

Troubleshoot SMF CNDP "network-receive-error" on eno6/bd0 Interfaces

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Introduction

This document describes how to identify the compute and leaf switch for a specific Session Management Function (SMF) Cloud Native Deployment Platform (CNDP) and resolve "network-receive-error" alert reported in Common Execution Environment (CEE).

Problem

The "network-receive-error" alerts are reported on the CEE Opcenter Rack2.

```
[lab0200-smf/labceed22] cee# show alerts active summary
```

```
NAME UID SEVERITY STARTS AT SOURCE SUMMARY
```

```
-----  
network-receive-error 998c77d6a6a0 major 10-26T00:10:31 lab0200-smf-mas Network interface "bd0"  
showing receive errors on hostname lab0200-s...  
network-receive-error ea4217bf9d9e major 10-26T00:10:31 lab0200-smf-mas Network interface "bd0"  
showing receive errors on hostname lab0200-s...  
network-receive-error 97fad40d2a58 major 10-26T00:10:31 lab0200-smf-mas Network interface "eno6"  
showing receive errors on hostname lab0200-...  
network-receive-error b79540eb4e78 major 10-26T00:10:31 lab0200-smf-mas Network interface "eno6"  
showing receive errors on hostname lab0200-...  
network-receive-error e3d163ff4012 major 10-26T00:10:01 lab0200-smf-mas Network interface "bd0"  
showing receive errors on hostname lab0200-s...  
network-receive-error 12a7b5a5c5d5 major 10-26T00:10:01 lab0200-smf-mas Network interface "eno6"  
showing receive errors on hostname lab0200-...
```

Please refer to [Ultra Cloud Core Subscriber Microservices Infrastructure Operations Guide](#) for the description of the alert.

```
Alert: network-receive-errors
Annotations:
Type: Communications Alarm
Summary: Network interface "{{ $labels.device }}" showing receive errors on hostname {{
$labels.hostname }}"
Expression:
|
rate(node_network_receive_errs_total{device!~"veth.+"}[2m]) > 0
For: 2m
Labels:
Severity: major
```

Identify the Source of the Alerts

Log in to **CEE labceed22**, check the "network-receive-error" alert details reported on the bd0 and eno6 interfaces to identify the node and pod.

```
[lab0200-smf/labceed22] cee# show alerts active summary
NAME                               UID                               SEVERITY  STARTS AT          SOURCE                SUMMARY
-----
network-receive-error 3b6a0a7ce1a8 major      10-26T21:17:01 lab0200-smf-mas Network
interface "bd0" showing receive errors on hostname tpc...
network-receive-error 15abab75c8fc major      10-26T21:17:01 lab0200-smf-mas Network
interface "eno6" showing receive errors on hostname tp...
```

Execute **show alerts active detail network-receive-error <UID>** to pull details of the alert.

In the example, the source of both alerts is node lab0200-smf-primary-1 pod node-exporter-47xmm.

```
[lab0200-smf/labceed22] cee# show alerts active detail network-receive-error 3b6a0a7ce1a8
alerts active detail network-receive-error 3b6a0a7ce1a8
severity      major
type          "Communications Alarm"
startsAt      2021-10-26T21:17:01.913Z
source        lab0200-smf-primary-1
summary       "Network interface \"bd0\" showing receive errors on hostname lab0200-smf-primary-1\"
labels        [ "alertname: network-receive-errors" "cluster: lab0200-smf_cee-labceed22"
"component: node-exporter" "controller_revision_hash: 75c4cb979f" "device: bd0" "hostname:
lab0200-smf-primary-1" "instance: 10.192.1.42:9100" "job: kubernetes-pods" "monitor: prometheus"
"namespace: cee-labceed22" "pod: node-exporter-47xmm" "pod_template_generation: 1" "replica:
lab0200-smf_cee-labceed22" "severity: major" ]
annotations [ "summary: Network interface \"bd0\" showing receive errors on hostname lab0200-
smf-primary-1\" "type: Communications Alarm" ]
```

```
[lab0200-smf/labceed22] cee# show alerts active detail network-receive-error 15abab75c8fc
alerts active detail network-receive-error 15abab75c8fc
severity      major
type          "Communications Alarm"
startsAt      2021-10-26T21:17:01.913Z
source        lab0200-smf-primary-1
summary       "Network interface \"eno6\" showing receive errors on hostname lab0200-smf-primary-1\"
labels        [ "alertname: network-receive-errors" "cluster: lab0200-smf_cee-labceed22"
"component: node-exporter" "controller_revision_hash: 75c4cb979f" "device: eno6" "hostname:
lab0200-smf-primary-1" "instance: 10.192.1.42:9100" "job: kubernetes-pods" "monitor: prometheus"
```

```
"namespace: cee-labceed22" "pod: node-exporter-47xmm" "pod_template_generation: 1" "replica:
lab0200-smf_cee-labceed22" "severity: major" ]
  annotations [ "summary: Network interface \"eno6\" showing receive errors on hostname lab0200-
smf-primary-1\" \"type: Communications Alarm" ]
```

