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## MaxScale

# Debug & Diagnostic Support

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[Change History](#)

[Introduction](#)

[Debugger Support](#)

[Command Line Option](#)

[Convenience Functions](#)

[Printing Services](#)

[Printing Sessions](#)

[Printing Servers](#)

[Modules](#)

[Descriptor Control Blocks](#)

[Diagnostic Interface](#)

[Listing Services](#)

[Listing Listeners](#)

[Listing Servers](#)

[Listing Modules](#)

[Showing Services](#)

[Showing Sessions](#)

[Show Servers](#)

[Show Server](#)

[Show DCBS](#)

[Show Modules](#)

[Show Polling Statistics](#)

[Show Dbusers](#)

[Show Users](#)

[Show Monitors](#)

[Shutdown maxscale](#)

[Shutdown monitor](#)

[Shutdown service](#)

[Restart service](#)

[Restart Monitor](#)

[Set server](#)

[Version string is available in the output only if the node is running.](#)

[Clear server](#)

[Reload users](#)



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[Reload config](#)

[Add user](#)

[Enable/disable log](#)



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## Change History

| Date               | Comment   |
|--------------------|---|
| 20th June 2013     | Initial Version   |
| 22nd July 2013     | Updated with new naming MaxScale<br>Addition of description of login process for the debug CLI<br>Updates debug CLI output examples<br>Addition of show users, shutdown maxscale, shutdown service, restart service, set server, clear server, reload users, reload config and add user commands. |
| 23rd July 2013     | Rename of show users command to show dbusers and addition of the show users command to show the admin users.<br>Addition of example configuration data.   |
| 14th November 2013 | Added enable/disable log commands details<br>Added Galera Monitor as an example in show monitors  |
| 3rd March 2014     | Added show users details for MySQL users  |
| 27th May 2014      | Document the new debugcli mode switch and command changes in the two modes.<br>Added the new show server command.   |
| 29th May 2014      | Addition of new list command that gives concise tabular output  |
| 4th June 2014      | Added new 'show monitors' and 'show servers' details  |
| 29th August 2014   | Added new 'show monitors' details for MySQL/Galera monitors   |

## Introduction

MaxScale is a complex application and as such is bound to have bugs and support issues that occur from time to time. There are a number of things we need to consider for the development stages and long term supportability of MaxScale

- Flexible logging of MaxScale activity
- Support for connecting a debugger to MaxScale



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- A diagnostic interface to MaxScale

The topic of logging has already been discussed in another document in this series of documents about MaxScale and will not be covered further here.

## Debugger Support

Beyond the language support for debugging using tools such as gdb, MaxScale will also offer convenience functions for the debugger to call and a command line argument that is useful to run MaxScale under the debugger.

### Command Line Option

Normally when MaxScale starts it will place itself in the background and setup the signal masks so that it is immune to the normal set of signals that will cause the process to exit, SIGINT and SIGQUIT. This behaviour is normally what is required, however if you wish to run MaxScale under the control of a debugger it is useful to suppress this behaviour. A command line option, `-d` is provided to turn off this behaviour.

```
% gdb maxscale
(gdb) run -d
```

### Convenience Functions

A set of convenience functions is provided that may be used within the debugger session to extract information from MaxScale.

### Printing Services

A service within MaxScale provides the encapsulation of the port MaxScale listen on, the protocol it uses, the set of servers it may route to and the routing method to use. Two functions exists that allow you to display the details of the services and may be executed from within a debugger session.

The `printAllServices()` function will print all the defined services within MaxScale and is invoked using the call syntax of the debugger.

```
(gdb) call printAllServices()
Service 0x60da20
  Service:          Debug Service
  Router:           debugcli (0x7ffff5a7c2a0)
  Started:         Thu Jun 20 15:13:32 2013
  Backend databases
```



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```
Total connections: 1
Currently connected: 1
Service 0x60d010
  Service:          Test Service
  Router:           readconnroute (0x7ffff5c7e260)
  Started:          Thu Jun 20 15:13:32 2013
Backend databases
  127.0.0.1:3308 Protocol: MySQLBackend
  127.0.0.1:3307 Protocol: MySQLBackend
  127.0.0.1:3306 Protocol: MySQLBackend
Total connections: 1
Currently connected: 1
(gdb)
```

**It is possible to print an individual service if you know the memory address of the service.**

```
(gdb) call printService(0x60da20)
Service 0x60da20
  Service:          Debug Service
  Router:           debugcli (0x7ffff5a7c2a0)
  Started:          Thu Jun 20 15:13:32 2013
Backend databases
Total connections: 1
Currently connected: 1
(gdb)
```

## Printing Sessions

Sessions represent the data for a client that is connecting through MaxScale, there will be a session for each client and one for each listener for a specific port/protocol combination. Similarly there are two calls to print all or a particular session.

