Cassandra for Developers

WHAT IS CASSANDRA?

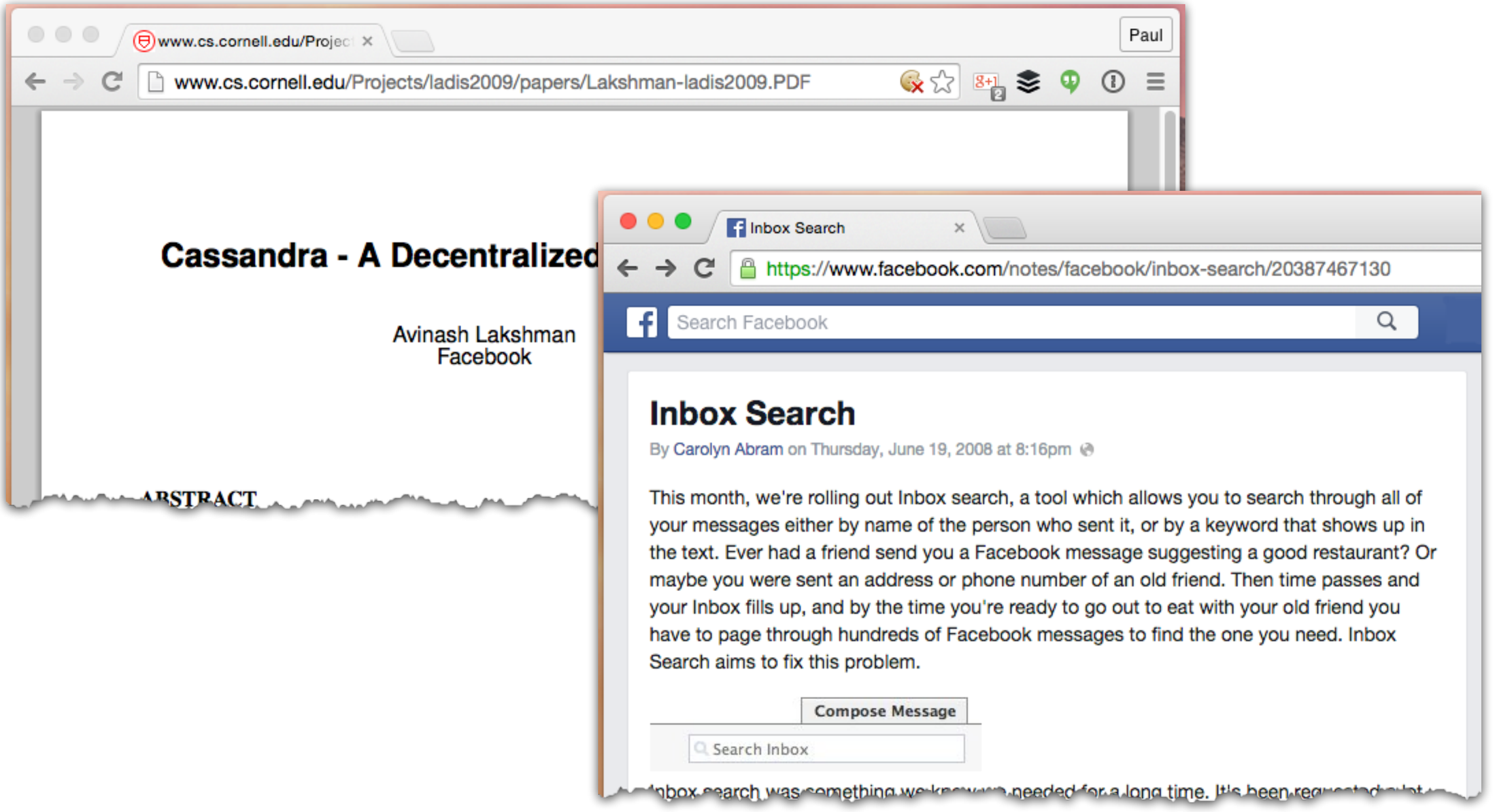
Paul O'Fallon

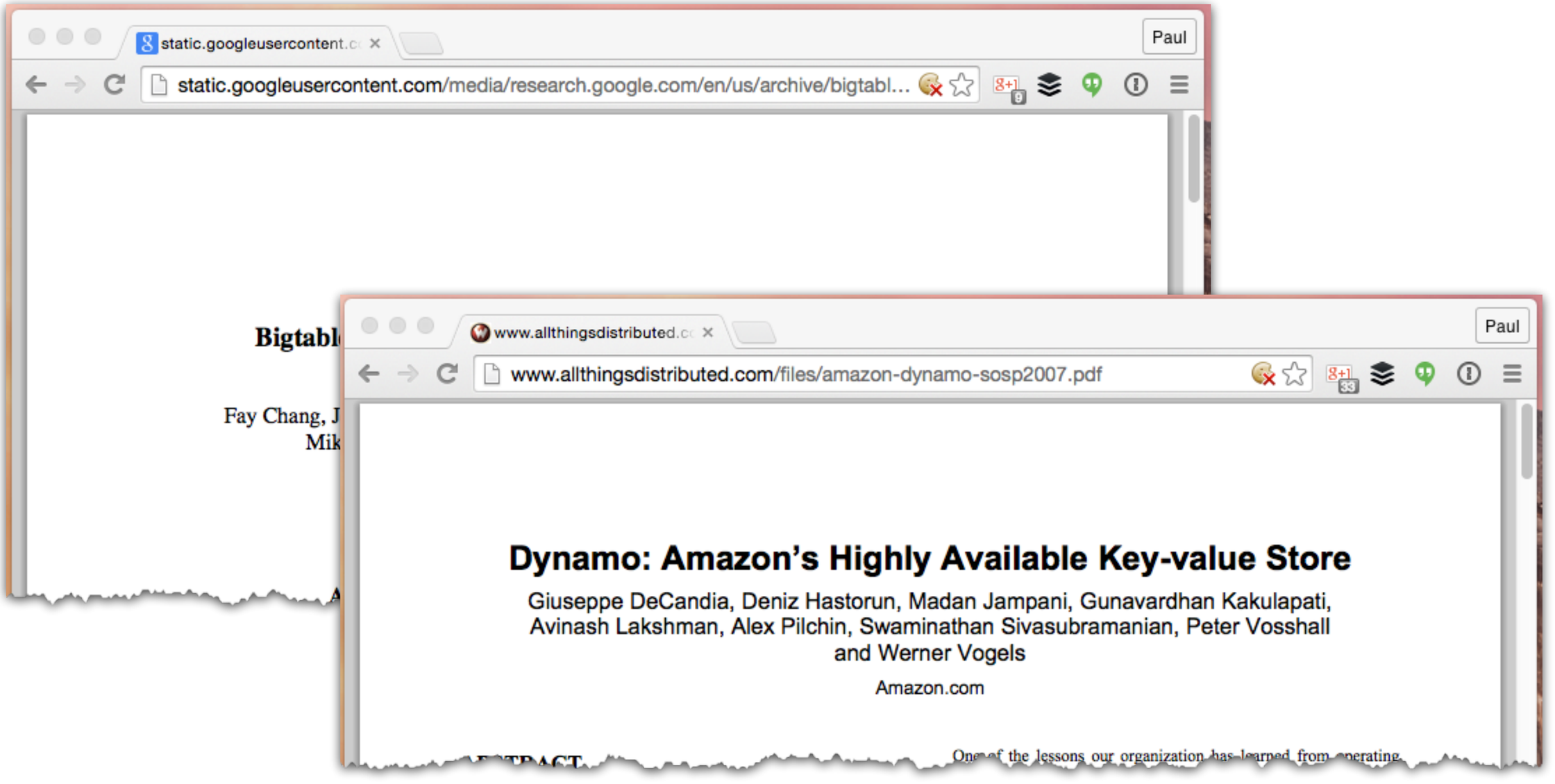
@paulofallon

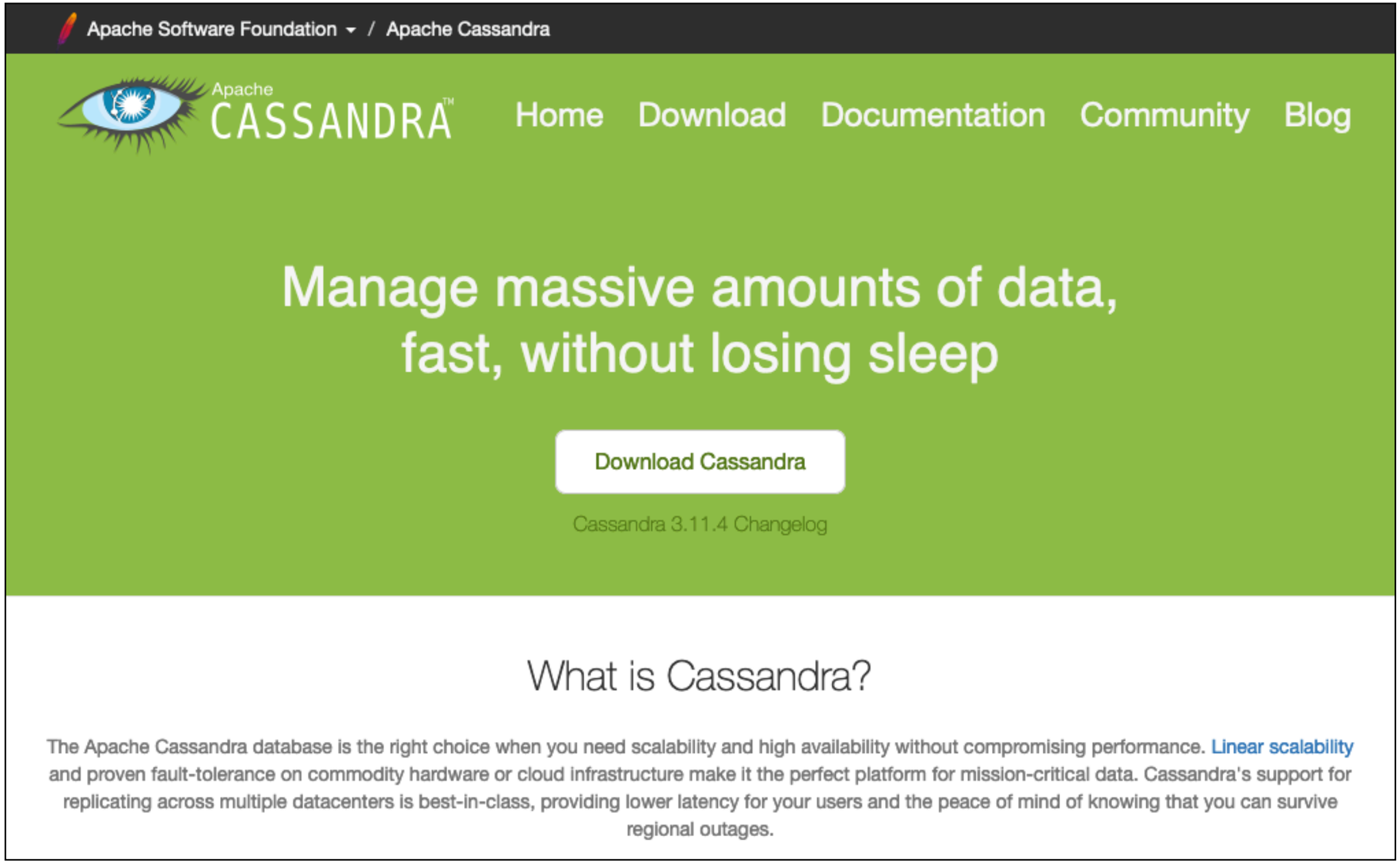
Overview

A brief history of Cassandra

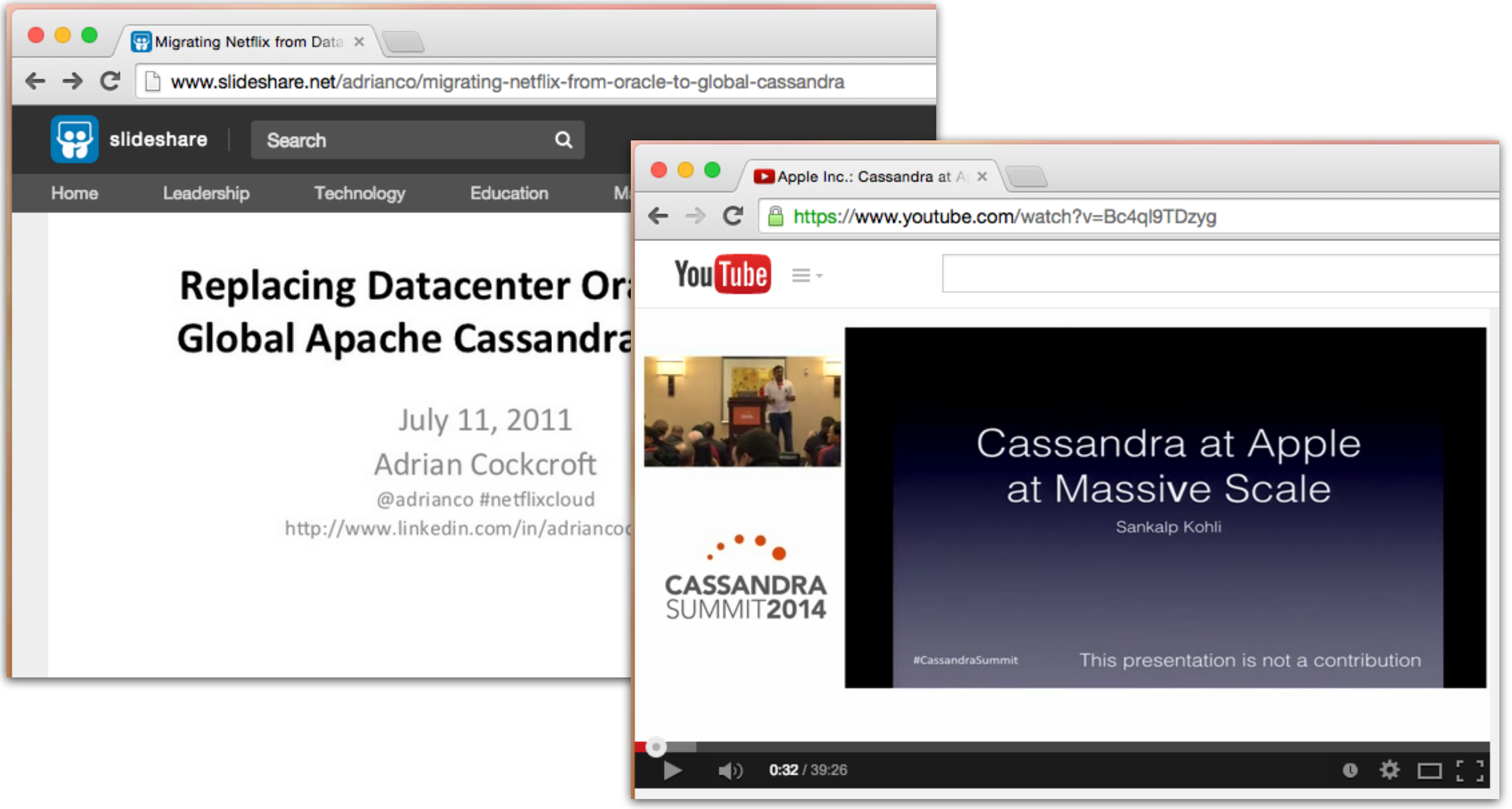
Topology of a Cassandra cluster


www.cs.cornell.edu/Projec
Paul
www.cs.cornell.edu/Projects/ladis2009/papers/Lakshman-ladis2009.PDF
Cassandra - A Decentralized
Avinash Lakshman
Facebook
ABSTRACT
Inbox Search
https://www.facebook.com/notes/facebook/inbox-search/20387467130
Search Facebook
Inbox Search
By Carolyn Abram on Thursday, June 19, 2008 at 8:16pm
This month, we're rolling out Inbox search, a tool which allows you to search through all of your messages either by name of the person who sent it, or by a keyword that shows up in the text. Ever had a friend send you a Facebook message suggesting a good restaurant? Or maybe you were sent an address or phone number of an old friend. Then time passes and your Inbox fills up, and by the time you're ready to go out to eat with your old friend you have to page through hundreds of Facebook messages to find the one you need. Inbox Search aims to fix this problem.
