

# LinksPlatform's Platform.Communication.Protocol.Lino Class Library

## 1.1 ./csharp/Platform.Communication.Protocol.Lino/ILinksGroupListExtensions.cs

```
1 using System.Collections.Generic;
2 using System.Runtime.CompilerServices;
3
4 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
5
6 namespace Platform.Communication.Protocol.Lino
7 {
8     public static class ILinksGroupListExtensions
9     {
10         [MethodImpl(MethodImplOptions.AggressiveInlining)]
11         public static List<Link> ToLinksList(this IList<LinksGroup> groups)
12         {
13             var list = new List<Link>();
14             for (var i = 0; i < groups.Count; i++)
15             {
16                 groups[i].AppendToLinksList(list);
17             }
18             return list;
19         }
20     }
21 }
```

## 1.2 ./csharp/Platform.Communication.Protocol.Lino/IListExtensions.cs

```
1 using Platform.Collections;
2 using System;
3 using System.Collections.Generic;
4 using System.Linq;
5 using System.Runtime.CompilerServices;
6
7 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
8
9 namespace Platform.Communication.Protocol.Lino
10 {
11     public static class IListExtensions
12     {
13         [MethodImpl(MethodImplOptions.AggressiveInlining)]
14         public static string Format(this IList<Link> links) => string.Join(Environment.NewLine,
15             ↪ links.Select(l => l.ToString()));
16
17         [MethodImpl(MethodImplOptions.AggressiveInlining)]
18         public static string Format(this IList<Link> links, bool lessParentheses)
19         {
20             if (lessParentheses == false)
21             {
22                 return links.Format();
23             }
24             else
25             {
26                 return string.Join(Environment.NewLine, links.Select(l =>
27                     ↪ l.ToString().TrimSingle('(').TrimSingle(')')));
28             }
29         }
30     }
31 }
```

## 1.3 ./csharp/Platform.Communication.Protocol.Lino/Link.cs

```
1 using System;
2 using System.Collections.Generic;
3 using System.Runtime.CompilerServices;
4 using System.Text;
5 using Platform.Collections;
6 using Platform.Collections.Lists;
7
8 #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
9
10 namespace Platform.Communication.Protocol.Lino
11 {
12     public struct Link : IEquatable<Link>
13     {
14         public readonly string Id;
15
16         public readonly IList<Link> Values;
17
18         [MethodImpl(MethodImplOptions.AggressiveInlining)]
19         public Link(string id, IList<Link> values) => (Id, Values) = (id, values);
20
21         [MethodImpl(MethodImplOptions.AggressiveInlining)]
22         public Link(IList<Link> values) : this(null, values) { }
```

```

23 [MethodImpl(MethodImplOptions.AggressiveInlining)]
24 public Link(params Link[] values) : this(null, values) { }
25
26 [MethodImpl(MethodImplOptions.AggressiveInlining)]
27 public Link(string id) : this(id, null) { }
28
29 [MethodImpl(MethodImplOptions.AggressiveInlining)]
30 public override string ToString() => Values.IsNullOrEmpty() ? $"{Id}" :
31     ↪ GetLinkValuesString();
32
33 [MethodImpl(MethodImplOptions.AggressiveInlining)]
34 private string GetLinkValuesString() => Id == null ? $"{GetValuesString()}" :
35     ↪ $"{Id}: {GetValuesString()}";
36
37 [MethodImpl(MethodImplOptions.AggressiveInlining)]
38 public string GetValuesString()
39 {
40     var sb = new StringBuilder();
41     for (int i = 0; i < Values.Count; i++)
42     {
43         if (i > 0)
44         {
45             sb.Append(' ');
46         }
47         sb.Append(GetValueString(Values[i]));
48     }
49     return sb.ToString();
50 }
51
52 [MethodImpl(MethodImplOptions.AggressiveInlining)]
53 public Link Simplify()
54 {
55     if (Values.IsNullOrEmpty())
56     {
57         return this;
58     }
59     else if (Values.Count == 1)
60     {
61         return Values[0];
62     }
63     else
64     {
65         var newValues = new Link[Values.Count];
66         for (int i = 0; i < Values.Count; i++)
67         {
68             newValues[i] = Values[i].Simplify();
69         }
70         return new Link(Id, newValues);
71     }
72 }
73
74 [MethodImpl(MethodImplOptions.AggressiveInlining)]
75 public Link Combine(Link other) => new Link(this, other);
76
77 [MethodImpl(MethodImplOptions.AggressiveInlining)]
78 public static string GetValueString(Link value) => value.ToLinkOrIdString();
79
80 [MethodImpl(MethodImplOptions.AggressiveInlining)]
81 public string ToLinkOrIdString() => Values.IsNullOrEmpty() ? Id : ToString();
82
83 [MethodImpl(MethodImplOptions.AggressiveInlining)]
84 public static implicit operator Link(string value) => new Link(value);
85
86 [MethodImpl(MethodImplOptions.AggressiveInlining)]
87 public static implicit operator Link((string, IList<Link>) value) => new
88     ↪ Link(value.Item1, value.Item2);
89
90 [MethodImpl(MethodImplOptions.AggressiveInlining)]
91 public static implicit operator Link((Link, Link) value) => new Link(value.Item1,
92     ↪ value.Item2);
93
94 [MethodImpl(MethodImplOptions.AggressiveInlining)]
95 public static implicit operator Link((Link, Link, Link) value) => new Link(value.Item1,
96     ↪ value.Item2, value.Item3);
97
98 [MethodImpl(MethodImplOptions.AggressiveInlining)]
99 public override bool Equals(object obj) => obj is Link link ? Equals(link) : false;

