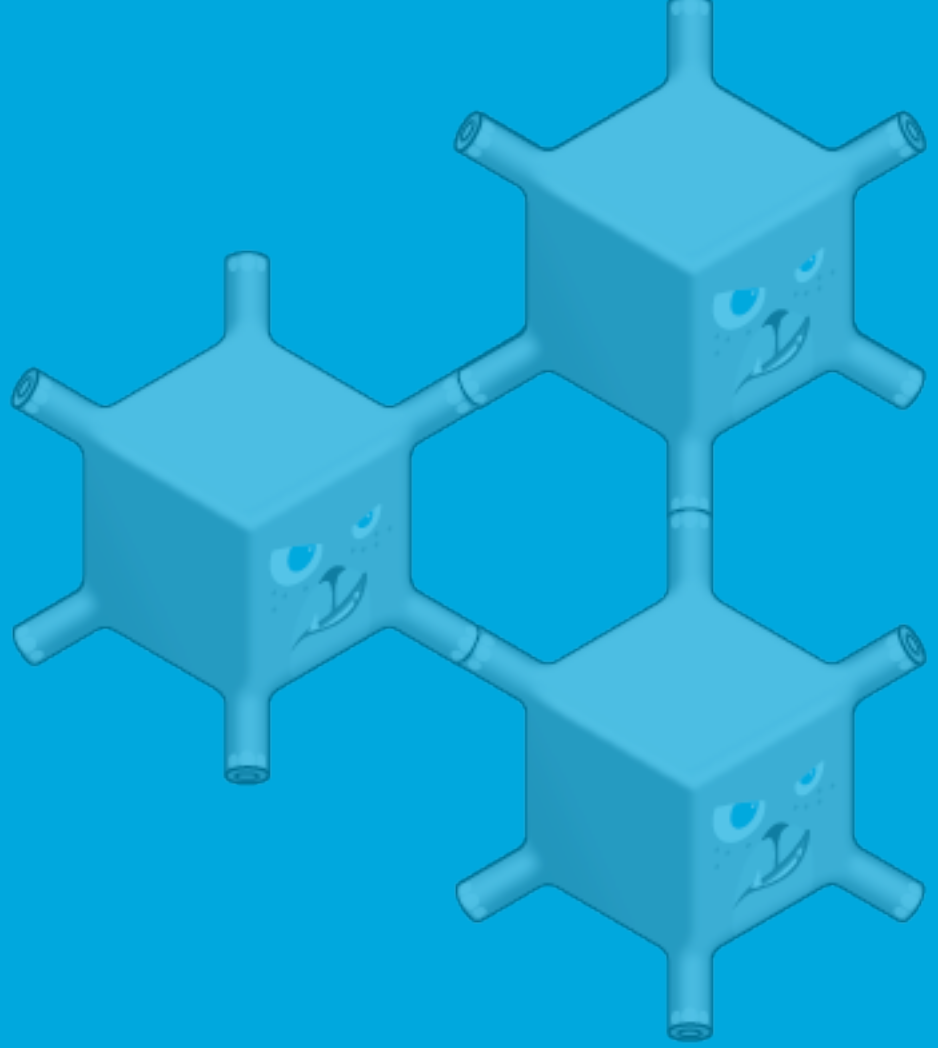


membase

Matt Ingenthron

Couchbase, Inc.

