

JDBC      ODBC      .Net      C++      PHP      Memcached

Compute grid

Service grid

SQL grid  
(new)

Machine  
learning  
(new)

Key-value  
store

Streaming

BigData  
accelerator

ORM support  
(new)

Memory-centric storage  
(On-Heap & Off-Heap)

Native persistence (new)  
(Flash, SSD, Intel 3B XPoint)

Third-party persistence  
(HDFS, NoSQL, RDBMS)

Docker      AWS      Google      Mesos      Yarn      Kubernetes (new)

```
shamim:~ shamim$ ignite.sh $IGNITE_HOME/examples/config/example-cache.xml
[21:03:07] _____
[21:03:07] / \ \ / \ // \ \ / \ \ /
[21:03:07] \ // (7 7 \ / / / / / /
[21:03:07] / \ \ \ / \ / \ \ / \ \ /
[21:03:07]
[21:03:07] ver. 2.6.0#20180710-sha1:669feacc
[21:03:07] 2018 Copyright(C) Apache Software Foundation
[21:03:07]
[21:03:07] Ignite documentation: http://ignite.apache.org
[21:03:07]
[21:03:07] Quiet mode.
[21:03:07]   ^-- Logging to file '/Users/shamim/Development/bigdata/ignite/2.6.0-s3/work/log/ignite-13a5b397.0.log'
[21:03:07]   ^-- Logging by 'JavaLogger [quiet=true, config=null]'
[21:03:07]   ^-- To see **FULL** console log here add -DIGNITE_QUIET=false or "-v" to ignite.{sh|bat}
[21:03:07]
[21:03:07] OS: Mac OS X 10.11.6 x86_64
[21:03:07] VM information: Java(TM) SE Runtime Environment 1.8.0_45-b14 Oracle Corporation Java HotSpot(TM) 64-Bit Server VM
[21:03:07] Configured plugins:
[21:03:07]   ^-- None
[21:03:07]
[21:03:07] Configured failure handler: [hnd=StopNodeOrHaltFailureHandler [tryStop=false, timeout=0]]
[21:03:08] Message queue limit is set to 0 which may lead to potential OOMEs when running cache operations in FULL_ASYNC or P
s due to message queues growth on sender and receiver sides.
[21:03:08] Security status [authentication=off, tls/ssl=off]
[21:03:10] Performance suggestions for grid (fix if possible)
[21:03:10] To disable, set -DIGNITE_PERFORMANCE_SUGGESTIONS_DISABLED=true
[21:03:10]   ^-- Enable G1 Garbage Collector (add '-XX:+UseG1GC' to JVM options)
[21:03:10]   ^-- Set max direct memory size if getting 'OOME: Direct buffer memory' (add '-XX:MaxDirectMemorySize=<size>[gIG
 options)
[21:03:10]   ^-- Disable processing of calls to System.gc() (add '-XX:+DisableExplicitGC' to JVM options)
[21:03:10]   ^-- Decrease number of backups (set 'backups' to 0)
[21:03:10] Refer to this page for more performance suggestions: https://apacheignite.readme.io/docs/jvm-and-system-tuning
[21:03:10]
[21:03:10] To start Console Management & Monitoring run ignitevisorcmd.{sh|bat}
[21:03:10]
[21:03:10] Ignite node started OK (id=13a5b397)
[21:03:10] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=1.0GB]
[21:03:10]   ^-- Node [id=13A5B397-5A50-4CF0-81BF-97DD02AB8CD1, clusterState=ACTIVE]
```

```
shamim:~ shamim$ ignite.sh $IGNITE_HOME/examples/config/example
-cache.xml
[21:03:07] _____
[21:03:07] / / / | / / / - / /
[21:03:07] / / (7 7 / / / / / /
[21:03:07] / \ \ / / / / / / / /
[21:03:07]
[21:03:07] ver. 2.6.0#20180710-sha1:669feacc
[21:03:07] 2018 Copyright(C) Apache Software Foundation
[21:03:07]
[21:03:07] Ignite documentation: http://ignite.apache.org
[21:03:07]
[21:03:07] Quiet mode.
[21:03:07]   ^-- Logging to file '/Users/shamim/Development/big
data/ignite/2.6.0-s3/work/log/ignite-13a5b397.0.log'
[21:03:07]   ^-- Logging by 'JavaLogger [quiet=true, config=nul
l]'
[21:03:07]   ^-- To see **FULL** console log here add -DIGNITE_
QUIET=false or "-v" to ignite.{shlbat}
[21:03:07]
[21:03:07] OS: Mac OS X 10.11.6 x86_64
[21:03:07] VM information: Java(TM) SE Runtime Environment 1.8.
0_45-b14 Oracle Corporation Java HotSpot(TM) 64-Bit Server VM 2
```

```
shamim:~ shamim$ ignite.sh $IGNITE_HOME/examples/config/example
-cache.xml
[21:06:47] _____
[21:06:47] / / / | / / / - / /
[21:06:47] / / (7 7 / / / / / /
[21:06:47] / \ \ / / / / / / /
[21:06:47]
[21:06:47] ver. 2.6.0#20180710-sha1:669feacc
[21:06:47] 2018 Copyright(C) Apache Software Foundation
[21:06:47]
[21:06:47] Ignite documentation: http://ignite.apache.org
[21:06:47]
[21:06:47] Quiet mode.
[21:06:47]   ^-- Logging to file '/Users/shamim/Development/big
data/ignite/2.6.0/work/log/ignite-0d8a321a.0.log'
[21:06:47]   ^-- Logging by 'JavaLogger [quiet=true, config=nul
l]'
[21:06:47]   ^-- To see **FULL** console log here add -DIGNITE_
QUIET=false or "-v" to ignite.{shlbat}
[21:06:47]
[21:06:47] OS: Mac OS X 10.11.6 x86_64
[21:06:47] VM information: Java(TM) SE Runtime Environment 1.8.
0_45-b14 Oracle Corporation Java HotSpot(TM) 64-Bit Server VM 2
```

```
shamim:~ shamim$ docker pull apacheignite/ignite
Using default tag: latest
latest: Pulling from apacheignite/ignite
4fe2ade4980c: Pull complete
6fc58a8d4ae4: Pull complete
819f4a45746c: Pull complete
a5770aa7884a: Pull complete
703fadb3d9f4: Pull complete
faada2abf232: Pull complete
aa25326111cd: Pull complete
fd5aeda61ba6: Pull complete
f50830480165: Pull complete
87b89e6c5ff8: Pull complete
Digest: sha256:d7deab68b8fa447798eedaa71c6c4794fdd704e8400458d612af43d4d2264bc7
Status: Downloaded newer image for apacheignite/ignite:latest
```

```
shamim:~ shamim$ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
apacheignite/ignite	latest	4eca783f1bed	5 weeks ago	530.2 MB
<none>	<none>	107c5a038ae7	14 months ago	1.1 GB
cassandra-matview	latest	38f4e5bcf7f1	2 years ago	380.8 MB
cassandra	3.3	7514d930eadf	2 years ago	379.8 MB

```
[18:39:47] 2018 Copyright(C) Apache Software Foundation
[18:39:47]
[18:39:47] Ignite documentation: http://ignite.apache.org
[18:39:47]
[18:39:47] Quiet mode.
[18:39:47]   ^-- Logging to file '/opt/ignite/apache-ignite/work/log/ignite-81d98712.0.log'
[18:39:47]   ^-- Logging by 'JavaLogger [quiet=true, config=null]'
[18:39:47]   ^-- To see **FULL** console log here add -DIGNITE_QUIET=false or "-v" to ignite.{sh|bat}
[18:39:47]
[18:39:47] OS: Linux 4.1.19-boot2docker amd64
[18:39:48] VM information: OpenJDK Runtime Environment 1.8.0_181-b13 Oracle Corporation OpenJDK 64-Bit Server VM b13
[18:39:48] Please set system property '-Djava.net.preferIPv4Stack=true' to avoid possible problems in mixed
s.
[18:39:48] Configured plugins:
[18:39:48]   ^-- None
[18:39:48]
[18:39:48] Configured failure handler: [hnd=StopNodeOrHaltFailureHandler [tryStop=false, timeout=0, super=Ab
reHandler [ignoredFailureTypes=[SYSTEM_WORKER_BLOCKED]]]]
[18:39:48] Message queue limit is set to 0 which may lead to potential OOMEs when running cache operations i
C or PRIMARY_SYNC modes due to message queues growth on sender and receiver sides.
[18:39:48] Security status [authentication=off, tls/ssl=off]
[18:39:50] Nodes started on local machine require more than 80% of physical RAM what can lead to significant
```

**EMPLOYEE**

Employee_ID	First_Name	Last_Name	Hire_Date	Manager	Department_ID
37	Frances	Newton	14-SEP-2005		
1234	Donald	Newton	24-SEP-2006	28	10
7895	Matthew	Michaels	16-MAY-2007	28	10

→ (M)

**DEPARTMENT**

Department_ID	Name
10	Accounting
20	Payroll

↑  
(1)

```
shamim:~ shamim$ sqlline.sh --color=true --verbose=true -u jdbc:ignite:thin://127.0.0.1/
issuing: !connect jdbc:ignite:thin://127.0.0.1/ '' '' org.apache.ignite.IgniteJdbcThinDriver
Connecting to jdbc:ignite:thin://127.0.0.1/
Connected to: Apache Ignite (version 2.6.0#20180710-sha1:669feacc)
Driver: Apache Ignite Thin JDBC Driver (version 2.6.0#20180710-sha1:669feacc)
Autocommit status: true
Transaction isolation: TRANSACTION_REPEATABLE_READ
sqlline version 1.3.0
```

```
0: jdbc:ignite:thin://127.0.0.1/> !tables
```

TABLE_CAT	TABLE_SCHEMA	TABLE_NAME	TABLE_TYPE
	PUBLIC	EMP	TABLE
	PUBLIC	DEPT	TABLE

```
0: jdbc:ignite:thin://127.0.0.1> select * from emp;
```

EMPNO	ENAME	JOB	M
7782	CLARK	MANAGER	7839
7839	KING	PRESIDENT	null

2 rows selected (0.043 seconds)

ENAME	EMPNO	DEPTNO	L
CLARK	7782	10	NEW YORK
KING	7839	10	NEW YORK

2 rows selected (0.014 seconds)

```
0: jdbc:ignite:thin://127.0.0.1> SELECT d.deptno, d.dname, e.empno, e.ename FROM emp e  
..... > INNER JOIN dept d  
..... > ON (e.deptno = d.deptno)  
..... > WHERE EXISTS (select 1 from emp t where t.mgr = e.empno)  
..... > AND d.deptno in (10,20,30);
```

DEPTNO	DNAME	EMPNO	EN
10	ACCOUNTING	7839	KING

1 row selected (0.008 seconds)

```
shamim:2.4 shamim$ ignite.sh
[10:13:18] 
[10:13:18] 
[10:13:18] 
[10:13:18] 
[10:13:18] 
[10:13:18] 
[10:13:18] ver. 2.4.0#20180305-sha1:aa342270
[10:13:18] 2018 Copyright(C) Apache Software Foundation
[10:13:18]
[10:13:18] Ignite documentation: http://ignite.apache.org
[10:13:18]
[10:13:18] Quiet mode.
[10:13:18]   ^-- Logging to file '/Users/shamim/Development/bigdata/ignite/2.4/work/log/ignite-b3e856c8.0.log'
[10:13:18]   ^-- Logging by 'JavaLogger [quiet=true, config=null]'
[10:13:18]     ^-- To see **FULL** console log here add -DIGNITE_QUIET=false or "-v" to ignite.{sh|bat}
[10:13:18]
[10:13:18] OS: Mac OS X 10.11.6 x86_64
[10:13:18] VM information: Java(TM) SE Runtime Environment 1.8.0_45-b14 Oracle Corporation Java HotSpot(TM) 64-Bit Server VM 25.45-b02
[10:13:18] Configured plugins:
[10:13:18]   ^-- None
[10:13:18]
[10:13:18] Message queue limit is set to 0 which may lead to potential OOMEs when running cache operations in FULL_ASYNC or PRIMARY_SYNC modes on sender and receiver sides.
[10:13:18] Security status [authentication=off, tls/ssl=off]
[10:13:19] H2 debug console URL: http://192.168.1.35:56723/frame.jsp?jsessionid=282bc4a8e45462eade038aa409997484
[10:13:20] Performance suggestions for grid (fix if possible)
[10:13:20] To disable, set -DIGNITE_PERFORMANCE_SUGGESTIONS_DISABLED=true
[10:13:20]   ^-- Enable G1 Garbage Collector (add '-XX:+UseG1GC' to JVM options)
[10:13:20]   ^-- Set max direct memory size if getting 'OOME: Direct buffer memory' (add '-XX:MaxDirectMemorySize=<size>[g|G|m|M|k|K]')
[10:13:20]   ^-- Disable processing of calls to System.gc() (add '-XX:+DisableExplicitGC' to JVM options)
[10:13:20] Refer to this page for more performance suggestions: https://apacheignite.readme.io/docs/jvm-and-system-tuning
[10:13:20]
[10:13:20] To start Console Management & Monitoring run ignitevisorcmd.{sh|bat}
[10:13:20]
[10:13:20] Ignite node started OK (id=b3e856c8)
[10:13:20] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=1.0GB]
[10:13:20] Data Regions Configured:
[10:13:20]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]
```

Auto commit | Max rows: 1000 | Auto complete | Off | Auto select | On | ?

jdbc:h2:mem:b3e856c8-2431-4b` | Run | Run Selected | Auto complete | Clear | SQL statement:

INFORMATION\_SCHEMA

Users

H2 1.4.195 (2017-04-23)

### Important Commands

?	Displays this Help Page
!	Shows the Command History
Ctrl+Enter	Executes the current SQL statement
Shift+Enter	Executes the SQL statement defined by the text selection
Ctrl+Space	Auto complete
Disconnect	Disconnects from the database

### Sample SQL Script

Delete the table if it exists	DROP TABLE IF EXISTS TEST;
Create a new table with ID and NAME columns	CREATE TABLE TEST(ID INT PRIMARY KEY, NAME VARCHAR(255));
Add a new row	INSERT INTO TEST VALUES(1, 'Hello');
Add another row	INSERT INTO TEST VALUES(2, 'World');
Query the table	SELECT * FROM TEST ORDER BY ID;
Change data in a row	UPDATE TEST SET NAME='Hi' WHERE ID=1;
Remove a row	DELETE FROM TEST WHERE ID=2;
Help	HELP ...

```
[0: jdbc:ignite:thin://127.0.0.1/> !tables
```

TABLE_CAT	TABLE_SCHEMA	TABLE_NAME
	PUBLIC	
		DEPT

Auto commit | Max rows: 1000 | Auto complete | Off | Auto select: On | ?

jdbc:h2:mem:e9752a16-da20-4cb6-ba26-3ed5 | Run | Run Selected | Auto complete | Clear | SQL statement:

- DEPT
  - + \_KEY
  - + \_VAL
  - + \_VER
  - + DEPTNO
  - + DNAME
  - + LOC
  - + ↴ Indexes
- + INFORMATION\_SCHEMA

Run Run Selected Auto complete Clear SQL statement:

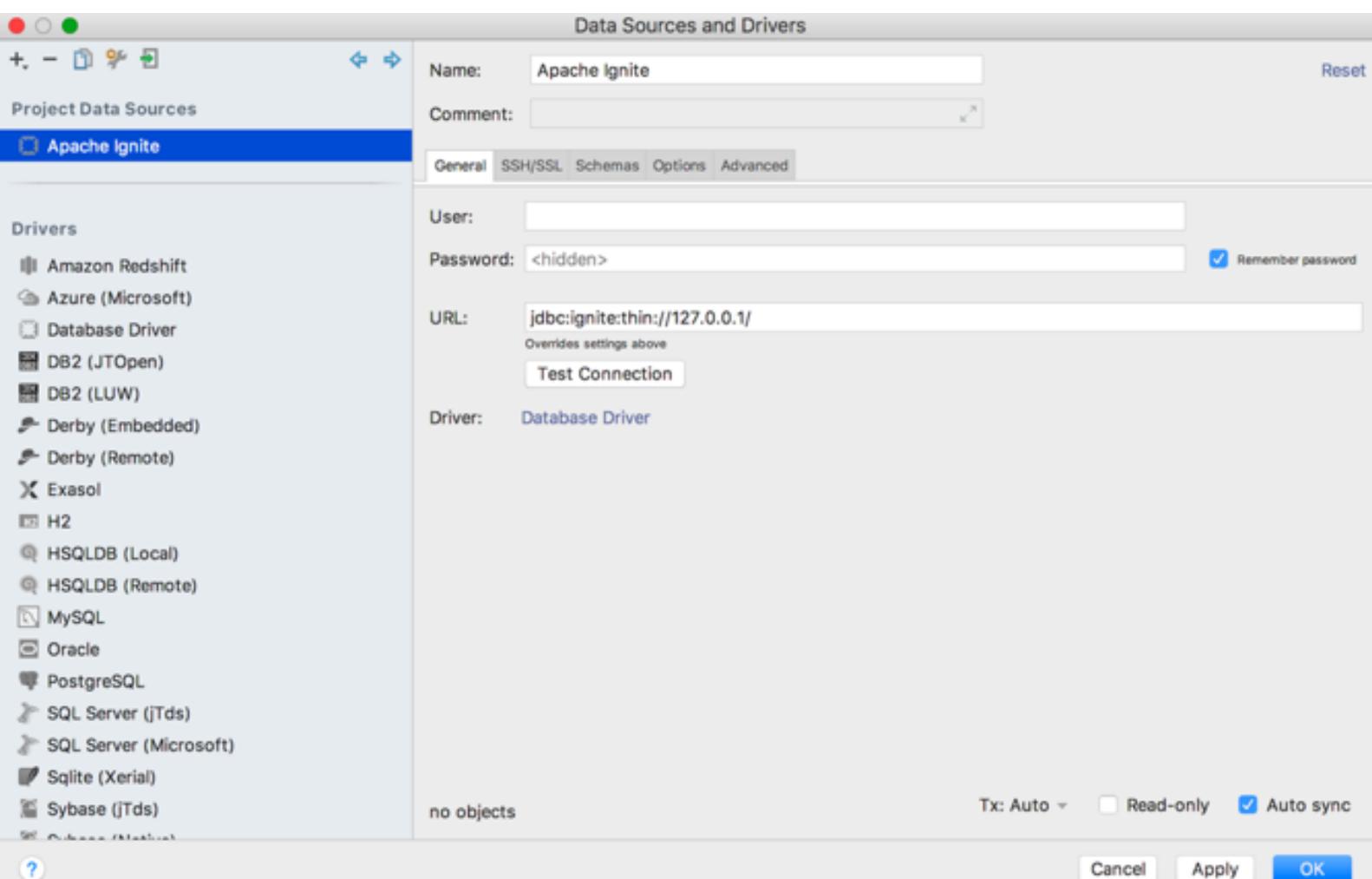
```
select _key, _val, _ver from dept;
```

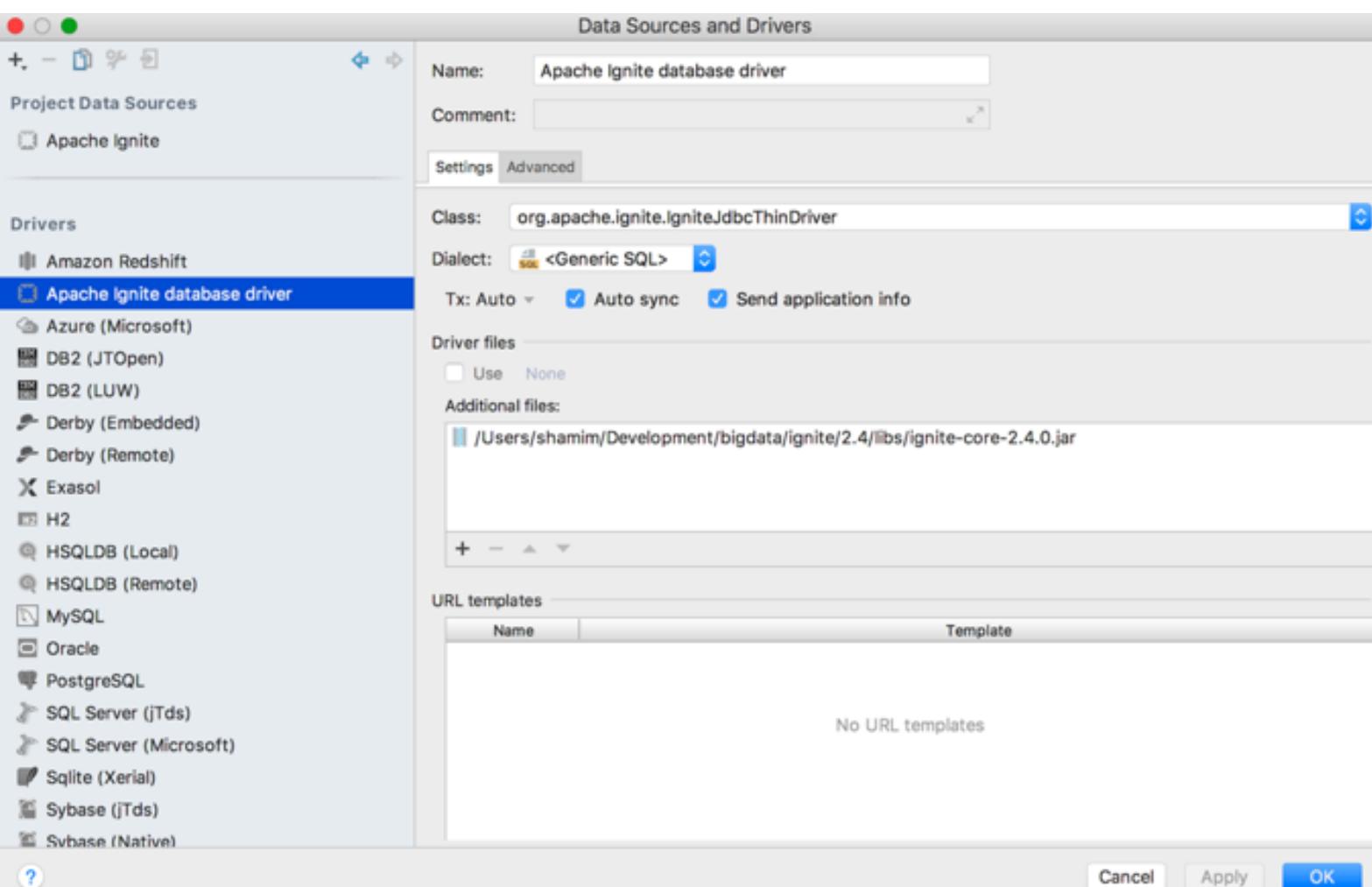
```
select _key, _val, _ver from dept;
```

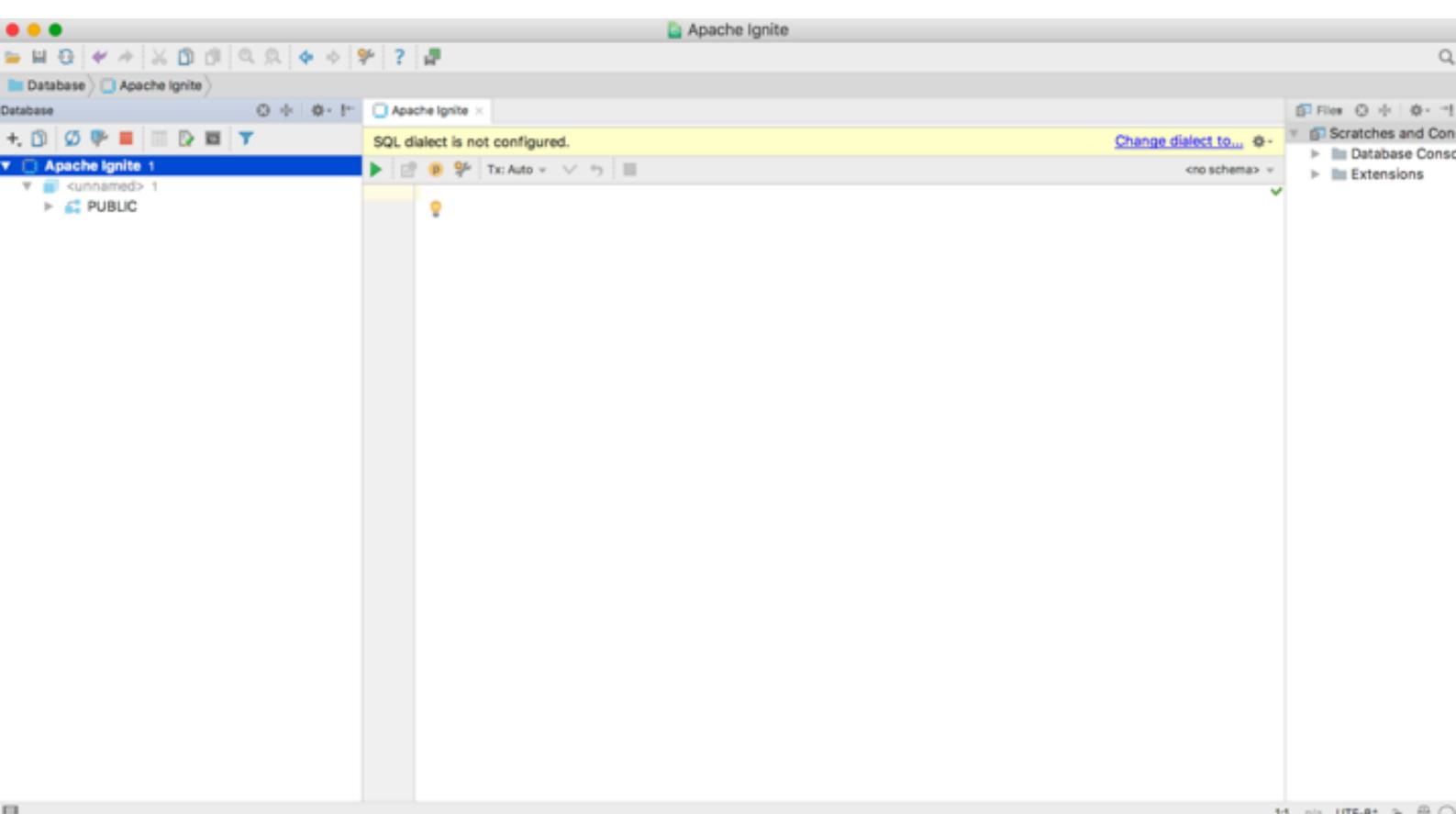
_KEY	_VAL	_VER
10	SQL_PUBLIC_DEPT_d8575d1b_87a8_4642_9b14_363153555594 [idHash=81635754, hash=-850331171, DNAME=ACCOUNTING, LOC=NEW YORK]	GridCacheVersion [topVer=132756184, order=1521276182264, nodeOrder=1]
20	SQL_PUBLIC_DEPT_d8575d1b_87a8_4642_9b14_363153555594 [idHash=1080543470, hash=-1365635177, DNAME=RESEARCH, LOC=DALLAS]	GridCacheVersion [topVer=132756184, order=1521276182268, nodeOrder=1]
30	SQL_PUBLIC_DEPT_d8575d1b_87a8_4642_9b14_363153555594 [idHash=938817198, hash=1109622257, DNAME=SALES, LOC=CHICAGO]	GridCacheVersion [topVer=132756184, order=1521276182268, nodeOrder=1]

(3 rows, 2 ms)

```
explain
  select * from dept d where d.deptno = 10;
PLAN
SELECT
  D.DEPTNO,
  D.DNAME,
  D.LOC
FROM PUBLIC.DEPT D
  /* PUBLIC."_key_PK_proxy": DEPTNO = 10 */
WHERE D.DEPTNO = 10
(1 row, 3 ms)
```







Apache Ignite

Database Consoles > Apache Ignite > Apache Ignite

Database

+ Apache Ignite 1

- <unnamed> 1
- PUBLIC
- DEPT
- EMP

Apache Ignite x

SQL dialect is not configured. Change dialect to...

Tx: Auto

```

1 insert into dept (deptno, dname, loc) values (10, 'ACCOUNTING', 'NEW YORK');
2 insert into dept (deptno, dname, loc) values(20, 'RESEARCH', 'DALLAS');
3 insert into dept (deptno, dname, loc) values(30, 'SALES', 'CHICAGO');
4 insert into emp (empno, ename, job, mgr, hiredate, sal, comm, deptno) values(7839, 'KING', 'PRESIDENT', null, to_date('17-11-1981','dd-mm-yyyy'), 5000, null, 10);
5 insert into emp (empno, ename, job, mgr, hiredate, sal, comm, deptno) values( 7698, 'BLAKE', 'MANAGER', 7839, to_date('1-5-1981','dd-mm-yyyy'), 2850, null, 30);
6 insert into emp (empno, ename, job, mgr, hiredate, sal, comm, deptno) values(7782, 'CLARK', 'MANAGER', 7839, to_date('9-6-1981','dd-mm-yyyy'), 2450, null, 10);
7

```

File Scratches and Com... Database Consoles Extensions

Database Console Apache Ignite

```

sql> insert into dept (deptno, dname, loc) values (10, 'ACCOUNTING', 'NEW YORK')
[2018-03-17 17:13:58] 1 row affected in 1ms
sql> insert into dept (deptno, dname, loc) values(20, 'RESEARCH', 'DALLAS')
[2018-03-17 17:13:58] 1 row affected in 4ms
sql> insert into dept (deptno, dname, loc) values(30, 'SALES', 'CHICAGO')
[2018-03-17 17:13:58] 1 row affected in 5ms
sql> insert into emp (empno, ename, job, mgr, hiredate, sal, comm, deptno) values(7839, 'KING', 'PRESIDENT', null, to_date('17-11-1981','dd-mm-yyyy'), 5000, null, 10)
[2018-03-17 17:13:58] 1 row affected in 17ms
sql> insert into emp (empno, ename, job, mgr, hiredate, sal, comm, deptno) values( 7698, 'BLAKE', 'MANAGER', 7839, to_date('1-5-1981','dd-mm-yyyy'), 2850, null, 30)
[2018-03-17 17:13:58] 1 row affected in 5ms
sql> insert into emp (empno, ename, job, mgr, hiredate, sal, comm, deptno) values(7782, 'CLARK', 'MANAGER', 7839, to_date('9-6-1981','dd-mm-yyyy'), 2450, null, 10)
[2018-03-17 17:13:58] 1 row affected in 4ms

```

1 row affected in 4ms 703 chars, 6 line breaks 7:1 n/a UTF-8 2a

Apache Ignite

Database Consoles > Apache Ignite > Apache Ignite >

Apache Ignite x

SQL dialect is not configured. Change dialect to...

Apache Ignite 1

<unnamed> 1

PUBLIC

DEPT

EMP

SELECT d.deptno, d.dname, e.empno, e.ename  
FROM emp e  
INNER JOIN dept d  
ON (e.deptno = d.deptno)  
WHERE EXISTS (select 1 from emp t where t.mgr = e.empno)  
AND d.deptno in (10,20,30);

File x PUBLIC x

Scratches and Con...

Database Conso...

Extensions

Database Console Apache Ignite

Output Result 6 x

Tab-se...d (TSV) View Query

	DEPTNO	DNAME	EMPNO	ENAME
1	10	ACCOUNTING	7839	KING

1 row retrieved starting from 1 in 27ms (execution: 8ms, fetching: 19ms)

181 chars, 5 line breaks 6:28 n/a UTF-81 %

```
[17:04:43] - - - - -
[17:04:43] Ignite node started OK (id=69608c1e)
[17:04:43] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=1.0GB]
[17:04:43]   ^-- Node [id=69608C1E-44DC-4FDC-979A-33627AF3D963, clusterState=ACTIVE]
[17:04:43] Data Regions Configured:
[17:04:43]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]
[17:05:43] Topology snapshot [ver=2, servers=1, clients=1, CPUs=8, offheap=3.2GB, heap=4.6GB]
[17:05:43]   ^-- Node [id=69608C1E-44DC-4FDC-979A-33627AF3D963, clusterState=ACTIVE]
[17:05:43] Data Regions Configured:
[17:05:43]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]
[17:05:44] Topology snapshot [ver=3, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=1.0GB]
[17:05:44]   ^-- Node [id=69608C1E-44DC-4FDC-979A-33627AF3D963, clusterState=ACTIVE]
[17:05:44] Data Regions Configured:
[17:05:44]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]
```

```
Cache get>Hello Worlds: 92
Cache get>Hello Worlds: 93
Cache get>Hello Worlds: 94
Cache get>Hello Worlds: 95
Cache get>Hello Worlds: 96
Cache get>Hello Worlds: 97
Cache get>Hello Worlds: 98
Cache get>Hello Worlds: 99
Cache get>Hello Worlds: 100
[17:05:44] Ignite node _stopped OK [uptime=00:00:00.343]
```

```
Cache 'testCache(@c0)':
```

Name(@)	testCache(@c0)
Nodes	1
Total size Min/Avg/Max	100 / 100.00 / 100
Heap size Min/Avg/Max	0 / 0.00 / 0
Off-heap size Min/Avg/Max	100 / 100.00 / 100

