Custom Code within SAP S/4HANA On-Premise
# Table of Contents

1 INTRODUCTION .................................................................................................................. 4

2 SAP S/4HANA EXTENSIBILITY – SOME BASICS ......................................................... 6
   2.1 What are the available extensibility technology ....................................................... 6
   2.2 What happens with existing custom code ............................................................... 6
   2.3 Compatibility Views ............................................................................................... 6
   2.4 Doing Things different .......................................................................................... 8

3 CUSTOM CODE RELATED TOOLING AND SERVICES ........................................... 10
   3.1 Traditional Custom Code tooling ........................................................................... 10
      3.1.1 Custom Code Lifecycle Management ............................................................... 10
      3.1.2 Usage and Procedure Logging (UPL) ............................................................... 11
      3.1.3 SAP Code Inspector ..................................................................................... 11
      3.1.4 ABAP Test Cockpit (ATC) ............................................................................. 11
   3.2 Custom Code Migration Worklist ........................................................................... 11
      3.2.1 Custom Code Migration Worklist at a Glance ............................................... 11
      3.2.2 Custom Code related activities in the different project phases .................... 12
   3.3 Custom Code related Service Offering .................................................................. 14

4 STEPS TO ADAPT CUSTOM CODE .............................................................................. 15
   4.1 Get transparency on your custom code ................................................................. 15
   4.2 Remove waste ........................................................................................................ 15
   4.3 Analyse the impact, and create a plan ................................................................ 16
      4.3.1 Transition Path dependency .......................................................................... 16
      4.3.2 SAP S/4HANA specific custom code tasks .................................................. 17
   4.4 Do the required custom code changes .................................................................. 18

5 APPENDIX ..................................................................................................................... 19
   5.1 Additional Information .......................................................................................... 19
1 Introduction

In November 2015, SAP delivered a massive wave of simplification and innovation in the core of SAP S/4HANA. SAP S/4HANA is SAP’s next-generation business suite, it is not a legal successor of any SAP Business Suite product. It is a new product completely built on one of the most advanced in-memory platforms today – SAP HANA – and modern design principles with the SAP Fiori user experience (UX). SAP S/4HANA delivers massive simplifications (customer adoption, data model, user experience, decision making, business processes, and models) and innovations (Internet of Things, Big Data, business networks, and mobile-first) to help businesses Run Simple in the digital economy.

From a business perspective the following key simplifications and innovations can be mentioned:

- Optimized working capital with new accounts payable and receivable cockpits
- Decreased stock buffers with a simplified data model in inventory management for real-time, high-volume processing
- Increased visibility with real-time insight into stock and material flow
- Reduced manufacturing cycle time with streamlined material flow for internal requirements and material requirements planning
- Augmented reactivity with real-time monitoring of production orders for flow and critical issues
- Improved operational decisions with easier simulation of supply alternatives
- Lower procurement costs with standard integration to the Ariba Network
- Better customer service with a new sales order fulfillment cockpit to help identify bottlenecks and issues instantly

From a technical perspective these simplifications are based on:

- SAP user experience (UX) with SAP Fiori. The user interfaces run on any devices, desktops, tablets, smart phones, and even smart watches and have been redesigned for exception-bases issue handling.
- Leveraging the SAP HANA capabilities with a simplified data model with no aggregates & indexes, real time & high volume processing, Elimination of locking and increased throughput.

In this sense SAP is re-architecting its solution for modern business processes demanded by an increasing digitization of the world. Re-architecting a solution that has been growing over the past 25 years means and sometimes evolved into different data structures and architectures means as well that we have to decide on one data structure and architecture moving forward. This is the only way how we can prepare the solution for more simplicity and faster innovation cycles.

With the system conversion approach of SAP S/4HANA SAP is offering a technical approach to convert an existing SAP Business Suite system to SAP S/4HANA. The system conversion to SAP S/4HANA is based on established lifecycle management tools (Software Update Manager SUM with Database Migration Option DMO). Things are done differently in SAP S/4HANA and a customer needs to adopt to the target capabilities of SAP S/4HANA. Many of the changes are technical in nature and
have no or only limited impact on peoples work and thus do not trigger business change management. SAP at large keeps the traditional capabilities available as compatibility scope enabling a rather technical migration of these processes and leaving the time of change management at customer decision that may well happen when initially converting or at a later point in time.

