

How to Test an OpenVMS failSAFE IP Configuration

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1. How to Test an OpenVMS failSAFE IP Configuration

The OpenVMS failSAFE IP feature provides IP address redundancy by allowing the same IP address to exist across multiple network interfaces.

This guide explains how to verify a failSAFE IP configuration.

In the following example, two interfaces are configured on the node named BART. Interfaces WE0 and WE1 are defined in the 10.1.1.0/24 subnet with redundancy.

 Warning

This procedure may temporarily disrupt network services and should be performed during a scheduled maintenance window.

2. Procedure

2.1 Check Current Interface Status

Define the TCP/IP command symbols:

```
$ @SYS$STARTUP:TCPIP$DEFINE_COMMANDS.COM
```

Display all interface information:

```
$ IFCONFIG -A
```

Example output:

```
WE0: flags=c43<UP,BROADCAST,RUNNING,MULTICAST,SIMPLEX>
      failSAFE IP Addresses:
        inet 10.1.1.2 netmask ffffffff00 broadcast 10.1.1.255 (on BART WE1)
      *inet 10.1.1.1 netmask ffffffff00 broadcast 10.1.1.255 ipmtu 1500

WE1: flags=c43<UP,BROADCAST,RUNNING,MULTICAST,SIMPLEX>
      failSAFE IP Addresses:
        inet 10.1.1.1 netmask ffffffff00 broadcast 10.1.1.255 (on BART WE0)
      *inet 10.1.1.2 netmask ffffffff00 broadcast 10.1.1.255 ipmtu 1500
```

The output of the IFCONFIG command shows that each interface is configured with an active primary address and a standby failSAFE IP address.

2.2 Check failSAFE Poll Timing

The INFO_POLL parameter in the failSAFE configuration specifies how often the interface is polled during normal operation.

Note that INFO_POLL does not represent the failover time. Failover time is calculated using the formulas defined in SYS\$SYSDEVICE:[TCPIP\$FSAFE]TCPIP\$FAILSAFE.CONF:

```
Minimum failover time = info_poll + (warn_poll * retry_warn)
Maximum failover time = (2 * info_poll) + (warn_poll * retry_warn)
```

To determine the configured INFO_POLL value, search the failSAFE log file:

```
$ SEARCH SYS$SYSDEVICE:[TCPIP$FSAFE]*.LOG "INFO POLL"

*****
SYS$SYSDEVICE:[TCPIP$FSAFE]TCPIP$FAILSAFE_BART.LOG;1

Info Poll : 3s
```

In this example, the interface is polled every 3 seconds.

2.3 Simulate an Interface Failure and Verify Failover

Enable NETWORK OPCOM messages and simulate a failure on the WE0 interface by defining the logical name TCPIP\$FAILSAFE_FAILED_*interface_name*. In this example, TCPIP\$FAILSAFE_FAILED_WE0 forces a failSAFE failover test.

After the configured INFO_POLL interval expires, OPCOM messages report that the WE0 interface has failed and that the failSAFE IP address (10.1.1.1) has been activated on the backup interface, WE1.

```
$ REPLY/ENABLE=NETWORK
$ DEFINE/SYSTEM TCPIP$FAILSAFE_FAILED_WE0 1

%%%%%%%%%%%% OPCOM 28-JAN-2025 14:57:25.97 %%%%%%%%%%%%%
Message from user TCPIP$FSAFE on BART
TCPIP-I-FAILSAFE, WE0 - ifconfig WE0 fail

%%%%%%%%%%%% OPCOM 28-JAN-2025 14:57:26.22 %%%%%%%%%%%%%
Message from user INTERnet on BART
%TCPIP-W-FSINTUNAVL, WE0 interface unavailable

%%%%%%%%%%%% OPCOM 28-JAN-2025 14:57:26.23 %%%%%%%%%%%%%
Message from user INTERnet on BART
%TCPIP-I-FSIPADDRUP, WE1 10.1.1.1 alias active on node BART,
interface WE1
```

These messages confirm that failSAFE detected the WE0 failure and successfully moved the IP address to WE1.