```
(gdb) call printAllSessions()
Session 0x60fdf0
  Service:  Debug Service (0x60da20)
  Client DCB:  0x60f6c0
  Connected:  Thu Jun 20 15:13:32 2013
Session 0x60f620
  Service:  Test Service (0x60d010)
  Client DCB:  0x60ead0
  Connected:  Thu Jun 20 15:13:32 2013
(gdb) call printSession(0x60fdf0)
```



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```
Session 0x60fdf0
  Service:  Debug Service (0x60da20)
  Client DCB:  0x60f6c0
  Connected:  Thu Jun 20 15:13:32 2013
```

(gdb)

## Printing Servers

Servers are a representation of the backend database to which MaxScale may route SQL statements. Similarly two calls exist to print server details.

```
(gdb) call printAllServers()
```

```
Server 0x60d9a0
```

```
  Server:          127.0.0.1
  Protocol:       MySQLBackend
  Port:           3308
```

```
Server 0x60d920
```

```
  Server:          127.0.0.1
  Protocol:       MySQLBackend
  Port:           3307
```

```
Server 0x60d8a0
```

```
  Server:          127.0.0.1
  Protocol:       MySQLBackend
  Port:           3306
```

```
(gdb) call printServer(0x60d920)
```

```
Server 0x60d920
```

```
  Server:          127.0.0.1
  Protocol:       MySQLBackend
  Port:           3307
```

(gdb)

## Modules

MaxScale makes significant use of modules, shared objects, that are loaded on demand based on the configuration. A routine exists that will print the currently loaded modules.

```
(gdb) call printModules()
```

```
Module Name      | Module Type | Version
-----
telnetd          | Protocol   | V1.0.0
MySQLClient      | Protocol   | V1.0.0
testroute        | Router     | V1.0.0
debugcli         | Router     | V1.0.0
```



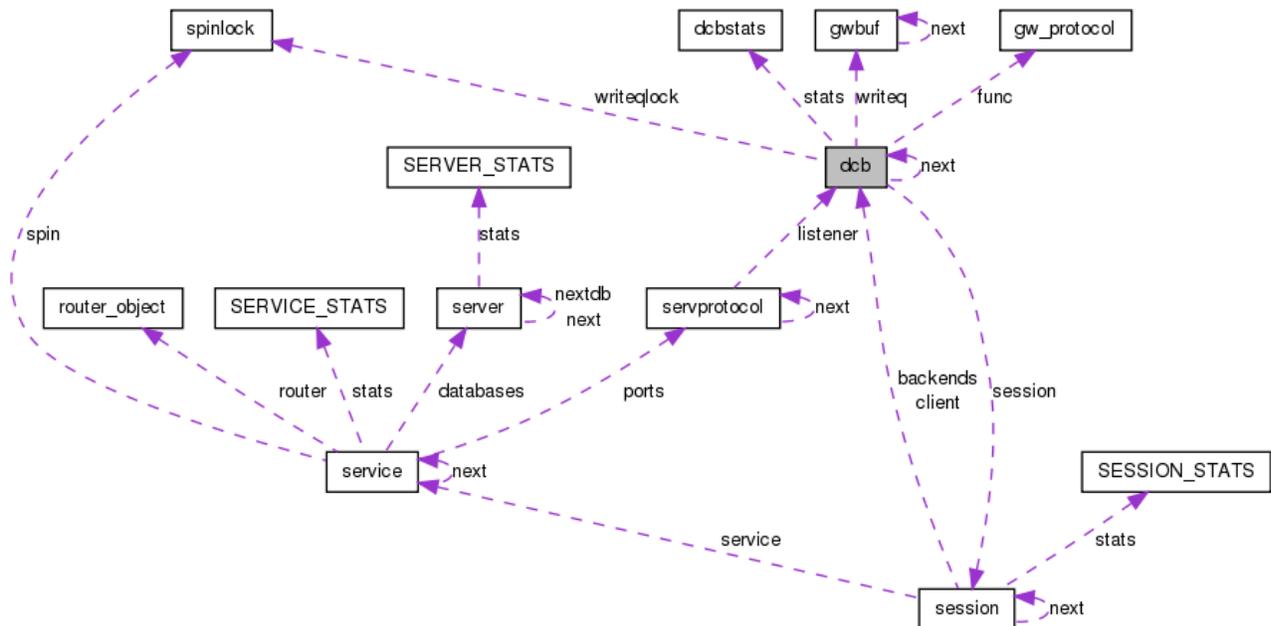
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```
readconnroute | Router | V1.0.0  
(gdb)
```

## Descriptor Control Blocks

The Descriptor Control Block (DCB) is an important concept within MaxScale since it is this block that is passed to the polling system, when an event occurs it is that structure that is available and from this structure it must be possible to navigate to all other structures that contain state regarding the session and protocol in use.



## Similar print routines exist for the DCB

```
(gdb) call printAllDCBs()  
DCB: 0x60ead0  
    DCB state:                DCB for listening socket  
    Queued write data:        0  
    Statistics:  
        No. of Reads:         0  
        No. of Writes:         0  
        No. of Buffered Writes: 0  
        No. of Accepts:        0  
DCB: 0x60f6c0  
    DCB state:                DCB for listening socket  
    Queued write data:        0
```



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```
Statistics:
    No. of Reads:    0
    No. of Writes:   0
    No. of Buffered Writes:  0
    No. of Accepts:  0
(gdb) call printDCB(0x60ead0)
DCB: 0x60ead0
DCB state:          DCB for listening socket
Queued write data:  0
Statistics:
    No. of Reads:    0
    No. of Writes:   0
    No. of Buffered Writes:  0
    No. of Accepts:  0
(gdb)
```

## Diagnostic Interface

It is possible to configure a service to run within MaxScale that will allow a user to telnet to a port on the machine and be connected to MaxScale. This is configured by creating a service that uses the debugcli routing module and the telnetd protocol with an associated listener. The service does not require any backend databases to be configured since the router never forwards any data, it merely accepts commands and executes them, returning data to the user.

