

Nvidia MIG

Official Documentation

- <https://docs.nvidia.com/datacenter/tesla/mig-user-guide/#running-with-mig>

Disable MIG

```
$ sudo nvidia-smi -mig 0
Disabled MIG Mode for GPU 00000000:06:00.0
```

Warning: persistence mode is disabled on device 00000000:06:00.0. See the Known Issues section of the nvidia-smi(1) man page for more information. Run with [--help | -h] switch to get more information on how to enable persistence mode.
All done.

```
$ nvidia-smi
Thu Mar 10 21:25:12 2022
```

```
+-----+
--+
| NVIDIA-SMI 510.47.03      Driver Version: 510.47.03      CUDA Version: 11.6
|
|-----+-----+-----+
--+
| GPU   Name               Persistence-M| Bus-Id        Disp.A | Volatile Uncorr.
ECC |
| Fan   Temp   Perf   Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute
M. |
|               |              |              |              |
M. |               |              |              |              |
|=====+=====+=====+
==|
|  0  NVIDIA A100 80G...  Off  | 00000000:06:00.0 Off |
0 |
| N/A   33C    P0     58W / 300W |      0MiB / 81920MiB |      20%
Default |
|               |              |              |              |
Disabled |
+-----+
--+

+-----+
--+
| Processes:
|
```

GPU	GI	CI	PID	Type	Process name	GPU
Memory						
	ID	ID				Usage
=====						
==						
No running processes found						
+-----						
--+						

Enable MIG

```
$ sudo nvidia-smi -mig 1
Enabled MIG Mode for GPU 00000000:06:00.0

Warning: persistence mode is disabled on device 00000000:06:00.0. See the
Known Issues section of the nvidia-smi(1) man page for more information. Run
with [--help | -h] switch to get more information on how to enable
persistence mode.
All done.

$ nvidia-smi
Thu Mar 10 21:32:23 2022
+-----+
--+
| NVIDIA-SMI 510.47.03      Driver Version: 510.47.03      CUDA Version: 11.6
|
|-----+-----+-----+
--+
| GPU   Name               Persistence-M| Bus-Id        Disp.A | Volatile Uncorr.
ECC |
| Fan   Temp   Perf    Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute
M. |
|               |              |              |
M. |
|=====+=====+=====+
==|
|    0  NVIDIA A100 80G...  Off  | 00000000:06:00.0 Off  |
On |
| N/A    32C    P0      57W / 300W |      0MiB / 81920MiB |      N/A
Default |
|               |              |              |
Enabled |
+-----+-----+-----+
--+

+-----+
--+
| MIG devices:
```

```
|
+-----+-----+-----+-----+
--+
| GPU  GI  CI  MIG |           Memory-Usage |           Vol |           Shared
|           ID  ID  Dev |           BAR1-Usage | SM           Unc| CE  ENC  DEC  OFA
JPG|
|           |           |           ECC|
|
|=====+=====+=====+=====+
==|
| No MIG devices found
|
+-----+-----+-----+-----+
--+

+-----+-----+-----+-----+
--+
| Processes:
|
| GPU  GI  CI           PID  Type  Process name           GPU
Memory |
|           ID  ID
|
|=====+=====+=====+=====+
==|
| No running processes found
|
+-----+-----+-----+-----+
--+
```

List GPU Instance Profiles (-lgip)

```
$ sudo nvidia-smi mig -lgip

+-----+-----+-----+-----+
--+
| GPU instance profiles:
|
| GPU  Name           ID  Instances  Memory  P2P  SM  DEC  ENC
|           Free/Total  GiB           CE  JPEG  OFA
|
|=====+=====+=====+=====+
==|
|  0  MIG 1g.10gb      19    7/7      9.50    No   14   0   0
|
|           1   0   0
|
```

+-----									
--+									
	0	MIG 1g.10gb+me	20	1/1	9.50	No	14	1	0
							1	1	1
+-----									
--+									
	0	MIG 2g.20gb	14	3/3	19.50	No	28	1	0
							2	0	0
+-----									
--+									
	0	MIG 3g.40gb	9	2/2	39.25	No	42	2	0
							3	0	0
+-----									
--+									
	0	MIG 4g.40gb	5	1/1	39.25	No	56	2	0
							4	0	0
+-----									
--+									
	0	MIG 7g.80gb	0	1/1	78.75	No	98	5	0
							7	1	1
+-----									
--+									

