ARDA (Aqua Router DAemon)

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Description

ARDA (Aqua Router DAemon) – part of the routing package, which includes OSPF and ARIP modules. Performs a coordinator and integrator functions for the routing protocols management. ARDA module realize all manipulations with system routing tables.

ARDA has its own command shell (CS), to enter ARDA CS use the "*arda*" command. The command shell can work in different modes:

- Basic mode;
- ARDA config;
- ARDA config-if.

The current mode is displayed along with the command prefix in the form "*ARDA(mode)#*". To get a quick hint you can press "?" at any time. In order to switch the configuration mode you should have superuser rights. After entering a configuration mode, the configuration is being blocked and entering in this mode from other terminal (e.g. other telnet session) is prohibited. In order to avoid a "dead" block of the session, CS automatically quits the configuration mode after two minutes of no activity. After leaving CS by "*arda exit*" command ("*Ctrl+D*") the router's CS remains in the last mode.

Commands in CS are not case-sensitive and can be shortened until ambiguity appears.

Commands may have different arguments, which are specified in several formats. Arguments format is described in the context help ("?") or in the list of commands ("*help*"). If an argument can be written in different formats, it will be displayed in round brackets, options are separated by "|" character. Example: "(A.B.C.D|<0-4294967295>)". If an argument is optional, it is put into square brackets: "[]". Any parameter may have "*no*" prefix, it will remove a corresponding parameter from the configuration.

Allowable arguments:

- *"A.B.C.D"* – IP address.
- "*WORD*" – a set of characters with no spaces.
- "*<1-N>*" – a decimal number in a range from 1 to N.
- "*A.B.C.D/M*" – a parameter is set in a format IP address/subnet mask length – an integer in range 0...32 (ex. *192.168.0.0/24).*
- "*IFNAME*" – physical network interface name (ex. *eth0).*

Syntax:

```
configure  Configuration
  access-list  Add an access list entry
  end          End current mode and change to root mode (CTRL+C).
  exit         Back to WANFlex command shell (CTRL+D).
  help         Print command list
  interface    Select an interface to configure
    bandwidth    Set bandwidth informational parameter
    description  Interface specific description
    end          End current mode and change to root mode (CTRL+C).
    exit         Back to WANFlex command shell (CTRL+D).
    help         Print command list
    link-detect  Enable link detection on interface
    no           Negate a command or set its defaults
    show         Show running system information
  no           Negate a command or set its defaults
  route        Establish static routes
  show         Show running system information
  stop         stop
end        End current mode and change to root mode (CTRL+C).
exit       Back to WANFlex command shell (CTRL+D).
help       Print command list
show       Show running system information
  access-list     List IP access lists
  arda            Arda information
  interface       Interface status and configuration
  ip              IP information
  memory          Memory statistics
  route           IP routing table
  running-config  running configuration
  thread          Thread information
  version         Displays version
```

Parameters

Parameter	Description
end	Goes back from the current mode to the basic (ARDA), keyboard shortcut Ctrl+C can also be used.
exit	Exit from ARDA CS, keyboard shortcut Ctrl+D can also be used.
help	Displays the whole command list for the current mode.

show	Allows to review current ARDA configuration.
	• "*access-list*" – displays access lists content.
	• "*[(<1-99>|<100-199>|<1300-1999>|<2000-2699>|WORD)]*" – the list identifier, if not specified then all lists content is displayed.
	• "*memory*" – a memory statistic.
	• "*all*", "*lib*", "*ospf*" and "*rip*" – specify values types to be shown. If not specified, data will be displayed for all types, same as the "*all*" parameter.
	• "*arda client*" – displays ARDA client information.
	• "*route*" – displays a routing table. Additional parameters allow to filter displayed routes. If not specified the whole table is shown.
	• "*connected*" – directly connected routes.
	• "*kernel*" – routes created by the kernel, except for the default route.
	• "*ospf*" – routes advertised by the OSPF router.
	• "*rip*" – routes retransmitted from the RIP protocol.
	• "*static*" – static routes.
	• "*summary*" – summary routes.
	• "*supernets-only*" – connections from aggregated networks only.
	• "*interface*" – displays information about network interfaces.
	• "*IFNAME*" – a network interface name, if not specified, information about all interfaces is displayed.
	• "*ip forwarding*" – shows IP routing state.
	• "*running-config*" – shows a current ARDA configuration.
	• "*show thread cpu*" – shows current cpu load. Filters can be used to display specific data (rwtex).
	• "*version*" – shows ARDA version.
configure	Allows to enter the "ARDA config" mode
ARDA config mode	
access-list	Access lists are used in the ARDA configuration as filters, in addition, they are also used to set the matching conditions in the route map configuration. Access lists consist of an operators set. Each operator consists of a IP addresses range (matching conditions) and resulting action: "*deny*" or "*permit*". The IP addresses range is set in "*<value> <mask>*" form. The object to be filtrated has its basic parameter in the same format (IP address, subnet etc). To make a decision whether the object corresponds with a list, each operator from the list is consequently applied to the object basic parameter until this parameter satisfies the condition. When a right condition is met, the decision is made according to the record in the operator command. While configuring, the operators are added to the end of the list. Thus, when filtering, the sequence of viewing access list operators is determined only by the sequence of their addition. There are three access lists type in the ARDA module. • Standard – is identified by the 1-99 numbers in the standard range or 1300-1999 in the extended and is used to evaluate one filtration objects parameter. • Extended – is identified by the 100-199 numbers in the standard range or 2000-2699 in the extended and is used to evaluate one filtration objects parameter (ex. source IP address and destination IP address). • Nominate – is similar to the standard, but is identified by a name. In addition, operators are configured in a "*<value>/<mask length>*" format. For more information about managing access lists parameters see the "Access list" subsection.
interface IFN AME	Entering the "*config-if*" mode. "*IFNAME*" – an interface to configure. • "*bandwidth <1-10000000>*" – limits bandwidth, allowable values are in range 1...10000000 Kbps. • "*description*" – network interface symbolic description. • "*link-detect*" – allows the use physical layer messages about the network interface status. Otherwise, the link presence or absence is determined by exceeding the time limit.

