In this chapter, we’ll show you how the book is structured to prepare you for the exam! You’ll explore the architecture of SAP HANA, see the scope and deployment options of SAP S/4HANA, and learn the basic functions of the SAP Fiori user interface (UI).

“SAP HANA, SAP S/4HANA, and SAP Fiori”

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Chapter 1
SAP HANA, SAP S/4HANA, and SAP Fiori

Techniques You’ll Master
- Explain the SAP strategy for digital transformation
- Describe the SAP framework for the digital enterprise
- Understand the role of the SAP Cloud Platform and SAP Leonardo
- Review basic SAP HANA technology
- Describe the scope of financials for SAP S/4HANA
- Choose the relevant deployment option for SAP S/4HANA
- Explain the SAP Fiori design pillars
- Use the SAP Fiori launchpad
- Describe the basic SAP Fiori application types
In this chapter, we’ll explore the architecture of SAP HANA, describe the scope and deployment options of SAP S/4HANA, and discuss the basic functions of the SAP Fiori user interface (UI).

**Real-World Scenario**

As a consultant, you need to understand the underlying architecture that the SAP S/4HANA system is built on. SAP HANA is at the core of the SAP strategy, and you need to feel comfortable explaining this technology to your customers in simple terms. SAP HANA is a faster database, but there’s more information you should be able to pass on without scaring nontechnical people off. SAP HANA is often perceived as expensive, so understanding technologies such as compression and columnar store on a high level can help you build a case to alter this perception for your potential customers.

The SAP S/4HANA system is a separate product line from the old SAP ERP system. SAP ERP is no longer the default go-to enterprise resource planning (ERP) platform for SAP. This was a huge change and a business decision with quite a large risk for SAP. It has proven to be successful, and more and more customers are persuaded by the true benefits of the new system. But what’s special about it? How difficult is it to adopt? How can customers move to SAP S/4HANA, and do they risk losing the (potentially) millions they have invested in the “old” software? You need to be able to explain the reasons for this move by SAP and what it means for new and existing SAP customers.

Finally, SAP Fiori is the default graphical user interface (GUI) for end users in SAP S/4HANA, so you need to be able to use it with confidence, explain its components, and describe the benefits it brings. Explain the importance of a simple interface with great usability and applications that can be used on a mobile device and on a desktop. You should also have knowledge of how the tile groups, tile catalogues, roles, and users cooperate to form what the user sees on his own SAP Fiori launchpad.

**Objectives of This Portion of the Test**

The purpose of this portion of the certification exam is to test your general knowledge of the SAP HANA, SAP S/4HANA, and SAP Fiori applications. The certification exam expects you to have a good understanding of the following topics:

- Overview of SAP HANA in-memory architecture
- SAP S/4HANA products, and architecture for financials
- Deployment options for SAP S/4HANA
- SAP Fiori launchpad features
- SAP Fiori application types

**Key Concept Refresher**

Digital transformation is motivating innovation in business, and in this section we’ll describe SAP’s intelligent enterprise vision and strategy, as well as show how SAP HANA and SAP S/4HANA are at the core of this strategy. We’ll go over the basic SAP HANA architecture and look at the technology that enables SAP HANA to be the innovation platform of the future for SAP.

In addition, we’ll discuss the SAP S/4HANA solution, deployment options, and system landscape. Finally, we’ll look at the SAP Fiori user experience (UX) and analyze basic generic functions, application types, and administration tools.

**Digital Transformation**

Because the technological world is expanding with unprecedented speed, it’s imperative for businesses to not only catch up with these advances but also use them to their competitive advantage. Computers and software are traditionally considered supportive to business, and digital transformation brings the digital world to the forefront of innovation and makes it a key business driver on its own. Digital transformation in business implies the adoption and use of technologies such as big data, the Internet of Things (IoT), mobile, artificial intelligence (AI), and social media to drive business innovation and growth.

**Intelligent Enterprise Framework**

The effect of digital transformation can be felt across business functions such as marketing, operations, human resources, administration, and so on. It forces organizations and people to rethink and optimize how they execute business...
processes and how they can benefit from adopting automation in their day-to-day activities. SAP is investing heavily to support all facets of the digital enterprise and has adopted a strategic framework to help businesses run while utilizing the cutting edge of enterprise technology.

The SAP strategy for supporting the intelligent enterprise is focused on three key product offerings:

- **Intelligent suite**
  The intelligent suite includes all the SAP applications that support the end-to-end business processes of the enterprise (Figure 1.1).

![Figure 1.1 Intelligent Suite](image)

- **Digital platform**
  The digital platform refers to SAP Cloud Platform, an open business platform for building and delivering business applications. The strategy put forward by SAP is to shift development focus from the core solutions into the SAP Cloud Platform to ensure the greatest flexibility both for SAP and third-party developers while maintaining a lean and stable core.

