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

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1. INTRODUCTION
This guide provides lessons learned guidance and best practices for **upgrade from your current SAP S/4HANA release to a higher SAP S/4HANA release** to take advantage of the latest capabilities. The guide includes advice for those who want to manage the pace of organizational change by running multiple, repeatable **Continuous Improvement Projects** after upgrade to drive more business value out of their SAP S/4HANA solution over time.

Customer experiences of SAP S/4HANA upgrades confirm that upgrade is a relatively smooth process. **Statistics as at June 2020, show that technical upgrades to higher releases of SAP S/4HANA take an average of 3-6 months** (reported by 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 in the SAP Help Portal. For example: **Upgrade Guide for SAP S/4HANA 1909**.

**Important**: You must refer to the official SAP S/4HANA Upgrade guide for detailed technical upgrade steps and follow-on activities to upgrade to your target SAP S/4HANA release.

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.

**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 1511 to 1909.

- Migrating from the earlier solution SAP S/4HANA Finance (previously known as SAP Simple Finance) releases 1503 or 1605 (is not considered as a SAP S/4HANA upgrade. This solution was an add-on to SAP Business Suite on HANA and is therefor treated as system conversion. For more
1.1. Why this upgrade guide is needed
SAP S/4HANA was first introduced to the market in 2015 as SAP’s strategic Digital Core solution for the Intelligent Enterprise. It was a bold vision to make 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 of SAP S/4HANA, SAP S/4HANA 1511, is approaching end of maintenance on 31st December 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.

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 AnyPremise 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 & capture lessons learned immediately after go-live. This is the time to recognize what has been done right, and what can 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 3 BEFORE UPGRADE: PREPARING YOUR BUSINESS CASE.

Provided appropriate preparation and planning has been completed in advance, upgrade 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. Feedback channel for this guide**
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.
2. WHY UPGRADE SAP S/4HANA

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 5 AFTER UPGRADE: **DRIVING MORE VALUE FROM SAP S/4HANA**

You can also apply for a 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 site
- Pathfinder for SAP S/4HANA Overview
- Pathfinder for SAP S/4HANA Sample Report
- How to apply for a Pathfinder report – video and guide

2.1. Maintenance reasons

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

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

2.1.1. SAP S/4HANA Release Maintenance Strategy

SAP S/4HANA releases follow a yearly cycle. They have a five-year Mainstream Maintenance phase after which they enter 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 marks the first year where one of the SAP S/4HANA releases will fall out of support. SAP S/4HANA 1511 mainstream maintenance will expire on the 31st December of 2020. Customers who are still running SAP S/4HANA 1511 are strongly advised to start planning the upgrade now. Mainstream maintenance for every subsequent release will end the years following 2020.

Refer to:
- SAP Product Availability Matrix (PAM) for SAP S/4HANA ON-PREMISE 1511
- SAP Product Availability Matrix (PAM) for SAP S/4HANA 1610
- SAP Product Availability Matrix (PAM) for SAP S/4HANA 1709
- SAP Product Availability Matrix (PAM) for SAP S/4HANA 1809
- SAP Product Availability Matrix (PAM) for SAP S/4HANA 1909

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 3 - SAP S/4HANA AnyPremise release and maintenance strategy from calendar years 2015 to 2019
2.1.2. 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 use right to run these selected classic SAP ERP solutions on SAP S/4HANA expires on Dec 31, 2025.

**Important:** The announcement about the extension of maintenance for 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 Packs, and an alternative solution has already been provided in SAP S/4HANA, you will need to adopt it as part of your upgrade.

2.2. Improve and Increase value delivered by your SAP S/4HANA system

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. There are 3 main drivers:

- New features and new business requirements
- New embedded products within SAP S/4HANA
- Improve and grow your SAP Fiori User Experience

These 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.

2.2.1. New business process features and new business requirements

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 is also potentially significant functional rework that happens in this type of upgrade with redesign of business processes. Each new SAP S/4HANA release enables customers to take advantage of latest innovations using intelligent technologies such as predictive analytics, AI, machine learning and robotic process automation.

This type of upgrade is typically called a Functional Upgrade.
The SAP S/4HANA What’s New Viewer is a great resource to explore the new, changed and deleted features and functions at a high level of all releases and feature packages of SAP S/4HANA when evaluating potential upgrades.

You can also review the video series: The Power of SAP S/4HANA for some examples of the latest new value of SAP S/4HANA 1909 in action in blog post Video Series – The Power of SAP S/4HANA

2.2.2. New embedded products

With more and more solutions and functionalities being embedded and enhanced with each release of SAP S/4HANA, 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.


2.2.3. Improve and Grow your SAP Fiori User Experience

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

- Increased SAP Fiori coverage (new apps, new features in existing apps)
- New SAP Fiori features (new launchpad options, new automatic features in floorplans, for example “export to spreadsheet” added to many SAP Fiori elements apps)
- 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 also get some useful starting points for discussion 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.

2.3. Technical reasons

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.
3. BEFORE UPGRADE: PREPARING YOUR BUSINESS CASE

This phase covers the DISCOVER and PREPARE phases of 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 Key considerations when Estimating Effort to Upgrade; an example Upgrade Plan for a Functional Upgrade; and an example plan for a Technical 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 in 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 four (4) 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 Solution Manager you will find a brief overview of Solution Manager features that will help you scope business impacts and critical areas for regression testing later in this guide in section 4.4 Regression Testing.

3.1. 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 2 x 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.)

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**
  
  o 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. So, 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**
  
  o 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.
  
  o Customers are advised to check expected release dates of partner add-ons directly with the relevant partner organization.

Depend on the timing of your project, it may make sense to start your project in sandpit 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 2020 is available at the project start, however SAP S/4HANA 2020 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 in sandpit, you can do the majority of your discovery and exploration in sandpit, 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 1909 FPS02 and SAP S/4HANA 2020.

