

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

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

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

```

62     private TLink Create(TLink marker, string content)
63     {
64         var contentSequence = _stringToUnicodeSequenceConverter.Convert(content);
65         return _links.GetOrCreate(marker, contentSequence);
66     }
67
68     public void AttachElementToParent(TLink elementToAttach, TLink parent) =>
69         ↪ _links.GetOrCreate(parent, elementToAttach);
70 }

```

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     public interface ICommandLineInterface
6     {
7         void Run(params string[] args);
8     }
9 }

```

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 namespace Platform.Data.Doublets.Xml
4 {
5     public interface IXmlStorage<TLink>
6     {
7         TLink CreateDocument(string name);
8         TLink CreateElement(string name);
9         TLink CreateTextElement(string content);
10        void AttachElementToParent(TLink elementToAttach, TLink parent);
11    }
12 }

```

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     internal class XmlElementContext
8     {
9         public readonly Dictionary<string, int> ChildrenNamesCounts;
10        public int TotalChildren;
11
12        public XmlElementContext() => ChildrenNamesCounts = new Dictionary<string, int>();
13
14        public void IncrementChildNameCount(string name)
15        {
16            if (ChildrenNamesCounts.TryGetValue(name, out int count))
17            {
18                ChildrenNamesCounts[name] = count + 1;
19            }
20            else
21            {
22                ChildrenNamesCounts[name] = 0;
23            }
24            TotalChildren++;
25        }
26    }
27 }

```

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 public class XmlElementCounter
15 {
16     public XmlElementCounter() { }
17
18     public Task Count(string file, string elementName, CancellationToken token)
19     {
20         return Task.Factory.StartNew(() =>
21         {
22             try
23             {
24                 var context = new RootElementContext();
25                 using (var reader = XmlReader.Create(file))
26                 {
27                     Count(reader, elementName, token, context);
28                 }
29                 Console.WriteLine($"Total elements with specified name:
30                                     ↳ {context.TotalElements}, total content length:
31                                     ↳ {context.TotalContentsLength}.");
32             }
33             catch (Exception ex)
34             {
35                 Console.WriteLine(ex.ToStringWithAllInnerExceptions());
36             }
37         }, token);
38     }
39
40     private void Count(XmlReader reader, string elementNameToCount, CancellationToken token,
41     ↳ XmlElementContext context)
42     {
43         var rootContext = (RootElementContext)context;
44         var parentContexts = new Stack<XmlElementContext>();
45         var elements = new Stack<string>(); // Path
46         // TODO: If path was loaded previously, skip it.
47         while (reader.Read())
48         {
49             if (token.IsCancellationRequested)
50             {
51                 return;
52             }
53             switch (reader.NodeType)
54             {
55                 case XmlNodeType.Element:
56                     var elementName = reader.Name;
57                     context.IncrementChildNameCount(elementName);
58                     elementName =
59                         ↳ $"[{elementName}]{context.ChildrenNamesCounts[elementName]}";
60                     if (!reader.IsEmptyElement)
61                     {
62                         elements.Push(elementName);
63                         ConsoleHelpers.Debug("{0} starting...", elements.Count <= 20 ?
64                                             ↳ ToXPath(elements) : elementName); // XPath
65                         parentContexts.Push(context);
66                         context = new XmlElementContext();
67                     }
68                     else
69                     {
70                         ConsoleHelpers.Debug("{0} finished.", elementName);
71                     }
72                     break;
73                 case XmlNodeType.EndElement:
74                     ConsoleHelpers.Debug("{0} finished.", elements.Count <= 20 ?
75                                         ↳ ToXPath(elements) : elements.Peek()); // XPath
76                     var topElement = elements.Pop();
77                     // Restoring scope
78                     context = parentContexts.Pop();
79                     if (topElement.StartsWith(elementNameToCount))
80                     {
81                         rootContext.TotalElements++;
82                         // TODO: Check for 0x00 part/symbol at 198102797 line and 13
83                         ↳ position.
84                         //if (rootContext.TotalPages > 3490000)
85                         //    selfCancel = true;
86                     if (context.ChildrenNamesCounts[elementNameToCount] % 10000 == 0)
87                     {
88                         Console.WriteLine(topElement);
89                     }
90                     }
91             }
92         }
93     }
94 }

