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Data Warehousing

→ constructed from multiple heterogeneous sources.

→ support analytical reporting, structured queries and decision making.

→ provides us generalized and consolidated data in multidimensional views.

→ It also provide us OLAP tools
↓
Online Analytical Processing

→ Analysis results in data generalization and data mining.
↓
Association, Clustering, Prediction.

Data Warehouse: Database which is kept separate from the organisation's operational database.
It has consolidated historical data.

→ OLTP (Online Transactional Processing)

Operational Database	Data warehouse
→ concurrent processing of multiple transactions	
Concurrent control & recovery mechanism req. to ensure robustness and consistency of data base.	→ time variant: It tells about the time stamp of that transaction
→ Read & modify operations	→ read only access.
→ maintains current data (Day to Day processing)	- historical data (Historical processing of information)
→ High performance	- high flexibility
→ ER model	→ Star schema, Snowflake schema fact constellation ..
100 MB – 1 GB	→ 100 GB – 1 TB.

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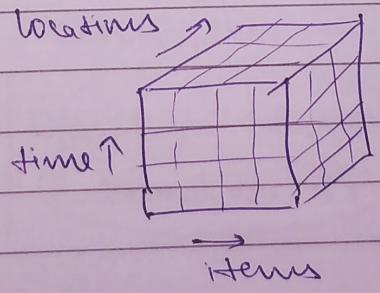
→ DWH is constructed by integrating data from multiple heterogeneous sources that supports analytical reporting, structured queries and decision making.

DWH
- → comparing quarterly & yearly sales
- → Analyse customer buying preferences, buying time, budget cycles etc.

Metadata → Data about data
eg. index of a book is metadata for contents in the book
- → summarised data that leads to detailed data
- → Road map to data warehouse.

Data Cube:



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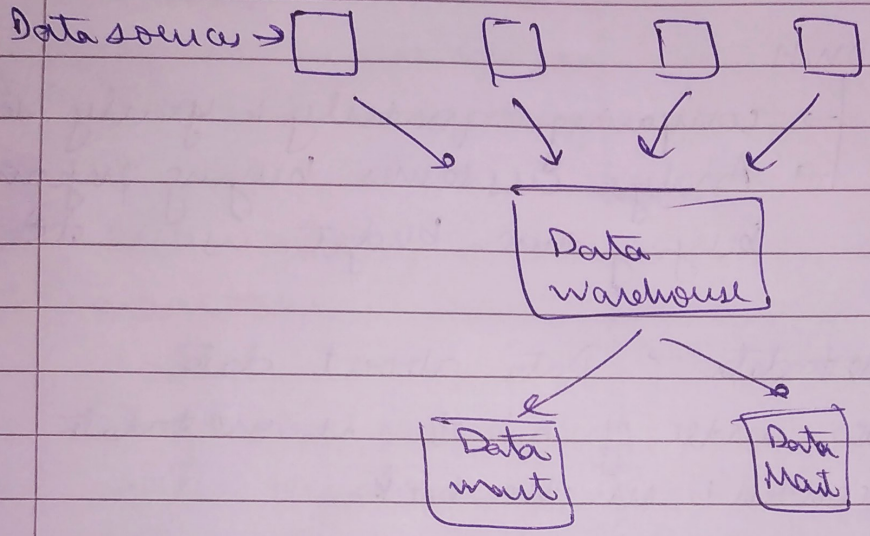
Data Mart : Subset of organisation wide data that is valuable to specific group of people in organisation



