Below are the basic and complex interview questions of SAP HANA that are commonly asked by interviewees:

Q.1 What do you understand by SAP HANA?

Ans. SAP HANA is an in-memory database that encompasses special software and hardware components used for a centralized ERP system and business application development.
It uses real-time data processing/computing engine which fetches data directly from the in-memory (main memory/RAM) speeding up the data retrieval operations.

Q.2 Why is SAP HANA unique?

Ans. SAP HANA proves to be a unique tool for users in many ways. The reasons for uniqueness are:

- SAP HANA is the first technology ever to be used for both OLTP and OLAP application processing.
- It provides query processing environment for structured as well as unstructured data. That is, for both relational database (tables) and less structured (texts, graphs) respectively.
- The multi-core processing engines of the SAP HANA system process data parallelly. The parallel processing is done within different columns of the same database. Using a columnar database, the system optimizes data structure and eases storing large data by compressing it.

Q.3 What are the components comprising SAP HANA technology?

Ans. SAP HANA is a technology that is a collection of different tools and technologies that work in tandem to bring it in existence. There are four technologies which collectively make SAPA HANA:

- **SAP HANA DB:** It is the core in-memory database which is central to the functioning of SAP HANA.
- **SAP HANA Studio:** It has the modelling tools for data handling and management.
- **SAP HANA Appliance:** It is the Vendor hardware in which we install SAP HANA software.
- **SAP HANA Application Cloud:** It is the cloud-based infrastructure ensuring the functioning of appliances.

Q.4 Which platforms SAP HANA supports?

Ans. SAP HANA supports various platforms:

- Microsoft Windows Vista, 7, 8, Server 2008 (*32-bit*)
- Microsoft Windows 7, 8, 10, Server 2008 / R2 (*64-bit*)
- SUSE Linux Enterprise Server (SLES) 11 (*64-bit*)
- Red Hat Enterprise Linux (RHEL) 6 (*64-bit*)
- Mac OS X Mavericks (*10.9*)

Q.5 What do you understand from in-memory computing? What is its significance in SAP HANA?

Ans. In the in-memory computing, a huge amount of data as the information is stored in the *Random-Access Memory (RAM)* instead of external storage disks.
This technology replaces the traditional way of storing data in disks and uses relational database management methods to fetch and process the data. In-memory computing technology is much cheaper and faster than the traditional database system.

Applications in SAP HANA are developed in close association with the database and there is close to no data movement involved from the database to the system.

SAP HANA keeps a primary copy of the data ready in in-memory storage which results in data access and processing for ad-hoc reporting, analysis of data in real-time, and quick query response. Also, it reduces data complexity, data redundancy, data footprint, hardware and IT costs.

Q.6 What are the main components of the SAP HANA environment?
Ans. The primary components of the SAP HANA environment are:

In-memory computing engine: This is a component residing within the Index Server. It has got several sub-components such as *Planning Engine, Session Management, Disk Storage, Request Processing and Execution Control, Relational Engine,* etc.
Database: This has raw data residing in the ERP database which is sent to the HANA database. *Replication Agent* (in ERP DB) and *Replication Server* (in the computing engine) provisions this data movement. This component provides log-based data provisioning.
SAP Business Objects BI 4: This component includes tools like *SBO BI Information Designer tool, Data Services Designer, Data Services Server, and Data servers,* etc.

We use the components for job-based data provisioning. They design and implement a job on data and store the reports created in the form of a result. Therefore, it also acts as a repository.

SAP HANA Studio: This is a user interfacing platform which an Eclipse-based tool where we can manage, administer and manipulate data. We can work on several views like *Attribute, Analytic, and Calculation.*
Clients: These are miscellaneous reporting tools which we can connect to the computing engine by utilizing specific drivers. We can design and share reports by utilizing these tools and client applications.
Note: This question is very important for your SAP HANA interview. Prepare it nicely.

Q.7 What is the function of a Replication server?
Ans. The replication server is responsible for managing the replication of table data as well as metadata from the data source.

Q.8 What is a persistence layer?
Ans. The persistence layer is mainly responsible for processing data backups periodically and storing it permanently. This is known as *"Savepoints"* and by default, the savepoint frequency is in every 5 minutes. The data stores as log volumes and data volumes.

Q.9 What are the architectural components of SAP HANA?
Ans. The SAP HANA system consists of different components which together makes its system architecture.
Index server: The Index Server is the main server in SAP HANA. It has the data storage and processing engine. Queries in different languages like SQL and MDX are received in the index server.
Then, the queries are processed by different components and servers within it. Index server also manages the transactions and authentications. It also has a component that manages transaction logs and selectively stores data.

In addition, the index server is further divided into smaller components like *relational data engine, session manager, authorization management, planning engine, calc engine, and persistence layer.*
Name server: Name server maintains the information of the topology or landscape of SAP HANA system environment. It contains information related to the name and location of the HANA components.
This server manages and monitors the topology of all the distributed servers or nodes. It increases the processing time by decreasing the re-indexing process as it keeps the information on what data stores in which server.

Pre-processor server: Pre-processor server is a text analyzing server which processes textual data. The service provided by this component is used during text search. Whenever a request initiates, this server processes textual data and provides it to the user.
SAP HANA Studio Repository: The repository stores information related to the newly released updates. We can update the old version to the latest ones with the help of this.
XS Engine: It facilitates communication between the external applications (*Java and HTML based*) and SAP HANA system via HTTP/HTTPS in a web browser. The XS Engine converts the system's state from the persistence model stored in the database into the consumption model for clients.

Q.10 What is the most important component in SAP HANA architecture?

Ans The Index Server is the most important component of SAP HANA architecture. It has the data storage (having the actual data) component and a processing engine.
Queries in different languages like SQL and MDX are received in the index server. These queries are processed by different components and servers within the index server.

Q.11 Name the components of an index server.

Ans There are six main components of an index server:

- Relational data engine
- Connection and Session manager
- Authorization manager
- Planning engine
- Calc engine
- Persistence layer

Q.12 What is sizing in SAP HANA?

Ans. Sizing in SAP HANA refers to determining the hardware requirements for specific SAP HANA installation requirements. Hardware components important for sizing point of view are *CPU, memory (RAM) and hard disk*.
The most crucial task in sizing is to estimate the size of the server best suited for the business user's requirements.

In SAP HANA, we can perform sizing in three ways:

- Using Quick Sizer tool
- Using DB script
- Using ABAP report

Q.13 What are row and column storage in SAP HANA?

Ans. Data in the SAP HANA database stores in two ways; row storage, and column storage.
Row storage is the method of storing data in a horizontal fashion. It is similar to how data is stored traditionally in disk databases. However, there is one main difference between the SAP HANA row storage and traditional row storage.

That is, in SAP HANA, data is stored in rows in the main memory and in traditional databases, data is stored in rows in the disk storage.

Column storage method stores data in a columnar fashion (linear/ vertical). Data is compressed efficiently in column stores. It improves SAP HANA's performance by optimizing both the read and write operations on data.

Data is stored in the column storage area which is divided into two sections: Main storage and Delta Storage.

Q.14 What are the different perspectives in SAP HANA Studio?

Ans. The SAP HANA Studio contains different perspectives which we can choose to work on. Some commonly used perspectives are:

- SAP HANA Administration Console
- SAP HANA Modeler
- Application Development
- Lifecycle Management
- SAP HANA Development
- ABAP
- BW Modelling

Q.15 What is SAP HANA System Monitor?

Ans. Using the system monitor in SAP HANA Studio, we can administer and monitor the system's health and availability of SAP HANA components. Also, using the system monitor, we can access the system's details and configurations and the services offered by different SAP HANA components.
We can monitor several aspects through the SAP HANA system monitor such as the *alerts, disk space, log disks, trace disk, data disk, memory, performance, volume,* etc. Thus, it is convenient to manage individual aspects, tasks, and components.

Q.16 What all administrative operations can we achieve from the Administration Console?

Ans. A number of administrative tasks can be performed in the SAP HANA Studio such as; *regulating (start/stop) services, monitoring the system, audit policy, and security configuration, user management and authorization, backup and recovery, memory management, license management, alerts and messages,* etc.

All of these tasks can be performed from different tabs present in the **administration console of SAP HANA Studio** such as:

- Overview (monitor and general management)
- Alerts (position and view the details of the alerts)
- Performance (evaluates the performance of the system for the activities happening in the database)
- System Information (access system information files and queries)
- Landscape (check of all running services)
- Volumes (details of the logs and data volumes)
- Trace Configuration (includes the traces set up information)
- Configuration (includes the information on system configuration files)
- Diagnosis Files (includes the system log files)

Q.17 What is SAP HANA Information Modeler?

