SAP Cloud Installation CLI vs GUI: Comparative Study

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Abstract: *SAP installations are preliminary steps for new installations, adhoc additional application installations, Plug-ins setup, additional hana Nodes, mostly anything required to do trigger at host level, based on new versions getting released, year-on-year enterprise changes new feature additions for continuous significant improvements in SAP enterprises for database or applications or SAP products whether they are available on customer On-Premises or Cloud Platforms or hybrid environments, the root source is Operating System layer, this is to let administration or newbies know to consider GUI based or CLI (Command Line Interface) installation approach.*

Keywords: SAP, SAP HANA, SAP Application GUI, Graphical User Interface, Command Line Interface, CLI

1. Introduction

a) What is SAP?

SAP stands for "Systems, Applications & Products in data processing" – this is German Software Company that provides enterprise application software (ERP) help businesses manager their operations, Supply Chain, Manufacturing, several horizontal alliances of a company including Finance, Human Resources, and Customer Relationships using SAP ERP software. 85% of fortune 500 companies rely on SAP for their core business processes, Customers using SAP have reported 20% increase in operational efficiency

b) What is Hyperscaler?

Hyperscalors is a type of large-scale data center that offers massive computing resources, typically in the form of an elastic cloud platform, Organizations use them to deploy and manage large scale applications and services. In SAP it is basically offered as Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) over these hyperscale cloud platforms for SAP applications considering their scalability, Network connectivity for their mass/critical distributed environments across multiple datacenters across global/regions

c) What are Computing resources in SAP

SAP can be implemented in customers own hardware or Cloud environments – considering proven best practices hardware recommendations, Fast time to value, Continuous Innovation, Open & extensible, Security, Compliance and scalability, Automatic and continual updates – these are possible based on cost/money on the table to choose between below snip to show SAP trend on top Cloud Vendors market share between Q1 2021 to Q2 2024

d) SAP Cloud service provider

A CSP (cloud service provider) is a third-party company that provides scalable computing resources that businesses can access on demand over a network, including cloud-based compute, storage, platform, and application services, Cloud Computing is becoming go-to model for accelerating digital transformation and offers flexibility, scalability, resiliency with Security protocols in place that business demands without being concerned with physical limitations, easy to manage & maintain plannings instead of building a own infrastructure for your business applications, you can rent any CSP which can be shared with other individuals or other organizations.

e) GUI

GUI is an abbreviation for Graphical User Interface, this lets user to do things in interactive mode in graphics mode interpretation, this is more of icon-ical, choosing interactive options with radio buttons, checkboxes, Menu options for making things easy to choose right required choices based on the documentation, it has scrollbars, wizards, icons, buttons easy to understand and more easy even for newbie to SAP world with the images, plain texts, gifs, as much information with hypertext or hyperlinks in the GUI formats.

f) CLI

CLI stands for Command Line Interface, this format lets users to use commands that are directly linked to SAP executables or kernels associated with installation media less load on Operating System resources, direct link to writing to logs, easy to swap/tab between these logs and command line interface screens operating system level putty or similar interface sessions, Seniors or users who like coding more of hands-on expertise level might like this CLI – Command Line Interface pattern approach, it will performed over the terminal/console window which is more close to interact with operating system & SAP provided kernel executable libraries. However this is also call backend written commands for a visual prompts expects responses from the user/system, this is most suitable for expertise complicated computing. CLI allows to run high automation through scripting.

2. SAP GUI vs CLI

SAP shares media which can be downloaded or saved at Operating System Level or Compact Disc (Obsolete) not anymore, SAP marketplace links with SAP provided S-User (SAP User) ID direct link to download media based on these phases for Software Downloads
- Installations & Upgrades
- Support Packages & Patches
- Databases

Media can be download from these tabs which will be further categorized based on software product type licensed/non-license version, later corresponding license to be applied for respective enterprise product

Few below ease-of-use comparison between GUI vs CLI approach

GUI –
- Comparatively GUI consumes more memory than CLI based
- GUI offers lower-level precision
- Comparatively easier to understand and use
- Works much slower speed getting data from logs to update back to GUI
- More of keyboard & Mouse interaction, along with product documentation reference
- Information displayed with radio buttons, checkboxes, GIFs
- Additional settings xMing, Graphical settings should be enabled to pop-up GUI

CLI –
- CLI consumes less OS resources
- Faster responses compared to GUI
- Higher precision of work achieved
- No Graphics used
- Make sure typing errors are avoided
- If you the commands, a CLI can be lot faster and efficient than any other type of interface

SAP GUI –
SAP Graphical User Interface (GUI) is a front-end program interface that can be used to access SAP system, it must be installed on Windows terminal or central Citrix/VDI based access point for SAP accesses.

