

# SAP Application Development

Adrian Streitz, Johannes Rank, Borys Levkovskyi



# Prerequisites

---

- Fundamental programming skills
- Recommended: Experience in software development with Eclipse

# Agenda

- I. Application development with SAP**
- II. Technical basis**
- III. Introduction to SAP GUI**
- IV. Introduction to ABAP for Eclipse**
- V. Setting up the development environment**

# I. Application Development with SAP

## Introduction

---

- SAP is one of the largest providers of enterprise applications worldwide
- SAP software is highly customizable on individual business processes
- SAP offers different possibilities to extend its software and develop own applications based on its infrastructure
- The core of application of programming in SAP is the proprietary programming language called ABAP
- But: current trends lead to an increasing demand for web-based and mobile applications
- New SAP technologies provide the possibility to react to new trends and still be compatible with the existing solutions

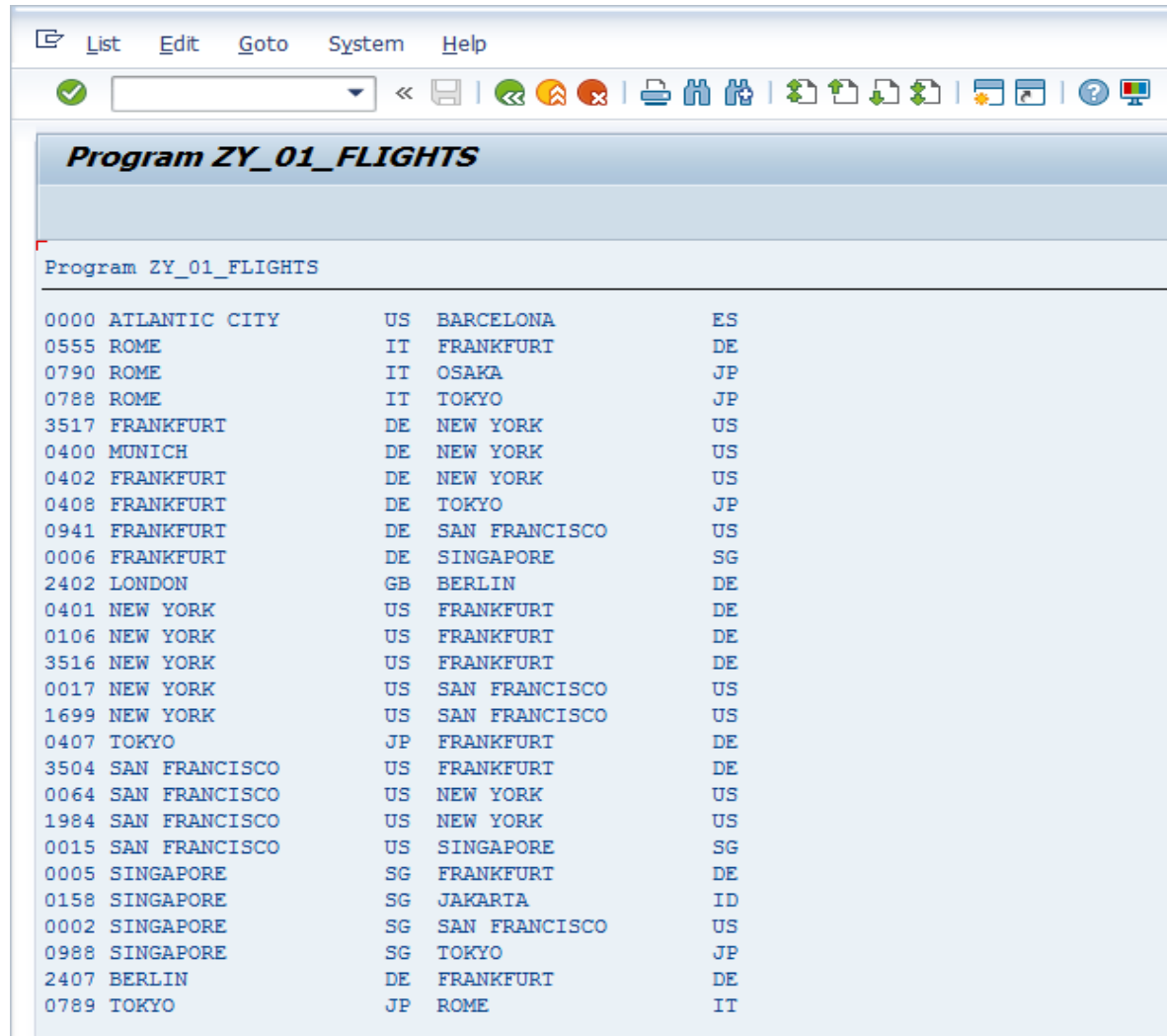
# Application program types

| Type                  | Description  | Programming languages   |
|-----------------------|--|-------------------------|
| Report                | <ul style="list-style-type: none"><li>• Executable programs</li><li>• Processing and displaying of data</li></ul>  | ABAP                    |
| Dynpro                | <ul style="list-style-type: none"><li>• Application programs with user interface within SAP GUI</li><li>• Handling user interaction with SAP GUI</li></ul> | ABAP                    |
| Business Server Pages | <ul style="list-style-type: none"><li>• Web-based applications</li><li>• Creating HTML pages with ABAP</li></ul>   | HTML, HTMLB, ABAP       |
| Web Dynpro            | <ul style="list-style-type: none"><li>• Web-based applications</li><li>• Creating web pages solely with ABAP</li></ul>                                     | ABAP                    |
| SAPUI5                | <ul style="list-style-type: none"><li>• Web and mobile applications</li><li>• Focus on increased usability</li></ul>                                       | HTML5, JavaScript, ABAP |



