

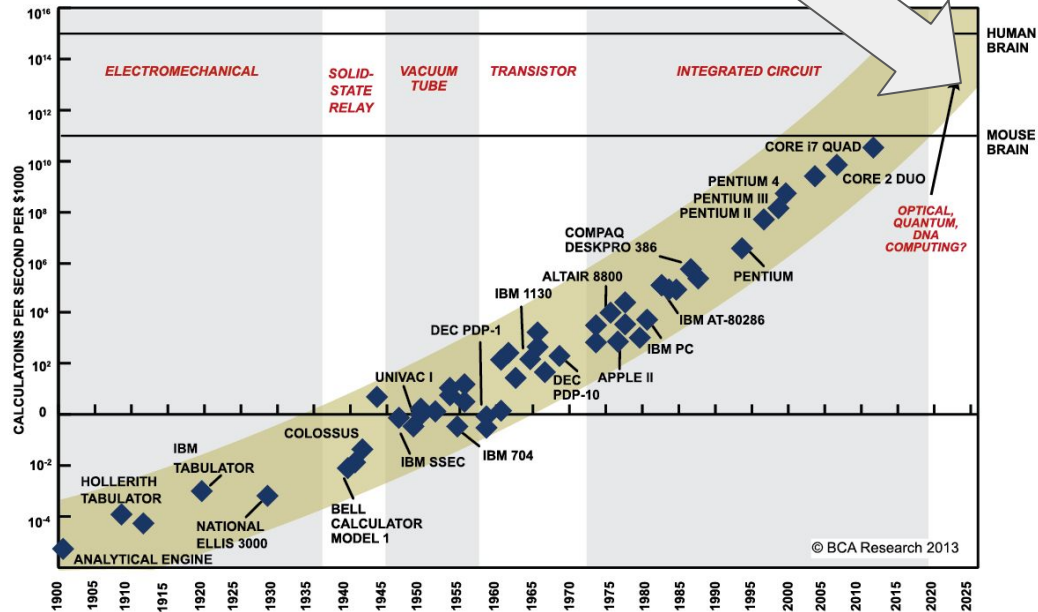
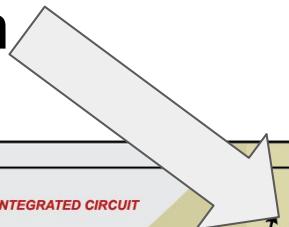
# Towards a cat-based computational platform

Pjakkur Helgscat Depill Helgscat  
Scotch Kaufmann Whiskey Kaufmann  
Max Zhang Pixel Zhang Minion Zhang

# Moore's Law is dead!



# Cat Brain



SOURCE: RAY KURZWEIL, "THE SINGULARITY IS NEAR: WHEN HUMANS TRANSCEND BIOLOGY", P.67, THE VIKING PRESS, 2006. DATAPPOINTS BETWEEN 2000 AND 2012 REPRESENT BCA ESTIMATES.

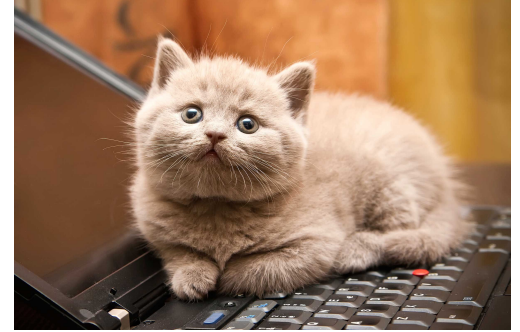
# We must use new computational platforms



