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Pre-testing:

1. Set up connection so that your server can connect to the target server
2. Run 2 servers
3. Run 2 clients (one on each server)

Testing:

| | Process | Expected behavior | Result (Pass / Fail / Unsure) | Comment |
|---|---|--|-------------------------------|--|
| 1 | server_hello | The traffic is captured at the server | Unsure | The traffic is capture but: - If our server runs later, exception is raised on the other group's server. But, a server_hello message is received later on our end, which mean the connection between 2 servers are established. - When Group 12's server connect to ours, |
| 2 | client_update_request | A client list is sent back to the server. | Fail | Our server receives nothing after sending a client_update_request. |
| 3 | Sending message (chat or public_chat) from clients. | The message successfully appears in the correct format at target client (s). | Fail | - Due to the difference in the way to create signature and fingerprint, although public_chat is received at both ends, it is not validated. - As online clients from our server is not shown in Group 12's client's UI, I cannot choose a client to send message to. On the other hand, when our client send a private message to that server, "Unable to load PEM file" error is raised. |
| 4 | Updated online users | When a new user connects or a user disconnect in the distant server, the clients list on left-hand side menu is updated. | Unsure | - The expected behavior only happens on our end, when a user on the other side goes online. - When a client on the other server goes offline, the client list is received at |

| | | | |
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| | | | our client but is not properly handled. This make the offline user remain online on our end. - It does not work the other way (no update on Group 12's clients). |
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Screenshots:

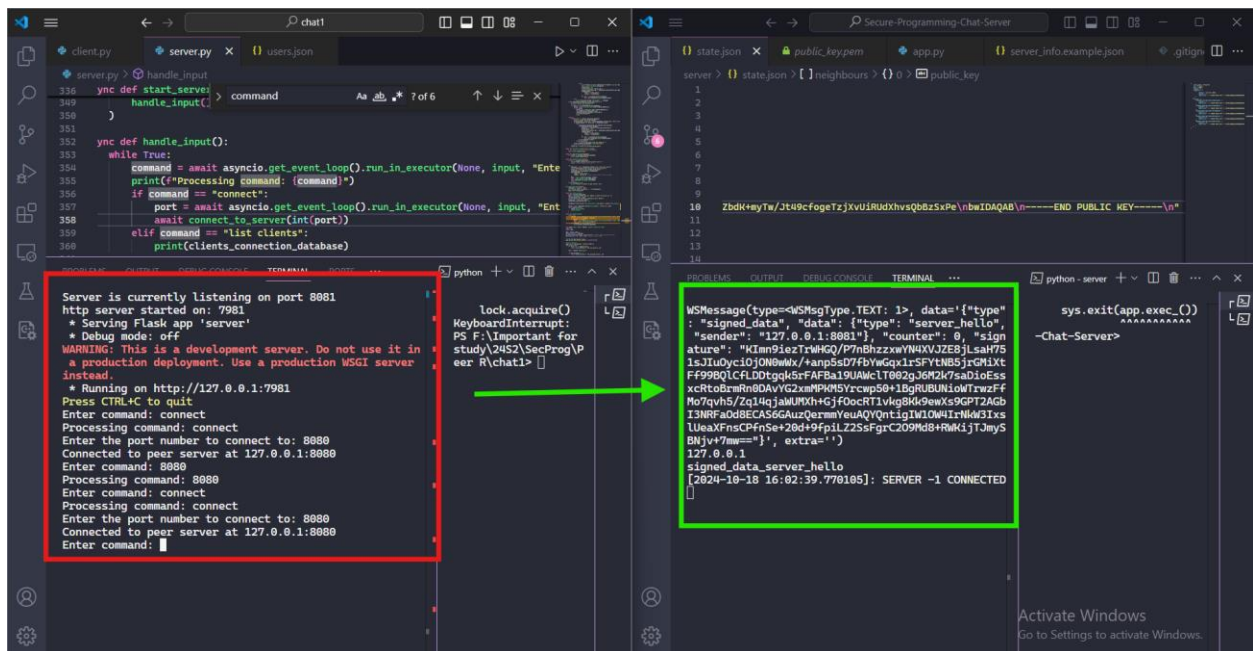
1.