For more details about the system conversion process and the supporting functionality related to the system conversion see the following SAP Community Network blog (http://scn.sap.com/docs/DOC-68976), summarizing the different aspects of the system conversion.

In this document we want to focus on custom code within a transition to SAP S/4HANA with the specific focus on the system conversion scenario. SAP provided the so called Simplification List for SAP S/4HANA, on-premise edition to make the differences between the two solutions SAP Business Suite and SAP S/4HANA, on-premise edition transparent. The required custom code adaptions are a consequence that things are done differently in SAP S/4HANA accordingly they need to be seen in the context of the related Simplification List Item.

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1 See Simplification List in the SAP Help: Link
2  SAP S/4HANA Extensibility – Some Basics

2.1  What are the available extensibility technology

Let’s start with some basic comments regarding the extensibility or custom code technology available in SAP S/4HANA, on-premise edition 1511. The short answer is that you can use all known extension technology you know from SAP Business Suite. None is falling away with the move to SAP S/4HANA, on-premise edition.

Additionally in SAP S/4HANA the extensibility technique designed for the cloud can be used (and SAP recommends to use them as well in SAP S/4HANA, on-premise edition). On-premise customers can benefit from the tools that are designed for the cloud to reduce their TCO related to custom code. For more details regarding extensibility in the cloud see the information in the following SAP Community Network blog (*S/4HANA Extensibility – The new White Paper*)².

2.2  What happens with existing custom code

Basically for on-premise deployment existing customer and partner extensions, and even modifications can be used. It is only necessary to adapt them according to the simplification SAP has applied to SAP S/4HANA compared to the SAP Business Suite (e.g. transition of index tables into SAP HANA compatibility views).

To identify the required custom code adaptions SAP S/4HANA offers a new custom code check tool the so called **Custom Code Migration Worklist**. The Custom Code Migration Worklist shows customer objects, which reference SAP objects changed in S/4HANA, and appropriate guidance what needs to be done. See chapter 3.2 for more details.

Additionally the **traditional SAP Custom Code tools** remain relevant and are available as part of SAP S/4HANA. See chapter 3.1 for more details.

2.3  Compatibility Views

To achieve the target of no aggregates & indexes, real time & high volume processing, Elimination of locking and increased throughput data models have been adapted with SAP S/4HANA. Find below an example from Inventory Management where the new de-normalized table MATDOC has been introduced which contains the former header and item data of a material document as well as a lot of further attributes³.

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³ For more application specific information see SAP Note 2206980 - Material Inventory Management: change of data model in S/4HANA
Material document data will be stored in MATDOC only and not anymore in table MKPF and MSEG. Additionally the aggregated actual stock quantities will not be persisted anymore in the hybrid or replaced aggregation tables. Instead, actual stock quantity data will be calculated on-the-fly from the new material document table MATDOC for which some of those additional special fields are used. Hence, with the new MM-IM data model the system will work on database level in an INSERT only mode without DB locks. Nevertheless, for stock decreasing processes there will be still ABAP locks to ensure stock consistency. A further advantage of the new MM-IM data model is the capability of simple and fast reporting because the most information is all in one place - table MATDOC.

All below mentioned tables of the SAP ERP 6.0 product do still exist in S/4HANA as DDIC definition as well as database object and the hybrid tables will still be used to store the material master data attributes. For compatibility reasons there are Core Data Service (CDS) Views assigned as proxy objects to all those tables ensuring that each read access to one of the mentioned tables below still returns the data as before in SAP ERP 6.0.