Validate Node, Pod, Ports Status

Node and Pod Validation from Primary VIP

Log in K8s Primary VIP of the Rack2 to validate the status of the source node and pod.

In the example, both are in a good state: Ready and Running.

```
cloud-user@lab0200-smf-primary-1:~$ kubectl get nodes
```

NAME	STATUS	ROLES	AGE	VERSION
lab0200-smf-primary-1	Ready	control-plane	105d	v1.21.0
lab0200-smf-primary-2	Ready	control-plane	105d	v1.21.0
lab0200-smf-primary-3	Ready	control-plane	105d	v1.21.0
lab0200-smf-worker-1	Ready	<none>	105d	v1.21.0
lab0200-smf-worker-2	Ready	<none>	105d	v1.21.0
lab0200-smf-worker-3	Ready	<none>	105d	v1.21.0
lab0200-smf-worker-4	Ready	<none>	105d	v1.21.0
lab0200-smf-worker-5	Ready	<none>	105d	v1.21.0

```
cloud-user@lab0200-smf-primary-1:~$ kubectl get pods -A -o wide | grep node-exporter--47xmm
cee-labceed22      node-exporter-47xmm      1/1      Running      0
                  18d      10.192.1.44      lab0200-smf-primary-1      <none>      <none>
```

Ports Validations from K8s Primary VIP

Validate bd0 and eno6 interfaces are UP with `ip addr | grep eno6` and `ip addr | grep bd0`.

Note: When the filter is applied for bd0 the eno6 is shown in the output. The reason is that eno5 and eno6 are configured as bonded interfaces under bd0, which can be validated in the SMI Cluster Deployer.

```
cloud-user@lab0200-smf-primary-1:~$ ip addr | grep eno6
```

```
3: eno6: <BROADCAST,MULTICAST,SECONDARY,UP,LOWER_UP> mtu 1500 qdisc mq primary bd0 state UP
group default qlen 1000
```

```
cloud-user@lab0200-smf-primary-1:~$ ip addr | grep bd0
```

```
2: eno5: <BROADCAST,MULTICAST,SECONDARY,UP,LOWER_UP> mtu 1500 qdisc mq primary bd0 state UP
group default qlen 1000
3: eno6: <BROADCAST,MULTICAST,SECONDARY,UP,LOWER_UP> mtu 1500 qdisc mq primary bd0 state UP
group default qlen 1000
12: bd0: <BROADCAST,MULTICAST,PRIMARY,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
qlen 1000
13: vlan111@bd0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
qlen 1000
14: vlan112@bd0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
qlen 1000
182: cali7a166bd093d@if4: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1440 qdisc noqueue state UP
group default
```