GPU



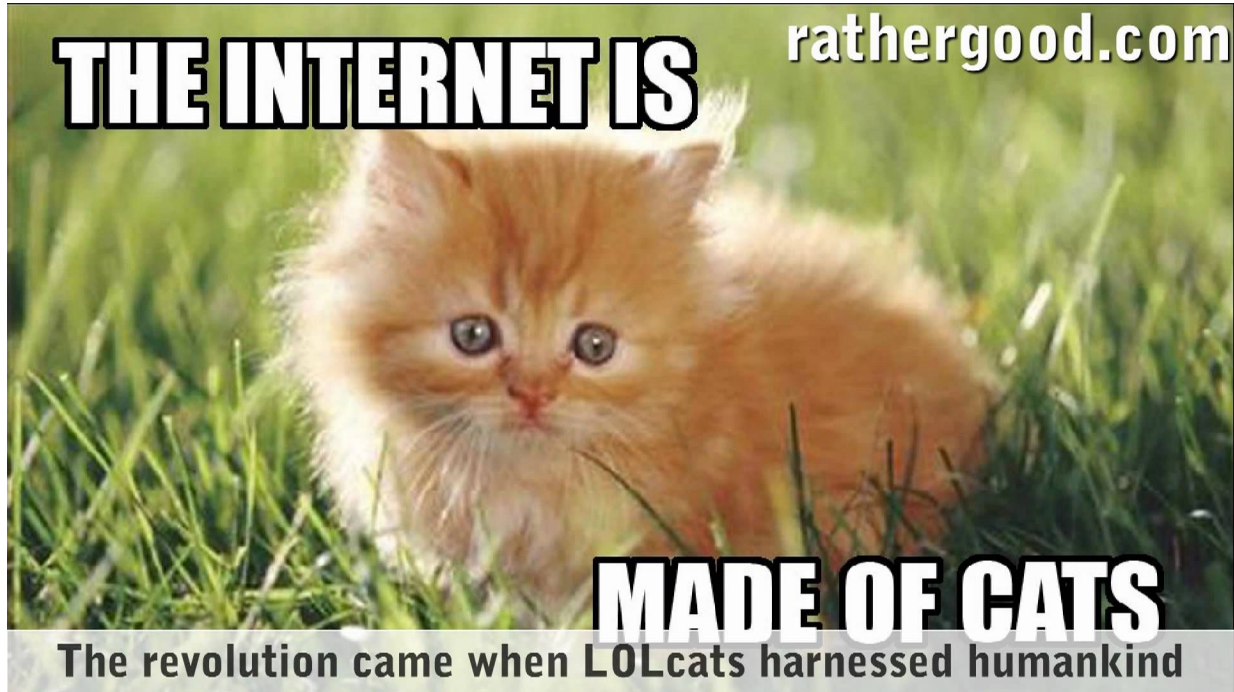
Programmable devices



Cats

# Advantages of Cat-based Computation

Optimized for internet meme workloads



# Advantages of Cat-based Computation

Energy-efficient: supports multiple sleep states



# Advantages of Cat-based Computation

Speedup: Able to support bursts of high energy





# Advantages of Cat-based Computation

Good at cat-recognition tasks



# Challenges

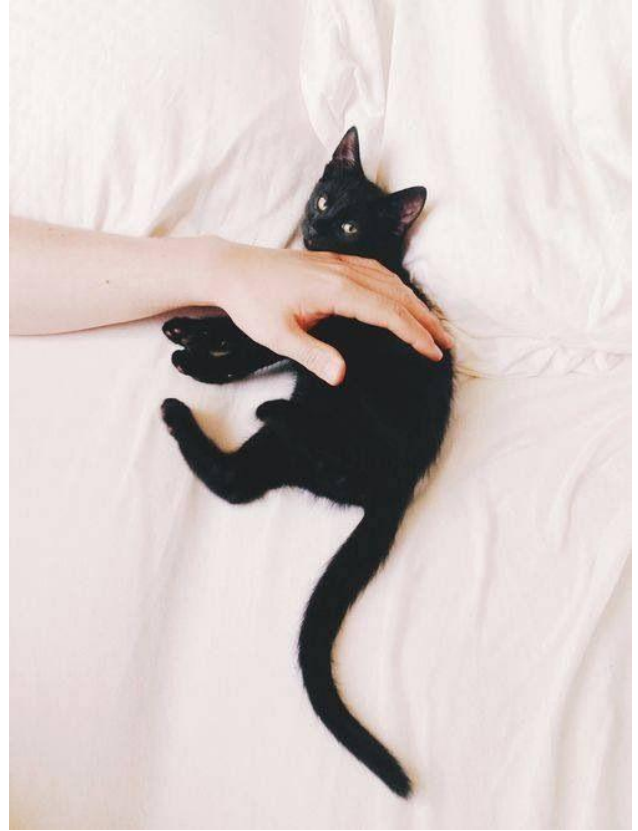
Problems managing multi-threaded applications





# Challenges

Long tail latency



# Challenges

Requires periodic  
litter collection



## Rest of this talk

- Operating systems and language runtimes
  - Hide the complexity of interfacing with cats
- Distributed Systems
  - Hide cat failures and unavailability
- Verification
  - Prove programs executed by cats are correct
- Evaluation

