Google SRE: Chasing Uptime

What do Google clusters look like?
How do we manage them?
Site Reliability Engineering

• Manage Google’s serving infrastructure
• Plan and execute new capacity deployment (e.g. new datacenters)
• Performance tuning
• Handle serious system problems and outages
Commodity Hardware

- IDE Drives, Midrange CPUs, non-redundant power supplies
- Cheap and readily available parts
- Outstanding bang for the buck
Google, circa 1996
Much improved, Google rack, but…
...tangled wires, cardboard, cork, bent motherboards!
Commodity Hardware

• IDE Drives, Midrange CPUs, non-redundant power supplies
• Cheap and readily available parts
• Outstanding bang for the buck
• Unreliable, temperamental, flaky
Site Reliability Engineering

• Automate common failure cases: Disk, memory, CPU errors, misconfiguration
• …and the dreaded “unexplained server down”
• Deploy and maintain monitoring and automation infrastructure
Strength in numbers: shard

• Dataset is huge, but divided up among many machines, giving us:
  • Subset of data fits on one machine
  • Splitting processing gives lower latency
  • More CPUs gives higher throughput
Site Reliability Engineering

• How is the decision to divide up data among machines made?
• Correct for uneven workload and changes in query mix
• Design, deploy, and maintain automation
Strength in numbers: clone

• Each server has a number of clones that serve the same subset of data
• Many queries to be processed in parallel, giving scalability
• If any one clone goes down, others pick up, giving reliability
Sally’s carwash
Employee cost: $395K/year
Site Reliability Engineering

• Diagnose and fix performance problems on live serving systems
• Plan and execute deployment of new capacity
• Work with new projects deployments to ensure they meet production criteria
• …and much more!

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Questions?

A few starters:
• How can I learn more?
• Is Google hiring?

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