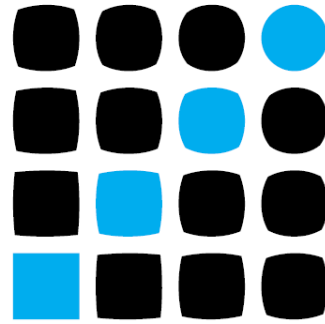




norberto@mongodb.com

@nleite



adaptTo()

APACHE SLING & FRIENDS TECH MEETUP
BERLIN, 28-30 SEPTEMBER 2015

Effectively Scale and Operate AEM with MongoDB

Norberto Leite

Agenda

MongoDB Introduction

MongoMK

Sizing

Deployment

Operational Best Practices

Ola!

Norberto Leite
Technical Evangelist

Madrid, Spain

<http://www.mongodb.com/norberto>

@nleite

norberto@mongodb.com

Anyone here owns a VW?

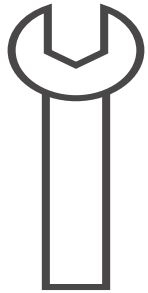




mongoDB introduction

MongoDB

GENERAL PURPOSE



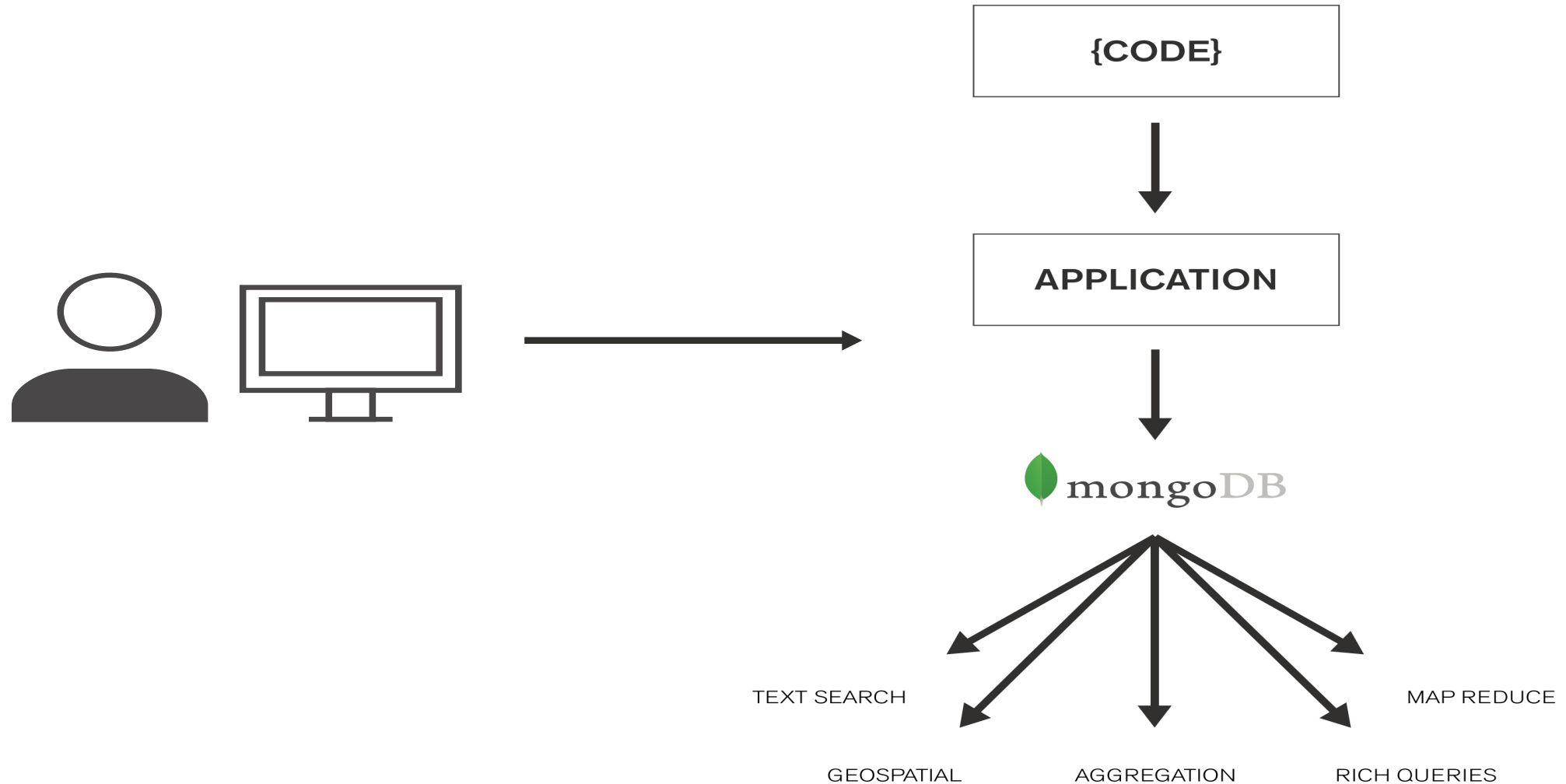
DOCUMENT DATABASE



OPEN-SOURCE



MongoDB is Fully Featured



Query Operators

Conditional Operators

\$all, \$exists, \$mod, \$ne, \$in, \$nin, \$nor, \$or, \$size, \$type
\$lt, \$lte, \$gt, \$gte

```
// find customers with any claims
```

```
> db.customers.find( {claims: {$exists: true }} )
```

```
// find customers matching a regular expression
```

```
> db.customers.find( {last: /^rog*/i } )
```

```
// count customers by city
```

```
> db.customers.find( {city: 'Philadelphia'} ).count()
```

Indexes

// Index nested documents

```
> db.customers.ensureIndex( "policies.agent":1 )  
> db.customers.find( { 'policies.agent': 'Fred' } )
```

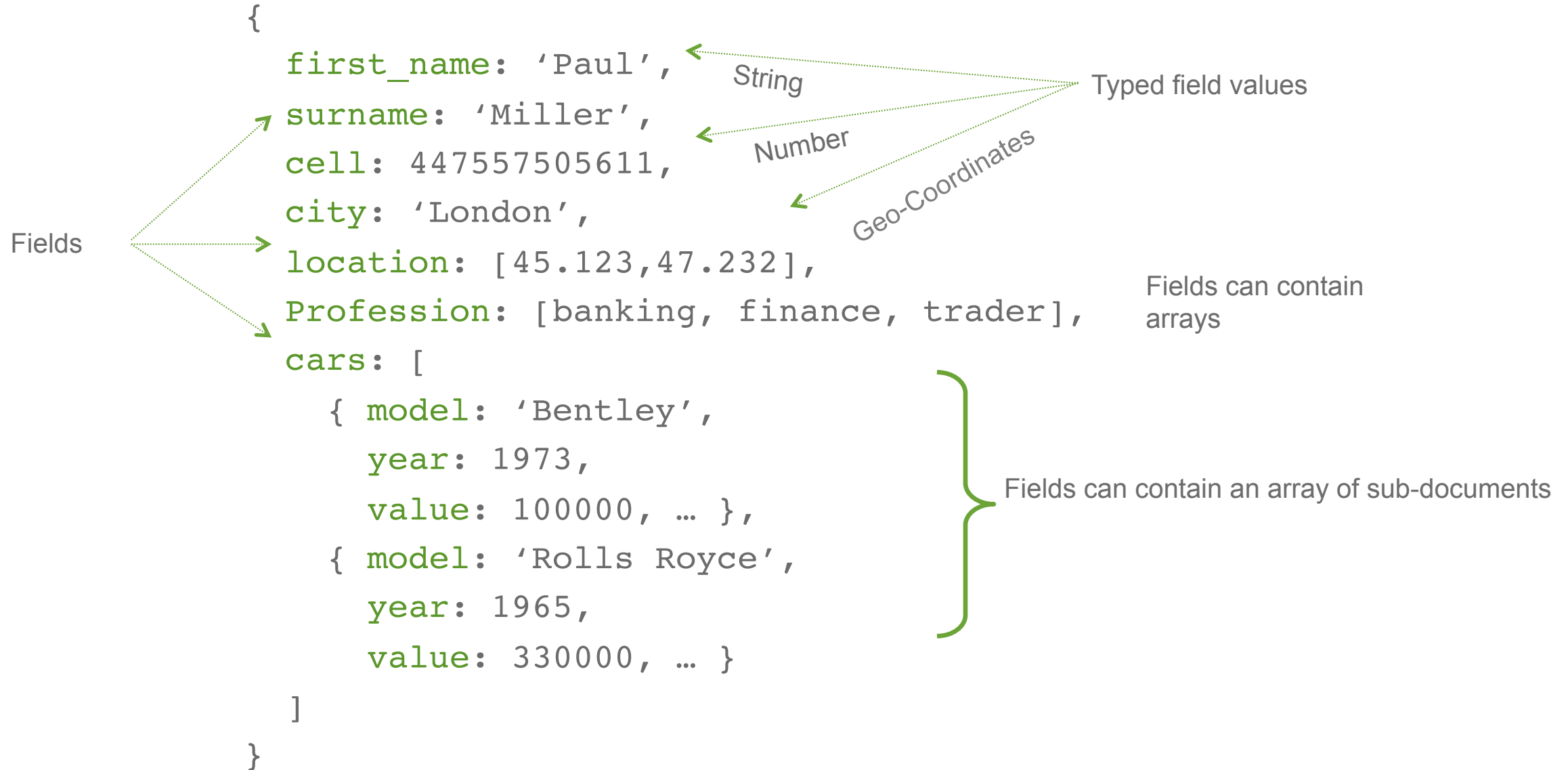
// geospatial index

```
> db.customers.ensureIndex( "property.location": "2d" )  
> db.customers.find( "property.location" : { $near : [22,42] } )
```

