

# LinksPlatform's Platform.Disposables Class Library

./Platform.Disposables/DisposableBase.cs

```
1  using System;
2  using System.Collections.Concurrent;
3  using System.Threading;
4  using Platform.Exceptions;
5
6  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
7
8  namespace Platform.Disposables
9  {
10     /// <summary>
11     /// <para>Provides a base implementation for IDisposable interface with the basic logic
12     ///     necessary to increase the likelihood of correct unmanaged resources release.</para>
13     /// <para>Предоставляет базовую реализацию для интерфейса IDisposable с основной логикой
14     ///     необходимой для повышения вероятности корректного высвобождения неуправляемых
15     ///     ресурсов.</para>
16     /// </summary>
17     public abstract class DisposableBase : IDisposable
18     {
19         private static readonly AppDomain _currentDomain = AppDomain.CurrentDomain;
20         private static readonly ConcurrentStack<WeakReference<DisposableBase>>
21             _disposablesWeekReferencesStack = new
22             ConcurrentStack<WeakReference<DisposableBase>>();
23
24         private volatile int _disposed;
25
26         public bool IsDisposed => _disposed > 0;
27
28         protected virtual string ObjectName => GetType().Name;
29
30         protected virtual bool AllowMultipleDisposeAttempts => false;
31
32         protected virtual bool AllowMultipleDisposeCalls => false;
33
34         static DisposableBase() => _currentDomain.ProcessExit += OnProcessExit;
35
36         protected DisposableBase()
37         {
38             _disposed = 0;
39             _disposablesWeekReferencesStack.Push(new WeakReference<DisposableBase>(this, false));
40         }
41
42         ~DisposableBase() => Destruct();
43
44         protected abstract void Dispose(bool manual, bool wasDisposed);
45
46         public void Dispose()
47         {
48             GC.SuppressFinalize(this);
49             Dispose(true);
50         }
51
52         public void Destruct()
53         {
54             try
55             {
56                 if (!IsDisposed)
57                 {
58                     Dispose(false);
59                 }
60             }
61             catch (Exception exception)
62             {
63                 exception.Ignore();
64             }
65         }
66
67         private void Dispose(bool manual)
68         {
69             var originalDisposedValue = Interlocked.CompareExchange(ref _disposed, 1, 0);
70             var wasDisposed = originalDisposedValue > 0;
71             if (wasDisposed && !AllowMultipleDisposeCalls && manual)
72             {
73                 Ensure.Always.NotDisposed(this, ObjectName, "Multiple dispose calls are now
74                     allowed. Override AllowMultipleDisposeCalls property to modify behaviour.");
75             }
76             if (AllowMultipleDisposeAttempts || !wasDisposed)
77             {
78                 Dispose(manual, wasDisposed);
79             }
80         }
81     }
82 }
```

```

73     }
74 }
75
76 private static void OnProcessExit(object sender, EventArgs e)
77 {
78     while (_disposablesWeekReferencesStack.TryPop(out WeakReference<DisposableBase>
79         ↪ weakReference))
80     {
81         if (weakReference.TryGetTarget(out DisposableBase disposable))
82         {
83             GC.SuppressFinalize(disposable);
84             disposable.Destruct();
85         }
86     }
87     UnsubscribeFromProcessExitedEventIfPossible();
88 }
89
90 private static void UnsubscribeFromProcessExitedEventIfPossible()
91 {
92     try
93     {
94         if (_currentDomain != null)
95         {
96             _currentDomain.ProcessExit -= OnProcessExit;
97         }
98         else
99         {
100             AppDomain.CurrentDomain.ProcessExit -= OnProcessExit;
101         }
102     }
103     catch (Exception exception)
104     {
105         exception.Ignore();
106     }
107 }
108 }

