



## Users and clients on the Internet

- **Where does software run?**
  - DNS, BGP, 802.11
  - HTML, Javascript, Flash, Java
  - Apache, php, ASP, mySQL, Oracle,
  
- **Differences between client and server**
  - Web browser, webserver
  - Online games: poker, WOW, ...

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16.2

## What's in a URL?

- [http://www.youtube.com/watch?v=D4gw\\_3nA5G4](http://www.youtube.com/watch?v=D4gw_3nA5G4)
  - What does DNS do? What does YouTube do?
- <http://www.youtube.com/watch?v=bPMo14XTTvE&feature=related>
  - What does 'related' mean?
- **Query String**
  - <http://www.duke.edu?user=ola>
  - What processes the query? Utility? Cookie?
- [http://googleads.g.doubleclick.net/aclk?](http://googleads.g.doubleclick.net/aclk?sa=l&ai=...)  
[loopt.com/loopt/%3Fs%3D21&nm=2](http://loopt.com/loopt/%3Fs%3D21&nm=2)
  - [adurl=https://loopt.com/loopt/%3Fs%3D21&nm=2](https://loopt.com/loopt/%3Fs%3D21&nm=2)

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16.3

## Bits, Hex: TinyURL, YouTube, bit.ly

- [6n7kqv](#) and [D3dKbq5AXz8](#) are links to ...
  - What does 6n7kqv mean? How is it generated?
- **# four digit, base-ten numbers?**
  - 10, 100, 1000, 10000, ...
- **# numbers represented by 4-bits, base-two**
  - 2, 4, 8, 16, 32, ...
- **How many two letter words are there?**
  - aa, ab, ac, ..., az, ba, bb, bc, ..., za, zb, ..., zz
  - $26 \times 26 = 676$ , three letter words?

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## How do tinyurl/bit.ly work?

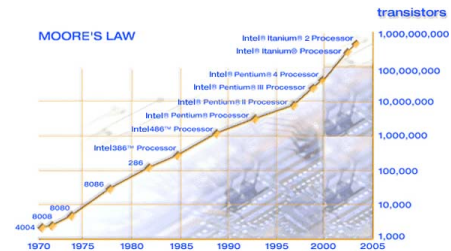
- Enter *any* URL, do some math stuff to turn the string/words into a number
  - If only lower-case letters and digits used, then 36 different “digits”, so six-digit number is
  - $36 \times 36 \times 36 \times 36 \times 36 \times 36 = 2,176,782,336$
  - What about upper and lower case?
  - What about YouTube, number of videos?
- *hashing*, change words to number
  - Any word converted to number? Collisions?

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## Can we double every two years?

- Explaining Moore’s Law:
  - <http://www.youtube.com/watch?v=bLSMn0cNWAw>
  - <http://www.youtube.com/watch?v=D3dKbq5AXz8>



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## Moore’s Law

- See Wikipedia entry for complete Info
  - [http://en.wikipedia.org/wiki/Moore's\\_law](http://en.wikipedia.org/wiki/Moore's_law)
- All things digital, Sept 16, 2008: “Hurley’s Law: Like Moore’s Law, but With Doltish Video Clips”
  - <http://tinyurl.com/6n7kqv>
  - Thirteen hours of video uploaded every minute

“Over the next decade, people will be at the center of their video and media experience. More and more consumers will become creators. We will continue to help give people unlimited options and access to information, and the world will be a smaller place.”

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<http://googleblog.blogspot.com/2008/09/future-of-online-video.html>

16.7

## Online and Behavioral Advertising

- Google query for ‘campaign contributions’

What are these links?

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16.8