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# Working with GFlags

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**Summary:** This document talks about the use of gflags on a Nutanix cluster, including how to check what is set, how to set and make active, how to clear entries and expected behaviour on upgrades.

**Versions affected:** AOS 5.9.X, AOS 5.9.2.4, AOS 5.9.2.3, AOS 5.9.2.2, AOS 5.9.2.1, AOS 5.9.2, AOS 5.9.1, AOS 5.9.0.1, AOS 5.8.X, AOS 5.6.X, AOS 5.6, AOS 5.5.X, AOS 5.11.X, AOS 5.10.X, AOS 5.10.1.1, AOS 5.10.1, AOS 5.10.0.7, AOS 5.10.0.3, AOS 5.10.0.2, AOS 5.10.0.1, AOS 5.10

Troubleshooting

CVM

## Description:

This document talks about the use of gflags on a Nutanix cluster, including how to check what is set, how to set and make active, how to clear entries and expected behaviour on upgrades.

At the end of the document is a troubleshooting section.

Note that this KB makes use of the 'allssh' function in NOS, which is available from late NOS 3.5 releases. For work on clusters prior to that release, you will need to fashion the equivalent 'for' loops, or manually touch each node.

## Solution:

**"WARNING: Support, SEs and Partners should never make Zeus, Zookeeper or Gflag alterations without guidance from Engineering or a SRE or a Support Tech Lead (STL) before doing any c**

**Config & GFLAG Editing Guidelines**

(<https://docs.google.com/document/d/1FLqG4SXIQ0C...>)

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Gflags are all of the parameters of our various services that we expose for fine-tuning upon Engineering request.

### IMPORTANT NOTE:

Prior to AOS version 5.5, gflags were changed using the Aegis interface, which is a web interface accessible via the CVM's port 7777 ([KB 7443](#)). As of AOS version 5.5, Aegis has been deprecated and replaced by the `edit-aos-gflags` command. See Jira <https://jira.nutanix.com/browse/ENG-103337> for more details. For more information on the `edit-aos-gflags` command, see the following User Guide as reference: [https://docs.google.com/document/d/1Xu1VWqzv\\_uRrRw9SRN2zp5WtF1PnzfPi7FP8ms27Lns](https://docs.google.com/document/d/1Xu1VWqzv_uRrRw9SRN2zp5WtF1PnzfPi7FP8ms27Lns)

## I. How to find out if there are existing gflags

1. Running `ncc health_checks system_checks gflags_diff_check` provides an accurate list of non-default gflags on the system, both global and those set on individual nodes. It does this by checking the `~/config/*.gflags.zk` files, which are created by individual processes when they restart and find non-default gflags that they need to apply.

*Note: This check in NCC versions prior to 1.2 is broken and should not be trusted.*

2. Via output from relevant 20xx page (e.g. `http://<CMV_IP>:2009/h/gflags` for Stargate gflags).

Here is a list of the 20xx pages, gleaned from [KB 1202](#):

### Port Gflags

2009 Stargate, Cassandra

2010 Curator

2012 Chronos

2014 Alert Manager

2016 Ditch

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Search An Sean 

2020 Cerebro

2025 Arithmos

2031 Hyperint

9877 Zookeeper

```
#Initial settings check
#Variable to edit before pasting into CVM:
gflag_string=<gflag in question>
port_page=<20xx>
#First, let's check the gflag's current setting across the entire
allssh "curl http://localhost:$port_page/h/gflags 2>&1 /dev/null
```

**Example:**

```
nutanix@cvm$ gflag_string=stargate_operation_hung_threshold_secs
nutanix@cvm$ port_page=2009
nutanix@cvm$ allssh "curl http://localhost:$port_page/h/gflags 2
Executing curl http://localhost:2009/h/gflags 2>&1 /dev/null | c
===== x.x.x.105 =====
FIPS mode initialized
Nutanix Controller VM
--stargate_operation_hung_threshold_secs=60
===== x.x.x.106 =====
FIPS mode initialized
Nutanix Controller VM
--stargate_operation_hung_threshold_secs=60
===== x.x.x.107 =====
FIPS mode initialized
Nutanix Controller VM
```

