Secure Channel Application

Running on BlueField:

1. Login to BlueField

2. Enter the code folder

```
cd /opt/mellanox/doca/applications
```

3. Build DOCA Secure Channel Application on BlueField

```
meson /tmp/build –Denable_all_applications=false –Denable_secure_channel=true
ninja –C /tmp/build
```

4. Check Device PCI Address and Device Representor PCI Address:

```
doca_caps --list-rep-devs
PCI: 0000:03:00.0
        representor-PCI: 0000:18:00.0
             pci_func_type                PF
             hotplug                      no
             vuid                         MT2331XZ0CALMLNXS0D0F0
        representor-PCI: 0000:03:00.0
             pci_func_type                SF
             hotplug                      no
             vuid                         MT2331XZ0CALECMLNXS0D0F0SF32800
PCI: 0000:03:00.1
        representor-PCI: 0000:18:00.1
             pci_func_type                PF
             hotplug                      no
             vuid                         MT2331XZ0CALMLNXS0D0F1
        representor-PCI: 0000:03:00.1
             pci_func_type                SF
             hotplug                      no
             vuid                         MT2331XZ0CALECMLNXS0D0F1SF32800
PCI: 0000:03:00.0
PCI: 0000:03:00.1
```

Note: Device PCI Address is 03:00.0, and Device Representor PCI Address is 18:00.0

5. Run Secure Channel Application with 256 bytes as message size, with 10 as number of messages, with 03:00.0 as PCI Device Address and with 18:00.0 as representor PCI Device

Address:

```
/tmp/build/secure_channel/doca_secure_channel -s 256 -n 10 -p 03:00.0 -r 18:00.0
```

Notes:

-s is message size to be sent

-n is number of message to be sent

-p is DOCA Comm Channel Device PCI Address

-r is DOCA Comm Channel Device Representor PCI Address

Running on Host:

1. Login to Host

2. Enter the code folder

```
cd /opt/mellanox/doca/applications
```

3. Build DOCA Secure Channel Application on Host

```
meson /tmp/build –Denable_all_applications=false –Denable_secure_channel=true
ninja –C /tmp/build
```

4. Check Device PCI Address

```
lspci | grep Mellanox
0b:00.0 Ethernet controller: Mellanox Technologies MT43244 BlueField-3 integrated
ConnectX-7 network controller (rev 01)
0b:00.1 Ethernet controller: Mellanox Technologies MT43244 BlueField-3 integrated
ConnectX-7 network controller (rev 01)
0b:00.2 DMA controller: Mellanox Technologies MT43244 BlueField-3 SoC Management
Interface (rev 01)
```

Note: Device PCI Address is 0b:00.0

5. Run Secure Channel Application with 256 bytes as message size, with 10 as number of
   messages and with 0b:00.0 as PCI Device Address:

```
/tmp/build/secure_channel/doca_secure_channel -s 256 -n 10 -p 0b:00.0
```

Notes:

-s is message size to be sent

-n is number of message to be sent

-p is DOCA Comm Channel Device PCI Address

Modifying the sourse code of Secure Channel for printing the messages

- Modify the source code of Secure Channel on BlueField

1. Edit "secure_channel_core.c" file by vi command

```
sudo vi /opt/mellanox/doca/applications/secure_channel/secure_channel_core.c
```

2. add the code as line 276 and line 277:

```
265     while(1) {
266         thread_res = pthread_mutex_lock(ctx->mutex);
267         if (pthread res != 0) {
268              DOCA_LOG_ERR("Failed to lock Comm Channel for reading");
269              ctx->results->recvfrom_result = DOCA_ERROR_OPPERATING_SYSTEM;
270              return NULL;
271         }
272         msg_len = CC_MAX_ MSG_SIZE;
273         result =
274              doca_comm_channel_ep_ recvfrom(ctx->ep, recv_buffer, Smsg_len,
DOCA_CC_MSG_FLAG_NONE, &curr_peer);
275         pthread res = pthread mutex unlock(ctx->mutex;
276         DOCA LOG INFO("Received message is: %s", recv buffer);
277         memset (recv_buffer, 0, sizeof(recv_buffer));
278
279         if (pthread_res != 0) {
280              DOCA LOG ERR"Failed to lock Comm Channel for reading");
281              ctx->results->recvfrom_result = DOCA_ERROR_OPERATING_SYSTEM;
282              return NULL;
283         }
284
285         if (result == DOCA_ERROR_AGAIN) {
286              resure a CoCA Succeel epevent_handle_arm recv(cx->ep);
287              if (result != DOCA SUCCESS) {
288                   DOCA_LOG ERR( "Failed to arm Comm Channel receive event
channel, errored", errno);
289                   ctx->results->recvfrom result = DOCA_ERROR_TO_FAILED;
290                   return NULL;
291         }
```

3. Rebuild DOCA Secure Channel Application on BlueField

```
meson /tmp/build –Denable_all_applications=false –Denable_secure_channel=true
ninja –C /tmp/build
```

- Modify the source code of Secure Channel on Host

1. Edit "secure_channel_core.c" file by vi command

```
sudo vi /opt/mellanox/doca/applications/secure_channel/secure_channel_core.c
```

