Flask-Login Documentation

Release 0.3.1

Matthew Frazier

October 08, 2015

Contents

Flask-Login provides user session management for Flask. It handles the common tasks of logging in, logging out, and remembering your users' sessions over extended periods of time.

It will:

- Store the active user's ID in the session, and let you log them in and out easily.

- Let you restrict views to logged-in (or logged-out) users.

- Handle the normally-tricky "remember me" functionality.

- Help protect your users' sessions from being stolen by cookie thieves.

- Possibly integrate with Flask-Principal or other authorization extensions later on.

However, it does not:

- Impose a particular database or other storage method on you. You are entirely in charge of how the user is loaded.

- Restrict you to using usernames and passwords, OpenIDs, or any other method of authenticating.

- Handle permissions beyond "logged in or not."

- Handle user registration or account recovery.

Configuring your Application

The most important part of an application that uses Flask-Login is the *LoginManager* class. You should create one for your application somewhere in your code, like this:

```
login_manager = LoginManager()
```

The login manager contains the code that lets your application and Flask-Login work together, such as how to load a user from an ID, where to send users when they need to log in, and the like.

Once the actual application object has been created, you can configure it for login with:

```
login_manager.init_app(app)
```

How it Works

You will need to provide a *user_loader* callback. This callback is used to reload the user object from the user ID stored in the session. It should take the `unicode` ID of a user, and return the corresponding user object. For example:

```python
@login_manager.user_loader
def load_user(user_id):
    return User.get(user_id)
```

It should return `None` (**not raise an exception**) if the ID is not valid. (In that case, the ID will manually be removed from the session and processing will continue.)

Your User Class

The class that you use to represent users needs to implement these properties and methods:

is_authenticated Returns `True` if the user is authenticated, i.e. they have provided valid credentials. (Only authenticated users will fulfill the criteria of *login_required*.)

is_active Returns `True` if this is an active user - in addition to being authenticated, they also have activated their account, not been suspended, or any condition your application has for rejecting an account. Inactive accounts may not log in (without being forced of course).

is_anonymous Returns `True` if this is an anonymous user. (Actual users should return `False` instead.)

get_id() Returns a `unicode` that uniquely identifies this user, and can be used to load the user from the *user_loader* callback. Note that this **must** be a `unicode` - if the ID is natively an `int` or some other type, you will need to convert it to `unicode`.

To make implementing a user class easier, you can inherit from *UserMixin*, which provides default implementations for all of these methods. (It's not required, though.)

Login Example

Once a user has authenticated, you log them in with the *login_user* function. For example:

```python
@app.route('/login', methods=['GET', 'POST'])
def login():
    # Here we use a class of some kind to represent and validate our
    # client-side form data. For example, WTForms is a library that will
    # handle this for us, and we use a custom LoginForm to validate.
    form = LoginForm()
    if form.validate_on_submit():
        # Login and validate the user.
        # user should be an instance of your `User` class
        login_user(user)

        flask.flash('Logged in successfully.')

        next = flask.request.args.get('next')
        # next_is_valid should check if the user has valid
        # permission to access the `next` url
        if not next_is_valid(next):
            return flask.abort(400)

        return flask.redirect(next or flask.url_for('index'))
    return flask.render_template('login.html', form=form)
```

Warning: You MUST validate the value of the next parameter. If you do not, your application will be vulnerable to open redirects.

It's that simple. You can then access the logged-in user with the *current_user* proxy, which is available in every template:

```
{% if current_user.is_authenticated %}
  Hi {{ current_user.name }}!
{% endif %}
```

Views that require your users to be logged in can be decorated with the *login_required* decorator:

```python
@app.route("/settings")
@login_required
def settings():
    pass
```

When the user is ready to log out:

```
@app.route("/logout")
@login_required
def logout():
    logout_user()
    return redirect(somewhere)
```

They will be logged out, and any cookies for their session will be cleaned up.

Customizing the Login Process

By default, when a user attempts to access a *login_required* view without being logged in, Flask-Login will flash a message and redirect them to the log in view. (If the login view is not set, it will abort with a 401 error.)

