Bootstrapping SLES for SAP HANA clusters with Terraform and Salt on Public Cloud [DEV1044]

Diego Akechi
Engineering Manager
dakechi@suse.com

Xabier Arbulu
Software Engineer
xarbulu@suse.com
Front Runner Technologies
- 1st Amazon EC2 OS for SAP
- 1st validated open source HA
- 1st validated virtualization
- 1st Linux for SAP HANA on x86-64 and IBM Power
- 1st Linux with HA clustering solution certified for NetWeaver

Strategic OS for many SAP products
- SAP HANA and S/4HANA
- SAP BW
- SAP Business One for SAP HANA
- SAP Cloud Platform
- SAP Enterprise Cloud
- SAP Vora

Cloud Foundry collaboration
Cool, but... What is the “SUSE Linux Enterprise Server for SAP Applications”? 
The SUSE platform that is optimized for SAP operations

SUSE Linux Enterprise Server for SAP Applications

- **Reliability and Resilience**: SUSE Linux Enterprise High Availability, SAP HANA HA Resource Agents, SAP HANA Firewall, Remote Storage Encryption Management
- **Performance**: Workload Memory Protection, Performance Configuration and Tuning, TCP Connection Sharing for NFS
- **Ease of use and deployment**: Installation Wizard, Public Cloud Platform Images, S/4HANA Transition to Linux Support, SUSE Connect, SUSE Package Hub
- **Base Operating System and Support**: SUSE Linux Enterprise Server, Lifecycle 24x7 Priority Support, SAP specific Update Channel

SUSE product services

SUSE features SAP system
Let’s take a deeper look into the "SUSE Linux Enterprise High Availability Extension"
Features
SUSE Linux Enterprise High Availability

- Service Failover
- Cluster File Systems
- Clustered Samba
- Virtualization Agnostic
- Full support for x86_64, POWER, and System z
- Network Load-Balancer
- Data Replication
- Node Recovery
- HAWK2 Web GUI
- (*) Resource Agents (>100)
- Fence Agents (>50)

(*) The HANA System Replication agents are only in SLES4SAP
... and what these products can do for my SAP Landscape?
SAP S/4 HANA and SAP NetWeaver HA
Clustered central services and distributed System

Mandatory cluster

Node A
- Pacemaker
- ASCS
- VIP ascs

Node B
- Pacemaker
- ERS
- VIP ers

Optional clusters

AppSrv Node 1
- VIP pas
- PAS

AppSrv Node 2
- VIP aas
- AAS

DB Node 1
- VIP db
- DB

DB Node N
- VIP dbN
- DB

See more: https://www.suse.com/documentation/suse-best-practices/
SAP HANA System Replication Agents automate data recovery.
HA Feature Available on Public Cloud

- Amazon Web Services
- Google
- Microsoft Azure
Nice, can we, PLEASE, talk about Salt and Terraform now?
Why are they so exciting?
Yes, but first the problem… =P

• SAP Applications are complex and demands big effort to be deployed manually

• Reproducing the process can be tedious and error-prone

• This can also take days or even months!

• The complexity multiplies when the deployment is extended to a clustered solution
Terraform and Salt to the rescue...

- Terraform is a tool for building, changing, and versioning infrastructure safely and efficiently

- Terraform can manage existing and popular service providers, like cloud, libvirt and many others

- Terraform can manage low-level and high-level components such as instances, storage, networking, DNS entries, etc

- Allow IaC, using a high-level configuration syntax. This allow versioning, sharing and reusing the infrastructure code

Source: https://www.terraform.io/intro/index.html
Terraform and Salt to the rescue...

- Salt is a configuration management system, capable of maintaining remote nodes in defined states.
- It is a distributed remote execution system used to execute commands and query data on remote nodes.
- Has an extensive list of existing standard states and formulas for the many different purposes.

Source: https://docs.saltstack.com/en/latest/topics/#introduction-to-salt
Combining both, we deliver...

- Our engineering goal: Improved user experience for our SAP customers 💛

- Fast and secure way to deploy your SUSE HANA Cluster
  - Minutes or hours instead of days
  - Idempotent States

- Customizable and modular “blocks”, allowing customers to reuse it and adjust for their specific needs on premises, clouds or hybrid-clouds

- It can be integrated on existing solutions like SUSE Manager, or existing Terraform and Salt, + others...
How it looks right now...

- It is Open Source and public available

- We currently maintain deployments for the following providers:
  - Azure
  - Amazon Web Services
  - Google Cloud Platform
  - Libvirt
Modular and reusable to attend from single HANA to full cluster deployment.
Demo \lol\
Our future plans…
This is subject to change at any time.

- Enable more HANA Scenarios and SAP Applications
  - Netweaver
  - S/4 HANA
  - More…
- Include integration tests after the deployment to “certify” the cluster
- New integrations. E.g.: SUSE Open Stack, Enterprise Storage, others…
- Improve the Cluster Monitoring and Troubleshoot experience
Visit our open-source projects and give us your feedback

https://github.com/SUSE/ha-sap-terraform-deployments
https://github.com/SUSE/saphanabootstrap-formula
https://github.com/SUSE/habootstrap-formula
https://github.com/SUSE/shaptools
https://github.com/ClusterLabs/hawk-apiserver
https://github.com/ClusterLabs/hawk
https://build.opensuse.org/project/show/network:ha-clustering:Factory
Important links to the relevant documents

SLES-for-SAP Applications product documentation
https://www.suse.com/documentation/sles-for-sap-12/

SLES HA Extension product documentation
https://www.suse.com/documentation/sle-ha-12/index.html

Best Practices for Mission-Critical SAP Applications on-premises and AWS

High availability for SAP NetWeaver on Azure VMs on SUSE Linux Enterprise Server for SAP applications

Setting up Pacemaker on SUSE Linux Enterprise Server in Azure

High availability for NFS on Azure VMs on SUSE Linux Enterprise Server

Setup SAP HANA System replication in Azure virtual machines

SAP HANA High Availability Cluster on SLES Deployment Guide - GCP
Thank you!