route A.B.C.D/M (A.B.C.D|INTERFACE|null0) (blackhole|reject) (<1-255>)	Allows to configure static routes within an ARDA module. ⚠️ **NOTE** These static routes will only be applied if the ARDA module is active. ● *"A.B.C.D/M"* – source IP address. ● *"A.B.C.D|INTERFACE|null0"* – the gateway IP address / the network interface name through which the connection is established. If "*null0*" interface is specified, traffic will be destroyed. ● *"blackhole"* – traffic is destroyed without notifying the sender. ● *"reject"* – traffic is destroyed, sender receives an ICMP notification. ● "*<1-255>*" – route metric.
stop (daemon|clear)	Stops ARDA module: ● "*daemon*" – stops the router. ● "*clear*" – the router will clear its system configuration part before quitting.

Access lists

The following "*config"* mode parameters are used to create or modify access lists for the ARDA module.

Standard list:

```
access-list (<1-99>|<1300-1999>) (remark WORD) (deny|permit) A.B.C.D A.B.C.D
```

● "*<1-99>|<1300-1999>*" – list identifier.
● "*remark WORD*" – list symbolic description.
● "*deny|permit*" – resulting action.
● "*A.B.C.D A.B.C.D*" – IP address range in "*<value> <mask>*" form.

This command creates an operator in a standard access list. Value and mask define a range (criteria) for the operator. The mask defines those bits of the value which form the range. For example, in order to specify the range of IP address from 192.168.12.0 to 192.168.255, the "192.168.12.0" value and the "0.0.0.255" mask should be specified. For value and mask of 0.0.0.0 255.255.255.255 there is a key word "*any*". Commands below are equal.

```
ARDA(config)# access-list 1 permit 0.0.0.0 255.255.255.255
ARDA(config)# access-list 1 permit any
```

For the range which consists of only one address, the key word "*host"* is used. Commands below are equal.

```
ARDA(config)# access-list 1 permit 192.168.12.150 0.0.0.0
ARDA(config)# access-list 1 permit host 192.168.12.150
```

Extended list:

```
access-list (<100-199>|<2000-2699>) (remark WORD) (deny|permit) ip A.B.C.D A.B.C.D A.B.C.D A.B.C.D
```

● "*(<100-199>|<2000-2699>)*" – list identifier.
● "*remark WORD*" – list symbolic description.
● "*(deny|permit)*" – resulting action.
● "*A.B.C.D A.B.C.D*" – source IP address range.
● "*A.B.C.D A.B.C.D*" – destination IP address range.

Nominate list:

```
access-list WORD (remark WORD) (deny|permit) A.B.C.D/M exact-match
```

● "*WORD*" – list identifier.

- "*remark WORD*" – list symbolic description.
- "*(deny|permit)*" – resulting action.
- *"A.B.C.D/M"* – IP address range.
- "*exact-match*" – is used for the exact match of a parameter to the range.

In case of nominate list, identifier is an arbitrary characters combination. Values range is specified in "*<value> <mask>*" form. For value 0.0.0.0 there is a key word "*any*".

Examples

In the nominate list, specify the decision to discard a packet for the "*192.168.110.0*"..."*192.168.110.255*" IP addresses range. Value "*192.168.110.0/24*" should be specified and the decision to accept packets from all other addresses.

```
ARDA(config)# access-list TestList1 deny 192.168.110.0/24
ARDA(config)# access-list TestList1 permit any
```

Display the information about all network routes.

```
ARDA> sh route
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       > - selected route, * - FIB route
    Destination       Dist/Met Gateway
K>* 0.0.0.0/0                   via 192.168.103.35   , svi1
C>* 10.10.10.0/24               is directly connected, eth0
C>* 10.10.20.0/24               is directly connected, svi1
C>* 123.1.1.1/32                is directly connected, rf5.0
C>* 127.0.0.1/32                is directly connected, lo0
S>* 192.103.168.0/24   [  2/0 ] is black-hole        , Null0, bh
                                 via 10.123.45.33      inactive, bh
C>* 192.168.103.0/24            is directly connected, svi1
K>* 224.0.0.0/8                 via 127.0.0.1        , lo0
```

Set a static route to the "*12.11.12.12/24*" IP address through the "*eth0*" interface, all traffic will be destroyed without notifying the sender.

```
ARDA(config)# route 12.11.12.12/24 eth0 blackhole
```