The name of the log in view can be set as *LoginManager.login_view*. For example:

```
login_manager.login_view = "users.login"
```

The default message flashed is Please log in to access this page. To customize the message, set *LoginManager.login_message*:

```
login_manager.login_message = u"Bonvolu ensaluti por uzi tiun paon."
```

To customize the message category, set LoginManager.login_message_category:

```
login_manager.login_message_category = "info"
```

When the log in view is redirected to, it will have a next variable in the query string, which is the page that the user was trying to access.

If you would like to customize the process further, decorate a function with *LoginManager.unauthorized_handler*:

```
@login_manager.unauthorized_handler
def unauthorized():
    # do stuff
    return a_response
```

Login using Authorization header

> **Caution:** This method will be deprecated; use the `request_loader` below instead.

Sometimes you want to support Basic Auth login using the `Authorization` header, such as for api requests. To support login via header you will need to provide a *header_loader* callback. This callback should behave the same as your *user_loader* callback, except that it accepts a header value instead of a user id. For example:

```python
@login_manager.header_loader
def load_user_from_header(header_val):
    header_val = header_val.replace('Basic ', '', 1)
    try:
        header_val = base64.b64decode(header_val)
    except TypeError:
        pass
    return User.query.filter_by(api_key=header_val).first()
```

By default the `Authorization` header's value is passed to your *header_loader* callback. You can change the header used with the AUTH_HEADER_NAME configuration.

Custom Login using Request Loader

Sometimes you want to login users without using cookies, such as using header values or an api key passed as a query argument. In these cases, you should use the `request_loader` callback. This callback should behave the same as your *user_loader* callback, except that it accepts the Flask request instead of a user_id.

For example, to support login from both a url argument and from Basic Auth using the `Authorization` header:

```python
@login_manager.request_loader
def load_user_from_request(request):

    # first, try to login using the api_key url arg
    api_key = request.args.get('api_key')
    if api_key:
        user = User.query.filter_by(api_key=api_key).first()
        if user:
            return user

    # next, try to login using Basic Auth
    api_key = request.headers.get('Authorization')
    if api_key:
        api_key = api_key.replace('Basic ', '', 1)
        try:
            api_key = base64.b64decode(api_key)
        except TypeError:
            pass
        user = User.query.filter_by(api_key=api_key).first()
        if user:
            return user

    # finally, return None if both methods did not login the user
    return None
```

Anonymous Users

By default, when a user is not actually logged in, *current_user* is set to an `AnonymousUserMixin` object. It has the following properties and methods:

- `is_active` and `is_authenticated` are `False`

- `is_anonymous` is `True`

- `get_id()` returns `None`

If you have custom requirements for anonymous users (for example, they need to have a permissions field), you can provide a callable (either a class or factory function) that creates anonymous users to the *LoginManager* with:

```
login_manager.anonymous_user = MyAnonymousUser
```

Remember Me

"Remember Me" functionality can be tricky to implement. However, Flask-Login makes it nearly transparent - just pass remember=True to the *login_user* call. A cookie will be saved on the user's computer, and then Flask-Login will automatically restore the user ID from that cookie if it is not in the session. The cookie is tamper-proof, so if the user tampers with it (i.e. inserts someone else's user ID in place of their own), the cookie will merely be rejected, as if it was not there.

That level of functionality is handled automatically. However, you can (and should, if your application handles any kind of sensitive data) provide additional infrastructure to increase the security of your remember cookies.

9.1 Alternative Tokens

Using the user ID as the value of the remember token is not necessarily secure. More secure is a hash of the username and password combined, or something similar. To add an alternative token, add a method to your user objects:

get_auth_token() Returns an authentication token (as unicode) for the user. The auth token should uniquely identify the user, and preferably not be guessable by public information about the user such as their UID and name - nor should it expose such information.

Correspondingly, you should set a *token_loader* function on the *LoginManager*, which takes a token (as stored in the cookie) and returns the appropriate User object.

The *make_secure_token* function is provided for creating auth tokens conveniently. It will concatenate all of its arguments, then HMAC it with the app's secret key to ensure maximum cryptographic security. (If you store the user's token in the database permanently, then you may wish to add random data to the token to further impede guessing.)