Connecting our server to Group 12's

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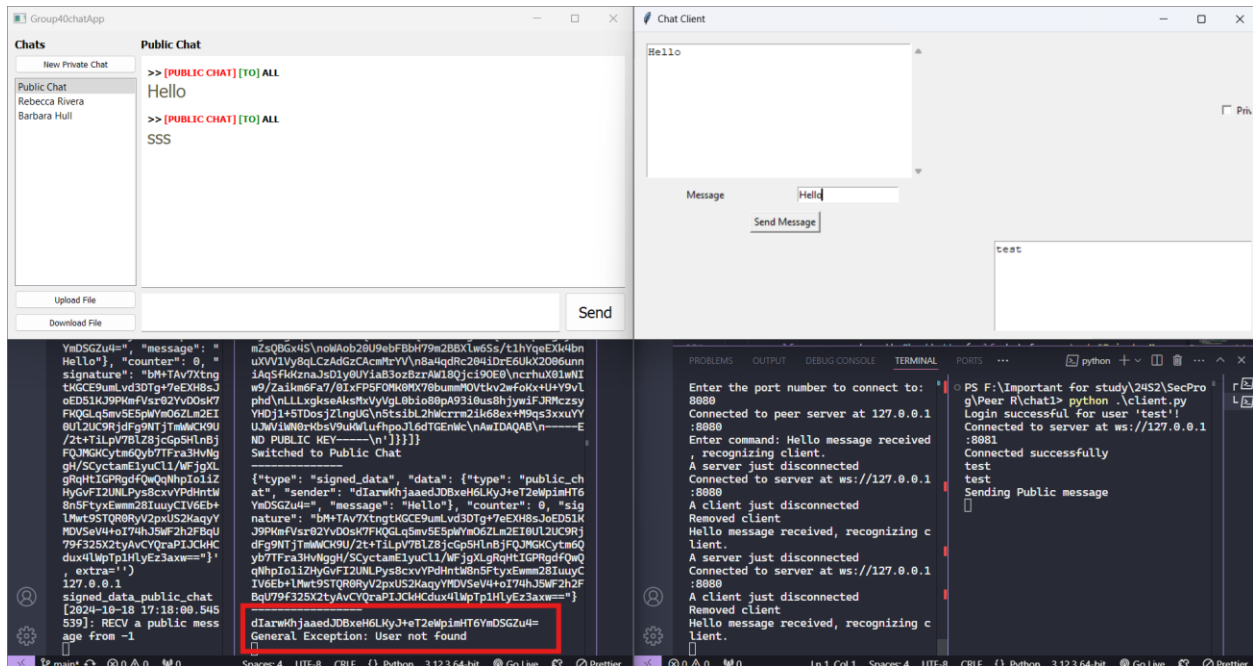
state.json
1 server > {} state.json > {} neighbours > {} 0 > public_key
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10 +YI7b3eKexvB0qBF0hAdPPK4S3XG1ZTrEM0Ijw\ncQIDAQAB/n-----END PUBLIC KEY-----\n*
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16 1VhPwH95zUwpnizL3ngd4qHOF+0h1h2hBYTjeeU7q\nOwIDAQAB/n-----END PUBLIC KEY-----*
17
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19

