

# Namespace AetherUtils.Core.Attributes

## Classes

### [ConfigAttribute](#)

Specifies the name of a property in a YAML configuration file.

# Class ConfigAttribute

Namespace: [AetherUtils.Core.Attributes](#)

Assembly: AetherUtils.Core.dll

Specifies the name of a property in a YAML configuration file.

```
[AttributeUsage(AttributeTargets.Property)]
public sealed class ConfigAttribute : Attribute
```

## Inheritance

[object](#) ← [Attribute](#) ← ConfigAttribute

## Inherited Members

[Attribute.Equals\(object\)](#) , [Attribute.GetCustomAttribute\(Assembly, Type\)](#) ,  
[Attribute.GetCustomAttribute\(Assembly, Type, bool\)](#) ,  
[Attribute.GetCustomAttribute\(MemberInfo, Type\)](#) ,  
[Attribute.GetCustomAttribute\(MemberInfo, Type, bool\)](#) ,  
[Attribute.GetCustomAttribute\(Module, Type\)](#) , [Attribute.GetCustomAttribute\(Module, Type, bool\)](#) ,  
[Attribute.GetCustomAttribute\(ParameterInfo, Type\)](#) ,  
[Attribute.GetCustomAttribute\(ParameterInfo, Type, bool\)](#) , [Attribute.GetCustomAttributes\(Assembly\)](#) ,  
[Attribute.GetCustomAttributes\(Assembly, bool\)](#) , [Attribute.GetCustomAttributes\(Assembly, Type\)](#) ,  
[Attribute.GetCustomAttributes\(Assembly, Type, bool\)](#) , [Attribute.GetCustomAttributes\(MemberInfo\)](#) ,  
[Attribute.GetCustomAttributes\(MemberInfo, bool\)](#) ,  
[Attribute.GetCustomAttributes\(MemberInfo, Type\)](#) ,  
[Attribute.GetCustomAttributes\(MemberInfo, Type, bool\)](#) , [Attribute.GetCustomAttributes\(Module\)](#) ,  
[Attribute.GetCustomAttributes\(Module, bool\)](#) , [Attribute.GetCustomAttributes\(Module, Type\)](#) ,  
[Attribute.GetCustomAttributes\(Module, Type, bool\)](#) , [Attribute.GetCustomAttributes\(ParameterInfo\)](#) ,  
[Attribute.GetCustomAttributes\(ParameterInfo, bool\)](#) ,  
[Attribute.GetCustomAttributes\(ParameterInfo, Type\)](#) ,  
[Attribute.GetCustomAttributes\(ParameterInfo, Type, bool\)](#) , [Attribute.GetHashCode\(\)](#) ,  
[Attribute.IsDefaultAttribute\(\)](#) , [Attribute.IsDefined\(Assembly, Type\)](#) ,  
[Attribute.IsDefined\(Assembly, Type, bool\)](#) , [Attribute.IsDefined\(MemberInfo, Type\)](#) ,  
[Attribute.IsDefined\(MemberInfo, Type, bool\)](#) , [Attribute.IsDefined\(Module, Type\)](#) ,  
[Attribute.IsDefined\(Module, Type, bool\)](#) , [Attribute.IsDefined\(ParameterInfo, Type\)](#) ,  
[Attribute.IsDefined\(ParameterInfo, Type, bool\)](#) , [Attribute.Match\(object\)](#) , [Attribute.TypeId](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Constructors

### ConfigAttribute(string)

Specifies the name of a property in a YAML configuration file.

```
public ConfigAttribute(string name)
```

Parameters

name [string](#)

## Properties

### Name

The YAML name of the property in the configuration file.

```
public string Name { get; }
```

Property Value

[string](#)

# Namespace AetherUtils.Core.Configuration

## Classes

### [ConfigManager<T>](#)

This class cannot be instantiated. A child class must be created inheriting from [ConfigManager<T>](#). Handles saving, loading, and querying a generic configuration based on class T.

### [DefaultConfig](#)

A [DTO](#) representing the default, bare configuration of a new application. This class can be used as is, or a new class can be created to store the configuration for an application.

If a new class is needed, it must be a [DTO](#) and its properties should be marked with [ConfigAttribute](#) attributes in order to be saved and loaded from disk by a [ConfigManager<T>](#).

This class can contain instances of other [DTO](#) classes so long as those classes also have the [Config Attribute](#) on their properties.

### [LogOptions](#)

A [DTO](#) representing options for how log files are handled and formatted for an application.

### [YamlConfigManager](#)

Represents a configuration manager for a YAML configuration file using [DefaultConfig](#) as the base configuration.

## Interfaces

### [IConfig](#)

Interface that all [ConfigManager<T>](#) classes must implement.

# Class ConfigManager<T>

Namespace: [AetherUtils.Core.Configuration](#)

Assembly: AetherUtils.Core.dll

This class cannot be instantiated. A child class must be created inheriting from [ConfigManager<T>](#). Handles saving, loading, and querying a generic configuration based on class T.

```
public abstract class ConfigManager<T> : IConfig where T : class
```

## Type Parameters

T

The DTO class that represents the configuration.

## Inheritance

[Object](#) ↗ ← ConfigManager<T>

## Implements

[IConfig](#)

## Derived

[YamlConfigManager](#)

## Inherited Members

[object.Equals\(object\)](#) ↗ , [object.Equals\(object, object\)](#) ↗ , [object.GetHashCode\(\)](#) ↗ , [object.GetType\(\)](#) ↗ ,  
[object.MemberwiseClone\(\)](#) ↗ , [object.ReferenceEquals\(object, object\)](#) ↗ , [object.ToString\(\)](#) ↗

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Remarks

The custom class should have its properties related to configuration marked with a [ConfigAttribute](#). These properties are the only ones which will be serialized and de-serialized from disk.

## Constructors

# ConfigManager(string)

This class cannot be instantiated. A child class must be created inheriting from [ConfigManager<T>](#). Handles saving, loading, and querying a generic configuration based on class T.

```
protected ConfigManager(string configFilePath)
```

## Parameters

**configFilePath** [string](#)

## Remarks

The custom class should have its properties related to configuration marked with a [ConfigAttribute](#). These properties are the only ones which will be serialized and de-serialized from disk.

# Properties

## ConfigExists

Get a value indicating whether the configuration file exists on disk.

```
public bool ConfigExists { get; }
```

## Property Value

[bool](#)

## ConfigFilePath

Get or set the path to the configuration file on disk.

```
public string? ConfigFilePath { get; set; }
```

## Property Value

[string](#)

## CurrentConfig

Get or set the current configuration.

```
protected T? CurrentConfig { get; set; }
```

Property Value

T

## IsInitialized

Get a value indicating whether the configuration has been initialized.

```
public bool IsInitialized { get; }
```

Property Value

[bool](#) ↗

## Methods

### CreateDefaultConfig()

Create the default configuration.

```
public abstract bool CreateDefaultConfig()
```

Returns

[bool](#) ↗

### Get(ConfigOption)

Get a configuration value specified by the configuration [option](#).

```
public object? Get(ConfigOption option)
```

## Parameters

**option** [ConfigOption](#)

The [ConfigOption](#) containing information about the value to get.

## Returns

[object](#)

The configuration value or `null` if the value did not exist.

## Get(string)

Get a configuration value specified by `configName`.

```
public object? Get(string configName)
```

## Parameters

**configName** [string](#)

The name of the configuration to get.

## Returns

[object](#)

The configuration value or `null` if the value did not exist.

## Load()

Load a configuration file from disk based on the [ConfigFilePath](#).

```
public bool Load()
```

Returns

[bool](#)

`true` if the config loaded successfully; `false` otherwise.

Exceptions

[ArgumentException](#)

If [ConfigFilePath](#) is `null` or empty.

[FileNotFoundException](#)

## LoadAsync()

Asynchronously load a configuration file from disk based on the [ConfigFilePath](#).

`public Task<bool> LoadAsync()`

Returns

[Task](#)<[bool](#)>

`true` if the config loaded successfully; `false` otherwise.

Exceptions

[ArgumentException](#)

If [ConfigFilePath](#) is `null` or empty.

[FileNotFoundException](#)

If the configuration file specified by [ConfigFilePath](#) was not found on disk.

## Save()

Save a configuration file to disk based on the [CurrentConfig](#) and the [ConfigFilePath](#).

```
public bool Save()
```

Returns

[bool](#)

`true` if the config saved successfully; `false` otherwise.

Exceptions

[ArgumentException](#)

If [ConfigFilePath](#) is `null` or empty.

## SaveAsync()

Asynchronously save a configuration file to disk based on the [CurrentConfig](#) and the [ConfigFilePath](#).

```
public Task<bool> SaveAsync()
```

Returns

[Task](#) <[bool](#)>

`true` if the config saved successfully; `false` otherwise.

Exceptions

[ArgumentException](#)

If [ConfigFilePath](#) is `null` or empty.

## Set(ConfigOption)

Set a configuration value specified by the configuration `option`.

```
public bool Set(ConfigOption option)
```

## Parameters

### option [ConfigOption](#)

The [ConfigOption](#) containing information about the value to set.

## Returns

### [bool](#) ↗

`true` if the value was set successfully; `false` otherwise.

## Set(string, object?)

Set a configuration `value` specified by `configName`.

```
public bool Set(string configName, object? value)
```

## Parameters

### configName [string](#) ↗

The name of the configuration to set.

### value [object](#) ↗

The value to set.

## Returns

### [bool](#) ↗

`true` if the value was set successfully; `false` otherwise.

# Class DefaultConfig

Namespace: [AetherUtils.Core.Configuration](#)

Assembly: AetherUtils.Core.dll

A [DTO](#) representing the default, bare configuration of a new application. This class can be used as is, or a new class can be created to store the configuration for an application.

If a new class is needed, it must be a [DTO](#) and its properties should be marked with [ConfigAttribute](#) attributes in order to be saved and loaded from disk by a [ConfigManager<T>](#).

This class can contain instances of other [DTO](#) classes so long as those classes also have the [ConfigAttribute](#) on their properties.

```
public sealed class DefaultConfig
```

## Inheritance

[object](#) ← DefaultConfig

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

# Properties

## ConnectionString

The connection string used for connecting to a database.

```
[Config("connectionString")]
public string ConnectionString { get; set; }
```

## Property Value

[string](#)

## LicenseFile

The full path to a valid license file for an application.

```
[Config("licenseFile")]
public string LicenseFile { get; set; }
```

Property Value

[string](#)

## LogOptions

A collection of options used for logging.

```
[Config("logOptions")]
public LogOptions LogOptions { get; set; }
```

Property Value

[LogOptions](#)

# Interface IConfig

Namespace: [AetherUtils.Core.Configuration](#)

Assembly: AetherUtils.Core.dll

Interface that all [ConfigManager<T>](#) classes must implement.

```
public interface IConfig
```

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,

[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

## Properties

### ConfigExists

Get a value indicating whether the configuration file specified by [ConfigFilePath](#) exists.

```
bool ConfigExists { get; }
```

#### Property Value

[bool](#) ↗

### ConfigFilePath

The file path to a configuration file. This path can contain Windows path variables (i.e., `%TEMP%`). They will be expanded when saving and loading.

```
string? ConfigFilePath { get; set; }
```

#### Property Value

[string](#) ↗

## IsInitialized

Get a value indicating whether this configuration is initialized and ready to be used.

```
bool IsInitialized { get; }
```

Property Value

[bool](#)

## Methods

### Get(ConfigOption)

Get the configuration value for the named config property.

```
object? Get(ConfigOption option)
```

Parameters

[option](#) [ConfigOption](#)

The [ConfigOption](#) defining the configuration parameters to get.

Returns

[object](#)

The value of the configuration property.

### Load()

Deserialize a configuration file from disk, if it exists.

```
bool Load()
```

Returns

[bool](#)

`true` if the file loaded successfully; `false`, otherwise.

## LoadAsync()

Asynchronously deserialize a configuration file from disk, if it exists.

`Task<bool> LoadAsync()`

Returns

[Task](#) <[bool](#)>

`true` if the file loaded successfully; `false`, otherwise.

## Save()

Serialize and save a configuration file to disk based on the current configuration.

`bool Save()`

Returns

[bool](#)

`true` if the file saved successfully; `false`, otherwise.

## SaveAsync()

Asynchronously serialize and save a configuration file to disk based on the current configuration.

`Task<bool> SaveAsync()`

Returns

[Task](#) <[bool](#)>

`true` if the file saved successfully; `false`, otherwise.

## Set(ConfigOption)

Set a configuration value for the named config property.

```
bool Set(ConfigOption option)
```

Parameters

`option` [ConfigOption](#)

The [ConfigOption](#) defining the configuration parameters to set.

Returns

[bool](#) ↗

`true` if the value was set successfully; `false` otherwise.

# Class LogOptions

Namespace: [AetherUtils.Core.Configuration](#)

Assembly: AetherUtils.Core.dll

A [DTO](#) representing options for how log files are handled and formatted for an application.

```
public sealed class LogOptions
```

## Inheritance

[object](#) ← LogOptions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

# Properties

## AppName

The name of the application doing the logging.

```
[Config("appName")]
public string AppName { get; set; }
```

## Property Value

[string](#)

## IncludeDateOnly

Indicates if the log file name should include the date only, instead of the full formatted [DateTime](#).

```
[Config("includeDateOnly")]
public bool IncludeDateOnly { get; set; }
```

Property Value

[bool](#)

## IncludeDateTime

Indicates if the log file name should include the current formatted [DateTime](#) the file was created.

```
[Config("includeDateTime")]
public bool IncludeDateTime { get; set; }
```

Property Value

[bool](#)

## LogFileDirectory

The directory that the log file should be saved to.

```
[Config("logFileDirectory")]
public string LogFileDirectory { get; set; }
```

Property Value

[string](#)

## LogFooter

Specifies the footer to add at the end of each log file.

```
[Config("logFooter")]
public string LogFooter { get; set; }
```

## Property Value

[string](#) ↗

## LogHeader

Specifies the header to add at the top of each log file.

```
[Config("logHeader")]
public string LogHeader { get; set; }
```

## Property Value

[string](#) ↗

## LogLayout

Specifies the default log layout to use for NLog.

```
public string LogLayout { get; set; }
```

## Property Value

[string](#) ↗

## NewFileEveryLaunch

Indicates whether a new log file should be created for every new launch of the application.

```
[Config("newFileEveryLaunch")]
public bool NewFileEveryLaunch { get; set; }
```

## Property Value

[bool](#) ↗

## WriteLogToConsole

Indicates whether the log should write to the system console in addition to a log file.

```
[Config("writeLogToConsole")]
public bool WriteLogToConsole { get; set; }
```

Property Value

[bool](#) ↗

# Class YamlConfigManager

Namespace: [AetherUtils.Core.Configuration](#)

Assembly: AetherUtils.Core.dll

Represents a configuration manager for a YAML configuration file using [DefaultConfig](#) as the base configuration.

```
public sealed class YamlConfigManager : ConfigManager<DefaultConfig>, IConfig
```

## Inheritance

[object](#) ← [ConfigManager<DefaultConfig>](#) ← [YamlConfigManager](#)

## Implements

[IConfig](#)

## Inherited Members

[ConfigManager<DefaultConfig>.ConfigFilePath](#) , [ConfigManager<DefaultConfig>.IsInitialized](#) ,  
[ConfigManager<DefaultConfig>.ConfigExists](#) , [ConfigManager<DefaultConfig>.LoadAsync\(\)](#) ,  
[ConfigManager<DefaultConfig>.Load\(\)](#) , [ConfigManager<DefaultConfig>.SaveAsync\(\)](#) ,  
[ConfigManager<DefaultConfig>.Save\(\)](#) , [ConfigManager<DefaultConfig>.Get\(ConfigOption\)](#) ,  
[ConfigManager<DefaultConfig>.Get\(string\)](#) , [ConfigManager<DefaultConfig>.Set\(ConfigOption\)](#) ,  
[ConfigManager<DefaultConfig>.Set\(string, object\)](#) , [object.Equals\(object\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

## Constructors

### YamlConfigManager(string)

Represents a configuration manager for a YAML configuration file using [DefaultConfig](#) as the base configuration.

```
public YamlConfigManager(string configFilePath)
```

## Parameters

`configFilePath` [string](#)

The path to the configuration file.

## Methods

`CreateDefaultConfig()`

Create a new, default configuration in memory.

```
public override bool CreateDefaultConfig()
```

Returns

[bool](#)

# Namespace AetherUtils.Core.Exceptions

## Classes

### [PasswordRuleException](#)

Custom exception class for password rule validation.

### [QrException](#)

Custom class for exceptions that occur when handling QR codes.

