Raport podsumowującego wyniki sposobu serializacji danych

Adrian Stahl

GRPC - Interfejs IDL

```proto
syntax = "proto3";

option java_multiple_files = true;
option java_package = "gen.grpc";

package gen.grpc;

enum DemoEnum {
    UNKNOWN = 0;
    FOO = 1;
    BAR = 2;
}

message IntMessage {
    int32 arg1 = 1;
    int32 arg2 = 2;
}

message StringMessage {
    string arg1 = 1;
    string arg2 = 2;
}

message EnumMessage {
    DemoEnum arg1 = 1;
    DemoEnum arg2 = 2;
}

message Empty {

}

service DemoService {
    rpc IntMethod(IntMessage) returns (Empty) {}
    rpc StringMethod(StringMessage) returns (Empty) {}
    rpc EnumMethod(EnumMessage) returns (Empty) {}
}
```

String

```
▾ GRPC Message: /gen.grpc.DemoService/StringMethod, Request
     Compressed Flag: Not Compressed (0)
     Message Length: 16
     Message Data: 16 bytes
▾ Protocol Buffers: /gen.grpc.DemoService/StringMethod,request
   ▾ Message: <UNKNOWN> Message Type
      ▾ Field(1):
           [Field Name: <UNKNOWN>]
           .000 1... = Field Number: 1
           .... .010 = Wire Type: Length-delimited (2)
           Value Length: 6
           Value: 49206c6f7665
      ▾ Field(2):
           [Field Name: <UNKNOWN>]
           .001 0... = Field Number: 2
           .... .010 = Wire Type: Length-delimited (2)
           Value Length: 6
           Value: 206772706321
```

```
0080   74 68 6f 64 83 86 5f 10   61 70 70 6c 69 63 61 74   thod··_· applicat
0090   69 6f 6e 2f 67 72 70 63   40 02 74 65 08 74 72 61   ion/grpc @·te·tra
00a0   69 6c 65 72 73 7a 16 67   72 70 63 2d 6a 61 76 61   ilersz·g rpc-java
00b0   2d 6e 65 74 74 79 2f 31   2e 36 33 2e 30 40 14 67   -netty/1 .63.0@·g
00c0   72 70 63 2d 61 63 63 65   70 74 2d 65 6e 63 6f 64   rpc-acce pt-encod
00d0   69 6e 67 04 67 7a 69 70   00 00 15 00 01 00 00 00   ing·gzip ········
00e0   03 00 00 00 00 10 0a 06   49 20 6c 6f 76 65 12 06   ······· I love··
```

```
▸ Frame 608: 496 bytes on wire (3968 bits), 496 bytes captured (3968 bits) on interface lo, id 0
▸ Ethernet II, Src: 00:00:00_00:00:00 (00:00:00:00:00:00), Dst: 00:00:00_00:00:00 (00:00:00:00:00:00)
▸ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
▸ Transmission Control Protocol, Src Port: 48186, Dst Port: 9090, Seq: 80, Ack: 50, Len: 430
▸ HyperText Transfer Protocol 2
▾ GRPC Message: /gen.grpc.DemoService/StringMethod, Request
     Compressed Flag: Not Compressed (0)
     Message Length: 266
     Message Data: 266 bytes
▾ Protocol Buffers: /gen.grpc.DemoService/StringMethod,request
   ▾ Message: <UNKNOWN> Message Type
      ▾ Field(2):
           [Field Name: <UNKNOWN>]
           .001 0... = Field Number: 2
           .... .010 = Wire Type: Length-delimited (2)
           Value Length: 263
           Value: 49206162736f6c7574656c792061646f7265206752504320666f7220697473207365616d…
```

```
00e0   03 00 00 00 01 0a 12 87   02 49 20 61 62 73 6f 6c   ········ ·I absol
00f0   75 74 65 6c 79 20 61 64   6f 72 65 20 67 52 50 43   utely ad ore gRPC
0100   20 66 6f 72 20 69 74 73   20 73 65 61 6d 6c 65 73    for its  seamles
0110   73 20 63 6f 6d 6d 75 6e   69 63 61 74 69 6f 6e 20   s commun ication
0120   62 65 74 77 65 65 6e 20   64 69 73 74 72 69 62 75   between  distribu
0130   74 65 64 20 73 79 73 74   65 6d 73 2c 20 65 66 66   ted syst ems, eff
0140   69 63 69 65 6e 74 20 62   69 6e 61 72 79 20 73 65   icient b inary se
```