```

./Platform.Disposables/Disposable.cs

```

1 using System;
2
3 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
4
5 namespace Platform.Disposables
6 {
7     /// <summary>
8     /// <para>Represents disposable object that contains OnDispose event which is raised when
9     ↪ the object itself is disposed.</para>
10    /// <para>Представляет высвобождаемый объект, который содержит событие OnDispose, которое
11    ↪ возникает при высвобождении самого объекта.</para>
12    /// </summary>
13    public class Disposable : DisposableBase
14    {
15        private static readonly Disposal _emptyDelegate = (manual, wasDisposed) => { };
16
17        public event Disposal OnDispose;
18
19        public Disposable(Action disposed)
20        {
21            OnDispose = (manual, wasDisposed) =>
22            {
23                if (!wasDisposed)
24                {
25                    disposed();
26                }
27            };
28        }
29
30        public Disposable(Disposal disposed) => OnDispose = disposed;
31
32        public Disposable() => OnDispose = _emptyDelegate;
33
34        public static implicit operator Disposable(Action action) => new Disposable(action);
35
36        public static implicit operator Disposable(Disposal disposal) => new
37        ↪ Disposable(disposal);
38
39        protected override void Dispose(bool manual, bool wasDisposed) => OnDispose(manual,
40        ↪ wasDisposed);

```

```

37
38     protected void RaiseOnDisposeEvent(bool manual, bool wasDisposed) => OnDispose(manual,
    ↪     wasDisposed);
39
40     public static bool TryDisposeAndResetToDefault<T>(ref T @object)
41     {
42         var result = @object.TryDispose();
43         if (result)
44         {
45             @object = default;
46         }
47         return result;
48     }
49 }
50 }

```

./Platform.Disposables/Disposable[T].cs

```

1  using System;
2
3  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
4
5  namespace Platform.Disposables
6  {
7      /// <summary>
8      /// <para>Represents disposable container that disposes contained object when the container
    ↪     itself is disposed.</para>
9      /// <para>Представляет высвобождаемый контейнер, который высвобождает содержащийся в нём
    ↪     объект при высвобождении самого контейнера.</para>
10     /// </summary>
11     public class Disposable<T> : Disposable
12     {
13         public T Object { get; }
14
15         public Disposable(T @object, Action<T> disposed)
16         {
17             Object = @object;
18             OnDispose += (manual, wasDisposed) =>
19             {
20                 if (!wasDisposed)
21                 {
22                     disposed(Object);
23                 }
24             };
25         }
26
27         public Disposable(T @object, Action disposed) : base(disposed) => Object = @object;
28         public Disposable(T @object, Disposal disposed) : base(disposed) => Object = @object;
29         public Disposable(T @object) => Object = @object;
30
31         public static implicit operator Disposable<T>(ValueTuple<T, Action<T>> tuple) => new
    ↪     Disposable<T>(tuple.Item1, tuple.Item2);
32
33         public static implicit operator Disposable<T>(ValueTuple<T, Action> tuple) => new
    ↪     Disposable<T>(tuple.Item1, tuple.Item2);
34
35         public static implicit operator Disposable<T>(ValueTuple<T, Disposal> tuple) => new
    ↪     Disposable<T>(tuple.Item1, tuple.Item2);
36
37         public static implicit operator Disposable<T>(T @object) => new Disposable<T>(@object);
38         public static implicit operator T(Disposable<T> disposable) => disposable.Object;
39
40         protected override void Dispose(bool manual, bool wasDisposed)
41         {
42             base.Dispose(manual, wasDisposed);
43             Object.TryDispose();
44         }
45     }
46 }
47
48 }
49 }

```

./Platform.Disposables/Disposable[TPrimary, Tauxiliary].cs

```

1  using System;
2
3  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
4
5  namespace Platform.Disposables
6  {

