

LinksPlatform's Platform.Data.Doublets.Xml Class Library

1.1 ./csharp/Platform.Data.Doublets.Xml/DefaultXmlStorage.cs

```
1 using System.Collections.Generic;
2 using Platform.Numbers;
3 using Platform.Data.Numbers.Raw;
4 using Platform.Data.Doublets;
5 using Platform.Data.Doublets.Sequences.Converters;
6 using Platform.Data.Doublets.Sequences.Frequencies.Cache;
7 using Platform.Data.Doublets.Sequences.Frequencies.Counters;
8 using Platform.Data.Doublets.Sequences.Indexes;
9 using Platform.Data.Doublets.Unicode;
10
11 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
12
13 namespace Platform.Data.Doublets.Xml
14 {
15     /// <summary>
16     /// <para>
17     /// Represents the default xml storage.
18     /// </para>
19     /// <para></para>
20     /// </summary>
21     /// <seealso cref="IXmlStorage{TLink}" />
22     public class DefaultXmlStorage<TLink> : IXmlStorage<TLink>
23     {
24         private static readonly TLink _zero = default;
25         private static readonly TLink _one = Arithmetic.Increment(_zero);
26         private readonly StringToUnicodeSequenceConverter<TLink>
27             ↪ _stringToUnicodeSequenceConverter;
28         private readonly ILinks<TLink> _links;
29         private TLink _unicodeSymbolMarker;
30         private TLink _unicodeSequenceMarker;
31         private TLink _elementMarker;
32         private TLink _textElementMarker;
33         private TLink _documentMarker;
34
35         private class Unindex : ISequenceIndex<TLink>
36         {
37             public bool Add(IList<TLink> sequence) => true;
38
39             public bool MightContain(IList<TLink> sequence) => true;
40         }
41
42         /// <summary>
43         /// <para>
44         /// Initializes a new <see cref="DefaultXmlStorage" /> instance.
45         /// </para>
46         /// <para></para>
47         /// </summary>
48         /// <param name="links">
49         /// <para>A links.</para>
50         /// <para></para>
51         /// </param>
52         /// <param name="indexSequenceBeforeCreation">
53         /// <para>A index sequence before creation.</para>
54         /// <para></para>
55         /// </param>
56         /// <param name="frequenciesCache">
57         /// <para>A frequencies cache.</para>
58         /// <para></para>
59         /// </param>
60         public DefaultXmlStorage(ILinks<TLink> links, bool indexSequenceBeforeCreation,
61             ↪ LinkFrequenciesCache<TLink> frequenciesCache)
62         {
63             var linkToItsFrequencyNumberConverter = new
64                 ↪ FrequenciesCacheBasedLinkToItsFrequencyNumberConverter<TLink>(frequenciesCache);
65             var sequenceToItsLocalElementLevelsConverter = new
66                 ↪ SequenceToItsLocalElementLevelsConverter<TLink>(links,
67                 ↪ linkToItsFrequencyNumberConverter);
68             var optimalVariantConverter = new OptimalVariantConverter<TLink>(links,
69                 ↪ sequenceToItsLocalElementLevelsConverter);
70             InitConstants(links);
71             var charToUnicodeSymbolConverter = new CharToUnicodeSymbolConverter<TLink>(links,
72                 ↪ new AddressToRawNumberConverter<TLink>(), _unicodeSymbolMarker);
73             var index = indexSequenceBeforeCreation ? new
74                 ↪ CachedFrequencyIncrementingSequenceIndex<TLink>(frequenciesCache) :
75                 ↪ (ISequenceIndex<TLink>)new Unindex();
76         }
77     }
78 }
```

```

67         _stringToUnicodeSequenceConverter = new
        ↪ StringToUnicodeSequenceConverter<TLink>(links, charToUnicodeSymbolConverter,
68         ↪ index, optimalVariantConverter, _unicodeSequenceMarker);
69     _links = links;
70 }
71 public DefaultXmlStorage(ILinks<TLink> links, bool indexSequenceBeforeCreation = false) :
72     this(links, indexSequenceBeforeCreation,
73         new LinkFrequenciesCache<TLink>(links,
74         new TotalSequenceSymbolFrequencyCounter<TLink>(links))) { }
75
76 private void InitConstants(ILinks<TLink> links)
77 {
78     var markerIndex = _one;
79     var meaningRoot = links.GetOrCreate(markerIndex, markerIndex);
80     _unicodeSymbolMarker = links.GetOrCreate(meaningRoot, Arithmetic.Increment(ref
        ↪ markerIndex));
81     _unicodeSequenceMarker = links.GetOrCreate(meaningRoot, Arithmetic.Increment(ref
        ↪ markerIndex));
82     _elementMarker = links.GetOrCreate(meaningRoot, Arithmetic.Increment(ref
        ↪ markerIndex));
83     _textElementMarker = links.GetOrCreate(meaningRoot, Arithmetic.Increment(ref
        ↪ markerIndex));
84     _documentMarker = links.GetOrCreate(meaningRoot, Arithmetic.Increment(ref
        ↪ markerIndex));
85 }
86
87 /// <summary>
88 /// <para>
89 /// Creates the document using the specified name.
90 /// </para>
91 /// <para></para>
92 /// </summary>
93 /// <param name="name">
94 /// <para>The name.</para>
95 /// <para></para>
96 /// </param>
97 /// <returns>
98 /// <para>The link</para>
99 /// <para></para>
100 /// </returns>
101 public TLink CreateDocument(string name) => Create(_documentMarker, name);
102
103 /// <summary>
104 /// <para>
105 /// Creates the element using the specified name.
106 /// </para>
107 /// <para></para>
108 /// </summary>
109 /// <param name="name">
110 /// <para>The name.</para>
111 /// <para></para>
112 /// </param>
113 /// <returns>
114 /// <para>The link</para>
115 /// <para></para>
116 /// </returns>
117 public TLink CreateElement(string name) => Create(_elementMarker, name);
118
119 /// <summary>
120 /// <para>
121 /// Creates the text element using the specified content.
122 /// </para>
123 /// <para></para>
124 /// </summary>
125 /// <param name="content">
126 /// <para>The content.</para>
127 /// <para></para>
128 /// </param>
129 /// <returns>
130 /// <para>The link</para>
131 /// <para></para>
132 /// </returns>
133 public TLink CreateTextElement(string content) => Create(_textElementMarker, content);
134
135 private TLink Create(TLink marker, string content) => _links.GetOrCreate(marker,
    ↪ _stringToUnicodeSequenceConverter.Convert(content));
136

