Quaderno di progetto

Нрс

Definizione dei Modelli di container



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1 Contenuto

Questo documento illustra le modalità di definizione dei diversi modelli di container da utilizzarsi nella creazione di quelli effettivamente utilizzati dagli utenti.

Tali modelli, come vedremo, sono essi stessi dei container.

Attenzione:

non è possibile derogare all'ordine di definizione dei modelli seguito in questo documento!!!



2 I modelli di container

La soluzione prevista prevede quattro diversi modelli di container: la tabella seguente ne elenca le caratteristiche principali.

	ModelGpu00	ModelGpu01	ModelGpu10	ModelGpu11
ContainerId	900	901	902	903
S.O.	Ubuntu 22.04 std	Ubuntu 22.04 std	Ubuntu 22.04 std	Ubuntu 22.04 std
Account	root	root	root	root
PW	#MGpu00#	#MGpu01#	#MGpu10#	#MGpu11#
Cores	1	1	1	1
GPU 1	No	No	Si	Si
GPU 2	No	Si	No	Si
Disk	32 GB	32 GB	32 GB	32 GB
RAM	2 GB	2 GB	2 GB	2 GB
Swap	2 GB	2 GB	2 GB	2 GB
Мас	40:40:40:10:02:16	40:40:40:10:02:17	40:40:40:10:02:18	40:40:40:10:02:19
Address				
IP Address	150.146.100.216	150.146.100.217	150.146.100.218	150.146.100.219

Notare come i modelli differiscano l'uno dall'altro per l'uso che fanno delle GP.

In particolare:

- il modello *ModelGpu00* non utilizza GPU;
- il modello *ModelGpu01* utilizza solo la prima GPU;
- il modello *ModelGpu10* utilizza solo la seconda GPU;
- il modello *ModelGpu11* utilizza entrambe le GPU.

a) accedi via Web alla console di amministrazione di *Proxmox*, semplicemente *Console* in quanto segue, disponibile alla URL *https://150.146.100.245:8006*, inserisci le credenziali di *root*, poi fai click su *login*

- → C 🙁 Not se	cure <u>https</u> ://1	50.146.100.245:8006 🛠 🕐	🌇 🔁 🛛	🔲 🕜 Pau	ised
🕽 Google Meet 🛛 🗧 Accedi a	al tuo accou	🗳 Webmail Istituti CNR 🛛 🔇 Mail Admir	Siper	» 🗅 Al	Bookmarks
X PROXMOX V	irtual Environm	ent Search	Documentation		
Server View	× 1	8			
✓ ■ Datacenter	Proxmox \	/E Login			
	User name:	root			
	Password:				
Tasks Cluster log	Realm:	Linux PAM standard authentication	~		
Start Time ↓ End	Language:	English	∽ Sta	tus	
		Save User name:	Login 🔶		

 b) nell'espansione di *hpc*, fai click su *local (hpc)*, poi su *CT Templates* e infine su *Templates*

	7.4-3 Search	
Server View 🗸 🌣	Storage 'local' on node	'hpc'
✓	Summary	Upload Download from URL Templates Remove
lomes (hpc)	🖺 Backups	Name
📕 🗐 local (hpc)	 ISO Images 	
■ local-zfs (hpc)	🕞 CT Templates 🗲	
	Permissions	

c) nel pop up *Templates* seleziona *ubuntu-22.04-standard*, poi fai click su *download*

Templates	5			\otimes
			Search	
Туре	Package	Version	Description	
Ixc	ubuntu-23.04-standard	23.04-1	Ubuntu 23.04 Lunar (standard)	-
lxc	gentoo-current-openrc	20231009	LXC openrc image for gentoo current (20231008)	
lxc	ubuntu-22.04-standard	22.04-1	Ubuntu 22.04 Jammy (standard)	
lxc	archlinux-base	202306	ArchLinux base image.	
lxc	debian-10-standard	10.7-1	Debian 10 Buster (standard)	

d) terminato il download chiudi la finestra Task viewer: File Ubuntu/22.04

Task viewer: File ubuntu/22.04/standard_22.04/1_amd64.tar.zst - Download	\otimes
Output Status	
Stop	📥 Download
downloading http://download.proxmox.com/images/system/ubuntu-22.04-standard_22.04-1_amd64.tar.zst to /var/lib/vz/template/cache/ubuntu-22.04-standard_22.04-1_amd64.tar.zst	tu-22.04-standard_1
Resolving download.proxmox.com (download.proxmox.com) 144.217.225.162, 2a01:7e0:0:424::249	
Connecting to download.proxmox.com (download.proxmox.com) 144.217.225.162 :80 connected.	
HTTP request sent, awaiting response 200 OK	

Prima di proseguire, provvedi a creare una directory destinata alle copie dei backup dei modelli.

e) seleziona *hpc*, poi fai click su >_ *Shell*

	al Environment 7	7.4-3 Search	🖉 Documentation 🛛 🖵 Create VM 😭 Create CT 🔹 root@pam
Server View	~ \$	Node 'hpc'	"O Reboot O Shutdown >_ Shell ∨ I Bulk Actions ∨ O Hel
✓ ■ Datacenter ✓ ■ hpc		A Saarah	Linux hpc 5.15.102-1-pve #1 SMP FVE 5.15.102-1 (2023-03-14T13:48Z) x86_64
 homes (hpc) local (hpc) 		Summary	The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the
local-zfs (hpc)		Notes	individual files in /usr/share/doc/*/copyright.
		>_ Shell	Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
		og System	permitted by applicable law. Last login: Thu Mar 14 20:45:08 CET 2024 on pts/0 root@hpc:~# []

f) crea la directory /var/lib/vz/rescue

root@hpc:~# mkdir /var/lib/vz/rescue

4 Il modello ModelGpu00

Per semplicità e uniformità di notazione, in questa sezione ci riferiremo al modello *ModelGpu00* semplicemente come al container.

4.1 Creazione del container

a) fai click su *hpc*, poi su *Create CT*

	nment 7.4-3 Search	Documentation Create VM Create CT root@pam
Server View	Node 'hpc'	🖒 Reboot 🕐 Shutdown >_ Shell 🗸 🗄 Bulk Actions 🛛 🛛 Help
→ ■ Datacenter > □ ppc ● □ homes (hpc) ● □ local (hpc) ● □ local-zfs (hpc)	Q Search Summary Notes	Linux hpc 5.15.102-1-pve #1 SMP FVE 5.15.102-1 (2023-03-14T13:482) x85 64 The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/copyright.
	>_ Shell ¢ \$ System	Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law. Last Login: Thu Mar 14 20:45:08 CET 2024 on pts/0 root@hpc:~# []

 b) compila il tab *General* del pop-up *Create: LXC Container*: imposta a *900* il campo *CT ID*, a *ModelGpu00* il campo *Hostname*, a *#MGpu00#* i campi *Password* e *Confirm password*, deseleziona l'opzione *Unprivileged container*, lascia gli altri campi inalterati, infine fai click su *Next*

Node:	hpc	~	Resource Pool:	~
CT ID:	900	0	Password:	
Hostname:	ModelGpu00		Confirm password	
Unprivileged container:			SSH public key:	

c) compila il tab *Templates* dello stesso pop-up: nell'espansione del campo *Template*, seleziona *ubuntu-22.04-standard_22.04-1_amd64.tar.zst*, lascia gli altri campi inalterati, quindi fai click su *Next*