- **Intelligent technologies**
  The third and final component revolves around the SAP Leonardo offering. SAP Leonardo is a technology framework that combines multiple modern technological tools that can be used to improve applications by providing automation, detection, and prevention capabilities, among others. Some of the key words for SAP Leonardo technologies include artificial intelligence and machine learning, blockchain, data intelligence, big data, Internet of Things, and analytics.

Traditional business applications and ERP software packages aren’t designed to fully support businesses throughout this digital transformation journey. SAP saw this growing gap as an opportunity more than 10 years ago and created SAP HANA to be the core building block of business software that not only supports but drives digital transformation. Today, SAP HANA is at the core of virtually all SAP product development. But what is SAP HANA, and why is it so important?

**SAP HANA Architecture**

In its simplest form, SAP HANA is a database management system. It performs all the expected database functions of storing and retrieving data for applications that sit on top of it, but SAP HANA is unique in how it performs these tasks. In addition, SAP HANA has embedded advanced analytics capabilities such as predictive analytics and text analysis, mining, and search. SAP HANA also offers application development services supporting a variety of programming languages. Finally, SAP HANA offers a slew of data access, administration, and security support services. Clearly, SAP HANA is much more than “just” a really fast database.

Interesting as all the features are, we’ll concentrate on the database architecture. We won’t get too technical, and we’ll keep things in scope both for the certification and the financial accounting associate role. The SAP HANA database has three standout features that work together and make it unique:

- **In-memory database**
  Using RAM to store all data has only even been imagined as a possibility in the past decade or so. Memory is faster than disk storage—in fact, much faster. In best-case-scenario sequential reads, the best solid-state disks today can read data at about 3 GB/s. Modern, fast memory reads, writes, and copies at rates around 60 GB/s. That’s a factor of 20 against best-case-scenario disk drive speed. Of course, this method is more expensive, but these costs usually aren’t prohibitive for enterprises. In addition, the data storage capacities supported aren’t as large, but modern servers can support tens of terabytes of capacity. The memory size limitations aren’t critical in any but the most extreme cases due to the other features of SAP HANA, described in the next list items.

- **Aggressive compression**
  All major databases support compression, but what you save in space, you lose in speed. SAP HANA uses smart techniques to make compression a viable option while sacrificing little speed. You can expect data in an SAP HANA data-
base to be compressed by a factor of 10 on average, meaning neither acquisition cost nor storage capacity is a huge factor. One of the ways SAP HANA avoids losing speed is by inserting only new data rather than editing existing entries; decompressing and recompressing for changing entries is a costly proposition. By only adding entries and appending the old ones, SAP HANA doesn’t go through the compress/decompress cycle. With versioning, the system knows always to read the latest entry for a given data set. This brings us to another major technical difference that allows larger compression, discussed in the next list item.

- **Columnar data storage**
  SAP HANA uses the columnar data store type for two major reasons:
  - Much better compression
  - Faster data retrieval for queries (when only a subset of the full table data set is required)

Column storage also works great for data aggregation (SAP HANA is used for ad hoc aggregation a lot) and parallel processing. Column storage is more commonly found in online analytical processing (OLAP) applications (e.g., business warehouse systems), rather than online transaction processing (OLTP) systems (which a typical ERP system might be considered), for which row storage is considered faster. Although SAP HANA supports both types of tables (developers can decide what works for their use case), the columnar store is where SAP HANA shines.

**Technology Enablers for Success with SAP HANA**
Most databases are designed to work optimally with the technology available at the time of their design. The de facto approach before SAP HANA was for applications to minimize disk access requirements and perform calculations in the code. However, as technology continues to progress, this design is no longer the only way to go. The following are the main technology drivers and trends that led SAP to invest in SAP HANA:

- **Large-volume, extremely high-bandwidth, affordable memory**
  Memory has always been much faster, but 20 years ago, it was inconceivable to be able to purchase and take advantage of the volumes that we can today.

- **New-generation microprocessors with multiple cores and larger optimized caches**
  CPUs can now access data at much higher rates than in the past.

- **Expandable modular data centers**
  Modular data centers now can be expanded by adding servers for more memory and processing power to scale to any new sizing requirements.

- **Cloud computing applications**
  These apps are used more and more by customers as an alternative to investing in on-premise software, even for critical backend components. Customers save on IT costs, and their solution is always up to date. The subscription model makes the cost of ownership more transparent and increases flexibility because the buy-in is smaller.

