

OpenSDS-installer/salt

Pull Request #13

[WIP] Foundation support for opensds-installer/salt module

Full lifecycle management of the project

- Deployment Principle from OpenSDS #60
 - support at least one Automation tool (ansible)

Deployment

With the development of IaaS and PaaS, automatic deployment and installation become more and more important in a distributed system cluster. As a cloud-native storage system, opensds controller project MUST support (at least one of) automatic deployment as shown below:

- Scripts
- Automatic tools (such as ansible)
- Containerization (docker, helm, bosh etc)

* See <https://github.com/opensds/opensds/issues/60>

Deployment Automation Tools

- OpenSDS-installer/ansible is officially supported DAT.
- Project to focus on improvement of official DAT.

Notable CCA tools include:

Tool	Released by	Method	Approach	Written in
Ansible Tower	RedHat	Push	Declarative and imperative	Python
CFEngine	CFEngine	Pull	Declarative	-
Chef	Chef	Pull	Imperative	Ruby
Otter	Inedo	Push	Declarative and imperative	-
Puppet	Puppet	Pull	Declarative	Ruby
SaltStack	SaltStack	Push and Pull	Declarative and imperative	Python
Terraform	HashiCorp	Push	Declarative	Go

* See https://en.wikipedia.org/wiki/Infrastructure_as_Code#Continuous_configuration_automation

RFE: automatic deployment using Saltstack

- Three concerns
 - 1. Why introduce another DAT, i.e. **opensds-installer/salt**
 - 2. Does project have capacity to support multiple installers?
 - 3. Does product need multiple installers?
- Answer – Using Salt middleware for DAT can improve OpenSDS:
 - 1. Widen Linux OS family support.
 - 2. evolve common deployment model technology (i.e. site specific inputs, yaml).
 - 3. Reuse upstream DAT modules for integration codebase (i.e. ansible-galaxy/etcfd).
 - 4. Rendering Structured formats (Jinja + YAML, Mako + YAML, Jinja + json, etc, etc).
 - 5. Introduce new ideas, problems, and solutions.

OpenSDS-Installer structure

- Structure: <https://github.com/opensds/opensds-installer>
 - Ansible: <https://github.com/opensds/opensds-installer/ansible>
 - Charts: <https://github.com/opensds/opensds-installer/charts> (WIP)
 - Salt: <https://github.com/opensds/opensds-installer/salt> (WIP)

OpenSDS-installer/salt

Goal: Widen Linux OS family support.

- Salt method: merge dictionaries of settings with **grains.filter_by**

Look up the given grain in a given dictionary for the current OS and return the result

Although this may occasionally be useful at the CLI, the primary intent of this function is for use in Jinja to make short work of creating lookup tables for OS-specific data. For example:

```
{% set apache = salt['grains.filter_by']({  
    'Debian': {'pkg': 'apache2', 'srv': 'apache2'},  
    'RedHat': {'pkg': 'httpd', 'srv': 'httpd'},  
}, default='Debian') %}  
  
myapache:  
  pkg.installed:  
    - name: {{ apache.pkg }}  
  service.running:  
    - name: {{ apache.srv }}
```

JINJA

Common deployment model technology (i.e. site specific inputs capture).

- Salt method: yaml model of default overrides (salt pillar data), with possibility to enrich by rendering conditionals (Jinja2).

Here is an example using the `grains` matcher to target pillars to minions by their `os` grain:

```
dev:  
  'os:Debian':  
    - match: grain  
    - servers
```

YAML

`/srv/pillar/packages.sls`

```
{% if grains['os'] == 'RedHat' %}  
apache: httpd  
git: git  
{% elif grains['os'] == 'Debian' %}  
apache: apache2  
git: git-core  
{% endif %}  
  
company: Foo Industries
```

JINJA

Reused upstream DAT modules for SALT

Deployer Component	DAT Module	DAT States	Upstream repos
Database driver	etcd	etcd.running, etcd.stopped, etcd.docker.running, etcd.docker.stopped	saltstack-formulas/etcd ansible-galaxy/etcd ?
Packages baseline	packages	packages.wanted, packages.unwanted, package.pips, etc	saltstack-formulas/packages ansible-galaxy/packages?
RBD driver	ceph, deepsea	ceph.repo, deepsea.install, deepsea.remove	Saltstack-formulas/deepsea Saltstack-formulas/ceph ceph/ceph-ansible?
Docker service	Docker	docker.running, docker.stopped, ...	Saltstack-formulas/docker ansible-galaxy/docker?
Firewall service	firewalld	firewalld.configure, firewalld.start, firewalld.stop	Saltstack-formulas/firewalld ansible-galaxy/firewalld?
ISCSI and iSNS	iscsi	iscsi.isns, iscsi.target, iscsi.initiator	Saltstack-formulas/iscsi ansible-galaxy/iscsi ?
Linux LVM	lvm	lvm.profiles, lvm.pv, lvm.vg, lvm.lv, full API support	Saltstack-formulas/lvm ansible-galaxy/lvm

