```
LinksPlatform's Platform Communication Class Library
     ./csharp/Platform.Communication/Protocol/Gexf/Edge.cs
   using System.Globalization;
   using System.Runtime.CompilerServices;
2
   using System.Xml;
   using System.Xml.Serialization;
4
   #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
6
   namespace Platform.Communication.Protocol.Gexf
8
        public class Edge
10
11
            public static readonly string ElementName = "edge";
12
            public const string IdAttributeName = "id"
13
            public const string SourceAttributeName = "source";
14
            public const string TargetAttributeName = "target";
public const string LabelAttributeName = "label";
15
16
17
            [XmlAttribute(AttributeName = IdAttributeName)]
18
            public long Id
19
20
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
22
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
                set:
^{24}
            }
25
26
            [XmlAttribute(AttributeName = SourceAttributeName)]
            public long Source
28
29
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
30
31
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
33
                set;
            }
34
35
            [XmlAttribute(AttributeName = TargetAttributeName)]
36
            public long Target
37
38
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
39
40
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
41
42
                set;
            }
43
44
            [XmlAttribute(AttributeName = LabelAttributeName)]
45
            public string Label
46
47
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
48
49
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
50
                set;
51
52
53
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
54
            public void WriteXml(XmlWriter writer) => WriteXml(writer, Id, Source, Target, Label);
55
56
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
57
            public static void WriteXml(XmlWriter writer, long id, long sourceNodeId, long
            targetNodeId) => WriteXml(writer, id, sourceNodeId, targetNodeId, null);
59
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
60
            public static void WriteXml(XmlWriter writer, long id, long sourceNodeId, long
                targetNodeId, string label)
62
                // <edge id="0" source="0" target="0" label="..." />
63
                writer.WriteStartElement(ElementName);
                writer.WriteAttributeString(IdAttributeName,

→ id.ToString(CultureInfo.InvariantCulture));
                writer.WriteAttributeString(SourceAttributeName,
66
                 → sourceNodeId.ToString(CultureInfo.InvariantCulture));
                writer.WriteAttributeString(TargetAttributeName,
                    targetNodeId.ToString(CultureInfo.InvariantCulture));
                if (!string.IsNullOrWhiteSpace(label))
                {
                    writer.WriteAttributeString(LabelAttributeName, label);
7.0
71
                writer.WriteEndElement();
72
            }
73
```

```
}
75
     ./csharp/Platform.Communication/Protocol/Gexf/Gexf.cs
1.2
   using System;
   using System.Runtime.CompilerServices;
2
   using System.Xml;
   using System.Xml.Serialization;
4
   #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
6
   namespace Platform.Communication.Protocol.Gexf
8
9
10
        [XmlRoot(ElementName = ElementName, Namespace = Namespace)]
       public class Gexf
11
12
            public const string ElementName = "gexf";
13
            public const string Namespace = "http://www.gexf.net/1.2draft";
public const string VersionAttributeName = "version";
15
            public const string GraphElementName = "graph";
            public static readonly string CurrentVersion = "1.2";
17
18
            [XmlAttribute(AttributeName = VersionAttributeName)]
19
            public string Version
20
21
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
2.3
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
25
            }
26
27
            [XmlElement(ElementName = GraphElementName)]
28
29
            public Graph Graph
30
31
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
32
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
34
                set;
            }
35
36
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
37
            public Gexf() => (Version, Graph) = (CurrentVersion, new Graph());
39
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
40
            public void WriteXml(XmlWriter writer) => WriteXml(writer, () => Graph.WriteXml(writer),
            → Version);
42
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
43
            public static void WriteXml(XmlWriter writer, Action writeGraph) => WriteXml(writer,

→ writeGraph, CurrentVersion);

