

# 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         public TLink CreateElement(string name) => Create(_elementMarker, name);
74         public TLink CreateTextElement(string content) => Create(_textElementMarker, content);
75         private TLink Create(TLink marker, string content) => _links.GetOrCreate(marker,
76             ↪ _stringToUnicodeSequenceConverter.Convert(content));
77         public void AttachElementToParent(TLink elementToAttach, TLink parent) =>
78             ↪ _links.GetOrCreate(parent, elementToAttach);
79     }
80 }
```

```

60
61     public TLink GetDocument(string name) => Get(_documentMarker, name);
62     public TLink GetTextElement(string content) => Get(_textElementMarker, content);
63     public TLink GetElement(string name) => Get(_elementMarker, name);
64     private TLink Get(TLink marker, string content) => _links.SearchOrDefault(marker,
        ↳ _stringToUnicodeSequenceConverter.Convert(content));
65     public IList<TLink> GetChildren(TLink parent) {
66         var childrens = new List<TLink>();
67         _links.Each((link) => {
68             childrens.Add(_links.GetTarget(link));
69             return this._links.Constants.Continue;
70         }, new Link<TLink>(_links.Constants.Any, parent, _links.Constants.Any));
71         return childrens;
72     }
73 }
74 }

```

## 1.2 ./csharp/Platform.Data.Doublets.Xml/IComandLineInterface.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 IComandLineInterface
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  using System.Collections.Generic;
4
5  namespace Platform.Data.Doublets.Xml
6  {
7      public interface IXmlStorage<TLink>
8      {
9          TLink CreateDocument(string name);
10         TLink CreateElement(string name);
11         TLink CreateTextElement(string content);
12         TLink GetDocument(string name);
13         TLink GetElement(string name);
14         TLink GetTextElement(string content);
15         IList<IList<TLink>> GetChildren(TLink parent);
16         void AttachElementToParent(TLink elementToAttach, TLink parent);
17     }
18 }

```

## 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             private void Count(XmlReader reader, string elementNameToCount, CancellationToken token,
40                               ↳ XmlElementContext context)
41             {
42                 var rootContext = (RootElementContext)context;
43                 var parentContexts = new Stack<XmlElementContext>();
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                                 parentContexts.Push(context);
65                                 context = new XmlElementContext();
66                             }
67                             else
68                             {
69                                 ConsoleHelpers.Debug("{0} finished.", elementName);
70                                 break;
71                             }
72                         case XmlNodeType.EndElement:
73                             ConsoleHelpers.Debug("{0} finished.", elements.Count <= 20 ?
74                                                         ↳ ToXPath(elements) : elements.Peek()); // XPath
75                             var topElement = elements.Pop();
76                             // Restoring scope

```

```

73         context = parentContexts.Pop();
74         if (topElement.StartsWith(elementNameToCount))
75         {
76             rootContext.TotalElements++;
77             // TODO: Check for 0x00 part/symbol at 198102797 line and 13
78             ↪ position.
79             //if (rootContext.TotalPages > 3490000)
80             //    selfCancel = true;
81             if (context.ChildrenNamesCounts[elementNameToCount] % 10000 == 0)
82             {
83                 Console.WriteLine(topElement);
84             }
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
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/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     class XmlExporter<TLink>
14     {
15         private readonly IXmlStorage<TLink> _storage;
16
17         public XmlExporter(IXmlStorage<TLink> storage) => _storage = storage;
18
19         public Task Export(string documentName, string fileName, CancellationToken token)
20         {
21             return Task.Factory.StartNew(() =>
22             {
23                 try
24                 {
25                     var document = _storage.GetDocument(documentName);
26                     using (var writer = XmlWriter.Create(fileName))
27                     {
28                         Write(writer, token, new ElementContext(document));
29                     }
30                 }
31                 catch (Exception ex)
32                 {
33                     Console.WriteLine(ex.ToStringWithAllInnerExceptions());
34                 }
35             }, token);
36         }
37
38         private void Write(XmlWriter writer, CancellationToken token, ElementContext context)
39         {
40             var parentContexts = new Stack<ElementContext>();
41             var elements = new Stack<string>(); // Path
42                                     // TODO: If path was loaded previously, skip it.
43             foreach (TLink lvl in _storage.GetChildren(parent: context.Parent))
44             {
45                 Write(writer: writer, token: token, context: new ElementContext(lvl));
46             }
47         }
48
49         private class ElementContext : XmlElementContext
50         {
51             public readonly TLink Parent;
52
53             public ElementContext(TLink parent) => Parent = parent;
54         }
55     }
56 }
57

```

## 1.8 ./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

