SAS® GLOBAL FORUM 2018

USERS PROGRAM

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#SASGF
SAS® Configuration Management with Ansible
What is configuration management?

“Configuration management (CM) is a systems engineering process for establishing and maintaining consistency of a product's performance, functional, and physical attributes with its requirements, design, and operational information throughout its life.”

ANSI-EIA-649-A Standard: NATIONAL CONSENSUS STANDARD FOR CONFIGURATION MANAGEMENT
Why is configuration management important?

*The practice of handling changes systematically so that a system maintains its integrity over time*¹

- Reduce risks due to ad-hoc changes
  - Operating System Configuration
  - SAS Home Configuration
  - SAS Level Configuration

¹ Wikipedia https://en.wikipedia.org/wiki/Configuration_management
Configuration Management for SAS

• Can be applied to many aspects of a “system”

• Data Integration/ETL
• Reports
• Custom built SAS Applications/Programs
• Environment
SAS Environment configuration

Overview

• We will look at three configuration aspects of a SAS Environment

• Pre-requisites
• Binaries (SAS Home)
• Configuration (e.g. Lev1)
SAS Environment

Pre-requisites

- Users
  - SAS Installation User
  - SAS Spawned Servers User

- Groups
  - SAS Server Users

- Directory Permissions
  - For SAS Home
  - For SAS Config
  - For SAS Work

- Disks
  - Space

- Authentication
  - Active Directory
  - LDAP

- Operating System Rights
  - Log on as a Batch Job

- Kernel Parameters
  - Open Files
SAS Environment

SAS Home Directory

- File permissions
  - setuid bit
- sassw.config
  - SASENVIRONMENTSURL
- sasv9_local.cfg
  - -WORK
  - -MEMSIZE

- SAS Deployment Agent
  - daemon/service
- SAS Data Management Server
  - daemon/service
- Deployment Registry
  - Check for Hot Fixes
SAS Environment
Configuration (e.g. Lev1) Directory

• Directory Permissions
• Object Spawner config
• SASApp
  • *_usermod files
• SASMeta
  • Security
  • User Sync
Ansible
What is Ansible?

- Multiple hosts
- On-premise / Multi-Cloud / Hybrid
- No agents required
- Supports *nix / Windows
- Extendable
Ansible
The Controller

- Linux OS or Windows Subsystem for Linux
- Communication with all hosts to be managed.
- Python 2.7 / 3x
Ansible

Your Hosts

- Can communicate with your controller
- Multi - OS Supported.
- Windows requires Powershell remoting.
- SSH Preferred
Ansible Project

Inventory

Facts

Variables
- Host
- Group
- Task

Plays

Templates

Roles
Ansible Inventories

• Dynamic or Static.
• Define your servers and group them by management function.
• E.G: AWS, tags are your friends.
• Connection params support using variables.
Ansible

Facts

- Describe your Hosts and Applications.
- Ansible will collect Host Facts.
- Custom processes can create Application facts.
- For SAS,
  - sassw
  - sas_config
  - sas_install
Ansible Plays

- Execute commands on your target hosts.
- Executed within a Playbook
- Accepts input / output variables, filters, looping
- Can be async.
Ansible Variables

- Supports INI, Json, Dictionary, YAML structure
- Can be set nearly anywhere in your project.
- Beware of precedence.
Ansible

Variable Precedence

• Be aware of variable precedence

• Example:
  • Ansible Role Default
    • allow_x_cmd: yes
  • Ansible Playbook Variable
    • allow_x_cmd: no

• Which one is set?
Ansible Templates

```yaml
---
- name: Create SAS Usermods Config
  template:
    src: sas_v9_usermods.tmpl
    src: "{{ sas_config_home }}/{{ item }}/sasv9_usermods.cfg"
    with_items:
    --Lev1/SASApp
    -Lev1/SASMeta
```
# Ansible

## Roles

<table>
<thead>
<tr>
<th>Folder</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasks</td>
<td>Playbooks which execute specific tasks</td>
</tr>
<tr>
<td>Handlers</td>
<td>Handlers are special tasks that can execute based on conditions. Examples might include restarting a service after a specific file has changed.</td>
</tr>
<tr>
<td>Files</td>
<td>Static files which are to be transported to your target host.</td>
</tr>
<tr>
<td>Templates</td>
<td>Jinja2 templates which Ansible will parse into files before execution</td>
</tr>
<tr>
<td>Vars</td>
<td>Variables</td>
</tr>
<tr>
<td>Defaults</td>
<td>Default variables</td>
</tr>
<tr>
<td>Meta</td>
<td>Metadata about the role for ansible-galaxy to identify the role</td>
</tr>
</tbody>
</table>
Ansible
Structuring Your Project

- `ansible-playbook --i environments/production site.yml --l compute_servers`
## Mapping SAS Configuration Tasks to Ansible Plays

<table>
<thead>
<tr>
<th>Installation</th>
<th>Configuration</th>
<th>BAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>metadata_servers.yml</td>
<td>os.yml</td>
<td>di_provision.yml</td>
</tr>
<tr>
<td>midstier_servers.yml</td>
<td>config.yml</td>
<td>hotfix.yml</td>
</tr>
<tr>
<td>compute_servers.yml</td>
<td>sasconfig.yml</td>
<td>promotion.yml</td>
</tr>
<tr>
<td>hadoop_servers.yml</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Structure into small includable plays.
- Use tags
- Handle idempotence in shell script Plays
Mapping SAS Configuration Tasks to Ansible Playbooks

• Structure Playbooks as an amalgam of Plays and Roles.

• site.yml should be constructed of only includes.
Mapping SAS Configuration Tasks to Ansible Roles

```yaml
- hosts: all
  become: yes
  become_method: sudo

vars:
  selerity_customer: dummy

vars_files:
  - "group_vars/common.yml"
  - "group_vars/customer_{{ selerity_customer }}.yml"

roles:
  - role: selerity.os.roles
  - role: selerity.os.packages
  - role: selerity.os.filesystem
  - role: selerity.os.kernel
  - role: selerity.os.pam
  - role: selerity.os.tz
```
Governance and Maintenance
Presenter
Michael Dixon, Managing Director, Selerity

Michael's love for all things technical – especially in taking things apart, seeing how they work, and putting them back together – makes him a natural problem solver. His client-centric and solutions-based approach has enabled him to work seamlessly with businesses across multiple segments - helping them exceed their goals in the process.

@SelerityMichael
Cameron’s love for Computer Science began as a child programming games on his Vic 20. He started using SAS in the mid 90’s. Over a 20 year career, Cameron has become a leading consultant on analytic and data architecture, strategy, governance and operations and is a trusted advisor to many leading companies in the Australia – Pacific region.

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