



PUBLIC

SAP SuccessFactors Suite: Building Extensions Leveraging SAP BTP

Document Details

Name	Objective	Audience
SAP SuccessFactors Suite: Building Extensions Leveraging SAP BTP	This document guides on building side-by-side extensions for SAP SuccessFactors. This first version provides an overview of available assets, communities, and processes to help you get a jump start. With further iterations, we will provide guidance on architecture and best practices for building extensions by comparing the pros and cons of different solution approaches, calling out common pitfalls or antipatterns.	SAP SuccessFactors Customers: IT and HR professionals, Developers, and Development Architects building custom extensions on SAP BTP SAP SuccessFactors Partners: Consultants, Solution Architects, Project Managers, Developers, and Development Architects building custom or partner extensions on SAP BTP

Change Log

Version	Date	Description
1.0	23.06.2023	Initial version
1.1	11.12.2023	Minor correction of links, spelling, and references
1.11	14.02.2023	Fixed broken links, references and empty pages

Supported Releases

Product	Release - From	Release-Valid till
SAP SuccessFactors HXM Suite	2305	

Contribution

Role	Name	Organization
Author / Owner	SAP SuccessFactors Product Management	SAP SE

Implementation Design Principles (IDPs) are documents that complement existing implementation handbooks by addressing real-life implementation challenges as well as frequently asked questions. They are best practices verified by the SAP SuccessFactors product in collaboration with our experienced implementation partners and SAP services. IDPs will give structured guidance to address challenges via product configuration and/or provide workarounds to avoid typical implementation pitfalls. Some of the guidance, especially technical solutions, may require custom development, which may require partner support.

The recommendations in this document are based on the features and functionality available up to SuccessFactors release at the time of writing. Future functionality can impact the recommendations provided by this document. We strive to keep these recommendations up-to-date; however, in case you find that a recent functionality has not yet been considered in the latest version of this document, please send an email to SAPSuccessFactorsIDPDoc@sap.com. In addition, the reader is advised to read and familiarize themselves with essential and additional product-related documentation, which includes Implementation Guides, SAP Notes, SAP Knowledge Base Articles, and additional assets as referenced in this document, see Chapter 7.

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WHAT’S NEW (OPTIONAL)

Learn about changes to this document in recent releases.

1H 2023

What’s New	More Information
Initial Version	Provide basic information about assets, processes, and communities to start your development of BTP Extensions for SAP SuccessFactors.

1 TERMINOLOGY

The following table explains abbreviations and terminology used in this document.

Abbreviation	Description
EC	SAP SuccessFactors Employee Central
MDF	Meta Data Framework
RBP	Role-Based Permissions
IdP	Identity Provider
SP	Service Provider
IAS	Identity Authentication Service
IPS	Identity Provisioning Service
UI	User Interface
BTP	Business Technology Platform
SSO	Single-Sign-On
IC	Integration Center
BAS	Business Application Studio
CAP	Cloud Application Programming Model
CF	Cloud Foundry
XSUAA	eXtended Service for User Authentication and Authorization
Tenant	A tenant (also referred to as an instance, company or company ID) is holding all the data of an owner/customer in a shared SAP SuccessFactors multi-tenant system. A customer might have multiple tenants for different purposes, for example, development and test tenants. Usually, there is only one productive tenant in a customer landscape for the SAP SuccessFactors Suite. Tenants are isolated from each other so that data in one tenant can never be accessed from another one.
DC	Data Center. Each data center at SAP SuccessFactors has multiple landscapes, e.g., sales demo, preview, and production. Each data center and landscape has a different URL to access.
Business User	The (Business) User is a person who has access to the SAP SuccessFactors HXM Suite and can log in to it using his username (credential) and secret (password).
API User	An API User is a special user who is not associated with a person and is used for technical integration between SAP SuccessFactors and another system. API Users can be created by the owner of the tenant.
Technical User	A technical User is an API User that is delivered by SAP and cannot be changed or created by the owner of the tenant. It is often used for internal integrations between SAP SuccessFactors Products.
Action Search	The action and people search are realized in the same search field in the header frame of the SAP SuccessFactors HXM Suite. This field can be used to execute actions by typing them (for example, "Add Employee" or "View User Permissions") or search employees managed in the product.
Extension	An extension is an application build by an SAP partner or customer. Applications are usually integrated with SAP SuccessFactors using APIs.
RPA	Robotic Process Automation
IRPA	Intelligent Robotic Process Automation
LCNC	Low-code/No-code
BC UI	Business Configuration UI is used to edit the data model for Employee Central. Edits can include adding custom fields, changing labels of fields, or triggering business rules to start workflows or send events.
ISC	Intelligent Service Center

2 ABSTRACT

This implementation design principle document (IDP) focuses on side-by-side extensibility and the most known challenges when building extensions for SAP SuccessFactors. With the first version of this IDP, we provide an overview of available assets, communities, and processes to help you get a jump start. With further iterations, we will provide guidance on architecture and best practices for building extensions by comparing the pros and cons of different solution approaches and calling out common pitfalls or anti-patterns.

3 INTRODUCTION

When building an extension application integrated with SAP SuccessFactors, new developers face similar challenges. Those challenges are:

- Understand the whole process of how to become an SAP Partner and what is needed, from the idea of the partner application to the publishing stage and selling it on the SAP Store and finally supporting our common customers.
- Get access to your own SAP SuccessFactors tenant with business data and learn how to use it for development and testing, e.g., creating new users and assigning them permissions.
- Find example data or example scripts to use the product like an end user to run an end-2-end demo or prepare some business data the partner application needs.
- Understanding the SAP SuccessFactors module, he wants to integrate from a business process, data model and API point of view.
- Know what SAP BTP Technologies and SAP SuccessFactors Technologies can be reused to build extensions or integrations in a more efficient way and what their recommended usage areas and best practices are.
- Where to get help or advise in case there are roadblocks or if there is more coaching needed to take architectural decisions on BTP Technologies or get a feasibility assessment of the planned integration with SuccessFactors.

With the first iteration of this document, we aim to provide an overview of available assets, communities, and processes that are there to help you, as a partner or customer, to develop your own extension or to build an integration to your existing application. Based on feedback, we will add additional topics but also go deeper into individual topics to provide more examples, best practices, recommendations, and advantages or disadvantages of different approaches.

This document will focus more on the technology challenges above, but we will also cover the process-related ones by pointing you to the available services and assets we introduced at SAP to cover those. By this, we want to ensure that each partner is aware of those offerings and makes use of them.

4 BUSINESS REQUIREMENT

Throughout this document, we address different types of extensions or application integration scenarios. While most of our examples will be based on SAP BTP technologies, many concepts and assets, e.g., SSO and APIs, also apply to applications that are not built on BTP technology. As such, we will also address both cases, e.g., building a completely new application from scratch (extension case) and integrating an existing application (integration case).

4.1 The SAP Partner Process

In Chapter 5.1, we will talk about the partner process and explain the available services and assets to be aware of for a successful partnership. Those services and assets will help you to be more efficient and have access to experts (BTP and SuccessFactors) at each time of your journey building an SAP SuccessFactors extension leveraging BTP services.

4.2 Basic SuccessFactors Product Knowledge related to building extensions

As many of the challenges we have seen were related to a missing understanding of the SAP SuccessFactors system and its data model, we will give a short introduction to available assets in Chapter 5.2 and mention the most important aspects. We will also provide further material to deepen your understanding of the SAP SuccessFactors product by providing links to learning material as well as demo scripts.

4.3 Building SAP SuccessFactors Extension Application on SAP BTP

In a similar way, we like to lay the foundation for BTP-related topics and point you to some of the generic training and assets in Chapter 5.3 before we go into the more specific topics of building low-code/no-code applications in Chapter 5.6 and pro-code using SAP Business Application Studio (BAS) and the Cloud Application Programming Model (CAP) in chapter 5.7 in a future version of this document.

4.4 Embedding Extensions Applications in SAP SuccessFactors

To achieve a good end-user experience, deep integration of the extension and SAP SuccessFactors is key. To help you with this, we will explain in Chapter 5.5 how to embed your application UI into SAP SuccessFactors screens and menus. To avoid any unnecessary logins for your application, we are providing Single-Sign-On to your end users leveraging SAP SuccessFactors and/or IAS/IPS as the Identity Provider (IdP) as laid out in chapter 5.4.

4.5 Permission Handling of an Extension Application

Another important aspect of each extension is security. Besides the different authentication methods for APIs, the aspect of user authorization and authentication (what the end user is allowed to access) will be covered in chapter 5.8.

5 SOLUTION OVERVIEW AND CONCEPTS

5.1 SAP Build Partnership

In this section, we will explain how to become a build partner of SAP and what tools, assets, services, and communities are available to you.

What is the right partnership for you?

At the beginning of each SAP build partnership is the application as an SAP PartnerEdge Open Ecosystem Build Partner (<https://www.sap.com/partners/partner-program/build.html>). This partnership type is the prerequisite to get you access to many partner tools. It can be expanded at a later point into an SAP PartnerEdge Build partnership. If you start from scratch or if you don't yet have a technically integrated solution with SAP SuccessFactors, SAP PartnerEdge OpenEcosystem Build Partnership is the right one to start with.

What is your major channel for interacting with SAP SuccessFactors?

As soon as you have your partnership established and you get your S-Users or Universal-ID to logon to the partner management tools, you can start our SAP SuccessFactors Discovery Center mission called **"Build SAP SuccessFactors Extensions as an SAP Partner"**. The purpose of this mission is to ensure reliable, secure, and scalable extensions are built for SAP SuccessFactors by software vendors, parallel to helping the vendors become SAP partners from an independent software vendor by providing guidance on the partnership process.

The mission will help you on your journey of building an SAP SuccessFactors extension or integration. It will

- Explain and guide you through the overall process.
- Give you access via the built-in chat to the SAP SuccessFactors Partner Success team for Q&A
- Refer you to relevant technical documentation and tools needed to build SAP SuccessFactors integrations.
- Following are the milestones listed in the mission.
 - Assess the feasibility of your planned application or integration.
 - Purchase your own SAP SuccessFactors tenant for development, demo, and test.
 - Complete the SAP Application Readiness Check (ARC Review).
 - Create your own product integration guide.
 - Publish your application on the SAP Store.

If you want to become an SAP Partner to build SAP SuccessFactors extensions:

1. Apply for the [SAP PartnerEdge Open Ecosystem Build](#) partnership.
2. After you get your S-Users, start your mission with us by following this [blog](#).

Where can you ask questions or get direct support from topic experts?

Besides the SAP SuccessFactors discovery center mission, there are a few additional services and communities we would like to mention.

First, we would like to highlight the [SAP SuccessFactors Partner Community](#), where SAP Partners and SAP Employees can collaborate with each other on product or integration-related questions around SAP SuccessFactors. This community is structured by topics and products. Please use the right topic of your question to ensure better responses. For SAP SuccessFactors integration and API-related topics, this group is a good one to start with: <https://groups.community.sap.com/t5/api-integration/bd-p/api-integration>

For BTP-related services and technologies, we also have a BTP Partner Group here: <https://groups.community.sap.com/t5/sap-business-technology-platform/gh-p/SAP-BTP>

In addition to the partner community, SAP also offers a free BTP coaching service for SAP Build Partners. If you plan to consume a BTP service like SAP Integration Suite or even build your application on top of one of the BTP environments, you can leverage this service. Get to know the details of this offering here:

<https://blogs.sap.com/2023/03/15/extending-sap-successfactors-with-sap-btp-from-ideation-to-monetization/>

Besides the above free-of-charge service, there is also a commercial service offering for Co-Innovation between SAP and its Partners. This commercial option can be ordered here:

<https://partnerbenefitscatalog.sap.com/Partner-Benefits-Catalog/Innovation/Co-Innovated-with-SAP/p/1000260>

Tool/Asset/Community	Link	Purpose
SAP PartnerEdge Build Program	https://www.sap.com/partners/partner-program/build.html or https://store.sap.com/dcp/en/partner-with-us	Establish a contractual basis for working with SAP as a partner. Get Users to access further tools, order products, or access learning material and other assets.
SAP Discovery Center Mission - Build SAP SuccessFactors Extensions as an SAP Partner	https://blogs.sap.com/2021/09/01/one-stop-shop-mission-for-sap-successfactors-software-partners/	SAP SuccessFactors-specific technical support and process guidance are provided by the SAP SuccessFactors Partner Success Team free of charge for all SAP PartnerEdge Build and Open Ecosystem partners.
SAP Community Partner Groups	https://groups.community.sap.com/t5/human-experience-management/ct-p/human-capital-management	Community for SAP Partners to search for answers to your questions or get answers to new questions from experts within SAP and our Partner Ecosystem. Customers do not have access to this.
SAP SuccessFactors Customer Community	https://community.sap.com/topics/successfactors/products	Similar to the partner community, with partners and customers having access.
Co-innovation Advisory Service	https://blogs.sap.com/2023/03/15/extending-sap-successfactors-with-sap-btp-from-ideation-to-monetization/ and SAP BTP - Partner enablement & coaching overview	Getting support and guidance from BTP experts in case you plan to leverage SAP BTP Services.
Co-Innovate with SAP	https://partnerbenefitscatalog.sap.com/Partner-Benefits-Catalog/Innovation/Co-Innovated-with-SAP/p/1000260	Commercial Co-Innovation Service for SAP partners independent from used SAP products.

Further References

- Revenue Share for SAP Store: <https://news.sap.com/2022/05/sap-updates-pricing-structure-of-sap-store>

5.2 Basic SuccessFactors Knowledge

In this chapter, we would like to provide information to anyone interested in building an integration or a solution with SAP SuccessFactors. This will not replace the need for training, [learning journeys](#), or [certifications](#) offered on the partner edge portal for our [products](#). Those are still needed, and as a basis, we highly recommend everybody the following Learning Journey for SAP SuccessFactors: <https://learning.sap.com/learning-journey/explore-sap-successfactors-solutions>.

Please complete at least Unit 1 + 2, and depending on your integration scenario, you can review additional Units for other SuccessFactors modules like Recruiting or Learning. It will be beneficial if you already have an SAP SuccessFactors tenant available to try some of the features on your own and live in the system. See also the next chapter on how to request a non-commercial license for such a sandbox instance for test and development.

The following sections will add to and build on this knowledge and provide specific information relevant to the application integration use case you will go through. We will address topics around the Employee Central

Data Models and basic platform capabilities such as permissions, workflows, user proxies, and API basics. Where needed, we will explain some details or refer to the right documentation to find those.

5.2.1 Requesting and accessing an SAP SuccessFactors test and development tenant

After ordering and requesting the SAP SuccessFactors test and demo tenant as part of the discovery center mission mentioned in chapter 5.1, you will get emails about your tenant with information on how to access it. All needed details, the URL, the Company ID of the tenant, as well as the initial username and password of an admin user can be found anytime in the [SAP SuccessFactors HXM Cloud Ops Portal](#) in the section “Demo Instance Request Tool” by clicking on the entry of your tenant in the displayed table there.

Tenants will have different URLs depending on the data center and landscape they are hosted¹. An example of such a URL looks like this: <https://salesdemo.successfactors.eu/login?company=SFHUB004711>. The last part of this URL is the ID of your tenant, also known as the Company ID. This company ID must be provided with your login credentials in the login screen or must be part of the URL as above.

After providing your username and password, you will find yourself on the SAP SuccessFactors Homepage or in the Admin Center, depending on the role of the user:

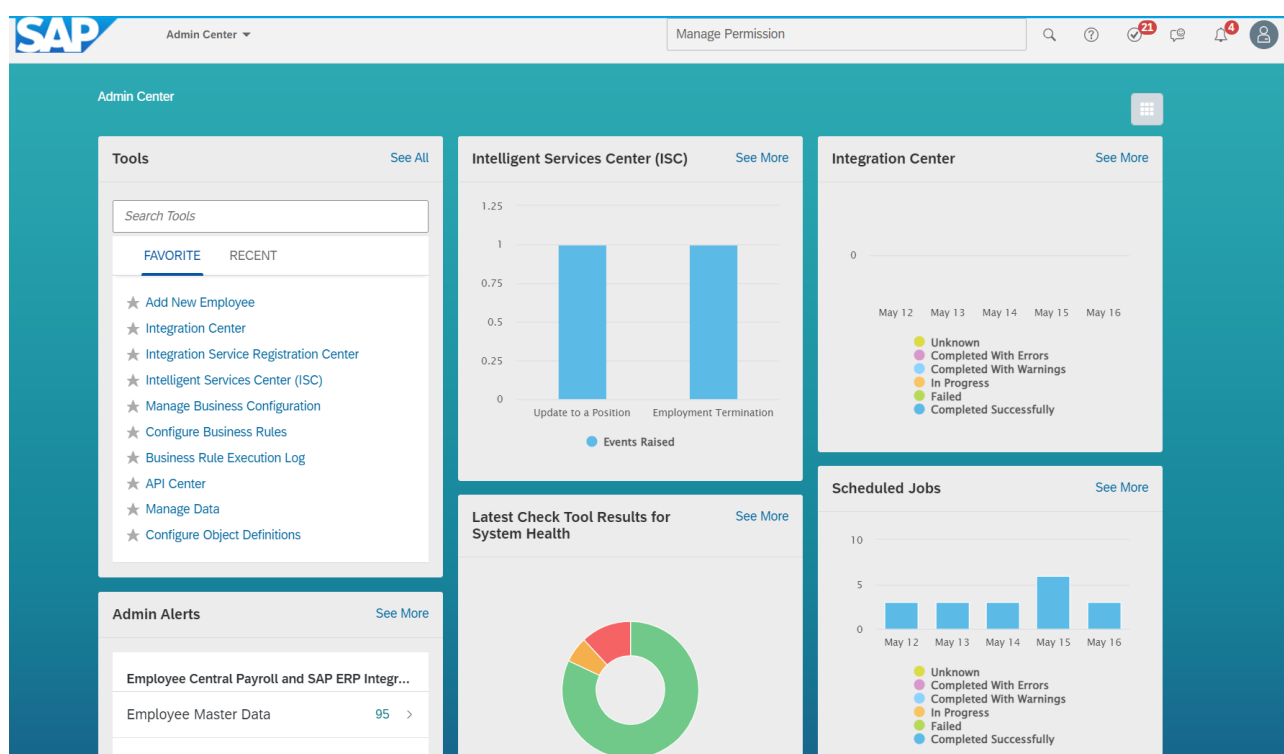


Figure 1: Admin Center and the Top Navigation Bar of the SAP SuccessFactors HXM Suite

The top navigation (also known as module picker) in the upper left corner of the picture above can be used to switch between the different modules or important screens (Homepage, Admin Center, Learning, Recruiting, etc.). The search bar in the upper middle can be used to find employees or execute actions by typing them there, e.g., “View User Permissions” or “Add Employee”. More details about the configuration of action search and all available actions can be found [here](#).