Virtual warehouse : View over an operational data warehouse

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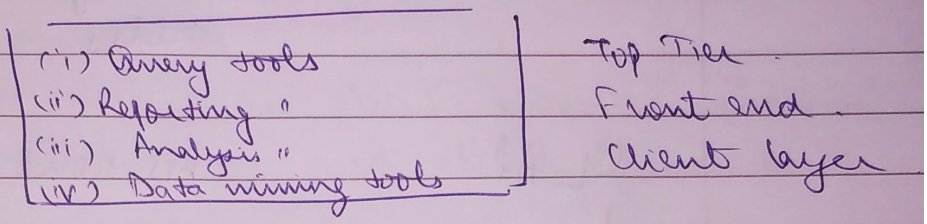
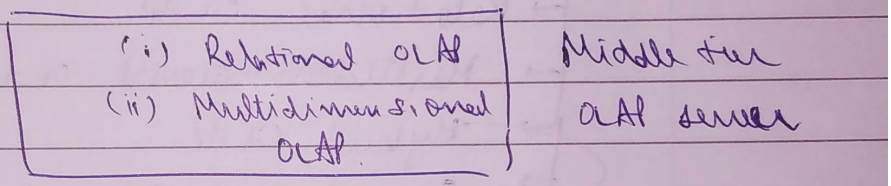
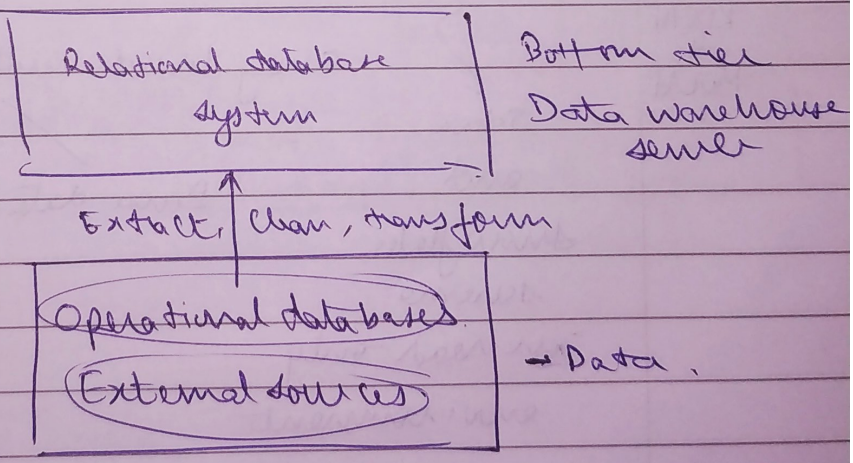
DWH – Architecture

