

CSE312 WebSockets Report

Web Framework: Flask / Python

General Information & Licensing

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| Code Repository | https://github.com/miguelgrinberg/Flask-SocketIO |
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Create Websocket connection

- CSE312_GroupProject-/Server/project_server.py (Line 59)
- Link:
https://github.com/XuyangLi-12088/CSE312_GroupProject/blob/master/Server/project_server.py#L59
- SocketIO() will create a Flask-SocketIO Server with support for long-polling and WebSocket transports. (We are using “eventlet” for WebSocket transports)
- ```
socketio = SocketIO(app, cors_allowed_origins="*")
```

  - Call Class SocketIO(object) (Line 54)
  - Link:  
[https://github.com/miguelgrinberg/Flask-SocketIO/blob/main/src/flask\\_socketio/\\_init\\_.py#L54](https://github.com/miguelgrinberg/Flask-SocketIO/blob/main/src/flask_socketio/_init_.py#L54)
  - Class SocketIO(object) will “create a Flask-SocketIO Server”
  - Pass “app” as a parameter: The flask application instance. If the application instance isn't known at the time this class is instantiated, then call "socketio.init\_app(app)" once the application instance is available.
  - Pass “cors\_allowed\_origins=`\*`” as a parameter: Origin or list of origins that are allowed to connect to this server. Only the same origin is allowed by default. Set this argument to '\*' to allow all origins, or to ``[]`` to disable CORS handling.
    - Call \_\_init\_\_() function
    - Link:  
[https://github.com/miguelgrinberg/Flask-SocketIO/blob/main/src/flask\\_socketio/\\_init\\_.py#L171](https://github.com/miguelgrinberg/Flask-SocketIO/blob/main/src/flask_socketio/_init_.py#L171)
    - Set all parameters to default value
      - Call init\_app(app, \*\*kwargs)
      - Set app.extension['socketio'] = self (set to a 'socketIO' object class)
      - Set server\_options to kwargs
      - Set up client\_manager
      - Self.server = socketio.Server(\*\*self.server\_options) (line 243)
      - Link:  
[https://github.com/miguelgrinberg/Flask-SocketIO/blob/main/src/flask\\_socketio/\\_init\\_.py#L243](https://github.com/miguelgrinberg/Flask-SocketIO/blob/main/src/flask_socketio/_init_.py#L243)
        - Pass all the options we set up in \_\_init\_\_() and init\_app() functions into

`socketio.Server(**self.server_options)`

- Link:  
<https://github.com/miguelgrinberg/python-socketio/blob/main/src/socketio/server.py#L13>
- All parameters should already set up in in `__init__()` and `init_app()` functions
- Call `__init__(self, ...)` (line 116)
- Link:  
<https://github.com/miguelgrinberg/python-socketio/blob/main/src/socketio/server.py#L116>
- `self.eio = self._engineio_server_class()` (line 134)
- Link:  
<https://github.com/miguelgrinberg/python-socketio/blob/main/src/socketio/server.py#L134>
- Call `_engineio_server_class()` function (line 811)
- Link:  
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L811>
  - `_engineio_server_class()` function returns an `engineio.Server`
  - Call Class `Server(object)` (line 18)
  - Link:  
<https://github.com/miguelgrinberg/python-engineio/blob/main/src/engineio/server.py#L18>
  - Server class is an `Engine.IO` server. This class implements a fully compliant `Engine.IO` web server with support for websocket and long-polling transports.
  - if `transport == 'polling'` or `transport == upgrade_header == 'websocket'` (line 396)
  - Link:  
<https://github.com/miguelgrinberg/python-engineio/blob/main/src/engineio/server.py#L396>
  - Check If the transport options is “websocket” or not
  - Call `_handle_connect()` function (line 541)
  - Link:

<https://github.com/miguelgrinberg/python-engineio/blob/6e93a2c19655b1a2f2dc4af858452505740eac3b/src/engineio/server.py#L541>