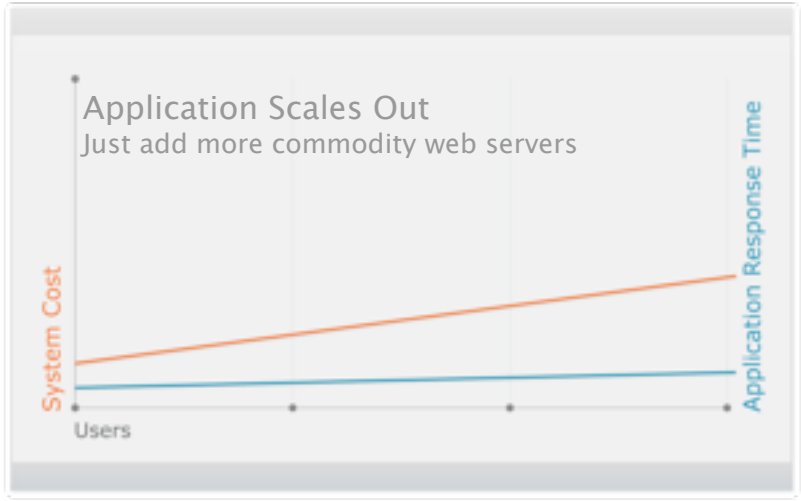
Membase + CouchOne =

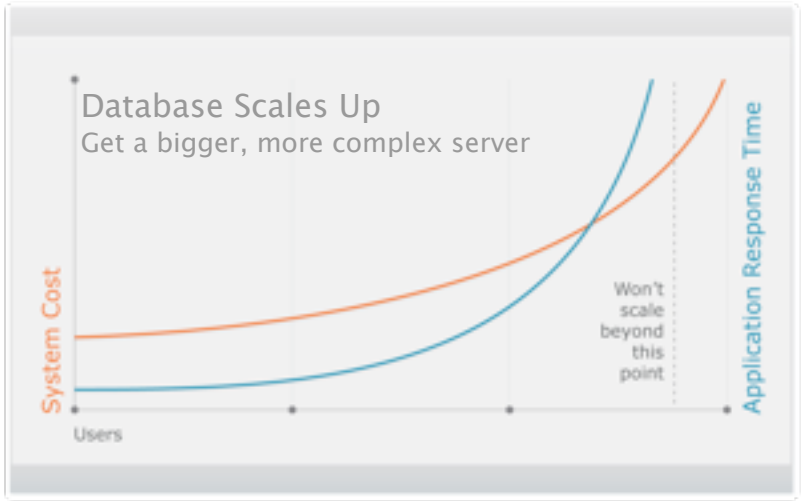
COUCHBASE

Is it us, or did databases just get a lot more awesome?

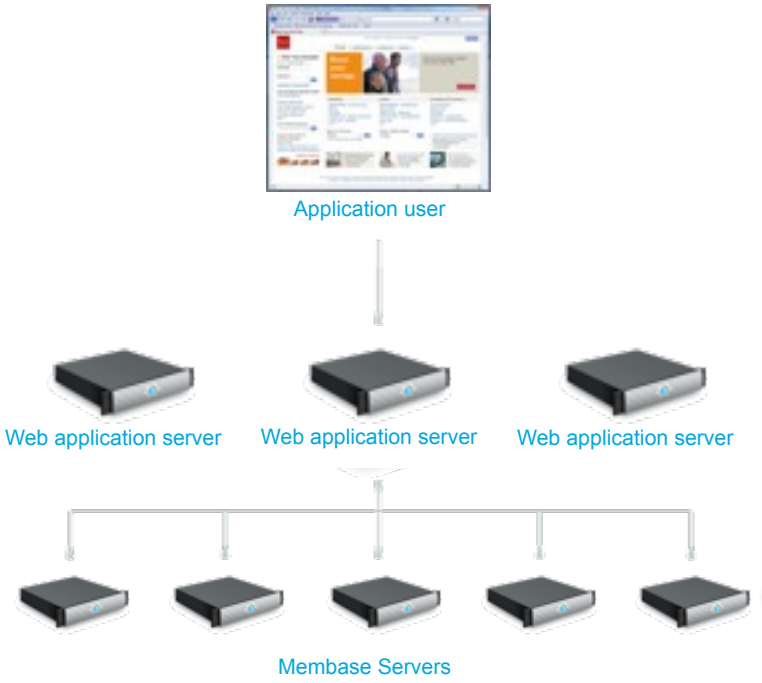
What is Membase?

Before: Application scales linearly, data hits wall





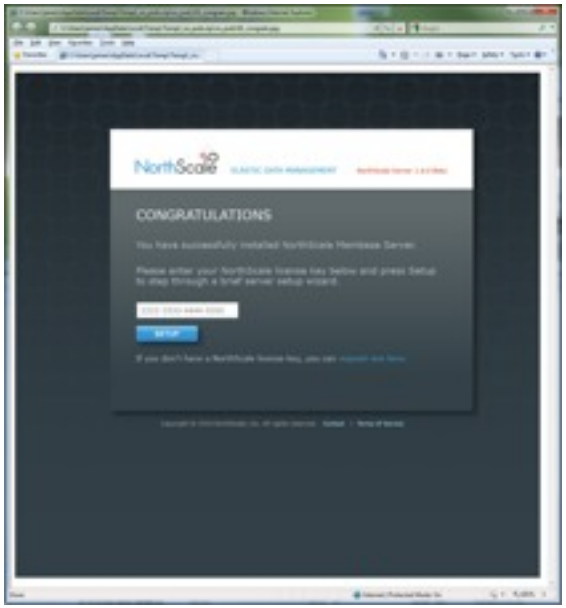
Membase is a distributed database



In the data center

On the administrator console

Membase is Simple, Fast, Elastic



- Five minutes or less to a working cluster
  - Downloads for Linux and Windows
  - Start with a single node
  - One button press joins nodes to a cluster
- Easy to develop against
  - Just SET and GET – no schema required
  - Drop it in. 10,000+ existing applications already “speak membase” (via memcached)
  - Practically every language and application framework is supported, out of the box
- Easy to manage
  - One-click failover and cluster rebalancing
  - Graphical and programmatic interfaces
  - Configurable alerting