```

```

137     /// <summary>
138     /// <para>
139     /// Attaches the element to parent using the specified element to attach.
140     /// </para>
141     /// <para></para>
142     /// </summary>
143     /// <param name="elementToAttach">
144     /// <para>The element to attach.</para>
145     /// <para></para>
146     /// </param>
147     /// <param name="parent">
148     /// <para>The parent.</para>
149     /// <para></para>
150     /// </param>
151     public void AttachElementToParent(TLink elementToAttach, TLink parent) =>
152         ↪ _links.GetOrCreate(parent, elementToAttach);
153
154     /// <summary>
155     /// <para>
156     /// Gets the document using the specified name.
157     /// </para>
158     /// <para></para>
159     /// </summary>
160     /// <param name="name">
161     /// <para>The name.</para>
162     /// <para></para>
163     /// </param>
164     /// <returns>
165     /// <para>The link</para>
166     /// <para></para>
167     /// </returns>
168     public TLink GetDocument(string name) => Get(_documentMarker, name);
169
170     /// <summary>
171     /// <para>
172     /// Gets the text element using the specified content.
173     /// </para>
174     /// <para></para>
175     /// </summary>
176     /// <param name="content">
177     /// <para>The content.</para>
178     /// <para></para>
179     /// </param>
180     /// <returns>
181     /// <para>The link</para>
182     /// <para></para>
183     /// </returns>
184     public TLink GetTextElement(string content) => Get(_textElementMarker, content);
185
186     /// <summary>
187     /// <para>
188     /// Gets the element using the specified name.
189     /// </para>
190     /// <para></para>
191     /// </summary>
192     /// <param name="name">
193     /// <para>The name.</para>
194     /// <para></para>
195     /// </param>
196     /// <returns>
197     /// <para>The link</para>
198     /// <para></para>
199     /// </returns>
200     public TLink GetElement(string name) => Get(_elementMarker, name);
201
202     private TLink Get(TLink marker, string content) => _links.SearchOrDefault(marker,
203         ↪ _stringToUnicodeSequenceConverter.Convert(content));
204
205     /// <summary>
206     /// <para>
207     /// Gets the children using the specified parent.
208     /// </para>
209     /// <para></para>
210     /// </summary>
211     /// <param name="parent">
212     /// <para>The parent.</para>
213     /// <para></para>
214     /// </param>

```

```

213     /// <returns>
214     /// <para>The childrens.</para>
215     /// <para></para>
216     /// </returns>
217     public IList<TLink> GetChildren(TLink parent)
218     {
219         List<TLink> childrens = new List<TLink>();
220         _links.Each((link) => {
221             childrens.Add(_links.GetTarget(link));
222             return this._links.Constants.Continue;
223         }, new Link<TLink>(_links.Constants.Any, parent, _links.Constants.Any));
224         return childrens;
225     }
226 }
227 }

```

1.2 ./csharp/Platform.Data.Doublets.Xml/ICommandLineInterface.cs

```

1  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
2
3  namespace Platform.Data.Doublets.Xml
4  {
5      /// <summary>
6      /// <para>
7      /// Defines the command line interface.
8      /// </para>
9      /// <para></para>
10     /// </summary>
11     public interface ICommandLineInterface
12     {
13         /// <summary>
14         /// <para>
15         /// Runs the args.
16         /// </para>
17         /// <para></para>
18         /// </summary>
19         /// <param name="args">
20         /// <para>The args.</para>
21         /// <para></para>
22         /// </param>
23         void Run(params string[] args);
24     }
25 }

