Materialized views

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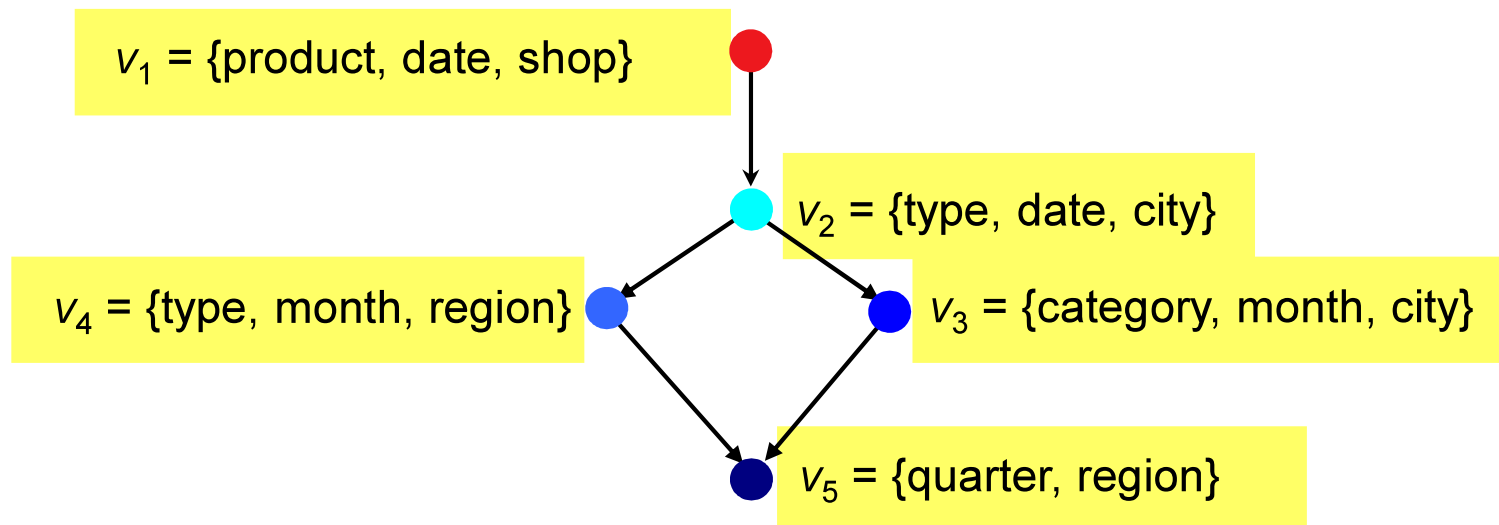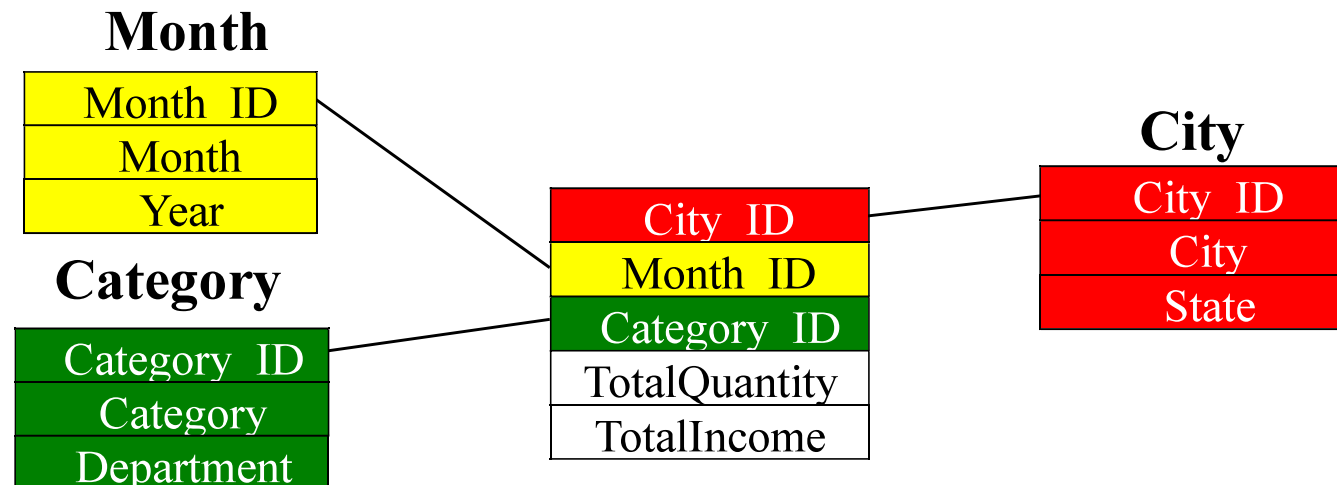
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Materialized views

