



# IPFS - The Practical Bits

## Cody Zuschlag



 codyzus

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Staff Developer Relations Engineer @[NearForm](#)  
University Instructor @ Université Savoie Mont Blanc

Annecy, France



# InterPlanetary File System

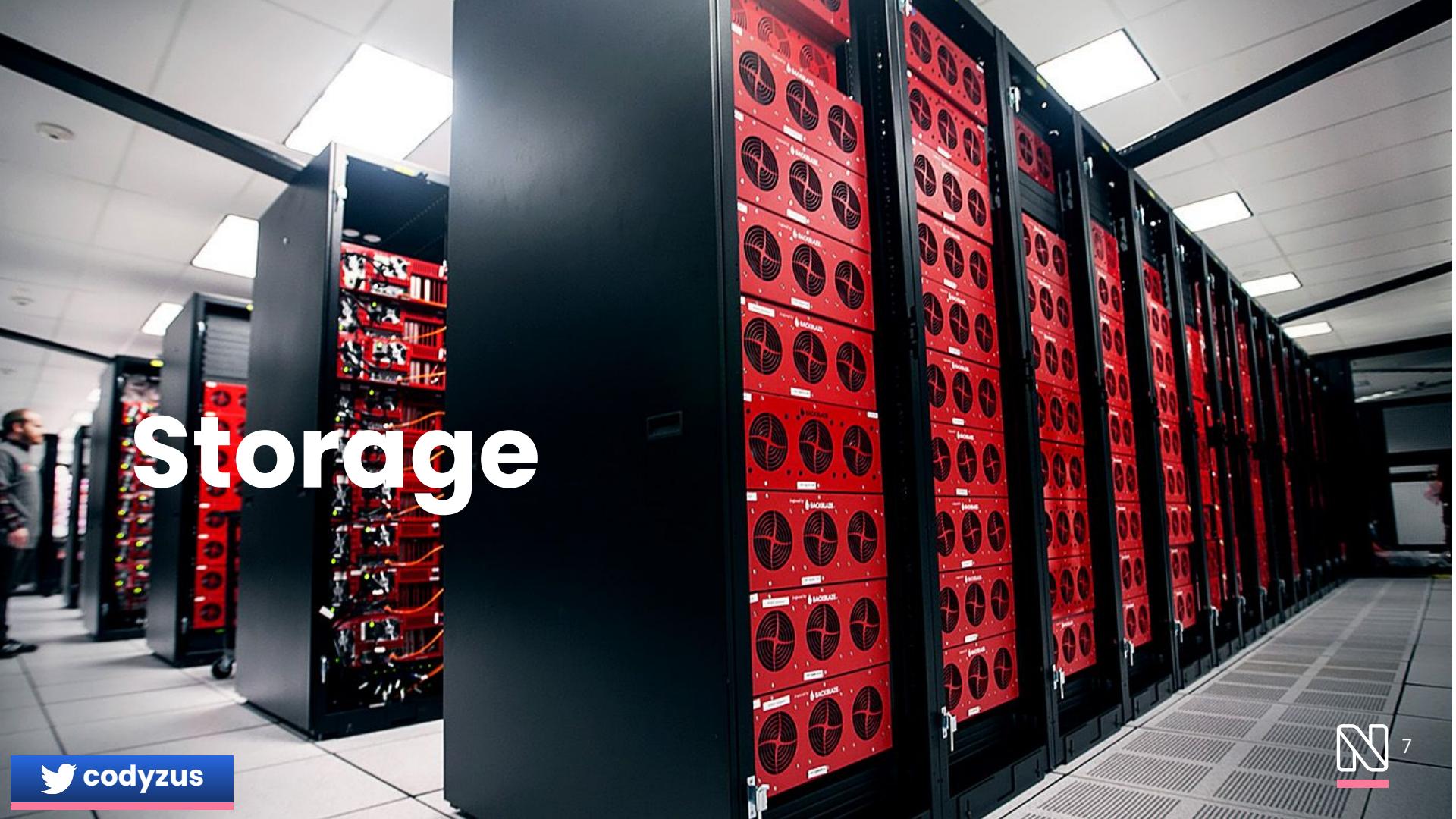


# Storage

69

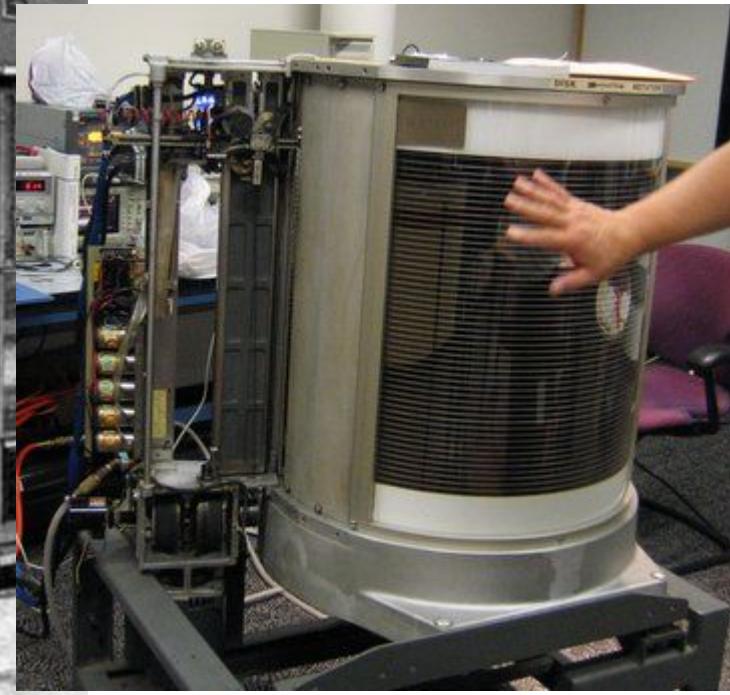
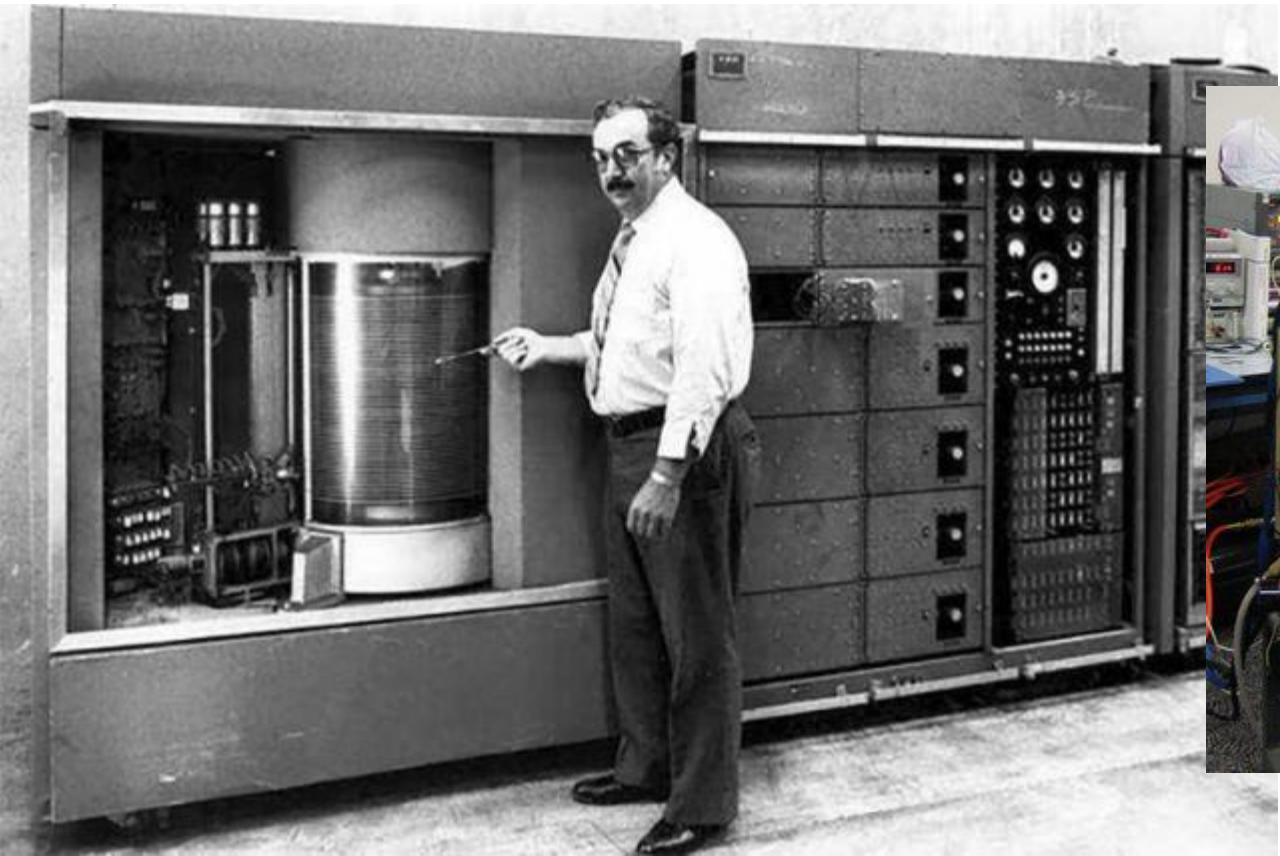
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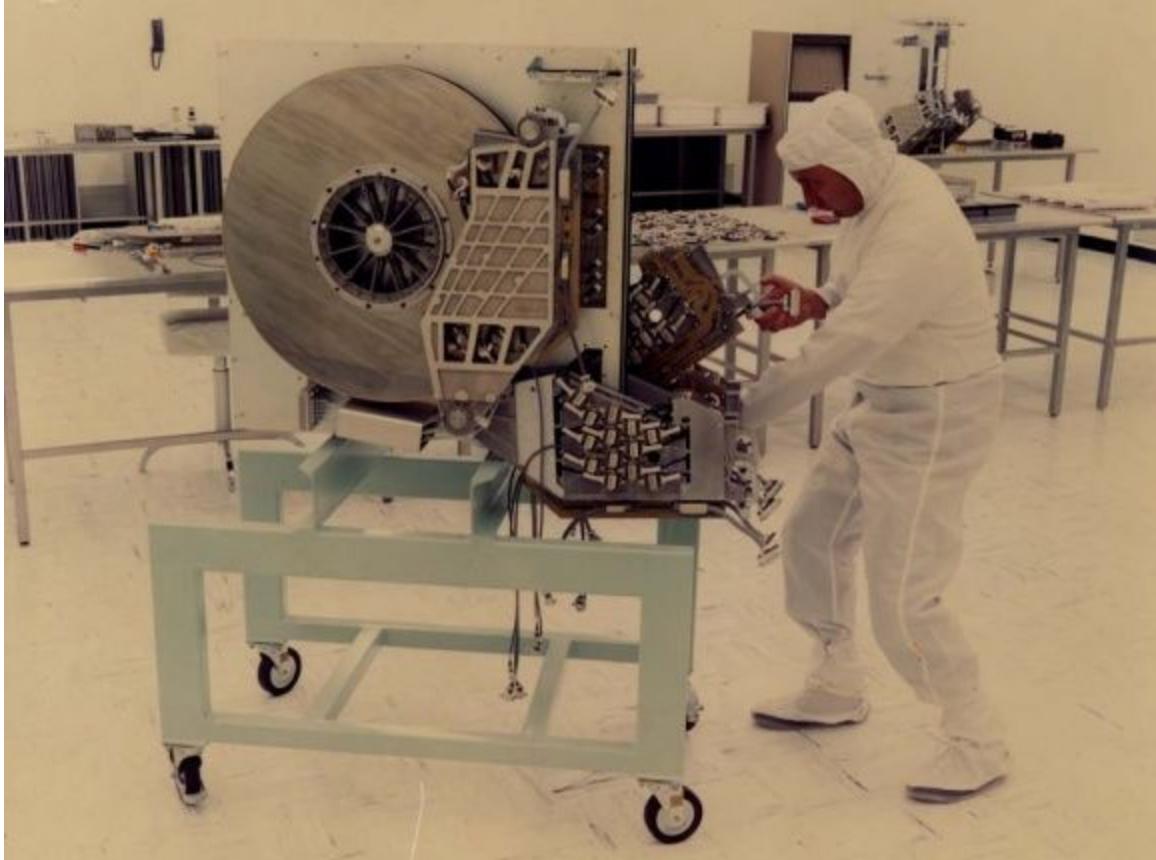
# Storage