# Class PasswordRuleException

Namespace: [AetherUtils.Core.Exceptions](#)

Assembly: AetherUtils.Core.dll

Custom exception class for password rule validation.

```
public class PasswordRuleException : Exception, ISerializable
```

## Inheritance

[object](#) ← [Exception](#) ← PasswordRuleException

## Implements

[ISerializable](#)

## Inherited Members

[Exception.GetBaseException\(\)](#) , [Exception.GetType\(\)](#) , [Exception.ToString\(\)](#) , [Exception.Data](#) ,  
[Exception.HelpLink](#) , [Exception.HResult](#) , [Exception.InnerException](#) , [Exception.Message](#) ,  
[Exception.Source](#) , [Exception.StackTrace](#) , [Exception.TargetSite](#) , [Exception.SerializeObjectState](#) ,  
[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

# Constructors

## PasswordRuleException(string)

Custom exception class for password rule validation.

```
public PasswordRuleException(string message)
```

## Parameters

message [string](#)

# Class QrException

Namespace: [AetherUtils.Core.Exceptions](#)

Assembly: AetherUtils.Core.dll

Custom class for exceptions that occur when handling QR codes.

```
public class QrException : Exception, ISerializable
```

## Inheritance

[object](#) ← [Exception](#) ← QrException

## Implements

[ISerializable](#)

## Inherited Members

[Exception.GetBaseException\(\)](#) , [Exception.GetType\(\)](#) , [Exception.ToString\(\)](#) , [Exception.Data](#) ,  
[Exception.HelpLink](#) , [Exception.HResult](#) , [Exception.InnerException](#) , [Exception.Message](#) ,  
[Exception.Source](#) , [Exception.StackTrace](#) , [Exception.TargetSite](#) , [Exception.SerializeObjectState](#) ,  
[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

# Constructors

## QrException(string)

```
public QrException(string message)
```

## Parameters

message [string](#)

## QrException(string, Exception)

```
public QrException(string message, Exception innerException)
```

## Parameters

message [string](#)

innerException [Exception](#)

# Namespace AetherUtils.Core.Extensions

## Classes

### [ArrayExtensions](#)

Provides extension methods for manipulating [Array](#) objects.

### [CollectionExtensions](#)

Provides extension methods for manipulating [IDictionary<TKey, TValue>](#) and [ICollection<T>](#) objects.

### [ControlExtensions](#)

Provides extension methods for manipulating WinForm [Control](#) objects.

### [DataTableExtensions](#)

Provides extension methods for manipulating [DataTable](#) objects.

### [EnumExtensions](#)

Provides extension methods for manipulating [Enum](#) objects.

### [ImageExtensions](#)

Provides extension methods for manipulating [Image](#) objects.

### [NumberExtensions](#)

Provides extension methods for manipulating various number objects.

### [SizeExtensions](#)

Provides extension methods for manipulating [Size](#) objects.

### [StreamExtensions](#)

Provides extension methods for manipulating [Stream](#) objects.

### [StringExtensions](#)

Provides extension methods for manipulating [string](#) objects.

### [TimeExtensions](#)

Provides extension methods for manipulating various time related objects.

### [TypeExtensions](#)

Provides extension methods for manipulating generic object types.

# Class ArrayExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating [Array](#) objects.

```
public static class ArrayExtensions
```

## Inheritance

[object](#) ← ArrayExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### ToImage(byte[])

Get an [Image](#) represented by the [byte](#) array.

```
public static Image ToImage(this byte[] bytes)
```

#### Parameters

**bytes** [byte](#)[]

The [byte](#) array containing properly formatted image bytes.

#### Returns

[Image](#)

A new [Image](#).

#### Exceptions

[ArgumentNullException](#)

If `bytes` was `null`.

## [FormatException](#)

If `bytes` did not have a valid [ImageFormat](#).

# ToPrintableString(IEnumerable<byte>)

Convert the numeric value of each element of a specified array of bytes to its equivalent hexadecimal string representation.

```
public static string ToPrintableString(this IEnumerable<byte> bytes)
```

## Parameters

`bytes` [IEnumerable](#)<`byte`>

An [IEnumerable](#)<`T`> of `bytes`.

## Returns

[string](#)

A string of hexadecimal pairs separated by hyphens, where each pair represents the corresponding element in value; for example, "7F-2C-4A-00".

## Exceptions

### [ArgumentNullException](#)

If `bytes` was `null`.

# ToStringList<T>(T[], char, string, string)

Convert an array of values to a string using the specified prefix, delimiter, and optional suffix.

```
public static string ToStringList<T>(this T[] values, char delimiter = ',', string prefix = "", string suffix = "")
```

## Parameters

**values** `T[]`

The array of values to combine.

**delimiter** `char`

The delimiter to separate the values with; default is `,`

**prefix** `string`

The prefix to add to the resulting string; default is an empty string.

**suffix** `string`

The suffix to add to the resulting string; default is an empty string.

## Returns

`string`

A string formatted with the **values** separated by the **delimiter**.

## Type Parameters

`T`

The type of objects contained within the array.

## Examples

```
string[] values = ["val1", "val2", "val3"];
string str = values.ToStringList(',');
returns: "PRE(val1,val2,val3)"
```

## Exceptions

[ArgumentNullException](#)

If **values**, **prefix**, or **delimiter** was `null`.

# Class CollectionExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating [IDictionary<TKey, TValue>](#) and [ICollection<T>](#) objects.

```
public static class CollectionExtensions
```

## Inheritance

[object](#) ← CollectionExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

# Methods

## RenameKey<TKey, TValue>(IDictionary<TKey, TValue>, TKey, TKey)

Rename a key contained in a dictionary. This method is thread-safe.

```
public static void RenameKey<TKey, TValue>(this IDictionary<TKey, TValue> dictionary, TKey  
oldKey, TKey newKey) where TKey : notnull
```

### Parameters

**dictionary** [IDictionary](#)<TKey, TValue>

The dictionary to perform the rename on.

**oldKey** TKey

The name of the old key.

**newKey** TKey

The name to change **oldKey** to.

# Type Parameters

## TKey

The [Type](#) of the key.

## TValue

The [Type](#) of the value.

## Remarks

If the `newKey` is the same as the `oldKey` using the default equality operator, no operation is performed.

## Exceptions

### [ArgumentNullException](#)

If `dictionary` is `null`.

### [ArgumentException](#)

If `newKey` already exists in `dictionary`.

# Class ControlExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating WinForm [Control](#) objects.

```
public static class ControlExtensions
```

## Inheritance

[object](#) ← ControlExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### InvokeIfRequired<T>(T, Action<T>)

Invoke the specified action on the specified control, if required.

```
public static void InvokeIfRequired<T>(this T control, Action<T> action) where T : ISynchronizeInvoke
```

## Parameters

**control** T

The [Control](#) to invoke an action on.

**action** [Action](#)<T>

The [Action](#) to invoke on the control.

## Type Parameters

T

The [Control](#) type.

## ResizeColumns(ListView)

Resizes the columns of a [ListView](#) control to be a best-fit compromise between the header and the content.

```
public static void ResizeColumns(this ListView listView)
```

### Parameters

**listView** [ListView](#)

The [ListView](#) to auto-size the columns of.

# Class DataTableExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating [DataTable](#) objects.

```
public static class DataTableExtensions
```

## Inheritance

[object](#) ← DataTableExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

# Methods

## ToCsvFile(DataTable, string, char)

Create and save a generated CSV file from a [DataTable](#).

```
public static void ToCsvFile(this DataTable table, string filePath, char delimiter = ',')
```

### Parameters

**table** [DataTable](#)

The [DataTable](#) to create a CSV file from.

**filePath** [string](#)

The path of a new CSV file to create or overwrite.

**delimiter** [char](#)

The delimiter to separate fields with; default is `,`.

### Exceptions

## [ArgumentNullException](#)

If `table` was `null`.

## [ArgumentException](#)

If `filePath` was `null` or empty.

# ToCsvFiles(List<DataTable>, string, char)

Create and save individual CSV files based on a [List<T>](#) containing [DataTable](#) objects. Each file is saved as `tablename.csv`.

```
public static void ToCsvFiles(this List<DataTable> tables, string folderPath, char delimiter = ',' , )
```

## Parameters

### `tables` [List](#)<[DataTable](#)>

The [List<T>](#) containing [DataTable](#) objects.

### `FolderPath` [string](#)

The folder path that the CSV files should be saved into.

### `delimiter` [char](#)

The delimiter to separate fields with; default is `,`.

## Exceptions

## [ArgumentNullException](#)

If `tables` was `null`.

## [ArgumentException](#)

If `FolderPath` was `null` or empty.

# Class EnumExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating [Enum](#) objects.

```
public static class EnumExtensions
```

## Inheritance

[object](#) ← EnumExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

# Methods

## ToDescriptionString<T>(T)

Get the string associated with a [DescriptionAttribute](#) attribute on an [Enum](#) value.

```
public static string ToDescriptionString<T>(this T val) where T : Enum
```

### Parameters

**val** T

The Enum value to get the description string of.

### Returns

[string](#)

The description string or [Empty](#) if no [DescriptionAttribute](#) was found.

### Type Parameters

T

The Enum type to get the attributes of.

# Class ImageExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating [Image](#) objects.

```
public static class ImageExtensions
```

## Inheritance

[object](#) ← ImageExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### IsValidImage(string)

Get a value indicating if the image specified by the `filePath` is a valid image file.

```
public static bool IsValidImage(this string filePath)
```

#### Parameters

`filePath` [string](#)

The file path to an image file.

#### Returns

[bool](#)

`true` if the image was valid; `false` otherwise.

#### Exceptions

[FormatException](#)

If the image specified by `filePath` was not in the correct format.

### [FileNotFoundException](#)

If the file specified by `filePath` was not found.

## ResizeImage(Image, int, int)

Resize the [Image](#) to the specified width and height.

```
public static Image ResizeImage(this Image image, int newWidth, int newHeight)
```

### Parameters

#### `image` [Image](#)

The [Image](#) to resize.

#### `newWidth` [int](#)

The width to resize to.

#### `newHeight` [int](#)

The height to resize to.

### Returns

#### [Image](#)

The resized [Image](#).

### Exceptions

#### [ArgumentNullException](#)

If `image` was `null`.

#### [InvalidOperationException](#)

If the `newWidth` or `newHeight` was less than 0.

## ResizeImageScaled(Image, float, float)

Resize the image to be the desired width and height while attempting to maintain the aspect ratio.

```
public static Image ResizeImageScaled(this Image image, float desiredWidth,  
float desiredHeight)
```

### Parameters

**image** [Image](#)

The [Image](#) to resize.

**desiredWidth** [float](#)

The desired width of the new image.

**desiredHeight** [float](#)

The desired height of the new image.

### Returns

[Image](#)

The scaled [Image](#).

### Exceptions

[ArgumentNullException](#)

If **image** was **null**.

[InvalidOperationException](#)

If the **desiredWidth** or **desiredHeight** was less than 0.

## ToByteArray(Image)

Convert an [Image](#) into a [byte](#) array.

```
public static byte[] ToByteArray(this Image image)
```

## Parameters

`image` [Image](#)

The image to convert.

## Returns

[byte](#)[]

A [byte](#) array representing the image.

## Exceptions

[ArgumentNullException](#)

If the `image` was `null`.

# Class NumberExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating various number objects.

```
public static class NumberExtensions
```

## Inheritance

[object](#) ← NumberExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### FormatSize(ulong)

Formats a size in bytes (represented by an [ulong](#) value) to the next closest base-2 size representation and appends its suffix to the end; uses [1024](#) as the conversion factor.

```
public static string FormatSize(this ulong sizeInBytes)
```

#### Parameters

**sizeInBytes** [ulong](#)

The size, in bytes, to format.

#### Returns

[string](#)

The number formatted with its suffix as a [string](#).

#### Exceptions

## [ArgumentNullException](#)

If `sizeInBytes` was `null`.

## ToInches(double, double)

Get an absolute value in inches represented by the specified number of pixels.

```
public static double ToInches(this double pixels, double dpi = 96)
```

### Parameters

#### `pixels` [double](#)

The number of pixels to convert.

#### `dpi` [double](#)

The DPI (dots per inch) of the screen; defaults to `96`.

### Returns

#### [double](#)

The inches equivalent of the pixels.

### Exceptions

#### [ArgumentNullException](#)

If `pixels` was `null`.

#### [DivideByZeroException](#)

If `dpi` was 0.

## ToPixels(double, double)

Get an absolute value in pixels represented by the specified number of inches.

```
public static double ToPixels(this double inches, double dpi = 96)
```

## Parameters

`inches` [double](#)

The number of inches to convert.

`dpi` [double](#)

The DPI (dots per inch) of the screen; default is `96`.

## Returns

[double](#)

The pixels equivalent of the inches.

## Exceptions

[ArgumentNullException](#)

If `inches` was `null`.

# Class SizeExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating [Size](#) objects.

```
public static class SizeExtensions
```

## Inheritance

[object](#) ← SizeExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

# Methods

## GetCenterPoint(Size)

Get the center [Point](#) for the specified [Size](#).

```
public static Point GetCenterPoint(this Size size)
```

### Parameters

**size** [Size](#)

The [Size](#) to get the center of.

### Returns

[Point](#)

A [Point](#) representing the center point of the [Size](#).

### Exceptions

[ArgumentNullException](#)

If the `size` was `null`.

## GetCenterPointF(SizeF)

Get the center [PointF](#) for the specified [SizeF](#).

```
public static PointF GetCenterPointF(this SizeF size)
```

### Parameters

`size` [SizeF](#)

The [SizeF](#) to get the center of.

### Returns

[PointF](#)

A [PointF](#) representing the center point of the [SizeF](#).

### Exceptions

[ArgumentNullException](#)

If the `size` was `null`.

# Class StreamExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating [Stream](#) objects.

```
public static class StreamExtensions
```

## Inheritance

[object](#) ← StreamExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### ToImage(Stream)

Get an [Image](#) represented by a [Stream](#).

```
public static Image ToImage(this Stream stream)
```

#### Parameters

**stream** [Stream](#)

The [Stream](#) containing properly formatted image data.

#### Returns

[Image](#)

A new [Image](#).

#### Exceptions

[ArgumentNullException](#)

If `stream` was `null`.

### [FormatException](#)

If `stream` did not have a valid [ImageFormat](#).

# Class StringExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating [string](#) objects.

```
public static class StringExtensions
```

## Inheritance

[object](#) ← StringExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### BytesFromString(string)

Get a [byte](#) array representing the [string](#) using [UTF8](#).

```
public static byte[] BytesFromString(this string value)
```

#### Parameters

**value** [string](#)

A [string](#) to get the bytes of.

#### Returns

[byte](#)[]

A [byte](#) array containing the bytes representing the [string](#).

### BytesToEncodedBytes(byte[], HashEncoding)

Encode the [byte](#) array to the specified [HashEncoding](#).

```
public static byte[] BytesToEncodedBytes(this byte[] bytes, HashEncoding encoding)
```

Parameters

[bytes](#) [byte](#)[]

A [byte](#) array to encode.

[encoding](#) [HashEncoding](#)

The [HashEncoding](#) to use.

Returns

[byte](#)[]

A [byte](#) array containing the encoded bytes.

## BytesToEncodedString(byte[], HashEncoding)

Encode the [byte](#) array to the specified [HashEncoding](#).

```
public static string BytesToEncodedString(this byte[] bytes, HashEncoding encoding)
```

Parameters

[bytes](#) [byte](#)[]

A [byte](#) array to encode.

[encoding](#) [HashEncoding](#)

The [HashEncoding](#) to use.

Returns

[string](#)

A [string](#) encoded using the specified [HashEncoding](#).

## DecodedBytesFromEncodedString(string, HashEncoding)

Decodes the encoded [string](#) according to the specified [HashEncoding](#).

```
public static byte[] DecodedBytesFromEncodedString(this string value, HashEncoding encoding)
```

Parameters

**value** [string](#)

The encoded [string](#).

**encoding** [HashEncoding](#)

The [HashEncoding](#) to use.

Returns

[byte](#)[]

A [byte](#) array containing the decoded bytes.

## DecodedStringFromEncodedString(string, HashEncoding)

Decodes an encoded [string](#) according to the specified [HashEncoding](#).

```
public static string DecodedStringFromEncodedString(this string value,  
HashEncoding encoding)
```

Parameters

**value** [string](#)

The encoded [string](#).

**encoding** [HashEncoding](#)

The [HashEncoding](#) to use.

Returns

## [string](#)

A decoded [string](#).

## DeserializeJson<T>(string)

Deserializes an object from a JSON [string](#).

```
public static T? DeserializeJson<T>(this string json) where T : class
```

### Parameters

#### json [string](#)

The JSON [string](#) to deserialize.

### Returns

#### T

The deserialized [object](#) or [null](#) if the deserialization failed.

### Type Parameters

#### T

The type of [object](#) to deserialize to.

### Exceptions

#### [ArgumentException](#)

If [json](#) was [null](#) or empty.

## DeserializeXml<T>(string)

Deserializes an object from an XML [string](#).

```
public static T? DeserializeXml<T>(this string xml) where T : class
```

## Parameters

`xml` [string](#)

The XML [string](#) to deserialize.

## Returns

`T`

The deserialized [object](#) or `null` if the deserialization failed.

## Type Parameters

`T`

The type of [object](#) to deserialize to.

## Exceptions

[ArgumentException](#)

If `xml` was `null` or empty.

## FromSecureString(SecureString)

Convert a [SecureString](#) to an unsecured [string](#).

```
public static string FromSecureString(this SecureString secure)
```

## Parameters

`secure` [SecureString](#)

The [SecureString](#).

