¿Por qué vManage no puede instalar el contenedor de aplicaciones de seguridad en un dispositivo?

Contenido

Introducción

Este documento describe un problema con la instalación del contenedor de la aplicación de seguridad cuando se utiliza la política de seguridad en una plantilla de dispositivo y cómo resolverlo.

Problema

El usuario no puede adjuntar la plantilla de dispositivo con una política de seguridad que requiera que el contenedor de la aplicación de seguridad se instale con este error en un vManage:

```
Failed to install 1/1 Security App container (app-hosting-UTD-Snort-Feature-aarch64_be-
1.0.8_SV2.9.11.1_XE16.10). Failed to enabled iox: null
05 Apr 2019 11:46:09 AM IST
[5-Apr-2019 6:16:09 UTC] Total number of Security App containers to be installed: 1. Security
App containers to be installed are following: [app-hosting-UTD-Snort-Feature-aarch64_be-
1.0.8_SV2.9.11.1_XE16.10]
[5-Apr-2019 6:16:09 UTC] Started 1/1 Security app container (app-hosting-UTD-Snort-Feature-
aarch64_be-1.0.8_SV2.9.11.1_XE16.10) installation
[5-Apr-2019 6:16:10 UTC] Checking if iox is enabled on device
[5-Apr-2019 6:16:18 UTC] Failed to install 1/1 Security App container (app-hosting-UTD-Snort-
Feature-aarch64_be-1.0.8_SV2.9.11.1_XE16.10).
Failed to enabled iox: null
```

Desde el **/var/log/nms/vmanage-server.log** en un controlador vManage se puede ver este error:

```
05-Apr-2019 08:41:54,488 UTC ERROR [vManage] [AppHostingTemplateProcessor] (device-action-
lxc_install-10) |default| Error while enabling iox on device-C1111X-8P-FGL230513Y0-1.1.1.1: rpc-
reply error: <rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="5">
  <rpc-error>
    <error-type>application</error-type>
    <error-tag>invalid-value</error-tag>
    <error-severity>error</error-severity>
    <error-message unknown:lang="en">inconsistent value: Device refused one or more
commands</error-message>
    <error-info>
```