¹ Each data center hosts multiple tenants with unique company IDs. Each customer is assigned one or more tenant in the production or preview landscape of the data center. A customer has at least two, while in some cases three or more tenants. As a partner, you will get a single tenant in a special landscape called salesdemo. See all data centers, landscapes, and URLs [here](#).

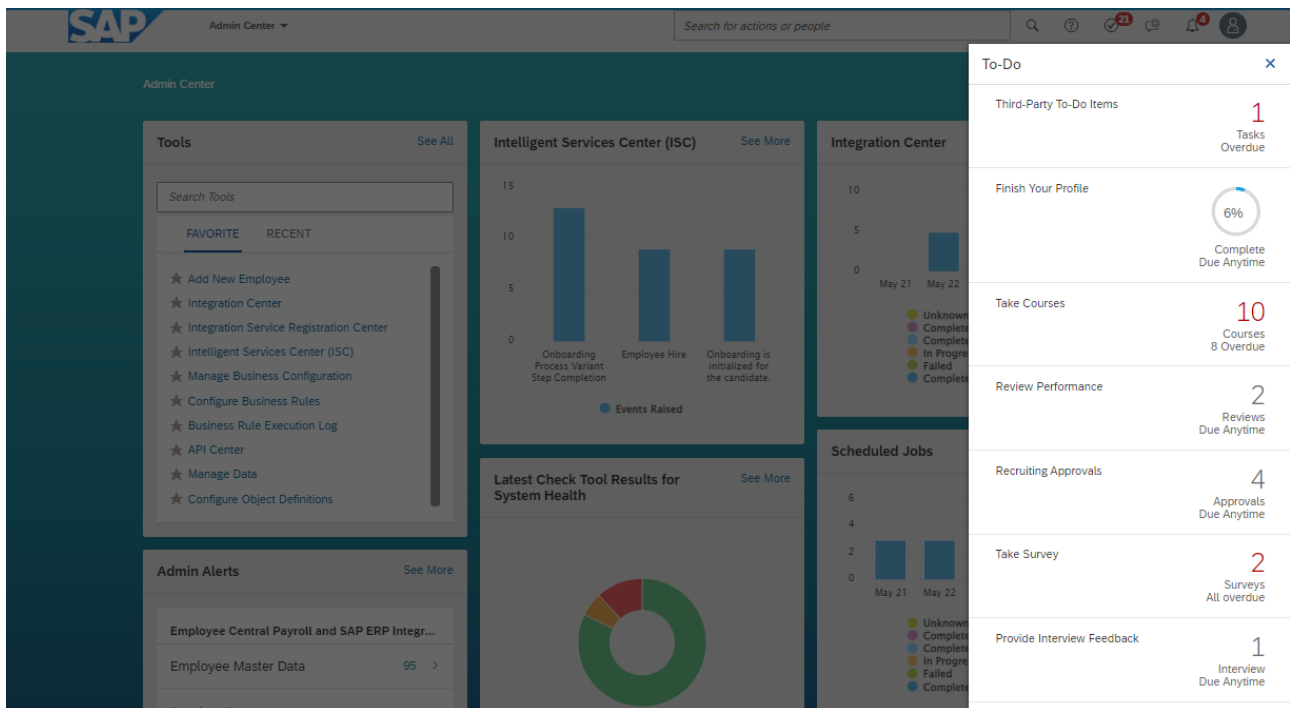


Figure 2: To-do Panel with Workflows and Todo's. Some of the Todo's and workflows are also accessible from the engagement cards on the new homepage.

The last important thing to mention is the to-do panel, which lists all workflows and to-dos a person must act on. It also includes a count of remaining active items. It can be seen when clicking on the round icon with the check mark in the upper right corner of the screen.

5.2.2 The Person and Employment Data Model of Employee Central

When it comes to the SAP SuccessFactors Employee Central data model, there are a few important concepts to be understood to avoid any surprises when replicating this data or using it in the context of authentication or API calls.

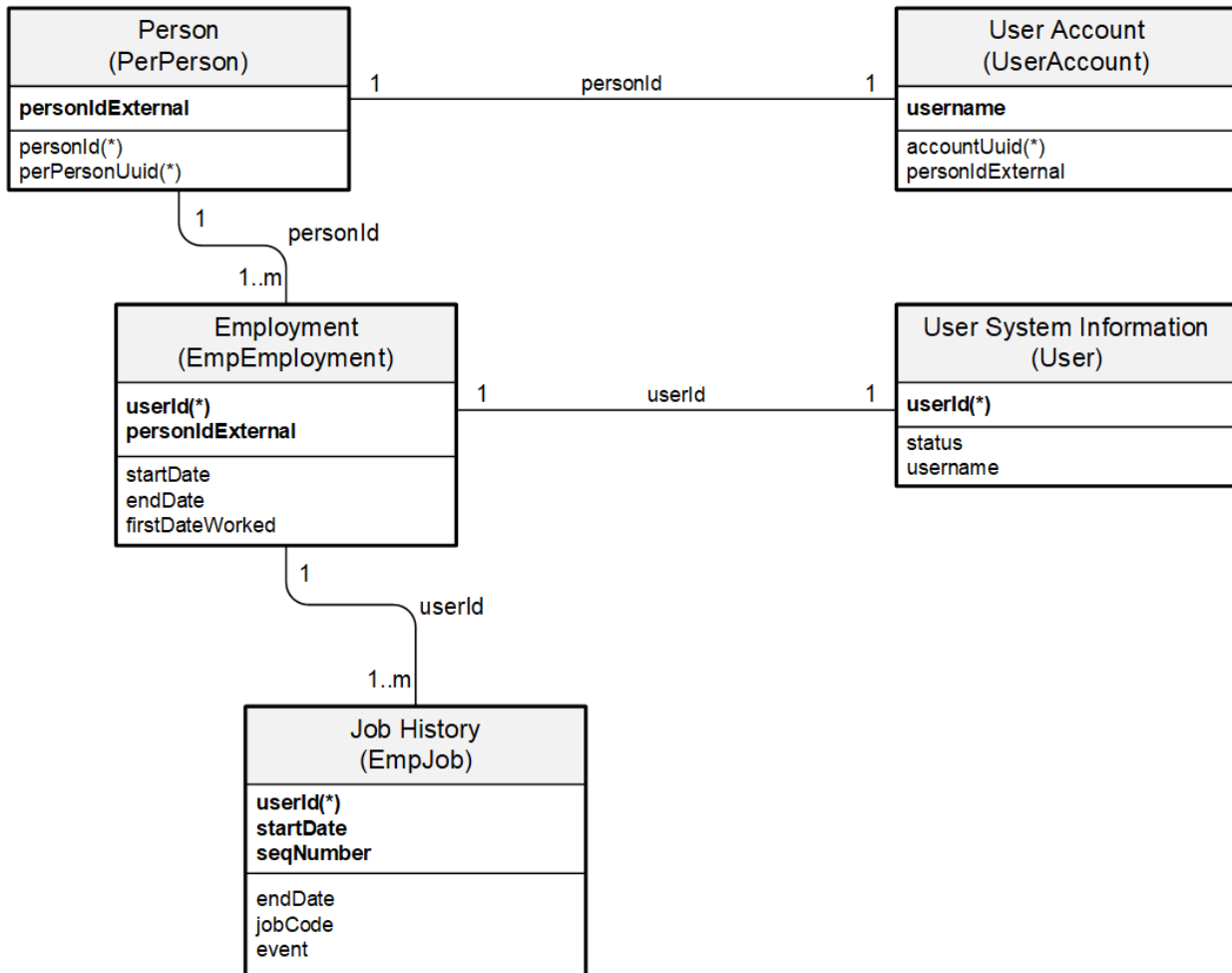


Figure 3: Simplified OData Data Model of Employee Central, showing Person, Employments, Job History, and User Account Information

The above picture shows a simplified version of the SuccessFactors data model. For every employee managed in the SAP SuccessFactors system, there is a Person record. This record has relationships to other person-related data, such as email, which are not drawn in this picture. Each person record has a 1:1 relationship to a record in the User Account entity, which stores the information needed to manage system access via login.

Usually, each Person has just one Employment, but for larger companies, a small number of employees have multiple ones since they have multiple jobs with different contracts in the same company (e.g., being a doctor at a hospital and at the same time being a professor to teach at the university being part of the hospital) or because they have been rehired (one inactive and on active employment) or because they are on a global assignment (working temporarily on a different job and returning again into the home assignment later). Each new employment requires a new record in the User entity, with its own unique user ID. Permissions, for example, are granted on this level using `userId`. In case of multiple active employments, a logged-in employee can toggle between employments using the Context Switcher. See picture below. In the same way, there is an employment switcher also in each people profile to allow switching between the employments when looking at other employees.

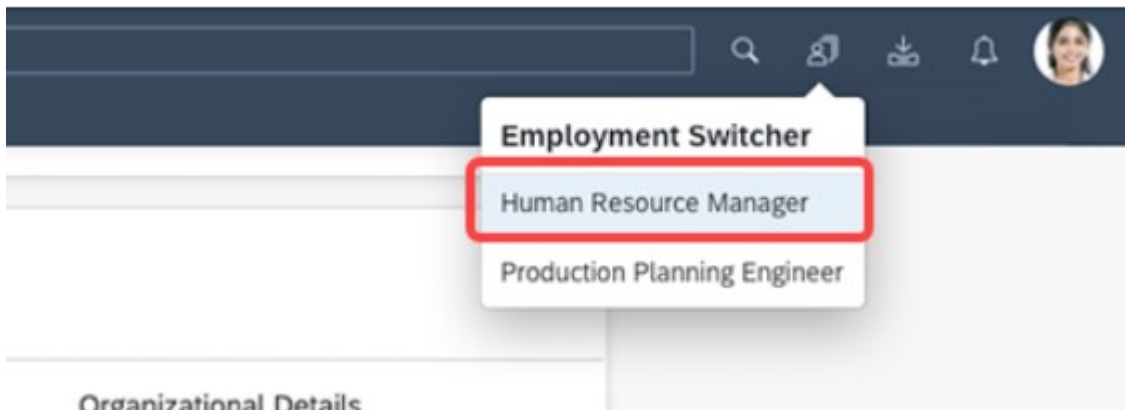


Figure 4: Context Switcher to switch between different employments of an employee.

Below each employment, there is an entity called EmpJob that holds the complete job history for this employment. This means each change in the job within this employment will create a new effective dated record in this entity. As a result, this entity has a start date and a sequence number as additional keys to allow multiple changes - within a single day, e.g., a location change and a promotion.

In Figure 3 above, fields that cannot be changed in the UI are marked with an asterisk (*). This is especially important in case of replication to ensure that no duplicated records are created when an identifier changes. On the Person level, only personId and personUuid are immutable. The personIdExternal attribute can be changed in the system either from the UI or by API calls.

At the same time, userId is a stable ID that cannot be changed either on the UI or via an API call. It's set during the creation of data, during a new hire in the UI, or by initially creating an employee via API calls.

It's a common misconception that username, personIdExternal, and userId have the same value. By coincidence, these values are the same in demo systems but not in most customer systems. If the wrong field is used, for example, to generate the SAML assertion for API calls, the integration will work as long as the data is the same but will start breaking as soon as this is not the case anymore, e.g., in a customer system where those values often differ. It is a best practice to use example data where those values are different.

OData Entity	Field	Example	Stable	Usage
PerPerson	personIdExternal	E-4711	No	
PerPerson	perPersonUUID	123e4567-e89b-12d3-a456-426614174000	Yes	
PerPerson	personId	31832	Yes	
PerEmail	emailAddress	bernd.muster@sap.com	No	SSO SAML
UserAccount	username	bmuster	No	SSO + OAuth2 SAML
User	userId	1234723	Yes	SSO + OAuth2 SAML
EmpEmployment	assignmentIdExternal	E4711-1	No	

Most of the entities above (EmpJob, EmpEmployment, PerPerson, etc.) are only present when a customer has purchased Employee Central, i.e. if the core HR system of the customer is SuccessFactors. For customers who have licensed stand-alone modules such as Learning or Recruiting or bundled licenses for Talent Management, the only relevant entities are User and UserAccount in Figure 1 & Figure 3. In such a scenario, all employee-related data from the customer's core HR system is stored in the user entity. In such a case, the User entity holds the actual state of the employee as of today. To avoid internal and external integration having to distinguish those two cases, SAP SuccessFactors syncs the data from Employee Central into the User Entity using a job called HRIS-Sync. Hence, the User entity always contains the data of the employee as of today, while all the other entities contain the full history using effective dating.

Note: When employees have multiple employments, the corresponding User entity will have multiple records for each employee and not just one.

For a full data model view, have a look at either the graphical SAP SuccessFactors [Data Model Navigator](#) in the Integration Center, the [data inspector](#) (database-level view for data model and the stored data), or the [OData API Dictionary](#).

Each module provides its own UI to change the data models. For Employee Central, this can either be the XML-based import in provisioning (accessible only for partners, not customers) or, alternatively, the [Business Configuration UI](#). For [Recruiting](#) and [Performance and Goals Management](#), it is the Manage Templates action. It is important to understand that changing those data models will affect not only the underlying APIs but also the associated data. Hence, those changes must be made with care. Examples of risky or incompatible changes are the deactivation or removal of fields (which will let APIs error out trying to select this field) or the changing of the type of fields from string to picklist without migrating the data (this will make existing string values inconsistent with the number format used for the picklist option IDs and might cause errors in UIs and/or problems in integrations to downstream systems).

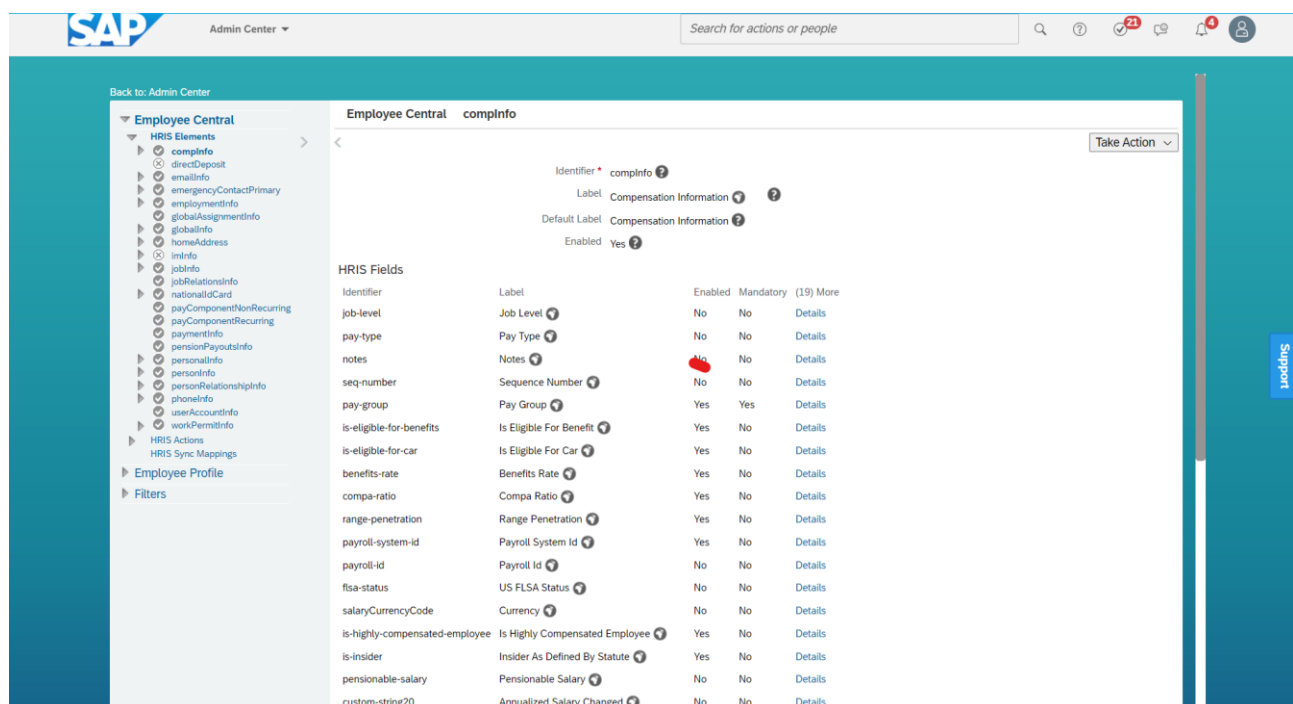


Figure 5: Manage Business Configuration UI. This UI controls the visibility and behavior of fields in the UI and the API for Employee Central managed employee data. Marked in red is the setting for the field notes that enables/disables this field and removes it from the UI and the API. As a result, APIs reading this data and requesting the notes field will fail after this change.

A common mistake made is that developers assume that the data model looks like this in every customer tenant. This is, unfortunately, not the case. While certain standard fields are available in almost every customer configuration, for example, first name or last name in personInfo (OData Entity PerPersonal), this can be different for other fields. Also, the properties of the fields might be different. Some customers might require a certain field while others do not require it. All this information is available in the metadata of our APIs ([OData \\$metadata](#)) and, of course, in the data models mentioned above. Since the API metadata is derived directly from the data models, there are certain consequences when data is being written or read. This means a read API will fail if an extension application tries to access a field that is not present in the customer tenant, and a write API will also fail in case a mandatory field is not provided. Instead, it is recommended to dynamically read the data model or meta data of the APIs or provide an application configuration for customers to map/define certain fields the application can rely on.

5.2.3 How to find the right demo data and users to access the data

Especially in the case of doing demos, testing, or development, it is important to switch between different users that have different roles, e.g., an admin, a manager, or a recruiter, to have access to use case-specific data and the right permissions to view or edit them. This feature is called proxy access.

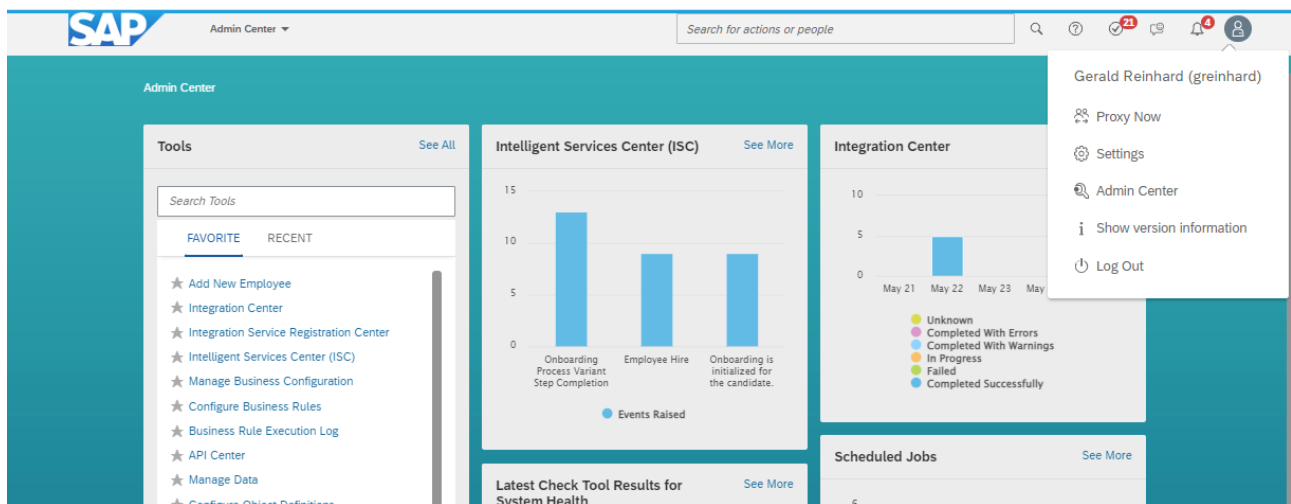


Figure 6: The Proxy Now feature in the profile menu of SAP SuccessFactors HXM Suite allows users to switch between different users and act on their behalf. This is especially helpful when workflow approvals or certain permissions are required when running demos or creating test data.

