

chapter 6:
-SQL Views-
&
-SQL Privileges-

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SQL Views

❖ A view is a table whose instance is derived from other tables by a query.

create view ViewName [(AttributeList)] as SQLSelect

❖ A view is defined by a query over other relations (tables and/or views)

❖ A view is a virtual table that does not exist physically

❖ A view can be

– Queried: the query processor replaces the view by its definition.

– Used in other queries.

Example:

```
create view AdminEmp(empNo,firstName,lastName,sal) as  
select EmpNo, firstName, lastName, salary  
from employee  
where dept = 'Administration' and salary > 10
```

```
CREATE VIEW Redcount  
AS SELECT B.bid, COUNT(*) AS scout  
FROM Boats B, Reserves R  
WHERE R.bid=B.bid AND B.color='red'  
GROUP BY B.bid
```

```
CREATE VIEW TOPSUPPLIERS  
AS SELECT SUPNR, SUPNAME  
FROM SUPPLIER  
WHERE SUPSTATUS > 50
```

Maximizing Aggregates

- “Which age group has the highest total income?”
- One solution is to use nesting in the `having` clause:

```
select age
from person
group by age
having sum(income) >= all (select sum(income)
                           from person
                           group by age)
```

- Another solution is to create a view.

Solution with Views

```
create view ageIncome(age, sumIncome) as
  select age, sum(income)
  from   person
  group by age
```

```
select age
from   ageIncome
where  sumIncome = (select max(sumIncome)
                   from   ageIncome)
```

❖ **A view is by default not updatable.**

So if, we want to insert any data to view, we have 2 solutions:

- 1. Change the underlying tables, so that the view will be automatically updated.**
- 2. Use trigger to handle it.**

❖ **A view is useful in simplifying SQL statements by encapsulating commonly-used calculations.**

- ✓ Useful in speeding up query answering**
- ✓ Defining access control to hide some of the values from certain users (mechanism to hide certain data from the view of certain user).**

Types of SQL Views

- 1. Materialized view:** pre-calculated and stored on the database so that we can save computing time, but they require extra work to keep them updated whenever the underlying tables are modified.
 - a physical table is created when the view is first queried.
- 2. Virtual view:** reconstructed every time they are used so they always reflect the current state of the database.

Access Control

- ❖ In SQL it is possible to specify
 - who can use (i.e., which user)
 - in which way (i.e., read, write,...) a data base (or part of it)
- ❖ The object of such privileges (access rights) are usually tables, but also other types of resources, like attributes, views, or domains.
- ❖ A privilege corresponds to the right to use certain SQL statements such as SELECT, INSERT, etc. on one or more database objects

Access Control

- ❖ **The predefined user `_system` (database administrator) has all privileges.**
- ❖ **The creator of a resource has all privileges for it.**
- ❖ **A privilege is characterized by:**
 - the resource to which it refers
 - the user who grants the privilege
 - the user who receives the privilege
 - the action that is permitted
 - the possibility to transfer the privilege

SQL Privileges Types

Privilege	Explanation
SELECT	Gives retrieval privilege
INSERT	Gives insert privilege
UPDATE	Gives update privilege
DELETE	Gives delete privilege
ALTER	Gives privilege to change the table definition
REFERENCES	Gives the privilege to reference the table when specifying integrity constraints
ALL	Gives all privileges (DBMS specific)

Types of privileges

- insert: permits to insert new records (tuples)
- update: permits to modify the content
- delete: permits to eliminate records
- select: permits to read the resource
- references: permits the definition of referential integrity constraints that target the resource (can limit the possibility to modify the resource)
- usage: permits the usage in a definition (for example, the usage of a domain)

Grant and Revoke

- **Concession of privileges:**

grant < Privileges | all privileges > on

Resource to Users [with grant option]

– with grant option specifies whether the privilege can be transferred to other users

grant select on Department to Joe

- **Revocation of privileges:**

revoke Privileges on Resource from Users

[restrict | cascade]

SQL Privileges

- ❖ **GRANT SELECT, INSERT, UPDATE, DELETE ON SUPPLIER TO BBAESENS;**
- ❖ **GRANT SELECT (PRODNR, PRODNAME) ON PRODUCT TO PUBLIC;**
- ❖ **REVOKE DELETE ON SUPPLIER FROM BBAESENS;**
- ❖ **GRANT SELECT, INSERT, UPDATE, DELETE ON PRODUCT TO
WLEMAHIEU WITH GRANT OPTION;**
- ❖ **GRANT REFERENCES ON SUPPLIER TO SVANDENBROUCKE;**

SQL Privileges

❖ **CREATE VIEW SUPPLIERS_NY;**

AS SELECT SUPNR, SUPNAME FROM SUPPLIERS;

WHERE SUPCITY = 'New York';

❖ **GRANT SELECT ON SUPPLIERS_NY TO WLEMAHIEU;**

❖ **GRANT ALL ON SUPPLIERS_NY TO WLEMAHIEU;**

❖ **GRANT ALL PRIVILEGES ON SUPPLIERS_NY TO WLEMAHIEU;**

SHOW GRANTS Statement

➤ Review the privileges given to a certain user:

❖ **SHOW GRANTS FOR** WLEMAHIEU;

❖ **SHOW GRANTS;**

❖ **SHOW GRANTS FOR CURRENT_USER;**

❖ **SHOW GRANTS FOR CURRENT_USER();**