HBase Monitoring

How do I enable JMX in HBase

Please see HBase Metrics page for instructions.

Do I need to add a separate SPM Application for each HBase server/node I want to monitor

No, one Application is enough. Think of an SPM "Application" as a "HBase Cluster". Thus, to monitor N HBase servers that belong to the same cluster you would create just a single SPM Application and use its Token in SPM configuration file on all HBase servers that are a part of this cluster.

Why don't some HBase metrics graphs have any data

There could be 2 possible reasons:

- 1. Some metrics are for RegionServers (HBase slaves), some for HBase Master. Thus, if you select the Master node in the UI, graphs that contain Slave-specific metrics will be blank and vice-versa.
- 2. Different versions of HBase provide different metrics. Thus, if you have an older version of HBase, it may not be providing all metrics that SPM collects and graphs.

Which versions of HBase does SPM support

SPM has been tested with HBase 0.90, 0.92, 0.94, and 0.98, but will work for newer versions, including all CDH versions.

Metrics

Report: HBase JVM

Chart: Log

Metric Name	Metric Description
fatal	Hadoop:service=HBase,name=JvmMetrics#LogFatal
error	Hadoop:service=HBase,name=JvmMetrics#LogError
warn	Hadoop:service=HBase,name=JvmMetrics#LogWarn
info	Hadoop:service=HBase,name=JvmMetrics#LogInfo

Chart: Threads

Metric Name	Metric Description
new	Hadoop:service=HBase,name=JvmMetrics#ThreadsNew
runnable	Hadoop:service=HBase,name=JvmMetrics#ThreadsRunnable
blocked	Hadoop:service = HBase, name = JvmMetrics #ThreadsBlocked
waiting	Hadoop:service=HBase,name=JvmMetrics#ThreadsWaiting
timed waiting	Hadoop:service = HBase, name = JvmMetrics #ThreadsTimedWaiting
terminated	Hadoop:service = HBase, name = JvmMetrics #ThreadsTerminated

Chart: Memory

	Metric
	De-
Metric	•
Name	tion
non heap used	Hadoop:service = HBase, name = JvmMetrics # MemNonHeapUsedM
non heap com- mit- ted	Hadoop: service = HBase, name = JvmMetrics # MemNonHeapCommitte
heap used	Hadoop:service=HBase,name=JvmMetrics#MemHeapUsedM
heap com- mit- ted	Hadoop:service = HBase, name = JvmMetrics # MemHeapCommitted M
non heap max	Hadoop: service = HBase, name = JvmMetrics # MemNonHeapMaxM
heap max	Hadoop:service=HBase,name=JvmMetrics#MemHeapMaxM

Metric De-Metricscrip-Name tion Hadoop:service=HBase,name=JvmMetrics#MemMaxMtotal \max Hadoop:service=HBase,name=JvmMetrics#MemNonHeapCommitte non heap committed Hadoop:service=HBase,name=JvmMetrics#MemHeapCommittedM committed

Report: UGI

Chart: Login Success & Failure

Metricscrip-Name tion
______successHadoop:service=HBase,name=UgiMetrics#LoginSuccessNumOps ops
failure Hadoop:service=HBase,name=UgiMetrics#LoginFailureNumOps

 $success Hadoop:service=HBase,name=UgiMetrics\#LoginSuccessAvgTime\ time\ \ ^*$

Login-Success-Nu-

Metric De-

mOps

ops

Metric
DeMetricscripName tion

failure Hadoop:service=HBase,name=UgiMetrics#LoginFailureAvgTime time *
LoginFailureNumOps

Chart: Get Groups

Metric Name	Metric Description
ops	Hadoop:service=HBase,name=UgiMetrics#GetGroupsNumOps
time	Hadoop:service=HBase,name=UgiMetrics#v * GetGroupsNumOps

Report: RS WAL

Chart: Sync & Append Ops & Time

Metric
DeMetricscripName tion

syncs Count
of
syncs the
HLog
to
HDFS.Hadoop:service=HBase,name=RegionServer,sub=WAL#Sync

```
Metric
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 Metricscrip-
 Name tion
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 time
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                                                                        pend-
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```

Chart: Append Ops & Size

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                                                    HLog.Hadoop:service=HBase,name=RegionServer,sub=WAL#Appe
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                                                    Size_mean
```

Chart: Sync & Append Max & Min Time

Metric De-Metricscrip-Name tion

 $\label{eq:sync} \begin{tabular}{ll} sync & Hadoop:service=HBase,name=RegionServer,sub=WAL\#SyncTime_min\\ time \end{tabular}$

Metric De-Metricscrip-Name tion sync Hadoop:service=HBase,name=RegionServer,sub=WAL#SyncTime_ \max time append Hadoop: service = HBase, name = Region Server, sub = WAL#Append Times append Times appe \min time append Hadoop: service = HBase, name = Region Server, sub = WAL#Append Times append to the service of the sertime appendHadoop:service=HBase,name=RegionServer,sub=WAL#AppendSize \min size append Hadoop: service = HBase, name = Region Server, sub = WAL#Append Size append Figure 1 and 1 append Figure 2 append Figure 2 append Figure 2 append Figure 3 append Fig \max size

Chart: Slow Appends

Metric
DeMetricscripMetricscripName tion

slow Number
ap- of
pends appends
that
were
slow.Hadoop:service=HBase,name=RegionServer,sub=WAL#slowAp

DeMetricscripName tion

appendSount

of
appends
to
the
log.Hadoop:service=HBase,name=RegionServer,sub=WAL#appendO

Metric

Report: RS Compact & Flush

Chart: Flush Queue

```
De-
Metricscrip-
Name tion
flush Length
queue of
      the
      queue
      for
      re-
      gion
      flushes.If
      in-
      creas-
      ing,
      we
      are
      falling
      be-
      hind
      with
      clear-
      ing
      mem-
      stores
      out
      HDFS.Hadoop:service=HBase,name=RegionServer,sub=Server#flush
```

Chart: Blocked Updates

Metric

```
Metric
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Metricscrip-
Name tion
updateNumber
time MS
                                                                      up-
                                                                      dates
                                                                      have
                                                                      been
                                                                      blocked
                                                                      \mathbf{so}
                                                                      that
                                                                      the
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                                                                      store
                                                                      can
                                                                      be
                                                                    flushed. Hadoop:service=HBase, name=RegionServer, sub=Server\#uper flushed. Hadoop:service=HBase, name=RegionServer, sub=Server flushed. Hadoop:server flu
```

${\bf Chart:\ Flush\ Counts/Size}$

 $\begin{array}{c} {\rm Metric} \\ {\rm De-} \\ {\rm Metricscrip-} \end{array}$

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Metricscrip-
Metricscrip-
Name tion

flushedThe
cells to-
size tal
amount
of
data
flushed
to
disk,
in
bytes.Hadoop:service=HBase,name=RegionServer,sub=Server#flush
```

Chart: Compaction Queue

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Metricscrip-
Name tion
compa \textbf{Climment}
queue depth
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      com-
      paction
      re-
      quest
      queue.
      If
      in-
      creas-
      ing,
      we
      are
      falling
      be-
      hind
      with
      store-
      file
      com-
      paction.Hadoop:service=HBase,name=RegionServer,sub=Server#con
```

Chart: Compaction Counts/Size

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  Metricscrip-
  Name tion
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Metric

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Metric
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```

Report: Master Assign Mngr

Chart: Assigns Ops & Time

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                                        Hadoop:service=HBase,name=Master,sub=AssignmentManger#Bull
 signs
assigns Hadoop: service = HBase, name = Master, sub = Assignment Manger \#Assignment Manger Manger
 bulk
                                     Hadoop:service=HBase,name=Master,sub=AssignmentManger#Bull
                                       BulkA-
 \operatorname{sign}
 time
                                        S-
                                        sign\_num\_ops
 assign Hadoop:service=HBase,name=Master,sub=AssignmentManger#Assi
 time *
                                        As-
                                        sign\_num\_ops
```

Chart: Regions In Transition

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Metricscrip-
Name tion
       The
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old-
       age
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       gion
       in
       tran-
       tion.Hadoop:service=HBase,name=Master,sub=AssignmentManger#
```

Metric

Metric

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Metricscrip-
Name tion
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```

Chart: Assigns Max & Min Time

MetricscripName tion

bulk Hadoop:service=HBase,name=Master,sub=AssignmentManger#Bull assign max time

bulk Hadoop:service=HBase,name=Master,sub=AssignmentManger#Bull assign min

assign Hadoop:service=HBase,name=Master,sub=AssignmentManger#Assi
max time

assign Hadoop:service=HBase,name=Master,sub=AssignmentManger#Assimin time

Report: RS Operations

Chart: Operation Calls & Time

Metric De-Metricscrip-Name tion

time

Metric De-

appendHadoop:service=HBase,name=RegionServer,sub=Server#Append_ndeletesHadoop:service=HBase,name=RegionServer,sub=Server#Delete_numutateHadoop:service=HBase,name=RegionServer,sub=Server#Mutate_ndeletesHadoop:service=HBase,name=RegionServer,sub=Server#Get_num_

```
Metric
                                      De-
Metricscrip-
Name tion
replaysHadoop:service=HBase,name=RegionServer,sub=Server#Replay_nu
increment_soop:service=HBase,name=RegionServer,sub=Server#Increment_
append Hadoop: service = HBase, name = Region Server, sub = Server \# Append\_nerver + Region Server + Region 
time *
                                      Ap-
                                      pend mean
delete Hadoop:service=HBase,name=RegionServer,sub=Server#Delete_nu
time *
                                      Delete_mean
mutateHadoop:service=HBase,name=RegionServer,sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.su
time *
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                                      tate_mean
                                      Hadoop:service=HBase,name=RegionServer,sub=Server#Get num
get
time
                                       Get mean
replay Hadoop:service=HBase,name=RegionServer,sub=Server#Replay_nu
_{\text{time}}
                                      Re-
                                      play_mean
time *
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                                      ment_mean
```

Chart: Slow Operations

```
Metric
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 Metricscrip-
Name tion
                                               The
 slow
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 slow
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```

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Metric
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```

Metric De-Metricscrip-Name tion

Chart: Operation Max & Min Time

Metric De-Metricscrip-Name tion appendHadoop:service=HBase,name=RegionServer,sub=Server#Append_n time ${\tt delete\ Hadoop:service=HBase,name=RegionServer,sub=Server\#Delete_minus}$ \min time mutateHadoop:service=HBase,name=RegionServer,sub=Server#Mutate_m \min time $Hadoop:service=HBase,name=RegionServer,sub=Server\#Get_min$ get \min time

replay Hadoop:service=HBase,name=RegionServer,sub=Server#Replay_m

increment_doop:service=HBase,name=RegionServer,sub=Server#Increment_

appendHadoop:service=HBase,name=RegionServer,sub=Server#Append_n

min time

min time

max time MetricscripName tion

delete Hadoop:service=HBase,name=RegionServer,sub=Server#Delete_mamax
time

 $\label{lem:mutateHadoop:service=HBase,name=RegionServer,sub=Server\#Mutate_mmax\\time$

get Hadoop:service=HBase,name=RegionServer,sub=Server#Get_max max time

replay Hadoop:service=HBase,name=RegionServer,sub=Server#Replay_max

time

 $\begin{array}{c} {\rm Metric} \\ {\rm De}\text{-} \end{array}$

$$\label{lem:eq:constraint} \begin{split} &\operatorname{increm} \textbf{\textit{E}tat} \\ &\operatorname{doop:service} = HBase, \\ &\operatorname{name} = RegionServer, \\ &\operatorname{sub} = Server\#Increment_max \end{split}$$

time

Report: Master Snapshot

Chart: Snapshot Ops & Time

```
Metric
                                                                                                                      De-
   Metricscrip-
   Name tion
restore {\Bbb Count}
                                                                                                                      of
                                                                                                                      re-
                                                                                                                      storeS-
                                                                                                                      nap-
                                                                                                                      shot()
                                                                                                                      \quad \text{in-} \quad
                                                                                                                      vo-
                                                                                                                      tions. Hadoop: service = HBase, name = Master, sub = Snapshots \#Snapshots \#Snapshot MSnapshot MS
clones Count
                                                                                                                      of
                                                                                                                      cloneS-
                                                                                                                      nap-
                                                                                                                      shot()
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                                                                                                                      tions. Hadoop: service = HBase, name = Master, sub = Snapshots \#Snapshots \#Snapshot MSnapshot MSnap
   snapsh \textbf{6} \textbf{to} \textbf{sunt}
                                                                                                                      of
                                                                                                                      snap-
                                                                                                                      shot()
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                                                                                                                      vo-
                                                                                                                      tions. Hadoop: service = HBase, name = Master, sub = Snapshots \#Snapshots \#Snapshot MSnapshot MS
```