In order to find the right demo data and the right demo users, our [SAP SuccessFactors Demo Book](#) or the [SAP Content Discovery](#) data can be used. Content Discovery offers demo scripts for many SuccessFactors modules, such as Employee Central, Recruiting, or Learning. In some cases, the test scripts provided with the [SAP SuccessFactors Best Practice Content](#) might be helpful to understand a certain business process, too, e.g., [terminating an employee](#).

Proxy access can be used to switch to the right user for a certain demo script. It also can be used to approve workflows by proxying to the approver when data changes require approval. This can be required during your test data creation, for example, in the case of creating employees using a new hire process. When another person must approve the hire before the process can continue, a workflow is created. In such a case, the requestor of the workflow is informed about this in the UI and can see the approver. In order to approve the workflow, the proxy feature can be used to login as this user and approve the workflow in his/her To-do Panel. An alternative, in case the workflow is not needed, is to deactivate the workflow in the workflow configuration, either by changing the if-condition of the [rule](#) or removing the rule completely from the triggering object using the [Business Configuration UI](#). It's important to understand that in some cases, if a workflow is not approved, the data might not be active in the system². This means UIs might not display this data, e.g., the yet-to-be-approved hire will not appear in the people search, and APIs might not return this information. In such a case, the workflow has to be approved first, or if pending data should be read, a special [workflow API](#) has to be used.

In some cases, the feature to be tested might not have a default user or demo script, and it is needed to assign the corresponding permission to the user. The needed permissions are documented in our help documentation and can be assigned to end-users using permission roles and permission groups. The full documentation of the permission concept can be found in this [document](#), but this [blog](#) also gives a quick overview. The approach is always the same: first, the permission must be added to a permission role (or a new one must be created, and the permission added), and the group this permission role is associated with has to have the corresponding user in it, or the user must be added. After a successful change, the granted user's permission can be viewed using the "View User Permission" action in the action search or by using the link in the admin center as documented [here](#).

References:

² This is the case for almost all Employee Central workflows. For Recruiting workflows on the other side a not approved Job Requisition is just indicated by a status field and is immediately visible in the UI and the API.

- [KBA](#) on Proxy Management.
- [Proxy Access](#) on SAP Help.

5.2.4 Discover and use SAP SuccessFactors APIs

The first place to discover our SAP SuccessFactors APIs, even before you have your own sandbox tenant for test and development, is the [SAP Business Accelerator Hub](#). Here, you can explore and test our SAP SuccessFactors APIs and find the links to the API documentation:

- [SAP SuccessFactors API Reference Guide \(OData V2\)](#)
- [SAP SuccessFactors API Reference Guide \(OData V4\)](#)
- [Employee Central Compound Employee API](#)

For APIs, we also have two relevant Implementation Design Principle (IDP) documents:

- [Best Practices using SAP SuccessFactors APIs for Custom Integrations](#) - lists important best practices when using SAP SuccessFactors APIs
- [SAP SuccessFactors Employee Data: Integration Best Practices and Considerations](#) - focuses especially on employee data replication.
- [Migrating SAP SuccessFactors API calls from Basic Authentication to OAuth2.0](#) - highlights the importance of API security and should help to avoid unsecured authentications such as Basic Authentication or the OAuth2 call.

In addition to the documents above, you can also find webinars and blog posts for them here at the end of this page: <https://community.sap.com/topics/successfactors/implementation-design-principles>

5.2.5 SAP SuccessFactors Integration Tool Overview

5.2.5.1 OData API Log

In SAP SuccessFactors, OData (Open Data Protocol) V2 is the widely used protocol for building and consuming RESTful APIs. The OData API in SAP provides a standardized way to access and manipulate data. For this purpose, logging and monitoring capabilities for API calls are important. Now, it is only possible to monitor OData V2 APIs since OData V4 is not inside the OData API audit logs. The OData API log comes in handy when:

1. Troubleshooting – When you encounter errors consuming or implementing OData APIs, logging helps provide valuable insights for debugging and root cause analysis
2. Performance analysis - Logging assists in analyzing the performance of OData API calls, identifying bottlenecks and performance optimization
3. Compliance and auditing - Logging API requests and responses helps maintain and audit trail of data access and modifications
4. Security monitoring - Log analysis helps to detect and investigate any suspicious/uncensored/unauthorized access attempts or potential security breaches

To achieve this, you need to enable the OData API Audit Logs in the API Center to capture all request and response payload logs from API calls that are reaching your SuccessFactors instance. The sole intention for activating these logs is for debugging purposes in your production and preview instances.

This [KBA](#) has simplified steps with screenshots on how to enable audit logs + payload logging. This is also stressed more in our SAP SuccessFactors API Reference Guide (OData V2) under [Enabling API Audit Logs](#).

1. Completely switch off the OData API Audit Log so that nothing gets logged at all.
2. Enabling OData API Audit Log by switching ON
3. Further enabling “Enable Payloads in OData API Audit Log for Edit Errors” enables logging Request and Response payloads for failed edit operations.
4. Further enabling “Enable All Payloads” which enables audit logs for all operations (Read/Write) and for all status (Success/Failed). This has a time limit, and upon expiration, you need to enable afresh (after 4 hours)

OData APIs developed on BTP will not appear here. Only APIs from custom MDF objects will. Finally, authorization calls (oauth/idp) and token requests (oauth/token) are equally not captured in the audit logs.



Once this is specified, we can download the payload (request and response) under “HTTP Message” and check some key metrics that can be used for debugging.

OData API Audit Log Detail			
Request Header	Response Header	Request Payload	Response Payload
<pre> GET https://[redacted]successfactors.com/odata/v2/ToDoEntryV2? %24filter=categoryId+eq+%2741%27&%24format=atom&%24select=subjectId%2CuserId%2CcreatedDate%2CtodoEntryId ip address: [redacted] host: [redacted] x-forwarded-port: 9003 x-forwarded-proto: https authorization: Bearer ***** user-agent: PostmanRuntime/7.29.2 accept: */* postman-token: [redacted] accept-encoding: gzip, deflate, br x-correlation-id: [redacted] x-sf-correlation-id: [redacted] unique-id: [redacted] successfactors-origin: API </pre>			

Figure 9: OData API Log Details with Request URL and Request Header

From the Request header, we can see the API call, the IP address from where it originated, and the host. We can also get information on the user agent (where the call came from, which could be Postman, SAP Cloud Integration, etc.) and correlation IDs.

In case the string says “Authorization: Bearer” this API call is secure and uses oAuth2 already or mTLS.

In case the string says “Authorization: Basic” this API call is less secure and uses basic auth.

How to use SuccessFactors API Audit Log to determine [authentication methods used in your environment](#)

OData API Audit Log Detail			
Request Header	Response Header	Request Payload	Response Payload
<pre> X-Event-ID: [redacted] CorrelationId: [redacted] Content-Type: application/atom+xml; charset=utf-8 DataServiceVersion: 2.0 Record-Count: 25 X-SF-Record-Count-Recursive: 25 Vary: Accept-Encoding Content-Encoding: gzip successfactors-message: X-SF-Correlation-Id, successfactors-sourcetype are missing in request headers SFODataServerTimeZone: America/New_York APIQueryExecutionTimestamp: 2023-05-23T08:03:40.673Z Status: 200 </pre>			

Figure 10: OData API Log Details with Response Header

From the Response header, we can get more insights, for instance, the correlation ID which relates the API call to a message in the Cloud Integration service, the content type being used, record count, encoding used, server time zone, and execution timestamps as well as the status of the call. More on these is documented in this SAP KBA [How to check and understand OData API Audit Logs - SuccessFactors OData API](#).

This is useful during debugging, as one can use these logs from the application side and compare them to those on the server side to outline inconsistencies, delays, and performance issues to get end-to-end visibility.

5.2.5.2 Intelligent Service Events and External Event Notifications

To achieve real-time or near real-time integration, we use ISC and/or IC, as this helps to build more contextualized payloads. To avoid manual or scheduled runs for an integration center activity, you may want to specify predefined triggers or actions once a given condition is met or completed in SAP SuccessFactors process integrations to other systems or within modules. This is accomplished using Intelligent Service Events, which automate and control process linkages. The integration center can establish event-driven integrations so that information transmission occurs when specific actions are performed on the data. Please keep in mind that Intelligent Services should only be utilized for process integrations, not data replications. The reason for this is that Intelligent Services does not cover all the required update, create, and delete events for such data integration.

Below are the decision pointers on when to use Intelligent Services coupled with the Integration Center and when to use Intelligent Services alone. The Table below describes the supported protocols and possible authentication mechanisms.

Table 5-1

	Protocols Supported	Authentication Supported
ISC + IC	SOAP + REST	Client Certificate, Basic
ISC	SOAP (only)	OAuth 2 Client Credentials, Client Certificate, Basic

One important advantage of the ISC + IC approach is the ability to execute content enrichment with the Integration Center, allowing you to improve the content of messages throughout the integration process.

However, the use of Integration Center is not mandatory; when no data enrichment is required, Intelligent Services can be used to trigger a SOAP endpoint directly.

We can also trigger the Integration Center automatically based on Intelligent Services without using any 3rd party integration tool or middleware. This [blog](#) explains an example scenario when you have to send employee data to an SFTP server whenever there is a location change in employee job information.

You can refer to this [document](#) on the creation of outbound integrations using different trigger, source, and destination types using different formats.

To configure events, publishers, and subscribers, you need to enable the Intelligent Services Center and also have access to the Upgrade Center. The complete procedure can be found [here](#).

Most SAP SuccessFactors products raise and publish events. The Integration Center, SAP CPI, or third-party applications can subscribe to any published event. Publishers can send out external notifications that subscribers can receive. See more here: [Events, Publishers, and Subscribers](#).

Intelligent Services Center		
All Events		
Sort by: Events Raised		
Past 7 days		
Search events ...		
Event	Publisher	Events Raised
Onboarding Process Variant Step Completion This event is published after completion of a step in the Process Variant.	Onboarding	6
Employee Hire This event is raised when a new worker is created with a specified start date.	Employee Central	5

Figure 11: Intelligent Service Center Configuration and Monitoring UI

From the above screenshot, the Employee Hire event will be raised when a new worker is created with the specified start date. The publisher, in this case, is Employee Central, and there is a count of the number of events raised at the far end. Rules can also be applied to these events.

Once we have these events set up and raised, we need to be notified. “Web [Notifications](#) are calls to action to individual users of the SAP SuccessFactors HXM Suite that are triggered by events or transactions in the system.” From

https://help.sap.com/docs/SAP_SUCCESSFACTORS_PLATFORM/e85fac4e6a3b4884b6451d4208cdb778/a895ded3ceb04b3183e9a0be513d6d6f.html?q=intelligent%20service%20center&locale=en-US

Web notification appears in the corresponding web notification panel in the header in the upper right corner.

We also have Best Practices around this topic containing basic guidelines for creating event-based integration via the intelligent services center (ISC) and integration center (IC) in this [KBA](#).

Refer to the [Implementing and Managing Intelligent Services](#) for a complete documented guide.

5.2.5.3 Extension Center

The SAP Extension Center was previously used for MDF and BTP extensions. However, SAP SuccessFactors Extensions in the Extension Center were deleted on December 9, 2022. This means that the deprecation milestone was reached when a feature is no longer available for productive use. Currently, you can maintain MDF objects in Configure Object Definition or via SuccessFactors Extensions in the Extension Center. The Configure Object Definition tool is used by most customers and partners to create the basis for their in-app extensions. There are functional gaps between Extension Center and Configure Object Definition regarding maintaining object definitions. The deprecation of SAP SuccessFactors Extensions in the Extension Center doesn't take away any capability to build or maintain in-app extensions based on MDF objects. The deprecation allows you to focus our innovations on one fully functional UI (Configure Object Definition).

Configure Object Definition within the Admin UI is advantageous and allows you to define the data structure of custom objects, connect business rules on object- or field-level, activate workflows, enable permission checks, and make it accessible using APIs and much more.

There are a couple of documents in this context:

- Customer/Partner Community Blog: <https://groups.community.sap.com/t5/product-and-customer-updates/deprecation-of-the-successfactors-extension-from-extension/ba-p/162493>
- KBA: <https://launchpad.support.sap.com/#/notes/0003153985>
- What's New Viewer for 2H 2022 Release:
https://help.sap.com/docs/SAP_SUCCESSFACTORS_RELEASE_INFORMATION/8e0d540f96474717bbf18df51e54e522/db6c01cd44174e14a45ab081bc7932b2.html

Refer to the [Implementing Metadata Framework guide](#) for instructions on maintaining MDF objects and picklists.

5.2.5.4 API Center

The API Center is a centralized reference point for all the configurations related to APIs. Currently, SAP SuccessFactors supports SFAPI (Compound Employee API) and OData APIs for integration. Compound Employee API will be used when you are building Integrations around Employee data in Employee Central, and for the rest of the scenarios, we can leverage OData APIs. To get an overview of when to consider using SFAPI or OData API, refer to this IDP [SuccessFactors Integrations - Best Practices using SAP SuccessFactors APIs for Custom Integrations](#) (Section 6.1 – Using the right APIs).

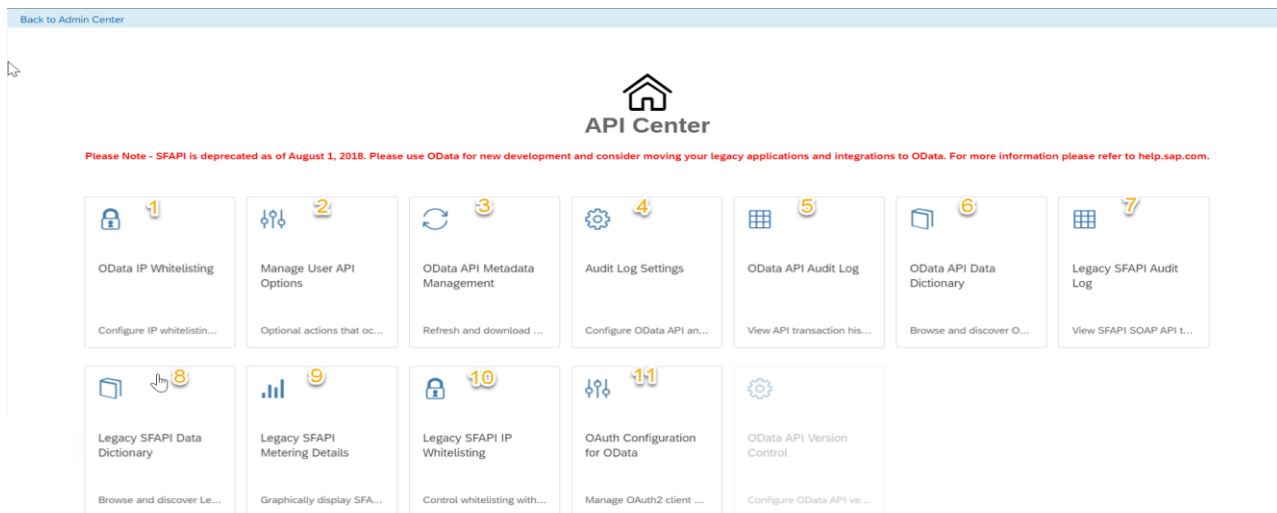


Figure 12: The API Center is the central place for all API-related configuration, monitoring, and metadata display

This [blog](#) covers every option of this API Center in detail.

This API Reference Guide (OData V2) describes the features of the [API Center](#) and the required permissions.

5.2.5.5 Data Inspector

This is an admin tool that lets you view and download raw data from the system in a tabular format.



Figure 13: The SAP SuccessFactors Data Inspector UI to view the data of OData entities.

The sample screenshot of Data Inspector shows the Entity “Table_PERMISSION” and the results displayed in a tabular format that is downloadable. The user can also apply some filter criteria accordingly.

The Data Inspector only allows you to view and download the table. You cannot modify or upload the table using Data Inspector. Also, the tool does not show personally identifiable information (PII). The results are downloaded in a .csv file. Find more information about the tool in the help documentation: [Using Data Inspector](#).

5.2.5.6 Integration Center

When working with integrations, you want to accomplish smooth data integration across many HR systems, preserve data consistency and quality, and eliminate manual data entry, which eliminates data errors and increases efficiency. All of this saves you time and keeps the work required to run your integrations to a minimum.

When discussing the integration topic regarding SAP SuccessFactors, the Integration Center (IC) is a must-mention. The Integration Center enables you to build, run, schedule, and monitor simple integrations and, by this, simplify common export and import use cases.

When to use the Integration Center? As a partner, you can use IC when you have either REST/SOAP APIs or when you wish to store data on an SFTP server to bring it into SuccessFactors (only SFTP is supported in IC, no FTP) or vice versa (from SF into your Application). If none of these conditions is true, then it is not possible to use IC. If you still wish to proceed in this way, you shall be provided a code-free tool, and you can ship the integration configuration to the customer via the SAP Business Accelerator Hub. No additional license is needed in this case.

In some cases, the use of IC is not recommended. For instance, when the integration requirements are too complex to be realized with it (remember, single query) or when the prerequisites above are not fulfilled. As a limitation, it is important to mention that this is in the tenant of the customer, and hence, only the customer (not the partner) will have access to it when this is in operation. Hence, updates cannot be applied by the partner but only by the customer.

It offers a user-friendly interface and graphical mapping tools that allow users to define data mapping rules and transformations. With this, you can build integrations quickly and easily by using a guided workflow. Loaded with predefined templates as well as the ability to create your own template supporting various integration scenarios, including inbound data integration (importing data into SuccessFactors *SFTP only* no outbound systems) and outbound data integration (exporting data from SuccessFactors to external systems). The Integration Center supports integration using various protocols and formats, such as SOAP, REST, OData, CSV, XML, and more.

To access the Integration Center, go to the Admin Center, and in the Tool Search field, enter Integration Center.