```

```

96     [MethodImpl(MethodImplOptions.AggressiveInlining)]
97     public override int GetHashCode() => (Id, Values.GenerateHashCode()).GetHashCode();
98
99     [MethodImpl(MethodImplOptions.AggressiveInlining)]
100    public bool Equals(Link other) => Id == other.Id && Values.EqualTo(other.Values);
101
102    [MethodImpl(MethodImplOptions.AggressiveInlining)]
103    public static bool operator ==(Link left, Link right) => left.Equals(right);
104
105    [MethodImpl(MethodImplOptions.AggressiveInlining)]
106    public static bool operator !=(Link left, Link right) => !(left == right);
107
108    }
109 }

```

#### 1.4 ./csharp/Platform.Communication.Protocol.Lino/LinksGroup.cs

```

1  using System;
2  using System.Collections.Generic;
3  using System.Runtime.CompilerServices;
4  using Platform.Collections;
5  using Platform.Collections.Lists;
6
7  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
8
9  namespace Platform.Communication.Protocol.Lino
10 {
11     public struct LinksGroup : IEquatable<LinksGroup>
12     {
13         public Link Link
14         {
15             [MethodImpl(MethodImplOptions.AggressiveInlining)]
16             get;
17             [MethodImpl(MethodImplOptions.AggressiveInlining)]
18             set;
19         }
20
21         public IList<LinksGroup> Groups
22         {
23             [MethodImpl(MethodImplOptions.AggressiveInlining)]
24             get;
25             [MethodImpl(MethodImplOptions.AggressiveInlining)]
26             set;
27         }
28
29         [MethodImpl(MethodImplOptions.AggressiveInlining)]
30         public LinksGroup(Link link, IList<LinksGroup> groups)
31         {
32             Link = link;
33             Groups = groups;
34         }
35
36         [MethodImpl(MethodImplOptions.AggressiveInlining)]
37         public LinksGroup(Link link) : this(link, null) { }
38
39         [MethodImpl(MethodImplOptions.AggressiveInlining)]
40         public static implicit operator List<Link>(LinksGroup value) => value.ToLinksList();
41
42         [MethodImpl(MethodImplOptions.AggressiveInlining)]
43         public List<Link> ToLinksList()
44         {
45             var list = new List<Link>();
46             AppendToLinksList(list);
47             return list;
48         }
49
50         [MethodImpl(MethodImplOptions.AggressiveInlining)]
51         public void AppendToLinksList(List<Link> list) => AppendToLinksList(list, Link, this);
52
53         [MethodImpl(MethodImplOptions.AggressiveInlining)]
54         public static void AppendToLinksList(List<Link> list, Link dependency, LinksGroup group)
55         {
56             list.Add(dependency);
57             var groups = group.Groups;
58             if (!groups.IsNullOrEmpty())
59             {
60                 for (int i = 0; i < groups.Count; i++)
61                 {
62                     var innerGroup = groups[i];
63                     AppendToLinksList(list, dependency.Combine(innerGroup.Link), innerGroup);
64                 }
65             }
66         }
67     }
68 }

```

```

65     }
66 }
67
68 [MethodImpl(MethodImplOptions.AggressiveInlining)]
69 public override bool Equals(object obj) => obj is LinksGroup linksGroup ?
    ↳ Equals(linksGroup) : false;
70
71 [MethodImpl(MethodImplOptions.AggressiveInlining)]
72 public override int GetHashCode() => (Link, Groups.GenerateHashCode()).GetHashCode();
73
74 [MethodImpl(MethodImplOptions.AggressiveInlining)]
75 public bool Equals(LinksGroup other) => Link == other.Link &&
    ↳ Groups.EqualTo(other.Groups);
76
77 [MethodImpl(MethodImplOptions.AggressiveInlining)]
78 public static bool operator ==(LinksGroup left, LinksGroup right) => left.Equals(right);
79
80 [MethodImpl(MethodImplOptions.AggressiveInlining)]
81 public static bool operator !=(LinksGroup left, LinksGroup right) => !(left == right);
82 }
83 }

