Killing pigs and saving Danish bacon

NoSQL Roadshow
That there London

20th November 2013

```
$ whoami

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```
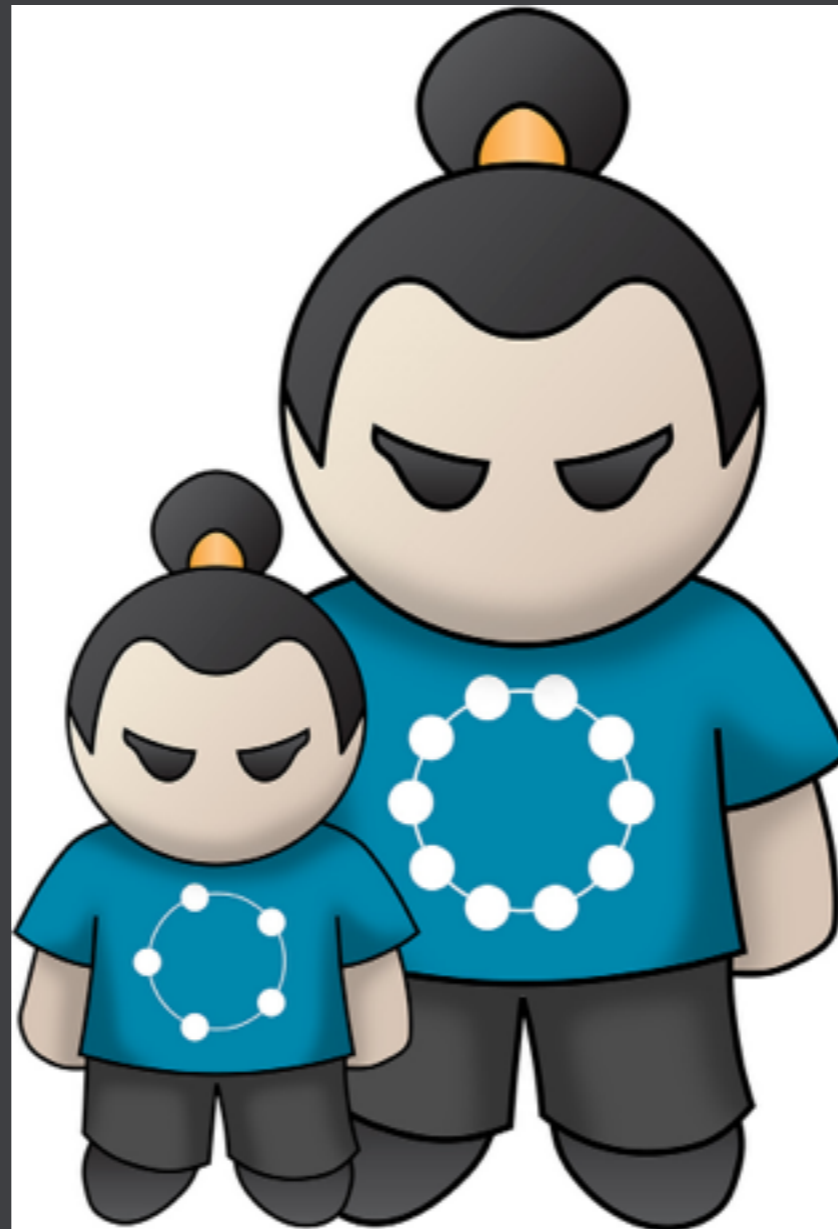
Zeitgeist

- Web scale

- Big data

- Dev ops

Scalability

Data availability

Ops friendliness

Riak is...

Key-value store

Riak is...

Key-value store, with extras!

Riak is...

Distributed key-value store, with extras!

Okay, so Riak is...

