

# Архитектура **ORACLE**

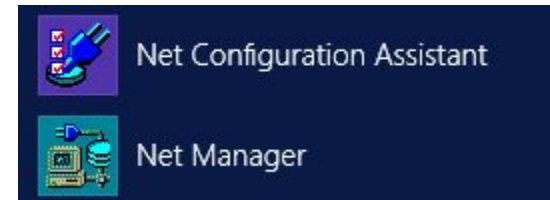
**Установление соединения по сети**

Лекция 8

# Типы соединений клиента с сервером

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- Oracle Net Services – набор служб, которые устанавливают подключение между сервером БД и пользователями БД
  - Службы Oracle Net
  - Oracle Net Listener
  - Oracle Net Configuration Assistant
  - Oracle Net Manager
  - Oracle Connection Manager



# Oracle Net

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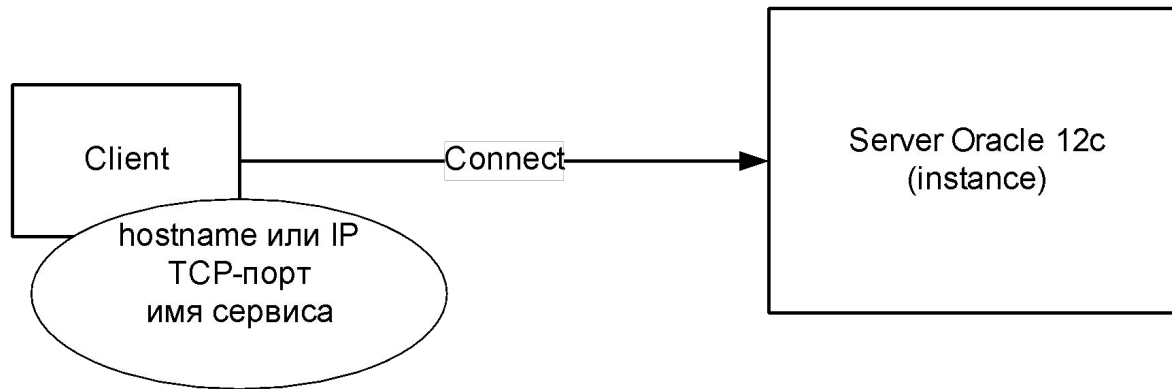
- Oracle Net – программный компонент, который инициализирует, устанавливает и поддерживает подключения между клиентом и сервером.
- Должен быть установлен и на клиенте, и на сервере.
- Состоит из двух компонентов:
  - Oracle Network Foundation layer – отвечает за установку и поддержание подключений между клиентским приложением и сервером.
  - Oracle Protocol Support – отвечает за отображение функциональности TNS (Transparent Network Substrate) на стандартные протоколы, используемые при подключении.



# Соединение клиента с сервером

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- Имена экземпляров (SID)
- Имена служб – глобальные имена баз данных
- Дескрипторы соединений
- Идентификаторы соединений
- Строки соединений



# Дескрипторы соединений

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- Дескриптор соединения – объединенная спецификация двух обязательных компонентов подключения к базе данных:
  - Имени службы базы данных
  - Местоположения адреса базы данных

```
(DESCRIPTION
  (ADDRESS = (PROTOCOL = TCP)
              (HOST = имя_хоста)
              (PORT = 1521))
  (CONNECT_DATA =
    (SERVICE_NAME = имя_службы_базы_данных)))
```

```
(DESCRIPTION
  (ADDRESS = (PROTOCOL = TCP)
              (HOST = 192.168.1.225)(PORT = 1521))
  (CONNECT_DATA = (SERVICE_NAME = pdb_a.be.by)))
```



# Идентификаторы соединений

---

```
pdb_a = (DESCRIPTION  
  (ADDRESS = (PROTOCOL = TCP)  
    (HOST = 192.168.1.225)(PORT = 1521))  
  (CONNECT_DATA = (SERVICE_NAME = pdb_a.be.by)))
```



# Строки соединений

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- Подключение к базе данных выполняется путем указания строки соединения:

```
CONNECT scott/tiger@(DESCRIPTION  
  (ADDRESS = (PROTOCOL = TCP)  
    (HOST = 192.168.1.225)(PORT = 1521))  
  (CONNECT_DATA = (SERVICE_NAME = pdb_a.be.by)))
```

```
CONNECT scott/tiger@pdb_a
```



# Oracle - клиент

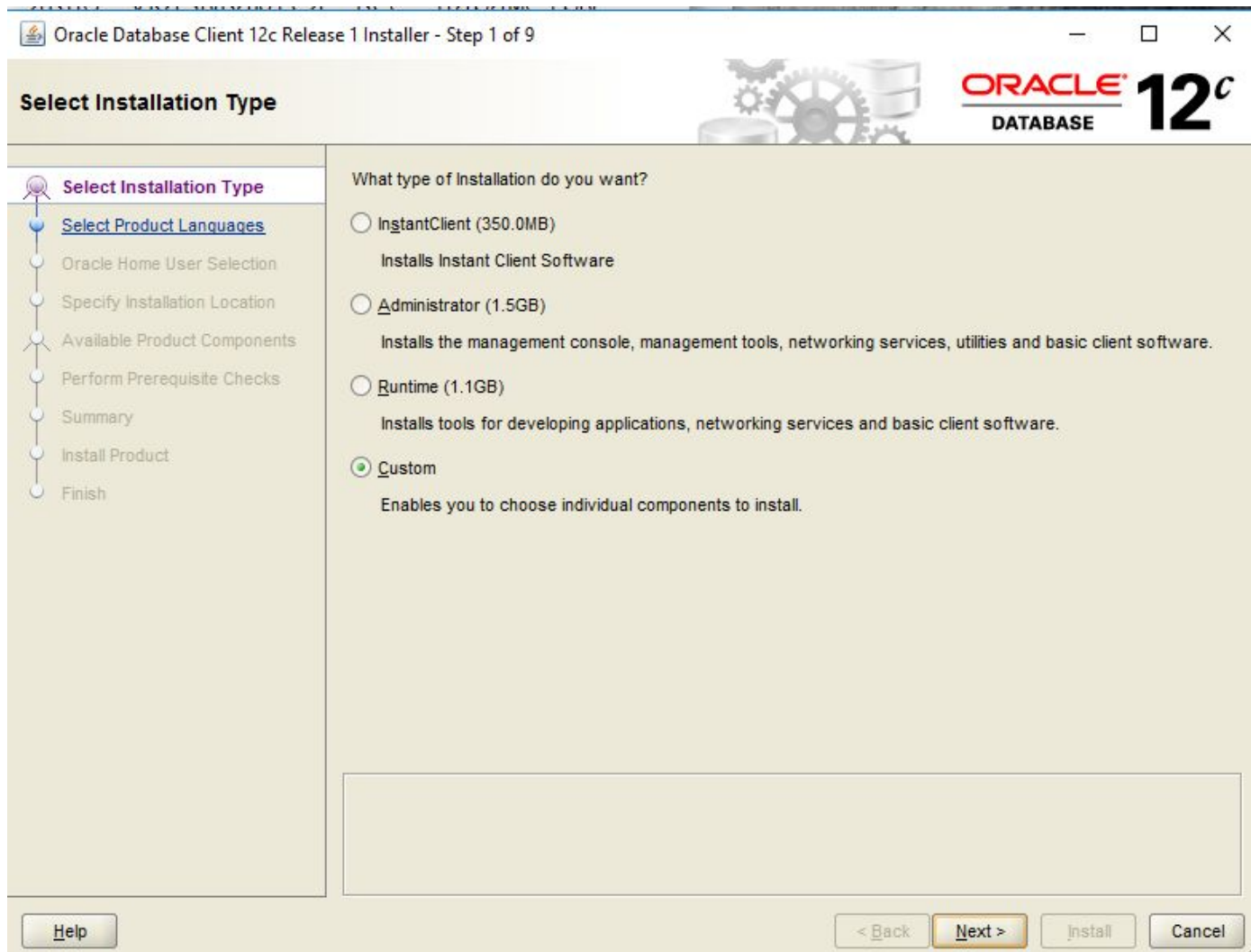
---

- Есть в поставке сервера
- Дополнительно загружается с [oracle.com](http://oracle.com)
- Не обязательно должен совпадать по версии с сервером, но желательно