```
Nodes for: testCache(@c0)
```

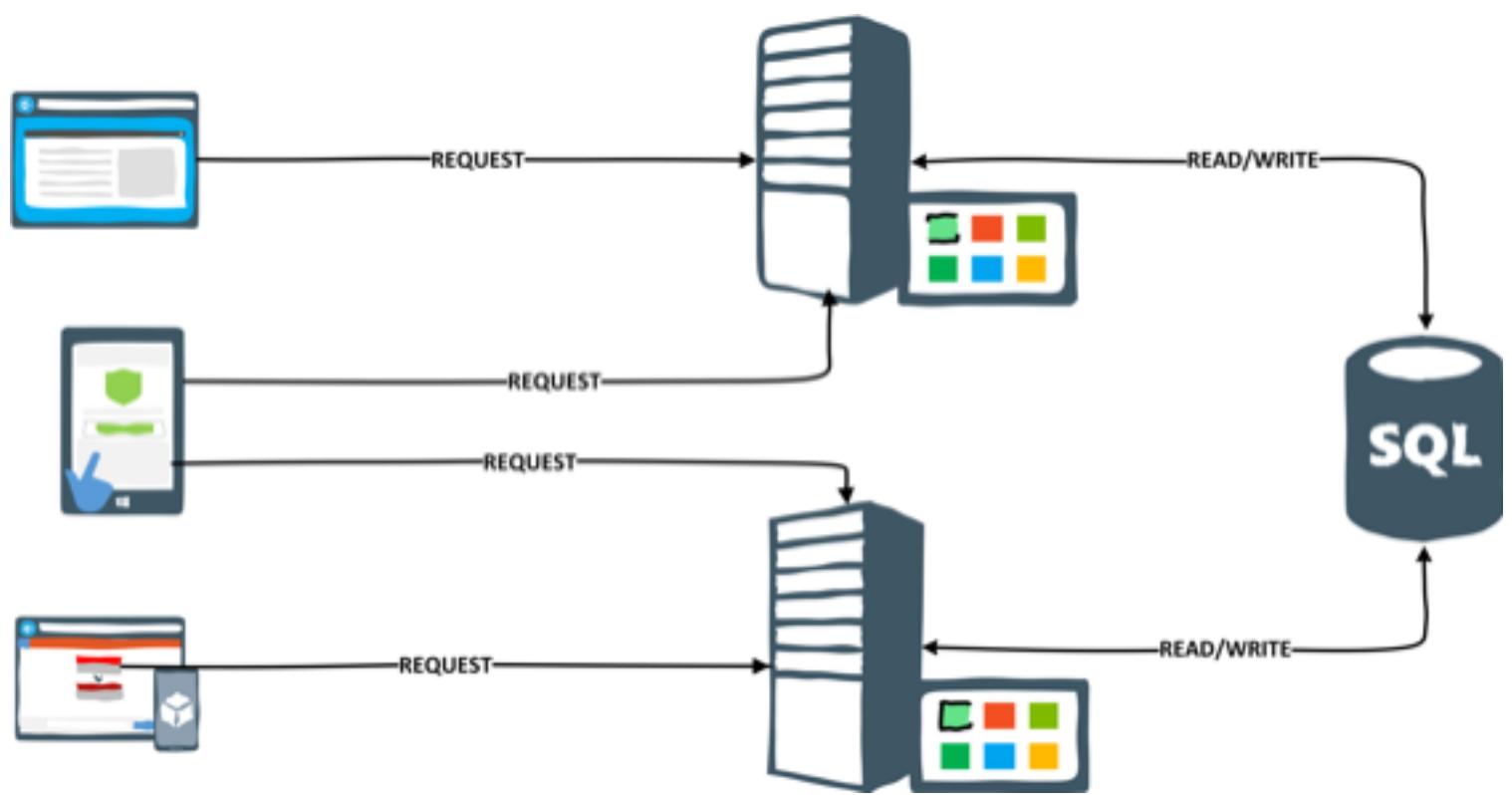
Node ID8(@), IP	CPU	Heaps Used	CPU Load	Up Time	Size	Hi/Mi/Rd/Wr
69608C1E(@n0), 10.42.68.230	8	13.11 %	0.07 %	00:06:04.323	Total: 100 Heap: 0 Off-Heap: 100 Off-Heap Memory: 0	Hi: 0 Mi: 0 Rd: 0 Wr: 0

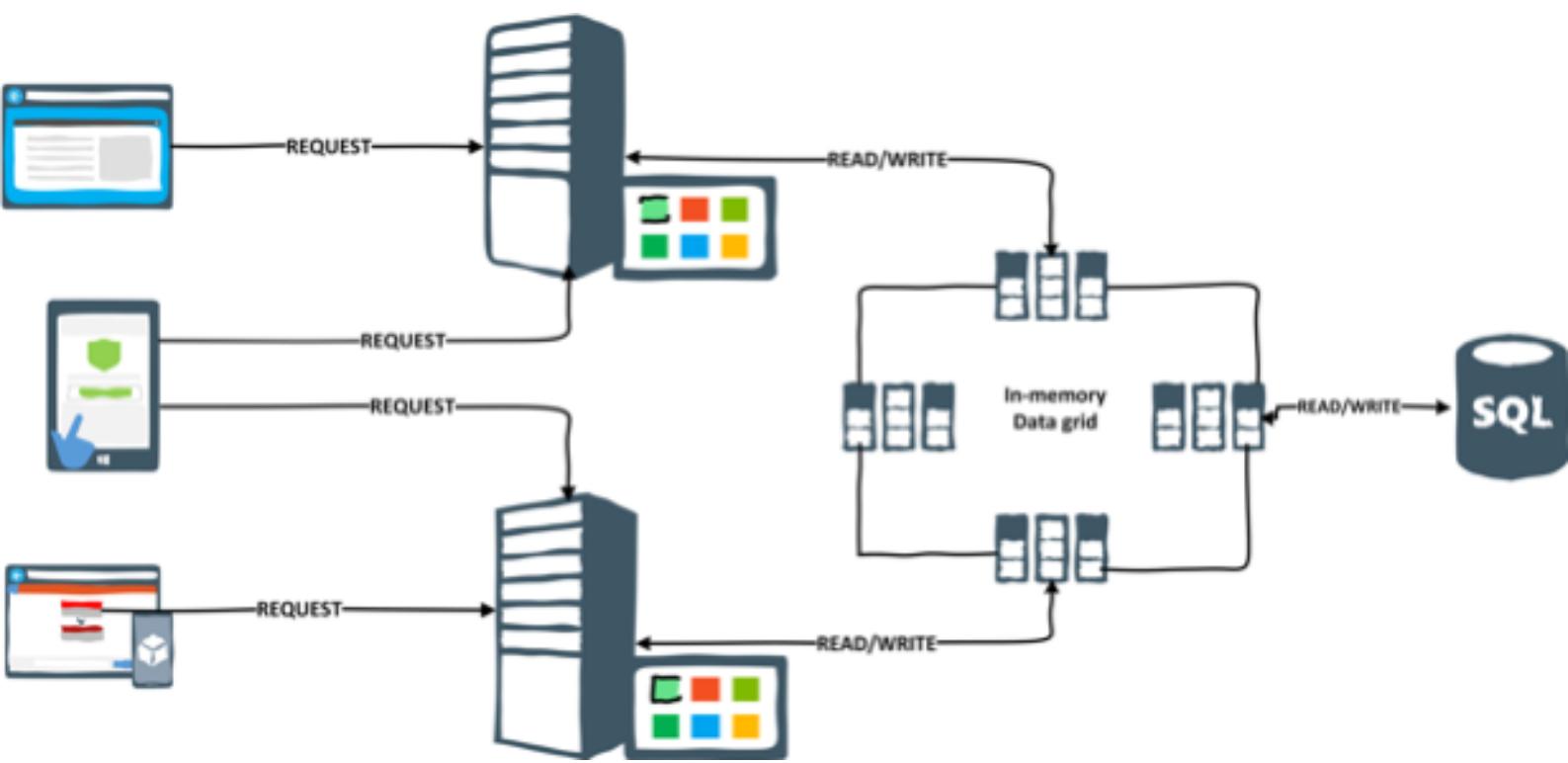
```
2018-07-30 16:03:18 [main] INFO com.blu.imdg.HelloThinClient - Simple Ignite thin client example working over TCP socket.  
2018-07-30 16:03:19 [main] INFO com.blu.imdg.HelloThinClient - Print value: 033
```

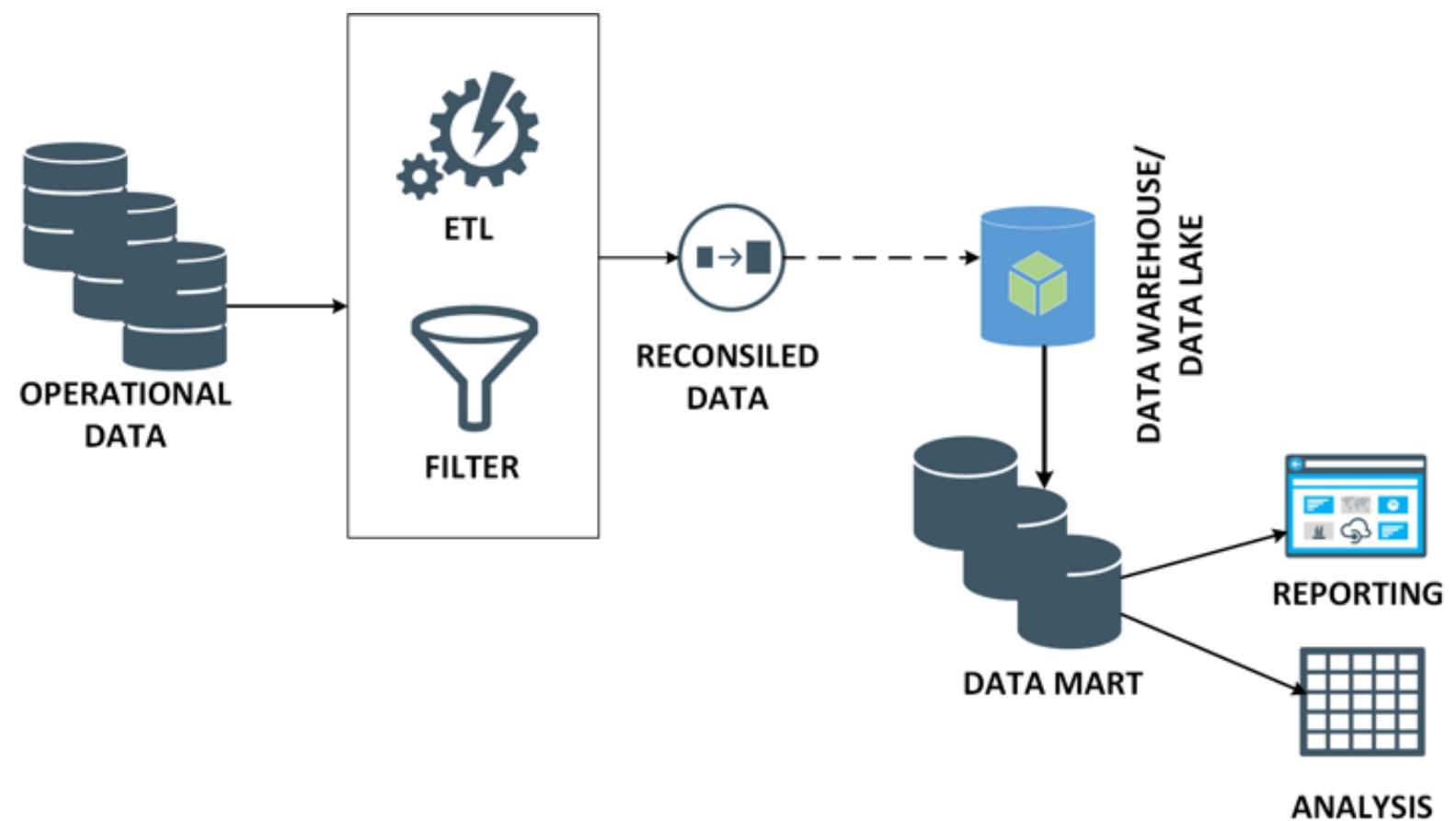
```
[16:01:26] Ignite node started OK (id=784af67b)
[16:01:26] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=1.0GB]
[16:01:26]   ^-- Node [id=784AF67B-C199-4939-BE16-04583365C6FE, clusterState=ACTIVE]
[16:01:26] Data Regions Configured:
[16:01:26]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]
```

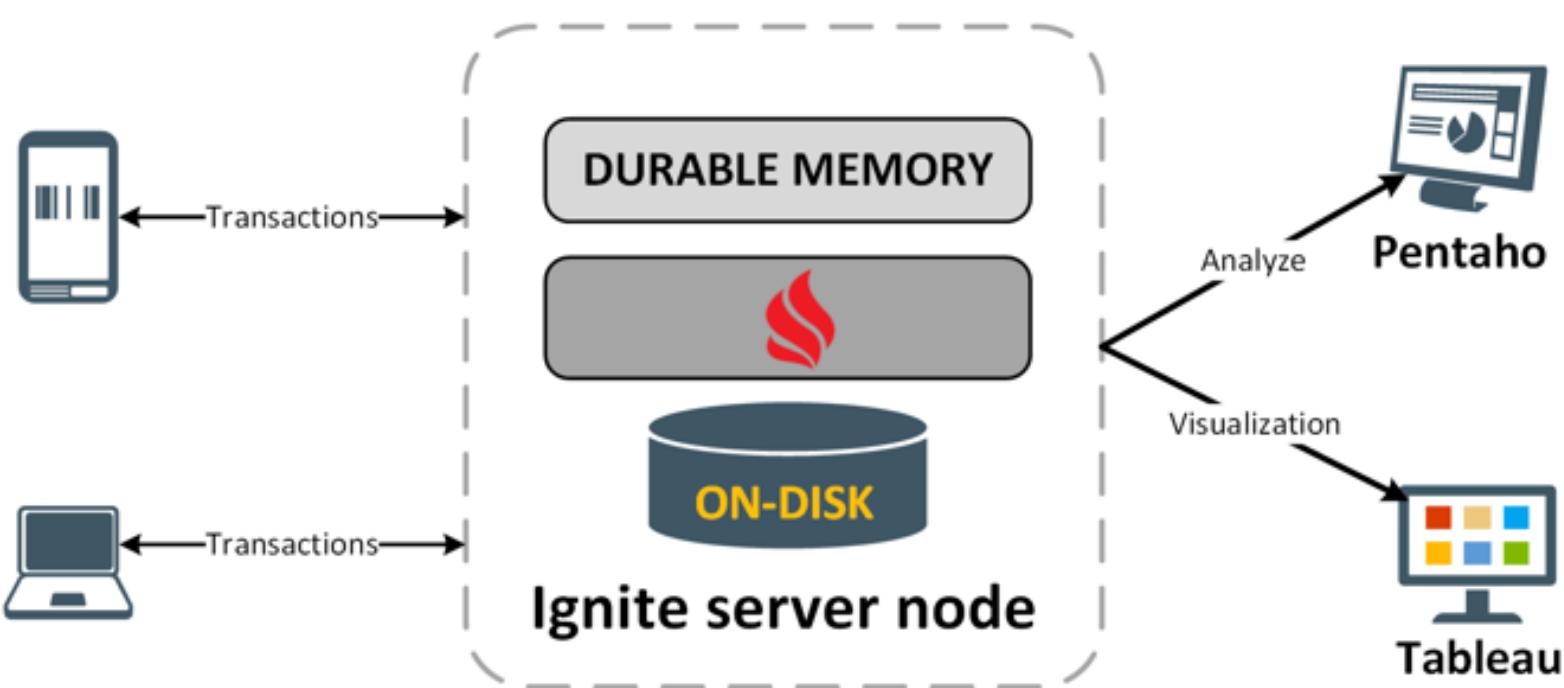
```
visor> cache -scan
Time of the snapshot: 2018-04-07 11:10:27
+-----+
| # | Name(@)      | Mode       | Size (Heap / Off-heap) |
+-----+
| 0 | testCache(@c0) | PARTITIONED | min: 1 (0 / 1)
|   |                 |             | avg: 1.00 (0.00 / 1.00)
|   |                 |             | max: 1 (0 / 1)
+-----+
Choose cache number ('c' to cancel) [c]: 0
Entries in cache: testCache
+-----+
| Key Class    | Key     | Value Class   | Value |
+-----+
| java.lang.String | moscow | java.lang.String | 777   |
+-----+
visor> █
```

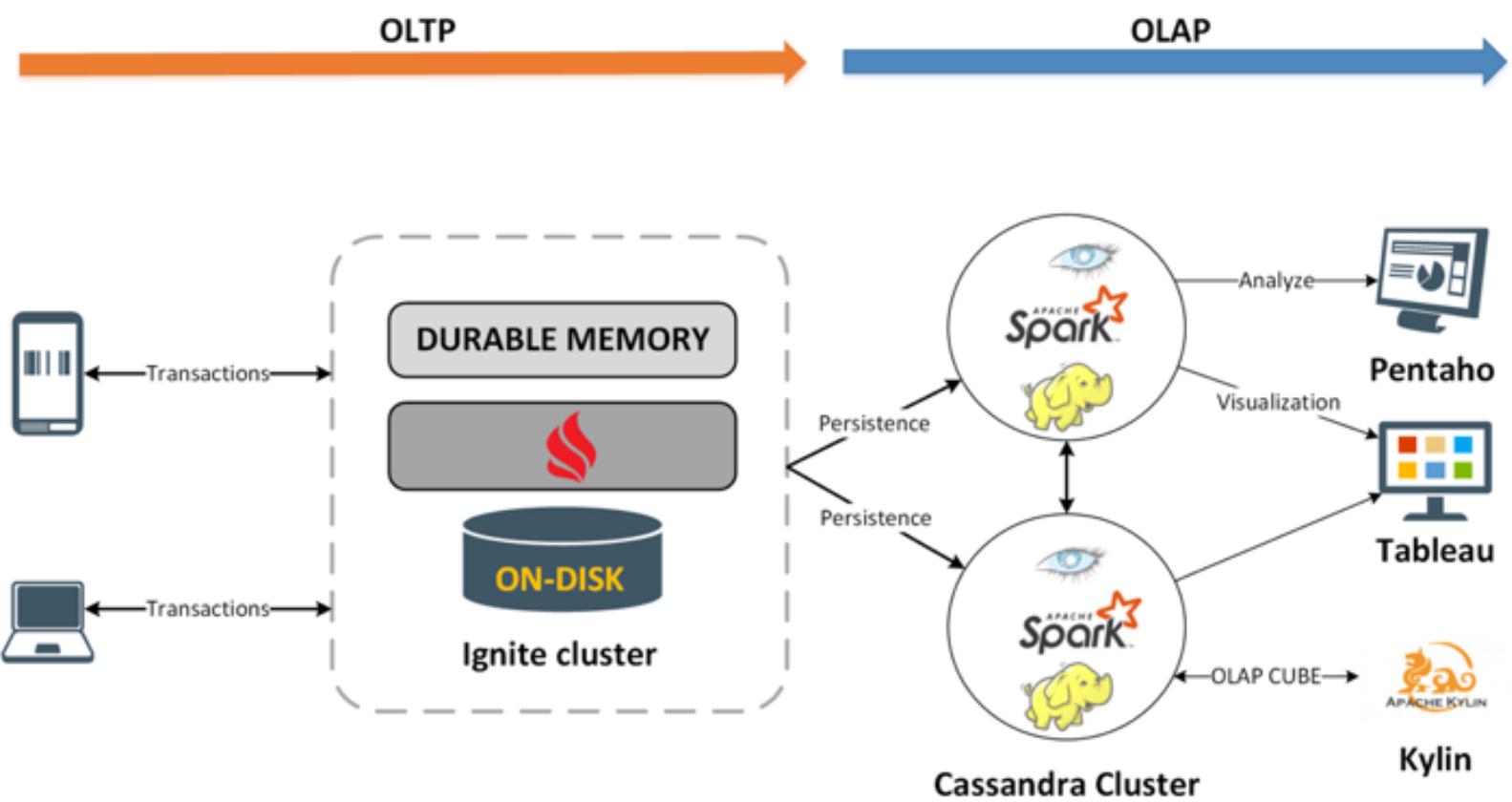
Int./Ext. IPs	Node ID8(@)	Node Type	OS	CPUs	MACs	CPU Load
0:0:0:0:0:0:1	1: 7286CB34(@n0)	Server	Mac OS X x86_64 10.11.6	8	46:97:7F:66:5C:2C	0.23 %
127.0.0.1	2: 6B0F819D(@n1)	Server			80:E6:50:07:70:B6	
192.168.1.36						

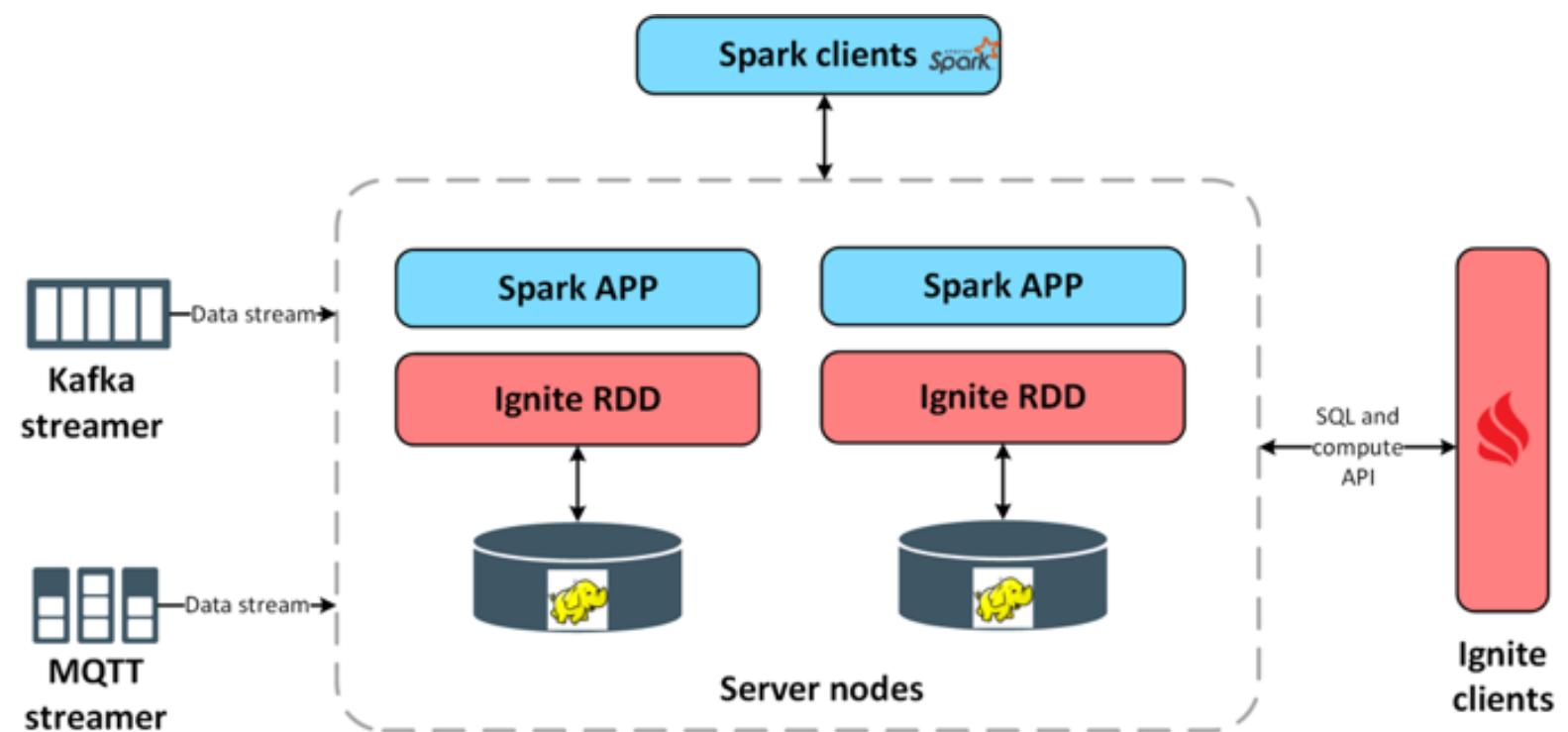


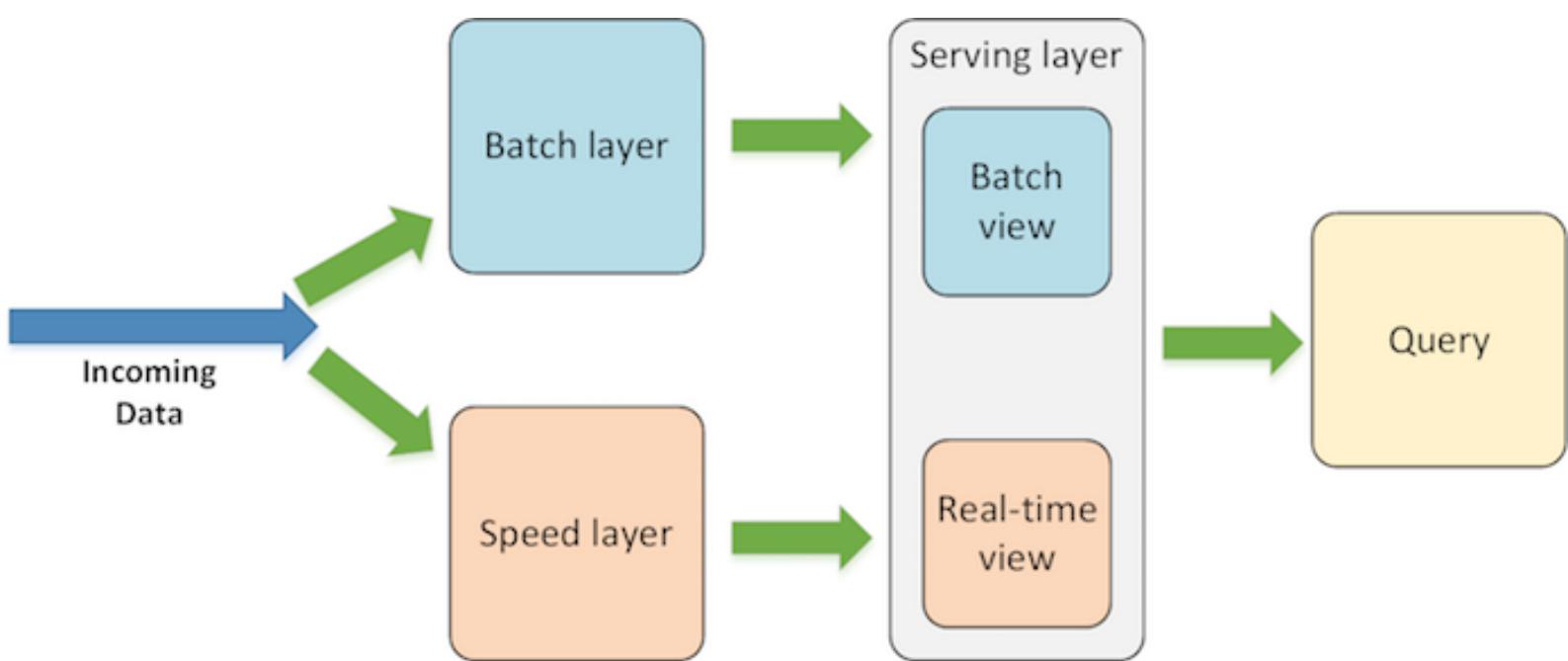


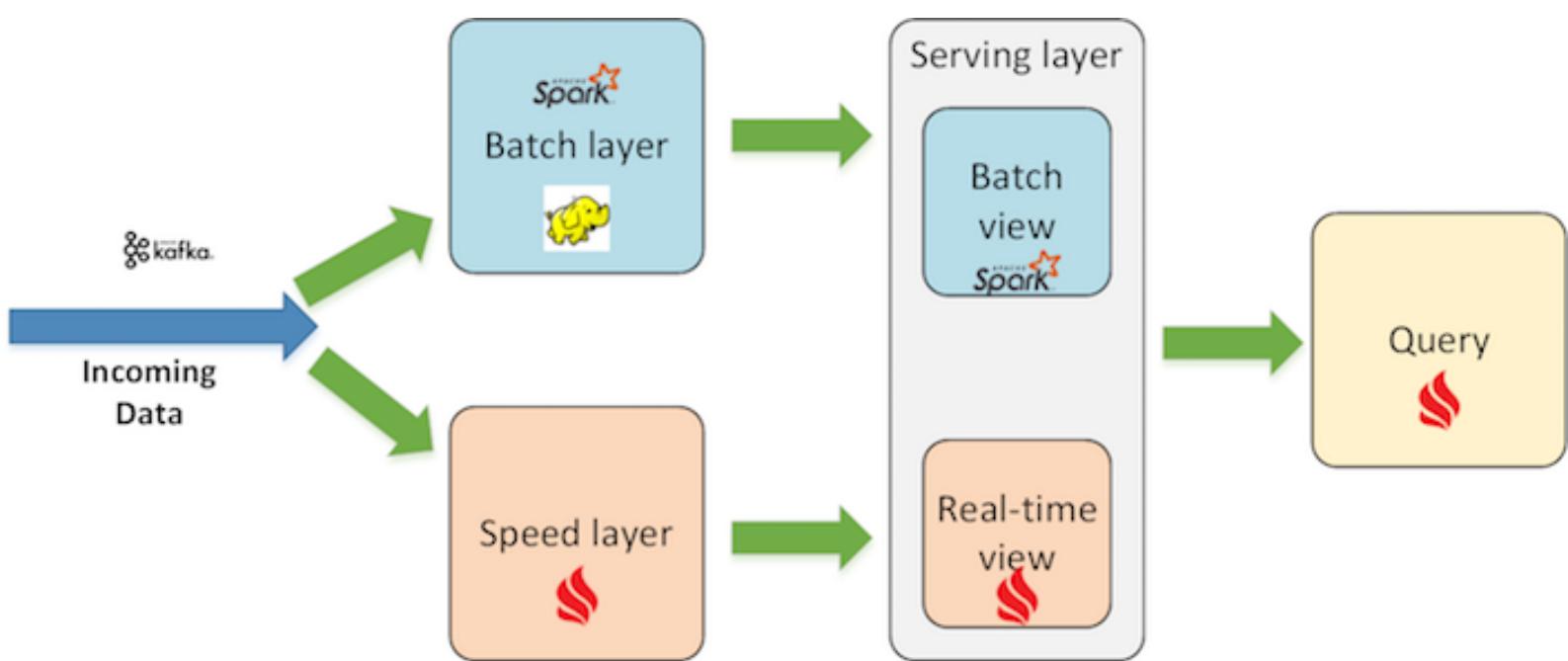


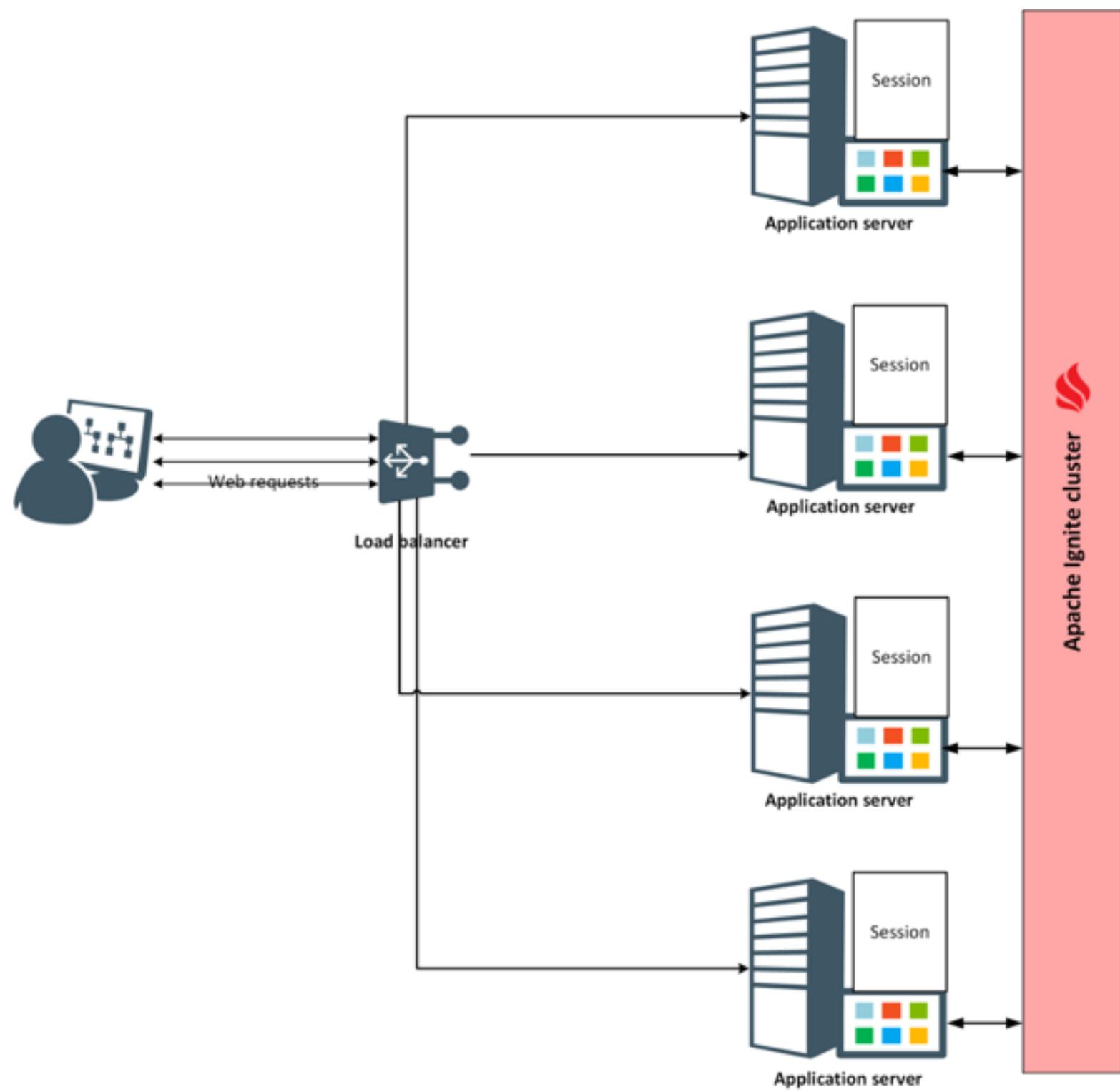


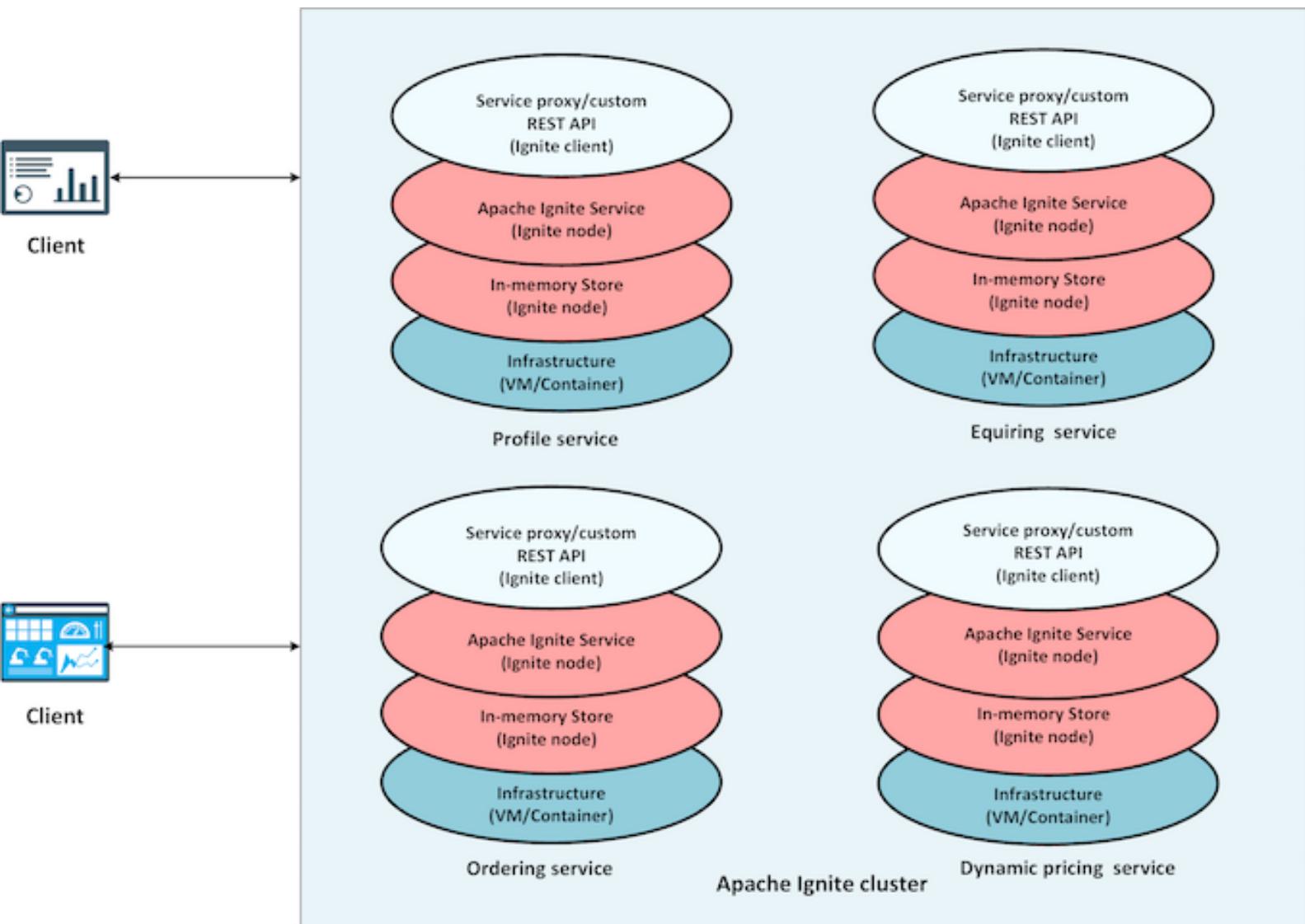


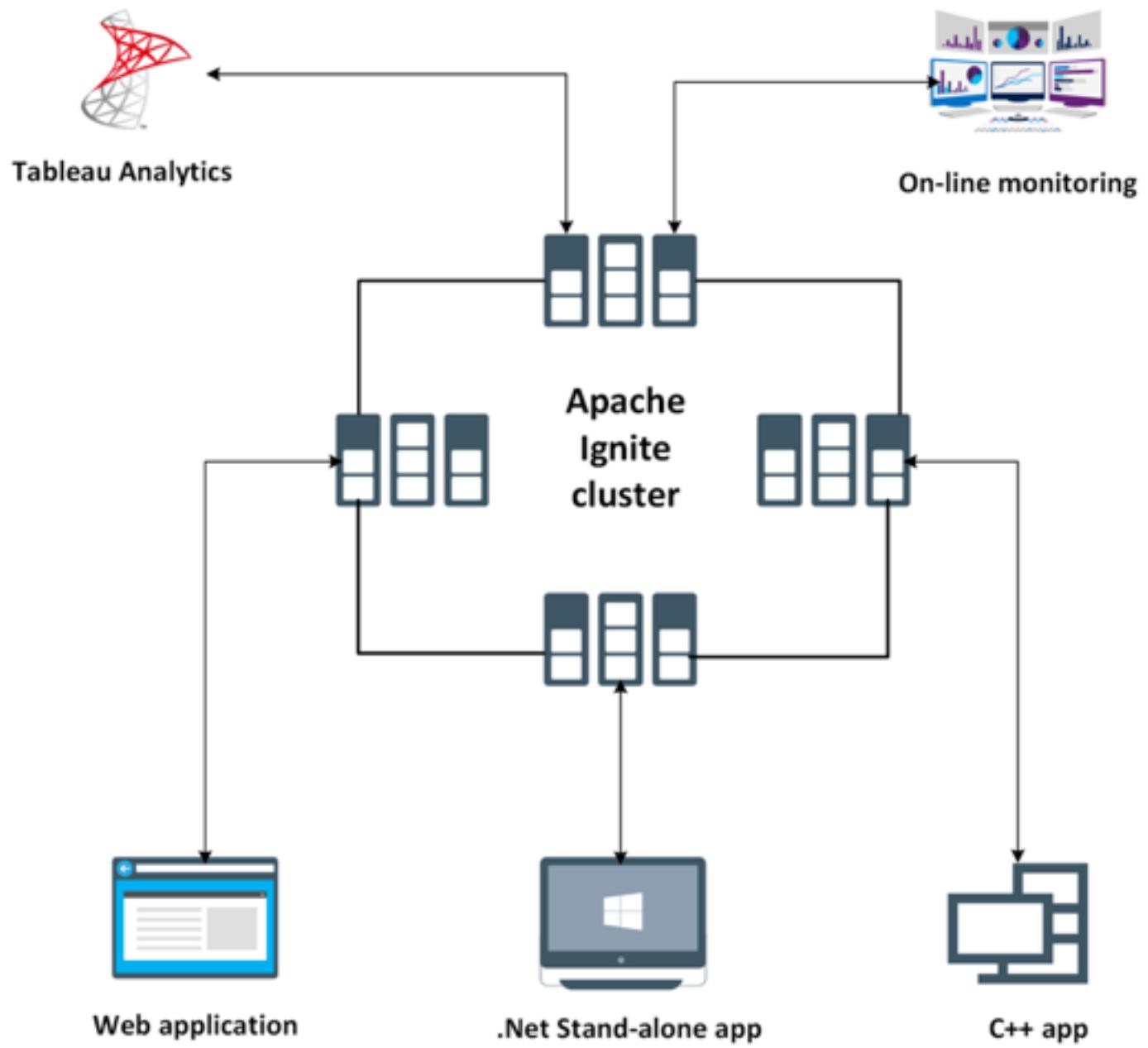


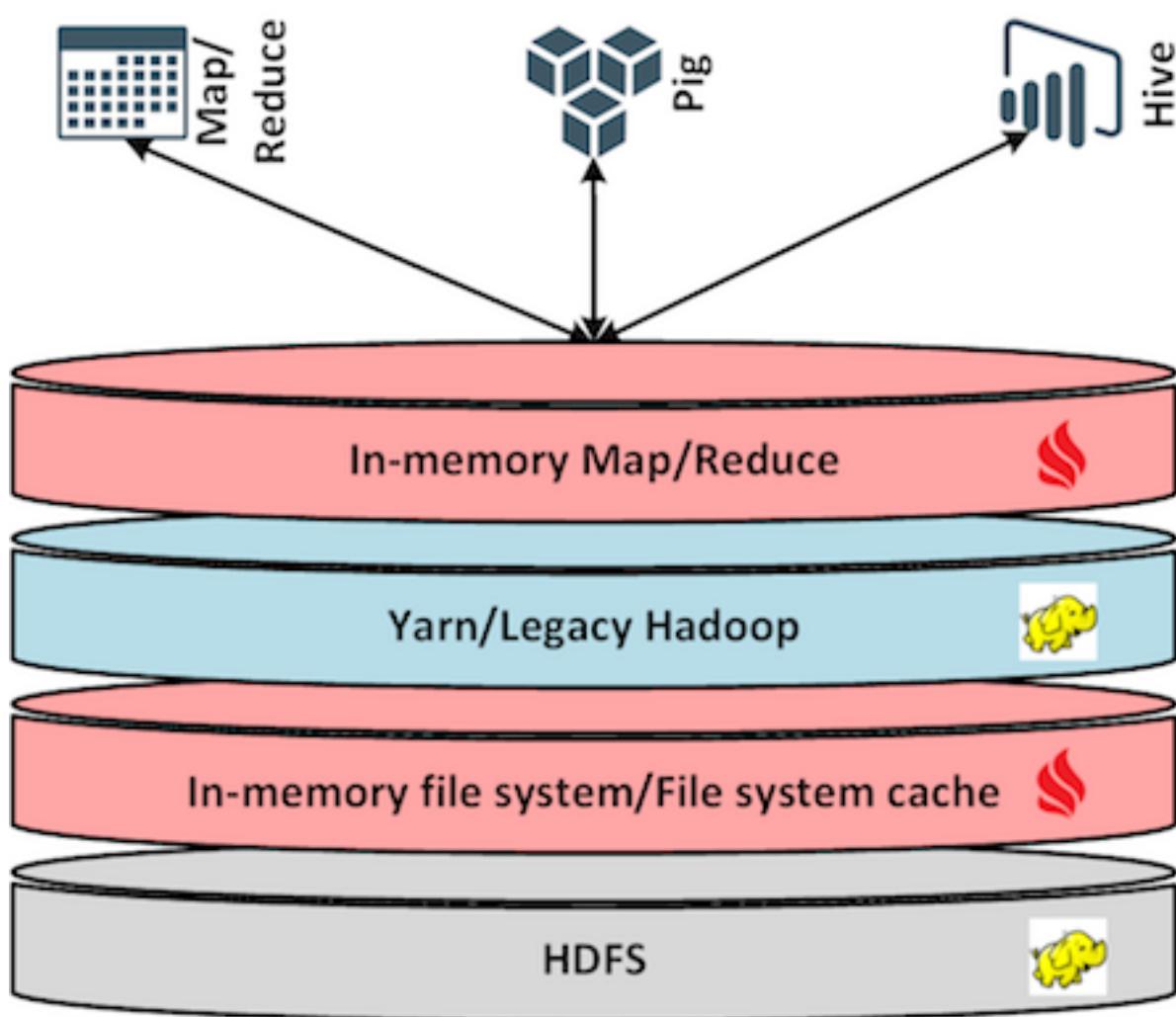












R

C++

Python

Java

Scala

REST

K-Means

Regressions

Decision Trees

• • •

Random Forest

### Distributed Core Algebra

DURABLE MEMORY



ON-DISK

DURABLE MEMORY



ON-DISK

DURABLE MEMORY



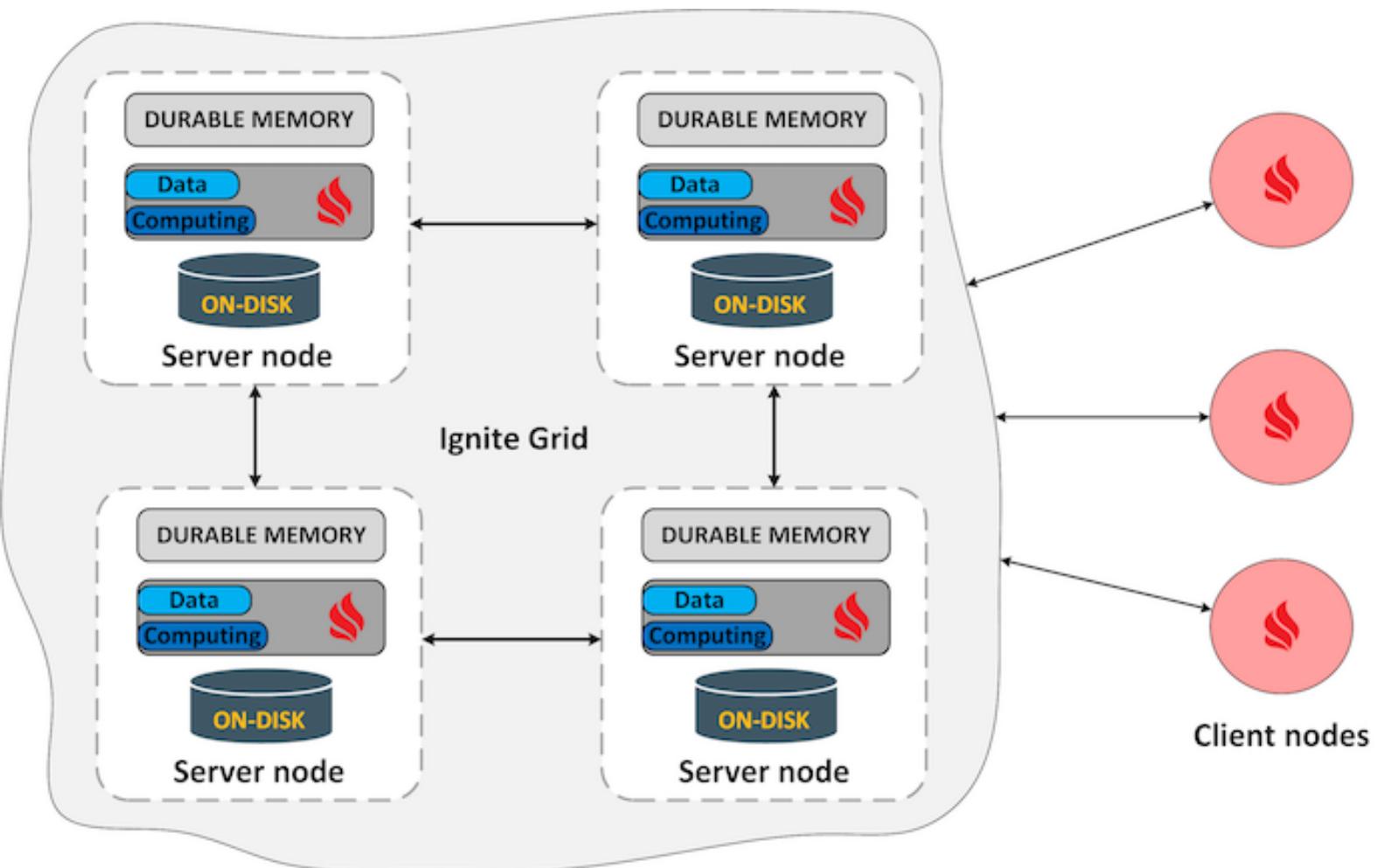
ON-DISK

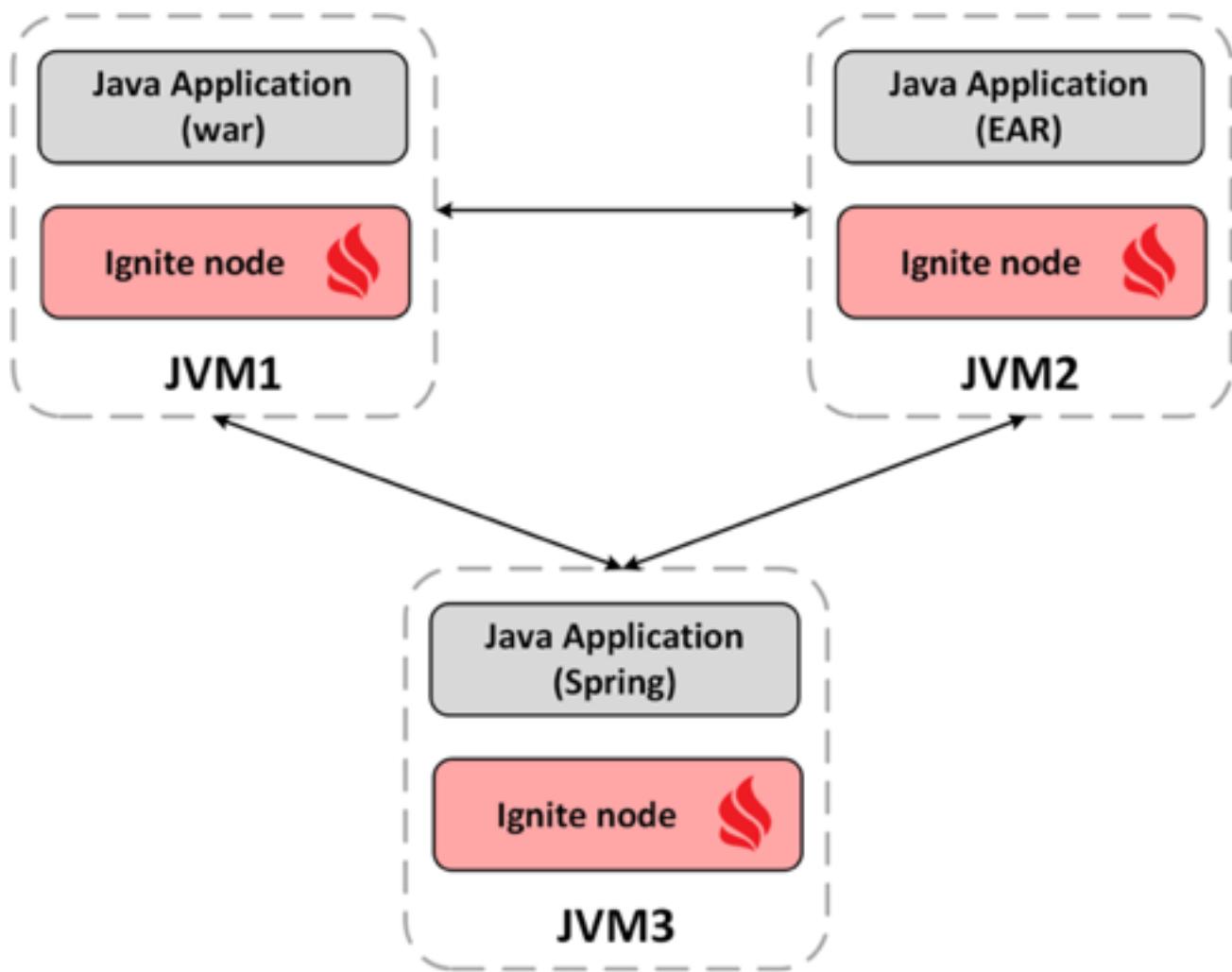
Server Node

Server Node

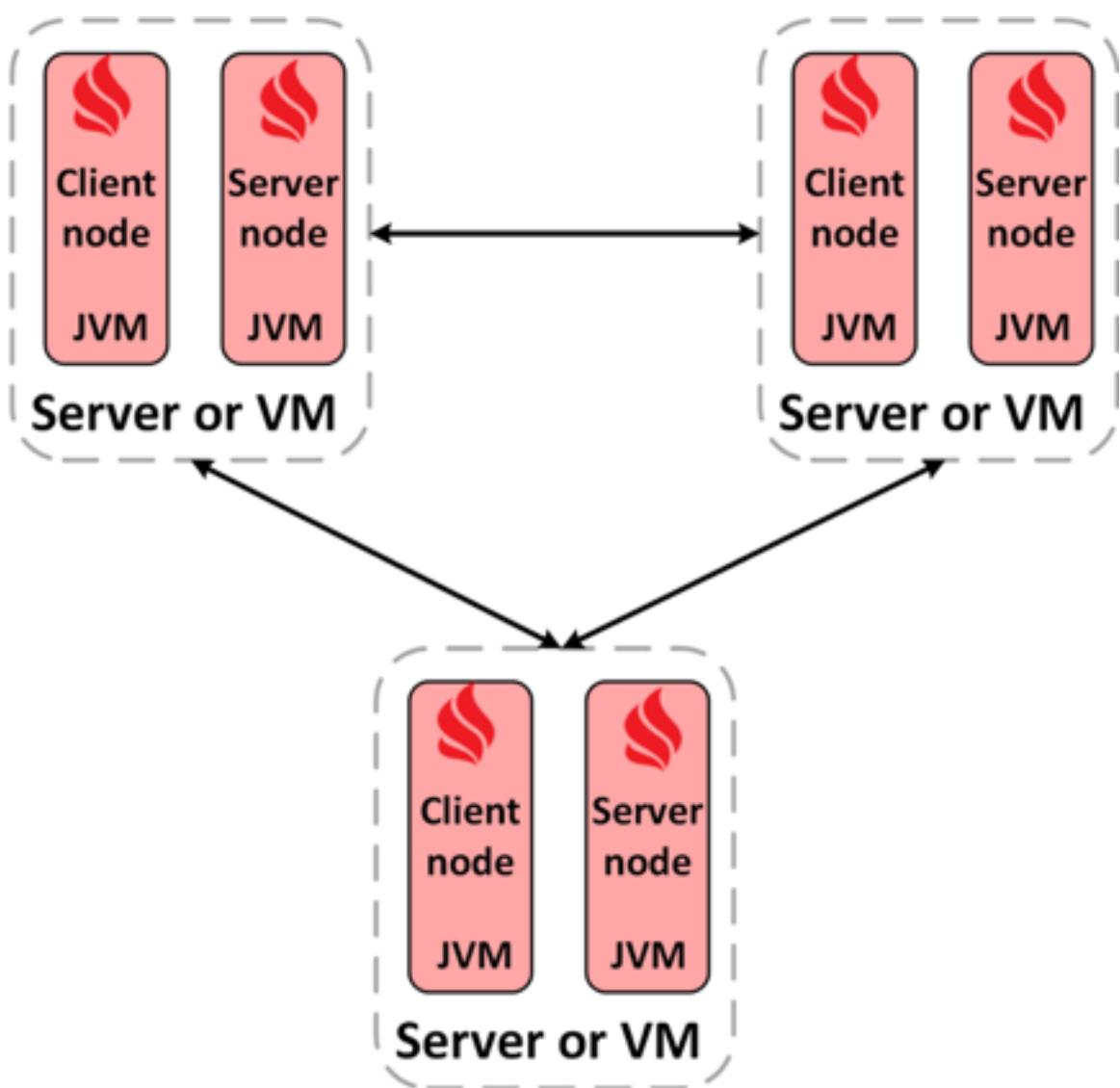
Server Node

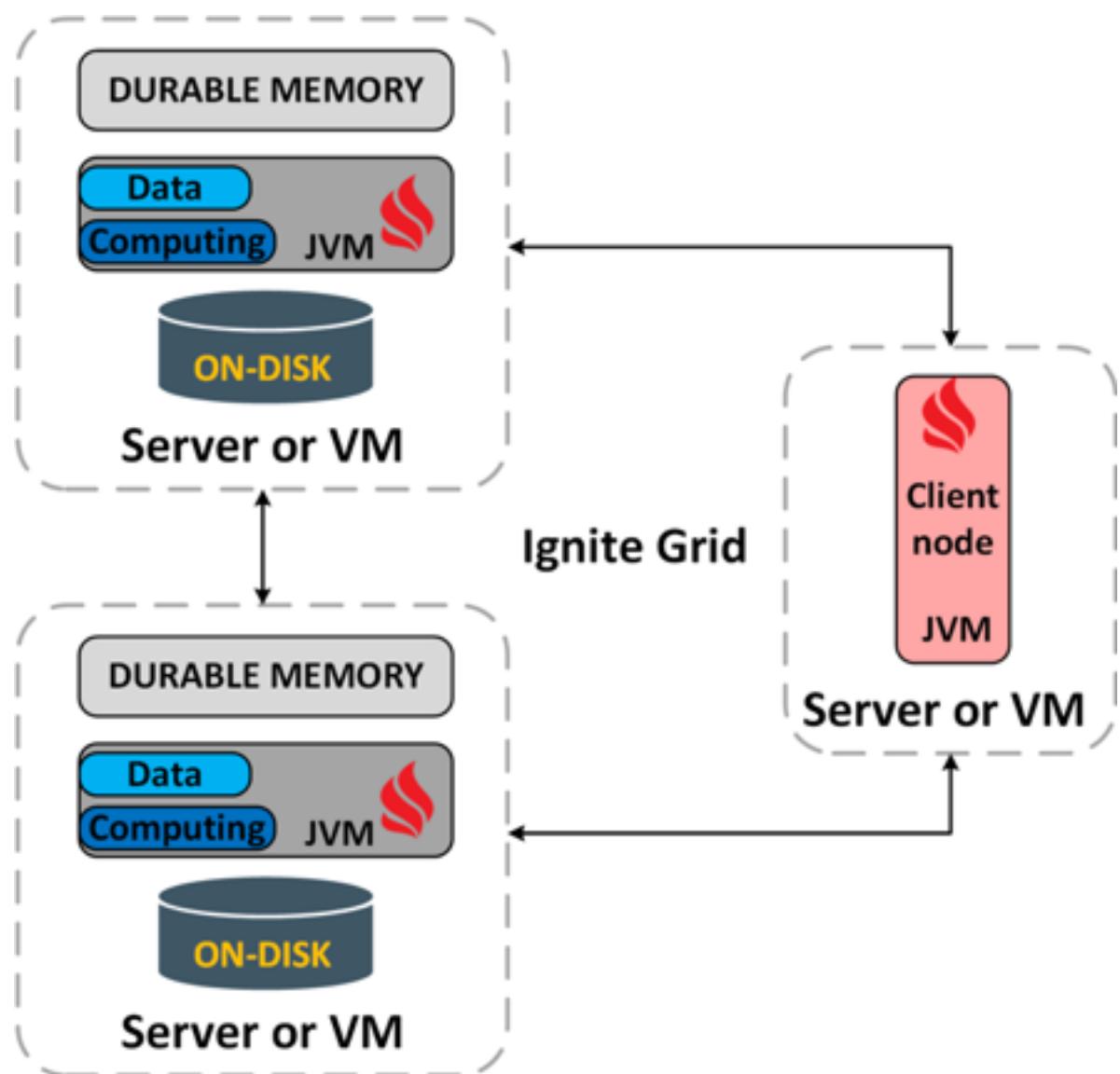
API	Java, .Net, C++, Rest, SQL, Python, Memcache
Drivers	JDBC, ODBC, Thin
Data structure	Queue, Set, Atomic types, Semaphore
Caching	Jcache (write behind) L2 caching (Hibernate, MyBatis) Web session clustering
Computing	Compute task, in-memory Map/Reduce, distributed closure, Fork-join Service task
Partitioning	Partitioned Replicated
Engines	SQL (H2) Full text search (Lucene) Servlet container (Jetty server)
Storage	On-heap Off-heap Disk
Streaming	Ignite data streamer, Kafka, Storm, Camel, Flume, MQTT
Bigdata	In-memory Map/Reduce, IGFS, Hadoop FS cache, Spark (RDD, Data frame)
Management	Visor Web console JMX
Networking	IPv4, IPv6
Deployment	JVM (JDK: 8,9 Vendors: Oracle JDK, Open JDK, IBM JDK) OS (*nix, Windows, MacOs, Oracle Solaris) Cluster deployment (AWS, Vcenter, Docker, Mesos, Kubernetes, On premise, Google cloud)

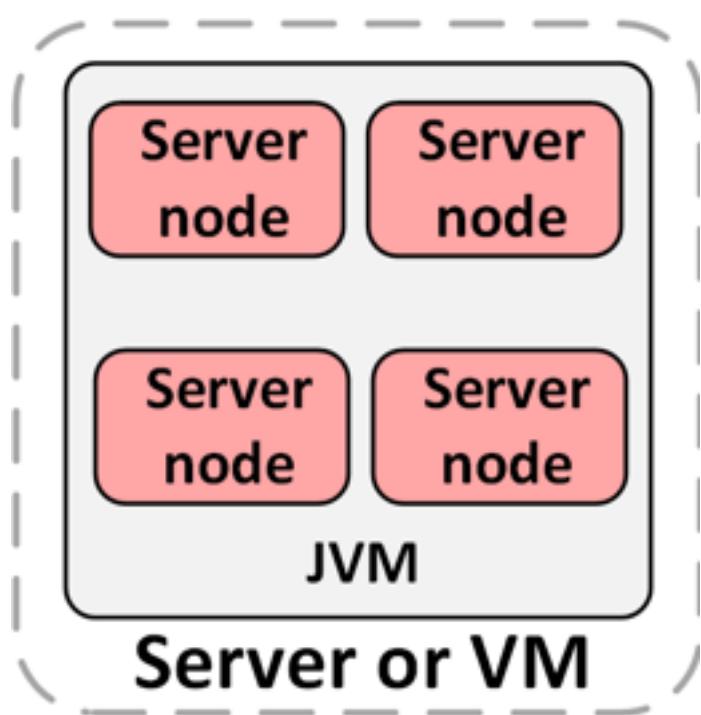