Ports Validations from SMI Cluster Deployer

Log in the **Cluster Manager VIP** and then ssh access to Operations (Ops) Center ops-center-smi-cluster-deployer.

```
cloud-user@lab-deployer-cm-primary:~$ kubectl get svc -n smi-cm
NAME                                TYPE           CLUSTER-IP      EXTERNAL-IP
PORT(S)                             AGE
cluster-files-offline-smi-cluster-deployer ClusterIP      10.102.53.184   <none>
8080/TCP                             110d
iso-host-cluster-files-smi-cluster-deployer ClusterIP      10.102.38.70   172.16.1.102
80/TCP                                 110d
iso-host-ops-center-smi-cluster-deployer ClusterIP      10.102.83.54   172.16.1.102
3001/TCP                               110d
netconf-ops-center-smi-cluster-deployer ClusterIP      10.102.196.125 10.241.206.65
3022/TCP,22/TCP                       110d
ops-center-smi-cluster-deployer      ClusterIP      10.102.12.170  <none>
8008/TCP,2024/TCP,2022/TCP,7681/TCP,3000/TCP,3001/TCP 110d
squid-proxy-node-port                NodePort      10.102.72.168  <none>
3128:32572/TCP                       110d
```

```
cloud-user@lab-deployer-cm-primary:~$ ssh -p 2024 admin@10.102.12.170
```

```
admin@10.102.12.170's password:
```

```
Welcome to the Cisco SMI Cluster Deployer on lab-deployer-cm-primary
```

```
Copyright © 2016-2020, Cisco Systems, Inc.
```

```
All rights reserved.
```

```
admin connected from 172.16.1.100 using ssh on ops-center-smi-cluster-deployer-5cdc5f94db-bnxqt
```

```
[lab-deployer-cm-primary] SMI Cluster Deployer#
```

Verify the cluster, node-defaults, interfaces, and parameters mode for the node. In the example the **lab0200-smf**.

```
[lab-deployer-cm-primary] SMI Cluster Deployer# show running-config clusters
```

```
clusters lab0200-smf
```

```
environment lab0200-smf-deployer_1
```

```
...
```

```
node-defaults initial-boot netplan ethernet eno5
```

```
dhcp4 false
```

```
dhcp6 false
```

```
exit
```

```
node-defaults initial-boot netplan ethernet eno6
```

```
dhcp4 false
```

```
dhcp6 false
```

```
exit
```

```
node-defaults initial-boot netplan ethernet enp216s0f0
```

```
dhcp4 false
```

```
dhcp6 false
```

```
exit
```

```
node-defaults initial-boot netplan ethernet enp216s0f1
```

```
dhcp4 false
```

```
dhcp6 false
```

```
exit
```

```
node-defaults initial-boot netplan ethernet enp94s0f0
```

```
dhcp4 false
```

```
dhcp6 false
```

```
exit
```

```
node-defaults initial-boot netplan ethernet enp94s0f1
```

```
dhcp4 false
```

```
dhcp6 false
```

```
exit
```

```
node-defaults initial-boot netplan bonds bd0
dhcp4         false
dhcp6         false
optional      true
interfaces [ eno5 eno6 ]
parameters mode active-backup
parameters mii-monitor-interval 100
parameters fail-over-mac-policy active
exit
```

In the Primary VIP validate errors and/or drops on interfaces bd0 and eno6.

When both interfaces have drops, the UCS or Leaf switch hardware has to be checked for any hardware issues.

```
cloud-user@lab0200-smf-primary-1:~$ ifconfig bd0
bd0: flags=5187<UP,BROADCAST,RUNNING,PRIMARY,MULTICAST> mtu 1500
    inet6 fe80::8e94:1fff:fef6:53cd prefixlen 64 scopeid 0x20<link>
    ether 8c:94:1f:f6:53:cd txqueuelen 1000 (Ethernet)
    RX packets 47035763777 bytes 19038286946282 (19.0 TB)
    RX errors 49541 dropped 845484 overruns 0 frame 49541
    TX packets 53797663096 bytes 32320571418654 (32.3 TB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
cloud-user@lab0200-smf-primary-1:~$ ifconfig eno6
eno6: flags=6211<UP,BROADCAST,RUNNING,SECONDARY,MULTICAST> mtu 1500
    ether 8c:94:1f:f6:53:cd txqueuelen 1000 (Ethernet)
    RX packets 47035402290 bytes 19038274391478 (19.0 TB)
    RX errors 49541 dropped 845484 overruns 0 frame 49541
    TX packets 53797735337 bytes 32320609021235 (32.3 TB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Identify the UCS Server

UCS Server Validation from SMI Cluster Deployer

Run **show running-config clusters <cluster name> nodes <node name>** in the SMI Cluster Deployer to find out the CIMC IP address of the UCS server.