Compose Message
Search Inbox


static.googleusercontent.com/media/research.google.com/en/us/archive/bigtabl...
Paul
Bigtabl
Fay Chang, J
Mik
www.allthingsdistributed.com/files/amazon-dynamo-sosp2007.pdf
Paul
Dynamo: Amazon's Highly Available Key-value Store
Giuseppe DeCandia, Deniz Hastorun, Madan Jampani, Gunavardhan Kakulapati,
Avinash Lakshman, Alex Pilchin, Swaminathan Sivasubramanian, Peter Vosshall
and Werner Vogels
Amazon.com



https://cassandra.apache.org/


Migrating Netflix from Data
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Global Apache Cassandra
July 11, 2011
Adrian Cockcroft
@adrianco #netflixcloud
http://www.linkedin.com/in/adriancoc
Apple Inc.: Cassandra at A
https://www.youtube.com/watch?v=Bc4ql9TDzyg
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CASSANDRA
SUMMIT2014
Cassandra at Apple
at Massive Scale
Sankalp Kohli
#CassandraSummit
This presentation is not a contribution
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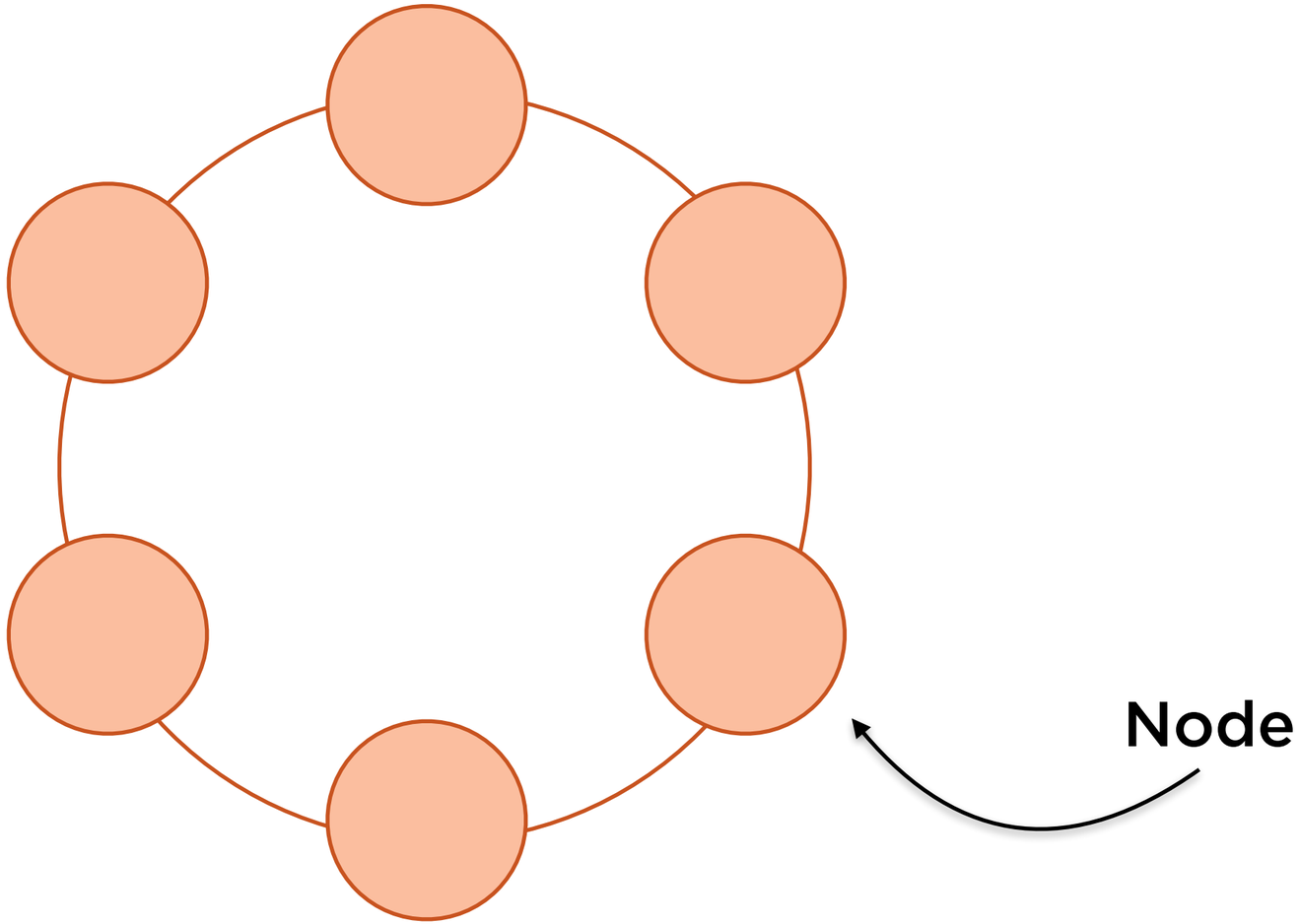
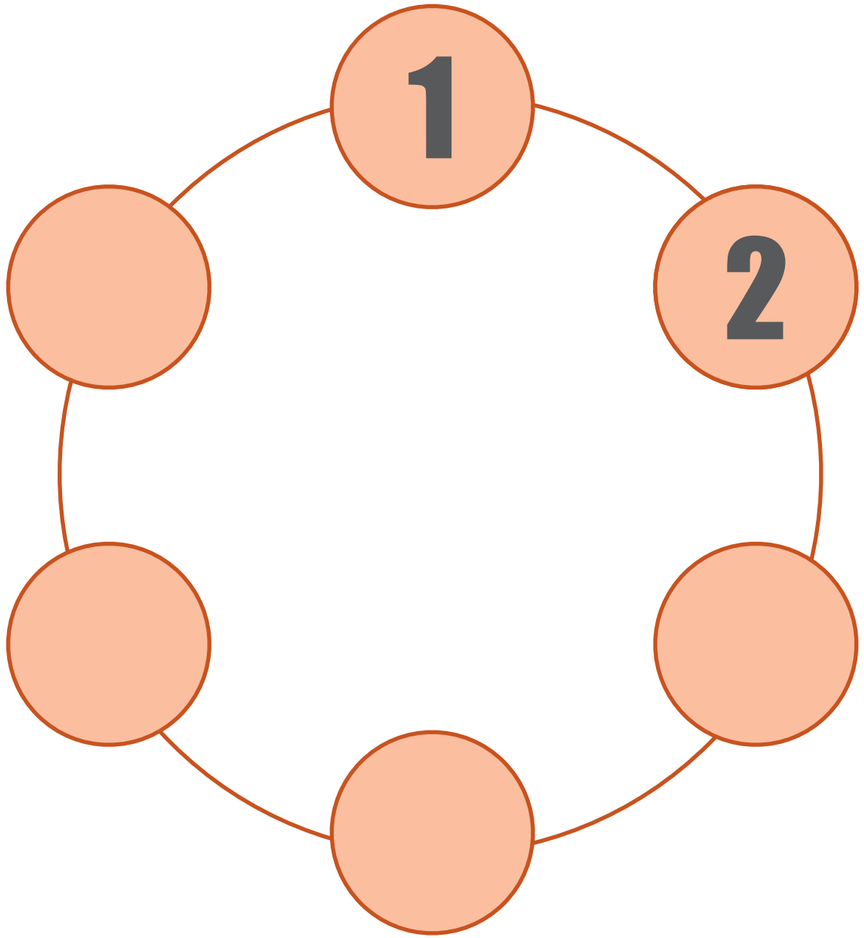

