snf-image

An OS provider for Ganeti

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What is snf-image?

- Started at 2011 as part of the Synnefo stack
- Ganeti OS interface v20
- A secure way to create VMs out of untrusted images
- Current version (v0.19.1) is known to work on:
  - Linux
  - Windows
  - {Free, Net, Open}BSD
- Spawned > 500,000 VMs

Instance Deployment Methods

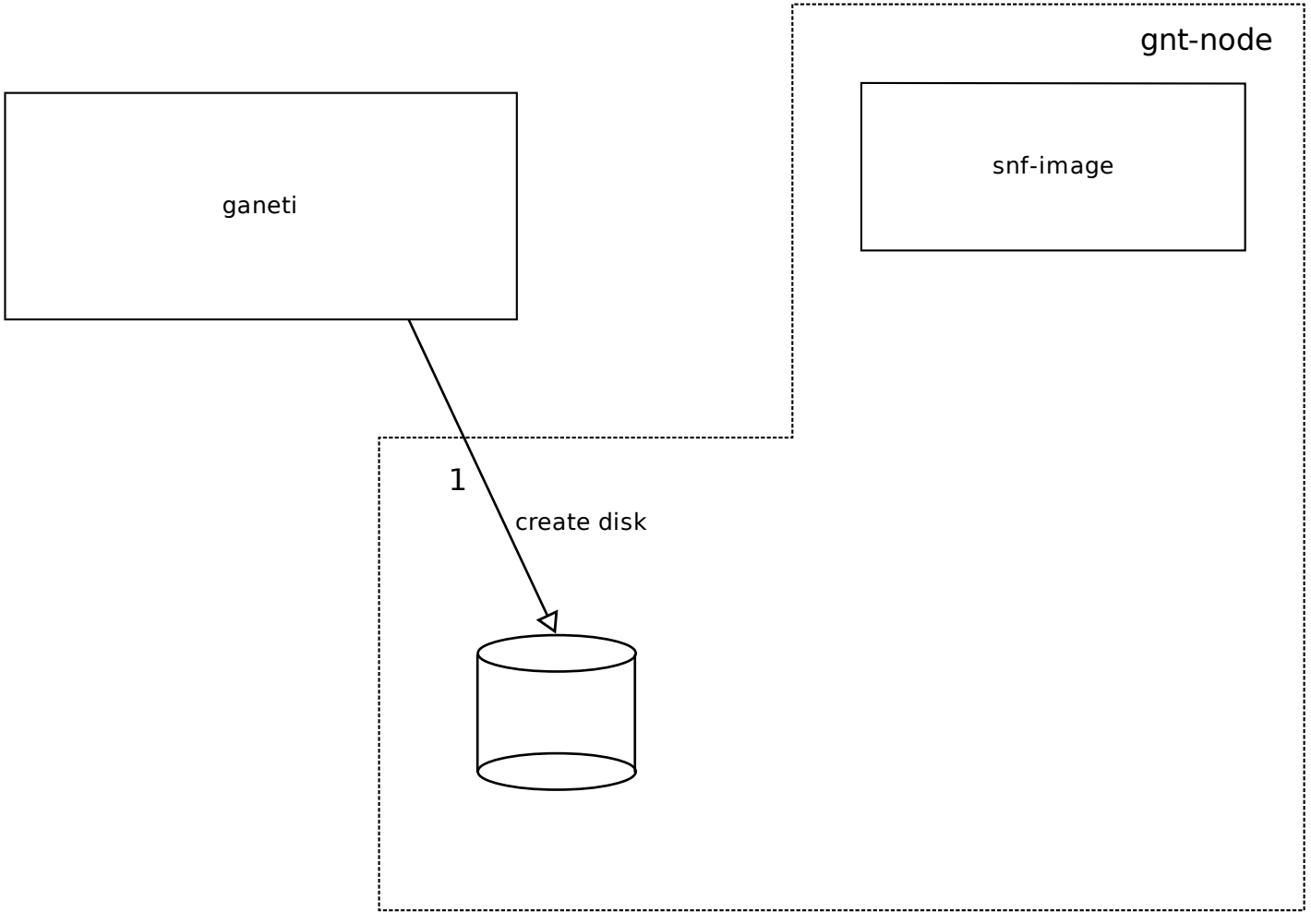
- **Instance self-configuration:**
  - Magic IP:
    - Amazon Elastic Compute Cloud (EC2): 169.254.169.254
  - Config Drive (cloud-init):
    - floppy: RHEVm
    - disk: OpenStack
    - cdrom: OpenNebula, vSphere
- **Instance external configuration:**
  - snf-image