45
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
            public static void WriteXml(XmlWriter writer, Action writeGraph, string version)
47
48
                writer.WriteStartDocument();
                writer.WriteStartElement(ElementName, Namespace);
50
                writer.WriteAttributeString(VersionAttributeName, version);
51
                writeGraph();
52
                writer.WriteEndElement();
                writer.WriteEndDocument();
54
            }
5.5
56
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
57
            public static void WriteXml(XmlWriter writer, Action writeNodes, Action writeEdges) =>
58
                WriteXml(writer, writeNodes, writeEdges, CurrentVersion, GraphMode.Static,
                GraphDefaultEdgeType.Directed);
59
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
60
            public static void WriteXml(XmlWriter writer, Action writeNodes, Action writeEdges,
                string version) => WriteXml(writer, writeNodes, writeEdges, version,
                GraphMode.Static, GraphDefaultEdgeType.Directed);
62
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
63
            public static void WriteXml(XmlWriter writer, Action writeNodes, Action writeEdges,
64
                string version, GraphMode mode) => WriteXml(writer, writeNodes, writeEdges, version,
               mode, GraphDefaultEdgeType.Directed);
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
66
```

```
public static void WriteXml(XmlWriter writer, Action writeNodes, Action writeEdges,
67
                string version, GraphMode mode, GraphDefaultEdgeType defaultEdgeType) =>
                WriteXml(writer, () => Graph.WriteXml(writer, writeNodes, writeEdges, mode,
                defaultEdgeType), version);
       }
   }
69
1.3
     ./csharp/Platform.Communication/Protocol/Gexf/Graph.cs
   using System;
   using System.Collections.Generic;
   using System.Runtime.CompilerServices;
3
   using System.Xml;
   using System.Xml.Serialization;
5
   #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
   namespace Platform.Communication.Protocol.Gexf
10
        public class Graph
11
12
            public static readonly string ElementName = "graph";
13
            public const string ModeAttributeName = "mode"
            public const string DefaultEdgeTypeAttributeName = "defaultedgetype";
15
                                                     "nodes";
            public const string NodesElementName =
16
            public const string NodeElementName = "node"
17
            public const string EdgesElementName = "edges";
18
            public const string EdgeElementName = "edge"
19
20
            [XmlAttribute(AttributeName = ModeAttributeName)]
            public GraphMode Mode
22
23
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
24
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
27
                set;
            }
28
29
            [XmlAttribute(AttributeName = DefaultEdgeTypeAttributeName)]
            public GraphDefaultEdgeType DefaultEdgeType
31
32
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
33
34
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
                set;
36
            }
37
38
            [XmlArray(ElementName = NodesElementName)]
39
            [XmlArrayItem(ElementName = NodeElementName)]
40
            public List<Node> Nodes
41
42
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
43
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
45
46
                set;
            }
47
48
            [XmlArray(ElementName = EdgesElementName)]
            [XmlArrayItem(ElementName = EdgeElementName)]
50
            public List<Edge> Edges
52
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
53
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
55
56
57
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
59
            public Graph() => (Nodes, Edges) = (new List<Node>(), new List<Edge>());
60
61
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
62
            public void WriteXml(XmlWriter writer) => WriteXml(writer, () => WriteNodes(writer), ()
63
               => WriteEdges(writer), Mode, DefaultEdgeType);
64
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
65
66
            private void WriteEdges(XmlWriter writer)
67
                for (var i = 0; i < Edges.Count; i++)</pre>
68
                {
69
                    Edges[i].WriteXml(writer);
                }
7.1
```

```
73
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
74
            private void WriteNodes(XmlWriter writer)
76
                for (var i = 0; i < Nodes.Count; i++)</pre>
77
78
                    Nodes[i].WriteXml(writer);
79
                }
80
            }
81
82
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