Node

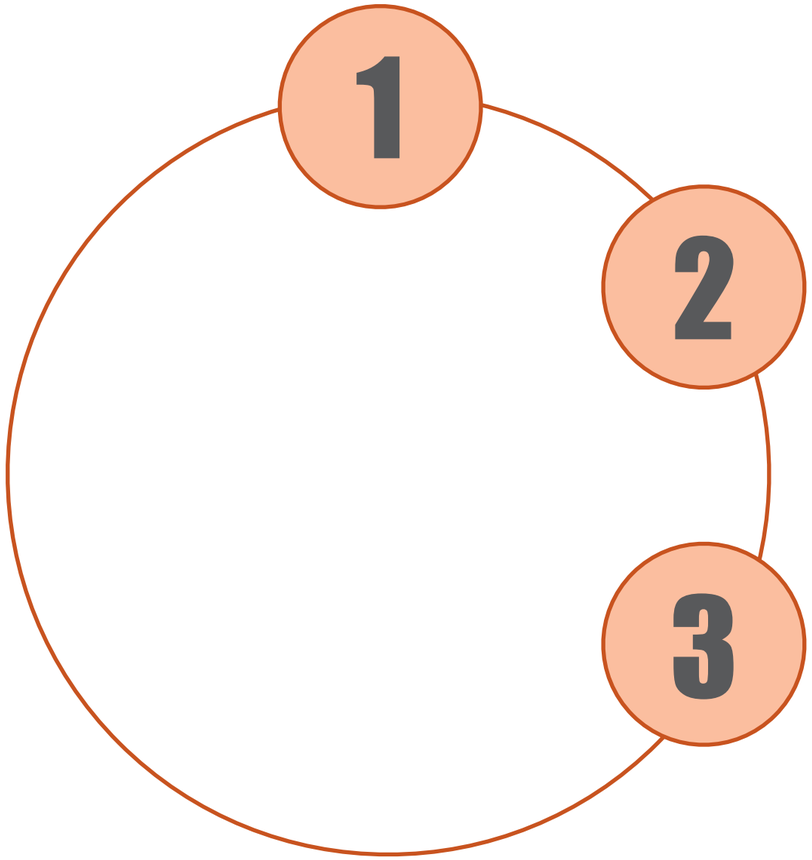


Storing Data in Cassandra

Range of all possible token values

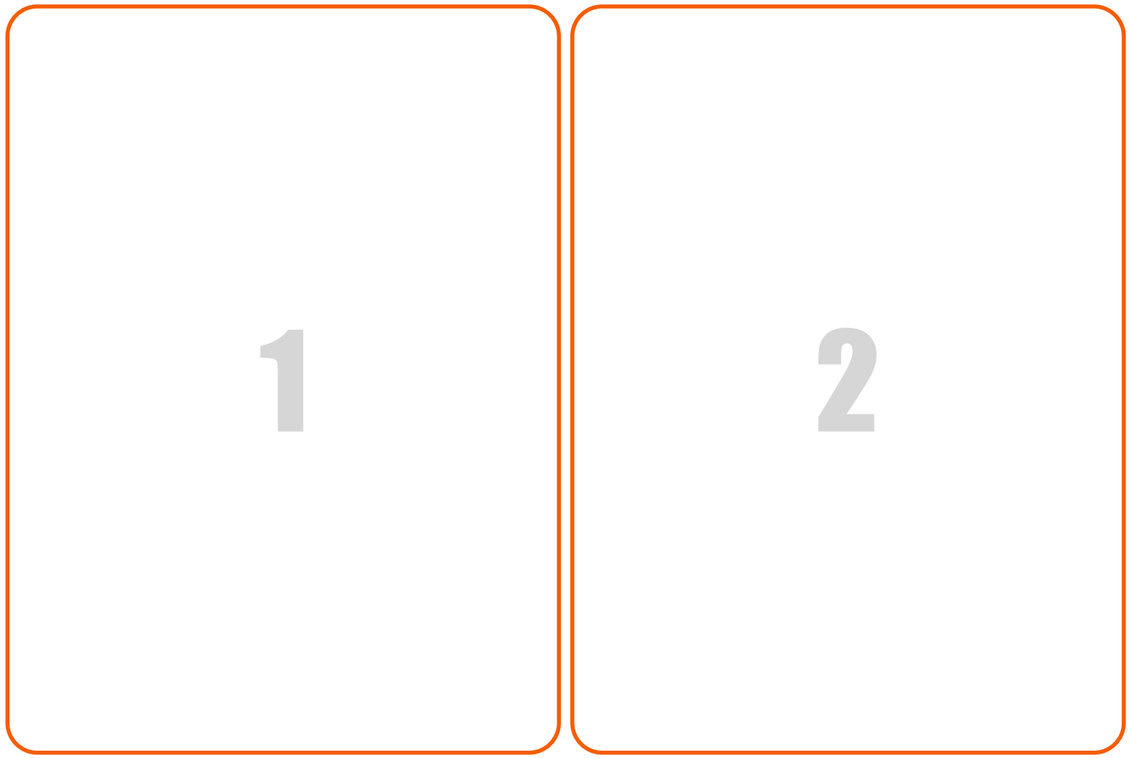
1

-2^{63} to $+2^{63}$



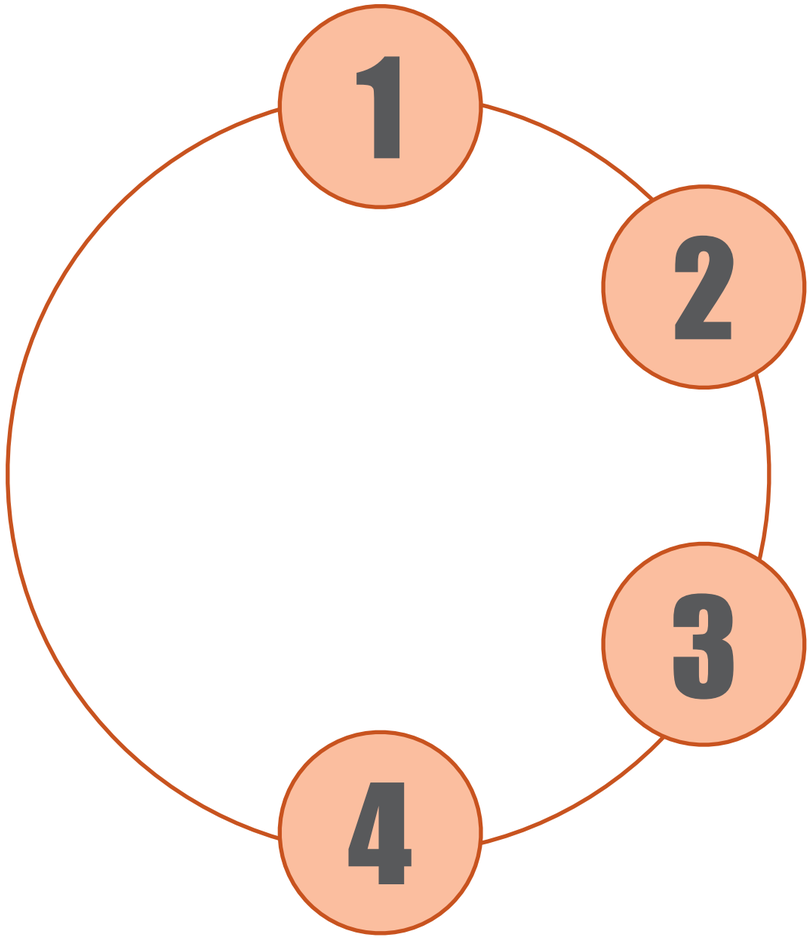
Storing Data in Cassandra

Range of all possible token values

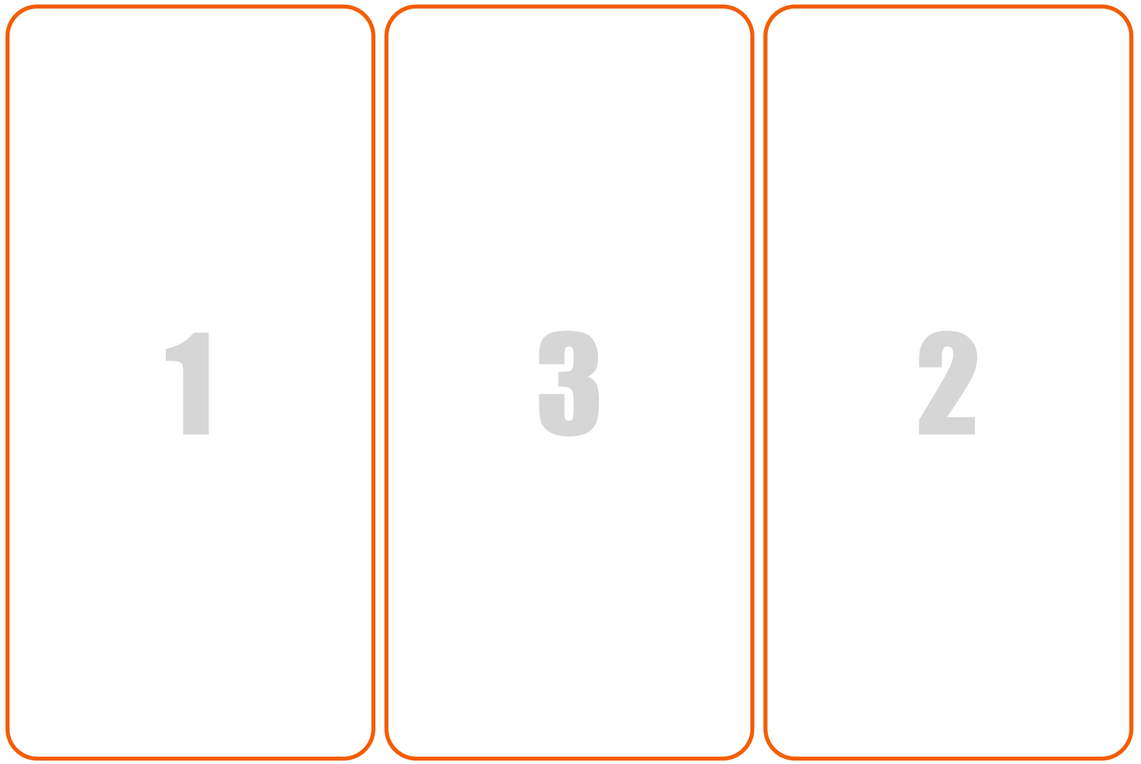


-2^{63} to $+2^{63}$

Storing Data in Cassandra

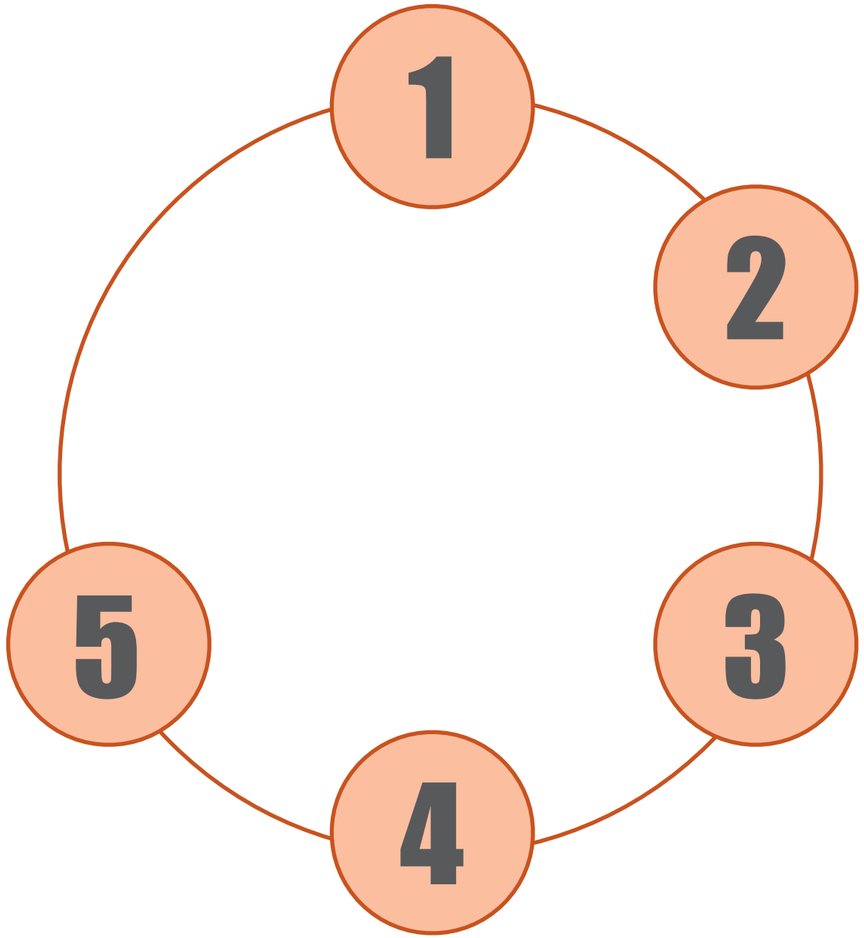


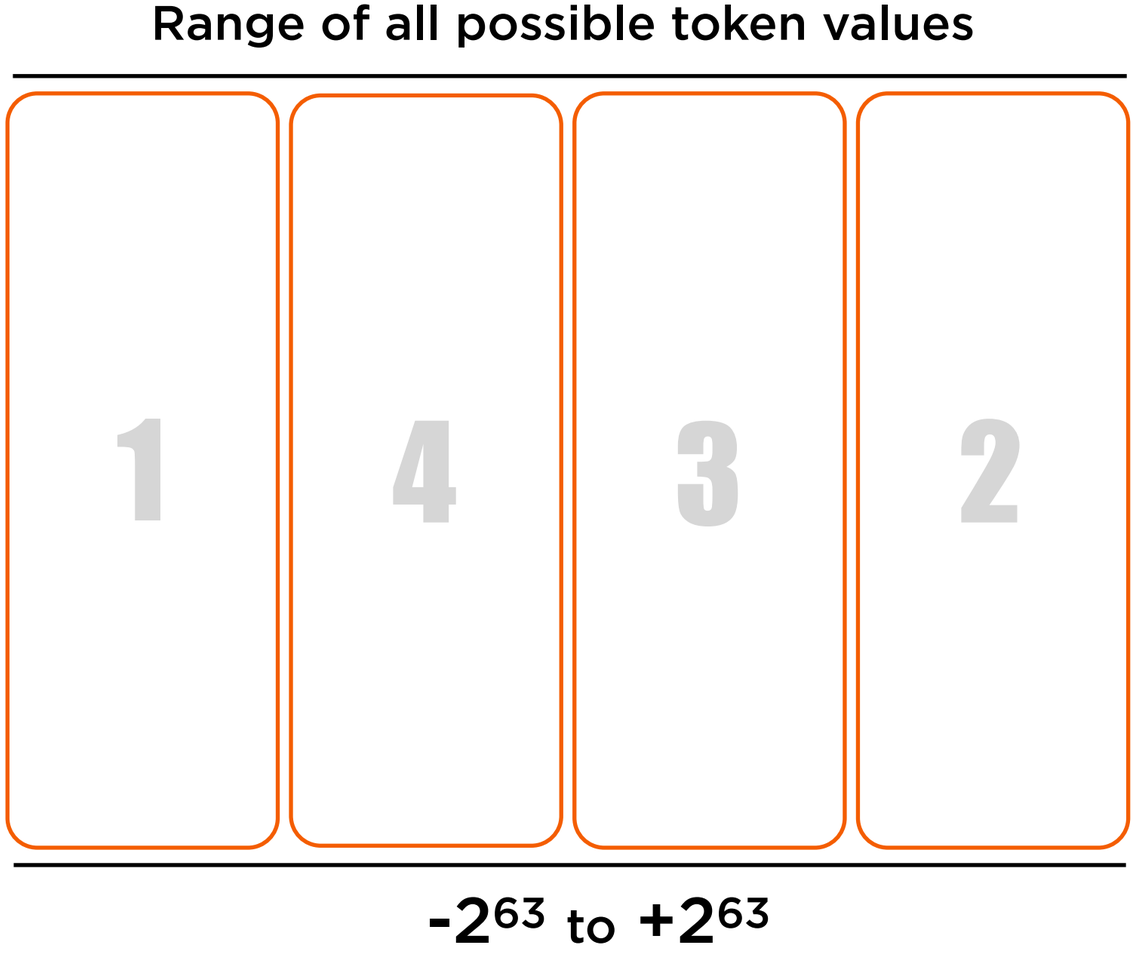
Range of all possible token values