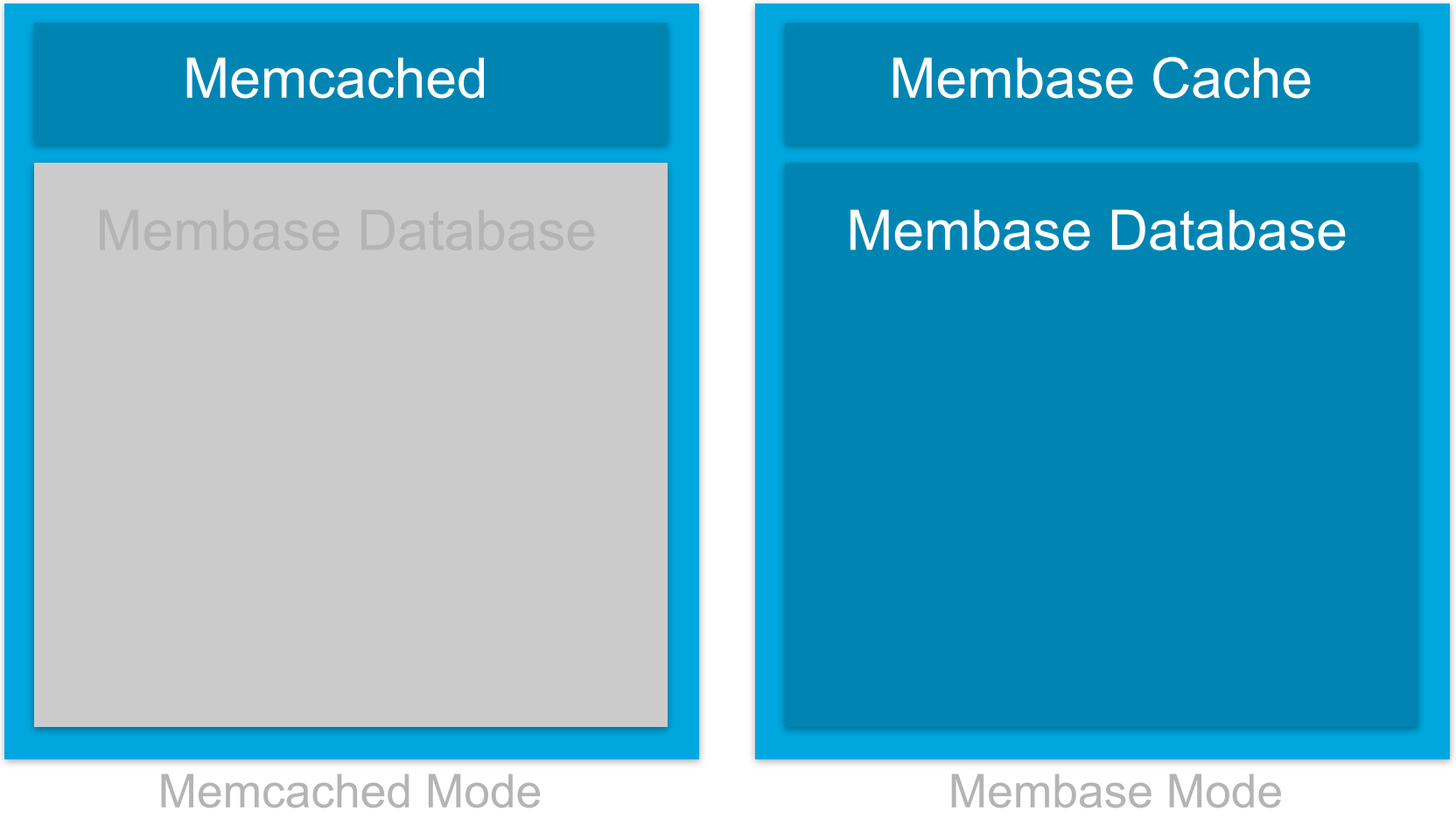
Membase is Simple, Fast, Elastic

- Predictable
  - "Never keep an application waiting"
  - Quasi-deterministic latency and throughput
- Low latency
  - Built-in Memcached technology
- High throughput
  - Multi-threaded
  - Low lock contention
  - Asynchronous wherever possible
  - Automatic write de-duplication

Membase is Simple, Fast, Elastic

- Zero-downtime elasticity
  - Spread I/O and data across commodity servers (or VMs)
  - Consistent performance with linear cost
  - Dynamic rebalancing of a live cluster
- All nodes are created equal
  - No special case nodes
  - Any node can replace any other node, online
  - Clone to grow
- Extensible
  - Filtered TAP interface provides hook points for external systems (e.g. full-text search, backup, warehouse)
  - Data bucket – engine API for specialized container types

Built-in Memcached Caching Layer



Memcached Mode

Membase Mode

- Fact: Membase development team has also contributed over half of the code to the Memcached project.

Use Cases

Ad targeting

40 milliseconds to come up with an answer.