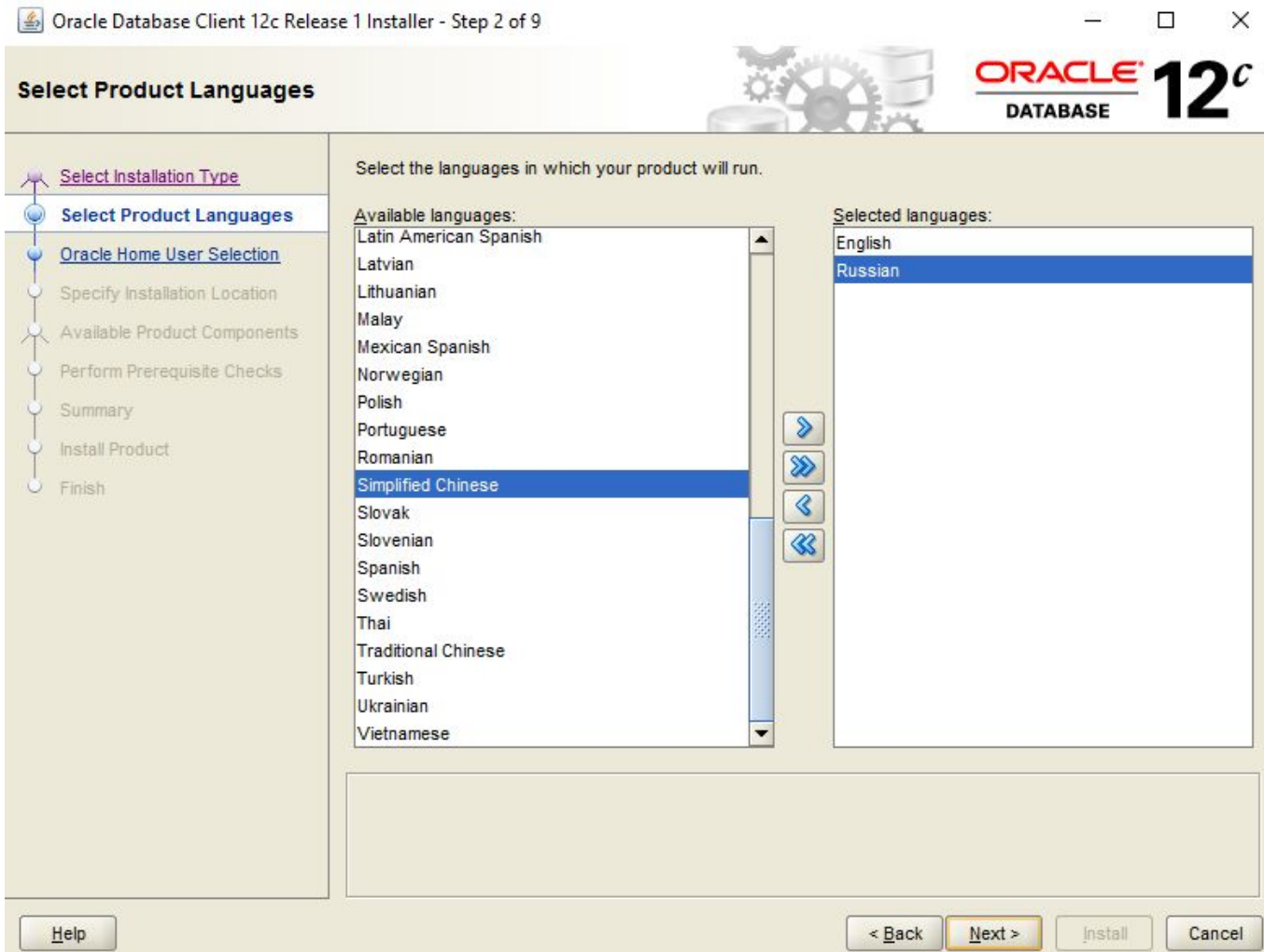




# Oracle - клиент



# Oracle - клиент



# Oracle - клиент

Oracle Database Client 12c Release 1 Installer - Step 4 of 9

**Specify Installation Location**

Select Installation Type  
Select Product Languages  
Oracle Home User Selection  
**Specify Installation Location**  
Available Product Components  
Perform Prerequisite Checks  
Summary  
Install Product  
Finish


Specify an Oracle base path to place all Oracle software and configuration-related files. This location is the Oracle base directory.

Oracle base:  Browse...

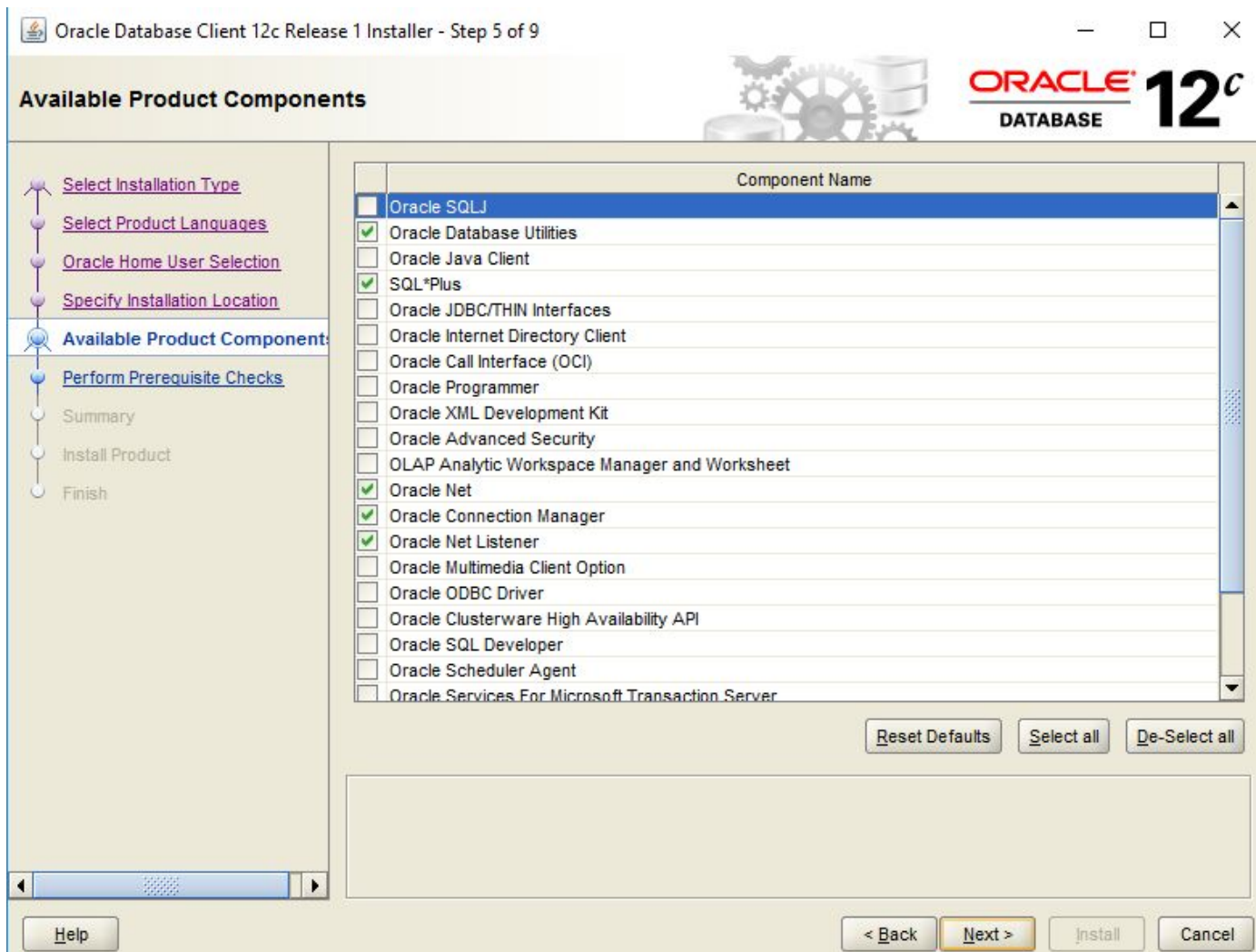
Specify a location for storing Oracle software files. This location is the Oracle home directory.