Create: LXC C	ontainer		\otimes	
Gener. Ter	nplate Disks CPU Memory Network DNS Confirm			
Storage:	local \vee			
Template:	ubuntu-22.04-standard_22.04-1_a V			
	Name ↑	For	Size	
	ubuntu-22.04-standard_22.04-1_amd64.tar.zst	tzst	129.82 MB	
				/
2 Help	Adva	anced 🗆 🖪	ack Next	



d) compila il tab *Disks* dello stesso pop-up: imposta a *32* il campo *Disk size (GiB)*,



poi nel menu Storage seleziona local-zfs, lascia gli altri campi inalterati,



infine fai click su Next

reate: LX	(C Contain	ier								\otimes	
General	Template	Disks	CPU	Memory	Network	DNS	Confirm				
rootfs	Û	Storage:		local-zfs	~						
		Disk size (GiB):	32	0						
🕀 A	Add										ſ
Help							Adv	/anced 🗆	Back	Next	







 f) compila il tab *Memory* dello stesso pop-up: imposta a *2048* entrambi i campi *Memory* (*MiB*) e *Swap* (*MiB*), poi fai click su *Next*

Memory (MiB):	2048	0	
Swap (MiB):	2048	\$	

g) compila il tab Netwok dello stesso pop-up: imposta a 40:40:40:10:02:16 il campo MAC address, a 150.146.100.216/24 il campo iPv4/CIDR, a 150.146.100.1 il campo Gateway (Ipv4), lascia gli altri campi inalterati, infine fai click su Next

	etnu		IPv4: 💿 Static	ODHCP
MAC address:	40:40:40:10:02:16		IPv4/CIDR:	150.146.100.216/24
Bridge:	vmbr0	\sim	Gateway (IPv4):	150.146.100.1
VLAN Tag:	no VLAN	\diamond	IPv6: Static	O DHCP O SLAAC
Firewall:			IPv6/CIDR:	None
			Gateway (IPv6):	



h) compila il tab *DNS* dello stesso pop-up: imposta a *iasi.cnr.it* il campo *DNS Domain* e a *8.8.8.8* il campo *DNS servers*, infine fai click su *Next*

Create: LXC Co	ntainer				\otimes	
General Tem	plate Disks	CPU Memory	Network DNS	Confirm		
DNS domain:	iasi.cnr.it 🔫					
DNS servers:	8.8.8.8					
						>
				Advanced Back	Next	

 i) nel tab *Confirm* dello stesso pop-up, verifica la correttezza dei dati impostati, poi fai click su *Finish*

eneral Template	Disks CPU Memory Network DNS Confirm	
Key ↑	Value	
cores	1	
nostname	ModelGpu00	
nemory	2048	
nameserver	8.8.8.8	
net0	name=eth0,hwaddr=40:40:40:10:02:16,bridge=vmbr0,firewall=1,ip=150.146.100	.216/24,
nodename	hpc	
ostemplate	local:vztmpl/ubuntu-22.04-standard_22.04-1_amd64.tar.zst	
loool		
ootfs	local-zfs:32	
searchdomain	iasi.cnr.it	
swap	2048	
/mid	900	
Start after created		

j) al termine della creazione chiudi la finestra Task viewer: CT 900 – Create

Task viewer: CT 900 - Create	8	
Output Status		
Stop	📥 Download	
extracting archive '/var/lib/vz/template/cache/ubuntu-22.04-standard_22.04-1_amd64.tar.zst'		
Total bytes read: 5065/7640 (466MIB, 236MIB(s) Detected container architecture: amd64		
Creating SSH host key 'ssh_host_dsa_key' - this may take some time		_ /
done: SHA256:+0GhWelu5F0X2XqT948X0fhEc5ey5nPI2oHTKbmI79g root@ModelGpu00		
Creating SSH host key 'ash_host_rsa_key' + this may take some time daan SHADEE fam heliothisEppning III h CODINGVD-MVAnanOMEra Built can be Madelon CO		
Creating SSH host key 'ssh host ecdsa key' - this may take some time		
done: SHA256;ezGu6OjgQ53GojbO8+mj+c)xizuIzXifqAodg/pxLDgk root@ModelGpu00		
Creating SSH host key 'ssh_host_ed25519_key' - this may take some time		
done: SHA256:cZO9jufq+Ucb5pqp+wcTI6uxpG4/wU2wd+wkodkyLzk root@ModelGpu00		
TASK OK		

10 di 32



4.2 Aggiornamento dei package del container

a) nell'espansione di *hpc*, fai click su *900 (ModelGpu00)*, poi su *Start*



b) avviato il container, fai click su >_ Console

	7.4-3 Search		Documentation 🖵 Create VM 🜍 Create CT 🛔 root@pam
Server View 🗸 🗘	Container 900 (Model	Gpu00) on node 'hpc' No Tags 🖋	▶ Start 🕐 Shutdown 🗸 ≻_ Console 🗸 More ∨ 🚱 Help
✓ ■ Datacenter ✓ ● hpc ● 900 (ModelGpu00)	Summary	Ubuntu 22.04 LTS ModelGpu00 tt	-y1
 homes (hpc) local (hpc) local size (npc) 	 >_ Console 	ModelGpu00 login: []	
	© DNS		v

c) accedi all'account *root* tramite *username* e *password*

	7.4-3 Search		Documentation - Create VM Create CT - root@pam >
Server View 🗸 🗘	Container 900 (ModelGpu00)	on node 'hpc' No Tags 🖋	▶ Start 🕐 Shutdown 🗸 ≻_ Console 🗸 More ∨ 🚱 Help
Datacenter Dotacenter Dotac	Summary L Console Resources Resourc	ClGpu00 login: root word: come to Ubuntu 22.04 LTS (comentation: https://he lanagement: https://lan bupport: https://ubu login: Fri Mar 15 09:22:: @ModelGpu00:~# [GNU/Linux 5.15.102-1-pve x86_64) lp.ubuntu.com ndscape.canonical.com untu.com/advantage 29 UTC 2024 on lxc/ttyl

d) esegui, nell'ordine

root@ModelGpu00:~#	apt-get	upo	late	
root@ModelGpu00:~#	apt-get	-у	upgrade	
root@ModelGpu00:~#	apt-get	-у	dist-up	grade
root@ModelGpu00:~#	apt-get	-у	install	sudo
root@ModelGpu00:~#	apt-get	-у	install	build-essential
root@ModelGpu00:~#	apt-get	-у	install	linux-source
root@ModelGpu00:~#	apt-get	-у	install	net-tools
root@ModelGpu00:~#	apt-get	-у	install	htop
root@ModelGpu00:~#	apt-get	-у	install	mlocate
root@ModelGpu00:~#	apt-get	-у	install	mc
root@ModelGpu00:~#	apt-get	-у	install	wget



4.3 Messa in sicurezza dell'accesso remoto all'account *root*

Provvedi a disabilitare l'accesso remoto all'utente *root*, sia tramite *username* e *password* che tramite *chiavi RSA*.

Terminata questa procedura, potrai accedere all'utente *root* esclusivamente da *Console*.

