Hey there!

v. 2021.0.7
[version history]

Huge thanks for purchasing **Anti-Cheat Toolkit (ACTk)**, comprehensive anti-cheat solution for Unity!

DISCLAIMER:

Anti-cheat techniques used in this plugin do not pretend to be 100% secure and unbreakable (this is impossible on client side), they should stop most cheaters trying to hack your app though.
Please, keep in mind: well-motivated and skilled hackers are able to break anything!

If you have questions about plugin API usage from the scripting side:
codestage.net/uas_files/actk/api

Contents

Installation and setup

Before importing a new version into your project, please consider removing previous one completely in order to avoid any issues due to possible files and folders structure changes in new version.

After importing plugin to the project, you will find new menus for further setup and control:

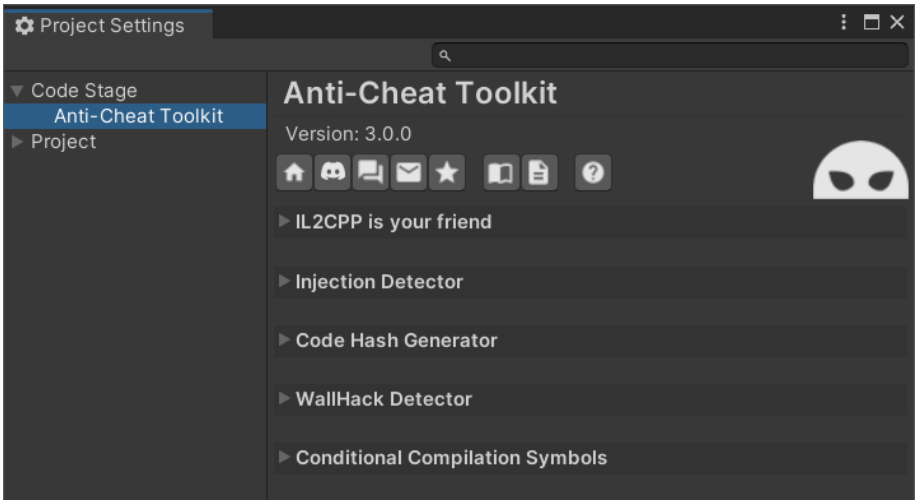
- Tools > Code Stage > Anti-Cheat Toolkit
- GameObject > Create Other > Code Stage > Anti-Cheat Toolkit

Please read through this document to know more about plugin features, best practices and hints.

Settings window

Use Editor Preferences section to configure detectors and conditional compilation symbols for debugging and compatibility purposes. All settings are stored at the "ProjectSettings/ACTkSettings.asset" of your project.

To open ACTk Settings, just use the Tools > Code Stage > Anti-Cheat Toolkit > Settings menu command.



Here you can see such items:

- ACTk version you're using in the project
- Useful links & shortcuts (homepage, forums, support, review, this manual, API reference, about)
- **IL2CPP is your friend** section – describes IL2CPP advantages over Mono from anti-cheat perspective & allows to easily switch to the IL2CPP if current platform supports it.
- **Injection Detector** settings section – see details at the *Managed DLL Injection detection* chapter.
- **Code Hash Generator** – see details at the *Code Integrity check* chapter.
- **WallHack Detector** settings section - see details at the *Wallhacks detection* chapter.
- **Conditional Compilation Symbols** section which allows to switch different debug and compatibility tweaks, logs, and such.

Plugin features in-depth

Preventing memory cheating [video tutorial]

IMPORTANT: *Be careful while replacing regular types with the obscured ones – inspector values will reset!*

This is most popular cheating method on different platforms. People use special tools to search variables in memory and change their values. It is usually money, health, score, etc. Just few examples: Cheat Engine, ArtMoney (PC), Game CIH, Game Guardian (Android). There are plenty of other tools for these and other platforms as well.

To leverage **memory** anti-cheat techniques just use obscured types instead of regular ones: ObscuredInt, ObscuredFloat, ObscuredString and so on (all basic types + few Unity-specific types are covered) ...

These types may be used instead of (and in conjunction with) regular built-in types, just like this:

```
// place this line right at the beginning of your .cs file!
using CodeStage.AntiCheat.ObscuredTypes;

int totalCoins = 500;
ObscuredInt collectedCoins = 100;
int coinsLeft = totalCoins - collectedCoins;

// will print: "Coins collected: 100, left: 400"
Debug.Log("Coins collected: " + collectedCoins + ", left: " + coinsLeft);
```

All int <-> ObscuredInt casts are done implicitly. Same for any other obscured type!

There is one big difference between regular int and ObscuredInt though - cheater will not be able to easily find and change values stored in memory as ObscuredInt, what can't be said about regular int!

Well, actually, you may allow cheaters to find what they are looking for and catch them on cheating attempts. Actual obscured values are still safe in such case: plugin will allow cheaters to find and change fake unencrypted variables if you wish them to ;)

For such cheating attempts detection use ObscuredCheatingDetector described below.

Few more words about obscured types

You can find obscured types usage examples and even try to cheat them yourself in the scene "Examples/API Examples" shipped with plugin.

Obscured types pro-tips:

- All simple Obscured types have public static methods **GetEnctypted()** and **SetEncrypted()** to let you work with encrypted value from obscured instance. May be helpful if you're going to use some custom saves engine.
- In some cases cheaters can find obscured variables using so-called "unknown value" search. Despite the fact they'll find encrypted value and any cheating (freeze at in Cheat Engine or change in any memory editor) will be detected by ObscuredCheatingDetector, they still can find it. To completely prevent this, you may use the special method in all basic obscured types - **RandomizeCryptoKey()**. Use it at the moments when variable doesn't change to change an encrypted representation keeping original value untouched. Cheater will search for unchanged value but value actually will change preventing variable finding.
- You may generate random crypto keys for the **Encrypt(value, key)** methods using **GenerateKey()** API. Do not forget to store those keys in order to **Decrypt()** your value later.

IMPORTANT:

- Currently these types can be exposed to the inspector: ObscuredString, ObscuredBool, ObscuredInt, ObscuredUInt, ObscuredFloat, ObscuredLong, ObscuredULong, ObscuredDouble, ObscuredVector2, ObscuredVector3, ObscuredDecimal, ObscuredVector2Int, ObscuredVector3Int, ObscuredQuaternion. **Be careful while replacing regular types with the obscured ones – inspector values will reset!**

- While still pretty fast and lightweight, obscured types are usually requiring additional resources comparing to the regular ones. Please, try keeping obscured variables away from Updates, loops, huge arrays, etc. and keep an eye on your Profiler, especially when working on mobile projects.
- LINQ and XmlSerializer are not supported at this moment.
- Binary serialization is supported out of the box.
- JSON serialization is also possible both with:
  - Newtonsoft Json for .NET using ISerializable implementation (example) or Converters (example by mcmorry)
  - Unity's own JsonUtility with help of ISerializationCallbackReceiver (example).
- Generally, I would suggest casting obscured variables to the regular ones to make any advanced operations and cast it back after that to make sure it will work fine.

Preventing files cheating [video tutorial]

Obscured File

Files are common place for saved games and other sensitive information storage.
But without proper protection, files are vulnerable to these threats:

- Sensitive data identification at non-binary files (game variables, credentials, in-game dev cheats etc.).
- Data modification (to cheat money from 100 to 999999 etc.).
- Cheated / modified file sharing with other cheaters.

ObscuredFile does covers all these threats:

- Optionally encrypts data to hide it from curious eyes.
- Has built-in tamper detection so data modification can be spotted (both for encrypted and plain files).
- Optionally locks data to the Device ID or user-defined ID to detect files shared from other devices. See device lock notes to know more.

ObscuredFile can read and write raw byte arrays only. Check out ObscuredFilePrefs below for user-friendly PlayerPrefs – alike API.