```
Metric
       De-
Metricscrip-
Name tion
{\bf restoreTime}
time it
       takes
       to
       fin-
       ish
       re-
       storeS-
       nap-
       \verb|shot|(). Hadoop:service=HBase, name=Master, \verb|sub=Snapshots|| \#Snapshots||
       Snap-
       \operatorname{shotRe}
       store-
       Time\_mean
clone Time
time it
       takes
       to
       fin-
       ish
       cloneS-
       nap-
       \substack{\text{shot()}. Hadoop:service=HBase, name=Master, sub=Snapshots\#Snapshell} *
       Snap-
       shot-
       Clone-
       Time\_mean
```

```
Metricscrip-
Metricscrip-
Name tion

snapshotime
time it
    takes
    to
    fin-
    ish
    snap-
    shot().Hadoop:service=HBase,name=Master,sub=Snapshots#Snapsl
    *

Snap-
    shot-
    Time_mean
```

Chart: Snapshot Max & Min Time

```
Metric De-
Metricscrip-
Name tion

restoreHadoop:service=HBase,name=Master,sub=Snapshots#SnapshotResmin time

restoreHadoop:service=HBase,name=Master,sub=Snapshots#SnapshotResmax time

clone Hadoop:service=HBase,name=Master,sub=Snapshots#SnapshotClonmin time

clone Hadoop:service=HBase,name=Master,sub=Snapshots#SnapshotClonmin time
```

max time

```
Metric
De-
Metricscrip-
Metricscrip-
Name tion

snapshbladoop:service=HBase,name=Master,sub=Snapshots#SnapshotTim
min
time
snapshbladoop:service=HBase,name=Master,sub=Snapshots#SnapshotTim
max
time
```

Report: Master FS

Chart: Split Ops & Time

```
Metric
                                                       De-
 Metricscrip-
Name tion
 hlog Count
 splits of
                                                         HLog.splitLog()
                                                       in-
                                                       vo-
                                                       tions. Hadoop: service = HBase, name = Master, sub = File System \# H log Specific File System File Syste
 meta Count
 hlog
                                                      of
 splits split-
                                                       Met-
                                                       a-
                                                       Log()
                                                       in-
                                                       vo-
                                                       tions.Hadoop:service=HBase,name=Master,sub=FileSystem#MetaH
```

```
Metric
                                             De-
 Metricscrip-
 Name tion
                                             Time
 hlog
 split
                                            it
 time
                                            takes
                                             to
                                             fin-
                                             HLog.splitLog(). Hadoop: service = HBase, name = Master, sub = FileSystem (Service) + Fil
                                             HlogSplit-
                                            Time\_mean
meta Time
 hlog
                                             it
 split
                                             takes
 time
                                           to
                                             fin-
                                             ish
                                             split-
                                             Met-
                                             MetaHlogSplit-
                                             Time\_mean
```

Chart: Split Ops & Size

```
Metric
                                                                       De-
 Metricscrip-
 Name tion
 hlog Count
splits of
                                                                       HLog.splitLog()
                                                                       in-
                                                                       vo-
                                                                       ca-
                                                                       meta Count
 hlog of
 splits split-
                                                                       Met-
                                                                       a-
                                                                       Log()
                                                                       in-
                                                                       vo-
                                                                       tions. Hadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = Master, sub = Mas
 hlog
                                                                       \operatorname{Size}
\operatorname{split}
                                                                       of
 size
                                                                       HLog
                                                                       files
                                                                       be-
                                                                       split. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# Hlog
                                                                       HlogSplit-
                                                                       Size\_mean
```

```
Metric
                                                                            De-
 Metricscrip-
 Name tion
 meta Size
hlog
                                                                          of
 \operatorname{split}
                                                                        hbase:meta
                                                                          HLog
 size
                                                                            files
                                                                            be-
                                                                            ing
                                                                          \begin{tabular}{ll} split. Hadoop: service = HBase, name = Master, sub = FileSystem \#MetaHBase, name = FileSystem \#MetaHBase, 
                                                                            {\bf MetaHlogSplit-}
                                                                            Size\_mean
```

Chart: Split Max & Min time

	Metric De-		
Metri	cscrip-		
Name tion			
hlog split min time	Hadoop:service=HBase,name=Master,sub=FileSystem#HlogSplitTir		
hlog split max time	Hadoop: service = HBase, name = Master, sub = File System # Hlog Split Time Andrew System # Hlog Split Time System # Hlog Split Time System Hlog Split Time System Hlog Split Time		
meta hlog split min time	Hadoop: service = HBase, name = Master, sub = File System # MetaHlog Space And the substitution of the s		

	De-			
Metricscrip-				
Name tion				
meta hlog split max time	Hadoop:service=HBase,name=Master,sub=FileSystem#MetaHlogSp			
hlog split min size	Hadoop: service = HBase, name = Master, sub = File System # Hlog Split Size Andrew System # Hog Split Size Andrew System # Hlog Split Size Andrew System # Hog Split Size Andrew System M Hog Split Size Andrew System			
hlog split max size	Hadoop: service = HBase, name = Master, sub = File System # Hlog Split Size Andrew System # Hog Split Size Andrew System # Hlog Split Size Andrew System # Hog Split Size Andrew System M Hog Split Size Andrew System			
meta hlog split min size	Hadoop: service = HBase, name = Master, sub = File System # MetaHlog Spring = Master, sub = File System # MetaHl			
meta hlog split max size	Hadoop: service = HBase, name = Master, sub = File System # Meta H log Space + Master, sub = File System # Meta H log			

Report: RS Regions & Stores

Chart: Indexes & Bloom Filters

Metric

```
Metric
                                                                                                   De-
Metricscrip-
Name tion
  static Uncompressed
  in-
                                                                                                   size
  \operatorname{dex}
                                                                                                   of
  size
                                                                                                   the
                                                                                                   static
                                                                                                   in-
                                                                                                   {\tt dexes. Hadoop:service=HBase, name=RegionServer, sub=Server\#stations and the action of the actio
  static Uncompressed
  bloom size
  size
                                                                                                   of
                                                                                                   the
                                                                                                   \operatorname{static}
                                                                                                   bloom
                                                                                                   fil-
                                                                                                   ters. Hadoop:service=HBase, name=RegionServer, sub=Server\#staticHadoop:service=HBase, name=RegionServer, sub=Server, sub
```

Chart: Regions & Stores

```
Metric
De-
Metricscrip-
Name tion

regionsNumber
of
re-
gions.Hadoop:service=HBase,name=RegionServer,sub=Server#regio

stores Number
of
Stores.Hadoop:service=HBase,name=RegionServer,sub=Server#stor
```

Files. Hadoop: service = HBase, name = Region Server, sub = Server # storell Region Server = Region Server + Region Server +

of

files

Metric De-Metricscrip-Name tion

Chart: Store Files

Metric De-Metricscrip-Name tion store Size file of size storefiles being served. Hadoop: service = HBase, name = Region Server, sub = Server #storker + Serstore Size ${\rm file}$ of inin- dex dexes size instorefiles

 $\label{lem:disk.Hadoop:service=HBase,name=RegionServer,sub=Server\#storeFaces and the service of the service o$

Chart: Mem Stores

on

```
De-
Metricscrip-
Name tion

mem Size
store of
size the
mem-
store.Hadoop:service=HBase,name=RegionServer,sub=Server#mems

upper Property
limit 'hbase.regionserver.global.memstore.upperLimit'
value.

lower Property
limit 'hbase.regionserver.global.memstore.lowerLimit'
```

Metric

value.

Report: IPC

Chart: Connections & Handler

```
Metric
                                                                                   De-
Metricscrip-
  Name tion
open The
  con-
                                                                                   num-
                                                                                   ber
  nec-
  tions of
                                                                                     open
                                                                                   con-
                                                                                   nec-
                                                                                   tions
                                                                                   at
                                                                                   the
                                                                                   RPC
                                                                                   layer. Hadoop: service = HBase, name = IPC, sub = IPC \# numOpenConnection + IPC \# numOpenConne
```

```
De-
Metricscrip-
Name tion

active Number
han- of
dlers ac-
tive
rpc
han-
dlers.Hadoop:service=HBase,name=IPC,sub=IPC#numActiveHandl
```

Chart: Queue & Process Calls & Times

Metric

```
Metric
    De-
Metricscrip-
Name tion
calls
processHadoop:service=HBase,name=IPC,sub=IPC#ProcessCallTime_num
calls
queue Hadoop:service=HBase,name=IPC,sub=IPC#QueueCallTime_mean
call
time Queue-
    Call-
    Time_num_ops
processHadoop:service=HBase,name=IPC,sub=IPC#ProcessCallTime_mea
call
time Pro-
    cess-
    Call-
    Time_num_ops
```

Chart: Authentication & Authorization

```
Metric
                                                                                   De-
  Metricscrip-
  Name tion
authen No carbioer
  fail-
                                                                                   of
  ures
                                                                                   au-
                                                                                   then-
                                                                                   ti-
                                                                                   ca-
                                                                                   tion
                                                                                   fail-
                                                                                   ures. Hadoop: service = HBase, name = IPC, sub = IPC \# authentication Fairly for the substitution of the
  author \textbf{Nautiober}
  fail-
                                                                                   of
  ures
                                                                                   au-
                                                                                   tho-
                                                                                   riza-
                                                                                   tion
                                                                                   fail-
                                                                                   authen \hbox{\it N can liver}
  suc-
                                                                                   of
  cesses au-
                                                                                   then-
                                                                                   ti-
                                                                                   ca-
                                                                                   tion
                                                                                   cesses. Hadoop: service = HBase, name = IPC, sub = IPC \# authentication States and the states are substituted as the states of the states are substituted as the states are states as the states are substituted as the states are states are states as the states are states are states as the states are states are states as the states are states are states as the states are states as the states are states as the states are states are states as the states are states are states as the states are states are states as the states are states are stat
  author Nautidoer
  suc-
                                                                                 of
  cesses au-
                                                                                   tho-
                                                                                   riza-
                                                                                   tion
                                                                                   cesses. Hadoop: service = HBase, name = IPC, sub = IPC \# authorization Substitution Substituti
```

Chart: Send & Received Bytes

```
Metric De-
Metricscrip-
Name tion

sent Number
bytes of
bytes
sent.Hadoop:service=HBase,name=IPC,sub=IPC#sentBytes

receiveNumber
bytes of
bytes
re-
ceived.Hadoop:service=HBase,name=IPC,sub=IPC#receivedBytes
```

Chart: Queue

```
Metric
De-
Metricscrip-
Name tion

queue Number
size of
bytes
in
the
call
queues.Hadoop:service=HBase,name=IPC,sub=IPC#queueSize
```

```
Metric
                                                De-
 Metricscrip-
 Name tion
 {\rm calls}
                                               The
                                                num-
 in
                                                ber
 gen-
 eral
                                                of
queue cur-
                                                rently
                                                en-
                                                queued
                                                user
                                                {\it quests.} Hadoop: service = HBase, name = IPC, sub = IPC \# num Calls In General Control Co
 calls
                                              Number
                                                of
 in
repli- calls
 ca-
                                                in
 tion
                                              the
 queue repli-
                                                ca-
                                                tion
                                                call
                                                {\tt queue. Hadoop:service=HBase, name=IPC, sub=IPC\#numCallsInRep} \\
```

```
The
{\rm calls}
in
                                                                                num-
                                                                                ber
pri-
                                                                                of
or-
ity
                                                                                  cur-
queue rently
                                                                                en-
                                                                                queued
                                                                                pri-
                                                                                or-
                                                                                ity
                                                                                (in-
                                                                                ter-
                                                                                nal
                                                                                house-
                                                                                keep-
                                                                                ing)
                                                                                {\it quests.} Hadoop: service = HBase, name = IPC, sub = IPC \# num Calls In Prior to the control of the control
```

Chart: Queue & Process Max & Min Times

```
Metric De-
Metricscrip-
Name tion

______
processHadoop:service=HBase,name=IPC,sub=IPC#ProcessCallTime_min call min time

queue Hadoop:service=HBase,name=IPC,sub=IPC#QueueCallTime_min call min time
```

 $\begin{array}{c} {\rm Metric} \\ {\rm De-} \\ {\rm Metricscrip-} \\ {\rm Name~tion} \end{array}$

```
De-
Metricscrip-
Name tion

_______
processHadoop:service=HBase,name=IPC,sub=IPC#ProcessCallTime_max
call
max
time

queue Hadoop:service=HBase,name=IPC,sub=IPC#QueueCallTime_max
call
max
time
```

Report: RS Requests

Chart: Requests