3 profiles, real time campaign statistics

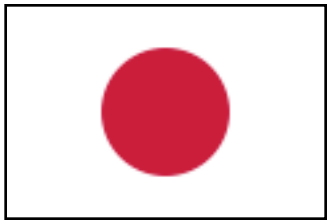
1 events

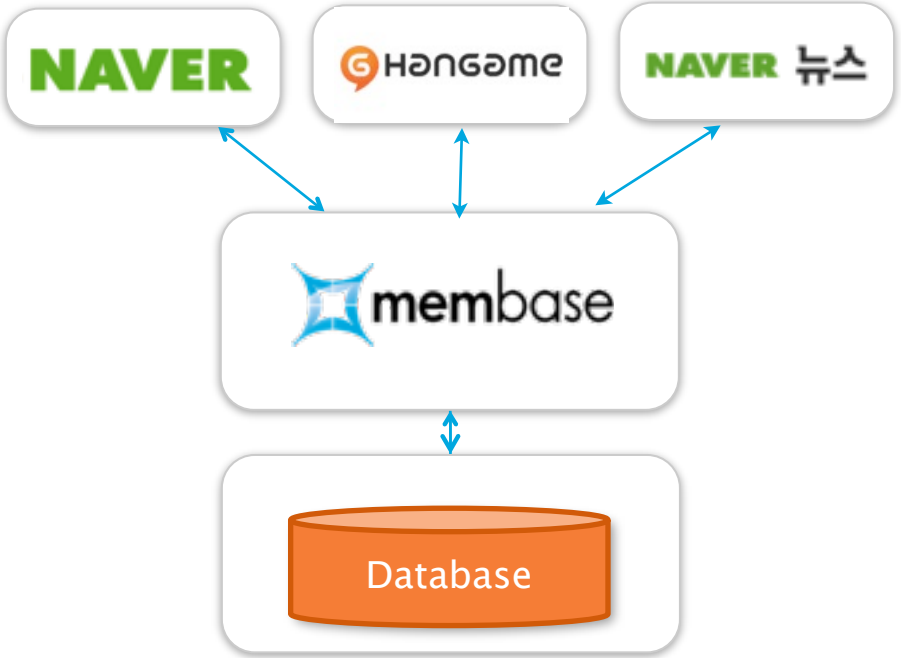
2 profiles, campaigns

ShareThis

Aol Advertising.