**SAP S/4HANA**
SAP S/4HANA is the current ERP solution from SAP. As the name implies, it’s optimized for SAP HANA. In fact, unlike all previous ERP solutions from SAP, it will only work on SAP HANA. SAP S/4HANA comprises the SAP S/4HANA Enterprise Management digital core, the component closest in scope to the SAP ERP solution, and various line of business (LoB) solutions, which are generally cloud solutions that are SAP products gained through mergers and acquisitions and that have been and are being optimized to work together as a seamless, integrated solution (Figure 1.2).

**Figure 1.2 SAP S/4HANA: Digital Core**
The following are the main LoB solutions you should be aware of:

- SAP C/4HANA, the customer experience and engagement suite
- SAP SuccessFactors and SAP Fieldglass for human resource management
- SAP Concur for travel management
- SAP Ariba for sourcing and procurement

Now let’s explore the digital core, in which you’ll find the financial components this exam is about. SAP S/4HANA is a new breed of ERP system written specifically with two major goals in mind:

- **Writing code to take advantage of SAP HANA**
  SAP removes architectural redundancies to simplify and speed up the system. New code was developed for the core system architecture that did away with the aggregation tables the old system relied on. The system doesn’t use separate totals tables to store values; instead, totals are calculated on the fly from the line items. The system also did away with the index tables used for reporting because SAP HANA is fast enough to work on the line item level. Indices increase code complexity and have been removed. These are ambitious simplification steps that seem incompatible with the second goal.

- **Safeguarding existing customer investments**
  Writing a completely new logic for the SAP S/4HANA system was and is ambitious, but doing so while maintaining compatibility with custom code written for the previous SAP ERP system seems like it would require some form of witchcraft. However, this is exactly what SAP programmers have managed. The exact description of the mechanism isn’t in scope for this certification, but in a nutshell, SAP HANA compatibility views make it possible to replicate obsolete tables on the fly. In this way, an existing program that, for example, reads data from an index table (that was removed in SAP S/4HANA) can continue to retrieve the data because the system creates an on-the-fly replication of the original table. Another manifestation of this goal is the option SAP offers to customers to transform their SAP ERP systems into SAP S/4HANA systems and continue business as usual without extensive downtimes.

Figure 1.3 shows how data is accessed for traditional applications that use compatibility views and aggregates, along with the simplification achieved from reading directly from line item tables with SAP HANA-optimized apps.

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**Note**

For a little history, the first component of the SAP ERP to be “simplified” through module unification and removal of aggregates was Finance with the introduction of the universal ledger in the SAP Simple Finance 1503 add-on (internally at SAP, this release was referred to as SFIN2.0). The financials-only version of SAP S/4HANA was originally sold as a separate product in parallel to the complete SAP S/4HANA suite, but they have now been consolidated into a single, complete product.

### SAP S/4HANA Deployment Options

There are currently four deployment options for SAP S/4HANA that customers can choose from, as detailed in Table 1.1.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional scope</strong></td>
<td>Core ERP and select LoB processes</td>
<td>Full functional SAP S/4HANA scope</td>
<td>Full functional SAP S/4HANA scope</td>
<td>Full functional S/4HANA scope</td>
</tr>
<tr>
<td><strong>Innovation cycle</strong></td>
<td>Quarterly</td>
<td>Two per year</td>
<td>Annual</td>
<td>Annual</td>
</tr>
</tbody>
</table>

Table 1.1 SAP S/4HANA Deployment Options
For simplicity, and from a functional consultant perspective, you can simplify this to two editions: SAP S/4HANA Cloud (the first column, multitenant edition), for the scope and customizing possibilities are limited; and SAP S/4HANA (the other three columns), which provides the full scope of functionality and configuration flexibility.

**Tip**
SAP naming conventions mandate that when referring to the on-premise editions, the product is SAP S/4HANA. The cloud edition is referred to as SAP S/4HANA Cloud.

**Warning**
The certification and this book focus only on SAP S/4HANA (the on-premise version).

### SAP S/4HANA Adoption

Customers have three major options to start using SAP S/4HANA: a new implementation, system conversion, or landscape transformation. Let’s drill down into these adoption options:

- **New implementation**
  
  In this case, customers can move from their legacy system (SAP ERP or a non-SAP system) and implement SAP S/4HANA from scratch. This scenario is also known as a **greenfield approach**. Customers with older, highly customized ERP solutions might prefer this option to clean up their systems and start over. This option is available for all editions of SAP S/4HANA.

- **System conversion**
  
  This is for customers who want to convert their existing SAP ERP system into an SAP S/4HANA system. The benefit is that customers can move to SAP S/4HANA without a reimplementation and with no major disruption to existing business processes. Once the conversion is completed, customers can gradually update their processes to adapt to SAP S/4HANA and SAP Fiori. This option is available for on-premise and private cloud customers of SAP S/4HANA.