Instance Deployment Methods - Comparison

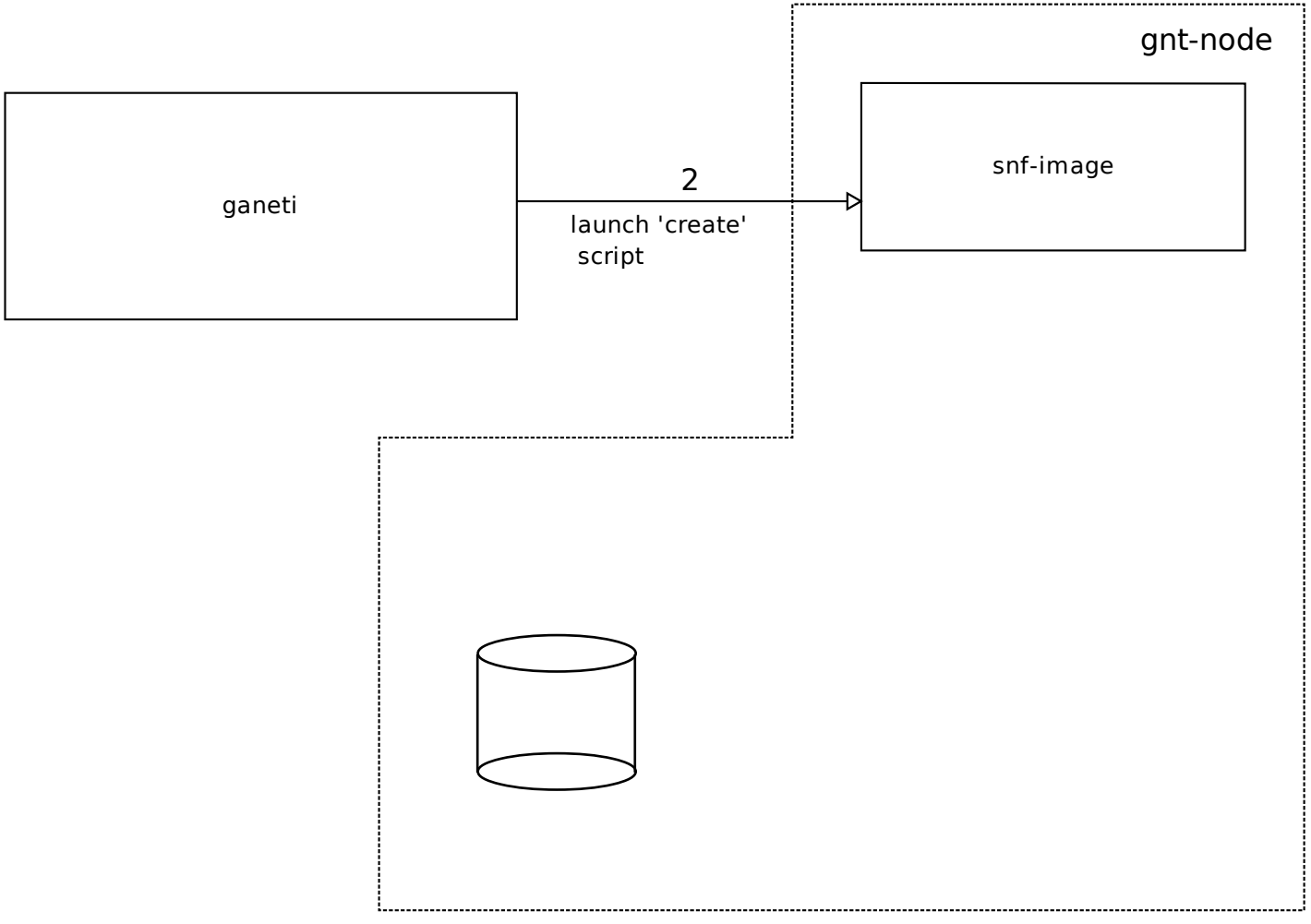
	self-configuration	external configuration
needs host support	no	yes
needs guest support	yes	no
file system resizing	online	online & offline
error detection	hard	easy
security	through isolation	host may run malicious code

- Host support is not a problem. Linux supports most file systems. How can we overcome the security issues of the external configuration process?
- What if we create a VM jail?

Architecture



Architecture



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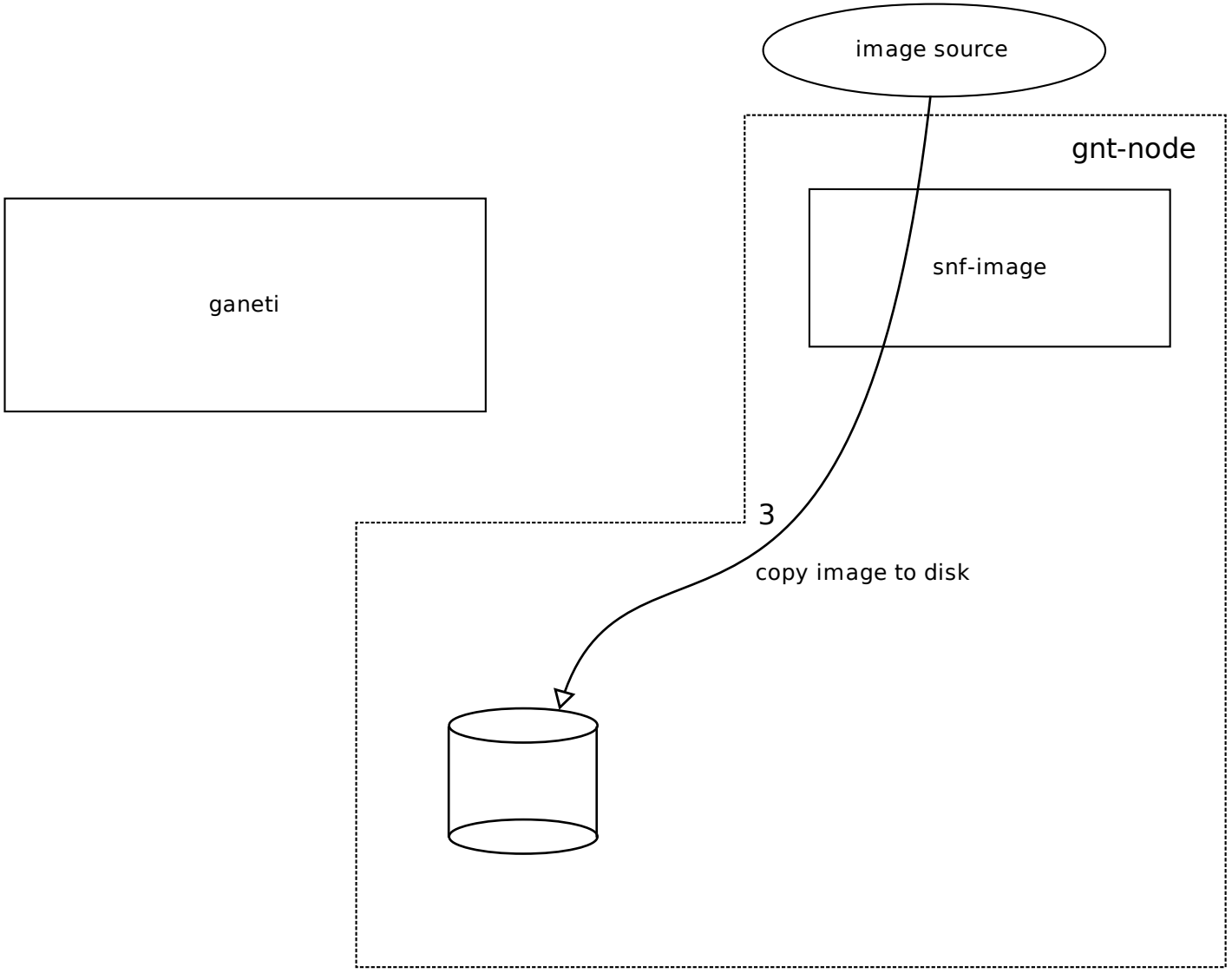