## Returns

[string](#)

The unsecured [string](#).

## Exceptions

### [ArgumentNullException](#)

If `secure` was `null`.

## ImageFromString(string)

Convert the Base64 representation of a picture into a usable [Image](#) object for drawing.

```
public static Image ImageFromString(this string base64)
```

## Parameters

### `base64` [string](#)

The [Image](#) as a Base64 [string](#).

## Returns

### [Image](#)

An [Image](#) or `null` if `base64` is an invalid string.

## Exceptions

### [ArgumentNullException](#)

If `base64` was `null`.

### [FormatException](#)

If the input was not a valid Base64 [string](#).

## IsBase64Encoded(string)

Get a value indicating if the [string](#) appears to be Base64 encoded.

```
public static bool IsBase64Encoded(this string input)
```

## Parameters

**input** [string](#)

The [string](#) to check encoding on.

## Returns

[bool](#)

**true** if the [string](#) is Base64 encoded; **false** otherwise.

## Exceptions

[ArgumentNullException](#)

If **input** was **null**.

## IsHexEncoded(string)

Get a value indicating if the [string](#) appears to be Hex (Base16) encoded.

```
public static bool IsHexEncoded(this string input)
```

## Parameters

**input** [string](#)

The [string](#) to check encoding on.

## Returns

[bool](#)

**true** if the [string](#) is Hex encoded; **false** otherwise.

## Exceptions

[ArgumentNullException](#)

If **input** was **null**.

## RemoveWhitespace(string)

Removes all whitespace characters from the specified [string](#).

```
public static string RemoveWhitespace(this string str)
```

### Parameters

**str** [string](#)

The string to remove whitespace from.

### Returns

[string](#)

A new string, without the whitespace characters.

## StringToEncodedBytes(string, HashEncoding)

Encode the [string](#) to the specified [HashEncoding](#).

```
public static byte[] StringToEncodedBytes(this string value, HashEncoding encoding)
```

### Parameters

**value** [string](#)

The [string](#) to encode.

**encoding** [HashEncoding](#)

The [HashEncoding](#) to use.

### Returns

[byte](#)[]

A [byte](#) array containing the encoded bytes.

## StringToEncodedString(string, HashEncoding)

Encode the [string](#) to the specified [HashEncoding](#).

```
public static string StringToEncodedString(this string value, HashEncoding encoding)
```

Parameters

**value** [string](#)

The [string](#) to encode.

**encoding** [HashEncoding](#)

The [HashEncoding](#) to use.

Returns

[string](#)

A [string](#) encoded using the specified [HashEncoding](#).

## ToSecureString(string)

Convert an unsecure [string](#) value into a [SecureString](#).

```
public static SecureString ToSecureString(this string unsecure)
```

Parameters

**unsecure** [string](#)

The unsecure [string](#).

Returns

[SecureString](#)

A new read-only [SecureString](#).

Exceptions

## [ArgumentNullException](#)

If `unsecure` was `null`.

## Trim(string, int)

Trims the [string](#) to be the length specified before a new-line character is inserted.

If the new-line character would be inserted at the position of a period (`.`), the new line is inserted at the index of `(.) + 1`. If the line being checked contains a new-line character already, nothing is done for that line.

```
public static TrimmedString Trim(this string input, int lineLength = 80)
```

### Parameters

`input` [string](#)

The [string](#) to trim.

`lineLength` [int](#)

The number of characters in the line; default is `80`.

### Returns

[TrimmedString](#)

A new [TrimmedString](#) containing the trimmed [string](#) and the number of new lines.

### Exceptions

[ArgumentNullException](#)

If `input` was `null`.

# Class TimeExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating various time related objects.

```
public static class TimeExtensions
```

## Inheritance

[object](#) ← TimeExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

# Methods

## EndOfMonth(DateTime)

Get the ending [DateTime](#) of the month based on the supplied [DateTime](#).

```
public static DateTime EndOfMonth(this DateTime date)
```

### Parameters

**date** [DateTime](#)

The [DateTime](#) representing the current date for the month.

### Returns

[DateTime](#)

A [DateTime](#) representing the end of the month.

### Exceptions

[ArgumentNullException](#)

If the `date` was `null`.

## StartOfMonth(DateTime)

Get the starting [DateTime](#) of the month based on the supplied [DateTime](#).

```
public static DateTime StartOfMonth(this DateTime date)
```

### Parameters

`date` [DateTime](#)

The [DateTime](#) to get the start of the month of.

### Returns

[DateTime](#)

A [DateTime](#) representing the start of the month.

### Exceptions

[ArgumentNullException](#)

If the `date` was `null`.

## StartOfWeek(DateTime)

Get the starting [DateTime](#) of the week based on the supplied [DateTime](#).

```
public static DateTime StartOfWeek(this DateTime date)
```

### Parameters

`date` [DateTime](#)

The [DateTime](#) to get the start of the week of.

### Returns

## [DateTime](#)

A [DateTime](#) representing the start of the week.

## Exceptions

### [ArgumentNullException](#)

If the `date` was `null`.

## TimeSpanToString(TimeSpan)

Get a [string](#) representing the [TimeSpan](#) in the form of:

`w day(s), x hour(s), y minute(s), z second(s)`

```
public static string TimeSpanToString(this TimeSpan timeSpan)
```

## Parameters

### `timeSpan` [TimeSpan](#)

The [TimeSpan](#) to convert.

## Returns

### [string](#)

A [string](#) representing the [TimeSpan](#).

## Exceptions

### [ArgumentNullException](#)

If `timeSpan` was `null`.

# Class TypeExtensions

Namespace: [AetherUtils.Core.Extensions](#)

Assembly: AetherUtils.Core.dll

Provides extension methods for manipulating generic object types.

```
public static class TypeExtensions
```

## Inheritance

[object](#) ← TypeExtensions

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

# Methods

## CanSerializeJson<T>(T)

Get a value indicating if this object can be serialized via JSON serializion.

```
public static bool CanSerializeJson<T>(this T obj) where T : class
```

### Parameters

**obj** T

The instance of the object with type T.

### Returns

[bool](#)

true if the object can be serialized; false otherwise.

### Type Parameters

T

The [Type](#) of the object to check.

## Exceptions

### [ArgumentNullException](#)

If **obj** was **null**.

## CanSerializeXml<T>(T)

Get a value indicating if this object can be serialized via XML serialization.

```
public static bool CanSerializeXml<T>(this T obj) where T : class
```

## Parameters

### **obj** T

The instance of the object with type **T**.

## Returns

### [bool](#)

**true** if the object can be serialized; **false** otherwise.

## Type Parameters

### **T**

The [Type](#) of the object to check.

## Exceptions

### [ArgumentNullException](#)

If **obj** was **null**.

## GetFriendlyName(Type)

Get the friendly, displayable name for the [Type](#).

```
public static string GetFriendlyName(this Type type)
```

## Parameters

**type** [Type](#)

The [Type](#) to get the name of.

## Returns

[string](#)

The friendly name for the [Type](#).

## Exceptions

[ArgumentNullException](#)

If **type** was **null**.

## SerializeJson<T>(T)

Serializes a .NET object to a JSON string.

```
public static string SerializeJson<T>(this T obj) where T : class
```

## Parameters

**obj** **T**

An instance of **T** to serialize.

## Returns

[string](#)

A JSON string representing the serialized object, **obj**.

## Type Parameters

T

The [Type](#) of the object to serialize.

## Exceptions

### [ArgumentNullException](#)

If **obj** was **null**.

## SerializeXml<T>(T)

Serializes a .NET object to an XML string.

```
public static string SerializeXml<T>(this T obj) where T : class
```

## Parameters

**obj** T

An instance of T to serialize.

## Returns

### [string](#)

An XML string representing the serialized object, **obj**.

## Type Parameters

T

The [Type](#) of the object to serialize.

## Exceptions

### [ArgumentNullException](#)

If **obj** was **null**.

# Namespace AetherUtils.Core.Files

## Classes

### [FileHelper](#)

Provides methods to manipulate files and folders on the Windows file system.

### [Json<T>](#)

Implements serializing and de-serializing generic object types to/from JSON files.

### [Xml<T>](#)

Implements serializing and de-serializing generic object types to/from XML files.

# Class FileHelper

Namespace: [AetherUtils.Core.Files](#)

Assembly: AetherUtils.Core.dll

Provides methods to manipulate files and folders on the Windows file system.

```
public static class FileHelper
```

## Inheritance

[object](#) ← FileHelper

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### CreateDirectories(string, bool)

Create directories along the specified file path if they don't already exist.

```
public static void CreateDirectories(string filePath, bool expandPath = true)
```

#### Parameters

**filePath** [string](#)

The path to create directories on.

**expandPath** [bool](#)

Should the **filePath** be expanded before creating directories?

#### Exceptions

[ArgumentException](#)

If the **filePath** was **null** or empty.

## DeleteFile(string, bool)

Delete the file, if it exists, specified by `filePath`.

```
public static void DeleteFile(string filePath, bool expandPath = true)
```

### Parameters

`filePath` [string](#)

The path to a file to delete.

`expandPath` [bool](#)

Should the `filePath` be expanded before accessing?

### Exceptions

[ArgumentException](#)

If the `filePath` was `null` or empty.

## DoesFileExist(string, bool)

Check if a file exists on the file system.

```
public static bool DoesFileExist(string filePath, bool expandPath = true)
```

### Parameters

`filePath` [string](#)

The path to a file.

`expandPath` [bool](#)

Should the `filePath` be expanded before checking?

### Returns

[bool](#)

`true` if the file exists; `false` otherwise.

## Exceptions

### [ArgumentException](#)

If the `filePath` was `null` or empty.

## DoesFolderExist(string, bool)

Check if a folder exists on the file system.

```
public static bool DoesFolderExist(string folderPath, bool expandPath = true)
```

## Parameters

### `FolderPath` [string](#)

The path to a folder.

### `expandPath` [bool](#)

Should the `FolderPath` be expanded before checking?

## Returns

### [bool](#)

`true` if the folder exists; `false` otherwise.

## Exceptions

### [ArgumentException](#)

If the `FolderPath` was `null` or empty.

## ExpandPath(string)

Expand a file path containing environment path variables, if possible.

```
public static string ExpandPath(string filePath)
```

## Parameters

### [filePath](#) [string](#)

The path to expand.

## Returns

### [string](#)

The expanded path, or the original path if no expansion was necessary.

## Exceptions

### [ArgumentException](#)

If the `filePath` was `null` or empty.

## GetExtension(string, bool)

Get the extension component, including the `.`, of a file name specified by `filePath`.

```
public static string GetExtension(string filePath, bool expandPath = true)
```

## Parameters

### [filePath](#) [string](#)

The path to a file.

### [expandPath](#) [bool](#)

Should the `filePath` be expanded before accessing?

## Returns

### [string](#)

The file extension, including the `..`.

## Exceptions

### [ArgumentException](#)

If the `filePath` was `null` or empty.

## IsValidPath(string)

Get whether the specified `path` is a valid absolute file path on Windows.

```
public static bool IsValidPath(string path)
```

### Parameters

#### `path` [string](#)

A path to check.

### Returns

#### [bool](#)

## Exceptions

### [ArgumentException](#)

If the `path` was `null` or empty.

## OpenFile(string, bool)

Open a text file, read all text within to a string, and close the file.

```
public static string OpenFile(string filePath, bool expandPath = true)
```

### Parameters

#### `filePath` [string](#)

The path to the file.

`expandPath` [bool](#)

Should the `filePath` be expanded before attempting to open the file?

Returns

[string](#)

The contents of `filePath` or [Empty](#) if the file could not be opened.

Exceptions

[ArgumentException](#)

If the `filePath` was `null` or empty.

## OpenFileAsync(string, bool)

Open a text file, read all text within asynchronously to a string, and close the file.

```
public static Task<string> OpenFileAsync(string filePath, bool expandPath = true)
```

Parameters

`filePath` [string](#)

The path to the file.

`expandPath` [bool](#)

Should the `filePath` be expanded before attempting to open the file?

Returns

[Task](#)<[string](#)>

A [Task<TResult>](#) which contains the [string](#) contents upon completion.

Exceptions

[ArgumentException](#)

If the `filePath` was `null` or empty.

## OpenNonTextFile(string, bool)

Open a binary file, read all bytes within to a `byte[]` array, and close the file.

```
public static byte[] OpenNonTextFile(string filePath, bool expandPath = true)
```

Parameters

`filePath` `string`

The path to the file.

`expandPath` `bool`

Should the `filePath` be expanded before attempting to open the file?

Returns

`byte[]`

The contents of `filePath` as a `byte[]` array.

Exceptions

`ArgumentException`

If the `filePath` was `null` or empty.

## OpenNonTextFileAsync(string, bool)

Open a binary file asynchronously, read all bytes within to a `byte[]` array, and close the file.

```
public static Task<byte[]> OpenNonTextFileAsync(string filePath, bool expandPath = true)
```

Parameters

`filePath` `string`

The path to the file.

[expandPath](#) [bool](#)

Should the `filePath` be expanded before attempting to open the file?

Returns

[Task](#) <[byte](#) []>

A [Task<TResult>](#) which contains the [byte](#) array upon completion.

Exceptions

[ArgumentException](#)

If the `filePath` was `null` or empty.

## RemoveInvalidFileNameChars(string)

Remove the platform-specific invalid file name characters from the specified file name.

```
public static string RemoveInvalidFileNameChars(string fileName)
```

Parameters

`fileName` [string](#)

The filename.

Returns

[string](#)

A string with the invalid characters removed from the filename.

Exceptions

[ArgumentException](#)

If the `fileName` was `null` or empty.

## RemoveInvalidPathChars(string)

Remove the platform-specific invalid path characters from the specified path.

```
public static string RemoveInvalidPathChars(string path)
```

### Parameters

**path** [string](#)

The path.

### Returns

[string](#)

A string with the invalid characters removed from the path.

### Exceptions

[ArgumentException](#)

If the **path** was **null** or empty.

## SaveFile(string, byte[], bool)

Create a new file and write the specified [byte](#) array to it. If the file exists, it is overwritten.

```
public static void SaveFile(string filePath, byte[] contents, bool expandPath = true)
```

### Parameters

**filePath** [string](#)

The path of the file to save.

**contents** [byte](#)[]

The [byte](#)s to save to the file.

**expandPath** [bool](#)

Should the `filePath` be expanded before creating file?

## Exceptions

### [ArgumentException](#)

If the `filePath` was `null` or empty.

## SaveFile(string, string, bool)

Create a new file and write the specified content to it.

If the file already exists, it is overwritten.

```
public static void SaveFile(string filePath, string content, bool expandPath = true)
```

## Parameters

### `filePath` [string](#)

The path to the file.

### `content` [string](#)

The text to save to the file.

### `expandPath` [bool](#)

Should the `filePath` be expanded before creating file?

## Exceptions

### [ArgumentException](#)

If the `filePath` was `null` or empty.

## SaveFile(string, string, Encoding, bool)

Create a new file and write the specified content to it, using the specified encoding. If the file exists, it is overwritten.

```
public static void SaveFile(string filePath, string content, Encoding encoding, bool expandPath = true)
```

## Parameters

### filePath [string](#)

The path of the file to save.

### content [string](#)

The text to save to the file.

### encoding [Encoding](#)

The [Encoding](#) to use when saving the file.

### expandPath [bool](#)

Should the `filePath` be expanded before creating file?

## Exceptions

### [ArgumentException](#)

If the `filePath` was `null` or empty.

## SaveFileAsync(string, byte[], bool)

Asynchronously create a new file and write the specified [byte](#) array to it. If the file exists, it is overwritten.

```
public static void SaveFileAsync(string filePath, byte[] content, bool expandPath = true)
```

## Parameters

### filePath [string](#)

The path of the file to save.

### content [byte](#)[]

The `byte`s to save to the file.

#### `expandPath` `bool`

Should the `filePath` be expanded before creating file?

### Exceptions

#### [ArgumentException](#)

If the `filePath` was `null` or empty.

## SaveFileAsync(string, string, bool)

Asynchronously create a new file and write the specified content to it.

If the file exists, it is overwritten.

```
public static void SaveFileAsync(string filePath, string content, bool expandPath = true)
```

### Parameters

#### `filePath` `string`

The path of the file to save.

#### `content` `string`

The text to save to the file.

#### `expandPath` `bool`

Should the `filePath` be expanded before creating file?

### Exceptions

#### [ArgumentException](#)

If the `filePath` was `null` or empty.

## SaveFileAsync(string, string, Encoding, bool)

Asynchronously create a new file and write the specified content to it, using the specified encoding. If the file exists, it is overwritten.

```
public static void SaveFileAsync(string filePath, string content, Encoding encoding, bool expandPath = true)
```

## Parameters

**filePath** [string](#)

The path of the file to save.

**content** [string](#)

The text to save to the file.

**encoding** [Encoding](#)

The [Encoding](#) to use when saving the file.

**expandPath** [bool](#)

Should the **filePath** be expanded before creating file?

## Exceptions

[ArgumentException](#)

If the **filePath** was **null** or empty.