Architecture carries message server which must be configured for Load Balancing, there are several blogs, helpful documents, URLs available but shifting of architectural solutions, more tools around this area more enhanced processes, this is at bottom of all the architecture layer at Application level workload is distributed optimized to improve and achieve maximum performance by SAP work processes, these settings accept incoming inbound processing of master data, forecasting jobs, it will break down and distribute operations into many smaller tasks decompresses into small tasks owning by each dialog work process until available maximum number of work processes whatever percentage it was assigned/allocated to use by each application sever settings.
- Allow system to perform/process tasks in parallel to workloads
- Distribute workload equally within the system
- It can limit the scope to local to application server & particular client
- Configurations on how many numbers of work processes based on available CPUs & Memory

3. Activities with GUI & CLI

Below are few list of administration, Operational activities ease-of-use based on GUI vs CLI

3.1 System Build Activities

Usage of GUI/CLI to create disks to the Virtual Machines using Azure/AWS/GCP or private other Hyperscalors from Command Level or GUI based
- GUI approaches based on expertise and hands-on leve
- CLI with scripts more senior and faster approaches, not recommended for Newbies
- SAP Cloning activities, RSYNC activities, robo copy multiple using CLI based

3.2 System Refresh Activities

More than 50% are based on CLI, remaining are from Application level, this is traditional approach when you are not using any Refresh tool, or SAP recommended PCA – Post Copy Automation refresh tool
- Export of tables using R3trans scripts - CLI
- Exporting of configurations - CLI
- Taking backups of profiles, other certificates, acl entries all required mandatory using CLI
- Stopping/Starting Applications using CLI
- Running SQL scripts for DB (HANA/Oracle/Sybase, other non-windows) – CLI
- DB restore – both CLI or GUI whichever is comfortable
- Post Refresh – like importing table entries R3trans – CLI
- Other post refresh can be performed from Application interface – GUI

3.3 SAP HANA Snapshots

For AWS/Azure/GCP this is to perform DB snapshots also called as Backups for larger databases can be performed using CLI/GUI, preferably CLI based on the detach the disks /hana/data/<SID> running python scripts (.py), detach can be performed by GUI

For SNAPSHOTs running scripts steps using CLI is better option to trigger firing scripts with required data/time details under <sid>adm privileges, this is to perform DB STOP/RESTORE/START steps

This is applicable for larger databases based on scale-up, Multitenant databases, either GUI or CLI operations scripts to be executed to achieve healthy results, choose the right approach based on administrative expertise as Preprocessor & Compile Server runs on System Database as they don't contain persistent data, multiple hosts are involved in this Multitenant database architecture with both GUI vs CLI activities for database HIGH AVAILABILITY/Disaster Recovery system fails, stand-by instances will fail over all active database, most of the configurations to be performed from Command Line expertise is recommended for ease-of-use
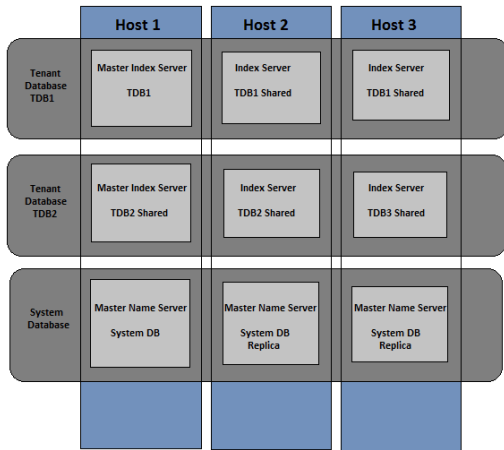
Figure: Multitenant database architecture

4. HANA Server/Client Installations or Plug-In Installation

Command Line Arguments are interpreted for these installations using Command Line arguments to be passed during ./hdbinst or ./hdbsetup
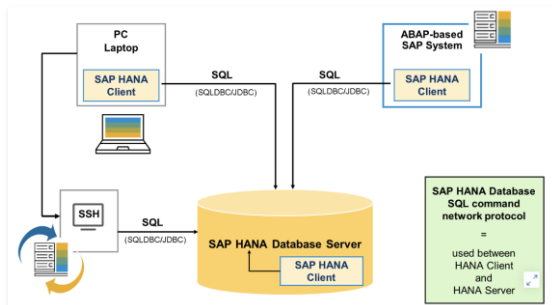