```
[23:55:22] Ignite node started OK (id=92c8bc87)
[23:55:22] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=3.6GB]
[23:55:22]   ^-- Node [id=92C8BC87-82A1-443E-BF6F-0F5963BECB65, clusterState=ACTIVE]
[23:55:22] Data Regions Configured:
[23:55:22]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]
Cache get>Hello Worlds: 1
```







Client ID	Surname	First name	E-mail	Location
FJ06	Foster	Jane	foster@yahoo.com	New York
MK04	Mack	ken	Mack@gmail.com	Pennsylvania
PJ05	Power	Julie	powerJ@gmail.com	New York
SN09	Suvenkors	Natalia	Natalisu@yandex.ru	Moscow
MB04	Marc	Brandon	<a href="mailto:Marcbr@aol.com">Marcbr@aol.com</a>	Toronto
AM05	Aroon	Mortan	<a href="mailto:armron@yahoo.com">armron@yahoo.com</a>	Delhi
FJ08	Foucault	Jaenne	<a href="mailto:Faucaultj@aol.com">Faucaultj@aol.com</a>	Bombay

Partition A-F



Partition G-P



Client ID	Surname	First name	E-mail	Location
MB04	Marc	Brandon	<a href="mailto:Marcbr@aol.com">Marcbr@aol.com</a>	Toronto
MK04	Mack	ken	Mack@gmail.com	Pennsylvania
PJ05	Power	Julie	powerJ@gmail.com	New York

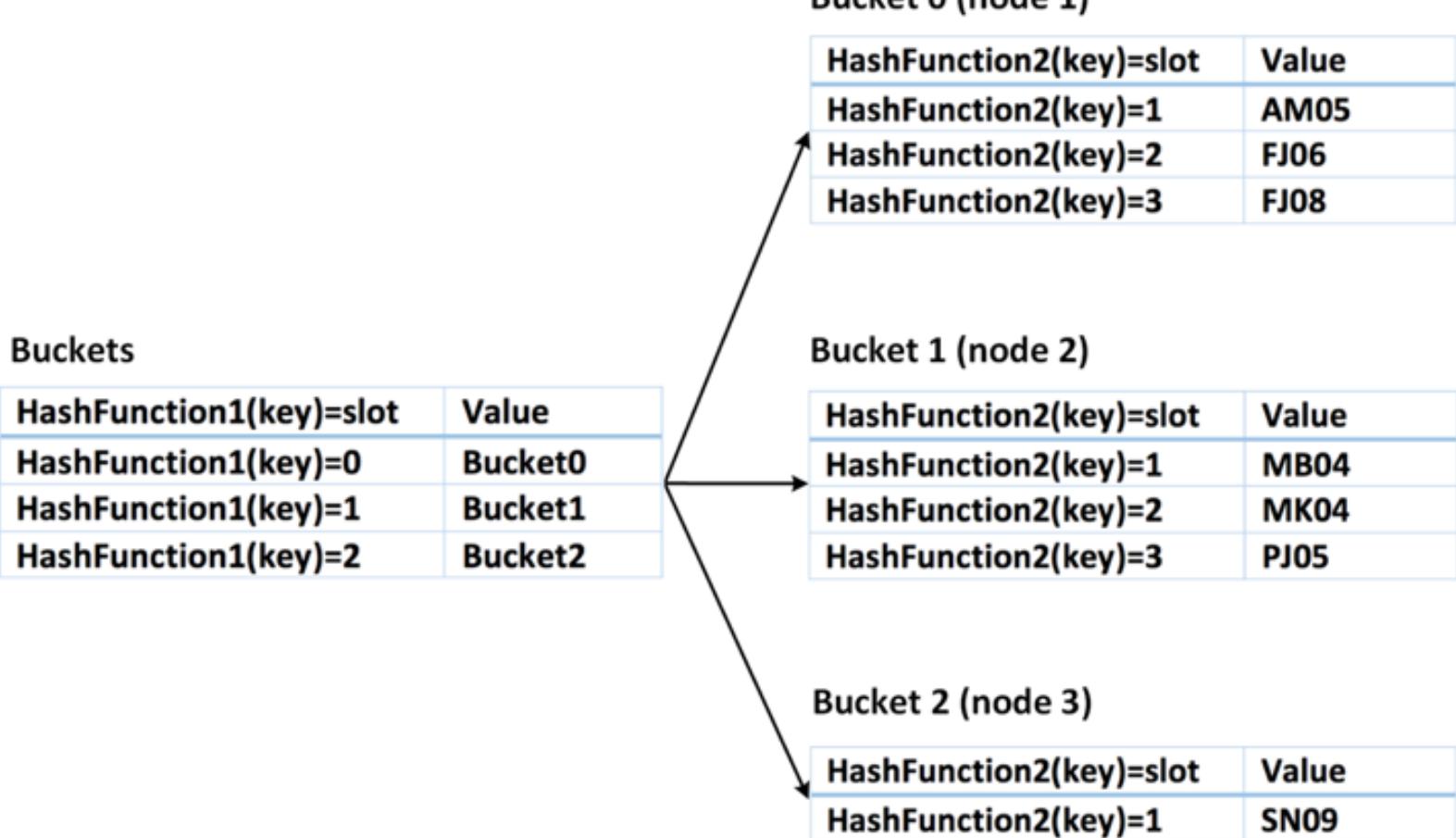
Client ID	Surname	First name	E-mail	Location
AM05	Aroon	Mortan	<a href="mailto:armron@yahoo.com">armron@yahoo.com</a>	Delhi
FJ06	Foster	Jane	foster@yahoo.com	New York
FJ08	Foucault	Jaenne	<a href="mailto:Faucaultj@aol.com">Faucaultj@aol.com</a>	Bombay

Client ID

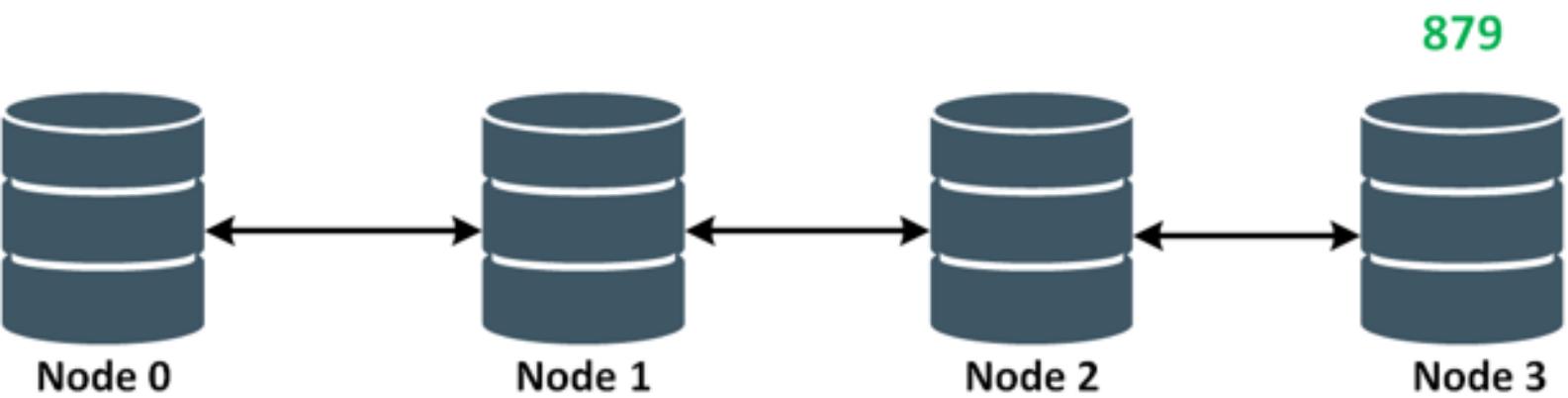
FJ06
MK04
PJ05
SN09
MB04
AM05
FJ08

Hash function  
Hash (o) % n

Slot	Surname	First name	E-mail	Location
01	Foster	Jane	foster@yahoo.com	New York
02	Mack	ken	Mack@gmail.com	Pennsylvania
03	Power	Julie	powerJ@gmail.com	New York
04	Suvenkors	Natalia	Natalisu@yandex.ru	Moscow
05	Marc	Brandon	<a href="mailto:Marcbr@aol.com">Marcbr@aol.com</a>	Toronto
06	Aroon	Mortan	<a href="mailto:armron@yahoo.com">armron@yahoo.com</a>	Delhi
07	Foucault	Jaenne	<a href="mailto:Faucaultj@aol.com">Faucaultj@aol.com</a>	Bombay



1. Hash (Node id || Key) -> Score
2. Node with the highest score wins



Hash ("0" || 612) = 759  
Hash ("1" || 612) = 481  
Hash ("2" || 612) = 430  
Hash ("3" || 612) = **879**

**Step 1. gets an affinity for any given key**

*Affinity Key =*

*CacheAffinityKeyMapper.affinityKey(given key)*



**Step 2. gets partition number for any given key**

*Partition number =*

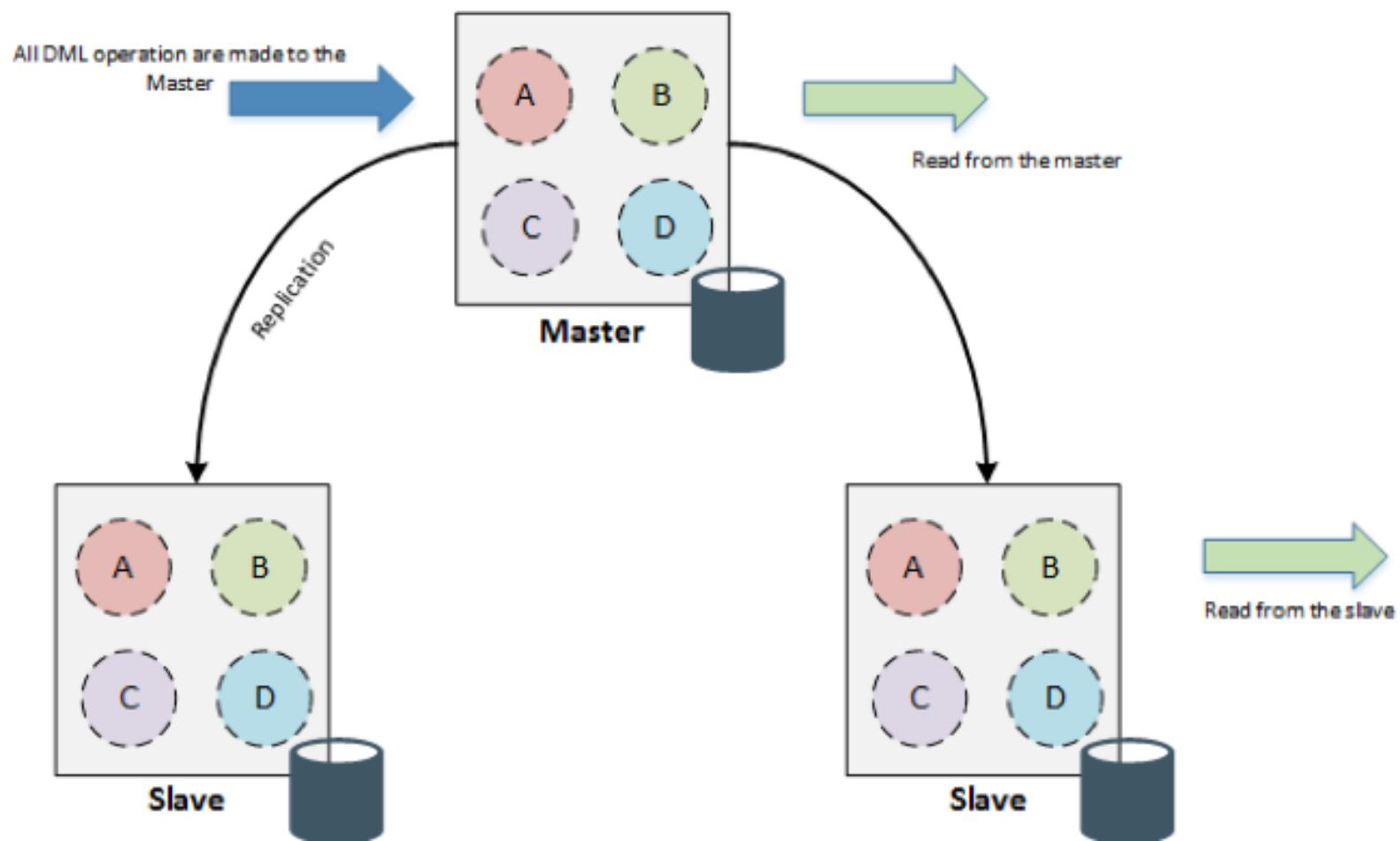
*AffinityFunction.partition(affinity key)*

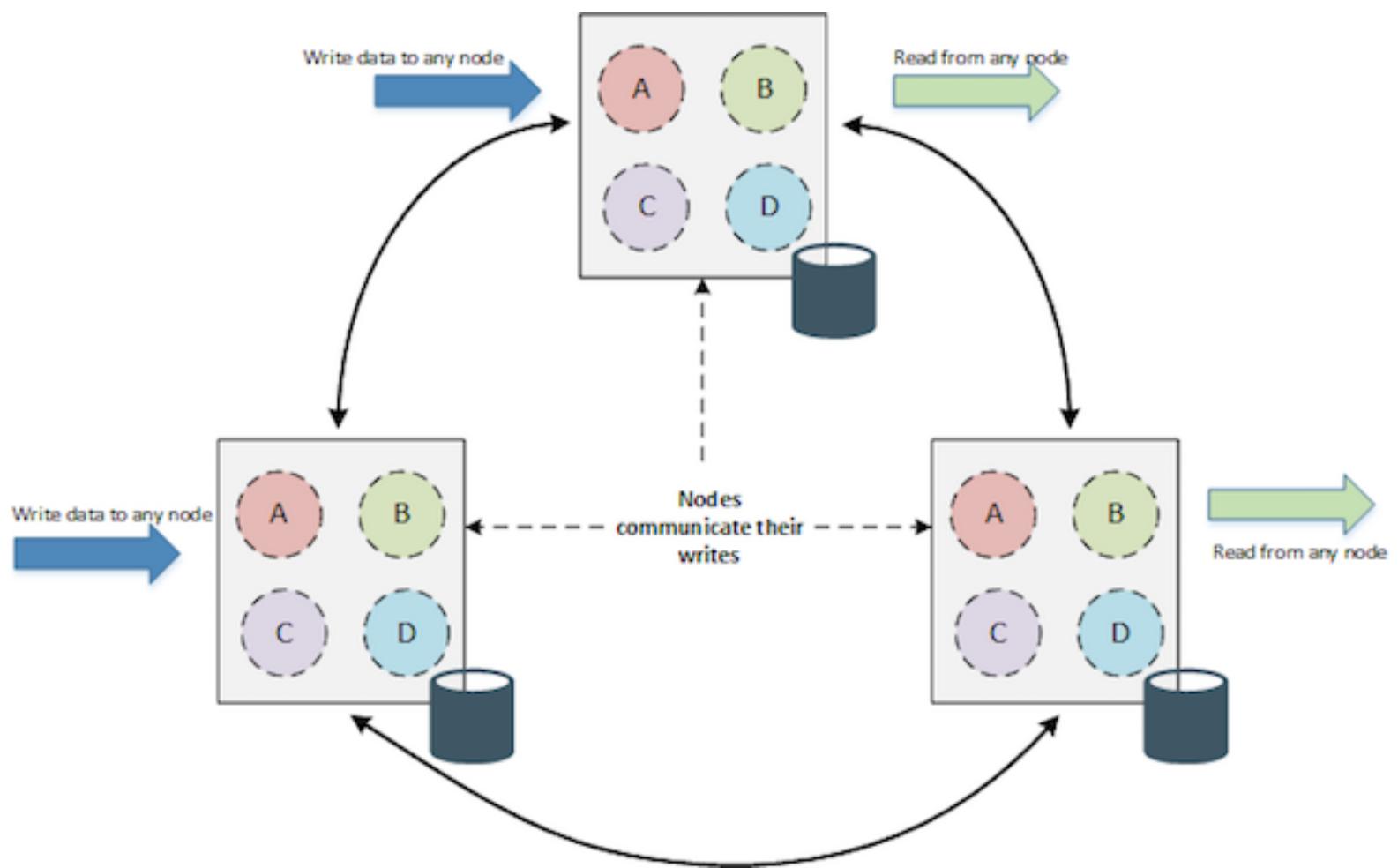


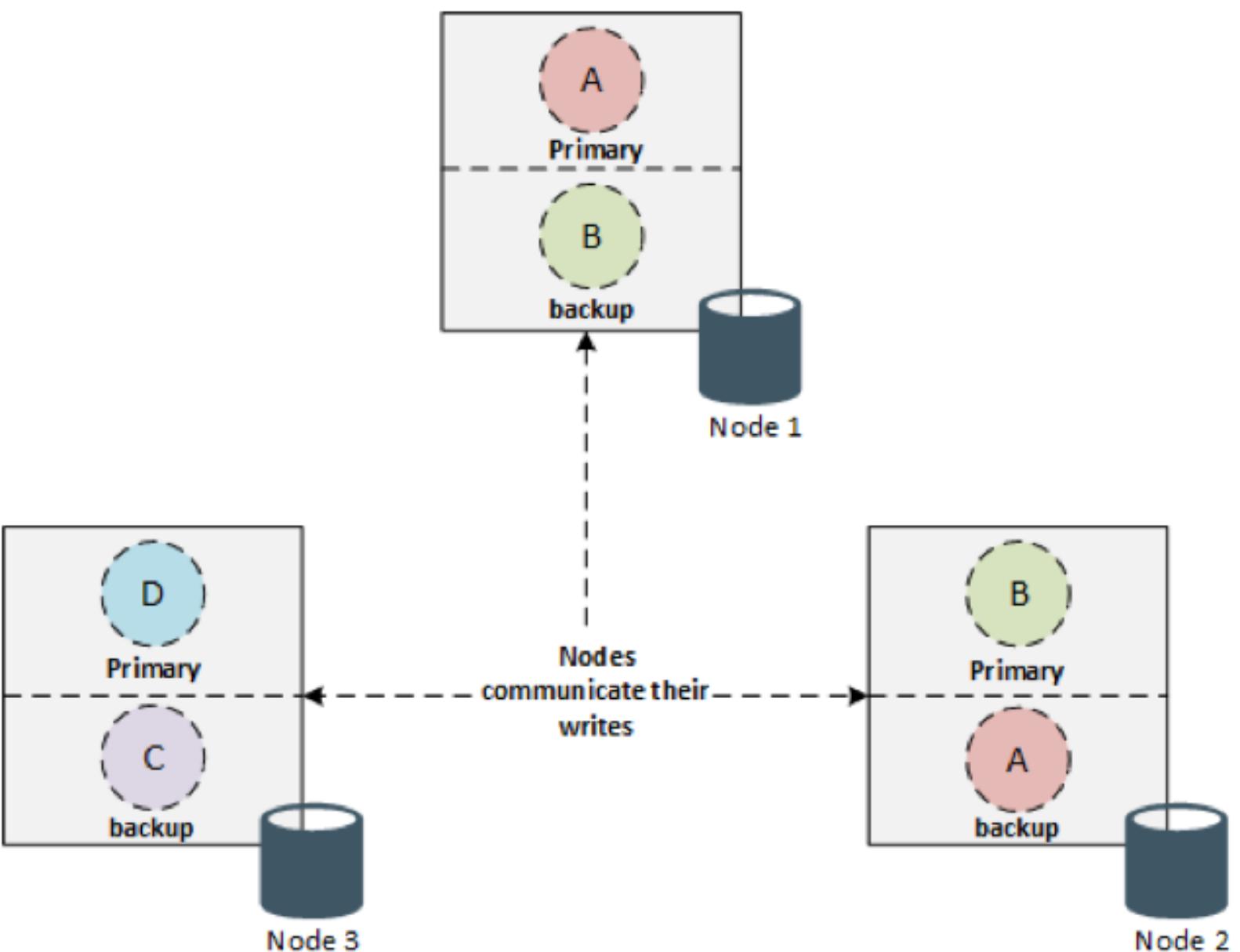
**Step 3. gets affinity nodes for a partition**

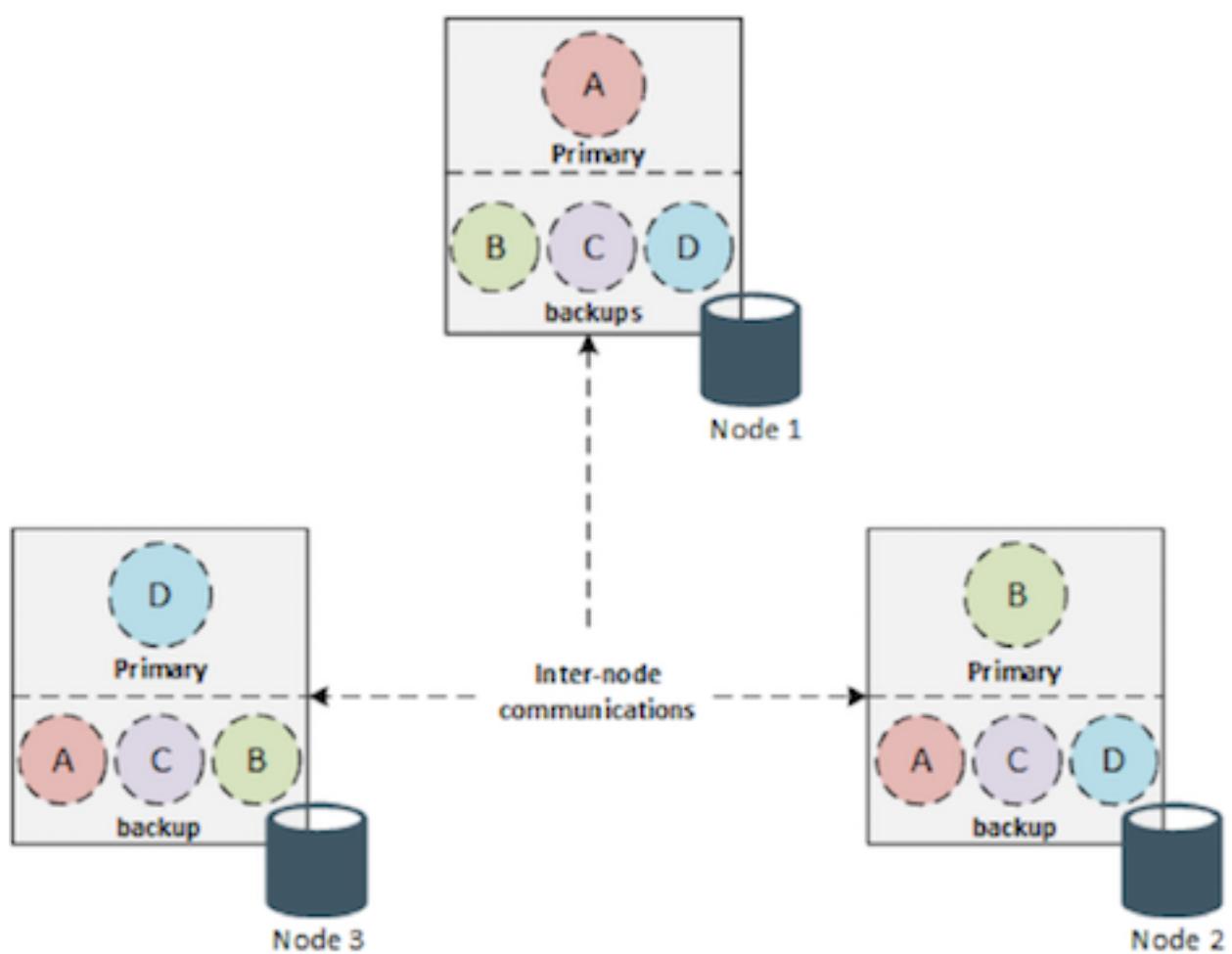
*List of nodes = AffinityFunction.assignPartitions()*

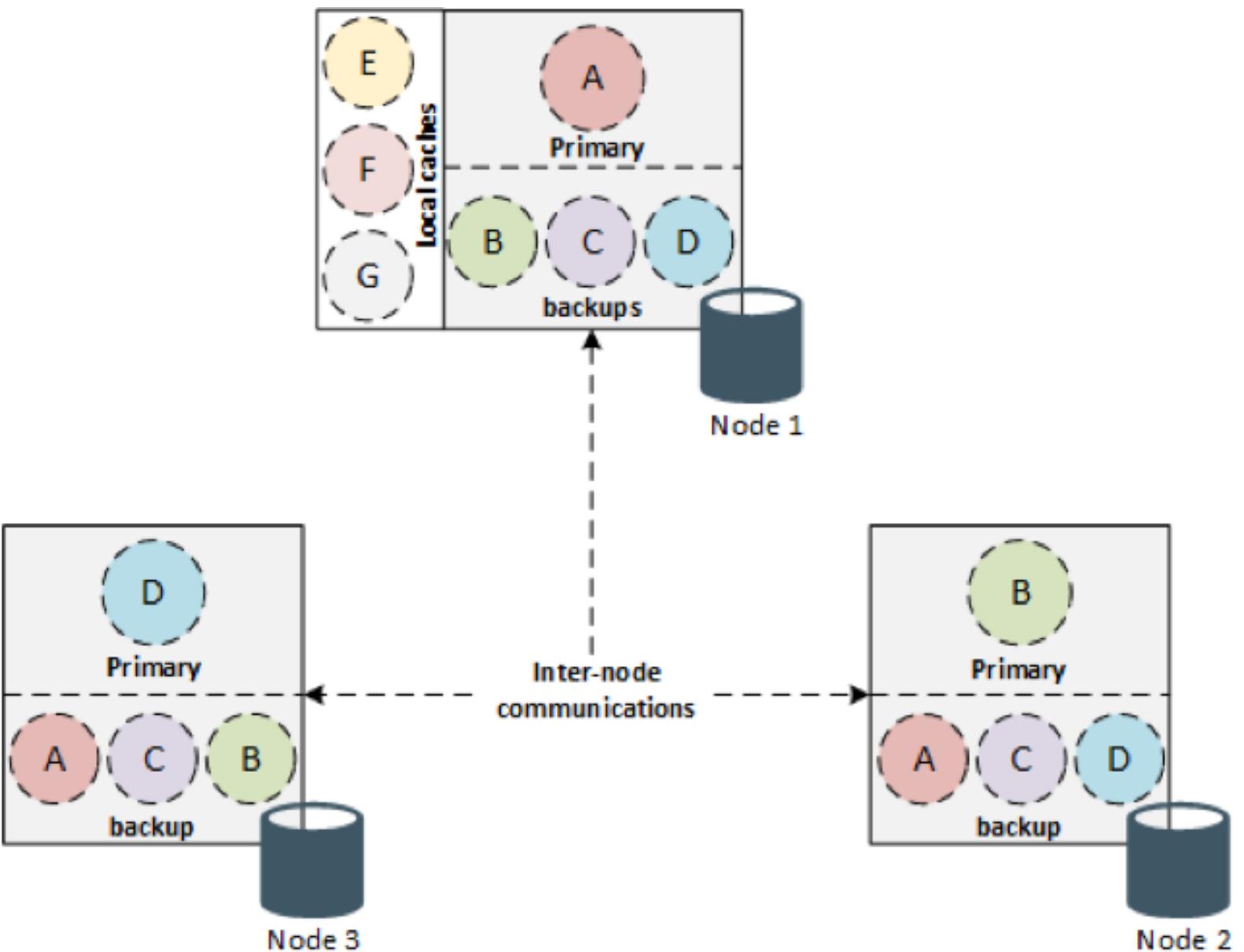


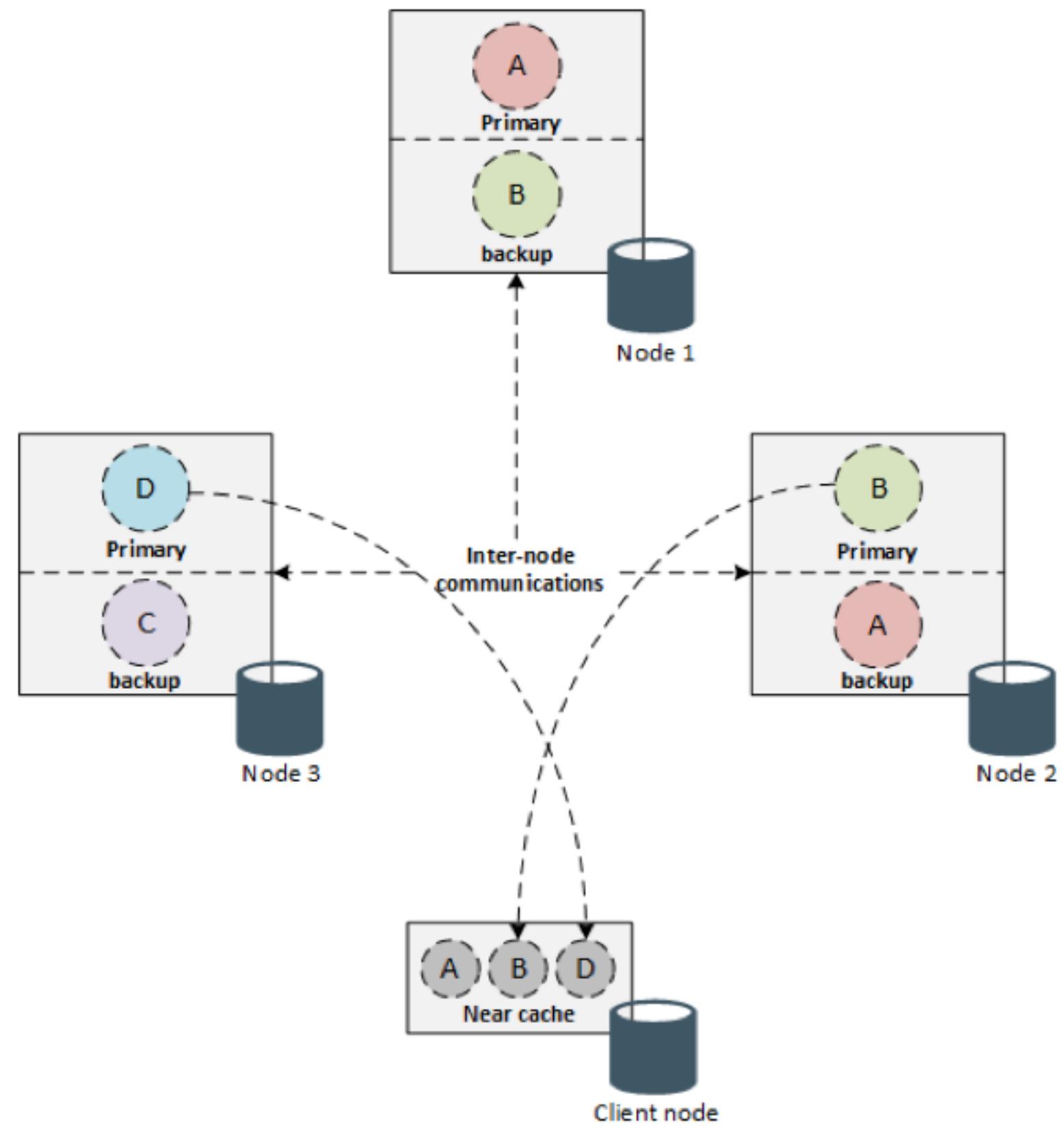


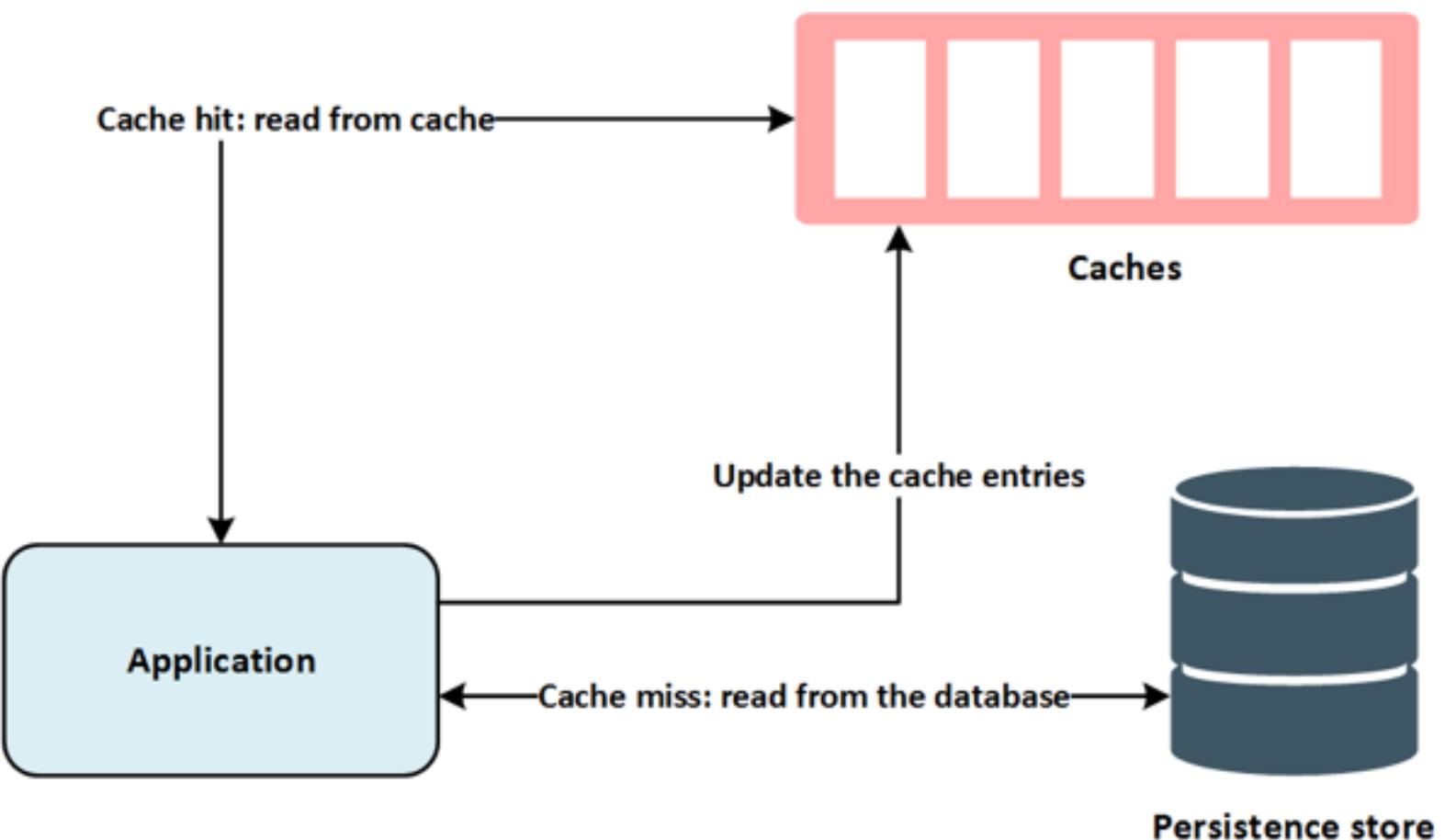


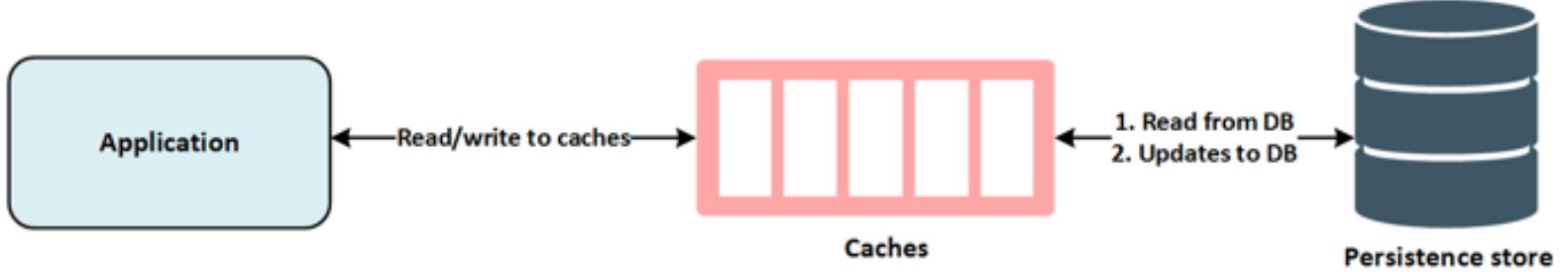


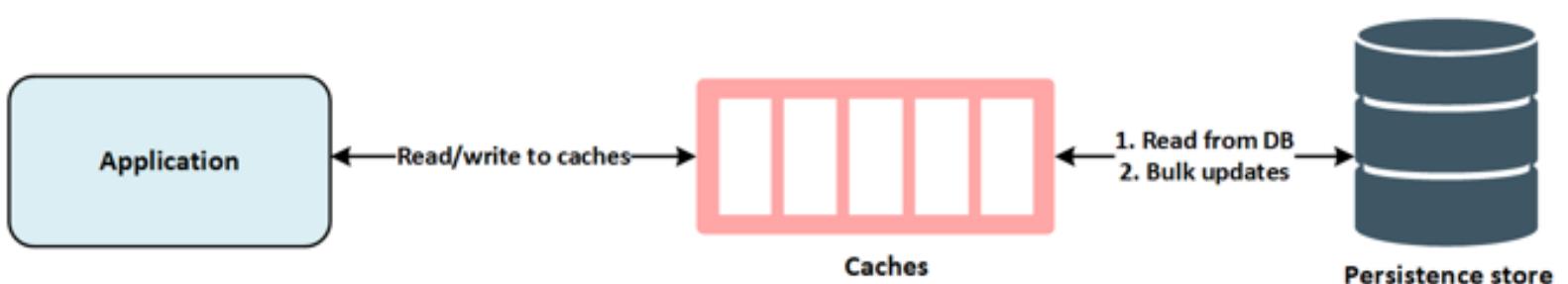










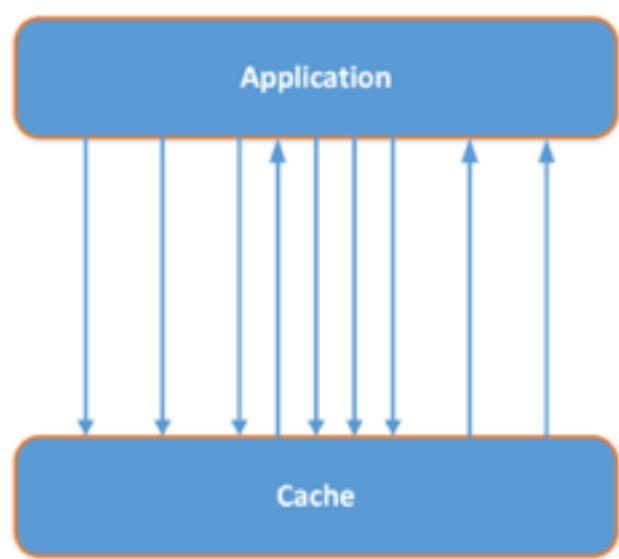


**<Key = Client profile ID>**

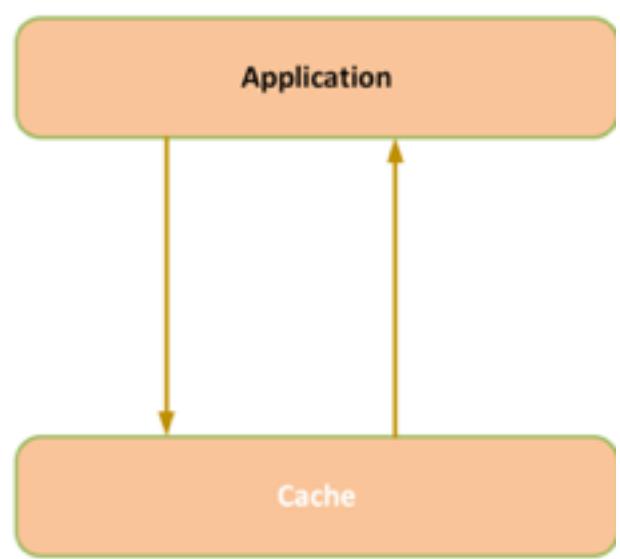
**<Value=Object>**

User profile

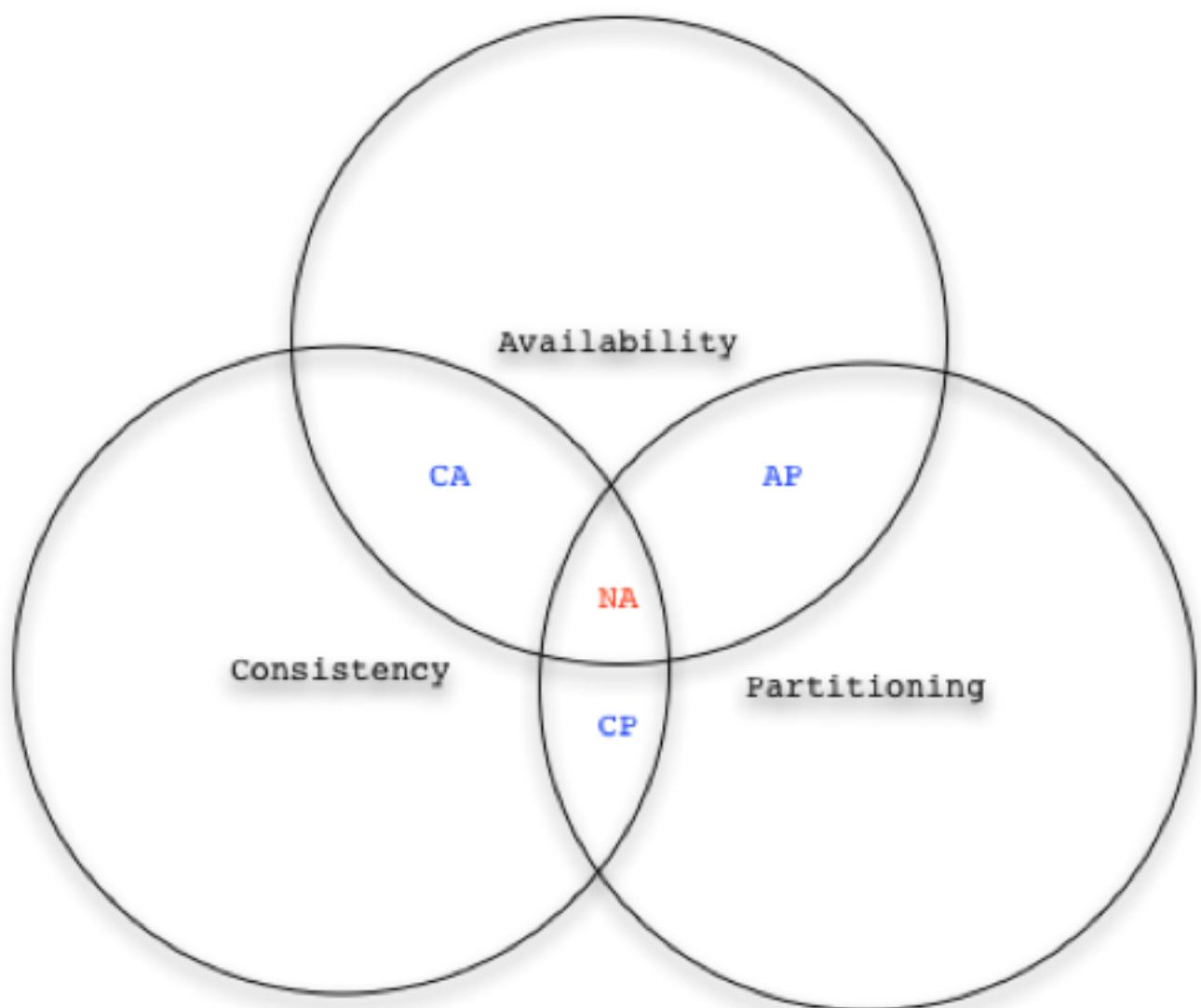
Products

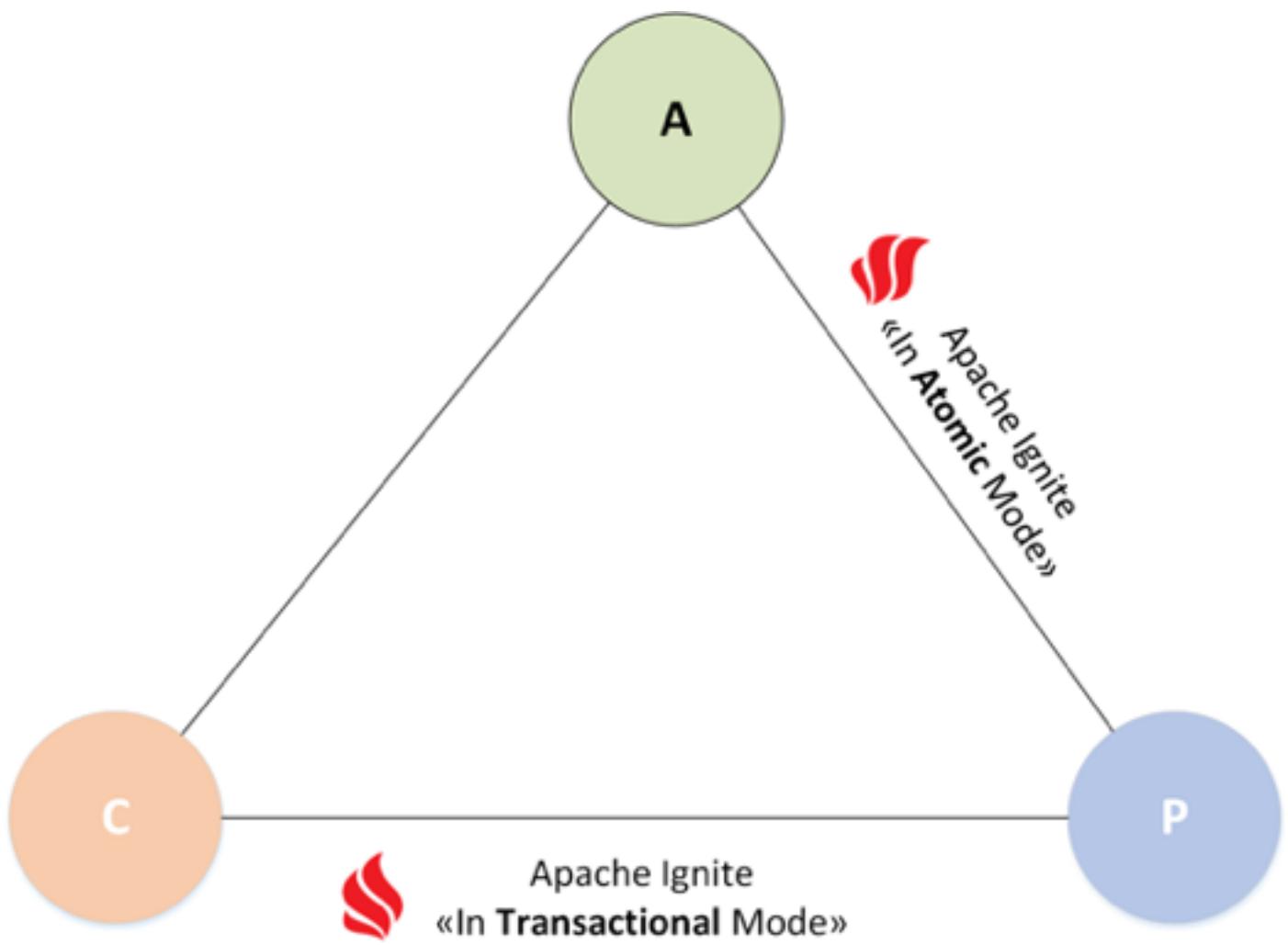


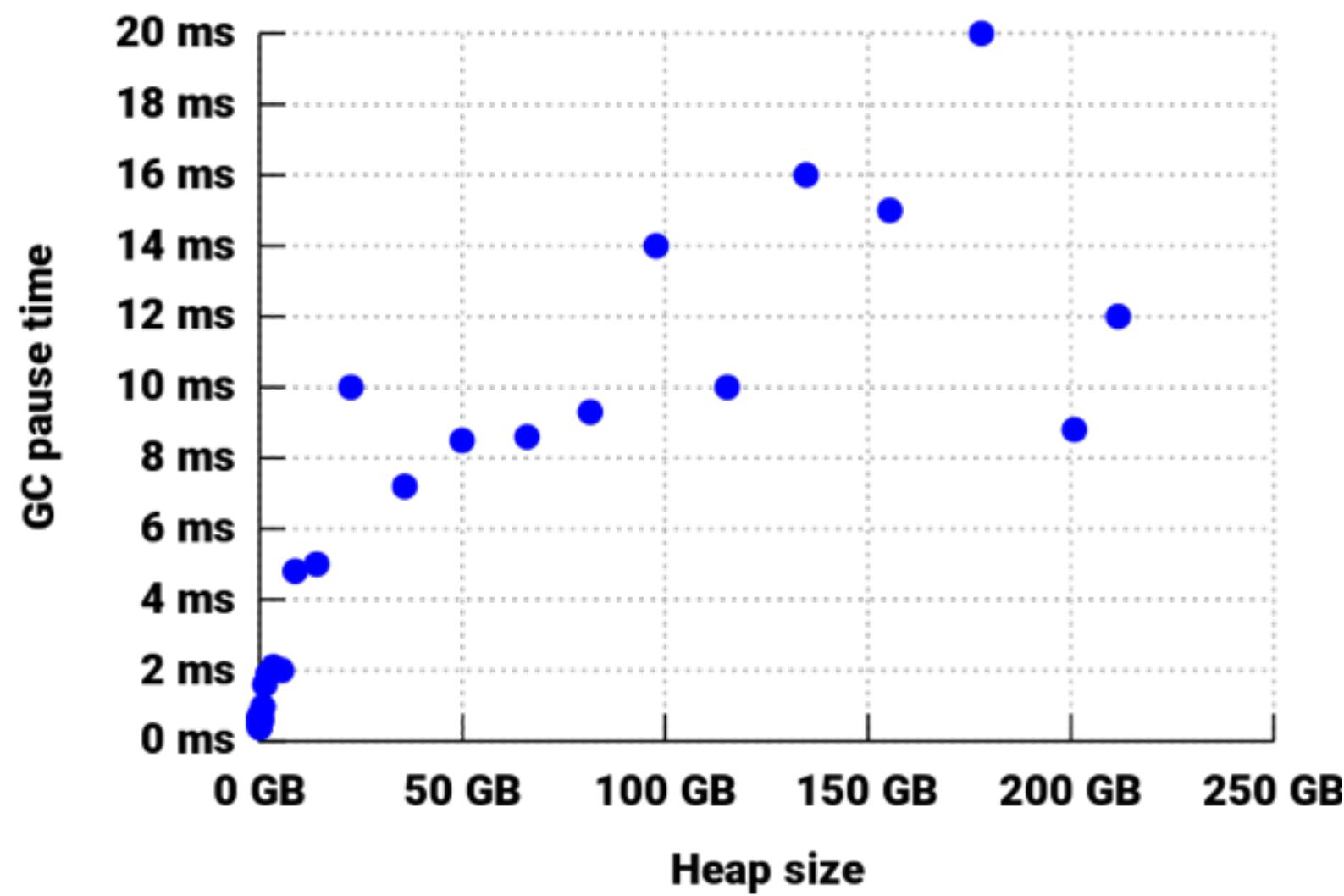
Without EntryProcessor

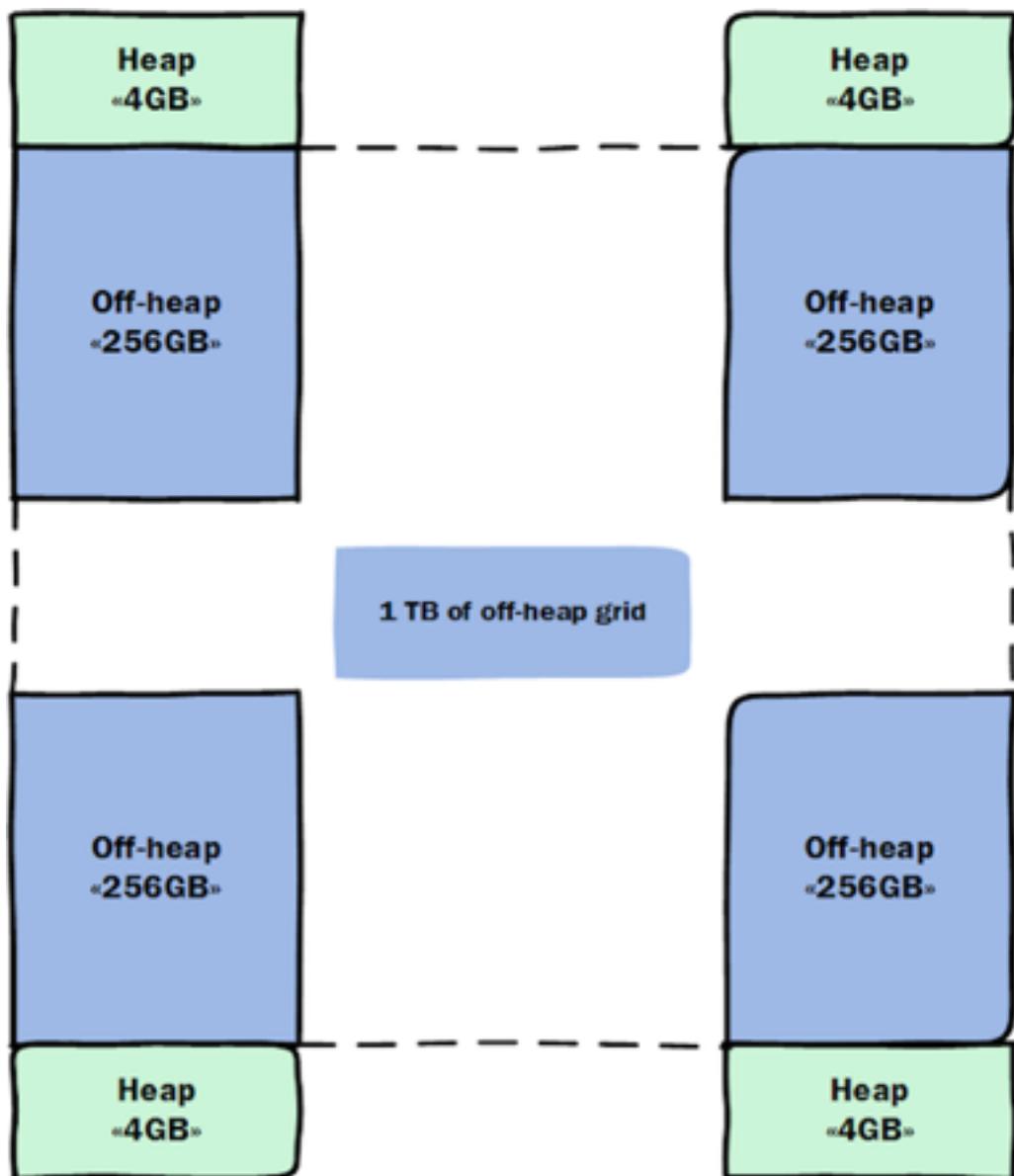


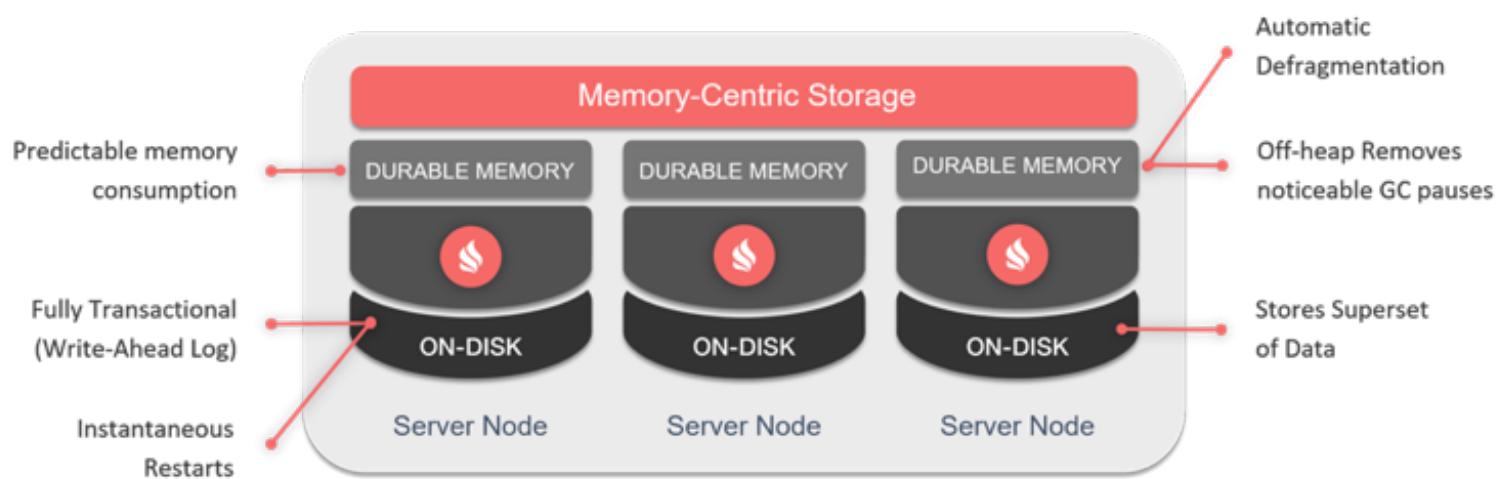
Jcache EntryProcessor





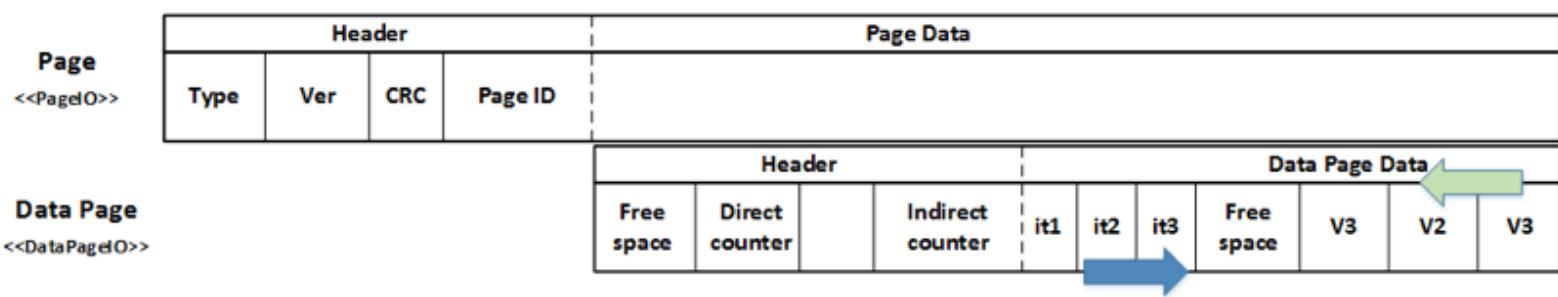


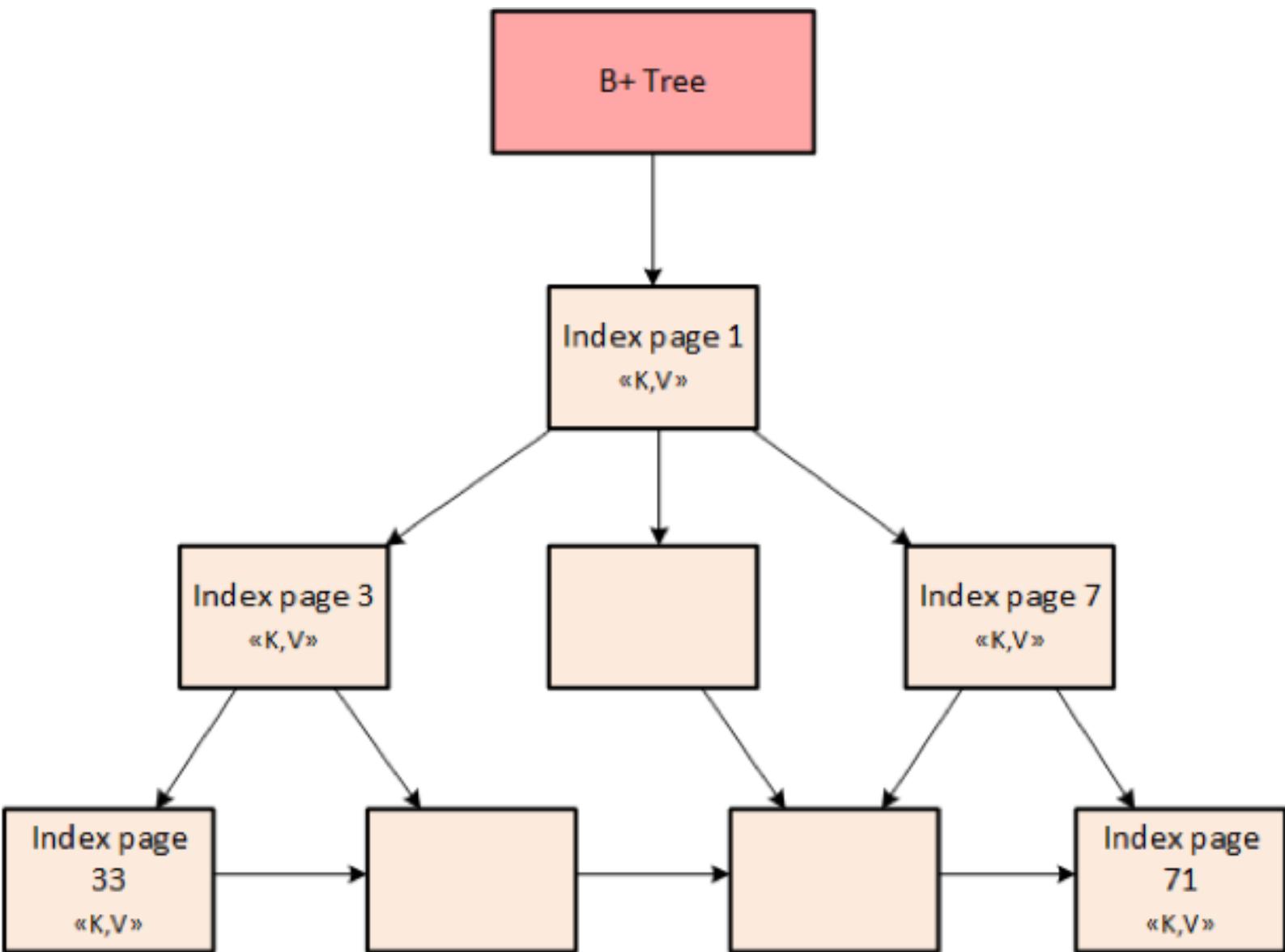




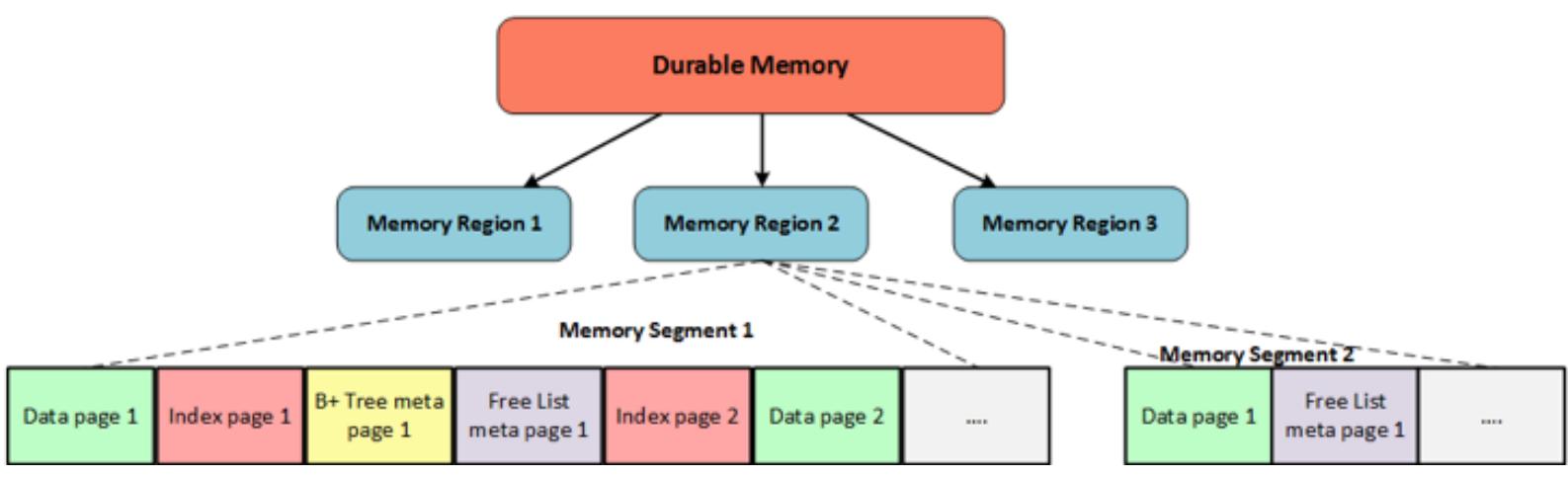
**Page**  
  <<Page10>>

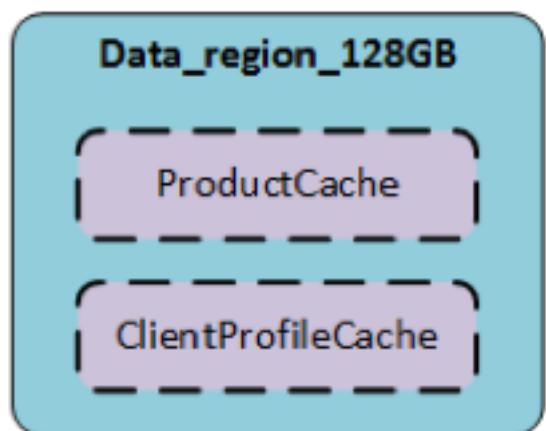
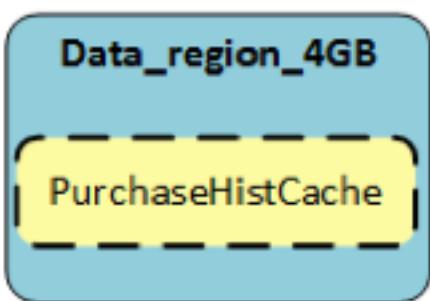
Header				Page Data
Type	Ver	CRC	Page ID	





Data page 1	Index page 1	B+ Tree meta page 1	Free List meta page 1	Index page 2	Data page 2	....
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**Off-heap array for tracking**



Off-heap array for tracking

Use, T1 for eviction

T1 1531599000	T2 1531599600	
------------------	------------------	--

Use, T2 for eviction

T2 1531599000	T3 1531599600	
------------------	------------------	--

Use, T3 for eviction

T3 1531599000	T4 1531599600	
------------------	------------------	--



In-Memory mode



In-Memory  
+  
Native persistence



In-Memory  
+  
3<sup>rd</sup> party database



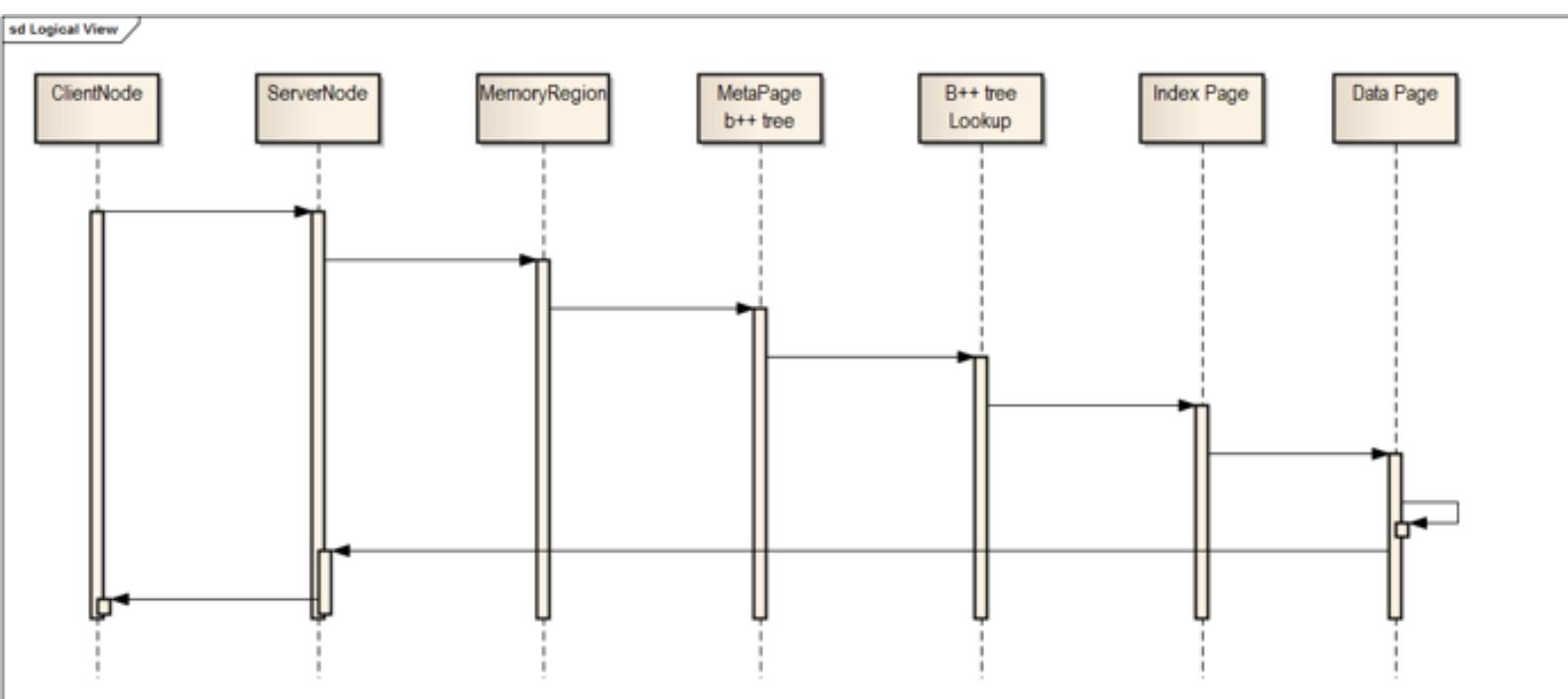
In-Memory  
+  
Swap file

- Expired entries are deleted from the RAM completely.
- Applies to all distributed node in which the item is replicated.

- Expired entries are removed from the memory and disk.
- Applies to all distributed nodes in which the item is replicated.

- Expired entries are removed from the memory of all nodes from the cluster and left untouched in the 3rd party persistence.

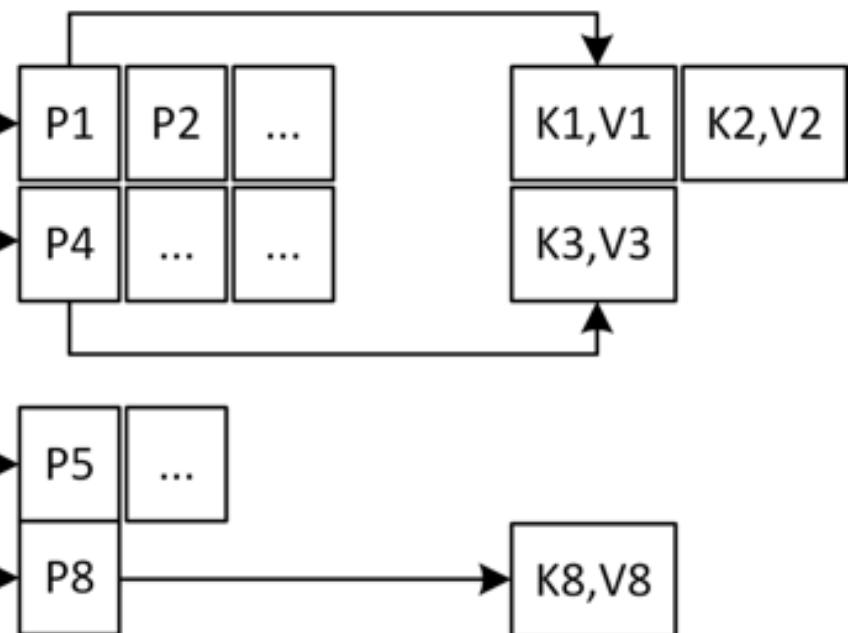
- Expired entries are purged from memory and the swap files.
- Applies to all the nodes of the cluster.

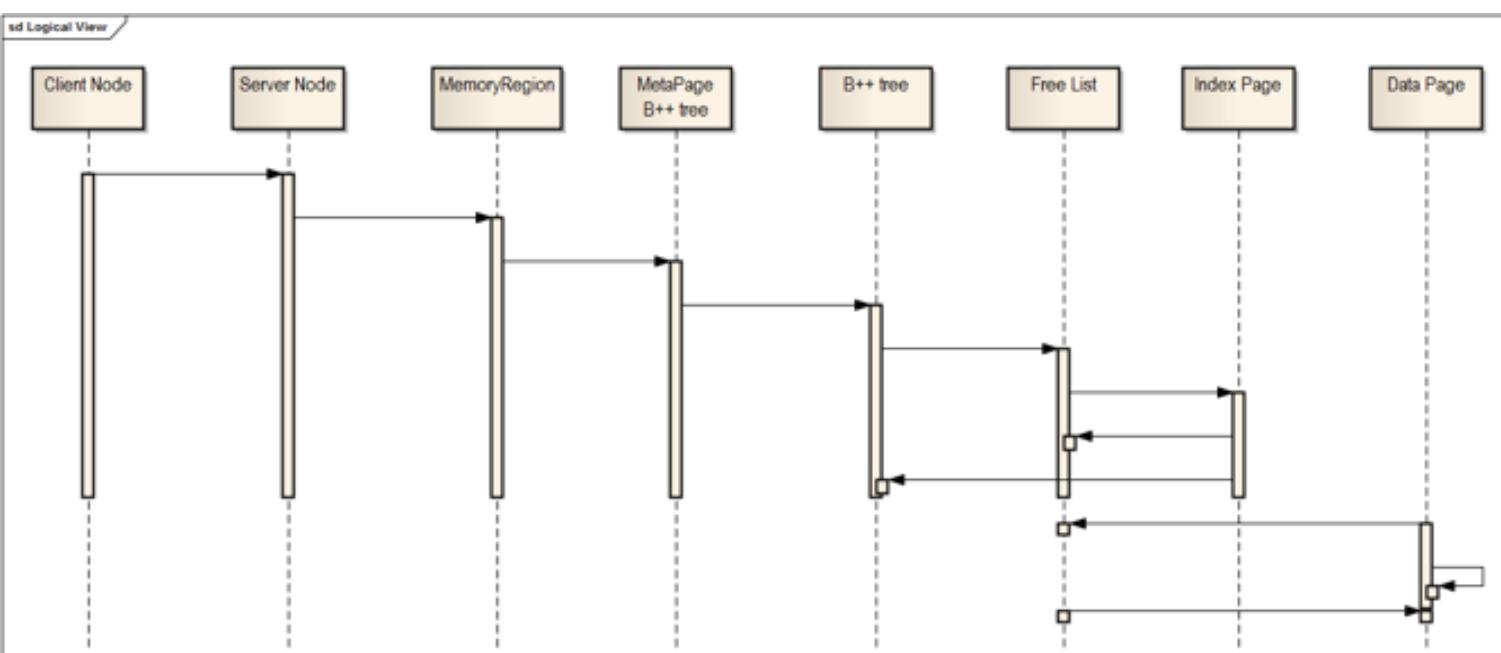


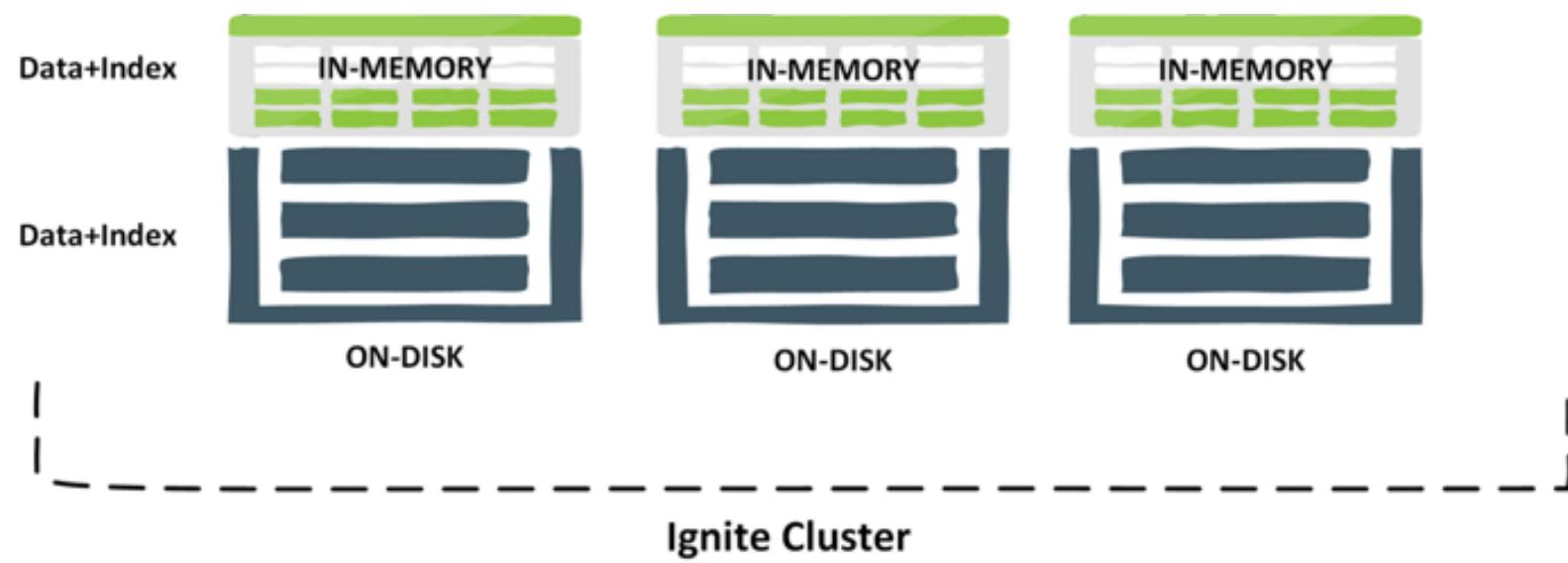
## Available page size

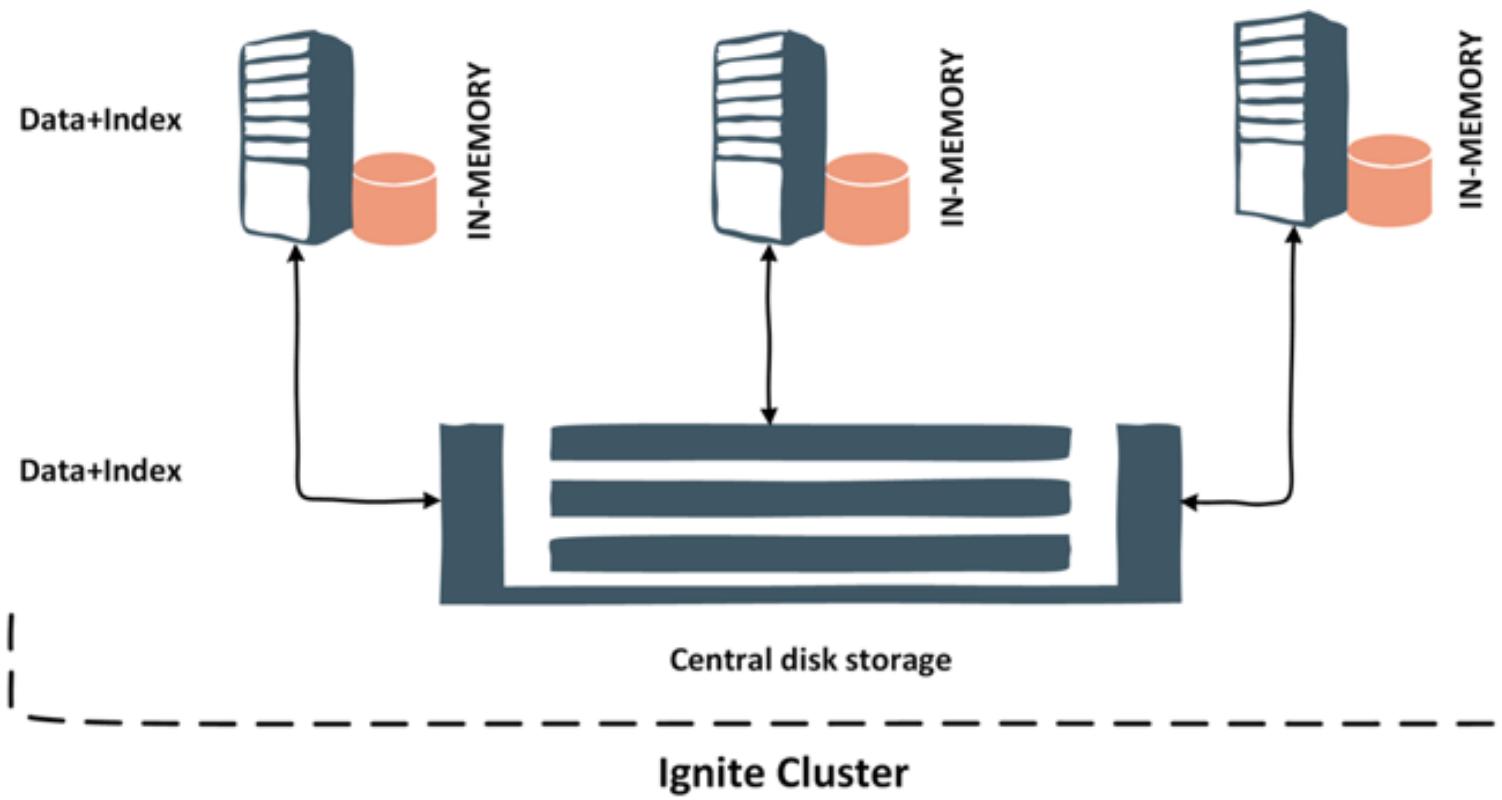
8-15 free bytes
16-32 free bytes
.....
2032-2039 free
2040-2048 free

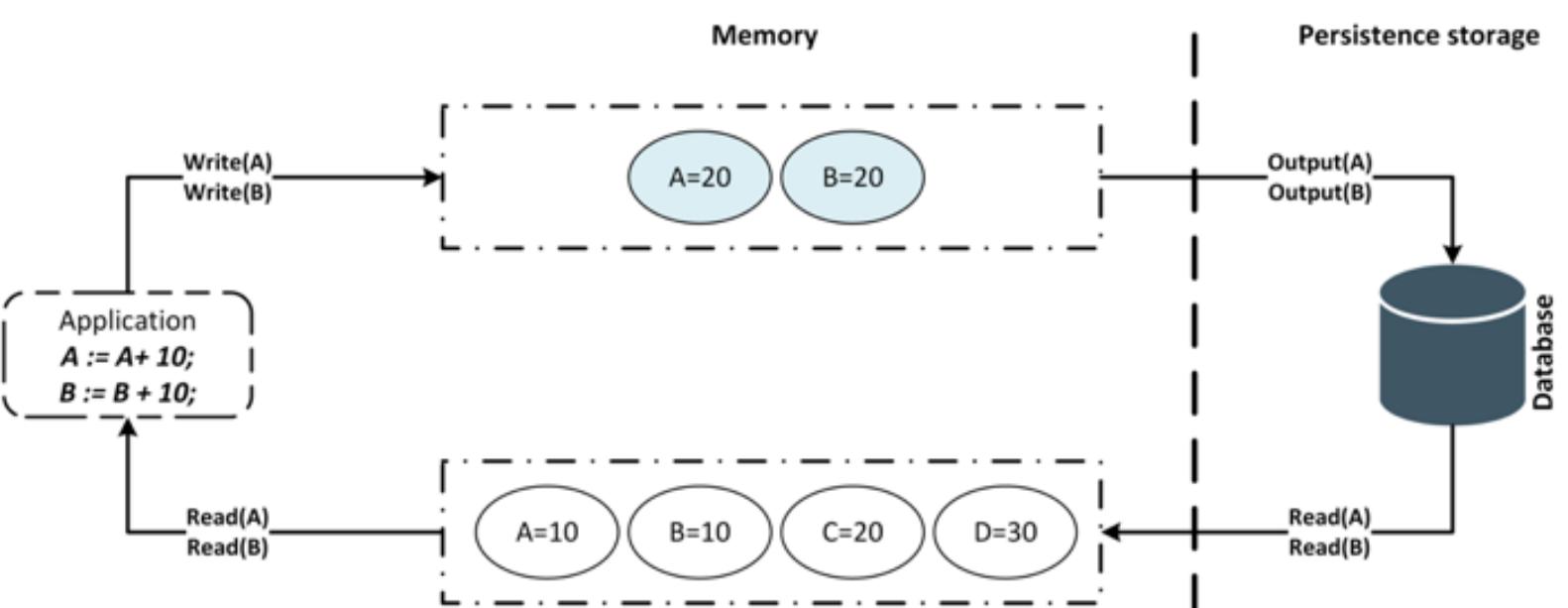
## Pages linked list

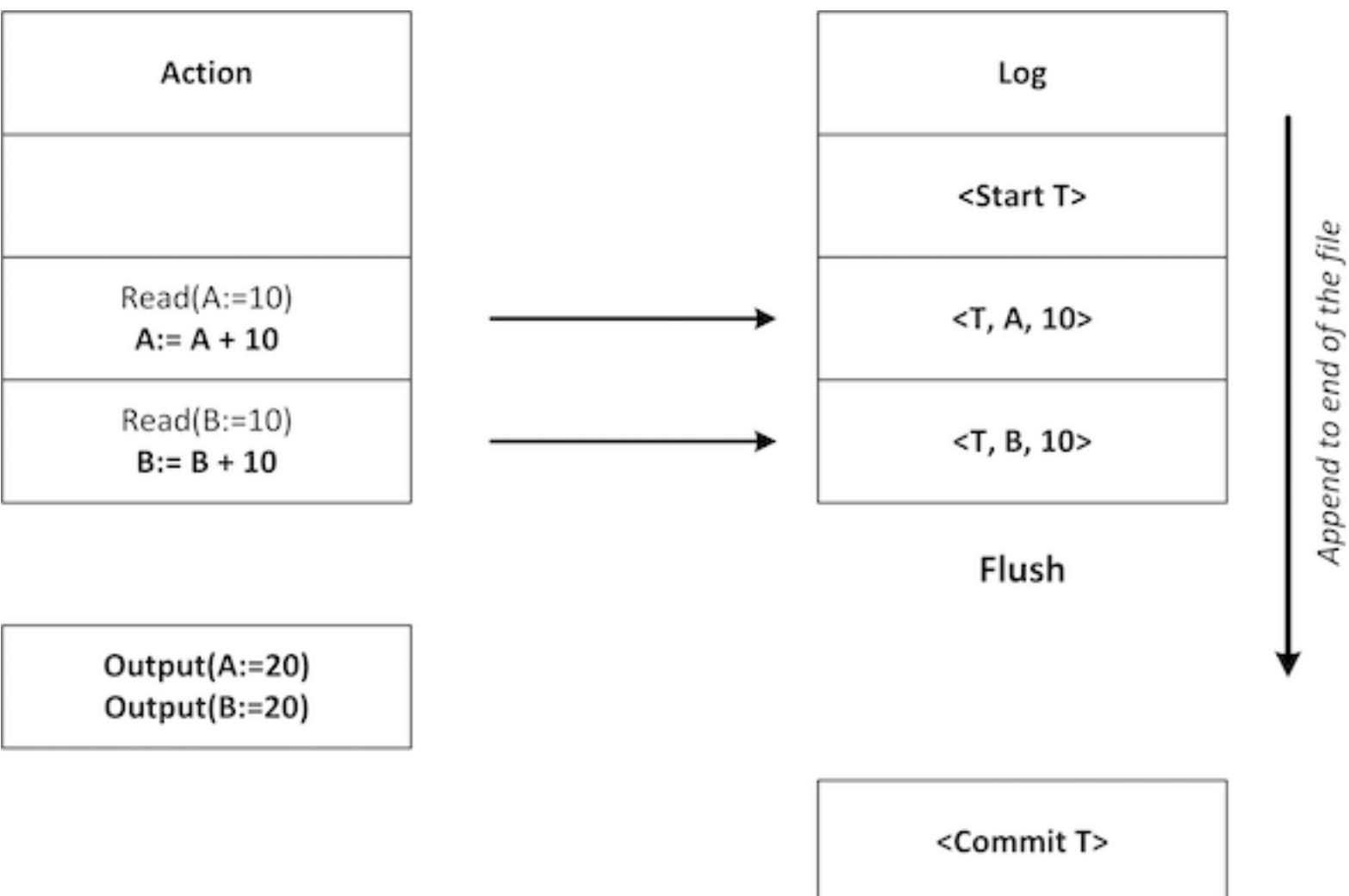












Action

<Start T>

Read (A)  
<T, A, 10>

Read (B)  
<T, B, 10>

Output(A:=10)  
Output(B:=10)

Log

<Start T>

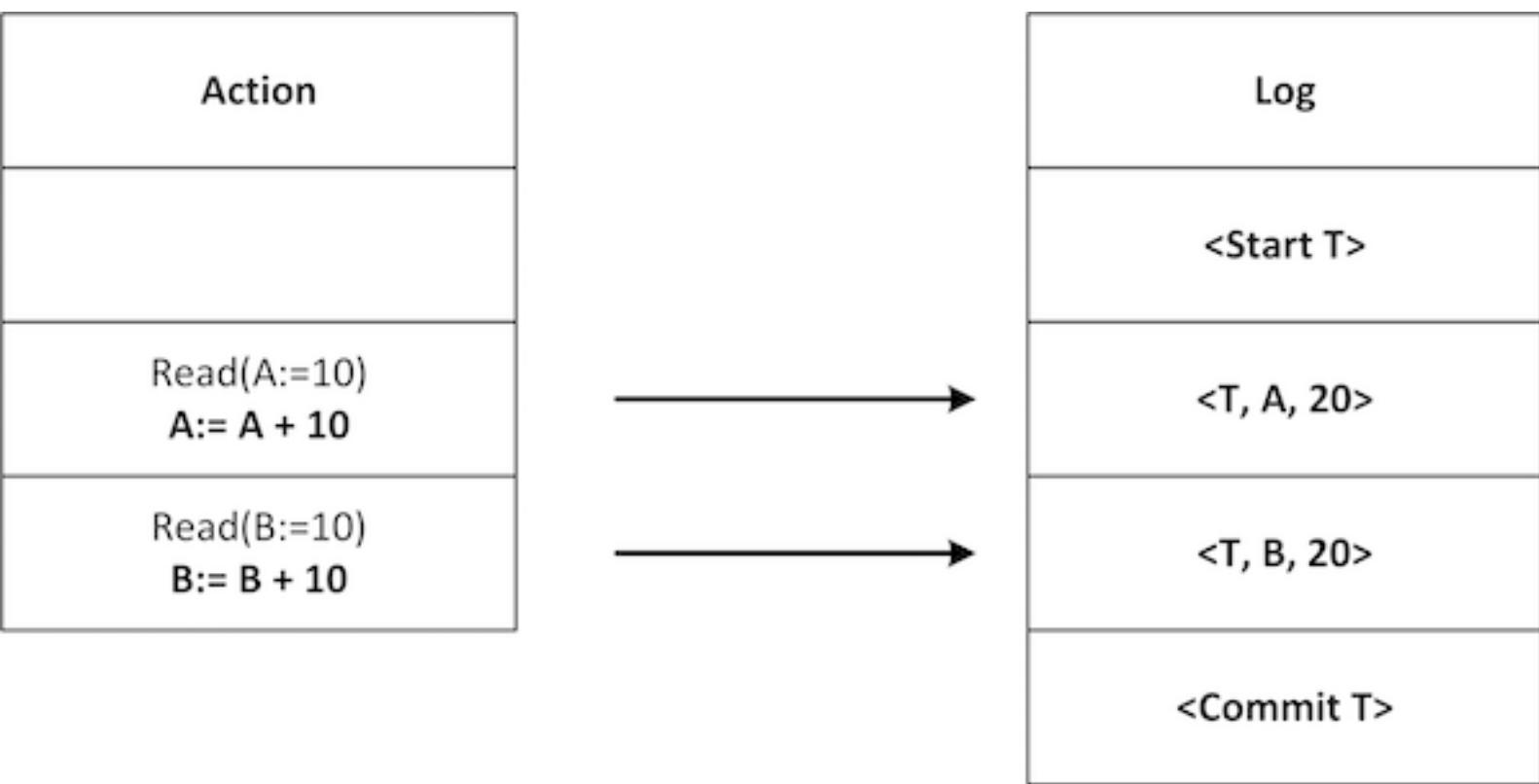
<T, A, 10>

<T, B, 10>

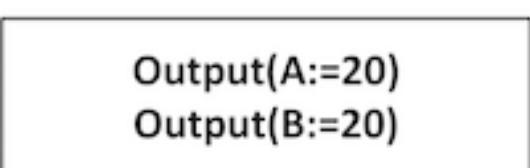
<Abort T>

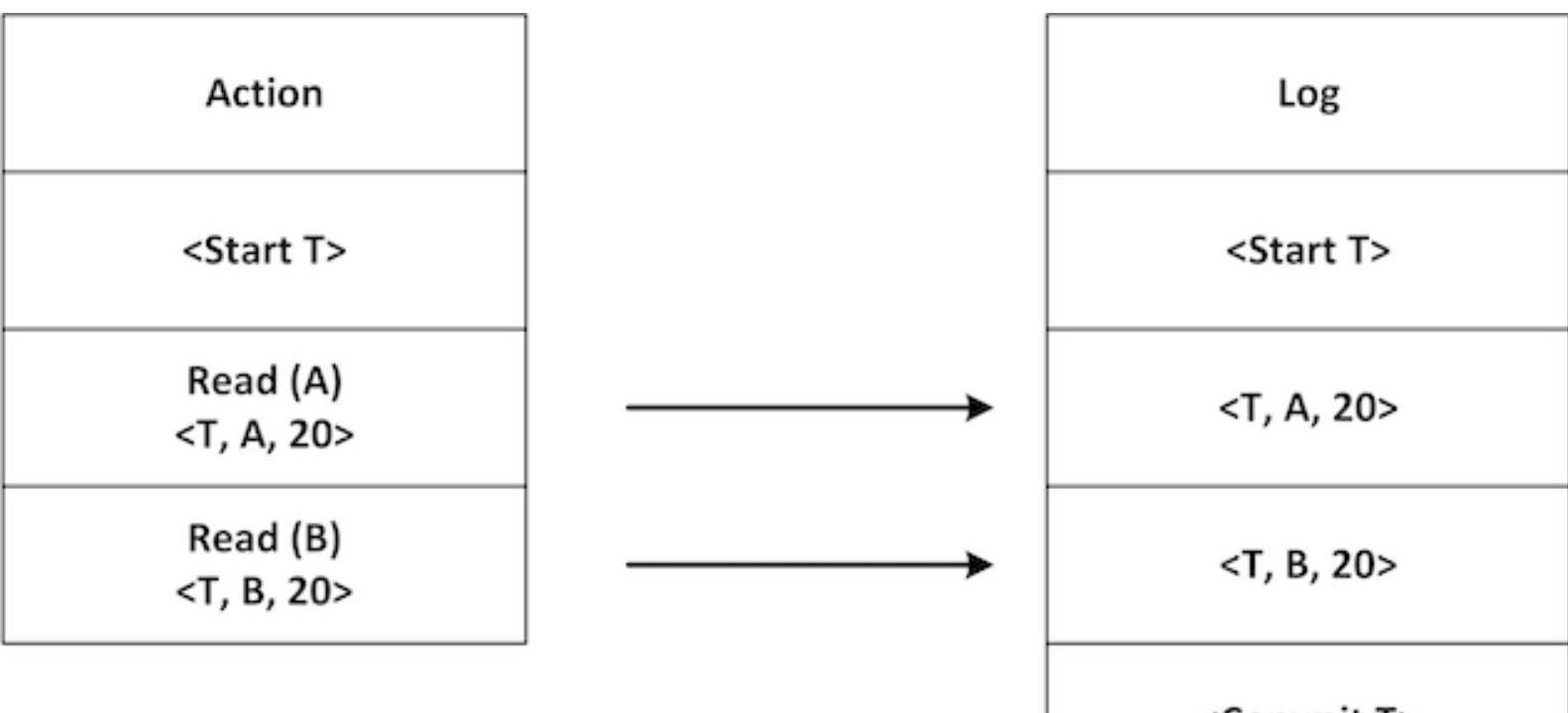
Flush





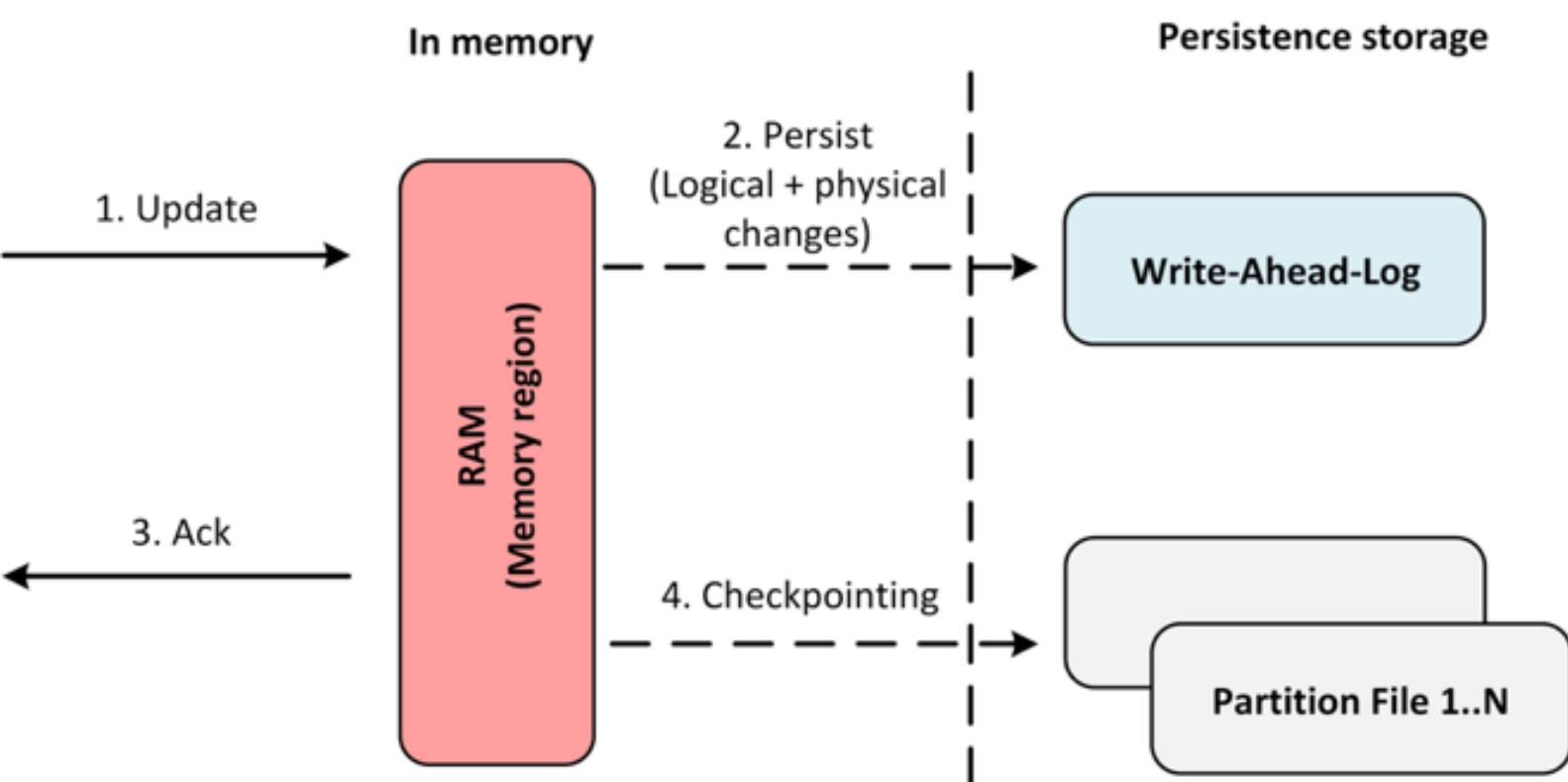
Flush



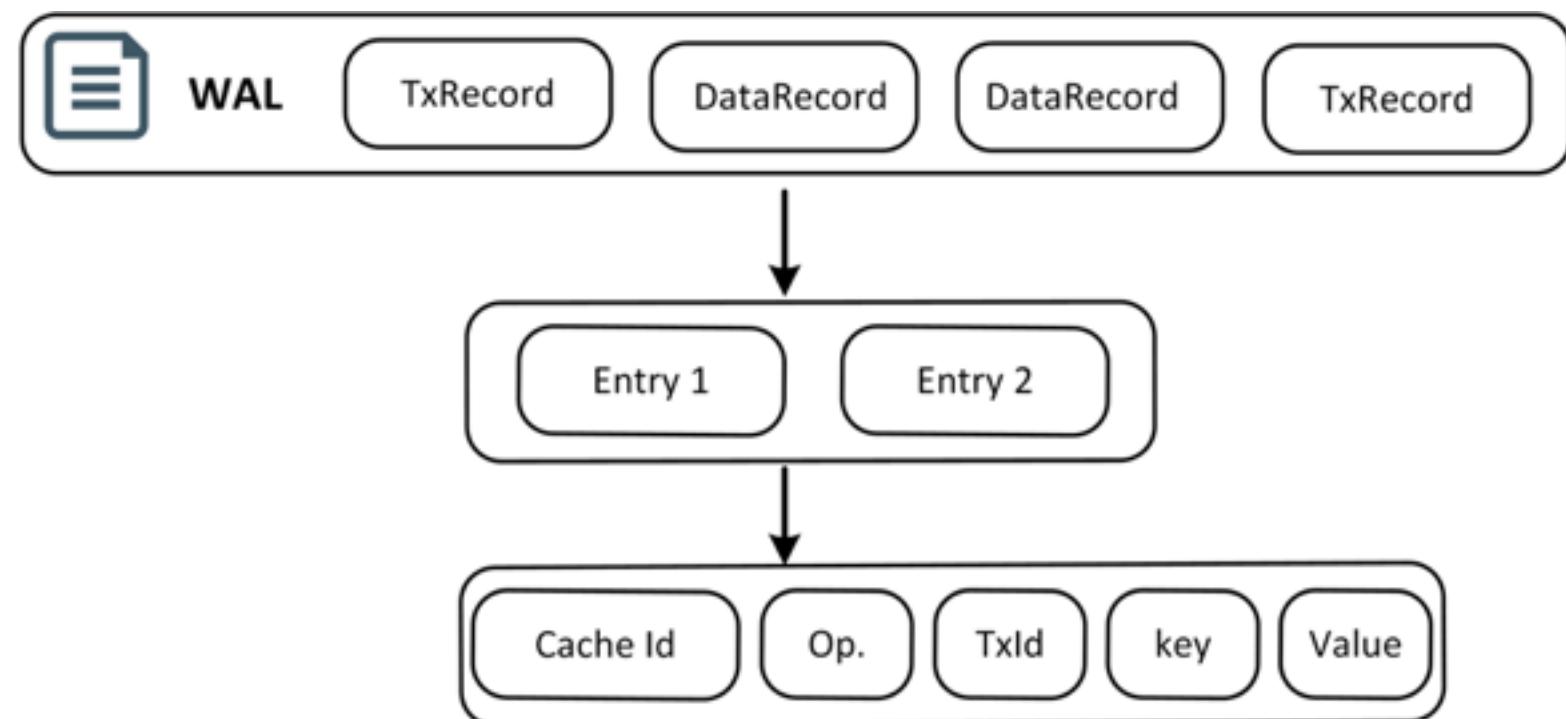


Output(A:=20)  
Output(B:=20)

Flush



