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Hadoop HDFS / HDFS-4995

# Make getContentSummary() less expensive

Details

Type:	Bug	Status:	<b>CLOSED</b>
Priority:	Major	Resolution:	Fixed
Affects Version/s:	0.23.9, 2.3.0	Fix Version/s:	0.23.10, 2.3.0
Component/s:	namenode		
Labels:	None		
Hadoop Flags:	Reviewed		

Description

When users call du or count DFS command, getContentSummary() method is called against namenode. If the directory has many directories and files, it could hold the namesystem lock for a long time. We've seen it taking over 20 seconds. Namenode should not allow regular users to cause extended locking.

Attachments

<a href="#">HDFS-4995.branch-0.23.3.patch</a>	17 kB	12/Nov/13 23:28
<a href="#">HDFS-4995.trunk.2.patch</a>	29 kB	29/Oct/13 18:18
<a href="#">HDFS-4995.trunk.3.patch</a>	25 kB	12/Nov/13 23:28
<a href="#">HDFS-4995.trunk.patch</a>	28 kB	18/Oct/13 22:54
<a href="#">HDFS-4995.trunk1.patch</a>	28 kB	17/Oct/13 19:52

Issue Links

is related to		
	<a href="#">HDFS-8898</a> Create API and command-line argument to get quota and quota usage without detailed conten...	<b>RESOLVED</b>
	<a href="#">HDFS-1658</a> A less expensive way to figure out directory size	<b>OPEN</b>

Activity

[Kihwal Lee](#) added a comment - 15/Jul/13 21:30

Here is my first cut of idea.

If the result of these commands don't need to be strictly consistent, we can probably avoid potentially long lock region.

- Lock directory when obtaining a copy of children list (ReadOnlyList).
- Lock namesystem when computing in INodeFile.
- Handle stale children in the depth first traversing.

Recursion may need to be done at FSDirectory-level. This also makes it easy to ensure the namespace lock is not acquired while the directory lock is held. If we do this at the finest granularity, lock contention will increase and at minimum getContentSummary() will take considerably longer. We may internally batch (increased lock granularity) to reduce the impact. In this case, processing of a batch needs to be in the same namespace lock. Locking may look less tangled if the recursion is in FSNamesystem.

[Suresh Srinivas](#) added a comment - 15/Jul/13 22:37


We've seen it taking over 20 seconds.

How big was the directory? That seems like an awful lot of time.

Lock directory when obtaining a copy of children list (ReadOnlyList).

I am not sure what you are proposing. Are you saying you will make a read only copy of the children list of the directory for which content summary is being computed? What happens to the lock if the parent directory is deleted?

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▼  Kihwal Lee added a comment - 17/Oct/13 19:52

Here is a candidate patch, which adds a runtime context object to keep track of progress at various inodes. When it goes over the configured limit, locks are relinquished and reacquired after a delay. If this happens, all affected inodes should check for safety.

With this change, the consistency is not guaranteed. But it is no different from what is expected from "du" command against normal file systems. If a tree is actively being modified, the result may not be consistent, but still useful. If the tree is not changing, it will give a consistent result. Even without this patch, the result of getContentSummary() will get stale if the tree is constantly being modified. So I think the strict consistency is not required.


By setting the limit to something like 750,000, the max blocking time becomes about 15-25ms on today's typical Intel servers. This is set to 0 by default, which makes the getContentSummary() calls blocking, which is the behavior before this patch.

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▼  Kihwal Lee added a comment - 17/Oct/13 19:53

I have an equivalent patch for 0.23, but will wait until the trunk version is reviewed.

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▼  Hadoop QA added a comment - 17/Oct/13 22:07

+1 overall. Here are the results of testing the latest attachment  
<http://issues.apache.org/jira/secure/attachment/12609007/HDFS-4995.trunk1.patch>  
against trunk revision .

+1 @author. The patch does not contain any @author tags.

+1 tests included. The patch appears to include 1 new or modified test files.

+1 javac. The applied patch does not increase the total number of javac compiler warnings.