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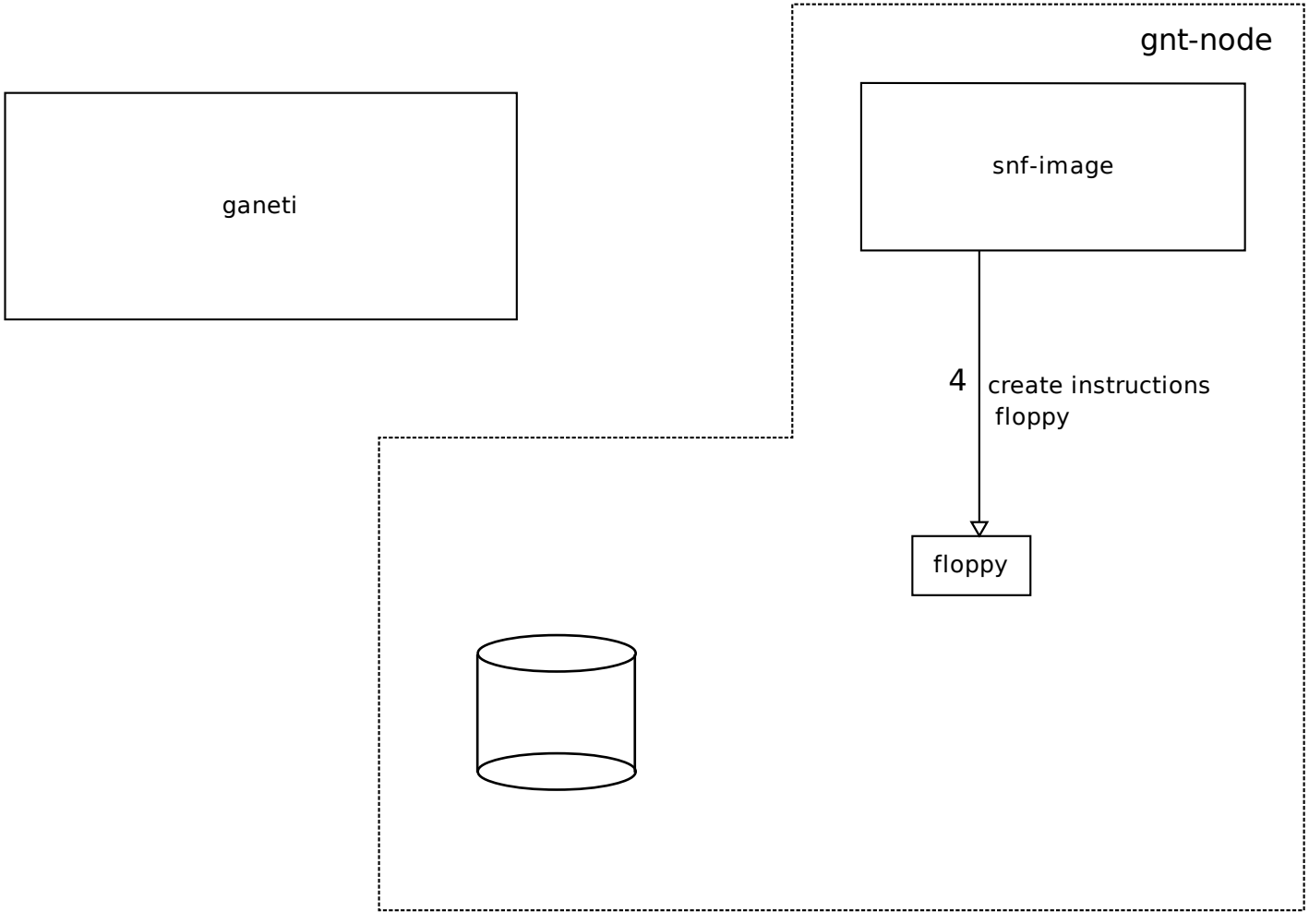

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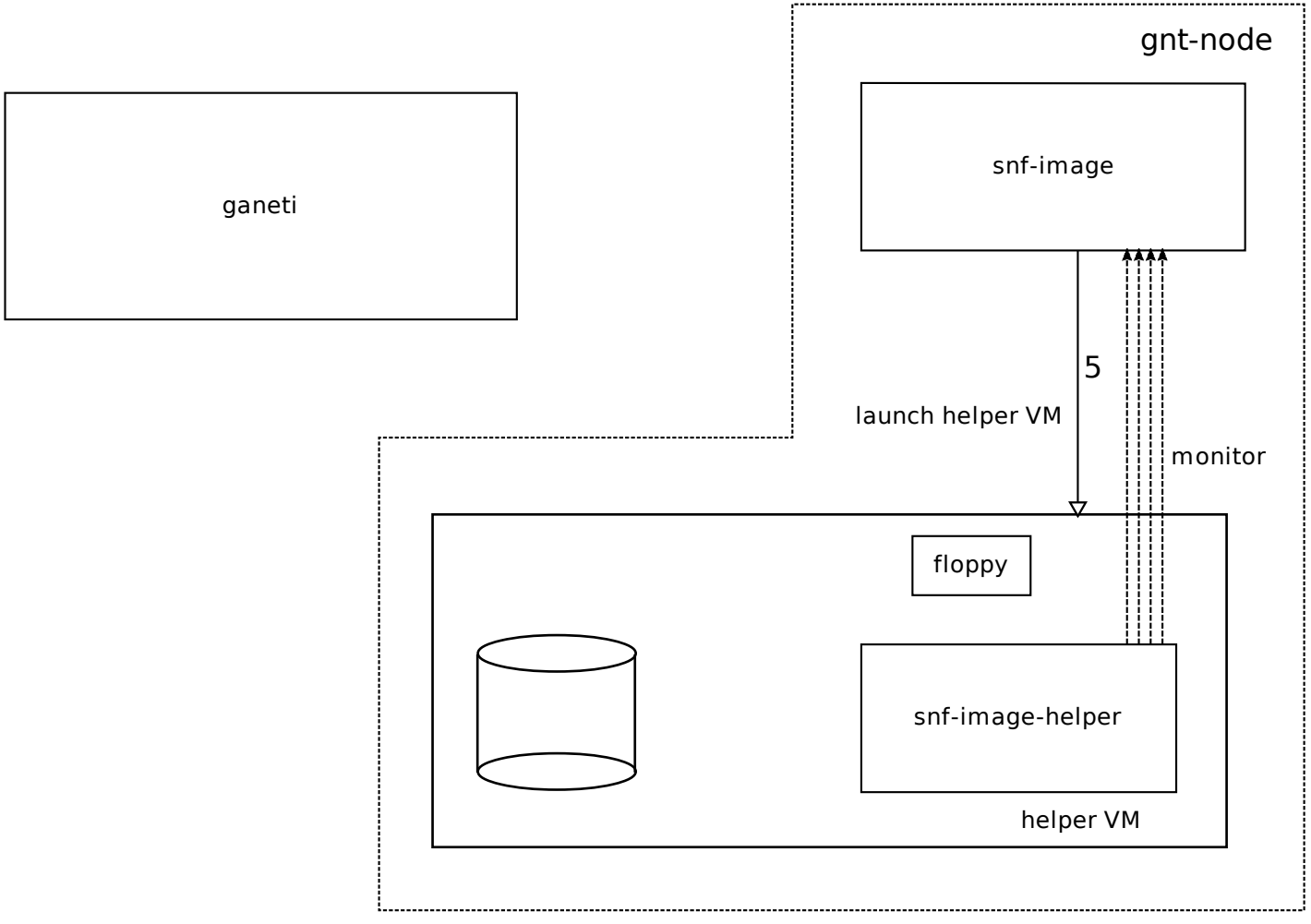