```

```

7  /// <summary>
8  /// <para>Represents disposable container that disposes two contained objects when the
   ↪ container itself is disposed.</para>
9  /// <para>Представляет высвобождаемый контейнер, который высвобождает два содержащихся в
   ↪ нём объектов при высвобождении самого контейнера.</para>
10 /// </summary>
11 public class Disposable<TPPrimary, TAuxiliary> : Disposable<TPPrimary>
12 {
13     public TAuxiliary AuxiliaryObject { get; }
14
15     public Disposable(TPrimary @object, TAuxiliary auxiliaryObject, Action<TPPrimary,
   ↪ TAuxiliary> action)
16         : base(@object)
17     {
18         AuxiliaryObject = auxiliaryObject;
19         OnDispose += (manual, wasDisposed) =>
20         {
21             if (!wasDisposed)
22             {
23                 action(Object, AuxiliaryObject);
24             }
25         };
26     }
27
28     public Disposable(TPrimary @object, TAuxiliary auxiliaryObject, Action action) :
   ↪ base(@object, action) => AuxiliaryObject = auxiliaryObject;
29
30     public Disposable(TPrimary @object, TAuxiliary auxiliaryObject, Disposal disposal) :
   ↪ base(@object, disposal) => AuxiliaryObject = auxiliaryObject;
31
32     public Disposable(TPrimary @object, TAuxiliary auxiliaryObject) : base(@object) =>
   ↪ AuxiliaryObject = auxiliaryObject;
33
34     public Disposable(TPrimary @object) : base(@object) { }
35
36     public static implicit operator Disposable<TPPrimary, TAuxiliary>(ValueTuple<TPPrimary,
   ↪ TAuxiliary, Action<TPPrimary, TAuxiliary>> tuple) => new Disposable<TPPrimary,
   ↪ TAuxiliary>(tuple.Item1, tuple.Item2, tuple.Item3);
37
38     public static implicit operator Disposable<TPPrimary, TAuxiliary>(ValueTuple<TPPrimary,
   ↪ TAuxiliary, Action> tuple) => new Disposable<TPPrimary, TAuxiliary>(tuple.Item1,
   ↪ tuple.Item2, tuple.Item3);
39
40     public static implicit operator Disposable<TPPrimary, TAuxiliary>(ValueTuple<TPPrimary,
   ↪ TAuxiliary, Disposal> tuple) => new Disposable<TPPrimary, TAuxiliary>(tuple.Item1,
   ↪ tuple.Item2, tuple.Item3);
41
42     public static implicit operator Disposable<TPPrimary, TAuxiliary>(ValueTuple<TPPrimary,
   ↪ TAuxiliary> tuple) => new Disposable<TPPrimary, TAuxiliary>(tuple.Item1, tuple.Item2);
43
44     public static implicit operator TPrimary(Disposable<TPPrimary, TAuxiliary>
   ↪ disposableContainer) => disposableContainer.Object;
45
46     public static implicit operator TAuxiliary(Disposable<TPPrimary, TAuxiliary>
   ↪ disposableContainer) => disposableContainer.AuxiliaryObject;
47
48     protected override void Dispose(bool manual, bool wasDisposed)
49     {
50         RaiseOnDisposeEvent(manual, wasDisposed);
51         AuxiliaryObject.TryDispose();
52         Object.TryDispose();
53     }
54 }
55 }

```

./Platform.Disposables/Disposal.cs

```

1  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
2
3  namespace Platform.Disposables
4  {
5      public delegate void Disposal(bool manual, bool wasDisposed);
6  }

```

./Platform.Disposables/EnsureExtensions.cs

```

1  using System;
2  using System.Diagnostics;
3  using System.Runtime.CompilerServices;
4  using Platform.Exceptions;

