ISM 50 - Business Information Systems

Lecture 16

Instructor: John Musacchio
UC Santa Cruz
November 18, 2010
Class announcements

- Reading for Tuesday:
  - Akamai Case
  - Chapter 1 of networking book (on website)
  - Username: ism050
  - Password: Lds3umnM

- Database project due Nov 23
Student Presentations
Standardization
Types of standards

*de jure*
- Sanctioned and actively promoted by some organization with jurisdiction, or by government

*de facto*
- Dominant solution arising out of the market

Industry consortium
Common or best practice
  Volunteer industry body

Examples?
Examples

**de jure**
- GSM, ISDN Telephone interface

**de facto**
- Microsoft Windows API (Application Programming Interface)
- Intel Pentium instruction set,

**Voluntary industry standards body**
- IEEE (Institute of Electrical and Electronic Engineers)
- IETF (Internet Engineering Task Force)

**Industry consortium**
- W3C (World Wide Web Consortium)

**Best practice**
- Windowed GUI

Slide adapted from slides for *Understanding Networked Applications*
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The changing process

- As technology moves more quickly, global consensus activity has proven too unwieldy
  - e.g. ISO

- “New age” standards activities are more informal, less consensus driven, and involve smaller groups
  - e.g. OMG, IETF, ATM Forum, WAP

Programmable/extensible approaches for flexibility
  - e.g. XML, Java

Slide adapted from slides for *Understanding Networked Applications*
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Reasons for change

- From government sanction/ownership to market forces
  - Increasing fragmentation
  - Importance of time to market

Greater complexity
- Less physical/performance constraint for either hardware or software
Lock-in

(Particularly open) standards reduce consumer lock-in

- Consumers can mix and match complementary products

Increase supplier lock-in

- Innovation limited by backward compatibility
- e.g. IP/TCP, x86, Hayes command set
Aside: Network Effects

- The value of owning some products goes up if lots of other people have it too.
  - Examples?

- This phenomenon is called “network effects”

- How do standards influence network effects?
Network effects

Standards can harness network effects to the industry advantage

- Revenue = (market size) x (market share)

Increases value to customer

Increases competition

- Only within confines of the standard
- But forces customer integration or services of a system integrator

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Open vs. Proprietary Standards

- Open standard - a standard that is well documented, unencumbered by intellectual property rights and restrictions, and available to any vendor.

- What are the advantages?

- What are the disadvantages?
Why companies participate

Pool expertise in collaborative design
- e.g. MPEG

Have influence on the standard

Get technology into the standard
- Proprietary, with expectation of royalties
- Non-proprietary

Reduced time to market
Standards applied to Business Processes?

- Can you standardize business processes?

- Yes!:
  - ISO 9000
    - A set of standardized business processes for Quality Management.
    - Supports TQM (Total Quality Management)
  - RosettaNet
    - A set of standardized business processes, and accompanying standardized data interfaces/formats for conducting e-business.
Databases

by

David G. Messerschmitt
Databases

Treat data as a separate asset
- May be shared by multiple applications

Provide protection and integrity features appropriate to mission-critical data
- Access control
- Integrity constraints
- Persistence
- etc.
Two capabilities

Application I

Aggregation: accessing multiple databases

Application II

Sharing: two or more applications accessing the same databases

Databases
Relational table

<table>
<thead>
<tr>
<th>Table</th>
<th>Employee</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>Name</td>
</tr>
<tr>
<td><strong>Record</strong></td>
<td>Field</td>
</tr>
</tbody>
</table>
SQL interface

- SQL (Structured Query Language)
- Presents single abstract interface to the application logic
  - For manipulating, and extracting data from database
- Standardized, not vendor specific

- Encapsulates various internal details
  - Data partitioning and replication
  - Host mapping
  - File representation
  - etc.
Database operations

“PROJECT”

“SELECT”

Each operation results in a new table
## Database Operations

### Passengers

<table>
<thead>
<tr>
<th>Name</th>
<th>Dept ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>1</td>
</tr>
<tr>
<td>Bob</td>
<td>1</td>
</tr>
<tr>
<td>Chris</td>
<td>2</td>
</tr>
</tbody>
</table>

### Departments

<table>
<thead>
<tr>
<th>Dept Name</th>
<th>Dept ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>1</td>
</tr>
<tr>
<td>Sales</td>
<td>2</td>
</tr>
</tbody>
</table>