Cats are extremely heterogeneous



Some are high-performance









# Programming platforms hide cats from programmers



Programming Platform

Cloud providers are increasingly deploying their own platforms



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# Replication

- Cats are unreliable



- Replication can mask many types of cat failures



# Networking





# Types of Replication



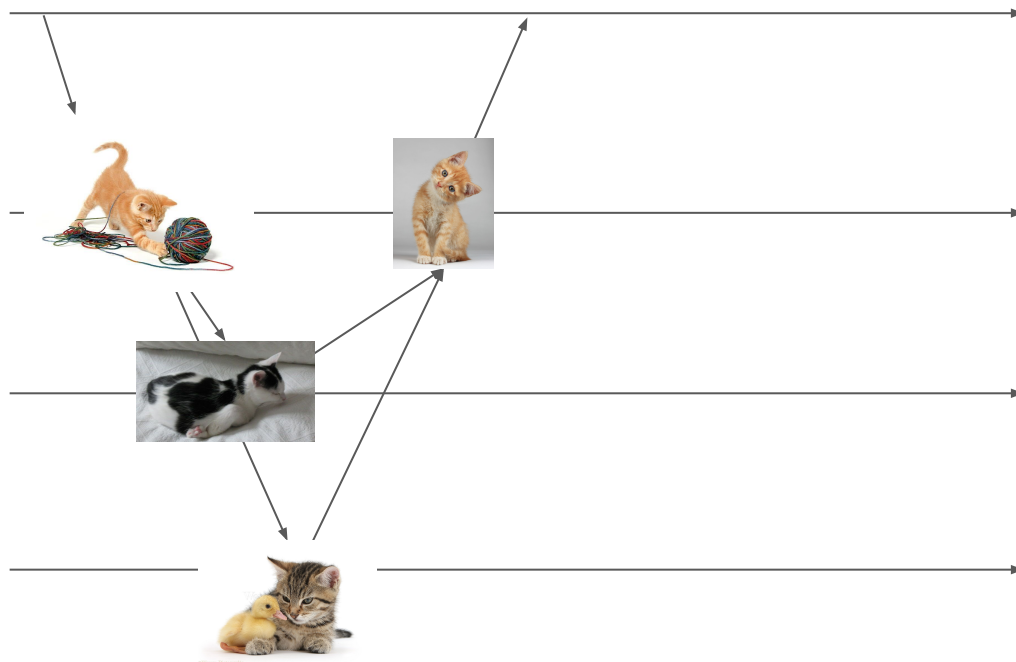
Primary-Backup



Consensus-based



# Paxos



Inefficient!

High Latency!

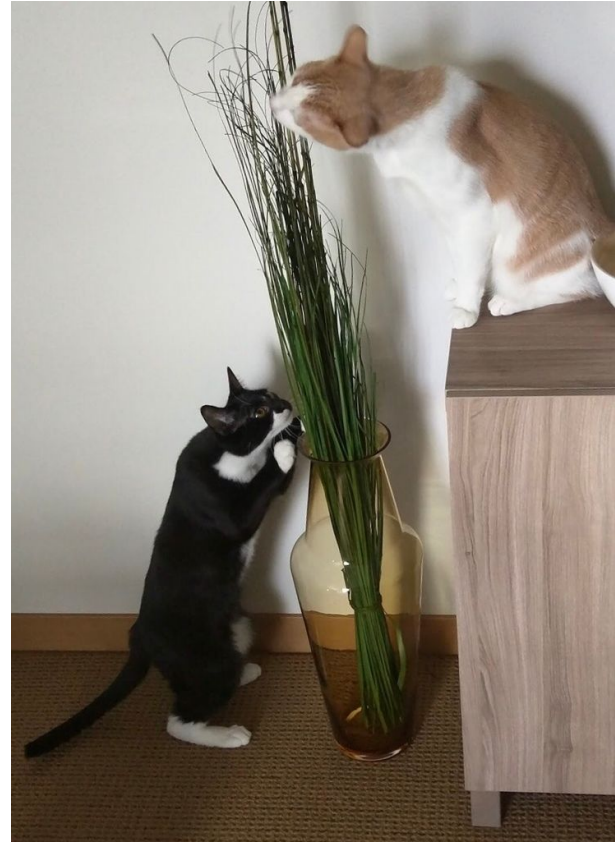
Processes  
1 operation/day!