// text index

```
> db.customers.ensureIndex( "policies.notes": "text" )
```

Documents are Rich Data Structures





Over
10,000,000
downloads



300,000 Students
for MongoDB
University



35,000
attendees to
MongoDB events
annually



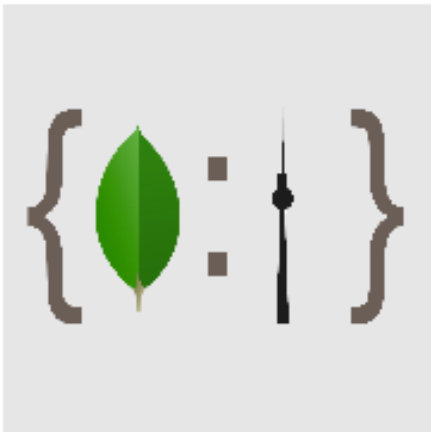
Over **1,000**
Partners



Over **2,000**
Paying Customers

We are local!

MongoDB User Group Berlin (@MUGBerlin)

[Home](#)[Members](#)[Photos](#)[Discussions](#)[More ●](#)[My profile](#)

Berlin, Germany

Founded Apr 5, 2012

Welcome!

+ SUGGEST A NEW MEETUP

[Upcoming](#)[Past](#)[Calendar](#)

What's next?

[Contact the Organizer](#)

What's new



<http://www.meetup.com/mugberlin/>

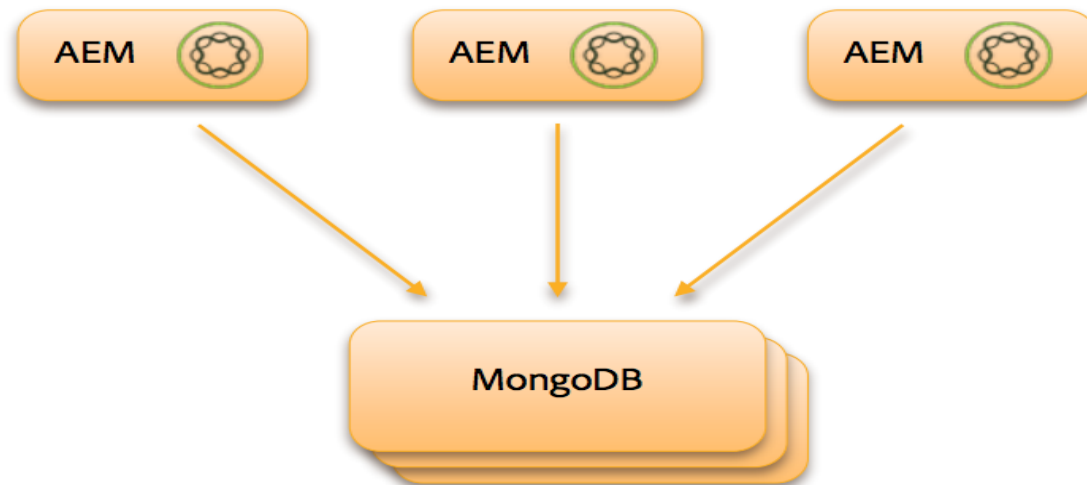


An aerial, black and white photograph of a wide river meandering through a vast, dense forest. The river forms a large, irregular loop in the center of the frame. The forest is thick and covers the entire landscape except for the river. The sky is filled with scattered clouds, and the horizon is visible in the distance.

MongoMK

MongoDB MicroKernel

- AEM 6 Scalable Storage Solution
- Flexible
- Multi-Datacenter Deployments
- Geo Distributed Content
- Auto-Failover



MongoMK

aem-author

Metadata collection

Content node structure
Internal AEM indexes
Multi version structures

Nodes

Blobs

Settings, Changes, ClusterNodes
Internal AEM collections
Configuration and settings data

Blobs collection

Binary file chunks
Enforces data de-duplication

Changes

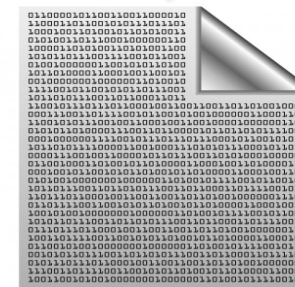
MongoMK - Content



Metadata

```
{
  _id : "/home/john",
  name : "john",
  email : "john@example.com"
}
```

Binary / Blobs



MongoMK – Metadata

Metadata

```
{  
  _id : "/home/john",  
  name : "john",  
  email : "john@example.com"  
}
```

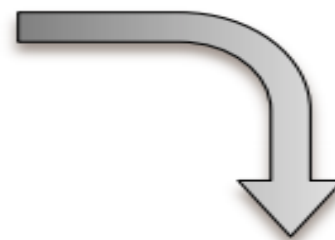


Binary / Blobs



MongoMK – Data Model

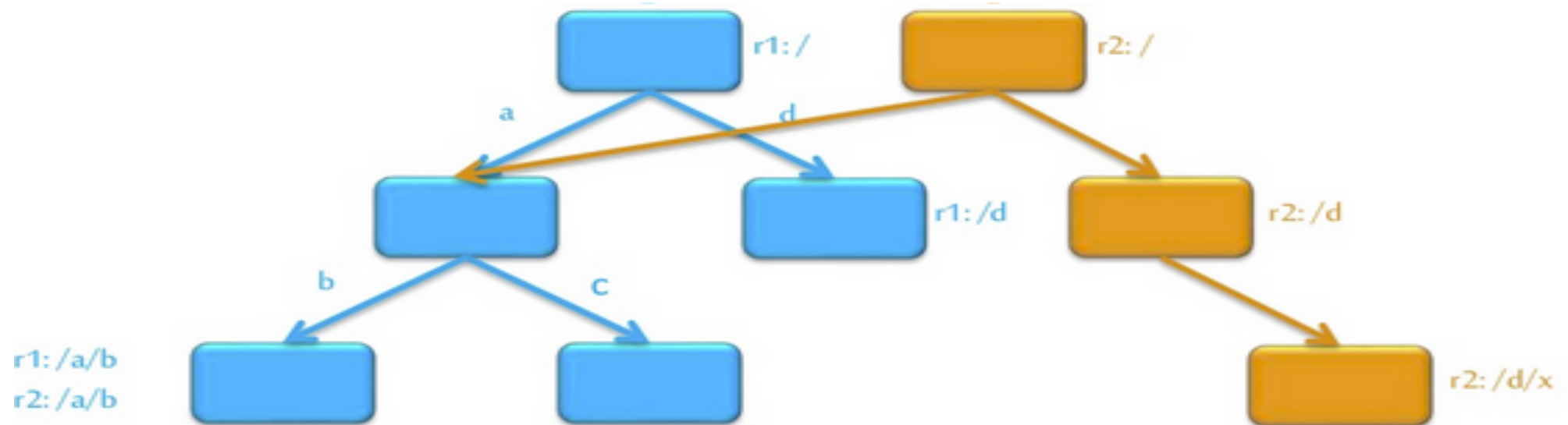
```
{  
  _id : "/home/john",  
  name : "john",  
  email : "john@example.com"  
}
```



```
{  
  _id : "2:/home/john",  
  name : { "r14979e4b424-0-1" : "john" },  
  email : { "r14979e4b424-0-1" : "john@example.com" },  
  _deleted : { "r14979e4b424-0-1" : "false" },  
  _revisions : { "r14979e4b424-0-1" : "c" }  
}
```

