CHAPTER 4

DESIGNING DATA-INTENSIVE APPLICATIONS

DATA SERIALIZATION

WHAT IS THE MAIN PROBLEM THIS CHAPTER SOLVE?

BACKWARD COMPATIBILITY

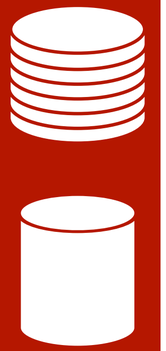
FORWARD COMPATIBILITY

ROLLING UPGRADE

BLUE GREEN

CANARY

COMPATIBILITY?!



FORMATS FOR ENCODING DATA

SERIALIZATION

JSON

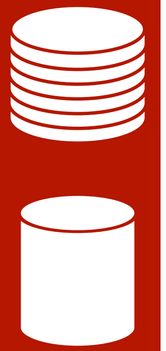
XML

PROTOCOL BUFFER

THRIFT

AVRO

JAVA.IO.SERIALIZABLE



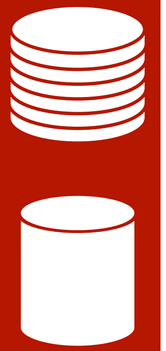
BJSON

```
{
    "userName": "Martin",
    "favoriteNumber": 1337,
    "interests": ["daydreaming", "hacking"]
}
```

