Heat Harvesting For Power

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Outline

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Motivation

- Data centers produce lots of waste heat
- That heat could go to good use
  - Heat buildings
  - Heat water pipes
  - Generate electricity
  - Heating a greenhouse
  - Cooking eggs
Problem

* Currently excess heat from data centers and PCs is wasted

* Viable reuse of heat may be difficult
  * Not an enormous amount of heat
  * Datacenters’ locations are restricted by many factors

* Overhead might be more than recycled energy gained

* Moving the datacenter to inside people’s homes poses challenges
  * But comes with great possible gain
Literature Review

* Microsoft and UVa Research
  * “Data Furnaces”
  * In-home data centers with wattage based on region

* IBM
  * Datacenter heats swimming pool
  * Doesn’t actually exist yet

* Swedish ISP Bahnhof
  * James Bond Villain Datacenter
  * Datacenter in a cave
Methodology

- Measure heat output of PCs under various loads
- Obtain data from existing server farms
  - Power consumption
  - Heat dissipation
- Possibly use GEMS to measure existing power dissipation
  - Convert power numbers into heat dissipation
Milestones

* Obtain a computer and performance benchmarks
* Build an enclosure to measure heat output of computer
* Use GEMS to measure power usage
* Research heat outputs vs. energy input in datacenters
* Comment on viability of heat reuse
* Comment on viability of servers in home
Questions?