# Fortnite UML Report

# System Design Section 111

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# __Abstract__

Within this project report, we provide a synopsis of the sensational game, Fortnite. Fortnite is one of the largest growing games to ever come out in the world. The most insane part about this game… It is free. You can download it onto computers, game consoles, and on mobile devices as well. We were able to go into great detail relating to the facts, where you can play the game, how to play the game, and the specific steps that are needed in order to do certain aspects within. The members of our team were able to break down the specific parts in which you can play the game, invite friends, buy items at the store, purchase V-bucks, and more. We were able to put passion into a game we have played and enjoyed throughout the years that it has been around. Our team put together use-case, activity, sequence and ER Diagrams to bring to life, the joy we had while researching such an up and coming game. In addition, we created common SQL queries a user might have while playing the game. Finally, we analysed the HCI interaction of Fortnite using the major design principles. Below, we have summaries, diagrams with documentation, and a bunch of relevant facts to really give a strong understanding of the game we call today - Fortnite.

# <u>Summary of Relevant Facts</u>

Since it launched in 2017, Fortnite: Battle Royale has not only become the biggest title in the growing battle royale genre, but also the hottest game in the world. This title is based on Fortnite (now renamed Fortnite Save the World), a third-person cooperative, base-defense game. In 2017, developer Epic Games took this concept and spun it out into a separate, free-to-play battle royale game for PC, PlayStation 4 and Xbox One. It has gone on to eclipse the success of PUBG and other battle royale games like it, boasting a record-breaking 3.4 million concurrent players across all platforms. So while you're waiting for the game to download, you'll want to read up on exactly how Fortnite Battle Royale sets itself apart, and what you can expect on your first time out. Like other battle royale games, Fortnite Battle Royale is a competitive shooter between 100 players as they air-drop out of a moving plane (or "battle bus", in this case), then fight to survive as the play space slowly shrinks to force people into combat. True to the battle royale formula, you need to find all of your weapons and equipment on the map — you don't land with anything other than a pickaxe (Melcon, Andrew).

While you could try attacking someone with your pick, it's best used to harvest building materials from trees, cars and other free-standing objects so you can make your own walls, ramps and platforms.This is a carry-over from the base-defence game Fortnite Battle Royale sprang from, but this mechanic adds a new ingredient to the battle royale recipe that makes it stand apart (Melcon, Andrew).

Fortnite: Battle Royale is currently free to download on PC, PS4, Xbox One, Nintendo Switch, iOS and Android. While Battle Royale is free-to-play, there are various paid packages

that you can purchase in order to get more cosmetic items right out of the gate. For more on these options, check out our guide to fortnite free and paid version. The developers of Fornite Battle Royale have said the game will remain free-to-play permanently. Fortnite Save the World currently costs $39.99 to play, but once both modes leave Early Access later this year, Save the World will also become free-to-play. If you're playing on Xbox One, you will need an Xbox Live Gold account, however PS4 players won't need a PlayStation Plus account (Melcon, Andrew).

Fortnite does offer cross-platform play between most platforms, which you can opt-in to in the game's settings menu. One notable exception has been the PS4 version of Fortnite, which hasn't played nice with the Xbox One and Switch versions of the game since it launched. But Sony is finally working to change that after months of fan backlash, and cross platform play with Playstation is now supported. For more on which versions of Fortnite work with each other, be sure to check out our complete Fortnite cross-platform guide (Melcon, Andrew).

V-Bucks are the premium currency of Fortnite that are used to buy cosmetic items in the shop. Cosmetics include character skins, dances, glider skins and pickaxe skins. What's on offer can change from day to day, so check back often for the skin you've been looking for. One V-buck is about equal to a penny, and the fewest you can buy at once is 500 which is listed at $4.99 (Melcon, Andrew).

Player costumes can be bought with V-Bucks at any time, and some skins are earned through the Battle Pass or the Free Pass as you complete challenges. However, the same skins are not always available to earn or to buy. Every day the store cycles through new inventory that

can be bought with V-Bucks, so check back frequently for skin you want. Battle Pass skins change out with every content season, which usually lasts two or three months(Melcon, Andrew).

Occasionally, very special skins are offered for a premium price. The raven skin is a very detailed skin sold in early April for a short time for a hefty $20, and is no longer for sale. Epic may sell it again in the future, so keep your eyes peeled if you missed it (Melcon, Andrew).

Fortnite Battle Royale offers a few different progression systems to give you something to work toward as you play the game and it can be a little intimidating to figure out what all of it means. The Free Pass is a tiered system that unlocks some cool freebies, like account icons and emotes every once in awhile as you complete certain challenges. The Battle Pass is a premium version that unlocks rewards more often, including more cosmetic rewards and experience boosters that will help you rank up more quickly. Access to the Battle Pass costs 950 V-Bucks which is $9.50 and lasts throughout the season (Melcon, Andrew).

Fortnite, and in fact most of Epic's games, use AWS (Amazon Web Services) as the infrastructure to run games on. This cloud based service by Amazon is easily the biggest and most widely used cloud infrastructure at the time of publishing of this article. However, Google's Cloud Computing Services is gaining ground on Amazon. What does this mean to the average player of Fortnite? It means that when connecting to Fortnite, there are a number of hops that every connection must take. Amazon's world wide cloud computing distribution means that there are relatively few hops before you network packet finds its way to the entrance points of

the Amazon cloud. Once inside the AWS infrastructure traffic flows across a very fast private fibre network. See the map below to find the closest epic games servers to you (Fussman).



*Fortnite Server Locations*

This isn't the end of the story for Fortnite players network traffic. Fortnite's matchmaking will try and select the closest server to you when you load the game. This is not foolproof, occasionally Fortnite will try and connect the player to a server that is further away or the server closest you may indeed be laggy for some reason. If this happens the game can feel very laggy and you might want to try and reset the server connection. If this has happened to you do the following (Fussman).

● Check the Fortnite Status and see if there is a problem with your region.

- Check your Fortnite Server Ping. This will show you which server has the lowest latency.

If one or both above checks are highlighting a problem with the closest region to you then you can change the matchmaking region in the game. Do this by doing the following (Fussman).

1. Enter game settings.

2. Open the game tab.

3. Select matchmaking Region.

4. Apply the changes.



*Use Matchmaking Region to select a new Fortnite server*

Below we have listed all the known Fortnite server regions. Fortnite is constantly adding server capacity as the game's player base continues to grow. When more servers are added, even more people around the world can play (Fussman).

*Fortnite Server Regions*

| | |
|---|---|
| Ohio, USA | Singapore |
| Virginia, USA | Australia |
| California, USA | Canada |
| Oregon, USA | Frankfurt, Germany |
| Tokyo, Japan | Ireland |
| South Korea | London, UK |
| Osaka, Japan | Paris, France |
| Mumbai, India | Sao Paulo, Brazil |

# **System Specifications**

## **Use Case Diagram**
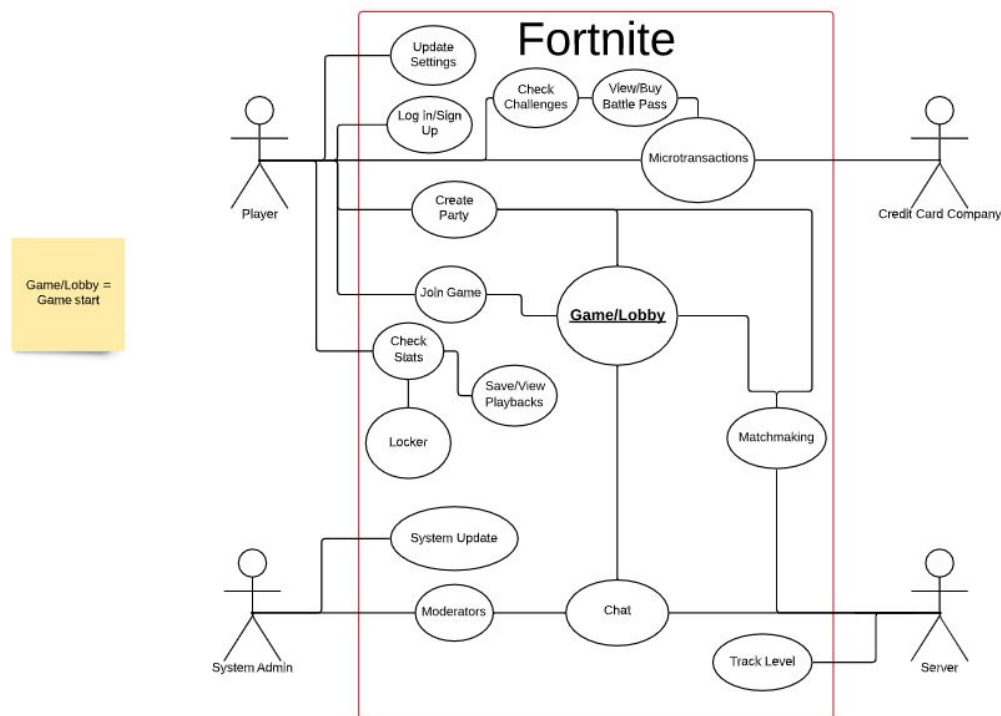


## **Actor: Player**

Log in - User logs into the app from the Epic Games Launcher or on their platform of choice (mobile, PSN, Xbox Live, or Switch Online), and is automatically log into the game.

Sign up - If the user is new, they will have to create an epic account through either the Epic launcher, PSN, Xbox Live, Switch Online, and Mobile. Each player is given an Epic ID once they sign up.

Microtransactions - Spend "V-Bucks" on cosmetic in-game items. Players can purchase V-Bucks with real money, and are given a set amount of V-Bucks when they start

- Buy Battle Pass - When a player buys a season's battle pass, they get 10 skins, stickers/sprays, 4 emotes, 4 gliders from the new set. When a new season of Fortnite starts, new customization items are added.

Create Party- Invite Friends to play with. Friends can be invited either through your platform's built in friends list, or an invite can be sent to their Epic ID, allowing you to play with people on different platforms.

Join Game - Find a group of players to play with.
- Skilled based matchmaking
- Competitive or casual based matchmaking

Game/Lobby - Begin/play a game with other people.

Check Stats - View past game statistics and current level. Tracks stats such as kill to death ratio (KD), level, experience points, and total wins.

Locker - The locker is where the user's cosmetic items are saved. These are unlocked by purchasing items with in game currency known as V-Bucks. These locker items allow the user to customize their character to their liking.

Save Playback - Allows users to save highlights and cool moments in their games. If a player gets a cool kill or has a funny moment with their friends, these replays can be saved for future viewing

- View Playback - Allows users to view the playbacks and replays they have saved

Check Challenges - Daily challenges are given out to keep the gameplay varied. These challenges are not required to play a game of Fortnite, but if they are completed, bonus experience points are rewarded, allowing for the player to level up faster.

## Actor: Credit Card Company

Microtransactions - Allows the user to purchase in game styles and outfits - gives no competitive advantage, but allows users to personalize their character. Players buy a currency called V-Bucks with real money.