# History





??? 250MB - 1979



HDDs got smaller





... and smaller

# Storage

- Centralized: mainframes
- Decentralized: portable
- Centralized: cloud
- Decentralized: IPFS



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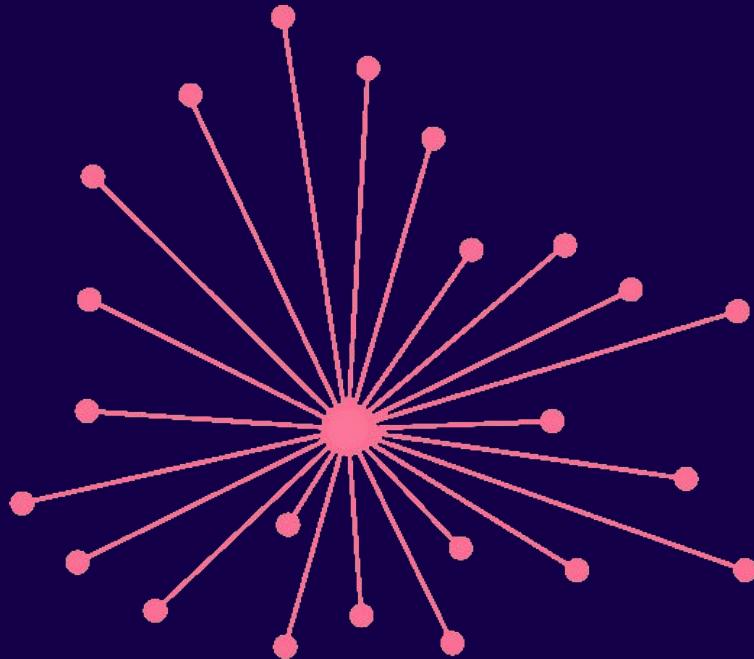
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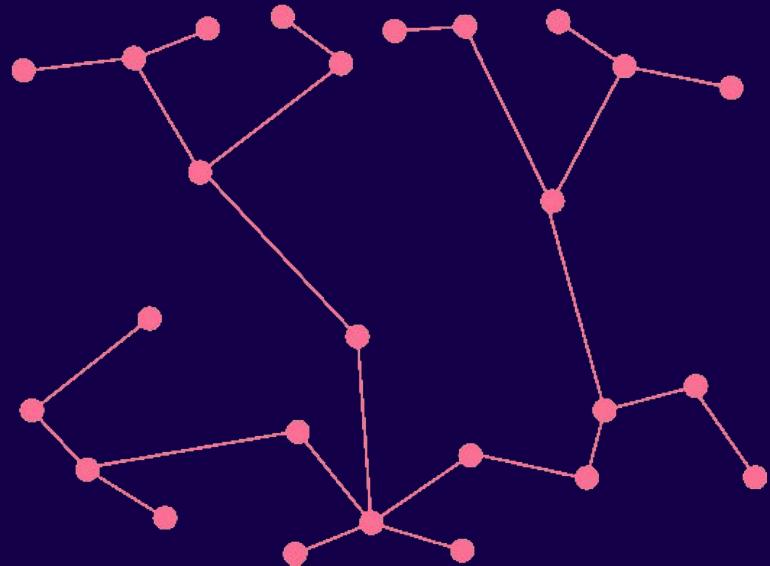
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Centralized



Decentralized



# Distributed Storage

# CAP Theorem



?