```
De-
Metricscrip-
Name tion

total Total
re- num-
quests ber
    of
    re-
    quests
    this
    Re-
    gion-
    Server
    has
    an-
    swered.Hadoop:service=HBase,name=RegionServer,sub=Server#tota
```

Metric

Metric

```
Metric
                                                                                        De-
  Metricscrip-
  Name tion
                                                                                      Number
  read
                                                                                        of
quests read
                                                                                        re-
                                                                                          quests
                                                                                        this
                                                                                        re-
                                                                                        gion
                                                                                        server
                                                                                        has
                                                                                        an-
                                                                                        swered. Hadoop:service=HBase, name=RegionServer, sub=Server\#reactions and the substitution of the substi
write Number
                                                                                        of
  re-
  quests mu-
                                                                                        ta-
                                                                                        tion
                                                                                        re-
                                                                                        quests
                                                                                        this
                                                                                        re-
                                                                                        gion
                                                                                        server
                                                                                        has
                                                                                        an-
                                                                                        swered. Hadoop:service=HBase, name=RegionServer, sub=Server\#wring and support of the support o
  read \quad Hadoop:service=HBase,name=RegionServer,sub=Server\#readRequents (a) \\
  re-
  quests
write \quad Hadoop:service=HBase,name=RegionServer,sub=Server\#writeRequestions and the substitution of the s
  re-
```

quests

Report: RS Replication

Chart: Sink Ops & Batches

 $\begin{array}{c} {\rm Metric} \\ {\rm De-} \\ {\rm Metricscrip-} \end{array}$

Metricscrip-Name tion

applied Hadoop: service = HBase, name = Region Server, sub = Replication # sink. a batches

applied Hadoop: service = HBase, name = Region Server, sub = Replication # sink. a ops

Report: Master Balancer

Chart: Balancing Min & Max Time

Metric

De-

Metricscrip-

Name tion

 $balance \verb| Hadoop:service = HBase, name = Master, sub = Balancer \#Balancer Cluster max$

time

 $balance \verb|Hadoop:service=| HBase, name=| Master, sub=| Balancer \# Balancer Cluster \# Balancer \# B$

min time

Chart: Balancing Ops & Time

	Metric
	De-
Metri	cscrip-
Name	e tion
ops	Hadoop:service=HBase,name=Master,sub=Balancer#BalancerCluster
time	${\small \begin{array}{l} {\rm Hadoop:service=HBase,name=Master,sub=Balancer\#BalancerCluster} \\ * \\ \end{array}}$
	Bal-
	ancer-
	Clus-
	ter_mean

Chart: Misc Invocations

Metric De-Metricscrip-Name tion

 ${\rm tions}$

misc Hadoop:service=HBase,name=Master,sub=Balancer#miscInvocation invo-

Report: RS MOB

Chart: MOB Cache Stats

```
Metric
                                                                                                    De-
  Metricscrip-
  Name tion
                                                                                                    The
  file
  cache count
  ac-
                                                                                                    of
cesses ac-
                                                                                                       cesses
                                                                                                    to
                                                                                                    the
                                                                                                    mob
                                                                                                    file
                                                                                                    cache. Hadoop: service = HBase, name = Region Server, sub = Server \# mobile to the service = Region Server + Region Server +
                                                                                                    The
  file
  cache count
{\it misses} \ {\it of}
                                                                                                    misses
                                                                                                    to
                                                                                                    the
                                                                                                    \operatorname{mob}
                                                                                                    file
                                                                                                    cache. Hadoop: service = HBase, name = Region Server, sub = Server \# mobile to the service = Region Server + Region Server +
                                                                                                    The
  file
  cache num-
evic- ber
tions of
                                                                                                    items
                                                                                                    evicted
                                                                                                    from
                                                                                                    the
                                                                                                    \operatorname{mob}
                                                                                                    file
                                                                                                    cache. Hadoop: service = HBase, name = Region Server, sub = Server \# mobile service = Server \# mobile service = Region Server, sub = Server \# mobile service = Server \# mobi
```

```
Metric De-
Metric scrip-
Name tion

file The cache hit hits percent to the mob file cache.Hadoop:service=HBase,name=RegionServer,sub=Server#mob.
```

Chart: MOB Compaction Stats

```
Metric
         De-
Metricscrip-
Name tion
\operatorname{compa} \overline{\operatorname{d}} \overline{\operatorname{thd}}
from num-
         ber
\operatorname{mob}
{\it cells}
         of
         cells
         moved
         from
         \operatorname{mob}
         dur-
         ing
         com-
         paction.Hadoop:service=HBase,name=RegionServer,sub=Server#mo
```

```
Metric
                                                                                    De-
  Metricscrip-
  Name tion
\operatorname{compact}_{\boldsymbol{h}\boldsymbol{d}}
  into
                                                                                  num-
  \operatorname{mob}
                                                                                    ber
  {\it cells}
                                                                                    of
                                                                                    {\it cells}
                                                                                    moved
                                                                                    to
                                                                                    mob
                                                                                    \operatorname{dur}-
                                                                                    ing
                                                                                    com-
                                                                                    paction. Hadoop: service = HBase, name = Region Server, sub = Server \# model = Region Server + Region Server
from to-
mob
                                                                                    tal
  cells
                                                                                    amount
  size
                                                                                    of
                                                                                    cells
                                                                                    move
                                                                                    from
                                                                                    \operatorname{mob}
                                                                                    dur-
                                                                                    ing
                                                                                    com-
                                                                                    paction,
                                                                                  bytes. Hadoop: service = HBase, name = Region Server, sub = Server \# mobel to the substantial state of the substantial
```

```
Metric
                                                                            De-
 Metricscrip-
 Name tion
\operatorname{compa} \operatorname{d}\! E h \operatorname{d}\! e
 into
                                                                          to-
 \operatorname{mob}
                                                                            tal
 cells
                                                                            amount
 size
                                                                            of
                                                                            {\it cells}
                                                                            move
                                                                            to
                                                                            \operatorname{mob}
                                                                            dur-
                                                                            ing
                                                                            com-
                                                                            paction,
                                                                            bytes. Hadoop: service = HBase, name = Region Server, sub = Server \# mobel to the substitution of the su
```

Chart: MOB Cache Files

```
Metric
De-
Metricscrip-
Metricscrip-
Name tion

file The
caches count
of
cached
mob
files.Hadoop:service=HBase,name=RegionServer,sub=Server#mobFi
```

Chart: MOB Scan Stats

```
Metric
                                                                                                          De-
Metricscrip-
Name tion
                                                                                                          The
scan
cells
                                                                                                          num-
                                                                                                          ber
                                                                                                          of
                                                                                                          scanned
                                                                                                          mob
                                                                                                          cells. Hadoop: service = HBase, name = Region Server, sub = Server \# mob Server \# mob Server, sub = Server \# mob Server \# mob Server, sub = Server \# mob Server \# mob Server, sub = Server \# mob Ser
                                                                                                          The
scan
cells
                                                                                                          to-
size
                                                                                                          \operatorname{tal}
                                                                                                          amount
                                                                                                          of
                                                                                                          scanned
                                                                                                          \operatorname{mob}
                                                                                                          cells,
                                                                                                          in
                                                                                                          bytes. Hadoop: service = HBase, name = Region Server, sub = Server \# mob Server \#
```

Chart: MOB Flush Stats

```
Metricscrip-
Metricscrip-
Name tion

The

num-
ber

of
the
flushes
in
mob-
enabled
stores.Hadoop:service=HBase,name=RegionServer,sub=Server#mob
```

```
Metric
                                                                                                De-
Metricscrip-
Name tion
flushed The
cells num-
                                                                                                ber
                                                                                                of
                                                                                                \operatorname{mob}
                                                                                                {\it cells}
                                                                                                flushed
                                                                                             \label{lem:disk.Hadoop:service=HBase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server
flushed The
cells
                                                                                           to-
size
                                                                                                tal
                                                                                                amount
                                                                                                of
                                                                                                mob
                                                                                                {\it cells}
                                                                                                flushed
                                                                                                to
                                                                                                disk,
                                                                                                bytes. Hadoop: service = HBase, name = Region Server, sub = Server \# mobile to the substantial state of the substantial
```

Report: RS Files

Chart: HLog

```
Metric
                                                                                                            De-
Metricscrip-
Name tion
                                                                                                            The
hlog
files
                                                                                                            num-
                                                                                                            ber
                                                                                                            of
                                                                                                            \quad \text{write} \quad
                                                                                                            ahead
                                                                                                            logs
                                                                                                            \operatorname{not}
                                                                                                            yet
                                                                                                         archived. Hadoop: service = HBase, name = Region Server, sub = Server\#hland Server = Region Server + Region 
hlog
                                                                                                            Size
files
                                                                                                            of
size
                                                                                                            all
                                                                                                         HLog
                                                                                                         Files. Hadoop: service = HBase, name = Region Server, sub = Server \# hlog Formula + Region Formula + Region
```

Chart: Local Files

```
Metric
       De-
Metricscrip-
Name tion
       The
local
files
       per-
       \operatorname{cent}
       of
       HFiles
       that
       are
       stored
       on
       the
       lo-
       cal
       hdfs
       {\tt node. Hadoop:service=HBase, name=Region Server, sub=Server\#perce}
```

Report: Master Servers

Chart: Region Servers

Metric De-Metricscrip-Name tion

 $region\ Hadoop:service=HBase, name=Master, sub=Server\#numRegionServers$ servers

 $\label{lem:dead} \begin{tabular}{ll} dead & Hadoop:service=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionServer#numDea$

servers

Chart: Requests & Load

Metric DeMetricscripMetricscripName tion

ClusterHadoop:service=HBase,name=Master,sub=Server#clusterRequests requests

averageHadoop:service=HBase,name=Master,sub=Server#averageLoad load

Report: RS Check & Mutate

Chart: Check & Mutate Calls

 $\begin{array}{c} {\rm Metric} \\ {\rm De-} \\ {\rm Metricscrip-} \\ {\rm Name\ tion} \end{array}$

mutateNumber failed of ops Check and Mutate calls that

failed the

checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Region Server, sub = Se

```
Metric
                                                                                De-
Metricscrip-
Name tion
{\bf mutate Number}
passed of
ops
                                                                                \operatorname{Check}
                                                                                and
                                                                                Mu-
                                                                                tate
                                                                                calls
                                                                                that
                                                                                passed
                                                                                the
                                                                              checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server \# checks. Hadoop: service = Re
```

Chart: Mutations

```
Metric
                                        De-
 Metricscrip-
Name tion
mutati {\color{red} {\bf N} nm} ber
 with- of
 out
                                        mu-
 wal
                                        ta-
                                        tions
                                        that
                                        have
                                        been
                                        \operatorname{sent}
                                        by
                                        clients
                                        with
                                        the
                                        write
                                        ahead
                                        log-
                                        ging
                                        turned
                                        off.Hadoop:service=HBase,name=RegionServer,sub=Server#mutation
 \mathrm{mutati} \mathbf{Six} \mathbf{e}
 with- of
 out
                                        data
 wal
                                        that
                                        has
 size
                                        been
                                        \operatorname{sent}
                                        by
                                        clients
                                        with
                                        the
                                        write
                                        ahead
                                        log-
                                        ging
                                        turned
                                        off. Hadoop: service = HBase, name = Region Server, sub = Server \# mutation for the service in the service in
```

Report: RS Cache

Chart: Cache Blocks

```
Metric
                                                                                                               De-
Metricscrip-
Name tion
cache Number
count of
                                                                                                               block
                                                                                                               {\rm in}
                                                                                                               the
                                                                                                               block
                                                                                                               cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
cache Size
                                                                                                               of
free
size
                                                                                                               the
                                                                                                               block
                                                                                                               cache
                                                                                                               that
                                                                                                               is
                                                                                                               not
                                                                                                               oc-
                                                                                                               pied. Hadoop: service = HBase, name = Region Server, sub = Server \#block General Foundation + Region Server 
block Size
cache of
                                                                                                               the
size
                                                                                                               block
                                                                                                               cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
```

Chart: Cache Stats

```
Metric
                                                                                                          De-
Metricscrip-
Name tion
hits
                                                                                                          Count
                                                                                                          of
                                                                                                          the
                                                                                                          hit
                                                                                                          on
                                                                                                          the
                                                                                                          block
                                                                                                          cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
                                                                                                       Number
_{
m miss}
                                                                                                          of
                                                                                                          re-
                                                                                                          quests
                                                                                                          for
                                                                                                          \mathbf{a}
                                                                                                          block
                                                                                                          that
                                                                                                          missed
                                                                                                          the
                                                                                                          block
                                                                                                          cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
evictionsount
                                                                                                          of
                                                                                                          the
                                                                                                          num-
                                                                                                          ber
                                                                                                          of
                                                                                                          blocks
                                                                                                          evicted
                                                                                                          from
                                                                                                          the
                                                                                                          block
                                                                                                          cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
```

