PUBLIC

Upgrading SAP S/4HANA: Why, How, and Best Practices

Version: June 2021

THE BEST RUN SAP

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VERSIONING

Date	Changes
Initial version June 2020	• Initial version of the document
Revision 1 – August 2020	• Incorporating initial feedback • Additional information added re SAP Activate Functional Upgrade roadmap and project plan • Options for downtime optimization expanded • Expanded advice for SAP Fiori, especially for custom apps • Added additional known issues • Expanded advice re available services • Added Learning Journeys and available microlearnings
Revision 2 – June 2021	• Revised content structure • Removal of duplicate content • Additional information about added business value with upgrades • Updated information with respect to latest release SAP S/4HANA 2020 and project experiences • Added several additional chapters based on lessons learned from projects • Additional references for further information and learning

The authors welcome your feedback to improve this guide further. Please email your feedback to Feedback for Upgrading SAP S/4HANA Why, How and Best Practices

1. INTRODUCTION AND MOTIVATION FOR THE UPGRADE

This guide provides lessons learned and best practices for **upgrading from your current SAP S/4HANA release to a higher version** to take advantage of the latest capabilities.

This guide is relevant for **SAP S/4HANA On-Premise** and **SAP S/4HANA Cloud, private edition**.

You will also find advice for those who want to manage the pace of organizational change by running multiple, repeatable **continuous improvement projects** after the upgrade to drive more business value out of their SAP S/4HANA solution over time.

Customer experiences of SAP S/4HANA upgrades confirm that upgrading is a relatively smooth process. **Statistics as of June 2021, show that technical upgrades to higher releases of SAP S/4HANA take an average of 2-6 months** (reported by the SAP S/4HANA Customer Care Program).

This guide complements the official **SAP S/4HANA Upgrade guide** of your chosen target release of SAP S/4HANA, which can be found on the SAP S/4HANA product page, for example: Upgrade Guide for SAP S/4HANA 2020.

Important: You must also refer to the official SAP S/4HANA Upgrade guide of your target SAP S/4HANA release for detailed technical upgrade steps and post upgrade activities for that release.

Fast Track path for this guide - While you will find a lot of knowledge, experiences and recommendations about upgrades in this guide, you can start with the most important chapters to start your initial planning and activities. As you progress through your upgrade, you will find the remaining chapters full of valuable information that will save you missteps and rework. Should you want to start with this fast-track approach, the following diagram outlines the most important chapters and adds up to around half of this document.

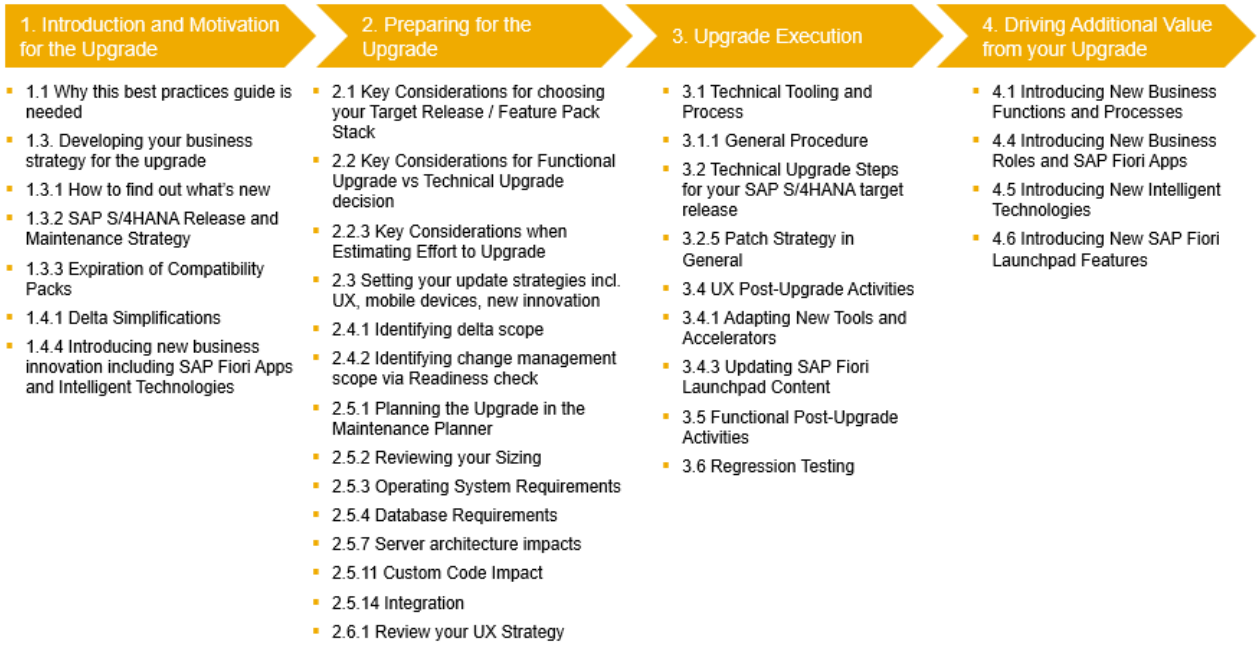


Figure 1- Fast-track most important chapters

You can get a high-level overview of the entire upgrade project in the SAP Activate roadmap SAP S/4HANA Upgrade and Product Integration. Here you find a description of all phases from Discover to Run for the upgrade project and detailed information for all required activities and tasks within the

phases, followed by **How SAP can support** sections containing the SAP service offerings and links to all tools and guides which help to perform the activities.

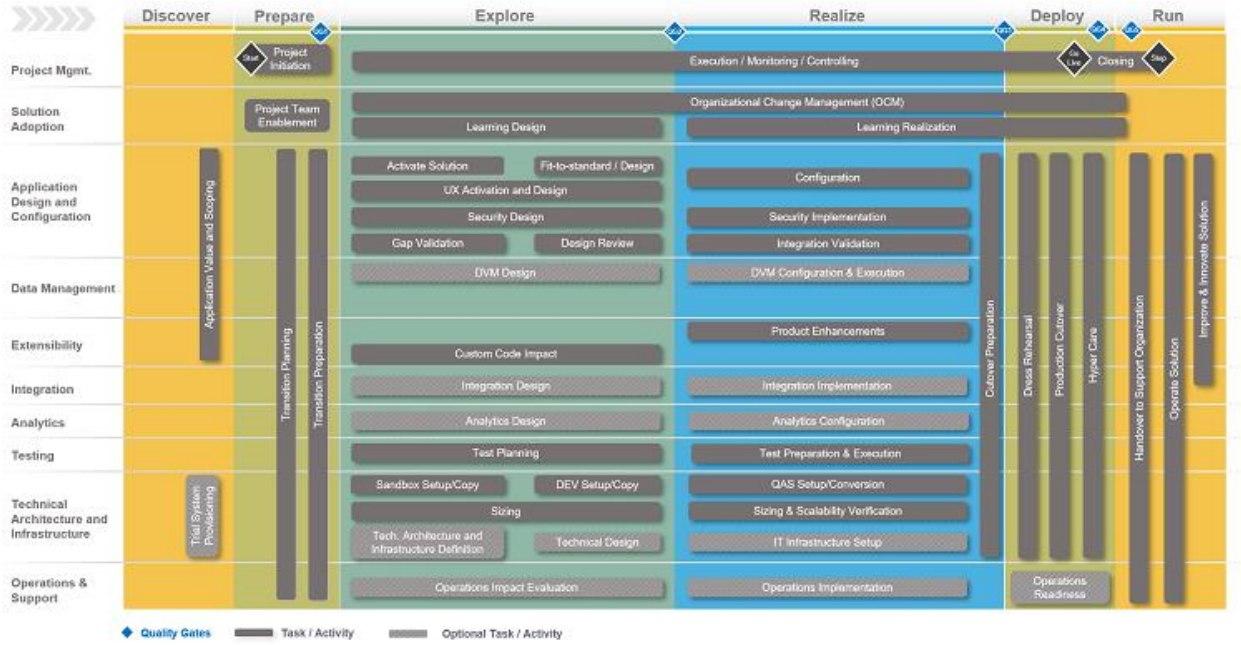


Figure 2 - SAP Activate Roadmap Overview of the Functional Upgrade of SAP S/4HANA

Important: This SAP S/4HANA How, Why and Best Practices Guide is applicable in scenarios where customers are upgrading from a SAP S/4HANA release to a higher S/4HANA release, e.g. from SAP S/4HANA 1610 to 2020.

Migrating from the earlier solution SAP S/4HANA Finance (previously known as SAP Simple Finance) releases 1503 or 1605 is not considered as an SAP S/4HANA upgrade. That solution was an add-on to SAP Business Suite on HANA and is therefore treated as a system conversion. For more details, refer to the SAP Note 2450377 - Conversion of SAP S/4HANA Finance to SAP S/4HANA – Migration Steps for Finance.

1.1. Why this best practices guide is needed

SAP S/4HANA was introduced in 2015 as SAP's strategic Digital Core solution for the Intelligent Enterprise. It was a major shift from the very successful SAP Business Suite to a new future focused solution that took a cloud-first, mobile-first, and intelligent technologies approach to SAP's comprehensive ERP solutions. In each SAP S/4HANA release the capabilities have grown, along with the number of SAP S/4HANA customers.

The first release SAP S/4HANA 1511 has gone out of mainstream maintenance on December 31st, 2020.

Successive releases will reach end of standard 5-year maintenance period in successive years. Several customers who went live on early SAP S/4HANA releases have already upgraded.

This guide brings lessons learned from real customer experiences across many upgrade projects gathered by the SAP S/4HANA Regional Implementation Group, SAP S/4HANA Customer Care Program, SAP Centre of Excellence, SAP Mission Control Center, SAP Enterprise Support and SAP Intelligent Delivery Group.

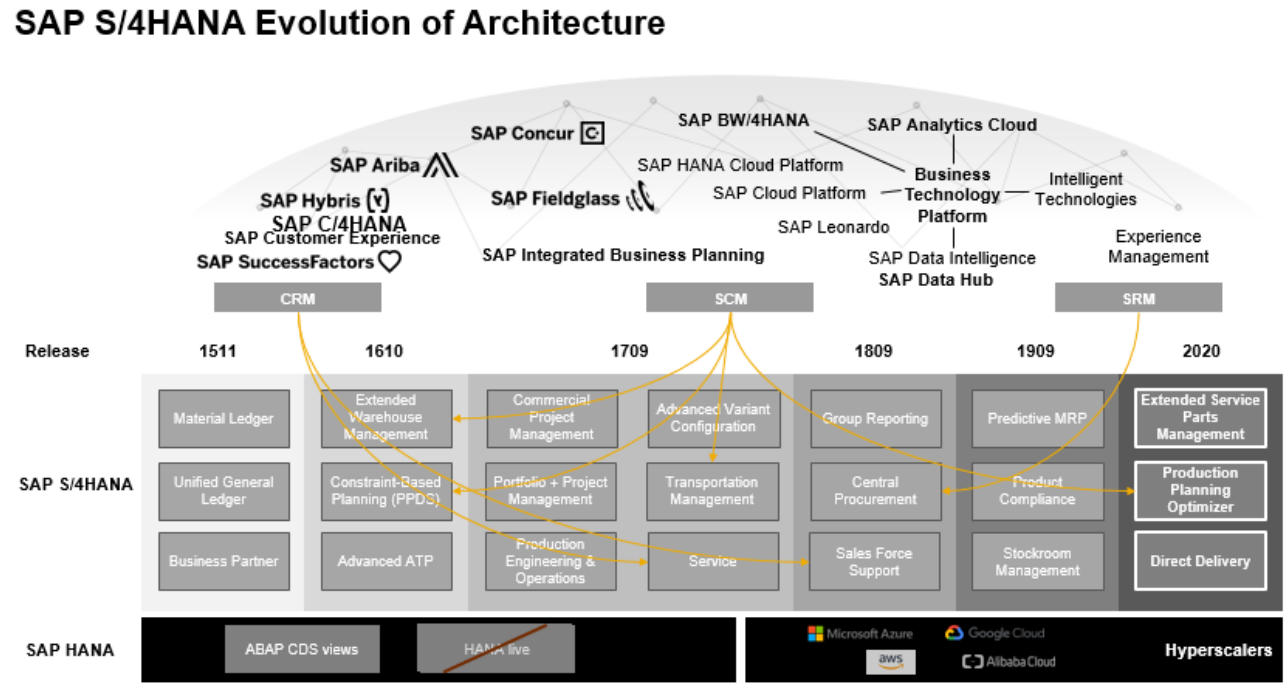


Figure 3 - The evolution of SAP S/4HANA from release 1511 to 2020

1.2. Our most important recommendation – capture your own Lessons Learned

For all SAP customers we expect **upgrades and continuous improvement projects will become a normal part of keeping up with the pace of innovation**.

There is a new release of SAP S/4HANA each year. Business changes quickly and functional requirements may be different in the next upgrade, but with guidance from SAP and your own lessons learned, adopting changes and new SAP S/4HANA innovations will become easier and more routine with experience.

Whether you are executing an upgrade as part of your initial SAP S/4HANA implementation; executing an upgrade after you have been live for some time; or simply executing one of many smaller continuous improvement projects, it is always a good idea to review and capture lessons learned immediately after go-live. This is the time to recognize what has been done right and what could be improved next time.

Depending on your organizational culture, you may even consider a **Centre of Excellence** team to ensure these lessons are captured, communicated, and updated with each project.

Important:

You will notice that the largest chapter in this guide is 2 PREPARING FOR THE UPGRADE.

Provided appropriate preparation and planning has been completed in advance, upgrading is a relatively smooth process. Preparation and planning ensure you have:

- Involved appropriate business and technical stakeholders
- Included appropriate resources and effort estimations in your project plan
- Made informed decisions regarding the scope of the upgrade
- Minimized surprises and associated risks

1.3. Defining your business strategy for the upgrade

The need to upgrade an SAP S/4HANA platform can come from your business or IT departments or both. The identified needs will determine the scope and approach to the upgrade namely – Functional Upgrade or Technical Upgrade.

- A **Technical Upgrade** focuses on minimum mandatory changes, and defers taking advantage of new business value until later **continuous improvement projects**
- A **Functional Upgrade** includes a Technical Upgrade, with added scope to take advantage of at least some new business functionality immediately

Regardless of your chosen upgrade approach, it is usual to introduce further business functionality after upgrade via multiple **continuous improvement projects** over time.

In this chapter you will find the main reasons for upgrade and the driving factors for both types of upgrade. Continuous improvement projects are covered in chapter 4 DRIVING ADDITIONAL VALUE FROM YOUR UPGRADE.

You can also apply for an SAP Innovation and Optimization Pathfinder report, which provides tailor-made recommendations on areas of relevant SAP innovations, business process improvements and IT optimization potentials for your SAP S/4HANA system. This interactive report is available for all customers on SAP Maintenance and provides recommendations that are based on the way you are using your system today, for example:

- Where are areas of business process improvement for my system, and how am I positioned compared to my peers?
- Out of SAP's vast offering of SAP Fiori apps, SAP S/4HANA scenarios or Cloud extensions, which are the most relevant ones, based on my system usage today?
- If you are operating an older SAP S/4HANA release: what are most relevant innovations in the latest SAP S/4HANA release?
- Where are potential areas for IT optimization?
- And, for all the above: how can I best use SAP Services to implement innovations, or optimize business or IT processes? What is suitable from SAP Enterprise Support, SAP Services, SAP S/4HANA Value Assurance Packages etc.?

Refer to:

- SAP Innovation and Optimization Pathfinder
- Pathfinder for SAP S/4HANA Overview
- Pathfinder for SAP S/4HANA Sample Report
- How to apply for a Pathfinder report – video and guide

1.3.1. Drivers for a Technical Upgrade strategy

One driving factor for an SAP S/4HANA Upgrade is to simply stay on a supported SAP S/4HANA release as dictated by the SAP S/4HANA maintenance schedule.

Another driving factor is to replace any classic ERP Compatibility Packs that expire on 31st December 2025 with the alternative new capabilities in SAP S/4HANA.

In addition to the maintenance reasons mentioned above, the key driving factors for the IT department to upgrade the SAP S/4HANA system are to stay current with corrections and security patches that are delivered with new releases, new Feature Package Stacks (FPS), and Support Package Stacks (SPS). Keeping current with updates not only helps stabilize the system, but also improves performance as well as ensures the security of the system.

The pure **Technical Upgrade** approach is more suitable if you are not ready to adopt the functional changes and sets the path for future initiatives to adopt functional changes for added business value via continuous improvement projects.

Even with a pure technical upgrade, you should still take the opportunity to ensure your systems are ready for future continuous improvement projects, e.g. by ensuring your SAP Fiori for SAP S/4HANA architecture is in place.

1.3.2. Drivers for a Functional Upgrade strategy

The primary reason for choosing a **Functional Upgrade** is to drive more value out of your SAP S/4HANA system by taking advantage of new business functionality immediately.

The business need for an upgrade is usually driven by new requirements, for example:

- Providing mobile access for internal and external users
- Digitalizing a feedback process
- Reducing manual effort for payment matching or improving the quality of payment matching

Innovations, new features, and improvements in new SAP S/4HANA releases help realize these requirements and increase business value by demonstrating return on investment (ROI). Depending on your scope there may be significant functional work that happens in this type of upgrade with redesign of business processes. Such efforts are offset by the expected business benefits of change.

The main drivers for functional upgrades are:

- Introduce new business processes or improve existing business processes
- Move from side-by-side to embedded solutions within SAP S/4HANA
- Improve and grow your SAP Fiori User Experience
- Introduce new use cases for intelligent automation and intelligent technologies

Important: These drivers are not exclusive – it is reasonable and expected for a functional upgrade to introduce multiple benefits at once, for example to grow the SAP Fiori user experience so that you can take advantage of new business process features only available in SAP Fiori.

1.3.3. How to find out what's new

You can use the SAP S/4HANA What's New Viewer to quickly identify any new, changed, deprecated, or deleted functionality between SAP S/4HANA source and target releases.

The link to the SAP S/4HANA What's New Viewer is found on the SAP Help Portal product page for SAP S/4HANA. The quick link to get to the product page is https://help.sap.com/s4hana_op.

The What's New Viewer link can be found on the What's New tab.

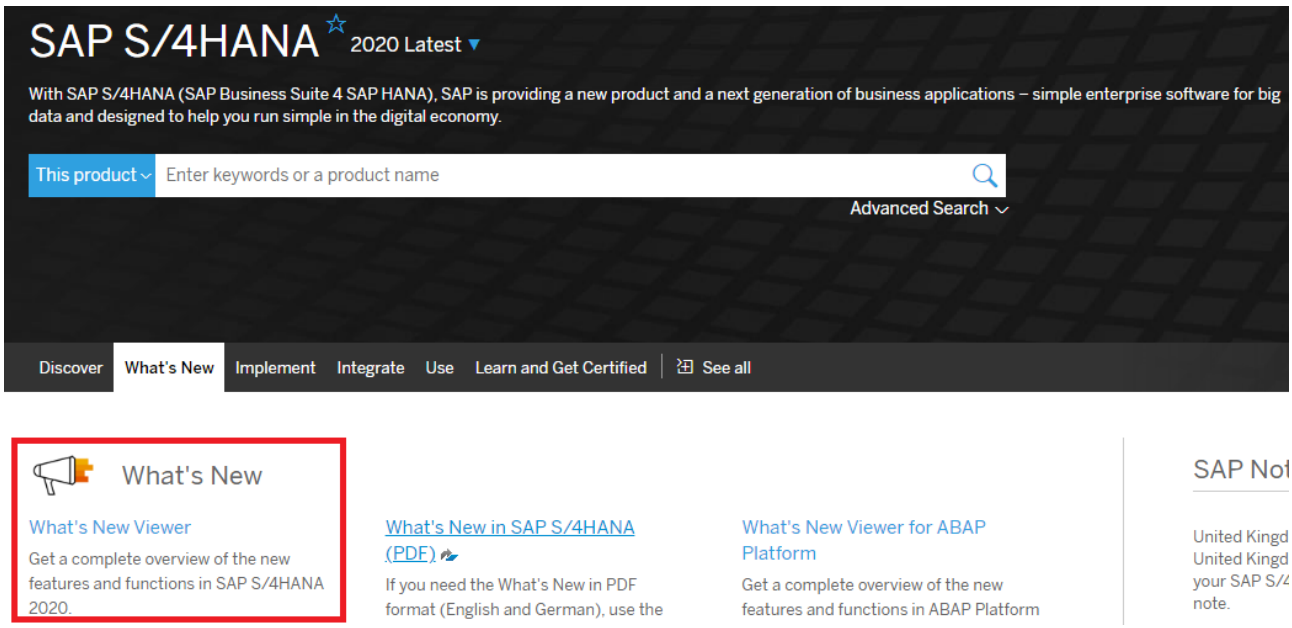


Figure 4 - What's New Viewer for SAP S/4HANA in the SAP Help Portal

In the What's New Viewer you can select the releases and feature pack stacks (FPS) above your source release up to and including your target release/FPS.

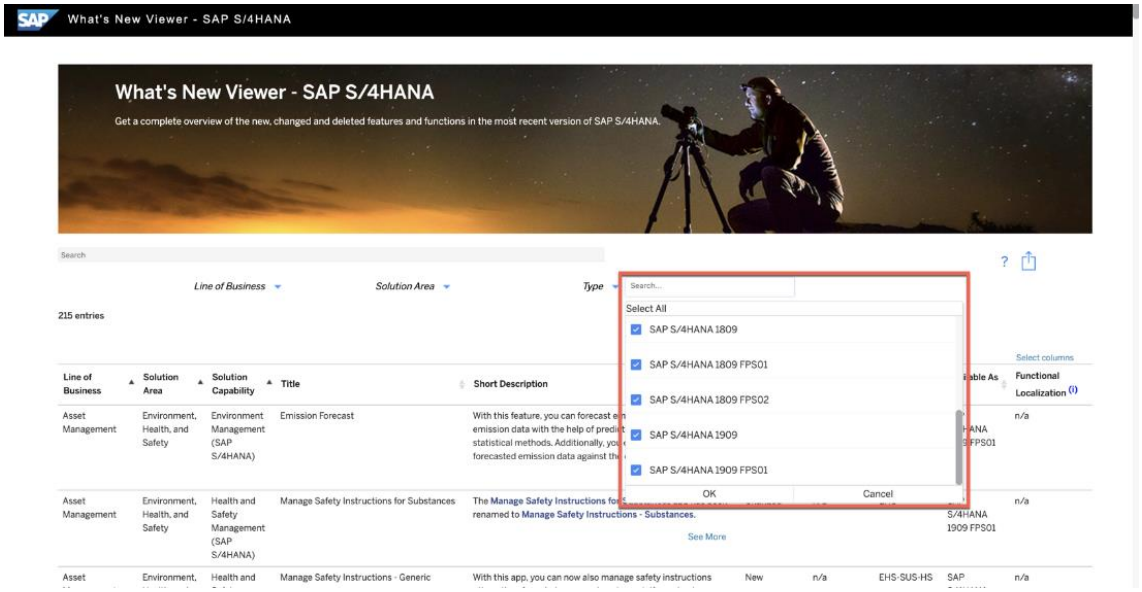


Figure 5 - What's New Viewer - showing selection of SAP S/4HANA releases and feature pack stacks for evaluation

You can further filter on: Line of Business, Solution area, and Type (New, Changed, Deprecated, or Deleted). You can use the free text Search to search for terms such as "Fiori", "report", etc.

Refer to:

- openSAP microlearning video Working with the What's New Viewer in the SAP S/4HANA playlist, Lines of Business Cross-Topics
- Blog Video Series – The Power of SAP S/4HANA

1.3.4. SAP S/4HANA release and maintenance strategy

SAP S/4HANA releases follow a yearly cycle, i.e. every year there is a major on-premise release.

Every release has a five-year mainstream maintenance phase after which it enters the customer-specific maintenance phase. See SAP Note 52505 - Support after end of mainstream maintenance or extended maintenance and/or SAP Maintenance Strategy for a description of all maintenance phases.

The year 2020 marked the first year where one of the SAP S/4HANA releases went out of support. SAP S/4HANA 1511 mainstream maintenance expired on December 31st, 2020. At the end of 2021 SAP S/4HANA 1610 will reach its end of mainstream maintenance. Mainstream maintenance for every subsequent release will end the years following 2021.

Customers who are still running SAP S/4HANA 1610 are strongly advised to start planning the upgrade now.

Refer to the SAP Product Availability Matrix and specific SAP S/4HANA release version information in there.

Usually there is a direct upgrade path available from one SAP release to any other subsequent release, provided the releases are all in mainstream maintenance. However, in some cases, an upgrade to a release that is several releases beyond customer's current release may have to be performed in more than one step which can result in delays and/or incur additional cost.

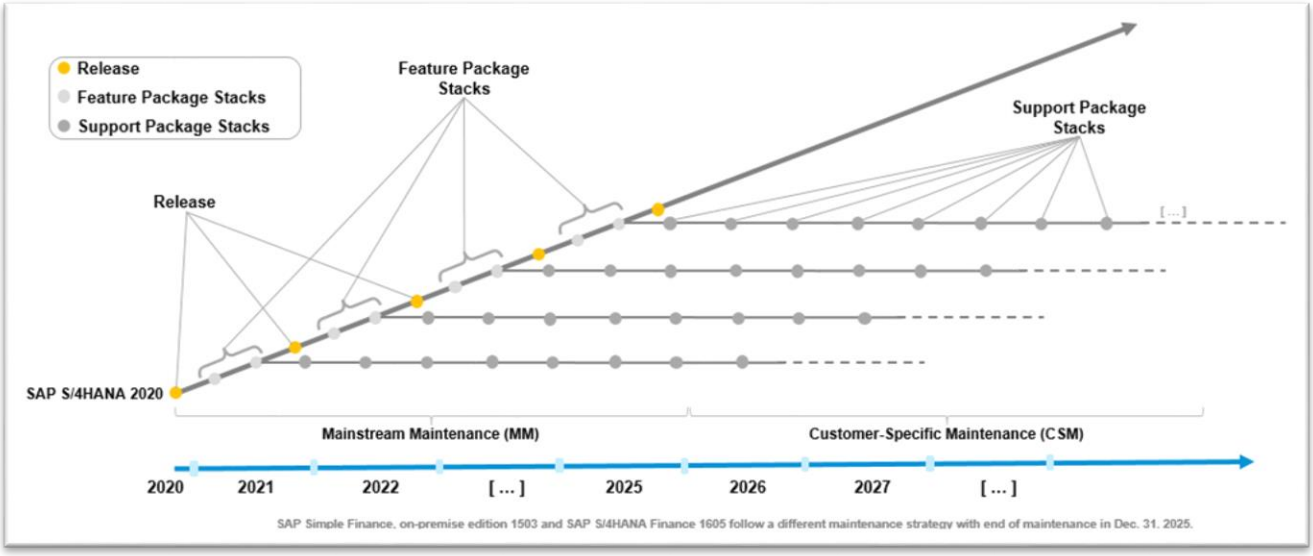


Figure 6 - SAP S/4HANA release and maintenance strategy for calendar years 2020 to 2025

Refer to:

- SAP Release Strategy (PDF)
- SAP S/4HANA Maintenance Strategy (PDF)

1.3.5. Expiration of Compatibility Packs

Some of the classic features in SAP ERP are supported in SAP S/4HANA as Compatibility Packs, listed in the Compatibility Scope Matrix. The usage rights to run these selected classic SAP ERP solutions on SAP S/4HANA expire on December 31st, 2025. This is under the condition that you have licensed the applicable solutions as set forth in your license agreements

Important: The announcement about the extension of maintenance for SAP Business Suite solutions has no influence on the end of compatibility pack use rights - they will be terminated after 2025.

Out of 183 compatibility pack items, only 15 are still in clarification for an alternative.

If you are currently using any Compatibility Pack and an alternative solution has already been provided in SAP S/4HANA, you should adopt it as part of your upgrade.

You can find the alternative solutions listed in the **Compatibility Scope - Way Forward** attachments to SAP Note 2269324 - Compatibility Scope Matrix for SAP S/4HANA on-premise. Refer to the blog post The Future of Compatibility Packs in SAP S/4HANA.

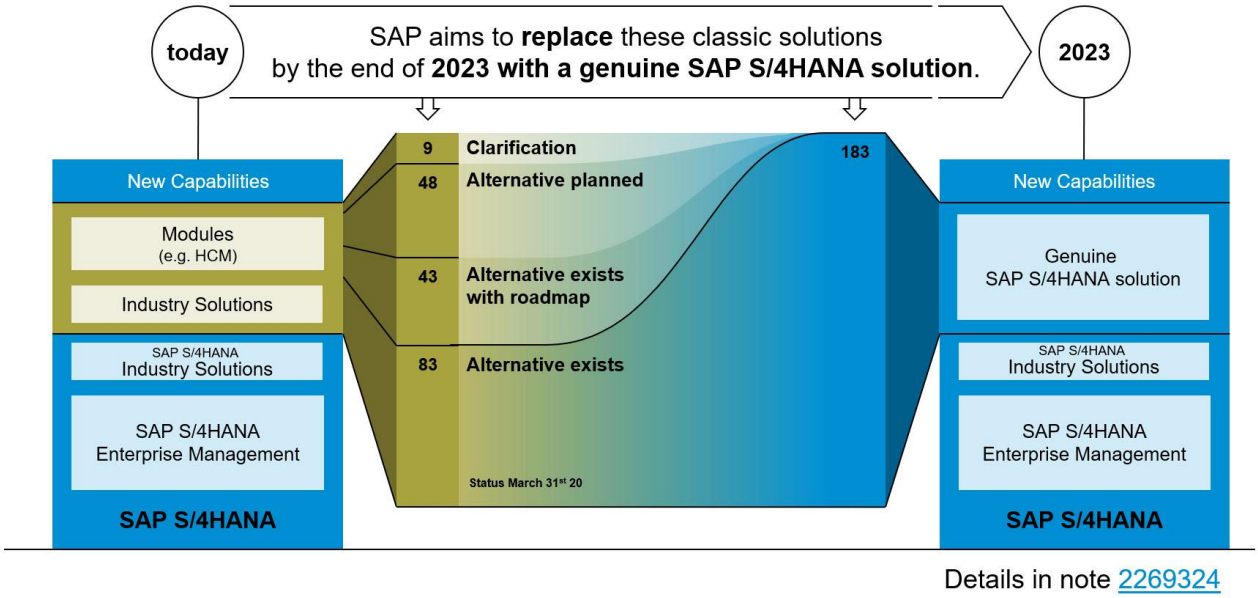


Figure 7 - The Future of Compatibility Packs for SAP S/4HANA

1.4. Business functionality impacts

These are the main areas to review to understand the business impacts:

- Delta simplifications due to the ongoing transformation from SAP Business Suite to SAP S/4HANA
- New and changed functionality in SAP S/4HANA
- Business function activation impacts
- Add-on impacts for SAP S/4HANA releases
- Impacts due to the future of Compatibility Packs

1.4.1. Delta simplifications

Simplifications relate to the ongoing transformation from SAP Business Suite to SAP S/4HANA. Simplifications are significantly reduced for upgrades between SAP S/4HANA releases compared to initial system conversions to SAP S/4HANA, however, some simplifications still apply in an upgrade context and need to be reviewed. Simplifications need to be assessed for:

- SAP S/4HANA
- ABAP

Important: These Simplifications are checked as part of the upgrade process prior to upgrade. Ensure the latest version of SAP Note 2502552 - S4TC - SAP S/4HANA Conversion & Upgrade new Simplification Item Checks has been applied to your source (as-is) SAP S/4HANA release.

Delta simplifications between SAP S/4HANA source and target releases can be found in the SAP Simplification Catalog at https://launchpad.support.sap.com/#/sic/overview. The simplification catalog contains all simplifications including SAP S/4HANA and ABAP. The related SAP Notes explaining the simplifications have the title prefix:

- S4TWL for SAP S/4HANA simplifications
- ABAPTWL for ABAP simplifications

Within the Simplification Catalog, to identify delta simplifications, set the following filter criteria:

- Source Validity (Prod) = your source SAP S/4HANA release e.g. 1709
- Source Validity (Stack) = your source SAP S/4HANA release FPS or SPS stack, e.g. Initial Shipment Stack
- Target Validity (Prod) = your target SAP S/4HANA release e.g. 2020
- Target Validity (Stack) = your target SAP S/4HANA release FPS or SPS, e.g. 01 for FPS01

An example of filtering in the SAP Simplification Catalog is shown below.

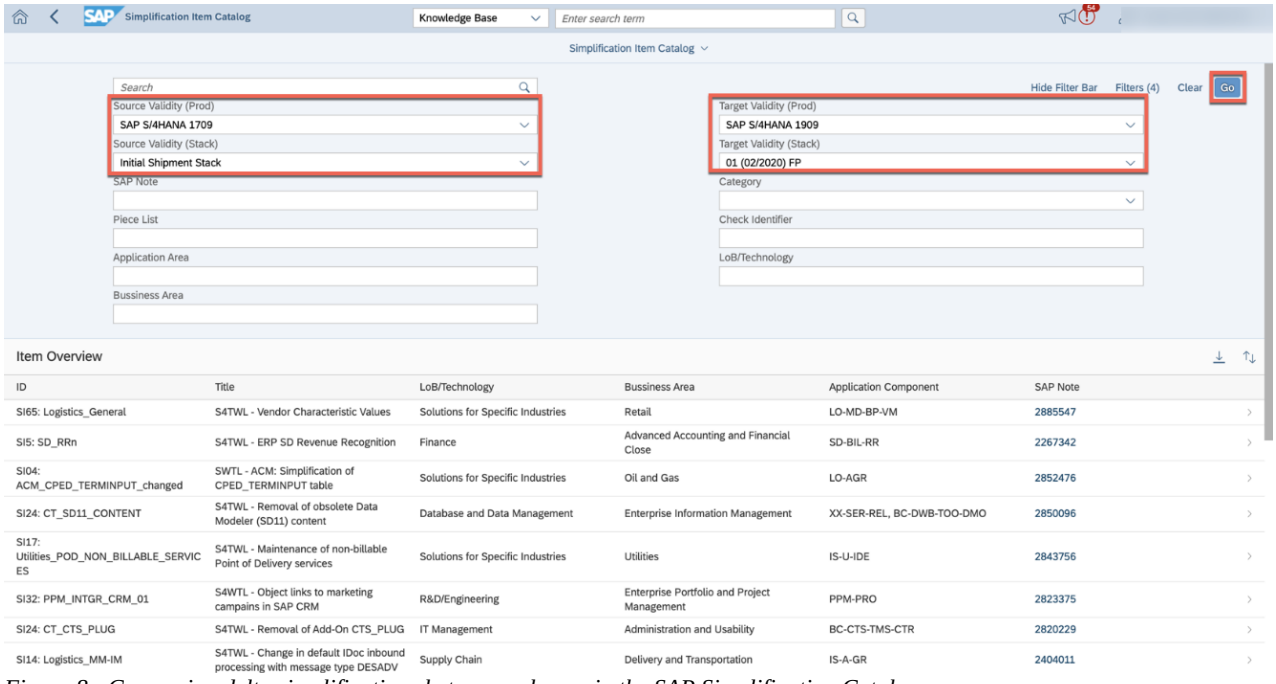


Figure 8 - Comparing delta simplifications between releases in the SAP Simplification Catalog

You can filter on additional criteria such as: LoB/Technology or Business Area. The category filter can be used to identify whether this is a change of existing functionality or impacted by the roadmap.

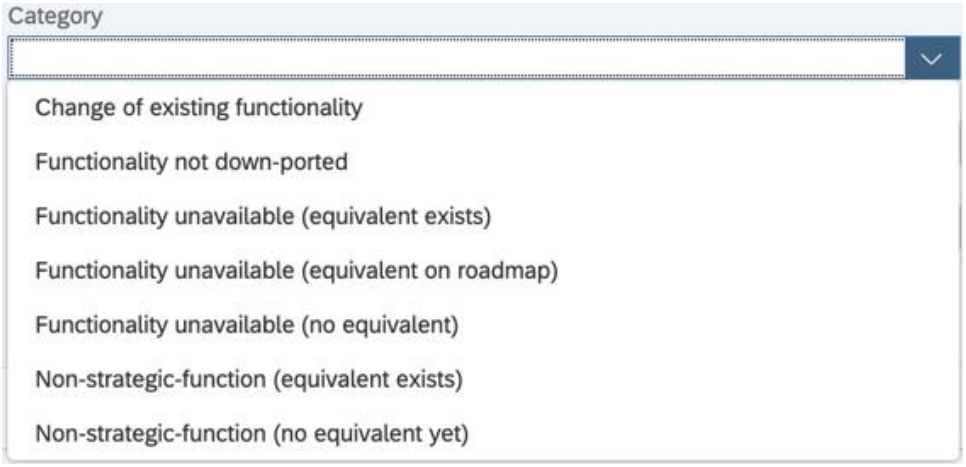


Figure 9 - Simplification categories

You can also use the free text Search to search for terms such as ACR, ABAP, etc.

Once you have found the relevant items, select the SAP Note listed in the SAP Note column for a detailed description of the change and its business impacts.

Alternatively, you can use the target release Simplification List PDF on the SAP S/4HANA product page in the SAP Help Portal – and visually compare with your source release Simplification List PDF.

Refer to:

- SAP Note 2502552 - S4TC - SAP S/4HANA Conversion & Upgrade new Simplification Item Checks
- openSAP microlearning video Finding Delta Simplifications between SAP S/4HANA releases in the SAP S/4HANA playlist, Lines of Business Cross-Topics

1.4.2. Business function activation impacts

Business functions can have the following status: always_on, customer_switchable, and always_off. This results in the following behaviour during the upgrade:

- If a business function was switched on in the SAP S/4HANA source release system but defined as always_off in the SAP S/4HANA target release, then an upgrade of the business function is not possible with this release.
- If a business function was switched off in the SAP S/4HANA source release system but defined as always_on in the SAP S/4HANA target release, then the business function will be activated during the upgrade.
- If a business function is defined as customer_switchable in the SAP S/4HANA target release, it will keep the state defined in the target release during the upgrade.

Additional business functions can be activated or deactivated after upgrade.