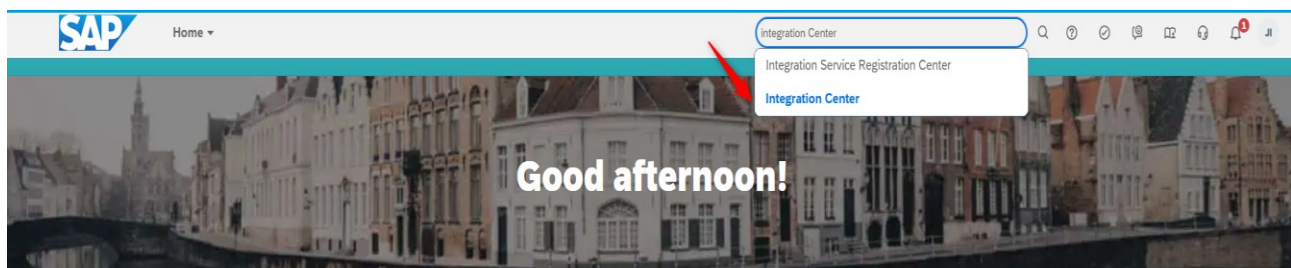


Figure 14: Accessing the integration center from the action search

Here, you can build customized file extracts using any data using the SAP SuccessFactors OData APIs catalog.

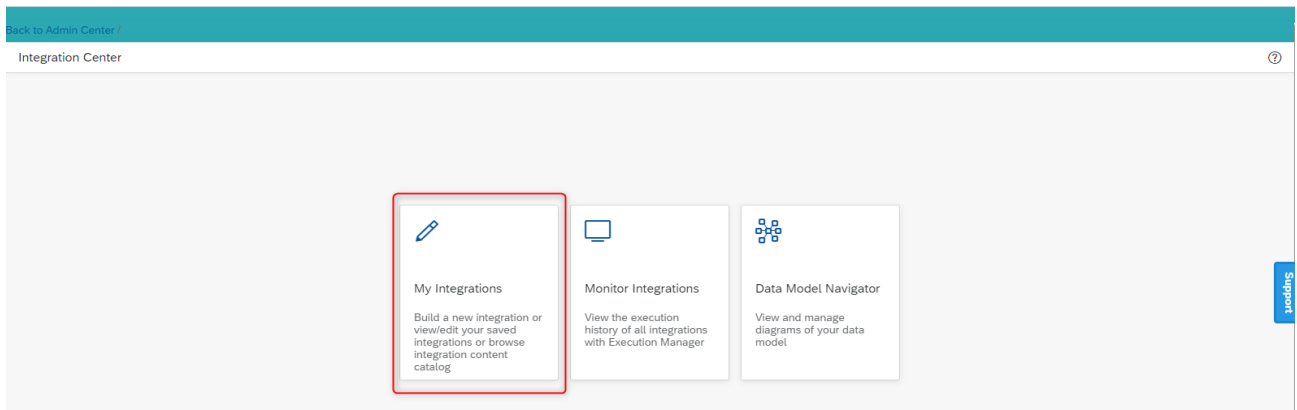


Figure 15: Integration Center UI with Configuration, Monitoring, and Data Model Navigator cards

To access the Integration Center, you need to assign role-based permissions for all administrators so they can build, run, schedule, and monitor these integrations. For setting up integrations, it is very important to identify the user groups you want to provide access to and then accordingly enable the required role-based permissions for each group.

To find the role-based permissions for the Integration Center, refer to the [List of Role-Based Permissions](#).

If you try to access **Integration Center** without the relevant permissions enabled, you will see the following message on the screen: **The user does not have the required permissions to access Integration Center.**

The Integration Center supports SuccessFactors Business Suite; hence, these integrations can be built with OData APIs (Employee Central, Recruiting, Performance Management, Goals, Succession). Here are the available [APIs for SuccessFactors](#).

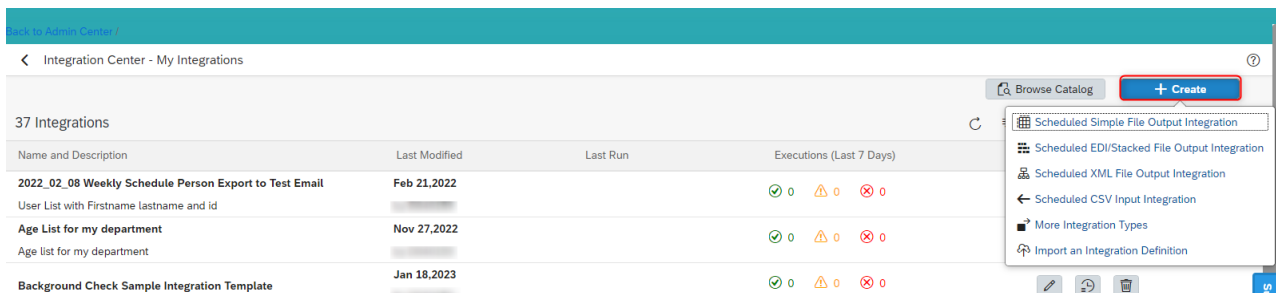


Figure 16: List of Integration flows created with Integration Center

Above, we see the “My Integrations” tab in the Integration Center with some already created integrations with name and description, when the integration was last modified, the last run, executions, and lastly, the actions you can take (edit, view history, or delete integration). To the right, we have the create button and the various integrations that can be created using this action.

The Integration Center is constantly evolving. Check the [Integration Center – User Assistance Guide](#) for more details.

Our [SAP SuccessFactors Integration: Integration Center and Cloud Integration](#) - (Section #7) IDP document discusses the choice of using SuccessFactors Integration Center and SAP Cloud Integration (previously SAP Cloud Platform Integration) within SAP Integration Suite and also provides recommendations on when to use each tool in SuccessFactors implementation projects.

The following table details what is possible using integration tools in the SAP SuccessFactors Integration Center and in Cloud Integration.

Integration tool Integration tool Capability	SAP SuccessFactors Integration Center	Cloud Integration
Extract data using CompoundEmployee API	✗	✓
Support for complex message transformation	✗	✓
Support for scripting in the integration flows	✗	✓
Extract data using SAP SuccessFactors OData APIs	✓	✓
Data extraction from SAP SuccessFactors to SFTP	✓	✓
Data extraction from SAP SuccessFactors to FTP	✗	✓
Send data directly to a SOAP/REST based 3rd party API end point from SAP SuccessFactors	✓	✓
Support for SSH key based authentication to SFTP	✓	✓
Consume data from a SOAP/REST based 3rd party API end point into SAP SuccessFactors	✗	✓
Support for EDI format	✓	✓
Support for file Encryption/Signing through PGP keys	✓	✓
Support for multiple SFTP destinations in single integration flow	✓	✓
Support for high frequency-based integrations	✗	✓
Ability to extract history/future date/as-of-dated information from SAP SuccessFactors	✓	✓
Ability for scheduling the integrations	✓	✓
Ability to send email notification for success/failure of the integrations	✓	✓
Support for both server/client-side paging mechanism	✓	✓
Suitable tool for productized integration development/Lifecycle management	✗	✓
API payload enrichment by calling a different source/target API in the integration flow	✗	✓
Support for 3rd party certificate-based authentication	✓	✓
Support for 3rd party OAuth2 based authentication	✓	✓
Support for OAuth2 based authentication to SAP SuccessFactors	✓	✓

Figure 17: Capabilities of SAP SuccessFactors Integration Center and SAP Integration Suite (Cloud Integration)

Only simple integrations based on a single API call are possible. Coding or scripting is not possible. This would be a short summary, and then you can refer to the detailed chapter of the document and the help page.

Also, this [blog](#) explains the capabilities of the SAP SuccessFactors Integration Center and SAP Integration Suite.

5.2.5.7 Monitor Jobs / Scheduled Jobs

Once we have created our integrations in the Integration Center, there is a need to monitor these integrations to ascertain how they are running, the list of the integrations center jobs created, and the status of each job. While it is possible to use the Integration Center to build your integrations or build integrations on your own stack, you can use the [Execution Manager APIs](#) to create entries here, too. This allows you to view the integration run errors in the customer's Integration Monitor. This is, however, an integration monitor and not an application logging tool. Hence, it is not designed to handle hundreds of messages a day like an application log. So, the Execution Manager is to help you quickly identify and troubleshoot errors. Execution Manager is included as part of Next Gen Admin. It doesn't need to be enabled separately, but you do need to grant the appropriate permissions.

In the Integration Center, you'll see a list of integration scenarios or jobs that have been created. The list displays the status of each job, such as "Running," "Scheduled," "Completed," or "Failed."

Here, we can view the execution history of all jobs using the execution manager.

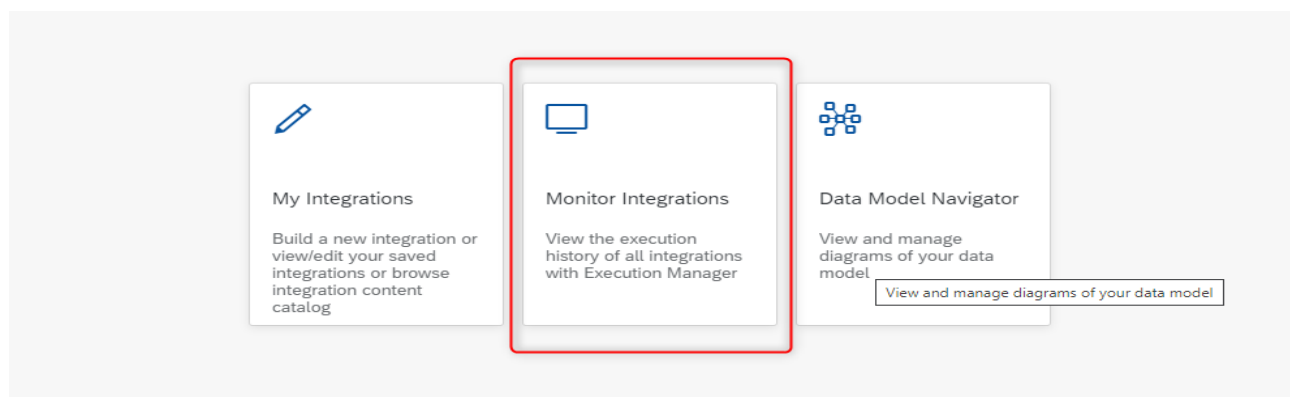


Figure 18: Integration Monitor as part of the Integration Center UI

In the Admin Center, search for "Integration Center" in the search bar and navigate to the "Monitor Integrations" section. Upon clicking, this will automatically open a new tab with the Execution Manager dashboard displayed.

The Execution Manager logs are retained for a duration of 15 days by default. Logs that are older than the retention period are automatically removed from the system.

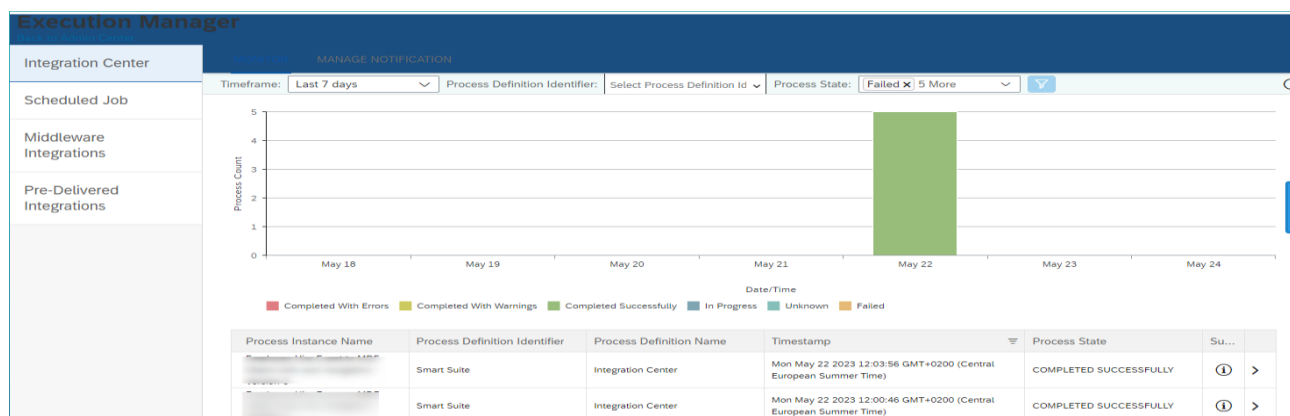


Figure 19: Overview of executed integration center flows in the Integration Monitor

Here, we can monitor the Integration Center jobs, Scheduled Jobs, Middleware Integrations, and pre-delivered integrations. Using the timeframe (which can only go back to the last 15 days), we can filter on the time and the process definition identifier as well as the state we wish to see, could be (Completed Successfully, Completed with Warnings, Completed with Errors, In Progress, Failed)

Event Name	Event Description	Event Type	Created Date
Event	Event ended	END	Mon May 22 2023 12:03:56 GMT+0200 (Central European Summer Time)
Integration Center Info	No Records found for integration; processing finished without generating any output	SUMMARY_SO_FAR	Mon May 22 2023 12:03:56 GMT+0200 (Central European Summer Time)
Integration Center Info	Couldn't perform Read Access Logging. Ensure you have also enabled the Read Access Logging switch from Admin Center > Manage Audit Configuration > Read Audit.	SUMMARY_SO_FAR	Mon May 22 2023 12:03:56 GMT+0200 (Central European Summer Time)
Event	Event started	START	Mon May 22 2023 12:03:56 GMT+0200 (Central European Summer Time)

Figure 20: Event Details in the Integration Monitor

Further, we can click on the Process Instance Name to get the Event Details that give more information about the Process Instance ID, Event Name, Event Description, Event Type, and Created Date.

If needed, you can also download the Event Log. You can also manage notifications using the execution manager dashboard by stating the process type you wish to be notified on, providing an email where these emails are sent, and toggling the **ON** button next to it to enable this functionality. An example could be if you wish to get email notifications of all failed jobs.

Figure 21: Create Email Notifications in case of failed Integrations.

Read more on the [Execution Manager](#), the dashboard, granting permissions to access Execution Manager, and more on the Scheduled Jobs Tab, Integration Center Tab, and how this is put into use to quickly identify and troubleshoot errors.

5.2.5.8 Security Center

Having created your integration in the Integrations Center, there is a need to secure these integrations, and for this, we have the Security Center, which allows you to create and manage keys, certificates, and configurations that can be used in integrations.

You can access the Security Center from the Admin Center. The Security Center provides a dashboard that you can easily create, modify, configure, update, and/or delete according to the use case.

You can also view detailed change log information with regards to when and who created it, as well as when and who performed the last modification.

As a prerequisite, it is important to note that you should be logged in as the RBP Admin to set up role-based [permissions](#) that are required to use the Security Center. Once this is set, you can perform all the actions highlighted above.

In summary, here are the major advantages of using SAP SuccessFactors Integration tools when building extensions:

- Always there and included in customer SAP licensing. No additional cost or deployment is required.
- SAP SuccessFactors Integration tools are tightly coupled with SAP SuccessFactors products and don't need additional *configuration* as such.

- SAP SuccessFactors tools are always kept up to date with technology roadmap as SAP SuccessFactors enhances the Integration capabilities.
- Packaging/Life-Cycle maintenance capability by using our [instance sync tool](#)
- Content discovery made easy for APIs and Integration Center content ([SAP Business Accelerator Hub](#))

5.3 General Information about BTP

The following chapters are a summary of the SAP learning journey on SAP BTP. More details can be found here: https://learning.sap.com/learning-journey/introducing-cloud-security-on-sap-business-technology-platform/using-global-accounts-and-subaccounts_fc42dbb5-5c5b-4903-a3f6-fed3d7f5ee22

5.3.1 Basic Platform Concepts

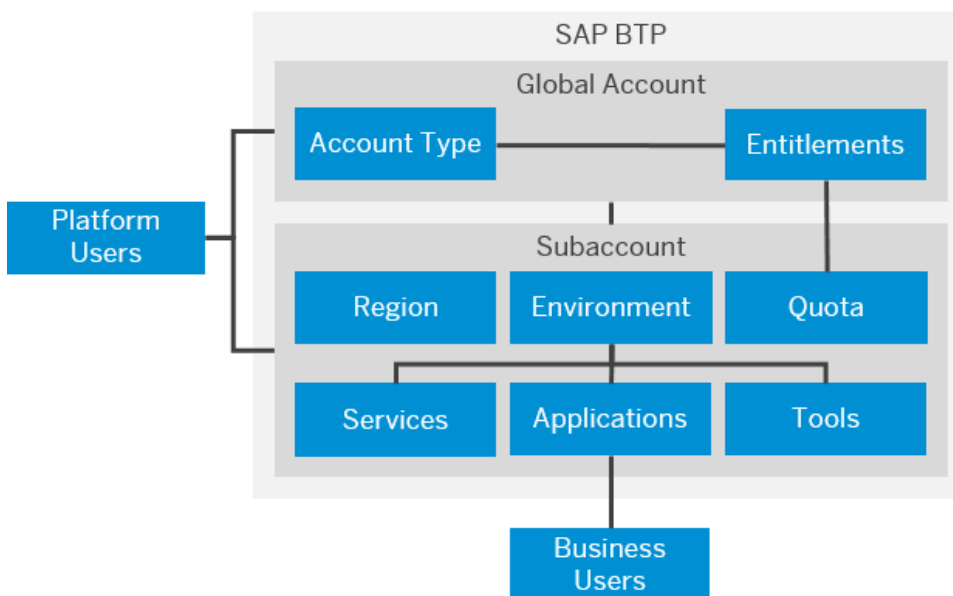


Figure 22: Account concept in SAP Business Technology Platform

The figure above outlines Platform Users (often developers, administrators, or operators who deploy, administer, and troubleshoot applications and services on SAP BTP) and Business Users (users who consume applications that are deployed to SAP BTP. For example, the end users of SaaS apps or services, such as SAP Workflow service or SAP Cloud Integration, or end users of your custom applications are business users.) and how they are incorporated into User Accounts in SAP BTP.

The services and solutions of SAP BTP are available on multiple cloud infrastructure providers. The multi-cloud foundation supports different environments, such as Cloud Foundry, ABAP, and Kyma, as well as multiple different regions and a broad choice of programming languages.

5.3.2 Account Models

A **global account** is the realization of a contract you or your company has made with SAP. A global account is used to manage subaccounts, members, entitlements, and quotas. **Subaccounts** let you structure a global account according to your organization's and project's requirements about members, authorizations, and entitlements. Explore more about [Account Models](#).

Refer to our [Best Practices](#) guide on how to set up Account Models on SAP BTP.

The environments constitute the actual platform-as-a-service offering of SAP BTP anchored on the subaccount level where you can perform your development and administration of business applications. Read more [here](#).

The central point of entry to the cloud platform is the [SAP BTP cockpit](#), where you can access your accounts and applications and manage all activities associated with them.

After purchasing an enterprise account, you're entitled to use a specific set of resources, such as the amount of memory that can be allocated to your applications. This falls under the entitlements and quotas to help guide you and avoid misuse and overuse, which might end up affecting the pricing. Refer to this page for Entitlements and Quotas and their management: [Entitlements and Quotas](#).

5.3.3 Trial Accounts and Free Tier

Here, we will explore the different options for trying SAP BTP. Before setting up your account, you need to decide which free offering for SAP BTP is suitable for your needs.