The CDS Views do the on-the-fly aggregation of actual stock quantities from the new MM-IM data model and join the master data attributes from the material master data table. Hence all customer coding reading data from those tables will work as before because each read access to one of the tables will get redirected in the database interface layer of NetWeaver to the assigned CDS view. Just custom code which executes a write accesses to those tables (anyway not recommended) have to be adjusted.
2.4 Doing Things different

In any scenario, the move to SAP S/4HANA is a great opportunity to validate the existing extensions and modifications and simplify your solution. Based on our experience from typical customer systems we need to be aware about the following key figures:

- Usage: 65% of custom code objects have not been used within the last 4 weeks
- Similarity: 12% of custom code objects are identical or very similar to each other (clones)
- Quality: 60% of all custom code objects contain code inspection messages
- Criticality: 23% of custom code objects were supporting critical processes

The move SAP S/4HANA is a great opportunity to optimize your custom code and the processes around the custom code:

- Remove unused custom code (based on input from business department and based on measurements)
- Setup governance models with the goal to avoid new custom code and review existing modifications
- Improve and optimize quality, performance and security of custom code
- It is not unusual for customers to realize that 50% of the extensions and modifications that hamper fast release cycles and require long test cycles were no longer necessary to run the business.

In general, when moving to SAP S/4HANA, customers can leverage the SAP HANA Cloud Platform (HCP) to build and operate extensions to the SAP core as well as own applications. HCP is a common extension platform for all SAP products, offering an SAP Fiori stack, a SAP HANA database, a full-fledged development environment and even additional choices, such as the integration of open source solutions. It is the ideal platform for all custom apps which operate in a self-contained way, are only loosely coupled with SAP S/4HANA or reach to the outside world. This kind of extensibility is called "side-by-side extensibility" and has the advantage that extensions run in a safe environment so that innovation packages can be easily applied to the SAP S/4HANA core. The SAP S/4HANA core system remains “clean” and can be quickly and easily updated when new innovations are added, in just the same way that consumer mobile apps are updated on a regular basis. Further, the SAP S/4HANA stack can also be directly extended by partners and customers – in a process that we call "in-app extensibility". For on-premise deployment existing customer and partner extensions, and even modifications can be used. It is only necessary to adapt them according to the simplification SAP has applied to SAP S/4HANA compared to the SAP Business Suite (e.g. transition of index tables into SAP HANA compatibility views). All these changes are described in a simplification database which can be downloaded from the SAP Market Place. Even more, a custom code migration tool exists which analyses custom code and its usage, resulting in a precise list of extensions and modifications which have to be reworked. In the cloud deployment, key user extensibility is the recommended approach for in-app extensibility. Within the SAP Fiori UX key users can adapt UIs, create field extensions or even define simple custom business logic at selected places. The underlying SAP S/4HANA extension framework isolates extensions from the core and thus drives safeguard agility for cloud deployments. To drive agility, key user extensibility is also available for on-premise deployments.

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6 Based on SAP (CQC) Solution Transition Assessment and follow-up services
5 side-by-side extensibility: Extension built on a separate extension platform (see SAP S/4HANA Extensibility – Whitepaper [Appendix] for more details)
6 in-app extensibility: Extension built in the same system as the enhanced application (see SAP S/4HANA Extensibility – Whitepaper [Appendix] for more details)
deployments. Existing extensions and modifications cannot be transformed into key user extensions, but a data migration into key user extensions will be offered.
3 Custom Code related Tooling and Services

The traditional custom code tools remain relevant for SAP S/4HANA transition. For the system conversion or even for a new implementation these tools remain relevant. These tools are listed in chapter 3.1 but it is not the purpose of this document to describe them in detail (link to additional detailed information is added).

With SAP S/4HANA there is an additional custom code check tool available – the Custom Code Migration Worklist. The tool is described in chapter 3.2.

Before you are going in the very details to adapt the custom code you should make yourself familiar with the SAP S/4HANA, on-premise solution and the things which are different to the SAP Business Suite. Here two central documents are relevant:

- Conversion Guide for SAP S/4HANA, on-premise edition
- Simplification List for SAP S/4HANA, on-premise edition

In cases where within SAP S/4HANA existing functionality was consolidated (following the principle of one) related custom code might become obsolete and a detailed investigation regarding custom code adaption might in this case not be required.

3.1 Traditional Custom Code tooling

The traditional custom code related tooling remains relevant for SAP S/4HANA, on-premise edition. Just the following should be mentioned here.

- Custom Code Lifecycle Management
- Usage and Procedure Logging (UPL)
- SAP Code Inspector
- ABAP Test Cockpit (ATC)

In addition to the specific adaptions required for SAP S/4HANA for those customers moving from any DB to SAP S/4HANA the custom code tasks related to the SAP HANA database migration are relevant. For more information see the following document (Considerations for Custom ABAP Code when Migrating to SAP HANA): Link.