MongoMK – Version Control

Revisions of content are maintained as separate trees



MongoMK – Data Model

```
{  
  _id : "2:/home/john",  
  name : { "r14979e4b424-0-1" : "john" },  
  email : { "r14979e4b424-0-1" : "john@example.com" },  
  _deleted : { "r14979e4b424-0-1" : "false" },  
  _revisions : { "r14979e4b424-0-1" : "c" }  
}
```

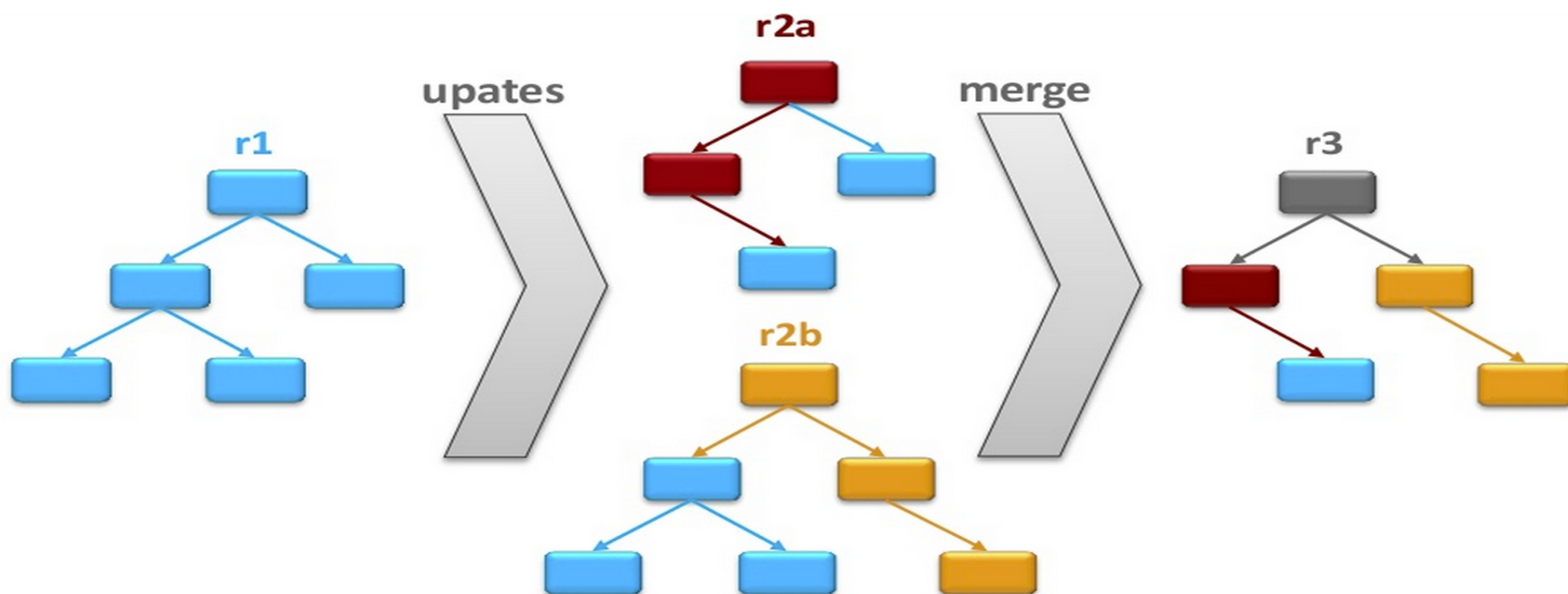
Timestamp

Counter

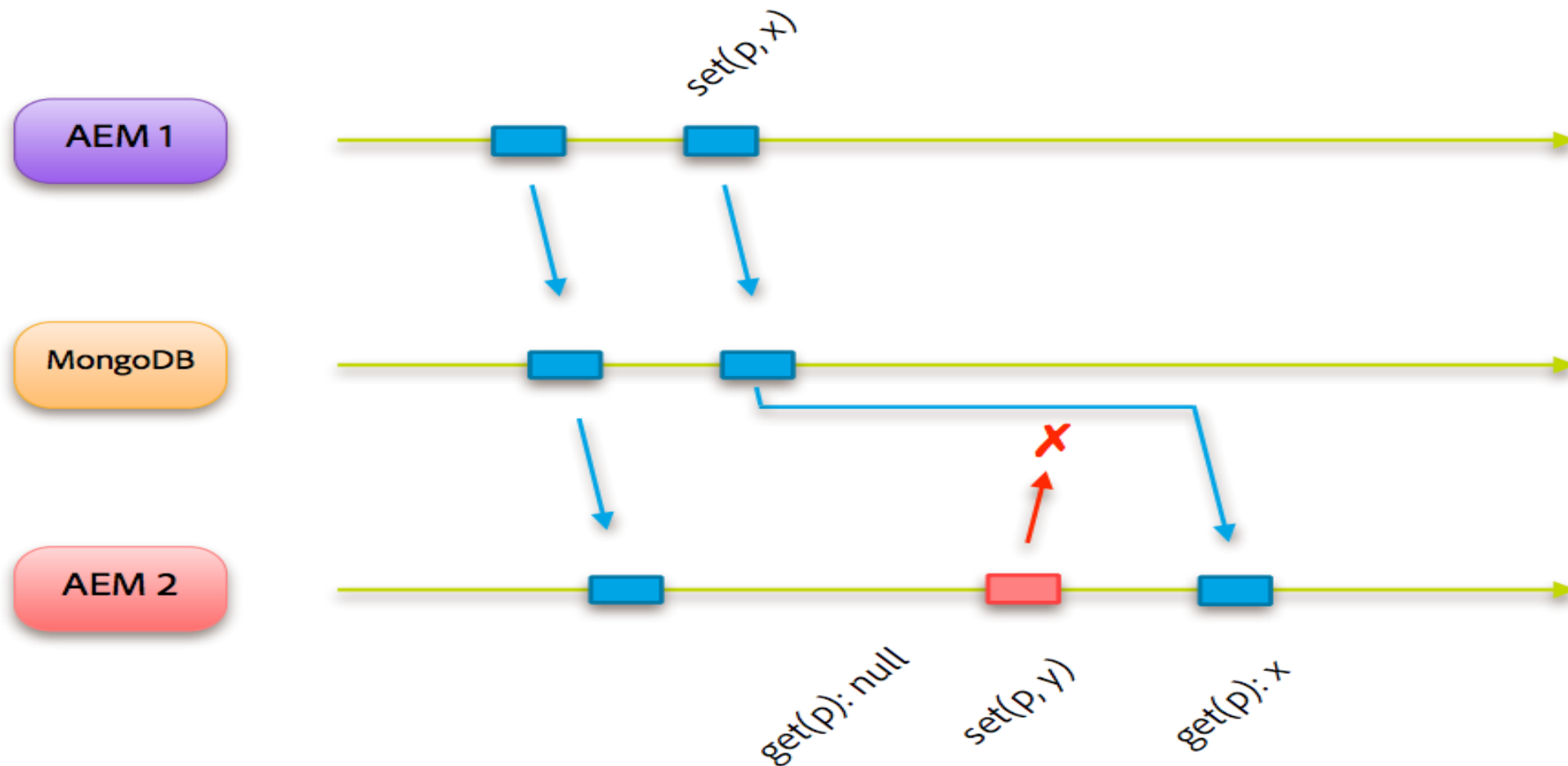
Cluster ID

MongoMK – Versioning & Concurrency

System provides version and concurrency control of content revisions.



MongoMK – Versioning & Concurrency



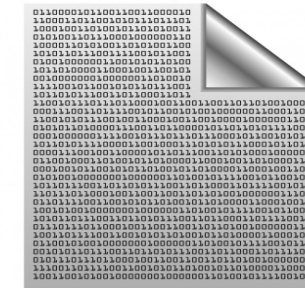
MongoMK – Binary Data

Metadata

```
{
  _id : "/home/john",
  name : "john",
  email : "john@example.com"
}
```



