Master Guide
SAP NetWeaver Composition Environment 7.1

Target Audience
- System administrators
- Technology consultants

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<td>1.10</td>
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<td>SR5 Chapter 3.2 contains the new section <em>Integrating Applications into an SAP NetWeaver Portal</em>. Chapters 2.1 and 3.2 make it clear that only the producer capabilities of the Portal are supported in SAP NetWeaver CE and not the consumer capabilities.</td>
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</table>
# Table of Contents

**Chapter 1**

About This Document ........................................... 5

**Chapter 2**

Introduction ..................................................... 7

**Chapter 3**

System Landscape ................................................ 11
  3.1 Planning Your Landscape ................................... 11
  3.2 Use Cases .................................................. 11
  3.3 Implementation of SAP NetWeaver Composition Environment .... 16
1 About This Document

This document explains how to plan an SAP NetWeaver Composition Environment system. For more information about SAP NetWeaver Composition Environment, see http://sdn.sap.com/irj/sdn/nw-ce.
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2 Introduction

Overview
SAP NetWeaver Composition Environment is a platform for building and running applications based on Service-Oriented Architecture (SOA) principles. It offers a set of capabilities for integrating new and existing services (from SAP as well as proprietary services), into business-specific solutions. You can develop portable, standard-compliant applications based on the latest Java Enterprise Edition (Java EE) 5 technologies and integrate them in existing SAP and third-party solutions using a central enterprise service registry. SAP NetWeaver CE increases development productivity by providing model-driven composition tools for creating services and user interfaces and orchestrating them into collaborative user-centric workflows.

Enabling SOA
To enable SOA development, SAP NetWeaver CE provides the following key capabilities:

- **A lean and robust application server based on the latest Java EE 5 technology**
  With the Java EE 5 certified application server that SAP provides, you can develop Java EE applications based on the latest Java EE standard as well as migrate existing JEE applications. The application server offers full support of the latest Java EE 5 features, updates, and adjustments for simplifying the development of enterprise applications such as JEB 3.0, the new JSF 1.2, the new Java Persistency API 1.0, the updated Web services stack, among others. It provides an implementation of the Service Data Objects (SDO) 2.1 standard simplifying data programming for applications and frameworks, support for development of standard-based portlets, and a job scheduler implementation. With the Java Connector Architecture (JCA) 1.5 and full Java EE 5 Web Services support, it enables connectivity to SAP and non-SAP back ends and services. In addition to being standard-based, the application server in SAP NetWeaver CE comprises features for ensuring its robustness, scalability, and supportability such as configurable session failover support, built-in load balancing support, fast and robust shared memory based on request handling, and robust monitoring and unique supportability of nonfunctional problems based on SAP’s own Java VM features.

- **An integrated environment for Java application development**
  The SAP NetWeaver Developer Studio is SAP’s Integrated Development Environment (IDE) for Java and is based on the open-source tools framework Eclipse 3.3. With the SAP NetWeaver Developer Studio, you can develop Java EE 5 applications from scratch using the built-in support for new technologies such as EJB 3.0 and JSF 1.2. In addition, the integration with the service registry in SAP NetWeaver CE enables you to browse and consume services in the applications you create.

- **Model-driven tools for increased development productivity**
SAP NetWeaver CE provides a set of model-driven tools for creating user interfaces and composing services that simplify development and increase productivity significantly. With Visual Composer you can model transactional and analytical user interfaces that can easily be integrated into the user interaction layer of a composite. The tool offers a graphical interface that is suitable for business users as well. Using Web Dynpro in SAP NetWeaver CE, you can build complex user interfaces and data-driven applications while benefiting from graphical tools and code generation that speeds up the development process. Web Dynpro clearly separates business and display logic, and allows user interaction with back-end systems using enterprise services. The Composite Application Framework (CAF) design time integrated into the SAP NetWeaver Developer Studio enables model-driven development of composite applications on top of existing enterprise services.

Service orchestration into user-centric collaborative workflows by means of reusable building blocks

The services and applications that you create are typically transactional and apply to certain use cases. You can add more flexibility and innovation to your solutions by integrating them into collaborative workflows that address enterprise-specific business processes. SAP NetWeaver CE provides Guided Procedures as a framework for designing and running user-centric lightweight processes. It enables you to create reusable workflow building blocks that can be integrated in multiple custom solutions.