- A key-value store, with extras

- Masterless: no single point of failure

- Distributed: within a cluster and between geographic locations

- Easily and massively linearly scalable

- Highly available and fault tolerant

- Redundant: automatically replicates data

- Always available for reads and writes

- Built for the web

Requests in Riak

- 160-bit integer keyspace

- divided into fixed number of evenly-sized partitions

- partitions are claimed by nodes in the cluster

- replicas go to the N partitions following the key

node 0

node 1

node 2

node 3

0

32 partitions $2^{160}/4$

N=3

$2^{160}/2$
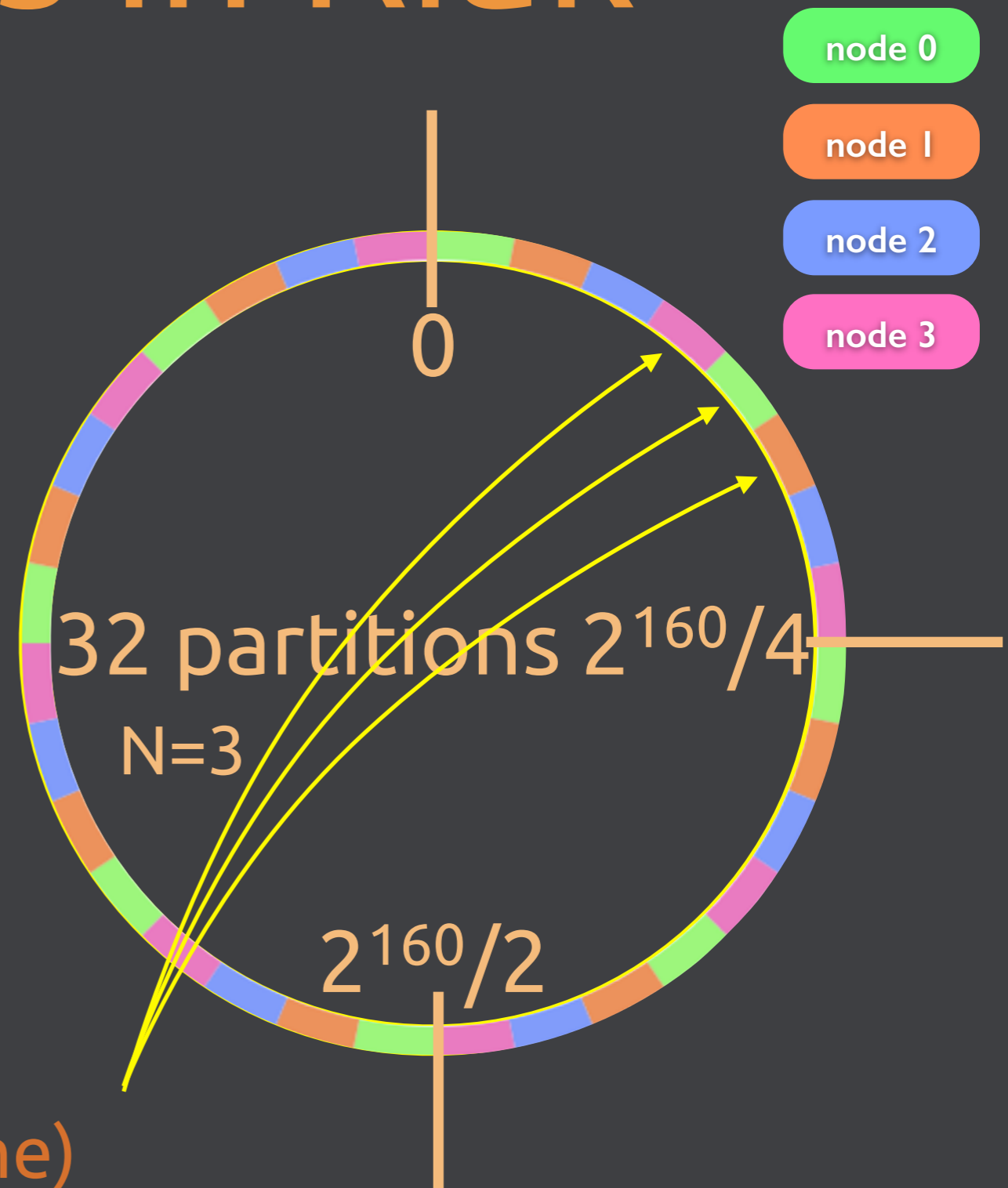
hash(key-name)

Failure scenario

- Node fails

- Requests go to fallback

- Node comes back

- Handoff - data returns to recovered node

