

APPLICATION NOTE

APNUS37 How to Configure VRRP on ACKSYS Router December 2023

Copyright © 2023 ACKSYS Communications & Systems. All rights reserved.



Content

1.	VRRP Glossary and Term	3
2.	Introduction	4
3.	VRRP Configuration architecture	5
4.	ACKSYS Router configuration	6
	Configuring Router1 in AP role	6
	Network Configuration	6
	Configuring SSID For Router 1	8
	Configuring Router 2 in AP Role	9
	Configuring Network on Router2:	9
	Configuring SSID For Router 2	9
	Configuring Router 3 in Master State and in Client Role	10
	Network Configuration	10
	Configuring SSID For MASTER Router 3	13
	Configuring Network Zones on Router 3	14
	Configuring Connection Tracking	15
	Configuring VRRP Service	16
	Configuring Router 4 in Backup state and in Client Role	17
	Configuring Network on Router4:	17
	Configuring SSID For Router 4	18
	Configuring Network Zone For Router 4	18
	Configuring Connection Tracking	19
	Configuring VRRP Service on Router 4 in Backup Role	19
5.	STATUS	20
6.	TESTING	21
	Test Scenario 1	21
	Test Scenario 2	21



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 <u>here</u>:

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 ightarrow Physical Interfaces ightarrow Edit LAN Interface to create the LAN Network

		SETUP	TOOLS	STATUS						
PHYSICAL INTERFACES	NE			,						
VIRTUAL INTERFACES										
BRIDGING		NAME	ENABLED	IPV6 ADDRESS	IPV6 GATEWAY	IPV4 ADDRESS	NETMASK	IPV4 GATEWAY (METRIC)	PERSISTENCE	ACTIONS
NETWORK		lan				192.168.1.253	255.255.255.0		Default	
LAN		+) Ade	d notwork							
VPN		Aut	THELWOIK							
ROUTING / FIREWALL										
SECURITY										
QOS										
SERVICES										

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. Yo	u can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interface
COMMON CONFIGURATION	
General Setup Interfaces Settings Advanced Settings	IPv6 Setup
Network description	LAN G Friendy name for your network
Protocol	static ~
IPv6-Address	CIDR-Notation: address/prefix
Default <u>IPv6</u> gateway	
IPv4-Address	192.168.2.1
IPv4-Netmask	255.255.255.0 ×
Default <u>IPv4</u> gateway	
Default gateway metric	0 © Galeway priority when several default paleways are configured, lowest is chosen. Used and environment of fortill antennation of this interfaces.
<u>DNS</u> server(s)	Ordering must dealer getting is denied at minimizer

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

NETWORK - WLAN

On this page you can configure the network interfaces. You can brid	Ige 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 S	Setup
Bridge interfaces	🗹 🔞 creates a bridge over specified interface(s)
Enable <u>STP/RSTP</u>	O Enables the Spanning Tree Protocol on this bridge WARNING: Some cautions must be taken with wireless interfaces, please see user guide
Enable LLDP forwarding	Ø 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)
МТ	1500

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

		SETUR	р тоо	_S STATUS						
PHYSICAL INTERFACES	N			FW						
VIRTUAL INTERFACES	IAL INTERFACES									
BRIDGING		NAME	ENABLED	IPV6 ADDRESS	IPV6 GATEWAY	IPV4 ADDRESS	NETMASK	IPV4 GATEWAY (METRIC)	PERSISTENCE	ACTIONS
NETWORK		WLAN				192.168.2.1	255.255.255.0		Default	2
WLAN	NLAN +									
VPN		<u> </u>	dd network	J						



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 adapter to allow end device in client mode to connect on its .