3.1.1 Custom Code Lifecycle Management

This application is the central point of access for all functions that you use to manage the lifecycle of custom developments (from creation to deletion). The custom developments that you manage with this application are programs, transactions, and other objects.

The application provides an overview of all the custom developments in your systems. You can identify changes and manage your developments more effectively. You can also perform upgrade tests more efficiently by identifying the custom objects that are currently in use.

For more information see SAP Help: Link
3.1.2 Usage and Procedure Logging (UPL)
UPL is a Kernel based logging technology with no measurable performance impact and available in any ABAP based system based on the core functionality of SAP Coverage Analyser. It is used to log all called and executed ABAP units like programs, function modules down to classes, methods and subroutines.

More Information see SAP SCN: Link

3.1.3 SAP Code Inspector
The Code Inspector is a generic tool that you use to check SAP repository objects. You use it to define inspections which examine object sets with the help of check variants. It checks the performance, security, syntax, and adherence to naming conventions of individual or sets of repository objects. You also use it to retrieve statistical information or to search for certain ABAP tokens. As a result of an inspection, you receive information, warning, and error messages about the different properties of the examined objects.

For more information see SAP Help: Link

3.1.4 ABAP Test Cockpit (ATC)
Based on the ABAP Test Cockpit (ATC) a customer can check and verify the quality of ABAP programs.

For more information see SAP Help: Link

3.2 Custom Code Migration Worklist

3.2.1 Custom Code Migration Worklist at a Glance
With the Custom Code Migration Worklist (technically part of SAP NetWeaver 7.5) a customer can check if his SAP Business Suite custom code complies with the scope and data structure of SAP S/4HANA, on-premise edition. The following figure describes basically the supporting custom code management approach related to SAP S/4HANA.

![Custom Code Migration Worklist Diagram]

7 See SAP Help: Link
In the context of Custom Code Migration Worklist a central component is a data store called “Simplification Database”. This database contains information about which SAP objects changed between the classical Business Suite and SAP S/4HANA. For each changed object, a SAP note is referenced describing what has been changed, why it has been changed and how custom code needs to be adapted.

The content for the Simplification Database can be downloaded as a ZIP file from the SAP Service Marketplace and imported in a SAP NetWeaver 7.5 system.

- See SAP Note 2241080 for more details about the download of the SAP S/4HANA on-premise edition custom code check content from SAP Service Marketplace
- The ZIP file can be imported into SAP NetWeaver 7.5 system using program SYCM_UPLOAD_SIMPLIFIC_INFO.

In addition to the information about changed SAP objects, the custom code needs to be scanned for references to these SAP objects. The customer can run the Custom Code Analyzer to extract these references. The resulting file can be imported in the SAP NetWeaver 7.5 system.

- See SAP Note 2185390 for more details on the Custom Code Analyzer
- The Custom Code Analysis Result file can be imported into SAP NetWeaver 7.5 system using program SYCM_UPLOAD_REPOSITORY_INFO

With executing the Custom Code Migration Worklist the information about the current custom code base is checked against the content of the Simplification Database. This custom code information includes modifications and enhancements to SAP code as well as customer-owned main objects, respective where-used list information and possibly available usage information (UPL). The Custom Code Migration Worklist is provided in an ALV-like list (including XLS download opportunities).

Besides the pure listing of customers code entities which do not comply with the SAP S/4HANA data structure and scope additional information (based on SAP notes) and recommendations will be included in the resulting list. Customers can navigate from the worklist to a corresponding SAP Note. The dedicated SAP Notes then will give the explanation about the technical change and how the related custom code needs to be adapted. Based on the results, the individual custom code analysis results and the provided adaption recommendations, the customer can plan and adapt his custom code to comply with the SAP S/4HANA data structures and scope.

### 3.2.2 Custom Code related activities in the different project phases

The Custom Code Migration Worklist can be used in the different phases of a SAP S/4HANA transition project.
In the preparation phase where no SAP S/4HANA system might be available the custom code migration worklist is used to plan (effort-wise and area-wise) the SAP S/4HANA transition project. In the realization phase the customer is using the Custom Code Migration Worklist to execute the different custom code related tasks.

