

LinksPlatform's Platform.Converters Class Library

1.1 ./csharp/Platform.Converters/CachingConverterDecorator.cs

```
1 using System.Collections.Generic;
2 using System.Runtime.CompilerServices;
3 using Platform.Collections;
4
5 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
6
7 namespace Platform.Converters
8 {
9     public class CachingConverterDecorator<TSource, TTarget> : IConverter<TSource, TTarget>
10     {
11         private readonly IConverter<TSource, TTarget> _baseConverter;
12         private readonly IDictionary<TSource, TTarget> _cache;
13
14         [MethodImpl(MethodImplOptions.AggressiveInlining)]
15         public CachingConverterDecorator(IConverter<TSource, TTarget> baseConverter,
16             ↪ IDictionary<TSource, TTarget> cache) => (_baseConverter, _cache) = (baseConverter,
17             ↪ cache);
18
19         [MethodImpl(MethodImplOptions.AggressiveInlining)]
20         public CachingConverterDecorator(IConverter<TSource, TTarget> baseConverter) :
21             ↪ this(baseConverter, new Dictionary<TSource, TTarget>()) { }
22
23         [MethodImpl(MethodImplOptions.AggressiveInlining)]
24         public TTarget Convert(TSource source) => _cache.GetOrAdd(source,
25             ↪ _baseConverter.Convert);
26     }
27 }
```

1.2 ./csharp/Platform.Converters/CheckedConverter.cs

```
1 using System;
2 using System.Runtime.CompilerServices;
3 using Platform.Reflection;
4
5 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
6
7 namespace Platform.Converters
8 {
9     public abstract class CheckedConverter<TSource, TTarget> : ConverterBase<TSource, TTarget>
10     {
11         public static CheckedConverter<TSource, TTarget> Default
12         {
13             [MethodImpl(MethodImplOptions.AggressiveInlining)]
14             get;
15         } = CompileCheckedConverter();
16
17         [MethodImpl(MethodImplOptions.AggressiveInlining)]
18         private static CheckedConverter<TSource, TTarget> CompileCheckedConverter()
19         {
20             var type = CreateTypeInheritedFrom<CheckedConverter<TSource, TTarget>>();
21             EmitConvertMethod(type, il => il.CheckedConvert<TSource, TTarget>());
22             return (CheckedConverter<TSource,
23                 ↪ TTarget>)Activator.CreateInstance(type.CreateTypeInfo());
24         }
25     }
26 }
```

