



# CLOUD COMPUTING CONCEPTS

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## DATACENTER OUTAGE STUDIES

Lecture A

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WHAT CAUSES DISASTERS?

# TAKE A GUESS!

Which of the following do you think is the leading cause of datacenter outages?

1. Power outage
2. Overheating
3. Human error
4. Fire
5. DOS attacks

# TAKE A GUESS!

Which of the following do you think is the leading cause of datacenter outages?

1. Power outage
2. Overheating
3. Human error (70%)
4. Fire
5. DOS attacks

# HUMAN ERROR EXAMPLES

- A system operator mistakenly deleted the \$38 billion Alaska Permanent Fund database and then deleted its backup.
- A maintenance contractor's mistake shut down the Oakland Air Traffic Control Center.
- A State of Virginia technician pulled the wrong controller and crashed a redundant SAN that already had suffered a controller failure.
- A technician with DBS Bank made an unauthorized repair on a redundant SAN and took down both sides.

Source:

[http://www.availabilitydigest.com/public\\_articles/0704/data\\_center\\_outages-lessons.pdf](http://www.availabilitydigest.com/public_articles/0704/data_center_outages-lessons.pdf)

# HUMAN ERROR EXAMPLES (2)

- A system administrator closed all applications on one server in an active/active pair to upgrade it and then shut down the operating server.
- A test technician failed to disable a fire alarm actuator prior to testing the fire suppression system.
- Siren noise damaged several disks, including the virtual backup disks.
- (hosting.com) Incorrect breaker operation sequence executed by servicing vendor caused a shutdown of UPS and offline time to websites of 1-5 hours
- Thirteen million German websites went dark when an operator mistakenly uploaded an empty zone file.
- (And many more!)

Source:

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# WHY STUDY OUTAGES?

- They're fun! (Schadenfreude!)
- But really – so that we can learn lessons
- Learn more about the actual behavior of systems in the real world
- Design better systems in the future
- Not our goal to say some companies are worse than others
  - In fact, companies that suffer outages run better and more robust infrastructure afterwards!
  - “What doesn't kill you, makes you stronger”
- We'll see a few case studies of outages
  - And learn lessons from them