

Cloudera Runtime 7.1.4

## Troubleshooting Apache Hadoop YARN

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# CLOUdera

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# Troubleshooting Docker on YARN

A list of common Docker on YARN related problem and how to resolve them.

## Docker is not enabled

### Problem statement

Started an application on Docker, but the containers are running as regular containers.

### Root cause

Docker is not enabled.

### Resolution

Enable Docker in Cloudera Manager.

## YARN\_CONTAINER\_RUNTIME\_TYPE runtime environment variable is not provided during Application submission

### Problem statement

Started an application on Docker, but the containers are running as regular containers.

### Root cause

YARN\_CONTAINER\_RUNTIME\_TYPE runtime environment variable is not provided during Application submission.

### Resolution

Provide the environment variable when submitting the application.

## LCE enforces running user to be nobody in an unsecure cluster

### Problem statement

On an unsecure cluster, Appattempt exited with exitCode -1000 with diagnostic message:

```
[...]
main : run as user is nobody
main : requested yarn user is yarn
Can't create directory /yarn/nm/usercache/yarn/appcache/applic
ation_1570626013274_0001 - Permission denied
```

### Root cause

LCE enforces running user to be nobody in an unsecure cluster if yarn.nodemanager.linux-container-executor.nonsecure-mode.limit-users is set.

### Resolution

In Cloudera Manager, add the following configuration to the YARN Service Advanced Configuration Snippet (Safety Valve) for yarn-site.xml safety-valve by clicking the plus icon:

- Key: yarn.nodemanager.linux-container-executor.nonsecure-mode.limit-users
- Value: false

Then use a user who has the correct permissions or add more permissive access to these folders for the nobody user. For more information, see [YARN force nobody user on all jobs](#).

## The Docker binary is not found

### Problem Statement

Container launch fails with the following message:

```
Container launch fails
Exit code: 29
Exception message: Launch container failed
Shell error output: sh: <docker binary path, /usr/bin/docker by
default>: No such file or directory
Could not inspect docker network to get type /usr/bin/docker net
work inspect host --format='{{.Driver}}'.
Error constructing docker command, docker error code=-1, error
message='Unknown error'
```

**Root cause**

The Docker binary is not found.

**Resolution**

The Docker binary is either not installed or installed to a different folder. Install Docker binary and provide the path to the binaries by specifying it using the Docker Binary Path (docker.binary) property in Cloudera Manager.

**The Docker daemon is not running or does not respond****Problem statement**

Container launch fails with the following message:

```
[timestamp] Exception from container-launch.
Container id: container_e06_1570629976081_0004_01_000003
Exit code: 29
Exception message: Launch container failed
Shell error output: Cannot connect to the Docker daemon at unix:/
/var/run/docker.sock. Is the docker daemon running?
Could not inspect docker network to get type /usr/bin/docker ne
twork inspect host --format='{{.Driver}}'.
Error constructing docker command, docker error code=-1, error me
ssage='Unknown error'
```

**Root cause**

The Docker daemon is not running or does not respond.

**Resolution**

Start or restart the Docker daemon with the dockerd command.

**Docker rpm misses some symbolic link****Problem statement**

On Centos 7.5 container launch fails with the following message:

```
[...]
[layer hash]: Pull complete
[layer hash]: Pull complete
Digest: sha256:[sha]
Status: Downloaded newer image for [image]
/usr/bin/docker-current: Error response from daemon: shim error:
docker-runc not installed on system.
```

**Root cause**

Docker rpm misses some symbolic link.

**Resolution**

Create the missing symbolic link using the following command in a terminal: `sudo ln -s /usr/libexec/docker/docker-runc-current /usr/bin/docker-runc`

### YARN\_CONTAINER\_RUNTIME\_DOCKER\_IMAGE is not set

#### Problem statement

Container launch fails with the following message:

```
[timestamp]Exception from container-launch.
Container id: container_e06_1570629976081_0004_01_0000003
Exit code: -1
Exception message: YARN_CONTAINER_RUNTIME_DOCKER_IMAGE not set!
Shell error output: <unknown>
Shell output: <unknown>
```

#### Root cause

YARN\_CONTAINER\_RUNTIME\_DOCKER\_IMAGE is not set.