Search and Gaming Portal





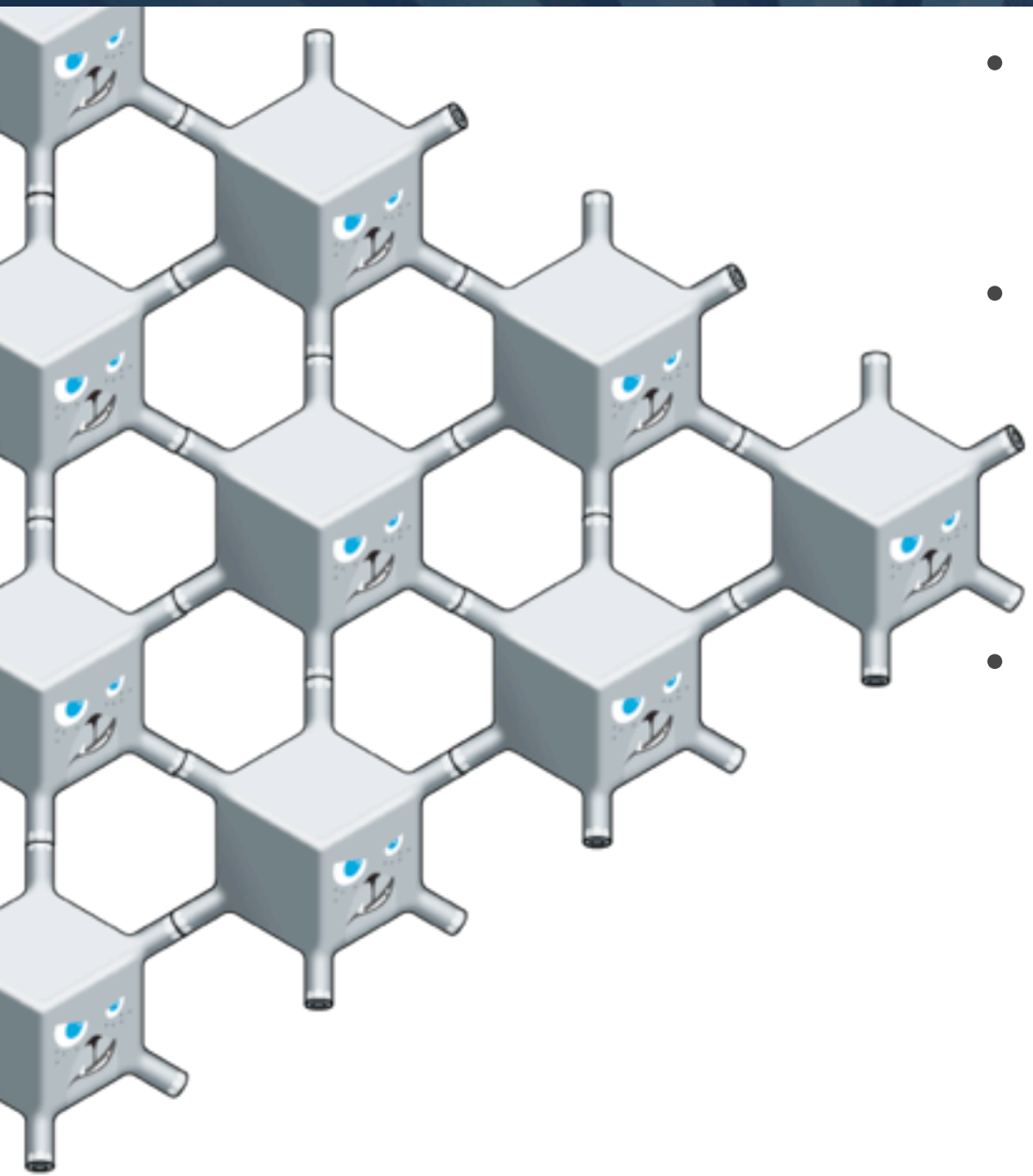
NAVER

Hangame

NHN

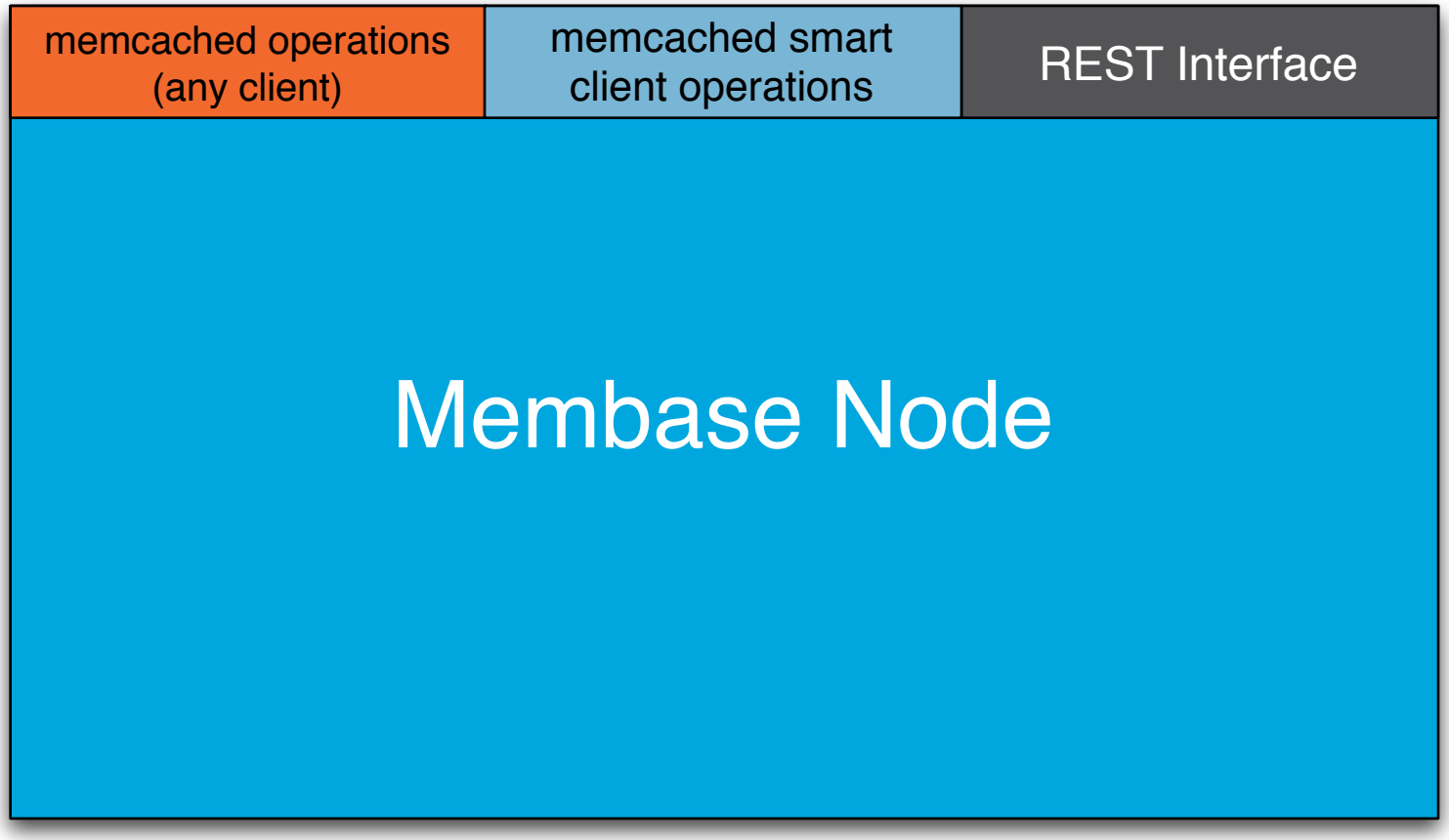
Membase Architecture

Clustering

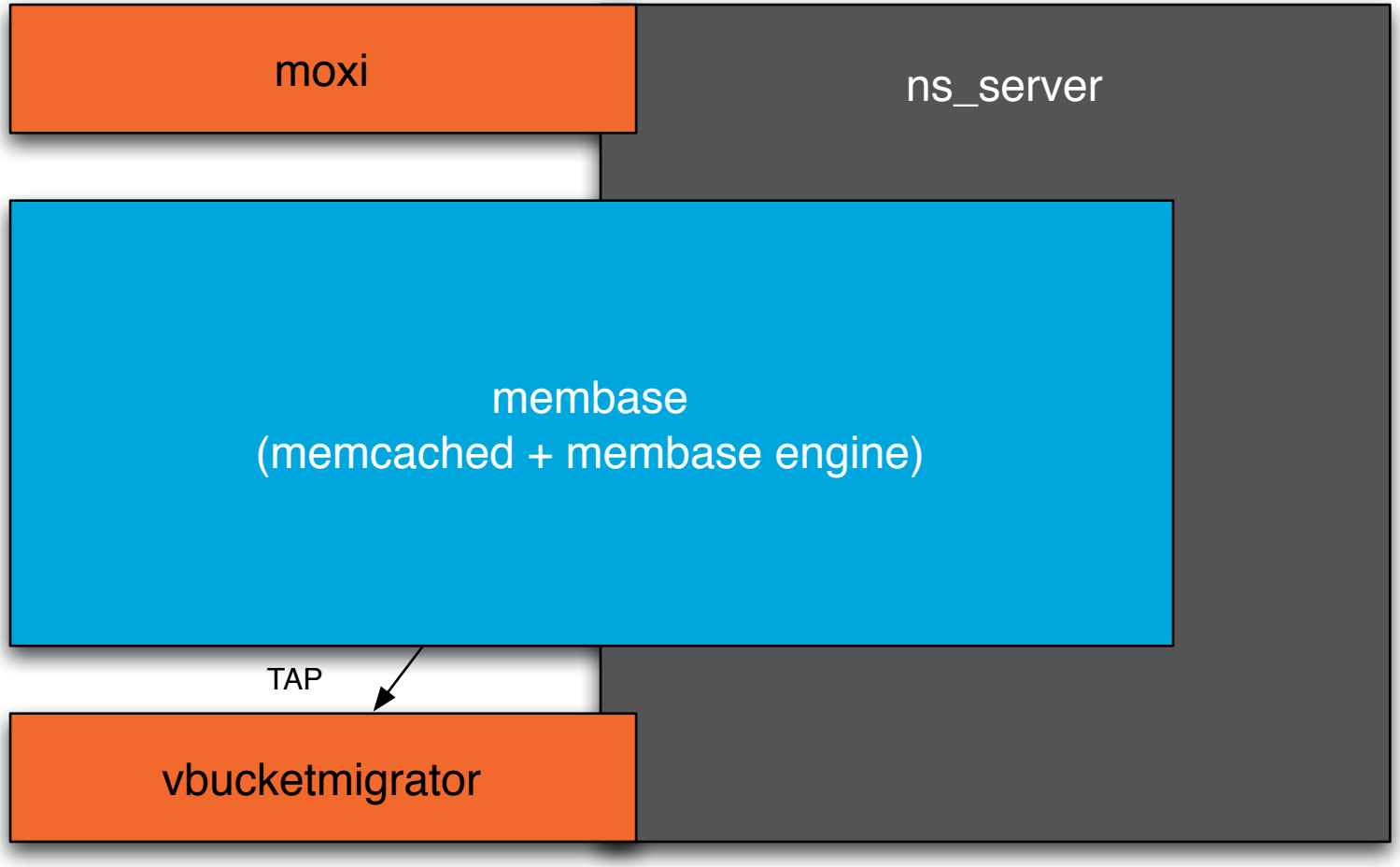


- Underlying cluster functionality based on erlang OTP
- Have a custom, vector clock based way of storing and propagating...
  - Cluster topology
  - vBucket mapping
- Collect statistics from many nodes of the cluster
  - Identify hot keys, resource utilization