```
Metric
                                                                                              De-
Metricscrip-
  Name tion
  \mathrm{hit}\% \quad \mathrm{Percent}
                                                                                              of
                                                                                              block
                                                                                              cache
                                                                                              re-
                                                                                              quests
                                                                                              that
                                                                                              are
                                                                                              \label{lem:hits.Hadoop:service=HBase,name=RegionServer, sub=Server\#blockControl of the property of the prope
  express The
  hit\% per-
                                                                                              \operatorname{cent}
                                                                                              of
                                                                                              the
                                                                                              time
                                                                                              that
                                                                                              re-
                                                                                              quests
                                                                                              with
                                                                                              the
                                                                                              cache
                                                                                              turned
                                                                                              on
                                                                                              hit
                                                                                              the
                                                                                              cache. Hadoop: service = HBase, name = Region Server, sub = Server \#blockers + Server \#
```

Report: RS Replication Src

Chart: Log Queue

	Metric
	De-
	Metricscrip-
	Name tion
	log Hadoop:service=HBase,name=RegionServer,sub=Replication#source
	queue
Chart: Log Reads	
S	
	Metric
	De-
	Metricscrip-
	Name tion
	log Hadoop:service=HBase,name=RegionServer,sub=Replication#sourced-
	its
	read
	log Hadoop:service=HBase,name=RegionServer,sub=Replication#sourced-
	its
	fil-
	tered
	log Hadoop:service=HBase,name=RegionServer,sub=Replication#sourc read
	bytes
	by tes
	
Chart: Shipped Ops & Size	
	Metric
	De-
	Metricscrip-
	Name tion
	chinnella de angentica IIDega nomo Desire Como esta Desir (* 11
	shippedHadoop:service=HBase,name=RegionServer,sub=Replication#sourc

batches

DeMetricscripName tion

shipped Hadoop:service=HBase,name=RegionServer,sub=Replication#source

Report: Overview

Chart: Requests

Metric
DeMetricscripName tion
total Total

Metric

re- numquests ber
of
requests
this
RegionServer
has
an-

swered. Hadoop:service = HBase, name = RegionServer, sub = Server#total swered. Hadoop:service = HBase, name = RegionServer, sub = Server#total swered. Hadoop:service = HBase, name = RegionServer, sub = Server#total swered. Hadoop:service = HBase, name = RegionServer, sub = Server#total swered. Hadoop:service = HBase, name = RegionServer, sub = Server#total swered. Hadoop:server, sub = Server#total swer

```
Metric
                                                                                        De-
  Metricscrip-
  Name tion
  read Number
                                                                                        of
  {\it quests\ read}
                                                                                        re-
                                                                                        quests
                                                                                        this
                                                                                        re-
                                                                                        gion
                                                                                        server
                                                                                        has
                                                                                        an-
                                                                                      swered. Hadoop: service = HBase, name = Region Server, sub = Server \# reader the substitution of the sub
  write Number
                                                                                        of
  re-
quests mu-
                                                                                        ta-
                                                                                        tion
                                                                                        re-
                                                                                        quests
                                                                                        this
                                                                                        re-
                                                                                        gion
                                                                                        server
                                                                                        has
                                                                                        an-
                                                                                        swered. Hadoop:service=HBase, name=RegionServer, sub=Server\#wring and the substantial statement of th
```

Chart: Compaction Queue

```
Metric
                                                                De-
Metricscrip-
Name tion
compa \textbf{Climment}
queue depth
                                                                of
                                                                the
                                                                com-
                                                                paction
                                                                re-
                                                                quest
                                                                queue.
                                                                If
                                                                in-
                                                                creas-
                                                                ing,
                                                                we
                                                                are
                                                                falling
                                                                be-
                                                                hind
                                                                with
                                                                store-
                                                                file
                                                                com-
                                                               paction. Hadoop: service = HBase, name = Region Server, sub = Server \# contact = Server
```

Chart: Disk Space Used

Metric Name | Metric Description — | — used space |

Chart: Mem Stores

Metric De-Metricscrip-Name tion mem Size of store size the store. Hadoop: service = HBase, name = Region Server, sub = Server # mem Server + Supper Property limit 'hbase.regionserver.global.memstore.upperLimit' value. lower Property $limit \ 'hbase.regionserver.global.memstore.lowerLimit'$ value.

Chart: Region Servers

Metric
DeMetricscripName tion

 $\label{lem:service} \begin{tabular}{ll} region Hadoop: service = HBase, name = Master, sub = Server \# num Region Server servers \end{tabular}$

 $\label{lem:dead} \begin{tabular}{ll} dead & Hadoop:service=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionServer=HBase,name=Master,sub=S$

Chart: Garbage Collectors

Metric Name | Metric Description — | — collection time | collection count | avg collection time |

servers

Chart: Flush Queue

```
De-
Metricscrip-
Name tion
flush Length
queue of
      the
      queue
      for
      re-
      gion
      flushes.If
      in-
      creas-
      ing,
      we
      are
      falling
      be-
      hind
      with
      clear-
      ing
      mem-
      stores
      out
      HDFS.Hadoop:service=HBase,name=RegionServer,sub=Server#flush
```

Chart: Local Files

Metric

```
Metric
                                                                                       De-
Metricscrip-
Name tion
local
                                                                           The
files
                                                                                       per-
                                                                                       \operatorname{cent}
                                                                                       of
                                                                                       HFiles
                                                                                       that
                                                                                       are
                                                                                       stored
                                                                                       on
                                                                                       the
                                                                                       lo-
                                                                                       cal
                                                                                       hdfs
                                                                                       node. Hadoop: service = HBase, name = Region Server, sub = Server \# percent Advances + Region Server \# percent \# percent Advances + Region Server \# percent \# percent Advances + Region Server \# percent \# p
```

Chart: CPU

Metric Name | Metric Description — | — 'user' | 'system' | 'wait' | 'interruption' | 'soft interrupt' | 'nice' | 'steal' | 'idle' |

Report: RS Hedged Reads

Chart: Hedged Reads

```
Metric
                                                 De-
 Metricscrip-
Name tion
 {\bf hedgedThe}
 reads num-
                                                 ber
                                                 of
                                                 times
                                                 we
                                                 started
                                                 hedged
                                                 read.Hadoop:service=HBase,name=RegionServer,sub=Server#hedge
 {\bf hedgedThe}
 read
                                              num-
wins
                                                ber
                                                 of
                                                 times
                                                 we
                                                 started
                                                 hedged
                                                 read
                                                 and
                                                 hedged
                                                 won. Hadoop: service = HBase, name = Region Server, sub = Server \# hedged the substitution of the substi
```

Report: HBase Store (0.94)

```
Chart: Stores
```

Metric Name | Metric Description — | — stores | store files |

Chart: Compaction

Metric Name | Metric Description — | — compactions | avg time |

Chart: StoreFile Index

Chart: Memstore Flush Metric Name | Metric Description — | — flushes | avg time | Report: HBase FS (0.94) Chart: Min Time Latency Metric Name | Metric Description — | — read | write | sync | Chart: Avg Time Latency Metric Name | Metric Description — | — read | write | sync | Chart: Max Time Latency Metric Name | Metric Description — | — read | write | sync | Report: HBase Memstore (0.94) Chart: Memstore Size Metric Name | Metric Description — | — memstore size | memory store upper limit | memory store lower limit | Chart: Memstore Flush Queue Metric Name | Metric Description — | — flush queue **Chart: Memstore Flush Operations** Metric Name | Metric Description — | — flushes | avg time | Chart: Memstore Flush Size Metric Name | Metric Description — | — \max | \arg | \min | Chart: Memstore Flush Time Metric Name | Metric Description — | — max | avg | min |

 $\begin{tabular}{ll} Metric Name & | Metric Description -- | -- store file index size & | store files & | \\ \end{tabular}$

Chart: HBase Request Rate Metric Name | Metric Description — | — request rate | Report: HBase Compactions (0.94) Chart: Compaction Size Metric Name | Metric Description — | — \max | \arg | \min | **Chart: Compaction Operations** Metric Name | Metric Description — | — compactions | avg time | **Chart: Compaction Time** Metric Name | Metric Description — | — max | avg | min | Chart: Compaction Queue Metric Name | Metric Description — | — compaction queue | Report: HBase Block Cache (0.94) Chart: Block Cache Hit Ratio Metric Name | Metric Description — | — blockCacheHitCachingRatio | block-CacheHitRatio | Chart: Block Cache Size Metric Name | Metric Description — | — cache size | cache free | block cache count **Chart: Block Cache Operations** Metric Name | Metric Description — | — evicted count | hit count | miss count

Report: HBase Requests (0.94)

Report: Split (0.94)

Chart: Split Time

Metric Name | Metric Description — | — max | avg | min |

Chart: Split Operations

Metric Name | Metric Description — | — splits | avg time |

Metric Name | Metric Description — | — max | avg | min |

Report: HBase Regions (0.94)

Chart: Split Size

Chart: Regions

Metric Name | Metric Description — | — regions |

Chart: Splits

Metric Name | Metric Description — | — splits | avg time |

Metrics HBase 0.94

Report: HBase Store (0.94)

Chart: Stores

Metric Name | Metric Description — | — stores | store files |

Chart: Compaction

Metric Name | Metric Description — | — compactions | avg time |

Chart: StoreFile Index

Metric Name | Metric Description — | — store file index size | store files |

Chart: Memstore Flush

Metric Name | Metric Description — | — flushes | avg time |

Report: HBase FS (0.94) Chart: Min Time Latency Metric Name | Metric Description — | — read | write | sync | Chart: Avg Time Latency Metric Name | Metric Description — | — read | write | sync | Chart: Max Time Latency Metric Name | Metric Description — | — read | write | sync | Report: HBase Memstore (0.94) Chart: Memstore Size Metric Name | Metric Description — | — memstore size | memory store upper limit | memory store lower limit | Chart: Memstore Flush Queue Metric Name | Metric Description — | — flush queue | **Chart: Memstore Flush Operations** Metric Name | Metric Description — | — flushes | avg time | Chart: Memstore Flush Size Metric Name | Metric Description — | — max | avg | min | Chart: Memstore Flush Time Metric Name | Metric Description — | — max | avg | min |

Report: HBase Requests (0.94)

Chart: HBase Request Rate

Metric Name | Metric Description — | — request rate |

Report: HBase Compactions (0.94) Chart: Compaction Size Metric Name | Metric Description — | — \max | \arg | \min | **Chart: Compaction Operations** Metric Name | Metric Description — | — compactions | avg time | **Chart: Compaction Time** Metric Name | Metric Description — | — max | avg | min | Chart: Compaction Queue Metric Name | Metric Description — | — compaction queue | Report: HBase Block Cache (0.94) Chart: Block Cache Hit Ratio $\label{eq:metric Name | Metric Description - | - blockCacheHitCachingRatio | block-properties | block-prop$ CacheHitRatio | Chart: Block Cache Size Metric Name | Metric Description — | — cache size | cache free | block cache count **Chart: Block Cache Operations** Metric Name | Metric Description — | — evicted count | hit count | miss count Report: Split (0.94) Chart: Split Time Metric Name | Metric Description — | — \max | \arg | \min | **Chart: Split Operations**

Metric Name | Metric Description — | — splits | avg time |

Chart: Split Size

Metric Name | Metric Description — | — max | avg | min |

Report: HBase Regions (0.94)

Chart: Regions

Metric Name | Metric Description — | — regions |

Chart: Splits

Metric Name | Metric Description — | — splits | av
g time |

Metrics HBase 0.98

Report: HBase JVM

Chart: Log

Metric Name	Metric Description
fatal	${\color{blue} \textbf{Hadoop:service=HBase,name=JvmMetrics\#LogFatal}}$
error	Hadoop:service=HBase,name=JvmMetrics#LogError
warn	${\tt Hadoop:service=HBase,name=JvmMetrics\#LogWarn}$
info	Hadoop:service=HBase,name=JvmMetrics#LogInfo

Chart: Threads

Metric Name	Metric Description
new	Hadoop:service=HBase,name=JvmMetrics#ThreadsNew
runnable	Hadoop:service=HBase,name=JvmMetrics#ThreadsRunnable
blocked	Hadoop:service=HBase,name=JvmMetrics#ThreadsBlocked
waiting	Hadoop:service=HBase,name=JvmMetrics#ThreadsWaiting
timed waiting	Hadoop: service = HBase, name = JvmMetrics #ThreadsTimedWaiting
terminated	Hadoop:service = HBase, name = JvmMetrics #ThreadsTerminated

Chart: Memory

	Metric De-
Metric Name	tion
non heap used	$\label{lem:hadoop:service} Hadoop: service = HBase, name = JvmMetrics \# MemNonHeapUsedM$
non heap com- mit- ted	Hadoop: service = HBase, name = JvmMetrics # MemNonHeapCommitted for the strength of the str
heap used	Hadoop:service=HBase,name=JvmMetrics#MemHeapUsedM
heap com- mit- ted	Hadoop:service = HBase, name = JvmMetrics # MemHeapCommitted M
non heap max	Hadoop:service = HBase, name = JvmMetrics # MemNonHeapMaxM
heap max	Hadoop:service=HBase,name=JvmMetrics#MemHeapMaxM
total max	Hadoop:service=HBase,name=JvmMetrics#MemMaxM
non heap com- mit- ted	Hadoop: service = HBase, name = JvmMetrics # MemNonHeapCommitted for the strength of the str
heap com- mit-	Hadoop:service=HBase, name=JvmMetrics#MemHeapCommittedM

 ted

Report: UGI

Chart: Login Success & Failure