#### Resolution

Set the YARN\_CONTAINER\_RUNTIME\_DOCKER\_IMAGE environment variable when submitting the application.

### Image is not trusted

#### Problem statement

Container launch fails with the following message:

```
[timestamp] Exception from container-launch.
Container id: container_e06_1570629976081_0004_01_0000003
Exit code: 127
Exception message: Launch container failed
Shell error output: image: [image] is not trusted.
Disable mount volume for untrusted image
image: library/ibmjava:8 is not trusted.
Disable cap-add for untrusted image
Docker capability disabled for untrusted image
[...]
```

#### Root cause

The image is not trusted.

#### Resolution

Add the image's registry to the list of trusted registries (docker.trusted.registries). For example in case of library/ubuntu:latest, add the "library" registry to that list.

### Docker image does not include the Snappy library

#### Problem statement

Running the hadoop-mapreduce-examples pi job fails with the following error:

```
[...]
[timestamp] INFO mapreduce.Job: map 0% reduce 0%
[timestamp] INFO mapreduce.Job: Task Id : attempt_1570629976081_0001_m_0000000_0, Status : FAILED
Error: org/apache/hadoop/util/NativeCodeLoader.buildSupportsSnappy()Z
```

#### Root cause

The provided Docker image does not include the Snappy library. MapReduce needs this if compression is used and the Snappy codec is chosen for compression.

### Resolution

Either add the Snappy library to the image or change the “Compression Codec of MapReduce Map Output” to some other codec

## Hadoop UserGroupInformation class does not have access to the user permissions in the host system

### Problem statement

Container fails shortly after start with the following exception:

```
Exception in thread "main" org.apache.hadoop.security.KerberosAuthException: failure to login: javax.security.auth.login.LoginException: java.lang.NullPointerException: invalid null input: name
  At com.sun.security.auth.UnixPrincipal.<init>(UnixPrincipal.java:71)
    at com.sun.security.auth.module.UnixLoginModule.login(UnixLoginModule.java:133)
    at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
    at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62)
    at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
```

### Root cause

The Hadoop UserGroupInformation class does not have access to the user permissions in the host system.

### Resolution

Mount the /etc/passwd to the image. More configuration issues can be found in upstream Hadoop 3.2 documentation: [Launching Applications Using Docker Containers upstream documentation](#).

## Kerberos configuration is not mounted for Docker containers

### Problem Statement

MapReduce and Spark jobs fail with Docker on a secure cluster. It cannot get Kerberos realm.

```
user@<HOSTNAME> /]$ cd /yarn/container-logs/application_1573764921308_0002/container_e147_1573764921308_0002_01_000005
[user@<HOSTNAME> container_e147_1573764921308_0002_01_000005]$ ll
total 8
-rw-r--r-- 1 systest yarn 0 Nov 14 12:57 prelaunch.err
-rw-r--r-- 1 systest yarn 70 Nov 14 12:57 prelaunch.out
-rw-r--r-- 1 systest yarn 0 Nov 14 12:57 stderr
-rw-r----- 1 systest yarn 0 Nov 14 12:57 stderr.txt
-rw-r--r-- 1 systest yarn 0 Nov 14 12:57 stdout
-rw-r----- 1 systest yarn 0 Nov 14 12:57 stdout.txt
-rw-r--r-- 1 systest yarn 892 Nov 14 12:57 syslog
[user@<HOSTNAME> container_e147_1573764921308_0002_01_000005]$ cat syslog
2019-11-14 20:57:41,765 ERROR [main] org.apache.hadoop.yarn.YarnUncaughtExceptionHandler: Thread Thread[main,5,main] threw an Exception.
java.lang.IllegalArgumentException: Can't get Kerberos realm
    at org.apache.hadoop.security.HadoopKerberosName.setConfiguration(HadoopKerberosName.java:71)
    at org.apache.hadoop.security.UserGroupInformation.initialize(UserGroupInformation.java:330)
```

```

    at org.apache.hadoop.security.UserGroupInformation.setConfig
uration(UserGroupInformation.java:381)
    at org.apache.hadoop.mapred.YarnChild.main(YarnChild.java:80)
Caused by: java.lang.IllegalArgumentException
    at javax.security.auth.kerberos.KerberosPrincipal.<init>(Kerb
erosPrincipal.java:136)
    at org.apache.hadoop.security.authentication.util.KerberosUt
il.getDefaultRealm(KerberosUtil.java:108)
    at org.apache.hadoop.security.HadoopKerberosName.setConfig
uration(HadoopKerberosName.java:69)
    ... 3 more
[user@<HOSTNAME> container_e147_1573764921308_0002_01_000005]$

```

### Root cause

Kerberos configuration is not mounted for Docker containers.