DAT upstream modules (defaults)

```
openuds: git
salt:
  apache: apache2
  basedir: git-core
  states: /srv/salt
  pillars: /srv/pillar
  formula: /srv/formula
formulas:
  ceph: https://github.com/saltstack-formulas/ceph-formula.git
  deepsea: https://github.com/saltstack-formulas/deepsea-formula.git
  docker: https://github.com/saltstack-formulas/docker-formula.git
  etcd: https://github.com/saltstack-formulas/etcd-formula.git
  firewalld: https://github.com/saltstack-formulas/firewalld-formula.git
  helm: https://github.com/saltstack-formulas/helm-formula.git
  iscsi: https://github.com/saltstack-formulas/iscsi-formula.git
  packages: https://github.com/saltstack-formulas/packages-formula.git
solutions:
```

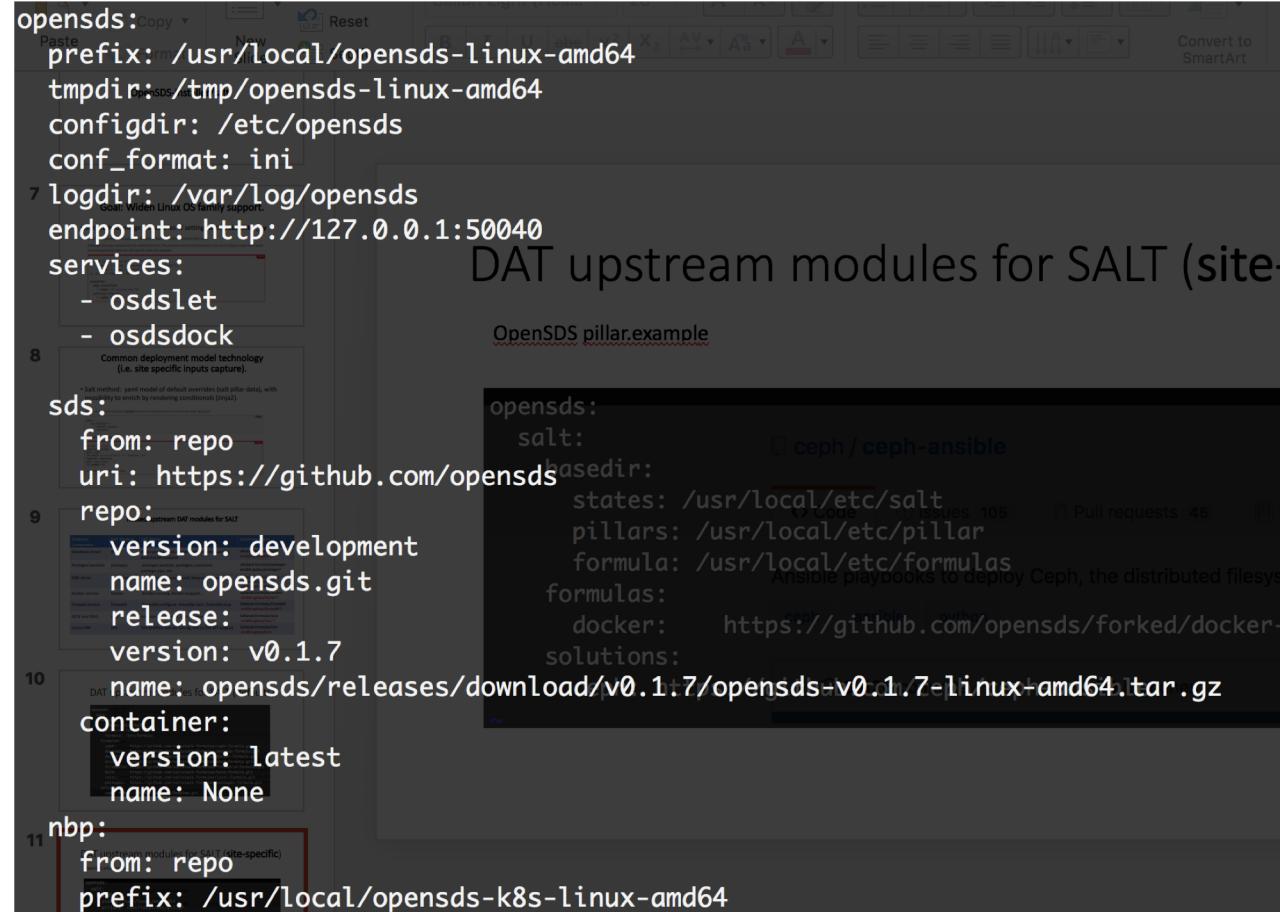
ceph: https://github.com/SUSE/DeepSea.git