```
Metric
      De-
Metricscrip-
Name tion
success Hadoop: service = HBase, name = UgiMetrics \# LoginSuccess Num Ops
ops
failure\, Hadoop: service = HBase, name = UgiMetrics \# LoginFailure Num Ops
success Hadoop:service=HBase, name=UgiMetrics\#LoginSuccess AvgTime
time *
      Lo-
      gin-
      Suc-
      cess-
      Nu-
      mOps
failure \ Hadoop: service = HBase, name = UgiMetrics \# LoginFailure \ AvgTime
time *
      Login-
      Fail-
      ureNu-
```

Chart: Get Groups

Metric Name	Metric Description
ops	Hadoop:service=HBase,name=UgiMetrics#GetGroupsNumOps
time	Hadoop:service=HBase,name=UgiMetrics#v * GetGroupsNumOps

mOps

Report: RS WAL

Chart: Sync & Append Ops & Time

```
Metric
                                          De-
 Metricscrip-
 Name tion
syncs Count
                                          of
                                          syncs
                                          the
                                          HLog
                                         \label{eq:hdfs} \begin{split} \text{HDFS.Hadoop:service=HBase,name=RegionServer,sub=WAL\#Sync} \end{split}
 {\it append} {\it Sount}
                                          of
                                          ap-
                                          pends
                                          to
                                         log. Hadoop: service = HBase, name = Region Server, sub = WAL\#Appendent and the substitution of the subs
sync
                                        The
 time
                                         time
                                          it
                                          took
                                          to
                                          \operatorname{sync}
                                          the
                                          HLog
                                         {\tt HDFS.Hadoop:service=HBase,name=RegionServer,sub=WAL\#Synce} \\
                                          Sync-
                                          Time\_mean
```

```
Metric De-
Metricscrip-
Name tion

appendlime
time an append to the log took.Hadoop:service=HBase,name=RegionServer,sub=WAL#Appen

*

Append-
Time_mean
```

Chart: Append Ops & Size

```
Metricscrip-
Metricscrip-
Name tion

appendSount

of
appends
to
the
log.Hadoop:service=HBase,name=RegionServer,sub=WAL#Appends
```

```
Metric
                                                                              De-
  Metricscrip-
Name tion
  appendSize
  size
                                                                              (in
                                                                              bytes)
                                                                              of
                                                                              the
                                                                              data
                                                                              ap-
                                                                              pended
                                                                              to
                                                                              the
                                                                              HLog. Hadoop: service = HBase, name = Region Server, sub = WAL\#Apperent Apperent A
                                                                              Ap-
                                                                              pend-
                                                                              Size_mean
```

Chart: Sync & Append Max & Min Time

```
Metric De-
Metricscrip-
Name tion

sync Hadoop:service=HBase,name=RegionServer,sub=WAL#SyncTime_
min time

sync Hadoop:service=HBase,name=RegionServer,sub=WAL#SyncTime_
max time
```

append Hadoop: service = HBase, name = Region Server, sub = WAL#Append Times append to the service of the ser

min time

```
Metricscrip-
Metricscrip-
Name tion

appendHadoop:service=HBase,name=RegionServer,sub=WAL#AppendTimmax
time

appendHadoop:service=HBase,name=RegionServer,sub=WAL#AppendSizemin
size

appendHadoop:service=HBase,name=RegionServer,sub=WAL#AppendSizemax
size
```

Chart: Slow Appends

```
Metric
                                                                                De-
  Metricscrip-
  Name tion
                                                                                Number
  slow
                                                                                of
  ap-
  pends ap-
                                                                                pends
                                                                                that
                                                                                were
                                                                                slow. Hadoop: service = HBase, name = Region Server, sub = WAL\#slowApple + Region Server, sub = WAL\#slowApple + Region Server, sub = Region Server, sub = WAL\#slowApple + Region Server, sub = WALA#slowApple + WALA#slowApple + Re
appendSount
                                                                                of
                                                                                ap-
                                                                                pends
                                                                                to
```

log. Hadoop: service = HBase, name = RegionServer, sub = WAL#appendOrder + RegionServer, sub = WAL#appendOrder + RegionServer + RegionServe

Report: RS Compact & Flush

Chart: Flush Queue

```
Metric
                                                               De-
 Metricscrip-
 Name tion
flush Length
 queue of
                                                               the
                                                               queue
                                                               for
                                                               re-
                                                               gion
                                                               flushes.If
                                                               in-
                                                               creas-
                                                               ing,
                                                               we
                                                               are
                                                               falling
                                                               be-
                                                               hind
                                                               with
                                                               clear-
                                                               ing
                                                               mem-
                                                               stores
                                                               out
                                                             \label{prop:service} HDFS. Hadoop: service = HBase, name = RegionServer, sub = Server\#fluster + RegionServer + RegionServer
```

Chart: Blocked Updates

```
Metric
                                                                        De-
Metricscrip-
Name tion
 updateNumber
 time MS
                                                                        up-
                                                                        dates
                                                                        have
                                                                        been
                                                                        blocked
                                                                        \mathbf{so}
                                                                        that
                                                                        the
                                                                        mem-
                                                                        store
                                                                        can
                                                                        be
                                                                        flushed. Hadoop:service=HBase, name=RegionServer, sub=Server\#uper flushed. Hadoop:service=HBase, name=RegionServer, sub=Server flushed. Hadoop:server fl
```

Chart: Flush Counts/Size

```
Metricscrip-
Name tion

flushedThe
cells num-
ber
of
cells flushed
to
disk.Hadoop:service=HBase,name=RegionServer,sub=Server#flushee
```

 $\begin{array}{c} {\rm Metric} \\ {\rm De} \text{-} \end{array}$

```
Metric De-
Metricscrip-
Name tion

flushedThe
cells to-
size tal
amount
of
data
flushed
to
disk,
in
bytes.Hadoop:service=HBase,name=RegionServer,sub=Server#flush
```

Chart: Compaction Queue

```
Metric
      De-
Metricscrip-
Name tion
compa\textbf{Climment}
queue depth
      of
      the
      com-
      paction
      re-
      quest
      queue.
      If
      in-
      creas-
      ing,
      we
      are
      falling
      be-
      hind
      with
      store-
      file
      com-
      paction.Hadoop:service=HBase,name=RegionServer,sub=Server#con
```

Chart: Compaction Counts/Size

```
De-
  Metricscrip-
  Name tion
\operatorname{compact}_{\boldsymbol{h}\boldsymbol{d}}
  cells num-
                                                                                                ber
                                                                                                of
                                                                                                {\it cells}
                                                                                                pro-
                                                                                                cessed
                                                                                                dur-
                                                                                                ing
                                                                                                mi-
                                                                                                nor
                                                                                                com-
                                                                                                pactions. Hadoop: service = HBase, name = RegionServer, sub = Server\#constant = Server \#constant = Server 
  major The
  com- num-
  pactedber
  cells
                                                                                             of
                                                                                                cells
                                                                                                pro-
                                                                                                cessed
                                                                                                dur-
                                                                                                ing
                                                                                                ma-
                                                                                             jor
                                                                                                com-
                                                                                             pactions. Hadoop: service = HBase, name = Region Server, sub = Server \# matter # matter # matter # matter # matter # m
```

```
De-
  Metricscrip-
  Name tion
\operatorname{compa} \operatorname{d}\! E h \operatorname{d}\! e
cells
                                                                               to-
  size
                                                                                 \operatorname{tal}
                                                                                 amount
                                                                                 of
                                                                                 data
                                                                                 pro-
                                                                                 cessed
                                                                                 dur-
                                                                                 ing
                                                                                 mi-
                                                                                 nor
                                                                                 com-
                                                                                 pactions,
                                                                                 in
                                                                                 bytes. Hadoop:service=HBase, name=RegionServer, sub=Server\#compared to the compared to the c
major The
  com- to-
  pactedtal
  {\it cells}
                                                                                 amount
  size
                                                                                 of
                                                                                   data
                                                                                 pro-
                                                                                 cessed
                                                                                 dur-
                                                                                 ing
                                                                                 ma-
                                                                                 jor
                                                                                 com-
                                                                                 pactions,
                                                                                 bytes. Hadoop: service = HBase, name = Region Server, sub = Server \# major + Region + Re
```

Report: Master Assign Mngr

Chart: Assigns Ops & Time

```
De-
Metricscrip-
Name tion
                                       Hadoop:service=HBase,name=Master,sub=AssignmentManger#Bull
signs
assigns Hadoop: service = HBase, name = Master, sub = Assignment Manger \#Assignment Manger Manger
bulk
                                    Hadoop:service=HBase,name=Master,sub=AssignmentManger#Bull
                                      BulkA-
\operatorname{sign}
time
                                       S-
                                       sign\_num\_ops
assign Hadoop:service=HBase,name=Master,sub=AssignmentManger#Assi
time *
                                       As-
                                       sign\_num\_ops
```

Chart: Regions In Transition

```
Metric
      De-
Metricscrip-
Name tion
      The
rit
old-
      age
      of
\operatorname{est}
age
      the
      longest
      re-
       gion
      in
      tran-
      tion.Hadoop:service=HBase,name=Master,sub=AssignmentManger#
```

```
Metric
                                                                                  De-
Metricscrip-
Name tion
                                                                                  The
\operatorname{rit}
count num-
                                                                                  ber
                                                                                  of
                                                                                  re-
                                                                                  gions
                                                                                  {\rm in}
                                                                                  tran-
                                                                                  tion. Hadoop: service = HBase, name = Master, sub = Assignment Manger \# Master + Manger \# Master + Manger \# Manger \# Manger + Manger \# Manger Mang
                                                                                  The
\operatorname{rit}
count num-
over
                                                                                ber
thresh\text{-}of
old
                                                                                  re-
                                                                                  gions
                                                                                  that
                                                                                  have
                                                                                  been
                                                                                  in
                                                                                  tran-
                                                                                  si-
                                                                                  tion
                                                                                  longer
                                                                                  than
                                                                                  thresh-
                                                                                  old
                                                                                  _{\rm time}
                                                                                  (de-
                                                                                  fault:
                                                                                  60
                                                                                  onds). Hadoop: service = HBase, name = Master, sub = Assignment Manger = Master, sub = Maste
```

Chart: Assigns Max & Min Time

MetricscripName tion

bulk Hadoop:service=HBase,name=Master,sub=AssignmentManger#Bull assign max time

bulk Hadoop:service=HBase,name=Master,sub=AssignmentManger#Bull

bulk Hadoop:service=HBase,name=Master,sub=AssignmentManger#Buas-sign

assign Hadoop:service=HBase,name=Master,sub=AssignmentManger#AssignmentMan

assign Hadoop:service=HBase,name=Master,sub=AssignmentManger#Assignin

 $_{\rm time}$

min time

time

Report: RS Operations

Chart: Operation Calls & Time

Metric De-

Metric De-

Metricscrip-

Name tion

appenddadoop:service=HBase,name=RegionServer,sub=Server#Append_ndeletesHadoop:service=HBase,name=RegionServer,sub=Server#Delete_numutateddadoop:service=HBase,name=RegionServer,sub=Server#Mutate_ndeletesHadoop:service=HBase,name=RegionServer,sub=Server#Get_num_

```
Metric
                                      De-
Metricscrip-
Name tion
replaysHadoop:service=HBase,name=RegionServer,sub=Server#Replay_nu
increment_soop:service=HBase,name=RegionServer,sub=Server#Increment_
append Hadoop: service = HBase, name = Region Server, sub = Server \# Append\_nerver + Region Server + Region 
time *
                                      Ap-
                                      pend mean
delete Hadoop:service=HBase,name=RegionServer,sub=Server#Delete_nu
time *
                                      Delete_mean
mutateHadoop:service=HBase,name=RegionServer,sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server#Mutate_name=RegionServer.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.sub=Server.su
time *
                                      Mu-
                                      tate_mean
                                      Hadoop:service=HBase,name=RegionServer,sub=Server#Get num
get
time
                                       Get mean
replay Hadoop:service=HBase,name=RegionServer,sub=Server#Replay_nu
_{
m time}
                                      Re-
                                      play_mean
time *
                                      In-
                                      cre-
                                      ment_mean
```

Chart: Slow Operations

