.2 Live Response Errors

There are four classes of errors that you will commonly encounter when working with the Live Response API:

- A *`cbapi.errors.TimeoutError`* is raised if a timeout is encountered when waiting for a response for a Live Response API request.
- A `cbapi.response.live_response_api.LiveResponseError` is raised if an error is returned during the execution of a Live Response command on an endpoint. The `LiveResponseError` includes detailed information about the error that occurred, including the exact error code that was returned from the endpoint and a textual description of the error.
- A *`cbapi.errors.ApiError`* is raised if you attempt to execute a command that is not supported by the sensor; for example, attempting to acquire a memory dump from a sensor running a pre-5.1 version of the agent will fail with an `ApiError` exception.
- A *`cbapi.errors.ServerError`* is raised if any other error occurs; for example, a 500 Internal Server Error is returned from the Live Response API.

4.6.3 Job-Based API

The basic Synchronous API described above in the Getting Started section works well for small tasks, targeting one sensor at a time. However, if you want to execute the same set of Live Response commands across a larger number of sensors, the cbapi provides a Job-Based Live Response API. The Job-Based Live Response API provides a straightforward API to submit Live Response jobs to a scheduler, schedule those Live Response jobs on individual endpoints concurrently, and return results and any errors back to you when the jobs complete. The Job-Based Live Response API is a natural fit with the Event-Based API to create IFTTT-style pipelines; if an event is received via the Event API, then perform Live Response actions on the affected endpoint via the Live Response Job-Based API.

The Job-Based API works by first defining a reusable "job" to perform on the endpoint. The Job is simply a class or function that takes a Live Response session object as input and performs a series of commands. Jobs can be as simple as retrieving a registry key, or as complex as collecting the Chrome browser history for any currently logged-in users.

Let's look at an example Job to retrieve a registry key. This example job is pulled from the `get_reg_autoruns.py` example script:

```
class GetRegistryValue(object):
    def __init__(self, registry_key):
        self.registry_key = registry_key

    def run(self, session):
        reg_info = session.get_registry_value(self.registry_key)
        return time.time(), session.sensor_id, self.registry_key, reg_info["value_data
↪"]
```

To submit this job, you instantiate an instance of a `GetRegistryValue` class with the registry key you want to pull back from the endpoint, and submit the `.run()` method to the Live Response Job API:

```
>>> job = GetRegistryValue(regmod_path)
>>> registry_job = cb.live_response.submit_job(job.run, sensor_id)
```

Your script resumes execution immediately after the call to `.submit_job()`. The job(s) that you've submitted will be executed in a set of background threads managed by cbapi.

4.7 CbAPI Changelog

4.7.1 CbAPI 1.4.0 - Released January 10, 2019

This release introduces support for Cb PSC's ThreatHunter APIs

- Process, Tree, and Search are supported with more to come

4.7.2 CbAPI 1.3.6 - Released February 14, 2018

This release has one critical fix:

- Fix a fatal exception when connecting to Cb Response 6.1.x servers

4.7.3 CbAPI 1.3.5 - Released February 2, 2018

This release includes bugfixes and contributions from the Carbon Black community.

All products:

- More Python 3 compatibility fixes.
- Fix the `wait_for_completion` and `wait_for_output` options in the Live Response `.create_process()` method. If `wait_for_completion` is True, the call to `.create_process()` will block until the remote process has exited. If `wait_for_output` is True, then `.create_process()` will additionally wait until the output of the remote process is ready and return that output to the caller. Setting `wait_for_output` to True automatically sets `wait_for_completion` to True as well.
- The `BaseAPI` constructor now takes three new optional keyword arguments to control the underlying connection pool: `pool_connections`, `pool_maxsize`, and `pool_block`. These arguments are sent to the underlying `HTTPAdapter` used when connecting to the Carbon Black server. For more information on these parameters, see the Python requests module API documentation for HTTPAdapter.

Cb Defense:

- Date/time stamps in the Device model object are now represented as proper Python datetime objects, rather than integers.
- The `policy_operations.py` example script's "Replace Rule" command is fixed.
- Add the Cb Live Response job-based API.
- Add a new example script `list_devices.py`

Cb Response:

- The `Process` and `Binary` model objects now return None by default when a non-existent attribute is referenced, rather than throwing an exception.
- Fixes to `walk_children.py` example script.
- Fix exceptions in enumerating child processes, retrieving path and MD5sums from processes.
- Multiple `.where()` clauses can now be used in the `Sensor` model object.
- Workaround implemented for retrieving/managing more than 500 banned hashes.
- Alert bulk operations now work on batches of 500 alerts.
- `.flush_events()` method on `Sensor` model object no longer throws an exception on Cb Response 6.x servers.
- `.restart_sensor()` method now available for `Sensor` model object.
- Fix `user_operations.py` example script to eliminate exception when adding a new user to an existing team.
- Add `.remove_team()` method on `User` model object.
- Automatically set `cb.legacy_5x_mode` query parameter for all Process queries whenever a legacy Solr core (from Cb Response 5.x) is loaded.
- Added `.use_comprehensive_search()` method to enable the "comprehensive search" option on a Process query. See the Cb Developer Network documentation on Comprehensive Search for more information on "comprehensive search".
- Add `.all_childprocs()`, `.all_modloads()`, `.all_filemods()`, `.all_regmods()`, `.all_crossprocs()`, and `.all_netconns()` methods to retrieve process events from all segments, rather than the current process segment. You can also use the special segment "0" to retrieve process events across all segments.
- Fix `cmdline_filters` in the `IngressFilter` model object.

Cb Protection:

- Tamper Protection can now be set and cleared in the `Computer` model object.

4.7.4 CbAPI 1.3.4 - Released September 14, 2017

This release includes a critical security fix and small bugfixes.

Security fix:

- The underlying CbAPI connection class erroneously disabled hostname validation by default. This does *not* affect code that uses CbAPI through the public interfaces documented here; it only affects code that accesses the new `CbAPISessionAdapter` class directly. This class was introduced in version 1.3.3. Regardless, it is strongly recommended that all users currently using 1.3.3 upgrade to 1.3.4.

Bug fixes:

- Add rule filename parameter to Cb Defense `policy_operations.py` script's `add-rule` command.
- Add support for `tamperProtectionActive` attribute to Cb Protection's `Computer` object.
- Work around Cb Response issue- the `/api/v1/sensor` route incorrectly returns an HTTP 500 if no sensors match the provided query. CbAPI now catches this exception and will instead return an empty set back to the caller.

4.7.5 CbAPI 1.3.3 - Released September 1, 2017

This release includes security improvements and bugfixes.

Security changes:

- CbAPI enforces the use of HTTPS when connecting to on-premise Cb Response servers.
- CbAPI can optionally require TLSv1.2 when connecting to Carbon Black servers.
  - Note that some versions of Python and OpenSSL, notably the version of OpenSSL packaged with Mac OS X, do not support TLSv1.2. This will cause CbAPI to fail to connect to Cb Response 6.1+ servers which require TLSv1.2 cipher suites.
  - A new command, `cbapi check-tls`, will report the TLS version supported by your platform.
  - To enforce the use of TLSv1.2 when connecting to a server, add `ssl_force_tls_1_2=True` to that server's credential profile.
- Add the ability to "pin" a specific server certificate to a credential profile.
  - You can now force TLS certificate verification on self-signed, on-premise installations of Cb Response or Protection through the `ssl_cert_file` option in the credential profile.
  - To "pin" a server certificate, save the PEM-formatted server certificate to a file, and put the full path to that PEM file in the `ssl_cert_file` option of that server's credential profile.
  - When using this option with on-premise Cb Response servers, you may also have to set `ssl_verify_hostname=False` as the hostname in the certificate generated at install time is `localhost` and will not match the server's hostname or IP address. This option will still validate that the server's certificate is valid and matches the copy in the `ssl_cert_file` option.

Changes for Cb Protection:

- The API now sets the appropriate "GET" query fields when changing fields such as the `debugFlags` on the Computer object.
- The `.template` attribute on the Computer model object has been renamed `.templateComputer`.
- Remove AppCatalog and AppTemplate model objects.

Changes for Cb Response:

- Added `.webui_link` property to Cb Response Query objects.
- Added `ban_hash.py` example.

Bug Fixes:

- Error handling is improved on Python 3. Live Response auto-reconnect functionality is now fixed on Python 3 as a result.
- Workaround implemented for Cb Response 6.1 where segment_ids are truncated on Alerts. The `.process` attribute on an Alert now ignores the `segment_id` and links to the first Process segment.
- Fixed issue with `Binary.signed` and `CbModLoadEvent.is_signed`.

4.7.6 CbAPI 1.3.2 - Released August 10, 2017

This release introduces the Policy API for Cb Defense. A sample `policy_operations.py` script is now included in the `examples` directory for Cb Defense.

Other changes:

- Cb Response
  - Bugfixes to the `User` Model Object.
  - New `user_operations.py` example script to manage users & teams.
  - Additional `Team` Model Object to add/remove/modify user teams.
  - New `check_datasharing.py` example script to check if third party data sharing is enabled for binaries on any sensor groups.
  - Documentation fix for the `User` Model Object.
  - Fix to the `watchlist_operations.py` example script.

4.7.7 CbAPI 1.3.1 - Released August 3, 2017

This is a bugfix release with minor changes:

- Cb Response
  - Add `partition_operations.py` script to demonstrate the use of the StoragePartition model object.
  - Fix errors when accessing the `.start` attribute of child processes.
  - Fix errors generated by the `walk_children.py` example script. The output has been changed as well to indicate the process lifetime, console UI link, and command lines.
  - Add an `.end` attribute to the Process model object. This attribute reports back either `None` if the process is still executing, or the last event time associated with the process if it has exited. See the `walk_children.py` script for an example of how to calculate process lifetime.
  - Fix errors when using the `.parents` attribute of a Process.
  - Add `wait_for_completion` flag to `create_process` Live Response method, and default to `True`. The `create_process` method will now wait for the target process to complete before returning.
- Cb Defense
  - Add `wait_for_completion` flag to `create_process` Live Response method, and default to `True`. The `create_process` method will now wait for the target process to complete before returning.

