2.2 System Architectures

Client server

- Single server
  - can be server & client, eg
    - DNS -> Web -> fileserver -> disc server

- practical for Yahoo’s homepage?

- Multiple replicated servers
  - load balancing
  - global tfc management

Caching

- Used everywhere:
  - cpu instructions & data (80-95% *hit rate)* in a small fast local cache memory; LRU replacement algorithm
  - in a Web browser (local disc is quicker to access than a remote server
  - in the closest of a set of servers (*client-side* or *proxy server)*

2.2.3 Client-server variations

- Mobile code & agents
- cheap clients
- mobile devices

Mobile code

- Code which can be written here, then downloaded & run there
- *very* tough problems - software portability
  - language, hardware & OS incompatibility
  - largely solved by Java Virtual Machine (JVM)
- handy for applets, mobile devices, …
- security threat

Mobile agents

- Agent:
  - entity which collects information, makes inferences on that information
    - MIT Media Lab shopping agent:
      - find the closest, cheapest copy of some book by negotiating prices, and guide me to the store
      - find the cheapest 1998 Mazda Miata in Vancouver
      - NB location-aware computing

Mobile agents

- Agent which travels from site to site to gather data,
  - replacing *remote* procedure calls with *local* ones
- Examples:
  - Shoch’s Worm
    - network performance gathering

Thin Clients

- El cheapo PC
  - local GUI
  - executes remote applications
- example: Yahoo mail
- slow, vulnerable to Internet Quality of Service (QoS) failings

Mobile Devices: spontaneous networking

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Caching

- Basic algorithm:
  - look for it in the cache
    - if there, supply it from there
    - if not there, look in the original source

- What’s a problem with this?

Caching

- Consistency !
  - What if the original changes, so the cache copy is inconsistent?
    - Some things are read-only (Web pages)
    - some changes are ignorable (colour scheme)
    - otherwise must invalidate the cache copy (“dirty bit”) and then update it.
      - How to tell?