```
-rw-r--r-- 1 shamim staff 67108864 Jul 27 14:23 0000000000000000.wal
-rw-r--r-- 1 shamim staff          0 Jul 24 12:00 0000000000000001.wal
-rw-r--r-- 1 shamim staff          0 Jul 24 12:00 0000000000000002.wal
-rw-r--r-- 1 shamim staff          0 Jul 24 12:00 0000000000000003.wal
-rw-r--r-- 1 shamim staff          0 Jul 24 12:00 0000000000000004.wal
-rw-r--r-- 1 shamim staff          0 Jul 24 12:00 0000000000000005.wal
-rw-r--r-- 1 shamim staff          0 Jul 24 12:00 0000000000000006.wal
-rw-r--r-- 1 shamim staff          0 Jul 24 12:00 0000000000000007.wal
-rw-r--r-- 1 shamim staff          0 Jul 24 12:00 0000000000000008.wal
-rw-r--r-- 1 shamim staff          0 Jul 24 12:00 0000000000000009.wal
```





**WAL**

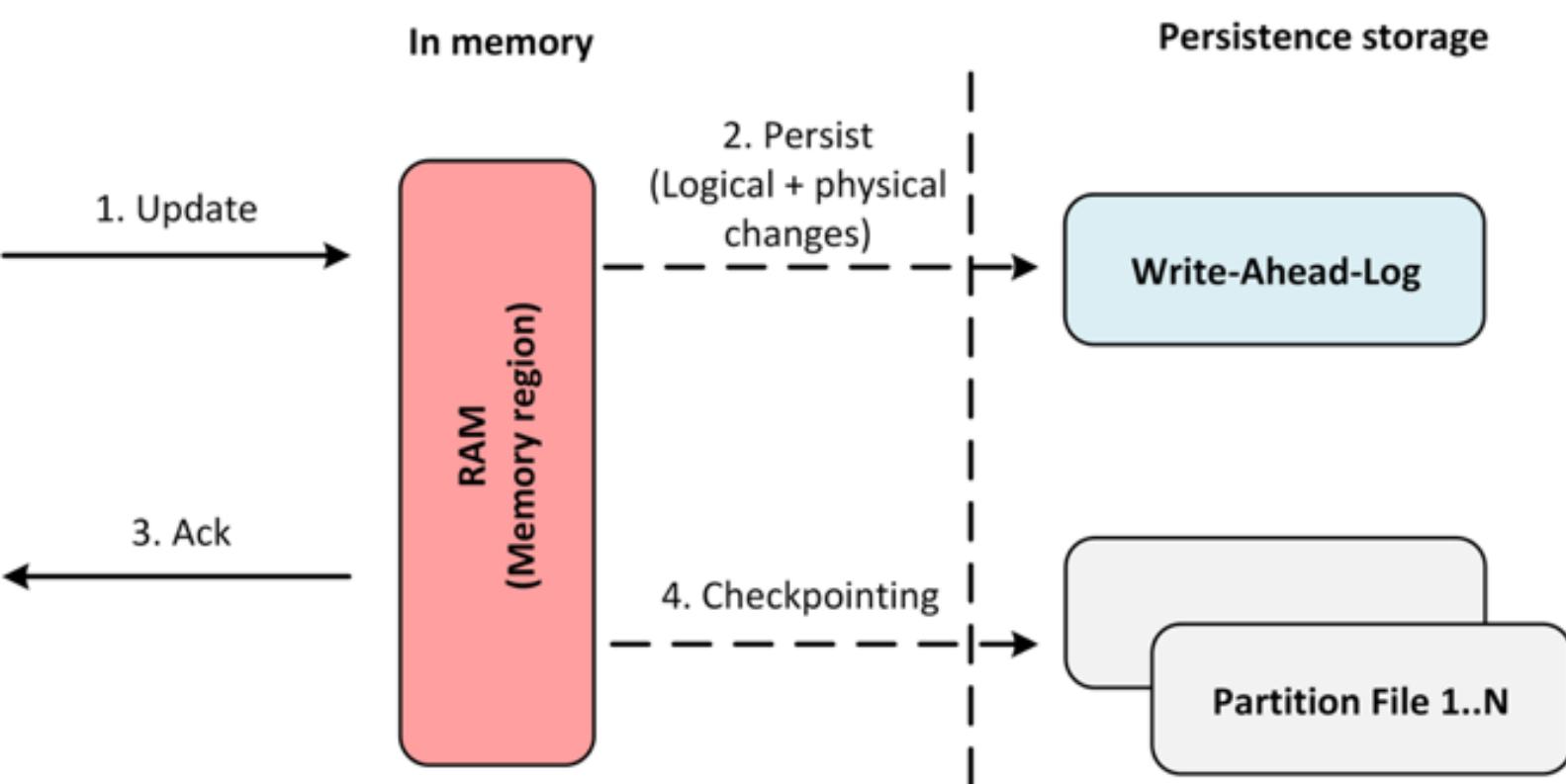
DataRecord

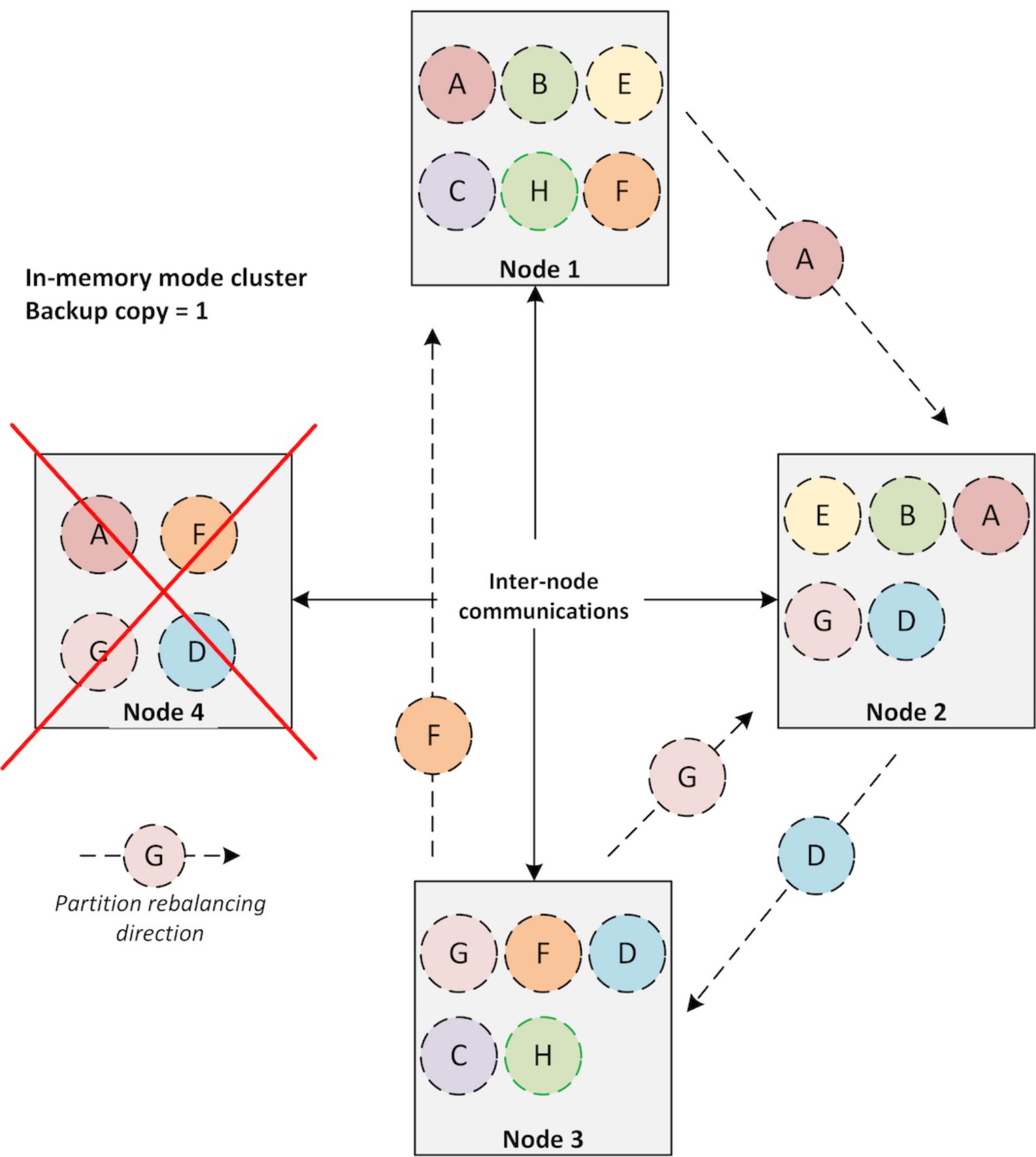
Page snapshot

P. Delta

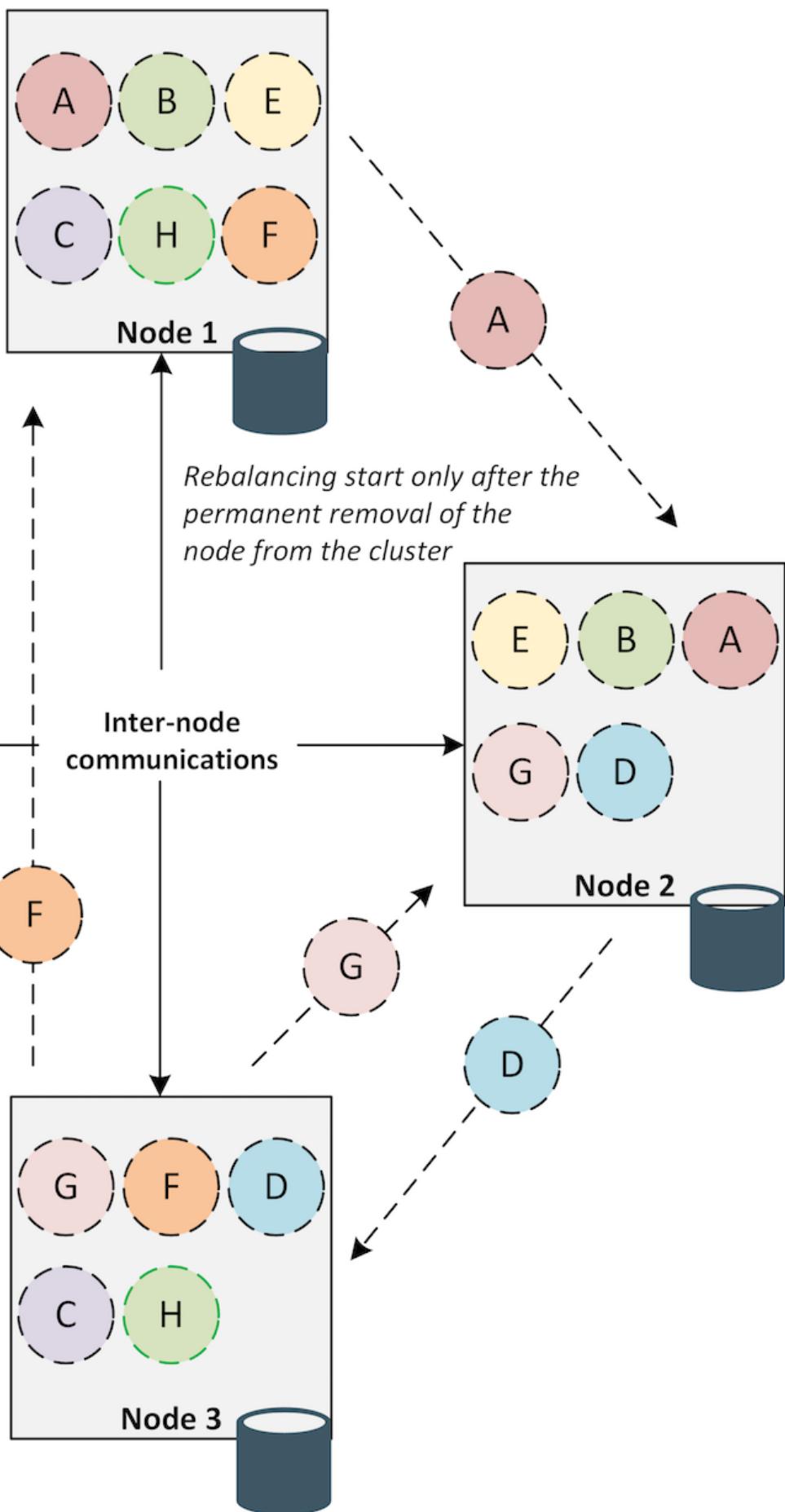
P. Delta

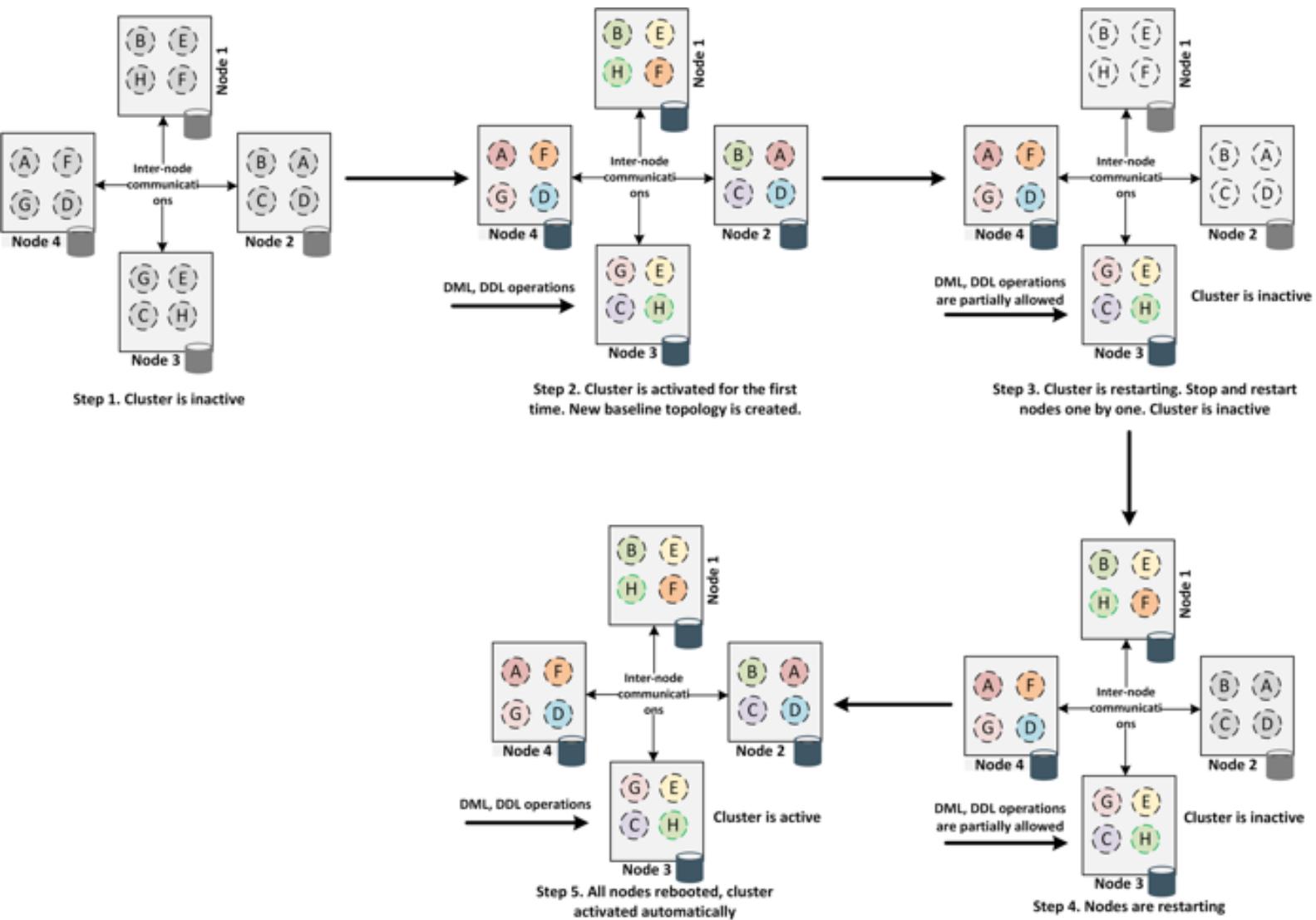
```
super = [WALRecord [size=4129, chainSize=0, pos=FileWALPointer [idx=0, fileOff=1339310, len=4129], type=PAGE  
[W] MetaPageUpdatePartitionDataRecord [updateCntr=1, globalRmvId=153243728144800000, partSize=1, state=1, a  
[W] CheckpointRecord [cpId=05aa7b50-0faa-49db-afe5-b8cabc22dddc, end=false, cpMark=null, super=WALRecord [si  
[W] DataRecord [writeEntries=[UnwrapDataEntry[k = 1, v = [ Hello Worlds: 1], super = [DataEntry [cacheId=-12  
[W] PageSnapshot [fullPageId = FullPageId [pageId=0001000100000006, effectivePageId=0000000100000006, grpId=
```

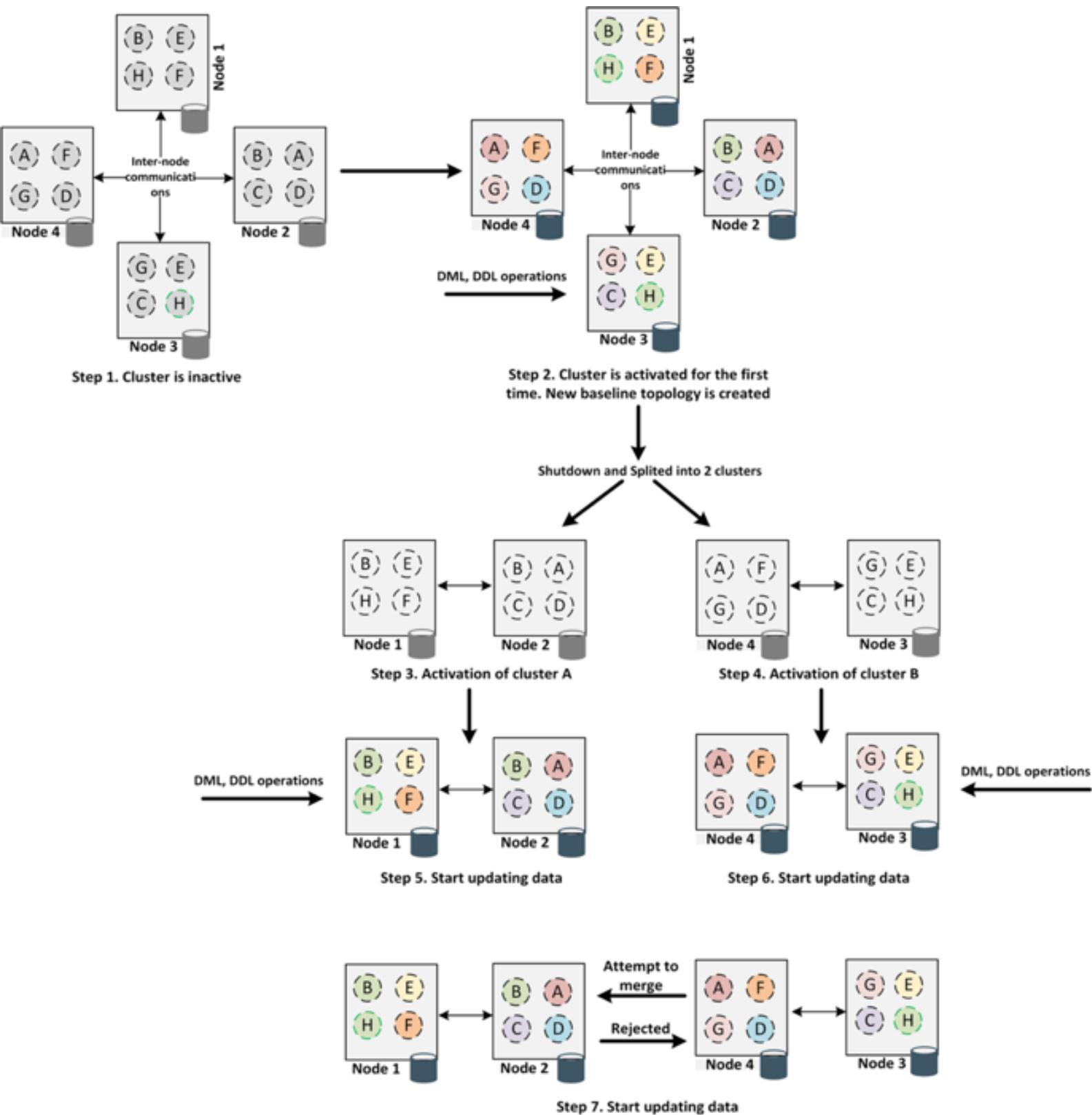


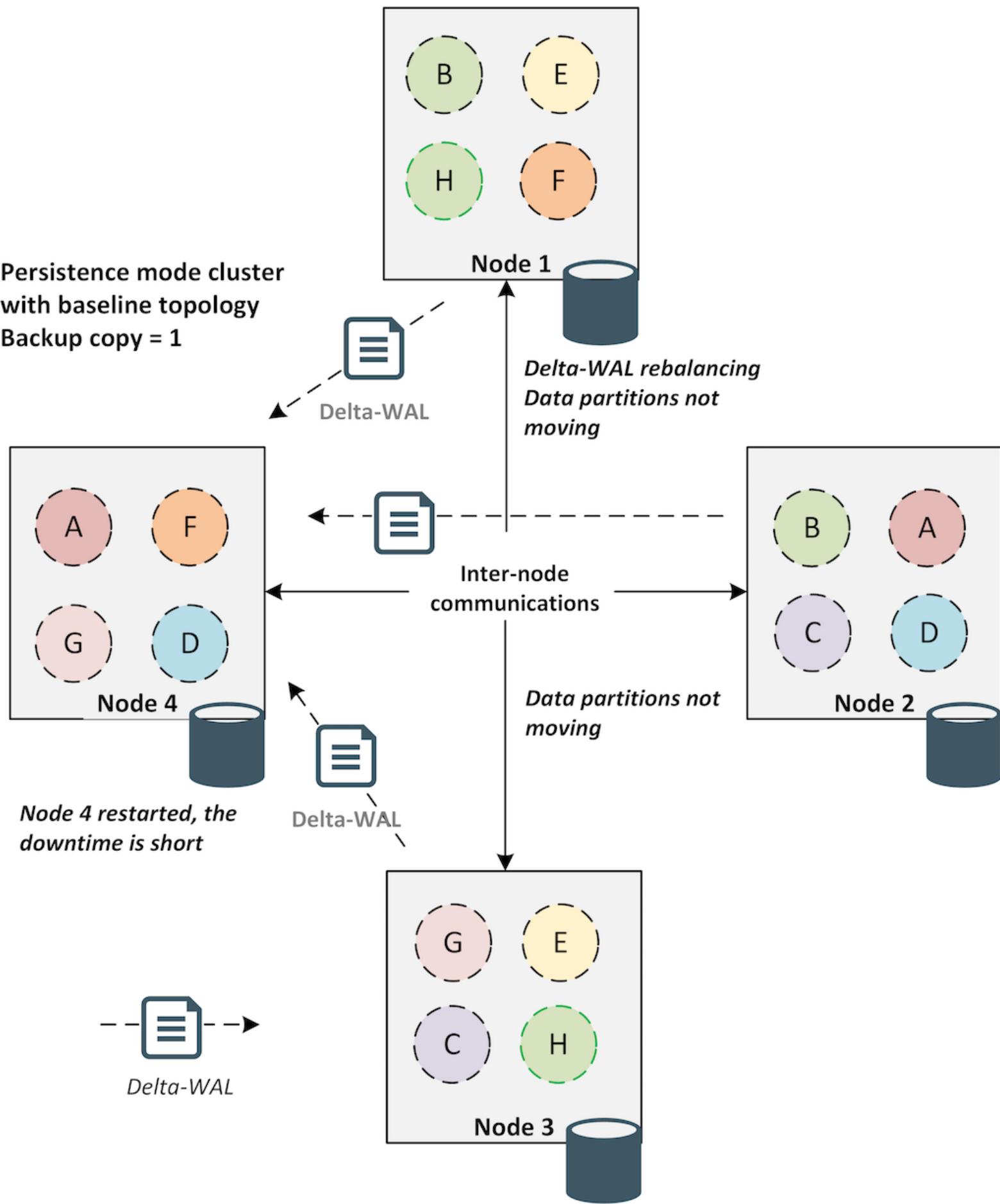


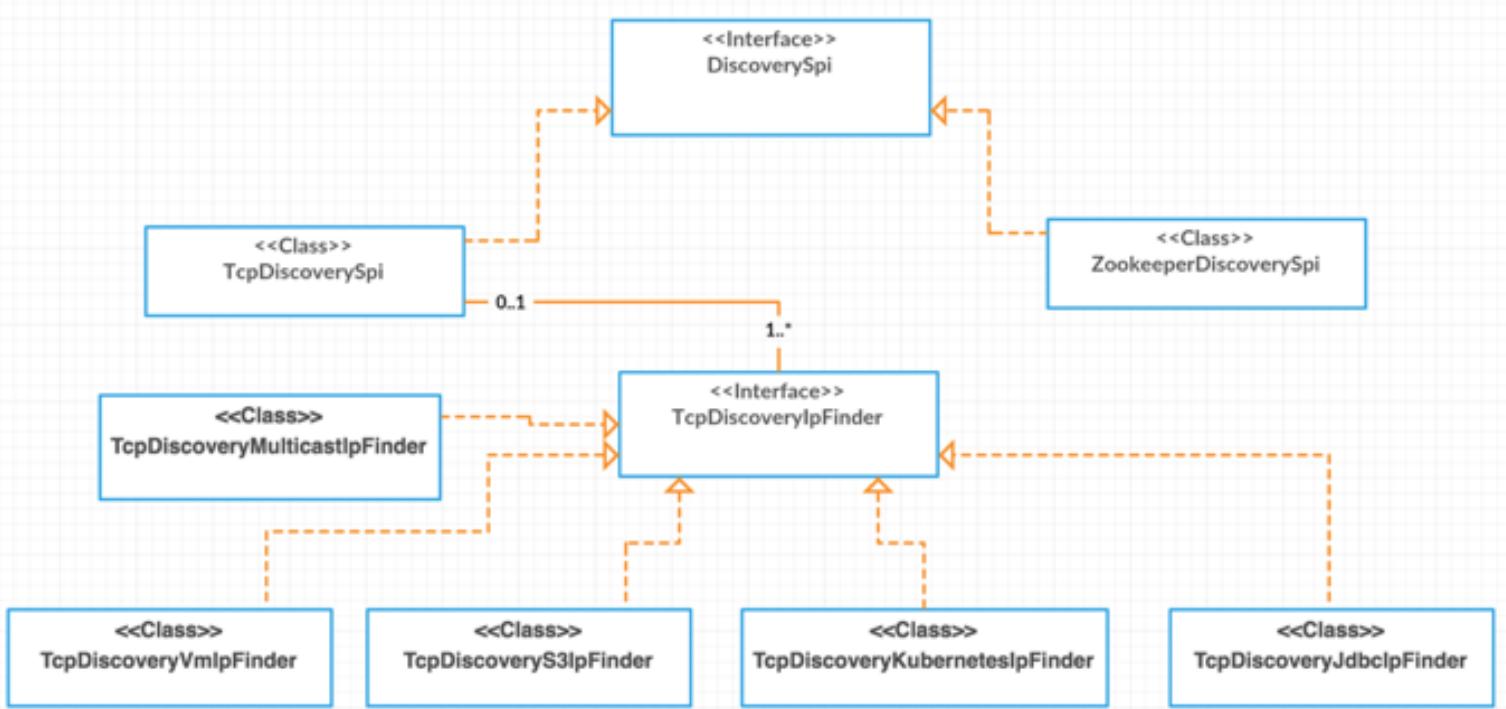
**Persistence mode cluster  
with baseline topology**  
**Backup copy = 1**

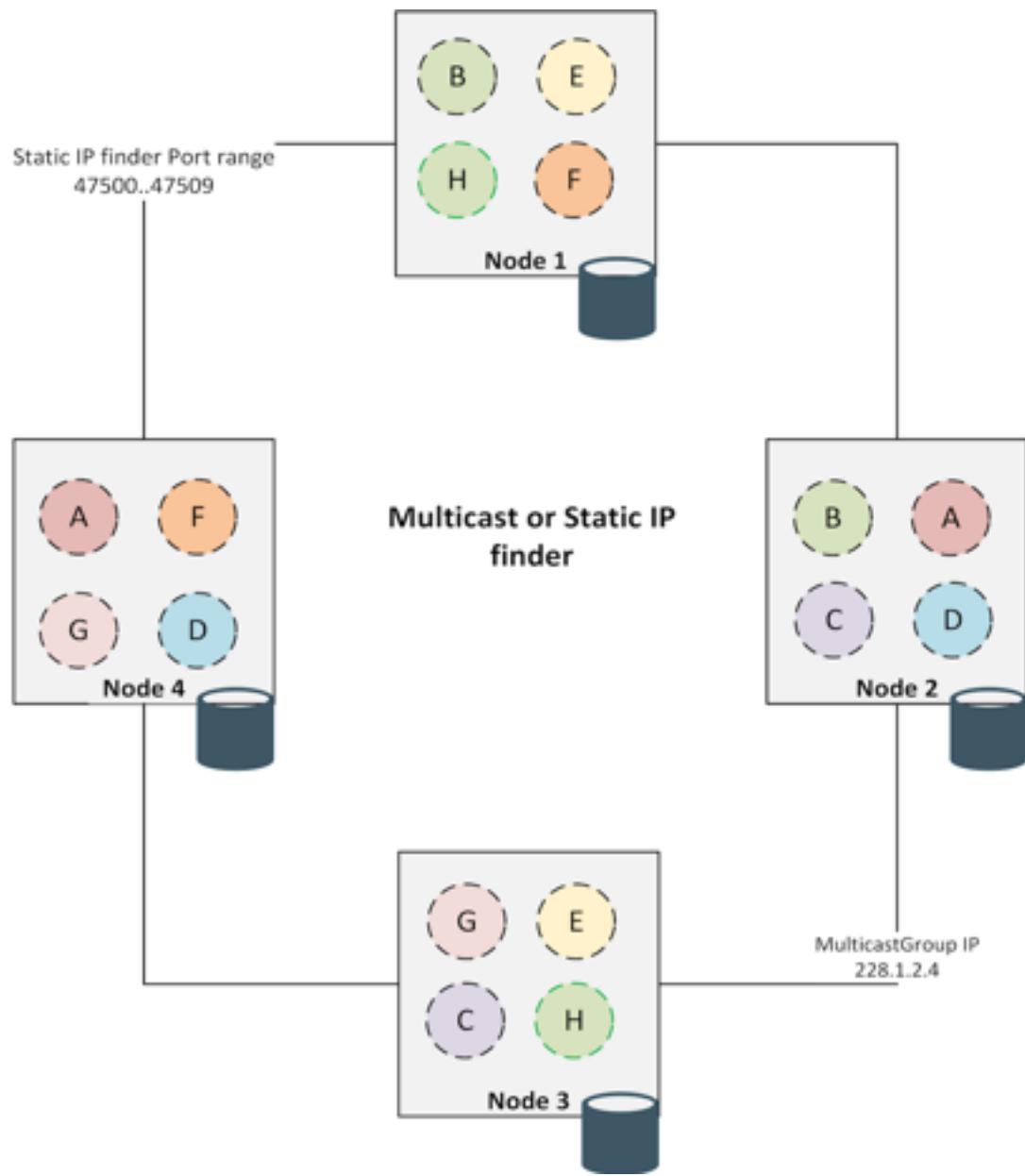


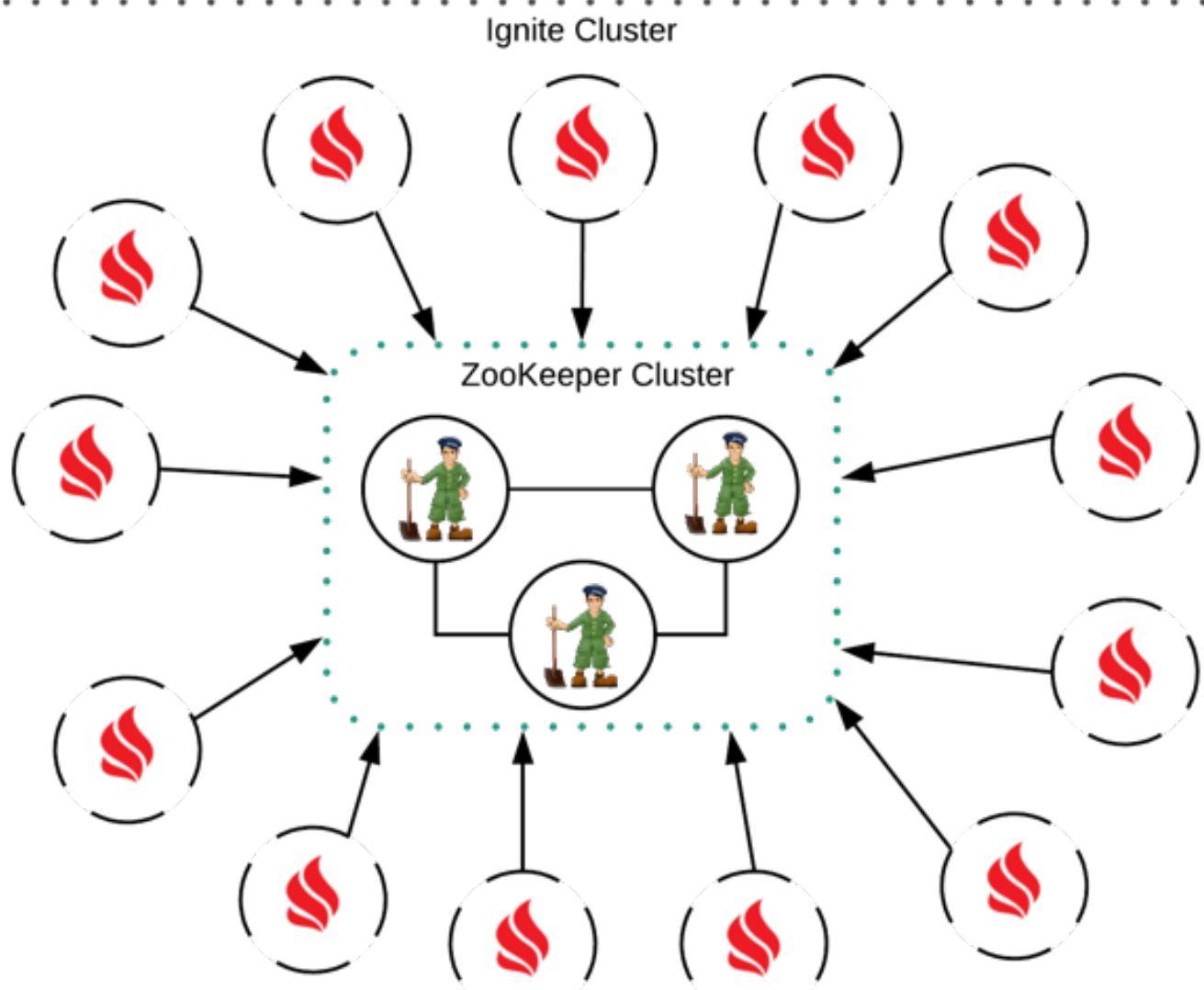


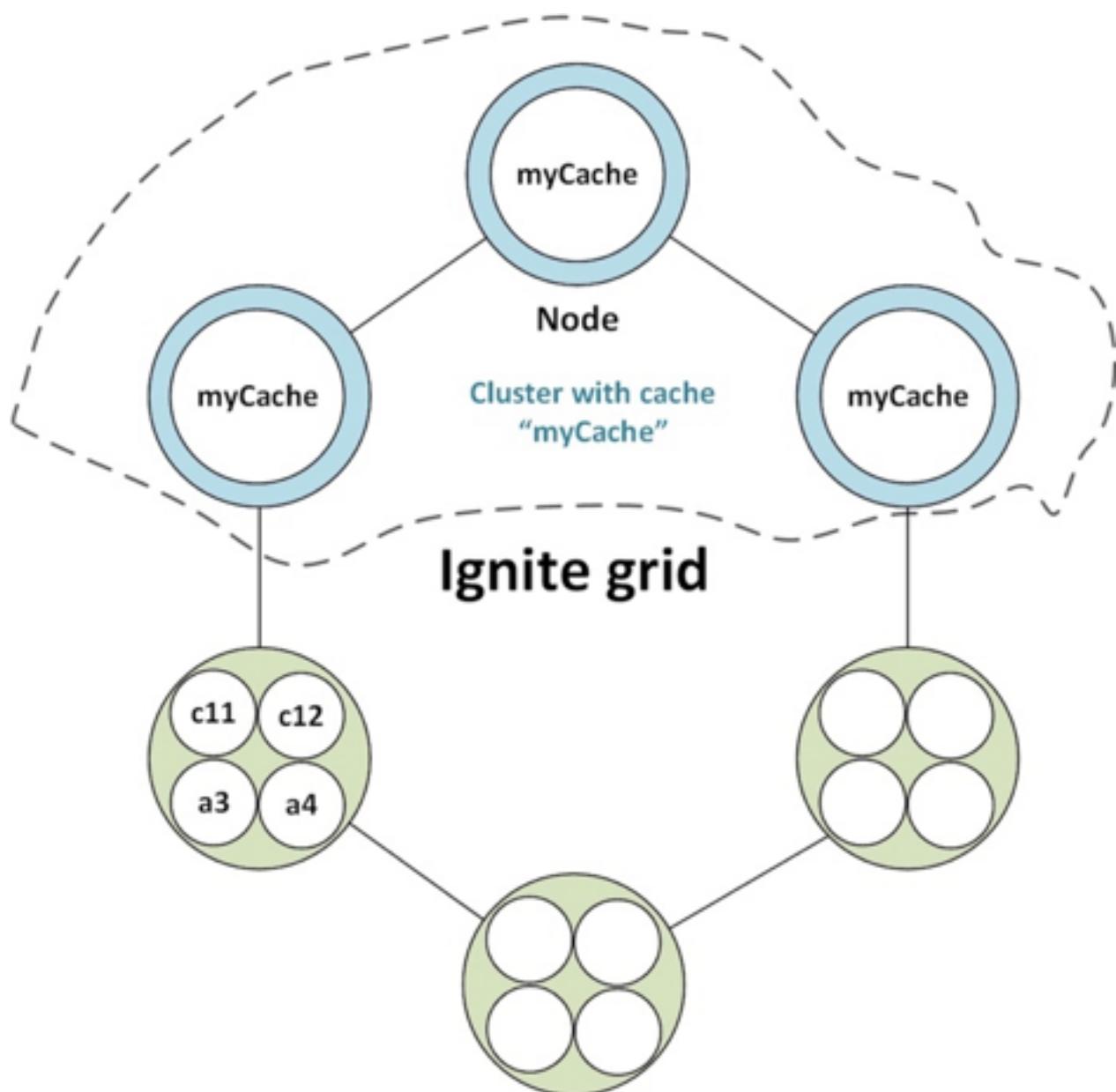


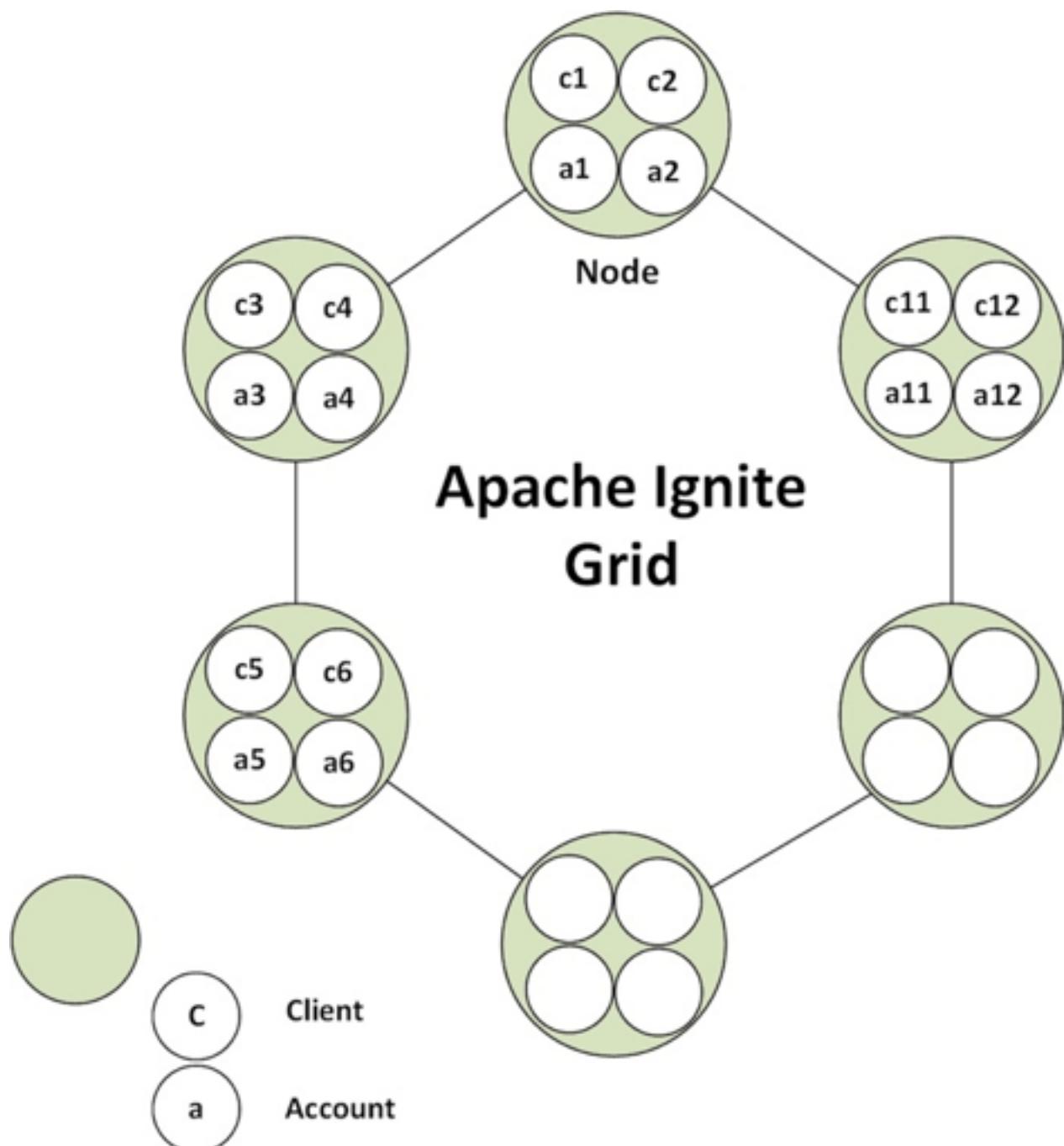


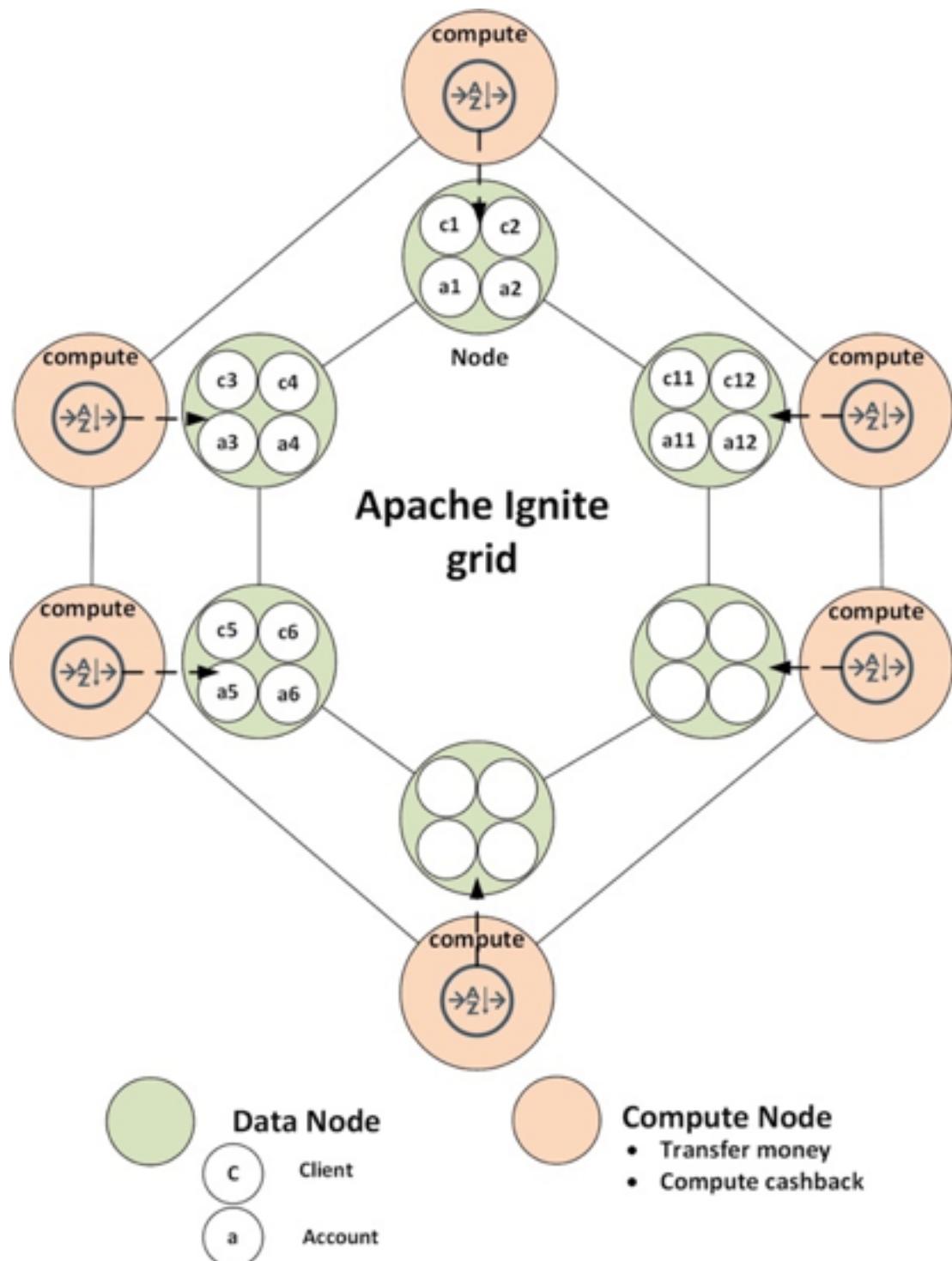


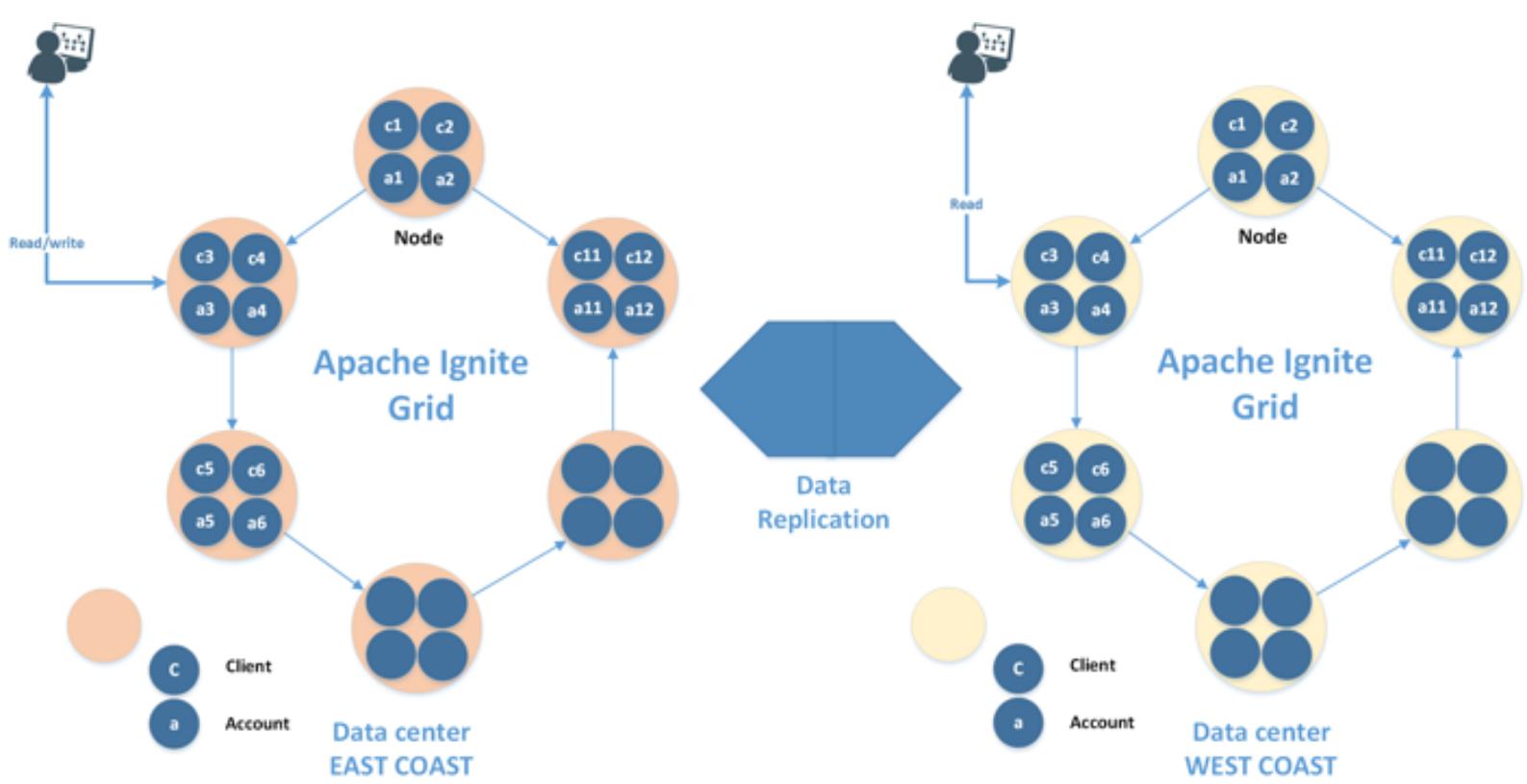


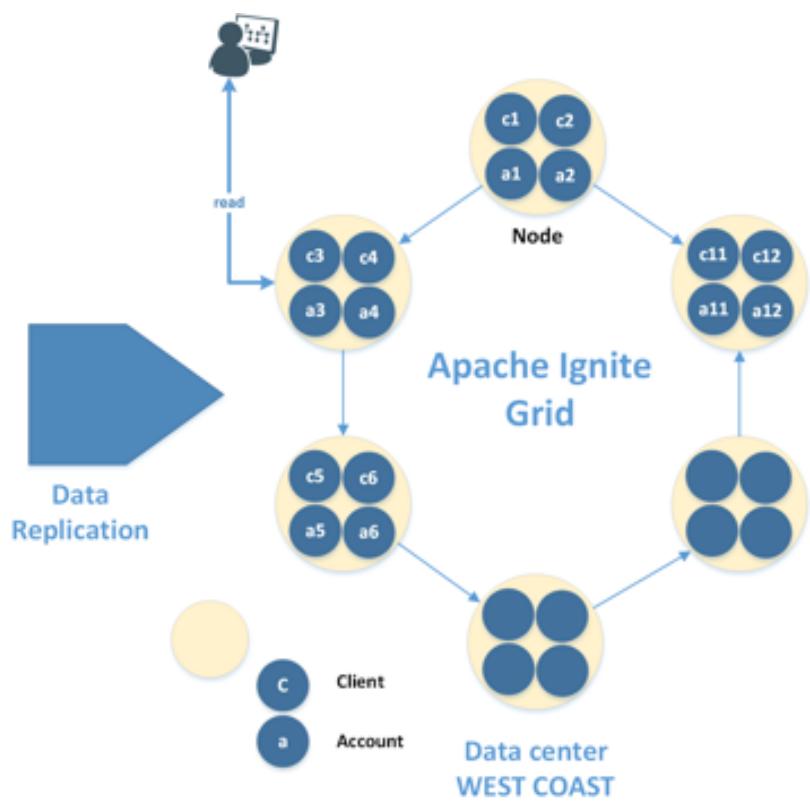
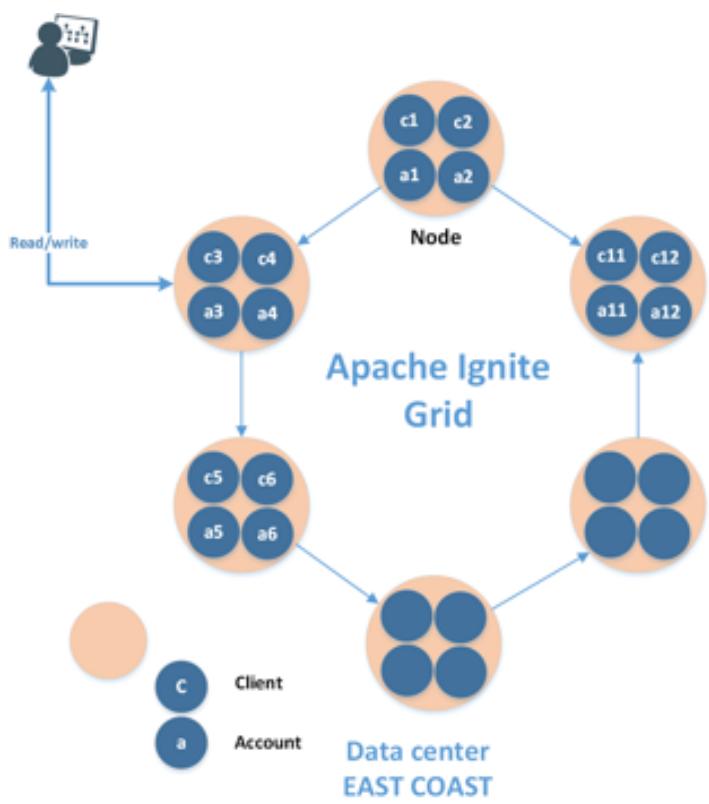


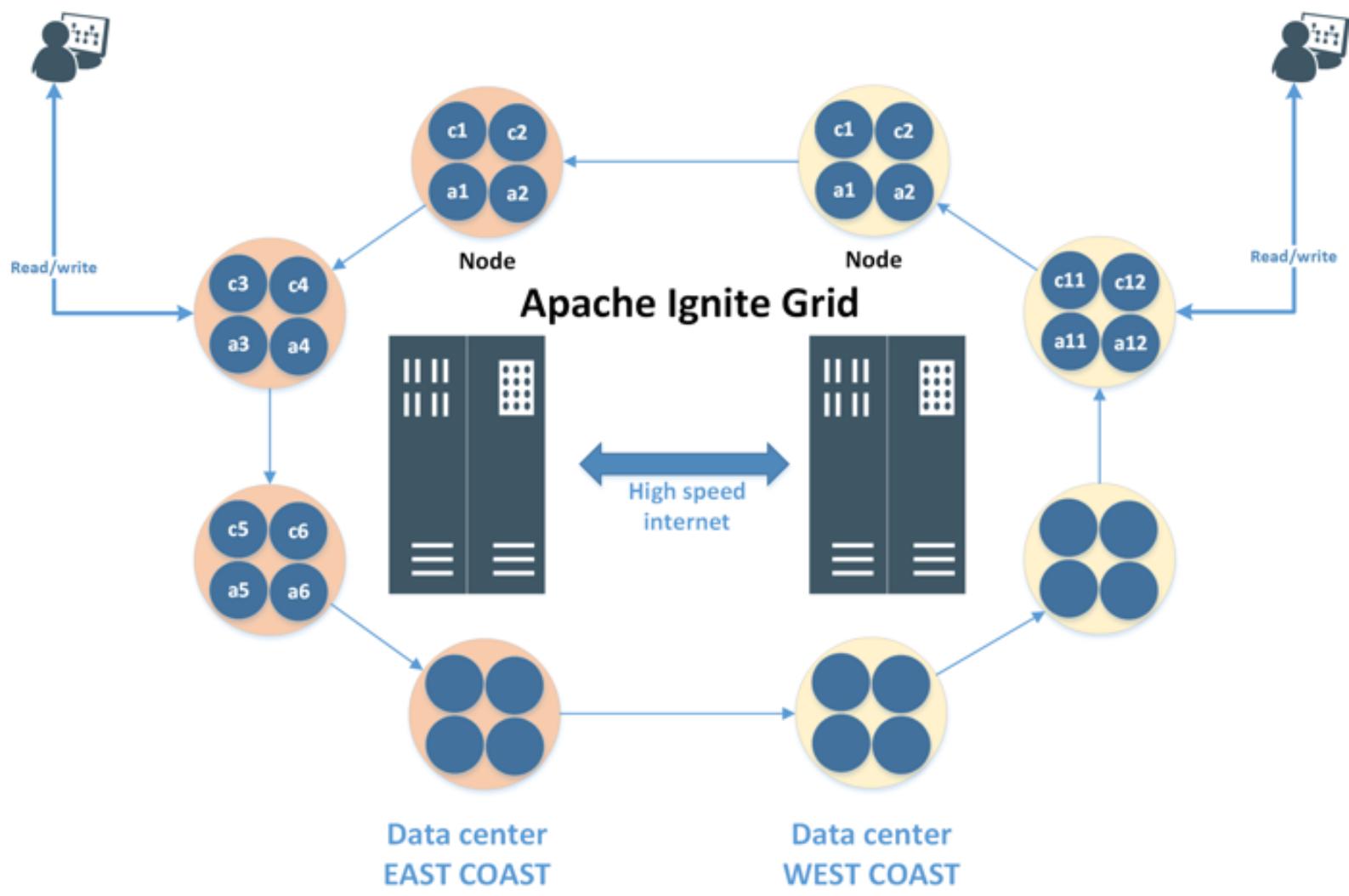


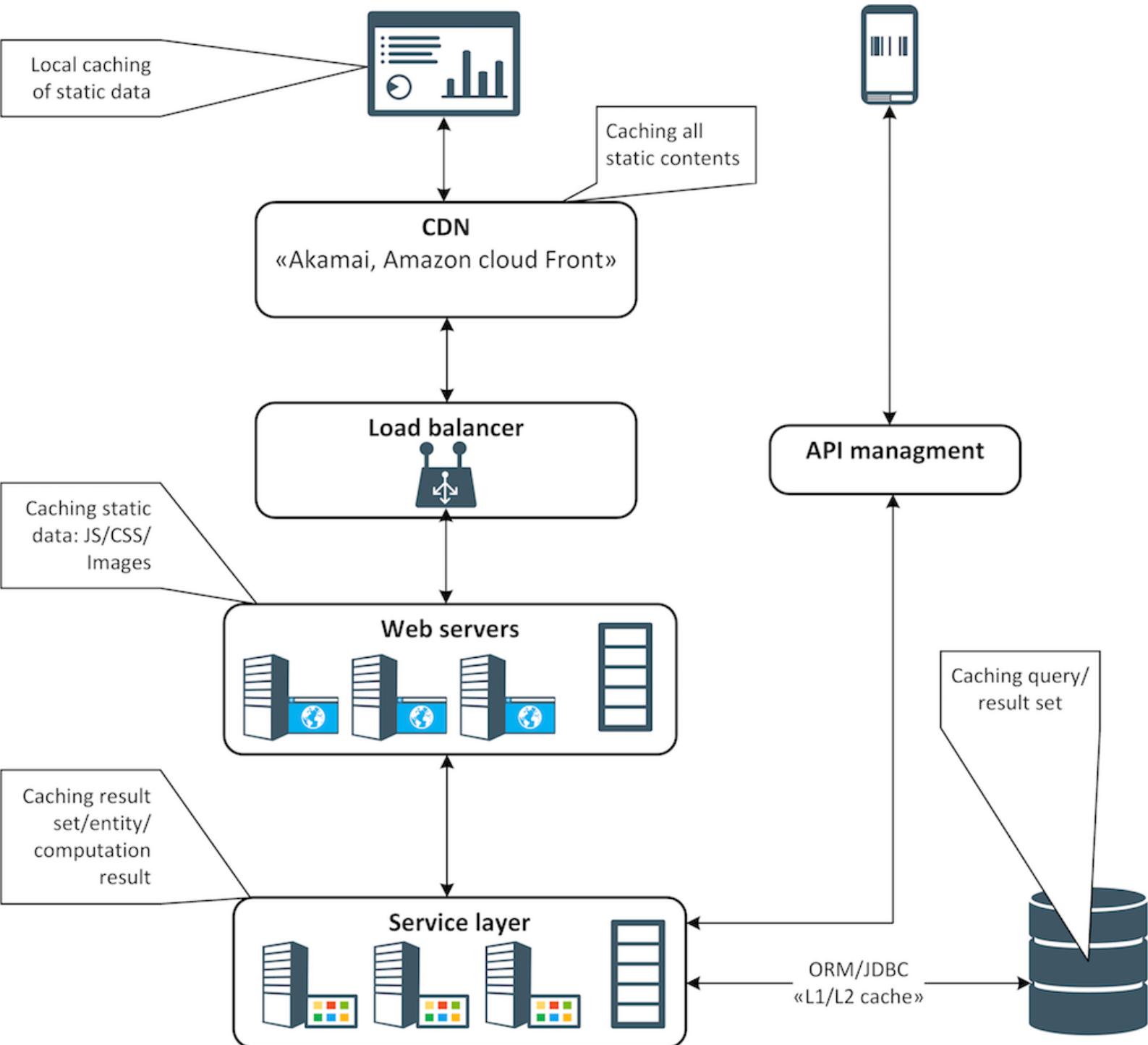


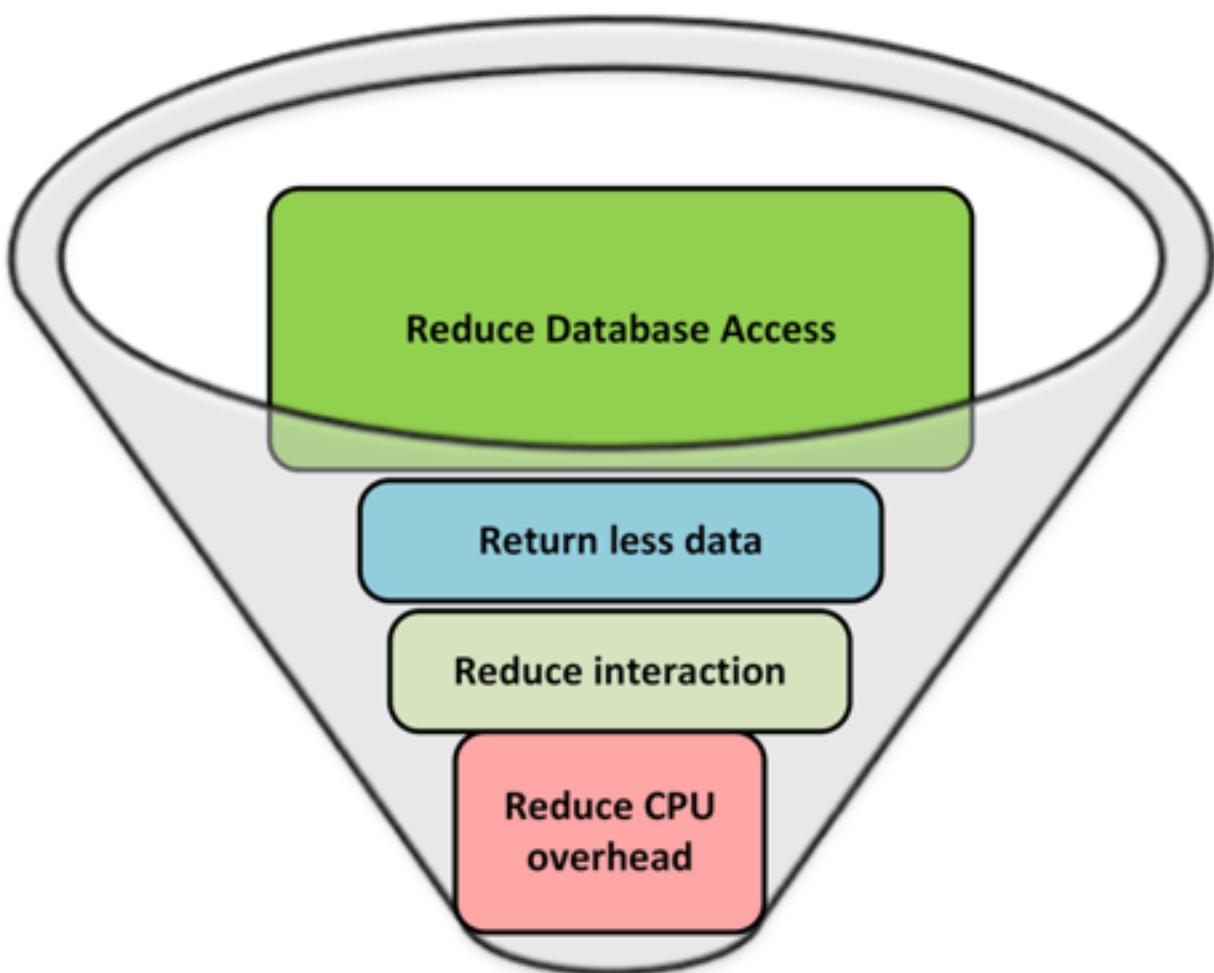


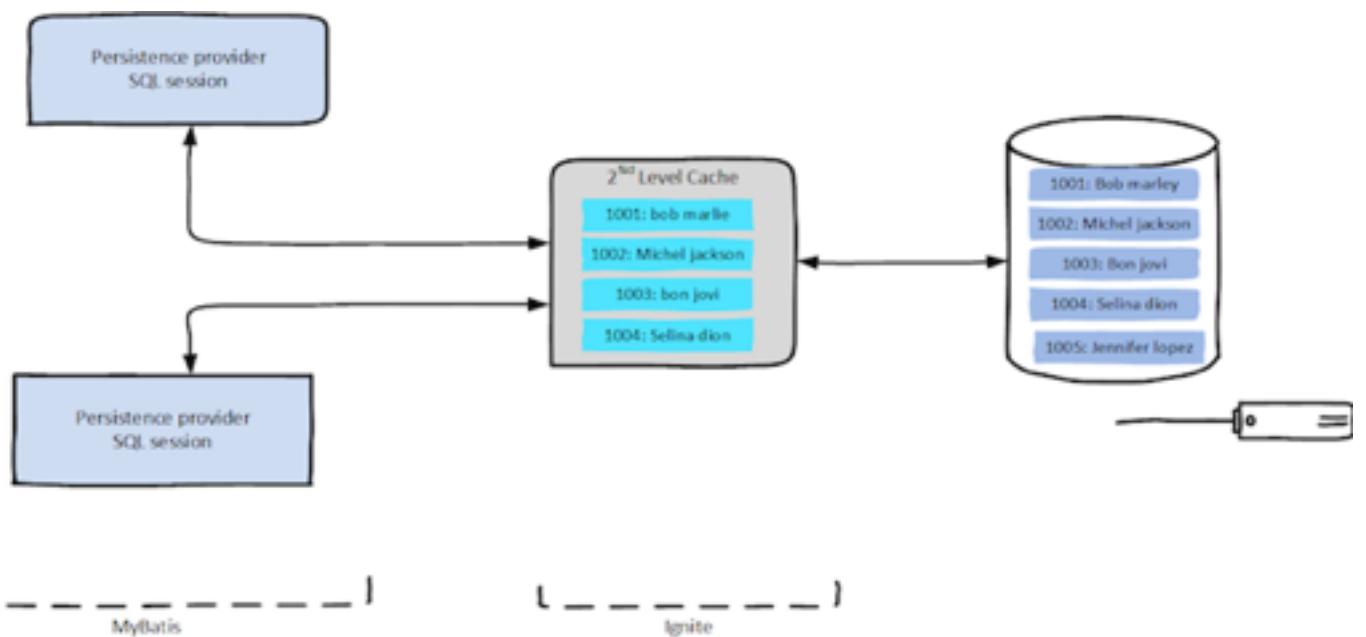


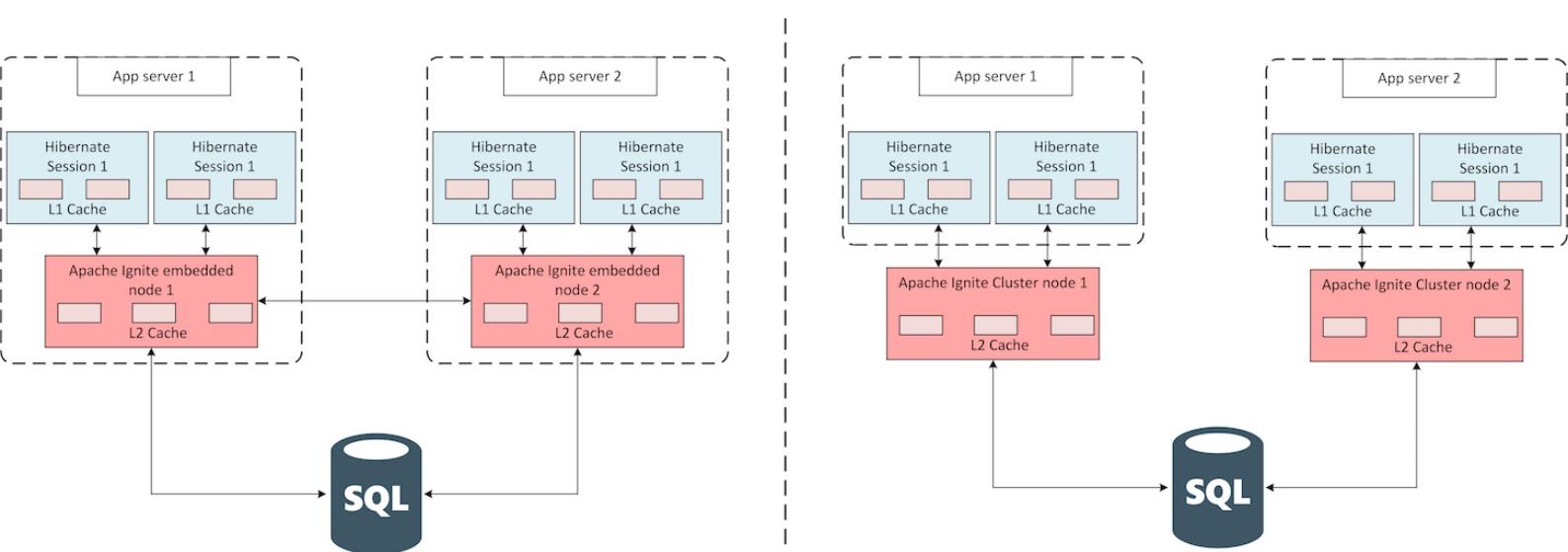