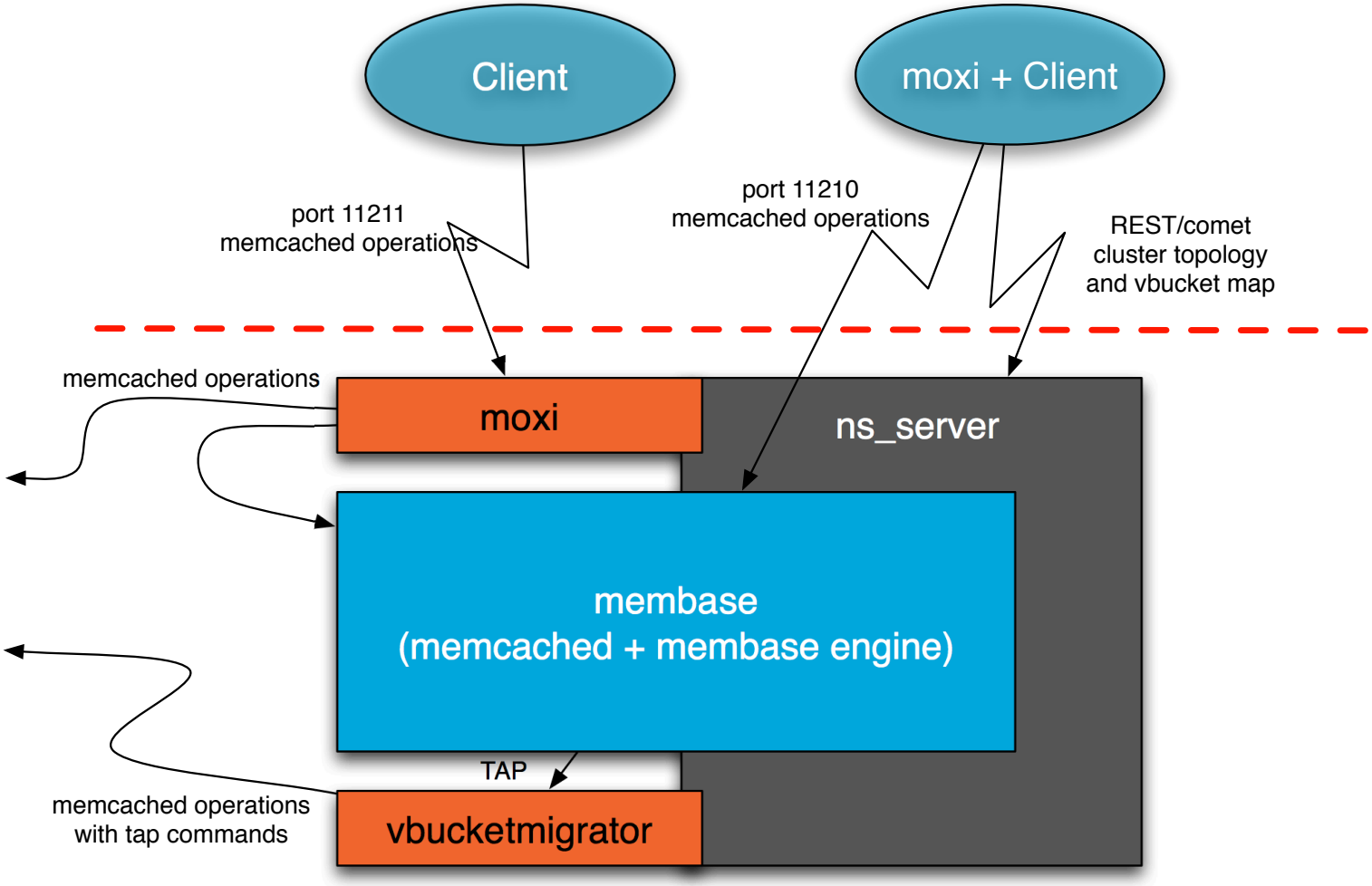
A Membase Node



A Membase Node: Component View



Clients, nodes and other nodes



Data buckets are secure Membase “slices”

