CSE 265:
System and Network Administration

- Disaster Recovery
  - Why disaster recovery?
  - What is a disaster?
  - Risk analysis?
  - Legal obligations
  - Damage limitation
  - Preparation
- Backup and Restore is coming in a few weeks

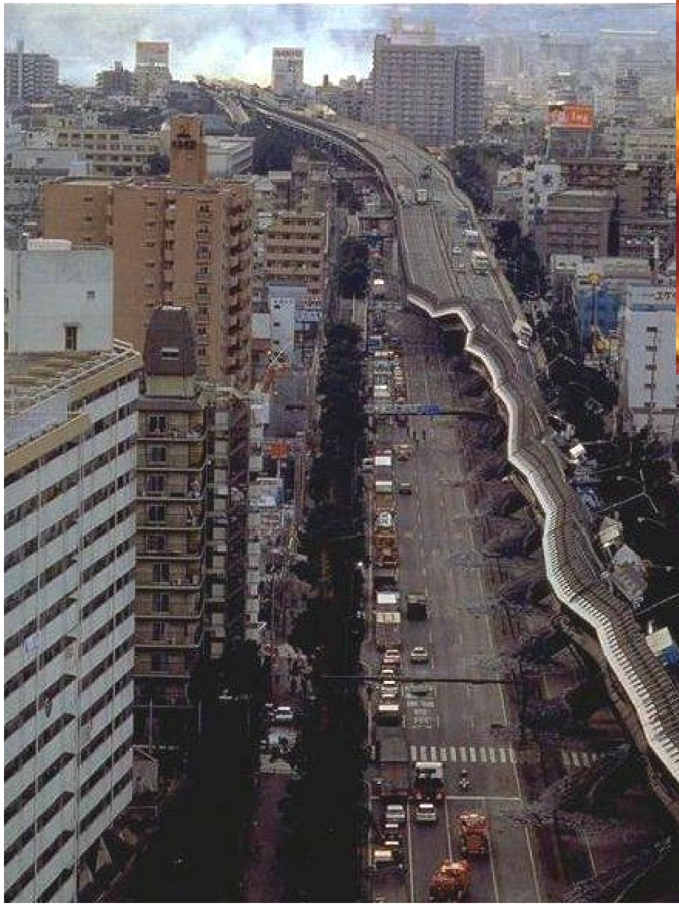
Why Disaster Recovery

- A disaster recovery plan
  - considers what disasters could hit
  - implements ways to mitigate potential disasters
  - makes preparations to enable quick restoration of services
  - identifies key services and how quickly they need to be restored
- Need to understand the requirements

What is a disaster?

- A catastrophic event that causes a massive outage (affecting an entire building or site)
  - Natural disasters
  - Man-made disasters

Fire and Earthquake



Lightning and Tornadoes

Altronix

Bombings

Back-hoes

Power Outages

Electronic Break-In

What is a disaster?

- A catastrophic event that causes a massive outage (affecting an entire building or site)
- Natural disasters
  - Earthquake, hurricane, tornado, plague or other diseases, lightning strike, fire, or flood
- Man-made disasters
  - Bomb or other terrorism, massive loss of power, idiots with backhoes, security breaches

Risk analysis

- First step in disaster recovery planning (usu. outsourced)
- Determines budget for mitigation of disaster
  - (ExpCost(Disast) – ExpCost(MitigatedDisast)) * Prob(Disast)
  - Examples
    - Flooding chance is 1 in million, flood cost would be $10M, not worth spending > $10
    - Severe earthquake chance 1/3000, $60M loss, then budget of $20K
- Simpler case: single point of failure in major router
  - 70% chance of failure every 24 months
  - One day to repair, with estimated loss of productivity $68K
  - Annual redundancy budget could be $24K

Legal obligations

- In addition to costs to company, there may be legal obligations to vendors, customers, and shareholders
- Contracts may allow for delays of *n* days, which defines the amount of time available
- May require that individual parts of infrastructure be operational before the rest
  - Need to carefully track dependencies!