# CAP Theorem



Eric Brewer - 1998

# CAP Theorem

Consistency



Eric Brewer - 1998

# CAP Theorem

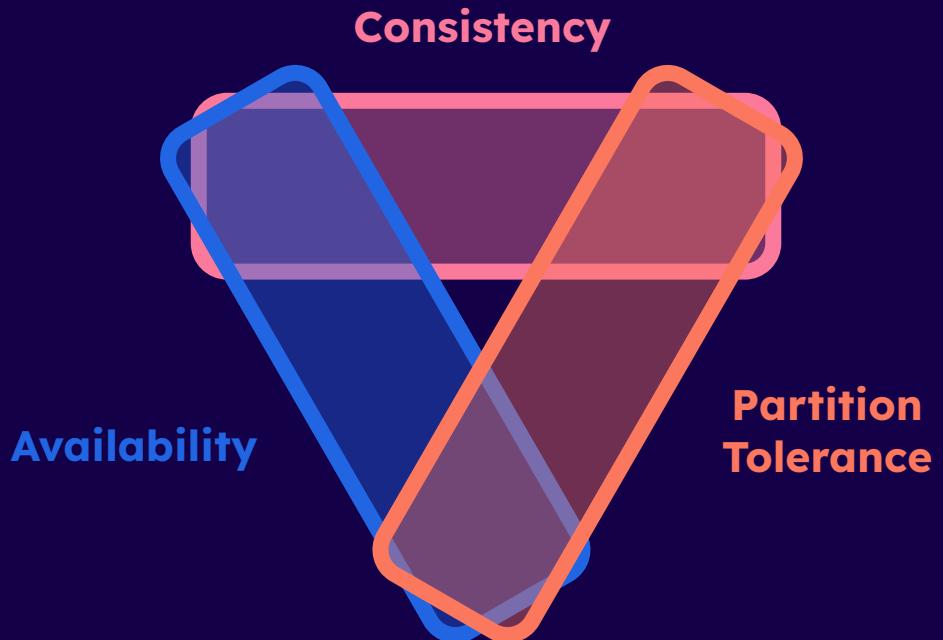
Consistency

Availability



Eric Brewer - 1998

# CAP Theorem

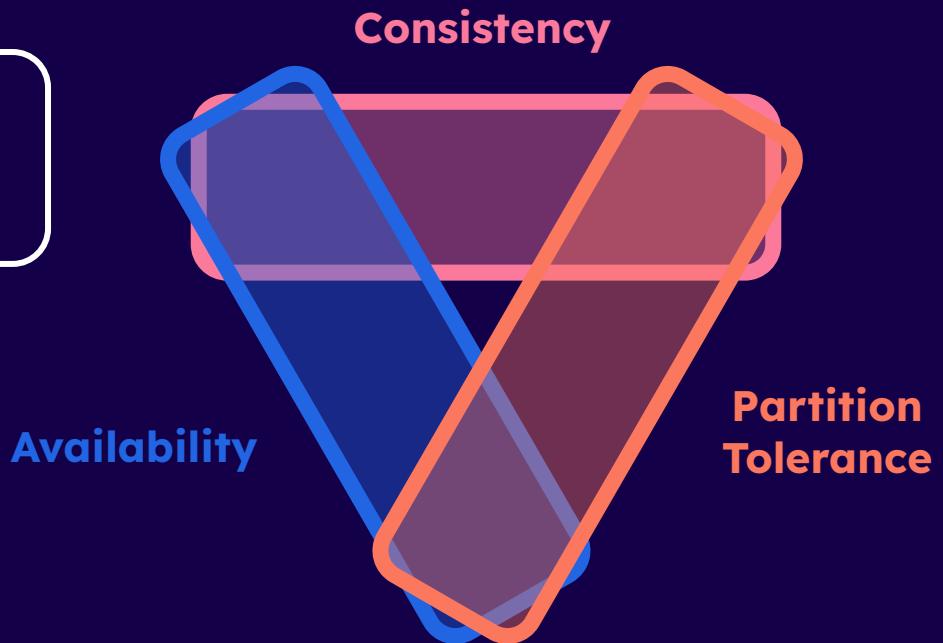


Eric Brewer - 1998

# CAP Theorem



There can be  
only 2!

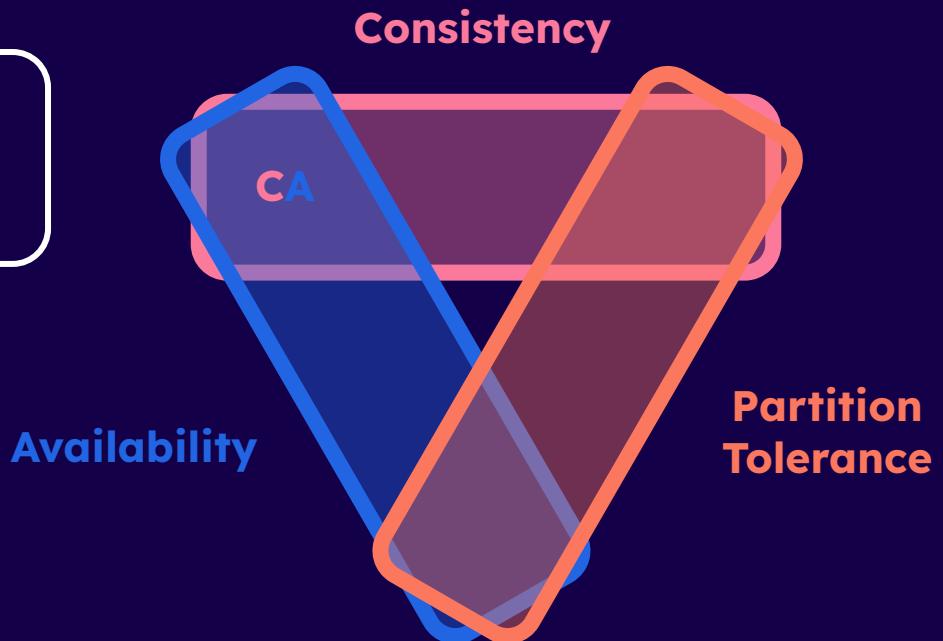


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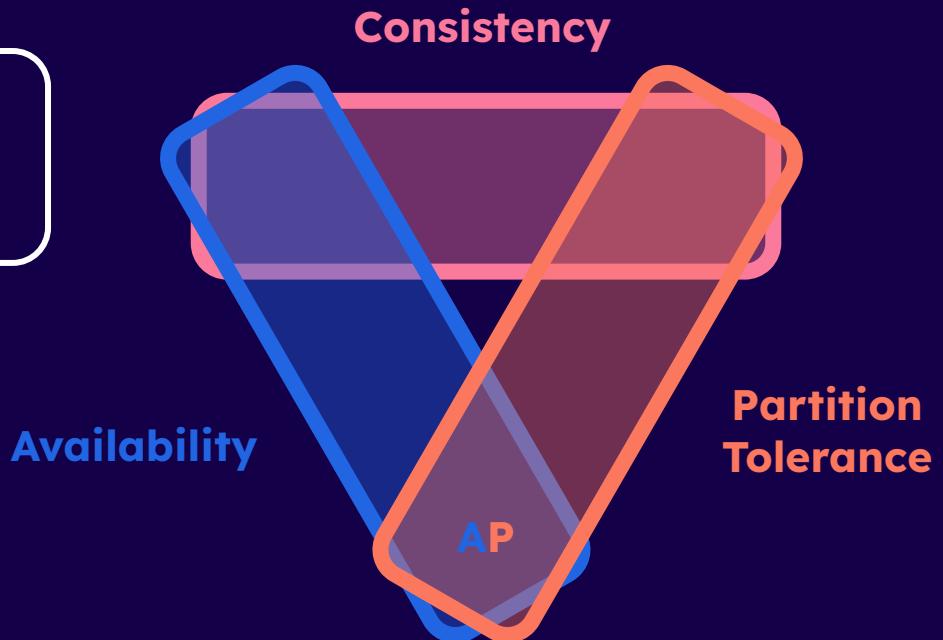


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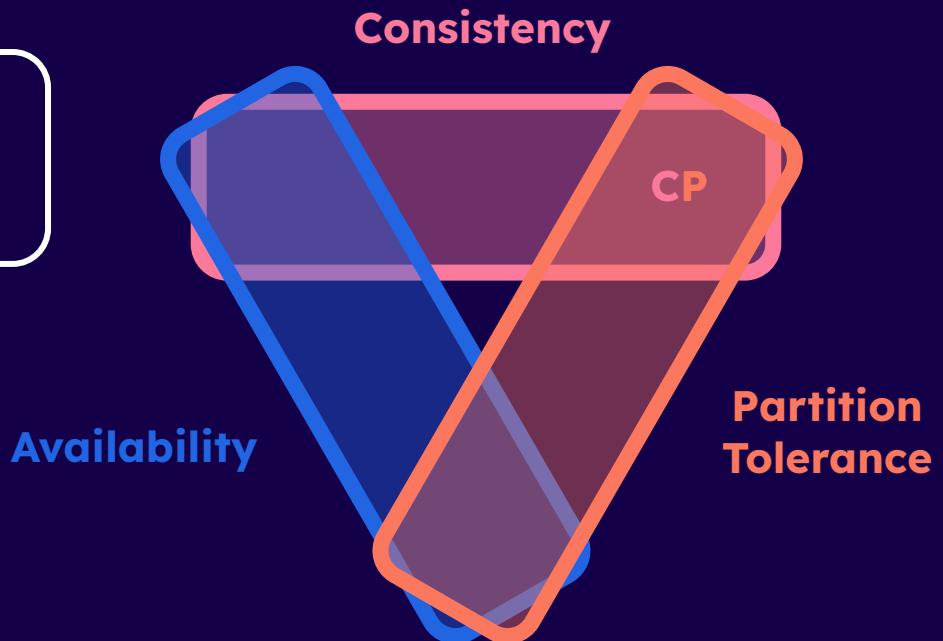


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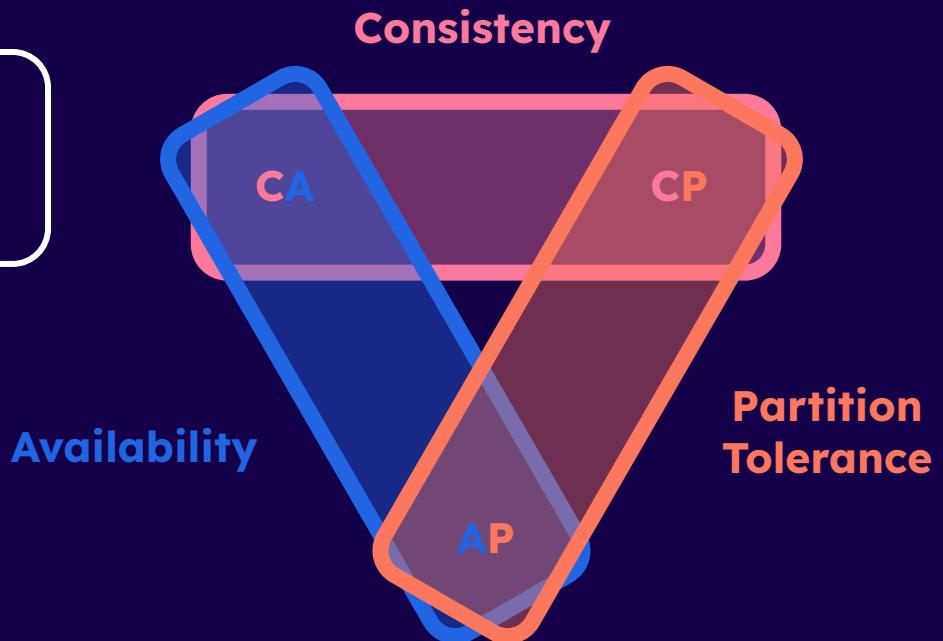