Software location:  Browse...

Help < Back Next > Install Cancel

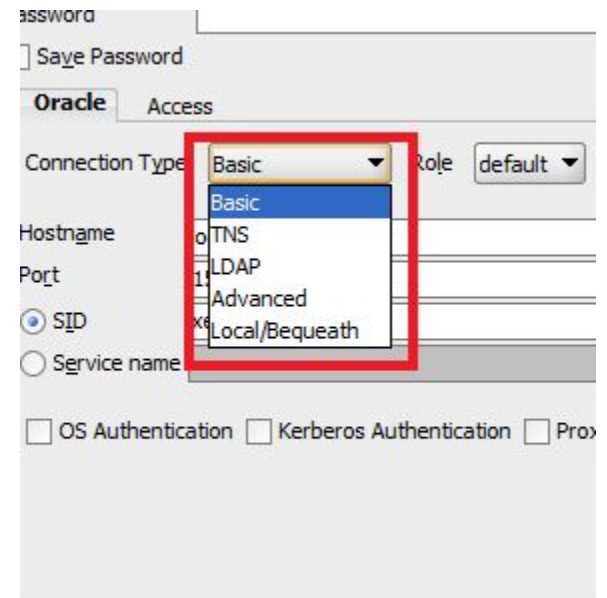
The image shows a screenshot of the Oracle Database Client 12c Release 1 Installer window, specifically Step 4 of 9, titled "Specify Installation Location". The window has a title bar with the text "Oracle Database Client 12c Release 1 Installer - Step 4 of 9" and standard window control buttons (minimize, maximize, close). The main content area is divided into two sections. On the left is a vertical navigation pane with a list of steps: "Select Installation Type", "Select Product Languages", "Oracle Home User Selection", "Specify Installation Location" (which is highlighted with a blue circle and a blue arrow), "Available Product Components", "Perform Prerequisite Checks", "Summary", "Install Product", and "Finish". The main area on the right contains two text boxes for specifying installation paths. The first is labeled "Oracle base:" and contains the path "C:\app\client\binova" with a dropdown arrow and a "Browse..." button. The second is labeled "Software location:" and contains the path "C:\app\client\binova\product\12.1.0\client\_1" with a dropdown arrow and a "Browse..." button. Below these text boxes is a large empty rectangular area. At the bottom of the window, there is a navigation bar with buttons for "Help", "< Back", "Next >", "Install", and "Cancel". The "Next >" button is highlighted in yellow. In the top right corner of the main area, there is a logo for "ORACLE 12c DATABASE".

# Oracle - клиент



# Виды подключений к Oracle

- Простое подключение – Basic
- Локальное именованное – TNS
- LDAP-соединение
- Local/bequeath-соединение
- Прочие



# Basic – соединение

- Явно указываются все параметры соединения

New / Select Database Connection

Connection Name	Connection Details
eacore_to_pdb_a	eacore@//192.168.1.2...
sys_to_instance_as_s...	sys@//192.168.1.225:...
system_to_instance	system@//bor.be.by:....

Connection Name: sys\_to\_instance\_as\_sysdba  
Username: sys  
Password: .....

Save Password  Connection Color

**Oracle**

Connection Type: Basic Role: SYSDBA

Hostname: 192.168.1.225  
Port: 1521  
 SID: ord  
 Service name

OS Authentication  Kerberos Authentication

Status : Success

# Basic – соединение

---

```
SQL*Plus: Release 12.1.0.2.0 Production on Tue Oct 25 17:23:58 2016  
Copyright (c) 1982, 2014, Oracle. All rights reserved.  
  
SQL> connect system/Pa$$w0rd@192.168.1.225:1521/pdb_a.be.by  
ERROR:  
ORA-12154: TNS:could not resolve the connect identifier specified  
  
SQL>
```

```
SQL> connect system/Pa$$w0rd@(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=192.168.1.225)(PORT=1521))  
(CONNECT_DATA=(SERVICE_NAME=pdb_a.be.by)))  
Connected.  
SQL>
```





# Basic – соединение

sqlnet.ora — Блокнот



Файл Правка Формат Вид Справка

```
# sqlnet.ora Network Configuration File: C:\app\client\blinova\product\12.1.0\client_1\network\admin\sqln
# Generated by Oracle configuration tools.
```

```
# This file is actually generated by netca. But if customers choose to
# install "Software Only", this file wont exist and without the native
# authentication, they will not be able to connect to the database on NT.
```

```
SQLNET.AUTHENTICATION_SERVICES= (NTS)
```

```
NAMES.DIRECTORY_PATH= (TNSNAMES)
```

Файл Правка Формат Вид Справка

```
# sqlnet.ora Network Configuration File: C:\app\client\blinova\product\12.1.0\client_1\network\admin
# Generated by Oracle configuration tools.
```

```
# This file is actually generated by netca. But if customers choose to
# install "Software Only", this file wont exist and without the native
# authentication, they will not be able to connect to the database on NT.
```

```
SQLNET.AUTHENTICATION_SERVICES= (NTS)
```

```
NAMES.DIRECTORY_PATH= (EZCONNECT, TNSNAMES)
```



# Basic – соединение

---

- CONNECT имя/пароль@[//]хост[:порт][/имя\_службы]

```
SQL*Plus: Release 12.1.0.2.0 Production on Tue Oct 25 16:08:35 2016
Copyright (c) 1982, 2014, Oracle. All rights reserved.

SQL> connect system/Pa$$w0rd@192.168.1.225:1521/pdb_a.be.by
Connected.
SQL> _
```

```
SQL> connect system/Pa$$w0rd@192.168.1.225/pdb_a.be.by
Connected.
SQL>
```



# Basic – соединение

---

- Должны быть установлены Oracle Net Services
- Поддержка протокола TCP/IP – на сервере и клиенте
- Нельзя использовать расширенные сетевые функциональные возможности Oracle



# TNS-соединение

ent > blinova > product > 12.1.0 > client\_1 > NETWORK > ADMIN

Имя	Дата изменения
SAMPLE	25.10.2016 13:58
listener.ora	25.10.2016 14:00
sqlnet.ora	25.10.2016 17:34
sqlnet1610256AM2941.bak	25.10.2016 13:59
tnsnames.ora	25.10.2016 14:01

tnsnames.ora — Блокнот

Файл Правка Формат Вид Справка

```
# tnsnames.ora Network Configuration File: C:\app\client\blinova\product\12.1.0\client_1\network\admin\tnsnames.ora
# Generated by Oracle configuration tools.
```

```
PDB_A =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP)(HOST = bor.be.by)(PORT = 1521))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = pdb_a.be.by)
    )
  )
```

# Создание локального именования

The screenshot displays the Oracle Net Manager interface. The title bar reads "Oracle Net Manager - C:\app\client\blinova\product\12.1.0\client\_1\NETWORK\ADMIN\". The menu bar includes "File", "Edit", "Command", and "Help".