- a) posizionati all'interno della directory che contiene la configurazione del *demone ssh* root@modelGpu00:~# cd /etc/ssh
- b) effettua un backup del file di configurazione principale di tale *demone*, sshd_config, nel file sshd_config.old

root@ModelGpu00:/etc/ssh# cp sshd_config sshd_config.old

c) aggiorna il contenuto del file **sshd_config** con la nuova configurazione del *demone*

Attenzione:

nell'inserimento rispetta la suddivisione in linee!!!
root@ModelGpu00:/etc/ssh# echo "AcceptEnv LANG LC_*
ChallengeResponseAuthentication no
PasswordAuthentication no ####
PermitEmptyPasswords no
PermitRootLogin no ####
Port 22
PrintMotd no
PubkeyAuthentication yes
####RSAAuthentication yes
Subsystem sftp /usr/lib/openssh/sftp-server
UsePAM no
X11Forwarding yes" > sshd_config
> prosta il containor

d) arresta il container

root@ModelGpu00:/etc/ssh# shutdown -h now

4.4 Backup del container

a) nell'espansione di *hpc*, fai click su *900 (ModelGpu00)*, poi su *Backup* infine su *Backup Now*



b) compila il pop-up *Backup CT 900*: imposta a *Stop* il campo *Mode*, a *ModelGpu00* il campo *Notes*, lascia gli altri campi inalterati, infine fai click su *Backup*

Storage:	local	\sim	Compression:	ZSTD (fast and good)	\sim	
Mode:	Stop	\sim	Send email to:	none		•
Protected:						
Notes:	ModelGpu00					
Possible templa	ate variables are: {{	luster}},{	{guestname}}, {{n	ode}},{{vmid}}	_ /	

c) terminato il backup, chiudi il pop-up *Task viewer: VM/CT 900 – Backup*

butput Status	
top	🛓 Download
D: starting new backup job: vzdump 900remove 0compress zstdstorage localmode stopnode hpcnotes-template ModelGpu0 D: filesystem type on dumpdir is 'zfs' -using /var/tmp/vzdumptmp1871618_900 for temporary files	0

 d) nell'espansione di *hpc*, fai click su *900 (ModelGpu00)* poi, nell'espansione del menu *More*, seleziona *Remove*

Server View Verver View	Container 900 (Model	IGpu00) on node 'hpc' 🛛 No Tags 🖋	► Star	t 🕐 Shutdown 🗸 >_ Co	nsole 🗸	More 🗸 🕜 Help
Datacenter		Gackup now Restore	Show Configuration	Edit Notes Change Protec	tion	Clone Convert to template
900 (ModelGpu00)	 Consolo 	Name	Notes	♥ Date ↓	Format 💖	Manage HA
≧ homes (hpc) ≧ local (hpc) ≧ local-zfs (hpc)	 Consulte Resources Network DNS 	vzdump-lxc-900-2024_03_15-1	ModelGpu00	2024-03-15 11:35:14	tar.zst 🗐	Remove
	Options					
	Task History					
	Task History					

e) compila il pop-up *Confirm*: imposta a *900* il campo *Please enter the ID to confirm* (900), seleziona entrambe le opzioni *Purge from job configurations* e *Destroy unreferenced disks owned by guest*, infine fai click su *Remove*

	Confir	m	\otimes	
		CT 900 - Destroy Please enter the ID to confirm (900):	900	
7		Destroy unreferenced disks owned by guest Referenced disks will always be destroyed. Remove		

f) fai click su *hpc*, poi su >_ *Shell*

XPROXMOX Virtu	al Environment 7	.4-3 Search	Documentation Create VM Create CT root@pam
Server View	~ \$	Node 'hpc'	"O Reboot d' Shutdown >_ Shell ∨ I Bulk Actions ∨ O Help
Datacenter			Linux hpc 5.15.102-1-pve #1 SMP PVE 5.15.102-1 (2023-03-14T13:48Z) x86_64
		Q Search	
S local (hpc)		Summary	the exact distribution terms for each program are described in the
local-zfs (hpc)		Notes	individual files in /usr/share/doc/*/copyright.
		>_ Shell	Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
		oc System	permitted by applicable law. Last login: Thu Mar 14 20:45:08 CET 2024 on pts/0 rootfignerst

g) copia il backup appena effettuato nella directory /var/lib/vz/rescue

root@hpc:~# cp /var/lib/vz/dump/vzdump-lxc-900*.tar.zst /var/lib/vz/rescue/ (Cipsi

5 Il modello *ModelGpu01*

Per semplicità e uniformità di notazione, in questa sezione ci riferiremo al modello *ModelGpu01* semplicemente come al container

5.1 Creazione del container

 a) nell'espansione di *hpc*, fai click su *local (hpc)*, poi su *Backups*, sul backup *ModelGpu00* (colonna *Notes*) e infine su *Restore*



b) compila il pop-up *Restore: CT*: dal menu *storage* seleziona *local-zfs*,

Storago	homos			
Storage.	nomes	-	a 1	×
CT:	Name 1°	Type	Avail	Capacity
Bandwidth Limit:	homes	lvm	39.46 TB	40.01 TB
Unique:	local-zfs	zfspool	961.10 GB	961.10 GB
Privilege Level:	From Backup O Unprivile	eged 🔿	Privileged	
- Override Setting	S:			
Hostname:	ModelGpu00 Memory	20)48 🗘	
Cores:	1			

imposta a **901** il campo **CT**, a **ModelGpu01** il campo **Hostname**, lascia gli altri campi inalterati, infine fai click su **Restore**

Source: vzdump-lxc-900-2024_03_28-15_53_00.tar.zst Storage: local-zfs Storage: 901 Bandwidth Limit: Defaults to target storage restore limit 🗘 Jnique: Start after restore: Privilege Level: From Backup Unprivileged Poverride Settings: ModelGpu01 Memory: 2048					
Storage: Iocal-zfs OT: 901 Bandwidth Limit: Defaults to target storage restore limit \$ Jnique: Image: I	rce:	vzdump-lxc-900-20	24_03_28-15_53_(00.tar.zst	
CT: 901 Bandwidth Limit: Defaults to target storage restore limit \Diamond Jnique: Start after restore: Privileged Privilege Level: From Backup Unprivileged Privileged Override Settings: Hostname: ModelGpu01 Memory: 2048	age:	local-zfs			~
Bandwidth Limit: Defaults to target storage restore limit \$ Jnique: Start after restore: Privilege Level: From Backup Unprivileged Privilege Level: From Backup Unprivileged Hostname: ModelGpu01 Memory: 2048		901			0
Jnique: Start after restore: Privilege Level: From Backup Override Settings: Unprivileged Hostname: ModelGpu01 Memory: 2048	dwidth Limit:	Defau	ilts to target storage	e restore limit 🗘	MiB/s
Privilege Level: From Backup Unprivileged Privileged Override Settings: Hostname: ModelGpu01 Memory: 2048	que:		Start after resto	ore: 🗌	
Override Settings: Hostname: ModelGpu01 Memory: 2048	ilege Level:	From Backup	O Unprivileged	O Privilege	d
Hostname: ModelGpu01 Memory: 2048	verride Setting	s:			
	ostname:	ModelGpu01	Memory:	2048	\sim
Cores: 1 🖓	ores:	1	0		



c) terminato il restore, chiudi il pop-up Task viewer CT 901 - Restore



5.2 Aggiornamento della password di ModelGpu01

 a) nell'espansione di *hpc*, avvia il container *ModelGpu01* facendo click su *901* (*ModelGpu01*) e poi su *Start*