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```
FIPS mode initialized
Nutanix Controller VM
--stargate_operation_hung_threshold_secs=60
```

In the above example, we see that the gflag is at its default value. For a gflag that is not at default, the default value will be shown after each line, e.g. (default 60).

## II. Procedure for setting a gflag

1. **AOS 5.5 or later**, run `edit-aos-gflags`, as follows. In order to change a gflag, the `-service` parameter is required, which identifies the desired component. For example, stargate:

```
nutanix@cvm$ ~/serviceability/bin/edit-aos-gflags --service=star
```

This will open a vim session where the desired gflags can be set under the "All available flags" section.

```
#
# Edit gflags for stargate
#
# Directions: Edit any/all "Value" Column Entries. Then save and
# Validation will be done to ensure the updated value is valid.
#
# Updated gflags (Delete line to set a gflag to its default value)
# Name : Type : Default :: Value
#
scsi_logical_per_physical_exponent :
```

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```
# All available flags for stargate by module.
# Name : Description : Type :: Value

Module: ../../../../stargate/stargate.cc
    stargate_binary_log_after_rss_exceeded_secs : The number of se
    stargate_memory_allocator_pageheap_buffer_mb : Amount of memor
    medusa_threads_high_threshold : High limit for number of medus
<snip>
```

**NOTE:** Do not add the gflag manually to the "Updated gflags" section. This will happen automatically when saving the changes.

**IMPORTANT:** When updating one or more gflags, remember to always review the list of gflags listed in the "Updated gflags" section, too. There may be some leftover from a previous update or from previous AOS after an upgrade.

Look for the gflag you want to change under the "All available flags" section and change the value column at the end of the line. In this example, we have altered the value to 300.

```
stargate_operation_hung_threshold_secs : = 0. : int32 :: 300
```

**NOTE:** The edit-aos-gflags script DOES NOT restart any service. The newly configured value for the gflag is only applied to the specific service after that service is restarted manually on each of the required CVMs.

2. Make the gflag change and commit/save the changes.
3. Make the change live. To make the changes take effect, you must restart the service.

4. This should be performed in a rolling fashion across the cluster. It is generally recommended to perform this on a single node first to ensure it works as expected.

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exceptions for some services that can be restarted differently - see step (b) below.

```
nutanix@cvm$ allssh "source /etc/profile; genesis stop stargat
```

b. Some services do not require a rolling restart. It does not hurt to apply the above rolling restart to them.

```
nutanix@cvm$ allssh "genesis stop acropolis; cluster start;"
```

Note that on a cluster with a current problem, you cannot rely on (for example) stargate crashes to have the new gflags take effect. An explicit kill of the process is required.

4. To verify if the service restart has taken effect, we can check the gflag live value.

Following command can be used for reference:

```
nutanix@cvm$ allssh "links --dump http:0:<service-port>/h/gflags
```

5. To remove a previously set gflag for a specific component, the added line within the "Updated gflags" section can be simply deleted. As with modifying a gflag, this does not immediately set the specific gflag's value to default. In order to do that, a restart of the service has to be performed on each of the CVMs affected by the change.

### III. Apply gflags to live process, but do not persistently save after restart process.

#### 1. Reasons why you may want to use this method:

In the event you are addressing a specific problem (in an ONCALL), you may want to only enable a gflag for troubleshooting purposes knowing full well it will not persist through

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If you need the gflag to apply persistently through upgrades or service restarts, check [Procedure for setting a gflag](#) section above.

