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Integrating Adobe Interactive Forms in SAP Netweaver

Technology and Communication

2012

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ABSTRACT

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Title	Integrating Adobe Interactive Forms in SAP Netweaver
Year	2012
Language	English
Pages	50
Name of Supervisor	Dr. Ghodrat Moghadampour

Systems, Applications and Products in Data Processing (SAP), the leader in Enterprise Resource Planning Software (ERP) as a strategy is moving its technology into Virtualization. In light of that, this project utilized SAP Netweaver VMware edition which is licensed for developers to illustrate the integration of Adobe interactive forms.

SAP as a practice has installation notes for every solution, but they are not uniformly released. Thus technical consultants encounters compatibility challenges in installing, integrating and implementing SAP systems. For example, a technical support would read about twenty to thirty released notes (SAP Note) to install a solution with its patches. Something hitherto seems simple as Microsoft software, and this is no exaggeration.

So the goal of this project is to produce a detailed practical and non-duplicated document on how Adobe interactive forms can be integrated into Netweaver Application Servers in order to provide robust solutions to the inevitable hiccups confronting SAP developers in Marx Consulting.

Adobe Document Services, Adobe LiveCycle Designer

CONTENTS

LIST OF ABBREVIATIONS

ABAP	Advanced Business Application Programming
ADS	Adobe Document Services
ALD	Adobe LiveCycle Designer
ERP	Enterprise Resource Planning
GUI	Graphical User Interface
HTML	Hypertext Markup Language
IFbA	SAP Interactive Forms by Adobe
J2EE	Java 2 Platform Enterprise Edition
NAT	Network Address Translation
NWDS	Netweaver Developer Studio
PDF	Portable Document Format
SAP	Systems, Applications and Products in Data Processing
SLD	System Landscape Directory
SDN	SAP Developers Network
TCO	Total Cost of Ownership
URL	Uniform Resource Locator
T-Code	Transaction Code
XML	Extensible Markup Language

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1 INTRODUCTION

In today's intelligent digital documents world electronic forms offers a perfect clone of static printed materials and a promised of far greater rewards for enterprises. The advantages of using intelligent digital documents cannot be overemphasized enough, as they can be customized with application data specifically defined for the targeted recipients: results are forms that can be populated dynamically online or offline with adjustment possibilities. That is the level intelligent digital document technology of today points to: a completely digitized business documents workflow. The application of intelligent digital documents like *Adobe Interactive Forms* has unique advantages: for example, it enables companies to reduce the costs of storing, printing, producing paper brochures and other external materials crucial to meeting customers' needs etc. (SAP; AG, 2006). And, it is estimated that an average costs of paper to typical global enterprise is circa thirty million US dollars per year in materials and labor. (SAP, 2008; AG, 2006)

By placing intelligent digital documents relevant to their enterprise applications, businesses are now able to streamline their operational cost, at same time satisfying target audiences, ensuring their materials are accurate and current. This also gives them an edge above their competitors, whereby customer satisfaction is enhanced. All these are achieved without affecting the bottom-line, rather minimizes their total cost of ownership (TCO). Thus reducing greatly, time-consuming bureaucracy usually associated to large corporation business processes (AG, 2006).

These benefits of this high-intelligent document are now possible with the strategic collaboration of Adobe Systems and SAP. This collaboration ensures SAP customers to deploy fully automated digital forms called SAP Interactive Forms by Adobe (IFbA). Customers will not only be able to generate personalized forms directly from SAP ERP solutions, but also be able to enter new and updated data back into the system. With this new solution, most bottlenecks usually faced in traditional document processing by customers will be significantly reduced (Adobe, 2011; SAP, 2008; AG, 2006).

The key enabler of this technology is Adobe Portable Document Format (PDF): the standard for digital collaboration and document exchange worldwide. The ubiquitous PDF serves as a holder for dynamic Extensible Markup Language (XML) content that mirrors the recognized paper forms. The Result is an interactive digital document that clones its paper-based original, and contained dynamic data that is within SAP Application Server (; SAP, 2008; Dr. Michael Hahsler, 2004; AG, 2006).

Businesses can now embed their processes into intelligent documents that are delivered (online and offline), which exactly translates digitally the paper forms they represents. This empowers them to serve millions of internal and external users, providing users equipped with the free Adobe Reader to quickly complete an interactive form and in real-time return the data to SAP server. (SAP, 2008; Zeller, 2004; AG, 2006)

1.1 SAP Forms Roadmap

Going further, SAP has hinted that its forms strategy will be more IFbA focused. That means SAPscript and Smart Form developers would have to embrace IFbA as those becomes less used. Here is the official SAP position: "The SAP forms strategy is based on SAP Interactive Forms by Adobe (IFbA). This applies to both Print and Interactive forms. In this context, most Business Suite solutions have already been converted to the IFbA technology (more than 2300 forms), and new standard SAP forms will be created using IFbA instead of Smart Form or

SAPscript and Smart Forms shall continue to be supported in line with SAP's maintenance strategy, thereby ensuring the ability to protect existing customer investment" (Lax, 2008). Good thing is that ABAP developers are still going to be relevant though the Portal has given Java developers some distinct edge.

1.1.1 SAPscript

SAPscript is a legacy integrated User Interface (UI) tool for form printing and text input for SAP ERP applications. It customizes SAP provided documents or creating newer ones for printing. The following are advantages and disadvantages in using SAPscript:

Table 1: SAPscript

Advantages	Disadvantages
It is a popular tool because of its legacy advantage.	Limited features output - multiple page formats not possible.
It has many existing preconfigured form templates beneficial to customers.	Unfortunately, it is not user-friendly.
	Stops evolving because of the introduction of *Smart Forms.*

(Lax Jason, 2008; SAP, 2006)

1.1.2 Smart Form

Smart Form was introduced in SAP Basis 4.6 to replace SAP script. A tool for creating and maintaining forms within SAP ERP applications. Here are the advantages and disadvantages in using Smart Forms:

Table 2: Smart Form

Advantages	Disadvantages
User-friendly graphical with table and templates painter tool that aids the overall TCO.	Unlike SAPscript, it has fewer form templates.
It supports more output options- PDF, XML etc.	No further improvement after IFbA introduction, except for bug fixes.

(Hub, 2011; Zeller, 2004)

1.1.3 IFbA

Here are the advantages and disadvantages in deploying IFbA:

Table 3: IFbA

Advantages	Disadvantages
It supports certification and digital signature.	Unlike Smart Forms, it cannot convert to SAPscript.
It can also serve as print form with more advance features to explore.	
Forms can be interactive in both offline and online scenarios.	

Overcomes the defects of papers based forms as it is prone to mistakes, often outdated and exposed to manual date entry that leads to inaccurate data.	

(Lax Jason, 2008; Lax, 2008; Zeller, 2004; Hub, 2011)

1.2 Licensing

In production scenario SAP delivers over two thousands forms (Print and IFbA) through different module solutions to meet its customer's forms workflow business process needs. Before discussing the licensing complexities further, there is a need to understand the differences between Print Forms against Interactive Forms. Also and more importantly poor knowledge of licensing issues can be a big disadvantage to Interactive Forms developers in production scenarios as lots of errors stem from violations.

Table 4: Interactive Forms versus Print Forms

Interactive Forms	Print Forms
The forms fields are reactive to data inputs both in online and offline situations. It should be noted that IFbA can also function as a print form too.	The fields are static and must be printed before filling in data, usually by hand.

1.2.1 Licensable and Non-Licensable Scenarios (SAP, 2006)

Table 5: Licensable and Non-Licensable

Licensable	Non-Licensable

IFbA designed and deployed on a production system.	IFbA created or customized on development system.
	Customers can use print forms for free either customized or created anew.
	IFbA can also be customized *cosmetically* without being licensable. (more on cosmetic and non- cosmetic modification)

(s. 4)

1.2.2 Cosmetic and Non-Cosmetic Modifications

The table below highlights cosmetic and non-cosmetic modifications of IFbA delivered in Production system:

Table 6: Cosmetic and Non-Cosmetic Modifications.

Cosmetic Modifications	Non-Cosmetic Modifications
Deleting a form fields.	Inserting a new image field that function calls data from an SAP application or submits image data in the form data.
Modifying logos or static graphics	Inserting a new image field that function calls data from an SAP application or

elements or deleting, adding.	submits image location URL in the form data.
Modifying the color, font, content or formatting of boiler-plate.	Re-position of a field in the form.
Modifying the color, position, or style of lines, circles, arcs, boxes in form adding, deleting.	Transferring copied field from a form design to another.
	Inserting an interactive field on a form.

(s. 5; Lax, 2008; SAP, 2006)

1.2.3 Localization of Forms

By default SAP create and stamp forms in English, whereby customers can translate to local languages using internal translation capabilities. Some of these localizations are licensable and are detailed below:

- It is not licensable if only the form designs translated and the stamp unchanged.
- It is not licensable if only the strings are affected and the stamp remained unchanged.
- In the scenario say, a customer creates custom form design and requires about ten of the said forms, then if the customer uses SAP internal translation only one of the said forms would count for licensing, whereas

licensable if the forms were localized manually and then copies form designs ten times many (s. 7; SAP, 2008)**.**

2 TECHNOLOGY PREREQUISITES

SAP started supporting Adobe Document Services (ADS) from Netweaver 04-Web Application Server 6.40, ADS has since evolved. ADS as shown below (figure 1) functions as web services which runs on J2EE engine generating documents for Adobe LiveCycle Designer (ALD), the user interface tool contributed by Adobe Systems in this collaboration (p. 9; AG, SAP, 2007). These are the core components of IFbA.

Before explaining this project further, I highlighted and gave below an overview of this technology. So those that are new to SAP can have an easy time to understanding IFbA and this thesis.

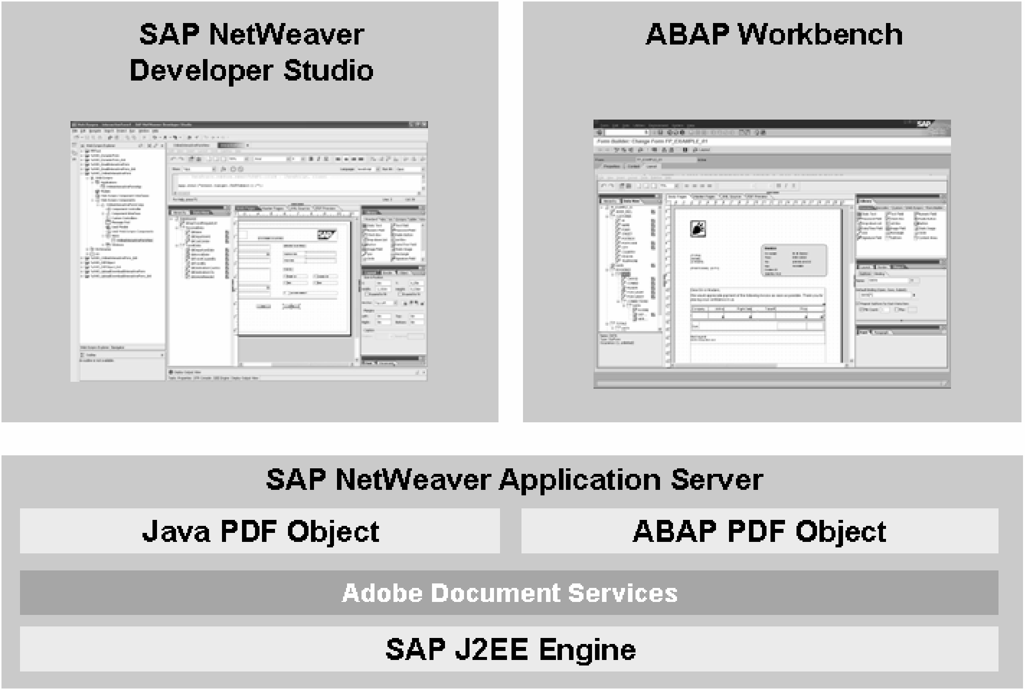
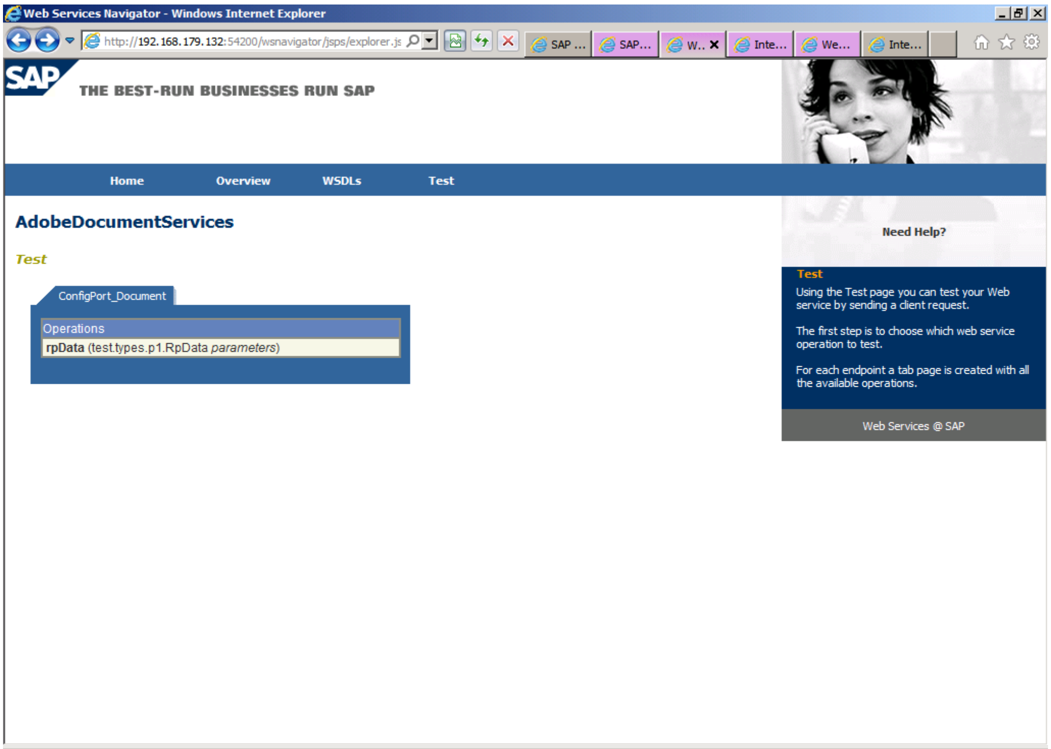


Figure 1: Development Environment for ABAP and Java

Source: (s. 6)

2.1 Adobe Document Services (ADS)

ADS were specifically developed by Adobe for SAP Web Server, so it is platform defined. As a web services server components, ADS handles the backend jobs for Adobe interactive forms in SAP NetWeaver Application Server. Main functions are to generate the output of data in PDF form format or generates printer codes if it is a print form scenario. When it is interactive, it extracts the user's input from the PDF form into the system. (AG, SAP, 2007; SAP, 2007)


Web Services Navigator - Windows Internet Explorer
http://192.168.179.132:54200/wsnavigator/jsps/explorer.js
SAP ...
SAP...
W..
Inte...
We...
Inte...
SAP
THE BEST-RUN BUSINESSES RUN SAP
Home
Overview
WSDLs
Test
Need Help?