- Buy Battle Pass - When a player buys a season's battle pass, they get 10 skins, stickers/sprays, 4 emotes, 4 gliders from the new set. When a new season of Fortnite starts, new customization items are added.

## **Actor: System Admin**

System Update - Allows the system to update when a new patch is released. Patches include updates such as new features, game balance, new cosmetic items available for character customization, and other tweaks to the game.

Moderators - In the public text chat, this will censor your words if you are typing inappropriately. This makes sure you are playing the game the right way as well, and are not cheating. Players will be banned if they are caught cheating.

## **Actor: Server**

Communication - Fortnite allows for three different methods of basic communication while playing a match

- Text Chat - A chat that allows you to enter a party and communicate with these specific members. This can be used before or during the game.
- Voice Chat - There is pregame voice chat but once entered in the game, you will not have the opportunity to speak with these individuals.
- Party Chat - This method of communication is private. If you are in a party with your friends, that is when you can speak with them during the game. This method of voice chat lasts throughout the entire game

Matchmaking - Group players or groups of players of appropriate skill level together for a game. Skill level is tracked by experience gained after a match is completed. Experience points are distributed at the end of the game, and if players pass a certain threshold, they level up.

- Add bots - If a user is a low level, bots are added to the game to better fit the skill level of the user

Game/Lobby - Create and host a game with all the players grouped by matchmaking.

Track Level - At the end of a match, the user is awarded experience points depending on how well they did. Once a player reaches a certain threshold, the player will level up, and will be matched with players that are more skilled

## **Activity Diagram - Play Game**
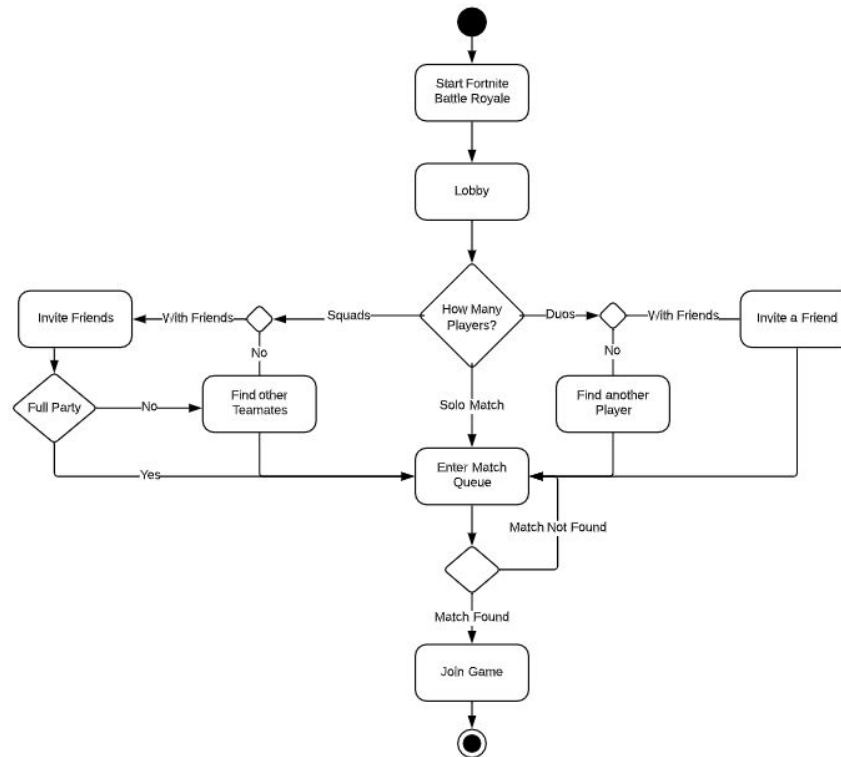


1. **Start Battle Royale** - Battle Royale is the classic player versus player game mode that Fortnite is known for. Players are placed into a match with 99 other players, and fight to be the last player or team standing.

2. **Lobby** - Choose game modes and setup game. The lobby acts as a menu in between matches, allowing players to catch a breather between games.

3. **How many players** - The first choice a player must make when deciding to play a game of Fortnite is how many players they want to play with. The game modes are broken into three categories - Solo, Duo, and Squad matches.

    a. **Solo Match** - 100 Player Free-for-all, Last man standing wins.

    b. **Duo Match** - 50 Teams of two players each compete to be the last pair alive. Player wins if they or their teammate survives.

        i. **With friends** - Players have the option to play with friends, or they will be paired up with another random partner.

        ii. **Invite a friend** - Every player has an Epic ID. To invite players that play Fortnite even if they play on a different platform, you can send an invite to their Epic ID. This allows players on all platforms to play with their friends.

        iii. **Find another player** - Another player is randomly found if a player is playing solo.

    c. **Squad Match** - Parties of multiple players (3-4 players on average) compete to be the last team alive. The team wins if a member of their party is the last one standing.

        i. **With friends** - Players have the option to fill out their squad with friends, or to have other random players be placed into their team.

        ii. **Invite friends** - Every player has an Epic ID. To invite players that play Fortnite even if they play on a different platform, you can send an invite to

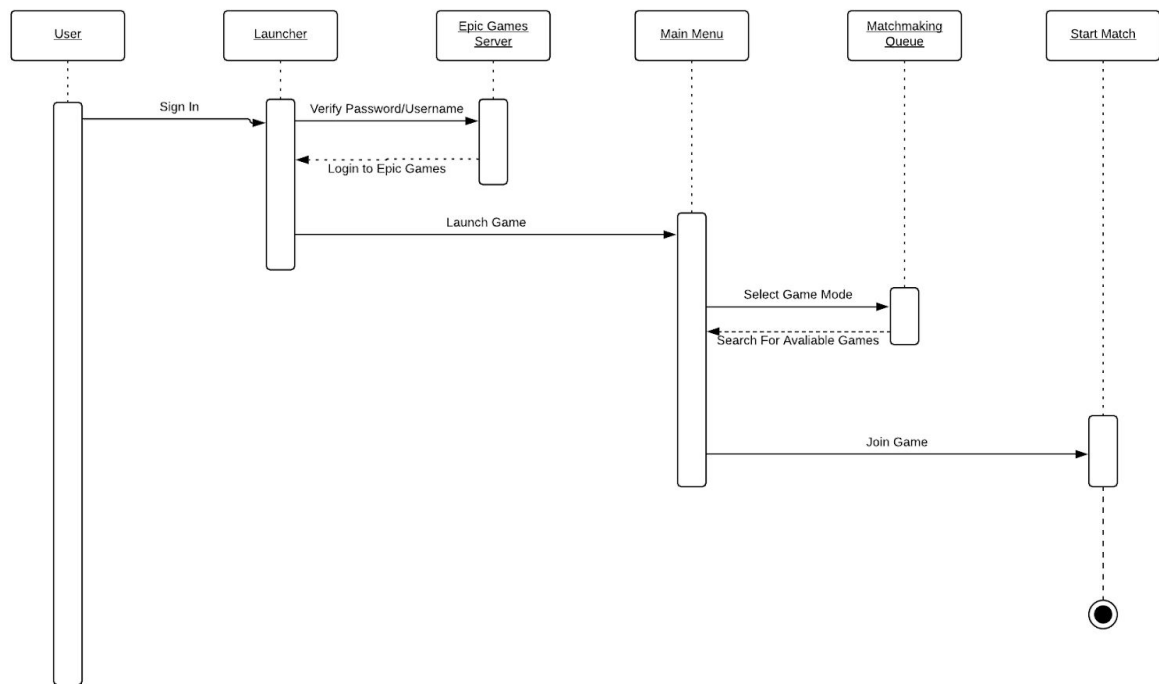their Epic ID. This allows players on all platforms to play with their friends.

  iii. **<u>Find other teammates</u>** - A random team of 3-4 players is made if the user decides not to invite any friends to their party.

4. **<u>Enter match queue</u>** - The match queue is created when a user decides to join a match. The user is placed in the match queue while the game tries to match the user with other players of similar skill level.

  a. **<u>Match found</u>** - Once a match is found, the player is removed from the match queue, and the game begins.

  b. **<u>Match not found</u>** - While a match is not found yet, players have full access to the lobby. They can customize their character, change their settings, and perform other actions while they wait for a match to begin.

5. **<u>Join Game</u>** - Now that a match is found, the player has officially begun a game of Fortnite.

## Sequence Diagram - Play Game



**User**

Sign In - A user must sign in to the Epic Games launcher before starting a game of Fortnite. The user can sign in with either their email, Playstation Network ID, Xbox Live username, or Nintendo Switch Online username.

**Launcher**

Verify Username/Password - The launcher has to decide if your login credentials are correct in order to continue forward to the Epic Games Server. If your username or password is incorrect, the launcher will send you back to the sign-in page so that you can re enter your information and retry the verifying process again.

Login to Epic Games - This message is sent back letting the user know that they have successfully logged into their Epic Games account. Now that they have done this, they can access their library of games and use the Epic Games launcher.

Launch Game - Once you have signed in to the Epic Games launcher, you can launch Fortnite from the launcher. To do this, a user would go to their library of games and click on the Fortnite icon. The game will login using your credentials and then launch the system so that the user can play.

**Epic Games Server**

Used to authenticate your username and password and stores all the information about the user including but not limited to: Profile, Name, Scores, Friends, and more.

**Main Menu**

Once the users launch the game, they are taken to the main menu. At this menu, they have a variety of choices to enter a game.

Select Game Mode - The user will pick the game mode they want to play. The options are squads, duos, and solo queue. Once the user picks the game mode they want to play, they are then entered into that mode's respective matchmaking queue.

**Matchmaking Queue**

The matchmaking queue will match you with players that are close to the same level as you, as well as the type of game mode selected for the users best enjoyment. Based upon the game mode chosen, the matchmaking queue will add the amount of people needed for that specific game and directly pair you with the players closely related.

Search for available games - While looking for a game, the player will be placed into a queue and sent back to the main menu. The game will look for a match in the background, and the user will be able to use all of the main menu functions while they are looking for a match.

**Start Match**

Join game - once a game is found, the user will leave the matchmaking queue and enter the game lobby. Now, you can play a game of Fortnite.