1.4.3. Add-on impacts

Upgrades to standard SAP add-ons are delivered as part of the SAP S/4HANA release.
You will need to check:

- What add-ons are currently installed in the source system and what are their target releases?
- Are any add-ons installed in the source system that are not yet supported on the target release?
- Is any 3rd party software present in the landscape that was imported via transports?
- Does this software require any update as part of the upgrade?

For 3rd party software you may need to contact your 3rd party vendor to check on the status and expected delivery date of any updates.

Important: Contact your 3rd party vendor early, e.g. when planning your project, as this may influence your choice of target release and go-live date.

You should also be aware that add-ons running on SAP S/4HANA Cloud, private edition cannot have any operating system access requirements.

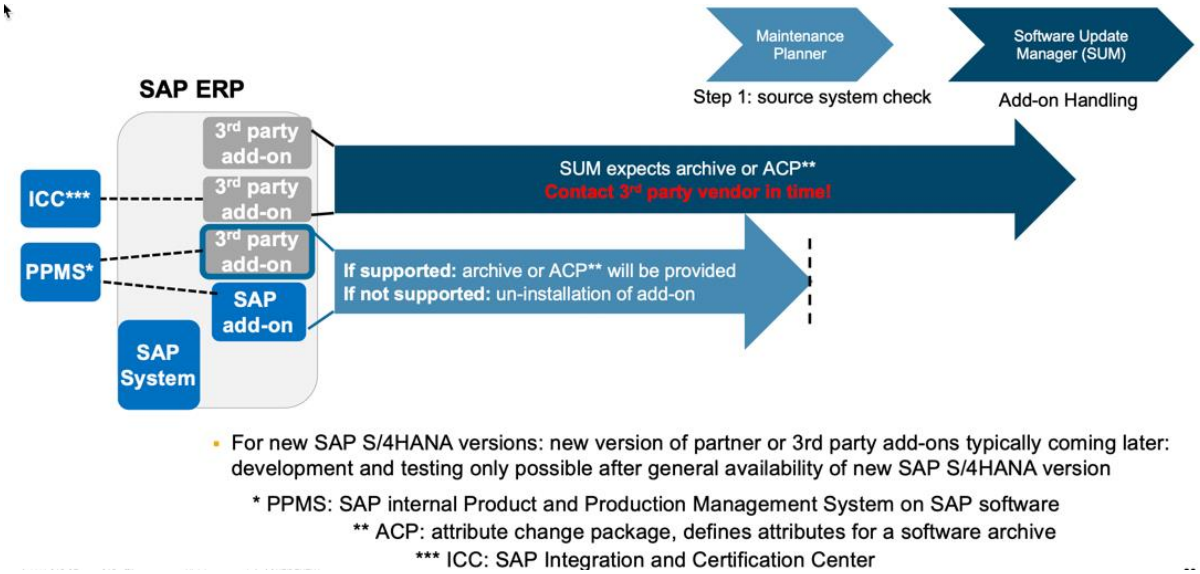


Figure 10 - 3rd Party and SAP add-on support for SAP S/4HANA compared to SAP ERP

You can find the What's New information in the product page for each standard SAP add-on in the SAP Help Portal, e.g. for the add-on SAP Access Control, you would go to the related SAP Access Control product page in the SAP Help Portal.

You should also check for related integration information for SAP S/4HANA, such as:
Integration: Access Control with Fiori Apps for S/4HANA On-Premise

You will need to check if your add-on is available for your target SAP S/4HANA release if:

- You want to introduce new SAP add-ons during the upgrade
- You want to uninstall ABAP add-ons during the upgrade
- Your add-on was developed by SAP Custom Development (formerly IBSO)
- Your add-on is provided by a partner

In each of these scenarios, consult SAP Note 2214409 - SAP S/4HANA: Compatible Add-Ons.

1.4.4. Introducing new business innovation

Upgrading SAP S/4HANA automatically delivers new business innovations including new business processes, new SAP Fiori apps, and new use cases for intelligent technologies.

Typical new business innovation includes:

- **New business processes**
- **New use cases for intelligent technologies**
- **New apps and improvements in existing apps**
- **New SAP Fiori features**
- **New classic User Interface (UI) capabilities** when launched from SAP Fiori
- **Performance improvements**

You can find the list of all SAP Fiori for SAP S/4HANA apps in the SAP Fiori apps reference library. You can also get some useful starting points for discussion with business stakeholders on the best new business value for specific lines of business in the SAP Fiori lighthouse scenarios (regularly updated).

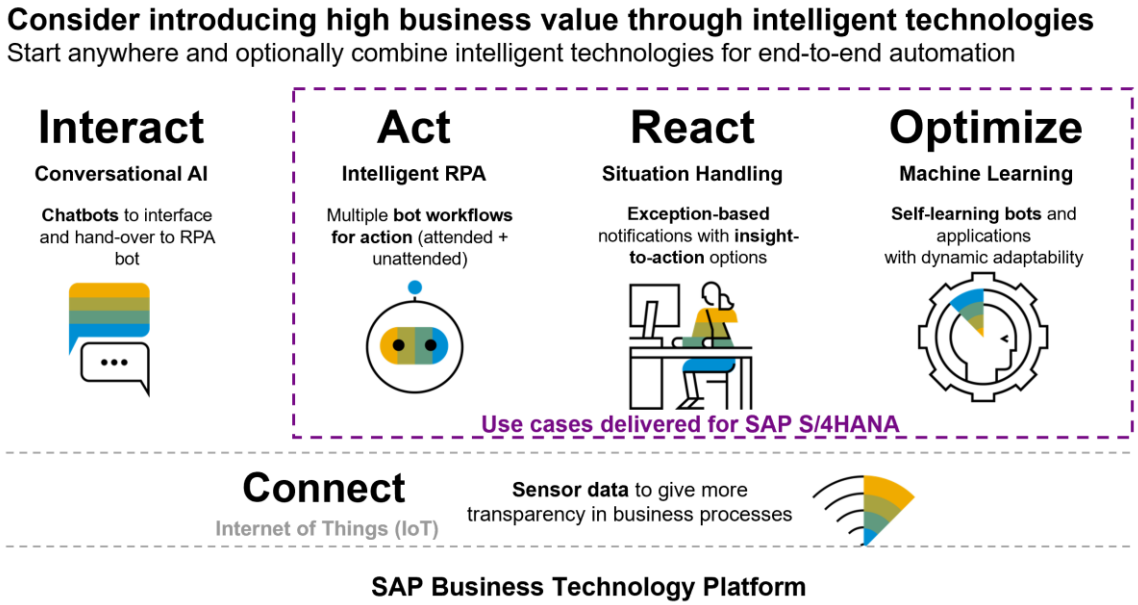


Figure 11 - Use cases for Intelligent Technologies introduced as new innovations with SAP S/4HANA

While these new business innovations will technically exist in your upgraded system, most new innovations must be activated, configured, and assigned to users before you can use it. Some changes may be automatically applied to your existing usage, such as: improvements in existing apps, some changes in SAP Fiori features, some classic UI capabilities, and some performance improvements.

You can choose to take advantage of these new business innovations immediately as part of your upgrade, i.e. the Functional Upgrade approach. Alternatively, you can choose to introduce new business innovations after a Technical upgrade, e.g. as part of an innovation phase or continuous improvement project. In either strategy, you dictate the pace of organizational change to balance effort with reward.

VERY IMPORTANT: If you wish to take advantage of new business innovations after a Technical Upgrade, you will need to ensure you put the requisite technical architecture in place during your technical upgrade. For example: your SAP Fiori front-end server (FES) established, your system sized appropriately, and prerequisites for intelligent technologies established, such as considering security needs for mobile devices and on-premise/cloud integration.

2. PREPARING FOR THE UPGRADE

This phase covers the DISCOVER and PREPARE phases of the SAP Activate Methodology. It will typically start weeks to months before your intended upgrade.

Some customers treat creation of the business case and effort estimation as a small project itself. Before you upgrade you will need to prepare your business case. Your upgrade drivers are based on understanding the benefits of upgrading and mapping those benefits to the expected business and technical value of the upgrade.

Important: There may be a gap between completing these phases and starting the upgrade itself, e.g. to allow for approval of the business case, for resourcing the skills needed for the technical upgrade itself, and for deploying relevant tools needed for the upgrade. If the operating environment for business users needs to change, this may also be done before or parallel to the upgrade project.

At this point, you usually have a rough idea of a potential timeline for your upgrade. This will help you determine your likely target SAP S/4HANA release and Feature Pack Stack. You will need to have decided on your target release to work out the delta changes from your source release. While this decision will vary depending on your circumstances, in this chapter you will find **Key considerations for choosing your target release and Feature Pack Stack**.

You will need to decide whether:

- You will use a **Functional Upgrade** approach, i.e. introduce new functionality as part of your Upgrade scope, or
- You will use a **Technical Upgrade** approach, do the minimum changes now and introduce new functional changes in the RUN phase Post Upgrade, e.g. via one or more **continuous improvement projects**

In this chapter you will find **Key considerations for choosing functional upgrade versus technical upgrade**.

Having decided on your upgrade scope, you will need to estimate the effort to upgrade, and the resources needed. Estimation depends on many factors, such as:

- Planned functional scope
- Whether SAP Fiori is already in use
- Whether new intelligent technologies are in scope
- Resources and skills available

In this chapter you will find **2.2.1 Example upgrade plan for a Functional Upgrade, 2.2.2 Example plan for a Technical Upgrade** and **2.2.3 Key considerations when estimating effort to upgrade.**

You will need to propose a timeline for your upgrade. Make sure you have allowed sufficient time for:

- Approval of your business case,
- Gathering resources for your upgrade
- Making commercial arrangements with system implementation partners
- Booking SAP Services to support your plan, e.g. MaxAttention Business Process Performance Optimization (BPPO) service

To ensure your Business Case and effort estimates cover your upgrade scope, you will need to understand the impacts for these major areas discussed in this chapter:

- **Architecture and technical impacts**
- **Business process and other functional impacts**
- **User experience impacts**
- **Custom code impacts**

Having assessed the impacts and discussed them with your project sponsor and stakeholders, you can then determine:

- The business value of upgrade to your organization
- Any risks or issues to be factored into your business case and upgrade plan

For those customers taking advantage of SAP Solution Manager you will find a brief overview of SAP Solution Manager features that will help you scope business impacts and critical areas for regression testing later in this guide in the appendix.

2.1. Key Considerations for choosing your target release / Feature Pack Stack

The key considerations for choosing your target release / feature pack stack are:

- Expected start date of your upgrade project
- Expected go-live date of your upgrade project
- Availability of desired to-be functionality
- Availability of desired partner add-ons

As a rule of thumb, it is recommended to start your upgrade project with the most recent release of SAP S/4HANA. The initial shipment stack of each SAP S/4HANA release is followed by two Feature Package Stacks (FPS01 and FPS02) bringing some additional new features, and then moves to maintenance mode with any further corrections or improvements via successive Support Package Stacks (SPS03, SPS04, etc.).

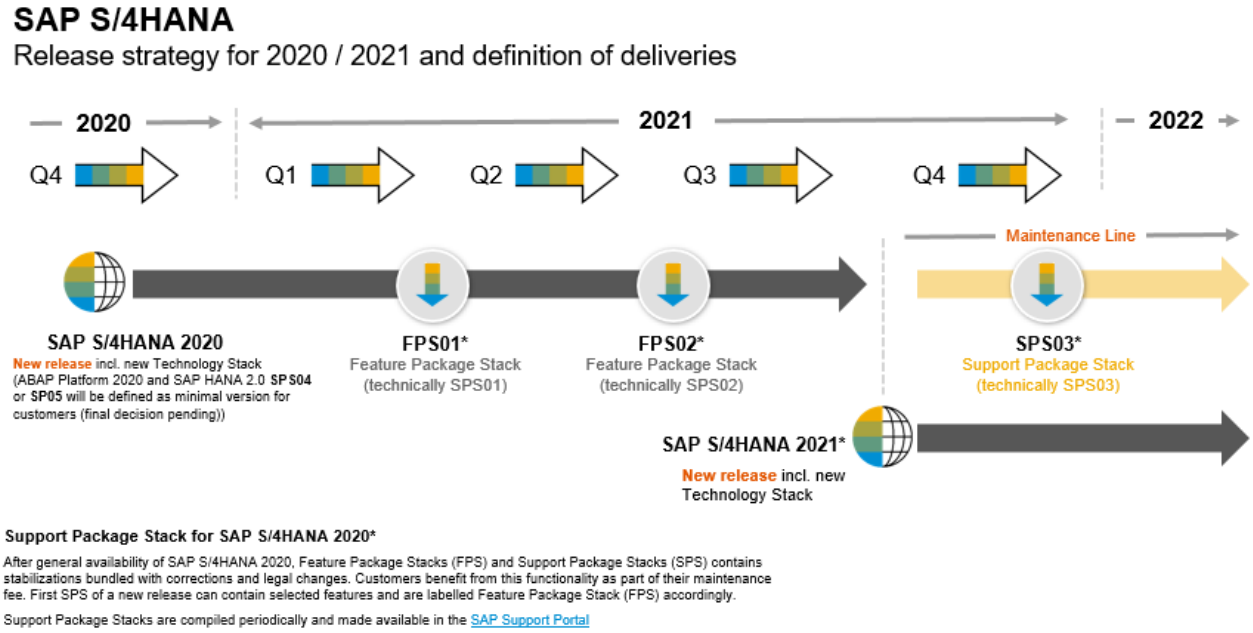


Figure 12 - Example of SAP S/4HANA release strategy showing SAP S/4HANA release strategy for 2020/2021

You should further consider implementing the most recent shipment stack - Feature Package Stack (FPS) or Support Package Stack (SPS) - of your SAP S/4HANA release, preferably at least Feature Package Stack 1 (FPS01), rather than starting with the Initial Shipment Stack. This has the following benefits:

- **Simplified support**
  - While most apps/processes are pre-tested in SAP S/4HANA Cloud, there are always additional apps/processes that are specific to SAP S/4HANA AnyPremise. Moving to FPS01 or higher FPS/SPS applies available fixes related to known issues with the initial release.
- **Long-term maintenance**
  - The long-term maintenance version of SAPUI5, the primary technology used for SAP Fiori apps, is aimed at the FPS01 of each release of SAP S/4HANA. Going live on FPS01 or higher FPS/SPS reduces the need for further upgrades or patches in the short to medium term.
- **Partner add-ons**
  - Since partners receive SAP S/4HANA releases at the same time as customers, there is usually a lag between the release of a new release and the provision of a certified partner add-on for that release. By the time FPS01 is released, most partner add-ons are available.
  - Customers are advised to check expected release dates of partner add-ons directly with the relevant partner organization.

Depending on the timing of your project, it may make sense to start your project on a sandbox on the latest currently available shipment stack, even if you intend to go-live on a different shipment stack. However, once you move to your development environment you should keep the shipment stack stable to avoid further technical impacts, for example:

- The initial shipment stack of SAP S/4HANA 2021 is available at the project start, however SAP S/4HANA 2021 Feature Pack Stack 1 (FPS01) is planned to be released prior to the expected date to upgrade your development (DEV) environment.
- By starting on the initial shipment stack on a sandbox you can do most of your discovery and exploration while waiting for Feature Pack Stack 1 (FPS01) to be released.
- Once the Feature Pack Stack is released, you then start the upgrade of your development environment on FPS01.
- You then continue the rest of the project on FPS01.
- This approach is sensible because generally the majority of new innovations for a SAP S/4HANA release are part of the Initial Shipment Stack, so the difference between shipment stacks of the same SAP S/4HANA release is smaller than the differences between e.g. SAP S/4HANA 2020 FPS02 and SAP S/4HANA 2021.

The following are NOT considerations for choosing your target release and feature pack stack:

- Your source SAP S/4HANA release or feature pack stack
- Your SAP add-ons
  - These are released aligned to the current SAP S/4HANA source release or feature pack stack
- “N-1” release approach to support
  - This approach is **not** recommended for SAP S/4HANA AnyPremise, as the majority of functionality has already been released on SAP S/4HANA Cloud up to 1 year before the release of the equivalent SAP S/4HANA AnyPremise release.

You should also check for any restriction notes for the target SAP S/4HANA release. This gives a summary of any major restrictions, for example SAP Note 2943206 - SAP S/4HANA 2020: Restriction Note.

2.2. Key considerations for Functional Upgrade vs Technical Upgrade decision

The main difference between a Functional Upgrade and a Technical Upgrade is the timing for introducing new business value and/or process changes.

A Technical Upgrade includes only the minimum mandatory changes in its scope. Adding new business value is deferred to running continuous improvement projects after upgrade. Continuous improvement projects are discussed in more detail in chapter 4 DRIVING ADDITIONAL VALUE FROM YOUR UPGRADE.

A Functional Upgrade necessarily includes both Technical Upgrade and some expanded scope for introducing new business value to one or more business processes and impacts one or more business user groups (i.e. business roles).

The main tipping points between Functional Upgrade vs. Technical Upgrade are:

- Is there a hard deadline for go-live that would prevent a functional upgrade approach?
- Is the business as a whole ready for functional improvements?
- Are there particular user groups who need to take advantages of innovation sooner than later?
- Are there particular budget concerns that restrict the scope of any functional changes?

Remember that all upgrades will introduce some mandatory changes, e.g. automatic changes to SAP Fiori app floorplans and simplification changes.

Very important: If you have not yet implemented SAP Fiori in your current SAP S/4HANA release, you must include implementation of your SAP Fiori front-end server – embedded (recommended) or standalone - and SAP Fiori Launchpad even when choosing a Technical Upgrade approach.

This is because SAP Fiori is where business users consume SAP S/4HANA innovations including embedded analytics, intelligent technologies, new business processes (such as Group Reporting, Central Procurement, and Demand-driven MRP), and the new user experience itself. Without SAP Fiori deriving additional business value from your SAP S/4HANA solution will be greatly impaired.

There are also configuration and extension options for SAP S/4HANA that can only be performed using SAP Fiori apps, even where these changes impact on SAP GUI transactions, for example adding custom fields to the virtual data models based on CDS Views, which is done using the SAP Fiori app F1481 Custom Fields and Logic.

The SAP Fiori setup must be done either during the initial implementation of SAP S/4HANA or during an upgrade, because establishing SAP Fiori involves:

- Setup of the SAP Fiori FES & related architecture (such as SAP Web Dispatcher)
- Impacts on system sizing and performance
- Central configuration of the SAP Fiori launchpad and related features (search, notifications, user defaults, context-sensitive help, etc.)
- Activation of essential business roles to support configuration and extensions.

Refer to: 2.7.9 Essential business roles required to administrate and extend SAP Fiori.

Similarly, if you have not yet installed SAP Screen Personas in your SAP S/4HANA solution, you should consider doing so as part of your Technical Upgrade.

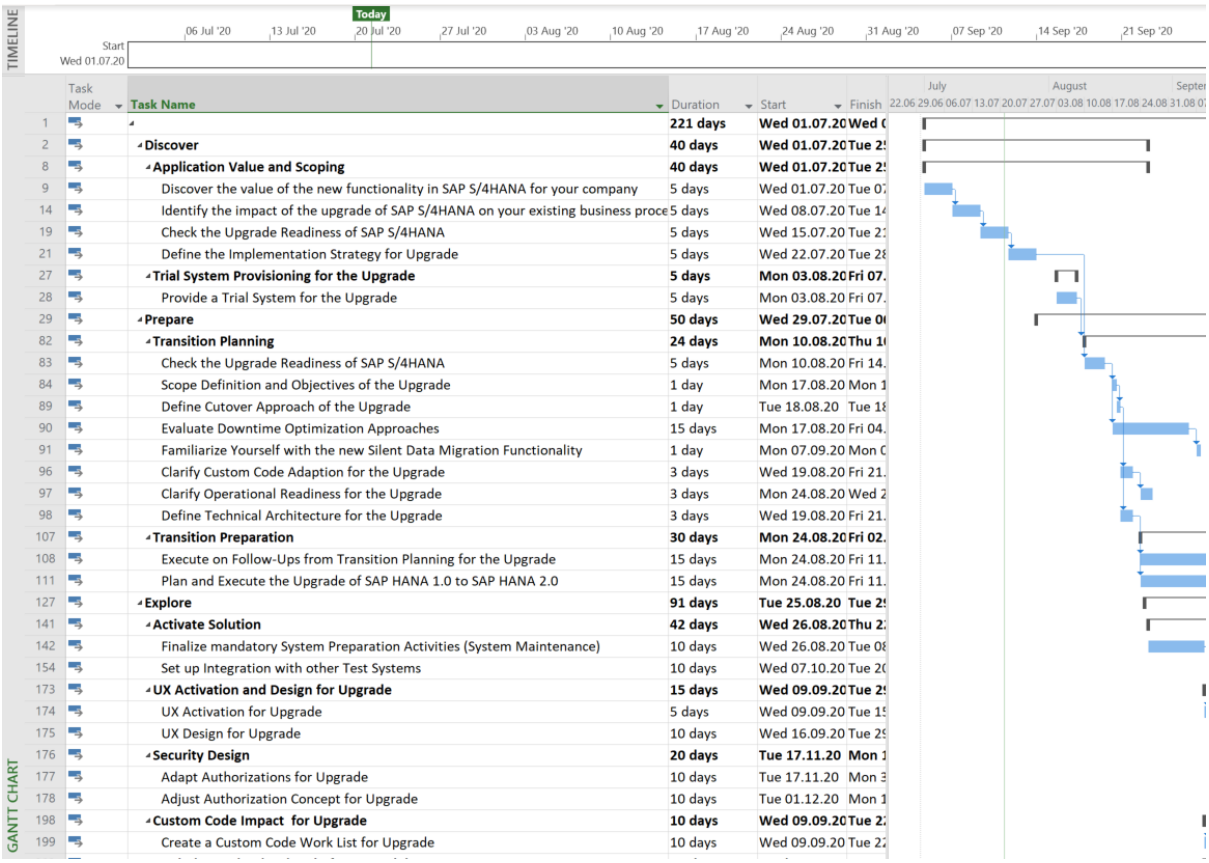
SAP Screen Personas provides non-coding options to improve classic user interfaces, such as SAP GUI and Web Dynpro ABAP applications, for example to hide unwanted fields / buttons and merge tabs. This improves user experience in areas where there is no equivalent SAP Fiori app yet and it is not viable to create a custom Fiori app. Refer to:

- Blog post SAP Fiori for SAP S/4HANA – Yes you need SAP Fiori to Configure, Adapt and Extend SAP S/4HANA
- SAP Screen Personas topic in the SAP Community

2.2.1. Example upgrade plan for a Functional Upgrade

You can download the example project plan provided in the SAP S/4HANA Upgrade and Product Innovation Roadmap in the SAP Roadmap Viewer. Further details of all tasks listed in the plan are explained in the Roadmap Viewer content section. The project plan template is intended to give you a complete list of all tasks and should be adapted to your project setup and requirements.

Refer to: SAP Roadmap Viewer Download ZIP



	Task Mode	Task Name	Duration	Start	Finish
1			221 days	Wed 01.07.20	Wed 0
2		Discover	40 days	Wed 01.07.20	Tue 2
8		Application Value and Scoping	40 days	Wed 01.07.20	Tue 2
9		Discover the value of the new functionality in SAP S/4HANA for your company	5 days	Wed 01.07.20	Tue 0
14		Identify the impact of the upgrade of SAP S/4HANA on your existing business proce	5 days	Wed 08.07.20	Tue 1
19		Check the Upgrade Readiness of SAP S/4HANA	5 days	Wed 15.07.20	Tue 2
21		Define the Implementation Strategy for Upgrade	5 days	Wed 22.07.20	Tue 2
27		Trial System Provisioning for the Upgrade	5 days	Mon 03.08.20	Fri 07.
28		Provide a Trial System for the Upgrade	5 days	Mon 03.08.20	Fri 07.
29		Prepare	50 days	Wed 29.07.20	Tue 0
82		Transition Planning	24 days	Mon 10.08.20	Thu 1
83		Check the Upgrade Readiness of SAP S/4HANA	5 days	Mon 10.08.20	Fri 14.
84		Scope Definition and Objectives of the Upgrade	1 day	Mon 17.08.20	Mon 1
89		Define Cutover Approach of the Upgrade	1 day	Tue 18.08.20	Tue 1
90		Evaluate Downtime Optimization Approaches	15 days	Mon 17.08.20	Fri 04.
91		Familiarize Yourself with the new Silent Data Migration Functionality	1 day	Mon 07.09.20	Mon 0
96		Clarify Custom Code Adaption for the Upgrade	3 days	Wed 19.08.20	Fri 21.
97		Clarify Operational Readiness for the Upgrade	3 days	Mon 24.08.20	Wed 2
98		Define Technical Architecture for the Upgrade	3 days	Wed 19.08.20	Fri 21.
107		Transition Preparation	30 days	Mon 24.08.20	Fri 02.
108		Execute on Follow-Ups from Transition Planning for the Upgrade	15 days	Mon 24.08.20	Fri 11.
111		Plan and Execute the Upgrade of SAP HANA 1.0 to SAP HANA 2.0	15 days	Mon 24.08.20	Fri 11.
127		Explore	91 days	Tue 25.08.20	Tue 2
141		Activate Solution	42 days	Wed 26.08.20	Thu 2
142		Finalize mandatory System Preparation Activities (System Maintenance)	10 days	Wed 26.08.20	Tue 0
154		Set up Integration with other Test Systems	10 days	Wed 07.10.20	Tue 2
173		UX Activation and Design for Upgrade	15 days	Wed 09.09.20	Tue 2
174		UX Activation for Upgrade	5 days	Wed 09.09.20	Tue 1
175		UX Design for Upgrade	10 days	Wed 16.09.20	Tue 2
176		Security Design	20 days	Tue 17.11.20	Mon 1
177		Adapt Authorizations for Upgrade	10 days	Tue 17.11.20	Mon 3
178		Adjust Authorization Concept for Upgrade	10 days	Tue 01.12.20	Mon 1
198		Custom Code Impact for Upgrade	10 days	Wed 09.09.20	Tue 2
199		Create a Custom Code Work List for Upgrade	10 days	Wed 09.09.20	Tue 2

Figure 13 - Example Functional Upgrade Plan for SAP S/4HANA

2.2.2. Example upgrade plan for a Technical Upgrade

The primary focal points of a technical upgrade are:

- Technical upgrade of the hardware and software
- Mandatory changes to configuration and custom code
- Regression testing and remediation

With a technical upgrade, adding new functionality (such as deploying more SAP Fiori apps) is deferred until the RUN phase after upgrade, and is added via continuous improvement projects.

Customer experiences show that a technical upgrade averages from 2-6 months (reported by SAP S/4HANA Customer Care Program).

A sample 5-month plan for a Technical Upgrade is shown below. This is based on a real-life example of a customer who upgraded from SAP S/4HANA 1610 to 1909, with a 1 TB system.

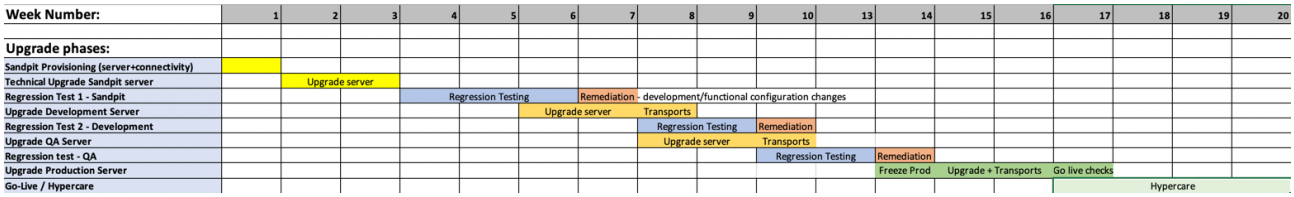


Figure 14 - Example Technical Upgrade Plan for SAP S/4HANA

Key assumptions in the plan are:

- You have a standard 3-tier DEV-QAS-PRD landscape and a separate sandbox server
- Your sandbox system is a non-integrated environment so that other parallel solutions are not impacted.
- You start the upgrade with a sandbox system, which is a snapshot copy of your production system and sized accordingly
- DEV & QAS regression testing includes integration testing since this cannot be tested on the sandbox
- The upgrade project starts on Feature Pack Stack 1 or higher of the current SAP S/4HANA release
- SAP Fiori FES is already in place, in either embedded or standalone mode
- The current choice of embedded or standalone deployment is not to be changed
- SAP HANA database is already on SAP HANA 2.0 version
- Only mandatory functional and technical changes are to be applied
- No new apps will be introduced, other than successor apps for deleted or deprecated apps
- Go-live occurs over a weekend
- Hypercare needs to cover the initial fiscal period end after go-live
- Resourcing estimates are for an onsite team

Project Resources needed typically include:

- **Project Manager** – Required
  - Part-time, moving to full time for the production upgrade and Hypercare period
- **Solution Architect** – Required – Part-time throughout the project
- **UX Expert** – Required – Part-time throughout the project
- **Technical/Basis Expert(s)** – Required
  - Full-time – moving to overtime for the upgrade go-live
- **Functional SME (Subject Matter Expert)** for each functional area in scope
  - Part-time depending on business functions in scope

    - E.g. Finance consultant may be full-time during uptime and regression testing, while Logistics expert may be part-time
- **Developer(s)** – Required
    - Full-time during custom-code remediation on the sandbox
    - Part-time after that to diagnosis & resolve any residual issues in other systems
- **Business User Tester(s)** – Required
    - Business User Testers dedicated for each functional area in scope
    - Full-time during regression testing

2.2.3. Key considerations when estimating effort to upgrade

Key considerations for estimating efforts for the upgrade include:

- What experience and skills do you have available to assist with the upgrade?
- Does your scope include any new functionality, e.g. new SAP Fiori apps, new build of custom SAP Fiori apps or new business functions that will be activated?
- Does your existing scope (in your current SAP S/4HANA system) include any deprecated GUI transactions or SAP Fiori apps that will require business process changes?
- Is your existing scope impacted by any delta simplifications that will require business process changes?
- What degree of test automation do you have available for regression testing?
- How many test scripts will need to be revised or written from scratch?

You may wish to consider starting your project explore phase with a sandbox system that is a copy of production, rather than in your development environment.

The benefits of starting with a sandbox that is a copy of production are:

- Less disruption to your business as usual DEV-QAS-PRD systems
- Delta simplifications, mandatory custom code corrections and areas requiring performance optimization can be assessed against realistic data
- Using a copy of production enables regression testing on realistic databases
- It rapidly identifies any fine detail changes in existing apps
- During regression testing, you can quickly identify & assess any first targets for performance optimization
- Quicker upgrades in your DEV-QAS-PRD systems, as any early discoveries or corrections made in the sandbox can be factored in to optimize the upgrade process
    - Runsheets of all upgrade activities should be made for the upgrade on the sandbox, then used to speed up the upgrade of subsequent systems
    - Test cases and test scripts should be identified and refined on the sandbox, then used to speed up regression testing in later systems
    - Any test automation can be trialed and refined on a sandbox, then used to speed up regression testing in later systems
- Mandatory custom code corrections can be performed on a sandbox and optionally transported to DEV, minimizing the uptime requirement for DEV before moving to QAS

Add extra time to your Upgrade Project if any of the following circumstances apply:

- You need to upgrade from SAP HANA 1.0 to 2.0
- You have decided to migrate your SAP Fiori FES from standalone(hub) to embedded mode
- You start on the initial shipment stack and need to upgrade to FPS01 or higher before go-live
- You have many integrated parallel solutions and need to allow additional time for integration testing
- You have parallel integrated Cloud solutions that are updated during the timeline of the project and need to allow additional time for integration testing after each Cloud upgrade
- You need to upgrade the operating environment for business users as part of the project, e.g. deploy new devices, new versions of device operating systems, or new browser versions
- Due to simplifications of tables to CDS Views in critical reports/analytics, you may need to allow additional time to remediate custom reports/analytics
- You have strict segregation of duties requirements that require a more than usual degree of authorization testing
- You have more systems in your SAP S/4HANA landscape to upgrade, e.g. training servers
- You have a remote or mixed onsite/remote team

2.3. Setting your update strategies incl. UX and mobile devices

Your mobile device strategy is a living document. While use of mobile devices is optional, their use is now so widespread that it is rare for mobile devices to be out of scope. Even if the current strategy is desktop and laptop only, some statement of the business reasons for this choice should be kept on record, along with any conditions that would need to change before mobile devices can be considered.

There are many holistic considerations when using mobile devices, for example:

- Company-issued vs BYOD (bring your own device)
- Mobile device management, e.g. remediation strategy in case of lost or stolen devices
- Internet and/or VPN access
- Cyber security, authentication, and Single-Sign On (SSO) arrangements
- Supported device operating systems (device OS)
- Native vs. online app requirements

Moving to mobile devices can be done at any time, however the strategy around mobility does need to be carefully considered before moving any business apps and data onto these devices.

Your User Experience strategy is a living document that should be defined at the latest as part of your initial SAP S/4HANA project. Once defined, your UX strategy should be updated whenever you upgrade or other circumstances change.

Circumstances that could require your UX strategy to be adjusted include:

- Upgrade to a new SAP S/4HANA release, e.g. to take new UX options in the SAP Fiori launchpad or in SAP Fiori floorplans (such as Fiori elements) into consideration
- Introduction of mobile devices and a mobile device strategy, e.g. to capture new entry point options for business users
- Introduction of new software, e.g. SAP Cloud solutions, which need to be aligned to the overall strategy
- Mergers and acquisitions, as these may change the mix of business users to be supported

- Introduction of new web browsers or desktop client software, which may impact entry points and launching options
- Move to a central hub such as SAP Launchpad Service running in the SAP Business Technology Platform (BTP), which has impact on entry points and app launching options
- Introduction of new intelligent technologies and how they impact the delivery, appearance, or behavior of the user experience

2.4. General planning for the upgrade

Once you have taken the decision whether to plan for a technical or functional upgrade and set your UX strategy, you are ready to take the next steps and plan for the exact identification of delta scope and change management. There are different important considerations and tools you can leverage for it.

2.4.1. Identifying delta scope

The minimum required delta scope for a Technical Upgrade is:

- **Review and update your architecture** including:
    - Patching your SAP Fiori FES and SAP S/4HANA solution to the most recent patches for your target SAP S/4HANA release to minimize issues
    - Key areas to patch include kernel, Unified Rendering, ABAP, and SAPUI5
- **Evaluate the impact of delta simplifications** on your current processes
- **Replace deprecated (i.e. deleted) functionality with successors**, including:
    - SAP Fiori apps superseded by new versions or new apps
    - Classic UIs, e.g. obsolete GUI transactions due to simplifications
    - SAP Business Roles, e.g. in rare cases a role may be split or renamed
    - Obsolete SAP Fiori launchpad configuration features
- **Review launchpad content and layout for outdated references**, e.g. where tiles/target mappings have been reassigned to a different catalog
- **Review any custom-built SAP Fiori apps and ABAP code,** where needed to migrate them to the target SAPUI5 version, and similarly adjust the ABAP code layer, e.g. for delta simplifications
- **Review authorizations**, e.g. new authorizations added to processes or apps
- **Regression test all critical processes**

Strongly recommended scope for a technical upgrade includes:

- If using standalone Fiori front-end server, **migrate to embedded Fiori front-end server**
- **Review launchpad features** and activate any obvious high benefit features, e.g. new App Support option in SAP S/4HANA 2020 FPS01 greatly simplifies support
- **Replace existing predecessor apps** with their successors
- **Move to the latest best practice tools** for managing launchpad content, layout, authorizations, and support to improve efficiency and capability
- **Review end-to-end performance** to take advantage of any performance improvement options
- **Review test automation options**, to minimize future regression testing
- **Consider extending your solution with side-by-side services and capabilities** using SAP Business Technology Platform, such as SAP intelligent Robotic Process Automation. Spotlight reports highlight innovation opportunities for your transformation journey.

For a Functional Upgrade, you include the technical upgrade scope as a minimum. You add whatever additional scope is aligned to the business outcomes of your functional upgrade. Typical scope additions include:

- Replace standalone solutions with solutions embedded in SAP S/4HANA
- Grow your coverage of processes, including new business processes in SAP S/4HANA
- Grow your coverage of users and business roles
- Grow your SAP Fiori coverage, e.g. replace classic UIs with SAP Fiori apps, add embedded analytics, add intelligent automation apps
- Activate new SAP Fiori launchpad features
- Grow your usage of intelligent automation, by deploying use cases embedded within SAP S/4HANA
- Extend your solution with additional side-by-side capabilities, using SAP Business Technology Platform, such as SAP intelligent Robotic Process Automation
- Extend your solution by integrating with additional SAP cloud solutions, such as SAP Analytics Cloud

2.4.2. Identifying change management scope via Readiness check

While the Readiness Check in its current version as of Q2/2021 is intended for analyzing systems to be converted from SAP ERP to SAP S/4HANA, it can still provide relevant information even for an upgrade context.

- For example, this is true for identifying the impact on Add-ons and Business Functions for the upgrade target release.

Additionally, more innovation can be added and rolled out as per SAP Fiori app recommendations.

- Change management is very important when moving from classic SAP transactions to SAP Fiori and you can find a lot of useful information about how to pace organizational change in the blog post SAP Fiori for SAP S/4HANA – Recommendations for transitioning users from SAP GUI to SAP Fiori.

You should consider simplifying future upgrades and aligning to cloud strategy by reverting back to standard with a clean core. Review the latest guidance in Custom Extensions in SAP S/4HANA Implementations - A Practical Guide for Senior IT Leadership.

You should evaluate your custom code for opportunities:

- to replace custom extensions with equivalent capabilities provided as standard in SAP S/4HANA, and/or
- move custom developments to the Cloud, e.g. via SAP Business Technology Platform services.

You can evaluate your code using the SAP Fiori app F3191 Custom Code Migration that is part of your SAP S/4HANA solution (releases 1809 and higher).

2.5. Technical planning for the upgrade

There are several architecture and technical impacts to be considered during the upgrade. These need to be reviewed and key decisions made to ensure your target release meets expectations and can cope with any expected increase in usage.

- System architecture

- System requirements for the target release
- SAP HANA database changes
- Globalization, country versions and languages
- Sizing

In addition, the following technical areas need to be reviewed and updated. These may affect the scope, timing and resources needed.

Important: As a minimum, every upgrade project should include performance testing and assume authorizations will need to be adjusted.

