

APPLICATION NOTE

APNUS37 How to Configure VRRP on ACKSYS Router December 2023

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1. VRRP Glossary and Term

Virtual router - Group of physical routers that act as the default gateway in a network using the Virtual Router Redundancy Protocol.

VIP- Virtual IP Address

VRRP router - Physical router with VRRP enabled.

Master router - Physical router within a virtual IP address that is responsible for forwarding data packets and responding to ARP queries.

Backup router - A VRRP router providing a stand-by route for the master router.

VRRP priority - A number from 1 through 255.

VRID – The unique identifier of a virtual router.

VID - Virtual router instance.

VRRP- Virtual Router Redundancy Protocol

ICMP- Internet Control Protocol

LAN- Local Area Network

2. Introduction

Virtual Router Redundancy Protocol (VRRP) is a redundancy protocol that elects one or more routers in a virtual group , one acting as Master router with the VIP (IP of the Gateway) and the other one acting as a Backup. In the event of a failure, this protocol dynamically assigns the responsibility of an Active router to one of the physical routers on a Local Area Network (LAN).

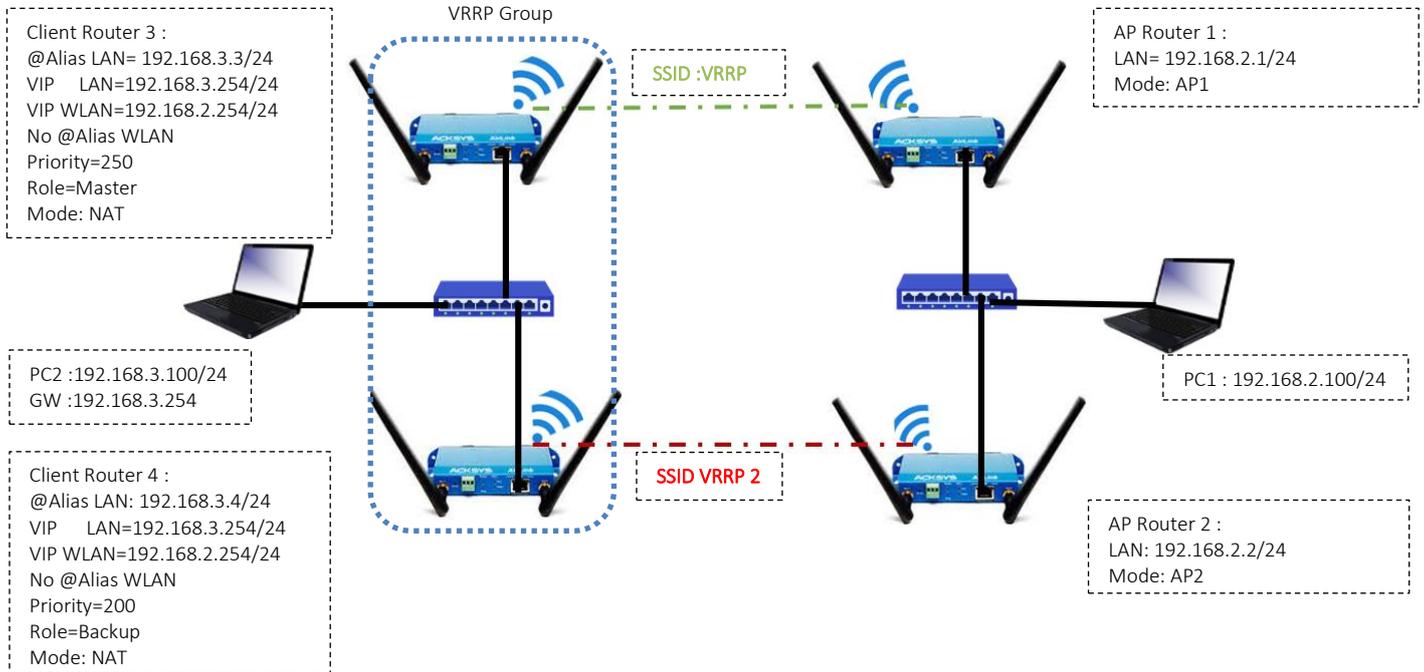
The synchronization between Master and Backup routers in a cluster is done by sending VRRP periodical keepalive messages (advertisements) to the backup router in the virtual IP to inform them about its existence.

In this application note, we will explain in detail the basic steps required to configure Virtual Router Redundancy Protocol (VRRP) on Acksys Router to maintain the IP connectivity to the End device connected to the Router in cluster.

We will see how to check if the backup Router is doing the failover for the Master Router.

3. VRRP Configuration architecture

In this test, we have 2 physical routers connected to a switch within the same subnet sharing a virtual IP address that is responsible for forwarding data packets and responding to IP connectivity queries (ICMP).



