VanillaComm
Getting Started

Introduction to Databases

DataLab

CS, NTHU

What is VanillaComm?

- A project that aims to provide a reliable communication channel through networks.

- Two main functionalities
  - Total-ordered broadcasting
    - Total-order: a global order agreed by all participants
  - Point-to-point messaging

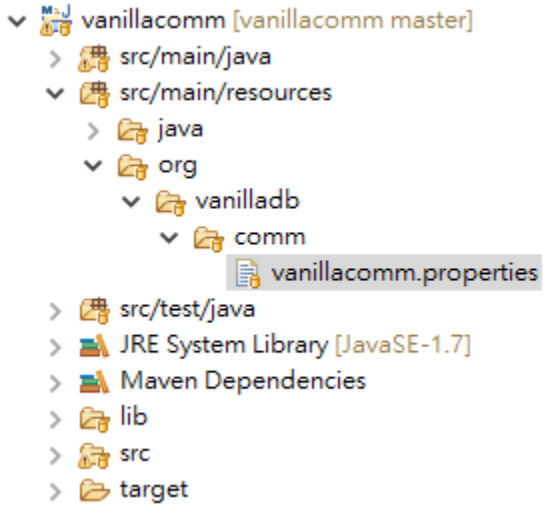
Let’s Run a Demo!

Source

- https://github.com/kkeevin123456/db22-vanillacomm.git

Getting Started

1. Decides how many servers and clients you want to use in this demonstration.
2. Sets up the addresses of servers and clients:

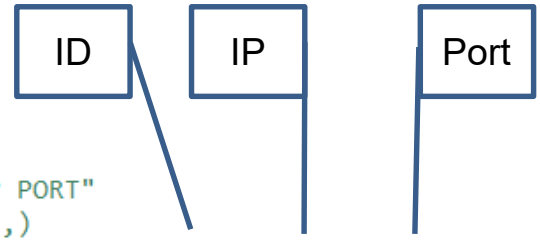


vanillacomm.properties

```
14 # The views of the machine
15 # A machine is represented by "ID IP PORT"
16 # Each machine is split by a comma (,)
17 org.vanilladb.comm.view.ProcessView.SERVER_VIEW=0 127.0.0.1 42961, 1 127.0.0.1 42962, 2 127.0.0.1 42963
18 org.vanilladb.comm.view.ProcessView.CLIENT_VIEW=0 127.0.0.1 30000, 1 127.0.0.1 30001
19
```

3 servers and 2 clients

vanillacomm.properties

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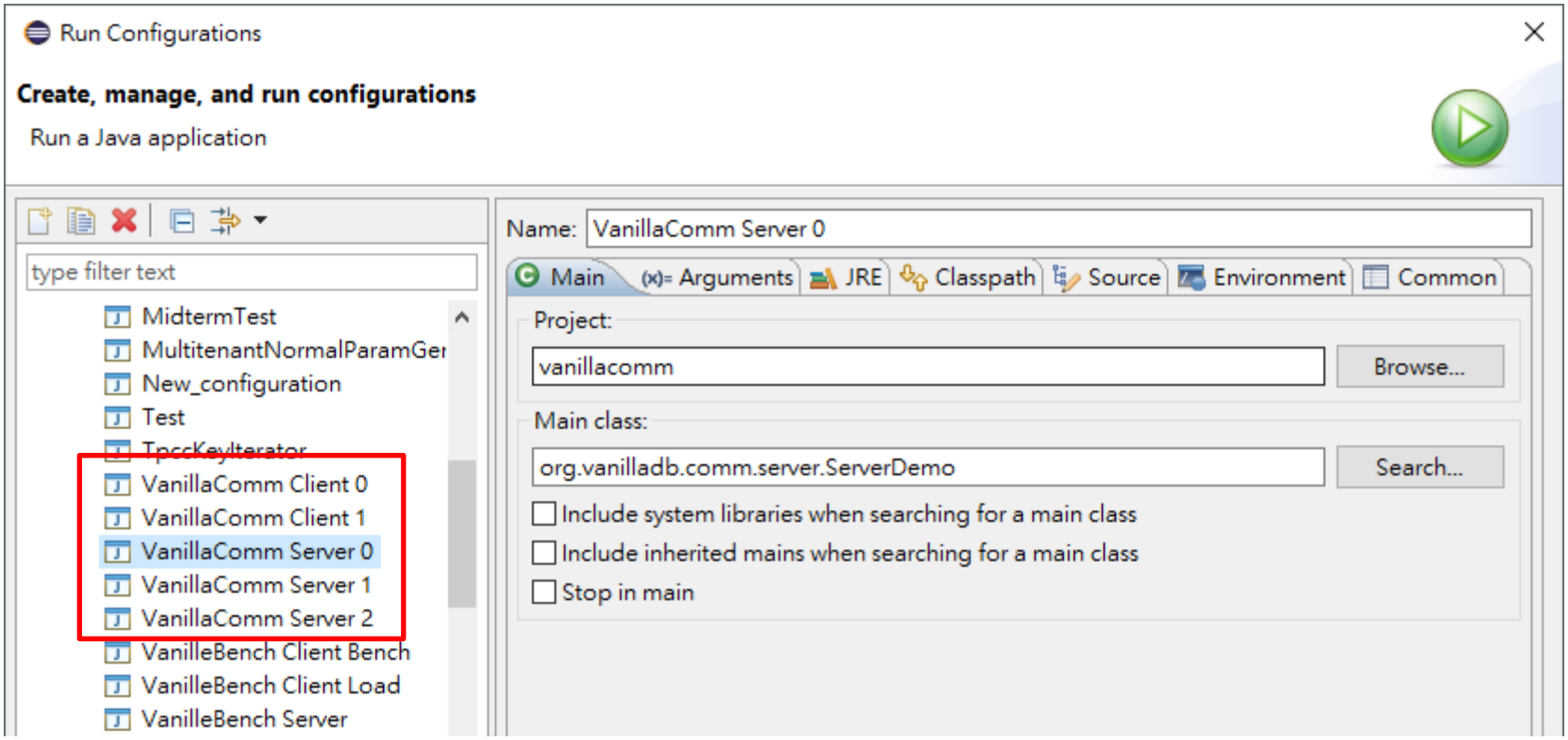
18 org.vanilladb.comm.view.ProcessView.CLIENT_VIEW=0 127.0.0.1 30000, 1 127.0.0.1 30001
19
```

3 servers and 2 clients

Getting Started

3. Creates a run configuration for each server and client.



Run Configuration - Server

- Main class: `org.vanilladb.comm.server.ServerDemo`
- Program arguments: [server id]
  - Example: `0` for server no.0
- VM arguments:

```
-Dorg.vanilladb.comm.config.file=target/classes/org/vanilladb/comm/vanillacomm.properties
-Djava.util.logging.config.file=target/classes/java/util/logging/logging.properties
```

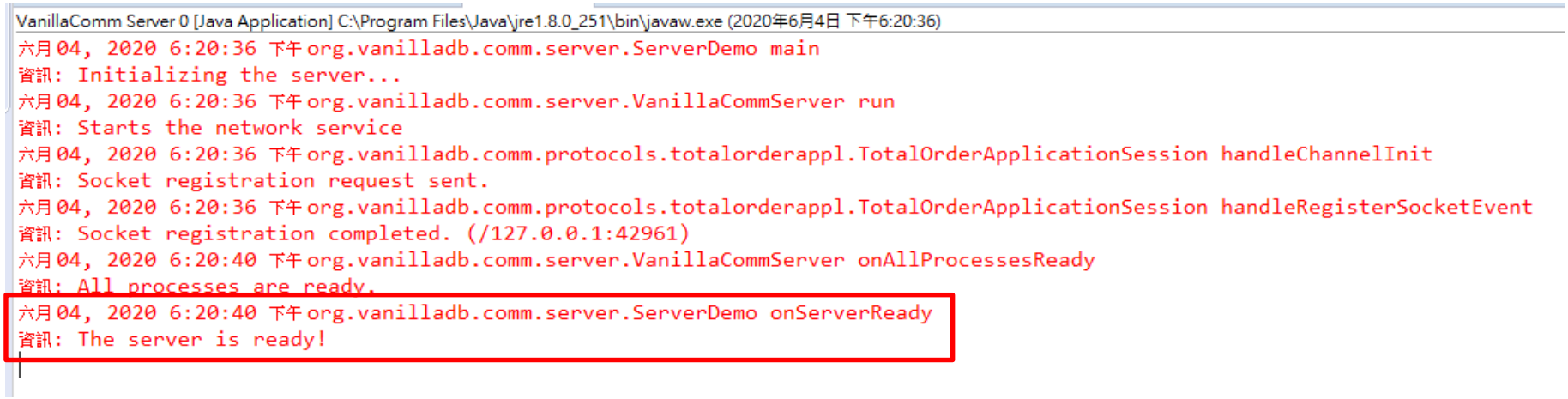
Run Configuration - Client

- Main class: `org.vanilladb.comm.client.ClientDemo`
- Program arguments: [client id]
  - Example: `0` for client no.0
- VM arguments:

```
-Dorg.vanilladb.comm.config.file=target/classes/org/vanilladb/comm/vanillacomm.properties
-Djava.util.logging.config.file=target/classes/java/util/logging/logging.properties
```

Getting Started

4. Starts up the servers



Getting Started

5. Once all the servers are ready, starts the clients
   - The clients will start sending requests to servers.
   - Then, the servers will run a protocol to order these requests.

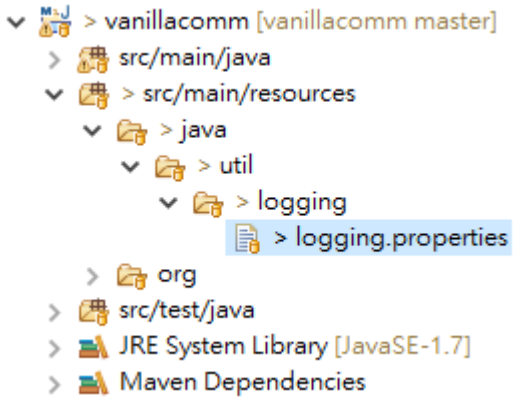
Results

- The server will show the total-ordered broadcast messages
  - You should see all the servers show the messages in the same order

