
mongoDB

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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!

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Madrid, Spain

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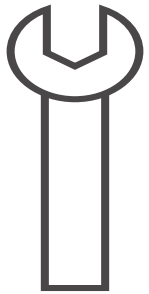
mongoDB

Anyone here owns a VW?


mongoDB introduction

MongoDB

GENERAL PURPOSE



DOCUMENT DATABASE

OPEN-SOURCE

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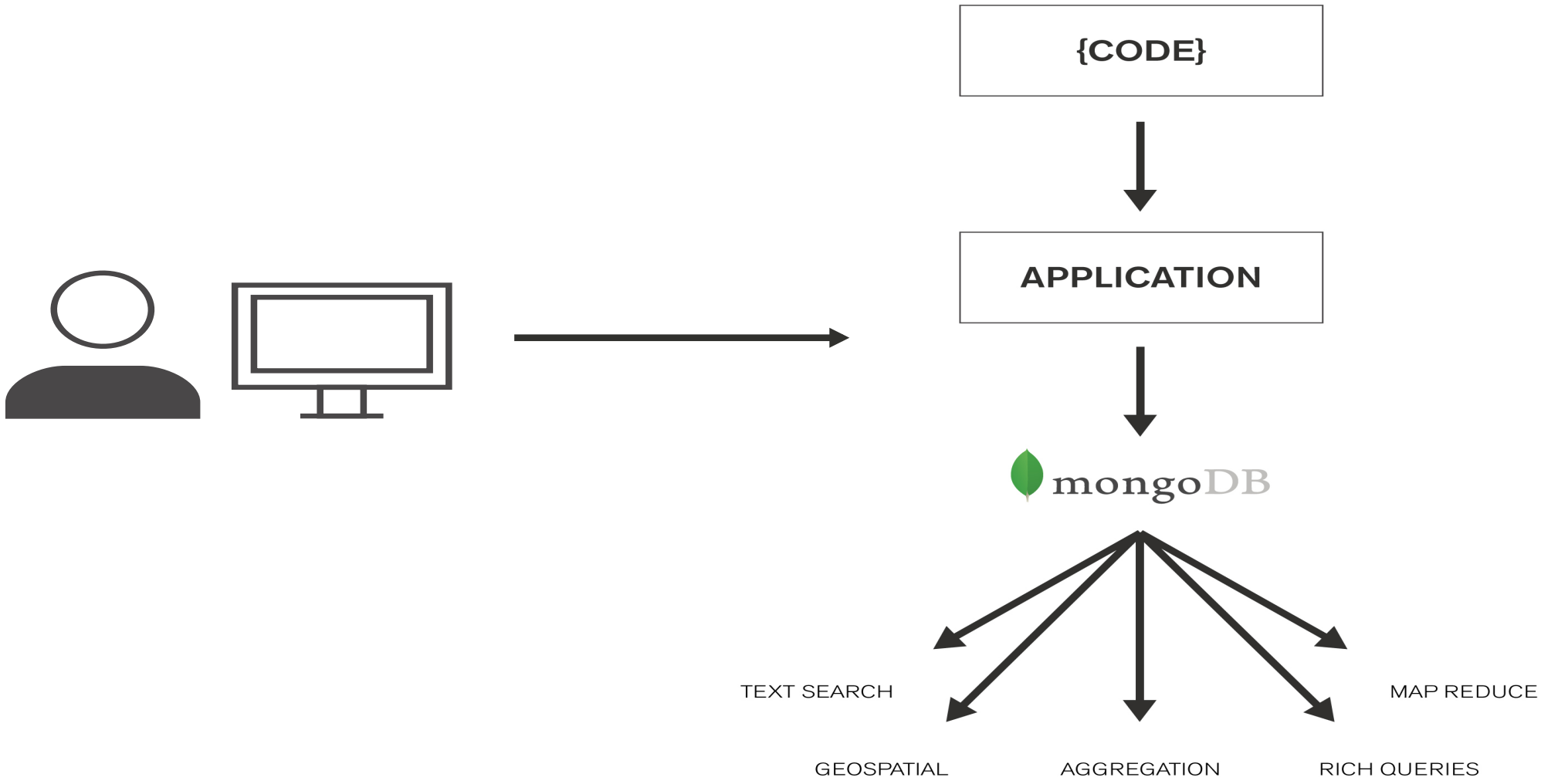
MongoDB is Fully Featured



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()
```

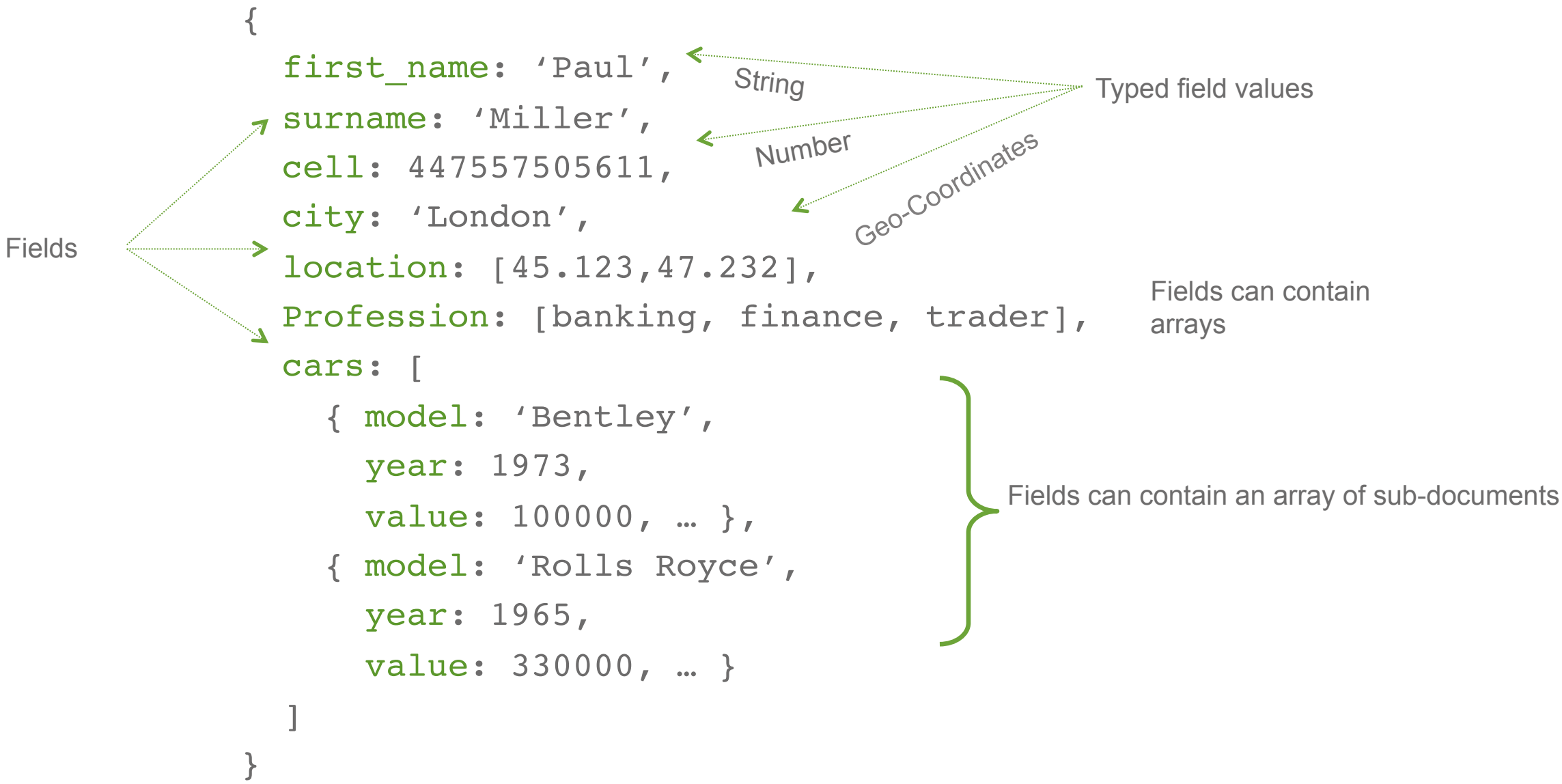
Indexes

