Troubleshooting vMotion

VMware Application Acceleration

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Overview

This article is dedicated to gaining more knowledge on what to do when troubleshooting vMotion if a live-migration is not successful. What are typical reasons for failed migrations? What logs to look into? Let’s have a look at how you can troubleshoot and prevent vMotion operations to fail.

Common Failures

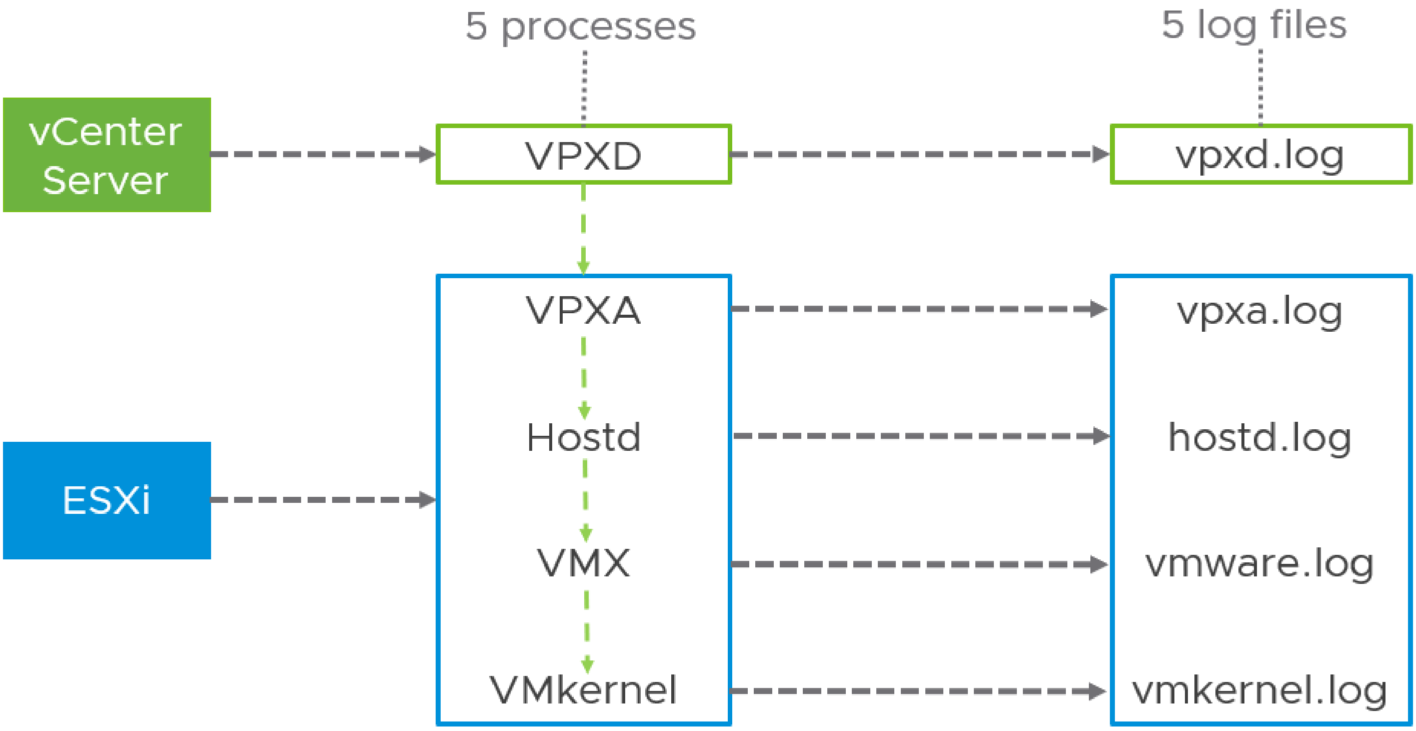
Common failures and patterns that cause live-migrations to be unsuccessful are the following:

- vMotion network connectivity issues
  - ESXi hosts cannot ping or timeout after 20 seconds.
  - MTU mismatch between the VMkernel interface and the network layer (i.e. switches and routers)
  - Misconfiguration on what networks are vMotion enabled on the ESXi hosts
- Storage
  - Datastore is unreachable or experiencing an APD (All Paths Down)
  - I/O’s timeout of 20 seconds or more
- vMotion successful, but guest issues occur
  - The VM network is not reachable – No layer-2 connectivity on the destination ESXi host
- Resources are overcommitted
  - Cannot allocate memory for a long time
  - Swapping takes a long time leading to a vMotion timeout

Verify that you have met all the vMotion requirements. That includes the primary reason for vMotion issues which is network connectivity or MTU mismatches. If you are unable to pinpoint the issue, it might be useful to look into the vSphere logs to see what happened.

vSphere Logs

Digging deeper into the vSphere logs can be useful to verify what is causing the live-migration to fail. The vMotion process uses both vCenter Server and ESXi components. There are five processes involved that log into five different log files.



