SaltStack for Developers
Extending SaltStack
Hello
my name is

Gareth
WE ARE HIRING
SaltStack for Developers
Extending SaltStack
What is SaltStack?
SaltStack == Salt

Salt == SaltStack
Remote Execution
Configuration Management
What is SaltStack?
Event Driven Orchestration
DevOps Platform
SaltStack Loader
Standard Modules
Virtual Modules
Lazy Loader
Types of Modules
Remote Execution Modules

The heavy lifters of SaltStack.

Typically calling out to other programs and services.

Used by other modules.

Examples:

- file
- cmd
- docker
- pkg (aptpkg, yumpkg, freebsdpkg, mac_pkgutil)
State Modules

Used for configuration management.

Examples:

- pkg
- x509
- schedule
- file
- apache_module
gen_csr:
  x509.csr_managed:
  - name: /etc/pki/salt/{{ grains.id }}.csr
  - private_key: /etc/pki/salt/{{ grains.id }}.key
  - private_key_passphrase: {{ private_pass }}
  - CN: {{ grains.host }}.{{ domain }}
  - C: US
  - ST: California
  - L: San Jose
  - O: MDSLab.eBay.com
  - OU: IT Department
  - basicConstraints: 'CA:FALSE'
  - keyUsage: 'nonRepudiation, digitalSignature, keyEncipherment'
  - 1.3.6.1.4.1.311.20.2: 'ASN1:UTF8String:eBayComputerCES'
  - ext_mapping:
    '1.3.6.1.4.1.311.20.2': 'DomainController'
  - require:
    - x509: gen_private_key
Grain Modules

Used to report information about machines running SaltStack.

Populated or updated on server start or minion software start.

Updated periodically.

Similar to facts from Facter, used by Puppet & Ansible or Chef Ohai attributes.

Examples: Salt version, Python version, operating system.
Runner Modules

Execution modules run on minions, runners run on the master calling out to the minions.

Examples:

- Jobs runner
- State runner
- Event runner
Returners Modules

Gives a minion a way to return data to something besides the master.

Examples:

- MySQL
- Slack
- SMS
- SMTP
Pillar

Centralized system to define configuration.

Examples:

- consul
- etcd
- postgres
- mysql
- mongodb
- s3
- gpg
Outputter modules

Determine the output from the command line interfaces

Examples:

- json
- yaml
- progress
Cloud modules

Used to manage virtual machines on various cloud providers.

Examples:

- Amazon EC2
- Google Cloud
- Azure
- Digital Ocean
- VMWare
- Openstack
Beacons

Allows various software, both Salt components and external applications to report data to Salt.

Examples:

- diskusage
- inotify
- wtmp/btmp
- ps
Engines

Allow Salt to provide internal information and services to long-running external processes.

Examples:

- Docker
- Slack
- Logstash
- SQS Events
Agenda

1. Tools & Best Practices
2. Briefly look at the Salt loader
3. Custom Salt Modules
4. Updating Replacing an existing beacon module
5. Custom Salt engines
Tools
Editor Bits

- https://github.com/saltstack/salt-vim
- https://github.com/saltstack/sublime-text
- Emacs salt-mode
- https://github.com/w0rp/ale
- https://github.com/Valloric/YouCompleteMe
Testing

- https://github.com/cachedout/barnacle
- https://github.com/saltstack/kitchen-salt
- PyENV
Documentation

- https://docs.saltstack.com/en/latest/
- Salt sys.doc, state_doc, runner_doc, etc.
Return the docstrings for all modules. Optionally, specify a module or a function to narrow the selection.

The strings are aggregated into a single document on the master for easy reading.

Multiple modules/functions can be specified.

CLI Example:

```
salt '*' sys.doc
salt '*' sys.doc sys
salt '*' sys.doc sys.doc
salt '*' sys.doc network.traceroute user.info
```

Modules can be specified as globs.

New in version 2015.5.0

```
salt '*' sys.doc 'sys.*'
salt '*' sys.doc 'sys.list_*'
```
Debugging

- PyCharm Professional Edition
- PyDev ([http://www.pydev.org](http://www.pydev.org))
- pdb
- pudb
- ptvsd: Visual Studio Remote Debugging Server
SaltConf 17
Megan Wilhite
salt-extend
https://bit.ly/2Gd0E6z
SaltStack Development Basics
The __virtual__ function

- Not required, but definitely best practice.
- Executed when Salt minion starts up.
- Optionally provides identification for the name of the module.
- Commonly used to identify whether the module should be loaded and made available.
- __virtual_aliases__ allows you to provide multiple names
Commonly Used Dunder Variables
__opts__
pillar
Docstrings

'''
My function in my Salt module

CLI Example:

.. code-block:: bash

    salt '*' really_cool.function argument keyword=value

'''
Private Functions

- Name starts with an underscore.
- Only used internally by the module.
- Will not show up in results from `sys.doc` and friends
Public Functions

- Called directly by Salt commands
- Will show up in the results returned from sys.doc and friends, such as list_functions.
Logging

```python
import logging

log = logging.getLogger(__name__)
log.info('Useful for users')
log.warn('Something went wrong but I am still good to go.')
log.error('Something has gone wrong and should be fixed.')
log.debug('Useful information for developers.')```
Python2/Python3 Compatibility

```
from __future__ import absolute_import, unicode_literals, print_function
```
Custom Modules
Why?
SaltConf 17 Module Counts

beacons: 27
clouds: 34
ingines: 17
grains: 21
log handlers: 5
output: 17
modules: 481
proxy: 18
renderers: 20
returners: 39
sdb: 14
states: 317
utils: 129
Current Module Counts

- beacons: 28
- cloud: 34
- engines: 18
- grains: 25
- log handlers: 5
- output: 17
- modules: 497
- proxy: 19
- renderers: 21
- returners: 40
- sdb: 14
- states: 338
- utils: 135

Open Source Summit North America 2018
So why?
Let’s Look At Some Code!

All Code Examples
https://bit.ly/2rLheVH
Questions?

Thanks for coming!