# I. Application Development with SAP

## Report



**Program ZY\_01\_FLIGHTS**

Program ZY\_01\_FLIGHTS

|      |               |    |               |    |
|------|---------------|----|---------------|----|
| 0000 | ATLANTIC CITY | US | BARCELONA     | ES |
| 0555 | ROME          | IT | FRANKFURT     | DE |
| 0790 | ROME          | IT | OSAKA         | JP |
| 0788 | ROME          | IT | TOKYO         | JP |
| 3517 | FRANKFURT     | DE | NEW YORK      | US |
| 0400 | MUNICH        | DE | NEW YORK      | US |
| 0402 | FRANKFURT     | DE | NEW YORK      | US |
| 0408 | FRANKFURT     | DE | TOKYO         | JP |
| 0941 | FRANKFURT     | DE | SAN FRANCISCO | US |
| 0006 | FRANKFURT     | DE | SINGAPORE     | SG |
| 2402 | LONDON        | GB | BERLIN        | DE |
| 0401 | NEW YORK      | US | FRANKFURT     | DE |
| 0106 | NEW YORK      | US | FRANKFURT     | DE |
| 3516 | NEW YORK      | US | FRANKFURT     | DE |
| 0017 | NEW YORK      | US | SAN FRANCISCO | US |
| 1699 | NEW YORK      | US | SAN FRANCISCO | US |
| 0407 | TOKYO         | JP | FRANKFURT     | DE |
| 3504 | SAN FRANCISCO | US | FRANKFURT     | DE |
| 0064 | SAN FRANCISCO | US | NEW YORK      | US |
| 1984 | SAN FRANCISCO | US | NEW YORK      | US |
| 0015 | SAN FRANCISCO | US | SINGAPORE     | SG |
| 0005 | SINGAPORE     | SG | FRANKFURT     | DE |
| 0158 | SINGAPORE     | SG | JAKARTA       | ID |
| 0002 | SINGAPORE     | SG | SAN FRANCISCO | US |
| 0988 | SINGAPORE     | SG | TOKYO         | JP |
| 2407 | BERLIN        | DE | FRANKFURT     | DE |
| 0789 | TOKYO         | JP | ROME          | IT |

# I. Application Development with SAP Dynpro

**Salesperson Support Admin GUI**

Create Salesperson   Create Customer   Create Product   Create Order

Salespersons   Customers   Products   Orders

Filter ID:  Qualification: ☐ Representative:  Filter Show All

| Salesperson ID | Title | First Name | Last Name   | Sales Qualifications                     | Email                 | Representative: First I |
|----------------|-------|------------|-------------|--|-----------------------|-------------------------|
| 24             | MRS   | BARBARA    | SMITH       | LAWN MOWER                               | BARBARA.SMITH@WEB.DE  | HOWARD                  |
| 26             | MR    | HOWARD     | WEBB        | VACUUM CLEANER; LAWN MOWER; GARDEN TOOLS | HOWARD.WEBB@GMAIL.COM | JULIA                   |
| 32             | MR    | AARON      | BROOKS      | VACUUM CLEANER                           | AARON.BROOKS@WEB.DE   | JULIA                   |
| 35             | MRS   | TIFFANY    | HUBER       | HEDGE CLIPPERS; GARDEN TOOLS             | TIFFANY.HUBER@GMX.COM | HOWARD                  |
| 37             | MRS   | AMANDA     | RICKY       | VACUUM CLEANER; HEDGE CLIPPERS           | AMANADA.RICK@WEB.DE   | BARBARA                 |
| 42             | MRS   | CORNELIA   | BLUM        | VACUUM CLEANER; PRESSURE WASHER          | DELETE@ME.COM         | HOWARD                  |
| 51             | MR    | JAMES      | LAST        | PRESSURE WASHER                          | MYMAIL@DOMAIN.DE      | TIFFANY                 |
| 54             | MR    | MAX        | MEIER       | VACUUM CLEANER                           | MAX.MEIER@GMAIL.COM   | AARON                   |
| 65             | MRS   | VIOLA      | BAUMGARTNER | HEDGE CLIPPERS; PRESSURE WASHER          | V_BAUM@GMX.DE         | TIFFANY                 |
| 67             | MRS   | MARION     | SCHMIDT     | PRESSURE WASHER                          | M.SCHMIDT@TUM.DE      | TIFFANY                 |
|                |       |            |             |  |                       |                         |
|                |       |            |             |  |                       |                         |
|                |       |            |             |  |                       |                         |
|                |       |            |             |  |                       |                         |
|                |       |            |             |  |                       |                         |