UDDI-based service registry for service provisioning and discovery

To enable end-to-end SOA development, SAP NetWeaver CE offers a UDDI v3-based service registry where providers can publish service endpoints, definitions and associated metadata, and consumers can discover the appropriate services for their scenarios. The registry provides capabilities for classifying and browsing services using semantic-rich classification systems.

User interaction by a lightweight portal

All Java and composite applications that you develop on top of SAP NetWeaver CE can be integrated and made available in the lightweight portal provided with the stack. It offers a unified user experience and a single access point for end users.
**Interoperability with SAP Products**

SAP NetWeaver CE is a platform specifically designed to enable application development on top of other solutions such as SAP ERP 6.0. Using the services that this solution provides, you can leverage all existing business logic and data while modeling new solutions to meet the specific requirements of your business.

If you have an SAP NetWeaver 7.0 environment set up, you can also leverage other capabilities offered with it. For example:

- You can connect to an SAP NetWeaver Developer Infrastructure (NWDI) and utilize it for the lifecycle management of the applications you build on SAP NetWeaver CE.
- Using the federated portal network or application integration capabilities in SAP NetWeaver CE, you can integrate your composite applications into an existing SAP NetWeaver 7.0 runtime environment. Note that a portal running on SAP NetWeaver CE can function as a producer portal only; hence, consumer capabilities are not supported.
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3 System Landscape

3.1 Planning Your Landscape

This section gives you an overview of the steps required to identify your technical system landscape for SAP NetWeaver CE:

1. You determine the use case of SAP NetWeaver CE you want to implement.
2. You determine the components of SAP NetWeaver CE you want to install.
3. You determine your system landscape; that is, you decide how many systems you require and how you want to use each of these systems.
4. Considering the hardware requirements, you map the required SAP NetWeaver CE systems to hosts.

3.2 Use Cases

You can set up your SAP NetWeaver CE differently according to the use case you wish to enable. For example, to implement a landscape for development, testing, or production purposes, you need to fulfill different requirements and the system landscape is specific to each of these cases.

The following graphic provides an overview of possible SAP NetWeaver CE system landscapes.
You can install SAP NetWeaver CE as:

- **Development Edition**
  With the development edition, you can set up a system that has at least one Application Server Java (AS Java) and an SAP NetWeaver Developer Studio. The AS Java can be installed as dedicated server or together with the Developer Studio on one workstation.

- **Productive Edition**
  The productive edition is designed to provide optimal performance to run applications and offers more security, scalability, and availability features than a development system.

### Components
You can choose between the following installation components:

- **Application Server Java**
  You use this component to develop applications based on Enterprise Edition (Java EE) technology. With this component, you can:
    - Develop a Java EE compliant application
      Focus on developing open standards-based Java EE applications in the SAP NetWeaver Developer Studio and running them on the Java EE 5-certified SAP NetWeaver Application Server.
    - Develop user interfaces with Web Dynpro for Java
      Focus on developing professional user interfaces using SAP’s highly productive, model-driven Web Dynpro technology.
**Composition Platform**

You use this component for fast and easy composite application development, SAP provides a tool set for model-driven user interface development, service composition, and process orchestration. They comprise the design-time tools, methodologies, and runtime environment required for building and executing composites. By using these capabilities, you can:

- Create services that can use data from legacy or third-party systems with the Composite Application Framework (CAF).
- Implement service orchestration with Guided Procedures (GP) as collaborative business processes.
- Model user interfaces and integrate them into composites using Visual Composer.

The Composition Platform component contains the Java Application Server component.

**Adobe Document Services**

You use this component to develop application that use Adobe forms, online or offline. Adobe Document Services requires the Application Server Java component.

**Voice**

You use this component to develop applications that allow customers and employees to interactively access SAP or non-SAP solutions from a telephone. Internet connectivity or special mobile devices are not required. Voice is a development and runtime environment for creating and deploying these voice applications.

Voice requires the Application Server Java and Composition Platform component.