4.7.8 CbAPI 1.3.0 - Released July 27, 2017

This release introduces the Live Response API for Cb Defense. A sample `cblr_cli.py` script is now included in the `examples` directory for both Cb Response and Cb Defense.

Other changes:

- Cb Protection
  - You can now create new `FileRule` and `Policy` model objects in cbapi.
- Cb Response
  - Added `watchlist_exporter.py` and `watchlist_importer.py` scripts to the Cb Response examples directory. These scripts allow you to export Watchlist data in a human- and machine-readable JSON format and then re-import them into another Cb Response server.
  - The `Sensor` Model Object now uses the non-paginated (v1) API by default. This fixes any issues encountered when iterating over all the sensors and receiving duplicate and/or missing sensors.
  - Fix off-by-one error in `CbCrossProcess` object.
  - Fix issue iterating through `Process` Model Objects when accessing processes generated from a 5.2 server after upgrading to 6.1.
  - Reduce number of API requests required when accessing sibling information (parents, children, and siblings) from the `Process` Model Object.
  - Retrieve all events for a process when using `segment` ID of zero on a Cb Response 6.1 server.
  - Behavior of `Process.children` attribute has changed:
    - Only one entry is present per child (before there were up to two; one for the spawn event, one for the terminate event)
    - The timestamp is derived from the start time of the process, not the timestamp from the spawn event. the two timestamps will be off by a few microseconds.
    - The old behavior is still available by using the `Process.childprocs` attribute instead. This incurs a performance penalty as another API call will have to be made to collect the childproc information.
  - `Binary` Model Object now returns False for `.is_signed` attribute if it is set to `(Unknown)`.
- Moved the `six` Python module into cbapi and removed the external dependency.

4.7.9 CbAPI 1.2.0 - Released June 22, 2017

This release introduces compatibility with our new product, Cb Defense, as well as adding new Model Objects introduced in the Cb Protection 8.0 APIs.

Other changes:

- Cb Response
  - New method `synchronize()` added to the `Feed` Model Object
- Bug fixes and documentation improvements

4.7.10 CbAPI 1.1.1 - Released June 2, 2017

This release includes compatibility fixes for Cb Response 6.1. Changes from 1.0.1 include:

- Substantial changes to the `Process` Model Object for Cb Response 6.1. See details below.
- New `StoragePartition` Model Object to control Solr core loading/unloading in Cb Response 6.1.
- New `IngressFilter` Model Object to control ingress filter settings in Cb Response 6.1.
- Fix issues with `event_export.py` example script.
- Add `.all_events` property to the `Process` Model Object to expose a list of all events across all segments.
- Add example script to perform auto-banning based on watchlist hits from Cb Event Forwarder S3 output files.
- Add bulk operations to the `ThreatReport` and `Alert` Query objects:
  - You can now call `.set_ignored()`, `.assign()`, and `.change_status()` on an `Alert` Query object to change the respective fields for every Alert that matches the query.
  - You can now call `.set_ignored()` on a `ThreatReport` Query object to set or clear the ignored flag for every ThreatReport that matches the query.

Changes to `Process` Model Object for Cb Response 6.1

Cb Response 6.1 uses a new way of recording process events that greatly increases the speed and scale of collection, allowing you to store and search data for more endpoints on the same hardware. Details on the new database format can be found on the Developer Network website at the Process API Changes for Cb Response 6.0 page.

The `Process` Model Object traditionally referred to a single "segment" of events in the Cb Response database. In Cb Response versions prior to 6.0, a single segment will include up to 10,000 individual endpoint events, enough to handle over 95% of the typical event activity for a given process. Therefore, even though a `Process` Model Object technically refers to a single *segment* in a process, since most processes had less than 10,000 events and therefore were only comprised of a single segment, this distinction wasn't necessary.

However, now that processes are split across many segments, a better way of handling this is necessary. Therefore, Cb Response 6.0 introduces the new `.group_by()` method. This method is new in cbapi 1.1.0 and is part of five new query filters available when communicating with a Cb Response 6.1 server. These filters are accessible via methods on the `Process` Query object. These new methods are:

- `.group_by()` - Group the result set by a field in the response. Typically you will want to group by `id`, which will ensure that the result set only has one result per *process* rather than one result per *event segment*. For more information on processes, process segments, and how segments are stored in Cb Response 6.0, see the Process API Changes for Cb Response 6.0 page on the Developer Network website.
- `.min_last_update()` - Only return processes that have events after a given date/time stamp (relative to the individual sensor's clock)
- `.max_last_update()` - Only return processes that have events before a given date/time stamp (relative to the individual sensor's clock)
- `.min_last_server_update()` - Only return processes that have events after a given date/time stamp (relative to the Cb Response server's clock)
- `.max_last_server_update()` - Only return processes that have events before a given date/time stamp (relative to the Cb Response server's clock)

Examples for new Filters

Let's take a look at an example:

```
>>> from datetime import datetime, timedelta
>>> yesterday = datetime.utcnow() - timedelta(days=1)      # Get "yesterday" in GMT
>>> for proc in c.select(Process).where("process_name:cmd.exe").min_last_
↪update(yesterday):
...     print proc.id, proc.segment
DEBUG:cbapi.connection:HTTP GET /api/v1/process?cb.min_last_update=2017-05-21T18%3A41
↪%3A58Z&cb.urlver=1&facet=false&q=process_name%3Acmd.exe&rows=100&sort=last_
↪update+desc&start=0 took 2.164s (response 200)
00000001-0000-0e48-01d2-c2a397f4cfe0 1495465643405
00000001-0000-0e48-01d2-c2a397f4cfe0 1495465407157
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463680155
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463807694
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463543944
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463176570
00000001-0000-0e48-01d2-c2a397f4cfe0 1495463243492
```

Notice that the "same" process ID is returned seven times, but with seven different segment IDs. Cb Response will return *every* process event segment that matches a given query, in this case, any event segment that contains the process command name `cmd.exe`.

That is, however, most likely not what you wanted. Instead, you'd like a list of the *unique* processes associated with the command name `cmd.exe`. Just add the `.group_by("id")` filter to your query:

```
>>> for proc in c.select(Process).where("process_name:cmd.exe").min_last_
↪update(yesterday).group_by("id"):
...     print proc.id, proc.segment
DEBUG:cbapi.connection:HTTP GET /api/v1/process?cb.group=id&cb.min_last_update=2017-
↪05-21T18%3A41%3A58Z&cb.urlver=1&facet=false&q=process_name%3Acmd.exe&rows=100&
↪sort=last_update+desc&start=0 took 2.163s (response 200)
00000001-0000-0e48-01d2-c2a397f4cfe0 1495465643405
```

CHAPTER 5

API Documentation

Once you've taken a look at the User Guide, read through some of the examples on GitHub, and maybe even written some code of your own, the API documentation can help you get the most out of cbapi by documenting all of the methods available to you.

5.1 Cb Response API

This page documents the public interfaces exposed by cbapi when communicating with a Carbon Black Enterprise Response server.

5.1.1 Main Interface

To use cbapi with Carbon Black Response, you will be using the CbResponseAPI. The CbResponseAPI object then exposes two main methods to access data on the Carbon Black server: `select` and `create`.

class cbapi.response.rest_api.**CbResponseAPI**(**args*, ***kwargs*)

The main entry point into the Carbon Black Enterprise Response API. Note that calling this will automatically connect to the Carbon Black server in order to verify connectivity and get the server version.

Parameters

- **profile** (*str*) – (optional) Use the credentials in the named profile when connecting to the Carbon Black server. Uses the profile named 'default' when not specified.
- **url** (*str*) – (optional, discouraged) Instead of using a credential profile, pass URL and API token to the constructor.
- **token** (*str*) – (optional, discouraged) API token
- **ssl_verify** (*bool*) – (optional, discouraged) Enable or disable SSL certificate verification

Usage:

```
>>> from cbapi import CbEnterpriseResponseAPI
>>> cb = CbEnterpriseResponseAPI(profile="production")
```

create(*cls*, *data=None*)
Creates a new object.

Parameters **cls** (*class*) – The Model class (only some models can be created, for example, Feed, Notification, . . .)

Returns An empty instance of the Model class

Raises ***ApiError*** – if the Model cannot be created

create_new_partition()
Create a new Solr time partition for event storage. Available in Cb Response 6.1 and above. This will force roll-over current hot partition into warm partition (by renaming it to a time-stamped name) and create a new hot partition ("writer").

Returns Nothing if successful.

Raises

- ***ApiError*** – if there was an error creating the new partition.
- ***ServerError*** – if there was an error creating the new partition.

dashboard_statistics()
Retrieve dashboard statistics from the Carbon Black Enterprise Response server.

Returns Dictionary with information retrieved from the `/api/v1/dashboard/statistics` API route

Return type dict

from_ui(*uri*)
Retrieve a Carbon Black Enterprise Response object based on URL from the Carbon Black Enterprise Response web user interface.

For example, calling this function with `https://server/#/analyze/00000001-0000-0554-01d1-3bc4553b8c9f/1` as the `uri` argument will return a new :py:class: cbapi.response.models.Process class initialized with the process GUID from the URL.

Parameters **uri** (*str*) – Web browser URL from the Cb web interface

Returns the appropriate model object for the URL provided

Raises ***ApiError*** – if the URL does not correspond to a recognized model object

info()
Retrieve basic version information from the Carbon Black Enterprise Response server.

Returns Dictionary with information retrieved from the `/api/info` API route

Return type dict

license_request()
Retrieve license request block from the Carbon Black Enterprise Response server.

Returns License request block

Return type str

select(*cls*, *unique_id=None*, **args*, ***kwargs*)
Prepares a query against the Carbon Black data store.