XPROXMOX Virtual Environment 7	🖉 Do	Documentation Create VM Create CT Screate CT					
Server View 🗸 🌣	Container 901 (Model	Gpu01) on node 'hpc' No Tags	🖉 🕨 Star		lh_Shutdown ∨ >_ C	onsole 🗸 🛛 Mo	ore 🗸 🔞 Help
✓ ■ Datacenter ▶ hpc		Backup now Restore	Show Configuration	Ed	it Notes Change Protect	tion	10 E >
901 (ModelGpu01)	 Summary 	Name	 Notes 	U	Date \downarrow	Format	Size
l homes (hpc)	>_ Console						
Iocal (hpc)	Resources						
local-zfs (hpc)	≓ Network						

b) avviato il container, fai click su *hpc* e poi su >_ *Shell*

	7.4-3 Search	🖉 Documentation 🛛 🖵 Create VM 😵 Create CT 🔹 root@pam 🗸
Server View 🗸 🌣	Node 'hpc'	♡ Reboot 🖞 Shutdown >_ Shell ∨ 🚦 Bulk Actions ∨ 🕼 Help
Datacenter	Q Search	Linux hpc 5.15.102-1-pve #1 SMP FVE 5.15.102-1 (2023-03-14T13:48Z) x86_64
901 (ModelGpu01)	Summary	The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/copyright.
Clocal-zfs (hpc)	>_ Shell	Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
	¢ [®] System → Network	Last login: Fri Mar 15 11:51:34 CET 2024 on pts/0 root@hpc:~#

- c) collega la sessione al container *ModelGpu01* tramite il suo identificativo (*901*) root@hpc:~# lxc-attach -n 901
- aggiorna la password di root di *ModelGpu01* root@modelGpu01:~#: passwd

quando richiesto fornisci e conferma la nuova password #MGpu01#

5.3 Installazione dei driver delle GPU

a) scarica nella directory **/root** gli *header* del kernel del S.O.

```
root@ModelGpu01:~# wget
http://download.proxmox.com/debian/pbs/dists/bullseye/pbstest
/binary-amd64/pve-headers-5.15.102-1-pve_5.15.102-1_amd64.deb
```

b) installa gli header appena scaricati

```
root@ModelGpu01:~# dpkg -i pve-headers-5.15.102-1-
pve_5.15.102-1_amd64.deb
```



- c) scarica nella directory **/root** i driver per le GPU
 - root@ModelGpu01:~# wget https://us.download.nvidia.com/XFree86/Linuxx86_64/535.154.05/NVIDIA-Linux-x86_64-535.154.05.run
- d) rendi eseguibile il file appena scaricato root@ModelGpu01:~# chmod ugo+x NVIDIA-Linux-x86_64-535.154.05.run
- e) installa i driver appena scaricati

root@ModelGpu01:~# ./NVIDIA-Linux-x86_64-535.154.05.run -nokernel-module

rispondendo **OK** ai primi due *warning*, **Yes** alla richiesta "*Install NVIDIA's 32-bit compatibility libraries?*", **OK** al successivo *warning*, e **OK** per terminare l'installazione

f) arresta il container

root@ModelGpu01:~# shutdown -h now

- 5.4 Configurazione del container
 - a) aggiorna il contenuto del file /etc/pve/lxc/901.conf come segue

```
root@hpc:~# echo "arch: amd64
cores: 1
hostname: ModelGpu01
memory: 2048
nameserver: 8.8.8.8
net0:
name=eth0,bridge=vmbr0,firewall=1,gw=150.146.100.1,hwaddr=40:
40:40:10:02:17, ip=150.146.100.217/24, type=veth
ostype: ubuntu
rootfs: local-zfs:subvol-901-disk-0,size=32G
searchdomain: iasi.cnr.it
swap: 2048
lxc.cgroup2.devices.allow: c 195:0 rwm
lxc.cgroup2.devices.allow: c 195:255 rwm
lxc.cgroup2.devices.allow: c 509:0 rwm
lxc.cgroup2.devices.allow: c 509:1 rwm
lxc.cgroup2.devices.allow: c 234:0 rwm
lxc.cgroup2.devices.allow: c 234:1 rwm
lxc.mount.entry: /dev/nvidia0 /dev/nvidia0 none
bind, optional, create=file
lxc.mount.entry: /dev/nvidiactl /dev/nvidiactl none
bind, optional, create=file
```

lxc.mount.entry: /dev/nvidia-modeset /dev/nvidia-modeset none bind,optional,create=file

lxc.mount.entry: /dev/nvidia-uvm /dev/nvidia-uvm none bind,optional,create=file

lxc.mount.entry: /dev/nvidia-uvm-tools /dev/nvidia-uvm-tools
none bind,optional,create=file" > /etc/pve/lxc/901.conf

In giallo sono evidenziate le impostazioni per l'attivazione della prima GPU

 b) per verificare che tutto sia andato a buon fine, nell'espansione di *hpc*, fai click su *901* (*ModelGpu01*) e poi su *Start*

	Environment 7	7.4-3 Search			🖉 Do	cume	ntation 🖵 Create VM	Create CT	CT Tool@pam
Server View	~ 0	Container 901 (Model	Gpu01) on node 'hpc'	No Tags 🖋	► Start		Shutdown 🗸 🛌 C	onsole 🗸 🛛 M	ore 🗸 🔞 Help
Datacenter			< Backup now	Restore	Show Configuration	Edi	t Notes Change Proc	tion Remo	ve 5
901 (ModelGpu01)		J Summary	Name		Notes	U	Date \downarrow	Format	Size
I homes (hpc)		>_ Console							
Clocal (hpc)		Resources							
local-zfs (hpc)									

avviato il container, fai click su *hpc* e poi su >_ *Shell*



collega la sessione al container *ModelGpu01* tramite il suo identificativo (901)

root@hpc:~# lxc-attach -n 901

infine esegui

root@ModelGpu01:~# nvidia-smi

dovresti ottenere il seguente risultato

	tual Environment 7.4-3	earch	m ~
Server View 🗸 🌣	Node 'hpc'	D Reboot O Shutdown >_ Shell ∨ I Bulk Actions ∨ O F	lelp
Datacenter Mpc		+	
901 (ModelGpu01) 901 (ModelGpu01) 901 (hores (hpc) 10csl (hpc)	Summary Notes	GFU Name Persistence-M Bus-Id Disp.A Volatile Uncorr. ECC Fan Temp Perf Pwr:Usage/Cap Memory-Usage GPU-Util Compute M.	
local-zfs (hpc)	>_ Shell	HIG M. 	
	⇒ Network	N/A 60C P0 29W / 70W 2MiB / 15360MiB 04 Default N/A +	
	 Certificates DNS 	+ Processes:	
	 Hosts Options 	GPU GI CI PID Type Process name GPU Memory I ID ID Usage 	
	⊙ Time ≔ Sueles	No running processes found +	-
	\sim		

5.5 Backup del container

a) arresta il container

root@ModelGpu10:~# shutdown -h now

b) arrestato il container, nell'espansione di *hpc*, fai click su *901 (ModelGpu01)*, poi su *Backup* infine su *Backup Now*



c) compila il pop-up *Backup CT 901*: imposta a *Stop* il campo *Mode*, a *ModelGpu01* il campo *Notes*, lascia gli altri campi inalterati, infine fai click su *Backup*