Binary / Blobs



AEM Blob Storage

TAR



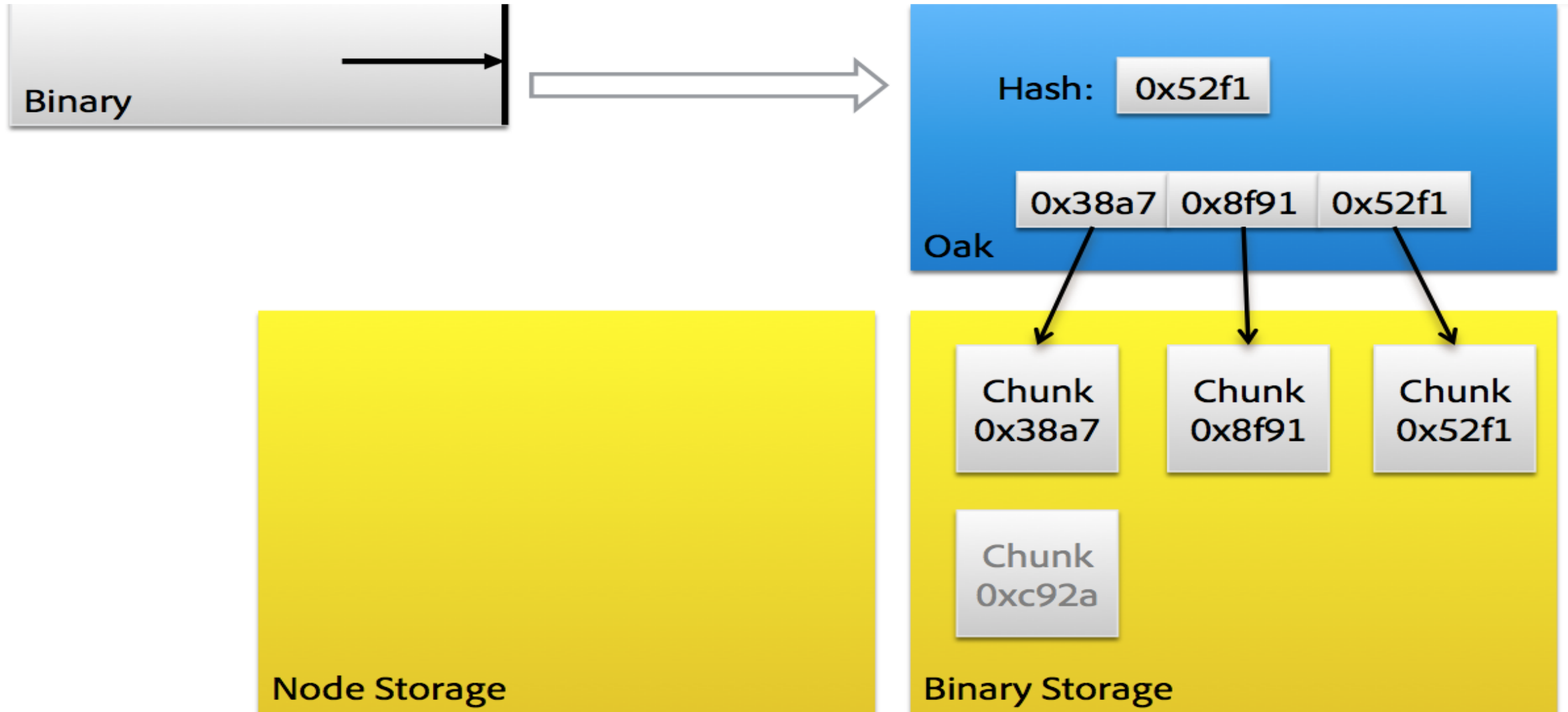
MONGODB



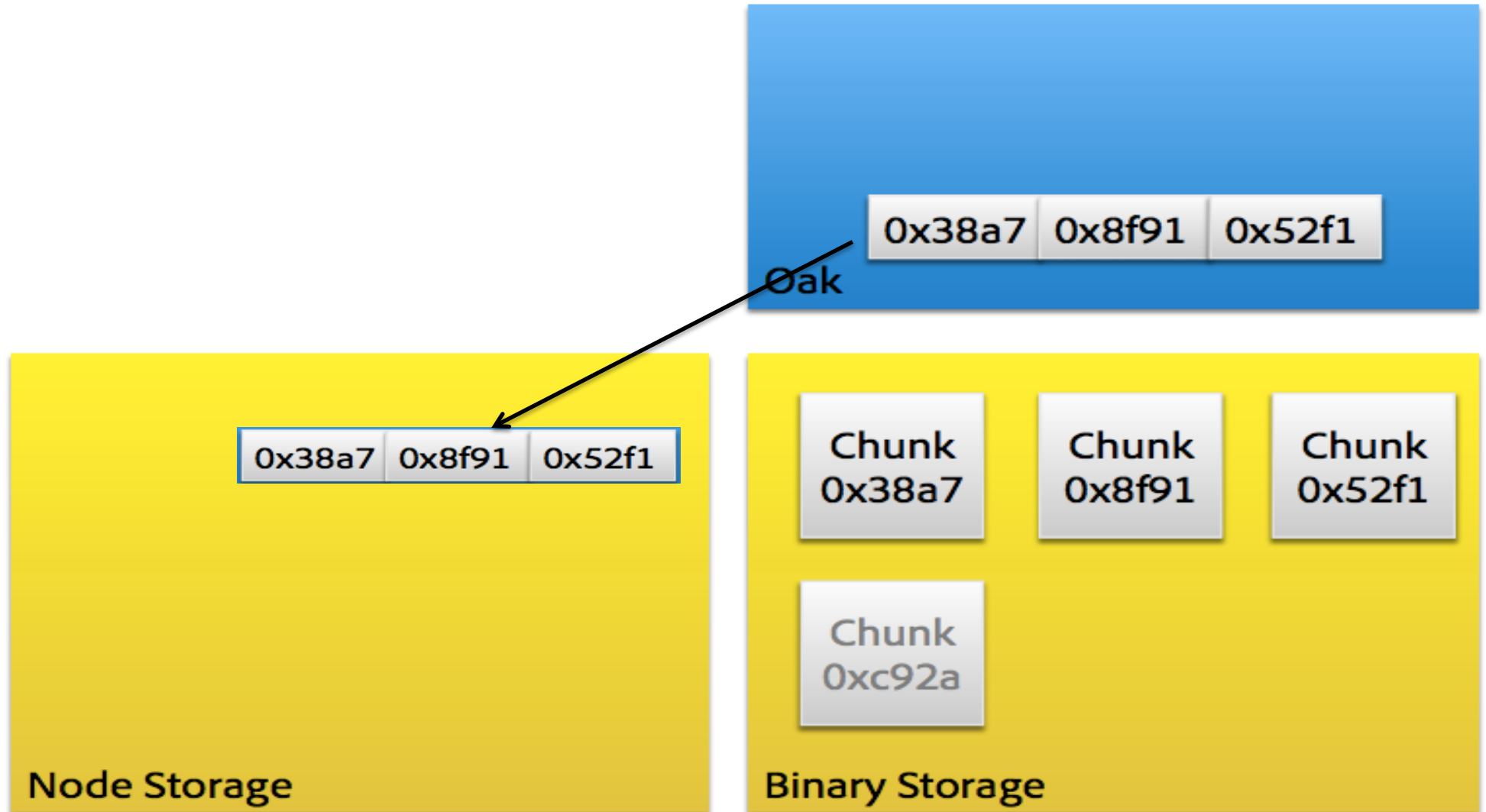
S3



MongoMK - Blobs



MongoMK - Blobs



Blobs on MongoMK

Positive	Penalty
Unified Storage Layer	More Storage Requirements
Reduced Operational Overhead	More I/O Intensive
Binary De-duplication	Higher Bandwidth Requirements