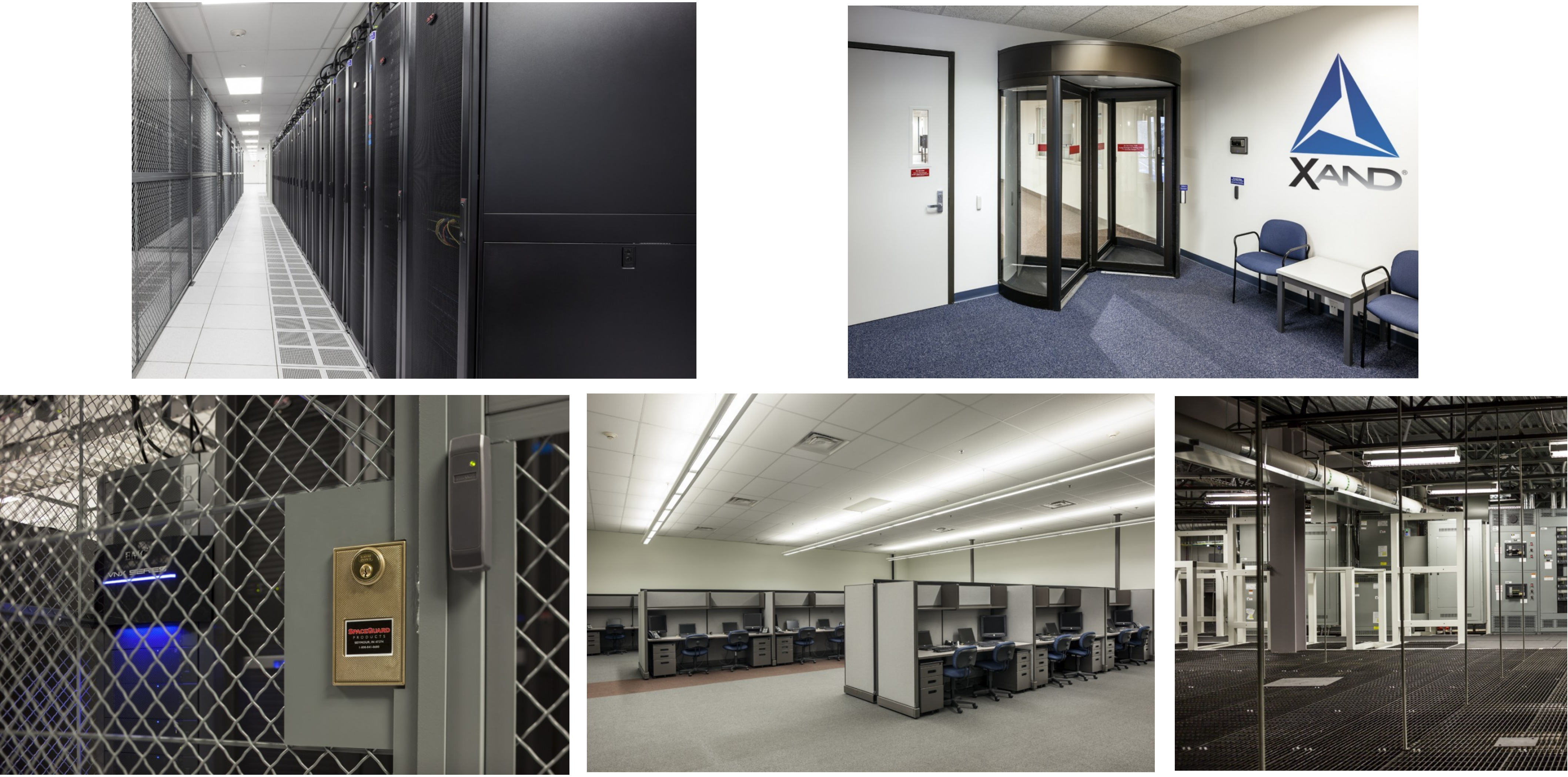
Damage limitation

- I.e., reducing the cost of the disaster (still subject to cost-benefit analysis)
- Relatively inexpensive, but specific to expected disaster
    - Put equipment above ground in flood plains
    - Mount equipment in earthquake areas
    - Use of lightning rods
- Other mechanisms
    - Fire protection systems that limit damage to computer systems (inert gases, delayed water systems)
    - Moisture detection for raised floors or UPS rooms
    - UPS for short power outages

Preparation

- In addition to damage limitation, you still need to be prepared for likely disaster scenarios
  - must be able to restore essential services to working order in a timely manner
- Need to
  - be able to rebuild data and services on new equipment if old equipment is not operational
  - arrange for replacement hardware in advance
  - arrange for a facility to put the replacement hardware
    - arrange for power, telephone, network connectivity at backup site
  - plan for time to get backup tapes from off-site storage

Disaster Recovery Centers



Images from XAND Tek Park Data Center (near Allentown). See http://www.xand.com/data-centers/tek-park/