1.3 ./csharp/Platform.Converters/ConverterBase.cs

```
1 using System;
2 using System.Reflection;
3 using System.Reflection.Emit;
4 using System.Runtime.CompilerServices;
5 using Platform.Reflection;
6
7 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
8
9 namespace Platform.Converters
10 {
11     /// <summary>
12     /// <para>Represents a base implementation for IConverter interface with the basic logic
13     ↪ necessary for value converter from the <typeparamref name="TSource"/> type to the
14     ↪ <typeparamref name="TTarget"/> type.</para>
15     /// <para>Представляет базовую реализацию для интерфейса IConverter с основной логикой
16     ↪ необходимой для конвертера значений из типа <typeparamref name="TSource"/> в тип
17     ↪ <typeparamref name="TTarget"/>.</para>
18     /// </summary>
19     /// <typeparam name="TSource"><para>Source type of conversion.</para><para>Исходный тип
20     ↪ конверсии.</para></typeparam>
```

```

16  /// <typeparam name="TTarget"><para>Target type of conversion.</para><para>Целевой тип
    ↳ конверсии.</para></typeparam>
17  public abstract class ConverterBase<TSource, TTarget> : IConverter<TSource, TTarget>
18  {
19      /// <summary>
20      /// <para>Converts the value of the <typeparamref name="TSource"/> type to the value of
    ↳ the <typeparamref name="TTarget"/> type.</para>
21      /// <para>Конвертирует значение типа <typeparamref name="TSource"/> в значение типа
    ↳ <typeparamref name="TTarget"/>.</para>
22      /// </summary>
23      /// <param name="source"><para>The <typeparamref name="TSource"/> type
    ↳ value.</para><para>Значение типа <typeparamref name="TSource"/>.</para></param>
24      /// <returns><para>The converted value of the <typeparamref name="TTarget"/>
    ↳ type.</para><para>Значение конвертированное в тип <typeparamref
    ↳ name="TTarget"/>.</para></returns>
25      [MethodImpl(MethodImplOptions.AggressiveInlining)]
26      public abstract TTarget Convert(TSource source);
27
28      /// <summary>
29      /// <para>Generates a sequence of instructions using <see cref="ILGenerator"/> that
    ↳ converts a value of type <see cref="System.Object"/> to a value of type
    ↳ <typeparamref name="TTarget"/>.</para>
30      /// <para>Генерирует последовательность инструкций при помощи <see cref="ILGenerator"/>
    ↳ выполняющую преобразование значения типа <see cref="System.Object"/> к значению типа
    ↳ <typeparamref name="TTarget"/>.</para>
31      /// </summary>
32      /// <param name="source"><para>The source type value (TSource).</para><para>Значение
    ↳ исходного типа (TSource).</para></param>
33      [MethodImpl(MethodImplOptions.AggressiveInlining)]
34      protected static void ConvertFromObject(ILGenerator il)
35      {
36          var returnDefault = il.DefineLabel();
37          il.Emit(OpCodes.Brfalse_S, returnDefault);
38          il.LoadArgument(1);
39          il.Emit(OpCodes.Castclass, typeof(IConvertible));
40          il.Emit(OpCodes.Ldnull);
41          il.Emit(OpCodes.Callvirt, GetMethodForConversionToTargetType());
42          il.Return();
43          il.MarkLabel(returnDefault);
44          LoadDefault(il, typeof(TTarget));
45      }
46
47      /// <summary>
48      /// <para>Converts the value of the source type (TSource) to the value of the target
    ↳ type.</para>
49      /// <para>Конвертирует значение исходного типа (TSource) в значение целевого типа.</para>
50      /// </summary>
51      /// <param name="source"><para>The source type value (TSource).</para><para>Значение
    ↳ исходного типа (TSource).</para></param>
52      /// <returns><para>The value is converted to the target type
    ↳ (TTarget).</para><para>Значение ковертированное в целевой тип
    ↳ (TTarget).</para></returns>
53      [MethodImpl(MethodImplOptions.AggressiveInlining)]
54      protected static string GetNewName() => Guid.NewGuid().ToString("N");
55
56      /// <summary>
57      /// <para>Converts the value of the source type (TSource) to the value of the target
    ↳ type.</para>
58      /// <para>Конвертирует значение исходного типа (TSource) в значение целевого типа.</para>
59      /// </summary>
60      /// <param name="source"><para>The source type value (TSource).</para><para>Значение
    ↳ исходного типа (TSource).</para></param>
61      /// <returns><para>The value is converted to the target type
    ↳ (TTarget).</para><para>Значение ковертированное в целевой тип
    ↳ (TTarget).</para></returns>
62      [MethodImpl(MethodImplOptions.AggressiveInlining)]
63      protected static TypeBuilder CreateTypeInheritedFrom<TBaseClass>()
64      {
65          var assemblyName = new AssemblyName(GetNewName());
66          var assembly = AssemblyBuilder.DefineDynamicAssembly(assemblyName,
    ↳ AssemblyBuilderAccess.Run);
67          var module = assembly.DefineDynamicModule(GetNewName());
68          var type = module.DefineType(GetNewName(), TypeAttributes.Public |
    ↳ TypeAttributes.Class | TypeAttributes.Sealed, typeof(TBaseClass));
69          return type;
70      }