Figure: HANA Server/Client Command execution approach pictorially

Hdbsql commands – CLI options to connect to SAP HANA system interactive to execute commands, logon to database as a database user

Figure: Command Line options for database logon

Figure: Command Line options for database logon

JDBC Command-Line Connection

JDBC is used to connect to database between JDBC client and HANA database, there are several parameters can be interpreted at OS level from this Command Line

```
java -jar ngdbc.jar -u <user,password>
          [-n <hostname:port>]
          [-i <instance_number>]
          [-d <database_name>]
          [-o <connect option>]
          [-c <sql command>]
```

Connections with an instance Number and Database Name **from Command Line**

| **java -jar ngdbc.jar -u MyUser,MyPassword1 -i 00 -n myServer -d tdb1 -c "SELECT DATABASE_NAME FROM SYS.M_DATABASES"**

Connections with SYSTEMDB Port and Database Name **from Command Line**

| **java -jar ngdbc.jar -u MyUser,MyPassword1 -n myServer:30013 -d tdb1 -c "SELECT DATABASE_NAME FROM SYS.M_DATABASES"**

Command Line tracing is available by running the tracing configuration commands via Command Line
show the available trace command-line options

| **java -jar <installation-path>\ngdbc.jar -h**

5. Other HANA Administration Activities from Command Line –

HANA DB User Store – this is to enable store information to connect to a HANA system by using corresponding hostname and post information
hdbuserstore.exe set <key> <server>:<port>@<database> <user> <password>

ODBC data source
Calling to run Commands after connecting to Database to run SAP HAN hdbsql commands

Example:
This is to run and display about general information about the database in command line mode with simultaneous database logon

```
hdbsql -n localhost:39613 -u SYSTEM -p MyPWD1234 "\s"
```

Above command returns below result

```
host           : localhost:39613
sid            : H4C
dbname         : SYSTEMDB
user           : SYSTEM
kernel version : 2.00.054.00.1611906357
SQLDBC version : libSQLDBCHDB 2.07.021.1611351107
autocommit     : ON
locale         : en_US.UTF-8
input encoding : UTF8
sql port       : linux-bj73:39613
```

Run for Background for longer run purposes

This is always a situation based on calling and interaction required from legacy systems running few background jobs to perform code logic interpretations will use Operating System level command kernel executables to get the work done

Placing the legacy mGet files into corresponding path used and fetch the same files to further operations target requirement – this is basically mixed of multiple GUI with Command Line operational activities.

Multiple SQL Statements will be triggered respective logs to be monitored based on what is being called vs what is expected – troubleshooting required based on program logic reads between Table entries to avoid performance bottlenecks SQL statements to reviewed from OS level trace files either location or calling py scripts from command lines,

SAP BTP GUI & CLI Options:
To keep it simple around CLI management - SAP BTP tools like Cloud Foundry Environment, KYMA environments offers CLI which allows for high automation can be achieved through scripting. SAP BTP KYMA environment provides a fully managed Kubernetes runtime based on the Open Sources project which has larger focus on containers, container orchestration and scalability.

Besides that, you can also use the SAP BTP CLI, a command line interface for managing the SAP **BTP accounts or API calls**. When you want to manage the Kyma environment, you need to use the Kyma Dashboard, or you can use the Kubernetes command-line tool: **kubectl**.

For managing the Cloud Foundry environment, you can use the SAP BTP cockpit or alternative for better administration the Cloud Foundry command-line interface: **cf cli**

However other all SAP BTP cockpit (SAP Business Technology Platform) administration activities more with a graphical user interface – it displays all directories, subaccounts that are in Global Accounts where you can navigate through for administration activities and other analytical insights.

6. Conclusion

Running SAP operations either Command Line or Graphical User interface have their own advantages, few things are good to run Command Level when same can be run using GUI for better look and feel, most of front-end operations, end-user

activities are performed over GUI, whereas Administrative activities, technical operations, Basis related where they've both GUI & CLI based newbies likes GUI as it'll have more documentation help links, CLI is for seniors, very good hands-on, expected what it comes next, review logs simultaneously help to be on top of it ahead of steps.

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