**Activity Diagram - Invite Friends**
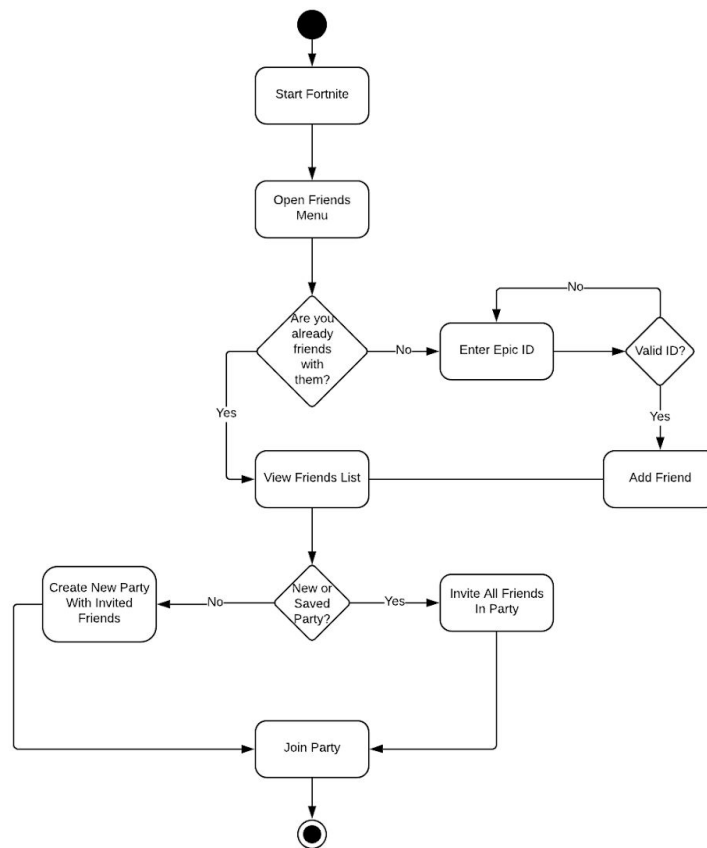


1. **Start Fortnite** - Using the Epic Games launcher, the first step to inviting your friends and creating a party to play Fortnite is to start the game.

2. **Open Friends Menu** - On the main menu, you can open the friends menu. In this menu, you can view your friends that you have already added, or you can add new friends using their Epic ID.

3. **Are You Already Friends With the Person You Want to Invite?** - Depending on if the user is friends with the person they want to invite or not, the process is a bit different. If

they are friends with the user already, they can add them to their party directly from the friends list. If they are not, then they have to add the friend by looking up their Epic ID.

4.  **Yes**

    a.  **View Friends List** - If you are already friends with the person you would like to invite, you can send them an invite directly from your friends list. Just scroll down to their corresponding Epic ID in your friends list and select the user to send them an invite to your party.

5.  **No**

    a.  **Enter Epic ID** - In order to add a new friend, the user must search for the person they want to add to their friends list using their unique Epic ID.

        i.  **Is the ID Valid?**

            1.  **Yes** - If the ID is valid, then the friend will be added. Now that they have been added to your friends list, you can now send them an invite.

            2.  **No** - If the ID is not valid, the user will be prompted to enter a valid Epic ID.

6.  **Are You Creating A New Party Or Using One That Already Exists?**

7.  **Using An Existing Party** - If the party already exists, and you have saved it, you can send an invite to everyone in that party.

8.  **Creating a New Party** - Once the user you have sent an invite to accepts your invitation, a party will be automatically created between you and them.

9. **<u>Join Party</u>** - Now that the party has been created and joined, users can now enter a game of Fortnite, and be sure that they will be partnered together in either duos or squad matches.

## Sequence Diagram - Invite Friends
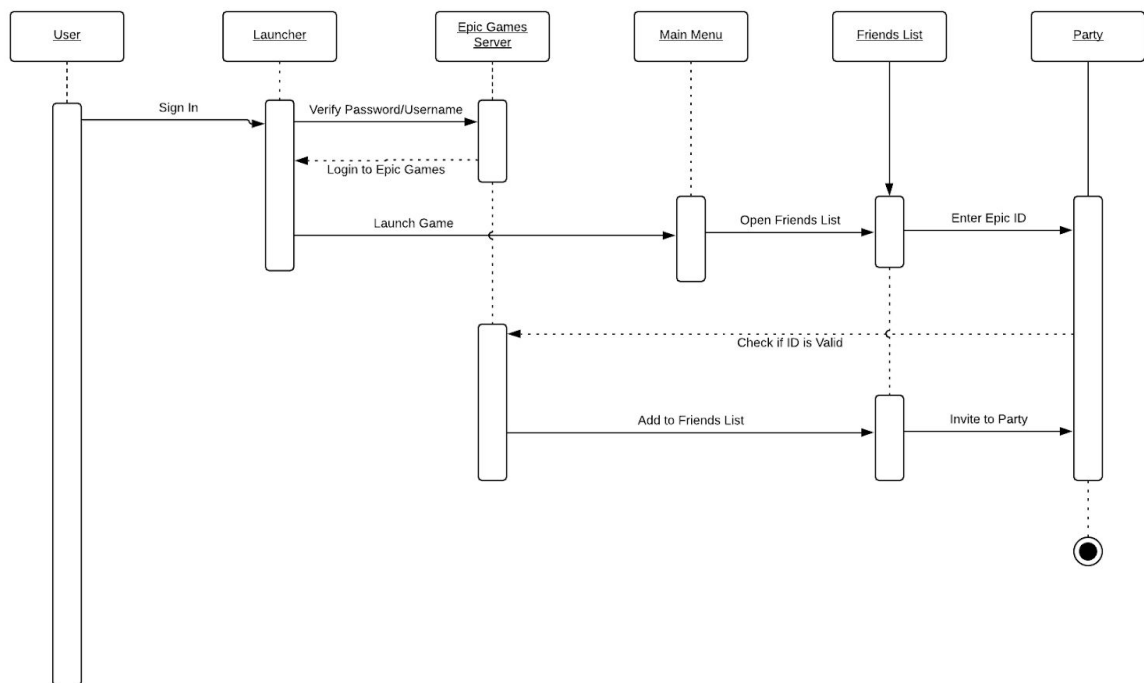


## Invite Friends Sequence Diagram

**User**

Sign In - A user must sign in to the Epic Games launcher before starting a game of Fortnite. The user can sign in with either their email, Playstation Network ID, Xbox Live username, or Nintendo Switch Online username.

**Launcher**

Verify Username/Password - The launcher has to decide if your login credentials are correct in order to continue forward to the Epic Games Server. If your username or password is incorrect, the launcher will send you back to the sign-in page so that you can re enter your information and retry the verifying process again.

Login to Epic Games - This message is sent back letting the user know that they have successfully logged into their Epic Games account. Now that they have done this, they can access their library of games and use the Epic Games launcher.

Launch Game - Once you have signed in to the Epic Games launcher, you can launch Fortnite from the launcher. To do this, a user would go to their library of games and click on the Fortnite icon. The game will login using your credentials and then launch the system so that the user can play.

**Epic Games Server**

Add to Friends List - Once the user you would like to add's Epic ID has been validated, that person will be added to your friends list. Once a user is added to your friends list, they can quickly be sent invites without having to enter their Epic ID manually every time they want to create a party.

Invite to Party - Now that the user has been added to your friends list, an invite can be sent to join your party. Once they accept your invitation, the party will be created, and you can add further friends using the same method.

**Main Menu**

Open Friends List - In order to send an invite to a player, the user must open their friends list. The friends list displays any other Epic Games members they have added as friends, and allows them to add new friends. If you are already friends with a user, an invite can be sent without entering their Epic ID. If not, they have to add the user as a friend before an invite can be sent.

**Friends List**

Enter Epic ID - To begin sending the invite, you must enter your friend's Epic ID to add them as a friend. Each player is assigned a unique Epic ID regardless of platform, so users playing Fortnite on any console can be friends with any other user regardless if they play the game on the same console.

Check if ID is Valid - The Epic Games server must check and see if the Epic ID you entered is assigned to a player or not. If the ID is not valid, Fortnite will prompt you to enter another valid Epic ID. If the ID is valid, then the user will be added to your friends list.

**Party** - Assuming the user accepts your invitation, a party will be created between you and your friend. From here, you can either invite more friends to join your party, or you can start playing a

match. Since you are in a party with the other player, matchmaking will ensure that you are on a team with your friend in either duos or squad matches.

**Store Activity Diagram:**
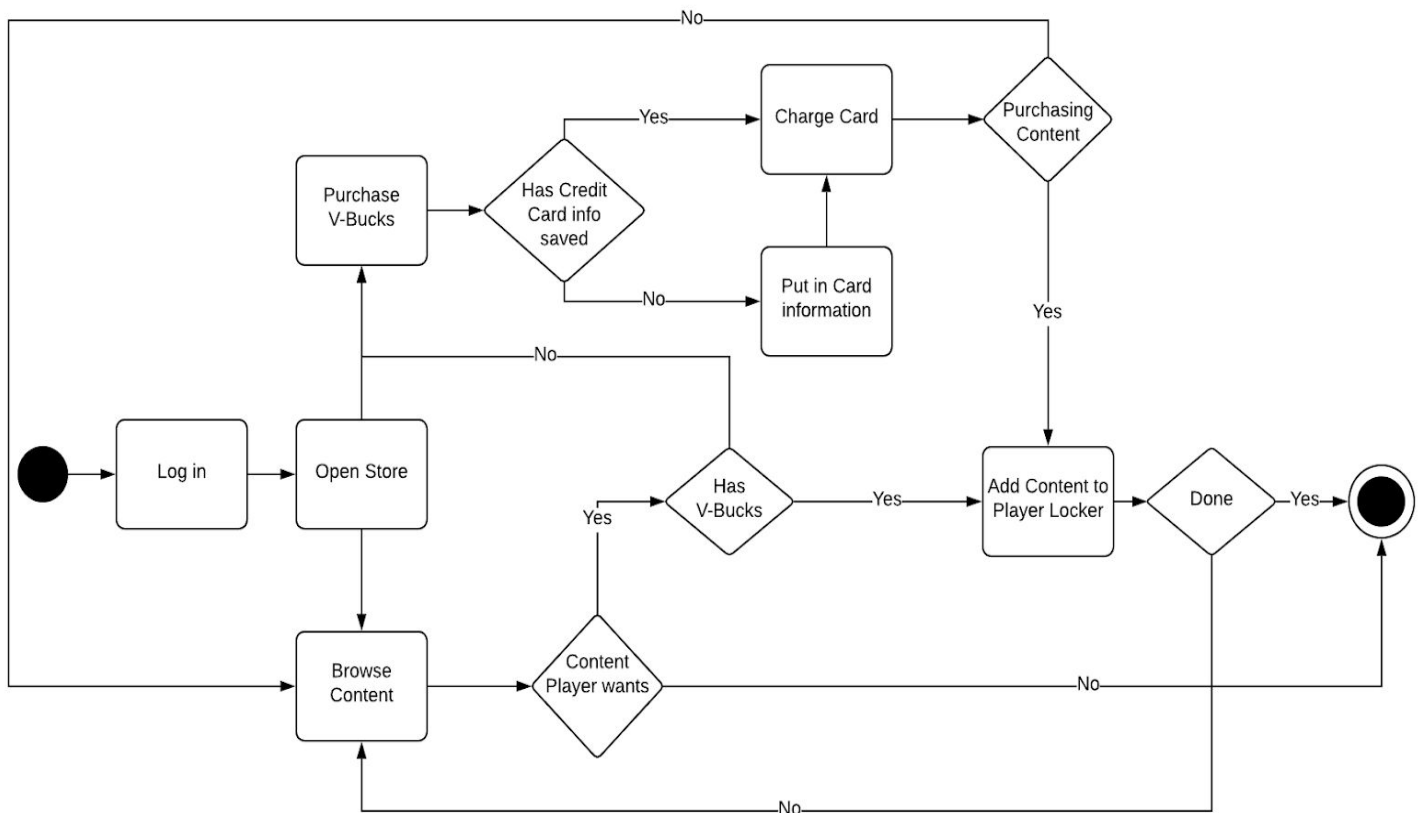


**Log in**

A user must sign in to the Epic Games launcher before opening the Fortnite Store. The user can sign in with either their email, Playstation Network ID, Xbox Live username, or Nintendo Switch Online username.