Sizing

MONGODB SIZING

Availability



Volume



Expected Latency



Working Data Set

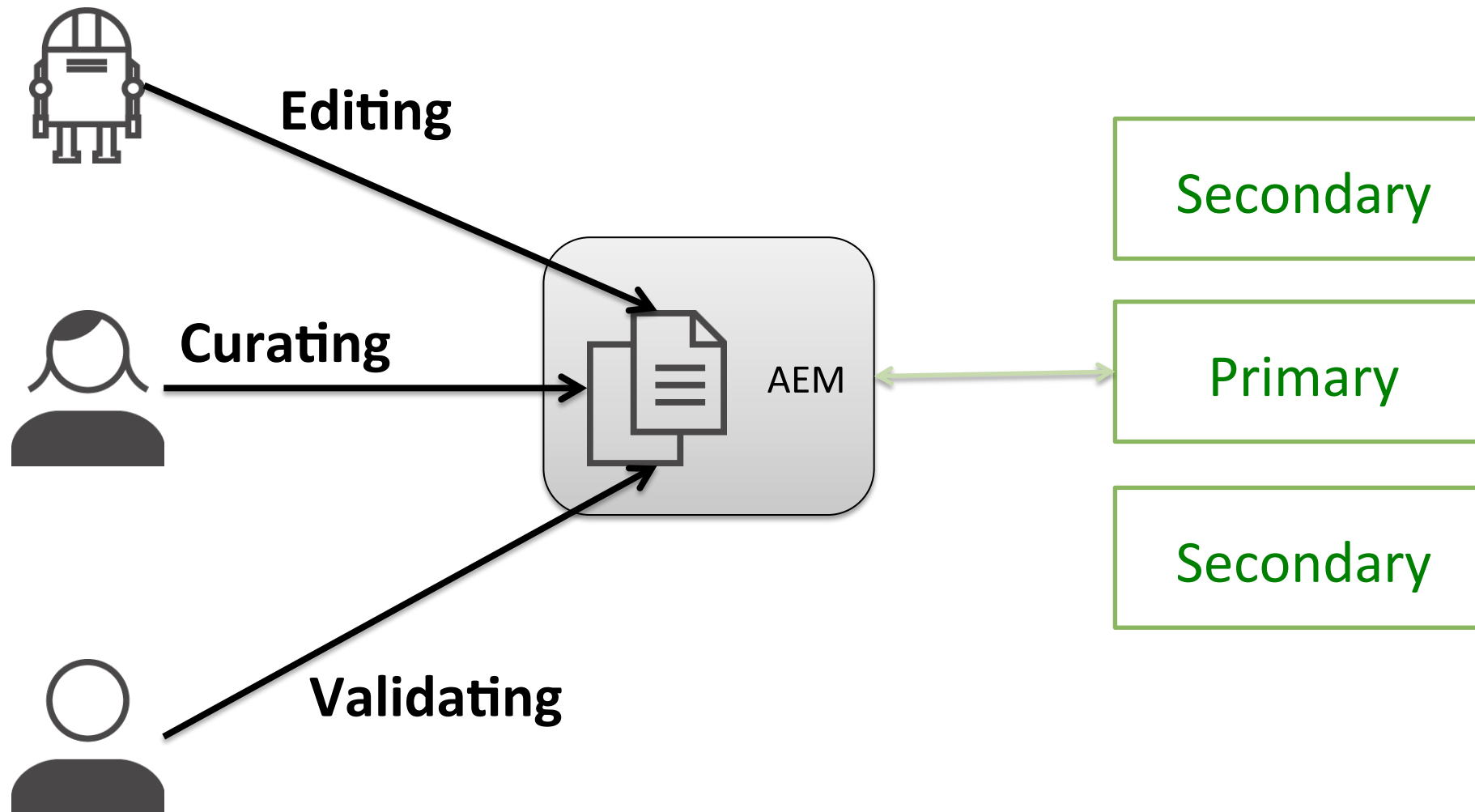


Availability

<http://i.ytimg.com/vi/urAmQRc6los/maxresdefault.jpg>

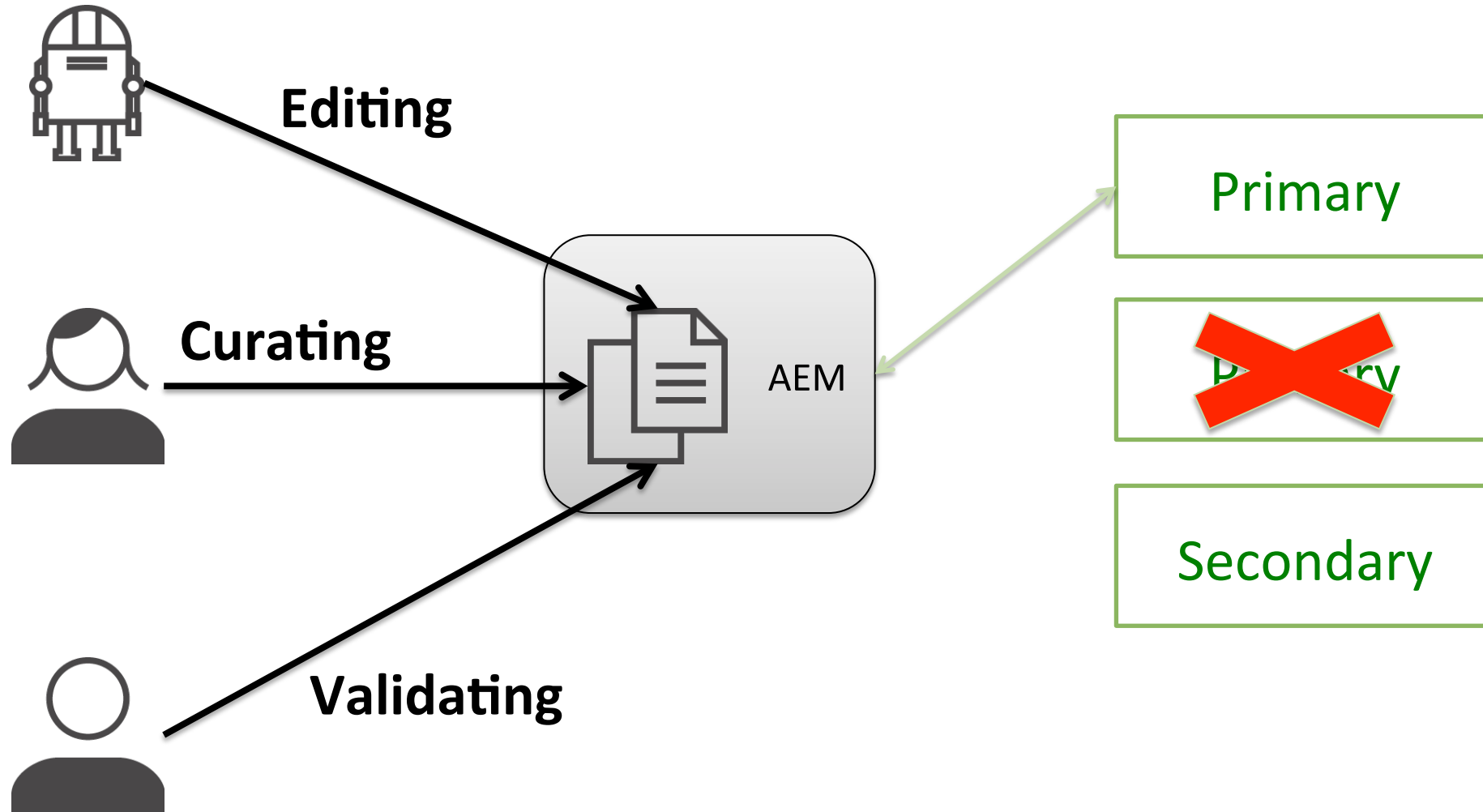


Sizing - Availability



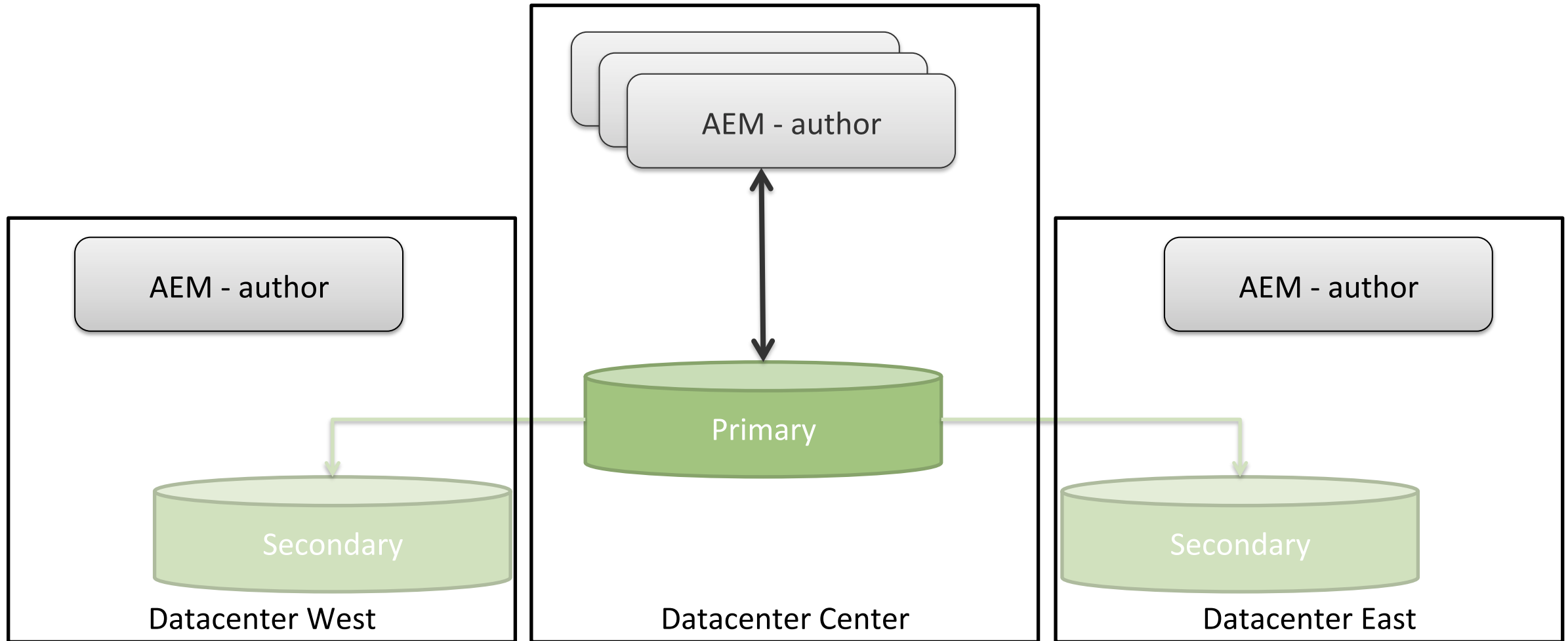


Sizing - Availability



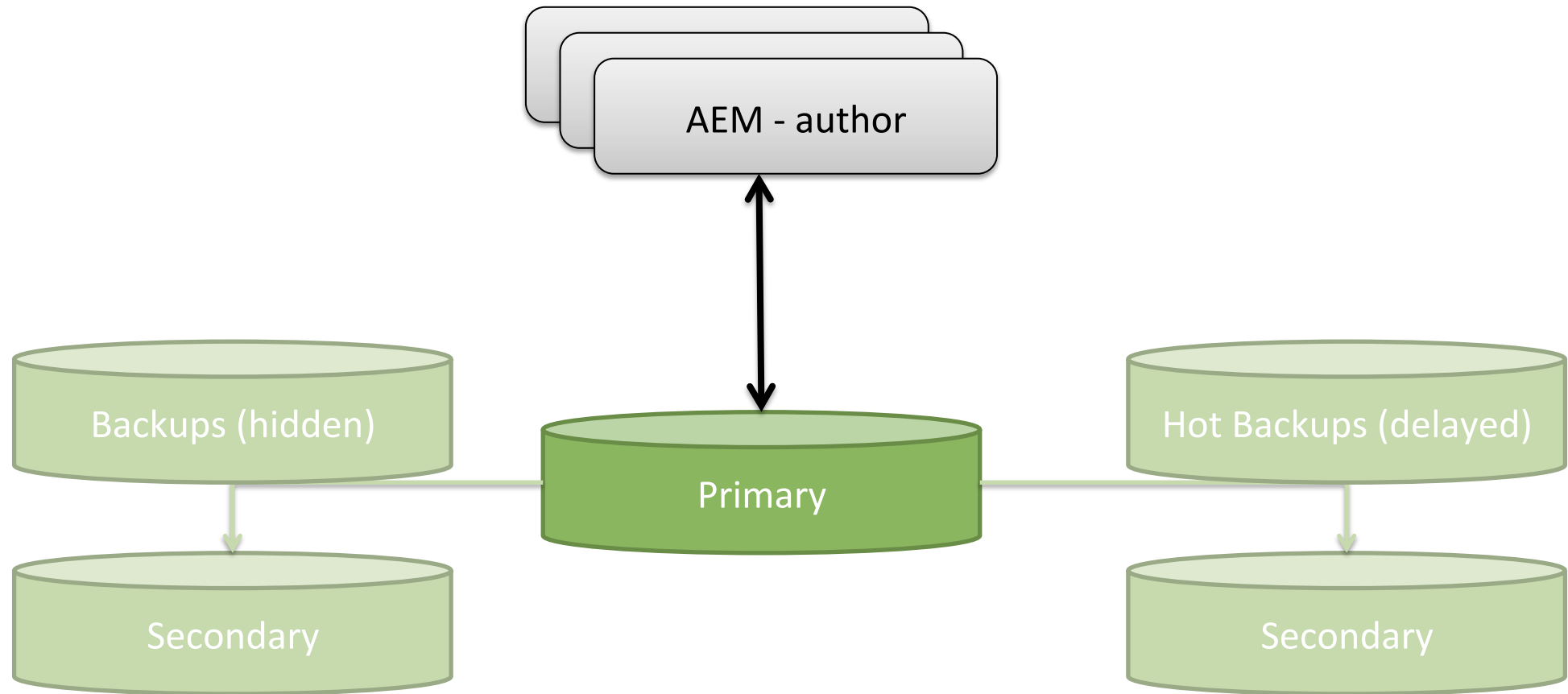


Sizing - Availability





Sizing - Availability



Volume

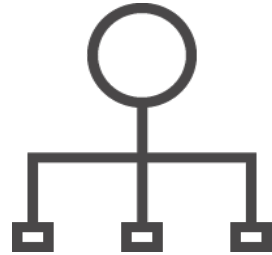
A black and white photograph of a large, sculptural iceberg floating in a dark sea. The iceberg features a prominent natural ice arch in the center. The sky is filled with dramatic, layered clouds. The word "Volume" is overlaid in white text on the left side of the image.

http://cdn.papermag.com/uploaded_images/salgado_genesis.jpg



Sizing - Volume

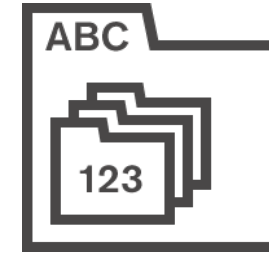
Nodes



Indexes



Properties



Multi Version

Blobs



Full Text Search
Indexes



Binary Chunks



Sizing - Volume

- Space required by
 - Data
 - Indexes
- Read / Write Ratio
- Computational Unit Capacity
 - RAM
 - Disk
 - Types of Disks!
 - CPU



Working Set