```
Metric
                                                De-
Metricscrip-
Name tion
                                              The
slow
deletesnum-
                                                ber
                                                of
                                                Deletes
                                                that
                                                took
                                                over
                                                1000 \mathrm{ms}
                                                to
                                                com-
                                              plete. Hadoop: service = HBase, name = Region Server, sub = Server \# slow Interval + Server \# 
                                                The
slow
                                                num-
in-
cre-
                                                ber
ments of
                                                In-
                                                cre-
                                                \operatorname{ments}
                                                that
                                                took
                                                over
                                                1000 \mathrm{ms}
                                                to
                                                com-
                                              plete. Hadoop: service = HBase, name = Region Server, sub = Server \# slow I
```

```
Metric
                                                                                                 De-
  Metricscrip-
  Name tion
                                                                                                 The
  \operatorname{slow}
  gets
                                                                                                 num-
                                                                                                 ber
                                                                                                 of
                                                                                                 Gets
                                                                                                 that
                                                                                                 took
                                                                                                 over
                                                                                                 1000 \mathrm{ms}
                                                                                                 to
                                                                                                 com-
                                                                                               plete. Hadoop: service = HBase, name = Region Server, sub = Server \# slow One to the state of 
                                                                                                 The
  slow
                                                                                                 num-
  ap-
pends ber
                                                                                                 of
                                                                                                 Ap-
                                                                                                 pends
                                                                                                 that
                                                                                                 took
                                                                                                 over
                                                                                                 1000 \mathrm{ms}
                                                                                                 to
                                                                                                 plete. Hadoop: service = HBase, name = Region Server, sub = Server \# slow Anti-American Server = Server = Server = Server = Server \# slow Anti-American Server = Serve
  slow\_pTibæ
                                                                                                 num-
                                                                                                 ber
                                                                                                 of
                                                                                                 Puts
                                                                                                 that
                                                                                                 took
                                                                                                 over
                                                                                                 1000 \mathrm{ms}
                                                                                                 to
                                                                                                 com-
                                                                                               plete. Hadoop: service = HBase, name = Region Server, sub = Server \# slow Frank Fr
```

 $\begin{array}{c} {\rm Metric} \\ {\rm De} \\ {\rm Metricscrip} \\ {\rm Name\ tion} \end{array}$

Chart: Operation Max & Min Time

Metric De-Metricscrip-Name tion appendHadoop:service=HBase,name=RegionServer,sub=Server#Append_n time ${\tt delete\ Hadoop:service=HBase,name=RegionServer,sub=Server\#Delete_minus}$ \min time mutateHadoop:service=HBase,name=RegionServer,sub=Server#Mutate_m \min time $Hadoop:service=HBase,name=RegionServer,sub=Server\#Get_min$ get \min time replay Hadoop:service=HBase,name=RegionServer,sub=Server#Replay_m \min

increment_doop:service=HBase,name=RegionServer,sub=Server#Increment_

appendHadoop:service=HBase,name=RegionServer,sub=Server#Append_n

time

min time

max time Metricscrip-Name tion

delete Hadoop:service=HBase,name=RegionServer,sub=Server#Delete_mamax
time

 $\label{lem:mutateHadoop:service=HBase,name=RegionServer,sub=Server\#Mutate_mmax\\time$

get Hadoop:service=HBase,name=RegionServer,sub=Server#Get_max max time

replay Hadoop:service=HBase,name=RegionServer,sub=Server#Replay_max

time

 $\label{lem:combination} \begin{tabular}{l} increme \begin{tabular}{l} Hase, name = Region Server, sub = Server \# Increment_max \\ time \end{tabular}$

011110

 $\begin{array}{c} {\rm Metric} \\ {\rm De}\text{-} \end{array}$

Report: Master Snapshot

Chart: Snapshot Ops & Time

```
Metric
                                                                                                                      De-
   Metricscrip-
Name tion
restore {\Bbb Count}
                                                                                                                      of
                                                                                                                      re-
                                                                                                                      storeS-
                                                                                                                      nap-
                                                                                                                      shot()
                                                                                                                      \quad \text{in-} \quad
                                                                                                                      vo-
                                                                                                                      tions. Hadoop: service = HBase, name = Master, sub = Snapshots \#Snapshots \#Snapshot MSnapshot MS
clones Count
                                                                                                                      of
                                                                                                                      cloneS-
                                                                                                                      nap-
                                                                                                                      shot()
                                                                                                                      in-
                                                                                                                      vo-
                                                                                                                      ca-
                                                                                                                      tions. Hadoop: service = HBase, name = Master, sub = Snapshots \#Snapshots \#Snapshot MSnapshot MS
   snapsh \textbf{6} \textbf{to} \textbf{sunt}
                                                                                                                      of
                                                                                                                      snap-
                                                                                                                      shot()
                                                                                                                      in-
                                                                                                                      vo-
                                                                                                                      tions. Hadoop: service = HBase, name = Master, sub = Snapshots \#Snapshots \#Snapshot MSnapshot MS
```

```
Metric
       De-
Metricscrip-
Name tion
{\bf restoreTime}
time it
       takes
       to
       fin-
       ish
       re-
       storeS-
       nap-
       \verb|shot|(). Hadoop:service=HBase, name=Master, \verb|sub=Snapshots|| \#Snapshots||
       Snap-
       \operatorname{shotRe}
       store-
       Time\_mean
clone Time
time it
       takes
       to
       fin-
       ish
       cloneS-
       nap-
       \substack{\text{shot()}. Hadoop:service=HBase, name=Master, sub=Snapshots\#Snapshell} *
       Snap-
       shot-
       Clone-
       Time\_mean
```

```
Metricscrip-
Metricscrip-
Name tion

snapsh@time
time it
    takes
    to
    fin-
    ish
    snap-
    shot().Hadoop:service=HBase,name=Master,sub=Snapshots#Snapsh
    *

Snap-
    shot-
    Time_mean
```

Chart: Snapshot Max & Min Time

```
Metric De-
Metricscrip-
Name tion

restoreHadoop:service=HBase,name=Master,sub=Snapshots#SnapshotResmin
time

restoreHadoop:service=HBase,name=Master,sub=Snapshots#SnapshotResmax
time

clone Hadoop:service=HBase,name=Master,sub=Snapshots#SnapshotClonmin
time

clone Hadoop:service=HBase,name=Master,sub=Snapshots#SnapshotClonmin
time
```

max time

```
Metric
De-
Metricscrip-
Name tion

snapshbladoop:service=HBase,name=Master,sub=Snapshots#SnapshotTim
min
time
snapshbladoop:service=HBase,name=Master,sub=Snapshots#SnapshotTim
max
time
```

Report: Master FS

Chart: Split Ops & Time

```
Metric
                                                                                                        De-
  Metricscrip-
Name tion
  hlog Count
  splits of
                                                                                                           HLog.splitLog()
                                                                                                        in-
                                                                                                        vo-
                                                                                                        tions. Hadoop: service = HBase, name = Master, sub = File System \# H log Specific File System File Syste
  meta Count
  hlog
                                                                                                      of
  splits split-
                                                                                                        Met-
                                                                                                        a-
                                                                                                        Log()
                                                                                                        in-
                                                                                                        vo-
                                                                                                        tions. Hadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = Master, sub = Master, sub = File System \#MetaHadoop: service = Master, sub = Master, su
```

```
Metric
                                              De-
 Metricscrip-
 Name tion
                                              Time
 hlog
 split
                                             it
 time
                                              takes
                                              to
                                              fin-
                                              HLog.splitLog(). Hadoop: service = HBase, name = Master, sub = FileSystem (Service) + Fil
                                              HlogSplit-
                                             Time\_mean
meta Time
 hlog
                                              it
 \operatorname{split}
                                              takes
 time
                                           to
                                              fin-
                                              ish
                                              split-
                                              Met-
                                              MetaHlogSplit-
                                              Time\_mean
```

Chart: Split Ops & Size

```
Metric
                                                                       De-
 Metricscrip-
 Name tion
 hlog Count
splits of
                                                                       HLog.splitLog()
                                                                       in-
                                                                       vo-
                                                                       ca-
                                                                       meta Count
 hlog of
 splits split-
                                                                       Met-
                                                                       a-
                                                                       Log()
                                                                       in-
                                                                       vo-
                                                                       tions. Hadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = HBase, name = Master, sub = File System \#MetaHadoop: service = Master, sub = Master, sub = File System \#MetaHadoop: service = Master, sub = Master, su
 hlog
                                                                       \operatorname{Size}
\operatorname{split}
                                                                       of
 size
                                                                       HLog
                                                                       files
                                                                       be-
                                                                       split. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = HBase, name = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# HlogSplit. Hadoop: service = Master, sub = FileSystem \# Hlog
                                                                       HlogSplit-
                                                                       Size\_mean
```

```
Metric
                                                                          De-
 Metricscrip-
 Name tion
 meta Size
hlog
                                                                        of
 split
                                                                    hbase:meta
 size
                                                                        HLog
                                                                          files
                                                                          be-
                                                                        ing
                                                                        \stackrel{\circ}{\text{split.Hadoop:service=HBase,name=Master,sub=FileSystem\#MetaHBase,name=Master,sub=FileSystem\#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,sub=FileSystem#MetaHBase,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,name=Master,n
                                                                        MetaHlogSplit-
                                                                          Size\_mean
```

Chart: Split Max & Min time

	Metric	
	De-	
Metricscrip-		
Name	tion	
hlog split min time	Hadoop:service=HBase,name=Master,sub=FileSystem#HlogSplitTir	
hlog split max time	Hadoop: service = HBase, name = Master, sub = File System # Hlog Split Time Andrew System # Hog Split Time System Hog Split Time System Hog Split Ti	
meta hlog split min time	Hadoop:service=HBase,name=Master,sub=FileSystem#MetaHlogSp	

	Metric	
	De-	
Metricscrip-		
Name tion		
meta	Hadoop:service=HBase,name=Master,sub=FileSystem#MetaHlogSp	
hlog split max time	Tradoop.service—Tradec,name—Tradect,sub—Tracoy suching Incoming Sp	
hlog split min size	Hadoop: service = HBase, name = Master, sub = File System # Hlog Split Size Andrew System #	
hlog split max size	Hadoop: service = HBase, name = Master, sub = File System # Hlog Split Size Andrew System # Hog Split Size Andrew System # Hlog Split Size Andrew System # Hog Split Size Andrew System M Hog Split Size Andrew System	
meta hlog split min size	Hadoop: service = HBase, name = Master, sub = File System # MetaHlog Spread File System File S	
meta hlog split max size	Hadoop:service = HBase, name = Master, sub = File System # MetaHlog Spread of the state of the	

Report: RS Regions & Stores

Chart: Indexes & Bloom Filters

```
Metric
                                                                                                   De-
Metricscrip-
Name tion
  static Uncompressed
  in-
                                                                                                   size
  \operatorname{dex}
                                                                                                   of
  size
                                                                                                   the
                                                                                                   static
                                                                                                   in-
                                                                                                   {\tt dexes. Hadoop:service=HBase, name=RegionServer, sub=Server\#stations and the action of the actio
{\it static} \ {\it Uncompressed}
  bloom size
  size
                                                                                                   of
                                                                                                   the
                                                                                                   \operatorname{static}
                                                                                                   bloom
                                                                                                   fil-
                                                                                                   ters. Hadoop:service=HBase, name=RegionServer, sub=Server\#staticHadoop:service=HBase, name=RegionServer, sub=Server, sub
```

Chart: Regions & Stores

```
Metric
De-
Metricscrip-
Name tion

regionsNumber
of
re-
gions.Hadoop:service=HBase,name=RegionServer,sub=Server#region
stores Number
of
Stores.Hadoop:service=HBase,name=RegionServer,sub=Server#store
store Number
```

Files. Hadoop: service = HBase, name = Region Server, sub = Server # storell Region Server = Region Server + Region Server +

of

files

Metric De-Metricscrip-Name tion

Chart: Store Files

Metric De-Metricscrip-Name tion store Size file of size storefiles being served. Hadoop: service = HBase, name = Region Server, sub = Server #storker + Serstore Size ${\rm file}$ of inin- dex dexes size instorefiles on

 $\label{lem:disk.Hadoop:service=HBase,name=RegionServer,sub=Server\#storeFaces and the service of the service o$

Chart: Mem Stores