```

```

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());
101
102 private class ElementContext : XmlElementContext
103 {
104     public readonly TLink Parent;
105
106     public ElementContext(TLink parent) => Parent = parent;
107 }

```

```

103     }
104 }

```

## 1.9 ./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     }

```

## 1.10 ./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
        ↳ TotalSequenceSymbolFrequencyCounter<TLink>(links);
30     Cache = new LinkFrequenciesCache<TLink>(links, totalSequenceSymbolFrequencyCounter);
31     _index = new CachedFrequencyIncrementingSequenceIndex<TLink>(Cache);
32     var addressToRawNumberConverter = new AddressToRawNumberConverter<TLink>();
33     InitConstants(links);
34     _charToUnicodeSymbolConverter = new CharToUnicodeSymbolConverter<TLink>(links,
        ↳ addressToRawNumberConverter, _unicodeSymbolMarker);
35 }
36
37 private void InitConstants(ILinks<TLink> links)
38 {
39     var markerIndex = _one;
40     var meaningRoot = links.GetOrCreate(markerIndex, markerIndex);
41     _unicodeSymbolMarker = links.GetOrCreate(meaningRoot,
        ↳ Arithmetic.Increment(markerIndex));
42     _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
43     _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
44     _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
45     _ = links.GetOrCreate(meaningRoot, Arithmetic.Increment(markerIndex));
46 }
47
48 public void AttachElementToParent(TLink elementToAttach, TLink parent)
49 {
50 }
51
52 public IList<TLink> ToElements(string @string)
53 {
54     var elements = new TLink[@string.Length];
55     for (int i = 0; i < @string.Length; i++)
56     {
57         elements[i] = _charToUnicodeSymbolConverter.Convert(@string[i]);
58     }
59     return elements;
60 }
61
62 public TLink CreateDocument(string name)
63 {
64     _index.Add(ToElements(name));
65     return _nullConstant;
66 }
67
68 public TLink CreateElement(string name)
69 {
70     _index.Add(ToElements(name));
71     return _nullConstant;
72 }
73
74 public TLink CreateTextElement(string content)
75 {
76     _index.Add(ToElements(content));
77     return _nullConstant;
78 }
79
80 public TLink GetDocument(string name)
81 {
82     throw new System.NotImplementedException();
83 }
84
85 public TLink GetElement(string name)
86 {
87     throw new System.NotImplementedException();
88 }
89
90 public TLink GetTextElement(string content)
91 {
92     throw new System.NotImplementedException();
93 }
94
95 public IList<IList<TLink>> GetChildren(TLink parent)
96 {
97     throw new System.NotImplementedException();
98 }
99 }
100 }

```



## Index

./csharp/Platform.Data.Doublets.Xml/DefaultXmlStorage.cs, 1  
./csharp/Platform.Data.Doublets.Xml/ ICommandLineInterface.cs, 2  
./csharp/Platform.Data.Doublets.Xml/IXmlStorage.cs, 2  
./csharp/Platform.Data.Doublets.Xml/XmlElementContext.cs, 2  
./csharp/Platform.Data.Doublets.Xml/XmlElementCounter.cs, 2  
./csharp/Platform.Data.Doublets.Xml/XmlElementCounterCLI.cs, 4  
./csharp/Platform.Data.Doublets.Xml/XmlExporter.cs, 4  
./csharp/Platform.Data.Doublets.Xml/XmlImporter.cs, 5  
./csharp/Platform.Data.Doublets.Xml/XmlImporterCLI.cs, 7  
./csharp/Platform.Data.Doublets.Xml/XmlIndexer.cs, 7