Infinium

User's guide

Foreword

"After long time Tinder dating, I finally invite a very cute girl out. When taking bath together, I saw it, her is even bigger than mine."

➢ Online environment is dangerous zone with a lot of tricksters and trap. Think twice before act, especially when it come with money.
➢ Infinium application have been programmed to act properly to avoid being addressed as computer virus. We will never ask user turn protection off or add exclusion. If your antivirus notifies about one of our files, check with multi-scanner like VirusTotal for false-positive error. If multi-scanner confirms of infection, either validate file source or consult with us. Infinium application files also have been signed with Digital Signature.
➢ Infinium application can run properly without Administration right. If any function requires Administration right, it will ask for it, and there is always a clearly note what it does. If you click a program of our and it ask for Administration right immediately on start, double check for infection.
➢ Personal information should be protected in online environment. Infinium only acquire phone number to avoid spammer delete Telegram account and re-create new one. That phone number will also keep in secret and will not be visible in any case. Outside of that, there is no information required. Do not share your information, especial important ones like address, bank account, credit card…
➢ Administrator can access your account without neither user's password nor certificate. We will never require user to provide it outside of Avatar name and certain account number which provided clearly on registration. If someone ask for your password, it's scam.

Also, there is certain important note we want to mention before you continue:

➢ Unlike many other communities, Infinium have no word filter, but instead, we have function for community member with high legitimacy like Guild Leader or active Veteran to ban or mute those have bad behavior. Talk freely, but respect the others.
➢ Infinium have strict LGBT tolerant. While not deny non-binary user, spreading LGBT content in public channel consider as violate Community Truce. Avatar same-gender marriage mechanic is off. Avatar change gender is uber-strict, always invoke manual operation from administrator.
➢ Many Infinium channel is International and only accept English. You are free to speak other language in private channel like Guild, Group. But in public channel like World, Zone, it is provoking Administrator. The "Nearby" or "Local" channel consider as private. This rule also applies to Telegram commuting.
➢ Changing name also very hard and expensive operation in Infinium. Administrator and other Essential will have feature to change avatar name to community demand if avatar have offended or illegible name. If you don't want wake up and see your avatar have silly name like "SinglePlayer17", choose avatar name when creation carefully. The naming rule is detailed in the Avatar Naming page.

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1.   A little presentation

Before coming into many boring numeric, let's step into some simple feature to help user easily image a picture of Infinium system. Here goes a screen capture of our Guild Experience Pool mechanic:
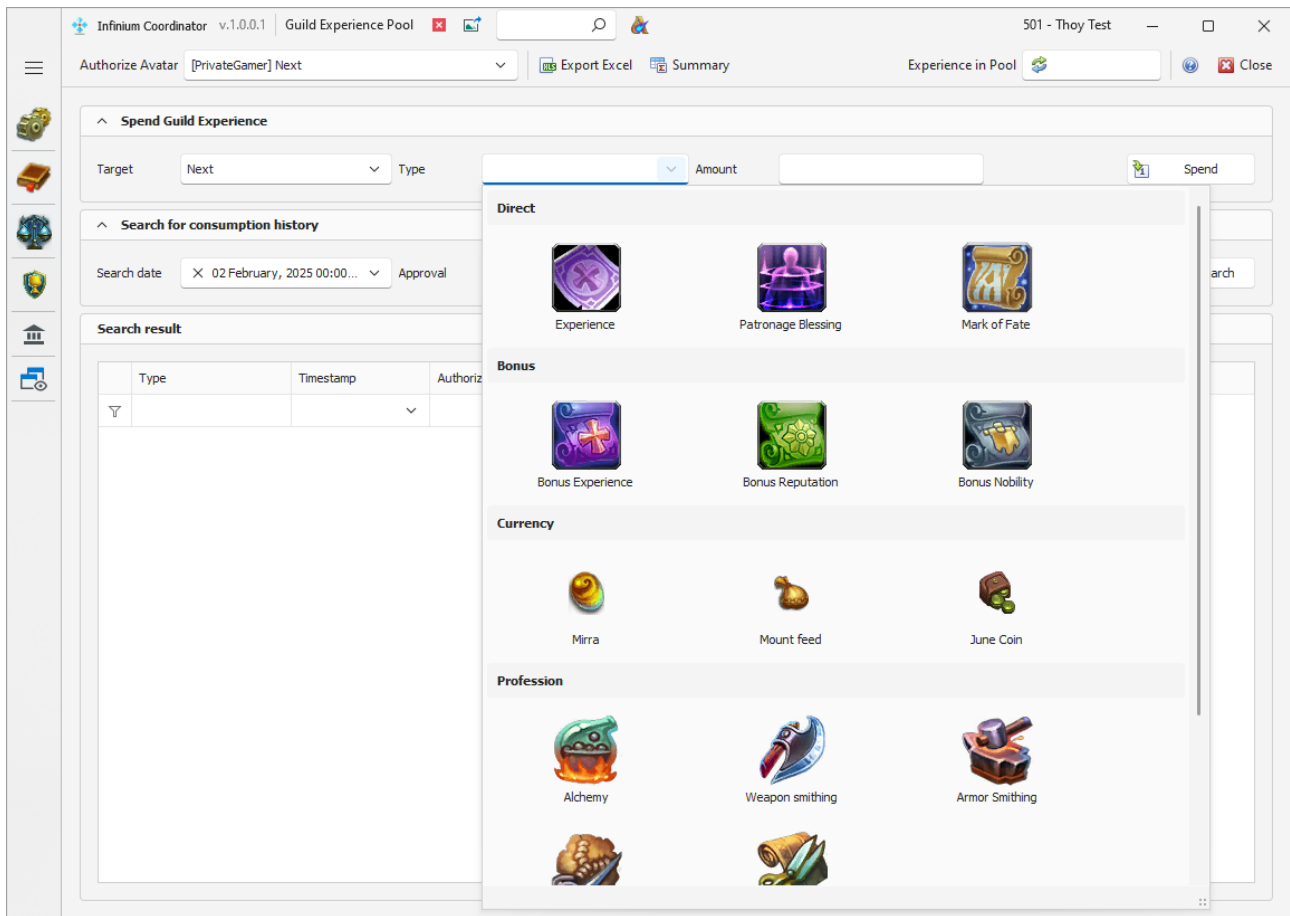

Figure 1: Guild Experience Pool interface

The mechanic is simple: Every time avatar gaining exp, included max avatar level, the same amount will be added to that avatar's guild. Exception are avatar has no guild, exp draw from Pool, or exp added from Bonus Experience. The exp in pool later can be uses for beneficial effect for others guild member. The full detail will be described fully inside program. Here is something we want to tell:

- Infinium two interfaces outside of game client: Infinium Coordinator and Telegram Bridge, which have certain interaction to the game.
- Infinium create its own unique mechanics, with the purpose to fix many failures of base game and entire online gaming industry. In Infinium Community, we will collect the idea, and tuning those mechanics as well.
- While most of online game aim to serving single player, Infinium prefer building community, creating environment where player can enjoy and make friend. Particularly, many mechanics often have relative with Guild and Groups, help player enjoy the community. A sole survivor wandering unknown land are scene for Single Player, not Online Game.
- The mechanics must always have consideration impact into game eco system. As you can see, the Bonus Experience has scale Guild level ÷ Avatar level, which mean force avatar level up their guild in order to keep their beneficial effect. There are many other variables like this

"scale", in all kind of type and amount to help preserve in-game eco system. We do watch for game balance, as well as the player quality of life.

2.   System requirement

Infinium have plenty of components with different system requirement. Listing as:

- Shard, the base game.
- Telegram Bridge, a service allows relay message between Shard and Telegram. This also the gate for registration.
- Infinium Coordinator, an interface allows various management, mostly for Guild management and Searching records.
- Updater, a self-update component help install, update other components.
- Infinium website for hosting document and download static record. There is neither registration nor interaction on web.

Notes: we don't have discord, facebook, twitter, youtube, tiktok, and never do. The reason is simple: Their CEO has not arrested for protect user private data.

2.1.   Requirement for Shard

This piece of masterwork does have really low requirement:

- It's primary design for Windows 7, but it has no performance impact on Windows 10 and Windows 11. Should be no problem on Linux with Wine as well. MacOS is no way. Shard will never run on Virtual machine.
- The game start with 1GB+ and can reach 3GB RAM. Includes Operation System, user need minimal 2GB RAM, but 4GB RAM is recommended.
- Hard drive is 12 GB unpacked, this also included Coordinator. But when download, it requires 11 GB temporary files, so you will need 23GB total to start installation.
- Server locate in South East Asian. EU or NA player may have bad ping. The game does design to play with medium ping, but game interaction delay is no one desire.

2.2.   Requirement for Telegram Bridge

Telegram is an instant messaging service. It supports media and files sharing, voice call, video calls, public livestreams, group meeting… There is some notice feature:

- o Telegram allows to share 2 GB file for free. And unlimited cloud storage.
- o Telegram allows private game streaming through screen sharing. You can start screen sharing in private call, or group call. Don't mistake it with channel livestream which require many setups for quality streaming.
- o Telegram requires real phone number to registration. Currently, there is no way to bypass it.
- o Telegram supports most platform: Windows (32 and 64, Portable and Installation), macOS, Linux… Even Raspberry Pi.

Telegram Bridge is a component which link Infinium System to Telegram. There is no additional installation required outside Telegram to access this component. Which mean requirement for Telegram Bridge simply is installation of Telegram app, and have a Telegram account. After that, you are ready to bridge in-game message. Mostly user will command with InfiniumWTBot to execute certain demand. InfiniumRelayBot as passive, after setup from guild authority, it will transfer guild message to the game and back.

2.3. Requirement for Infinium Coordinator

Coordinator is high-tech piece. It requires only 220MB RAM to start, and 350MB Hard drive which included in 12GB total mention in Shard. But as it supports many high-end features like encryption connection, server-client streaming, high speed record loader… its requirement for OS is specify to Windows 10 Update 21H2 and Windows 11.

But if you don't have Windows 10 or higher, don't be disappointed because this is optional component. Most of its feature for guild wide. So basically, only 1 user in guild install this is enough.