  **Tip**
  The specific tasks required of a financial accounting consultant during a system conversion project are a part of the SAP Certified Application Professional—Financials in SAP S/4HANA certification curriculum. However, this is out of scope for the application associate certification.

- **Landscape transformation**
  
  This adoption method is for customers who want to consolidate their landscapes or to selectively bring data into an SAP S/4HANA system. For example, through Central Finance, customers can take advantage of the features and advantages of the Universal Journal and reporting using the SAP S/4HANA system. In this case, the source systems remain intact and business transactions are still performed in the source systems. Landscape transformation scenarios work on premise and may selectively work with the cloud deployment as well.

### The SAP S/4HANA System Landscape

System landscapes can vary greatly depending on the customer requirements and legacy ERP systems in use. A new installation for SAP S/4HANA would typically require two basic productive systems: the SAP S/4HANA backend server and an SAP Gateway server. The SAP S/4HANA backend is, of course, a required component because without it, there is no ERP system. The SAP Gateway server is where the connections and settings to SAP Fiori are established. You can access both with the traditional SAP GUI. Figure 1.4 shows the **SAP Logon** window with the two system setup we use in SAP Education courses for most SAP S/4HANA Finance courses: **T41** is the backend server, and **T4N** is the gateway server.
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Figure 1.4  SAP Logon Screen with SAP S/4HANA Backend and SAP Gateway Server

Note
SAP Fiori is in theory an optional component of SAP S/4HANA; however, you aren’t taking full advantage of SAP S/4HANA without it and as the product matures and is enhanced, you are utilizing fewer and fewer of the new developments for it.

The SAP Fiori User Interface

SAP Fiori is the common design paradigm for SAP. The SAP Fiori design language affects the look and feel of all things SAP, not only the interface of the new SAP S/4HANA system. SAP recognized that everyday apps are becoming simpler to use and more flexible. Business software needs to keep up with this development or else the disconnect between “work software” and “daily apps” will cause issues in user acceptance, satisfaction, and productivity.

To create apps in SAP Fiori, you use the SAPUI5 framework. This framework is in turn based on the open source OpenUI5 framework, with the addition of a few extra SAP-specific tools. SAPUI5 is an open-source framework; that is, anyone can use it and implement improvements. The main development tools to work with SAPUI5 include HTML5, CSS3, jQuery, and JavaScript. Basing the entire development platform on open standards with general and broad acceptance ensures that a lot of people will be familiar with the tools needed to develop SAP Fiori apps and that the apps have great compatibility with multiple device platforms.

SAP Fiori User Experience Paradigm

The SAP Fiori design and user experience paradigm is built on five principles:

1. Role-based
   Applications should be focused on providing the functionality required for a specific task. Complex screens with infinite selection options and one app for doing everything isn’t the aim.

2. Responsive
   Apps should be usable on multiple devices and be able to adjust their interface to fit the device size, input methods, and so on.

3. Simple
   Apps should not need a manual or special training to be used. The apps should be designed for a single user and use case and require no more than three screens end to end.

4. Coherent
   The design has to be coherent between apps, and users should feel instant familiarity when accessing new apps. Also, apps should be designed with technical coherence as well, meaning they can be ported to other systems and speak the same language.

5. Instant value
   Apps need to be useful immediately, meaning they need to be easy to install, configure, and deploy in your IT landscape. On the user side, the purpose of the apps should be clear, and users should have no problem learning how to use them. Ideally, users who have seen a couple of SAP Fiori apps in action should be able to move on to other apps without needing help or training.

SAP Fiori for SAP S/4HANA

SAP Fiori for SAP S/4HANA refers more specifically to the apps available for the system. The SAP development teams are constantly developing new native applications for SAP Fiori to replace the traditional and usually “busier” SAP GUI apps that SAP S/4HANA inherited. Native applications can also make use of all the exciting new technology available with SAP S/4HANA, such as conversational UI, machine learning, immersive experiences, and the like. SAP S/4HANA Finance has a good head start, and quite a few native applications are already available.

In addition to the native SAP Fiori apps, you can also launch SAP GUI apps from the SAP Fiori launchpad. These apps will be launched in the web browser with an SAP Fiori “look” design theme called Belize (see Figure 1.5). The scope of the SAP ERP apps is huge, and not immediately having to replace everything at once gives SAP some breathing room to create useful and simpler native applications without sacrificing scope coverage. Customers can always develop their own apps as well, and easily adding SAP GUI apps to SAP Fiori allows any legacy custom ABAP apps to work through SAP Fiori.
You can see an example of the SAP Fiori–look classic applications in Figure 1.5. The basic design elements for these apps include:

- A text-based toolbar instead of icons
- All labels right-aligned
- New design icons with common design language
- Condensed table rows
- The SAP Fiori header Back button replacing the in-app navigation controls
- Redesigned tab strips (the active tab highlighting)
- Processing and closing actions moved to the footer of the screen

Tip
SAP GUI apps are referred to by SAP in the new system as SAP S/4HANA classic applications.

