

## 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>Converts the value of the source type (TSource) to the value of the target
    ↳ type.</para>
30      /// <para>Конвертирует значение исходного типа (TSource) в значение целевого типа.</para>
31      /// </summary>
32      /// <param name="source"><para>The source type value (TSource).</para><para>Значение
    ↳ исходного типа (TSource).</para></param>
33      /// <returns><para>The value is converted to the target type
    ↳ (TTarget).</para><para>Значение конвертированное в целевой тип
    ↳ (TTarget).</para></returns>
34      [MethodImpl(MethodImplOptions.AggressiveInlining)]
35      protected static void ConvertFromObject(ILGenerator il)
36      {
37          var returnDefault = il.DefineLabel();
38          il.Emit(OpCodes.Brfalse_S, returnDefault);
39          il.LoadArgument(1);
40          il.Emit(OpCodes.Castclass, typeof(IConvertible));
41          il.Emit(OpCodes.Ldnull);
42          il.Emit(OpCodes.Callvirt, GetMethodForConversionToTargetType());
43          il.Return();
44          il.MarkLabel(returnDefault);
45          LoadDefault(il, typeof(TTarget));
46      }
47
48      /// <summary>
49      /// <para>Converts the value of the source type (TSource) to the value of the target
    ↳ type.</para>
50      /// <para>Конвертирует значение исходного типа (TSource) в значение целевого типа.</para>
51      /// </summary>
52      /// <param name="source"><para>The source type value (TSource).</para><para>Значение
    ↳ исходного типа (TSource).</para></param>
53      /// <returns><para>The value is converted to the target type
    ↳ (TTarget).</para><para>Значение конвертированное в целевой тип
    ↳ (TTarget).</para></returns>
54      [MethodImpl(MethodImplOptions.AggressiveInlining)]
55      protected static string GetNewName() => Guid.NewGuid().ToString("N");
56
57      /// <summary>
58      /// <para>Converts the value of the source type (TSource) to the value of the target
    ↳ type.</para>
59      /// <para>Конвертирует значение исходного типа (TSource) в значение целевого типа.</para>
60      /// </summary>
61      /// <param name="source"><para>The source type value (TSource).</para><para>Значение
    ↳ исходного типа (TSource).</para></param>
62      /// <returns><para>The value is converted to the target type
    ↳ (TTarget).</para><para>Значение конвертированное в целевой тип
    ↳ (TTarget).</para></returns>
63      [MethodImpl(MethodImplOptions.AggressiveInlining)]
64      protected static TypeBuilder CreateTypeInheritedFrom<TBaseClass>()
65      {
66          var assemblyName = new AssemblyName(GetNewName());
67          var assembly = AssemblyBuilder.DefineDynamicAssembly(assemblyName,
    ↳ AssemblyBuilderAccess.Run);
68          var module = assembly.DefineDynamicModule(GetNewName());
69          var type = module.DefineType(GetNewName(), TypeAttributes.Public |
    ↳ TypeAttributes.Class | TypeAttributes.Sealed, typeof(TBaseClass));
70          return type;
71      }

```

```

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

```

```

138     {
139         return convertibleType.GetMethod(nameof(IConvertible.ToInt16), typeParameters);
140     }
141     else if (targetType == typeof(int))
142     {
143         return convertibleType.GetMethod(nameof(IConvertible.ToInt32), typeParameters);
144     }
145     else if (targetType == typeof(long))
146     {
147         return convertibleType.GetMethod(nameof(IConvertible.ToInt64), typeParameters);
148     }
149     else if (targetType == typeof(sbyte))
150     {
151         return convertibleType.GetMethod(nameof(IConvertible.ToSByte), typeParameters);
152     }
153     else if (targetType == typeof(float))
154     {
155         return convertibleType.GetMethod(nameof(IConvertible.ToSingle), typeParameters);
156     }
157     else if (targetType == typeof(string))
158     {
159         return convertibleType.GetMethod(nameof(IConvertible.ToString), typeParameters);
160     }
161     else if (targetType == typeof(ushort))
162     {
163         return convertibleType.GetMethod(nameof(IConvertible.ToUInt16), typeParameters);
164     }
165     else if (targetType == typeof(uint))
166     {
167         return convertibleType.GetMethod(nameof(IConvertible.ToUInt32), typeParameters);
168     }
169     else if (targetType == typeof(ulong))
170     {
171         return convertibleType.GetMethod(nameof(IConvertible.ToUInt64), typeParameters);
172     }
173     else
174     {
175         throw new NotSupportedException();
176     }
177 }
178
179 /// <summary>
180 /// <para>Converts the value of the source type (TSource) to the value of the target
181   ↳ type.</para>
182   /// <para>Конвертирует значение исходного типа (TSource) в значение целевого типа.</para>
183   /// </summary>
184   /// <param name="source"><para>The source type value (TSource).</para><para>Значение
185   ↳ исходного типа (TSource).</para></param>
186   /// <returns><para>The value is converted to the target type
187   ↳ (TTarget).</para><para>Значение конвертированное в целевой тип
188   ↳ (TTarget).</para></returns>
189   [MethodImpl(MethodImplOptions.AggressiveInlining)]
190   protected static void LoadDefault(ILGenerator il, Type targetType)
191   {
192       if (targetType == typeof(string))
193       {
194           il.Emit(OpCodes.Ldsfld, targetType.GetField(nameof(string.Empty),
195               ↳ BindingFlags.Static | BindingFlags.Public));
196       }
197       else if (targetType == typeof(DateTime))
198       {
199           il.Emit(OpCodes.Ldsfld, targetType.GetField(nameof(DateTime.MinValue),
200               ↳ BindingFlags.Static | BindingFlags.Public));
201       }
202       else if (targetType == typeof(decimal))
203       {
204           il.Emit(OpCodes.Ldsfld, targetType.GetField(nameof(decimal.Zero),
205               ↳ BindingFlags.Static | BindingFlags.Public));
206       }
207       else if (targetType == typeof(float))
208       {
209           il.LoadConstant(0.0F);
210       }
211       else if (targetType == typeof(double))
212       {
213           il.LoadConstant(0.0D);
214       }
215   }

```

```

208         else if (targetType == typeof(long) || targetType == typeof(ulong))
209         {
210             il.LoadConstant(0L);
211         }
212         else
213         {
214             il.LoadConstant(0);
215         }
216     }
217 }
218 }

```

#### 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 type.</para>
5     /// <para>Определяет конвертер между двумя значениями одного типа.</para>
6     /// </summary>
7     /// <typeparam name="T"><para>Type of value to convert.</para><para>Тип преобразуемого
8     /// <para>значения.</para></typeparam>
9     public interface IConverter<T> : IConverter<T, T>
10     {
11     }
12 }

```

#### 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         }
41     }
42 }

```

```
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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