### Resolution

In case of MapReduce job, add the following environment variable when running the job: `-Dmapreduce.reduce.env=YARN_CONTAINER_RUNTIME_DOCKER_MOUNTS=/etc/krb5.conf:/etc/krb5.conf:ro`

Ensure to add `/etc/krb5.conf` to the Allowed Read-Only Mounts in Cloudera Manager configuration.

Example:

```

yarn jar /opt/cloudera/parcels/CDH-7.0.3-1.cdh7.0.3.p0.1616399/lib/hadoop-mapreduce/hadoop-mapreduce-examples.jar pi -Dmapreduce.map.env="YARN_CONTAINER_RUNTIME_TYPE=docker,YARN_CONTAINER_RUNTIME_DOCKER_IMAGE=library/ibmjava:8,YARN_CONTAINER_RUNTIME_DOCKER_DELAYED_REMOVAL=true,YARN_CONTAINER_RUNTIME_DOCKER_MOUNTS=/etc/krb5.conf:/etc/krb5.conf:ro" -Dmapreduce.reduce.env="YARN_CONTAINER_RUNTIME_TYPE=docker,YARN_CONTAINER_RUNTIME_DOCKER_IMAGE=library/ibmjava:8,YARN_CONTAINER_RUNTIME_DOCKER_DELAYED_REMOVAL=true,YARN_CONTAINER_RUNTIME_DOCKER_MOUNTS=/etc/krb5.conf:/etc/krb5.conf:ro" 1 40000

```

In case of Spark job, ensure that mount is added as read-only for `/etc/krb5.conf` as `spark.appMasterEnv` and `spark.executorEnv`:

```

--conf spark.yarn.appMasterEnv.YARN_CONTAINER_RUNTIME_DOCKER_MOUNTS=/etc/passwd:/etc/passwd:ro,/opt/cloudera/parcels:/opt/cloudera/parcels:ro,/etc/krb5.conf:/etc/krb5.conf:ro \

```

```

--conf spark.executorEnv.YARN_CONTAINER_RUNTIME_DOCKER_MOUNTS="/etc/passwd:/etc/passwd:ro,/opt/cloudera/parcels:/opt/cloudera/parcels:ro,/etc/krb5.conf:/etc/krb5.conf:ro"

```

## The ssl-client.xml file and the truststore file is not mounted for Docker containers using MapReduce

### Problem statement

Reducer cannot connect to the shuffle service due to SSL handshake issues.

CLI logs:

```

19/11/15 03:26:02 INFO impl.YarnClientImpl: Submitted application application_1573810028869_0004
19/11/15 03:26:02 INFO mapreduce.Job: The url to track the job: <URL>
19/11/15 03:26:02 INFO mapreduce.Job: Running job: job_1573810028869_0004