- Patch strategy
- Performance
- Authorizations
- Operating environment for users
- Development environment
- Security
- Integration
- Intelligent capabilities

2.5.1. Planning the upgrade in the Maintenance Planner

Similar as for new installations and system conversions, the Maintenance Planner is the SAP tool to be used for planning updating the existing system. It will perform several checks on the system, point out the impact and help calculate and download the software files required for the actual upgrade. The actual upgrade will then be executed with the Software Update Manager (SUM).

The Maintenance Planner is accessible at https://apps.support.sap.com/sap/support/mp and will check the source system for Add-Ons and Business Functions.

2.5.2. Reviewing your sizing

Always re-check your system sizing as part of your upgrade.

In addition to database growth due to business changes, new features, new capabilities, new performance options, increasing your SAP Fiori and analytics coverage, and/or adding new users can all have an impact on sizing.

An upgrade is the ideal time to re-check and adjust your system size if needed.

Important: If you intend to add new functionalities **during or after the upgrade** - such as SAP Fiori and embedded analytics – you will need to perform additive sizing using the SAP Quick Sizer, too.

Reference notes:
- SAP HANA Quick Sizer introductory resources
- SAP Help Portal - SAP Fiori implementation chapter on Sizing
- SAP Note 1872170 - ABAP on HANA sizing report (S/4HANA, Suite on HANA...)
- SAP Note 2813738 - Brownfield sizing for SAP S/4HANA embedded analytics
- SAP Note 2815376 - Greenfield sizing for SAP S/4HANA embedded analytics

- SAP Note 2467172 - How to size Fiori applications based on number of users

2.5.3. Operating system requirements

Before you upgrade your SAP S/4HANA system, you may need to upgrade or change the operating system for your application servers. The following SAP Notes are a must read:

- SAP Note 2620910 - SAP S/4HANA 1511, 1610, 1709, 1809 and SAP BW/4HANA 1.0, 2.0: Recommended and released Application Server Platforms.
- SAP Note 2696472 - Upgrade/Conversion planning hints for de-supported platforms lists different options to handle this situation.

2.5.4. Database sequirements

Before you upgrade your SAP S/4HANA system, you may need to upgrade your SAP HANA database to the relevant release, support package stack (SPS), and revision for your target SAP S/4HANA release.

For example, for upgrading to SAP S/4HANA 2020, SAP HANA 2.0 SPS05 revision 51 is the minimum revision. The latest available revision is typically recommended.

The SUM tool will check if the correct SAP HANA revision has been applied.

Important: If you are upgrading from 1511 or 1610 to 1709 or higher, this also involves an upgrade from SAP HANA 1.0 to SAP HANA 2.0

Refer to:

- SAP Note 2655761 - SAP S/4HANA - restrictions and recommendations regarding specific revisions of SAP HANA database for use in SAP S/4HANA

Other useful references:

- SAP HANA Server Installation and Update Guide
- SAP Note 2426339 - Support for SAP HANA 2 in SAP S/4HANA - Technical Information Regarding SAP HANA Requirements
- SAP Note 2372809 - Mandatory Preparation Steps for Upgrading a SAP HANA 1 System to SAP HANA 2
- SAP Note 2378962 - SAP HANA 2.0 Revision and Maintenance Strategy
- SAP Note 2600030 - Parameter Recommendations in SAP HANA Environments

2.5.5. Application server considerations

Ensure you check the target release's Release Information Note for the available upgrade paths, required feature pack stacks and tooling requirements.

For example, for SAP S/4HANA 2020:

- You can upgrade from SAP S/4HANA 1511, 1610, 1709, 1809, or 1909 to SAP S/4HANA 2020

- Check the SAP Note 2883413 SAP S/4HANA 2020: Release Information Note for the required feature package stack equivalencies for the upgrade from SAP S/4HANA 1511, 1610, 1709, 1809, or 1909 to SAP S/4HANA 2020
- You must additionally check the release information note for the minimum required Software Update Manager 2.0 (SUM) Support release and support pack for the upgrade

A summary of the stack components for each release can be found in blog post: Upgrade to SAP S/4HANA 2020 – time to change.

2.5.6. Globalization, country versions and languages

If you want to add additional language packs as part of upgrade, check the globalization note for your SAP S/4HANA target release for any considerations and the relevant SAP Note number for language availability of your SAP S/4HANA target release.
For example, for target release SAP S/4HANA 2020, all feature pack stacks:

- SAP Note 2953103 SAP S/4HANA ON-PREMISE 2020, Globalization & Local Versions: Release Information & Restriction Note
- SAP Note 2957040 - SAP S/4HANA ON-PREMISE 2020: Language Availability

Important: If Best Practices content was applied to the source system, it is not possible to apply language packs to Best Practices content. Adding system language packs is still possible.

2.5.7. Server architecture impacts

Out of the typical server architecture of an SAP S/4HANA system, the SAP Fiori front-end server and SAP S/4HANA server are the most important components.

Important: In embedded mode the SAP Fiori FES and SAP S/4HANA server are different components of the same server. This reduces the technical upgrade of the servers somewhat, however all other considerations are largely similar regardless of whether embedded or standalone mode is used. While additional components are needed - such as SAP Web Dispatcher for load balancing and to avoid cross-site scripting - upgrading these is typically unlikely to add significant effort in a technical upgrade project.

Refer to: SAP Web Dispatcher guide on SAP Help Portal

In a functional upgrade project, there may be additional effort if there is a significant shift in security requirements. For example:

- If mobile devices are introduced for the first time as part of the functional upgrade
- If internet access to apps is introduced for the first time as part of the functional upgrade

If your original SAP S/4HANA system was deployed using the standalone approach for the SAP Fiori FES, migrating from standalone to embedded should be considered, i.e. with your SAP Fiori FES on a separate server to your backend SAP S/4HANA server.

Embedded mode provides numerous benefits such as reduced server costs and simpler configuration.

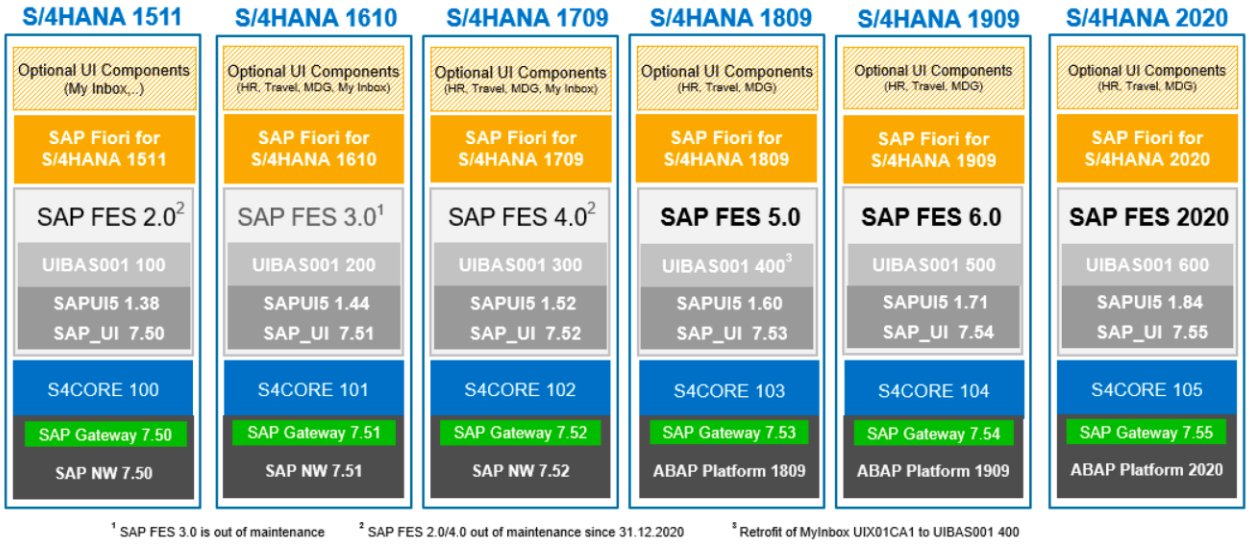


Figure 15 *- Embedded Fiori front-end server comparisons across SAP S/4HANA releases*

For SAP Fiori FES 2020 for SAP S/4HANA, both deployment options - embedded and standalone server - are supported. In case of a standalone server deployment, the minimum SAP NetWeaver release is SAP NetWeaver 7.52.

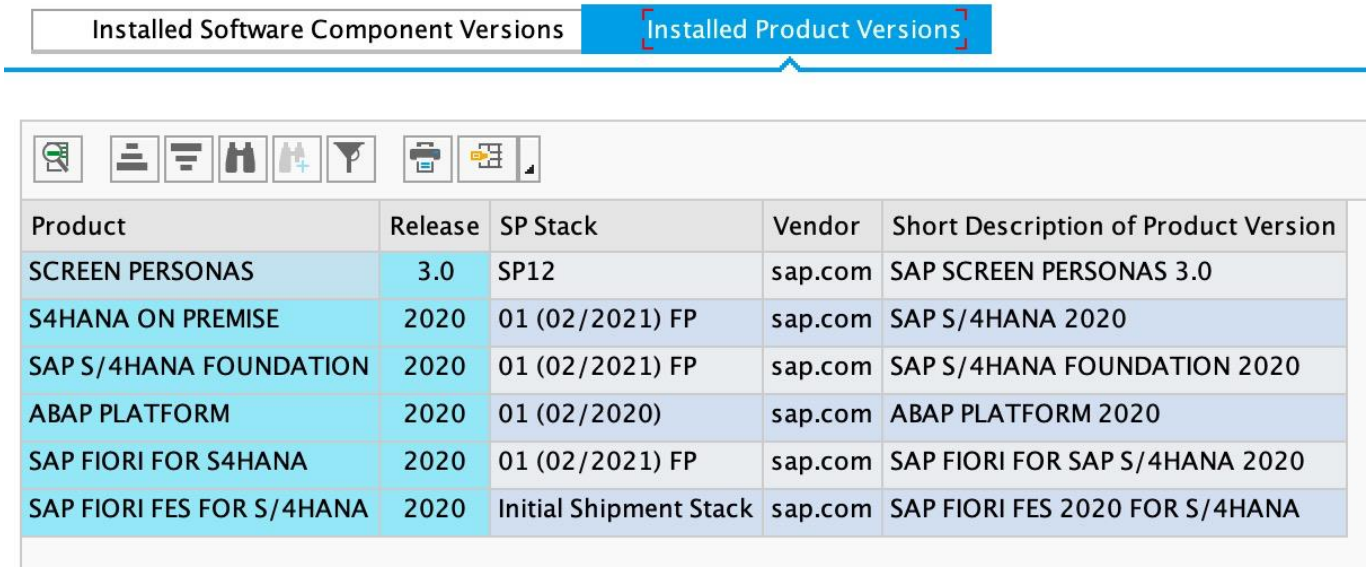
The general architecture recommendation has changed since December 2017 from standalone to embedded Fiori FES deployment. This is how most SAP customers are planning their architecture.

For an architecture overview and possible deployment options, see SAP Fiori Deployment Options and System Landscape Recommendations. **Important:** This document is regularly updated.

How to move from standalone to embedded deployment is described in Migrate SAP Fiori Front-End Server from Standalone to Embedded System Deployment.

For example, the installed software components of a SAP S/4HANA system with embedded FES will include components for:

- SAP FIORI FOR S4HANA – the software component for SAP Fiori apps
- SAP FIORI FES FOR S/4HANA – the SAP Fiori front-end server itself



Product	Release	SP Stack	Vendor	Short Description of Product Version
SCREEN PERSONAS	3.0	SP12	sap.com	SAP SCREEN PERSONAS 3.0
S4HANA ON PREMISE	2020	01 (02/2021) FP	sap.com	SAP S/4HANA 2020
SAP S/4HANA FOUNDATION	2020	01 (02/2021) FP	sap.com	SAP S/4HANA FOUNDATION 2020
ABAP PLATFORM	2020	01 (02/2020)	sap.com	ABAP PLATFORM 2020
SAP FIORI FOR S4HANA	2020	01 (02/2021) FP	sap.com	SAP FIORI FOR SAP S/4HANA 2020
SAP FIORI FES FOR S/4HANA	2020	Initial Shipment Stack	sap.com	SAP FIORI FES 2020 FOR S/4HANA

Figure *16* - Example of Installed Product Versions for SAP S/4HANA 2020 FPS1 system with embedded SAP Fiori front-end server

Refer to SAP Fiori Deployment Options and System Landscape Recommendations for more information and details of the considerations.

Important: This document is usually updated several times per year, so it is important to re-check the document during your project.

The following are NOT considerations for standalone (hub) versus embedded mode:

- SAP Launchpad Service on SAP BTP
- SAP Work Zone on SAP BTP

In both these cases the SAP Launchpad service launches the app which is stored on your SAP S/4HANA On-Premise or SAP S/4HANA Cloud, private edition solution.

Upgrade prerequisites:
Important: If your SAP Fiori FES is on SAP FES 5.0 or below, you will need to transition to SAP FES 6.0 before upgrading to SAP FES 2020 or higher.

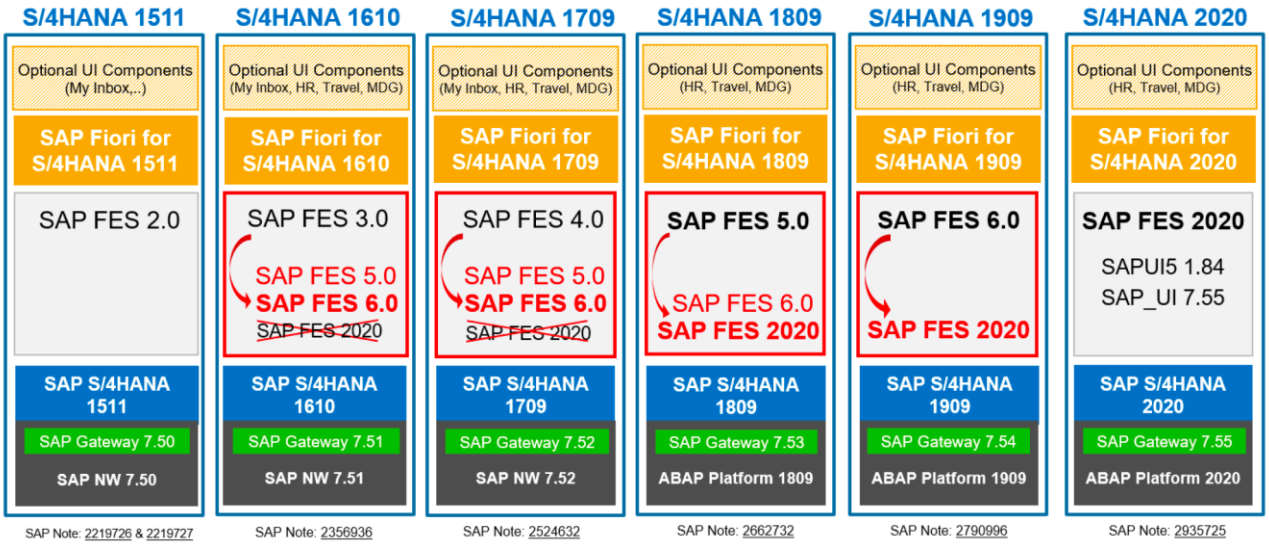


Figure 17 - SAP Fiori front-end server release upgrade options within SAP S/4HANA releases

Important: Using a standalone SAP Fiori FES as a hub for both SAP S/4HANA and SAP Business Suite systems is no longer permitted as of SAP FES 2020. The SAP Fiori FES 2020 for S/4HANA supports the latest SAP S/4HANA releases 1809/1909/2020. It cannot be used with older SAP S/4HANA releases or SAP Business Suite systems.

Finally, in the Software Downloads of the SAP Support Portal, check for the identified known side-effects of the related SAP_UI component on your target release. These side-effects are usually related to:

- Unified Rendering Library Patches
- Business Client (formerly NWBC) Runtime Patches

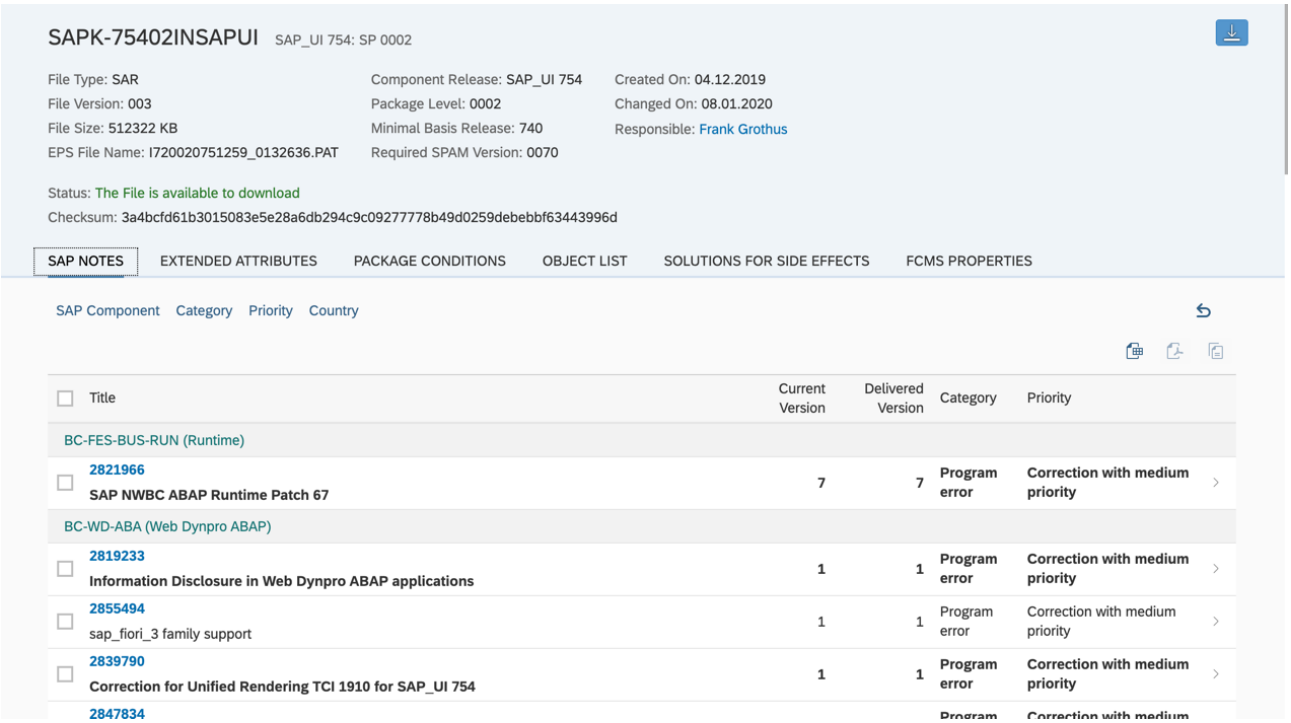


Figure 18 - Example: Identified side-effects of SAP_UI 7.54 SP02

Considerations for after your upgrade:

Once you have decided on the deployment of your SAP Fiori FES, future upgrades of the FES release are possible as demonstrated in the example below via any of the 3 following scenarios:

1. Upgrade SAP FES with your upgrade of SAP S/4HANA
2. Upgrade your SAP FES and ABAP Platform, without upgrading SAP S/4HANA
3. Patch your SAP FES to the latest SAPUI5 release.

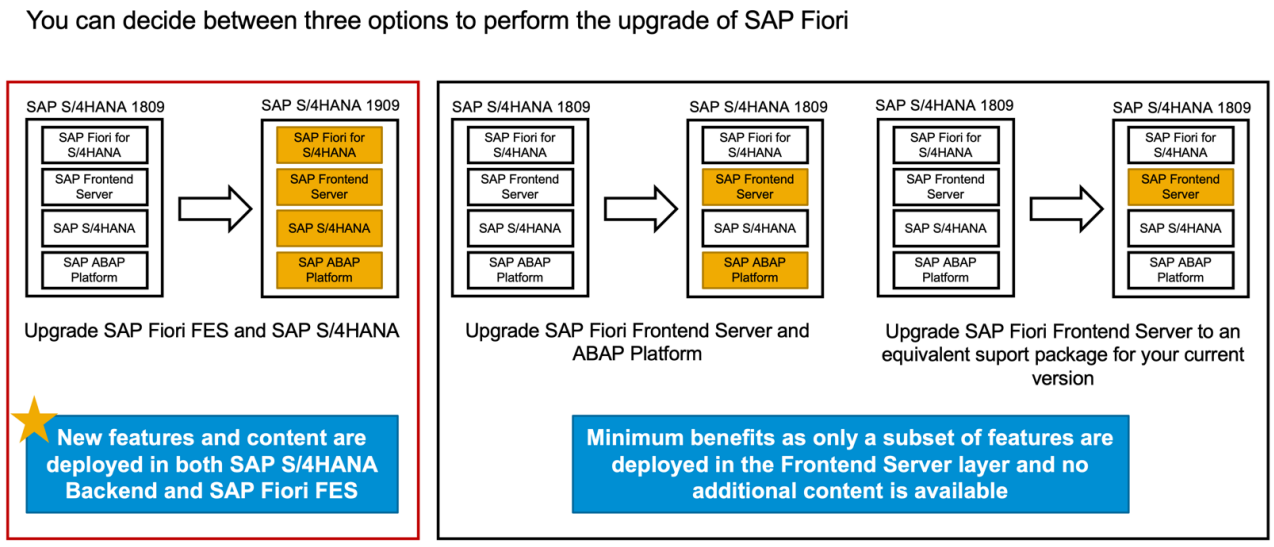


Figure 19 - Options to upgrade SAP Fiori for your SAP S/4HANA system

Refer to:

- SAP Fiori Deployment Options and System Landscape Recommendations

- SAP Fiori deployment options and SAP Fiori front-end server strategy- UPDATE 2020
- SAP Fiori for SAP S/4HANA – Transition from Standalone to Embedded Deployment in SAP S/4HANA
- How and Why to Upgrade SAP Fiori for your SAP S/4HANA solution
- SAP Note 2217489 - Maintenance and Update Strategy for SAP Fiori Front-End Server – this contains a central table mapping of SAP Fiori FES to SAPUI5 versions

2.5.8. Security - authentication

If moving from intranet only to Internet access for the first time, allow additional time to ensure security has been appropriately considered.

Refer to the latest recommendations in:

- Blog post Considerations and Recommendations for Internet-facing Fiori apps

2.5.9. Security - authorizations

New and/or changed authorizations may be introduced due to:

- New SAP Fiori apps
- Changes in SAP Fiori apps
- Changes in the catalog assignment of SAP Fiori apps or classic UIs
- Changes in business processes
- Additional authorizations on existing data extracts (e.g. CDS Views)

A key watchpoint for regression testing is to gather and assess authorization changes, especially those related to underlying CDS Views.

Refer to:

- SAP Note 2919392 – Determining missing authorizations for Access Controlled CDS Entities

From a security perspective, plan on executing these activities prior to running the upgrade:

- Program: SU24_AUTO_REPAIR – Repair Inconsistent data
- Program: SU25_INITIALIZE_TSTMP – Initialize Timestamps
- Transaction: SU25 – Step 3 - export and create backup
- Transaction: PFCG – read old status and merge with new data
- Transaction: PFCG – create backup transport and export

After upgrading plan for executing these activities:

- Review SAP Note 440231 - SU25 | FAQ: Upgrade postprocessing for Profile Generator
- Transaction: SU25 – 2a, 2b - Postprocessing settings
- Transaction: SU25 – 2d, 2c - Postprocessing settings, comparison of transactions, roles
- Transaction SUPC – regenerate authorization profiles of SAP Business Roles
- Transport customer tables

These steps ensure consistency for your authorization objects and will help correctly activating new apps when executing the SAP Fiori rapid activation or content activation for (custom) business roles task lists.

2.5.10. Operating environment impacts

There are differences to be considered for operating environments for business users, administrators, support teams and developers.

2.5.10.1. Operating environment for business users

Always check the following operating environment pre-requisites for all business user operating environments:

- Supported web browsers and related versions
- Supported device operating system and related versions
- Supported versions of connected physical hardware (such as printers and barcode scanners)

Refer to SAP Note 1672817 Browser: Microsoft Legacy Edge and Internet Explorer Support Policy Note

Important: SAP FES 2020 is the last SAP Fiori FES version to support Internet Explorer. Refer to Internet Explorer 11 will no longer be supported by various SAP UI technologies in newer releases.

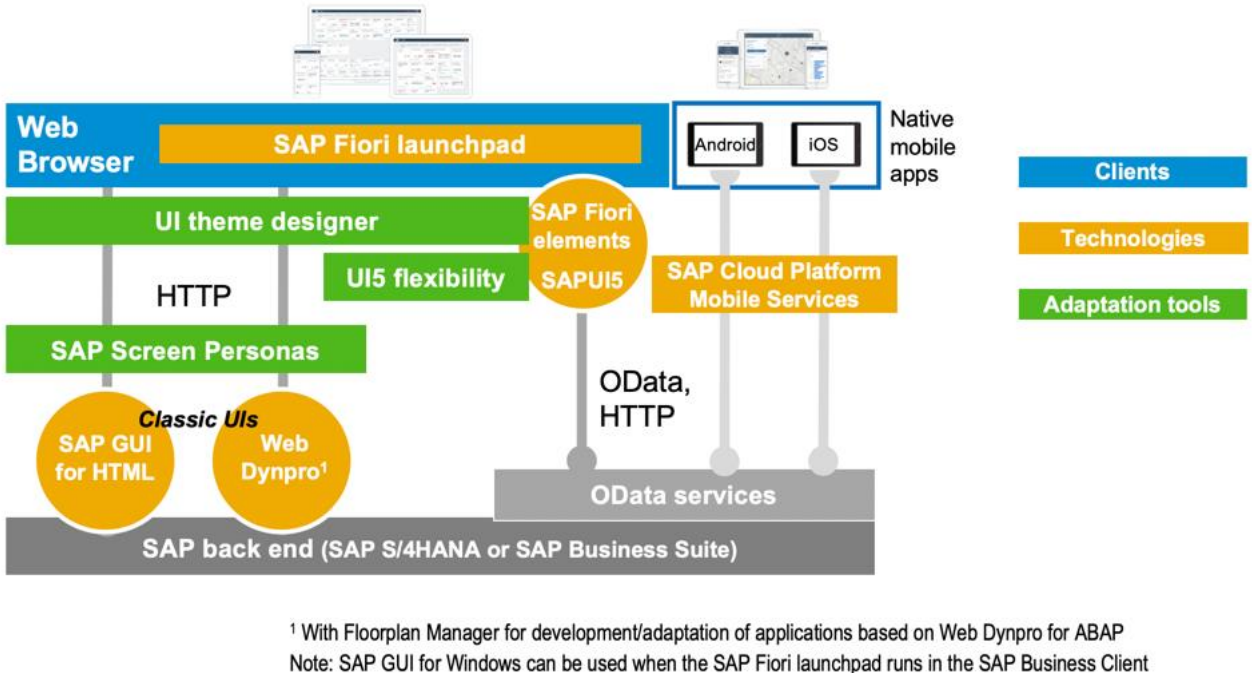


Figure 20 - Simplified overview - SAP Fiori runtime environment

To find supported browsers, OS versions, etc., refer to the SAP Product Availability Matrix (PAM) for your SAP S/4HANA target release. Check your target release for the following software components:

- SAP S/4HANA release
- SAP FIORI FOR SAP S/4HANA target release
- SAP FIORI FRONT-END SERVER target release

E.g. for SAP S/4HANA 2020, within the Product Availability Matrix tool:

1. Navigate to SAP FIORI FOR SAP S/4HANA 2020 (Note: This is the main software component for SAP Fiori apps delivered with SAP S/4HANA)
2. Then go to Essential Information
3. Use the Browser Support link to go to the related information for this release

You can also find the related SAP Fiori FES release for your SAP S/4HANA release in the Product Availability Matrix, e.g.:

1. Navigate to the related Frontend server release for SAP S/4HANA 2020 which is SAP FIORI FRONT-END SERVER 2020 FOR SAP S/4HANA
2. Then go to section Related Links and use the link Web Browser information

2.5.10.2. Operating environment for administrators and support teams

Like other business users, administrators require access to the SAP Fiori launchpad to launch relevant SAP Fiori apps of the SAP Business Role Administrator, e.g. Extensibility Inventory app, Application jobs scheduling app, etc.

This is particularly true for Launchpad content and layout administration tools, such as SAP Fiori apps F4384 Manage Launchpad Spaces and F4512 Manage Launchpad Pages. A SAP Fiori administration role is generated via the task list SAP_FIORI_FOUNDATION_S4 for this purpose.

However, it is expected that administrators and support teams will continue to perform many activities via SAP GUI. These can be launched from the SAP Fiori launchpad, SAP Business Client, or accessed directly via SAP GUI.

For administrators and other users accessing SAP S/4HANA directly via SAP GUI, refer to:
SAP Note 66971 Supported SAP GUI platforms

2.5.10.3. Operating environment for developers

Most development tools and services are made available on the SAP Business Technology Platform. They are the recommended and most efficient development tooling for:

- Developer-led extensions of SAP Fiori apps
- Custom-built apps – including those based on SAP Fiori elements and freestyle apps based on the SAPUI5 and SAP Fiori design guidelines
- Integration of intelligent technologies services into apps, e.g. SAP intelligent Robotic Process Automation

Developers are strongly recommended to keep up to date with the latest best practice advice regarding tools, coding and environments, e.g.:

- via https://developers.sap.com
- via SAPUI5 Software Development Kit (SDK) at https://ui5.sap.com
- via SAP Community topic pages

For example, SAP Business Application Studio and the SAP Fiori Tools extension for SAP Business Application Studio were released in 2020. These are considered the next generation tools compared to SAP Web IDE. These tools come with improved options for building custom apps and extending delivered apps. If you are currently using the SAP Web IDE, you are advised to evaluate these new tools and decide the appropriate timing for moving to the new tools.

The Fiori Tools extension is the recommended tool for creating apps using the SAP Fiori elements floorplans.

For offline development, Visual Studio Code is the equivalent of SAP Business Application Studio. SAP Fiori Tools extension can also be used with a local installation of Visual Studio Code (aka VSCode).

Refer to:

- SAP Community topic SAP Business Application Studio
- SAP Community topic SAP Fiori
- SAP Community topic SAP Fiori elements
- SAP Community topic ABAP Development
- Blog post SAP Fiori Tools is generally available. Increase the efficiency of developing SAP Fiori elements apps
- SAP Developers Tutorials for SAP Fiori Tools
- SAP Developers Tutorial Set up SAP Fiori Tools in your Development Environment (VSCode)
- Blog post Adaptation Project – your one stop tool for extending SAPUI5 applications

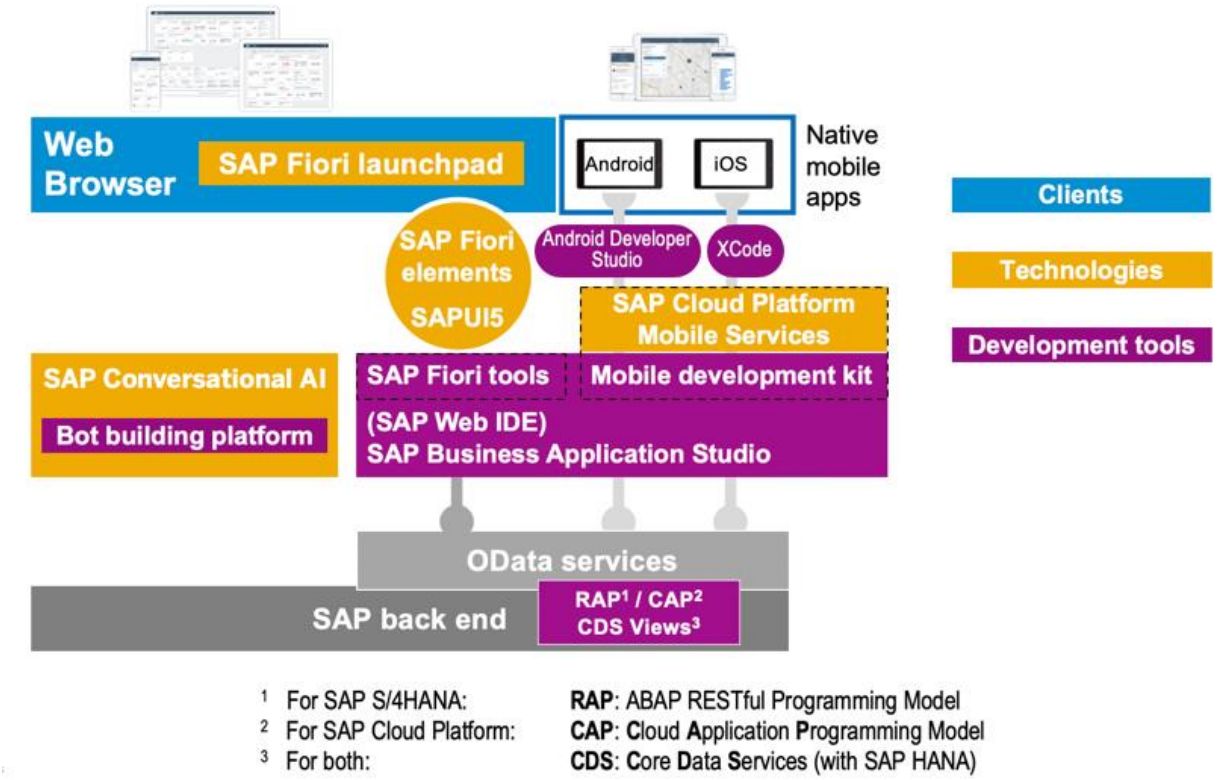


Figure 21 - Simplified overview of SAP Fiori development tools and technologies (source: openSAP)

Current minimum tools & services requirements are:

- Developer-led extensions of SAP Fiori apps and custom Fiori apps will require:
  - SAP Business Application Studio on SAP Business Technology Platform (Cloud Foundry) or
  - SAP Web IDE (Full Stack edition) on SAP Business Technology Platform (Neo)

Additional tools & services requirements may be desirable depending on your scope and development preferences, e.g.:

- DevOps tooling for custom SAP Fiori apps
  - For example, if you are deploying apps side by side in the SAP Business Technology Platform, you may want to consider Continuous Integration and Delivery solutions for SAP Business Technology Platform

- SAP mobile services on SAP Business Technology Platform
    - For example, for creating offline apps or adding additional native app features such as GPS, Voice Recording, etc.

Refer to:

- Continuous Integration and Delivery Best Practices guide in the SAP Help Portal
- SAP Solutions for Continuous Integration and Delivery in the SAP Help Portal
- Blog post Meet our new continuous integration and delivery solution

Important: While there are some alternatives development environments possible for custom-built apps, these do not provide the wide range of accelerators for efficient development. Similarly, developer-led extensions of SAP Fiori apps are not able to be generated outside of SAP Business Technology Platform tools such as SAP Business Application Studio or SAP Web IDE.

Some on-premise tools are also required to complete your development environment. These tools and more can be downloaded from the SAP Development Tools site https://tools.hana.ondemand.com where you will find further details and instructions. The primary tools are:

- To connect your SAP S/4HANA On-Premise or SAP S/4HANA Cloud, private edition development environment with the SAP Business Technology Platform, the **SAP Cloud Connector** must be installed or upgraded.
    - The SAP Cloud Connector acts as a VPN tunnel to your SAP S/4HANA On-Premise system or SAP S/4HANA Cloud, private edition.
- For ABAP development, the Integrated Development Environment (IDE) is **ABAP Development Tools for Eclipse**. This must also be installed/upgraded on developer PCs.

2.5.11. Custom code impacts

Custom code impacts may require rework due to:

- Changes in the ABAP Foundation capabilities of your SAP S/4HANA system
- Delta simplifications, e.g. changes in the underlying database model and CDS Views
- Successor SAP Fiori apps providing new or changed extension options
- Evolution of the recommended ABAP Programming Model

Important: For those coming from SAP S/4HANA 1511, 1610, or 1709, the ABAP Foundation of SAP S/4HANA was changed from SAP NetWeaver to ABAP Platform. From SAP S/4HANA 1809, the ABAP Platform is shipped with your SAP S/4HANA system and is not provided standalone.

Refer to:

- ABAP Platform in the SAP Help Portal
- What's New Viewer for the ABAP Platform
- Blog post ABAP Platform for SAP S/4HANA 1909

Evolution of the ABAP Programming Model has progressed across SAP S/4HANA releases. With SAP S/4HANA 1909, the unmanaged scenario of the ABAP RESTful Programming Model was introduced. With SAP S/4HANA 2020, further scenarios of the ABAP RESTful Programming Model were introduced.

In SAP S/4HANA 2020 and higher releases, ABAP RESTful Programming Model is the current best practice for creating custom apps. Where custom code is currently based on earlier programming models and requires significant revision, consider moving to the ABAP RESTful Programming Model. Earlier programming models are still supported but will not be further improved.