+1 javadoc. The javadoc tool did not generate any warning messages.

+1 eclipse:eclipse. The patch built with eclipse:eclipse.

+1 findbugs. The patch does not introduce any new Findbugs (version 1.3.9) warnings.

+1 release audit. The applied patch does not increase the total number of release audit warnings.


+1 core tests. The patch passed unit tests in hadoop-hdfs-project/hadoop-hdfs.

+1 contrib tests. The patch passed contrib unit tests.

Test results: <https://builds.apache.org/job/PreCommit-HDFS-Build/5229//testReport/>  
Console output: <https://builds.apache.org/job/PreCommit-HDFS-Build/5229//console>

This message is automatically generated.

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▼  Kihwal Lee added a comment - 18/Oct/13 22:54


The new patch moves the lock yield code to the context object. This is based on a casual review comment by Daryn. Having those methods in FSDirectory and FSNamesystem may cause misuses. While moving it into the context class, I added more sanity check to make sure that it has locked the correct locks and only once for each.

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▼  Kihwal Lee added a comment - 18/Oct/13 22:57

I've tested this with 100 threads creating, renaming deleting and also reader client calling getContentSummary(). The threshold was set to 2 in this test, so that it does lock yielding very frequently.

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▼  Hadoop QA added a comment - 19/Oct/13 01:14

+1 overall. Here are the results of testing the latest attachment  
<http://issues.apache.org/jira/secure/attachment/12609230/HDFS-4995.trunk.patch>  
against trunk revision .

+1 @author. The patch does not contain any @author tags.

+1 tests included. The patch appears to include 1 new or modified test files.

+1 **javac**. The applied patch does not increase the total number of javac compiler warnings.

+1 **javadoc**. The javadoc tool did not generate any warning messages.

+1 **eclipse:eclipse**. The patch built with eclipse:eclipse.

+1 **findbugs**. The patch does not introduce any new Findbugs (version 1.3.9) warnings.

+1 **release audit**. The applied patch does not increase the total number of release audit warnings.


+1 **core tests**. The patch passed unit tests in hadoop-hdfs-project/hadoop-hdfs.

+1 **contrib tests**. The patch passed contrib unit tests.

Test results: <https://builds.apache.org/job/PreCommit-HDFS-Build/5238//testReport/>  
 Console output: <https://builds.apache.org/job/PreCommit-HDFS-Build/5238//console>


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▼  **Kihwal Lee** added a comment - 29/Oct/13 18:18

Modified the patch to allow querying lock yield count. The test case checks it against the expected number.  
 We have tested this approach in production environment.

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▼  **Hadoop QA** added a comment - 29/Oct/13 20:54

-1 **overall**. Here are the results of testing the latest attachment  
<http://issues.apache.org/jira/secure/attachment/12610893/HDFS-4995.trunk.2.patch>  
 against trunk revision .

+1 **@author**. The patch does not contain any @author tags.

+1 **tests included**. The patch appears to include 1 new or modified test files.

+1 **javac**. The applied patch does not increase the total number of javac compiler warnings.

+1 **javadoc**. The javadoc tool did not generate any warning messages.

+1 **eclipse:eclipse**. The patch built with eclipse:eclipse.

+1 **findbugs**. The patch does not introduce any new Findbugs (version 1.3.9) warnings.

+1 **release audit**. The applied patch does not increase the total number of release audit warnings.

-1 **core tests**. The following test timeouts occurred in hadoop-hdfs-project/hadoop-hdfs:


org.apache.hadoop.hdfs.TestMissingBlocksAlert

+1 **contrib tests**. The patch passed contrib unit tests.

Test results: <https://builds.apache.org/job/PreCommit-HDFS-Build/5305//testReport/>  
 Console output: <https://builds.apache.org/job/PreCommit-HDFS-Build/5305//console>


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▼  **Kihwal Lee** added a comment - 30/Oct/13 12:35

The failed test case does not exercise the modified code path. It also passes when run separately.

