Monitoring

Objectives

At the end of this module, you will be able to use:

- Aerospike Management Console
- asadm – CLI for administering Aerospike
- asloglatency – CLI for looking at server latency

Aerospike Management Console (AMC)

Aerospike Management Console (AMC)

The AMC is a web interface to managing/monitoring the Aerospike database.

- Cluster summary
- Node info
- Storage info
- Definitions
- Jobs
- Alerts
- Cross Datacenter Replication (XDR) stats
- Latency stats
- Backup/restore
- Edit configuration

AMC Community Edition is for Monitoring only.
AMC Enterprise Edition includes management functions.

This class is intended for AMC Community Edition, but we do cover a few Enterprise Edition features.

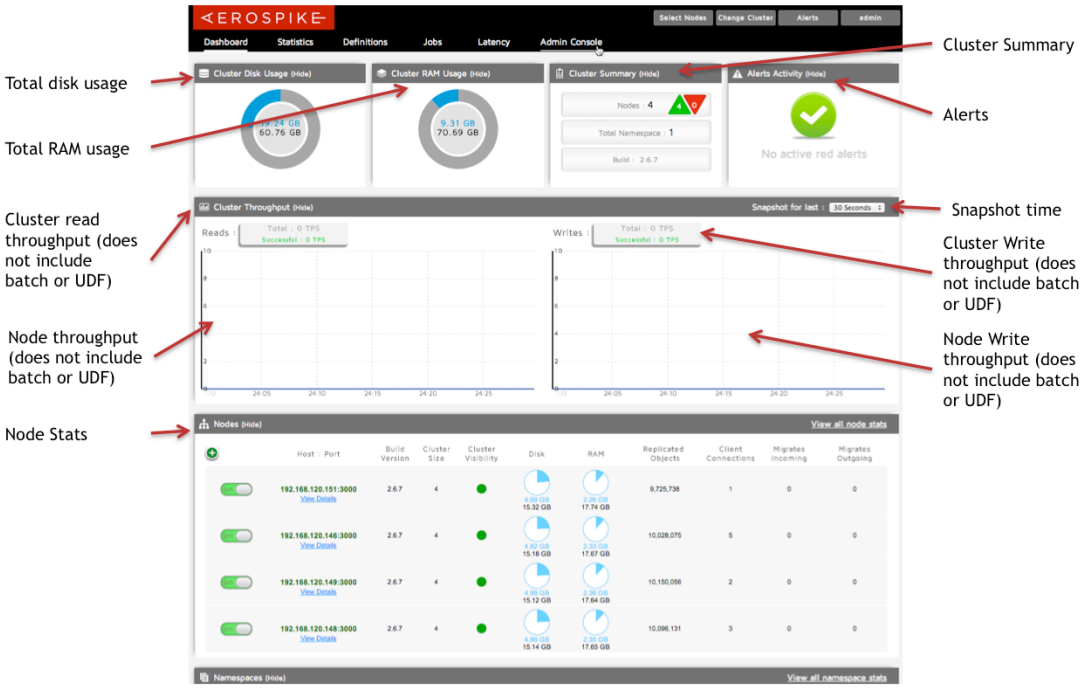
AMC - Dashboard

The AMC Dashboard provides many of the high level health statistics. This is often used in NOCs to see if there are any problems with the Aerospike clusters.

A listing of different plug-ins is also available at:

http://www.aerospike.com/docs/operations/monitor/

AMC – Dashboard (top)

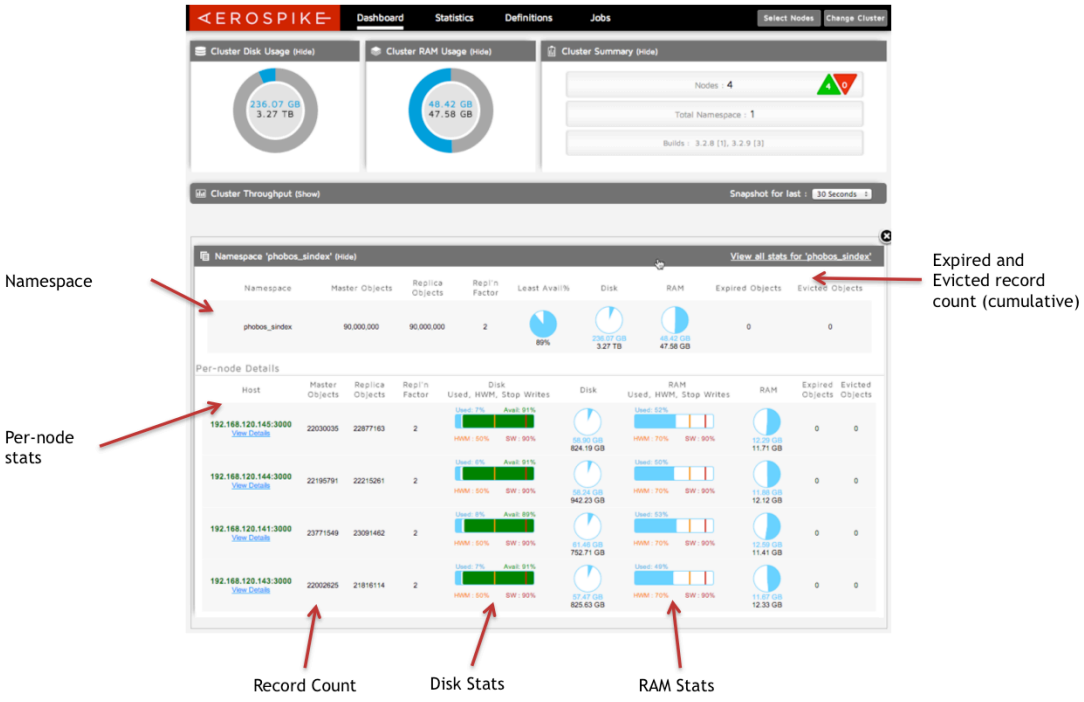


This interface is sometimes used in NOCs.

From the TOP:

- The Disk and RAM usage are marked in blue as a fraction of the total available space.
- The Cluster Summary shows the number of nodes (total) as well has how many are up (GREEN) and down (RED), a count of the number of namespaces, and the current build number. Be careful as it is possible that individual nodes may be on a different version.
- The Alerts Activity panel is only available in the Enterprise Edition. It is missing in the Community Edition.

AMC – Dashboard (bottom)



In the Namespace panel, you see the high level information for each namespace.

The Per-node section will show the detail for each node in the cluster.