```
// 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

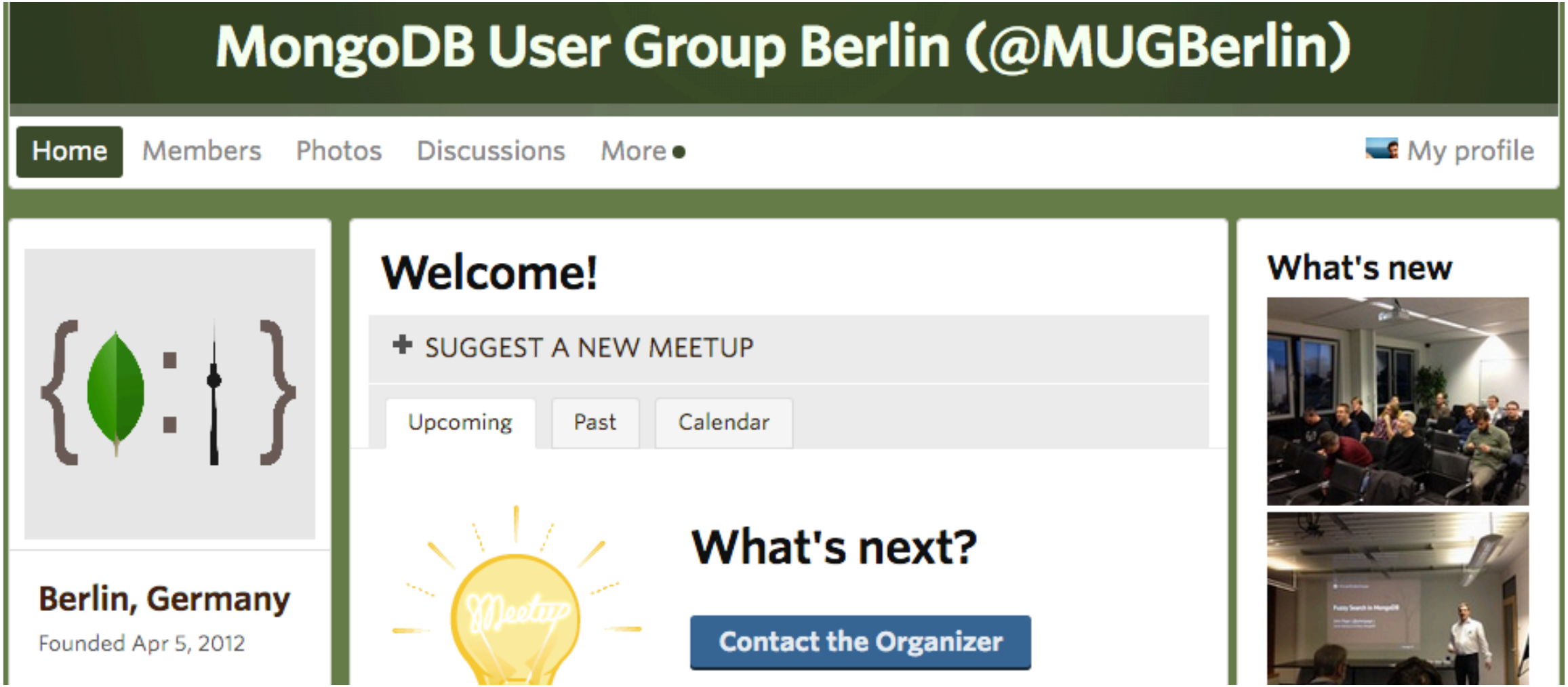
300,000 Students
for MongoDB
University

35,000
attendees to
MongoDB events
annually

Over **1,000**
Partners

Over **2,000**
Paying Customers

We are local!



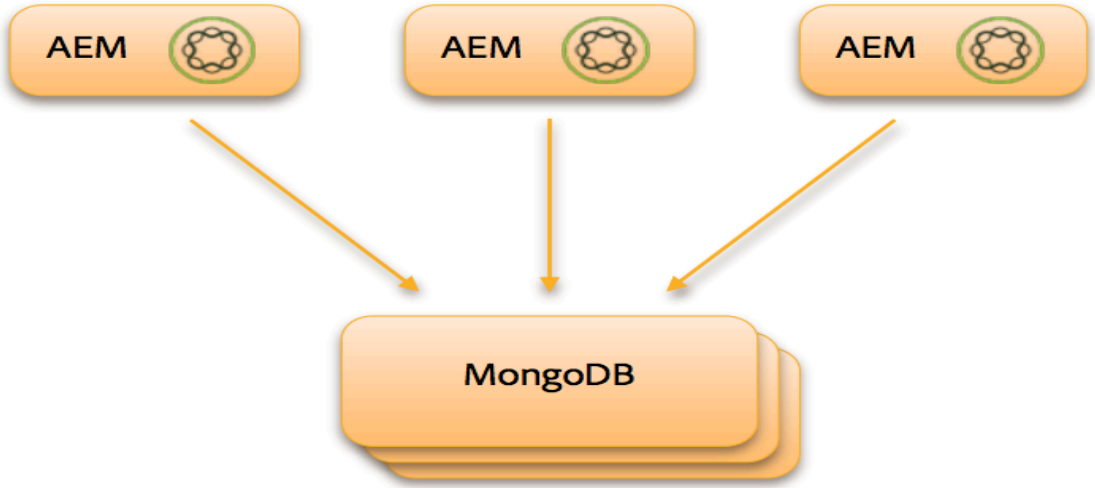
http://www.meetup.com/mugberlin/

mongoDB

http://graphics8.nytimes.com/images/2013/04/21/blogs/dotgenesis/dotgenesis-superJumbo.jpg

MongoDB MicroKernel

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



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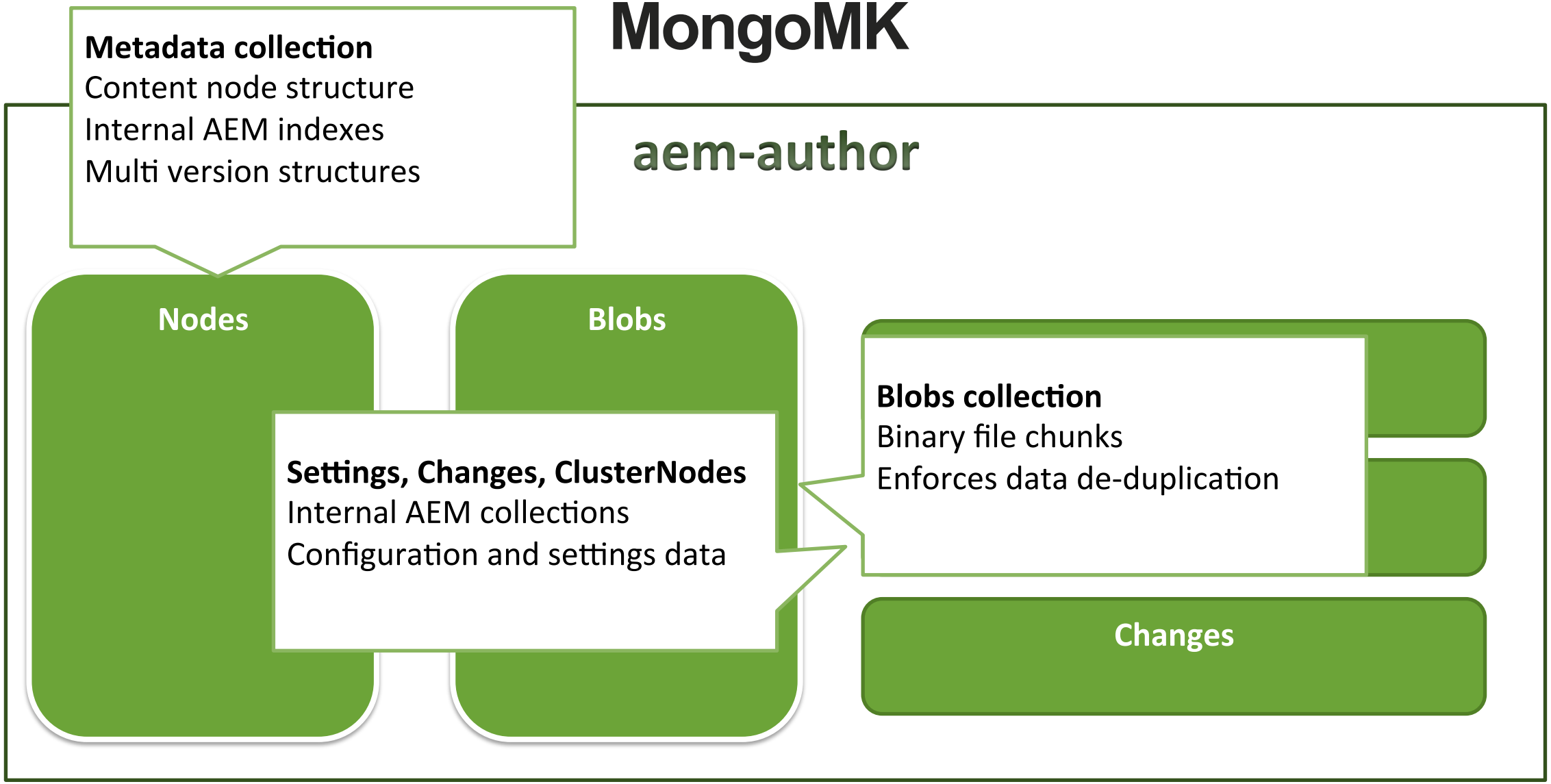
MongoMK