```



```

19/11/15 03:26:12 INFO mapreduce.Job: Job job_1573810028869_0004
running in uber mode : false
19/11/15 03:26:12 INFO mapreduce.Job: map 0% reduce 0%
19/11/15 03:26:23 INFO mapreduce.Job: map 100% reduce 0%
19/11/15 03:27:30 INFO mapreduce.Job: Task Id : attempt_15738100
28869_0004_r_000000_0, Status : FAILED
Error: org.apache.hadoop.mapreduce.task.reduce.Shuffle$ShuffleErr
or: error in shuffle in fetcher#2
    at org.apache.hadoop.mapreduce.task.reduce.Shuffle.run(Shu
ffle.java:136)
    at org.apache.hadoop.mapred.ReduceTask.run(ReduceTask.java:37
7)
    at org.apache.hadoop.mapred.YarnChild$2.run(YarnChild.java:17
4)
    at java.security.AccessController.doPrivileged(AccessControll
er.java:770)
    at javax.security.auth.Subject.doAs(Subject.java:570)
    at org.apache.hadoop.security.UserGroupInformation.doAs(UserG
roupInformation.java:1876)
    at org.apache.hadoop.mapred.YarnChild.main(YarnChild.java:168
)
Caused by: java.io.IOException: Exceeded MAX_FAILED_UNIQUE_FET
CHES; bailing-out.
    at org.apache.hadoop.mapreduce.task.reduce.ShuffleSchedulerIm
pl.checkReducerHealth(ShuffleSchedulerImpl.java:396)
    at org.apache.hadoop.mapreduce.task.reduce.ShuffleScheduler
Impl.copyFailed(ShuffleSchedulerImpl.java:311)
    at org.apache.hadoop.mapreduce.task.reduce.Fetcher.openShuffl
eUrl(Fetcher.java:291)
    at org.apache.hadoop.mapreduce.task.reduce.Fetcher.copyFromHo
st(Fetcher.java:330)
    at org.apache.hadoop.mapreduce.task.reduce.Fetcher.run(Fetc
her.java:198)

```

NodeManager logs:

```

2019-11-15 03:30:16,323 INFO org.apache.hadoop.yarn.server.nodem
anager.NodeStatusUpdaterImpl: Removed completed containers from
NM context: [container_e149_1573810028869_0004_01_000005]
2019-11-15 03:30:50,812 ERROR org.apache.hadoop.mapred.Shuffle
Handler: Shuffle error:
javax.net.ssl.SSLException: Received fatal alert: certificate_un
known
    at sun.security.ssl.Alerts.getSSLException(Alerts.java
:208)
    at sun.security.ssl.SSLEngineImpl.fatal(SSLEngineImpl.
java:1666)
    at sun.security.ssl.SSLEngineImpl.fatal(SSLEngineImpl.jav
a:1634)
    at sun.security.ssl.SSLEngineImpl.recvAlert(SSLEngineImp
l.java:1800)
    at sun.security.ssl.SSLEngineImpl.readRecord(SSLEngineI
mpl.java:1083)
    at sun.security.ssl.SSLEngineImpl.readNetRecord(SSLEngine
Impl.java:907)
    at sun.security.ssl.SSLEngineImpl.unwrap(SSLEngineImpl.ja
va:781)
    at javax.net.ssl.SSLEngine.unwrap(SSLEngine.java:624)
    at org.jboss.netty.handler.ssl.SslHandler.unwrap(SslHa
ndler.java:1218)
    at org.jboss.netty.handler.ssl.SslHandler.decode(SslHan
dler.java:852)

```

```

        at org.jboss.netty.handler.codec.frame.FrameDecoder.callD
        ecode(FrameDecoder.java:425)
        at org.jboss.netty.handler.codec.frame.FrameDecoder.mes
        sageReceived(FrameDecoder.java:303)
        at org.jboss.netty.channel.SimpleChannelUpstreamHandler.
        handleUpstream(SimpleChannelUpstreamHandler.java:70)
        at org.jboss.netty.channel.DefaultChannelPipeline.sendU
        pstream(DefaultChannelPipeline.java:564)
        at org.jboss.netty.channel.DefaultChannelPipeline.sendU
        pstream(DefaultChannelPipeline.java:559)
        at org.jboss.netty.channel.Channels.fireMessageReceived
        (Channels.java:268)
        at org.jboss.netty.channel.Channels.fireMessageReceived(
        Channels.java:255)
        at org.jboss.netty.channel.socket.nio.NioWorker.read(NioW
        orker.java:88)
        at org.jboss.netty.channel.socket.nio.AbstractNioWorker.p
        rocess(AbstractNioWorker.java:108)
        at org.jboss.netty.channel.socket.nio.AbstractNioSelector
        .run(AbstractNioSelector.java:337)
        at org.jboss.netty.channel.socket.nio.AbstractNioWorker.r
        un(AbstractNioWorker.java:89)
        at org.jboss.netty.channel.socket.nio.NioWorker.run(Ni
        oWorker.java:178)
        at org.jboss.netty.util.ThreadRenamingRunnable.run(Thr
        eadRenamingRunnable.java:108)
        at org.jboss.netty.util.internal.DeadLockProofWorker$1
        .run(DeadLockProofWorker.java:42)
        at java.util.concurrent.ThreadPoolExecutor.runWorker(T
        hreadPoolExecutor.java:1149)
        at java.util.concurrent.ThreadPoolExecutor$Worker.run(T
        hreadPoolExecutor.java:624)
        at java.lang.Thread.run(Thread.java:748)
2019-11-15 03:30:50,812 ERROR org.apache.hadoop.mapred.ShuffleH
        andler: Shuffle error [id: 0xf95ad8ab, /10.65.53.21:44366 => /10
        .65.53.21:13562] EXCEPTION: javax.net.ssl.SSLException: Received
        fatal alert: certificate_unknown
2019-11-15 03:30:51,156 INFO org.apache.hadoop.yarn.server.nod
        emanager.containermanager.ContainerManagerImpl: Stopping contain
        er with container Id: container_e149_1573810028869_0004_01_0000006