One special thing to note is that the expired and evicted record counts are cumulative, so you should look at the number increasing rather than the static value.

AMC - Statistics

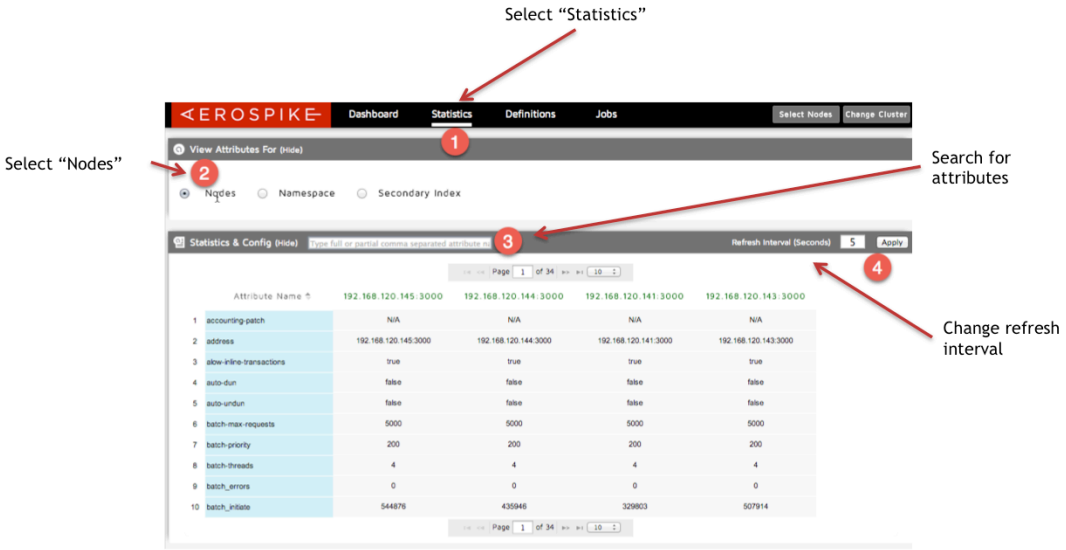
The statistics page shows all statistics and configuration variables related to:

- Nodes
- Namespaces
- Secondary Indexes

These statistics show how these are being used.

These interfaces can be used to quickly find where there are differences in the cluster.

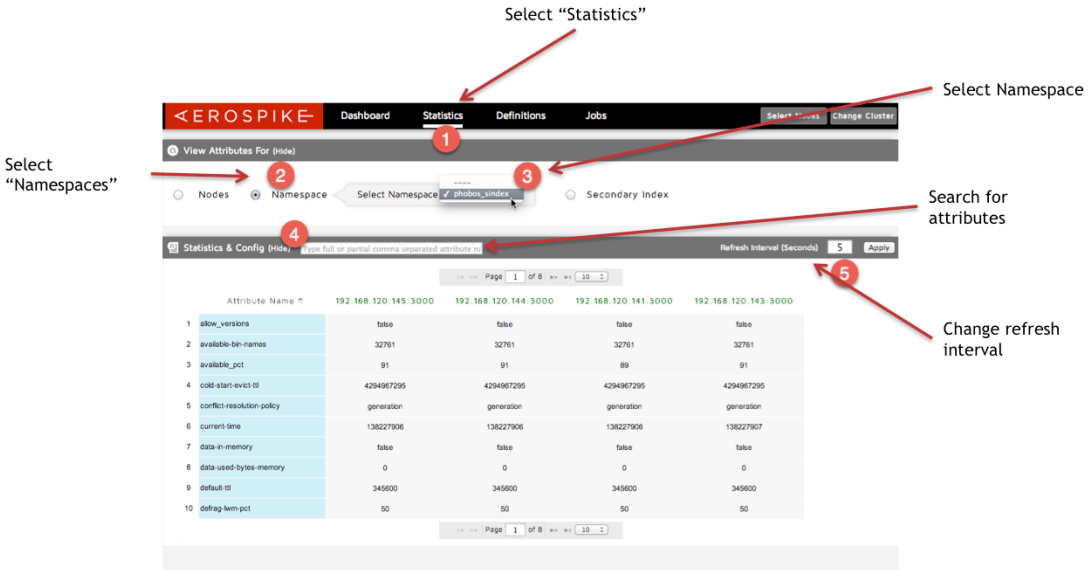
AMC – Statistics: Nodes



You can quickly find differences between different nodes. While this is not always an indication of a problem, you can quickly find where the differences are.

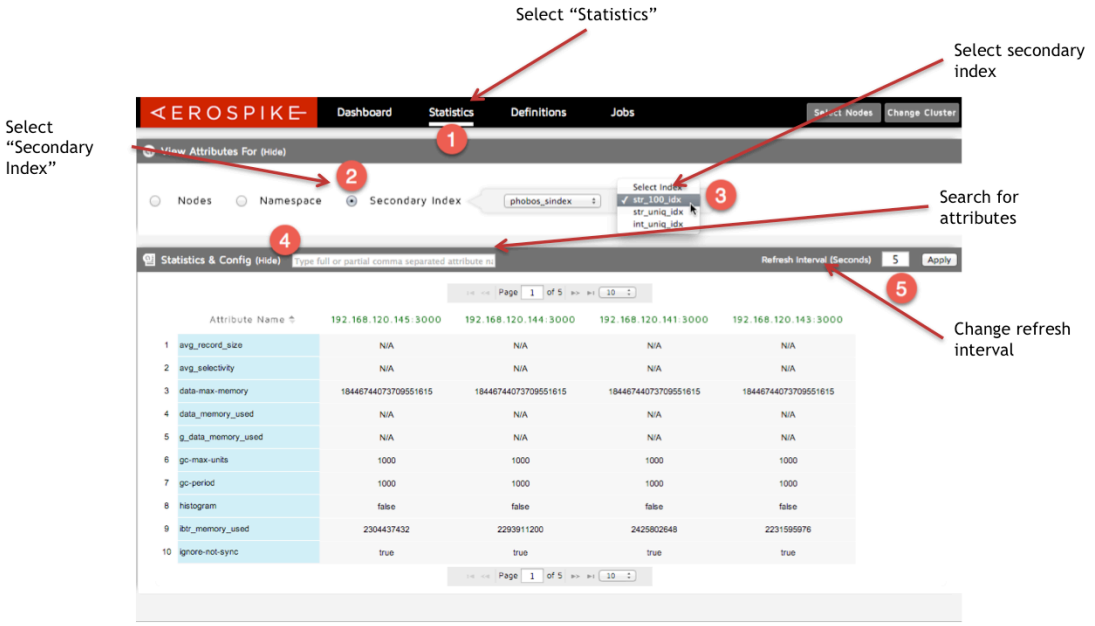
There are hundreds of values. So if you know what value you want, enter in a search string in box (3) and hit enter. It will filter on just the ones that match the pattern.