The example below shows the configuration that is required to set-up a debug interface that listens for incoming telnet connections on port 4442.

```
[Debug Service]
type=service
router=debugcli

[Debug Listener]
type=listener
service=Debug Service
protocol=telnetd
port=4442
```



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The `Debug Service` section sets up a service with no backend database servers, but with a `debugcli` module as the router. This module will implement the commands and send the data back to the client.

The `debugcli` accepts router options of either `developer` or `user`, these are used to control the mode of the user interface. If no router options are given then the CLI is in user mode by default.

The `Debug Listener` section setups the protocol and port combination and links that to the service.

Assuming a configuration that includes the debug service, with the listening port set to 4442, to connect from the machine that runs MaxScale you must first install telnet and then simply call `telnet` to connect.

```
-bash-4.1$ telnet localhost 4442
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
Welcome the SkySQL MaxScale Debug Interface (V1.1.0).
Type help for a list of available commands.

MaxScale login: admin
Password:

MaxScale>
```

As delivered MaxScale uses a default login name of `admin` with the password of `skysql` for connections to the debug interface. Users may be added to the CLI by use of the `add user` command.

This places you in the debug command line interface of MaxScale, there is a help system that will display the commands available to you

```
MaxScale> help
Available commands:
  add user
  clear server
  disable log
  enable log
  list [listeners|modules|services|servers|sessions]
  reload [config|dbusers]
```



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```
remove user
restart [monitor|service]
set server
show [dcbs|dcb|dbusers|epoll|modules|monitors|server|servers|services|
service|session|sessions|users]
shutdown [maxscale|monitor|service]
```

Type help command to see details of each command.  
Where commands require names as arguments and these names contain  
whitespace either the \ character may be used to escape the whitespace  
or the name may be enclosed in double quotes ".

**MaxScale>**

Different command help is shown in user mode and developer mode, in user mode the help for the show command is;

**MaxScale>** help show

Available options to the show command:

```
dcbs      Show all descriptor control blocks (network connections)
dcb       Show a single descriptor control block e.g. show dcb 0x493340
dbusers   Show statistics and user names for a service's user table.
          Example : show dbusers <service name>
epoll     Show the poll statistics
modules   Show all currently loaded modules
monitors  Show the monitors that are configured
server    Show details for a named server, e.g. show server dbnode1
servers   Show all configured servers
services  Show all configured services in MaxScale
service   Show a single service in MaxScale, may be passed a service name
session   Show a single session in MaxScale, e.g. show session 0x284830
sessions  Show all active sessions in MaxScale
users     Show statistics and user names for the debug interface
```

**MaxScale>**

However in developer mode the help is;

**MaxScale>** help show

Available options to the show command:

```
dcbs      Show all descriptor control blocks (network connections)
dcb       Show a single descriptor control block e.g. show dcb 0x493340
dbusers   Show statistics and user names for a service's user table
epoll     Show the poll statistics
modules   Show all currently loaded modules
monitors  Show the monitors that are configured
```



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```
server      Show details for a server, e.g. show server 0x485390
servers     Show all configured servers
services    Show all configured services in MaxScale
session     Show a single session in MaxScale, e.g. show session 0x284830
sessions    Show all active sessions in MaxScale
users       Show statistics and user names for the debug interface
```

**MaxScale>**

The commands available are very similar to those described above to print things from the debugger, the advantage being that you do not need a debug version or a debugger to use them.

## Listing Services

The `list services` command is designed to give a concise tabular view of the currently configured services within MaxScale along with key data that summarises the use being made of the service.

```
MaxScale> list services
Service Name          | Router Module          | #Users | Total Sessions
-----
Test Service          | readconnroute         | 1      | 1
Split Service         | readwritesplit        | 1      | 1
Debug Service         | debugcli              | 2      | 2
MaxScale>
```

This provides a useful mechanism to see what is configured and provide the service names that can be passed to a `show service` command.