Setup and usage are very straightforward:

```
// place this line right in the beginning of your .cs file
using CodeStage.AntiCheat.Storage;

// create new instance with default settings
var secureFile = new ObscuredFile();

// write data
var writeResult = secureFile.WriteAllBytes(abstractBytes);
if (writeResult.Success)
  Debug.Log($"Data saved to {secureFile.FilePath}");
else
  Debug.LogError($"Couldn't save data: {writeResult.Error}");

// read data
var readResult = secureFile.ReadAllBytes();
if (readResult.Success)
  // process readResult.Data;
else if (readResult.CheatingDetected)
  // punish cheaters, check DataFromAnotherDevice \ DataIsNotGenuine readResult properties
else
  Debug.LogError($"Something went wrong while reading data: {readResult.Error}");
```

In example above, `abstractBytes` are saved and loaded with default settings but you are free to configure file path and name, encryption settings, lock to device feature settings and anti-tamper using ObscuredFileSettings APIs.

To know more about how to configure and use ObscuredFile, please refer to the API documentation and usage example: Examples\API Examples\Scripts\Runtime\UsageExamples\ObscuredFilePrefsExamples.cs

IMPORTANT:

- Call `UnityApiResultsHolder.InitForAsyncUsage(true);` from main thread before working with obscured files from background threads.
- Please keep in mind ObscuredFile will work slower comparing to the regular File due to additional encryption. Make sure to avoid using it at hot paths.

Obscured File Prefs

This is a static ObscuredFile wrapper with very easy to use generic API. It allows reading and writing prefs of different types (all basic C# types, byte[], DateTime and few Unity types are supported).

It has all the same features ObscuredFile has and does stores prefs in an ObscuredFile, protected from cheaters.
Here is a simple usage example:

```
// place this line right in the beginning of your .cs file
using CodeStage.AntiCheat.Storage;

// init with default settings
ObscuredFilePrefs.Init();

// listen for cheating
ObscuredFilePrefs.NotGenuineDataDetected += OnDataCheat;
ObscuredFilePrefs.DataFromAnotherDeviceDetected += OnLockCheat;

// write pref
ObscuredFilePrefs.Set("pref key", data);

// read pref
data = ObscuredFilePrefs.Get("pref key", defaultValue);

// alternatively, specify data type and omit defaultValue argument
// data = ObscuredFilePrefs.Get<T>("pref key");

// get all pref keys to iterate then needed
var keys = ObscuredFilePrefs.GetKeys();
```

Similarly to ObscuredFile example, default settings were used and you can configure ObscuredFilePrefs for your needs with ObscuredFileSettings APIs.

IMPORTANT:

- Call `UnityApiResultsHolder.InitForAsyncUsage(true);` from main thread before working with obscured files from background threads.
- Please keep in mind ObscuredFilePrefs will work slower comparing to the regular File or PlayerPrefs due to additional encryption. Make sure to avoid using it at hot paths.

Preventing Player Prefs cheating [video tutorial]

Unity developers often use PlayerPrefs (PP) class to store small amounts of sensitive data (money, game progress etc.), but it can be found and tampered with almost no effort. This is as simple as opening regedit and navigating it to the HKEY_CURRENT_USER\Software\Your Company Name\Your Game Name on Windows for example!

That's why I decided to include ObscuredPrefs (OP) class into this toolkit. It allows you to save data as usual, but keeps it safe from views and changes, exactly what we need to keep our saves cheatersproof! ☺

Here is a simple example:

```
// place this line right in the beginning of your .cs file
using CodeStage.AntiCheat.Storage;

ObscuredPrefs.Set<float>("currentLifeBarObscured", 88.4f);
var currentLifeBar = ObscuredPrefs.Get<float>("currentLifeBarObscured");

// will print: "Life bar: 88.4"
Debug.Log("Life bar: " + currentLifeBar);
```

As you can see, nothing changed in how you use it – everything works just like with old good regular PlayerPrefs class, but now your saves are secure from cheaters (well, from most of them)!
Additional functionality:

- You may subscribe to the **NotGenuineDataDetected** event. It allows you to know about saved data integrity violation. Fires once (for whole session) as soon as you read some tampered data.
- OP supports plenty of additional data types comparing to regular PP: all basic C# types, byte[], DateTime and few Unity types.
- Device Lock feature is supported. See device lock notes to know more.

ObscuredPrefs pro-tips:

- You may easily migrate from PP to OP – just replace PP occurrences in your project with OP and you're good to go (be careful though, don't replace PP with OP in the ACTk classes)! OP automatically encrypts any data saved with PP on first read. Original PP key will be deleted by default. You may preserve it though using **preservePlayerPrefs** flag. In such case PP data will be encrypted with OP as usual, but original key will be kept, allowing you to read it again using PP. You may see **preservePlayerPrefs** in action in the API Examples scene.
- You may mix regular PP with OP (make sure to use different key names though!), use obscured version to save only sensitive data. No need to replace all PP calls in project while migrating, regular PP works faster comparing to OP.
- Use OP to save adequate amount of data, like local leaderboards, player scores, money, etc., avoid using it for storing huge portions of data like maps arrays, your own database, etc. - use ObscuredFile or ObscuredFilePrefs for that.
- There are some great contributions extending regular PlayerPrefs around, like ArrayPrefs2 for example. OP could easily replace PP in such classes, making all saved data secure.

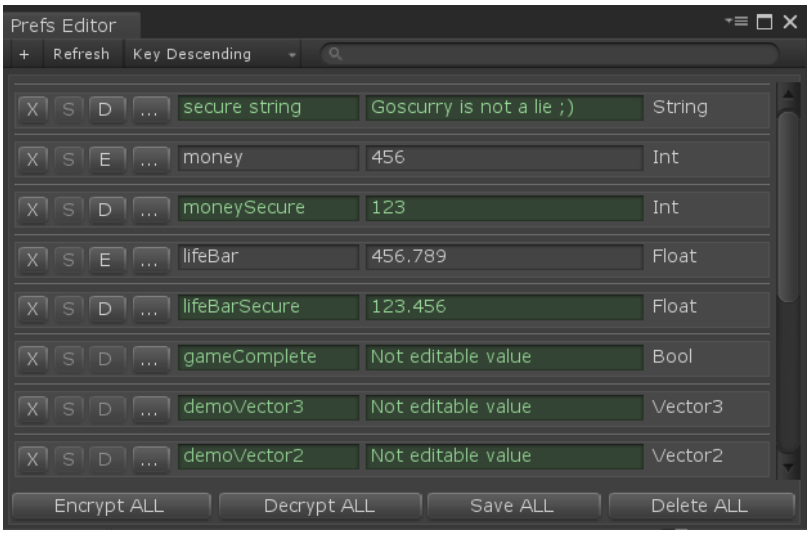
IMPORTANT:

- Please keep in mind OP will work slower comparing to the regular PP since it encrypts and decrypts all your data consuming some additional resources. Feel free to check it yourself, using Performance Obscured Tests component on the PerformanceTests game object in the API Examples scene.
- Please use ObscuredPrefs.DeleteAll() to remove all prefs instead of PlayerPrefs.DeleteAll() to properly clear internals and avoid any data loss when saving new obscured prefs after DeleteAll() call.

ObscuredPrefs / PlayerPrefs editor window

ACTk includes helpful Editor Window – **Prefs Editor**.
Use it to edit your PlayerPrefs and ObscuredPrefs in Unity Editor.

