



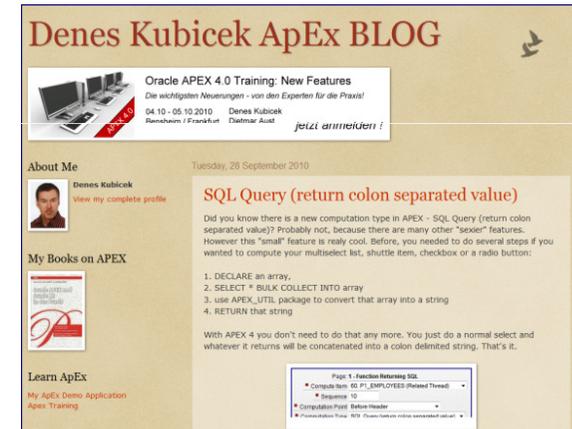
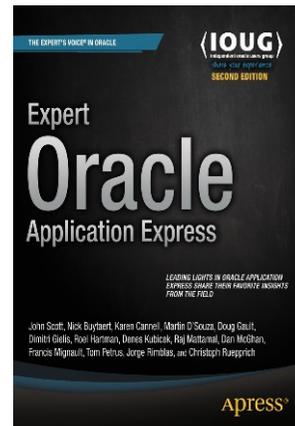
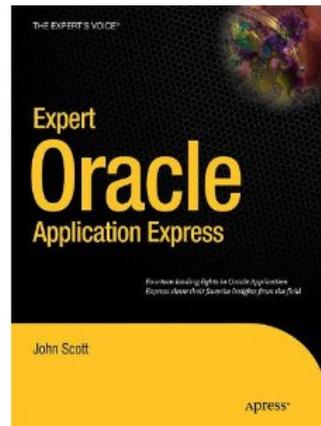
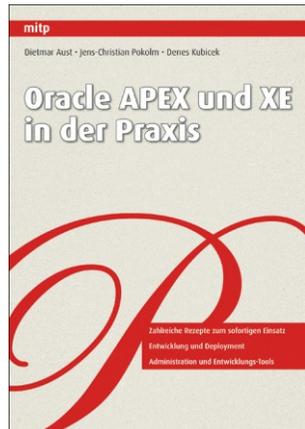
# **Installing Oracle XE with ORDS and Apache Tomcat or Oracle Glassfish Server**

Denes Kubicek

# Denes Kubicek

- We will keep this short:
  - My Name is Denes Kubicek – born 1965 in Croatia.
  - Working since 2007 as a freelancer on APEX and PL/SQL projects.
  - APEX Developer of the Year 2008.
  - Oracle ACE Director. The logo for Oracle ACE Director, featuring a yellow 'A' in a circle and the text 'ORACLE ACE Director'.
  - I have many customers in Germany, Switzerland and other countries around the world.
  - I am an active member of the APEX Forum and have more than 6000 postings – usually answering the questions.
  - Published three books on APEX – one in German and two books in English.
  - I have my own APEX blog:  
<http://www.deneskubicek.blogspot.de/>
  - You can always reach me under the following email address:  
[deneskubicek@yahoo.de](mailto:deneskubicek@yahoo.de)

# Denes Kubicek



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# Agenda

- Why using ORDS / Tomcat / Glassfish?
- Things to consider
- Understanding the Architecture
- Installing Glassfish Server
- Installing Tomcat Server
- Setting up ORDS
- Getting the components together



**Why using ORDS / Tomcat / Glassfish?**

# Why ORDS?

- Oracle REST Data Services (ORDS) is a Java EE-based alternative for Oracle HTTP Server (OHS) and mod\_plsql.
- The Java EE implementation offers increased functionality including command line based configuration, enhanced security, file caching and RESTful Web Services.
- Oracle REST Data Services also provides increased flexibility by supporting deployments using Oracle WebLogic Server, Oracle Glassfish Server, Apache Tomcat, and a standalone mode.

# Why ORDS?

- If using a setup with Oracle RDS, you can provide RESTFul Web Services using APEX Builder interface.
- If using Oracle RDS, you can use native Excel file upload in your APEX applications by extending the defaults.xml file:

```
<properties>
...
<entry key="apex.excel2collection">true</entry>
<entry key="apex.excel2collection.onecollection">true</entry>
<entry key="apex.excel2collection.name">EXCEL_COLLECTION</entry>
<entry key="apex.excel2collection.useSheetName">true</entry>
</properties>
```

# Why this kind of setup at all?

- Infrastructure for Oracle APEX production environments often poorly configured:
  - Still use the embedded PL/SQL gateway
  - ORDS connection pool not properly configured
- People find it hard to implement the recommended setup with an Apache http server and ORDS, because it seems to be complicated
- My personal interest:
  - Want to have a step-by-step guide to implement the recommended architecture
  - Want to have a presentation to educate my clients regarding the architecture and the best setup

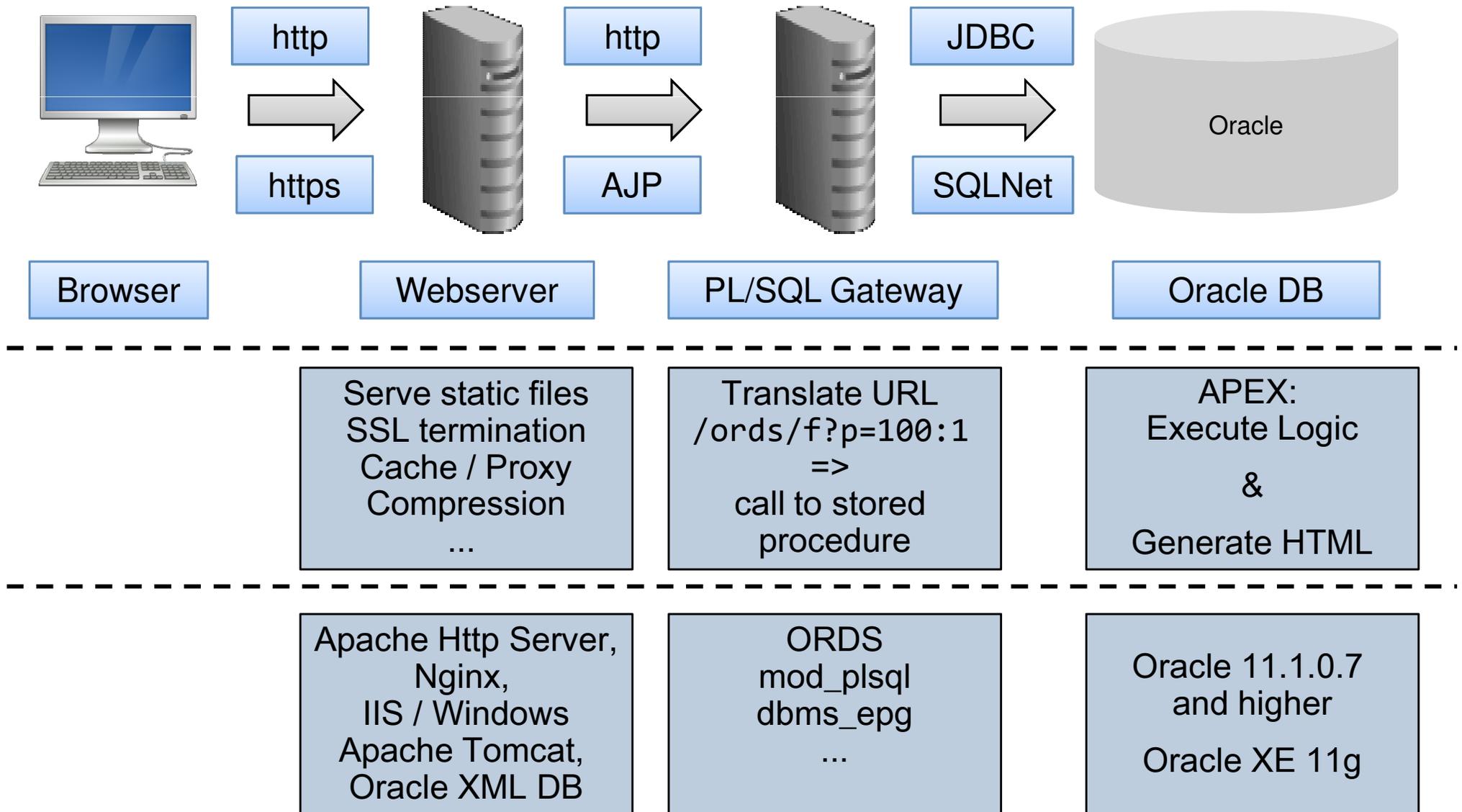
# Prerequisites

- Download Oracle REST Data Services (ORDS) here:
  - <http://www.oracle.com/technetwork/developer-tools/rest-data-services/downloads/index.html>
- Download Glassfish here:
  - <http://www.oracle.com/technetwork/java/javaee/downloads/ogs-3-1-1-downloads-439803.html>
- You will need Java installed on your server, in order to configure ORDS
- Download Tomcat (newest version) here:
  - <http://tomcat.apache.org/>



# Understanding the Architecture

# Understanding the Architecture



# Understanding the Architecture

- The WORK is done IN THE DATABASE
- The Webserver and PL/SQL gateway don't need a lot of processing power, most of the time idle

# Understanding the Architecture

- The components in this presentation:
- Windows 8 64 bit (virtual machine)
- Tomcat 8
- Oracle Glassfish 3.1.2.2
- ORDS 3.0
- Oracle XE 11g
- APEX 5.0.0

# Understanding the Architecture

ORDS 2.0

APEX\_PUBLIC\_USER

APEX / OWA main connection pool

Size according to number of concurrent apex users

OPTIONALLY installed  
when using  
REST services

APEX\_LISTENER *(with APEX 4.2.2+)*

Reads REST Definitions from repository APEX\_040200

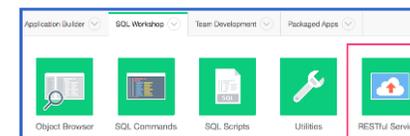
APEX\_REST\_PUBLIC\_USER *(with APEX 4.2.2+)*

REST Connection pool for all REST operations

Size according to concurrent REST calls



- Users APEX\_LISTENER and APEX\_REST\_PUBLIC\_USER were created using the script `apex_rest_config.sql` as part of the APEX installation.



# Understanding the Architecture

ORDS 3.0

- ORDS 3.0 support RESTful Webservices **even without APEX**

APEX\_PUBLIC\_USER

APEX / OWA main connection pool

Size according to number of concurrent apex users

ORDS\_METADATA

Stores REST Definitions

ORDS\_PUBLIC\_USER

REST Connection pool for all REST operations

Size according to concurrent REST calls

- **Currently there is still the need for the users APEX\_LISTENER and APEX\_REST\_PUBLIC\_USER:**

- **The new download of static application files and static workspace files require it**
- So that you can continue to use the management interface in the SQL Workshop (else you have to use SQL Developer)



# Understanding the Architecture

- Should we migrate the existing RESTful definitions in our APEX environment?
  - => **!!! NO !!!**
- What happens?
  - They get copied over from APEX\_050000 => ORDS\_METADATA
  - Now they exist in two places redundantly
  - In this situation the definition stored in ORDS\_METADATA “wins” over the definition stored in APEX
  - Through the management interface in APEX you still manage the “OLD” definition
- This is too confusing, thus:
  - Keep the definitions separate
  - Either create new ones with SQL Dev directly or still using the SQL Workshop in APEX



# **Installing Glassfish Server**

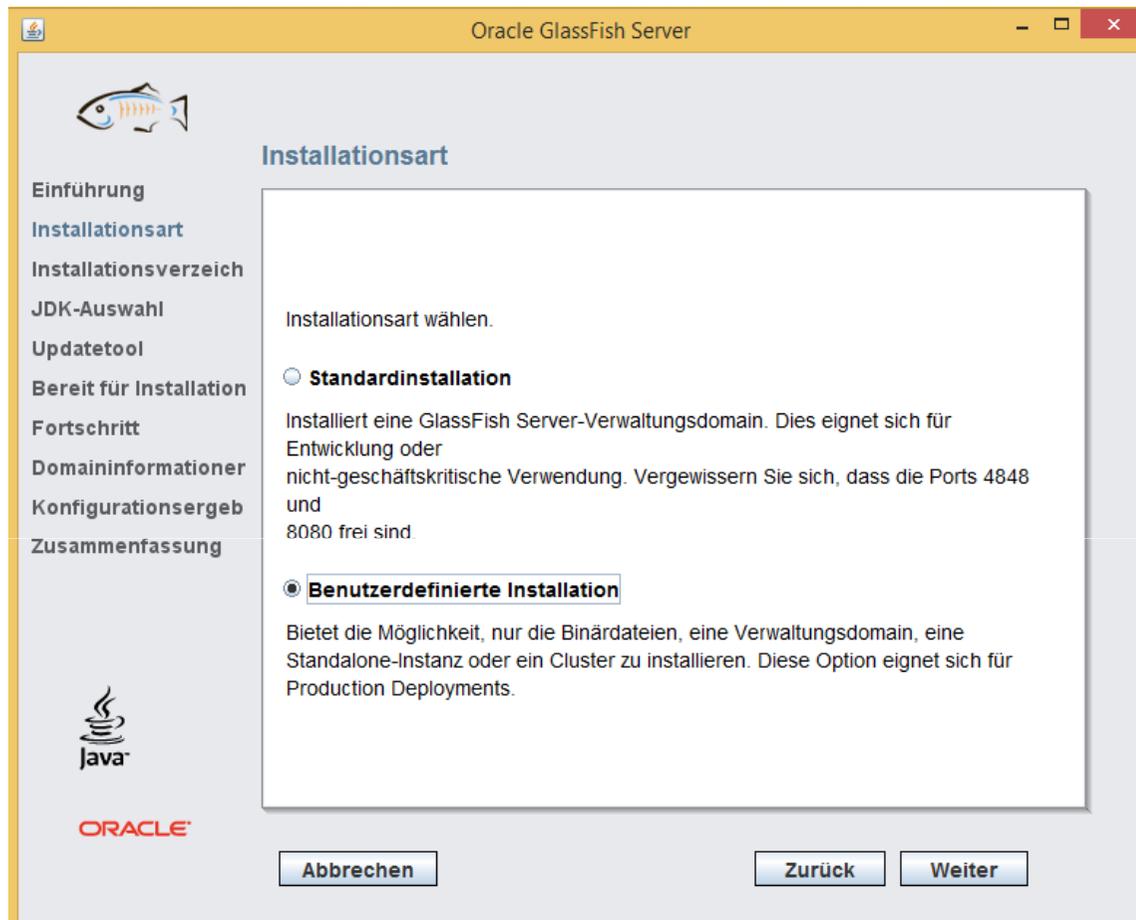
# Installing Glassfish Server

- Starting Glasfish installation.