SAP Fiori apps fit into one of three categories:

- **Transactional apps**
  Apps used to perform operations such as master record creation and maintenance or posting transactions. For example, the Clear Incoming Payments app, shown in Figure 1.6.

![Figure 1.5 SAP Fiori Look for HTML SAP GUI App](image1)

- **Analytical apps**
  These are detailed reports used to drill down to finer details or “zoom out” to the organization level you need. One of these, Overdue Payables, is shown in Figure 1.7.

- **Factsheet apps**
  Quick overviews of a specific object, with the basic details and even some key performance indicators (KPIs) in one screen. You can often navigate directly via links from one factsheet to another for related objects. Figure 1.8 shows an example of this, the Supplier Invoice Search app.

![Figure 1.6 Transactional Application Example: Clear Incoming Payments](image2)
The SAP Fiori launchpad is the user access point to the system (as shown in Figure 1.9). It’s a customizable web-based interface from which all the apps a user has assigned can be launched. The apps don’t need to be from one specific system; the tiles can launch apps and links for any system that’s connected and compatible.

Let’s explore the important characteristics and functionalities of the SAP Fiori launchpad:

- You access it from a web browser with a fixed URL. The URL can be shared with anyone on the network. If they have a username and password and are authorized, they will be able to log on without further installations of local software (see top of Figure 1.10).
- Apps are displayed as tiles (or, rarely, as text links). The tiles can be static, meaning they have a fixed icon, or active. Active tiles show some important information directly without needing to be clicked on. Active tiles update displayed...
information at customizable periodic intervals and can be helpful to provide a quick status overview for topics of interest, such as open payments, number of open workflow messages, and more. You can see the active tile for the Cumulative Totals app in Figure 1.10.

Advanced search functionality isn’t limited to applications; there is a dropdown list to search for many characteristics. The system will display information for the searched-for object directly in a factsheet, as shown in Figure 1.11.

An end user can customize the apps and app groups displayed in his SAP Fiori launchpad. Selecting the **Edit Home Page** option (shown previously in the **Me** area in Figure 1.9) will allow a user to reposition apps, remove apps, add apps (that the user has access to), move groups, add groups, rename groups, and remove groups completely. A user can at any time reset groups back to their default.

Within most native SAP Fiori apps, and especially for reports, a user has the option to save the current view (with whatever inputs have been made) as a new tile. Clicking on the tile directly from the SAP Fiori home page will execute the app with the settings defined when the tile was created. This is useful, for example, in KPI reports when you want to have easy access to information for a specific combination of characteristic values.

Customers can use their own themes to fully customize the look of the SAP Fiori launchpad. The colors, background, logos, fonts, and so on can all be changed from the SAP-standard-delivered theme. You can design multiple themes, and users can select from among them. All such customizing is done with the UI theme designer, as shown in Figure 1.12.

The user can select the **Settings** option in the **Me** area to display information for his user account, as shown in Figure 1.13. This is also where users select the theme.
and default language and region settings. Under User Profiling, the user can enable customized search (which tracks the user’s activity to tailor search results) and, if enabled, clear the search cache. Finally, the user can set default values proposed by apps for many system attributes, such as company code, plant, planner profile, and so on.

**SAP Fiori Launchpad User Settings**

**SAP Fiori Launchpad Designer**

In SAP S/4HANA, you define roles, which provide authorizations for performing various functions, and then you assign these roles to users. A user can be assigned to multiple roles. SAP delivers a standard set of roles and sample users through best practices content. It’s the same in the SAP Gateway server, but the business roles you assign here contain SAP Fiori tile catalogs and tile groups. Catalogs and groups are assigned to roles, which in turn are assigned to users. This assignment defines which application tiles a user sees on his SAP Fiori launchpad and has authorization to add to groups and launch through the app finder. You can rely on the many SAP-delivered standard catalogs and groups if you don’t want to make changes, or you can use them as a reference for your own. With the SAP launchpad designer, you create the catalogs and the groups for your SAP Fiori launchpad, as shown in Figure 1.14.

SAP Fiori catalogs hold configuration information for apps. Here you maintain names, subtitles, icons, and other options for the more technical settings for your tiles (these are useful to understand, but completely out of scope for this book). After you’ve created a catalog, you assign it to a role (and the role to a user). The application tiles inside the catalog define the applications a user has access to. If a tile is included in an SAP Fiori tile group to which a user is assigned, but the tile isn’t in any of the catalogs assigned, the user won’t be able to see the tile. You’ll need to assign the catalog to the user that the tile is in. You can create as many catalogs as required to meet the needs of end-user roles (see Figure 1.15).
The name of a group and the tiles included in that group are assigned in the SAP Fiori tile group configuration in the SAP Fiori launchpad designer (see Figure 1.16). You can add tiles to the group from many different catalogs, but the user must be assigned to all the relevant catalogs to see and use the tiles. You can select whether the end user will be allowed to change a tile group on his own launchpad or not. Finally, you select whether apps will be displayed as tiles or as links.