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
  
  o These are released aligned to the current SAP S/4HANA source release or feature pack stack

• “N-1” release approach to support
  
  o 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, for SAP S/4HANA 1909, SAP Note 2799003 - SAP S/4HANA 1909: Restriction Note

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### 3.2. 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 until after upgrade. New business value is added by running Continuous
Improvement projects after upgrade. Continuous Improvement Projects are discussed in more detail in chapter 5 AFTER UPGRADE: DRIVING MORE VALUE FROM SAP S/4HANA.

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 frontend 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 impared.

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.

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

- Set up of the SAP Fiori frontend server & related architecture (such as 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: 3.5.8 Essential business roles required to monitor/configure/adapt/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 and buttons, and merge tabs. This improves the 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: SAP Screen Personas topic in the SAP Community
3.2.1. 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

Figure 7 - Example Functional Upgrade Plan for SAP S/4HANA

3.2.2. Example Upgrade Plan for a Technical Upgrade

The primary focal points of 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 3-6 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.
Key assumptions in the plan are:

- You have a standard 3-tier DEV-QAS-PRD landscape and separate Sandpit server
- Your sandpit system is a non-integrated environment so that other parallel solutions are not impacted.
- You start the upgrade with a sandpit system that is a snapshot copy of your production system, and sized accordingly
- DEV & QAS regression testing includes integration testing, since this cannot be tested in sandpit
- The upgrade project starts on Feature Pack Stack 1 or higher of the current SAP S/4HANA release
- SAP Fiori frontend server is already in place, in either embedded or standalone(hub) mode
- The current choice of embedded or hub deployment is not to be changed
- HANA Database is already on HANA DB 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 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 in sandpit
  - 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

### 3.2.3. Key Considerations when Estimating Effort to Upgrade

Key considerations for estimating effort to upgrade include:

- What experience & 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 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 sandpit system that is a copy of production, rather than in your development environment.

The benefits of starting with a sandpit 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 sandpit can be factored in to optimize the upgrade process
  o Runsheets of all upgrade activities should be made for the upgrade in sandpit, then used to speed upgrade of later systems
  o Test cases & test scripts should be identified and refined in sandpit, then used to speed regression testing in later systems
  o Any test automation can be trialed & refined in sandpit, then used to speed regression testing in later systems
• Mandatory custom code corrections can be performed in sandpit 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 HANA DB 1.0 to 2.0
• You have decided to migrate your SAP Fiori Frontend server 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 a large number of 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
3.3. Architecture and Technical impacts
There are several architecture and technical impacts to be considered during 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
- 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

3.3.1. Server architecture impacts
Of the typical server architecture of a SAP S/4HANA system, the SAP Fiori frontend server and SAP S/4HANA server are the most important components.

**Important:** In embedded mode the SAP Fiori Frontend server 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(hub) 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](https://help.sap.com/en) 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

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

Embedded has been the recommended deployment option for SAP S/4HANA since December 2017. Embedded mode provides numerous benefits such as reduced server costs and simpler configuration.
For SAP Fiori frontend server (FES) 2020 for SAP S/4HANA, both deployment options - embedded and standalone server - are supported. The embedded deployment is recommended. In case of a standalone server deployment, the minimum SAP NetWeaver release is SAP NetWeaver 7.52.

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

- **SAP FIORI FRONT-END SERVER** – the SAP Fiori frontend server itself
- **SAP FIORI FOR S4HANA** – the software component for SAP Fiori apps

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 recheck the document during your project.

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

- SAP Cloud Platform Portal service
- SAP Cloud Platform central Launchpad (via the SAP Cloud Platform Portal service)

In both these cases the SAP Cloud Platform Portal service launches the app which is stored on your SAP S/4HANA AnyPremise solution.
**Important:** If your SAP Fiori Frontend Server 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.

Using a standalone SAP Fiori frontend server (FES) as a hub for both SAP S/4HANA and SAP Business Suite systems will no longer be permitted from SAP FES 2020. The planned SAP Fiori frontend server 2020 for S/4HANA will support 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
Considerations for after your upgrade:

Once you have decided on the deployment of your SAP Fiori frontend Server (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.

You can decide between three options to perform the upgrade of SAP Fiori

Reference:

- SAP Fiori Deployment Options and System Landscape Recommendations
- SAP Fiori deployment options and SAP Fiori front-end server strategy - UPDATE 2020
3.3.1.2. SAP S/4HANA Server

From SAP S/4HANA 1809 and higher, the SAP NetWeaver ABAP platform was renamed to SAP S/4HANA FOUNDATION. The SAP S/4HANA FOUNDATION contains the ABAP Platform release. Both SAP S/4HANA FOUNDATION and ABAP Platform align to the SAP S/4HANA release. For example, with SAP S/4HANA 1909 the related releases are:

- SAP S/4HANA FOUNDATION 1909
- ABAP Platform 1909
- SAP Kernel 7.77

Refer to:
- ABAP Platform – Part 1 – Evolution from SAP NetWeaver

Make sure you check the relevant restrictions note for your SAP S/4HANA, ABAP Platform, and associated SAP Kernel release. For example:

- SAP Note 2750164 - SAP S/4HANA FOUNDATION 1909: Release Information Note
- SAP Note 2799003 - SAP S/4HANA 1909: Restriction Note
- SAP Note 2794219 - ABAP Platform 1909 - Restrictions
- SAP Note 2868598 - 7.77: SAP GUI for HTML functionality / Limitations / Sp. Behaviour

You can find the latest news on the system architecture stack for SAP S/4HANA in blog post Upgrade to S/4HANA 2020 – time to change

3.3.2. System Requirements

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 1909:

- You can upgrade from SAP S/4HANA, on-premise edition 1511, SAP S/4HANA 1610, SAP S/4HANA 1709 or SAP S/4HANA 1809 to SAP S/4HANA 1909
- Check the SAP Note 2769531 SAP S/4HANA 1909: Release Information Note for the required feature package stack equivalencies for the upgrade from SAP S/4HANA 1511, 1610, 1709, or 1809 (all feature package stacks) to 1909.
- You must check the minimum required Software Update Manager 2.0 (SUM) Support release and support pack for the upgrade in the release information note for your target SAP S/4HANA release, e.g. SAP Note 2769531 SAP S/4HANA 1909: Release Information Note

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

3.3.2.1. SAP HANA Database Changes

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 1909 FPS02, HANA DB 2.0 SPS04 revision 44 is the minimum revision. Latest available revision is recommended.