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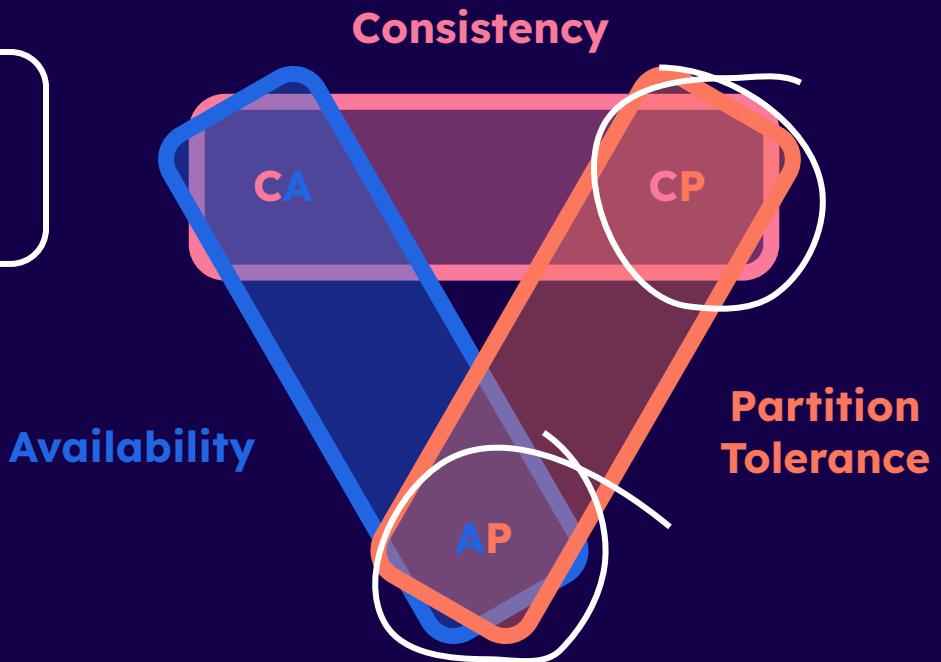


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# Cloud Storage

# Cloud

- Services such as Cloud Spanner
- Resilient network infrastructure
- 99.999%
- Partitioning is [nearly] eliminated



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Spanner

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# IPFS

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- Decentralized
- Distributed
- P2P
- Content Addressable
- Immutable
- Distributed Hash Table
- Web 3.0
- Directed Acyclic Graph



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# Content Addressable

- Web 2
  - <https://squirrels.com/peanut.jpg>
  - Centralized authority for hostname
  - URL is an abstraction (content could change)
- IPFS
  - CID
  - `/ipfs/bafybeigdyrzs...3lgtqy55fbzdi`
  - Hash derived from content
  - Don't care who hosts content



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# Gateways

- Web “2.5”
- Bridges gap
- <https://web3.storage>
- Cloudflare, etc...



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# Why???

# Use Cases

- Website hosting
- Distributed package management
- Storage of publicly accessible records
- Distributed gaming
- NFTs



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# Open Source

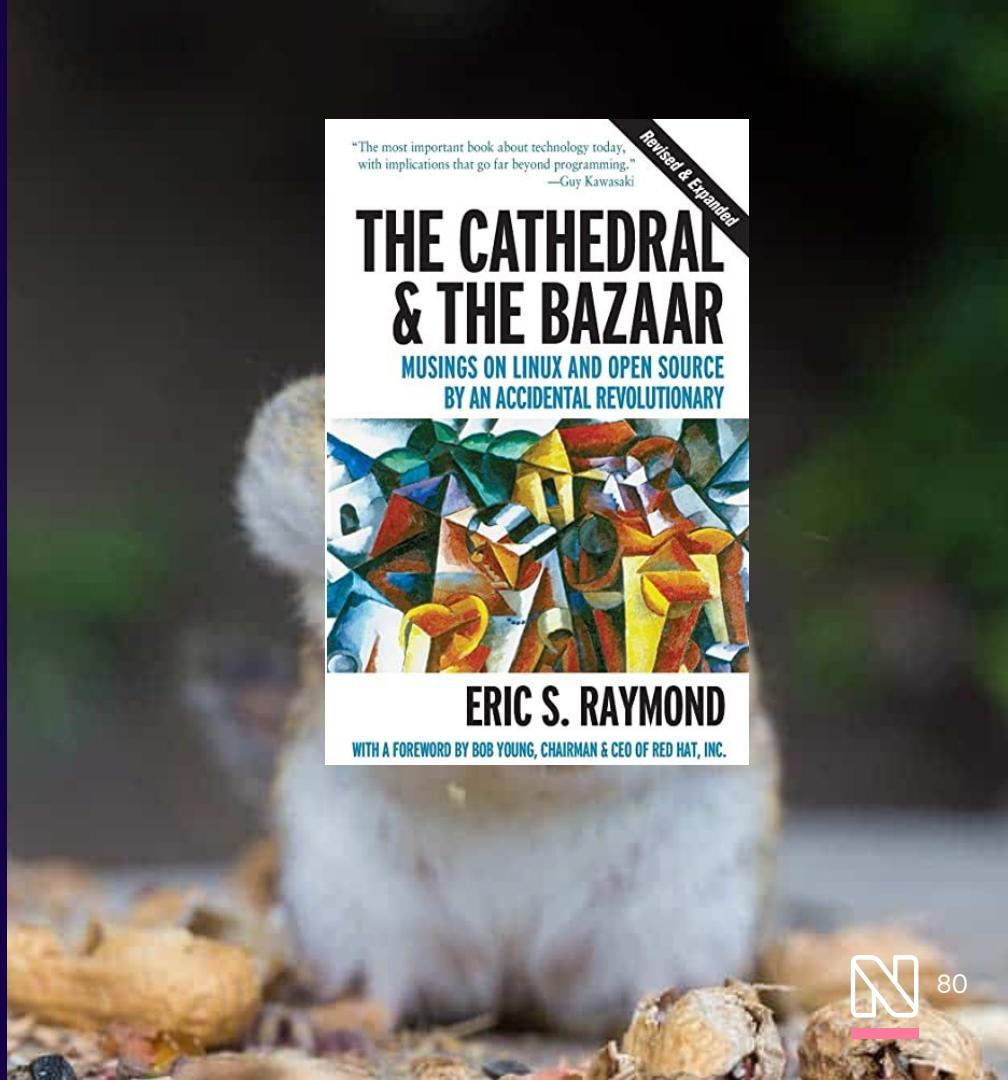
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- Top down vs bottom up
- Cathedral
  - Top down
  - Source available upon release
  - Exclusive group of devs
- Bazaar
  - Bottom up
  - Developed via internet
  - Public
  - “Given enough eyeballs, all bugs are shallow”