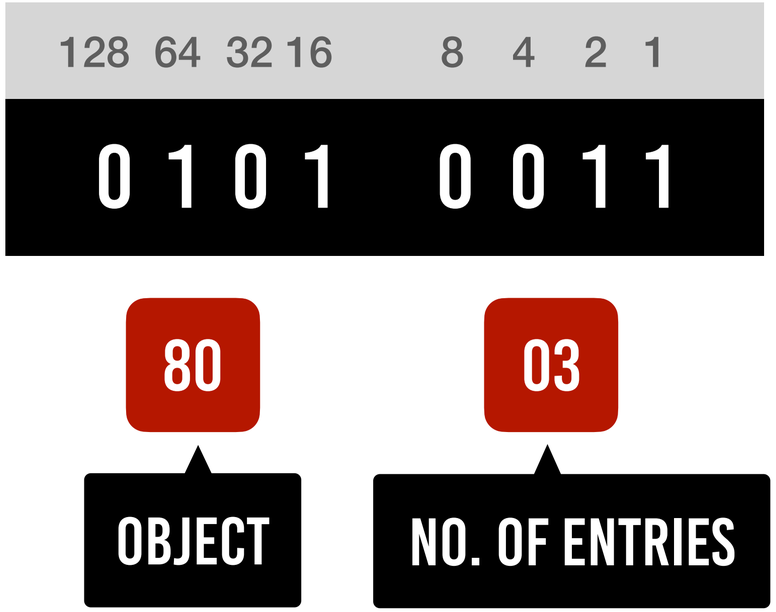
MessagePack

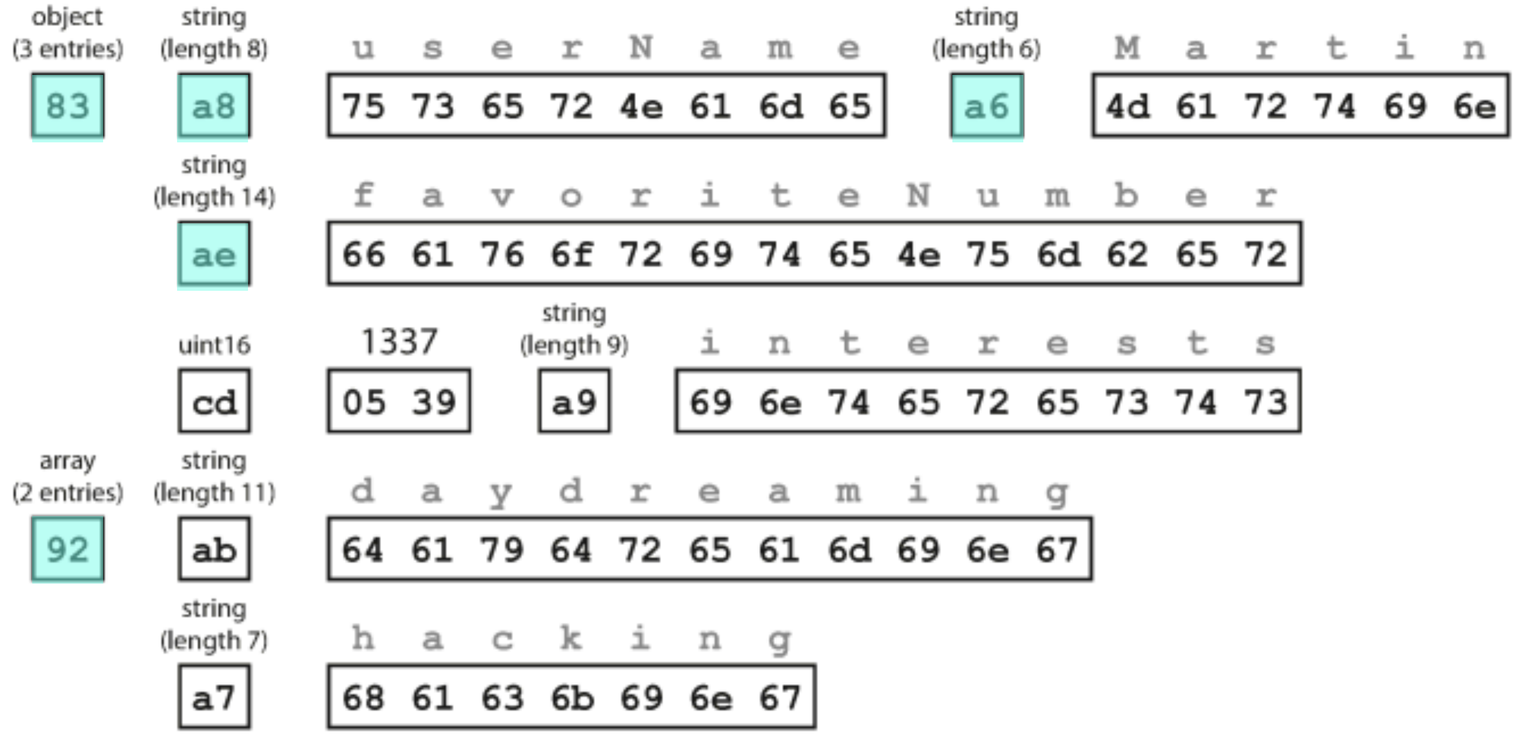
Byte sequence (66 bytes):

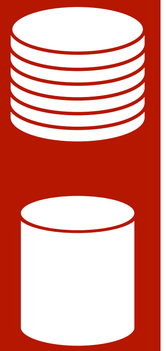
```
83 a8 75 73 65 72 4e 61 6d 65 a6 4d 61 72 74 69 6e ae 66 61
76 6f 72 69 74 65 4e 75 6d 62 65 72 cd 05 39 a9 69 6e 74 65
72 65 73 74 73 92 ab 64 61 79 64 72 65 61 6d 69 6e 67 a7 68
61 63 6b 69 6e 67
```



```
{
    "userName": "Martin",
    "favoriteNumber": 1337,
    "interests": ["daydreaming", "hacking"]
}
```







APACHE THRIFT

PROTOCOL BUFFERS

AVRO

HADOOP

APACHE THRIFT

```
struct Person {
  1: required string       userName,
  2: optional i64          favoriteNumber,
  3: optional list<string> interests
}
```

BINARY PROTOCOL

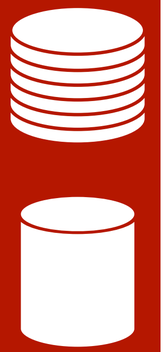
COMPACT PROTOCOL

JSON PROTOCOL

PROTOCOL BUFFERS

```
message Person {
    required string user_name       = 1;
    optional int64  favorite_number = 2;
    repeated string interests       = 3;
}
```

COMPACT PROTOCOL



Thrift BinaryProtocol

Byte sequence (59 bytes):

```
0b 00 01 00 00 00 06 4d 61 72 74 69 6e 0a 00 02 00 00 00 00
00 00 05 39 0f 00 03 0b 00 00 00 02 00 00 00 0b 64 61 79 64
72 65 61 6d 69 6e 67 00 00 00 07 68 61 63 6b 69 6e 67 00
```

Breakdown:

4 BYTES

type 11 (string)	field tag = 1	length 6	M a r t i n
0b	00 01	00 00 00 06	4d 61 72 74 69 6e

1337

type 10 (i64)	field tag = 2	00 00 00 00 00 00 05 39
0a	00 02	

8 BYTES

type 15 (list)	field tag = 3	item type 11 (string)	2 list items
0f	00 03	0b	00 00 00 02

length 11	d a y d r e a m i n g
00 00 00 0b	64 61 79 64 72 65 61 6d 69 6e 67

length 7	h a c k i n g	end of struct
00 00 00 07	68 61 63 6b 69 6e 67	00

```
{
    "userName": "Martin",
    "favoriteNumber": 1337,
    "interests": ["daydreaming", "hacking"]
}
```

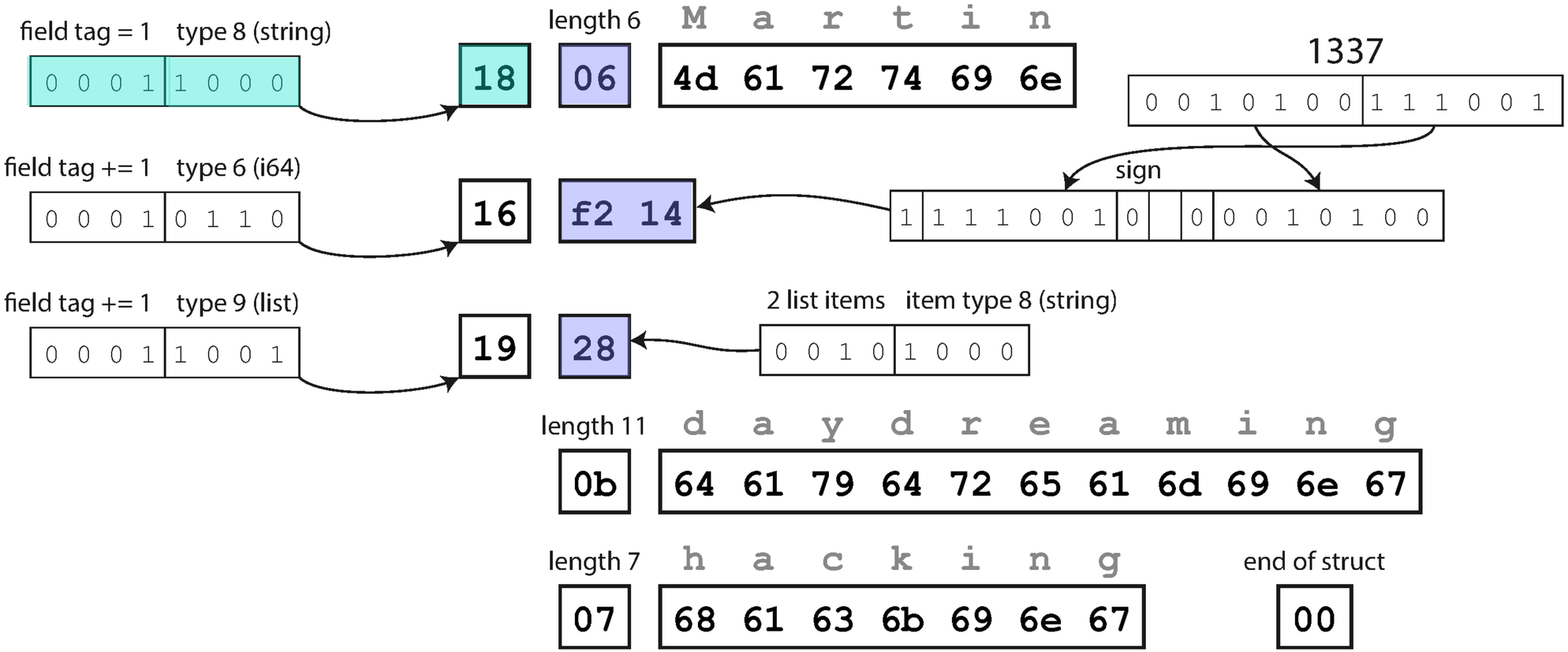
Thrift CompactProtocol

Byte sequence (34 bytes):