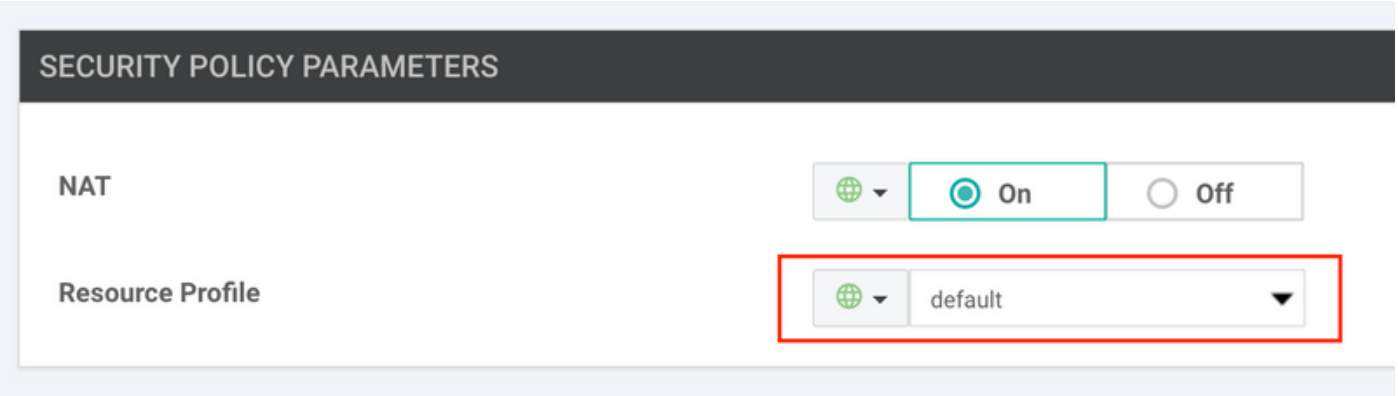
```
      <severity xmlns=" http://cisco.com/yang/cisco-ia">error_cli</severity>;
      <detail xmlns=" http://cisco.com/yang/cisco-ia">;
        <bad-cli>
          <bad-command>iox</bad-command>
          <error-location>1</error-location>
          <parser-response/>        </bad-cli>
      </detail>
    </error-info>
  </rpc-error>
</rpc-reply>

at com.tailf.jnc.NetconfSession.recv_rpc_reply_ok(Unknown Source) [JNC-1.2.jar:]
at com.tailf.jnc.NetconfSession.recv_rpc_reply_ok(Unknown Source) [JNC-1.2.jar:]
at com.tailf.jnc.NetconfSession.commit(Unknown Source) [JNC-1.2.jar:]
at
com.viptela.vmanage.server.device.common.NetConfClient.commitAndUnlock(NetConfClient.java:458)
[classes:]
at
com.viptela.vmanage.server.deviceaction.processor.config.AppHostingTemplateProcessor.checkAndEna
bleIox(AppHostingTemplateProcessor.java:358) [classes:]
at
com.viptela.vmanage.server.deviceaction.processor.config.AppHostingTemplateProcessor.preTemplate
PushCheck(AppHostingTemplateProcessor.java:173) [classes:]
at
com.viptela.vmanage.server.deviceaction.processor.service.lxc.LxcInstallActionProcessor$LxcInsta
llActionWorker.startMaintenanceDeviceActions(LxcInstallActionProcessor.java:340) [classes:]
at
com.viptela.vmanage.server.deviceaction.DefaultActionWorker.startDeviceAction(DefaultActionWorke
r.java:82) [classes:]
at
com.viptela.vmanage.server.deviceaction.AbstractActionWorker.call(AbstractActionWorker.java:117)
[classes:]
at
com.viptela.vmanage.server.deviceaction.AbstractActionWorker.call(AbstractActionWorker.java:35)
[classes:]
at java.util.concurrent.FutureTask.run(FutureTask.java:266) [rt.jar:1.8.0_162]
at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1149)
[rt.jar:1.8.0_162]
at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:624)
[rt.jar:1.8.0_162]
at java.lang.Thread.run(Thread.java:748) [rt.jar:1.8.0_162]

05-Apr-2019 08:41:54,496 UTC ERROR [vManage] [LxcInstallActionProcessor] (device-action-
lxc_install-10) |default| On device C1111X-8P-FGL230513Y0-1.1.1.1, Failed to install 1/1
Security App container (app-hosting-UTD-Snort-Feature-aarch64_be-1.0.8_SV2.9.11.1_XE16.10).
Failed to enabled iox: null
05-Apr-2019 08:41:54,524 UTC INFO  [vManage] [DeviceActionStatusDAO] (device-action-lxc_install-
10) |default| End task lxc_install
05-Apr-2019 08:41:54,533 UTC INFO  [vManage] [DeviceActionStatusDAO] (device-action-lxc_install-
10) |default| Publish client event: ACTIVITY
05-Apr-2019 08:41:54,533 UTC INFO  [vManage] [DeviceActionStatusDAO] (device-action-lxc_install-
10) |default| Publish client event: DEVICE_ACTION
```

Como se puede ver arriba, algunos mensajes no muy informativos "Failed to enabled iox: null" se ve en ambas salidas que a veces significa que la cantidad de memoria no es suficiente para el perfil de alojamiento de aplicaciones de seguridad seleccionado que se conectó al dispositivo.

Solución

Dado que se sospechaban problemas de memoria debido al perfil de alojamiento de aplicaciones

de seguridad, se marca y se descubre que se utiliza el perfil predeterminado.



A diferencia del perfil **alto** que se sabe causa problemas cuando el dispositivo no tiene suficiente memoria.

Como paso siguiente, se comprobó el consumo de memoria en el propio dispositivo y se descubrió que el router C1111X con 8 Gb de RAM sólo tiene 1 Gb de memoria libre (por favor, tenga en cuenta **Free**):

```
cEdge10#show memory platform
  Virtual memory   : 11512180736
  Pages resident   : 730200
  Major page faults: 2501
  Minor page faults: 114581800

  Architecture     : aarch64_be
  Memory (kB)
    Physical       : 3758804
    Total          : 3758804
    Used           : 2620884
    Free           : 1137920
    Active         : 2191472
    Inactive       : 807536
    Inact-dirty    : 0
    Inact-clean    : 0
    Dirty          : 0
    AnonPages      : 1473636
    Bounce         : 0
    Cached         : 1212660
    Commit Limit   : 1813864
    Committed As   : 3224504
    High Total     : 0
    High Free      : 0
    Low Total      : 3758804
    Low Free       : 1137920
    Mapped         : 416524
    NFS Unstable   : 0
    Page Tables    : 17160
    Slab           : 170624
    Writeback      : 0

  Swap (kB)
    Total          : 0
    Used           : 0
    Free           : 0
    Cached         : 0
```

```
  Buffers (kB)     : 312844

  Load Average
    1-Min          : 0.60
    5-Min          : 0.66
    15-Min         : 0.86
```