AdobeDocumentServices

Test

ConfigPort_Document

Operations

rpData (test.types.p1.RpData *parameters*)

Test

Using the Test page you can test your Web service by sending a client request.

The first step is to choose which web service operation to test.

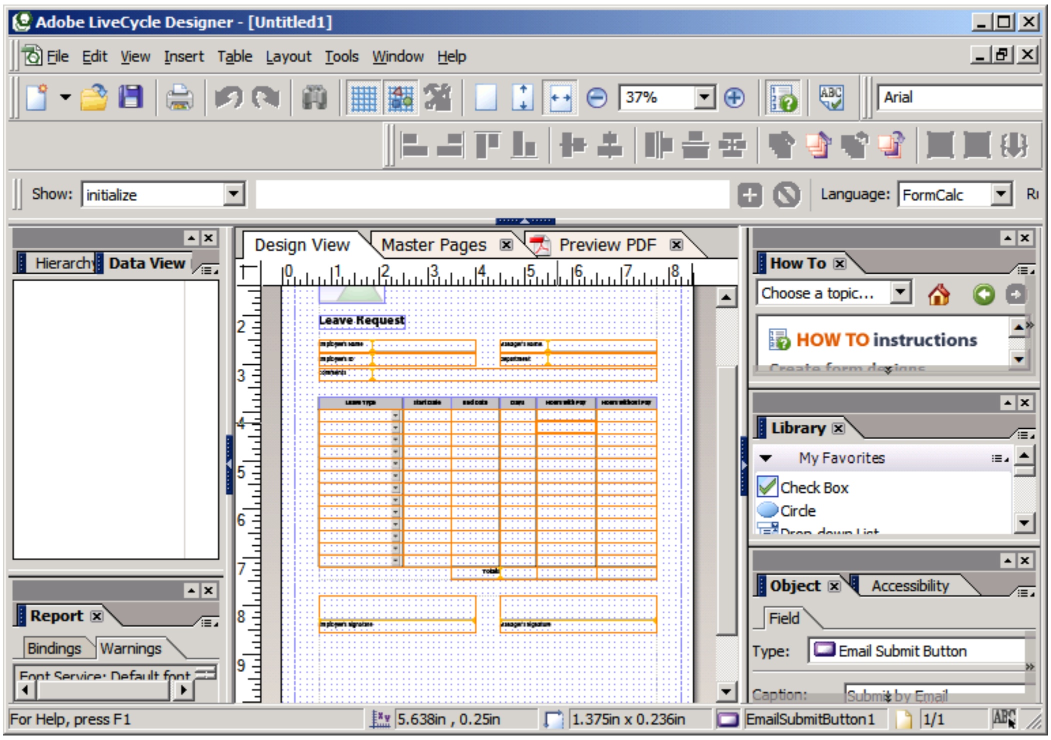
For each endpoint a tab page is created with all the available operations.

Web Services @ SAP

Figure 2: Adobe Document Services

2.2 Adobe LiveCycle Designer (ALD)

ALD is an easy-to-use tool for designing form templates use in development projects in SAP system that significantly reduces TCO. SAP has its version of ALD different from the one being marketed by Adobe Systems. ALD can be integrated into both ABAP workbench and Java Netweaver developer Studio [See figure 1] (SAP, 2008).



Show: initialize

Language: FormCalc

Font: Arial

Zoom: 37%

Type: Email Submit Button

Caption: Submit by Email

For Help, press F1 | 5.638in , 0.25in | 1.375in x 0.236in | EmailSubmitButton1 | 1/1

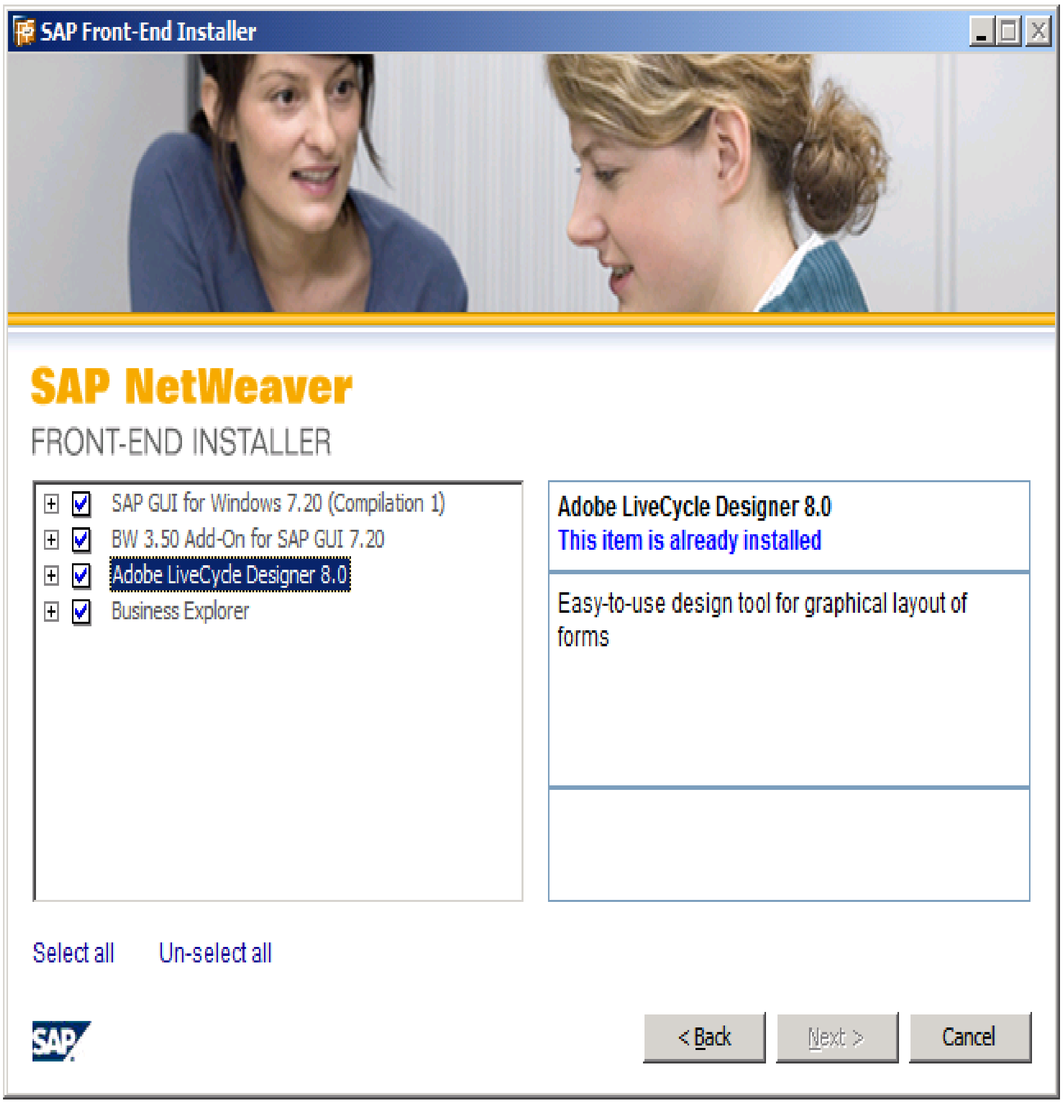
Figure 3: Screenshot of ALD Interface (Version 8)

2.3 SAP GUI

SAP is a three tier architecture Enterprise Resource Planning software (SAP R/3), which consists of Presentation (GUI), Application layer and Database layer. Although its name has evolved to SAP ERP, still its underlying architecture remained same. The presentation layer has three types for different platforms (Eyal Katz, 2012; SAP, 2001):

- GUI for Java environment being used by non-Windows operating systems to access SAP applications on systems like Linux/Unix, Mac OS X etc.
- GUI for the Windows environment- which is used for this project runs on Windows operating systems, and for now the only GUI that supports ALD [figure 4].
- GUI for HTML- SAP GUI for HTML emulates R/3 transaction screens (SAP Easy Access) in web browser [Figure 10]. It is an implementation

model for SAP Internet applications, but IFbA is not supported (SAP, 2001).



- ☑ SAP GUI for Windows 7.20 (Compilation 1)
- ☑ BW 3.50 Add-On for SAP GUI 7.20
- ☑ Adobe LiveCycle Designer 8.0
- ☑ Business Explorer

Adobe LiveCycle Designer 8.0
This item is already installed

Easy-to-use design tool for graphical layout of forms

Figure 4: ALD in SAP GUI for windows.

2.4 Adobe Reader

Adobe Reader is a free proprietary software by Adobe Systems that is the de - facto standard for reading PDF files (Version 7 and above).

2.5 ABAP

ABAP is the basis language in which all SAP ERP applications were implemented (ABAP stack). It is a very robust language for business programming with an evolutionary strategy- now at its fourth generation (ABAP/4). SAP later morphed ABAP into a fully featured object-oriented language called ABAP Objects (Margaret Rouse, 2010; SAP, 2008).

2.6 SAP Netweaver Developer Studio (NWDS)

This is an Integrated Environment for developing Java based business applications in SAP. NWDS is solely based on Eclipse which makes it quite beneficial, not only for its open source communities but also make it easier for generic Java programmers moving into SAP careers (s. 6).

2.7 System Requirements

Below is the system configuration for this project and probably going to be the same for those with like intent:

- A Windows Server (2003/2008) or 7, Intel Pentium 4 or higher minimum 1536MB recommended, 2GB RAM or higher, 30GB hard disc space. 32-Bit Version for x86 based upon DB2 9.1. Must be a Server system if you intend to use it with IFbA for ABAP and but home windows system is good for Java stack, otherwise personal computer windows systems suffice.
- Downloaded files from SAP Developer Network (SDN), SUSE SLES 10 SAP version from Novell and VMware Player from VMware website. Adobe LiveCycle Designer (version 8 not higher) requires SAP market place password at *SAP Note 962763.*

- Downloaded SAP NetWeaver7.0 - Trial Version on Linux - VMware Edition files from SDN and, SAP GUI for Windows (version 7.20 or lesser with patches) which supports most windows operating system. (requires SAP market place *password*)

- Download SAP Netweaver Developer studio 730 (requires SAP market place).Unfortunately, we will have to install NWDS as a stand-alone and integrate into NetWeaver7.0 - Trial Version on Linux - VMware Edition Web Dynpro for Java as it has no portal.

Note: If you are using a home computer you should enable Virtual Technology (VT) in **Bios** set-up to have less troubled installation.

3 INTEGRATION

Interactive Forms can only be integrated into Netweaver Application Server with dual instances (ABAP and Java Stack) or single Application Server for Java like Composite Environment family solutions. The system used here has dual instances.

Except for the root user (Username: *root*; Password: *sap123*), below are all created users by SAP for use during and after installation of SAP NetWeaver7.0 - Trial Version on Linux - VMware Edition:

Table 7: Operating System Users

Username	Password	Description
dasusr1	dasusr1	DB2 Administration Server User
n4sadm	n4sadm	SAP System Administrator
db2n4s	db2n4s	SAP Database Administrator
sapn4s	sapn4s	Database Connect User
sapn4sdb	sapn4sdb	J2EE Database User

Table 8: SAP Users

Username	Password	Description
DDIC	sapn4sadm	Data Dictionary User
developer	developer	Developer User
Sap*	sapn4sadm	SAP Administrator
J2EE_ADMIN	J2EE_ADMIN	J2EE Administrator

Note: All passwords are subject to change except for the *root* password.

Table 9: Port

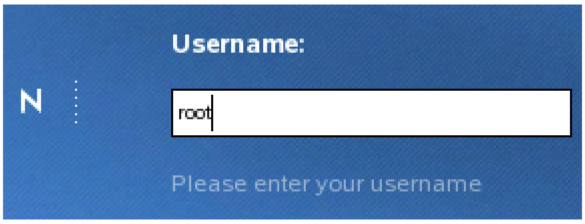
Application	Ports
J2EE	54200
SDM	54218

3.1 Netweaver

First, start by installing VMware player on the local Windows System, and thereafter extracted the SAP Netweaver files and SUSE SLES components into common directory. Then start the virtual appliance by going to file and double-click on the *SLES10SP1_Test_Drive* in the folder to start the virtual machine. A dialog will come up, click on **I copied it** and OK:

Automatically, the boot process will start, and after some minutes you will see the boot screen. To return the console to boot screen press *ctrl g*. If interested in seeing the boot process at the background, press *ALT F2* and then *start-up* console will be displayed.

Below is the logon after system has booted- Username *root* and the Password *sap123:*



Username:

root

Please enter your username

Figure 5: Logon Screen

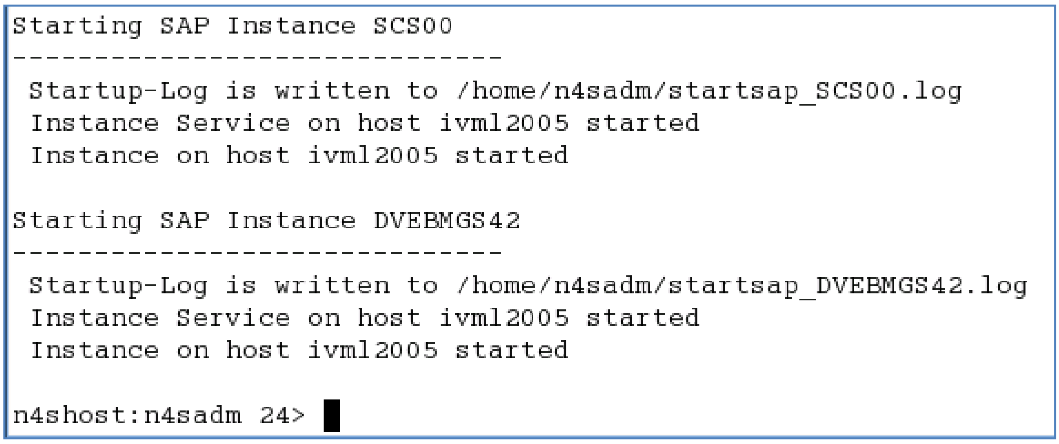
(Gregor Wolf , 2008)

After logging into the Linux System SAP Application Server will not start automatically, always going to be started manually. Open the Gnome Terminal to give a command. At this point, you will notice that the keyboard layout is set to German, the default language. If you are not familiar with German keyboard layout, you can change it in SUSE Enterprise Linux by going to YaST administrator tools. Now to get the required *hardware key* to request for the renewable 90-days developer's license, change to administrator's domain and issue the hardware key command: **saplicense -get**

You can now go to http://www.sap.com/minisap/ , fill all the required fields and the developer's license will be mailed to you in few minutes with an attached text file.