```
六月 04, 2020 6:20:40 下午 org.vanilladb.comm.server.ServerDemo onServerReady
資訊: The server is ready!
Received a total order message: Request #0 from client 0, serial number: 1
Received a total order message: Request #1 from client 0, serial number: 2
Received a total order message: Request #100000 from client 1, serial number: 3
Received a total order message: Request #2 from client 0, serial number: 4
Received a total order message: Request #100001 from client 1, serial number: 5
Received a total order message: Request #3 from client 0, serial number: 6
Received a total order message: Request #100002 from client 1, serial number: 7
Received a total order message: Request #4 from client 0, serial number: 8
Received a total order message: Request #100003 from client 1, serial number: 9
Received a total order message: Request #5 from client 0, serial number: 10
Received a total order message: Request #100004 from client 1, serial number: 11
Received a total order message: Request #6 from client 0, serial number: 12
Received a total order message: Request #100005 from client 1, serial number: 13
Received a total order message: Request #7 from client 0, serial number: 14
Received a total order message: Request #100006 from client 1, serial number: 15
Received a total order message: Request #8 from client 0, serial number: 16
Received a total order message: Request #100007 from client 1, serial number: 17
Received a total order message: Request #9 from client 0, serial number: 18
Received a total order message: Request #100008 from client 1, serial number: 19
```

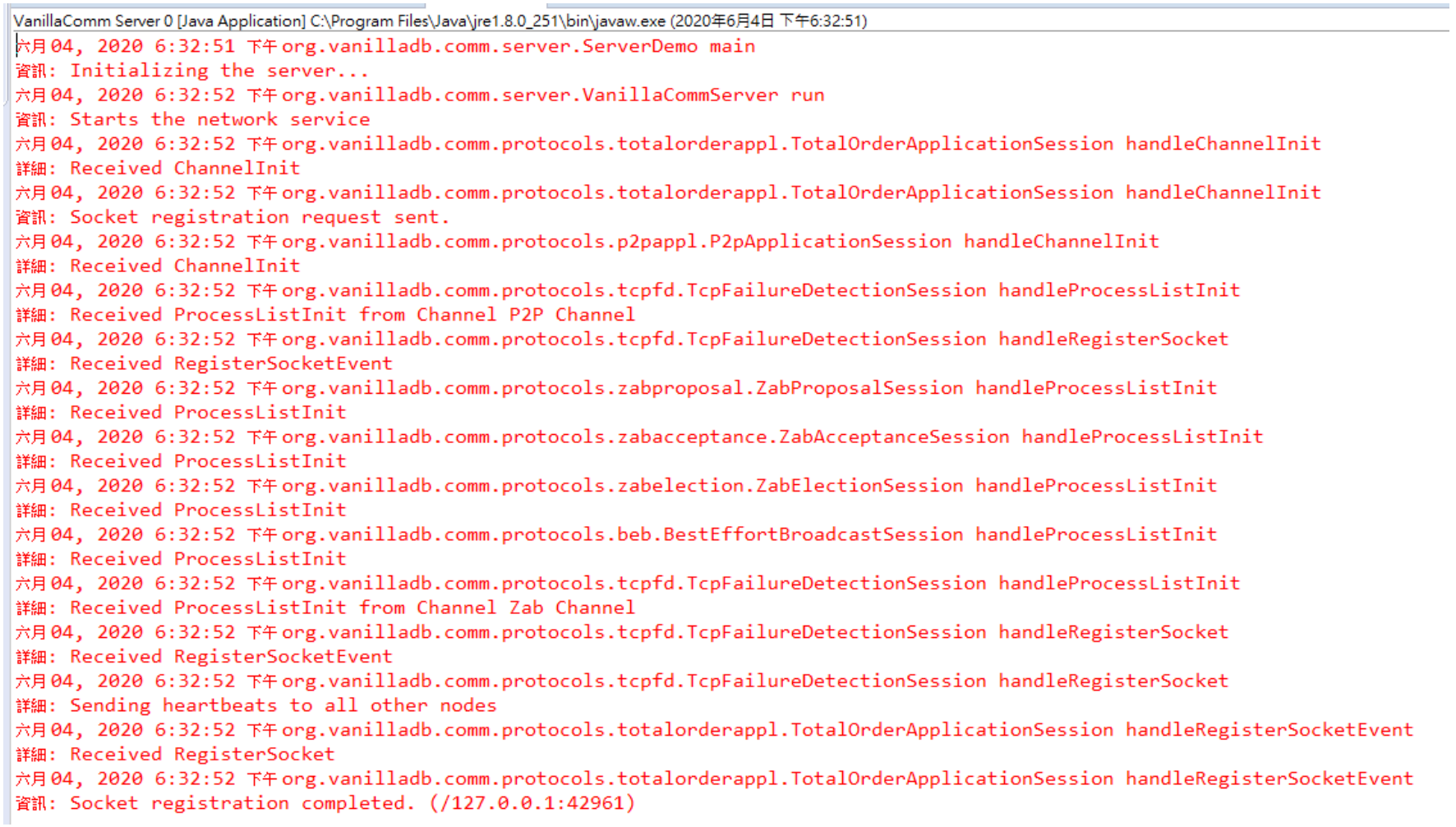
More Logs!!!

- The current logs only show necessary messages.
  - However, you can change logging setting to see more.