- `_handle_connect()` function will Handle a client connection request
  - `s = socket.Socket(self, sid)` (line 550) This returns a Socket class.
  - Link:  
<https://github.com/miguelgrinberg/python-engineio/blob/6e93a2c19655b1a2f2dc4af858452505740eac3b/src/engineio/server.py#L550>
  - Call class `Socket(object)` (line 10)
  - Socket class is an `Engine.IO` socket.
    - Set `upgrade_protocols = ['websocket']` (line 12)
    - Link:  
<https://github.com/Qdigital/python-engineio/blob/d6ae500a9c2a33bafdddc27a5ff30e663064a1bd/engineio/socket.py#L12>
    - `_upgrade_websocket()` (line 144)
    - Link:  
<https://github.com/Qdigital/python-engineio/blob/d6ae500a9c2a33bafdddc27a5ff30e663064a1bd/engineio/socket.py#L144>
    - `_upgrade_websocket()` function will upgrade the connection from polling to websocket.
    - Call `_websocket_handler()` function (line 154)
    - Link:  
<https://github.com/Qdigital/python-engineio/blob/d6ae500a9c2a33bafdddc27a5ff30e663064a1bd/engineio/socket.py#L154>

- [064a1bd/engineio/socket.py#L154](#)
  - `_websocket_handler()` function is an `Engine.IO` handler for websocket transport.
  - `set self.connected = True, self.upgraded = True`
- `self.sockets[sid] = s` (set `self.sockets[sid]` to a `Socket` class) (line 551)
- Link: <https://github.com/miguelgrinberg/python-engineio/blob/6e93a2c19655b1a2f2dc4af858452505740eac3b/src/engineio/server.py#L551>
- `'upgrades': self._upgrades(sid, transport)` (line 555)
- Link: <https://github.com/miguelgrinberg/python-engineio/blob/6e93a2c19655b1a2f2dc4af858452505740eac3b/src/engineio/server.py#L555>
- Call `_upgrades()` function (line 600)
  - Link: <https://github.com/miguelgrinberg/python-engineio/blob/6e93a2c19655b1a2f2dc4af858452505740eac3b/src/engineio/server.py#L600>
  - `_upgrades()` function will return the list of possible upgrades for a client connection. And check if websocket transport is available.
- In `transport(self, sid)` function (line 314), it will return the name of the transport used by the client
- Link: <https://github.com/miguelgrinberg/python-engineio/blob/6e93a2c19655b1a2f2dc4af858452505740eac3b/src/engineio/server.py#L314>

[b1a2f2dc4af858452505740eac3b/src/engineio/server.py#L314](https://github.com/miguelgrinberg/python-engineio/blob/6e93a2c19655b1a2f2dc4af858452505740eac3b/src/engineio/server.py#L314)

- Call `_get_socket(self, sid)` (line 630), which will return the socket object for a given session.
- Link: <https://github.com/miguelgrinberg/python-engineio/blob/6e93a2c19655b1a2f2dc4af858452505740eac3b/src/engineio/server.py#L630>
- In this case, it will return `self.sockets[sid]`.

## Parsing Frames

- CSE312\_GroupProject-/Server/project\_server.py (Line 59)
- Link: [https://github.com/XuyangLi-12088/CSE312\\_GroupProject/blob/master/Server/project\\_server.py#L59](https://github.com/XuyangLi-12088/CSE312_GroupProject/blob/master/Server/project_server.py#L59)
- SocketIO() will create a Flask-SocketIO Server with support for long-polling and WebSocket transports. (We are using “eventlet” for WebSocket transports)
- ```
socketio = SocketIO(app, cors_allowed_origins="*")
```

 - Call Class SocketIO(object) (Line 54)
 - Link: https://github.com/miguelgrinberg/Flask-SocketIO/blob/main/src/flask_socketio/_init_.py#L54
 - Class SocketIO(object) will “create a Flask-SocketIO Server”
 - Pass “app” as a parameter: The flask application instance. If the application instance isn't known at the time this class is instantiated, then call "socketio.init_app(app)" once the application instance is available.
 - Pass “cors_allowed_origins=`*`” as a parameter: Origin or list of origins that are allowed to connect to this server. Only the same origin is allowed by default. Set this argument to '*' to allow all origins, or to ``[]`` to disable CORS handling.
 - Call `__init__()` function

- Link:
https://github.com/miguelgrinberg/Flask-SocketIO/blob/main/src/flask_socketio/__init__.py#L171
- Set all parameters to default value
 - Call `init_app(app, **kwargs)`
 - Set `app.extension['socketio'] = self` (set to a 'socketIO' object class)
 - Set `server_options` to `kwargs`
 - Set up `client_manager`
 - `Self.server = socketio.Server(**self.server_options)` (line 243)
 - Link:
https://github.com/miguelgrinberg/Flask-SocketIO/blob/main/src/flask_socketio/__init__.py#L243
 - Pass all the options we set up in `__init__()` and `init_app()` functions into