**Warning**

If you make changes to SAP-delivered catalogs or groups, these will be overwritten by updated versions of the groups and catalogs provided by SAP. It’s always best to create your own and assign tiles as needed. You can then assign these to your own roles.

### Important Terminology

In this chapter, the following terminology was used:

- **In-memory technology**
  Data storage in RAM instead of in disks to capitalize on lower latency and read/write times. The technology still makes use of disks for historic data and backup purposes.

- **Columnar store**
  Data is stored in columns instead of in the more traditional rows; this allows speedier read performance and greater compression capabilities. The downside is suboptimal transactional processing.

- **SAP S/4HANA**
  The new ERP system from SAP that leverages SAP HANA to simplify the code and data structures. It’s designed to be the digital core for all business applications of the customer and to allow businesses to go digital. It’s offered on premise with a traditional ownership model and in the cloud with a subscription model.

- **SAP Cloud Platform**
  The SAP Cloud Platform is a development and deployment platform that aids the creation of intelligent, integrated, and mobile-ready applications to support business operations.

- **SAP Leonardo**
  SAP Leonardo is a collection of intelligent technologies that can be utilized in conjunction with the SAP Cloud Platform to develop next-generation applications. Relevant technologies include machine learning, Internet of Things, analytics, blockchain, data intelligence, and big data.
SAP Fiori
A new common design paradigm for all SAP applications. The design goal is to make business apps intuitive to use and available on all platforms and devices. SAP Fiori is based on the following design principles: role-based, responsive, simple, coherent, and instant value.

SAP Fiori for SAP S/4HANA
A group of applications that are designed for SAP S/4HANA. There are three basic app types: transactional, analytical, and factsheets.

SAP Gateway server
The server used to connect SAP Fiori to one or more SAP S/4HANA, SAP ERP, SAP Business Warehouse (SAP BW), and other such backend systems. SAP Fiori application configuration is performed here, as well as SAP Fiori user maintenance.

SAP Fiori Launchpad
The end-user interface “cockpit” for SAP Fiori that is accessed through any modern web browser without extra software requirements. It displays several applications in flat, rectangular forms called tiles. The applications available depend on the user’s role and authorizations. The SAP Fiori launchpad offers many Customizing options for the end user, such as theme selection, custom grouping, and displayed application selection.

SAP Fiori launchpad designer
Administrator interface to customize the catalogs and groups available in the system. You define the configuration for SAP Fiori tiles in the Catalog section and for the tiles included in groups in the Group section.

Practice Questions
These practice questions will help you evaluate your understanding of the topics covered in this chapter. The questions shown are similar in nature to those found on the certification examination. Although none of these questions will be found on the exam itself, they will allow you to review your knowledge of the subject. Select the correct answers, and then check the completeness of your answers in the next section. Remember that on the exam, you must select all correct answers and only correct answers to receive credit for the question.

1. Which SAP technological products provide the platform required for SAP to support the digital transformation of an organization? (There are two correct answers.)
   □ A. SAP HANA
   □ B. SAP Leonardo
   □ C. SAP Fiori
   □ D. SAP Cloud Platform

2. Which component of the framework for the intelligent enterprise includes SAP Leonardo?
   □ A. Intelligent suite
   □ B. Digital platform
   □ C. Intelligent technologies
   □ D. Machine learning

3. You want to develop a substantial enhancement for the purchase-to-pay process in your SAP S/4HANA system. Where does SAP recommend you perform this enhancement?
   □ A. SAP Leonardo
   □ B. SAP Fiori
   □ C. SAP Cloud Platform
   □ D. SAP S/4HANA core

4. True or False: SAP S/4HANA (on premise) can be deployed on cloud infrastructure.
   □ A. True
   □ B. False

5. The SAP HANA database relies on which of the following technologies for storing data? (There are three correct answers.)
   □ A. In-memory
   □ B. Aggregation
   □ C. Indexing
   □ D. Columnar store
   □ E. Compression
6. Data in the SAP HANA database is stored in which two ways? (There are two correct answers.)
- A. Random
- B. Vector
- C. Column
- D. Row

7. True or False: In an environment of systems using SAP HANA, you can perform both OLAP and OLTP processing without duplication of the data for the SAP BW and SAP ERP systems.
- A. True
- B. False

