

dagcat-setup Software Guide

EDM04-35 - Version 3



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dagcat-setup

The `dagcat-setup` application allows you to configure the CAT (Color Association Table) in the steering module for non-accelerated DAG cards with the appropriate filtering firmware. The steering module maps packet color, hash-width and interface / port ID values to stream buffer bit mask. There is one bit per stream and these results in the packet being steered to one or more streams, or dropped.

CAT is organized into two banks, with only one active at any one time. `dagcat-setup` loads the new configuration in the inactive bank and then activates that bank.

The `dagcat-setup` tool is used to configure the DAG card:

- in one of several pre-defined modes, or
- by specifying a rule file used to load customized (per packet color) settings.

`dagconfig` attributes can be used to get/set CAT attributes.

Before You Begin

This document is applicable to DAG cards that support Enhanced Packet Processing v2. Refer to the individual DAG card User Guides to see if this document is applicable to a particular DAG card.

We recommend you read *EDM04-31 Enhanced Packet Processing v2* to explain the underlying architecture of the Enhanced Packet Processing prior to reading this Software Guide.

For details on using `dagcat-setup` for accelerated DAG cards, refer *EDM04-27 dagcat-setup Software Guide*.

Requirements

The requirements for using the `dagcat-setup` are:

- A DAG card with an appropriate firmware image.
- DAG software (4.2.2 or greater).
Customers with a current support contract can download this from the secure Endace website: <https://support.endace.com/>.

For details on how to install and compile the DAG software, refer to one of the following:

- *EDM04-01 DAG Software Installation Guide*
- *EDM04-37 Windows DAG Software Installation Guide*

Related Documents

The following is a list of documents referred to in this document. These are available from the Support section of the Endace website at <https://support.endace.com/>:

- *EDM04-01 DAG Software Installation Guide*
- *EDM04-30 dagfilter-loader Software Guide*
- *EDM04-31 Enhanced Packet Processing v2*

How does steering work?

The output color value of the filtering module combined with the Hash Load Balancing and interface / port number is combined and is looked up in the user defined CAT. The resulting value determines the steering of the packet.

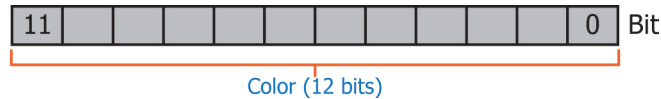
The number of stream buffers supported by each DAG card depends on type of card. Sending a packet to more than one stream buffer is valid and results packet duplication to multiple stream buffers.

Number of color bits

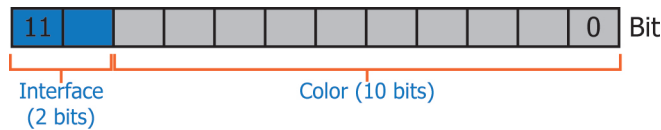
The CAT lookup table has a maximum width of 12 bits. These can either be all used to contain color values or combined with Hash Load Balancing bits and/or interface / port number bits. As a result of this 12 bit width, only the 12 least significant bits in the color table is used in any CAT lookups (this is the reason the full 16 bits of color available in the filter module cannot be used).

The CAT value is a combination of the filter module color, the packets hash-bin value and the interface id. Since the use of HLB and interface ID is optional there are four combinations of how the CAT value can be constructed. The width of the CAT (also known as the number of input bits) is card dependent, see the relevant DAG card User Guide. Let $N = \text{number_of_input_bits} - 1$ giving the following combinations:

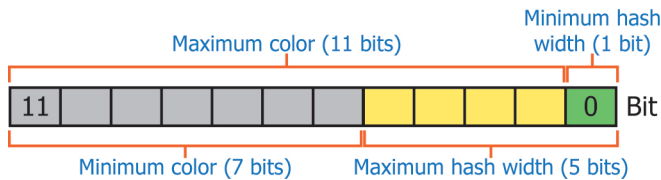
interface ID disabled, HLB disabled: Bits [N:0] = Bits [N:0] from the packet's filter color.



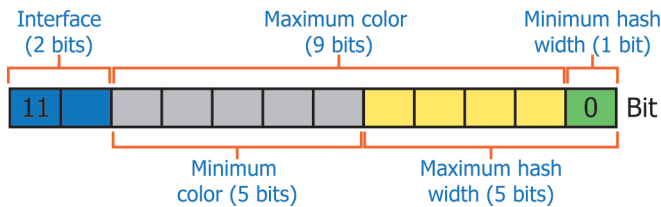
interface ID enabled, HLB disabled: Bits [N:N-1] = The interface number the packet was captured on
 Bits [N-2:0] = Bits [N-2:0] from the packet's filter color.



interface ID disabled, HLB enabled: Bits [N:hash_width] = Bits [N-hash_width:0] from the packet's filter color.
 Bits [hash_width-1:0] = HLB hash-bin value.