## Listing Listeners

The `list listeners` command outputs a table that provides the current set of listeners within the MaxScale instance and shows the status of each listener.

```
MaxScale> list listeners
Service Name          | Protocol Module        | Address          | Port | State
-----
Test Service          | MySQLClient           | (null)          | 4006 | Running
Split Service         | MySQLClient           | (null)          | 4007 | Running
Debug Service         | telnetd               | localhost       | 4242 | Running
MaxScale>
```

## Listing Servers



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The `list servers` command will display a table that contains a row for every server defined in the configuration file. The row contains the server name that can be passed to the `show server` command, the address and port of the server, its current status and the number of connections to that server from MaxScale.

```
MaxScale> list servers
Server          | Address      | Port | Status          | Connections
-----
server1         | 127.0.0.1   | 3306 | Running         | 0
server2         | 127.0.0.1   | 3307 | Slave, Running  | 0
server3         | 127.0.0.1   | 3308 | Master, Running | 0
server4         | 127.0.0.1   | 3309 | Slave, Running  | 0
MaxScale>
```

## Listing Modules

The `list modules` command displays a table of all the modules loaded within MaxScale.

```
MaxScale> list modules
Module Name      | Module Type | Version
-----
telnetd          | Protocol    | V1.0.1
MySQLClient      | Protocol    | V1.0.0
mysqlmon         | Monitor     | V1.1.0
readconroute     | Router      | V1.0.2
readwritesplit   | Router      | V1.0.2
debugcli         | Router      | V1.1.1
MaxScale>
```

## Showing Services

The `show services` command will show all the services configured currently

```
MaxScale> show services
Service 0xf44c10
  Service:          Test Service
  Router:           readconroute (0x7f7fd8afba40)
  Number of router sessions: 0
  Current no. of router sessions: 0
  Number of queries forwarded: 0
  Started:         Mon Jul 22 11:24:09 2013
  Backend databases
    127.0.0.1:3309 Protocol: MySQLBackend
    127.0.0.1:3308 Protocol: MySQLBackend
    127.0.0.1:3307 Protocol: MySQLBackend
```



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```
127.0.0.1:3306 Protocol: MySQLBackend
Users data:      0xf454b0
Total connections: 1
Currently connected: 1
Service 0xf43910
Service:          Split Service
Router:           readwritesplit (0x7f7fd8f05460)
Number of router sessions: 0
Current no. of router sessions: 0
Number of queries forwarded: 0
Number of queries forwarded to master: 0
Number of queries forwarded to slave: 0
Number of queries forwarded to all: 0
Started:          Mon Jul 22 11:24:09 2013
Backend databases
127.0.0.1:3308 Protocol: MySQLBackend
127.0.0.1:3307 Protocol: MySQLBackend
127.0.0.1:3306 Protocol: MySQLBackend
Users data:      0xf449b0
Total connections: 1
Currently connected: 1
Service 0xea0190
Service:          Debug Service
Router:           debugcli (0x7f7fd910d620)
Started:          Mon Jul 22 11:24:09 2013
Backend databases
Users data:      0xea2d80
Total connections: 2
Currently connected: 2
MaxScale>
```

## Showing Sessions

There are two options to show sessions, either an individual session or all sessions

```
MaxScale> show sessions
Session 0x6f8f20
State:          Session Ready
Service:        Debug Service (0x649190)
Client DCB:     0x6f8e20
Client Address: 0.0.0.0
Connected:      Mon Jul 22 11:31:56 2013
Session 0x6f83b0
State:          Session Allocated
Service:        Split Service (0x6ec910)
Client DCB:     0x64b430
```



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```
Client Address:          127.0.0.1
Connected:              Mon Jul 22 11:31:28 2013
Session 0x6efba0
State:                  Listener Session
Service:                Debug Service (0x649190)
Client DCB:             0x64b180
Connected:              Mon Jul 22 11:31:21 2013
Session 0x64b530
State:                  Listener Session
Service:                Split Service (0x6ec910)
Client DCB:             0x6ef8e0
Connected:              Mon Jul 22 11:31:21 2013
Session 0x618840
State:                  Listener Session
Service:                Test Service (0x6edc10)
Client DCB:             0x6ef320
Connected:              Mon Jul 22 11:31:21 2013
MaxScale> show session 0x6f83b0
Session 0x6f83b0
State:                  Session Allocated
Service:                Split Service (0x6ec910)
Client DCB:             0x64b430
Client Address:        127.0.0.1
Connected:              Mon Jul 22 11:31:28 2013
MaxScale>
```

## Show Servers

The configured backend databases can be displayed using the `show servers` command.

```
MaxScale> show servers
Server 0x6ec840 (server1)
Server:                127.0.0.1
Status:                Running
Protocol:              MySQLBackend
Port:                  3306
Number of connections: 0
Current no. of connections:0

Server 0x6ec770 (server2)
Server:                127.0.0.1
Status:                Master, Running
Protocol:              MySQLBackend
Port:                  3307
Server Version:        5.5.35-MariaDB-log
```