Ans. Information Modeler lets us design information views or models on top of SAP HANA database using tables in it. Such models are created to serve a business logic and operation. They are generated directly on top of the HANA database layer.

The information modeler provides the interface and tools to select attributes and measures from the database tables so that the user can create multiple information views using the physical tables of transactional data stored in the databases.

The information views are a logical representation of the data which can be further published or consumed for analytical purposes. Information modelling implements on the SAP HANA Modeler perspective of SAP HANA Studio.

Q.18 What is the difference between Information Modeler and Information Composer?

Ans. The two differ from each other based on target users. SAP HANA Information Modeler is for technical users with extensive data modelling requirements and technical knowledge.

They can perform a range of advanced operations related to modelling such as *creating attribute views, analytic views, calculation views, processing models, data management and administration, data loading and import/export tables.* Whereas, information composer is made for non-technical users who are not IT and data science experts (with no database or modelling knowledge).

The information composer is so designed that it aids non-technical users with user-friendly interface, animations, hints, and suggestions for modelling and reporting.

Q.19 What are the three types of information views?
Ans. The three types of information views are:
1. Attribute view
Attribute view uses attributes, or the non-measurable, non-quantifiable data to design views and models according to the business logic.

Thus, the data used in attribute view is referred to as '*Master data*' as it is used as reference information in other views (analytic and calculation). The tables in attribute view do not contain any facts or measure.
2. Analytic view
In an analytic view, we can create star schemas, having a central transaction or fact table and multiple dimension tables linked to it via primary keys. The measures are contained only in the central transaction table which can be grouped or joined with multiple dimension tables.

3. Calculation view
Calculation view is an advanced model which uses both attribute and analytic view elements in it to make a complex data model following complex business logic.

It gives us the freedom to combine and create from a range of options like tables, column views, analytic views, attribute view, etc. It enables us to do multidimensional reporting using measures and dimensions from different sources.

Note: This one is very popular SAP HANA interview question.

Q.20 What are the types of SAP HANA engines?
Ans. There are three types of SAP HANA engines:

- **Join Engine:** We use the join engine every time an attribute view is created or used, or a join condition is applied in a native SQL command.

- **OLAP Engine:** We use the OLAP engine in the creation of analytic views. We use it only when attributes are used in the analytical view and no calculation is done. If operations like calculations, counters, restricted measures are used then other engines like a calculation engine is used along with the OLAP engine.
- **Calculation Engine:** We use the calculation engine in calculation along with being used in other views like analytical and attribute view whenever they apply complex logic and calculation operations.

Q.21 Explain the different types of joins in SAP HANA.
Ans. The types of joins in SAP HANA divides into two categories; Standard database joins and Specific joins.

1. Standard Database Joins
Inner join: The inner join joins the left and right tables with only matching records. That is, only that part in both tables that coincides displays. Inner joins are very useful while creating information models as we can use it to join tables in attribute views.
Left outer join: The left outer join combines the entire left table with only the matching records from the right table. If some the engine can't find any records matching for the left columns in the right table then it returns NULL at those places.
Right outer join: The right outer join combines the entire right table with the matching contents in the left table. We rarely use the right outer join in real scenarios. It returns NULL in place of values which do not find an association with the records in the right table.
Full outer join/Union: A full outer join combines all the records from both left and right tables irrespective of the matching conditions. The cells which are not able to find any association with the other table are left NULL.
2. SAP HANA Specific Joins
Referential join: Referential joins are like inner joins but with a condition of keeping the referential integrity intact.
We use it whenever there is a primary key and foreign key association between two tables. And, referential integrity is when for every value in the foreign key column, there is a reference value in the primary key column of the master data table.

From a performance point of view, referential joins are better than inner joins. Referential joins are necessary for star schemas as long as referential integrity maintains.

Text join: Text join provides a description of text records in the language specific to the user. If user A selects the language as German, then all the

details regarding the table and columns will display to the user in German. We use text joins for joining a text table with a master data table.
Note: This one is the favorite SAP HANA interview question of most interviewees.

Q.22 What are analytic privileges in SAP HANA?
Ans. Analytic privileges in SAP HANA are data access restrictions which define and assigns to selected users.
They work as data security tools for SAP HANA users and clients. Analytic privileges provide row-level data security to SAP HANA users on contrary to object-level security which the object privileges assign. Thus, it restricts users to see only a selected section of data from the entire data set.

Q.23 What are the packages in SAP HANA?
Ans. Packages are folders which contains all the modelling related data objects. We call it a package because it can contain all the information modelling data in a complete package and we can use it for transferring (Import/Export) purposes.
The design-time objects such as *information views, sub-packages, procedure, analytic privilege* reside in a package.
There are two types of packages:

- Structural
- Non-structural

Q.24 What are schemas in SAP HANA?
Ans. The database elements of a system reside in the Catalog node of SAP HANA Modeler. The relational SAP HANA database divides into sub-databases within the Catalog node as schemas.
Schemas are like containers containing all the different elements or objects of a relational database. It categorizes important information about a database into folders such as *indexes, tables, views, triggers, sequences, procedures, functions,* etc.

Q.25 Difference between OLAP and relational connection to SAP HANA.
Ans. A relational connection establishes when the user needs to access conventional data tables. Relational connections can only create via IDT or UDT created semantic layers.

On the contrary, if we need to access multi-dimensional data cubes, then we need an OLAP connection. It is a direct connection to the business layer of the data model as opposed to the relational connection which is an indirect connection.

These connections enable a user to connect to the data tables or information views in SAP HANA.

Q.26 What is referential join? Explain referential integrity.
Referential join is the default join type in HANA modelling. A referential join is very similar to an inner join. The only difference between the two is referential integrity must be ensured in the case of referential join otherwise it cannot be formed.
Referential join forms between a fact table (transaction data or analytic view) and a master data table (attribute view). Every master data table has a primary key column which acts as a foreign key in the fact table.

We use referential joins whenever there is a primary key and foreign key association between two tables. And, referential integrity is when for every value in the foreign key column, there is a reference value in the primary key column of the master data table.

From a performance point of view, referential joins are better than inner joins. Referential joins are necessary for star schemas as long as referential integrity maintains.

Q.27 What are SAP Business Objects BI 4 reporting tools?
Ans. SAP Business Objects BI 4 client tools are SAP products that offer reporting applications and tools that use data from SAP BW and SAP HANA for reporting and analysis purpose. The list of reporting and dashboarding tools available under SAP Business Objects BI 4 package is:

- SAP Lumira
- Web Intelligence
- SAP Crystal Reports
- Design Studio
- Dashboard designer
- Universe Designer (IDT/UDT)
- BusinessObjects Explorer
- Analysis Office
- MS Excel

Q.28 Difference between Catalog and Content node.
The contents of an SAP HANA system (database) majorly divides into two folders; Catalog and Content folder.

Catalog folder: The Catalog node acts as a data directory for SAP HANA system and keeps structured information of all the physical objects in HANA.
It primarily contains schemas and each of them divides into different folders like *Column Views, EPM Models, Functions, Indexes, Procedures, Sequences, Tables, Triggers and Views.*
Content folder: The Content node contains the design-time repository objects such as the information models created in SAP HANA Modeler. Packages contain the information models.
Thus, the Content node mainly contains packages created by users. Within each package are the *Attribute Views, Analytic Views, Calculation Views, Analytic Privileges and Decision tables* created by a HANA user.

Q.29 What are the ways to create a table in SAP HANA?
There are two ways of creating tables in SAP HANA. One method is a *command line method*, where we use the SQL console to write an SQL script and create a table. The second method is a *GUI based method* where we use a graphical interface to create a table.

Q.30 Types of connecting drivers used by SAP HANA reporting tools?
SAP HANA uses four main types of drivers as discussed below:

ODBO (OLE DB for OLAP): The ODBO driver is a driver by Microsoft for connecting MS Excel to the SAP HANA database. This driver is specifically for *multi-dimensional reporting* (multi-dimensional data stores) and it communicates through MDX language.
ODBC: ODBC stands for Open DataBase Connectivity. The ODBC driver is for establishing relational database connections between reporting tools and SAP HANA database. Reporting tools like CR Report and Universe layer (IDE) use ODBC driver that communicates via SQL.
JDBC: JDBC driver is a Java-based connection service. We also use it for relational reporting by reporting tools like *Explorer, UNX using IDT, CR Report.* JDBC drivers communicate with the database through SQL queries. JDBC stands for Java DataBase Connectivity.
BICS: The BICS driver is SAP propriety connecting driver. Reporting tools that use SQLDB language as the interaction language with SAP database uses BICS driver.

1. **Question 1. What Is Sap Hana Studio?**

   Answer :

   1. The SAP HANA studio is an Eclipse-based development and administration tool for working with HANA.
   2. It enables technical users to manage the SAP HANA database, to create and manage user authorizations, to create new or modify existing models of data etc.
   3. It is a client tool, which can be used to access local or remote HANA system.