<http://barrydequanne.com/wp-content/uploads/2014/09/Sebasti%C3%A3o-Salgado-3.jpg>



Sizing – Working Set



Rest of your Database

Working Set



Sizing – Working Set

- Percentage of data that is constantly request by the application
 - Indexes
 - Recent Used Data
- Read / Write
 - Impacts the calculation of the RAM requirement
- Working Set Should Fit In RAM



Working Set Not in RAM





Sizing – Working Set

- AEM Calculation of Working Set
 - Internal MongoDB Indexes
 - Constantly accessed Assets
 - % of data access
 - AEM Indexes
 - Multi-version Indexes
 - Lucene Indexes

MongoDB 3.0

- Document Level Locking
- Compression
- Tunable Memory Cache
- Index Prefix
Compression

**Adobe Recommended
Engine for AEM 6.1!!!**

The logo consists of the letters 'WT' in a bold, sans-serif font. The 'W' is black and the 'T' is orange. They are positioned inside a white circle.

WT

The background of the bottom section is a close-up, high-contrast image of a tiger's face, showing its stripes and fur in shades of orange, black, and white.

making big data roar
now part of MongoDB

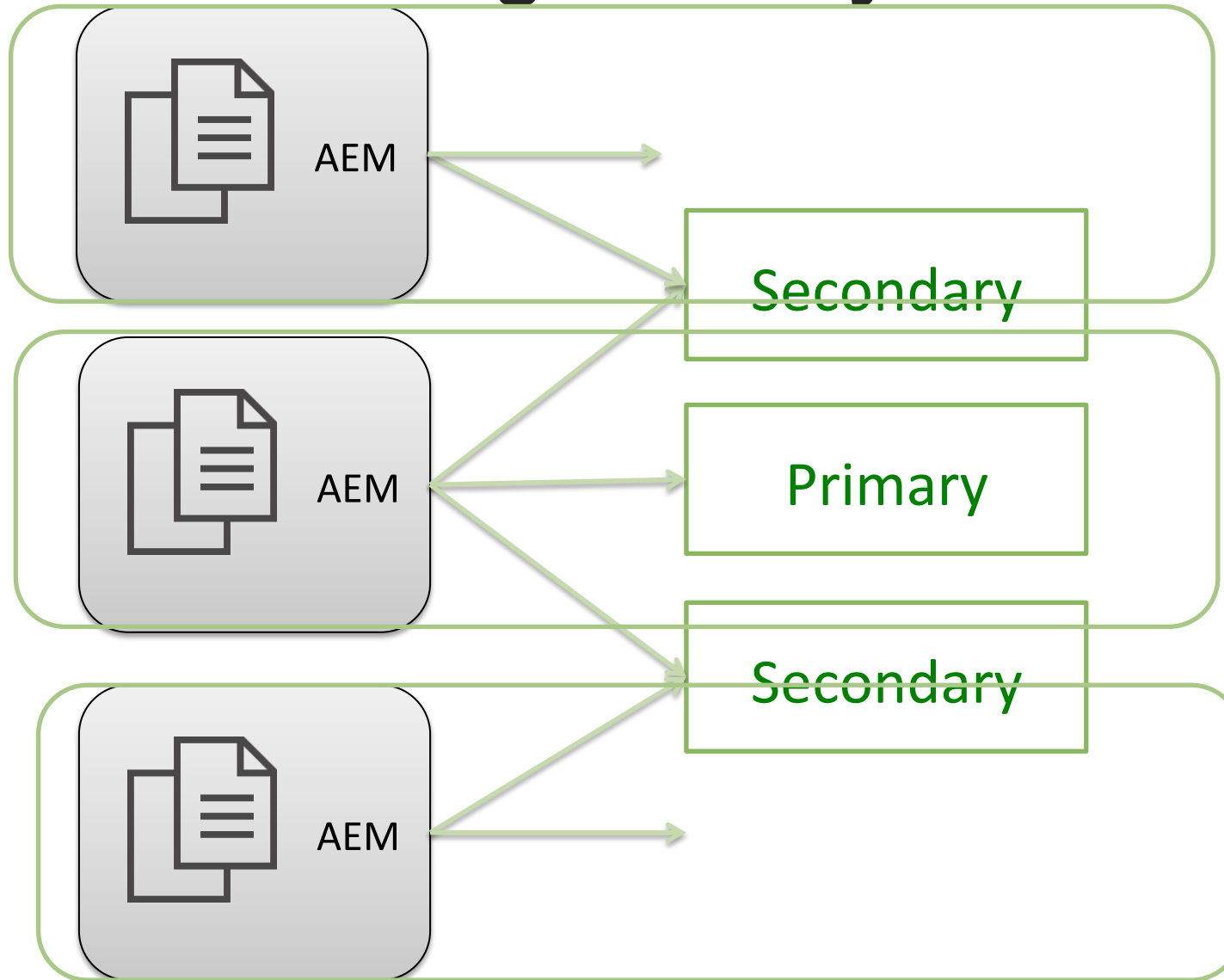
Working Set Can Be Distributed Across Shards