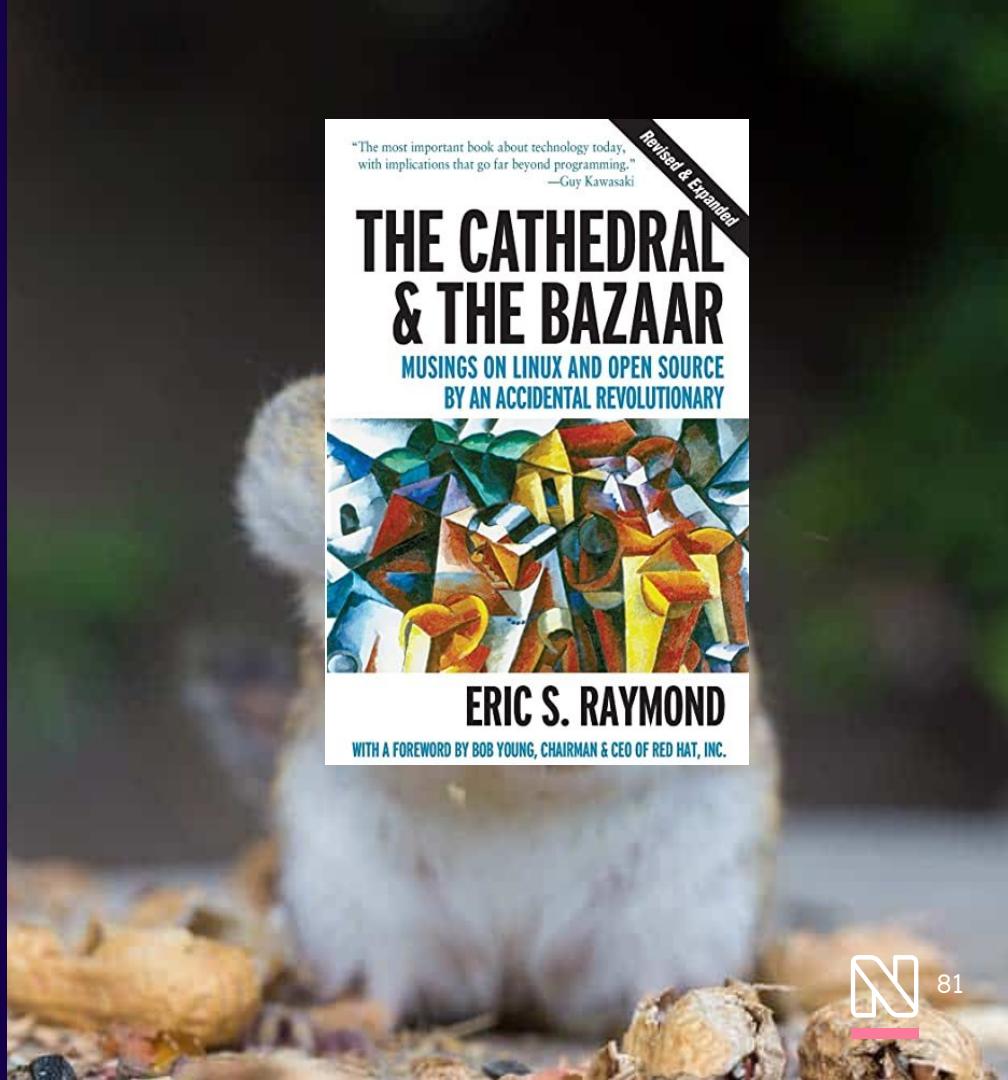
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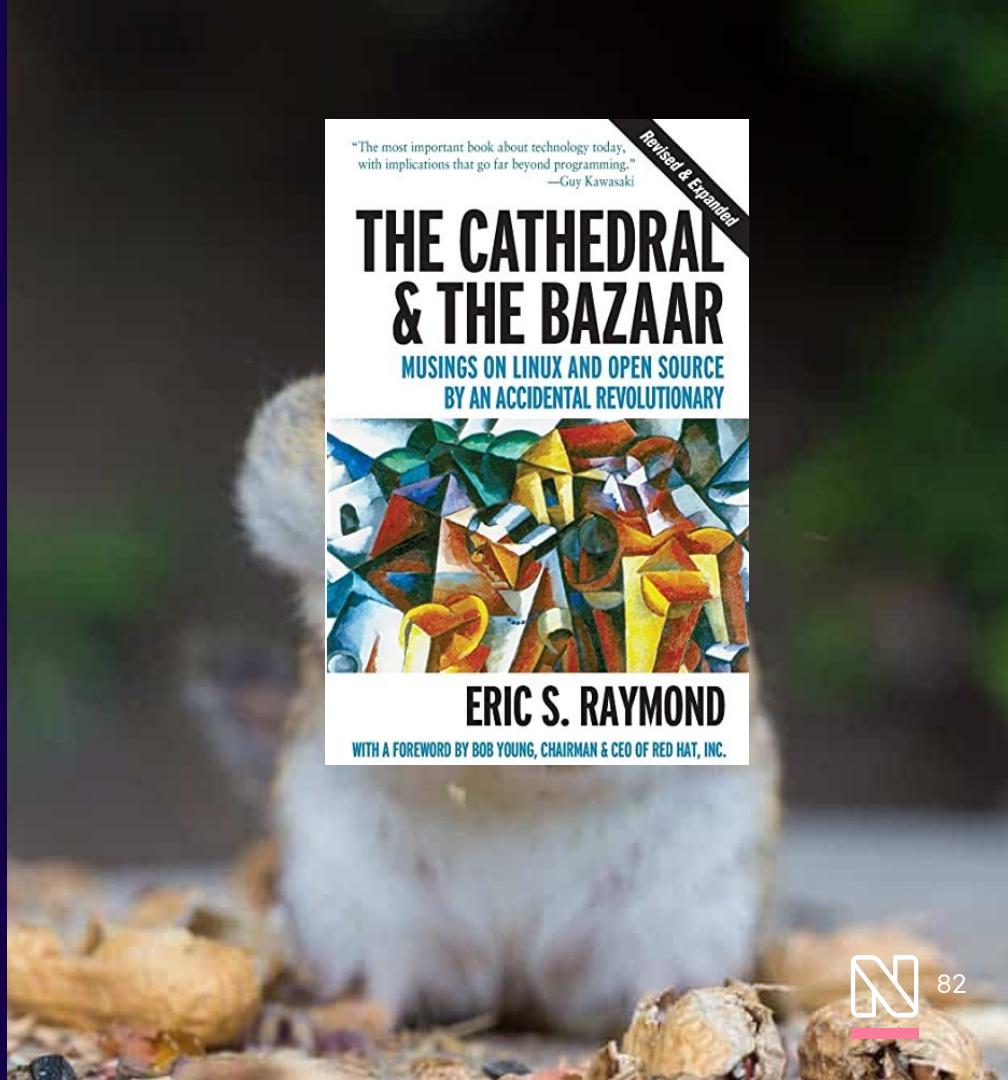
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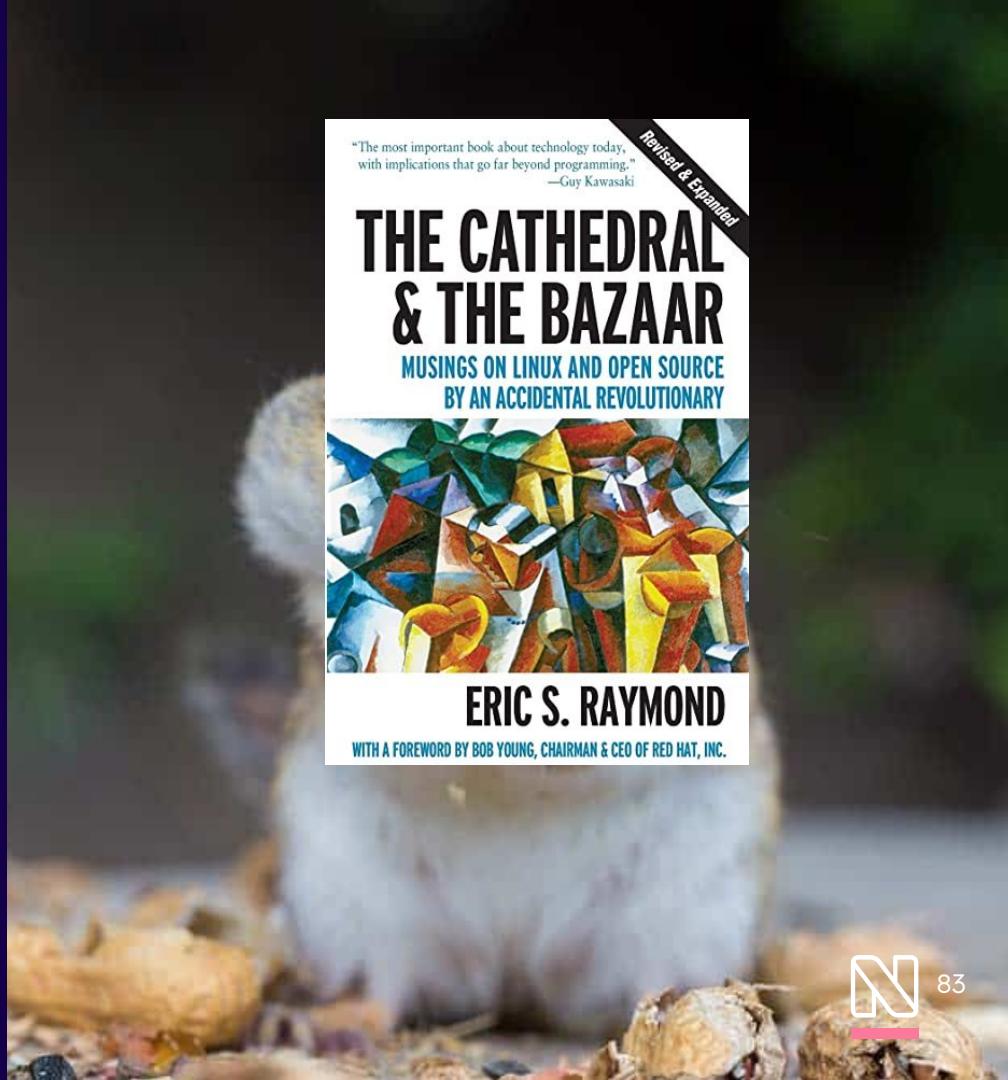
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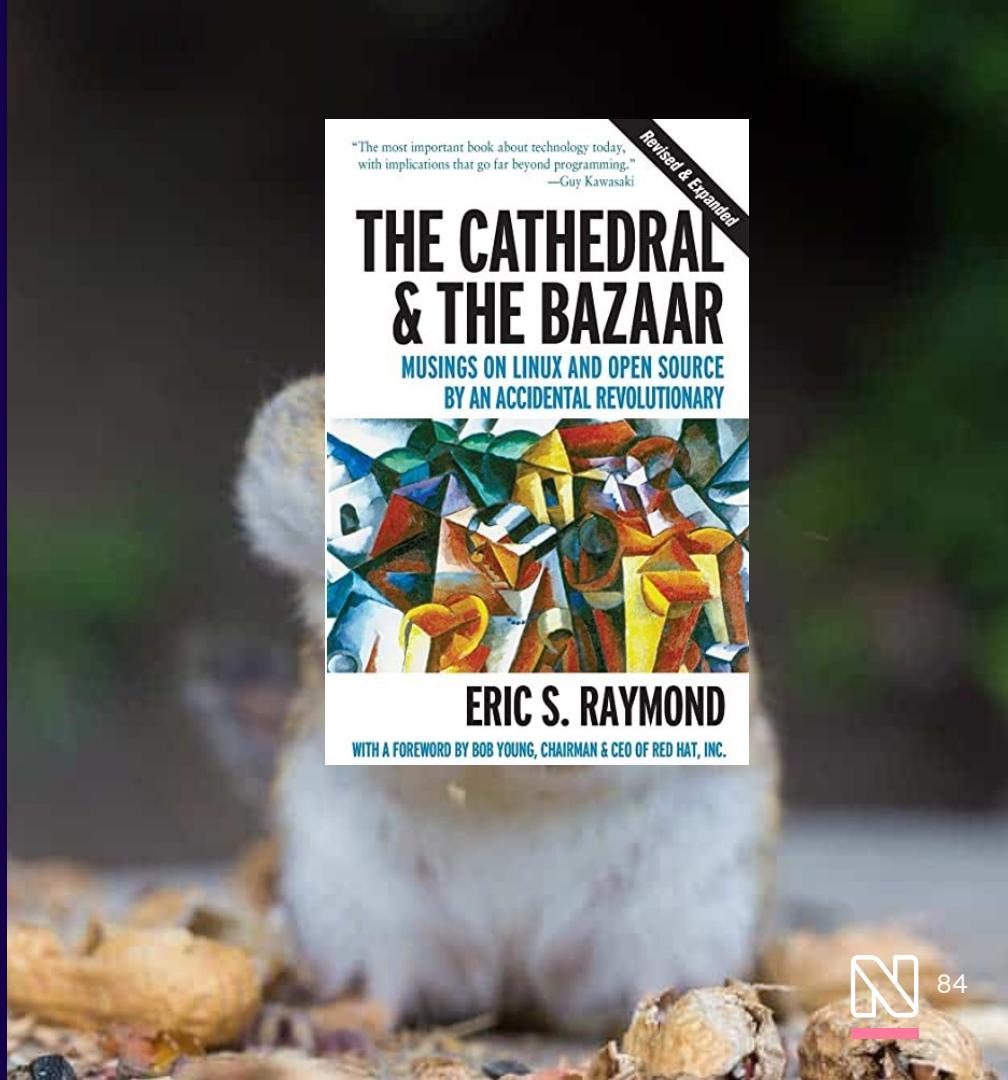
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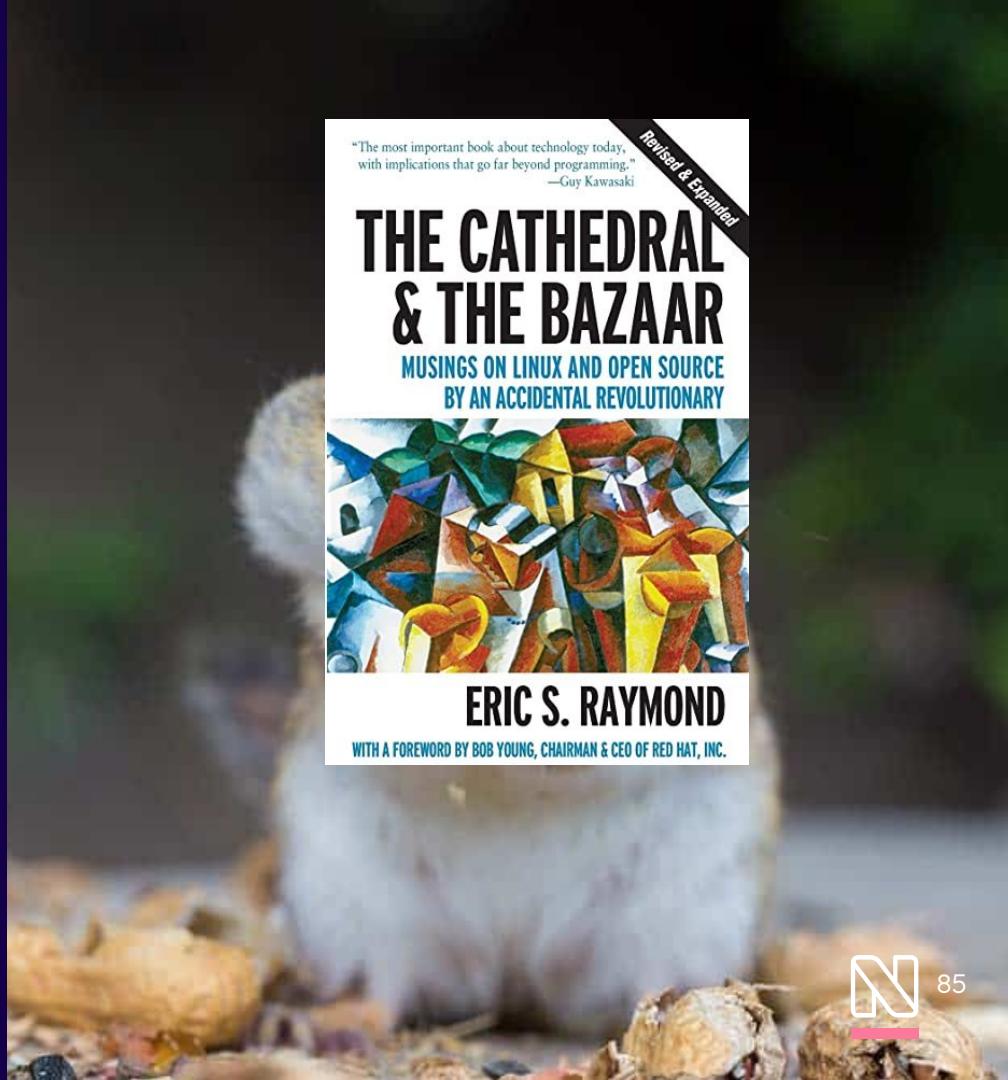