INT32

```
▶ HyperText Transfer Protocol 2
▼ GRPC Message: /gen.grpc.DemoService/IntMethod, Request
    Compressed Flag: Not Compressed (0)
    Message Length: 4
    Message Data: 4 bytes
▼ Protocol Buffers: /gen.grpc.DemoService/IntMethod,request
  ▼ Message: <UNKNOWN> Message Type
    ▼ Field(1): 1 (uint32)
        [Field Name: <UNKNOWN>]
        .000 1... = Field Number: 1
        .... .000 = Wire Type: varint (0)
      ▶ Value: 01
    ▼ Field(2): 2 (uint32)
        [Field Name: <UNKNOWN>]
        .001 0... = Field Number: 2
        .... .000 = Wire Type: varint (0)
      ▶ Value: 02
```

```
0030   02 00 fe cd 00 00 01 01   08 0a c1 24 52 ca c1 24    ········ ··$R··$
0040   52 b7 00 00 8a 01 24 00   00 00 03 00 00 00 00 0f    R·····$· ········
0050   41 0e 31 32 37 2e 30 2e   30 2e 31 3a 39 30 39 30    A·127.0. 0.1:9090
0060   44 1f 2f 67 65 6e 2e 67   72 70 63 2e 44 65 6d 6f    D·/gen.g rpc.Demo
0070   53 65 72 76 69 63 65 2f   49 6e 74 4d 65 74 68 6f    Service/ IntMetho
0080   64 83 86 5f 10 61 70 70   6c 69 63 61 74 69 6f 6e    d··_·app lication
0090   2f 67 72 70 63 40 02 74   65 08 74 72 61 69 6c 65    /grpc@·t e·traile
```

```
▶ Frame 710: 231 bytes on wire (1848 bits), 231 bytes captured (1848 bits) on interface lo, id 0
▶ Ethernet II, Src: 00:00:00_00:00:00 (00:00:00:00:00:00), Dst: 00:00:00_00:00:00 (00:00:00:00:00:00)
▶ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
▶ Transmission Control Protocol, Src Port: 34834, Dst Port: 9090, Seq: 80, Ack: 50, Len: 165
▶ HyperText Transfer Protocol 2
▼ GRPC Message: /gen.grpc.DemoService/IntMethod, Request
    Compressed Flag: Not Compressed (0)
    Message Length: 4
    Message Data: 4 bytes
▼ Protocol Buffers: /gen.grpc.DemoService/IntMethod,request
  ▼ Message: <UNKNOWN> Message Type
    ▼ Field(1): 200000 (uint32)
        [Field Name: <UNKNOWN>]
        .000 1... = Field Number: 1
        .... .000 = Wire Type: varint (0)
      ▶ Value: c09a0c
```

```
0000   00 00 00 00 00 00 00 00   00 00 00 00 08 00 45 00    ········ ······E·
0010   00 d9 86 80 40 00 40 06   b5 9c 7f 00 00 01 7f 00    ····@·@· ········
0020   00 01 88 12 23 82 c4 03   08 35 e0 fa 04 26 80 18    ····#··· ·5···&··
0030   02 00 fe cd 00 00 01 01   08 0a c1 2e 6b 16 c1 2e    ········ ····k··.
0040   6a ff 00 00 8a 01 24 00   00 00 03 00 00 00 00 0f    j·····$· ········
0050   41 0e 31 32 37 2e 30 2e   30 2e 31 3a 39 30 39 30    A·127.0. 0.1:9090
0060   44 1f 2f 67 65 6e 2e 67   72 70 63 2e 44 65 6d 6f    D·/gen.g rpc.Demo
```