```

```

71
72 /// <summary>
73 /// <para>Converts the value of the source type (TSource) to the value of the target
  ↳ type.</para>
74 /// <para>Конвертирует значение исходного типа (TSource) в значение целевого типа.</para>
75 /// </summary>
76 /// <param name="source"><para>The source type value (TSource).</para><para>Значение
  ↳ исходного типа (TSource).</para></param>
77 /// <returns><para>The value is converted to the target type
  ↳ (TTarget).</para><para>Значение ковертированное в целевой тип
  ↳ (TTarget).</para></returns>
78 [MethodImpl(MethodImplOptions.AggressiveInlining)]
79 protected static void EmitConvertMethod(TypeBuilder typeBuilder, Action<ILGenerator>
  ↳ emitConversion)
80 {
81     typeBuilder.EmitFinalVirtualMethod<Converter<TSource,
  ↳ TTarget>>(nameof(IConverter<TSource, TTarget>.Convert), il =>
82     {
83         il.LoadArgument(1);
84         if (typeof(TSource) == typeof(object) && typeof(TTarget) != typeof(object))
85         {
86             ConvertFromObject(il);
87         }
88         else if (typeof(TSource) != typeof(object) && typeof(TTarget) == typeof(object))
89         {
90             il.Box(typeof(TSource));
91         }
92         else
93         {
94             emitConversion(il);
95         }
96         il.Return();
97     });
98 }
99
100 /// <summary>
101 /// <para>Converts the value of the source type (TSource) to the value of the target
  ↳ type.</para>
102 /// <para>Конвертирует значение исходного типа (TSource) в значение целевого типа.</para>
103 /// </summary>
104 /// <param name="source"><para>The source type value (TSource).</para><para>Значение
  ↳ исходного типа (TSource).</para></param>
105 /// <returns><para>The value is converted to the target type
  ↳ (TTarget).</para><para>Значение ковертированное в целевой тип
  ↳ (TTarget).</para></returns>
106 [MethodImpl(MethodImplOptions.AggressiveInlining)]
107 protected static MethodInfo GetMethodForConversionToTargetType()
108 {
109     var targetType = typeof(TTarget);
110     var convertibleType = typeof(IConvertible);
111     var typeParameters = Types<IFormatProvider>.Array;
112     if (targetType == typeof(bool))
113     {
114         return convertibleType.GetMethod(nameof(IConvertible.ToBoolean), typeParameters);
115     }
116     else if (targetType == typeof(byte))
117     {
118         return convertibleType.GetMethod(nameof(IConvertible.ToByte), typeParameters);
119     }
120     else if (targetType == typeof(char))
121     {
122         return convertibleType.GetMethod(nameof(IConvertible.ToChar), typeParameters);
123     }
124     else if (targetType == typeof(DateTime))
125     {
126         return convertibleType.GetMethod(nameof(IConvertible.ToDateTime),
  ↳ typeParameters);
127     }
128     else if (targetType == typeof(decimal))
129     {
130         return convertibleType.GetMethod(nameof(IConvertible.ToDecimal), typeParameters);
131     }
132     else if (targetType == typeof(double))
133     {
134         return convertibleType.GetMethod(nameof(IConvertible.ToDouble), typeParameters);
135     }
136     else if (targetType == typeof(short))

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```

137     {
138         return convertibleType.GetMethod(nameof(IConvertible.ToInt16), typeParameters);
139     }
140     else if (targetType == typeof(int))
141     {
142         return convertibleType.GetMethod(nameof(IConvertible.ToInt32), typeParameters);
143     }
144     else if (targetType == typeof(long))
145     {
146         return convertibleType.GetMethod(nameof(IConvertible.ToInt64), typeParameters);
147     }
148     else if (targetType == typeof(sbyte))
149     {
150         return convertibleType.GetMethod(nameof(IConvertible.ToSByte), typeParameters);
151     }
152     else if (targetType == typeof(float))
153     {
154         return convertibleType.GetMethod(nameof(IConvertible.ToSingle), typeParameters);
155     }
156     else if (targetType == typeof(string))
157     {
158         return convertibleType.GetMethod(nameof(IConvertible.ToString), typeParameters);
159     }
160     else if (targetType == typeof(ushort))
161     {
162         return convertibleType.GetMethod(nameof(IConvertible.ToUInt16), typeParameters);
163     }
164     else if (targetType == typeof(uint))
165     {
166         return convertibleType.GetMethod(nameof(IConvertible.ToUInt32), typeParameters);
167     }
168     else if (targetType == typeof(ulong))
169     {
170         return convertibleType.GetMethod(nameof(IConvertible.ToUInt64), typeParameters);
171     }
172     else
173     {
174         throw new NotSupportedException();
175     }
176 }
177
178 /// <summary>
179 /// <para>Converts the value of the source type (TSource) to the value of the target
180   ↳ type.</para>
181   /// <para>Конвертирует значение исходного типа (TSource) в значение целевого типа.</para>
182   /// </summary>
183   /// <param name="source"><para>The source type value (TSource).</para><para>Значение
184   ↳ исходного типа (TSource).</para></param>
185   /// <returns><para>The value is converted to the target type
186   ↳ (TTarget).</para><para>Значение ковертированное в целевой тип
187   ↳ (TTarget).</para></returns>
188   [MethodImpl(MethodImplOptions.AggressiveInlining)]
189   protected static void LoadDefault(ILGenerator il, Type targetType)
190   {
191       if (targetType == typeof(string))
192       {
193           il.Emit(OpCodes.Ldsfld, targetType.GetField(nameof(string.Empty),
194               ↳ BindingFlags.Static | BindingFlags.Public));
195       }
196       else if (targetType == typeof(DateTime))
197       {
198           il.Emit(OpCodes.Ldsfld, targetType.GetField(nameof(DateTime.MinValue),
199               ↳ BindingFlags.Static | BindingFlags.Public));
200       }
201       else if (targetType == typeof(decimal))
202       {
203           il.Emit(OpCodes.Ldsfld, targetType.GetField(nameof(decimal.Zero),
204               ↳ BindingFlags.Static | BindingFlags.Public));
205       }
206       else if (targetType == typeof(float))
207       {
208           il.LoadConstant(0.0F);
209       }
210       else if (targetType == typeof(double))
211       {
212           il.LoadConstant(0.0D);
213       }