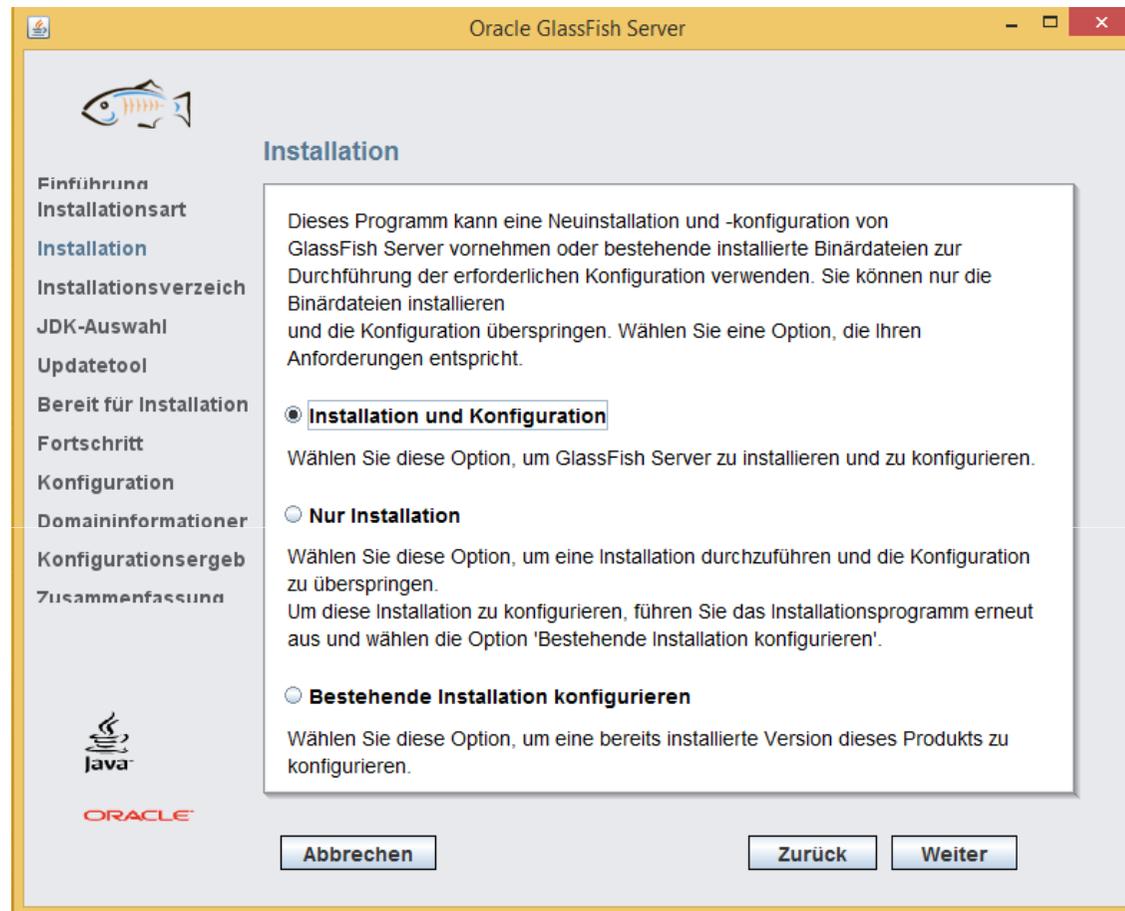
# Installing Glassfish Server

- Installation is Custom.



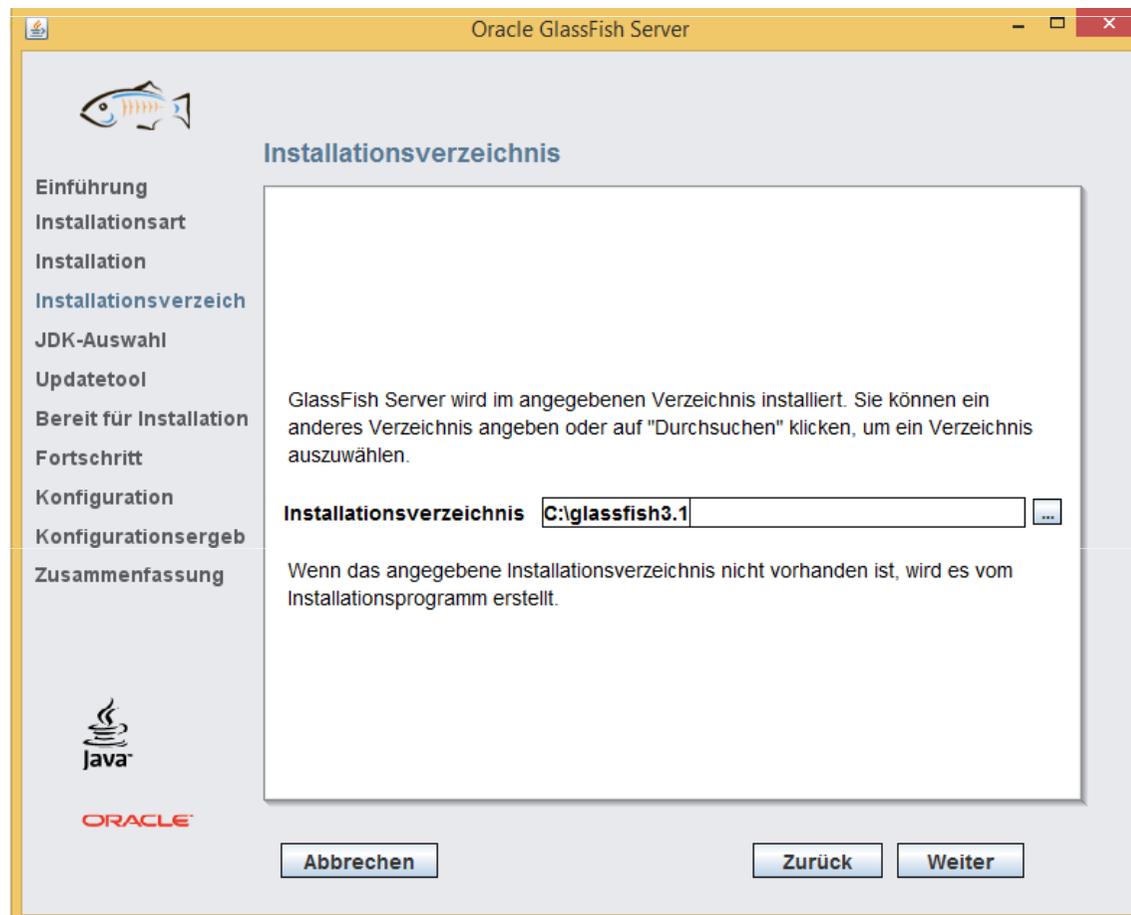
# Installing Glassfish Server

- Installation and Configuration.



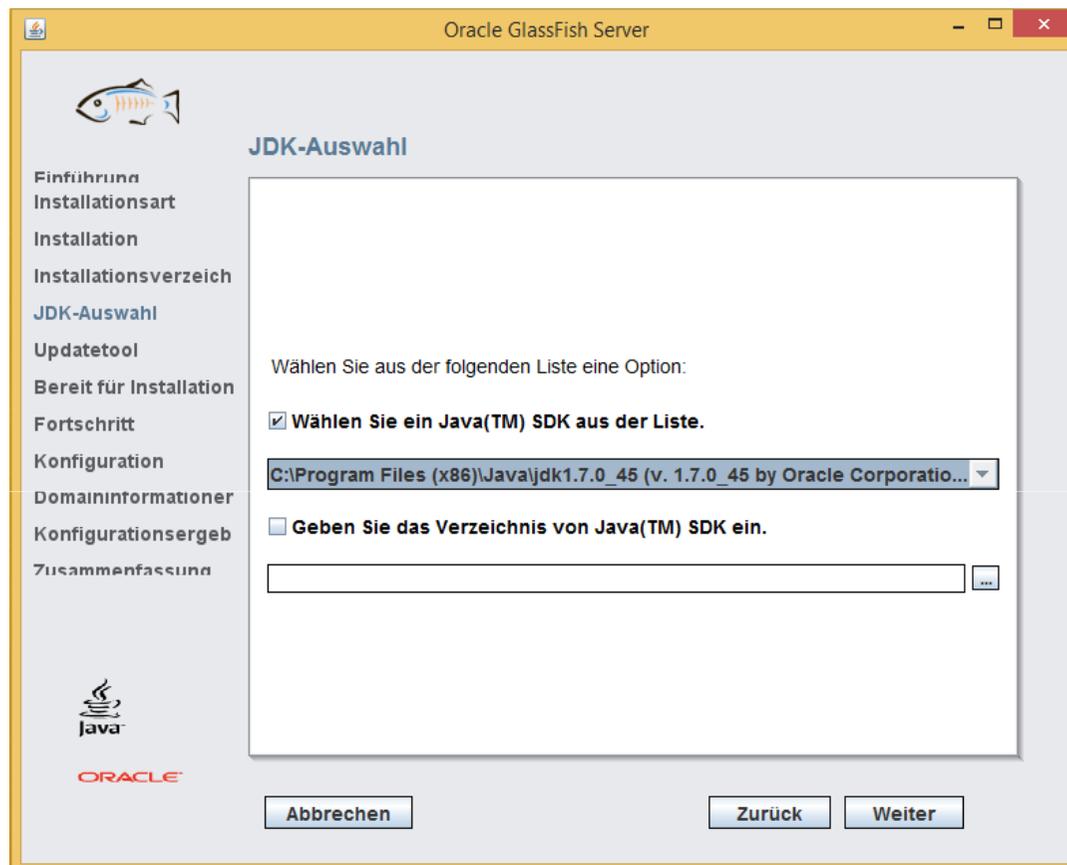
# Installing Glassfish Server

- Installation Folder.



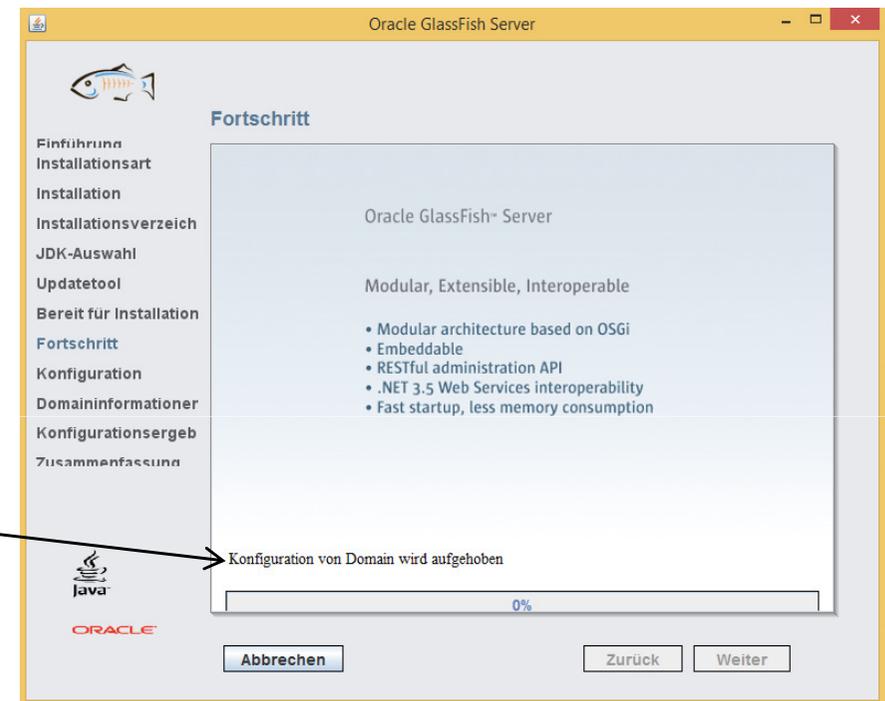
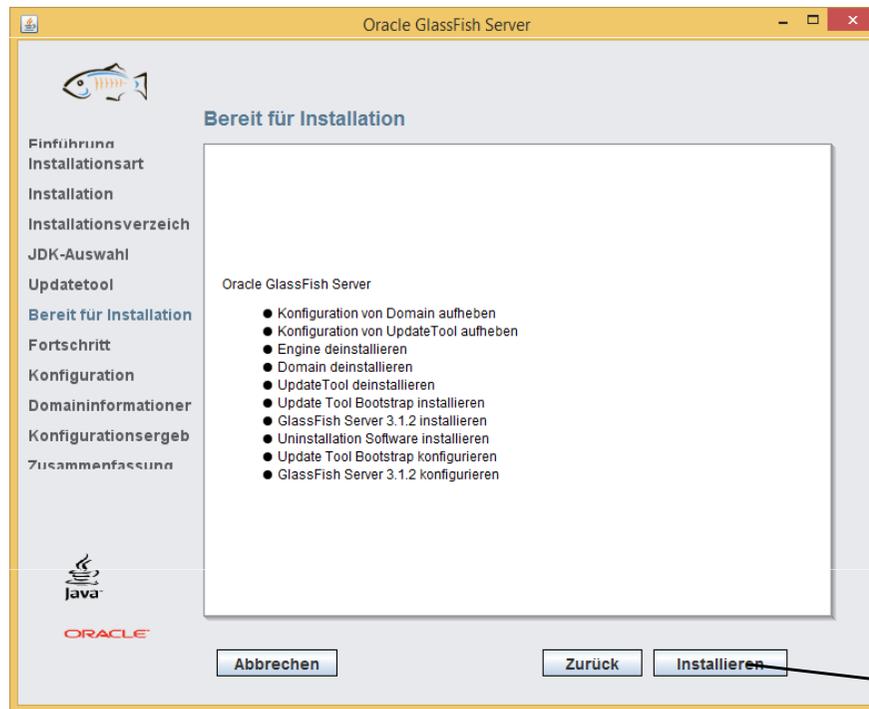
# Installing Glassfish Server

- Make sure you have Java SDK installed on your machine. Use 32-bit Java version on Windows 64-bit.