Interface ID enabled, HLB enabled: Bits [N:N-1] = The interface number the packet was captured on.
 Bits [N-2:hash_width] = Bits [N-hash_width-2:0] from the packet's filter color.
 Bits [hash_width-1:0] = HLB hash-bin value.



So, if **no** Hash Load Balancing or interface / port filtering is used, all 12 bits in the CAT can be assigned for color, in which case the color value range is 0-4095. Conversely, if the HAT is configured for Hash Load Balancing across 32 bins (see *EDM04-31 Enhanced Packet Processing v2*) then 5 bits (of the 12) are required to store the Hash values. If interface / port filtering is also enabled then a further 2 bits are used in the CAT to store the interface / port values, leaving only 5 bits for color. This would impose a color range of 0-63.

Note:

The interface / port filter bits are always the top 2 bits in the CAT table. The Hash Load Balancing bits are always the least significant bits.

Note:

If you reconfigure the CAT and change the Hash Load Balancing and/or interface / port bit settings, the number of color bits available to you in the CAT will change. You may then need to alter your color values to match the number of color bits available, which would also reprogramming the filter module for this change to take effect. If you do not check the color values, then the CAT will be filtering on a subset of the bits you have allocated and you will get unexpected results. See EDM04-31 Enhanced Packet Processing v2 for more details.

dagcat-setup options

The following table explains the `dagcat-setup` command line options.

Short Option	Long Option	Explanation
-h	--help	Help menu
-V	--version	Display version information.
-v	--verbose	Increase verbosity.
-d	--device	DAG card to use. the default is d0.
-f	--rules	Name of the file containing the rules to load
-m	--mode	Mode in which CAT should be configured in. Supported modes are: dup3, z4, z8, dup2, z3, z2, z3monitor For further details, see Pre-defined modes.
-q	--query	Queries the maximum values allowed for different parameters.

The following `dagconfig` attributes are applicable to the CAT (Color Association Table) part of Enhanced Packet Processing. Using the `dagconfig -S` and `-G` options you can set and get values of the listed attributes. For more details about `dagconfig`, see you DAG Card User Guide.

Option	Description
<code>bank_select</code>	Activates a CAT bank without loading a new configuration. Bank 0 = off, Bank 1 = on.
<code>by_pass</code>	Enables (off) or disables (on) the CAT.
<code>interface_overwrite_enable</code>	Enables (on) or disables (off) the use of Interface / Port ID. If enabled the top two bits contain the interface/port information.
<code>deliberate_drop_count</code>	Read only. Use with <code>dagconfig -G</code> only. Displays the number of packets dropped at the CAT due to not matching a stream.
<code>number_of_input_bits</code>	Read only. Use with <code>dagconfig -G</code> only. Displays the number of input bits in the CAT (Color Association Table). The default is 12.
<code>stream_drop_countn</code>	Displays the number of packets dropped by stream "n".

dagconfig attribute examples

The following examples demonstrate how to initialize and configure the steering function.

This example displays which CAT bank is currently active.

```
dagconfig -dX -G bank_select
```

This example activates a bank without loading new configuration (off/on are valid).

```
dagconfig -dX -S bank_select=on
```

This example disables the CAT.

```
dagconfig -dX -S by_pass=on
```

This example enables the CAT

```
dagconfig -dX -S by_pass=off
```

This example enables use of port ID

```
dagconfig -dX -S interface_overwrite_enable=on
```

This example disables use of port ID

```
dagconfig -dX -S interface_overwrite_enable=off
```

Where X is the device number of the DAG card you want to configure

Tip:
For further details, see *dagconfig attributes - CAT*.

How to program dagcat-setup

dagcat-setup can be used in two modes:

- Predefined mode - where the steering module uses one of a group of predefined steering rules. See [How to Program - Pre-defined Modes](#) (page 5).
- Customized mode - where the user defines custom steering rules. See [How to Program - Customized Modes](#) (page 6).

How to Program - Pre-defined Modes

dagcat-setup pre-defined modes provide a shortcut to configuring the steering module to replicate some of the duplication and load balancing modes of old generation DAG cards. Note that as dagcat-setup only operates on the CAT in the steering module, the user is still required to setup the HLB module for the load balancing modes (see *EDM04-31 Enhanced Packet Processing v2* for further details).