2. **Question 2. What Are The Supported Platforms For Hana Studio?**

   Answer :

   The SAP HANA studio runs on the Eclipse platform 3.6.

   We can use the SAP HANA studio on the following platforms:
   Microsoft Windows x32 and x64 versions of: Windows XP, Windows Vista, Windows 7

   SUSE Linux Enterprise Server SLES 11: x86 64-bit version
   Note : For Mac OS, HANA studio is available but there is no HANA client for that.

Question 3. What Is Sap Hana 1.5, 1.2 Or 1.0 Sp03?

Answer :

They are all the same thing, and 1.0 SP03 is touted to be the final name which should go into Ramp Up (beta) in Q4 2011. This allows any SAP Net Weaver BW 7.3 Data Warehouse to be migrated into a HANA appliance. HANA 1.0 SP03 specifically also accelerates BW calculations and planning, which means even more performance gains can be attained.

Question 4. What Is A Restricted User In Sap Hana System?

Answer :

Restricted users are those users who access HANA system with some applications and they don't have SQL privileges on HANA system. When these users are created they don't have any access initially.

Question 5. What Is Schema In Sap Hana?

Answer :

There are 3 types of schemas:

1. User Defined Schema
2. System Defined Schema
3. SLT Derived Schema

User Defined Schema : These are created by user (DBA or System Administrator
SLT Derived Schema : When SLT is configured, it creates schema in HANA system. All the tables replicated into HANA system are contained in this schema

System Defined Schema : These schemas are delivered with the SAP HANA database and contain HANA system information. There are system schemas like _SYS_BIC, _SYS_BI, _SYS_REPO,_SYS_STATISTICS etc.
A database schema is a way to logically group objects such as tables, views, stored procedures etc.

Question 6. Explain What Is Schema Mapping In Sap Hana ?
Answer :
Schema mapping is done when the physical schema in the target system is not the same as the physical schema in the source system. As mentioned earlier, suppose we are moving components from Development System (DEV) to Production System (PROD).

The tables in DEV reside in DEV_SCHEMA and the same tables reside in PROD system in PROD_SCHEMA schema. If an attribute view is transported from DEV to PROD, it will not work because the schema name is referenced in the definition of attribute view. In order for the promoted objects to work in PROD, schema mapping needs to be set up in the target system.

Question 7. What Are System Requirements For Sap Hana?
Answer :
Java JRE 1.6 or 1.7 must be installed to run the SAP HANA studio. The Java runtime must be specified in the PATH variable. Make sure to choose the correct Java variant for installation of SAP HANA studio:

32-bit installation, choose a 32-bit Java variant.

For a 64-bit installation, choose a 64-bit Java variant.

Question 8. What Is A Delivery Unit In Sap Hana?
Answer :
Delivery unit (DU) is a container used by the Life Cycle Manager (LCM) to transport repository objects between the SAP HANA systems.

The name of Delivery Unit must contain only capital letters (A-Z), digits (0-9) and underscores (_).

Question 9. Why To Configure Import Server In Sap Hana ?
Answer :
In order to load data from external sources to SAP HANA we need to establish a connection with the server. To connect, we need to provide details of Business Objects Data Services repository and ODBC drivers. Once the connection is established, we can import the tables definition and then load data into table definition.

Question 10. Explain The Column And Row Store In Hana?

Answer :

- HANA supports both type of data store in database.
- Row store is used when you need to use Select statement and no aggregations are performed.
- Column store is used to perform aggregations and HANA Modelling is supported only on Column based tables.

Question 11. What Are The Different License Keys Types In Hana System? What Is Their Validity?

Answer :

1. Temporary License key
2. Permanent License Key

Temporary License key:

3. Temporary License keys are automatically installed when you install the HANA database.
4. These keys are valid only for 90 days and you should request permanent license keys from SAP market place before expiry of this 90 days period after installation.

Permanent License Key:

5. Permanent License keys are valid till the predefine expiration date.
6. License keys specify amount of memory licensed to target HANA installation.

Question 12. What Is The Difference Between Catalog And Content Tab?

Answer :

Catalog: This contains RDBMS objects like schemas, tables, views, procedures, etc.
you can open SQL editor and design database objects.

Content tab: This is used to maintain design time repository. You can create new packages and design Information views in HANA system. Various views can be created under content tab to meet business requirement and to perform analytical reports on the top of the Modelling views.

Question 13. What Are The Different Perspectives Available In Hana?

Answer :

Modeler : used for creating various types of views and analytical privileges. SAP HANA Development: Used for programming applications for creating development objects to access or update data models such as Server-side Java script or HTML files.

Administration : Used to monitor the system and change settings.
Debug: Used to debug code such as SQLScript (.procedure files) or Server-side Java script (.xsjs files).

Question 14. What Are The Supported Object Types In Modeler Perspective?

Answer :

Attribute views, Analytical views, Calculation views, Analytical privileges, Procedures, Decision tables, Process Visibility Scenario.

Question 15. Explain Parallel Processing In Sap Hana?

Answer :

1. Using the columnar data storage approach, the workload in SAP HANA is divided vertically.
2. The columnar approach allows linear searching and aggregation of data rather than two-dimensional data structure.
3. If more than one column is to be processed, each task is assigned to diverse processor.
4. Operations on one column are then collimated by column divisions processed by different processors.

Question 16. What Are The Advantages Of Attribute View?

Answer :

- Attribute View act as Master data context, which provides Text or Description for Key/Non-key field.
- Attribute View can be reuse in Analytic View and Calculation View.
- Attributes View is used to select a subset of columns and rows from a database table.
- Attributes (fields) can be calculated from multiple table fields.
- There is no measure and aggregation option.

Question 17. Which Engine Is Used To Create Attribute View?

Answer :

- Join engine is used to create attribute view
- This engine is used when we execute any Attribute View in HANA or run native SQL on more than one table with join condition.
- If there are any calculations involved either in Attribute View or in native SQL then Join Engine will use Calculation Engine for calculations or fetch the result.

Question 18. What Are The Characteristic Of Sap Hana Calculation View?

Answer :

- Support Complex Calculation.
- Support OLTP and OLAP models.
- Support Client handling, language, currency conversion.
- Support Union, Projection, Aggregation, Rank, etc.

Question 19. What Are The Types Of Calculation View?

Answer :

SAP HANA Graphical Calculation View (Created by SAP HANA Studio Graphical editor).

SAP HANA Script-based calculations Views (Created by SQL Scripts by SAP HANA Studio).

Question 20. What Are The Different Types Of Nodes In Calculation View?

Answer :

Different types of nodes, they are:

Join: This node is used to join two source objects and pass the result to the next node. The join types can be inner, left outer, right outer and text join.Note: We can only add two source objects to a join node.

Union: This is used to perform union all operation between multiple sources. The source can be n number of objects.

Projection: This is used to select columns, filter the data and create additional columns before we use it in next nodes like a union, aggregation and rank.

Aggregation: This is used to perform aggregation on specific columns based on the selected attributes.

Rank: This is the exact replacement for RANK function in SQL. We can define the partition and order by clause based on the requirement.

Question 21. What Is Calculation View With Star Join?

Answer :

Calculation View with Star Join :

- It does not allow base column tables, Attribute Views or Analytic views to add at data foundation.
- All Dimension tables must be changed to Dimension Calculation views to use in Star Join.
- All Fact tables can be added and can use default nodes in Calculation View.

Question 22. Can We Call An Analytic View Or Calculation View Inside Another Calculation View In Sap Hana ?

2. **Answer :**
3. Yes. We can call all the views (attribute, analytic and calculation view) inside a calculation view.
4. **Note:** Calculation views are composite views and can be used to combine other views.
5. It can consume other Analytical, Attribute, other Calculation Views & tables.
6. It can perform complex calculations not possible with other views

Question 23. Which Engine Is Used To Create Calculation View?

Answer :

SQL Engine which is also known as SQL Parser/interface is used for all sorts of SQL statements generated by frontend application via different different clients and also for native sql run at database level.

From SAP HANA SP7, we have an option for Calculation Views in 'Properties' section, where we have an option to choose calculation view to run in 'SQL Engine'. Advantage of this option is that, instead of moving data between multiple engines HANA executes the entire script in SQL Engine to get the final result.

Question 24. What Are The Properties Of Analytic View?

Answer :

Following are the properties of SAP HANA Analytic View :

- Analytic Views are used to perform complex calculations and Aggregate functions like Sum, Count, Min, Max, Etc.
- Analytic Views are designed to run Start schema queries.
- Each Analytic View has one Fact table surrounded by multiple dimension tables. Fact table contains primary key for each Dim table and measures.
- Analytic Views are similar to Info Objects and Info sets of SAP BW.

