Perché vManage non installa il contenitore delle app di sicurezza in un dispositivo?

Sommario

Introduzione

In questo documento viene descritto un problema con l'installazione del contenitore di app di sicurezza quando in un modello di dispositivo vengono utilizzati i criteri di sicurezza e come risolverlo.

Problema

L'utente non può collegare il modello di dispositivo con un criterio di sicurezza che richiede l'installazione del contenitore dell'app di sicurezza con questo errore in 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
```

Dalla pagina **/var/log/nms/vmanage-server.log** di un controller vManage è possibile visualizzare questo errore:

```
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>;
```

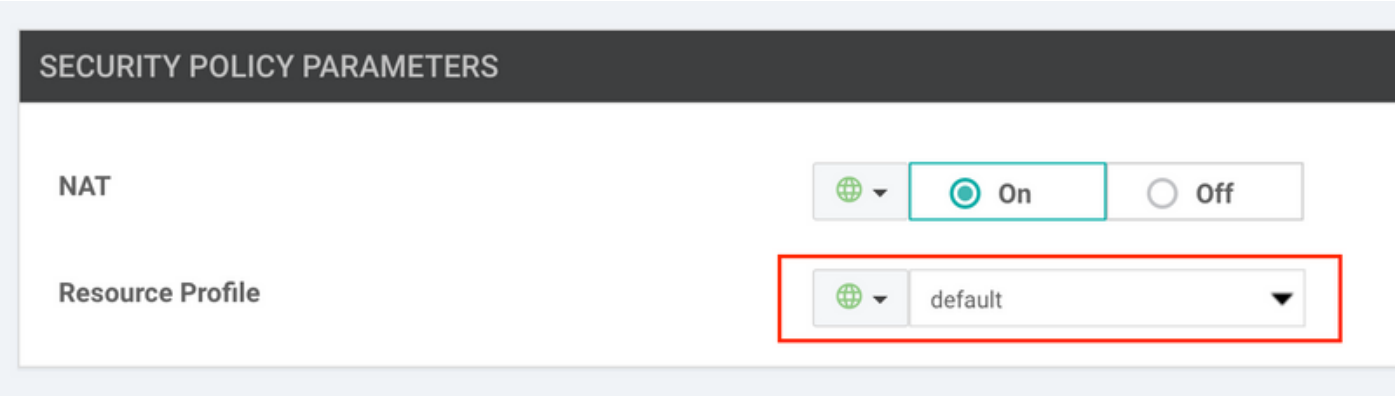
```
      <detail xmlns=" http://cisco.com/yang/cisco-ia">;
        <bad-cli>
          <bad-command>iox</bad-command>
          <error-location>1</error-location>
          <parser-response/>        </bad-cli>
      </detail>
    </error-info>
  </rpc-error>
</rpc-reply>

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
```

Come si può vedere sopra, alcuni non molto informativo messaggio "Non è stato possibile abilitare iox: null" è presente in entrambi gli output e ciò significa che talvolta la quantità di memoria non è sufficiente per il profilo di hosting dell'app di sicurezza selezionato collegato al dispositivo.

Soluzione

Poiché si sospettano problemi di memoria a causa del profilo di hosting dell'app di sicurezza,

viene controllato e quindi viene rilevato che viene utilizzato il profilo predefinito.



A differenza del profilo **elevato** che causa problemi quando la memoria del dispositivo non è sufficiente.

Come passo successivo, è stato controllato il consumo di memoria sul dispositivo stesso ed è stato scoperto che il router C111X con 8 Gb di RAM ha solo circa 1 Gb di memoria libera (notare **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
```

Contemporaneamente, dall'output **show version** è stato confermato che il dispositivo ha 8 Gb di RAM (notare la **memoria fisica**):

```
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 mancanza di memoria è il motivo per cui non è possibile installare il contenitore delle app di sicurezza, quindi viene controllata la versione di ROMmon perché esiste un requisito minimo di ROMmon per le piattaforme IOS-XE SD-WAN supportate. Questa versione si trova nel 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)
```

Durante l'esecuzione del software versione 16.10.2 e in base alle note sulla versione, la versione minima di ROMmon richiesta è 16.9(1r), quindi ROMmon è stato aggiornato e la memoria libera è stata nuovamente controllata:

```
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
```

Come si evince dall'output sopra riportato, è opportuno notare la memoria libera e fisica (più di 5 Gb e 8 Gb corrispondenti).

Dopo l'attivazione dell'installazione del contenitore dell'app di sicurezza, il modello di dispositivo viene scollegato e ricollegato e vengono visualizzati i messaggi relativi all'esito positivo dell'installazione:

```
%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
```

A questo punto è possibile verificare l'aspetto dell'installazione corretta dal lato 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
```

Riferimenti

- 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