AMC – Statistics: Namespaces



Very similar to the Nodes, the Namespaces page shows statistics for the namespaces. You must select the namespace (3).

AMC – Statistics: Secondary Indexes



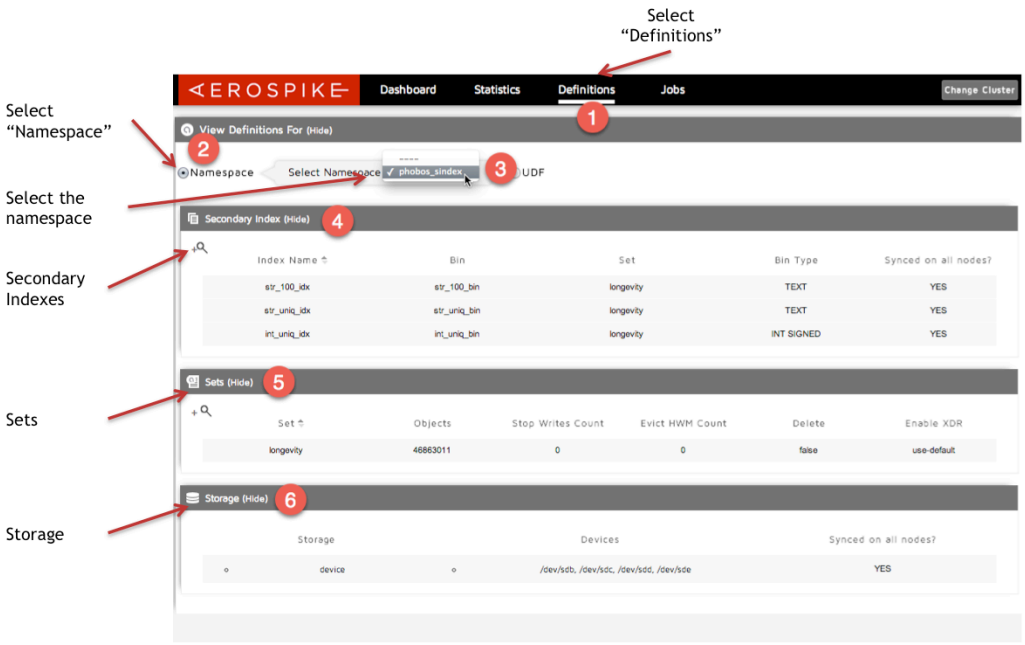
You can also see the attributes for secondary indexes. In this case you must select both the namespace and the secondary index (3).

AMC - Definitions

The Definitions page shows how the following are defined:

- Namespaces
- User Defined Functions (UDFs)

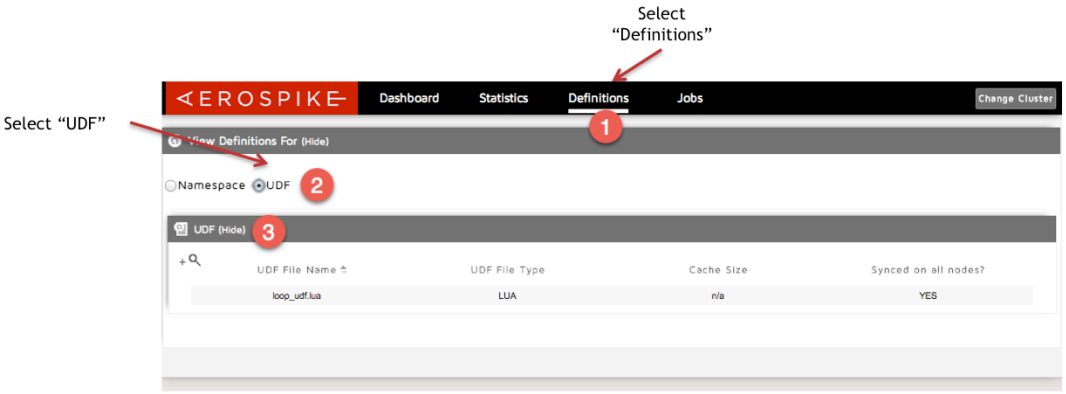
AMC – Definitions: Namespaces



On the Definitions: Namespaces page, you can see statistics for Secondary Indexes, Sets, and what storage is attached to the namespace.

Of particular importance for Secondary Indexes is whether or not the index is synchronized on all nodes. This refers to Secondary Indexes only. If they are not synchronized, queries based on the secondary index will fail with an error.

AMC – Definitions: User Defined Functions



User Defined Functions (UDFs) are code that are run on the Aerospike server rather than the client (similar to stored procedures).

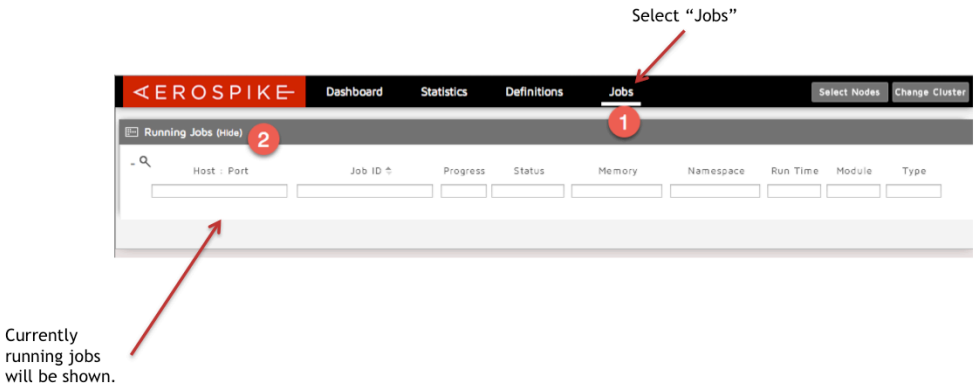
UDFs are managed automatically by the Aerospike database, but must be registered. Once it has been registered, it will be internally distributed to all nodes in the cluster. If there has been a problem the the "Synced on all nodes?" column will show "NO"

AMC - Jobs

The Jobs page allows you to see what jobs are currently running on the server.

Because most queries are fast, you will only be able to see very long running ones.

