Archelon Documentation

Release 0.4.1

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January 04, 2015

Contents

I live more than half my waking life in a shell, and one of my frustrations has always been having a nicely searchable and synced shell history across hundreds of servers. This is my attempt at solving this problem using a curses client for searching paired with a simple API and Web server backed by a nice search engine (Elasticsearch).

The project is split in two, and the client is actually pretty cool without the Web server. To get started, check out each of the projects below.

CHAPTER 1

Archelon Client

Curses based application for command history that can be wired up to a Web server (archelond) for shared shell history across multiple hosts.

1.1 Installation

```
pip install archelonc
```

Once that is setup you can try it out by running `. archelon` this uses your existing shell history to let you try out the client. To make this work more like the bash reverse history search via `C-r` I recommend adding:

```
bind '"\033a":". archelon\n"'
```

this will launch the reverse search of archelon via Alt-A.

1.2 Web Enabled History

From here you can use archelon as is, but the cool part really start when you install archelond and wire the client up to use that project for shared and indexed shell history. To configure the client side after you have setup the server, you just need to add two environment variables to the mix.

- `ARCHELON_URL` - Web URL to your archelond installation
- `ARCHELON_TOKEN` - The API token for your user. You can get this by going to https://your.archelond.domain/api/v1/token and logging in with the username and password you've created.

Add those to `.bashrc`, `.profile`, or whichever shell startup you are using and it will be hooked up to the Web server. You can verify this and populate your Web history by running the `archelon_import` command which will import your current computers history.

1.3 Keyboard Shortcuts

Within the client curses application, there are a few handy keyboard shortcuts.

Alt-o This presses the Ok button and runs whatever command is in the `command` field

Alt-c This presses the cancel button and exits out of the application without running a command. `Ctrl-C` also works, but currently has a nasty exception message.

Ctrl-x

This brings up the menu for doing things like changing the order of the search results.

1.3.1 Within Menus

Within the menu there are also keyboard shortcuts. And are executed emacs style, i.e. `Ctrl-x Ctrl-f` to set sorting order to oldest->newest. So far those are:

Ctrl-F Sort results from oldest to newest

Ctrl-R Default order. Sort results from newest to oldest.

CHAPTER 2

Archelon Client API

For convenient reference in development, here are the Archelon client API docs.

2.1 Data Module

Data modeling for command history to be modular

class archelonc.data.**HistoryBase**
Bases: object

Base class of what all backend command history searches should use.

search_forward(*term*)
Return a list of commmands that is in forward time order. i.e oldest first.

search_reverse(*term*)
Return a list of commmands that is in reverse time order. i.e newest first.

class archelonc.data.**LocalHistory**
Bases: archelonc.data.HistoryBase

Use local .bash_history for doing searches

search_forward(*term*)
Return a list of commmands that is in forward time order. i.e oldest first.

search_reverse(*term*)
Return reversed filtered list by term

class archelonc.data.**WebHistory**(*url*, *token*)
Bases: archelonc.data.HistoryBase

Use RESTful API to do searches against archelond.

SEARCH_URL = '/api/v1/history'

add(*command*)
Post a command to the remote server using the API

bulk_add(*commands*)
Post a list of commands

search_forward(*term*)
Return a list of commmands that is in forward time order. i.e oldest first.

search_reverse(*term*)
Make request to API with sort order specified and return the results as a list.

2.2 Search Module

npyscreen based application for searching shell history

class archelonc.search.**CommandBox**(*screen*, ***kwargs*)
Bases: npyscreen.wgtitlefield.TitleText

Command Box widget

when_value_edited()
Mark myself as having been edited

class archelonc.search.**Search**
Bases: npyscreen.apNPSApplicationManaged.NPSAppManaged

Search application. Determines which form to show.

onStart()
Startup routine for the search application

class archelonc.search.**SearchBox**(*screen*, *begin_entry_at=16*, *field_width=None*, *value=None*, *use_two_lines=None*, *hidden=False*, *labelColor='LABEL'*, *allow_override_begin_entry_at=True*, ***keywords*)
Bases: npyscreen.wgtitlefield.TitleText

Search box command, updates trigger deeper searching.