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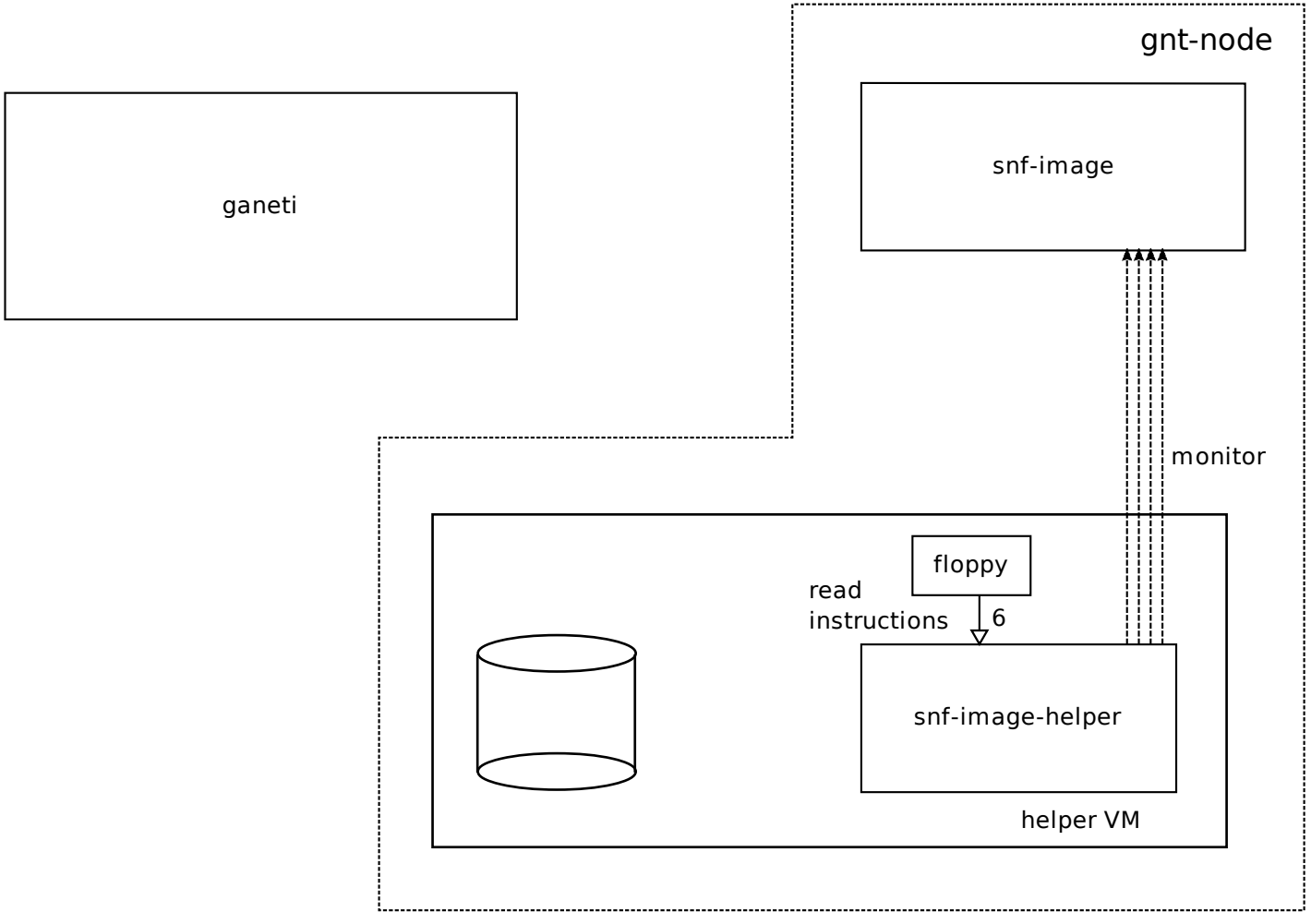

