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OVERVIEW / PROTOCOLS & PORTS

A high availability (HA) deployment of two Citrix® NetScaler® appliances can provide uninterrupted operation in any transaction. With one appliance configured as the primary node and the other as the secondary node, the primary node accepts connections and manages servers while the secondary node monitors the primary. If, for any reason, the primary node is unable to accept connections, the secondary node takes over.

By default, NetScaler (NS) sends heartbeats every 200ms and dead interval is 3sec. After three seconds, a peer node is marked DOWN if heartbeat messages are not received from the peer node.

Common HA Ports	
UDP 3003	Exchange of HA/Hello packets for communicating UP/DOWN status
TCP 3008	Secure HA configuration synchronization
TCP 3010	Non-Secure HA configuration synchronization
TCP 22	Used by the rsync process during file synchronization

TROUBLESHOOTING CHECKLIST

- Ensure all necessary ports are open, bi-directional
- nsroot passwords between both NS must be the same
- Set rpcNode passwords the same for both NetScalers. Common troubleshooting step is to reset the passwords and change them again (on both NS)
- Model (for hardware) and Hypervisor type (for VPX) and firmware version and build must be the same between NS
- Ensure synchronization and propagation are enabled on both NS
- Disable all unused interfaces and turn off HAMON
- Ensure 'sync VLAN' is set to correct VLAN
- Verify if relevant processes are running: nsnetsvc and nsfsyncd
- Save config and restart the NS (this helps to ensure a restart of processes)
- If failover occurs, check the following for reasons of the failover:
  - Log file: `/var/log/ns.log`
  - Crash files located in: `/var/core/` or `/var/crash/`
  - Events using nsconmsg command in shell:
    `# nsconmsg -K /var/nslog/newnslog -d event`

HA HEARTBEATS/HELLO PACKETS FLOW

HA packets are sent untagged, using the native VLAN, unless NSVLAN is changed from '1' or an interface is configured using the tag all ON function.

Scenarios	
NSVLAN is VLAN 1 interface 1/1 bound VLAN 2 interface 1/2 bound VLAN3	HA packets will flow as untagged on 1/1 and 1/2 interfaces on the native VLAN
NSVLAN is VLAN 1 interface 1/1 bound VLAN 2 w/ -tagall ON interface 1/2 bound VLAN 3	HA packets will flow on 1/1 interface tagged with VLAN ID of 2 and untagged on 1/2 interface
NSVLAN is VLAN 10 interface 1/1 bound VLAN2 interface 1/2 bound VLAN 10	HA packets will flow as tagged on VLAN 10, interface 1/2 only and will not flow on VLAN 2

HELPFUL HA COUNTERS

Command Usage:
```
# nsconmsg -K /var/nslog/newnslog -d stats -g <counterName>
# nsconmsg -K /var/nslog/newnslog -s disptime=1 -d current -g <counterName> | more
```
View list of HA counters (CTX131802)

Counter names	
`ha_err_sync_failure`	The number of times the primary and secondary appliance failed to synchronize the configuration after the last transition
`nic_cur_ha_MAC`	Displays the MAC Address of the interface used for HA communication.
`ha_cur_master_state`	Checks the HA master state—to determine if the NetScaler is Primary or Secondary
`ha_tot_pkt_rx (receive)` `ha_tot_pkt_tx (transmit)`	Number of HA packets received (RX) or transmitted (TX). Default is 200ms, which equals 5 heartbeats packets per second. We should see a total of ~35 (5 a second X 7 seconds = 35) in the delta column to indicate a healthy HA network. Far less would indicate an HA network issue. Note: By default, the newnslog records data and increments every 7 seconds, as shown in the time column below.

Index	Rtime	totalcount-val	Delta	rate/seconds	Symbol-name&device-no&time
0	3579	13	13 (missed heartbeats)	3	ha_tot_pkt_rx Fri Nov 3 23:58:32 2017
1	0	19	19 (missed)	5	ha_tot_pkt_tx Fri Nov 3 23:58:32 2017
2	7009	47	34 (healthy)	4	ha_tot_pkt_rx Fri Nov 3 23:58:39 2017
3	0	54	35 (healthy)	4	ha_tot_pkt_tx Fri Nov 3 23:58:39 2017
4	6996	82	35	5	ha_tot_pkt_rx Fri Nov 3 23:58:46 2017
5	0	89	35	5	ha_tot_pkt_tx Fri Nov 3 23:58:46 2017
6	7024	117	35	4	ha_tot_pkt_rx Fri Nov 3 23:58:53 2017

IMPORTANT INFORMATION / USE CASES

Note: If your environment includes devices that do not accept NetScaler gratuitous ARP messages, it is recommended to configure virtual MAC (VMAC) addresses.

HA Failovers and missed heartbeats on VPX HA running on VMware ESX Hypervisor (Refer to CTX217788).

Reserve dedicated resources, CPU/Memory, for both Primary/Secondary VPX virtual machines

NetScaler Gateway ICA connections are disconnected when HA failover occurs.

Verify if session reliability is enabled and following command is set to YES:
`set ica parameter EnableSRonHAFailover YES`

How do I test if rsync is working between my Primary and Secondary?

1. Create a temp folder on the SECONDARY: /tmp/test_rsync
2. Then run the following command on the PRIMARY:
```
# root@ns# rsync --timeout=60
--log-file=/var/log/nsfsyncd.log1
-arRK --ignore-errors --files-from=
/var/log/nsfsyncd.list
/ nsroot@NSIPofSECONDARY:/tmp/test_rsync/
```

NetScaler File Sync is failing. Errors such as, "nsfsyncd: NSFSYNCD: Partial File-Sync 23" or "rsync: connection unexpectedly closed" in the /var/log/ns.log.

Rsync requires RPCnode passwords to match. Try resetting them and then changing them again to the same passwords, on both nodes.

Also, the NetScaler appliance logs all the files that were not synchronized and generates these errors. These log messages are available in the `/var/log/nsfsyncd.log` file.

Note: HA for VPXs need to be on the same Hypervisor Type. Examples below:

- **Recommended: Primary on XenServer and Secondary on XenServer. Primary on VMware ESXi and Secondary on VMware ESXi.**
- **Not Recommended: Primary on XenServer and Secondary on VMware ESXi**

HA Failovers due to NS crashing.

If an unexpected HA failover occurs, check the `/var/core/` or `/var/crash/` directories to see if the NetScaler crashed. An `NSPPE-XX-XXXX` file in `/var/core/` directory is a key indicator of a crash.