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

- 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
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

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

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**

- 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**

**Relational table**

<table>
<thead>
<tr>
<th>Field</th>
<th>Record</th>
<th>Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Address</td>
<td>Dept</td>
</tr>
</tbody>
</table>

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Slide adapted from slides for Understanding Networked Applications by David G. Messerschmitt. Copyright 2000. See copyright notice.
**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**

- **Departments**
  - Name | Dept Name | Dept ID
  - Alice | Engineering | 1
  - Bob | Sales | 2

- **Employees**
  - Name | Dept ID | Dept Name
  - Alice | 1 | Engineering
  - Bob | 1 | Engineering
  - Chris | 2 | Sales

**MySQL**

**What does MySQL make?**

- Success factors:
  - 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 boosted 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 $1150 single price for 50 users
      - IBM $31000 single price for 50 users
      - Oracle $4000 single price 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>Middleware</td>
<td>MySQL or MySQL, IBM, etc.</td>
<td>MySQL or other DB</td>
<td>Oracle or other DB</td>
</tr>
<tr>
<td>Operating System</td>
<td>MS Windows or other OS</td>
<td>Linux or other OS</td>
<td>IBM z/iOS or other OS</td>
</tr>
</tbody>
</table>

- Which companies are competitors?
- Which are complimenter?
- Which are both?

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**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?

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**MySQL: market**

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

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

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**MySQL: Growth Strategy**

- 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.

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**MySQL: Growth Strategy**

- Not a big enough market to reach stated $100 million goal.

Figure adapted from “Teaching Note for MySQL Open Source Database,” 6/1/04, Stanford GSB.

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**MySQL: Growth Strategy**

- 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

<table>
<thead>
<tr>
<th>Enterprise wide data 90%</th>
<th>Web Sites 10%</th>
<th>Cost</th>
<th>Maybe?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft</td>
<td>My SQL</td>
<td>Oracle IBM</td>
<td>Reliability</td>
</tr>
</tbody>
</table>

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

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### Markup languages

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### 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

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### Example: HTML

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

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### Super Widget

**Widgets Incorporated**

123456789

$300