```
De-
Metricscrip-
Name tion

mem Size
store of
size the
mem-
store.Hadoop:service=HBase,name=RegionServer,sub=Server#mems

upper Property
limit 'hbase.regionserver.global.memstore.upperLimit'
value.

lower Property
limit 'hbase.regionserver.global.memstore.lowerLimit'
```

Metric

value.

Report: IPC

Chart: Connections & Handler

```
Metric
                                                                                   De-
Metricscrip-
  Name tion
open The
  con-
                                                                                   num-
                                                                                   ber
  nec-
  tions of
                                                                                     open
                                                                                   con-
                                                                                   nec-
                                                                                   tions
                                                                                   at
                                                                                   the
                                                                                   RPC
                                                                                   layer. Hadoop: service = HBase, name = IPC, sub = IPC \# numOpenConnection + IPC \# numOpenConne
```

```
De-
Metricscrip-
Name tion

active Number
han- of
dlers ac-
tive
rpc
han-
dlers.Hadoop:service=HBase,name=IPC,sub=IPC#numActiveHandl
```

Chart: Queue & Process Calls & Times

Metric

```
Metric
    De-
Metricscrip-
Name tion
calls
processHadoop:service=HBase,name=IPC,sub=IPC#ProcessCallTime_num
calls
queue Hadoop:service=HBase,name=IPC,sub=IPC#QueueCallTime_mean
call
time Queue-
    Call-
    Time_num_ops
processHadoop:service=HBase,name=IPC,sub=IPC#ProcessCallTime_mea
call
time Pro-
    cess-
    Call-
    Time_num_ops
```

Chart: Authentication & Authorization

```
Metric
                                                                                   De-
  Metricscrip-
  Name tion
authen No carbioer
  fail-
                                                                                   of
  ures
                                                                                   au-
                                                                                   then-
                                                                                   ti-
                                                                                   ca-
                                                                                   tion
                                                                                   fail-
                                                                                   ures. Hadoop: service = HBase, name = IPC, sub = IPC \# authentication Fairback and the substitution of t
  author \textbf{Nautiober}
  fail-
                                                                                   of
  ures
                                                                                   au-
                                                                                   tho-
                                                                                   riza-
                                                                                   tion
                                                                                   fail-
                                                                                   authen \hbox{\it N can liver}
  suc-
                                                                                   of
  cesses au-
                                                                                   then-
                                                                                   ti-
                                                                                   ca-
                                                                                   tion
                                                                                   cesses. Hadoop: service = HBase, name = IPC, sub = IPC \# authentication States and the states are substituted as a substitute of the substitute of the substit
author Nautidoer
  suc-
                                                                               of
  cesses au-
                                                                                   tho-
                                                                                   riza-
                                                                                   tion
                                                                                   cesses. Hadoop: service = HBase, name = IPC, sub = IPC \# authorization Substitution Substituti
```

Chart: Send & Received Bytes

```
Metric
      De-
Metricscrip-
Name tion
      Number
sent
bytes of
      bytes
      sent. Hadoop: service = HBase, name = IPC, sub = IPC \# sentBytes
{\bf receive \hbox{\it M} umber}
bytes of
      bytes
      re-
      ceived. Hadoop:service=HBase, name=IPC, sub=IPC\#received Bytes
      Metric
      De-
Metricscrip-
```

Name tion

queue Number
size of
bytes
in
the
call
queues.Hadoop:service=HBase,name=IPC,sub=IPC#queueSize

```
Metric
                                                De-
 Metricscrip-
 Name tion
 {\rm calls}
                                               The
                                                num-
 in
                                                ber
 gen-
 eral
                                                of
queue cur-
                                                rently
                                                en-
                                                queued
                                                user
                                                {\it quests.} Hadoop: service = HBase, name = IPC, sub = IPC \# num Calls In General Control Co
 calls
                                              Number
                                                of
 in
repli- calls
 ca-
                                                in
 tion
                                              the
 queue repli-
                                                ca-
                                                tion
                                                call
                                                {\tt queue. Hadoop:service=HBase, name=IPC, sub=IPC\#numCallsInRep} \\
```

```
The
{\rm calls}
in
                                                                                num-
                                                                                ber
pri-
                                                                                of
or-
ity
                                                                                  cur-
queue rently
                                                                                en-
                                                                                queued
                                                                                pri-
                                                                                or-
                                                                                ity
                                                                                (in-
                                                                                ter-
                                                                                nal
                                                                                house-
                                                                                keep-
                                                                                ing)
                                                                                {\it quests.} Hadoop: service = HBase, name = IPC, sub = IPC \# num Calls In Prior to the control of the control
```

Chart: Queue & Process Max & Min Times

```
Metric De-
Metricscrip-
Name tion

______
processHadoop:service=HBase,name=IPC,sub=IPC#ProcessCallTime_min call min time

queue Hadoop:service=HBase,name=IPC,sub=IPC#QueueCallTime_min call min time
```

 $\begin{array}{c} {\rm Metric} \\ {\rm De-} \\ {\rm Metricscrip-} \\ {\rm Name~tion} \end{array}$

```
De-
Metricscrip-
Name tion

_______
processHadoop:service=HBase,name=IPC,sub=IPC#ProcessCallTime_max
call
max
time

queue Hadoop:service=HBase,name=IPC,sub=IPC#QueueCallTime_max
call
max
time
```

Report: RS Requests

Chart: Requests

```
De-
Metricscrip-
Name tion

total Total
re- num-
quests ber
    of
    re-
    quests
    this
    Re-
    gion-
    Server
    has
    an-
    swered.Hadoop:service=HBase,name=RegionServer,sub=Server#tota
```

Metric

```
Metric
                                                                                                                   De-
  Metricscrip-
  Name tion
                                                                                                                Number
  read
                                                                                                                   of
quests read
                                                                                                                   re-
                                                                                                                      quests
                                                                                                                   this
                                                                                                                   re-
                                                                                                                   gion
                                                                                                                   server
                                                                                                                   has
                                                                                                                   an-
                                                                                                                   swered. Hadoop:service=HBase, name=RegionServer, sub=Server\#reactions and the substitution of the substi
write Number
                                                                                                                   of
  re-
  quests mu-
                                                                                                                   ta-
                                                                                                                   tion
                                                                                                                   re-
                                                                                                                   quests
                                                                                                                   this
                                                                                                                   re-
                                                                                                                   gion
                                                                                                                   server
                                                                                                                   has
                                                                                                                   an-
                                                                                                                   swered. Hadoop:service=HBase, name=RegionServer, sub=Server\#wring and the substantial statement of th
read \quad Hadoop:service=HBase,name=RegionServer,sub=Server\#readRequents and the service is a substant of the service of the service is a substant of the service of the ser
  re-
  quests
  write \quad Hadoop:service=HBase,name=RegionServer,sub=Server\#writeRequestions and the substitution of the s
  re-
```

quests

Report: RS Replication

Chart: Sink Ops & Batches

Metric
De-

Metricscrip-Name tion

applied Hadoop: service = HBase, name = Region Server, sub = Replication # sink. a batches

applied Hadoop: service = HBase, name = Region Server, sub = Replication # sink. a ops

Report: Master Balancer

Chart: Balancing Min & Max Time

Metric

De-

Metricscrip-

Name tion

 $balance \verb|Hadoop:service=HBase, name=Master, sub=Balancer \#Balancer Cluster max$

 $_{\rm time}$

 $balance \verb|Hadoop:service=HBase,name=Master,sub=Balancer \#Balancer Cluster + Balancer \#Balancer \#Balancer$

min time

Chart: Balancing Ops & Time

	Metric
	De-
Metri	icscrip-
Name	e tion
ops	Hadoop:service=HBase,name=Master,sub=Balancer#BalancerClus
time	${\bf Hadoop:service=HBase,name=Master,sub=Balancer\#BalancerCluster} \\ *$
	Bal-
	ancer-
	Clus-
	ter_mean

Chart: Misc Invocations

Metric De-Metricscrip-Name tion

 ${\rm tions}$

 $\label{eq:misc} \begin{array}{ll} misc & Hadoop:service=HBase,name=Master,sub=Balancer\#miscInvocation invocation invocat$

Report: RS MOB

Chart: MOB Cache Stats

```
Metric
                                                                                                    De-
  Metricscrip-
  Name tion
                                                                                                    The
{\rm file}
  cache count
  ac-
                                                                                                    of
cesses ac-
                                                                                                       cesses
                                                                                                    to
                                                                                                    the
                                                                                                    mob
                                                                                                    file
                                                                                                    cache. Hadoop: service = HBase, name = Region Server, sub = Server \# mobile the service is a substant with the service is 
                                                                                                    The
  file
cache count
{\it misses} \ {\it of}
                                                                                                    misses
                                                                                                    to
                                                                                                    the
                                                                                                    \operatorname{mob}
                                                                                                    file
                                                                                                    cache. Hadoop: service = HBase, name = Region Server, sub = Server \# mobile to the service = Region Server + Region Server +
                                                                                                    The
  file
  cache num-
evic- ber
tions of
                                                                                                    items
                                                                                                    evicted
                                                                                                    from
                                                                                                    the
                                                                                                    \operatorname{mob}
                                                                                                    file
                                                                                                    cache. Hadoop: service = HBase, name = Region Server, sub = Server \# mobile service = Server \# mobile service = Region Server, sub = Server \# mobile service = Server \# mobi
```

```
Metricscrip-
Metricscrip-
Name tion

file The cache hit hits percent to the mob file cache.Hadoop:service=HBase,name=RegionServer,sub=Server#mobile.
```

Chart: MOB Compaction Stats

```
Metric
         De-
Metricscrip-
Name tion
\operatorname{compa} \overline{\operatorname{d}} \overline{\operatorname{thd}}
from num-
         ber
mob
{\it cells}
         of
         cells
         moved
         from
         \operatorname{mob}
         dur-
         ing
         com-
         paction.Hadoop:service=HBase,name=RegionServer,sub=Server#mo
```

```
Metric
                                                                                     De-
  Metricscrip-
Name tion
\operatorname{compact}_{\boldsymbol{h}\boldsymbol{d}}
  into
                                                                                   num-
  \operatorname{mob}
                                                                                     ber
  {\it cells}
                                                                                     of
                                                                                     {\it cells}
                                                                                     moved
                                                                                     to
                                                                                     mob
                                                                                     \operatorname{dur}-
                                                                                     ing
                                                                                     com-
                                                                                     paction. Hadoop: service = HBase, name = RegionServer, sub = Server \# model = RegionServer + R
  \operatorname{compa} \overline{\partial t} \underline{\partial d}
  from to-
mob
                                                                                     tal
  cells
                                                                                     amount
  size
                                                                                     of
                                                                                     cells
                                                                                     move
                                                                                     from
                                                                                     \operatorname{mob}
                                                                                     dur-
                                                                                     ing
                                                                                     com-
                                                                                     paction,
                                                                                   bytes. Hadoop: service = HBase, name = Region Server, sub = Server \# mobel to the substantial state of the substantial
```

```
Metric
                                                                            De-
 Metricscrip-
 Name tion
\operatorname{compa} \operatorname{d}\! E h \operatorname{d}\! e
 into
                                                                          to-
 \operatorname{mob}
                                                                            tal
 cells
                                                                            amount
 size
                                                                            of
                                                                            {\it cells}
                                                                            move
                                                                            to
                                                                            \operatorname{mob}
                                                                            dur-
                                                                            ing
                                                                            com-
                                                                            paction,
                                                                            bytes. Hadoop: service = HBase, name = Region Server, sub = Server \# mobel to the substitution of the su
```

Chart: MOB Cache Files

```
Metric
De-
Metricscrip-
Metricscrip-
Name tion

file The
caches count
of
cached
mob
files.Hadoop:service=HBase,name=RegionServer,sub=Server#mobFi
```

Chart: MOB Scan Stats

```
Metric
                                                                                                             De-
  Metricscrip-
  Name tion
                                                                                                             The
  scan
  cells
                                                                                                             num-
                                                                                                             ber
                                                                                                             of
                                                                                                             scanned
                                                                                                             mob
                                                                                                             cells. Hadoop: service = HBase, name = Region Server, sub = Server \# mob Server \# mob Server, sub = Server \# mob Server \# mob Server, sub = Server \# mob Server \# mob Server, sub = Server \# mob Ser
                                                                                                             The
  scan
cells
                                                                                                             to-
  size
                                                                                                             \operatorname{tal}
                                                                                                             amount
                                                                                                             of
                                                                                                             scanned
                                                                                                             \operatorname{mob}
                                                                                                             cells,
                                                                                                             in
                                                                                                             bytes. Hadoop: service = HBase, name = Region Server, sub = Server \# mob Server \#
```

Chart: MOB Flush Stats