Backup CT 9	01		
Storage:	local	 Compression: 	ZSTD (fast and good)
Mode:	Stop	 Send email to: 	none
Protected:			
Notes:	ModelGpu01		
Possible templ	ate variables are: {{cluste	er}}, {{guestname}}, {{n	ode}},{{vmid}}
1			

d) terminato il backup, chiudi il pop-up Task viewer: VM/CT 901 – Backup

Task viewer: VM/CT 901 - Backup	8
Output Status	
Stop	📥 Download
NFO: starting new backup job: vzdump 901node hpccompress zstdmode stopremove 0storage localnotes-template ModelGpu NFO: filesystem type on dumodir is 'zfs' -using /var/tmp/vzdumotmo260849_901 for temporary files	01
NFO: Starting Backup of VM 901 (lxc) NFO: Backup started at 2024-02-21 16:18:28	

 e) nell'espansione di *hpc*, fai click su *901 (ModelGpu01)*, poi, nell'espansione del menu *More*, seleziona *Remove*

Server View 🗸 🌣	Container 901 (Model	Gpu01) on node 'hpc' No Tags 🖋	Start	🖒 Shutdown 🗸 >_ C	onsole	More 🗸 🔞 Help
Datacenter		Show Configuration	Edit Notes Change Prot	ection Remove	Storag	Clone Convert to template
901 (ModelGpu01)	 Cancele 	Name	Notes	■ Date ↓	Format	Manage HA
<pre>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>></pre>	 Resources Network DNS Options 	vzdump-lxc-901-2024_03_16-13_12_38.tar.zst	ModelGpu01	2024-03-16 13:12:38	tar.zst	Remove
	Task History Backup					

19 di 32

f) compila il pop-up *Confirm*: imposta a *901* il campo *Please enter the ID to confirm* (901), seleziona entrambe le opzioni *Purge from job configurations* e *Destroy unreferenced disks owned by guest*, infine fai click su *Remove*

	Confirm	
11	CT 901 - Destroy Please enter the ID to confirm (901): Purge from job configurations Destroy unreferenced disks owned by guest Referenced disks will always be destroyed.	-
	Remove	-

g) fai click su *hpc*, poi su >_ *Shell*

	7.4-3 Search	🖉 Documentation 📮 Create VM 🜍 Create CT 🛔 root@pam 🗸
Server View 🗸 🌣	Node 'hpc'	♡ Reboot U Shutdown >_ Shell > I Bulk Actions > @ Help
✓ ✓ ■ Datacenter	Q Search Summary Notes	Linux hpc 5.15.102-1-pve #1 SMP FVE 5.15.102-1 (2023-03-14T13:482) x86_64. The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/copyright.
	>_ Shell ✿ System	Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law. Last login: Thu Mar 14 20:45:08 CET 2024 on pts/0 root@hpc:~# []

h) copia il backup appena effettuato nella directory /var/lib/vz/rescue

root@hpc:~# cp /var/lib/vz/dump/vzdump-lxc-901*.tar.zst /var/lib/vz/rescue/

6 Il modello ModelGpu10

Per semplicità e uniformità di notazione, in questa sezione ci riferiremo al modello *ModelGpu10* semplicemente come al container

6.1 Creazione del container

 a) nell'espansione di *hpc*, fai click su *local (hpc)*, poi su *Backups*, sul backup *ModelGpu01* (colonna *Notes*) e infine su *Restore*

×	XPROXMOX Virtual Environment 7.4-3 Search								🖻 De	ocume	entation 🖵 o	Create VM
Serve	rer View ~	Storage	e 'local' on node '	hpc'								
Datacenter		🖉 Sur	nmary	Restore	mow Configuration	Edit Notes	Change Protec	tion	Prune gro	up lxc	/901 Remo	ve Se
	l homes (hpc)	🏲 🖺 Bac	ckups	Name				Notes		U	Date \downarrow	
	Iocal (hpc)	⊚ iso	Images	vzdump-lx	c-900-2024_03_15-13_	30_38.tar.zst		Model	Gpu00		2024-02-15	10.30:38
	Senocal-zfs (hpc)		Templates	vzdump-lx	c-901-2024_03_16-13_	12_38.tar.zst		ModelGpu01			2024-03-16 13:12:38	

b) compila il pop-up *Restore: CT*: dal menu *storage* seleziona *local-zfs*,

Source:	vzdump-lxc-901-2024_03_16	i-13_12_38.tar.zs	t	
Storage:	local-zfs			~
CT:	Name 1	Туре	Avail ~	Capacity
Bandwidth Limit:	homes	lvm	39.46 TB	40.01 TB
Unique:	local-zfs	zfspool	959.53 GB	959.53 GB
Privilege Level:	From Backup O Unp	orivileged 🔿	Privileged	
- Override Setting	S:			
Hostname:	ModelGpu01 Men	nory: 2	024 🗘	
Cores:	1			

imposta a *902* il campo *CT*, a *ModelGpu10* il campo *Hostname*, lascia gli altri campi inalterati, infine fai click su *Restore*

Source:	vzdump-lxc-901-2024	4_02_21-16_18_2	8.tar.zst	
Storage:	local-zfs			\sim
CT:	902			$\hat{}$
Bandwidth Limit:	Defaults	to target storage	restore limit 🗘	ME7/S
Unique:		Start after resto	re: 🗌	
Privilege Level:	From Backup	O Unprivileged	O Privilegeo	d
- Override Setting	s:			
Hostname:	ModelGpu10	Memory:	2024	\sim
Cores:	1 0]		

(Cipsi



c) terminato il restore, chiudi il pop-up Task viewer: CT 902 - Restore



6.2 Aggiornamento della password di ModelGpu10

 a) nell'espansione di *hpc*, avvia il container *ModelGpu10* facendo click su *902* (*ModelGpu10*) e poi su *Start*

	7.4-3 Search		🖉 Doo
Server View 🗸 🗘	Container 902 (Model	IGpu01) on node 'hpc' No Tags 🖋	► Start
∠≣ Datacenter			
🔶 խ hpc	Summary		
902 (ModelGpu01)		MadalQavQd	Mater
lomes (hpc)	>_ Console	ModelGpuU1	Notes
Seal (hpc)	Resources		
local-zfs (hpc)		i Status	stopped

b) avviato il container, fai click su *hpc* e poi su >_ *Shell*

× PRO×MO×	Virtual Environment	7.4-3 Search	Documentation Create VM Create CT
Server View	~ \$	Node 'hpc'	♡ Reboot ♡ Shutdown >_ Shell ∨ I Bulk Action
Datacenter hpc 10 902 (ModelGpu0 10 Inomes (hpc) 10 Iocal (hpc) 10 Iocal-zfs (hpc)	1)	Q Search Summary Notes Shell	The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/copyright. Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law. Last login: Sat Mar 16 13:13:44 CET 2024 on pts/0 root@hpc:~# []

- c) collega la sessione al container *ModelGpu10* tramite il suo identificativo (*902*) root@hpc:~# lxc-attach -n 902
- d) aggiorna la password di root di *ModelGpu01* root@modelGpu01:~#: passwd

quando richiesto fornisci e conferma la nuova password #MGpu10#

6.3 Configurazione dei driver delle GPU

a) arresta il container

```
root@ModelGpu10:~# shutdown -h now
```

b) arrestato il container, aggiorna il contenuto del file /etc/pve/lxc/902.conf come segue root@hpc:~# echo "arch: amd64 cores: 1 hostname: ModelGpu10 memory: 2048 nameserver: 8.8.8.8 net0: name=eth0,bridge=vmbr0,firewall=1,gw=150.146.100.1,hwaddr=40: 40:40:10:02:18, ip=150.146.100.218/24, type=veth ostype: ubuntu rootfs: local-zfs:subvol-902-disk-0,size=32G searchdomain: iasi.cnr.it swap: 2048 lxc.cgroup2.devices.allow: c 195:1 rwm lxc.cgroup2.devices.allow: c 195:255 rwm lxc.cgroup2.devices.allow: c 509:0 rwm lxc.cgroup2.devices.allow: c 509:1 rwm lxc.cgroup2.devices.allow: c 234:0 rwm lxc.cgroup2.devices.allow: c 234:1 rwm lxc.mount.entry: /dev/nvidia1 /dev/nvidia0 none bind,optional,create=file lxc.mount.entry: /dev/nvidiactl /dev/nvidiactl none bind, optional, create=file lxc.mount.entry: /dev/nvidia-modeset /dev/nvidia-modeset none bind, optional, create=file lxc.mount.entry: /dev/nvidia-uvm /dev/nvidia-uvm none bind, optional, create=file lxc.mount.entry: /dev/nvidia-uvm-tools /dev/nvidia-uvm-tools none bind,optional,create=file" > /etc/pve/lxc/902.conf

