Web Application Performance

Performance issues

- Client-side

- Server-side

Client-side performance [1]

- Minimize HTTP requests
  - Lesser requests per page rendering, faster time
  - Combine files such as scripts, images, etc
    - CSS Sprites, Image maps, etc. for images
    - Combine multiple js files manually or using some tool e.g YUI compressor **(HTTP/1 only)**
  - Remove duplicate scripts

- Reduce content size, reduce transfer time
  - Remove unnecessary tags
  - Compress files
    - Browser supported: Gzip
  - Minification of Javascript and CSS:
    - YUI Compressor, JSMin, etc.
  - Post-load components
    - Ajax
    - YUI Get Utility

Client-side performance [1]

- Make use of browser idle time

  – Flush the buffer early

  – Preload components

- Make use of cache

  – Make Javascript and CSS external

  – Cache static resources

  – ETags

- Parallelize downloads **(HTTP/1 only)**

  – Create multiple domains

  – Download resources in parallel

- Reduce latency, network transfer time

  – Exploit proximity, deploy on geographically dispersed servers

  – Use CDN

Server-side performance

- Balance the load [2]

- Too many database queries make applications slow:

  - Optimize database
    - Use indexes / query optimization techniques
  - Cache data
    - Memcache [3]

- Parallelize – use threads / asynchronous operations

  - Make best use of available CPU during I/O
  - Consider thread pools to avoid the cost of creation / destruction of threads

Load Balancing

- Considerations
    - Response Time
    - Response Size

- Techniques
    - Hardware-based
    - Software-based
    - DNS-based

- Implementation support
    - Session-less state management

Measure

- Key to improvement is measurement

- Use tools for performance testing

    - Server-side

        - Jmeter [4]

    - Client-side

        - Profiling tools
        - Chrome / Firefox Developer Tools

References

(1) http://developer.yahoo.com/performance/rules.html

(2) http://people.apache.org/~mturk/docs/article/ftwai.html

(3)http://code.google.com/p/memcached/wiki/NewStart

(4)http://jmeter.apache.org/