### Pros:

- May not require process restart for gflag to apply

### Cons:

- Depending on the gflag you wish to modify, this method may not work because the gflag may require a service restart anyway.
- Does not persist between services restart
- Does not create ~/config/\*gflag.zk file
- Is not detected by NCC check gflags\_diff\_check
- Can be prone to typos and requires you to know the exact flag you wish to change.

## 2. How to apply live gflags:

In this example, we will change stargate\_operation\_hung\_threshold\_secs from default of 60 seconds to 888 seconds.

Make sure you specify the correct port/process when applying, i.e. stargate is 2009, curator is 2010. The [table](#) above and [KB 1202](#) cover which ports are for which service.

```
nutanix@cvm$ for i in `svmips`; do echo CVM $i ; curl -s http://  
CVM 10.X.XX.245  
Successfully set --stargate_operation_hung_threshold_secs to 888  
CVM 10.X.XX.246  
Successfully set --stargate_operation_hung_threshold_secs to 888  
CVM 10.X.XX.247  
Successfully set --stargate_operation_hung_threshold_secs to 888  
CVM 10.X.XX.248  
Successfully set --stargate_operation_hung_threshold_secs to 888
```

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For later NOS 4.5.x:

```
nutanix@cvm$ allssh curl -s http://0:2009/h/gflags?stargate_oper
10.X.XX.245
=====
10.X.XX.246
=====
10.X.XX.247
=====
10.X.XX.248
=====
```

### 3. How to verify gflag has been applied:

Via output from relevant 20xx page (e.g. `http://<CMV_IP>:2009/h/gflags` for Stargate gflags).

## IV. Set the gflag to persist on upgrades or not

You should never change a gflag to persist across upgrades as there have been customer issues in the past where code use of a gflag has varied so much that after the upgrade the cluster has crashed due to the old setting. As such, gflags are expected to be automatically removed upon upgrade. This can be a problem for Support, and something to watch out for and re-apply if the setting is still required after the upgrade (i.e. the upgrade was performed for another issue, not as a permanent fix for the issue that the gflag is being used for).

- On `edit-aos-gflags`, changing a gflag to per specifying the `--all_future_versions` flag. For service:

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- On the Aegis page, it is done by ticking the checkbox **"Apply flag changes to all future versions of this binary"**.

If you must set the gflag to persist on upgrades, here are some ground rules:

- Discuss with your local Escalation Engineer and/or manager. Normally the safer setting is to not make it persistent, but make a note so that they are re-applied upon upgrade.
- If setting, you MUST document the setting in Salesforce by setting a marquee banner for the account referencing a note in the account. The note must clearly show the gflags that are set, whether they are persistent or not, and the reason that they are set (case numbers / ENG- tickets where relevant). See the BestBuy account (August 2014) as an example of an account with such a banner/note.
- If you decide not to set persistent, it is probably still worth setting the marquee and writing the note as per the last point, but noting that the gflags are not persistent and need to be reset after the upgrade.

## V. Gflag files

A copy of locally applied gflags are kept in the ~/config directory of each node in the cluster. It is from these files that the NCC check for gflags makes its analysis. It may be useful to check their contents for some troubleshooting scenarios, however you should always query the relevant 20xx page for the live setting, which is pulled from Zookeeper. See [ENG-16828](#) for some additional information.

Example:

```
nutanix@cvm$ cat ~/config/*gflags.zk

# stargate version release-danube-4.0.1

--stargate.operation.hung.threshold.secs=300
```

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## VI. Troubleshooting

I made a change and now the service will not come up.

Check for typos - It is possible to enter malformed strings into `edit-aos-gflags` or into the Aegis page and have them accepted. Blank space at the start of the string is a problem, for example. In the event of a malformed string, you may see symptoms such as this output from the cluster start command:

```
Waiting on 172.XX.XX.111 (Up, ZeusLeader) to start:  Curator
Waiting on 172.XX.XX.112 (Up) to start:
Waiting on 172.XX.XX.113 (Up) to start:
<snip>
<repeats>
```

Checking the curator.INFO log shows only that it is not up. Checking `ha.py` shows that it is not active (although in a stargate gflag issue it would kick in). `genesis.out` is unhelpful. Restarting the CVM, should you try it, would also fail.