AMC – Jobs



Jobs like scans and queries may show up in the Jobs page. Be aware that many queries are very short duration and may not show up on this interface.

AMC – Admin Console

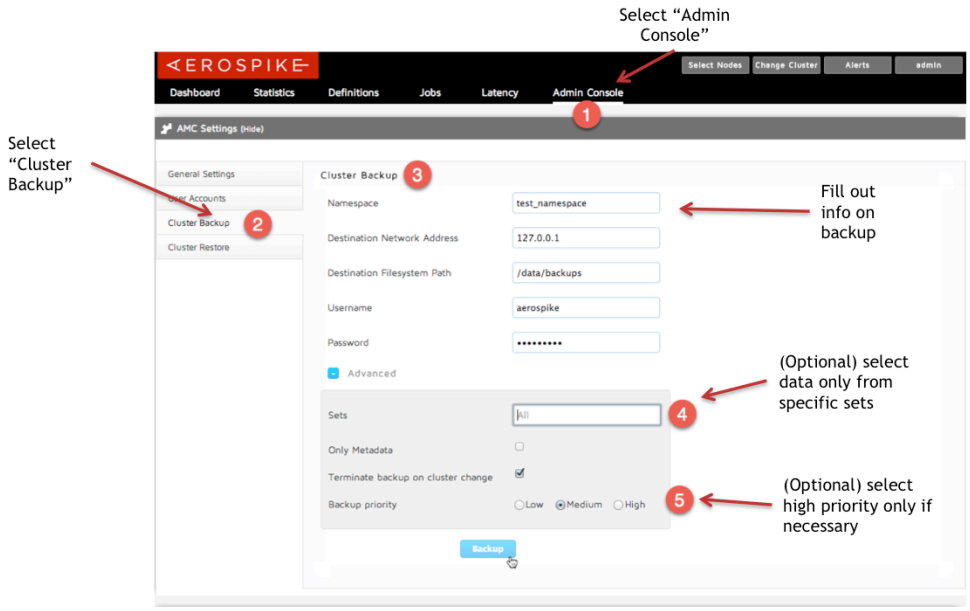
Enterprise Edition Only

The AMC admin console gives you added functionality to manage a cluster.

- Backup a cluster
- Restore a cluster
- Dynamically change configuration node variables
- Dynamically change configuration namespace variables
- View Cross Datacenter Replication (XDR) stats

AMC – Admin Console: Backups

Enterprise Edition Only



Backups are done on a namespace by namespace basis and will be done on the AMC server.

The export will be in human readable format, but is not consistent. It is possible for a record to appear more than once. This normally fixes itself during the restore process. But if you will be importing the backup file into another system you should know that records may have multiple entries with different generations.

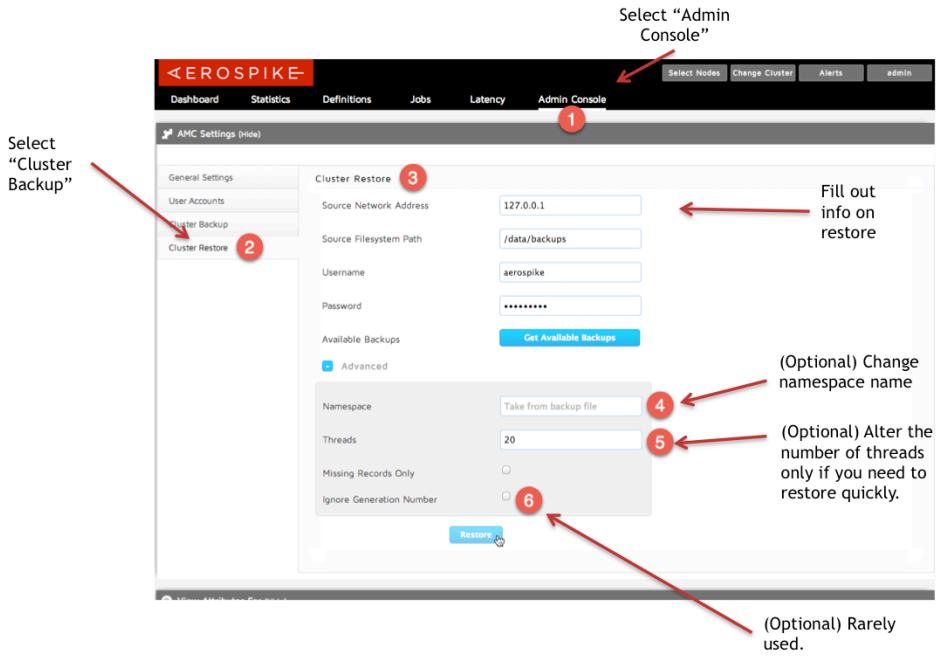
As an option, you can specify to only backup specific sets.

We generally recommend using medium priority, which places a lower load on the cluster, but still should complete in a reasonable time. Use "High" if you must have the backup and are willing to take the risk of them impacting traffic. Use "Low" if you don't want to impact traffic and are ok with the backup taking a long time.

Performance will depend on how much data, how many nodes, etc, but it will take a long time.

