

Enos: a Holistic Framework for Conducting Scientific Evaluations of OpenStack



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Enos

Full stack for OpenStack performance analysis

1. `enos deploy`:

- Gets testbed resources
- Deploys OpenStack
- Initialises with cirros image, public/private network

2. `enos bench`:

- Runs benchmarks
- Measures CPU/RAM/Network consumption per site/node/service

3. `enos backup`:

- Performs post-mortem analysis (`enos backup`)

Motivations

Chasing 1000 nodes scale (OS Summit Barcelona)

⇒ Flexible topologies

⇒ Flexible Benchmarks

⇒ <https://youtu.be/XURkQ3biF6w>

Enos Workflow

enos deploy

enos bench

enos backup

Flexible Topology Example: basic.yml

```
resources:  
  paravance:  
    control: 1  
    network: 1  
    compute: 50
```

```
$ enos deploy -f basic.yml
```

Flexible Topology Example: advanced.yml

```
resources:  
  paravance:  
    control: 1  
    network: 1  
    compute: 50  
    nova-conductor: 1
```

```
$ enos deploy -f advanced.yml
```

Flexible Topology Example: advanced-scale.yml

```
resources:  
  paravance:  
    control: 1  
    network: 1  
    compute: 50  
    nova-conductor: 5
```

```
$ enos deploy -f advanced-scale.yml
```

Flexible Topology Example: network-emulation.yml

```
resources:
```

```
  grp1:
```

```
    paravance:
```

```
      control: 1
```

```
      network: 1
```

```
      compute: 50
```

```
  grp2:
```

```
    paravance:
```

```
      nova-conductor: 5
```

```
network_constraints:
```

```
- src: grp1
```

```
  dst: grp2
```

```
  delay: 150ms
```

```
  rate: 100mbit
```

```
  symmetric: true
```

```
$ enos deploy -f network-emulation.yml
```


Under the Hood

Provider to get testbed resources

- Resource \equiv Anything running a Docker daemon and Enos can SSH to.
- Supports Grid5000 and VirtualBox (Chameleon soon)
- ~500 LOC

resources:

paravance:

control: 1

network: 1

compute: 50

\Rightarrow

1. Get 52 nodes on paravance Renne's cluster.
2. SSH to, and install Docker daemon.
3. Return nodes IP address to Enos to install OpenStack

Container based deployment (using kolla)

Enos Workflow

enos deploy

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Flexible Benchmark Example: run.yml

```
rally:
  enabled: true
  args:
    concurrency:
      - 5
    times:
      - 100
  scenarios:
    - name: boot and list servers
      file: nova-boot-list-cc.yml
```

```
$ enos bench --workload=run.yml
```

Under the Hood

- Rally benchmark (control plane)/Shaker benchmark (data plane)
- Container offers a general interface to measure CPU/RAM/Network consumption whatever the service is (cAdvisor).
- Query your measures with Grafana (annotations show Ansible tasks)
- Query your logs with Heka

Enos Workflow

enos deploy

enos bench

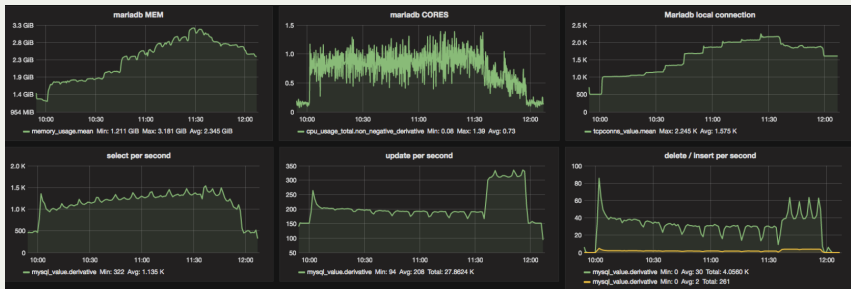
enos backup

Dump Measures

`enos backup` produces a tarball with:

- Rally/Shaker reports
- OpenStack logs
- InfluxDB database with cAdvisor/collectd measures

Measures Output



Interact with Enos

Enos fully exposes its state so you can add your own tasks/benchmarks.

```
$ enos info
```

```
{
  'cinder_database_password': 'demo',
  ...
  'mariadb_password': 'demo',
  ...
  'vip': '10.24.61.254',
  'eths': ('eth0', 'eth1'),
  'provider_net': {'cidr': '10.24.0.0/18',
                   'start': '10.24.0.0',
                   'gateway': ...},
  'rsc': {'compute': [Host('paravance-16-kavlan-4.rennes.grid5000.fr'),
                     Host('paravance-15-kavlan-4.rennes.grid5000.fr')],
          'nova-conductor': ...}
}
```


Future Works

- Multiple Regions
- WANwide OpenStack
- OSProfiler Integration (internship)

Important Links

- <https://enos.readthedocs.io>
- discovery-dev@inria.fr
- <https://hal.archives-ouvertes.fr/hal-01415522v2>