83
            public static void WriteXml(XmlWriter writer, Action writeNodes, Action writeEdges) =>
84
                WriteXml(writer, writeNodes, writeEdges, GraphMode.Static,
                GraphDefaultEdgeType.Directed);
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
86
            public static void WriteXml(XmlWriter writer, Action writeNodes, Action writeEdges,
                GraphMode mode) => WriteXml(writer, writeNodes, writeEdges, mode,
                GraphDefaultEdgeType.Directed);
88
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
            public static void WriteXml(XmlWriter writer, Action writeNodes, Action writeEdges,
90
                GraphMode mode, GraphDefaultEdgeType defaultEdgeType)
                writer.WriteStartElement(ElementName);
92
                writer.WriteAttributeString(ModeAttributeName, mode.ToString().ToLower());
                writer.WriteAttributeString(DefaultEdgeTypeAttributeName,
94

→ defaultEdgeType.ToString().ToLower());
                writer.WriteStartElement(NodesElementName);
95
                writeNodes();
96
                writer.WriteEndElement();
                writer.WriteStartElement(EdgesElementName);
98
                writeEdges();
99
                writer.WriteEndElement();
                writer.WriteEndElement();
101
            }
102
        }
103
104
     ./csharp/Platform.Communication/Protocol/Gexf/GraphDefaultEdgeType.cs
1.4
    using System.Xml.Serialization;
    #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
    namespace Platform.Communication.Protocol.Gexf
 5
        public enum GraphDefaultEdgeType
            [XmlEnum(Name = "directed")]
 9
            Directed
10
        }
11
    }
12
1.5
     ./csharp/Platform.Communication/Protocol/Gexf/GraphMode.cs
    using System.Xml.Serialization;
    #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
 3
    namespace Platform.Communication.Protocol.Gexf
 5
    {
        public enum GraphMode
 8
             [XmlEnum(Name = "static")]
            Static,
10
11
            [XmlEnum(Name = "dynamic")]
12
            Dynamic
13
        }
14
15
     ./csharp/Platform.Communication/Protocol/Gexf/Node.cs
   using System. Globalization;
   using System.Runtime.CompilerServices;
   using System.Xml;
 3
    using System.Xml.Serialization;
 4
    #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
```

```
namespace Platform.Communication.Protocol.Gexf
   {
        public class Node
10
11
            public static readonly string ElementName = "node";
12
            public const string IdAttributeName = "id";
13
            public const string LabelAttributeName = "label";
14
15
            [XmlAttribute(AttributeName = IdAttributeName)]
16
            public long Id
17
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
19
20
                {\tt [MethodImpl(MethodImplOptions.AggressiveInlining)]}
21
            }
23
24
            [XmlAttribute(AttributeName = LabelAttributeName)]
25
            public string Label
26
27
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
28
29
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
30
                set:
            }
32
33
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
34
            public void WriteXml(XmlWriter writer) => WriteXml(writer, Id, Label);
35
37
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
            public static void WriteXml(XmlWriter writer, long id, string label)
38
39
                // <node id="0" label="..
40
                writer.WriteStartElement(ElementName);
41
                writer.WriteAttributeString(IdAttributeName,
42

    id.ToString(CultureInfo.InvariantCulture));
                writer.WriteAttributeString(LabelAttributeName, label);
43
                writer.WriteEndElement();
44
            }
45
        }
46
47
     ./csharp/Platform. Communication/Protocol/Udp/UdpClientExtensions.cs\\
1.7
   using System.Net;
   using System. Net. Sockets:
2
   using System.Runtime.CompilerServices;
   using System. Text;
4
   #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
6
8
   namespace Platform.Communication.Protocol.Udp
9
        public static class UdpClientExtensions
10
11
            public static readonly Encoding DefaultEncoding = Encoding.UTF8;
12
13
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
14
            public static int SendString(this UdpClient udp, IPEndPoint ipEndPoint, string message)
15
                var bytes = DefaultEncoding.GetBytes(message);
17
                return udp.Send(bytes, bytes.Length, ipEndPoint);
18
            }
19
20
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
            public static string ReceiveString(this UdpClient udp)
23
                IPEndPoint remoteEndPoint = default;
