Google SRE: Chasing Uptime

What do Google clusters look like?

How do we manage them?

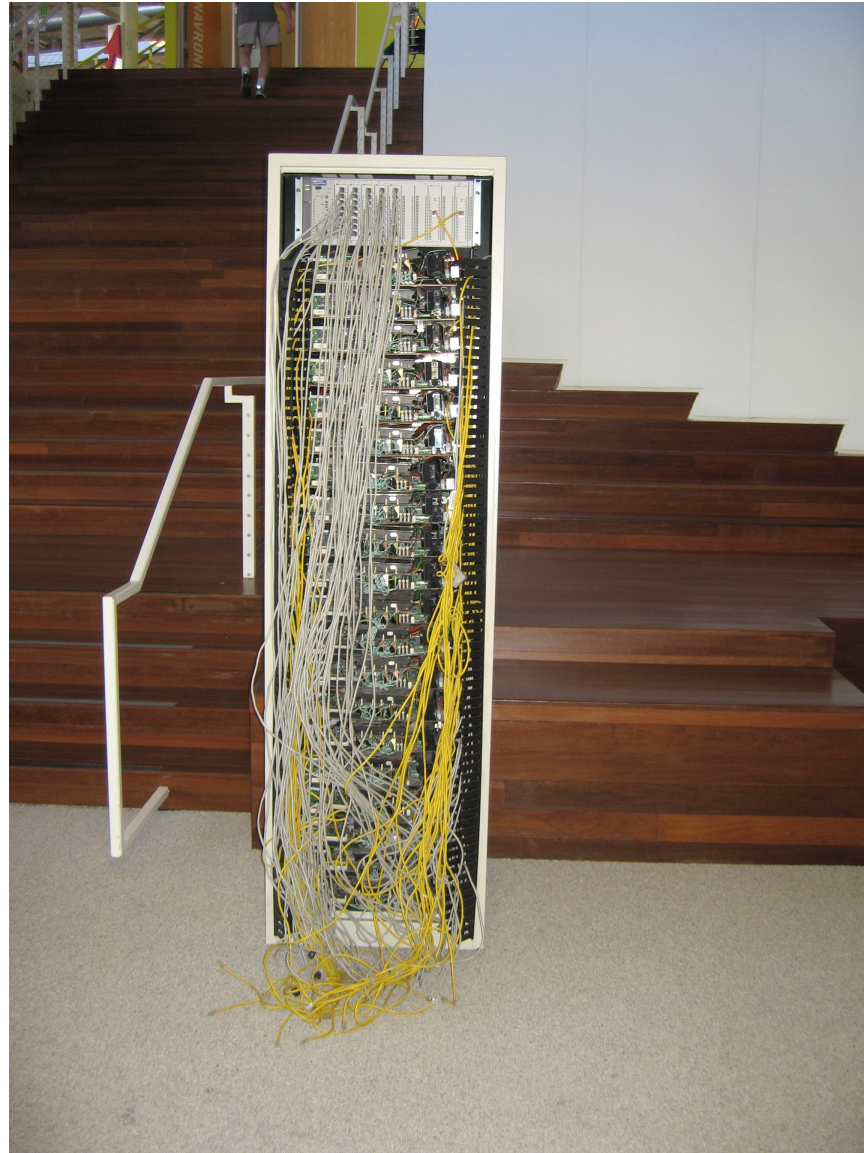# Site Reliability Engineering

- Manage Google's serving infrastructure

- Plan and execute new capacity deployment (e.g. new datacenters)