- Normal operations resume
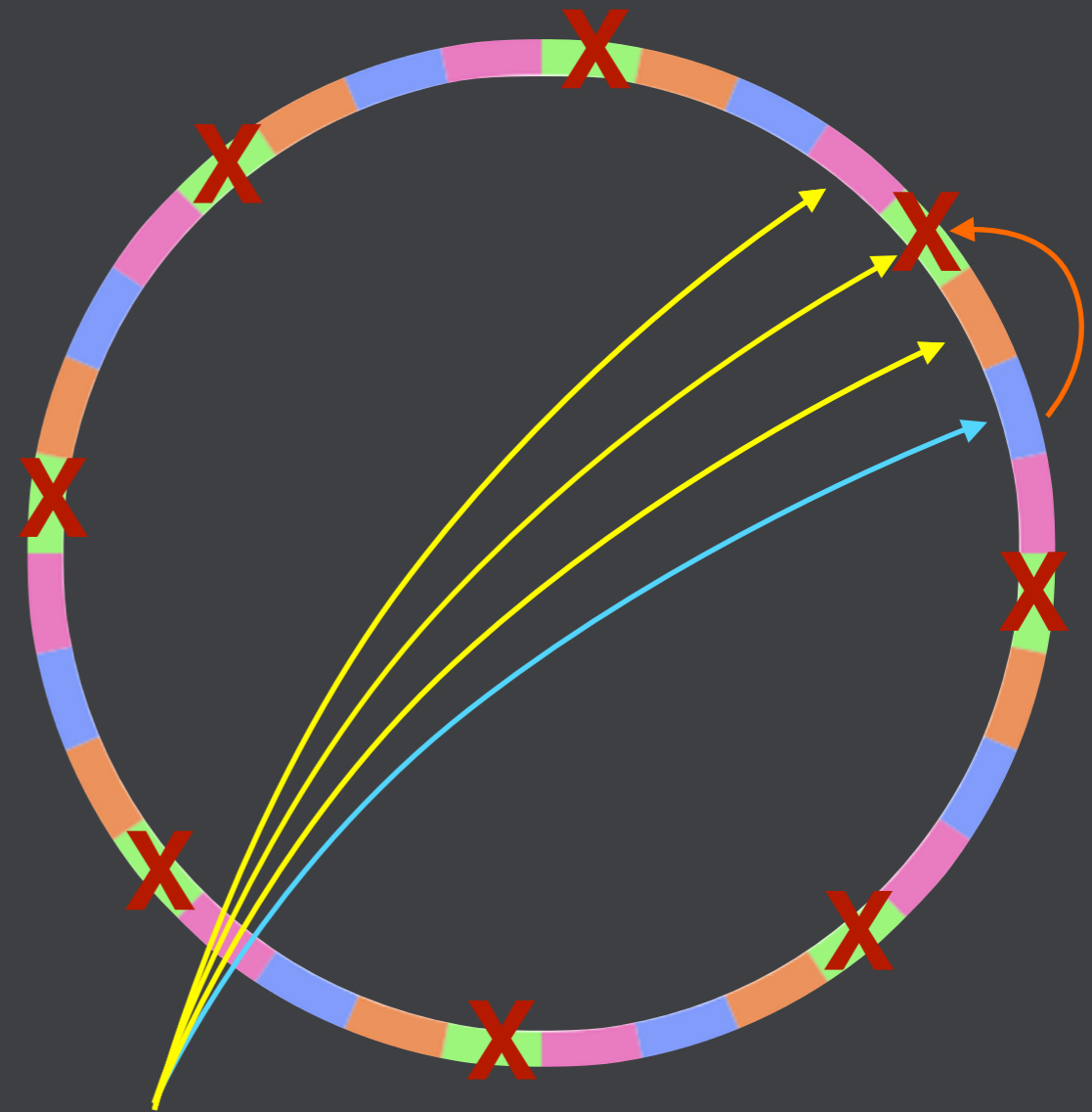
hash(key-name)

Easy scalability

- `riak-admin cluster join riak@192.168.1.1`

- `Success: staged join request for 'riak@192.168.2.5' to 'riak@192.168.2.2'`

Riak the project

- Open source: Apache licensed

- Created by Basho

- Developed by Basho and community developers

- Also available in enterprise and S3-compatible flavours

- Based on the Dynamo paper from Amazon

- Built using Erlang/OTP: designed for fault-tolerance

Temetra

temetra

Fixed Network Concentrator

Low Power Radio AMR

Manual/ Eyeball Reads

Data Logger
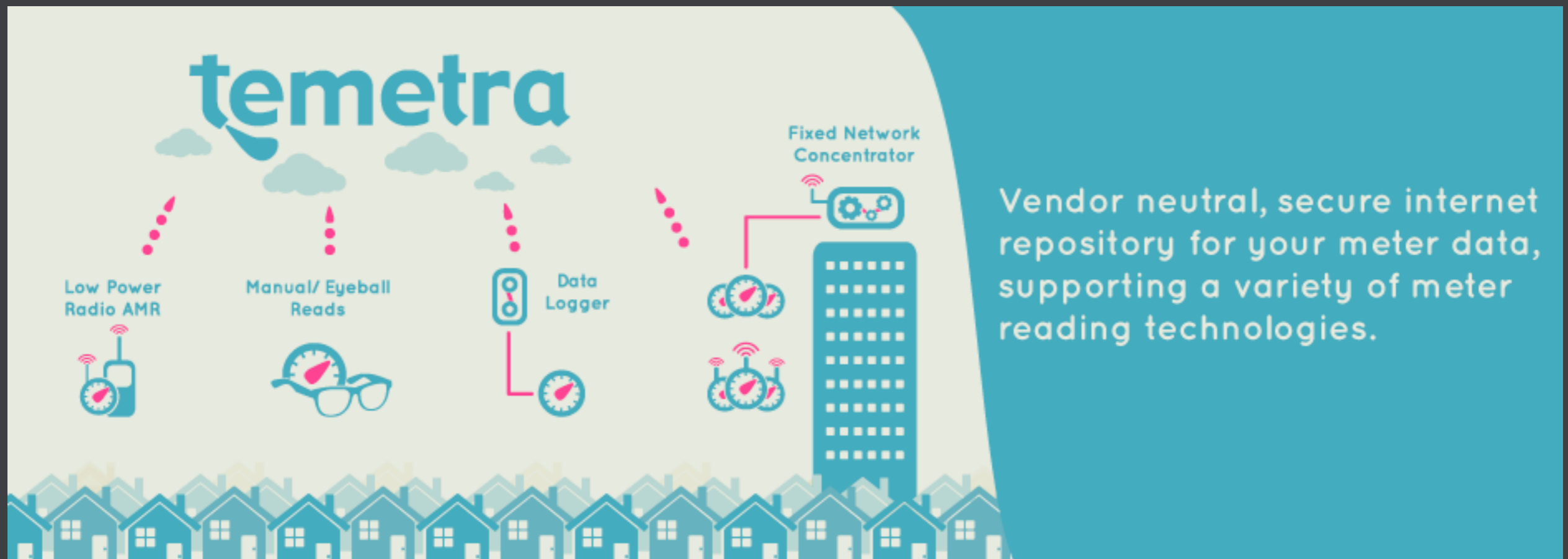
Vendor neutral, secure internet repository for your meter data, supporting a variety of meter reading technologies.