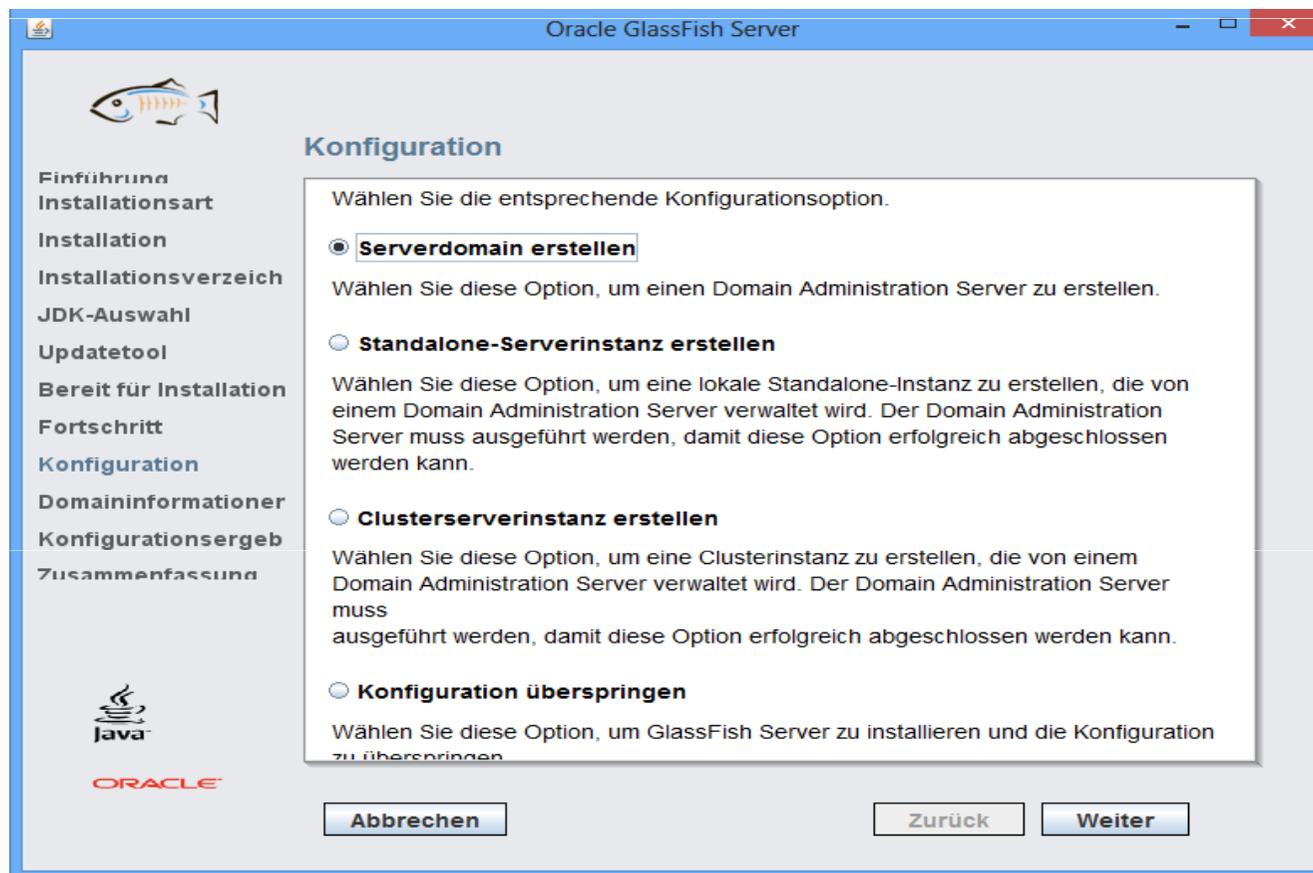
# Installing Glassfish Server

- Confirm and start the installation.



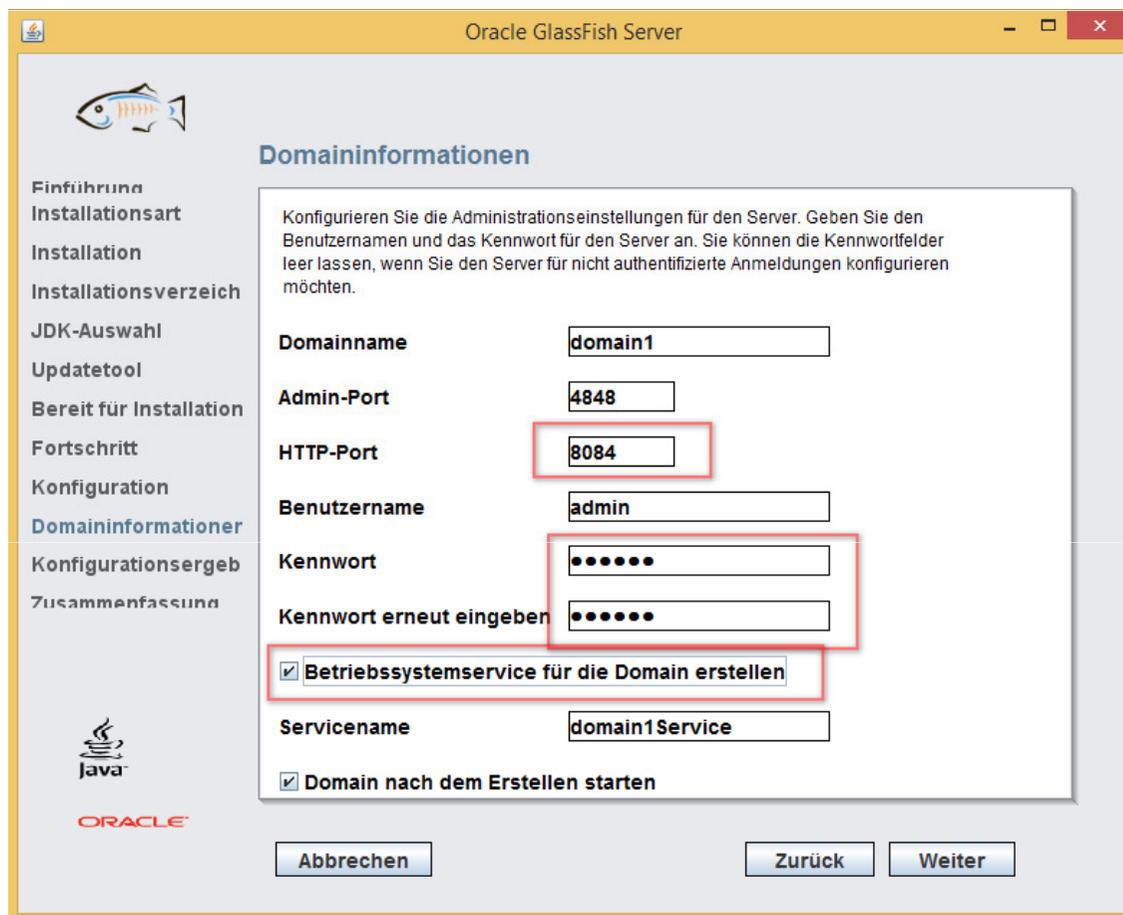
# Installing Glassfish Server

- Choose Server Domain installation.



# Installing Glassfish Server

- Choose a port and ADMIN password.



The screenshot shows the 'Oracle GlassFish Server' installation wizard window. The title bar reads 'Oracle GlassFish Server'. On the left is a navigation pane with the following items: Einführung, Installationsart, Installation, Installationsverzeichnis, JDK-Auswahl, Updatetool, Bereit für Installation, Fortschritt, Konfiguration, **Domaininformationer** (highlighted), Konfigurationsergeb, and Zusammenfassung. Below the navigation pane is the Java logo and the ORACLE logo.

The main content area is titled 'Domaininformationen'. It contains the following text: 'Konfigurieren Sie die Administrationseinstellungen für den Server. Geben Sie den Benutzernamen und das Kennwort für den Server an. Sie können die Kennwortfelder leer lassen, wenn Sie den Server für nicht authentifizierte Anmeldungen konfigurieren möchten.'

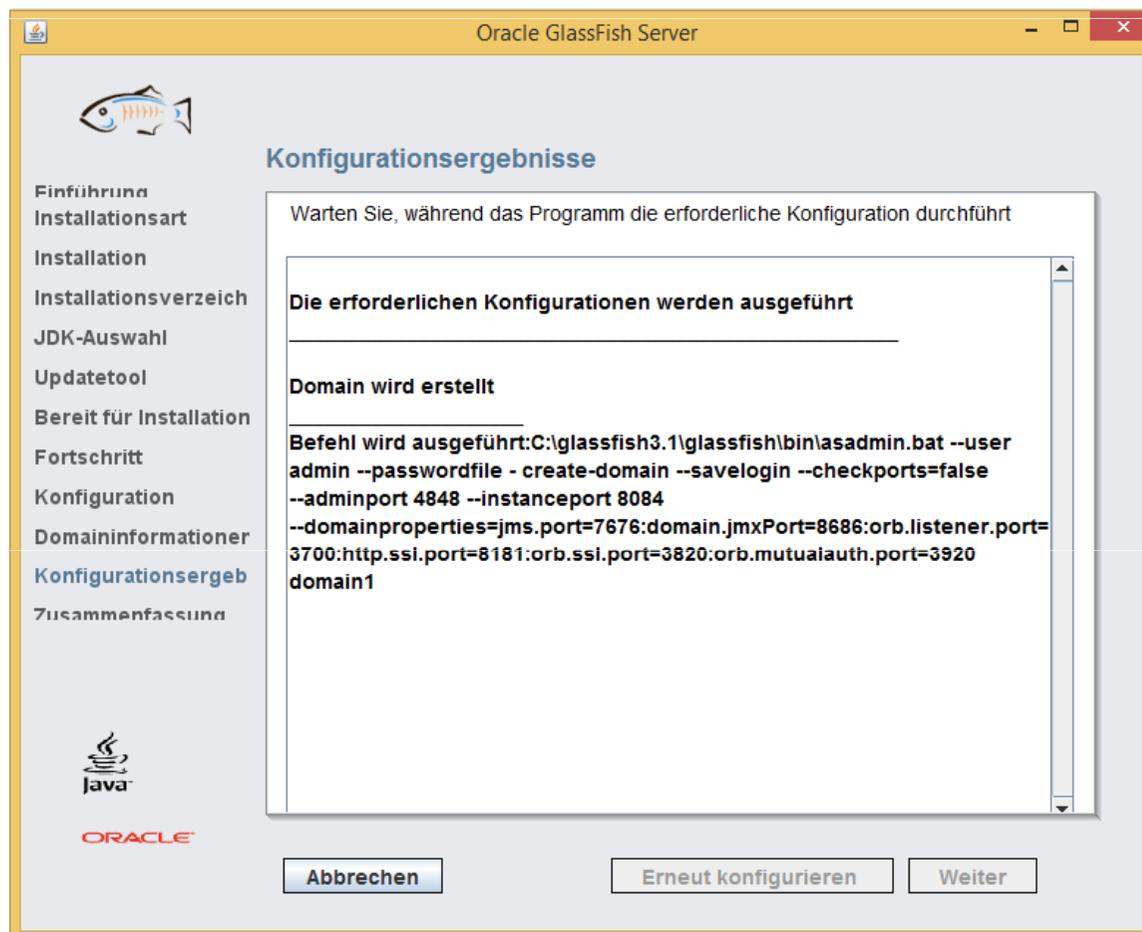
The configuration fields are as follows:

- Domainname: domain1
- Admin-Port: 4848
- HTTP-Port: 8084 (highlighted with a red box)
- Benutzername: admin
- Kennwort: [masked with dots] (highlighted with a red box)
- Kennwort erneut eingeben: [masked with dots] (highlighted with a red box)
- Betriebssystemservice für die Domain erstellen (highlighted with a red box)
- Servicename: domain1Service
- Domain nach dem Erstellen starten

At the bottom of the window are three buttons: 'Abbrechen', 'Zurück', and 'Weiter'.