List GPU Instance Profiles possible placements (-lgipp)

```
$ sudo nvidia-smi mig -lgipp
GPU 0 Profile ID 19 Placements: {0,1,2,3,4,5,6}:1
GPU 0 Profile ID 20 Placements: {0,1,2,3,4,5,6}:1
GPU 0 Profile ID 14 Placements: {0,2,4}:2
GPU 0 Profile ID 9 Placements: {0,4}:4
GPU 0 Profile ID 5 Placement : {0}:4
GPU 0 Profile ID 0 Placement : {0}:8
```

Creating GPU Instances

Create only GPU instances

```
$ sudo nvidia-smi mig -cgi 14,14,19,19,20
```

```

Successfully created GPU instance ID 5 on GPU 0 using profile MIG 2g.20gb
(ID 14)
Successfully created GPU instance ID 3 on GPU 0 using profile MIG 2g.20gb
(ID 14)
Successfully created GPU instance ID 13 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created GPU instance ID 9 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created GPU instance ID 10 on GPU 0 using profile MIG
1g.10gb+me (ID 20)

```

Create GPU instances and apply default compute instance profile

```

$ sudo nvidia-smi mig -cgi 14,14,19,19,20 -C
Successfully created GPU instance ID 5 on GPU 0 using profile MIG 2g.20gb
(ID 14)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 5
using profile MIG 2g.20gb (ID 1)
Successfully created GPU instance ID 3 on GPU 0 using profile MIG 2g.20gb
(ID 14)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 3
using profile MIG 2g.20gb (ID 1)
Successfully created GPU instance ID 13 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 13
using profile MIG 1g.10gb (ID 0)
Successfully created GPU instance ID 9 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 9
using profile MIG 1g.10gb (ID 0)
Successfully created GPU instance ID 10 on GPU 0 using profile MIG
1g.10gb+me (ID 20)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 10
using profile MIG 1g.10gb (ID 0)

```

One big GPU

```

$ sudo nvidia-smi mig -cgi 0 -C
Successfully created GPU instance ID 0 on GPU 0 using profile MIG 7g.80gb
(ID 0)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 0
using profile MIG 7g.80gb (ID 4)

$ nvidia-smi -L
GPU 0: NVIDIA A100 80GB PCIe (UUID: GPU-
a166d193-64ba-8969-91b0-7729983c680b)
    MIG 7g.80gb    Device 0: (UUID: MIG-c4f17314-2b46-5569-ac07-
bb0781b44ba7)
$ nvidia-smi
Thu Mar 10 21:34:25 2022