```
2018-09-06 21:51:25 WARN  JdbcEnvironmentInitiator:132 - HHH000342: Could not obtain connection to query metadata : Connection to localhost:5432 refused. Check that the hostname and port are correct and that the postmaster is accepting TCP/IP connections.
2018-09-06 21:51:25 INFO  Dialect:156 - HHH000400: Using dialect: org.hibernate.dialect.PostgreSQLDialect
2018-09-06 21:51:25 INFO  LobCreatorBuilderImpl:63 - HHH000422: Disabling contextual LOB creation as connection was null
2018-09-06 21:51:25 INFO  BasicTypeRegistry:139 - HHH000270: Type registration [java.util.UUID] overrides previous : org.hibernate.type.UUIDBinaryType@3b94d659
2018-09-06 21:51:25 INFO  UpdateTimestampsCache:55 - HHH000250: Starting update timestamps cache at region: org.hibernate.cache.spi.UpdateTimestampsCache
2018-09-06 21:51:25 INFO  StandardQueryCache:74 - HHH000248: Starting query cache at region: org.hibernate.cache.internal.StandardQueryCache
Server start in Port .. 7001
Web service WSDL is available at http://localhost:7001/invokeRules?wsdl
2018-09-06 21:51:33 INFO  GridUpdateNotifier:566 - Your version is up to date.
```

POST       http://localhost:7001/invokeRules