Note that 220MB RAM and 350MB Hard drive is only for start and most feature. Certain report and searching function can easily burn up CPU and RAM like reading daily activity. A Guild each day can kill few thousand mobs and finish hundred quests, yes? So, requirement for guild officer who want to help with searching and management may be a computer with 8GB RAM and good speed CPU like 6 Threads.

2.4. Requirement for Updater

Updater is a component help with versioning. It actually contains three separate programs: Updater, Updater Fx and Updater Console.

- Updater is rich interface, designated for Windows 10 and above. Its primary requirement is .NET 8 which require Windows 10 21H2, and WinForms which only work on Windows.
- Updater Fx is smaller scale of Updater, only work on Windows, require .NET framework 4.6.2, which mean without Windows 7 SP1, you cannot run it. Sorry for Windows XP users, it's beyond our help, you will need download and update base game by your own.
- Updater Console are no-Gui application designated for Linux user, require user have to install net core 3.1. Updater Console and Updater Fx cannot update itself as well.

Regardless of type, all Updater have resume capability, which mean if you shut it down when it is downloading, it will resume its download when start up to closest package.

3.   Registration

So, you have good computer and want to join? Here it starts, with Registration. In contrast with traditional authentication system require email, Infinium prefer the most convenient way for user. Therefore, instead of asking for user email then registration code, we take it to Telegram Bot. Simply, talk to InfiniumWTBot, it will ask user share phone number just to check spammer, and then, registration is complete, you will be generated game login account, game login password.

Prerequired: Telegram username. This nickname will be display as user nickname for ease of address in community. If you haven't set it up, InfiniumWTBot will ask you to do so. You can set it up in Telegram setting » My account » Username.
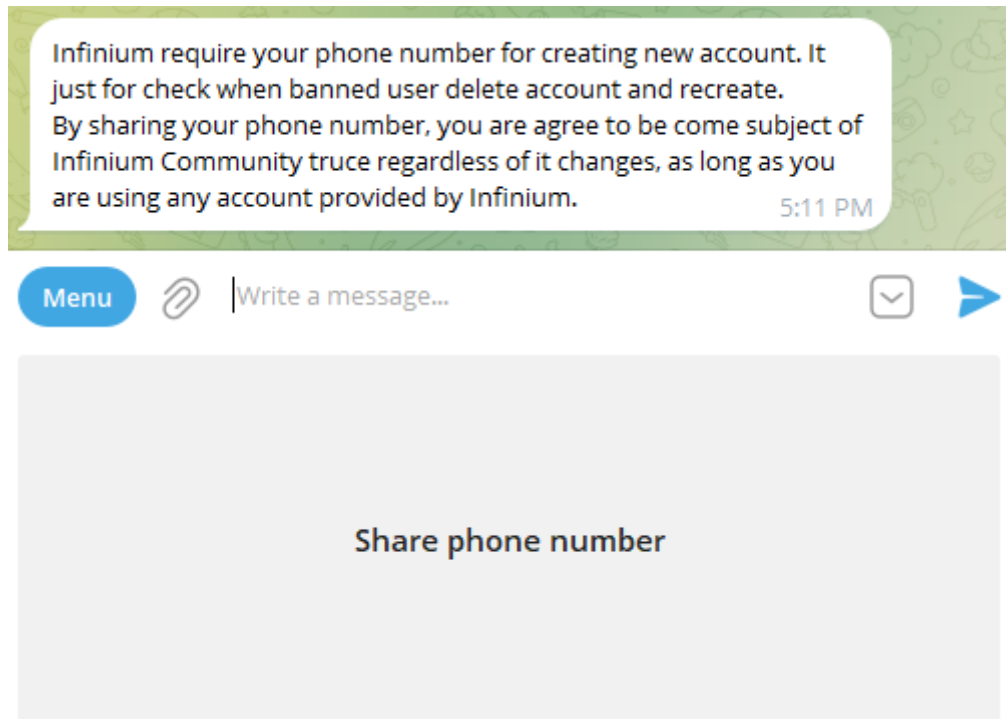

Figure 2: Just click [Share phone number] to start registration

Note: If registration error occurs, and button [Share phone number] *still visible, click it again to continue registration process.*

Infinium account are bound to a Telegram in this way of creation. This not only fast, convenient, but also automatic link to InfiniumRelayBot function, which mean when you join guild, the guild chat will relay into that guild Telegram group, without any other configuration unless you are guild leader.

The requirement for phone number is simple: Acquiring Telegram ID is not enough, as a banned user can delete that Telegram account, and recreate new Telegram account. The new Telegram account ID are different to the old one, but the phone number always the same. The phone number is stored just for this measure, it will not be share in any other consequences.

Telegram registration require real phone number, meaning its user are real, no bot. Surely some people can have multiple phone number, but it is limited, and for that, registration through Telegram actually a shield, protect our community from spammer, bot, and bad player.
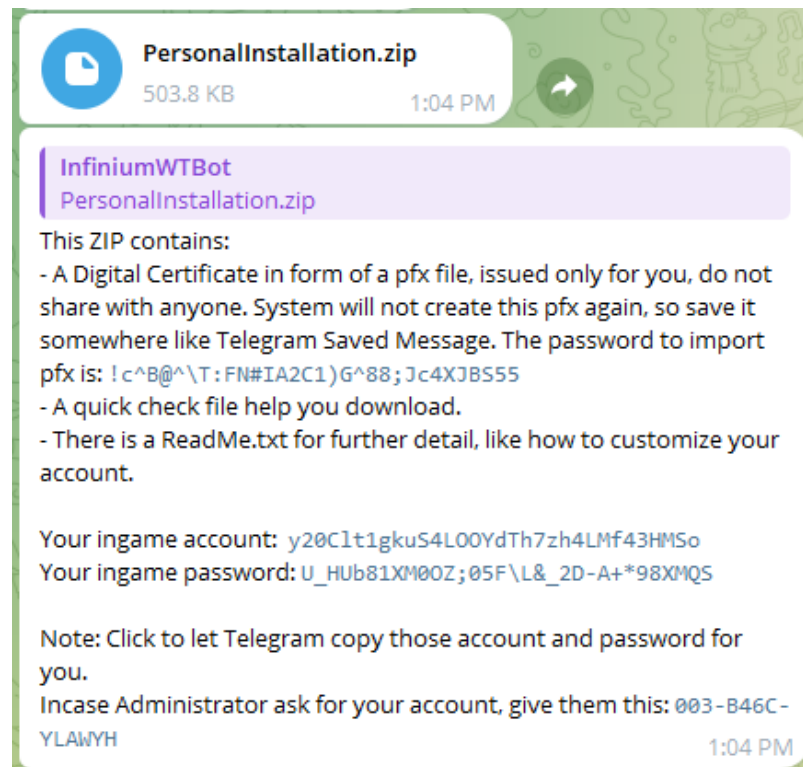
Figure 3: Registration result example

The registration result is sent by InfiniumWTBot right after it process finish, which would take only few seconds. It included a zip contains personal installation files and a well formatted message. In any case, do not share the password or the file. First, let's take a look into the message:

➤ First of all, the formatted message allows user to copy important information in convenient with just a click. Don't select and Ctrl + C, just click at those texts for copying.

➤ Second, the ingame account and ingame password are generated for user. They are both 32 char wide, fully randomized, and copy-ready. If player already have a copy of game client files, they can start immediately with that account and password. The account and password also are secret to user. You read right, account login identifier can consider as secret too, administrator will never ask for it and it will never go public. The nickname community will use is your Telegram username. So, consider keep it as a form of protection.

➤ Third, it's not advisable to change those random account and password. AOGame remember last login account, and Coordinator have Ephemeral login function so user don't have to remember the password. But in case of user demand, read the Change account login identifier and Change password below.

➤ Fourth, the password for import certificate is for a file in that zip. It will be further explained in Coordinator installation.

Change account login identifier:

➤ Command: */changeloginidentifier* `<new identifier>`
➤ Length requirement: Minium 6, Maximum 50
➤ Valid character: a-z, 0-9, and special character: at sign (@) and dot (.)
➤ Ignore case: Yes
➤ Complexity requirement: No.

- ➢ User should change account immediately after creation. After character creation, it may damage data consistency.
- ➢ Changing login identifier is not advised. This only for user without personal computer and have to remember that login identifier.

Change password:

- ➢ Command: */changepassword <new password>*
- ➢ Leng requirement: Minium 1, Maximum 50
- ➢ Valid character: All, including all special characters, all special symbol, icon, emoji, as long as you can type it on the game login keyboard and Telegram can read it. Space character will be trimmed start but not be trimmed end, so watch out if you want to use space character.
- ➢ Ignore case: No
- ➢ Complexity requirement: No
- ➢ There is no maximum change password duration enforcement too. Your password is your take care, if you choose convenient with 1 char long password, it's your choice. But if you don't want peace, very well.

The zip attached with the message contains files for installation as well as Coordinator authentication:

- ➢ A readme.txt file, it contains many notes for joining community.
- ➢ A Personal Information Exchange key file (.pfx).
- ➢ Installation starting program Infinium.Installer.exe. You can start installation by running this file, it will guide you through the rest of installation.

Here is short note about the pfx file:

- ➢ The .pfx is a [x509 Digital Certificate](#) in PKCS#12 format. Windows is designed to handle this format very well, allow other application use it after import.
- ➢ It is Infinium self-signed, and invalid in others network.
- ➢ Default it is RSA-2048 key. With this size of key, it mostly impossible to counterfeit.
- ➢ Everyone have their own key and shall never be shared.
- ➢ Right now, the pfx only mean for Coordinator. In future, we may create Relay chat client which use this key to listen chat from ingame.
- ➢ InfiniumWTBot will not generate it again and require Administrator action to do so if you lost it. By default, Telegram never deletes your message, and your key will always be there.
- ➢ If the pfx is compromised, others player can use Ephemeral login to log into your avatar.
- ➢ The pfx can be install on multiple machines in case user have more than one computer.
- ➢ For more, read the Digital Certificate section.

4.   Telegram Bridge

What is the mostly feared in online game, isn't hard boss or long dungeon, but empty chat message in guild of full member. Too many causes: unsupported language, chat history cleared after relog in, player don't have to cooperate with each other, or simply because game chat cannot share meme. Guild is basic unit of community, guild without communication meaning community being dead from inside. And there are plenty more reason guide Infinium declare this feature, to make online community healthy growth once more.