- **Pay-As-You-Go or CPEA accounts with free tier service plans** are open to customers, partners, and individual developers and let you try out SAP BTP for free without time limits. These account types enable you to test your scenarios and generally offer the option to upgrade to paid service plans. These accounts also allow you to store data long-term and move projects to production. You also get access to our community, including free technical resources such as tutorials and blog posts. For more information, see [Enterprise Accounts](#), [Using Free Service Plans](#), and this [blog](#).

You can self-register for an enterprise account with free tier service plans. For more information, see [Get an Account on SAP BTP to Try Out Free Tier Service Plans](#)

Note: Only community support is available for free tier service plans, and these are not subject to SLAs.

The option to upgrade from free tier service plans to paid service plans is not yet available for all services and runtimes, such as Kyma. See [Using Free Service Plans](#) to read more about upgrading from free tier service plans to paid service plans.

- A **trial account** lets you try out SAP BTP for free for 90 days. The services provided for the trial account allow restricted use of the platform resources and services. Access is open to everyone. Trial accounts are intended for personal exploration, your own non-productive testing, and evaluation of the services in accordance with [SAP BTP trial terms and conditions](#). A SAP BTP trial account must not be used for production use or team development. You are not permitted to use the trial account in any productive or commercial manner.

This [documentation](#) discusses the Trial Accounts and Free Tier in detail.

Enterprise Accounts are usually associated with SAP customer or partner contracts and contain their purchased entitlements to platform resources and services. However, it's also possible to create an enterprise account for personal exploration. [Here](#), we discuss the use cases, benefits, available services, limitations, registration, and available regions.

As there is a difference between who is considered a customer and a partner and as such, there might be different offerings, here are all non-commercial license offerings a partner can choose from: <https://partneredge.sap.com/en/partnership/licenses.html>

This blog offers more insights on the free tier trial environment: <https://blogs.sap.com/2021/08/09/sap-business-technology-platform-free-tier-trial-environment/>

5.4 SSO Configuration of BTP extensions

The authentication to SAP SuccessFactors applications is restricted to authorized users. The identification of a user is verified by the identity provider, as specified by SAML 2.0. The Identity Authentication service stores a list of all users that are allowed to access the SAP SuccessFactors system along with their credentials. The integration between SAP SuccessFactors and the identity provider is based on a trust configuration. When a user attempts to access SAP SuccessFactors for the first time, the system redirects the user to the identity provider for identification. From then on, the user session is kept active, and the user is no longer prompted for credentials when trying to use the SAP SuccessFactors application. This is called single sign-on (SSO).

To ensure the required security for accessing the applications, you need to configure the single sign-on between the subaccount in SAP BTP and the SAP SuccessFactors system using a SAML identity provider. The single sign-on requires both solutions to be configured as trusted SAML service providers for the identity provider and, at the same time, the identity provider to be configured as the trusted identity provider for the two solutions.

If you have an account in the Cloud Foundry environment, you need to set up the single sign-on (SSO) according to this environment.

5.4.1 Configure SAP SuccessFactors as a Trusted Identity Provider in SAP BTP

Before we embark on the actual configuration, as a prerequisite, you need to have the **UI and Role Administrator** role assigned to your user. See [Security Administration: Managing Authentication and Authorization](#).

This procedure sets up the trust configuration of the subaccount in SAP BTP and adds SuccessFactors as an identity provider.

1. Download SAML metadata from the SAP SuccessFactors system.

Go to `https://<sap_successfactors_system>/idp/samlmetadata?company=<company_id>&cert=sha2` where:

where **<sap_successfactors_system>** is the hostname of your SAP SuccessFactors system and **<company_id>** is the ID of your SAP SuccessFactors company

When prompted, save the file on your local file system and change its extension to .xml.

2. Register the SAP SuccessFactors identity provider in the SAP BTP cockpit.

- Open the cockpit and navigate to your subaccount.
- Choose **Security > Trust Configuration**.
- Choose New Trust Configuration.

To upload the SAML metadata you downloaded in step 1, choose Upload. Browse to the XML file you saved and select it. Some of the fields are automatically filled in. In the Name field, enter a meaningful name for the trust configuration and save the changes.

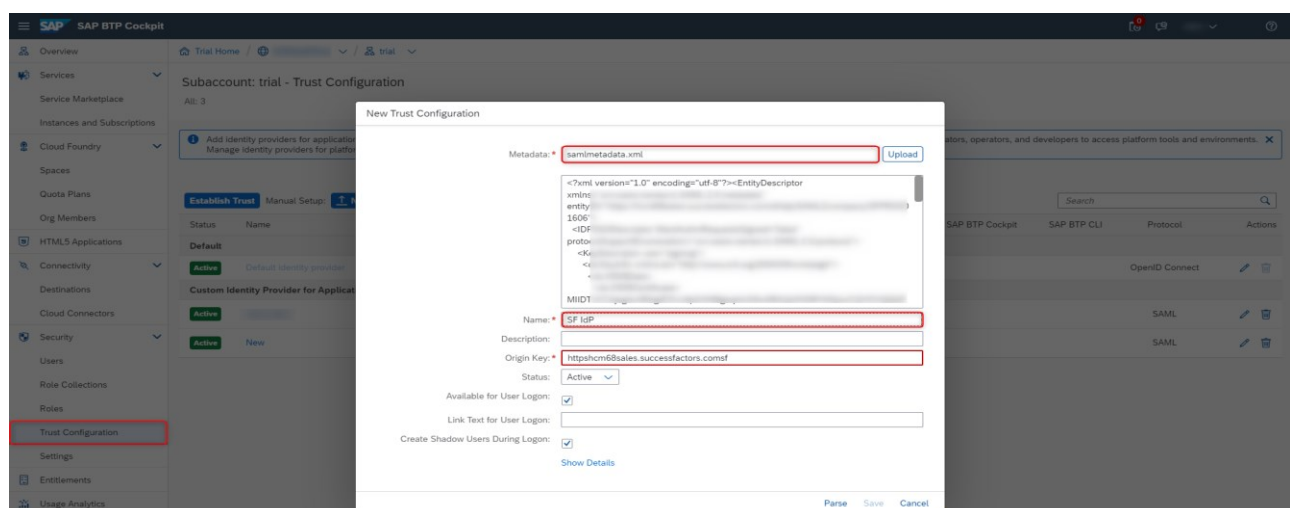


Figure 23: Enabling trust between the SAP Subaccount and the custom identity provider (SF)

Make the trust configuration to the SAP SuccessFactors identity provider the only configuration that is active.

5.4.2 Configure the Subaccount as a Trusted Service Provider in SAP SuccessFactors

To configure the subaccount as a trusted service provider in SAP SuccessFactors, you must create an SAP SuccessFactors Extensibility service instance using the “sso-configuration” service plan.

Prerequisites

- [Register an SAP SuccessFactors System in a Global Account in SAP BTP](#)
- [Configure the Entitlements for the SAP SuccessFactors Extensibility Service](#)
- [Configure SAP SuccessFactors as a Trusted Identity Provider in SAP BTP](#)

With the SAP SuccessFactors Extensibility service instance using the sso-configuration service plan, you can automatically create an assertion consumer service in SAP SuccessFactors for the subaccount in which this service instance has been created and a logout URL for each extension application you have deployed in SAP BTP, in essence, extending the functionality of the registered SAP SuccessFactors system.

There are two ways to create an assertion consumer service(ACS). You either:

1. Create automatically in the SAP BTP cockpit via an SAP SuccessFactors Extensibility service instance using the sso-configuration service plan.
2. Go to the SAP SuccessFactors Provisioning and create these assertion consumer services manually.
See:
 - [Register the Assertion Consumer Service of the Subaccount in SAP BTP in SAP SuccessFactors](#)
 - [Register the Assertion Consumer Service for Every Extension Application in SAP SuccessFactors](#)

In our case, we will focus on creating the assertion consumer service automatically by creating an SAP SuccessFactors Extensibility service instance of plan sso-configuration, providing all the necessary information in a JSON file. It is important to note that you can have only one service instance of plan “sso-configuration” per subaccount.

In the JSON file, under the **systemName** parameter, specify the SAP SuccessFactors system where you want the assertion consumer services to be created. You will automatically get an assertion consumer service for the subaccount where the service instance is created and assertion consumer services for each logout URL that you provided.

If you wish to add/delete assertion consumer services with logout URLs, you must update the SAP SuccessFactors Extensibility service instance of plan sso-configuration and provide an updated JSON file with the respective information. Before updating the service instance, you have the option to view the JSON that was previously passed.

When updating the service instance:

- All the new assertion consumer services with logout URLs will be created in SAP SuccessFactors.
- All the assertion consumer services with logout URLs that were previously created but are not part of the new JSON file will be deleted.
- All the assertion consumer services with logout URLs that were previously created and are part of the new JSON file will be recreated.

If at any point you wish to delete the SAP SuccessFactors Extensibility service instance of plan sso-configuration, all the assertion consumer services with logout URLs created by this service instance will also be deleted.

Note: You cannot bind the service instance of the “sso-configuration” service plan.

Procedure

1. In the SAP BTP cockpit, navigate to the subaccount in which you want to create a service instance.
2. In the navigation area, choose **Services Service Marketplace**.
All services available to you appear.

3. To enable the integration with an SAP SuccessFactors system that you have registered in the global account, choose **SAP SuccessFactors Extensibility**.
4. In the **SAP SuccessFactors Extensibility** page, choose **Create**.
5. In the **New Instance or Subscription** wizard:
 - a. In the Service dropdown list, ensure you have selected the SAP SuccessFactors Extensibility service.
 - b. In the **Plan** dropdown list, select the **sso-configuration** service plan.
 - c. In the **Runtime Environment** dropdown list, select **Other**.
 - d. In the **System Name** dropdown list, select the SAP SuccessFactors system you have registered.
 - e. In the **Instance Name** field, enter a name for your instance. Choose **Next**.

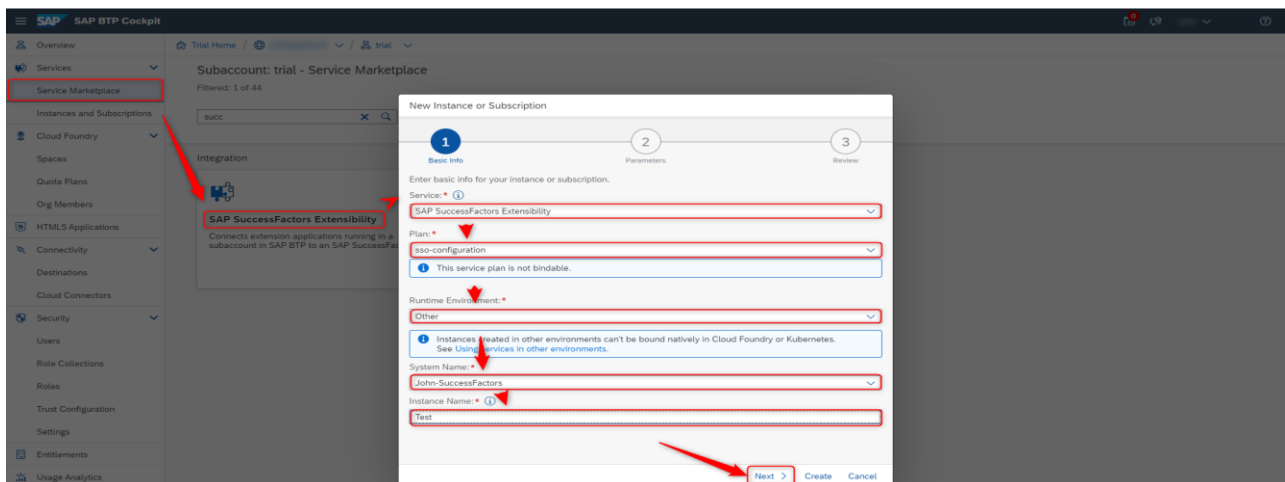
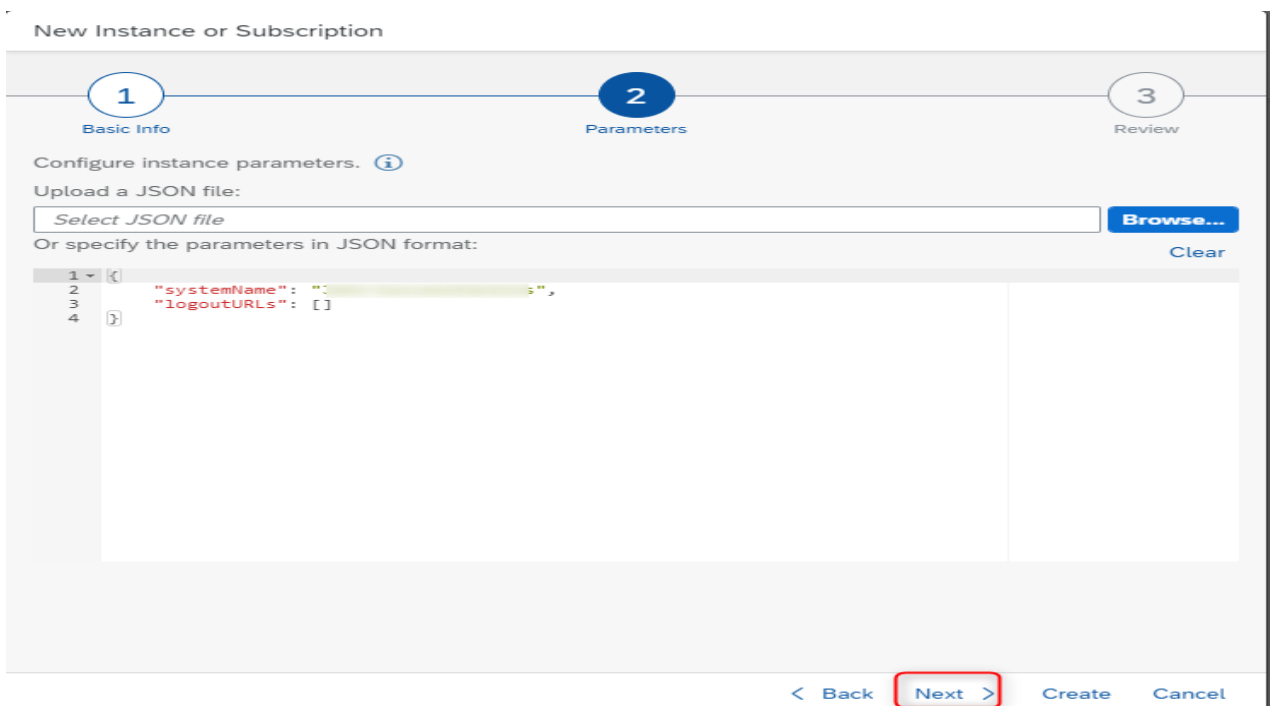


Figure 24: Using the SAP SuccessFactors Extensibility Service to automatically configure SSO for a BTP application

- f. To configure the assertion consumer service of the subaccount and the respective applications, specify a JSON file or specify parameters in a JSON format. You can also do this later. Choose **Next**.

For more information about the structure of the JSON file, see [Single Sign-On Configuration JSON File](#). (The content of the JSON file must be up to 5120 characters without spaces.)



- g. Choose **Create**.

Upon successful completion of the above steps, the assertion consumer service is created in SAP SuccessFactors, and you have the SSO between your subaccount in SAP BTP and your SAP SuccessFactors system established.

Instances (6)								
Service instances created in: Cloud Foundry Kyma/Kubernetes Other environments								
Instance	Service	Plan	Runtime Environment	Scope	Credentials	Status		
						Created	...	>
						Created	...	>
						Created	...	>
SSO	SAP SuccessFactors Extensibil...	sso-configuration	Other Environments			Created	...	>
						Created	...	>
						Created	...	>

Figure 25: Service Instances in the Subaccount after configuring SSO for SuccessFactors

You can check the assertion consumer services. To do so, go to the **Admin Center** of your SAP SuccessFactors company, and in the **Search** field, enter **Authorized SP Assertion Consumer Service Settings**. This is read-only information that allows you to verify if all the assertion consumer services that you need are created.

Admin Center / Authorized SP Assertion Consumer Service Settings							
Authorized SP Assertion Consumer Service Settings							
Before updating to SHA-256, please ensure that the downstream application related to the Assertion Consumer Service (ACS) entry will support the SHA-256 certificate. Use the link to Download the SuccessFactors IdP Metadata with SHA-256 Certificate to assess this readiness. Please note that if the SHA-256 option is not enabled for a given entry, this means SHA-1 is being used and it must be updated. All existing ACS entries must be updated to SHA-256 as soon as possible, for better security.							
Download SuccessFactors IdP Metadata with SHA-256 Certificate							
Assertion Consumer Service	Logout URL	Audience URL	SP Mapping Key	Application Name	Prevent Proxy User	Use Email Assertion	SHA-256 Certificate
				SAP Busines...	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
				Workforce An...	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
				Recruiting Po...	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Figure 26: The SAP SuccessFactors Extensibility service automatically creates an entry in the Authorized SP Assertion Consumers Service list

This can also be checked via provisioning under Service Provider Settings > Authorized SP Assertion Consumer Service Settings.

Authorized SP Assertion Consumer Service Settings							
Please add only one entry for an application.							
All new ACS entries must use the SHA-256 signing option, and all existing ACS entries still using the SHA-1 certificate should migrate to SHA-256 immediately.							
Authorized Service Provider Assertion Consumer Services	Assertion Consumer Service	Logout URL	Audience URL	SP Mapping Key	Application Name	Prevent Proxy User	Use Email Assertion
					SAP Business Technology Platform	<input type="checkbox"/>	<input type="checkbox"/>
					Workforce Analytics	<input type="checkbox"/>	<input type="checkbox"/>
				IP	Recruiting Posting	<input type="checkbox"/>	<input type="checkbox"/>
					SAP Business Technology Platform	<input type="checkbox"/>	<input type="checkbox"/>
					SAP Business Technology Platform	<input type="checkbox"/>	<input type="checkbox"/>
					SAP Business Technology Platform	<input type="checkbox"/>	<input type="checkbox"/>

Figure 27: Authorized SP Assertion Consumer Services in Provisioning.

5.4.3 Configuring SSO for 3rd party applications not running on SAP BTP

The following KBA explains the needed steps to configure SSO between a 3rd party application not running on SAP BTP (the SP or service provider) and SAP SuccessFactors as the Identity Provider (IDP): <https://me.sap.com/notes/2441407>.

The attachment in this KBA is a step-by-step guide on what must be done on the SuccessFactors side. There are also required steps in the 3rd party application that cannot be documented with screenshots but are mentioned in the text accordingly (e.g., uploading the SAML metadata from SuccessFactors into the 3rd party application).