```
<Envelope xmlns="http://schemas.xmlsoap.org/soap/envelope/">
  <Body>
    <getEmpByNo xmlns="http://com.blu.rules/services">
      <Employee_ID xmlns="">7788</Employee_ID>
    </getEmpByNo>
  </Body>
</Envelope>
```

POST http://localhost:7001/invokeRules

```
<?xml version="1.0" ?>
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:getEmpByNoResponse xmlns:ns2="http://com.blu.rules/services">
      <return>
        <date>0001-04-19T00:00:00+03:00</date>
        <deptno>20</deptno>
        <empno>7788</empno>
        <ename>SCOTT</ename>
        <job>ANALYST</job>
        <mgr>7566</mgr>
        <sal>3000</sal>
      </return>
    </ns2:getEmpByNoResponse>
  </S:Body>
</S:Envelope>
```

Request Response Done (86 ms).

```
-----  
2018-09-06 22:05:05 DEBUG SQL:92 - select employee0_.empno as empno1_0_0_, employee0_.comm as comm2_0_0_, employee0_.hiredate as hiredate3_0_0_, employee0_.deptno as deptno4_0_0_, employee0_.ename as ename5_0_0_, employee0_.job as job6_0_0_, employee0_.mgr as mgr7_0_0_, employee0_.sal as sal8_0_0_ from emp employee0_ where employee0_.empno=?  
2018-09-06 22:05:05 INFO  StatisticalLoggingSessionEventListener:258 - Session Metrics {  
    5442623 nanoseconds spent acquiring 1 JDBC connections;  
    0 nanoseconds spent releasing 0 JDBC connections;  
    5612646 nanoseconds spent preparing 1 JDBC statements;  
    1921402 nanoseconds spent executing 1 JDBC statements;  
    0 nanoseconds spent executing 0 JDBC batches;  
    56515534 nanoseconds spent performing 1 L2C puts;  
    0 nanoseconds spent performing 0 L2C hits;  
    293789 nanoseconds spent performing 1 L2C misses;  
    0 nanoseconds spent executing 0 flushes (flushing a total of 0 entities and 0 collections);  
    0 nanoseconds spent executing 0 partial-flushes (flushing a total of 0 entities and 0 collections)  
}
```



```
=====
| o.a.i.i.binary.BinaryObjectImpl | org.apache.ignite.cache.hibernate.HibernateKeyWrapper [hash=410249197, key=7788, en
try=com.blu.imdg.dto.Employee, tenantId=null] | o.a.i.i.binary.BinaryObjectImpl | org.hibernate.cache.spi.Standard
dCacheEntryImpl [hash=202351689, disassembledState=[Ljava.lang.Object;@70c087e5, subclass=com.blu.imdg.dto.Employee, ve
rsion=null] |
```

POST ▾ http://localhost:7001/invokeRules

```
<?xml version="1.0" ?>
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:getEmpByNoResponse xmlns:ns2="http://com.blu.rules/services">
      <return>
        <date>0001-04-19T00:00:00+03:00</date>
        <deptno>20</deptno>
        <empno>7788</empno>
        <ename>SCOTT</ename>
        <job>ANALYST</job>
        <mgr>7566</mgr>
        <sal>3000</sal>
      </return>
    </ns2:getEmpByNoResponse>
  </S:Body>
</S:Envelope>
```

Request Response Done (6 ms).

```
2018-09-06 22:41:26 INFO  StatisticalLoggingSessionEventListener:258 - Session Metrics {
    0 nanoseconds spent acquiring 0 JDBC connections;
    0 nanoseconds spent releasing 0 JDBC connections;
    0 nanoseconds spent preparing 0 JDBC statements;
    0 nanoseconds spent executing 0 JDBC statements;
    0 nanoseconds spent executing 0 JDBC batches;
    0 nanoseconds spent performing 0 L2C puts;
    377339 nanoseconds spent performing 1 L2C hits;
    0 nanoseconds spent performing 0 L2C misses;
    0 nanoseconds spent executing 0 flushes (flushing a total of 0 entities and 0 collections);
    0 nanoseconds spent executing 0 partial-flushes (flushing a total of 0 entities and 0 collections)
}
```

```
| o.a.i.i.binary.BinaryObjectImpl | org.apache.ignite.cache.hibernate.HibernateKeyWrapper [hash=410249197, entry=com.blu.imdg.dto.Employee, tenantId=null, key=7788] | java.util.HashMap | {date=0001-04-19 00:00:00.0, _subclass=com.blu.imdg.dto.Employee, comm=null, ename=SCOTT, mgr=7566, job=ANALYST, _version=null, deptno=20, sal=3000} |
+--
```

#	Name(@)	Mode	Size (Heap / Off-heap)
0	com.blu.imdg.dto.Employee(@c0)	PARTITIONED	min: 1 (0 / 1) avg: 1.00 (0.00 / 1.00) max: 1 (0 / 1)
1	org.hibernate.cache.internal.StandardQueryCache(@c1)	PARTITIONED	min: 0 (0 / 0) avg: 0.00 (0.00 / 0.00) max: 0 (0 / 0)
2	org.hibernate.cache.spi.UpdateTimestampsCache(@c2)	PARTITIONED	min: 1 (0 / 1) avg: 1.00 (0.00 / 1.00) max: 1 (0 / 1)

```
Entries in cache: org.hibernate.cache.spi.UpdateTimestampsCache
+=====+
|   Key Class    | Key | Value Class   |      Value      |
+=====+
| java.lang.String | emp | java.lang.Long | 1536511934341 |
+=====+
```

POST http://localhost:7001/invokeRules

```
<?xml version="1.0" ?>
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:getEmpByNameResponse xmlns:ns2="http://com.blu.rules/services">
      <return>
        <date>1980-12-17T00:00:00+03:00</date>
        <deptno>20</deptno>
        <empno>7369</empno>
        <ename>SMITH</ename>
        <job>CLERK</job>
        <mgr>7902</mgr>
        <sal>800</sal>
      </return>
    </ns2:getEmpByNameResponse>
  </S:Body>
</S:Envelope>
```

Request

Response

Done (21 ms).

POST ▾ http://localhost:7001/invokeRules

```
<?xml version="1.0" ?>
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:getEmpByNameResponse xmlns:ns2="http://com.blu.rules/services">
      <return>
        <date>1980-12-17T00:00:00+03:00</date>
        <deptno>20</deptno>
        <empno>7369</empno>
        <ename>SMITH</ename>
        <job>CLERK</job>
        <mgr>7902</mgr>
        <sal>800</sal>
      </return>
    </ns2:getEmpByNameResponse>
  </S:Body>
</S:Envelope>
```

Request

Response

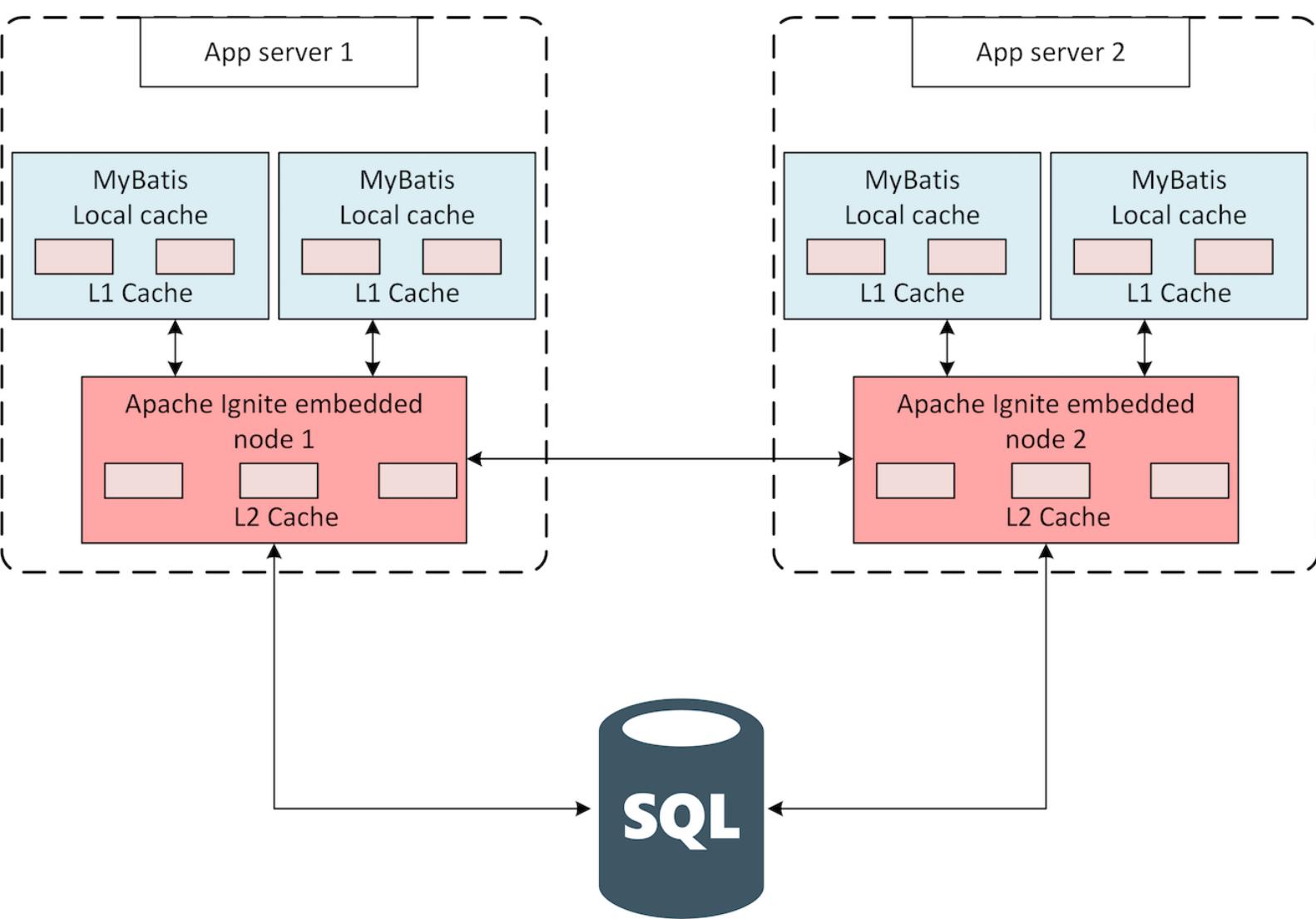
Done (6 ms).

```
| o.a.i.i.binary.BinaryObjectImpl | org.hibernate.cache.spi.QueryKey [hash=337104888, sqlQueryString=select employee0_.empno as empno1_0_, employee0_.comm as comm2_0_, employee0_.hiredate as hiredate3_0_, employee0_.deptno as deptno4_0_, employee0_.ename as ename5_0_, employee0_.job as job6_0_, employee0_.mgr as mgr7_0_, employee0_.sal as sal8_0_ from emp employee0_ where employee0_.ename=? , positionalParameterTypes=[Ljava.lang.Object;@60f644db, positionalParameterValues=[Ljava.lang.Object;@5260dd63, namedParameters={ename=org.hibernate.engine.spi.TypedValue [idHash=1071879085, hash=-187635101, type=org.hibernate.type.StringType [idHash=1176341696, hash=666966831, dictatedSize=org.hibernate.engine.jdbc.Size [idHash=337627204, hash=891931472, length=255, precision=19, scale=2, lobMultiplier=NULL], sqlTypeDescriptor=org.hibernate.type.descriptor.sql.VarcharTypeDescriptor [idHash=1086362721, hash=1], javaTypeDescriptor=org.hibernate.type.descriptor.java.StringTypeDescriptor [idHash=1671235887, hash=-319830697, type=class java.lang.String, mutabilityPlan=org.hibernate.type.descriptor.java.ImmutableMutabilityPlan [idHash=1229775376, hash=1], comparator=org.hibernate.internal.util.compare.ComparableComparator [idHash=595287701, hash=1]], sqlTypes=[12]], value=SMITH}], firstRow=null, maxRows=null, tenantIdentifier=null, filterKeys=null, customTransformer=org.hibernate.transform.CacheableResultTransformer [idHash=1742513415, hash=853949397, tupleLength=1, tupleSubsetLength=1, includeInTuple=[true], includeInTransformIndex=null]] | java.util.ArrayList | [1536519863357, 7369] |
+-----
```

```
2018-09-09 22:06:39 DEBUG StandardQueryCache:155 - Checking cached query results in region: org.hibernate.cache.internal.StandardQueryCache
2018-09-09 22:06:39 DEBUG StandardQueryCache:253 - Checking query spaces are up-to-date: [emp]
2018-09-09 22:06:39 DEBUG UpdateTimestampsCache:171 - [emp] last update timestamp: 1536517688332, result set timestamp: 1536519863357
2018-09-09 22:06:39 DEBUG StandardQueryCache:178 - Returning cached query results
2018-09-09 22:06:39 INFO  StatisticalLoggingSessionEventListener:258 - Session Metrics {
    0 nanoseconds spent acquiring 0 JDBC connections;
    0 nanoseconds spent releasing 0 JDBC connections;
    0 nanoseconds spent preparing 0 JDBC statements;
    0 nanoseconds spent executing 0 JDBC statements;
    0 nanoseconds spent executing 0 JDBC batches;
    0 nanoseconds spent performing 0 L2C puts;
    855771 nanoseconds spent performing 3 L2C hits;
    0 nanoseconds spent performing 0 L2C misses;
    0 nanoseconds spent executing 0 flushes (flushing a total of 0 entities and 0 collections);
    0 nanoseconds spent executing 0 partial-flushes (flushing a total of 0 entities and 0 collections)
}
```

Key: org.apache.ibatis.cache.CacheKey [hash=2025310740, multiplier=37, hashCode=421191021, checksum=6335551979, count=6, updateList=[com.blu.imdg.mapper.UserMapper.getEmployee, 0, 2147483647, SELECT \* FROM emp WHERE ename = ?, SMITH, SqlSessionFactoryBean]]

Value: com.blu.imdg.dto.Employee [idHash=531482076, hash=924414128, empno=7369, ename=SMITH, job=CLERK, mgr=7902, date=null, sal=800, deptno=20]



```
2018-09-12 23:07:08 INFO GridDhtPartitionsExchangeFuture:566 - finishExchangeOnCoordinator [topVer=AffinityTopologyVersion [topVer=1, minorTopVer=1], resVer=AffinityTopologyVersion [topVer=1, minorTopVer=1]]
2018-09-12 23:07:08 INFO GridDhtPartitionsExchangeFuture:566 - Finish exchange future [startVer=AffinityTopologyVersion [topVer=1, minorTopVer=1], resVer=AffinityTopologyVersion [topVer=1, minorTopVer=1], err=null]
2018-09-12 23:07:08 INFO time:566 - Finished exchange init [topVer=AffinityTopologyVersion [topVer=1, minorTopVer=1], crd=t
rue]
2018-09-12 23:07:08 INFO GridCachePartitionExchangeManager:566 - Skipping rebalancing (nothing scheduled) [top=AffinityTopo
logyVersion [topVer=1, minorTopVer=1], evt=DISCOVERY_CUSTOM_EVT, node=b568db9f-f54f-4066-bbb7-9b54b6c60c6b]
log4j: Finalizing appender named [null].
Server start in Port .. 7001
Web service WSDL is available at http://localhost:7001/invokeRules?wsdl
```

POST       http://localhost:7001/invokeRules

```
<Envelope xmlns="http://schemas.xmlsoap.org/soap/envelope/">
  <Body>
    <getEmployee xmlns="http://com.blu.rules/services">
      <EmployeeName xmlns="">SMITH</EmployeeName>
    </getEmployee>
  </Body>
</Envelope>
```

POST http://localhost:7001/invokeRules

```
<?xml version="1.0" ?>
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:getEmployeeResponse xmlns:ns2="http://com.blu.rules/services">
      <return>
        <deptno>20</deptno>
        <empno>7369</empno>
        <ename>SMITH</ename>
        <job>CLERK</job>
        <mgr>7902</mgr>
        <sal>800</sal>
      </return>
    </ns2:getEmployeeResponse>
  </S:Body>
</S:Envelope>
```

Request

Response

Done (164 ms).

POST http://localhost:7001/invokeRules

```
<?xml version="1.0" ?>
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:getEmployeeResponse xmlns:ns2="http://com.blu.rules/services">
      <return>
        <deptno>20</deptno>
        <empno>7369</empno>
        <ename>SMITH</ename>
        <job>CLERK</job>
        <mgr>7902</mgr>
        <sal>800</sal>
      </return>
    </ns2:getEmployeeResponse>
  </S:Body>
</S:Envelope>
```

Request

Response

Done (5 ms).

```
[visor> cache -scan
Time of the snapshot: 2018-09-12 23:18:13
+-----+
| # |           Name(@)           | Mode      | Size (Heap / Off-heap) |
+-----+
| 0 | com.blu.imdg.mapper.UserMapper(@c0) | PARTITIONED | min: 1 (0 / 1)
|   |                                         |             | avg: 1.00 (0.00 / 1.00)
|   |                                         |             | max: 1 (0 / 1)
+-----+
```

Choose cache number ('c' to cancel) [c]: █

Key Class	Value
Key	Value Class
o.a.i.i.binary.BinaryObjectImpl   org.apache.ibatis.cache.CacheKey [hash=2025310740, multiplier=37, hashCode=421191021, checksum=6335551979, count=6, updateList=[com.blu.imdg.mapper.UserMapper.getEmployee, 0, 2147483647, SELECT * FROM emp WHERE ename = ?, SMITH, SqlSessionFactoryBean]]   java.util.ArrayList   [com.blu.imdg.dto.Employee [idHash=2047256401, hash=924414128, empno=7369, ename=SMITH, job=CLERK, mgr=7902, date=null, sal=800, deptno=20]]	+-----+-----+-----+

```
log4j: Finalizing appender named [null].  
2018-09-13 14:58:14 INFO Dialect:156 - HHH000400: Using dialect: org.hibernate.dialect.PostgreSQLDialect  
2018-09-13 14:58:14 INFO LobCreatorBuilderImpl:63 - HHH000422: Disabling contextual LOB creation as connection was null  
2018-09-13 14:58:14 INFO BasicTypeRegistry:139 - HHH000270: Type registration [java.util.UUID] overrides previous : org  
inaryType@481a15ff  
Server start in Port .. 7001  
Web service WSDL is available at http://localhost:7001/invokeRules?wsdl
```

POST http://localhost:7001/invokeRules

```
<Envelope xmlns="http://schemas.xmlsoap.org/soap/envelope/">
  <Body>
    <getExchangeRateByRegion xmlns="http://com.blu.rules/services">
      <RegionName xmlns="">Moscow</RegionName>
    </getExchangeRateByRegion>
  </Body>
</Envelope>
```

Request

Response

POST http://localhost:7001/invokeRules

```
<?xml version="1.0" ?>
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:getExchangeRateByRegionResponse xmlns:ns2="http://com.blu.rules/services">
      <return>71.7</return>
    </ns2:getExchangeRateByRegionResponse>
  </S:Body>
</S:Envelope>
```

Request Response Done (129 ms).

```
[visor> cache -scan
Time of the snapshot: 2018-09-13 15:33:17
+-----+
| # |      Name(@)      |      Mode      | Size (Heap / Off-heap) |
+-----+
| 0 | exchangeRate(@c0) | PARTITIONED | min: 1 (0 / 1)
|   |                   |             | avg: 1.00 (0.00 / 1.00)
|   |                   |             | max: 1 (0 / 1)
+-----+
[Choose cache number ('c' to cancel) [c]: 0
Entries in cache: exchangeRate
+-----+
|      Key Class      |      Key      |      Value Class      |      Value      |
+-----+
| java.lang.String | Moscow | java.lang.String | 71.7 |
+-----+
```

POST http://localhost:7001/invokeRules

```
<?xml version="1.0" ?>
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Body>
    <ns2:getExchangeRateByRegionResponse xmlns:ns2="http://com.blu.rules/services">
      <return>71.7</return>
    </ns2:getExchangeRateByRegionResponse>
  </S:Body>
</S:Envelope>
```

Request Response Done (6 ms).

POST http://localhost:7001/invokeRules

```
<Envelope xmlns="http://schemas.xmlsoap.org/soap/envelope/">
  <Body>
    <updateExchangeRate xmlns="http://com.blu.rules/services">
      <RegionName xmlns="">Moscow</RegionName>
      <Date xmlns="">2015-05-03</Date>
      <USdollarRate xmlns="">80.00</USdollarRate>
      <EuroRate xmlns="">90.00</EuroRate>
      <BritishPoundRate xmlns="">110.00</BritishPoundRate>
    </updateExchangeRate>
  </Body>
</Envelope>
```

Request

Response

2015-05-02	111.01	77.1	102.03	Vladimir
2015-05-02	71.7	77.1	102.03	Tver
2015-05-02	80	77.1	102.03	Moscow

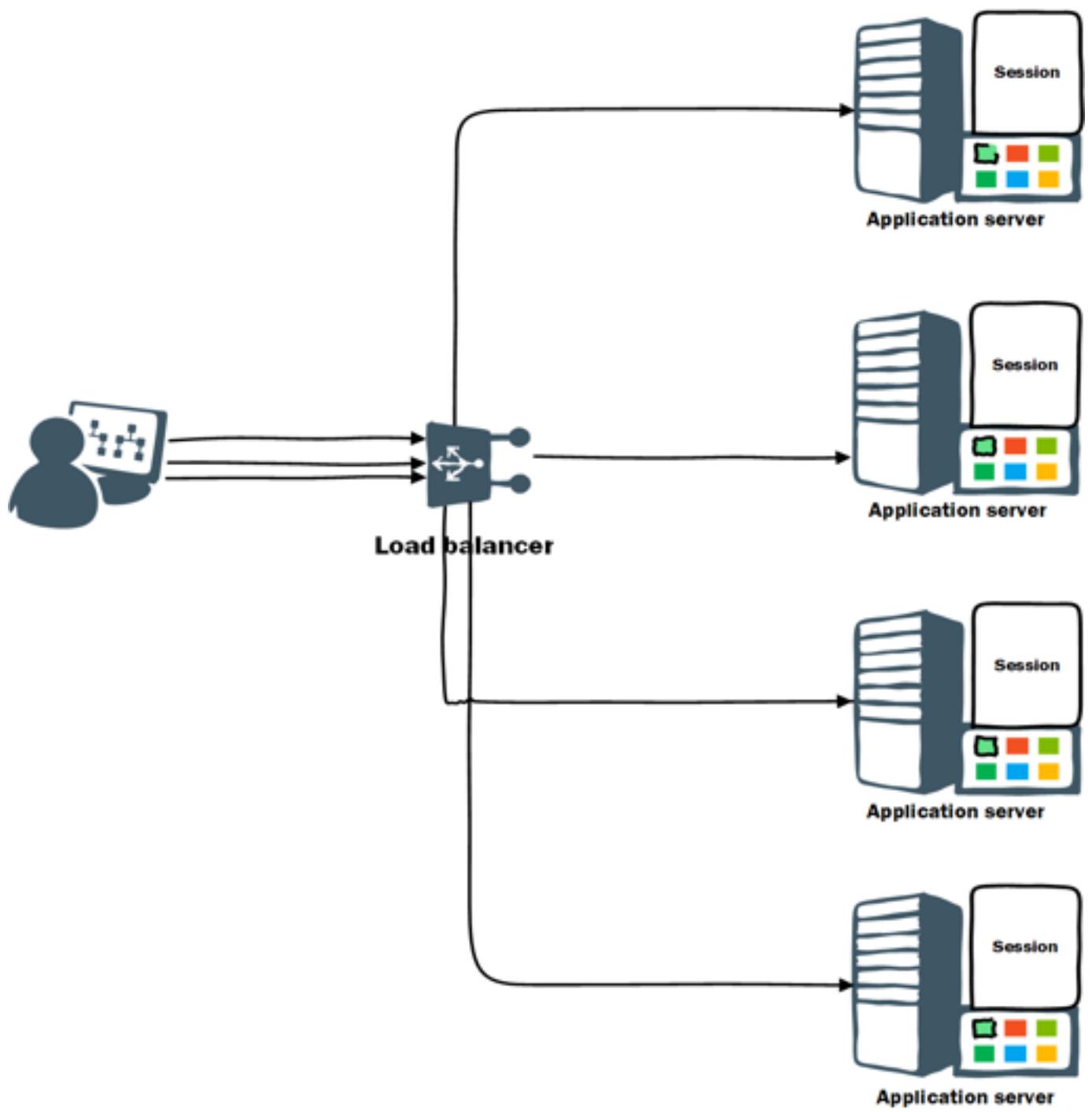
Entries in cache: exchangeRate

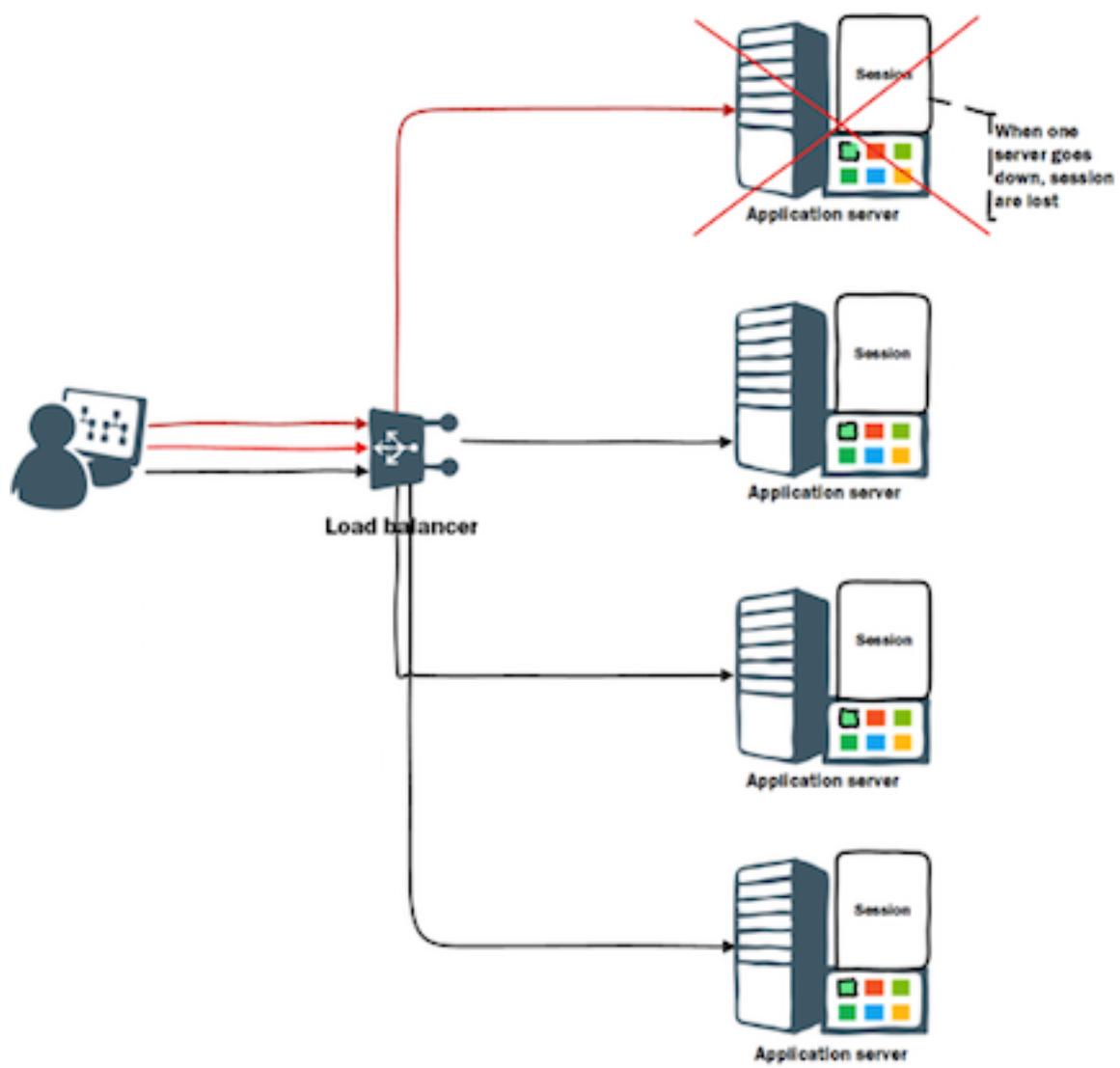
Key Class	Key	Value Class	Value
java.lang.String	Moscow	java.lang.String	71.7

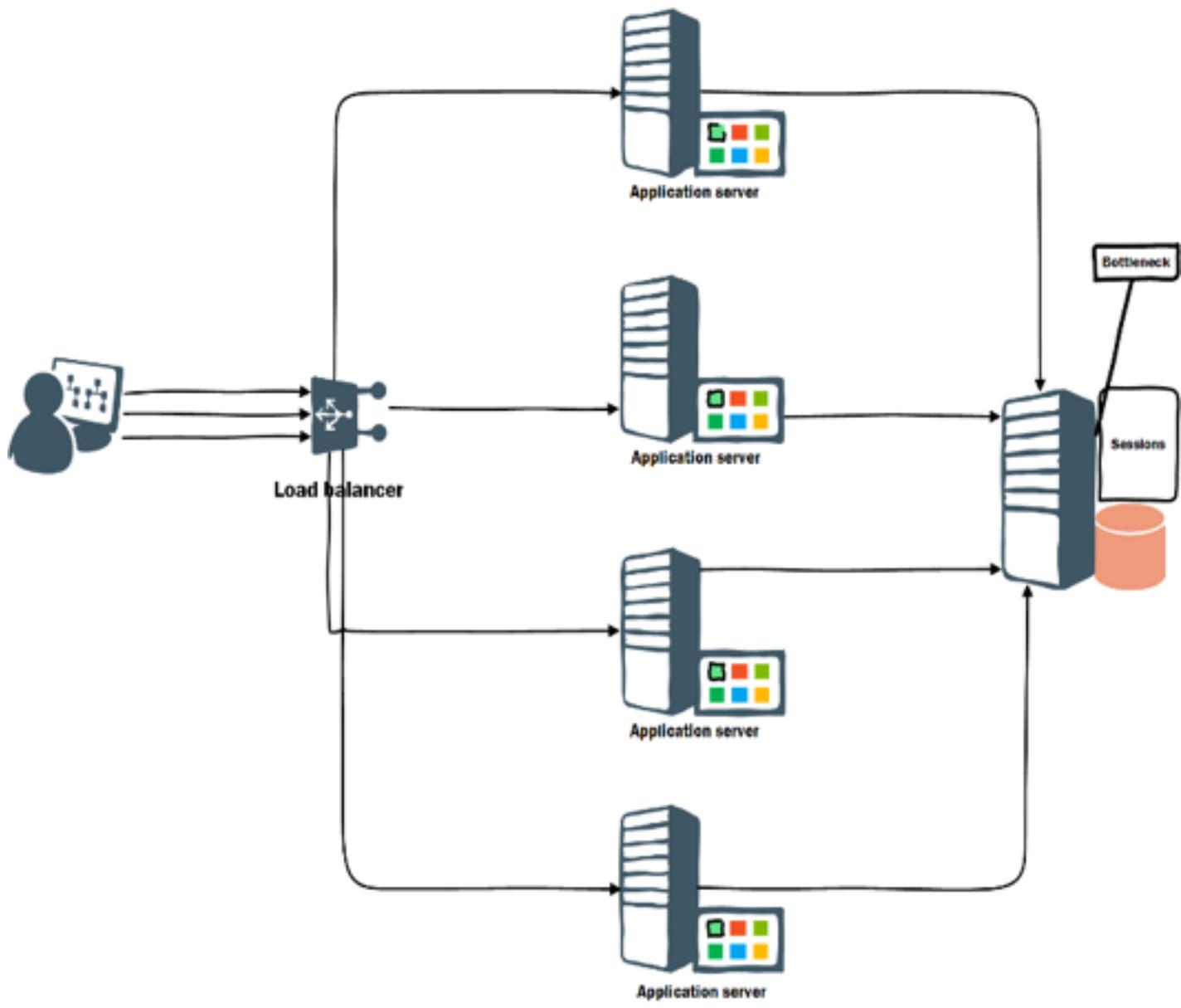
```
[visor> cache -scan
```

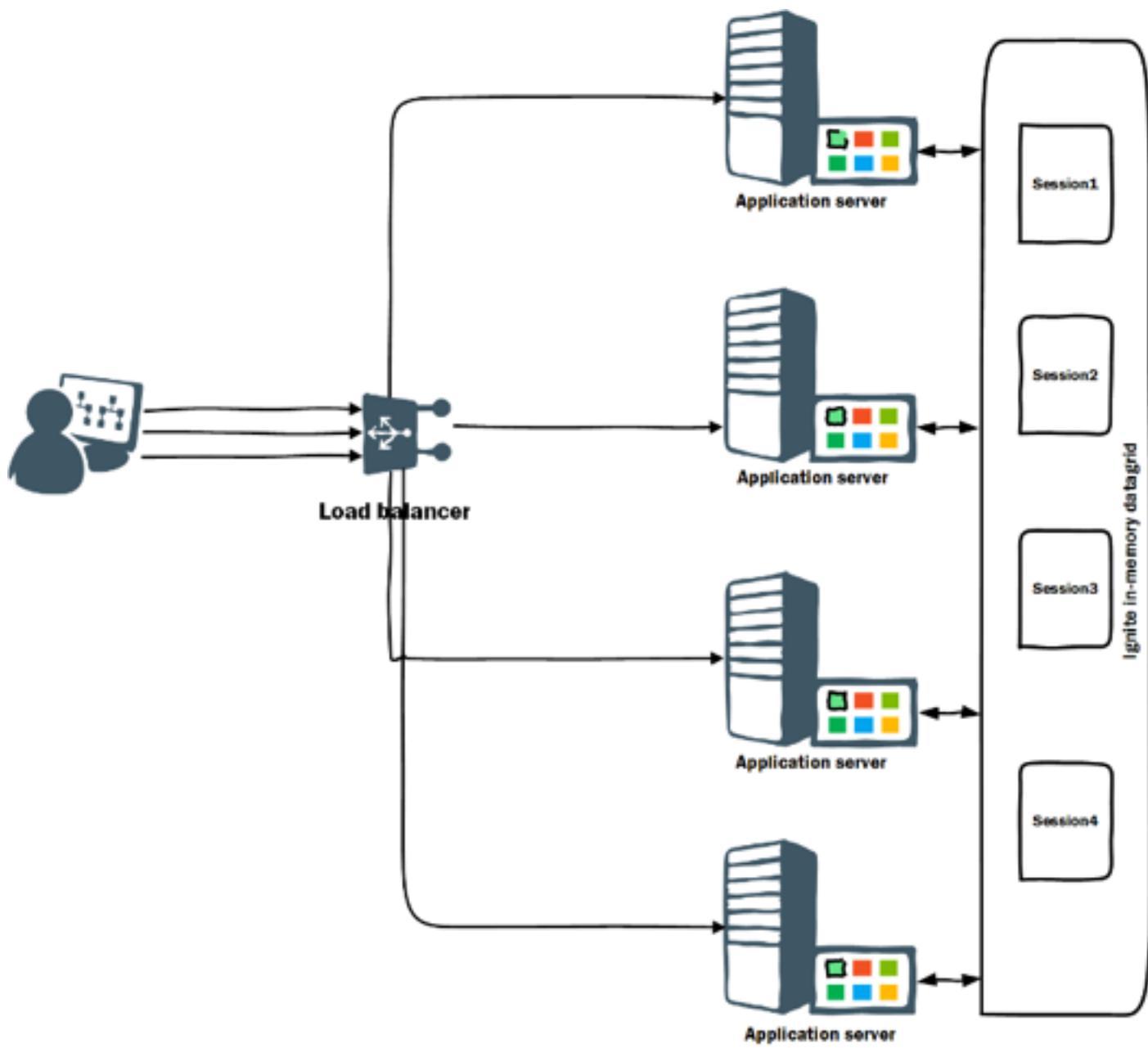
Time of the snapshot: 2018-09-13 15:45:31

#	Name(@)	Mode	Size (Heap / Off-heap)
0	exchangeRate(@c0)	PARTITIONED	min: 0 (0 / 0) avg: 0.00 (0.00 / 0.00) max: 0 (0 / 0)



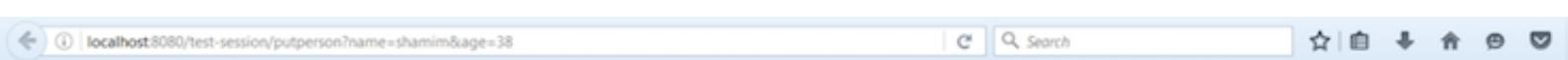






```
▼ web-session-clustering
  ▼ src
    ▼ main
      ▼ java
        ▼ com.blu.imdg.wsession
          ▼ bean
            Person
          ▼ controller
            WebSessionController
      ▼ resources
        ▼ META-INF
          spring-ignite-cache.xml
      ▼ webapp
        ▼ WEB-INF
          ▼ views
            welcome.jsp
            spring-servlet.xml
            web.xml
  pom.xml
  README
```

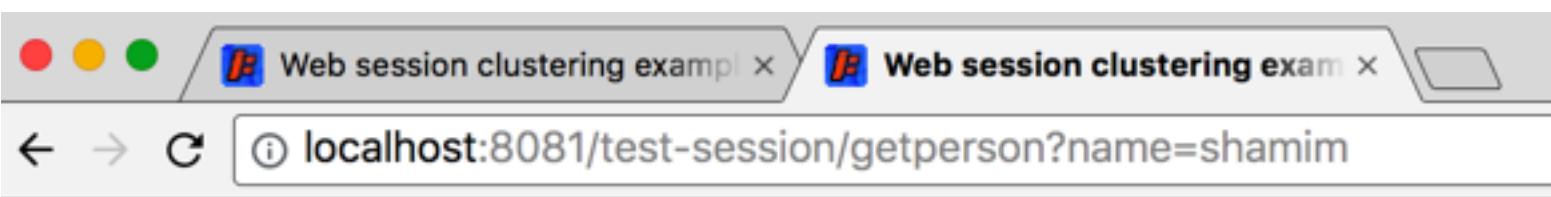
```
[22:42:07] Ignite node started OK (id=75195f1a, instance name=session-grid)
[22:42:07] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB,
heap=3.6GB]
[22:42:07]    --> Node [id=75195F1A-2614-498F-B846-C1C118818089, clusterState=ACTIV
E]
[22:42:07] Data Regions Configured:
[22:42:07]    --> default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=
false]
[INFO] Initializing Spring FrameworkServlet 'dispatcher'
[INFO] Started o.e.j.m.p.JettyWebAppContext@31ff6309{/test-session,file:/Users/sha
min/Development/workshop/github/the-apache-ignite-book/chapters/chapter-5/web-sess
ion-clustering/src/main/webapp/,AVAILABLE}{file:/Users/shamim/Development/workshop
/github/the-apache-ignite-book/chapters/chapter-5/web-session-clustering/src/main/
webapp/}
[WARNING] !RequestLog
[INFO] Started ServerConnector@5bdf8907{HTTP/1.1}{0.0.0.0:8080}
[INFO] Started @9945ms
[INFO] Started Jetty Server
[INFO] Starting scanner at interval of 10 seconds.
[22:42:09] Topology snapshot [ver=2, servers=2, clients=0, CPUs=8, offheap=6.4GB,
heap=7.1GB]
[22:42:09]    --> Node [id=75195F1A-2614-498F-B846-C1C118818089, clusterState=ACTIV
E]
[22:42:09] Data Regions Configured:
[22:42:09]    --> default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=
false]
[INFO] To start Console Management & Monitoring run ignitevisorcmd.sh!bot
[INFO] Ignite node started OK (id=79c3b6b7, instance name=session-grid)
[22:42:09] Topology snapshot [ver=2, servers=2, clients=0, CPUs=8, offheap=6.4GB,
heap=7.1GB]
[22:42:09]    --> Node [id=79C3B6B7-9A03-48CB-BF8E-9488E968138C, clusterState=ACTIV
E]
[22:42:09] Data Regions Configured:
[22:42:09]    --> default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=
false]
[INFO] Initializing Spring FrameworkServlet 'dispatcher'
[INFO] Started o.e.j.m.p.JettyWebAppContext@7a344b65{/test-session,file:/Users/sha
min/Development/workshop/github/the-apache-ignite-book/chapters/chapter-5/web-sess
ion-clustering/src/main/webapp/,AVAILABLE}{file:/Users/shamim/Development/workshop
/github/the-apache-ignite-book/chapters/chapter-5/web-session-clustering/src/main/
webapp/}
[WARNING] !RequestLog
[INFO] Started ServerConnector@5fe46d52{HTTP/1.1}{0.0.0.0:8081}
[INFO] Started @9362ms
[INFO] Started Jetty Server
[INFO] Starting scanner at interval of 10 seconds.
```



A screenshot of a developer tools interface, specifically the Network tab. The table shows a single request: a GET request to "putperson?name=shamim&amp;age=38" from "localhost:8080" with a status of 200. In the Cookies section, there is one cookie listed: "JSESSIONID: "vjo4ua7ifgova9majzn93puz"".