```

```

207         else if (targetType == typeof(long) || targetType == typeof(ulong))
208         {
209             il.LoadConstant(0L);
210         }
211         else
212         {
213             il.LoadConstant(0);
214         }
215     }
216 }
217 }

```

1.4 ./csharp/Platform.Converters/IConverter[TSource, TTarget].cs

```

1 namespace Platform.Converters
2 {
3     /// <summary>
4     /// <para>Defines a value converter from the <typeparamref name="TSource"/> type to the
5     /// <para><typeparamref name="TTarget"/> type.</para>
6     /// <para>Определяет конвертер значений из типа <typeparamref name="TSource"/> в тип
7     /// <para><typeparamref name="TTarget"/>.</para>
8     /// </summary>
9     /// <typeparam name="TSource"><para>Source type of conversion.</para><para>Исходный тип
10     /// <para>конверсии.</para></typeparam>
11     /// <typeparam name="TTarget"><para>Target type of conversion.</para><para>Целевой тип
12     /// <para>конверсии.</para></typeparam>
13     public interface IConverter<in TSource, out TTarget>
14     {
15         /// <summary>
16         /// <para>Converts the value of the <typeparamref name="TSource"/> type to the value of
17         /// <para>the <typeparamref name="TTarget"/> type.</para>
18         /// <para>Конвертирует значение типа <typeparamref name="TSource"/> в значение типа
19         /// <para><typeparamref name="TTarget"/>.</para>
20         /// </summary>
21         /// <param name="source"><para>The <typeparamref name="TSource"/> type
22         /// <para>value.</para><para>Значение типа <typeparamref name="TSource"/>.</para></param>
23         /// <returns><para>The converted value of the <typeparamref name="TTarget"/>
24         /// <para>type.</para><para>Значение конвертированное в тип <typeparamref
25         /// <para>name="TTarget"/>.</para></returns>
26         TTarget Convert(TSource source);
27     }
28 }

```

1.5 ./csharp/Platform.Converters/IConverter[T].cs

```

1 namespace Platform.Converters
2 {
3     /// <summary>
4     /// <para>Defines a converter between two values of the same <typeparamref name="T"/>
5     /// <para>type.</para>
6     /// <para>Определяет конвертер между двумя значениями одного типа <typeparamref
7     /// <para>name="T"/>.</para>
8     /// </summary>
9     /// <typeparam name="T"><para>The type of value to convert.</para><para>Тип преобразуемого
10     /// <para>значения.</para></typeparam>
11     public interface IConverter<T> : IConverter<T, T>
12     {
13     }
14 }