In the GUI, go to Setup \rightarrow Physical Interfaces \rightarrow Click WiFI Adaptor to On

WI-FI INT	WI-FI INTERFACE								
	Wi-Fi 4 (802.11n) Wireless i	nterface							
	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								
i 4 (802.11n) Wireless int	terface				()			
CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	ACTIONS			
Automatic	802.11b+g+n	acksys	Access Point (infrastructure)	none				
i -	4 (802.11n) Wireless in CHANNEL Automatic	4 (802.11n) Wireless interface CHANNEL 802.11 MODE Automatic 802.11b+g+n	Employed State 4 (802.11n) Wireless interface 802.11 MODE SSID CHANNEL 802.11 MODE SSID Automatic 802.11b+g+n acksys	CHANNEL SSID ROLE Automatic 802.11b+g+n acksys Access Point (infrastructure)	CHANNEL SID ROLE SECURITY Automatic 802.11b-g+n acksys Access Point (infrastructure) none			

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

WIRELESS SETTINGS : WIFI

The Device Configuration section covers physical settings of the ra operation mode are in the Interface Configuration. If SRCC role is selected, most of the Device Configuration is irrelev	dio hardware which is shared among all defined wireless networks. Per network settings like encryption or vant (please refer to the product user guide).
DEVICE CONFIGURATION	
General Setup a/b/g Data Rates 802.11n Mcs Advanced Se 802.11 mode HT mode	802.11b+g+n (2.4 GHz) > Changing the mode may affect the list in the 'a/b/g data rates' tab 20MHz
Automatic channel select	Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces O Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces
INTERFACE CONFIGURATION	
General Setup Wireless Security Advanced Settings MAC Role	Filter Frame filters Access Point (infrastructure) V
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	v
	WARNING: The WEP encryption is only su	upported 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:

NAME	ENABLED	IPV6 ADDRESS	IPV6 GATEWAY	IPV4 ADDRESS	NETMASK	IPV4 GATEWAY (METRIC)	PERSISTENCE	ACTIONS			
WLAN				192.168.2.2	255.255.255.0		Default	2			
1 A	dd network										

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:

V	Vi-Fi 4 (802.11n) Wireless in	Iterface				
	CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	ACTIONS
	Automatic	802.11b+g+n	acksys	Access Point (infrastructure)	none	
	Advinaic	 Role: Access ESSID: VRRP Network: W Click on Sav 	s Point 22 /LAN e	Access rom (Intestructure)	THE	
	WIREL	ESS SETTINGS : WIFI				
	Ih op If S	e Device Configuration section coverse eration mode are in the Interface Con SRCC role is selected, most of the De	s physical settings of the i afiguration. avice Configuration is irrele	radio hardware which is shared among all defined wireless networks. Per evant (please refer to the product user guide).	network settings like encryptic	n or
	DEVICE	CONFIGURATION				
	Gene 802.11	eral Setup a/b/g Data Rates 80	2.11n Mcs Advanced S	Settings S02.11b+g+n (2.4 GHz)		
	HTmo	ode		20MHz Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces	i	
	Auton	natic channel select		Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces		
	INTERF	ACE CONFIGURATION				
	Gene Role	eral Setup Wireless Security Ad	dvanced Settings MAC	Filter Frame filters Access Point (infrastructure) ✓		
	ESSIC	!		VRRP2		
	Maxin	num simultaneous associations		Max allowed by radio card (see documentation) (2) 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 the user guide for more details.	this option and select a DFS channel. S	ee
	Netwo	ork		WLAN: 🛃 👳		



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

General Setup Wireless Security	Advanced Settings MAC Filter Frame filters							
Security	No encryption V							
	WARNING: The WEP encryption is only supported with 11abg mode.							