```
[lab-deployer-cm-primary] SMI Cluster Deployer# show running-config clusters lab0200-smf nodes primary-1
clusters lab0200-smf
nodes primary-1
maintenance false
host-profile cp-data-r2-sysctl
k8s node-type primary
k8s ssh-ip 10.192.1.42
k8s sshd-bind-to-ssh-ip true
k8s node-ip 10.192.1.42
k8s node-labels smi.cisco.com/node-type oam
exit
k8s node-labels smi.cisco.com/node-type-1 proto
exit
ucs-server cimc user admin
...
ucs-server cimc ip-address 172.16.1.62
...
```

exit

SSH into the CIMC IP address 172.16.1.62 via the Active CM and validate the server name.

In the example, the server name is LAB0200-Server8-02.

```
cloud-user@lab-deployer-cm-primary:~$ ssh admin@172.16.1.62
Warning: Permanently added '172.16.1.62' (RSA) to the list of known hosts.
admin@172.16.1.62's password:
LAB0200-Server8-02#
```

Note: Validate the name of the server in the Customer Information Questionnaire (CIQ), if the CIQ is available.

Map the Primary VIP Ports and UCS Network Interfaces

On Primary VIP, check the physical interface names for eno6 with **ls -la /sys/class/net** command. In the example, when **lspci** is used to identify the eno6 device, then port **1d:00.1** has to be used to identify **eno6**.

```
cloud-user@lab0200-smf-primary-1:~$ ls -la /sys/class/net
total 0
drwxr-xr-x  2 root root    0 Oct 12 06:18 .
drwxr-xr-x 87 root root    0 Oct 12 06:18 ..
lrwxrwxrwx  1 root root    0 Oct 12 06:18 bd0 -> ../../devices/virtual/net/bd0
lrwxrwxrwx  1 root root    0 Oct 12 06:18 bd1 -> ../../devices/virtual/net/bd1
...
lrwxrwxrwx  1 root root    0 Oct 12 06:18 eno5 ->
../../devices/pci0000:17/0000:17:00.0/0000:18:00.0/0000:19:01.0/0000:1b:00.0/0000:1c:00.0/0000:1d:00.0/net/eno5
lrwxrwxrwx  1 root root    0 Oct 12 06:18 eno6 ->
../../devices/pci0000:17/0000:17:00.0/0000:18:00.0/0000:19:01.0/0000:1b:00.0/0000:1c:00.0/0000:1d:00.1/net/eno6
```

Note: The **lspci** shows information about all devices on the UCS server such as MLOM, SLOM, PCI, and so on. The device information can be used to map with the names of the interfaces in **ls -la /sys/class/net** command output.

In the example, port 1d:00.1 belongs to the **MLOM** and **eno6** interface. The **eno5** is 1d:00.0 MLOM port.

```
cloud-user@lab0200-smf-primary-1:~$ lspci
.....
1d:00.0 Ethernet controller: Cisco Systems Inc VIC Ethernet NIC (rev a2)
1d:00.1 Ethernet controller: Cisco Systems Inc VIC Ethernet NIC (rev a2)
3b:00.0 Ethernet controller: Intel Corporation Ethernet Controller 10G X550T (rev 01)
3b:00.1 Ethernet controller: Intel Corporation Ethernet Controller 10G X550T (rev 01)
5e:00.0 Ethernet controller: Intel Corporation Ethernet Controller XL710 for 40GbE QSFP+ (rev 02)
5e:00.1 Ethernet controller: Intel Corporation Ethernet Controller XL710 for 40GbE QSFP+ (rev 02)
```

d8:00.0 Ethernet controller: Intel Corporation Ethernet Controller XL710 for 40GbE QSFP+ (rev 02)

d8:00.1 Ethernet controller: Intel Corporation Ethernet Controller XL710 for 40GbE QSFP+ (rev 02)

In the CIMC GUI match the MLOM MAC Address seen on **ifconfig** output from Primary VIP.

