5. System implementation

5.1. Implementation plan

To be completed

5.2. Build tools and libraries

To be completed

5.3. Database creation and integration

5.3.1. Creation and remote connection to the database behind the firewall

Due to security reasons, direct connection to a service (database console), hosted on a protected network (University of Surrey network), is not possible [26]. The steps followed to enable the connection are described below:

1. Creation of a remote server on the protected network as well as a local workstation (a local MySQL server, database). Following the completion of the development phase on the (i) local workstation, the Pinboard website is deployed on the (ii) remote server.
2. To establish the connection between the (i) local workstation and the (ii) remote server a tunnel that uses a secure protocol is created.
3. Access to a free port can only be achieved from the localhost and not remotely [27]. For security reasons a high, local, port such as 10,000 is used and PuTTY listens to it for incoming connections.
4. The MySQL database that runs on the server listens to port 3306.

   ```
   $ ssh ck00113@student01.eps.surrey.ac.uk -L 10000:mysql0.ee.surrey.ac.uk:3306
   ```

   The use of '`-L`' states that the port is being forwarded. The use of '`10000:mysql0.ee.surrey.ac.uk:3306`' forwards the connections from the local port (`10000`) to the server port (`mysql0.ee.surrey.ac.uk:3306`). During this step a connection (Tunnel) is made between the local port and the server port.
5. Following the port set-up, the details for connection are pulled from the config file and the connection to the remote server is established.
6. The use of '`mysql -h mysql0.ee.surrey.ac.uk -u ck00113 -D ck00113 -p ck00113`' enables the connection to the database.

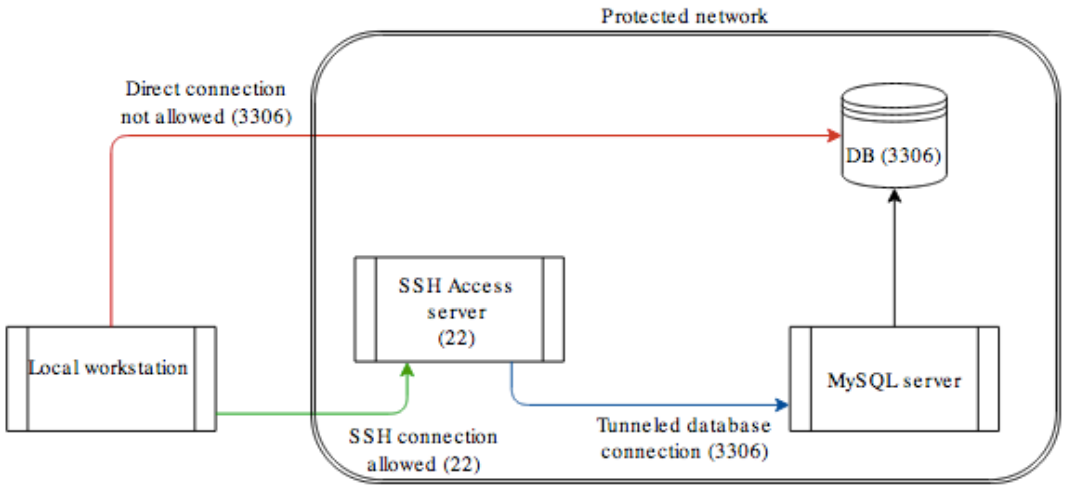


Figure 5: SSH Tunnel

5.4. Success criteria

- The deliverables and software development requirements met.
- The objectives are met.
- The website is functional.
- Delivery of final project in agreed timescale.
- System testing (requirements and UAT) is documented and completed.