5.5 Embedding 3rd party applications into SAP SuccessFactors

In order to achieve a better user experience, there are multiple SAP SuccessFactors features your partner application can use. Those include, but are not limited to,

- embedding a link to your UI into the SuccessFactors Homepage or Custom Navigations to allow direct navigation from SuccessFactors to your product.
- embed some of your screens into the SAP Work Zone
- applying SuccessFactors theming to your application
- using deep links from your application into SuccessFactors
- enabling SSO

While SSO will be covered in a separate chapter, all the above topics will be addressed here.

Feature Name	Documentation	Extension Point	Restrictions
Homepage Card	help.sap.com	Home page cards under "Organizational Announcements."	Maximum of 100 cards per customer and 16 visible at any time. There is no dynamic content on view; it is only on click. Todo Item Categories cannot be configured anymore compared to the legacy homepage.
Custom Navigation	help.sap.com	Top Navigation, Employee Profile Jump To, Person Goto and Take Action, Action Search	Only dynamic parameters mentioned here can be added to the embedded URL. Must be activated in provisioning first
MDF Custom UI	help.sap.com and this KBA	People Profile and MDF generic UI	Data of those screens must be stored in SuccessFactors MDF
SAP Work Zone for HR	help.sap.com and implementation design principles	UI Integration Cards, Guided Activities	Work Zone is a separate product that must be licensed separately by customers.
Theming	helps.sap.com	n/a, API to read SuccessFactors theming info	
Script Injection	Allows to inject Java script into SAP SuccessFactors to avoid building browser plugins	All SF screens	Requires SuccessFactors development now and will need 3-9 months for delivery of a new vendor. We will guide you through this process when you start our mission: https://blogs.sap.com/2021/09/01/one-stop-shop-mission-for-sap-successfactors-software-partners/

5.5.1 Latest Homepage

The new home page allows the creation of own cards to embed 3rd party applications using “Manage Homepage”. All those custom cards will appear under organizational announcements. The maximum number of cards available in a customer system is 100, while only 16 cards can be displayed at the same time. As a result, customers using multiple partner applications might not have left many of those cards. For that reason, it is always a good idea to think about other unlimited embedding options or reduce the number of cards needed for your application.

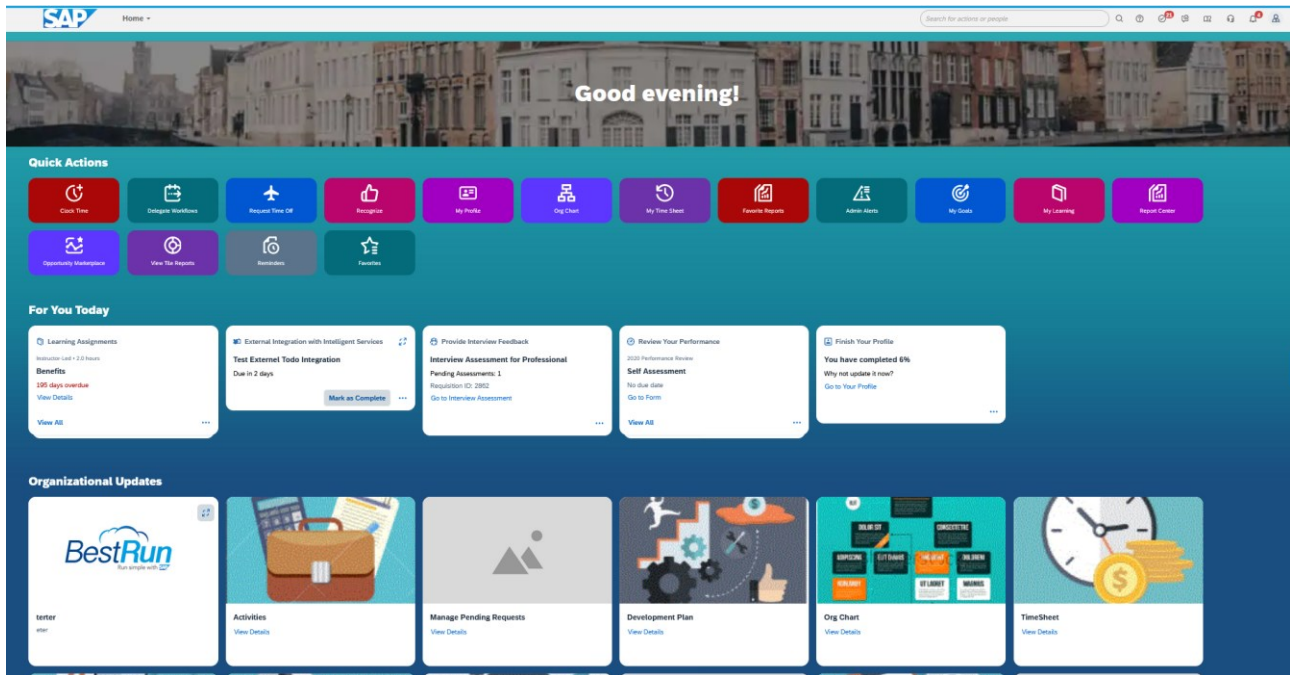


Figure 28: Latest homepage with a custom card in section Organizational Updates

There are several ways to embed content into a card, including raw HTML, iFrames, video files, and templates. What they all have in common is that they only get triggered when the user clicks on the card.

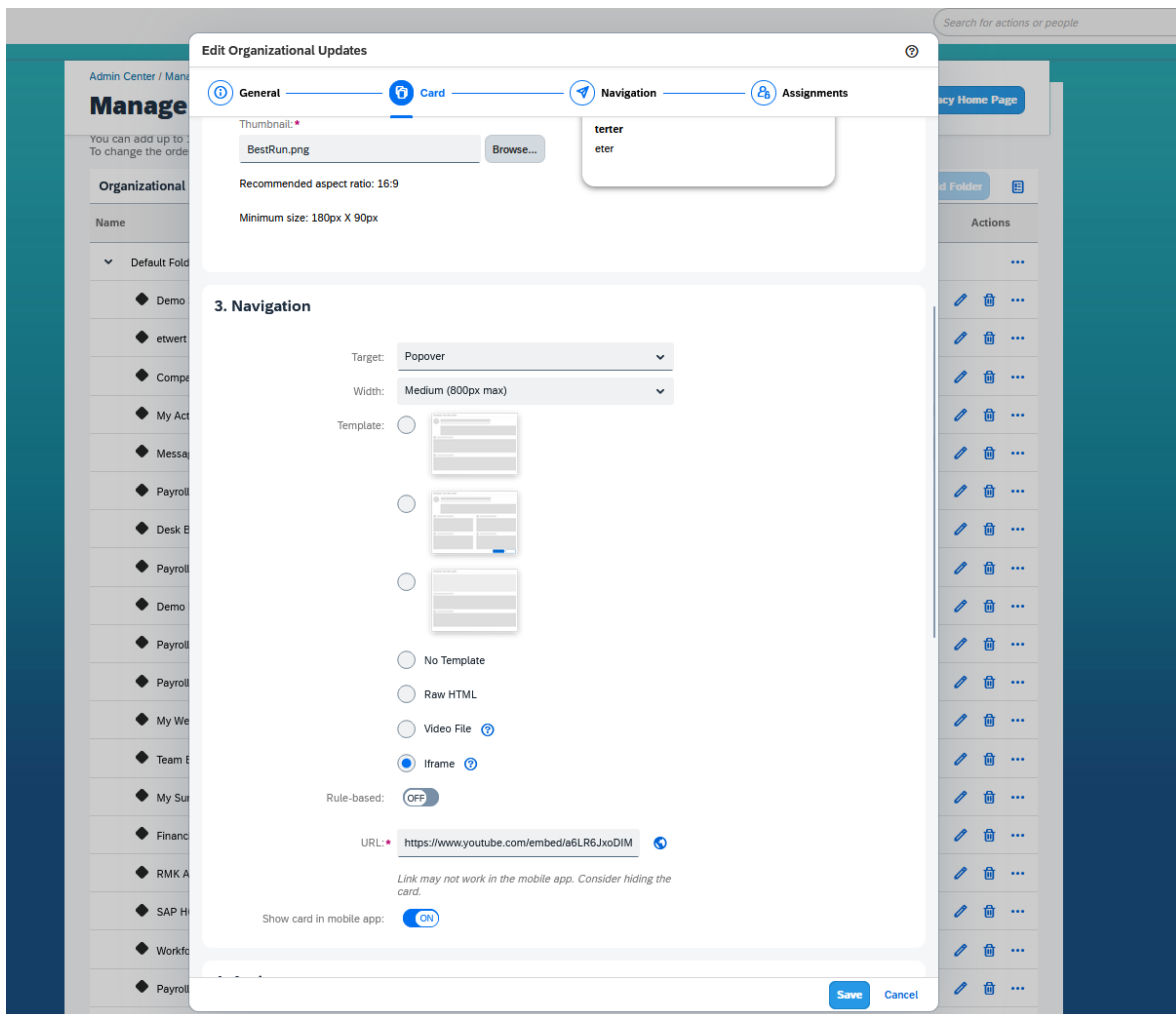


Figure 29: Navigation configuration of the latest homepage. This content is displayed after the end user clicks on the card.

This means the content displayed on the card is static and just based on the settings done in the card section of the configuration UI.

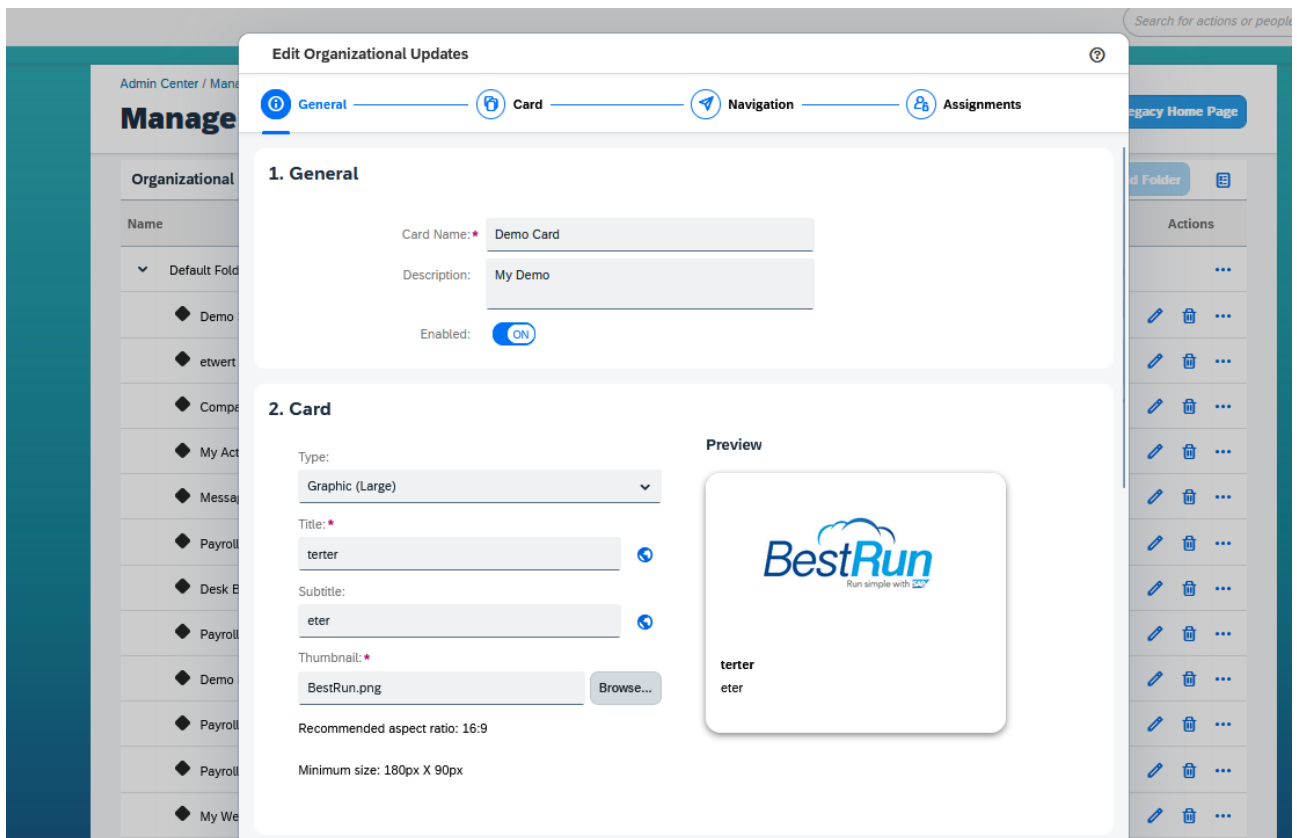


Figure 30: Static card configuration of the latest homepage. This is the content displayed on the card on the homepage. After the user clicks this card, the URL entered in the navigation section will be executed.

5.5.2 Configure Custom Navigations

Another option to embed a partner application and allow navigation from SuccessFactors to the extension is the [Configure Custom Navigation](#). Different than in the homepage, this also allows providing the context of the selected user when embedding the application into the people profile of the person.

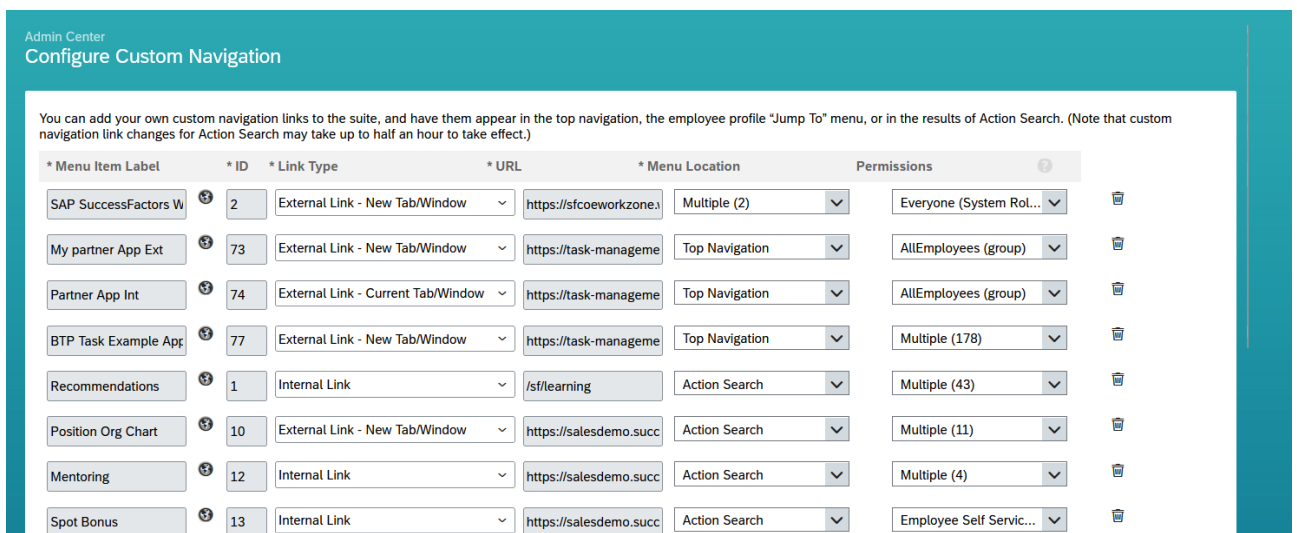


Figure 31: Configure Custom Navigations can be used to embed 3rd party applications into Top Navigation, Action Search, Take Action, etc.

5.5.3 SAP SuccessFactors Work Zone

“SAP SuccessFactors Work Zone centralizes access to relevant business applications, processes, information, and communication in a unified entry point that users can access from any device. It’s a separate to-be-licensed product and, hence, not a part of the SAP SuccessFactors Platform. It offers prepackaged experience specifically to address the needs of HR organizations based on SAP Build Work Zone, advanced edition. The SAP SuccessFactors Work Zone solution is a superset of SAP Build Work Zone, an advanced edition with additional functionality such as workflow and mobile services.” (help.sap.com)

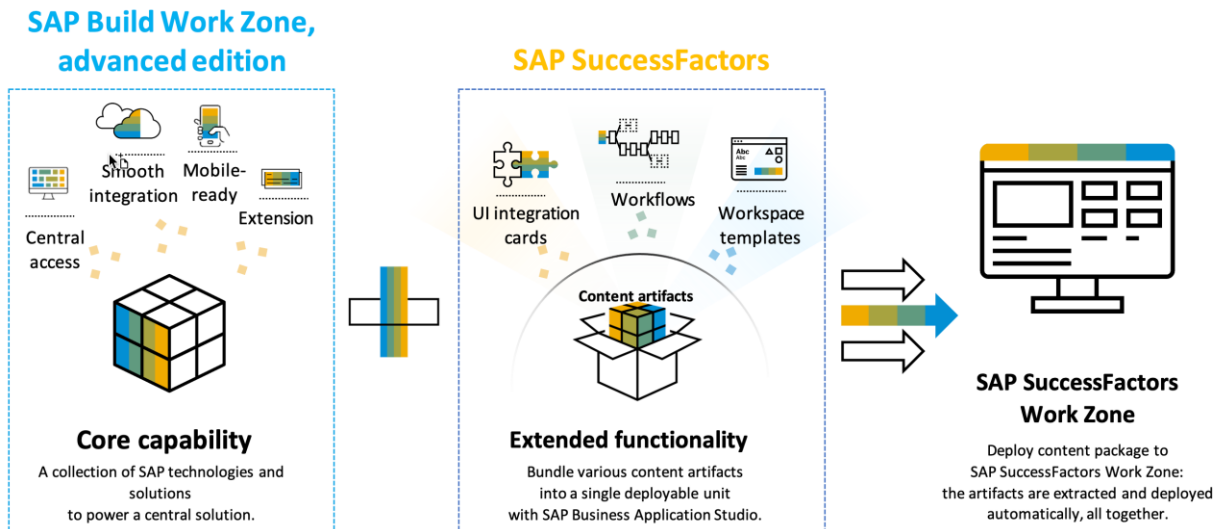


Figure 32: SAP SuccessFactors Work Zone

The implementation design principle document [here](#) explains how a partner or customers can create their own cards or guided activities to embed their application into SAP Work Zone. In this scenario, the Work Zone product acts as a development environment using Business Application Studio as well as the final portal to embed your extension.

5.5.4 Theming

If you embed your application, you also want to make it look like the surrounding solution. The [Theming API](#) can help to achieve this. This [blog](#) explains, based on the company logo, how to use the theming API to retrieve the URL of that logo.

Further References:

- [Theming API Documentation](#)

5.5.5 Deep links

Many 3rd partner applications that are integrated with SAP SuccessFactors do not only want to embed their application into the SuccessFactors UI but also the other way around, which is to navigate from the 3rd party application to SuccessFactors UIs, including SSO. This can be achieved by using so-called deep links. A deep link is a URL that navigates the end user to a dedicated screen and sometimes even to specific data. A prerequisite to making this work is that the application is configured for SSO with SuccessFactors. Otherwise, the end user would get a login screen and would not see the SuccessFactors UI without providing the credentials every time.

[SAP Help](#) documentation covers the latest list of available deep links supported with SAP SuccessFactors.