Going back into the Aegis page and inspecting the string should find the problem. Reverting the change would also be a valid troubleshooting step.

If these steps fail, run NCC again and log an ONCALL ticket.

## VII. How to tell if a gflag is persistent

If you are curious, or uncertain if a gflag has been set the below screenshots list examples.

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For AOS 5.5 or later, run `edit-aos-gflags` without arguments. This will show a list of the supported services followed the gflags that have been set by the script under the "Active Gflags" section. Look for the gflag under the "Active Gflags" section. Check its "Binary Version" attribute. If it lists an AOS version next to it, and/or a last-commit-date, then the gflag is not persistent.

```
Active Gflags:
  stargate:
    Binary Version: stargate version e17.3-release-euphrates-5.9.1
  Gflags:
    stargate_operation_hung_threshold_secs = 300
```

## PERSISTENT GFLAGS:

```
acropolis:
  Binary Version: *
  Gflags:
    acropolis_host_ha_timeout_sec = 50
    acropolis_client_poll_timeout = 60
    acropolis_qemu_img_hung_threshold_secs = 125
```

## Internal Comments:

[ENG-16928](#) gflag non-persistence is not working as expected during NOS upgrades

[KB 1767](#) Aegis page inaccessible by default after 3.5.4.6 and 4.0.1.2

\*dandrus: edit-aos-gflags is the name of the script and NO

If the AOS version is 5.5 or newer, 'edit-aos-gflags' script r

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To find out if there are existing gflags, run the script 'edit-aos-gflags' under /home/nutanix/serviceability/bin.

```
nutanix@cvm$ cd /home/nutanix/serviceability/bin
nutanix@cvm$ ./edit-aos-gflags
```

We can also run NCC gflags\_diff\_check within system\_checks to find gflags applied.

```
nutanix@cvm$ ncc health_checks system_checks gflags_diff_check
```

To edit acropolis gflags across the cluster, we can run the below command.

```
nutanix@cvm$ cd /home/nutanix/serviceability/bin]
nutanix@cvm$ ./edit-aos-gflags --service=acropolis
```

I would encourage you to refer the below URL for to get information on editing gflags:

[https://docs.google.com/document/d/1Xu1VWqzv\\_uRrRw9SRN2zp5WtF1PnzfPi7FP8ms27Lns/edit?ts=59d52022#](https://docs.google.com/document/d/1Xu1VWqzv_uRrRw9SRN2zp5WtF1PnzfPi7FP8ms27Lns/edit?ts=59d52022#)

You can watch video "edit gflags for AOS 5.5" here <https://goo.gl/nVv6Qk>

To edit acropolis gflags for CVM 10.0.0.1 we can run the below command.

```
nutanix@cvm$ cd /home/nutanix/serviceability/bin
nutanix@cvm$ ./edit-aos-gflags --service=acropolis --cvm_ip=10.0.0.1
```

To edit acropolis gflags across the cluster that will persist

```
nutanix@cvm$ cd /home/nutanix/serviceability
```

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The above command be used for any service (e.g. stargate, cassandra, etc.) and you can verify that it will persist simply by running:

```
nutanix@cvm$ cd /home/nutanix/serviceability/bin
nutanix@cvm$ ./edit-aos-gflags
```

And confirming there is an asterisk (\*) next to "Binary Version: \*" rather than a specific AOS version.

Tickets resolved: [ENG-103337](#)

Tickets related: [FEAT-1634](#)

Note that genesis gflags cannot be set currently using edit-aos. Genesis requires manual gflag file to be created. The gflag file itself is upgrade persistent. **Check with a Senior SRE/DevEx Engineer before setting any such gflags.**

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