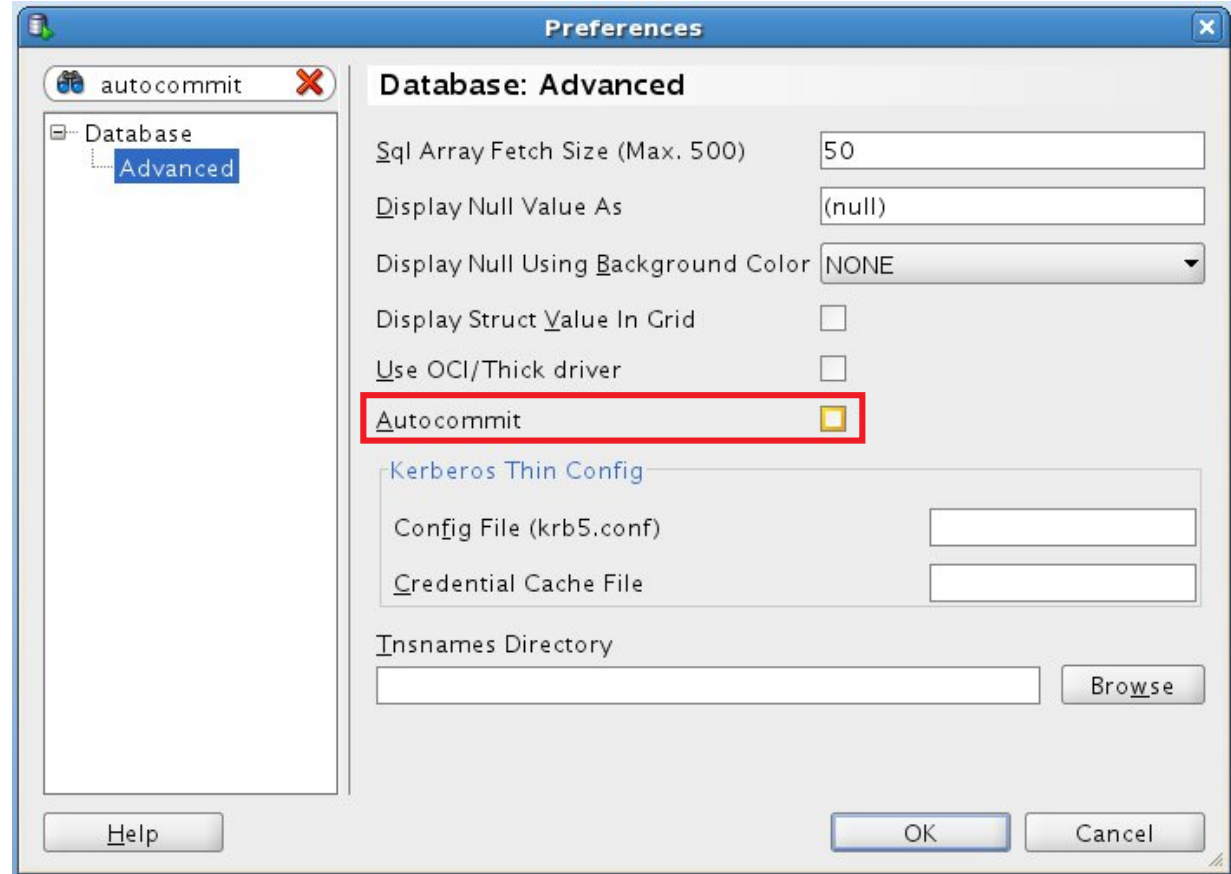
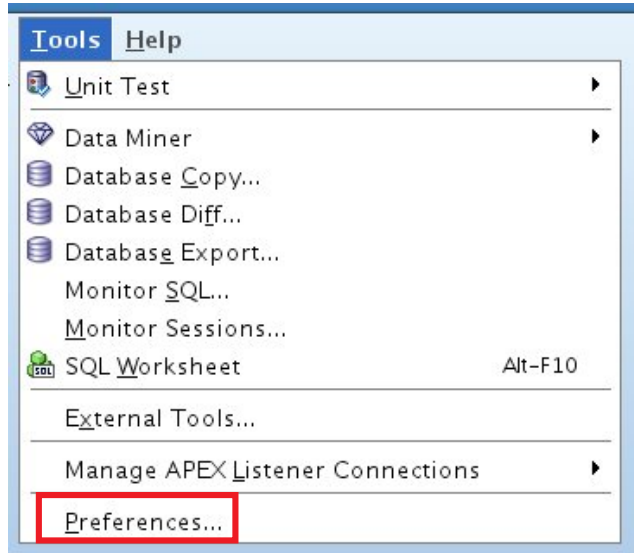


Redo Undo

Mag. Thomas Griesmayer

Autocommit

- The autocommit option **COMMIT**s every DML statement after its execution.