# Class Json<T>

Namespace: [AetherUtils.Core.Files](#)

Assembly: AetherUtils.Core.dll

Implements serializing and de-serializing generic object types to/from JSON files.

```
public sealed class Json<T> where T : class
```

## Type Parameters

T

The type of object to serialize/deserialize.

### Inheritance

[object](#) ← Json<T>

### Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

### Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Remarks

T must support JSON serialization.

## Constructors

### Json()

```
public Json()
```

## Methods

## FromJson(string)

```
public T? FromJson(string json)
```

### Parameters

json [string](#)

### Returns

T

## LoadJson(string)

Deserialize and load a .NET object from a JSON file.

```
public T? LoadJson(string filePath)
```

### Parameters

filePath [string](#)

The file to load.

### Returns

T

The T object, or null if the object could not be deserialized.

### Exceptions

[ArgumentException](#)

If filePath was null or empty.

[FileNotFoundException](#)

If the filePath did not exist.

## SaveJson(string, T)

Serialize a .NET object, `T`, to a JSON string and save to a file.

If the file already exists, it is overwritten.

```
public bool SaveJson(string filePath, T obj)
```

Parameters

`filePath` [string](#)

The file to save.

`obj` `T`

The .NET object to serialize and save.

Returns

[bool](#)

`true` if the object was serialized and the file was saved; `false` otherwise.

Exceptions

[ArgumentException](#)

If the `filePath` was `null` or empty.

## ToJson(T)

```
public string ToJson(T obj)
```

Parameters

`obj` `T`

Returns

[string](#)



# Class Xml<T>

Namespace: [AetherUtils.Core.Files](#)

Assembly: AetherUtils.Core.dll

Implements serializing and de-serializing generic object types to/from XML files.

```
public sealed class Xml<T> where T : class
```

## Type Parameters

T

The type of object to serialize/deserialize.

## Inheritance

[object](#) ← Xml<T>

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Remarks

T must support XML serialization.

## Methods

### LoadXml(string)

Deserialize and load a .NET object from an XML file.

```
public T? LoadXml(string filePath)
```

## Parameters

## [filePath](#) `string`

The file to load.

## Returns

`T`

The `T` object, or `null` if the object could not be deserialized.

## Exceptions

### [ArgumentException](#)

If the `filePath` was `null` or empty.

## `SaveXml(string, T)`

Serialize an object of type `T` to an XML string and save to a file.

If the file already exists, it is overwritten.

```
public bool SaveXml(string filePath, T obj)
```

## Parameters

### [filePath](#) `string`

The file to save.

### `obj` `T`

The object to serialize and save.

## Returns

### [bool](#)

`true` if the object was serialized and the file was saved; `false` otherwise.

## Exceptions

## [ArgumentException](#)

If the `filePath` was `null` or empty.

## [ArgumentNullException](#)

If the `obj` was `null`.

# Namespace AetherUtils.Core.Licensing

## Classes

### [KeyManager](#)

Handles loading and saving private and public keys to file system.

### [Licenser](#)

## Structs

### [KeyPair](#)

Stores a read-only pair of keys.

# Class KeyManager

Namespace: [AetherUtils.Core.Licensing](#)

Assembly: AetherUtils.Core.dll

Handles loading and saving private and public keys to file system.

```
public static class KeyManager
```

## Inheritance

[object](#) ← KeyManager

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### DoesKeyFileExist(string, string)

Get a value indicating whether the keyPair.keys file exists at the specified base path.

```
public static bool DoesKeyFileExist(string basePath, string fileName = "keyPair.keys")
```

#### Parameters

**basePath** [string](#)

The base folder the keys are located in.

**fileName** [string](#)

The name of the file to check: default is **keyPair.keys**

#### Returns

[bool](#)

**true** if the file was found; **false**, otherwise.

## LoadKeys(string)

Load a key pair from a file.

```
public static KeyPair? LoadKeys(string fullPath)
```

Parameters

**fullPath** [string](#)

The full, absolute path to a key file.

Returns

[KeyPair?](#)

A [KeyPair](#) representing the key values.

## LoadKeys(string, string)

Load a key pair from a file.

```
public static KeyPair? LoadKeys(string basePath, string fileName = "keyPair.keys")
```

Parameters

**basePath** [string](#)

The base folder the keys are located in.

**fileName** [string](#)

The name of the file to load: default is `keyPair.keys`

Returns

[KeyPair?](#)

A [KeyPair](#) representing the key values.

## SaveKeys(KeyPair, string, string)

Save the key pair to a file.

```
public static void SaveKeys(KeyPair keys, string basePath, string fileName = "keyPair.keys")
```

### Parameters

**keys** [KeyValuePair](#)

The pair of keys (private and public). Private key should be first.

**basePath** [string](#)

The base folder to save the keys in.

**fileName** [string](#)

The name of the file to save: default is `keyPair.keys`

## SavePublicKey(KeyPair, string, string)

Save only the public key to a file.

```
public static void SavePublicKey(KeyPair keys, string basePath, string fileName  
= "public.key")
```

### Parameters

**keys** [KeyValuePair](#)

The pair of keys (private and public). Private key should be first.

**basePath** [string](#)

The base folder to save the public key in.

**fileName** [string](#)

The name of the file to save: default is `public.key`

## SavePublicKey(string, string, string)

Save only the public key to a file.

```
public static void SavePublicKey(string publicKey, string basePath, string fileName  
= "public.key")
```

### Parameters

**publicKey** [string](#)

The public key to save.

**basePath** [string](#)

The base folder to save the public key in.

**fileName** [string](#)

The name of the file to save: default is [public.key](#)

# Struct KeyPair

Namespace: [AetherUtils.Core.Licensing](#)

Assembly: AetherUtils.Core.dll

Stores a read-only pair of keys.

```
public readonly struct KeyPair
```

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Constructors

### KeyPair(string, string)

Stores a read-only pair of keys.

```
public KeyPair(string privateKey, string publicKey)
```

#### Parameters

**privateKey** [string](#)

The private key.

**publicKey** [string](#)

The public key.

## Properties

### PrivateKey

```
public string PrivateKey { get; }
```

Property Value

[string](#) ↗

PublicKey

```
public string PublicKey { get; }
```

Property Value

[string](#) ↗

# Class Licenser

Namespace: [AetherUtils.Core.Licensing](#)

Assembly: AetherUtils.Core.dll

```
public static class Licenser
```

## Inheritance

[object](#) ← Licenser

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### Validate(string, string)

Validates a license with the specified public key.

```
public static List<IValidationFailure> Validate(string license, string publicKey)
```

#### Parameters

**license** [string](#)

The license XML string or file path to a license file ([.lic](#)).

**publicKey** [string](#)

The public key to validate against.

#### Returns

[List](#)<IValidationFailure>

A string representing the results of validation.

# Namespace AetherUtils.Core.Licensing.Models

## Classes

[Customer](#)

[Feature](#)

[License](#)

# Class Customer

Namespace: [AetherUtils.Core.Licensing.Models](#)

Assembly: AetherUtils.Core.dll

```
public class Customer
```

## Inheritance

[object](#) ← Customer

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

# Constructors

## Customer()

```
public Customer()
```

# Properties

## Company

```
public string Company { get; set; }
```

## Property Value

[string](#)

## Email

```
public string Email { get; set; }
```

### Property Value

[string ↗](#)

## Name

```
public string Name { get; set; }
```

### Property Value

[string ↗](#)

# Class Feature

Namespace: [AetherUtils.Core.Licensing.Models](#)

Assembly: AetherUtils.Core.dll

```
[Serializable]
public class Feature
```

## Inheritance

[object](#) ← Feature

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

# Constructors

## Feature()

```
public Feature()
```

## Feature(string, string)

```
public Feature(string name, string text)
```

## Parameters

name [string](#)

text [string](#)

# Properties

## Name

```
[Browsable(true)]  
public string Name { get; set; }
```

## Property Value

[string](#) ↗

## Text

```
[Browsable(true)]  
public string Text { get; set; }
```

## Property Value

[string](#) ↗

# Class License

Namespace: [AetherUtils.Core.Licensing.Models](#)

Assembly: AetherUtils.Core.dll

```
[TypeConverter(typeof(ExpandableObjectConverter))]  
public sealed class License : ExpandableObjectConverter
```

## Inheritance

[object](#) ← [TypeConverter](#) ← [ExpandableObjectConverter](#) ← License

## Inherited Members

[ExpandableObjectConverter.GetProperties\(ITypeDescriptorContext, object, Attribute\[\]\)](#) ,  
[ExpandableObjectConverter.GetPropertiesSupported\(ITypeDescriptorContext\)](#) ,  
[TypeConverter.CanConvertFrom\(ITypeDescriptorContext, Type\)](#) ,  
[TypeConverter.CanConvertFrom\(Type\)](#) , [TypeConverter.CanConvertTo\(ITypeDescriptorContext, Type\)](#) ,  
[TypeConverter.CanConvertTo\(Type\)](#) ,  
[TypeConverter.ConvertFrom\(ITypeDescriptorContext, CultureInfo, object\)](#) ,  
[TypeConverter.ConvertFrom\(object\)](#) ,  
[TypeConverter.ConvertFromInvariantString\(ITypeDescriptorContext, string\)](#) ,  
[TypeConverter.ConvertFromInvariantString\(string\)](#) ,  
[TypeConverter.ConvertFromString\(ITypeDescriptorContext, CultureInfo, string\)](#) ,  
[TypeConverter.ConvertFromString\(ITypeDescriptorContext, string\)](#) ,  
[TypeConverter.ConvertFromString\(string\)](#) ,  
[TypeConverter.ConvertTo\(ITypeDescriptorContext, CultureInfo, object, Type\)](#) ,  
[TypeConverter.ConvertTo\(object, Type\)](#) ,  
[TypeConverter.ConvertToInvariantString\(ITypeDescriptorContext, object\)](#) ,  
[TypeConverter.ConvertToInvariantString\(object\)](#) ,  
[TypeConverter.ConvertToString\(ITypeDescriptorContext, CultureInfo, object\)](#) ,  
[TypeConverter.ConvertToString\(ITypeDescriptorContext, object\)](#) ,  
[TypeConverter.ConvertToString\(object\)](#) , [TypeConverter.CreateInstance\(IDictionary\)](#) ,  
[TypeConverter.CreateInstance\(ITypeDescriptorContext, IDictionary\)](#) ,  
[TypeConverter.GetCreateInstanceSupported\(\)](#) ,  
[TypeConverter.GetCreateInstanceSupported\(ITypeDescriptorContext\)](#) ,  
[TypeConverter.GetProperties\(ITypeDescriptorContext, object\)](#) , [TypeConverter.GetProperties\(object\)](#) ,  
[TypeConverter.GetPropertiesSupported\(\)](#) , [TypeConverter.GetStandardValues\(\)](#) ,  
[TypeConverter.GetStandardValues\(ITypeDescriptorContext\)](#) ,  
[TypeConverter.GetStandardValuesExclusive\(\)](#) ,  
[TypeConverter.GetStandardValuesExclusive\(ITypeDescriptorContext\)](#) ,

[TypeConverter.GetStandardValuesSupported\(\)](#) ,  
[TypeConverter.GetStandardValuesSupported\(ITypeDescriptorContext\)](#) ,  
[TypeConverter.IsValid\(ITypeDescriptorContext, object\)](#) , [TypeConverter.IsValid\(object\)](#) ,  
[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(I\)](#) , [TypeExtensions.CanSerializeXml<T>\(I\)](#) ,  
[TypeExtensions.SerializeJson<T>\(I\)](#) , [TypeExtensions.SerializeXml<T>\(I\)](#).

# Properties

## Customer

```
[Browsable(false)]
public Customer Customer { get; set; }
```

### Property Value

[Customer](#)

## Expiration

```
[Browsable(true)]
public DateTime Expiration { get; set; }
```

### Property Value

[DateTime](#)

## Id

```
[Browsable(false)]
public string Id { get; set; }
```

### Property Value

[string](#)

## ProductFeatures

```
[Browsable(false)]  
public List<Feature> ProductFeatures { get; set; }
```

Property Value

[List](#)<[Feature](#)>

## Quantity

```
[Browsable(true)]  
public int Quantity { get; set; }
```

Property Value

[int](#)

## Signature

```
[Browsable(false)]  
public string Signature { get; set; }
```

Property Value

[string](#)

## Type

```
[Browsable(true)]  
public LicenseType Type { get; set; }
```

Property Value

LicenseType

## Methods

### ToString()

Get a string that represents this license object:

ID:

Type:

Expiration:

Quantity:

Customer Name:

Customer Email:

```
public override string ToString()
```

Returns

[string](#)

A string representing this [License](#).

# Namespace AetherUtils.Core.Logging

## Classes

### [CLogger](#)

Provides static methods to facilitate logging to a file as well as to the console for an application. Uses NLog internally.

# Class CLogger

Namespace: [AetherUtils.Core.Logging](#)

Assembly: AetherUtils.Core.dll

Provides static methods to facilitate logging to a file as well as to the console for an application. Uses NLog internally.

```
public static class CLogger
```

## Inheritance

[object](#) ← CLogger

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Properties

### IsInitialized

```
public static bool IsInitialized { get; }
```

## Property Value

[bool](#)

## Methods

### GetCurrentLogger(string)

Get a logger reference based on the specified name.

```
public static Logger GetCurrentLogger(string name)
```

## Parameters

`name` [string](#)

The name of the logger to get.

Returns

Logger

A NLog.Logger object that can be used for logging. Returns default name if logging has not been initialized.

## GetCurrentLogger<T>()

Get a logger reference based on the type of class.

```
public static Logger GetCurrentLogger<T>() where T : class
```

Returns

Logger

A NLog.Logger object that can be used for logging. Returns default name if logging has not been initialized via [Initialize\(LogOptions\)](#).

Type Parameters

T

The class type to get the logger of.

## GetCurrentLogger<T>(string)

Get a logger reference based on the type of class as well as an additional name identifier.

```
public static Logger GetCurrentLogger<T>(string name) where T : class
```

Parameters

`name` [string](#)

The additional name to add to the logger. (i.e., the method name)

Returns

Logger

A NLog.Logger object that can be used for logging. Returns default name if logging has not been initialized.

Type Parameters

T

The class type to get the logger of.

## Initialize(LogOptions)

Initialize the logger for the application. This should be called before any logging takes place; usually, directly after reading or creating the initial configuration for the application.

```
public static void Initialize(LogOptions options)
```

Parameters

options [LogOptions](#)

The [LogOptions](#) that are used to setup the logger.

# Namespace AetherUtils.Core.Reflection

## Classes

### [Reflect](#)

Contains methods to help with runtime reflection of classes, types, and attributes.

# Class Reflect

Namespace: [AetherUtils.Core.Reflection](#)

Assembly: AetherUtils.Core.dll

Contains methods to help with runtime reflection of classes, types, and attributes.

```
public static class Reflect
```

## Inheritance

[object](#) ← Reflect

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### GetAttributesRecurse<T>(object?, Type, HashSet<Type>?)

Retrieve all of the [Type](#),  [PropertyInfo](#), [Attribute](#), and [object](#)s related to the custom attribute T specified, recursively.

```
public static IEnumerable<(Type Class, PropertyInfo Property, Attribute Attribute, object?  
Instance)> GetAttributesRecurse<T>(object? instance, Type type, HashSet<Type>? visited =  
null) where T : Attribute
```

## Parameters

**instance** [object](#)

The initial [object](#) instance to start the search on.

**type** [Type](#)

The initial [Type](#) to start the search on.

**visited** [HashSet](#)<[Type](#)>

Defaults to `null`. Used to maintain a [HashSet<T>](#) of already visited types while searching.

Returns

[IEnumerable](#)<(Type [Class](#), PropertyInfo [Property](#), Attribute [Attribute](#), object [Instance](#))>

An [IEnumerable](#) of tuples:

(Type [Class](#), PropertyInfo [Property](#), Attribute [Attribute](#), object [Instance](#))

Type Parameters

T

The custom attribute to search for.

## GetCollectionElementType(Type)

Retrieves the collection element type from this type.

```
public static Type? GetCollectionElementType(Type type)
```

Parameters

**type** Type

The type to query.

Returns

Type

The element type of the collection or `null` if the type was not a collection.

## IsList(Type)

Indicates whether or not the specified type is a [List<T>](#).

```
public static bool IsList(Type type)
```

## Parameters

**type** [Type ↗](#)

The type to query.

## Returns

[bool ↗](#)

**true** if the type is a [List<T> ↗](#); **false** otherwise

# Namespace AetherUtils.Core.RegEx

## Classes

[RegexGenerator](#)

# Class RegexGenerator

Namespace: [AetherUtils.Core.RegEx](#)

Assembly: AetherUtils.Core.dll

```
public static class RegexGenerator
```

## Inheritance

[object](#) ← RegexGenerator

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### Base64Regex()

```
[GeneratedRegex("^( [A-Za-z0-9+/]{4})*([A-Za-z0-9+/]{3}=|[A-Za-z0-9+/]{2}==)?$",
    RegexOptions.CultureInvariant, 1000)]
public static Regex Base64Regex()
```

## Returns

[Regex](#)

## Remarks

Pattern:

$^{([A-Za-z0-9+/]{4})*([A-Za-z0-9+/]{3}=|[A-Za-z0-9+/]{2}==)?\$}$

Options:

`RegexOptions.CultureInvariant`

Explanation:

- o Match **if** at the beginning of the **string**.
- o Loop greedily any number of times.
  - o 1st capture **group**.
    - o Match a character **in** the **set** [+/-9A-Za-z] exactly 4 times.
- o Optional (greedy).
  - o 2nd capture **group**.
    - o Match **with** 2 alternative expressions.
      - o Match a sequence of expressions.
        - o Match a character **in** the **set** [+/-9A-Za-z] exactly 3 times.
        - o Match '='.
      - o Match a sequence of expressions.
        - o Match a character **in** the **set** [+/-9A-Za-z] exactly 2 times.
        - o Match the **string** "==".
  - o Match **if** at the end of the **string** or **if** before an ending newline.