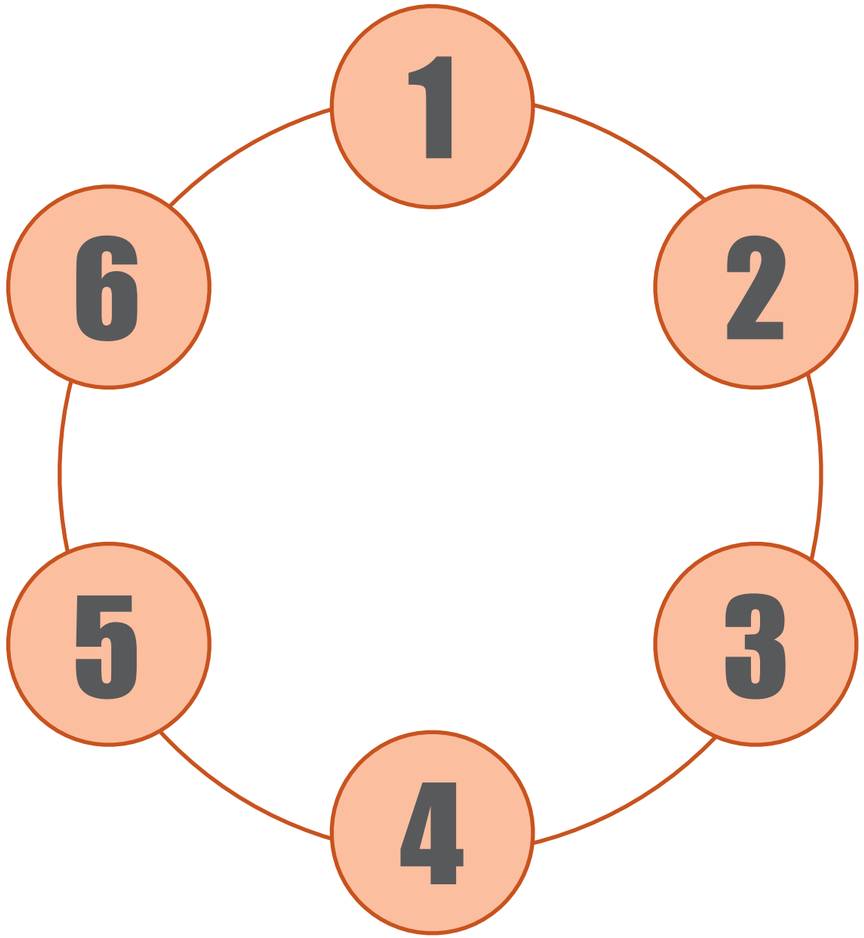


-2^{63} to $+2^{63}$

Storing Data in Cassandra

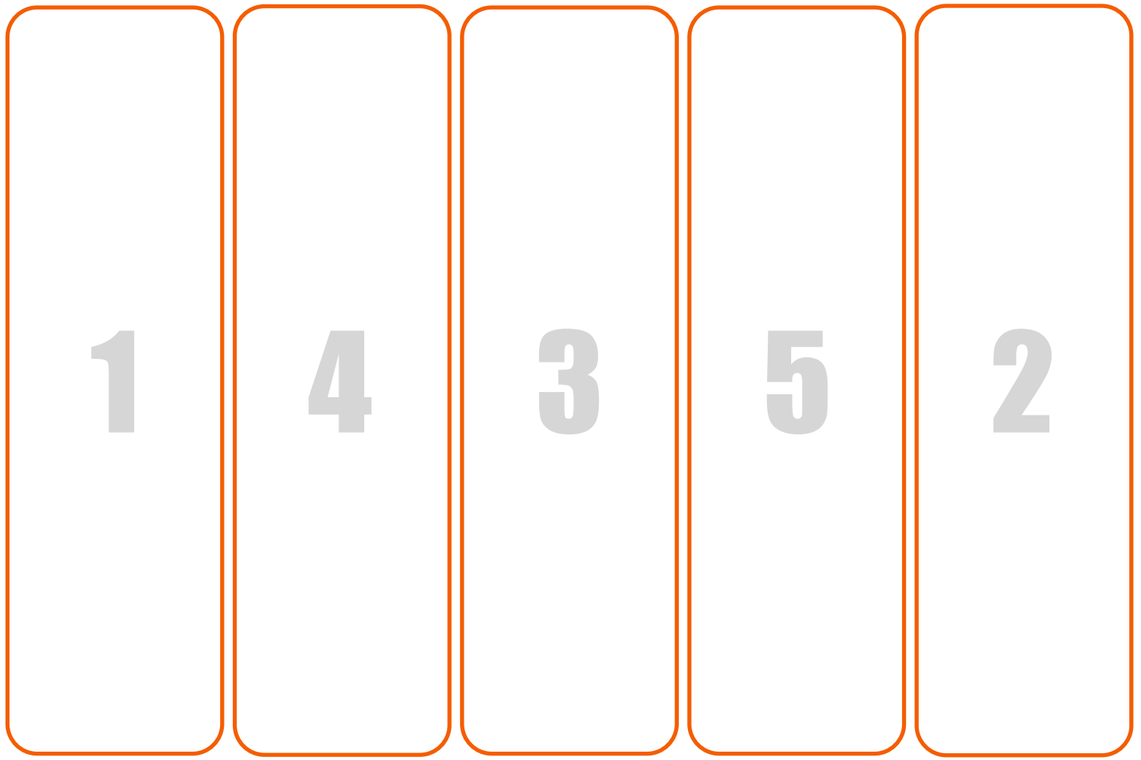






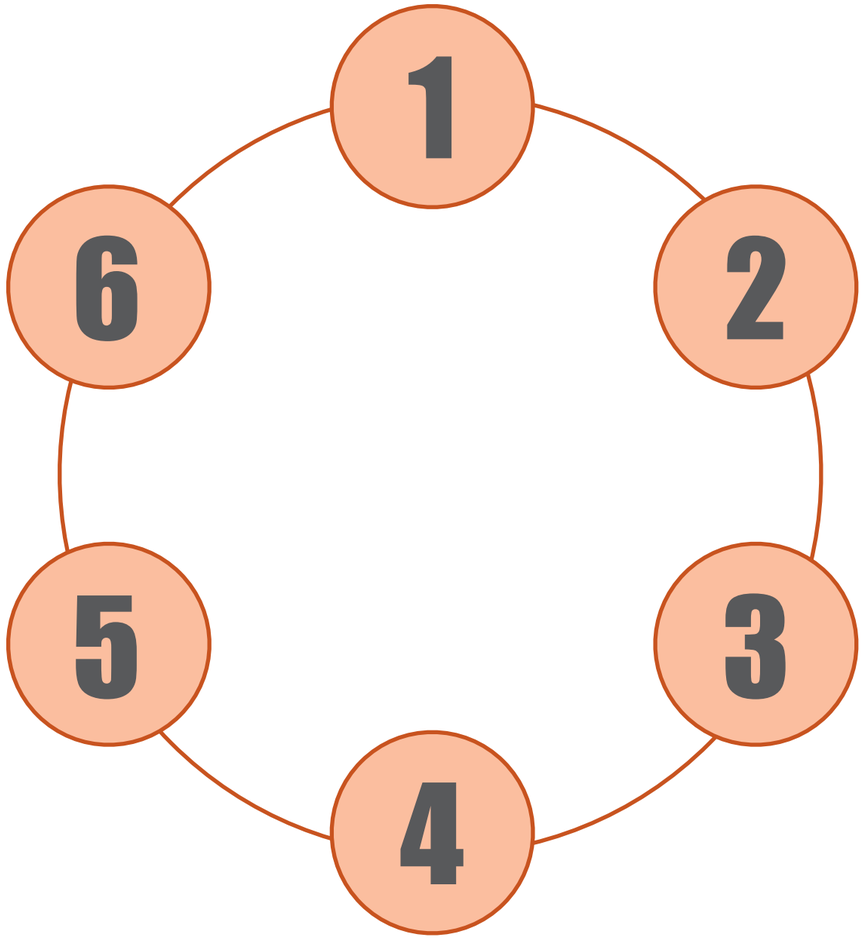
Storing Data in Cassandra

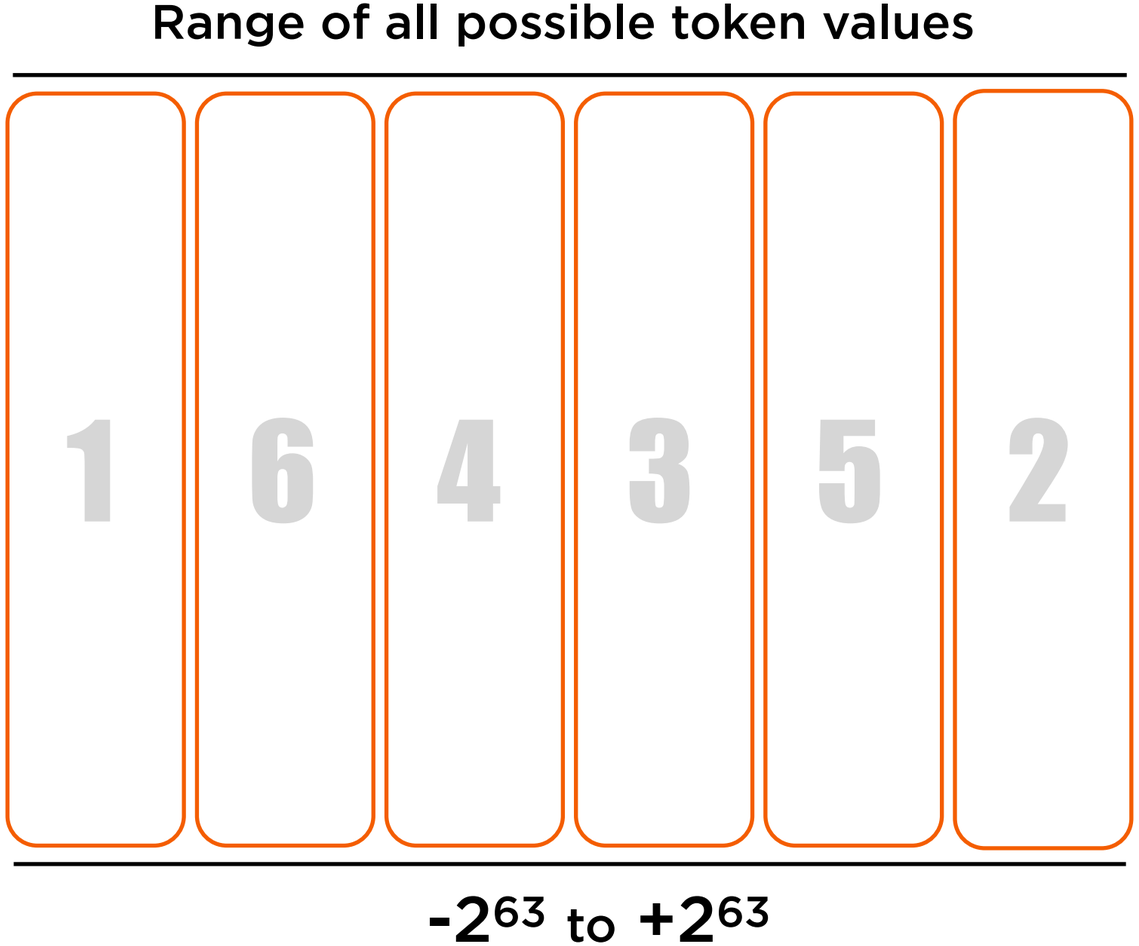
Range of all possible token values



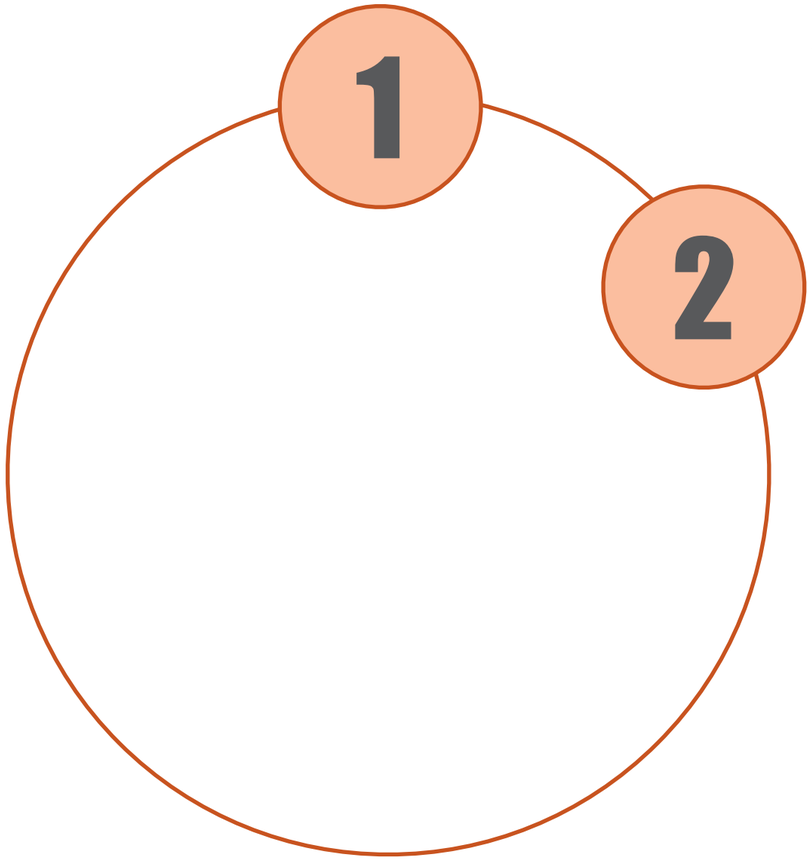
-2^{63} to $+2^{63}$

Storing Data in Cassandra





Storing Data with Virtual Nodes

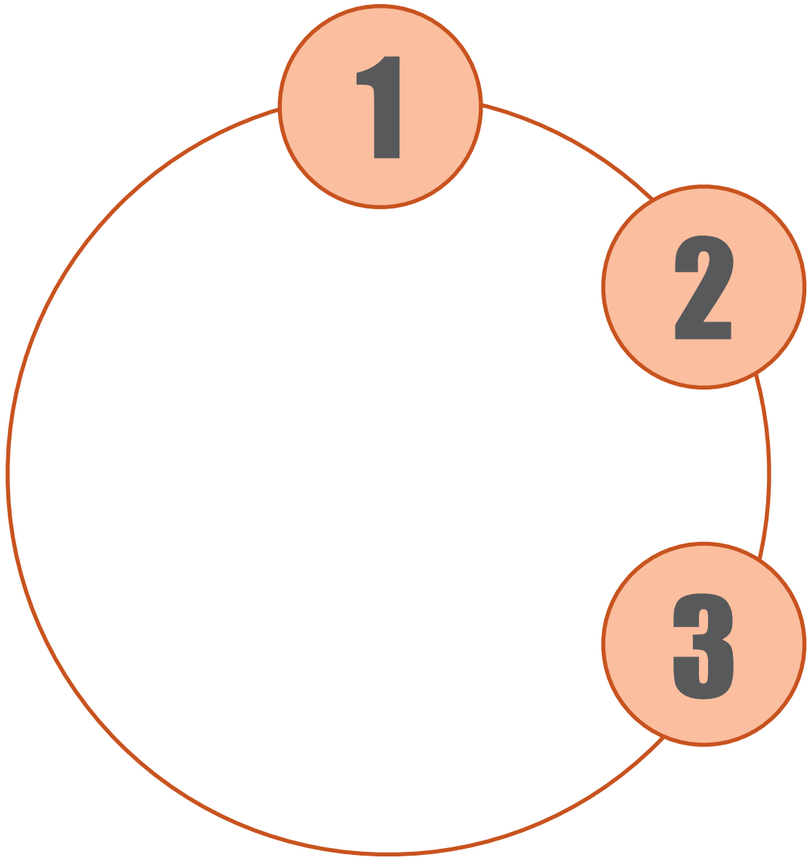


Range of all possible token values

1	1
1	1

-2^{63} to $+2^{63}$

Storing Data with Virtual Nodes

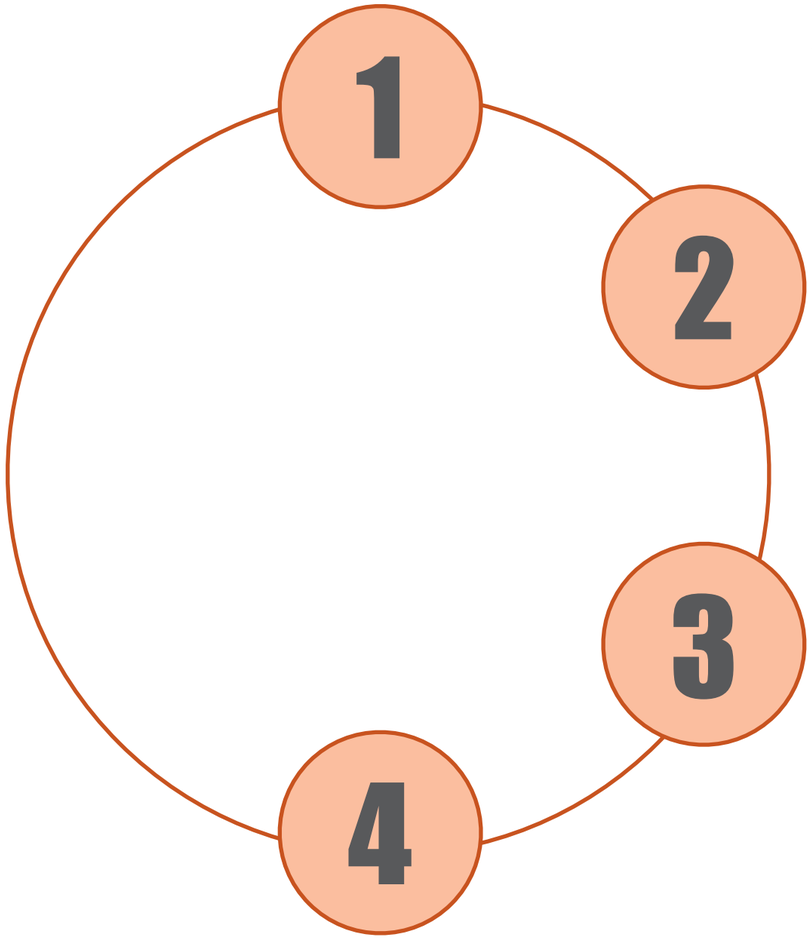


Range of all possible token values

1	2
2	1
1	2
2	1

-2^{63} to $+2^{63}$

Storing Data with Virtual Nodes

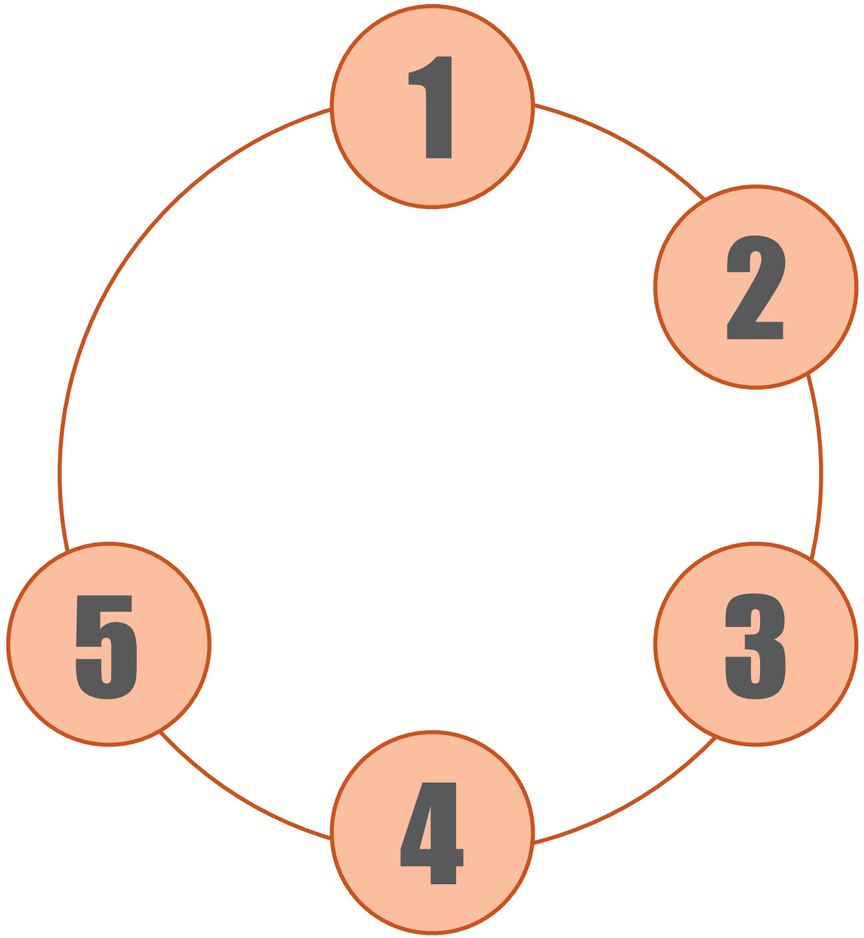


Range of all possible token values

1	2	3
2	3	1
1	2	3
3	2	1

-2^{63} to $+2^{63}$

Storing Data with Virtual Nodes

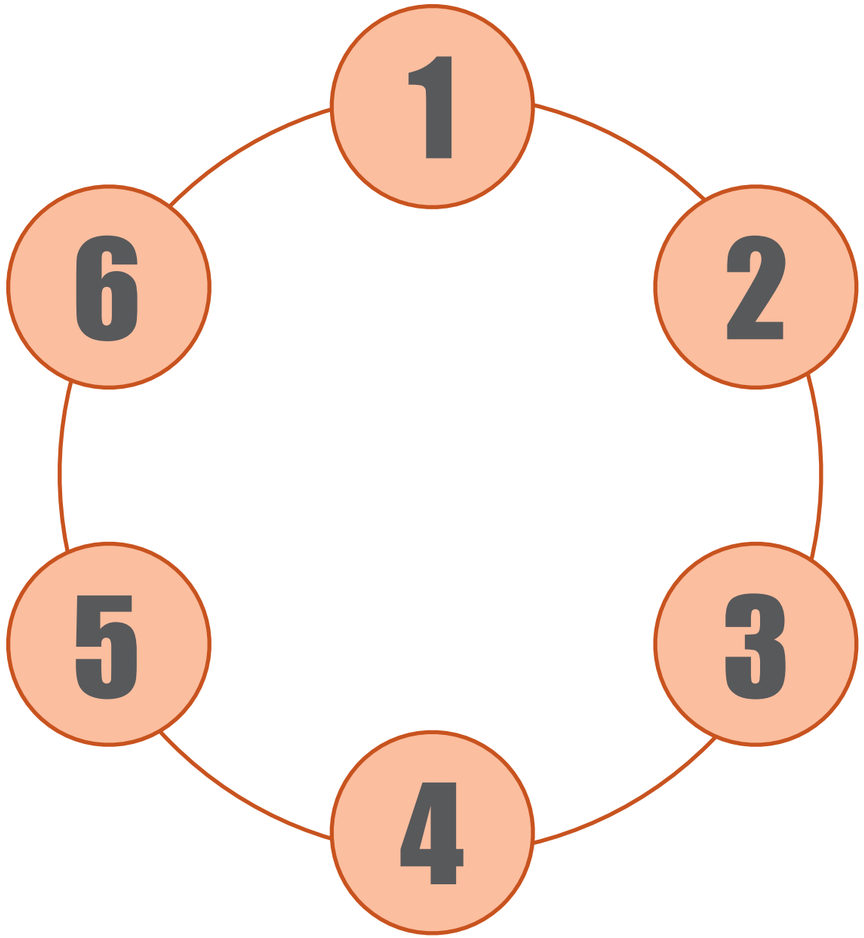


Range of all possible token values

1	2	3	4
2	4	3	1
4	1	2	3
3	2	4	1

-2^{63} to $+2^{63}$

Storing Data with Virtual Nodes

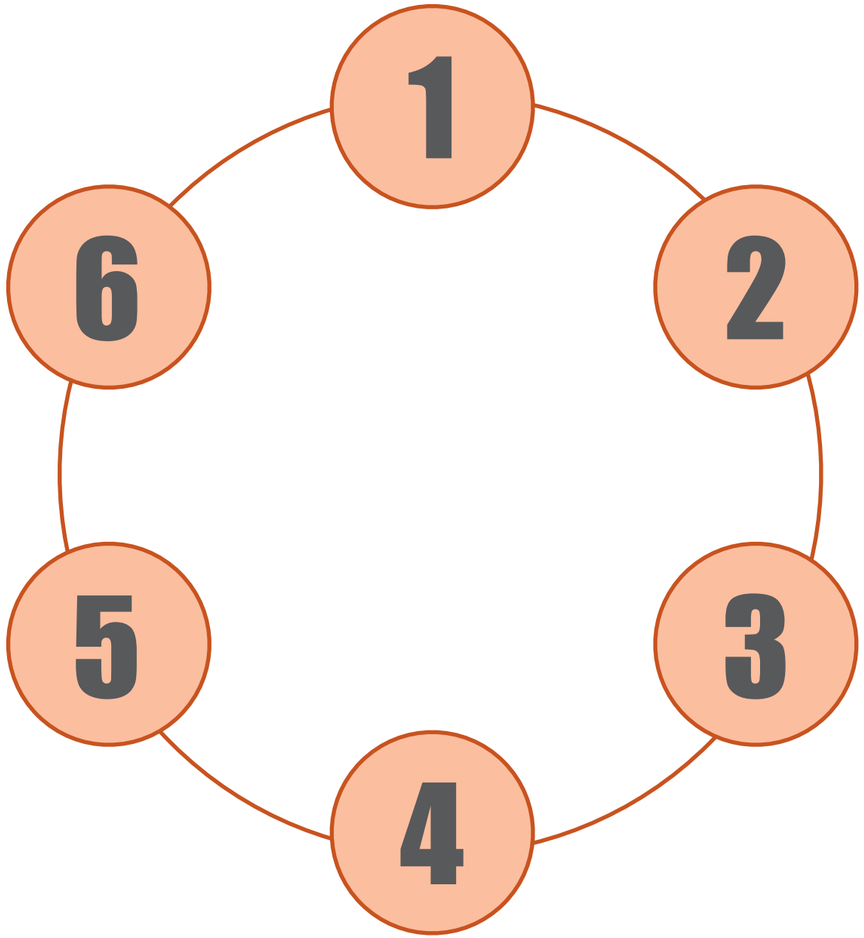


Range of all possible token values

1	2	3	5	4
5	2	4	3	1
4	1	2	3	5
3	5	2	4	1

-2^{63} to $+2^{63}$

Storing Data with Virtual Nodes

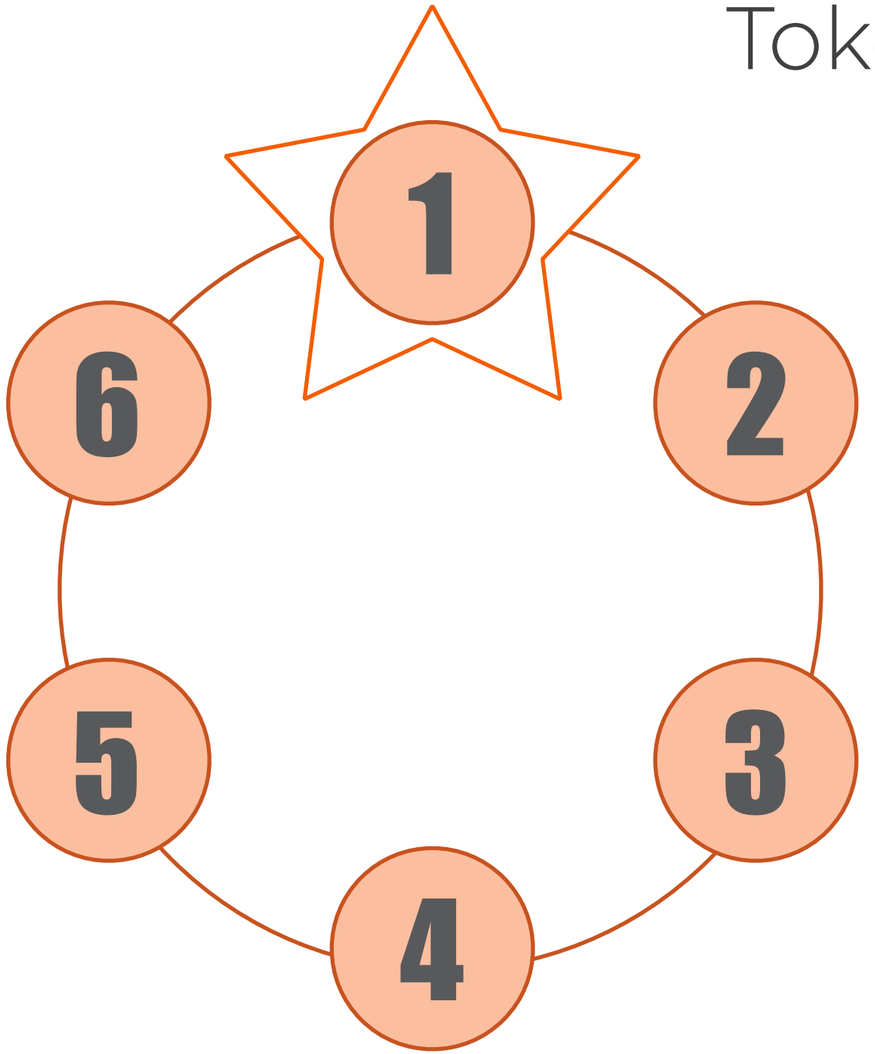


Range of all possible token values

1	2	3	5	4	6
5	2	4	6	3	1
4	6	1	2	3	5
3	5	2	4	6	1

-2^{63} to $+2^{63}$

Token Allocation via the Partitioner



`insert into…`

hash(partition key)

1	2	3	5	4	6
5	2	4	6	3	1
4	6	1	2	3	5
3	5	2	4	6	1

-2^{63} to $+2^{63}$

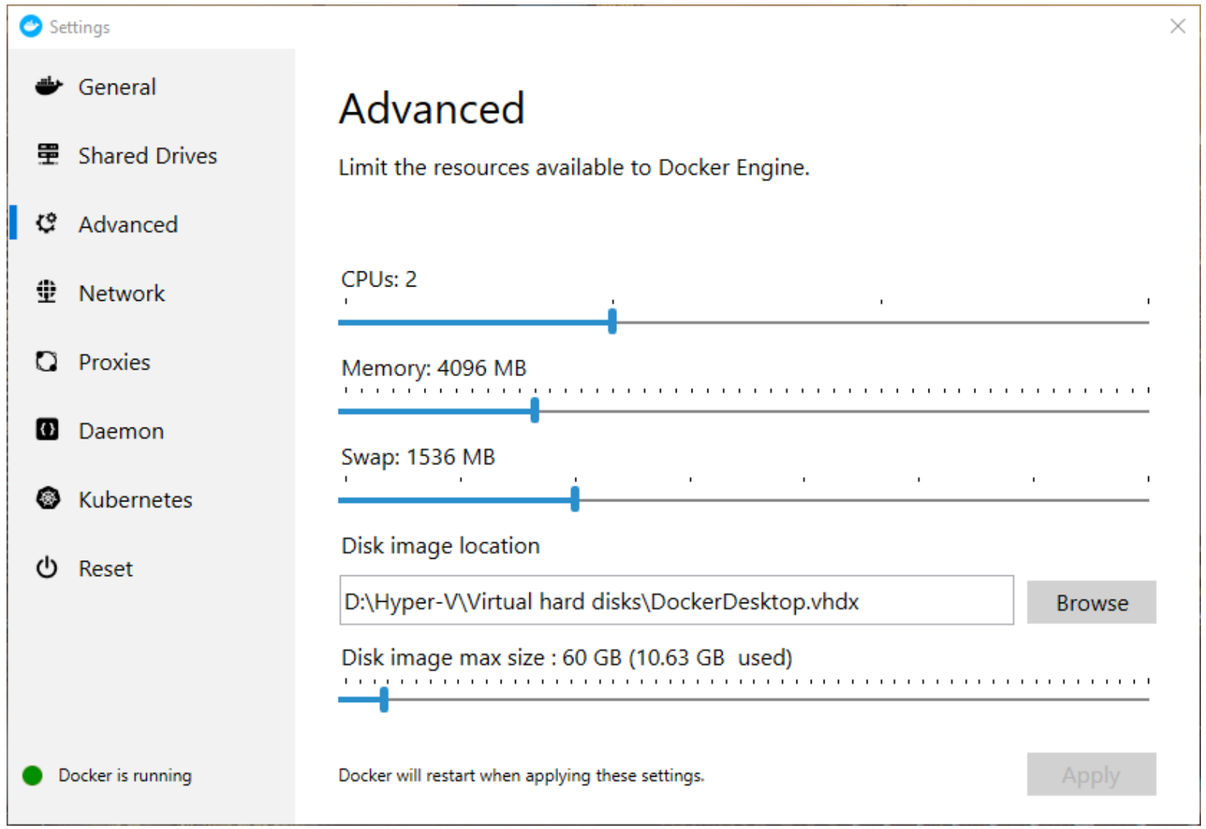
Demo

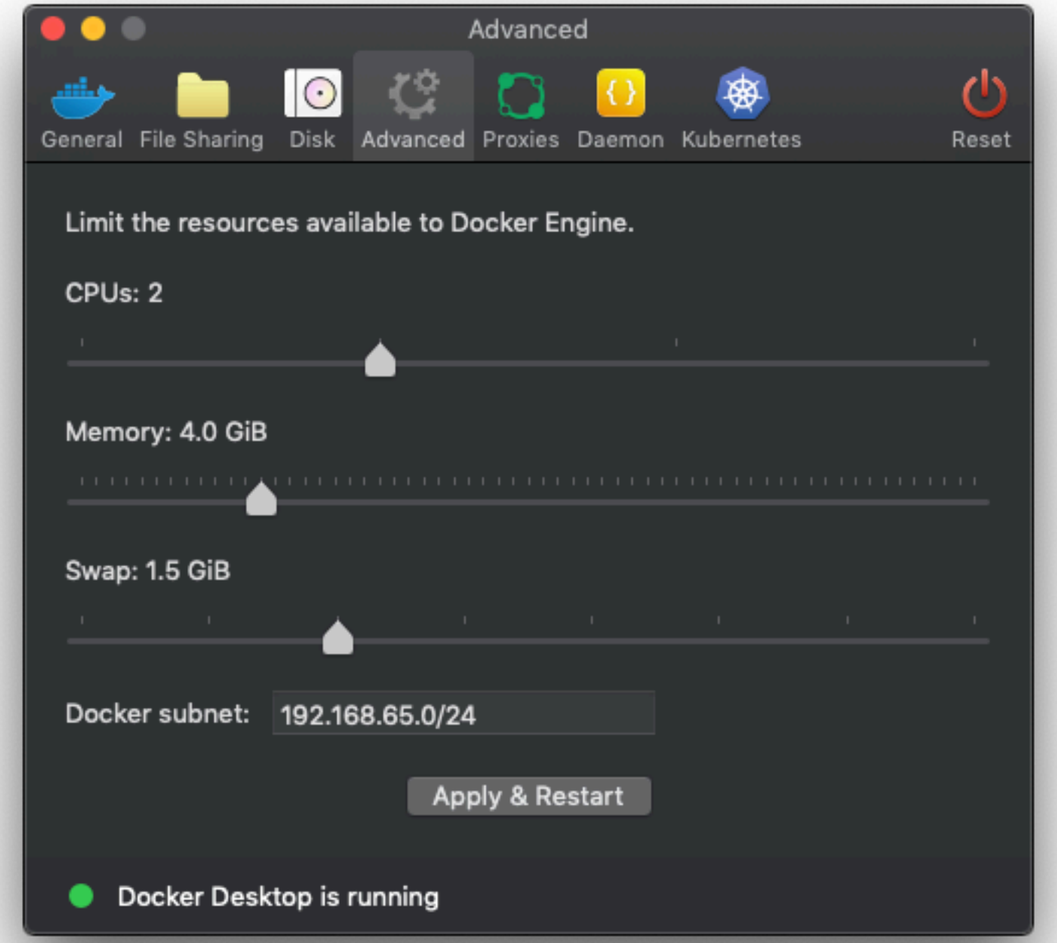
Stand up a Cassandra cluster

“nodetool” CLI

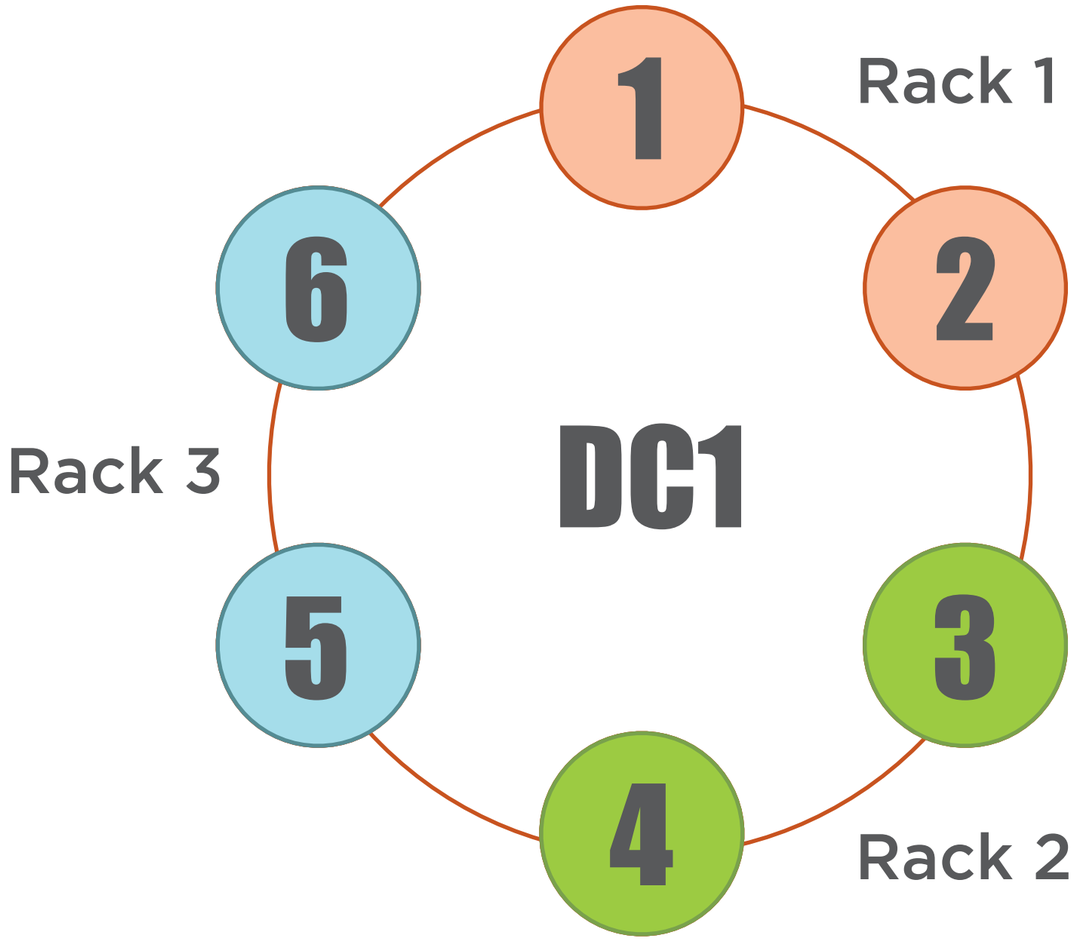
Cassandra configuration file

Docker Desktop Community Edition





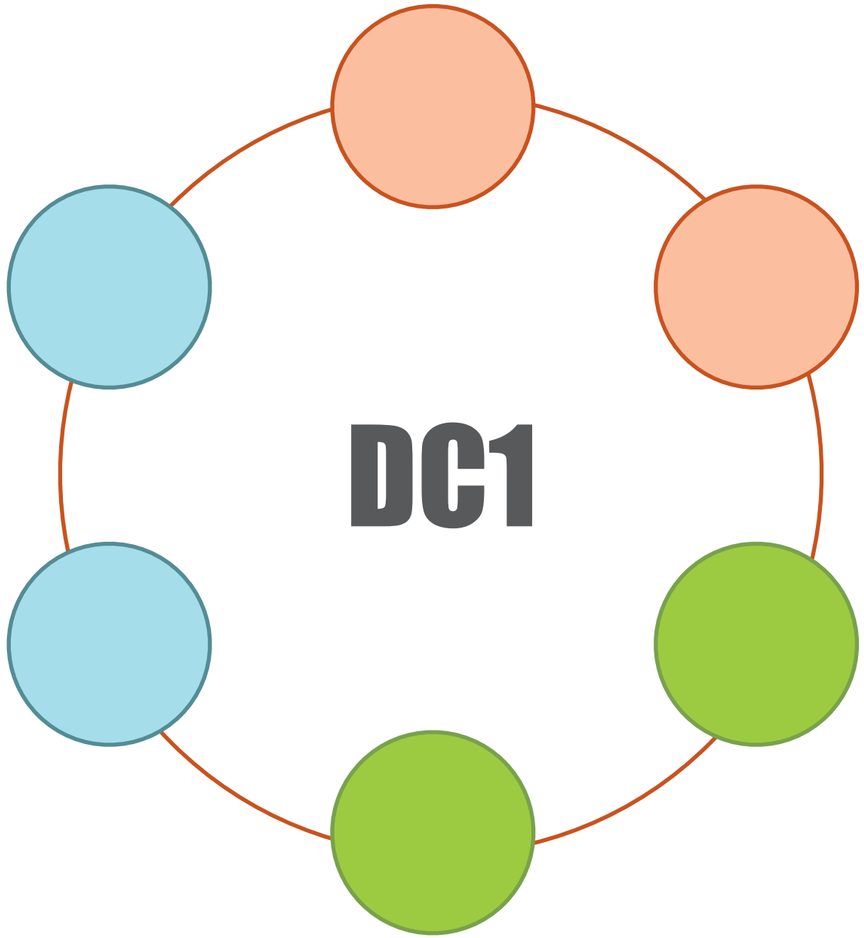
https://www.docker.com/products/docker-desktop



Snitch

SimpleSnitch

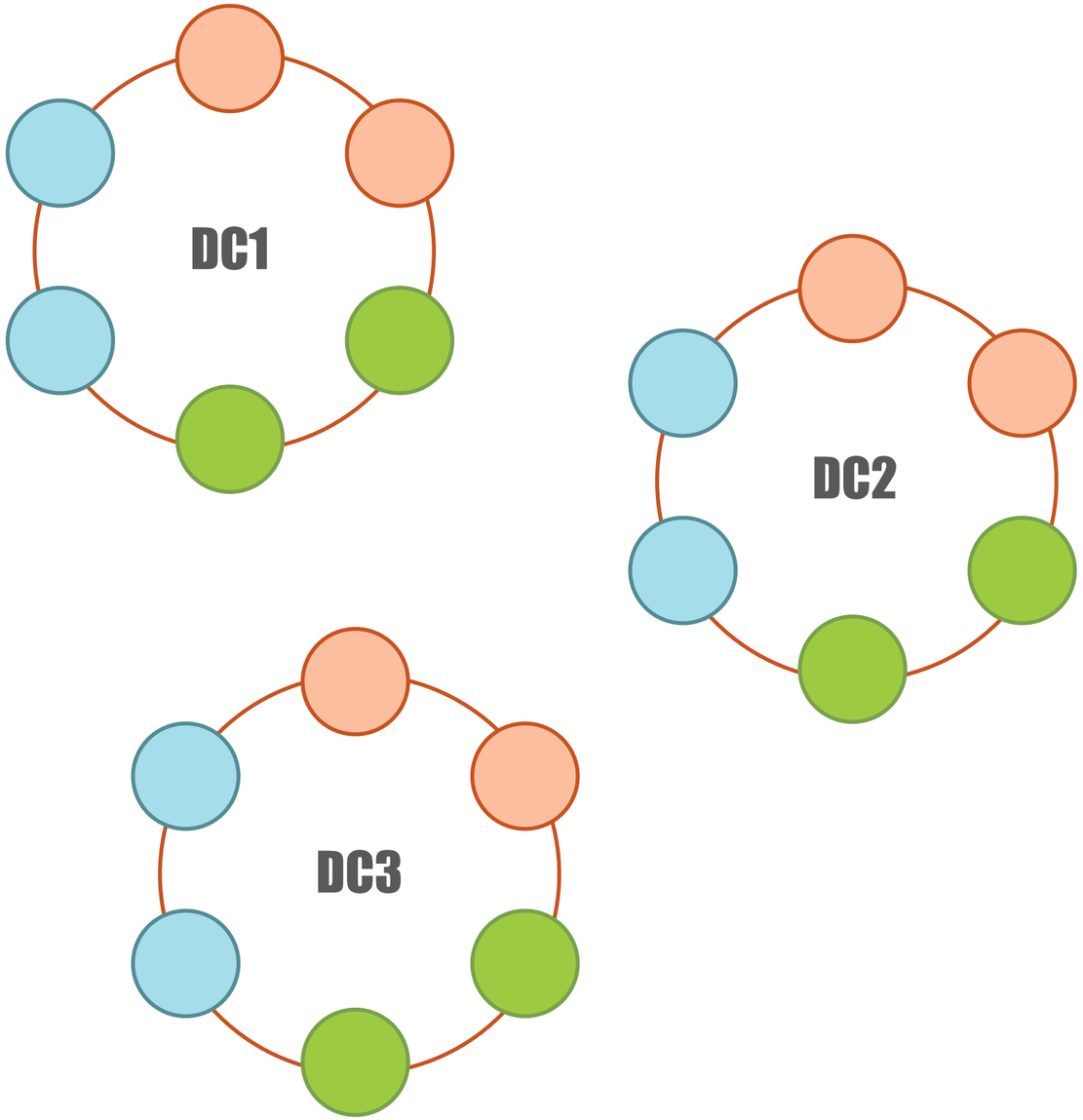
GossipingPropertyFileSnitch



Snitch

SimpleSnitch

GossipingPropertyFileSnitch



Snitch

SimpleSnitch

GossipingPropertyFileSnitch

PropertyFileSnitch

EC2Snitch

EC2MultiRegionSnitch

RackInferringSnitch

Demo

Multi-datacenter cluster

“nodetool” CLI

Cassandra configuration files

Conclusion

History of Cassandra

How data is spread around a cluster

How snitches describe a cluster

Single and multi-DC clusters in Docker

Inspected our clusters with “nodetool”