```
cloud-user@lab0200-smf-primary-1:~$ ifconfig bd0
bd0: flags=5187<UP,BROADCAST,RUNNING,PRIMARY,MULTICAST> mtu 1500
    inet6 fe80::8e94:1fff:fef6:53cd prefixlen 64 scopeid 0x20<link>
    ether 8c:94:1f:f6:53:cd txqueuelen 1000 (Ethernet)
RX packets 47035763777 bytes 19038286946282 (19.0 TB)
RX errors 49541 dropped 845484 overruns 0 frame 49541
TX packets 53797663096 bytes 32320571418654 (32.3 TB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
cloud-user@lab0200-smf-primary-1:~$ ifconfig eno6
eno6: flags=6211<UP,BROADCAST,RUNNING,SECONDARY,MULTICAST> mtu 1500
    ether 8c:94:1f:f6:53:cd txqueuelen 1000 (Ethernet)
RX packets 47035402290 bytes 19038274391478 (19.0 TB)
RX errors 49541 dropped 845484 overruns 0 frame 49541
TX packets 53797735337 bytes 32320609021235 (32.3 TB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

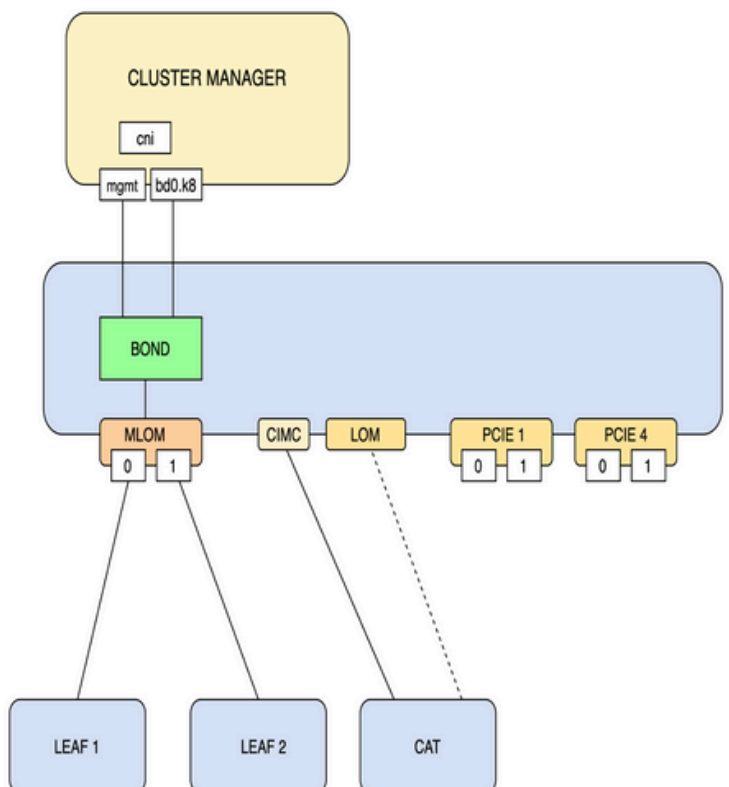
Identify the Leaf Switch

In the Cluster Manager network, as shown in the image, the **MLOM (eno5/eno6)** are connected to Leafs 1 and 2.

Note: Validate leaves hostnames in CIQ, if the CIQ is available.

CM Networking Design

- Management Port (CIMC)– this port is connected to the Management network.
- External provisioner accesses CIMC and mounts vMedia with initial boot configuration
- Initial boot
 - MLOM port 1 and 2 bonded
 - Management VLAN (with IP)
- Additional networking added post boot
 - Internal VLAN attached to MLOM Bond
 - LAN1 is activated and attached to the CIMC network



Log in to both Leaves and grep the name of the server.

In the example, the LAB0200-Server8-02 MLOM and MLOM interfaces are connected to interfaces **Eth1/49** on Leaf1 and Leaf2.

```
Leaf1# sh int description | inc LAB0200-Server8-02
Eth1/10      eth      40G      PCIE-01-2-LAB0200-Server8-02
Eth1/30      eth      40G      PCIE-02-2-LAB0200-Server8-02
Eth1/49      eth      40G      LAB0200-Server8-02 MLOM-P2
```

```
Leaf2# sh int description | inc LAB0200-Server8-02
Eth1/10      eth      40G      PCIE-01-1-LAB0200-Server8-02
Eth1/30      eth      40G      PCIE-02-1-LAB0200-Server8-02
Eth1/49      eth      40G      LAB0200-Server8-02 MLOM-P1
```

Solution

Important: Every issue needs its own analysis. In case no errors are found on the Nexus side then check UCS server interfaces for errors.

