Dipl.-Inf. Dipl-Ing. Bernd Reiner

Tertiary Storage Support for Large-Scale Multidimensional Array Database Management Systems

Knowledge Bases Research Group (R. Bayer, Ph.D.)

Bavarian Research Center for Knowledge-Based Systems (FORWISS)
Munich, Germany
Motivation

- Increasing amount of data (up to Petabyte)
- Hard disks too small/expensive to hold hundreds of Terabytes
- Typically data stored as files on Hierarchical Storage Management Systems (HSM-System, e.g. Tapes)

With DBMS RasDaMan only subsets must be transferred instead of whole MDDs (files)

RasDaMan needs a connection to mass storage devices (for handling Terabytes)

New functionalities of applications can be developed (e.g. WWW based access to data stored on tertiary storage media)
System Architecture

Client
- RasQL
- RasDaMan Server
  - Tertiary Storage Manager
  - File Storage Manager
- SQL
- DBMS Oracle / DB2
- DBMS (on HDD)

Multidimensional Array DBMS
- RasDaMan

Hierarchical Storage Management System

HSM
- Cache
- migrate
- stage

Online Nearline Offline

© 2002 ESTEDI / Reiner@forwiss.de
VLDB 2002, HongKong, Slide 3
Multidimensional object (MDD)

- set of multidimensional tiles
  - tile = subarray

Tiles stored in relational DBMS as BLOBs

- multidimensional index (R+ tree)

Access to subsets of MDDs

Multidimensional Query Language RasQL
Export Data to Tertiary Media

Preserves multidim. clustering on Tape

One Tile

Super-Tile algorithm

Tile 1 | Tile 2 | Tile 3 | Tile 4

Magnetic Tape

.export

ST-1 | ST-2 | ST-3 | ST-4

© 2002 ESTEDI / Reiner@forwiss.de

VLDB 2002, HongKong, Slide 5
Import Data from Tertiary Media

Query Box

Compute required Super-Tiles

Import Super-Tiles from Tape

RasDaMan viewer

RasDaMan
The response time scales with the size of the query box, NOT with the size of MDD.