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 ightarrow Physical Interfaces ightarrow Edit LAN Interface to create the LAN Network

		SETUP	TOOLS	STATUS						
PHYSICAL INTERFACES	N	ETWOR		u .						
VIRTUAL INTERFACES	-			•						
BRIDGING		NAME	ENABLED	IPV6 ADDRESS	IPV6 GATEWAY	IPV4 ADDRESS	NETMASK	IPV4 GATEWAY (METRIC)	PERSISTENCE	ACTION C
NETWORK		lan				192.168.1.253	255.255.255.0		Default	
LAN		+ Ad	d notwork							
VPN		Au	unetwork							
ROUTING / FIREWALL										
SECURITY										
QOS										
SERVICES										

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 inte	rfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interface
OMMON CONFIGURATION	
General Setup Interfaces Settings Advance	d Settings IPv6 Setup
Enable interface	
Network description	LAN
	Friendly name for your network
Protocol	VRRP v
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.
PALIASES	
VATed VRRP networks warning The following applies to NATed networks which use th	e VRRP protocol:
 Public-side NAT MUST NOT define IP aliases; Conversely, Private-side NAT SHOULD define 	else the NAT might use the alias IP as public address instead of the VRRP IP a private IP alias to allow connection tracking replication
1	× Delet
General Setup IPv6 Setup	
IPv4-Address	192.168.3.3
IPv4-Netmask	
	255.255.255.0
	Add

- 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 brid	Ige several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces							
COMMON CONFIGURATION	OMMON CONFIGURATION							
General Setup Interfaces Settings Advanced Settings IPv6 S	Setup							
Bridge interfaces	creates a bridge over specified interface(s)							
Enable <u>STP/RSTP</u>	O Enables the Spanning Tree Protocol on this bridge WARNING: Some cautions must be taken with vireless interfaces, please see user guide							
Enable LLDP forwarding	[2] 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	✓ Z Ethernet adapter: LAN (network: LAN) ○ WiFi adapter: WiFi - VRRP (network: LAN)							
мти	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 brid	dge 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 Enable interface	Setup
Network description	WLAN G Friendly name for your network
Protocol	VRRP v
<u>DNS</u> 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 Conversely, Private-side NAT SHOULD define a private IP alias to a	use the alias IP as public address instead of the VRRP IP allow connection tracking replication
This section contains no values yet	
Ad	ld

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

NETWORK - WLAN

On this page you can configure the network interfaces. You can brid	dge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.								
COMMON CONFIGURATION	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	Implementation of the second sec								
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)								
МТО	1500								

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				VRRP			Default	2 🗙
WLAN				VRRP			Default	2 🗙
1 A	dd network]						



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 \rightarrow Physical Interfaces \rightarrow Click WiFI Adaptor to On



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

WI-111011									
V	Vi-Fi 4 (802.11n) Wireless in	terface				()			
	CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	ACTIONS			
	Automatic	802.11b+g+n	acksys	Access Point (infrastructure)	none	2 8			

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

I he Device Configuration section con operation mode are in the Interface C If SRCC role is selected, most of the	ers physical settings of the radio hardware which is shared among all defined wireless networks. Per network settings like encryption o onfiguration. Device Configuration is irrelevant (please refer to the product user guide).
EVICE CONFIGURATION	
General Setup a/b/g Data Rates	802.11n Mcs Advanced Settings
802.11 mode	802.11b+g+n (2.4 GHz)
HT mode	20MHz Automatic 400Hz HT mode is not compatible with AP Archarc Mesh and multi-interfaces
Automatic channel select	Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces
Automatic channel select	Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces
Automatic channel select	Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces
Automatic channel select	Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces
Automatic channel select TERFACE CONFIGURATION General Setup Wireless Security	Advanced Settings Roaming Advanced Roaming Frame filters
TERFACE CONFIGURATION General Setup Wireless Security Role	Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces Advanced Settings Roaming Advanced Roaming Frame filters Client (infrastructure)
Automatic channel select TERFACE CONFIGURATION General Setup Vireless Security Note Automatic channel select	Advanced Settings Roaming Advanced Roaming Frame fillers Client (infrastructure)
International select International select Internation Internation International Security International Inter	Advanced Settings Roaming Advanced Roaming Frame filters Client (infrastructure) VRRP VRRP
Automatic channel select TERFACE CONFIGURATION General Setup Wureless Security Atole Wurtiple ESSIDs ESSID tetwork	Advanced Settings Roaming Advanced Roaming Frame filters Client (infrastructure) VRRP

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

General Setup Wireless Security	Advanced Settings MAC Filter Frame filters	
Security	No encryption v	
	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 \rightarrow Routing/Firewall \rightarrow Network Zones Click on the button Add to create the first Network Zone to be redirected on the configuration page.