AMC – Admin Console: Restore

Enterprise Edition Only

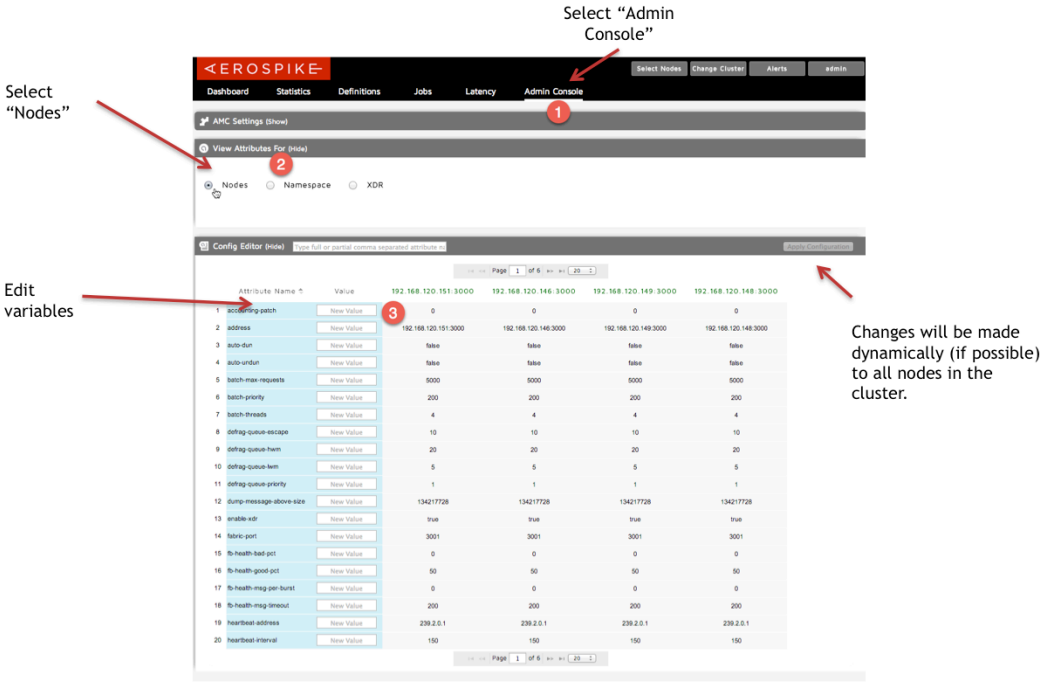


The restoration works in reverse of the backup.

One important note is that if you are restoring because an application error has lead to corruption of data, you can select to "Ignore Generation Number". This will let you restore the old data without wiping out everything. Otherwise, you will usually want to leave this unselected.

AMC – Admin Console: Change Node Variables

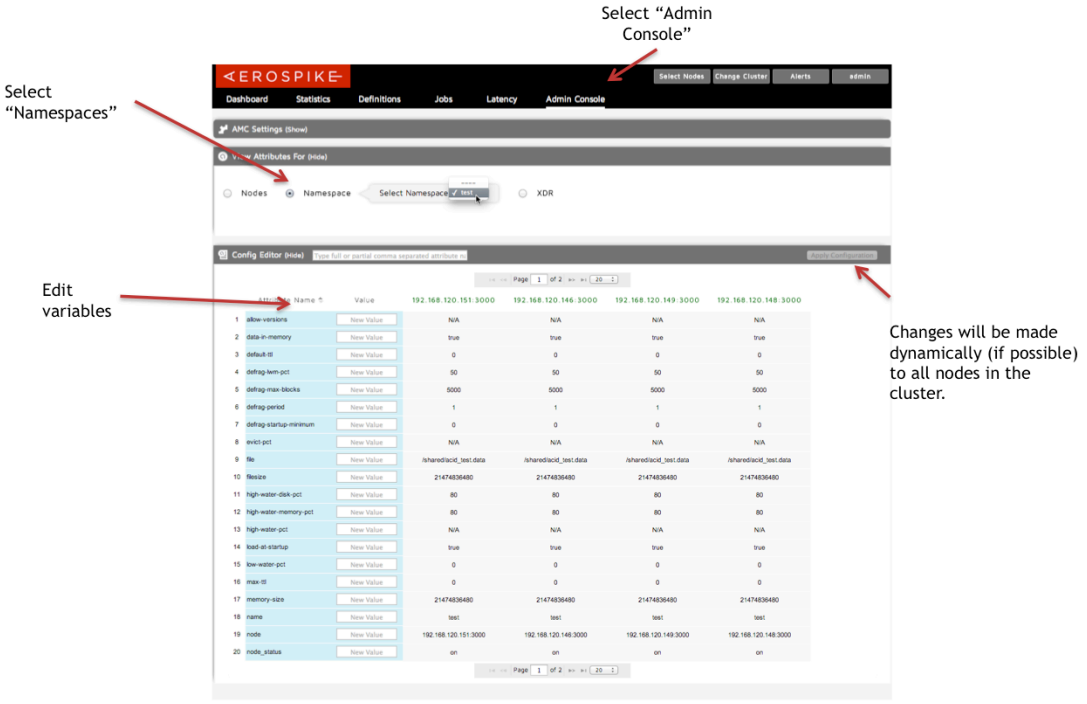
Enterprise Edition Only



With the Enterprise Edition AMC you can make changes to the node configuration dynamically. That is, the AMC can change the value of many variables while the server is still operating.

