[HDFS-4315](https://www.google.com/url?q=https://issues.apache.org/jira/browse/HDFS-4315&sa=D&source=editors&ust=1751359163152731&usg=AOvVaw2awu9YV-cIC8NQstulA0Qu)

**DNs with multiple BPs can have BPOfferServices fail to start due to unsynchronized map access**

**(1)  Log information**

(1.1) Roles in this case

 DFSClient (client-side)  applies to NN(server-side)  for a new DataNode

 DataNode (client-side)  connects to NN(server-side) and shakes hands

**(1.2) Symptoms**

According to the description, there are multiple NameNodes in this setting, so on each DataNode, there are multiple BlockPools(BPs). “In all of the failing test runs that I saw, the client would end up failing with an error like the following:”

DFSClient:

2012-12-14 16:30:36,818 WARN  hdfs.DFSClient (DFSOutputStream.java:run(562)) - DataStreamer Exception

java.io.IOException: Failed to add a datanode.  User may turn off this feature by setting dfs.client.block.write.replace-datanode-on-failure.policy in configuration, where the current policy is DEFAULT.  (Nodes: current=[127.0.0.1:52552, 127.0.0.1:43557], original=[127.0.0.1:43557, 127.0.0.1:52552])

  at org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.findNewDatanode(DFSOutputStream.java:792)

  at org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.addDatanode2ExistingPipeline(DFSOutputStream.java:852)

  at org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.setupPipelineForAppendOrRecovery(DFSOutputStream.java:958)

  at org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.run(DFSOutputStream.java:469)

It shows that when DFSClient is setting up pipeline for append or recovery, it fails to add the new DataNode to the existing pipeline: original nodes in the pipeline are [127.0.0.1:43557, 127.0.0.1:52552], while current nodes in pipeline are still these two nodes [127.0.0.1:52552, 127.0.0.1:43557].

“This suggests that either an entire DN or one of the BPOfferServices of one of the DNs was not starting correctly, or had not started by the time the client was trying to access it.”

DataNode side:  The following error can be seen occasionally.

java.lang.NullPointerException

  at org.apache.hadoop.hdfs.server.datanode.DataNode.initStorage(DataNode.java:850)

  at org.apache.hadoop.hdfs.server.datanode.DataNode.initBlockPool(DataNode.java:819)

  at org.apache.hadoop.hdfs.server.datanode.BPOfferService.verifyAndSetNamespaceInfo(BPOfferService.java:308)

  at org.apache.hadoop.hdfs.server.datanode.BPServiceActor.connectToNNAndHandshake(BPServiceActor.java:218)

  at org.apache.hadoop.hdfs.server.datanode.BPServiceActor.run(BPServiceActor.java:660)

  at java.lang.Thread.run(Thread.java:662)

The NPE occurs when one of the BPServiceActors in the specific DataNode tries to connect the corresponding NN and shakes hands. So this error will cause one of the BPOfferServices in this DN to not come up.