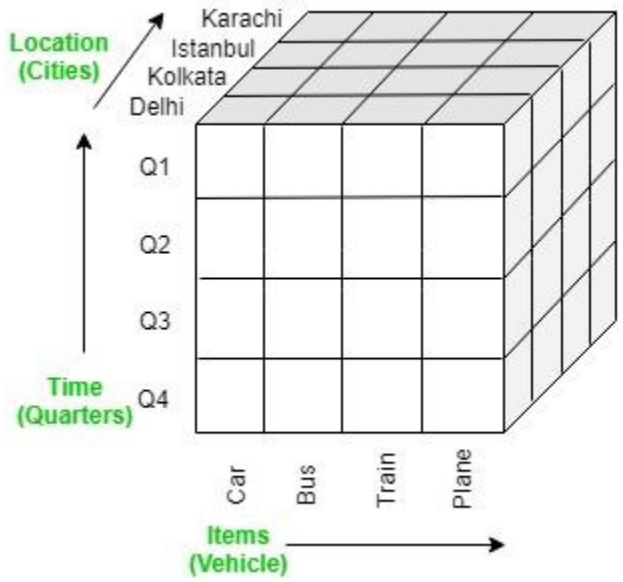
OLAP Operations

It is a software technology that allows users to analyze information from multiple database systems at the same time. It is based on multidimensional data model and allows the user to query on multi-dimensional data (eg. Delhi -> 2018 -> Sales data). OLAP databases are divided into one or more cubes and these cubes are known as *Hyper-cubes*.



OLAP operations:

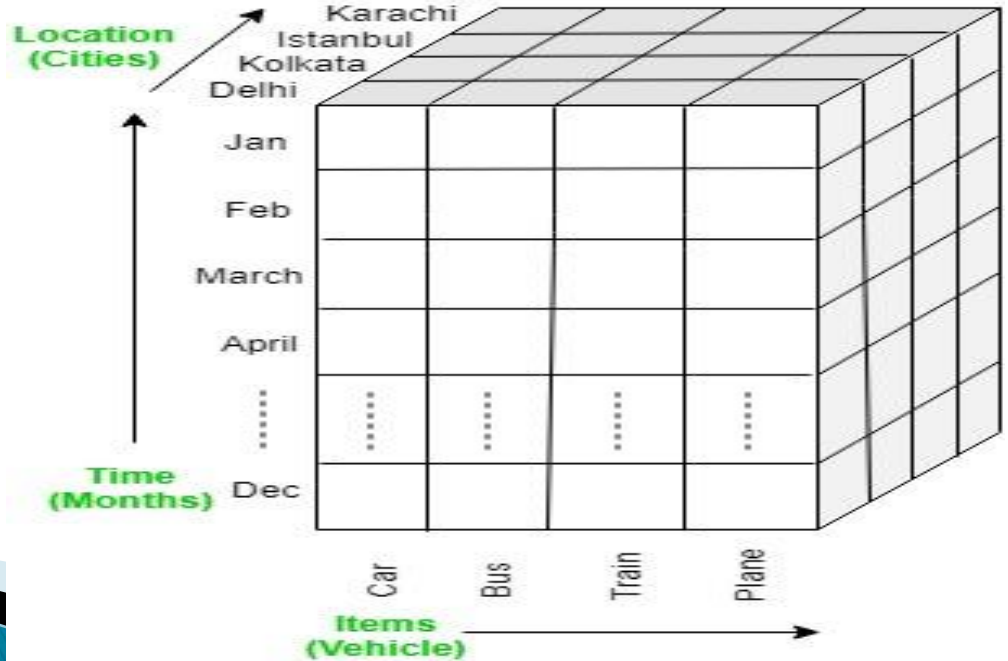
There are five basic analytical operations that can be performed on an OLAP cube:

Drill down: In drill-down operation, the less detailed data is converted into highly detailed data. It can be done by:

Moving down in the concept hierarchy

Adding a new dimension

In the cube given in overview section, the drill down operation is performed by moving down in the concept hierarchy of *Time* dimension (Ouarter -> Month).