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▼  **Daryn Sharp** added a comment - 01/Nov/13 22:11

I'd prefer to see ContentSummaryComputationContext and FSComputationContext folded together to help prevent proliferation of this technique. While very attractive for content summary, this approach is really going to make my experimental fine grain locking harder so I'd like to see it confined to content summary.


Minor: `InodeDirectory.computeContentSummary` appears to be unnecessarily copying the last child's local name. I believe the name is considered immutable.

I think the staleness handling could be improved and simpler to understand by using an incrementing yield count instead of a stale boolean. I.e. calling yield returns the current yield count which may be the same if no yield was necessary. Then the directory iteration can remember the current yield count when it fetches its children, and refresh its position if the current yield count is different.

You may even consider passing inodes to the computation context so you could encapsulate the entire yield behavior.

▼  Kihwal Lee added a comment - 12/Nov/13 23:28

New patch addresses the review comments.

▼  Hadoop QA added a comment - 13/Nov/13 04:22

-1 overall. Here are the results of testing the latest attachment <http://issues.apache.org/jira/secure/attachment/12613458/HDFS-4995.trunk.3.patch> against trunk revision .

+1 @author. The patch does not contain any @author tags.

+1 tests included. The patch appears to include 1 new or modified test files.

+1 javac. The applied patch does not increase the total number of javac compiler warnings.

+1 javadoc. The javadoc tool did not generate any warning messages.

+1 eclipse:eclipse. The patch built with eclipse:eclipse.

+1 findbugs. The patch does not introduce any new Findbugs (version 1.3.9) warnings.

+1 release audit. The applied patch does not increase the total number of release audit warnings.

-1 core tests. The patch failed these unit tests in hadoop-hdfs-project/hadoop-hdfs:


org.apache.hadoop.hdfs.server.namenode.TestPathBasedCacheRequests

+1 contrib tests. The patch passed contrib unit tests.

Test results: <https://builds.apache.org/job/PreCommit-HDFS-Build/5412//testReport/>

Console output: <https://builds.apache.org/job/PreCommit-HDFS-Build/5412//console>

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▼  Daryn Sharp added a comment - 13/Nov/13 20:59

Looks much cleaner. One question:

code

+ // Snapshot summary calc won't be relinquishing locks in the middle.


+ // Do this first and handover to parent.

+ computeContentSummary4Snapshot(summary.getCounts());

+ super.computeContentSummary(summary);


code

Is switching the order of the calls completely safe? Is there any chance you can fall through an inode reference to a directory that will yield?

▼  Kihwal Lee added a comment - 13/Nov/13 22:16

Is switching the order of the calls completely safe? Is there any chance you can fall through an inode reference to a directory that will yield?

Nope. computeContentSummary4Snapshot() will calculate the summary using a new context instance with yield disabled, and then merge the individual counts.

▼  Daryn Sharp added a comment - 14/Nov/13 15:53

+1 Not yielding in snapshots might need to be revisited in the future, but at least this patch addresses the common case.


▼  Hudson added a comment - 14/Nov/13 16:56

SUCCESS: Integrated in Hadoop-trunk-Commit #4736 (See <https://builds.apache.org/job/Hadoop-trunk-Commit/4736/>)

HDFS-4995. Make getContentSummary less expensive. Contributed by Kihwal Lee. (kihwal: <http://svn.apache.org/viewcvcs.cgi/?root=Apache-SVN&view=rev&rev=1541971>)

- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/CHANGES.txt
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/DFSConfigKeys.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/ContentSummaryComputationContext.java

- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSDirectory.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSNamesystem.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INode.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeDirectory.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeDirectoryWithQuota.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeFile.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeMap.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeReference.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeSymlink.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/snapshot/INodeDirectorySnapshottable.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/snapshot/INodeDirectoryWithSnapshot.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/test/java/org/apache/hadoop/hdfs/TestQuota.java

▼  Kihwal Lee added a comment - 14/Nov/13 17:00

Thanks for the reviews, Daryn. I've committed this to branch-0.23, branch-2 and trunk.