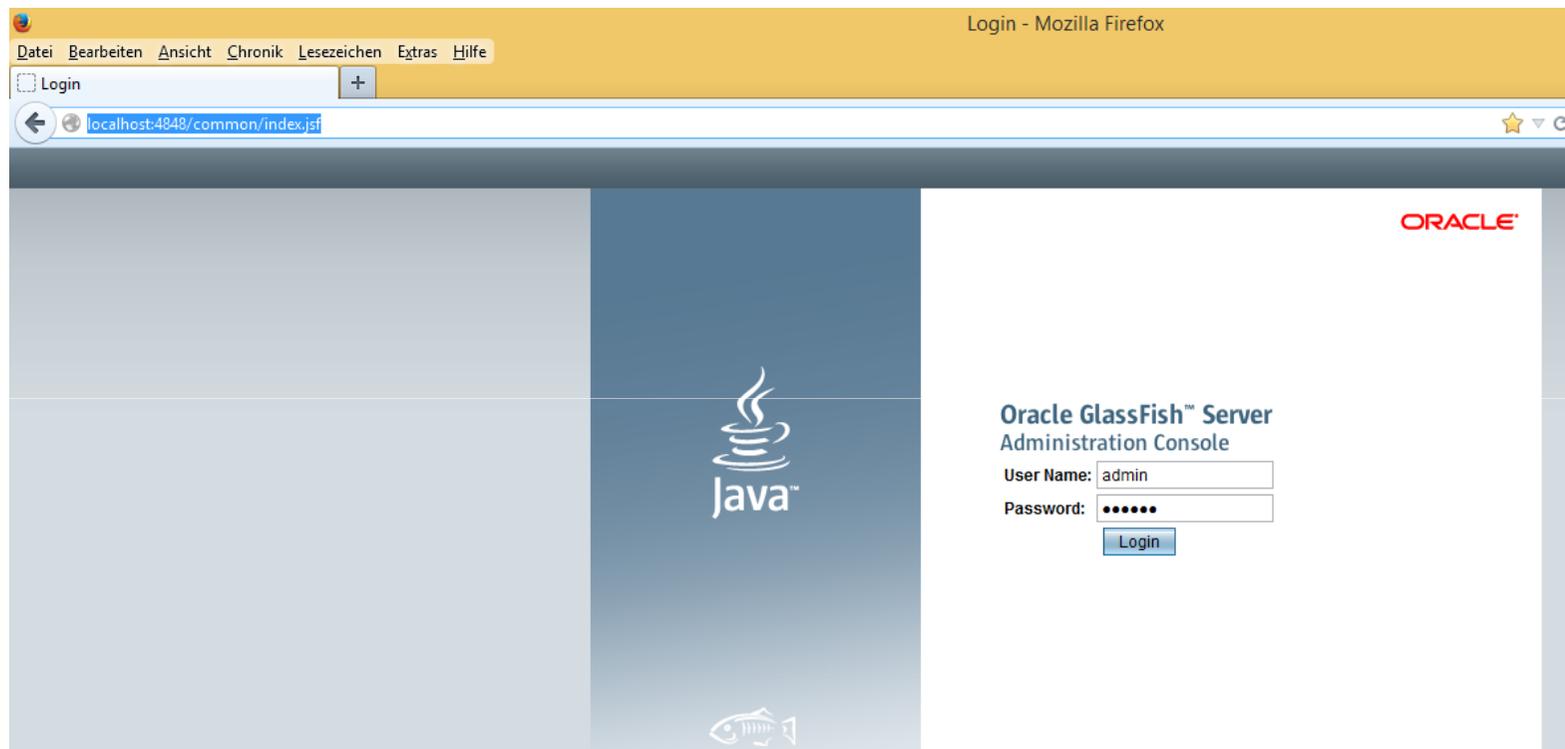
# Installing Glassfish Server

- The setup will show the results after it is finished.



# Installing Glassfish Server

- You can now login using the following link:
  - <http://localhost:4848/common/index.jsf>.

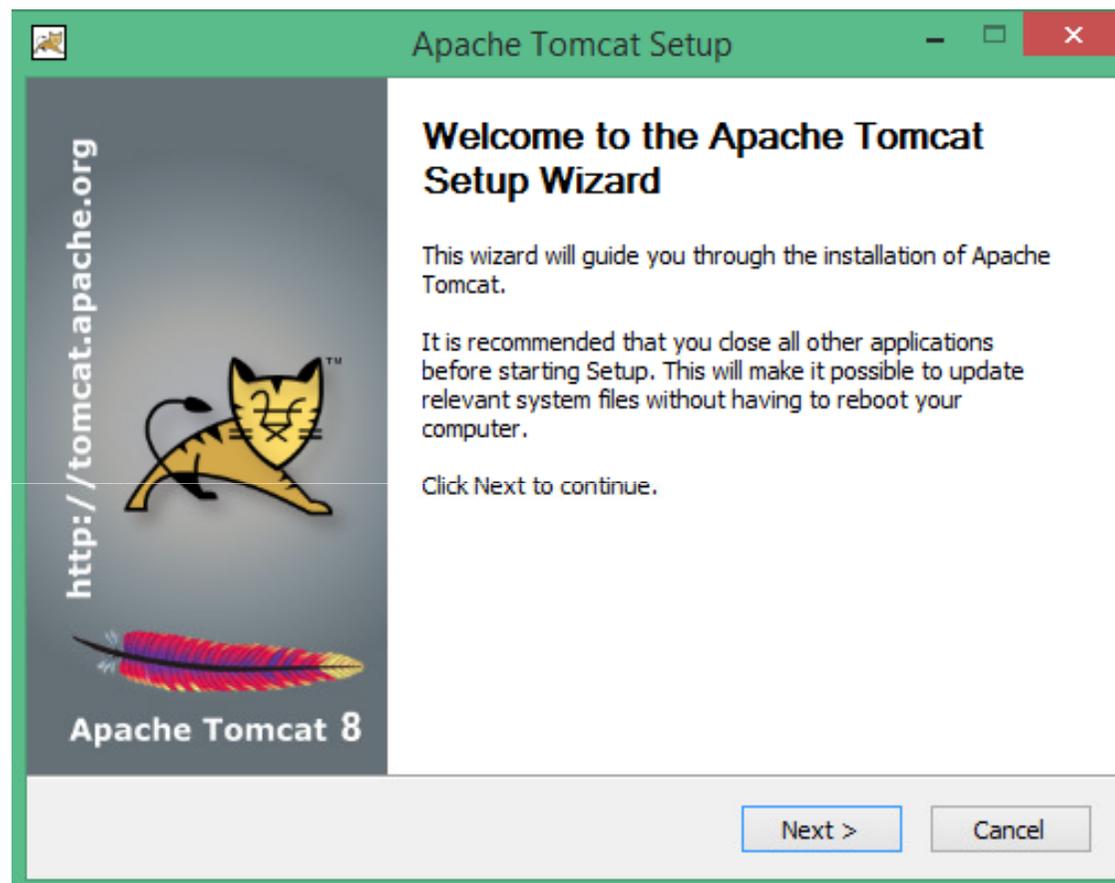




# **Installing Apache Tomcat Server**

# Installing Apache Tomcat Server

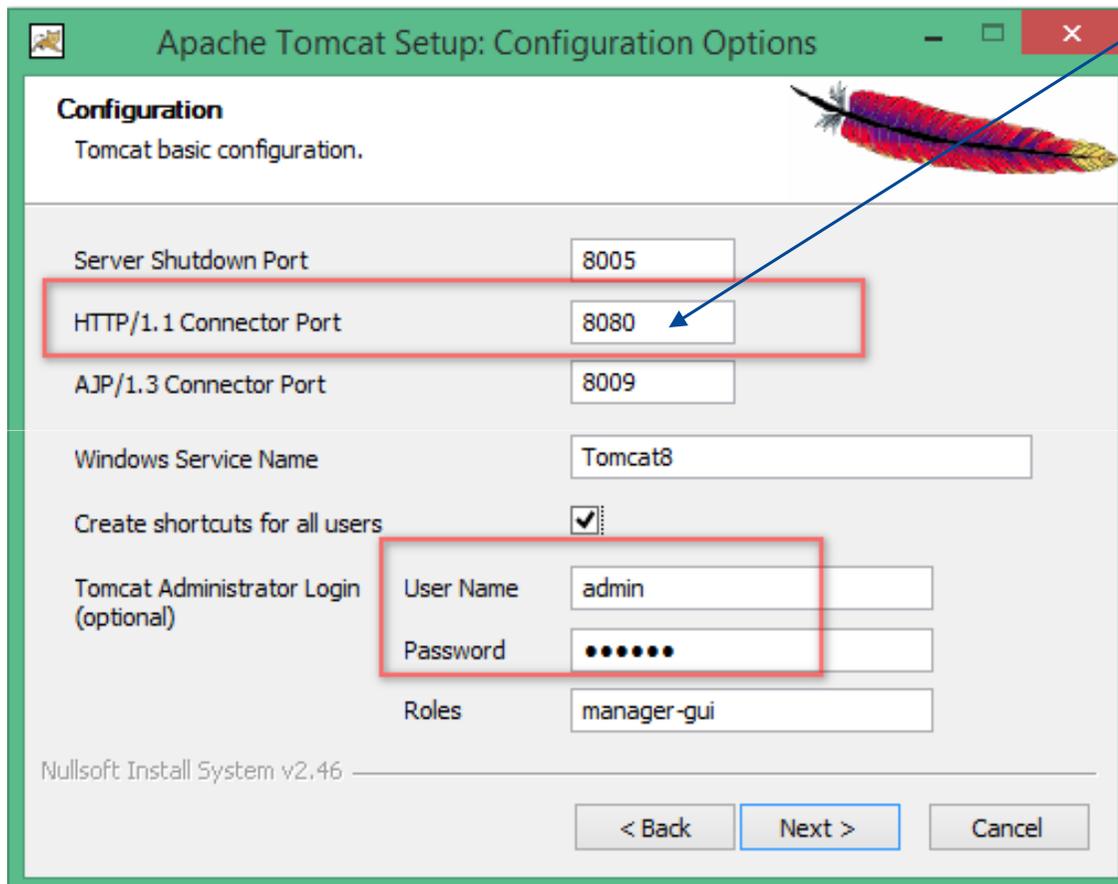
- Starting Tomcat installation.



# Installing Apache Tomcat Server

- Port / Admin Credentials (if Port is 8080 then the xdb port has to be set to 0):

```
BEGIN
  DBMS_XDB.sethttpport ('0');
  DBMS_XDB.setftpport ('0');
  COMMIT;
END;
/
```



Apache Tomcat Setup: Configuration Options

Configuration  
Tomcat basic configuration.

Server Shutdown Port: 8005

HTTP/1.1 Connector Port: 8080

AJP/1.3 Connector Port: 8009

Windows Service Name: Tomcat8

Create shortcuts for all users:

Tomcat Administrator Login (optional)