```
48 # Default handlers for all loggers
49 handlers=java.util.logging.ConsoleHandler
50
51 # Logging levels for handlers
52 java.util.logging.ConsoleHandler.level=ALL
53
54 # Default logging level for all loggers
55 .level=INFO
56
```

Change to
".level=FINE"


VanillaComm Server 0 [Java Application] C:\Program Files\Java\jre1.8.0_251\bin\javaw.exe (2020年6月4日 下午6:32:51)
六月 04, 2020 6:32:51 下午 org.vanilladb.comm.server.ServerDemo main
資訊: Initializing the server...
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.server.VanillaCommServer run
資訊: Starts the network service
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.totalorderappl.TotalOrderApplicationSession handleChannelInit
詳細: Received ChannelInit
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.totalorderappl.TotalOrderApplicationSession handleChannelInit
資訊: Socket registration request sent.
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.p2pappl.P2pApplicationSession handleChannelInit
詳細: Received ChannelInit
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.tcpfd.TcpFailureDetectionSession handleProcessListInit
詳細: Received ProcessListInit from Channel P2P Channel
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.tcpfd.TcpFailureDetectionSession handleRegisterSocket
詳細: Received RegisterSocketEvent
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.zabproposal.ZabProposalSession handleProcessListInit
詳細: Received ProcessListInit
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.zabacceptance.ZabAcceptanceSession handleProcessListInit
詳細: Received ProcessListInit
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.zabelection.ZabElectionSession handleProcessListInit
詳細: Received ProcessListInit
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.beb.BestEffortBroadcastSession handleProcessListInit