**Open Store**

The user must navigate to the store from the launcher. The Launcher will then retrieve and display the landing page for the store. This is the homepage for the store. It displays any new deals or special offers that are going on, as well as navigation to other parts of the store.

**Browse Content**

By far the most significant thing the user will do. The User can navigate through numerous different categories of accessories and cosmetic upgrades for the character/account. These upgrades will appear in game. The store displays each category as its own page. When the User clicks on an item it will bring up detailed information about the item and then the User will be able to purchase the item or not.

**Has V-Bucks**

After selecting their purchase, the Store will check the Users V-Buck balance, if enough V-Bucks are on the User's account, they will be subtracted from the account and the item/content will be added to the User's Locker Room. If the User does not have enough V-Bucks, they will be prompted to purchase more.

**Purchase V-Bucks**

The User may purchase Fortnite's in-game currency "V-Bucks" for real world currency. It is expected the Users will not purchase V-Bucks unless there is something in the store they intend to purchase. However, the User has the option to purchase V-Bucks from the Store at any point

during their browsing. Any V-Bucks that are not spent immediately are added to the User's account for future purchases. V-Bucks cost less per unit the more are purchased at a time, so it is expected that most User's will purchase enough to cover multiple transactions.

**Has Credit Card info saved**

If the User has made no purchases before, they will not have a card saved on their account. They will be required to provide a card or alternative payment method before continuing. Users also have the option to NOT save their card after a purchase, but it is expected that most people will save their card for the sake of convenience.

**Charge Card**

After a payment method has been selected the charge will go through and V-Bucks will be added to the User's account upon completion. At that point the User will either be returned to the store page they were on if they had no items queued for purchase, or they will be returned to the item they were in the middle of purchasing.

**Add Content Player Locker**

The content the player is purchasing with V-Bucks is added to their Locker and the amount of V-Bucks is subtracted from their account. Then they will be prompted to return to the store. The User may either accept and continue browsing the store or leave the store.

**Store Sequence Diagram:**
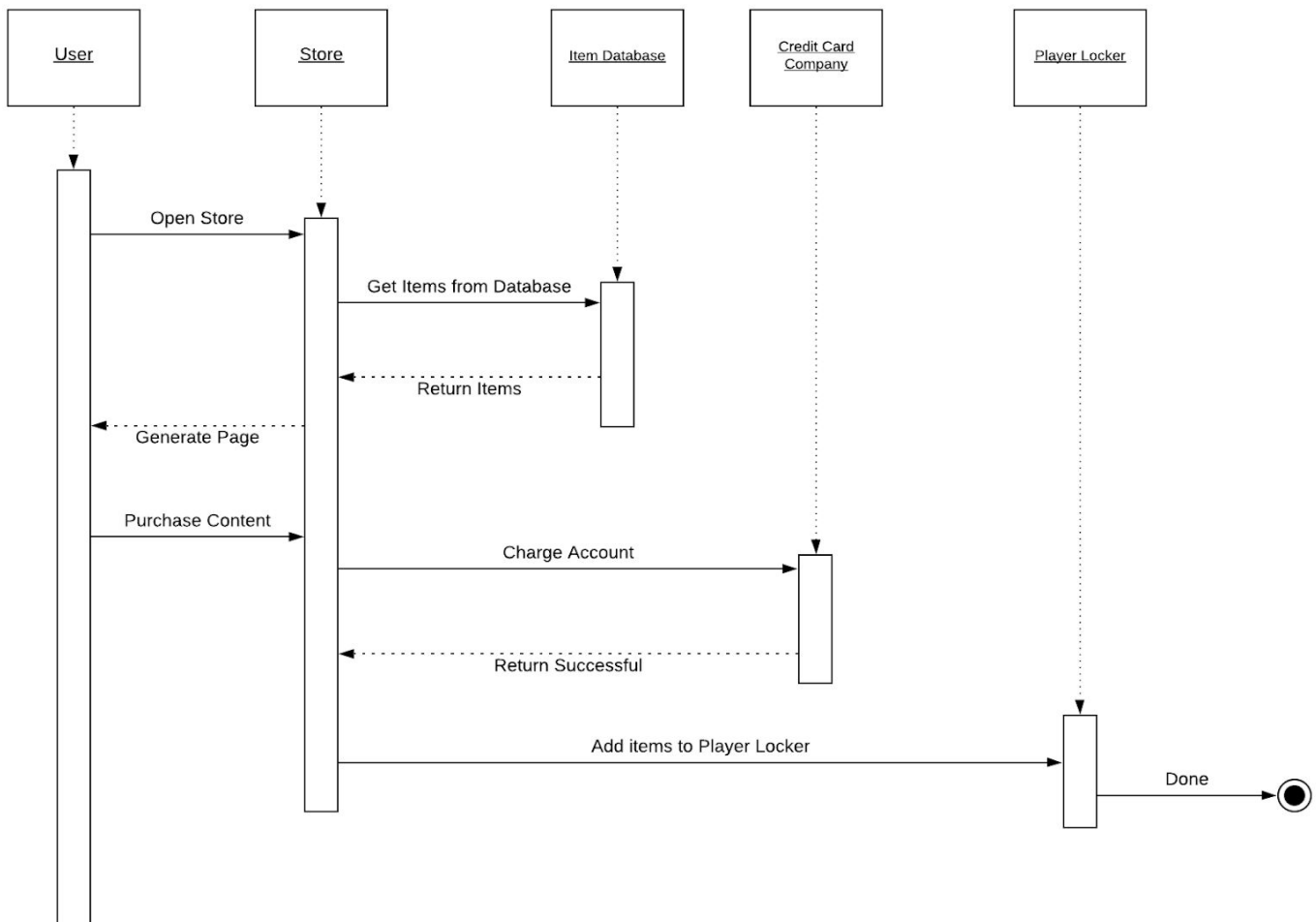


**User**

Open Store - The User starts the process by opening the store page from the Fortnite Launcher. It is assumed that the player has already logged onto their Fortnite account before now, since the store can only be accessed through the Fortnite Launcher.

Purchase Content - The player chooses the content from the store page that they wish to purchase.

**Store**

Get items from Database - Requests certain items or item types based on the page the User is currently looking at or the content the User is looking for. The items are then placed onto the page for the User to view.

Generate Page - Generates a store page with the content returned from the item database and then displays that to the user.

Charge Account - After the User has made a purchase, the Store will create a transaction for the Credit Card company to process, then wait for the transaction to be completed.

Add items to Player Locker - After the transaction is completed, the items purchased are added to the User's account.

**Item Database**

Return Items - Gets the items that the Store has requested and sends them back. This includes, the item's price, the item model, any animations attached to it, and any other data on that item.
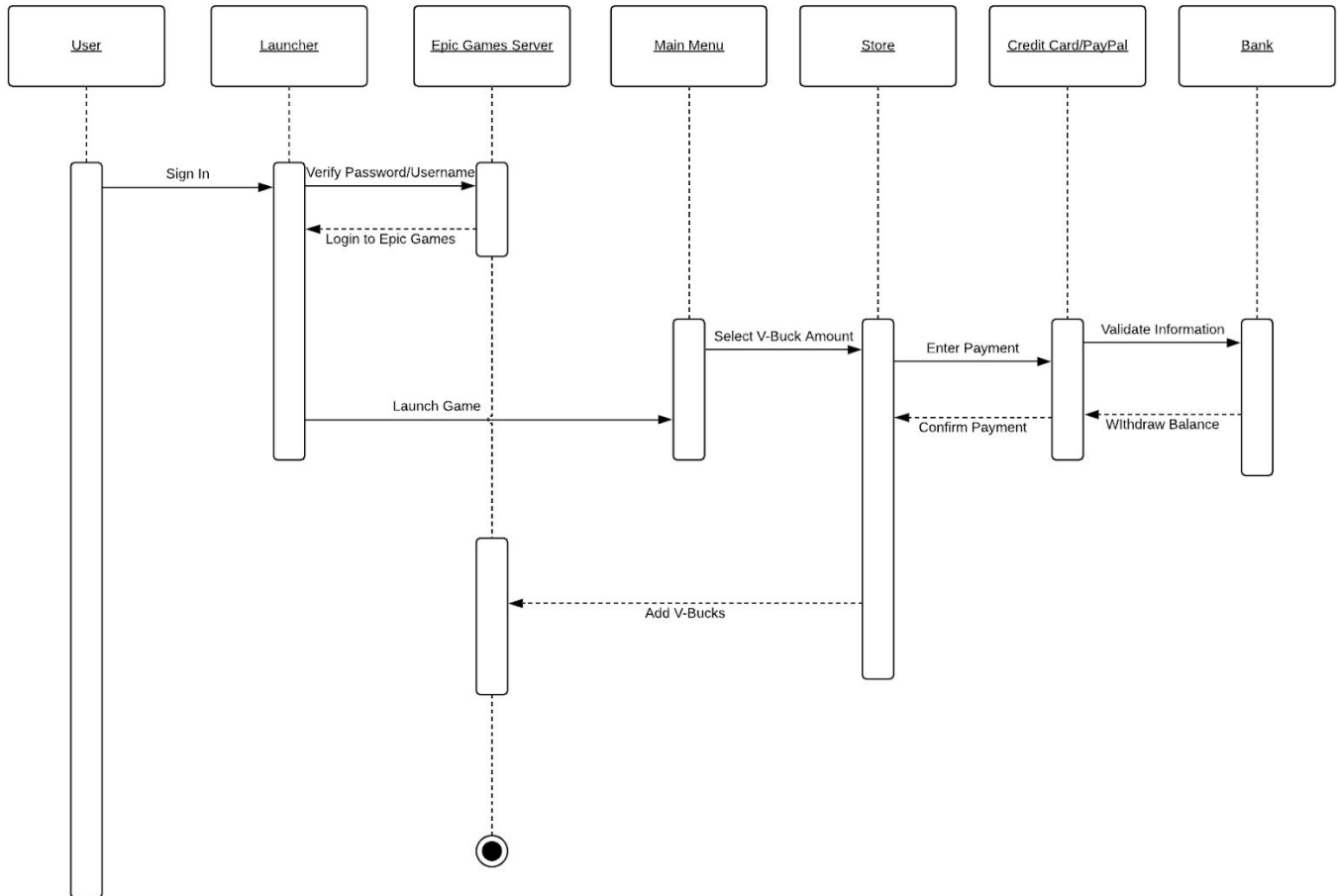
**Credit Card Company**

Return Successful - Returns the results of a transaction to the Store.