User Name: admin

Password: ●●●●●●

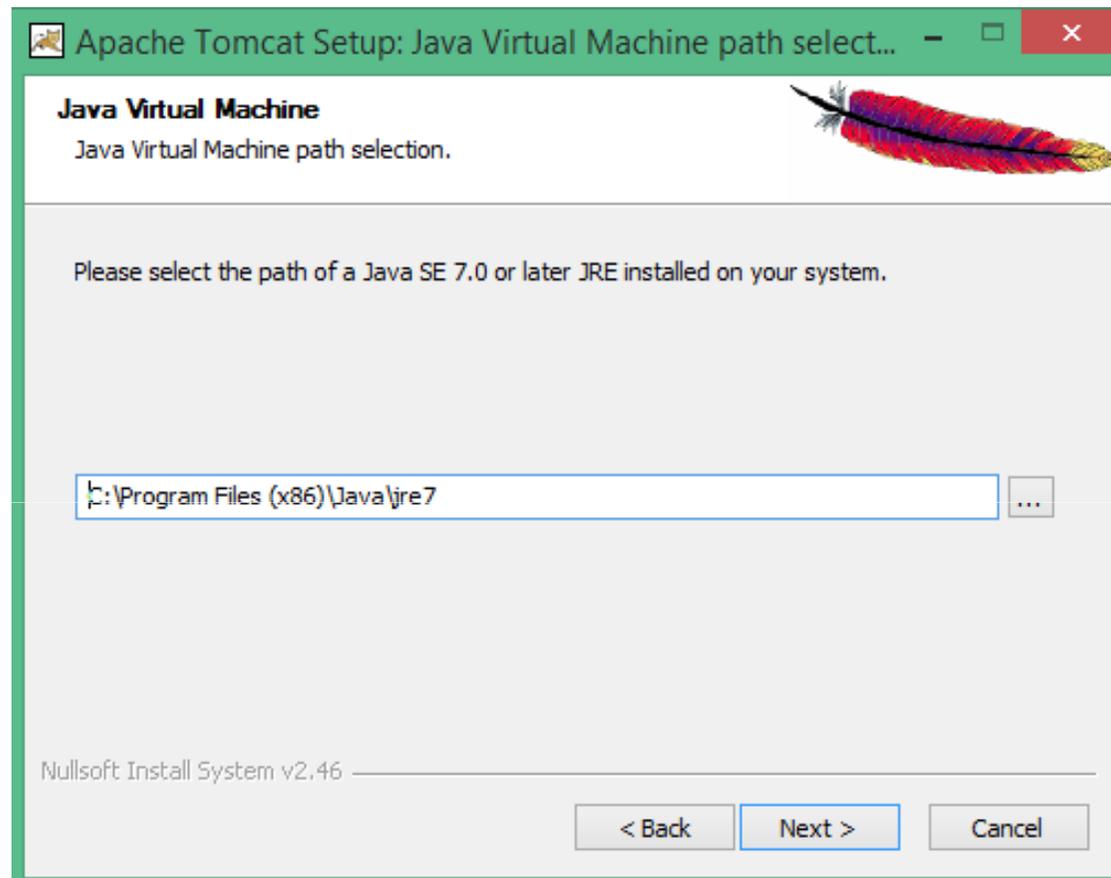
Roles: manager-gui

Nullsoft Install System v2.46

< Back Next > Cancel

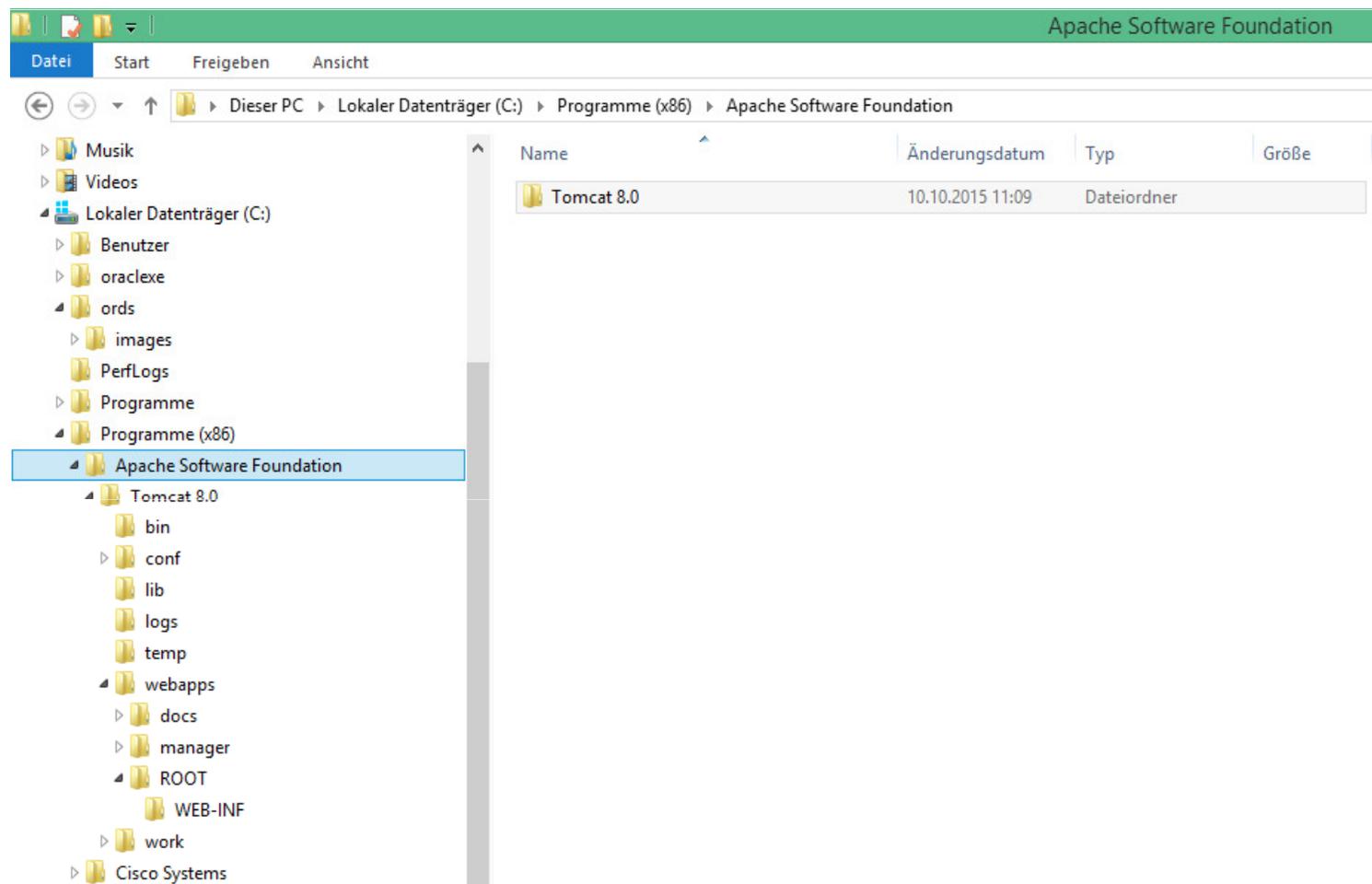
# Installing Apache Tomcat Server

- JRE Path.



# Installing Apache Tomcat Server

- Folder Structure.



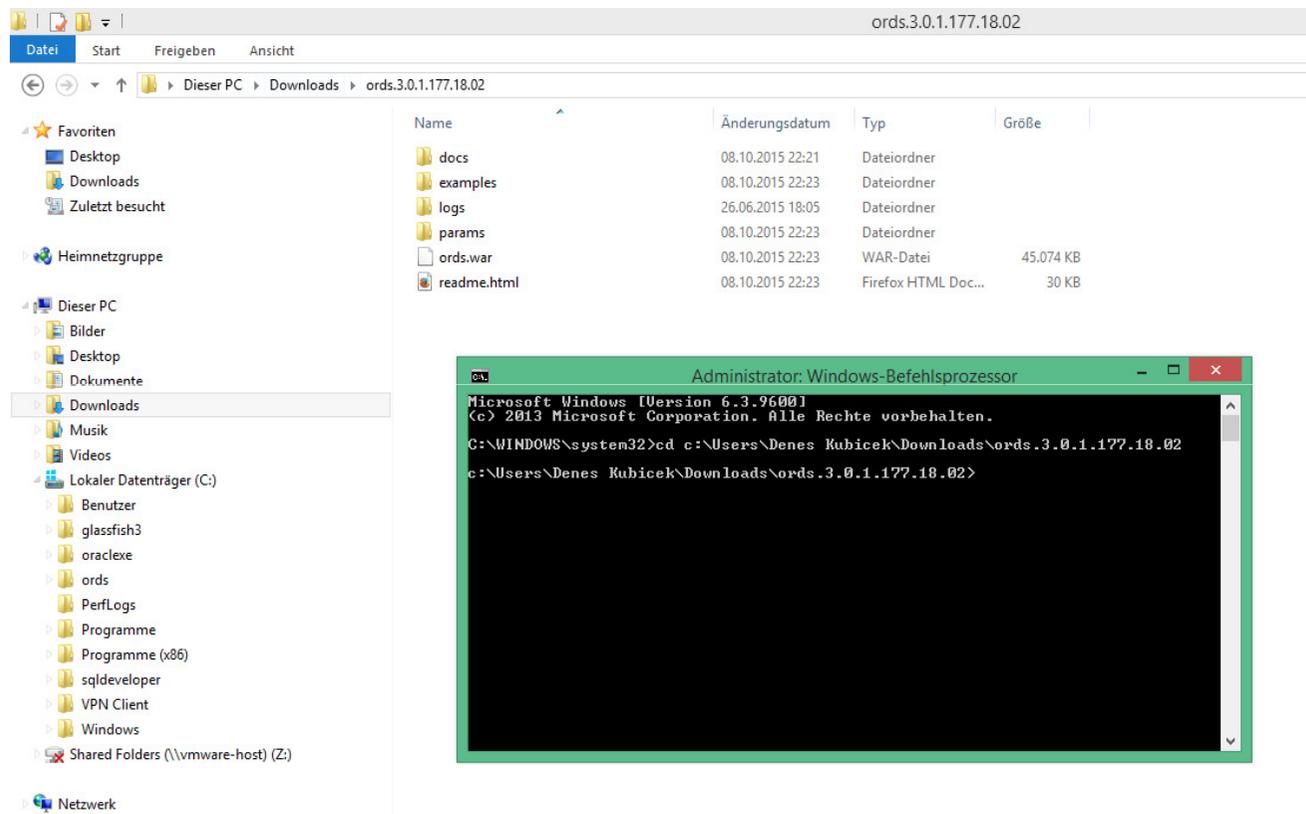


## **Setting up ORDS (as of version 3.x)**

# Setting up ORDS

- Switching to the Folder with Installation Files:

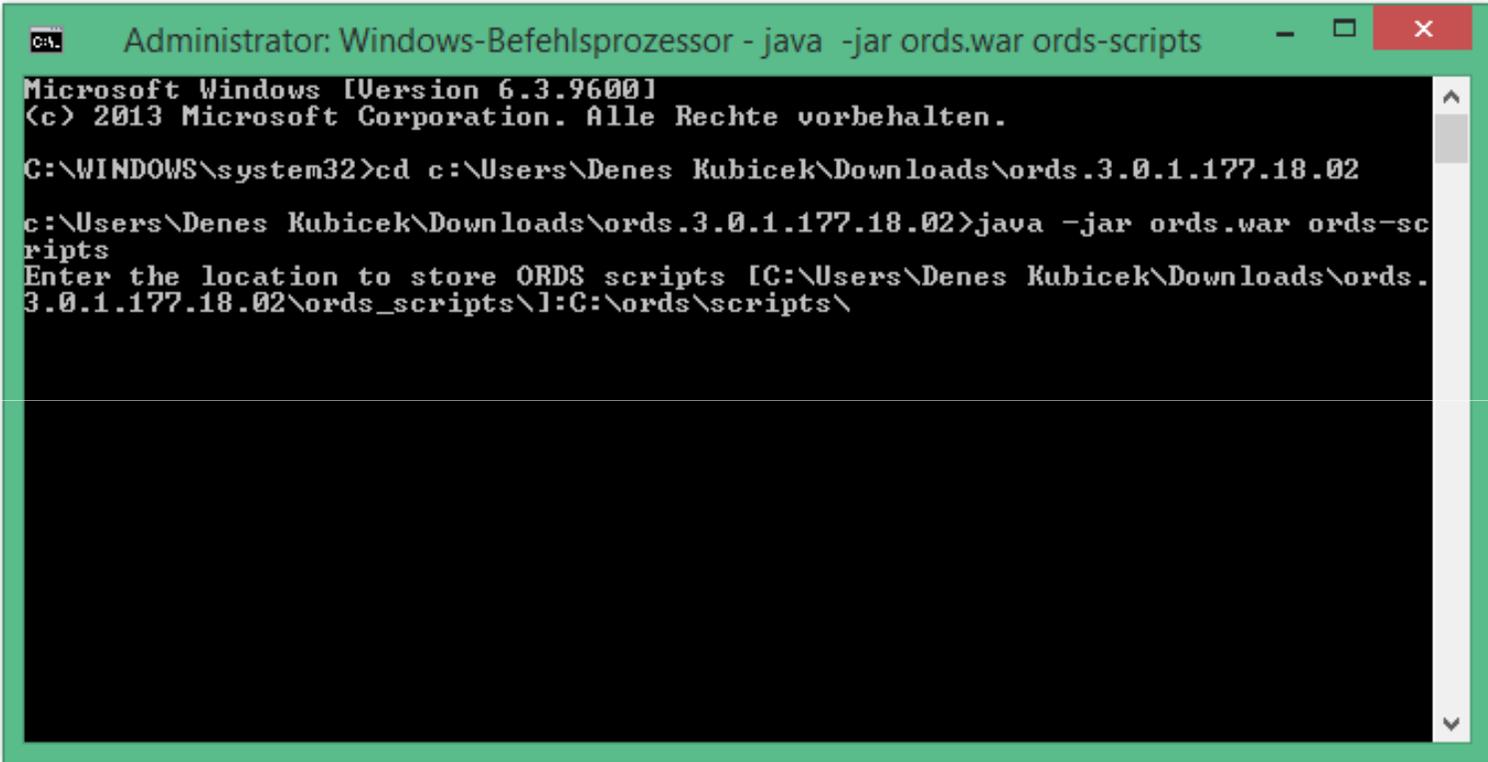
```
cd c:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02
```



# Setting up ORDS

- Extract the ORDS Scripts:

```
java -jar ords.war ords-scripts
```



```
Administrator: Windows-Befehlsprozessor - java -jar ords.war ords-scripts
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. Alle Rechte vorbehalten.

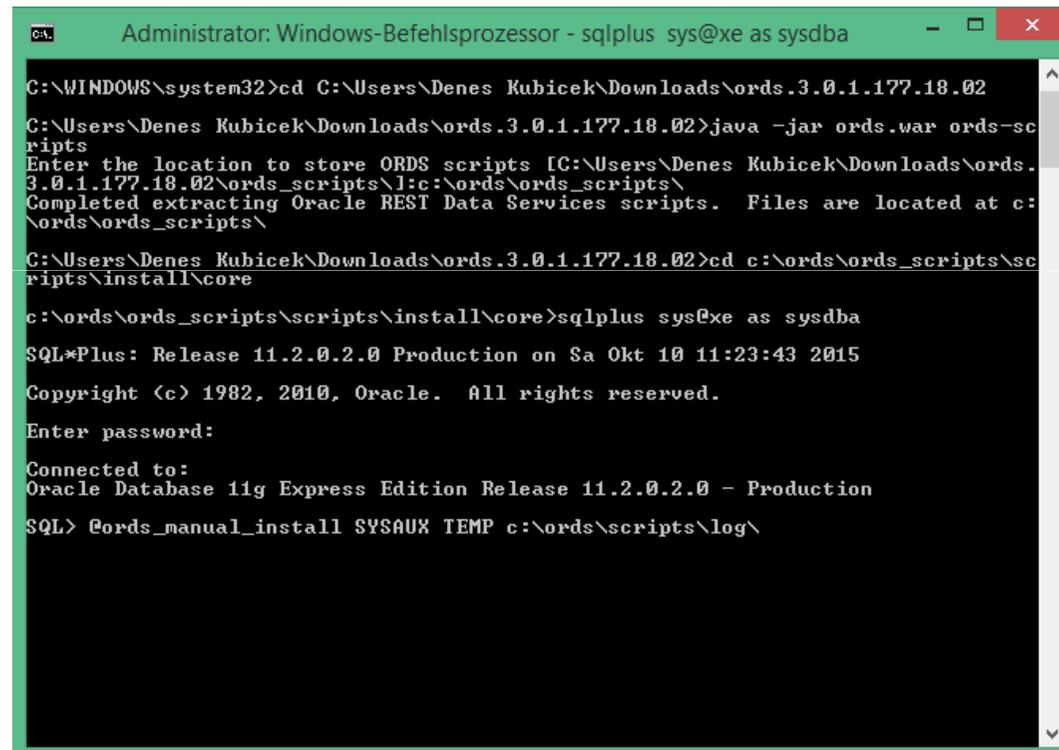
C:\WINDOWS\system32>cd c:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02

c:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02>java -jar ords.war ords-sc
ripts
Enter the location to store ORDS scripts [C:\Users\Denes Kubicek\Downloads\ords.
3.0.1.177.18.02\ords_scripts\]:C:\ords\scripts\
```