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```
Node Id:                1
Master Id:              -1
Slave Ids:              2,3
Repl Depth:            0
Last Repl Heartbeat:   1417080906
Number of connections: 1
Current no. of connections:1
Server 0x6ec6a0 (server3)
  Server:                127.0.0.1
  Status:               Slave, Running
  Protocol:             MySQLBackend
  Port:                 3308
  Server Version:      5.5.35-MariaDB-log
  Node Id:              2
  Master Id:            1
  Slave Ids:            1
  Repl Depth:           1
  Slave delay:          8
  Last Repl Heartbeat: 1417080898
  Number of connections: 1
  Current no. of connections:1
Server 0x6ec5d0 (server4)
  Server:                127.0.0.1
  Status:               Down
  Protocol:             MySQLBackend
  Port:                 3309
  Server Version:      5.5.35-MariaDB-log
  Node Id:              3
  Master Id:            1
  Slave Ids:            1
  Repl Depth:           1
  Number of connections: 0
  Current no. of connections:0
```

**MaxScale>**

- Version string is available in the output only if the node is running.
- Node Id possible values:
  - the value of server-id from MySQL or MariaDB servers in Master/Slave replication setup.
  - the value of 'wsrep\_local\_index' for Galera cluster nodes
  - the -1 value for a failure getting one of these informations



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- Repl Depth is the replication depth level found by MaxScale MySQL Monitor
- Master Id is the master node, if available, for current server
- Slave Ids is the slave list for the current node, if available

Note, the Master Root Server used for routing decision is the server with master role and with lowest replication depth level. All slaves servers even if they are intermediate master are suitable for read statement routing decisions.

- Slave Delay is the found time difference used for Replication Lag support in routing decision, between the value read by the Slave (it was inserted into the master) and maxscale current time  
Value of 0 or less than monitor interval means there is no replication delay.
- Last Repl Heartbeat is the maxScale timestamp read or inserted (if current server is master)

The Replication Heartbeat table is updated by MySQL replication, starting MaxScale when there is a significant slave delay may result that Slave Delay and Last Repl Heartbeat are not available for some time in the slave server details

There may be other status description such us:

|                           |   |
|---------------------------|---|
| Slave of External Server: | the node is slave of a server not configured in MaxScale (by MySQL monitor)       |
| Master Stickiness:        | the Master node is kept (by Galera monitor)                                       |
| Stale Status:             | the master node is kept even if the replication is not working (by MySQL monitor) |
| Auth Error:               | Monitor was not able to login into backend  |

A few examples:

```
Server 0x1a5aae0 (server3)
  Server:          127.0.0.1
  Status:         Master, Slave of External Server, Running
  Protocol:      MySQLBackend
  Port:          3308
  Server Version: 5.5.35-MariaDB-log
  Node Id:       3
  Master Id:     1
  Slave Ids:    2
  Repl Depth:   1
```



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```
Server 0x2d1b5c0 (server2)
  Server:                192.168.122.142
  Status:                Master, Synced, Master Stickiness, Running
  Protocol:              MySQLBackend
  Port:                  3306
  Server Version:        5.5.40-MariaDB-wsrep-log
  Node Id:               1
  Repl Depth:           0
```

## Show Server

Details of an individual server can be displayed by using the show server command. In user mode the show server command is passed the name of the server to display, these names are the section names used in the configuration file.

```
MaxScale> show server server4
Server 0x6ec5d0 (server4)
  Server:                127.0.0.1
  Status:                Down
  Protocol:              MySQLBackend
  Port:                  3309
  Number of connections: 0
  Current no. of connections:0
MaxScale>
```

In developer mode the show server command is passed the address of a server structure.

```
MaxScale> show server 0x6ec5d0
Server 0x6ec5d0 (server4)
  Server:                127.0.0.1
  Status:                Down
  Protocol:              MySQLBackend
  Port:                  3309
  Number of connections: 0
  Current no. of connections:0
MaxScale>
```

## Show DCBS

There are two forms of the show command that will give you DCB information, the first will display information for all DCBs within the system.

```
MaxScale> show dcbs
DCB: 0x6ef320
```



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```
DCB state:          DCB for listening socket
Service:           Test Service
Queued write data: 0
Statistics:
  No. of Reads:    0
  No. of Writes:   0
  No. of Buffered Writes: 0
  No. of Accepts:  0
DCB: 0x6ef8e0
DCB state:          DCB for listening socket
Service:           Split Service
Queued write data: 0
Statistics:
  No. of Reads:    0
  No. of Writes:   0
  No. of Buffered Writes: 0
  No. of Accepts:  1
DCB: 0x64b180
DCB state:          DCB for listening socket
Service:           Debug Service
Queued write data: 0
Statistics:
  No. of Reads:    0
  No. of Writes:   0
  No. of Buffered Writes: 0
  No. of Accepts:  1
DCB: 0x64b430
DCB state:          DCB processing event
Service:           Split Service
Connected to:      127.0.0.1
Queued write data: 0
Statistics:
  No. of Reads:    2
  No. of Writes:   3
  No. of Buffered Writes: 0
  No. of Accepts:  0
DCB: 0x6f8400
DCB state:          DCB in the polling loop
Service:           Split Service
Queued write data: 0
Statistics:
  No. of Reads:    3
  No. of Writes:   1
  No. of Buffered Writes: 0
  No. of Accepts:  0
DCB: 0x6f8b40
DCB state:          DCB in the polling loop
```



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```
Service:          Split Service
Queued write data: 0
Statistics:
  No. of Reads:      2
  No. of Writes:     0
  No. of Buffered Writes: 0
  No. of Accepts:    0
DCB: 0x6f8e20
DCB state:        DCB processing event
Service:          Debug Service
Connected to:     0.0.0.0
Queued write data: 0
Statistics:
  No. of Reads:      8
  No. of Writes:     133
  No. of Buffered Writes: 0
  No. of Accepts:    0
MaxScale>
```