The SUM tool will check the correct SAP HANA DB revision has been applied.
Important: If you are upgrading from 1511 or 1610 to 1709 or higher, this also involves an upgrade from HANA DB 1.0 to HANA DB 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
- SAP Note 2896748 - SAP S/4HANA 1909 Feature Package Stack 02: Additional Release Information

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

3.3.2.2. Operating System Changes for Application Servers

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.

3.3.3. 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 1909, all feature pack stacks:

- SAP Note 2826929 SAP S/4HANA ON-PREMISE 1909, Globalization & Local Versions: Release Information & Restriction Note
- SAP Note 2825302 - SAP S/4HANA ON-PREMISE 1909: Language Availability

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

3.3.4. Sizing

Always recheck your system sizing as part of your upgrade.

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

Upgrade is the ideal time to recheck 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 QuickSizer 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

### 3.3.5. Performance

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.

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 2916959 - Fiori Performance Troubleshooting
- Performance Improvements in SAP Gateway Foundation
- Performance Improvements for SAP Smart Business Drill-Down Applications

### 3.3.6. 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 upgrade plan on 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
- 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.

### 3.3.7. Security

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

### 3.3.8. 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 solutions, 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 for SAP Cloud Solutions. These can be found on the Integrate tab of the SAP S/4HANA Product Page in the SAP Help Portal.
For integration to other solutions check:

- Simplification catalog for any deprecated BAPIs or APIs
- SAP API hub [https://api.sap.com](https://api.sap.com) for advice regarding APIs for SAP S/4HANA

### 3.3.9. Intelligent Technologies

SAP S/4HANA scenarios that involve intelligent technologies may require additional SAP Cloud Platform services with their own prerequisites for subscription and integration:

- Predictive (Machine Learning) scenarios can be contained wholly within SAP S/4HANA or may require SAP Cloud Platform Services depending on the scenario
- All SAP Intelligent RPA scenarios require SAP Cloud Platform services
- Situation Handling scenarios can be within SAP S/4HANA or may require SAP Cloud Platform Services depending on the scenario

If you have a particular scenario in scope, check the pre-requisites carefully.

References:

- Predictive Scenarios
- SAP Intelligent Robotic Process Automation scenarios in SAP Best Practices Explorer (login required)
- Situation Handling scenarios

### 3.3.10. Operating Environment impacts

New releases of SAP S/4HANA typically require parallel upgrade of operating environment pre-requisites. Upgrade can also provide a reason for changing your business users operating environment for business or technical reasons, e.g. to a preferred web browser due to sunset of MS Internet Explorer.
3.3.10.1. Operating Environment for Business Users
Always check the following operating environment pre-requisites for all business user operating environments:

- Supported web browsers & related versions
- Supported Device Operating System & 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

![Simplified Overview - SAP Fiori runtime environment](image)

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 solutions:

- 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 1909, within the Product Availability Matrix tool:

1. Navigate to SAP FIORI FOR SAP S/4HANA 1909.
   Note: This is the main software component for SAP Fiori apps delivered with SAP S/4HANA

2. Then go to the Essential Information link

3. use the Browser Support link to go to the Browser Support information for this release

You can also find the related Fiori Frontend Server 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 1909 which is SAP FIORI FRONT-END SERVER 6.0
2. Then go to Related links and Web Browser information

3.3.10.2. Operating Environment for Administrators and Support Teams

Similar to other business users, administrators require access to 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.

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 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

3.3.10.3. Operating Environment for Developers

Most development tools and services are made available on the SAP Cloud Platform. These development tools are the recommended and most efficient development tooling for:

- SAP Fiori app developer-led extensions
- Custom-built apps using SAPUI5 and SAP Fiori design guidelines, e.g. SAP Fiori tools
- Integration of intelligent technologies services into apps, e.g. SAP intelligent Robotic Process Automation

Across calendar 2020, a variety of new developer tools are becoming available on SAP Cloud Platform. Developers are strongly recommended to keep up-to-date with the latest best practice advice re tools, coding and environments, e.g. on https://developers.sap.com

For example, SAP Business Application Studio, and the Fiori Tools extension for SAP Business Application Studio have been 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.

Refer to:

- SAP Community topic SAP Business Application Studio
- SAP Community topic SAP Fiori
- Blog post SAP Fiori Tools is generally available. Increase the efficiency of developing SAP Fiori elements apps
- SAP Developers Tutorials for SAP Fiori Tools
- Blog post Adaptation Project – your one stop tool for extending SAPUI5 applications
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 Cloud Platform (Cloud Foundry), or
  - SAP Web IDE (Full Stack edition) on SAP Cloud Platform (Neo)

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

- DevOps tooling for custom Fiori apps
  - For example, if you are deploying apps side by side in the SAP Cloud Platform, you may want to consider Continuous Integration and Delivery solutions for SAP Cloud Platform
- SAP Cloud Platform mobile services
  - 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 Cloud Platform tools such as SAP Web IDE or SAP Business Application Studio.
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 AnyPremise development environment with the SAP Cloud Platform, the **SAP Cloud Connector** must be installed or upgraded.
  - The SAP Cloud Connector acts as a VPN tunnel to your SAP S/4HANA AnyPremise system.
- For ABAP development, the Integrated Development Environment (IDE) is **ABAP Development Tools for Eclipse**. This must also be installed/upgraded on developer PCs.

### 3.4. 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

#### 3.4.1. 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](https://launchpad.support.sap.com/#/sic/overview) 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](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. 1909
- Target Validity (Stack) = our target SAP S/4HANA release FPS or SPS stack, e.g. 01 for FPS01, 02 for FPS02, etc.