4.1.   Understand about the bridge

Telegram Bridge is duplex connection between base game and Telegram. Honestly, it's imperfect, complex and still need a lot of improvement, but right now, it's usable at ease and does not require much setup. There is no magic word or prefabricated setup, Infinium have to create its own mechanic to create this feature. Because of that, we want user understand the bridge limitation to cooperate, improve it in future, or at least, understand certain behavior and setup.

- There are much different between two chat system. Telegram cannot show ingame item link nor the game cannot see sticker as well as receiving file attachment. There is a small plan to translate the link by Firefox or Chrome add-ons, may be need help from community.
- Currently, the bridge only support link guild chat to Telegram. World or zone chat is ignored. Party chat is considering in near future but this kind of chat have problem that it is newly created each time the group is create, require dynamical link. For private chat, just message them directly, we won't create relay for that kind of unnecessary.
- The relay can work even when Avatar is <u>Offline</u>. Message will show with the last avatar name when avatar online.
- The bridge graft directly into base chat messaging system, but in Telegram, it only is Telegram Bot. Therefore, while message relayed from Telegram to the game are instant and no limit, the message relayed from the game to Telegram has certain limit is applied by Telegram to refrain spammer or abuse their bot system, such as 20 message limit per minute in each group. This limit applies to all other bridge type, they just don't want to mention it.
- If player choose to create their own relay bot, their chat experience mostly great as the bridge will relay their message to Telegram instantly. If player choose to use bridge client, the chat experience is equal to use Telegram directly, but this requires much setup (See Infinium Bridge - Client part).
- If player haven't created their own relay bot yet, their message is relay by [InfiniumRelayBot](). As a single bot, the relay is delayed and will be merge with other players' messages.
- Right now, the relay is setup for each account. Meaning player have join two guilds must abandon one guild chat group. This is certain step with reduce bot and clone player. When second server open up, this behavior will change.
- Guild must setup certain link for their guild chat message relay. Player will have to join their guild Telegram group by themselves. Adding automatically is good way to get mark as spammer bot.
- While cannot relay stickers, emoji are in relay capability. Using emoji is advice. Also, we can create dictionary to transform stickers to Lenny face text like (͡° ͜ʖ ͡°) or ಠ_ಠ with dictionary. This operation requires a lot of effort, so we will let community decide the plan and the set of stickers to transform.
- Bridge will mimic avatar chat into game, even when user not in your guild or group, their message still forward into game under last avatar they logged in.

4.2. Personal relay

To avoid message merged or delay in relay, it's advice that player should setup their personal replay bot. The setup is easy.

- Step 1: talk to Bot Father, use command `/newbot` to create new bot. Follow Bot Father instruction to create the bot. Don't reuse bot.
- Step 2: give the access token to InfiniumWTBot with command: `/bridgebot <token>`. The bridge will verify the token and begin to connect to Telegram.
- Step 3: add the bot to guild group.
- Step 4: talk to InfiniumRelayBot, just click `/start` and all done. The bot requires user talk to its before it can read user message in guild group chat.

Normally take about 3 - 5 minutes, the progress is easy setup for everyone. It's recommended that player should change the bot about text with the username to easily direct message, either by `/setabouttext` or talk to Bot Father. You may want to change the bot profile picture same as your profile picture to increase reorganization too.
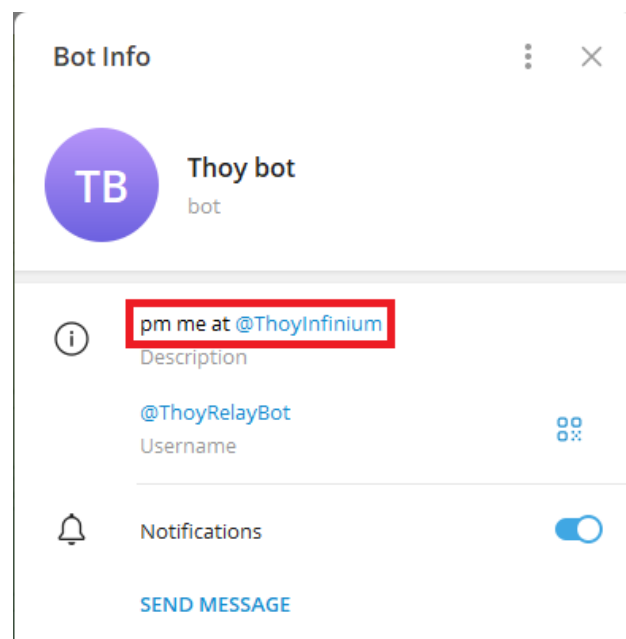

Figure 4: Setup user name pm link to bot for easy direct message

Note: Please remember the limit 20 message per minute. So don't chat too fast or your bot will be mark with bad behavior and Telegram may block it.

One of our alternatives to increase player chat experience is Relay client. It not using bot but instead, using a Telegram client, its real user relay message, not via bot. However, either by time is rushing, unable to proper test, or by security method where this kind of client require many setups for user, it will be delayed to the future where most user familiar with the bridge.

4.3. Bridge guild

Link Telegram group to the bridge allow Guild Leader or Treasurer specific which group is designated for relay guild chat.

- Step 1: Add both InfiniumWTBot and InfiniumRelayBot to the group.
- Step 2: use command `@InfiniumWTBot /bridge` in that group. There is no argument in this command. The command must be used by Leader or Treasurer as Infinium with search for which guild that user in.

Then it's done. If success, the bot notices in that group, or displays any failure message. You may want to give InfiniumRelayBot admin right for the group for some feature in far future. Automatic add guild member to Telegram chat group is not a wise way, but automatic send them the invite link to guild chat group actually a good idea, but not declared yet.

Additional step for send guild invite link when new player joins the guild:

5. Infinium Coordinator

Coordinator is external graphic user interface outside of base game to help player with certain management. Thinking about a solid replacement for normal Website which take few Gigabytes of your RAM for just open up, Coordinator only take few hundred MB. The name Coordinator comes from its purpose: an informer to help player team up and play together. Many features of Coordinator have relation with ingame Guild system, like Guild Quest, Guild Shop, Guild Experience Pool…

5.1. Installation

The installation progress actually simple and easy, start Infinium.Installer.exe inside the zip to start installation and follow its direction. If user using Linux, start by downloading Installer Console and follow its step. But in case of technophobia or user stuck with certain step, we will provide some pictures with description for installation of Windows 10 user.
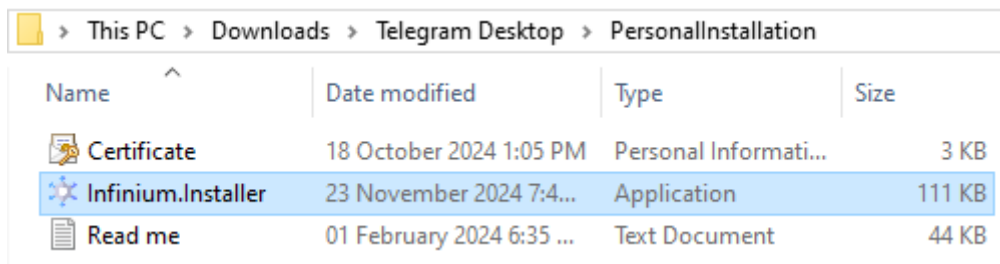

Figure 5: Content inside PersonalInstallation.zip

After registration, InfiniumWTBot will give user a zip, and this is what it has. To start installation, run InfiniumInstaller.exe, it will show up.
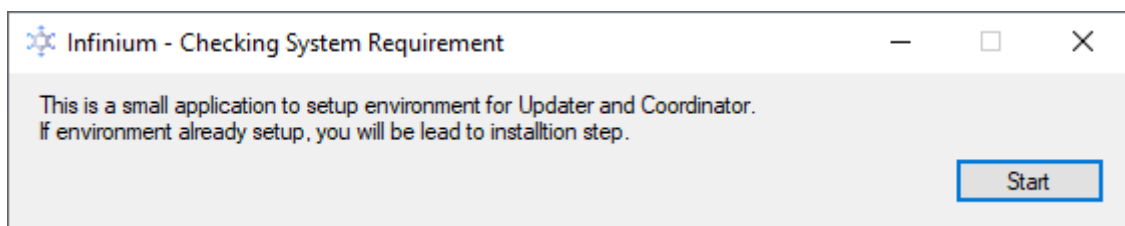

Figure 6: Starting Installer

When start, the installer will stand still and wait for user action, even it only has only one available action. This is behavior by most of program from Infinium to avoid addressed as virus. To begin, click [Start] button, Installer will check for current Windows version as well as installation of exists .NET runtime. If Windows 10 or higher, installer will try to install .NET 8 if it not exists, or process to setup `UpdaterFx` if user only have Windows 7.
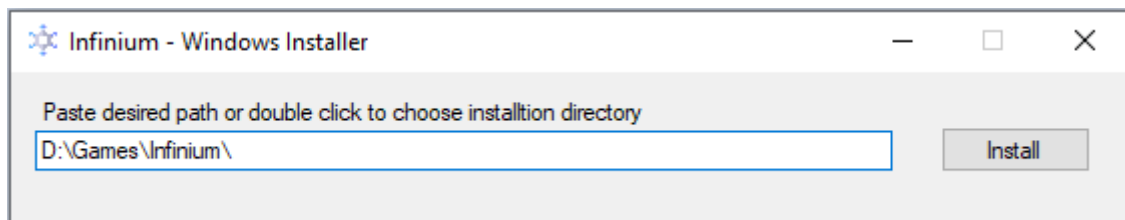

Figure 7: Select install location

After download .NET 8 or it already installed, proceed to choose installation directory. By default, `D:\Games\Infinium\` will be chosen. Click [Install] or [Install Fx] will proceed to download the latest version of Infinium Updater for Windows 10 or Infinium Updater Fx for Windows 7 respectively. If Infinium Updater being installed for the first time, Installer will require additional