client.py
177 class ChatClient:
178     def __init__(self, host, port):
179         self.host = host
180         self.port = port
181         self.sock = None
182         self.conn = None
183         self.send_data = None
184         self.recv_data = None
185         self.is_private = False
186         self.is_public = True
187         self.create_widgets()
188
189     def create_widgets(self):
190         # Chat section
191         self.chat_frame = tk.Frame(self.root)
192         self.chat_frame.pack(padx=10, pady=10, fill=tk.BOTH, expand=True)
193         self.message_text = scrolledtext.ScrolledText(self.chat_frame, wrap=tk.WORD)
194         self.message_text.grid(row=0, column=0, columnspan=2, padx=5, pady=5)
195         self.client_list = scrolledtext.ScrolledText(self.chat_frame, wrap=tk.WORD)
196         self.client_list.grid(row=1, column=0, columnspan=2, padx=5, pady=5)
197         # Toggle between public and private messaging
198         self.is_private.set(False) # Start with public messaging
199
200     def connect(self):
201         self.sock = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
202         self.sock.connect((self.host, self.port))
203         self.conn = self.sock.makefile('r')
204         self.send_data = self.sock.makefile('w')
205         self.recv_data = self.sock.makefile('r')
206         self.is_private.set(False)
207         self.is_public.set(True)
208         self.create_widgets()
209
210     def send(self, data):
211         self.send_data.write(data)
212         self.send_data.flush()
213
214     def recv(self):
215         data = self.recv_data.read(1024)
216         if data:
217             self.message_text.insert(tk.END, data)
218             self.message_text.see(tk.END)
219             self.client_list.insert(tk.END, data)
220             self.client_list.see(tk.END)
221         return data
222
223     def run(self):
224         self.connect()
225         while True:
226             data = self.recv()
227             if data:
228                 self.message_text.insert(tk.END, data)
229                 self.message_text.see(tk.END)
230                 self.client_list.insert(tk.END, data)
231                 self.client_list.see(tk.END)
232             if self.is_private:
233                 self.send_data.write(self.recv_data.read(1024))
234                 self.send_data.flush()
235             else:
236                 self.send_data.write(self.recv_data.read(1024))
237                 self.send_data.flush()
238
239     def __del__(self):
240         self.sock.close()
241         self.conn.close()
242         self.send_data.close()
243         self.recv_data.close()
244
245     def __str__(self):
246         return f'ChatClient({self.host}, {self.port})'
247
248     def __repr__(self):
249         return f'ChatClient({self.host}, {self.port})'
250
251     def __eq__(self, other):
252         return self.host == other.host and self.port == other.port
253
254     def __neq__(self, other):
255         return self.host != other.host or self.port != other.port
256
257     def __hash__(self):
258         return hash((self.host, self.port))
259
260     def __lt__(self, other):
261         return self.host < other.host or self.port < other.port
262
263     def __gt__(self, other):
264         return self.host > other.host or self.port > other.port
265
266     def __le__(self, other):
267         return self.host <= other.host or self.port <= other.port
268
269     def __ge__(self, other):
270         return self.host >= other.host or self.port >= other.port
271
272     def __add__(self, other):
273         return self.host + other.host or self.port + other.port
274
275     def __sub__(self, other):
276         return self.host - other.host or self.port - other.port
277
278     def __mul__(self, other):
279         return self.host * other.host or self.port * other.port
280
281     def __div__(self, other):
282         return self.host / other.host or self.port / other.port
283
284     def __mod__(self, other):
285         return self.host % other.host or self.port % other.port
286
287     def __pow__(self, other):
288         return self.host ** other.host or self.port ** other.port
289
290     def __call__(self):
291         return self
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1058     def __setitem__(self, index, value):
1059         return self
1060     def __delitem__(self, index):
1061         return self
1062     def __len__(self):
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1064     def __iter__(self):
1065         return iter([self])
1066     def __contains__(self, item):
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1098     def __len__(self):
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1100     def __iter__(self):
1101         return iter([self])
1102     def __contains__(self, item):
1103         return self == item
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1105         return self
1106     def __setitem__(self, index, value):
1107         return self
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1399         return 1
1400     def __iter__(self):
1401         return iter([
```

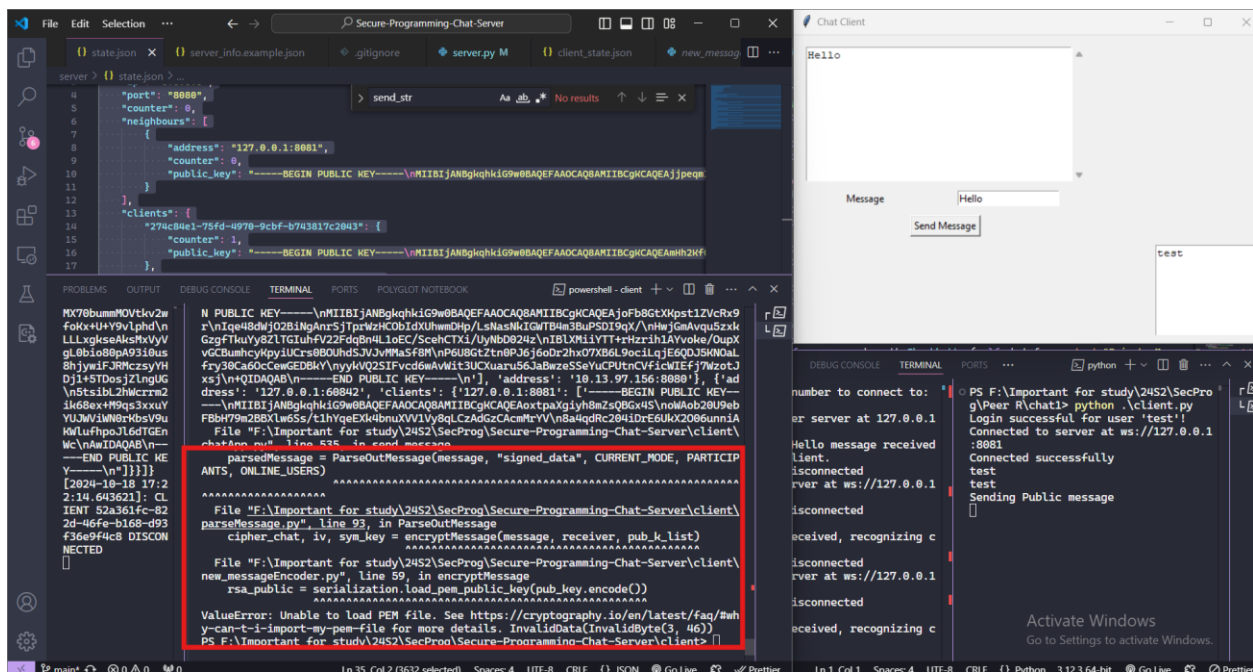


3. Sending messages

Sending public chat:



Sending private chat:



4. Online user update

(Inside red squares are the same entity)