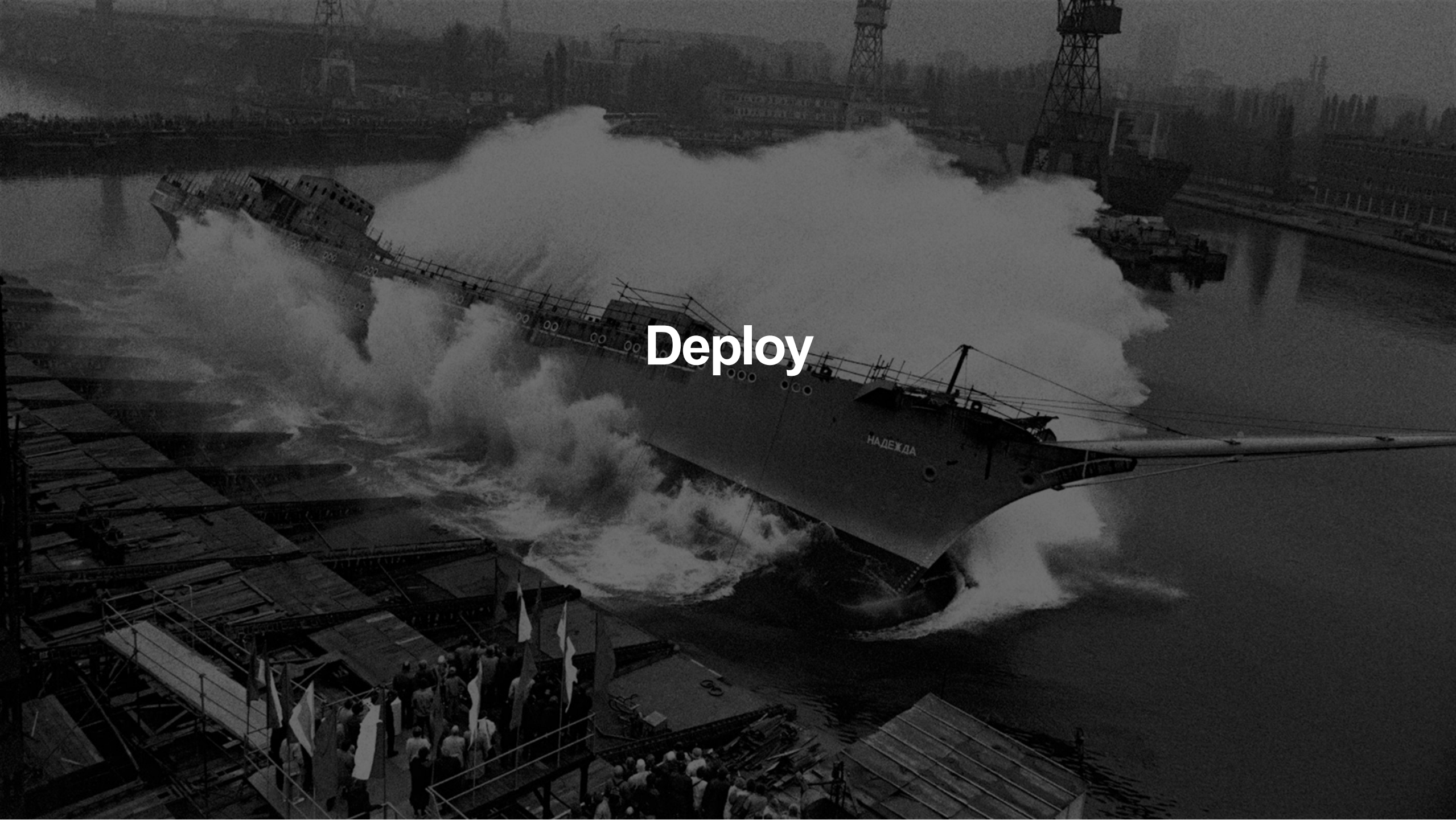




Sizing - Latency

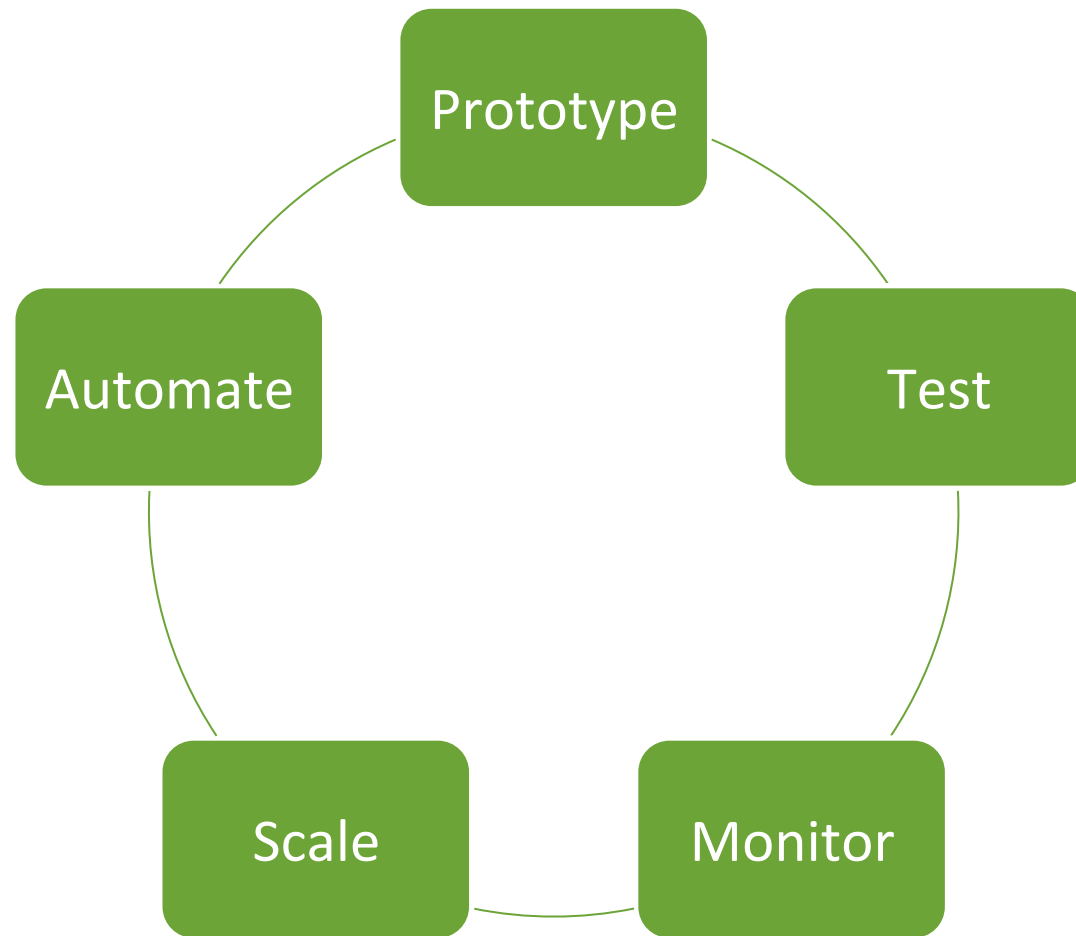
**ONLY
SECONDARY
READS!**



A black and white photograph capturing the dramatic moment of a large ship, the 'НАДЕЖДА' (Nadezhda), being launched from a dry dock. The ship is tilted at a steep angle, its bow pointing towards the right, as it is lowered into the water. Massive plumes of white water and steam erupt from the point of contact, creating a sense of immense power and scale. In the foreground, a large crowd of people stands on a platform, observing the event. Several flags are visible, flying from poles. The background shows the industrial setting of the dry dock, with various structures and cranes visible under a hazy sky.