- In the preparation phase the customer just need access to a SAP NetWeaver 7.5 system. A SAP S/4HANA is not required. Based on the Custom Code Analysis Result file and the custom code check content the analysis can be done. For the different simplification items detailed adaption information are provided based on SAP Notes.
- In the realization phase a SAP S/4HANA system is required. SAP S/4HANA 1511 is based on SAP NetWeaver 7.5 system. Accordingly the Custom Code Migration Worklist is available (usually you would execute the custom code analysis in the SAP S/4HANA DEV/TEST system). Based on the Custom Code Analysis Result file and the custom code check content the analysis can be done. For the different simplification items detailed adaption information are provided based on SAP Notes. In case the custom code is available on this SAP S/4HANA system the customer can navigate from the Custom Code Analysis Result Screen to the dedicated custom code to be adapted.

In dependency to the dedicated simplification item the custom code can be adapted already on start release (for example for Simplification items where the functionality is not available on SAP S/4HANA or where anyway the custom code is not cleverly done [e.g. in case in current custom code CHAR18 is directly used and not domain MATNR is referenced]). For the majority of the required custom code adaption the installation of the SAP S/4HANA is required. These adaption need to be done on SAP S/4HANA target release.
Regarding the system landscape requirements the SAP S/4HANA system conversion is not different to a SAP Business Suite Release upgrade. Upfront to the system conversion of the PROD system the DEV system needs to be converted. The required custom code adaption tasks are done on the SAP S/4HANA DEV system first and applied to the PROD system during the PROD system conversion.

The recommended system landscape for a SAP Business Suite release upgrade is similarly relevant for a SAP S/4HANA system conversion.

The following figure display the sequence of a system conversion including the custom code adaptions in an abstract manner.

3.3 Custom Code related Service Offering
Beside the custom code related tooling SAP is of course offering a number of tailored services related to the SAP S/4HANA transition and the related custom code adaptions. We strongly recommend considering these services when planning a SAP S/4HANA transition project.

For more information regarding the Service offering see: Link
4 Steps to adapt Custom Code
You can distinguish your custom code related tasks

Within the SAP S/4HANA system conversion project you can distinguish between the following steps related to your custom code:

- Get Transparency on your custom code
- Remove waste
- Analyze the impact, and create a plan
- Do the required custom code changes

4.1 Get transparency on your custom code
The main goal in the first phase of the SAP S/4HANA transition project is to get transparency about your custom code and to get an overview of the required adaptation efforts. You should know about the custom objects in your system. For example the following information are required:

- General information (information which should always be available – independent from the SAP S/4HANA transition project)
  - Number of custom objects (reports or transactions) including modifications and enhancements.
  - SAP objects referenced from your code
  - The quality of your custom code
  - Custom code documentation and business process documentation
- SAP S/4HANA specific information
  - Areas of required Custom Code adaption (dependent from dedicated Simplification Item – differs from customer to customer)
  - Number of custom objects to be adapted based on the Custom Code Migration Worklist

4.2 Remove waste
When planning a SAP S/4HANA transition project, it makes sense to combine this with certain “housekeeping” activities for the existing custom code base. In particular, having a consolidated view of productively used custom developments (and their respective status) will help tremendously for the other activities outlined below. You don’t need to adjust custom code which is not in use. To be precise, you don’t need to maintain unused custom code at all. You can, and you should, decommission unused code. Why? Because custom code will cause additional work for you during each and every major SAP software lifecycle management event. Decommissioned code never needs to be adjusted again. The SAP S/4HANA transition project is the ideal opportunity to remove waste!

- Based on the Usage and Procedure Logging (UPL) you can switch on a monitoring feature in your productive system over some weeks’ time. UPL tracks (with very little performance impact) what code has been executed. Please take care of also tracking special business events like month-end activities). More details regarding the Set-Up of the UPL: Link
- When you compare the list of used code, with the custom code inventory list, you know what code is not in use. The Decommissioning Cockpit as part of Custom Code Lifecycle Management in SAP Solution Manager supports you in that exercise, and helps you to find the right custom objects to decommission. More details regarding decommissioning with CCML: Link
Now, all custom code which is still in your system should be subjected for further investigation.