ENUM

```
▸ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
▸ Transmission Control Protocol, Src Port: 48186, Dst Port: 9090, Seq: 544, Ack: 201, Len: 73
▸ HyperText Transfer Protocol 2
▾ GRPC Message: /gen.grpc.DemoService/EnumMethod, Request
    Compressed Flag: Not Compressed (0)
    Message Length: 4
    Message Data: 4 bytes
▾ Protocol Buffers: /gen.grpc.DemoService/EnumMethod,request
  ▾ Message: <UNKNOWN> Message Type
    ▾ Field(1): 2 (uint32)
        [Field Name: <UNKNOWN>]
        .000 1... = Field Number: 1
        .... .000 = Wire Type: varint (0)
      ▸ Value: 02
    ▾ Field(2): 1 (uint32)
        [Field Name: <UNKNOWN>]
        .001 0... = Field Number: 2
        .... .000 = Wire Type: varint (0)
      ▸ Value: 01
```

```
0010  00 7d 27 fb 40 00 40 06  14 7e 7f 00 00 01 7f 00   ·}'·@·@·  ·~······
0020  00 01 bc 3a 23 82 28 ff  21 a7 f9 27 35 03 80 18   ···:#·(·  !··'5···
0030  02 00 fe 71 00 00 01 01  08 0a c1 36 bf 06 c1 35   ···q····  ···6··5
0040  77 ba 00 00 2e 01 24 00  00 00 05 00 00 00 00 0f   w····.$·  ········
0050  c3 44 20 2f 67 65 6e 2e  67 72 70 63 2e 44 65 6d   ·D /gen.  grpc.Dem
0060  6f 53 65 72 76 69 63 65  2f 45 6e 75 6d 4d 65 74   oService  /EnumMet
0070  68 6f 64 83 86 c2 c1 c0  bf 00 00 09 00 01 00 00   hod·····  ········
```

```
▸ Frame 59987: 104 bytes on wire (832 bits), 104 bytes captured (832 bits) on interface lo, id 0
▸ Ethernet II, Src: 00:00:00_00:00:00 (00:00:00:00:00:00), Dst: 00:00:00_00:00:00 (00:00:00:00:00:00)
▸ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
▸ Transmission Control Protocol, Src Port: 50898, Dst Port: 9090, Seq: 278, Ack: 201, Len: 38
▸ HyperText Transfer Protocol 2
▾ GRPC Message: /gen.grpc.DemoService/EnumMethod, Request
    Compressed Flag: Not Compressed (0)
    Message Length: 2
    Message Data: 2 bytes
▾ Protocol Buffers: /gen.grpc.DemoService/EnumMethod,request
  ▾ Message: <UNKNOWN> Message Type
    ▾ Field(1): 2 (uint32)
        [Field Name: <UNKNOWN>]
        .000 1... = Field Number: 1
        .... .000 = Wire Type: varint (0)
      ▸ Value: 02
```

```
0000  00 00 00 00 00 00 00 00  00 00 00 00 08 00 45 00   ········  ······E·
0010  00 5a 5e 5e 40 00 40 06  de 3d 7f 00 00 01 7f 00   ·Z^^@·@·  ·=······
0020  00 01 c6 d2 23 82 57 26  fa 4f 93 b2 88 11 80 18   ····#·W&  ·O······
0030  02 00 fe 4e 00 00 01 01  08 0a c1 41 f8 0c c1 41   ···N····  ···A···A
0040  b5 5e 00 00 0d 01 24 00  00 00 05 00 00 00 00 0f   ·^····$·  ········
0050  c3 c2 83 86 c1 c0 bf be  00 00 07 00 01 00 00 00   ········  ········
0060  05 00 00 00 00 02 08 02                            ·····.··
```

ICE - Interfejs IDL

```
1    #ifndef DEMO_ICE
2    #define DEMO_ICE
3
4    module Demo {
5        enum DemoEnum {
6            UNKNOWN,
7            FOO,
8            BAR
9        }
10       interface DemoService {
11           void IntMethod(optional(0) int arg1, optional(1) int arg2);
12           void StringMethod(optional(0) string arg1, optional(1) string arg2);
13           void EnumMethod(optional(0) DemoEnum arg1, optional(1) DemoEnum arg2);
14       }
15   }
16
17   #endif
```