Deploy

Rules for a Good Deployment



AEM + Ops Manager



Best Practices,
Automated



Cut Management
Overhead



Meet SLAs



Scale Easily

Operational Best Practices



Node Documents

```
{
  "_id": "1:/norberto",
  "_deleted": {
    "r14e211fe903-0-1": "false"
  },
  "jcr:created": {
    "r14e211fe903-0-1": "\"dat:2015-06-23T17:53:36.257+02:00\""
  },
  "jcr:createdBy": {
    "r14e211fe903-0-1": "\"admin\""
  },
  "_commitRoot": {
    "r14e211fe903-0-1": "0"
  },
  "jcr:primaryType": {
    "r14e211fe903-0-1": "\"nam:nt:folder\""
  },
  "_modified": NumberLong("1435074815"),
  "_modCount": NumberLong("1")
}
```



```
{
  "_id": "1:/norberto",
  ...
  "_commitRoot": {
    "r14e211fe903-0-1": "0",
    "r14e2122a4bb-0-1": "0"
  },
  ...
  "_modified": NumberLong("1435074995"),
  "_modCount": NumberLong("3"),
  "_children": true,
  "_lastRev": {
    "r0-0-1": "r14e2122a4bb-0-1"
  }
}
```

Document Moves

```
2015-05-18T17:07:10.264+0200 [conn1298] command aem.$cmd command: findAndModify { findandmodify: "nodes",
query: { _id: "10:/content/www/...", _modCount: 3 }, fields: { _id: 1 }, update: { $set: { ... }, $max:
{ _modified: 1431961630 }, $inc: { _modCount: 1 } } } update: { $set: { ... }, $max: { _modified:
1431961630 }, $inc: { _modCount: 1 } } nscanned:1 nscannedObjects:1 nmoved:1 nMatched:1 nModified:1
keyUpdates:0 numYields:0 locks(micros) w:116270 reslen:203 116ms
```

```
nscanned:1464 nscannedObjects:1044 nmoved:288 nMatched:1044 nModified:1044 keyUpdates:1 numYields:11
locks(micros) w:242369 169ms
```

```
nscanned:10829 nscannedObjects:10000 nmoved:1316 nMatched:10000 nModified:10000 keyUpdates:1 numYields:89
1
ocks(micros) w:2372208 1234ms
```

Fragmentation

AEM will be constantly growing the documents
generating document moves and subsequently
producing fragmentation

```
db.adminCommand( { repairDatabase: 1 } )
```

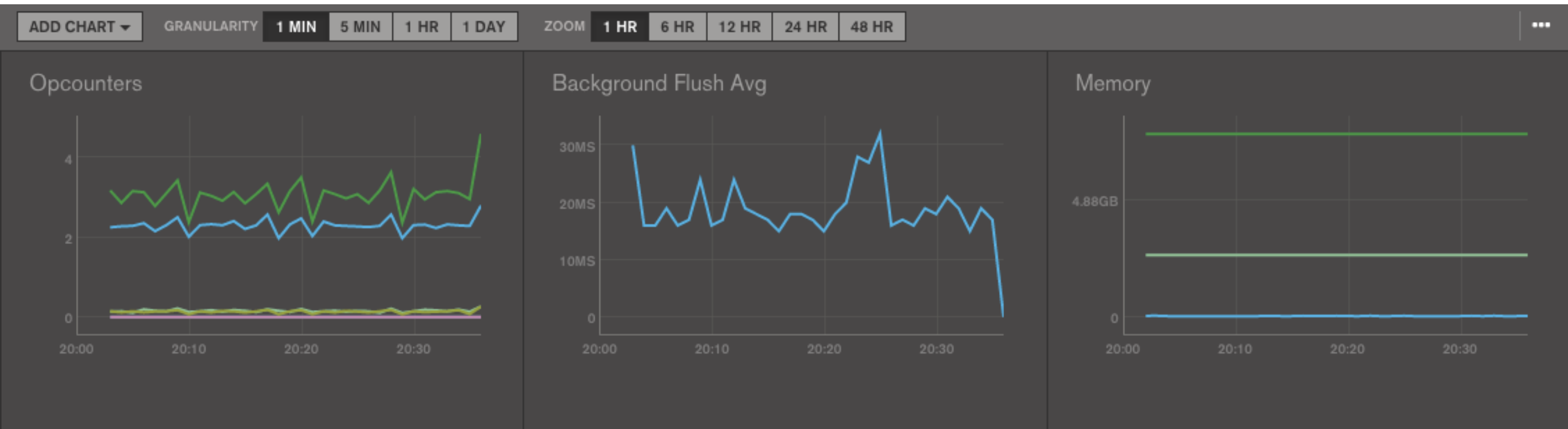
I/O

MongoDB will use your servers IO resources heavily

PLEASE DO NOT USE NFS!

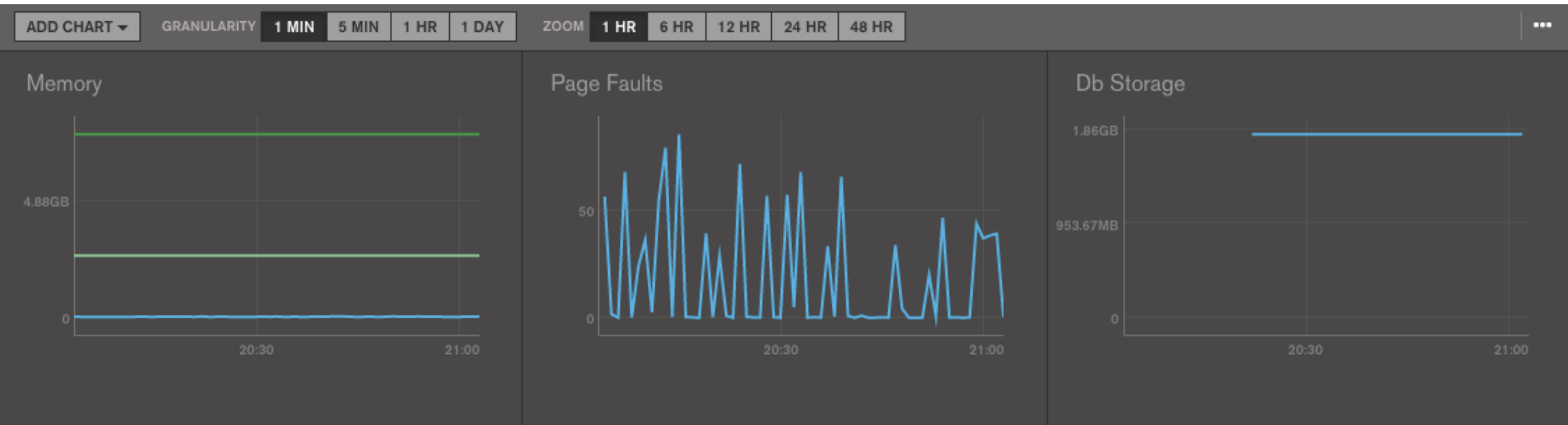
`iostat | iftop | iperf | vmstat`

Monitoring Performance Indicators



<https://docs.mms.mongodb.com/>

Working Set Measurement



<https://docs.mms.mongodb.com/>

Take Aways



Takeway

AEM + MongoDB is a Scalable Solution

Provisioning is Key

Monitor, monitor, monitor

Working closely with Adobe

We are ready to help you!

SPECIAL
PALM
READING
\$5

BY · MADISON
347-243-9530



France
Oct 06

Germany
Oct 20

UK
Nov 05

Silicon Valley
Dec 02

MongoDB Days 2015

20 October, 2015 **Munich**

<https://www.mongodb.com/events/mongodb-days-germany>

I also drive a VW group car!



A black and white photograph of a lake at sunset. The sun is a bright circle in the upper right sky, reflecting on the water. In the foreground, two people are on a small boat, their silhouettes clearly visible against the bright reflection. They are holding long poles. In the background, two more small boats with people are visible on the water. The sky is filled with soft, wispy clouds.

Obrigado!

Norberto Leite
Technical Evangelist
norberto@mongodb.com
[@nleite](https://twitter.com/nleite)