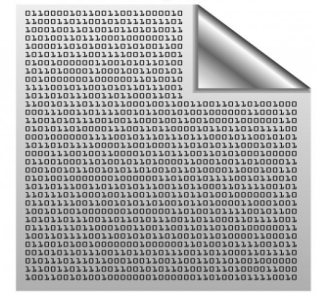

Metadata collection
Content node structure
Internal AEM indexes
Multi version structures
aem-author
Nodes
Blobs
Settings, Changes, ClusterNodes
Internal AEM collections
Configuration and settings data
Blobs collection
Binary file chunks
Enforces data de-duplication
Changes

MongoMK - Content

Metadata

Binary / Blobs

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



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MongoMK – Metadata

Metadata

Binary / Blobs


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

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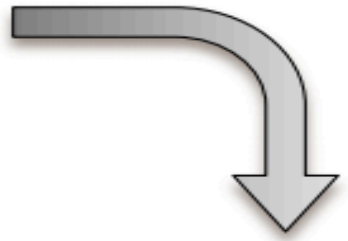
MongoMK – Data Model

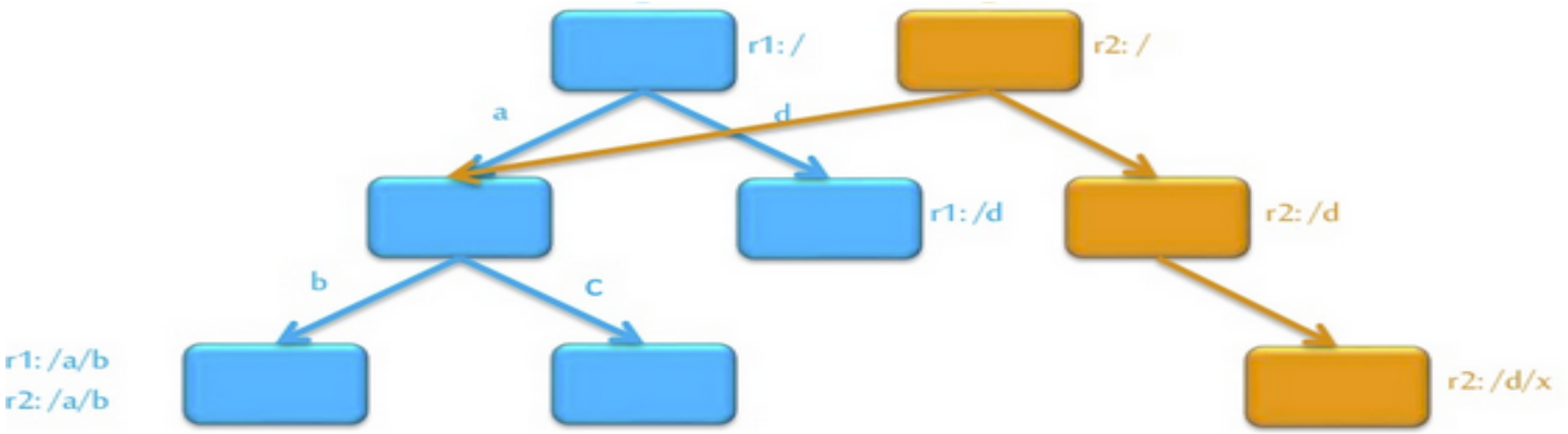
```
{
   _id : “/home/john”,
   name : “john”,
   email : “john@example.com”
}
```



```
{
   _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” }
}
```

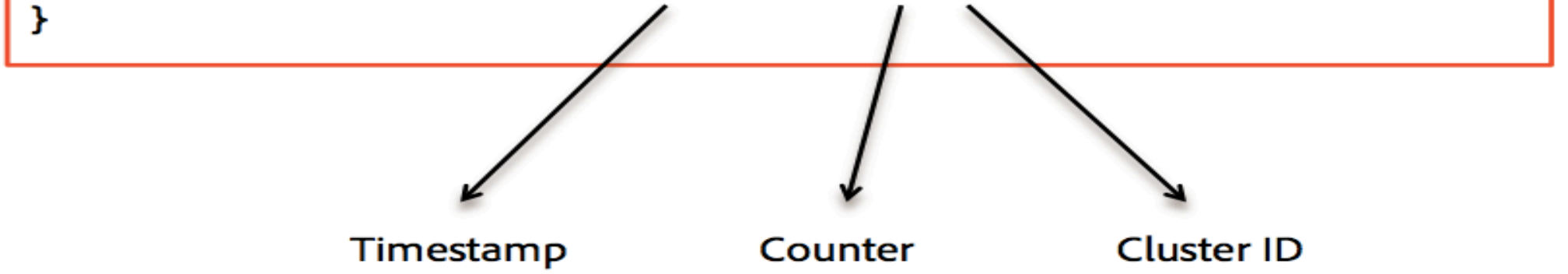
MongoMK – Version Control

Revisions of content are maintained as separate trees



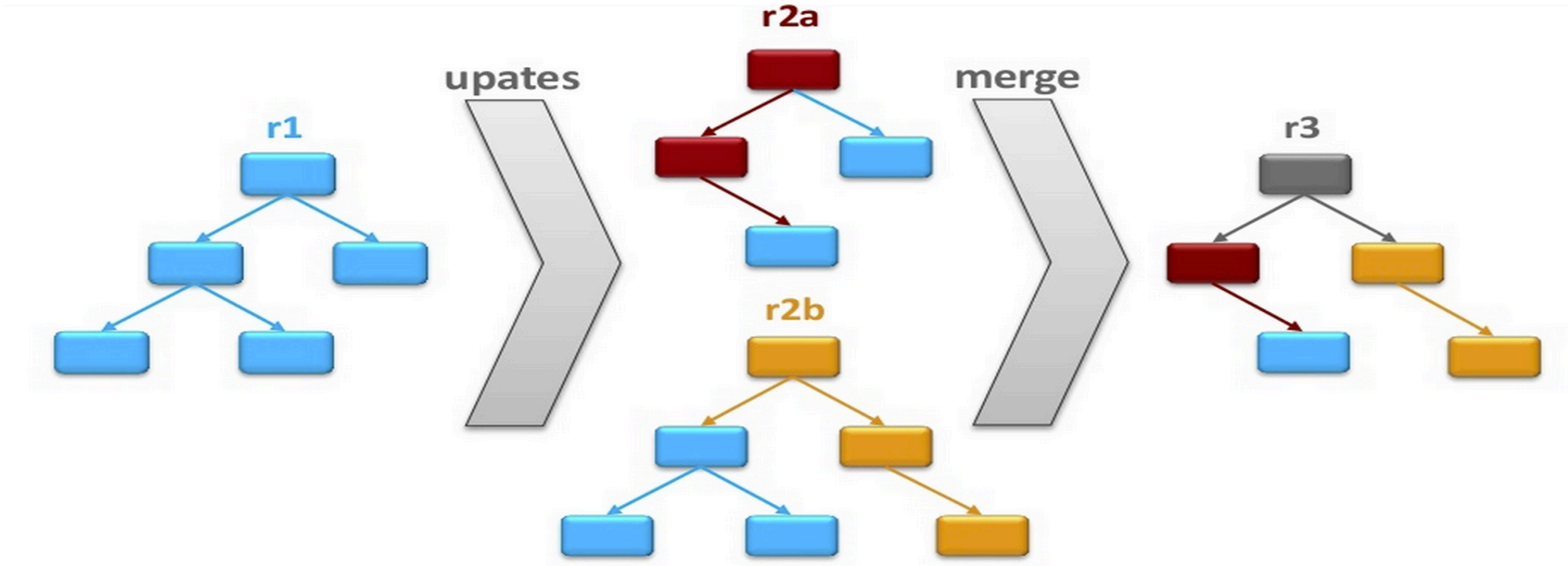
MongoMK – Data Model

```
{
   _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” }
}
```