Open it via menu command:
Tools > Code Stage > Anti-Cheat Toolkit > Prefs Editor as Tab (utility window mode also available)



Quick tour:

- "+" button: add new pref - select type, optionally enable encryption, set key and value, press OK button
- "Refresh" button: re-read all prefs and update list
- "Key Descending" - sorting type, other possible values: Key Ascending, Type, Obscurance
- search field - just start typing and it will filter out records with name containing specified text
- list of both ObscuredPrefs and PlayerPrefs with paging (shows 50 records per page)
- record breakdown:
  - "X" button - deletes record from prefs
  - "S" button - saves changes to the prefs storage
  - "E" / "D" buttons - encrypt / decrypt pref (obscured prefs are colored in green)
  - "..." button - extra actions, like Copy pref to clipboard
  - key and value fields allow to change key and / or value of the pref (if pref has editable type)
  - type label shows pref type
- some buttons in bottom for group actions (with self-explanatory names)
- has overwrite confirmation
- has prefs parse progress bar if you're working with huge prefs amount (over 1k)
- works on Win, Mac, Linux

Prefs Editor ignores few standard prefs Unity uses for own needs (like UnitySelectMonitor, UnityGraphicsQuality, etc.).

Please note, on Windows, prefs stored in Editor and in standalone player are placed in different locations, so it's not possible to use Prefs Editor for prefs saved outside the Unity Editor.

Common Device Lock feature notes

When using **Device Lock** feature with ObscuredPrefs, ObscuredFile or ObscuredFilePrefs, please consider following:

- **DeviceLockSettings** property allows locking any saved data to the current device. This could be helpful to prevent save games moving from one device to another (saves with 100% game progress, or with bought in-game goods for example).
  WARNING: On iOS use at your peril! There is no reliable way to get persistent device ID on iOS. So, avoid using it or use in conjunction with **DeviceIdHolder.DeviceId** to set own device ID (e.g. user email).
  You may specify three different levels of data lock strictness:
  None: you may read both locked and unlocked data, saved data will remain unlocked.
  Soft: you still may read both locked and unlocked data, but all saved data will lock to the current device.
  Strict: you may read only locked to the current device data. All saved data will lock to the current device.
  See DeviceLockSettings description in API docs for more info.
  Android users: see **Troubleshooting** section below if you don't use this feature.
- Listen to the **DataFromAnotherDeviceDetected** event to detect data from another device. In ObscuredPrefs invokes only once (per session), in ObscuredFile \ ObscuredFilePrefs – invokes every time file is read.

- When DeviceLockLevel.Strict is used, saves from other devices are not readable by default. You may reduce DeviceLockSettings.DeviceLockTamperingSensitivity to Low (detection event still will be fired) or Disabled (event will not be fired)**.** This also can be used to restore data in case Device ID changed unexpectedly.
- First access to the Device ID can produce CPU spike on some platforms causing gameplay hiccup when you first time load or save data. To avoid this, call **DeviceIdHolder.ForceLockToDeviceInit()** to avoid possible spike on first data load / save with **Device Lock** enabled. Use this method to force getting device id at desired time, while you showing something static, like a loading fade or splash screen.
- Use **DeviceIdHolder.DeviceId** property to explicitly set device id. This may be useful to lock saves to the unique user ID (or email) if you have server-side authorization. Best for iOS since there is no way to get consistent device ID (on iOS 7+), all we have is Vendor and Advertisement IDs, both can change and have restrictions \ corner cases.

Code obfuscation and overall code protection notes

ACTk does not obfuscate or protect your source code thus it's still vulnerable to the hackers and reverse-engineers even if you are using all ACTk features.

Thus, it's highly recommended to use **both** good code obfuscator and IL2CPP scripting backend when possible, to make it much harder to analyze and change your compiled application code.

IL2CPP does produces raw binary code with metadata instead if Mono's IL bytecode making all IL reversing tools useless (like dnSpy and such) and making it much, much harder to get good decompilation of your method bodies (only possible with expensive and not easy to use native disassemblers and decompiles). As a side bonus, it also totally prevents managed assemblies' injection into the Mono ApplicationDomain.

Metadata is generated for the limited reflection purposes and still allows to construct IL assemblies without method code but with all namespaces, classes, fields and such and cheaters do actively use tools like IL2CPP Dumper to reconstruct IL assemblies to look at the overall code structure.

That's why it's dramatically important to complement IL2CPP with good code obfuscator with names obfuscation feature, which is integrated into the Unity's build process and does obfuscates code **before** IL2CPP makes a build. In such case most of IL2CPP metadata will become a mess of useless names making reconstructed IL assembly very hard to reverse-engineer and analyze.

There are lots of good code obfuscators around, including free ones, though not that much are properly integrate with Unity, that's why I'd recommend to take a look at the Obfuscator plugin from the Asset Store (read more about this plugin at the *third-party* section).

There are also lots of native protectors around, for specific platforms and use cases. Please consider using native protectors as well if possible, it will add additional protection layer increasing requirements to the hacker skills who would like to edit or reverse-engineer your application (examples: Denuvo, VMProtect, etc).

Anyways, it's always a good idea to check if your code is genuine and was not tampered if you have some sensitive parts of the code on the client side (i.e. not on the server side which is not reachable to hackers), and ACTk is here to help using *CodeHashGenerator*.

Code Integrity validation

IMPORTANT:
- *Only Android and Windows PC builds are supported so far*
- *For advanced Unity developers mostly as it requires additional coding*

The general idea behind code integrity validation is to make a unique fingerprint (hash) of your code, which will change as soon as your code will be altered after you get the fingerprint, and to compare that fingerprint against the current fingerprint your runtime application has.

When you have to deal with novice cheaters, it's enough to make a comparison right in your application in most simple cases and more likely it will be not noticed by the novice cheater, so you're free to start from simple hash comparison right in the C# code of your application.

However, due to the nature of the treat, your check can be altered too by the more advanced cheaters, so it's more secure to make a validation outside your C# code. Best choice here – make a server-side validation. You just send current hashes to the server and check them against initially generated (whitelisted) ones to make sure your code didn't change.

So, your validation procedure generally consists of three steps: get the *reference* hashes, get the *actual runtime* hashes, compare hashes. Please read more details about each step below.

IMPORTANT:

- Hashes generation operation (both in editor or at runtime) produces ***per-file hashes*** for each file in build and gets **summary hash** from those files.
- Thus, while per-file hashes should remain unchanged both in editor (got from CodeHashGeneratorPostprocessor) and runtime (got from CodeHashGenerator), summary hash may differ in some cases (for example, when your runtime app is a part of AAB bundle and it has no few platform-specific files inside).
- Recommended hashes comparison strategy: compare summary hashes first and if they don't match, check all runtime per-file hashes against pre-generated per-files hashes whitelist (and treat any unknown hash as a build alteration trigger).

CodeHashGeneratorPostprocessor

This Editor script allows to generate *reference* hashes of your code in your resulting build file(s).
You can listen to the HashesGenerated event to get the resulting hashes after each build.
Enable "Generate code hash on build completion" option at the *ACTk Settings* in order to enable this event. Resulting hashes will also be printed to the Editor Console (even if you didn't subscribe to the event).

You also can get any external build code hashes manually via built-in menu item: Tools > Code Stage > Anti-Cheat Toolkit > Calculate external build hashes
Or you can call **CalculateExternalBuildHashes()** directly from your Editor code for the same result.

This postprocessor was made to generate hashes without executing builds at runtime.

Use CodeHashGenerator in your genuine build to generate *reference* hashes at runtime if you have any problems with in-editor hashes generation or in case you post-process your code after finishing Unity build.

See usage example at the "Examples/Code Genuine Validation/Scripts/Editor".

CodeHashGenerator

This Runtime script allows to generate *reference* or *runtime* hash right from your running app.
Subscribe to the static event **HashGenerated** and call **Generate()** method to start hash generation. Underlying hash generation code differs for different platforms but in general it does works at the separate threads or coroutines when possible, to make generation process smooth and avoid CPU spikes preventing overall app performance degradation.

Feel free to generate reference hashes at runtime to compare it later against runtime hashes to validate code integrity.