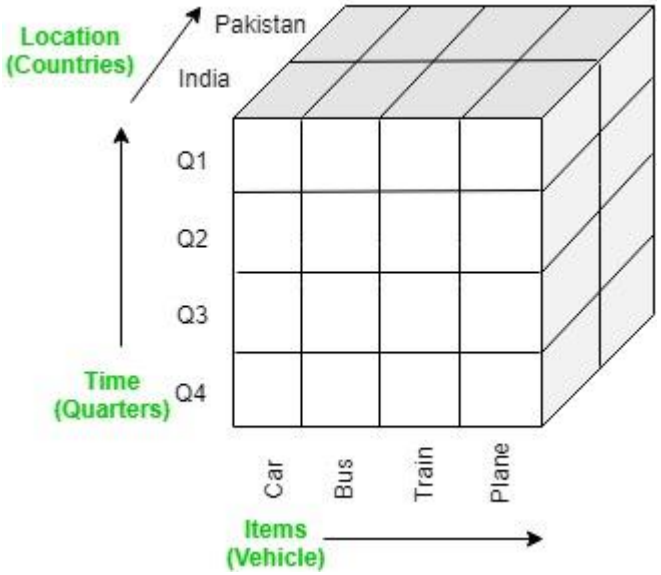


Roll up

It is just opposite of the drill-down operation. It performs aggregation on the OLAP cube. It can be done by

- Climbing up in the concept hierarchy
- Reducing the dimensions

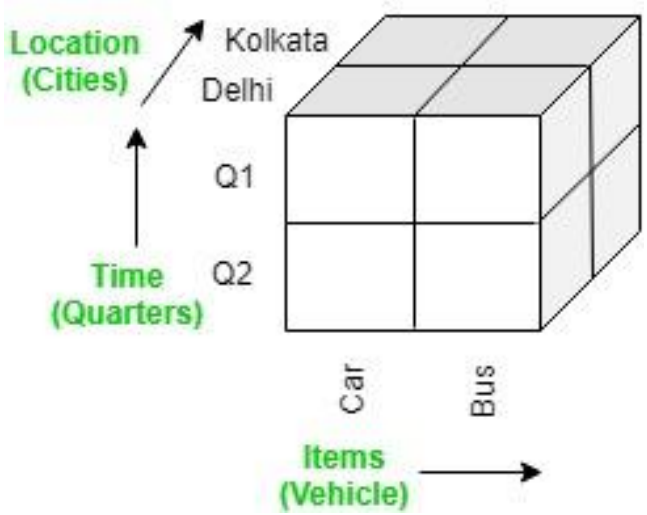
In the cube given in the overview section, the roll-up operation is performed by climbing up in the concept hierarchy of *Location* dimens



Dice

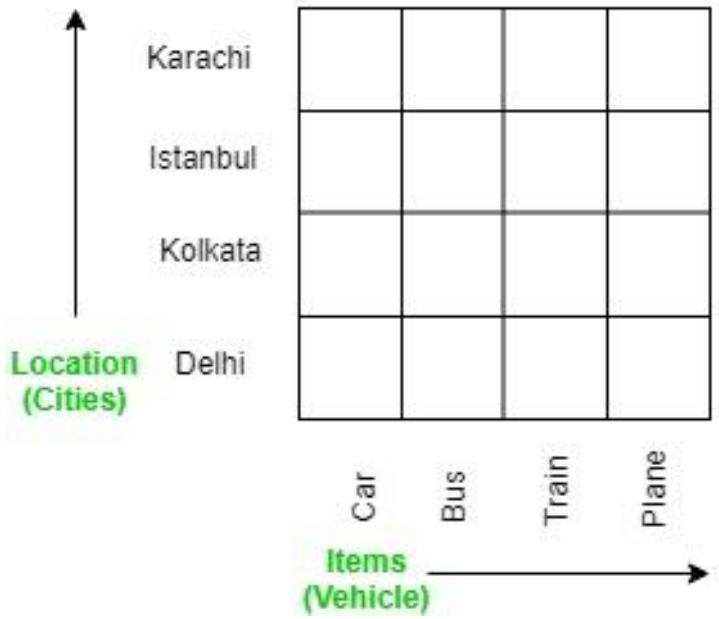
It selects a sub-cube from the OLAP cube by selecting two or more dimensions. In the cube given in the overview section, a sub-cube is selected by selecting following dimensions with criteria:

- Location = “Delhi” or “Kolkata”
- Time = “Q1” or “Q2”
- Item = “Car” or “Bus”



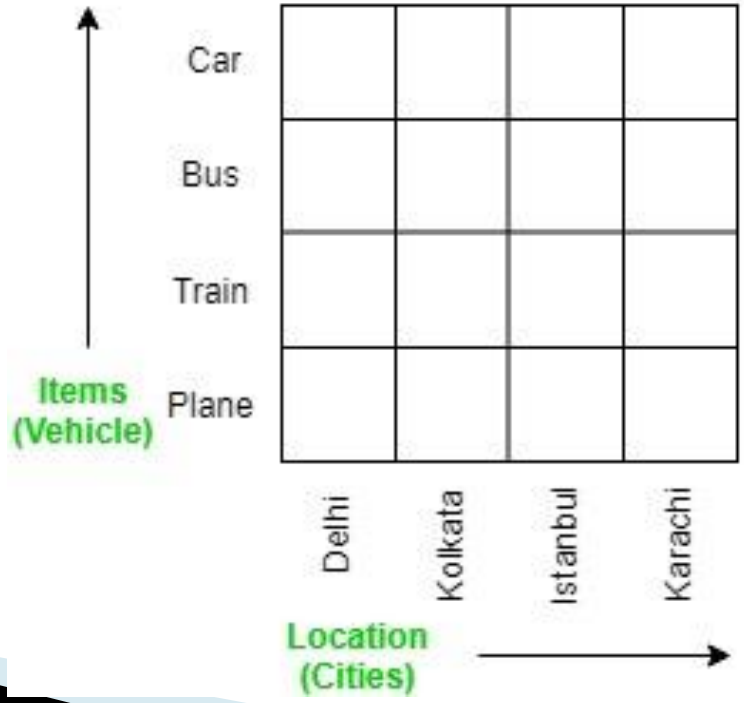
Slice:

It selects a single dimension from the OLAP cube which results in a new sub-cube creation. In the cube given in the overview section, Slice is performed on the dimension
Time = “Q1”.



Pivot:

It is also known as *rotation* operation as it rotates the current view to get a new view of the representation. In the sub-cube obtained after the slice operation, performing pivot operation gives a new view of it.