```

NodeManager logs (Exception):

```

2019-11-15 03:30:50,812 ERROR org.apache.hadoop.mapred.ShuffleHa
        ndler: Shuffle error:
        javax.net.ssl.SSLException: Received fatal alert: certificate_
        unknown
        [...]
2019-11-15 03:30:50,812 ERROR org.apache.hadoop.mapred.Shuffle
        Handler: Shuffle error [id: 0xf95ad8ab, /10.65.53.21:44366 => /1
        0.65.53.21:13562] EXCEPTION: javax.net.ssl.SSLException: Received
        fatal alert: certificate_unknown
2019-11-15 03:30:51,156 INFO org.apache.hadoop.yarn.server.nodema
        nager.containermanager.ContainerManagerImpl: Stopping container
        with container Id: container_e149_1573810028869_0004_01_0000006

```

### Root cause

For normal containers, the file `ssl-client.xml` defines the SSL settings and it is on the classpath (normally under directory: `/etc/hadoop/conf.cloudera.YARN-1/ssl-client.xml`). Therefore, it has to be mounted for Docker containers using MapReduce. Since the `ssl-client.xml` file refers to the truststore file as well, that also had to be mounted.

**Resolution**

Add the following when running the job:

```
-Dmapreduce.reduce.env=YARN_CONTAINER_RUNTIME_DOCKER_MOUNTS="/etc/hadoop/conf.cloudera.YARN-1/ssl-client.xml:/etc/hadoop/conf.cloudera.YARN-1/ssl-client.xml:ro,/var/lib/cloudera-scm-agent/agent-cert/cm-auto-global_truststore.jks:/var/lib/cloudera-scm-agent/agent-cert/cm-auto-global_truststore.jks:ro"
```

Ensure to add /etc/hadoop/conf.cloudera.YARN-1/ssl-client.xml and /var/lib/cloudera-scm-agent/agent-cert/cm-auto-global\_truststore.jks to the Allowed Read-Only Mounts in Cloudera Manager.

Note, that the location of the truststore can vary, so verify its location from the ssl-client.xml file. You can access that file in Clouder Manager through the Processes view for NodeManager.

## Troubleshooting on YARN

General troubleshooting procedures to diagnose some of the commonly encountered issues in YARN.

### The Kill application button does not display in the YARN UI

**Problem statement**

The YARN UI does not display the Kill application button.

**Root cause**

Kerberos is not enabled.

**Resolution**

Enable Kerberos in order to view the Kill application button.

With the application state API, you can query the state of a submitted app as well as kill a running app by modifying the state of a running app using a PUT request with the state set to “KILLED”. To perform the PUT operation, authentication has to be set up for the Resource Manager (RM) web services. See [Enabling Kerberos Authentication for CDP](#) linked below.

**Related Information**

[Enabling Kerberos Authentication for CDP](#)

## Troubleshooting Linux Container Executor

A list of numeric error codes communicated by the container-executor to the NodeManager that appear in the /var/log/hadoop-yarn NodeManager log.