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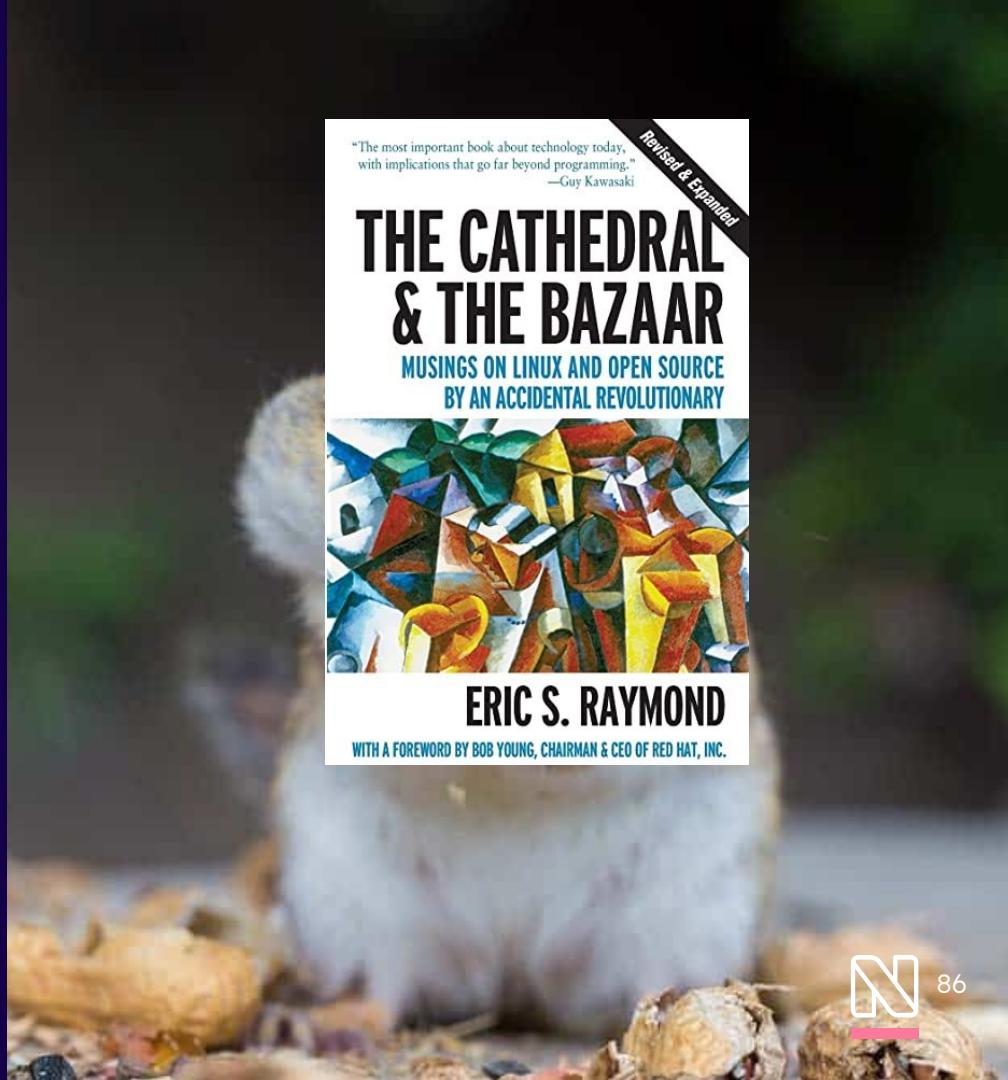
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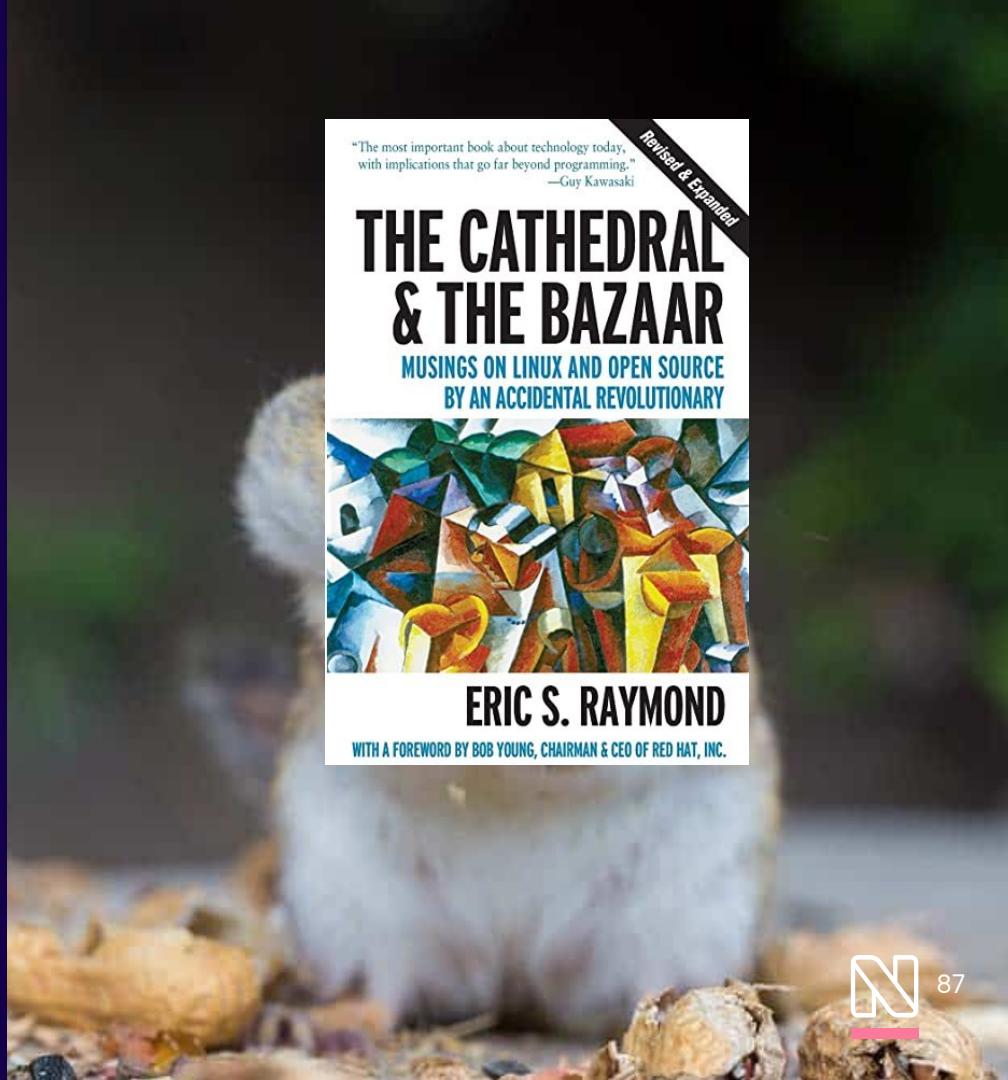
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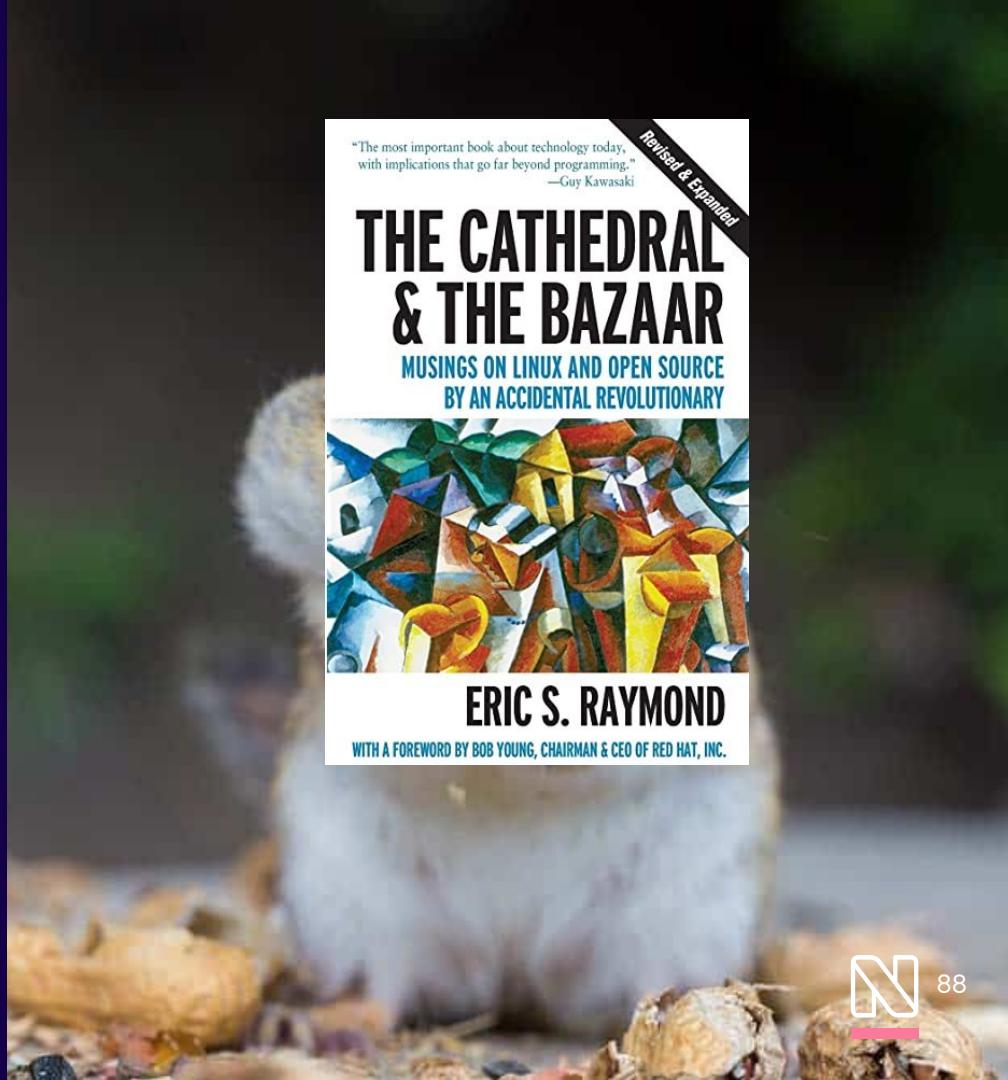
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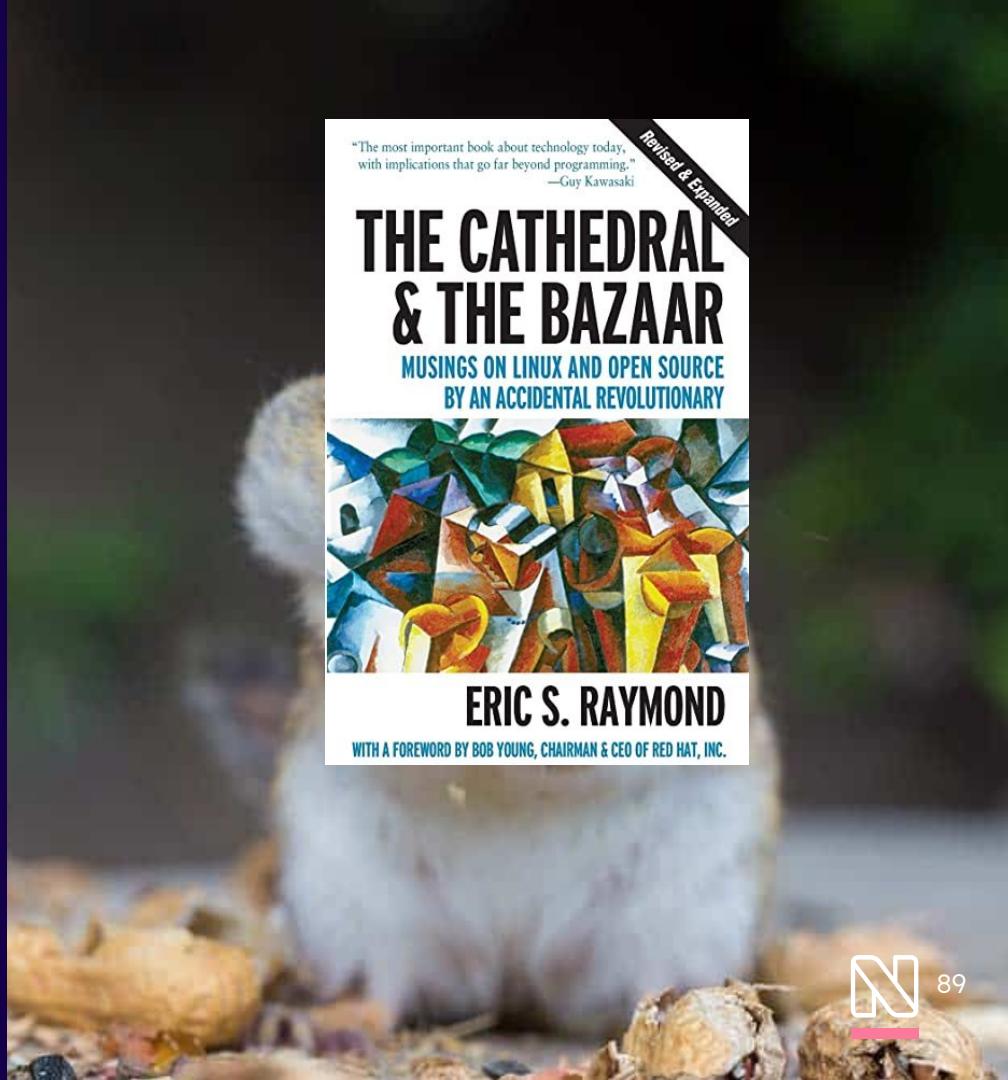
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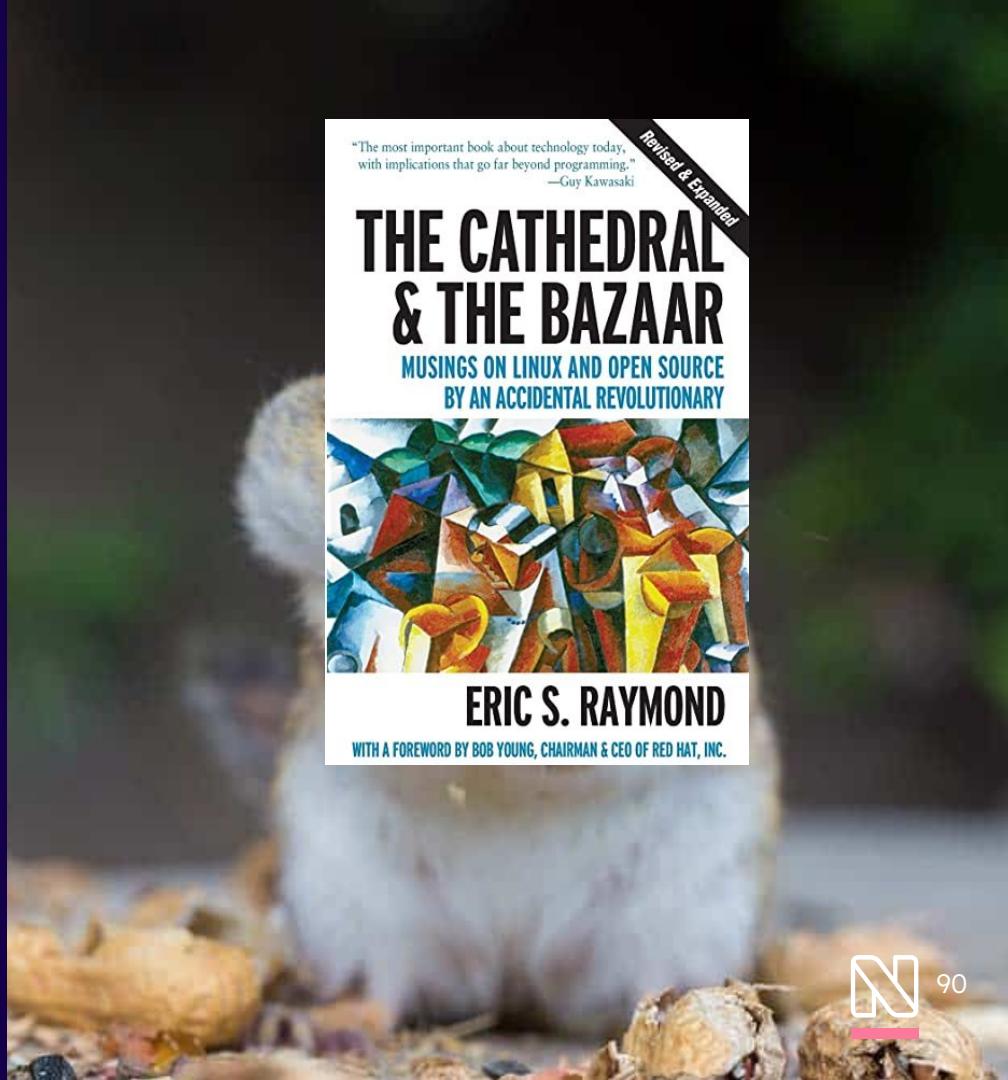