If your application uses passwords to authenticate users, including the password (or the salted password hash you should be using) in the auth token will ensure that if a user changes their password, their old authentication tokens will cease to be valid.

9.2 Fresh Logins

When a user logs in, their session is marked as "fresh," which indicates that they actually authenticated on that session. When their session is destroyed and they are logged back in with a "remember me" cookie, it is marked as "non-fresh." *login_required* does not differentiate between freshness, which is fine for most pages. However, sensitive actions like changing one's personal information should require a fresh login. (Actions like changing one's password should always require a password re-entry regardless.)

fresh_login_required, in addition to verifying that the user is logged in, will also ensure that their login is fresh. If not, it will send them to a page where they can re-enter their credentials. You can customize its behavior in the same ways as you can customize *login_required*, by setting *LoginManager.refresh_view*, *needs_refresh_message*, and needs_refresh_message_category:

```
login_manager.refresh_view = "accounts.reauthenticate"
login_manager.needs_refresh_message = (
    u"To protect your account, please reauthenticate to access this page."
)
login_manager.needs_refresh_message_category = "info"
```

Or by providing your own callback to handle refreshing:

```
@login_manager.needs_refresh_handler
def refresh():
    # do stuff
    return a_response
```

To mark a session as fresh again, call the *confirm_login* function.

9.3 Cookie Settings

The details of the cookie can be customized in the application settings.

REMEMBER_COOKIE_NAME	The name of the cookie to store the "remember me" information in. **Default:** remember_token
REMEMBER_COOKIE_DURATION	The amount of time before the cookie expires, as a datetime.timedelta object. **Default:** 365 days (1 non-leap Gregorian year)
REMEMBER_COOKIE_DOMAIN	If the "Remember Me" cookie should cross domains, set the domain value here (i.e. .example.com would allow the cookie to be used on all subdomains of example.com). **Default:** None
REMEMBER_COOKIE_PATH	Limits the "Remember Me" cookie to a certain path. **Default:** /

Session Protection

While the features above help secure your "Remember Me" token from cookie thieves, the session cookie is still vulnerable. Flask-Login includes session protection to help prevent your users' sessions from being stolen.

You can configure session protection on the *LoginManager*, and in the app's configuration. If it is enabled, it can operate in either `basic` or `strong` mode. To set it on the *LoginManager*, set the `session_protection` attribute to `"basic"` or `"strong"`:

```
login_manager.session_protection = "strong"
```

Or, to disable it:

```
login_manager.session_protection = None
```

By default, it is activated in `"basic"` mode. It can be disabled in the app's configuration by setting the `SESSION_PROTECTION` setting to `None`, `"basic"`, or `"strong"`.

When session protection is active, each request, it generates an identifier for the user's computer (basically, the MD5 hash of the IP address and user agent). If the session does not have an associated identifier, the one generated will be stored. If it has an identifier, and it matches the one generated, then the request is OK.

If the identifiers do not match in `basic` mode, or when the session is permanent, then the session will simply be marked as non-fresh, and anything requiring a fresh login will force the user to re-authenticate. (Of course, you must be already using fresh logins where appropriate for this to have an effect.)

If the identifiers do not match in `strong` mode for a non-permanent session, then the entire session (as well as the remember token if it exists) is deleted.

Localization

By default, the *LoginManager* uses `flash` to display messages when a user is required to log in. These messages are in English. If you require localization, set the `localize_callback` attribute of *LoginManager* to a function to be called with these messages before they're sent to `flash`, e.g. `gettext`. This function will be called with the message and its return value will be sent to `flash` instead.

API Documentation

This documentation is automatically generated from Flask-Login's source code.

12.1 Configuring Login

class flask.ext.login.**LoginManager**(*app=None*, *add_context_processor=True*)

    This object is used to hold the settings used for logging in. Instances of *LoginManager* are *not* bound to specific apps, so you can create one in the main body of your code and then bind it to your app in a factory function.

    setup_app(*app*, *add_context_processor=True*)

        This method has been deprecated. Please use LoginManager.init_app() instead.

    unauthorized()

        This is called when the user is required to log in. If you register a callback with *LoginManager.unauthorized_handler()*, then it will be called. Otherwise, it will take the following actions:

            •Flash *LoginManager.login_message* to the user.