- Precomputed summaries for the fact table
  - explicitly stored in the data warehouse
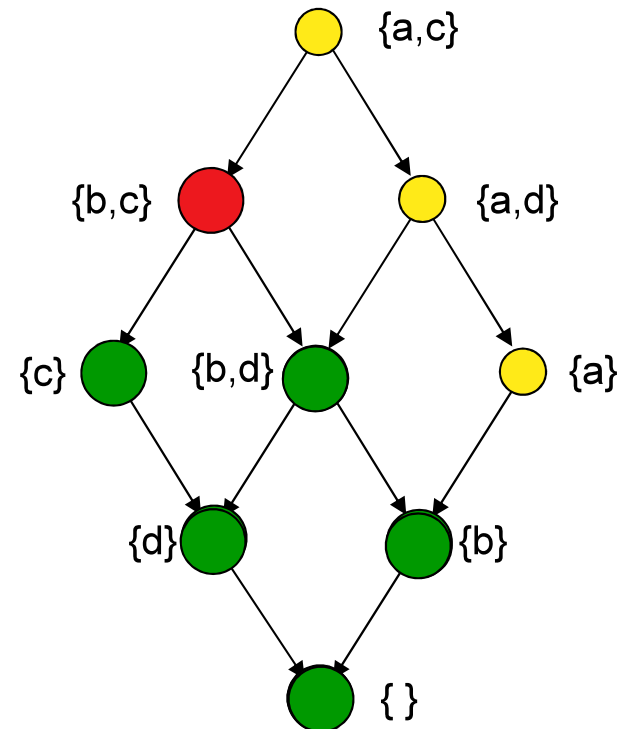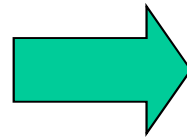 - provide a performance increase for aggregate queries

$v_1 = \{product, date, shop\}$

$v_2 = \{type, date, city\}$

$v_4 = \{type, month, region\}$

$v_3 = \{category, month, city\}$

$v_5 = \{quarter, region\}$

From Golfarelli, Rizzi,"Data warehouse, teoria e pratica della progettazione", McGraw Hill 2006

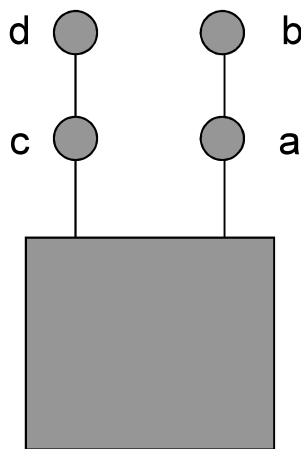*Elena Baralis*
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Materialized views

- ## Defined by SQL statements

- ## Example: definition of v_3

  - ### Starting from base tables or views with higher granularity

    ```
    group by City, Category, Month
    ```

  - ### Aggregation (SUM) on `Quantity`, `Income` measures
  - ### Reduction of detail in dimensions

Month

Month
Month ID
Month
Year

Category

Category
Category ID
Category
Department

City ID
Month ID
Category ID
TotalQuantity
TotalIncome

City

City
City ID
City
State

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Materialized views

- Materialized views may be exploited for answering several different queries
 - not for all aggregation operators

Multidimensional lattice

From Golfarelli, Rizzi,"Data warehouse, teoria e pratica della progettazione", McGraw Hill 2006

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Materialized view selection

- Huge number of allowed aggregations
  - most attribute combinations are eligible

- Selection of the "best" materialized view set

- Cost function minimization
  - query execution cost
  - view maintainance (update) cost

- Constraints
  - available space
  - time window for update
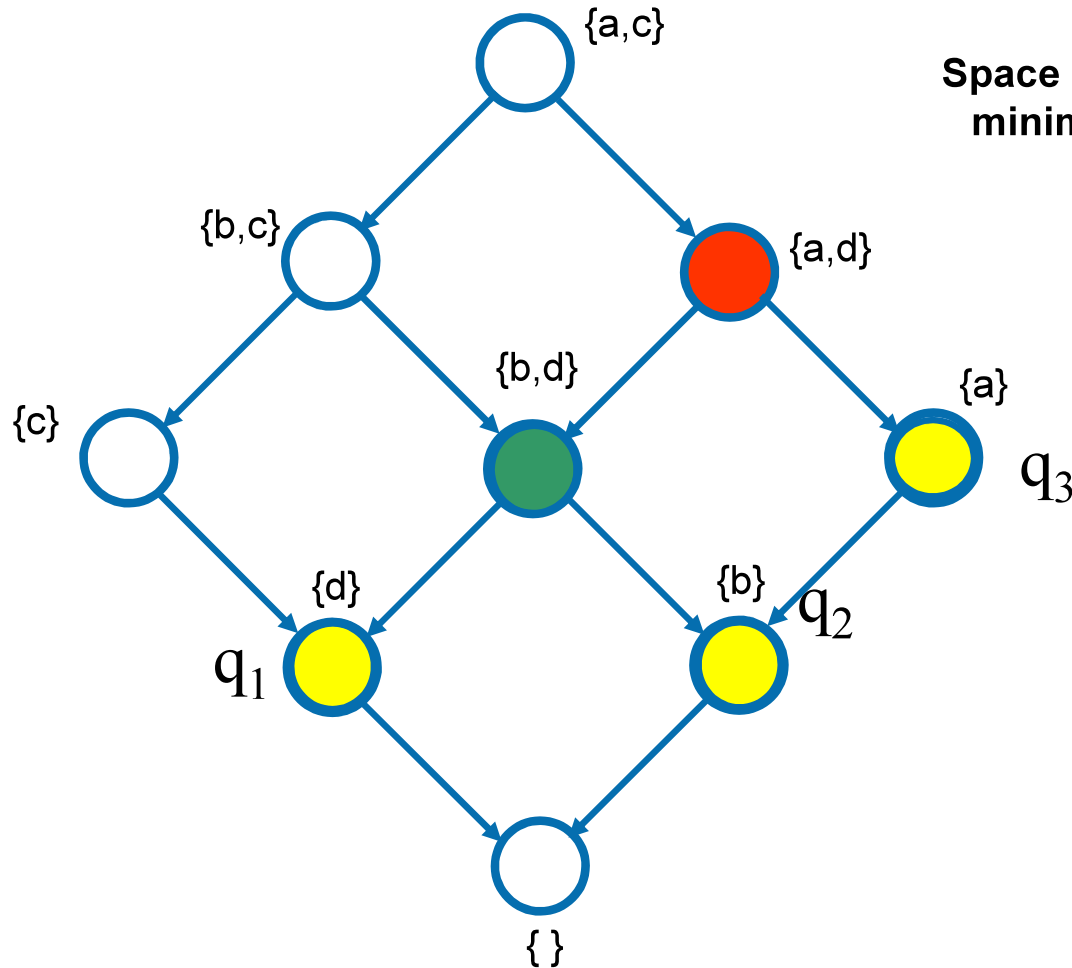 - response time
  - data freshness

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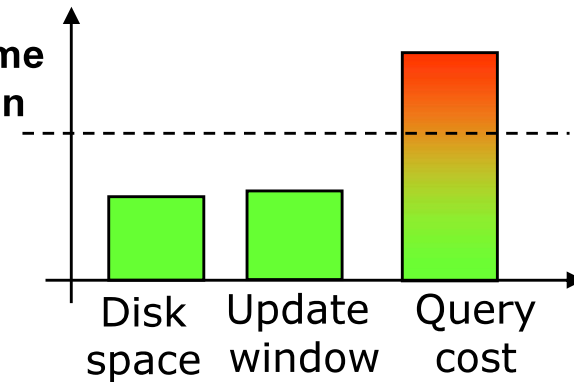*Politecnico di Torino*