24
                return DefaultEncoding.GetString(udp.Receive(ref remoteEndPoint));
25
            }
26
       }
   }
28
     ./csharp/Platform.Communication/Protocol/Udp/UdpReceiver.cs
   using System;
   using System. Net. Sockets;
2
   using System.Runtime.CompilerServices;
   using System. Threading
   using Platform.Disposables;
5
   using Platform.Exceptions;
```

```
using Platform. Threading;
   #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
10
   namespace Platform.Communication.Protocol.Udp
11
12
        public delegate void MessageHandlerCallback(string message);
13
        /// <summary>
15
        /// <para>Represents the receiver of messages transfered via UDP protocol.</para>
16
        /// <para>Представляет получателя сообщений по протоколу UDP.</para>
17
        /// </summary>
18
        public class UdpReceiver : DisposableBase //-V3073
19
20
            private const int DefaultPort = 15000;
2.1
22
            private bool _receiverRunning;
23
            private Thread _thread;
private readonly UdpClient _udp;
24
25
            private readonly MessageHandlerCallback _messageHandler;
26
            public bool Available
28
29
                [MethodImpl(MethodImplOptions.AggressiveInlining)]
30
                get => _udp.Available > 0;
            }
32
33
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
34
            public UdpReceiver(int listenPort, bool autoStart, MessageHandlerCallback messageHandler)
35
36
                _udp = new UdpClient(listenPort);
                _messageHandler = messageHandler;
38
                if (autoStart)
39
                {
40
                    Start();
41
                }
42
            }
43
44
45
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
            public UdpReceiver(int listenPort, MessageHandlerCallback messageHandler) :
46
                this(listenPort, true, messageHandler) { }
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
            public UdpReceiver(MessageHandlerCallback messageHandler) : this(DefaultPort, true,
49
            → messageHandler) { }
50
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
51
            public UdpReceiver() : this(DefaultPort, true, message => { }) { }
52
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
54
            public void Start()
55
56
                if (!_receiverRunning && _thread == null)
57
58
                     _receiverRunning = true;
                     _thread = new Thread(Receiver);
60
                     _thread.Start();
61
                }
            }
63
64
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
            public void Stop()
66
67
                if (_receiverRunning && _thread != null)
68
                {
69
                     _receiverRunning = false;
70
71
                    _thread.Join();
                     _thread = null;
72
                }
73
            }
74
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
76
            public string Receive() => _udp.ReceiveString();
77
78
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
79
            public void ReceiveAndHandle() => _messageHandler(Receive());
80
81
            /// <remarks>
82
            /// <para>The method receives messages and runs in a separate thread.</para>
83
            /// <para>Метод получает сообщения и работает в отдельном потоке.</para>
84
```

```
/// </remarks>
85
             [MethodImpl(MethodImplOptions.AggressiveInlining)]
            private void Receiver()
87
88
                 while (_receiverRunning)
                 {
90
                     try
91
                         if (Available)
93
                         {
94
                              ReceiveAndHandle();
                         }
                         else
97
                         {
                              ThreadHelpers.Sleep();
99
                         }
100
                     catch (Exception exception)
102
103
                         exception.Ignore();
104
                     }
105
                 }
106
            }
107
108
             [MethodImpl(MethodImplOptions.AggressiveInlining)]
109
            protected override void Dispose(bool manual, bool wasDisposed)
110
                 if (!wasDisposed)
112
                 {
113
                     Stop();
115
                     _udp.DisposeIfPossible();
116
            }
117
        }
118
119
1.9
     ./csharp/Platform.Communication/Protocol/Udp/UdpSender.cs
    using System.Net;
    using System.Net.Sockets;
          System.Runtime.CompilerServices;
 3
    using
    using Platform.Disposables;
    #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
    namespace Platform.Communication.Protocol.Udp
 9
        /// <summary>
10