String

```
    Protocol Major: 1
    Protocol Minor: 0
    Encoding Major: 1
    Encoding Minor: 0
    Message Type: Request (0)
    Compression Status: Uncompressed, sender cannot accept a compressed reply (0)
    Message Size: 67
  ▼ Request Message Body
    Request Identifier: 1
    Object Identity Name: test1
    Object Identity Content: test
    Facet Name: (empty)
    Operation Name: stringMethod
    Ice::OperationMode: normal (0)
    Invocation Context: (empty)
    Input Parameters Size: 22
    Input Parameters Encoding Major: 1
    Input Parameters Encoding Minor: 1
    Encapsulated parameters: 050649206c6f76650d06206772706321
```

```
0000  00 00 00 00 00 00 00 00   00 00 00 00 08 00 45 00   ........ ......E.
0010  00 77 79 1a 40 00 40 06   c3 64 7f 00 00 01 7f 00   .wy.@.@. .d......
0020  00 01 ca 1c 23 84 ee 09   66 ef dc 2d 72 f5 80 18   ....#... f..-r...
0030  02 00 fe 6b 00 00 01 01   08 0a c1 88 9b 21 c1 88   ...k.... .....!..
0040  9b 20 49 63 65 50 01 00   01 00 00 00 43 00 00 00   . IceP.. ....C...
0050  01 00 00 00 05 74 65 73   74 31 04 74 65 73 74 00   .....tes t1.test.
0060  0c 73 74 72 69 6e 67 4d   65 74 68 6f 64 00 00 16   .stringM ethod...
0070  00 00 00 01 01 05 06 49   20 6c 6f 76 65 0d 06 20   .......I  love..
0080  67 72 70 63 21                                       grpc!
```

```
    Protocol Major: 1
    Protocol Minor: 0
    Encoding Major: 1
    Encoding Minor: 0
    Message Type: Request (0)
    Compression Status: Uncompressed, sender cannot accept a compressed reply (0)
    Message Size: 320
  ▼ Request Message Body
    Request Identifier: 2
    Object Identity Name: test1
    Object Identity Content: test
    Facet Name: (empty)
    Operation Name: stringMethod
    Ice::OperationMode: normal (0)
    Invocation Context: (empty)
    Input Parameters Size: 275
    Input Parameters Encoding Major: 1
    Input Parameters Encoding Minor: 1
    Encapsulated parameters: 05ff0701000049206162736f6c7574656c792061646f7265206752504320666f20697...
```

```
0060  0c 73 74 72 69 6e 67 4d   65 74 68 6f 64 00 00 13   .stringM ethod...
0070  01 00 00 01 01 05 ff 07   01 00 00 49 20 61 62 73   .......I abs
0080  6f 6c 75 74 65 6c 79 20   61 64 6f 72 65 20 67 52   olutely  adore gR
0090  50 43 20 66 6f 72 20 69   74 73 20 73 65 61 6d 6c   PC for i ts seaml
00a0  65 73 73 20 63 6f 6d 6d   75 6e 69 63 61 74 69 6f   ess comm unicatio
00b0  6e 20 62 65 74 77 65 65   6e 20 64 69 73 74 72 69   n betwee n distri
00c0  62 75 74 65 64 20 73 79   73 74 65 6d 73 2c 20 65   buted sy stems, e
00d0  66 66 69 63 69 65 6e 74   20 62 69 6e 61 72 79 20   fficient  binary
00e0  73 65 72 69 61 6c 69 7a   61 74 69 6f 6e 2c 20 61   serializ ation, a
```

ENUM

Protocol Major: 1
Protocol Minor: 0
Encoding Major: 1
Encoding Minor: 0
Message Type: Request (0)
Compression Status: Uncompressed, sender cannot accept a compressed reply (0)
Message Size: 53
▾ Request Message Body
    Request Identifier: 3
    Object Identity Name: test1
    Object Identity Content: test
    Facet Name: (empty)
    Operation Name: enumMethod
    Ice::OperationMode: normal (0)
    Invocation Context: (empty)
    Input Parameters Size: 10
    Input Parameters Encoding Major: 1
    Input Parameters Encoding Minor: 1
    Encapsulated parameters: 04020c01

```
0000   00 00 00 00 00 00 00 00   00 00 00 00 08 00 45 00   ········ ······E·
0010   00 69 79 1e 40 00 40 06   c3 6e 7f 00 00 01 7f 00   ·iy·@·@·  ·n······
0020   00 01 ca 1c 23 84 ee 09   68 72 dc 2d 73 27 80 18   ····#···  hr·-s'··
0030   02 00 fe 5d 00 00 01 01   08 0a c1 89 56 37 c1 88   ···]····  ····V7··
0040   db cb 49 63 65 50 01 00   01 00 00 00 35 00 00 00   ··IceP··  ····5···
0050   03 00 00 00 05 74 65 73   74 31 04 74 65 73 74 00   ·····tes  t1·test·
0060   0a 65 6e 75 6d 4d 65 74   68 6f 64 00 00 0a 00 00   ·enumMet  hod·····
0070   00 01 01 04 02 0c 01                                ·······
```