```

```

5 using Platform.Exceptions.ExtensionRoots;
6
7 #pragma warning disable IDE0060 // Remove unused parameter
8 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
9
10 namespace Platform.Disposables
11 {
12     public static class EnsureExtensions
13     {
14         #region Always
15
16         [MethodImpl(MethodImplOptions.AggressiveInlining)]
17         public static void NotDisposed(this EnsureAlwaysExtensionRoot root, IDisposable
            ↳ disposable) => NotDisposed(root, disposable, null, null);
18
19         [MethodImpl(MethodImplOptions.AggressiveInlining)]
20         public static void NotDisposed(this EnsureAlwaysExtensionRoot root, IDisposable
            ↳ disposable, string objectName) => NotDisposed(root, disposable, objectName, null);
21
22         [MethodImpl(MethodImplOptions.AggressiveInlining)]
23         public static void NotDisposed(this EnsureAlwaysExtensionRoot root, IDisposable
            ↳ disposable, string objectName, string message)
24         {
25             if (disposable.IsDisposed)
26             {
27                 throw new ObjectDisposedException(objectName, message);
28             }
29         }
30
31         #endregion
32
33         #region OnDebug
34
35         [Conditional("DEBUG")]
36         public static void NotDisposed(this EnsureOnDebugExtensionRoot root, IDisposable
            ↳ disposable) => Ensure.Always.NotDisposed(disposable, null, null);
37
38         [Conditional("DEBUG")]
39         public static void NotDisposed(this EnsureOnDebugExtensionRoot root, IDisposable
            ↳ disposable, string objectName) => Ensure.Always.NotDisposed(disposable, objectName,
            ↳ null);
40
41         [Conditional("DEBUG")]
42         public static void NotDisposed(this EnsureOnDebugExtensionRoot root, IDisposable
            ↳ disposable, string objectName, string message) =>
            ↳ Ensure.Always.NotDisposed(disposable, objectName, message);
43
44         #endregion
45     }
46 }

```

./Platform.Disposables/GenericObjectExtensions.cs

```

1 using System;
2 using Platform.Exceptions;
3
4 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
5
6 namespace Platform.Disposables
7 {
8     /// <summary>
9     /// <para>Provides a set of static methods that help dispose an object.</para>
10    /// <para>Предоставляет набор статических методов которые помогают высвободить объект.</para>
11    /// </summary>
12    static public class GenericObjectExtensions
13    {
14        public static bool TryDispose<T>(this T @object)
15        {
16            try
17            {
18                if (@object is DisposableBase disposableBase)
19                {
20                    disposableBase.DisposeIfNotDisposed();
21                }
22                else if (@object is System.IDisposable disposable)
23                {
24                    disposable.Dispose();
25                }
26                return true;
27            }
28        }
29    }
30 }

```

```

28         catch (Exception exception)
29         {
30             exception.Ignore();
31         }
32         return false;
33     }
34
35     public static void DisposeIfPossible<T>(this T @object) => TryDispose(@object);
36 }
37 }

```

#### ./Platform.Disposables/IDisposable.cs

```

1  namespace Platform.Disposables
2  {
3      /// <summary>
4      /// <para>Представляет расширенный интерфейс IDisposable.</para>
5      /// <para>Represents an extended IDisposable interface.</para>
6      /// </summary>
7      public interface IDisposable : System.IDisposable
8      {
9          /// <summary>
10         /// <para>Gets a value indicating whether the object was disposed.</para>
11         /// <para>Возвращает значение определяющее был ли высвобожден объект.</para>
12         /// </summary>
13         bool IsDisposed { get; }
14
15         /// <summary>
16         /// <para>Performs application-defined tasks associated with freeing, releasing, or
17         ↪ resetting unmanaged resources without throwing any exceptions.</para>
18         /// <para>Выполняет определенные пользователем задачи, связанные с освобождением,
19         ↪ высвобождением или сбросом неуправляемых ресурсов без выбрасывания исключений.</para>
20         /// </summary>
21         /// <remarks>
22         /// <para>Should be called only from classes destructors, or in case exceptions should
23         ↪ be not thrown.</para>
24         /// <para>Должен вызываться только из деструкторов классов, или в случае, если
25         ↪ исключения выбрасывать нельзя.</para>
26         /// </remarks>
27         void Destruct();
28     }
29 }