An individual DCB can be displayed by passing the DCB address to the `show dcb` command

```
MaxScale> show dcb 0x64b430
DCB: 0x64b430
DCB state:        DCB processing event
Connected to:     127.0.0.1
Owning Session:   7308208
Queued write data: 0
Statistics:
  No. of Reads:      2
  No. of Writes:     3
  No. of Buffered Writes: 0
  No. of Accepts:    0
MaxScale>
```

## Show Modules

The `show modules` command will display the list of the currently loaded modules

```
MaxScale> show modules
Module Name      | Module Type | Version
-----
MySQLBackend    | Protocol    | V2.0.0
telnetd         | Protocol    | V1.0.1
MySQLClient     | Protocol    | V1.0.0
mysqlmon        | Monitor     | V1.0.0
readconroute    | Router      | V1.0.2
readwritesplit  | Router      | V1.0.2
```



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```
debugcli | Router | V1.1.0
MaxScale>
```

## Show Polling Statistics

Display statistics related to the main polling loop. The `epoll` cycles is the count of the number of times `epoll` has returned with one or more event. The other counters are for each individual events that has been detected.

```
MaxScale> show epoll
Number of epoll cycles: 7928
Number of read events: 2000920
Number of write events: 2000927
Number of error events: 0
Number of hangup events: 0
Number of accept events: 4
MaxScale>
```

## Show Dbusers

The `show dbuser` command allows data regarding the table that holds the database users for a service to be displayed. It does not give the actual user data, but rather details of the hashtable distribution.

The `show dbuser` command takes different arguments in the two modes of MaxScale, in user mode it may be passed the name of a service rather than an address, whilst in developer mode it needs the address of a user structure that has been extracted from a service.

In developer mode the `show users` commands must be passed the address of the user table, this can be extracted from the output of a `show services` command.

```
MaxScale> show services
Service 0x6ec910
  Service: Split Service
  Router: readwritesplit (0x7ffff1698460)
  Number of router sessions: 1
  Current no. of router sessions: 0
  Number of queries forwarded: 2
  Number of queries forwarded to master: 0
  Number of queries forwarded to slave: 1
  Number of queries forwarded to all: 1
  Started: Mon Jul 22 11:31:21 2013
```



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```
Backend databases
  127.0.0.1:3308 Protocol: MySQLBackend
  127.0.0.1:3307 Protocol: MySQLBackend
  127.0.0.1:3306 Protocol: MySQLBackend
Users data:      0x6ed9b0
Total connections: 2
Currently connected: 1
```

...

The following example shows the MySQL users.

Users are loaded with the host (IPv4 data) as they are created in the backend.

```
MaxScale> show dbusers 0x6ed9b0
Users table data
Hashtable: 0x19243a0, size 52
  No. of entries:      16
  Average chain length: 0.3
  Longest chain length: 4
User names: one@%, new@192.168.56.1, new@127.0.0.1, repluser@%,
seven@127.0.0.1, four@%
MaxScale>
```

In user mode the command is simply passed the name of the service

```
MaxScale> show dbusers "Split Service"
Users table data
Hashtable: 0x19243a0, size 52
  No. of entries:      16
  Average chain length: 0.3
  Longest chain length: 4
User names: one@%, new@192.168.56.1, new@127.0.0.1, repluser@%,
seven@127.0.0.1, four@%
MaxScale>
```

Please note the use of quotes in the name in order to escape the white space character.

## Show Users

The `show users` command lists the users defined for the administration interface. Note that if there are no users defined, and the default admin user is in use, then no users will be displayed.

```
MaxScale> show users
```



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```
Administration interface users:
Users table data
Hashtable: 0x25ef5e0, size 52
  No. of entries:          2
  Average chain length:    0.0
  Longest chain length:    1
User names: admin, mark
MaxScale>
```

## Show Monitors

The `show monitors` show the status of the database monitors. The address of the monitor can be used for the `shutdown monitor` and `restart monitor` commands.

```
MaxScale> show monitors
Monitor: 0x80a510
  Name:          MySQL Monitor
  Monitor running
  Sampling interval: 10000 milliseconds
  Replication lag:  enabled
  Detect Stale Master: disabled
  Connect Timeout:  3 seconds
  Read Timeout:     1 seconds
  Write Timeout:    2 seconds
  Monitored servers: 127.0.0.1:3306, 127.0.0.1:3307, 127.0.0.1:3308,
127.0.0.1:3309
```

```
Monitor: 0x73d3d0
  Name:          Galera Monitor
  Monitor running
  Sampling interval: 7000 milliseconds
  Master Failback: off
  Connect Timeout:  3 seconds
  Read Timeout:     1 seconds
  Write Timeout:    2 seconds
  Monitored servers: 127.0.0.1:3310, 127.0.0.1:3311, 127.0.0.1:3312
MaxScale>
```



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Monitor timeouts used in Galera and MySQL monitor follow the rules of `mysql_real_connect` C API:

- Connect Timeout is the connect timeout in seconds.
- Read Timeout is the timeout in seconds for each attempt to read from the server. There are retries if necessary, so the total effective timeout value is three times the option value.
- Write Timeout is the timeout in seconds for each attempt to write to the server. There is a retry if necessary, so the total effective timeout value is two times the option value.

## Shutdown maxscale

The CLI can be used to `shutdown` the MaxScale server by use of the `shutdown` command, it may be called with the argument either `maxscale` or `gateway`.