The left-hand tree view shows the "Oracle Net Configuration" structure:

- Local
  - Profile
  - Service Naming
    - pdb\_a** (selected)
  - Listeners

The main configuration area is divided into two sections:

**Service Identification**

- Service Name:
- SID:
- Connection Type:
- Use Oracle8 Release 8.0 Compatible Identification

**Address Configuration**

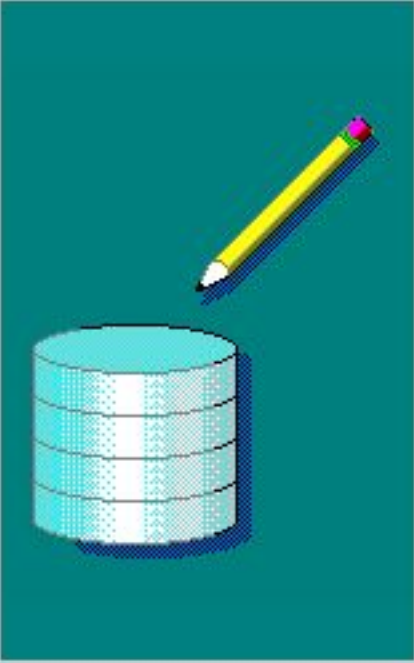
**Address 1**

- Protocol:
- Host Name:
- Port Number:
- 

At the bottom of the configuration area, there are navigation buttons: a green plus sign (+), a grey X, a grey left arrow (<), and a grey right arrow (>). A "Help" button is located at the bottom left of the window.

# Создание локального именованного

Net Service Name Wizard: Welcome



To access an Oracle database, or other service, across the network you use a net service name. This wizard will help you create a net service name.

Enter the name you want to use to access the database or service. It can be any name you choose.

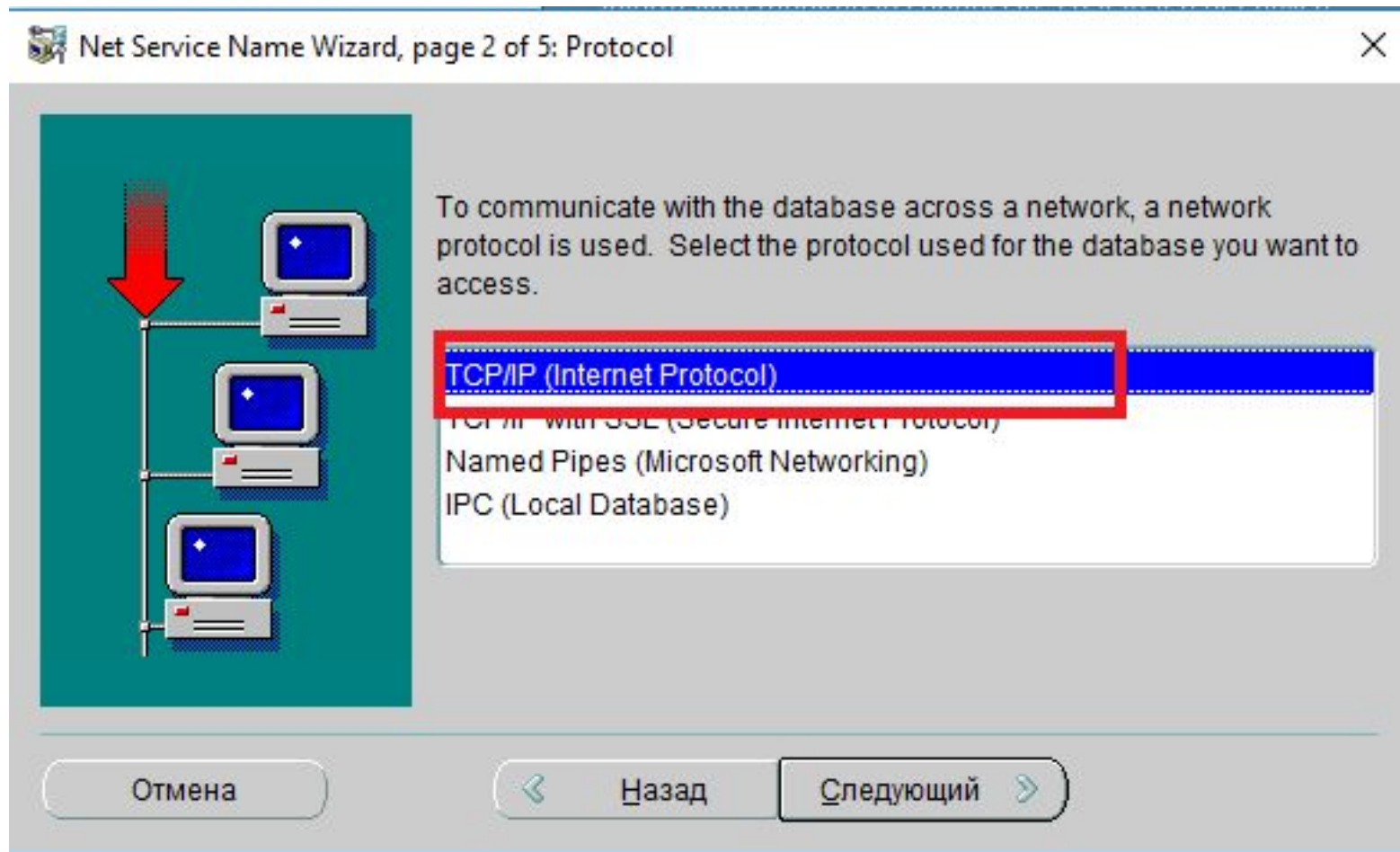
Net Service Name:

Отмена

Назад

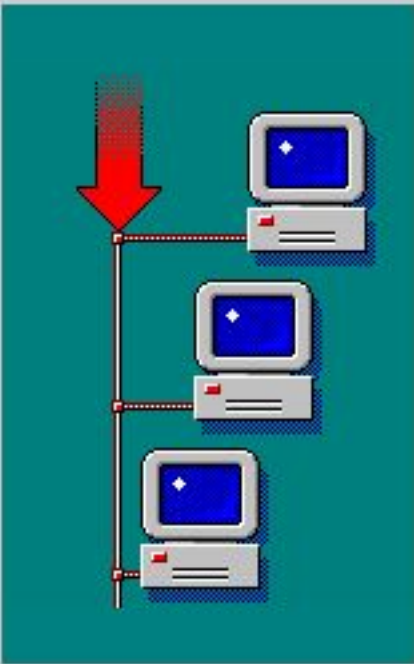
Следующий

# Создание локального именованного



# Создание локального именованного

Net Service Name Wizard, page 3 of 5: Protocol Settings



To communicate with the database using the TCP/IP protocol, the database computer's host name is required. Enter the TCP/IP host name for the computer where the database is located.