            •If the app is using blueprints find the login view for the current blueprint using blueprint_login_views. If the app is not using blueprints or the login view for the current blueprint is not specified use the value of *login_view*. Redirect the user to the login view. (The page they were attempting to access will be passed in the next query string variable, so you can redirect there if present instead of the homepage.)

        If *LoginManager.login_view* is not defined, then it will simply raise a HTTP 401 (Unauthorized) error instead.

        This should be returned from a view or before/after_request function, otherwise the redirect will have no effect.

    needs_refresh()

        This is called when the user is logged in, but they need to be reauthenticated because their session is stale. If you register a callback with *needs_refresh_handler*, then it will be called. Otherwise, it will take the following actions:

            •Flash *LoginManager.needs_refresh_message* to the user.

            •Redirect the user to *LoginManager.refresh_view*. (The page they were attempting to access will be passed in the next query string variable, so you can redirect there if present instead of the homepage.)

If *LoginManager.refresh_view* is not defined, then it will simply raise a HTTP 401 (Unauthorized) error instead.

This should be returned from a view or before/after_request function, otherwise the redirect will have no effect.

General Configuration

user_loader(*callback*)
> This sets the callback for reloading a user from the session. The function you set should take a user ID (a `unicode`) and return a user object, or `None` if the user does not exist.
>
> > **Parameters callback** (*callable*) – The callback for retrieving a user object.

header_loader(*callback*)
> This sets the callback for loading a user from a header value. The function you set should take an authentication token and return a user object, or `None` if the user does not exist.
>
> > **Parameters callback** (*callable*) – The callback for retrieving a user object.

token_loader(*callback*)
> This sets the callback for loading a user from an authentication token. The function you set should take an authentication token (a `unicode`, as returned by a user's `get_auth_token` method) and return a user object, or `None` if the user does not exist.
>
> > **Parameters callback** (*callable*) – The callback for retrieving a user object.

anonymous_user
> A class or factory function that produces an anonymous user, which is used when no one is logged in.

unauthorized Configuration

login_view
> The name of the view to redirect to when the user needs to log in. (This can be an absolute URL as well, if your authentication machinery is external to your application.)

login_message
> The message to flash when a user is redirected to the login page.

unauthorized_handler(*callback*)
> This will set the callback for the *unauthorized* method, which among other things is used by *login_required*. It takes no arguments, and should return a response to be sent to the user instead of their normal view.
>
> > **Parameters callback** (*callable*) – The callback for unauthorized users.

needs_refresh Configuration

refresh_view
> The name of the view to redirect to when the user needs to reauthenticate.

needs_refresh_message
> The message to flash when a user is redirected to the reauthentication page.

needs_refresh_handler(*callback*)
> This will set the callback for the *needs_refresh* method, which among other things is used by

> > *fresh_login_required*. It takes no arguments, and should return a response to be sent to the user instead of their normal view.
>
> > **Parameters callback** (*callable*) – The callback for unauthorized users.

12.2 Login Mechanisms

flask.ext.login.**current_user**
> A proxy for the current user.

flask.ext.login.**login_fresh**()
> This returns `True` if the current login is fresh.

flask.ext.login.**login_user**(*user*, *remember=False*, *force=False*, *fresh=True*)
> Logs a user in. You should pass the actual user object to this. If the user's `is_active` property is `False`, they will not be logged in unless `force` is `True`.
>
> This will return `True` if the log in attempt succeeds, and `False` if it fails (i.e. because the user is inactive).
>
> > **Parameters**
> >
> > • **user** (*object*) – The user object to log in.
> >
> > • **remember** (*bool*) – Whether to remember the user after their session expires. Defaults to `False`.
> >
> > • **force** (*bool*) – If the user is inactive, setting this to `True` will log them in regardless. Defaults to `False`.
> >
> > • **fresh** – setting this to `False` will log in the user with a session
>
> marked as not "fresh". Defaults to `True`. :type fresh: bool

flask.ext.login.**logout_user**()
> Logs a user out. (You do not need to pass the actual user.) This will also clean up the remember me cookie if it exists.

flask.ext.login.**confirm_login**()
> This sets the current session as fresh. Sessions become stale when they are reloaded from a cookie.