- Performance tuning

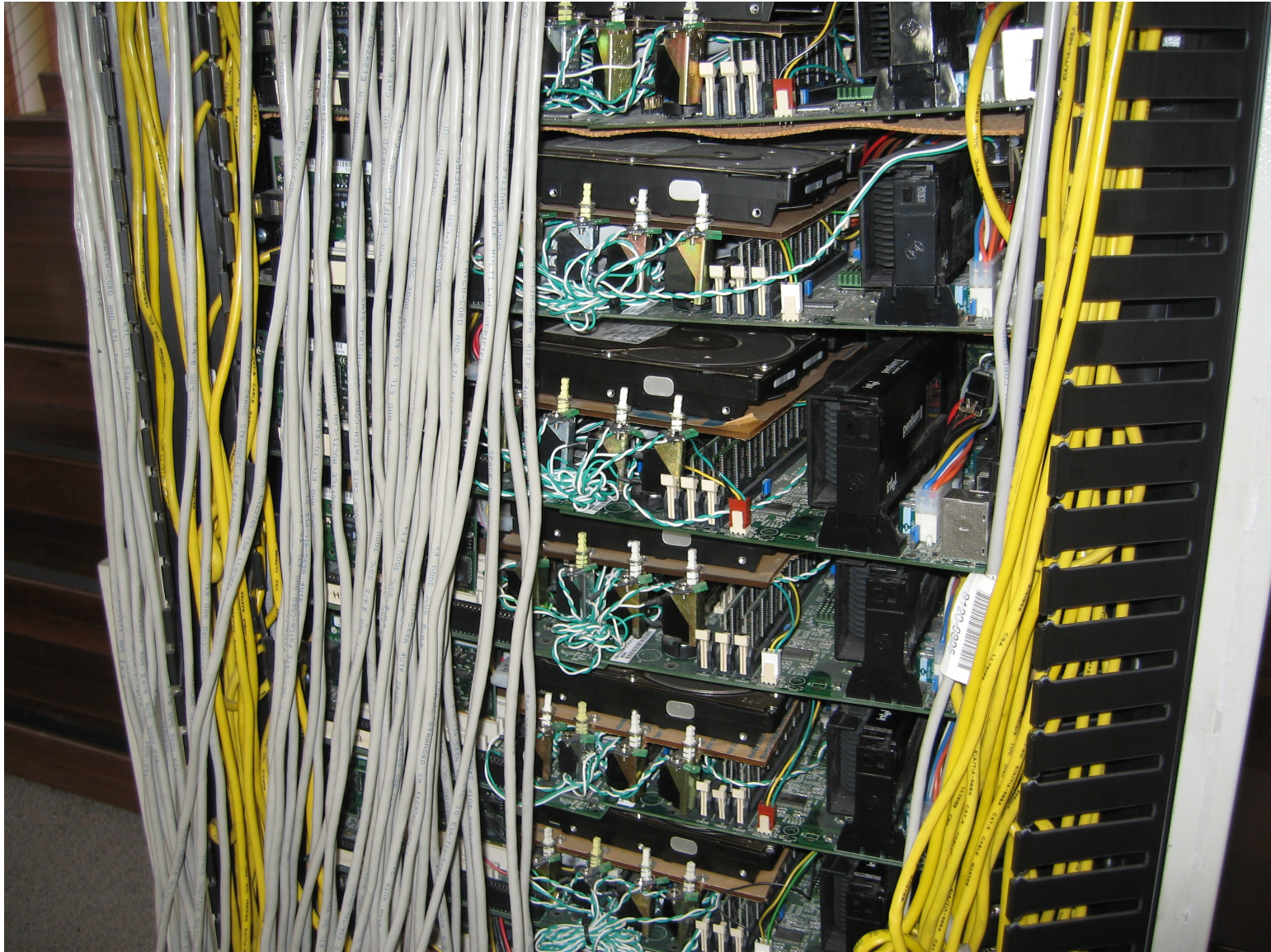- Handle serious system problems and outages

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

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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

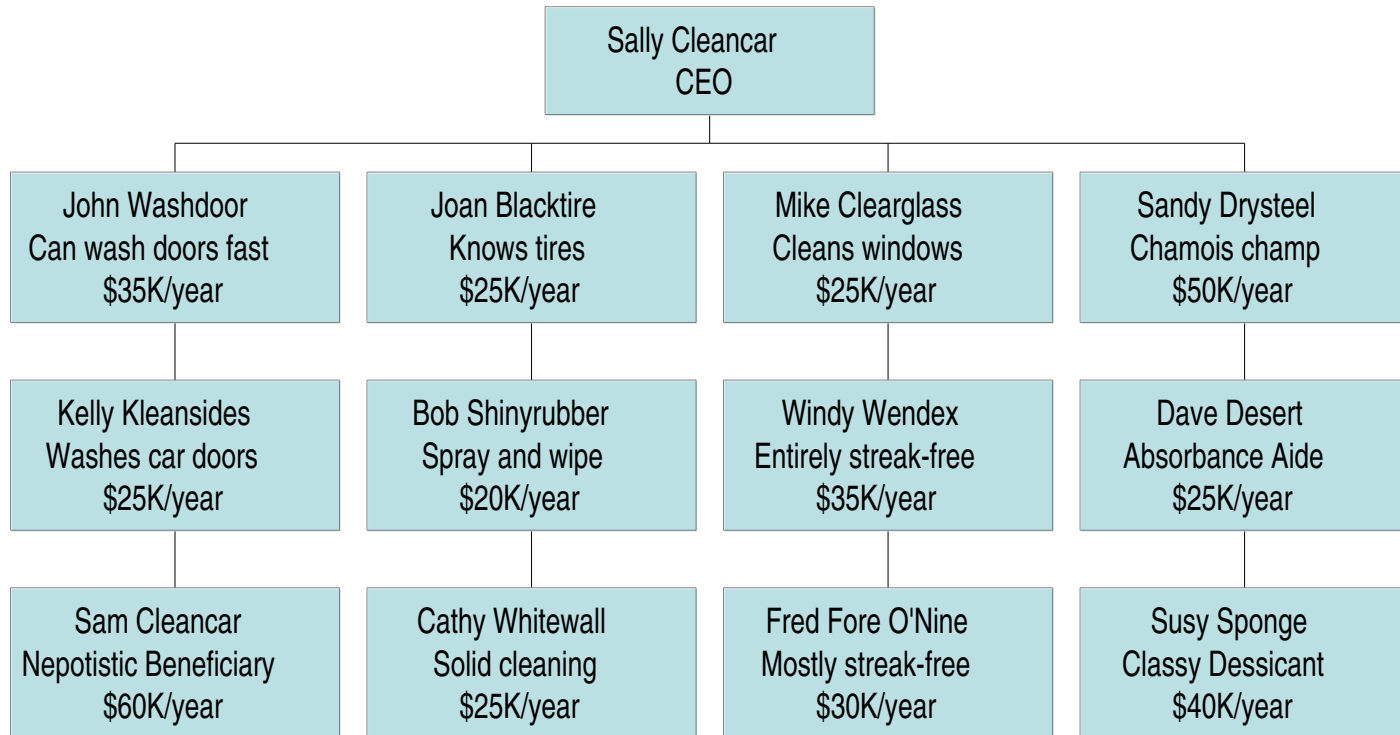- Design, deploy, and maintain automation

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

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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