See usage example at the "Examples/Code Genuine Validation/Scripts/Runtime" and "Examples/Code Genuine Validation/GenuineValidator" scene.

Common detectors features and setup

ACTk has various ***detectors*** included to let you detect different cheats and react accordingly.
All detectors have some common features and setup processes.

Generally, you have three ways to setup and use any detector:

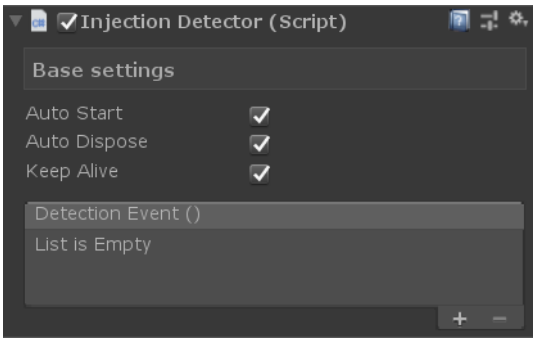
- setup through the Unity Editor
- setup through the code
- mixed mode

Setup through the Unity Editor

First, you need to add detector to the scene. You have two options for that:

1. Use GameObject > Create Other > Code Stage > Anti-Cheat Toolkit menu to quickly add detector to the scene. "Anti-Cheat Toolkit Detectors" Game Object with detector will be created in scene (if it does not exist). This is recommended way to setup detectors.
2. Alternatively, you may add detector to any existing Game Object of your choice via the Component > Code Stage > Anti-Cheat Toolkit menu

Next step – configure added detector. All detectors have some common options to configure.
Here is freshly added Injection Detector for example (as it has no other options except the common ones):



Auto Start: enable to let detector start automatically after scene load. Otherwise, you'll need to start it explicitly from code (see details below). In order to use this feature you should configure *Detection Event* described below.

Auto Dispose: enable to let detector automatically dispose itself and destroy own component after cheat detection. Otherwise, detector will just stop.

Keep Alive: enable to let detector survive new level (scene) load. Otherwise detector will self-dispose on new level load.

Detection Event: it's a standard Unity Event which detector executes on cheat detection.

Recommended setup – keep all options enabled and set appropriate event for detection.
In such case you'll have always working detector travelling through the scenes and it will destroy itself after detection.
You may attach your script with detection callbacks to the same Game Object where you have your detector and they both will survive scenes reload.

Setup through the code

If you prefer to setup things from code - just call static **StartDetection(callback)** method of any detector once anywhere in your code to get that detector running with default parameters. Detector will be added to the scene automatically if it doesn't exist.

If you wish to tune any options – just use static **Instance** property to reach all configurable fields and properties right after starting the detector (Instance will be null if there is no such detector in scene).
Some specific for detector options usually available for initial configuration through the arguments of the overloaded **StartDetection()** methods, see API docs for your detector to figure out which options are available for the initial tuning.
Here is an example for the Injection Detector:

```
// place this line right at the beginning of your .cs file!
using CodeStage.AntiCheat.Detectors;

// starts detection with specified callback
InjectionDetector.StartDetection(OnInjectionDetected);

// this method will be called on injection detect
private void OnInjectionDetected() { Debug.Log("Gotcha!"); }
```

Mixed setup

Detectors allow you to setup them in a mixed way – combining configuration in the inspector and manual launch through the code.

You may add detector to the scene as described in the **Setup through the Unity Editor** topic, keeping Detection Event empty and start it manually from the code using **StartDetection(callback)** method as described in the **Setup through the code** topic.

This way allows you to control the moment when detector should start and lets you configure detector both from the Inspector and from the code through the **Instance** property before starting it.

In order to use such approach, you should disable **Auto Start** option in the detector's inspector.

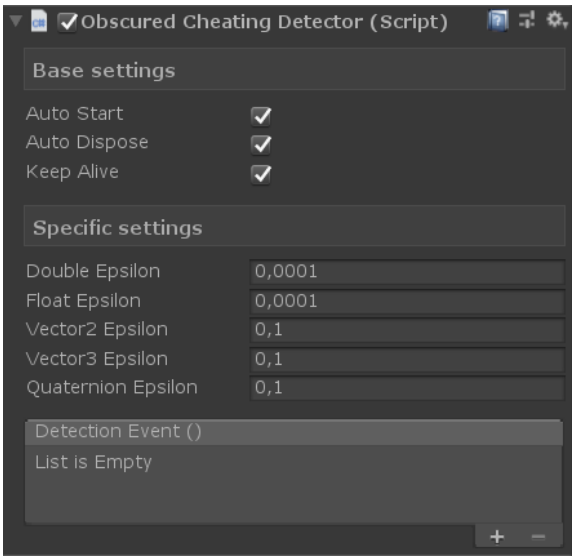
You also may fill Detection Event in the inspector and start detector using **StartDetection()** method (without arguments).

Obscured types cheating detection

Anti-Cheat Toolkit's **Obscured Cheating Detector** allows to detect cheating of all obscured types except ObscuredPrefs (it has own detection mechanisms covered in next section).

When running, this detector allows obscured vars to use fake unencrypted values as a honeypot for cheaters. They'll be able to find desired values, but changing or freezing them will not do anything except triggering cheating detection.

See *Common detectors features and setup* topic above for the details on setup and common features of any detector.



Epsilons: maximum allowed difference between fake and real encrypted variables before cheat attempt will be detected. Default values are suitable for most cases, but you're free to tune them for your case (if you have false positives for some reason for example).

IMPORTANT:

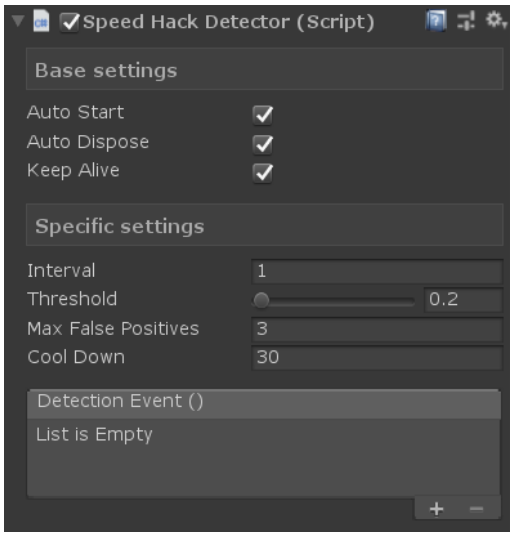
- Cheating detection will not work and fake unencrypted variables will not exist in memory while detector is not running. So, if you don't use ObscuredCheatingDetector or you have disabled Auto Run in inspector and you don't run it from code - your values will not appear in any memory searchers at all.

Speed hack detection [video tutorial]

This type of cheating is very popular and used pretty often since it is really easy to use and any child around may try it on your game. Speed Hack allows speeding up or slowing down your game in various cheating tools with few simple clicks.

Anti-Cheat Toolkit's **Speed Hack Detector** allows to detect speed hack usage (from tools like Cheat Engine, GameGuardian, etc.). It's really easy to use as well ;)

See ***Common detectors features and setup*** topic above for the details on setup and common features of any detector.



Interval: detection period (in seconds). Better, keep this value at one second and more to avoid extra overhead.

Threshold: allowed speed multiplier both for speeding up and slowing down. Was introduced to decrease possible false positives for rare cases with slightly faster or slower timers due to the hardware diversity. Default value 0.2 allows both 1.2x and 0.8x game speeds, which in general is stable enough and should workaround most known timers problems.

Max False Positives: in some very rare cases (system clock errors, OS glitches, etc.) detector may produce false positives, this value allows skipping specified amount of speed hack detections before reacting on cheat. When actual speed hack is applied – detector will detect it on every check. Quick example: you have Interval set to 1 and Max False Positives set to 5. In case speed hack was applied to the application, detector will fire detection event in ~5 seconds after that (Interval * Max False Positives + time left until next check).