18	06	4d	61	72	74	69	6e	16	f2	14	19	28	0b	64	61	79	64	72	65

61	6d	69	6e	67	07	68	61	63	6b	69	6e	67	00

Breakdown:



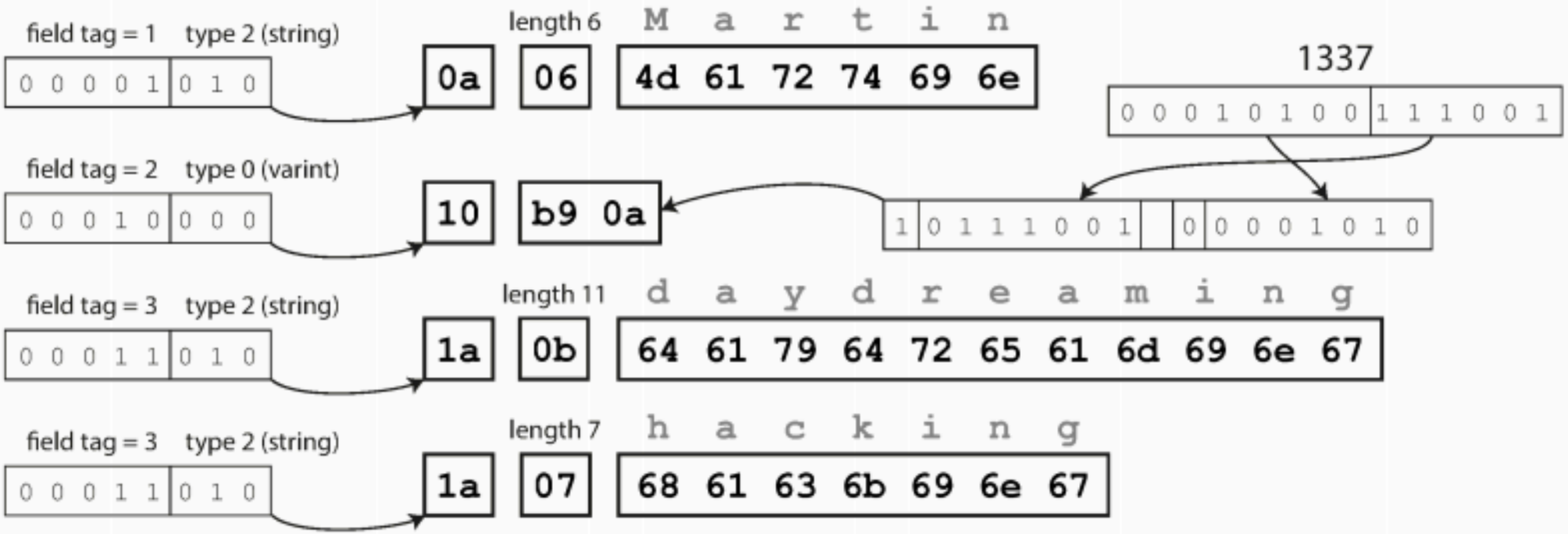
Protocol Buffers

Byte sequence (33 bytes):

0a	06	4d	61	72	74	69	6e	10	b9	0a	1a	0b	64	61	79	64	72	65	61

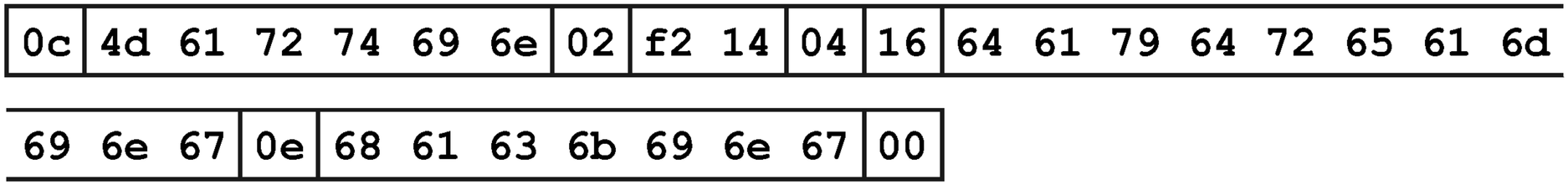
6d	69	6e	67	1a	07	68	61	63	6b	69	6e	67

Breakdown:



Avro

Byte sequence (32 bytes):



Breakdown: