Where do I put this Data?

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#lessql

SQL Databases Are Not A Panacea

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NO-SQL Databases Are Not A Panacea

SQL Databases Are
Not A Panacea

But!

NO-SQL Database
Are Not A Panacea

Who really needs a #lessql database?

Who really needs a #nosql database?

Probably not you!

Who really needs a #nosql database?

Probably not you!

Unless you do your homework first...

Limitations of SQL

Don't think #NOSQL

Think #LESSQL

Hybrid systems are
where it's at

Find a small part of your application that has pain because of the sql database and port just that part to one of these systems

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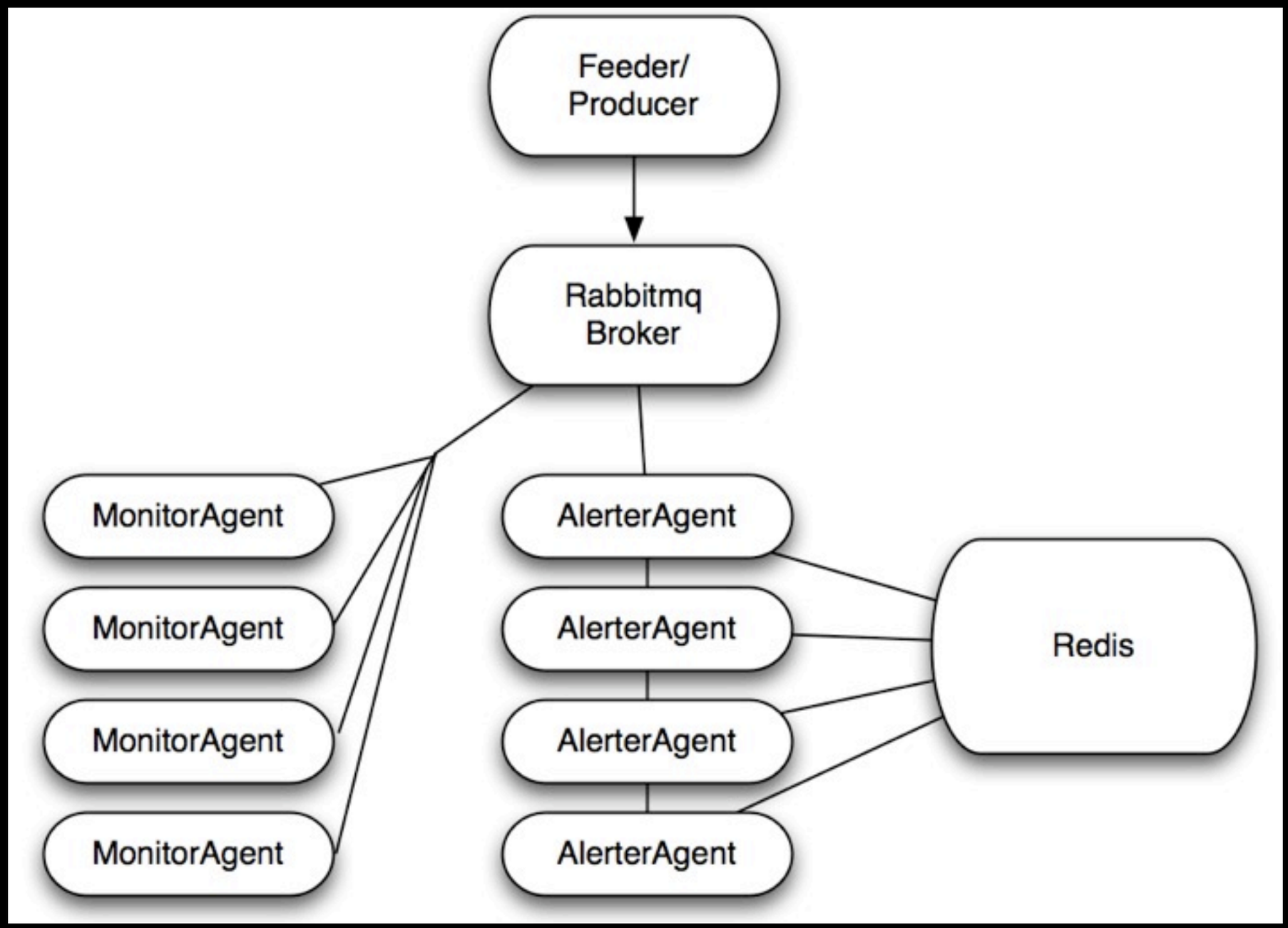
rinse ... repeat...

Example


Feeder/
Producer
Rabbitmq
Broker
MonitorAgent
MonitorAgent
MonitorAgent
MonitorAgent
AlerterAgent
AlerterAgent
AlerterAgent
AlerterAgent
Redis

The Players

- Redis
- Tokyo*
- MongoDB
- Riak
- Cassandra
- Dynomite

- Fast, in memory key/value store
- Async disk persistence
- STRING, LIST and SET data types
- Perfect Data Structure/State/Cache Server

http://code.google.com/p/redis/
http://github.com/ezmobius/redis-rb

Pros:

Very Fast(110k/ops/sec)

High Level Data Types

Sequential IO Only

Very Clean C Code

Cons:

Data Set must fit in Memory

Possible to lose some data between syncs(configurable)

Scales horizontally via consistent hashing in the client

Use Redis when you want:

As fast as you can get

Data structure sharing between ruby processes

A better, persistent memcached

Hit counters, rate limiters, circular log buffers and sessions

- Large data workhorse
- Native, memcached and http interfaces
- Fast with full disk persistence
- Key/value with Lua extensions available

http://1978th.net/tokyocabinet/
http://1978th.net/tokyotyrant/
http://github.com/jmettraux/rufus-tokyo
http://copiousfreetime.rubyforge.org/tyrantmanager/

Pros:
Fast and Stable
Ability to store Large amounts of data
Embeded Lua in the tyrant server
Pluggable storage engines

Cons:
No data types for values (table db type excluded)
Some issues with data sets larger then 70Gigs

Scales horizontally via consistent hashing in the client
Tyrant also supports master/master and master /slave replication

Use Tokyo when you want:

As fast as you can get with synchronous writes

Store large amounts of persistent data

Use the smallest amount of disk space for your data set

Tunable RAM usage

- JSON document database
- the ‘mysql’ of key/value stores
- Fast but flexible query engine
- Support for sharding baked in(sorta)
- Replication

http://www.mongodb.org
http://github.com/mongodb/mongo-ruby-driver
http://github.com/jnunemaker/mongomapper

Pros:

Schemaless

Advanced query features

Relatively Fast

GridFS

Easy transition from SQL databases

Active development

Cons:

AutoSharding not ready yet

No Transactions

Scales horizontally via auto sharding

Supports master/slave replication for failover

Use MongoDB when you want:

Very Fast with synchronous writes

Store large amounts of schemaless data

Great for logging, stats collection

Very powerful query API and indexing capabilities

riak

- Document oriented database
- HTTP/JSON query interface
- Erlang map/reduce query interface
- Decentralized, just add or remove nodes to scale

http://riak.basho.com/

riak

Pros:
Schemaless
No master node/share nothing
Add/remove nodes easily to scale up/down

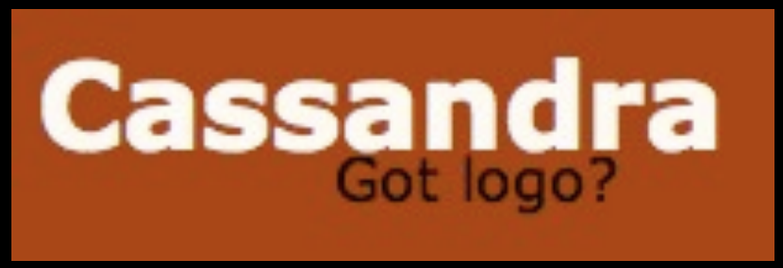
Cons:
Still young project
Not much documentation

Scales horizontally via shared nothing, hinted handoff and consistent hashing. Definitely one to watch

riak

Use Riak when you want:

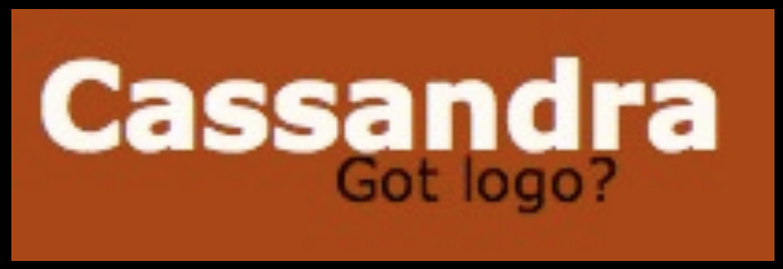
Ease of operations when adding/removing nodes



- Eventually consistent, distributed, structured key/value store
- Cross between Big Table and Dynamo
- Column Families provide higher level data models then most key/value stores
- Truly add or remove nodes to scale capacity

http://incubator.apache.org/cassandra/

http://blog.evanweaver.com/articles/2009/07/06/up-and-running-with-cassandra/



Pros:

Always writable

Horizontally scalable

Addnodes easily to scale write capacity

Easy to get common sorted queries(recent blog posts etc)

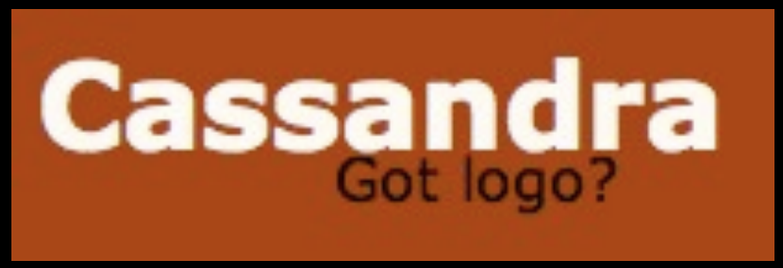
Cons:

Restart whole system when making schema changes

Not much documentation

Rough edges abound

Scales horizontally via automatic replication, even tunable across racks/data centers



Use Cassandra when you want:

Truly just add nodes to scale out

Fairly rich data model, sorted supercolumn familes

Store truly large amounts of data

- Eventually consistent, distributed, key/value store

- Based on Amazon's Dynamo Papers
- Data Partitioning, versioning and read repair
- Written in Erlang

http://github.com/cliffmoon/dynomite

Pros:
Always writable
Horizontally scalable
Good for storing large binaries
Add nodes to repartition
Gossip protocol
Pluggable storage engines

Cons:
New partitions come online before they are *ready*
Migration is very painful
Still beta quality but used in production at powerset

Scales horizontally via automatic replication, talk to any node in the cluster from clients

Use Dynomite when you want:

Scale writes by adding nodes

Store large binaries(like image assetts)

Nice web admin interface

Thats great but which one should I use?

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Unless you have good reasons stick with Redis, Tokyo and MongoDB for now

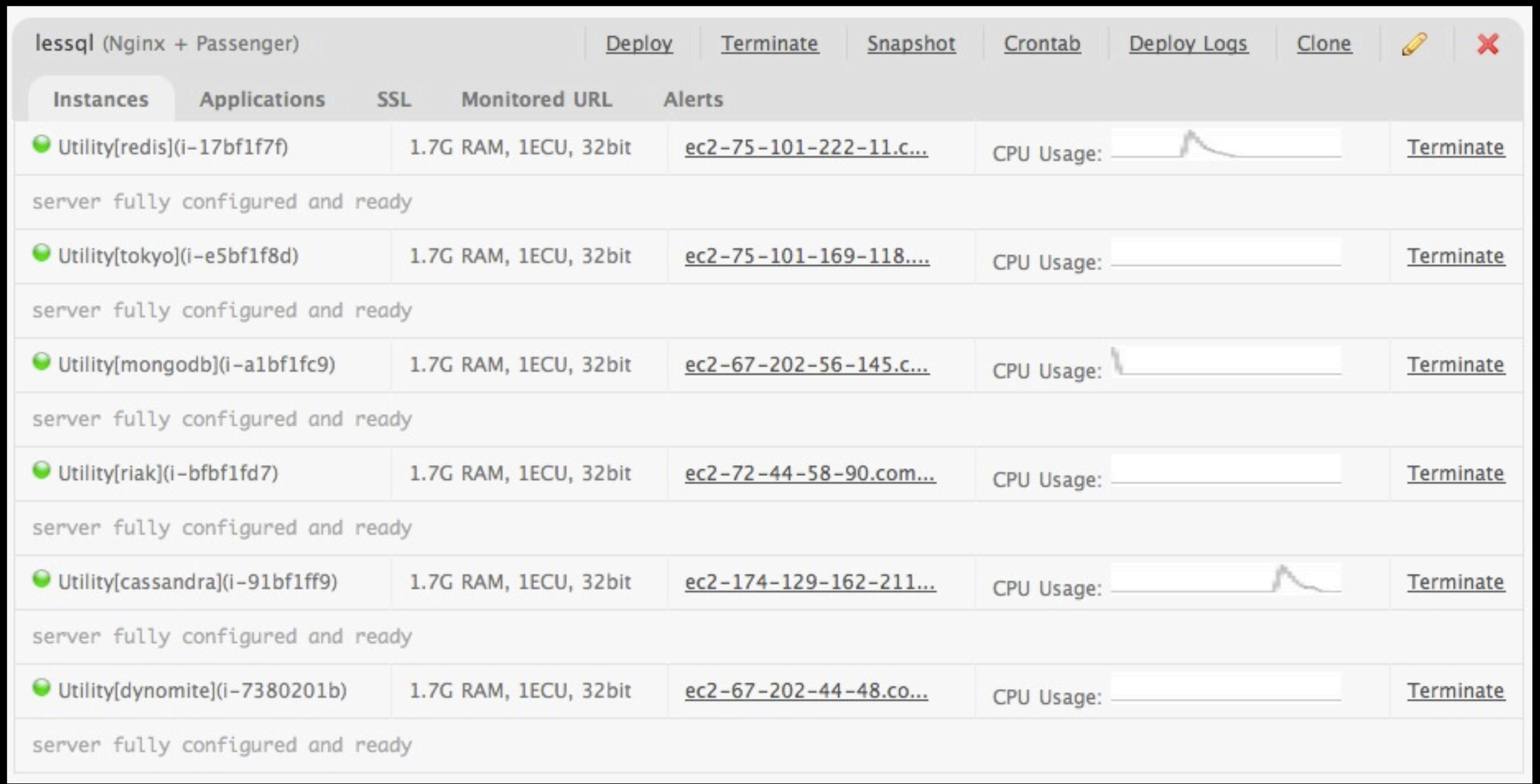
Thats great but which one should I use?

Unless you have good reasons stick with Redis, Tokyo and MongoDB for now

But keep an eye on the others for truly add node to scale out capacity

Chef recipes to configure all of these on the Engine Yard Cloud

http://github.com/ezmobius/ey-lessql



Pitfalls of #LESSQL

- No Referential Integrity
- Not as much tooling
- Almost non existent disaster recovery tools
- Not as much production, used in anger experience

Do not buy into the hype!
Most of you do not need this stuff. Relational databases scale well for 99% of use cases.

Don't do it because it's "Cool"

But if you do your homework, #LESSQL can be very compelling and very useful.

Please make informed decisions so you don't have to hire me to clean up your mess!

Questions?