```



```
|
|=====
==|
| No running processes found
|
+-----+
- -+
```

Many (7) smallest GPUs

```
~$ sudo nvidia-smi mig -cgi 19,19,19,19,19,19,19 -C
Successfully created GPU instance ID 13 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 13
using profile MIG 1g.10gb (ID 0)
Successfully created GPU instance ID 11 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 11
using profile MIG 1g.10gb (ID 0)
Successfully created GPU instance ID 12 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 12
using profile MIG 1g.10gb (ID 0)
Successfully created GPU instance ID 7 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 7
using profile MIG 1g.10gb (ID 0)
Successfully created GPU instance ID 8 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 8
using profile MIG 1g.10gb (ID 0)
Successfully created GPU instance ID 9 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 9
using profile MIG 1g.10gb (ID 0)
Successfully created GPU instance ID 10 on GPU 0 using profile MIG 1g.10gb
(ID 19)
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 10
using profile MIG 1g.10gb (ID 0)

$ nvidia-smi -L
GPU 0: NVIDIA A100 80GB PCIe (UUID: GPU-
a166d193-64ba-8969-91b0-7729983c680b)
    MIG 1g.10gb Device 0: (UUID: MIG-6655c8fd-3878-5030-
a9b0-65b40839f65e)
    MIG 1g.10gb Device 1: (UUID: MIG-52c663bb-eef5-580c-
b98f-2c2d93f4d668)
    MIG 1g.10gb Device 2: (UUID: MIG-
efafa9b6-09cc-5b9f-9a43-73dc927794f0)
    MIG 1g.10gb Device 3: (UUID:
```

```
MIG-3f2ece72-3e45-560d-8698-79d951b1312b)
  MIG 1g.10gb      Device  4: (UUID: MIG-09f3602a-747a-5357-9d60-
fd883da6fae2)
  MIG 1g.10gb      Device  5: (UUID:
MIG-38d561b9-0ddf-5033-9fc0-1016588a3854)
  MIG 1g.10gb      Device  6: (UUID: MIG-33709a1d-5135-5f0d-a6ab-
b936857ed5e4)

$ nvidia-smi
Thu Mar 10 21:36:19 2022
+-----+
--+
| NVIDIA-SMI 510.47.03      Driver Version: 510.47.03      CUDA Version: 11.6
|
|-----+-----+-----+
--+
| GPU   Name                Persistence-M| Bus-Id        Disp.A | Volatile Uncorr.
ECC |
| Fan   Temp   Perf    Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute
M. |
|                               |                      |              MIG
M. |
|=====+=====+=====+
==|
|   0  NVIDIA A100 80G...  Off  | 00000000:06:00.0 Off |
On |
| N/A   32C    P0      68W / 300W |      45MiB / 81920MiB |      N/A
Default |
|                               |                      |
Enabled |
+-----+-----+-----+
--+

+-----+
--+
| MIG devices:
|
+-----+-----+-----+
--+
| GPU  GI  CI  MIG |      Memory-Usage |      Vol|      Shared
|
|      ID  ID  Dev |      BAR1-Usage | SM      Unc| CE  ENC  DEC  OFA
JPG|
|                  |                  |          ECC|
|
|=====+=====+=====+
==|
|   0    7    0    0 |      6MiB / 9728MiB | 14      0 | 1   0   0   0
0 |
|                  |      0MiB / 16383MiB |          |
|
```

+-----+-----+-----+-----+																										
--+																										
	0	8	0	1		6MiB / 9728MiB		14	0		1 0 0 0															
0						0MiB / 16383MiB																				
+-----+-----+-----+-----+																										
--+																										
	0	9	0	2		6MiB / 9728MiB		14	0		1 0 0 0															
0						0MiB / 16383MiB																				
+-----+-----+-----+-----+																										
--+																										
	0	10	0	3		6MiB / 9728MiB		14	0		1 0 0 0															
0						0MiB / 16383MiB																				
+-----+-----+-----+-----+																										
--+																										
	0	11	0	4		6MiB / 9728MiB		14	0		1 0 0 0															
0						0MiB / 16383MiB																				
+-----+-----+-----+-----+																										
--+																										
	0	12	0	5		6MiB / 9728MiB		14	0		1 0 0 0															
0						0MiB / 16383MiB																				
+-----+-----+-----+-----+																										
--+																										
	0	13	0	6		6MiB / 9728MiB		14	0		1 0 0 0															
0						0MiB / 16383MiB																				
+-----+-----+-----+-----+																										
--+																										
+-----+-----+-----+-----+																										
--+																										
	Processes:																									
	GPU	GI	CI		PID	Type	Process name				GPU															
Memory																										
		ID	ID								Usage															
	=====																									
==																										
	No running processes found																									

```
|
+-----
--+
```