```

1.3 ./csharp/Platform.Data.Doublets.Xml/IXmlStorage.cs

```

1  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
2
3  using System.Collections.Generic;
4
5  namespace Platform.Data.Doublets.Xml
6  {
7      /// <summary>
8      /// <para>
9      /// Defines the xml storage.
10     /// </para>
11     /// <para></para>
12     /// </summary>
13     public interface IXmlStorage<TLink>
14     {
15         /// <summary>
16         /// <para>
17         /// Creates the document using the specified name.
18         /// </para>
19         /// <para></para>
20         /// </summary>
21         /// <param name="name">
22         /// <para>The name.</para>
23         /// <para></para>
24         /// </param>
25         /// <returns>
26         /// <para>The link</para>
27         /// <para></para>
28         /// </returns>
29         TLink CreateDocument(string name);
30
31         /// <summary>
32         /// <para>
33         /// Creates the element using the specified name.
34         /// </para>

```

```

35     /// <para></para>
36     /// </summary>
37     /// <param name="name">
38     /// <para>The name.</para>
39     /// <para></para>
40     /// </param>
41     /// <returns>
42     /// <para>The link</para>
43     /// <para></para>
44     /// </returns>
45     TLink CreateElement(string name);
46
47     /// <summary>
48     /// <para>
49     /// Creates the text element using the specified content.
50     /// </para>
51     /// <para></para>
52     /// </summary>
53     /// <param name="content">
54     /// <para>The content.</para>
55     /// <para></para>
56     /// </param>
57     /// <returns>
58     /// <para>The link</para>
59     /// <para></para>
60     /// </returns>
61     TLink CreateTextElement(string content);
62
63     /// <summary>
64     /// <para>
65     /// Gets the document using the specified name.
66     /// </para>
67     /// <para></para>
68     /// </summary>
69     /// <param name="name">
70     /// <para>The name.</para>
71     /// <para></para>
72     /// </param>
73     /// <returns>
74     /// <para>The link</para>
75     /// <para></para>
76     /// </returns>
77     TLink GetDocument(string name);
78
79     /// <summary>
80     /// <para>
81     /// Gets the element using the specified name.
82     /// </para>
83     /// <para></para>
84     /// </summary>
85     /// <param name="name">
86     /// <para>The name.</para>
87     /// <para></para>
88     /// </param>
89     /// <returns>
90     /// <para>The link</para>
91     /// <para></para>
92     /// </returns>
93     TLink GetElement(string name);
94
95     /// <summary>
96     /// <para>
97     /// Gets the text element using the specified content.
98     /// </para>
99     /// <para></para>
100    /// </summary>
101    /// <param name="content">
102    /// <para>The content.</para>
103    /// <para></para>
104    /// </param>
105    /// <returns>
106    /// <para>The link</para>
107    /// <para></para>
108    /// </returns>
109    TLink GetTextElement(string content);
110
111    /// <summary>
112    /// <para>

```

```

113     /// Gets the children using the specified parent.
114     /// </para>
115     /// <para></para>
116     /// </summary>
117     /// <param name="parent">
118     /// <para>The parent.</para>
119     /// <para></para>
120     /// </param>
121     /// <returns>
122     /// <para>A list of i list t link</para>
123     /// <para></para>
124     /// </returns>
125     IList<TLink> GetChildren(TLink parent);
126
127     /// <summary>
128     /// <para>
129     /// Attaches the element to parent using the specified element to attach.
130     /// </para>
131     /// <para></para>
132     /// </summary>
133     /// <param name="elementToAttach">
134     /// <para>The element to attach.</para>
135     /// <para></para>
136     /// </param>
137     /// <param name="parent">
138     /// <para>The parent.</para>
139     /// <para></para>
140     /// </param>
141     void AttachElementToParent(TLink elementToAttach, TLink parent);
142 }
143 }

```

1.4 ./csharp/Platform.Data.Doublets.Xml/XmlElementContext.cs

```

1 using System.Collections.Generic;
2
3 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
4
5 namespace Platform.Data.Doublets.Xml
6 {
7     /// <summary>
8     /// <para>
9     /// Represents the xml element context.
10    /// </para>
11    /// <para></para>
12    /// </summary>
13    internal class XmlElementContext
14    {
15        public readonly Dictionary<string, int> ChildrenNamesCounts;
16        public int TotalChildren;
17
18        public XmlElementContext() => ChildrenNamesCounts = new Dictionary<string, int>();
19
20        public void IncrementChildNameCount(string name)
21        {
22            if (ChildrenNamesCounts.TryGetValue(name, out int count))
23            {
24                ChildrenNamesCounts[name] = count + 1;
25            }
26            else
27            {
28                ChildrenNamesCounts[name] = 0;
29            }
30            TotalChildren++;
31        }
32    }
33 }

```

1.5 ./csharp/Platform.Data.Doublets.Xml/XmlElementCounter.cs

```

1 using System;
2 using System.Collections.Generic;
3 using System.Threading;
4 using System.Threading.Tasks;
5 using System.Xml;
6 using System.Linq;
7 using Platform.Exceptions;
8 using Platform.IO;
9
10 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
11