# Setting up ORDS

- Switch to the script location and install the required objects:

```
cd c:\ords\ords_scripts\scripts\install\core  
  
sqlplus sys@xe as sysdba  
  
@ords_manual_install SYSAUX TEMP c:\ords\scripts\log\
```



```
Administrator: Windows-Befehlsprozessor - sqlplus sys@xe as sysdba  
C:\WINDOWS\system32>cd C:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02  
C:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02>java -jar ords.war ords-sc  
ripts  
Enter the location to store ORDS scripts [C:\Users\Denes Kubicek\Downloads\ords.  
3.0.1.177.18.02\ords_scripts\]:c:\ords\ords_scripts\  
Completed extracting Oracle REST Data Services scripts. Files are located at c:  
\ords\ords_scripts\  
C:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02>cd c:\ords\ords_scripts\sc  
ripts\install\core  
c:\ords\ords_scripts\scripts\install\core>sqlplus sys@xe as sysdba  
SQL*Plus: Release 11.2.0.2.0 Production on Sa Okt 10 11:23:43 2015  
Copyright (c) 1982, 2010, Oracle. All rights reserved.  
Enter password:  
Connected to:  
Oracle Database 11g Express Edition Release 11.2.0.2.0 - Production  
SQL> @ords_manual_install SYSAUX TEMP c:\ords\scripts\log\
```

# Setting up ORDS

- Set user credentials:

```
Administrator: Windows-Befehlsprozessor - sqlplus sys@xe as sysdba
C:\WINDOWS\system32>cd C:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02
C:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02>java -jar ords.war ords-sc
ripts
Enter the location to store ORDS scripts [C:\Users\Denes Kubicek\Downloads\ords.
3.0.1.177.18.02\ords_scripts\]:c:\ords\ords_scripts\
Completed extracting Oracle REST Data Services scripts.  Files are located at c:
\ords\ords_scripts\
C:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02>cd c:\ords\ords_scripts\sc
ripts\install\core
c:\ords\ords_scripts\scripts\install\core>sqlplus sys@xe as sysdba
SQL*Plus: Release 11.2.0.2.0 Production on Sa Okt 10 11:23:43 2015
Copyright (c) 1982, 2010, Oracle.  All rights reserved.
Enter password:
Connected to:
Oracle Database 11g Express Edition Release 11.2.0.2.0 - Production
SQL> @ords_manual_install SYSAUX TEMP c:\ords\scripts\log\
*****
* Oracle REST Data Services (ORDS) Installation.
*****
Enter a password for the ORDS_PUBLIC_USER:
Enter an existing data tablespace for ORDS_PUBLIC_USER [USERS]:
Enter an existing temporary tablespace for ORDS_PUBLIC_USER [TEMP]:
```

# Setting up ORDS

- Process will complete and install the required objects:

```
Administrator: Windows-Befehlsprozessor
Revoke succeeded.
INFO: Completed removing temporal privileges
* INFO: Validating Installation
Session altered.
INFO: 11:25:50 Validating objects for Oracle REST Data Services.
VALIDATION: 11:25:50 Starting validation with connected user: SYS, schema:
ORDS_METADATA
VALIDATION: 11:25:50 Total objects: 179, compiled objects: 0, failed
compilation: 0
VALIDATION: 11:25:50      71 INDEX
VALIDATION: 11:25:50      1 JOB
VALIDATION: 11:25:50      7 PACKAGE
VALIDATION: 11:25:50      7 PACKAGE BODY
VALIDATION: 11:25:50      1 SEQUENCE
VALIDATION: 11:25:50      26 TABLE
VALIDATION: 11:25:50      26 TRIGGER
VALIDATION: 11:25:50      2 TYPE
VALIDATION: 11:25:50      38 VIEW
VALIDATION: 11:25:50 Validation completed.
INFO: 11:25:50 Completed validation for Oracle REST Data Services.
PL/SQL procedure successfully completed.

PL/SQL procedure successfully completed.

Commit complete.

*****
INFO: Completed Oracle REST Data Services Installation.
timing for: ORDS Installation
Elapsed: 00:00:09.23
*****
not spooling currently

*****
INFO: Completed Oracle REST Data Services Installation.
timing for: ORDS Installation
Elapsed: 00:01:15.29
*****
Disconnected from Oracle Database 11g Express Edition Release 11.2.0.2.0 - Produ
ction
c:\ords\ords_scripts\scripts\install\core>
```

# Setting up ORDS

- Switch to the script location and start the ORDS setup:

```
cd c:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02
```

```
java -jar ords.war setup
```

```
c:\ords\ords_scripts\scripts\install\core>cd c:\Users\Denes Kubicek\Downloads\or
ds.3.0.1.177.18.02

c:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02>
c:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02>java -jar ords.war setup
Diese Oracle REST Data Services-Instanz wurde noch nicht konfiguriert.
Nehmen Sie an den folgenden Aufforderungen die entsprechenden Einstellungen vor

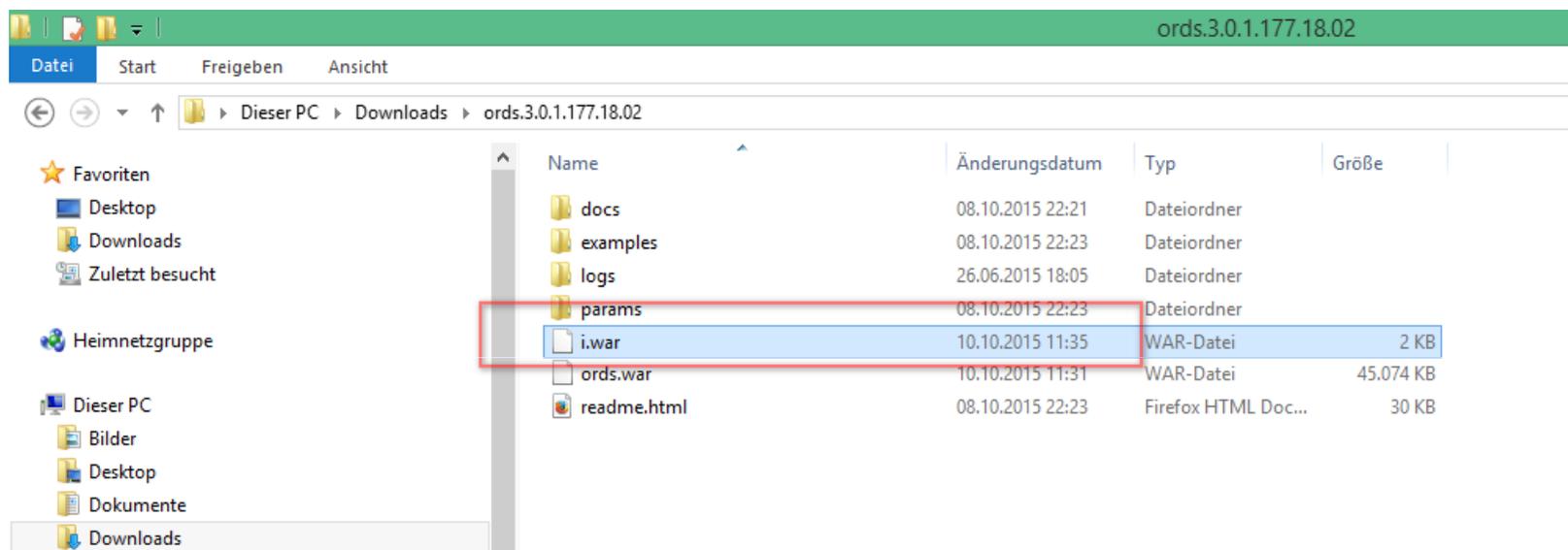
Geben Sie das Verzeichnis für Konfigurationsdaten an:c:\ords
Name des Datenbankservers eingeben [localhost]:
Listener-Port der Datenbank eingeben [15211]:
1 eingeben, um den Servicennamen der Datenbank anzugeben, oder 2, um die Datenban
k-SID anzugeben [1]:2
Datenbank-SID eingeben [xe]:
Geben Sie 1 ein, wenn Sie das Oracle REST Data Services-Schema verifizieren/inst
allieren möchten, oder 2, um diesen Schritt zu überspringen [1]:2
Geben Sie 1 ein, wenn Sie PL/SQL Gateway verwenden möchten, oder 2, um diesen Sc
hritt zu überspringen [1]:1
Geben Sie den Benutzernamen für die PL/SQL Gateway-Datenbank ein [APEX_PUBLIC_US
ER]:
Datenbankkennwort für APEX_PUBLIC_USER eingeben:
Kennwort bestätigen:
Geben Sie 1 ein, um Kennwörter für Application Express RESTful Services-Datenban
kbenutzer anzugeben (APEX_LISTENER, APEX_REST_PUBLIC_USER), oder 2, um diesen Sc
hritt zu überspringen [1]:1
Datenbankkennwort für APEX_LISTENER eingeben:
Kennwort bestätigen:
Datenbankkennwort für APEX_REST_PUBLIC_USER eingeben:
Kennwort bestätigen:
Okt 10, 2015 11:32:37 AM oracle.dbtools.common.config.file.ConfigurationFilesBas
e update
Information: Updated configurations: defaults, apex, apex_al, apex_rt

c:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02>
```

# Setting up ORDS

- Configure i.war for Glassfish:

```
java -jar ords.war static c:\ords\images
```