	NETWORK	CZONES OVERVIEW				
ſ						
	NAME	COVERED NETWORKS	FORWARD TO DESTINATION ZONE	IP MASQUERADING	LOCAL SERVICES	ACTIONS
	1 A	dd zone				

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

NETWORK ZONES - ZONE SETTINGS				
	NETWORK	ZONES	ZONE	CETTINICO
NETWORK ZONED - ZONE DET HIGO	NEIWORN	ZONES -	ZUNE	361111463

Sovered networks specifies which available networks are me	mbers of this zone.
General Settings Advanced Settings	
lame	WLAN
Enable IP Masquerading	Only on public zones. Use for NATIPAT routing Warning: if using VRRP, the NATed network must be set to protocol NONE
MSS clamping	
Default acceptance policy for local services	All enabled V V V V V V V V V V V V V V V V V V V
Covered networks	LAN: 2
TER-ZONE FORWARDING	
Se this section only if IP Masquerading is disabled on the options below control the forwarding policies between the indirectional, e.g. a forward from lan to wan does not imply a forward from lan to wante forward fro	his zone. is zone (%s) and other zones. <i>Destination zones</i> cover forwarded traffic originating from %q . The forwarding rule is a permission to forward from wan to lan as well.

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

I his section defines common properties of "zone_2". Covered networks specifies which available networks are me	mbers of this zone.
General Settings Advanced Settings	
Name	LAN
Enable IP Masquerading	(i) 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: @
ITER-ZONE FORWARDING	
Jse this section only if IP Masquerading is disabled on the options below control the forwarding policies between th unidirectional, e.g. a forward from lan to wan does not imply a	his zone. is zone (%s) and other zones. <i>Destination zones</i> cover forwarded traffic originating from %q . The forwarding rule is a permission to forward from wan to lan as well.

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"			All enabled	2 🗶
LAN	"LAN"	WLAN		All enabled	2 🗙
<u>†</u> /	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 \rightarrow Services \rightarrow Conn. Tracking \rightarrow 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/PA	AT router.
CONNECTION TRACKING SERVER CONFIGURATION	
Basic Advanced	
Enable connection tracking	
Network for messages exchange	O LAN: 🖉
	O WLAN: 👷
	② Communication link used to exchange connection tracking information
Log to system log	



Configuring VRRP Service

•

In the GUI, go to Setup \rightarrow Services \rightarrow 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

VRRP INSTAN	ICES CONFIGUR/	ATION				
VIRTUA	L ROUTER ID	ENABLE	NETWORK 😁	VIRTUAL IPV4 ADDRESS	NETMASK	UNICAST PEER IP
		Use this entry?	Associated real subnet	Must be different from any other IP assigned to this device	Number of net bits, CIDR format	Set peer unicast IP where VRRP will send the advertisement. Leave blank to used a Multicast advertisement
				This sec	tion contains no values yet	
100			<u>t</u>	Add		
Enter the second sec	virtual router ID for I	the new instance, as	a number between 0 and 25			

- 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.

VF	RP INSTANCE	S CONFIGI	JRATION				
	VIRTUAL ROUTER ID	ENABLE	NETWORK 🖻	VIRTUAL IPV4 ADDRESS	NETMASK	UNICAST PEER IP	
		Use this entry?	Associated real subnet	Must be different from any other IP assigned to this device	Number of net bits, CIDR format	Set peer unicast IP where VRRP will send the advertisement. Leave blank to used a Multicast advertisement	
	100		LAN ¥	192.168.3.254	24	Multicast advertisement used	×
	200	<	WLAN ¥	192.168.2.254	24	Multicast advertisement used	×
	Enter the virtual re	outer ID for the	new instance, as a nu	mber between 0 and 255	J		