8. SAP HANA makes extensive use of which high-speed hardware technology to offer more speed?
- A. Read-only memory
- B. Solid-state drives (SSDs)
- C. Graphics processing units (GPUs)
- D. Multicore CPUs

9. True or False: SAP S/4HANA replaces SAP ERP, and development and support are shifted completely to it.
- A. True
- B. False

10. Which of the following product lines does the SAP S/4HANA system rely on for procurement functions?
- A. SAP Concur
- B. SAP Ariba
- C. SAP SuccessFactors
- D. SAP C/4HANA

11. What technology did SAP leverage to eliminate aggregate tables from the SAP S/4HANA system while maintaining compatibility with many legacy programs?
- A. Columnar store
- B. Compatibility views
- C. Data aging
- D. Indices

12. True or False: Choosing between SAP S/4HANA and SAP S/4HANA Cloud, multitenant edition is also a matter of required scope.
- A. True
- B. False

13. True or False: The only version of the public cloud edition of SAP S/4HANA Cloud a customer can be on is the latest released version.
- A. True
- B. False

14. A user wants to add an application to his SAP Fiori home page but can’t find it in the app finder. What does the admin have to do?
- A. Assign the corresponding SAP Fiori tile group to the user.
- B. Assign the corresponding SAP Fiori tile catalog to the user.
- C. Add the tile to a tile group already assigned to the user.
- D. Add the corresponding tile catalog to the tile group.

15. Where can an SAP Fiori end user change the theme of his SAP Fiori launchpad?
- A. In the Me area of the SAP Fiori launchpad
- B. In the Tile Catalog area of the SAP Fiori launchpad designer
- C. In the Tile Group area of the SAP Fiori launchpad designer
- D. In the UI theme designer
16. True or False: Anyone with an appropriate user name and password can log on to the SAP Fiori launchpad through a web browser.

☐ A. True
☐ B. False

17. What kind of customizations can users make to their SAP Fiori launchpads? (There are two correct answers.)

☐ A. Change the name of tile groups.
☐ B. Create their own tile groups.
☐ C. Change the names of tiles.
☐ D. Change the icons on tiles.

18. Which of the following are SAP Fiori design principles? (There are two correct answers.)

☐ A. Role-based
☐ B. Routine
☐ C. Rational
☐ D. Responsive

19. You use the search in your SAP Fiori launchpad to look up information for a cost center. What kind of app is used for the information shown in the search results?

☐ A. Transactional
☐ B. Factsheet
☐ C. Analytical
☐ D. List

Practice Question Answers and Explanations

1. Correct answers: A, D

SAP HANA is SAP’s default platform to support the digital transformation for businesses. In addition, the SAP Cloud platform provides the infrastructure and tools for developing next-generation applications.

2. Correct answer: C

SAP Leonardo is a collection of technology innovations, so intelligent technologies is the correct answer here. Artificial intelligence, mostly currently through machine learning, is only one of these technologies supported by SAP Leonardo.

3. Correct answer: C

Traditionally, such enhancements are made directly in the core SAP ERP component. This will indeed still work today in your SAP S/4HANA system; however, SAP wants to shift such development to the SAP Cloud Platform. This is part of a strategy to keep the core running lean and as close to standard as possible. The other answers are wrong because SAP Leonardo is a technology framework, which you can use when you develop apps but not to directly build apps on; and SAP Fiori represents the UI level, so you would incorporate SAP Fiori as the default user interface of your enhancement, but it is not where the enhancement is developed.

4. Correct answer: A

True. There is no limitation on the location of the hardware that the on-premise version of SAP S/4HANA is deployed on. A customer can choose (compatible) third-party cloud vendors other than SAP. If a customer chooses to go with SAP as the cloud infrastructure vendor for an “on-premise” SAP S/4HANA deployment, the product is called SAP S/4HANA Cloud, private option; with other vendor infrastructure, it’s just SAP S/4HANA.

5. Correct answers: A, D, E

In-memory is the most obvious answer here; columnar store is the preferred SAP HANA data storage technique; and through compression, SAP HANA manages to cut down on the infrastructure costs and support larger customers. On the other hand, aggregates are supported but should be avoided as the idea is to have all the data at the highest granularity to provide flexible reporting. The same is true for the indices because with SAP HANA, they offer little speed improvement and sacrifice too much in the way of flexibility because they must be predefined and adding reporting characteristics is difficult.

6. Correct answers: C, D

Column store is the preferred method for SAP HANA as discussed because it’s better for reading data. Row storage is preferred by classic databases and is supported fully by SAP HANA.
7. Correct answer: A
   True. SAP HANA was designed to fulfill the goal of combining optimal OLTP and OLAP processing in one database. This simplifies the process of answering questions such as “How did I come up with this number?” and saves on IT resources by requiring fewer systems to support.