3.1.1 Application Server for ABAP

To install the license key, the Application Server has to be started manually and always going to start-up this way. Now issue the command *startsap* n4shost and wait patiently like below:



```
Starting SAP Instance SCS00
------------------------------
 Startup-Log is written to /home/n4sadm/startsap_SCS00.log
 Instance Service on host ivml2005 started
 Instance on host ivml2005 started

Starting SAP Instance DVEBMGS42
------------------------------
 Startup-Log is written to /home/n4sadm/startsap_DVEBMGS42.log
 Instance Service on host ivml2005 started
 Instance on host ivml2005 started

n4shost:n4sadm 24> █
```

Figure 6: Application Server Start-up

3.1.2 Installing License

At this point, it will be wise to configure virtual machine and the Firefox browser to access the host internet connection. This procedure is necessary to import the attached license text file to the Application Server. On the browser, click Edit > Preferences > Advanced Tab > Settings button and choose “Direct connection to the internet”; remember to first set VMware router to NAT. In a corporate setting, you can ask technical support to provide you with the right configuration. Now that there is an internet connection in virtual machine; to import the license file, minimize the terminal window and then save it on the desktop.

Note: There are two ways to installing license in SAP Netweaver: ABAP stack- **License Administrator** when it is dual stacks which are discussed here, and in single Java stack- **Netweaver Administrator**. In newer releases of Application Server for Java **Virtual Administrator** is no longer supported.

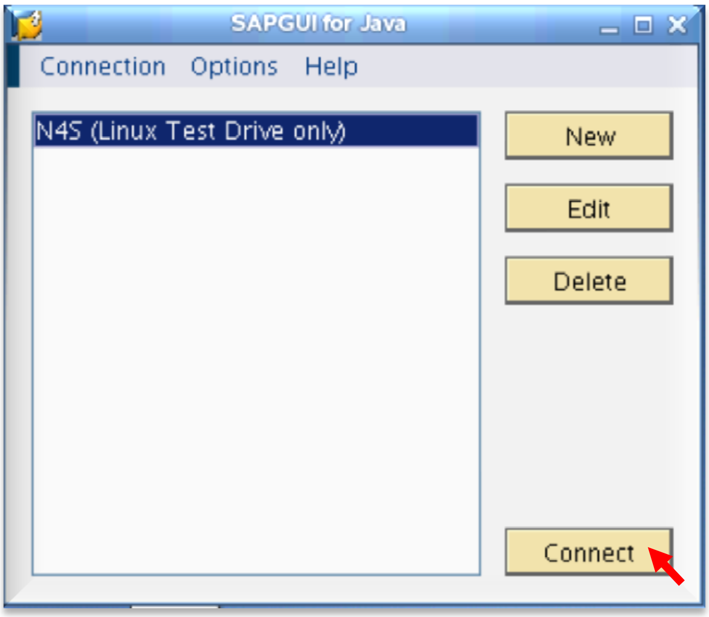
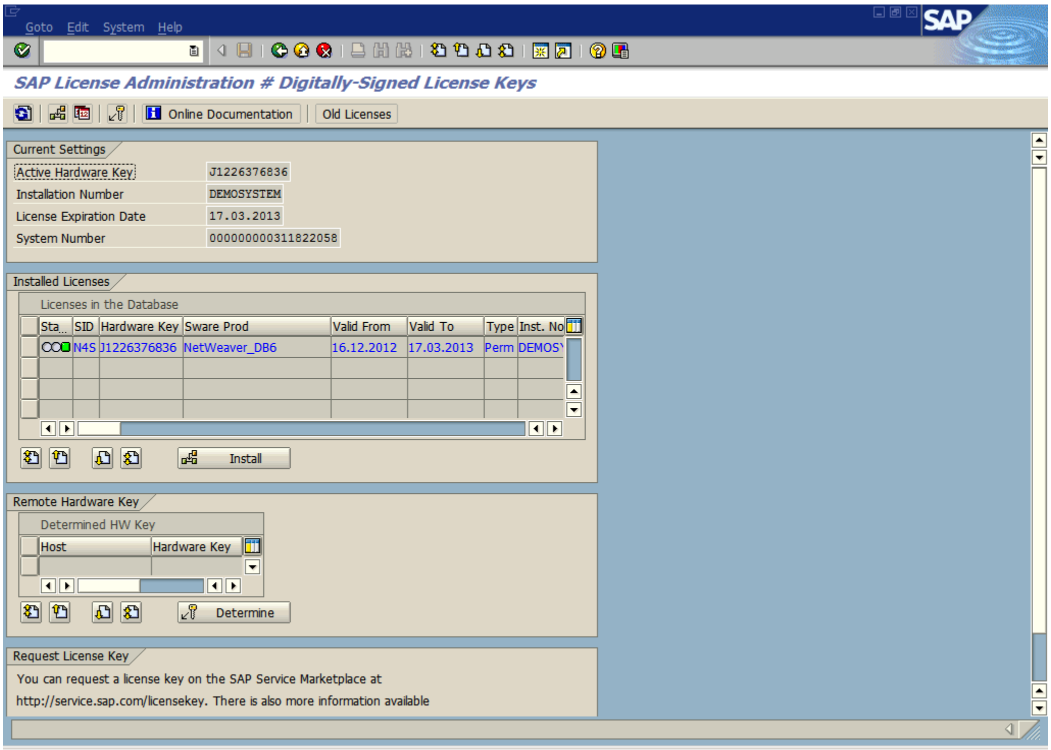


Figure 7: SAP GUI for Java

On the desktop there is a SAP *logo* double-click on it and launch the image as above-GUI for Java. Click on connect button and log into client one with username: sap*, password: sapn4sadm. It is the default administrator's password which can be changed like most passwords in SAP.

Now use s*license* (T-code) to go to the License Administration page:



SAP License Administration # Digitally-Signed License Keys

Current Settings

Active Hardware Key	J1226376836
Installation Number	DEMOSYSTEM
License Expiration Date	17.03.2013
System Number	000000000311822058

Installed Licenses

Licenses in the Database

Sta...	SID	Hardware Key	Sware Prod	Valid From	Valid To	Type	Inst. No
○○🟩	N4S	J1226376836	NetWeaver_DB6	16.12.2012	17.03.2013	Perm	DEMOSY

Remote Hardware Key

Determined HW Key

Host	Hardware Key

Request License Key

You can request a license key on the SAP Service Marketplace at http://service.sap.com/licensekey. There is also more information available

Figure 8: SAP License Administration

Import the already saved license file (N4S.txt) and OK it, a success message will appear confirm it and your page should be like above.

Now you have to restart Application Server to apply the license by issuing this command: *stopsap n4shostand* thereafter the *startsap n4shosthand* command. Then we can access the Java stack (Application Server for Java) and to configure the ADS. (Gregor Wolf , 2008)

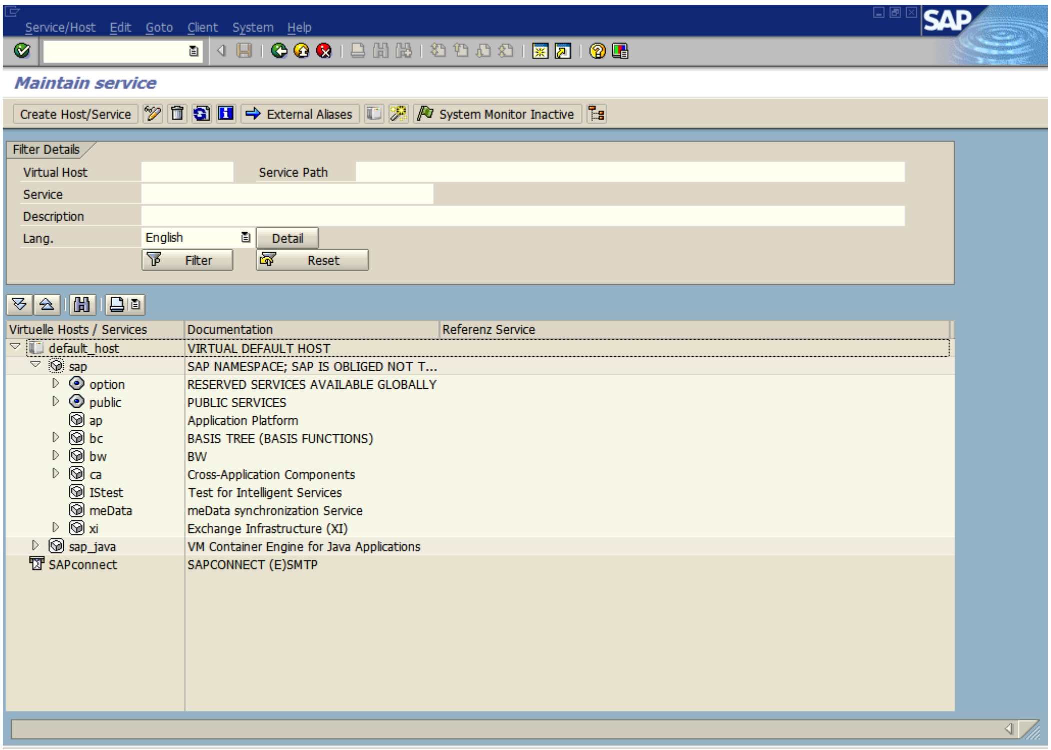
Note: Java stack shut downs after 30 minutes if license is invalid; usually works that way after every start-up until a valid license is applied.

3.1.3 Internet Communication Framework (ICF)

All ICF services by default are in inactive mode for security reasons; we have to decide which services to activate for the application you want to use. However since this system is licensed for educational purposes we are going to activate all and test a service. For specific Web Dynpro for ABAP and Java application nodes, see SAP Note **1109215**, **724804**.

Below are the following steps to active ICF:

- Issue T-Code *SICF* in SAP Easy Access.
- Use the menu *Service* then click on execute or issue F8.
- Now right-click and active all nodes tree.



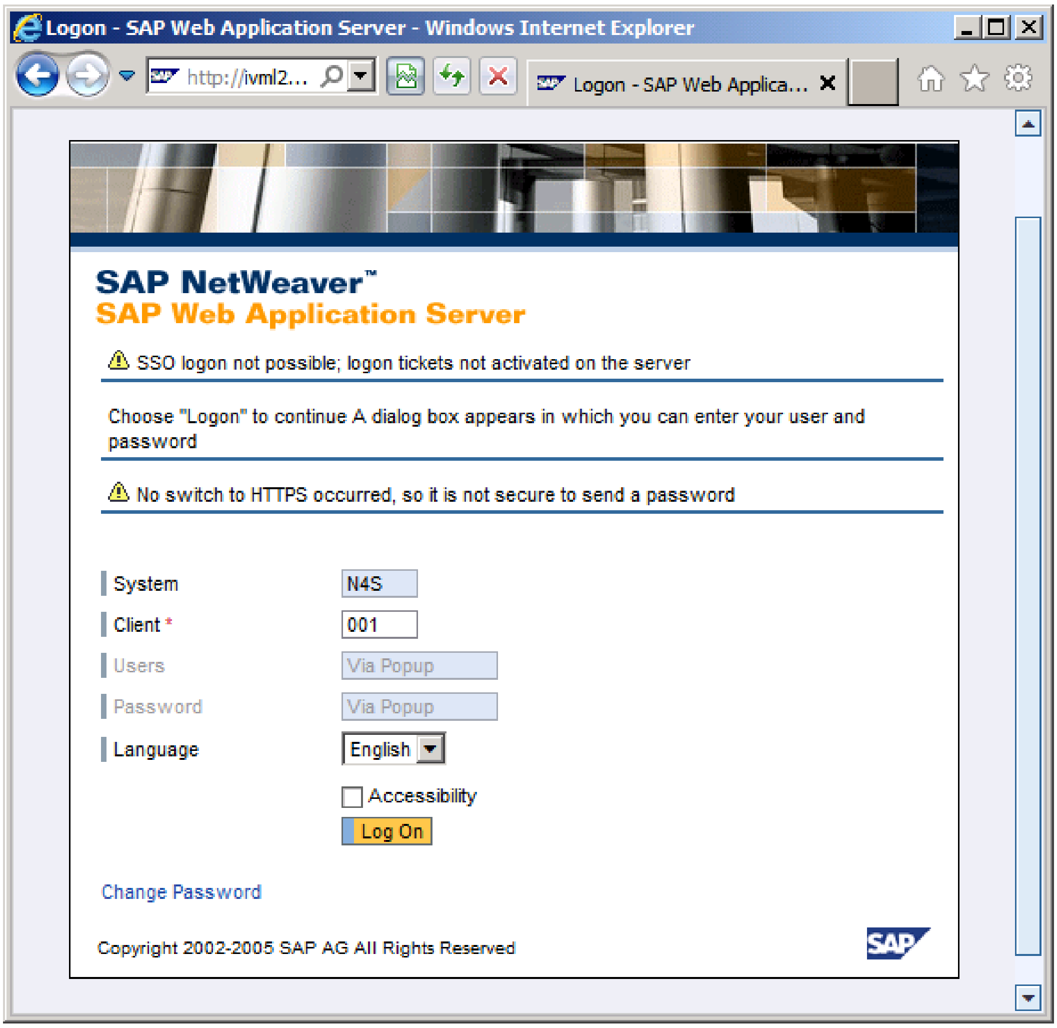
Filter Details

Virtual Host		Service Path	
Service			
Description			
Lang.	English		

Virtuelle Hosts / Services	Documentation	Referenz Service
default_host	VIRTUAL DEFAULT HOST	
sap	SAP NAMESPACE; SAP IS OBLIGED NOT T...	
option	RESERVED SERVICES AVAILABLE GLOBALLY	
public	PUBLIC SERVICES	
ap	Application Platform	
bc	BASIS TREE (BASIS FUNCTIONS)	
bw	BW	
ca	Cross-Application Components	
IStest	Test for Intelligent Services	
meData	meData synchronization Service	
xi	Exchange Infrastructure (XI)	
sap_java	VM Container Engine for Java Applications	
SAPconnect	SAPCONNECT (E)SMTP	

Figure 9: Internet Communication Framework

Note that if the appropriate nodes are not activated there will be no access to ADS, Java stack, Web Dynpro for ABAP Java, GUI for HTML etc.