12.3 Protecting Views

flask.ext.login.**login_required**(*func*)
> If you decorate a view with this, it will ensure that the current user is logged in and authenticated before calling the actual view. (If they are not, it calls the *LoginManager.unauthorized* callback.) For example:

```python
@app.route('/post')
@login_required
def post():
    pass
```

> If there are only certain times you need to require that your user is logged in, you can do so with:

```python
if not current_user.is_authenticated:
    return current_app.login_manager.unauthorized()
```

...which is essentially the code that this function adds to your views.

It can be convenient to globally turn off authentication when unit testing. To enable this, if the application configuration variable `LOGIN_DISABLED` is set to `True`, this decorator will be ignored.

> **Parameters func** (*function*) – The view function to decorate.

`flask.ext.login.`**`fresh_login_required`**(*func*)

> If you decorate a view with this, it will ensure that the current user's login is fresh - i.e. there session was not restored from a 'remember me' cookie. Sensitive operations, like changing a password or e-mail, should be protected with this, to impede the efforts of cookie thieves.
>
> If the user is not authenticated, *`LoginManager.unauthorized()`* is called as normal. If they are authenticated, but their session is not fresh, it will call *`LoginManager.needs_refresh()`* instead. (In that case, you will need to provide a *`LoginManager.refresh_view`*.)
>
> Behaves identically to the *`login_required()`* decorator with respect to configutation variables.
>
> > **Parameters func** (*function*) – The view function to decorate.

12.4 User Object Helpers

class `flask.ext.login.`**`UserMixin`**

> This provides default implementations for the methods that Flask-Login expects user objects to have.

12.5 Utilities

`flask.ext.login.`**`login_url`**(*login_view*, *next_url=None*, *next_field='next'*)

> Creates a URL for redirecting to a login page. If only `login_view` is provided, this will just return the URL for it. If `next_url` is provided, however, this will append a `next=URL` parameter to the query string so that the login view can redirect back to that URL.
>
> > **Parameters**
> >
> > - **`login_view`** (*str*) – The name of the login view. (Alternately, the actual URL to the login view.)
> >
> > - **`next_url`** (*str*) – The URL to give the login view for redirection.
> >
> > - **`next_field`** (*str*) – What field to store the next URL in. (It defaults to `next`.)

`flask.ext.login.`**`make_secure_token`**(**args*, ***options*)

> This will create a secure token that you can use as an authentication token for your users. It uses heavy-duty HMAC encryption to prevent people from guessing the information. (To make it even more effective, if you will never need to regenerate the token, you can pass some random data as one of the arguments.)
>
> > **Parameters**
> >
> > - **`*args`** – The data to include in the token.
> >
> > - **`**options`** (*kwargs*) – To manually specify a secret key, pass `key=THE_KEY`. Otherwise, the `current_app` secret key will be used.

12.6 Signals

See the Flask documentation on signals for information on how to use these signals in your code.

`flask.ext.login.`**`user_logged_in`**
> Sent when a user is logged in. In addition to the app (which is the sender), it is passed `user`, which is the user being logged in.

`flask.ext.login.`**`user_logged_out`**
> Sent when a user is logged out. In addition to the app (which is the sender), it is passed `user`, which is the user being logged out.

`flask.ext.login.`**`user_login_confirmed`**
> Sent when a user's login is confirmed, marking it as fresh. (It is not called for a normal login.) It receives no additional arguments besides the app.

`flask.ext.login.`**`user_unauthorized`**
> Sent when the `unauthorized` method is called on a *LoginManager*. It receives no additional arguments besides the app.

`flask.ext.login.`**`user_needs_refresh`**
> Sent when the `needs_refresh` method is called on a *LoginManager*. It receives no additional arguments besides the app.

`flask.ext.login.`**`session_protected`**
> Sent whenever session protection takes effect, and a session is either marked non-fresh or deleted. It receives no additional arguments besides the app.

A

C

F

H

L

M

N

R

S

T

U