Show Details   Change selected Salesperson   Delete selected Salesperson

# I. Application Development with SAP

## Business Server Pages

Display all data of table spfli

| Airline | Connection | Departure airport | Arrival airport | Departure time | Arrival time |
|---------|------------|-------------------|-----------------|----------------|--------------|
|         | 0000       |                   |                 | 000000         | 000000       |
| AA      | 0017       | JFK               | SFO             | 110000         | 140100       |
| AA      | 0064       | SFO               | JFK             | 090000         | 172100       |
| AZ      | 0555       | FCO               | FRA             | 190000         | 210500       |
| AZ      | 0788       | FCO               | TYO             | 120000         | 085500       |
| AZ      | 0789       | TYO               | FCO             | 114500         | 192500       |
| AZ      | 0790       | FCO               | KIX             | 103500         | 081000       |
| DL      | 0106       | JFK               | FRA             | 193500         | 093000       |
| DL      | 1699       | JFK               | SFO             | 171500         | 203700       |
| DL      | 1984       | SFO               | JFK             | 100000         | 182500       |
| JL      | 0407       | NRT               | FRA             | 133000         | 173500       |
| JL      | 0408       | FRA               | NRT             | 202500         | 154000       |
| LH      | 0400       | FRA               | JFK             | 110000         | 143500       |
| LH      | 0401       | JFK               | FRA             | 193000         | 084500       |
| LH      | 0402       | FRA               | JFK             | 133000         | 150500       |
| LH      | 2402       | FRA               | SXF             | 103000         | 115500       |
| LH      | 2407       | TXL               | FRA             | 071000         | 081500       |
| QF      | 0005       | SIN               | FRA             | 225000         | 053500       |
| QF      | 0006       | FRA               | SIN             | 205500         | 150500       |
| SQ      | 0002       | SIN               | SFO             | 170000         | 192500       |
| SQ      | 0015       | SFO               | SIN             | 160000         | 024500       |
| SQ      | 0158       | SIN               | JKT             | 152500         | 160000       |
| SQ      | 0988       | SIN               | TYO             | 163500         | 001500       |
| UA      | 0941       | FRA               | SFO             | 143000         | 170600       |
| UA      | 3504       | SFO               | FRA             | 150000         | 103000       |
| UA      | 3516       | JFK               | FRA             | 162000         | 054500       |
| UA      | 3517       | FRA               | JFK             | 104000         | 125500       |

| All connections   |     |    |      |     |               |     |     |               |     |           |        |         |            |    |         |                         |
|---|-----|----|------|-----|---------------|-----|-----|---------------|-----|-----------|--------|---------|------------|----|---------|-------------------------|
|   | MDT | ID | Nr   | Lnd | Abflugstadt   | FLH | Lnd | Ankunftstadt  | FLH | Flugdauer | Abflug | Ankunft | Entf       | In | Charter | Ankunft n Tag(e) später |
|   | 600 |    | 0000 | US  | ATLANTIC CITY |     | ES  | BARCELONA     |     | 0:00      | 00:00  | 00:00   | 0,0000     |    |         | 0                       |
|   | 600 | AA | 0017 | US  | NEW YORK      | JFK | US  | SAN FRANCISCO | SFO | 6:22      | 11:00  | 14:01   | 2.572,0000 | MI |         | 0                       |
|   | 600 | AA | 0064 | US  | SAN FRANCISCO | SFO | US  | NEW YORK      | JFK | 5:21      | 09:00  | 17:21   | 2.572,0000 | MI | X       | 0                       |
|   | 600 | AZ | 0555 | IT  | ROME          | FCO | DE  | FRANKFURT     | FRA | 2:05      | 19:00  | 21:05   | 845,0000   | MI |         | 0                       |
|   | 600 | AZ | 0788 | IT  | ROME          | FCO | JP  | TOKYO         | TYO | 12:55     | 12:00  | 08:55   | 6.130,0000 | MI |         | 1                       |
|    Zeile 1 von 27    |     |    |      |     |               |     |     |               |     |           |        |         |            |    |         |                         |



# I. Application Development with SAP

## Web Dynpro


### SAP for University Management

Welcome to SAP for University Management! This tool allows you to manage room and lectures, as well as assign lectures to rooms.

#### Control Center

[Allocation of Lectures to Rooms](#)[Managing Lectures](#)[Managing Rooms](#)[Create new Room](#)

#### Overview over Rooms

|  | Room ID | Room Name                  | Location                   | Building                    | Available Equipment                               | Capacity | Floor |
|---|---------|----------------------------|----------------------------|-----------------------------|---|----------|-------|
|   | 01.789  | INTERMINS HÖRSAAL 2        | GARCHING-FORSCHUNGSZENTRUM | INTERIMS-GEBÄUDE            | MICROPHONE ; PROJECTOR ; RECORDING ; WHITEBOARD ; | 300      | 1     |
|   | 01.890  | PC LABOR I17               | GARCHING-FORSCHUNGSZENTRUM | MATHEMATIK-INFORMATIK (FMI) | PROJECTOR ; WHITEBOARD ; WORKSTATIONS ;           | 20       | 1     |
|   | 10.123  | BWL HÖRSAAL 3              | STAMMGELÄNDE               | WIRTSCHAFTSWISSENSCHAFTEN   | PROJECTOR ; WHITEBOARD ;                          | 40       | 3     |
|   | 01.123  | FRIEDRICH L. BAUER HÖRSAAL | GARCHING-FORSCHUNGSZENTRUM | MATHEMATIK-INFORMATIK (FMI) | MICROPHONE ; PROJECTOR ; RECORDING ; WHITEBOARD ; | 400      | 0     |
|   | 01.345  | HÖRSAAL 2                  | GARCHING-FORSCHUNGSZENTRUM | MATHEMATIK-INFORMATIK (FMI) | MICROPHONE ; PROJECTOR ; WHITEBOARD ;             | 200      | 0     |
|   | 01.456  | HÖRSAAL 3                  | GARCHING-FORSCHUNGSZENTRUM | MATHEMATIK-INFORMATIK (FMI) | PROJECTOR ; RECORDING ; WHITEBOARD ;              | 150      | 0     |
|   | 01.567  | INTERMINS HÖRSAAL 1        | GARCHING-FORSCHUNGSZENTRUM | INTERIMS-GEBÄUDE            | MICROPHONE ; PROJECTOR ; RECORDING ; WHITEBOARD ; | 0        | 1     |
|   |         |                            |                            |                             |   |          |       |
|   |         |                            |                            |                             |   |          |       |
|   |         |                            |                            |                             |   |          |       |