Cool Down: allows resetting internal false positives counter after specified amount of successful shots in the row.
It may be useful if your app has rare yet periodic false detections (in case of some constant OS timer issues for example), slowly increasing false positives counter and leading to the false speed hack detection at all.
Set value to 0 to completely disable cool down feature.

Let me show you few examples of what happens "under the hood", for your information. I'll use these parameters: **Interval** = 1, **Max False Positives** = 5, **Cool Down** = 30

Ex. 1: Application works without speed hacks. Detector runs its internal checks every second (**Interval** == 1). If something is wrong and timers desynchronize, false positives counter will be increased by 1. After 30 seconds (**Interval** * **Cool Down**) of smooth work (without any OS hiccups) false positives counter sets back to 0. It prevents undesired detection.
Ex. 2: Application started, and after some time Speed Hack applied to the application. Detector runs its internal checks every second, raising false positives counter by 1. After 5 seconds (**Interval** * **Max False Positives**) cheat will be detected. If cheater will try to avoid detection and will stop speed hack after 3 seconds, he has to wait for another 30 seconds before applying cheat again. Pretty annoying. And may be annoying even more if you increase Cool Down up to 60 (1 minute to wait). And cheater have to know about Cool Down at all to try make use of it.

SpeedHackProofTime APIs

In conjunction with SpeedHackDetector, you can utilize SpeedHackProofTime class in order to use reliable timers instead of Unity's Time.* timers which usually do suffer from the speed hacks. Mimics Time.* APIs except fixed* physics APIs. Works only when SpeedHackDetector is running and falls back to the Unity's timers until actual speed hack is detected. Use to make your animations and internal time-related calculations immune to the detected speed hack.

See usage example at the "Examples/API Examples/Scripts/Runtime/InfiniteRotatorReliable" script and at the "API Examples" scene.

IMPORTANT:

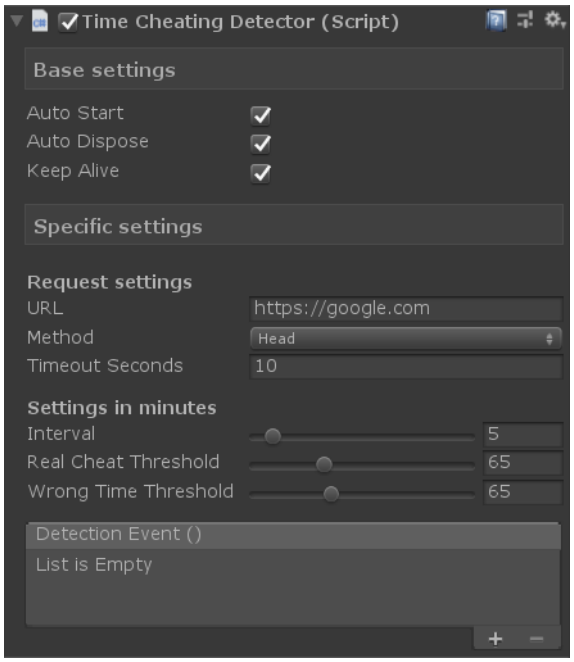
- Please note, SpeedHackProofTime may not work in some cases, e.g. when there is no legal way to reach reliable timers (may happen in sandbox processes, like processes in Chrome browser).

Time cheating detection

Players often use this type of cheating to speed up some long-term processes in the game, like building progress, or energy cool down \ restore through few hours or days. All cheater needs to do to leverage such cheating – just change system time to make your game "think" day or few hours passed since he started to build a new item.

Anti-Cheat Toolkit's **Time Cheating Detector** allows to detect such cheating using online timeservers. You need an Internet connection to be able to use this detector.

See ***Common detectors features and setup*** topic above for the details on setup and common features of any detector.



URL: absolute URL to the resource which will return correct Date response header value to the HEAD or GET request. When running in WebGL, URL automatically changed to the current domain if necessary, to avoid CORS limitations.

Method: request method to use. Head is faster and uses less traffic but some web servers may treat too often HEAD requests as a bot activity and temporary block client. In case of any problems, use Get method as it more compatible.

Timeout Seconds: how long to wait for the server reply before aborting the request.

Interval: detection period (in **minutes**). Try to avoid using too short intervals (below 1 minute) to reduce traffic and extra resources usage.

Real Cheat Threshold: Maximum allowed difference between two subsequent measurements of the online and offline time differences, in **minutes**. Actual cheat registered when difference overshoots this value.

Wrong Time Threshold: Maximum allowed difference between online and offline time. When difference overshoots this value, callback or event raised (you can subscribe to these from scripting only) with check result: TimeCheatingDetector.CheckResult.WrongTimeDetected

IMPORTANT:

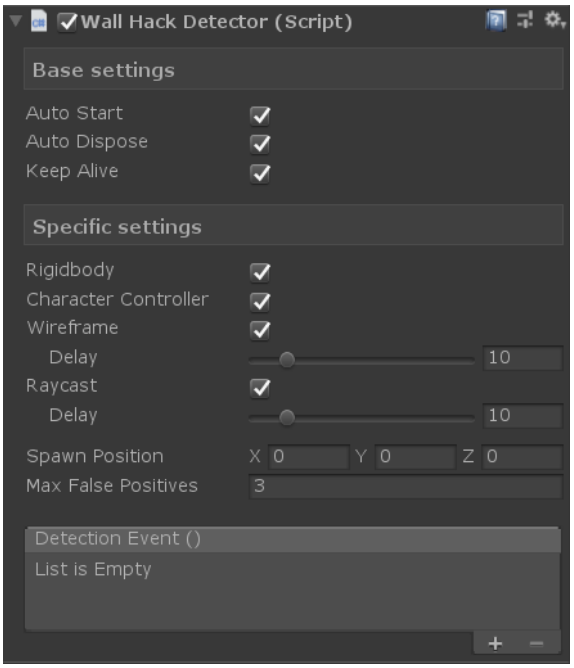
- You may subscribe to the additional event: **CheatChecked** to get the full information about cheating check result. Same delegate is used for all the callbacks you can set through the scripting when starting detection.
- If there will be no Internet while checking for cheating, **CheatChecked** event will be raised with CheckResult.Error *result* argument and ErrorKind.OnlineTimeError *error* argument, check will just be skipped and scheduled for retry in specified interval again. Detector should work fine on devices with poor or time-to-time Internet connection.
- Since this detector needs Internet, obviously it will generate additional permissions requests on mobile platforms, like INTERNET permission on Android (which is usually auto-granted). If you don't need this detector and wish to get rid of extra permission, please check the ACTK_PREVENT_INTERNET_PERMISSION at the *ACTk Settings* window.
- Any manual system time changes leading to difference between local UTC time and online UTC time will NOT be treated as a cheating but will be treated as wrong time instead.
- You may use ForceCheck* methods to manually execute cheating check and get result (see API docs of these methods for usage examples). May be combined with 0 interval to switch detector into the fully manual mode, when you manually execute checks at the desired moments.

Wallhacks detection [video tutorial]

There are few different cheating methods which are usually mentioned as "wall hack" – player can see through the transparent or wireframe walls, can walk through the walls like a ghost and can shoot through the walls.

ACTk has **WallHack Detector** which covers all of these.
It consists of few different modules, each detects different kind of cheats.

While running, WallHack Detector creates service container "[WH Detector Service]" in scene and uses it as a virtual sandbox within 3x3x3 cube where it creates different items depending on your settings.
See ***Common detectors features and setup*** topic above for the details on setup and common features of any detector.



Rigidbody: enable this module to check for the "walk through the walls" kind of cheats made via Rigidbody hacks. Disable to save some resources if you're not using Rigidbody for characters.