DAT upstream modules (site-specific)

OpenSDS pillar.example

```
opensds:  
salt:  
  basedir: ceph / ceph-ansible  
  states: /usr/local/etc/salt  
  pillars: /usr/local/etc/pillar  
  formula: /usr/local/etc/formulas  
formulas:  
  docker: https://github.com/opensds/forked/docker-formula.git  
solutions:  
  ceph: https://github.com/ceph/ceph-ansible
```

opensds-installer/salt/opensds-formula defaults.yaml



DAT upstream modules for SALT (site-

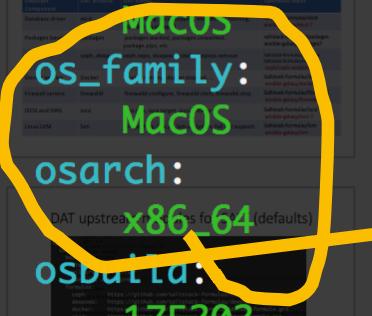
```
opensds:
  prefix: /usr/local/opensds-linux-amd64
  tmpdir: /tmp/opensds-linux-amd64
  configdir: /etc/opensds
  conf_format: ini
  logdir: /var/log/opensds
  endpoint: http://127.0.0.1:50040
  services:
    - osdslet
    - osdsdock
  sds:
    from: repo
    uri: https://github.com/opensds
  repo:
    version: development
    name: opensds.git
    release:
      version: v0.1.7
    name: opensds/releases/download/v0.1.7/opensds-v0.1.7-linux+amd64.tar.gz
    container:
      version: latest
      name: None
  nbp:
    from: repo
    prefix: /usr/local/opensds-k8s-linux-amd64
```

OpenSDS pillar.example

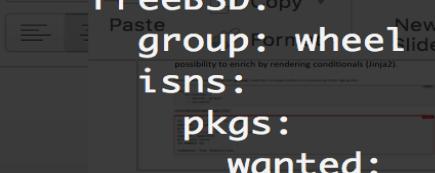
```
opensds:
  salt: ceph/ceph-ansible
  basedir: /usr/local/etc/salt
  states: /usr/local/etc/salt
  pillars: /usr/local/etc/pillar
  formula: /usr/local/etc/formulas
  formulas:
    docker: https://github.com/opensds/forked/docker-formulas
  solutions:
```

opensds-installer/salt/opensds-formula

host facts (salt grains, puppet factor, ansible ?)

```
Paste New Slide Section ▾ B I U   
num_cpus: 8  
num_gpus: 1  
  
os:  
  os_family: MacOS  
  osarch: x86_64  
  osbuild_id: 17E202  
  osfinger: Mac OS X 10.13.4-10  
  osfullname: Mac OS X 10.13.4  
  osmajorrelease: 10  
  osrelease: 10.13.4  
  osrelease_info: 10.13.4  
  
osfamilymap.yaml
```

osfamilymap.yaml

```
Paste New Slide Section ▾ B I U   
FreeBSD:  
  group: wheel  
  isns:  
  pkgs:  
  wanted:  
    - net/open-isns  
  
server:  
  provider: ctld  
  
Debian:  
  client:  
  pkgs:  
  wanted:  
    - open-iscsi  
    - libiscsi-bin  
  
RedHat:  
  isns:  
  pkgs:  
  wanted:  
    - isns-utils  
    - yum-plugin-versionlock  
  
initiator:  
  open-iscsi:
```

Upstream DAT modules – to support opensds-installer/salt

- ETCD: <https://github.com/saltstack-formulas/etcd-formula#etcd-docker-running> **DONE**
- CEPH repos: <https://github.com/saltstack-formulas/ceph-formula#ceph-repo> **DONE**
- CEPH RBD: engage with SUSE/DeepSea project (os families) **ongoing**
- **LVM driver:** <https://github.com/saltstack-formulas/lvm-formula/pull/1> **PR REVIEW / DONE**
- **ISCSI driver:** <https://github.com/saltstack-formulas/iscsi-formula#id1> **DONE (Phew!)**
- DeepSea install: <https://github.com/saltstack-formulas/deepsea-formula#id1> **DONE!**
- Postgres: <https://github.com/saltstack-formulas/postgres-formula#id1> **DONE**
- Docker driver, etc etc

opensds-installer/salt PR WIP code

- Opensds-installer:
- <https://github.com/noelmcloughlin/opensds-installer/tree/dev-salt>
- OpenSDS-formula (DAT module):
<https://github.com/noelmcloughlin/opensds-formula/tree/master/opensds>