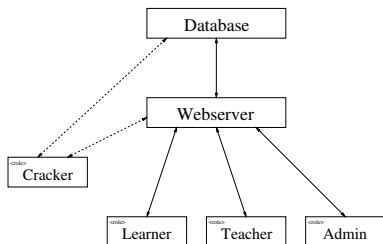


1. Identification and Authentication
  - *moodle* demands user login; courses can be opened to guests
2. Authorization
  - strict role management: distinction between learner, teacher, and administrator
3. Confidentiality
  - only registered users may access course contents
  - only admins may access configuration files and user data
4. Integrity
  - only teachers may change their own course elements
5. Non-repudiation/Non-denial
6. Availability

## Security problems:

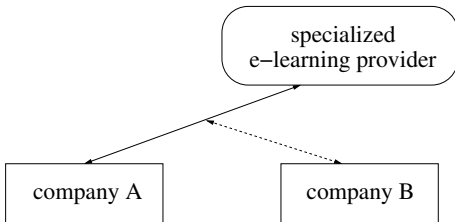
1. the web server has security holes
2. the web application is has security issues
3. the web server is non-exclusively used for the e-learning system



<http://seclists.org/lists/bugtraq/2005/Nov/0139.html>:

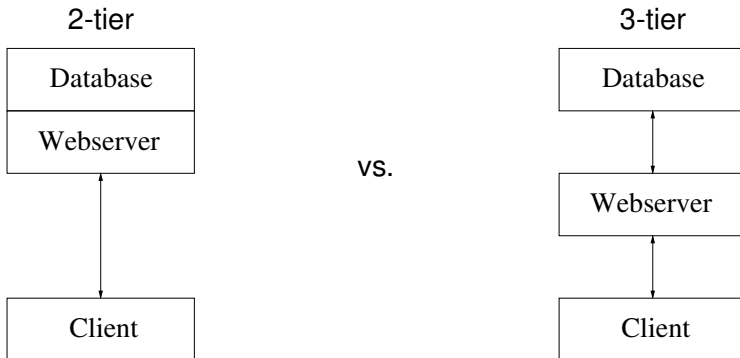
blind SQL Injection POC for moodle  $\leq$  1.6dev

- Anonymity is important as well in some cases! (7<sup>th</sup> pillar?)



- Communication of secret topologies

C.J. Eibl: *Preserving the Secret of the Topology and Affiliation in Moderated Networks*,  
Diploma thesis, University of Lübeck, 2005



## 1. Bell-LaPadula

- model for the “Confidentiality”
- multi-level security
- “no read up, no write down”

## 2. Biba

- model for the “Integrity”
- multi-level security
- “no read down, no write up”

## 3. Clark-Wilson

- model for the “Integrity”
- based on transitions of one consistent state to another one
- transitions initiated by well-formed transactions
- separation of duty