- `self.eio.on('connect', self._handle_eio_connect)` (line 135)
- Link:
<https://github.com/miguelgrinberg/python-socketio/blob/main/src/socketio/server.py#L135>
 - Call `_handle_eio_connect()` function (line 768)
 - Link:
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L768>
 - `_handle_eio_connect()` will handle the Engine.IO connection event
- `self.eio.on('message', self._handle_eio_message)` (line 136)
- Link:
<https://github.com/miguelgrinberg/python-socketio/blob/main/src/socketio/server.py#L136>
 - Call `_handle_eio_message()` function (line 775)
 - Link:
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L775>
 - `_handle_eio_message()` function will dispatch Engine.IO message
 - If `packet_type` is Connect Call `_handle_connect()` function (line 656)
 - Link:
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L656>
 - `_handle_connect()` function will handle a client connection request
 - Call `connect()` function (line 51)
 - Link:

https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/base_manager.py#L51

- connect() function will register a client to a namespace
 - Call enter_room() function (line 116)
 - Link:
https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/base_manager.py#L116
 - enter_room() function will add the client into a room with the corresponding namespace
- If packet_type is Event Call _handle_event() function (line 712)
- Link:
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L712>
- _handle_event() function will handle an incoming client event
 - Call handle_event_internal() function (line 729)
 - Link:
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L729>
 - Call _trigger_event() function (line 751)
 - Link:
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L751>

- `_trigger_event()` function will Invoke an application event handler
- Call `_send_packet()` function (line 647)
- Link:
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L647>
- `_send_packet()` function will send a socket.IO packet to a client
 - `self.eio.send()` function will send a message to one or more connected clients.
 - Link:
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L322>
 - `self.emit()` function will Emit a custom event to one or more connected clients
 - Link:
<https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L271>
 - `self.manager.emit()` will send the data to all connected clients
 - Call Class `BaseManger()`
 - Link:

https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/base_manager.py#L9

- Class BaseManger() will manage all connected client connections
- self.eio.on('disconnect', self._handle_eio_disconnect) (line 137)
- Link: <https://github.com/miguelgrinberg/python-socketio/blob/main/src/socketio/server.py#L137>
 - Call _handle_disconnect() function
 - Link: <https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/server.py#L702>
 - Self.manger.disconnect()
 - Call disconnect() function
 - disconnect() function will register a client disconnect from a namespace
 - Link: https://github.com/miguelgrinberg/python-socketio/blob/55db7458900a179a9363294cc4fc91eb9c775f54/src/socketio/base_manager.py#L98
 - socketio.Server(**self.server_options)
 - Link: <https://github.com/miguelgrinberg/python-socketio/blob/main/src/socketio/server.py#L13>
 - All parameters should already set up in in __init__() and init_app() functions
 - Call __init__(self, ...) (line 116)
 - Link: <https://github.com/miguelgrinberg/python-socketio/blob/main/src/socketio/server.py>

#L116

- self.packet_class = packet.Packet (line 124)
- Link: <https://github.com/miguelgrinberg/python-socketio/blob/main/src/socketio/server.py#L124>
- Call class Packet(object) (line 12)
- Link: https://github.com/csulliv9/python_socketio/blob/1600aa424c334eb9328dc8ae633ada68f65c3923/socketio/packet.py#L12
- Packet class is a Socket.IO packet, which contains data: JSON dump of data payload.
- In _inti_() (line 27)
- Link: https://github.com/csulliv9/python_socketio/blob/1600aa424c334eb9328dc8ae633ada68f65c3923/socketio/packet.py#L27
 - If there is an encoded_packet(), call self.decode(encoded_packet) (line 43)
 - Link: https://github.com/csulliv9/python_socketio/blob/1600aa424c334eb9328dc8ae633ada68f65c3923/socketio/packet.py#L43
 - Call decode(self, encoded_packet) function (line 76)
 - Link: https://github.com/csulliv9/python_socketio/blob/1600aa424c334eb9328dc8ae633ada68f65c3923/socketio/packet.py#L76
 - decode() function will decode

a transmitted package. It get the “encoded_packet”, then parsing it get the packet_type, dash, attachment_count, namespace, id. Most importantly, it will json.loads(ep), get the data.