Logon - SAP Web Application Server - Windows Internet Explorer
http://ivml2...
Logon - SAP Web Applica...
SAP NetWeaver™
SAP Web Application Server

⚠ SSO logon not possible; logon tickets not activated on the server

Choose "Logon" to continue A dialog box appears in which you can enter your user and password

⚠ No switch to HTTPS occurred, so it is not secure to send a password

System	N4S
Client *	001
Users	Via Popup
Password	Via Popup
Language	English

□ Accessibility

Copyright 2002-2005 SAP AG All Rights Reserved

Figure 10: SAP GUI for HTML

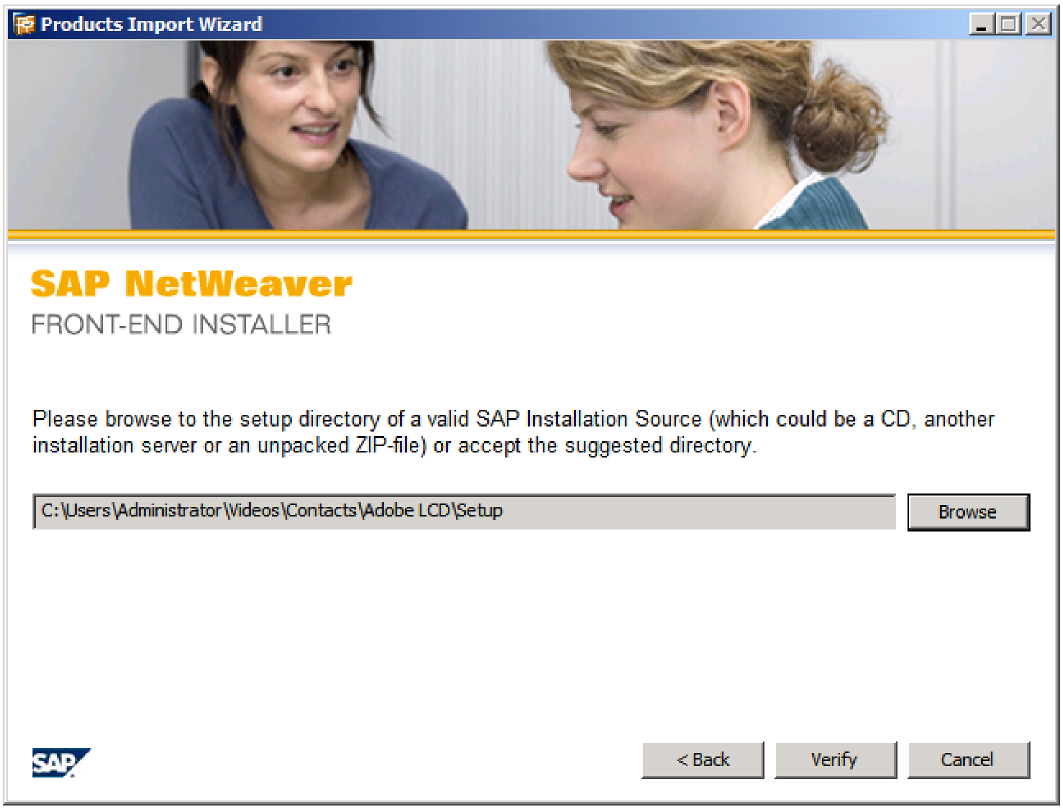
3.2 Using External Front End

Working in virtual machines slows time thus setting up an external frontend connection is necessary; in this case SAP GUI for Windows. More importantly, ALD only works in windows front end. So to start, install ALD in the Server system, before the GUI for Windows. Installing GUI for Windows is a bit fuzzy, and deserves further discussion.

3.2.1 Configuring SAP GUI for windows

The two most important points to note here amongst others when configuring GUI for windows with the intention of using IFbA are as follows:

- After unpacking the GUI files, you sort out *NwSapSetupAdmin* in folder PRES1>GUI>WINDOWS>WIN32> setup, then double-click on it and import product-ALD in its unpacked directory, finally *Verify*
- Now select the executable *NwSapsetup* file for guided installation (Figure 4).

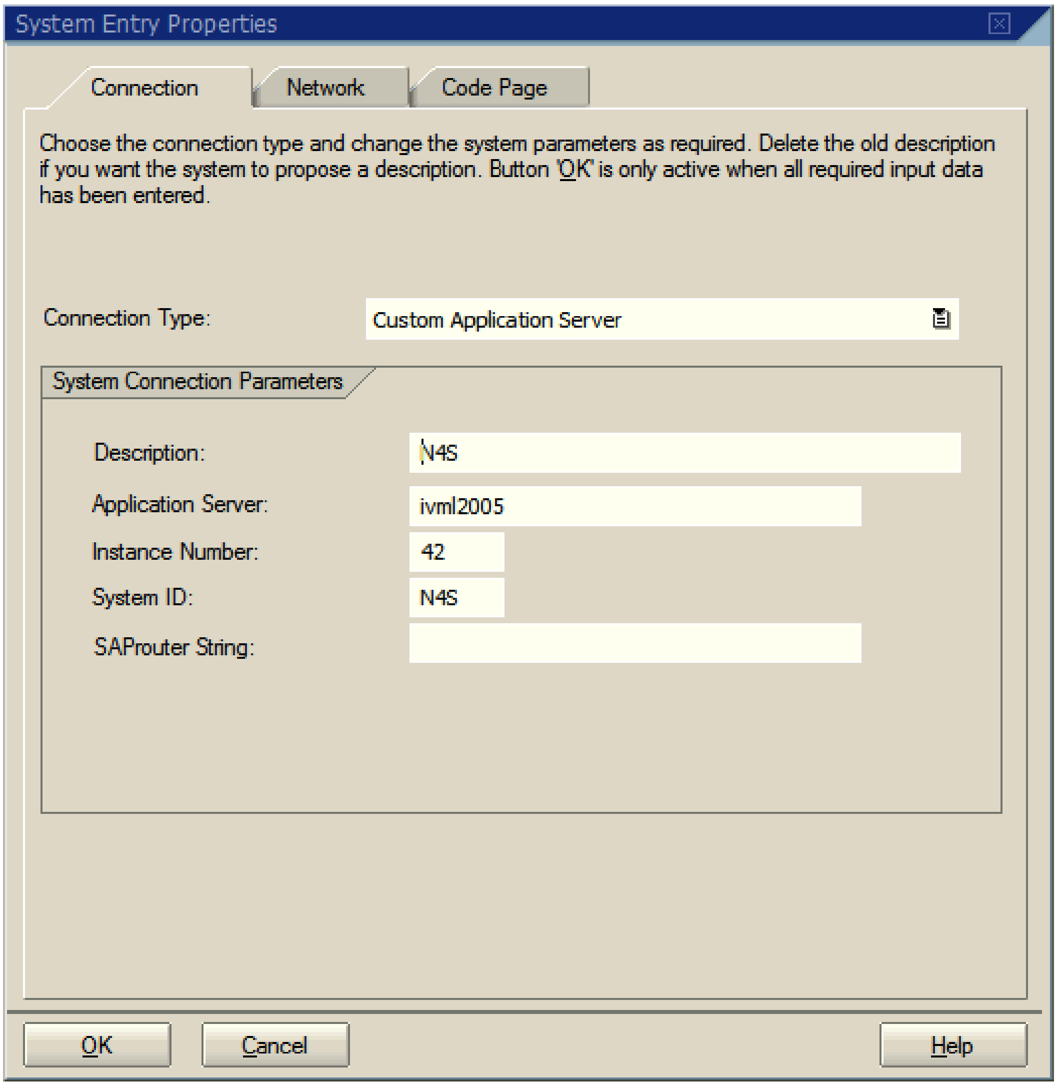


Please browse to the setup directory of a valid SAP Installation Source (which could be a CD, another installation server or an unpacked ZIP-file) or accept the suggested directory.

C:\Users\Administrator\Videos\Contacts\Adobe LCD\Setup

Figure 11: ALD Integration

After integration and installation there will a SAP logon logo on your desktop, double click on it > right-click on connection > add new entry > users specified system, and issue the following parameter:



Choose the connection type and change the system parameters as required. Delete the old description if you want the system to propose a description. Button 'OK' is only active when all required input data has been entered.

Connection Type: Custom Application Server

System Connection Parameters

Description: N4S

Application Server: ivml2005

Instance Number: 42

System ID: N4S

SAProuter String:

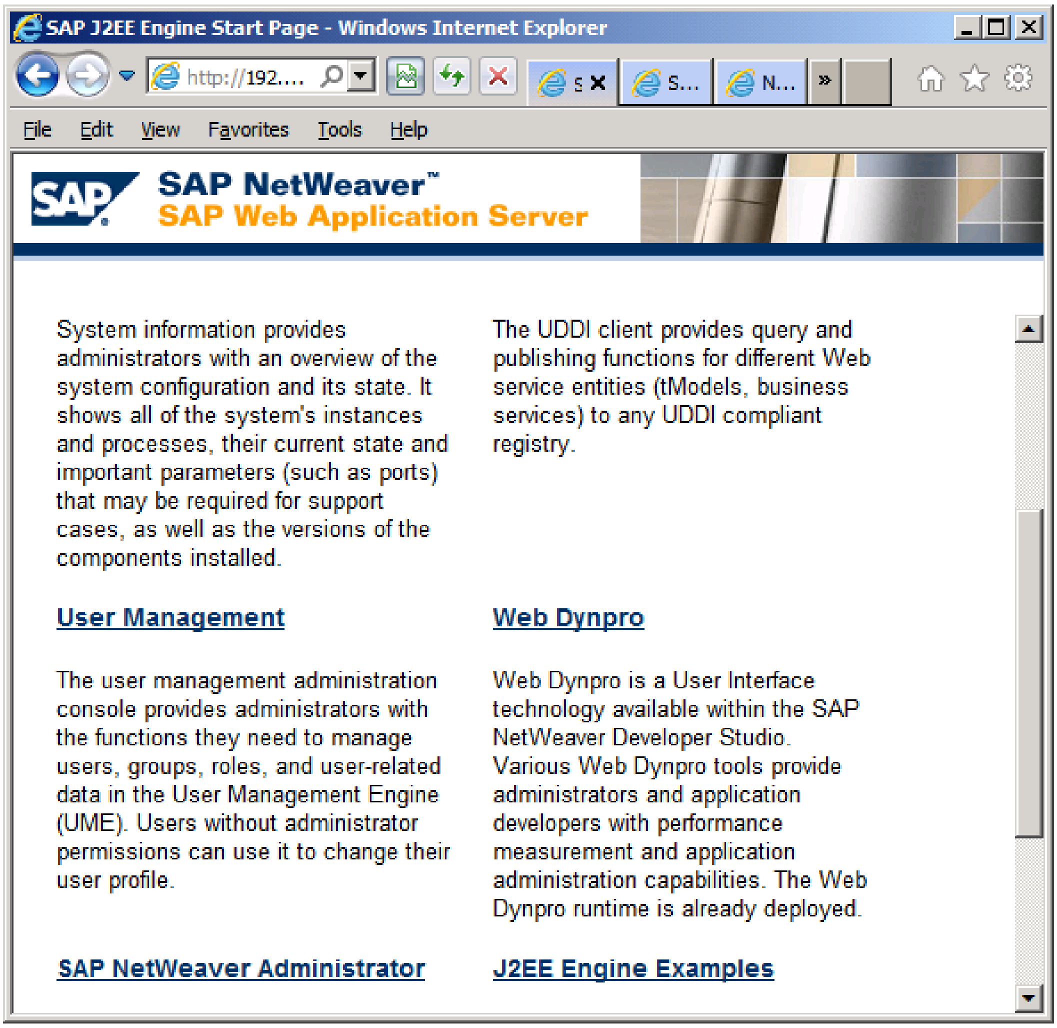
Figure 12: GUI Connection Parameter

This Connection parameter is only good for Application Server ivml2005, but the same approach applies for most GUI connections just short of differences of host name, instance number and System ID.

IFbA is almost good to go but there lies the problem which actually the most important section of this project: ADS configuration. To have the ADS working properly, we first have to set the System Landscape Directory (SLD) in the Java stack before checking or troubleshooting the ADS.

3.3 Application Server for Java

Since we have activated all the ICF services in the previous topic, Java stack is already accessible with home page- *http:// <localhost><port>* showing all the function and Administrator tools. Unlike in ABAP stack that you will have to issue T-codes to get to a page, Java stake is just segmented with detail instructions to surf around like for example, **System Information page** gives a full systems breakdowns like ports, System ID etc. However, we are going to configure the System Landscape Directory (SLD) and then test for ADS.


SAP J2EE Engine Start Page - Windows Internet Explorer
http://192....
S...
N...
File
Edit
View
Favorites
Tools
Help
SAP NetWeaver™
SAP Web Application Server

System information provides administrators with an overview of the system configuration and its state. It shows all of the system's instances and processes, their current state and important parameters (such as ports) that may be required for support cases, as well as the versions of the components installed.

The UDDI client provides query and publishing functions for different Web service entities (tModels, business services) to any UDDI compliant registry.

User Management

The user management administration console provides administrators with the functions they need to manage users, groups, roles, and user-related data in the User Management Engine (UME). Users without administrator permissions can use it to change their user profile.

Web Dynpro

Web Dynpro is a User Interface technology available within the SAP NetWeaver Developer Studio. Various Web Dynpro tools provide administrators and application developers with performance measurement and application administration capabilities. The Web Dynpro runtime is already deployed.

SAP NetWeaver Administrator

J2EE Engine Examples

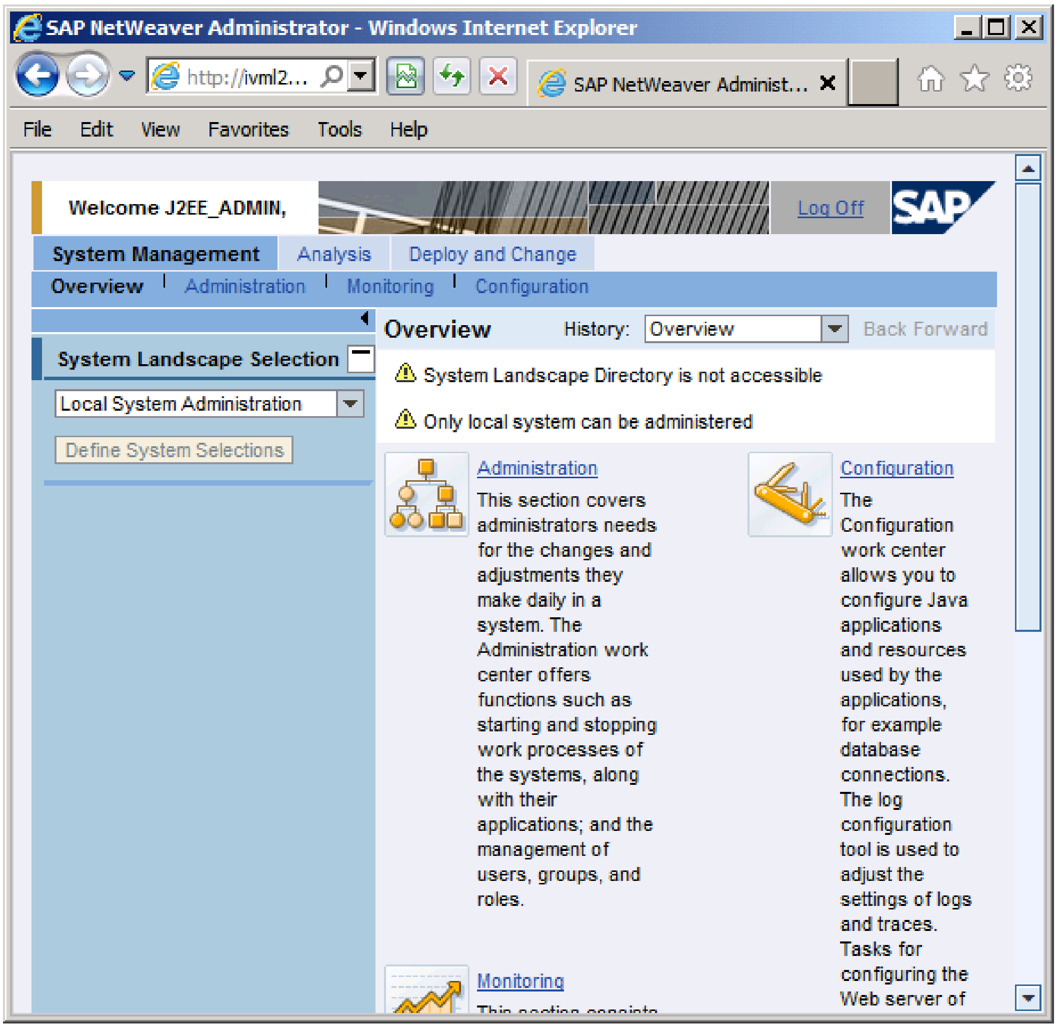
Figure 13: Java Stack

Note: Microsoft internet explorer is best with the Java stack as Mozilla tends to be slow (not fully support by SAP).