**Player Locker**

When a player purchases an item from the store, this is where the item is added to the Player's account. This is where the player will be able to interact with it once the item has been purchased.

**V-Bucks Sequence Diagram:**



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**Launcher:**

Verify Username/Password - The launcher has to decide if your login credentials are correct in order to continue forward to the Epic Games Server. If your username or password is incorrect, the launcher will send you back to the sign-in page so that you can re enter your information and retry the verifying process again.

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**Epic Games Server:**

Used to authenticate your username and password and stores all the information about the user including but not limited to: Profile, Name, Scores, Friends, and more.

**Main Menu:**

Once the users launch the game, they are taken to the main menu. At this menu, they have a variety of choices of tabs to select through.

**Store:**

Once the user selects the store icon, they will be brought to the screen where they have the choice to buy V-Bucks. The V-buck options are: 1,000 - 2,800 - 5,000 - 13,500. Once the user selects the amount of V-Bucks that they want to buy. They will be directed to the payment page.

**Credit Card/PayPal:**

The user will enter their payment information by using their credit card or their paypal account. After entering that information, the user will be asked to confirm their payment.

**Bank:**

Lastly, the bank will validate your information to make sure you have enough funds to pay for the V-Bucks. Next, the bank will withdraw the balance. After, the v-bucks will be added from the store directly to the users epic games server.

**V-Bucks Activity Diagram:**
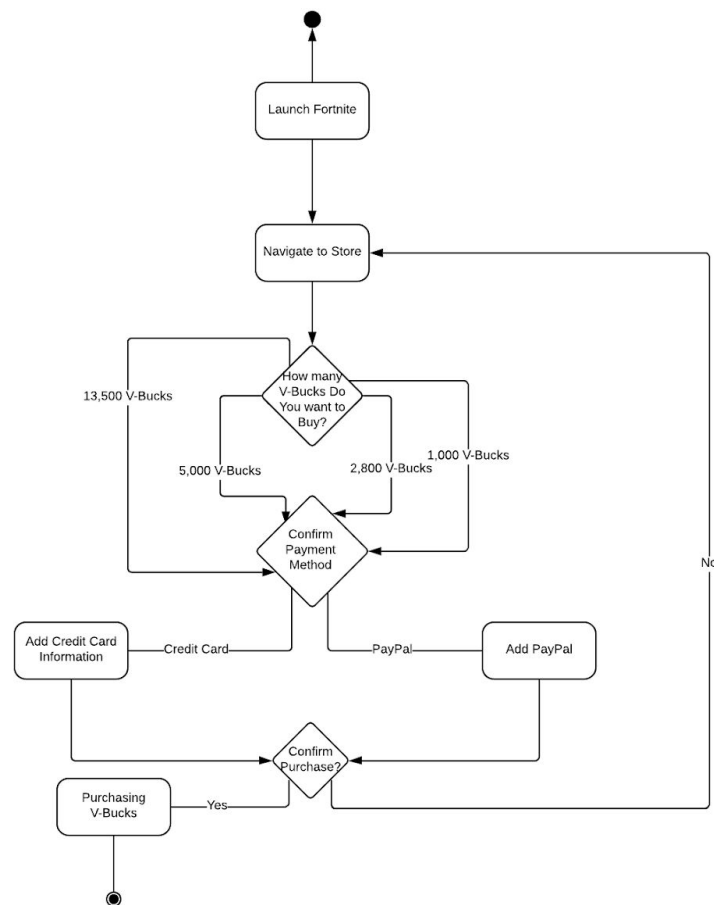


**Launch Fortnite:**

The user needs to launch Fornite using the epic games server. The user will have to use this in order to navigate to the main menu and then to the store.

**Navigate to Store:**

From the main menu, the user will have to navigate to the store so that they can have the opportunity to see what amount of V-Bucks that Fortnite will be offering.

**How Many V-Bucks Do You Want to Buy?:**

The user will have the opportunity to buy a certain amount of V-Bucks from the selection of 1,000 - 2,800 - 5,000 - and 13,800. Each one is a different price - the higher the amount, the higher the dollar amount needed to pay.

**Confirm Payment Method:**

After the user selects the amount of V-Bucks, they will have to confirm the payment method between a credit card and paypal.

**Add Credit Card Information:**

The user will enter their credit card information in order to purchase the selected V-Bucks amount and then brought to the page to confirm their purchase.

**Add PayPal:**

The user will enter their PayPal information in order to purchase the selected V-Bucks amount and then brought to the page to confirm their purchase.

**Confirm Purchase:**

After entering in the Credit Card or PayPal information, the user will be asked if they want to confirm their payment. If yes, the user will receive the purchased V-Bucks. If no, the user will be navigated back to the store to either start the process over or not buy any.

**Purchasing V-Bucks:**

The user will purchase the V-Bucks and they will be able to be used to buy whatever items within the amount that is purchased.

**Create Epic ID Activity Diagram**
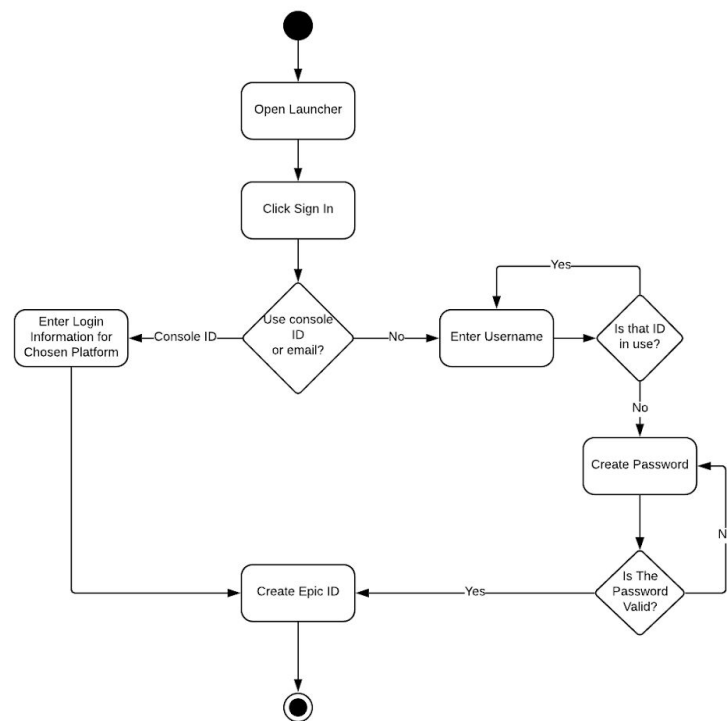
**Open Launcher:**

In order to create an Epic ID, the user must either open the Epic Games launcher or the Epic Games website to create an account.

**Click Sign In:**

To get to the screen to create an account, the user must go to the sign in page. Once they are there, they can click that they do not already have an account, and then will be prompted to create their account.

**Use Console ID or Email?**

If a user already has an account on Playstation Network, Xbox Live, or Nintendo Switch Online, they can use their login information from those accounts to create an Epic ID. If this option is chosen, then an Epic ID with their username and password from the respective platform will be created.

- **Enter Login Information For Chosen Platform:** In order to link the two accounts, the user must enter their login information for their platform of choice. Once this is done, the two accounts will be linked and users will be able to login to their Epic Games account using their respective console's online username.

- **Enter Username:** If the user does not use another account to login, they will have to create their own username. If their username is taken, they will be prompted to enter another one that is not.

- **Create Password:** After the user has created a username, they must create a password to go along with their Epic ID. If the password is valid, an Epic ID will be created.

**Create Epic ID:**

Once the user has followed the steps to create an account, their Epic ID will be created and they will be able to play Fortnite.

**Create Epic ID Sequence Diagram**
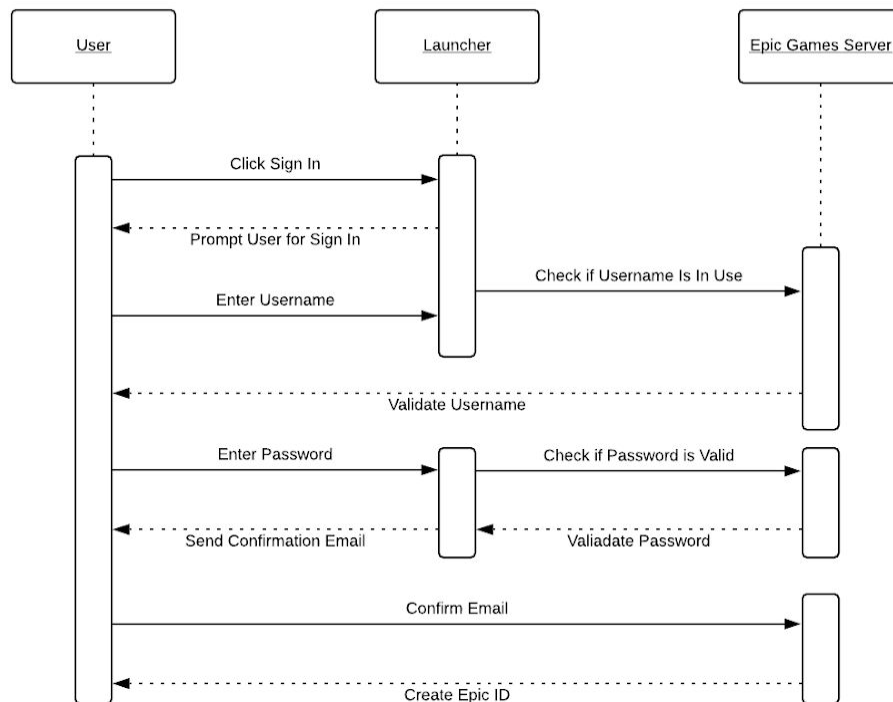


**User**

Click Sign in - To get to the screen to create an account, the user must go to the sign in page. Once they are there, they can click that they do not already have an account, and then will be prompted to create their account.

Enter Username - The user will first be prompted to enter their username. They can use a username that is connected to their Playstation Network, Xbox Live, or Nintendo Switch Online account, or they can create a unique one.

Enter Password - The user will then be prompted to create a password.

Confirm Email - After the confirmation email is sent, the user must confirm their email in order to create the Epic ID.

**Launcher**

Prompt User to Sign In - When the user clicks sign in, they will then be prompted to enter their username and password, or create a new account.

Check if the Username is in Use - The Epic Games server will confirm that the username you entered is not being used by another player. If it is, then they will be prompted to enter a different username

Check if Password is Valid - The Epic Games server must validate your password. Once it is validated, then the user will be sent a confirmation email.

**Epic Games Server**

Validate Username - This message will be sent once it is confirmed that the username is valid.

Validate Password - This message will be sent once it is confirmed that the password is valid.

Create Epic ID - Once the email is confirmed, the user's Epic ID will be created.