Parameters

- **cls** (*class*) – The Model class (for example, Computer, Process, Binary, FileInstance) to query
- **unique_id** – (optional) The unique id of the object to retrieve, to retrieve a single object by ID

Returns An instance of the Model class if a unique_id is provided, otherwise a Query object

update_license(*license_block*)
Upload new license to the Carbon Black Enterprise Response server.

Parameters **license_block** (*str*) – Licence block provided by Carbon Black support

Raises ***ServerError*** – if the license is not accepted by the Carbon Black server

5.1.2 Queries

class cbapi.response.query.**Query**(*doc_class*, *cb*, *query=None*, *raw_query=None*)
Represents a prepared query to the Carbon Black Enterprise Response server.

This object is returned as part of a `CbEnterpriseResponseAPI.select()` operation on Process and Binary objects from the Carbon Black Enterprise Response server. You should not have to create this class yourself.

The query is not executed on the server until it's accessed, either as an iterator (where it will generate values on demand as they're requested) or as a list (where it will retrieve the entire result set and save to a list). You can also call the Python built-in `len()` on this object to retrieve the total number of items matching the query.

The syntax for query :py:meth:where and :py:meth:sort methods can be found in the Query Reference posted on the Carbon Black Developer Network website.

Examples:

```
>>> cb = CbEnterpriseResponseAPI()
>>> query = cb.select(Process)                          # returns a Query object␣
↪matching all Processes
>>> query = query.where("process_name:notepad.exe") # add a filter to this Query
>>> query = query.sort("last_update desc")          # sort by last update time,␣
↪most recent first
>>> for proc in query:                                  # uses the iterator to␣
↪retrieve all results
>>>     print("{0} {1}".format(proc.username, proc.hostname))
>>> processes = query[:10]                              # retrieve the first ten␣
↪results
>>> len(query)                                          # retrieve the total count
```

Notes:

- The slicing operator only supports start and end parameters, but not step. `[1:-1]` is legal, but `[1:2:-1]` is not.
- You can chain where clauses together to create AND queries; only objects that match all `where` clauses will be returned.

and_(*new_query*)
Add a filter to this query. Equivalent to calling *where()* on this object.

Parameters **new_query** (*str*) – Query string - see the Query Reference.

Returns Query object

Return type *Query*

facets(**args*)
Retrieve a dictionary with the facets for this query.

Parameters **args** – Any number of fields to use as facets

Returns Facet data

Return type dict

sort(*new_sort*)
Set the sort order for this query.

Parameters **new_sort** (*str*) – New sort order - see the Query Reference.

Returns Query object

Return type *Query*

where(*new_query*)
Add a filter to this query.

Parameters **new_query** (*str*) – Query string - see the Query Reference.

Returns Query object

Return type *Query*

class cbapi.response.models.**ProcessQuery**(*doc_class*, *cb*, *query=None*, *raw_query=None*)

group_by(*field_name*)
Set the group-by field name for this query. Typically, you will want to set this to 'id' if you only want one result per process.

This method is only available for Cb Response servers 6.0 and above. Calling this on a Query object connected to a Cb Response 5.x server will simply result in a no-op.

Parameters **field_name** (*str*) – Field name to group the result set by.

Returns Query object

Return type *ProcessQuery*

max_last_server_update(*v*)
Set the maximum last update time (relative to server) for this query. The timestamp can be expressed either as a `datetime` like object or as an ISO 8601 string formatted timestamp such as 2017-04-29T04:21:18Z. If a `datetime` like object is provided, it is assumed to be in GMT time zone.

This option will limit the number of Solr cores that need to be searched for events that match the query.

This method is only available for Cb Response servers 6.0 and above. Calling this on a Query object connected to a Cb Response 5.x server will simply result in a no-op.

Parameters **v** (*str*) – Timestamp (either string or datetime object).

Returns Query object

Return type *ProcessQuery*

max_last_update(*v*)
Set the maximum last update time (relative to sensor) for this query. The timestamp can be expressed either as a `datetime` like object or as an ISO 8601 string formatted timestamp such as 2017-04-29T04:21:18Z. If a `datetime` like object is provided, it is assumed to be in GMT time zone.

This option will limit the number of Solr cores that need to be searched for events that match the query.

This method is only available for Cb Response servers 6.0 and above. Calling this on a Query object connected to a Cb Response 5.x server will simply result in a no-op.

Parameters **v** (*str*) – Timestamp (either string or datetime object).

Returns Query object

Return type *ProcessQuery*

min_last_server_update(*v*)

Set the minimum last update time (relative to server) for this query. The timestamp can be expressed either as a `datetime` like object or as an ISO 8601 string formatted timestamp such as 2017-04-29T04:21:18Z. If a `datetime` like object is provided, it is assumed to be in GMT time zone.

This option will limit the number of Solr cores that need to be searched for events that match the query.

This method is only available for Cb Response servers 6.0 and above. Calling this on a Query object connected to a Cb Response 5.x server will simply result in a no-op.

Parameters **v** (*str*) – Timestamp (either string or datetime object).

Returns Query object

Return type *ProcessQuery*

min_last_update(*v*)

Set the minimum last update time (relative to sensor) for this query. The timestamp can be expressed either as a `datetime` like object or as an ISO 8601 string formatted timestamp such as 2017-04-29T04:21:18Z. If a `datetime` like object is provided, it is assumed to be in GMT time zone.

This option will limit the number of Solr cores that need to be searched for events that match the query.

This method is only available for Cb Response servers 6.0 and above. Calling this on a Query object connected to a Cb Response 5.x server will simply result in a no-op.

Parameters **v** (*str*) – Timestamp (either string or datetime object).

Returns Query object

Return type *ProcessQuery*

use_comprehensive_search()

Set the *comprehensive_search* flag on the Process query.

Returns new Query object

Return type *ProcessQuery*

class cbapi.response.models.**ThreatReportQuery**(*doc_class*, *cb*, *query=None*, *raw_query=None*)

class cbapi.response.models.**AlertQuery**(*doc_class*, *cb*, *query=None*, *raw_query=None*)

5.1.3 Models

class cbapi.response.models.**Process**(*cb*, *procguid*, *segment=None*, *initial_data=None*, *force_init=False*, *suppressed_process=False*)

all_events

Returns a list of all events associated with this process across all segments, sorted by timestamp

Returns list of CbEvent objects

all_events_segment
Returns a list of all events associated with this process segment, sorted by timestamp

Returns list of CbEvent objects

binary
Joins this attribute with the *Binary* object associated with this Process object

Example

```
>>> process_obj = c.select(Process).where('process_name:svch0st.exe')[0]
>>> binary_obj = process_obj.binary
>>> print(binary_obj.signed)
False
```

childprocs
Generator that returns `CbChildProcEvent` objects associated with this process

children
Generator that returns `CbChildProcEvent` objects associated with this process

cmdline

Returns Returns the command line of the process

Return type string

comms_ip
Returns ascii representation of the ip address used to communicate with the Cb Response Server

crossprocs
Generator that returns `CbCrossProcEvent` objects associated with this process

depth
Returns the depth of this process from the "root" system process

Returns integer representing the depth of the process (0 is the root system process). To prevent infinite recursion, a maximum depth of 500 processes is enforced.

end
Returns the end time of the process (based on the last event received). If the process has not yet exited, "end" will return None.

Returns datetime object of the last event received for the process, if it has terminated. Otherwise, None.

filemods
Generator that returns `CbFileModEvent` objects associated with this process

find_file_writes (*filename*)
Returns a list of file writes with the specified filename

Parameters **filename** (*str*) – filename to match on file writes

Returns Returns a list of file writes with the specified filename

Return type list

interface_ip
Returns ascii representation of the ip address of the interface used to communicate with the Cb Response server. If using NAT, this will be the "internal" IP address of the sensor.

last_server_update
Returns a pretty version of when this process last updated

last_update
Returns a pretty version of when this process last updated

max_last_server_update
Returns a pretty version of the latest event in this process segment

max_last_update
Returns a pretty version of the latest event in this process segment

min_last_server_update
Returns a pretty version of the earliest event in this process segment

min_last_update
Returns a pretty version of the earliest event in this process segment

modloads
Generator that returns *:py:class:CbModLoadEvent* associated with this process

netconns
Generator that returns `CbNetConnEvent` objects associated with this process

parent
Returns the parent Process object if one exists

parent_md5
Workaround since parent_md5 silently disappeared in ~Cb Response 6.x

refresh()
Refresh the object from the Carbon Black server.

regmods
Generator that returns `CbRegModEvent` objects associated with this process

sensor
Joins this attribute with the *Sensor* object associated with this Process object

Example

```
>>> process_obj = c.select(Process).where('process_name:svch0st.exe')[0]
>>> sensor_obj = process.sensor
>>> print(sensor_obj.computer_dns_name)
hyperv-win7-x86
```

start
Returns the start time of the process

unsigned_modloads
Returns all unsigned module loads. This is useful to filter out all Microsoft signed DLLs

username
Returns the username of the owner of this process

walk_children(*callback*, *max_depth=0*, *depth=0*)
Walk down the execution chain while calling the specified callback function at each depth.