詳細: Received ProcessListInit
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.tcpfd.TcpFailureDetectionSession handleProcessListInit
詳細: Received ProcessListInit from Channel Zab Channel
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.tcpfd.TcpFailureDetectionSession handleRegisterSocket
詳細: Received RegisterSocketEvent
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.tcpfd.TcpFailureDetectionSession handleRegisterSocket
詳細: Sending heartbeats to all other nodes
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.totalorderappl.TotalOrderApplicationSession handleRegisterSocketEvent
詳細: Received RegisterSocket
六月 04, 2020 6:32:52 下午 org.vanilladb.comm.protocols.totalorderappl.TotalOrderApplicationSession handleRegisterSocketEvent
資訊: Socket registration completed. (/127.0.0.1:42961)

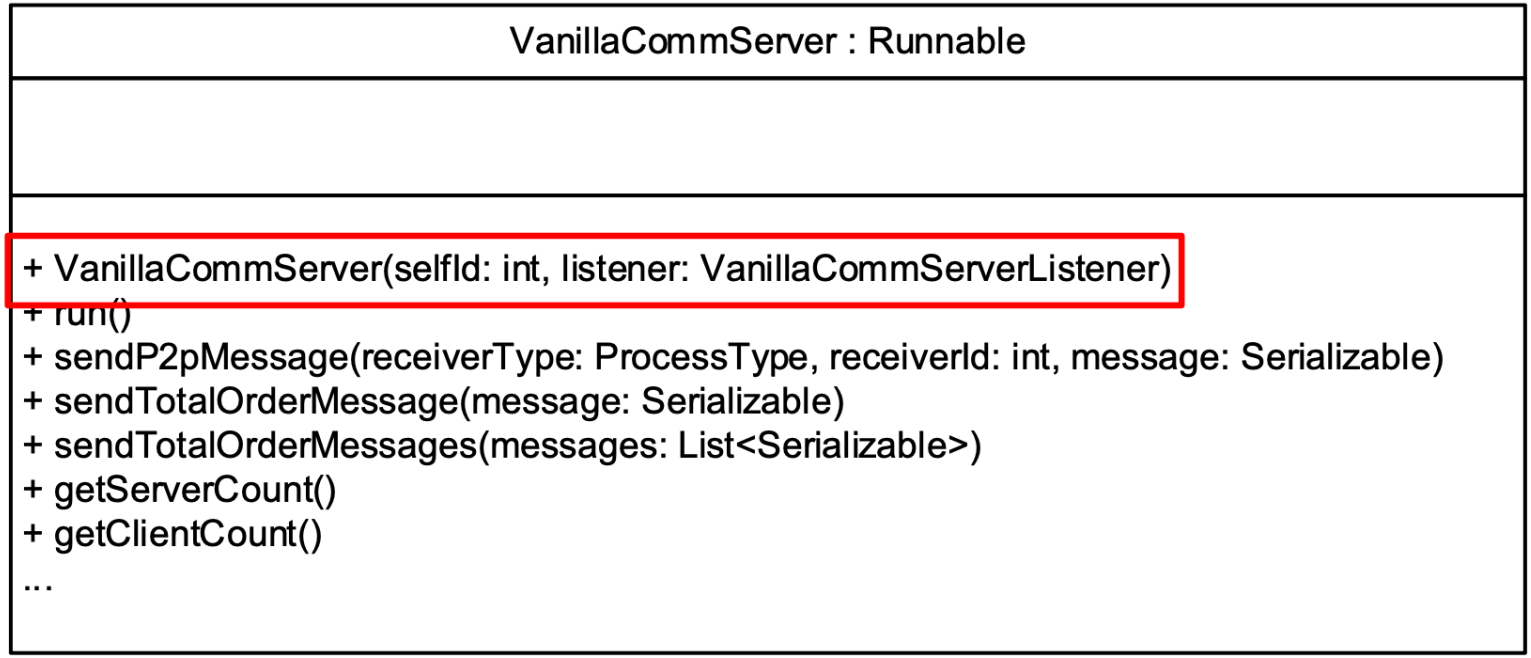