4.3 Analyse the impact, and create a plan
Now, you need to identify code, which has to be adjusted (“Must-Do’s”), or which should be adjusted (“Should-Do”).

4.3.1 Transition Path dependency
The custom code related tasks are dependent from the transition path to SAP S/4HANA on-premise edition 1511. The following figure shows the possible transition paths with the target SAP S/4HANA on-premise edition 1511.

![Figure 6: SAP S/4HANA 1511 on-premise edition – transition paths](image)

SAP S/4HANA, on-premise edition 1511 transition path (at a glance):

- There is a **one-step procedure** in the Software Update Manager (SUM) for customers based on SAP ERP6.0 on Unicode. Customers on older releases (or still with a Non-Unicode system) have to upgrade (recommended) to SAP Business Suite powered by SAP HANA (ERP 6.0, EHP7, SAP HANA) and then to SAP S/4HANA. We call this then a **two-step procedure**

- Customers on any DB need to migrate to SAP HANA (in addition to the installation of the SAP S/4HANA software). The move to SAP HANA database is included in the one-step-procedure and called the Database Migration Option (DMO) within Software Update Manager (SUM)

- Customers with SAP S/4HANA Finance moving to SAP S/4HANA, on-premise edition 1511 have already adapted to the application simplification in financials area.

Impact of the transition path on the custom code adaption:

- **Two-Step Procedure**
  Customers going to SAP S/4HANA, on-premise edition 1511 in a two-step procedure need to adapt their custom code to the first step target (let’s assume in the first step the target is SAP Business Suite powered by SAP HANA) first and then to the second step target. In case you modified an SAP
program, and SAP comes with a new version of this program as part of the upgrade or EHP, you will need to adjust your custom code and your modification (that is: keep it, or go back to SAP standard, or mix it somehow together. See how good it was to remove unused waste before?). Once you have done the upgrade and the EHP installation, you will see all modified objects that need to be technically adjusted in the transactions SPDD\(^8\), SPAU\(^9\) or SPA_ENH.

- **Database Migration**
  If your current system is not already on SAP HANA, you will need to change your database. SAP HANA behaves under certain conditions different than other databases. For instance, if you used database hints in your coding, those hints may have to be technically adjusted. Also, during DB migration to SAP HANA, cluster tables are converted to transparent tables. The implicit sort order of cluster tables is no longer a given – ABAP coding expects data coming to be automatically sorted from the database, and is subject for inspection (implicitly expecting sorted data is should not be the custom code guideline – for guidelines see for example the following SAP SCN Blog: [Link](#)).

### 4.3.2 SAP S/4HANA specific custom code tasks

With SAP S/4HANA, on-premise edition we are doing things differently. In some areas we have a different data structure we are more strictly following the principle of one and we have new target architectures for the different functionalities. This does have impact on the existing custom code for customers converting their SAP Business Suite system to SAP S/4HANA. SAP is supporting the transition to SAP S/4HANA by providing the so called **Simplification List** where on detail level it is described what is different between SAP Business Suite and SAP S/4HANA, on-premise edition. The Simplification List is available in SAP Help → Simplification List for SAP S/4HANA 1511: [Link](#). The Simplification List Items can be categorized into three categories:

- Simplification Items describing functionality which is **not available** in SAP S/4HANA (but available in SAP Business Suite). Usually the functionality is then covered by a different business process (the functional equivalent is then mentioned in the Simplification Item).
- Simplification Items where the functionality **changed** within SAP S/4HANA
- Simplification Items describing functionality which is available in SAP S/4HANA, but **not considered as SAP S/4HANA target architecture**. This functionality might be subject of change in future SAP S/4HANA releases

The categories of the Simplification Items do have an impact on the existing custom code:

- Custom Code related to functionality not available in SAP S/4HANA need to be removed. The customer need to check if the required functionality is covered by the functional equivalent (within Sap S/4HANA standard). In case the requirement is not in scope of the standard functionality appropriate enhancements need to be specified (recommendation: use the standard extensibility tools as far as possible)
- Custom Code related to changed functionality need to be adapted. The details are depending from the change and the related custom code. Based on the Custom Code Migration Worklist the customer gets additional information how his custom code needs to be adapted.
- Custom Code related to functionality not considered as target architecture is subject of an optional adaption. The traditional functionality is still supported in SAP S/4HANA accordingly the related custom code should run in an unchanged manner. Nevertheless the recommendation is to move to the target architecture functional-wise. Then the related custom code has to follow