AMC – Admin Console: Change Namspace Vars

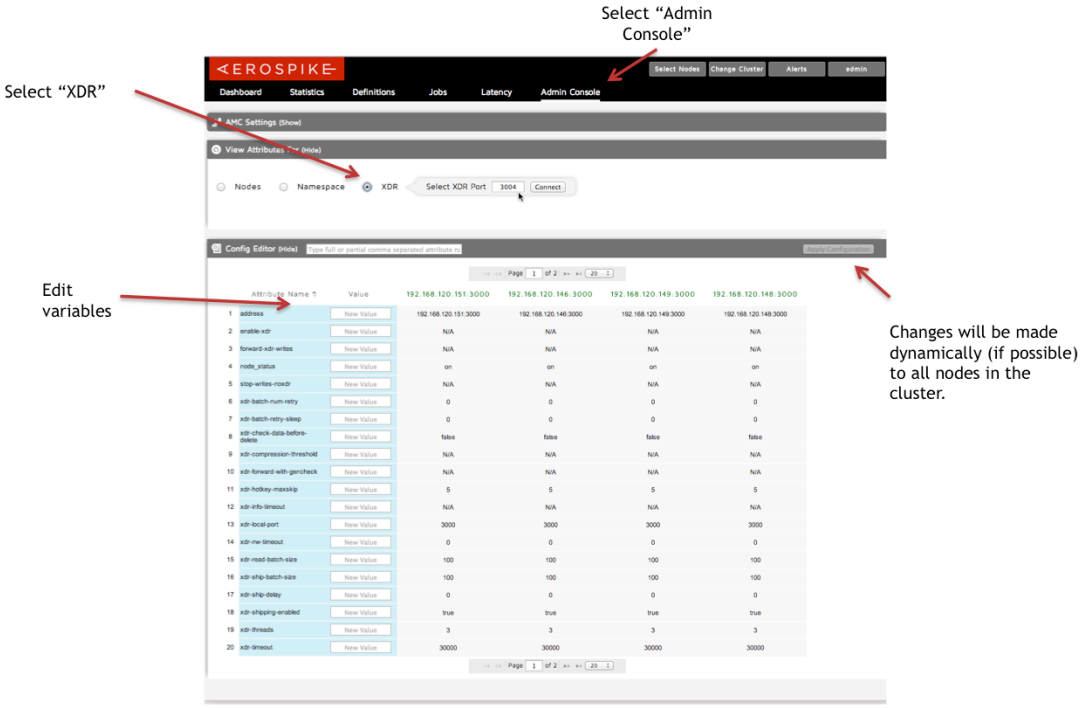
Enterprise Edition Only



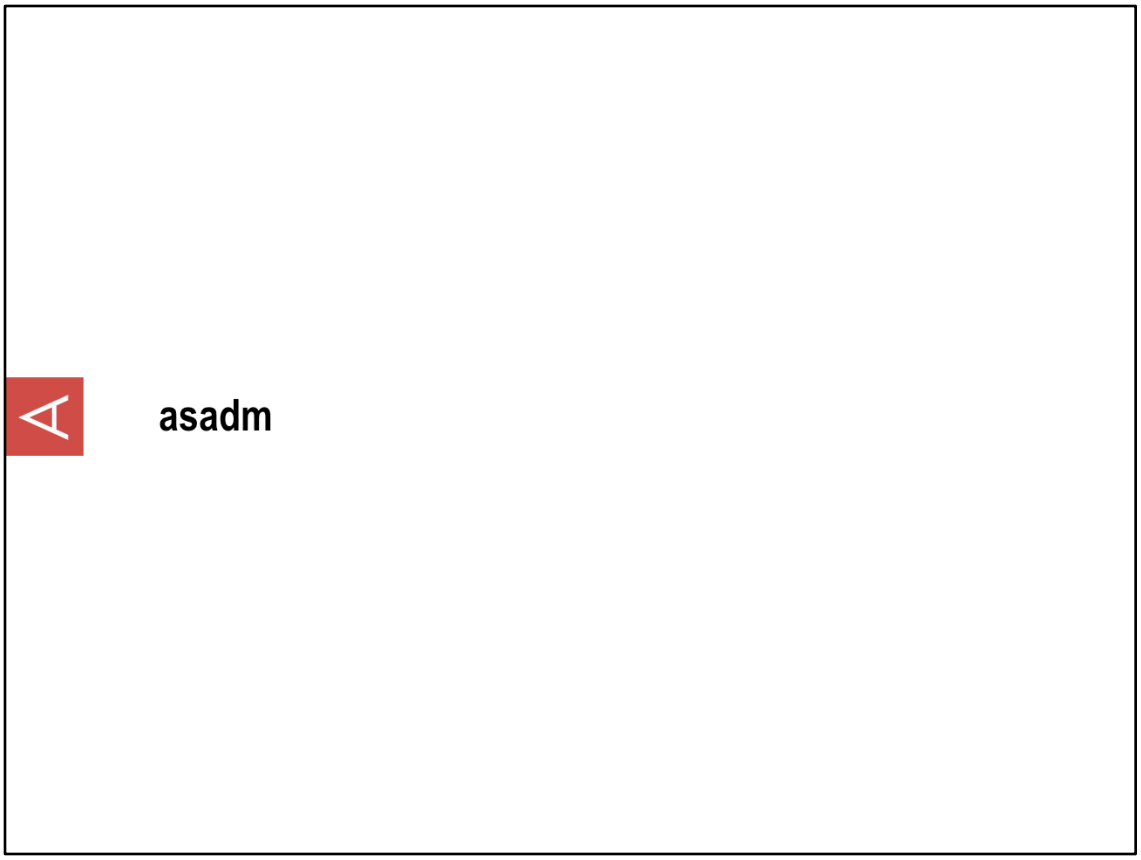
You can do likewise dynamically change the Namespace variables.

AMC – Admin Console: Change XDR Vars

Enterprise Edition Only



You can also dynamically alter the XDR variables.


asadm

asadm

asadm is a command line tool used to track the health of an Aerospike cluster.

Typical syntax:

- `asadm [-h <host>[:<port>]] [-p <port>]`

This will put you into the asadm command line which looks like this:

`Admin>`

Hitting <TAB> will show you possible options.

While there are other options for asadm we will just try connecting to an instance.

The asadm does not need to be on the same host. You need only give asadm one host/IP address and it will connect to the other nodes in the cluster.

Just entering asadm without any parameters will put you into the local Aerospike node on port 3000.

asadm – Commonly Used Commands

Subcommand: `help`

Displays the full syntax of the asadm command.

asadm – Commonly Used Commands

Subcommand: `info`

Displays cluster info similar to the dashboard on the AMC.

```
Admin> info
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~Service Information~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Node               Build   Cluster      Cluster      Cluster     Free    Free   Migrates   Principal     Objects      Uptime
   .                   .      Size   Visibility    Integrity    Disk%    Mem%          .           .           .           .
u10    3.5.3-62-ge9e92ce       N/E   True          N/E            N/E     N/E   N/E        N/E               N/E   N/E
u12    3.5.3-62-ge9e92ce         3   True          True            89      30   (0,0)      u12          57.277 M   15:38:53
u13    3.5.3-62-ge9e92ce         3   True          True            91      43   (0,0)      u12          57.480 M   10:03:27
Number of rows: 3

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~Network Information~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Node               Node                    Fqdn                        Ip   Client     Current     HB         HB
   .                 Id                       .                         .    Conns        Time   Self    Foreign
u10    BB931F106CA0568    u10.citrusleaf.local:3000   192.168.120.110:3000    13891   163636730      0     694935
u12    *BB9BE0A05CA0568   u12.citrusleaf.local:3000   192.168.120.112:3000     2367   163636730      0     704077
u13    BB93AF106CA0568    u13.citrusleaf.local:3000   192.168.120.113:3000     1821   163636730      0     469679
Number of rows: 3

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~Namespace Information~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Node     Namespace   Avail%   Evictions    Objects     Repl    Stop       Disk     Disk     HWM         Mem     Mem     HWM      Stop
   .             .        .           .          .   Factor  Writes       Used    Used%   Disk%        Used   Used%    Mem%   Writes%
u10           test       88           0   54.072 M        2  false    74.332 GB       10      50   15.721 GB      70      70        90
u12           test       87     3913203   57.277 M        2  false    74.799 GB       11      50   16.742 GB      70      70        90
u13           test       89           0   57.480 M        2  false    75.185 GB        9      50   13.582 GB      57      70        90
```

The most important things to note here are:

- The number of object are replicated.
- If the number of migrates is non-zero, the cluster is in a dynamic state.
- There are counters for the number of evicted objects, if this is increasing, the system is short on configured resources.

asadm – Commonly Used Commands

Command: `show stat`

Displays node stats for each node in the cluster. You can select for a single set of statistics by choosing the statistic type:

- bins
- namespace
- service
- sets
- xdr (for Enterprise Edition)

```
Admin> show stat sets
~~~~~~~~test longevity Set Statistics~~~~~~~
NODE                 :   u10              u13
n_objects            :   55976084         57480531
ns_name              :   test             test
set-delete           :   false            false
set-enable-xdr       :   use-default      use-default
set-evict-hwm-count  :   0                0
set-stop-write-count:    0                0
set_name             :   longevity        longevity
```

There are hundreds of possible variables and just entering "stat" will show all values for all nodes in the cluster.

asadm – Commonly Used Commands

Command: `show stat`

Displays node stats for each node in the cluster. The output can be very long, so filter with the "like" modifer.