In giallo sono evidenziate le impostazioni per l'attivazione della seconda GPU

c) per verificare che tutto sia andato a buon fine,

nell'espansione di *hpc*, avvia il container *ModelGpu10* facendo click su *902 (ModelGpu10)* e poi su *Start*

	7.4-3 Search		🖉 Docu
Server View 🗸 🌣	Container 902 (Model	IGpu10) on node 'hpc' No Tags 🖋	► Start
✓			
► V ស hpc	Summary		
902 (ModelGpu10)			
🗐 homes (hpc)	>_ Console	ModelGpu10	NOTE
Sel local (hpc)	Resources		
local-zfs (hpc)	≓ Network	i Status	stopped
		👽 HA State	none
	\sim	Node	hpc

avviato il container, fai click su *hpc* e poi su >_ *Shell*

	tual Environment 7.4-3	Search 🖉 Documentation 🖵 Create VM 😵 Create CT 🛓 root@pam 🗸
Server View 🗸 🌣	Node 'hpc'	🖱 Reboot 🖄 Shutdown 🖂 Shell 🗸 🗄 Bulk Actions 🗸 🖗 Help
) 📑 Datacenter		
🔫 🌄 hpc	Q Search	The programs included with the Debian GNU/Linux system are free software;
902 (ModelGpu10)		the exact distribution terms for each program are described in the
🛢 🛛 homes (hpc)	Summary	individual files in /usr/share/doc/*/copyright.
Scal (hpc)	Notes	Debian GNTI/Linux comes with ABCOLUTELY NO BARDANTY to the extent
local-zfs (hpc)	>_ Shell	permit do phila conto and about an average in the watching to the catche
	-	Last login: Mon Mar 18 13:54:00 CET 2024 on pts/0
- F	\sim	root@hpc:~#



collega la sessione al container *ModelGpu10* tramite il suo identificativo

root@hpc:~# lxc-attach -n 902

infine esegui

root@ModelGpu10:~# nvidia-smi

dovresti ottenere il seguente risultato

	7.4-3 Search	Documentation	ate CT 💄 root@pam 🗸						
Server View 🗸 🗘	Node 'hpc'	"O Reboot d' Shutdown >_ Shell ∨ I Bu	ulk Actions \vee 🔞 Help						
✓ ■ Datacenter ✓ ■ pc	Q Search	Linux hpc 5.15.102-1-pve #1 SMP FVE 5.15.102-1 (2023-03-14T13:482) x86_64	•						
902 (ModelGpu10) 902 (ModelGpu10)	Summary	The programs included with the Debian GNU/Linux system are free software;							
Dinnes (hpc)	Notes	the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/copyright.							
S local (hpc)	>_ Shell								
	Ø6 System →	Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law.							
	A Network	Last login: Tue Mar 19 11:57:23 CET 2024 on pts/0							
	 Certificates 	root@npc:~# 1xc-attacn -n 902 root@ModelGpu10:~# nvidia-smi							
	ONS	Tue Mar 19 11:00:37 2024	+						
	Hosts	NVIDIA-SMI 535.154.05 Driver Version: 535.154.05 CUDA Versio	on: 12.2						
	Options	GPU Name Persistence-M Bus-Id Disp.A Volatile	Uncorr. ECC						
	O Time	Fan Temp Perf Pwr:Usage/Cap Memory-Usage GPU-Util 	Compute M. MIG M.						
	i ≣ Syslog								
	2 Updates -	N/A 39C P0 25W / 70W 2MiB / 15360MiB 6%	Default						
	P Repositories		N/A						
	♥ Firewall								
	🖨 Disks 🔍	+	+						
	LVM	GPU GI CI PID Type Process name	GPU Memory						
	LVM-Thin								
	Directory	No running processes found							
	# ZFS	root@ModelGpu10:~#							

6.4 Backup del container

a) arresta il container

root@ModelGpu10:~# shutdown -h now

b) arrestato il container, nell'espansione di *hpc*, fai click su *902 (ModelGpu10)*, poi su *Backup* infine su *Backup Now*



c) compila il pop-up *Backup CT 902*: imposta a *Stop* il campo *Mode*, a *ModelGpu10* il campo *Notes*, lascia gli altri campi inalterati, infine fai click su *Backup*

Backup CT 9	02				\otimes	
Storage:	local	\sim	Compression:	ZSTD (fast and good)	\sim	•
Mode:	Stop	~	Send email to:	none		
Protected:						
Notes:	ModelGpu10					
Possible templ	ate variables are: {{	:luster}},{	{guestname}}, {{n	ode}}, {{vmid}}		
				_		
Help				Ba	ackup	

d) terminato il backup, chiudi il pop-up *Task viewer: VM/CT 902 – Backup*



 e) nell'espansione di *hpc*, fai click su *902 (ModelGpu10)*, poi, nell'espansione del menu *More*, seleziona *Remove*

	7.4-3 Search		🖉 D	ocum	entation Create VM	🗊 Crea	ite CT	占 root@pam 🗸
Server View 🗸 🗘	Container 902 (M	odelGpu10) on node 'hpc' No	Tags 🖌 🕨 🕨	Start	🖒 Shutdown 🗸 >	Console	$ $ \vee	More \vee \bigcirc $>$
○≣ Datacenter Ipc	Discussion Summary	C Backup now Restore	Show Cont	igurat	ion Edit Notes Char	nge Prote	0 0	Clone Convert to template
902 (ModelGpu10)	>_ Console	Name	Notes	U	Date \downarrow	Forma	t 😎	Manage HA
homes (hpc)	Resources	vzdump-lxc-902-2024_0	ModelGp		2024-03-19 09:39:29	tar.zst	Ô	Remove
S [] Iocal-zis (ripc)	ONS DNS							

f) compila il pop-up *Confirm*:imposta a *902* il campo *Please enter the ID to confirm* (902), seleziona entrambe le opzioni *Purge from job configurations* e *Destroy unreferenced disks owned by guest*, infine fai click su *Remove*