In the scenario, the issue is related to the link failure on Leaf1 **int eth1/49** which is connected with LAB0200-Server8-02 MLOM eno6.

The UCS server is validated and no hardware issue was found, MLOM and ports were in a good state.

Leaf1 showed TX Output errors:

```
Leaf1# sh int Eth1/49
Ethernet1/49 is up
admin state is up, Dedicated Interface
Hardware: 10000/40000/100000 Ethernet, address: e8eb.3437.48ca (bia e8eb.3437.48ca)
Description: LAB0200-Server8-02 MLOM-P2
MTU 9216 bytes, BW 40000000 Kbit , DLY 10 usec
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, medium is broadcast
Port mode is trunk
full-duplex, 40 Gb/s, media type is 40G
Beacon is turned off
Auto-Negotiation is turned on FEC mode is Auto
Input flow-control is off, output flow-control is off
Auto-mdix is turned off
Rate mode is dedicated
Switchport monitor is off
EtherType is 0x8100
EEE (efficient-ethernet) : n/a
  admin fec state is auto, oper fec state is off
Last link flapped 5week(s) 6day(s)
Last clearing of "show interface" counters never
12 interface resets
Load-Interval #1: 30 seconds
  30 seconds input rate 162942488 bits/sec, 26648 packets/sec
  30 seconds output rate 35757024 bits/sec, 16477 packets/sec
  input rate 162.94 Mbps, 26.65 Kpps; output rate 35.76 Mbps, 16.48 Kpps
```



```
Load-Interval #2: 5 minute (300 seconds)
 300 seconds input rate 120872496 bits/sec, 22926 packets/sec
 300 seconds output rate 54245920 bits/sec, 17880 packets/sec
input rate 120.87 Mbps, 22.93 Kpps; output rate 54.24 Mbps, 17.88 Kpps
```

```
RX
85973263325 unicast packets  6318912 multicast packets  55152 broadcast packets
85979637389 input packets  50020924423841 bytes
230406880 jumbo packets  0 storm suppression bytes
0 runts  0 giants  0 CRC  0 no buffer
0 input error  0 short frame  0 overrun  0 underrun  0 ignored
0 watchdog  0 bad etype drop  0 bad proto drop  0 if down drop
0 input with dribble  0 input discard
0 Rx pause
```

```
TX
76542979816 unicast packets  88726302 multicast packets  789768 broadcast packets
76632574981 output packets  29932747104403 bytes
3089287610 jumbo packets
79095 output error  0 collision  0 deferred  0 late collision
0 lost carrier  0 no carrier  0 babble  0 output discard
0 Tx pause
```

The "network-receive-error" alert was resolved with cable replacement on **int eth1/49 Leaf1**.

The last interface link failure was reported right before cable replacement.

```
2021 Nov 17 07:36:48 TPLF0201 %BFD-5-SESSION_STATE_DOWN: BFD session 1090519112 to neighbor
10.22.101.1 on interface Vlan2201 has gone down. Reason: Control
Detection Time Expired.
```

```
2021 Nov 17 07:37:30 TPLF0201 %BFD-5-SESSION_STATE_DOWN: BFD session 1090519107 to neighbor
10.22.101.2 on interface Vlan2201 has gone down. Reason: Control
Detection Time Expired.
```

```
2021 Nov 18 05:09:12 TPLF0201 %ETHPORT-5-IF_DOWN_LINK_FAILURE: Interface Ethernet1/48 is down
(Link failure)
```

The alerts are cleared on eno6/bd0 of the labceed22 after the cable replacement.

```
[lab0200-smf/labceed22] cee# show alerts active summary
```

```
NAME UID SEVERITY STARTS AT SOURCE SUMMARY
```

```
-----
watchdog a62f59201ba8 minor 11-02T05:57:18 System This is an alert meant to ensure that the
entire alerting pipeline is functional. This ale...
```