

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,
61                 ↪ Arithmetic.Increment(markerIndex));
62             _unicodeSequenceMarker = links.GetOrCreate(meaningRoot,
63                 ↪ Arithmetic.Increment(markerIndex));
64             _elementMarker = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
65             _textElementMarker = links.GetOrCreate(meaningRoot,
66                 ↪ Arithmetic.Increment(markerIndex));
67             _documentMarker = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
68         }
69
70         public TLink CreateDocument(string name) => Create(_documentMarker, name);
71
72         public TLink CreateElement(string name) => Create(_elementMarker, name);
73
74         public TLink CreateTextElement(string content) => Create(_textElementMarker, content);
75
76         private TLink Create(TLink marker, string content)
77         {
78         }
```

```

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                     break;
72                 }
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                 break;
92         }
93     }
94 }

```

```

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
98 private string ToXPath(Stack<string> path) => string.Join("/", path.Reverse());
99
100 private class RootElementContext : XmlElementContext
101 {
102     public ulong TotalElements;
103     public ulong TotalContentsLength;
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
38     }, token);
39 }
40
41 private void Read(XmlReader reader, CancellationToken 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 }
99
100 private string ToXPath(Stack<string> path) => string.Join("/", path.Reverse());

```

```

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     }

```

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
83 }
84
85 }

```

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