[Delete room](#)[Change room](#)

# I. Application Development with SAP

## SAPUI5

Create Purchase Order

General Data

\*Supplier: Olympic Protective Gear (101999)

\*Company Code: Global Bike Inc. (US00)

\*Currency: USD

\*Purchasing Group: North America (N00)

\*Purchasing Organization: GBI US (US00)

Total PO Value: 7000.00 USD

Items

General Data

Delivery Address

Process Flow

Delivery

Source of Supply

Account Assignment

Tax

| Item                               | Material Group   | Plant        | Quantity | Unit of Measure | Net Price | Per | Price Unit | Item Value          |
|------------------------------------|------------------|--------------|----------|-----------------|-----------|-----|------------|---------------------|
| Deluxe Touring Bike (red) (DXTR39) | Finished Bikes ( | DC Miami (M) | 5,000    | each (EA)       | 1.400     | USD | 1          | each (EA) 7.000 USD |

Delivery and Invoice

Payment Terms: Payable immediately Due net (0001)

0 Days 0,0 %

0 Days 0,0 %

0 Days Net

Exchange Rate: 1,00000

Invoicing Party: Olympic Protective Gear (101999)

Incoterm

Incoterm Location:

Submit

Simulate

Messages

Clear

Cancel

# SAP system architecture

Presentation

SAP GUI

...

SAP GUI

Web

Mobile

Application

Application  
Server

...

Application  
Server

Data

DB

...

DB

...

DB

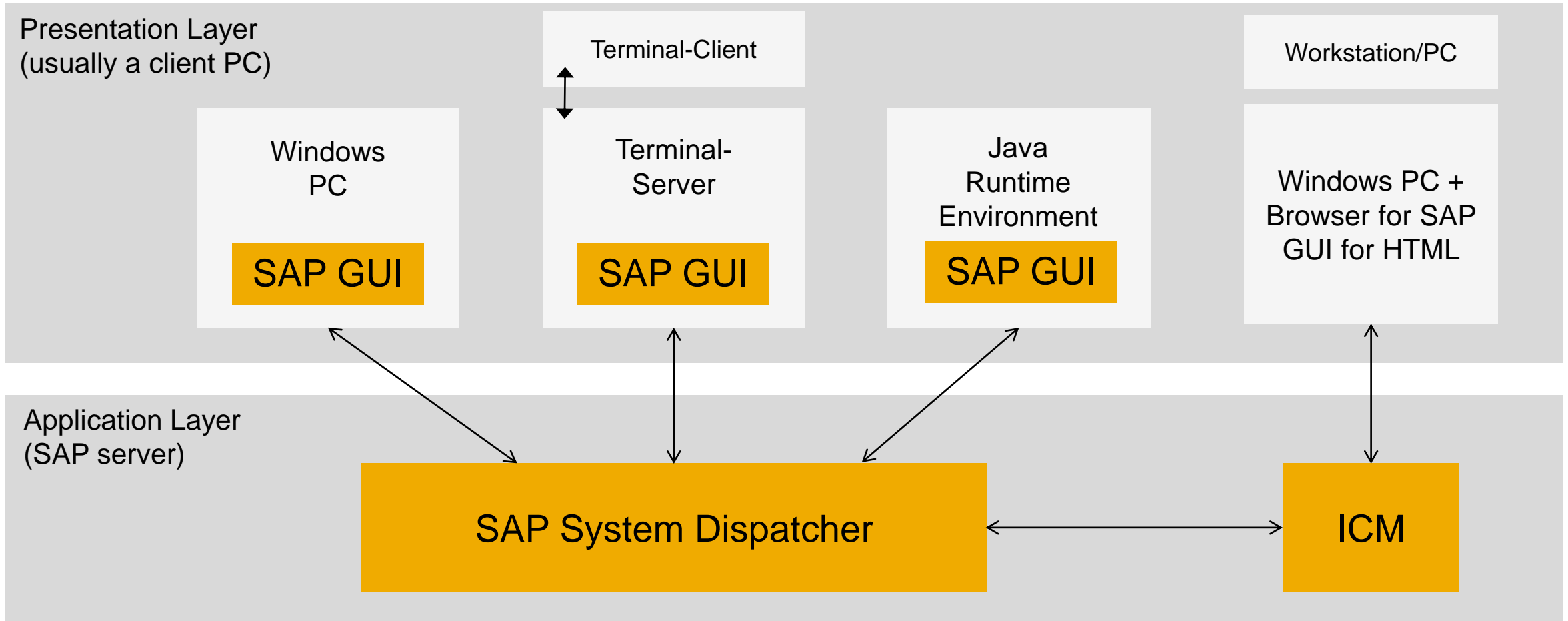
### III. Introduction to SAP GUI

# About the SAP GUI

---

- User interface for system interaction
- SAP GUI is offered on different platforms
  - Windows (most popular)
  - Java Environment
  - HTML
- All three offer the same basic functionality, but the **Windows client is recommended** by SAP
- Most SAP solutions are accessible via SAP GUI
- New SAP solutions are accessible via web browser, but still configurable via SAP GUI