3.3.1 System Landscape Directory

SLD is the central information repository for the SAP landscape. Things in SLD which can be viewed and managed are data about business systems, technical systems, landscapes, products, and software components of Netweaver landscape. Missing software components in SLD for example can be downloaded at SAP developers site (SAP, 2004).

We are going to configure the SLD so we can integrate NWDS into Java Web Dynpro.



⚠ System Landscape Directory is not accessible

⚠ Only local system can be administered

Administration

This section covers administrators needs for the changes and adjustments they make daily in a system. The Administration work center offers functions such as starting and stopping work processes of the systems, along with their applications; and the management of users, groups, and roles.

Configuration

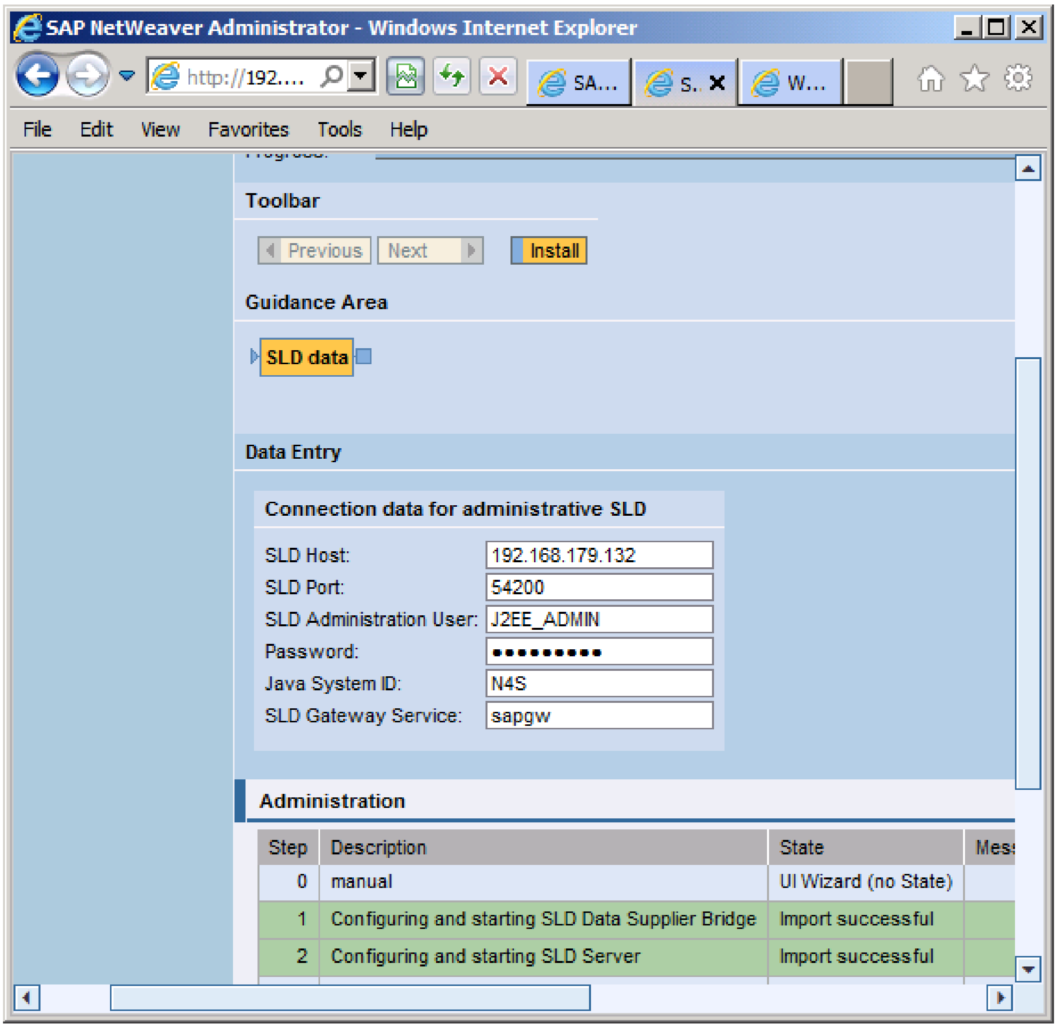
The Configuration work center allows you to configure Java applications and resources used by the applications, for example database connections. The log configuration tool is used to adjust the settings of logs and traces. Tasks for configuring the Web server of

Monitoring

This section consists

Figure 14: Netweaver Administrator

We signed into Netweaver Administrator as predicted the SLD cannot be accessed hence it is not configured. Now to activate the SLD execution template as seen below, go to deploy and change then click *Executive Template* to start:



Connection data for administrative SLD

SLD Host:	192.168.179.132
SLD Port:	54200
SLD Administration User:	J2EE_ADMIN
Password:	••••••••••
Java System ID:	N4S
SLD Gateway Service:	sapgw

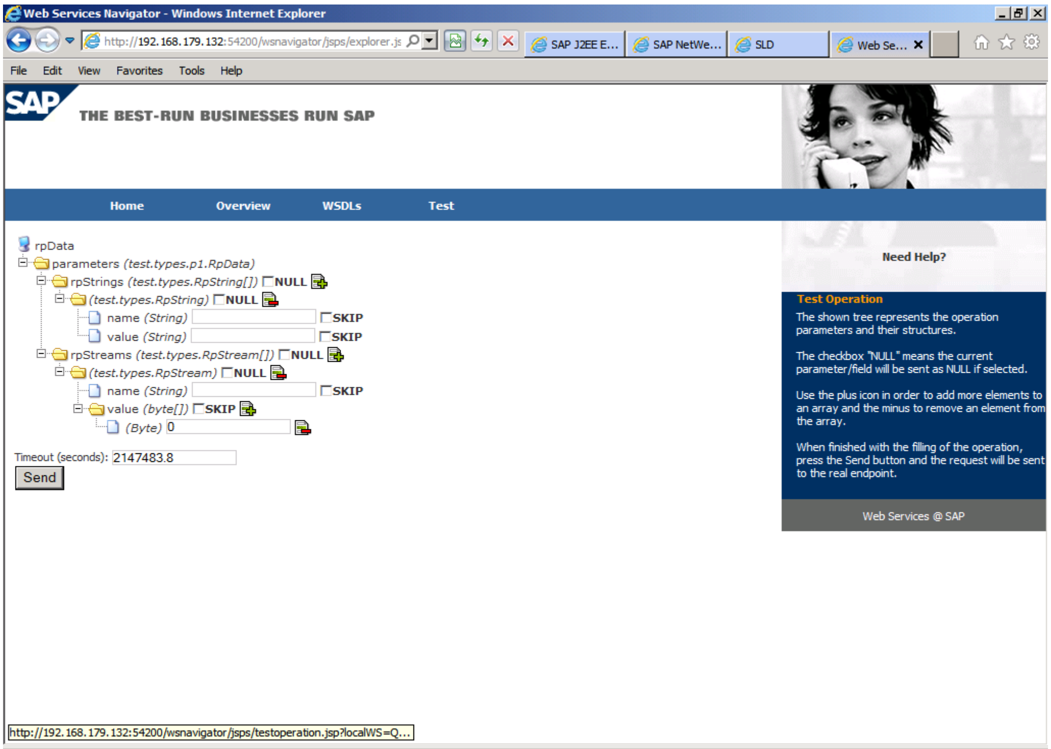
Step	Description	State	Mes
0	manual	UI Wizard (no State)	
1	Configuring and starting SLD Data Supplier Bridge	Import successful	
2	Configuring and starting SLD Server	Import successful	

Figure 15: SLD

There are seven template identification scenarios to go through, just choose which to install and then set connection. To see if successful, go to Web Dynpro to check the connection. For more information go to *http ://< hostname> <port>/sld* click on **help**.

3.3.2 Testing ADS

ADS must be sound and working otherwise Adobe Interactive Forms will be giving errors messages. To test ADS in Java stack go to the Web Services Navigator page click ADS > Test> log in as an ADSUSER then see if version number comes up. If you do not see it (version number) then ADS is not working, then you have not installed ADS **special key**.


Web Services Navigator - Windows Internet Explorer
http://192.168.179.132:54200/wsnavigator/jsps/explorer.js
SAP J2EE E...
SAP NetWe...
SLD
Web Se...
File
Edit
View
Favorites
Tools
Help
THE BEST-RUN BUSINESSES RUN SAP
Home
Overview
WSDLs
Test
Need Help?
Web Services @ SAP
http://192.168.179.132:54200/wsnavigator/jsps/testoperation.jsp?localWS=Q...

```
rpData
⊟ parameters (test.types.p1.RpData)
  ⊟ rpStrings (test.types.RpString[]) □NULL
    ⊟ (test.types.RpString) □NULL
        name (String)  □SKIP
        value (String)  □SKIP
  ⊟ rpStreams (test.types.RpStream[]) □NULL
    ⊟ (test.types.RpStream) □NULL
        name (String)  □SKIP
      ⊟ value (byte[]) □SKIP
          (Byte) 0
Timeout (seconds): 2147483.8
Send
```

Test Operation

The shown tree represents the operation parameters and their structures.

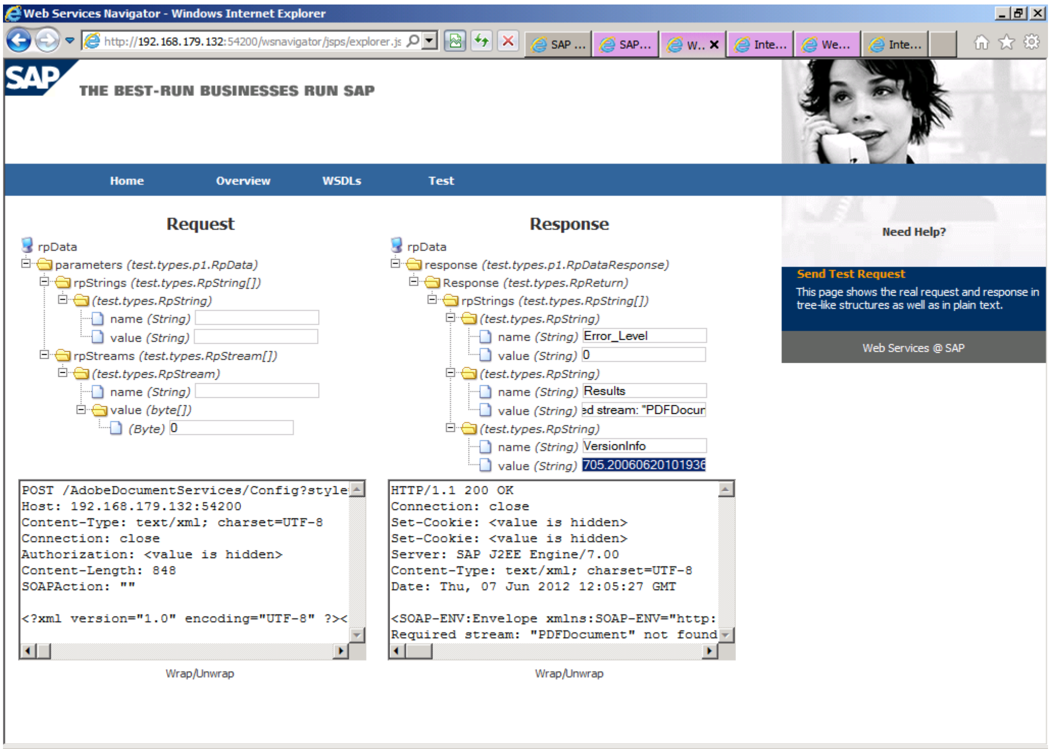
The checkbox "NULL" means the current parameter/field will be sent as NULL if selected.

Use the plus icon in order to add more elements to an array and the minus to remove an element from the array.

When finished with the filling of the operation, press the Send button and the request will be sent to the real endpoint.

Figure 16: Testing ADS

Now that ADS is working, IFbA is ready to be deployed but we are going to put it to test only after installing and integrating NWDS the final puzzle to this jigsaw.



Web Services Navigator - Windows Internet Explorer
http://192.168.179.132:54200/wsnavigator/jsps/explorer.js
SAP
THE BEST-RUN BUSINESSES RUN SAP
Home
Overview
WSDLs
Test
Need Help?
Send Test Request
Web Services @ SAP
Wrap/Unwrap

This page shows the real request and response in tree-like structures as well as in plain text.