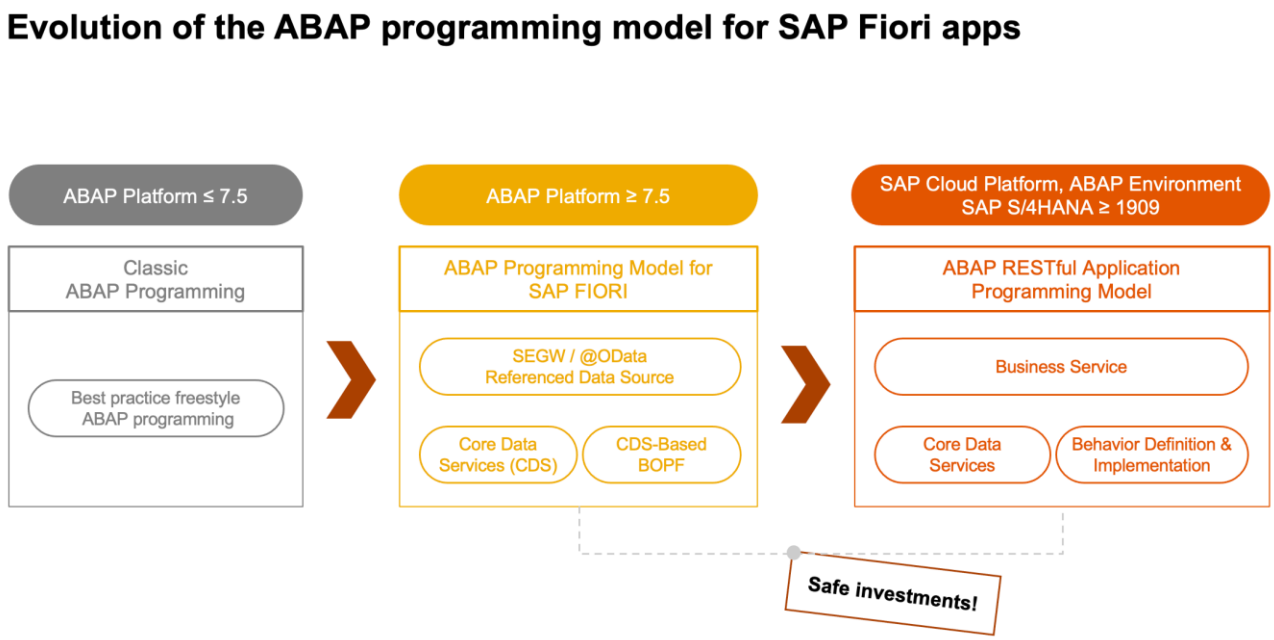


Figure 22 - Evolution of ABAP Programming Model

Refer to:

- ABAP RESTful Programming Model
- SAP Community topic ABAP Development
- Blog post Evolution of the ABAP Programming Model
- Blog post Getting Started with the ABAP RESTful Application Programming Model
- TechEd 2019 Replay CAA103 Get the Big Picture of the ABAP RESTful Programming Model
- TechEd 2020 Replay Major Updates on ABAP RESTful Application Programming Model [DEV102]

2.5.12. Upgrading custom ABAP code

Custom ABAP code may need to be remediated due to simplifications in the ABAP Platform and changes in the database.

From SAP S/4HANA 1809 or higher you can use the SAP Fiori app F3191 Custom Code Migration to assist code migration to your target release. The app is part of SAP Business Role **Project Manager – IT**.

Alternatively, you can use the ABAP Test Cockpit as described in the Custom Code Migration guide to check your custom code against the SAP S/4HANA simplifications of your SAP S/4HANA target release. Running the tool will give a results list of instances where your custom code does not comply with the scope and data structure of your SAP S/4HANA target release.

You must resolve any mandatory non-compliance items. You may optionally resolve other non-compliant items, e.g. to improve performance by removing the use of Compatibility Views.

Refer to:

- Blog post Custom code analysis for SAP S/4HANA with SAP Fiori App Custom Code Migration
- SAP Note 2190420 - SAP S/4HANA: Recommendations for adaption of customer specific code
- SAP Note 2241080 - SAP S/4HANA: Content for checking customer specific code

2.5.13. Upgrading custom SAP Fiori apps

When upgrading from SAP S/4HANA 1511 to any higher SAP S/4HANA release, this is also an upgrade from the original SAP Fiori design to SAP Fiori 2.0 or SAP Fiori 3 design. This means that there are some additional checks to be performed. Find more information in the guide Welcome to SAP Fiori 2.0 pack.

When upgrading from SAP S/4HANA 1610, 1709, or 1809 to SAP S/4HANA release 1909 or higher, it is an upgrade from SAP Fiori 2.0 design to SAP Fiori 3 design. This is an evolution of the SAP Fiori design and typically does not require any rework of custom-built apps, provided current SAP Fiori 2 best practice recommendations were followed during the development.

For all SAP S/4HANA releases you will need to reference the SAPUI5 SDK to review the advice on upgrading from your current to your target SAPUI5 version. You will need to:

- Check for deprecated SAPUI5 themes, libraries, and controls
- Check for deprecated APIs

Where you need to replace deprecated controls, you should also review current best practices and recommendations for your target SAPUI5 version in the SAP Fiori design guidelines.

To identify required and recommended changes directly in your code you can use the tools:

- Support Assistant
- UI5 Migration Tool

To minimize custom code remediation in future upgrades, review these best practices when building SAPUI5 apps:

- Consider migrating freestyle apps to SAP Fiori elements where possible
    - SAP Fiori elements are automatically updated on upgrade to your target SAPUI5 version
    - Review the SAP Fiori element feature map for your target SAPUI5 version
- Review the Best Practices for App Developers in the SAPUI5 SDK
- Blog post Performance Checklist for UI5 Apps
- Blog post Best practices for async loading in UI5
- Blog post UI5 Tooling: a modern development experience for UI5!
- OPENUI5 Development Conventions and Guidelines
- Ruleset for ESLint Code Checks for SAPUI5

Refer to:

- openSAP course Evolved Web Apps with SAPUI5
- SAP Community topic Fiori elements
- Blog post 3 ways to speed up development with SAP Fiori elements
- Blog post When to use SAP Fiori elements to reduce development time and costs
- SAP Note 2217489 - Maintenance and Update Strategy for SAP Fiori Front-End Server – this contains a central table mapping of SAP Fiori FES to SAPUI5 versions

2.5.13.1. Deprecated SAPUI5 themes, libraries, and controls

Deprecated SAPUI5 controls can be found in the SAPUI5 Software Development Kit. Each deprecated element typically provides recommendations for alternatives. Within the Documentation section, search for the term “deprecated” to find the section Deprecated Themes and Libraries.

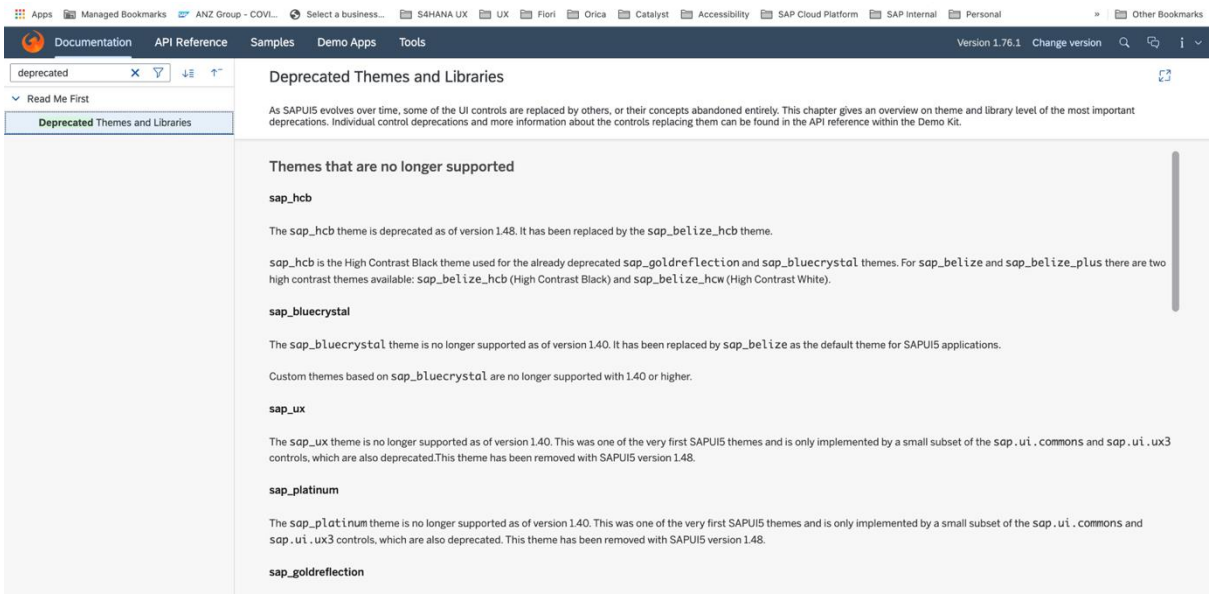


Figure 23 - SAPUI5 Software Development Kit section Deprecated Themes and Libraries

Within the API Reference, select the checkbox “include deprecated controls”, and selected deprecated APIs to find the index of deprecated APIs. The list of all deprecated APIs as of each SAPUI5 version is displayed.

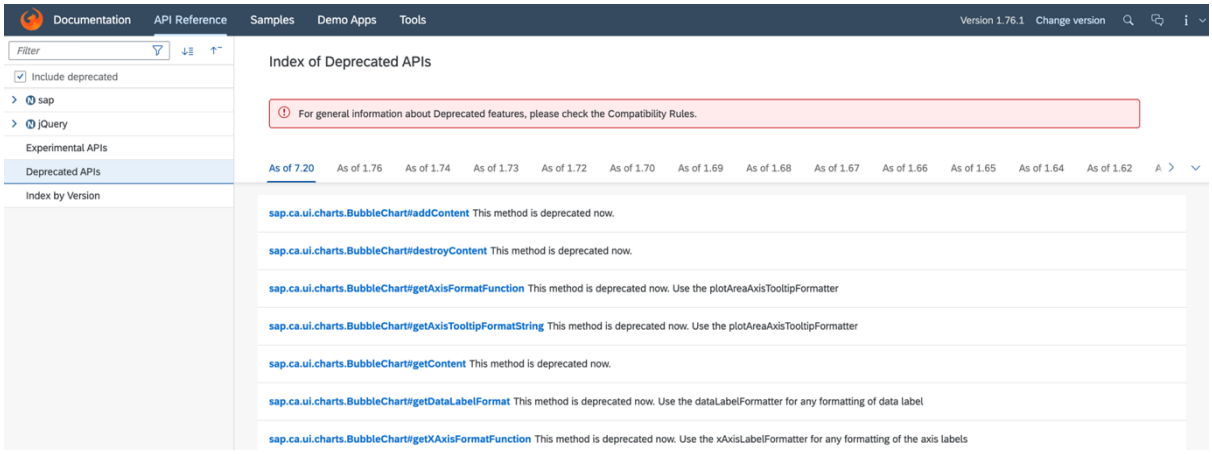


Figure 24 - SAPUI5 Software Development Kit - section Index of Deprecated APIs

Important: Tools such as the SAP Business Application Studio typically display warning messages for deprecated elements.

Some customers have also developed ways of assessing deprecated elements in their apps, for example, the chrome extension detailed in Detecting and Updating Deprecated UI5 controls.

2.5.13.2. Using the Support Assistant to identify required changes

The Support Assistant check apps are built according to the current SAPUI5 best practices and guidelines. You can use Support Assistant to identify the required changes in your custom SAP Fiori (SAPUI5) apps.

Start the Support Assistant from the Technical Information Dialog by using the following keyboard combination [CTRL + SHIFT + ALT + P], then Select **Activate Support Assistant**.

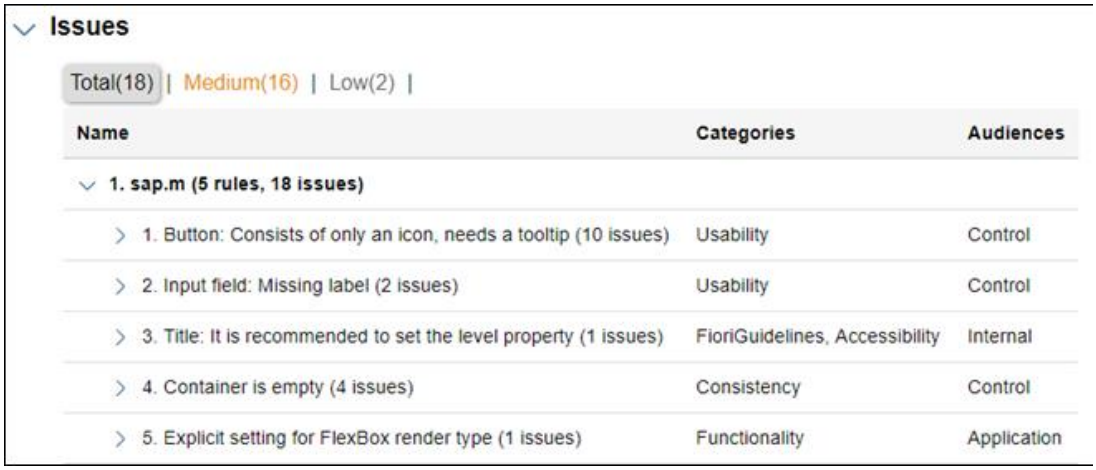


Figure 25 - Example of Support Assistant identified issues for remediating custom SAP Fiori (SAPUI5) apps

Refer to:

- Using the Support Assistant in the SAPUI5 SDK

2.5.13.3. Using the Migration Tool to adapt custom code to higher SAPUI5 releases

The UI5 migration tool is a node.js-based offering that supports you in the migration of UI5 projects by adapting the code to fit newer UI5 framework versions. The UI5 migration tool performs source code replacements and optimizations to reduce or get rid of deprecated APIs.

Migration consists of an analysis part and a code modification part. The tool comes with a comprehensive set of command-line options to configure the steps to analyze or to migrate specifically for your UI5 project.

Refer to:

- UI5 Migration tool on Github

2.5.14. Integration

In a technical upgrade, most integration is covered by regression testing.

You must also check any integration to analytics platforms, such as SAP BW or SAP BW/4HANA. For BW Extractors refer to SAP Note 2500202 S4TWL - BW Extractors in SAP S/4HANA

If you are integrating to Cloud solutions, such as SAP cloud or 3rd party solutions, it is important to check for any shift in integration techniques due to the change in release. For example, from SAP S/4HANA 1809, integration to SAP Ariba requires a change to the Content Integration Gateway (CIG) integration approach.

For changes in integration of SAP cloud solutions refer to the appropriate references, which can be found on the Integrate tab of the SAP S/4HANA product page in the SAP Help Portal.

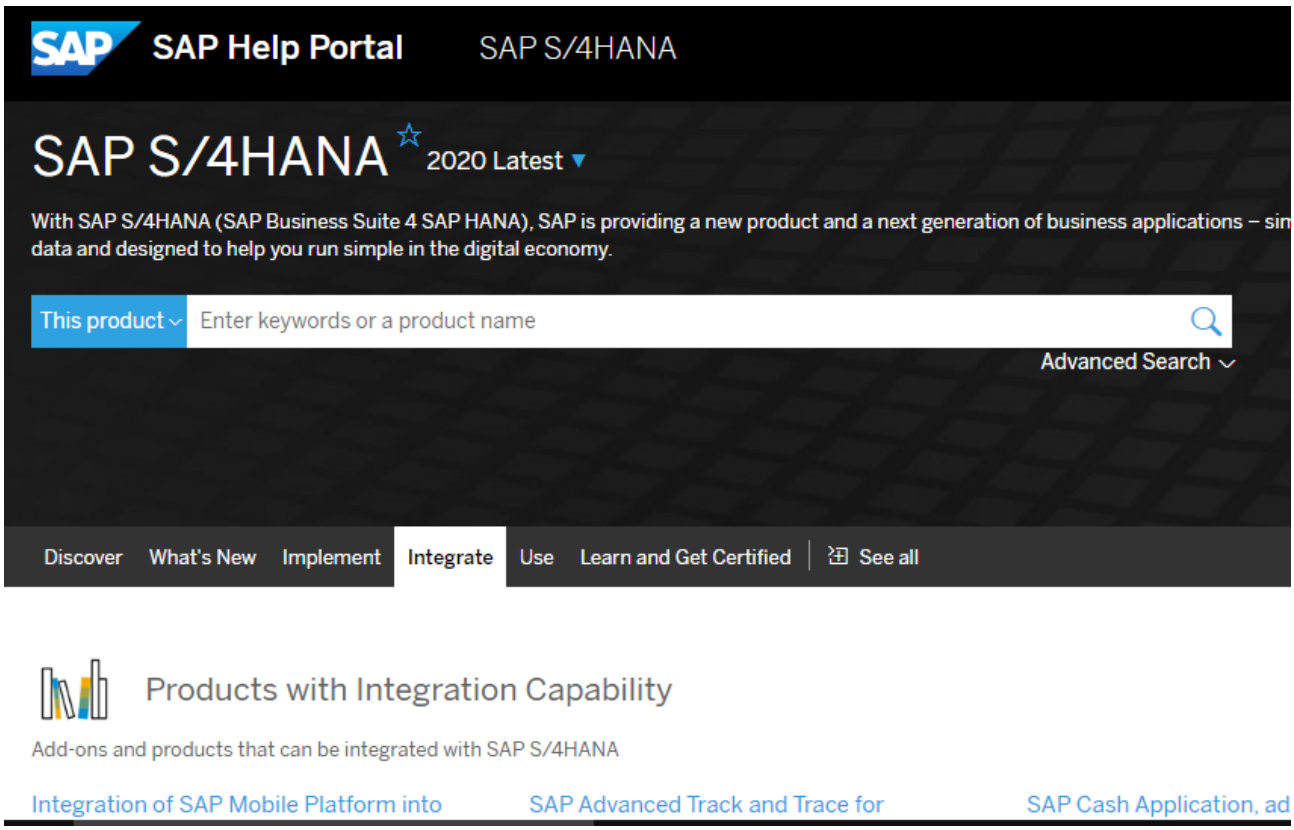


Figure 26 - Integrate tab of the SAP S/4HANA product page in the SAP Help Portal

For integration to other solutions check:

- Simplification Item Catalog for any deprecated BAPIs or APIs
- SAP API hub https://api.sap.com for advice regarding APIs for SAP S/4HANA

2.5.15. Move to Hyperscaler

As part of your upgrade you might have taken the decision to move your SAP S/4HANA into a Hyperscaler and run it as a hosted cloud system. You can find more information about this option in SAP S/4HANA Deployment on Hyperscalers and in our openSAP course SAP on Hyperscalers – Strategy, Architecture and Deployment.

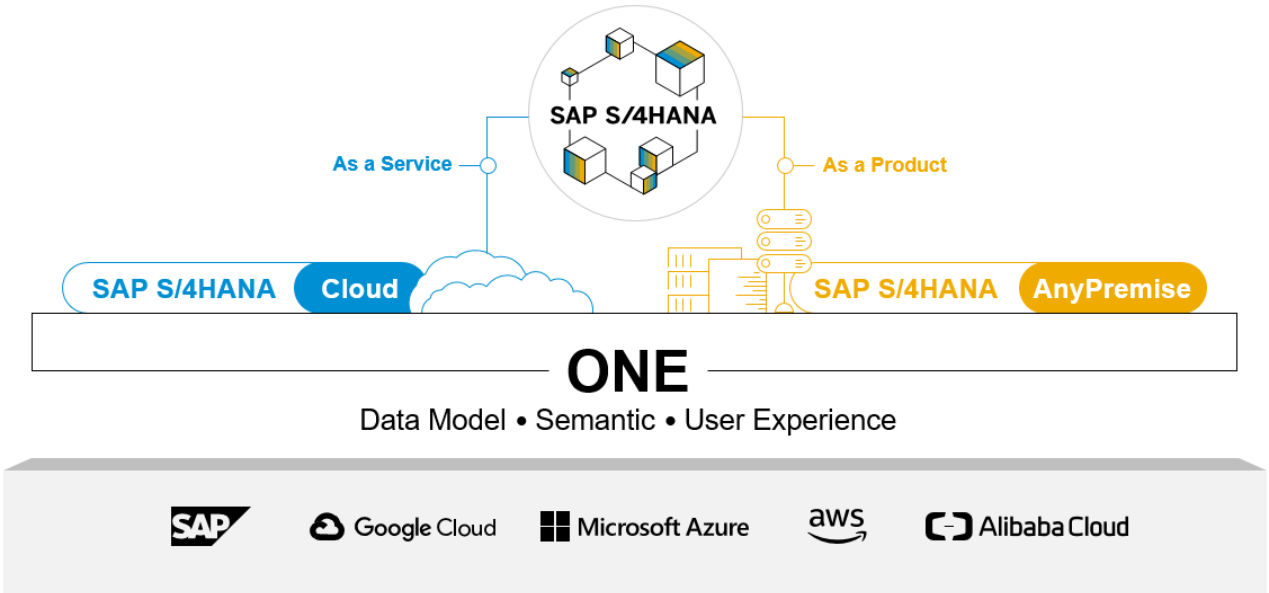


Figure 27 - Running SAP S/4HANA on a hyperscaler

You should plan for the following activities:

1. Review your current operating system and check if you need to change to another supported OS available on your hyperscaler. Refer to SAP Note 2620910 for Recommended Application Server Platforms.
2. For landscape planning use standard reference architectures as offered by the hyperscaler vendors including high availability (HA) and disaster recovery. These are available with standard automation scripts for creation of instances to reduce cost. High availability can be configured within an availability zone, across availability zones, or in a combination of both. HA configuration and the choice entirely depends on availability requirements and how much your organization can afford in terms of cost.
3. Evaluate hardware requirements. For sizing you can scale up or scale out all your servers. Therefore, it becomes easier to initially use lower sized application and database server instances to save cost.
4. Please ensure a backup solution is selected and in place before the upgrade. You may find it convenient to change to a cloud-native backup service instead of third-party tools.
5. Plan the landscape rollout strategy using either horizontal or vertical strategy of the hyperscaler rollout. In a horizontal strategy you would move sandboxes first to the hyperscaler, then the non-production systems and finally the production system. In a vertical strategy all instances of non-critical systems would directly be moved to the hyperscaler.
6. Evaluate deployment options for key components like application central services, Fiori front-end server, SAP Web dispatcher, SAP Cloud Connector and agents.

Migration approach
Select the Migration approach based on your cutover window, migration link bandwidth, platform change needed, database-to-database replication capability and file synchronization offered by the hyperscaler. Feasibility will depend on your contract with the hyperscaler vendor and/or feasible target OS.

The options below may be considered:

1) Use the Software Provisioning Manager (SWPM) tool to first “lift and shift” without upgrading SAP S/4HANA. Evaluate both the options of moving the database backup or database export to files. Database-to-database replication capability should also be considered to reduce downtime. You can then use the Software Update Manager (SUM) tool to upgrade to the target release version.
2) Use the Software Update Manager (SUM) tool to upgrade the SAP S/4HANA system to the target release and then move to the hyperscaler using the Software Provisioning Manager (SWPM) tool to “lift and shift”.

2.5.16. Leveraging CQC Support Services (SAP Enterprise Support customers)

If you have an SAP Enterprise Support maintenance contract for your SAP S/4HANA system, it is recommended that you schedule the following SAP Support services to perform some quality checks specific to Upgrades:

- CQC for Upgrade, which consists of:
  - An Analysis Session, which includes parameter setting checks and sizing (delivered 5-6 weeks before upgrade Go-Live)
  - A Verification session, which includes parameter setting checks and performance analysis (delivered 6 weeks after Go Live)
- CQC Going Live Support

    - Monitors your system on the first 3-5 productive days after Go-Live to detect issues before they arise

In case of an SAP Fiori FES standalone deployment both services can and should be booked for the SAP S/4HANA and the SAP Fiori FESs.

In case of moving from hub/standalone to embedded deployment both services should be booked for the SAP S/4HANA system only. You should mention that there will be increased workload due to the embedded SAP Fiori FES.

Optionally, you could book the following additional services to improve system performance and minimize potential risks prior to the upgrade:

- CQC Business Process Performance Optimization
    - In case of specific performance issues on a process, SAP Fiori App, or Transaction, regardless of the upgrade
- CQC Business Process Improvement
    - Understand business issues in your critical processes before upgrade, and try to implement solutions during your upgrade projec
- CQC Security Optimization Service
    - Improve security settings of your system before or after the upgrade
    -

You can book these services by creating an incident under component SV-BO-REQ (SAP Note 1296527) or contacting the SAP Enterprise Support Advisory team via our Customer Interaction Center (CIC).

2.5.17. Leveraging support services (standard support)

If you do not have an SAP Enterprise Support maintenance contract for your SAP S/4HANA system, it is recommended that you schedule the following SAP Support services to perform some quality checks specific to Upgrades. It is recommended to request the following services:

- A GoingLive Upgrade Check
- In case of vital alerts reported by SAP EarlyWatch® Alert, up to two (2) SAP EarlyWatch® Checks may be performed per calendar year for a production system if required

Prior to ordering the services, it is recommended to read the standard support scope description.

2.5.18. Leveraging support services (SAP Product Support for Large Enterprises)

If you have a Product Support for Large Enterprise (PSLE) contract, it is recommended to reach out to your SAP contact to discuss which services could be planned for your project.

Prior to ordering the services, it is recommended to read the SAP Product Support for Large Enterprises scope description and the SAP Product Support for Large Enterprises web page.

2.5.19. SAP Enterprise Support value map

SAP Enterprise Support value map for SAP S/4HANA offers a one-stop shop for prescriptive guidance, interactive learning, and social collaboration, covering each phase of an SAP S/4HANA project.

Prescriptive content within the “Run Learning Journey” available in the value map includes a range of meet-the-expert webcasts, blog posts, and best practices documentation relevant for SAP S/4HANA upgrade. We have also set out remote services (availability depending on your SAP maintenance agreement) that will help to safeguard your upgrade project from potential showstoppers. If you have questions about any aspect of your SAP S/4HANA upgrade project, you can ask them in the value map.

Joining SAP Enterprise Support Value Maps:

- If you are an SAP Enterprise Support, SAP Enterprise Support Cloud Edition or SAP Product Support for Large Enterprises (PSLE) customer, then value map access is already included in your maintenance contract.
- Read more about SAP Enterprise Support value maps and sign up at SAP Enterprise Support Value Maps.
- Please note that before you can access the value map, a one-time registration in SAP Learning Hub, edition for SAP Enterprise Support, is required. A detailed step-by step guide to registration can be found at SAP Learning Hub, edition for SAP Enterprise Support.
- If you have any questions, please contact sapesvaluemaps@sap.com.

2.6. Improving your User Experience

User Experience is the corner stone of user productivity, satisfaction and adoption. User Experience is arguably the most important factor in realizing customer value from the Intelligent Enterprise, including from SAP S/4HANA. Business outcomes can only be achieved when business users adopt to the new solution. The faster the user adoption, the more swiftly benefits can be achieved.

SAP Fiori is the way business users consume SAP S/4HANA innovations including:

- UX on multiple web browsers and mobile devices
- Embedded analytics
- New business processes only on SAP Fiori – such as Group Reporting, Central Procurement, Predictive MRP, etc.
- Intelligent Technologies – such as Situation Handling, Machine Learning, and Robotic Process Automation, and chatbots.

Your user experience drives solution adoption and changes in user behavior towards achieving strategic and tactical business outcomes.

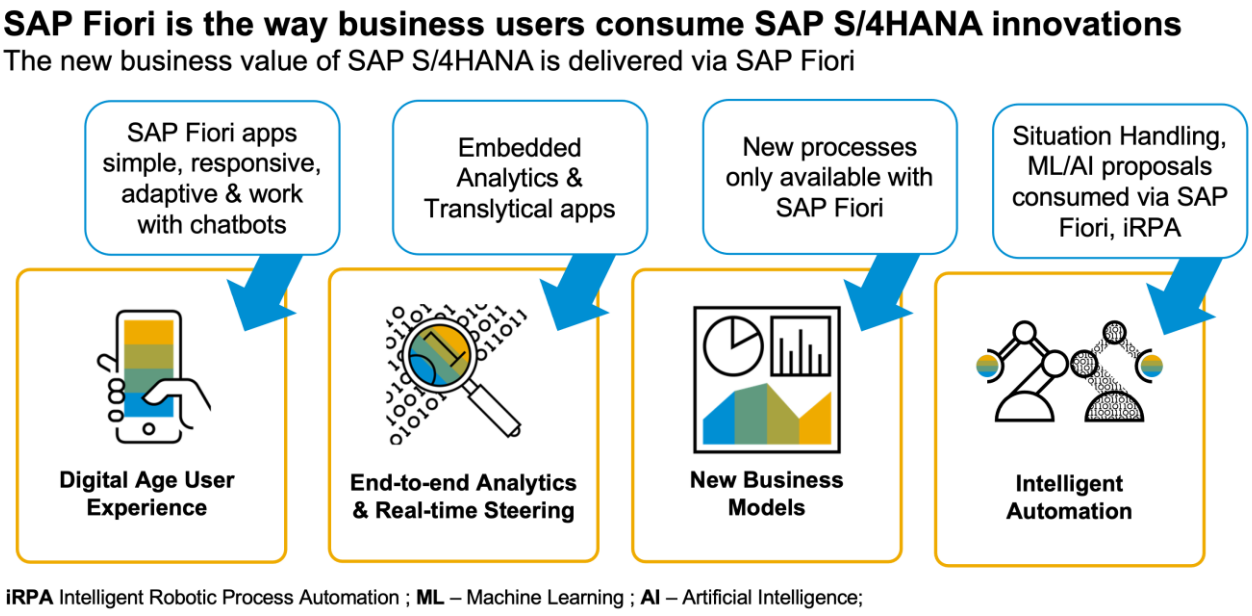


Figure 28 - SAP Fiori is the way business users consume SAP S/4HANA innovations

Your SAP S/4HANA upgrade an important time to review your UX Strategy. Reviewing your UX strategy helps you avoid surprises, take advantage of new SAP-delivered business value, and bring more value to your users. Such benefits can be major or incremental, for example:

- **Major**: as part of a functional upgrade, you may introduce new SAP Fiori apps.
  - With each SAP S/4HANA release, SAP typically delivers 300-400 new SAP Fiori apps plus new SAP Fiori features.

- **Incremental**: as part of a technical upgrade, you introduce new SAP Fiori features in the launchpad, and in commonly used SAP Fiori floorplans
  - For example, in SAP S/4HANA 1909, many floorplans automatically added an Export to spreadsheet feature, and in SAP S/4HANA 2020, the ability to save multiple value sets of User Defaults was added to the Launchpad > User Actions > Settings dialog.

2.6.1. Review your UX strategy

Upgrading provides significant improvements in SAP S/4HANA User Experience in:

- **Increased SAP Fiori coverage**
  - Each new release of SAP S/4HANA has typically introduced approximately 350-400 new SAP Fiori apps
  - Improvements in existing apps that cover new use cases
- **New SAP Fiori features**
  - New launchpad options and new in-built features in floorplans
  - For example “export to spreadsheet” was added to many SAP Fiori elements apps in SAP S/4HANA 1909
- **New classic User Interface (UI) capabilities** when launched from SAP Fiori
  - For example, touch-enabled user interfaces for Web Dynpro ABAP applications and SAP GUI for HTML transactions
- **Performance improvements** in both SAP Fiori and classic user interface technologies.

There are always significant UI design and performance improvements, new features, and apps (and often lifting of previous restrictions) that the upgraded version of SAP Fiori brings along with the upgrade of SAP S/4HANA. Refer to this blog post that explains SAP Fiori upgrade scenarios in detail – How and Why to Upgrade SAP Fiori for your SAP S/4HANA solution.

You can get some useful starting points for discussions with business stakeholders in the SAP Fiori lighthouse scenarios (regularly updated), which highlights apps with the best new business value for specific lines of business.

You can find the list of all SAP Fiori for SAP S/4HANA apps in the SAP Fiori apps reference library.

For your UX strategy, whether you are doing a Technical Upgrade or a Functional Upgrade, review as a minimum:

- Changes in **supported operating systems and web browsers** for desktop and mobile devices
- Improvements and new **launchpad features**
- New **performance improvement** options, e.g. for your Fiori launchpad and for the Gateway component on which it runs
- Improvements in **major SAP Fiori floorplans** (covered in section 2.7.2 Changed Apps)
    - Especially the most common: SAP Fiori elements and SAP Smart Business Framework – refer to section 2.7.2 Changed Apps
- Improvements in **support for classic UI technologies** and their deployment options
- New/improved options for **context-sensitive help**, e.g. updates to the User Assistant
- New/improved **tools for managing launchpad content and layout**
- New/improved **support tools**

For functional upgrades you should also review:

- New/improved **intelligent automation** features
- New/improved **in-app extension capabilities** within your target SAP S/4HANA release
- New/improved **side-by-side extension capabilities** in the SAP Business Technology Platform, e.g. SAP Launchpad service.

Refer to:

- PAM for your target release, e.g. SAP FIORI FOR SAP S/4HANA 2020 > Essential Information – for supported browsers and operating systems
- Fiori Launchpad guide for your target SAP S/4HANA release
- What's New Viewer for the ABAP Platform - this includes What's New for the Fiori launchpad
- SAP Note 2217489 - Maintenance and Update Strategy for SAP Fiori Front-End Server – this contains a central table mapping of SAP Fiori FES to SAPUI5 versions

2.7. User Experience impacts

If you are using SAP Fiori apps in your SAP S/4HANA source system, as a minimum you will need to assess:

- Deleted and deprecated SAP Fiori apps
- Successor apps for existing SAP Fiori apps you have deployed
- Changes to existing SAP Fiori apps that you have deployed
- Changes to classic User Interface capabilities
- Deleted and deprecated classic UIs
- Change to catalog assignment of SAP delivered SAP Fiori apps and classic UIs
- Changes in Accessibility

If you are using a Functional Upgrade approach, you will also need to assess:

- New apps available in your target SAP S/4HANA release and FPS
- New SAP Fiori launchpad features
- Essential business roles required to configure/adapt/extend SAP Fiori

A detailed summary of app changes and recommendations per app can be found in SAP Note 2881803 - FAQ: S/4HANA Fiori Best Practices - Collective Note

2.7.1. Deleted, deprecated, and successor apps

Deleted and deprecated SAP Fiori apps can be identified in the SAP Fiori apps reference library. You must replace deleted and deprecated apps with an alternative. The SAP Fiori apps reference library will also present you with the alternatives.

SAP Fiori apps that you have already deployed may also have successor apps. You should replace predecessor apps with their successor apps, if possible. As well as introducing new capabilities, improvements and new features will only be provided in the successor app.

Successor apps are typically introduced as a new app with a new app id. The relationship between predecessor and successor apps is held in the SAP Fiori apps reference library. You should find a Predecessor or Successor apps section in the Product Features tab of the app, for example:

SAP Fiori app F0842 Manage Purchase Orders shows the following subsection on the Product Features tab

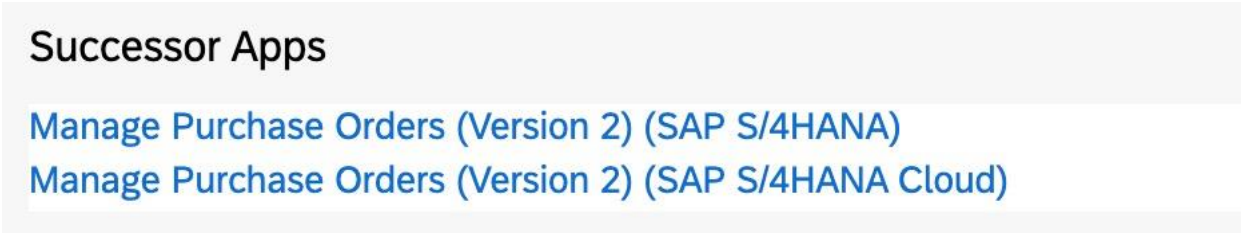


Figure 29 - Successor apps subsection of Product Features listing and linking to the successor apps

Similarly, SAP Fiori app F0842A Manage Purchase Orders (Version 2) shows the following subsection on the Product Features tab:

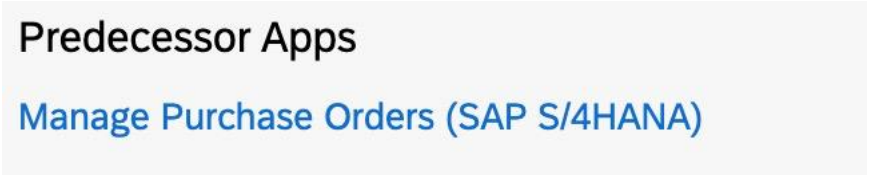


Figure 30 - Predecessor apps subsection of the Product Features tab listing and linking to predecessor apps

In the SAP Fiori apps reference library:

1. Select main filter SAP Fiori apps for SAP S/4HANA, then sub-filter All Apps
2. Select your existing apps
3. Aggregate the configuration information
4. Select your target release and FPS
5. Check the Selected apps section

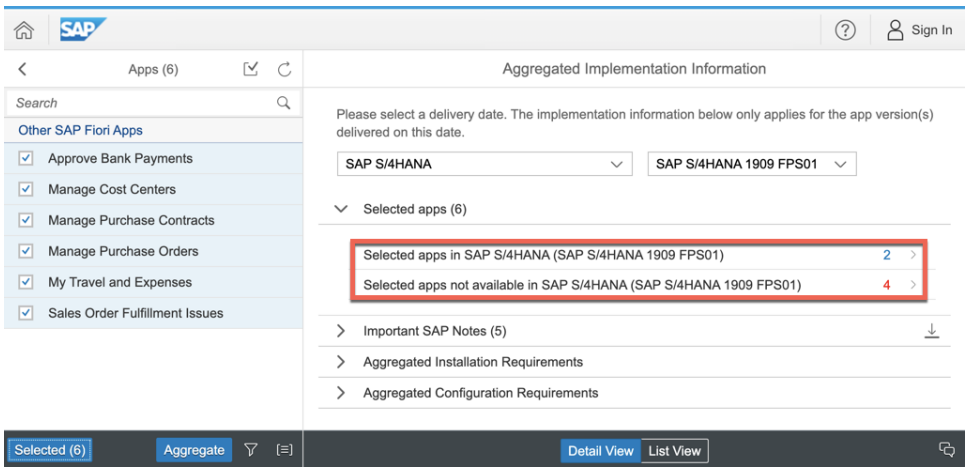


Figure 31 - SAP Fiori apps reference library showing Aggregated Implementation Information for a selection of SAP Fiori apps

If there are deleted or deprecated apps, these can be listed by expanding “Selected apps not available...” to display the unavailable apps. This list can be downloaded using the download icon at the top right of the table.

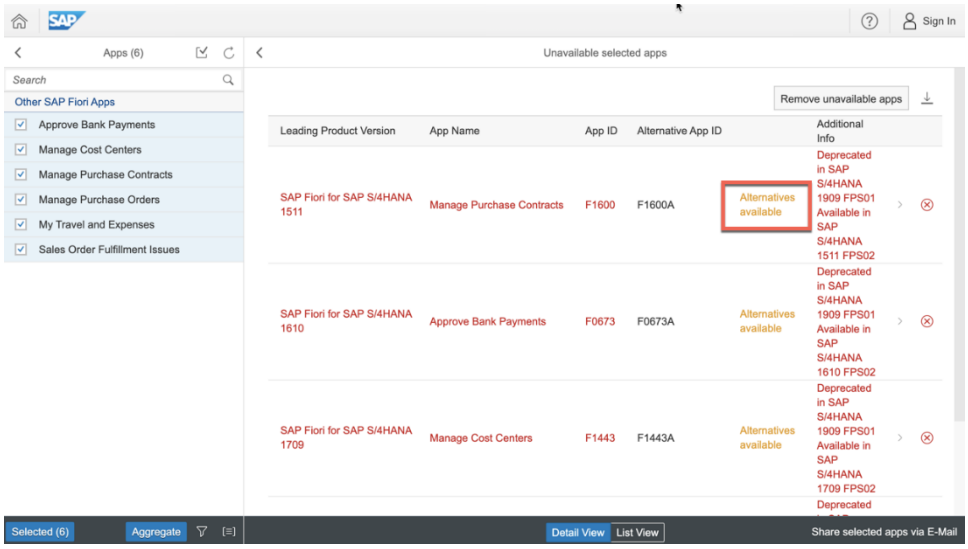


Figure 32 - SAP Fiori apps reference library – showing unavailable apps list information for a specific SAP S/4HANA release

If there are currently deployed apps that have successors these can be listed by expanding “Selected apps available...” to display the available apps.

