Industry View on future Database Education

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Database Future?

- NoSQL
  - MapReduce, Bigtable
- Column-oriented DBMS
- Cloud computig ➔ centralized DB Administration
- ”Forgetting” ➔ massive growth in data ➔how to get rid of all that obsolete data
- Structured + unstructured data

- BUT for most organisations
  - **relational databases remain the mainstream**
  - **SQL will be dominant**
  - **data modeling skills are in demand in future too**
  - **Data Warehousing, BI and analytics growing**

- Database technology development vs. needs of industry

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Relational world

- Relational model and relational databases
  - Chris Date: ”The relational model is like a Natural Law”
  - Relational database products getting richer in features – following hot trends, eg.:
    - Object oriented features
    - XML –functions
    - Data Warehouse and BI features and software
    - Text handling
    - Support for multimedia and spatial data
  - Challenge: on-demand scalability for massive data

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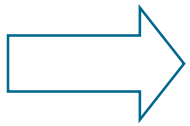
Problem today

- Object-oriented programming vs. relational databases
  - impedance mismatch
  - some OO gurus state: ”no database design needed”
  - databases not considered ”sexy” by students
  - lack of relational database skills
    - at worst: joins performed in programming language (not SQL)
    - a huge amount of tables due to massive inheritance hierarchy
    - index design bad or missing
  - many powerful DBMS features remain unused
    - implemented in application code



Productivity suffers
Bad database schema design
Poor performance

Object vs. relational

- **Object -world**
  - proven application development methods
  - object navigation
  - ”data persistency” only a sidebar
  - UML-design, often no actual database design
- **Relational world**
  - relational model: strong scientific background
  - table manipulation with SQL-language, joins
  - storing data is important
  - conceptual, logical and physical modelling

”Object vs. relational people mismatch?”

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”Relational conclusion”

- Today – and in future still needed:
  - education of
    - relational model
    - general relational DBMS and their features
    - specialized rel. databases eg. mobile and in-memory
      - SQLite, Solid
    - relational database tuning
      - especially indexing
    - SQL – for specialists inc. advanced features
      - THE basic language for databases, good skills have a huge impact on appl development, data integration, DW dev., reporting and testing
    - Object – relational mapping

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Data Modeling

- Data modeling is gaining more interest
  - due to Data Architecture and Data Warehouse projects
- Data models are importat as a bridge
  - between IT and Business users
  - between IT and software vendors
  - between IT and databases
- Data Warehouse and BI require special skills
  - eg. Dimensional modeling, Data Vault modeling
- Data base design for good performance
  - solid state disks have an impact
- Conclusion:
  - education required: data modeling, data base design and CASE - tools

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Interfaces

- User interface design important
  - operational applications
  - BI-applications
- Interfaces between applications
  - XML
  - Clouds
  - data integration

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Project skills

- Basic project skills needed
- In addition agile and scrum methods
- Students need practice in working life
  - traineeships, learning by doing

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Specialization

- Possible specialization lines
  - DBA
    - installation, cofiguration, tuning, backup, recovery…
  - BI / DW specialist
    - data modelling (etc. dimensional modeling), ETL-programming, SQL, ETL -tools
    - reporting, visualisation, data mining, OLAP design, dashboards, reporting tools
  - On-line database specialist
    - ORM, DB tuning, …
  - NoSQL – cloud – columnar databases
- Another option: generalist
  - understand the big picture

Bottomline

- Demand for database and data management skills is increasing
- Database technology: fast development, new innovations
  - ”traditional” database technology does not go away soon
- Challenges
  - How to make databases and data management appealing for students
  - How to add database knowlegde for programmers
  - How sell these ideas to management

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