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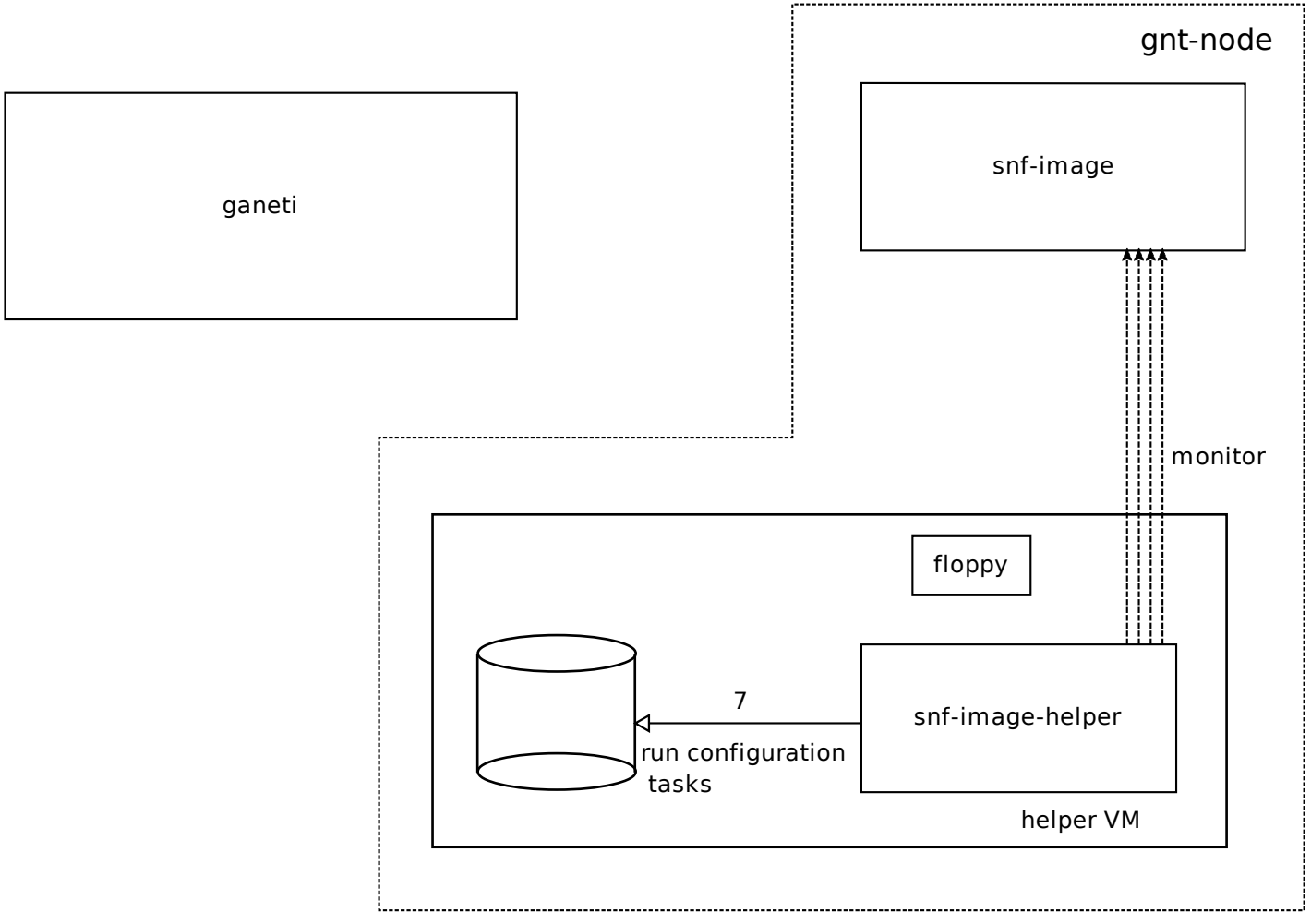