```

1.6 ./csharp/Platform.Converters/UncheckedConverter.cs

```

1 using System;
2 using System.Runtime.CompilerServices;
3 using Platform.Reflection;
4
5 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
6
7 namespace Platform.Converters
8 {
9     public abstract class UncheckedConverter<TSource, TTarget> : ConverterBase<TSource, TTarget>
10     {
11         public static UncheckedConverter<TSource, TTarget> Default
12         {
13             [MethodImpl(MethodImplOptions.AggressiveInlining)]
14             get;
15             } = CompileUncheckedConverter();
16
17         [MethodImpl(MethodImplOptions.AggressiveInlining)]
18         private static UncheckedConverter<TSource, TTarget> CompileUncheckedConverter()

```

```

19     {
20         var type = CreateTypeInheritedFrom<UncheckedConverter<TSource, TTarget>>>();
21         EmitConvertMethod(type, il => il.UncheckedConvert<TSource, TTarget>());
22         return (UncheckedConverter<TSource,
23             ↳ TTarget>)Activator.CreateInstance(type.CreateTypeInfo());
24     }
25 }

```

1.7 ./csharp/Platform.Converters/UncheckedSignExtendingConverter.cs

```

1 using System;
2 using System.Runtime.CompilerServices;
3 using Platform.Reflection;
4
5 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
6
7 namespace Platform.Converters
8 {
9     public abstract class UncheckedSignExtendingConverter<TSource, TTarget> :
10     ↳ ConverterBase<TSource, TTarget>
11     {
12         public static UncheckedSignExtendingConverter<TSource, TTarget> Default
13         {
14             [MethodImpl(MethodImplOptions.AggressiveInlining)]
15             get;
16         } = CompileUncheckedConverter();
17
18         [MethodImpl(MethodImplOptions.AggressiveInlining)]
19         private static UncheckedSignExtendingConverter<TSource, TTarget>
20         ↳ CompileUncheckedConverter()
21         {
22             var type = CreateTypeInheritedFrom<UncheckedSignExtendingConverter<TSource,
23                 ↳ TTarget>>>();
24             EmitConvertMethod(type, il => il.UncheckedConvert<TSource, TTarget>(extendSign:
25                 ↳ true));
26             return (UncheckedSignExtendingConverter<TSource,
27                 ↳ TTarget>)Activator.CreateInstance(type.CreateTypeInfo());
28         }
29     }
30 }

```

1.8 ./csharp/Platform.Converters.Tests/ConverterTests.cs

```

1 using System;
2 using Xunit;
3
4 namespace Platform.Converters.Tests
5 {
6     public static class ConverterTests
7     {
8         [Fact]
9         public static void SameTypeTest()
10         {
11             var result = UncheckedConverter<ulong, ulong>.Default.Convert(2UL);
12             Assert.Equal(2UL, result);
13             result = CheckedConverter<ulong, ulong>.Default.Convert(2UL);
14             Assert.Equal(2UL, result);
15         }
16
17         [Fact]
18         public static void Int32ToUInt64Test()
19         {
20             var result = UncheckedConverter<int, ulong>.Default.Convert(2);
21             Assert.Equal(2UL, result);
22             result = CheckedConverter<int, ulong>.Default.Convert(2);
23             Assert.Equal(2UL, result);
24         }
25
26         [Fact]
27         public static void SignExtensionTest()
28         {
29             var result = UncheckedSignExtendingConverter<byte, long>.Default.Convert(128);
30             Assert.Equal(-128L, result);
31             result = UncheckedConverter<byte, long>.Default.Convert(128);
32             Assert.Equal(128L, result);
33         }
34
35         [Fact]
36         public static void ObjectTest()
37         {

```

```
38     TestObjectConversion("1");
39     TestObjectConversion(DateTime.UtcNow);
40     TestObjectConversion(1.0F);
41     TestObjectConversion(1.0D);
42     TestObjectConversion(1.0M);
43     TestObjectConversion(1UL);
44     TestObjectConversion(1L);
45     TestObjectConversion(1U);
46     TestObjectConversion(1);
47     TestObjectConversion((char)1);
48     TestObjectConversion((ushort)1);
49     TestObjectConversion((short)1);
50     TestObjectConversion((byte)1);
51     TestObjectConversion((sbyte)1);
52     TestObjectConversion(true);
53 }
54
55 private static void TestObjectConversion<T>(T value) => Assert.Equal(value,
    ↪    UncheckedConverter<object, T>.Default.Convert(value));
56 }
57 }
```

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