Request

```
rpData
parameters (test.types.p1.RpData)
  rpStrings (test.types.RpString[])
    (test.types.RpString)
      name (String)
      value (String)
  rpStreams (test.types.RpStream[])
    (test.types.RpStream)
      name (String)
      value (byte[])
        (Byte) 0
```

Response

```
rpData
response (test.types.p1.RpDataResponse)
  Response (test.types.RpReturn)
    rpStrings (test.types.RpString[])
      (test.types.RpString)
        name (String) Error_Level
        value (String) 0
      (test.types.RpString)
        name (String) Results
        value (String) ed stream: "PDFDocur
      (test.types.RpString)
        name (String) VersionInfo
        value (String) 705.20060620101936
```

```
POST /AdobeDocumentServices/Config?style
Host: 192.168.179.132:54200
Content-Type: text/xml; charset=UTF-8
Connection: close
Authorization: <value is hidden>
Content-Length: 848
SOAPAction: ""

<?xml version="1.0" encoding="UTF-8" ?><
```

```
HTTP/1.1 200 OK
Connection: close
Set-Cookie: <value is hidden>
Set-Cookie: <value is hidden>
Server: SAP J2EE Engine/7.00
Content-Type: text/xml; charset=UTF-8
Date: Thu, 07 Jun 2012 12:05:27 GMT

<SOAP-ENV:Envelope xmlns:SOAP-ENV="http:
Required stream: "PDFDocument" not found
```

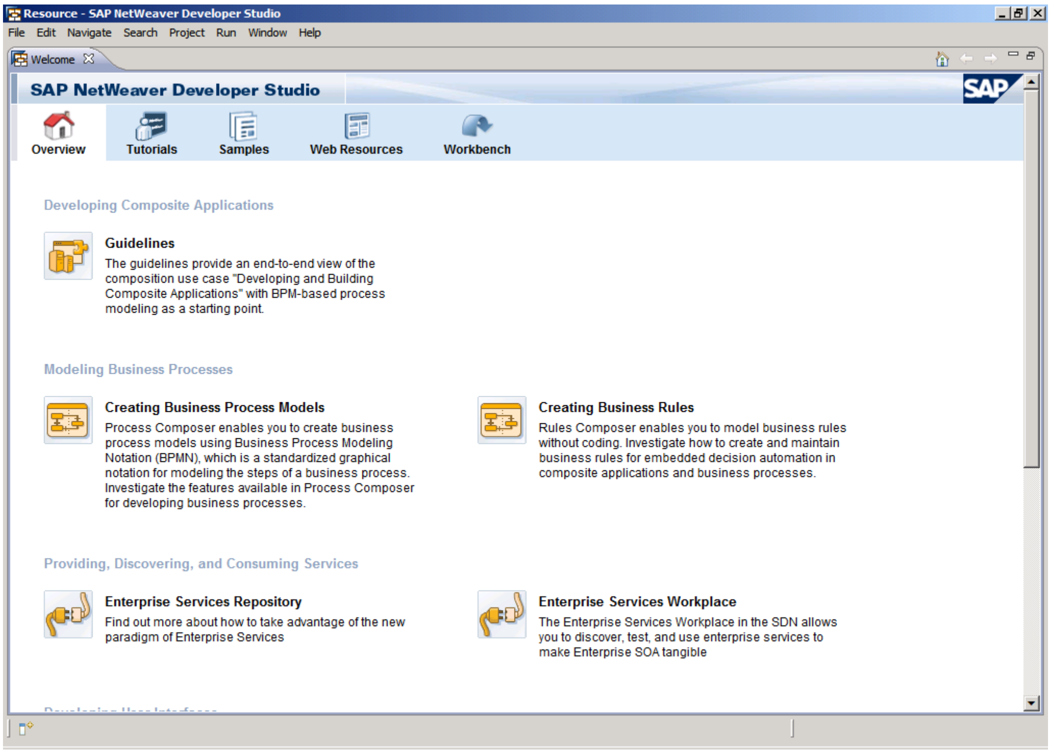
Figure 17: Working ADS

As we can see the version number is highlighted on the right meaning configuration is good.

Note: In ABAP stack you test for ADS by issuing T-Code *SE38* using executing test report *FP_TEST_00.*

3.3.3 NWDS

NWDS 730 only work with jdk_1_6_7 or higher upgrades of still version 6 (SAP do not support version 7 at this time). So if you have version 7 then you must uninstall it re-create new path and class-path for version 6 and then install NWDS. Failure to use version 6 will result it not installing with error messages.


Resource - SAP NetWeaver Developer Studio
File Edit Navigate Search Project Run Window Help
Welcome
SAP NetWeaver Developer Studio
SAP
Overview
Tutorials
Samples
Web Resources
Workbench

Developing Composite Applications

Guidelines
The guidelines provide an end-to-end view of the composition use case "Developing and Building Composite Applications" with BPM-based process modeling as a starting point.

Modeling Business Processes

Creating Business Process Models
Process Composer enables you to create business process models using Business Process Modeling Notation (BPMN), which is a standardized graphical notation for modeling the steps of a business process. Investigate the features available in Process Composer for developing business processes.

Creating Business Rules
Rules Composer enables you to model business rules without coding. Investigate how to create and maintain business rules for embedded decision automation in composite applications and business processes.

Providing, Discovering, and Consuming Services

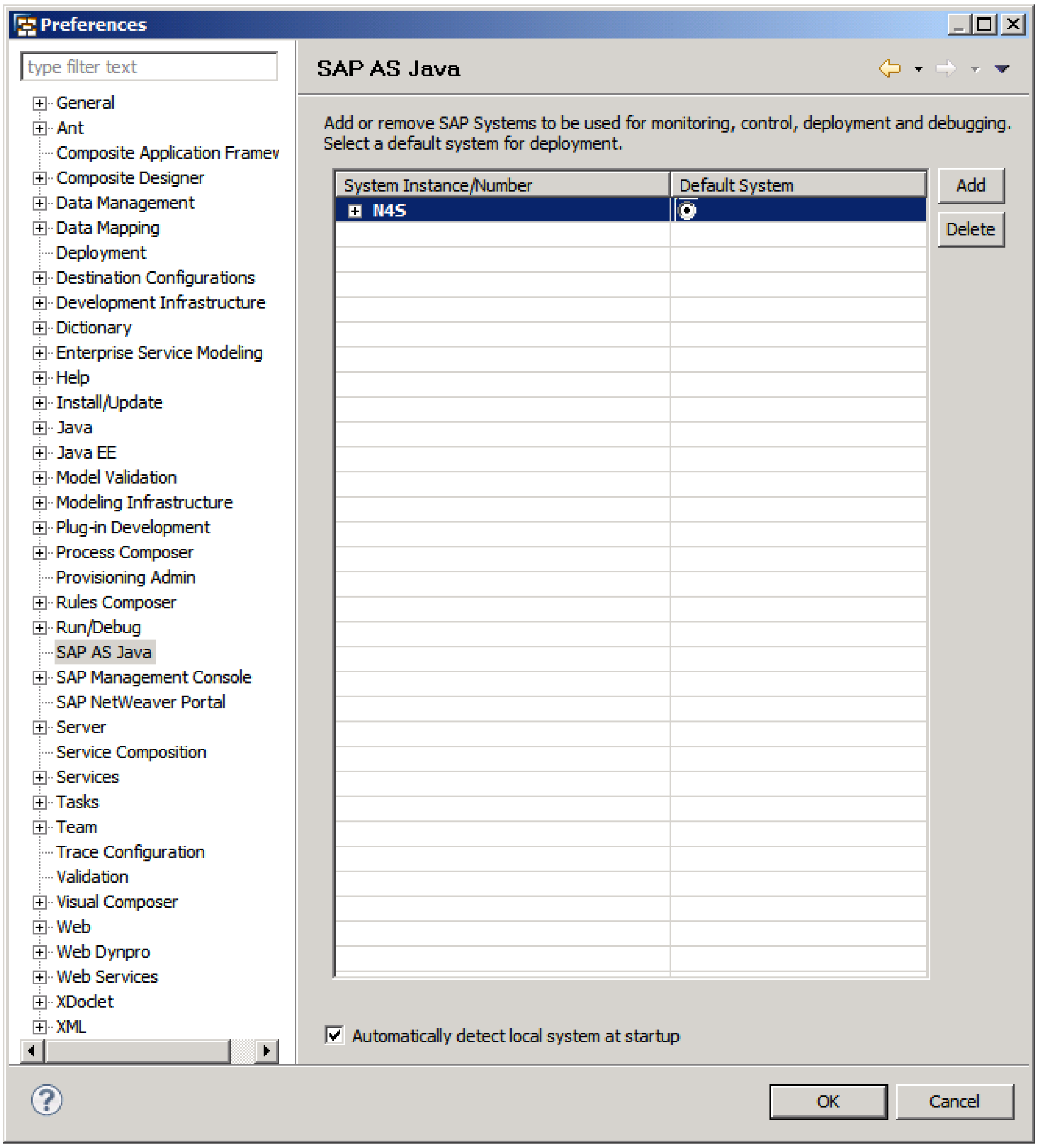
Enterprise Services Repository
Find out more about how to take advantage of the new paradigm of Enterprise Services

Enterprise Services Workplace
The Enterprise Services Workplace in the SDN allows you to discover, test, and use enterprise services to make Enterprise SOA tangible

Figure 18: NWDS Front Page

After successful installation we are greeted by this welcome page. Note**:** Do not use an old version workspace with a new version, create new workbench when installing.

Now to integrate NWDS into the Web Dynpro go to Windows > Preferences on the left list > Application Server for Java > Add then apply appropriate parameter but remember to set system to **default**.



Add or remove SAP Systems to be used for monitoring, control, deployment and debugging. Select a default system for deployment.

System Instance/Number	Default System
N4S	●

☑ Automatically detect local system at startup

Figure 19: NWDS Connection

Finally, we can now start developing interesting and challenging Interactive Forms in both instances but first going to test the system. Check Appendix for detailed steps.

4 DEPLOYING INTERACTIVE FORMS

4.1 Online Forms Scenarios

It is online when a user enters data onto a pre-filled PDF form and sends it to a company intranet Enterprise portal or website database. Below are the technical characteristics of online Interactive forms:

- Adobe Interactive form is executed in ABAP browser using Adobe reader plug-in.
- An ADS generates the form and update it with relevant data.
- After the ABAP system receives the data, ADS extracts the data from the PDF file and then enters the received data to the back-end system. (s. 7)

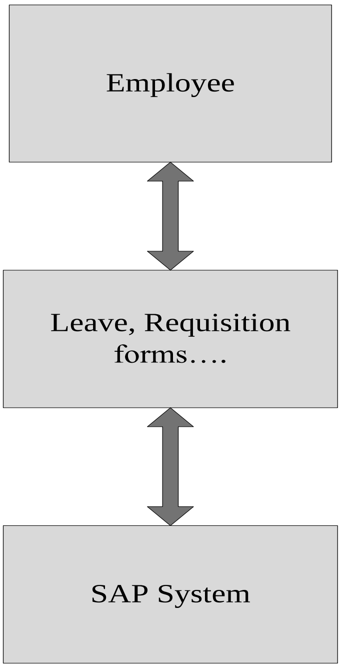


Figure 20: Online Form scenario

Here is a diagram of an online scenario depicting the workflow process of an employee updating an *Interactive Form* in real-time.

4.2 Offline Forms Scenarios

The end-user would download PDF *Interactive form* to its system and print, fax or email it after filling with data. Below are the technical characteristics of Offline Interactive forms:

- SAP system access is not necessary in this scenario.
- The end-user downloads the interactive PDF form to his local system.
- The form can only work with the right version of Adobe Reader.
- The end-user can manipulate forms using Adobe Reader.
- Uploads the interactive form from local system into the portal.
- The interactive form can be sent via email or fax using in-built ABAP business communication service.
- Some Interactive forms are developed with E-mail submit button or print button which triggers sending IFbA as an attached message, or a print out. (p. 12; SAP, 2008)

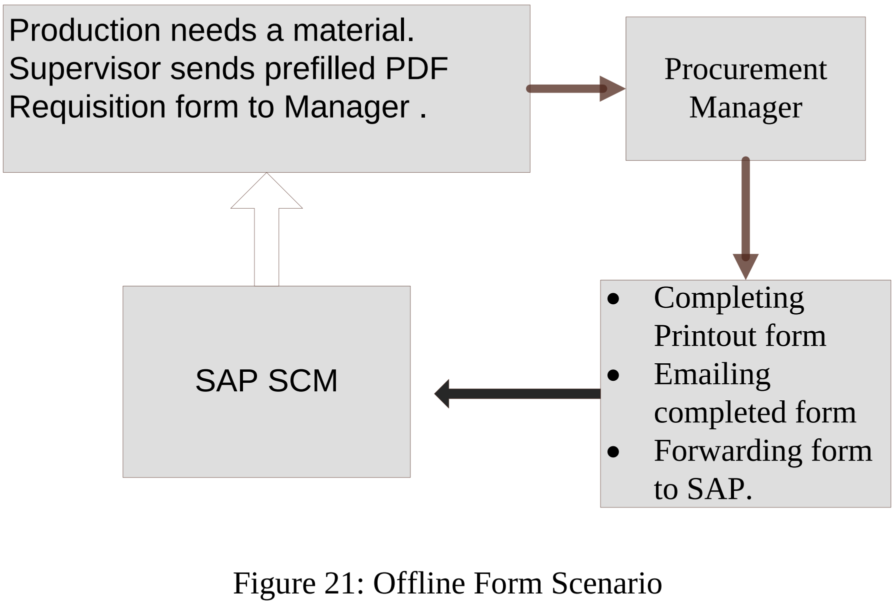

Production needs a material. Supervisor sends prefilled PDF Requisition form to Manager .
Procurement Manager
• Completing Printout form
• Emailing completed form
• Forwarding form to SAP.
SAP SCM

Figure 21: Offline Form Scenario

Here is a business process diagram of an offline scenario depicting workflow of a factory Supervisor making requisition to the Procurement Manager for approval of inventories.

5 CONCLUSION

There are a lot of resources about SAP Interactive Forms by Adobe, but what this thesis achieved like no other is its detailed approach; highlighting every important step from installation to integration then testing based on Netweaver 7 VMware Edition. The purpose was to make developers have a reliable resource to implement Adobe Interactive Forms in SAP. This thesis also discussed licensing in a way that is beneficial to developers as poor licensing knowledge usually result in errors in production scenarios.

The core of this integration is Adobe Document Services which requires deep knowledge to configure, and where most this project time was spent. A good understanding of System Landscape Directory is necessary; its applications, connections to other components in the ecosystem, before ADS would make sense. This project also provided the opportunity to learn Linux at an advance level in order to completely comprehend the installation of developer’s and ADS licenses. Basically, it avail a window to SAP Netweaver technology which was quite impactful to an aspiring technical consultant.

Overall, it was a challenging journey, picking up new skills while unlearning impatience as there are no short cuts in SAP.