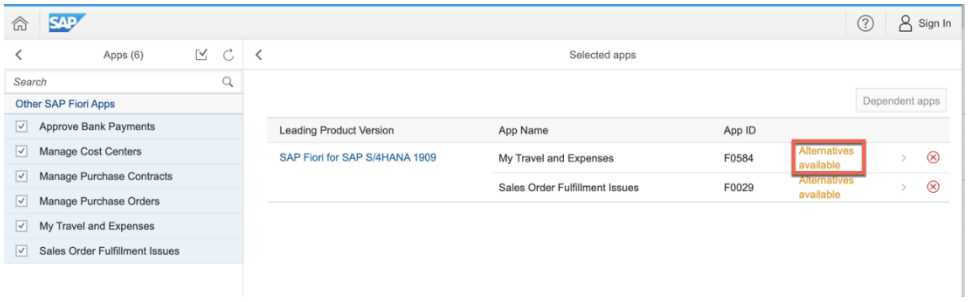


Figure 33 - SAP Fiori reference apps library - showing Unavailable apps list showing Alternatives Available link

In both lists you can select the alternatives available link to see the recommended successor apps. The recommended successor app is listed as a heading above each set of alternatives:

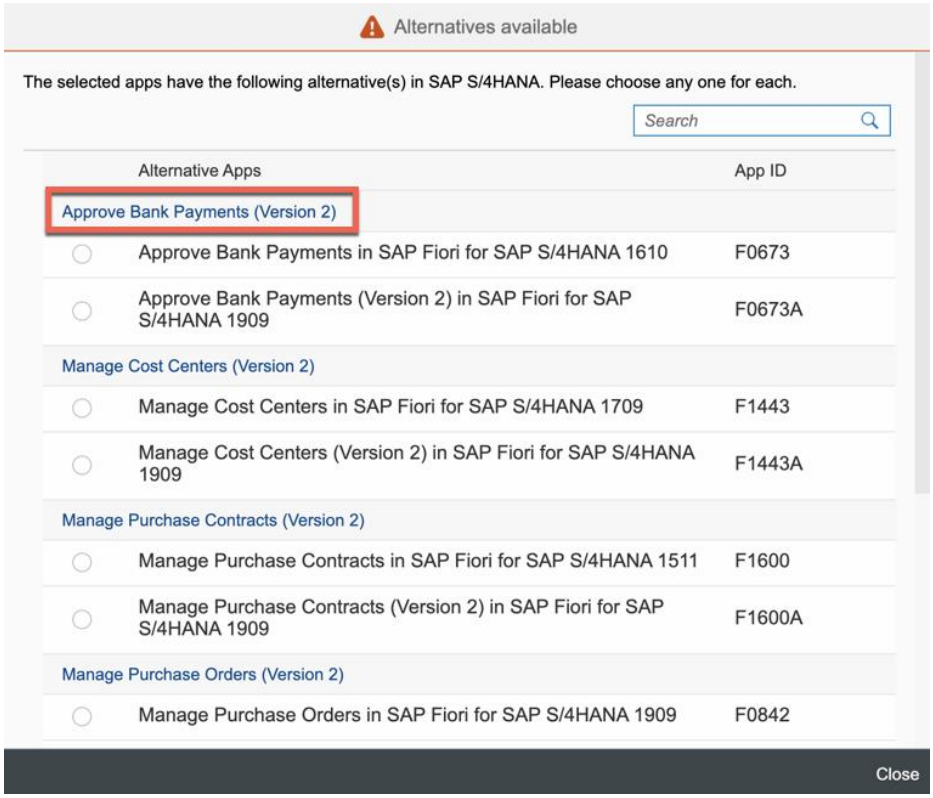


Figure 34 - SAP Fiori apps reference library - showing Alternatives available list and highlighting the recommended app of alternative apps

Refer to:

- openSAP microlearning video Finding available SAP Fiori apps in the SAP S/4HANA playlist, Lines of Business Cross-Topics

2.7.2. Changed apps

Major functional changes to apps are typically listed in the SAP S/4HANA What's New Viewer.

There can also be automatic changes to SAP Fiori apps due to improvements in the underlying SAPUI5 controls and SAP Fiori floorplans and frameworks, such as:

- SAP Fiori elements floorplans
- SAP Fiori Smart Business

These depend on your SAPUI5 version and changes can be found by examining SAPUI5 version differences for your target SAPUI5 version in:

- SAP Fiori Design Guidelines – What's New
- SAPUI5 Software Development Kit – What's New in SAPUI5 and Change Log
- SAP Note 2217489 - Maintenance and Update Strategy for SAP Fiori Front-End Server – this contains a central table mapping of SAP Fiori FES to SAPUI5 versions

2.7.3. Changes in classic user interface capabilities

Classic User Interfaces are existing SAP technologies that can be launched from the SAP Fiori launchpad.

From SAP S/4HANA 1511, SAP GUI transactions and ABAP Web Dynpro applications have been supported as classic user interfaces. From SAP S/4HANA 1909, Web Client UIs are also supported as classic user interfaces.

The full list of whitelisted SAP Fiori launchpad content can be found in the SAP Fiori apps reference library using the main filter All Apps for SAP S/4HANA.

In preparation for upgrade, review changes to classic user interface capabilities, limitations, and restrictions. These are contained in release notes for the related Kernel and Unified Rendering.

For example, there was a major change as of SAP S/4HANA 1909 to provide mobile and touch capability of classic UIs. Refer to SAP Note 2700517 - Mobile device support for Unified Rendering based frameworks: Web Dynpro ABAP and SAP GUI for HTML.

Related capabilities for SAP Screen Personas should also be checked, as SAP Screen Personas is the recommended tooling for adjusting the look and feel classic user interfaces.

Theming restrictions should also be reviewed, regardless of whether you use standard or custom themes. Theming improvements are usually applied to SAP Fiori in advance of classic user interfaces.

Refer to:

- SAP Note 2658822 - Release notes for SAP GUI for HTML (short WEBGUI)
- SAP Note 314568 - SAP GUI for HTML functionality / Limitations / Sp. Behaviour
- SAP Note 1927011 - Restrictions to Unified Rendering
- SAP Note 2050838 - SAP Screen Personas - Limitations / Restrictions / Behavior
- SAP Note 2814266 - Restrictions of SAP Fiori 3 visual theme for classic applications

2.7.4. Deleted and deprecated classic user interfaces

Deleted and deprecated classic UIs are typically listed in the SAP S/4HANA What's New Viewer. They can also be listed in the ABAP blocklist monitor, e.g. table SBLM_BLACKLIST.

For more information refer to blog post SAP Fiori for SAP S/4HANA - Identifying classic user interfaces available for use with SAP S/4HANA.

2.7.5. Changes in catalog assignments

Changes in catalog assignment of SAP delivered apps can impact your existing custom business catalogs. These changes can result from:

- New or deprecated SAP Business Roles
- New or deprecated business catalogs or technical catalogs
- New or deprecated content in business catalogs or technical catalogs
- New navigation capabilities in SAP Fiori, e.g. inclusion of SmartLink dialogs that impact the display and selection of related apps

Recommended actions for upgrade:

1. Review best practices and tools for launchpad content creation and assignment for the target release. Consider the impact of changes on your current catalog design
    a. The SAP Fiori apps reference library can be used to compare the catalog assignment of the source vs. target release.

2. Before upgrading, check for references to SAP technical catalogs or business catalogs in custom business roles to avoid changes after upgrade.
    a. Upgrade in a sandbox system aids comparison of before/after catalog changes
    b. Consider migrating to best practice approach of copying SAP Business Roles to custom business roles to better manage the pace of change

3. Extract all needed and active ICF nodes for your custom roles (e.g. in the SAP Fiori launchpad content manager) to be able to check, and if necessary, re-activate them afterwards.
    a. You can use the program RS_ICF_SERV_ADMIN_TASKS to export the list of active services from your source release
    b. If necessary, a mass activation can be performed with the report RS_ICF_SERV_MASS_PROCESSING.
    c. Refer to SAP Note 1555208 - ICF services become inactive after upgrade or SP update for more information.

Refer to:

- openSAP Microlearning video Refining Business Roles with SAP Fiori Launchpad Content Manager
- SAP Note 2455198 - Business Catalog or Group Outdated in Fiori Launchpad Designer

2.7.6. Changes in accessibility features

Accessibility refers to the possibility for everyone, including and especially people with disabilities, to access and use information and communication technology

Accessibility features available at the framework level relate to the target UI technology versions of your SAP S/4HANA release.

For SAP Fiori, refer to Accessibility in SAP Fiori and select your target SAPUI5 version. For developers creating custom apps refer to the SAPUI5 SDK documentation for your target SAPUI5 version, particularly the sections:

- Essentials > Accessibility
- Developing Apps > Accessibility

For SAP GUI for HTML and ABAP Web Dynpro applications, accessibility is driven by the Unified Rendering framework. Refer to SAP Note 2376128 - Accessibility with Unified Rendering based UI technologies

For general advice on accessibility across SAP solutions, refer to SAP Note 1139953 - Requirements and infrastructure for accessibility which includes guides for an administrators and users in the Attachments section of the Note.

Refer to:

- Accessibility in SAP Fiori in the SAP Fiori Design Guidelines.
- SAP Note 2376128 - Accessibility with Unified Rendering based UI technologies

2.7.7. New apps

Even when planning a technical upgrade, it is useful to capture the delta of new SAP Fiori apps during upgrade planning to motivate subsequent continuous improvement projects. For example, the list of new

apps available can be distributed to relevant business stakeholders to encourage forward planning to take advantage of new opportunities provided by your SAP S/4HANA upgrade.

The delta of new apps between SAP S/4HANA releases can be found in the SAP Fiori apps reference library. For more information refer to the blog post SAP Fiori for SAP S/4HANA – Finding the Delta of New Apps between SAP S/4HANA Releases

Important: You will usually also find many of the new apps mentioned in the SAP S/4HANA What's New Viewer.

Refer to:

- openSAP microlearning video Finding available SAP Fiori apps

2.7.8. New SAP Fiori launchpad and shared features

New features to extend your SAP Fiori apps and SAP Fiori launchpad are added with each release. New features typically add functionality for business users, improve performance, and make supporting SAP Fiori easier.

Key areas to review on upgrade are:

- New Fiori launchpad configuration parameters
- Changes in Best Practices for managing launchpad content and layout
- Changes tools for managing launchpad content and layout
- New support tooling

Special attention should be given to adjusting new launchpad configuration parameters that improve performance and usability such as:

- HOMEPAGE_GROUPSELECTIONBAR_MODE
- NAVIGATION_WDA_INPLACE
- NAVIGATION_GUI_INPLACE
- NAVIGATION_GUI_STATEFUL_CONTAINER
- HOMEPAGE_BACKGROUNDSHAPES

Refer to:

- SAP Fiori launchpad guide for your SAP S/4HANA release on the SAP Help Portal
- Blog post Recommendation for Structuring Roles, Spaces and Pages in the SAP Fiori Launchpad Based on Common User Behaviors
- Blog post SAP Fiori for SAP S/4HANA – Overview of tools for maintaining custom launchpad content and layout
- Blog post Check out the improvements in SAP Fiori launchpad content administration and operations with SP01 of SAP Fiori front-end server 2020
- Blog post App Support for the SAP Fiori launchpad

2.7.9. Essential business roles required to administrate and extend SAP Fiori

There are a small set of business roles delivered with SAP Fiori for SAP S/4HANA that are considered essential roles for all customers. They are considered essential because they contain SAP Fiori apps that enable you to monitor, configure, adapt, and extend other SAP Fiori apps.

If not previously activated, you should ensure these business roles are activated when you upgrade.

If previously activated, you should reactivate these business roles.

You can use the **Select Recommended Roles** feature in the SAP_FIORI_CONTENT_ACTIVATION (Rapid content activation) and SAP_FIORI_FCM_CONTENT_ACTIVATION (Content activation) to pre-select these roles for activation.

The essential business roles are:

- **Administrator** SAP_BR_ADMINISTRATOR
    - The Administrator role contains apps that enable you to add custom fields and logic, adjust email & form templates, schedule jobs, monitor extensions made by key users, etc.
- **Analytics Specialist** SAP_BR_ANALYTICS_SPECIALIST
    - The Analytics Specialist role contains apps to review CDS Views, adjust KPI thresholds, and manage date functions for analytical apps such as Smart Business, Overview Pages, and Analysis Path Framework.
    - It also contains apps to create new custom analytical queries and Intelligent Scenario Lifecycle Management for machine learning use cases.
- **Business Process Specialist** SAP_BR_BUSINESS_PROCESS_SPEC
    - The Business Process Specialist role contains apps to manage teams and responsibilities for flexible workflows.
- **Configuration Expert – Business Process Configuration** SAP_BR_BPC_EXPERT
    - The Configuration Expert – Business Process Configuration role contains app to centrally manage new processes and intelligent features such as Group Reporting, Central Procurement, Advanced Compliance Reporting, flexible Workflows and Situation Handling
    - It also contains a number of mass processing apps for a variety of business objects such as File Upload/Download, Data Replication, Hierarchy Maintenance, Catalog Item Recommendations and Scheduling.

Refer to:

- Blog post SAP Fiori for SAP S/4HANA – Yes you need SAP Fiori to Configure, Adapt and Extend SAP S/4HANA

2.7.10. Required adaptations to custom SAP Fiori Apps

In preparation for your SAP Fiori for SAP S/4HANA upgrade, you will need to review the status of your current developments. This is required because you will be obtaining new features in the UI layer by either the updated UI5 libraries, the updated UI components in the ABAP stack, or through the new features in the ABAP layer, for example, programming model improvements or new features available for CDS View development.

We recommend reviewing the following tasks to identify the possible adaptations to your custom developments.

Identify the target SAPUI5 library version
Having selected your target SAP S/4HANA release, you must confirm the long-term maintenance version of the SAPUI5 libraries (and the associated version of SAP_UI components) you will be using in your target SAP S/4HANA release. The SAPUI5 version will have an impact on the features provided by these libraries, and may impact the code remediations you might need to perform. Refer to:

- SAP_UI Support Packages
- SAPUI5 Versions Maintenance Status

Identify supported browsers, platforms, and reference devices
With the use of updated SAPUI5 libraries, support for specific browsers, platforms and reference devices may be dropped. Keep this in mind when you decide to use a certain product version and adjust or rebuild your custom applications accordingly. Refer to:

- Browser and platform support Matrix
- Visual Degradations
- Product Availability Matrix
- Blog post Update: Future SAPUI5 versions will no longer support Microsoft's legacy browsers

Removal of SAP Fiori Client from Public App stores
If you have developed custom applications leveraging the SAP Fiori Client to enhance the features provided by your apps, for example, by adding barcode scanning capabilities, your custom applications must be reviewed and redesigned considering new development approaches focused on the use of native browser features or native developments for iOS or Android.

The SAP Fiori Client app was initially developed to help users run SAP Fiori web applications using their mobile devices. With the considerable improvement of device browser capabilities, the need for the SAP Fiori Client app has been significantly reduced. In addition, due to the increasing limitations of the WebView component, applications such as the SAP Fiori Client that are built on top of it can no longer provide an optimal user experience.

For these reasons, SAP will be removing the SAP Fiori Client app from the public app stores, with the recommendation that end-users use their native browsers instead. Refer to:

- Removal of SAP Fiori Client from Public app stores
- SAP Fiori for IOS design
- SAP BTP SDK for iOS
- SAP Fiori for Android design
- SAP BTP SDK for Android

Identify SAPUI5 library upgrade impacts in Custom Apps
As SAPUI5 evolves, multiple improvements are introduced, and specific APIs are deprecated. You can use the UI5 Migration tool to perform source code replacements and optimizations to remove deprecated APIs. Refer to:

- Blog Post UI5ers Buzz #45: UI5 Migration Tool
- Github Project UI5-migration

Identify Core Data Service updates and run remediations
In SAP S/4HANA, the source object for data extraction in most reports, transactions and SAP Fiori apps are the Core Data Service (CDS) Views. CDS Views are also leveraged by the new programming models in SAP S/4HANA. When new versions are released, improvements to these sources may require performing minor adjustments in the custom objects you have built that consume these objects.

You can leverage the ABAP Test Cockpit (ATC) and the check variants in SAP S/4HANA to run checks on your custom developments and custom CDS views. Refer to:

- Blog post Remote Code Analysis in ATC – One central check system for multiple systems on various releases
- Blog post Semi-automatic custom code adaptation after SAP S/4HANA system conversion

To run ATC checks for custom CDS views, run the following steps:

1. Set up ATC
2. Create a copy of variant ***S4HANA_READINESS_<your_target_S/4HANA_version>*** via report SYCM_SETUP_VARIANT_FOR_RELEASE
3. In transaction SCI and your custom check variant, activate all checks for CDS views and deactivate all other checks
4. In ATC define Object Set (Z*, Y* packages) and run inspection
5. Analyse incidences and run manual remediations

Evolve your custom apps with the new programming models
Starting with SAP S/4HANA new programming models have been released for you to take advantage of the new platform features. You should pay particular attention to the the ABAP RESTful programming model for releases SAP S/4HANA 2020 and higher, and ABAP Programming Model for Fiori for SAP S/4HANA releases 1909 or lower. It is highly recommended you migrate your custom app developments to these new models. See chapter 2.5.11 and refer to:

- openSAP course Evolved Web Apps with SAPUI5
- openSAP course Building Applications with SAP Cloud Application Programming Model
- openSAP course Building Apps with the ABAP RESTful Application Programming Model
- openSAP course SAP Fiori Overview: Design Develop and Deploy (Week 3)

Validate status of custom fields and custom logic added via Fiori Extensibility Tools
If you are performing an upgrade from recent SAP S/4HANA versions and have used SAP Fiori extensibility apps like Custom Fields and Logic, there are some recommendations you need to be aware of to ensure a successful upgrade:

1. Ensure all custom fields are in active state – inactive objects will be flagged during SUM execution.
2. Remove all custom fields or custom logic that are not active – most times these are test fields or test scenarios ran by your team that you can get rid of prior to running the upgrade.
3. Keep control of the custom objects generated via extensibility tools by using the Extensibility Inventory App.
4. Run transaction SCFD_FIELDVIEWER after and before the upgrade to ensure consistency of custom fields. Note that via this transaction you may repair your custom fields after or before the upgrade.
5. Any issue with objects generated via SAP Fiori extensibility tools should be reported via an SAP incident to component ***BC-SRV-APS-EXT-FLD***

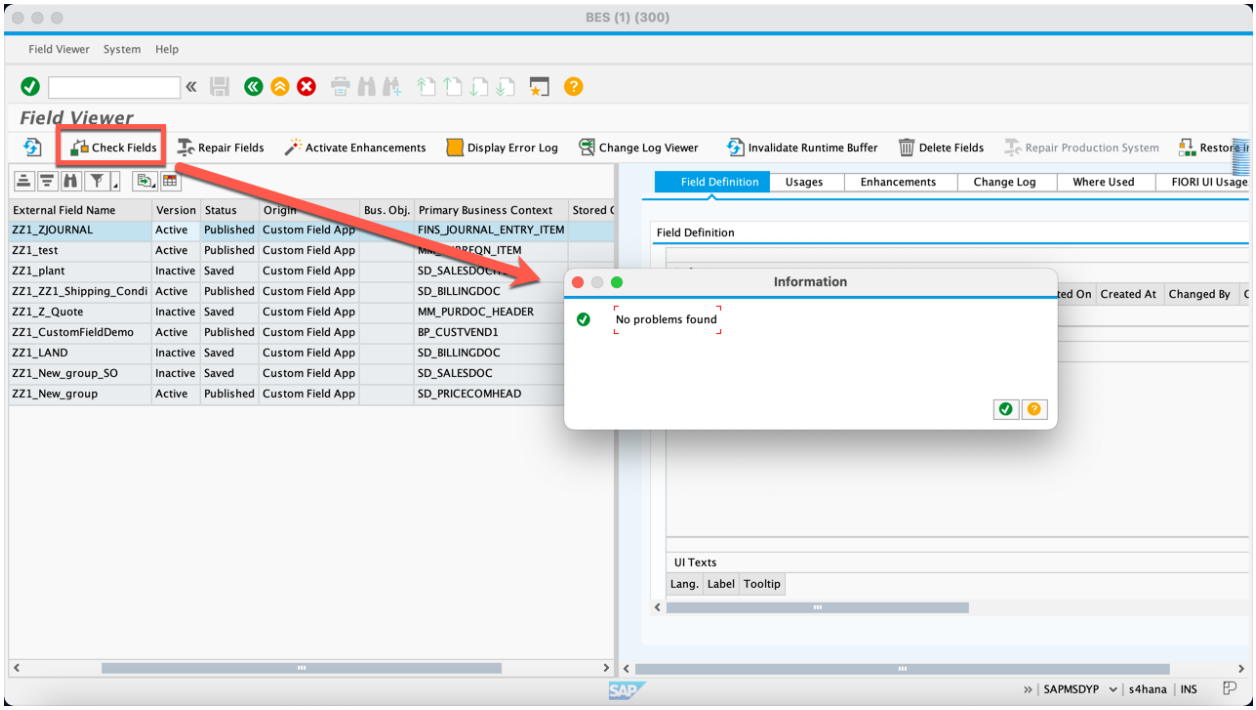


Figure 35 - Field Viewer

Upskill your team

Along with SAP S/4HANA, multiple development technologies and procedures have been delivered by SAP either via On-Premise or Cloud solutions. Explore the deployment of these additional technologies that help you cover extended business requirements, and intelligent automation features which bring you new business opportunities and increased process efficiency. Refer to:

- openSAP course Delivering Value with Intelligent Innovations in SAP S/4HANA
- openSAP course Developing and Extending SAP Fiori Elements Apps

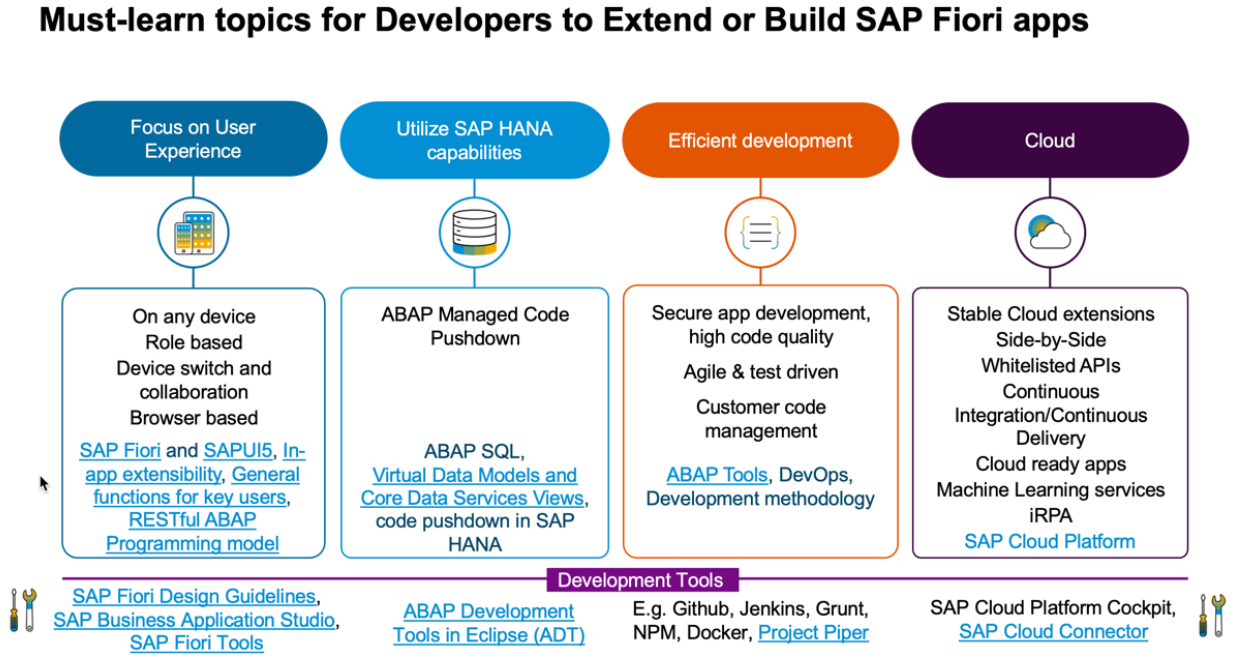


Figure 36 - Learning topics for extending or building SAP Fiori apps

2.8. Functional planning for the upgrade

With more and more solutions and functionalities being embedded and enhanced with each release of SAP S/4HANA, an upgrade provides the option to activate and adopt such business functions for customers who can benefit from them.

For example: The embedded SAP Transportation Management (TM) solution was made available in SAP S/4HANA 1709 and enhanced in subsequent releases as explained in blog post SAP Transportation Management with SAP S/4HANA 1709.

The integration of a new embedded product is described in the SAP Activate roadmap SAP S/4HANA Upgrade and Product Integration (currently covering embedded SAP Transportation Management, embedded Extended Warehouse Management, SAP S/4HANA Service, and embedded Production Planning and Detailed Scheduling).

Refer to:

- openSAP microlearning video Finding delta simplifications between SAP S/4HANA releases in the SAP S/4HANA playlist, Lines of Business Cross-Topics

3. UPGRADE EXECUTION

After scoping your project, reviewing your strategy and deciding about change management scope, it is time to execute the upgrade technically. There are several tools provided and required.

3.1. Technical tooling and process

3.1.1. General procedure

These are the EXPLORE, REALIZE and DEPLOY phases of your SAP S/4HANA Upgrade project. You apply the upgrade steps to the following environments in your landscape:

- Development
- Quality Assurance
- Dress Rehearsal
- Pre-production (if it is planned/existing in the landscape)
- Production

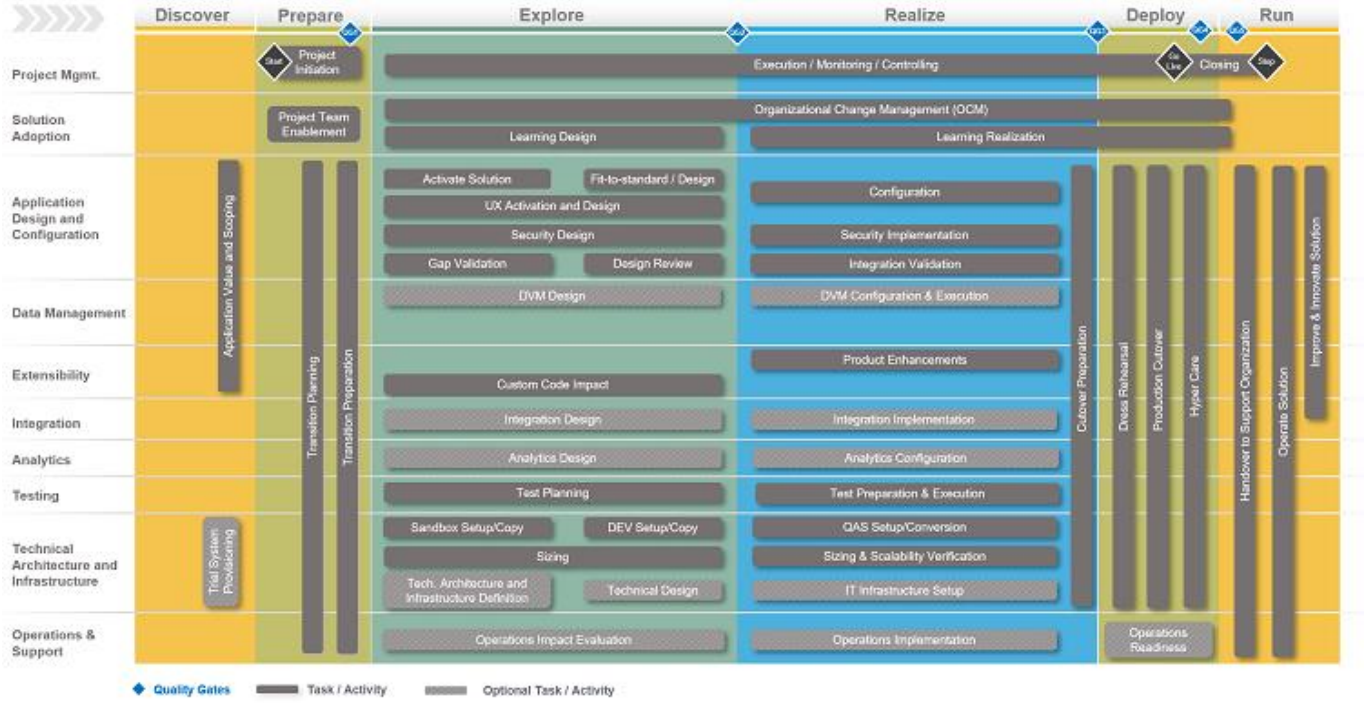


Figure 37 - Roadmap for Functional Upgrade

3.2. Technical Upgrade Steps for your SAP S/4HANA target release

The recommendation is to start at least with a sandbox, before upgrading your development (DEV) environment.

Upgrade steps will be repeated on each system, except for configuration and custom code which are realized in Development and transported to the next tiers of the landscape. When you reach the Development environment upgrade, you may consider switching to the latest release/Support Package of the SUM software. The cutover plan and cookbook should be improved throughout each upgrade exercise until it is finalized and ready for the dress rehearsal.

Important: You can find the specific upgrade steps for your target SAP S/4HANA release in the section Realizing the Upgrade in the Upgrade Guide for SAP S/4HANA for your SAP S/4HANA release.

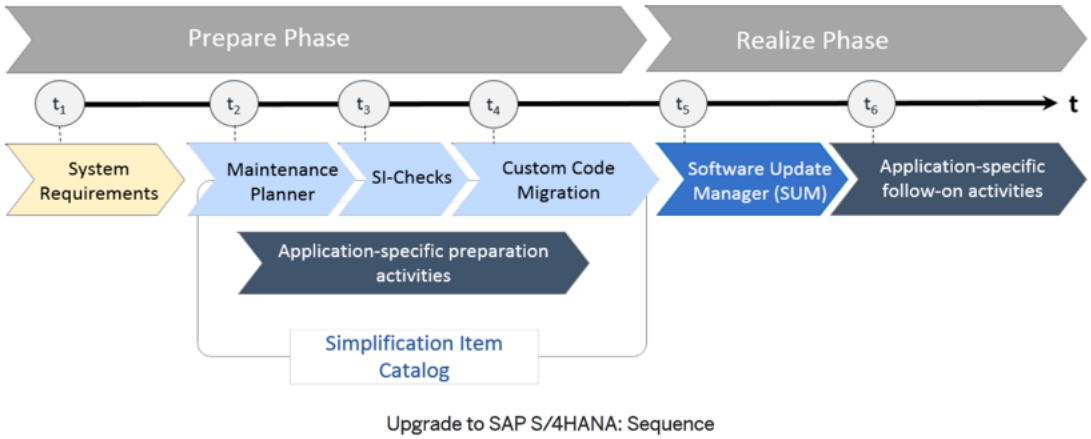


Figure 38 - Upgrade to SAP S/4HANA sequence of activities (source: Upgrade Guide for SAP S/4HANA 1909)

3.2.1. Downtime optimization options

During the SAP S/4HANA system conversion, SAP ERP data models have been converted into the SAP S/4HANA simplified data models. This also occurs for system upgrades within S/4HANA releases, even though it is to a reduced extent.

These data conversions are performed by data conversion methods such as XPRAs, XCLAs or AIMs. Some of these data conversion methods are processing potentially large amounts of master and/or transactional data, requiring efficient resource usage to achieve minimal runtime.

There are a comprehensive list of measures that can be taken to reduce the technical downtime of the system during the S/4HANA upgrade in SAP Note 2351294 - S/4HANA System Conversion / Upgrade: Measures to reduce technical downtime.

By performing your upgrade in a sandbox - which should be based on a copy of production – you can evaluate if the downtime window will fit into the business downtime window agreed with the business.

At the end of each upgrade run, where you are using a copy of production, the SUM logs should be stored in a safe place, as these can be used to further investigate opportunities for downtime optimization. The upgrade evaluation file (UPGANA.XML) is particularly important. At the end of each SUM run, the upgrade statistics can be uploaded to SAP. The data is used to further optimize the runtimes of updates and upgrades.

Also, the data will be visible in the newly launched **Technical Downtime Optimization app** as part of the SAP ONE Support Launchpad. The app helps upgrade or conversion project members to meet tight downtime requirements by providing the following:

- Easy to consume analytics
- Tailored downtime minimization advice
- A simulation from a continuously updated knowledge base that is managed by upgrade and conversion experts

The app is available for customers free of charge in the SAP One Support Launchpad via the tile Technical Downtime Optimization.

Refer to: SAP Note 2881515 - Introduction to the Technical Downtime Optimization App.

3.2.2. Downtime optimization approaches of Software Update Manager (SUM)

Performing an update or upgrade of SAP S/4HANA can be achieved using one of the following approaches of Software Update Manager (SUM):

- **Standard:** several downtime-optimizations (e.g. shadow system operations)
- **near-Zero Downtime Maintenance (nZDM):** downtime reduction by moving main import and table conversion partly into uptime.
  - Refer to: SAP Note 1678565 - Prerequisites and restrictions of nZDM (near-Zero Downtime Maintenance).
- **Zero Downtime Option (ZDO):** handling all update related changes in uptime.
  - Refer to: SAP Note 2707731 - Prerequisites and restrictions of Zero Downtime Option of SUM for SAP S/4HANA.

Both the standard approach as well as the near-Zero Downtime Maintenance (nZDM) contain major improvements for minimizing the technical downtime. These approaches are generally available for all customers.
However, neither standard nor near-Zero Downtime Maintenance offer the option to reduce the technical outage down to zero. This can be achieved by the next level of downtime-optimization: **Zero Downtime Option of SUM**.

Important: You should consider that the more you want to optimize the downtime, the more effort you have in the project. The effort includes project planning effort, as well as testing effort which is higher in case of zero-downtime updates.

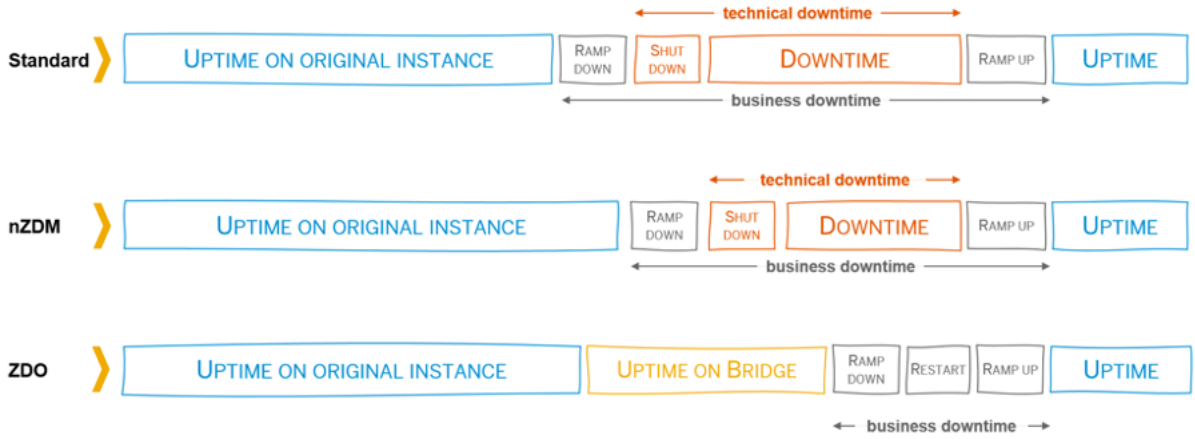


Figure 39 - High-level comparison of downtime optimization approaches of the Software Update Manager (SUM)

With nZDM, the technical downtime is already significantly reduced by moving the main import and table conversion partly into uptime. Going beyond this to use ZDO, the technical downtime is replaced by the so-called **Uptime on Bridge**.

Refer to:

- SAP Community blog post Leveraging Zero Downtime Option of SUM for SAP S/4HANA Support Package Stack updates.

3.2.3. Silent Data Migration

When planning a release upgrade and executing Software Update Manager (SUM), often data migrations are required due to changes in the data structures. These changes may occur while developing new features or enabling more performant applications. Usually, such data migrations when carried out during

the upgrades, prolongs the downtime period since they are executed as part of the XPRAs execution (technical phase name: XPRAS_AIMMRG).

To reduce the duration of the downtime in such a scenario, a new data conversion technology known as Silent Data Migration (SDMI) has been introduced for target releases SAP S/4HANA 1909 or higher.

SDMI allows migrating application data during uptime, which means in that time you can use the system productively. The migration to the new model happens after upgrade to the new release. Until the Silent data migration has finished in the background, the application continues to work without impacting the business processes. This approach requires the upgrade to follow release sequence step by step.
Important: No jump upgrade is allowed – i.e. an upgrade that skips a release - with ZDO. Jump upgrades are possible with standard and nZDM.

For more details on the implementation and execution of SDMI approach, refer to the SAP Note 2907976 Silent Data Migration (SDMI) - FAQ and 2916801 - Silent Data Migration (SDMI) Configuration Options.

Refer to:

- Blog post Silent Data Migration for S/4HANA 1909 Upgrade/Conversion
- Blog post Monitoring Silent Data Migration (SDM_MON) – S/4HANA 1909 upgrade/conversion

3.2.4. Patch strategy in general

You will need to apply the latest patches to the user interface technologies used throughout SAP S/4HANA. These patches contain bug fixes and performance improvements. Applying these patches avoids wasted effort encountering known issues that have already been resolved.