```

```

12 namespace Platform.Data.Doublets.Xml
13 {
14     /// <summary>
15     /// <para>
16     /// Represents the xml element counter.
17     /// </para>
18     /// <para></para>
19     /// </summary>
20     public class XmlElementCounter
21     {
22         /// <summary>
23         /// <para>
24         /// Initializes a new <see cref="XmlElementCounter"/> instance.
25         /// </para>
26         /// <para></para>
27         /// </summary>
28         public XmlElementCounter() { }
29
30         /// <summary>
31         /// <para>
32         /// Counts the file.
33         /// </para>
34         /// <para></para>
35         /// </summary>
36         /// <param name="file">
37         /// <para>The file.</para>
38         /// <para></para>
39         /// </param>
40         /// <param name="elementName">
41         /// <para>The element name.</para>
42         /// <para></para>
43         /// </param>
44         /// <param name="token">
45         /// <para>The token.</para>
46         /// <para></para>
47         /// </param>
48         public Task Count(string file, string elementName, CancellationToken token)
49         {
50             return Task.Factory.StartNew(() =>
51             {
52                 try
53                 {
54                     var context = new RootElementContext();
55                     using (var reader = XmlReader.Create(file))
56                     {
57                         Count(reader, elementName, token, context);
58                     }
59                     Console.WriteLine($"Total elements with specified name:
60                                     ↳ {context.TotalElements}, total content length:
61                                     ↳ {context.TotalContentsLength}.");
62                 }
63                 catch (Exception ex)
64                 {
65                     Console.WriteLine(ex.ToStringWithAllInnerExceptions());
66                 }
67             }, token);
68
69             private void Count(XmlReader reader, string elementNameToCount, CancellationToken token,
70                               ↳ XmlElementContext context)
71             {
72                 var rootContext = (RootElementContext)context;
73                 var parentContexts = new Stack<XmlElementContext>();
74                 var elements = new Stack<string>(); // Path
75                 // TODO: If path was loaded previously, skip it.
76                 while (reader.Read())
77                 {
78                     if (token.IsCancellationRequested)
79                     {
80                         return;
81                     }
82                     switch (reader.NodeType)
83                     {
84                         case XmlNodeType.Element:
85                             var elementName = reader.Name;
86                             context.IncrementChildNameCount(elementName);
87                             elementName =
88                                 ↳ $"{elementName}[{context.ChildrenNamesCounts[elementName]}]";

```

```

86         if (!reader.IsEmptyElement)
87         {
88             elements.Push(elementName);
89             ConsoleHelpers.Debug("{0} starting...", elements.Count <= 20 ?
            ↪ ToXPath(elements) : elementName); // XPath
90             parentContexts.Push(context);
91             context = new XmlElementContext();
92         }
93         else
94         {
95             ConsoleHelpers.Debug("{0} finished.", elementName);
96         }
97         break;
98
99     case XmlNodeType.EndElement:
100         ConsoleHelpers.Debug("{0} finished.", elements.Count <= 20 ?
            ↪ ToXPath(elements) : elements.Peek()); // XPath
101         var topElement = elements.Pop();
102         // Restoring scope
103         context = parentContexts.Pop();
104         if (topElement.StartsWith(elementNameToCount))
105         {
106             rootContext.TotalElements++;
107             // TODO: Check for 0x00 part/symbol at 198102797 line and 13
            ↪ position.
108             //if (rootContext.TotalPages > 3490000)
109             //    selfCancel = true;
110             if (context.ChildrenNamesCounts[elementNameToCount] % 10000 == 0)
111             {
112                 Console.WriteLine(topElement);
113             }
114         }
115         break;
116
117     case XmlNodeType.Text:
118         ConsoleHelpers.Debug("Starting text element...");
119         var content = reader.Value;
120         rootContext.TotalContentsLength += (ulong)content.Length;
121         ConsoleHelpers.Debug($"Content length is: {content.Length}");
122         ConsoleHelpers.Debug("Text element finished.");
123         break;
124     }
125 }
126 }
127
128 private string ToXPath(Stack<string> path) => string.Join("/", path.Reverse());
129
130 private class RootElementContext : XmlElementContext
131 {
132     public ulong TotalElements;
133     public ulong TotalContentsLength;
134 }
135 }
136 }

```

1.6 ./csharp/Platform.Data.Doublets.Xml/XmlElementCounterCLI.cs

```

1  using System;
2  using System.IO;
3  using Platform.IO;
4
5  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
6
7  namespace Platform.Data.Doublets.Xml
8  {
9      /// <summary>
10     /// <para>
11     /// Represents the xml element counter cli.
12     /// </para>
13     /// <para></para>
14     /// </summary>
15     /// <seealso cref="ICommandLineInterface"/>
16     public class XmlElementCounterCLI : ICommandLineInterface
17     {
18         /// <summary>
19         /// <para>
20         /// Runs the args.
21         /// </para>
22         /// <para></para>
23         /// </summary>