Transaction

- The use of transactions is one of the most important ways that a database management system differs from a file system.
- A transaction is a logical, atomic unit of work that contains one or more SQL statements.
- A transaction groups SQL statements so that they are either all committed, which means they are applied to the database, or all rolled back, which means they are undone from the database.
- Oracle Database assigns every transaction a unique identifier called a transaction ID.

ACID

- All Oracle transactions obey the basic properties of a database transaction, known as ACID properties.
- ACID is an acronym for the following:
 - A**tomicity - All tasks of a transaction are performed or none of them are.
 - C**onsistency - The transaction takes the database from one consistent state to another consistent state.
 - I**solation - The effect of a transaction is not visible to other transactions until the transaction is committed.
 - D**urability - Changes made by committed transactions are permanent. After a transaction completes, the database ensures through its recovery mechanisms that changes from the transaction are not lost.

Transaction ID

```
SELECT *  
FROM CUSTOMER;
```

```
SELECT XID  
FROM V$TRANSACTION;  
no rows selected
```

```
UPDATE CUSTOMER  
SET BALANCE = 550  
WHERE CUSTOMER_ID = 6;
```

```
SELECT XID  
FROM V$TRANSACTION;  
0400200015250000
```

```
UPDATE CUSTOMER  
SET BALANCE = 150  
WHERE CUSTOMER_ID = 8;
```

```
COMMIT;
```

```
SELECT XID  
FROM V$TRANSACTION;  
090000000B0250000
```

```
INSERT INTO CUSTOMER  
VALUES (9, 'Martina', 800);
```

```
DELETE FROM CUSTOMER  
WHERE CUSTOMER_ID = 1;
```

```
ROLLBACK;
```

ROWID

- For each row in the database, the ROWID pseudocolumn returns the address of the row.
- Oracle Database rowid values contain information necessary to locate a row:
 - The data object number of the object
 - The data block in the datafile in which the row resides
 - The position of the row in the data block (first row is 0)
 - The datafile in which the row resides (first file is 1). The file number is relative to the tablespace.

ROWID

- Rowid values have several important uses:
 - They are the fastest way to access a single row.
 - They can show you how the rows in a table are stored.
 - They are unique identifiers for rows in a table.
 - You should not use ROWID as the primary key of a table.
 - If you delete and reinsert a row with the Import and Export utilities, for example, then its rowid may change.
 - If you delete a row, then Oracle may reassign its rowid to a new row inserted later.

ROWID

```
SELECT ROWID,  
       cus.*  
FROM   CUSTOMER cus;
```

Script Output x Query R... x

SQL | All Rows Fetched: 8 in 0.018 seconds

ROWID	CUSTOMER_ID	FIRST_NAME	BALANCE
1 AAAb3/AEAAAFHTAAA	1	Fritz	200
2 AAAb3/AEAAAFHTAAB	2	Susi	300
3 AAAb3/AEAAAFHTAAC	3	Hans	150
4 AAAb3/AEAAAFHTAAD	4	Franz	-80
5 AAAb3/AEAAAFHTAAE	5	Maria	0
6 AAAb3/AEAAAFHTAAF	6	Andrea	550
7 AAAb3/AEAAAFHTAAG	7	Verena	100
8 AAAb3/AEAAAFHTAAH	8	Marion	150

```
SELECT ROWID,  
       cus.*  
FROM   CUSTOMER cus  
WHERE  ROWID = 'AAAb3/AEAAAFHTAAB';
```

Script Output x Query R... x

SQL | All Rows Fetched: 1 in 0.001 seconds

ROWID	CUSTOMER_ID	FIRST_NAME	BALANCE
1 AAAb3/AEAAAFHTAAB	2	Susi	300


```
SELECT *
FROM CUSTOMER;
```

TRANSFER

RID	FROM	TO	DATE	AMOUNT

CUSTOMER

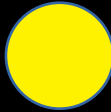
RID	CID	NAME	BALANCE
A0	1	Fritz	300
C1	2	Marion	400
A1	3	Andrea	200
B0	4	Hans	-300
B1	5	Verena	1000
C0	6	Thomas	800