### JOIN

<table>
<thead>
<tr>
<th>Name</th>
<th>Dept ID</th>
<th>Dept Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>1</td>
<td>Engineering</td>
</tr>
<tr>
<td>Bob</td>
<td>1</td>
<td>Engineering</td>
</tr>
<tr>
<td>Chris</td>
<td>2</td>
<td>Sales</td>
</tr>
</tbody>
</table>
### Fields, columns, attributes

- Records, rows

<table>
<thead>
<tr>
<th>Year</th>
<th>City</th>
<th>Accommodation</th>
<th>Tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>Oakley</td>
<td>Bed&amp;BREAKFAST</td>
<td>14</td>
</tr>
<tr>
<td>2002</td>
<td>Oakley</td>
<td>Resort</td>
<td>190</td>
</tr>
<tr>
<td>2002</td>
<td>Oakland</td>
<td>Bed&amp;BREAKFAST</td>
<td>340</td>
</tr>
<tr>
<td>2002</td>
<td>Oakland</td>
<td>Resort</td>
<td>230</td>
</tr>
<tr>
<td>2002</td>
<td>Berkeley</td>
<td>Camping</td>
<td>126000</td>
</tr>
<tr>
<td>2002</td>
<td>Berkeley</td>
<td>Bed&amp;BREAKFAST</td>
<td>3450</td>
</tr>
<tr>
<td>2002</td>
<td>Berkeley</td>
<td>Resort</td>
<td>390800</td>
</tr>
<tr>
<td>2002</td>
<td>Albany</td>
<td>Camping</td>
<td>8790</td>
</tr>
<tr>
<td>2002</td>
<td>Albany</td>
<td>Bed&amp;BREAKFAST</td>
<td>3240</td>
</tr>
<tr>
<td>2003</td>
<td>Oakley</td>
<td>Bed&amp;BREAKFAST</td>
<td>55</td>
</tr>
<tr>
<td>2003</td>
<td>Oakley</td>
<td>Resort</td>
<td>320</td>
</tr>
<tr>
<td>2003</td>
<td>Oakland</td>
<td>Bed&amp;BREAKFAST</td>
<td>280</td>
</tr>
<tr>
<td>2003</td>
<td>Oakland</td>
<td>Resort</td>
<td>210</td>
</tr>
<tr>
<td>2003</td>
<td>Berkeley</td>
<td>Camping</td>
<td>115800</td>
</tr>
<tr>
<td>2003</td>
<td>Berkeley</td>
<td>Bed&amp;BREAKFAST</td>
<td>4560</td>
</tr>
<tr>
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<td>Berkeley</td>
<td>Resort</td>
<td>419000</td>
</tr>
<tr>
<td>2003</td>
<td>Albany</td>
<td>Camping</td>
<td>7650</td>
</tr>
<tr>
<td>2003</td>
<td>Albany</td>
<td>Bed&amp;BREAKFAST</td>
<td>6750</td>
</tr>
</tbody>
</table>

- Entries are simple data types or compositions of those types
  - Integer, string, etc.
mySQL

What does mySQL make?

How Successful is mySQL?

- Visibility: Fortune magazine, more mentions on www
- Reaction from giants
- Revenue growth 2001 700k, 2002 6.2m, 2003 10m
- Good performance reviews
- Recent SAP alliance
- But Market share tiny:
  - $10 million out of $10 billion market!

Why Success?

- Good Technology
- Large DBMS bloated with features most don’t need
- Innovative OSS model
**mySQL**

How does OSS work?

**Two Types of License:**

- **GPL**
  - Free
  - No Support
  - Any software that uses MySQL as a module must itself be made GPL

- **Commercial License**
  - Support
  - Could be distributed with non-open source software
  - Not Free:
    - MySQL: Classic $250, Pro $495 (for ~ 50 users)
    - Compare to:
      - MSFT  $3150  single proc for 50 users
      - IBM   $33000 single proc for 50 users
      - Oracle $40000 single proc for 50 users
Aside: DB’s in different software stacks