- 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



	_	
nable		
nitial state	Master (routing)	
	(2) Masters directly try to overtake the virtual IP at startup; backups first check for masters	
dvertisements period	1000	
	100-15000 milliseconds	
riority	250	
	1-254, default is 200 for backups and 230 for masters	
'irtual router IDs	100	
	200 🗸	
	Remember to [save] the newly added instances to allow choosing them here	
upport connection tracking 🖭	🔽 🍘 handle NAT/PAT connection recovery.	
	Warning: NATed VRRP networks must not define IP aliases	
	Allow Multicast routing only when this group is in Master state	

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				VRRP			Default	2 🗙
WLAN				VRRP			Default	2 🗙
1 A	dd 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:

(802.11n) Wireless in	terface				
CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	A
Automatic	802.11b+g+n	acksys	Access Point (in frastructure)	none	
	Role: Clien	t			
	ESSID: VRR	RP2			
	Network: W	NLAN			
	Click on Sa	ve			
WIRELE	SS SETTINGS : WIFI				
The <i>L</i> opera If SR0	Device Configuration section cove tion mode are in the Interface Ca CC role is selected, most of the D	ers physical settings of the ra onfiguration. Device Configuration is irrele	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en	ncryption or
The <i>L</i> opera If <i>SR</i> (DEVICE C General 802.11 m	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION	ers physical settings of the monfiguration. Device Configuration is irrele	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en	ncryption or
The <i>L</i> opera If <i>SR</i> DEVICE C Genera 802.11 m	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode	ers physical settings of the monifiguration. Device Configuration is irrele	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide). Settings 802.11b+g+n (2.4 GHz) ✓ ⓓ Changing the mode may affect the list in the 'a/b/g data rates' tab	s. Per network settings like en	ncryption or
The L opera If SRC DEVICE C Genera 802.11 m HT mode	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode	ers physical settings of the monfiguration. Device Configuration is irrele 202.11n Mcs Advanced S	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide). Settings 802.11b+g+n (2.4 GHz)	s. Per network settings like en	ncryption or
The L opera If SRC DEVICE C Genera 802.11 m HT mode	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode	ers physical settings of the m onfiguration. Device Configuration is irrele 202.11n Mcs Advanced S	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en	ncryption or
The L opera If SRC DEVICE C General 802.11 m HT mode	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode	ers physical settings of the m onfiguration. Device Configuration is irrele 202.11n Mcs Advanced S	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en	ncryption or
The L opera If SR DEVICE C Genera 802.11 m HT mode Automati	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode	ers physical settings of the m onfiguration. Device Configuration is irrele 302.11n Mcs Advanced S	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en Iterfaces	cryption or
The L opera If SR DEVICE C General 802.11 m HT mode Automati	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode c channel select E CONFIGURATION	ers physical settings of the n onfiguration. Device Configuration is irrele 002.11n Mcs Advanced S	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide). Settings 802.11b+g+n (2.4 GHz) Changing the mode may affect the list in the 'afbig data rates' tab 20MHz Automatic 40MHz HT mode is not compatible with Ad-hoc, Mesh and multi-in C automatic channel select is not compatible with Ad-hoc, Mesh and multi-in	s. Per network settings like en terfaces	Acryption or
The L opera If SR DEVICE C Genera 802.11 m HT mode Automati	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode c channel select E CONFIGURATION I Setup Wireless Security 4	ers physical settings of the monfiguration. Device Configuration is irrele 002.11n Mcs Advanced S	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en	Acryption or
The L opera If SR DEVICE C Genera 802.11 m HT mode Automati INTERFAC Genera Role	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode c channel select E CONFIGURATION I Setup Wireless Security 4	ers physical settings of the monfiguration. Device Configuration is irrele 002.11n Mcs Advanced S	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en Iterfaces	Acryption or
The L opera If SR DEVICE C Genera 802.11 m HT mode Automati INTERFAC Genera Role Multiple	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode c channel select E CONFIGURATION I Setup Wireless Security A ESSIDs	ers physical settings of the monfiguration. Device Configuration is irrele 002.11n Mcs Advanced S	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en Iterfaces	Acryption or
The L opera If SR DEVICE C General 802.11 m HT mode Automati NTERFAC General Role Multiple ESSID	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode c channel select E CONFIGURATION I Setup Wireless Security 7 ESSIDs	ers physical settings of the monfiguration. Device Configuration is irrele 202.11n Mcs Advanced S	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en	acryption or
The L opera If SR DEVICE C Genera 802.11 m HT mode Automati INTERFAC Genera Role Multiple ESSID Network	Device Configuration section cove tion mode are in the Interface Co CC role is selected, most of the D ONFIGURATION I Setup a/b/g Data Rates 8 ode c channel select E CONFIGURATION I Setup Wireless Security 4 ESSIDs	ers physical settings of the monfiguration. Device Configuration is irrele 202.11n Mcs Advanced S Advanced Settings Roam	adio hardware which is shared among all defined wireless network evant (please refer to the product user guide).	s. Per network settings like en Iterfaces	acryption or