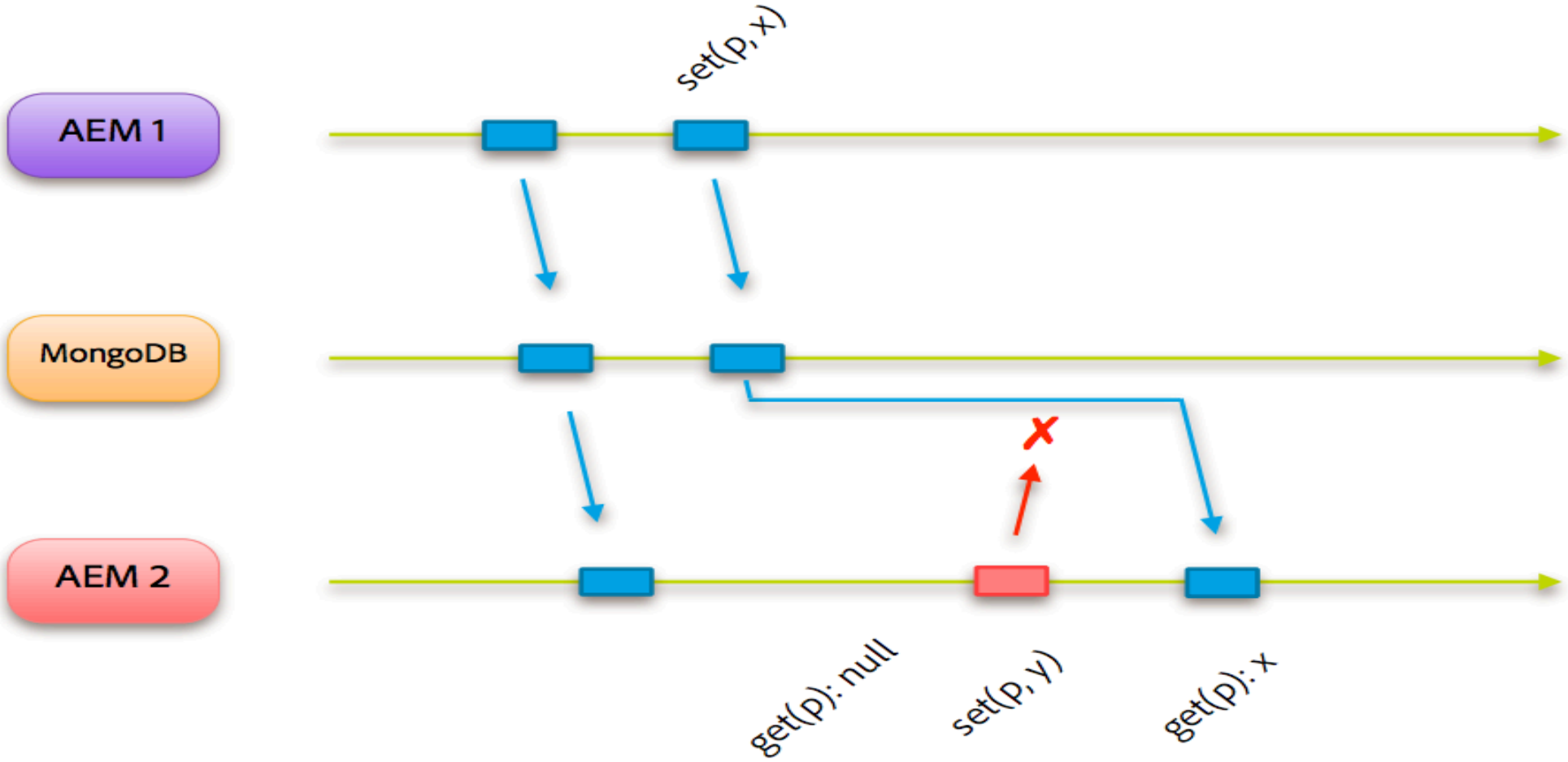


MongoMK – Versioning & Concurrency

System provides version and concurrency control of content revisions.