Question 25. Which Engine Is Used To Create Analytic View?

Answer :

OLAP Engine :

- This engine will be called in the backend whenever we run any queries on Analytic Views in SAP HANA.
- If there are no additional calculations performed like calculated columns, restricted measures and counters, then everything will be processed in OLAP Engine.
- OLAP Engine acts as join engine for those Attribute Views used in Analytic Views, without any calculated columns
- All the join engine work will be converted into 'BwPopJoin' which is part of OLAP Engine.
- If there are any calculations present, to be performed then Calculation engine will be used along with OLAP Engine.

Question 26. Tell Something You Know About Normalization And De-normalization?

Answer :

Normalization is nothing but the process that is adopted for the purpose or removing the redundant data from the database. This is generally done by splitting the table into different sections. This actually makes sure of integrity. On the other side, the de-normalization is the process of

considering the redundant data so that all the queries which are complex can be enhanced in terms of overall performance.

Question 27. Organizations Have To Spend A Very Large Amount Of Money Every Year On Database Management, Are You Agree With This?

Answer :

Yes, this is totally right. However, it largely depends on the way a users is handling this approach. Basically, data management is a complex approach and there are a lot of tasks which are actually very critical. Managing the database without an effective tool is a big challenge. If an organization can consider a powerful tool like SAP HANA, a lot of tasks can be made simply and a ton of favourable outcomes can be derived simply.

Question 28. Why There Is Actually A Need For The Businesses To Invest In A Rdbms Tool In The Present Time?

Answer :

Managing the data is very important. In the present time, data plays an excellent role in the success of almost every business. Data helps in decision making, collaborations, start new ventures, tackling competition, improving quality and so on. There are a large number of other reasons as well that are mandatory for the business to get it done in a right manner. Thus management of data is important.

Question 29. What Sort Of Advantages Do Businesses Have With Effective Database Management?

Answer :

1. By data managing the users are free to derive results that can be considered for the long run
2. A lot of difficulties related to data can be avoided easily
3. The data can be managed in sections and can be accessed easily
4. Well managed data is useful in designing reports, preparing documents and assisting various departments in other tasks.

Question 30. What Are The Various Tasks In The Sap Hana Which Are Performed By The Modelling Studio?

Answer :

The very first task it perform is selecting the type of tables which are to be stored in the HANA. The selection of Meta data is also the responsibility of the modelling studio. All the data services for entering the data from warehouse or other location are handled by it. It simply manages the ERP instances connections. The entire data services can be used for modelling only through the modelling studio. Any sort of other modelling in the SAP HANA itself is handled by the studio. Moreover the tasks associated with the encoding are also managed and controlled by the modelling studio.

Question 31. Can You Tell Some Important Benefits That Users Can Have From The Slt Replication In Sap Hana?

Answer :

It is basically an approach that has been categorized as triggered one i.e. users need not to worry about the overall impact of performance on the source system. The users can simply make sure of filtering, as well as transformation of the data even if the size is bulky. In addition to this, real-time data replication can also be assured by the users. It is possible for the users to simply make sure of multiple source systems to only one system based on HANA. The reverse action is also possible.

Question 32. What Problems Can Unnecessary Information Can Cause In The Sap Hana And How You Can Avoid The Same From Being Stored In The Application?

Answer :

Many times the users have to deal with the information that is not relevant with any task. Generally, it can cause slow data processing speeds and can affect accuracy and reliability upto a high extent. The users are free to temporary stop the replication and this can avoid the problem of storing any unwanted information or data in the system. To disable replication temporarily, the users just have to stop the schema related jobs in the system.

Question 33. What Do You Know About The Master Controller Job In The Hana?

Answer :

It is a controller that can be deployed for various reasons and purposes. It simply makes sure of creating logging tables and triggers the same in the system. The synonyms can also be created with the help of master controller. Also, the new entries in the administration tables can be made with the help of this approach. The whole table can also be loaded with this approach.

Question 34. Can You Tell Something About The Role Of Transaction Manager And Session In Sap Hana?

Answer :

All the database transactions can be co-ordinated simply with the transaction manager and the users are free to keep a close eye on the closed as well as on the running transactions. The transactions are notified to the users when they are rolled backed or when they are committed. This makes sure of the smooth running of the storage engines.

Question 35. What Is The Best Way To Manage, Operate, And Monitor Sap Hana Systems?

Answer :

Sap Hana is a young database with interesting features of SAP HANA. First of all Sap Hana is an in-memory database. It is accessible for

administration via various channels. Directly from the Server, It is not the most convenient method but you can use hdbsql to manage databases. With the web-based interface Hana cockpit, you can browse and manage sap hana environments. The Client Hana Studio is the complete tool to administer Sap Hana but it has to be physically installed and therefore is dependent on the client hardware.

Question 36. How To Secure A Sap Hana User Connexion?

Answer :

A Sap Hana database user is protected in the first place with a password. However, a password is very often required at the command line in order to connect and execute a batch or an SQL script. The username and password are then visible to anyone. In order to avoid that situation, it is possible to create a special key in relation to a particular user. Username and password are then invisible via the use of that key.

Question 37. What Exactly Is The Significance Of Persistence Layer In Sap Hana?

Answer :

It is actually an important later in SAP HANA which plays a very important role. Actually, HANA has a computing engine built inside and the users have to utilize the data directly without taking any backup. The same can create an issue during powerful failure and thus it is necessary to keep a backup of the same. This layer comes as a savior and it make sure no loss of data during such a situation.

Question 38. What Are The Benefits That Sql Can Bring For You?

Answer :

If the queries in the SQL are simple, the users are free to retrieve a very large sum of data very easily from the system. Another good thing about SQL is it is very easy to learn and implement. There is a vast support available for SQL and all the queries can be addressed reliably. Using SQL, the database can be managed very easily and in fact without considering a large amount of coding.

Question 1. Mention What Is Sap Hana?

Answer :

SAP HANA stands for High Performance Analytical Appliance- in-memory computing engine. HANA is linked to ERP systems; Frontend modelling studio can be used for replication server management and load control.

Question 2. Mention The Two Types Of Relational Data Stored In Hana?

Answer :

The two types of relational data stored in HANA includes

1. Row Store
2. Column Store

Question 3. Mention What Is The Role Of The Persistence Layer In Sap Hana?

Answer :

SAP HANA has an in-memory computing engine and access the data straightaway without any backup. To avoid the risk of losing data in case of hardware failure or power cutoff, persistence layer comes as a savior and stores all the data in the hard drive which is not volatile.

Question 4. Mention What Is Modelling Studio?

Answer :

Modelling studio in HANA performs multiple task like

- Declares which tables are stored in HANA, first part is to get the meta-data and then schedule data replication jobs
- Manage Data Services to enter the data from SAP Business Warehouse and other systems
- Manage ERP instances connection, the current release does not support connecting to several ERP instances
- Use data services for the modelling
- Do modelling in HANA itself
- essential licenses for SAP BO data services

Question 5. Mention What Are The Different Compression Techniques?

Answer :

There are three different compression techniques
Run-length encoding
Cluster encoding
Dictionary encoding

Question 6. Mention What Is Latency?

Answer :

Latency is referred to the length of time to replicate data from the source system to the target system.

Question 7. Explain What Is Transformation Rules?

Answer :

Transformation rule is the rule specified in the advanced replication setting transaction for the source table such that data is transformed during the replication process.

Question 8. Mention What Is The Advantage Of Slt Replication?

Answer :

- SAP SLT works on trigger based approach; such approach has no measurable performance impact in the source system
- It offers filtering capability and transformation

- It enables real-time data replication, replicating only related data into HANA from non-SAP and SAP source systems
- It is fully integrated with HANA studios
- Replication from several source systems to one HANA system is allowed, also from one source system to multiple HANA systems is allowed.

Question 9. Explain How You Can Avoid Un-necessary Information From Being Stored?

Answer :

To avoid un-necessary information from being stored, you have to pause the replication by stopping the schema-related jobs

Question 10. Mention What Is The Role Of Master Controller Job In Sap Hana?

Answer :

The job is arranged on demand and is responsible for

- Creating database triggers and logging table into the source system
- Creating Synonyms
- Writing new entries in admin tables in SLT server when a table is replicated/loaded

Question 11. Explain What Happens If The Replication Is Suspended For A Longer Period Of Time Or System Outage Of Slt Or Hana System?

Answer :

If the replication is suspended for a longer period of time, the size of the logging tables increases.

Question 12. Mention What Is The Role Of The Transaction Manager And Session?