```
Admin> show stat like total
~~~~~~~~~~~~~~~~~~~~~~~~Service Statistics~~~~~~~~~~~~~~~~~~~~~~~~
NODE               :   u10            u12            u13
total-bytes-disk   :   800197705728   800197705728   948214693888
total-bytes-memory:    25769803776    25769803776    25769803776

~~~~~~~~~~~~~~~~~~ test Namespace Statistics~~~~~~~~~~~~~~~~~~~~~
NODE               :   u10            u12            u13
total-bytes-disk   :   800197705728   800197705728   948214693888
total-bytes-memory:    25769803776    25769803776    25769803776
```

It is often easier to filter for just the variables you are interested in. Use the "like" will limit the variables to those that contain the string.

asadm – Commonly Used Commands

Command: `show config`

Displays node configurations for each node in the cluster. The output can be made specific to specific areas:

- namespace
- network
- service
- xdr (for Enterprise Edition)

```
Admin> show config namespace
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ test Namespace Configuration~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
NODE                           :   u12                                  u13
allow_versions                 :   false                                false
cold-start-evict-ttl           :   4294967295                           4294967295
conflict-resolution-policy     :   generation                           generation
data-in-memory                 :   false                                false
default-ttl                    :   345600                               345600
defrag-lwm-pct                 :   50                                   50
defrag-queue-min               :   0                                    0
defrag-sleep                   :   1000                                 1000
defrag-startup-minimum         :   10                                   10
dev                            :   /dev/sdb,/dev/sdc,/dev/sdd,/dev/sde  /dev/sdb,/dev/sdc,/dev/sdd,/dev/sde
disallow-null-setname          :   false                                false
enable-xdr                     :   true                                 true
evict-tenths-pct               :   5                                    5
filesize                       :   17179869184                          17179869184
flush-max-ms                   :   1000                                 1000
fsync-max-sec                  :   0                                    0
high-water-disk-pct            :   50                                   50
high-water-memory-pct          :   70                                   70
ldt-enabled                    :   true                                 true
max-ttl                        :   0                                    0
max-write-cache                :   67108864                             67108864
memory-size                    :   25769803776                          25769803776
...
```

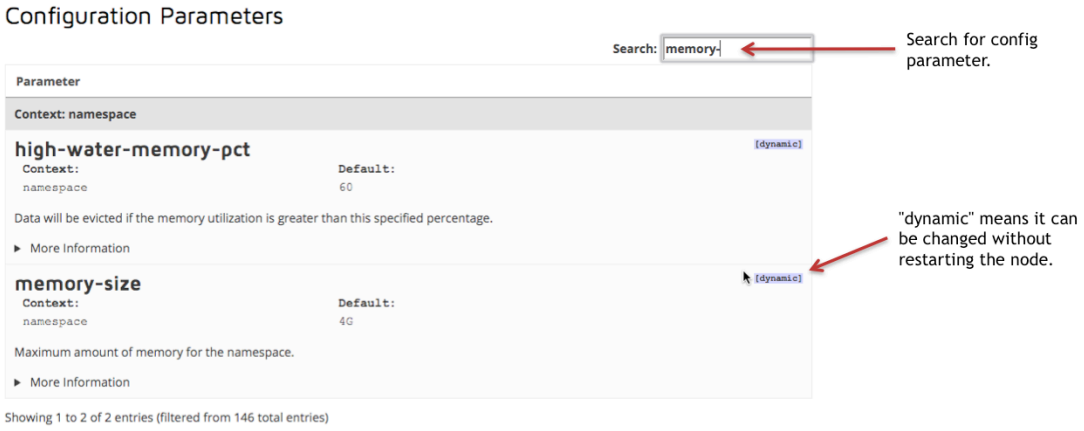
Each area contains a different set of configuration variables specific to the different contexts in the configuration file.

asadm – Commonly Used Commands

Command: `asinfo -v`

Dynamically alters the configuration of the nodes in the cluster. The context will match the area in the configuration file. Not all variables are dynamically changeable.

Go to http://www.aerospike.com/docs/reference/configuration/.



You may find that you need to change a configuration variable. First, you may want to determine if it can be changed without restarting the node.

While this is often true, it is not always true. You can find out if the parameter you want to change is by looking at the Aerospike web site.

asadm – Commonly Used Commands

Example

Command: `asinfo -v`

To update the amount of memory (RAM) used by the namespace "test" to 2 GB without restarting the nodes in the cluster. Issue the following command. Note that all nodes will be changed. The configuration file will NOT be altered.

```
Admin> asinfo -v "set-config:context=namespace;id=test;memory-size=2G"
u12 (192.168.120.112) returned:
ok
u13 (192.168.120.113) returned:
ok
u10 (192.168.120.110) returned:
ok
```

In this example we have now dynamically changed the amount of RAM used in the namespace "test" to 2 GB. Note that shrinking memory can have bad side effects.

asadm – Commonly Used Commands

Command: `show latency`

Displays latency stats for how long requests take to be filled as measured on the server. This may differ significantly from the client latency measures. There are additional parameters to take a look back at a specific time or gather other metrics. Useful for determining throughput.