## HexRegex()

```
[GeneratedRegex("^(0x|0X)?[a-fA-F0-9]+$", RegexOptions.CultureInvariant, 1000)]  
public static Regex HexRegex()
```

Returns

[Regex](#)

Remarks

Pattern:

`^(0x|0X)?[a-fA-F0-9]+$`

Options:

`RegexOptions.CultureInvariant`

Explanation:

- o Match **if** at the beginning of the **string**.
- o Optional (greedy).
  - o 1st capture **group**.
  - o Match '**0**'.
  - o Match a character **in** the **set** [Xx].
- o Match a character **in** the **set** [0-9A-Fa-f] atomically at least once.
- o Match **if** at the end of the **string** or **if** before an ending newline.

## PathRegex()

```
[GeneratedRegex("^(([a-zA-Z]:)|(\\))(\\{1}|((\\{1})[^\\\\]([^/*?>\"|]*)))+)$",
    RegexOptions.CultureInvariant, 1000)]
public static Regex PathRegex()
```

Returns

[Regex](#)

Remarks

Pattern:

`^(([a-zA-Z]:)|(\\))(\\{1}|((\\{1})[^\\\\]([^/*?>\"|]*)))+$`

Options:

`RegexOptions.CultureInvariant`

Explanation:

- o Match **if** at the beginning of the **string**.
- o 1st capture **group**.
  - o Match **with** 2 alternative expressions.
    - o 2nd capture **group**.
    - o Match a character **in** the **set** [A-Za-z].

- o Match `:`.
- o Match a sequence of expressions.
  - o 3rd capture group.
  - o Match `)`.
- o Loop greedily at least once.
  - o 4th capture group.
  - o Match with 2 alternative expressions.
    - o Match the string "{1}".
    - o 5th capture group.
    - o 6th capture group.
    - o Match the string "{1}".
  - o Match a character in the set [^"(\*/:>?[]^|]" greedily any number of times.
- o Match if at the end of the string or if before an ending newline.

# Namespace AetherUtils.Core.Security

## Classes

### [SecretQa](#)

Represents a secret question and answer pair.

# Class SecretQa

Namespace: [AetherUtils.Core.Security](#)

Assembly: AetherUtils.Core.dll

Represents a secret question and answer pair.

```
public sealed class SecretQa
```

## Inheritance

[object](#) ← SecretQa

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

## Remarks

Once instantiated, the question cannot be changed. However, the answer can be changed using [Change Answer\(string\)](#).

## Constructors

### SecretQa(string, string)

Create a new [SecretQa](#) with the specified `question` and `answer`.

```
public SecretQa(string question, string answer)
```

## Parameters

### question [string](#)

The question.

**answer** [string](#)

The answer.

## Properties

### Answer

The answer component.

```
public string Answer { get; }
```

Property Value

[string](#)

### Question

The question component.

```
public string Question { get; }
```

Property Value

[string](#)

## Methods

### ChangeAnswer(string)

Set a new answer for the secret question.

```
public void ChangeAnswer(string newAnswer)
```

Parameters

**newAnswer** [string](#)

The new answer to set for the [Question](#).

# Namespace AetherUtils.Core.Security.

## Encryption

### Classes

#### [ByteEncryptionService](#)

Provides methods to encrypt and decrypt `byte[]` arrays.

#### [EncryptionBase](#)

Represents the base class for all encryption service classes. All encryption is performed using AES-256 and encoded with [UTF8](#).

#### [FileEncryptionService](#)

Provides methods to encrypt and decrypt files on the file system. This service contains potentially destructive methods that can render a file unreadable for a few reasons:

1. If a file is encrypted with [EncryptFileAsync\(string, string, string\)](#) and then opened in a text editor (to view/edit the contents), and then the file is saved, it could render the file unable to be decrypted.
2. If after performing item 1, you attempt to encrypt the file again, it could be lost forever.
3. If the file extension of an encrypted file is changed manually, the file will be unable to be decrypted.

#### **Use at your own risk!**

#### [ObjectEncryptionService<T>](#)

Provides methods to encrypt and decrypt XML serializable .NET objects.

#### [StringEncryptionService](#)

Provides methods to encrypt and decrypt strings.

# Class ByteEncryptionService

Namespace: [AetherUtils.Core.Security.Encryption](#)

Assembly: AetherUtils.Core.dll

Provides methods to encrypt and decrypt [byte](#) arrays.

```
public class ByteEncryptionService : EncryptionBase
```

## Inheritance

[object](#) ← [EncryptionBase](#) ← ByteEncryptionService

## Inherited Members

[EncryptionBase.GetRandomKeyPhrase\(int\)](#), [object.Equals\(object\)](#), [object.Equals\(object, object\)](#),  
[object.GetHashCode\(\)](#), [object.GetType\(\)](#), [object.MemberwiseClone\(\)](#),  
[object.ReferenceEquals\(object, object\)](#), [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#), [TypeExtensions.CanSerializeXml<T>\(T\)](#),  
[TypeExtensions.SerializeJson<T>\(T\)](#), [TypeExtensions.SerializeXml<T>\(T\)](#).

## Methods

### DecryptAsync(byte[], string)

Decrypt the [input](#) using the specified passphrase.

```
public Task<byte[]> DecryptAsync(byte[] input, string passphrase)
```

#### Parameters

[input](#) [byte](#)[]

The data to decrypt.

[passphrase](#) [string](#)

The passphrase used to derive the decryption key.

## Returns

[Task](#)<[byte](#)[]>

The decrypted data.

## EncryptAsync(byte[], string)

Encrypt the `input` using the specified passphrase.

```
public Task<byte[]> EncryptAsync(byte[] input, string passphrase)
```

## Parameters

`input` [byte](#)[]

The data to encrypt.

`passphrase` [string](#)

A passphrase used to derive the encryption key.

## Returns

[Task](#)<[byte](#)[]>

The encrypted data.

# Class EncryptionBase

Namespace: [AetherUtils.Core.Security.Encryption](#)

Assembly: AetherUtils.Core.dll

Represents the base class for all encryption service classes. All encryption is performed using AES-256 and encoded with [UTF8](#).

```
public class EncryptionBase
```

## Inheritance

[object](#) ← EncryptionBase

## Derived

[ByteEncryptionService](#), [FileEncryptionService](#), [ObjectEncryptionService<T>](#), [StringEncryptionService](#)

## Inherited Members

[object.Equals\(object\)](#), [object.Equals\(object, object\)](#), [object.GetHashCode\(\)](#), [object.GetType\(\)](#),  
[object.MemberwiseClone\(\)](#), [object.ReferenceEquals\(object, object\)](#), [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#), [TypeExtensions.CanSerializeXml<T>\(T\)](#),  
[TypeExtensions.SerializeJson<T>\(T\)](#), [TypeExtensions.SerializeXml<T>\(T\)](#).

## Methods

### GetRandomKeyPhrase(int)

Get a cryptographically strong random key phrase that can be used for encryption.

```
public static string GetRandomKeyPhrase(int keySize = 32)
```

#### Parameters

**keySize** [int](#)

The size, in bytes, for the generated key.

## Returns

[string](#)

A cryptographically strong and random [string](#).

# Class FileEncryptionService

Namespace: [AetherUtils.Core.Security.Encryption](#)

Assembly: AetherUtils.Core.dll

Provides methods to encrypt and decrypt files on the file system. This service contains potentially destructive methods that can render a file unreadable for a few reasons:

1. If a file is encrypted with [EncryptFileAsync\(string, string, string\)](#) and then opened in a text editor (to view/edit the contents), and then the file is saved, it could render the file unable to be decrypted.
2. If after performing item 1, you attempt to encrypt the file again, it could be lost forever.
3. If the file extension of an encrypted file is changed manually, the file will be unable to be decrypted.

## Use at your own risk!

```
public sealed class FileEncryptionService : EncryptionBase
```

### Inheritance

[object](#) ← [EncryptionBase](#) ← FileEncryptionService

### Inherited Members

[EncryptionBase.GetRandomKeyPhrase\(int\)](#) , [object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) ,  
[object.GetHashCode\(\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

### Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

## Constructors

### FileEncryptionService(string)

```
public FileEncryptionService(string filePath)
```

### Parameters

filePath [string](#)

# Properties

## FilePath

Get or set the file path that is used for encryption.

```
public string FilePath { get; set; }
```

## Property Value

[string](#)

# Methods

## DecryptAsync(string, string)

Decrypt a file specified by `filePath` using the `passphrase`.

```
public Task<string> DecryptAsync(string filePath, string passphrase)
```

## Parameters

`filePath` [string](#)

The path to the file to decrypt.

`passphrase` [string](#)

The passphrase used for decryption.

## Returns

[Task](#) <[string](#)>

The decrypted contents of the file.

## Exceptions

[FileNotFoundException](#)

If `filePath` was not a valid path to a file.

#### [ArgumentException](#)

If `filePath` was `null` or empty.

## DecryptFileAsync(string, string)

Decrypt an encrypted file from disk using the specified `passphrase` to derive the key.

```
public static Task<string> DecryptFileAsync(string filePath, string passphrase)
```

### Parameters

#### `filePath` [string](#)

The path to the file on disk to decrypt.

#### `passphrase` [string](#)

The passphrase used for decryption.

### Returns

#### [Task](#) <[string](#)>

The path to the decrypted file.

### Remarks

If the encrypted file's extension is different than the original file's, the encrypted file is deleted after decryption occurs and the file extension is changed back to the original extension.

### Exceptions

#### [FileNotFoundException](#)

If the file could not be found at the `filePath`.

## EncryptAsync(string, string)

Create and encrypt a file with the specified `content` using the `passphrase`.

This method will either create a new file if one does not exist or overwrite the existing file.

```
public Task<string> EncryptAsync(string content, string passphrase)
```

## Parameters

`content` [string](#)

The string to encrypt into the file.

`passphrase` [string](#)

The passphrase used for encryption.

## Returns

[Task](#)<[string](#)>

The path to the encrypted file.

## Exceptions

[ArgumentException](#)

If `content` was `null` or empty.

[ArgumentNullException](#)

If `passphrase` was `null`.

[InvalidOperationException](#)

If the [FilePath](#) property is empty.

## EncryptFileAsync(string, string, string)

Encrypt an existing file on disk using the specified `passphrase` to derive the key.

```
public static Task<string> EncryptFileAsync(string filePath, string passphrase, string  
newExtension = ".enc")
```

## Parameters

### `filePath` [string](#)

The path to the file on disk to encrypt.

### `passphrase` [string](#)

The passphrase used for encryption.

### `newExtension` [string](#)

The file extensions to change the encrypted file to. If no file extension change is wanted, supply the original file's extension; default is `.enc`.

## Returns

### [Task](#) <[string](#)>

The path to the encrypted file.

## Remarks

If the original file's extension is different than the encrypted file's, the original file is deleted after encryption occurs and the file extension is changed to the new extension.

## Exceptions

### [FileNotFoundException](#)

If the file could not be found at the `filePath`.

# Class ObjectEncryptionService<T>

Namespace: [AetherUtils.Core.Security.Encryption](#)

Assembly: AetherUtils.Core.dll

Provides methods to encrypt and decrypt XML serializable .NET objects.

```
public sealed class ObjectEncryptionService<T> : EncryptionBase where T : class
```

## Type Parameters

T

The object type to encrypt/decrypt. This type must support XML serialization.

### Inheritance

[object](#) ↗ ← [EncryptionBase](#) ← ObjectEncryptionService<T>

### Inherited Members

[EncryptionBase.GetRandomKeyPhrase\(int\)](#) , [object.Equals\(object\)](#) ↗ , [object.Equals\(object, object\)](#) ↗ ,  
[object.GetHashCode\(\)](#) ↗ , [object.GetType\(\)](#) ↗ , [object.ReferenceEquals\(object, object\)](#) ↗ ,  
[object.ToString\(\)](#) ↗

### Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

## Methods

### DecryptAsync(byte[], string)

Decrypt a .NET object represented as an encrypted XML serialized [byte](#) ↗ array.

```
public Task<T> DecryptAsync(byte[] input, string passphrase)
```

## Parameters

input [byte](#) ↗ []

The serialized, encrypted .NET object as a [byte](#) array.

#### passphrase [string](#)

The passphrase for decryption.

#### Returns

#### [Task](#) <T>

The [T](#) object, decrypted and deserialized.

#### Exceptions

##### [ArgumentNullException](#)

If the [input](#) was [null](#) or 0-length.

##### [FormatException](#)

If the [input](#) could not be deserialized to type [T](#).

## DecryptFromFileAsync(string, string)

Decrypt a .NET object from an encrypted file.

```
public Task<T> DecryptFromFileAsync(string filePath, string passphrase)
```

#### Parameters

##### filePath [string](#)

The path to the file containing an encrypted, serialized .NET object.

##### passphrase [string](#)

The passphrase for decryption.

#### Returns

#### [Task](#) <T>

The [T](#) object, decrypted and deserialized.

## Exceptions

### [FileNotFoundException](#)

If the file specified by `filePath` did not exist.

### [FormatException](#)

If the object could not be deserialized to a new .NET object.

## EncryptAsync(T, string)

Encrypt a .NET XML serializable object to an encrypted [byte](#) array.

```
public Task<byte[]> EncryptAsync(T input, string passphrase)
```

### Parameters

#### `input` T

The serializable .NET object.

#### `passphrase` [string](#)

The passphrase for encryption.

### Returns

#### [Task](#) <[byte](#)[]>

An encrypted .NET object represented as a serialized [byte](#) array.

## Exceptions

### [InvalidOperationException](#)

If the `input` could not serialized to type `T`.

## EncryptToFileAsync(T, string, string)

Encrypt a .NET XML serializable object to an encrypted file.

```
public Task<byte[]> EncryptToFileAsync(T input, string filePath, string passphrase)
```

## Parameters

### input T

The serializable .NET object.

### filePath string ↗

The file to create (or overwrite).

### passphrase string ↗

The passphrase for encryption.

## Returns

### Task<byte[]>

An encrypted .NET object represented as a serialized [byte](#) array; or an empty [byte](#) array if the encryption failed.

## Exceptions

### [InvalidOperationException](#) ↗

If the [input](#) could not be serialized to type [T](#).

# Class StringEncryptionService

Namespace: [AetherUtils.Core.Security.Encryption](#)

Assembly: AetherUtils.Core.dll

Provides methods to encrypt and decrypt strings.

```
public sealed class StringEncryptionService : EncryptionBase
```

## Inheritance

[object](#) ← [EncryptionBase](#) ← StringEncryptionService

## Inherited Members

[EncryptionBase.GetRandomKeyPhrase\(int\)](#) , [object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) ,  
[object.GetHashCode\(\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Methods

### DecryptAsync(byte[], string)

Decrypt an encrypted [byte](#) array using the [passphrase](#).

```
public Task<string> DecryptAsync(byte[] encrypted, string passphrase)
```

#### Parameters

**encrypted** [byte](#)[]

An encrypted [byte](#) array.

**passphrase** [string](#)

The passphrase used for decryption.

Returns

[Task](#) <[string](#)>

The decrypted [string](#).

## EncryptAsync(string, string)

Encrypt a string using the [passphrase](#).

```
public Task<byte[]> EncryptAsync(string input, string passphrase)
```

Parameters

[input](#) [string](#)

The string to encrypt.

[passphrase](#) [string](#)

The passphrase used for encryption.

Returns

[Task](#) <[byte](#)[]>

The encrypted [byte](#) array.

# Namespace AetherUtils.Core.Security.Hashing

## Classes

### [HashService](#)

Provides a service for creating cryptographically strong hashes of [string](#)s and comparing plain-text [string](#)s against them for equality.

This class hashes strings based on the provided [HashOptions](#).

## Enums

### [HashEncoding](#)

Represents valid encoding options for hashing.

# Enum HashEncoding

Namespace: [AetherUtils.Core.Security.Hashing](#)

Assembly: AetherUtils.Core.dll

Represents valid encoding options for hashing.

```
public enum HashEncoding
```

## Extension Methods

[EnumExtensions.ToStringDescription<T>\(T\)](#)

## Fields

**Base64 = 64**

Represents BASE-64 encoding.

**Hex = 16**

Represents Hexadecimal encoding (BASE-16).

# Class HashService

Namespace: [AetherUtils.Core.Security.Hashing](#)

Assembly: AetherUtils.Core.dll

Provides a service for creating cryptographically strong hashes of [string](#)s and comparing plain-text [string](#)s against them for equality.