▸ Transmission Control Protocol, Src Port: 40186, Dst Port: 9092, Seq: 67, Ack: 41, Len: 53
▾ Internet Communications Engine Protocol
    Magic Number: IceP
    Protocol Major: 1
    Protocol Minor: 0
    Encoding Major: 1
    Encoding Minor: 0
    Message Type: Request (0)
    Compression Status: Uncompressed, sender cannot accept a compressed reply (0)
    Message Size: 53
    ▾ Request Message Body
        Request Identifier: 2
        Object Identity Name: test1
        Object Identity Content: test
        Facet Name: (empty)
        Operation Name: enumMethod
        Ice::OperationMode: normal (0)
        Invocation Context: (empty)
        Input Parameters Size: 10

```
0000   00 00 00 00 00 00 00 00   00 00 00 00 08 00 45 00   ········ ······E·
0010   00 69 01 6e 40 00 40 06   3b 1f 7f 00 00 01 7f 00   ·i·n@·@·  ;·······
0020   00 01 9c fa 23 84 1b c2   b4 61 b3 f0 7b 09 80 18   ····#···  ·a··{···
0030   02 00 fe 5d 00 00 01 01   08 0a c1 8b 05 8e c1 8b   ···]····  ········
0040   00 ea 49 63 65 50 01 00   01 00 00 00 35 00 00 00   ··IceP··  ····5···
0050   02 00 00 00 05 74 65 73   74 31 04 74 65 73 74 00   ·····tes  t1·test·
0060   0a 65 6e 75 6d 4d 65 74   68 6f 64 00 00 0a 00 00   ·enumMet  hod·····
0070   00 01 01 04 02 0c 00                                ·······
```

Int

```
    Protocol Major: 1
    Protocol Minor: 0
    Encoding Major: 1
    Encoding Minor: 0
    Message Type: Request (0)
    Compression Status: Uncompressed, sender cannot accept a compressed reply (0)
    Message Size: 58
  ▾ Request Message Body
      Request Identifier: 1
      Object Identity Name: test1
      Object Identity Content: test
      Facet Name: (empty)
      Operation Name: intMethod
      Ice::OperationMode: normal (0)
      Invocation Context: (empty)
      Input Parameters Size: 16
      Input Parameters Encoding Major: 1
      Input Parameters Encoding Minor: 1
      Encapsulated parameters: 02010000000a02000000
```

```
0000  00 00 00 00 00 00 00 00  00 00 00 00 08 00 45 00   · · · · · · · · · · · · · · E ·
0010  00 6e bf 7d 40 00 40 06  7d 0a 7f 00 00 01 7f 00   · n ·} @ · @ ·  } · · · · · · ·
0020  00 01 d7 ac 23 84 28 a4  d7 dd 29 9c d0 33 80 18   · · · · # · ( · · · ) · · 3 · ·
0030  02 00 fe 62 00 00 01 01  08 0a c1 86 35 e4 c1 86   · · · b · · · · · · · · 5 · · ·
0040  35 e4 49 63 65 50 01 00  01 00 00 00 3a 00 00 00   5 · IceP · · · · · · : · · ·
0050  01 00 00 00 05 74 65 73  74 31 04 74 65 73 74 00   · · · · · tes t1 · test ·
0060  09 69 6e 74 4d 65 74 68  6f 64 00 00 10 00 00 00   · intMeth od · · · · · ·
0070  01 01 02 01 00 00 00 0a  02 00 00 00               · · · · · · · · · · · ·
```

```
    Protocol Major: 1
    Protocol Minor: 0
    Encoding Major: 1
    Encoding Minor: 0
    Message Type: Request (0)
    Compression Status: Uncompressed, sender cannot accept a compressed reply (0)
    Message Size: 53
  ▾ Request Message Body
      Request Identifier: 3
      Object Identity Name: test1
      Object Identity Content: test
      Facet Name: (empty)
      Operation Name: intMethod
      Ice::OperationMode: normal (0)
      Invocation Context: (empty)
      Input Parameters Size: 11
      Input Parameters Encoding Major: 1
      Input Parameters Encoding Minor: 1
      Encapsulated parameters: 02400d0300
```

```
0000  00 00 00 00 00 00 00 00  00 00 00 00 08 00 45 00   · · · · · · · · · · · · · · E ·
0010  00 69 bf 81 40 00 40 06  7d 0b 7f 00 00 01 7f 00   · i · · @ · @ ·  } · · · · · · ·
0020  00 01 d7 ac 23 84 28 a4  d8 51 29 9c d0 65 80 18   · · · · # · ( · · Q ) · · e · ·
0030  02 00 fe 5d 00 00 01 01  08 0a c1 87 88 3b c1 86   · · · ] · · · · · · · · · ; · ·
0040  d7 28 49 63 65 50 01 00  01 00 00 00 35 00 00 00   · (IceP · · · · · · · 5 · ·
0050  03 00 00 00 05 74 65 73  74 31 04 74 65 73 74 00   · · · · · tes t1 · test ·
0060  09 69 6e 74 4d 65 74 68  6f 64 00 00 0b 00 00 00   · intMeth od · · · · · ·
0070  01 01 02 40 0d 03 00                                · · · @ · · ·
```