search()
Do the search and return the results

when_value_edited()
Do the search and filter the search result list based on what is returned

class archelonc.search.**SearchForm**(**args*, ***keywords*)
Bases: npyscreen.fmFormWithMenus.ActionFormWithMenus

Command history search form

afterEditing()
This is the form to display, so set next to None

beforeEditing()
Set the edit index to the search box and tell it to preserve the value

create()
Build the form for searching

forward_order()
Change sort order to forward

on_cancel(**args*)
Drop out with a non 1 exit code so the wrapper doesn't execute anything

on_ok(**args*)
We just drop the command into a known file for the wrapper to pick up

reverse_order()
Change sort order to forward

class archelonc.search.**SearchResult**(*screen*, *value=''*, *highlight_color='CURSOR'*, *highlight_whole_widget=False*, *invert_highlight_color=True*, ***keywords*)

Bases: npyscreen.wgtextbox.Textfield

Search result item

class archelonc.search.**SearchResults**(**args*, ***keywords*)

Bases: npyscreen.wgmultiline.MultiLineAction

MultiLine widget for displaying search results.

actionHighlighted(*act_on_this*, *key_press*)

2.3 Command Module

Command line entry points for the archelon client.

archelonc.command.**import_history**()

Import current shell's history into server

archelonc.command.**search_form**()

Entry point to search history

archelonc.command.**update**()

Capture diff between stored history and new history and upload the delta.

CHAPTER 3

Archelon Daemon

This is the Web server side of archelon. Once it is all configured and wired up to archelonc it can be used to store your shell history from all your hosts.

It is a simple Flask app that is generally designed to be wired up to an elasticsearch host to provide a nicely indexed shell history, and should be deployable for free on heroku using an elasticsearch addon.

3.1 Installation and Configuration

```
pip install archelond
```

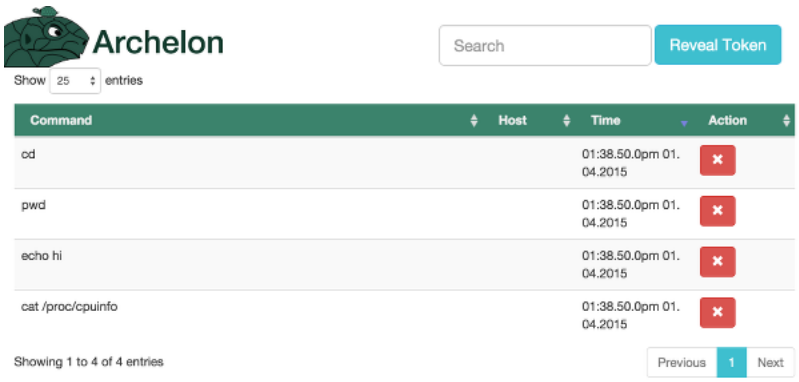
Security is obviously important for shell history, and to setup authentication we use basic authentication using apache htpasswd files as the user database. To add one for yourself and configure archelond to use it, run something like:

```
htpasswd -c ~/.htpasswd username
export HTPASSWD_PATH=~/.htpasswd
```

After that minimal setup we can try things out with just a simple command of:

```
archelond
```

Which will fire up the debug/development server using an in memory bash history data store that is very forgetful. Once it is up, you should be able to go http://localhost:8580/, login with the username and password you created in your htpasswd file, and see a lovely Web interface for searching and deleting your shell history similar to:



. It also provides a simple button to reveal the token you need in archelonc to connect the two together. To access the RESTful API side directly, you can check out the sample commands by visiting http://localhost:8580/api/v1/history or get your token for use with archelonc http://localhost:8580/api/v1/token.

3.2 Wiring Up to Elasticsearch

In order to have your history survive start ups we can use Elasticsearch. You can either install it locally, or grab it from an add-on on Heroku. Once you have the connection URL, we just need to add a couple environment variables to point at the service and set the storage provider class with something like:

```
export ARCHELOND_ELASTICSEARCH_URL='http://localhost:9200'
export ARCHELOND_ELASTICSEARCH_INDEX='history'
export ARCHELOND_DATABASE='ElasticData'
```

The index can be changed as desired, but it is the index in elasticsearch that will be used to store the history.