```
Admin> show latency
~~~~~~~~~~~~~~~~~~~~~~~~proxy Latency~~~~~~~~~~~~~~~~~~~~~~~~
Node                    Time   Ops/Sec   >1Ms   >8Ms   >64Ms
   .                    Span        .      .      .       .
u10    22:59:33-GMT->22:59:43       0.0    0.0    0.0     0.0
u12    22:59:30-GMT->22:59:40       0.0    0.0    0.0     0.0
u13    22:59:35-GMT->22:59:45       0.0    0.0    0.0     0.0
Number of rows: 3

~~~~~~~~~~~~~~~~~~~~~~~~query Latency~~~~~~~~~~~~~~~~~~~~~~~~
Node                    Time   Ops/Sec    >1Ms    >8Ms   >64Ms
   .                    Span        .       .       .       .
u10    22:59:33-GMT->22:59:43    1661.7   99.99    52.3   38.96
u12    22:59:30-GMT->22:59:40    1332.5   100.0   13.75    1.06
u13    22:59:35-GMT->22:59:45    1398.5   100.0   22.53     0.0
Number of rows: 3

~~~~~~~~~~~~~~~~~~~~~~~~reads Latency~~~~~~~~~~~~~~~~~~~~~~~~
Node                    Time   Ops/Sec    >1Ms    >8Ms   >64Ms
   .                    Span        .       .       .       .
u10    22:59:33-GMT->22:59:43       0.0     0.0     0.0     0.0
u12    22:59:30-GMT->22:59:40     152.1   37.28     0.0     0.0
u13    22:59:35-GMT->22:59:45     157.8   47.59     0.0     0.0
Number of rows: 3

~~~~~~~~~~~~~~~~~~~~~~~~udf Latency~~~~~~~~~~~~~~~~~~~~~~~~
Node                    Time   Ops/Sec   >1Ms   >8Ms   >64Ms
   .                    Span        .      .      .       .
u10    22:59:33-GMT->22:59:43       0.0    0.0    0.0     0.0
u12    22:59:30-GMT->22:59:40       0.0    0.0    0.0     0.0
u13    22:59:35-GMT->22:59:45       0.0    0.0    0.0     0.0
Number of rows: 3

~~~~~~~~~~~~~~~~~~~~~~~~writes_master Latency~~~~~~~~~~~~~~~~~~~~~~~~
Node                    Time   Ops/Sec    >1Ms    >8Ms   >64Ms
   .                    Span        .       .       .       .
u10    22:59:33-GMT->22:59:43       4.0   100.0   100.0   100.0
u12    22:59:30-GMT->22:59:40     357.9   76.73     2.1    0.08
u13    22:59:35-GMT->22:59:45     334.8   75.84    1.67    0.06
Number of rows: 3

~~~~~~~~~~~~~~~~~~~~~~~~writes_reply Latency~~~~~~~~~~~~~~~~~~~~~~~~
Node                    Time   Ops/Sec    >1Ms    >8Ms   >64Ms
   .                    Span        .       .       .       .
u10    22:59:33-GMT->22:59:43       4.0   100.0   100.0   100.0
u12    22:59:30-GMT->22:59:40     357.8   76.69    2.07    0.08
u13    22:59:35-GMT->22:59:45     334.8   75.84    1.67    0.06
Number of rows: 3
```

One of the most commonly used asadm commands is to measure latency.

Note that these are latencies as measured on the server, it is not possible to measure the client latencies from the Aerospike nodes. This command also shows the throughput for each node/ type.

This command gives you the latencies for all nodes in the cluster for different measures:

writes_master: These are the latency times for responds to writes from the master. Unless you have actively configured for asynchronous writes, this will be the same as the latency to any replica.

writes_reply: These are the latency times for replica writes. This is normally the same as for writes_master, unless you have configured differently.

reads: These are the latency times for reads. Aerospike does reads from a single node.

udf: The latency times for UDFs to run.

proxy: In cases where the cluster state is dynamic (nodes added/removed) it is possible that the node not have the data. Aerospike will automatically proxy the request for the client. These latency times are just for proxied requests.

query: The latency times for queries using secondary indexes.

asmonitor – Commonly Used Commands

Command: `collectinfo (not usually run from the asmonitor command line)`

Sometimes you need to gather information for Aerospike support. This can be done using the collectinfo command. Note that you must have sudo/root privileges. This command uses the precursor to asadm called asmonitor.

```
[root@v15 ~]# sudo asmonitor -e "collectinfo"

Enter help for commands

3 hosts in cluster: 192.168.120.143:3000,192.168.120.144:3000,192.168.120.145:3000
Data collection for collect_asdcheck in progress..
Data collection for collect_params in progress..
Data collection for collect_loginfo in progress..
Data collection for collect_readlogs in progress..
sh: line 1: 0: command not found
Data collection for collect_sys in progress..
Data collection for collect_shell in progress..
sh: dpkg: command not found
running shell command: tar -czvf /tmp/as_log_1408404265.16.log.tgz /tmp/as_log_1408404265.16.log
tar: Removing leading `/' from member names
/tmp/as_log_1408404265.16.log


FILE /tmp/as_log_1408404265.16.log and /tmp/as_log_1408404265.16.log.tgz saved. Please send it to support@aerospike.com
END OF ASCOLLECTINFO
```

This is being moved to asadm with the same parameters soon

asloglatency

asloglatency

`asloglatency` is a command line tool used find the latency of the server in log files for specific types of transactions.

Typical syntax

```
> asloglatency -h <histogram> -l <log_file> -f <time_from> -d <duration>
```

Option	Default	Description
-l	/var/log/aerospike/aerospike.log	Log file to read from. Can be used to read from logs that have been rotated out.
-h	[none]	(required) One of `read`, `writes_master`, `writes_reply`, `udf`, `proxy`, `query`
-t	10	Analysis slice interval in seconds or time format. Time format is "HH:MM:SS"
-f	tail	Time_from may be in either form "Aug 6 2014 22:10:13", "-3600", "-1:00:00". Default is to tail the file.
-d		Maximum duration from which to analyze. Duration is in either form "3600" or "HH:MM:SS"
-n	3	Number of buckets to display.
-e	3	Show the 0-th and then every e-th bucket. Lower numbers show finer granularity. Examples: n=3, e=3 → 1,8,64 n=7, e=1 → 1,2,4,8,16,32,64

asloglatency will show the latencies taken from log files. These may be a considerable time in the past. This is very useful for seeing:

- when a problem started
- did the problem occur suddenly or over a long period of time

asloglatency - example

Suppose there was an issue in read latency 12 hours ago that lasted for an hour. You wish to review the read latencies from 12 hours ago to 10 hours ago. You can issue the command:

```
> asloglatency -h reads -f -12:00:00 -d 2:00:00
```

```
reads
Aug 6, 2014 01:58:58
% > (ms)
slice-to (sec)       1       8      64   ops/sec
-------------- ------ ------ ------ --------
01:59:08    10   1.13   0.04   0.00   4661.8
01:59:18    10   1.13   0.04   0.00   4661.8
01:59:28    10   1.13   0.04   0.00   4661.8
...
03:58:58    10   1.13   0.04   0.00   4661.8
03:59:08    10   1.13   0.04   0.00   4661.8
-------------- ------ ------ ------ --------
avg              0.97   0.04   0.00   4188.0
max              1.34   0.05   0.00   4661.8
```

Summary

What we have covered:

- Aerospike Management Console
- asadm
- asloglatency