```



```

24     /// <param name="args">
25     /// <para>The args.</para>
26     /// <para></para>
27     /// </param>
28     public void Run(params string[] args)
29     {
30         var file = ConsoleHelpers.GetOrReadArgument(0, "Xml file", args);
31         var elementName = ConsoleHelpers.GetOrReadArgument(1, "Element name to count", args);
32         if (!File.Exists(file))
33         {
34             Console.WriteLine("Entered xml file does not exists.");
35         }
36         else if (string.IsNullOrEmpty(elementName))
37         {
38             Console.WriteLine("Entered element name is empty.");
39         }
40         else
41         {
42             using (var cancellation = new ConsoleCancellation())
43             {
44                 Console.WriteLine("Press CTRL+C to stop.");
45                 new XmlElementCounter().Count(file, elementName, cancellation.Token).Wait();
46             }
47         }
48     }
49 }
50 }

```

1.7 ./csharp/Platform.Data.Doublets.Xml/XmlExporter.cs

```

1  using System;
2  using System.Linq;
3  using System.Collections.Generic;
4  using System.Threading;
5  using System.Threading.Tasks;
6  using System.Xml;
7  using Platform.Exceptions;
8
9  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
10
11 namespace Platform.Data.Doublets.Xml
12 {
13     /// <summary>
14     /// <para>
15     /// Represents the xml exporter.
16     /// </para>
17     /// <para></para>
18     /// </summary>
19     public class XmlExporter<TLink>
20     {
21         private readonly IXmlStorage<TLink> _storage;
22
23         /// <summary>
24         /// <para>
25         /// Initializes a new <see cref="XmlExporter"/> instance.
26         /// </para>
27         /// <para></para>
28         /// </summary>
29         /// <param name="storage">
30         /// <para>A storage.</para>
31         /// <para></para>
32         /// </param>
33         public XmlExporter(IXmlStorage<TLink> storage) => _storage = storage;
34
35         /// <summary>
36         /// <para>
37         /// Exports the document name.
38         /// </para>
39         /// <para></para>
40         /// </summary>
41         /// <param name="documentName">
42         /// <para>The document name.</para>
43         /// <para></para>
44         /// </param>
45         /// <param name="fileName">
46         /// <para>The file name.</para>
47         /// <para></para>
48         /// </param>
49         /// <param name="token">
50         /// <para>The token.</para>

```

```

51     /// <para></para>
52     /// </param>
53     public Task Export(string documentName, string fileName, CancellationToken token)
54     {
55         return Task.Factory.StartNew(() =>
56         {
57             try
58             {
59                 var document = _storage.GetDocument(documentName);
60                 using (var writer = XmlWriter.Create(fileName))
61                 {
62                     Write(writer, token, new ElementContext(document));
63                 }
64             }
65             catch (Exception ex)
66             {
67                 Console.WriteLine(ex.ToStringWithAllInnerExceptions());
68             }
69         }, token);
70     }
71
72     private void Write(XmlWriter writer, CancellationToken token, ElementContext context)
73     {
74         var parentContexts = new Stack<ElementContext>();
75         var elements = new Stack<string>(); // Path
76                                     // TODO: If path was loaded previously, skip it.
77         foreach (TLink lvl in _storage.GetChildren(parent: context.Parent))
78         {
79             Write(writer: writer, token: token, context: new ElementContext(lvl));
80         }
81     }
82
83     private class ElementContext : XmlElementContext
84     {
85         public readonly TLink Parent;
86         public ElementContext(TLink parent) => Parent = parent;
87     }
88
89 }
90 }

```

1.8 ./csharp/Platform.Data.Doublets.Xml/XmlExporterCLI.cs

```

1  using System;
2  using System.IO;
3  using Platform.IO;
4  using Platform.Data.Doublets.Memory.United.Generic;
5
6  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
7
8  namespace Platform.Data.Doublets.Xml
9  {
10     public class XmlExporterCLI : ICommandLineInterface
11     {
12         public void Run(params string[] args)
13         {
14             var linksFile = ConsoleHelpers.GetOrReadArgument(0, "Links file", args);
15             var exportFile = ConsoleHelpers.GetOrReadArgument(1, "Xml file", args);
16
17             if (File.Exists(exportFile))
18             {
19                 Console.WriteLine("Entered xml file does already exists.");
20             }
21             else
22             {
23                 using (var cancellation = new ConsoleCancellation())
24                 {
25                     using (var memoryAdapter = new UnitedMemoryLinks<uint>(linksFile))
26                     {
27                         {
28                             Console.WriteLine("Press CTRL+C to stop.");
29                             var links = memoryAdapter.DecorateWithAutomaticUniquenessAndUsagesRe
30                                 ↪ solution();
31                             if (cancellation.NotRequested)
32                             {
33                                 var storage = new DefaultXmlStorage<uint>(links);
34                                 var exporter = new XmlExporter<uint>(storage);
35                                 exporter.Export(linksFile, exportFile,
36                                     ↪ cancellation.Token).Wait();
37                             }
38                         }
39                     }
40                 }
41             }
42         }
43     }
44 }