Temetra

- Meter data repository: many types of data

- Audit log

- Software for mobile devices

- Routing plans

- Interfaces to connected meters

- Web interface for office-based utility staff

Temetra

- Millions of meters
- Producing billions of data points
- Meters in 2000: four data points a year
- Meters in 2013: up to 35,000 data points a year
- Enormously high data ingress
- Relatively few reads

Temetra

- MUST NOT LOSE DATA
  - Revenue-generating data
  - Audit logs are serious business too
- Must not lose access to data
- Need to scale to expand

Temetra

Riak gave Temetra

- No slow downs with huge amounts of data

- No data loss

- Easy and affordable scalability

- Data availability even when things go wrong

- Operational simplicity

Rovio

- Makers of Angry Birds and many more games

- Consumers worldwide have downloaded 1.7B Rovio games
  (http://www.factbrowser.com/facts/10813/)

- As of December 2012, Rovio had 263M active monthly users across all platforms
  (http://www.factbrowser.com/facts/10814/)

Rovio and Riak

- Rovio have three Riak clusters:
  - Yellowbird
  - Redbird
  - Fatbird

Yellowbird (1)

- Account ID Storage Service

- Authenticates user with Rovio's digital services

- Communicates with Wallet

- Wallet, service for in-game micro transactions

- Designed to simplify the user experience for gamers across all of Rovio's games

Yellowbird (2)

- Why Riak?

  - User authentication is a k/v query

  - Needed a scalable solution to support the next-generation of their gaming platform

  - As they enable their customer base to use the new service, they can scale out their cluster easily

  - In production now!

Redbird (1)

- Account Push Notification Service

- Co-ordinates sending Apple/iOS push notifications

- Used to batch notifications:

  - based on timezone

  - based on game type

Redbird (2)

- Why Riak?

  - Secondary Index (2i) Range Queries for batch jobs

  - Very large dataset, each account has multiple records (one for each game type)

  - Handles large batches of k/v requests, sent to mobile services push systems

Fatbird (1)

- Game Storage Service
- Each account has many game sessions saved
- Allows users to transfer game sessions across devices (iOS, android, web-based)

Fatbird (2)

- Why Riak?

    - Game session requests are k/v queries

    - High availability, use Riak Enterprise for Disaster Recovery

    - Planning to expand the platform across multiple data centers

- In production now!

Danish Health Authority

- Common Medical Card program
  - Stores prescription information for all
  - Common view on patient data anywhere
- 70 prescriptions per citizen per year
- ~400 million critical transactions per year
- 100% availability of data without exception
- Far more cost-effective than MySQL from Oracle

UK National Health Service

- Spine project

- Non-clinical patient data:

  - NHS number: most people don't know it

- Every prescription issued by medical staff

- Keep a record of everyone current medicine and adverse reactions

- 80 million patients in England

UK National Health Service

- 20,000 integrated end points

- 500 complex messages per second

- Zero data loss requirement

- 99.9% availability requirement

UK National Health Service

- 2002 a £1 billion project

- Built by large consultancy

- 15,000 people years spent on meetings, project management, etc.

- £1 million per month on hardware update costs

- Business no-data-loss guarantee: useless

UK National Health Service

- Contract up for renewal in 2013

- Agile in-house team

- Evaluated Riak

- Built the Spine 2 project in-house on Riak

- Commodity hardware

- Technical zero data-loss guarantee

- Moral imperative: more money to save lives

Free stuff and talk to me

- mrevell@basho.com

- Tech talk: bit.ly/RiakTechTalk