Application user

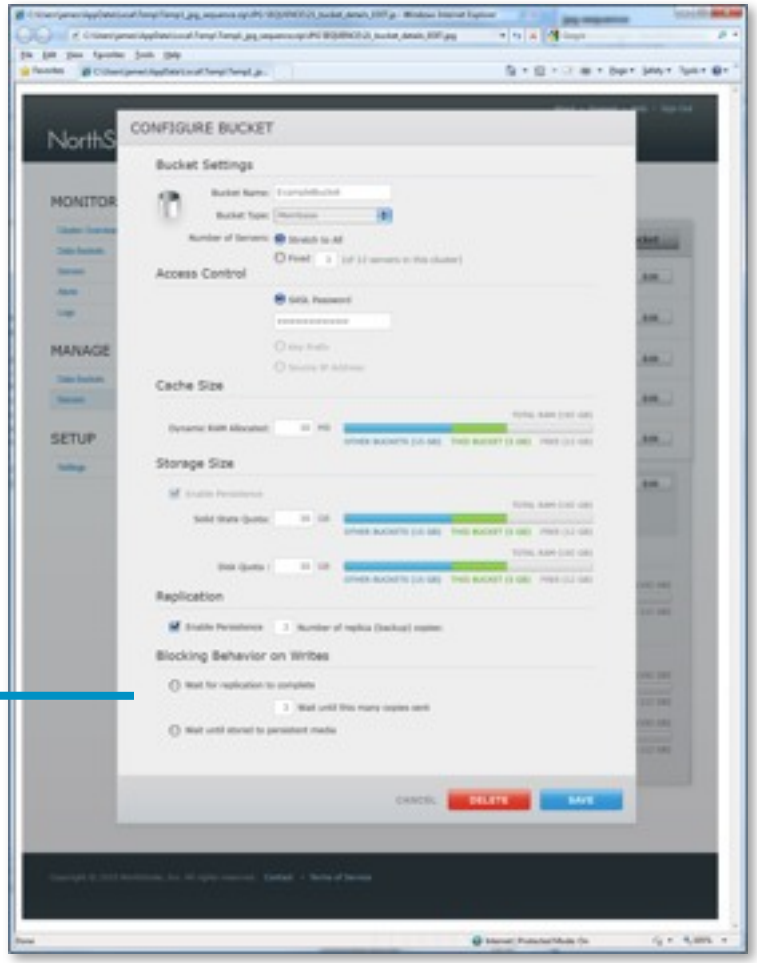
Web application server

Bucket 1

Bucket 2

Aggregate Cluster Memory and Disk Capacity

Membase data servers



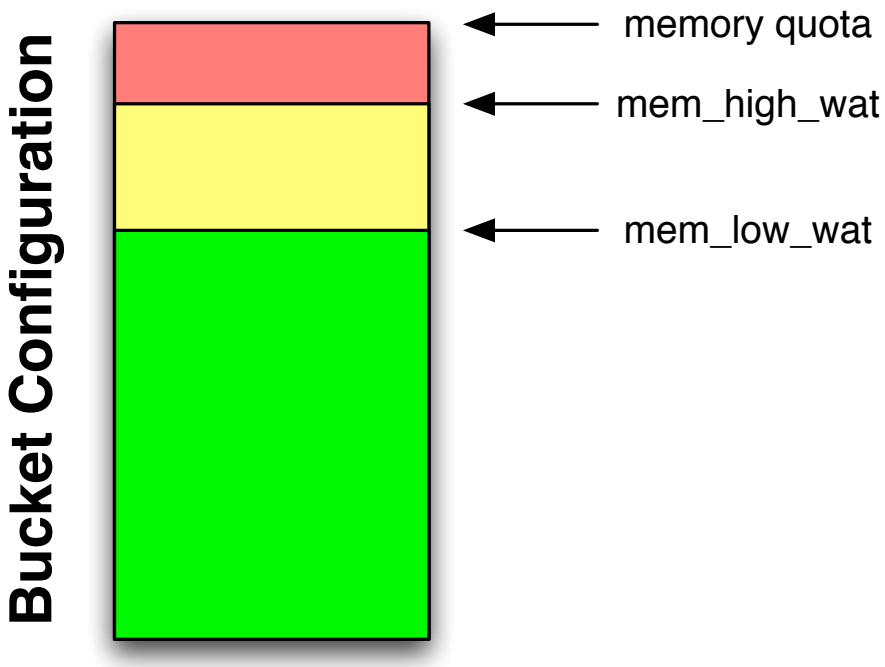
In the data center

On the administrator console

Disk > Memory

Dataset may have many items infrequently accessed. However, memcached has different behavior (LRU) than wanted with membase.

Still, traditional (most) RDBMS implementations are not 100% correct for us either. The speed of a miss is very, very important.



Membase Demo

The Future

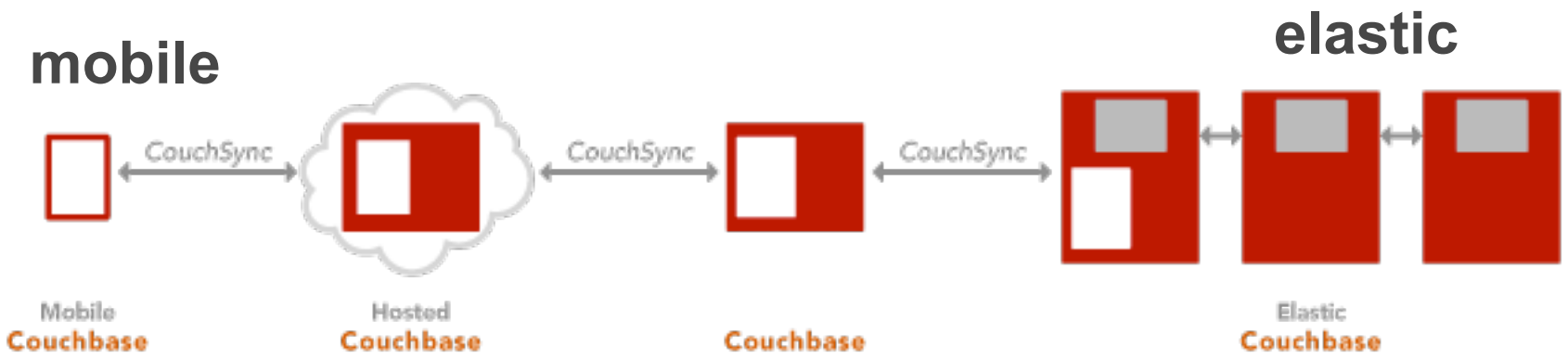
But first, an intro...

Apache CouchDB

What is Couchbase?

1+1 really does equal 3

Where will the merger take us



- Sub-document manipulation
- New approaches to indexing
- Simplified development

Attributions

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