Al mismo tiempo desde el resultado **show version** se confirmó que el dispositivo tiene 8 Gb de RAM (nota **memoria física**):

```
cisco C1111X-8P (1RU) processor with 1453914K/6147K bytes of memory.
Processor board ID FGL230513Y0
1 Virtual Ethernet interface
10 Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
8388608K bytes of physical memory.
6336511K bytes of flash memory at bootflash:.
```

La falta de memoria es la razón por la que no se puede instalar el contenedor de aplicaciones de seguridad, por lo que se verifica la versión ROMmon porque existe un requisito mínimo de ROMmon para las plataformas compatibles con SD-WAN IOS-XE. Esta versión se encuentra en el dispositivo:

```
cEdge10#show platform | b Firmware
Slot      CPLD Version        Firmware Version
--------- ------------------- ------------------------------------
0         17100501            16.8(1r)
R0        17100501            16.8(1r)
F0        17100501            16.8(1r)
```

Conforme ejecuta el software 16.10.2 y según las notas de la versión, la versión mínima requerida de ROMmon es 16.9(1r), por lo que ROMmon se actualizó y la memoria libre se verifica de nuevo:

```
cEdge10#sh memory platform
  Virtual memory   : 11516805120
  Pages resident   : 708276
  Major page faults: 2303
  Minor page faults: 1705306

  Architecture     : aarch64_be
  Memory (kB)
    Physical       : 8143440
    Total          : 8143440
    Used           : 2571908
    Free           : 5571532
    Active         : 2213868
    Inactive       : 1128140
    Inact-dirty    : 0
    Inact-clean    : 0
    Dirty          : 8
    AnonPages      : 1410328
    Bounce         : 0
    Cached         : 1619664
    Commit Limit   : 4006184
    Committed As   : 3136948
    High Total     : 0
    High Free      : 0
    Low Total      : 8143440
    Low Free       : 5571532
```

```
    Mapped         : 397692
    NFS Unstable   : 0
    Page Tables    : 17216
    Slab           : 158776
    Writeback      : 0
```

A partir del resultado anterior, tenga en cuenta la memoria física y libre (más de 5 Gb y 8 Gb correspondientes).

Una vez que se ha activado de nuevo la instalación del contenedor de la aplicación de seguridad, ya que la plantilla del dispositivo se desconecta y se vuelve a conectar y se ven los mensajes sobre la instalación correcta:

```
%IOSXE-5-PLATFORM: R0/0: VCONFD_NOTIFIER: Install status: cc761b3b-cb3b-4070-81de-9b842fd68b27
download-start. Message Downloading http://10.10.10.100:8080/software/package/lxc/app-
hosting_UTD-Snort-Feature-x86_64_1.0.8_SV2.9.11.1_XE16.10_secapp-
ucmk9.16.10.2.1.0.8_SV2.9.11.1_XE16.10.x86_64.tar?deviceId=10.10.10.10
%Cisco-SDWAN-cEdge10-action_notifier-6-INFO-1400002: R0/0: VCONFD_NOTIFIER: Notification:
4/5/2019 09:54:4 system-software-install-status severity-level:minor host-name:cEdge10 system-
ip:10.10.10.10 status:download-start install-id:cc761b3b-cb3b-4070-81de-9b842fd68b27
message:Downloading http://10.10.10.100:8080/software/package/lxc/app-hosting_UTD-Snort-Feature-
x86_64_1.0.8_SV2.9.11.1_XE16.10_secapp-
ucmk9.16.10.2.1.0.8_SV2.9.11.1_XE16.10.x86_64.tar?deviceId=10.10.10.10
%IOSXE-5-PLATFORM: R0/0: VCONFD_NOTIFIER: Install status: cc761b3b-cb3b-4070-81de-9b842fd68b27
download-complete. Message Downloaded app image to /bootflash/.UTD_IMAGES/app-hosting_UTD-Snort-
Feature-x86_64_1.0.8_SV2.9.11.1_XE16.10_secapp-ucmk9.16.10.2.1.0.8_SV2.9.11.1_XE16.10.x86_64.tar
%Cisco-SDWAN-cEdge10-action_notifier-6-INFO-1400002: R0/0: VCONFD_NOTIFIER: Notification:
4/5/2019 09:54:5 system-software-install-status severity-level:minor host-name:cEdge10 system-
ip:10.10.10.10 status:download-complete install-id:cc761b3b-cb3b-4070-81de-9b842fd68b27
message:Downloaded app image to /bootflash/.UTD_IMAGES/app-hosting_UTD-Snort-Feature-
x86_64_1.0.8_SV2.9.11.1_XE16.10_secapp-ucmk9.16.10.2.1.0.8_SV2.9.11.1_XE16.10.x86_64.tar
%IOSXE-5-PLATFORM: R0/0: VCONFD_NOTIFIER: Install status: 9fd36cd6-f601-4fac-a5b0-1a36f06ba18a
verification-complete. Message NOOP
%Cisco-SDWAN-cEdge10-action_notifier-6-INFO-1400002: R0/0: VCONFD_NOTIFIER: Notification:
4/5/2019 9:54:5 system-software-install-status severity-level:minor host-name:cEdge10 system-
ip:10.10.10.10 status:verification-complete install-id:cc761b3b-cb3b-4070-81de-9b842fd68b27
message:NOOP
%VMAN-5-PACKAGE_SIGNING_LEVEL_ON_INSTALL: R0/0: vman: Package 'iox-
utd_1.0.8_SV2.9.11.1_XE16.10.tar' for service container 'utd' is 'Cisco signed', signing level
cached on original install is 'Cisco signed'
%VIRT_SERVICE-5-INSTALL_STATE: Successfully installed virtual service utd
%IOSXE-5-PLATFORM: R0/0: VCONFD_NOTIFIER: Install status: cc761b3b-cb3b-4070-81de-9b842fd68b27
install-start. Message Success, App state: DEPLOYED
%Cisco-SDWAN-cEdge10-action_notifier-6-INFO-1400002: R0/0: VCONFD_NOTIFIER: Notification:
4/5/2019 09:54:5 system-software-install-status severity-level:minor host-name:ISR-4331 system-
ip:10.10.10.10 status:install-start install-id:cc761b3b-cb3b-4070-81de-9b842fd68b27
message:Success, App state: DEPLOYED
```