```

```

36     }
37 }
38 }
39 }
40 }
41 }
42 }

```

1.9 ./csharp/Platform.Data.Doublets.Xml/XmlImporter.cs

```

1  using System;
2  using System.Linq;
3  using System.Collections.Generic;
4  using System.Threading;
5  using System.Threading.Tasks;
6  using System.Xml;
7  using Platform.Exceptions;
8  using Platform.Collections;
9  using Platform.IO;
10
11 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
12
13 namespace Platform.Data.Doublets.Xml {
14     /// <summary>
15     /// <para>
16     /// Represents the xml importer.
17     /// </para>
18     /// <para></para>
19     /// </summary>
20     public class XmlImporter<TLink>
21     {
22         private readonly IXmlStorage<TLink> _storage;
23
24         /// <summary>
25         /// <para>
26         /// Initializes a new <see cref="XmlImporter"/> instance.
27         /// </para>
28         /// <para></para>
29         /// </summary>
30         /// <param name="storage">
31         /// <para>A storage.</para>
32         /// <para></para>
33         /// </param>
34         public XmlImporter(IXmlStorage<TLink> storage) => _storage = storage;
35
36         /// <summary>
37         /// <para>
38         /// Imports the file.
39         /// </para>
40         /// <para></para>
41         /// </summary>
42         /// <param name="file">
43         /// <para>The file.</para>
44         /// <para></para>
45         /// </param>
46         /// <param name="token">
47         /// <para>The token.</para>
48         /// <para></para>
49         /// </param>
50         public Task Import(string file, CancellationToken token)
51         {
52             return Task.Factory.StartNew(() =>
53             {
54                 try
55                 {
56                     var document = _storage.CreateDocument(file);
57
58                     using (var reader = XmlReader.Create(file))
59                     {
60                         Read(reader, token, new ElementContext(document));
61                     }
62                 }
63                 catch (Exception ex)
64                 {
65                     Console.WriteLine(ex.ToStringWithAllInnerExceptions());
66                 }
67             }, token);
68         }
69     }
70 }

```

```

1 private void Read(XmlReader reader, CancellationToken token, ElementContext context)
2 {
3     var parentContexts = new Stack<ElementContext>();
4     var elements = new Stack<string>(); // Path
5     // TODO: If path was loaded previously, skip it.
6     while (reader.Read())
7     {
8         if (token.IsCancellationRequested)
9         {
10             return;
11         }
12         switch (reader.NodeType)
13         {
14             case XmlNodeType.Element:
15                 var elementName = reader.Name;
16                 context.IncrementChildNameCount(elementName);
17                 elementName =
18                     ↪ $"{elementName}[{context.ChildrenNamesCounts[elementName]}]";
19                 if (!reader.IsEmptyElement)
20                 {
21                     elements.Push(elementName);
22                     ConsoleHelpers.Debug("{0} starting...", elements.Count <= 20 ?
23                         ↪ ToXPath(elements) : elementName); // XPath
24                     var element = _storage.CreateElement(name: elementName);
25                     parentContexts.Push(context);
26                     _storage.AttachElementToParent(elementToAttach: element, parent:
27                         ↪ context.Parent);
28                     context = new ElementContext(element);
29                 }
30                 else
31                 {
32                     ConsoleHelpers.Debug("{0} finished.", elementName);
33                 }
34                 break;
35             case XmlNodeType.EndElement:
36                 ConsoleHelpers.Debug("{0} finished.", elements.Count <= 20 ?
37                     ↪ ToXPath(elements) : elements.Peek()); // XPath
38                 elements.Pop();
39                 // Restoring scope
40                 context = parentContexts.Pop();
41                 if (elements.Count == 1)
42                 {
43                     if (context.TotalChildren % 10 == 0)
44                         Console.WriteLine(context.TotalChildren);
45                 }
46                 break;
47             case XmlNodeType.Text:
48                 ConsoleHelpers.Debug("Starting text element...");
49                 var content = reader.Value;
50                 ConsoleHelpers.Debug("Content: {0}{1}", content.Truncate(50),
51                     ↪ content.Length >= 50 ? "... " : "");
52                 var textElement = _storage.CreateTextElement(content: content);
53                 _storage.AttachElementToParent(textElement, context.Parent);
54                 ConsoleHelpers.Debug("Text element finished.");
55                 break;
56         }
57     }
58 }
59
60 private string ToXPath(Stack<string> path) => string.Join("/", path.Reverse());
61
62 private class ElementContext : XmlElementContext
63 {
64     public readonly TLink Parent;
65     public ElementContext(TLink parent) => Parent = parent;
66 }
67
68 }
69
70 }

```

1.10 ./csharp/Platform.Data.Doublets.Xml/XmlImporterCLI.cs

```

1 using System;
2 using System.IO;
3 using Platform.IO;
4 using Platform.Data.Doublets.Memory.United.Generic;
5
6 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
7
8 namespace Platform.Data.Doublets.Xml
9 {