For the people profile blocks, a special syntax has to be used, which is documented [here](#). This document also describes where to find the corresponding blockIds in the MDF or people profile configuration UI.

An example of a more complex deep link URL can look like this for an MDF block:

https://hcm68sales.successfactors.com/sf/liveprofile?mdfBlock=COVID19HEALTHTRACKING&company=SFPRO001306&selected_user=cgrante

And like this for a normal standard block:

https://hcm68sales.successfactors.com/sf/liveprofile?bplte_company=SFPRO001606&blockId=block1592&selected_user=cgrante

Both links will open the corresponding block or MDF screen for a user with ID cgrante. The company parameter will only be used to set the right company ID in case the user is not signed on yet. If not used, the user will be prompted with a login screen where he must provide the company ID. Hence, this parameter should always be provided to avoid this.

When using deep links into SAP SuccessFactors in your application, it's important to allow the URL domain part to be configurable or dynamic. Similar to the API URLs, the UI URLs differ per data center and landscape.

Deep linking also depends on the IDP setup the customer has chosen. In the case of IDP-initiated SSO, deep links work differently than in the case of SP-initiated SSO. For details, see this [SAP Help](#) documentation.

Additional References

- Deep link into SuccessFactors Mobile Application:

https://help.sap.com/docs/SAP_SUCCESSFACTORS_MOBILE/d80e3ce0e9234cba86f4abbafd4b761e/54149e23d15b4ce38235c48362d3f5b4.html?q=deeplink

5.5.6 General remarks on embedding and portal services

SAP has offered several portal services in the past, including the SAP Enterprise Portal and SAP Cloud Portal Services. Those are not recommended anymore for new developments, and we ask partners to use either the SAP Launchpad Service or SAP Work Zone. They are both part of our new SAP Build Work Zone offering. For more details, see here: [SAP Launchpad service and SAP Work Zone: Frequently Asked Questions | SAP Blogs](#)

Note: Especially when embedding your application into other products using iFrames, please note that this might make use of 3rd party cookies. All browser vendors plan to deprecate those 3rd party cookies in 2024. As a result, your embedded application will stop working when it relies on those 3rd party cookies.

5.6 Extending SuccessFactors using SAP Build Apps – Low-Code/No-Code

5.6.1 SAP Build

SAP Build is an application development solution that provides intuitive no-code development to accelerate development and automation by providing low-code/no-code (LCNC) tools to rapidly develop software without writing any code. This is geared towards non-technical business users (citizen developers with minimal or no coding experience) or code-first developers.

SAP Build Products include:

1. Build Apps –create enterprise applications without code.
2. SAP Build process Automation (low code) – automates workflow processes and tasks with simple drag-and-drop features.
3. SAP Build Work Zone – design engaging sites to get work done quickly across all enterprise applications.

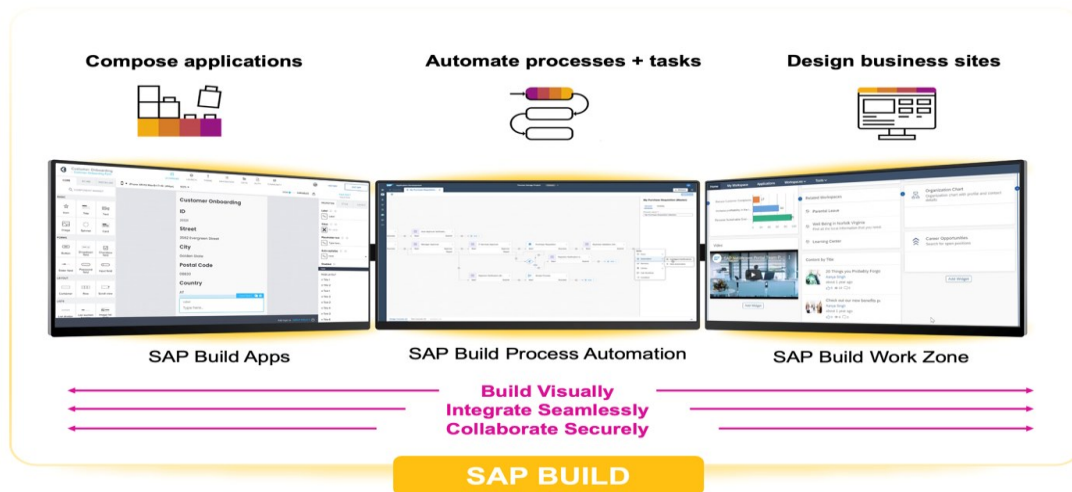


Figure 33: SAP Build as a unified platform enjoining the products and functionalities of SAP Build Apps, SAP Build Process Automation, and SAP Build Work Zone.

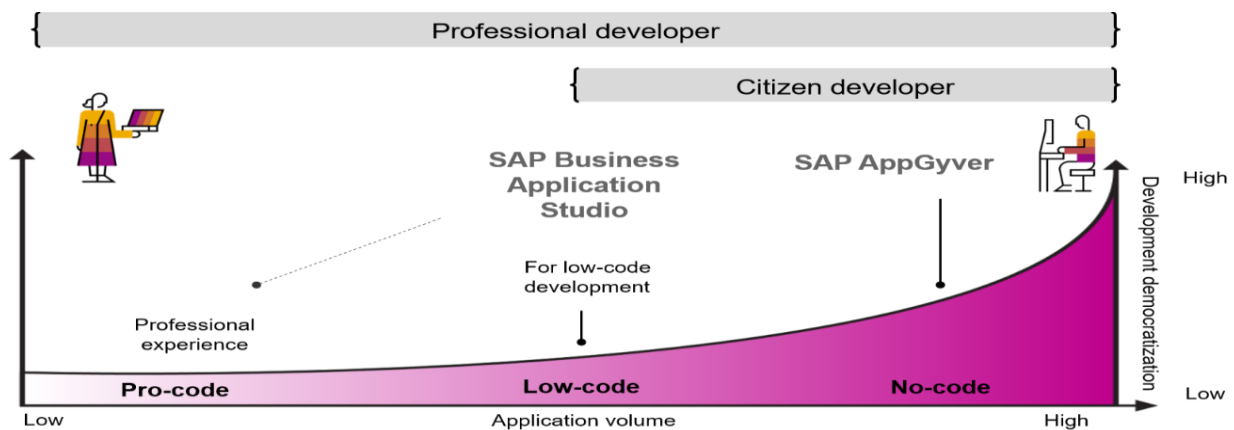


Figure 34: Pro-code, low-code, and no-code tools in SAP BTP.

From the picture above, SAP Build primarily targets a citizen developer but can also be used by professional developers to "get at the code" behind the low-code / no-code.

Reviewing the Advantages of Low-Code / No-Code Platforms:

- **Enhanced ROI** by optimizing existing investment using simplified SAP integrations.
- **Maximized speed and agility** through accelerated delivery.
- **Increased adoption** of new processes and applications
- **Greater collaboration** through co-development between business and IT
- **Accelerated time to value**, using support for best practices with industry and LoB-specific prebuilt content.
- **Reduced the total cost** of enterprise software development.

An overview of SAP Build can be found [here](#).

On getting started with Low-Code / No-Code and SAP Build, we have an [SAP Learning Journey](#) that will take you through an end-to-end scenario.

To get the latest news on the products, including the latest learning offerings, engage with the SAP Build community. Visit this page: [SAP Build Products](#).

For a detailed explanation, this [blog](#) breaks down what SAP Build is, its functionalities, and its capabilities in a more detailed yet precise manner.

5.6.2 SAP Build Apps

“In 2021, SAP acquired AppGyver Oy, a pioneer in no-code development platforms that enable users with no coding skills to build applications for Web and mobile use. SAP Build Apps evolved from SAP AppGyver and other SAP technologies. SAP Build Apps adds additional application-building capabilities for use in enterprises that address authentication, data integration, and lifecycle management needs. A community edition of SAP AppGyver remains available but does not include the features developed for use in enterprises.” From <https://news.sap.com/2021/02/sap-acquire-appgyver/>

“SAP Build Apps empowers anyone to develop full stack applications in a visual way. SAP Build Apps is a low-code development platform to create apps for the Web and native mobile use. As an evolution of SAP AppGyver, it now includes backend capabilities. Business users can confidently build enterprise-grade apps that work seamlessly across all operating systems – all without writing a single line of code. Professional developers will reduce coding effort in the creation of complex data models and business logic and enjoy a significant boost in productivity.” ([SAP Build Apps – Service Guide](#))

This [page](#) serves as the central entry point with documentation on pricing, subscribing to SAP Build Apps, migration and activation, development, and integration with SAP Build Apps. The [features](#) and capabilities are explained there in depth.

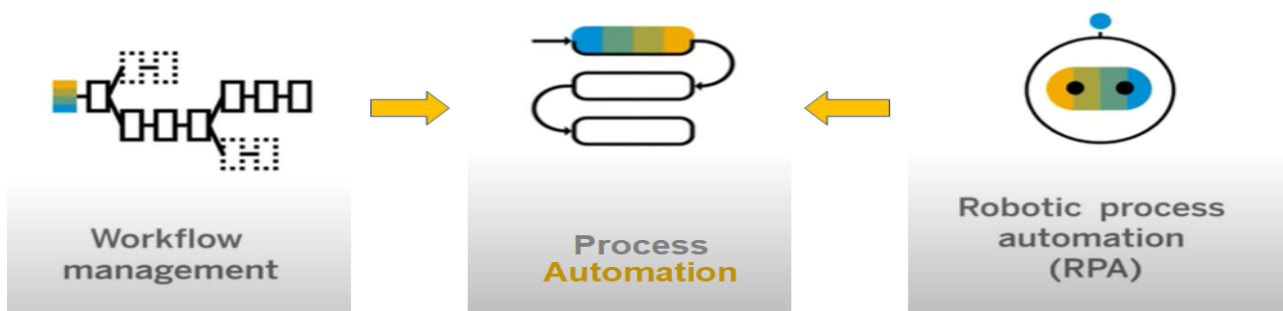
On this [page](#), you'll find news, best practices, and enablement resources. Join us and connect with peers and experts.

SAP Build Apps Free Tier has three offerings discussed [here](#) in detail.

5.6.3 SAP Build Process Automation

SAP Build Process Automation enables everyone, no matter the skill level, to automate processes and tasks with drag-and-drop simplicity. This is an SAP BTP service. A general product overview can be found [here](#).

We have SAP Build Process Automation for our citizen developers to create solutions that adapt, improve, and innovate business processes with no-code workflow management and robotic process automation capabilities. The features, setup, limitations, and development can be found in this [guide](#).



The above picture describes the consolidation of workflow management and Robotic process automation into Process Automation. This is documented in the [beginner series](#) blog.

To ensure all customers can benefit from our latest innovations, and as functional parity is available between SAP Intelligent Robotic Process Automation and SAP Build Process Automation, we have deprecated SAP Intelligent Robotic Process Automation.

Refer to this [transition guide](#) for migration of SAP IRPA to SAP Process Automation

As this is a unified environment, you can move your automation from SAP Intelligent RPA to SAP Process Automation. Reference can be made to these blogs concerning the migration [MOVE NOW](#) and [Changes moving from IRPA to process automation](#).

If you are wondering where to start, we have a couple of options for you:

Explore the learning Journey [low-code/no-code applications and automation for citizen developers](#)

Additionally, we have a series of blogs to [Get Started with SAP Process Automation Series](#), which beautifully covers different capabilities of SAP Process Automation.

Subscribing to SAP Process Automation

SAP Build Process Automation is now available to try free of charge on the SAP BTP free tier. You can follow this step-by-step guide to create a BTP free tier account and then activate SAP Process Automation in your free tier account.

For our partner, we recommend visiting this page concerning the available offerings on licensing: <https://partneredge.sap.com/en/partnership/licenses.html>

“Become part of this community to take advantage of great learning opportunities, stay informed about events, and connect with other SAP Builders to exchange ideas, ask questions, and celebrate success! The SAP Build portfolio is now included in the RISE with SAP and GROW with SAP offerings! Learn how to activate the SAP Build packages [here](#).” From <https://community.sap.com/topics/low-code-no-code>

5.6.4 SAP Build Work Zone

“SAP Build Work Zone is part of the new SAP Build portfolio. SAP Build Work Zone unifies SAP Launchpad service and SAP Work Zone into a single offering empowering business users to build & publish business sites.” ([Transition from SAP Enterprise Portal to the Cloud](#))

It is offered in two editions: standard edition (formerly known as SAP Launchpad service) and advanced edition (formerly known as SAP Work Zone).

- For SAP Build Work Zone, advanced edition, visit this product [page](#)
- For SAP Build Work Zone, standard edition, visit this product [page](#)

This IDP highlights the migration and implementation considerations [SAP SuccessFactors Work Zone: Migration and Implementation Considerations](#) also for developing and extending content with Work Zone refer to this IDP [SAP SuccessFactors Work Zone: Developing and Extending Content \(Updated\)](#)

Visit our community page for the latest news, learning offerings, and more on this topic: <https://community.sap.com/topics/work-zone>

5.7 Extending SuccessFactors using SAP Cloud Application Programming Model (CAP)

SAP CAP stands for SAP Cloud Application Programming Model. It is a framework provided by SAP for developing cloud-native business applications on the SAP Business Technology Platform. SAP CAP enables developers to build scalable and modular applications using a combination of programming languages, such as JavaScript and Java, along with declarative modeling and service annotations. It integrates with various SAP services and tools, allowing developers to quickly create and deploy applications that leverage SAP's enterprise capabilities.

The following link is a tutorial to extend SAP SuccessFactors using the SAP Cloud Application Programming Model (CAP). It uses the Business Application Studio as an IDE. It is a good starting point to make yourself familiar with the different BTP services in the context of building SAP SuccessFactors extension:

[Extend SAP SuccessFactors on SAP BTP with the SAP Cloud Application Programming Model \(CAP\) | Tutorials for SAP Developers](#)

Feel free to use [CAP Docs](#) to learn more and explore the [SAP community page](#) if you have any questions.

5.8 Permission Handling

In this chapter, we would like to explain the overall permission handling of a BTP application integrated with SAP SuccessFactors and authenticated via the Identity Authentication Service (IAS). IAS will be the identity provider (IDP) in this scenario.

We will talk about Users (also called identities in the context of the identity provider) and how they get provisioned into the different systems from SAP SuccessFactors.

We will explain the concept of user authentication in IAS and how user attributes can be transferred to the application after login using the SAML assertion. We will also mention how user attributes or groups from IAS can also be used to automatically assign permission in BTP to a user.

Finally, we will talk about the permission models in SAP SuccessFactors and BTP individually and how hybrid permission models can be realized.

Please note that some of the features explained here are not available as part of the SAP Cloud Platform Identity Authentication Service bundled with SAP SuccessFactors and might need an additional license on the customer side. The bundled license does not allow a configuration of a 3rd party customer or partner application in IAS, nor does it allow the use of IPS for managing users or groups for your application. See the [SAP SuccessFactors HXM Suite Supplemental Terms and Conditions](#) in section 2.3. As a result, you or your customer must configure the application for SSO in SAP SuccessFactors (not in IAS) in case you want to avoid additional licenses are needed.

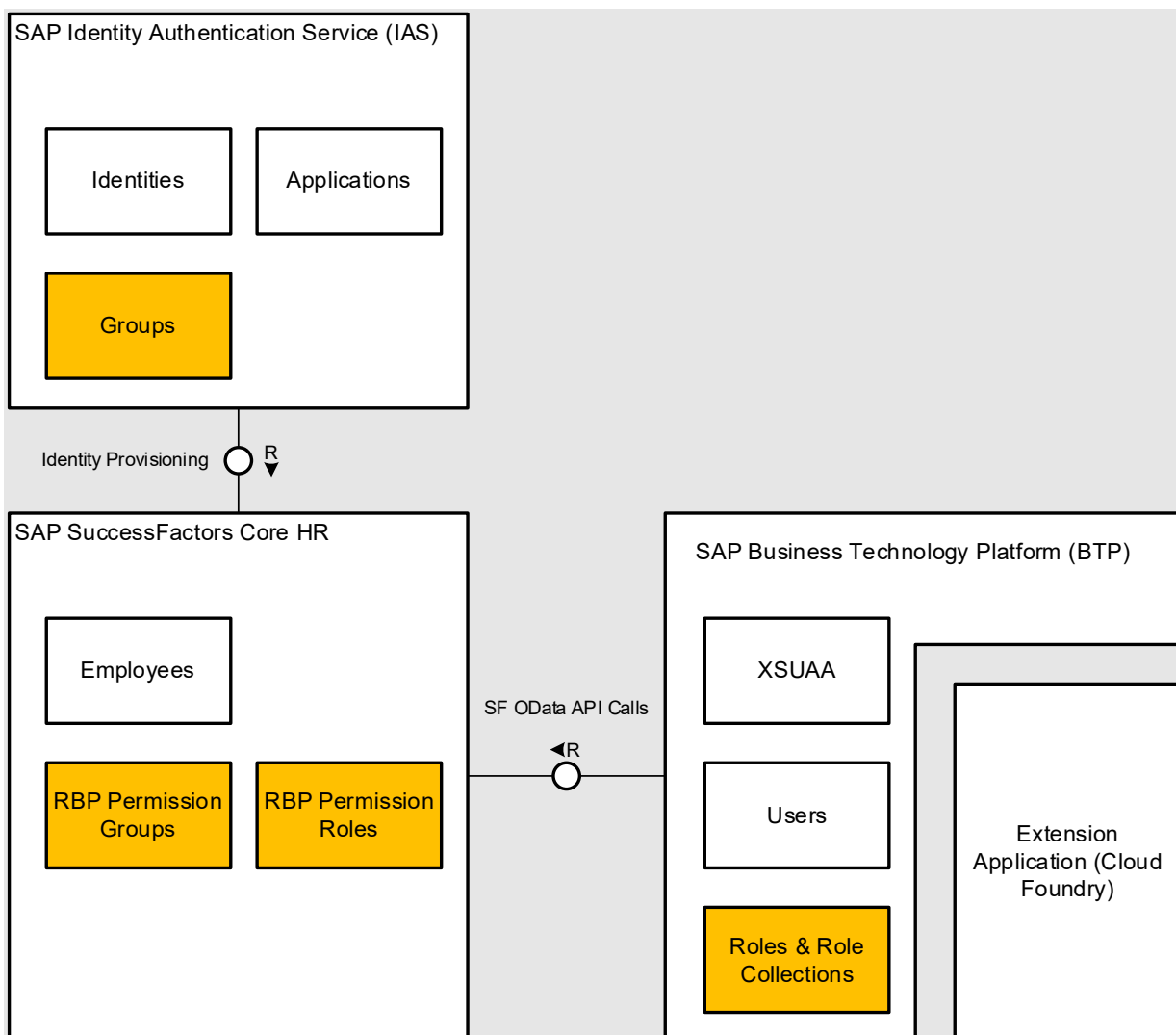


Figure 35: Simplified Block Diagram of an Extension Application based on Cloud Foundry connecting to SAP SuccessFactors

5.8.1 Identity Provisioning

Before users can access any application, they must be created in all needed systems. The process of automating this user creation is called Identity Provisioning. Identity provisioning takes a created user from a source system and copies it based on defined rules to a set of target systems. SAP offers this capability as part of the Identity Provisioning Service (IPS). It is closely integrated with the Identity Authentication Service (IAS), which is responsible for managing the authentication of users by providing a corresponding login screen that validates the identity of the login user using, for example, a username and a password.