Answer :

The transaction manager co-ordinates database transactions and keeps a record of running and closed transactions. When transaction is rolled back or committed, the transaction manager notifies the involved storage engines about the event so they can run necessary actions.

Question 13. Explain How You Can Avoid Un-necessary Logging Information From Being Stored?

Answer :

You can avoid un-necessary logging information from being stored by pausing the replication by stopping the schema-related jobs.

Question 14. Explain How Sql Statement Is Processed?

Answer :

In the HANA database, each SQL statement is implemented in the reference of the transaction. New session is allotted to a new transaction.

Question 15. Name Various Components Of Sap Hana?

Answer :

SAP HANA DB
SAP HANA Studio
SAP HANA Appliance
SAP HANA Application Cloud

Question 16. How To Perform Backup And Recovery Operations?

Answer :

During a regular operation, data is by default stored to the disk at savepoints in SAPHANA. As soon a there is any update and transaction, logs become active and get saved from the disk memory. In case of power failure, the database restarts like any other DB returning to the last savepoint log state. SAP HANA requires backup to protect against disk failure and reset DB to the previous state. The backups simultaneously as the users keep performing their tasks.

Question 17. Define Slt Configuration?

Answer :

Configuration is the meaningful information to establish a connection between source, SLT system and SAP HANA architecture as stated in the SLT system. Programmers are allowed to illustrate a new Configuration in Configuration and Monitoring Dashboard.

Question 18. What Is Stall?

Answer :

The waiting process for data to load from the main memory to the CPU cache is called

Question 19. Define Different Types Of Information Views.?

Answer :

There are primarily three types of information views in SAP HANA, which are all non-materialized.

- Attribute view
- Analytic view
- Calculation View

Question 20. What Are Configuration And Monitoring Dashboard?

Answer :

They are SLT Replication Application Servers to provide configuration information for data replication. This replication status can also be monitored.

Question 21. What Is Logging Table?

Answer :

Logging table records all replicated changes in the table, which can be further replicated to the target system.

Question 22. How To Define Transformation Rules In Hana?

Answer :

Using advanced replication settings, transformation rules are specified to transfer data from source tables during replication process. For instance, setting rules to covert fields, fill vacant fields and skip records. These rules are structured using advanced replication settings (transaction IUUC_REPL_CONT)

Question 23. Explain The Role Of Transaction Manager And Session?

Answer :

SAP HANA transaction manager synchronizes database transactions keeping the record of closed and open transactions. When a transaction is committed or rolled back, the manager informs all the active stores and engines about the action so that they can perform required actions in time

Question 24. How Is Sql Statement Processed In Sap Hana?

Answer :

Each SQL statement in SAP HANA is carried out in the form of a transaction. Every time, a new session is allocated to a new transaction.

Question 25. Define Master-controller Job.?

Answer :

A Master-controller job is responsible to build database logging table in the source system. It further creates synonyms and new entries in SLT server admin when the table loads / replicates.

Question 26. How Users Can Avoid Un-necessary Storage Of Logging Information?

Answer :

Pause the replication process and terminate the schema-related jobs.

Question 27. Is The Table Size In Source System And Sap Hana System Same?

Answer :

No

Question 28. When To Change The Number Of Data Transfer Jobs?

Answer :

The number of data transfer jobs change when the initial loading speed or latency replication time is not up to the mark. At the end of the initial load, the number of initial load jobs may be reduced.

Question 29. List The Merits And Demerits Of Using Row-based Tables.?

Answer :

Merits:

• No data approach can be faster than row-based if you want to analyze, process and retrieve one record at one time.
• Row-based tables are useful when there is specific demand of accessing complete record.
• It is preferred when the table consists of less number of rows.
• This data storage and processing approach is easier and effective without any aggregations and fast searching.Demerits:
• The data retrieval and processing operations involve the complete row, even though all the information is not useful.

Question 30. List Advantages Of Column-based Tables.?

Answer :

• Allows smoother parallel processing of data as the data in columns is stored vertically. Thus, to access data from multiple columns, every operation can be allocated to a separate processor core.
• Only specific columns need to be approached for Select query and any column can be used for indexing.
• Efficient operations since most columns hold unique values and thus, high compression rate.

Question 31. What Table Type Is Preferred In Sap Hana Administration: Column-based Or Row-based?

Answer :

Since analytic applications require massive aggregations and agile data processing, column-based tables are preferred in SAP HANA as the data in column is stored consequently, one after the other enabling faster and easier readability and retrieval. Thus, columnar storage is preferred on most OLAP (SQL) queries. On the contrary, row-based tables force users to read and access all the information in a row, even though you require data from few and/or specific columns.

Question 32. What Is The Main Sap Hana Database Component?

Answer :

Index Server consists of actual data engines for data processing including input SQL and MDX statements and performs authentic transactions.

Question 33. Explain The Concept Of Persistence Layer.?

Answer :

The persistence layer in SAP HANA handles all logging operations and transactions for secured backup and data restoring. This layer manages data stored in both rows and columns and provides steady savepoints. Built on the concept of persistence layer of SAP's relational database, it ensures successful data restores.

Besides managing log data on the disk, HANA's persistence layer allows read and write data operations via all storage interfaces.

Question 34. Define Modelling Studio In Sap Hana Administration.?

Answer :

Modelling Studio is an operational tool in SAP HANA based on Eclipse development and administration, which includes live project creation.

• The SAP HANA Studio further builds development objects and deploys them, to access and modify data models like HTML and JavaScript files.
• It also handles various data services to perform data input from SAP warehouse and other related databases.
• Responsible for scheduling data replication tasks.

Question 35. List The Different Compression Techniques In Hana?

Answer :

• Run-length encoding
• Cluster encoding
• Dictionary encoding

Question 36. Explain Slt

Answer :

SLT expands to SAP Landscape Transformation referring to trigger –based replication. SLT replication permits data transfer from source to target, where the source can be SAP or non-SAP while the target system has to be SAP HANA with HANA database. Users can accomplish data replication from multiple sources. The three replication techniques supported by HANA are:

• SLT
• SAP Business Objects Data Services (BODS)
• SAP HANA Direct Extractor Connection (DXC)

Question 37. What Is Latency?

Answer :

The time duration to perform data replication starting from the source to the target system is known as latency.

Question 38. What Are The Various Components Of Sap Hana Administration?

Answer :

• SAP HANA Studio
• SAP HANA Application Cloud
• SAP HANA Cloud
• Sap HANA DB The Sap Hana Training Videos and Certification Course can open the doors to a stellar career for you.

Question 39. List Advantages Of Using Sap Hana Database.?

Answer :

• With the HANA technology, you can create gen-next applications giving effective and efficient results in the digital economy.
• By using single data-in memory, SAP HANA supports smooth transaction process and fault-tolerant analytics
• Easy and simple operations using an open-source, unified platform in the cloud
• High-level Data Integration to access massive amounts of data
• Advanced tools for in-depth analysis of present, past and the future.
Interested in learning SAP HANA? Well, we have the comprehensive Sap Hana Course to give you a head start in your career.

Question 40. Explain Parallel Processing In Sap Hana?

Answer :

Using the columnar data storage approach, the workload in SAP HANA is divided vertically. The columnar approach allows linear searching and aggregation of data rather than two-dimensional data structure. If more than one column is to be processed, each task is assigned to diverse processor. Operations on one column are then collimated by column divisions processed by different processors.

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14) What are the components comprising SAP HANA technology?

Ans:

SAP HANA is a technology that is a collection of different tools and technologies that work in tandem to bring it in existence. There are four technologies which collectively make SAPA HANA:

- SAP HANA DB: It is the core in-memory database which is central to the functioning of SAP HANA.
- SAP HANA Studio: It has the modelling tools for data handling and management.
- SAP HANA Appliance: It is the Vendor hardware in which we install SAP HANA software.
- SAP HANA Application Cloud: It is the cloud-based infrastructure ensuring the functioning of appliances.

15) Which platforms SAP HANA supports?

Ans:

SAP HANA supports various platforms:

- Microsoft Windows Vista, 7, 8, Server 2008 (32-bit)
- Microsoft Windows 7, 8, 10, Server 2008 / R2 (64-bit)
- SUSE Linux Enterprise Server (SLES) 11 (64-bit)
- Red Hat Enterprise Linux (RHEL) 6 (64-bit)
- Mac OS X Mavericks (10.9)

16) What do you understand from in-memory computing? What is its significance in SAP HANA?

Ans:

In the in-memory computing, a huge amount of data as the information is stored in the Random-Access Memory (RAM) instead of external storage disks. This technology replaces the traditional way of storing data in disks and uses relational database management methods to fetch and process the data. In-memory computing technology is much cheaper and faster than the traditional database system.