Windows Administrator authority from user to perform install a font and setup files. In the time of this document, this is only one operation Infinium require client supply Administration right. Click Ok, the Windows start process as admin will show up, accept it and installer will do it job. If user start Infinium.Installer.exe with Windows admin right, this request will not show up and installer will setup directly.
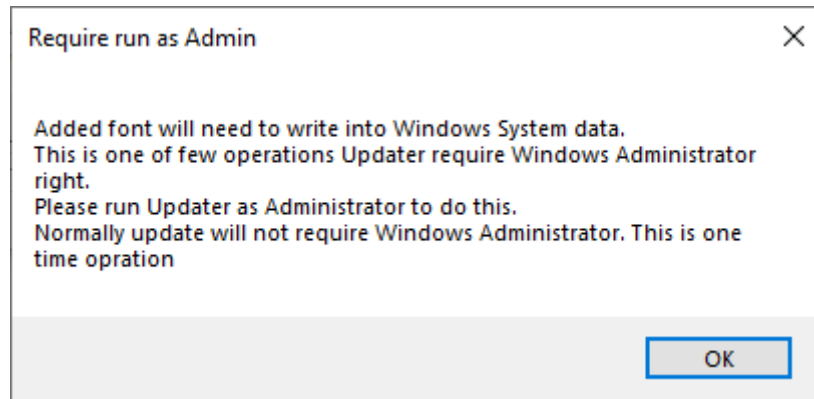
After install a shortcut will be added to desktop, and Updater or Updater Fx will show up. Here is the UI of Infinium Updater for Windows 10:
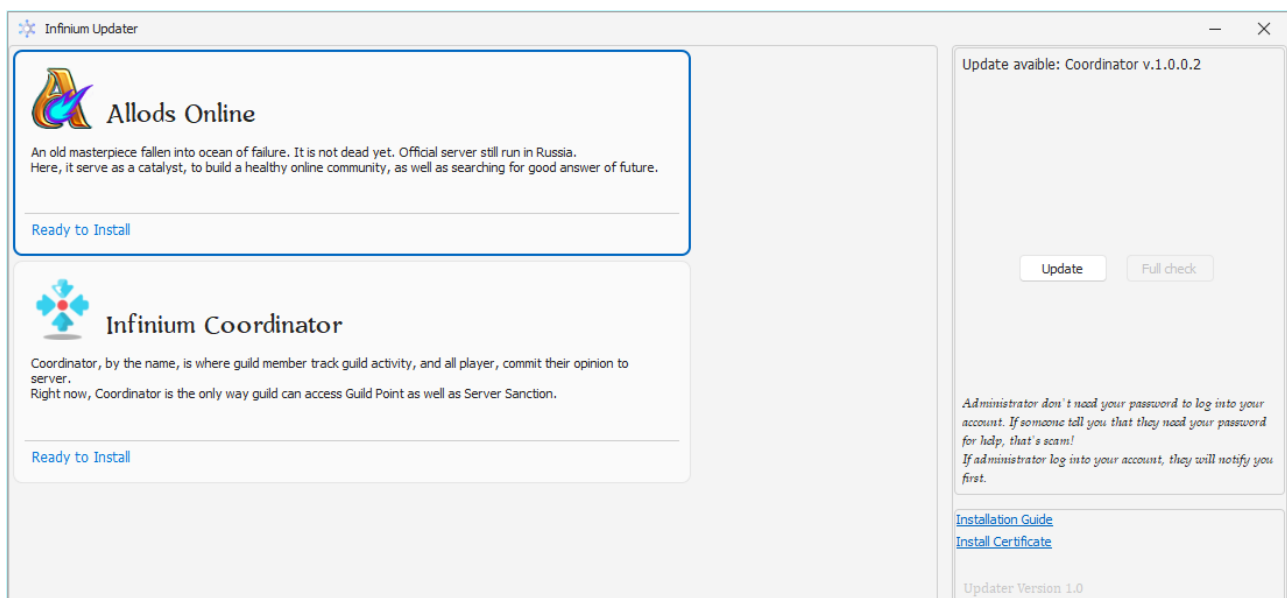

Figure 8: Infinium Updater interface

Infinium using self-signed root to secure connection between user and server. If user install Updater for the first time, the root certificate may not be installed, Updater will ask user to install root certificate. Updater Fx or Updater Console will not have this part, as user have no way to use Infinium Coordinator.
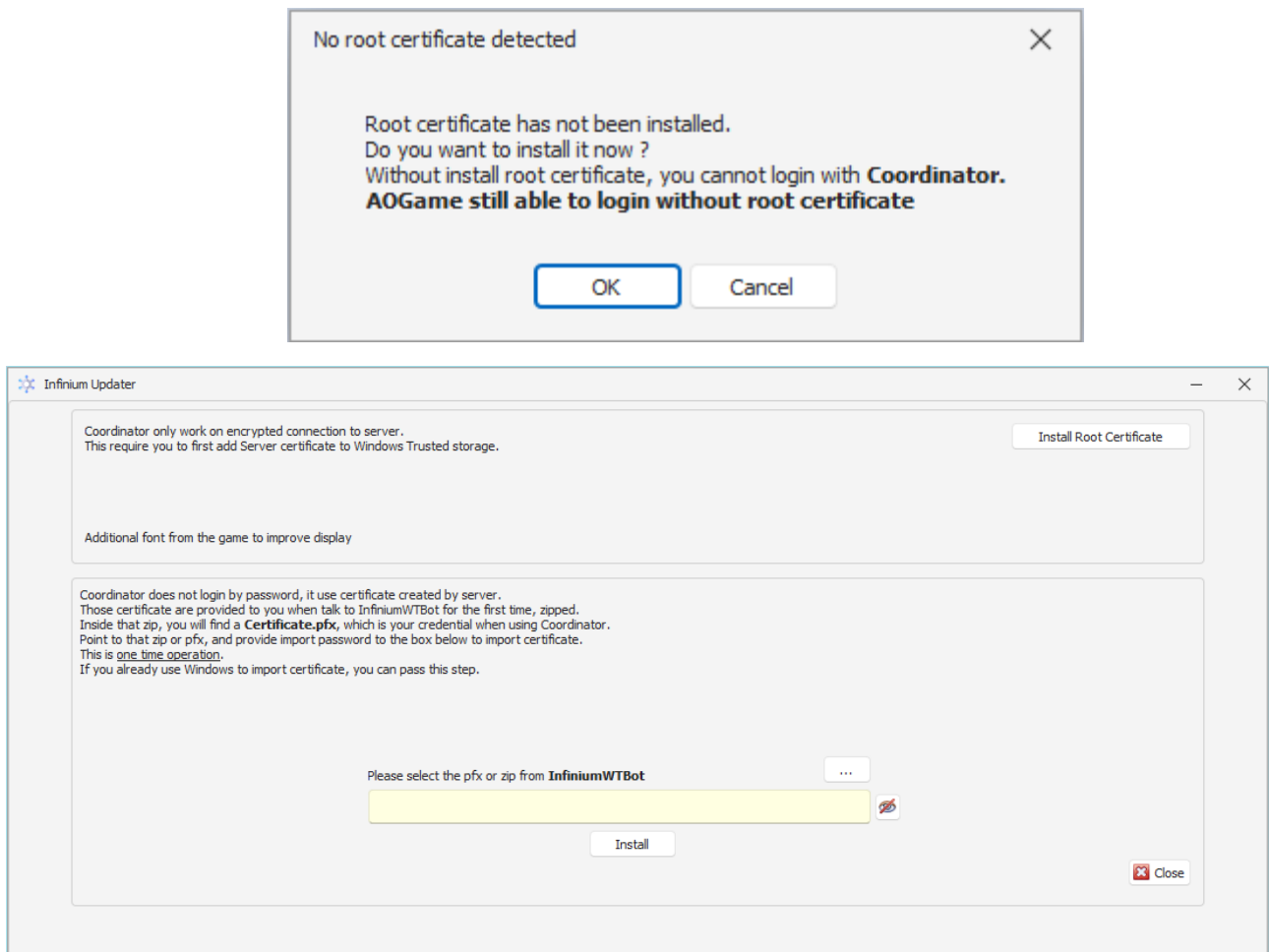
Figure 9: Install certificates interface

Install certificate is <u>required</u> to use Infinium Coordinator. By default, Coordinator use Http/2 secure connection, not only to secure connection, but also to refrain `Ddos` and hacking. Install certificate require two steps: install Root certificate, and install personal certificate.

To install root certificate, just click [Install Root Certificate], no Windows administration elevation required. To install personal certificate, select the `pfx` which InfiniumWTBot give you, or the zip contain it, both are fine. Click [Install] and you are ready for Coordinator.

After install certificate, come back to main screen of Updater and click [Update], it will begin the installation of both Coordinator, and the base game to the latest version of each application.

5.2.   Authentication

The best password is no password at all. Most of password problem come with its "ability" to forget. Securely, Infinium Coordinator replace password and account login by a modern way: x509 Digital Certificate. Each x509 Certificate contain different variable in very big integer which cannot be guessed, and cannot be counterfeit. After install the certificate into Windows, Coordinator can use it to connect to server, without require password from user.
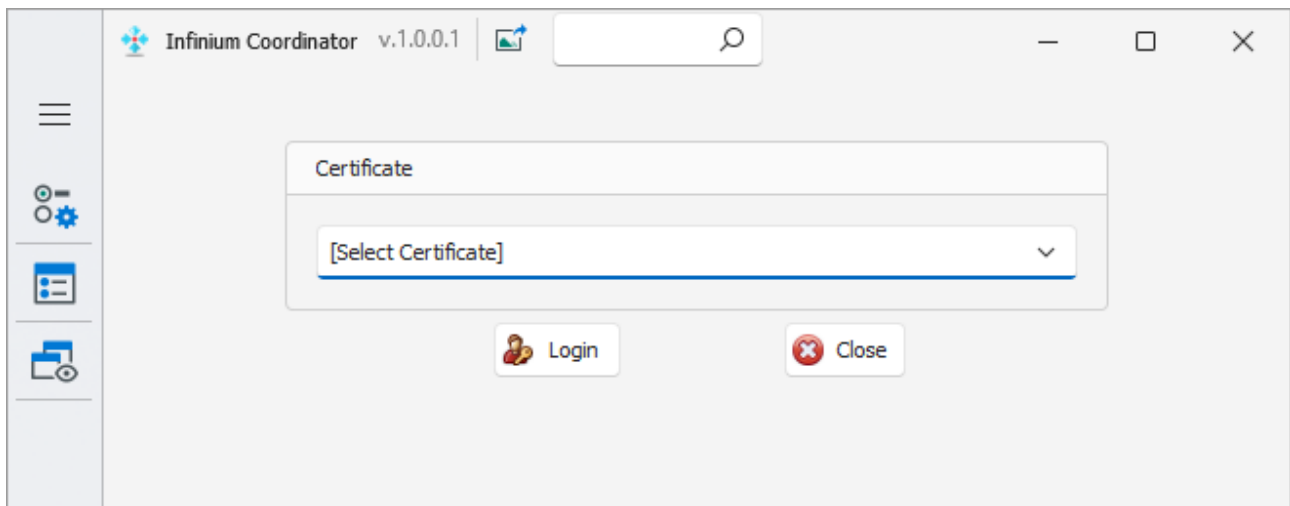
Figure 10: Coordinator login screen

When start, Coordinator will read certificate installed in Windows and list which has been issued by Infinium. If user install the `pfx` with Updater or manually install them, it will be there to select. After login for the first time, Coordinator will automatically re-login so user don't have to select certificate every time.