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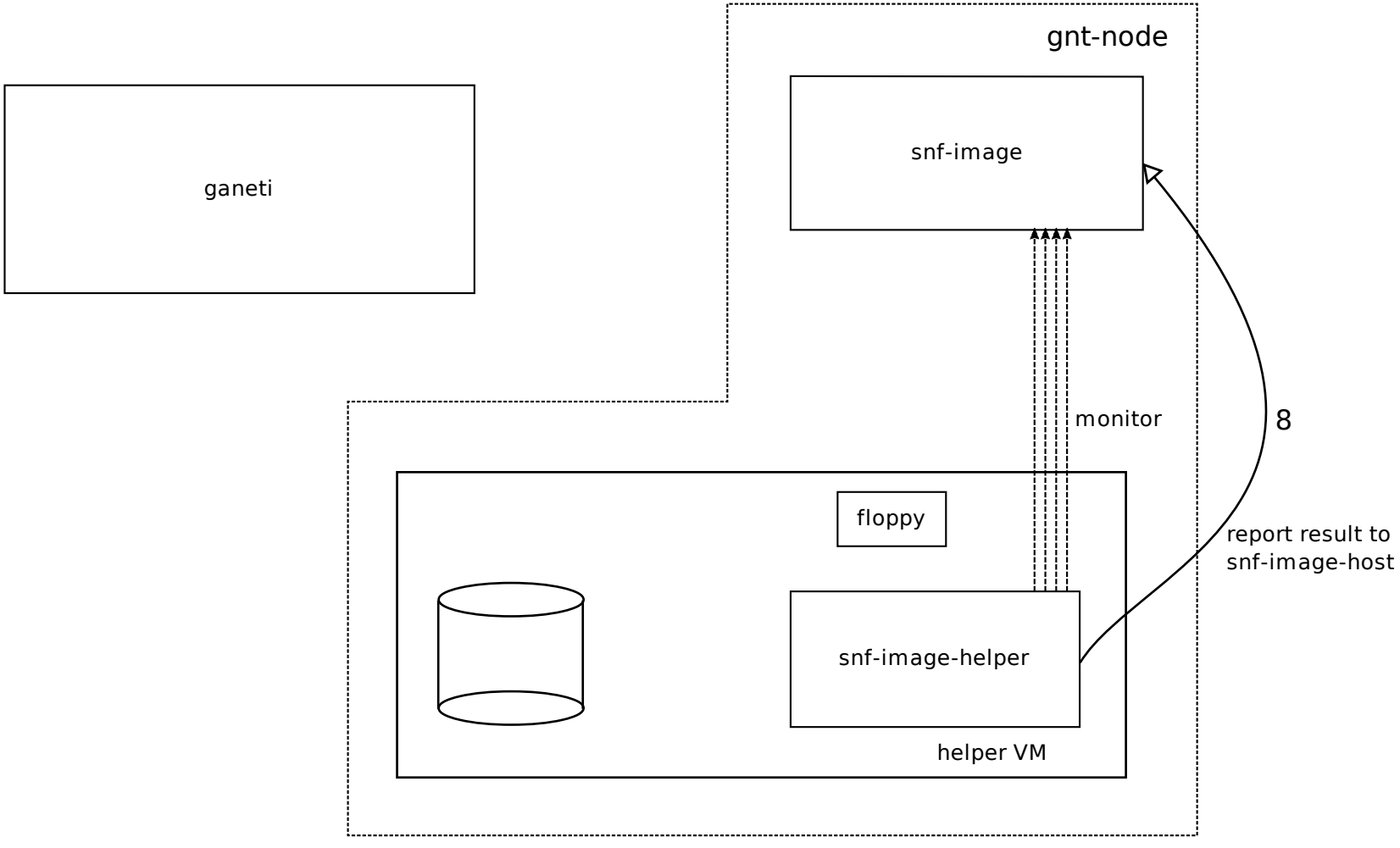
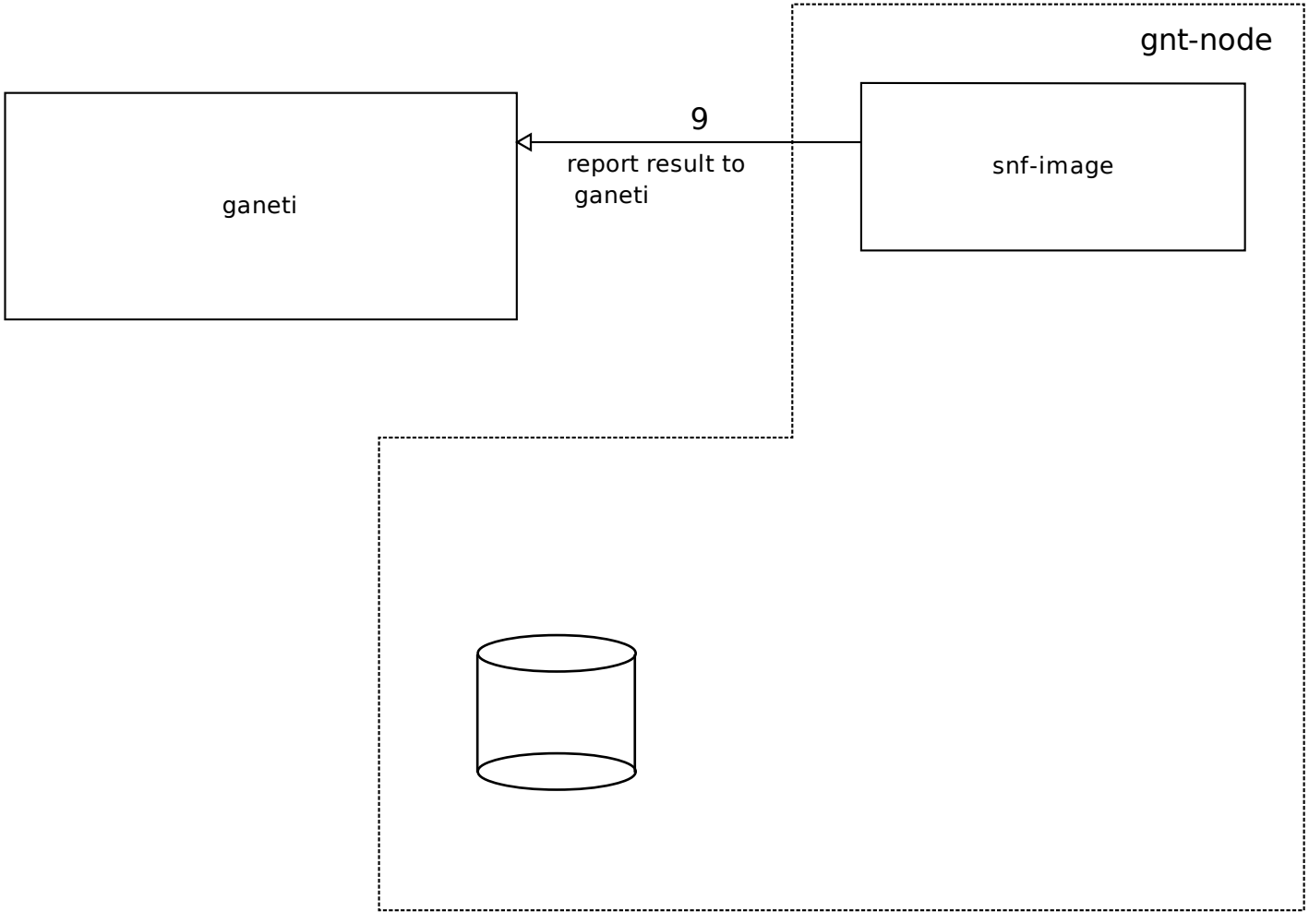


Architecture



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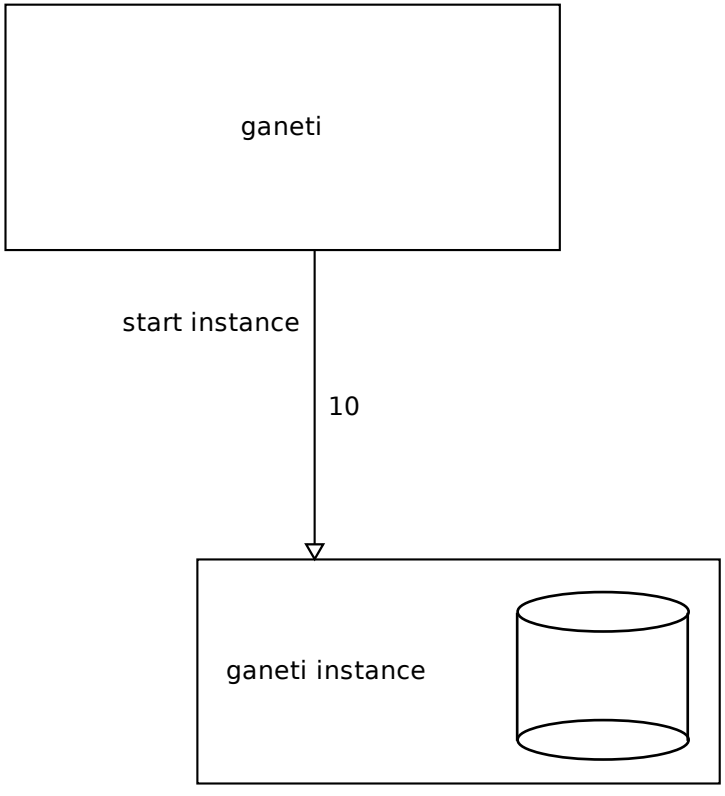