You should apply the latest patches immediately after upgrade, and prior to follow-on EXPLORE and REALIZE activities such as fit-to-standard of successor apps**.**

Important: You should be prepared to apply patches later in your upgrade project, especially prior to regression testing.

3.2.5. Patch strategy for SAP Fiori FES

Applying the latest SAP_UI component patch levels is essential for optimal performance and operation of all SAP Fiori and Web Client UI screens, which are both based on SAPUI5 technology. These patches update your SAPUI5 minor version to apply the latest bug fixes and optimizations, helping you avoid rediscovering known issues that have already been resolved.

Refer to:

- SAP Note 2217489 Maintenance and Update Strategy for SAP Fiori Front-End Server
- openSAP microlearning video How to Patch your SAP Fiori (SAPUI5) Version and Why in the SAP S/4HANA playlist, Lines of Business Cross-Topics

3.2.6. Patch strategy for SAP S/4HANA Server

Applying the latest Kernel and Unified Rendering patch levels is essential for optimal performance and operation of all SAP GUI for HTML and Web Dynpro ABAP applications. Make sure these are patched to the latest available patch for your target release.

Refer to:

- SAP Note 2658822 - Release notes for SAP GUI for HTML (short WEBGUI)
- SAP Note 2895568 Maintenance Strategy for Web Dynpro ABAP / Floorplan Manager
- SAP Note 2500800 - UR: General information about cumulative patches for Unified Rendering

If you are using SAP Business Client Launchpad Connection to access the SAP Fiori launchpad, refer to: SAP Note 2302074 Maintenance strategy and deadlines for SAP Business Client / NWBC

3.3. Post-upgrade follow-up activities

Every upgrade requires certain application-specific activities to be executed after the upgrade.

Important: You can find the specific activities for your target SAP S/4HANA release in the section Realizing the Upgrade in the Upgrade Guide for SAP S/4HANA for your SAP S/4HANA release.

3.3.1. Additional activities to be applied after upgrade

There may also be some additional release-specific activities and notes to be applied after upgrade. These may be listed in SAP Notes for your SAP S/4HANA release.

For example, for SAP S/4HANA 2020 refer to:

- SAP Note 2924845 - SAP S/4HANA 2020 - application specific notes in system conversion / upgrade follow-on phase

3.3.2. Updating the Enterprise Search content

As one of the last steps during the upgrade the following Task Lists (STC01) needs to be executed in order to ensure that the Enterprise Search content is updated with the correct information.

1. SAP_ESH_RESET - The task list is used to reset the Enterprise Search to the initial state in your working client
2. SAP_ESH_INITIAL_SETUP_WRK_CLIENT – The task list is used to create your Search Connectors for the newly deployed applications

Refer to:

- SAP Note 2626143 - How to execute SAP_ESH_RESET
- SAP Note 2626107 - How to execute task list SAP_ESH_INITIAL_SETUP_WRK_CLIENT

3.4. UX post-upgrade activities

As you are introducing a new version of SAP S/4HANA along with new SAP Fiori new components, features and capabilities on the UX level and the technical level (in the ABAP stack), you need to plan for specific tasks to ensure all SAP Fiori components behave correctly in your new SAP S/4HANA version.

There are certain upgrade tasks that are important and ensure object consistency within SAP Fiori. During an upgrade, you must pay particular attention to the following activities:

1. Run report: RUTDDLSACT
2. Run report: RS_ICF_SERV_MASS_PROCESSING
3. Run reports: /UI2/GET_APP_DESCR_REMOTE_ALL and /UI2/GET_APP_DESCR_REMOTE_DEV

4. Run report: /UI2/DELETE_CACHE_AFTER_IMP
5. Run report: /UI5/APP_INDEX_CALCULATE
6. Run report: /UI2/INVALIDATE_CLIENT_CACHES
7. Run report: /UI2/INVALIDATE_GLOBAL_CACHES
8. Regenerate custom themes in SAP Fiori Theme Designer
9. Ensure end-users clear browser cache

Depending on your target SAP S/4HANA release, there can be more steps required to ensure the correct execution of SAP Fiori tools and apps after an upgrade.

In the following sections you will find the recommended project activities to run after any upgrade in SAP Fiori for SAP S/4HANA.

3.4.1. Move to new tools and accelerators

You will find that each new SAP S/4HANA release usually introduces new tools that help you streamline your SAP Fiori implementation, adjustment, and support.

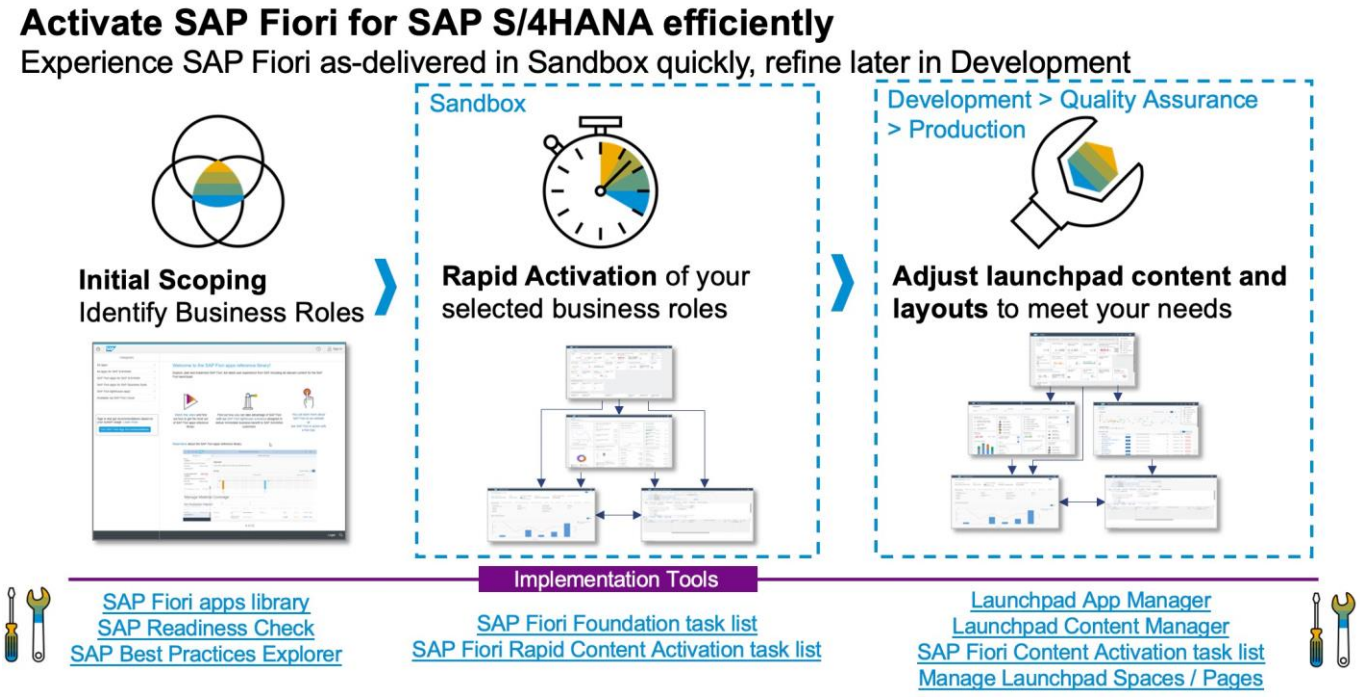


Figure 40 - Best practice tools for implementing SAP Fiori efficiently

These tools are usually introduced in a non-disruptive way, giving you time to adjust your processes. However, you should strongly consider moving to the new tools as quickly as possible during or immediately after an upgrade because:

- New tools are more efficient for managing UX at scale
- New tools typically supersede older tools which are intended to be deprecated in a future release
- Any further improvements will be added to new tools only

Refer to:

- SAP Fiori Launchpad Administration guide for your target SAP S/4HANA release, see sections “Tools for Setting Up Launchpad Content” and “Launchpad Support Tools”

- Blog post SAP Fiori for SAP S/4HANA – Overview of tools for maintaining custom launchpad content and layout
- openSAP Microlearning video Creating launchpad content with the SAP Fiori Launchpad App Manager
- Blog post SAP Fiori for SAP S/4HANA – 3 simple use cases for Launchpad Content Aggregator

3.4.2. Update SAP Fiori Launchpad configuration parameters and features

In the latest releases of SAP S/4HANA, configuration of launchpad parameters, features and plug-ins has been simplified by moving these settings into simple configuration tables. Many of these settings in earlier releases were made in the SAP Web Dispatcher configuration and/or made in target mappings as part of launchpad content.

You should look at migrating such settings to the new configuration tables to:

- Simplify ongoing management of launchpad features
- Improve performance and usability via newly available launchpad configuration parameters and features
- Apply delivered launchpad plug-ins for extended features, e.g to collect usage analytics via SAP Web Analytics
- Review and remove any obsolete configuration parameters to avoid confusion

You can also take advantage of the latest best practice options during the upgrade by reviewing the task list SAP_FIORI_FOUNDATION_S4 and selectively executing tasks that update your launchpad.

Refer to:
- SAP Fiori launchpad, see the respective administration guide for your target SAP S/4HANA release, e.g. Sections “Managing Launchpad Settings”, “Launchpad Configuration Parameters”, “Customizing the Shell Bar”, “Configuring SAP Web Analytics Plugin for the Launchpad”, “Obsolete Configuration Settings”
- Blog post SAP Fiori for SAP S/4HANA – Calling GUI & Web Dynpro ABAP without opening a new tab
- Blog post SAP Fiori for SAP S/4HANA – Improve Performance via SAP Fiori launchpad configuration in SAP Fiori for SAP S/4HANA
- Blog post Simplified configuration of Help links in SAP S/4HANA
- Blog post App Support for the SAP Fiori launchpad

3.4.3. Review SAP Fiori performance improvement options

Performance is a key factor in user adoption. Users should ideally be able to traverse from one screen to another at their speed of thought. Performance is a very broad consideration impacting many dimensions:

- Device operating system behavior
- Web browser version behavior
- Network/bandwidth considerations
- Server placement
- Single sign-on behavior
- SAPUI5 bootstrap placement
- SAP Fiori launchpad versions

- Behavior of individual app versions and classic user interfaces

Every new release of SAP S/4HANA so far has introduced new options to further improve performance on many dimensions.

Changes in technical architecture, changes in functional scope, changes in the user experience and changes in the numbers of users of your SAP S/4HANA solution also affect performance. To enable these performance improvements, you may need to adjust your current configurations.

It is essential to measure performance and identify bottlenecks before applying mitigation techniques. This avoids unnecessary effort applying changes that may make little difference to overall performance. The recommended approach for measuring performance is explained in SAP Note 2456424 - Fiori Launchpad: How to report performance issues by recording HTTP traces.

Be aware of the latest guidance on SAP Fiori Performance Troubleshooting. A summary of current recommendations can be found in: SAP Note 2916959 - Fiori Performance Troubleshooting

Refer to:

- SAP Note 2456424 - Fiori Launchpad: How to report performance issues by recording HTTP traces
- SAP Note 2916959 - Fiori Performance Troubleshooting
- SAP Note 2447857 - Fiori Launchpad: How to check browser settings for better performance
- Performance Improvements in SAP Gateway Foundation
- Performance Improvements for SAP Smart Business Drill-Down Applications
- Blog post Recommendation for Structuring Roles, Spaces and Pages in the SAP Fiori Launchpad Based on Common User Behaviors

3.4.4. Update SAP Fiori launchpad content and layout

Upon upgrade, SAP Business Roles will introduce new apps and new layouts automatically. You can manage the pace of change and minimize future upgrade impacts by shifting from SAP Business Roles to custom business roles using the following tools:

- **Launchpad Content Aggregator** (transaction /UI2/FLPCA) provides a view of the total launchpad content of SAP Business Roles and custom business roles in your system. You can use the tool to provide an aggregated overview of all the launchpad content maintained in the **SAP Fiori launchpad content manager (customizing scope)**.
    - Refer to: Blog post on this topic SAP Fiori for SAP S/4HANA – 3 simple use cases for Launchpad Content Aggregator and the example below:

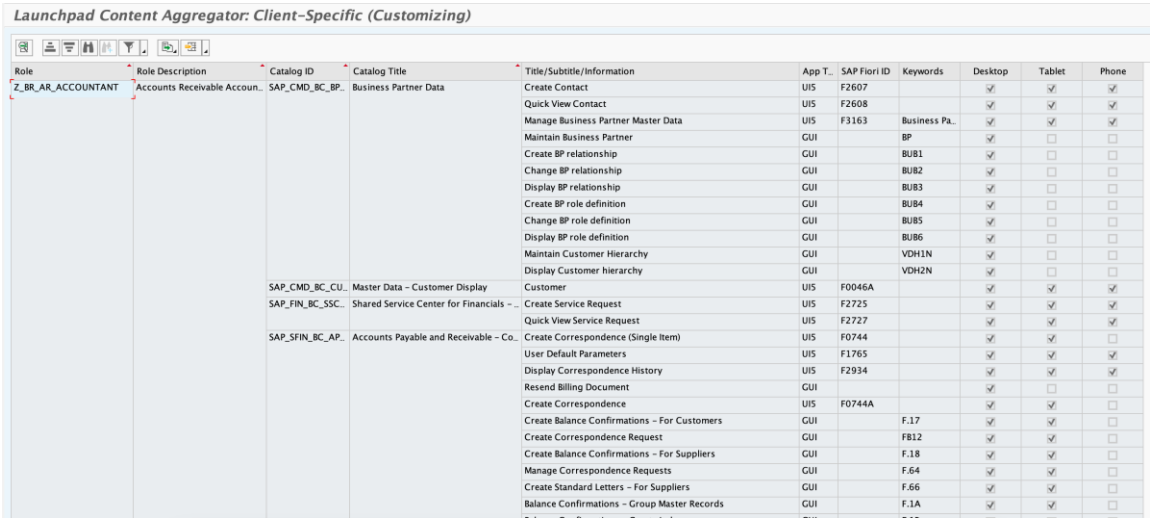


Figure 41 - Launchpad Content Aggregator

- **Launchpad Content Manager** (transaction /UI2/FLPCM_CUST) is used to manage your launchpad content. You can view SAP Business Roles, copy SAP Business Roles to custom business roles, and refine the content of your custom business roles to your needs. See the example below.

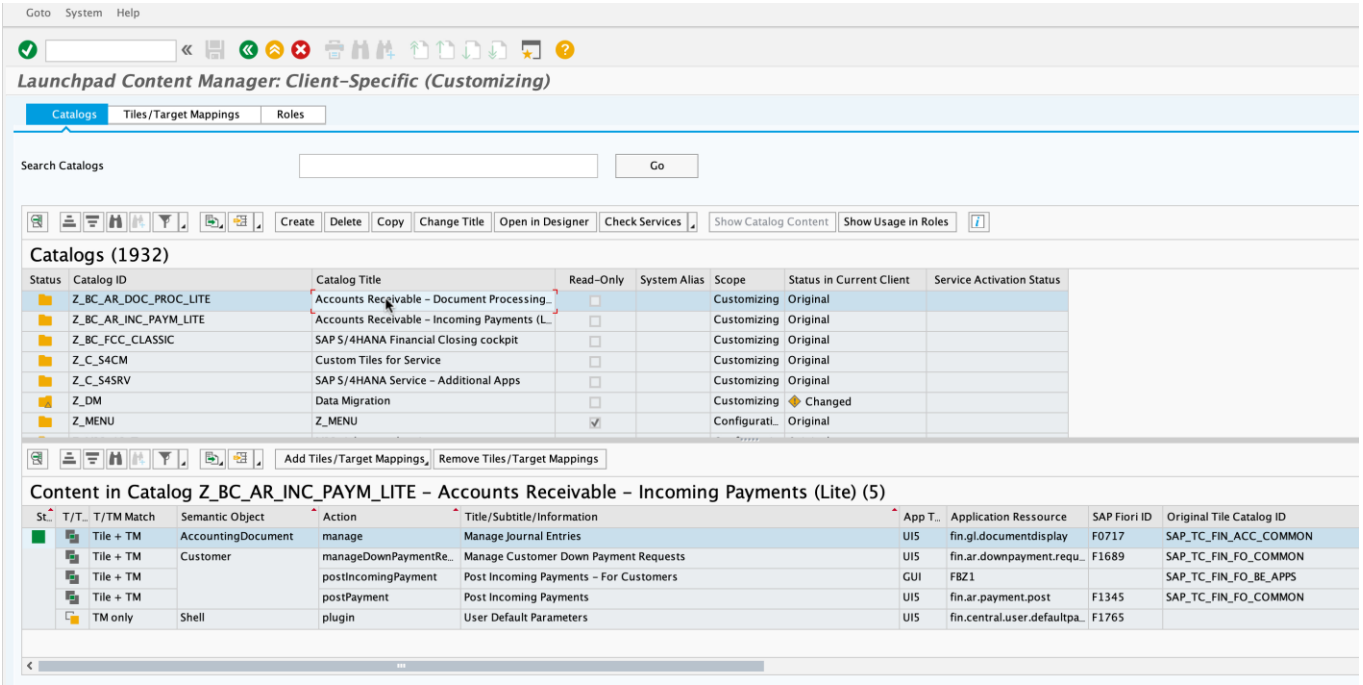


Figure 42 - Launchpad Content Manager Client-Specific (Customizing) is used to manage launchpad content

Refer to:

- Launchpad Content Aggregator: SAP Fiori Launchpad Content Administration
- openSAP microlearning video: Refining Business Roles with SAP Fiori Launchpad Content Manager
- SAP Fiori Launchpad Support Tools

Updating Content

Deprecated SAP Fiori Business Roles must be replaced. Review the related app's implementation information in the SAP Fiori apps reference library to check the new role. Deprecated apps and UIs must

be replaced & these typically show in the Launchpad Content Manager as Outdated references and/or Reference Lost – these need to be resolved & corrected as necessary.

- Use the Launchpad content manager '**Check Services**' feature to check if all apps are active.
- Use the **SAP_FIORI_FCM_CONTENT_ACTIVATION** task list to activate apps in custom business roles where needed.

You will need to understand changes in processes and tools for managing launchpad content and layout.

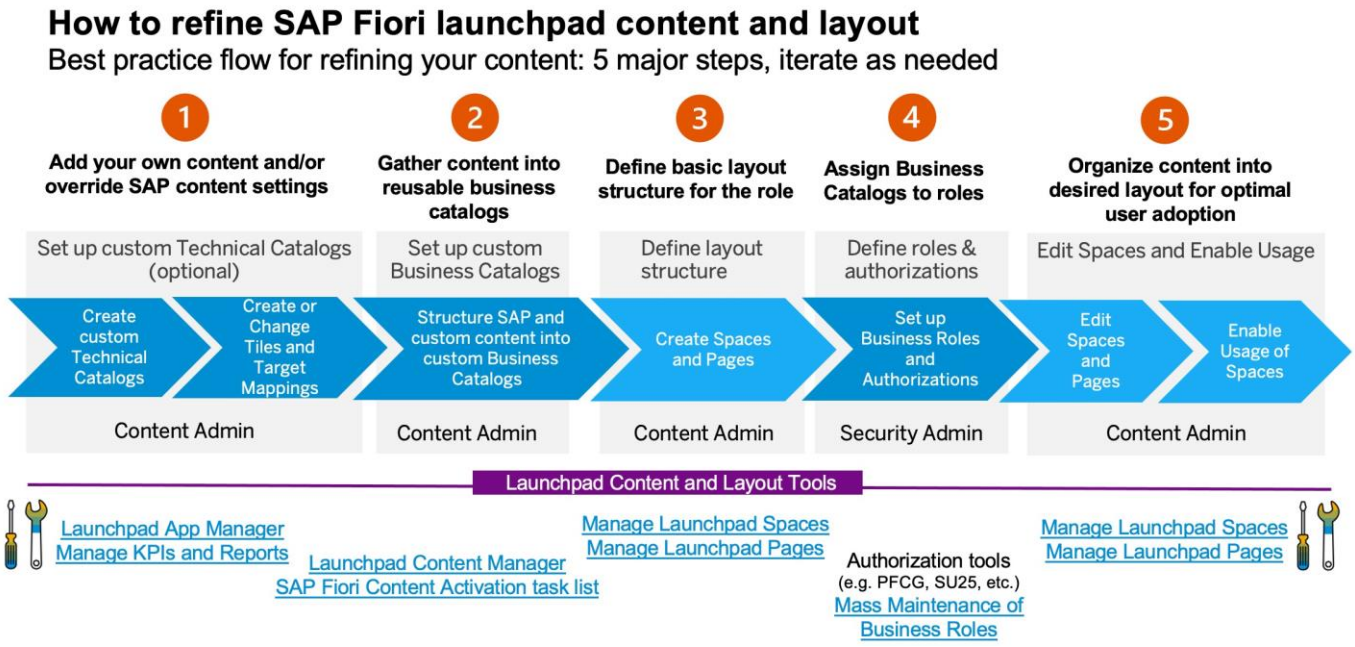


Figure 43 - Refining Launchpad content and layout

Refer to:

- Launchpad App Manager
- Launchpad Content Manager
- SAP Fiori Content Activation task list
- Manage Launchpad Spaces
- Manage Launchpad Pages
- Mass Maintenance of Business Roles
- Best Practices and Typical Scenarios for Managing Launchpad Content
- Blog post Creating custom content for Business Roles
- Blog post SAP S/4HANA Finding the delta of new apps between SAP S/4HANA versions
- openSAP Microlearning video Creating Launchpad Content with the SAP Fiori Launchpad App Manager
- openSAP microlearning video Activating SAP Fiori Content in Custom Business Roles

Updating Layout

From SAP Fiori FES 2020 and higher, new layout options for Spaces and Pages are now available to help you implement SAP Fiori at scale. Spaces and Pages provides a more robust and more scalable layout of content on the launchpad for business users. Spaces and Pages provide a better default user experience and starting point for business users to encourage high user adoption and optimal productivity.

While Groups can continue to be used in parallel to Spaces, Groups will be deprecated in a future release. You are recommended to start moving stepwise to Spaces and Pages as soon as possible. Spaces and Pages can be enabled for individual users via personalization or made the default globally via launchpad configuration parameters. SAP delivered Spaces and Pages for SAP Business Roles can be used as templates for creating your own Spaces and Pages for your custom business roles. Refer to:

- Enabling Spaces
- Fiori launchpad User Guide section Spaces and Pages
- Blog post Best Practices for Structuring Spaces and Pages
- Blog post Recommendation for Structuring Roles, Spaces & Pages in the SAP Fiori Launchpad based on Common User Behaviors

3.4.5. Update authorizations

Where new apps are introduced, related authorizations are added to SAP Business Roles and will need to be added to your affected custom business roles.

You may also find existing apps and UIs have additional data authorizations applied by the upgrade, for example: to provide improved segregation of duties. Where this has occurred, typically a SAP Note will explain these changes, e.g. SAP Note 2505099 - Worklist for transition to SAP S/4HANA - authorization objects in quality management.

Errors relating to missing explicit authorizations are typically shown in the error log transactions SU53, /IWFND/ERROR_LOG, /IWBEP/ERROR_LOG and STAUTHTRACE. Where available, you can also view these errors in the SAP Fiori launchpad using the App Support feature in the User Actions menu. Transaction SUPC and program PRGN_COMPARE_ROLE_MENU can be used to resolve missing authorizations in SAP Business Roles and custom business roles.

Where authorizations have been added to CDS Views, these are implicit authorizations that act as a filter on the view and are more likely to be identified as missing data than as an authorization error. You can use transaction SACMDCLS to review and test the authorizations related to CDS Views. Refer to:

- SAP Note 2919392 - Determining missing authorizations for Access Controlled CDS Entities
- Blog post App Support for the SAP Fiori launchpad

3.4.6. Transition from deprecated to successor SAP Fiori apps

Successor apps are the next generation of their predecessor. Relationships between predecessor and successor apps are maintained in the SAP Fiori apps reference library and can be viewed there. Refer to openSAP microlearning video Finding available SAP Fiori apps.

Predecessor apps may be deprecated (i.e. deleted) or may still be available for use as-is. Where a predecessor app is available in the same release as the successor app, the predecessor app will remain as-is and no further improvements will be made. Any additional improvements are only applied to the current best version of the app, i.e. the successor app.

Successor apps typically offer improved features and may also apply a new UX design to the task. In a few use cases such redesign may include splitting the predecessor app to multiple new apps. Because the successor app can be significantly different to the predecessor, you need to review the app’s features and confirm if they fit to your use cases.

You can include both the successor and the predecessor in your custom business roles to aid migration to the successor app if desired.

3.5. Functional post-upgrade activities

A collection of information of post-upgrade application-specific activities, which have not been described within the Business Impact Notes of relevant Simplification Items nor in any application specific documentation of the conversion/upgrade process can be found in:

SAP Note 2924845 - SAP S/4HANA 2020 - application specific notes in system conversion / upgrade follow-on phase

3.5.1. Transitioning users to new or changed functionality

Business users will need to be prepared for any changes introduced as part of the upgrade. This change communication activity is a normal part of organizational change management. You will find the following resources are helpful for enabling users on the changes.

Users moving from SAP Fiori 1.0 (SAP S/4HANA 1511) and SAP Fiori 2.0 design (SAP S/4HANA 1610, 1709, or 1809) to SAP Fiori 3 design (SAP S/4HANA 1909 or higher) will experience a major shift in launchpad features and behaviors. You can find a summary of the major changes in:

- Blog post SAP Fiori for SAP S/4HANA – Upgrading from Fiori 2.0 to Fiori 3 for SAP S/4HANA Cloud 1908 and SAP S/4HANA 1909 and higher Users

You can use the tutorials available as part of the User Assistant provided as part of your SAP S/4HANA system to enable business users on the target SAP S/4HANA release, in particular the tutorials "Working with Launchpad" and "Working with Apps" give a general introduction.

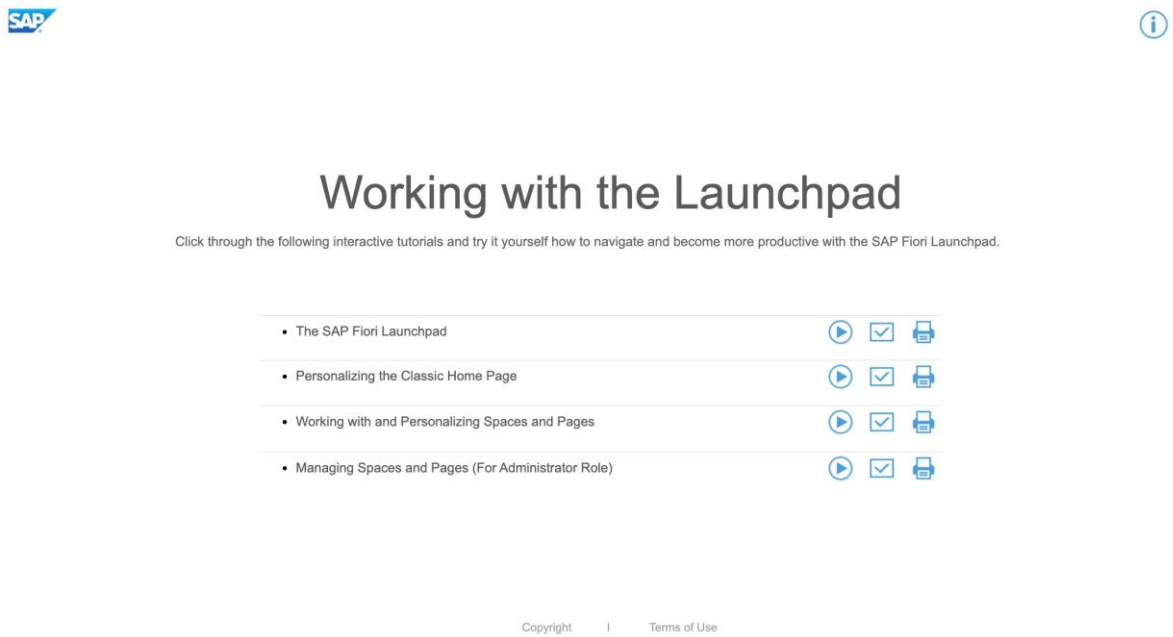


Figure 44 - Working with Launchpad tutorial landing page

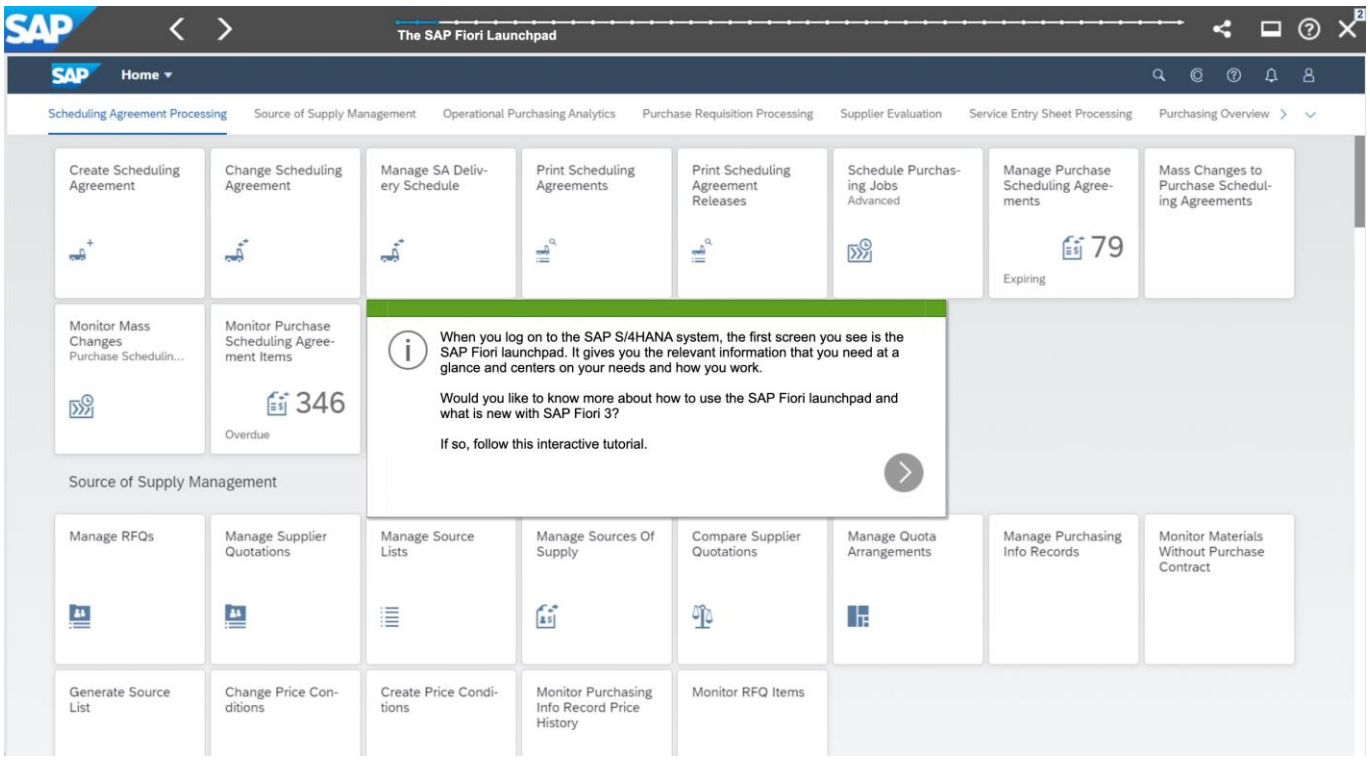


Figure 45 - Working with the Launchpad interactive tutorial

openSAP Microlearning SAP S/4HANA User Experience "Business End User Experience" playlist contains a number of videos to familiarize users with most common launchpad and personalization features.

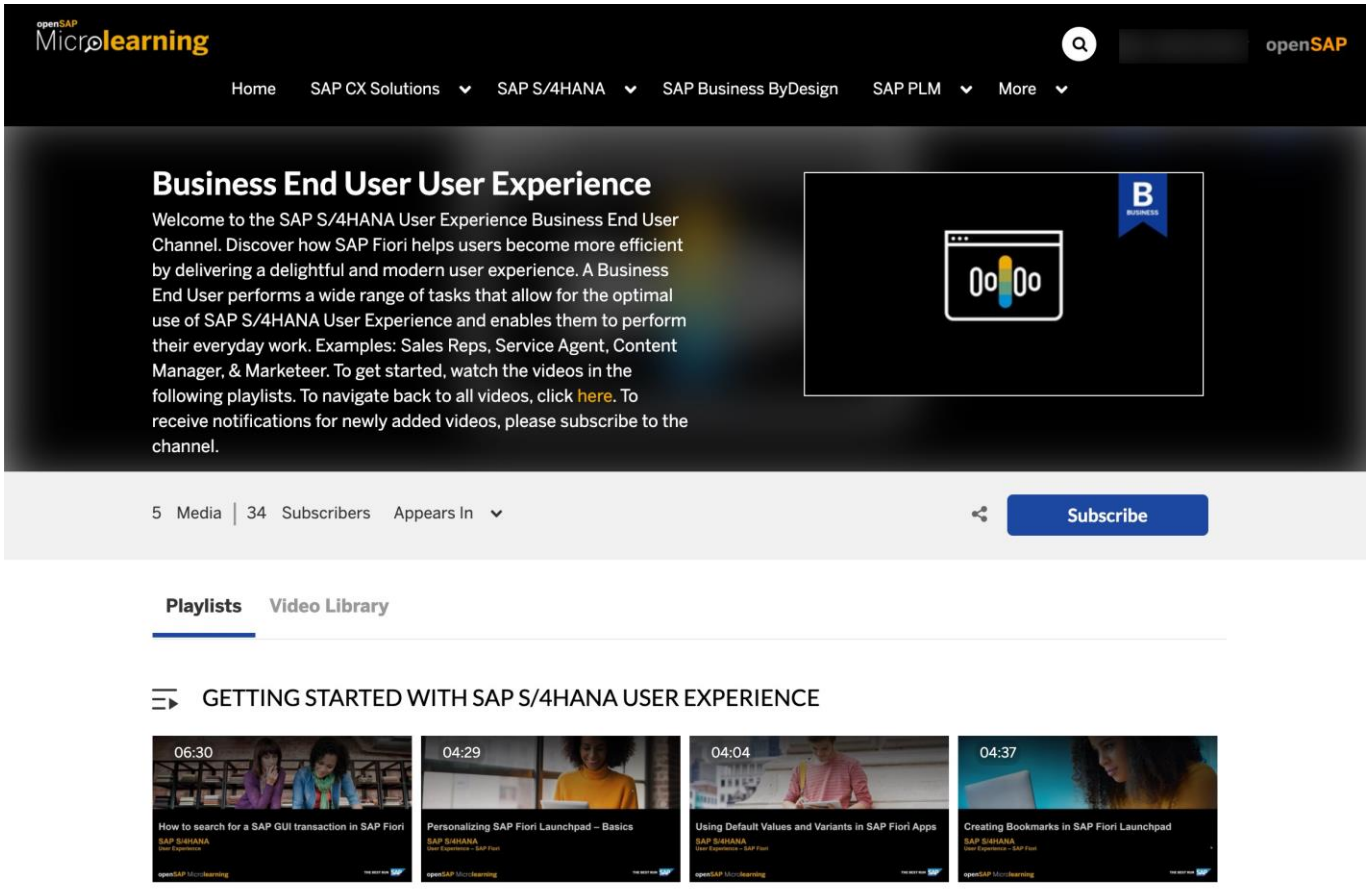


Figure 46 - openSAP microlearning video playlist SAP S/4HANA > User Experience > Business End User Experience

When moving users from GUI to SAP Fiori, consider the advice in Blog post SAP Fiori for SAP S/4HANA – Recommendations for transitioning users from SAP GUI to SAP Fiori.

Refer to:

- Podcast Inside SAP S/4HANA Podcast 46: SAP GUI to SAP Fiori
- Blog post SAP Fiori for SAP S/4HANA – Recommendations for transitioning users from SAP GUI to SAP Fiori
- Blog post SAP Fiori for SAP S/4HANA – Upgrading from Fiori 2.0 to Fiori 3 for SAP S/4HANA Cloud 1908 and SAP S/4HANA 1909 and higher Users
- Blog post Major next steps of SAP Fiori 3 available for SAP S/4HANA on-premise – spaces, central entry point, and more
- Blog post SAP Fiori 3 update: evolution continues, with flat tiles and more – have a look, and learn how to find what's new
- Blog post SAP Fiori 3: How to put intelligence into your user experience
- Blog post SAP Fiori for SAP S/4HANA – How to setup the User Assistant in your S/4HANA Fiori launchpad
- Blog post Simplified Configuration of Help Links in SAP S/4HANA

3.6. Regression testing

As for any application of Support Package, Enhancement Package, or release upgrade, regression testing is necessary and will be a significant part of the project. The following need to be verified:

- Changes to business processes, e.g. those impacted by simplifications or new functional features
- Changes to the SAP Fiori launchpad
- Changes to currently used SAP Fiori apps and classic user interfaces in scope
- All Custom extensions and custom-built apps

A particular watchpoint is performance of the overall solution and of specific apps, especially high-volume apps. While upgrades typically bring improved performance and new performance configuration options, these need to be reviewed and verified against your current system usage.

SAP Solution Manager can facilitate your regression testing. Since the relevant SAP Solution Manager capabilities could be used for any type of upgrade or conversion and are not SAP S/4HANA specific, they are described in the appendix.

3.6.1. Automated testing for custom SAP Fiori apps

For custom-built SAP Fiori apps, deeper technical regression testing may be needed. For testing of custom-built Fiori apps, refer to the SAPUI5 Software Development Kit for the latest advice on testing tools and best practices.