Ephemeral password

After Coordinator authenticated with server, the button 🔥 will show up. It allows user quickly run the game as well as create a one-time-password for base game login.

- If the game is not running, Coordinator will run the game, and request an ephemeral password, copy it to clipboard so user use Ctrl + V to paste it into password input of base game. User original password still valid in this scenario.
- If the game is running, Coordinator will copy last ephemeral password to clipboard and ask whether user want to generate new one. This scenario is useful when user choose [Log out] in the base game.
- Generate new ephemeral password will override last ephemeral password.
- Ephemeral password only last for 5 minutes, and consumed right on login success.
- User original password still valid in even the ephemeral password still exists.

The reason for ephemeral password actually embarrassing, that we don't know how to launch base game with login token or certificate. If someone know how, we can buy that knowledge.

5.3.   Authorization

Infinium Coordinator have additional authorization: Clearance and Validation, which create hierarchy in community for suitable of management.

5.3.1. Validation

Validation is the legitimacy of user. It also affects how community view to that user. The rank of Validation is increasement, which mean higher rank are superiority in authority to lower rank. More will be added in the future to satisfy the need of community. Right now, the lists are:

➢ Banned: User are banned, they can only speak in certain public channel for explanation as well as unable to login to the game or Coordinator.
➢ Spammer: User just have a bad behavior recently, they have chance to explain their action to return to Commoner validation, or will be reduced to Banned in near future.
➢ Commoner: Default rank for user have just joined the community.

➢ Validated: User has taken valid action to claim they are not Bot and will take responsibility for their action in the future. This validation is slightly higher Commoner, and create small barrier when authority cleaning out Bot and other strange behavior users. We are planning to create KYC for this Validation, before that, Validated can be gained through Crystal charging

➢ Trusted: User are trusted by community and they can drain more resource, take care of community via many actions like ban or mute avatar without guild, voting in important decision like Judge or Purify. Trusted validation and above cannot be ban in any method, they need to reduce to Spammer by Judge before that. Trusted may gained from Crystal charging at high amount or become Guild leader of big guild.

➢ Essential: Highest rank in the community, not only meaning full trust, but also the wisdom and ethic.

For full detail, see Sanction and Voting mechanic.

5.3.2. Clearance

Clearance is the authority within a guild. It links directly to guild system in the base game. Each guild has its own authority as well as define custom clearance rule through Guild Clearance interface. Unlike Validation, Clearance is accumulated, meaning an ingame rank can be mapped to multiple clearance. Instead apply to user like Validation, Clearance only applies to avatar. For convenient of user, Coordinator will check the clearance in all avatars of current user to for clearance of action. Outside of base game default rank, additional clearance is added:

➢ Authority: equivalent to Guild Leader clearance, only exception is unable to edit guild Clearance custom rule. This clearance allows to ban avatar without guild.

➢ Manager: equivalent to Guild Treasurer, authorize to buy item in guild point shop.

➢ Helper: authorize to drain Guild Experience Pool.

➢ Ban member: authorize to ban avatar within guild.

➢ Mute avatar: authorize to mute avatar within guild.

➢ Quest clearance: authorize to start or stop guild quest.

The clearance can be customized through Guild Clearance interface. By default, this clearance rule is applied when guild created:

➢ Guild Leader: Authority | Manager | Helper | Quest Clearance | Ban Member | Mute Avatar | Buy Item

➢ Treasurer: Manager | Helper | Buy Item | Quest Clearance

➢ Senior Officer: Manager | Helper | Quest Clearance

➢ Junior Officer: Helper

5.4. Interface interaction

The Infinium Coordinator have neither fancy animation nor luminous background wallpaper. It follows the style of old Windows where most of actions are responded imminent and function are not overflowing. In this section, we want give user a brief of certain utility in the Infinium Coordinator, which can help user familiar with its style, allow using without detailed manual.

- By default, the menu on the left is collapsed. User can click ≡ to expand it, or click directly the parent menu to show its sub menu. Active interfaces will show which feature are currently opened, or user can access it with Ctrl + Tab.

- After logged in for the first time and not logged out, Coordinator will automatic re-login when it starts. Authentication result will show on the top-right corner with avatar list in the pop-ups.

- Screenshot or Ctrl + B for quickly take screenshot. Use it to take screenshot if you want to ask for help or report error, don't take screenshot by `PrintScreen` key.
- Some function doesn't have close button on its own. Instead, there is a shown up when the function start. It can be use as shutdown to close that function. Shortcut is Ctrl + W.
- The button will launch the game with Ephemeral login. Shortcut Ctrl + Alt + S. For detail about Ephemeral password, please read in its own section.
- Most of function have mechanics description or guide right inside it with icon or simple question mark. Click or hover over it for detail of the guide. This document only for hard to display formula or clarify certain mechanics. When update comes, the detail in those buttons will be update first, this document will be update later.
- Infinium use 15 characters long code to address various resource and ID across its domain. The code looks like `003-B46C-YLAWYH` and can be fast search in search bar right in top of Coordinator GUI or default shortcut Ctrl + Alt + F. Right now, there only Reward code and Account Id can be lookup, but more will be added later.
- When viewing data shown in grid, user will see an empty row right below grid header with filter icon . The row called as filter row. Typing in filter row will allow user search quickly for the row match the typed word. The filter icon also appears if user hover up column header, allow quick filter in specific condition. If user have to filter in grid-wide condition, Ctrl + F shortcut to show up Find box. Filter row also appear in combo box, useful for searching condition like server-wide avatar list.
- In searching functions, many search conditions combo box have button, which mean the condition is optional. If user has selected condition value, the value can be clear for click those button or Ctrl + Delete key.
- The search in date often comes up with range, meaning it can search from a start date to an end date. When use those date range, use have to drag mouse between those date.
- Most of grid have column with draggable header. It allows user rearrange those headers. Drag header into group area make grid group up by the value of dragged header.

About interface layout:

- The interface may split into groups. This kind of split is common in Coordinator which help user see the relation between each element. Each group contains control serving option or action for that group.
- If button or option not in group but in toolbar in top, it means they serve purpose for entire interface. [Avatar Guild] often serving this purpose as choosing the avatar meaning select targeting guild contain avatar for entire interface.
- The divided group often collapsable, by double click it, or collapse button near its header. This help enlarge area in need for current use.

6. Guild Experience Pool

Guild Experience Pool, or Guild Pool, or Pool, is simple mechanics help guild members growth:

- When player gain exp in normal method, such as PvE or finish quest, the exp will be added to the Pool. If in-game event reward exp, it will be added to the Pool as well.
- Exp will not be added if it gained through special way, such as draining from the pool, through scroll, or add by administrator. The only exception is Symbol of Experience which often rewarded by Tka-Rik's Cave, Kirah treasure hunt.
- The mechanics occurred after exp is scaled with user level, and before calculation with others bonus. Clearly:
  - Even max level character exp still added to the pool.
  - If high level avatar killing mob, the exp rewarded will be lesser, and that "lesser" exp will be added to the pool, not the original value from the mob.
  - If avatar in group, as the group kill reward kill occurred before this mechanic, the exp from group kill will be added to the pool, including the counting player bonus.
  - The bonus from scroll of such as Manuscript of Enlightenment, Greater Manuscript of Knowledge, Tome of Influence, Ancient Tome, Lucky Hour… will not be added.
- Guild tabard give bonus to the exp added. Champion Tabard give 100% more, Member Tabard give 50% more, no Tabard give no bonus.
- The exp added to the pool scale with loyalty of 90.
  - Base 4563 exp, 10 loyalty, Champion tabard will generate:

$$4563 \times (100\% + 100\%) \times \frac{10}{90} = 1\ 014$$

  - Base 4563 exp, 100 loyalty, Member tabard will generate:

$$4563 \times (100\% + 50\%) \times \frac{100}{90} = 7\ 605$$

- There are various types to drain from pool for various beneficial effect, but it will have four variables:
  - Amount: the base value guild will spend on the avatar. Higher amount meaning more bonus or longer duration as well as drain more from the Pool.
  - Base: the base unit for calculation. For example: 1 coin, 1 mount feed, 1000 exp bonus…
  - Drain: the multiplication modifier for each type, often increase the final amount drained from the Pool.
  - Scale: the relative to final beneficial effect, reduce or increase due specific conditional avatar. Drain multiplier and Scale serving important role to keep the balance.
    - The Experience Bonus have scale of $\frac{Guild\ Level}{Avatar\ Level}$ meaning lower avatar level like newbie acquire huge boost in high level guild, while high level avatar only acquires low bonus as they closing to reach level cap. This also forcing player upgrade their guild rank to gain better beneficial effect.
    - The Bonus Reputation drain $1 \times \sqrt{Avatar\ Level}$ meaning it still scaling as avatar leveling up, but not draining hard like directly from $Avatar\ Level$.
- If not specified, all the calculation is using the nearest rounding calculation, meaning 0.5 or 0.9 will be round as 1 while 9.4 will be round to 9.