Confi	m	\otimes	
	CT 902 - Destroy Please enter the ID to confirm (902):	902	
	Destroy unreferenced disks owned by guest Referenced disks will always be destroyed. Remove		-

g) fai click su *hpc*, poi su >_ *Shell*

Server View	~ \$	Nede 'bes'	Debast (D. Shutdawa) Shall y L. Bulk Astisna y Q. Hal				
Contractor		Node fipc	Sindidowin >_ Sindidowin >_ Sindidowin >_ Sindidowin >				
			Linux hpc 5.15.102-1-pve #1 SMP PVE 5.15.102-1 (2023-03-14T13:48Z) x86_64				
npc npc		Q Search					
 homes (hpc) local (hpc) local-zfs (hpc) 		Summary	The programs included with the Debian GNU/Linux system are free software the exact distribution terms for each program are described in the				
		Notes	individual files in /usr/share/doc/*/copyright.				
		>_ Shell	Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent				
		¢ ⁸ ₆ System ▼	permitted by applicable law. Last login: Thu Mar 14 20:45:08 CET 2024 on pts/0				

h) copia il backup appena effettuato nella directory /var/lib/vz/rescue

root@hpc:~# cp /var/lib/vz/dump/vzdump-lxc-902*.tar.zst /var/lib/vz/rescue/

7 Il modello ModelGpu11

Per semplicità e uniformità di notazione, in questa sezione ci riferiremo al modello *ModelGpu11* semplicemente come al container

7.1 Creazione del container

 a) nell'espansione di *hpc*, fai click su *local (hpc)*, poi su *Backups*, sul backup *ModelGpu01* (colonna *Notes*) e infine su *Restore*

	.4-3 Search		2	Docum	entation Create VM	😯 Create CT	占 root@pam 🗸
Server View 🗸 🌣	Storage 'local' on node '	'hpc'					Help
Datacenter	Summary	Restore	Show Configuration Edit	lotee	Charge Participa	Prano group incit	er Remove
S homes (hpc)	🖺 Backups	Name	Notes	U	Date \downarrow	Format	Size
local (hpc)	ISO Images	vzd	ModelGpu00		2024-03-15 13:30:38	tar.zst	774.91 MB
Survey (hpc)	CT Templates	vzd	ModelGpu01		2024-03-19 09:00:34	tar.zst	1.57 GB
	Permissions	vzd	ModelGpu10		2024-03-19 09:39:29	tar.zst	1.57 GB

b) compila il pop-up *Restore: CT*: dal menu *storage* seleziona *local-zfs*

	·			
storage:	IOCAI-ZIS			*
CT:	Name 1	Туре	Avail	Capacity
Bandwidth Limit:	homes	lvm	39.46 TB	40.01 TB
Unique:	local-zfs	zfspool	957.95 GB	957.95 GB
Privilege Level:	From Backup O U	nprivileged	Privileged	
- Override Setting	S:			
Hostname:	ModelGpu01 M	lemory: 2	2024 🗘	

imposta a **903** il campo **CT**, a **ModelGpu11** il campo **Hostname**, lascia gli altri campi inalterati, infine fai click su **Restore**

Storage:	local-zfs			~
CT:	903			0
Bandwidth Limit:	Defau	Its to target storage r	estore limit 🗘	MiB/s
Unique:		Start after restore	e: 🗌	
Privilege Level:	From Backup	O Unprivileged	O Privileged	
- Override Setting	s:	_		
Hostname:	ModelGpu11	Memory:	2024	$\hat{}$
Cores:	1			





c) terminato il restore, chiudi il pop-up Task viewer CT 903 - Restore

Task viewer: CT 903 - Restore	\otimes
Output Status	
Stop	📥 Download
recovering backed-up configuration from 'local:backup/vzdump-lxc-901-2024_02_23-14_33_00.tar.zst' restoring 'local:backup/vzdump-lxc-901-2024_02_23-14_33_00.tar.zst' now extracting archive '/var/lib/vz/dump/vzdump-lxc-901-2024_02_23-14_33_00.tar.zst'	

- 7.2 Aggiornamento della password di *ModelGpu11*
 - a) nell'espansione di *hpc*, avvia il container *ModelGpu11* facendo click su *903* (*ModelGpu11*) e poi su *Start*

Server View V				6				
	Container 903 (Nodel	Gpu11) on node inpc No	o Tags 🖋		Start	Suudown V >_ 0		liore V W Help
₩ Datacenter	Summary	Sackup now Res	tore Show (Configuration	Edit Not	Change Protection	Remove	Storage: >
🚽 💮 903 (ModelGpu11)	>_ Console	Name		Notes		Date J	Format	Size
I homes (hpc)	Resources							
E local (hpc)	Retwork							
S [] locarzis (lipc)	ONS							
	Options							

b) avviato il container, fai click su *hpc* e poi su >_ *Shell*

	7.4-3 Search	Documentation Create VM Create CT Create CT Create CT
Server View 🗸 🌣	Node 'hpc'	"C Reboot O Shutdown >_ Shell > I Bulk Actions > O Help
Datacenter	Q Search	Linux hpc 5.15.102-1-pve #1 SMP FVE 5.15.102-1 (2023-03-14T13:482) x86_64
903 (ModelGpu11)	Summary Notes	The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/comprisht.
Social (hpc) Social (hpc) Social (hpc)	>_ Shell ✿¦system	Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law.
	➡ Network♦ Certificates	Last login: Tue Mar 19 12:02:43 CET 2024 on pts/0 root@hpc:~# []

- c) collega la sessione al container *ModelGpu11* tramite il suo identificativo (903) root@hpc:~# lxc-attach -n 903
- d) aggiorna la password di root di *ModelGpu11*

root@modelGpu11:~#: passwd

quando richiesto fornisci e conferma la nuova password #MGpu11#

e) arresta il container

root@ModelGpu11:~# shutdown -h now

7.3 Configurazione dei driver delle GPU

a) aggiorna il contenuto del file /etc/pve/lxc/903.conf come segue root@hpc:~# echo "arch: amd64 cores: 1 hostname: ModelGpu11 memory: 2048 nameserver: 8.8.8.8 net0: name=eth0,bridge=vmbr0,firewall=1,gw=150.146.100.1,hwaddr=40: 40:40:10:02:19,ip=150.146.100.219/24,type=veth ostype: ubuntu rootfs: local-zfs:subvol-903-disk-0,size=32G searchdomain: iasi.cnr.it swap: 2048 lxc.cgroup2.devices.allow: c 195:0 rwm lxc.cgroup2.devices.allow: c 195:1 rwm lxc.cgroup2.devices.allow: c 195:255 rwm lxc.cgroup2.devices.allow: c 509:0 rwm lxc.cgroup2.devices.allow: c 509:1 rwm lxc.cgroup2.devices.allow: c 234:0 rwm lxc.cgroup2.devices.allow: c 234:1 rwm lxc.mount.entry: /dev/nvidia0 /dev/nvidia0 none bind, optional, create=file lxc.mount.entry: /dev/nvidia1 /dev/nvidia1 none bind, optional, create=file lxc.mount.entry: /dev/nvidiactl /dev/nvidiactl none bind,optional,create=file lxc.mount.entry: /dev/nvidia-modeset /dev/nvidia-modeset none bind, optional, create=file lxc.mount.entry: /dev/nvidia-uvm /dev/nvidia-uvm none bind, optional, create=file lxc.mount.entry: /dev/nvidia-uvm-tools /dev/nvidia-uvm-tools none bind,optional,create=file" > /etc/pve/lxc/903.conf

In giallo sono evidenziate le impostazioni per l'attivazione di entrambe le GPU

 b) per verificare che tutto sia andato a buon fine, nell'espansione di *hpc*, avvia il container *ModelGpu11* facendo click su *903 (ModelGpu11)* e poi su *Start*