```

```

10  /// <summary>
11  /// <para>
12  /// Represents the xml importer cli.
13  /// </para>
14  /// <para></para>
15  /// </summary>
16  /// <seealso cref="ICommandLineInterface"/>
17  public class XmlImporterCLI : ICommandLineInterface
18  {
19      /// <summary>
20      /// <para>
21      /// Runs the args.
22      /// </para>
23      /// <para></para>
24      /// </summary>
25      /// <param name="args">
26      /// <para>The args.</para>
27      /// <para></para>
28      /// </param>
29      public void Run(params string[] args)
30      {
31          var linksFile = ConsoleHelpers.GetOrReadArgument(0, "Links file", args);
32          var file = ConsoleHelpers.GetOrReadArgument(1, "Xml file", args);
33
34          if (!File.Exists(file))
35          {
36              Console.WriteLine("Entered xml file does not exists.");
37          }
38          else
39          {
40              //const long gb32 = 34359738368;
41
42              using (var cancellation = new ConsoleCancellation())
43              using (var memoryAdapter = new UnitedMemoryLinks<uint>(linksFile))
44              //using (var memoryAdapter = new UInt64UnitedMemoryLinks(linksFile, gb32))
45              //using (var links = new UInt64Links(memoryAdapter))
46              {
47                  Console.WriteLine("Press CTRL+C to stop.");
48                  var links =
49                      ⇨ memoryAdapter.DecorateWithAutomaticUniquenessAndUsagesResolution();
50                  var indexer = new XmlIndexer<uint>(links);
51                  var indexingImporter = new XmlImporter<uint>(indexer);
52                  indexingImporter.Import(file, cancellation.Token).Wait();
53                  if (cancellation.NotRequested)
54                  {
55                      var cache = indexer.Cache;
56                      //var counter = new TotalSequenceSymbolFrequencyCounter<uint>(links);
57                      //var cache = new LinkFrequenciesCache<uint>(links, counter);
58                      Console.WriteLine("Frequencies cache ready.");
59                      var storage = new DefaultXmlStorage<uint>(links, false, cache);
60                      var importer = new XmlImporter<uint>(storage);
61                      importer.Import(file, cancellation.Token).Wait();
62                  }
63              }
64          }
65      }
66  }

```

1.11 ./csharp/Platform.Data.Doublets.Xml/XmlIndexer.cs

```

1  using System.Collections.Generic;
2  using Platform.Numbers;
3  using Platform.Data.Numbers.Raw;
4  using Platform.Data.Doublets;
5  using Platform.Data.Doublets.Sequences.Frequencies.Cache;
6  using Platform.Data.Doublets.Sequences.Frequencies.Counters;
7  using Platform.Data.Doublets.Sequences.Indexes;
8  using Platform.Data.Doublets.Unicode;
9
10 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
11
12 namespace Platform.Data.Doublets.Xml
13 {
14     /// <summary>
15     /// <para>
16     /// Represents the xml indexer.
17     /// </para>
18     /// <para></para>
19     /// </summary>

```

```

20 /// <seealso cref="IXmlStorage{TLink}"/>
21 public class XmlIndexer<TLink> : IXmlStorage<TLink>
22 {
23     private static readonly TLink _zero = default;
24     private static readonly TLink _one = Arithmetic.Increment(_zero);
25     private readonly CachedFrequencyIncrementingSequenceIndex<TLink> _index;
26     private readonly CharToUnicodeSymbolConverter<TLink> _charToUnicodeSymbolConverter;
27     private TLink _unicodeSymbolMarker;
28     private readonly TLink _nullConstant;
29
30     /// <summary>
31     /// <para>
32     /// Gets the cache value.
33     /// </para>
34     /// <para></para>
35     /// </summary>
36     public LinkFrequenciesCache<TLink> Cache { get; }
37
38     /// <summary>
39     /// <para>
40     /// Initializes a new <see cref="XmlIndexer"/> instance.
41     /// </para>
42     /// <para></para>
43     /// </summary>
44     /// <param name="links">
45     /// <para>A links.</para>
46     /// <para></para>
47     /// </param>
48     public XmlIndexer(ILinks<TLink> links)
49     {
50         _nullConstant = links.Constants.Null;
51         var totalSequenceSymbolFrequencyCounter = new
52             ↪ TotalSequenceSymbolFrequencyCounter<TLink>(links);
53         Cache = new LinkFrequenciesCache<TLink>(links, totalSequenceSymbolFrequencyCounter);
54         _index = new CachedFrequencyIncrementingSequenceIndex<TLink>(Cache);
55         var addressToRawNumberConverter = new AddressToRawNumberConverter<TLink>();
56         InitConstants(links);
57         _charToUnicodeSymbolConverter = new CharToUnicodeSymbolConverter<TLink>(links,
58             ↪ addressToRawNumberConverter, _unicodeSymbolMarker);
59     }
60
61     private void InitConstants(ILinks<TLink> links)
62     {
63         var markerIndex = _one;
64         var meaningRoot = links.GetOrCreate(markerIndex, markerIndex);
65         _unicodeSymbolMarker = links.GetOrCreate(meaningRoot,
66             ↪ Arithmetic.Increment(markerIndex));
67         _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
68         _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
69         _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
70         _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
71     }
72
73     /// <summary>
74     /// <para>
75     /// Attaches the element to parent using the specified element to attach.
76     /// </para>
77     /// <para></para>
78     /// </summary>
79     /// <param name="elementToAttach">
80     /// <para>The element to attach.</para>
81     /// <para></para>
82     /// </param>
83     /// <param name="parent">
84     /// <para>The parent.</para>
85     /// <para></para>
86     /// </param>
87     public void AttachElementToParent(TLink elementToAttach, TLink parent)
88     {
89     }
90
91     /// <summary>
92     /// <para>
93     /// Returns the elements using the specified string.
94     /// </para>
95     /// <para></para>
96     /// </summary>
97     /// <param name="@string">