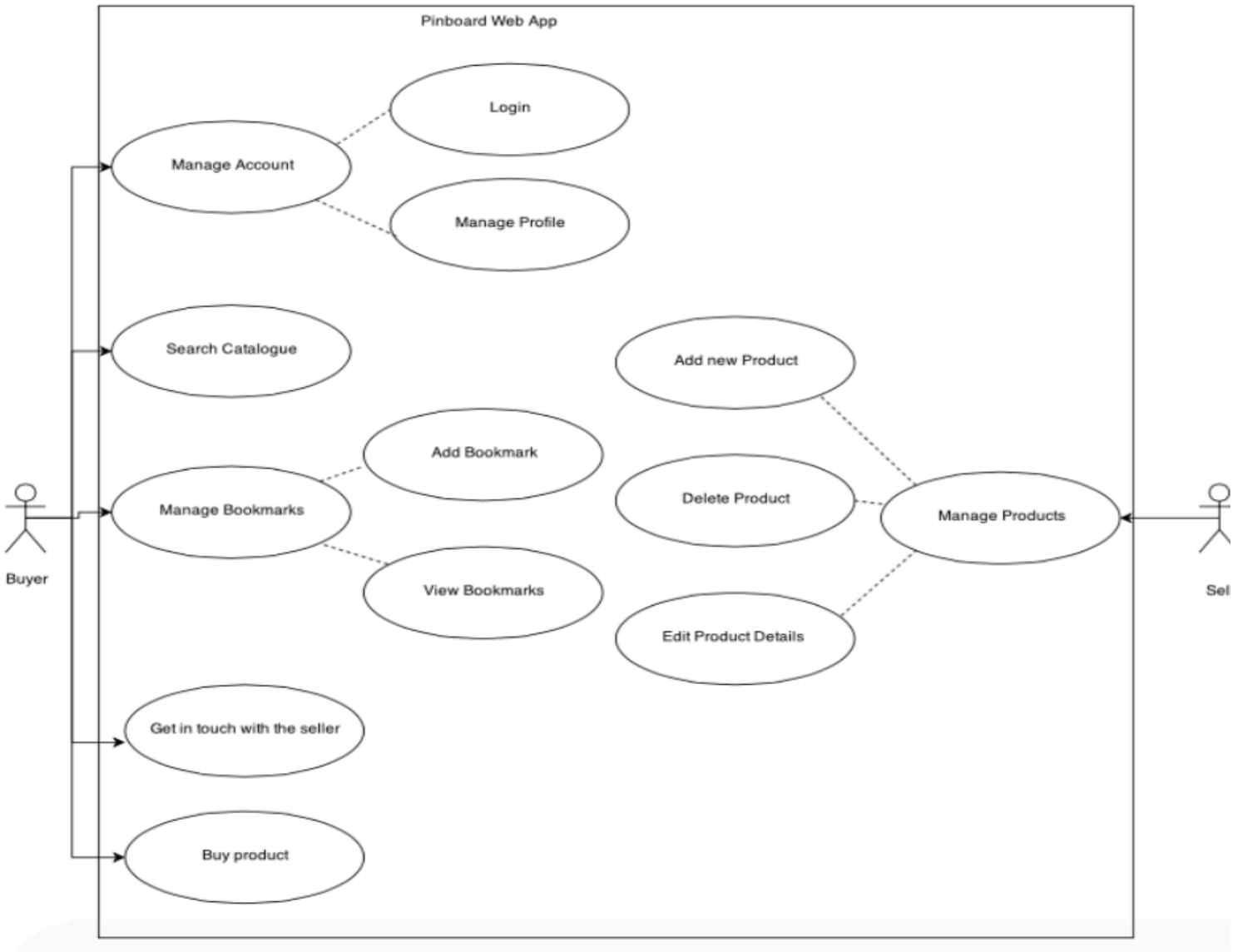
6. Diagrams

6.1. Class diagram

To be completed

6.2. Use case diagram

Use Case Name:	System Functionalities
Triggering event:	When the user browses the website
Description:	The diagram shows the functionalities available on the website.
Actors:	The user (seller and buyer)
Prerequisites:	1. The user is logged in. 2. Access to the Items database and User database is successful.
Flow of activities:	1. The user searches the books/rooms catalogue. 2. The items available in the database are shown to the user. 3. The user saves items of interest suing the bookmark functionality. 4. The user gets in touch with the seller to purchase the item.


Pinboard Web App
Login
Manage Account
Manage Profile
Search Catalogue
Add new Product
Add Bookmark
Manage Bookmarks
Delete Product
Manage Products
View Bookmarks
Edit Product Details
Get in touch with the seller
Buy product
Buyer
Sel