Note: archelond with the `ElasticData` can support multiple users as it uses the user in the document type

3.3 Running in Production

Running the `archelond` command is good for testing out, but to run it in production you will want to run it through a proper wsgi application server. As an example, we've added uwsgi in the requirements and it can be run in production with something like:

```
uwsgi --http :8580 -w archelond.web:app
```

and then a Web server like nginx proxying over https in order to further secure your shell history.

3.3.1 Running in Heroku

For heroku, it is very easy to setup the application part. Just create a requirements.txt file in the root of your repo with at least one line:

```
archelond
```

Setup a Procfile with:

```
web: uwsgi uwsgi.ini
```

and a uwsgi.ini that looks something like:

```
[uwsgi]
http-socket = :$(PORT)
master = true
processes = 10
die-on-term = true
module = archelond.web:app
memory-report = true
```

You also need to setup your secrets using `heroku config:set` commands. The vars that need to be set minimally for an elasticsearch version are:

```
ARCHELOND_DATABASE="ElasticData"
ARCHELOND_ELASTICSEARCH_INDEX="my_index"
ARCHELOND_ELASTICSEARCH_URL="http://example.com/elastic_search"
ARCHELOND_FLASK_SECRET="a_very_long_randomized_string"
ARCHELOND_HTPASSWD="username:hashfromhtpasswd"
ARCHELOND_HTPASSWD_PATH="htpasswd"
```

Note: I had to also add `-e git+https://github.com/elasticsearch/elasticsearch-py.git@master#egg=ela` to my requirements file because my elasticsearch server needed to specify https, username, and password. Currently the release version `1.2.0` didn't have that feature, but it is available in their master branch

CHAPTER 4

Archelon Daemon API

For convenient reference in development, here are the Archelon Daemon API docs.

4.1 Abstract Base Class for Data Storage

Abstract base class for data stores

class archelond.data.abstract.**HistoryData**(*config*)
Bases: object

Abstract Data storage for command history

Abstract class implementation of a database for use with command history. Generally a command data item needs just two things, an ID and the command itself. It also needs order. See the archelond.data.MemoryData class as the simplest structure using an collections.OrderedDict.

An ID can be any string, and the concrete implementation of HistoryData is responsible for type casting it if needed.

It is also required implicitly that there is only one entry per command. Thus add ing the same command multiple times should result in the return of just one command when filtered by a term equal to that command.

add(*command*, *username*, *host*, ***kwargs*)
Add or update a command

Save (update or create) a command to the data store.

Parameters

- **command** (*str*) – The command to store
- **username** (*str*) – The username of the person adding it
- **host** (*str*) – The IP address of API caller

Returns Command ID (str): The id of the command stored

all(*order*, *username*, *host*, ***kwargs*)
Unfiltered but ordered command history

Return the full data set as a list of dict structures in the specified order.

Parameters

- **order** (*str*) – An ordering from ORDER_TYPES

- **username** (*str*) – The username of the person adding it
- **host** (*str*) – The IP address of API caller

Returns A list of dictionaries where each dictionary must have at least a `command` key and an `id` key.

Return type list

delete (*command_id*, *username*, *host*, ***kwargs*)
Delete a command

Remove a command from the data store, raise a KeyError if it is not available to be deleted.

Parameters

- **command_id** (*str*) – Unique command identifier
- **username** (*str*) – The username of the person adding it
- **host** (*str*) – The IP address of API caller

filter (*term*, *order*, *username*, *host*, ***kwargs*)
Get a filtered by term and ordered command history

Parameters

- **term** (*str*) – The term being searched for/filtered by.
- **order** (*str*) – An ordering from `ORDER_TYPES`
- **username** (*str*) – The username of the person adding it
- **host** (*str*) – The IP address of API caller

Returns A list of dictionaries where each dictionary must have at least a `command` key and an `id` key.

Return type list

get (*command_id*, *username*, *host*, ***kwargs*)
Get a single command

Retrieve a single command by username and id. Raise a KeyError if the command does not exist.

