Views and View Management

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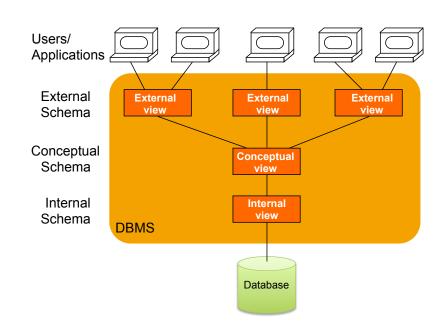CS 348
Introduction to Database Management
Fall 2012

Notes

Views

Recall the three-level schema architecture:

1. External schema
2. Conceptual schema
3. Physical schema

Notes

Views

> **Definition (View)**
>
> A *view* is a relation in the external schema whose instance is determined by the instances of the relations in the conceptual schema.

A view has many of the same properties as a base relation in the conceptual schema:

- its schema information appears in the database schema
- access controls can be applied to it
- other views can be defined in terms of it

Notes

Types of Views

- **Virtual:** Views are used only for querying; they are not stored in the database
- **Materialized:** The query that makes up the view is executed, the view constructed and stored in the database.

Notes

SQL DDL: Views

- General form:

  create [**materialized**] **view** <name>
     as <query>

- Example

  create view ManufacturingProjects **as**
     (**select** projno, projname, firstnme, lastname
     from project, employee
     where respemp = empno **and** deptno = 'D21')

Notes

Accessing a View

Query a view as if it were a base relation.

```
select projname
from ManufacturingProjects
```

What happens when you query a virtual view?

- At compile time, the view definition is found
- The query over the view is modified with the query definition
- The resulting query is optimized and executed

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Updating Views

- Modifications to a view's instance must be propagated back to instances of relations in conceptual schema.
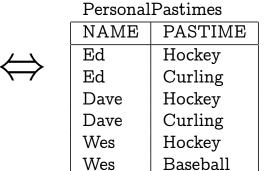- Some views cannot be updated unambiguously.

Conceptual Schema

Persons

NAME	CITIZENSHIP
Ed	Canadian
Dave	Canadian
Wes	American

NationalPastimes

CITIZENSHIP	PASTIME
Canadian	Hockey
Canadian	Curling
American	Hockey
American	Baseball

$\Longleftrightarrow$

External Schema

PersonalPastimes

NAME	PASTIME
Ed	Hockey
Ed	Curling
Dave	Hockey
Dave	Curling
Wes	Hockey
Wes	Baseball

1. What does it mean to insert (Darryl, Hockey)?
2. What does it mean to delete (Dave, Curling)?

Notes

View Updates in SQL

According to SQL-92, a view is updatable only if its definition satisfies a variety of conditions:

- The query references exactly one table
- The query only outputs simple attributes (no expressions)
- There is no grouping/aggregation/**distinct**
- There are no nested queries
- There are no set operations

These rules are more restrictive than necessary.

Notes

Materialized Views

> **Problem**
>
> When a base table changes, the materialized view may also change.

- Solution?
    - Periodically reconstruct the materialized view.
    - Incrementally update the materialized view.
- Example: Data warehouses

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