2. Make line 165 and line 166 be code comment and add the code as line 168, line169, line 188, line 189, line 190 and line 198

```
165
166    //for (idx = 0; idx < ctx->cfg->send_msg_size; idx++)
167    //         send buffer[idx] = (uint8_t)(idx & 0xFF):
168    sprintf(send_buffer, "%d", sent _count);
169    strcat(send_buffer, "my message");
170
171    while (msg_nb) {
172        /* Connection has not established yet, wait for receive thread notification
*/
173    if (ctx->peer == NULL && ctx->cfg->mode == SC_MODE_DPU) {
174        if (sigwait(&signal_mask, &signal) !=0 {
175            DOCA_LOG_ERR("Failed to wait for new connection, error=%d", errno);
176            ctx->results->sendto_result = DOCA_ERROR_OPERATING_SYSTEM;
177            return NULL;
178        }
179    }
180
181    pthread_res = thread_mutex_lock(ctx->mutex);
182    if (pthread_res != 0) {
183            DOCA_LOG_ERR("Failed to lock Comm Channel for writing");
184            ctx->results->sendto_result = DOCA_ERROR_OPERATING_SYSTEM;
185            return NULL;
186    }
187
188    memset(send_buffer, 0, sizeof(send_buffer));
189    sprintf(send_buffer, "%d", sent_count);
190    strcat(send_buffer, "my message");
191
192    result = doca_comm_channel_ep_sendto(ctx->ep,
193                                        send_buffer,
194                                        ctx->cfg->send_msg_size,
195                                        DOCA_CC_IMSG_FLAG_NONE,
196                                        ctx->peer);
197    pthread_res = pthread_mutex_unlock(ctx->mutex);
198    DOCA_LOG_INFO("send message is: %s", send_buffer);
199
200    if (pthread_res != 0) {
```

Notes:

When you run Secure Channel Application on Host and BlueField after you modified the code, please set message size to be sent (-s) parameter >= 32.

3. Rebuild DOCA Secure Channel Application on Host

```
meson /tmp/build –Denable_all_applications=false –Denable_secure_channel=true
ninja –C /tmp/build
```

- Runing Secure Channel on BlueField and Host

1. Run Secure Channel Application on BlueField:

```
/tmp/build/secure_channel/doca_secure_channel -s 256 -n 10 -p 03:00.0 -r 18:00.0
```

2. Run Secure Channel Application on Host

```
/tmp/build/secure_channel/doca_secure_channel -s 256 -n 10 -p 18:00.0
```

3. Host side shows:

4. BlueField side shows:

Note: Host sent 10 messages to BlueField and printed them on the screen. And BlueField received these 10 messages and also printed them on the screen.

FAQ

- If the previous running of Secure Channel Application fails to exit normally, an error will be reported as the following, when running it again. Please kill the previously running application and run it again.

```
ubuntu@localhost:/tmp/build/secure_channel$ ./doca_secure_channel -s 256 -n 10 -p 03:00.0 -r 18:00.0
[03:53:17:555222][1661650][DOCA][ERR][linux_devx_obj.cpp:61][priv_doca_devx_object] Failed to create devx object with syndrome
=0x64b4
[03:53:17:555346][1661650][DOCA][ERR][doca_dev.cpp:2064][priv_doca_dev_devx_object_create] Failed to create devx object: faile
d to allocate devx object wrapper with exception:
[03:53:17:555369][1661650][DOCA][ERR][doca_dev.cpp:2064][priv_doca_dev_devx_object_create] DOCA exception [DOCA_ERROR_DRIVER]
with message DEVX object failed to create
[03:53:17:555393][1661650][DOCA][ERR][cc_devx.cpp:446][cc_devx_register_channel_service] Failed to create channel service obje
ct with error DOCA_ERROR_DRIVER
[03:53:17:555400][1661650][DOCA][ERR][qp_channel.cpp:1036][cc_qp_register_server] server registration failed for recv side
[03:53:17:555406][1661650][DOCA][ERR][doca_comm_channel.cpp:795][doca_comm_channel_ep_listen] server registration failed
[03:53:17:570103][1661650][DOCA][ERR][secure_channel_core.c:486][init_cc] Secure Channel server couldn't start listening: Conn
ection aborted
[03:53:17:573131][1661650][DOCA][ERR][secure_channel.c:79][main] Failed to initialize endpoint: Connection aborted
ubuntu@localhost:/tmp/build/secure_channel$ ps -aux | grep doca
ubuntu    1658747  0.0  0.3 125496 105892 pts/1    Sl+  03:45   0:00 ./doca_secure_channel -s 256 -n 10 -p 03:00.0 -r 18:00.0
ubuntu    1661913  0.0  0.0   6416   1860 pts/3    S+   03:53   0:00 grep --color=auto doca
ubuntu@localhost:/tmp/build/secure_channel$ kill -9 1658747
```

1. Check the running applications:

```
ps -aux | grep doca
```

2. Kill the running application:

```
kill -9 1658747
```

- Compilation Error:

Remove previous compiliation

```
rm -rf /tmp/build
```