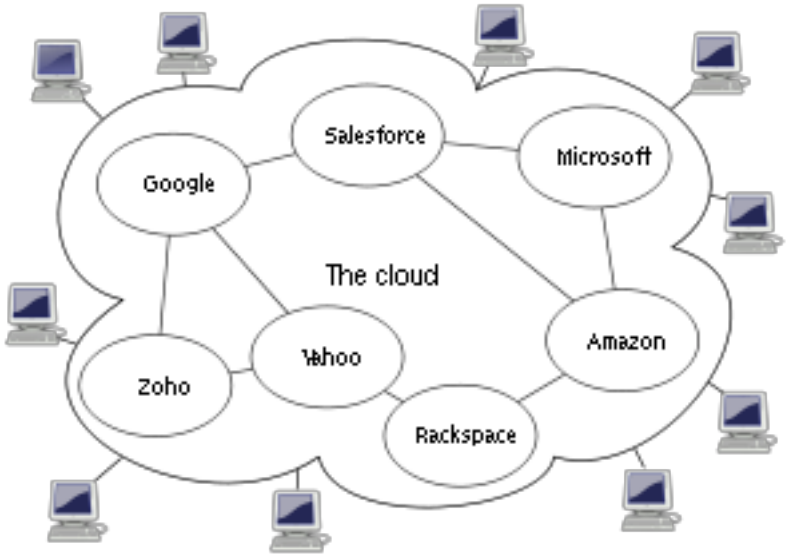
Cloud computing

What is cloud computing?

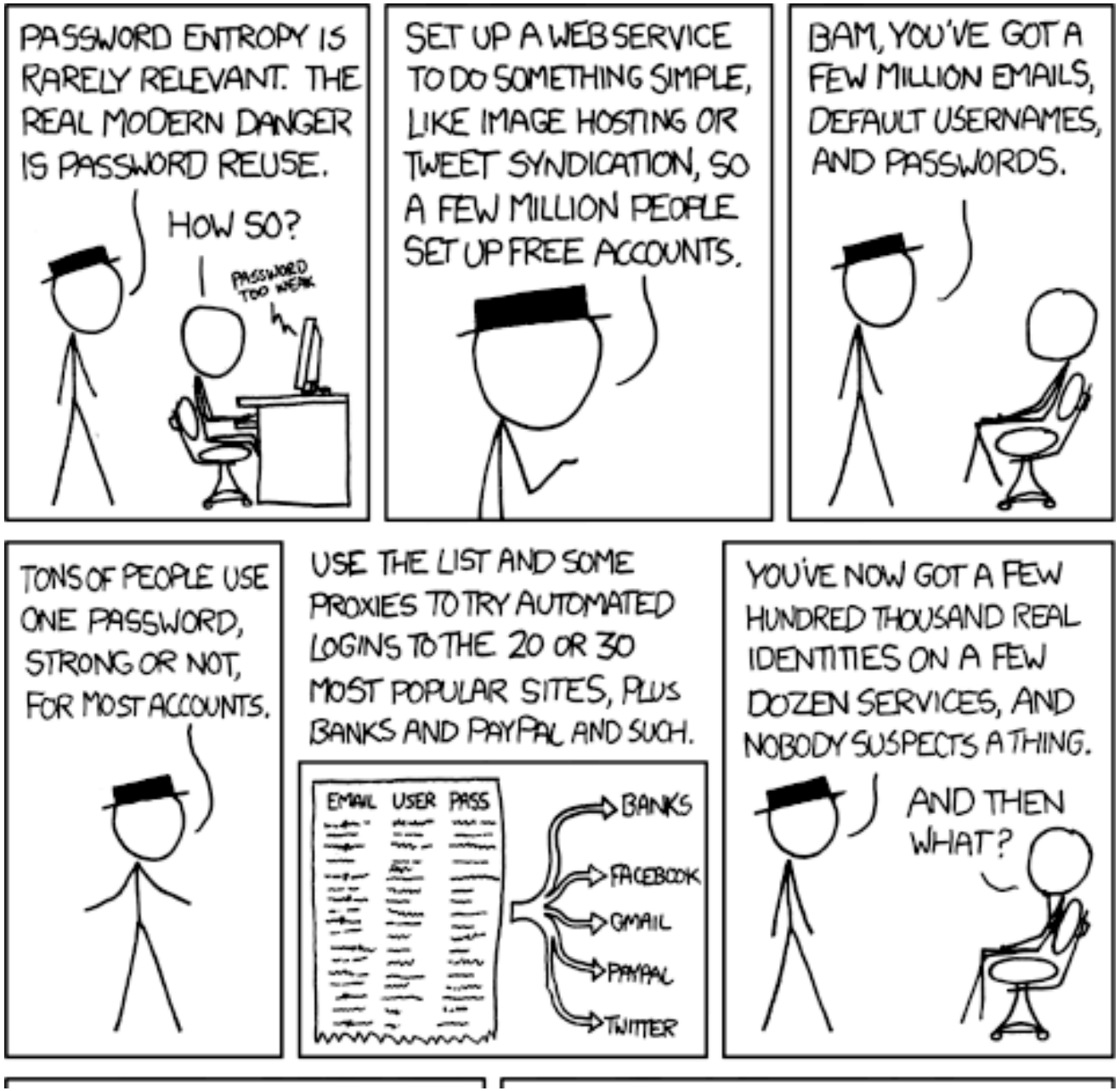
(for scientists)