An example of the filtering in the SAP Simplification Catalog is shown below.
You can filter on additional criteria such as: LoB/Technology, Business Area. The category filter can be used to identify whether this is a change of existing functionality or impacted by the roadmap.

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 Finding Delta Simplifications between SAP S/4HANA releases in the SAP S/4HANA playlist, Lines of Business Cross-Topics

3.4.2. New and changed functionality
You 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.

[Image: SAP S/4HANA Help Portal]

Figure 19 - 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 and up to and including your target release/FPS.

[Image: What’s New Viewer - Selection of SAP S/4HANA releases and feature pack stacks]

Figure 20 - 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 on terms such as “fiori”, “report”, etc.

Refer to:
- openSAP microlearning Working with the What’s New Viewer in the SAP S/4HANA playlist, Lines of Business Cross-Topics

### 3.4.3. Business function activation impacts
Business functions can have the following status: always_on, customer_switchable, and always_off. This results in the following behavior 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.

### 3.4.4. 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 release system and what are their target releases?
- Are any add-ons installed in the source release 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 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

In the following scenarios, you will need to do further due diligence to check if your add-on is available for your target SAP S/4HANA release:

- You want to introduce new SAP add-ons during upgrade
- You want to uninstall ABAP add-ons during 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 the advice in: SAP Note 2214409 - SAP S/4HANA: Compatible Add-Ons

### 3.4.5. Impacts due to the future 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. SAP provides a limited use right for you, as a SAP S/4HANA AnyPremise customer, to run these selected classic SAP ERP solutions on their SAP S/4HANA installation. This is under the condition is that you have licensed the applicable solutions as set forth in your License Agreements. This use right expires on Dec 31, 2025.

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

Compatibility Packs were originally introduced as a way to provide alternatives to customers while new capabilities were being developed and matured in SAP S/4HANA across multi-year development cycles.

Out of 183 compatibility pack items, only 15 are still in clarification for an alternative.
If you are currently using any Compatibility Packs, 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:
- SAP Note 2269324 - Compatibility Scope Matrix for SAP S/4HANA on-premise
- Blog post The Future of Compatibility Packs in SAP S/4HANA

3.5. 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

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

3.5.1. 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 at all possible. As well as introducing new capabilities, typically ongoing support & new features will only be provided on 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.

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 22 - 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 23 - SAP Fiori apps 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 24 - SAP Fiori 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:
Refer to:
- openSAP microlearning Finding available SAP Fiori apps in the SAP S/4HANA playlist, Lines of Business Cross-Topics

### 3.5.2. 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 changes can be found by examining SAPUI5 version differences in:
- SAP Fiori Design Guidelines – What’s New
- SAPUI5 Software Development Kit – What’s New in SAPUI5 and Change Log

### 3.5.3. 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 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

3.5.4. 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 Blacklist Monitor.

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

3.5.5. Changes in catalog assignments
Changes in catalog assignment of SAP delivered apps can impact your existing custom business catalogs. These changes can result from:
- Creation of new SAP Business Roles
- Changes in existing SAP Business Roles
- New assignment possibilities as SAP Fiori capabilities improve over time
- Other technical reasons for reassignment.

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

2. Before upgrade, check for references to SAP technical catalogs or business catalogs in custom business roles to avoid changes after upgrade.
   a. Upgrade in a sandpit system aids comparison of before/after catalog changes
b. Where possible, consider migrating to best practice approach of copying and refining the SAP business catalogs, e.g. using the SAP Fiori launchpad content manager

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, 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.

3.5.6. 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 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 the new apps mentioned in the SAP S/4HANA What’s New Viewer.

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

3.5.7. 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
• New Support tooling
• Changes in Best Practices and tools for launchpad content management

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

Refer to the SAP Fiori launchpad guide for your SAP S/4HANA release on the SAP Help Portal
3.5.8. Essential business roles required to monitor/configure/adapt/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 the 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.

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 manage Predictive Scenarios 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.

3.6. 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](https://help.sap.com) in the SAP Help Portal
- Blog post [ABAP Platform for SAP S/4HANA 1909](https://example.com)
- What’s New Viewer for the ABAP Platform
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 will be introduced.

Where custom code is currently based on earlier programming models and requires significant revision, consider moving to the ABAP RESTful Programming Model.

**Evolution of the ABAP programming model**

Refer to:
- 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](#)

3.6.1. Custom ABAP code

From SAP S/4HANA 1809 or higher you can use the SAP Fiori app F3191 Custom Code Migration to assist the migration. This 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
3.6.2. 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 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, this is an upgrade from SAP Fiori 2 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:
- Check for deprecated SAPUI5 controls

To identify required and recommended changes you can use:
- The Support Assistant
- The 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 release
  - Review the SAP Fiori element feature map for your target SAPUI5 release
- 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

3.6.2.1. 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 on the term “deprecated” to find the 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.

**Important:** Tools such as the SAP Cloud Platform Web IDE and 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.

### 3.6.2.2. Using the Support Assistant to identify required changes

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

Refer to:
• [Using the Support Assistant in the SAPUI5 SDK](https://ui5.sap.com/#/documentation/library/sap.m/

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

The [UI5 migration tool](https://github.com/sap-migration-ui5) 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](https://github.com/sap-migration-ui5) on Github
4. DURING UPGRADE: EXECUTING THE UPGRADE AND REGRESSION TESTING

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 30 - Example project plan for Realize, Deploy, and Run phases to upgrade SAP S/4HANA

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

The recommendation is to start at least with a sandpit, 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.
4.2. Downtime Optimization

During S/4HANA system conversion, ERP data models are converted into the SAP S/4HANA simplified data model. 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 on a sandpit - 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.
4.2.1. 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.

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.

4.2.2. 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).
In order 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

### 4.2.3. Patch Strategy

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-gap of successor apps.

