# 1.

Packet loss occurs when buffers, at the client, server or in the network itself, is overflowed. Meaning if the capacity of a buffer cannot support incoming requests without overflowing the buffers’ capacity, packets will be dropped.

In the case of examples 4.3 and 4.4 from the book; packet loss occurs in the buffers at either the server- or client side. The methods asocket.receive() and asocket.send() might generate packet loss when it throws an IOException.

# 2.

Some important characteristics among serialization protocols:

1. Number of supported languages
2. Speed – The time it takes to go from an object, serialize it to a byte array and deserialize it back into an object.

|  |  |  |
| --- | --- | --- |
| Name | Number of languages supported (officially) | Speed |
| Google Protocol Buffers | Mid | High |
| MessagePack | Mid | Mid |
| Apache Thrift | High | High |

# 3.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Message queue | Pub-sub | DSM | Tuple spaces |
| Read property | Consumed | Not consumed | Not consumed | Consumed but put back into the object space once finished |
| Write property | Asynchronous | Asynchronous | Asynchronous | Synchronous |
| Data property | Immutable | Immutable | Mutable | Immutable |
| Package examples | ActiveMQ, JBOSS Messaging, Glassfish | Apache Kafka | Kerrighead, OpenSSI, MOSIX, Treadmarks | Apache river, The Blitz project, Gigaspaces |