Host Name:

A TCP/IP port number is also required. The port number for Oracle databases is usually 1521. You should not normally need to specify a different port number.

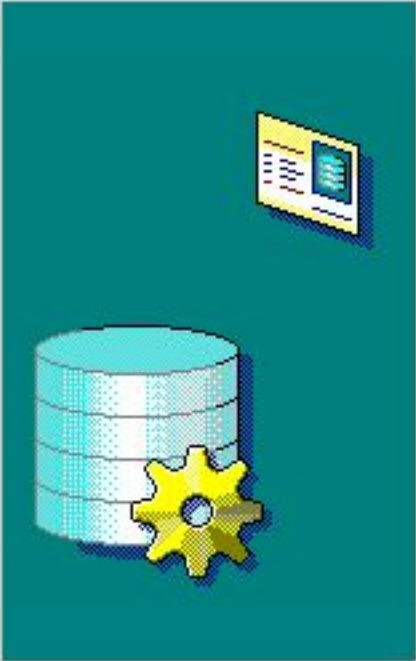
Port Number:

Отмена    < Назад    Следующий >



# Создание локального именованного

Net Service Name Wizard, page 4 of 5: Service



Each Oracle database or service has a service name. An Oracle database's service name is normally its global database name. Enter the service name of the database or other service you want to access.

Service Name:

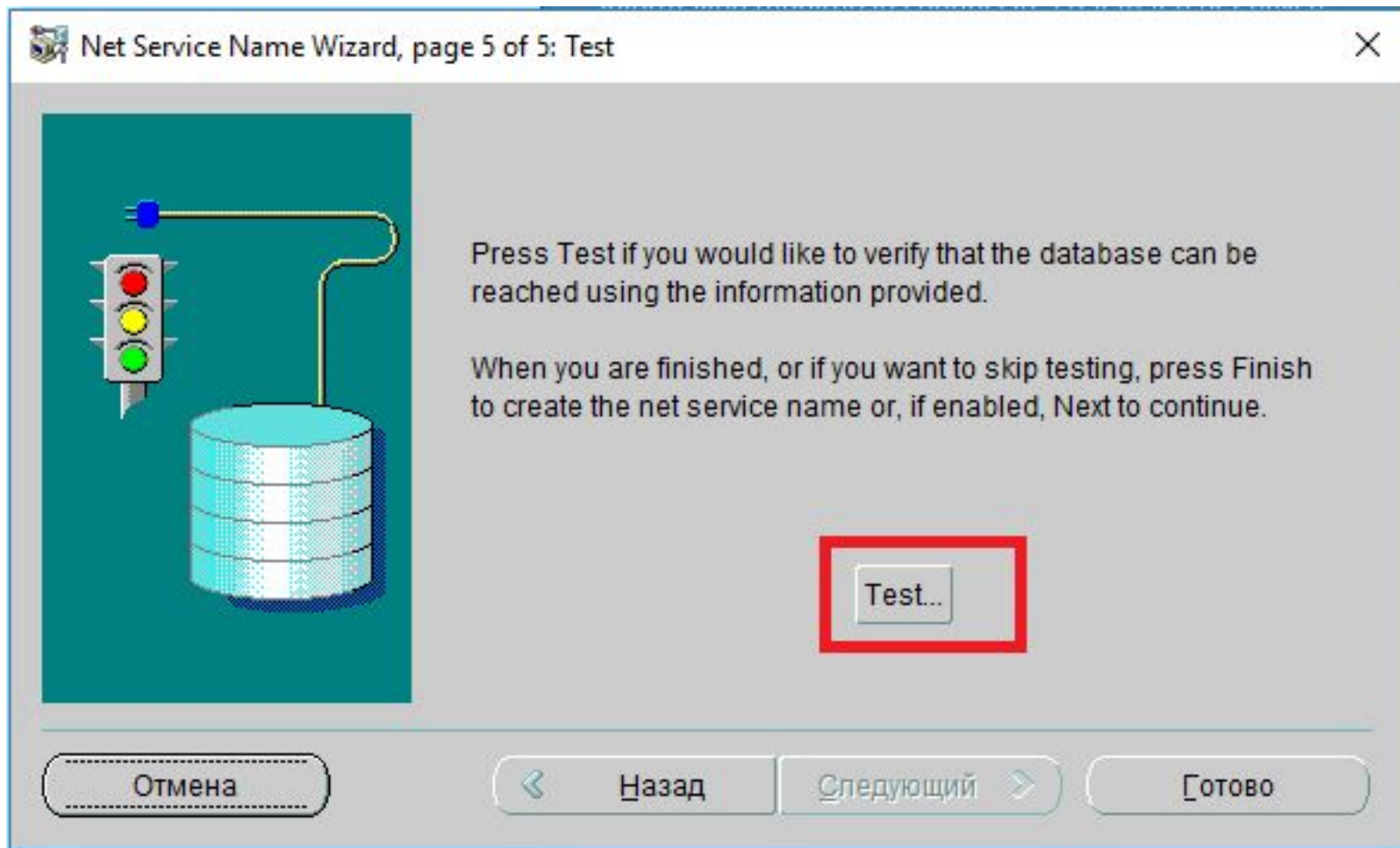
Optionally, you can choose if you want a shared, dedicated or pooled server database connection. The default is to let the database decide.

Connection Type:

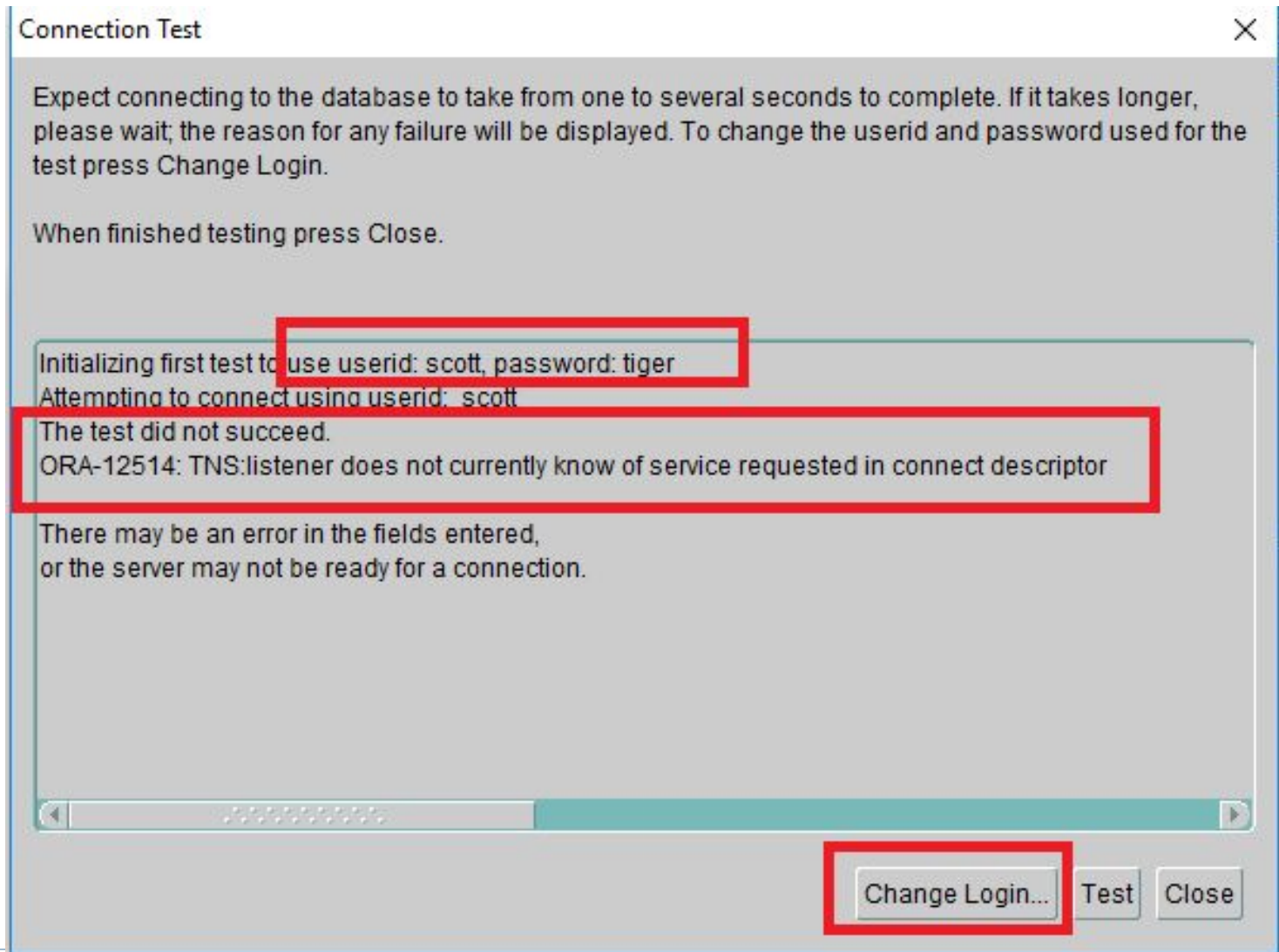
Отмена    < Назад    Следующий >



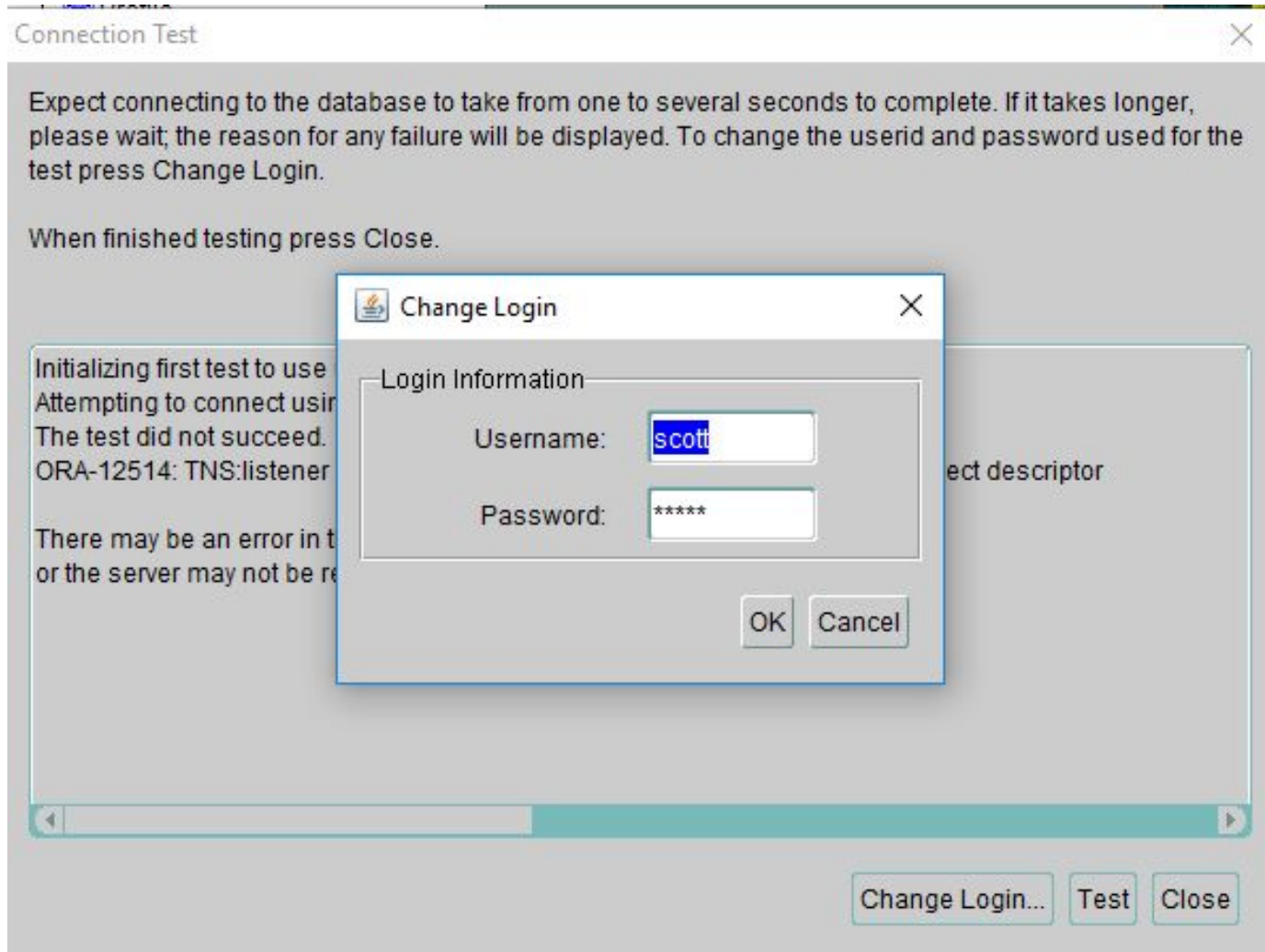
# Создание локального именованного



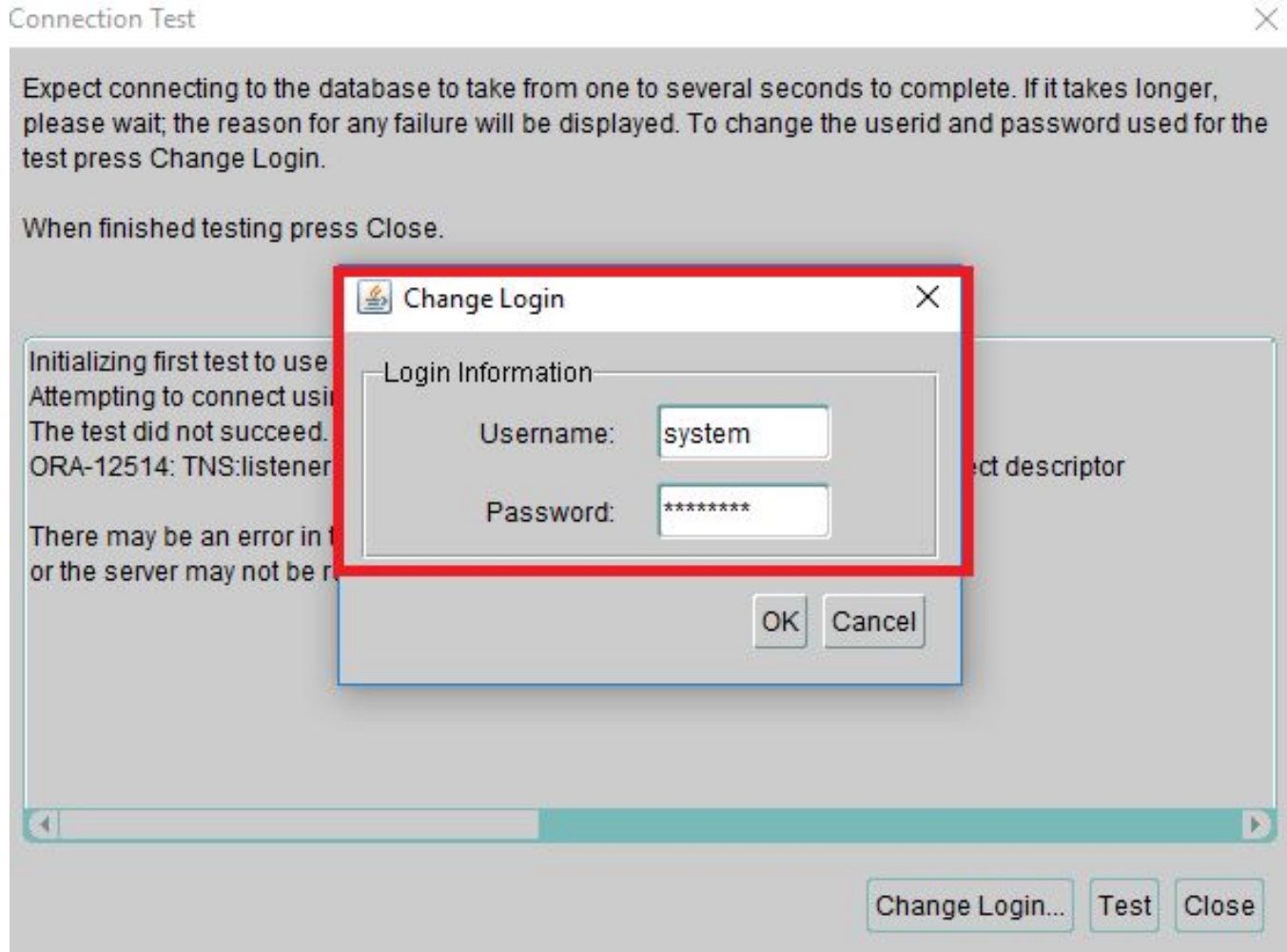
# Создание локального именованя



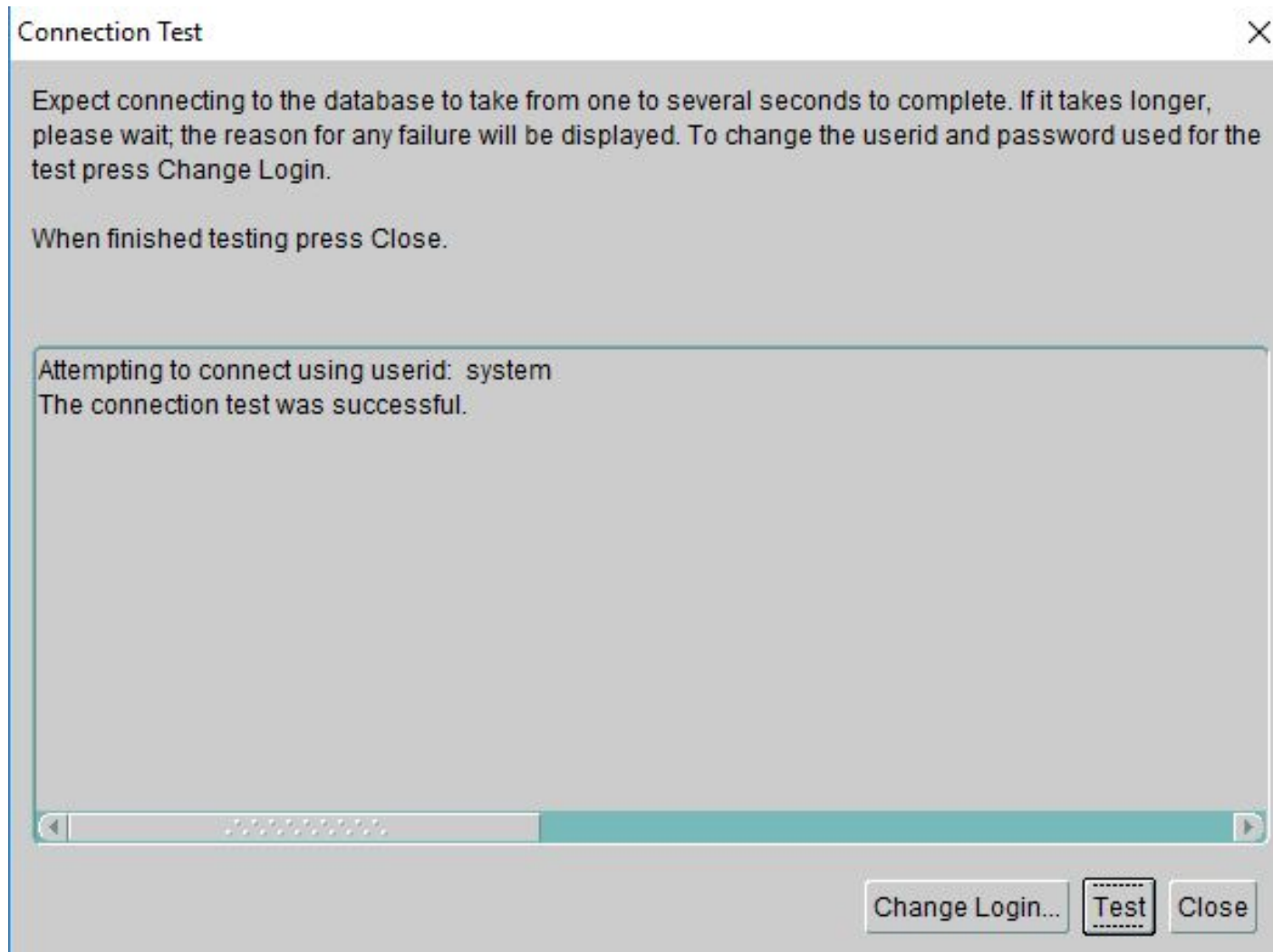
# Создание локального именованя



# Создание локального именованного



# Создание локального именованного



# Создание локального именования

The screenshot displays the