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

General Setup Wireless Security Advanced Settings MAC Filter Frame filters Security No encryption @ WARNING: The WEP encryption is only supported with 11abg mode.	NTERFACE CONFIGURATION		
Security Witness Security Advanced Security MACCINE Frame Terminents Security No encryption G WARNING: The WEP encryption is only supported with 11abg mode.	Conoral Satura Mirelana Segurity Advan	ad Sattings MAC Filter Frame filters	
Security No encryption V (2) WARNING: The WEP encryption is only supported with 11abg mode. (3) (3)	General Setup Wireless Security Advance	ed Settings MAC Filter Frame inters	
2 WARNING: The WEP encryption is only supported with 11abg mode.	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"	-		All enabled	2 🗶
LAN	"LAN"	WLAN		All enabled	2 🗶
*) <i>P</i>	Add zone				



Configuring Connection Tracking

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

CONNECTION TRACKING	
The main use of connection tracking is to support VF	P in a NAT/PAT router.
CONNECTION TRACKING SERVER CONFIGURATION	
Basic Advanced	
Enable connection tracking	
Network for messages exchange	💿 LAN: 🗾
	O 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 differents in the configuration such its Backup Role.

VRRP INSTANCES CONFIGURATION				
VIRTUAL ROUTER ID ENABL	NETWORK	VIRTUAL IPV4 ADDRESS	NETMASK	UNICAST PEER IP
Use this en	ry? Associated real subnet	Must be different from any other IP assigned to this device	Number of net bits, CIDR format	Set peer unicast IP where VRRP will send the advertisement. Leave blank to used a Multicast advertisement
100 Enter the virtual router ID for the new instan	Art Coe, as a number between 0 and 255	This se	iction contains no values yet	

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

VRRP INSTANCE	S CONFIGU	JRATION				
VIRTUAL ROUTER ID	ENABLE	NETWORK 🖭	VIRTUAL IPV4 ADDRESS	NETMASK	UNICAST PEER IP	
	Use this entry?	Associated real subnet	Must be different from any other IP assigned to this device	Number of net bits, CIDR format	Set peer unicast IP where VRRP will send the advertisement. Leave blank to used a Multicast advertisement	
100		LAN V	192.168.1.252	24	Multicast advertisement used	×
200		WLAN ~	192.168.2.252	24	Multicast advertisement used	×
Enter the virtual r	outer ID for the	new instance, as a nu	mber between 0 and 255]		

• Configuring the Synchronized Subnet Groups

acksys_vrp		💌 Dele
Enable		
Initial state	Backup (dormant) Backup (dormant) Backups 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-	Add	



5. **STATUS**

To check the VRRP state, let connecting In the GUI, go to Status \rightarrow Services \rightarrow 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
ackeye ym2	master	100	master
acksys_vipz	master	200	master

ROUTER4: Backup State

VRRP			
ACTIVE INSTANCES AND GROUPS			
GROUP NAME	GROUP STATE	VRRP INSTANCE	VRRP STATE
ackeye ym2	backup	100	backup
acksys_vipz	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.