Character Controller: enable this module to check for the "walk through the walls" kind of cheats made via Character Controller hacks. Disable to save some resources if you're not using Character Controllers.

Wireframe: enable this module to check for the "see through the walls" kind of cheats made via shader or driver hacks (wall became wireframe, alpha transparent, etc.). Disable to save some resources in case you don't care about such cheats.
Note: requires specific shader in order to properly work at runtime. Read more details below.

Wireframe Delay: time in seconds between Wireframe module checks, from 1 up to 60 secs.

Raycast: enable this module to check for the "shoot through the walls" kind of cheats made via Raycast hacks. Disable to save some resources in case you don't care about such cheats.

Raycast Delay: time in seconds between Raycast module checks, from 1 up to 60 secs.

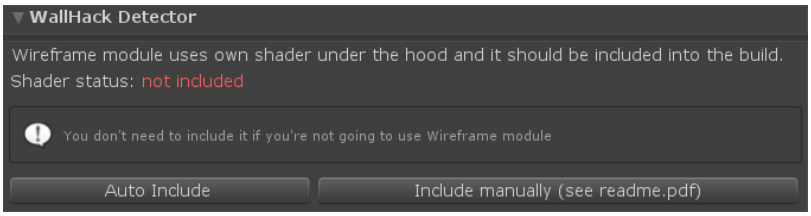
Spawn Position: world coordinates of the dynamic service container represented by 3x3x3 red wireframe cube in scene (visible when you select Game Object with detector).

Max False Positives: allowed detections in a row before actual detection. Each module has own detection counter. It increases on every cheat detection and resets on the first success shot of appropriate module (when cheat is not detected). If any of such counters became more than Max False Positives value, detector registers final, actual detection.

Wireframe module shader setup

Wireframe module uses Hidden/ACTk/WallHackTexture shader under the hood. Thus, such shader should be included into the build to exist at runtime. You'll see error in logs at runtime if you'll have no Hidden/ACTk/WallHackTexture shader included and you'll be prompted in Editor to include it when you run WallhackDetector without shader included.

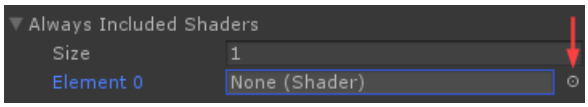
You may easily add or remove shader via the *ACTk Settings* window.



Press the "Auto include" button to automatically add the Hidden/ACTk/WallHackTexture shader to the Always Included Shaders list.

You also may press the second button ("Include manually") to open Graphics Settings for your project and add shader to the Always Included Shaders list manually.
To manually add shader to the list:

- add one more element to the list;
- click on the bulb next to the new empty element (see a red arrow on the image below);

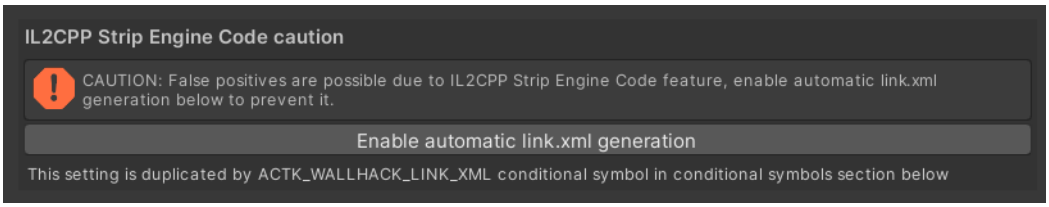


- search for "wallhack" in the opened window and select the WallHackTexture with double-click;

That's it for the wireframe module setup.

WallHack Detector and IL2CPP notice

When building with IL2CPP, Unity Engine stripping kicks in and removes unused components which can occasionally remove stuff used by WallHack Detector leading to false positives. To avoid this, make sure to enable automatic link.xml generation at the *ACTk Settings* (under WallHack Detector section):



IMPORTANT:

- Wallhacks are pretty specific kind of cheats usually applied to desktop FPS games, so make sure your game can suffer from them before using detector, since detection requires significant amount of extra resources.
- You may enable the ACTK_WALLHACK_DEBUG conditional compilation symbol at the *ACTk Settings* to keep the renderers on the service objects and see them in your game. It also enables OnGUI output of the resulting texture of the Wireframe module. This symbol works only in the development build or Editor.
- All objects within service container are placed on the "Ignore Raycast" layer and have disabled renderers by default.
- It's important to set Spawn Position to the empty and isolated space to avoid any collisions of 3x3x3 service sandbox with your objects leading to the false positives and your objects misbehavior.
- It's also important to keep in mind detector may constantly create and move objects, use physics and make other calculations in sandbox while running, depending on settings.

Managed DLL Injection detection [video tutorial]

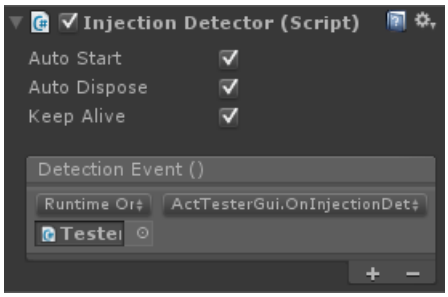
IMPORTANT #1: Works only on Mono Android and Mono PC builds!
IMPORTANT #2: **There is no assembly injection possible in IL2CPP builds**. Read more in dedicated *code protection section*.
IMPORTANT #3: Disabled in Editor because of specific assemblies causing false positives. Use ACTK_INJECTION_DEBUG symbol to force it in Editor.
WARNING: Please, test your app on target device and make sure you have no false positives from Injection Detector. If you have such issue, try to add detected assembly to the whitelist (covered below).

This kind of cheating is not as popular as others, though still used against Unity apps so it can't be ignored. To implement such injection, cheater needs some advanced skills, thus many of them just buy cheat injectors from skilled people on

special portals. One of easiest way to inject something – use mono-assembly-injector or similar software. Some nuts guys even use Cheat Engine's Auto Assemble for that. Do you see how cool Cheat Engine is? ☺

Anti-Cheat Toolkit's **Injection Detector** allows to react on injection of any *managed* assemblies (DLLs) into your app. Before using it in runtime, you need to enable it in *ACTk Settings* (Add mono injection detector support checkbox).

See ***Common detectors features and setup*** topic above for the details on setup and common features of any detector.



This detector has no additional options to tune except the common ones (note, when started from code, you pass callback which accepts string argument – detection cause).
Simple way to detect advanced cheat!

Injection Detector internals (advanced)

Let me tell you few words on the important Injection Detector "under the hood" topic to give you some insight.
Usually any Unity app may use three groups of assemblies:

- System assemblies: System.Core, mscoree, UnityEngine, etc.
- User assemblies: any assemblies you may use in project, including third party ones, like DOTween.dll (assembly from the great DOTween tweening library) or assemblies from the external packages + assemblies Unity generated from your code - Assembly-CSharp.dll, Assembly Definition assemblies, etc.
- Runtime generated and external assemblies. Some assemblies could be created at runtime using reflection or loaded from external sources (e.g. web server). This is usually a rare case.

Injection Detector needs to know about all valid assemblies you trust to detect any foreign assemblies in your app.
It automatically covers first two groups. Last group should be covered manually (read below).
Detector leverages whitelist approach to skip allowed assemblies. It generates such list automatically when you build your application and includes it into the build (if you have Enable Injection Detector checkbox checked at the ACTk Settings window).