Example

```
>>> def proc_callback(parent_proc, depth):
...     print(parent_proc.cmdline, depth)
>>>
>>> process = c.select(Process).where('process_name:svch0st.exe')[0]
>>> process.walk_children(proc_callback, depth=2)
```

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```
(u'cmd.exe \c ipconfig', 2)
(u'cmd.exe \\c ipconfig', 2)
(u'cmd.exe /c ipconfig', 2)
(u'ipconfig', 3)
(u'cmd.exe /c ipconfig.exe /all', 2)
(u'cmd.exe \c ipconfig', 2)
(u'cmd.exe \\c ipconfig', 2)
(u'cmd.exe /c ipconfig', 2)
(u'ipconfig', 3)
(u'cmd.exe /c ipconfig.exe /all', 2)
```

Parameters

- **callback** (*func*) – Callback function used for execution at each depth. This function is executed with the parent process object and depth as parameters.
- **max_depth** (*int*) – Max number of iterations down the execution chain.
- **depth** (*int*) – Number of iterations down the execution chain

Returns None

walk_parents(*callback*, *max_depth=0*, *depth=0*)

Walk up the execution chain while calling the specified callback function at each depth.

Example

```
>>> def proc_callback(parent_proc, depth):
...     print(parent_proc.cmdline, depth)
>>>
>>> process = c.select(Process).where('process_name:ipconfig.exe')[0]
>>> process.walk_parents(proc_callback)
(u'cmd.exe /c ipconfig.exe', 0)
(u'c:\windows\carbonblack\cb.exe', 1)
(u'C:\Windows\system32\services.exe', 2)
(u'wininit.exe', 3)
(u'\SystemRoot\System32\smss.exe 00000000 00000040 ', 4)
(u'\SystemRoot\System32\smss.exe', 5)
(u'', 6)
```

Parameters

- **callback** (*func*) – Callback function used for execution at each depth. This function is executed with the parent process object and depth as parameters.
- **max_depth** (*int*) – Max number of iterations up the execution chain
- **depth** (*int*) – Number of iterations up the execution chain.

Returns None

webui_link

Returns the Cb Response Web UI link associated with this process

class cbapi.response.models.**Binary**(*cb*, *md5sum*, *initial_data=None*, *force_init=False*)

class FrequencyData

Class containing frequency information about a binary

Parameters

- **computer_count** (*int*) – Number of endpoints this binary resides
- **process_count** (*int*) – Number of executions
- **all_process_count** (*int*) – Number of all process documents
- **module_frequency** (*int*) – process_count / all_process_count

class SigningData

Class containing binary signing information

Parameters

- **result** (*str*) – Signed or Unsigned
- **publisher** (*str*) – Singnature publisher
- **issuer** (*str*) – Signature issuer
- **subject** (*str*) – Signing subject
- **sign_time** (*str*) – Binary signed time
- **program_name** (*str*) – Binary program name

class VersionInfo

Class containing versioning information about a binary

Parameters

- **file_desc** (*str*) – File description
- **file_version** (*str*) – File version
- **product_name** (*str*) – Product Name
- **product_version** (*str*) – Product version
- **company_name** (*str*) – Company Name
- **legal_copyright** (*str*) – Copyright
- **original_filename** (*str*) – Original File name of this binary

class VirusTotal

Class containing information associated with a Virus Total Score

Parameters

- **score** (*int*) – Virus Total score
- **link** (*str*) – Virus Total link for this md5

banned

Returns *BannedHash* object if this Binary's hash has been whitelisted (Banned), otherwise returns *False*

digsig_issuer

Returns the Digital Signature Issuer

digsig_prog_name

Returns the Digital Signature Program Name

digsig_publisher

Returns the Digital Signature Publisher

digsig_sign_time

Returns the Digital Signature signing time

digsig_subject
Returns the Digital Signature subject

endpoints
Return a list of endpoints this binary resides

file
Returns a file pointer to this binary

Example

```
>>> process_obj = c.select(Process).where("process_name:svch0st.exe").first()
>>> binary_obj = process_obj.binary
>>> print(binary_obj.file.read(2))
MZ
```

frequency
Returns *FrequencyData* information about the binary.

Example

```
>>> process_obj = c.select(Process).where('process_name:svch0st.exe').first()
>>> binary_obj = process_obj.binary
>>> print(binary_obj.frequency)
FrequencyData(computer_count=1, process_count=5, all_process_count=4429,␣
↪module_frequency=0.001128923007450892)
```

icon
Returns the raw icon of this Binary. This data is not encoded.

is_64bit
Returns True if the Binary is an AMD64 or x64 (64-bit) Executable

is_executable_image
Returns True if the Binary is executable

observed_filenames
Returns a list of all observed file names associated with this Binary

signed
Returns True if the binary is signed.

signing_data
Returns *SigningData* object which contains: Digital Signature Result, Digital Signature publisher, Issuer, Subject, Signing Time, Program Name

size
Returns the size of the Binary

version_info
Returns a *VersionInfo* object containing detailed information: File Descritpion, File Version, Product Name, Product Version, Company Name, Legal Copyright, and Original FileName

virustotal
Returns a *VirusTotal* object containing detailed Virus Total information about this binary.

webui_link
Returns the Cb Response Web UI link associated with this Binary object

class cbapi.response.models.**Sensor**(**args*, ***kwargs*)
Represents a Sensor object in the Carbon Black server.

class NetworkAdapter(*macaddr*, *ipaddr*)

ipaddr
Alias for field number 1

macaddr
Alias for field number 0

activity_stats
Returns a list of activity statistics from the associated Cb Response Sensor

dns_name
Returns the DNS name associated with this sensor object. This is the same as 'computer_dns_name'.

flush_events()
Performs a flush of events for this Cb Response Sensor

Warning This may cause a significant amount of network traffic from this sensor to the Cb Response Server

group

Getter

Returns the sensor's group id.

Setter

Allows access to set the sensor's group id

hostname
Returns the hostname associated with this sensor object. This is the same as 'computer_name'

isolate(*timeout=None*)
Turn on network isolation for this Cb Response Sensor.

This function will block and only return when the isolation is complete, or if a timeout is reached. By default, there is no timeout. You can specify a timeout period (in seconds) in the "timeout" parameter to this function. If a timeout is specified and reached before the sensor is confirmed isolated, then this function will throw a TimeoutError.

Returns True if sensor is isolated

Raises ***TimeoutError*** – if sensor does not isolate before timeout is reached

lr_session()
Retrieve a Live Response session object for this Sensor.

Returns Live Response session object

Return type `cbapi.live_response_api.LiveResponseSession`

Raises ***ApiError*** – if there is an error establishing a Live Response session for this Sensor

network_interfaces
Returns a list of networks adapters on the sensor

os
Returns the operating system display string of the sensor

queued_stats
Returns a list of status and size of the queued event logs from the associated Cb Response Sensor

Example

```
>>> sensor_obj = c.select(Sensor).where("ip:192.168").first()
>>> pprint.pprint(sensor_obj.queued_stats)
[{u'id': u'355509',
  u'num_eventlog_bytes': u'0',
  u'num_eventlogs': u'0',
  u'num_storefile_bytes': u'0',
  u'num_storefiles': 0,
  u'sensor_id': 1,
  u'timestamp': u'2016-10-17 19:08:09.645294-05:00'}]
```

resource_status
Returns a list of memory statistics used by the Cb Response Sensor

restart_sensor()
Restarts the Carbon Black sensor (*not* the underlying endpoint operating system).

This simply sets the flag to ask the sensor to restart the next time it checks into the Cb Response server, it does not wait for the sensor to restart.

sid
Security Identifier being used by the Cb Response Sensor

unisolate(*timeout=None*)
Turn off network isolation for this Cb Response Sensor.

This function will block and only return when the isolation is removed, or if a timeout is reached. By default, there is no timeout. You can specify a timeout period (in seconds) in the "timeout" parameter to this function. If a timeout is specified and reached before the sensor is confirmed unisolated, then this function will throw a TimeoutError.

Returns True if sensor is unisolated

Raises ***TimeoutError*** – if sensor does not unisolate before timeout is reached

webui_link
Returns the Cb Response Web UI link associated with this Sensor

class cbapi.response.models.**Feed**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)
Represents a Feed object in the Carbon Black server.

actions

Returns Returns all `FeedAction` objects associated with this feed

Return type `response.rest_api.Query`

search_binaries(*min_score=None*, *max_score=None*)
Perform a *Binary* search within this feed that satisfies min_score and max_score :param min_score: minimum feed score :param max_score: maximum feed score :return: Returns a `response.rest_api.Query` object within the appropriate search parameters for binaries :rtype: `response.rest_api.Query`

search_processes(*min_score=None*, *max_score=None*)
Perform a *Process* search within this feed that satisfies min_score and max_score

Parameters

- **min_score** – minimum feed score
- **max_score** – maximum feed score

Returns Returns a `response.rest_api.Query` object with the appropriate search parameters for processes

Return type `response.rest_api.Query`

class `cbapi.response.models.`**BannedHash**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a BannedHash object in the Carbon Black server.

binary

Joins this attribute with the *Binary* object associated with this Banned Hash object

class `cbapi.response.models.`**Watchlist**(**args*, ***kwargs*)

Represents a Watchlist object in the Carbon Black server.

Variables

- **index_type** – Index to search for this watchlist. Must be either 'events' (Processes) or 'modules' (Binaries)
- ***description*** – A description of the watchlist.
- **search_query** – URL encoded search query associated with this watchlist.

facets

Returns facets from the search associated with the watchlist query

Returns dictionary of facets as keys

Return type dict

query

Getter

Returns the query associated with this watchlist.

Setter

Allows access to set the query associated with this watchlist

search()

Creates a search based on the watchlist's search parameter

Returns a *Process* `response.rest_api.Query` or Binary `response.rest_api.Query`

Return type `response.rest_api.Query`

class `cbapi.response.models.`**Alert**(*cb*, *alert_id*, *initial_data=None*)

Represents a Alert object in the Carbon Black server.

5.1.4 Live Response

class `cbapi.live_response_api.`**CbLRSessionBase**(*cblr_manager*, *session_id*, *sensor_id*, *session_data=None*)

File Operations

`CbLRSessionBase.`**get_file**(*file_name*, *timeout=None*, *delay=None*)

Retrieve contents of the specified file name

Parameters **file_name** (*str*) – Name of the file

Returns Content of the specified file name

Return type str

CbLRSessionBase.**delete_file**(*filename*)
Delete the specified file name

Parameters **filename** (*str*) – Name of the file

Returns None

CbLRSessionBase.**put_file**(*infp*, *remote_filename*)
Create a new file on the remote endpoint with the specified data

Example