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

### 4.2.4. Patch Strategy for SAP Fiori Frontend Server

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.

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

### 4.2.5. 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

4.3. Post upgrade follow-on activities
Every upgrade requires certain application-specific activities to be executed post 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.

4.3.1. 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 1909 refer to:
• SAP Note 2816275 - SAP S/4HANA 1909 - application specific notes in system conversion / upgrade follow-on phase

4.3.2. 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

4.3.3. Follow-on EXPLORE and REALIZE Activities
After your SAP S/4HANA sandpit 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-Gap blueprinting
  o for mandatory simplification items
  o for new or changed business processes
  o for new or changed business roles
  o 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

4.4. 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.

4.4.1. 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 33 - 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.

4.4.2. 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

4.4.3. Automated Testing for custom Fiori apps

For custom-built 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.
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

### 4.5. 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 and stakeholders that the system is ready for use
• Formally start the hypercare period for the upgrade
5. AFTER UPGRADE: DRIVING MORE VALUE FROM SAP S/4HANA
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
5.1. 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 sandpit to go-live in Production, plus a subsequent 3-week hypercare period. Discovery starts in a sandpit 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-gap 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.

<table>
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<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
<th>Week 9</th>
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<td></td>
<td></td>
<td>Hypercare</td>
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</tr>
</tbody>
</table>

Figure 35 - Example project plan for a Continuous Improvement Project

5.2. 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)

5.2.1. Establishing your SAP Fiori for SAP S/4HANA architecture

The most appropriate time to adjust system architecture is during initial installation or on upgrade, because changes in system architecture necessarily involve many impacts and considerations such as:

- Hardware and/or Cloud storage arrangements
- Cloud connectors
- Cyber security
- Network & bandwidth
- System Sizing
- Performance optimization of foundational components

5.2.2. Establishing your mobile device strategy

Your mobile device strategy is a living document. While use of mobile devices is optional, their use is now so widespread 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) devices
- Mobile device management, e.g. 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.

5.2.3. Establishing your User Experience strategy

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 as other circumstances change.

Circumstances that could require UX strategy to be adjusted include:

- Upgrade to a new SAP S/4HANA release, e.g. to take into consideration new UX options in the SAP Fiori launchpad or in SAP Fiori floorplans (such as Fiori elements)
- Introduction of mobile devices & mobile device strategy, e.g. to capture new entry points 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 Cloud Platform Portal Service or central launchpad, which impacts entry points and app launching options
• Introduction of new intelligent technologies and how they impact the delivery, appearance or behavior of the user experience

5.2.4. Introducing new intelligent technologies
Establishing your strategy for intelligent technologies should be done just-in-time and only for those capabilities in scope.

This is primarily because intelligent technologies:
• Continue to innovate rapidly – so any advance learning may already be superseded by the start of your project

Often involve additional costs such as Cloud services subscription costs - and it is usually desirable to avoid incurring these costs until you can implement a use case that offsets the costs with related business benefits

5.3. Setting up your project (DISCOVER)

5.3.1. Main activities
Main activities of the Discover phase are:
• Agree on your driving principles, goals, constraints, and success criteria
• Identify your target business roles (user groups)
• Identify your target business process improvements (which processes, and which capabilities of SAP S/4HANA are in scope to improve these processes)
• Build your stakeholder map - Identify sponsors and stakeholders, including business-as-usual support teams who will be impacted
• Identify project resources needed (including skills, budget, and - in the case of new intelligent technologies - related cloud services subscriptions)
• Establish communications with business stakeholders and business user representatives
• Capture “before” metrics (quantitative and qualitative) to prove success at the end of the project

Identify skills needed such as:
• Business process experts
• Business user representatives, who can bring real-world context into design workshops to identify potential barriers and risks early
• UX experts, e.g. to identify extension options, to configure/adjust launchpad content
• Solution architects & technical teams, especially if you are introducing new intelligent technologies
• Developers, e.g. for intelligent technologies, or if custom apps are expected
• Security administrators, to adjust authorizations needed
• Organizational change managers
• Business-as-usual support team managers
5.3.2. Key Considerations
The main considerations for the Discover phase are:

• **Where:** What will be your exploration environment?
• **How:** What will be your design approach?
• **What metrics & other evidence need to be gathered to provide evidence of success?**

5.3.2.1. What will be your exploration environment?
While it is possible to start directly in your development system, to minimize impact on business-as-usual, it may be prudent to execute your initial preparation in a Sandpit or SAP S/4HANA Trial system (e.g. from [https://cal.sap.com](https://cal.sap.com))

Starting in a sandpit or trial system enables deep exploration of technical, functional, and usability possibilities. It can be used as a prototyping environment to play back concrete examples and demonstrations to business users and business stakeholders.

Working in your sandpit or trial system can be used to avoid misunderstandings, missteps, and rework in your Development to Production system landscape.

Your sandpit or trial system can even be a learning environment for your development and technical teams. This is especially helpful when introducing new intelligent technologies, where there are typically a greater number of unknowns & typically a lower skill base in your project team.

5.3.2.2. What will be your design approach?
A design thinking approach is an excellent way to bring together diverse stakeholders to:

• ensure a common understanding,
• identify barriers and risks early
• identify additional opportunities and benefits that can promote user adoption, or trigger future continuous improvement opportunities
• and, most importantly, gain agreement early on the way forward.

Design thinking is a flexible collection of techniques that can be tailored to the needs of the organization and the use cases in scope. In particular, design thinking provides a framework for:

• Doing initial research, such as user observation studies and technical feasibility checks, to ensure your plans are grounded in reality
• Iterative prototyping to avoid misunderstandings, missteps, and rework
• Gaining agreement and buy-in from all parties

For more information on design thinking and design-led development, refer to:

• [Design-led Development process](https://www.sap.com/design-led-development) in the SAP Fiori Design Guidelines
• [Learn the Basics about Design and User Experience](https://www.sap.com/user-experience) in the SAP User Experience Community
• [Skill up on Design and User Experience](https://www.sap.com/user-experience) in the SAP User Experience Community
• SAP Community topic [SAP Fiori](https://www.sap.com/community)
5.3.2.3. **What metrics & other evidence need to be gathered to prove success?**

Identify usage metrics that need to be gathered as evidence of the “before” situation so that they can be compared to “after” metrics at the end of the project.