- You can “rent” access to computers and disk space from a commercial provider of same.
- This provides you with a way to scale your computation for “burst” periods, without investing in hardware.
- Or you can just use a bigger, faster computer.

Why “cloud”?!



…because the diagram that CS people use to represent abstract compute resources looks like a cloud.



http://xkcd.com/792

Amazon is a major cloud computing provider

- Did you know they rent computers!?

- Rumors are that it's more lucrative than their book selling division…

Terms

EC2 – Elastic Cloud Computing, computer rental from Amazon.

EBS – Elastic Block Storage, virtual hard drive rental from Amazon.

Some quick calculations:

1 small machine, / yr:

1.7gb of RAM, a ~1.0 GHz single-core CPU, 160gb of local disk.

$.06 / hr

8760 hrs / year

=> ~$525/ year.

~a somewhat effective server replacement.

1 high-memory quadruple extra-large instance / yr:

68.4 gb of RAM, 8 core @ ~3.2 GHz, 1.7tb of local disk.

$1.64 / hr

8760 hrs / year

=> $14,400 / year

20 high-CPU extra large machines, for a day:

7gb of RAM, 8 x 2.5 GHz CPUs, 1.7tb of local disk.

$0.58 / hr
24 hrs / day
20 machines
=> ~$278/ day.

Why is EC2 so expensive??

- They cover *all* hardware, power, air conditioning and network costs.
- That's actually way more expensive than you think. (Talk to your sysadmin or HPC person…)
- They do not operate at 100% capacity,
- They want to make $$.

What are **we** using it for?

- Teaching workshops and classes.
- Running MG-RAST, RAST, and assembly rast with kBase backends.
- Scientific computing workhorses without the sysadmins
- Automated testing on clean machines with known software install.

Today's tutorials

1. Log in to a new (blank) machine from Amazon. (We have provided these for you).
2. Install NCBI BLAST
3. Download & format some databases
4. Run BLAST
5. Produce an excel spreadsheet of best hits

…

1. Run 2-way BLAST (ecoli x ecoli strains)
2. Calculate reciprocal best hits
3. Produce an excel spreadsheet of putative orthologs

Today's tutorials

1. Get some short-read data onto our instance
2. Download a reference sequence
3. Run short-read aligner BWA

This is a tool for when your data is bigger than your laptop, or for when your campus cluster is down.