This class hashes strings based on the provided [HashOptions](#).

```
public sealed class HashService
```

## Inheritance

[object](#) ← HashService

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

# Constructors

## HashService(HashOptions)

Create a new service with the specified [HashOptions](#).

```
public HashService(HashOptions options)
```

## Parameters

**options** [HashOptions](#)

The options that should be used for hashing.

# Properties

## HashedString

Get the hashed string for this [HashService](#).

```
public string HashedString { get; }
```

Property Value

[string](#)

# Methods

## CompareHash(string)

Compare a non-hashed input [string](#) against the last hashed string for this [HashService](#).

```
public bool CompareHash(string input)
```

Parameters

**input** [string](#)

Returns

[bool](#)

**true** if the two strings are equivalent; **false** otherwise.

Exceptions

[ArgumentException](#)

Thrown if **input** is **null** or empty.

## CompareHash(string, string)

Compare a non-hashed input [string](#) against a hashed [string](#).

```
public static bool CompareHash(string input, string hashString)
```

## Parameters

### `input` [string](#)

The non-hashed string.

### `hashString` [string](#)

A hash string to compare against.

## Returns

### `bool`

`true` if the two strings are equivalent; `false` otherwise.

## Exceptions

### [ArgumentException](#)

Thrown if `input` or `hashString` are `null` or empty.

## HashString(string)

Generate a hash string for the specified plain-text string according to this object's [HashOptions](#).

```
public string HashString(string value)
```

## Parameters

### `value` [string](#)

The plain text string to hash.

## Returns

### [string](#)

A cryptographically strong hashed string.

## Exceptions

### [ArgumentNullException](#)

If `value` was `null`.

# Namespace AetherUtils.Core.Security. Passwords

## Classes

### [PasswordRule](#)

Represents a password rule with various options. A password rule should be built using the Rule Builder factory: [IPasswordRuleBuilder](#).

This class contains methods to parse and save a password rule to/from a file as well as a string.

A password can be validated against a rule using [Validate\(string\)](#).

### [PasswordRuleData](#)

Holds the data relating to a [PasswordRule](#) built using [IPasswordRuleBuilder](#).

## Interfaces

### [IPasswordRuleBuilder](#)

Builder interface for creating a new [PasswordRule](#).

# Interface IPasswordRuleBuilder

Namespace: [AetherUtils.Core.Security.Passwords](#)

Assembly: AetherUtils.Core.dll

Builder interface for creating a new [PasswordRule](#).

```
public interface IPasswordRuleBuilder
```

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

## Methods

### AllowNumbers()

Allows the password to contain numbers.

```
IPasswordRuleBuilder AllowNumbers()
```

Returns

[IPasswordRuleBuilder](#)

The builder instance.

### AllowSpecials()

Allows the password to contain special characters.

```
IPasswordRuleBuilder AllowSpecials()
```

Returns

[IPasswordRuleBuilder](#)

The builder instance.

## AllowWhitespace()

Allows the password to contain whitespace.

`IPasswordRuleBuilder AllowWhitespace()`

Returns

[IPasswordRuleBuilder](#)

The builder instance.

## Build()

Build and compile the password rule.

`PasswordRule Build()`

Returns

[PasswordRule](#)

The built [PasswordRule](#).

## Expires(DateTime)

Set the date that a password should expire at.

`IPasswordRuleBuilder Expires(DateTime expires)`

Parameters

`expires DateTime`

The expiration expires of passwords validated against the rule.

Returns

## [IPasswordRuleBuilder](#)

The builder instance.

## MinimumLength(int)

Set the minimum length a password should be.

```
IPasswordRuleBuilder MinimumLength(int length)
```

Parameters

length [int](#)

Returns

## [IPasswordRuleBuilder](#)

The builder instance.

## MinimumNumberCount(int)

Set the minimum count of numbers a password should contain.

```
IPasswordRuleBuilder MinimumNumberCount(int count)
```

Parameters

count [int](#)

The minimum number of digits allowed.

Returns

## [IPasswordRuleBuilder](#)

The builder instance.

## MinimumSpecialCount(int)

Set the minimum count of special characters a password should contain.

```
IPasswordRuleBuilder MinimumSpecialCount(int count)
```

### Parameters

count [int](#)

The minimum number of special characters allowed.

### Returns

[IPasswordRuleBuilder](#)

The builder instance.

# Class PasswordRule

Namespace: [AetherUtils.Core.Security.Passwords](#)

Assembly: AetherUtils.Core.dll

Represents a password rule with various options. A password rule should be built using the Rule Builder factory: [IPasswordRuleBuilder](#).

This class contains methods to parse and save a password rule to/from a file as well as a string.

A password can be validated against a rule using [Validate\(string\)](#).

```
public sealed class PasswordRule
```

## Inheritance

[object](#) ← PasswordRule

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

# Properties

## PasswordRules

Get the string representing this password rule.

```
public string PasswordRules { get; }
```

## Property Value

[string](#)

# Methods

## FromEncryptedString(string, string)

Parse a password rule from an encrypted string.

```
public static PasswordRule FromEncryptedString(string encrypted, string passphrase)
```

Parameters

**encrypted** [string](#)

The encrypted password rule to parse.

**passphrase** [string](#)

The passphrase used for decryption.

Returns

[PasswordRule](#)

The [PasswordRule](#) or `null` if parsing failed.

## GetValidPassword()

Get a random, cryptographically strong password that follows the password rule.

```
public string GetValidPassword()
```

Returns

[string](#)

A new, random password that adheres to the password rule created.

## New()

Start building the password rule.

```
public static IPasswordRuleBuilder New()
```

Returns

## [IPasswordRuleBuilder](#)

The builder instance.

## Parse(string)

Parse a password rule from a Json string.

```
public static PasswordRule Parse(string json)
```

Parameters

### `json` [string](#)

The password rule as Json to parse.

Returns

## [PasswordRule](#)

The [PasswordRule](#) or `null` if parsing failed.

## ParseFromFileAsync(string, string)

Parse an encrypted password rule from a file.

```
public static Task<PasswordRule?> ParseFromFileAsync(string filePath, string passphrase)
```

Parameters

### `filePath` [string](#)

The path to the file to load; can contain Windows path variables (i.e., `%temp%`)

### `passphrase` [string](#)

The passphrase used for decryption. Should be the same as the one used for encryption.

Returns

## [Task](#) <[PasswordRule](#)>

The [PasswordRule](#) or `null` if parsing failed.

## SaveToFileAsync(string, string)

Save the encrypted password rule to a file.

```
public Task<bool> SaveToFileAsync(string filePath, string passphrase)
```

Parameters

### `filePath` [string](#)

The path to the file to save; can contain Windows path variables (i.e., `%temp%`)

### `passphrase` [string](#)

The passphrase used for encryption.

Returns

## [Task](#) <[bool](#)>

`true` if the password rule saved successfully; `false` otherwise.

## ToEncryptedString(string)

Get an encrypted string representing this password rule.

```
public string ToEncryptedString(string passphrase)
```

Parameters

### `passphrase` [string](#)

The passphrase used for encryption.

Returns

[string](#)

A base64 string representing the password rule.

## ToString()

Get the Json string representing this password rule.

```
public override string ToString()
```

Returns

[string](#)

## Validate(string)

Validate a password against the password rule.

```
public List<IPasswordValidationFailure> Validate(string password)
```

Parameters

[password](#) [string](#)

The password to validate.

Returns

[List](#) <[IPasswordValidationFailure](#)>

A list of [IPasswordValidationFailure](#) containing the reasons the password failed to validate. If this list is empty, the password validated successfully.

# Class PasswordRuleData

Namespace: [AetherUtils.Core.Security.Passwords](#)

Assembly: AetherUtils.Core.dll

Holds the data relating to a [PasswordRule](#) built using [IPasswordRuleBuilder](#).

```
public class PasswordRuleData
```

## Inheritance

[object](#) ← PasswordRuleData

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Constructors

### PasswordRuleData()

```
public PasswordRuleData()
```

## Properties

### Expiration

```
public DateTime? Expiration { get; set; }
```

## Property Value

[DateTime](#)?

## MinimumLengthAllowed

```
public int MinimumLengthAllowed { get; set; }
```

Property Value

[int ↗](#)

## MinimumNumberCount

```
public int MinimumNumberCount { get; set; }
```

Property Value

[int ↗](#)

## MinimumSpecialCount

```
public int MinimumSpecialCount { get; set; }
```

Property Value

[int ↗](#)

## NumbersAllowed

```
public bool NumbersAllowed { get; set; }
```

Property Value

[bool ↗](#)

## SpecialsAllowed

```
public bool SpecialsAllowed { get; set; }
```

Property Value

[bool](#) ↗

## WhitespaceAllowed

```
public bool WhitespaceAllowed { get; set; }
```

Property Value

[bool](#) ↗

# Namespace AetherUtils.Core.Security. Passwords.Validation

## Classes

### [PasswordValidator](#)

Validates a password against a [PasswordRule](#). This class cannot be inherited and should only be called from an instance of [PasswordRule](#) to validate a password.

### [ValidationFailure](#)

Represents a validation failure when checking a password against a password rule.

## Interfaces

### [IPasswordValidationFailure](#)

Represents a failure of a password rule check.

# Interface IPasswordValidationFailure

Namespace: [AetherUtils.Core.Security.Passwords.Validation](#)

Assembly: AetherUtils.Core.dll

Represents a failure of a password rule check.

```
public interface IPasswordValidationFailure
```

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

## Properties

### HowToResolve

Gets or sets the message that describes how to resolve the validation failure.

```
string HowToResolve { get; set; }
```

#### Property Value

[string](#) ↗

### Message

Gets or sets the message that describes the password validation failure.

```
string Message { get; set; }
```

#### Property Value

[string](#) ↗

# Class PasswordValidator

Namespace: [AetherUtils.Core.Security.Passwords.Validation](#)

Assembly: AetherUtils.Core.dll

Validates a password against a [PasswordRule](#). This class cannot be inherited and should only be called from an instance of [PasswordRule](#) to validate a password.

```
public abstract class PasswordValidator
```

## Inheritance

[object](#) ← PasswordValidator

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

# Class ValidationFailure

Namespace: [AetherUtils.Core.Security.Passwords.Validation](#)

Assembly: AetherUtils.Core.dll

Represents a validation failure when checking a password against a password rule.

```
public class ValidationFailure : IPasswordValidationFailure
```

## Inheritance

[object](#) ← ValidationFailure

## Implements

[IPasswordValidationFailure](#)

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

## Constructors

### ValidationFailure()

```
public ValidationFailure()
```

### ValidationFailure(string, string)

Represents a validation failure when checking a password against a password rule.

```
public ValidationFailure(string message, string howToResolve)
```

## Parameters

**message** [string](#)

The message associated with the failure.

**howToResolve** [string](#)

Indicates how to fix the failure.

## Properties

### HowToResolve

Gets or sets the message that describes how to resolve the validation failure.

```
public string HowToResolve { get; set; }
```

Property Value

[string](#)

### Message

Gets or sets the message that describes the password validation failure.

```
public string Message { get; set; }
```

Property Value

[string](#)

# Namespace AetherUtils.Core.Security.TwoFactor

## Classes

### [Encoder](#)

Class that handles encoding strings and byte arrays to/from URLs and Base-32.

### [SetupCode](#)

### [TwoFactorAuth](#)

Provides methods to generate and validate two-factor authentication codes.

### [TwoFactorUser](#)

Represents a 2-factor authentication user.

## Enums

### [HashType](#)

Represents the various hash types valid for two factor authentication keys.

# Class Encoder

Namespace: [AetherUtils.Core.Security.TwoFactor](#)

Assembly: AetherUtils.Core.dll

Class that handles encoding strings and byte arrays to/from URLs and Base-32.

```
public static class Encoder
```

## Inheritance

[object](#) ← Encoder

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Methods

### Base32Encode(byte[])

Encode the [byte](#) array of data to a base-32 encoded string.

```
public static string Base32Encode(byte[] data)
```

#### Parameters

**data** [byte](#)[]

The [byte](#) array containing the data.

#### Returns

[string](#)

A string representing the **data** in base-32.

#### Exceptions

[ArgumentNullException](#)

If `data` is `null` or empty.

## ToBytes(string)

Encode the base-32 [string](#) to a [byte](#) array.

```
public static byte[] ToBytes(string input)
```

### Parameters

`input` [string](#)

The base-32 encoded string.

### Returns

[byte](#)[]

A [byte](#) array.

### Exceptions

[ArgumentException](#)

If `input` is `null` or empty.

## UrlEncode(string)

Encode the string `value` to a valid URL string according to the OATH specification.

```
public static string UrlEncode(string value)
```

### Parameters

`value` [string](#)

The string to URL encode.

### Returns

## string ↴

A URL encoded string.

# Enum HashType

Namespace: [AetherUtils.Core.Security.TwoFactor](#)

Assembly: AetherUtils.Core.dll

Represents the various hash types valid for two factor authentication keys.

```
public enum HashType
```

## Extension Methods

[EnumExtensions.ToString<T>\(T\)](#)

## Fields

Sha1 = 0

Sha256 = 1

Sha512 = 2

# Class SetupCode

Namespace: [AetherUtils.Core.Security.TwoFactor](#)

Assembly: AetherUtils.Core.dll

```
public sealed class SetupCode
```

## Inheritance

[object](#) ← SetupCode

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Constructors

### SetupCode(string, string)

```
public SetupCode(string manualEntryKey, string qrCodeSetupImageUrl)
```

## Parameters

manualEntryKey [string](#)

qrCodeSetupImageUrl [string](#)

## Properties

### ManualEntryKey

```
public string ManualEntryKey { get; }
```

Property Value

[string](#) ↗

## QrCodeSetupImageUrl

```
public string QrCodeSetupImageUrl { get; }
```

Property Value

[string](#) ↗

# Class TwoFactorAuth

Namespace: [AetherUtils.Core.Security.TwoFactor](#)

Assembly: AetherUtils.Core.dll

Provides methods to generate and validate two-factor authentication codes.

```
public class TwoFactorAuth
```

## Inheritance

[object](#) ← TwoFactorAuth

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Constructors

### TwoFactorAuth()

```
public TwoFactorAuth()
```

### TwoFactorAuth(HashType)

Provides methods to generate and validate two-factor authentication codes.

```
public TwoFactorAuth(HashType hashType)
```

## Parameters

hashType [HashType](#)

The [HashType](#) for the generated codes.

## Methods

### GeneratePinAtInterval(byte[], long, int)

This method is generally called via [GetCurrentPin\(string, bool\)](#)/>

```
public string GeneratePinAtInterval(byte[] accountSecretKey, long counter, int digits = 6)
```

#### Parameters

`accountSecretKey byte[]`

The account secret key as a byte array

`counter long`

The number of 30-second (by default) intervals since the unix epoch

`digits int`

The desired length of the returned PIN

#### Returns

`string`

A 'PIN' that is valid for the specified time interval

### GeneratePinAtInterval(string, long, int, bool)

This method is generally called via [GetCurrentPin\(string, bool\)](#)

```
public string GeneratePinAtInterval(string accountSecretKey, long counter, int digits = 6,  
bool secretIsBase32 = false)
```

#### Parameters

`accountSecretKey string`

The account secret key as a string

**counter** [long](#)

The number of 30-second (by default) intervals since the unix epoch

**digits** [int](#)

The desired length of the returned PIN

**secretIsBase32** [bool](#)

Flag saying if accountSecretKey is in Base32 format or original secret

Returns

[string](#)

A 'PIN' that is valid for the specified time interval

## GenerateSetupInformation(ref TwoFactorUser, byte[])

Generate the setup information needed for a user to scan with their authenticator app.

```
public void GenerateSetupInformation(ref TwoFactorUser user, byte[] secretKey)
```

Parameters

**user** [TwoFactorUser](#)

The [TwoFactorUser](#) containing the setup information, as a reference.

**secretKey** [byte](#)[]

The secret key used to generate the setup information.