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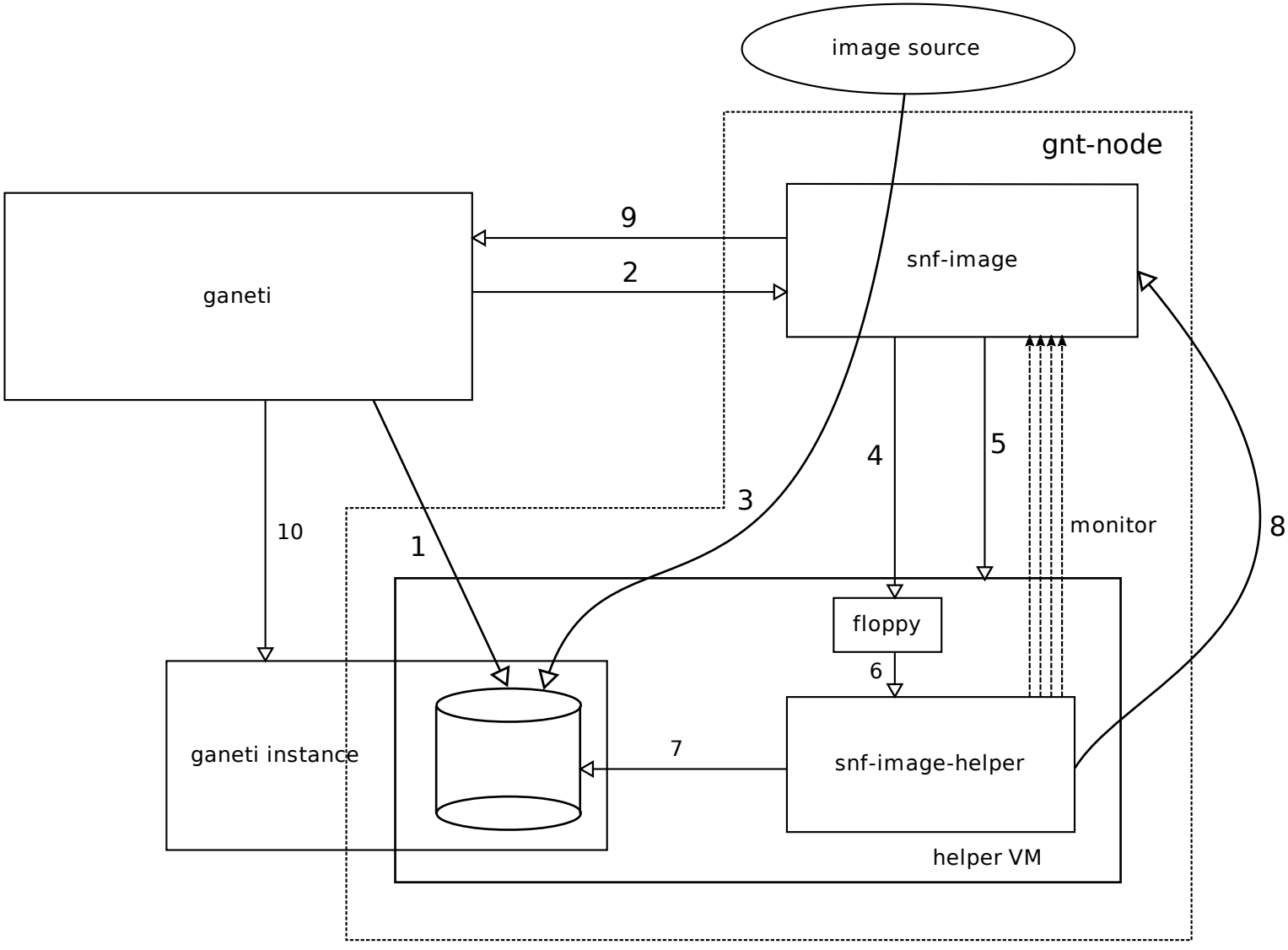
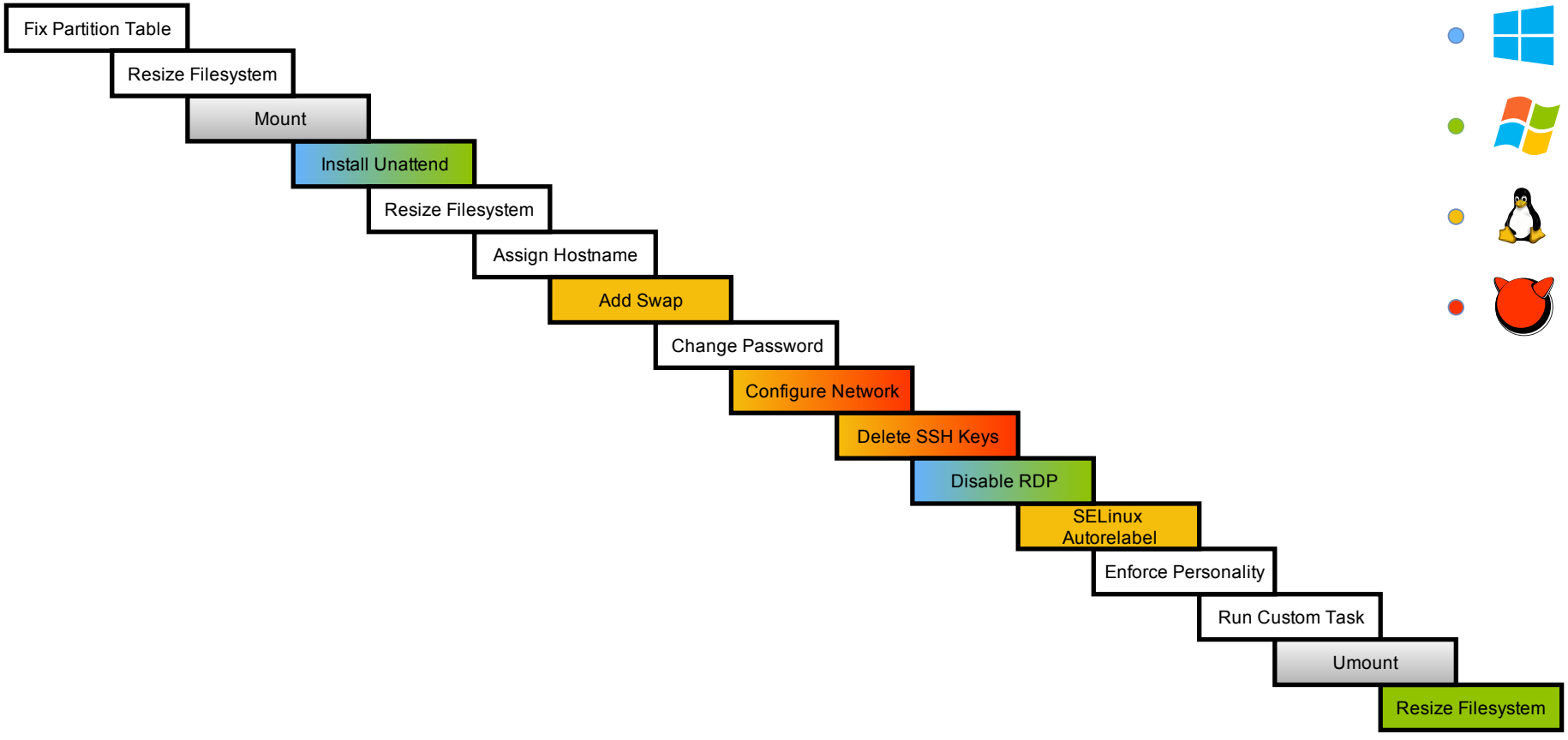