Before we begin, let's overview the configuration that we are attempting to achieve and the prerequisites that make it possible in this application note :

- 4 AirLink routers or Any type of Acksys Router
 - 2 Airlink Routers configured in Bridged and WIFI AP Mode
 - 2 Airlink Router configured in VRRP protocol and in Router Mode as Client
- A switch to connected the router in cluster
- Laptop to configure the routers and connected to the same Switch with router in Cluster and another PC for testing purpose

4. ACKSYS Router configuration

Let keeping in mind that all Acksys router implemented VRRP protocol feature and in this application note, 2 routers are in bridged mode and configured in AP role and a cluster of 2 others routers configured as clients on which VRRP services are applied.

Configuring Router1 in AP role

If you have familiarized yourself with the configuration scheme, we can start configuring the router using instructions provided.

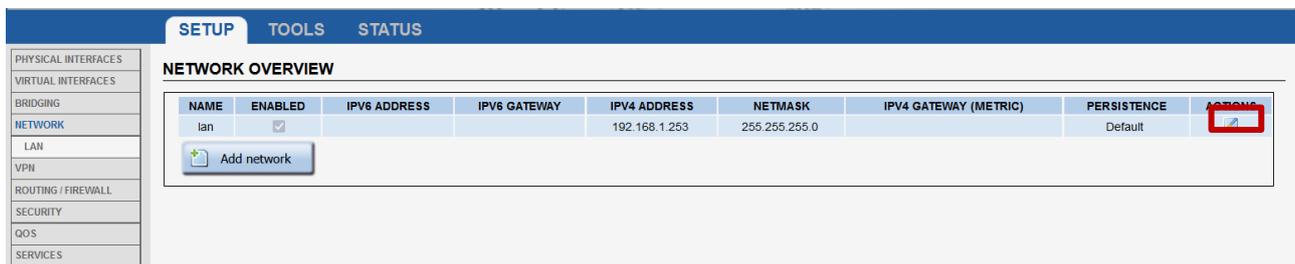
Networks	AirLink Router 1	Airlink Router 2
	LAN IP Alias: 192.168.2.1/24	LAN IP Alias: 192.168.2.2/24
Mode: AP	SSID:VRRP	SSID:VRRP2

Router 1 and Router 2 configuration are similar and only we will described the Router 1 full configuration and for further information on how to configure Acksys Router in AP mode, Application note is located [here](#):

Network Configuration

In this section, we will create modify the default Network according to our network scope in Bridged Mode.

In the GUI, go to Setup → Physical Interfaces → Edit LAN Interface to create the LAN Network



Click the "Edit" button located to the right and configure the Alias IP address used to configure the LAN Interface.

- General Setup
 - Network description :WLAN (use your custom name)
 - Protocol: Static
 - IPv4-Address : 192.168.2.1
 - IPv4 Netmask:255.255.255.0
 - Save

NETWORK - WLAN

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup | **Interfaces Settings** | Advanced Settings | IPv6 Setup

Enable interface

Network description: LAN
Friendly name for your network

Protocol: static

IPv6-Address:

Default IPv6 gateway:

IPv4-Address: 192.168.2.1

IPv4-Netmask: 255.255.255.0

Default IPv4 gateway:

Default gateway metric: 0
Gateway priority when several default gateways are configured; lowest is chosen. (Used only when a default gateway is defined on this interface)

DNS server(s):
You can specify multiple IPv4 DNS servers here, press enter to add a new entry. Servers entered here will override automatically assigned ones.

- Interface Settings
 - Bridge Interfaces: enable
 - Interface: Tick Ethernet Adaptor and WiFi Adaptor
 - Click Save

NETWORK - WLAN

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup | **Interfaces Settings** | Advanced Settings | IPv6 Setup

Bridge interfaces creates a bridge over specified interface(s)

Enable STP/RSTP Enables the Spanning Tree Protocol on this bridge
WARNING: Some cautions must be taken with wireless interfaces, please see user guide

Enable LLDP forwarding Enables the LLDP frame forwarding

bridge VLAN Enable VLAN management in bridge. You must configure the bridge VLANs before enabling this option (setup->bridging)

Interface:

- Ethernet adapter: LAN (network: WLAN)
- WiFi adapter: WiFi - VRRP (network: WLAN)

MTU: 1500

After modifying the default network, we should have the result below:

SETUP | TOOLS | STATUS

NETWORK OVERVIEW

NAME	ENABLED	IPv6 ADDRESS	IPv6 GATEWAY	IPv4 ADDRESS	NETMASK	IPv4 GATEWAY (METRIC)	PERSISTENCE	ACTIONS
WLAN	<input checked="" type="checkbox"/>			192.168.2.1	255.255.255.0		Default	

Configuring SSID For Router 1

By default the WiFi Adaptor is disabled therefore in this application note, we will create an SSID to associate to the WIFI adaptor to allow end device in client mode to connect on its .