In addition, Identity Provisioning can also take care of creating permission groups or assigning permission groups to users to automate the permission management process further.

Figure 35 shows a typical system landscape for a customer running a partner extensions application on Cloud Foundry (CF) in the SAP Business Technology Platform (BTP). Employees are hired in SAP SuccessFactors, and the Identity Provisioning Service (IPS) replicates those into the Identity Authentication Service using [transformations](#). When accessing the partner application on BTP, the users are authenticated against the IDP (in our example above IAS), and a User entity might be created in BTP in case it does not exist yet (see [here](#) how to configure/disable this creation if shadow users). An alternative to the automatic creation of the Shadow User by BTP is to use IPS for this, as explained in the IPS [documentation](#). This allows the customer to control much better which users get created in the BTP Subaccount and what role collections they get assigned to³.

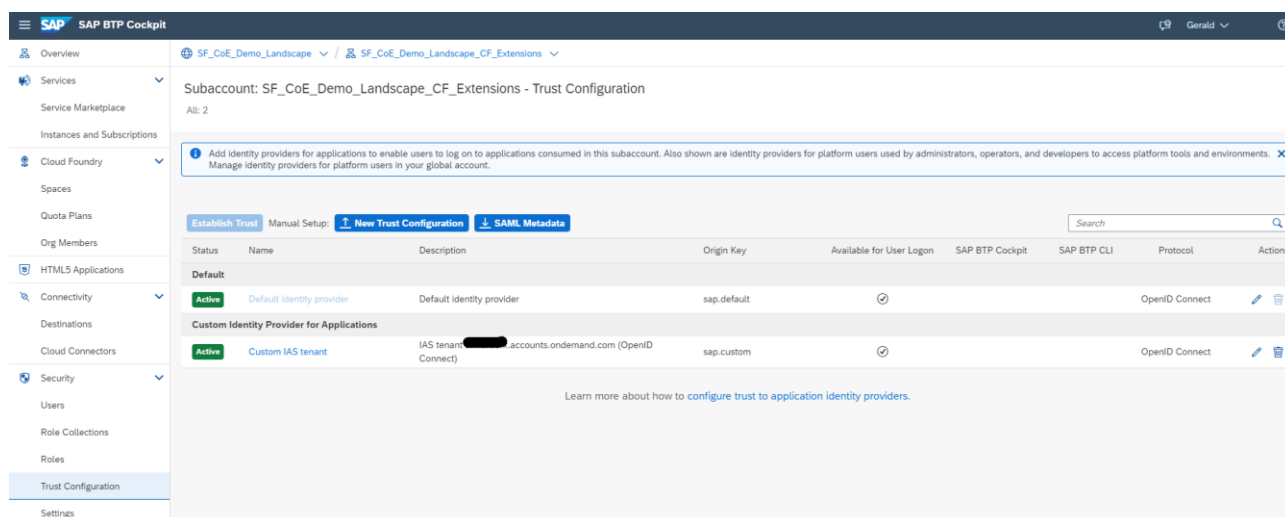


Figure 36: Configuring a custom identity provider in BTP in the Trust Configuration.

5.8.2 Identity Authentication in IAS

When users are present in different systems (SF, BTP, and IAS), their authentication can be managed. This means what user is allowed to access the application at all and what authentication method he must use (e.g., Two Factor Authentication - 2FA). The risk-based authentication configuration of the application in IAS can be used to achieve this.³ Based on different criteria, IAS can deny or allow access to the application based, for example, on the assignment of the user to a group, his IP address, or his user type.

³ The customer will need an additional license for IAS in case of a custom or 3rd party application since this is not included in the bundled version coming with SAP SuccessFactors, see chapter 2.3 in this [SAP SuccessFactors contract supplement](#).

Figure 37: IAS Configuration for Risk-Based Authentication using User Groups and other criteria.

Assignments between the group and the user can either be done manually in IAS or automatically by using an IPS transformation, which assigns groups based on user attributes. This [KBA](#) and this [help page](#) explain this transformation, and this [blog](#) gives a good step-by-step guide using a real-world example. Note that this automatic assignment is not possible in the case of self-registered users (<https://answers.sap.com/questions/13646449/can-we-automatically-assign-user-group-to-publicly.html>).

If your application needs some of the attributes from the user, e.g., the group assignment, it can also be sent via the SAML assertion. You can use the SAML attribute configuration for your application in IAS for this³: <https://help.sap.com/docs/identity-authentication/identity-authentication/configure-default-attributes-sent-to-application?locale=en-US>.

In case of questions about IAS or IPS, we recommend using the [official documentation](#) first, but also our partner community, which offers a special section with experts for all Identity service-related questions: [IAS / IPS | SAP Community](#)

5.8.3 Authorization in SAP SuccessFactors and BTP

Figure 35 shows all objects in the landscape with an orange filling that holds permission information. IAS user groups can be used to define the authentication behavior of your application, including denying access completely. The roles and role collections in BTP can be used to control the permission behavior in your application on a much finer granularity. This includes the operation (create, update, read, or delete) and the entity access. See also additional reference below for details.

While groups in IAS can be used to decide on authentications, groups and user attributes from IAS can also be used to automatically assign the right role collection in BTP to a user. This blog describes this nice end-to-end based on a cloud foundry example application: <https://blogs.sap.com/2022/08/26/sap-btp-security-how-to-handle-authorization-and-attributes-2-with-xsuaa-and-ias/>. With an automatic configuration like this the permission maintenance effort for customers can be kept quite low.

When the SuccessFactors tenant is accessed for a BTP application (or any other application running on a different platform), the SuccessFactors Role Based Permission Model (RBP) is applied for the API calls. This means the user used to call the APIs can only see the data he is allowed to see based on the assigned permissions. Within SAP SuccessFactors, Dynamic Groups are used to keep the maintenance effort for the permission assignment low. Dynamic groups are based on a user attribute filter, which automatically includes or excludes employees based on their data, e.g., position or job title. The Dynamic Group allows automatic assignment of permissions via permissions roles. Permission roles combine the “Who is allowed” (which can be a dynamic group) with the “What is allowed”, the final permission. For more details on the SuccessFactors

Roles Based Permission model, check the official [help](#) documentation, or for a quick overview, check this [SAP insider article](#). In case of questions, feel free to use the SAP SuccessFactors partner community for the platform topics: [SAP SuccessFactors Platform](#) | [SAP Community](#)

As a developer of an application, you must ensure that your application has the right permissions assigned in all those systems. Usually, this is part of your application setup or configuration guide. This guide must explain what SuccessFactors permission is needed based on the API you call and what additional parameters and groups your application would require from the IAS configuration (if any). The major part of your permission handling will happen inside your application with the help of a service called XSUAA. XSUAA is the abbreviation for eXtended Service for User Authentication and Authorization. This service knows that the extension application uses the IAS (or SF) as the IDP based on the trust configuration of BTP shown in Figure 36. This blog explains the central role of XSUAA in Cloud Foundry in detail: <https://blogs.sap.com/2020/08/20/demystifying-xsuaa-in-sap-cloud-foundry/>

Additional References

- Implementation [Best Practices for Role-based Permissions](#) in SAP SuccessFactors:
- [Role-based Permission \(RBP\) API](#) Documentation:
- [Permission handling](#) in the Cloud Application Programming Model:
- [Authentication and Authorization in BTP](#)

5.8.4 Hybrid Permission Models

As we can see from the previous chapter, each platform provides its own permission model, user stores, and groups. This is the case for SAP SuccessFactors as well as for SAP BTP. When building an application to extend SAP SuccessFactors, the API calls are protected by the SuccessFactors permission model, and the application data stored in BTP is protected by the BTP roles and role collections.

In some cases, you might want to avoid using a 2nd permissions model and re-use the SuccessFactors permission model instead. Reusing the SuccessFactors permission model is an interesting approach to avoid double maintenance for permissions or improve the usability of the application by not allowing certain operations instead of return errors due to failed permission checks. An example of this is a BTP application that allows an admin to change the data of multiple employees in a table. Without reusing the permission model from SuccessFactors, we would either have to implement another one in BTP or rely on the permission checks in the APIs. The APIs are called after all the data has been entered already, and the user will lose his data if he does not have permission. A better approach would be, in this case, to check the permission first and don't allow to edit.

In order to achieve this hybrid approach where BTP checks the SuccessFactors permissions, the SuccessFactors RBP APIs can be used. Security vulnerabilities can be avoided by using a special API user in the backend to call those APIs and not using the business user using the application to call the RBP APIs.

It is also important to mention here that some of the SuccessFactors APIs only have admin permissions and hence would require an additional layer of security checks in the BTP application to avoid any security concerns when being used in a normal user context.

This [blog](#) explains such a hybrid use case and the APIs available to implement them:

6 ASSUMPTIONS AND EXCLUSIONS

Throughout this document, we provided examples and recommendations for building SAP SuccessFactors extensions based on SAP SuccessFactors and BTP technologies and services. Some of the concepts and solutions also apply to extensions built with other technologies, e.g., consuming SAP SuccessFactors APIs or configuring Single-Sign-On (SSO) etc.

7 REFERENCES

Those are all the documents like IDPs, ALPs, implementation guides/handbooks, KBAs, and SAP Blogs that have a direct mention in any section of the document. In some cases (ALPs), we also listed additional references.

SAP Help Portal

- [SAP SuccessFactors Platform – Development](#)
- [SAP SuccessFactors Platform – Integration and Security](#)
- [SAP Build Apps](#)
- [SAP Build Process Automation](#)
- [SAP Business Technology Platform](#)
- [SAP Business Technology Platform - Basic Platform Concepts](#)
- [SAP Business Technology Platform - Best Practices for SAP BTP](#)
- [SAP Business Technology Platform – Entitlements and Quotas](#)
- [SAP Business Technology Platform – Trial Accounts and Free Tier](#)
- [SAP Business Technology Platform – Extensions](#)
- [SAP Business Technology Platform – Managing Authentication and Authorization](#)
- [SAP Business Technology Platform - Register the Assertion Consumer Service of the Subaccount in SAP BTP in SAP SuccessFactors](#)
- [SAP Business Technology Platform – Configure SAP SuccessFactors as a Trusted Identity Provider in SAP BTP](#)
- [SAP SuccessFactors Platform - Configuring Action Search](#)
- [SAP SuccessFactors Employee Central - Human Resource Information System \(HRIS\) Synchronization](#)
- [SAP SuccessFactors Platform - Data Model Navigator](#)
- [SAP SuccessFactors Platform - Data Inspector](#)
- [SAP SuccessFactors Platform - OData API Data Dictionary](#)
- [SAP SuccessFactors Platform - Execution Manager](#)
- [SAP SuccessFactors Platform - Business Configuration UI](#)
- [SAP SuccessFactors Platform - Security Center](#)
- [SAP SuccessFactors Platform - Integration Center](#)
- [SAP SuccessFactors Platform – Using Role-Based Permissions](#)
- [SAP SuccessFactors Platform – Implementing the Metadata Framework \(MDF\)](#)
- [SAP SuccessFactors Platform – Implementing and Managing Intelligent Services](#)
- [SAP SuccessFactors Recruiting – Manage Templates](#)
- [SAP SuccessFactors Performance and Goals - Configuring Form Templates in Admin Center](#)
- [SAP SuccessFactors Platform - Managing and Using Proxy Assignments](#)
- [SAP SuccessFactors Best Practice Content](#)
- [SAP SuccessFactors Employee Central - Triggering Workflows](#)
- [SAP SuccessFactors Platform - Implementing Role-Based Permissions](#)
- [SAP SuccessFactors API Reference Guide \(OData V2\)](#)

- [SAP SuccessFactors API Reference Guide \(OData V4\)](#)
- [SAP SuccessFactors API Reference Guide \(OData V2\) - Theming](#)
- [SAP SuccessFactors API Reference Guide \(OData V2\) - Workflow pending data](#)
- [SAP SuccessFactors API Reference Guide \(OData V2\) - Role Based Permission \(RBP\)](#)
- [SAP SuccessFactors API Reference Guide \(OData V2\) - OData \\$metadata](#)
- [SAP SuccessFactors API Reference Guide \(OData V2\) – API Center](#)
- [SAP SuccessFactors API Reference Guide \(OData V2\) – Enabling Audit Logs](#)
- [Employee Central Compound Employee API](#)
- [SAP SuccessFactors Platform - Managing Custom Cards on the Home Page](#)
- [SAP SuccessFactors Platform - Managing Custom Navigation Links](#)
- [SAP SuccessFactors Platform – Using Deep Links](#)
- [SAP SuccessFactors Platform – Configure People Profile - Deep Links to Blocks](#)
- [SAP SuccessFactors Mobile - Navigational Deep Link supported URLs](#)
- [SAP Build Work Zone, advanced edition](#)
- [SAP Cloud Identity Services - Identity Provisioning - Transformations](#)
- [SAP Cloud Identity Services - Identity Provisioning - SAP BTP XS Advanced UAA \(Cloud Foundry\)](#)
- [SAP Cloud Identity Services - Identity Provisioning - Configure the Default Attributes Sent to the Application.](#)
- [SAP Business Technology Platform - Switch Off Automatic Creation of Shadow Users](#)
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- [SAP Build Work Zone, standard edition](#)
- [SAP Intelligent Robotic Process Automation – Transition Guide](#)
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SAP Notes/KBA

- [SuccessFactors - Outbound SSO to 3rd Party](#)
- [KBA 2089448 - SuccessFactors Datacenter Name, Location, Production Login URL, Production Domain Name, External mail Server details and External mail Server IPs](#)
- [KBA 2087311 - Proxy Management and Proxy Now - SuccessFactors HXM Suite](#)
- [KBA 2984603 - How to auto-assign source system user to specific group in target system](#)
- [KBA 3141692 - How to provide API Audit Logs to Cloud Support - SuccessFactors API](#)
- [KBA 2209703 - How to check and understand OData API Audit Logs - SuccessFactors OData API](#)
- [KBA 3153985 - Deprecation of the SuccessFactors Extensions from Extension Center UI.](#)
- [KBA 2441407 - \[SSO\] SuccessFactors - Outbound SSO to 3rd Party Guide and Support Scope](#)
- [KBA 3063887 - Best Practices for creating Event Based Integration via Intelligent Services Center \(ISC\) and Integration Center \(IC\)](#)
- [KBA 3138533 - How to use SuccessFactors API Audit Log to determine authentication methods used in your environment](#)
- [KBA 2613670 - What are the available APIs for SuccessFactors?](#)

SAP Blogs and SAP News

- [Blog Series - Extend SAP SuccessFactors on SAP BTP with CAP](#)
- [One-Stop shop mission for SAP SuccessFactors Software Partners](#)
- [SAP Updates Pricing Structure of SAP Store to Make It Easier for Partners to Build and Commercialize Solutions for SAP Customers](#)
- [SuccessFactors: Employee Central – Role based permissions](#)
- [How to use the SAP SuccessFactors Theming APIs to adapt your Extension Application](#)
- [SAP Launchpad service and SAP Work Zone: Frequently Asked Questions | SAP Blogs](#)
- [SAP SuccessFactors HXM Suite Supplemental Terms and Conditions](#)
- [Group Assignments Based on User Attributes – a Flexible Solution for Managing Conditional & Risk-Based Authentication and Much More](#)
- [SAP BTP Security: How to handle Authorization and Attributes \[2\] with XSUAA and IAS](#)
- [Demystify SAP SuccessFactors Role Based Permission APIs](#)
- [Demystifying XSUAA in SAP Cloud Foundry](#)
- [Best Practices for Role based Permissions](#)
- [SAP Process Automation Beginner Series](#)
- [SAP Build is out!](#)
- [SAP Business Technology Platform Free Tier & Trial Environment](#)
- [SAP SuccessFactors Integration Tools](#)
- [SuccessFactors Integrations Beginners Guide- API Center](#)
- [SuccessFactors Intelligent Services Center \(ISC\) & Integration Center \(IC\): Replacement of 3rd Party middleware to trigger simple interfaces from Employee Central](#)

Implementation Design Principle Documents

- [SAP SuccessFactors Integration: Best Practices using SAP SuccessFactors APIs for Custom Integrations](#)
- [SAP SuccessFactors Employee Data: Integration Best Practices and Considerations](#)
- [SAP SuccessFactors Integration: Migrating SAP SuccessFactors API calls from Basic Authentication to OAuth2.0](#)
- [SAP SuccessFactors Integration: Integration Center and Cloud Integration](#)
- [SAP SuccessFactors Work Zone: Migration and Implementation considerations](#)
- [SAP SuccessFactors Work Zone: Developing and Extending Content](#)

Architectural Leading Practices (ALP)

- [Architectural Leading Practice- SAP SuccessFactors Permission Framework](#)
- [Architectural Leading Practice- SAP SuccessFactors Integration Strategy](#)
- [Architectural Leading Practice- SAP SuccessFactors Instance Strategy](#)
- [Architectural Leading Practice- SAP SuccessFactors Test Strategy](#)

Learnings/Missions/Tutorials/Other Pages

- [Learning for SAP SuccessFactors Products](#)
- [SAP SuccessFactors Learning Journeys for Consultants](#)
- [SAP SuccessFactors Implementation Training & Certification Path](#)
- [Explore SAP SuccessFactors Solutions \(including click-through demo\)](#)

- [SAP SuccessFactors Demo Book](#)
- [Extend SAP SuccessFactors on SAP BTP with the SAP Cloud Application Programming Model \(CAP\) | Tutorials for SAP Developers](#)
- [SAP Cloud Application Programming Model \(CAP\) Documentation](#)
- [The SAP SuccessFactors Role-Based Permissions Framework](#)
- [Getting Started With Low-Code / No-Code and SAP Build](#)
- [Code/No-Code Applications and Automations for Citizen Developers](#)

Communities

- [SAP SuccessFactors HXM Partner Groups](#)
- [SAP SuccessFactors Platform Partner Groups](#)
- [SAP SuccessFactors Partner Group for APIs and Integrations](#)
- [SAP Business Technology Platform Partner Groups](#)
- [Implementation Design Principle Documents for SAP SuccessFactors Solutions](#)

Services (free of charge and commercial)

- [SAP BTP Coaching Services](#)
- [Co-Innovated with SAP](#)

Partner Edge Portal and Tools

- [Become a SAP Build Partner](#)
- [Manage your SAP SuccessFactors tenants - SAP SuccessFactors HXM Cloud Ops Portal](#)
- [Human Capital Management – Product Overview](#)
- [SAP Content Discovery \(Demos\)](#)
- [SAP Business Accelerator Hub](#)

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