

## INFO 300 2/10/15

ECU- Executive control unit. Data must be moved into registers for the ALU (Arithmetic Logic Unit) to process it. Pipelining: more efficient use of the clock tick.

Cache memory: most recently referenced scheme. Two column table: address and contents. Hardware can search this quickly. But too much cache is a bad thing: delete your cache. CPUs are built in with cache now, used to be separate. High performance processors have 3 levels of cache.

RAM is a vector that starts at 0 and ends with your maximum amount of bytes.

RISC (Everything else) vs. CISC (intel and AMD):

- CISC can run more instructions but some take more than one clock tick to execute. Multi core processing fixed many of the freezing/wait state issues with CISC chips, however the performance advantage can be defeated by poor program design. Industry standardized chips. North bridge separates fast traffic (EX: RAM, processor, graphics unit) from slow traffic (PCI slots, USB, I/O). This standardization has made the technology very cheap. Recently, the north bridge has been moved onto the die with the cpu, all of those north bridge components are built into the CPU. This is called Sandy Bridge. The south bridge was named Cougar Point, but works the same way. Ivy Bridge → Haswell (most recent architecture). Intel and AMD are very different inside the chip. Compatible at the instruction level, but vastly different engineering and design. Shorter machine language programs.
- RISC is more open and manufactured by many different companies. ARM is the main designer of RISC chips, sell property to other companies to manufacture. Freescale manufactures the bottom line (small chips in cars, microwaves, etc), IBM manufactures the high power end. Motorola 6800 is the original RISC chip, used in apple classic, commodore machines. Every instruction completes within a clock tick. Longer programs, less power consumption, less expensive to manufacture. Google Android runs on RISC, as of recent Windows Phone is switching to RISC for free.

Client Server Relationship:

- DSLAM (DSL), POTS (Plain old telephone), CC (coper connection).
- DSLAMs are usually oversold and crowded, which often makes service and DSL slow.
- Telephone is pretty consistent (T1 - T3) in their speed, but more expensive.
- OC3-OC12, fiber optic is one of the fastest and most consistent options. Multiplexed fiber optic does not need CSMA/CA.
- Leased lines are an option for high security, truly private lines.
- Wave Division Multiplexing and Dark Fiber. Dark fiber was put there and unused until needed. WDM allows you to put a lot of channels over one fiber. We are reaching our cap of optical circuits, need to install more.

Business Systems Diligence — CIO Network Guy:

- Regular backups are super duper important!! Usually backed up over the weekend or nightly on a tape.
- Transaction logging: done at a remote location for security. Helps to figure out point of failure. Everything that happened since tape backup. Also a large part of keeping employees honest and health checking systems.

#### The Legacy:

- understand the legacy and figure out how to improve existing infrastructure.
- Proven technology, often cheaper to keep than replace with the latest and greatest.
- Plenty of systems put up in the 70s that still exist today.

#### Servers can be almost any kind of computer:

- Large websites and app. environments can be on a mainframe, midrange or server farm.
- Clustering software is when many computers link together to distribute and balance the work load.
- Blade Chassis are popular for server farms. Server farms are run by clustering software to create a cloud. This makes unreliable hardware very reliable.
- SAN-NAS store data for server farms, Replicate it for back up. "Department of Redundancy Department".

#### Strategy for Systems to Grow Exponentially:

- Ease of adding capacity, no need to change software
- GreenTec, company that helps companies install scaleable servers.
- Rackspace cloud → Cloud managing company. Runs off of real machines and virtual machines.
- Xen servers.