Consider both quantitative and qualitative metrics.

You can find examples of suitable metrics in:

- SAP Innovation and Optimization Pathfinder report
- SAP UX Value Calculator

You may also want to review reports previously run for your initial implementation or system conversion to SAP S/4HANA such as:

- SAP Transformation Navigator
- SAP Business Scenario Recommendations

5.4. **Design and fit-gap your new process (PREPARE / EXPLORE)**

5.4.1. **Main Activities**

Main activities of the Prepare/Explore phase are:

- **User Research** on the working context and as-is processes of business users
  - To ensure any new functionality or devices will work in the user’s working context
  - To uncover any pain points to be remediated and any opportunities to be built into the process to encourage user adoption and better business outcomes

- **Technical feasibility checks**
  - e.g. when introducing Intelligent technologies, to have a clear understanding on capabilities, restrictions and limitations
  - Will any stress testing or performance testing be needed? E.g. Where there is high volume data, new Cloud/On-Premise connections, or new intelligent technologies

- **Prototype the end to end process** to assess options & how they will impact business users and business process
  - E.g. “Day in the life” journey of a business user

- **Identify SAP business roles and related apps** that support your goals

- **Activate the related SAP business roles** in your sandpit or in a SAP S/4HANA trial system
  - Perform technical verification of apps
• Adjust any functional configuration needed to show the correct data

• **Run an initial fit-gap analysis workshop**
  • To agree on the desired process & identify any extensions needed

• **Validate extension options**, skills needed, and estimate effort

• **Run subsequent walkthroughs to gather feedback and get agreement** on the final to-be process from your business stakeholders and business user representatives

• **Agree on what freeze/blackout period is needed for cutover**, e.g. for intelligent technologies

• **Agree on the hypercare period and procedures**

Where needed, iteratively apply feedback and walk through the improved process with your business team until you gain agreement to go forward to Realize & Deploy.

For identifying related SAP Business Roles and associated SAP Fiori apps, you can use:

- SAP Innovation and Optimization Pathfinder report
- SAP Fiori lighthouse scenarios for inspiration re best business value
- SAP Fiori apps reference library, e.g. use the main filter All apps for SAP S/4HANA, and search by role name, app name, or current SAP GUI transactions in use
- SAP Fiori apps recommendation report, based on your current SAP GUI transaction usage
- Readiness Check 2.0 results from your initial implementation, e.g. apps that have been proposed but not yet implemented

Refer to:

- SAP Innovation and Optimization Pathfinder Overview
- SAP Readiness Check 2.0 – Details about the topic of SAP Fiori

### 5.4.2. Key Considerations

These depend largely on the use case and the types of changes being introduced. Typical considerations may include:

- **Will additional solutions or skills be required?**
- **Are there any new integrations required, or existing integrations impacted?** E.g. SAP S/4HANA to SAP cloud solutions
- **Will any new device types need to be introduced?**
- **Will there be any shared changes that may impact other business users or processes outside of the original scope?** E.g. New features enabled in the SAP Fiori launchpad, such as:
  - Additional notification providers
  - Additional My Inbox content
  - Additional search connectors
- **What changes will be needed to learning content to enable business users?**
- **What authorizations will need to be changed to support the new solution?** For both business users and business-as-usual support teams
- **Will there be any impacts on your business partners?** How will these be communicated?
- **What will be the impact on current business-as-usual support processes?** Have appropriate support tooling and procedures been included in the final solution to be deployed?
- **Can as-is and to-be processes be run in parallel?** How will that impact the roll out to users across the organization
• What “after” metrics can be captured, how, and over what time period? To prove success at the end of the project

• What degree of stress testing and performance testing is needed? Are there high-volume data use cases, or remote network users where special attention may be required?

**Important:**

You should ensure the essential business roles to monitor, configure, adapt, and extend SAP Fiori apps have all been activated.

Refer to: section 3.5.8 Essential business roles required to monitor/configure/adapt/extend SAP Fiori

You should ensure the in-app extensibility capabilities have been configured and authorizations assigned to nominated key users.

Refer to:

- SAP Fiori Launchpad guide > User Guide > Adapting SAP Fiori apps at Runtime – Key User Adaptation
- SAP Fiori Launchpad guide > Administration Guide > Enabling Key User Adaptation
- Blog post: SAP Fiori for SAP S/4HANA – Adaptation Transport Organizer

**5.5. Configure, Extend and Deploy your apps (REALIZE / DEPLOY)**

**5.5.1. Main activities**

Main activities of the Realize & Deploy phases are:

- **Activate your apps, and any related intelligent technologies** in your development system
- **Configure and extend apps** as agreed
- **Configure intelligent technologies** as needed on-premise and in Cloud
- **Adjust launchpad content** to assign new apps to users, and to adjust the default layout on the launchpad for impacted business roles
- **Confirm & apply changes to authorization roles**
- **Deploy apps to QA / Testing environment**
- **Test apps on all relevant device types**
- **Test to-be support tooling and business-as-usual support processes**
- **Stress testing and Performance optimization**, where necessary
- **Prepare a training plan for go-live**, e.g. to introduce business users to the why and what of process changes; to inform users about any relevant online learning content, getting started guides, personalization options, and support contacts
- **Prepare a cutover plan**

To activate SAP Fiori apps:

- You can use the SAP Fiori rapid activation tasklist to activate apps using SAP Business Roles
  - Remember your SAP Fiori foundation should already be in place, so you only need to activate the role itself
- Or use the SAP Fiori launchpad content manager tasklist to activate apps using custom Business Roles
You can minimize the effort of adjusting security authorization roles using the mass maintenance tools explained in SAP Fiori for SAP S/4HANA – Mass maintenance of Business Roles for SAP Fiori launchpad

Refer to:
- openSAP microlearning Activating SAP Fiori apps via Rapid Activation in the SAP S/4HANA playlist, Lines of Business Cross-Topics

5.5.2. Key considerations

Typical considerations include:
- **What regression testing is needed to ensure the end to end process works?** E.g. Testing of app to app navigation, testing of Fiori Search for new search object, testing of Fiori Search to check new apps can be found via known keywords/tags
- **What entities can be transported?** Is there a particular sequence needed for transport?
- **What once-off activities need to be executed in subsequent environments such as QA and Production environments?**
- **What getting started advice needs to be provided for users?** E.g. will they need to adjust their web browser or device settings?

