Multi Core and Databases

DBIS - an overview for the GK Metrik

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Agenda

• Hardware trends

• Challenges for Database Systems

• Solutions
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- Challenges for Database Systems
- Solutions

Hardware Trends

Disks – CPUs – Memory

- Flash disks low latency (read / write)
- Hugh main memory installations (~TB)
- Many core CPUs (~100), large CPU caches

Problems:

- Latency difference between CPU and main memory
- Bandwidth restrictions
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Query Processing

Problem Areas

- Physical Data Model
- Query Execution
- Query Optimization

Query Processing with hundreds of cores

Inter Query Parallelism

Only applicable to some degree

1. Resource contention
2. Lock contention

Queries interfere and slow each other down
Inter Operator Parallelism

- **Horizontal**
  
  Mainly used today, relies on data partitioning

- **Vertical**

  Does not work well with the iterator model / Problem of blocking operators

Intra Operator Parallelism

- Data partitioning
- Work distribution / parallelizing - queuing
Intra Operator Parallelism

- Data partitioning

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- Work distribution / queuing
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- Work distribution / parallelizing

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Contributions

• Query Processing with a high /scalable degree of inter / intra operator parallelism
  ▫ Focus on Data Warehouse / OLAP
  ▫ DBs are read mostly /only
Contributions

• Query Processing with a high /scalable degree of inter / intra operator parallelism
Contributions

- Query Processing with a high /scalable degree of inter / intra operator parallelism

Questions