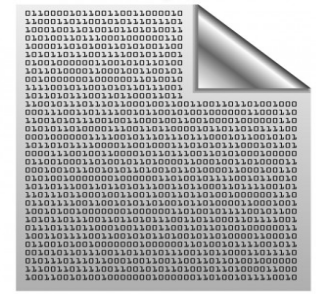
MongoMK – Versioning & Concurrency



MongoMK – Binary Data

Metadata

Binary / Blobs



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

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AEM Blob Storage

TAR

MONGODB

S3

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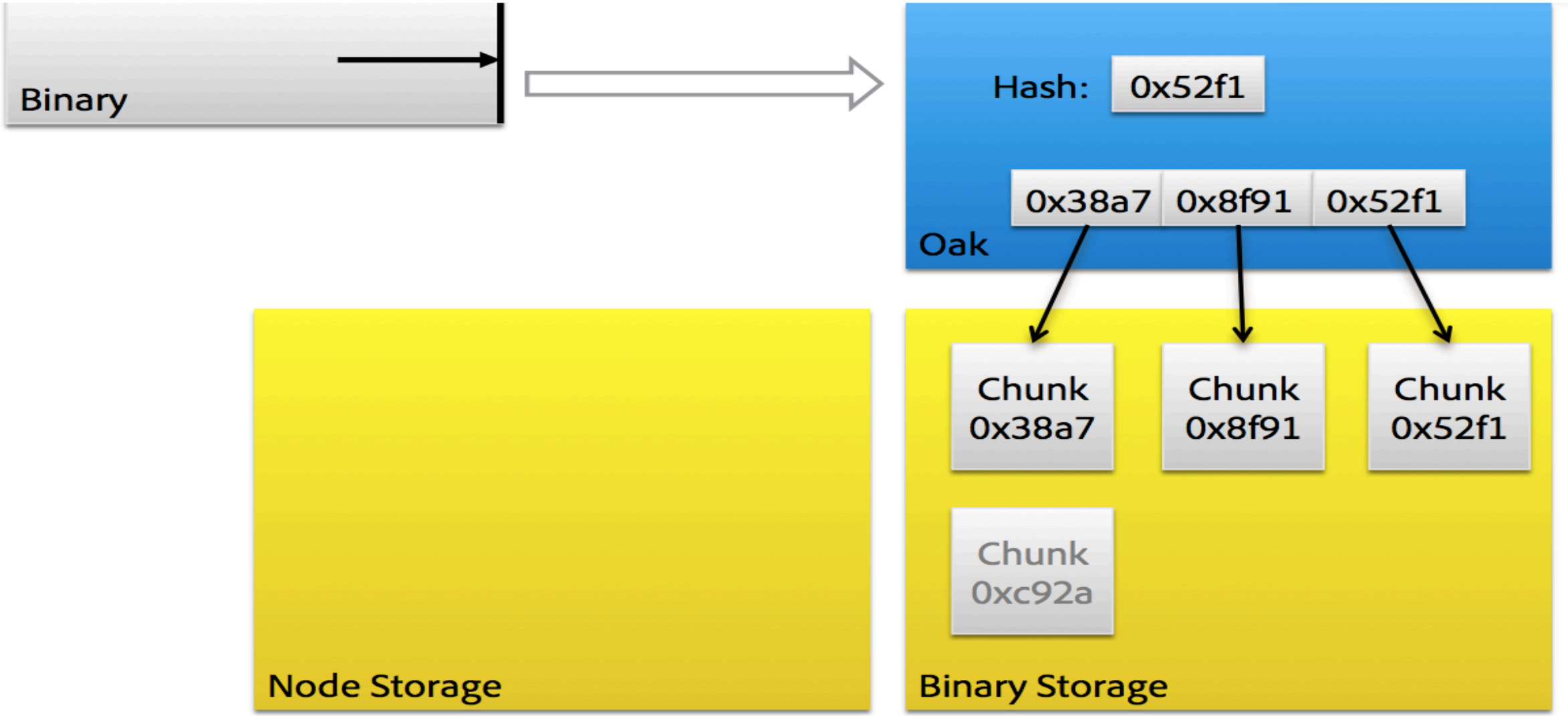
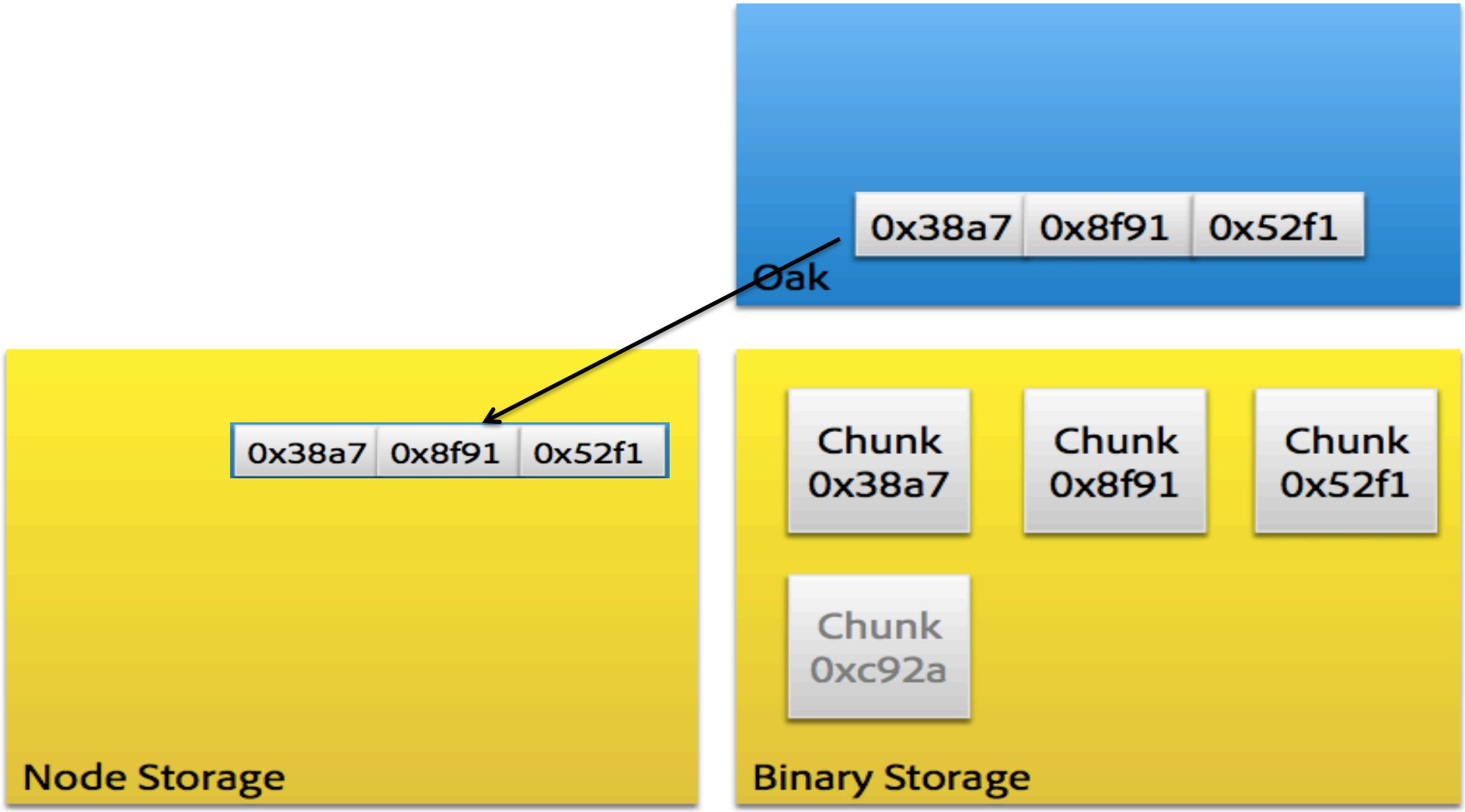
MongoMK - Blobs



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

http://centralskateco.com/wp/wp-content/uploads/2014/12/sebasti_o_salgado_church_gate_station_1995.jpg