Applications in SAP HANA are developed in close association with the database and there is close to no data movement involved from the database to the system. SAP HANA keeps a primary copy of the data ready in in-memory storage which results in data access and processing for ad-hoc reporting, analysis of data in real-time, and quick query response. Also, it reduces data complexity, data redundancy, data footprint, hardware and IT costs.

17) What are the main components of the SAP HANA environment?

Ans:

The primary components of the SAP HANA environment are:

In-memory computing engine: This is a component residing within the Index Server. It has got several sub-components such as Planning Engine, Session Management, Disk Storage, Request Processing and Execution Control, Relational Engine, etc.

Database: This has raw data residing in the ERP database which is sent to the HANA database. Replication Agent (in ERP DB) and Replication Server (in the computing engine) provisions this data movement. This component provides log-based data provisioning.

SAP Business Objects BI 4: This component includes tools like SBO BI Information Designer tool, Data Services Designer, Data Services Server, and Data servers, etc. We use the components for job-based data provisioning. They design and implement a job on data and store the reports created in the form of a result. Therefore, it also acts as a repository.

SAP HANA Studio: This is a user interfacing platform which an Eclipse-based tool where we can manage, administer and manipulate data. We can work on several views like Attribute, Analytic, and Calculation.

Clients: These are miscellaneous reporting tools which we can connect to the computing engine by utilizing specific drivers. We can design and share reports by utilizing these tools and client applications.

18) What is the function of a Replication server?

Ans:

The replication server is responsible for managing the replication of table data as well as metadata from the data source.

19) What is a persistence layer?

Ans:

The persistence layer is mainly responsible for processing data backups periodically and storing it permanently. This is known as "Savepoints" and by default, the savepoint frequency is in every 5 minutes. The data stores as log volumes and data volumes.

20) What are the architectural components of SAP HANA?

Ans:

The SAP HANA system consists of different components which together makes its system architecture.

Index server: The Index Server is the main server in SAP HANA. It has the data storage and processing engine. Queries in different languages like SQL and MDX are received in the index server. Then, the queries are processed by different components and servers within it. Index server also manages the transactions and authentications. It also has a component that manages transaction logs and selectively stores data.

In addition, the index server is further divided into smaller components like relational data engine, session manager, authorization management, planning engine, calc engine, and persistence layer.

Name server: Name server maintains the information of the topology or landscape of SAP HANA system environment. It contains information related to the name and location of the HANA components. This server manages and monitors the topology of all the distributed servers or nodes. It increases the processing time by decreasing the re-indexing process as it keeps the information on what data stores in which server.

Pre-processor server: Pre-processor server is a text analyzing server which processes textual data. The service provided by this component is used during text search. Whenever a request initiates, this server processes textual data and provides it to the user.

SAP HANA Studio Repository: The repository stores information related to the newly released updates. We can update the old version to the latest ones with the help of this.

XS Engine: It facilitates communication between the external applications (Java and HTML based) and SAP HANA system via HTTP/HTTPS in a web browser. The XS Engine converts the

system's state from the persistence model stored in the database into the consumption model for clients.

21) What is the most important component in SAP HANA architecture?

Ans:

The Index Server is the most important component of SAP HANA architecture. It has the data storage (having the actual data) component and a processing engine. Queries in different languages like SQL and MDX are received in the index server. These queries are processed by different components and servers within the index server.

22) Name the components of an index server.

Ans:

There are six main components of an index server:

- Relational data engine
- Connection and Session manager
- Authorization manager
- Planning engine
- Calc engine
- Persistence layer

23) What is sizing in SAP HANA?

Ans:

Sizing in SAP HANA refers to determining the hardware requirements for specific SAP HANA installation requirements. Hardware components important for sizing point of view are CPU, memory (RAM) and hard disk. The most crucial task in sizing is to estimate the size of the server best suited for the business user's requirements.

In SAP HANA, we can perform sizing in three ways:

- Using Quick Sizer tool
- Using DB script
- Using ABAP report

24) What are row and column storage in SAP HANA?

Ans:

Data in the SAP HANA database stores in two ways;

- Row storage
- Column storage.

Row storage is the method of storing data in a horizontal fashion. It is similar to how data is stored traditionally in disk databases. However, there is one main difference between the SAP HANA row storage and traditional row storage. That is, in SAP HANA, data is stored in rows in the main memory and in traditional databases, data is stored in rows in the disk storage.

Column storage method stores data in a columnar fashion (linear/ vertical). Data is compressed efficiently in column stores. It improves SAP HANA's performance by optimizing both the read and write operations on data. Data is stored in the column storage area which is divided into two sections; Main storage and Delta Storage.

25) What are the different perspectives in SAP HANA Studio?

Ans:

The SAP HANA Studio contains different perspectives which we can choose to work on. Some commonly used perspectives are:

- SAP HANA Administration Console
- SAP HANA Modeler
- Application Development
- Lifecycle Management
- SAP HANA Development
- ABAP
- BW Modelling

26) What is SAP HANA System Monitor?

Ans:

Using the system monitor in SAP HANA Studio, we can administer and monitor the system's health and availability of SAP HANA components. Also, using the system monitor, we can access the system's details and configurations and the services offered by different SAP HANA components.

We can monitor several aspects through the SAP HANA system monitor such as the alerts, disk space, log disks, trace disk, data disk, memory, performance, volume, etc. Thus, it is convenient to manage individual aspects, tasks, and components.

27) What all administrative operations can we achieve from the Administration Console?

Ans:

A number of administrative tasks can be performed in the SAP HANA Studio such as; regulating (start/stop) services, monitoring the system, audit policy, and security configuration, user management and authorization, backup and recovery, memory management, license management, alerts and messages, etc.

All of these tasks can be performed from different tabs present in the administration console of SAP HANA Studio such as:

- Overview (monitor and general management)
- Alerts (position and view the details of the alerts)
- Performance (evaluates the performance of the system for the activities happening in the database)
- System Information (access system information files and queries)
- Landscape (check of all running services)
- Volumes (details of the logs and data volumes)
- Trace Configuration (includes the traces set up information)
- Configuration (includes the information on system configuration files)
- Diagnosis Files (includes the system log files)

28) What is SAP HANA Information Modeler?

Ans:

Information Modeler lets us design information views or models on top of SAP HANA database using tables in it. Such models are created to serve a business logic and operation. They are generated directly on top of the HANA database layer. The information modeler provides the interface and tools to select attributes and measures from the database tables so that the user can create multiple information views using the physical tables of transactional data stored in the databases. The information views are a logical representation of the data which can be further published or consumed for analytical purposes. Information modelling implements on the SAP HANA Modeler perspective of SAP HANA Studio.

29) What is the difference between Information Modeler and Information Composer?

Ans:

The two differ from each other based on target users. SAP HANA Information Modeler is for technical users with extensive data modelling requirements and technical knowledge. They can perform a range of advanced operations related to modelling such as creating attribute views, analytic views, calculation views, processing models, data management and administration, data loading and import/export tables.

Whereas, information composer is made for non-technical users who are not IT and data science experts (with no database or modelling knowledge). The information composer is so designed that it aids non-technical users with user-friendly interface, animations, hints, and suggestions for modelling and reporting.

30) What are the three types of information views?

Ans:

The three types of information views are:

- Attribute view

Attribute view uses attributes, or the non-measurable, non-quantifiable data to design views and models according to the business logic. Thus, the data used in attribute view is referred to as 'Master data' as it is used as reference information in other views (analytic and calculation). The tables in attribute view do not contain any facts or measure.

- Analytic view

In an analytic view, we can create star schemas, having a central transaction or fact table and multiple dimension tables linked to it via primary keys. The measures are contained only in the central transaction table which can be grouped or joined with multiple dimension tables.

- Calculation view

Calculation view is an advanced model which uses both attribute and analytic view elements in it to make a complex data model following complex business logic.

It gives us the freedom to combine and create from a range of options like tables, column views, analytic views, attribute view, etc. It enables us to do multidimensional reporting using measures and dimensions from different sources.

31) What are the types of SAP HANA engines?

Ans:

There are three types of SAP HANA engines:

- Join Engine: We use the join engine every time an attribute view is created or used, or a join condition is applied in a native SQL command.
- OLAP Engine: We use the OLAP engine in the creation of analytic views. We use it only when attributes are used in the analytical view and no calculation is done. If operations like calculations, counters, restricted measures are used then other engines like a calculation engine is used along with the OLAP engine.
- Calculation Engine: We use the calculation engine in calculation along with being used in other views like analytical and attribute view whenever they apply complex logic and calculation operations.

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The persistence layer in SAP HANA handles all logging operations and transactions for secured backup and data restoring. This layer manages data stored in both rows and columns and provides steady savepoints. Built on the concept of persistence layer of SAP's relational database, it ensures successful data restores.
Besides managing log data on the disk, HANA's persistence layer allows read and write data operations via all storage interfaces.