XPR	CXMOX Virtual Environment 7	.4-3 Search		ł	Documer	ntation 🖵 Create VM	Create CT	Å root@pam 🗸
Server Vier	w ~ 🌣	Container 903 (Model	Gpu11) on node 'hpc' No Tags 🖋		Start	>_ Co	nsole 🗸 More	V 🕜 Help
, / ⊒≣ Data √ 💽 hp	acenter pc	Summary	Show C	Configuration	Edit Notes	Change Protection	Remove	Storage: >
7 0	903 (ModelGpu11)	>_ Console	Name	Notes	U	Date \downarrow	Format	Size
	L homes (hpc) local (hpc)	 Resources Network 						
5		O DNS						
		Options						



avviato il container, fai click su *hpc* e poi su >_ *Shell*

	vironment 7.4-3 Search	🖉 Documentation 📮 Create VM 🜍 Create CT 👗 root@pam 🗸
Server View	V 🗢 Node 'hpc'	🖱 Reboot 🖞 Shutdown >_ Shell 🗸 🗄 Bulk Actions 🗸 🚱 Help
∠ ■ Datacenter ↓ ♥ hpc	Q Search	Linux hpc 5.15.102-1-pve #1 SMP FVE 5.15.102-1 (2023-03-14T13:48Z) x86_64
903 (ModelGpu11)	Summary Notes	The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/comyright.
◯ local (npc) ◯ local-zfs (hpc)	>_ Shell © System	Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law.
	⇒ Network	Last login: Tue Mar 19 12:02:43 CET 2024 on pts/0 root@hpc:~# [] es

collega la sessione al container *ModelGpu11* tramite il suo identificativo

root@hpc:~# lxc-attach -n 903

infine esegui

root@ModelGpu11:~# nvidia-smi

dovresti ottenere il seguente risultato

	7.4-3 Search		Documentation Create VM 🕏							
Server View 🗸 🌣	Node 'hpc'	ී R	eboot 🖒 Shutdown >_ Shell >							
✓ ■ Datacenter ✓ ■ hpc	Q Search	Linux hpc 5.15.102-1-pve #1 SMP FVE 5.15.102-1 (2023-03-14T13:48	Z) x86_64							
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	 Certificates DNS Hosts 	root@hpc:-# lxc-attach -n 903 root@hodelgoull:-# avuidia-smi Tue Mar 19 11:24:56 2024 + NVIDIA-SMI 535.154.05 Driver Version: 535.154.05	CUDA Version: 12.2							
	 Options Time 	M Bus-Id Disp.A GPU Name Persistence-M Bus-Id Disp.A Fan Temp Perf Pwr:Usage/Cap Memory-Usage 	-++ Volatile Uncorr. ECC GPU-Util Compute M. MIG M.							
	Updates	0 Tesla T4 Off 00000000:60:00.0 Off N/A 39C P0 25W / 70W 2M1B / 15360M1B	0 0% Default N/A							
	Firewall Disks	1 Tesla T4 Off 00000000:61:00.0 Off N/A 58C P0 28W / 70W 2M1B / 15360M1E 	0 7% Default N/A							
	LVM-Thin Directory ZFS	 Processes: GFU GI CI PID Type Process name ID ID	GPU Memory Usage							
		No running processes found +	I							
	Task History	root@ModelGpul1:~#								

7.4 Backup del container

a) arresta il container

root@ModelGpu11:~# shutdown -h now

b) arrestato il container, nell'espansione di *hpc*, fai click su *903 (ModelGpu11)*, poi su *Backup* infine su *Backup Now*



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c) compila il pop-up *Backup CT 903*: imposta a *Stop* il campo *Mode*, a *ModelGpu11* il campo *Notes*, lascia gli altri campi inalterati, infine fai click su *Backup*

Storage:	local	\sim	Compression:	ZSTD (fast and good)	\sim
Mode:	Stop	\sim	Send email to:	none	
Protected:					
Notes:	ModelGpu11				
Possible template	e variables are: {{clu	uster}}, {	{guestname}},{{n	ode}},{{vmid}}	

d) terminato il backup, chiudi il pop-up Task viewer: VM/CT 903 – Backup

Task viewer: VM/CT 903 - Backup	8
Output Status	
Stop	🛓 Download
INFO: starting new backup job: vzdump 903remove 0storage localnotes-template ModelGpu11compress zstdnode hpcmode st INFO: filesvstem type on dumodir is 'zfg' -using /vze/tmg/vgdumotmg2505751_903 for temporary files	op
INFO: Starting Backup of VM 903 (lxc)	
INFO: Backup started at 2024-02-23 17:07:32	

 e) nell'espansione di *hpc*, fai click su *903 (ModelGpu11)*, poi, nell'espansione del menu *More*, seleziona *Remove*

	7.4-3 Search		릗 Do	cum	entation Create VM	🝞 Crea	ite CT	root@pam 🗸
Server View 🗸 🌣	Container 903 (Model	Gpu11) on node 'hpc' No Tags 🖉	 Star 	t	🖒 Shutdown 🖂 >_ Cor	nsole ~	N	More 🗸 🔞 Help
Datacenter	Summary	Backup now Restore	Show Configuration	1	Edit Notes Change Prot	ection	0	Clone Convert to template
903 (ModelGpu11)	>_ Console	Name	Notes	U	Date U	Forma	1 🐨	Manage HA
I homes (hpc)	Resources	vzdump-lxc-903-2024_03_19	ModelGpu11		2024-03-19 12:44:53	tar.zst	ŵ	Remove
local-zfs (hpc)	A Network							

f) nel pop-up *Confirm* imposta a *903* il campo *Please enter the ID to confirm (903)*, seleziona entrambe le opzioni *Purge from job configurations* e *Destroy unreferenced disks owned by guest*, infine fai click su *Remove*



g) fai click su *hpc*, poi su >_ *Shell*

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h) copia il backup appena effettuato nella directory /var/lib/vz/rescue

root@hpc:~# cp /var/lib/vz/dump/vzdump-lxc-903*.tar.zst /var/lib/vz/rescue/

8 Revision history

Data	Versione	Descrizione	Autori
23/02/2024	Preliminare		Carlo Gaibisso Bruno Martino
26/02/2024	1.0		Carlo Gaibisso Bruno Martino
05/03/2024	2.0	 eliminazione, nella versione 1.0 dell'ultimo punto della sezione 5.1 (j) arresta il container") inserimento nella tabella riassuntiva dei modelli di container della sezione 2 della riga Account 	Carlo Gaibisso
21/03/2024	3.0	 modifica delle password assegnate ai modelli nella tabella della sezione 2 e conseguente modifica degli altri contenuti eliminata anomalia legata al formato delle virgolette nel comando echo virgolette Corretti file di configurazione delle GPU Introdotta la gestione dello spazio delle home utente 	Carlo Gaibisso
29/03/2024	4.0	 Sezione 5.1 Creazione del Container: corretta la numerazione dei punti Sezione 5.2 Aggiornamento della password di ModelGpu01: corretta la numerazione dei punti Sezione 5.4 Configurazione del container: corretta la modalità di aggiornamento del file /etc/pve/lxc/901.conf Sezione 6.2 Aggiornamento della password di ModelGpu10: corretta la numerazione dei punti Sezione 6.3 Configurazione dei driver delle GPU: corretta la modalità di aggiornamento del file /etc/pve/lxc/902.conf Sezione 7.3 Configurazione dei driver delle GPU: corretta la numerazione dei punti Sezione 7.3 Configurazione dei driver delle GPU: corretta la numerazione dei punti 	

9 Task

Task	Data Inserimento	Data Inizio	Data Termine	Note