→ 3 tier architecture
- → Bottom tier
- → Middle tier
- → top tier







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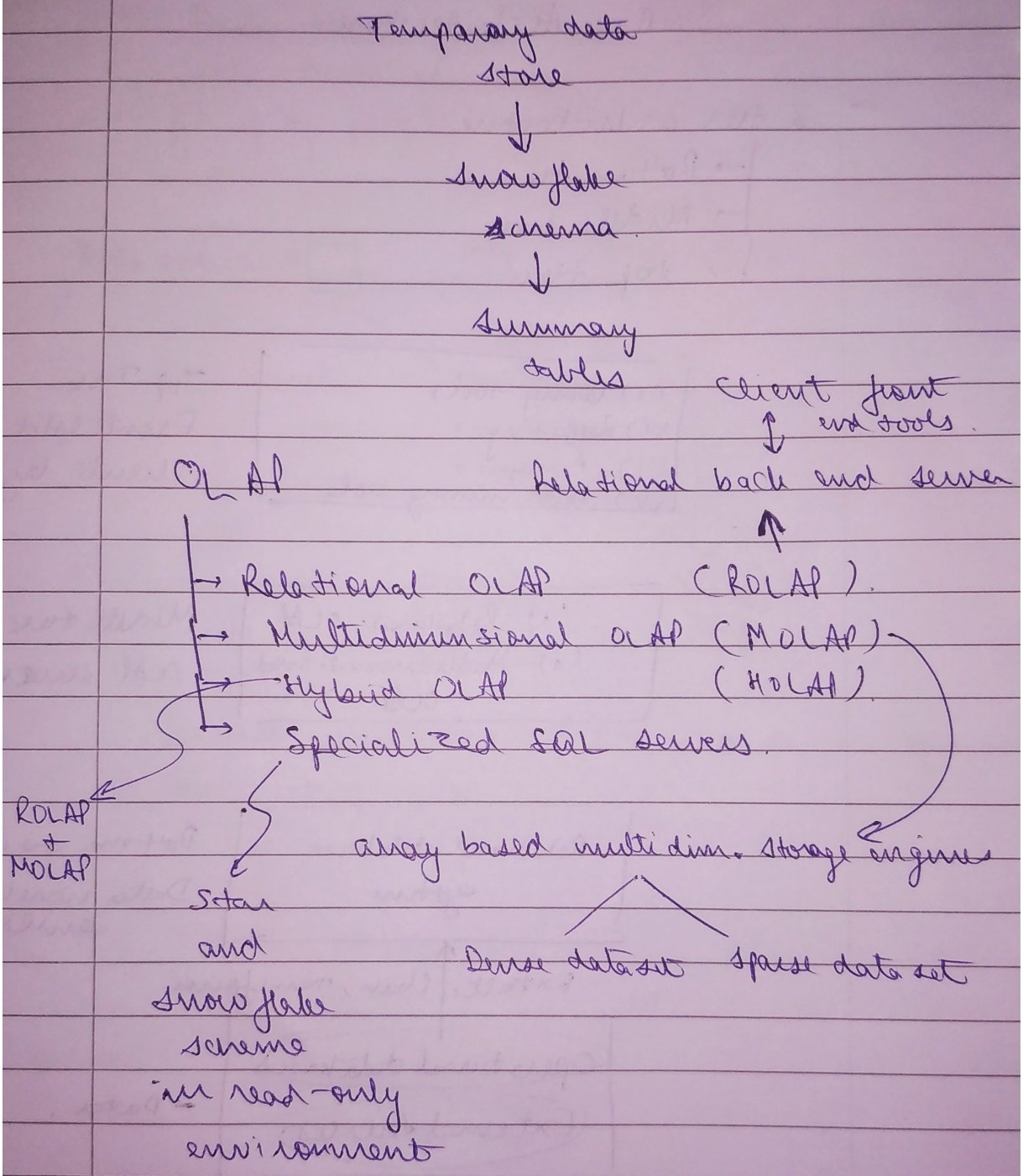
Temporary data store
Snow flake schema
Summary tables
Client front end tools
Relational back end server
OLAP
Relational OLAP (ROLAP)
Multidimensional OLAP (MOLAP)
Hybrid OLAP (HOLAP)
Specialized SQL servers
ROLAP + MOLAP
array based multidim. storage engines
Dense dataset
Sparse dataset
Star and snow flake schema in read-only environment

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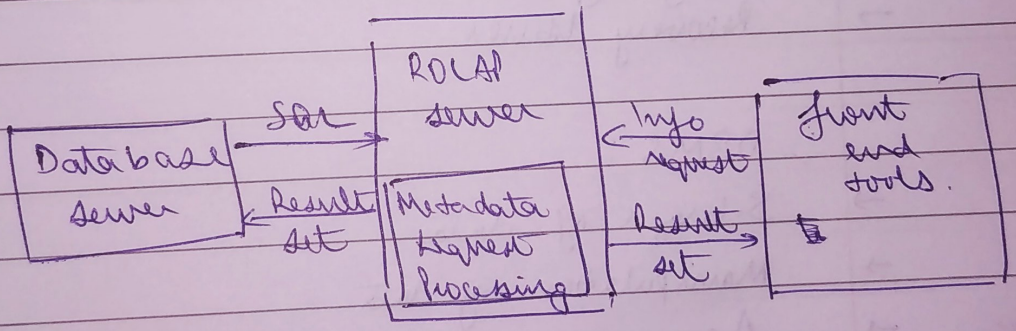
OLAP operations:

- Roll up
- Drill down (Reverse of Roll up)
- Slice & Dice.
- ~~Dice~~ Pivot (rotate)

Relational OLAP:
ROLAP servers are placed between relational back end server and client front end tools.

ROLAP architecture:



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Schema → Logical description of entire database.

Star schema:
Snowflake "
Fact constellation schema:

File Based System Drawbacks:
→ Data Redundancy & Inconsistency
→ Data Isolation.
→ Unanticipated queries
→ Concurrent access anomalies
→ Security Issues
→ Integrity Issues
→ Recovery Issues

DBMS:
→ Storage of data
→ Manipulation of data
→ Access restrictions for unauthorized users

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RDBMS

- multiple user access.
- access control feature.
- Support SQL.
- Reduce data redundancy