**IDE Update Site**

You use this component when you use SAP NetWeaver CE AS Java in development mode with several Developer Studio installations. An update site contains all features for the Developer Studio. You can initiate a check for updates or additional features in the Developer Studio and install them when available. The update site component mirrors the SAP Developer Studio update site on the Service Market Place. You can have several AS Java systems in your landscape but only one AS Java can contain an update site.

The update site requires the Application Server Java component.

**Planning Development Systems**

To implement a development system, you have the following options:

- You set up a *developer workplace* on each host.
  - You can install the Application Server Java (AS Java) in development mode together with the SAP NetWeaver Developer Studio on a single host.
  - Setting up the AS Java in development mode does not require specific infrastructure settings (such as setting up special users or shares) and saves hardware resources. It includes installation of a single server instance (with multiple server nodes possible).
  - You have to implement a developer workplace installation on Windows 32-bit operating systems, since the Developer Studio is available only for this platform. To implement this scenario, use the installation option *Development Edition*. 
You install an AS Java centrally and Developer Studio instances on each developer host. This option is recommended for large development projects, as it offers better scalability and requires less hardware resources per developer host. In this landscape scenario you can set up an AS Java in development or productive mode centrally (either on 64-bit Windows or Linux operating system) and connect to it from the other hosts in the landscape using the Developer Studio. We recommend to install the IDE Update Site component on the AS Java.

For each option, you can install the additional components Composition Platform, Adobe Document Services, or Voice.

**Planning Productive Systems**
To implement a productive system, you install an AS Java server on a 64-bit Windows or Linux operating system by using the installation option *Productive Edition*. Compared to a development system, the productive system offers the following enhancements:

- **Clustering**
  You can scale your system both by installing additional application server instances and by adding more server nodes to each instance.
  In a cluster environment, the installation creates additional SAP system users and shares. The \sapmnt share, which holds global and local (instance-specific) data, is available on the global server host. At server startup all instances synchronize their binaries with the ones available on the global share. Local data for each individual instance is stored in the \saploc share on the relevant local host.

- **Enhanced security**
  In a productive system the number of unsuccessful user attempts to log on is limited to six. Afterwards the user is locked. In addition, password expiry is enabled.

- **Resource consumption**
  The focus of the productive system is on the system runtime performance, so the default memory settings for certain Java Virtual Machine (JVM) parameters, such as permanent size and heap size, are higher than those for a development system. In addition, some design-time applications in the portal are disabled to save resources for those required for the runtime.

**Using a Development Infrastructure**
For team development and version control, you can use a development infrastructure together with your SAP NetWeaver CE systems. SAP NetWeaver CE supports the following scenarios:

- You use an existing SAP NetWeaver Development Infrastructure (NWDI) installed as a part of SAP NetWeaver 7.0. Using NWDI ensures seamless integration with the SAP NetWeaver CE capabilities.
- You use a non-SAP development environment and connect to it using the Developer Studio in SAP NetWeaver CE. You are flexible to choose a development and production infrastructure of your preference and use the CE development capabilities to implement your projects.
When you use a development infrastructure you have to install the Developer Studio feature SAP NetWeaver Developer Studio Development Infrastructure Client.

### Connecting to Back-end Systems

With the SAP NetWeaver CE you have the possibility to integrate and use a back-end system in the following scenarios:

- **You access data residing on a back-end system.**
  
  You can reuse existing data in the applications that you build on top of SAP NetWeaver CE. For example, if you wish to use data residing in an SAP ERP system, you can use the enterprise SOA capabilities (in SAP ERP 2005 systems based on SAP NetWeaver 7.0 Support Package Stack 9 or higher) or you can connect via Remote Function Calls (RFC) to older systems using the Java Connector (JCo) that is offered as a part of SAP NetWeaver CE.

- **You use enterprise services on an SAP or non-SAP back ends.**
  
  You can leverage the SOA capabilities of the SAP NetWeaver CE stack by consuming services provided by an SAP back-end system, such as SAP ERP 2005 (on SAP NetWeaver 7.0 SPS9 or higher), or the ES Workspace that you can access via the SAP Developer Network (SDN). In addition, you can consume services from a third-party back-end system using the standard-based Web service capabilities of the stack. The SAP NetWeaver CE installation includes an ES Registry that enables you to browse the registered service definitions.