The pre-defined modes available are:

Mode	Description
dup3	All packets are duplicated to Stream 0, 2, 4.
dup2	All packets are duplicated to Stream 0, 2.
z8	All packets depending on the packets Hash value, the packet is equally balanced across Stream 0, 2, 4, 6, 8, 10, 12, 14.
z3	All packets depending on the packets Hash value, the packet is equally balanced across Stream 0, 2, 4.
z2	All packets depending on the packets Hash value, the packet is equally balanced across Stream 0, 2.
z4	All packets depending on the packets Hash value, the packet is equally balanced across Stream 0, 2, 4, 6.
z3monitor	All packets depending on the packets Hash value, the packet is equally balanced across Stream 0, 2, 4. And every packet to be duplicated to the stream 6.

Note:

z(n) modes, are load balancing modes. They use the dagconfig attribute hat_range to determine which stream to allocate a particular packet. For more details on the dagconfig attributes, see dagconfig attributes - HAT.

Examples

- To configure the DAG card in z8 mode, type the following.
(Where X is the device number of the DAG card you want to configure)


```
dagconfig -dX -S ipf_enable=off
dagconfig -dX -S hash_encoding from_ipf=on
dagconfig -dX -S n_tuple_select=2
dagconfig -dX -S hash_width=3
dagconfig -dX -S hat_range=0-250:250-500:500-750:750-1000
dagconfig -dX -S interface_overwrite_enable=off
dagcat-setup -dX -m z8
```
- To configure the DAG card in dup2 mode, type the following.
(Where X is the device number of the DAG card you want to configure)


```
dagcat-setup -dX -m dup2
```

How to Program - Customized Modes

Type the following command:

```
dagcat-setup -dX -f cat_1.rule
```

(Where X is the device number of the DAG card you want to configure)

This configures the CAT as per the rules given in the input files. For details on the syntax of the CAT rules see [Rule file syntax](#) (page 6).

Note:

To drop traffic using `dagcat-setup`, do not map that color to any stream in the CAT rule file.

Rule File Syntax

Rules are one-line specifications used to describe the color, interface and hash values and the stream(s) to which they are to be mapped. Refer to the following table for the `dagcat-setup` [filter keywords](#) (page 6).

Notes:

- If two rules have overlapping ranges for any of the parameters, `dagcat-setup` displays an error.
- Unspecified parameters assume 0 to maximum range as the default.
- The `--query` or `-q` options of `dagcat-setup` displays the maximum values allowed for each parameter for the DAG card's given configuration.
- Comment start with `//` and must be on their own lines.

dagcat-setup Filter Keywords

keywords	Description
(not) color [<from>-<to>]	Specifies the <i>color range</i> for the rule. The use of "not" would mean that any values outside the specified range.
(not) color <colour_value>	Specifies the <i>color value</i> for the rule (only single value). The use of "not" means that any value other than the given value.
(not) hash [<from>-<to>]	Specifies the <i>hash range</i> for the rule. The use of "not" means that any values outside the specified range.
(not) hash <hash_value>	Specifies the <i>hash value</i> for the rule (only single value). The use of "not" means that any value other than the given value.
(not) iface [<from>-<to>]	Specifies the <i>iface range</i> for the rule. The use of "not" means that any values outside the specified range.
(not) iface <iface_value>	Specify the <i>iface</i> for the rule. (only single value). The use of "not" means that any value other than the given value.
stream <list>	Specify the <i>destination streams</i> for the rule. Specified as a comma separated list, for example: stream 0, 2 and 4.

Rule Examples

This example map packets with the following settings to stream 0, 2 and 4 (duplicated):

```
color [0-127] hash[0-8] iface 1 stream 0,2,4
```

- colors 0 to 127,
- hash values 0 to 8 and
- iface 1

This example maps packets with the following settings to stream 4:

```
not color [128-200] stream 4
```

- colors outside 0 to 127,
- hash values 0 to maximum hash and
- iface 0 to max iface

Use the following to configure the CAT into dup3 mode. All the ranges (color, hash, iface) are assumed to be from minimum to maximum.

```
stream 0,2,4
```


Version History

Version	Date	Reason
1	December 2009	For DAG 3.4.2 release. For non-accelerated DAG cards. See 04-27 v3 for dagcat_setup for accelerated cards.
2	September 2010	4.0.1 release. Added 7.5G4 and 9.2X2 as applicable cards. Added dagconfig stream_drop_countn attribute.
3	May 2012	DAG 4.2.2 release. Removed list of supported DAG cards.



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