Porting PSync C++ library to Java

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NEED

- No client library available for PSync
  - So currently not available for Android applications.
- Needed as some applications may desire only a subset of available data (Twitter)

APPROACH

- Write Java implementation from scratch by looking at the current ndn-cxx C++ implementation
- Find libraries for Bloom Filter and IBF
  - https://github.com/kallerosenbaum/ibltj
  - Google Guava Bloom Filter library
- Create an Android application

BENEFIT

- Java users and Android users can use the application
  - Ex: NDN Snapchat
- Same implementation of the library as C++ (ndn-cxx)
  - Same API

ACHIEVED

- PSync Java Library
  - Identify Bloom Filter and IBF library
  - PSync Partial Producer almost ready
    - Hello working
    - Sync not working - need to figure out how to use the IBF library correctly
  - PSync Consumer ready
- Demo application
  - Hello ready - need to let user select data from hello data
  - Send sync interest after selecting the subsription data

ALTERNATIVES

- Have a wrapper around the C++
  - A bit harder for Android applications to use
  - Wanted to have a fresh implementation to gain more experience about details of PSync
- Could have rolled out our own pending interest logic
  - Used modified MemoryContentCache that exposes pending sync interest table to to PSync

LINK

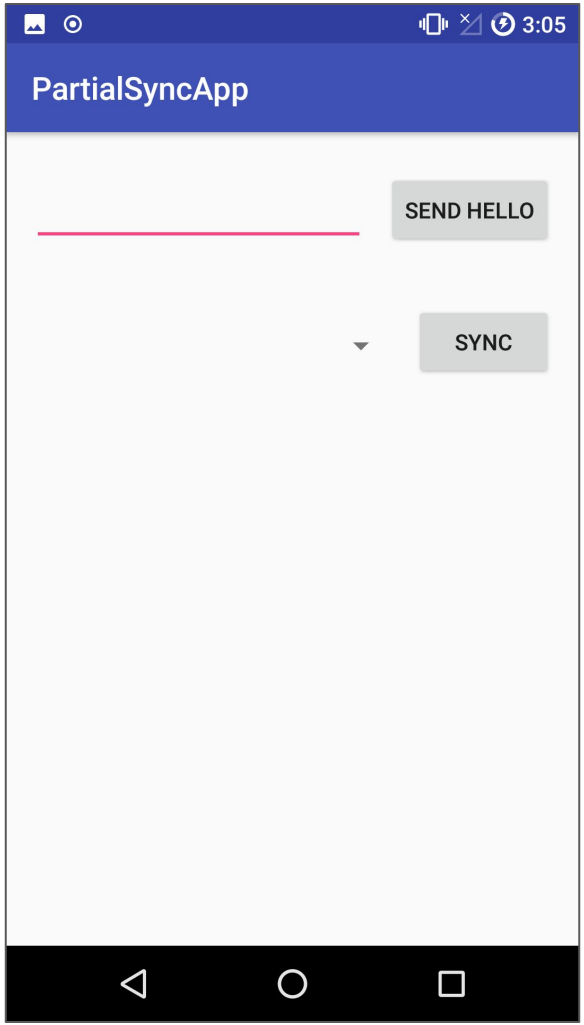
- Source code available at: https://github.com/6th-ndn-hackathon/psync-java
  - Master branch has the Java library with an example using the partial consumer
  - Android-app branch has the simple application