```
Entries in cache: session-cache
```

Key Class	Key	Value Class	
Value			
java.lang.String	1o8fvnavqa12sv3i4lokplrb	o.a.i.i.websession.WebSessionEntity	[id=1o8fvnavqa12sv3i4lokplrb, createTime=1537040909534, accessTime=1537040909566, maxInactiveInterval=1800, attributes=[shamim]]



Data : Age: 38



Key-Value



Ordered Key-Value



Big Table



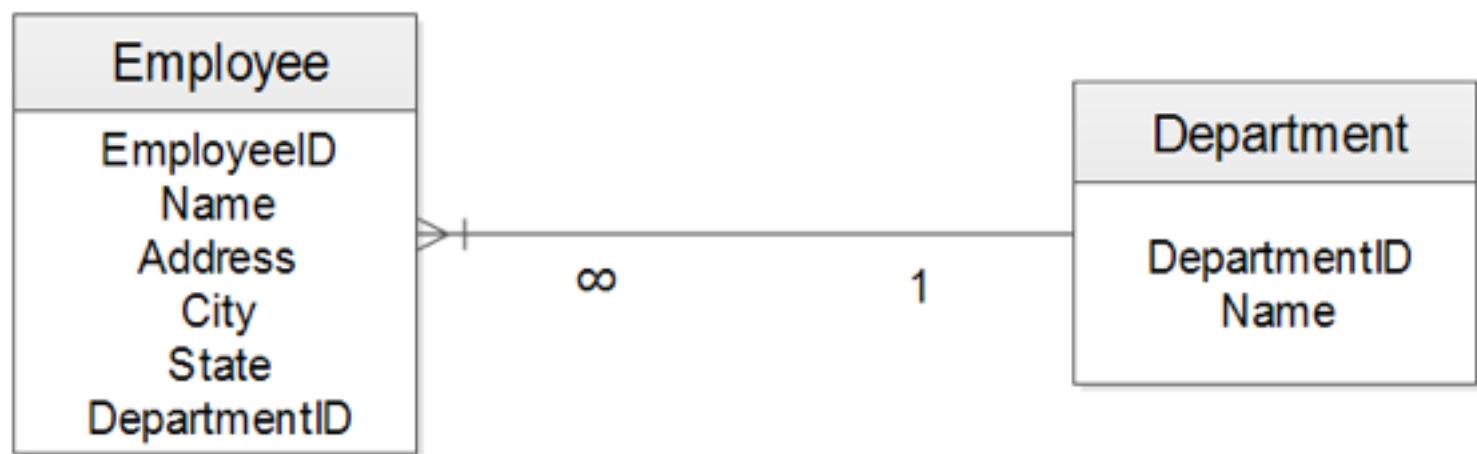
Document,  
Full-Text Search



Graph



SQL



Entries in cache: SQL\_PUBLIC\_EMP

Key Class	Value Class	Key	Value
o.a.i.i.binary.BinaryObjectImpl	SQL_PUBLIC_EMP_fdd90af4_8840_4d11_850b_dd342e4ea55e_KEY	[hash=2020639895, EMPNO=7698, DEPTNO=30]	o.a.i.i.binary.BinaryObjectImpl [SQL_PUBLIC_EMP_fdd90af4_8840_4d11_850b_dd342e4ea55e [hash=259097391, ENAME=BLAKE, JOB=MANAGER, MGR=7839, HIREDATE=1981-05-01, SAL=2850, COMM=null]]
o.a.i.i.binary.BinaryObjectImpl	SQL_PUBLIC_EMP_fdd90af4_8840_4d11_850b_dd342e4ea55e_KEY	[hash=-761930881, EMPNO=7782, DEPTNO=10]	o.a.i.i.binary.BinaryObjectImpl [SQL_PUBLIC_EMP_fdd90af4_8840_4d11_850b_dd342e4ea55e [hash=-165472427, ENAME=CLARK, JOB=MANAGER, MGR=7839, HIREDATE=1981-06-09, SAL=2450, COMM=null]]
o.a.i.i.binary.BinaryObjectImpl	SQL_PUBLIC_EMP_fdd90af4_8840_4d11_850b_dd342e4ea55e_KEY	[hash=512379064, EMPNO=7839, DEPTNO=10]	o.a.i.i.binary.BinaryObjectImpl [SQL_PUBLIC_EMP_fdd90af4_8840_4d11_850b_dd342e4ea55e [hash=479490351, ENAME=KING, JOB=PRESIDENT, MGR=null, HIREDATE=1981-11-17, SAL=5000, COMM=null]]

A list of the employees whose salary is more than 3000 after giving 25% !!!

Employee name: BLAKE Department: 30 Job:MANAGER Salary: 2850

Employee name: CLARK Department: 10 Job:MANAGER Salary: 2450

Employee name: KING Department: 10 Job:PRESIDENT Salary: 5000

A list of employees who earn such amount of salary which is the smallest salary of any of the departments!!!

Employee name: BLAKE Department: 30 Salary: 2850

Employee name: CLARK Department: 10 Salary: 2450

A list of employees who earn more than the average salary!!!

Employee name: KING Department: 10 Salary: 5000

```
0: jdbc:ignite:thin://127.0.0.1/> !tables
```

TABLE_CAT	TABLE_SCHEMA	TABLE_NAME	TABLE_TYPE
	SqlQueryEmployees-employees	EMPLOYEE	TABLE
	SqlQueryEmployees-departments	DEPARTMENT	TABLE

```
0: jdbc:ignite:thin://127.0.0.1/> SELECT * FROM "SqlQueryEmployees-employees".EMPLOYEE;
```

EMPNO	ENAME	JOB	MGR
14	Miller	Clerk	3
2	Blake	Manager	1
9	Ward	Salesman	2
4	Jones	Manager	1
11	Turner	Salesman	2
6	Ford	Analyst	4
13	James	Clerk	2
1	King	President	null
8	Allen	Salesman	2
3	Clark	Manager	1
10	Martin	Salesman	2
5	Scott	Analyst	4
12	Adams	Clerk	5
7	Smith	Clerk	6

Screenshot of a Java-based SQL editor interface.

Toolbar:

- Auto commit
- Max rows: 1000
- Auto complete
- Auto select: On

Connection Information:

- jdbc:h2:mem:b3e856c8-2431-4b
- INFORMATION\_SCHEMA
- Users
- H2 1.4.195 (2017-04-23)

Buttons:

- Run
- Run Selected
- Auto complete
- Clear
- SQL statement:

Important Commands Table:

?	Displays this Help Page
!	Shows the Command History
Ctrl+Enter	Executes the current SQL statement
Shift+Enter	Executes the SQL statement defined by the text selection
Ctrl+Space	Auto complete
Alt+F5	Disconnects from the database

Sample SQL Script Table:

Delete the table if it exists	DROP TABLE IF EXISTS TEST;
Create a new table with ID and NAME columns	CREATE TABLE TEST(ID INT PRIMARY KEY, NAME VARCHAR(255));
Add a new row	INSERT INTO TEST VALUES(1, 'Hello');
Add another row	INSERT INTO TEST VALUES(2, 'World');
Query the table	SELECT * FROM TEST ORDER BY ID;
Change data in a row	UPDATE TEST SET NAME='Hi' WHERE ID=1;
Remove a row	DELETE FROM TEST WHERE ID=2;
Help	HELP ...

```
0: jdbc:ignite:thin://127.0.0.1/> !tables
```

TABLE_CAT	TABLE_SCHEMA	TABLE_NAME
	PUBLIC	EMP

Auto commit | Max rows: 1000 | Auto complete Off | Auto select On | ?

jdbc:h2:mem:1d6cb8d8-84c6-48f Run Run Selected Auto complete Clear SQL statement:

EMP

- \_KEY
- \_VAL
- \_VER
- EMPNO
- ENAME
- JOB
- MGR
- HIREDATE
- SAL
- COMM
- DEPTNO

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INFORMATION\_SCHEMA

ignite-sys-cache

Users

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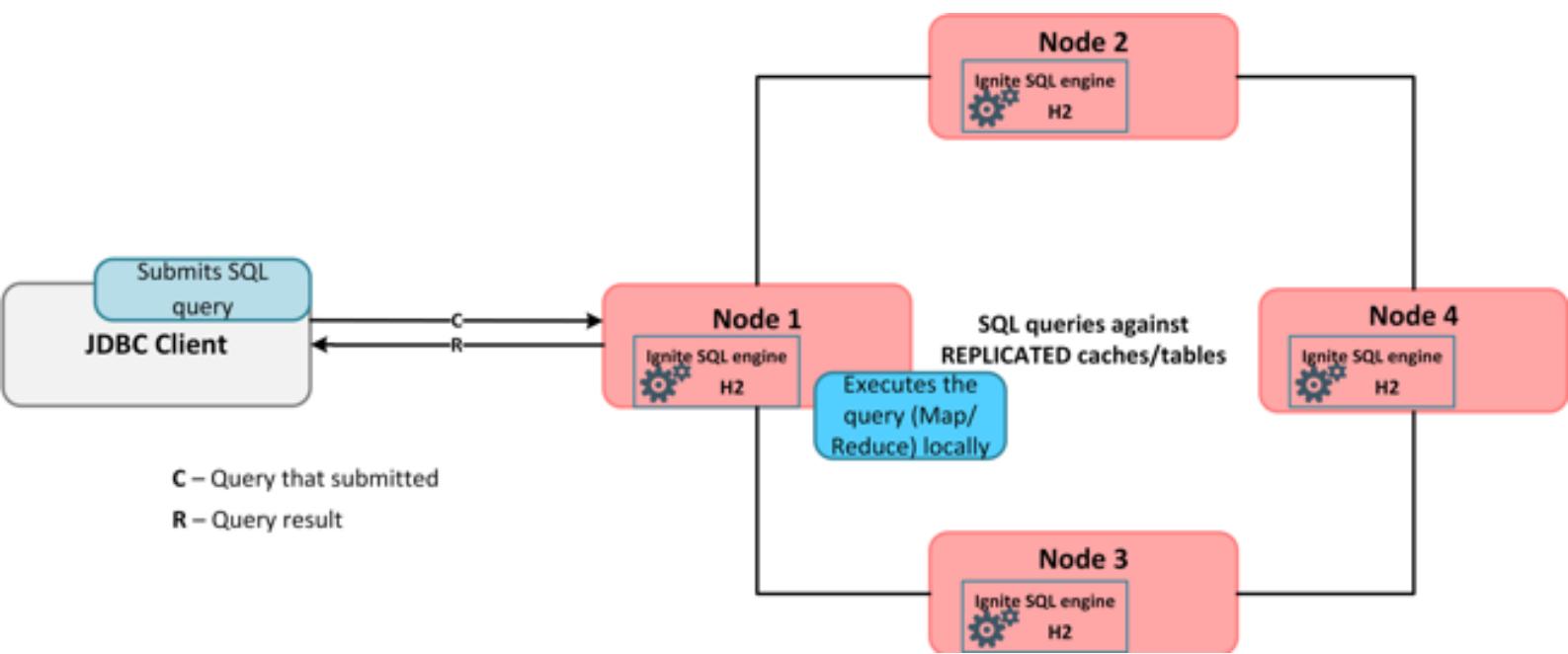
**Important Commands**

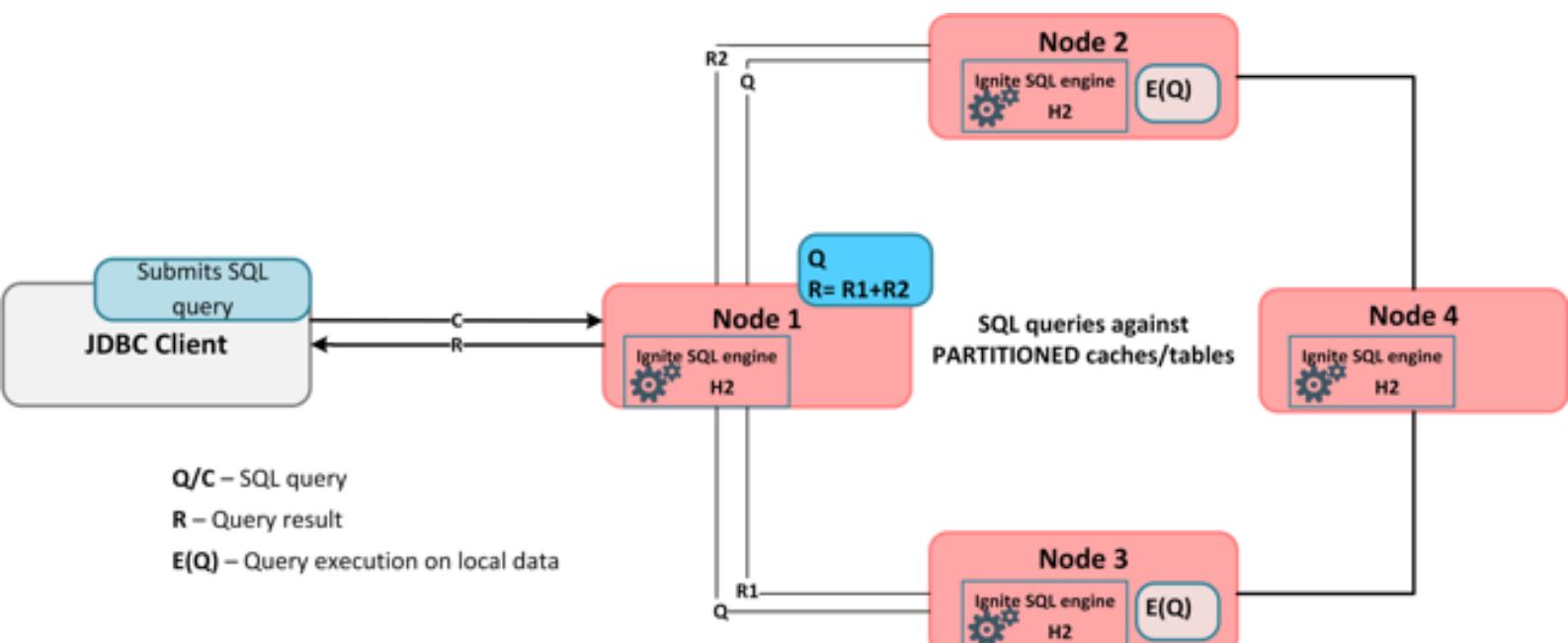
		Displays this Help Page
		Shows the Command History
	Ctrl+Enter	Executes the current SQL statement
	Shift+Enter	Executes the SQL statement defined by the text selection
	Ctrl+Space	Auto complete
		Disconnects from the database

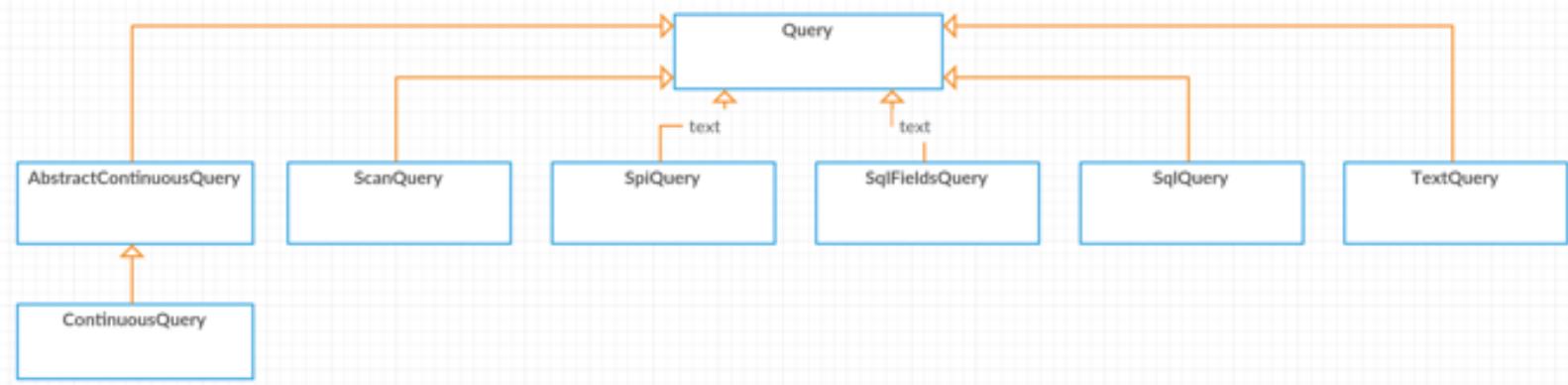
```
select table_name, table_type, storage_type, SQL, table_class from information_schema.tables where table_name = 'EMP';
```

```
select table_name, table_type, storage_type, SQL, table_class from information_schema.tables where table_name = 'EMP';
```

TABLE_NAME	TABLE_TYPE	STORAGE_TYPE	SQL	TABLE_CLASS
EMP	EXTERNAL	MEMORY	<pre>CREATE MEMORY TABLE PUBLIC.EMP(     _KEY BIGINT INVISIBLE NOT NULL,     _VAL OTHER INVISIBLE ,     _VER OTHER INVISIBLE ,     EMPNO BIGINT,     ENAME VARCHAR,     JOB VARCHAR,     MGR INT,     HIREDATE DATE,     SAL BIGINT,     COMM BIGINT,     DEPTNO BIGINT ) ENGINE "org.apache.ignite.internal.processors.query.h2.H2TableEngine"</pre>	org.apache.ignite.internal.processors.query.h2.opt.GridH2Table







ID	CAT	COMPANY_NAME	EMAIL	ADDRESS	CITY	STATE	ZIPCODE	PHONE_NUMBER	FAX_NUMBER
230001	M	Medical-ID.com	bcourt@aol.com	115 Cooper Dr	VAILS GATE	NY	12584	null	null
230002	W	WEINBERG; KEITH	keith@groupdigital.com	272 BLEECKER ST APT 51	NEW YORK	NY	10013	null	null
230003	M	Maccio Physical Therapy	Maccio@macciophysicaltherapy.com	1 New Hampshire Ave	Troy	NY	12180- 1754	5182730701	5182732121
230004	P	Prudential Douglas Elliman Re	thomas.uhlinger@prudentialelliman.com	10200 Main Rd / Po Box 1410	Mattituck	NY	11952	63129880000	-
230005	F	Fragomen Del Rey Bernsen & Low	sanfranciscoinfo@fragomen.com	515 Madison Ave # 15	New York	NY	10022- 5493	9494400119	2126888555

```
09:21:33.241 [main] INFO c.b.i.TextQueryExample - Yes Network
09:21:33.242 [main] INFO c.b.i.TextQueryExample - Launch Photography
09:21:33.242 [main] INFO c.b.i.TextQueryExample - ekstra design inc
09:21:33.242 [main] INFO c.b.i.TextQueryExample - New York Times
09:21:33.242 [main] INFO c.b.i.TextQueryExample - Lewis Brisbois
09:21:33.242 [main] INFO c.b.i.TextQueryExample - CafeCleo.com
09:21:33.242 [main] INFO c.b.i.TextQueryExample - Canfield media and arts; inc
09:21:33.242 [main] INFO c.b.i.TextQueryExample - DKO New York
09:21:33.242 [main] INFO c.b.i.TextQueryExample - Wedding Ring Originals
09:21:33.242 [main] INFO c.b.i.TextQueryExample - Slater
09:21:33.242 [main] INFO c.b.i.TextQueryExample - Text query example finished.
```

Company  
Id: 230001  
Name: Maccio Physical  
Therapy  
E-mail:  
Maccio@macciophysicalthera  
py.com  
Address: 1 New Hampshire Ave

Document 1

Company  
Id: 230002  
Name: Nominal assembly  
E-mail: nominal@hotmail.com  
Address: 101 bogalake, NY

Document 2

Company  
Id: 210503  
Name: Barbie salon  
E-mail:  
barbie@barbilesalon.com  
Address: 31 Mardia kollar ave

Document 3

### Inverted Index

Id	Terms	Documents
1	barbie	3
2	salon	3
3	new	1
4	hampshire	1
5	ave	1,3
6	1	1
7	nominal	2
8	maccio	1
9	bogalake	2

```
14:28:06.784 [main] INFO c.b.i.TextQueryExample - ==A company which name with ' beauty salon'==  
14:28:06.784 [main] INFO c.b.i.TextQueryExample -     Entry [key=233196, val=Company{id=233196, cat='B', companyName='Bardot Beauty', email='bardotbeauty@aol.com',  
14:28:06.784 [main] INFO c.b.i.TextQueryExample -     Entry [key=231457, val=Company{id=231457, cat='O', companyName='Oriental Barber & Beauty Salon', email='spn@se  
14:28:06.784 [main] INFO c.b.i.TextQueryExample -     Entry [key=231951, val=Company{id=231951, cat='B', companyName='Bleak Beauty Books', email='cs1mt@aol.com', ad  
14:28:06.784 [main] INFO c.b.i.TextQueryExample -     Entry [key=234486, val=Company{id=234486, cat='J', companyName='J & D BEAUTY PRODUCTS', email='jdbtyart@aol.co  
14:28:06.784 [main] INFO c.b.i.TextQueryExample -     Entry [key=234218, val=Company{id=234218, cat='U', companyName='Ultimate Make-Up & Beauty Applications', email='  
14:28:06.784 [main] INFO c.b.i.TextQueryExample -     Entry [key=231307, val=Company{id=231307, cat='J', companyName='JMC La Femina Beauty Salons Inc.', email='cyar  
14:28:06.784 [main] INFO c.b.i.TextQueryExample -     Entry [key=231419, val=Company{id=231419, cat='D', companyName='Devra Bader Skin Care & Beauty Spa', email='in
```

Auto commit | Max rows: 1000 | Auto complete Off | Auto select On | ?

jdbc:h2:mem:1d6cb8d8-84c6-48f Run Run Selected Auto complete Clear SQL statement:

EMP

- \_KEY
- \_VAL
- \_VER
- EMPNO
- ENAME
- JOB
- MGR
- HIREDATE
- SAL
- COMM
- DEPTNO

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**Important Commands**

		Displays this Help Page
		Shows the Command History
	Ctrl+Enter	Executes the current SQL statement
	Shift+Enter	Executes the SQL statement defined by the text selection
	Ctrl+Space	Auto complete
		Disconnects from the database

ACCOUNTING

- KING
- CLARK

Ignite node 1



SALES

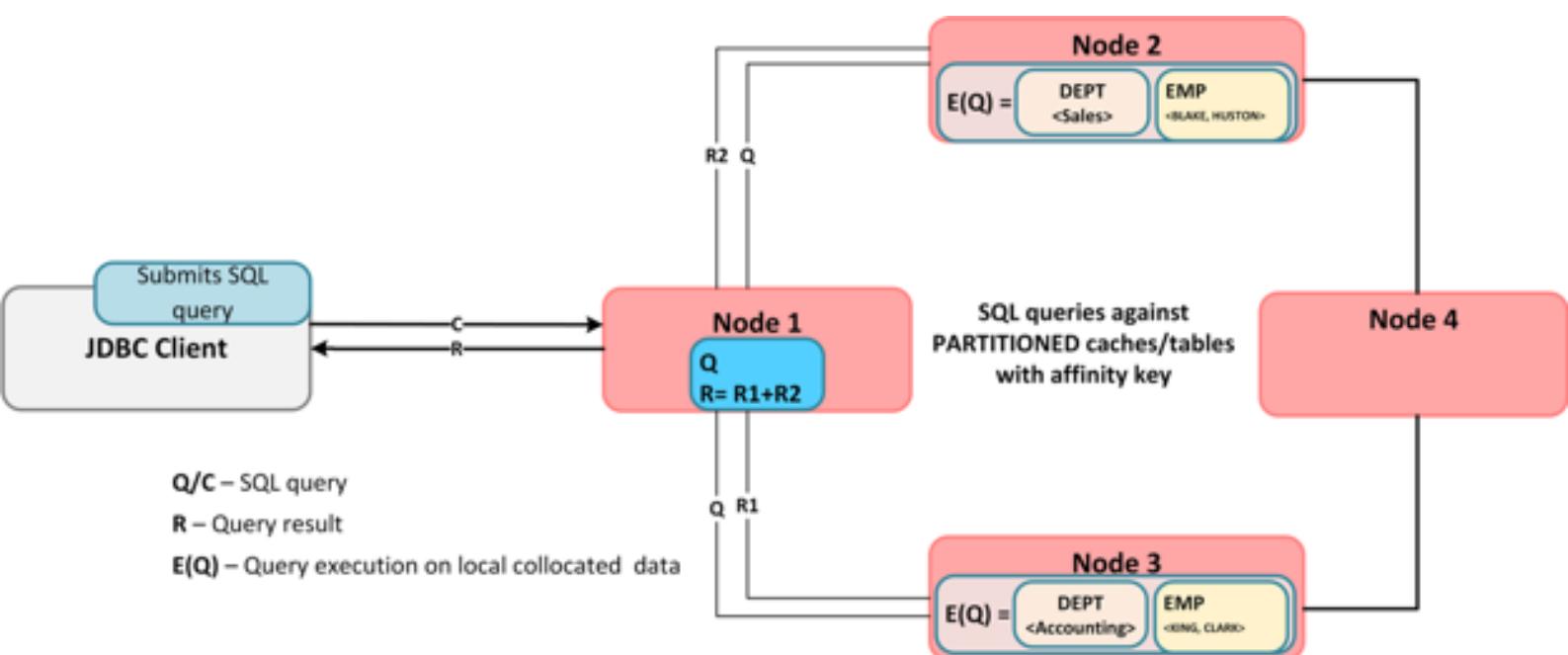
- BLAKE
- HUSTON

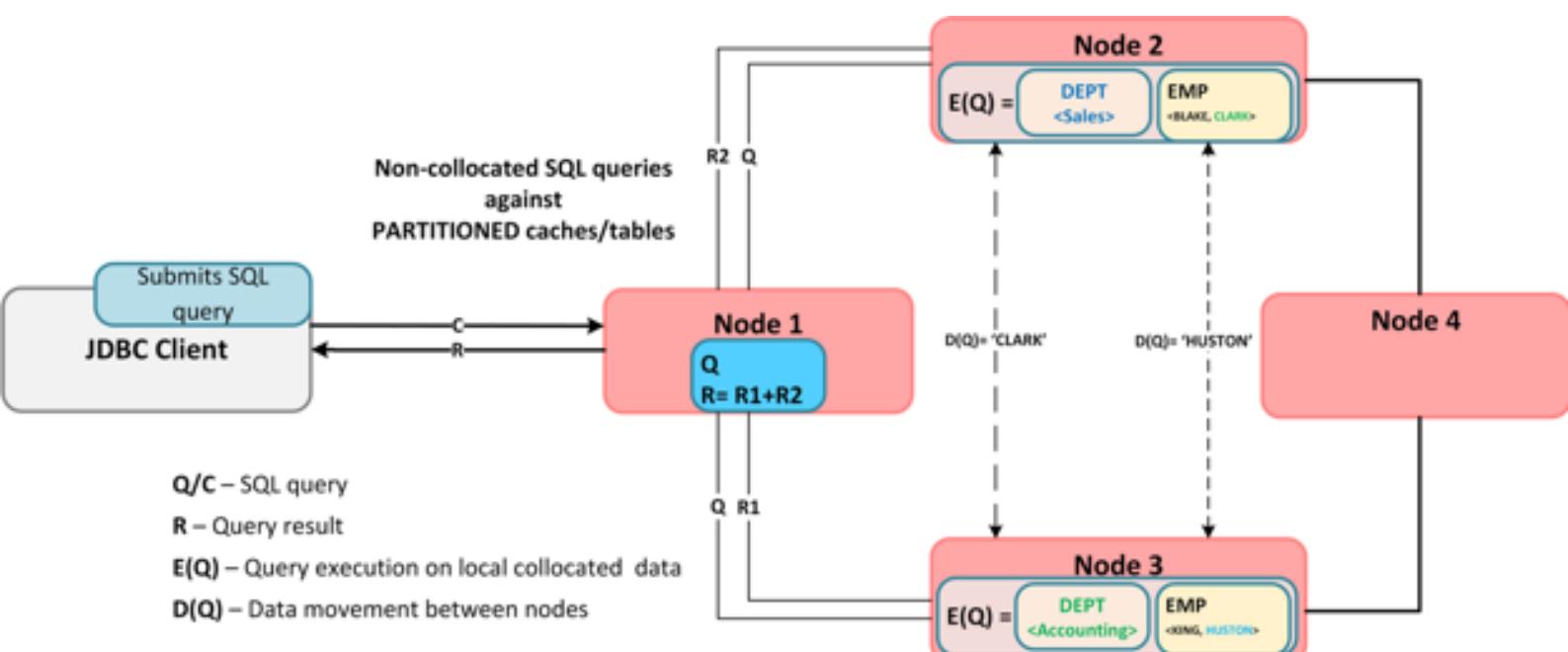
Ignite node 2

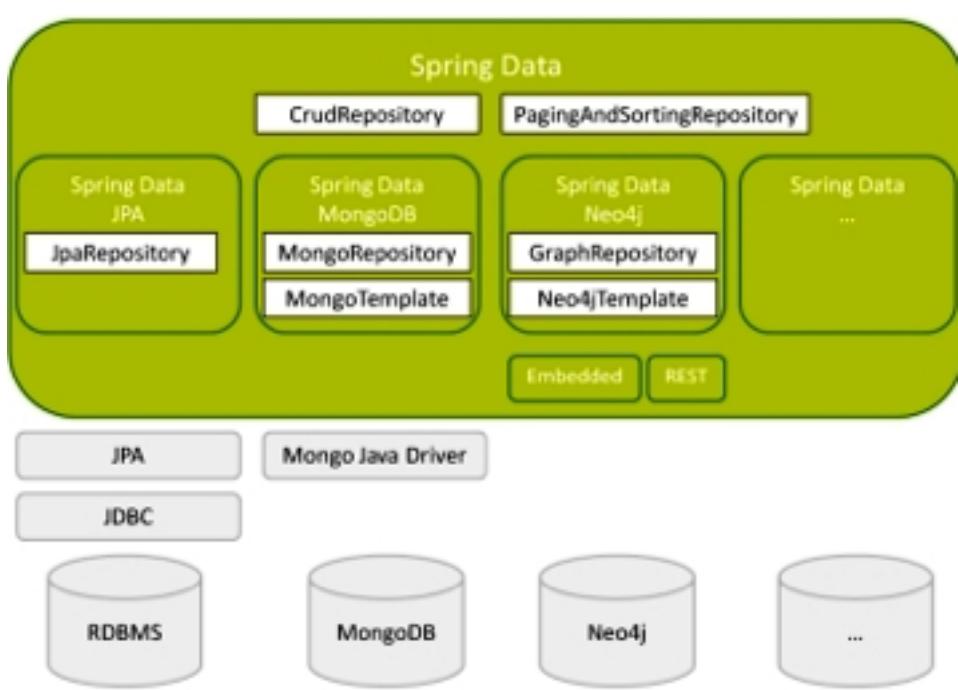


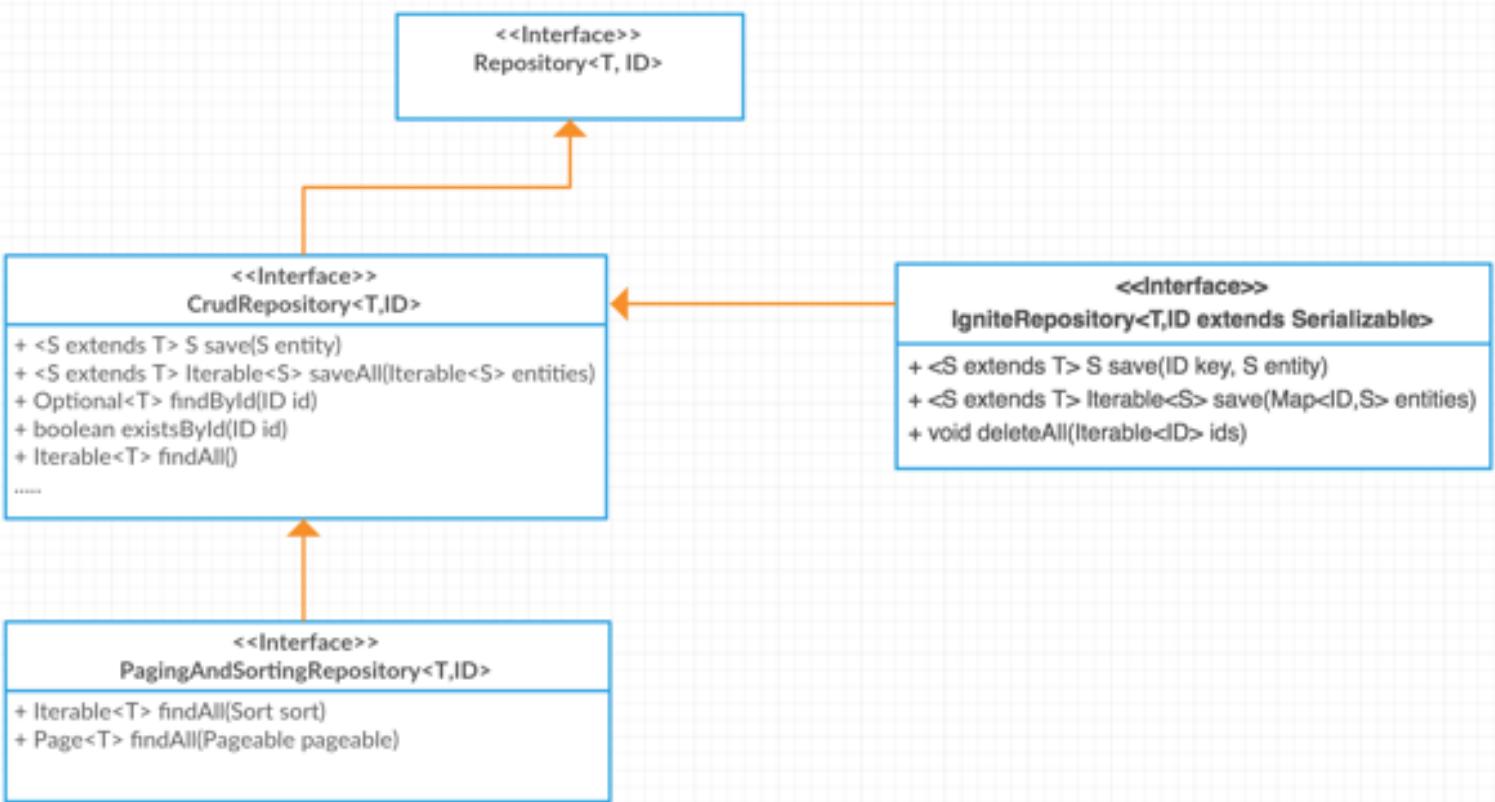
```
0: jdbc:ignite:thin://127.0.0.1/> SELECT Count(empno),  
... . . . . . . . . . . >      b.deptno,  
... . . . . . . . . . . >      dname  
... . . . . . . . . . . > FROM   emp a,  
... . . . . . . . . . . > dept b  
... . . . . . . . . . . > WHERE  a.deptno = b.deptno  
... . . . . . . . . . . > GROUP  BY b.deptno,  
... . . . . . . . . . . >      dname  
... . . . . . . . . . . > ORDER BY b.deptno;
```

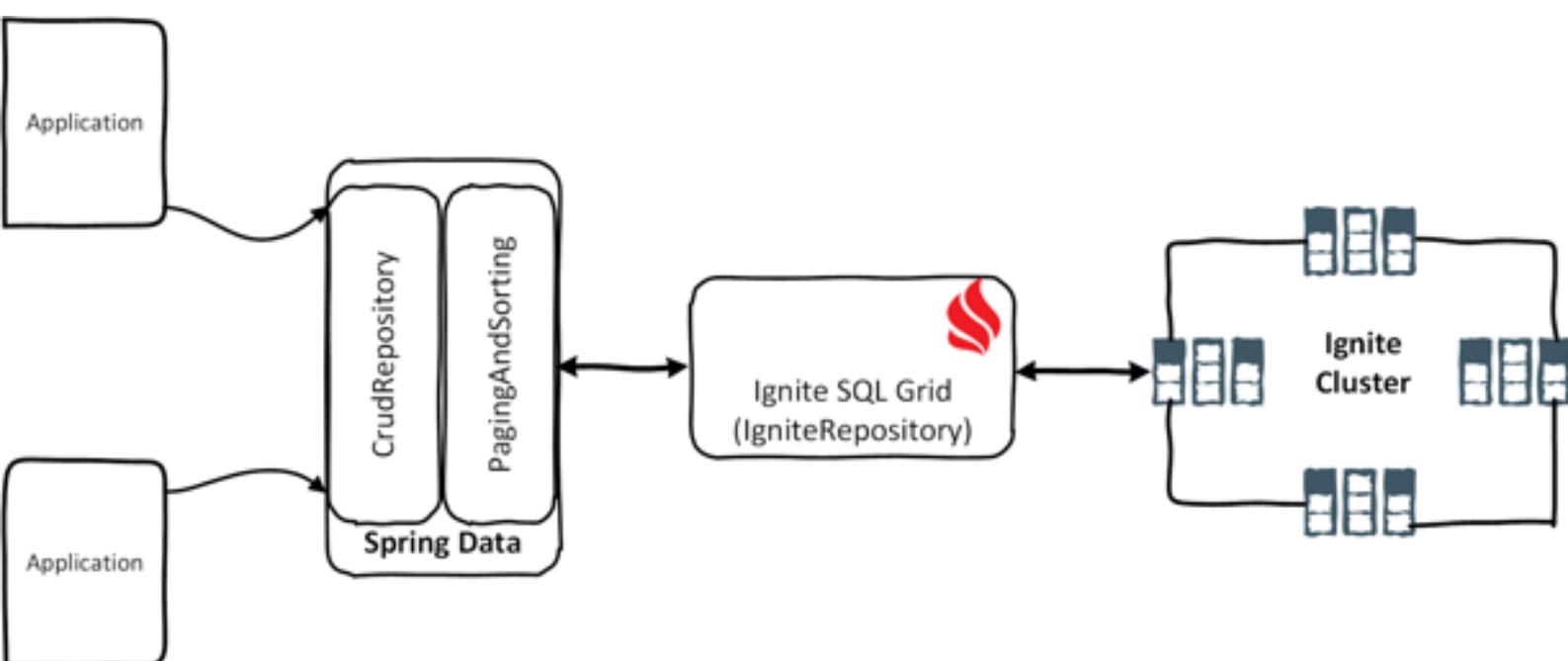
COUNT(EMPNO)	DEPTNO	DNAME
8	1	Engineering
11	2	Human Resources
10	3	Research and Development
9	4	Human Resources
15	5	Services
8	6	Marketing

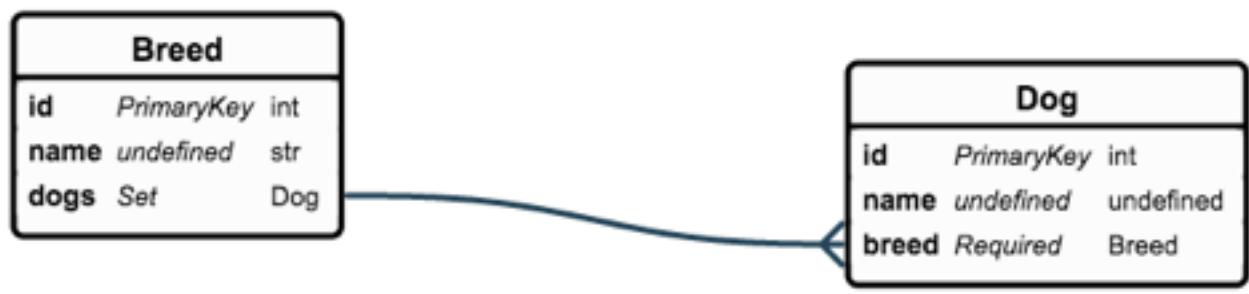












PONY

```
es.  
[21:48:33] Security status [authentication=off, tls/ssl=off]  
[21:48:35] Performance suggestions for grid 'springDataNode' (fix if possible)  
[21:48:35] To disable, set -DIGNITE_PERFORMANCE_SUGGESTIONS_DISABLED=true  
[21:48:35]   ^-- Enable G1 Garbage Collector (add '-XX:+UseG1GC' to JVM options)  
[21:48:35]   ^-- Specify JVM heap max size (add '-Xmx<size>[g|G|m|M|k|K]' to JVM options)  
[21:48:35]   ^-- Set max direct memory size if getting 'OOME: Direct buffer memory' (add '-XX:MaxDirectMemorySize=<size>[g|G|m|M|k|K]' to JVM options)  
[21:48:35]   ^-- Disable processing of calls to System.gc() (add '-XX:+DisableExplicitGC' to JVM options)  
[21:48:35] Refer to this page for more performance suggestions: https://apacheignite.readme.io/docs/jvm-and-system-tuning  
[21:48:35]  
[21:48:35] To start Console Management & Monitoring run ignitevisorcmd.{sh\bat}  
[21:48:35]  
[21:48:35] Ignite node started OK (id=f510a337, instance name=springDataNode)  
[21:48:35] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=3.66GB]  
[21:48:35]   ^-- Node [id=F510A337-6FFF-4BF6-A159-6A3011C66D97, clusterState=ACTIVE]  
[21:48:35] Data Regions Configured:  
[21:48:35]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]  
Add one breed in the repository!  
Breed:Breed{id='1', name='collie'}  
Dog dina save into the cache!  
Dog:Dog{id=1, name='dina', breedid=1, birthdate=2018-11-30}
```

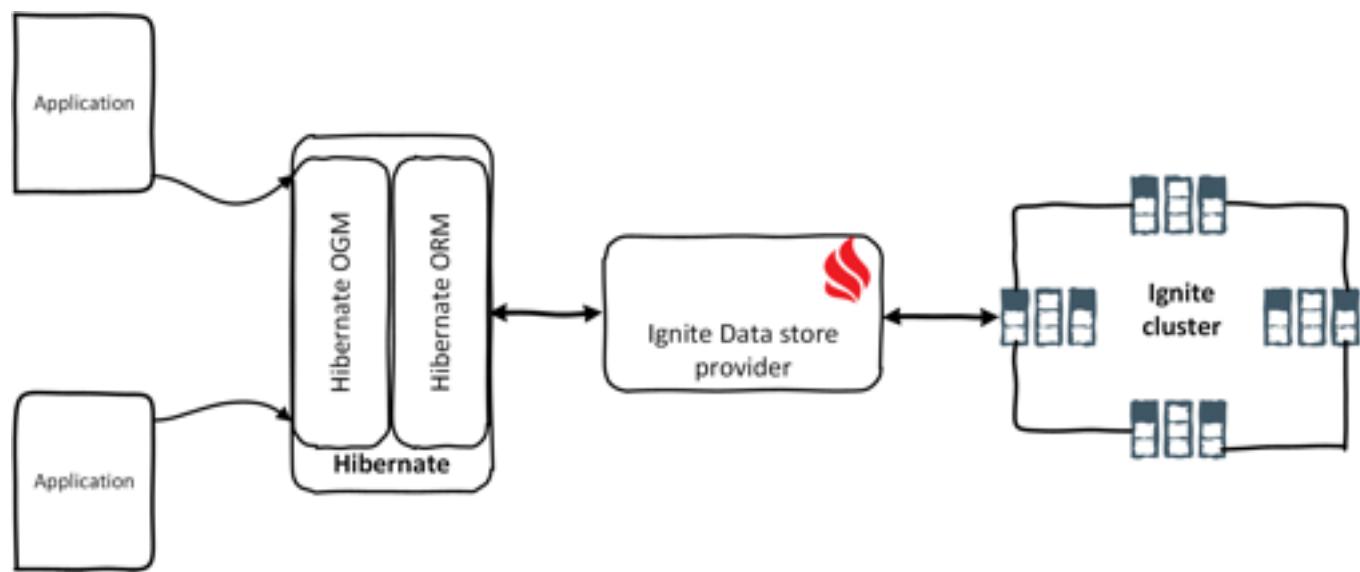
#	Name(@)	Mode	Size (Heap / Off-heap)
0	BreedCache(@c0)	PARTITIONED	min: 1 (1 / 0) avg: 1.00 (1.00 / 0.00) max: 1 (1 / 0)
1	DogCache(@c1)	PARTITIONED	min: 1 (1 / 0) avg: 1.00 (1.00 / 0.00) max: 1 (1 / 0)

```
Entries in cache: DogCache
+-----+
| Key Class | Key | Value Class | | Value |
+-----+
| java.lang.Long | 2 | o.a.i.t.binary.BinaryObjectImpl | com.blu.lmdg.model.Dog [hash=-2188743158, id=1, name=dina, breedId=1, birthdate=2017-07-08] |
+-----+
\lsor> |
```

```
0: jdbc:ignite:thin://127.0.0.1/> SELECT * FROM "DogCache".DOG;
```

ID	NAME	BREEDID
1	dina	1

```
1 row selected (0.006 seconds)
```



```
[DEBUG] 06:13:24.158 [com.blu.imdg.App.main()] DotNode - getDataType() : dept -> org.hibernate.type.ManyToOneType(com.blu.imdg.DTO.Department)
[DEBUG] 06:13:24.158 [com.blu.imdg.App.main()] DotNode - dereferenceShortcut() : property dept in com.blu.imdg.DTO.Employee does not require a join.
[DEBUG] 06:13:24.167 [com.blu.imdg.App.main()] DotNode - Terminal getPropertyPath = [dept]
[DEBUG] 06:13:24.167 [com.blu.imdg.App.main()] FromReferenceNode - Resolved : e.dept -> employee0_.dept_deptno
[DEBUG] 06:13:24.167 [com.blu.imdg.App.main()] HqlSqlBaseWalker - select : finishing up [level=1, statement=select]
[DEBUG] 06:13:24.167 [com.blu.imdg.App.main()] HqlSqlWalker - processQuery() : ( SELECT ( {select clause} ( employee0_.ename {synthetic-alias} ename ) ) ( FromClause[level=1] EMP employee0_ ) ( where ( = ( employee0_.dept_deptno employee0_.empno dept ) ? ) ) )
[DEBUG] 06:13:24.167 [com.blu.imdg.App.main()] JoinProcessor - Using FROM fragment [EMP employee0_]
[DEBUG] 06:13:24.167 [com.blu.imdg.App.main()] SyntheticAndFactory - Using unprocessed WHERE-fragment [null]
[DEBUG] 06:13:24.167 [com.blu.imdg.App.main()] SyntheticAndFactory - Using processed WHERE-fragment [null]
[DEBUG] 06:13:24.167 [com.blu.imdg.App.main()] HqlSqlBaseWalker - select >> end [level=1, statement=select]
[DEBUG] 06:13:24.178 [com.blu.imdg.App.main()] ErrorTracker - throwQueryException() : no errors
[DEBUG] 06:13:24.179 [com.blu.imdg.App.main()] QueryParser - Processed tree: (QUERY (QUERY_SPEC (SELECT_FROM (from (PERSISTER_SPA CE (ENTITY_PERSISTER_REF com.blu.imdg.DTO.Employee e))) (Select (SELECT_LIST (SELECT_ITEM (PATH ename)))) (where ( = (PATH (. e dept)) deptno)))))
[DEBUG] 06:13:24.179 [com.blu.imdg.App.main()] QueryParser - Processed tree: (QUERY (QUERY_SPEC (SELECT_FROM (from (PERSISTER_SPA CE (ENTITY_PERSISTER_REF com.blu.imdg.DTO.Employee e))) (Select (SELECT_LIST (SELECT_ITEM (PATH ename)))) (where ( = (PATH (. e dept)) deptno)))))
[DEBUG] 06:13:24.179 [com.blu.imdg.App.main()] SQL - SELECT e.ename as col_0 FROM EMP e WHERE e.dept_deptno=?1
[DEBUG] 06:13:24.182 [com.blu.imdg.App.main()] LogicalConnectionManagedImpl - Initiating JDBC connection release from afterTransaction
[INFO ] 06:13:24.182 [com.blu.imdg.App.main()] App - KING
[INFO ] 06:13:24.182 [com.blu.imdg.App.main()] App - CLARK
```

```
shamim:~ shamim$ sqlline.sh --color=true --verbose=true -u jdbc:ignite:thin://127.0.0.1/
issuing: !connect jdbc:ignite:thin://127.0.0.1/ '' '' org.apache.ignite.IgniteJdbcThinDriver
Connecting to jdbc:ignite:thin://127.0.0.1/
Connected to: Apache Ignite (version 2.6.0#20180710-sha1:669feacc)
Driver: Apache Ignite Thin JDBC Driver (version 2.6.0#20180710-sha1:669feacc)
Autocommit status: true
Transaction isolation: TRANSACTION_REPEATABLE_READ
sqlline version 1.3.0
0: jdbc:ignite:thin://127.0.0.1/> !tables
+-----+-----+-----+-----+-----+
| TABLE_CAT | TABLE_SCHEMA | TABLE_NAME | TABLE_TYPE |
+-----+-----+-----+-----+
|          | PUBLIC      | EMP        | TABLE      |
|          | PUBLIC      | DEPT       | TABLE      |
+-----+-----+-----+-----+
0: jdbc:ignite:thin://127.0.0.1/> Select * from emp;
+-----+-----+-----+-----+-----+
| EMPNO | ENAME    | HIREDATE | JOB      |
+-----+-----+-----+-----+
| 1     | KING     |           | PRESIDENT |
| 2     | BLAKE    |           | MANAGER   |
| 3     | CLARK    |           | MANAGER   |
| 4     | JONES    |           | MANAGER   |
+-----+-----+-----+-----+
4 rows selected (0.107 seconds)
```

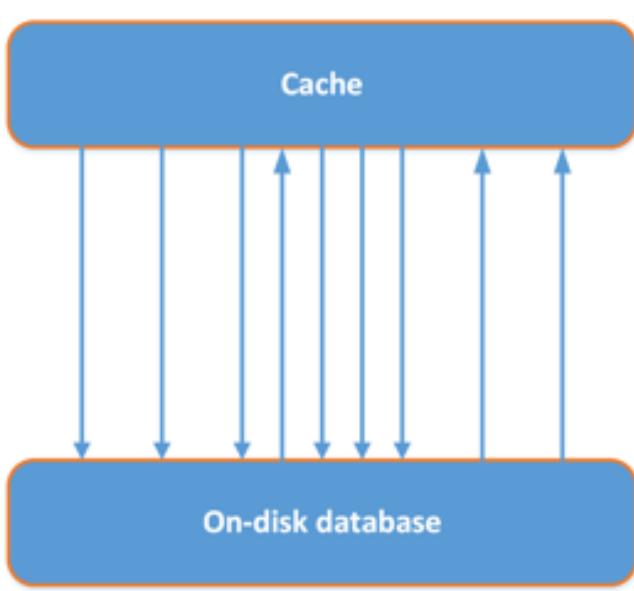
```
[22:19:27] Ignite node started OK (id=9afea73d)
[22:19:27] >>> Ignite cluster is not active (limited functionality available). Use control(shibat)
to activate.
[22:19:27] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=1.0GB]
[22:19:27]   ^-- Node [id=9AFEA73D-AF9B-4FEC-940C-41185B2D86EB, clusterState=INACTIVE]
[22:19:27] Data Regions Configured:
[22:19:27]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=true]
```