REDO

TID	RID	VALUE

UNDO

TID	RID	VALUE



```
UPDATE CUSTOMER
SET     BALANCE = BALANCE-50
WHERE  CUSTOMER_ID = 3;
```



REDO

UNDO

TID	RID	VALUE

TID	RID	VALUE



TRANSFER

RID	FROM	TO	DATE	AMOUNT

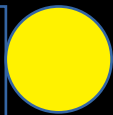


CUSTOMER

RID	CID	NAME	BALANCE
A0	1	Fritz	300
C1	2	Marion	400
A1	3	Andrea	200
B0	4	Hans	-300
B1	5	Verena	1000
C0	6	Thomas	800




```
UPDATE CUSTOMER
SET BALANCE = BALANCE+50
WHERE CUSTOMER_ID = 1;
```



REDO

UNDO

TID	RID	VALUE

TID	RID	VALUE

TRANSFER				
RID	FROM	TO	DATE	AMOUNT



CUSTOMER			
RID	CID	NAME	BALANCE
A0	1	Fritz	300
C1	2	Marion	400
A1	3	Andrea	200
B0	4	Hans	-300
B1	5	Verena	1000
C0	6	Thomas	800




```
UPDATE CUSTOMER
SET    BALANCE = BALANCE+5
WHERE  CUSTOMER_ID = 6;
```



REDO

TID	RID	VALUE

UNDO

TID	RID	VALUE



TRANSFER

RID	FROM	TO	DATE	AMOUNT

CUSTOMER

RID	CID	NAME	BALANCE
A0	1	Fritz	300
C1	2	Marion	400
A1	3	Andrea	200
B0	4	Hans	-300
B1	5	Verena	1000
C0	6	Thomas	800

```
INSERT INTO TRANSFER
VALUES (3, 1, SYSDATE, 50);
```



REDO		
TID	RID	VALUE

UNDO		
TID	RID	VALUE

TRANSFER

RID	FROM	TO	DATE	AMOUNT



CUSTOMER

RID	CID	NAME	BALANCE
A0	1	Fritz	300
C1	2	Marion	400
A1	3	Andrea	200
B0	4	Hans	-300
B1	5	Verena	1000
C0	6	Thomas	800



ROLLBACK;



REDO

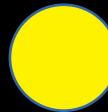
TID	RID	VALUE

UNDO

TID	RID	VALUE



TRANSFER



RID FROM TO DATE AMOUNT

CUSTOMER



RID CID NAME BALANCE

A0 1 Fritz 300

C1 2 Marion 400

A1 3 Andrea 200

B0 4 Hans -300

B1 5 Verena 1000

C0 6 Thomas 800

COMMIT;



TRANSFER

RID	FROM	TO	DATE	AMOUNT
-----	------	----	------	--------

--	--	--	--	--

--	--	--	--	--

CUSTOMER

RID	CID	NAME	BALANCE
-----	-----	------	---------

A0	1	Fritz	300
----	---	-------	-----

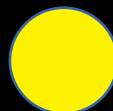
C1	2	Marion	400
----	---	--------	-----

A1	3	Andrea	200
----	---	--------	-----

B0	4	Hans	-300
----	---	------	------

B1	5	Verena	1000
----	---	--------	------

C0	6	Thomas	800
----	---	--------	-----



REDO

TID	RID	VALUE
-----	-----	-------

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

UNDO

TID	RID	VALUE
-----	-----	-------

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

**UPDATE CUSTOMER
SET BALANCE = BALANCE-5
WHERE CUSTOMER_ID = 2;**



TRANSFER

RID	FROM	TO	DATE	AMOUNT
-----	------	----	------	--------

--	--	--	--	--

--	--	--	--	--



CUSTOMER

RID	CID	NAME	BALANCE
-----	-----	------	---------

A0	1	Fritz	300
----	---	-------	-----

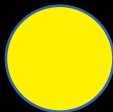
C1	2	Marion	400
----	---	--------	-----

A1	3	Andrea	200
----	---	--------	-----

B0	4	Hans	-300
----	---	------	------

B1	5	Verena	1000
----	---	--------	------

C0	6	Thomas	800
----	---	--------	-----



REDO

TID	RID	VALUE
-----	-----	-------

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

UNDO

TID	RID	VALUE
-----	-----	-------

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--

--	--	--