Parameters

- **command_id** (*str*) – Unique command identifier
- **username** (*str*) – The username of the person adding it
- **host** (*str*) – The IP address of API caller

Returns **Command** – Dictionary with at least the keys `id` and `command`

Return type dict

4.2 In Memory Data Storage

In memory data store implementation for development and testing

class `archelond.data.memory.`**MemoryData** (*config*)
Bases: `archelond.data.abstract.HistoryData`

A quick in memory deduplicated structure for standalone testing and development.

INITIAL_DATA = ['cd', 'pwd', 'echo hi', 'cat /proc/cpuinfo']

add(*command*, *username*, *host*, ***kwargs*)
Append item to data list

all(*order*, *username*, *host*, ***kwargs*)
Simply rewrap the data structure, order, and return

delete(*command_id*, *username*, *host*, ***kwargs*)
Remove key from internal dictionary

filter(*term*, *order*, *username*, *host*, ***kwargs*)
Return filtered and reversed OrderedDict.

get(*command_id*, *username*, *host*, ***kwargs*)
Pull the specified command out of the data store.

4.3 Elastic Search Data Storage

ElasticSearch implementation of the data store. Currently the recommended default data store.

class archelond.data.elastic.**ElasticData**(*config*)
Bases: archelond.data.abstract.HistoryData

An ElasticSearch implementation of HistoryData. This is what should be used in production

DOC_TYPE = 'history'

NUM_RESULTS = 50

add(*command*, *username*, *host*, ***kwargs*)
Add the command to the index with a time stamp and id by hash of the command and append username to doc type for user separation of data.

all(*order*, *username*, *host*, ***kwargs*)
Just build a body with match all and return filter

delete(*command_id*, *username*, *host*, ***kwargs*)
Remove item from elasticsearch

filter(*term*, *order*, *username*, *host*, *body=None*, ***kwargs*)
Return filtered search that is ordered

get(*command_id*, *username*, *host*, ***kwargs*)
Pull one command out of elasticsearch

4.4 Authentication Module

Decorators for authentication via basic auth or tokens

archelond.auth.**auth_failed**()
Sends a 401 response that enables basic auth

archelond.auth.**check_basic_auth**(*username*, *password*)
This function is called to check if a username / password combination is valid via the htpasswd file.

archelond.auth.**check_token_auth**(*token*)
Check to see who this is and if their token gets them into the system.

archelond.auth.**generate_token**(*username*)
assumes user exists in htpasswd file.

Return the token for the given user by signing a token of the username and a hash of the htpasswd string.

archelond.auth.**get_hashhash**(*username*)
Generate a digest of the htpasswd hash

archelond.auth.**get_signature**()
Setup crypto sig.

archelond.auth.**requires_auth**(*func*)
Decorator function with basic and token authentication handler

4.5 Configuration Module

Configure the flask application

4.6 Log Module

Configure logging

archelond.log.**configure_logging**(*app*)
Set the log level for the application

4.7 Utility Module

Classic utility module for removing repetitive tasks and such

archelond.util.**jsonify_code**(*src_object*, *status_code*)
Wrap jsonify with a status code option for jsonifying non-200 responses.

Parameters

- **src_object** (*serializable object*) – data structure to jsonify
- **status_code** (*int*) – Status code to send

Returns werkzug response object with json MIME-type

4.8 Web Module

Main entry point for flask application

archelond.web.**history**(**args*, ***kwargs*)
POST=Add entry GET=Get entries with query

archelond.web.**history_item**(**args*, ***kwargs*)
Actions for individual command history items.

Updates, gets, or deletes a command from the active data store.

PUT: Takes a payload in either form or JSON request, and runs the add routine by passing the dictinoary minus `command`, `username`, and `host` as kwargs to the data stores `add` routine.

archelond.web.**index**(**args*, ***kwargs*)
Simple index view for documentation and navigation.

archelond.web.**run_server**()
If started from command line, rebuild object in debug mode and run directly

archelond.web.**token**(**args*, ***kwargs*)
Return the user token for API auth that is based off the flask secret and user password

archelond.web.**wsgi_app**()
Start flask application runtime

CHAPTER 5

Indices and tables

- *genindex*
- *modindex*
- *search*

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