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\(^8\) Transaction **SPDD** allows you to adjust modifications to ABAP Dictionary objects during a system conversion

\(^9\) Transaction **SPAU** allows you to adjust notes, programs, function modules, screens, interfaces, documentation, and text elements after a system conversion.
Like mentioned in chapter 3.2 the Custom Code Migration Worklist is the specific tool providing the information if customers SAP Business Suite custom code complies with the scope and data structure of SAP S/4HANA, on-premise edition. Based on the result you get the custom code adaption categories (in dependency to the simplification item – there might be several custom code objects referencing to same simplification item – in this sense they have the same cause to adapt the coding) and the number of custom code objects which need to be adapted. Based on that the effort and the required development resources can be estimated.

4.4 Do the required custom code changes
You will need to execute the custom code adaption as part of the migration project. The adaption itself will take place in the migrated DEV system, and is transported to QAS and PRD once those systems have been migrated to SAP S/4HANA.

Custom Code related execution steps:

- Process customer development objects related to Simplification items with functionality not available in Sap S/4HANA. Remove the related custom code – consider equivalent standard functionality – if required create new enhancements (us recommended extensibility functionality).
- Process customer development objects related to Simplification items where the functionality has been changed. Adapt your custom-code based on the information from custom code migration worklist and code inspector checks.
- Ensure that you start your system conversion with the newest available version of SUM
- Execute transaction SPAU
- Execute transaction SPDD

1. Reset all candidates which have no difference between last modified version and delivered SAP version (consider log entries in /usr/sap/SUM/<systemID>/SUM/abap/log/SPDD_RESET_CANDIDATES.<systemID>, which has been generated by SUM; see documentation https://websmp203.sap-ag.de/~sapidb/011000358700000890302012E > Automatic Reset of Non-Adjusted Repository Objects to SAP Original Version)
2. Extend the S/4 core data model by own custom fields, appends (e.g. in SD appends have to be moved from old db tables to new db table) as mentioned by pre-checks or related Simplification DB
3. Adjust all other DDic objects in SPDD
- Find and migrate dynamic usages in your custom code by using Runtime Check Monitor and Blacklist Monitor in your Q- and Productive System

Recommendation: Each step above could be parallelized to assign the different tasks to different processors. To avoid unnecessary adaptations, the migration for functionality not available in SAP S/4HANA should be completed before adaptations take place.

Testing and Quality assurance
The offered custom code related tooling does not substitute testing, quality assurance measures to and regression tests related to your custom code!

- Static code checks and automated tests like ATC etc. to avoid regressions
- Manual testing of your business transactions
- Performance optimizations: Iterative tuning of SQL statements for HANA using SQL Monitor based on data from the productive system
## 5 Appendix

### 5.1 Additional Information

<table>
<thead>
<tr>
<th>Document</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General SAP S/4HANA information sources</strong></td>
<td></td>
</tr>
<tr>
<td>SAP SCN - SAP S/4HANA Community Network</td>
<td>[Link]</td>
</tr>
<tr>
<td>SAP SCN - SAP S/4HANA Cookbook</td>
<td>[Link]</td>
</tr>
<tr>
<td>SAP SCN - The System Conversion to SAP S/4HANA, on-premise edition 1511 - Technical procedure and semantic adaption tasks</td>
<td>[Link]</td>
</tr>
<tr>
<td>SAP SCN - SAP S/4HANA Custom Code Migration Worklist</td>
<td>[Link]</td>
</tr>
<tr>
<td><strong>SAP S/4HANA Extensibility</strong></td>
<td></td>
</tr>
<tr>
<td>SAP SCN - The Key User Extensibility Tools of SAP S/4 HANA</td>
<td>[LINK]</td>
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<tr>
<td>SAP S/4HANA Extensibility - Whitepaper</td>
<td>[Link]</td>
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<tr>
<td><strong>Custom Code</strong></td>
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<td>SAP SCN - Custom Code Management in ABAP Development</td>
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