Materialized view selection
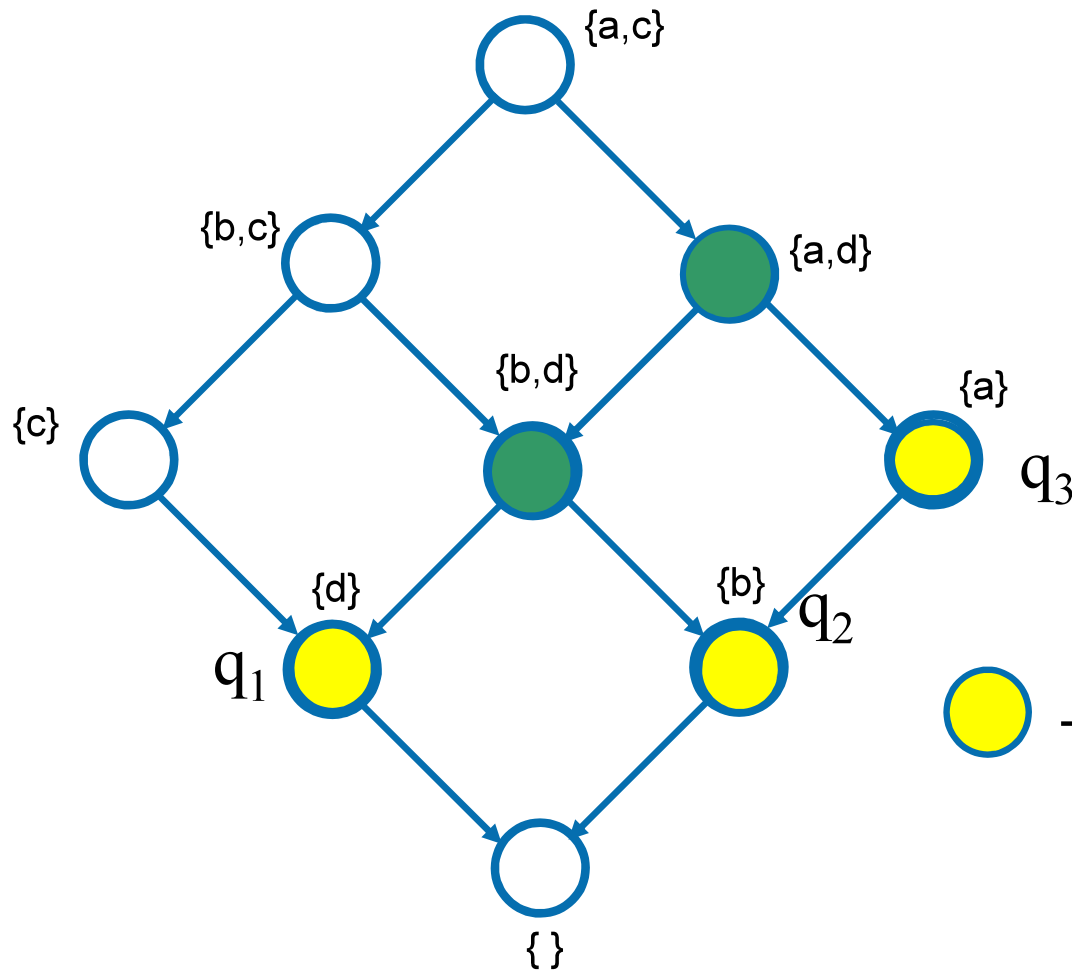
Multidimensional lattice