        /// <para>Represents the sender of messages transfered via UDP protocol.</para>
        /// <para>Представляет отправителя сообщений по протоколу UDP.</para>
12
        /// </summary>
13
14
        public class UdpSender : DisposableBase //-V3073
15
            private readonly UdpClient _udp;
16
            private readonly IPEndPoint _ipendpoint;
17
18
             [MethodImpl(MethodImplOptions.AggressiveInlining)]
19
            public UdpSender(IPEndPoint ipendpoint) => (_udp, _ipendpoint) = (new UdpClient(),
20
             → ipendpoint);
21
             [MethodImpl(MethodImplOptions.AggressiveInlining)]
22
            public UdpSender(IPAddress address, int port) : this(new IPEndPoint(address, port)) { }
23
24
             [MethodImpl(MethodImplOptions.AggressiveInlining)]
25
            public UdpSender(string hostname, int port) : this(IPAddress.Parse(hostname), port) { }
27
             [MethodImpl(MethodImplOptions.AggressiveInlining)]
28
            public UdpSender(int port) : this(IPAddress.Loopback, port) { }
29
30
             [MethodImpl(MethodImplOptions.AggressiveInlining)]
            public int Send(string message) => _udp.SendString(_ipendpoint, message);
32
             [MethodImpl(MethodImplOptions.AggressiveInlining)]
34
            protected override void Dispose(bool manual, bool wasDisposed)
35
36
37
                 if (!wasDisposed)
38
                     _udp.DisposeIfPossible();
39
                 }
40
            }
```

```
}
42
   }
43
      ./csharp/Platform.Communication/Protocol/Xml/Serializer.cs
1.10
   using System. IO;
   using System.Runtime.CompilerServices;
2
   using System.Text;
   using System.Xml.Serialization;
4
   #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
6
   namespace Platform.Communication.Protocol.Xml
8
        public static class Serializer<T>
10
11
            public static readonly XmlSerializer Instance = new XmlSerializer(typeof(T));
12
13
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
14
            public static T FromFile(string path)
15
16
                using var stream = File.OpenRead(path);
                return (T)Instance.Deserialize(stream);
            }
19
20
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
21
            public static T FromString(string xml)
22
24
                using var reader = new StringReader(xml);
                return (T)Instance.Deserialize(reader);
25
26
27
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
28
            public static void ToFile(T @object, string path)
30
                using var stream = File.OpenWrite(path);
31
                Instance.Serialize(stream, @object);
            }
33
            [MethodImpl(MethodImplOptions.AggressiveInlining)]
            public static string ToString(T @object)
36
37
                var sb = new StringBuilder();
                using (var writer = new StringWriter(sb))
39
                {
40
                    Instance.Serialize(writer, @object);
41
                }
                return sb.ToString();
43
            }
44
        }
45
   }
^{46}
      ./csharp/Platform.Communication.Tests/SerializerTests.cs
1.11
   using System;
   using System. IO;
   using Xunit;
   using Platform.Singletons;
   using Platform.Communication.Protocol.Xml;
   namespace Platform.Communication.Tests
        public static class SerializerTests
9
10
            [Fact]
            public static void SerializeToFileTest()
12
13
                var tempFilename = Path.GetTempFileName();
14
                Serializer<object>.ToFile(Default<object>.Instance, tempFilename);
15
                Assert.Equal(File.ReadAllText(tempFilename), $\Bar{\$}\"<?xml
16
                    version=\"1.0\"?>{Environment.NewLine}<anyType</pre>
                 xmlns:xsi=\"http://www.w3.org/2001/XMLSchema-instance\"

    xmlns:xsd=\"http://www.w3.org/2001/XMLSchema\" />");

                File.Delete(tempFilename);
17
            }
19
            [Fact]
            public static void SerializeAsXmlStringTest()
21
22
                var serializedObject = Serializer<object>.ToString(Default<object>.Instance);
```

```
^{24}
               encoding=\"utf-16\"?>{Environment.NewLine}<anyType
               xmlns:xsi=\"http://www.w3.org/2001/XMLSchema-instance\"
               \rightarrow xmlns:xsd=\"http://www.w3.org/2001/XMLSchema\" />");
          }
       }
^{26}
^{27}
1.12 ./csharp/Platform.Communication.Tests/UdpReceiverTests.cs
  using Xunit;
using Platform.Communication.Protocol.Udp;
3
   namespace Platform.Communication.Tests
5
       public static class UdpReceiverTests
           [Fact]
           public static void DisposalTest()
10
              using var receiver = new UdpReceiver();
11
12
       }
   }
14
```

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