**ER Diagram**
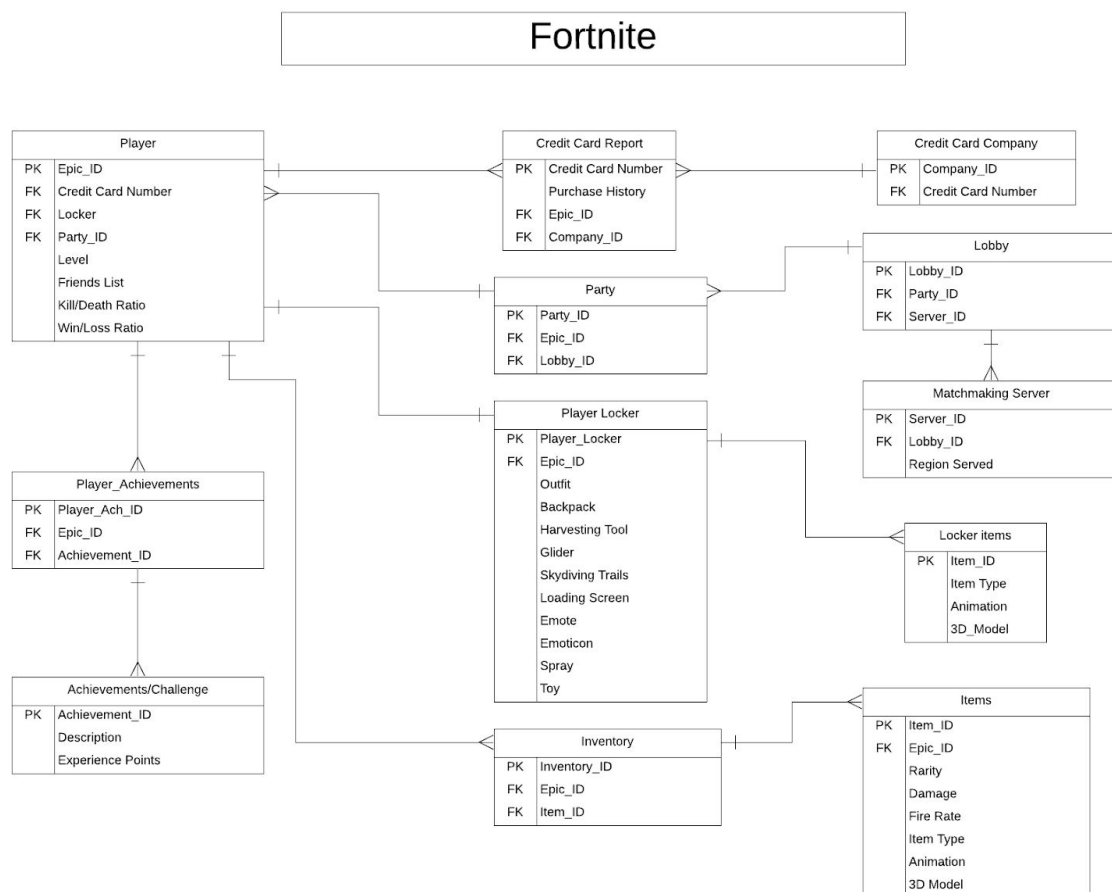


Entities:

- Player

  - **Primary Key: Epic_ID**

    - Each user's username for login

  - Foreign Key: Default Credit Card Number Hash

- An encrypted reference to each user's default payment method for microtransactions.

  ○ <u>Foreign Key: Locker</u>

  - ID reference to object that stores owned cosmetic data.

  ○ <u>Foreign Key: Party_ID</u>

  - ID reference to party joined

  ○ Attribute: Level

  - Player's numeric experience level

  ○ Attribute: Friends List

  - Imported friends list from Epic Launcher

  ○ Attribute: Kill/Death Ratio

  - Stats for kills and deaths of player

  ○ Attribute: Win/Loss Ratio

  - Stats for wins and losses of player

- Player Locker

  ○ **<u>Primary Key: Player_Locker:</u>**

  - ID reference for a player's locker and unlocked cosmetic information

  ○ <u>Foreign Key: Epic_ID:</u>

  - Each user's username for login; primary key above for player entity

  ○ <u>Foreign Key</u>: Outfit

  - Each of the following is a type of equippable cosmetic that alters how your game looks as well as how your avatar looks to other players. They aren't individually important perhaps other than the fact that the filenames these attributes reference can be describing anything from animated 3-D models to static flat images. Each

of these uses the Item_ID primary key as the database reference. Each attribute is multivalued and references each Item_ID of a certain category that resides within a player's locker.

- ○ <u>Foreign Key</u>: Backpack

- ○ <u>Foreign Key</u>: Harvesting Tool

- ○ <u>Foreign Key</u>: Glider

- ○ <u>Foreign Key</u>: Skydiving Trail

- ○ <u>Foreign Key</u>: Loading Screen

- ○ <u>Foreign Key</u>: Emote

- ○ <u>Foreign Key</u>: Emoticon

- ○ <u>Foreign Key</u>: Spray

- ○ <u>Foreign Key</u>: Toy

- Locker Items

  - ○ **<u>Primary Key: Item_ID</u>**

    - ■ An ID that is used to reference each cosmetic item in the game.

  - ○ Attribute: Item Type

    - ■ Labels which of the types of cosmetic (the types are listed above) the cosmetic is

  - ○ Attribute: Animation

    - ■ References the animation/s each item utilizes in-game

  - ○ Attribute: 3-D Model

    - ■ References the 3-D model used for each item

- Credit Card Report

  - ○ **<u>Primary Key: Credit Card Number (HASHED)</u>**

- - - ■ A hashed version of the credit card # used as an ID/Primary Key. This is saved and used to remember billing information for later purchases.
    - ○ Attribute: Purchase History
    - ○ Foreign Key: Epic_ID
    - ○ Foreign Key: Company_ID
- Credit Card Company
    - ○ **Primary Key: Company_ID**
    - ○ Foreign Key: Credit Card Number
- Party
    - ○ **Primary Key: Party_ID**
    - ○ Foreign Key: Epic_ID
    - ○ Foreign Key: Lobby_ID
- Lobby
    - ○ **Primary Key: Lobby_ID**
    - ○ Foreign Key: Party_ID
    - ○ Foreign Key: Server_ID
- Matchmaking Server
    - ○ **Primary Key: Server_ID**
    - ○ Foreign Key: Lobby_ID
    - ○ Attribute: Region Served
- Items
    - ○ **Primary Key: Item_ID**
    - ○ Foreign Key: Epic_ID
    - ○ Attribute: Rarity

- ○ Attribute: Damage/Healing

- ○ Attribute: Fire Rate

- ○ Attribute: Item Type

- ○ Attribute: Animation

- ○ Attribute: 3D Model

- Inventory

  - ○ **Primary Key: Inventory_ID**

  - ○ Foreign Key: Epic_ID

  - ○ Foreign Key: Item_ID

- Player Achievements

  - ○ **Primary Key: Player_Ach_ID**

  - ○ Foreign Key: Epic_ID

  - ○ Foreign Key: Achievement_ID

- Achievements/Challenges

  - ○ **Primary Key: Achievement_ID**

  - ○ Attribute: Description

  - ○ Attribute: Experience Points

Relationships:

- Player-Credit Card Report: 1-M

  - ○ One player can have many credit card reports and purchases. The player can purchase from a list of items and then create purchase history.

- Credit Card Report-Credit Card Company: M-1

- ○ The many credit card reports that Fornite receives due to purchases will connect with one credit card company for that specific player. This is used so that Fornite can know who paid for what and which credit card company to charge.

- Player-Party: M-1

  - ○ You can have one party for many players. The benefits would be that you can communicate with the members of your party and can play with them as well.

- Party-Lobby: M-1

  - ○ One lobby consists of multiple parties. Within each game, the multiple parties can interact and play specific game modes together.

- Lobby-Matchmaking Server: 1-M

  - ○ One lobby to many servers. The matchmaking server will connect the user with many individuals throughout the region and add them into the one lobby for that game mode.

- Player-Player Locker: 1-1

  - ○ One player can interact with their own player locker. The player locker is where all the users items are stored so that upgrades can be made.

- Player Locker-Locker Items: 1-M

  - ○ The one player locker consists of multiple locker items. The locker items are animated pieces that the player can use to upgrade and change skins for the most enjoyable experience.

- Player-Items: 1-M

  - ○ One player will have multiple items throughout the game. The items can be rare and certain types that can change the way your player looks and how the feel of the game can be.

- Items-Inventory: M-1

- ○ The player keeps the many items within their one inventory so that other players cannot steal from the game, as well as other players. Most times this is downloadable content so Fortnite would want users to pay for or unlock the items instead.

- Player-Player Achievements: 1-M

  - ○ One player will have many achievements while playing the game. The player can unlock items and gain achievements based upon their play. The player will complete certain challenges to complete the achievements.

- Player Achievements-Achievements/Challenges: M-1

  - ○ Fortnite gives the player many opportunities to complete all different challenges but the game is set up so that it is based on one users play instead of many. These are individual accolades that the player completes on their own.

**SQL Queries**

**Buying Daily Items From the Store**

| Item Name | Price | Item Type | Purchased | Available Until |
|-----------|-------|-----------|-----------|-----------------|
| Star Power | 800 V-Bucks | Emote | No | 12:00 PM |
| Hootenanny | 500 V-Bucks | Emote | Yes | 12:00 PM |
| Birdie | 800 V-Bucks | Skin | No | 12:00 PM |
| Recon Specialist | 1200 V-Bucks | Skin | No | 12:00 PM |
| Living Large | 500 V-Bucks | Emote | Yes | 12:00 PM |
| Driver | 500 V-Bucks | Harvesting Tool | No | 12:00 PM |

**Item Name** - The item name describes what the name of the item you want to purchase is. It allows users to identify each item easier, and remember which ones they want.

**Price** - Each item has a specific price in V-Bucks. If the user pays the required amount of V-Bucks, then the item is added to their inventory and it can be used to customize their character.

**Item Type** - There are many different types of items to customize your character in Fortnite. The item types are emotes, skins, harvesting tools, sprays, trails, loading screens, backpacks, gliders, and toys.

**Purchased** - This indicates if the user has purchased the item or not.

**Available Until** - Since we are buying items from the daily shop, each item will no longer be available by the end of the day.

## Completing Challenges

| Challenge Type | Difficulty | Description | Reward | Completed |
|---|---|---|---|---|
| Daily | Common | Place top 10 in solos or duos | 12500 XP | Yes |
| Daily | Common | Search 3 supply drops | 12500 XP | Yes |
| Trick Shot | Common | Get 2 kills while at 50 HP or less | 52000 XP | No |
| Trick Shot | Uncommon | Complete 8 other trick shot challenges | Loading Screen | No |
| Hunter and The Hunted | Common | Land in Frenzy Farm, Sweaty Sands, and Slurpy Swamp | 52000 XP | No |

**Challenge Type** - Each challenge is separated into different categories that vaguely describe the type of challenges it hosts. For example, daily challenges feature a variety of challenges that go

away after the end of the day, and trick shot challenges usually require the player to get cool kills or win in tense situations.

**Difficulty** - The difficulty of the challenge indicates how hard it will be to complete. Harder challenges give better rewards, to make them worth doing.