```
MaxScale> shutdown maxscale
```

## Shutdown monitor

The `shutdown monitor` command stops the thread that is used to run the monitor and will stop any update of the server status flags. This is useful prior to manual setting of the states of the server using the `set server` and `clear server` commands.

```
MaxScale> show monitors
Monitor: 0x80a510
  Name:          MySQL Monitor
  Monitor running
  Sampling interval: 10000 milliseconds
  Monitored servers: 127.0.0.1:3306, 127.0.0.1:3307, 127.0.0.1:3308,
127.0.0.1:3309
MaxScale> shutdown monitor 0x80a510
```

```
MaxScale> show monitors
Monitor: 0x80a510
  Name:          MySQL Monitor
  Monitor stopped
```



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```
Sampling interval: 10000 milliseconds
Monitored servers: 127.0.0.1:3306, 127.0.0.1:3307, 127.0.0.1:3308,
127.0.0.1:3309
MaxScale>
```

It may take some time before a monitor actually stops following the issuing of a `shutdown monitor` command. Stopped monitors can be restarted by issuing a `restart monitor` command.

## Shutdown service

The `shutdown service` command can be used to stop the listener for a particular service. This will prevent any new clients from using the service but will not terminate any clients already connected to the service.

The `shutdown service` command needs the address of a service to be passed as an argument, this can be obtained by running `show services`.

```
MaxScale> show services
Service 0x6edc10
  Service:          Test Service
  Router:           readconnroute (0x7ffff128ea40)
  Number of router sessions: 257
  Current no. of router sessions: 0
  Number of queries forwarded: 1000193
  Started:          Mon Jul 22 11:31:21 2013
  Backend databases
    127.0.0.1:3309 Protocol: MySQLBackend
    127.0.0.1:3308 Protocol: MySQLBackend
    127.0.0.1:3307 Protocol: MySQLBackend
    127.0.0.1:3306 Protocol: MySQLBackend
  Users data:      0x6ee4b0
  Total connections: 258
  Currently connected: 1
Service 0x6ec910
  Service:          Split Service
  Router:           readwritesplit (0x7ffff1698460)
  Number of router sessions: 1
  Current no. of router sessions: 0
  Number of queries forwarded: 2
  Number of queries forwarded to master: 0
  Number of queries forwarded to slave: 1
  Number of queries forwarded to all: 1
```



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```
Started:          Mon Jul 22 11:31:21 2013
Backend databases
  127.0.0.1:3308  Protocol: MySQLBackend
  127.0.0.1:3307  Protocol: MySQLBackend
  127.0.0.1:3306  Protocol: MySQLBackend
Users data:       0x6ed9b0
Total connections: 2
Currently connected: 1
Service 0x649190
  Service:        Debug Service
  Router:         debugcli (0x7ffff18a0620)
  Started:       Mon Jul 22 11:31:21 2013
  Backend databases
  Users data:    0x64bd80
  Total connections: 2
  Currently connected: 2
MaxScale> shutdown service 0x6edc10
```

In user mode the `shutdown service` command may be passed the name of the service as defined in configuration file.

```
MaxScale> shutdown service Split\ Service
```

## Restart service

The `restart service` command can be used to restart a previously stopped listener for a service. In developer mode the address of the service must be passed.

```
MaxScale> restart service 0x6edc10
MaxScale>
```

In user mode the name of the service may be passed.

```
MaxScale> restart service Test\ Service
MaxScale>
```

As with `shutdown service` the address of the service should be passed as an argument.

## Restart Monitor

The `restart monitor` command will restart a previously stopped monitor.



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```
MaxScale> show monitors
Monitor: 0x80a510
      Name:          MySQL Monitor
      Monitor stopped
      Monitored servers: 127.0.0.1:3306, 127.0.0.1:3307, 127.0.0.1:3308,
127.0.0.1:3309
MaxScale> restart monitor 0x80a510
MaxScale>
```

## Set server

The `set server` command can be used to set the status flags of a server directly from the user interface. The command should be passed a server address that has been obtained from the output of a `show servers` command.

```
MaxScale> show servers
Server 0x6ec840 (server1)
      Server:          127.0.0.1
      Status:          Running
      Protocol:        MySQLBackend
      Port:            3306
      Server Version:  10.0.11-MariaDB-log
      Node Id:         29
      Number of connections: 0
      Current n. of conns: 0
Server 0x6ec770 (server2)
      Server:          127.0.0.1
      Status:          Master, Running
      Protocol:        MySQLBackend
      Port:            3307
      Server Version:  5.5.35-MariaDB-log
      Node Id:         1
      Number of connections: 1
      Current n. of conns: 0
Server 0x6ec6a0 (server3)
      Server:          127.0.0.1
      Status:          Slave, Running
      Protocol:        MySQLBackend
      Port:            3308
      Server Version:  5.5.35-MariaDB-log
      Node Id:         2
      Number of connections: 258
```



