

Creating Customized Virtual Machines Using `virt-scenario`

WHAT?

When deploying multiple virtual machines (VM), they often serve a similar purpose. `virt-scenario` offers a way to quickly create a VM following a predefined scenario. As an option, you can create a secure VM or override certain default `virt-scenario` settings.

WHY?


This article introduces the `virt-scenario` tool and describes available predefined scenarios for creating VMs. It outlines steps to create a VM suitable for a selected scenario, as well as available commands for the `virt-scenario` interactive shell.

EFFORT

It takes up to 30 minutes to understand `virt-scenario` and use it to create a basic VM. To learn and try additional topics, for example, how to override default values or use interactive commands, you need additional time.

REQUIREMENTS

- **virt-scenario** requires KVM and libvirt virtualization environment configured and related daemons running.

- Secure virtual machines are supported only by an AMD processor that supports AMD SEV or SEV-ES technology. For more information about SUSE and AMD SEV, refer to <https://documentation.suse.com/sles/single-html/SLES-amd-sev/> .

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1 Introduction to **virt-scenario**

virt-scenario is a tool that helps you create virtual machines (VM) suitable for a specific scenario. It provides predefined *profiles* that include optimal settings for each scenario. You can override settings that are common to all profiles.



Important

Although **virt-scenario** generally provides the best possible configuration for a specific scenario, this cannot be guaranteed because each environment may have specific requirements.

1.1 How does **virt-scenario** work?

Interactive **virt-scenario** script creates a libvirt XML configuration file for a VM based on the following:

- selected basic profile
- overridden values for common parameters
- parameters that you specify interactively

After the configuration is validated, **virt-scenario** adjusts the VM Host Server system and creates the image file for the VM Guest. You can then operate the VM using standard libvirt commands.

1.2 Benefits of using **virt-scenario**

- Creating virtual machines is fast and simple. **virt-scenario** leaves all the virtualization complexity aside. You can focus on basic features only.
- Fine-tuned profiles already offer optimal settings for specified scenarios. You do not have to search and copy them to each virtual machine of the same type, just use the same profile.
- The override mechanism lets you specify other values than the profile's default for selected options. This way, you can customize virtual machines to your needs.

2 Creating VMs

The **virt-scenario** command presents an interactive shell where you optionally specify configuration parameters and finally select the target scenario. Its welcome screen shows categories with available commands.

```
virt-scenario Interactive Terminal!

Setting the virt-scenario Configuration: conf
Guest/Host/Both mode could be selected using: mode
Force overwrite previous setting: overwrite

Prepare a Libvirt XML guest config and the host to run a customized guest:
computation | desktop | securevm

Possible User Settings For VM are:
name | vcpu | memory | machine | bootdev | diskpath | cdrom

Hypervisors parameters:
hconf | hv_select | hvlist

You can overwrite some recommended VM settings editing: /etc/virt-scenario/virtscenario.yaml

Please read the manpage and the README.md file:
https://github.com/aginies/virt-scenario/blob/main/README.md

-----
Main Configuration: /etc/virt-scenario/virtscenario.yaml
Hypervisor Configuration: /etc/virt-scenario/virthosts.yaml

> 
```

FIGURE 1: **virt-scenario** WELCOME SCREEN



Tip

Each command has a built-in description of its usage. Enter **help COMMAND_NAME** to view it on the screen.



Warning: Unsafe `force_sev` option

The `force_sev` option forces the extraction of the Platform Diffie-Hellman key (PDH) on the current AMD SEV system. The PDH file is used to negotiate a master secret between the SEV firmware and the external entities. This file must be stored in a secure place, and this option is only provided for *testing* purposes.

After you finish optional configuration steps, enter the name of one of the scenarios—`computation`, `desktop` or `securevm`. **`virt-scenario`** then compiles all the configuration, prepares the VM Host Server, and saves the `libvirt` XML of the new VM.

2.1 Overriding default scenario settings

On each run, **`virt-scenario`** reads settings for a new VM from the `/etc/virt-scenario/virtscenario.yaml` file. Change settings in this file to affect *all* VMs created by **`virt-scenario`**.



Tip

Always backup `/etc/virt-scenario/virtscenario.yaml` before modifying it as incorrect parameters may lead to an invalid VM configuration.

To override settings for specific VMs only, copy `/etc/virt-scenario/virtscenario.yaml` to a different location and modify the settings that you need to override. On next **`virt-scenario`** run, specify the path to the new configuration file with the **`conf`** command, for example:

```
conf /home/tux/virt-scenarios/my-overriden-scenario.yaml
```



Important

In the overriding `virtscenario.yaml` file, you need to include *all* available settings from the original `virtscenario.yaml` file, not only the modified settings.



Warning

Never change section names in the `/etc/virt-scenario/virtscenario.yaml` file or its overriding copies.