- When new level cap unlocked, all the pool will be cleared.

7. Voting and Sanction

What's most different between game offline and game online? Apparently: other players and the game community. But instead of building strong community, many game prefer creating conflict for PvP for addition income. Overtime, little conflicts become war, friends become enemies, and the game, become place for strong players bullies the weak. Presumably, the strong dominate over the weak is the truth. In opposition, Infinium believe Online game is just a sport, and in sport, all player should be opponent instead of enemies, entertainment but not war, and through fight, we not only able to make friend, but even confidant. This faith is not blindly, it is explained with conviction in part 4 of Infinium Piercing Gaze.

To prove that belief, Infinium create an environment where player would prefer party over solo, coordinate within guild rather seeking temporary party like party exp bonus, guild exp pool… as well as a tool to enforce that environment clean: The Voting and Sanction mechanic. Infinium community really meant to let player keep their community.

Figure 11: Sanction interface

This interface provides basic need for an online democracy. For the full detail of each type are shown in application. Right here we only want to notice user about this complex progress:

➢ Sanction will be created if the action does not require voting, or voting will be created. The result will show right after click [Create Sanction] button as well the `Idkey` for quick search.
➢ Everyone can vote to show their opinion, but system only count valid Validation voting against the voting type.
➢ After planned time, if not enough valid vote, voting will be forfeit.
➢ As voting in online community where not all user dedicated to show their opinion within time, if certain condition is meet, the voting may close before time.
➢ If voting has been passed, the sanction will occur.

- When creating sanction or vote, user can supply with images and reason for clarify and logging. Both images and reason are immutable and can be view by other. The only thing can be change is note, and it must be voting in progress.
- To vote, user can search by the `Idkey` or search conditional. In search result, right click to vote or hover see current voting result.
- Only trusted or higher validation user can search more than 1 day search range. Normal user is limited to 1 day, or they have to search for specific Target, Authority. Retrieve current voting are not affected by this policy.

[Time is short for preparation deploy, please read in game for detail. This section will be filled later]

8. Potential point mechanic

8.1. Overview

Potential mechanic is a complex mechanic, creating global bonus when newly crystals enter game system. The bonus will later distribute to guilds through rating of their member daily activities, allow buying item like Crystal Chip, Chest… The exchange base game gold into crystal does not trigger this mechanic.
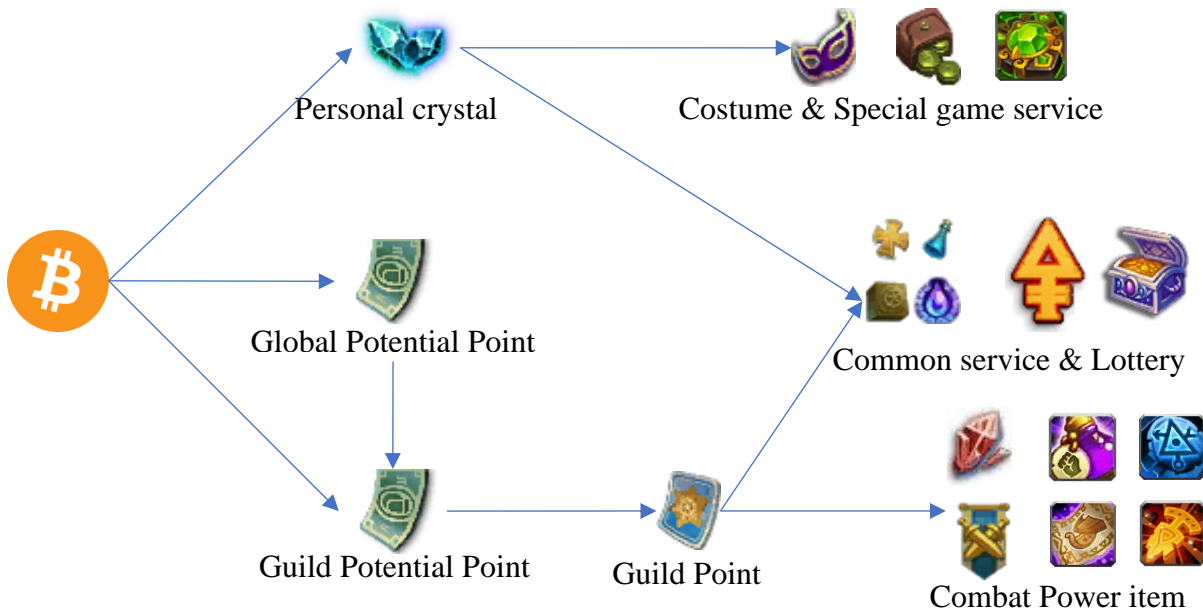
The mechanics have several steps. First, when player gain crystal, a bonus Potential Point will be created and will add to both Global Potential reservoir and Guild Potential bank. Next, the Global Potential Reservoir will be drained to Guild Potential bank everyday through reward ranking of guild member activities. Last, through Guild Quest, Potential Point will be converted to Guild Point, allow buying items in Guild Shop.

8.2. Shop configuration

Guild Point Shop, or Guild shop in short, is an interface hosting in Coordinator. It run parallel with ingame Item Mall, have price equally with Item Mall, each share many items and have its exclusive items.

- Item Mall and Guild shop share:
    - Common service: Bag and storage expand, mount feed, Mirra, Respec avatar, Fairy looter, Catalyst for Amalgam, wedding ring and Crystal chip.
    - Lottery: Prophetic Card & Ancient Compass, Box for mount, box for Jeweler Manuscript, box of wizard trinket…
    - Common combat power: Purification scrolls, Incense, Speck of light, dragon tear… each will have low to medium price.
- Item Mall exclusive:
    - Costume and pet and non-combat mount.
    - Extended game service: goblin banker stable slot, log extension. The Omnificent Core Morpher currently exclusive to Item Mall but it will be considered to be added to Guild shop in medium low price if community gain treaty for limit avatar per player to 1 and forbid incarnation.
- Guild Point exclusive:

- o Reward of lottery in high price: Emblem of the Vicious Wizard, Legendary Scroll of the Commander, Master Jeweler Manuscript, Vial of Condensed Water - Permanent.
- o Endgame combat power with extreme price: "Ship's Hull Upgrade Module: Corvette", Unstable Diamond Tear of the Dragon, Transforming Crystal of 19th Generation.
- o Elixir, Bonus scroll, Builder rune, Permit of the Exceptional Artisan, Barrel of Astral Emanations, Sacred Rune,
- o Miraculous Ark at low price for guild helping new player. But it won't unlock immediately.

8.3. Formula

The formula is complex part, for lazy reader, we give short notable information:

- o Bonus Potential are scale by number of active players, maximum at 3x of original value. Apparently, no way for pay-2-win with Item Mall price are equal to Guild shop price.
- o Portion of Potential are added directly to avatar's guild, which calculated by guild members' loyalty and level in the day before crystal charging. If crystal charging happens in 05 February 2025, it will use variable calculated from 04 February 2025.
- o All the calculation and addition will happen in 18:00 GMT+8.

8.3.1. Global Potential Multiplier modifier

The bonus potential generated from crystal not always same. Dynamically, it depends on status of server, minimum at 0.5 when less than 10 avatars active, maximum at 3x when at least 5000 avatars active. If fall between these amounts, multiplier $\mathcal{M}$ calculate as:

$$\mathcal{M} = \prod \frac{Avatar\ level \times Avatar\ Loyalty}{Level\ cap \times 100} \times \sqrt[3.56]{\frac{Active\ avatar}{100}}$$

To be adding for the mathematic Product $\prod$, avatar must online within 3 days, and have at least 70 loyalties. Supposed all avatar reach the level cap and have 100 loyalties, the root of 3.56 will give this result in certain amount of online avatar:

Amount	10	200	500	1000	2000	5000
$\mathcal{M}$	0.523722	1.214952	1.571592	1.909409	2.319839	3.000812

If some avatar has not reach max level or cannot keep full loyalty, the result of Product $\prod$ chain will decrease, and multiplier will decrease. That's why we count avatar but not user, and 70 loyalties requirement but not all. Don't mind about 3.56 constant, it means to make multiplier scale properly.

8.3.2. Guild migration pull modifier

When crystal charging happens, system will take amount crystal charged and $\mathcal{M}$ multiplier to calculate total Potential generated. Instead of all go to global reservoir, a portion of point will be pulled to guild potential bank, considerably helping building guild for crystal charged player. But this pull is limited at maximum of 75% total potential generated, and only case it reaches 75% is when number of active avatars really low, below 100.

$$\lambda = \left(\frac{Guild\ authority}{Max\ authority}\right)^2 \times \prod \frac{M_{loyalty} \times M_{Lvl}}{100 \times Level\ cap} \times \prod \left(\frac{C_{loyalty} \times C_{Lvl}}{100 \times Level\ cap} + 0.1\right)^2$$

The guild Migration Pull modifier λ calculate somewhat same as Global Potential Multiplier modifier $\mathcal{M}$. Where $C_{loyalty}$ and C_{Lvl} is loyalty and level of Champion tabard, $M_{loyalty}$ and M_{Lvl} is loyalty and level of guild member other than champion tabard. If the value of Migration Pull modifier λ calculated goes over 75%, it set back to 75%. For additional accuracy, instead of guild level, system take Guild authority, which is specified name for the exp to leveling up guild. The potential added will be:

$$P_{Guild} = \lambda \times Crystal\ amount$$

$$P_{Global} = \lfloor \mathcal{M} \times Crystal\ amount - P_{Guild} \rfloor$$

Where P_{Guild} and P_{Global} is potential point added to guild and global reservoir respectively. In small case where $\mathcal{M} \leq \lambda$, the potential added the to the global reservoir will be negative so it will be nullified.

8.4. Daily ranking

Right now, only activity which drain from Global Potential Reservoir is Daily activity ranking. More can be added later in case the reservoir is abundant.

Singularity, Infinium daily ranking is random. Instead of always bring the highest, the strongest to the top, we create random modification and progress. The system will log every time avatar kill mob, finish quest, kill other player… And in 18:00 GMT+8 everyday, those logs will be published for calculation. It may be some of this, some of that, or may be only one, or this and that sum up. Or even count which guild has most avatar being killed. All is random to avoid player grinding to their death. We do hope this kind of ranking will add something up to online gaming industry, accrete some fun into gamers life.