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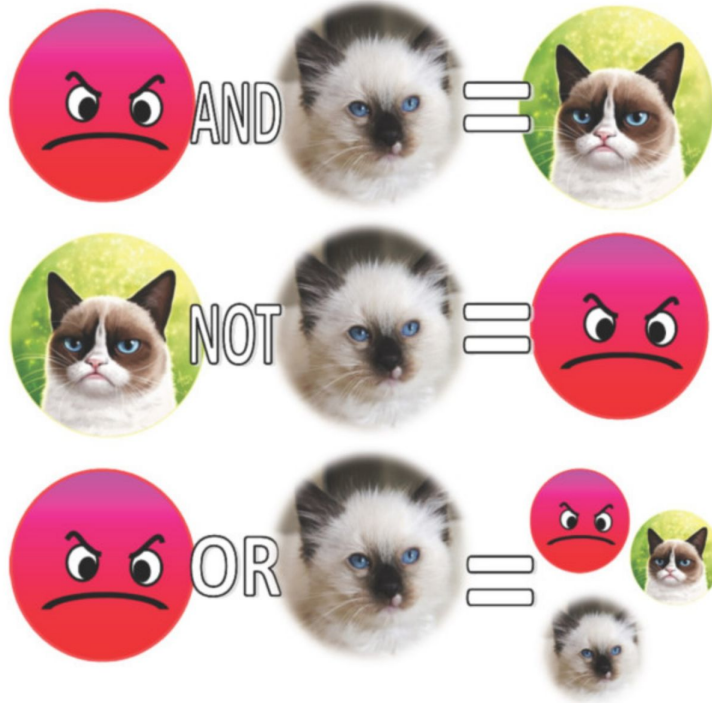
# Verification

- Frequent undefined behavior can cause breakage



# Verification

Amenable to verifying using boolean satisfiability solvers



# Verification

Also supports Coq



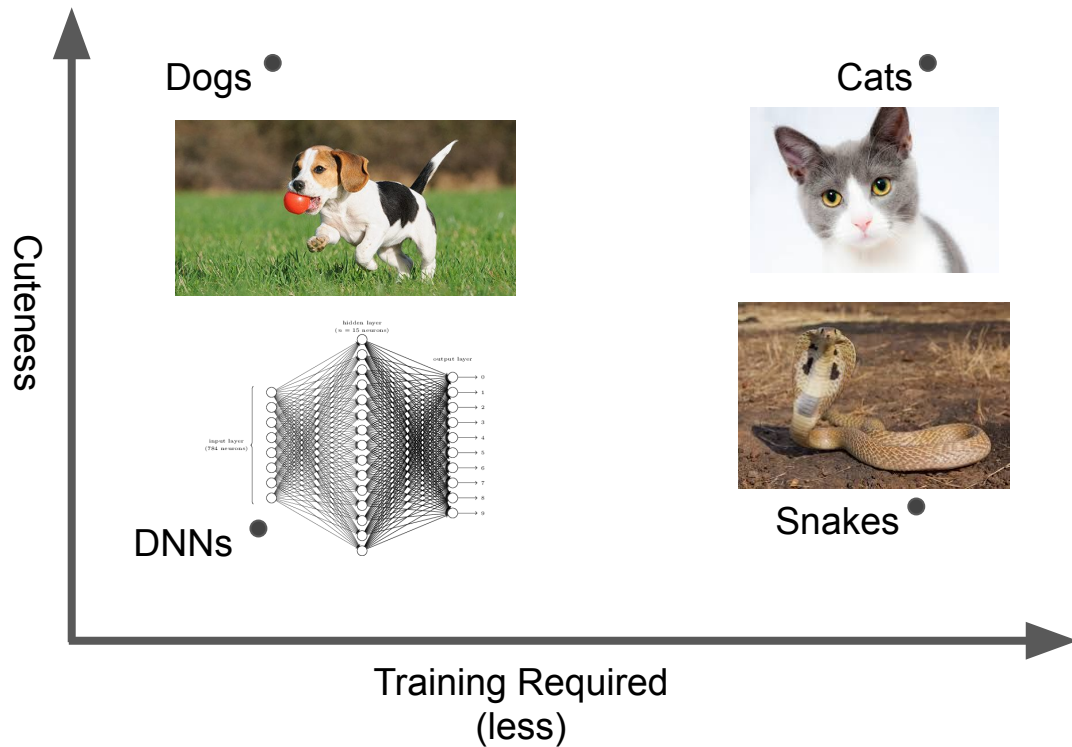
# Verification

Or use cat as proof assistant





# Evaluation



# Future work & Collaborations

HCI (Human-Cat Interaction)



Security and Privacy



Robotics



# Related work