▼  Hudson added a comment - 15/Nov/13 11:03

SUCCESS: Integrated in Hadoop-Yarn-trunk #392 (See <https://builds.apache.org/job/Hadoop-Yarn-trunk/392/>)  
**HDFS-4995**. Make getContentSummary less expensive. Contributed by Kihwal Lee. (kihwal: <http://svn.apache.org/viewcvcs.cgi/?root=Apache-SVN&view=rev&rev=1541971>)

- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/CHANGES.txt
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/DFSCfgKeys.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/ContentSummaryComputationContext.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSDirectory.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSNamesystem.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INode.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeDirectory.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeDirectoryWithQuota.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeFile.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeMap.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeReference.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeSymlink.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/snapshot/INodeDirectorySnapshottable.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/snapshot/INodeDirectoryWithSnapshot.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/test/java/org/apache/hadoop/hdfs/TestQuota.java

▼  Hudson added a comment - 15/Nov/13 11:33

FAILURE: Integrated in Hadoop-Hdfs-0.23-Build #791 (See <https://builds.apache.org/job/Hadoop-Hdfs-0.23-Build/791/>)  
**HDFS-4995**. Make getContentSummary less expensive. Contributed by Kihwal Lee. (kihwal: <http://svn.apache.org/viewcvcs.cgi/?root=Apache-SVN&view=rev&rev=1541978>)

- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/CHANGES.txt
- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/DFSConfigKeys.java
- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/ContentSummaryComputationContext.java
- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSDirectory.java
- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSNamesystem.java
- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INode.java
- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeDirectory.java
- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeFile.java
- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeSymlink.java
- /hadoop/common/branches/branch-0.23/hadoop-hdfs-project/hadoop-hdfs/src/test/java/org/apache/hadoop/hdfs/TestQuota.java

▼  Hudson added a comment - 15/Nov/13 13:21

FAILURE: Integrated in Hadoop-Hdfs-trunk #1583 (See <https://builds.apache.org/job/Hadoop-Hdfs-trunk/1583/>)  
**HDFS-4995**. Make getContentSummary less expensive. Contributed by Kihwal Lee. (kihwal: <http://svn.apache.org/viewcvcs.cgi/?root=Apache-SVN&view=rev&rev=1541971>)

- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/CHANGES.txt
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/DFSConfigKeys.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/ContentSummaryComputationContext.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSDirectory.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSNamesystem.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INode.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeDirectory.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeDirectoryWithQuota.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeFile.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeMap.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeReference.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeSymlink.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/snapshot/INodeDirectorySnapshottable.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/snapshot/INodeDirectoryWithSnapshot.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/test/java/org/apache/hadoop/hdfs/TestQuota.java

▼  Hudson added a comment - 15/Nov/13 13:28

FAILURE: Integrated in Hadoop-Mapreduce-trunk #1609 (See <https://builds.apache.org/job/Hadoop-Mapreduce-trunk/1609/>)  
**HDFS-4995**. Make getContentSummary less expensive. Contributed by Kihwal Lee. (kihwal: <http://svn.apache.org/viewcvcs.cgi/?root=Apache-SVN&view=rev&rev=1541971>)

- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/CHANGES.txt



- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/DFSConfigKeys.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/ContentSummaryComputationContext.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSDirectory.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/FSNamesystem.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INode.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeDirectory.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeDirectoryWithQuota.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeFile.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeMap.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeReference.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/INodeSymlink.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/snapshot/INodeDirectorySnapshottable.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/main/java/org/apache/hadoop/hdfs/server/namenode/snapshot/INodeDirectoryWithSnapshot.java
- /hadoop/common/trunk/hadoop-hdfs-project/hadoop-hdfs/src/test/java/org/apache/hadoop/hdfs/TestQuota.java

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**▼ People**

Assignee:



Kihwal Lee

Reporter:



Kihwal Lee

Votes:

0

Vote for this issue

Watchers:

11

Start watching this issue

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**▼ Dates**

Created:

15/Jul/13 20:50

Updated:

09/Oct/15 00:44

Resolved:

14/Nov/13 17:00