## GetCurrentPin(byte[])

Get the PIN for current time; the same code that a 2FA app would generate for the current time. Do not validate directly against this as clock drift may cause a different PIN to be generated.

```
public string GetCurrentPin(byte[] accountSecretKey)
```

Parameters

accountSecretKey [byte\[\]](#)

Account Secret Key

Returns

[string](#)

A 6-digit PIN

## GetCurrentPin(byte[], DateTime)

Get the PIN for current time; the same code that a 2FA app would generate for the current time. Do not validate directly against this as clock drift may cause a different PIN to be generated.

```
public string GetCurrentPin(byte[] accountSecretKey, DateTime now)
```

Parameters

accountSecretKey [byte\[\]](#)

Account Secret Key

now [DateTime](#)

The time you wish to generate the pin for

Returns

[string](#)

A 6-digit PIN

## GetCurrentPin(string, bool)

Get the PIN for current time; the same code that a 2FA app would generate for the current time. Do not validate directly against this as clock drift may cause a different PIN to be generated than one you did a second ago.

```
public string GetCurrentPin(string accountSecretKey, bool secretIsBase32 = false)
```

Parameters

**accountSecretKey** [string](#)

Account Secret Key

**secretIsBase32** [bool](#)

Flag saying if accountSecretKey is in Base32 format or original secret

Returns

[string](#)

A 6-digit PIN

## GetCurrentPin(string, DateTime, bool)

Get the PIN for current time; the same code that a 2FA app would generate for the current time. Do not validate directly against this as clock drift may cause a different PIN to be generated than one you did a second ago.

```
public string GetCurrentPin(string accountSecretKey, DateTime now, bool secretIsBase32 = false)
```

Parameters

**accountSecretKey** [string](#)

Account Secret Key

**now** [DateTime](#)

The time you wish to generate the pin for

`secretIsBase32` `bool`

Flag saying if accountSecretKey is in Base32 format or original secret

Returns

`string`

A 6-digit PIN

## GetCurrentPins(`byte[]`)

Get all the PINs that would be valid within the time window allowed for by the default clock drift.

```
public string[] GetCurrentPins(byte[] accountSecretKey)
```

Parameters

`accountSecretKey` `byte[]`

Account Secret Key

Returns

`string[]`

## GetCurrentPins(`byte[]`, `int`)

Get all the PINs that would be valid within the time window allowed for by the specified clock drift.

```
public string[] GetCurrentPins(byte[] accountSecretKey, int iterationOffset)
```

Parameters

`accountSecretKey` `byte[]`

Account Secret Key

`iterationOffset` `int`

The counter drift size you want to generate PINs for

Returns

[string](#)[]

## GetCurrentPins(byte[], TimeSpan)

Get all the PINs that would be valid within the time window allowed for by the specified clock drift.

```
public string[] GetCurrentPins(byte[] accountSecretKey, TimeSpan timeTolerance)
```

Parameters

[accountSecretKey](#) [byte](#)[]

Account Secret Key

[timeTolerance](#) [TimeSpan](#)

The clock drift size you want to generate PINs for

Returns

[string](#)[]

## GetCurrentPins(string, bool)

Get all the PINs that would be valid within the time window allowed for by the default clock drift.

```
public string[] GetCurrentPins(string accountSecretKey, bool secretIsBase32 = false)
```

Parameters

[accountSecretKey](#) [string](#)

Account Secret Key

[secretIsBase32](#) [bool](#)

Flag saying if accountSecretKey is in Base32 format or original secret

Returns

[string](#)[]

## GetCurrentPins(string, TimeSpan, bool)

Get all the PINs that would be valid within the time window allowed for by the specified clock drift.

```
public string[] GetCurrentPins(string accountSecretKey, TimeSpan timeTolerance, bool  
secretIsBase32 = false)
```

Parameters

[accountSecretKey](#) [string](#)[]

Account Secret Key

[timeTolerance](#) [TimeSpan](#)[]

The clock drift size you want to generate PINs for

[secretIsBase32](#) [bool](#)[]

Flag saying if accountSecretKey is in Base32 format or original secret

Returns

[string](#)[][]

## ValidateTwoFactorPin(byte[], string)

Given a PIN from a client, check if it is valid at the current time.

```
public bool ValidateTwoFactorPin(byte[] accountSecretKey, string twoFactorCodeFromClient)
```

Parameters

`accountSecretKey byte[]`

Account Secret Key

`twoFactorCodeFromClient string`

The PIN from the client

Returns

`bool`

True if PIN is currently valid

## ValidateTwoFactorPin(byte[], string, int)

Given a PIN from a client, check if it is valid at the current time.

```
public bool ValidateTwoFactorPin(byte[] accountSecretKey, string twoFactorCodeFromClient,  
int iterationOffset)
```

Parameters

`accountSecretKey byte[]`

Account Secret Key

`twoFactorCodeFromClient string`

The PIN from the client

`iterationOffset int`

The counter window within which to check to allow for clock drift between devices.

Returns

`bool`

True if PIN is currently valid

## ValidateTwoFactorPin(byte[], string, TimeSpan)

Given a PIN from a client, check if it is valid at the current time.

```
public bool ValidateTwoFactorPin(byte[] accountSecretKey, string twoFactorCodeFromClient,  
TimeSpan timeTolerance)
```

### Parameters

**accountSecretKey** [byte\[\]](#)

Account Secret Key

**twoFactorCodeFromClient** [string](#)

The PIN from the client

**timeTolerance** [TimeSpan](#)

The time window within which to check to allow for clock drift between devices.

### Returns

[bool](#)

True if PIN is currently valid

## ValidateTwoFactorPin(string, string, bool)

Given a PIN from a client, check if it is valid at the current time.

```
public bool ValidateTwoFactorPin(string accountSecretKey, string twoFactorCodeFromClient,  
bool secretIsBase32 = false)
```

### Parameters

**accountSecretKey** [string](#)

Account Secret Key

**twoFactorCodeFromClient** [string](#)

The PIN from the client

#### `secretIsBase32` [bool](#)

Flag saying if accountSecretKey is in Base32 format or original secret

Returns

#### [bool](#)

True if PIN is currently valid

## ValidateTwoFactorPin(string, string, int, bool)

Given a PIN from a client, check if it is valid at the current time.

```
public bool ValidateTwoFactorPin(string accountSecretKey, string twoFactorCodeFromClient,  
int iterationOffset, bool secretIsBase32 = false)
```

Parameters

#### `accountSecretKey` [string](#)

Account Secret Key

#### `twoFactorCodeFromClient` [string](#)

The PIN from the client

#### `iterationOffset` [int](#)

The counter window within which to check to allow for clock drift between devices.

#### `secretIsBase32` [bool](#)

Flag saying if accountSecretKey is in Base32 format or original secret

Returns

#### [bool](#)

True if PIN is currently valid

## ValidateTwoFactorPin(string, string, TimeSpan, bool)

Given a PIN from a client, check if it is valid at the current time.

```
public bool ValidateTwoFactorPin(string accountSecretKey, string twoFactorCodeFromClient,  
TimeSpan timeTolerance, bool secretIsBase32 = false)
```

### Parameters

**accountSecretKey** [string](#)

Account Secret Key

**twoFactorCodeFromClient** [string](#)

The PIN from the client

**timeTolerance** [TimeSpan](#)

The time window within which to check to allow for clock drift between devices.

**secretIsBase32** [bool](#)

Flag saying if accountSecretKey is in Base32 format or original secret

### Returns

[bool](#)

True if PIN is currently valid

# Class TwoFactorUser

Namespace: [AetherUtils.Core.Security.TwoFactor](#)

Assembly: AetherUtils.Core.dll

Represents a 2-factor authentication user.

```
public sealed class TwoFactorUser
```

## Inheritance

[object](#) ← TwoFactorUser

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

# Constructors

## TwoFactorUser(string, string)

Represents a 2-factor authentication user.

```
public TwoFactorUser(string issuer, string accountTitle)
```

## Parameters

**issuer** [string](#)

The issuer of the 2FA tokens.

**accountTitle** [string](#)

The account title as shown in the user's authenticator app.

# Properties

## AccountTitle

The account title as shown in the user's authenticator app.

```
public string AccountTitle { get; }
```

### Property Value

[string](#)

## Issuer

The issuer of the 2FA tokens.

```
public string Issuer { get; }
```

### Property Value

[string](#)

## SetupInformation

The information needed for the user to set the account up in their authenticator app.

```
public SetupCode? SetupInformation { get; }
```

### Property Value

[SetupCode](#)

# Namespace AetherUtils.Core.Structs

## Structs

### [ConfigOption](#)

Represents a single configuration option and its value. This option can contain a single-dimensional list indexer: `optionName[0]` - get/set the configuration with name `optionName` at index 0, where `optionName` is a list.

### [HashOptions](#)

Represents the options used for performing hashing functions. If unspecified at struct creation, the [HashAlgorithm](#) defaults to [SHA384](#) and the [Encoding](#) defaults to [Base64](#).

Once created, this struct's options cannot be changed.

### [Pair<K, V>](#)

Represents a generic key-value pair.

### [ReadOnlyPair<K, V>](#)

Represents a generic key-value pair that is read-only; Once the pair is instantiated, the values cannot be changed.

### [TrimmedString](#)

Represents a string that has new line characters (\n) inserted and has been formatted to be a specific length.

# Struct ConfigOption

Namespace: [AetherUtils.Core.Structs](#)

Assembly: AetherUtils.Core.dll

Represents a single configuration option and it's value. This option can contain a single-dimensional list indexer: `optionName[0]` - get/set the configuration with name `optionName` at index 0, where `optionName` is a list.

```
public struct ConfigOption
```

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Constructors

### ConfigOption(string, object?)

```
public ConfigOption(string option, object? value)
```

#### Parameters

option [string](#)

value [object](#)

## Properties

### ArrayIndexExists

```
public readonly bool ArrayIndexExists { get; }
```

#### Property Value

[bool](#)

## ArrayIndexer

```
public int ArrayIndexer { readonly get; set; }
```

Property Value

[int](#)

Name

```
public string Name { readonly get; set; }
```

Property Value

[string](#)

Value

```
public object? Value { readonly get; set; }
```

Property Value

[object](#)

# Struct HashOptions

Namespace: [AetherUtils.Core.Structs](#)

Assembly: AetherUtils.Core.dll

Represents the options used for performing hashing functions. If unspecified at struct creation, the [Hash Algorithm](#) defaults to [SHA384](#) and the [Encoding](#) defaults to [Base64](#).

Once created, this struct's options cannot be changed.

```
public readonly struct HashOptions
```

## Inherited Members

[ValueType.Equals\(object\)](#), [ValueType.GetHashCode\(\)](#), [ValueType.ToString\(\)](#),  
[object.Equals\(object, object\)](#), [object.GetType\(\)](#), [object.ReferenceEquals\(object, object\)](#)

## Constructors

### HashOptions(ReadOnlyPair<int, int>)

```
public HashOptions(ReadOnlyPair<int, int> iterations)
```

#### Parameters

iterations [ReadOnlyPair<int, int>](#)

### HashOptions(ReadOnlyPair<int, int>, HashEncoding)

```
public HashOptions(ReadOnlyPair<int, int> iterations, HashEncoding hashEncoding)
```

#### Parameters

iterations [ReadOnlyPair<int, int>](#)

hashEncoding [HashEncoding](#)

## HashOptions(ReadOnlyPair<int, int>, HashAlgorithmName, HashEncoding)

```
public HashOptions(ReadOnlyPair<int, int> iterations, HashAlgorithmName hashAlgorithm,  
HashEncoding hashEncoding)
```

### Parameters

iterations [ReadOnlyPair<int, int>](#)

hashAlgorithm [HashAlgorithmName](#)

hashEncoding [HashEncoding](#)

## HashOptions(int, ReadOnlyPair<int, int>, HashAlgorithmName)

```
public HashOptions(int saltLength, ReadOnlyPair<int, int> iterations,  
HashAlgorithmName hashAlgorithm)
```

### Parameters

saltLength [int](#)

iterations [ReadOnlyPair<int, int>](#)

hashAlgorithm [HashAlgorithmName](#)

## HashOptions(int, ReadOnlyPair<int, int>, HashAlgorithmName, HashEncoding)

```
public HashOptions(int saltLength, ReadOnlyPair<int, int> iterations, HashAlgorithmName  
hashAlgorithm, HashEncoding hashEncoding)
```

### Parameters

saltLength [int](#)

`iterations` [ReadOnlyPair<int, int>](#)

`hashAlgorithm` [HashAlgorithmName](#)

`hashEncoding` [HashEncoding](#)

## HashOptions(int, int)

```
public HashOptions(int minIterations, int maxIterations)
```

### Parameters

`minIterations` [int](#)

`maxIterations` [int](#)

## HashOptions(int, int, HashEncoding)

```
public HashOptions(int minIterations, int maxIterations, HashEncoding hashEncoding)
```

### Parameters

`minIterations` [int](#)

`maxIterations` [int](#)

`hashEncoding` [HashEncoding](#)

## HashOptions(int, int, int)

```
public HashOptions(int saltLength, int minIterations, int maxIterations)
```

### Parameters

`saltLength` [int](#)

`minIterations` [int](#)

`maxIterations` [int](#)

## HashOptions(int, int, int, int)

`public HashOptions(int saltLength, int keySize, int minIterations, int maxIterations)`

Parameters

`saltLength` [int](#)

`keySize` [int](#)

`minIterations` [int](#)

`maxIterations` [int](#)

## HashOptions(int, int, int, int, HashAlgorithmName)

`public HashOptions(int saltLength, int keySize, int minIterations, int maxIterations, HashAlgorithmName hashAlgorithm)`

Parameters

`saltLength` [int](#)

`keySize` [int](#)

`minIterations` [int](#)

`maxIterations` [int](#)

`hashAlgorithm` [HashAlgorithmName](#)

## HashOptions(int, int, int, int, HashAlgorithmName, HashEncoding)

`public HashOptions(int saltLength, int keySize, int minIterations, int maxIterations,`

```
HashAlgorithmName hashAlgorithm, HashEncoding hashEncoding)
```

## Parameters

saltLength [int](#)

keySize [int](#)

minIterations [int](#)

maxIterations [int](#)

hashAlgorithm [HashAlgorithmName](#)

hashEncoding [HashEncoding](#)

## HashOptions(int, int, HashAlgorithmName)

```
public HashOptions(int minIterations, int maxIterations, HashAlgorithmName hashAlgorithm)
```

## Parameters

minIterations [int](#)

maxIterations [int](#)

hashAlgorithm [HashAlgorithmName](#)

## HashOptions(int, int, HashAlgorithmName, HashEncoding)

```
public HashOptions(int minIterations, int maxIterations, HashAlgorithmName hashAlgorithm,  
HashEncoding hashEncoding)
```

## Parameters

minIterations [int](#)

maxIterations [int](#)

`hashAlgorithm` [HashAlgorithmName](#)

`hashEncoding` [HashEncoding](#)

## Properties

### Encoding

The encoding scheme to use when hashing.

```
public HashEncoding Encoding { get; }
```

Property Value

[HashEncoding](#)

### HashAlgorithm

The algorithm to use when hashing.

```
public HashAlgorithmName HashAlgorithm { get; }
```

Property Value

[HashAlgorithmName](#)

### Iterations

The number of iterations to perform when hashing.

A random value between the minimum and maximum iterations is retrieved every time this property is called.

```
public int Iterations { get; }
```

Property Value

[int↗](#)

## KeySize

The size (in bytes) of the hash key used when hashing.

```
public int KeySize { get; }
```

Property Value

[int↗](#)

## SaltLength

The length (in bytes) used for the salt when hashing.

```
public int SaltLength { get; }
```

Property Value

[int↗](#)

# Struct Pair<K, V>

Namespace: [AetherUtils.Core.Structs](#)

Assembly: AetherUtils.Core.dll

Represents a generic key-value pair.

```
public struct Pair<K, V>
```

## Type Parameters

K

The [Type](#) for the key.

V

The [Type](#) for the value.

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Constructors

### Pair(K?, V?)

Represents a generic key-value pair.

```
public Pair(K? key, V? value)
```

## Parameters

key K

value V

# Properties

## Key

```
public K? Key { readonly get; set; }
```

## Property Value

K

## Value

```
public V? Value { readonly get; set; }
```

## Property Value

V

# Struct ReadOnlyPair<K, V>

Namespace: [AetherUtils.Core.Structs](#)

Assembly: AetherUtils.Core.dll

Represents a generic key-value pair that is read-only; Once the pair is instantiated, the values cannot be changed.

```
public readonly struct ReadOnlyPair<K, V>
```

## Type Parameters

K

The [Type](#) for the key.

V

The [Type](#) for the value.

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Constructors

### ReadOnlyPair(K?, V?)

Represents a generic key-value pair that is read-only; Once the pair is instantiated, the values cannot be changed.

```
public ReadOnlyPair(K? key, V? value)
```

## Parameters

key K

value V

# Fields

## Key

```
public readonly K? Key
```

## Field Value

K

## Value

```
public readonly V? Value
```

## Field Value

V

# Struct TrimmedString

Namespace: [AetherUtils.Core.Structs](#)

Assembly: AetherUtils.Core.dll

Represents a string that has new line characters (\n) inserted and has been formatted to be a specific length.

```
public readonly struct TrimmedString
```

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Constructors

### TrimmedString(string)

Create a new [TrimmedString](#) struct from the specified string.

```
public TrimmedString(string s)
```

#### Parameters

s [string](#)

The string to initialize the struct with.

## Fields

### Lines

The number of new line characters (\n) in the string.

```
public readonly int Lines
```

Field Value

[int ↗](#)

## String

The trimmed string.

```
public readonly string String
```

Field Value

[string ↗](#)

# Namespace AetherUtils.Core.Utility

## Classes

### [ProportionalRandomSelector<T>](#)

Represents a cryptographically strong, random item selector using proportional percentages.

### [SerializableDictionary< TKey, TValue >](#)

Represents a generic key-value dictionary that is serializable via XML serialization.

This derived type from [Dictionary< TKey, TValue >](#) does not allow `null` for its values.

### [SizeConverter](#)

# Class ProportionalRandomSelector<T>

Namespace: [AetherUtils.Core.Utility](#)

Assembly: AetherUtils.Core.dll

Represents a cryptographically strong, random item selector using proportional percentages.

```
public sealed class ProportionalRandomSelector<T> where T : notnull
```

## Type Parameters

T

The type of item to select using this selector.