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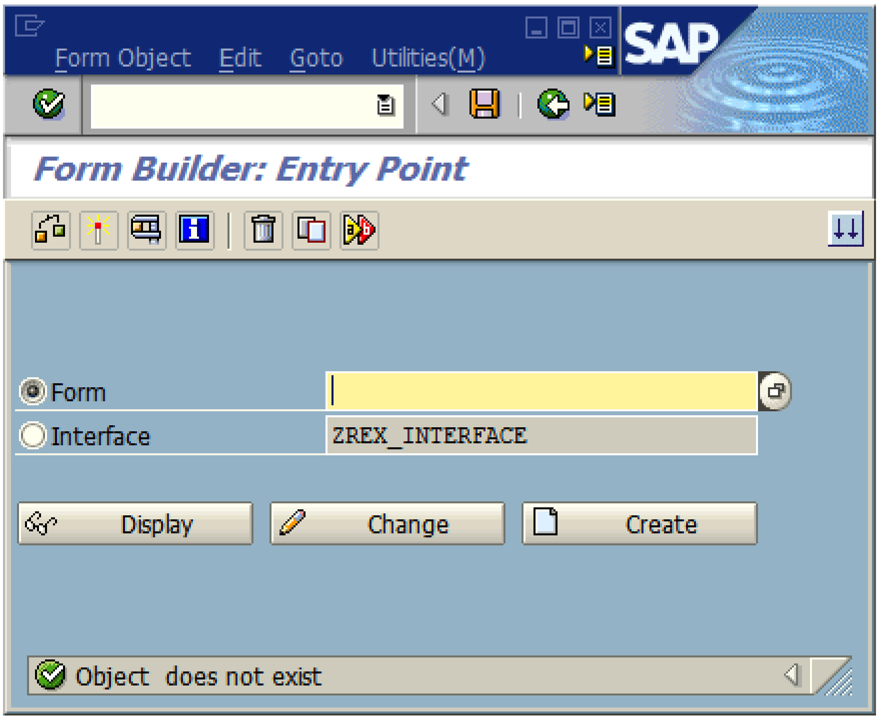
APPENDIX

Testing online forms in this system:

1. Log in as a developer issue T-Code SFP and create interface

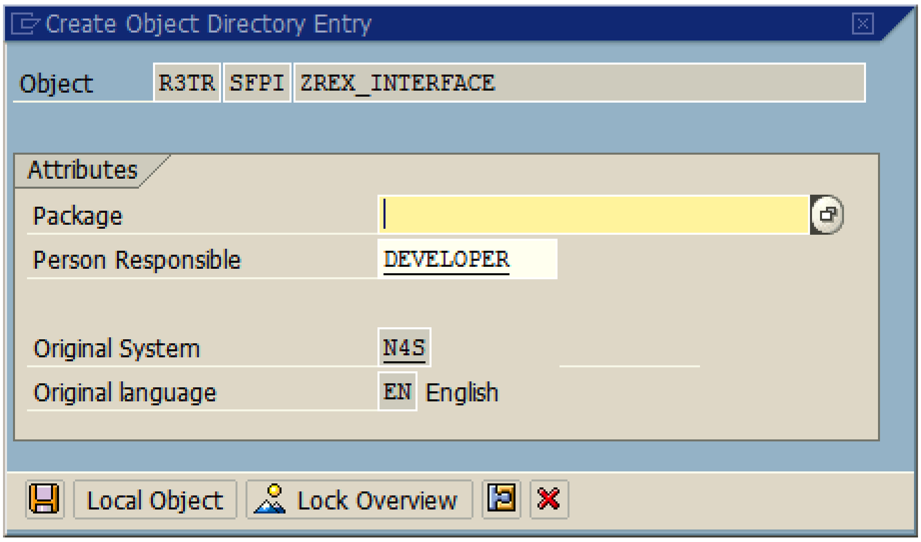


Form Builder: Entry Point

● Form

○ Interface ZREX_INTERFACE

Object does not exist



Create Object Directory Entry

Object R3TR SFPI ZREX_INTERFACE

Attributes

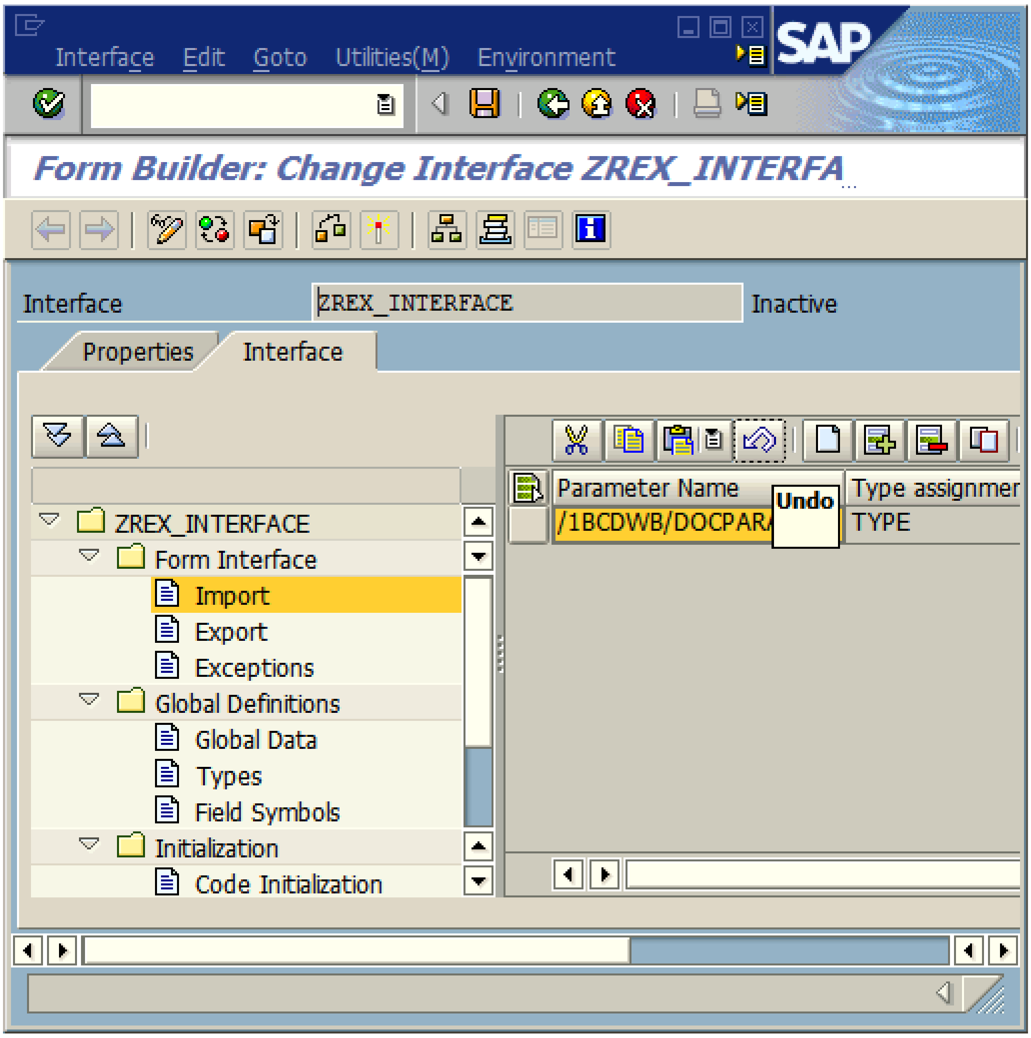
Package

Person Responsible DEVELOPER

Original System N4S

Original language EN English

Creating interface local Object

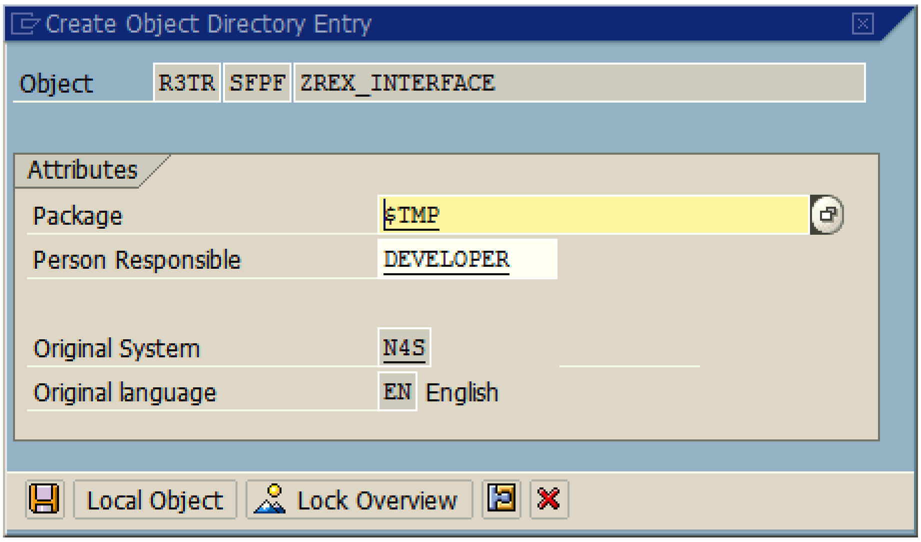


Form Builder: Change Interface ZREX_INTERFA...

Interface ZREX_INTERFACE Inactive

Parameter Name	Type assignmer
/1BCDWB/DOCPARA	TYPE

Now double click on import and click on create to set parameter.

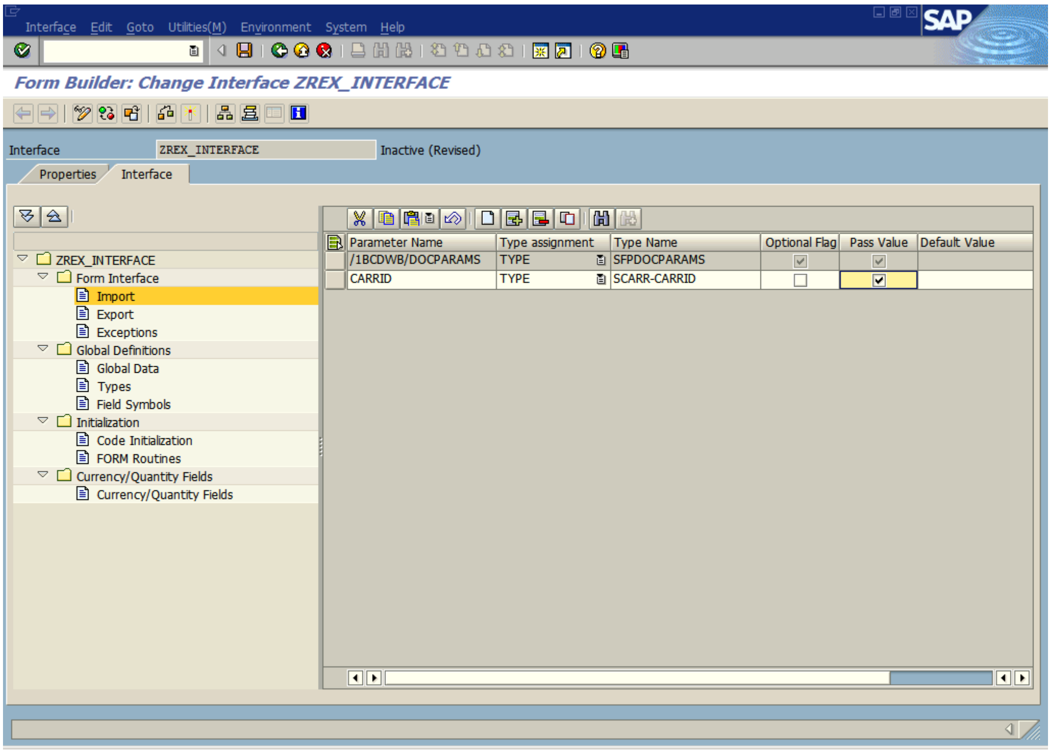


Create Object Directory Entry

Object	R3TR SFPF ZREX_INTERFACE

Attributes

Package	$TMP
Person Responsible	DEVELOPER
Original System	N4S
Original language	EN English

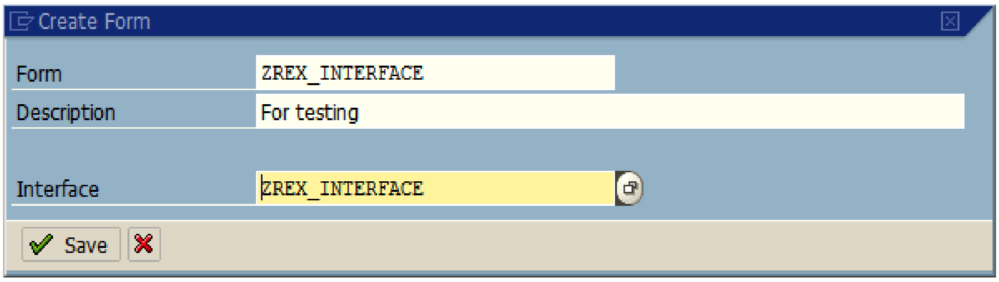


Form Builder: Change Interface ZREX_INTERFACE

Interface	ZREX_INTERFACE	Inactive (Revised)

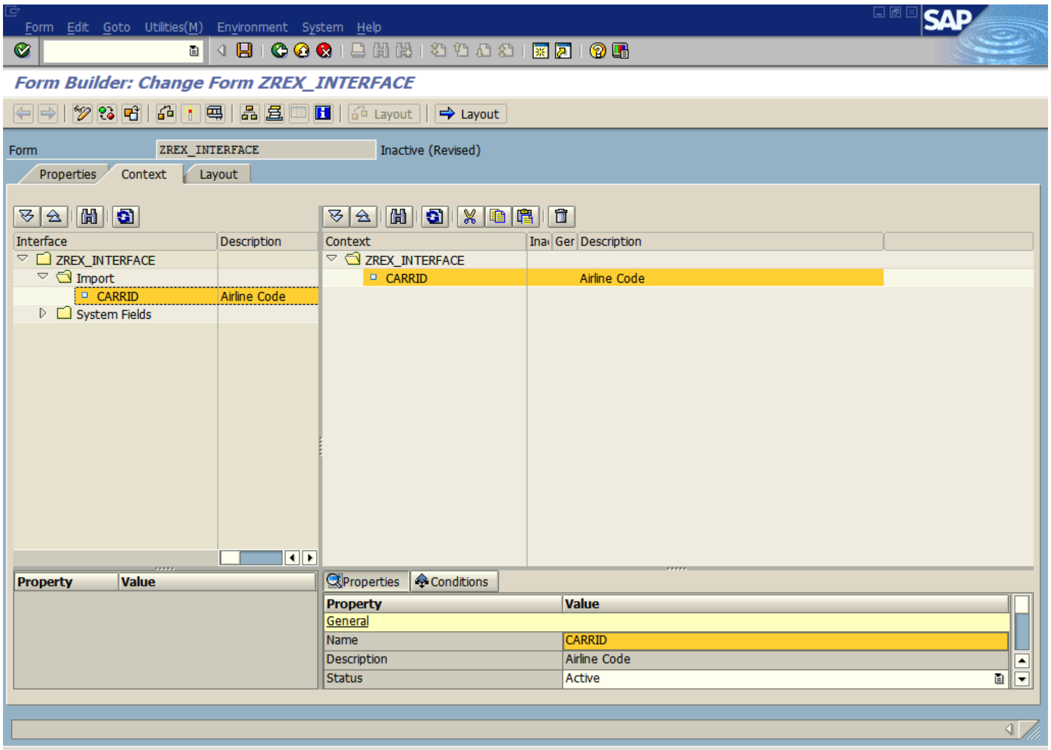
Parameter Name	Type assignment	Type Name	Optional Flag	Pass Value	Default Value
/1BCDWB/DOCPARAMS	TYPE	SFPDOCPARAMS	☑	☑	
CARRID	TYPE	SCARR-CARRID	□	☑	

Applying ABAP parameter saves go back and do the same for again. This time is for form interface.