🟡 + 🟢 = *candidate views*, possibly useful to increase workload query performance
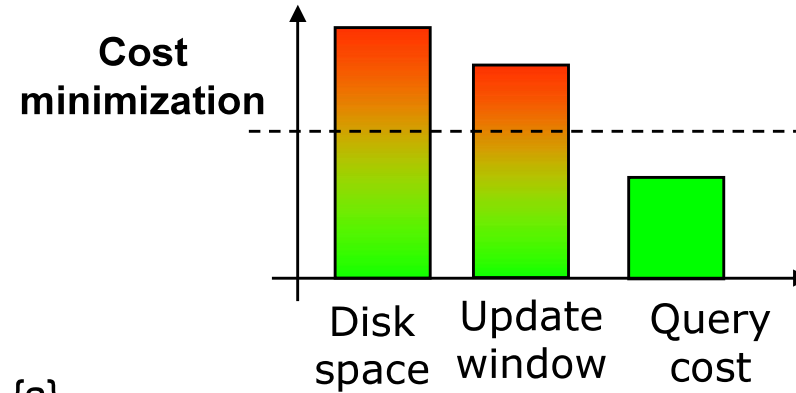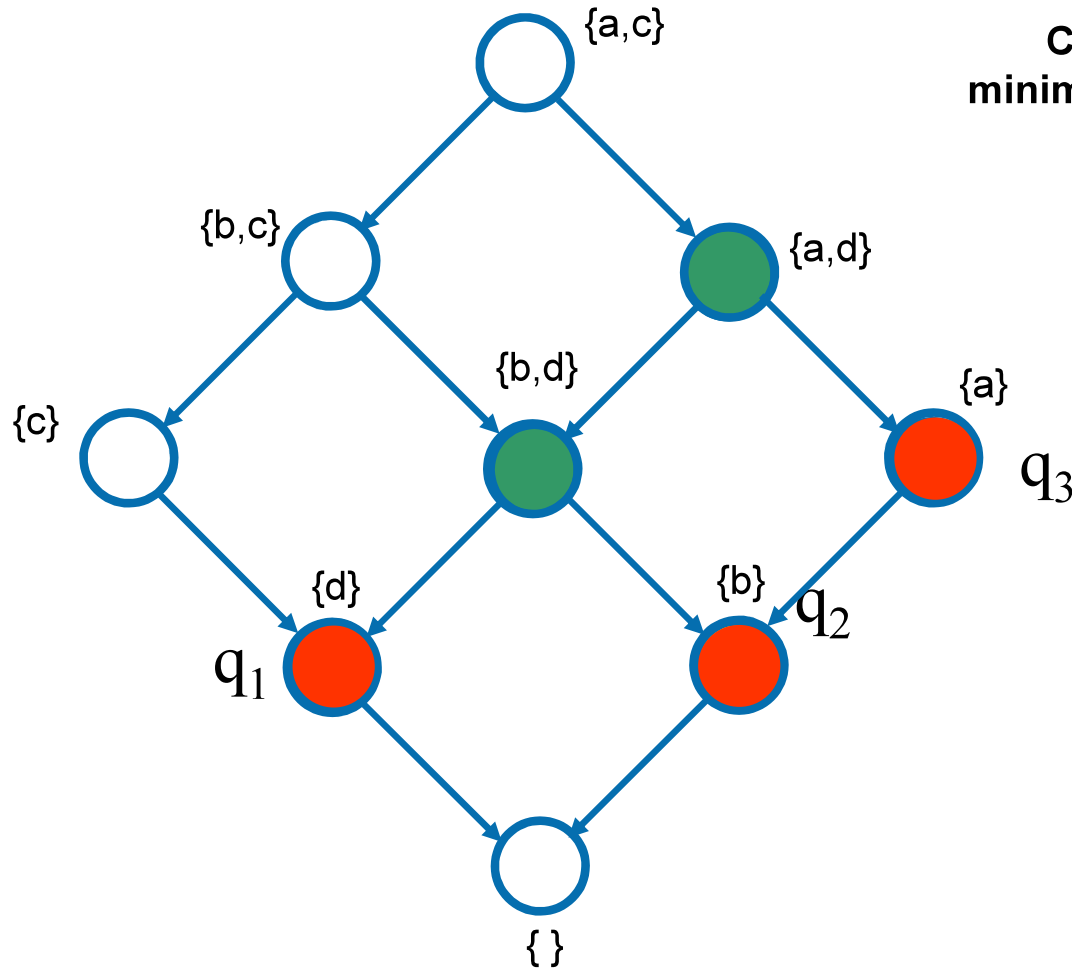
From Golfarelli, Rizzi,"Data warehouse, teoria e pratica della progettazione", McGraw Hill 2006

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Materialized view selection

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