```

```

95     /// <para>The string.</para>
96     /// <para></para>
97     /// </param>
98     /// <returns>
99     /// <para>The elements.</para>
100    /// <para></para>
101    /// </returns>
102    public IList<TLink> ToElements(string @string)
103    {
104        var elements = new TLink[@string.Length];
105        for (int i = 0; i < @string.Length; i++)
106        {
107            elements[i] = _charToUnicodeSymbolConverter.Convert(@string[i]);
108        }
109        return elements;
110    }
111
112    /// <summary>
113    /// <para>
114    /// Creates the document using the specified name.
115    /// </para>
116    /// <para></para>
117    /// </summary>
118    /// <param name="name">
119    /// <para>The name.</para>
120    /// <para></para>
121    /// </param>
122    /// <returns>
123    /// <para>The null constant.</para>
124    /// <para></para>
125    /// </returns>
126    public TLink CreateDocument(string name)
127    {
128        _index.Add(ToElements(name));
129        return _nullConstant;
130    }
131
132    /// <summary>
133    /// <para>
134    /// Creates the element using the specified name.
135    /// </para>
136    /// <para></para>
137    /// </summary>
138    /// <param name="name">
139    /// <para>The name.</para>
140    /// <para></para>
141    /// </param>
142    /// <returns>
143    /// <para>The null constant.</para>
144    /// <para></para>
145    /// </returns>
146    public TLink CreateElement(string name)
147    {
148        _index.Add(ToElements(name));
149        return _nullConstant;
150    }
151
152    /// <summary>
153    /// <para>
154    /// Creates the text element using the specified content.
155    /// </para>
156    /// <para></para>
157    /// </summary>
158    /// <param name="content">
159    /// <para>The content.</para>
160    /// <para></para>
161    /// </param>
162    /// <returns>
163    /// <para>The null constant.</para>
164    /// <para></para>
165    /// </returns>
166    public TLink CreateTextElement(string content)
167    {
168        _index.Add(ToElements(content));
169        return _nullConstant;
170    }
171
172    /// <summary>

```

```

173     /// <para>
174     /// Gets the document using the specified name.
175     /// </para>
176     /// <para></para>
177     /// </summary>
178     /// <param name="name">
179     /// <para>The name.</para>
180     /// <para></para>
181     /// </param>
182     /// <exception cref="System.NotImplementedException">
183     /// <para></para>
184     /// <para></para>
185     /// </exception>
186     /// <returns>
187     /// <para>The link</para>
188     /// <para></para>
189     /// </returns>
190 public TLink GetDocument(string name)
191 {
192     throw new System.NotImplementedException();
193 }
194
195     /// <summary>
196     /// <para>
197     /// Gets the element using the specified name.
198     /// </para>
199     /// <para></para>
200     /// </summary>
201     /// <param name="name">
202     /// <para>The name.</para>
203     /// <para></para>
204     /// </param>
205     /// <exception cref="System.NotImplementedException">
206     /// <para></para>
207     /// <para></para>
208     /// </exception>
209     /// <returns>
210     /// <para>The link</para>
211     /// <para></para>
212     /// </returns>
213 public TLink GetElement(string name)
214 {
215     throw new System.NotImplementedException();
216 }
217
218     /// <summary>
219     /// <para>
220     /// Gets the text element using the specified content.
221     /// </para>
222     /// <para></para>
223     /// </summary>
224     /// <param name="content">
225     /// <para>The content.</para>
226     /// <para></para>
227     /// </param>
228     /// <exception cref="System.NotImplementedException">
229     /// <para></para>
230     /// <para></para>
231     /// </exception>
232     /// <returns>
233     /// <para>The link</para>
234     /// <para></para>
235     /// </returns>
236 public TLink GetTextElement(string content)
237 {
238     throw new System.NotImplementedException();
239 }
240
241     /// <summary>
242     /// <para>
243     /// Gets the children using the specified parent.
244     /// </para>
245     /// <para></para>
246     /// </summary>
247     /// <param name="parent">
248     /// <para>The parent.</para>
249     /// <para></para>
250     /// </param>

```



```
251     /// <exception cref="System.NotImplementedException">
252     /// <para></para>
253     /// <para></para>
254     /// </exception>
255     /// <returns>
256     /// <para>A list of i list t link</para>
257     /// <para></para>
258     /// </returns>
259     public IList<TLink> GetChildren(TLink parent)
260     {
261         throw new System.NotImplementedException();
262     }
263 }
264 }
```

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