39) Explain What Is Schema Mapping In Sap Hana ?

Ans:

Schema mapping is done when the physical schema in the target system is not the same as the physical schema in the source system. As mentioned earlier, suppose we are moving components from Development System (DEV) to Production System (PROD).

The tables in DEV reside in DEV_SCHEMA and the same tables reside in PROD system in PROD_SCHEMA schema. If an attribute view is transported from DEV to PROD, it will not work because the schema name is referenced in the definition of attribute view. In order for the promoted objects to work in PROD, schema mapping needs to be set up in the target system.

40) What Are System Requirements For Sap Hana?

Ans:

Java JRE 1.6 or 1.7 must be installed to run the SAP HANA studio. The Java runtime must be specified in the PATH variable. Make sure to choose the correct Java variant for installation of SAP HANA studio:

32-bit installation, choose a 32-bit Java variant.

For a 64-bit installation, choose a 64-bit Java variant.

41) What Is A Delivery Unit In Sap Hana?

Ans:

Delivery unit (DU) is a container used by the Life Cycle Manager (LCM) to transport repository objects between the SAP HANA systems.

The name of Delivery Unit must contain only capital letters (A-Z), digits (0-9) and underscores (_).

42) Why To Configure Import Server In Sap Hana ?

Ans:

In order to load data from external sources to SAP HANA we need to establish a connection with the server. To connect, we need to provide details of Business Objects Data Services repository and ODBC drivers. Once the connection is established, we can import the tables definition and then load data into table definition.

43) Explain The Column And Row Store In Hana?

Ans:

- HANA supports both type of data store in database.
- Row store is used when you need to use Select statement and no aggregations are performed.
- Column store is used to perform aggregations and HANA Modelling is supported only on Column based tables.

44) What Are The Different License Keys Types In Hana System? What Is Their Validity?

Ans:

- Temporary License key
- Permanent License Key

Temporary License key:

- Temporary License keys are automatically installed when you install the HANA database.
- These keys are valid only for 90 days and you should request permanent license keys from SAP market place before expiry of this 90 days period after installation.

Permanent License Key:

- Permanent License keys are valid till the predefine expiration date.
- License keys specify amount of memory licensed to target HANA installation.

45) What Is The Difference Between Catalog And Content Tab?

Ans:

Catalog: This contains RDBMS objects like schemas, tables, views, procedures, etc.

you can open SQL editor and design database objects.

Content tab: This is used to maintain design time repository. You can create new packages and design Information views in HANA system. Various views can be created under content tab to meet business requirement and to perform analytical reports on the top of the Modelling views.

46) What Are The Advantages Of Attribute View?

Ans:

- Attribute View act as Master data context, which provides Text or Description for Key/Non-key field.
- Attribute View can be reuse in Analytic View and Calculation View.
- Attributes View is used to select a subset of columns and rows from a database table.
- Attributes (fields) can be calculated from multiple table fields.
- There is no measure and aggregation option.

47) Which Engine Is Used To Create Attribute View?

Ans:

- Join engine is used to create attribute view
- This engine is used when we execute any Attribute View in HANA or run native SQL on more than one table with join condition.
- If there are any calculations involved either in Attribute View or in native SQL then Join Engine will use Calculation Engine for calculations or fetch the result.

48) What Are The Different Types Of Nodes In Calculation View?

Ans:

Different types of nodes, they are:

Join: This node is used to join two source objects and pass the result to the next node. The join types can be inner, left outer, right outer and text join.Note: We can only add two source objects to a join node.

Union: This is used to perform union all operation between multiple sources. The source can be n number of objects.

Projection: This is used to select columns, filter the data and create additional columns before we use it in next nodes like a union, aggregation and rank.

Aggregation: This is used to perform aggregation on specific columns based on the selected attributes.

Rank: This is the exact replacement for RANK function in SQL. We can define the partition and order by clause based on the requirement.

49) What Is Calculation View With Star Join?

Ans:

Calculation View with Star Join :

- It does not allow base column tables, Attribute Views or Analytic views to add at data foundation.
- All Dimension tables must be changed to Dimension Calculation views to use in Star Join.
- All Fact tables can be added and can use default nodes in Calculation View.

50) Which Engine Is Used To Create Analytic View?

Ans:

- This engine will be called in the backend whenever we run any queries on Analytic Views in SAP HANA.
- If there are no additional calculations performed like calculated columns, restricted measures and counters, then everything will be processed in OLAP Engine.
- OLAP Engine acts as join engine for those Attribute Views used in Analytic Views, without any calculated columns
- All the join engine work will be converted into 'BwPopJoin' which is part of OLAP Engine.
- If there are any calculations present, to be performed then Calculation engine will be used along with OLAP Engine.

51) Tell Something You Know About Normalization And De-normalization?

Ans:

Normalization is nothing but the process that is adopted for the purpose or removing the redundant data from the database. This is generally done by splitting the table into different sections. This actually makes sure of integrity. On the other side, the de-normalization is the process of considering the redundant data so that all the queries which are complex can be enhanced in terms of overall performance.

52) What Sort Of Advantages Do Businesses Have With Effective Database Management?

Ans:

- By data managing the users are free to derive results that can be considered for the long run
- A lot of difficulties related to data can be avoided easily
- The data can be managed in sections and can be accessed easily
- Well managed data is useful in designing reports, preparing documents and assisting various departments in other tasks.

53) What Exactly Is The Significance Of Persistence Layer In Sap Hana?

Ans:

It is actually an important later in SAP HANA which plays a very important role. Actually, HANA has a computing engine built inside and the users have to utilize the data directly without taking any backup. The same can create an issue during powerful failure and thus it is necessary to keep a backup of the same. This layer comes as a savior and it make sure no loss of data during such a situation.

54) What Are The Benefits That Sql Can Bring For You?

Ans:

If the queries in the SQL are simple, the users are free to retrieve a very large sum of data very easily from the system. Another good thing about SQL is it is very easy to learn and implement. There is a vast support available for SQL and all the queries can be addressed reliably. Using SQL, the database can be managed very easily and in fact without considering a large amount of coding

55) What Is The Best Way To Manage, Operate, And Monitor Sap Hana Systems?

Ans:

Sap Hana is a young database with interesting features of SAP HANA. First of all Sap Hana is an in-memory database. It is accessible for administration via various channels. Directly from the Server, It is not the most convenient method but you can use hdbsql to manage databases. With the web-based interface Hana cockpit, you can browse and manage sap hana environments. The Client Hana Studio is the complete tool to administer Sap Hana but it has to be physically installed and therefore is dependent on the client hardware.

56) How To Secure A Sap Hana User Connexion?

Ans:

A Sap Hana database user is protected in the first place with a password. However, a password is very often required at the command line in order to connect and execute a batch or an SQL script. The username and password are then visible to anyone. In order to avoid that situation, it is possible to create a special key in relation to a particular user. Username and password are then invisible via the use of that key.

57) Compare SAP HANA and BWA (Business Warehouse Accelerator). Also, state how is SAP HANA working currently ?

Ans:

BWA or (Business Warehouse Accelerator): BWA is known as an in-memory accelerator for Business Warehouse (BW). The main focus of BWA is on improving the query performance of SAP Net Weaver BW. BWA is particularly designed to accelerate BW queries and also for reducing the data acquisition time by persisting the copies of the info cube.

SAP HANA: SAP HANA is an in-memory database. It is a platform where high-performance analytic reports and application is found. Another thing to notice here is that in SAP HANA data can be loaded from SAP and non-SAP Source System through SLT, BODS, DXC, and Sybase. This can be viewed using SAP BO/BI, Crystal Reports or Excel.

Currently, SAP HANA is working as an in-memory database for SAP BW. And now SAP HANA is able to improve the overall performance of SAP Net weaver BW.

58) What are the types of Relational Data stored in HANA?

Ans:

There are two types of relational data stored in HANA. They are:

- Row Store
- Column Store

59) Mention the different compression techniques in SAP HANA?

Ans:

There are three different compression techniques in SAP HANA and they are:

- Run-length encoding.
- Cluster encoding.
- Dictionary encoding.

60) What do you mean by latency?

Ans:

Latency is the length of time required to replicate data from the original system to the new system i.e. from the source system to the targeted system.

70) What happens when the replication is suspended for a long period of SLT or HANA system?

Ans :When the replication is suspended for a longer period of time of SLT or HANA system then the actual size of the logging tables increases.

61) Explain how the SQL statement is processed?

Ans:

In the HANA database, each SQL statement is basically implemented in the reference of the transaction. Therefore in the further process, the new session is allotted to a new transaction.

62) What is the reason for going In-memory?