In the GUI, go to Setup → Physical Interfaces → Click WiFi Adaptor to On

WI-FI INTERFACE							
Wi-Fi 4 (802.11n) Wireless interface							
CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	ACTIONS		
Automatic	802.11b+g+n	acksys	Access Point (infrastructure)	none	Interface disabled		

- Click the "Edit" button located to the right and your SSID configuration page:

WI-FI INTERFACE							
Wi-Fi 4 (802.11n) Wireless interface							
CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	ACTIONS		
Automatic	802.11b+g+n	acksys	Access Point (infrastructure)	none	[Edit] [Refresh] [Close]		

- Role: Access Point
- ESSID: VRRP
- Network: WLAN
- Click on Save

WIRELESS SETTINGS : WIFI

The *Device Configuration* section covers physical settings of the radio hardware which is shared among all defined wireless networks. Per network settings like encryption or operation mode are in the *Interface Configuration*.
If *SRCC* role is selected, most of the *Device Configuration* is irrelevant (please refer to the product user guide).

DEVICE CONFIGURATION

General Setup | a/b/g Data Rates | 802.11n Mcs | Advanced Settings

802.11 mode 802.11b+g+n (2.4 GHz)

Changing the mode may affect the list in the 'a/b/g data rates' tab

HT mode 20MHz

Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces

Automatic channel select Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces

INTERFACE CONFIGURATION

General Setup | Wireless Security | Advanced Settings | MAC Filter | Frame filters

Role Access Point (infrastructure)

ESSID VRRP

Maximum simultaneous associations Max allowed by radio card (see documentation)

Specifies the maximum number of clients to connect

Hide ESSID In order to comply with the DFS regulation, clients might not associate if you check this option and select a DFS channel. See the user guide for more details.

Network WLAN

- Security: No encryption (only in this note but we invite the partner to set a strong password)

INTERFACE CONFIGURATION

General Setup | Wireless Security | Advanced Settings | MAC Filter | Frame filters

Security No encryption

WARNING: The WEP encryption is only supported with 11abg mode.

NOTE: By default, when VRRP is enabled, the member with the highest priority will always be the master of the group. This is the end of this Router 1 step by step and the configuration is similar for the 3 others routers except IP addresses. The 3 others routers will not be described step by step.

Configuring Router 2 in AP Role

Network Interfaces

We then repeat the same steps use to configure Router 1, Network, SSID applied to the Router with information in the table below:

Networks	Router 2
	LAN IP: 192.168.2.2/24
AP	SSID:VRRP2

Configuring Network on Router2:

After modifying the default network, we should have the result below:

NETWORK OVERVIEW

NAME	ENABLED	IPV6 ADDRESS	IPV6 GATEWAY	IPV4 ADDRESS	NETMASK	IPV4 GATEWAY (METRIC)	PERSISTENCE	ACTIONS
WLAN	<input checked="" type="checkbox"/>			192.168.2.2	255.255.255.0		Default	

Configuring SSID For Router 2

The SSID configured on Router 2 is different from the one configured on Router 1 and all the other settings are similar:

WI-FI INTERFACE							
Wi-Fi 4 (802.11n) Wireless interface							
	CHANNEL	802.11 MODE	SSID	ROLE	SECURITY		ACTIONS
	Automatic	802.11b+g+n	acksys	Access Point (infrastructure)	none		

- Role: Access Point
- ESSID: VRRP2
- Network: WLAN
- Click on Save

WIRELESS SETTINGS : WIFI

The *Device Configuration* section covers physical settings of the radio hardware which is shared among all defined wireless networks. Per network settings like encryption or operation mode are in the *Interface Configuration*.
If *SRCC* role is selected, most of the *Device Configuration* is irrelevant (please refer to the product user guide).

DEVICE CONFIGURATION

General Setup | a/b/g Data Rates | 802.11n Mcs | Advanced Settings

802.11 mode: 802.11b+g+n (2.4 GHz)
Changing the mode may affect the list in the 'a/b/g data rates' tab

HT mode: 20MHz
Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces

Automatic channel select: Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces

INTERFACE CONFIGURATION

General Setup | Wireless Security | Advanced Settings | MAC Filter | Frame filters

Role: Access Point (infrastructure)

ESSID: VRRP2

Maximum simultaneous associations: Max allowed by radio card (see documentation)
Specifies the maximum number of clients to connect

Hide ESSID: In order to comply with the DFS regulation, clients might not associate if you check this option and select a DFS channel. See the user guide for more details.

Network: WLAN

- Security: No encryption (only in this note but we invite the partner to set a strong password)



Configuring Router 3 in Master State and in Client Role

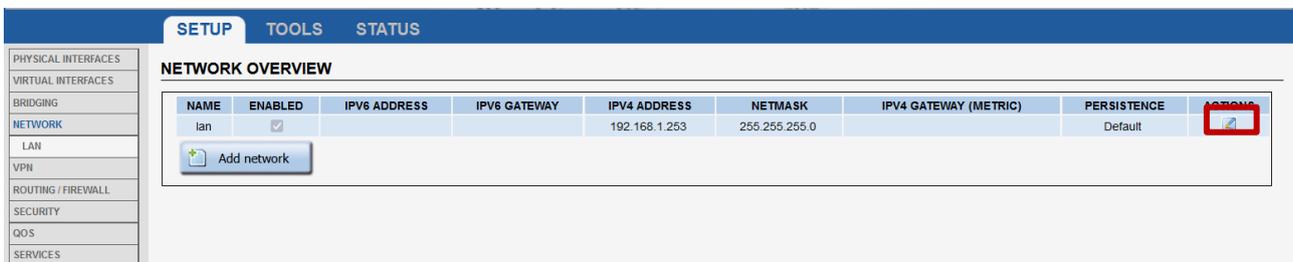
If you have familiarized yourself with the configuration scheme, we can start configuring the router using instructions provided.