Oracle Net Manager interface. The title bar reads "Oracle Net Manager - C:\app\client\blinova\product\12.1.0\client\_1\NETWORK\ADMIN\". The main window is divided into a left-hand tree view and a right-hand configuration panel.

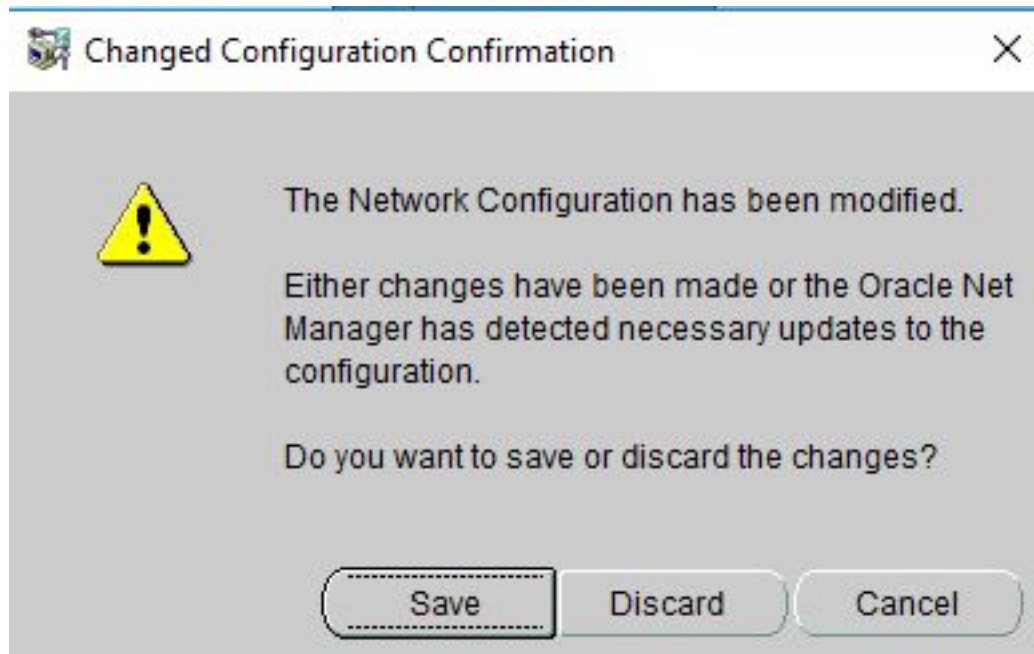
**Tree View:** The tree shows the hierarchy: Oracle Net Configuration > Local > Profile > Service Naming > pdb\_b. The "pdb\_b" node is selected and highlighted with a blue border.