### III. Introduction to SAP GUI Architecture



### III. Introduction to SAP GUI

# Login

- To login to an SAP system, a client, username and password is needed

The screenshot shows the SAP GUI login window. At the top, there is a menu bar with 'User', 'System', and 'Help'. Below the menu bar is a green checkmark icon, a dropdown menu, and navigation icons. The main area is titled 'SAP' and contains the following fields:

- New password
- Client: 100
- User: User
- Password: \*\*\*\*\*
- Logon Language: EN

The client is an organizational, legal and/or economical entity and has access to the systems data.

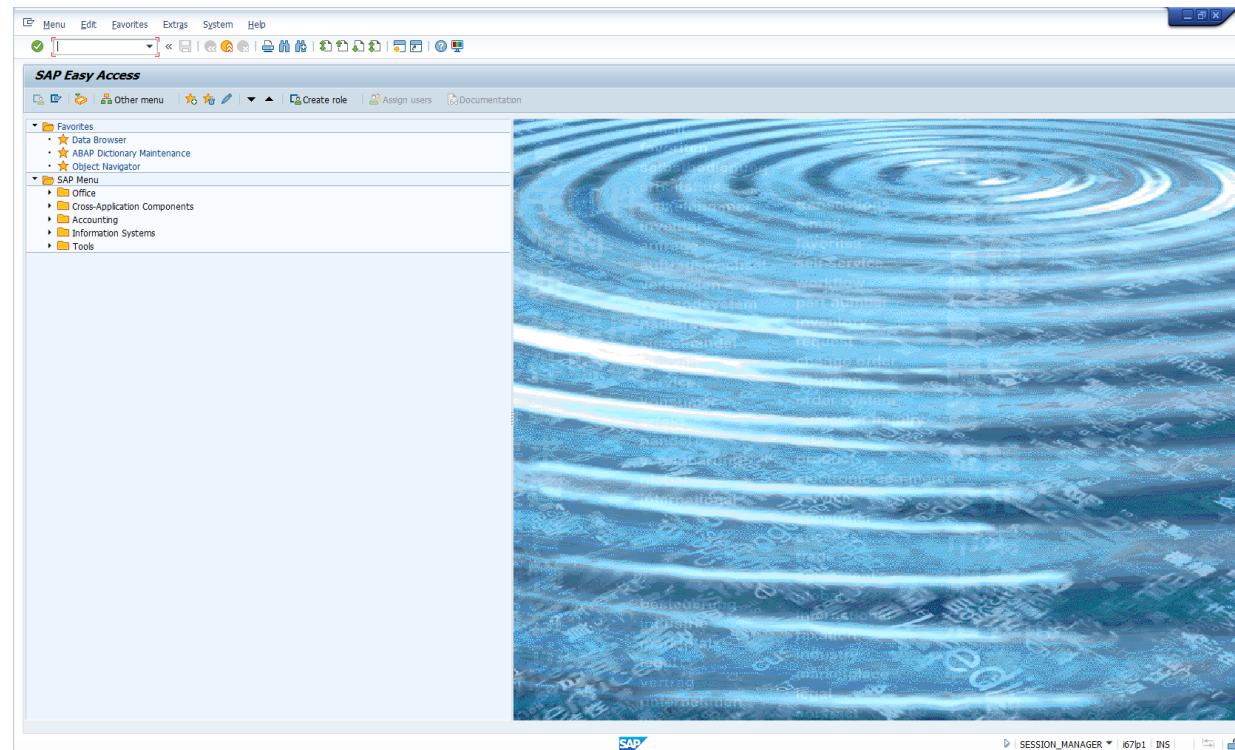
User data is saved dependent on the client where you are logged in.