Only half of the potential point in the reservoir will be used for daily ranking. Therefore, the reservoir will never be empty. That's why it's called as reservoir.

8.4.1. About the logs

These logs are exported from shard right the time player finish their activity. The player must have guild. Avatar without guild will not be recorded into the logs. As it is real time, even when avatar leave or join guild, the log will save the guild correctly. All the type are:

- ➢ Astral mob killed by ship weapons.
- ➢ Astral PvP between players while they boarding other ship or in trader hub.
- ➢ Quest completed, daily quest included, repeatable quest not included.
- ➢ Ship destroyed by other ship.
- ➢ Avatar destroy ship, by overload the reactor. But we intend to remove this kind of log as it is too hard.
- ➢ Avatar kill another avatar.
- ➢ Avatar kill mob. Astral mobs boarding ship not count. Summoned mobs not count.
- ➢ Avatar gain alternative currency.
- ➢ Astral trading finish as avatar sell ethereal, or supply faction outpost.
- ➢ Avatar kill hunting ground mob.

Log will be exporting 3 times per days, on 18:00, 9:00 and 14:00. All time in GMT+8. They can be download to observe or creating guild report as well any other business where user see fit.

8.4.2. Basic ranking progress

The detail will be filled later, but in short, the progress will count those logs, using random multiplier on the counting result, then sort. Only notable here is the sorting progress. If the 1st place is Empire, then the 2nd place must be League, 3rd place must be Empire, 4th place must League… and vice versa. Ignoring the distant between each rank is, sorting with odd and even serving as counterbalance to faction strength and population.

8.5. Guild quest

The potential point cannot be consumed directly. Guild must convert it to Guild Point, through Guild Quest. There will be more activity for this purpose will be added in near future, but right now, it's only one.
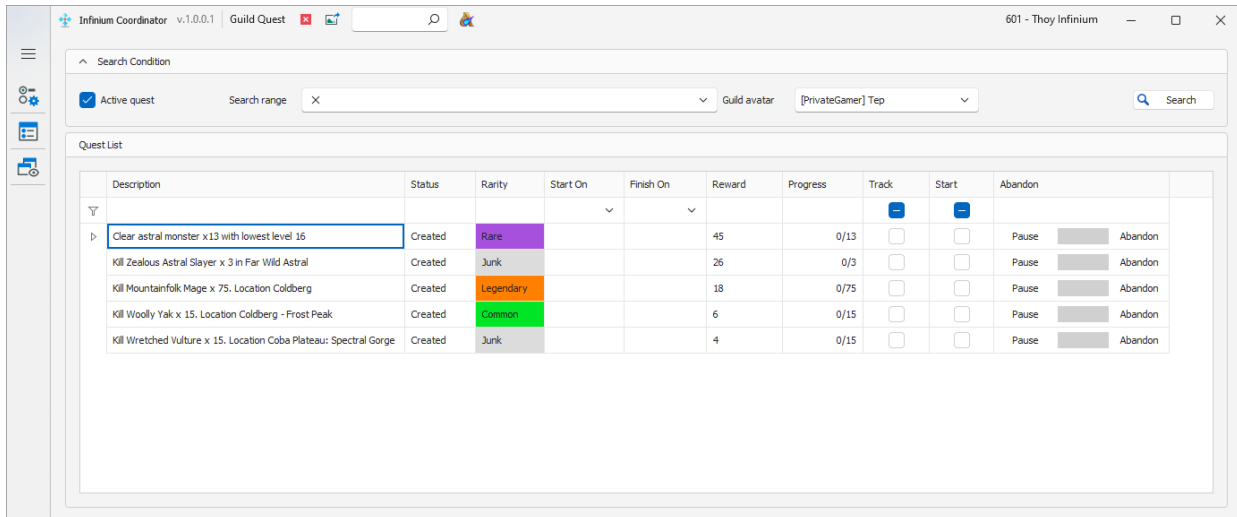

*Figure 12: Guld quest interface*

The mechanic here is simple:

➢ System generate quest randomly. After complete the quest, the reward amount is the Potential will be converted to Guild Point.
➢ The quest level is equivalent to Guild Level.
➢ The reward amount, the requirement to finish amount scale with number and loyalty of members. Quest rarity increase the reward as well as the requirement.
➢ When the quest starts, the Potential in reward amount will be freezing by system. Not suffice make the quest unable to start.
➢ If the quest is failed or abandoned, a small penalty will be deducted from the frozen Potential, the rest will return to the guild.
➢ Tick [Track] allow tracking the quest in real time. Currently, this feature is open to everyone in guild, but if it creates burden to server, we will limit it to Helper clearance. Without tracking, quest still progress and finish properly.
➢ The quest always take place in open world, never in instance.
➢ When killing mob quest start, system may create a chain, giving PvP quest to other guild, prevent finishing the quest. But finish the quest while being prevented will give bonus reward without draining guild potential. Later on, system can create another quest for other guild to stop that PvP quest. The chance each time is 25%, and maximum chain 4 times. Infinium does not forbid cooperate with guild in opposite faction.

For searching history, untick the box [Active quest] and select the date range to search.

25

8.6. Guild shop

Finally, when the point come to the guild, it can be spent on Guild Shop.
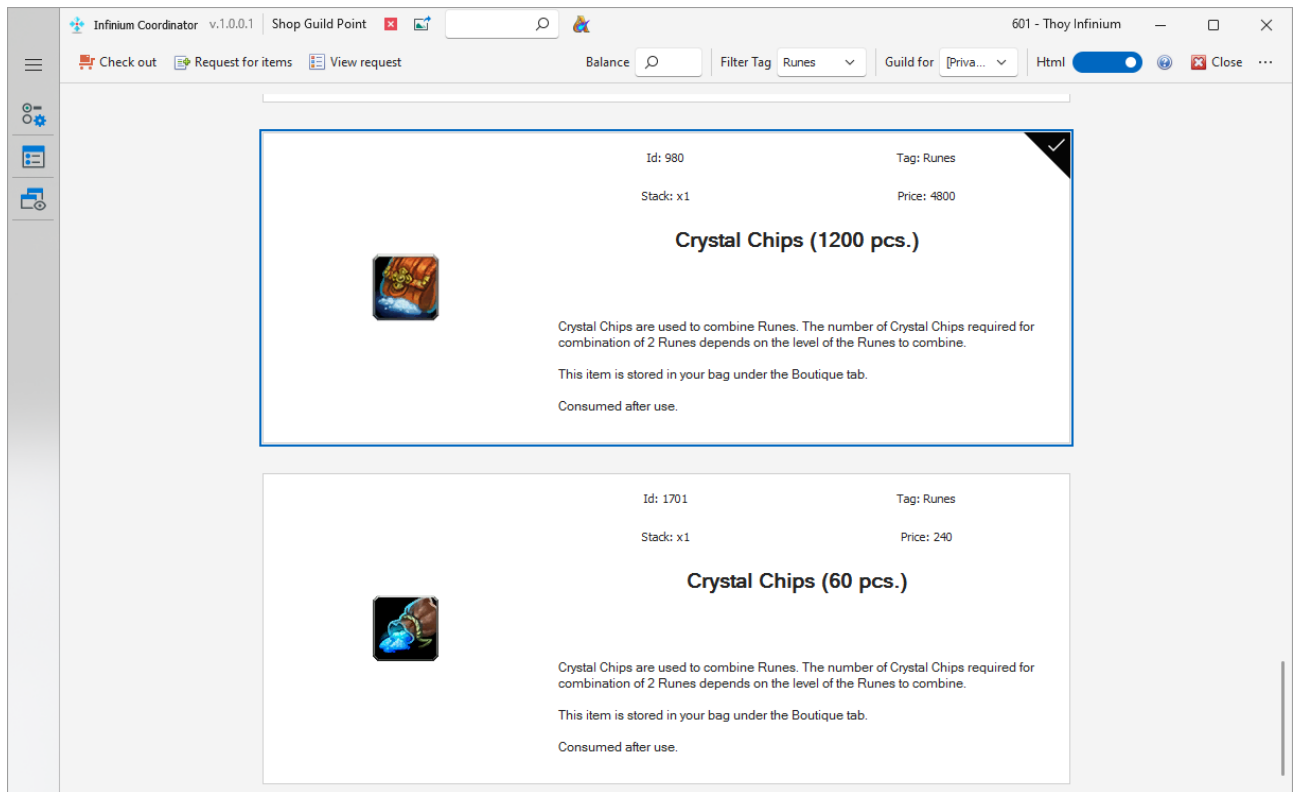
- The shop can only be authorized by Manager Clearance, which default only Guild Leader and Treasure has. But guild member can request for item, and Manager can authorize it later on.
- All item will be delivered by ingame mail, and have note as well as log for later searching.
- Item are split by category for ease of navigation. In case of search, use Ctrl + F hotkey to invoke search function.
- All item buy in guild shop is bound and unable to trade.

9.   Infinium Bridge - Client

This part is extension to Infinium Bridge, which added a second way to bridge game chat to Telegram, which is not using Telegram Bot, but using the Telegram Client, meaning other player seeing who truly said that message. This also the potential for expanding to group chat, whisper, world chat in the future.

This part contains a lot of technical terms with low yield and not required for everyone. Players can skip without affect gameplay.

Exclamation: The bridge with bot is complex, and bridge with client really a superstructure. Dubiously, we are uncertain about player view for this method. That's why bridge client is poorly invested and only barely running. Plus, with security of Telegram, there is good chance the client will become of open source and Infinium only help versioning it or even stay off and let community take care of it.

9.1.   Security risk
- The main reason the Bridge Client getting open source, is Telegram keep track of the API ID for creating that client. Bad behavior may cause Telegram account banned. Multiple Telegram account banned while using same API ID may cause that API ID banned too. That's good reason to let player have their client, so no API ID get abused.
- The Bridge Client is open for modification. Meaning if player use bridge client from invalid source, they may have their message disclosure or even computer virus.