Image Configuration Tasks



Overwriting Configuration Tasks

- The image that gets deployed may itself overwrite a configuration task
- Executable: `/root/snf-image/helper/overwrite_task_<TASK>`
- `pre-exec`, `post-exec` and 101 return code

Progress Monitoring Interface

```
{"type": "image-info", "messages": ["Starting image copy..."],
 "timestamp": 1378914866.209169}

{"type": "image-error", "messages": ["Image customization failed."],
 "timestamp": 1379507045.924449}

{"type": "image-copy-progress",
 "position": 335547996, "total": 474398720,  "progress": 70.73,
 "timestamp": 1378914869.312985}

{"type": "image-helper", "subtype": "task-start", "task": "FixPartitionTable",
 "timestamp": 1379507040.456931}

{"type": "image-helper", "subtype": "task-end", "task": "FixPartitionTable",
 "timestamp": 1379507041.357184}

{"type": "image-helper", "subtype": "warning",
 "messages": ["No swap partition defined"], "timestamp": 1379075807.71704}

{"type": "image-helper", "subtype": "error",
 "messages": ["Unable to read partition table. The image seems corrupted."],
 "timestamp": 1379507910.799365}
```

Usage

- Create a Debian Jessie VM

```
format="diskdump"
id="https://cdn.synnefo.org/debian_base-8.0-x86_64.diskdump"
passwd="1Ki77y"
properties='{"OSFAMILY":"linux"\,"ROOT_PARTITION":"1"\,"USERS":"root"}'

gnt-instance add -o snf-image+default \
  -O img_format=${format},img_id=${id},img_passwd=${passwd},img_properties=${properties} \
  -t plain --disk=0:size=10G --no-name-check --no-ip-check --no-nics debian1
```

- Create a Windows VM

```
format="diskdump"
id="local:///var/lib/snf-image/images/windows-2012R2-9-x86_64.diskdump"
passwd="Admin123"
properties='{"OSFAMILY":"windows"\,"ROOT_PARTITION":"2"\,"USERS":"Administrator"}'

gnt-instance add -o snf-image+default \
  -O img_format=${format},img_id=${id},img_passwd=${passwd},img_properties=${properties} \
  -t plain --disk=0:size=10G --no-name-check --no-ip-check --no-nics debian1
```

Ganeti OS Parameters

`img_format`	the image format type
`img_id`	the URI used to identify the image
`img_passwd`	the password to be injected into the image
`img_passwd_hash`	the hash of the password to be injected into the image
`img_properties`	image properties taken into account during customization
`img_personality`	files to be injected into the image's file system
`config_url`	the URL to download configuration data from
`os_product_key`	a product key to be used to license a Windows deployment
`os_answer_file`	an answer file used by Windows to automate the setup process

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Image Format (`img_format`)

- **extdump**: a raw dump of an ext{2,3,4} file system
- **ntfsdump**: a raw dump of an NTFS file system
- **diskdump**: a raw dump of a disk

Image ID (`img_id`)

local:/path/to/file

http(s)://<image-url>
ftp(s)://<image-url>

pithos://<user-uuid>/<container>/<i
pithosmap://<image-map-name>/<

Image Properties (`img_properties`)

- List of variables that describe the image (*not* the deployment)
- They all have default values or get auto-detected if missing

```
OSFAMILY:                          {linux|windows|windows-legacy|freebsd|netbsd|openbsd}
ROOT_PARTITION:                    [1-9]

USERS:                             user1 user2...
IGNORE_UNATTEND:                   <bool>
ALLOW_MOUNTED_TASK_OVERWRITING:    <bool>
OFFLINE_NTFSRESIZE:                <bool>
OFFLINE_NTFSRESIZE_NOCHECK:        <bool>
PASSWD_HASHING_METHOD:             {md5|sha1|blowfish|sha256|sha512}
CUSTOM_TASK:                       <base64_encoded_content>

EXCLUDE_ALL_TASKS:                 <bool>
EXCLUDE_TASK_<task_name>:          <bool>
EXCLUDE_MOUNTED_TASKS:             <bool>
EXCLUDE_FilesystemResize_TASKS:    <bool>

SWAP:                              {<partition id>:<size>|<disk letter>}
```

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Future Work

- Make `snf-image` storage backend agnostic
- Support the new Ganeti OS installation procedure
- Add support for cloud-init
- Add support for Network Manager in `ConfigureNetwork` task
- Implement `rename` script
- Support deployment on multiple disks

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Future Work (cont.)

- Agnostic design for storage backends:
  - Idea based on work done by Dimitris Aragiorgis
  - Provide a modular interface for populating the VM's disk
  - Image backends should be different modules
  - Extending the functionality without rewriting parts of snf-image

Thank you!

Questions?

source	https://github.com/grnet/snf-image
documentation	https://synnefo.org/docs/snf-image/latest/
contact	synnefo@googlegroups.org