### Inheritance

[object](#) ← ProportionalRandomSelector<T>

### Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

### Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Methods

### AddPercentage(T, int)

Add an item and its percentage to this selector.

```
public void AddPercentage(T item, int percentage)
```

## Parameters

item T

The item to add.

`percentage` [int ↗](#)

The percentage indicating the likelihood of the item being selected.

## SelectItem()

Get a random item from the selector using the percentages defined within.

```
public T? SelectItem()
```

Returns

T

A random item or `null` if an item could not be selected.

# Class SerializableDictionary<TKey, TValue>

Namespace: [AetherUtils.Core.Utility](#)

Assembly: AetherUtils.Core.dll

Represents a generic key-value dictionary that is serializable via XML serialization.

This derived type from [Dictionary<TKey, TValue>](#) does not allow `null` for its values.

```
[Serializable]
public class SerializableDictionary<TKey, TValue> : Dictionary<TKey, TValue>,
IDictionary<TKey, TValue>, ICollection<KeyValuePair<TKey, TValue>>,
IReadOnlyDictionary<TKey, TValue>, IReadOnlyCollection<KeyValuePair<TKey, TValue>>,
IEnumerable<KeyValuePair<TKey, TValue>>, IDictionary, ICollection, IEnumerable,
IDeserializationCallback, ISerializable, IXmlSerializable where TKey : notnull where TValue
: notnull
```

## Type Parameters

### TKey

The [Type](#) for the keys in this dictionary.

### TValue

The [Type](#) for the values in this dictionary.

## Inheritance

[object](#) ← [Dictionary](#)<TKey, TValue> ← SerializableDictionary<TKey, TValue>

## Implements

[IDictionary](#)<TKey, TValue>, [ICollection](#)<[KeyValuePair](#)<TKey, TValue>>,<br/>
[IReadOnlyDictionary](#)<TKey, TValue>, [IReadOnlyCollection](#)<[KeyValuePair](#)<TKey, TValue>>,<br/>
[IEnumerable](#)<[KeyValuePair](#)<TKey, TValue>>, [IDictionary](#), [ICollection](#), [IEnumerable](#),<br/>
[IDeserializationCallback](#), [ISerializable](#), [IXmlSerializable](#)

## Inherited Members

[Dictionary](#)<TKey, TValue>.Add(TKey, TValue), [Dictionary](#)<TKey, TValue>.Clear(),<br/>
[Dictionary](#)<TKey, TValue>.ContainsKey(TKey), [Dictionary](#)<TKey, TValue>.ContainsValue(TValue),<br/>
[Dictionary](#)<TKey, TValue>.EnsureCapacity(int), [Dictionary](#)<TKey, TValue>.GetEnumerator(),<br/>
[Dictionary](#)<TKey, TValue>.OnDeserialization(object), [Dictionary](#)<TKey, TValue>.Remove(TKey),<br/>
[Dictionary](#)<TKey, TValue>.Remove(TKey, out TValue), [Dictionary](#)<TKey, TValue>.TrimExcess(),

[Dictionary<TKey, TValue>.TrimExcess\(int\)](#) , [Dictionary<TKey, TValue>.TryAdd\(TKey, TValue\)](#) ,  
[Dictionary<TKey, TValue>.TryGetValue\(TKey, out TValue\)](#) , [Dictionary<TKey, TValue>.Comparer](#) ,  
[Dictionary<TKey, TValue>.Count](#) , [Dictionary<TKey, TValue>.this\[TKey\]](#) ,  
[Dictionary<TKey, TValue>.Keys](#) , [Dictionary<TKey, TValue>.Values](#) , [object.Equals\(object\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#) ,  
[CollectionExtensions.RenameKey<TKey, TValue>\(IDictionary<TKey, TValue>, TKey, TKey\)](#).

# Methods

## GetSchema()

This method is reserved and should not be used. When implementing the [IXmlSerializable](#) interface, you should return [null](#) ([Nothing](#) in Visual Basic) from this method, and instead, if specifying a custom schema is required, apply the [XmlAttributeProviderAttribute](#) to the class.

```
public XmlSchema? GetSchema()
```

## Returns

[XmlSchema](#)

An [XmlSchema](#) that describes the XML representation of the object that is produced by the [WriteXml\(XmlWriter\)](#) method and consumed by the [ReadXml\(XmlReader\)](#) method.

## ReadXml(XmlReader)

Generates an object from its XML representation.

```
public void ReadXml(XmlReader reader)
```

## Parameters

reader [XmlReader](#)

The [XmlReader](#) stream from which the object is deserialized.

## WriteXml(XmlWriter)

Converts an object into its XML representation.

```
public void WriteXml(XmlWriter writer)
```

### Parameters

`writer` [XmlWriter](#)

The [XmlWriter](#) stream to which the object is serialized.

# Class SizeConverter

Namespace: [AetherUtils.Core.Utility](#)

Assembly: AetherUtils.Core.dll

```
public static class SizeConverter
```

## Inheritance

[object](#) ← SizeConverter

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

# Namespace AetherUtils.Core.WinForms

## Classes

### [IconListManager](#)

Maintains a list of currently added file extensions

### [IconReader](#)

Provides static methods to read system icons for both folders and files. i.e.,

```
IconReader.GetFileIcon("c:\\general.xls");
```

### [Shell32](#)

Wraps necessary Shell32.dll structures and functions required to retrieve Icon Handles using SHGetFileInfo. Code courtesy of MSDN Cold Rooster Consulting case study.

### [User32](#)

Wraps necessary functions imported from User32.dll. Code courtesy of MSDN Cold Rooster Consulting example.

## Structs

### [Shell32.BROWSEINFO](#)

### [Shell32.ITEMIDLIST](#)

### [Shell32.SHFILEINFO](#)

### [Shell32.SHITEMID](#)

## Enums

### [IconReader.FolderType](#)

Options to specify whether folders should be in the open or closed state.

### [IconReader.IconSize](#)

Options to specify the size of icons to return.

# Class IconListManager

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

Maintains a list of currently added file extensions

```
public class IconListManager
```

## Inheritance

[object](#) ← IconListManager

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Constructors

### IconListManager(ImageList, IconSize)

Creates an instance of [IconListManager](#) that will add icons to a single [ImageList](#) using the specified [IconSize](#).

```
public IconListManager(ImageList imageList, IconReader.IconSize iconSize)
```

## Parameters

[imageList](#) [ImageList](#)

[ImageList](#) to add icons to.

[iconSize](#) [IconReader.IconSize](#)

Size to use (either 32 or 16 pixels).

## IconListManager(ImageList, ImageList)

Creates an instance of IconListManager that will add icons to two [ImageList](#) types. The two image lists are intended to be one for large icons, and the other for small icons.

```
public IconListManager(ImageList smallImageList, ImageList largeImageList)
```

### Parameters

[smallImageList](#) [ImageList](#)

The [ImageList](#) that will hold small icons.

[largeImageList](#) [ImageList](#)

The [ImageList](#) that will hold large icons.

## Methods

### AddFileIcon(string)

Called publicly to add a file's icon to the ImageList.

```
public int AddFileIcon(string filePath)
```

### Parameters

[filePath](#) [string](#)

Full path to the file.

### Returns

[int](#)

Integer of the icon's position in the ImageList

### ClearLists()

Clears all [ImageList](#)s that [IconListManager](#) is managing.

```
public void ClearLists()
```

# Class IconReader

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

Provides static methods to read system icons for both folders and files. i.e.,

```
IconReader.GetFileIcon("c:\\general.xls");
```

```
public class IconReader
```

## Inheritance

[object](#) ← IconReader

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#)

## Methods

### GetFileIcon(string, IconSize, bool)

Returns an icon for a given file - indicated by the name parameter.

```
public static Icon GetFileIcon(string name, IconReader.IconSize size, bool linkOverlay)
```

#### Parameters

**name** [string](#)

Pathname for file.

**size** [IconReader.IconSize](#)

Large or small

**linkOverlay** [bool](#)

Whether to include the link icon

Returns

[Icon](#)

System.Drawing.Icon

## GetFolderIcon(IconSize, FolderType)

Used to access system folder icons.

```
public static Icon GetFolderIcon(IconReader.IconSize size, IconReader.FolderType folderType)
```

Parameters

**size** [IconReader.IconSize](#)

Specify large or small icons.

**folderType** [IconReader.FolderType](#)

Specify open or closed FolderType.

Returns

[Icon](#)

System.Drawing.Icon

# Enum IconReader.FolderType

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

Options to specify whether folders should be in the open or closed state.

```
public enum IconReader.FolderType
```

## Extension Methods

[EnumExtensions.ToString<T>\(T\)](#)

## Fields

**Closed = 1**

Specify closed folder.

**Open = 0**

Specify open folder.

# Enum IconReader.IconSize

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

Options to specify the size of icons to return.

```
public enum IconReader.IconSize
```

## Extension Methods

[EnumExtensions.ToString<T>\(T\)](#)

## Fields

**Large = 0**

Specify large icon - 32 pixels by 32 pixels.

**Small = 1**

Specify small icon - 16 pixels by 16 pixels.

# Class Shell32

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

Wraps necessary Shell32.dll structures and functions required to retrieve Icon Handles using SHGetFileInfo. Code courtesy of MSDN Cold Rooster Consulting case study.

```
public class Shell32
```

## Inheritance

[object](#) ← Shell32

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

## Fields

### BIF\_BROWSEFORCOMPUTER

```
public const uint BIF_BROWSEFORCOMPUTER = 4096
```

Field Value

[uint](#)

### BIF\_BROWSEFORPRINTER

```
public const uint BIF_BROWSEFORPRINTER = 8192
```

Field Value

[uint](#)

## BIF\_BROWSEINCLUDEFILES

```
public const uint BIF_BROWSEINCLUDEFILES = 16384
```

Field Value

[uint](#)

## BIF\_BROWSEINCLUDEURLS

```
public const uint BIF_BROWSEINCLUDEURLS = 128
```

Field Value

[uint](#)

## BIF\_DONTGOBELOWDOMAIN

```
public const uint BIF_DONTGOBELOWDOMAIN = 2
```

Field Value

[uint](#)

## BIF\_EDITBOX

```
public const uint BIF_EDITBOX = 16
```

Field Value

[uint](#)

## BIF\_NEWDIALOGSTYLE

```
public const uint BIF_NEWDIALOGSTYLE = 64
```

Field Value

[uint](#)

## BIF\_RETURNFSANCESTORS

```
public const uint BIF_RETURNFSANCESTORS = 8
```

Field Value

[uint](#)

## BIF\_RETURNONLYFSDIRS

```
public const uint BIF_RETURNONLYFSDIRS = 1
```

Field Value

[uint](#)

## BIF\_SHAREABLE

```
public const uint BIF_SHAREABLE = 32768
```

Field Value

[uint](#)

## BIF\_STATUSTEXT

```
public const uint BIF_STATUSTEXT = 4
```

Field Value

[uint](#)

## BIF\_USENEWUI

```
public const uint BIF_USENEWUI = 80
```

Field Value

[uint](#)

## BIF\_VALIDATE

```
public const uint BIF_VALIDATE = 32
```

Field Value

[uint](#)

## FILE\_ATTRIBUTE\_DIRECTORY

```
public const uint FILE_ATTRIBUTE_DIRECTORY = 16
```

Field Value

[uint](#)

## FILE\_ATTRIBUTE\_NORMAL

```
public const uint FILE_ATTRIBUTE_NORMAL = 128
```

Field Value

[uint](#)

## MAX\_PATH

```
public const int MAX_PATH = 256
```

Field Value

[int](#)

## SHGFI\_ADDOVERLAYS

```
public const uint SHGFI_ADDOVERLAYS = 32
```

Field Value

[uint](#)

## SHGFI\_ATTRIBUTES

```
public const uint SHGFI_ATTRIBUTES = 2048
```

Field Value

[uint](#)

## SHGFI\_ATTR\_SPECIFIED

```
public const uint SHGFI_ATTR_SPECIFIED = 131072
```

Field Value

[uint](#)

## SHGFI\_DISPLAYNAME

```
public const uint SHGFI_DISPLAYNAME = 512
```

Field Value

[uint](#)

## SHGFI\_EXETYPE

```
public const uint SHGFI_EXETYPE = 8192
```

Field Value

[uint](#)

## SHGFI\_ICON

```
public const uint SHGFI_ICON = 256
```

Field Value

[uint](#)

## SHGFI\_ICONLOCATION

```
public const uint SHGFI_ICONLOCATION = 4096
```

Field Value

[uint](#)

## SHGFI\_LARGEICON

```
public const uint SHGFI_LARGEICON = 0
```

Field Value

[uint](#)

## SHGFI\_LINKOVERLAY

```
public const uint SHGFI_LINKOVERLAY = 32768
```

Field Value

[uint](#)

## SHGFI\_OPENICON

```
public const uint SHGFI_OPENICON = 2
```

Field Value

[uint](#)

## SHGFI\_OVERLAYINDEX

```
public const uint SHGFI_OVERLAYINDEX = 64
```

Field Value

[uint](#)

## SHGFI\_PIDL

```
public const uint SHGFI_PIDL = 8
```

Field Value

[uint](#)

## SHGFI\_SELECTED

```
public const uint SHGFI_SELECTED = 65536
```

Field Value

[uint](#)

## SHGFI\_SHELLICONSIZE

```
public const uint SHGFI_SHELLICONSIZE = 4
```

Field Value

[uint](#)

## SHGFI\_SMALLICON

```
public const uint SHGFI_SMALLICON = 1
```

Field Value

[uint](#)

## SHGFI\_SYSICONINDEX

```
public const uint SHGFI_SYSICONINDEX = 16384
```

Field Value

[uint](#)

## SHGFI\_TYPENAME

```
public const uint SHGFI_TYPENAME = 1024
```

Field Value

[uint](#)

## SHGFI\_USEFILEATTRIBUTES

```
public const uint SHGFI_USEFILEATTRIBUTES = 16
```

Field Value

[uint](#)

## Methods

SHGetFileInfo(string, uint, ref SHFILEINFO, uint, uint)

```
public static extern nint SHGetFileInfo(string pszPath, uint dwFileAttributes, ref  
Shell32.SHFILEINFO psfi, uint cbFileInfo, uint uFlags)
```

## Parameters

pszPath [string](#)

dwFileAttributes [uint](#)

psfi [Shell32.SHFILEINFO](#)

cbFileInfo [uint](#)

uFlags [uint](#)

## Returns

[nint](#)

# Struct Shell32.BROWSEINFO

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

```
public struct Shell32.BROWSEINFO
```

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Fields

### hwndOwner

```
public nint hwndOwner
```

#### Field Value

[nint](#)

### iImage

```
public nint iImage
```

#### Field Value

[nint](#)

### lParam

```
public int lParam
```

Field Value

[int](#)

lpfn

```
public nint lpfn
```

Field Value

[nint](#)

lpszTitle

```
public string lpszTitle
```

Field Value

[string](#)

pidlRoot

```
public nint pidlRoot
```

Field Value

[nint](#)

pszDisplayName

```
public nint pszDisplayName
```

Field Value

[nint](#) ↗

## ulFlags

public uint ulFlags

Field Value

[uint](#) ↗

# Struct Shell32.ITEMIDLIST

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

```
public struct Shell32.ITEMIDLIST
```

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Fields

### mkid

```
public Shell32.SHITEMID mkid
```

#### Field Value

[Shell32.SHITEMID](#)

# Struct Shell32.SHFILEINFO

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

```
public struct Shell32.SHFILEINFO
```

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Fields

### NAMESIZE

```
public const int NAMESIZE = 80
```

#### Field Value

[int](#)

### dwAttributes

```
public uint dwAttributes
```

#### Field Value

[uint](#)

### hIcon

```
public nint hIcon
```

Field Value

[nint](#) ↗

iIcon

`public int iIcon`

Field Value

[int](#) ↗

szDisplayName

`public string szDisplayName`

Field Value

[string](#) ↗

szTypeName

`public string szTypeName`

Field Value

[string](#) ↗

# Struct Shell32.SHITEMID

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

```
public struct Shell32.SHITEMID
```

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Fields

### abID

```
public byte[] abID
```

#### Field Value

[byte](#)[]

### cb

```
public ushort cb
```

#### Field Value

[ushort](#)

# Class User32

Namespace: [AetherUtils.Core.WinForms](#)

Assembly: AetherUtils.Core.dll

Wraps necessary functions imported from User32.dll. Code courtesy of MSDN Cold Rooster Consulting example.

```
public class User32
```

## Inheritance

[object](#) ← User32

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Extension Methods

[TypeExtensions.CanSerializeJson<T>\(T\)](#) , [TypeExtensions.CanSerializeXml<T>\(T\)](#) ,  
[TypeExtensions.SerializeJson<T>\(T\)](#) , [TypeExtensions.SerializeXml<T>\(T\)](#).

# Methods

## DestroyIcon(nint)

Provides access to function required to delete handle. This method is used internally and is not required to be called separately.

```
public static extern int DestroyIcon(nint hIcon)
```

## Parameters

**hIcon** [nint](#)

Pointer to icon handle.

## Returns

[int ↗](#)

N/A