Let’s See How To Use APIs

Main Components

- Four main components (you need to know)
  - VanillaCommServer
  - VanillaCommServerListener
  - VanillaCommClient
  - VanillaCommClientListener

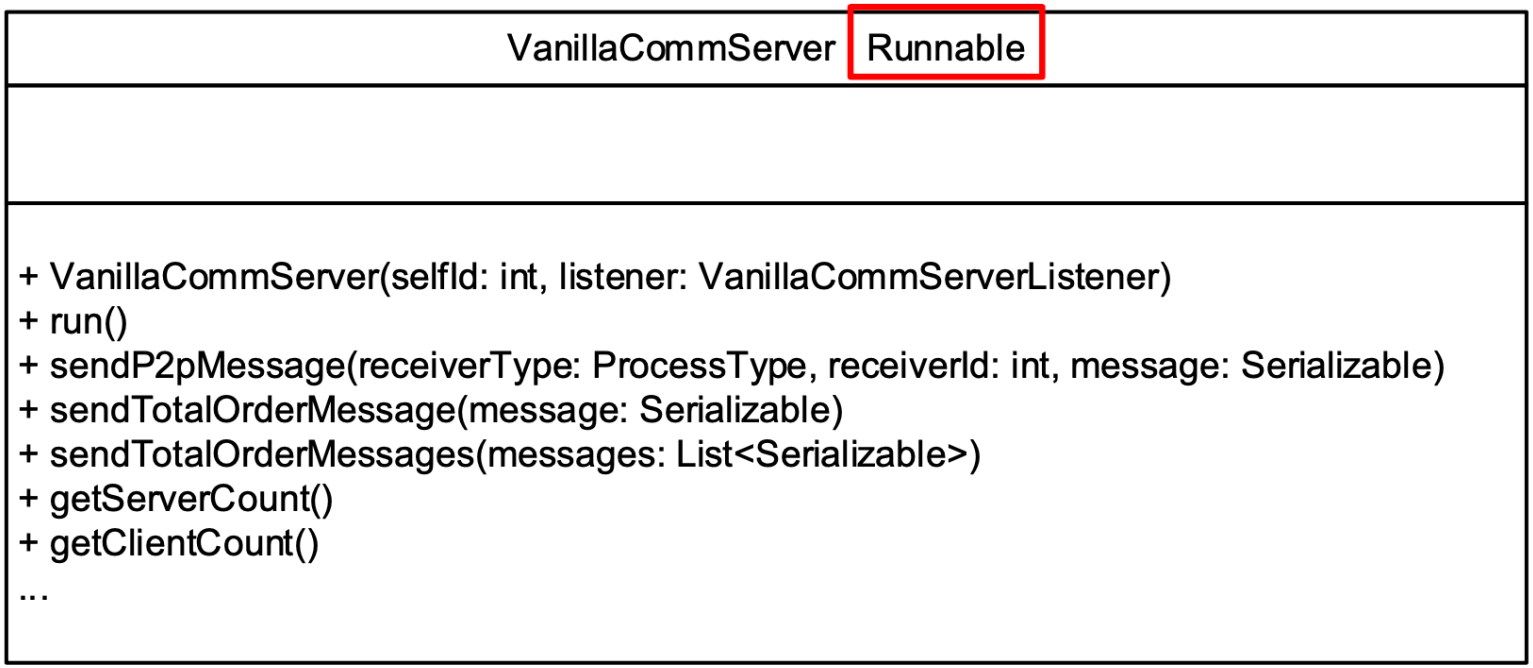
VanillaCommServer

- Need to provide the server id and a listener for messages during construction



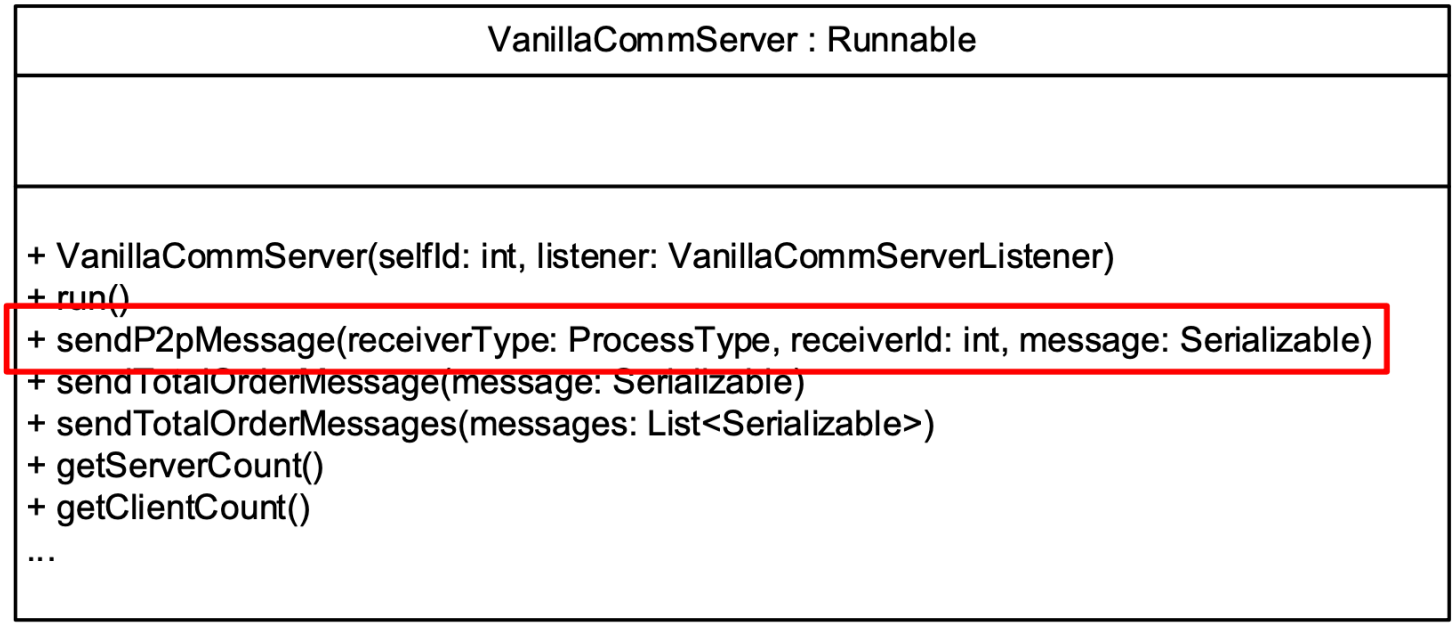
VanillaCommServer

- Need to be run in a dedicated thread
  - `new Thread(new VanillaCommServer(…))`



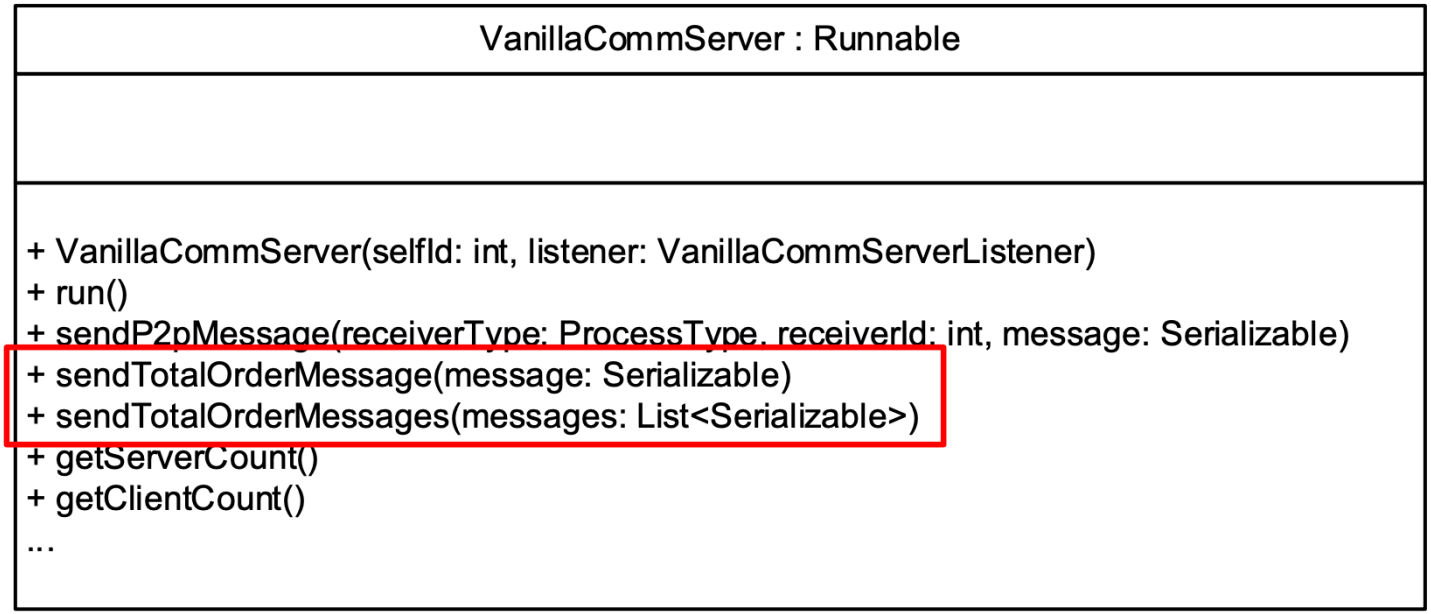
VanillaCommServer

- A P2p Message: a message from a process to another process
  - Need to specify if it is a server or a client



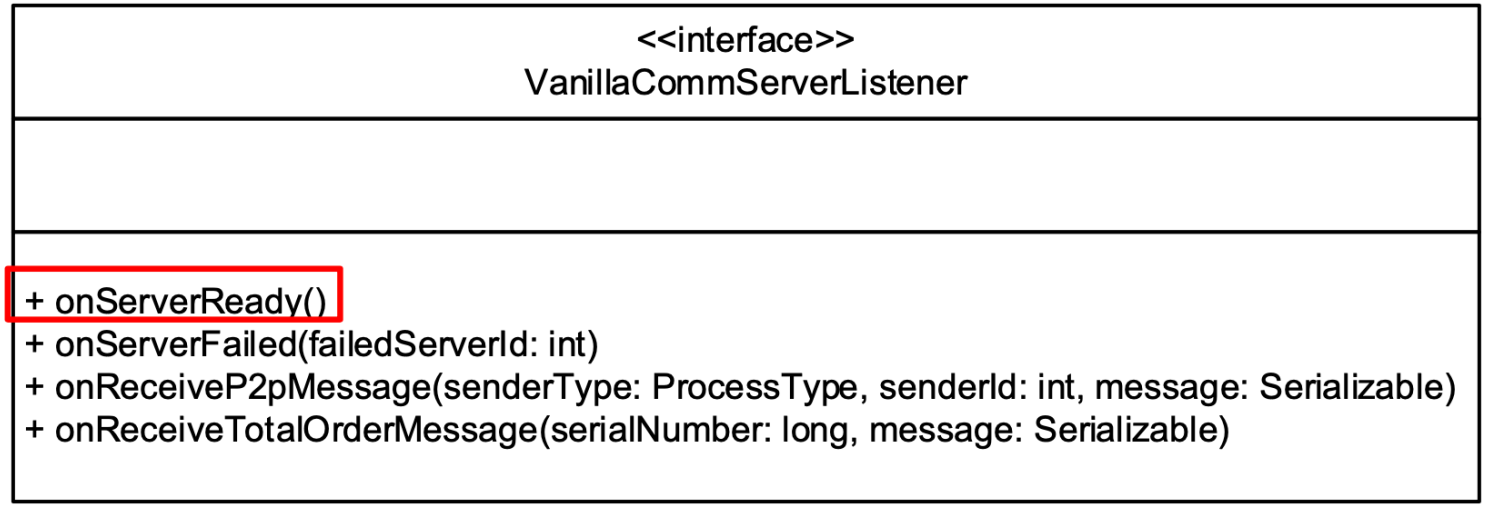
VanillaCommServer

- A Total-order Message: a broadcast message that will be sent to all servers in the same order



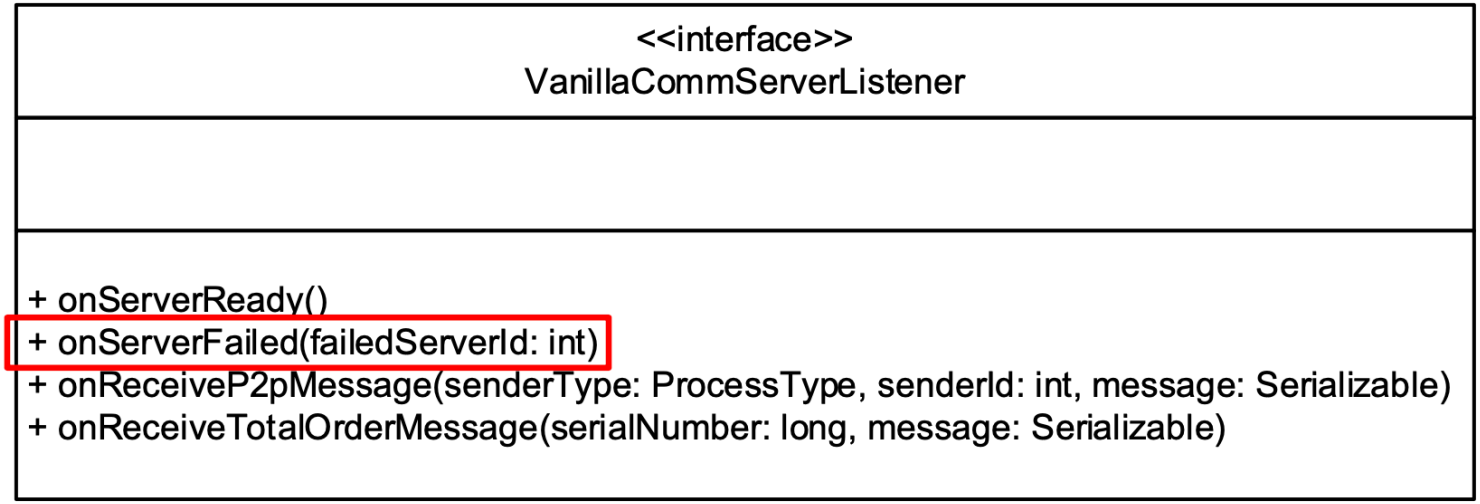
VanillaCommServerListener