### III. Introduction to SAP GUI

# SAP Easy Access

- The entrance screen of the SAP system is the SAP Easy Access menu



- The Easy Access menu can be designed individually for a specific role or user

### III. Introduction to SAP GUI

# System functions

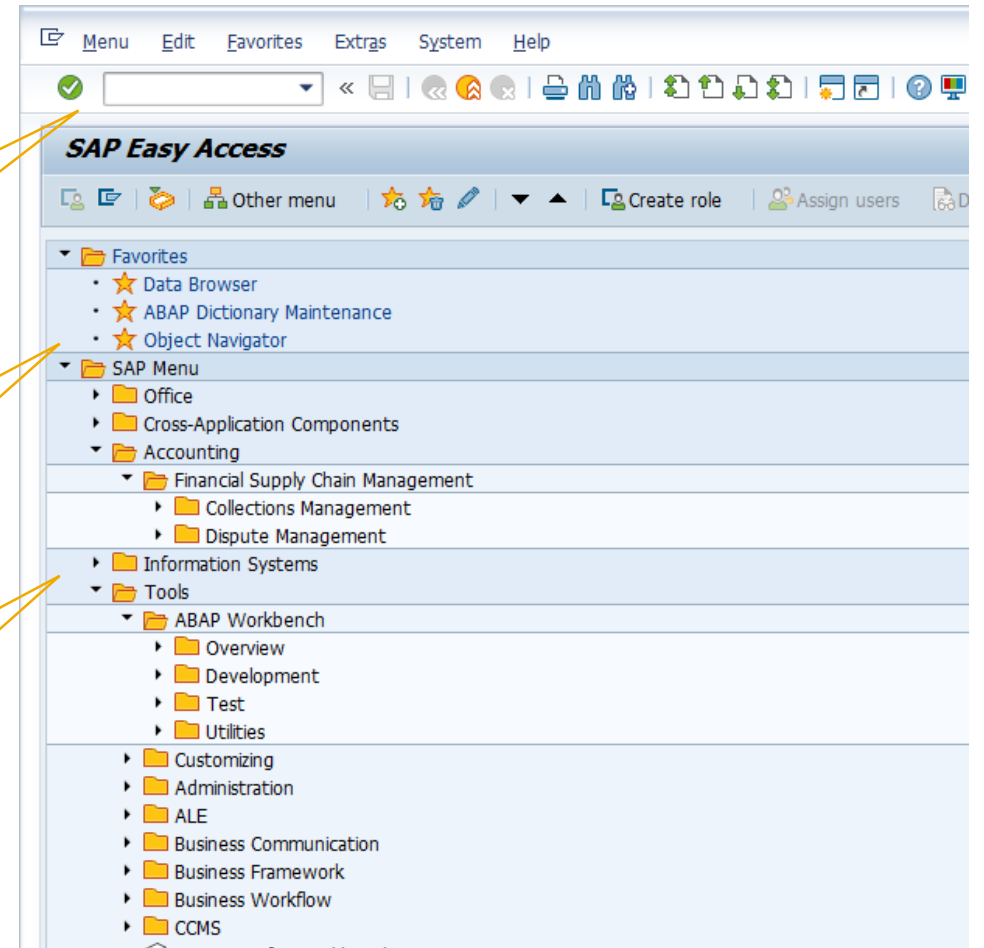
Functions can be called in three different ways

1. Input of transaction codes in the command line (TA-Code)
2. Entries in Favorite Menu or User Menu
3. Entries in the Menu Bar

1. Command line

2. Favorite Menu

3. Menu Bar



## IV. Introduction to ABAP for Eclipse

# About Eclipse

---

- SAP decided to enable ABAP application development in the Eclipse platform
- Eclipse is a widely used development IDE and the quasi standard for some languages like Java
- Eclipse is
  - open-source
  - has a plugin based architecture
  - and a massive developer and end-user base

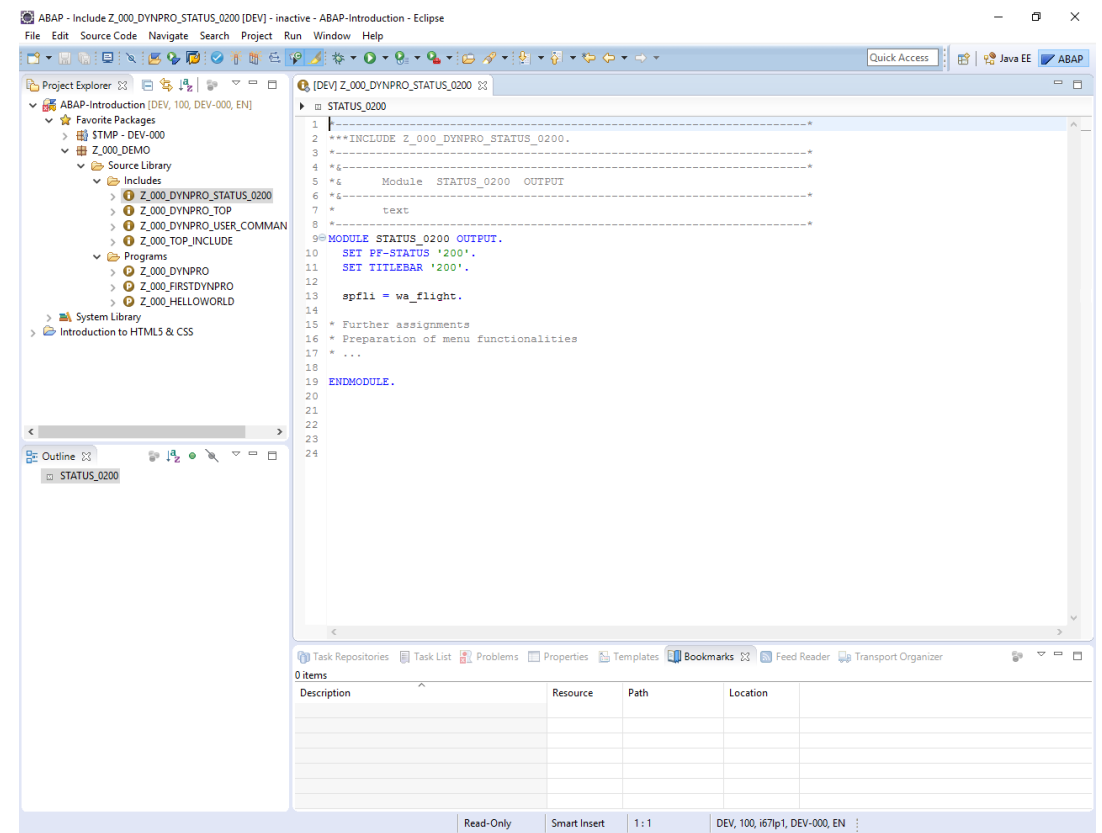


Source: The Eclipse Foundation (2016)