Ans:

One reason is the number of CPU cycles per second is increasing and the cost of processors is decreasing. For managing the data in memory, there is five-minute rule which is based on the suggestion that it costs more to wait for the data to be fetched from disk than it costs to keep data in memory so it depends on how often you fetch the data.

For example there is a table and no matter how large it is and this table is touched by a query at least once every 55 minutes, it is less expensive (in hardware costs) to keep it in memory than to read it from memory and if it is frequently accessed it is less expensive to store it in memory.

63) What is a Five-minute rule?

Ans:

It is a rule of thumb for deciding whether a data item should be kept in memory, or stored on disk and read back into memory when required. The rule is “randomly accessed disk pages of cache are re-used every 5 minutes”.

64) Is it possible to join tables of row-based with column-based tables?

Ans:

Yes

65) Are column-based tables always the better choice than row-based tables?

Ans:

No. There are also situations in which row based tables are advantageous.

66) Why materialized aggregates are not required?

Ans:

With a scanning speed of several gigabytes per millisecond, in-memory column stores, make it possible to calculate aggregates on large amounts of data on the fly with high performance. This is expected to eliminate the need for materialized aggregates in many cases.

67) What are the advantages of Eliminating materialized aggregates?

Ans:

No additional tables for storing aggregate results means:

Simplified data model

Simplified application logic

Higher level of concurrency and

With the fly Aggregation we have aggregated values up to date

68) What is parallelization?

Ans:

Column-based storage makes it easy to execute operations in parallel using multiple processor cores. In a column store data is already vertically partitioned means that operations

on different columns can easily be processed in parallel. If multiple columns need to be searched or aggregated, each of these operations can be assigned to a different processor core. In addition operations on one column can be parallelized by partitioning the column into multiple sections that can be processed by different processor cores (core 3 and 4 below).

69) Is it possible to load and replicate data from one source system to multiple target database schemas of HANA system?

Ans:

Yes. It is possible for up to 4.

70) Is it possible to specify the type of data load and replication?

Ans:

Yes either in real time, or scheduled by time or by interval.

71) What happens when you set-up a new configuration?

Ans:

The database connection is automatically created along with GUID and Mass transfer id (MT_ID).

A schema GUID ensures that configurations with the same schema name can be created.

The Mass transfer ID is used in the naming of SLT jobs and the system can uniquely identify a schema.

72) What factors influence the change/increase the number of jobs?

Ans:

Number of configurations managed by the SLT replication server

Number of tables to be loaded/replicated for each configuration

Expected speed of initial load

Expected replication latency time. As a rule of thumb, one BDG job should be used for each 10 tables in replication to achieve acceptable latency times.

73) If you set the parameter "data transfer jobs" to 04 in a configuration "SCHEMA1", a mass transfer ID 001 is assigned. Then what jobs should be in the system?

Ans:

1 Master job (IUUC_MONITOR_SCHEMA1)

1 Master Controller job (IUUC_REPL_CNTR_001_0001)

At most 4 parallel jobs for MT_ID 001 (DTL_MT_DATA_LOAD_001_ 01/~02/~03/~04)

Performance: If lots of tables are selected for load / replication at the same time, it may happen that there are not enough background jobs available to start the load procedure for all tables immediately. In this case you can increase the number of initial load jobs, otherwise tables will be handled sequentially.

For tables with large volume of data, you can use the transaction "Advanced Replication Settings (IUUC_REPL_CONT)" to further optimize the load and replication procedure for dedicated tables.

74) What are the different replication scenarios?

Ans:

Load, Replicate, Stop, Suspend and Resume.

Before you select any application table, the initial load of the tables DD02L, DD02T & DD08L must be completed as they contain the metadata information.

Load: Starts an initial load of replication data from the source system. The procedure is a one-time event. After it is completed, further changes to the source system database will not be replicated.

For the initial load procedure, neither database triggers nor logging tables are created in the source system. Default settings use reading type 3 (DB_SETGET) with up to 3 background jobs in parallel to load tables in parallel or subsequently into the HANA system.

Replicate: Combines an initial load procedure and the subsequent replication procedure (real time or scheduled).

Before the initial load procedure will start, database trigger and related logging table are created for each table in the source system as well as in SLT replication server.

Stop Replication: Stops any current load or replication process of a table.

The stop function will remove the database trigger and related logging tables completely. Only use this function if you do want to continue a selected table otherwise you must initially load the table again to ensure data consistency.

Suspend: Pauses a table from a running replication. The database trigger will not be deleted from the source system. The recording of changes will continue and related information is stored in the related logging tables in the source system.

If you suspend tables for a long time the size of logging tables may increase and adjust the table space if required.

Resume: Restarts the application for a suspended table. The previous suspended replication will be resumed (no new initial load required).

75) What happens if the replication is suspended for a long period of time or system outage of SLT or HANA system?

Ans:

The size of the logging tables increases.

76) Maximum number of tables in a schema?

Ans:

131072

77) What can be the maximum table name length?

Ans:

127 characters

78) What can be the maximum column name length?

Ans:

127 characters

79) What can be the maximum number of columns in a table?

Ans:

1000

80) What can be the maximum number of columns in a view?

Ans:

1000

81) What can be the maximum number of partitions of a column table?

Ans:

1000

82) What can be the maximum number of rows in each table?

Ans:

Limited by storage size RS: 1TB/sizeof(row)

CS: 2^31 * number of partitions

83) In which table you can get the current system limits?

Ans:

M_SYSTEM_LIMITS

84) Maximum number of jobs you can view the information in the Current tab of Job log?

Ans:

5

85) What happens when you compile the procedure?

Ans:

During compilation, the call to the procedure is rewritten for processing by the calculation engine.

86) What happens when you execute the procedure?

Ans:

It binds the actual parameters to the calculation models generated in the definition phase.

87) What is CE plan operator? What are the different categories?

Ans:

CE plan operator does the data transformation functionality internally and used in definition of functions. It is an alternate to using SQL statements.

Data Source Access operators that bind a column table or a column view to a table variable. (CE_COLUMN_TABLE, CE_JOIN_VIEW, CE_OLAP_VIEW, CE_CALC_VIEW)

Relational operators that allow a user to bypass the SQL processor during evaluation and directly executed in the calculation engine.

(CE_JOIN, CE_LEFT_OUTER_JOIN, CE_RIGHT_OUTER_JOIN, CE_PROJECTION,CE_CALC, CE_AGGREGATION, CE_UNION_ALL)

Special extensions implement, e.g., crucial business functions inside the database kernel.

(CE_VERTICAL_UNION, CE_CONVERSION)

88) What is CE_OLAP_VIEW operator?

Ans:

It return results for an existing OLAP view (also known as Analytical view). It takes the name of OLAP view and an optional list of key figures and dimensions as parameters. The OLAP view is grouped by dimensions and the key figures are aggregated using the default aggregation of the OLAP view.

Example:

```
1.  out = CE_OLAP_VIEW ("OLAP_view",["Dim1", "kf"]);
```

Is equivalent to

```
1.  out = SELECT dim1, SUM(kf) FROM OLAP_view GROUP BY dim1;
```

89) What is Repository?

Ans:

The HANA Repository is storage system for development objects and is built into SAP HANA.

The repository supports Version control, Transport, and Sharing of objects between multiple developers. We can add objects to the repository, update the objects, publish the objects, and compile these objects into runtime objects.

90) What is an Attribute?

Ans:

Attribute represents the descriptive data used in modelling. Example: City, Country, etc.

10) Mention what is the role of master controller job in SAP HANA?

The job is arranged on demand and is responsible for

- Creating database triggers and logging table into the source system
- Creating Synonyms
- Writing new entries in admin tables in SLT server when a table is replicated/loaded

11) Explain what happens if the replication is suspended for a longer period of time or system outage of SLT or HANA system?

If the replication is suspended for a longer period of time, the size of the logging tables increases.

12) Mention what is the role of the transaction manager and session?

The transaction manager co-ordinates database transactions and keeps a record of running and closed transactions. When transaction is rolled back or committed, the transaction manager notifies the involved storage engines about the event so they can run necessary actions.

13) Explain how you can avoid un-necessary logging information from being stored?

You can avoid un-necessary logging information from being stored by pausing the replication by stopping the schema-related jobs.

14) Explain how SQL statement is processed?

In the HANA database, each SQL statement is implemented in the reference of the transaction. New session is allotted to a new transaction.

15) Name various components of SAP HANA?

- **SAP HANA DB**
- **SAP HANA Studio**
- **SAP HANA Appliance**
- **SAP HANA Application Cloud**

HANA Upgrade from HANA 1.0 to 2.0

https://blogs.sap.com/2020/10/23/hana-db-upgrade-to-from-1.0-to-hana-2.0-and-xsa-migration-a-hybrid-approach/