```
>>> with c.select(Sensor, 1).lr_session() as lr_session:
...     lr_session.put_file(open("test.txt", "rb"), r"c:        est.txt")
```

Parameters

- **infp** (*str*) – Python file-like containing data to upload to the remote endpoint
- **remote_filename** (*str*) – File name to create on the remote endpoint

Returns None

CbLRSessionBase.**list_directory**(*dir_name*)
List the contents of a directory

Example

```
>>> with c.select(Sensor, 1).lr_session() as lr_session:
...     pprint.pprint(lr_session.list_directory('C:\\temp\\'))
[{u'attributes': [u'DIRECTORY'],
  u'create_time': 1471897244,
  u'filename': u'.',
  u'last_access_time': 1476390670,
  u'last_write_time': 1476390670,
  u'size': 0},
 {u'attributes': [u'DIRECTORY'],
  u'create_time': 1471897244,
  u'filename': u'..',
  u'last_access_time': 1476390670,
  u'last_write_time': 1476390670,
  u'size': 0},
 {u'attributes': [u'ARCHIVE'],
  u'create_time': 1476390668,
  u'filename': u'test.txt',
  u'last_access_time': 1476390668,
  u'last_write_time': 1476390668,
  u'size': 0}]
```

Parameters **dir_name** (*str*) – Directory to list. This parameter should end with ‘’

Returns Returns a directory listing

Return type list

CbLRSessionBase.**create_directory**(*dir_name*)
Create a directory on the remote endpoint

Parameters **dir_name** (*str*) – New directory name

Returns None

CbLRSessionBase.**walk**(*top*, *topdown=True*, *onerror=None*, *followlinks=False*)

Perform a full directory walk with recursion into subdirectories

Example

```
>>> with c.select(Sensor, 1).lr_session() as lr_session:
...     for entry in lr_session.walk(directory_name):
...         print(entry)
('C:\temp\', [u'dir1', u'dir2'], [u'file1.txt'])
```

Parameters

- **top** (*str*) – Directory to recurse
- **topdown** (*bool*) – if True, start output from top level directory
- **onerror** (*bool*) – Callback if an error occurs. This function is called with one argument (the exception that occurred)
- **followlinks** (*bool*) – Follow symbolic links

Returns Returns output in the follow tuple format: (Directory Name, [dirnames], [filenames])

Return type tuple

Registry Operations

CbLRSessionBase.**get_registry_value**(*regkey*)

Returns the associated value of the specified registry key

Example

```
>>> with c.select(Sensor, 1).lr_session() as lr_session:
>>>     pprint.pprint(lr_session.get_registry_value(
↪'HKLM\SYSTEM\CurrentControlSet\services\ACPI\Start'))
{u'value_data': 0, u'value_name': u'Start', u'value_type': u'REG_DWORD'}
```

Parameters **regkey** (*str*) – The registry key to retrieve

Returns Returns a dictionary with keys of: value_data, value_name, value_type

Return type dict

CbLRSessionBase.**set_registry_value**(*regkey*, *value*, *overwrite=True*, *value_type=None*)

Set a registry value of the specified registry key

Example

```
>>> with c.select(Sensor, 1).lr_session() as lr_session:
...     lr_session.set_registry_value(
↪'HKLM\\SYSTEM\\CurrentControlSet\\services\\ACPI\\testvalue', 1)
```

Parameters

- **regkey** (*str*) – They registry key to set
- **value** (*obj*) – The value data

- **overwrite** (*bool*) – Overwrite value if True
- **value_type** (*str*) – The type of value. Examples: REG_DWORD, REG_MULTI_SZ, REG_SZ

Returns None

CbLRSessionBase.**delete_registry_value**(*regkey*)
Delete a registry value

Parameters **regkey** (*str*) – the registry value to delete

Returns None

CbLRSessionBase.**create_registry_key**(*regkey*)
Create a new registry

Parameters **regkey** (*str*) – The registry key to create

Returns None

CbLRSessionBase.**delete_registry_key**(*regkey*)
Delete a registry key

Parameters **regkey** (*str*) – The registry key to delete

Returns None

CbLRSessionBase.**list_registry_keys_and_values**(*regkey*)
Enumerate subkeys and values of the specified registry key.

Example

```
>>> with c.select(Sensor, 1).lr_session() as lr_session:
>>>     pprint.pprint(lr_session.list_registry_keys_and_values(
↪'HKLM\SYSTEM\CurrentControlSet\services\ACPI'))
{'sub_keys': [u'Parameters', u'Enum'],
 'values': [{u'value_data': 0,
             u'value_name': u'Start',
             u'value_type': u'REG_DWORD'},
            {u'value_data': 1,
             u'value_name': u'Type',
             u'value_type': u'REG_DWORD'},
            {u'value_data': 3,
             u'value_name': u'ErrorControl',
             u'value_type': u'REG_DWORD'},
            {u'value_data': u'system32\drivers\ACPI.sys',
             u'value_name': u'ImagePath',
             u'value_type': u'REG_EXPAND_SZ'},
            {u'value_data': u'Microsoft ACPI Driver',
             u'value_name': u'DisplayName',
             u'value_type': u'REG_SZ'},
            {u'value_data': u'Boot Bus Extender',
             u'value_name': u'Group',
             u'value_type': u'REG_SZ'},
            {u'value_data': u'acpi.inf_x86_neutral_ddd3c514822f1b21',
             u'value_name': u'DriverPackageId',
             u'value_type': u'REG_SZ'},
            {u'value_data': 1,
             u'value_name': u'Tag',
             u'value_type': u'REG_DWORD'}]}
```

Parameters **regkey** (*str*) – The registry key to enumerate

Returns returns a dictionary with 2 keys (sub_keys and values)

Return type dict

CbLRSessionBase.**list_registry_keys**(*regkey*)

Enumerate all registry values from the specified registry key.

Parameters **regkey** – The registry key to enumearte

Returns returns a list of values

Return type list

Process Operations

CbLRSessionBase.**kill_process**(*pid*)

Terminate a process on the remote endpoint

Parameters **pid** – Process ID to terminate

Returns True if success, False if failure

Return type bool

CbLRSessionBase.**create_process**(*command_string*, *wait_for_output=True*, *remote_output_file_name=None*, *working_directory=None*, *wait_timeout=30*, *wait_for_completion=True*)

Create a new process with the specified command string.

Example

```
>>> with c.select(Sensor, 1).lr_session() as lr_session:
...     print(lr_session.create_process(r'cmd.exe /c "ping.exe 192.168.1.1"'))
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
```

Parameters

- **command_string** (*str*) – command string used for the create process operation
- **wait_for_output** (*bool*) – Block on output from the new process (execute in foreground). This will also set wait_for_completion (below).
- **remote_output_file_name** (*str*) – The remote output file name used for process output
- **working_directory** (*str*) – The working directory of the create process operation
- **wait_timeout** (*int*) – Time out used for this live response command
- **wait_for_completion** (*bool*) – Wait until the process is completed before returning

Returns returns the output of the command string

Return type str

CbLRSessionBase.**list_processes**()

List currently running processes

Example

```
>>> with c.select(Sensor, 1).lr_session() as lr_session:
...     print(lr_session.list_processes()[0])
{u'command_line': u'',
 u'create_time': 1476260500,
 u'parent': 0,
 u'parent_guid': u'00000001-0000-0000-0000-000000000000',
 u'path': u'',
 u'pid': 4,
 u'proc_guid': u'00000001-0000-0004-01d2-2461a85e4546',
 u'sid': u's-1-5-18',
 u'username': u'NT AUTHORITY\SYSTEM'}
```

Returns returns a list of running processes

Return type list

5.2 Cb Protection API

This page documents the public interfaces exposed by cbapi when communicating with a Carbon Black Enterprise Protection server.

5.2.1 Main Interface

To use cbapi with Carbon Black Protection, you will be using the CbProtectionAPI. The CbProtectionAPI object then exposes two main methods to select data on the Carbon Black server:

class cbapi.protection.rest_api.**CbProtectionAPI**(**args*, ***kwargs*)

The main entry point into the Carbon Black Enterprise Protection API.

Parameters **profile** (*str*) – (optional) Use the credentials in the named profile when connecting to the Carbon Black server. Uses the profile named 'default' when not specified.

Usage:

```
>>> from cbapi import CbEnterpriseProtectionAPI
>>> cb = CbEnterpriseProtectionAPI(profile="production")
```

create(*cls*, *data=None*)

Creates a new object.

Parameters **cls** (*class*) – The Model class (only some models can be created, for example, Feed, Notification, . . .)

Returns An empty instance of the Model class

Raises ***ApiError*** – if the Model cannot be created

select(*cls*, *unique_id=None*, **args*, ***kwargs*)

Prepares a query against the Carbon Black data store.

Parameters

- **cls** (*class*) – The Model class (for example, Computer, Process, Binary, FileInstance) to query
- **unique_id** – (optional) The unique id of the object to retrieve, to retrieve a single object by ID

Returns An instance of the Model class if a unique_id is provided, otherwise a Query object

5.2.2 Queries

class cbapi.protection.rest_api.**Query**(*doc_class*, *cb*, *query=None*)

Represents a prepared query to the Carbon Black Enterprise Protection server.

This object is returned as part of a `CbEnterpriseProtectionAPI.select()` operation on models requested from the Carbon Black Enterprise Protection server. You should not have to create this class yourself.

The query is not executed on the server until it's accessed, either as an iterator (where it will generate values on demand as they're requested) or as a list (where it will retrieve the entire result set and save to a list). You can also call the Python built-in `len()` on this object to retrieve the total number of items matching the query.

The syntax for query :py:meth:where and :py:meth:sort methods can be found in the Enterprise Protection API reference posted on the Carbon Black Developer Network website.

Examples:

```
>>> from cbapi.protection import CbEnterpriseProtectionAPI, Computer
>>> cb = CbEnterpriseProtectionAPI()
>>> query = cb.select(Computer)                        # returns a Query object␣
↪matching all Computers
>>> query = query.where("ipAddress:10.201.2.*")        # add a filter to this Query
>>> query = query.sort("processorSpeed DESC")          # sort by computer processor␣
↪speed, descending
>>> for comp in query:                                 # uses the iterator to␣
↪retrieve all results
>>>     print(comp.name)
>>> comps = query[:10]                                 # retrieve the first ten␣
↪results
>>> len(query)                                         # retrieve the total count
```

Notes:

- The slicing operator only supports start and end parameters, but not step. `[1:-1]` is legal, but `[1:2:-1]` is not.
- You can chain where clauses together to create AND queries; only objects that match all `where` clauses will be returned.

and_(*q*)

Add a filter to this query. Equivalent to calling *where()* on this object.

Parameters **q** (*str*) – Query string - see the Enterprise Protection API reference.

Returns Query object

Return type *Query*

sort(*new_sort*)

Set the sort order for this query.

Parameters **new_sort** (*str*) – Sort order - see the Enterprise Protection API reference.

Returns Query object

Return type *Query*

where(*q*)

Add a filter to this query.

Parameters **q** (*str*) – Query string - see the Enterprise Protection API reference.

Returns Query object

Return type *Query*

5.2.3 Models

class cbapi.protection.models.**ApprovalRequest**(*cb*, *model_unique_id*, *initial_data=None*)

ResolutionApproved = 2

ResolutionInstaller = 4

ResolutionNotResolved = 0

ResolutionOther = 7

ResolutionPublisher = 6

ResolutionRejected = 1

ResolutionRuleChange = 3

ResolutionUpdater = 5

StatusClosed = 3

StatusOpen = 2

StatusSubmitted = 1

computer

fileCatalog

installerFileCatalog

processFileCatalog

urlobject = '/api/bit9platform/v1/approvalRequest'

class cbapi.protection.models.**Certificate**(*cb*, *model_unique_id*, *initial_data=None*)

StateApproved = 2

StateBanned = 3

StateMixed = 4

StateUnapproved = 1

firstSeenComputer

parent

publisher

urlobject = '/api/bit9platform/v1/certificate'

class cbapi.protection.models.**Computer**(*cb*, *model_unique_id*, *initial_data=None*)

Represents a Computer object in the Carbon Black server.

fileInstances

policy

resetCLIPassword()

templateComputer

urlobject = '/api/bit9platform/v1/computer'

class cbapi.protection.models.**Connector**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a Connector object in the Carbon Black server.

Variables

- ***analysisName*** – Name for analysis component of the connector (can be same as the name field)
- ***analysisEnabled*** – True if analysis component of this connector is enabled
- ***analysisTargets*** – Array of possible analysis targets. Analysis targets are required when creating new fileAnalysis. They usualy represent different OS and configurations and are available only for some internal connectors.
- ***id*** – Unique connector Id
- ***connectorVersion*** – Version of this connector
- ***name*** – Name of the connector. Note that only non-internal connectors can be renamed
- ***isInternal*** – True if this is internal connector
- ***canAnalyze*** – True if this connector can analyze files
- ***enabled*** – True if connector is enabled

analysisEnabled = None

analysisName = None

analysisTargets = []

canAnalyze = None

connectorVersion = None

enabled = None

id = None

isInternal = None

name = None

pendingAnalyses

urlobject = '/api/bit9platform/v1/connector'

class cbapi.protection.models.**DriftReport**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a DriftReport object in the Carbon Black server.

urlobject = '/api/bit9platform/v1/driftReport'

class cbapi.protection.models.**DriftReportContents**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a DriftReportContents object in the Carbon Black server.

urlobject = '/api/bit9platform/v1/driftReportContents'

class cbapi.protection.models.**EnforcementLevel**

LevelHigh = 20

LevelLow = 40

LevelMedium = 30

LevelNone = 80

class cbapi.protection.models.**Event**(*cb*, *model_unique_id*, *initial_data=None*)
Represents a Event object in the Carbon Black server.

fileCatalog

urlobject = '/api/bit9platform/v1/event'

class cbapi.protection.models.**FileAnalysis**(*cb*, *model_unique_id*, *initial_data=None*)

urlobject = '/api/bit9platform/v1/fileAnalysis'

class cbapi.protection.models.**FileCatalog**(*cb*, *model_unique_id*, *initial_data=None*)
Represents a FileCatalog object in the Carbon Black server.

certificate

computer

fileHash

publisher

urlobject = '/api/bit9platform/v1/fileCatalog'

class cbapi.protection.models.**FileInstance**(*cb*, *model_unique_id*, *initial_data=None*)
Represents a FileInstance object in the Carbon Black server.

computer

fileCatalog

urlobject = '/api/bit9platform/v1/fileInstance'

class cbapi.protection.models.**FileInstanceDeleted**(*cb*, *model_unique_id*, *initial_data=None*)

urlobject = '/api/bit9platform/v1/fileInstanceDeleted'

class cbapi.protection.models.**FileInstanceGroup**(*cb*, *model_unique_id*, *initial_data=None*)

urlobject = '/api/bit9platform/v1/fileInstanceGroup'

class cbapi.protection.models.**FileRule**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)
Represents a FileRule object in the Carbon Black server.

Variables

- ***version*** – Version of this file rule
- ***platformFlags*** – Set of platform flags where this file rule will be valid. combination of: 1 = Windows 2 = Mac 4 = Linux
- ***createdBy*** – User that created this object

- ***modifiedByUserId*** – Id of user that last modified this object
- ***createdByUserId*** – Id of user that created this object
- ***name*** – Name of this rule.
- ***unifiedSource*** – Unified server name that created this rule
- ***hash*** – Hash associated with this rule. Note that hash will be available only if rule was created through md5 or sha-1 hash. If rule was created through fileName, fileCatalogId or sha-256 hash that exists in the catalog, this field will be empty.
- ***origIdUnique*** – Unique GUID of the original rule
- ***lazyApproval*** – This filed is valid only when creating approvals. When set to true, it will cause approval to be sent to agent only if file is marked as installer or if it blocked on any agent. This is useful when proactively creating lot of approvals that might or might not be required, since it is using less resources. Note that, as soone as lazy approval is sent to agents, this field will changed to 'false'.
- ***dateModified*** – Date/time when this object was last modified (UTC)
- ***sourceType*** – Mechanism that created this rule. Can be one of: 1 = Manual 2 = Trusted Directory 3 = Reputation 4 = Imported 5 = External (API) 6 = Event Rule 7 = Application Template 8 = Unified Management
- ***fileCatalogId*** – Id of fileCatalog entry associated with this fileRule. Can be null if file hasn't been seen on any endpoints yet. This is foreign key and can be expanded to expose fields from the related fileCatalog object
- ***description*** – Description of this rule.
- ***modifiedBy*** – User that last modified this object
- ***visible*** – If rule should be visible in the UI or not
- ***reputationApprovalsEnabled*** – True if reputation approvals are enabled for this file
- ***fileState*** – File state for this rule. Can be one of: 1=Unapproved 2=Approved 3=Banned
- ***forceNotInstaller*** – True if this file is forced to act as 'not installer', even if product detected it as installer
- ***unifiedFlag*** – Local override flag for unified rule (0 - if rule is not unified, 1 - no override allowed, 3 - local override allowed)
- ***sourceId*** – Id of source of this rule. Can be event rule id or trusted directory id
- ***id*** – Unique id of this fileRule
- ***forceInstaller*** – True if this file is forced to act as installer, even if product detected it as 'not installer'
- ***reportOnly*** – True if this has a report-only ban
- ***fileRuleType*** – Text description of file rule type
- ***dateCreated*** – Date/time when this rule was created (UTC)
- ***clVersion*** – CL version associated with this file rule
- ***policyIds*** – List of IDs of policies where this rule applies. Value will be empty if this is a global rule

- ***fileName*** – File name associated with this rule. Note that file name will be available only if rule was created through file name. If rule was created through fileCatalogId or hash, this field will be empty.
- ***idUnique*** – Unique GUID of this rule

```
PlatformLinux = 4
PlatformMac = 2
PlatformWindows = 1
SourceTypeApplicationTemplate = 7
SourceTypeEventRule = 6
SourceTypeExternal = 5
SourceTypeImported = 4
SourceTypeManual = 1
SourceTypeReputation = 3
SourceTypeTrustedDirectory = 2
SourceTypeUnifiedManagement = 8
StateApproved = 2
StateBanned = 3
StateUnapproved = 1
clVersion = None
createdBy = None
createdByUser
createdByUserId = None
dateCreated = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
dateModified = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
description = None
fileCatalog
fileCatalogId = None
fileName = None
fileRuleType = None
fileState = None
forceInstaller = None
forceNotInstaller = None
hash = None
id = None
idUnique = None
lazyApproval = None
modifiedBy = None
```

```
    modifiedByUserId = None
    name = None
    origIdUnique = None
    platformFlags = None
    policyIds = None
    reportOnly = None
    reputationApprovalsEnabled = None
    sourceId = None
    sourceType = None
    unifiedFlag = None
    unifiedSource = None
    urlobject = '/api/bit9platform/v1/fileRule'
    version = None
    visible = None
```

class cbapi.protection.models.**FileUpload**(*cb*, *model_unique_id*, *initial_data=None*)

```
    file
    urlobject = '/api/bit9platform/v1/fileUpload'
```

class cbapi.protection.models.**GrantedUserPolicyPermission**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a GrantedUserPolicyPermission object in the Carbon Black server.