MONGODB SIZING

Availability

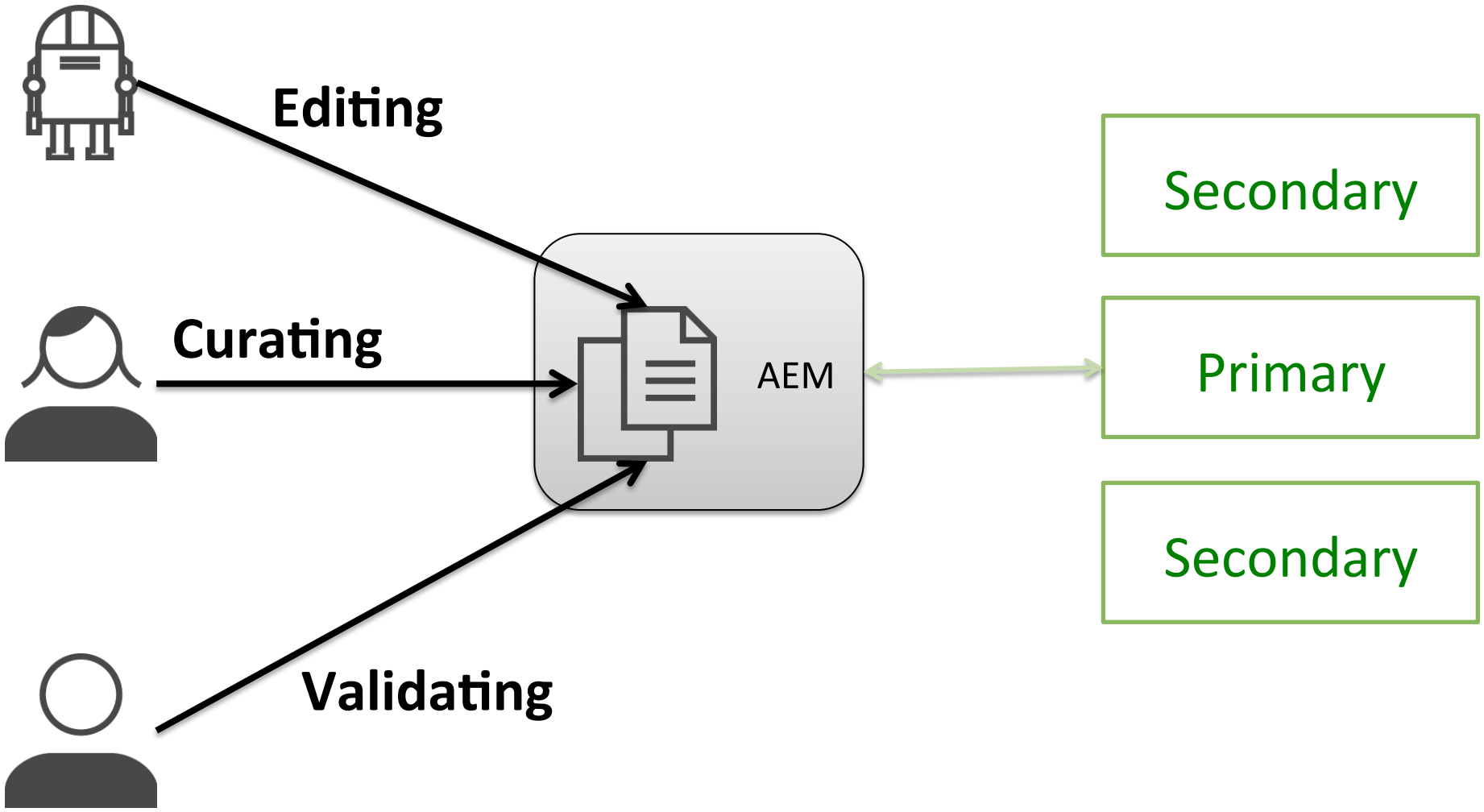
Volume

Expected Latency

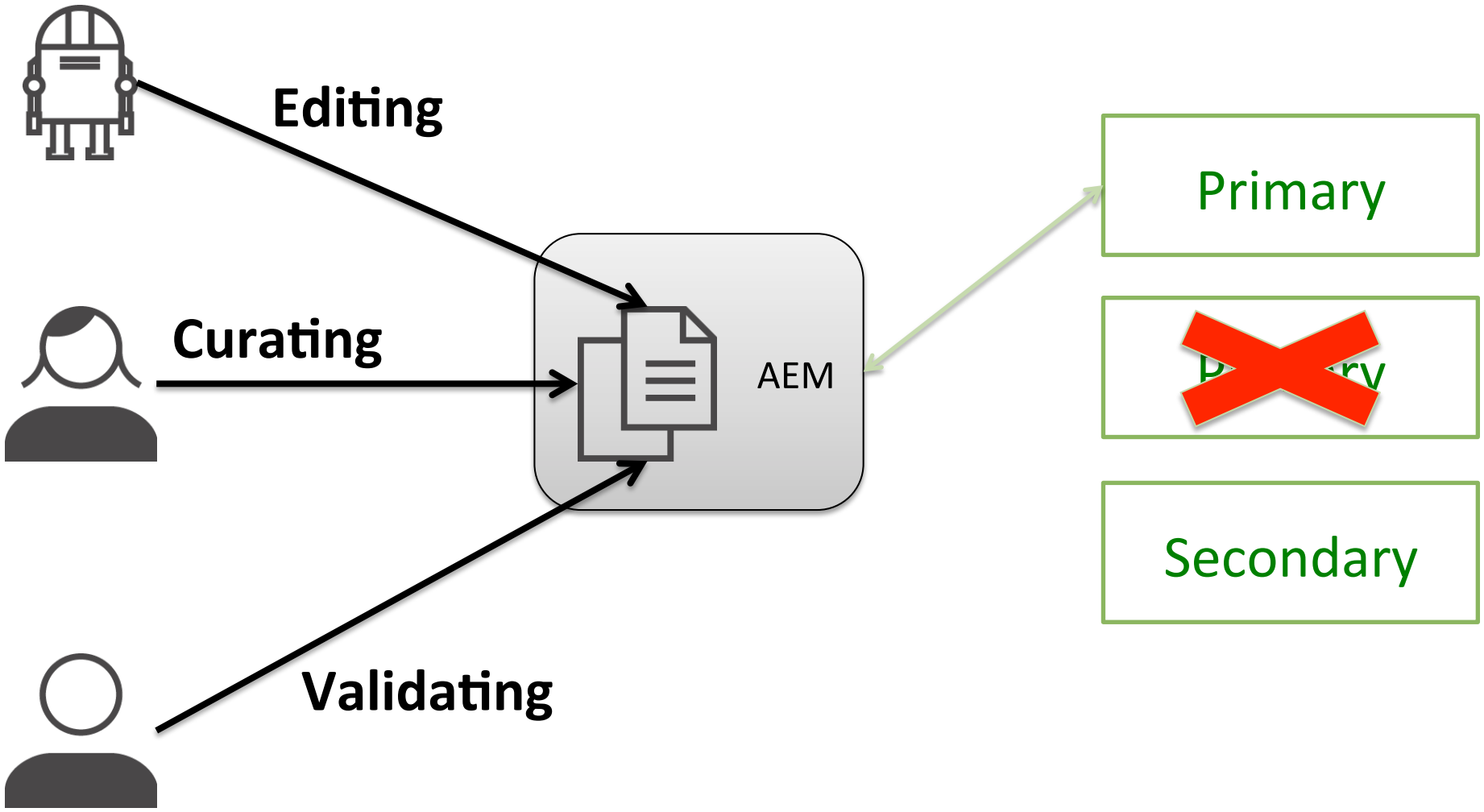
Working Data Set


Availability
http://i.ytimg.com/vi/urAmQRc6Ios/maxresdefault.jpg

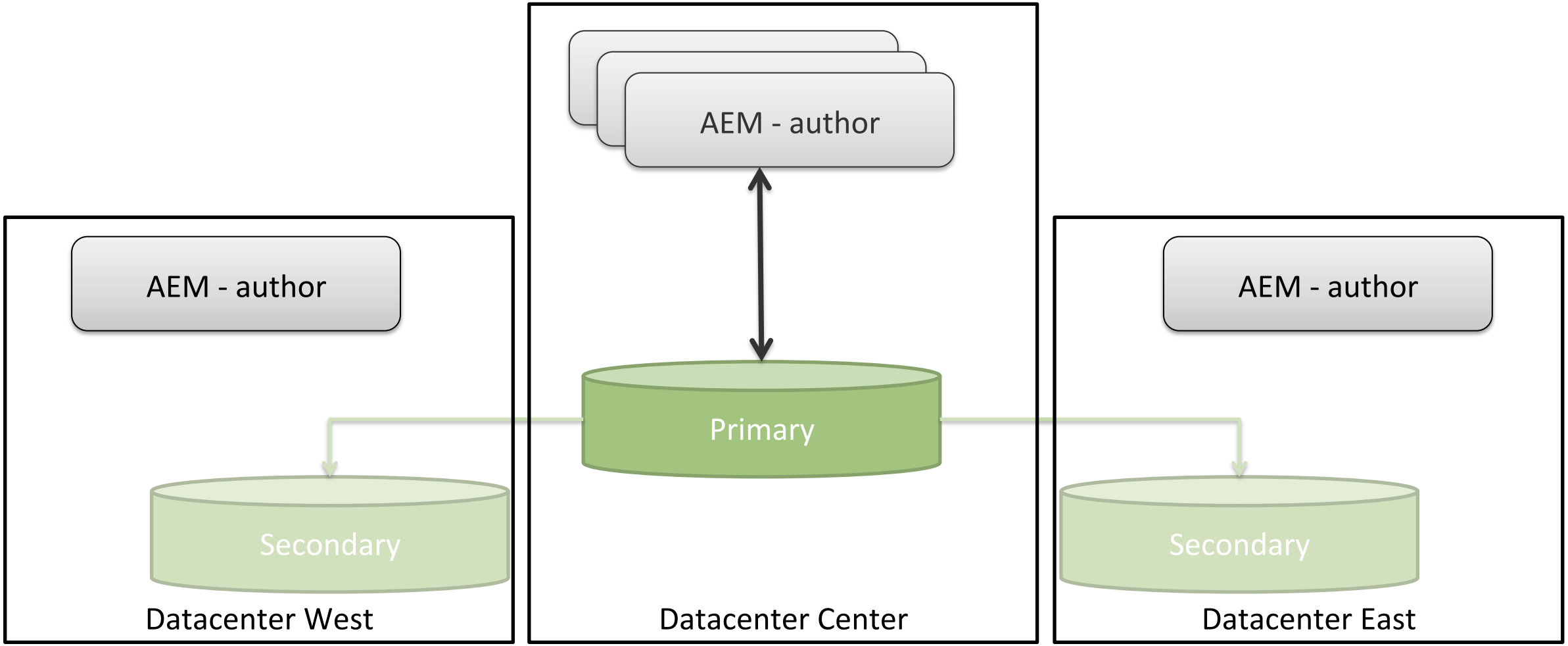
Sizing - Availability



Sizing - Availability



Sizing - Availability



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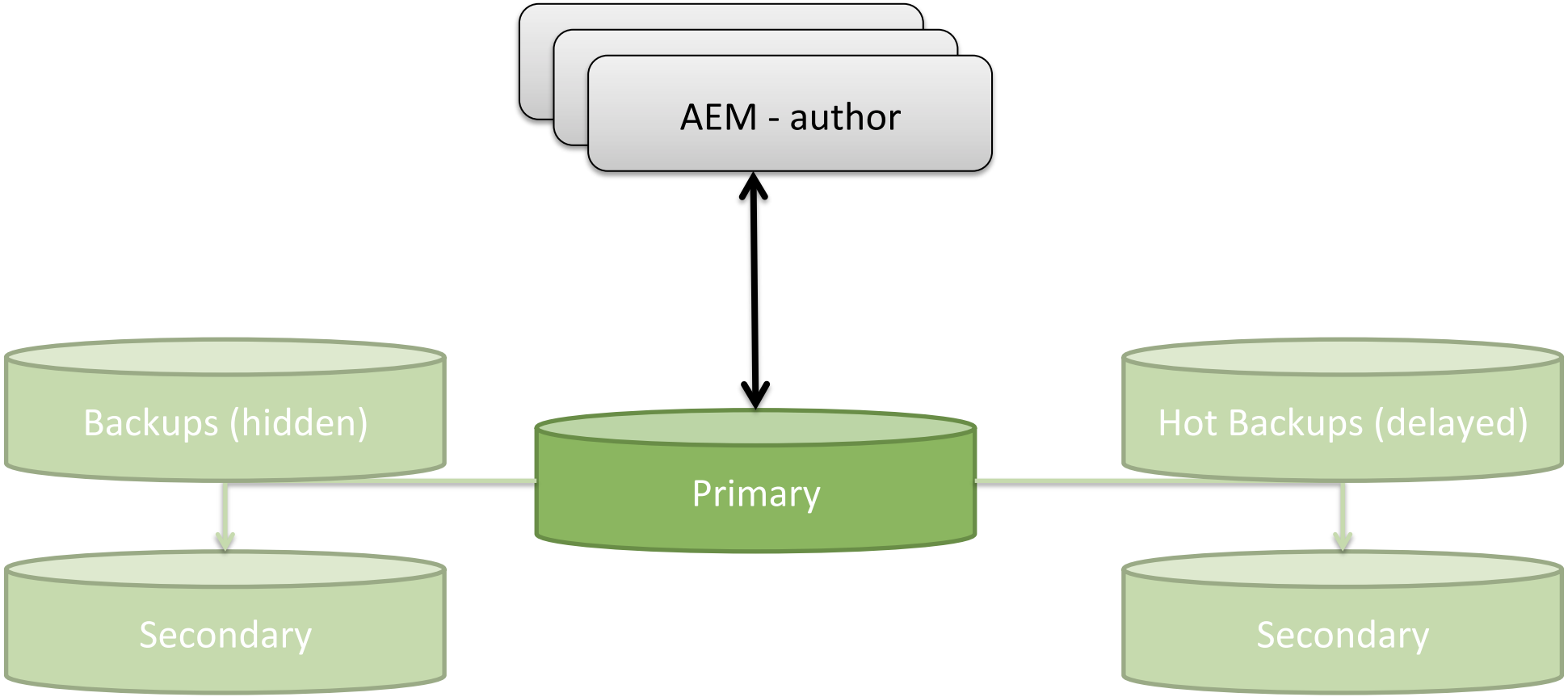
Sizing - Availability

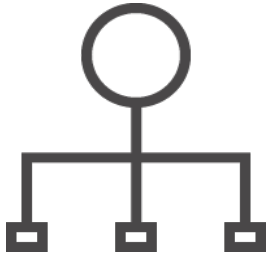


Volume