This whitelist consists of two parts:

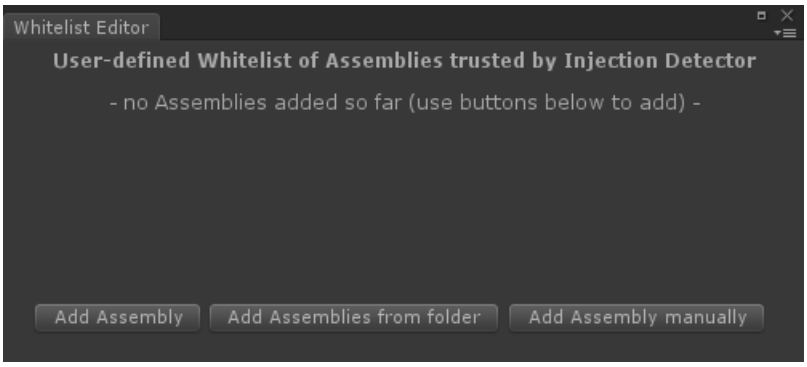
- Dynamic whitelist from assemblies used in project (covers first and second group)
- User-defined whitelist (third group, see details below).

In most cases, you shouldn't do anything but just enabling Injection Detector support in settings and setting it up in scene \ code to let it work properly.
However, if your project loads some assemblies from external sources (and these assemblies are not present in your project assets) or generates assemblies at runtime, you need to let detector know about such assemblies to avoid any false positives. For this reason, user-defined whitelist editor was implemented.

How to fill user-defined whitelist

To add any assembly to the whitelist, follow these simple steps:

- Open Whitelist Editor using "Tools > Code Stage > Anti-Cheat Toolkit > Injection Detector Whitelist Editor" menu or "Edit Whitelist" button in the Settings window:



- Add new assembly using three possible options: single file ("Add Assembly"), recursive folder scan ("Add Assemblies from folder"), manual addition - filling up full assembly name ("Add Assembly manually").

That's it!

If you wish to add detected assembly manually and don't know its full name, just enable debug in the Injection Detector: check the ACTK_INJECTION_DEBUG at the *ACTk Settings* window and let detector catch your assembly. You'll see its full name in console log, after "[ACTk] Injected Assembly found:" string. This symbol works only in the development build or Editor.

Whitelist editor allows to remove assemblies from the list one by one (with small "-" button next to the assembly names) and clear entire whitelist as well.
User-defined whitelist is stored in the ProjectSettings/ACTkSettings.asset file with all other settings.

IMPORTANT:

- Please email me (see support contacts at the end of this document) your Invoice ID for injection example if you wish to try InjectionDetector in the wild.
- You may check the ACTK_INJECTION_DEBUG_VERBOSE and ACTK_INJECTION_DEBUG_PARANOID options at the *ACTk Settings* window to enable such compilation symbols for additional debug information. These symbols work only in the development build or Editor.

Third party plugins integrations and notes

IMPORTANT:

Some third-party plugins with ACTk support may require ACTK_IS_HERE conditional symbol in your project..
You can enable it in *ACTk Settings*.

Obfuscator

Anti-Cheat Toolkit provides different ways to prevent and detect cheating.
In addition, I strongly suggest to complement ACTk with good code protection to make your setup complete.
Here are two first steps I suggest to make in order to increase difficulty of your code reverse-engineering:

- Consider using IL2CPP instead of Mono if possible since this will make it harder for cheaters to inspect and analyze your code. IL2CPP builds do not have IL bytecode, which cheaters usually decompile in ILSpy and such. Though cheaters still have a metadata of all your code (namespaces, class names, method names, and such) which could be used for bad. That's why second step exists.
- Consider using obfuscator to make class names, methods, fields and such a meaningless mess for the cheater. It will dramatically increase difficulty of your code reverse-engineering.

Thankfully, there is a nice asset on the store which fills the gap and lets you protect your code easily and seamlessly: Obfuscator, suddenly =) Since it's made for Unity, it "knows" about Unity events, messages, coroutines, etc. so you don't need to apply ACTK_EXCLUDE_OBFUSCATION symbol (see details about this symbol below).

PlayMaker

Currently ACTk has partial support for the PlayMaker (PM). There are few PM actions available in the package: Integration/PlayMaker.unitypackage. Import it into your project to add new actions to the PM Actions Browser. See few examples at the Scripts/PlayMaker/Examples folder.

ObscuredPrefs and ObscuredFilePrefs are fully supported. You'll find Obscured * actions in the PlayerPrefs section of the Actions Browser.

- All detectors except the ObscuredCheatingDetector are fully supported. You'll find detectors actions at the Anti-Cheat Toolkit section of the Actions Browser.
- Basic Obscured types for PM are not currently supported. PM doesn't allow to add new variables types. But it's possible to integrate them by hands. There is example and explanation by kreischweide.

Behavior Designer

Currently ACTk has **full** support for the Opsive Behavior Designer (BD). There are few BD tasks (Actions & Conditionals) and SharedVariables available in the package: Integration/BehaviorDesigner.unitypackage. Import it into your project to integrate Anti-Cheat Toolkit with BD. See few examples at the Scripts/BehaviorDesigner/Examples folder.

Other third-party plugins with ACTk support

There are some other third-party plugins with ACTk support:

- **Mad Level Manager**: ACTk is used as storage backend.
- **Stan's Assets**: **Android Native Plugin** and **Ultimate Mobile** plugins.

Please, let me know if you wish to see your plugin here.

Troubleshooting

- **I have errors after update.**
  In order to avoid any update issues, please completely remove previous version (whole CodeStage/AntiCheatToolkit folder) before importing updated ACTk package into your project.
- **I have false positives or other misbehaviour for one of detectors.**
  If you're starting your existing in scene detectors through the code, make sure you're using StartDetection() methods at the MonoBehaviour's Start() phase, not at the Awake or OnEnable phases. All detectors except InjectionDetector (since it has callback with cause) will print details about detection if you'll enable ACTK_DETECTION_BACKLOGS flag in *ACTk Settings* window. Please report any false positives with logs generated on development build with this flag enabled if possible.
- **I have InjectionDetector false positives.**
  Make sure you've added all external libraries your game uses to the whitelist (menu: Tools > Code Stage > Anti-Cheat Toolkit > Injection Detector Whitelist Editor). For how to fill this whitelist, see ***How to fill user-defined whitelist*** section above. Contact me if it doesn't helps.
- **I have WallHackDetector false positives**.
  Make sure you've properly configured **Spawn Position** of the detector and detector's service objects are not intersecting with any objects from your game. Also make sure Ignore Raycast layer collides with itself in the Layer Collision Matrix at the Edit > Project Settings > Physics. WallHackDetector places all its service objects to the Ignore Raycast layer to help you avoid unnecessary collisions with your game objects and collides such objects with each other. That's why you need make sure Ignore Raycast layer will collide with itself.
- **I'm having 'Can't add component because class * doesn't exist' error from WallHackDetector.**
  WallHackDetector does uses these Unity components: BoxCollider, MeshCollider, CapsuleCollider, Camera, Rigidbody, CharacterController, MeshRenderer. Such error may appear when one of those components gets stripped out, e.g. by

IL2CPP strip engine code option. To prevent components stripping, you can add them to any game object in any scene you have in your build or put such link.xml file anywhere in your Assets folder:

```
<linker>
  <assembly fullname="UnityEngine">
    <type fullname="UnityEngine.BoxCollider" preserve="all"/>
    <type fullname="UnityEngine.MeshCollider" preserve="all"/>
    <type fullname="UnityEngine.CapsuleCollider" preserve="all"/>
    <type fullname="UnityEngine.Camera" preserve="all"/>
    <type fullname="UnityEngine.Rigidbody" preserve="all"/>
    <type fullname="UnityEngine.MeshRenderer" preserve="all"/>
    <type fullname="UnityEngine.CharacterController" preserve="all"/>
  </assembly>
</linker>
```

ACTk tries to automatically handle this case and detect it at Play Mode to warn you and open settings where you can enable automatic link.xml file generation (using ACTK_WALLHACK_LINK_XML conditional compilation symbol).