```
    urlobject = '/api/bit9platform/v1/grantedUserPolicyPermission'
```

class cbapi.protection.models.**InternalEvent**(*cb*, *model_unique_id*, *initial_data=None*)

```
    urlobject = '/api/bit9platform/v1/internalEvent'
```

class cbapi.protection.models.**MeteredExecution**(*cb*, *model_unique_id*, *initial_data=None*)

```
    urlobject = '/api/bit9platform/v1/meteredExecution'
```

class cbapi.protection.models.**Notification**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a Notification object in the Carbon Black server.

Variables

- ***time*** – Date/time of the notification (UTC)
- ***connectorId*** – Id of connector object that sent the notification
- ***fileAnalysisId*** – Id of fileAnalysis object associated with the notification. This should be available if notification came as a result of the file analysis

- ***analysisResult*** – Analysis result. Can be one of: 0 = Unknown, 1 = Not malicious, 2 = Potential risk, 3 = Malicious

```
ResultClean = 1
ResultMalicious = 3
ResultNotAvailable = 0
ResultPotentialThreat = 2
analysisResult = None
anomaly = None
appliance = None
connectorId = None
destIp = None
destUsername = None
directories = []
externalId = None
externalUrl = None
fileAnalysisId = None
fileName = None
files = []
flags = None
httpHeader = None
malwareName = None
malwareType = None
md5 = None
msgFormat = None
product = None
regKeys = []
severity = None
sha1 = None
sha256 = None
srcHost = None
srcIp = None
srcUsername = None
status = None
targetApp = None
targetOS = None
time = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
```

type = None

urlobject = '/api/bit9platform/v1/notification'

version = None

class cbapi.protection.models.**Notifier**(*cb*, *model_unique_id*, *initial_data=None*)

urlobject = '/api/bit9platform/v1/notifier'

class cbapi.protection.models.**PendingAnalysis**(*cb*, *model_unique_id*, *initial_data=None*)

ResultClean = 1

ResultMalicious = 3

ResultNotAvailable = 0

ResultPotentialThreat = 2

StatusAnalyzed = 3

StatusCancelled = 5

StatusError = 4

StatusProcessed = 2

StatusScheduled = 0

StatusSubmitted = 1

create_notification(***kwargs*)

file

fileCatalog

fileHash

urlobject = '/api/bit9platform/v1/pendingAnalysis'

class cbapi.protection.models.**Policy**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a Policy object in the Carbon Black server.

Variables

- ***disconnectedEnforcementLevel*** – Target enforcement level for disconnected computers. Can be one of: 20=High (Block Unapproved) 30=Medium (Prompt Unapproved) 40=Low (Monitor Unapproved) 60=None (Visibility) 80=None (Disabled)
- ***totalComputers*** – Total number of computers in this policy
- ***allowAgentUpgrades*** – True if agents can be upgraded for this policy
- ***modifiedByUserId*** – Id of user that last modified this object
- ***createdByUserId*** – Id of user that created this object
- ***atEnforcementComputers*** – Number of computers that are at target enforcement level in this policy
- ***readOnly*** – True if this policy is read-only
- ***reputationEnabled*** – True if reputation approvals are enabled in this policy
- ***packageName*** – Name of installer package for this policy

- ***name*** – Name of this policy.
- ***enforcementLevel*** – Target enforcement level. Can be one of: 20=High (Block Unapproved) 30=Medium (Prompt Unapproved) 40=Low (Monitor Unapproved) 60=None (Visibility) 80=None (Disabled)
- ***description*** – Description of this policy.
- ***helpDeskUrl*** – Helpdesk URL for notifiers in this policy
- ***dateCreated*** – Date/time when this rule was created (UTC)
- ***automaticApprovalsOnTransition*** – True if agents in this policy will automatically locally approve files when transitioning into High Enforcement
- ***customLogo*** – True if notifiers in this policy use custom logo
- ***id*** – Unique id of this policy
- ***loadAgentInSafeMode*** – True if agents in this policy will be loaded when machine is booted in 'safe mode'
- ***automatic*** – True if AD mapping is enabled for this policy
- ***hidden*** – True if this policy is hidden in the UI
- ***clVersionMax*** – Max target CL version for agents in this policy
- ***fileTrackingEnabled*** – True if file tracking enabled in this policy
- ***dateModified*** – Date/time when this object was last modified (UTC)
- ***imageUrl*** – Image logo URL for notifiers in this policy
- ***connectedComputers*** – Number of connected computers in this policy

```
allowAgentUpgrades = None
atEnforcementComputers = None
automatic = None
automaticApprovalsOnTransition = None
clVersionMax = None
connectedComputers = None
createdByUserId = None
customLogo = None
dateCreated = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
dateModified = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
description = None
disconnectedEnforcementLevel = None
enforcementLevel = None
fileTrackingEnabled = None
helpDeskUrl = None
hidden = None
id = None
```

imageUrl = None

loadAgentInSafeMode = None

modifiedByUserId = None

name = None

packageName = None

readOnly = None

reputationEnabled = None

totalComputers = None

urlobject = '/api/bit9platform/v1/policy'

class cbapi.protection.models.**Publisher**(*cb*, *model_unique_id*, *initial_data=None*)

urlobject = '/api/bit9platform/v1/publisher'

class cbapi.protection.models.**PublisherCertificate**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a PublisherCertificate object in the Carbon Black server.

urlobject = '/api/bit9platform/v1/publisherCertificate'

class cbapi.protection.models.**ScriptRule**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a ScriptRule object in the Carbon Black server.

urlobject = '/api/bit9platform/v1/scriptRule'

class cbapi.protection.models.**ServerConfig**(*cb*, *model_unique_id*, *initial_data=None*)

urlobject = '/api/bit9platform/v1/serverConfig'

class cbapi.protection.models.**ServerPerformance**(*cb*, *model_unique_id*, *initial_data=None*)

urlobject = '/api/bit9platform/v1/serverPerformance'

class cbapi.protection.models.**TrustedDirectory**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a TrustedDirectory object in the Carbon Black server.

urlobject = '/api/bit9platform/v1/trustedDirectory'

class cbapi.protection.models.**TrustedUser**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a TrustedUser object in the Carbon Black server.

Variables

- ***dateCreated*** – Date/time when this object was created (UTC)
- ***createdBy*** – User that created this object
- ***modifiedByUserId*** – Id of user that last modified this object. This is foreign key and can be expanded to expose fields from the related user object

- ***createdByUserId*** – Id of user that created this object. This is foreign key and can be expanded to expose fields from the related user object
- ***userSid*** – Id of the user that will be trusted on the endpoint. This field can be user name, user SID (Security identifier) on Windows platforms or user's ID on Linux and Mac platforms
- ***id*** – Unique id of this trustedUser
- ***name*** – Name of the user as it will appear on the console. This is not the name that will be enforced on the endpoint
- ***dateModified*** – Date/time when this object was last modified (UTC)
- ***platformId*** – Platform where this trustedUser will be valid. it is one of: 1 = Windows, 2 = Mac, 4 = Linux
- ***clVersion*** – CL version associated with this trustedUser
- ***modifiedBy*** – User that last modified this object
- ***description*** – Description of this rule

```
clVersion = None
createdBy = None
createdByUserId = None
dateCreated = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
dateModified = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
description = None
id = None
modifiedBy = None
modifiedByUserId = None
name = None
platformId = None
urlobject = '/api/bit9platform/v1/trustedUser'
userSid = None
```

class cbapi.protection.models.**Updater**(*cb*, *model_unique_id*, *initial_data=None*)

```
urlobject = '/api/bit9platform/v1/updater'
```

class cbapi.protection.models.**User**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a User object in the Carbon Black server.

Variables

- ***apiToken*** – API token for this user
- ***department*** – Department this user belongs to
- ***cellPhone*** – User's cell phone
- ***adminComments*** – Administrator's comments for this user

- ***unified*** – True if this user's token is already connected to a remote unified environment (token should not be changed)
- ***backupPager*** – User's secondary pager number
- ***salutation*** – Salutation of this user
- ***readOnly*** – True if this user is one of internal users (System or Cb Collective Defense Cloud Service) or AD user. These users cannot be modified through the API
- ***name*** – Name of the user
- ***userGroupIds*** – Comma-separated list of IDs of corresponding userGroup objects
- ***external*** – True if this is externally generated user (e.g. from AD)
- ***title*** – Title of this user
- ***id*** – Unique id of this user
- ***backupCellPhone*** – User's secondary cell phone
- ***registrationDate*** – Date this user was first registered (UTC)
- ***firstName*** – First name of this user
- ***automatic*** – True if this user's roles are assigned automatically through mappings (valid only for external users)
- ***eMailAddress*** – EMail address of this user
- ***passwordSalt*** – Salt used to generate password hash
- ***passwordHash*** – Hash of user password
- ***homePhone*** – User's home phone
- ***comments*** – Comments for this user
- ***pager*** – User's pager number
- ***lastName*** – Last name of this user
- ***enabled*** – True if this user is enabled

adminComments = None

apiToken = None

automatic = None

backupCellPhone = None

backupPager = None

cellPhone = None

comments = None

department = None

eMailAddress = None

enabled = None

external = None

firstName = None

homePhone = None

```
id = None
lastName = None
name = None
pager = None
passwordHash = None
passwordSalt = None
readOnly = None
registrationDate = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
salutation = None
title = None
unified = None
urlobject = '/api/bit9platform/v1/user'
userGroupIds = None
```

class cbapi.protection.models.**UserGroup**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=False*)

Represents a UserGroup object in the Carbon Black server.

Variables

- ***dateCreated*** – Date/time when this object was created (UTC)
- ***permissions*** – Permissions associated with users of this user group as a hexadecimal string. See https://developer.carbonblack.com/reference/enterprise-protection/8.0/rest-api/#usergroup for more information.
- ***modifiedByUserId*** – Id of user that last modified this object. This is foreign key and can be expanded to expose fields from the related user object
- ***createdByUserId*** – Id of user that created this object. This is foreign key and can be expanded to expose fields from the related user object
- ***automaticCount*** – Number of users that belong to this group and have been assigned through AD rule (doesn't include internal users)
- ***id*** – Unique id of this user group
- ***editable*** – True if this userGroup is editable
- ***name*** – Name of the user group
- ***manualCount*** – Number of users that belong to this group and have been assigned manually (doesn't include internal users)
- ***dateModified*** – Date/time when this object was last modified (UTC)
- ***createdBy*** – User that created this object
- ***policyIds*** – List of IDs of policies where this user group applies. Value will be empty if this is a global user group
- ***modifiedBy*** – User that last modified this object
- ***description*** – Description of this user group
- ***enabled*** – True if this userGroup is enabled