Create Form

Form	ZREX_INTERFACE
Description	For testing
Interface	ZREX_INTERFACE

Creating another interface forms:



Form Builder: Change Form ZREX_INTERFACE

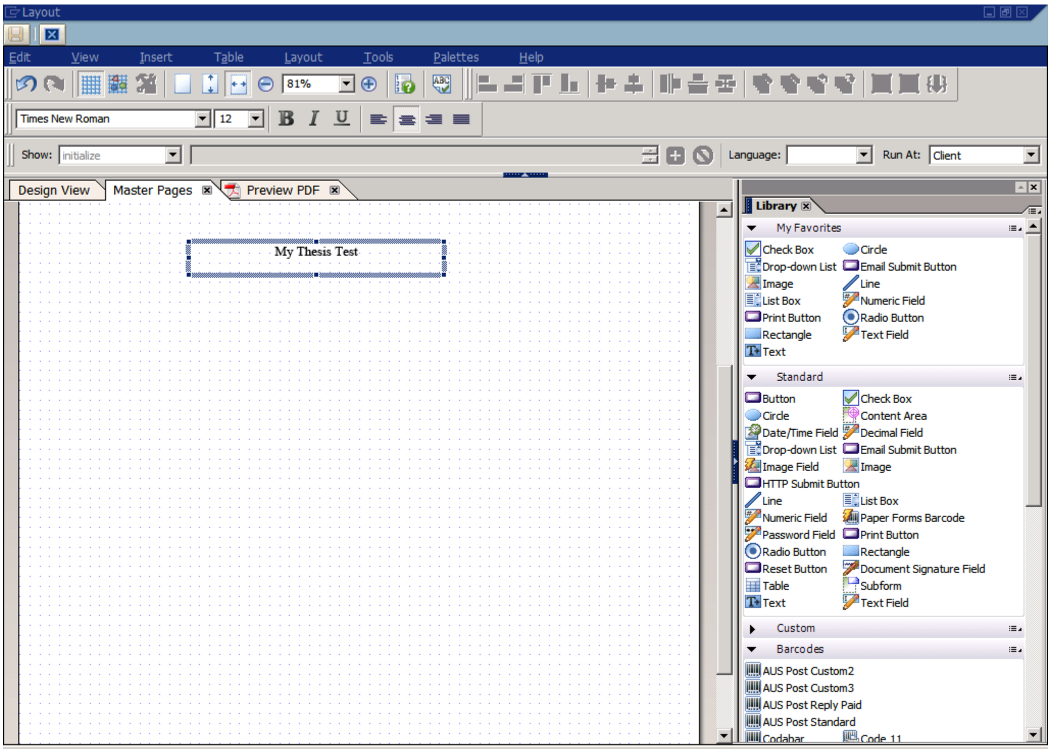
Form ZREX_INTERFACE Inactive (Revised)

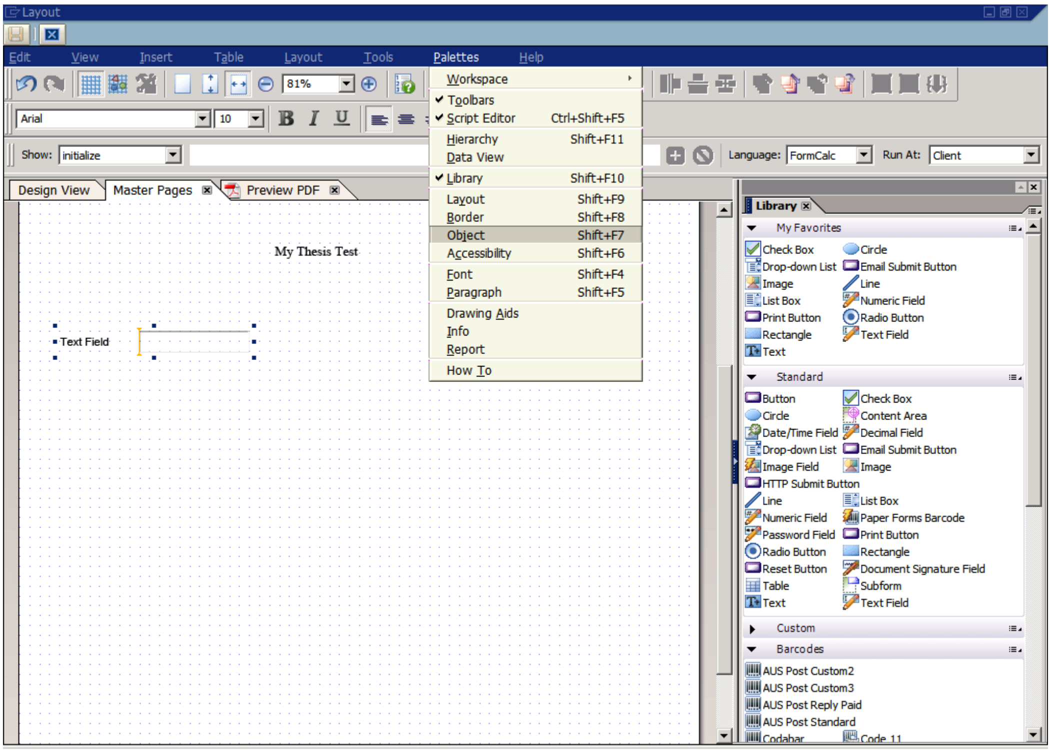
Interface	Description
ZREX_INTERFACE	
Import	
CARRID	Airline Code
System Fields	

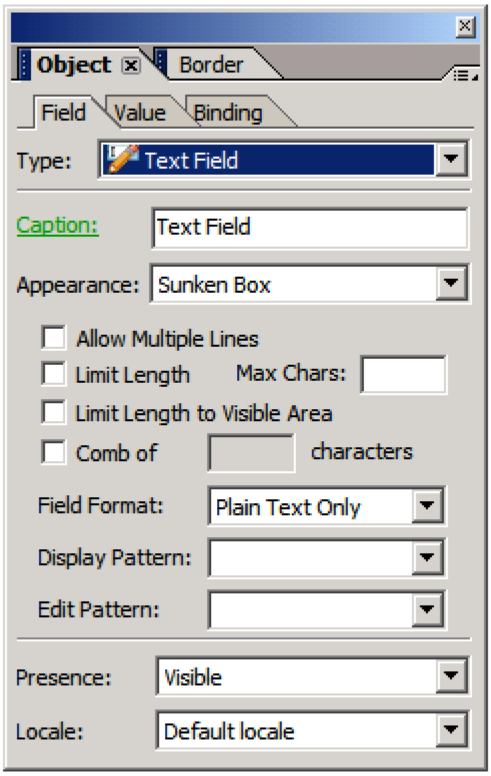
Context	Ina	Ger	Description
ZREX_INTERFACE			
CARRID			Airline Code

Property	Value

Property	Value
General	
Name	CARRID
Description	Airline Code
Status	Active


Layout
Edit View Insert Table Layout Tools Palettes Help
81%
Times New Roman
12
Show: initialize
Language:
Run At: Client
Design View
Master Pages
Preview PDF
My Thesis Test
Library
My Favorites
Check Box
Circle
Drop-down List
Email Submit Button
Image
Line
List Box
Numeric Field
Print Button
Radio Button
Rectangle
Text Field
Text
Standard
Button
Check Box
Circle
Content Area
Date/Time Field
Decimal Field
Drop-down List
Email Submit Button
Image Field
Image
HTTP Submit Button
Line
List Box
Numeric Field
Paper Forms Barcode
Password Field
Print Button
Radio Button
Rectangle
Reset Button
Document Signature Field
Table
Subform
Text
Text Field
Custom
Barcodes
AUS Post Custom2
AUS Post Custom3
AUS Post Reply Paid
AUS Post Standard
Codabar
Code 11


Layout
Edit View Insert Table Layout Tools Palettes Help
81%
Arial
10
Show: initialize
Language: FormCalc
Run At: Client
Workspace
✓ Toolbars
✓ Script Editor Ctrl+Shift+F5
Hierarchy Shift+F11
Data View
✓ Library Shift+F10
Layout Shift+F9
Border Shift+F8
Object Shift+F7
Accessibility Shift+F6
Font Shift+F4
Paragraph Shift+F5
Drawing Aids
Info
Report
How To
Design View
Master Pages
Preview PDF
My Thesis Test
Text Field
Library
My Favorites
Check Box
Circle
Drop-down List
Email Submit Button
Image
Line
List Box
Numeric Field
Print Button
Radio Button
Rectangle
Text Field
Text
Standard
Button
Check Box
Circle
Content Area
Date/Time Field
Decimal Field
Drop-down List
Email Submit Button
Image Field
Image
HTTP Submit Button
Line
List Box
Numeric Field
Paper Forms Barcode
Password Field
Print Button
Radio Button
Rectangle
Reset Button
Document Signature Field
Table
Subform
Text
Text Field
Custom
Barcodes
AUS Post Custom2
AUS Post Custom3
AUS Post Reply Paid
AUS Post Standard
Codabar
Code 11



Type: Text Field

Caption: Text Field

Appearance: Sunken Box

□ Allow Multiple Lines

□ Limit Length Max Chars:

□ Limit Length to Visible Area

□ Comb of characters

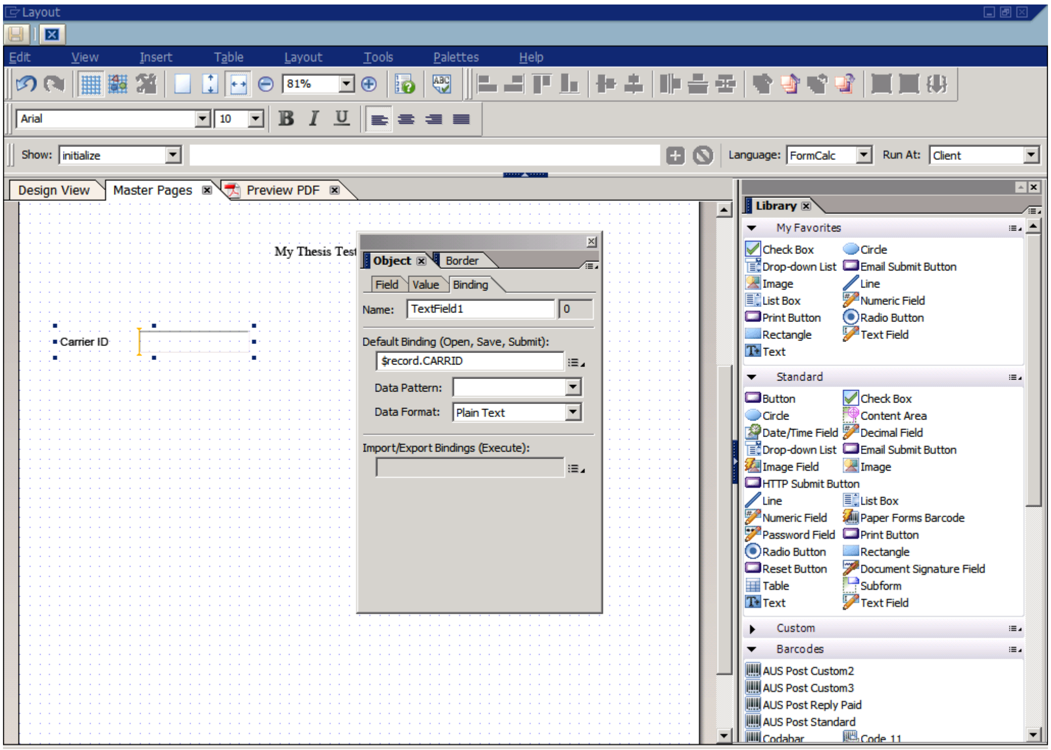
Field Format: Plain Text Only

Display Pattern:

Edit Pattern:

Presence: Visible

Locale: Default locale



81%

Arial 10

Show: initialize

Language: FormCalc Run At: Client

Name: TextField1 0

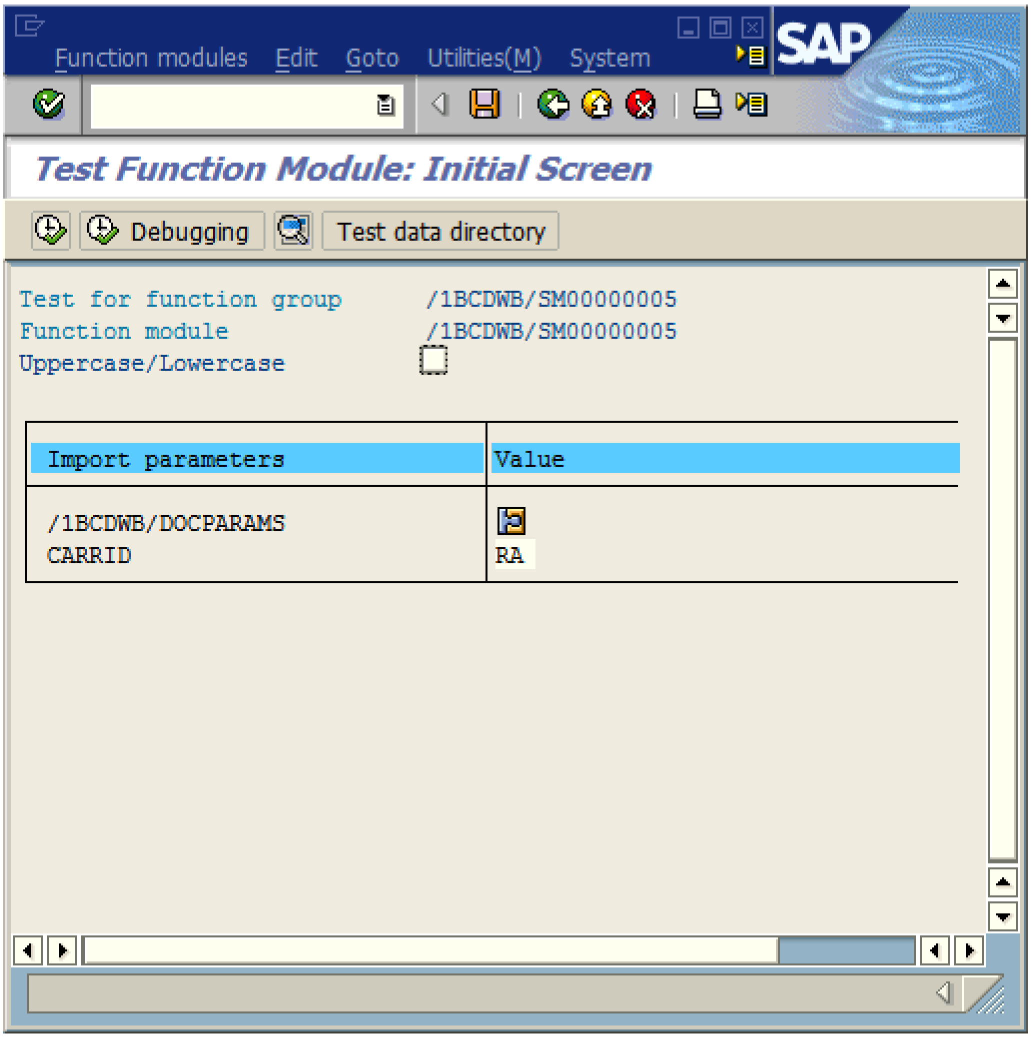
Default Binding (Open, Save, Submit):

$record.CARRID

Data Pattern:

Data Format: Plain Text

Import/Export Bindings (Execute):



Test Function Module: Initial Screen

Test for function group /1BCDWB/SM00000005
Function module /1BCDWB/SM00000005
Uppercase/Lowercase □

Import parameters	Value
/1BCDWB/DOCPARAMS	
CARRID	RA

.