5.6. Cutover & Go-Live (RUN)

Depending on the scope of your Continuous Improvement Project, you may not need all of these activities or they may be very short. For example:
- Freeze production could simply be a brief business pause while transports are applied
- Go-live announcements could be a simple email to the impacted business users, who have already been informed of the changes in earlier phases of the project

5.6.1. Main Activities

Main activities of the Run phase 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 and stakeholders that the system is ready for use
- **Formally start the hypercare period** for the changes

During the hypercare period immediately after go-live:
- **Capture Lessons Learned** and update all living documents (UX Strategy, Mobile Strategy, Intelligent Enterprise Strategy)
- **Monitor usage of new or changed apps and processes**
- **Capture “after” metrics as planned**, both quantitative and qualitative
- **Report success** to the sponsor, and stakeholders, using “before” and “after” metrics as evidence
5.6.2. Key Considerations

Typical considerations of the Run phase include:

- **What, if any, duration of production freeze is needed?**
- **What is the expected and worst-case cutover window?**
  - How will any 24x7 business requirements be handled during cutover?
- **Who in the team is needed to support cutover activities, and their availability?**
  - Typically, cutover windows are timed for weekend or off-peak times
- **Who in the team needs to be reachable in case of unexpected issues during cutover and verification testing?**
  - Some team members will need to be at-call in case of issues
- **What is the rollback approach if cutover & verification face a showstopper issue?**
  - Have all rollback scenarios been tested before and documented in the cutover plan?
- **On the cutover plan, is the first activity that makes the rollback impossible clearly marked?**
  - Often this is the case when interfaces are opened, and data gets exchanged with connected systems
- **In case of upgrading 2 or more systems in parallel, what happens if the cutover is not successful for some of the systems?**
- **Who is the primary contact in the business-as-usual support team?**
  - So that support teams are informed and ready for the hypercare period to start
- **Who will make the official go-live announcement?**
- **How, when, and to whom will success metrics be reported?**
  - How will “before” and “after” metrics be represented in the final report
  - What learnings for the next project can be taken to subsequent projects
6. KNOWN ISSUES

6.1. General

6.1.1. Missing Translations
Some customers have reported missing translations. For example in some SAP Fiori apps, e.g. SAP Fiori app F3228 Sales Accounting Overview. This can occur when:
1. Configuration is not complete, e.g. Semantic Tags are missing for some financial statement versions.
2. There are untranslated texts that need to be resolved via the usual SAP support processes.

Customers should:
1. Check all functional configurations are complete
2. If there are still 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 library, and via the User Actions > About feature.

Refer to:
- Blog post Speed Up your SAP Fiori support incidents
- Blog post 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

6.1.2. Currency display issues for countries with special currency formats
There is a country specific issue for Japan when Business Partner data is migrated after the system upgrade from SAP S/4HANA 1511 to 1809 or higher. Post upgrade, any values in the Capital amount for the Business Partner role FLVN00 Vendor are reduced by 100 times due to a bug.

This is a technical issue for which the solution is being worked upon and will be available shortly as part of SAP Note and will be included in upcoming support package stacks of SAP S/4HANA releases.

Refer to:
- SAP Note 2855805 - Sales Accounting Overview [F3072, F3228] - decimal currency is not shown correctly

6.2. Functional

6.2.1. New functionality impacting 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 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

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 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.

6.2.2. 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.

In order 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.

However, if you upgraded from a lower release to SAP S/4HANA 1909, the same is not available by default. 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 this pre-delivered content.

6.2.3. 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_ACDOČ_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.
6.3. User Experience

6.3.1. 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.

6.3.2. 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.

6.3.3. 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.

6.3.4. 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 sandpit/development environments, and to generate a transport request to apply these changes to other systems in your landscape.

Refer to:
- SAP Note 2495630 - Reference lost displayed in Fiori Launchpad Designer

6.3.5. 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/ssbtilesless1 – 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.

Refer to:
- SAP Note 2621243 Enable SAP Smart Business for S/4HANA
- SAP Note 2500794 Fiori Launchpad Designer: Tiles of analytical applications cannot be displayed properly
6.3.6. 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.

6.3.7. 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 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 sandpit or development environment.

Communicate any changes in the SAP Fiori content to your users before go-live.

6.3.8. 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 a 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 library, and via the User Actions > About Feature. Remember to specify the themes affected.

Refer to:

- Blog post [Speed Up your SAP Fiori support incidents](#)
- Blog post [Finding the technical name of an app](#)
- SAP Note [2761326 - SAP GUI for HTML: Unexpected results or sizes](#)

**6.3.9. 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 number of search connectors are now based on OData and CDS Views. Multiple SAP Notes have been delivered depending on specific errors.

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_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`

Refer to:

- SAP Note [2790616 - Enterprise Search Models : Availability of CDS based Search models in 1909 On Premise](#)
- SAP Note [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](#)

**6.3.10. Lost SAP Fiori launchpad configuration 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).

Refer to:

- Setting Parameters in SAP Fiori customizing
- Setting Parameters in a Launchpad Configuration File (Deprecated)
6.4. Technical

6.4.1. 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.

6.4.2. 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 client copy will not be an issue for the project.

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 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.