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```
Current n. of conns:      0
Server 0x6ec5d0 (server4)
Server:                  127.0.0.1
Status:                 Down
Protocol:               MySQLBackend
Port:                   3309
Node Id:                -1
Number of connections:  0
Current n. of conns:    0
MaxScale> set server 0x6ec840 slave
```

Valid options that are recognised by the `set server` command are `running`, `master` and `slave`. Please note that if the monitor is running it will reset the flags to match reality, this interface is really for use when the monitor is disabled.

In user mode there is no need to find the address of the server structure, the name of the server from the section header in the configuration file make be given.

```
MaxScale> set server server1 slave
```

## Clear server

The `clear server` command is the complement to the `set server` command, it allows status bits related to a server to be cleared.

```
MaxScale> clear server 0x6ec840 slave
```

Likewise in user mode the server name may be given.

```
MaxScale> clear server server1 slave
```

## Reload users

The `reload users` command is used to force a service to go back and reload the table of database users from the backend database. This is the data used in the transparent authentication mechanism in the MySQL protocol. The command should be passed the address of the service as shown in the output of the `show services` command.



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```
MaxScale> show services
Service 0x6edc10
  Service:          Test Service
  Router:           readconnroute (0x7ffff128ea40)
  Number of router sessions: 257
  Current no. of router sessions: 0
  Number of queries forwarded: 1000193
  Started:         Mon Jul 22 11:31:21 2013
  Backend databases
    127.0.0.1:3309 Protocol: MySQLBackend
    127.0.0.1:3308 Protocol: MySQLBackend
    127.0.0.1:3307 Protocol: MySQLBackend
    127.0.0.1:3306 Protocol: MySQLBackend
  Users data:      0x6ee4b0
  Total connections: 258
  Currently connected: 1
Service 0x6ec910
  Service:          Split Service
  Router:           readwritesplit (0x7ffff1698460)
  Number of router sessions: 1
  Current no. of router sessions: 0
  Number of queries forwarded: 2
  Number of queries forwarded to master: 0
  Number of queries forwarded to slave: 1
  Number of queries forwarded to all: 1
  Started:         Mon Jul 22 11:31:21 2013
  Backend databases
    127.0.0.1:3308 Protocol: MySQLBackend
    127.0.0.1:3307 Protocol: MySQLBackend
    127.0.0.1:3306 Protocol: MySQLBackend
  Users data:      0x6ed9b0
  Total connections: 2
  Currently connected: 1
Service 0x649190
  Service:          Debug Service
  Router:           debugcli (0x7ffff18a0620)
  Started:         Mon Jul 22 11:31:21 2013
  Backend databases
  Users data:      0x64bd80
  Total connections: 2
  Currently connected: 2
MaxScale> reload users 0x6edc10
Loaded 34 users.
MaxScale>
```

If user mode is in use then the service name may be given.



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```
MaxScale> reload users "Test Service"  
Loaded 34 users.  
MaxScale>
```

## Reload config

The `reload config` command can be used to force MaxScale to re-read the `MaxScale.cnf` and update itself to the latest configuration defined in that configuration file. It is also possible to force the reading of the configuration file by sending a HangUp signal (SIGHUP) to the `maxscale` process.

```
MaxScale> reload config  
Reloading configuration from file.  
MaxScale>
```

Note, not all configuration elements can be changed dynamically currently. This mechanism can be used to add new services, servers to services, listeners to services and to update passwords. It can not be used to remove services, servers or listeners currently.

## Add user

The `add user` command is used to add new users to the debug CLI of MaxScale. The default behaviour of the CLI for MaxScale is to have a login name of `admin` and a fixed password of `skysql`. Adding new users will disable this default behaviour and limit the login access to the users that are added.

```
MaxScale> add user admin july2013  
User admin has been successfully added.  
MaxScale> add user mark hambleden  
User mark has been successfully added.  
MaxScale>
```

User names must be unique within the debug CLI, this excludes the `admin` default user, which may be redefined.

```
MaxScale> add user mark 22july  
User admin already exists.  
MaxScale>
```



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If you should forget or lose the the account details you may simply remove the passwd file in `$MAXSCALE_HOME/etc` and the system will revert to the default behaviour with `admin/skysql` as the account.

## Enable/disable log

The `enable/disable log` command is used to enable/disable the log facility of MaxScale. The default behaviour for MaxScale is to have all logs enabled in DEBUG version, and only error log in production release.

Examples:

```
MaxScale> help enable log
Available options to the enable command:
    log      Enable Log options for MaxScale, options trace | error | message
E.g. enable log message.
```

```
MaxScale> help disable log
Available options to the disable command:
    log      Disable Log for MaxScale, Options: debug | trace | error |
message E.g. disable log debug
```

```
MaxScale> disable log trace
MaxScale>
```

No output for these commands in the debug interface, but in the affected logs there is a message:

```
2013 11/14 16:08:33 --- Logging is disabled --
```