```
Metricscrip-
Metricscrip-
Name tion

flushesThe

num-
ber
of
the
flushes
in
mob-
enabled
stores.Hadoop:service=HBase,name=RegionServer,sub=Server#mob
```

```
Metric
                                                                                                  De-
  Metricscrip-
Name tion
  flushed The
  cells num-
                                                                                                  ber
                                                                                                  of
                                                                                                  \operatorname{mob}
                                                                                                  {\it cells}
                                                                                                  flushed
                                                                                                \label{lem:disk.Hadoop:service=HBase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server\#mobFase,name=RegionServer,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server,sub=Server
  flushed The
  cells
                                                                                             to-
  size
                                                                                                  tal
                                                                                                  amount
                                                                                                  of
                                                                                                  mob
                                                                                                  {\it cells}
                                                                                                  flushed
                                                                                                  to
                                                                                                  disk,
                                                                                                  bytes. Hadoop: service = HBase, name = Region Server, sub = Server \# mobile to the substantial state of the substantial
```

Report: RS Files

Chart: HLog

```
Metric
                                                                                                            De-
Metricscrip-
Name tion
                                                                                                         The
hlog
files
                                                                                                            num-
                                                                                                            ber
                                                                                                            of
                                                                                                            \quad \text{write} \quad
                                                                                                            ahead
                                                                                                            logs
                                                                                                            \operatorname{not}
                                                                                                            yet
                                                                                                         archived. Hadoop: service = HBase, name = Region Server, sub = Server\#hland Server = Region Server + Region 
hlog
                                                                                                            Size
files
                                                                                                            of
size
                                                                                                            all
                                                                                                         HLog
                                                                                                         Files. Hadoop: service = HBase, name = Region Server, sub = Server \# hlog Formula + Region Formula + Region Server \# hlog Formula + Region Server \# hlog
```

Chart: Local Files

```
Metric
       De-
Metricscrip-
Name tion
       The
local
files
       per-
       \operatorname{cent}
       of
       HFiles
       that
       are
       stored
       on
       the
       lo-
       cal
       hdfs
       {\tt node. Hadoop:service=HBase, name=Region Server, sub=Server\#perce}
```

Report: Master Servers

Chart: Region Servers

 $\begin{array}{c} {\rm Metric} \\ {\rm De-} \\ {\rm Metricscrip-} \\ {\rm Name\ tion} \end{array}$

 $region\ Hadoop:service=HBase, name=Master, sub=Server\#numRegionServers$ servers

 $\label{lem:dead} \begin{tabular}{ll} dead & Hadoop:service=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,sub=Server#numDeadRegionService=HBase,name=Master,name=M$

Chart: Requests & Load

servers

Metric DeMetricscripName tion

ClusterHadoop:service=HBase,name=Master,sub=Server#clusterRequests requests

averageHadoop:service=HBase,name=Master,sub=Server#averageLoad load

Report: RS Check & Mutate

Chart: Check & Mutate Calls

 $\begin{array}{c} {\rm Metric} \\ {\rm De-} \\ {\rm Metricscrip-} \\ {\rm Name~tion} \end{array}$

 $\begin{array}{ll} mutateNumber\\ failed & of\\ ops & Check\\ & and\\ & Mu-\\ & tate\\ & calls\\ & that\\ & failed \end{array}$

the

checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = HBase, name = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server, sub = Server # checks. Hadoop: service = Region Server # checks. Hadoop: service = Re

```
Metric
                                                                                  De-
  Metricscrip-
  Name tion
{\it mutate Number}
  passed of
  ops
                                                                                  \operatorname{Check}
                                                                                  and
                                                                                  Mu-
                                                                                  tate
                                                                                  calls
                                                                                  that
                                                                                  passed
                                                                                  the
                                                                                checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = HBase, name = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server, sub = Server \# checks. Hadoop: service = Region Server \# checks. Hadoop: service = Re
```

Chart: Mutations

```
Metric
                                         De-
 Metricscrip-
 Name tion
mutati {\color{red} {\bf N} nm} ber
 with- of
 out
                                         mu-
 wal
                                         ta-
                                         tions
                                         that
                                         have
                                         been
                                         \operatorname{sent}
                                         by
                                         {\it clients}
                                         with
                                         the
                                         write
                                         ahead
                                         log-
                                         ging
                                         turned
                                         off.Hadoop:service=HBase,name=RegionServer,sub=Server#mutation
 \mathrm{mutati} \mathbf{Six} \mathbf{e}
 with- of
 out
                                         data
 wal
                                         that
                                         has
 size
                                         been
                                         \operatorname{sent}
                                         by
                                         clients
                                         with
                                         the
                                         write
                                         ahead
                                         log-
                                         ging
                                         turned
                                         off. Hadoop: service = HBase, name = Region Server, sub = Server \# mutation for the service in the service is a service in the service in t
```

Report: RS Cache

Chart: Cache Blocks

```
Metric
                                                                                                                  De-
  Metricscrip-
  Name tion
  cache Number
  count of
                                                                                                                  block
                                                                                                                  {\rm in}
                                                                                                                  the
                                                                                                                  block
                                                                                                                  cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
  cache Size
                                                                                                                  of
  free
  size
                                                                                                                  the
                                                                                                                  block
                                                                                                                  cache
                                                                                                                  that
                                                                                                                  is
                                                                                                                  not
                                                                                                                  oc-
                                                                                                                  pied. Hadoop: service = HBase, name = Region Server, sub = Server \#block General Foundation + Region Server 
  block Size
cache of
                                                                                                                  the
  size
                                                                                                                  block
                                                                                                                  cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
```

Chart: Cache Stats

```
Metric
                                                                                                          De-
Metricscrip-
Name tion
hits
                                                                                                          Count
                                                                                                          of
                                                                                                          the
                                                                                                          hit
                                                                                                          on
                                                                                                          the
                                                                                                          block
                                                                                                          cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
                                                                                                       Number
_{
m miss}
                                                                                                          of
                                                                                                          re-
                                                                                                          quests
                                                                                                          for
                                                                                                          \mathbf{a}
                                                                                                          block
                                                                                                          that
                                                                                                          missed
                                                                                                          the
                                                                                                          block
                                                                                                          cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
evictionsount
                                                                                                          of
                                                                                                          the
                                                                                                          num-
                                                                                                          ber
                                                                                                          of
                                                                                                          blocks
                                                                                                          evicted
                                                                                                          from
                                                                                                          the
                                                                                                          block
                                                                                                          cache. Hadoop: service = HBase, name = Region Server, sub = Server \#block + Region Server
```

```
Metric
                                                                                            De-
Metricscrip-
Name tion
\mathrm{hit}\% \quad \mathrm{Percent}
                                                                                            of
                                                                                            block
                                                                                            cache
                                                                                            re-
                                                                                            quests
                                                                                            that
                                                                                            \label{lem:hits.Hadoop:service=HBase,name=RegionServer, sub=Server\#blockControl of the property of the prope
express The
hit\% per-
                                                                                            \operatorname{cent}
                                                                                            of
                                                                                            the
                                                                                            time
                                                                                            that
                                                                                            re-
                                                                                            quests
                                                                                            with
                                                                                            the
                                                                                            cache
                                                                                            turned
                                                                                            on
                                                                                            hit
                                                                                            the
                                                                                            cache. Hadoop: service = HBase, name = Region Server, sub = Server \#blockers + Server \#
```

Report: RS Replication Src

Chart: Log Queue

	Metric
	De-
Metric	
Name	tion
log queue	Hadoop:service=HBase,name=RegionServer,sub=Replication#sour
	Metric
	De-
Metric	
Name	tion
	<u></u>
log ed- its read	$\label{lem:hadoop:service} Hadoop: service = HBase, name = Region Server, sub = Replication \# sources the source of the service is a service of the servic$
log ed- its fil- tered	Hadoop: service = HBase, name = Region Server, sub = Replication # source + Region Server, sub = Region Serve
log read bytes	Hadoop:service=HBase,name=RegionServer,sub=Replication#sour
	Metric Do

Chart: Log Reads

Metricscrip-

Name tion

 ${\it batches}$

Metric
DeMetricscripName tion
shipped Hadoop:service=HBase,name=RegionServer,sub=Re

Report: Overview

Chart: Requests

 ${\rm Metric}$

De-

Metricscrip-

Name tion

total Total

re- numquests ber

of

ro

quests

this

Re-

gion-

Server

has

an-

swered. Hadoop:service=HBase, name=RegionServer, sub=Server#total states and the states are also supported by the states are also

```
Metric
                                                                                      De-
Metricscrip-
Name tion
read Number
                                                                                      of
{\it quests\ read}
                                                                                      re-
                                                                                      quests
                                                                                      this
                                                                                      re-
                                                                                      gion
                                                                                      server
                                                                                      has
                                                                                      an-
                                                                                      swered. Hadoop:service=HBase, name=RegionServer, sub=Server\#readings and the substitution of the substit
write Number
                                                                                      of
re-
quests mu-
                                                                                      ta-
                                                                                      tion
                                                                                      re-
                                                                                      quests
                                                                                      this
                                                                                      re-
                                                                                      gion
                                                                                      server
                                                                                      has
                                                                                      an-
                                                                                      swered. Hadoop:service=HBase, name=RegionServer, sub=Server\#wring and the substantial state of the substantial state of
```

Chart: Compaction Queue

```
Metric
                                                                De-
Metricscrip-
Name tion
compa \textbf{Climment}
queue depth
                                                                of
                                                                the
                                                                com-
                                                                paction
                                                                re-
                                                                quest
                                                                queue.
                                                                If
                                                                in-
                                                                creas-
                                                                ing,
                                                                we
                                                                are
                                                                falling
                                                                be-
                                                                hind
                                                                with
                                                                store-
                                                                file
                                                                com-
                                                               paction. Hadoop: service = HBase, name = Region Server, sub = Server \# contact = Server
```

Chart: Disk Space Used

Metric Name | Metric Description — | — used space |

Chart: Mem Stores

Metric De-Metricscrip-Name tion mem Size of store size the store. Hadoop: service = HBase, name = RegionServer, sub = Server # mem Server #upper Property limit 'hbase.regionserver.global.memstore.upperLimit' value. lower Property $limit \ 'hbase.regionserver.global.memstore.lowerLimit'$ value.

Chart: Region Servers

Metric De-Metricscrip-Name tion

 $region\ Hadoop:service=HBase,name=Master,sub=Server\#numRegionServers$ servers

 $\label{lem:dead} \begin{tabular}{ll} dead & Hadoop:service=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionService=HBase,name=Master,sub=Server\#numDeadRegionServer=HBase,name=Master,sub=S$

Chart: Garbage Collectors

Metric Name | Metric Description — | — collection time | collection count | avg collection time |

servers

Chart: Flush Queue

```
De-
Metricscrip-
Name tion
flush Length
queue of
      the
      queue
      for
      re-
      gion
      flushes.If
      in-
      creas-
      ing,
      we
      are
      falling
      be-
      hind
      with
      clear-
      ing
      mem-
      stores
      out
      HDFS.Hadoop:service=HBase,name=RegionServer,sub=Server#flush
```

Chart: Local Files

Metric

```
Metric
                                                                                De-
Metricscrip-
Name tion
local
                                                                     The
files
                                                                                per-
                                                                                \operatorname{cent}
                                                                                of
                                                                                HFiles
                                                                                that
                                                                                are
                                                                                stored
                                                                                on
                                                                                the
                                                                                lo-
                                                                                cal
                                                                                hdfs
                                                                                node. Hadoop: service = HBase, name = Region Server, sub = Server \# percent Advances + Region Server + Regio
```

Chart: CPU

Metric Name | Metric Description — | — 'user' | 'system' | 'wait' | 'interruption' | 'soft interrupt' | 'nice' | 'steal' | 'idle' |

Report: RS Hedged Reads

Chart: Hedged Reads

```
Metric
                                                                                              De-
  Metricscrip-
  Name tion
{\bf hedgedThe}
  reads num-
                                                                                              ber
                                                                                              of
                                                                                              {\rm times}
                                                                                              we
                                                                                              started
                                                                                              hedged
                                                                                              read. Hadoop: service = HBase, name = Region Server, sub = Server \# hedge + Region Server \# hedge + 
  {\bf hedgedThe}
read num-
  wins
                                                                                         ber
                                                                                              of
                                                                                              times
                                                                                              we
                                                                                              started
                                                                                              hedged
                                                                                              \operatorname{read}
                                                                                              and
                                                                                              hedged
                                                                                              won. Hadoop: service = HBase, name = Region Server, sub = Server \# hedged the substitution of the substi
```