<table>
<thead>
<tr>
<th>General Software Stack</th>
<th>ERP Software Stack</th>
<th>Web Application Software Stack</th>
<th>Banking Software Stack</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application</strong></td>
<td><strong>SAP</strong> Or Oracle, Axtapa, etc.</td>
<td><strong>Proprietary Business Logic</strong></td>
<td><strong>Proprietary Banking App.</strong></td>
</tr>
<tr>
<td><strong>Middleware</strong></td>
<td><strong>Oracle</strong> Or MySQL, IBM, etc</td>
<td><strong>Apache Web Server</strong></td>
<td><strong>Oracle</strong> Or other DB</td>
</tr>
<tr>
<td><strong>Operating System</strong></td>
<td><strong>MS Windows</strong> Or other OS</td>
<td><strong>MySQL</strong> Or other DB</td>
<td><strong>IBM z/OS</strong> Or other OS</td>
</tr>
</tbody>
</table>

- Which companies are competitors?
- Which are complimen ters?
- Which are both!?
mySQL

- Which segments of market is mySQL strong in?
  - Large Companies or Small Companies?
  - Web applications or Critical Enterprise data?

- Why would a major enterprise want to pay so much more for an Oracle or IBM DB?
My SQL: market

<table>
<thead>
<tr>
<th></th>
<th>Small 20%</th>
<th>Medium 30%</th>
<th>Large 50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise wide data</td>
<td>Microsoft</td>
<td></td>
<td>Oracle, IBM</td>
</tr>
<tr>
<td>90%</td>
<td></td>
<td></td>
<td>Reliability, Scalability, Support, Longevity</td>
</tr>
<tr>
<td>Web Sites</td>
<td>My SQL Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How should mySQL grow in order to meet it’s stated goal of getting to $100 million in revenue?

Figure Adapted from “Teaching Note for MySQL Open Source Database,” 6/1/04, Stanford GSB.
# MySQL: Growth Strategy

## Diagram

<table>
<thead>
<tr>
<th>Enterprise data</th>
<th>Web Sites</th>
<th>Small 20%</th>
<th>Medium 30%</th>
<th>Large 50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%</td>
<td>10%</td>
<td>Microsoft</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IBM</td>
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<td>Scalability</td>
<td>Support</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Longevity</td>
</tr>
</tbody>
</table>

- Lack of Brand identity in this segment
- MySQL lacks the organization to offer support
- Large enterprises have high switching costs

Figure Adapted from “Teaching Note for MySQL Open Source Database,” 6/1/04, Stanford GSB.
# My SQL: Growth Strategy

<table>
<thead>
<tr>
<th>Enterprise wide data (90%)</th>
<th>Small 20%</th>
<th>Medium 30%</th>
<th>Large 50%</th>
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<tbody>
<tr>
<td>Microsoft</td>
<td></td>
<td></td>
<td>Oracle IBM</td>
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<td></td>
<td></td>
<td>Reliability</td>
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<td></td>
<td></td>
<td></td>
<td>Longevity</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Web Sites (10%)</th>
<th>My SQL Cost</th>
<th>Stay Put?</th>
</tr>
</thead>
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<tr>
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- Not a big enough market to reach stated $100 million goal.

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My SQL: Growth Strategy

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</tr>
<tr>
<td></td>
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<td></td>
<td>Support</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Longevity</td>
</tr>
</tbody>
</table>

- Many of these customers already using MySQL with websites
- Less emphasis on global organization
- Leverage SAP alliance
- Up against Microsoft.

Figure Adapted from “Teaching Note for MySQL Open Source Database,” 6/1/04, Stanford GSB.
# My SQL: Growth Strategy

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<tr>
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<td>Microsoft</td>
<td></td>
<td>Oracle IBM</td>
</tr>
<tr>
<td>Web Sites 10%</td>
<td>My SQL Cost</td>
<td>Maybe?</td>
<td>Reliability, Scalability, Support, Longevity</td>
</tr>
</tbody>
</table>

- + builds on existing brand and strengths
- - Market not so big

Figure Adapted from “Teaching Note for MySQL Open Source Database,” 6/1/04, Stanford GSB.
Markup languages
Definition

A **markup language** describes the structure of a document
- Based on tags
- Tags denote structural elements like sections, subsections, figures, etc

Internationally standardized, so application independent
Example: HTML

```html
<html>
<h1> Super Widget </h1>
<h2> Widgets Incorporated </h2>
<em> 123456789 </em>
<br/>
<p> $300 </p>
</html>
```