CS 5523 Lecture 15: Review

- *Comments on the exam*
- *Review questions Chapter 3*
- *Review questions Chapter 9*
- *Review questions Chapter 6*

Discussion questions from CDK Chapter 3

[CDK 3.1]

A client sends a 200-byte request message to a service, which produces a response containing 5000 bytes. Estimate the total time to complete the request in each of the following cases with the performance assumptions listed below:

- *Using connectionless communication (e.g., UDP);*
- *Using connection-oriented communication (e.g., TCP);*
- *The server on the same machine as the client*

Latency per packet: 5 ms; Connection setup time: 5 ms;

Data transfer rate: 10 Mbps; MTU: 1000 bytes;

Server request processing time: 2 ms

Discussion questions from CDK Chapter 3

[CDK 3.14]

Consider the use of TCP in a telnet remote terminal client. How should the keyboard input be buffered at the client? Investigate Nagle's and Clark's algorithms (Nagle 1984, Clark 1982) for flow control and compare them with the simple algorithm described on page 103 when TCP is used by:`

- *a web server;*
- *a telnet application;*
- *a remote graphical application with continuous mouse input.*

Discussion questions from CDK Chapter 9

CDK [9.2]

Discuss the problems raised by the use of aliases in a name service, and indicate how, if at all, these may be overcome.

Discussion questions from CDK Chapter 9

CDK [9.3]

Explain why iterative navigation is necessary in a name service in which different name spaces are partially integrated, such as the file naming scheme provided by NFS.

Discussion questions from CDK Chapter 9

CDK [9.4]

Describe the problem of unbound names in multicast navigation. What is implied by the installation of a server for responding to lookups of unbound names?

Discussion questions from CDK Chapter 9

CDK [9.8]

Why do DNS root servers hold entries for two-level names such as yahoo.com and purdue.com, rather than one-level names such as edu and com?

Discussion questions from CDK Chapter 9

CDK [9.9]

Which other name server addresses do DNS name servers hold by default, and why?

Discussion questions from CDK Chapter 9

CDK [9.12]

The Jini lookup service matches service offers to client request based on attributes or on Java typing. Explain with examples the difference between these two methods of matching. What is the advantage of allowing both sorts of matching?

Discussion questions from CDK Chapter 9

CDK [9.16]

Discuss the potential advantages and drawbacks in the use of a X.500 directory service in place of DNS and the Internet mail delivery programs. Sketch the design of a mail delivery system for an internet work in which all mail users and mail hosts are registered in an X.500 database.

Discussion questions from CDK Chapter 6

CDK [6.4]

Should signal (software interrupt) handlers belong to a process or to a thread?

Discussion questions from CDK Chapter 6

CDK [6.8]

A file server uses caching, and achieves a hit rate of 80%. File operations in the server cost 5 ms of CPU time when the server finds the requested block in the cache, and take an additional 15 ms of disk I/O time otherwise.

Explaining any assumptions you make, estimate the server's throughput capacity (average requests/sec) if it is:

- *i) single-threaded;*
- *ii) two-threaded, running on a single processor;*
- *iii) two-threaded, running on a two-processor computer.*

Discussion questions from CDK Chapter 6

CDK [6.9]

Compare the worker pool multi-threading architecture with the thread-per-request architecture.

Discussion questions from CDK Chapter 6

CDK [6.10]

What thread operations are the most significant in cost?

Discussion questions from CDK Chapter 6

CDK [6.14]

Explain the factors that motivate the hybrid scheduling approach of the 'scheduler activations' design (instead of pure user-level or kernel-level scheduling).

Discussion questions from CDK Chapter 6

CDK [6.23]

Explain the program linkage requirements that must be met if a server is to be dynamically loaded into the kernel's address space, and how these differ from the case of executing a server at user level.

Discussion questions from CDK Chapter 6

CDK [6.24]

How could an interrupt be communicated to a user-level server?

Discussion questions from CDK Chapter 6

CDK [6.25]

On a certain computer we estimate that, regardless of the OS it runs, thread scheduling costs about 50 μs, a null procedure call 1 μs, a context switch to the kernel 20 μs and a domain transition 40 μs. For each of Mach and SPIN, estimate the cost to a client of calling a dynamically loaded null procedure.