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

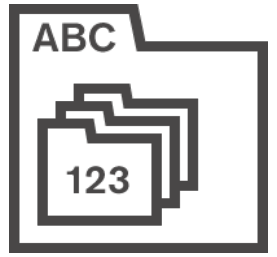
Sizing - Volume

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

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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

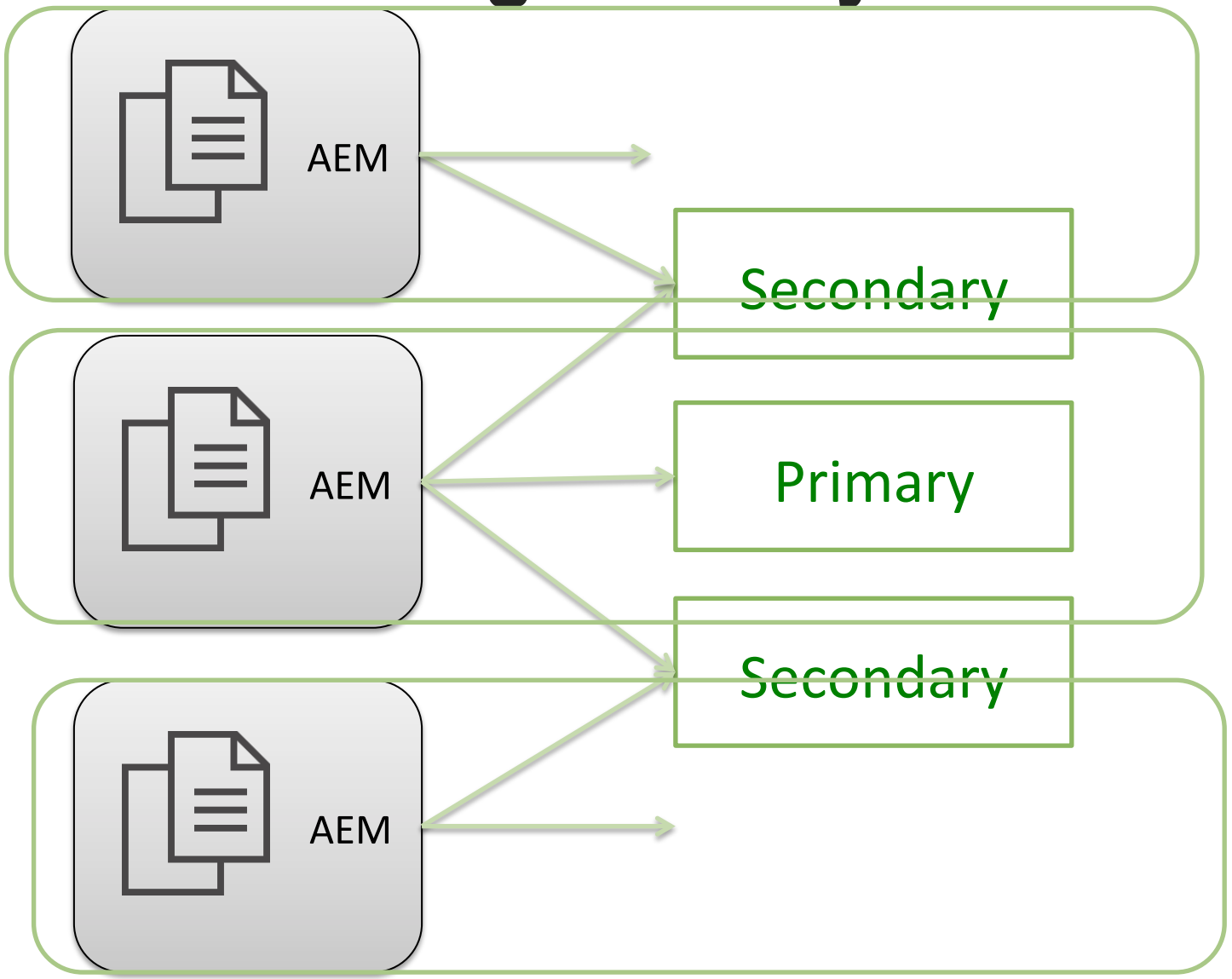
- Document Level Locking
- Compression
- Tunable Memory Cache
- Index Prefix Compression

Adobe Recommended Engine for AEM 6.1!!!

Working Set Can Be Distributed Across Shards

Sizing - Latency

ONLY SECONDARY READS!