**Table 1: Numeric error codes that are applicable to the container-executor in YARN, but are used by the LinuxContainerExecutor only.**

| Numeric Code | Name                    | Description                                                                                                                                                                              |
|--------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | INVALID_ARGUMENT_NUMBER | <ul style="list-style-type: none"> <li>Incorrect number of arguments provided for the given container-executor command</li> <li>Failure to initialize the container localizer</li> </ul> |
| 2            | INVALID_USER_NAME       | The user passed to the container-executor does not exist.                                                                                                                                |

| Numeric Code | Name                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3            | INVALID_COMMAND_PROVIDED           | The container-executor does not recognize the command it was asked to run.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 5            | INVALID_NM_ROOT                    | The passed NodeManager root does not match the configured NodeManager root (yarn.nodemanager.local-dirs), or does not exist.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 6            | SETUID_OPER_FAILED                 | Either could not read the local groups database, or could not set UID or GID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 7            | UNABLE_TO_EXECUTE_CONTAINER_SCRIPT | The container-executor could not run the container launcher script.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 8            | UNABLE_TO_SIGNAL_CONTAINER         | The container-executor could not signal the container it was passed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 9            | INVALID_CONTAINER_PID              | The PID passed to the container-executor was negative or 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 18           | OUT_OF_MEMORY                      | The container-executor couldn't allocate enough memory while reading the container-executor.cfg file, or while getting the paths for the container launcher script or credentials files.                                                                                                                                                                                                                                                                                                                                                                                       |
| 20           | INITIALIZE_USER_FAILED             | Couldn't get, stat, or secure the per-user NodeManager directory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 21           | UNABLE_TO_BUILD_PATH               | The container-executor couldn't concatenate two paths, most likely because it ran out of memory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 22           | INVALID_CONTAINER_EXEC_PERMISSIONS | The container-executor binary does not have the correct permissions set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 24           | INVALID_CONFIG_FILE                | The container-executor.cfg file is missing, malformed, or has incorrect permissions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 25           | SETSID_OPER_FAILED                 | Could not set the session ID of the forked container.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 26           | WRITE_PIDFILE_FAILED               | Failed to write the value of the PID of the launched container to the PID file of the container.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 255          | Unknown Error                      | <p>This error has several possible causes. Some common causes are:</p> <ul style="list-style-type: none"> <li>User accounts on your cluster have a user ID less than the value specified for the min.user.id property in the container-executor.cfg file. The default value is 1000 which is appropriate on Ubuntu systems, but may not be valid for your operating system. For information about setting min.user.id in the container-executor.cfg file.</li> <li>This error is often caused by previous errors; look earlier in the log file for possible causes.</li> </ul> |

**Table 2: Exit status codes apply to all containers in YARN. These exit status codes are part of the YARN framework and are in addition to application specific exit codes that can be set.**

| Numeric Code | Name    | Description                                                                                                                |
|--------------|---------|----------------------------------------------------------------------------------------------------------------------------|
| 0            | SUCCESS | Container has finished successfully.                                                                                       |
| -1000        | INVALID | Initial value of the container exit code. A container that does not have a COMPLETED state will always return this status. |

| Numeric Code | Name                        | Description                                                                                                                                                                                            |
|--------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -100         | ABORTED                     | Containers killed by the framework, either due to being released by the application or being 'lost' due to node failures, for example.                                                                 |
| -101         | DISKS_FAILED                | Container exited due to local disks issues in the NodeManager node. This occurs when the number of good nodemanager-local-directories or nodemanager-log-directories drops below the health threshold. |
| -102         | PREEMPTED                   | Containers preempted by the framework. This does not count towards a container failure in most applications.                                                                                           |
| -103         | KILLED_EXCEEDED_VMEM        | Container terminated because of exceeding allocated virtual memory limit.                                                                                                                              |
| -104         | KILLED_EXCEEDED_PMEM        | Container terminated because of exceeding allocated physical memory limit.                                                                                                                             |
| -105         | KILLED_BY_APPMASTER         | Container was terminated on request of the application master.                                                                                                                                         |
| -106         | KILLED_BY_RESOURCEMANAGER   | Container was terminated by the resource manager.                                                                                                                                                      |
| -107         | KILLED_AFTER_APP_COMPLETION | Container was terminated after the application finished.                                                                                                                                               |