Y aquí se puede ver cómo la instalación correcta se ve desde el lado de vManage:

```
[6-Apr-2019 12:38:13 CEST] Total number of Security App containers to be installed: 1. Security
App containers to be installed are following: [app-hosting-UTD-Snort-Feature-x86_64-
1.0.8_SV2.9.11.1_XE16.10]
[6-Apr-2019 12:38:13 CEST] Started 1/1 Security app container (app-hosting-UTD-Snort-Feature-
x86_64-1.0.8_SV2.9.11.1_XE16.10) installation
[6-Apr-2019 12:38:14 CEST] Checking if iox is enabled on device
[6-Apr-2019 12:38:17 CEST] Waiting for iox to be enabled on device
[6-Apr-2019 12:40:05 CEST] iox enable
[6-Apr-2019 12:40:05 CEST] Iox enabled on device
[6-Apr-2019 12:40:11 CEST] Security App container image: app-hosting_UTD-Snort-Feature-
x86_64_1.0.8_SV2.9.11.1_XE16.10_secapp-ucmk9.16.10.2.1.0.8_SV2.9.11.1_XE16.10.x86_64.tar
```

```
[6-Apr-2019 12:40:19 CEST] Connection Instance: 0, Color: biz-internet
[6-Apr-2019 12:40:19 CEST] Downloading http://10.10.10.100:8080/software/package/lxc/app-
hosting_UTD-Snort-Feature-x86_64_1.0.8_SV2.9.11.1_XE16.10_secapp-
ucmk9.16.10.2.1.0.8_SV2.9.11.1_XE16.10.x86_64.tar?deviceId=10.10.10.10
[6-Apr-2019 12:56:45 CEST] Downloaded app image to /bootflash/.UTD_IMAGES/app-hosting_UTD-Snort-
Feature-x86_64_1.0.8_SV2.9.11.1_XE16.10_secapp-ucmk9.16.10.2.1.0.8_SV2.9.11.1_XE16.10.x86_64.tar
[6-Apr-2019 12:56:48 CEST]
[6-Apr-2019 12:57:19 CEST] Success, App state: DEPLOYED
[6-Apr-2019 12:57:27 CEST] utd installed successfully
Current state is deployed

[6-Apr-2019 12:57:27 CEST] app-hosting-UTD-Snort-Feature-x86_64 installed in DEPLOYED state
[6-Apr-2019 12:57:27 CEST] Finished 1/1 Security app container (app-hosting-UTD-Snort-Feature-
x86_64-1.0.8_SV2.9.11.1_XE16.10) installation
```

Referencias

- https://sdwan-docs.cisco.com/Product_Documentation/vManage_Help/Release_18.4/Security/Configuring_SD-WAN_Security/Configuring_the_Security_Virtual_Image_for_IPS%2F%2FIDS_and_URL_Filtering
- https://sdwan-docs.cisco.com/Product_Documentation/Software_Features/Release_18.4/Release_Notes/Release_Notes_for_IOS_XE_SD-WAN_Release_16.10_and_SD-WAN_Release_18.4#ROMmon_Requirements_Matrix