```
automaticCount = None
createdBy = None
createdByUserId = None
dateCreated = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
dateModified = datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzlocal())
description = None
editable = None
enabled = None
id = None
manualCount = None
modifiedBy = None
modifiedByUserId = None
name = None
permissions = None
policyIds = None
urlobject = '/api/bit9platform/v1/userGroup'
```

5.3 Cb Defense API

This page documents the public interfaces exposed by cbapi when communicating with a Cb Defense server.

5.3.1 Main Interface

To use cbapi with Carbon Black Defense, you will be using the CbDefenseAPI. The CbDefenseAPI object then exposes two main methods to select data on the Carbon Black server:

5.3.2 Queries

5.3.3 Models

5.4 Cb ThreatHunter API

This page documents the public interfaces exposed by cbapi when communicating with a Carbon Black PSC ThreatHunter server.

5.4.1 Main Interface

To use cbapi with Carbon Black ThreatHunter, you use CbThreatHunterAPI objects. These objects expose two main methods to access data on the ThreatHunter server: `select` and `create`.

class cbapi.psc.threathunter.rest_api.**CbThreatHunterAPI**(**args*, ***kwargs*)

The main entry point into the Cb ThreatHunter PSC API.

Parameters **profile** (*str*) – (optional) Use the credentials in the named profile when connecting to the Carbon Black server. Uses the profile named 'default' when not specified.

Usage:

```
>>> from cbapi.psc.threathunter import CbThreatHunterAPI
>>> cb = CbThreatHunterAPI(profile="production")
```

create(*cls*, *data=None*)
Creates a new object.

Parameters **cls** (*class*) – The Model class (only some models can be created, for example, Feed, Notification, . . .)

Returns An empty instance of the Model class

Raises ***ApiError*** – if the Model cannot be created

limits()
Returns a dictionary containing API limiting information.

Example:

```
>>> cb.limits()
{u'status_code': 200, u'time_bounds': {u'upper': 1545335070095, u'lower':␣
↪1542779216139}}
```

Returns a dict of limiting information

Return type dict(str, str)

queries()
Retrieves a list of queries, active or complete, known by the ThreatHunter server.

Returns a list of query ids

Return type list(str)

select(*cls*, *unique_id=None*, **args*, ***kwargs*)
Prepares a query against the Carbon Black data store.

Parameters

- **cls** (*class*) – The Model class (for example, Computer, Process, Binary, FileInstance) to query
- **unique_id** – (optional) The unique id of the object to retrieve, to retrieve a single object by ID

Returns An instance of the Model class if a unique_id is provided, otherwise a Query object

5.4.2 Queries

The ThreatHunter API uses QueryBuilder instances to construct structured or unstructured (i.e., raw string) queries. You can either construct these instances manually, or allow `CbThreatHunterAPI.select()` to do it for you:

class cbapi.psc.threathunter.query.**QueryBuilder**(***kwargs*)
Provides a flexible interface for building prepared queries for the CB ThreatHunter backend.

This object can be instantiated directly, or can be managed implicitly through the `CbThreatHunterAPI.select()` API.

Examples:

```
>>> from cbapi.psc.threathunter import QueryBuilder
>>> # build a query with chaining
>>> query = QueryBuilder().where(process_name="malicious.exe").and_(device_name=
↪"suspect")
>>> # start with an initial query, and chain another condition to it
>>> query = QueryBuilder(device_os="WINDOWS").or_(process_username="root")
```

and_(*q*, ***kwargs*)
Adds a conjunctive filter to a query.

Parameters

- **q** – string or *solrq.Q* object
- **kwargs** – Arguments to construct a *solrq.Q* with

Returns QueryBuilder object

Return type *QueryBuilder*

not_(*q*, ***kwargs*)
Adds a negative filter to a query.

Parameters

- **q** – *solrq.Q* object
- **kwargs** – Arguments to construct a *solrq.Q* with

Returns QueryBuilder object

Return type *QueryBuilder*

or_(*q*, ***kwargs*)
Adds a disjunctive filter to a query.

Parameters

- **q** – *solrq.Q* object
- **kwargs** – Arguments to construct a *solrq.Q* with

Returns QueryBuilder object

Return type *QueryBuilder*

where(*q*, ***kwargs*)
Adds a conjunctive filter to a query.

Parameters

- **q** – string or *solrq.Q* object
- **kwargs** – Arguments to construct a *solrq.Q* with

Returns QueryBuilder object

Return type *QueryBuilder*

class cbapi.psc.threathunter.query.**Query**(*doc_class*, *cb*)
Represents a prepared query to the Cb ThreatHunter backend.

This object is returned as part of a `CbThreatHunterPI.select()` operation on models requested from the Cb ThreatHunter backend. You should not have to create this class yourself.

The query is not executed on the server until it's accessed, either as an iterator (where it will generate values on demand as they're requested) or as a list (where it will retrieve the entire result set and save to a list). You can also call the Python built-in `len()` on this object to retrieve the total number of items matching the query.

Examples:

```
>>> from cbapi.psc.threathunter import CbThreatHunterAPI
>>> cb = CbThreatHunterAPI()
>>> query = cb.select(Process)
>>> query = query.where(process_name="notepad.exe")
>>> # alternatively:
>>> query = query.where("process_name:notepad.exe")
```

Notes:

- The slicing operator only supports start and end parameters, but not step. `[1:-1]` is legal, but `[1:2:-1]` is not.
- You can chain where clauses together to create AND queries; only objects that match all `where` clauses will be returned.

and_(*q=None*, ***kwargs*)
Add a conjunctive filter to this query.

Parameters

- **q** – Query string or *solrq.Q* object
- **kwargs** – Arguments to construct a *solrq.Q* with

Returns Query object

Return type *Query*

not_(*q=None*, ***kwargs*)
Adds a negated filter to this query.

Parameters

- **q** – *solrq.Q* object
- **kwargs** – Arguments to construct a *solrq.Q* with

Returns Query object

Return type *Query*

or_(*q=None*, ***kwargs*)
Add a disjunctive filter to this query.

Parameters

- **q** – *solrq.Q* object
- **kwargs** – Arguments to construct a *solrq.Q* with

Returns Query object

Return type *Query*

where(*q=None*, ***kwargs*)
Add a filter to this query.

Parameters

- **q** – Query string, *QueryBuilder*, or *solrq.Q* object

- **kwargs** – Arguments to construct a *solrq.Q* with

Returns Query object

Return type *Query*

class cbapi.psc.threathunter.models.**AsyncProcessQuery**(*doc_class*, *cb*)

Represents the query logic for an asychronous Process query.

This class specializes `Query` to handle the particulars of process querying.

timeout(*msecs*)

Sets the timeout on a process query.

Example:

```
>>> cb.select(Process).where(process_name="foo.exe").timeout(5000)
```

Param msecs: the timeout duration, in milliseconds

Returns AsyncProcessQuery object

Return type *AsyncProcessQuery*

5.4.3 Models

class cbapi.psc.threathunter.models.**Process**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=True*)

Represents a Process object in the Carbon Black server.

children

Returns a list of child processes for this process.

Returns Returns a list of process objects

Return type list of *Process*

events(***kwargs*)

Returns a query for events associated with this process's process GUID.

Parameters **kwargs** – Arguments to filter the event query with.

Returns Returns a Query object with the appropriate search parameters for events

Return type *cbapi.psc.threathunter.query.Query*

Example:

```
>>> [print(event) for event in process.events()]
>>> [print(event) for event in process.events(event_type="modload")]
```

parents

Returns a query for parent processes associated with this process.

Returns Returns a Query object with the appropriate search parameters for parent processes, or None if the process has no recorded parent

Return type `cbapi.psc.threathunter.query.AsyncProcessQuery` or None

process_md5

Returns a string representation of the MD5 hash for this process.

Returns A string representation of the process's MD5.

Return type str

process_pids
Returns a list of PIDs associated with this process.

Returns A list of PIDs

Return type list of ints

process_sha256
Returns a string representation of the SHA256 hash for this process.

Returns A string representation of the process's SHA256.

Return type str

tree()
Returns a *Tree* of children (and possibly siblings) associated with this process.

Returns Returns a *Tree* object

Return type *Tree*

Example:

```
>>> tree = process.tree()
```

class cbapi.psc.threathunter.models.**Event**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=True*)
Represents a Event object in the Carbon Black server.

class cbapi.psc.threathunter.models.**Tree**(*cb*, *model_unique_id=None*, *initial_data=None*, *force_init=False*, *full_doc=True*)
Represents a Tree object in the Carbon Black server.

children
Returns all of the children of the process that this tree is centered around.

Returns A list of *Process* instances

Return type list of *Process*

5.5 Exceptions

If an error occurs, the API attempts to roll the error into an appropriate Exception class.

5.5.1 Exception Classes

exception cbapi.errors.**ApiError**(*message=None*, *original_exception=None*)

exception cbapi.errors.**CredentialError**(*message=None*, *original_exception=None*)

exception cbapi.errors.**ServerError**(*error_code*, *message*, *result=None*, *original_exception=None*)
A ServerError is raised when an HTTP error code is returned from the Carbon Black server.

exception cbapi.errors.**ObjectNotFoundError**(*uri*, *message=None*, *original_exception=None*)

The requested object could not be found in the Carbon Black datastore.

exception cbapi.errors.**MoreThanOneResultError**(*message=None*, *original_exception=None*)

Only one object was requested, but multiple matches were found in the Carbon Black datastore.

exception cbapi.errors.**InvalidObjectError**(*message=None*, *original_exception=None*)

exception cbapi.errors.**TimeoutError**(*uri=None*, *error_code=None*, *message=None*, *original_exception=None*)

CHAPTER 6

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