The following is an example of `/etc/virt-scenario/virtscenario.yaml`:

```
config:
  - path: /etc/virt-scenario
  - vm-config-store: ~/.local/virtscenario/
emulator:
  - emulator: /usr/bin/qemu-system-x86_64
input:
  - keyboard: virtio
  - mouse: virtio
architecture:
  - arch: x86_64
STORAGE_DATA:
# some options are only available with qcow2 format and
# will be ignored in case of any other image format
  - disk_type: file
  - disk_cache: none
  - disk_target: vda
  - disk_bus: virtio
  - path: /var/libvirt/images
  - format: qcow2
# host side: qemu-img creation options (-o), qemu-img --help
  - unit: G
  - capacity: 20
  - cluster_size: 1024k
  - lazy_refcounts: on
preallocation: full
  - preallocation: off
  - compression_type: zlib
  - encryption: off
host_filesystem:
  - fmode: 644
  - dmode: 755
  - source_dir: /tmp
  - target_dir: /tmp/host
```

2.2 Specifying **virt-scenario** mode

By default, **virt-scenario** creates the `libvirt` XML configuration of the new guest and adjusts the VM Host Server. You can instruct **virt-scenario** to perform only part of the task. After entering the **mode** command, you can enter one of the following:

guest

Creates only the `libvirt` XML configuration of the guest.

host

Prepares the VM Host Server system only.

both

Creates the guest configuration and prepares the host. This is the default mode.

2.3 Interactive commands

You can use the following commands when configuring a new VM using the **virt-scenario** interactive shell.



Tip

Each command has a built-in description of its usage. Enter **help COMMAND_NAME** to view it on the screen.

HYPERVISOR CONFIGURATION

hvconf

Loads hypervisor configuration.

hvselect

Sets the hypervisor for which VMs are configured.

hvlist

Lists available hypervisors.

overwrite

Forces overwriting previous configuration.

GUEST CONFIGURATION

name

Defines the name of the VM.

vcpu

Specifies the number of virtual CPUs.

memory

Specifies the memory size (in GiB).

machine

Selects the machine type.

bootdev

Selects the boot device.

diskpath

Specifies the directory where to store the VM disk image.

conf

Specifies the path to the custom **virtscenario.yaml** file.

cdrom

Specifies the path to the CD/DVD installation media.

GENERATE VM CONFIGURATION

computation

Creates a libvirt XML configuration and VM Host Server adjustments for the computation scenario.

desktop

Creates a libvirt XML configuration and VM Host Server adjustments for the desktop scenario.

securevm

Creates a libvirt XML configuration and VM Host Server adjustments for the secure VM scenario.

3 Predefined scenarios

When creating a VM, you can specify one of the following scenarios:

securevm

Selecting this scenario results in an encrypted VM image with a high level of isolation and data security.

computation

This scenario puts emphasis on the high performance of the resulting VM.

desktop

The result of this scenario is a VM suitable for running desktop applications.

The following tables show default settings for each scenario:

TABLE 1: DEFAULT STORAGE SETTINGS

Setting	securevm	computation	desktop
preallocation	metadata	off	metadata
encryption	on	off	off
disk_cache	writethrough	unsafe	none
lazy_refcounts	on	on	off
format	qcow2	raw	qcow2
disk bus	virtio	virtio	virtio
capacity	20G	20G	20G
cluster_size	1024k	N/A	1024k

TABLE 2: DEFAULT HOST SETTINGS

Setting	securevm	computation	desktop
Transparent HugePages	on	on	on
KSM	disable	enable	enable
KSM merge across	disable	enable	enable
swappiness	0	0	35
IO Scheduler	bfq	mq-deadline	mq-deadline

TABLE 3: DEFAULT GUEST SETTINGS

Setting	securevm	computation	desktop
CPU migratable	off	off	on
machine	pc-q35-6.2	pc-q35-6.2	pc-q35-6.2

Setting	securevm	computation	desktop
watchdog	none	i6300esb poweroff	none
boot UEFI	auto	auto	auto
vTPM	tpm-crb 2.0	none	none
iothreads	disable	4	4
video	qxl	qxl	virtio
network	e1000	virtio	e1000
keyboard	ps2	virtio	virtio
mouse	disable	virtio	virtio
on_poweroff	destroy	restart	destroy
on_reboot	destroy	restart	restart
on_crash	destroy	restart	destroy
suspend_to_mem	off	off	on
suspend_to_disk	off	off	on
features	acpi apic pae	acpi apic pae	acpi apic pae
host fs fmode, dmode, source_dir, target_dir	N/A	N/A	644 755 /tmp/ / tmp/host

TABLE 4: DEFAULT SEV SETTINGS

Setting	securevm	computation	desktop
kvm SEV	mem_encrypt = on kvm_amd sev = 1 sev_es = 1	N/A	N/A

Setting	securevm	computation	desktop
sec cbtpos	auto	N/A	N/A
sec reducedPhysBits	auto	N/A	N/A
sec policy	auto	N/A	N/A

4 Managing VMs

After you created a VM using the **virt-scenario** interactive shell, use the **virt-scenario-launch** command to manage it. The command identifies VMs by their name as displayed by the **--list** option.

```
# virt-scenario-launch --list
Version: 2.1.2
Available VMs:
  ALP_OS
  desktop
  testing_vm
  SLE15_HPC
```

When the VM is identified, you can manage it with the following options.

--help

Prints short descriptions of available options.

--start

Starts the VM and prints security attestation information, for example:

```
# virt-scenario-launch --start ALP_OS
Connected to libvirtd socket; Version: 7001000
SEV(-ES) attestation passed!
Validation successfull for domain ALPOS
```

--status

Shows the status of the VM, for example:

```
# virt-scenario-launch --status ALP_OS
Version: 2.1.2
Connecting to libvirt qemu:///system ...
```

```
Connected to libvirtd socket; Version: 7001000  
Domain SLE15SP5HPC state: Shutoff
```

--off

Shuts a VM down.

```
# virt-scenario-launch --off ALP_OS
```

--force


Forces a VM off.

```
# virt-scenario-launch --force ALP_OS
```

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