- **How can I remove READ_PHONE_STATE permission requirement on Android?**
  If you don't use Device Lock feature in ObscuredPrefs / ObscuredFile / ObscuredFilePrefs and building an android application, I'd suggest to check the ACTK_PREVENT_READ_PHONE_STATE at the *ACTk Settings* window to remove READ_PHONE_STATE permission requirement on Android. Otherwise, you'll need this requirement to let ACTk lock your saves to the device.

- **How can I remove INTERNET permission requirement on Android?**
  If you don't use TimeCheatingDetector, I'd suggest to check the ACTK_PREVENT_INTERNET_PERMISSION at the *ACTk Settings* window to remove INTERNET permission requirement on Android. Otherwise, you'll need this requirement to let ACTk detect time cheating.

- **My obfuscator breaks Unity build when I'm using ACTk.**
  If you're using some obfuscator which is not aware of Unity's Messages, Invoke()'s and Coroutines which may call methods by name, and your obfuscator is compatible with System.Reflection.ObfuscationAttribute attribute, feel free to check ACTK_EXCLUDE_OBFUSCATION at the *ACTk Settings* window to add [Obfuscation(Exclude = true)] attribute to such methods. Contact me if it doesn't help.

- **I've updated ACTk from some very old version and now it can't read my ObscuredPrefs.**
  If you're using ObscuredPrefs and wish to update ACTk, please consider following: ACTk >= 1.4.0 can't decrypt data saved with ObscuredPrefs in ACTk < 1.2.5, so make sure you're not jumping from version < 1.2.5 directly to the version >= 1.4.0. You need to use any version in between to automatically convert prefs to the new format or get decryption code and bring it as an additional fallback to the ACT >= 1.4.0. In case of any issues with migration feel free to contact me and I'll help you make it smooth.

- **I'm having merge conflicts for the Assets/Resources/fndid.bytes file.**
  If you're using version control for your project and you're using InjectionDetector, you may have merge conflicts. It's fine, just add that file to the ignore list of your VCS; fndid.bytes is automatically generated and can be different on the different machines.

- **I see StackOverflowException error in the Console.**
  If you see such message:
  StackOverflowException: The requested operation caused a stack overflow.
  CodeStage.AntiCheat.ObscuredTypes.ObscuredPrefs.HasKey (System.String key) (at
  **CodeStage/AntiCheatToolkit/Scripts/ObscuredTypes/ObscuredPrefs.cs:*)*
  More likely you accidentally replaced all PlayerPrefs.* calls not only in your classes, but also in the ACTk classes as well. Just remove ACTk from your project and re-import it again and issue should go away.

- **I see truncated or too short string as a result of the ObscuredString.GetEncrypted() \ EncryptDecrypt() method(s).**
  Obscured string may contain special characters, like line break, line end, etc. while encrypted. So it may look broken, but its length and actual content should still be fine.

- **I see corrupted ObscuredFloats / ObscuredDoubles after updating ACTk from 1.5.8.0 or earlier.**
  These types got new format in 1.6.0 and any saved or serialized instances needs to be migrated to the new format.
  To do this, use:
  - menu commands for Unity serialized instances migration: Tools > Code Stage > Anti-Cheat Toolkit > Migrate *
  - runtime API for saved as GetEncrypted(): ObscuredFloat/ObscuredDouble.MigrateEncrypted()
  - conditional compilation flag ACTK_OBSCURED_AUTO_MIGRATION at the *ACTk Settings* window to enable runtime checks and automatic migration for the instances until they will be rewritten with new values; reduces performance of ObscuredFloat/ObscuredDouble a bit

If you are updating from 1.5.1.0 or earlier, you'll need to make an additional migration step, which was added in 1.5.2.0 after first format change. Please request older ACTk version to be able to make a full *.*.*.* - 1.5.2.0 - 1.6.0 migration.

- **I see Error response code: 0 or java.io.EOFException errors in logs from Time Cheating Detector on old Android device (before Android 6).**
  There is a known bug in UnityWebRequest which reproduces only on old Android devices. Try setting request method to GET instead of HEAD to work this bug around.
- **I can't read or write ObscuredFile or ObscuredFilePrefs from the StreamingAssets on Android or WebGL.** This is an expected behavior due to the StreamingAssets nature on these platforms (see Unity Manual for more details). To work this around, please copy files from StreamingAssets folder to File.IO-accessible location (such as Application.dataPath) prior to reading them with ObscuredFile, like in this simple example made to demonstrate the idea.

Compatibility

All features with few exceptions listed below should be fully functional on any known platform.
- InjectionDetector works only at Android Mono and Standalone Mono builds
- CodeHashGenerator works only at Android and Windows Standalone builds
- ObscuredFIle does not work UWP .NET due to its deprecation (UWP IL2CPP is supported)

Plugin was tested on these platforms: **Standalone** (Win, Mac, Linux, WebGL), **iOS**, **Android, UWP variations**.

In addition, customers reported it as working on these:
Windows Phone 8, Apple TV (thx atmuc).

Please, let me know if plugin doesn't work for you on some specific platform and I'll try to help and fix it.

Apple Encryption Export Regulations compatibility

These ACTk features are not compatible with Apple's export compliance by default:
- ObscuredFile and ObscuredFilePrefs
- ObscuredLong, ObscuredULong, ObscuredDouble and ObscuredDecimal types

If you're using those in your app, you'll need to declare you're using encryption when publishing to the Apple App Store.

You can avoid this using ACTK_US_EXPORT_COMPATIBLE option at the Conditional Compilation Symbols settings.
It does prevent generation of keys in excess of 56-bits for symmetric encryption, so it does not fall anymore under the encryption definition at the Bureau of Industry and Security Commerce Control List's Category 5 Part 2, 2.a.1.a, making it fully compatible with export regulations, so ACTk is not forcing you to declare you're using encryption in your application when you do publish it to the Apple App Store.

Please note though, this comes with such side effects:

- ObscuredFile & ObscuredFilePrefs encryption strength weakening by switching from AES with 128-bit key to RC2 with 56-bit key (data still will be encrypted and not readable).
- Partial ObscuredLong, ObscuredULong, ObscuredDouble and ObscuredDecimal obscuration weakening, making it not fully encrypted in some rare cases. ObscuredCheatingDetector will keep an eye on them anyways.

ProGuard notice

In case you're using any optimizers, minimizers and obfuscators which do change native binaries in any way, make sure to add ACTk native Android library to the ignores. For example, add this line to your ProGuard configuration file:
-keep class net.codestage.actk.** { *; }

Third party licenses included

xxHashSharp
https://github.com/noricube/xxHashSharp
BSD 2-Clause License (http://www.opensource.org/licenses/bsd-license.php)

SharpZipLib
https://github.com/icsharpcode/SharpZipLib
MIT License (https://opensource.org/licenses/MIT)

Final words from author

One more time - please keep in mind my toolkit is not something what can stop a very skilled well-motivated cheater. There is no such solution actually, even giant anti cheat solutions, which cost thousands of dollars per month, still have flaws and cheating audience.

ACTk helps against most of the cheating players though, plus it will make advanced solo cheaters life harder :P

I hope you will find **Anti-Cheat Toolkit** suitable for your needs and it will save some of your priceless time!
Please, leave your reviews at the plugin's Asset Store page and feel free to drop me bug reports, feature suggestions and other thoughts on the forum or via support contacts you'll find below.

Thanks for taking your time to read this document!

Anti-Cheat Toolkit links and support

Asset Store | Homepage | API | Forum | YouTube

Support contacts:
discord.gg/KrU4psWffA
codestage.net/contacts
support@codestage.net

Subscribe for updates and news:
Discord Announcements Channel
@codestage_net
@codestage

Best wishes,
Dmitriy Yukhanov
Asset Store publisher
codestage.net

P.S. #0 I wish to thank my family for supporting me in my Unity Asset Store efforts and making me happy every day!
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