Refer to:
- SAP Note 2163425 - Recommendations for client copy performance improvement -> Central Note
• SAP Note 2555451 - Performance improvement in Client Copy for 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:
1. SAP GUI Transaction SCC3 – Client copy monitor
2. 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.
3. SAP GUI Transactions DB02 and DBACOCKPIT – Check from DB level, for any expensive SQL being executed.

6.4.3. 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 BE queries that call Operational Data Providers (ODP) are used in the SAP Business Suite, these BE queries must be converted to CDS View queries in SAP S/4HANA. That is, BE queries that call the new CDS interface views. Refer to the related Simplifications in the Simplification Catalog.

For example:
• 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

6.4.4. 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 3.3.10.1 Operating Environment for Business Users

Keep in mind that SAP GUI for HTML issues are fixed with SAP Kernel patches and Unified Rendering patches.

Refer to:
• 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
7. FREQUENTLY ASKED QUESTIONS (FAQ)

7.1. General

7.1.1. What is the difference between a SAP S/4HANA system conversion and a 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.

This is because 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). A system conversion involves moving to the SAP HANA database, removes unsupported add-ons and deprecated functionality, moves to the new architecture and data models, and executes 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 upgrade from your current SAP S/4HANA release to a higher SAP S/4HANA release. An upgrade to the next SAP S/4HANA release applies the newest release of the SAP S/4HANA software.

7.1.2. 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
7.1.3. If we plan to upgrade SAP S/4HANA in a future year, what release should we upgrade to?
How to choose your target release / feature pack stack is discussed in detail in the Before Upgrade chapter section 3.1 Key Considerations for choosing your Target Release / Feature Pack Stack.

7.1.4. Where can we find additional life-hacks, lessons learned for SAP S/4HANA upgrades?
That is the purpose of this document. You can also refer to other blogs and enablement materials in chapter 8 Further Resources.

7.1.5. 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 releases.

7.2. Functional

7.2.1. Why are simplification checks needed for upgrade?
Simplifications started with the first release of SAP S/4HANA 1511 and are on-going 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.

7.2.2. 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 3.4 Business functionality impacts.

7.2.3. 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.
7.3. User Experience

7.3.1. If we are currently using a 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.

7.3.2. 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 3.6.2 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-gap analysis and assessment of extension options must be reassessed as you would for any new app.
7.3.3. 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 3.6.2 Custom SAP Fiori apps for more details.

7.3.4. We have modified a 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 of 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 Cloud Platform

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

7.4. Technical

7.4.1. 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 4.2 Downtime Optimization. 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](https://support.sap.com/)

### 7.4.2. 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](https://www.sapblogs.com/)
- SAP Note [2190420 - SAP S/4HANA: Recommendations for adaption of customer specific code](https://support.sap.com/)

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

You should check the Simplifications Catalog for these types of changes.

For example:

- SAP Note [2628654 - S4TWL: Amount Field Length Extension](https://support.sap.com/)

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 field 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.

### 7.4.4. 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](https://support.sap.com/)

Refer to:

- SAP Note [2214409 - SAP S/4HANA: Compatible Add-Ons](https://support.sap.com/)

### 7.4.5. 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.

7.5. Services

7.5.1. What services are provided by Enterprise Services to support our upgrade?
SAP provides several services to support you.

There are two continuous quality check services which can help you minimize risks of unforeseen technical issues during the upgrade of your productive SAP S/4HANA system. Both services are delivered for your productive SAP S/4HANA system.

- **CQC for Upgrade** service focuses on the following topics:
  - Preparing your SAP solution to run with optimal data consistency, availability, and maintainability
  - Identifying areas that could benefit from optimization
  - Finding best utilization of hardware
  - Upgrading sizing verification
  - Increasing the throughput of your SAP solution and performance tuning

The service consists of 2 sessions:

1. Analysis session is typically performed 6 weeks before the upgrade of productive system
2. Verification session – 6 weeks after the upgrade of productive system.

- **CQC Going Live Support** service helps your team in minimizing the risks of unforeseen issues during the most critical week after the productive upgrade. Usually the delivery starts next working day after business downtime is over.

These CQC services can be requested by:

- Creating an SAP Incident using component SV-BO-REQ (SAP Note 1296527 - How to create a support incident (contact SAP Product Support)) or
- Contacting the SAP Enterprise Support Advisory team via our Customer Interaction Center (CIC)

If you have questions about these services, or any aspect of your upgrade project, you can ask them in our SAP Enterprise Support value map for SAP S/4HANA®. The value map is our empowerment and support program. It provides you with direct access to SAP experts and industry peers, and helps you build the digital skills needed as you innovate towards the intelligent enterprise. So join the value map today, ask questions, and why not utilize the "Request a Call" option? We would be delighted to hear from you!
*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 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 us: [sapesvaluemaps@sap.com](mailto:sapesvaluemaps@sap.com)

You can find out more in the blog post [Is it time for an SAP S/4HANA upgrade? And is it really necessary?](#) in the SAP Learning hub edition for SAP Enterprise Support. Register for the learning hub using your S-user id.

7.5.2. **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](mailto:S4H_Customer_Care@sap.com).
8. FURTHER 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.

8.1. openSAP Microlearning
Short how-to video playlists for business users and experts alike.

openSAP Microlearning can be accessed at https://open.sap.com/microlearning
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

8.2. openSAP Courses
Free massive online open course training for everyone.

openSAP courses can be accessed at https://open.sap.com/courses

Recommended courses include:
- Building Tomorrow’s ERP with SAP S/4HANA
- How to Deliver a Great User Experience with SAP S/4HANA
- SAP Fiori Overview: Design, Develop, and Deploy
- Evolved Web Apps with SAPUI5

8.3. openSAP Podcasts
Inside SAP S/4HANA – the official SAP S/4HANA podcast series.
8.4. 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

![SAP Community Feature Image](image.png)

Figure 38 - SAP Community topic SAP S/4HANA

8.5. 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
8.6. 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.

8.7. 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