Networks	AirLink Router 3 LAN IP Alias: 192.168.3.3/24 No WLAN IP Alias:
Virtual IP Addresses	LAN VIP:192.168.3.254/24 WLAN VIP:192.168.2.254/24
Mode: client	SSID:VRRP

Network Configuration

In WaveOs, to configure VRPPP IP alias must be defined as protocol on the interface and in this section, we will create 2 Network, LAN and WLAN.

In the GUI, go to Setup → Physical Interfaces → Edit LAN Interface to create the LAN Network



Click the "Edit" button located to the right and configure the Alias IP address used to configure the LAN Interface.

- General Setup
 - Network description :LAN (use your custom name)
 - Protocol: VRRP
- IP Aliases
 - Add the Alias Id:1 (you can use your custom number Id)
 - Add the Alias IP address : 192.168.3.3
 - IPv4 Netmask:255.255.255.0
 - Save

NETWORK - LAN

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup | Interfaces Settings | Advanced Settings | IPv6 Setup

Enable interface

Network description LAN

Protocol VRRP

DNS server(s)

IP ALIASES

NATed VRRP networks warning
The following applies to NATed networks which use the VRRP protocol:

- Public-side NAT MUST NOT define IP aliases; else the NAT might use the alias IP as public address instead of the VRRP IP
- Conversely, Private-side NAT SHOULD define a private IP alias to allow connection tracking replication

1 Delete

General Setup | IPv6 Setup

IPv4-Address 192.168.3.3

IPv4-Netmask 255.255.255.0

- Interface Settings
 - Bridge Interfaces: enable
 - Interface: Tick Ethernet Adapter
 - Untick WIFI adapter
 - Click Save

NETWORK - LAN

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup | Interfaces Settings | Advanced Settings | IPv6 Setup

Bridge interfaces creates a bridge over specified interface(s)

Enable STP/RSTP Enables the Spanning Tree Protocol on this bridge
WARNING: Some cautions must be taken with wireless interfaces, please see user guide

Enable LLDP forwarding Enables the LLDP frame forwarding.

bridge VLAN Enable VLAN management in bridge. You must configure the bridge VLANs before enabling this option (setup->bridging)

Interface Ethernet adapter: LAN (network: LAN)
 WIFI adapter: WIFI - VRRP (network: LAN)

MTU 1500

Same Steps to create the second Network WLAN mapping the WIFI Adapter.

- General Setup
 - Network description :WLAN (use your custom name)
 - Protocol: VRRP
 - Save

NETWORK - WLAN

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup | **Interfaces Settings** | Advanced Settings | IPv6 Setup

Enable interface

Network description

Protocol

DNS server(s)

You can specify multiple IPv4 DNS servers here, press enter to add a new entry. Servers entered here will override automatically assigned ones.

IP ALIASES

NATed VRRP networks warning
The following applies to NATed networks which use the VRRP protocol:

- Public-side NAT MUST NOT define IP aliases; else the NAT might use the alias IP as public address instead of the VRRP IP
- Conversely, Private-side NAT SHOULD define a private IP alias to allow connection tracking replication

This section contains no values yet

- Interface Settings
 - Bridge Interfaces: enable
 - Tick WIFI adapter
 - Click Save

NETWORK - WLAN

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup | **Interfaces Settings** | Advanced Settings | IPv6 Setup

Bridge interfaces creates a bridge over specified interface(s)

Enable STP/RSTP Enables the Spanning Tree Protocol on this bridge
WARNING: Some cautions must be taken with wireless interfaces, please see user guide

Enable LLDP forwarding Enables the LLDP frame forwarding

bridge VLAN Enable VLAN management in bridge. You must configure the bridge VLANs before enabling this option (setup->bridging)

Interface Ethernet adapter: LAN (network: WLAN)
 WiFi adapter: WIFI - VRRP (network: WLAN)

MTU

After creating the 2 networks, we should have the result below:

NETWORK OVERVIEW

NAME	ENABLED	IPV6 ADDRESS	IPV6 GATEWAY	IPV4 ADDRESS	NETMASK	IPV4 GATEWAY (METRIC)	PERSISTENCE	ACTIONS
LAN	<input checked="" type="checkbox"/>			VRRP			Default	
WLAN	<input checked="" type="checkbox"/>			VRRP			Default	

Configuring SSID For MASTER Router 3

By default the WiFi Adaptor is disabled therefore in this application note, we will create a SSID to associate to the WIFI adapter. In the GUI, go to Setup → Physical Interfaces → Click WiFi Adaptor to On