The Virtual Provisioning X Daemon (VPXD), Virtual Provisioning X Agent (VPXA) and Host Daemon (hostd) are the control plane for the vMotion process. The 'data plane' is in the VMX process and the VMkernel. The first step is to find the Operation ID (opID) in these logs. That opID maps to a Migration ID. Using these two identifiers, we can follow a vMotion process looking at the corresponding log files.

Operation ID

Find the "Operation ID" of the vMotion process in the VPXD logs on the vCenter Server instance. You can connect to the console of the VCSA (vCenter Server Appliance) instance and go to the bash shell. You can issue command:

```
grep "relocate" /var/log/vmware/vpxd/vpxd-*.log | grep BEGIN
```

The output of this commands exposes a log entry that contains the Operation ID:

```
/var/log/vmware/vpxd/vpxd-214.log:2019-09-24T15:38:10.042Z info vpxd[29243] [Originator@6876 sub=vpxLro
opID=jzlgfw8g-11824-auto-94h-h5:70003561-20] [VpxLRO] — BEGIN task-8031 — vm-269 — vim.VirtualMachine.relocate —
52b17681-35d1-998b-da39-de07b7925dda(520681db-25b7-c5d6-44d7-6a056620e043)
```

Migration ID

Now you retrieved the Operation ID (opID), you can use the opID to find the Migration ID in the hostd log file on the ESXi host. It helps when you know the source and destination ESXi hosts that are involved. This example is a compute and storage vMotion (XvMotion) using the Operation ID that we found using the previous command.

```
grep jzlgfw8g-11824-auto-94h-h5:70003561-20 /var/log/hostd.log | grep -i migrate
```

Source ESXi host output:

```
2019-09-24T15:38:47.070Z info hostd[2100388] [Originator@6876 sub=Vcsvc.VMotionSrc.3117907752192811422
opID=jzlgfw8g-11824-auto-94h-h5:70003561-20-01-10-e036 user=vpxuser:VSPHERE.LOCAL\Administrator] VMotionEntry:
migrateType = 1 2019-09-24T15:38:47.072Z info hostd[2100388] [Originator@6876 sub=Vmsvc.vm:/vmfs/volumes/b86202d8-
fb958817-0000-000000000000/NH-DC-02/NH-DC-02.vmx opID=jzlgfw8g-11824-auto-94h-h5:70003561-20-01-10-e036
user=vpxuser:VSPHERE.LOCAL\Administrator] VigorMigrateNotifyCb:: hostlog state changed from success to none
```

Destination ESXi host output:

```
2019-09-24T15:38:47.136Z info hostd[2099828] [Originator@6876 sub=Vcsvc.VMotionDst.3117907752192811422 opID=jzlgfw8g-11824-auto-94h-h5:70003561-20-01-2c-3c35 user=vpxuser:VSPHERE.LOCAL\Administrator] VMotionEntry: migrateType = 1
```

VMkernel entries

Now that we have the Migration ID, we can use that to extract information about the vMotion process for this specific live-migration in the vmkernel log files. Use the following command on both the source and destination ESXi host:

```
grep VMotion /var/log/vmkernel*
```

The output reveals several interesting data points on the vMotion process like the average bandwidth used for transmitting data.