**Description** - The description of the challenge tells the user how to complete the challenge.

**Reward** - When the challenge is completed, the user is given whatever the reward is. Rewards can range from either experience points or locker items for player customization.

**Completed -** This indicates if the challenge has been completed or not.


**In Game Inventory**

| Item Type | Name | Rarity | Damage/Healing | Ammo/Quantity |
|---|---|---|---|---|
| Shield Potion | Minor Shield Potion | Uncommon | Gain 50% Shield | 1 |
| Material | Wood | Common | N/A | 300 |
| Weapon | Shotgun | Epic | 85-87 Damage | 8 |
| Health Potion | Bandage | Uncommon | Gain 50% Health | 2 |

**Item Type** - Each item has a type that it is categorized into. There are weapons, materials for building, shields, healing items, and more.

**Name** - The name of the item indicates what the item is.

**Rarity** - The rarity of the item describes how rare the item is. Rarer versions of the same item tend to do more damage or heal more.

**Damage/Healing** - This field indicates how much damage a weapon does, or how much health/shield a potion heals. Not every item has a value in this field. For example, materials are only used for building, so they can't heal the player or deal damage to another player.

**Ammo/Quantity** - This field indicates how much of a certain item the player has.

**Locker Items**

| Item Type | Item Name | Rarity | Equipped |
|---|---|---|---|
| Emote | Dance Moves | Common | Yes |
| Skin | Rook | Epic | Yes |
| Skin | The Reaper | Legendary | No |
| Harvesting Tool | Eva | Epic | Yes |
| Glider | Splashdown | Epic | Yes |
| Trail | All-Star | Rare | No |
| Loading Screen | A Looming Threat | Uncommon | No |

**Item Type** - There are many different types of items to customize your character in Fortnite. The item types are emotes, skins, harvesting tools, sprays, trails, loading screens, backpacks, gliders, and toys.

**Item Name** - Each item has a unique name to help users identify which item is which.

**Rarity** - The rarity of an item indicates how rare it is. Rarer items appear less frequently in the shop, and cost more V-Bucks when they do show up.

**Equipped** - Indicates if the item is equipped or not.

**Friends List**

| Epic ID | Online Status | Last Online | In Game |
|---------|---------------|-------------|---------|
| x TrueGod | Offline | 2 Days Ago | No |
| JKSAP | Online | Now | Yes |
| uncle jamimah | Offline | 1 hour ago | No |
| armendo90 | Online | Now | No |

**Epic ID** - This field tells you the Epic ID of your friend. Each person who plays Fortnite creates a unique Epic ID when they sign up.

**Online Status** - This field lets you know if the player is online or offline.

**Last Online** - If a player is offline, Fortnite will let you know when they were last online.

**In Game** - If a player is online, Fortnite will let you know if they are in the game or not. If they are in a game, they cannot be invited to your party but if they are not, they can be.

# HCI: Navigation and Interface

Fortnite maintains a minimalistic design aesthetic both in it's menu design in game and in the lobby. The style is kept simple and non specific in order for users to be able to use it on multiple different platforms. Fortnite is on PC, mobile phones, and gaming consoles, so the design must be similar across all platforms in order for the user to be able to use it properly. One aspect of the design of Fortnite that is done really well is the layout when in a match. In every corner of the screen, important information is displayed, with the most important items being bigger than the others. However, the items are not any bigger than they need to be, because they could obstruct a player's vision while in a match. In addition, they are also intentionally transparent, so they don't obstruct the player's vision in a match.
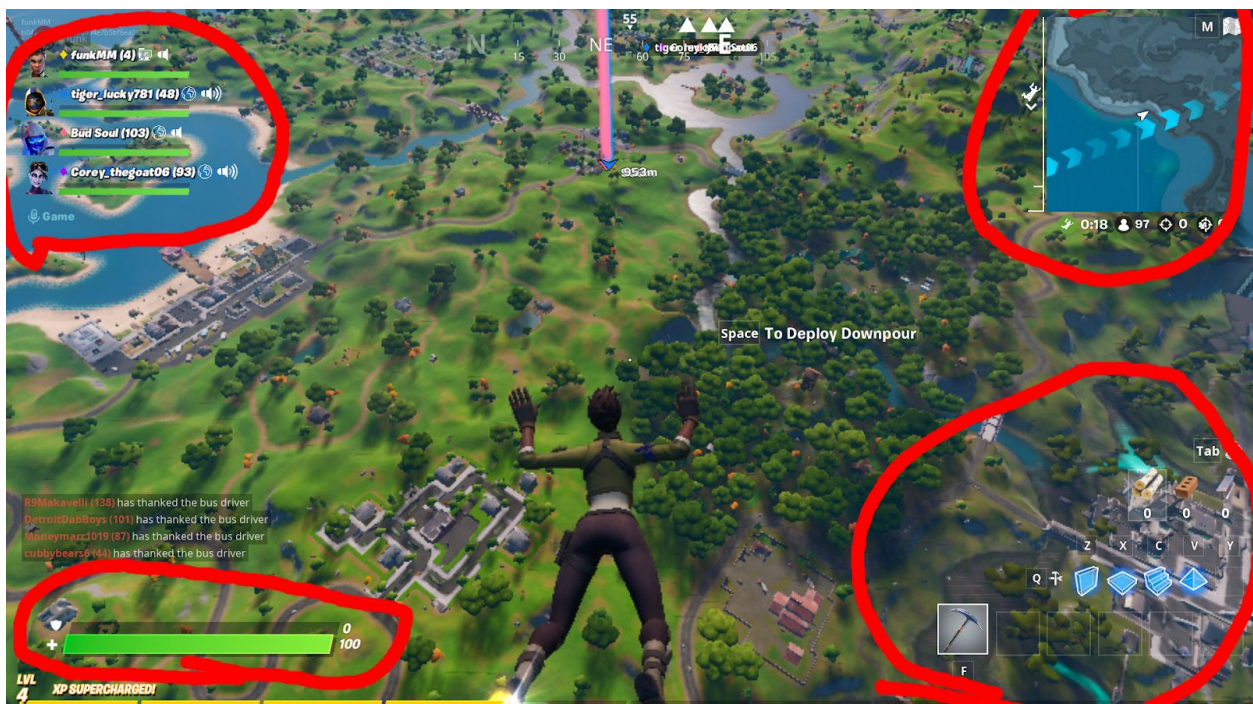
As can be seen in the image above, the most important information is arranged by size. The most important information, in the bottom right corner, is your inventory. It shows all of the items you have found, and the hotkeys associated with using each item. This information is used constantly in the head of a match, so it is the biggest. All of the other important icons, such as the map, health bar, and party members are each located as far into each corner as possible. This layout makes a lot of sense, as the icons are big enough for the player to easily see, but do not obstruct your field of view when playing the game. If the field of view was obstructed, playing the game could become very frustrating.

Another aspect of design that Fornite does well is content awareness on the main menu. In the main menu, there is a bar at the top of the screen that shows where the player is in the menu, and allows them to quickly navigate to the most important features in the game. In addition, a yellow exclamation mark is shown next to any tab that has new information in it. These tabs do a good job of letting the user know where they are in the menu, and what tabs have information that they have not seen yet, such as new items or deals in the store. These tabs are also useful for organizing information, and give a good summary of the information that can be found in each category.
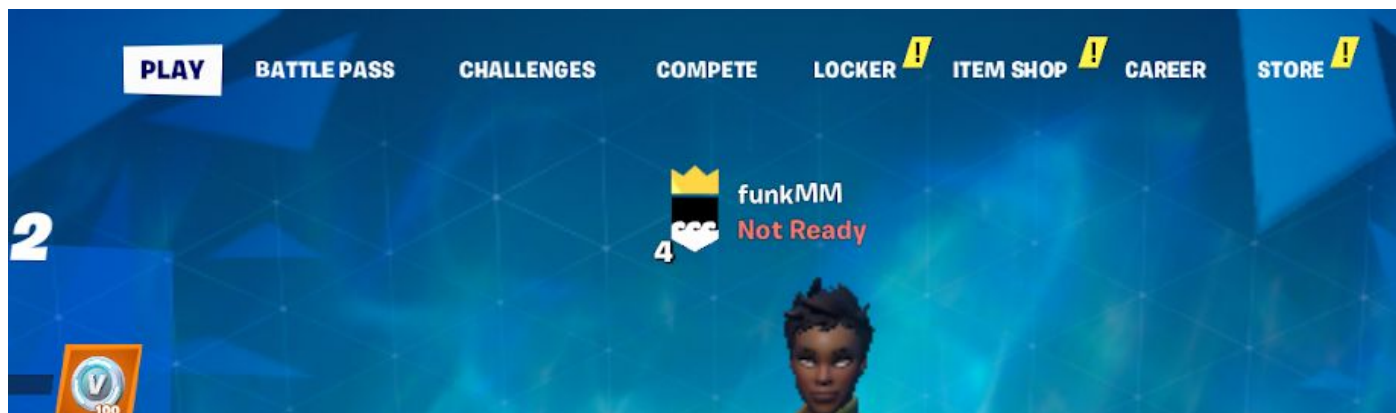
Breaking this information into tabs also supports the Android design principle of only showing what I need when I need it. The only information shown upon bootup is information used to join a match. In order to find other information, users can clearly and easily navigate between the tabs to find the information they need.