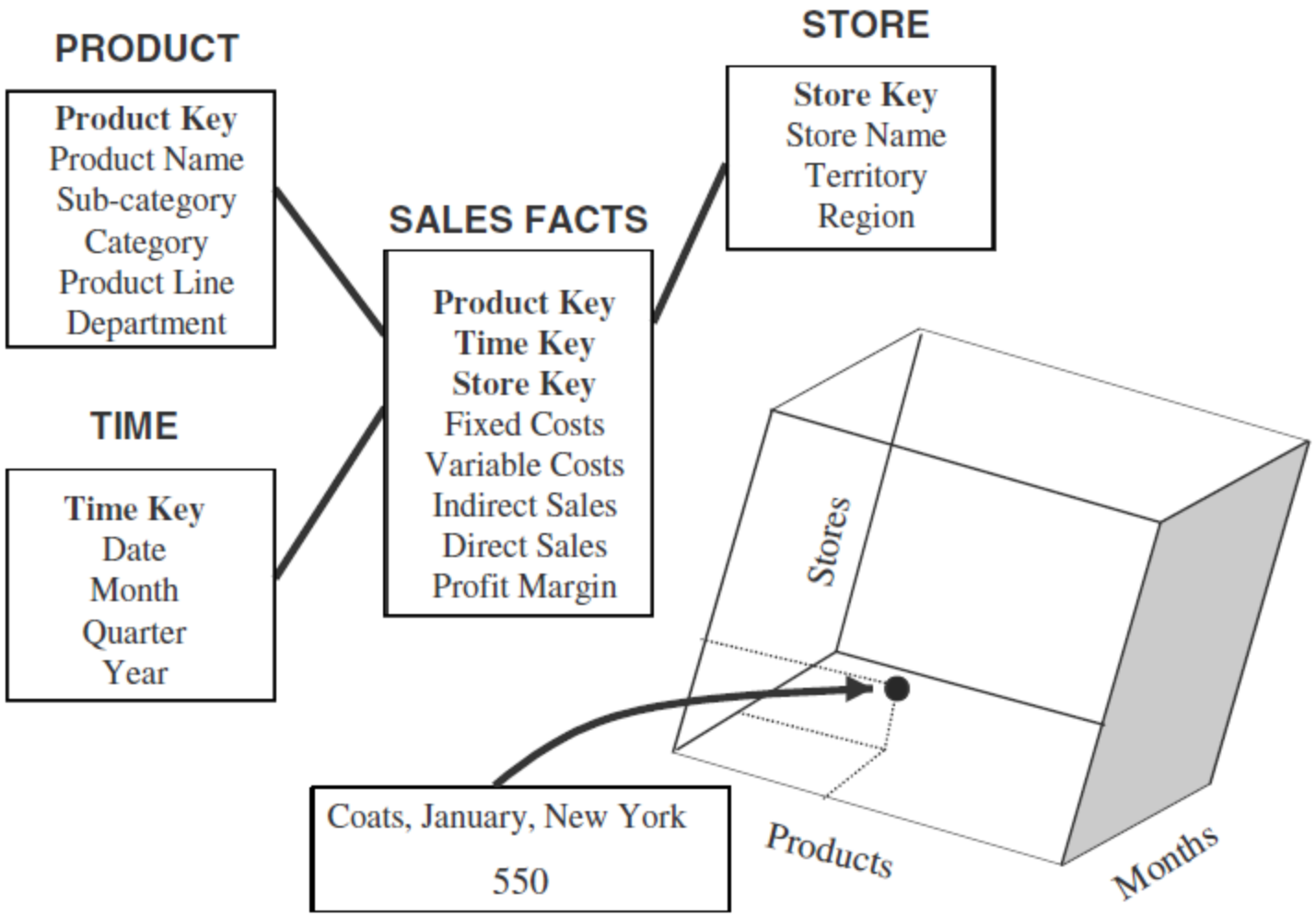


Figure 15-5 Simple STAR schema.

Store: New York

PAGES: STORE dimension

Products

COLUMNS: PRODUCT dimension

ROWS: TIME dimension

Months

	Hats	Coats	Jackets	Dresses	Shirts	Slacks
Jan	200	550	350	500	520	490
Feb	210	480	390	510	530	500
Mar	190	480	380	480	500	470
Apr	190	430	350	490	510	480
May	160	530	320	530	550	520
Jun	150	450	310	540	560	330
Jul	130	480	270	550	570	250
Aug	140	570	250	650	670	230
Sep	160	470	240	630	650	210
Oct	170	480	260	610	630	250
Nov	180	520	280	680	700	260
Dec	200	560	320	750	770	310

Query

Display the total sales of all products for past five years in all stores.

Display of Results

Rows: Year numbers 2000, 1999, 1998, 1997, 1996

Columns: Total Sales for all products

Page: One store per page

Query

Compare total sales for all stores, product by product, between years 2000 and 1999.

Display of Results

Rows: Year numbers 2000, 1999; difference; percentage increase or decrease

Columns: One column per product, showing all products

Page: All stores

Query

Show comparison of total sales for all stores, product by product, between years 2000 and 1999 only for those products with reduced sales.

Display of Results

Rows: Year numbers 2000, 1999; difference; percentage decrease

Columns: One column per product, showing only the qualifying products

Page: All stores

Query

Show comparison of sales by individual stores, product by product, between years 2000 and 1999 only for those products with reduced sales.

Display of Results

Rows: Year numbers 2000, 1999; difference; percentage decrease

Columns: One column per product, showing only the qualifying products

Page: One store per page

Query

Show the results of the previous query, but rotating and switching the columns with rows.

Display of Results

Rows: One row per product, showing only the qualifying products

Columns: Year numbers 2000, 1999; difference; percentage decrease

Page: One store per page

Query

Show the results of the previous query, but rotating and switching the pages with