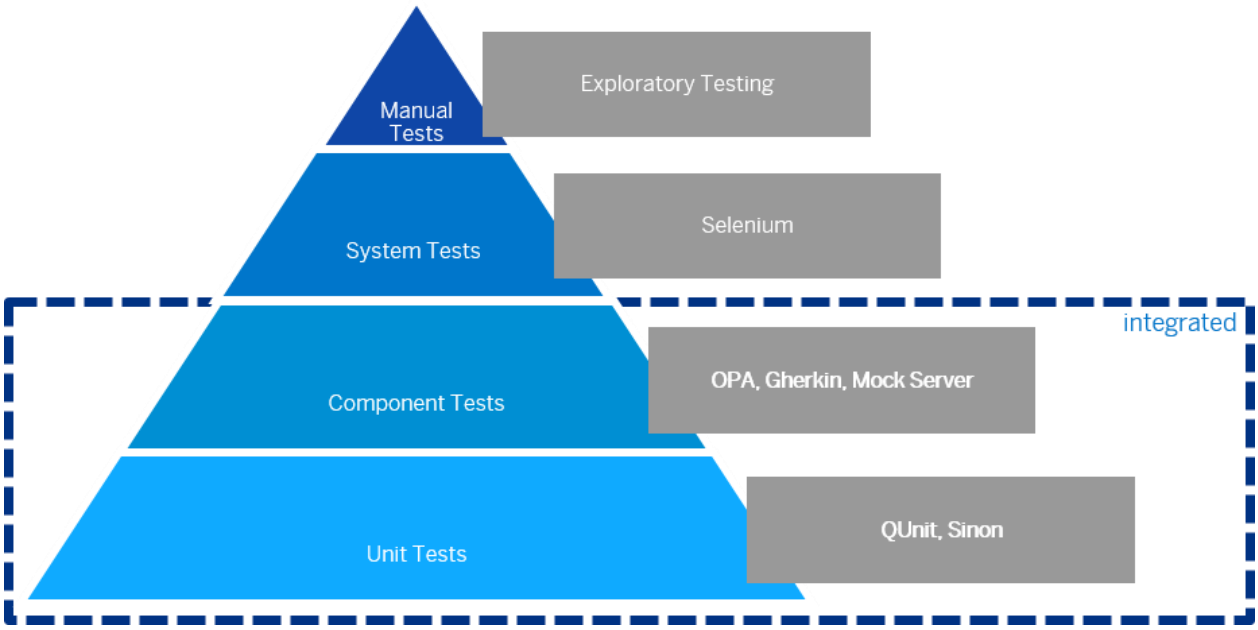


Figure 47 - SAPUI5 Testing Pyramid

For example, you can opt to use automated testing capabilities provided as part of SAPUI5, such as:

- **OPA5 tests** (One Page Acceptance Tests)
- **UIVeri5 tests** (end to end testing framework for SAPUI5 applications)

From SAPUI5 1.74, you can use the **Unit Test Recorder** to assist with creating these tests. You can use open source Test Automation Frameworks such as Vyper for UI5 to run repetitive tests.

Refer to:

- Testing section of the SAPUI5 Software Development Kit
- Blog post UIVeri5: More stable system tests for UI5 Applications
- Blog post Automated Testing for SAP Fiori apps: Piece of cake with SAP Web IDE and the SAPUI5 Testing Tools
- Blog post Test Recording with UI5 Recorder
- Blog post Get started with UIveri5 – SAPUI5 Test Automation
- Blog post Automate SAP UI5 Application Testing using Vyper Test Automation Framework

You can also do automated testing of OData Services using eCATT. Refer to: Testing OData Services in the SAP Help Portal

3.6.2. Validate your business processes

When replacing deprecated SAP Fiori apps with new apps and where there are major changes to existing apps, you must validate whether business processes are still running as desired. For new apps, you may also need to consider whether custom extensions might be required. You should also consider if the business process can be further optimized by using the new app features provided.

Deprecated and changed SAP Fiori apps can usually be identified with help of the What's New Viewer for SAP S/4HANA, or the SAP Fiori Apps library. Refer to:

- openSAP microlearning video Working with the What's New Viewer
- openSAP microlearning video Finding available SAP Fiori apps

3.6.3. Verify SAP Fiori floorplan changes

For any expected SAP Fiori floorplan changes, regression test a few apps with the relevant floorplan to check there are no issues with the changes. You should make sure you test any import/export features, e.g. export to spreadsheet, to ensure there are no issues being raised by your web browser settings, proxies or firewalls. Refer to:

- SAPUI5 Software Development Kit – What's New in SAPUI5 and Change Log

3.6.4. Validate changes in classic UI capabilities

For any change in classic UI capabilities, validate any important changes that impact business users are working as expected. For example:

- Cut/copy/paste capabilities
- File upload/download
- Themes
- Behavior on touch-enabled devices
- Significant changes in icons

If you are using SAP Business Client, validate changes in behaviors such as:

- Side panels
- Themes
- Tab and busy indicator behaviors

If you are using SAP Screen Personas, validate important changes in behavior for your target release:

- Slipstream on mobile

Refer to:

- SAP Note 2658822 - Release notes for SAP GUI for HTML (short WEBGUI)
- SAP Note 2963562 - Icons are displayed differently in WinGUI and WebGUI
- SAP Note 2540597 - Supported Themes for SAPGUI for HTML
- SAP Note 2340424 - Availability of Side Panels in S/4HANA (on-premise)
- SAP Community topic SAP Screen Personas

3.7. Cutover and go-live

Cutover and Go-Live for a SAP S/4HANA upgrade is similar to the upgrade process for any software. These are the main activities to be considered:

Main activities of the Cutover and Go-Live are:

- **Get go/no go agreement** to start the cutover from all stakeholders
- **Freeze production**, if needed
- **Execute transports and cutover activities**
- **Execute production verification testing**
- **Get final go/no go agreement to go-live**
- **Advise the business-as-usual support team** that the new changes are in production
- **Re-open the system** for business users
- **Make the go-live announcements** informing users/stakeholders that the system is ready for use
- **Formally start the hypercare period** for the upgrade

4. DRIVING ADDITIONAL VALUE FROM YOUR UPGRADE

4.1. Introducing new business functions and processes

After your SAP S/4HANA sandbox and/or development environment has been upgraded, you carry on the design, configuration, and extension of your solution based on the scope of your project. These are activities that depend on having system access to your target release of SAP S/4HANA.

Most of these activities are minimal for a Technical Upgrade, where the scope is constrained to mandatory changes. More effort is required for a Functional Upgrade where new functionality is being introduced.

Typical activities include:

- Fit-to-standard (aka fit-gap) blueprinting
    - for mandatory simplification items
    - for new or changed business processes
    - for new or changed business roles
    - for new apps, including successor apps of deprecated apps and classic UIs
- Configuration of functional processes
- Configuration of new features and options in SAP Fiori launchpad
- Extension of SAP Fiori apps
- Adjustment of security roles and authorizations to include new or changed authorization objects

This is the RUN phase of your SAP S/4HANA upgrade project.

Whether you applied a Functional Upgrade or Technical Upgrade approach, you are likely to want to drive more business value from your upgraded SAP S/4HANA solution over time. You do not need to wait until the next upgrade to do this. Introducing new business value is readily achievable provided the main activities and key considerations are understood.

For example: You may want to provide greater benefits to the business and business users by increasing your coverage of new or changed processes, more apps, and/or new intelligent technologies.

Once your upgrade has exited Hypercare and moved to business as usual support, you can look to introduce new business value by running much smaller **continuous improvement projects**.

Important: A continuous improvement project is much smaller and of shorter duration – typically weeks rather than months - than an Upgrade or Implementation project.

Depending on your organizational culture, you may want to establish a **Centre of Excellence** to guide running of continuous improvement projects and ensure lessons learned are captured and used to improve future continuous improvement projects.

Using a project framework enables you to:

- **Manage the potentially diverse impacts of process change** on the system and on the organization in a coherent manner

- **Maintain good communications** with sponsors, stakeholders, business users, and business-as-usual support teams
- **Continuously improve the execution and outcomes of any future continuous improvement projects**
    - For example, by capturing lessons learned, before/after metrics, runsheets of activities, and updating living documents to reflect lessons learned and key decisions taken (e.g. UX Strategy, Mobility Strategy, Intelligent Technologies Strategy)

Continuous improvement projects can be used to introduce:

- **Changes to existing business processes**
    - E.g. Adding more SAP Fiori apps to provide greater coverage of existing business processes
- **New intelligent technologies**
    - E.g. Adding Machine Learning or Situation Handling to existing business processes
- **New business processes or business models**
    - E.g. Group Reporting, Central Procurement, and/or Demand-driven MRP
- **New SAP Fiori launchpad features**
    - E.g. New notification types, new user defaults.

This section provides:

- **Example Project plan** for a continuous improvement project
- **Prerequisites** for a continuous improvement project
- **Main phases and related considerations** of a Continuous Improvement project
    - SAP Activate phases have been used as a guide and can be mapped to your chosen methodology

4.2. Example project plan for a continuous improvement project

The usual SAP Activate Methodology phases (DISCOVER, PREPARE, EXPLORE, REALIZE, DEPLOY, RUN) are a useful guide for a continuous improvement project.

Most phases will be much shorter than an implementation or upgrade project – typically of a few weeks' duration. This is particularly expected where your SAP Fiori architecture and UX/mobile strategies are already in place, enabling the team to focus on the business process and related business roles to be changed.

Important: If the focus of your Continuous Improvement project includes introducing any intelligent technologies for the first time, you will need to allow additional time to:

- Adjust your architecture
- Update your UX Strategy (and if impacted your Mobile Device strategy)
- Enable the team on intelligent technology design, behavior & tooling
- Enable your business-as-usual support team on support tooling

In this example project plan, some new business roles and related apps are being introduced by the Continuous improvement project. The project plan is 6 weeks from start in sandbox to go-live in Production, plus a subsequent 3-week hypercare period. Discovery starts in a sandbox or trial system, where the following activities can be completed without impacting the Development to Production landscape:

- Standard apps are explored
- New or changed business process(es) are prototyped
- Fit of apps can be workshopped
- App extension options verified
- SAP Fiori launchpad home page (or spaces and pages) design for business roles are prototyped

App extension options have been limited to configuration and in-app extensibility options. Developer-led extension options have been excluded from scope.

Once the new processes and apps to be introduced have been agreed, there is a quick progression to activate, configure, and test the agreed changes.

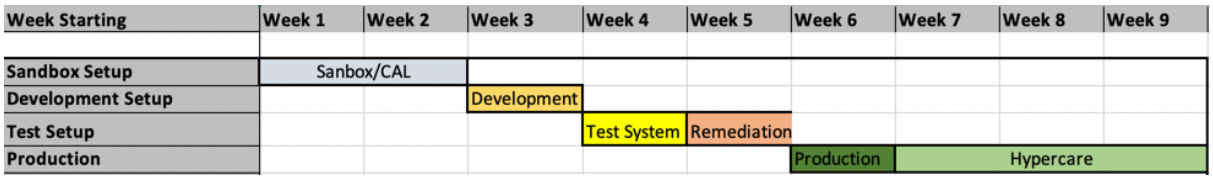


Figure 48 - Example project plan for a continuous improvement project

4.3. Prerequisites

Before starting your continuous improvement project, check the following are already established:

- Your SAP Fiori for SAP S/4HANA system architecture
- Your Mobile Device strategy
- Your User Experience strategy

If your scope includes introducing new intelligent technologies, you will need to have considered the strategy for the relevant capabilities. Intelligent technologies are varied and may include a range of technologies. A few examples of Intelligent technologies with related use cases that are integrated with SAP S/4HANA are:

- Machine Learning and Artificial Intelligence (ML/AI)
- SAP Intelligent Robotic Process Automation
- Chatbots such as SAP Conversational AI
- SAP Fiori Situation Handling scenarios (these can be just UX or involve additional technologies such as Machine Learning)

4.4. Introducing new business roles and SAP Fiori Apps

You can pace organizational change by focusing on groups of users who perform the same business role. People in the same business role are most likely to:

- work with similar business processes,
- have similar needs for apps/UIs,
- have similar working environments (office, home office, on-the-road, in the factory)
- have similar mobile device usage
- have similar pain points and opportunities.

These similarities make it easier to focus your User Experience efforts that drive desired changes in mindsets and behaviors.

Consider the following as a high level UX adoption process:

1. **Identify your target business roles**
    - **a.** E.g. These may be inherited from the related business processes in scope
2. **Gather information about your users**
    - a. E.g. current working environment, mobile device usage, current UI technologies used etc.
3. **Envision the future**
    - a. Clarify the most important business priorities for introducing the new apps and other innovations.
    - b. For example, is the aim to move more of their tasks onto mobile devices? Give them better guidance? Bring automation? Enable them to react faster? Bring better insights?
4. **Select and fit your apps/UIs**
    - a. Review the content of SAP Business Roles as a starting point
    - b. Craft a custom business role with the new apps/UIs needed, e.g. using the Launchpad content manager
    - c. Include launchpad features that are needed, e.g. Search, Notifications, Easy Access Menu
    - d. Ensure authorizations and device considerations have been covered
5. **Craft the default launchpad layout for the role**
    - a. Work with a few of the users in the role to make sure the content is organized in a way that makes sense minimizes time to adjust to the new role
    - b. Expect that many business users will not bother to personalize, and others may not wish to personalize until days/weeks after new apps are introduced

When moving users from GUI to SAP Fiori, you should also consider the advice in Blog post SAP Fiori for SAP S/4HANA – Recommendations for transitioning users from SAP GUI to SAP Fiori.

Refer to:

- openSAP microlearning Refining Business Roles with SAP Fiori Launchpad Content Manager
- openSAP Microlearning Creating Launchpad Content with the SAP Fiori Launchpad App Manager
- openSAP Microlearning Activating SAP Fiori Content in Custom Business Roles

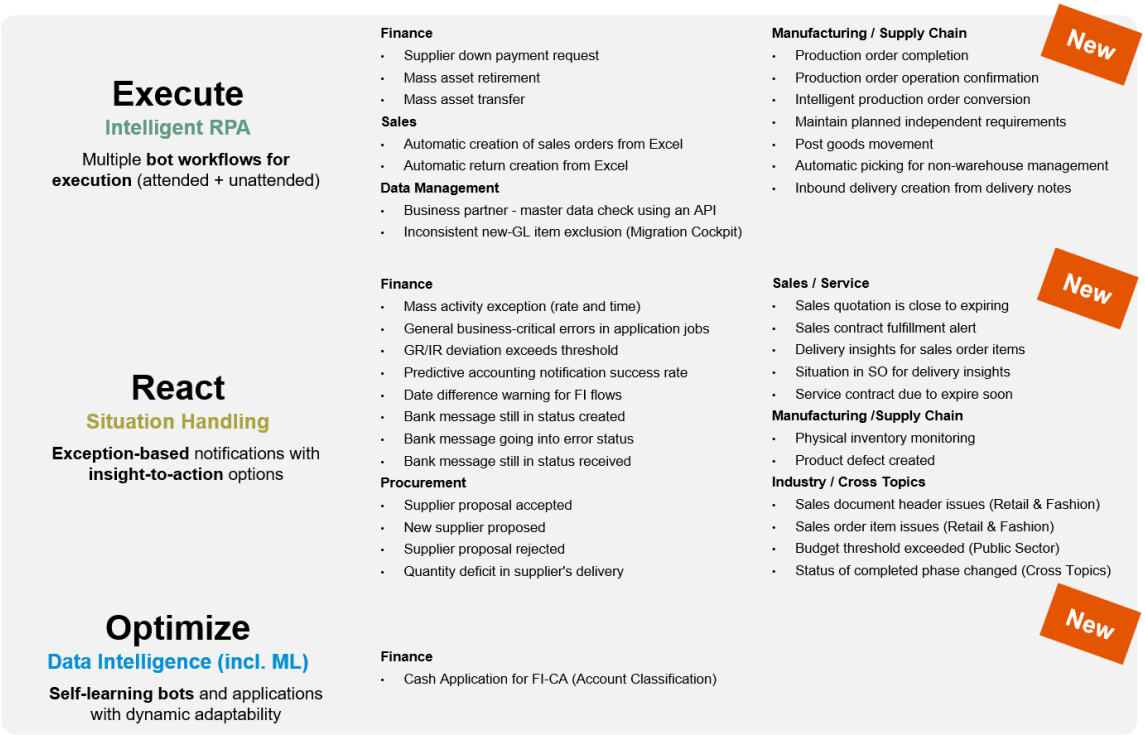
4.5. Introducing new Intelligent Technologies

Each new release of SAP S/4HANA offers the opportunity to implement new business processes and introduce high business value through intelligent technologies such as Intelligent RPA (Robotic Processing Automation, Situation Handling & Data Intelligence (incl. Machine Learning).

For each intelligent technology, SAP S/4HANA delivers use cases for business processes that are ready to configure, activate, and deploy. Use cases can be embedded or side-by-side.

Embedded use cases run within SAP S/4HANA, they are embedded within specific SAP Fiori apps and features. For example, most Situation Handling use cases and several Machine Learning use cases.

Side-by-side use cases require parallel services from the SAP Business Technology Platform (BTP), which may require subscription or cloud credits. For example, all Robotic Process Automation use cases, and some Machine Learning use cases.



Further details on these can be found below:

- Use Cases for Situation Handling
- Intelligent Scenario LifeCycle Management
- Blog post Intelligent LifeCycle Management – Frequently Asked Questions
- SAP Best Practices for iRPA on SAP S/4HANA
- Training and Activating the out of the box predictive content shipped by S/4HANA

4.6. Introducing new SAP Fiori launchpad features

SAP Fiori is not only a collection of apps. The SAP Fiori Launchpad as entry point provides many features already including Enterprise Search, Notifications, Settings (including Default Values), Personalization (including Edit Home/Current Page), User Assistance, About, and App Support. In the following image you can see several of features available in the latest releases of SAP S/4HANA.

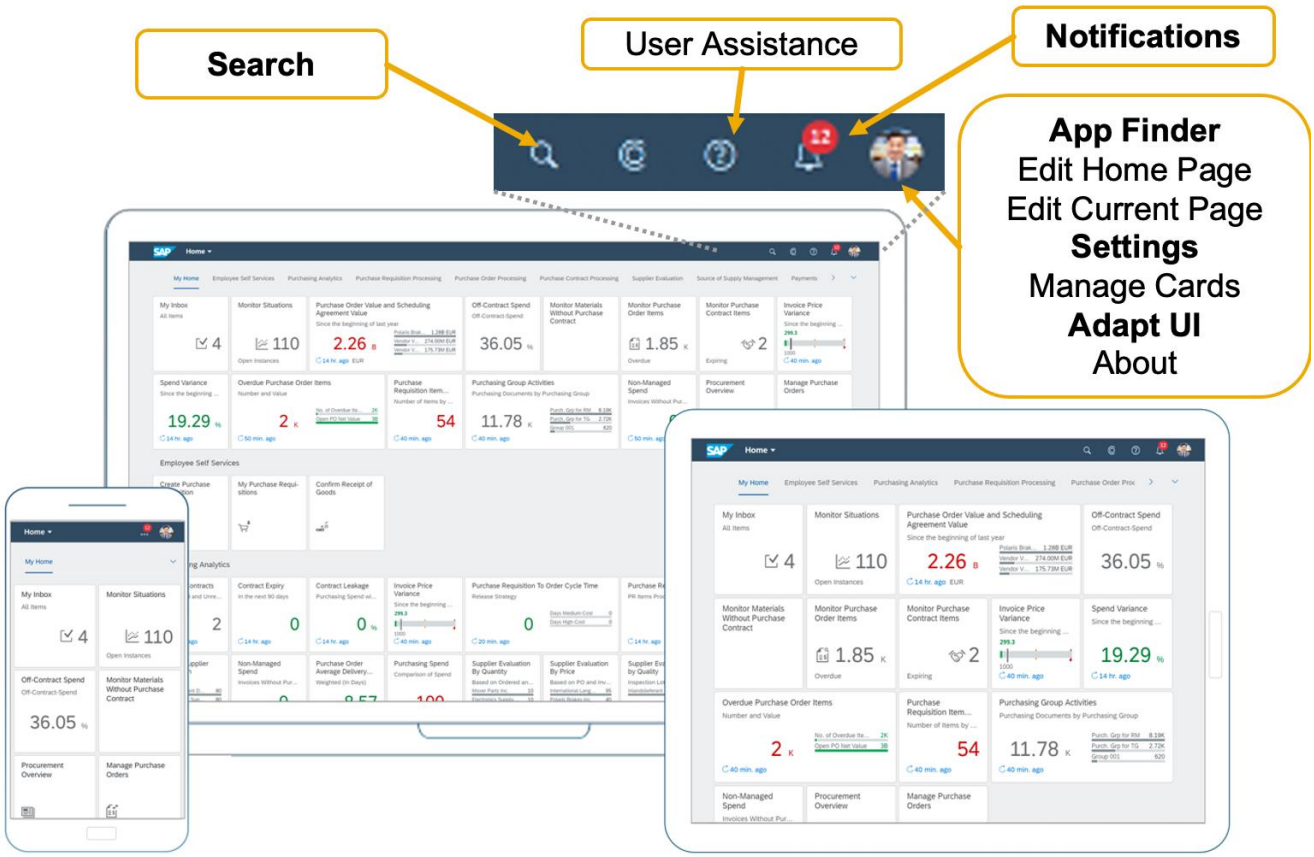


Figure 49 - SAP Fiori Launchpad features

It is recommended to always enable the following features for the SAP Fiori Launchpad:

Feature	Minimum	WHY
Enterprise Search	All environments, limit authorization to objects where needed	The Killer App of SAP S/4HANA – search, filter, and from results launch any related app
Notifications	All environments	The other killer feature!
User Defaults	All environments	Save typing + avoid mistakes (the new and improved SET/GET parameters)
User Assistant	At least in Sandpit (free) Consider your options for DEV/QA/PRD	Context-sensitive help to train the project team first
SAP Menu / Easy Access Menu in the App Finder	At least in Sandpit and DEV Consider fit to roles in QA/PRD	Ease the transition from SAP GUI to SAP Fiori by giving access to TCodes
Adapt UI	At least in Sandpit + DEV/QA	Easiest way to improve most SAP Fiori apps + supports most common changes
Personalization	All environments	Users have consumer expectations

Figure 50 - Recommended SAP Fiori Launchpad features

From experiences across SAP S/4HANA customers, there are five main SAP Fiori launchpad features to include in your project. Most of these features are either provided working out-of-the-box or require minimal once-off configuration to get them going. They are as follows:

Enterprise Search

The SAP Fiori launchpad offers an SAP HANA Enterprise Search function that provides unified, comprehensive, and secure real-time access across all apps and business objects, such as materials, customers, and maintenance plans. The search icon is displayed in the shell bar of the launchpad and is always readily available at the top of the screen.

Notifications
Notifications are the best way to make users aware of a situation that requires timely action or attention. This could be a situation that has just arisen, or a task triggered by a workflow. Notifications have the following benefits:

- Use notifications to make users aware of situations that require attention.
- Reduce the amount of information and the number of actions to a minimum but provide enough information to help users decide if the information is important.
- Use notification list items and notification list groups only in the SAP Fiori notifications popover.

For more information see SAP S/4HANA Notification Centre Part 1 Activation and SAP S/4HANA Notification Centre Part 1 Providing Notifications.

Default Values
You can personalize your default values in SAP S/4HANA to save time when using apps launched from your SAP Fiori Launchpad. You can set user-specific default values for any parameter values used when launching any of your apps from the SAP Fiori Launchpad, including:

- SAP Fiori apps
- SAP Web Dynpro ABAP applications
- SAP GUI for HTML
- SAP GUI for Windows

Guidance on configuring user default values is detailed in **Setting User Defaults in the SAP Fiori Launchpad.**

Personalization
One of the most important features in SAP Fiori is the possibility for each end-user to personalize the SAP Fiori Launchpad. Personalization features available include the following:

- Setting default values
- Filter variants
- Smart table/chart personalization
- Setting favorite links in Smart link dialogs
- Managing Cards on an overview page
- Creating bookmarks
- Using Enterprise Search for reporting

See more in SAP Fiori for SAP S/4HANA - How can end users personalize SAP Fiori.

User Assistance
The main characteristics of User Assistance are:

- Seamless – can be used, exactly when the user needs it from within the application
- Context-sensitive - shows exactly what is needed for the user, depending on the current screen
- Guiding - provides an interactive step-by-step process guidance

Guidance on configuring User Assistance is detailed in How to set up the User Assistant in your SAP Fiori Launchpad.

The top 5 SAP Fiori features are further detailed in blog post The top 5 SAP Fiori features that bring value to every business user.

4.7. Introducing native clients

Within the efforts for introducing new business value through new or enhanced applications, it might be worth considering introducing new or extending existing apps to new devices and operating systems.

While SAP Fiori can be run in any HMTL5 compatible browser, it's possible to leverage additional features and provide additional functionality and business value through native device / OS features.

Refer to the Mobile apps for SAP S/4HANA – Customer Guide.

For SAP Fiori using Apple iOS, refer to:

- Design Guidelines SAP Fiori for iOS
- SAP Business Technology Platform SDK for iOS

For SAP Fiori using Android, refer to:

- Design Guidelines SAP Fiori for Android
- SAP Business Technology Platform SDK for Android

5. KNOWN ISSUES

#	Issue	Description	Solution	References
1	General - Missing Translations	Some SAP Fiori apps, e.g. SAP Fiori app F3228 Sales Accounting Overview might have missing translations after the upgrade. Prerequisites: 1. Configuration was not complete, e.g. Semantic Tags were missing for some financial statement versions. 2 There are untranslated texts that need to be resolved via the usual SAP support processes.	1. Check all functional configurations are complete 2. If there are still issues, raise an SAP incident providing the exact App Id and using the designated application component for support of the app. These details can be found in the SAP Fiori apps reference library, and via the User Actions > About feature.	- Speed Up your SAP Fiori support incidents - Finding the technical name of an app - SAP Note 2838687 - [F3228] Sales Accounting Overview: Sales Volume Per Material Card - SAP Note 2855656 - Sales Accounting Overview - two cards show results slowly
2	General – Equivalent support package missing	Customer had upgraded one or more components on their current release to a too high SPS level, which has/have no equivalent support package released yet for the target S/4HANA release	Wait for next FPS/SPS or major S/4HANA release to include the equivalent support package. Alternatively revert to a source release status before upgrading the affected components. Point the customer to SAP Note 832594	- SAP Note 832594 - Importing Support Packages before an upgrade
3	General - Add-on version not available for target release	Customer is wondering how to proceed in case of having an add-on deployed, for which no new version is available yet for the target S/4HANA release	In some cases the old version can be uninstalled. Check with the tooling in transaction SAINT. SUM would also perform this check and advise.	SAP Note 2911053 2911053 - Uninstallation Information
4	Technical - Release of customizing and development requests	Customer upgrade is stuck due to non-released non-standard code customizing and development requests	Ideally, you would release all transport requests to avoid potential issues as much as possible. If you have not released them, it will lead to locked objects stopping the upgrade and SUM would inform you about it. You could then go into transaction SE03 or SE09, unlock them and proceed with the upgrade. Of course, you should know 100% that you can unlock them without any side effects. If you want to include and release objects during an upgrade, there	

			are some good recommendations how to save time during the upgrade in: https://blogs.sap.com/2020/08/07/reduce-time-for-customer-transports-in-zdo-and-conversion-projects-for-sap-s-4hana/ https://blogs.sap.com/2017/11/24/integrating-customer-transport-requests-in-updates-and-upgrades/
5	Technical - OS upgrade - app server and DB server running on different versions during upgrade	Customer would like to know whether you can have app server and DB server running on different versions during an OS upgrade	OS updates can be done anytime, irrespective of whether DB and PAS are running on the same instance or on different instances. Of course the target OS version needs to be in the supported range of OS versions for all SAP product(s) running on this instance. So running PAS and DB on the same instance might reduce the flexibility in terms of OS upgrades. Usually the upgrade can be done in-place. For the PAS anyway. But there are also scenarios where new install is recommended (e.g. see here). Depends also on the OS being used. E.g. for Windows in-place upgrade support has only been introduced quite recently (see SAP Note 1494740). Whether it should be done in-place is of course another question. In a productive or otherwise critical environment, it might be a better choice not to do an in-place upgrade, even in cases where it's supported and possible. Depends of course how big the upgrade is, whether you just install some security patches, or whether you upgrade to a major new OS version. Also depends on which quick restore options you have for the PAS in case the upgrade fails. Also some high availability setups on instance/OS level might technically prevent an in-place upgrade.
6	Technical - Ensure more DB space temporaril y during upgrade	Customer is wondering why a lot more DB capacity is required during upgrade	Due to temporarily required objects/copies, the DB capacity required during the upgrade might be +70% of your current DB size. Ensure sufficient space is available.
7	Technical – Customer cannot implement latest Simplifica tion Item Check Note 2399707	Customer is on S/4HANA 1809 and upgrading to S/4HANA 2020 and implemented prequisite note 1668882 and while trying to implement the latest note for 2399707 by resetting the note 2399707 is not	Resolution is to use version management and reactivate the following objects: /SDF/CL_RC_CHK_UTILITY=>GET_TEXT_STR /SDF/CL_RC_CHK_UTILITY=>SITEM_SKIP_STAT_UPDATE_SINGLE /SDF/CL_RC_MANAGER=>PERFORM_CONSISTENCY_CHECK /SDF/CL_RC_SIMPLE_CHK_DB=>PERFORM_CHECK /SDF/CL_RC_SIMPLE_CHK_EN_POINT=>PERF

		allowed. Customer then tries to impement the latest note and runs into syntax error with class /SDF/CL_RC_MANAGER with method PERFORM_CONSISTENCY_CHECK	ORM_CHECK back to the 1809 version and then reimplement SAP Note 2399707.	
8	Technical – Long runtime for transports impacting business downtime	Optimizing the transports requires firstly attention to the correct sequencing of transports.	Any further optimization considered for the import of transports must be tested before using it in your production environment. There are 3 main options: Enable the feature “Customer Transport Integration with SUM”. This enables the import of multi-client customer transport requests and - in connection with the near-Zero Downtime Maintenance (nZDM) or Zero Downtime Option (ZDO) technology - the conversion of custom tables during the uptime. Refer to SAP Note 1759080 - Prerequisites and restrictions of Customer Transport Integration with SUM Use parallel imports to accelerate the runtime for importing transports after the upgrade/update. In the Transport tool configuration, a new parameter "parallel = n" can be set.”. Review each individual setting and decide whether the recommendation is valid for your environment. Refer to SAP Note 1223360 - Composite SAP Note: Performance optimization during import. For transport of authorization there a further optimization possible. By using the parameter AUTH/NEW_BUFFERING special “After Import Methods” run later. Refer to SAP Note 1544295 - Performance of the after-import method PRGN_AFTER_IMP_PROFILE	
9	Technical – Poor performance of client copy	Client Copy performance can be a hidden cost for SAP S/4HANA upgrade projects, especially where you have large volumes of data, there has been insufficient archiving of old data, and server resources are scarce. It is always a good idea to ensure	Consider alternative solutions to achieve the same end. For example, if you are experiencing client copy of large amounts of data exceeds the permitted durations, consider using a system copy with pre and post steps to achieve the same objectives. Where there is no better alternative to client copy, you must manage the duration	- SAP Note 2163425 - Recommendations for client copy performance improvement -> Central Note - SAP Note 2555451 - Performance improvement in Client Copy for

		client copy will not be an issue for the project.	through project planning. For example, including activities to test the duration and calculate the expected timeline, or by adding temporary hardware resources. From a technical perspective, you can improve the performance with some preparation. For example, by: - Calculating the client size prior to client copy to ensure sufficient hardware resources - Using parallel processes - Reducing the data set via archiving - Deleting the target client or specific large tables in the target client in advance of client copy - Excluding large tables from client copy You should also review the latest SAP Notes relating to client copy. Apply these prior to starting a new client copy.	HANA -> Optimize Client Copy parameter - SAP Note 2550545 - Client copy performance improvements -> Update Client copy program - SAP Note 2761821 - Performance improvement for HANA systems : Client copy -> Use HANA Native SQL to accelerate - SAP Note 2759161 - Internal error: <TABLE_NAME> DWITH_CURS is raised during client copy/client deletion - SAP Note 489690 - CC-INFO: Copying large production clients - SAP Note 2868569 - Performance Improvement in Client Copy WAIT statements - SAP Note 2907850 - Enable single copy after performance improvements in Client Copy Tool - SAP Note 2759161 - Internal error: <TABLE_NAME>

				DWITH_CURS is raised during client copy/client deletion-> To accelerate Table Deletion tasks Examples of relevant monitoring tools: - SAP GUI Transaction SCC3 – Client copy monitor - SAP GUI Transaction SM50 – Check client copy work processes. You can see which job has been running for long, and what kind of task is being executed. - SAP GUI Transactions DB02 and DBACOCKPIT – Check from DB level, for any expensive SQL being executed.
10	Technical – Deactivated BEx Queries	This can occur due to Simplifications. Simplifications started with SAP S/4HANA 1511 and are still ongoing throughout subsequent SAP S/4HANA releases.	In each release, where BEx queries that call Operational Data Providers (ODP) are used in the SAP Business Suite, these BEx queries must be converted to CDS View queries in SAP S/4HANA. That is, BEx queries that call the new CDS interface views. Refer to the related Simplifications in the Simplification Catalog.	- SAP Note 2556089 - S4TWL - Simplification in Position Reporting for Financial Transactions - SAP Note 2555990 - S4TWL - CM: Unification of Technologies for Analytical Data Provision - SAP Note 2547347 - S4TWL

				- CM: Commodity Position Reporting on Versioned Pricing Data
11	Technical – Unexpected issues in web browsers due to changes in SAP GUI for HTML	Occasionally issues can be browser-specific, e.g. import data from clipboard not working in SAP GUI for HTML transactions with Chrome browser.	Your support team should always have access to an alternate web browser to confirm if an issue is specific to a certain web browser. Check you are using a supported browser as explained in section 2.5.10.1 Operating environment for business users Keep in mind that SAP GUI for HTML issues are fixed with SAP Kernel patches and Unified Rendering patches.	- SAP Note 2922263 - Webgui FSM: Clipboard access in Google Chrome 81 - SAP Note 2658822 - Release notes for SAP GUI for HTML (short WEBGUI) - SAP Note 2412840 - Kernel Patch SAPWEBGUI.SAR
12	Technical – Errors in the ACT_UPG phase	This can be caused by unexpected conflicts, such as clashes in CDS View names.	Use the logs to analyze the errors and check for related SAP Notes for affected CDS Views.	SAP Note 2050604 - Problem analysis in upgrade: Phase ACT_UPG SAP Note 3052823 - Agricultural Contract Management 2020 FPS1: CDS View 'I_ACMContractCounterparty' SQL view name correction
13	Functional – New functionality impact on classic functionality	In certain scenarios, new functionality can impact classic functionality. For example: Material Requirements Planning Live (MRP Live) versus classic Material Requirements Planning (MRP) MRP Lists were available in the earlier	SAP S/4HANA features MRP Live (MD01N); a new MRP run optimized for SAP HANA. MRP Live reads material receipts and requirements, calculates shortages, and creates planned orders and purchase requisitions all in one database procedure. This minimizes the volume of data that has to be copied from the database server to the application server and back, which considerably improves performance. MRP Live also has some restrictions listed in SAP Note 1914010 - MD01N: Restrictions for Planning	

		SAP S/4HANA releases but were removed in later releases due to the introduction of MRP Live. Refer to: S/4HANA MRP – to Live or not to Live: MRP lists	in MRP Live on HANA. One such major restriction is that MRP Live does not write MRP lists. MRP lists were intended for checking the MRP result. MRP lists were used to find materials with issues quickly. MRP lists are snapshots of the material supply and demand situation at the time of the last MRP run. This snapshot is often outdated. With the HANA Database, stock/requirements lists can be read with high speed. Therefore, with SAP S/4HANA there was supposed to be no need for outdated MRP lists. However, stock/requirements lists do not resemble the same situation as MRP list results in all scenarios. MRP Live currently doesn't provide a tool to check and verify MRP run results N/A	
13	Functional - Pre-delivered content unavailable for Intercompany Matching and Reconciliation (ICMR)	With SAP S/4HANA 1909, a new functionality has been introduced to speed up intercompany reconciliation process from company close to corporate close. Intercompany Matching and Reconciliation (ICMR) is a delivered solution in SAP S/4HANA, which matches transactions without any ETL process and reconciles data in real time. To further facilitate and accelerate the usage of the functionality, SAP has offered certain sample configurations that come as pre-delivered content. If there is a new S/4HANA 1909 installation, the content should be available in the target client after making the client copy from 000.	To get the pre-delivered content, you need to manually transport it to your working clients.	SAP Note 2901247 - Sample Configurations of Intercompany Matching and Reconciliation(On Premise) explains further steps to implement the pre-delivered content.

		However, if you upgraded from a lower release to SAP S/4HANA 1909, it is not available by default.		
14	Functional - Unexpected data inconsistencies during upgrade in certain Financial Ledger	Some unexpected data inconsistencies were identified during the upgrade. The consistency checks stopped in Currency conversion settings for Company code (Message class FINS_ACDOC_CUST number 137).	This error can occur when you are using the SAP GUI transaction FINSC_LEDGER. For example, where there are existing entries in table FINSC_LD_CMP for a ledger that no longer exists. In SAP S/4HANA 1511, the validation to identify this inconsistency was not available. The consistency checks in higher SAP S/4HANA releases are stricter than in SAP S/4HANA 1511.This is the reason why these error messages are displayed during the upgrade. If you want to get rid of these error messages, the only way to do so is to delete these entries directly from the table via SE16N, which will require a SAP Incident to be created for SAP Development support to handle this database correction.	
15	Functional - Additional add-on license for SAP Solution Sales required when upgrading from SAP S/4HANA 1809 to 2020	"Solution Configuration ERP 630 (SLCE 630)" with S/4HANA 1809 based on license "7018774 SAP Solution Sales Config., up to 20". Upgrading S/4HANA to 2020 requires the add-on to be upgraded to "Solution Configuration ERP 800 (SLCE 800)". This however requires a new license for the add-on.	"Solution Configuration ERP 630 (SLCE 630)" with S/4HANA 1809 based on license "7018774 SAP Solution Sales Config., up to 20". Upgrading S/4HANA to 2020 requires the add-on to be upgraded to "Solution Configuration ERP 800 (SLCE 800)". This however requires a new license for the add-on.	
16	Functional – Cost routing not correct	Error instead of warning message raised	Apply correction from SAP Note 3024875 - Error message CK-040 is wrongly raised	
17	UX – Deactivated ICF nodes	Some customers have found certain activated ICF nodes were deactivate during upgrade.	The recommended resolution is to capture the activated ICF nodes prior to activation for comparison with after upgrade. You can use program RS_ICF_SERV_ADMIN_TASKS to export the list of activated ICF nodes.	