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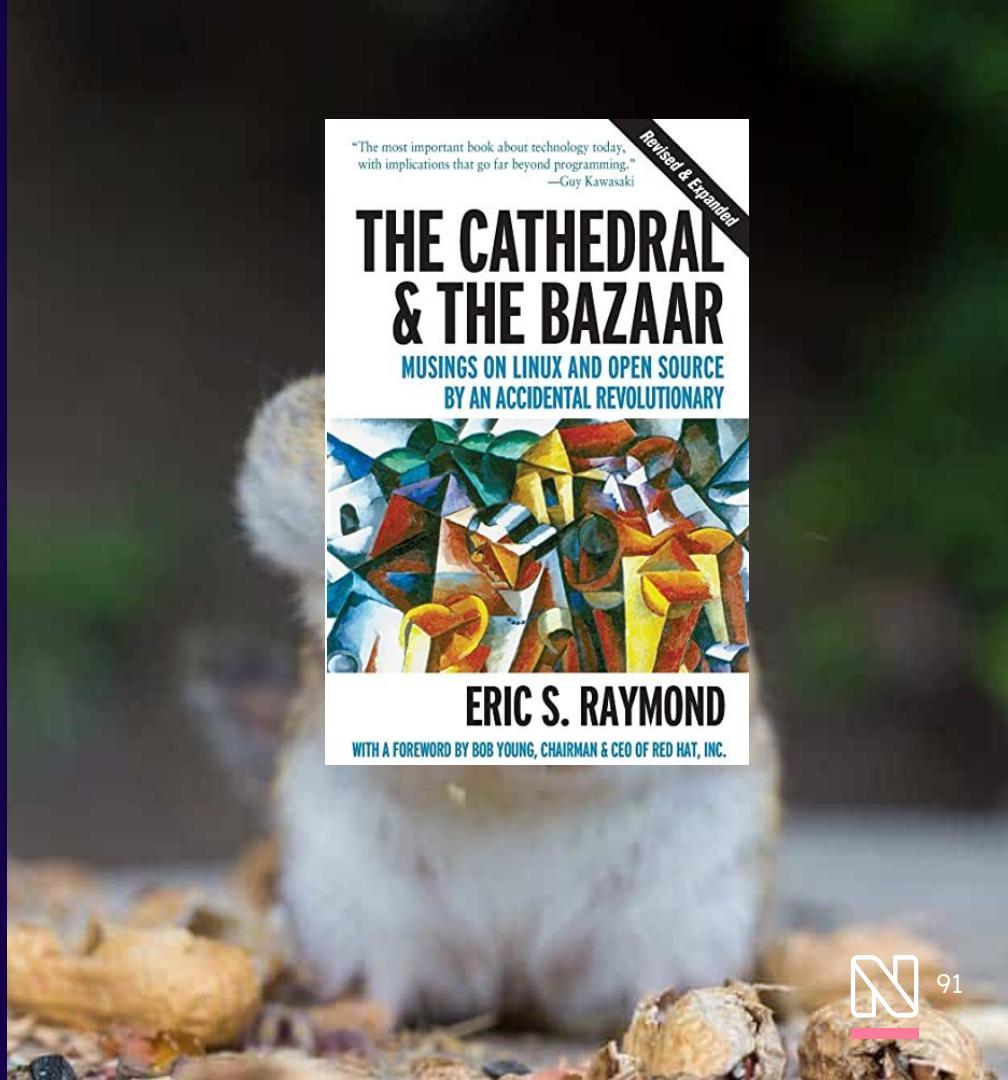
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# The Battle

# Distributed Storage

# CAP Theorem

# Opposing Forces

# Centralized vs Decentralized

# Cloud vs IPFS

**Let someone else do it**  
**vs**  
**Do it myself**



WE'RE BOLD  
WE'RE FLEXIBLE  
WE'RE OPEN  
WE'RE EMPOWERING

Global Delivery Org with 300+ and counting

We are hiring!

**Major Contributors to the  
Open Source Web Platform**

NPM monthly downloads

**1B**

Represents modules used globally

**8%**

# Links

- Google White Paper on CAP Theorem and Google Cloud Spanner
  - Spanner, TrueTime & The CAP Theorem
  - <https://static.googleusercontent.com/media/research.google.com/en/pubs/archive/45855.pdf>
- Elastic IPFS
  - <https://github.com/elastic-ipfs/elastic-ipfs>



Questions?