```

```

85         break;
86
87         case XmlNodeType.Text:
88             ConsoleHelpers.Debug("Starting text element...");
89             var content = reader.Value;
90             rootContext.TotalContentsLength += (ulong)content.Length;
91             ConsoleHelpers.Debug($"Content length is: {content.Length}");
92             ConsoleHelpers.Debug("Text element finished.");
93             break;
94     }
95 }
96
97 private string ToXPath(Stack<string> path) => string.Join("/", path.Reverse());
98
99 private class RootElementContext : XmlElementContext
100 {
101     public ulong TotalElements;
102     public ulong TotalContentsLength;
103 }
104
105 }
106 }

```

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      public class XmlElementCounterCLI : ICommandLineInterface
10     {
11         public void Run(params string[] args)
12         {
13             var file = ConsoleHelpers.GetOrReadArgument(0, "Xml file", args);
14             var elementName = ConsoleHelpers.GetOrReadArgument(1, "Element name to count", args);
15             if (!File.Exists(file))
16             {
17                 Console.WriteLine("Entered xml file does not exists.");
18             }
19             else if (string.IsNullOrEmpty(elementName))
20             {
21                 Console.WriteLine("Entered element name is empty.");
22             }
23             else
24             {
25                 using (var cancellation = new ConsoleCancellation())
26                 {
27                     Console.WriteLine("Press CTRL+C to stop.");
28                     new XmlElementCounter().Count(file, elementName, cancellation.Token).Wait();
29                 }
30             }
31         }
32     }
33 }

```

1.7 ./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     public class XmlImporter<TLink>
15     {
16         private readonly IXmlStorage<TLink> _storage;
17
18         public XmlImporter(IXmlStorage<TLink> storage) => _storage = storage;
19
20         public Task Import(string file, CancellationToken token)
21         {

```

```

22     return Task.Factory.StartNew(() =>
23     {
24         try
25         {
26             var document = _storage.CreateDocument(file);
27
28             using (var reader = XmlReader.Create(file))
29             {
30                 Read(reader, token, new ElementContext(document));
31             }
32         }
33         catch (Exception ex)
34         {
35             Console.WriteLine(ex.ToStringWithAllInnerExceptions());
36         }
37     }, token);
38 }
39
40
41 private void Read(XmlReader reader, CancellationTokens token, ElementContext context)
42 {
43     var parentContexts = new Stack<ElementContext>();
44     var elements = new Stack<string>(); // Path
45     // TODO: If path was loaded previously, skip it.
46     while (reader.Read())
47     {
48         if (token.IsCancellationRequested)
49         {
50             return;
51         }
52         switch (reader.NodeType)
53         {
54             case XmlNodeType.Element:
55                 var elementName = reader.Name;
56                 context.IncrementChildNameCount(elementName);
57                 elementName =
58                     → $"{elementName}[{context.ChildrenNamesCounts[elementName]}]";
59                 if (!reader.IsEmptyElement)
60                 {
61                     elements.Push(elementName);
62                     ConsoleHelpers.Debug("{0} starting...", elements.Count <= 20 ?
63                         → ToXPath(elements) : elementName); // XPath
64                     var element = _storage.CreateElement(name: elementName);
65                     parentContexts.Push(context);
66                     _storage.AttachElementToParent(elementToAttach: element, parent:
67                         → context.Parent);
68                     context = new ElementContext(element);
69                 }
70                 else
71                 {
72                     ConsoleHelpers.Debug("{0} finished.", elementName);
73                 }
74                 break;
75             case XmlNodeType.EndElement:
76                 ConsoleHelpers.Debug("{0} finished.", elements.Count <= 20 ?
77                     → ToXPath(elements) : elements.Peek()); // XPath
78                 elements.Pop();
79                 // Restoring scope
80                 context = parentContexts.Pop();
81                 if (elements.Count == 1)
82                 {
83                     if (context.TotalChildren % 10 == 0)
84                         Console.WriteLine(context.TotalChildren);
85                 }
86                 break;
87             case XmlNodeType.Text:
88                 ConsoleHelpers.Debug("Starting text element...");
89                 var content = reader.Value;
90                 ConsoleHelpers.Debug("Content: {0}{1}", content.Truncate(50),
91                     → content.Length >= 50 ? "... " : "");
92                 var textElement = _storage.CreateTextElement(content: content);
93                 _storage.AttachElementToParent(textElement, context.Parent);
94                 ConsoleHelpers.Debug("Text element finished.");
95                 break;
96         }
97     }
98 }