2.4 Verify IP Address Migration

Display the status of all TCP/IP interfaces:

```
$ IFCONFIG -A
```

Example output:

```
WE0: flags=c43<UP,BROADCAST,RUNNING,MULTICAST,SIMPLEX>
*failSAFE IP - interface is in a failed state.
failSAFE IP Addresses:
    inet 10.1.1.2 netmask ffffffff00 broadcast 10.1.1.255 (on BART WE1)
    *inet 10.1.1.1 netmask ffffffff00 broadcast 10.1.1.255 (on BART WE1)

WE1: flags=c43<UP,BROADCAST,RUNNING,MULTICAST,SIMPLEX>
    *inet 10.1.1.2 netmask ffffffff00 broadcast 10.1.1.255 ipmtu 1500
    inet 10.1.1.1 netmask ffffffff00 broadcast 10.1.1.255 ipmtu 1500
```

Results show that WE0 is in a failed state and both addresses are responding on the WE1 interface.

2.5 Review failSAFE Logs

Search the log files:

```
$ SEARCH SYS$SYSDEVICE:[TCPIP$FSAFE]*.LOG EVENT,INFO
```

Example:

```
SYS$SYSDEVICE:[TCPIP$FSAFE]TCPIP$FAILSAFE_BART.LOG;1

28-Jan-2025 15:53:45    INFO: Reading configuration file:
SYS$SYSDEVICE:[TCPIP$FSAFE]TCPIP$FAILSAFE.CONF
28-Jan-2025 15:53:46    EVENT: started on node BART:
28-Jan-2025 15:53:54    INFO: WE0 - TCPIP$FAILSAFE_FAILED_WE0 defined simulating
failure
28-Jan-2025 15:53:54    INFO: WE0 - retry limit reached
28-Jan-2025 15:53:54    EVENT: WE0 - ifconfig WE0 fail
```

Examining the output of the search command reveals how the TCPIP\$FAILSAFE process is logging the failed condition. The retry limit is reached and WE0 interface is in a failed status.

2.6 Simulate Interface Recovery

Simulate recovery of the WE0 interface by removing the logical name that was used to force the failure condition:

```
$ DEASSIGN/SYSTEM TCPIP$FAILSAFE_FAILED_WE0
```

Review the failSAFE log to verify that the recovery was detected:

```
$ SEARCH *.LOG EVENT
```

```
*****
```

```
SYS$SYSDEVICE:[TCPIP$FSAFE]TCPIP$FAILSAFE_BART.LOG;1
```

```
28-Jan-2025 14:44:14  EVENT: started on node BART:
28-Jan-2025 14:45:52  EVENT: WE0 - ifconfig WE0 fail
28-Jan-2025 14:47:22  EVENT: WE0 - ifconfig WE0 -fail
28-Jan-2025 14:47:23  EVENT: WE0 - interface has become functional
```

The log entries confirm that the simulated failure was cleared and that the WE0 interface is functional again.

2.7 Verify Failback to the Primary Interface

After recovery is detected, OPCOM messages indicate that the WE0 interface is available and that the failSAFE IP address (10.1.1.1) has been restored to the primary interface:

```
%%%%%%%%%% OPCOM 28-JAN-2025 16:33:41.12 %%%%%%%%%%
Message from user INTERNet on BART
%TCPIP-I-FSINTAVAIL, WE0 interface available

%%%%%%%%%% OPCOM 28-JAN-2025 16:33:41.12 %%%%%%%%%%
Message from user INTERNet on BART
%TCPIP-I-FSIPADDRUP, WE0 10.1.1.1 primary active on node BART,
    interface WE0

%%%%%%%%%% OPCOM 28-JAN-2025 16:33:41.87 %%%%%%%%%%
Message from user TCPIP$FSAFE on BART
TCPIP-I-FAILSAFE, WE0 - interface has become functional
```

These messages confirm that failSAFE detected the recovery, returned the IP address to the primary interface (WE0), and restored normal operation.