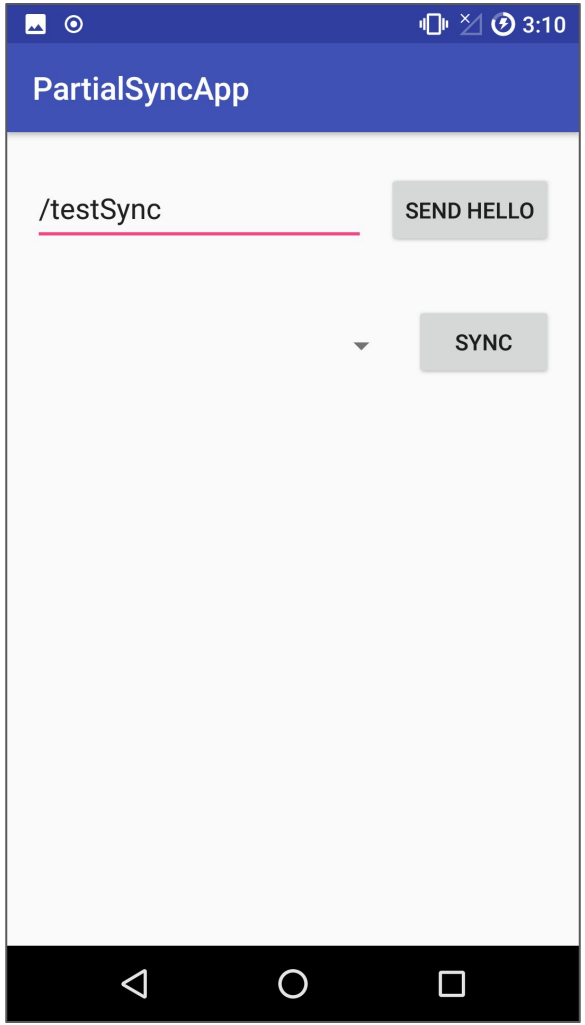
DEMO

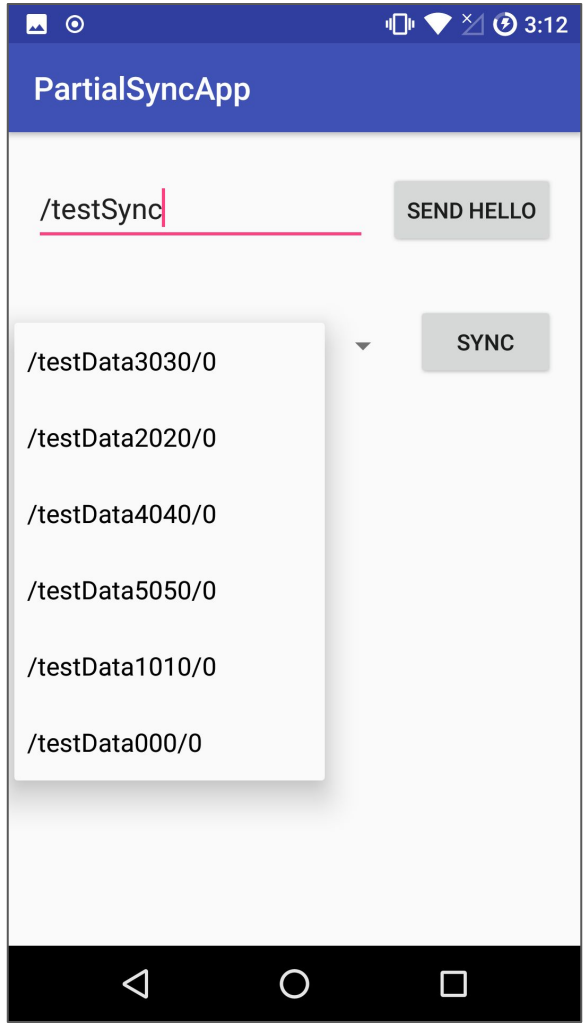
Console

TestLogic (1) [Java Application] /usr/lib/jvm/java-9-openjdk-amd64/bin/java (May 14, 2018, 4:11:54 PM)

```
May 14, 2018 4:11:55 PM net.named_data.jndn.Node$RegisterResponse onData
INFO: Register prefix succeeded with the NFD forwarder for prefix /testData000
May 14, 2018 4:11:55 PM net.named_data.jndn.Node$RegisterResponse onData
INFO: Register prefix succeeded with the NFD forwarder for prefix /testSync/hello
May 14, 2018 4:11:55 PM net.named_data.jndn.Node$RegisterResponse onData
INFO: Register prefix succeeded with the NFD forwarder for prefix /testSync/sync
May 14, 2018 4:11:55 PM net.named_data.jndn.Node$RegisterResponse onData
INFO: Register prefix succeeded with the NFD forwarder for prefix /testData1010
May 14, 2018 4:11:55 PM net.named_data.jndn.Node$RegisterResponse onData
INFO: Register prefix succeeded with the NFD forwarder for prefix /testData2020
May 14, 2018 4:11:55 PM net.named_data.jndn.Node$RegisterResponse onData
INFO: Register prefix succeeded with the NFD forwarder for prefix /testData3030
May 14, 2018 4:11:55 PM net.named_data.jndn.Node$RegisterResponse onData
INFO: Register prefix succeeded with the NFD forwarder for prefix /testData4040
May 14, 2018 4:11:55 PM net.named_data.jndn.Node$RegisterResponse onData
INFO: Register prefix succeeded with the NFD forwarder for prefix /testData5050
May 14, 2018 4:11:55 PM net.named_data.jndn.Node$RegisterResponse onData
INFO: Register prefix succeeded with the NFD forwarder for prefix /localhost/psync/publish
Received Hello Interest /testSync/hello
/testSync/hello/120/%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%
Sent Hello data net.named_data.jndn.Data@50de0926
```


3:05
PartialSyncApp
SEND HELLO
SYNC


3:10
PartialSyncApp
/testSync
SEND HELLO
SYNC


3:12
PartialSyncApp
/testSync
SEND HELLO
SYNC
/testData3030/0
/testData2020/0
/testData4040/0
/testData5050/0
/testData1010/0
/testData000/0