9.2.   Advantage
- Without chat through bot, there will be no limit at 20 message per minute, user can free to talk as long as his hand can.
- Bridge Client can automatically create Telegram private group, potential for relay in-game group chat.
- No longer work through bot, other can send whisper to player directly, and can be relay to the game. The problem here is address which one is whispering and which is his avatar in game.
- Infinium provide listening API, user can modify the bridge client as where they see fit. Meaning there is no tracking, player have their privacy.

9.3.   Setup
1) Player must have a valid Telegram API ID. Acquire it at: https://my.telegram.org/auth. Fill the acquired ID and HASH to bridge client.
2) Login with Infinium Coordinator. Infinium Bridge Client require it login to read the old session data to server. When start, if session data exists, Bridge Client will automatically connect to server.
3) Run Infinium Bridge Client, Click login. Scan QR Code to login.
4) Chat in guild for testing relay. It's done.

The Bridge Client will automatically login to Telegram and Connect to Server when start if the data exists. Player will not have to login to Telegram or Connect to Server every time. We will provide source code of Bridge Client as well. Here is the running of Bridge Client:
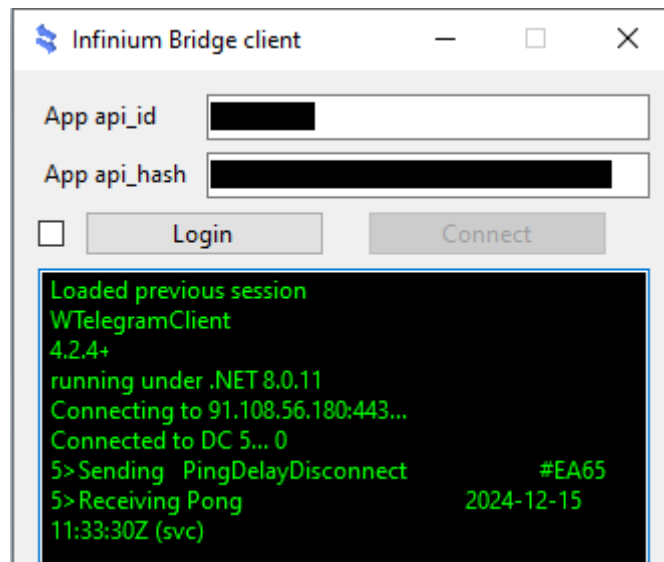
9.4. Behavior

- Infinium Bridge with priority in order: Personal Relay Client » Personal Relay Bot » InfiniumRelayBot. Once at a time, only 1 relay will be use for a message. If one disconnected/removed, Bridge will fall back to lower priority.

- If player have both Relay Client and Relay Bot, in case Relay Client disconnected, there are 30 second delay before Personal Relay Bot be loaded. In that time, InfiniumRelayBot will relay player message.

10. Digital Certificate

This part will give user certain knowledge about x509 Digital Certificate, a modern way to secure connection and authentication. But as time is short, we only give brief. This part is not important and has no feature, lazy reader can pass, user cannot install the Infinium Coordinator should pass as well.

Infinium using self-sign root certificate. Don't mind the name, Pacific help with the certificate and connection and he always giving weird name. Please notice when adding root thumbprint, the root thumbprint is: `A9706D925A4695C4443E1493ACBA820E1C7FBC66`.
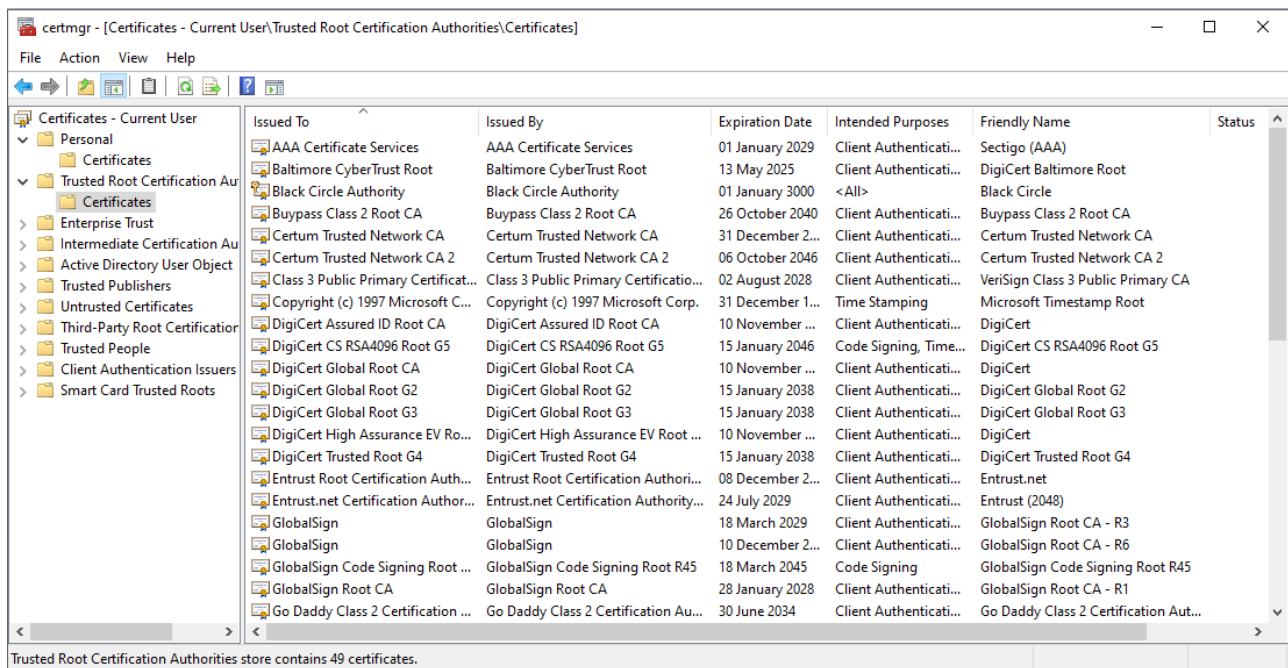

Figure 13: Certificate Management Snap-In

The certificate can be deleted after installed on Windows computer through Certificate Management Snap-In (`certmgr`). The snap in split into multiple directories, but we should only care about two directories: `Personal`, and `Trusted Root`. The `Personal` directory contains certificates where Coordinator can use for connect to server. The `Trusted Root` contain certificates to make Windows see if the connection to external machine is valid or not. To establish connection to Infinium Coordinator server, the self-sign root must be installed to the `Trusted Root` folder, and it is accomplished by Updater via Install Root button.

After install the root, windows can validate digital signature on connection as well as on file. The file with properly digital signature will have notice: This digital signature is OK. All file from Infinium will have Infinium prefix, as well as digital signed.
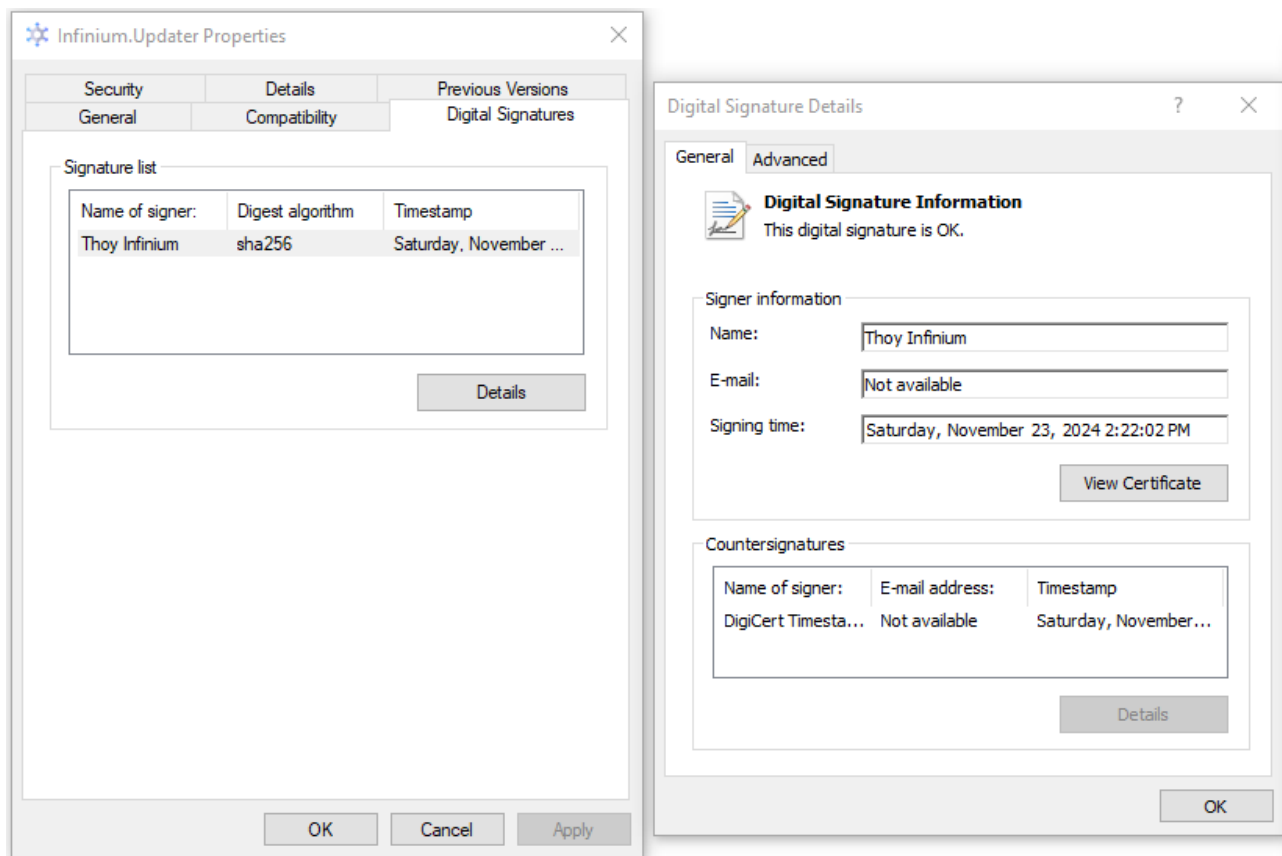
Figure 14: Digital signature on `Infinium.Updater.exe`