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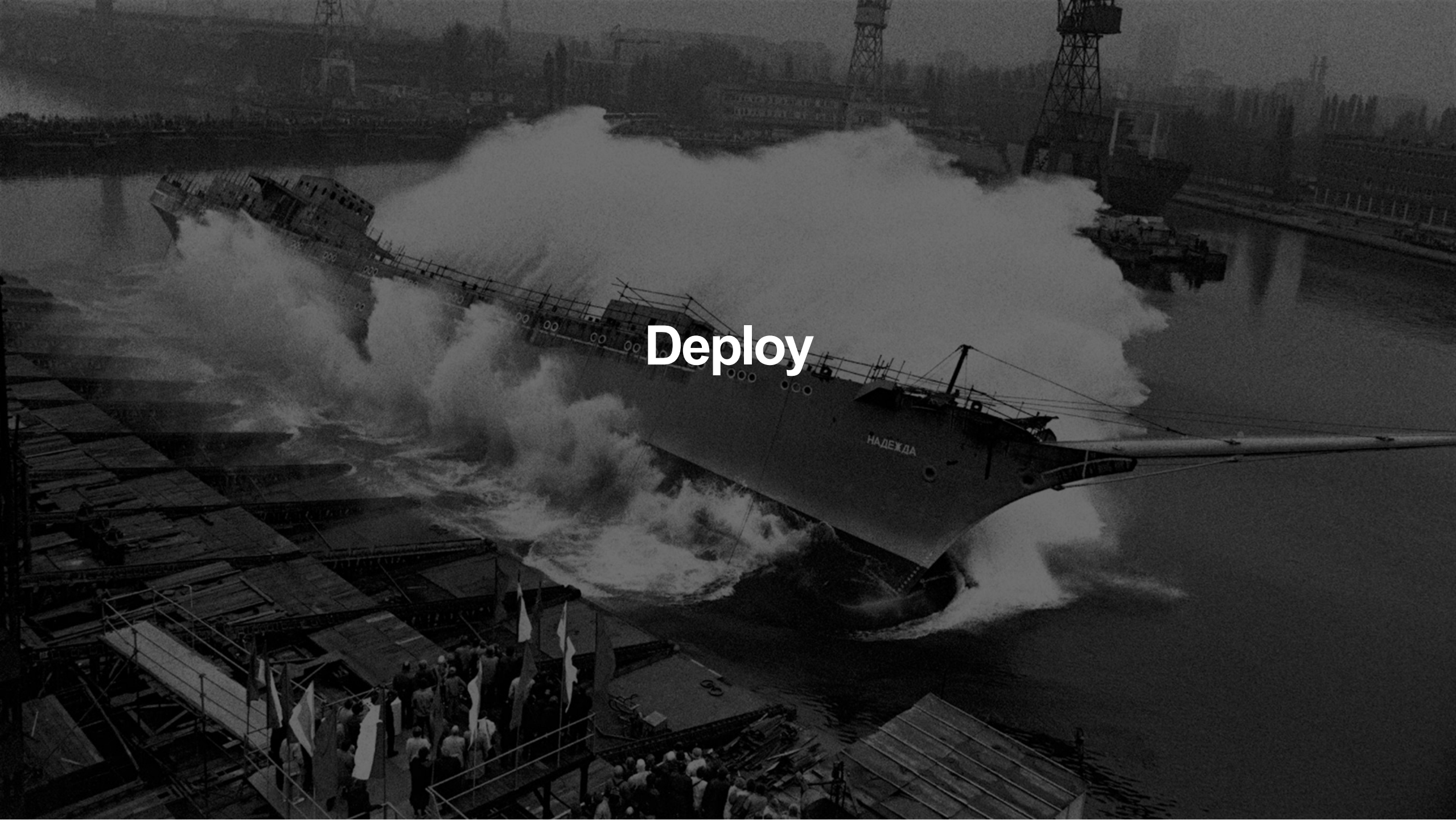
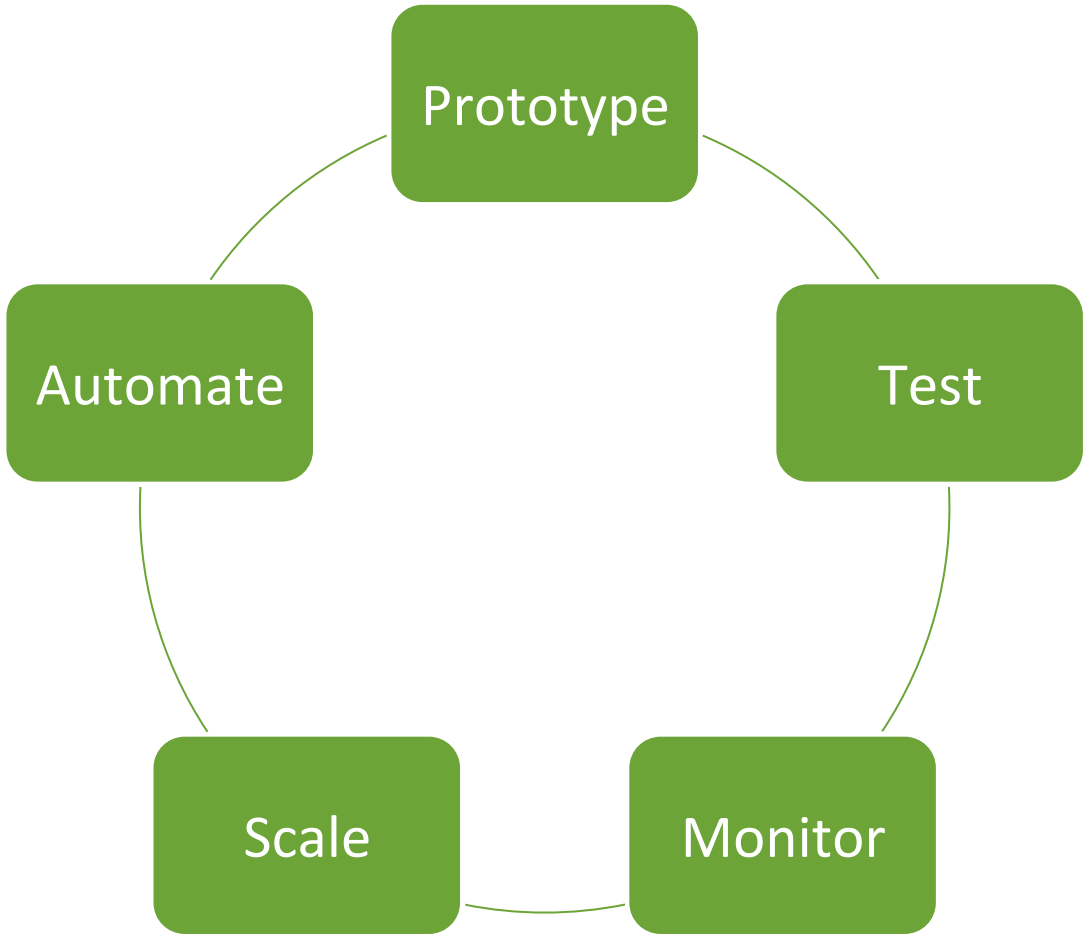


Deploy

Rules for a Good Deployment



AEM + Ops Manager

Best Practices, Automated

Cut Management Overhead

Meet SLAs

Scale Easily

Operational Best Practices

https://acebourke.files.wordpress.com/2015/04/photo-by-saldago-three-miners.jpg

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
l
ocks(micros) w:2372208 1234ms
```

Fragmentation

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

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

http://docs.mongodb.org/manual/reference/command/repairDatabase/

I/O

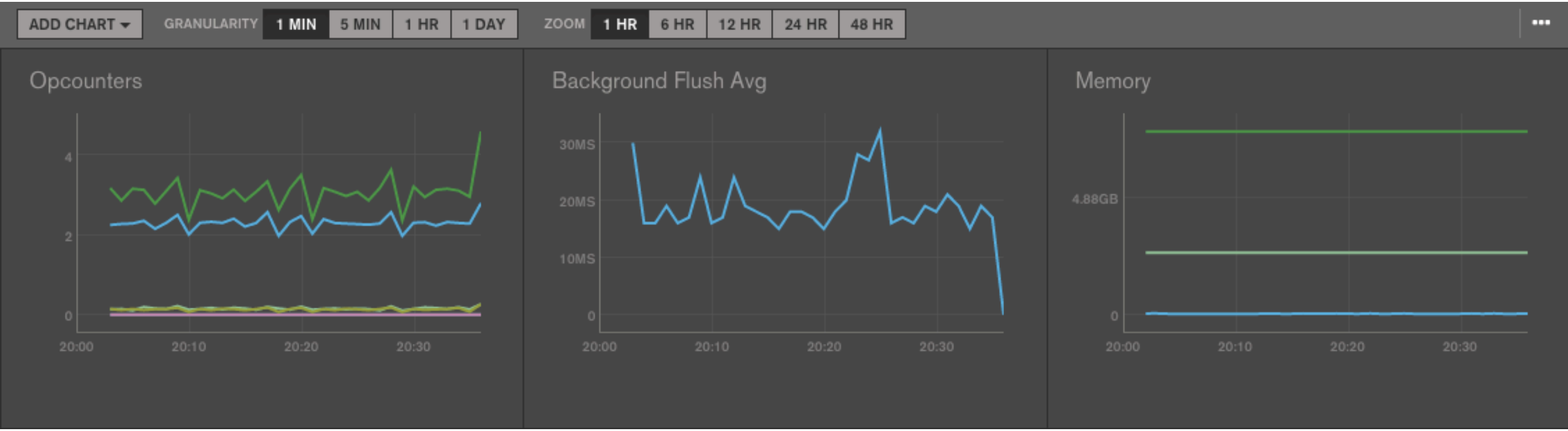
MongoDB will use your servers IO resources heavily

PLEASE DO NOT USE NFS!

```
iostat | iftop | iperf | vmstat
```

http://docs.mongodb.org/manual/administration/production-notes

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

MongoDB Days 2015

20 October, 2015 Munich

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

I also drive a VW group car!

Obrigado!

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@nleite


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