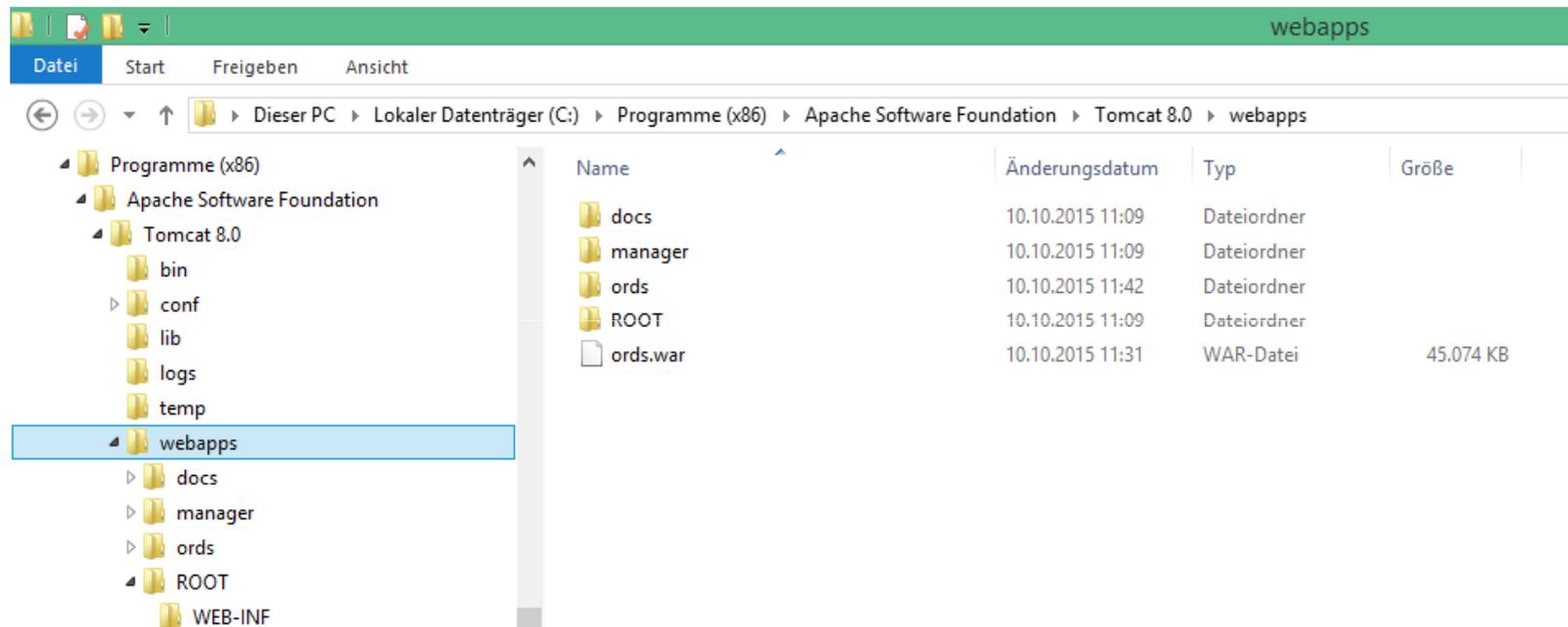


# Configuring Apache Tomcat

# Configuring Apache Tomcat

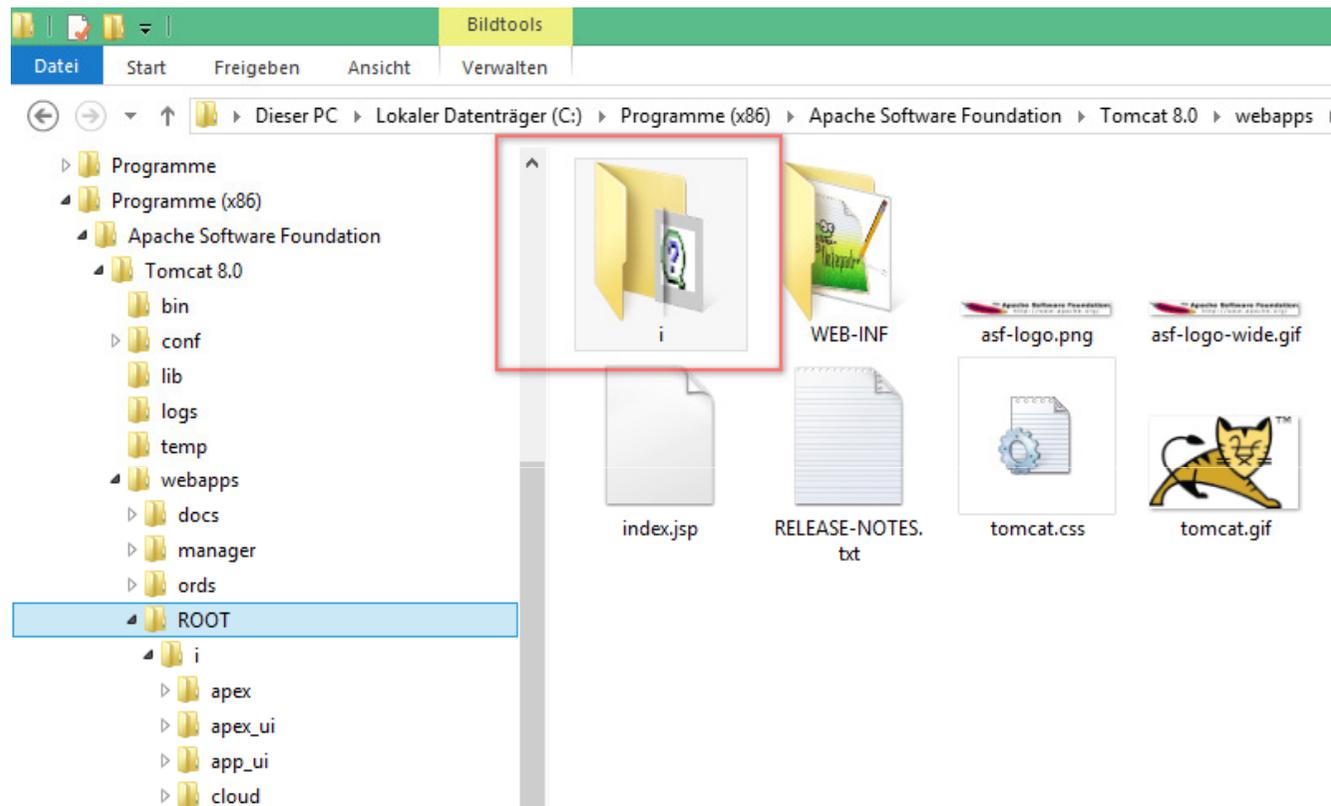
- Copy the ords.war to the server webapps folder:

```
COPY "C:\Users\Denes Kubicek\Downloads\ords.3.0.1.177.18.02\ords.war" "C:\Program Files (x86)\Apache Software Foundation\Tomcat 8.0\webapps\ords.war"
```



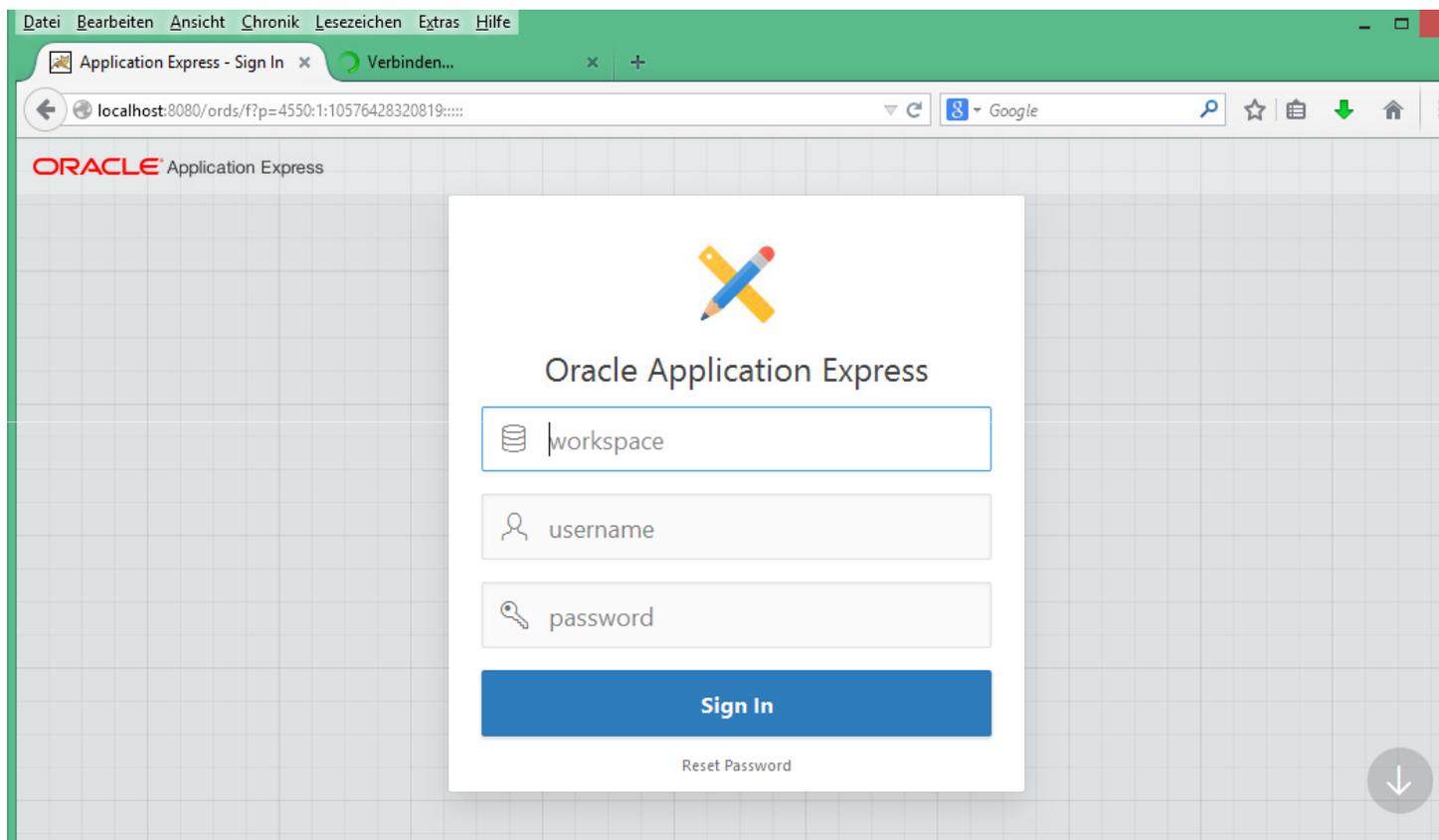
# Configuring Apache Tomcat

- Copy the APEX images to the Tomcat root folder /i/:



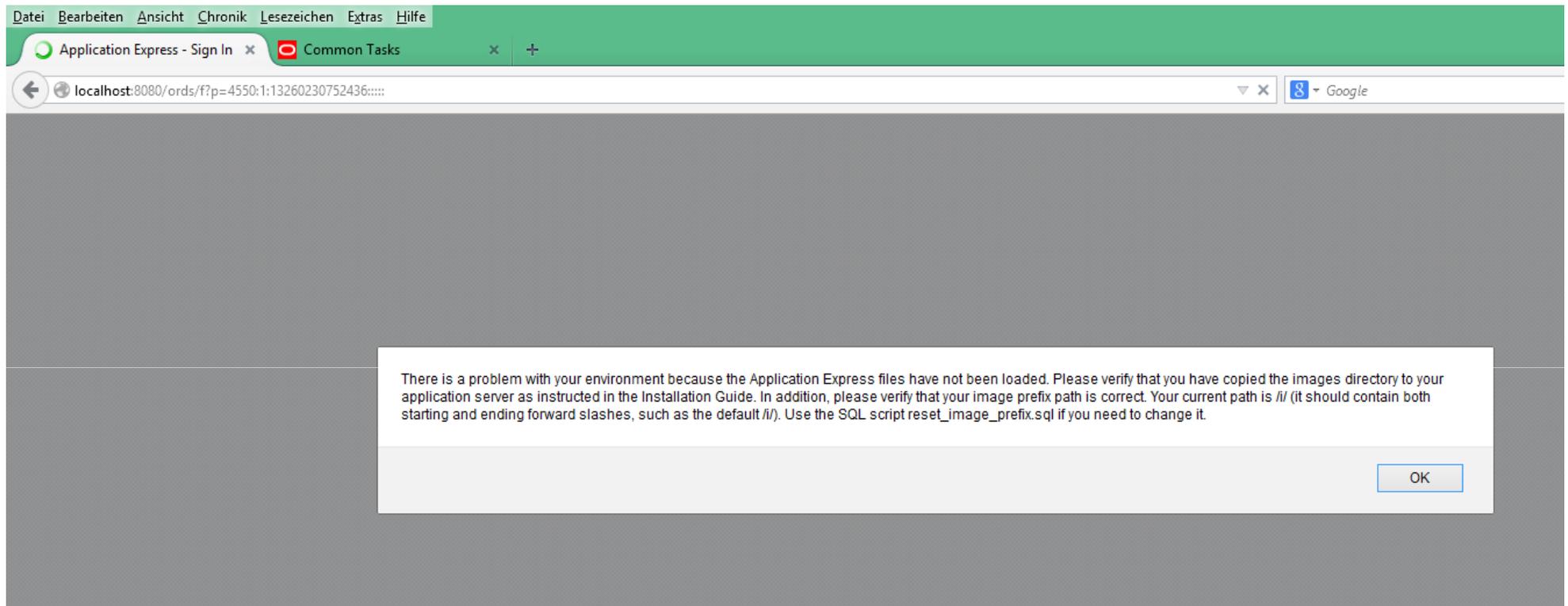
# Configuring Apache Tomcat

- Run APEX over Tomcat using:
  - `http://localhost:8080/ords`



# Configuring Apache Tomcat

- If a message like this appears, clear the browser cache:





# **Configuring Glassfish Server**

# Configuring Glassfish Server

- We will need the two files to configure Glassfish
  - ords.war
  - i.war
- Go to Glassfish Administration and let us configure the two files in order to start APEX.

# Configuring Glassfish Server

- Choose „Application“ > „Deploy“

The screenshot shows the Oracle GlassFish Server Administration Console. The browser window title is "Applications - Mozilla Firefox". The address bar shows "localhost:4848/common/index.jsf". The page header includes "Home" and "About..." buttons, and user information: "User: admin | Domain: domain1 | Server: localhost". The main heading is "Oracle GlassFish™ Server".

The left sidebar contains a "Common Tasks" menu with the following items: Domain, server (Admin Server), Clusters, Standalone Instances, HTTP Load Balancers, Nodes, Applications (highlighted with a red box), Lifecycle Modules, Monitoring Data, Resources, JDBC, and Connectors.

The main content area is titled "Applications" and contains the text: "Applications can be enterprise or web applications, or various kinds of modules. Restart an application or module by clicking on". Below this is a section titled "Deployed Applications (0)" with a "Deploy..." button (highlighted with a red box), "Undeploy", "Enable", and "Disable" buttons, and a "Filter:" dropdown menu. Below the buttons is a table with the following structure:

Name	Enabled	Engines
No items found.		

# Configuring Glassfish Server

- Locate the ords.war and click „OK“

The screenshot shows the Oracle GlassFish Server administration console in Mozilla Firefox. The main window is titled "Deploy Applications or Modules - Mozilla Firefox" and displays the "Deploy Applications or Modules" dialog box. The dialog box has a "Location:" section with two radio buttons: "Packaged File to Be Uploaded to the Server" (unselected) and "Local Packaged File or Directory That Is Accessible from GlassFish Server" (selected). The "Local Packaged File or Directory That Is Accessible from GlassFish Server" option has a text input field containing "c:\ords\ords.war" and a "Browse Files..." button. The "Type:" dropdown is set to "Web Application". The "Context Root:" is "ords", "Application Name:" is "ords", and "Virtual Servers:" is "server". The "Status:" checkbox is checked and labeled "Enabled".