WI-FI INTERFACE						
Wi-Fi 4 (802.11n) Wireless interface						
CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	ACTIONS	
Automatic	802.11b+g+n	acksys	Access Point (infrastructure)	none	Interface disabled	

- Click the "Edit" button located to the right and your SSID configuration page:

WI-FI INTERFACE						
Wi-Fi 4 (802.11n) Wireless interface						
CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	ACTIONS	
Automatic	802.11b+g+n	acksys	Access Point (infrastructure)	none	<input type="checkbox"/> On <input checked="" type="checkbox"/> Edit <input type="checkbox"/> Off	

- Role: Client
- ESSID: VRRP
- Network: WLAN
- Click on Save

WIRELESS SETTINGS : WIFI

The *Device Configuration* section covers physical settings of the radio hardware which is shared among all defined wireless networks. Per network settings like encryption or operation mode are in the *Interface Configuration*.
If SRCC role is selected, most of the *Device Configuration* is irrelevant (please refer to the product user guide).

DEVICE CONFIGURATION

General Setup | a/b/g Data Rates | 802.11n Mcs | Advanced Settings

802.11 mode: 802.11b+g+n (2.4 GHz)
Changing the mode may affect the list in the 'a/b/g data rates' tab

HT mode: 20MHz
Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces

Automatic channel select: Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces

INTERFACE CONFIGURATION

General Setup | Wireless Security | Advanced Settings | Roaming | Advanced Roaming | Frame filters

Role: Client (infrastructure)

Multiple ESSIDs:

ESSID: VRRP

Network: WLAN

- Security: No encryption (only in this note but we invite the partner to set a strong password)

INTERFACE CONFIGURATION

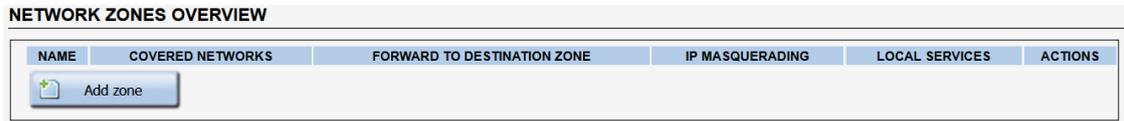
General Setup | Wireless Security | Advanced Settings | MAC Filter | Frame filters

Security: No encryption
WARNING: The WEP encryption is only supported with 11abg mode.

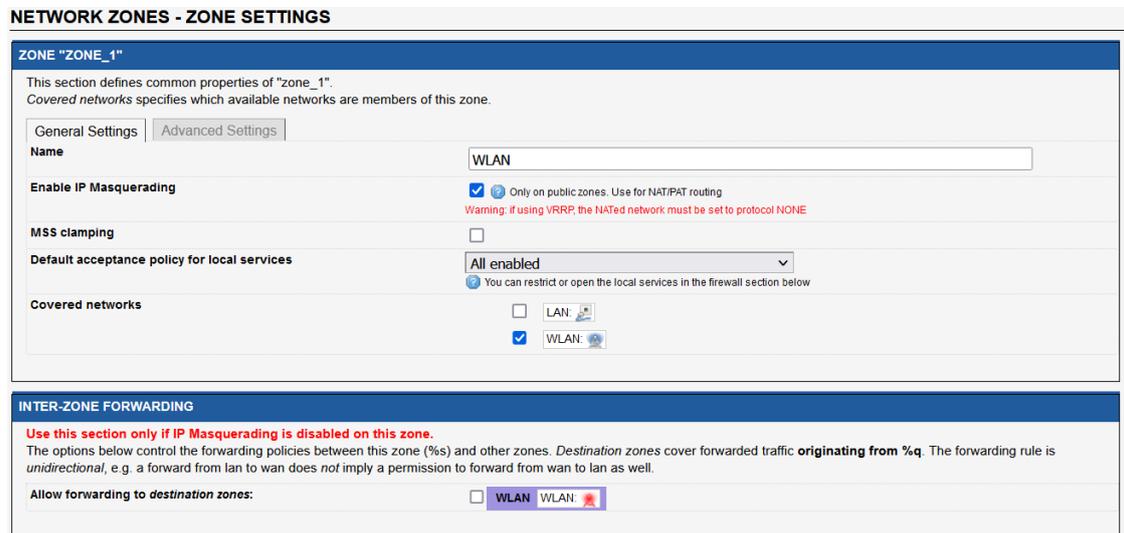
Configuring Network Zones on Router 3

Let create 2 Networks Zones mapping LAN and WLAN on which IP masquerading is enabled to allow traffic between LAN and WLAN.

In the GUI, go to Setup → Routing/Firewall → Network Zones Click on the button Add to create the first Network Zone to be redirected on the configuration page.



- General Settings
 - Name: WLAN (use your custom name)
 - Enable IP Masquerading: on
 - Covered networks: WLAN
 - Save



Same configuration as described previously for the Network zone.