18	UX – Deactivated OData Services	Deactivation of OData services can occur when the OData service is activated as a temporary object in the task lists (without defining a transport).	There is a custom report to identify these services prior to the upgrade in blog post Mass OData Unassign. You then have the option to add the services to a transport request.	
19	UX – Lost in-app extensions	In-app extensions can be lost if they were saved against temporary packages rather than transport requests.	This can happen if the configuration in the Adaptation Transport Organizer, transaction S_ATO_SETUP, is set to use temporary packages. Check the Adaptation Transport Organizer has been configured appropriately.	
20	UX – Reference lost due to missing system alias	During the upgrade process, new system aliases are introduced in table **/UI2/SYSTEMALIAS** as new content is deployed.	You need to map new system aliases to RFC Destinations. You can make these changes: - Manually in SAP GUI Transaction **SM30** using maintenance view **/UI2/V_ALIASMAP**, or - Automated by running task list **SAP_FIORI_FOUNDATION_S4**, step **Assign System alias to S/4 System Alias** to update this table in your sandbox/development environments, and to generate a transport request to apply these changes to other systems in your landscape.	SAP Note 2495630 - Reference lost displayed in Fiori Launchpad Designer
21	UX – Reference lost errors for SAP Smart Business KPI tiles	When moving from SAP S/4HANA 1511, 1610 or 1709 to SAP S/4HANA 1809 or higher releases, the ICF nodes for Smart Business apps have been changed and new nodes need to be activated.	Go to transaction SICF and activate ICF nodes: /sap/bc/ui5_ui5/sap/ssbtileslibs1 – library for smartbusiness tiles /sap/bc/ui5_ui5/sap/ssbtiless1 – Smart Business Runtime Tiles Starting with SAP S/4HANA 1909, SAP Fiori app F2814 Manage KPIs and Reports app replaces SAP Fiori apps F0814 KPI workspace and F2319 Report Workspace.	- SAP Note 2621243 Enable SAP Smart Business for S/4HANA - SAP Note 2500794 Fiori Launchpad Designer: Tiles of analytical applications cannot be displayed properly - SAP Note 2701036

				S/4HANA 1809 Error Loading Tile for Smart Business Tiles in Fiori Launchpad Designer
22	UX – Reference lost errors due to changes in technical catalogs	From time to time, as the content of SAP Business Roles is adjusted, tile definitions and target mappings can be reassigned to different technical catalogs. If you have created a custom business catalog that references these entities in the technical catalogs, you may experience Reference Lost errors in the SAP Fiori launchpad and Launchpad Designer.	The current recommendation is to: 1. In the SAP Fiori apps reference library, compare the Implementation Information for the app for your source and target SAP S/4HANA Release to identify the new technical catalog. 2. Correct the references in your custom business catalog as part of your follow-on activities during upgrade, preferably using the SAP Fiori launchpad content manager tool.	openSAP microlearning Refining Business Roles with SAP Fiori Launchpad Content Manager
23	UX – Unexpected changes in custom roles due to changes in SAP Business Catalogs	Each new SAP S/4HANA release includes new SAP Fiori apps and grows the amount of SAP Fiori coverage in related SAP Business Roles. This requires changes in the content of SAP Business Catalogs, which are a subset of SAP Business Roles.	Your user experience will change after upgrade where SAP Business Roles are assigned directly to users, or where SAP Business Catalogs are assigned directly to custom roles. This is expected. **Important:** Individual SAP Business Catalogs can be used in multiple SAP Business Roles or in assigned to your own custom roles. If you need to minimize changes to existing users, you can use the SAP Fiori launchpad content manager to copy the SAP Business Catalogs to the customer namespace. You can then refine and control the content of your custom business catalog, and assign it to your custom roles instead of	openSAP microlearning Refining Business Roles with SAP Fiori Launchpad Content Manager openSAP Microlearning Creating Launchpad Content with the SAP Fiori Launchpad App Manager openSAP Microlearning Activating SAP Fiori Content in Custom Business Roles

			directly using SAP Business Roles. Make sure you check the original SAP Business Catalog for changes, such as deprecated apps and their successors. Adjust your custom business catalog as needed. Preferably this should be done in your sandbox or development environment. Communicate any changes in the SAP Fiori content to your users before go-live.	
24	UX – Unexpected issues in standard or custom themes	Occasionally, new standard themes and custom themes can have unintended side effects on classic user interfaces and SAP Fiori apps. These problems do not occur when using other themes. For example: - [ENTER] key not working in SAP GUI for HTML transactions - Selected dates cannot be seen in My Leave Requests	Recommended resolution is to use the personalization options in the SAP Fiori launchpad User Actions menu to change to a standard SAP theme and confirm that the behaviour is specific to a theme. You can then report this as an SAP incident for resolution. When reporting issues, raise a SAP Incident giving the exact App Id, and using the designated application component for support of the app. These details can be found in the SAP Fiori apps reference library, and via the User Actions > About Feature. Remember to specify the themes affected.	- Speed Up your SAP Fiori support incidents - Finding the technical name of an app - SAP Note 2761326 - SAP GUI for HTML: Unexpected results or sizes
25	UX – Search connector model updates	Changes to search connector models have been occurring since the release of SAP S/4HANA 1610 where connector development was based on BW/INA. In SAP S/4HANA 1909 and higher releases a large	Running the following steps is recommended: - Re-index connectors after and before the upgrade via task-list SAP_ESH_INDEX_USER_AUTHORITY - Run task list	- SAP Note 2790616 - Enterprise Search Models : Availability of CDS based Search models in 1909 On Premise - SAP Note

		number of search connectors are now based on OData and CDS Views. Multiple SAP Notes have been delivered depending on specific errors.	SAP_ESH_CONSISTENCY_CHECK to identify issues in search connectors - Run task-list SAP_ESH_UPDATE_SC to activate new search connectors - Run report ESH_REFRESH_RUNTIME_BUFFER As a last resort if issues are still unresolved, you can run task list SAP_ESH_RESET and reactivate search connectors with task list SAP_ESH_INITIAL_SETUP_WRK_CLIENT	2889953 - Deactivation of old retail ESH search models in SAP S/4HANA - SAP Note 2690843 - CDS based search connector "Products" - SAP Note 2888521 - Fiori Business Catalogs assigned to S4HANA Enterprise Search Models - SAP Note 2462053 - 'Metadata call for model XXX was not successful' in /n/iwfnd/maint_service
26	UX – Lost SAP Fiori Launchpad config file	Setting configuration parameters using a launchpad configuration file was deprecated in SAP S/4HANA release 1809.	If you are upgrading from a lower SAP S/4HANA release, you are recommended to move all configuration parameters to setting parameters in SAP Fiori customizing using the transactions /UI2/FLP_SYS_CONF (cross client) or /UI2/FLP_CUS_CONF (client-specific).	- Setting Parameters in SAP Fiori customizing - Setting Parameters in a Launchpad Configuration File (Deprecated)

6. FREQUENTLY ASKED QUESTIONS (FAQ)

6.1. General

What is the difference between a SAP S/4HANA system conversion and an SAP S/4HANA upgrade?

SAP S/4HANA is a new product line, which is completely separated from the classical SAP Business Suite. This is why we use the term “system conversion” (and not “upgrade”) for the migration from the classic ERP system running on AnyDB to the SAP S/4HANA system which runs on SAP HANA.

You move from one SAP product (Business Suite) to the completely new one (S/4HANA), built on the new architecture and data models, containing renewed applications and new UI technology (SAP Fiori).

A system conversion is a move from SAP ERP and SAP Simple Finance (1503 or 1605) to SAP S/4HANA (1511 or higher). It involves moving to the SAP HANA database, removing unsupported add-ons and deprecated functionality, moving to the new architecture and data models and executing a data conversion from old table-based data structures to the new SAP S/4HANA data models based on CDS Views.

Once your system is on SAP S/4HANA, you can in the future upgrade from your current SAP S/4HANA release to a higher SAP S/4HANA release.

What are the risks if we do not upgrade from our current SAP S/4HANA release?

Once your SAP S/4HANA release reaches the end of maintenance date, SAP can provide extended maintenance for an additional maintenance fee. After the supplementary maintenance agreement has expired, the release automatically enters customer-specific maintenance, where additional maintenance fees must be paid and there is a restricted scope of services.

The expiry dates of mainstream maintenance and extended maintenance are published in SAP’s Product Availability Matrix and SAP Release Strategy.

SAP Release and Maintenance Strategy provides a description of all maintenance phases.

Important: New features and capabilities will not be downported to earlier releases. That is, unless and until you upgrade you will not be able to access:

- new SAP Fiori apps new SAP Fiori launchpad features
- new intelligent technologies scenarios
- new business processes
- new business models

Refer to:

- SAP Note 52505 Support after end of mainstream maintenance or extended maintenance
- SAP S/4HANA Release and Maintenance Strategy, and Related Commercial Terms for the On-Premise Edition

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Is the SAP Pathfinder report suitable for our SAP S/4HANA upgrade?

Yes, the SAP Innovation and Optimization Pathfinder report is now also available for SAP S/4HANA upgrades.

6.2. Functional

Why are simplification checks needed for upgrades?

Simplifications started with the first release of SAP S/4HANA 1511 and are ongoing as part of the SAP S/4HANA roadmap as different modules and processes are being renewed. You can review all of the Simplifications across all SAP S/4HANA releases in the Simplification Catalog.

The Simplification Item Check serves two purposes:

1. **Relevance check:** Determines which Simplification Items are relevant for the specific SAP S/4HANA release in which you are running the Simplification Item Check. This will help you to assess the functional and technical impact of the upgrade on your system.
2. **Consistency check:** During the upgrade process some parts of your solution may need to be migrated to new data structures and new processes. The data conversion routines rely on consistent data in order for this to happen automatically. If the Simplification Item Check identifies data inconsistencies or missing mandatory preparation activities which could cause the upgrade to fail, it will make you aware of these issues so you can correct or exempt them before the actual upgrade starts.

How can we know the differences between our current SAP S/4HANA release and the latest release?

You can get to know the delta between SAP S/4HANA releases using the SAP S/4HANA What's New Viewer, the Simplification Catalog, and the SAP Fiori apps reference library.

Refer to section 1.4 Business functionality impacts.

How do we approach financial closing in the month of go-live?

Monthly financial closing must be avoided during the DMO runs. Whether you run the month-end closing before or after your SAP S/4HANA upgrade go-live is a choice and needs to be discussed with your business subject matter experts.

6.3. User Experience

If we are currently using an SAP Fiori app that has a successor app, are we required to use the successor app on upgrade?

There are two possible scenarios that determine whether you need to change from your currently used SAP Fiori app to a successor app:

1. If your current SAP Fiori app is a deprecated app, it will no longer be available after upgrade. You must move to the successor app.

2. If your current SAP Fiori app is marked as an alternate app, this means both your current app and the successor app are available after upgrade. You can choose whether to continue with your current app or move to the successor app.

Important: any new features will only be made available on the recommended successor app. This includes new extension and personalization options.

Will our extensions to SAP Fiori apps still work after upgrade?

Provided the SAP Fiori app still exists and has not been deprecated, existing extensions will be retained.

However, because the app behavior and SAPUI5 control behaviors may have changed as part of upgrade, all extensions must be:

- Reviewed to check that the extension is still needed, e.g. the upgrade may have provided equivalent features in standard
- Regression tested to ensure the intended behavior is retained alongside the upgraded standard behavior

Important: The SAP S/4HANA What's New Viewer documents major changes to an app. More minor behavioral changes can impact any app, such as changes to the behavior of SAP Fiori elements floorplans.

For example:

- From SAP S/4HANA 1909, many of the SAP Fiori elements floorplans now include Export to Spreadsheet as a standard feature. Customers who had extended apps to include an Export to Spreadsheet feature should remove those extensions and revert to the standard behavior.

There may be additional rework required if your extension uses a deprecated SAPUI5 control or API method.

Refer to section 2.5.13 Upgrading custom SAP Fiori apps for more details.

If the existing SAP Fiori app has been superseded, typically the successor app is an entirely new app. This means frontend extensions to the SAP Fiori (SAPUI5) components are likely to be different. Backend extensions (e.g. BADIs in the SAP S/4HANA system) will remain unchanged. Usually successor apps offer improved behaviors and extension capabilities. So fit-to-standard analysis and assessment of extension options must be reassessed as you would for any new app.

Will our custom-built Fiori apps need to be remediated after upgrade?

Custom Fiori apps need to be tested and verified during your upgrade project. In most cases there is minimal rework required, provided best practice recommendations for SAP Fiori apps and SAPUI5 have been followed. However, there may be additional rework required if:

- You are upgrading from SAP S/4HANA 1511 and need to adapt apps to SAP Fiori 2.0 design requirements
- Your app uses a deprecated SAPUI5 control or API method

Refer to section 2.5.13 Upgrading custom SAP Fiori apps for more details.

We have modified an SAP Fiori app. Will it show up in SPAU or will it simply be overridden?

SAP Fiori apps typically consist of multiple components that may be affected in different ways via modifications.

- ABAP components – including the backend OData Service and underlying CDS Views; and may also include additional code in BOPF (Business Object Processing Framework) objects or ABAP RESTful Programming Model objects.
- SAPUI5 components – HTML, XML, and JSON files which are stored in your ABAP foundation as **BSP applications**

All these components are tracked for modification.

If an SAP object has been modified (usually due to an advanced correction) then a notification for the relevant object will be raised during SPAU. Developers have two possible responses to the notification:

- Adopt the new (upgraded) standard code, or
- Keep existing (pre-upgraded code).

If you select **adopt**, then the modification will be overwritten with the new upgraded code from SAP, i.e. the SAP standard code. If a developer has previously modified this SAP standard code, then adopting SAP standard will overwrite the modification.

If you select keep, then the existing pre-upgraded code will be kept. However, this can cause conflicts with upgraded code, and inconsistent or unexpected behaviors, which you will need to resolve. SAP does not support custom modifications.

Important: If you have modified a SAP Fiori app in a previous release, to avoid ongoing conflicts in the current and future releases, you should revert to an accepted extension approach instead, such as:

- Extensions supported by the SAP Fiori app and detailed in the Extensibility Documentation of the app in the SAP Fiori apps reference library
- Side-by-side extension using SAP Business Technology Platform

For further information on approved extensions refer to:
Custom Extensions in SAP S/4HANA Implementations – A Practical Guide for Senior Leadership

6.4. Technical

How can we reduce the downtime of our SAP S/4HANA upgrade?

There are a comprehensive list of measures that can be taken to reduce the technical downtime of the system during the S/4HANA upgrade in described in chapter **Error! Reference source not found.** REF _Ref47531551 \h **Error! Reference source not found.**. With Software Update Manager, the technical downtime can be reduced by either using near-Zero Downtime Maintenance (nZDM) or Zero Downtime Option (ZDO).

Important: Read the SAP Note carefully. Some of the measures are specific to specific SAP S/4HANA releases.

Refer to:

- SAP Note 2351294 - S/4HANA System Conversion / Upgrade: Measures to reduce technical downtime

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Why is custom code remediation needed for upgrade of SAP S/4HANA?

While many of your custom code adjustments will have been made when you first moved to SAP S/4HANA, some further simplifications of ABAP have occurred across subsequent SAP S/4HANA releases.

Refer to:

- Blog post SAP S/4HANA System Conversion – Challenge for your custom code
- SAP Note 2190420 - SAP S/4HANA: Recommendations for adaption of customer specific code

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Are there any major Data Dictionary changes for SAP S/4HANA upgrades?

You should check the Simplification Items Catalog for these types of changes.

For example:

- SAP Note 2628654 - S4TWL: Amount Field Length Extension

From SAP S/4HANA 1809, currency amount fields with a field length between 9-22 including 2 decimals have been extended to 23 digits including 2 decimals. In addition to currency amount fields, selected data elements of DDIC type DEC, CHAR, and NUMC with varying lengths and decimal places that may hold amounts have been affected.

The amount filed length extension must be explicitly activated in customizing.

Read the SAP Note carefully to understand the impact and requirements.

Decide if you want to keep the current length in S/4HANA 1809 or to extend it.

What is the maintenance lifecycle for the add-ons for SAP S/4HANA?

There is no common on maintenance lifecycle for the add-on for S/4HANA, you need to refer to the SAP standard documents for the compatibility information.

You need to run the maintenance planner tool as a first step in the upgrade process. It checks your components, add-ons, and business functions to ensure compatibility with the SAP S/4HANA release to which you are upgrading and also creates the stack file used during the upgrade process (done by the Software Update Manager tool).

For example: For the GRC add-on for S/4HANA, you find the maintenance lifecycle information in SAP Note 2229853 - GRC and S/4HANA oP: compatibility information

Refer to:

- SAP Note 2214409 - SAP S/4HANA: Compatible Add-Ons

How can we find authorization changes?

After the upgrade, you must do some follow-up activities to adjust authorizations. The default authorization values are the data basis for the provision of authorizations required for applications in the Profile Generator (SAP GUI Transaction PFCG). Default authorization values for standard SAP applications are delivered via upgrade, support package deployment, or SAP Notes. This SAP-provided data is displayed and maintained in transaction SU22. Customer default authorization values are maintained in transaction SU24. Only these customer default authorization values are applied when PFCG is used.

After the upgrade the SAP default values may have been changed. You therefore must use transaction SU25 to carry out a comparison of the default values (steps 2a and 2b) and transfer the default values

maintained by SAP.

For more information about this process, refer to:

- SAP Note 1539556 - FAQ | Administration of authorization default values
- SAP Note 440231 - SU25 | FAQ: Upgrade postprocessing for Profile Generator.

6.5. Services

What services are included in our SAP maintenance agreement to support our upgrade?

SAP provides different offerings for different maintenance agreements. See more details in chapters 2.5.16 - 2.5.19 of this document.

What other services are provided to support our upgrade?

You can apply for your upgrade project to be supported by the SAP S/4HANA Customer Care program. This program helps your project to be a success by offering:

- A named **Project Coach** serving as a remote contact to share best practices and collect feedback.
- A named **Development Angel** facilitating the access to the SAP S/4HANA development organization

The offer is free of charge. To apply please send an e-mail to S4H_Customer_Care@sap.com.

7. ADDITIONAL INFORMATION RESOURCES

The following are a list of resources helpful for further learning, documentation, blog posts and videos. While many of these are also relevant to any customer moving to SAP S/4HANA, they are also resources for the latest SAP S/4HANA release.

7.1. openSAP Microlearning

Short how-to video playlists for business users and experts alike. New videos are added over time.

openSAP Microlearning videos can be accessed at https://microlearning.opensap.com/

Look for the SAP S/4HANA how-to playlists.

The following videos in the SAP S/4HANA playlist are specifically relevant to upgrades:

- Cross-Topics – Working with the What's New Viewer
- Cross-Topics – Finding delta simplifications between SAP S/4HANA releases
- Cross-Topics – Finding available SAP Fiori apps
- Cross-Topics – Activating SAP Fiori apps with Rapid Activation
- Cross-Topics – How to Patch your SAP Fiori (SAPUI5) version and Why

The following videos in the SAP S/4HANA playlist are useful for adjusting your content:

- User Experience – Refining Business Roles with SAP Fiori Launchpad Content Manager
- User Experience - Activating SAP Fiori Content in Custom Business Roles
- User Experience – Adapting the UI of List Report Apps
- User Experience – Creating Launchpad Content with SAP Fiori Launchpad App Manager

Watch for more videos in the SAP S/4HANA User Experience.

Figure 51 - openSAP microlearning SAP S/4HANA playlist

7.2. openSAP courses

Free comprehensive online open course trainings for everyone.
openSAP courses can be accessed at https://open.sap.com/courses
They include many courses relevant to SAP S/4HANA, SAP Fiori, and intelligent technologies used with SAP S/4HANA.

Recommended SAP S/4HANA courses include:

- Delivering Value with Intelligent Innovations in SAP S/4HANA
- Guide your SAP S/4HANA Project to Success
- Building Tomorrow's ERP with SAP S/4HANA
- How to Deliver a Great User Experience with SAP S/4HANA
- Key Functional Topics in a System Conversion to SAP S/4HANA
- Key Technical Topics in a System Conversion to SAP S/4HANA

Related courses include:

- SAP Fiori Overview: Design, Develop, and Deploy
- Evolved Web Apps with SAPUI5
- Enter Next-Level Bot Building with SAP Intelligent RPA 2.0
- How to Build Chatbots with SAP Conversational AI
- Building Apps with the ABAP RESTful Application Programming Model
- Efficient DevOps with SAP

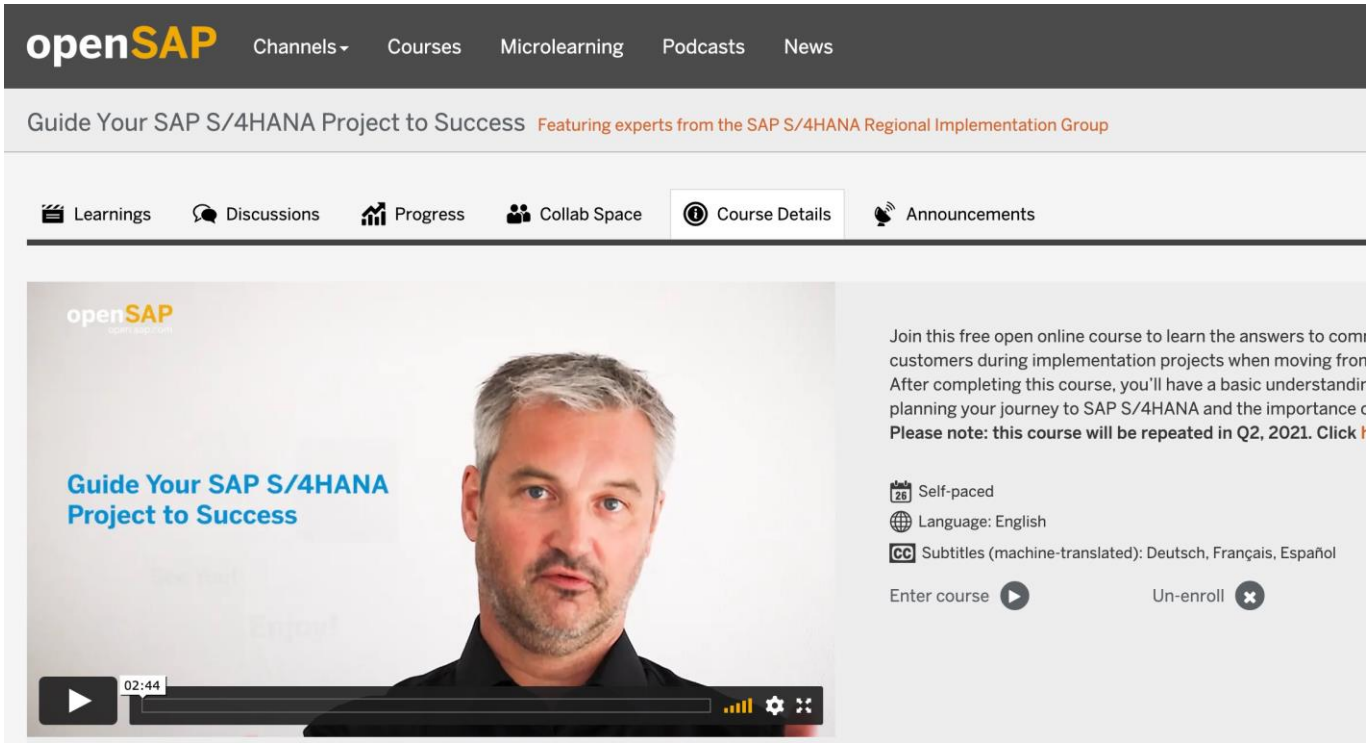

Figure 52 - openSAP courses on SAP S/4HANA annd SAP Fiori

7.3. openSAP podcasts

Inside SAP S/4HANA – the official SAP S/4HANA podcast series.

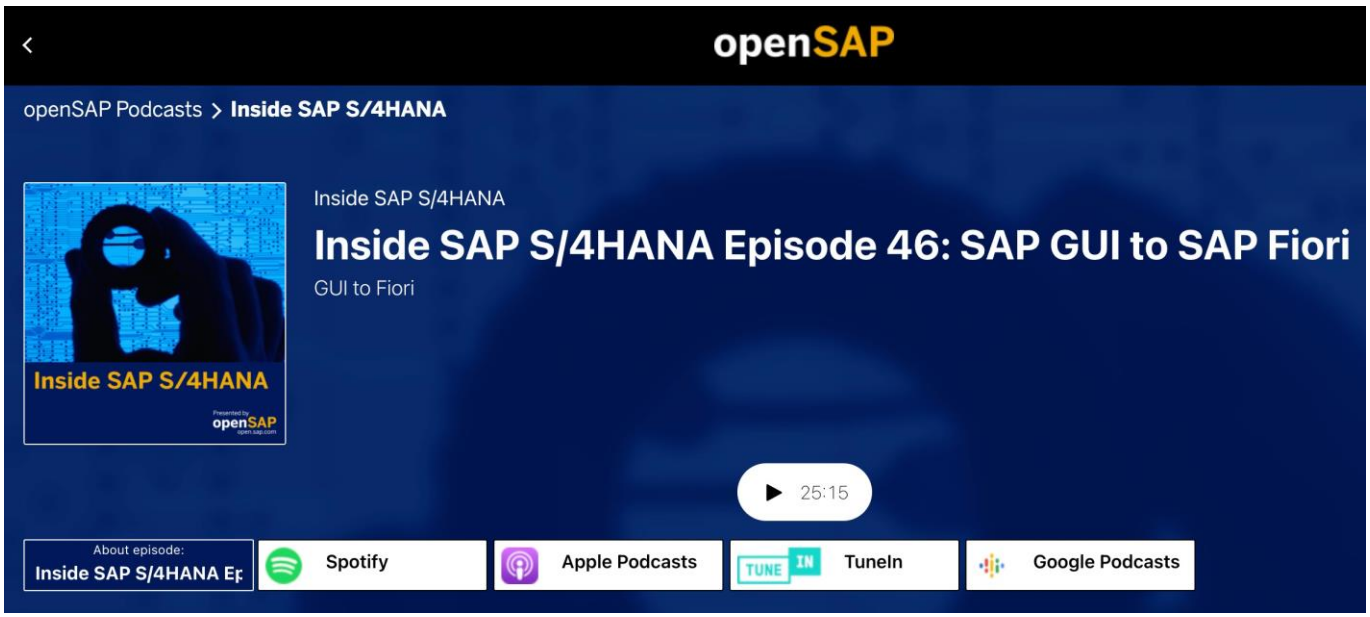

Figure 53 - Inside SAP S/4HANA podcast series

7.4. SAP Community topics

Blog posts, question & answer, and learning material from the SAP Community – SAP customers, partners and employees.

SAP Community topics can be accessed at https://community.sap.com

- SAP S/4HANA
- SAP Fiori for SAP S/4HANA
- SAP Fiori
- SAP Fiori elements
- SAP Business Application Studio
- ABAP Development

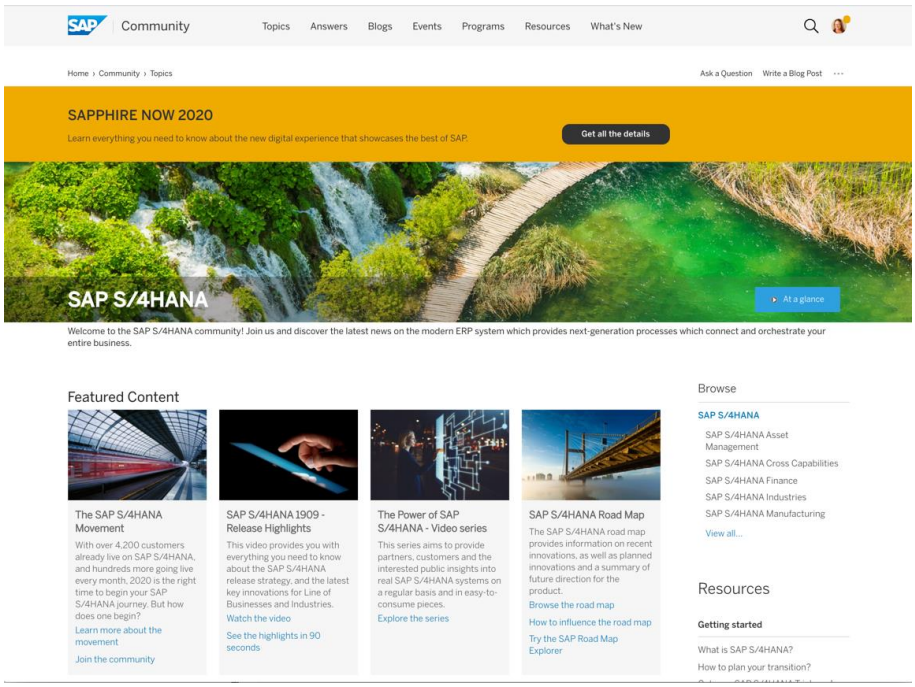

Figure 54 - SAP Community topic SAP S/4HANA

7.5. SAP Learning Journeys

Career paths defined by SAP via SAP learning Journeys tool that provides proper list of activates to be followed in order to get an expert.

There are 2 ways to access the SAP Learning Journeys:

1. Access Learning Journeys directly in the SAP Help Portal
2. Access Learning Journeys via the Learning Hub

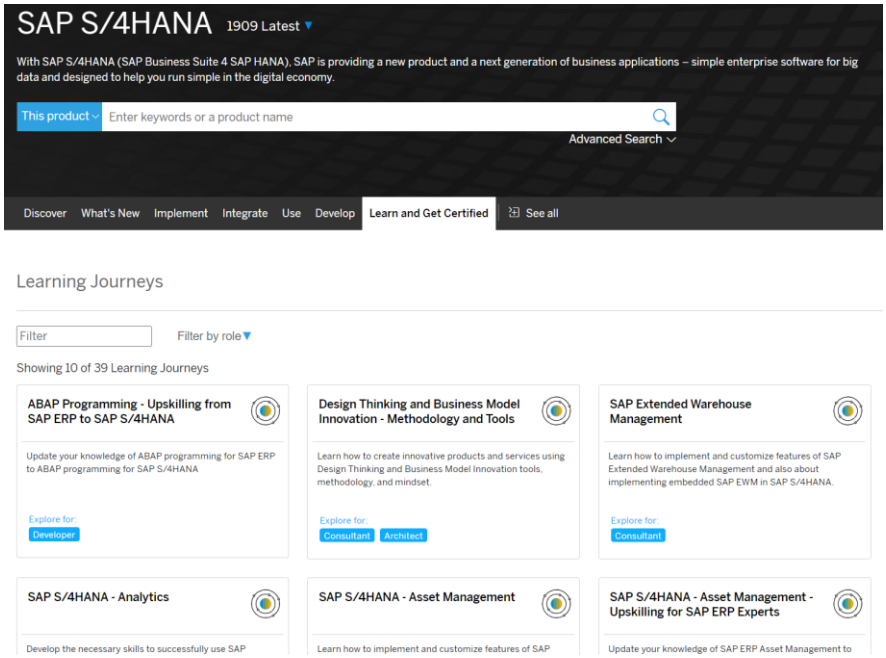

Figure 55 - Learning Journeys for SAP S/4HANA shown on the SAP S/4HANA product page in the SAP Help Portal

7.6. SAP Fiori for SAP S/4HANA wiki

A collection of official references, blog posts, and web sites with the latest news on SAP Fiori for SAP S/4HANA. The wiki is curated by the SAP S/4HANA Regional Implementation Program who are the experts supporting the SAP Customer Care Program.

SAP Fiori for SAP S/4HANA wiki

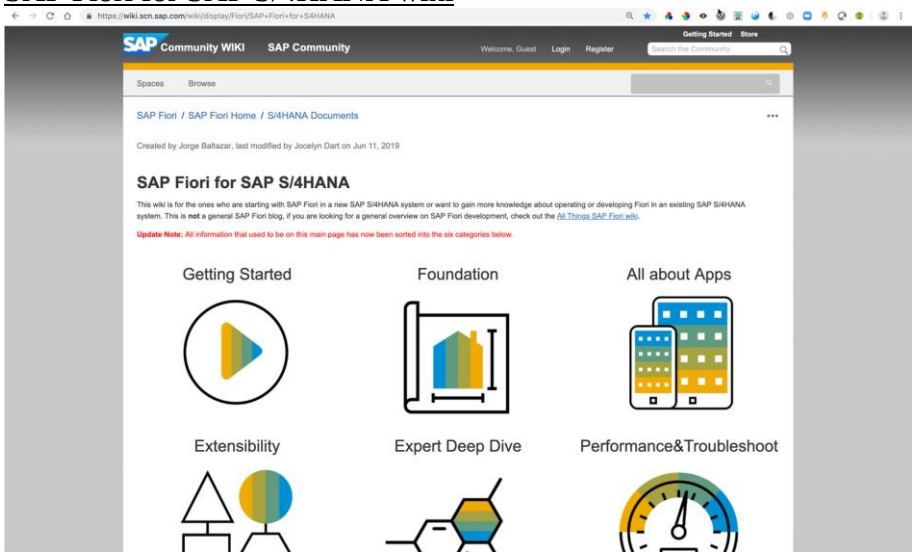

Figure 56 - SAP Fiori for SAP S/4HANA wiki

7.7. Useful SAP Notes and recommended blog posts

In addition to the many references included in this document, you should also consider these.

Useful SAP Notes:

- SAP Note 2916959 - Fiori Performance Troubleshooting

Recommended Blogs:

- Let's talk SAP S/4HANA AnyPremise Upgrade
- How and Why to Upgrade your SAP Fiori for SAP S/4HANA solution
- SAP S/4HANA conversion or upgrade – Do not wait to run Simplification Item Check
- Large or Small: ERP Solutions from SAP

Customer/Partner blogs:

- Upgrade to SAP S/4HANA 1909 – Lessons Learned
- SAP S/4HANA On-Premise (AnyPremise) Release Version Updates 1511 – Current State

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8. APPENDIX

8.1. Additional SAP Solution Manager details

The following SAP Solution Manager information is not specific to an SAP S/4HANA upgrade but applies to any SAP solution upgrade.

8.1.1. Using Solution Manager to manage your regression testing

Solution Manager 7.2 provides multiple capabilities to managing your upgrade from identifying changes in business processes, to scooping and executing critical test cases.

The SAP Solution Manager Test Suite can help you plan and manage your regression testing, and the testing of any new functionality introduced as part of the upgrade or post the upgrade process.

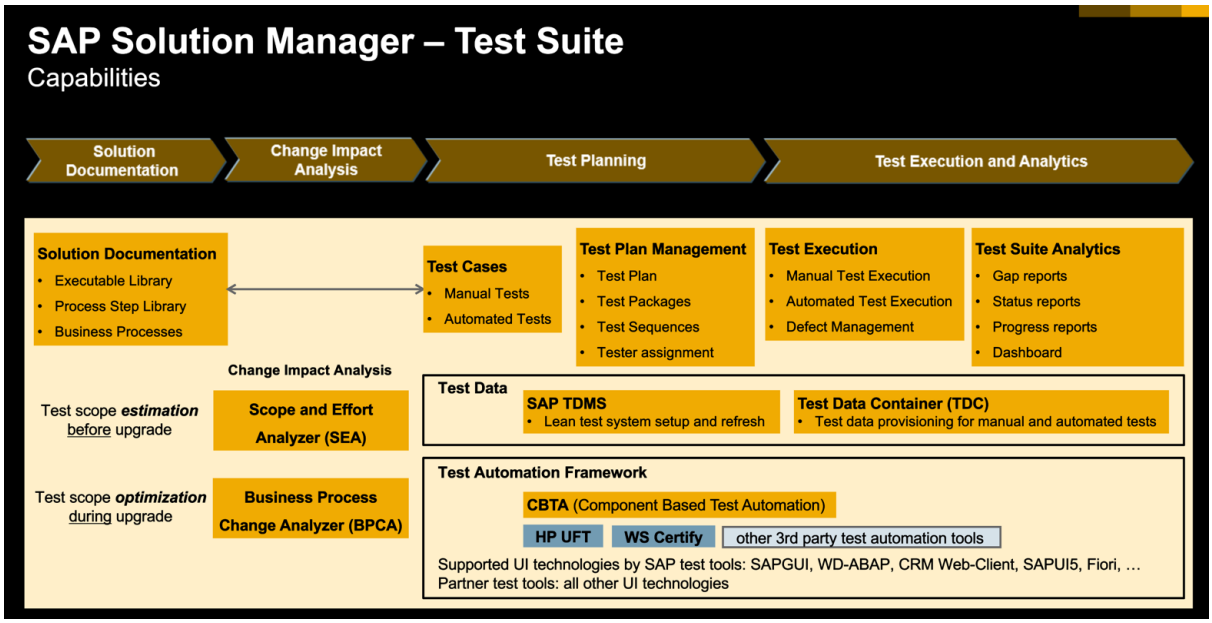

Figure 32 - SAP Solution Manager Test Suite components and major capabilities

The Test Suite is a full-featured application for manual/automated testing and change impact analysis. Its functional scope includes:

- Manual and automated functional tests
- Automated change impact analysis of maintenance activities for test scope optimization of regression tests
- New requirements triggering semi-automated test planning for user acceptance tests and functional integration tests
- High degree of test automation possible
- Supports agile development approach within requirements to-deploy process through Focused Build for SAP Solution Manager
- Seamlessly integrated with other components of SAP Solution Manager such as Process Management, Solution Documentation, ChaRM, and ITSM.

8.1.2. Using SAP Solution Manager to manage the impact on business processes

Changes to Support Packages, custom developments, add-on installations, or other changes to the system may also impact business processes.

Within the SAP Solution Manager 7.2 Test Suite, the Business Process Change Analyzer (BPCA) can assist you in managing your SAP S/4HANA upgrade in the following ways:

- Understanding changes in business processes between source and target releases
- Scoping critical test cases for regression testing

With the BPCA, you can do the following:

- Analyze which parts of a solution documentation are affected by the change.
- Analyze which parts of a solution documentation are affected by the planned activation of a business function
- Optimize the test scope of an analysis result.
- Create test plans from the analysis results.

More information:

- SAP Solution Manager product page in the SAP Help Portal

Further links in the SAP Help Portal

- Test Suite
- Business Process Change Analyzer