## IV. Introduction to ABAP for Eclipse

# Reasons to use Eclipse

- The ABAP Workbench within the SAP GUI is the main tool to develop ABAP applications
- It is a very powerful tool, but restrained by its historical and technological roots
- Eclipse is more modern and has nice usability features
- ABAP is more and more used in conjunction with different languages and technologies (e.g. JavaScript with SAPUI5)
- Benefit from HTML editor and code completion for ABAP and JavaScript
- Eclipse is still compatible with the existing SAP GUI



# Technical features and prerequisites

---

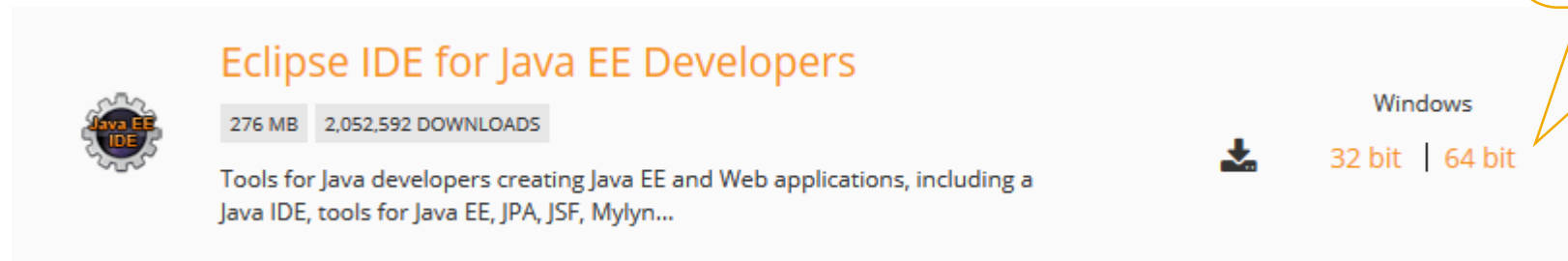
- ABAP code is completely developed online, i.e. on the server
- However, program code can be developed offline in Eclipse
- Eclipse needs a connection to the SAP system to pull the program code to Eclipse and push it back to the SAP system after saving it
- ABAP in Eclipse is delivered as an additional Eclipse plugin
- Prerequisites for development:
  - Eclipse IDE
  - SAP GUI for Windows
  - Java Runtime Environment
  - SAP system access data

## V. Setting up the development environment

### Step 1: Download Eclipse IDE

- Check if you have a current Java Runtime Environment installed
- Go to <https://eclipse.org/downloads/packages>
- Download a current version of the Eclipse IDE, we recommend the *Oxygen* release
- Choose *Eclipse IDE for Java EE Developers* as version
- Download and unzip the package to a preferred folder
- Start Eclipse

Depending on your installed JRE (Java Runtime Environment) decide the version of your Eclipse IDE.