```

## 1.5 ./csharp/Platform.Communication.Protocol.Lino/\_\_.cs

```

1  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
2
3  using System.Runtime.CompilerServices;
4
5  namespace Platform.Communication.Protocol.Lino
6  {
7      public struct _
8      {
9          public readonly Link Link;
10
11          [MethodImpl(MethodImplOptions.AggressiveInlining)]
12          public _(Link id) => Link = id;
13
14          [MethodImpl(MethodImplOptions.AggressiveInlining)]
15          public static implicit operator _(Link value) => new _(value);
16
17          [MethodImpl(MethodImplOptions.AggressiveInlining)]
18          public static implicit operator _((string id) => new _(id);
19
20          [MethodImpl(MethodImplOptions.AggressiveInlining)]
21          public static implicit operator _((string, Link) value) => new Link(value.Item1, new
    ↳ Link[] { value.Item2 });
22
23          [MethodImpl(MethodImplOptions.AggressiveInlining)]
24          public static implicit operator _((string, Link, Link) value) => new Link(value.Item1,
    ↳ new Link[] { value.Item2, value.Item3 });
25
26          [MethodImpl(MethodImplOptions.AggressiveInlining)]
27          public static implicit operator _((string, Link, Link, Link) value) => new
    ↳ Link(value.Item1, new Link[] { value.Item2, value.Item3, value.Item4 });
28
29          [MethodImpl(MethodImplOptions.AggressiveInlining)]
30          public static implicit operator Link(_ value) => value.Link;
31      }
32 }

```

## 1.6 ./csharp/Platform.Communication.Protocol.Lino.Tests/ParserTests.cs

```

1  using Xunit;
2
3  namespace Platform.Communication.Protocol.Lino.Tests
4  {
5      public static class ParserTests
6      {
7          [Fact]
8          public static void SingleLinkTest()
9          {
10              var source = @"(address: source target)";
11              var parser = new Parser();
12              var links = parser.Parse(source);
13              var target = links.Format();
14              Assert.Equal(source, target);
15          }
16
17          [Fact]
18          public static void TwoLinksTest()
19          {

```

```

20         var source = @"(first: x y)
21 (second: a b)";
22         var parser = new Parser();
23         var links = parser.Parse(source);
24         var target = links.Format();
25         Assert.Equal(source, target);
26     }
27
28     [Fact]
29     public static void ParseAndStringifyTest()
30     {
31         var source = @"(papa (lovesMama: loves mama))
32 (son lovesMama)
33 (daughter lovesMama)
34 (all (love mama))";
35         var parser = new Parser();
36         var links = parser.Parse(source);
37         var target = links.Format();
38         Assert.Equal(source, target);
39     }
40
41     [Fact]
42     public static void ParseAndStringifyWithLessParenthesesTest()
43     {
44         var source = @"lovesMama: loves mama
45 papa lovesMama
46 son lovesMama
47 daughter lovesMama
48 all (love mama)";
49         var parser = new Parser();
50         var links = parser.Parse(source);
51         var target = links.Format(lessParentheses: true);
52         Assert.Equal(source, target);
53     }
54
55     [Fact]
56     public static void SignificantWhitespaceTest()
57     {
58         var source = @"
59 users
60     user1
61         id
62             43
63         name
64             first
65                 John
66             last
67                 Williams
68         location
69             New York
70         age
71             23
72     user2
73         id
74             56
75         name
76             first
77                 Igor
78             middle
79                 Petrovich
80             last
81                 Ivanov
82         location
83             Moscow
84         age
85             20";
86         var target = @"(users)
87 (users user1)
88 ((users user1) id)
89 (((users user1) id) 43)
90 ((users user1) name)
91 (((users user1) name) first)
92 ((((users user1) name) first) John)
93 (((users user1) name) last)
94 (((((users user1) name) last) Williams)
95 ((users user1) location)
96 (((users user1) location) (New York))
97 ((users user1) age)
98 (((users user1) age) 23)
99 (users user2)
100 ((users user2) id)

```

```

101 ((users user2) id) 56)
102 ((users user2) name)
103 (((users user2) name) first)
104 (((users user2) name) first) Igor)
105 (((users user2) name) middle)
106 (((users user2) name) middle) Petrovich)
107 (((users user2) name) last)
108 (((users user2) name) last) Ivanov)
109 ((users user2) location)
110 ((users user2) location) Moscow)
111 ((users user2) age)
112 ((users user2) age) 20)";
113         var parser = new Parser();
114         var links = parser.Parse(source);
115         var formattedLinks = links.Format();
116         Assert.Equal(target, formattedLinks);
117     }
118 }
119 }

```

## 1.7 ./csharp/Platform.Communication.Protocol.Lino.Tests/TupleTests.cs

```

1 using System.Collections.Generic;
2 using Xunit;
3
4 namespace Platform.Communication.Protocol.Lino.Tests
5 {
6     public class TupleTests
7     {
8         [Fact]
9         public void TupleToLinkTest()
10        {
11            var source = @"(papa (lovesMama: loves mama))
12(son lovesMama)
13(daughter lovesMama)
14(all (love mama))";
15            var parser = new Parser();
16            var links = parser.Parse(source);
17            var targetFromString = links.Format();
18
19            IList<Link> constructedLinks = new List<Link>()
20            {
21                ("papa", (_)("lovesMama", "loves", "mama")),
22                ("son", "lovesMama"),
23                ("daughter", "lovesMama"),
24                ("all", ("love", "mama")),
25            };
26            var targetFromTuples = constructedLinks.Format();
27            Assert.Equal(targetFromString, targetFromTuples);
28        }
29    }
30 }

```

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