- General Settings
 - Name: LAN (use your custom name)
 - Enable IP Masquerading: off
 - Covered networks: LAN
- Inter-Zone Forwarding
 - Allow forwarding to destination zones : Tick for WLAN
 - Save

NETWORK ZONES - ZONE SETTINGS

ZONE "ZONE_2"

This section defines common properties of "zone_2".
Covered networks specifies which available networks are members of this zone.

General Settings | Advanced Settings

Name: LAN

Enable IP Masquerading: Only on public zones. Use for NAT/PAT routing
Warning: if using VRRP, the NATed network must be set to protocol NONE

MSS clamping:

Default acceptance policy for local services: All enabled

Covered networks: LAN: WLAN:

INTER-ZONE FORWARDING

Use this section only if IP Masquerading is disabled on this zone.

The options below control the forwarding policies between this zone (%s) and other zones. Destination zones cover forwarded traffic originating from %q. The forwarding rule is unidirectional, e.g. a forward from lan to wan does not imply a permission to forward from wan to lan as well.

Allow forwarding to destination zones: WLAN: WLAN:

After creating the 2 networks Zones, we should have the result below:

NETWORK ZONES OVERVIEW

NAME	COVERED NETWORKS	FORWARD TO DESTINATION ZONE	IP MASQUERADING	LOCAL SERVICES	ACTIONS
WLAN	"WLAN"	-	<input checked="" type="checkbox"/>	All enabled	
LAN	"LAN"	WLAN	<input type="checkbox"/>	All enabled	

Add zone

Configuring Connection Tracking

We are in Router mode and the NAT is configured, the connection tracking service is used to synchronize connection TCP connections between the Master and Backup.

In the GUI, go to Setup → Services → Conn. Tracking → Basic

- Enable connection tracking: Tick
- Network for messages exchange: LAN
- Log to system log: Tick

CONNECTION TRACKING

The main use of connection tracking is to support VRRP in a NAT/PAT router.

CONNECTION TRACKING SERVER CONFIGURATION

Basic | Advanced

Enable connection tracking:

Network for messages exchange: LAN: WLAN:

Communication link used to exchange connection tracking information

Log to system log:

Configuring VRRP Service

In the GUI, go to Setup → Services → VRRP. We will add 2 VRRP Instances (100 and 200) in this configuration.

- Multicast Group:224.0.0.18 (help IPV4 multicast group used for VRRP advertisement)
- VRRP Instance Configuration
 - Enter the VRID (Virtual Router ID):100 (your custom ID but between 1 and 255) then click Add to be redirected to the Next page

- Virtual Router ID=100
- Check Enable to use this entry
- Virtual IPv4 Address:192.168.3.254
- Netmask: 255.255.255.0

We created the second instance as described above with the Virtual Router Id 200.

- Save
- Configuring the Synchronized Subnet Groups
 - Enter a nickname for the new group: acksys_vrp (allowed characters are 0-9, a-z, A-Z, underscore) to be redirected to the Next page
 - Enable: check the button
 - Initial state: Master
 - Advertisements period:1000 (by default)
 - Priority:250
 - Virtual router IDs:100,200
 - Support connection Tracking: enable
 - Check allow multicast routing only when this group is in Master state
 - Save and Apply

SYNCHRONIZED SUBNETS GROUPS CONFIGURATION

acksys_vrp Delete

Enable

Initial state Master (routing)
Masters directly try to overtake the virtual IP at startup; backups first check for masters

Advertisements period 1000
100-15000 milliseconds

Priority 250
1-254, default is 200 for backups and 230 for masters

Virtual router IDs 100
200
Remember to (save) the newly added instances to allow choosing them here

Support connection tracking handle NAT/PAT connection recovery.
Warning: NATed VRRP networks must not define IP aliases

Services dependent on the state of this group Allow Multicast routing only when this group is in Master state

Add

Enter a nickname for the new group; allowed characters are 0-9, a-z, A-Z, underscore

NOTE: By default, when VRRP is enabled, the member with the highest priority will always be the master of the group. This is the end of this Router 1 step by step and the configuration is similar for the 3 others routers except IP addresses. The 3 others routers will not be described step by step.

Configuring Router 4 in Backup state and in Client Role

Network Interfaces

We then repeat the same steps use to configure Router 1, Network, Network Zone, SSID applied to the Router 1 in Master Role for the BACKUP router 2 with information in the table below:

Networks	Router 2: BACKUP
	LAN IP Alias: 192.168.3.4/24 No WLAN IP Alias:
Virtual IP Address	LAN VIP: 192.168.3.254/24 WLAN VIP:192.168.2.254/24
Client	SSID:VRRP2

Configuring Network on Router4:

After creating the 2 networks, we should have the result below:

NETWORK OVERVIEW

NAME	ENABLED	IPV6 ADDRESS	IPV6 GATEWAY	IPV4 ADDRESS	NETMASK	IPV4 GATEWAY (METRIC)	PERSISTENCE	ACTIONS
LAN	<input checked="" type="checkbox"/>			VRRP			Default	
WLAN	<input checked="" type="checkbox"/>			VRRP			Default	

Add network

Configuring SSID For Router 4

The SSID configured on Router 4 is different from the one configured on Router 3 and all the other settings are similar:

WI-FI INTERFACE						
Wi-Fi 4 (802.11n) Wireless interface						
CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	ACTIONS	
Automatic	802.11b+g+n	acksys	Access Point (infrastructure)	none	  	

- Role: Client
- ESSID: VRRP2
- Network: WLAN
- Click on Save

WIRELESS SETTINGS : WIFI

The *Device Configuration* section covers physical settings of the radio hardware which is shared among all defined wireless networks. Per network settings like encryption or operation mode are in the *Interface Configuration*.
If *SRCC* role is selected, most of the *Device Configuration* is irrelevant (please refer to the product user guide).