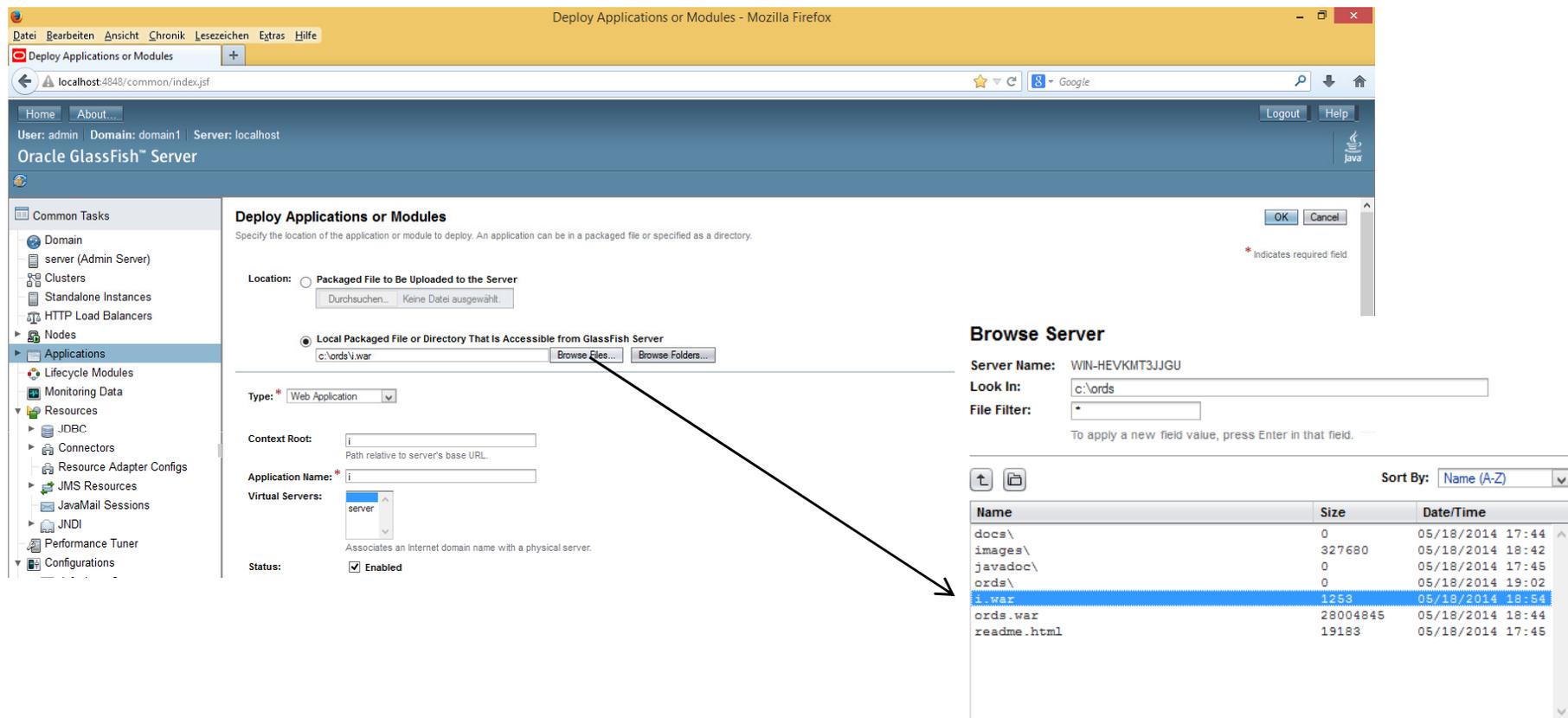
A "Browse Files..." button is highlighted with an arrow pointing to a file explorer window titled "Mozilla Firefox" with the URL "localhost:4848/common/applications/fileChooser.jsf". The file explorer shows a list of files in the "c:\ords" directory:

Name	Size	Date/Time
docs\	0	05/18/2014 17:44
images\	327680	05/18/2014 18:42
ords\	0	05/18/2014 17:45
ords.war	1253	05/18/2014 18:54
ords_war	28004845	05/18/2014 18:44
readme.html	19183	05/18/2014 17:45

The "ords.war" file is selected in the file explorer. The "Selected File:" field is empty. The "Choose File" and "Cancel" buttons are visible at the bottom of the file explorer window.

# Configuring Glassfish Server

- Repeat that step for the i.war file



The screenshot shows the Oracle GlassFish Server administration console in Mozilla Firefox. The main window is titled "Deploy Applications or Modules". The left sidebar shows a tree view of the server configuration, with "Applications" selected. The main content area is divided into two panes. The left pane, titled "Deploy Applications or Modules", contains the following fields:

- Location:** Radio buttons for "Packaged File to Be Uploaded to the Server" (selected) and "Local Packaged File or Directory That Is Accessible from GlassFish Server". The selected option has a text field containing "c:\ords\i.war" and "Browse Files..." and "Browse Folders..." buttons.
- Type:** A dropdown menu set to "Web Application".
- Context Root:** A text field containing "i".
- Application Name:** A text field containing "i".
- Virtual Servers:** A dropdown menu set to "server".
- Status:** A checkbox labeled "Enabled" which is checked.

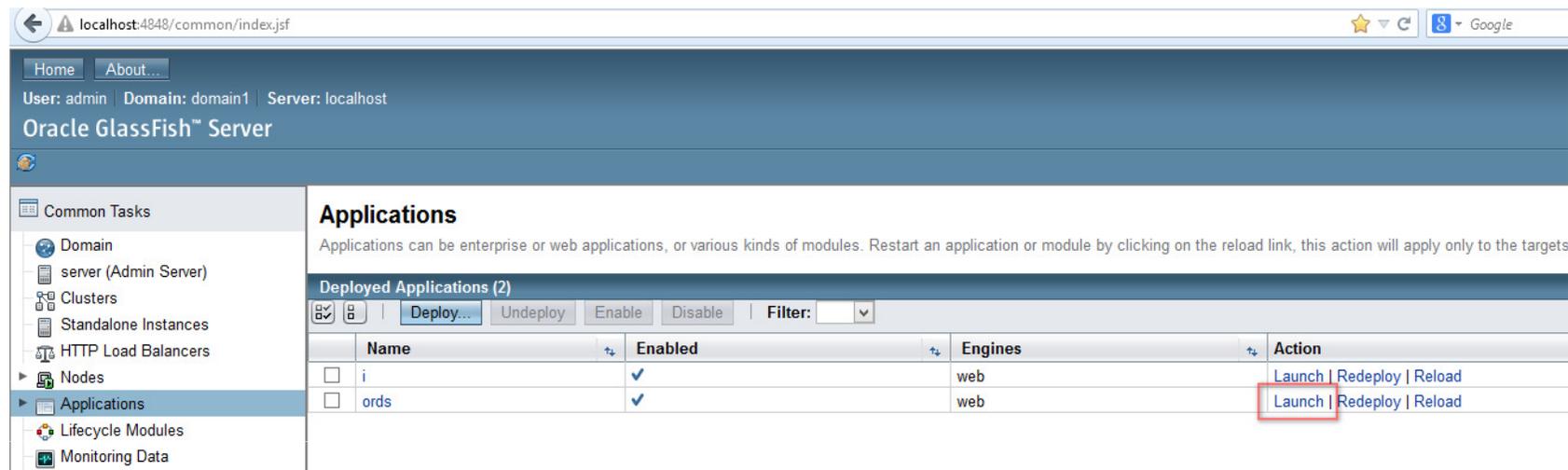
The right pane, titled "Browse Server", shows a file browser interface. It includes fields for "Server Name" (WIN-HEVKMT3JJGU), "Look In" (c:\ords), and "File Filter" (\*). Below these fields is a table of files and folders:

Name	Size	Date/Time
docs\	0	05/18/2014 17:44
images\	327680	05/18/2014 18:42
javadoc\	0	05/18/2014 17:46
ords\	0	05/18/2014 19:02
i.war	1253	05/18/2014 18:54
ords.war	28004845	05/18/2014 18:44
readme.html	19183	05/18/2014 17:46

An arrow points from the "Browse Files..." button in the "Deploy Applications or Modules" pane to the "i.war" file in the "Browse Server" pane.

# Configuring Glassfish Server

- Now, we can get the APEX link



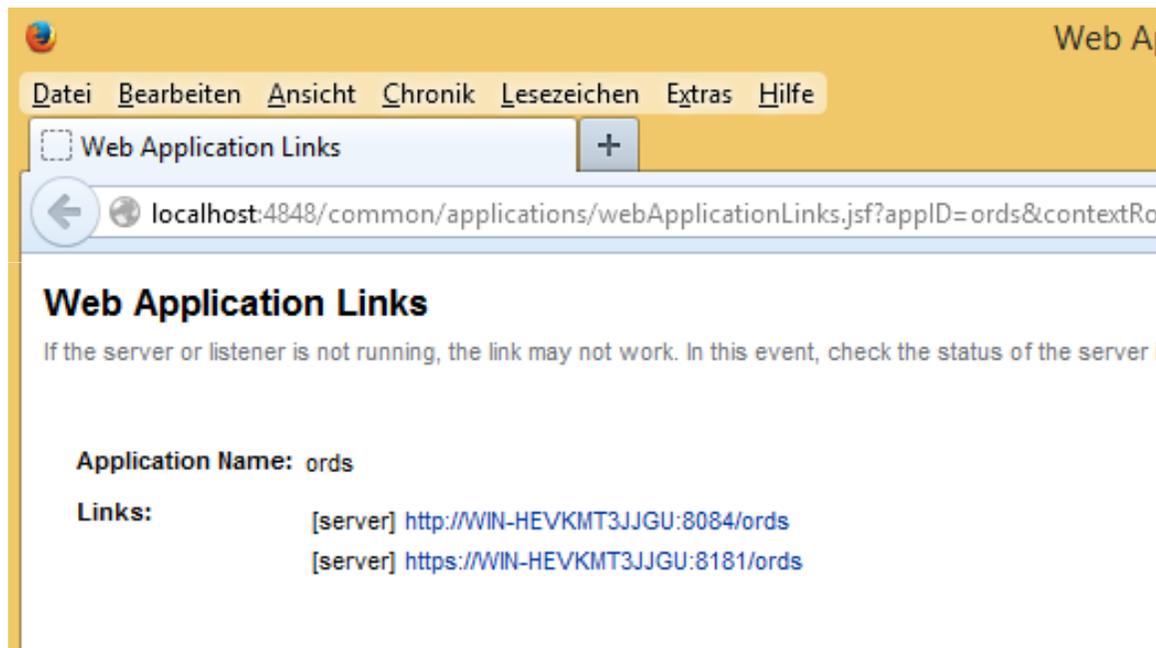
The screenshot shows the Oracle GlassFish Server administration console. The browser address bar indicates the URL is localhost:4848/common/index.jsf. The page title is "Oracle GlassFish™ Server". The user is logged in as "admin" for "domain1" on the "localhost" server. The left sidebar shows a navigation tree with "Applications" selected. The main content area is titled "Applications" and contains a table of "Deployed Applications (2)".

Applications can be enterprise or web applications, or various kinds of modules. Restart an application or module by clicking on the reload link, this action will apply only to the targets

	Name	Enabled	Engines	Action
<input type="checkbox"/>	i	✓	web	<a href="#">Launch</a>   <a href="#">Redeploy</a>   <a href="#">Reload</a>
<input type="checkbox"/>	ords	✓	web	<a href="#">Launch</a>   <a href="#">Redeploy</a>   <a href="#">Reload</a>

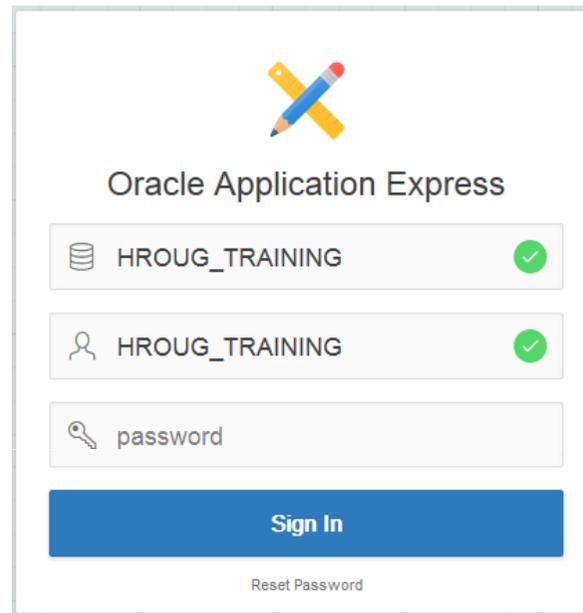
# Configuring Glassfish Server

- Glassfish will propose a domain name, we can also use localhost:port
  - localhost:8084/ords/f?p=4550:1



# Configuring Glassfish Server

- We can now start using APEX



Oracle Application Express

HROUG\_TRAINING ✓

HROUG\_TRAINING ✓

password

Sign In

Reset Password

# Advantages

- Upload of native Excel files

The image illustrates the process of uploading a native Excel file. On the left, a Microsoft Excel spreadsheet titled 'simple\_table1.xls [Kompatib]' is shown. The spreadsheet has a header row with columns labeled 'SPALTE1', 'SPALTE2', 'SPALTE3', and 'SPALTE4'. The data rows are as follows:

	SPALTE1	SPALTE2	SPALTE3	SPALTE4
1	SPALTE1			
2	A	1	01.01.2013	Hans
3	B	2	20.01.2013	Peter
4	C	3	22.01.2013	Ölaf
5	D	4	05.10.2013	Täter

A blue arrow points from the 'SPALTE1' header cell in the Excel spreadsheet to the 'Excel Content' section of a web interface. The web interface, titled 'Home', features an 'Upload Excel' section with a 'Browse...' button and the text 'No file selected.' Below this is the 'Excel Content' section, which shows a preview of the data from the spreadsheet. The preview table is:

SPALTE1	SPALTE2	SPALTE3	SPALTE4
A	1	01/01/2013	Hans
B	2	20/01/2013	Peter
C	3	22/01/2013	Ölaf
D	4	05/10/2013	Täter

The web interface also includes a 'Logout' button in the top right corner and a '1-4' indicator at the bottom left of the content area.

# Advantages

- Deploy RESTful Web Services

The screenshot displays the 'HTTP Resource Test' application window. The 'Resource' field is set to 'http://dkubicek-pc:8089/ords/dkubicek/insert\_product\_info/'. The 'Method' is set to 'POST'. The 'Client Request' section is active, showing a list of parameters: 'PROD\_PT\_CODE' (BUCH), 'PROD\_PCAT\_ID' (153), and 'PROD\_TITLE' (My New APEX Book). The 'Server Response' section is currently empty, with tabs for 'Headers' and 'Body'. The status bar at the bottom indicates 'Done'.

Parameter	Value
PROD_PT_CODE	BUCH
PROD_PCAT_ID	153
PROD_TITLE	My New APEX Book

**Questions?**