- Be notified when the server is good to go



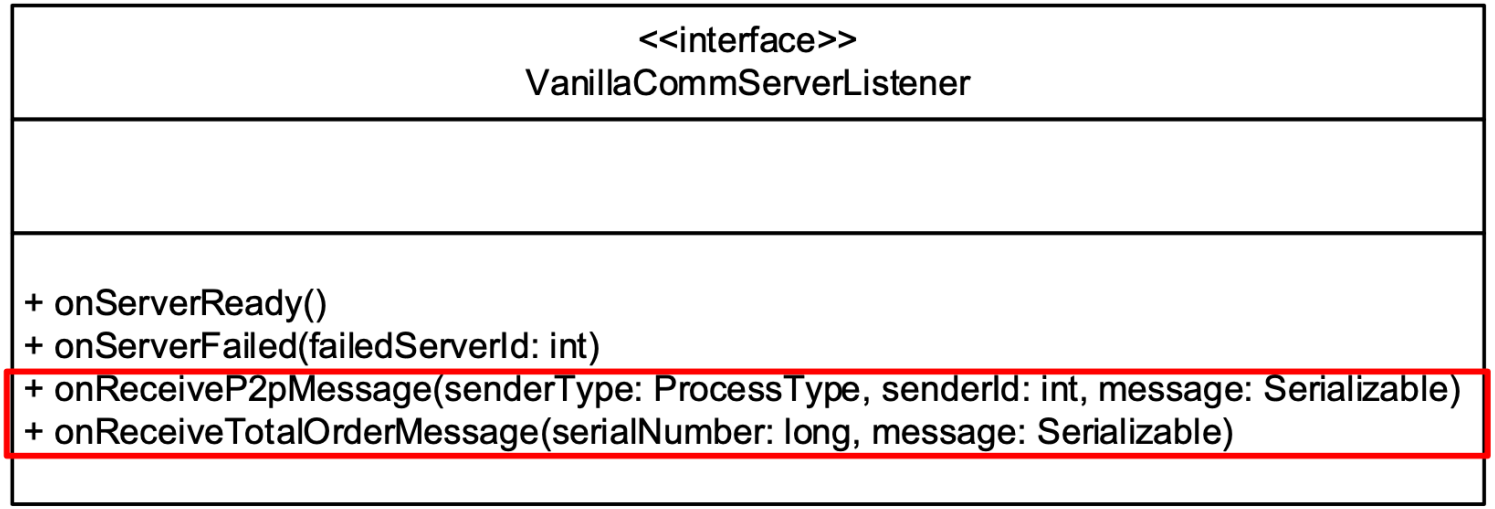
VanillaCommServerListener

- Be notified when one of servers is failed



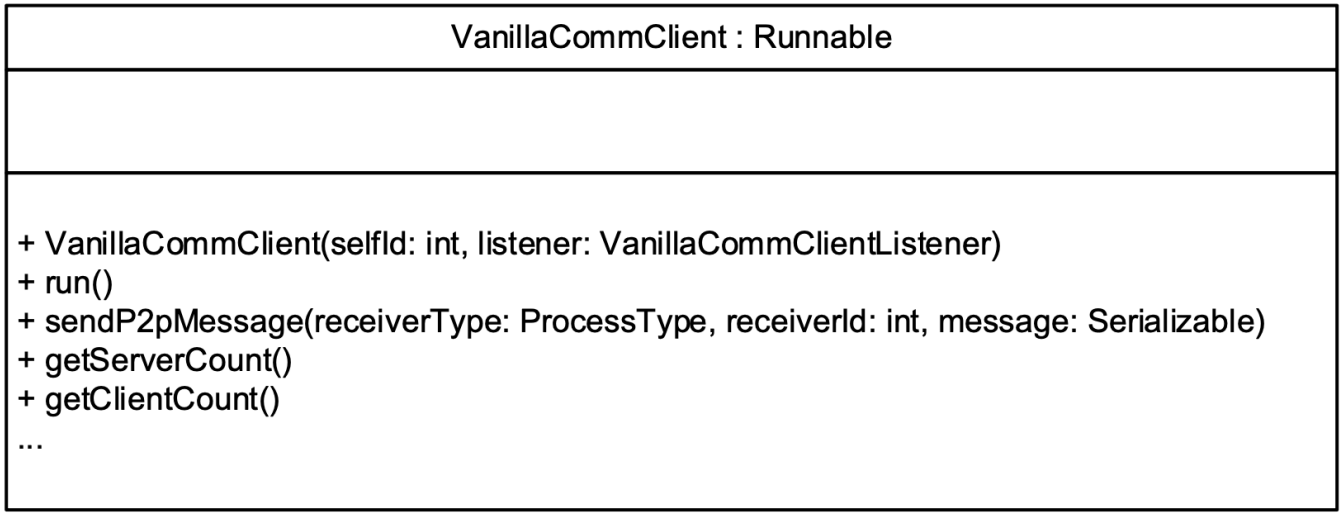
VanillaCommServerListener

- Be notified when the server received a message



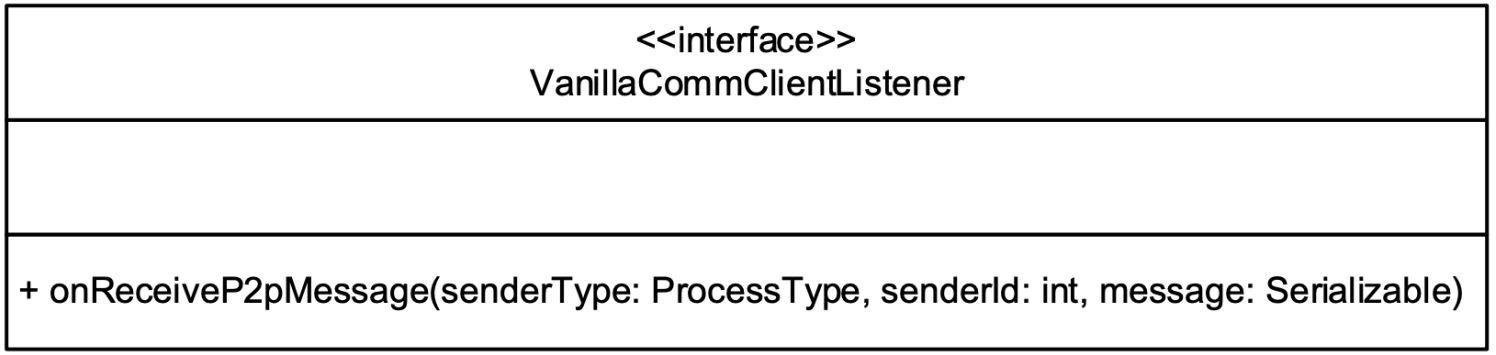
VanillaCommClient

- Similar to VanillaCommServer without the ability to send total-ordered messages
  - Check demo's code to see how to total-order a client's request.



VanillaCommClientListener

- Similar to VanillaCommServerListener without the ability to receive total-ordered messages



The Example Code

- Don’t forget to check the example code!
  - org.vanilladb.comm.client.ClientDemo
  - org.vanilladb.comm.server.ServerDemo
- You will learn how to send P2p and total-ordered messages

How Do Exactly These Work?

- You will learn more about these in Group Communication course.