ASSOCIA	TED STATIONS							
ASSOCIATE	D STATIONS RESULTS : 1							
GRAPH	RADIO	NAME / SSID	MODE	MAC 0	CHANNEL 0	SIGNAL O		SIGNAL/NOISE O
ilili	WiFi	VRRP	Infrastructure	C4:93:00:0C:3C:85	6	📶 -37 dBm	-95 dBm	58 dB

WIFI Connection Status on BACKUP

A	SSOCIAT	TED STATIONS	S								
ŀ	SSOCIATE	D STATIONS RESU	LTS : 1								
	GRAPH	RADIO -	~	NAME / SSID	θ	MODE 0	MAC 0	CHANNEL 0	SIGNAL O	NOISE O	SIGNAL/NOISE
	îlî	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
ackeys ymp?	master	100	master
acksys_vipz	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.

ernet Protocol Version 4 (TCP/IP)	v4) Properties	×	Propriétés de : Protocole Intern	et version 4 (T
eneral			Général	
You can get IP settings assigned au this capability. Otherwise, you need for the appropriate IP settings.	tomatically if your network supports d to ask your network administrator	3	Les paramètres IP peuvent être réseau le permet. Sinon, vous d appropriés à votre administrate	déterminés aut evez demander ır réseau.
Obtain an IP address automati	ically		Obtenir une adresse IP au	omatiquement
Use the following IP address:			Utiliser l'adresse IP suivant	e:
IP address:	192.168.2.100		Adresse IP :	192 .
Subnet mask:	255.255.255.0		Masque de sous-réseau :	255 .
Default gateway:			Passerelle par défaut :	192 .
Obtain DNS server address au	tomatically	_	Obtenir les adresses des s	erveurs DNS a
Use the following DNS server a	addresses:	_	O Utiliser l'adresse de serveu	r DNS suivant
Preferred DNS server:			Serveur DNS préféré :	
Alternate DNS server:			Serveur DNS auxiliaire :	
Validate settings upon exit	Advanced		Valider les paramètres en	quittant
	OK Cance	el		

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 parket.

C:\Users\	>ping 192.168	.2.100 -t							
Envoi d'une requ Réponse de 192.1 Réponse de 192.1 Réponse de 192.1 Réponse de 192.1	éte 'Ping' 192.168. 68.2.100 : octets=32 68.2.100 : octets=32 68.2.100 : octets=32 68.2.100 : octets=32 68.2.100 : octets=32	2.100 avec temps=1 ms temps=53 ms temps=2 ms temps=2 ms	32 octets (TTL=127 s TTL=127 TTL=127 TTL=127 TTL=127	de donnée	:5 :				
Délai d'attente de la demande dépassé.					The M	laster i	s Power		
Délai d'attente	de la demande dépass	é.	and the second second				_		
Reponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Reponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	60 3 100 : octots=32	temps=2 ms	TTL-127						
Réponse de 192.1	60 2 100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68 2 100 : octets=32	temps=2 ms	TTL=127						
Rénonse de 192.1	68 2 100 : octets=32	temps=1 ms	TTI =127						
Réponse de 192.1	68 2 100 : octets=32	temps=1 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=1 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=3 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=1 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=13 ms	5 TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=1 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=5 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=1 ms	TTL=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Reponse de 192.1	68.2.100 : octets=32	temps=2 ms	11L=127						
Réponse de 192.1	68.2.100 : octets=32	temps=2 ms	TTL=127						
Statistiques Pin	g pour 192.168.2.100								
Paquets : en	voyés = 36, recus =	34, perdus	= 2 (perte	5%),	ICMP	STAT	When	The	
Durée approximative des boucles en millisecondes :				Master is Power Off					
Minimum = 1ms, Maximum = 53ms, Moyenne = 3ms									

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