8. Correct answer: D
   With many streams of data to process and large requirements for communication between memory and the CPU cache, you can use a lot of CPU cores at the same time. Even though GPUs might seem the most out of place here, they offer tremendous calculation power and are developing faster than CPUs. Although many companies are considering using some of their special characteristics in the business application world, and we might be hearing of more of these exploits in the future, for now, they aren’t used by SAP HANA. SSDs offer a big boost to traditional databases, and because SAP HANA uses disk drives for many non-speed-critical processes (e.g., backup and aged data), they can be used with SAP HANA. Unfortunately, they don’t offer much in the way of improved speed due to the architecture. Read-only memory is irrelevant.

9. Correct answer: B
   False. SAP S/4HANA is the successor to SAP ERP, but it doesn’t replace it. There is still a huge customer base that relies on SAP ERP, and SAP has promised support until 2025 (at the time of publication) for these customers.

10. Correct answer: C
    SAP Ariba is the product that supports the SAP S/4HANA digital core with procurement. SAP Success Factors is for human resources, SAP Concur is for travel management, and SAP C/4HANA supports everything around the customer experience.

11. Correct answer: B
    Compatibility views can be materialized on demand for data in line item tables of the SAP HANA database to support programs that read old aggregate and index tables that are no longer in the system.

12. Correct answer: B
    False. The product scopes still vary with SAP S/4HANA being the more complete solution currently. The SAP S/4HANA Cloud solution is a better fit for new subsidiaries of large enterprises or companies interested in a lean digital core solution that is always up to date with the latest features and functions and that can live with the (decreasing) limitations of the multitenant cloud solution.

13. Correct answer: A
    True. Quarterly updates in the realm of the multitenant public cloud solution are always required. A customer can’t choose to skip a product release cycle because the system is upgraded for all at the same time. All other editions, including SAP S/4HANA Cloud, single-tenant edition give customers more flexibility when selecting their upgrade path and frequency.

14. Correct answer: B
    The SAP Fiori tile catalog defines which tiles a user is authorized to use. If the user isn’t assigned to the right catalog, he won’t see the application tile even if it’s part of a group he is also assigned to.

15. Correct answer: A
    An end user will only typically have access to the SAP Fiori launchpad; other SAP Fiori tools are for admins. The Me area is where users control all changeable settings for their SAP Fiori launchpads, including theme selection.

16. Correct answer: A
    True. No special software needs to be installed; all modern, up-to-date web browsers with HTML5 support will work. In our training system, we recommend using the Google Chrome browser because it seems currently to offer a better speed/compatibility mix.

17. Correct answers: A, B
    Changing the name and look of tiles can only be done in the catalog view of the SAP Fiori launchpad designer. End users can only access the SAP Fiori launchpad where they can manage their tile groups.

18. Correct answers: A, D
    SAP Fiori principles mandate that applications should be role-based, catering to specific tasks performed by specific users. SAP Fiori apps should also be responsive, adjusting their interface to work optimally for different devices.

19. Correct answer: B
    The result will be displayed with a factsheet app, which will provide key facts for the object you searched for. You will have the option to navigate to a transactional app, such as Manage Cost Centers, or an analytical app, such as a cost center report. The List answer option is not an official app type in the SAP Fiori design language.
**Takeaway**

You now have a good overview and understanding of the SAP HANA database. You understand the benefits of the SAP HANA architecture and the technologies that it uses to improve on traditional disk-based databases. You also got an introduction to the SAP intelligent enterprise strategy and new product portfolio that supports it, namely the SAP Cloud Platform and SAP Leonardo (together with SAP HANA, SAP S/4HANA, and the other cloud LoB solutions).

In addition, you got a thorough introduction to SAP S/4HANA, the successor to SAP ERP and the core software required for SAP’s vision of the digital business revolution. You understand the deployment options available and should be able to determine which option best fits a customer’s needs.

Finally, you gained insight into the SAP Fiori design paradigm and what it means specifically for SAP S/4HANA. You learned about the basic SAP Fiori tools and how the tile catalogs and groups control the apps a user sees and can use.

**Summary**

You’ve gained a high-level understanding of SAP HANA, SAP S/4HANA, and SAP Fiori. You can now explain the basic concepts and benefits of these to customers and can propose deployment options. You can also help users with basic SAP Fiori operations.

This chapter is the only one not directly related to financial accounting in SAP S/4HANA, and it’s also the most technical chapter in the book and exam. However, the knowledge here is very important for both new and experienced consultants with no prior experience with SAP S/4HANA.

In the next chapter, we’ll cover general ledger accounting business processes and Customizing, starting first with the description of the core organizational units in financial accounting with SAP S/4HANA.
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