One big GPU with many compute instances

```
$sudo nvidia-smi mig -cci 0
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 0
using profile MIG 1c.7g.80gb (ID 0)

$ sudo nvidia-smi mig -cci 0,0,0,0,0,0,0
Successfully created compute instance ID 0 on GPU 0 GPU instance ID 0
using profile MIG 1c.7g.80gb (ID 0)
Successfully created compute instance ID 1 on GPU 0 GPU instance ID 0
using profile MIG 1c.7g.80gb (ID 0)
Successfully created compute instance ID 2 on GPU 0 GPU instance ID 0
using profile MIG 1c.7g.80gb (ID 0)
Successfully created compute instance ID 3 on GPU 0 GPU instance ID 0
using profile MIG 1c.7g.80gb (ID 0)
Successfully created compute instance ID 4 on GPU 0 GPU instance ID 0
using profile MIG 1c.7g.80gb (ID 0)
Successfully created compute instance ID 5 on GPU 0 GPU instance ID 0
using profile MIG 1c.7g.80gb (ID 0)
Successfully created compute instance ID 6 on GPU 0 GPU instance ID 0
using profile MIG 1c.7g.80gb (ID 0)

$ nvidia-smi -L
GPU 0: NVIDIA A100 80GB PCIe (UUID: GPU-
a166d193-64ba-8969-91b0-7729983c680b)
  MIG 1c.7g.80gb Device 0: (UUID: MIG-c4f17314-2b46-5569-ac07-
bb0781b44ba7)
  MIG 1c.7g.80gb Device 1: (UUID: MIG-2b5e73e1-66c1-5801-8084-
ef0d0ec08b6c)
  MIG 1c.7g.80gb Device 2: (UUID: MIG-000028a5-5c26-532f-
b903-38ffc3ed1422)
  MIG 1c.7g.80gb Device 3: (UUID: MIG-3046d0e8-aaf9-546e-
a9a7-5673d31eeea8)
  MIG 1c.7g.80gb Device 4: (UUID: MIG-80c0ecbd-29bb-5944-8576-
a0c04b437a27)
  MIG 1c.7g.80gb Device 5: (UUID: MIG-e5a655a5-9430-51ef-
abca-3f8c1527023c)
  MIG 1c.7g.80gb Device 6: (UUID: MIG-
b6de6961-47b2-56c1-88f9-26775c22e1a7)
$ nvidia-smi
Thu Mar 10 21:21:23 2022
+-----
--+
| NVIDIA-SMI 510.47.03      Driver Version: 510.47.03      CUDA Version: 11.6
|
|-----+-----+-----
```

--+											
GPU Name Persistence-M			Bus-Id			Disp.A			Volatile Uncorr.		
ECC											
Fan Temp Perf Pwr:Usage/Cap			Memory-Usage			GPU-Util			Compute		
M.											
M.											
=====+=====+=====											
==											
0 NVIDIA A100 80G...			Off 00000000:06:00.0			Off					
On											
N/A 32C P0 61W / 300W			0MiB / 81920MiB			N/A					
Default											
Enabled											
+-----+-----+-----											
--+											
+-----+-----+-----											
--+											
MIG devices:											
+-----+-----+-----											
--+											
GPU GI CI MIG			Memory-Usage			Vol			Shared		
ID ID Dev			BAR1-Usage SM			Unc CE ENC DEC			OFA		
JPG											
						ECC					
=====+=====+=====											
==											
0 0 0 0			0MiB / 81069MiB			14 0			7 0 5 1		
1											
			1MiB / 13107...								
+-----+-----+-----											
--+											
0 0 1 1						14 0			7 0 5 1		
1											
+-----+-----+-----											
--+											
0 0 2 2						14 0			7 0 5 1		
1											
+-----+-----+-----											
--+											

0 0 3 3	14 0 7 0 5 1
1	
+-----+	+-----+
--+	
0 0 4 4	14 0 7 0 5 1
1	
+-----+	+-----+
--+	
0 0 5 5	14 0 7 0 5 1
1	
+-----+	+-----+
--+	
0 0 6 6	14 0 7 0 5 1
1	
+-----+	+-----+
--+	
+-----+	
--+	
Processes:	
GPU GI CI PID Type Process name GPU	
Memory	
ID ID Usage	
=====	
==	
No running processes found	
+-----+	
--+	

Delete all

```
$ sudo nvidia-smi mig -dci && sudo nvidia-smi mig -dgi
Successfully destroyed compute instance ID 0 from GPU 0 GPU instance ID 9
Successfully destroyed compute instance ID 0 from GPU 0 GPU instance ID 13
Successfully destroyed compute instance ID 0 from GPU 0 GPU instance ID 3
Successfully destroyed compute instance ID 0 from GPU 0 GPU instance ID 5
Successfully destroyed compute instance ID 0 from GPU 0 GPU instance ID 10
```

```
Successfully destroyed GPU instance ID 9 from GPU 0
Successfully destroyed GPU instance ID 13 from GPU 0
Successfully destroyed GPU instance ID 3 from GPU 0
Successfully destroyed GPU instance ID 5 from GPU 0
Successfully destroyed GPU instance ID 10 from GPU 0
```

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