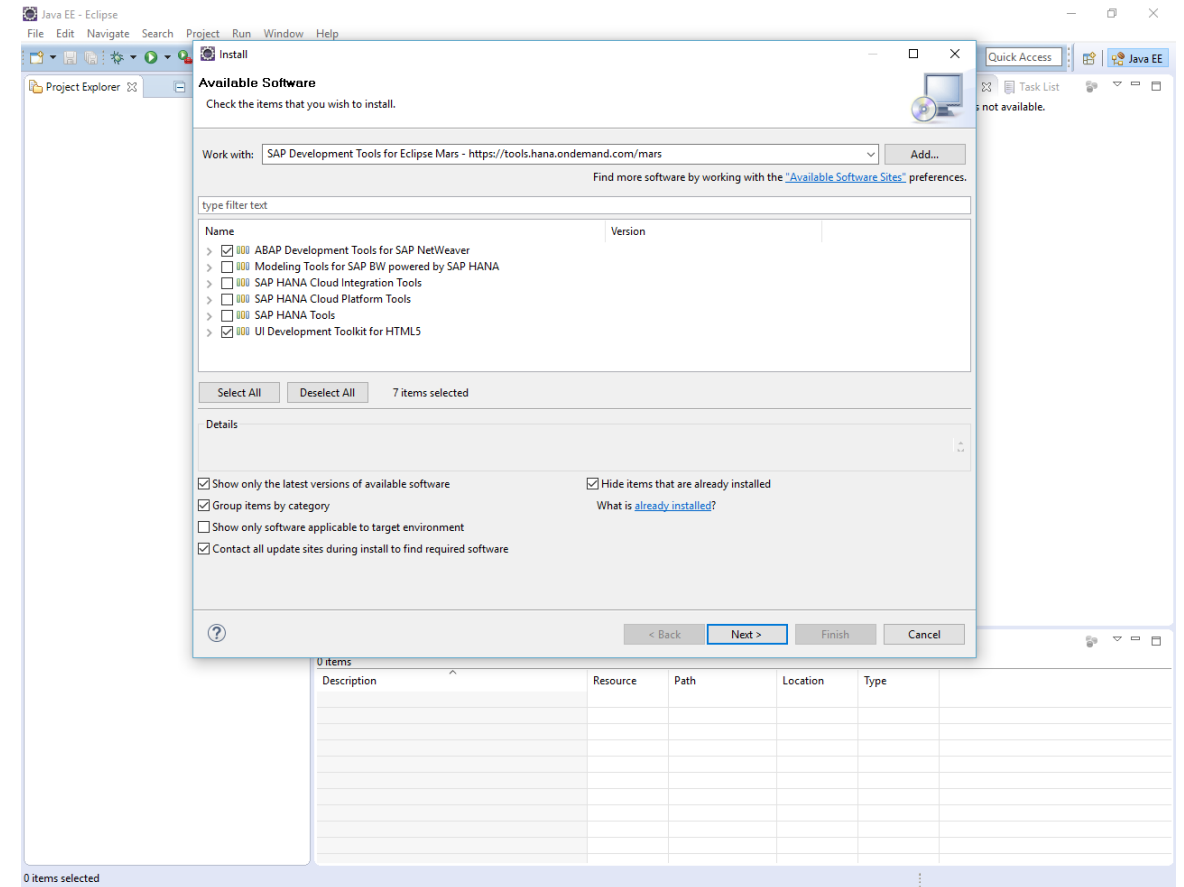




## V. Setting up the development environment

# Step 2: Install ABAP Plugin for Eclipse

- In the menu bar, choose *Help->Install New Software*
- Insert the link  
<https://tools.hana.ondemand.com/oxygen>  
(dependent on your Eclipse version)
- Choose ABAP and UI Development Tools
- Install the plugins



## V. Setting up the development environment

### Step 3: Connect to an SAP System

- Go to Window->Perspective->Open Perspective and open the ABAP perspective
- Go to File->New->Other->ABAP->ABAP Project
- Define the connection settings
- Login with your client, username, and password

System ID: DEV

---

Client: \* 100


User: \* DEV-000

Password: \* ••••••••

Language: \* EN

New ABAP Project

Connection Settings

 The selected system configuration has been changed, the new project will be independent from SAP Logon

Connection Parameters

System ID: \* DEV

Connection Type: Group Selection

Message Server: \* devz

Group: \* SPACE

Message Server Port: sapmsDEV

Application Server: \*

Instance Number: \* 00

SAProuter String: /H/saprouter.hcc.in.tum.de/S/3299/H/


Secure Network Settings

☐ Activate Secure Network Communication (SNC)

SNC Level: Highest available security level

SNC Name: \*

Single Sign-On (SSO): Disabled

 < Back Next > Finish Cancel

Now you know the basics about the Eclipse Development Environment and how it can be used for SAP application development.

To consolidate your knowledge, you can do tasks 1 to 5 of the *Introduction to SAP Programming* exercise.



# Check your knowledge

# Check your knowledge

---

- What is the difference between BSP, Web Dynpro, and SAPUI5?
- What are reasons to use Eclipse instead of the ABAP Workbench to develop applications with SAP?
- Which steps have to be processed to install ABAP for Eclipse?
  - ☐ Download and install Eclipse for ABAP development
  - ☐ Download a standard Eclipse version
  - ☐ Install an additional ABAP plugin for Eclipse

# Solution



# Solution

---

- What is the difference between BSP, Web Dynpro, and SAPUI5?

See section *application program types*

- What are reasons to use Eclipse instead of the ABAP Workbench to develop applications with SAP?

See section *Introduction to ABAP for Eclipse*

- Which steps have to be processed to install ABAP for Eclipse?

☐ Download and install Eclipse for ABAP development

☒ Download a standard Eclipse version

☒ Install an additional ABAP plugin for Eclipse

# References

---

- The Eclipse Foundation (2016): Eclipse Logos. Retrieved from <https://eclipse.org/artwork/>.

# © 2018 SAP SE or an SAP affiliate company. All rights reserved.

---

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP SE or an SAP affiliate company.

SAP and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP SE (or an SAP affiliate company) in Germany and other countries. Please see <http://global12.sap.com/corporate-en/legal/copyright/index.epx> for additional trademark information and notices.

Some software products marketed by SAP SE and its distributors contain proprietary software components of other software vendors.

National product specifications may vary.

These materials are provided by SAP SE or an SAP affiliate company for informational purposes only, without representation or warranty of any kind, and SAP SE or its affiliated companies shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP SE or SAP affiliate company products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warranty.

In particular, SAP SE or its affiliated companies have no obligation to pursue any course of business outlined in this document or any related presentation, or to develop or release any functionality mentioned therein. This document, or any related presentation, and SAP SE's or its affiliated companies' strategy and possible future developments, products, and/or platform directions and functionality are all subject to change and may be changed by SAP SE or its affiliated companies at any time for any reason without notice. The information in this document is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of their dates, and they should not be relied upon in making purchasing decisions.