DEVICE CONFIGURATION

General Setup | a/b/g Data Rates | 802.11n Mcs | Advanced Settings

802.11 mode 802.11b+g+n (2.4 GHz)
Changing the mode may affect the list in the 'a/b/g data rates' tab

HT mode 20MHz
Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces

Automatic channel select Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces

INTERFACE CONFIGURATION

General Setup | Wireless Security | Advanced Settings | Roaming | Frame filters

Role Client (infrastructure)

Multiple ESSIDs

ESSID VRRP2

Network LAN WLAN

- Security: No encryption (only in this note but we invite the partner to set a strong password)

INTERFACE CONFIGURATION

General Setup | Wireless Security | Advanced Settings | MAC Filter | Frame filters

Security No encryption
WARNING: The WEP encryption is only supported with 11abg mode.

Configuring Network Zone For Router 4

After creating the 2 networks Zones, we should have the result below:

NETWORK ZONES OVERVIEW

NAME	COVERED NETWORKS	FORWARD TO DESTINATION ZONE	IP MASQUERADING	LOCAL SERVICES	ACTIONS
WLAN	"WLAN"	-	<input checked="" type="checkbox"/>	All enabled	 
LAN	"LAN"	WLAN	<input type="checkbox"/>	All enabled	 

 Add zone

Configuring Connection Tracking

In the GUI, go to Setup → Services → Conn. Tracking → Basic

CONNECTION TRACKING

The main use of connection tracking is to support VRRP in a NAT/PAT router.

CONNECTION TRACKING SERVER CONFIGURATION

Basic | Advanced

Enable connection tracking

Network for messages exchange

LAN:

WLAN:

Communication link used to exchange connection tracking information

Log to system log

Configuring VRRP Service on Router 4 in Backup Role

Same configuration for Router 1 except some differences in the configuration such its Backup Role.

VRRP INSTANCES CONFIGURATION

VIRTUAL ROUTER ID	ENABLE	NETWORK	VIRTUAL IPV4 ADDRESS	NETMASK	UNICAST PEER IP
100	<input checked="" type="checkbox"/>	LAN	192.168.1.252	24	Multicast advertisement used
This section contains no values yet					
<input type="text" value="100"/> <input type="button" value="Add"/>					

Enter the virtual router ID for the new instance, as a number between 0 and 255

We created the second instance as described above with the Virtual Router Id 200.

VRRP INSTANCES CONFIGURATION

VIRTUAL ROUTER ID	ENABLE	NETWORK	VIRTUAL IPV4 ADDRESS	NETMASK	UNICAST PEER IP
100	<input checked="" type="checkbox"/>	LAN	192.168.1.252	24	Multicast advertisement used
200	<input checked="" type="checkbox"/>	WLAN	192.168.2.252	24	Multicast advertisement used
This section contains no values yet					
<input type="text"/> <input type="button" value="Add"/>					

Enter the virtual router ID for the new instance, as a number between 0 and 255

- **Configuring the Synchronized Subnet Groups**

SYNCHRONIZED SUBNETS GROUPS CONFIGURATION

acksys_vrp Delete

Enable

Initial state Backup (dormant) Masters directly try to overtake the virtual IP at startup; backups first check for masters

Advertisements period 1000 100-15000 milliseconds

Priority 200 1-254, default is 200 for backups and 230 for masters

Virtual router IDs 100, 200 Remember to [save] the newly added instances to allow choosing them here

Support connection tracking handle NAT/PAT connection recovery.
Warning: NATed VRRP networks must not define IP aliases

Services dependant on the state of this group Allow Multicast routing only when this group is in Master state

Enter a nickname for the new group; allowed characters are 0-9, a-z, A-Z, underscore

5. STATUS

To check the VRRP state, let connecting In the GUI, go to Status → Services → VRRP to identify the state of the **MASTER** and **BACKUP** router.

On the screenshot below, Router3 configured with High priority is MASTER where Router 4 with lower priority is Backup when the both router are powered on.