```

```

95     private string ToXPath(Stack<string> path) => string.Join("/", path.Reverse());
96
97     private class ElementContext : XmlElementContext
98     {
99         public readonly TLink Parent;
100
101         public ElementContext(TLink parent)
102         {
103             Parent = parent;
104         }
105     }
106 }
107 }

```

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

```

1.9 ./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 public class XmlIndexer<TLink> : IXmlStorage<TLink>
15 {
16     private static readonly TLink _zero = default;
17     private static readonly TLink _one = Arithmetic.Increment(_zero);
18
19     private readonly CachedFrequencyIncrementingSequenceIndex<TLink> _index;
20     private readonly CharToUnicodeSymbolConverter<TLink> _charToUnicodeSymbolConverter;
21     private TLink _unicodeSymbolMarker;
22     private readonly TLink _nullConstant;
23
24     public LinkFrequenciesCache<TLink> Cache { get; }
25
26     public XmlIndexer(ILinks<TLink> links)
27     {
28         _nullConstant = links.Constants.Null;
29         var totalSequenceSymbolFrequencyCounter = new
30             ↪ TotalSequenceSymbolFrequencyCounter<TLink>(links);
31         Cache = new LinkFrequenciesCache<TLink>(links, totalSequenceSymbolFrequencyCounter);
32         _index = new CachedFrequencyIncrementingSequenceIndex<TLink>(Cache);
33         var addressToRawNumberConverter = new AddressToRawNumberConverter<TLink>();
34         InitConstants(links);
35         _charToUnicodeSymbolConverter = new CharToUnicodeSymbolConverter<TLink>(links,
36             ↪ addressToRawNumberConverter, _unicodeSymbolMarker);
37     }
38
39     private void InitConstants(ILinks<TLink> links)
40     {
41         var markerIndex = _one;
42         var meaningRoot = links.GetOrCreate(markerIndex, markerIndex);
43         _unicodeSymbolMarker = links.GetOrCreate(meaningRoot,
44             ↪ Arithmetic.Increment(markerIndex));
45         _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
46         _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
47         _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
48         _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
49     }
50
51     public void AttachElementToParent(TLink elementToAttach, TLink parent)
52     {
53     }
54
55     public IList<TLink> ToElements(string @string)
56     {
57         var elements = new TLink[@string.Length];
58         for (int i = 0; i < @string.Length; i++)
59         {
60             elements[i] = _charToUnicodeSymbolConverter.Convert(@string[i]);
61         }
62         return elements;
63     }
64
65     public TLink CreateDocument(string name)
66     {
67         _index.Add(ToElements(name));
68         return _nullConstant;
69     }
70
71     public TLink CreateElement(string name)
72     {
73         _index.Add(ToElements(name));
74         return _nullConstant;
75     }
76
77     public TLink CreateTextElement(string content)
78     {
79         _index.Add(ToElements(content));
80         return _nullConstant;
81     }
82 }

```

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