Source ESXi host output:

```
2019-09-24T15:38:47.402Z cpu13:46101760)VMotionUtil: 5199: 3117907752192811422 S: Stream connection 1 added.
2019-09-24T15:38:47.445Z cpu8:46092538)XVMotion: 2062: Allocating pool 0.
2019-09-24T15:38:47.445Z cpu8:46092538)XVMotion: 642: Bitmap page: len = 16384, pgLen = 1, bitSet = 3001, bitClear = 13383.
2019-09-24T15:38:47.445Z cpu8:46092538)XVMotion: 642: Bitmap block: len = 131072, pgLen = 4, bitSet = 131072, bitClear = 0.
2019-09-24T15:38:47.445Z cpu8:46092538)VMotion: 8134: 3117907752192811422 S: Requiring explicit resume handshake.
2019-09-24T15:38:47.445Z cpu13:46101760)XVMotion: 3384: 3117907752192811422 S: Starting XVMotion stream.
2019-09-24T15:39:34.622Z cpu14:46101762)VMotion: 5426: 3117907752192811422 S: Disk copy complete, no bandwidth estimate.
2019-09-24T15:39:34.905Z cpu24:46092539)VMotion: 5281: 3117907752192811422 S: Stopping pre-copy: only 37 pages left to send, which can be sent within the switchover time goal of 0.500 seconds (network bandwidth ~185.134 MB/s, 1536000% t2d)
2019-09-24T15:39:34.965Z cpu13:46101760)VMotionSend: 5095: 3117907752192811422 S: Sent all modified pages to destination (network bandwidth ~281.100 MB/s)
2019-09-24T15:39:35.140Z cpu15:46101757)XVMotion: 642: Bitmap page: len = 16384, pgLen = 1, bitSet = 3001, bitClear = 13383.
2019-09-24T15:39:35.140Z cpu15:46101757)XVMotion: 642: Bitmap block: len = 131072, pgLen = 4, bitSet = 131072, bitClear = 0.
```

Destination ESXi host output:

```
2019-09-24T15:38:47.397Z cpu15:2099283)VMotionUtil: 5199: 3117907752192811422 D: Stream connection 1 added.
2019-09-24T15:38:47.440Z cpu3:3543984)XVMotion: 2062: Allocating pool 0.
2019-09-24T15:38:47.440Z cpu3:3543984)XVMotion: 642: Bitmap page: len = 16384, pgLen = 1, bitSet = 3001, bitClear = 13383.
2019-09-24T15:38:47.440Z cpu3:3543984)XVMotion: 642: Bitmap block: len = 131072, pgLen = 4, bitSet = 131072, bitClear = 0.
2019-09-24T15:38:47.440Z cpu3:3543984)VMotion: 8134: 3117907752192811422 D: Requiring explicit resume handshake.
2019-09-24T15:39:34.907Z cpu3:3543984)VMotionRecv: 761: 3117907752192811422 D: Estimated network bandwidth 205.138 MB/s during pre-copy
2019-09-24T15:39:34.960Z cpu3:3543984)VMotionRecv: 2961: 3117907752192811422 D: DONE paging in
2019-09-24T15:39:34.960Z cpu3:3543984)VMotionRecv: 2969: 3117907752192811422 D: Estimated network bandwidth 200.096 MB/s during page-in
2019-09-24T15:39:35.059Z cpu6:3543972)VMotion: 6675: 3117907752192811422 D: Received all changed pages.
2019-09-24T15:39:35.067Z cpu1:3543972)VMotion: 6454: 3117907752192811422 D: Resume handshake successful
2019-09-24T15:39:35.082Z cpu6:3543980)XVMotion: 642: Bitmap page: len = 16384, pgLen = 1, bitSet = 3001, bitClear = 13383.
2019-09-24T15:39:35.082Z cpu6:3543980)XVMotion: 642: Bitmap block: len = 131072, pgLen = 4, bitSet = 131072, bitClear = 0.
```

Virtual Machine log file entries

The virtual machine log file resides in the virtual machine home folder that also includes the vmx file and the vmdk files. Using root access on your ESXi host, you can go to appropriate folder. My test VM resides on vSAN, so I would look for the virtual machine home directory using symlink /vmfs/volumes/vsanDatastore. Using the following command shows even more information about the live-migration like the source and destination IP addresses:

```
grep "3117907752192811422" vmware.log
```

Output:

```
2019-09-24T15:38:47.280Z| vmx| I125: Received migrate ‘from’ request for mid id 3117907752192811422, src ip <192.168.200.93>.
```

```
2019-09-24T15:38:47.280Z| vmx| I125: MigrateSetInfo: state=8 srcIp=<192.168.200.93> dstIp=<192.168.200.91> mid=3117907752192811422 uuid=4c4c4544-004a-4c10-8044-c7c04f4d4e32 priority=high
2019-09-24T15:38:47.282Z| vmx| I125: MigID: 3117907752192811422
2019-09-24T15:39:34.971Z| vmx| I125: Migrate_Open: Restoring from <192.168.200.93> with migration id 3117907752192811422
2019-09-24T15:39:35.023Z| vmx| I125: Migrate_Open: Restoring from <192.168.200.93> with migration id 3117907752192811422
```

This article is to show what log entries are used, even though the exemplary vMotion operation was successful. The shown log entries include a lot of detailed information that take you through the process. If something fails, these logs will be a good resource to look for a possible cause.