ROUTER3: Master State

VRRP

ACTIVE INSTANCES AND GROUPS			
GROUP NAME	GROUP STATE	VRRP INSTANCE	VRRP STATE
acksys_vrp2	master	100	master
		200	master

ROUTER4: Backup State

VRRP

ACTIVE INSTANCES AND GROUPS			
GROUP NAME	GROUP STATE	VRRP INSTANCE	VRRP STATE
acksys_vrp2	backup	100	backup
		200	backup

WIFI Client connection Status on MASTER

As seen on the below screen shot, the both router in cluster in Client mode are connected to the both SSID (VRRP and VRRP2) but traffics are forwarded through the Master Router with the Virtual IP Address.

ASSOCIATED STATIONS

ASSOCIATED STATIONS RESULTS : 1								
GRAPH	RADIO	NAME / SSID	MODE	MAC	CHANNEL	SIGNAL	NOISE	SIGNAL/NOISE
	WiFi	VRRP	Infrastructure	C4:93:00:0C:3C:85	6	-37 dBm	-95 dBm	58 dB

WIFI Connection Status on BACKUP

ASSOCIATED STATIONS

ASSOCIATED STATIONS RESULTS : 1								
GRAPH	RADIO	NAME / SSID	MODE	MAC	CHANNEL	SIGNAL	NOISE	SIGNAL/NOISE
	WiFi	VRRP2	Infrastructure	00:09:90:01:94:D7	7	-41 dBm	-95 dBm	54 dB

6. TESTING

If you've followed all the steps presented above, your configuration should be finished. But as with any other configuration, it is always wise to test the setup in order to make sure that it works properly.

Test Scenario 1

For this basic test, let power off or disconnect the Network cable on the Router 3 which is in MASTER state therefore we could verify if the BACKUP Router 4 become MASTER.

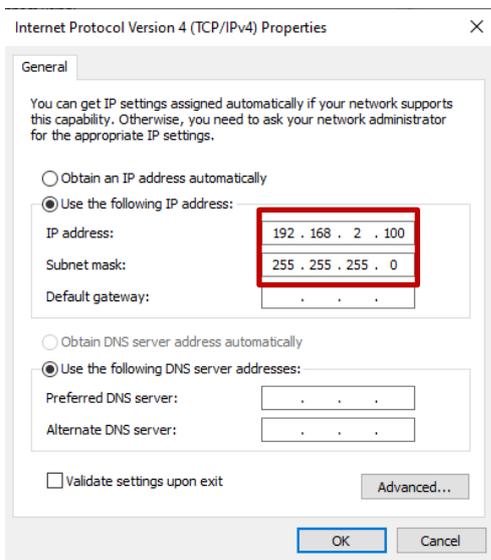
VRRP

ACTIVE INSTANCES AND GROUPS			
GROUP NAME	GROUP STATE	VRRP INSTANCE	VRRP STATE
acksys_vrp2	master	100	master
		200	master

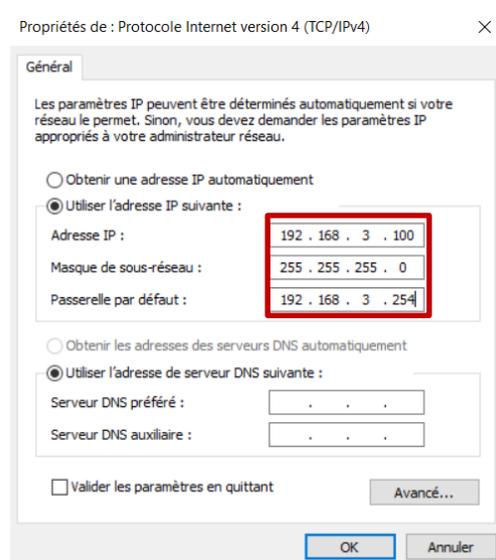
As expected, the BACKUP (192.168.3.4) become MASTER as shown the above screenshot confirming the VRRP protocol functions properly works in case of failover.

Test Scenario 2

The purpose of this second test is to check if a continuous ping from PC2 to PC1 connectivity is maintained when we power off the MASTER.



PC1 Network IP Parameter



PC2 Network IP Parameter

RESULT: ICMP Test PC2 ->PC1

When power off the MASTER router 192.168.2.3 in Client Mode and the Backup router become Master 192.168.3.4 and PC2 continue to ping PC1 with 5% loss of packet.

```
C:\Users\ >ping 192.168.2.100 -t
Envoi d'une requête 'Ping' 192.168.2.100 avec 32 octets de données :
Réponse de 192.168.2.100 : octets=32 temps=1 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=53 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Délai d'attente de la demande dépassé.
Délai d'attente de la demande dépassé.
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=1 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=1 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=1 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=3 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=1 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=13 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=1 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=5 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=1 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Réponse de 192.168.2.100 : octets=32 temps=2 ms TTL=127
Statistiques Ping pour 192.168.2.100:
  Paquets : envoyés = 36, recus = 34, perdus = 2 (perte 5%),
  Durée approximative des boucles en millisecondes :
    Minimum = 1ms, Maximum = 53ms, Moyenne = 3ms
```

When The Master is Power

ICMP STAT When The Master is Power Off

As result even if a physical router fails, VRRP helps to ensure that another physical router takes over the distribution tasks as part of the virtual router.

Support : <https://support.acksys.fr>