The user experience using Fortnite and its menus is great. Information is clearly organized, and navigating the menus is fast and responsive. There are many shortcuts embedded into the main menu to allow you to get to important features of the game quickly, without having to search for them in menus. For example, the main menu screen shows a picture of your character, and has platforms orbiting around them. If you hover over one of the platforms and click on them, it will allow you to quickly add one of your friends to your party. In addition, there are also buttons right on the main menu that allow you to change your game mode between squads, duos, and solos, and a button that will allow you to join a match with your current party. With all of these features being right on the first screen you see as soon as you boot up the game, users can have their friends added to their party and searching for a match extremely quickly. This is important because playing the game is the main feature people will be booting up Fortnite to access, and allowing users to get into games quickly minimizes frustrating wait times.
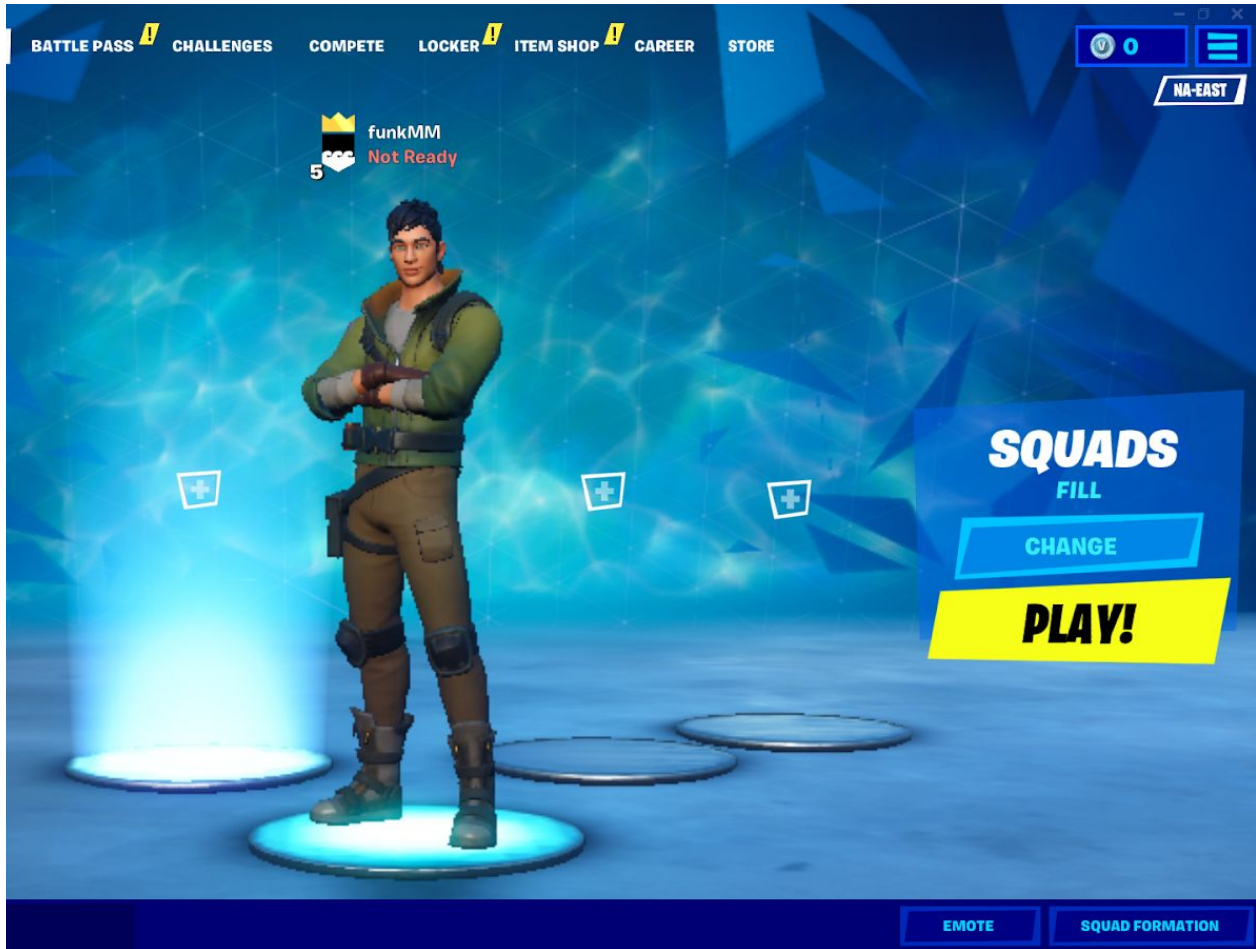
The aesthetics of Fortnite's menus are pleasant, but nothing mind-blowing. The main colors used in the menu presentation are blue, white, and yellow. This is a nice color combination. Many of the menu items are big square panels. This menu design is very simple, but works for the purposes of the game. The menus need to be accessed on multiple different platforms, so creating a simple menu design is essential to ensure that players can use Fortnite on multiple platforms and not be confused.
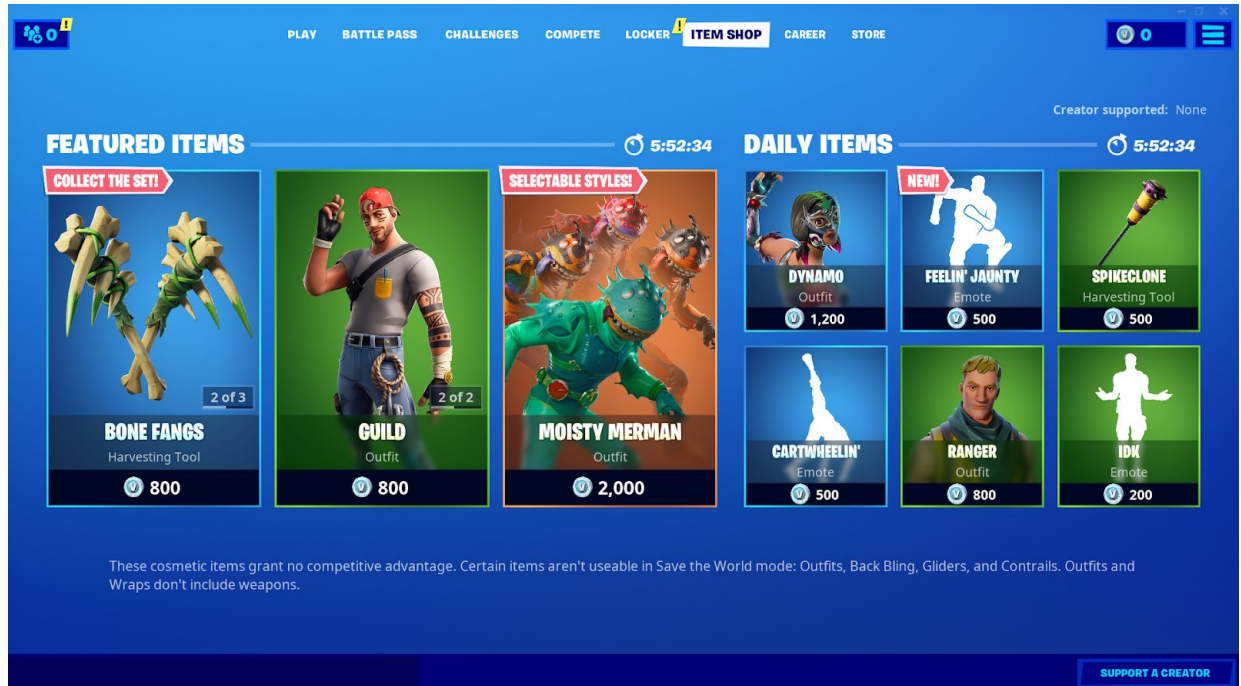
Even though the simple aesthetics may not be the most interesting to look at, it does create a really nice element of consistency between platforms. On PC and home console, the layout of the menus are almost exactly the same, and the menu design on mobile is very similar. For example, below are screen shots of the locker menu section on PC, Playstation 4, and on mobile phones respectively.
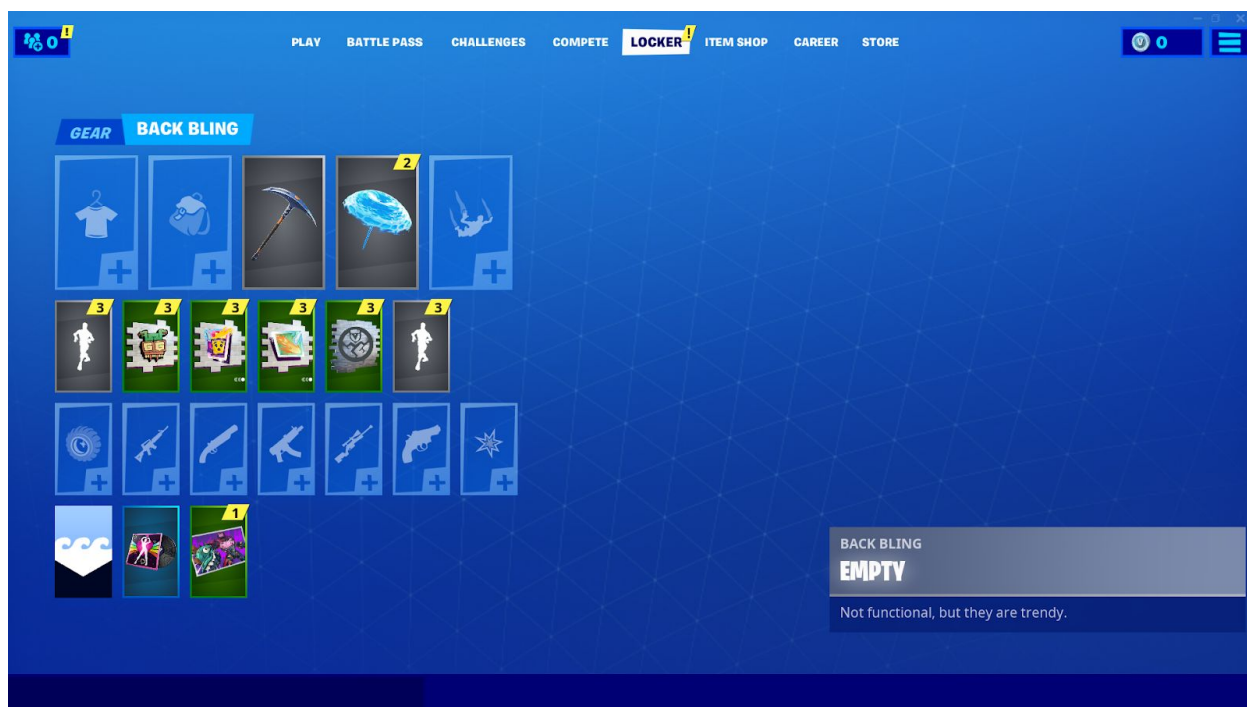
This similarity allows users to not feel confused when playing the game on a different platform. In addition, users can link their primary account to other platforms, so any progress made on a different platform will be saved to all platforms a user's Epic Games account is linked to. This creates a seamless and consistent experience no matter what platform the game is being played on, which is a really nice considering Fortnite is on many different platforms of varying specs.

Finally, the last element Fortnite does well is utilizing minimal user effort in syncing accounts between platforms. When using mobile versions of a game, or playing the same game on a different console, it can be difficult to transfer your progress to another platform. For example, when I bought the remake of Grand Theft Auto 5 for PS4, I wanted to transfer my data from the copy I had on PS3, but I was not able to. This can be very frustrating for the user, and can feel demoralizing when all of your progress is lost in the transition between platforms. Fortunately, Fortnite finds a clever solution to this issue. All account information is linked to

your Epic ID, which is created upon the first startup of the game. All of your progress, skins, and other data is linked to this account, meaning that no matter what platform you sign into your Epic ID on, you will be able to play Fortnite on the account with all of your data on it. This is a great example of minimal user effort because it is seamless to transfer data between platforms by linking their information to their Epic ID. Rather than saving their information directly to the platform they are playing on, it is saved to their Epic ID, making the transition from platform to platform effortless. Now, for example, I can play Fortnite on my phone, PS4, and laptop, and still feel like I am making progress on my main Fortnite account rather than having to create an account for each platform.

Works Cited

Melcon, Andrew. "Fortnite Battle Royale: Everything You Need to Know." *Tom's Guide*,

Tom's Guide, 1 Oct. 2018,

www.tomsguide.com/us/fortnite-battle-royale-faq,news-25928.html.

Fussman. "Fortnite Servers – Where Are They Located?" *Fortnite News and*

*Information*, 29 Aug. 2019,

fortniteserverstatus.com/articles/2019/08/14/fortnite-servers-where-are-they-located/.