- **You integrate your applications into an SAP NetWeaver Portal.**
  
  Once you create and run your applications on the SAP NetWeaver CE system, you can also enable their access from an SAP NetWeaver 7.0 Portal. To implement this scenario, you use the standard portal capabilities for integrating a Java application in an iView. Use the portal system landscape or portal APIs for back-end connectivity to BI composite and SAP transaction iViews only. Use Remote Function Calls (RFCs) and Web services, configured in the SAP NetWeaver Administrator (NWA), to enable back-end connectivity for other applications types, such as composite views and processes.

### Integrating Applications into an SAP NetWeaver Portal

Once you create and run your applications on the SAP NetWeaver CE system, you can use the standard portal capabilities for integrating a Java application in an iView.

- For back-end connectivity to BI composite and SAP transaction iViews, use the portal system landscape or portal APIs only.
- To enable back-end connectivity for other application types, such as composite views and processes, use Remote Function Calls (RFCs) and Web services, configured in SAP NetWeaver Administrator (NWA).

Optionally, once your applications are available in your local SAP NetWeaver CE system, you can enable their runtime access from a remote SAP NetWeaver 7.0 portal. You benefit by taking advantage of the advanced composition capabilities offered in SAP NetWeaver CE, while keeping your corporate portal in a stable and less frequently updated environment, ensuring a consistent end-user experience. To implement this scenario, do either of the following:

- Use the SAP Web Dynpro Java iView (Remote) template in the iView Wizard on the SAP NetWeaver 7.0 portal to integrate Web Dynpro Java applications running on the remote SAP NetWeaver CE system into local iViews.


- Set up a federated portal network between the SAP NetWeaver CE portal and the SAP NetWeaver 7.0 portal. This allows you to share content between distributed portal installations, both SAP and non-SAP, thus providing a single portal access point per user to portal information, services, and applications distributed on portals throughout the entire organizational network. Note that a portal running on SAP NetWeaver CE can function as a producer portal only; hence, consumer capabilities are not supported. Note that a portal running with SAP NetWeaver CE can function as a producer portal only; hence, consumer capabilities are not supported.


### 3.3 Implementation of SAP NetWeaver Composition Environment

To install the different use cases of SAP NetWeaver Composition Environment, refer to the corresponding documentation:

<table>
<thead>
<tr>
<th>Use Case</th>
<th>Documentation</th>
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<td>as Production Edition</td>
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## Typographic Conventions

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<td><code>&lt;Example&gt;</code></td>
<td>Angle brackets indicate that you replace these words or characters with appropriate entries to make entries in the system, for example, “Enter your <code>&lt;User Name&gt;</code>”.</td>
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<tr>
<td>Example → Example ↓</td>
<td>Arrows separating the parts of a navigation path, for example, menu options</td>
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<tr>
<td>Example</td>
<td>Emphasized words or expressions</td>
</tr>
<tr>
<td>Example</td>
<td>Words or characters that you enter in the system exactly as they appear in the documentation</td>
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<tr>
<td><code>http://www.sap.com</code></td>
<td>Textual cross-references to an internet address</td>
</tr>
<tr>
<td><code>/example</code></td>
<td>Quicklinks added to the internet address of a homepage to enable quick access to specific content on the Web</td>
</tr>
<tr>
<td><strong>123456</strong></td>
<td>Hyperlink to an SAP Note, for example, SAP Note <strong>123456</strong></td>
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| Example | - Words or characters quoted from the screen. These include field labels, screen titles, pushbutton labels, menu names, and menu options.  
  - Cross-references to other documentation or published works |
| Example | - Output on the screen following a user action, for example, messages  
  - Source code or syntax quoted directly from a program  
  - File and directory names and their paths, names of variables and parameters, and names of installation, upgrade, and database tools |
| EXAMPLE | Technical names of system objects. These include report names, program names, transaction codes, database table names, and key concepts of a programming language when they are surrounded by body text, for example, **SELECT** and **INCLUDE** |
| EXAMPLE | Keys on the keyboard |
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