**Configuration Panel:**

- Service Identification:**
  - Service Name:
  - SID:
  - Connection Type:
  - Use Oracle8 Release 8.0 Compatible Identification
- Address Configuration:**
  - Address 1:**
    - Protocol:
    - Host Name:
    - Port Number:
    -

# Создание локального именованя

---





# Создание локального именованния

```
tnsnames.ora — Блокнот
Файл  Правка  Формат  Вид  Справка
# tnsnames.ora Network Configuration File: C:\app\client\blinova\product\12.1.0\client_1\NETWORK\ADMIN\tns
# Generated by Oracle configuration tools.

PDB_B =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP)(HOST = bor.be.by)(PORT = 1521))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = pdb_b.be.by)
    )
  )

PDB_A =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP)(HOST = bor.be.by)(PORT = 1521))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = pdb_a.be.by)
    )
  )
```



# Проверка TNS



Connection Name: tna\_b  
Username: system  
Password: .....

Save Password  Connection Color

**Oracle**

Connection Type: TNS Role: default

Network Alias: PDB\_B  
 Connect Identifier:

OS Authentication  Kerberos Authentication

```
SQL*Plus: Release 12.1.0.2.0 Production on Tue Oct 25 18:16:02 2016
Copyright (c) 1982, 2014, Oracle. All rights reserved.

SQL> connect system/Pa$$w0rd@pdb_b
Connected.
SQL> _
```



# Утилита TNSPing

---

```
C:\Users\blinova>tns ping pdb_b
```

```
TNS Ping Utility for 64-bit Windows: Version 12.1.0.2.0 - Production on 25-OCT-2016 18:33:41
```

```
Copyright (c) 1997, 2014, Oracle. All rights reserved.
```

```
Used parameter files:
```

```
C:\app\client\blinova\product\12.1.0\client_1\network\admin\sqlnet.ora
```

```
Used TNSNAMES adapter to resolve the alias
```

```
Attempting to contact (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP)(HOST = bor.b  
e.by)(PORT = 1521))) (CONNECT_DATA = (SERVICE_NAME = pdb_b.be.by)))
```

```
OK (40 msec)
```



# LDAP-соединение

---

- Метод именованная с помощью службы каталогов
- OID – Oracle Internet Directory
- LDAP – Lightweight Directory Access Protocol
- Требуется наличие специального LDAP-сервера



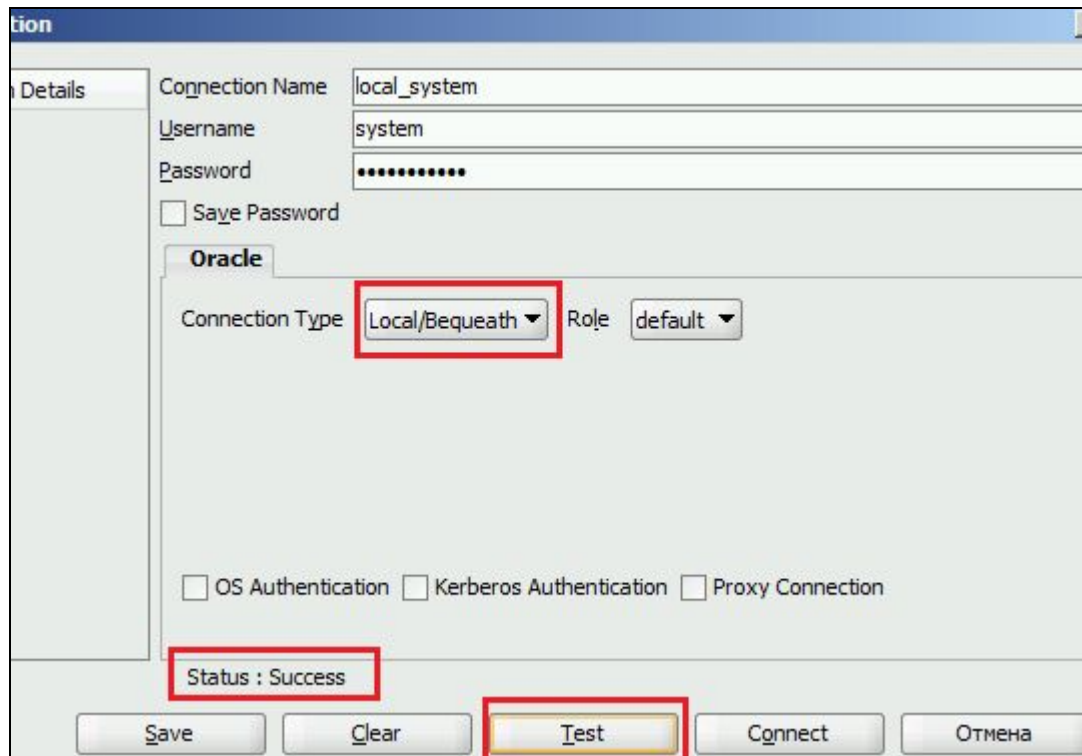
# Local/bequeath-соединение

---

- Только на сервере
- Можно соединяться с помощью sqlplus или sqldeveloper
- без указания параметров соединения
- только с выделенным сервером
- Listener не задействован
- Соединение со стандартным сервисом SYS\$USERS



# Local/bequeath-соединение



# Local/bequeath-соединение

Network Location Awareness	Collects an...	Running	Automatic	Network S...
Network Store Interface Service	This service ...	Running	Automatic	Local Service
Optimize drives	Helps the c...		Manual	Local System...
OracleJobSchedulerORCL			Disabled	.\ora_instal...
OracleOraDB12Home1MTSRcoveryService		Running	Automatic	.\ora_instal...
OracleOraDB12Home1TNSListener			Automatic	.\ora_instal...
OracleRsmExecServiceV2			Manual	Local System...
OracleServiceORCL		Running	Automatic	.\ora_instal...
OracleVssWriterORCL		Running	Automatic	.\ora_instal...

```
C:\app\ora_install_user\product\12.1.0\dbhome_1\BIN\sqlplus.exe
SQL*Plus: Release 12.1.0.1.0 Production on Tue Oct 25 08:30:20 2016
Copyright (c) 1982, 2013, Oracle. All rights reserved.
SQL> connect system/Pa$$w0rd@localhost:1521/orcl
ERROR:
ORA-12541: TNS:no listener
SQL> connect system/Pa$$w0rd
Connected.
SQL> _
```

# Вопросы?

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