```

#### ./Platform.Disposables/IDisposableExtensions.cs

```

1  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
2
3  namespace Platform.Disposables
4  {
5      /// <summary>
6      /// <para>Provides a set of extension methods for <see cref="IDisposable"/> objects.</para>
7      /// <para>Предоставляет набор методов расширения для объектов <see
8      ↪ cref="IDisposable"/>.</para>
9      /// </summary>
10     public static class IDisposableExtensions
11     {
12         /// <summary>
13         /// <para>Attempts to dispose the specified object.</para>
14         /// <para>Выполняет попытку высвободить указанный объект.</para>
15         /// </summary>
16         /// <param name="disposable"><para>The object implementing the <see cref="IDisposable"/>
17         ↪ interface.</para><para>Объект, реализующий интерфейс <see
18         ↪ cref="IDisposable"/></para></param>
19         public static void DisposeIfNotDisposed(this IDisposable disposable)
20         {
21             if (!disposable.IsDisposed)
22             {
23                 disposable.Dispose();
24             }
25         }
26     }
27 }

```

#### ./Platform.Disposables.Tests/DisposableTests.cs

```

1  using System;
2  using System.Collections.Generic;
3  using System.Diagnostics;
4  using System.IO;
5  using System.Threading;

```

```

6  using Xunit;
7
8  namespace Platform.Disposables.Tests
9  {
10     public static class DisposableTests
11     {
12         [Fact]
13         public static void DisposalOrderTest()
14         {
15             var path = GetDisposalObjectTestProjectFilePath();
16             var logPath = Path.GetTempFileName();
17             using (var process = Process.Start("dotnet", $"run -p \"{path}\" \"{logPath}\"
18                 ↪ false"))
19             {
20                 process.WaitForExit();
21             }
22             var result = File.ReadAllText(logPath);
23             Assert.Equal("21", result);
24             File.Delete(logPath);
25         }
26
27         [Fact]
28         public static void DisposalAtProcessKillTest()
29         {
30             var path = GetDisposalObjectTestProjectFilePath();
31             var logPath = Path.GetTempFileName();
32             using (var process = Process.Start("dotnet", $"run -p \"{path}\" \"{logPath}\"
33                 ↪ true"))
34             {
35                 Thread.Sleep(1000);
36                 process.Kill();
37             }
38             var result = File.ReadAllText(logPath);
39             Assert.Equal("", result); // Currently, process termination will not release
40                                     ↪ resources
41             File.Delete(logPath);
42         }
43
44         private static string GetDisposalObjectTestProjectFilePath()
45         {
46             const string currentProjectName = nameof(Platform) + "." + nameof(Disposables) + "."
47                 ↪ + nameof(Tests);
48             const string disposalOrderTestProjectName = currentProjectName + "." +
49                 ↪ nameof(DisposalOrderTest);
50             var currentDirectory = Environment.CurrentDirectory;
51             var pathParts = currentDirectory.Split(Path.DirectorySeparatorChar);
52             var newPathParts = new List<string>();
53             for (var i = 0; i < pathParts.Length; i++)
54             {
55                 if (string.Equals(pathParts[i], currentProjectName))
56                 {
57                     newPathParts.Add(disposalOrderTestProjectName);
58                     break;
59                 }
60                 else
61                 {
62                     newPathParts.Add(pathParts[i]);
63                 }
64             }
65             pathParts = newPathParts.ToArray();
66             var path = Path.Combine(Path.Combine(pathParts),
67                 ↪ $"{disposalOrderTestProjectName}.csproj");
68             if (!Path.IsPathRooted(path))
69             {
70                 path = $"{Path.DirectorySeparatorChar}{path}";
71             }
72             return path;
73         }
74     }
75 }

```

./Platform.Disposables.Tests/SystemTests.cs

```

1  using Xunit;
2
3  namespace Platform.Disposables.Tests
4  {
5      /// <summary>

```

```
6      /// <para>Contains tests for features of .NET Framework itself, that are required by current
    ↪ implementations.</para>
7      /// <para>Содержит тесты для функций самой .NET Framework, которые требуются для текущих
    ↪ реализаций.</para>
8      /// </summary>
9      public static class SystemTests
10     {
11         [Fact]
12         public static void UsingSupportsNullTest()
13         {
14             using (var disposable = null as IDisposable)
15             {
16                 Assert.True(disposable == null);
17             }
18         }
19     }
20 }
```



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