```

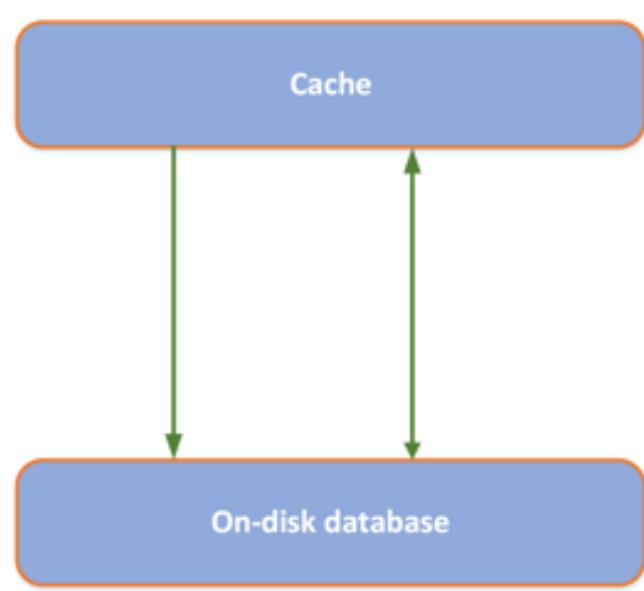
visor> cache -scan
Time of the snapshot: 2018-12-20 20:38:04
+-----+
| # | Name(@) | Mode | Size (Heap / Off-heap) |
+-----+
| 0 | EMPcache(@c0) | PARTITIONED | min: 3 (0 / 3)
|   |           |           | avg: 3.00 (0.00 / 3.00)
|   |           |           | max: 3 (0 / 3)
+-----+

Choose cache number ('c' to cancel) [c]: 0
Entries in cache: EMPcache
+-----+
| Key Class | Key | Value Class | Value |
+-----+
| java.lang.Long | 7698 | o.a.i.i.binary.BinaryObjectImpl | SQL_PUBLICC_EMP_0bd87eaf_b503_4b06_83b6_25be1cdb893c
[hash=-1417502761, ENAME=BLAKE, JOB=MANAGER, MGR=7839, HIREDATE=1981-05-01, SAL=2850, COMM=null, DEPTNO=30] |
| java.lang.Long | 7782 | o.a.i.i.binary.BinaryObjectImpl | SQL_PUBLICC_EMP_0bd87eaf_b503_4b06_83b6_25be1cdb893c
[hash=1453774085, ENAME=CLARK, JOB=MANAGER, MGR=7839, HIREDATE=1981-06-09, SAL=2450, COMM=null, DEPTNO=10] |
| java.lang.Long | 7839 | o.a.i.i.binary.BinaryObjectImpl | SQL_PUBLICC_EMP_0bd87eaf_b503_4b06_83b6_25be1cdb893c
[hash=1848897643, ENAME=KING, JOB=PRESIDENT, MGR=null, HIREDATE=1981-11-17, SAL=5000, COMM=null, DEPTNO=10] |

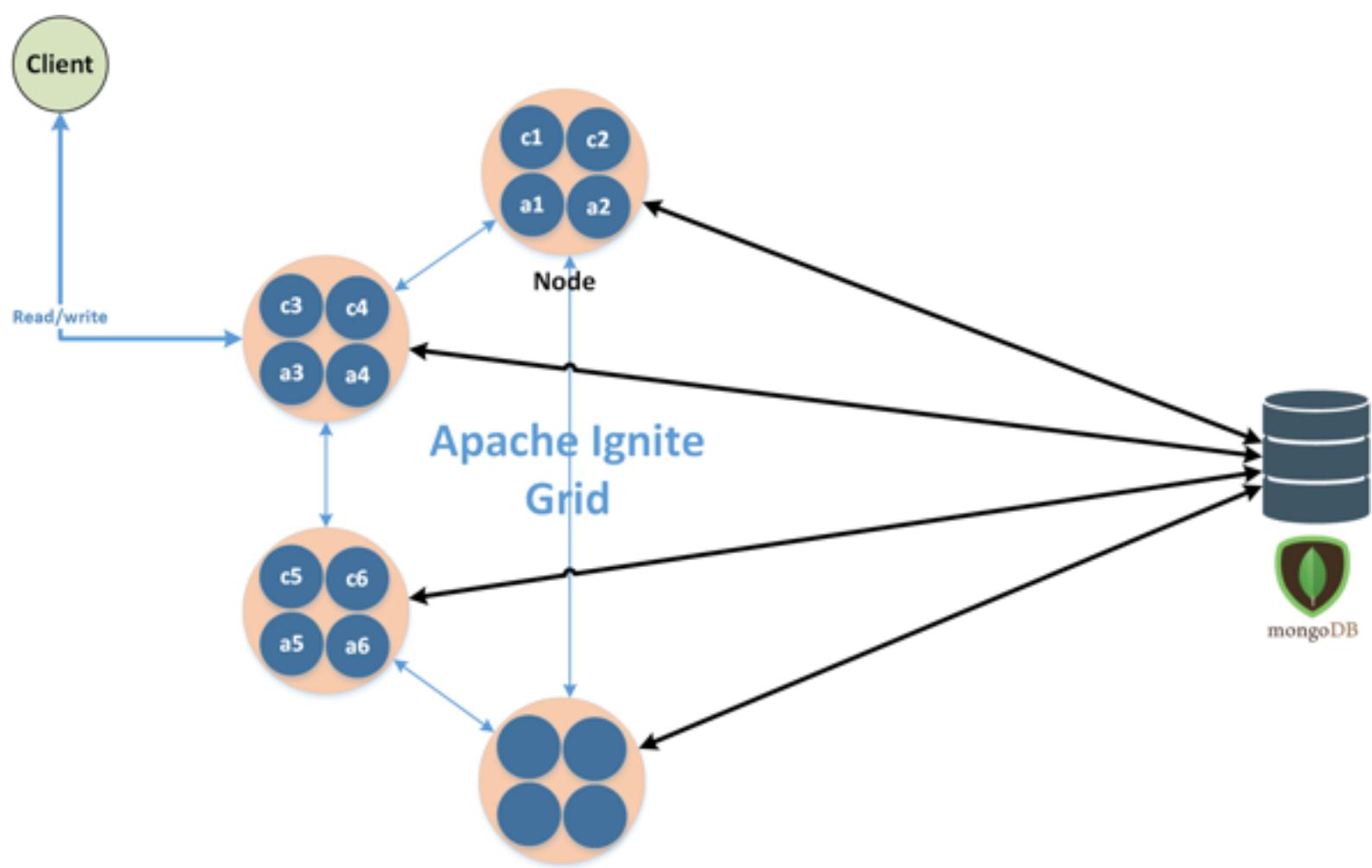
```



Write-through

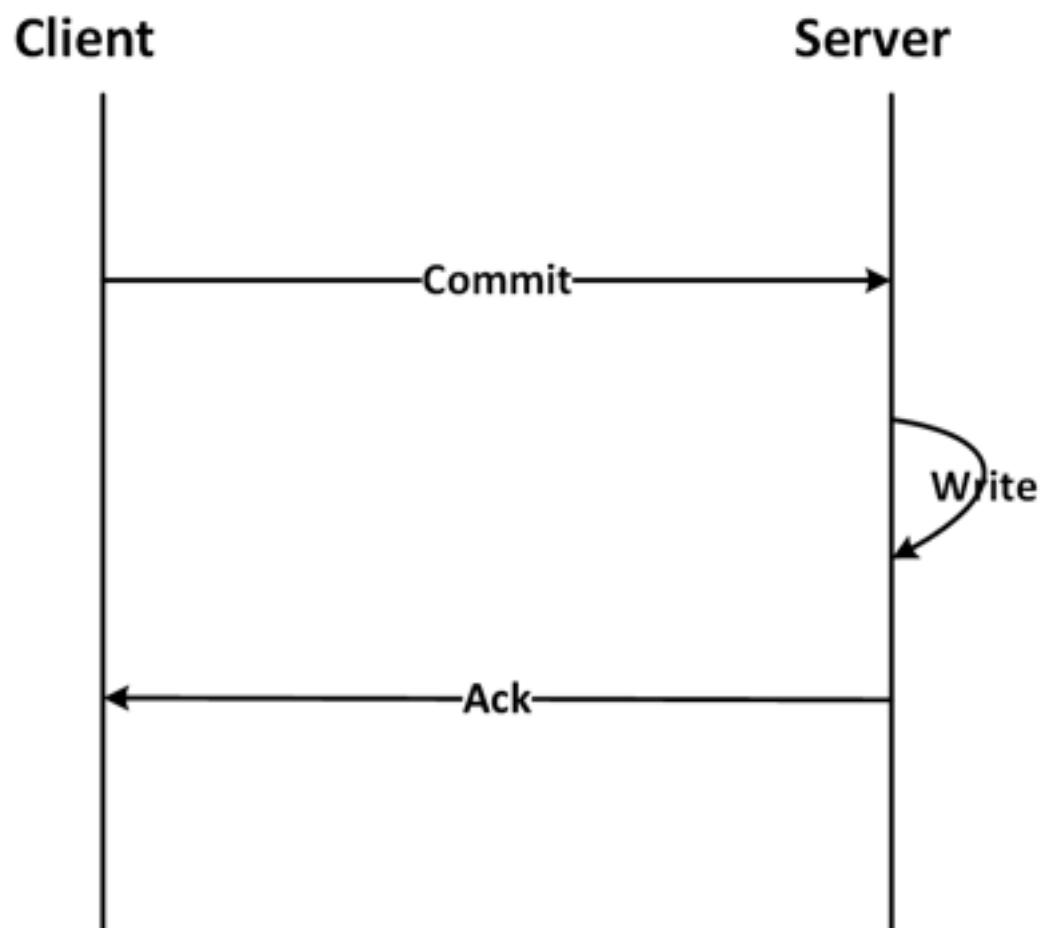


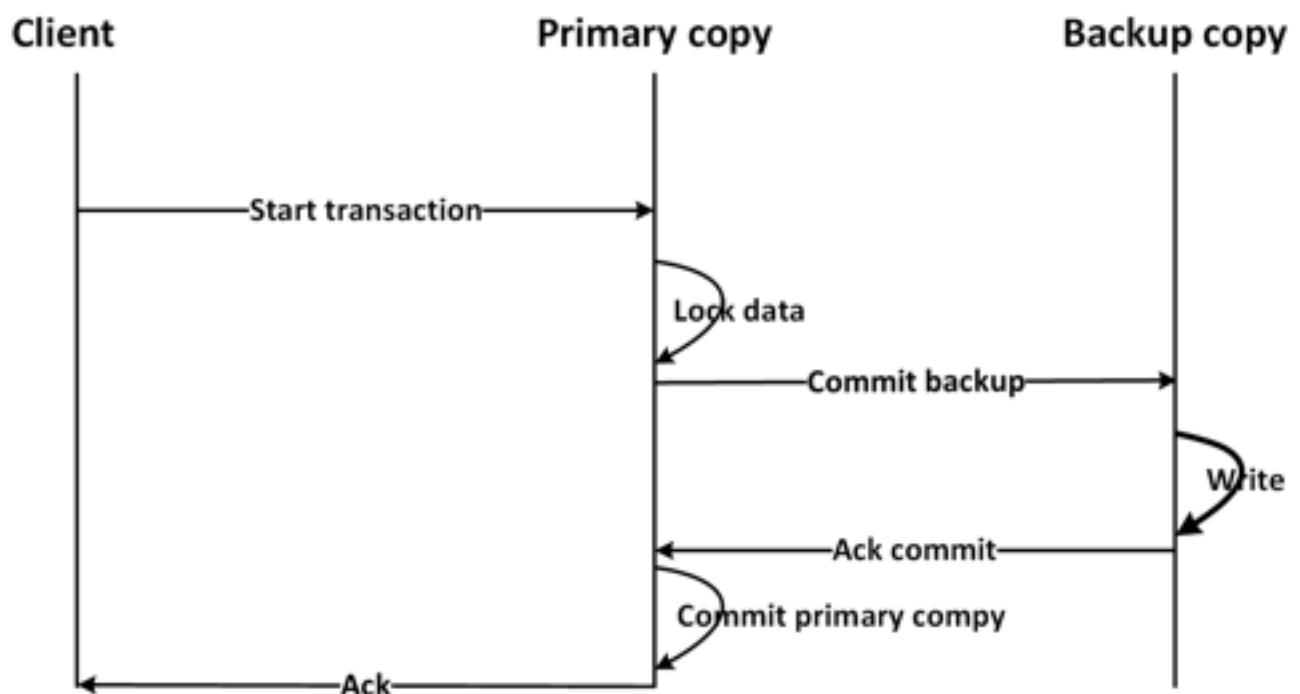
Ignite write-behind



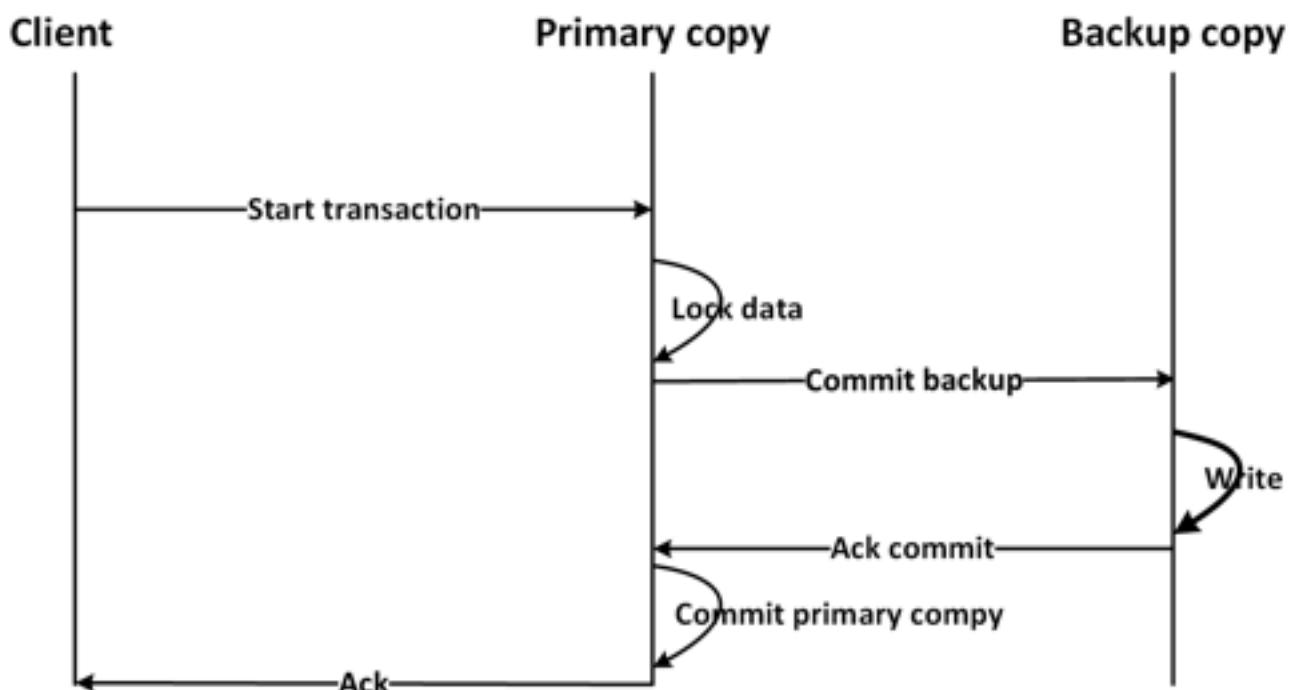
```
2018-12-21T22:18:27.083+0300 I CONTROL [initandlisten] ** WARNING: This server is bound to localhost.  
2018-12-21T22:18:27.083+0300 I CONTROL [initandlisten] ** Remote systems will be unable to connect to  
this server.  
2018-12-21T22:18:27.083+0300 I CONTROL [initandlisten] ** Start the server with --bind_ip <address> t  
o specify which IP  
2018-12-21T22:18:27.083+0300 I CONTROL [initandlisten] ** addresses it should serve responses from, o  
r with --bind_ip_all to  
2018-12-21T22:18:27.083+0300 I CONTROL [initandlisten] ** bind to all interfaces. If this behavior is  
desired, start the  
2018-12-21T22:18:27.083+0300 I CONTROL [initandlisten] ** server with --bind_ip 127.0.0.1 to disable  
this warning.  
2018-12-21T22:18:27.083+0300 I CONTROL [initandlisten]  
2018-12-21T22:18:27.291+0300 I FTDC [initandlisten] Initializing full-time diagnostic data capture with dir  
ecitory '/Users/shamim/Development/bigdata/mongodb-4.0.5/data/db/diagnostic.data'  
2018-12-21T22:18:27.293+0300 I NETWORK [initandlisten] waiting for connections on port 27017
```

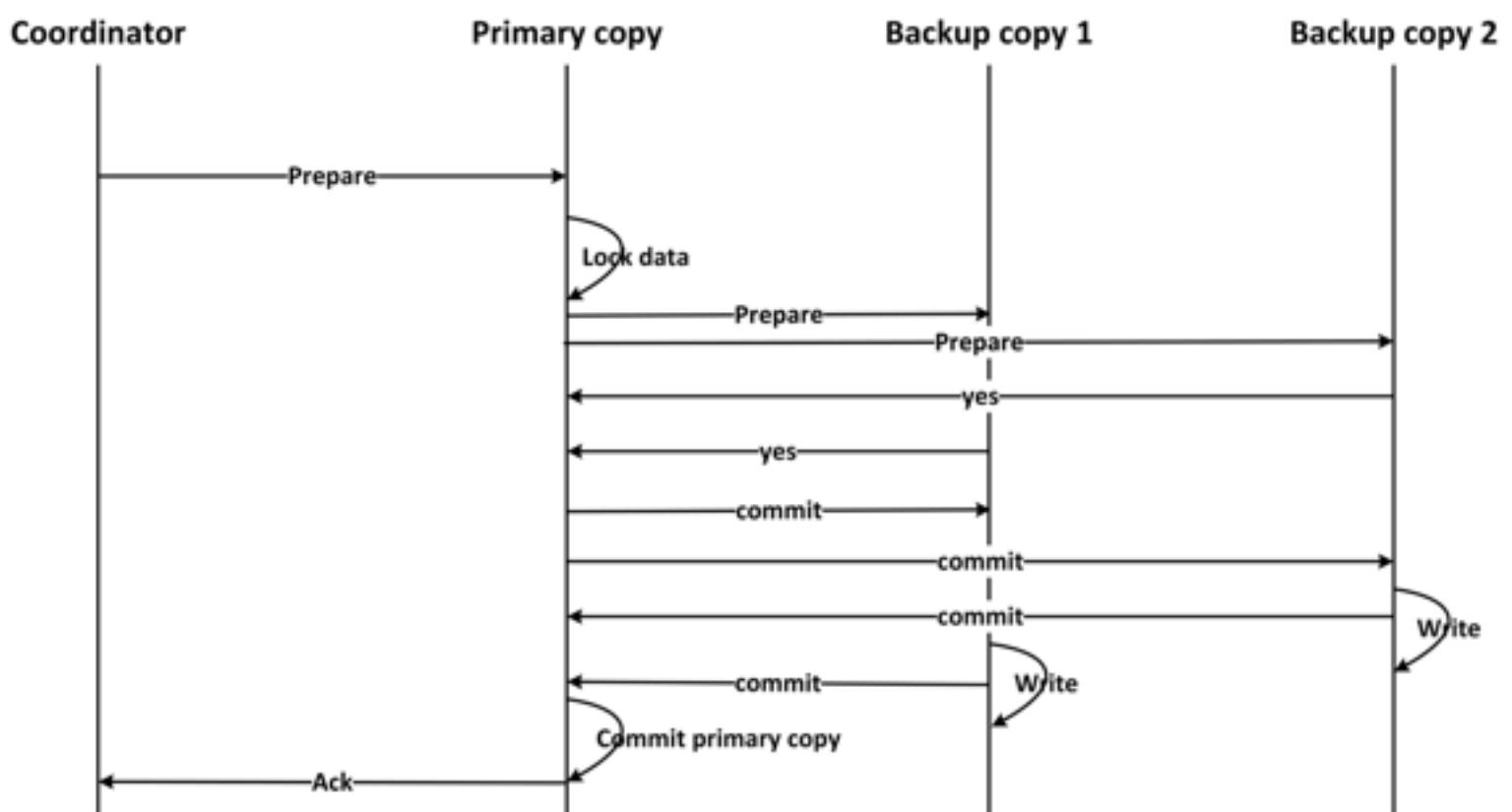
Atmoic mode	Transactional mode
<pre data-bbox="0 640 793 1370"> try (Ignite ignite = Ignition.start(cfg)) {     BankAccount bankAccount = cacheAccount.get(accountNumber);     // Deposit into account.     bankAccount.deposit(amount);     // Store updated account in cache.     <u>cacheAccount.put</u>(accountNumber, bankAccount);     <u>cacheAudit.put</u>(accountNumber, bankAccount); }</pre> <p data-bbox="0 1482 793 1675">In atomic mode, the two above cache operations can partaly fail.</p>	<pre data-bbox="793 640 1582 1370"> try (Transaction tx = Ignition.ignite().transactions().txStart()) {     BankAccount bankAccount = cacheAccount.get(accountNumber);     // Deposit into account.     bankAccount.deposit(amount);     // Store updated account in cache.     <u>cacheAccount.put</u>(accountNumber, bankAccount);     <u>cacheAudit.put</u>(accountNumber, bankAccount);     <u>tx.commit()</u>; }</pre> <p data-bbox="793 1482 1582 1675">In transactional mode, the two above cache operations will either commit or rollback.</p>



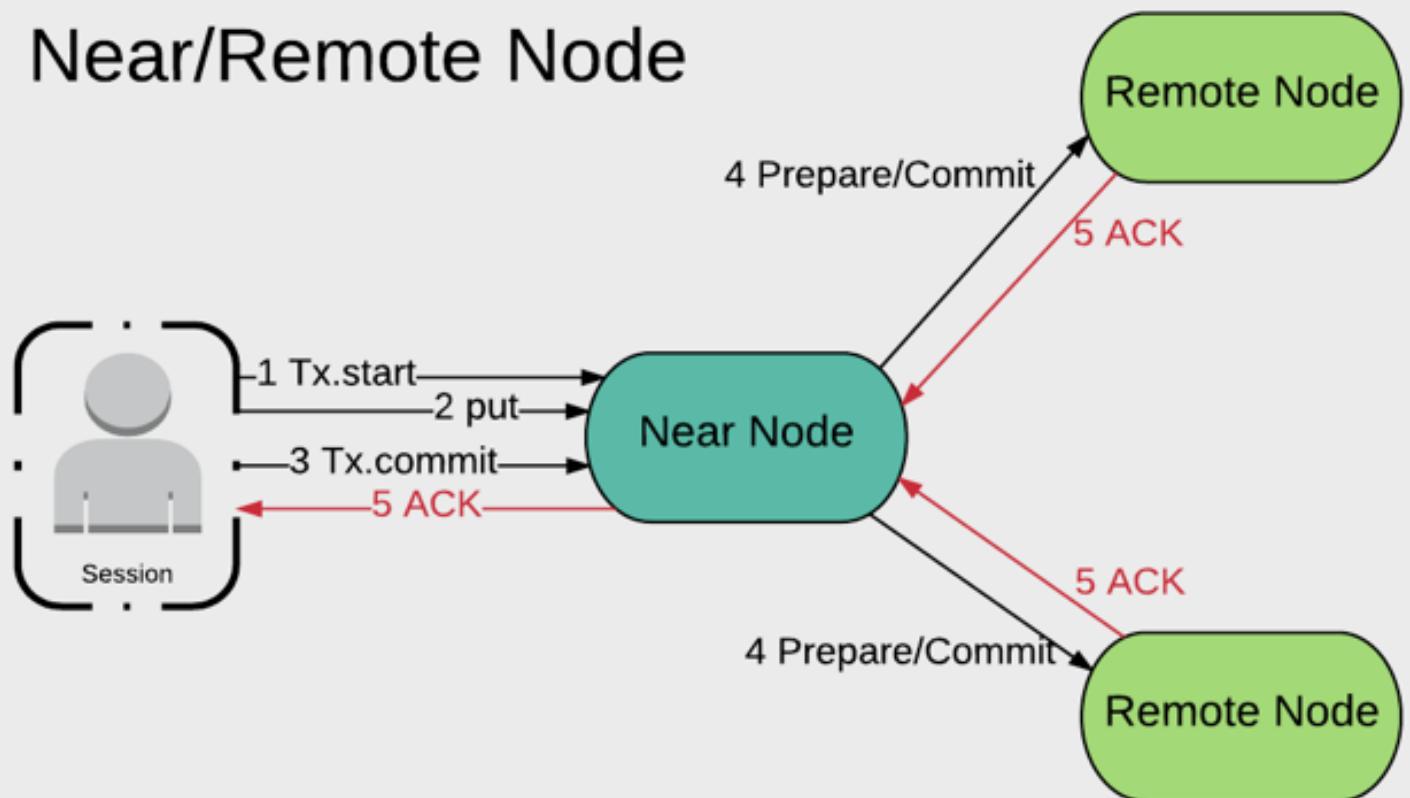


**Client and his transactions records in the same partition (AffinityKey: clientID)**

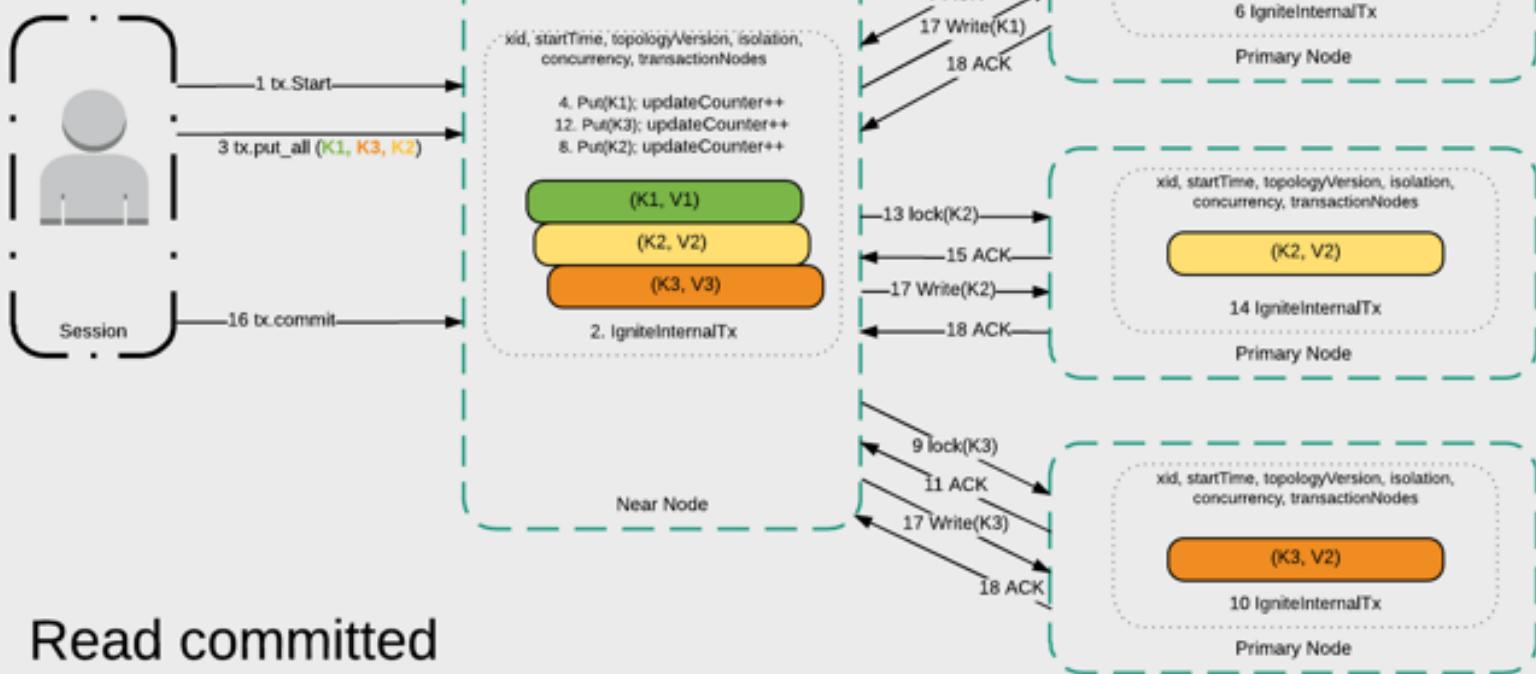




## Near/Remote Node

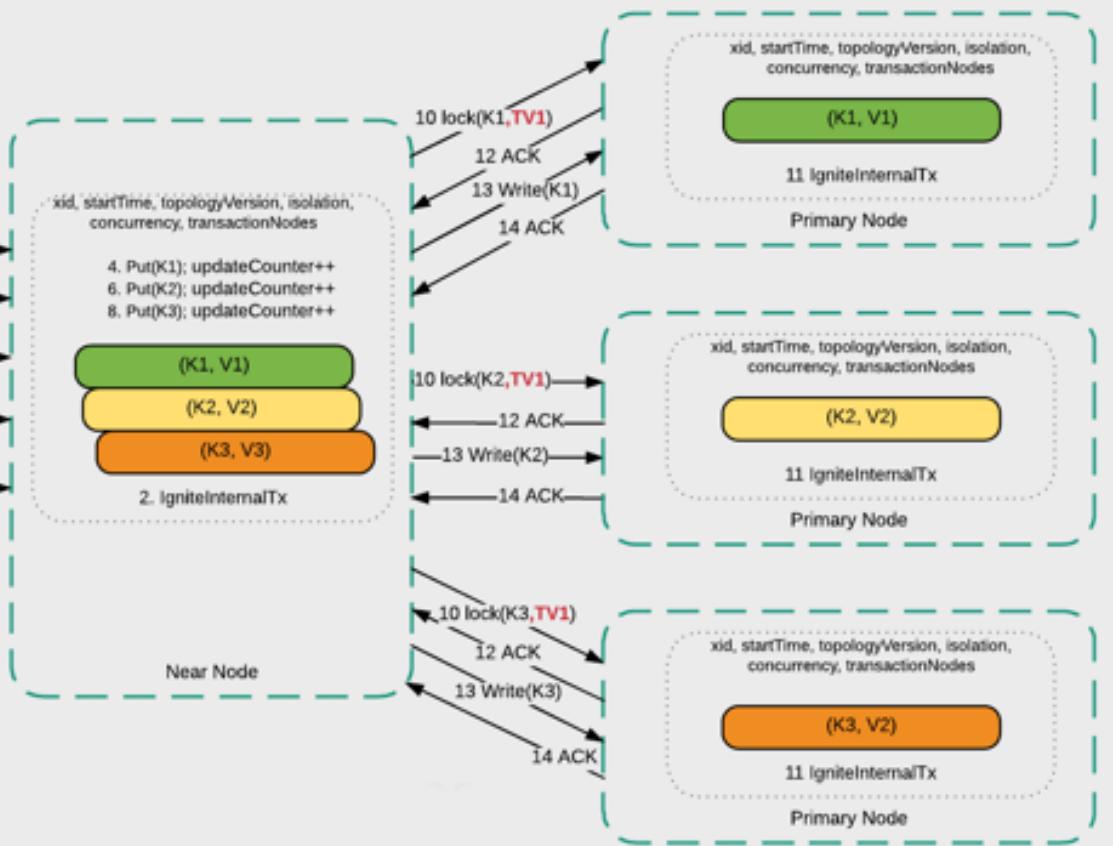
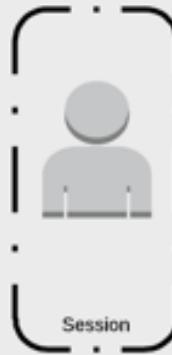


## Pessimistic



## Read committed

## Optimistic

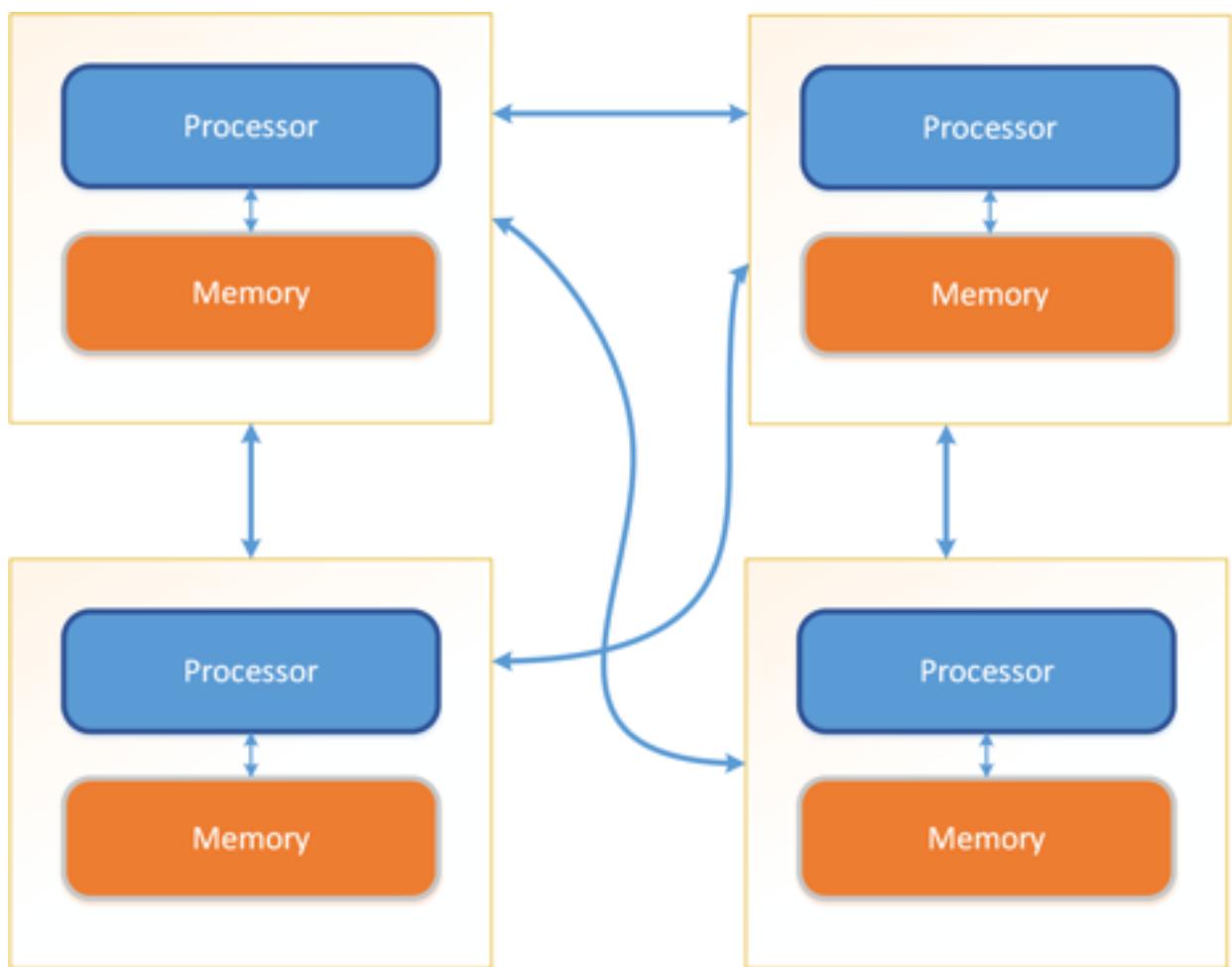


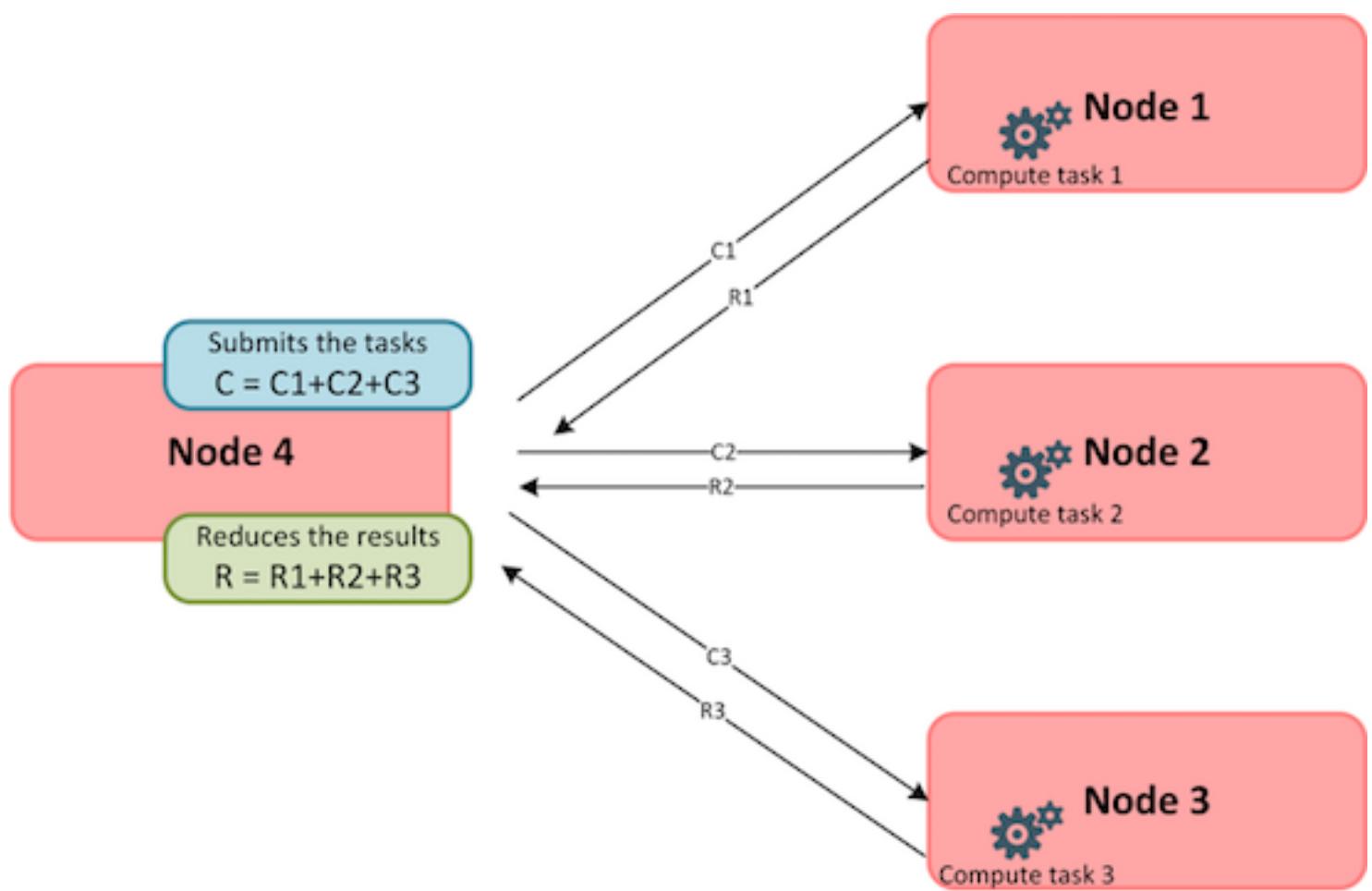
## Serializable

```
select _key, _val, _ver from EMP;
```

```
select _key, _val, _ver from EMP;
```

_KEY	_VAL	_VER
7698	SQL_PUBLIC_EMP_58eaf1b2_32d5_40be_8d4b_528a15bb0290 [idHash=897976764, hash=-1417502761, ENAME=BLAKE, JOB=MANAGER, MGR=7839, HIREDATE=1981-05-01, SAL=2850, COMM=null, DEPTNO=30]	GridCacheVersion [topVer=153321305, order=1541841302625, nodeOrder=1]
7782	SQL_PUBLIC_EMP_58eaf1b2_32d5_40be_8d4b_528a15bb0290 [idHash=989479142, hash=1453774085, ENAME=CLARK, JOB=MANAGER, MGR=7839, HIREDATE=1981-06-09, SAL=2450, COMM=null, DEPTNO=10]	GridCacheVersion [topVer=153321305, order=1541841302627, nodeOrder=1]
7839	SQL_PUBLIC_EMP_58eaf1b2_32d5_40be_8d4b_528a15bb0290 [idHash=1795185661, hash=1848897643, ENAME=KING, JOB=PRESIDENT, MGR=null, HIREDATE=1981-11-17, SAL=5000, COMM=null, DEPTNO=10]	GridCacheVersion [topVer=153321305, order=1541841302623, nodeOrder=1]





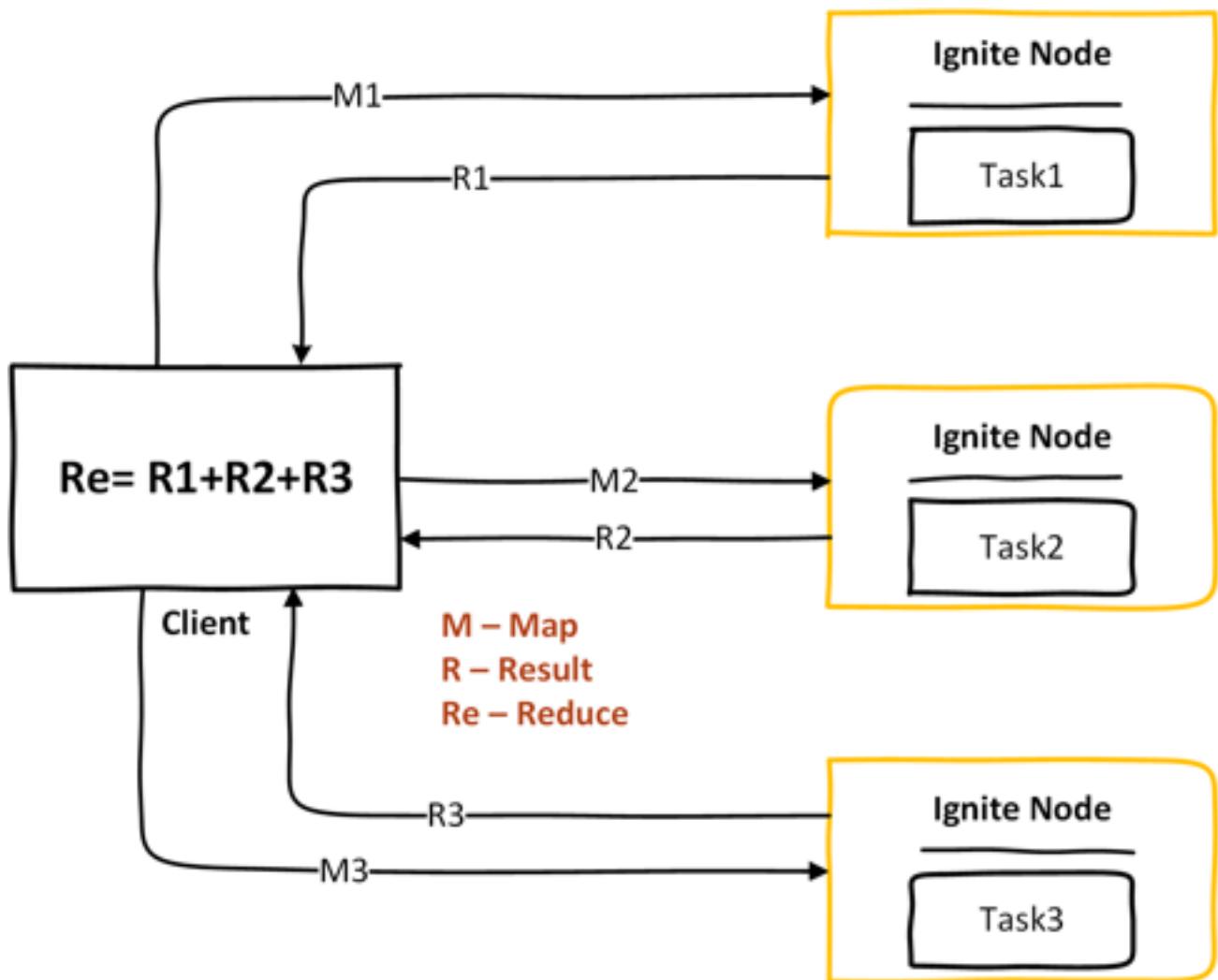
```
[17:58:12] Ignite node started OK (id=f41757cb)
[17:58:12] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=3.6GB]
[17:58:12]   ^-- Node [id=F41757CB-55F2-4B09-AEFA-0FF3AFE1E25E, clusterState=ACTIVE]
[17:58:12] Data Regions Configured:
[17:58:12]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]
Presse ENTER to exit!
```

```
validateXsdResult=true  
validateByJs=true  
[18:19:23] Topology snapshot [ver=5, servers=1, clients=0, CP  
Us=8, offheap=3.2GB, heap=3.6GB]  
[18:19:23]   ^-- Node [id=F41757CB-55F2-4B09-AEF4-0FF3AFE1E25  
E, clusterState=ACTIVE]  
[18:19:23] Data Regions Configured:  
[18:19:23]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB  
, persistenceEnabled=false]  
[18:19:23] Ignite node started OK (id=eff2f49c)  
[18:19:23] Topology snapshot [ver=4, servers=1, clients=1,  
CPUs=8, offheap=3.2GB, heap=7.1GB]  
[18:19:23]   ^-- Node [id=EFF2F49C-1BEB-4B2E-A63A-53368D462  
C1C, clusterState=ACTIVE]  
result=true  
[18:19:23] Ignite node stopped OK [uptime=00:00:00.098]  
[INFO] -----
```

```
[18:33:46] Ignite node started OK (id=cf52c2c)
[18:33:46] Topology snapshot [ver=6, servers=1, clients=1, CPUs=8, offheap=3.2GB, heap=7.1GB]
[18:33:46]    ^-- Node [id=CFD52C2C-BF74-4265-A759-D892A3CFFB36, clusterState=ACTIVE]
Length of the sentence: 27
[18:33:46] Ignite node stopped OK [uptime=00:00:00.066]
```



Apache Ignite in-memory MapReduce



```
3.2 GiB, persistenceEnabled=false]
msg=3
validateXsdResult=true
validateByJs=true
[19:26:59] Topology snapshot [ver=5, servers=3, clients=0, CPUs=8, offheap=9.6GB, heap=11.0GB]
[19:26:59]   ^-- Node [id=EDF05CBE-40F3-465D-8FCE-73ED
P9F12D09, clusterState=ACTIVE]

ze=3.2 GiB, persistenceEnabled=false]
msg=1
validateXsdResult=true
validateByJs=true
[19:26:59] Topology snapshot [ver=5, servers=3, clients=0, CPUs=8, offheap=9.6GB, heap=11.0GB]
[19:26:59]   ^-- Node [id=6BCAC994-6BC4-40B7-8713-F
2C1F24FCBF2, clusterState=ACTIVE]

e=3.2 GiB, persistenceEnabled=false]
msg=2
validateXsdResult=true
validateByJs=true
[19:26:59] Topology snapshot [ver=5, servers=3, clients=0, CPUs=8, offheap=9.6GB, heap=11.0GB]
[19:26:59]   ^-- Node [id=90955832-9FE9-447A-A150-77
9106A2C77C, clusterState=ACTIVE]
```

```
msg=3
```

```
validateXsdResult=false
```

```
validateByJs=true
```

```
[19:37:56] Topology snapshot [ver=7, servers=3, clients=0, CPUs=8, offheap=9.6GB, heap=11.0GB]  
[19:37:56]    ^-- Node [id=EDF05CBE-4DF3-4650-8FCE-73ED  
F9F12D09, clusterState=ACTIVE]
```

```
msg=1
```

```
validateXsdResult=true
```

```
validateByJs=true
```

```
[19:37:56] Topology snapshot [ver=7, servers=3, clients=0, CPUs=8, offheap=9.6GB, heap=11.0GB]  
[19:37:56]    ^-- Node [id=6BCAC994-6BC4-40B7-8713-F  
2C1F24FCBF2, clusterState=ACTIVE]
```

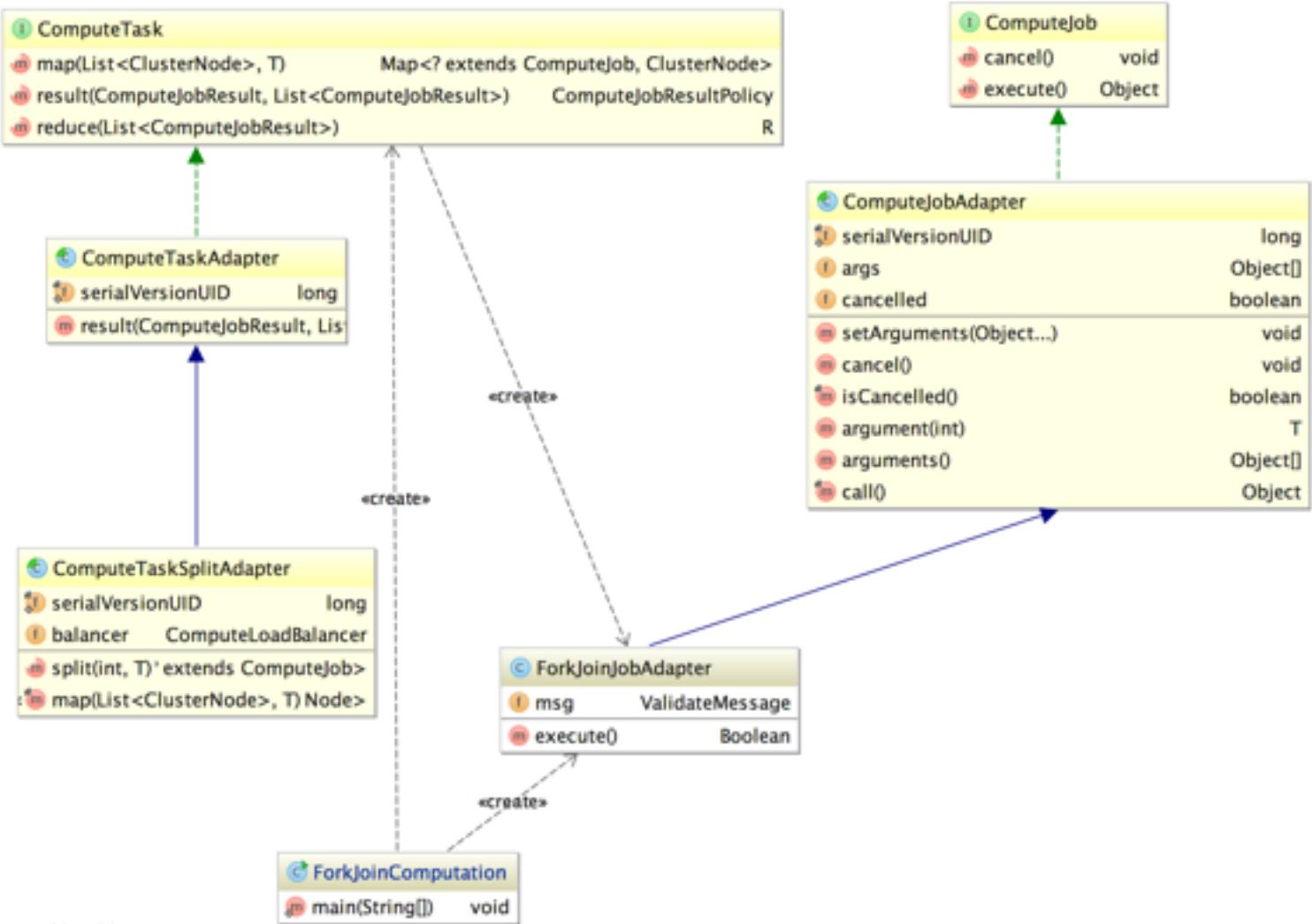
```
msg=2
```

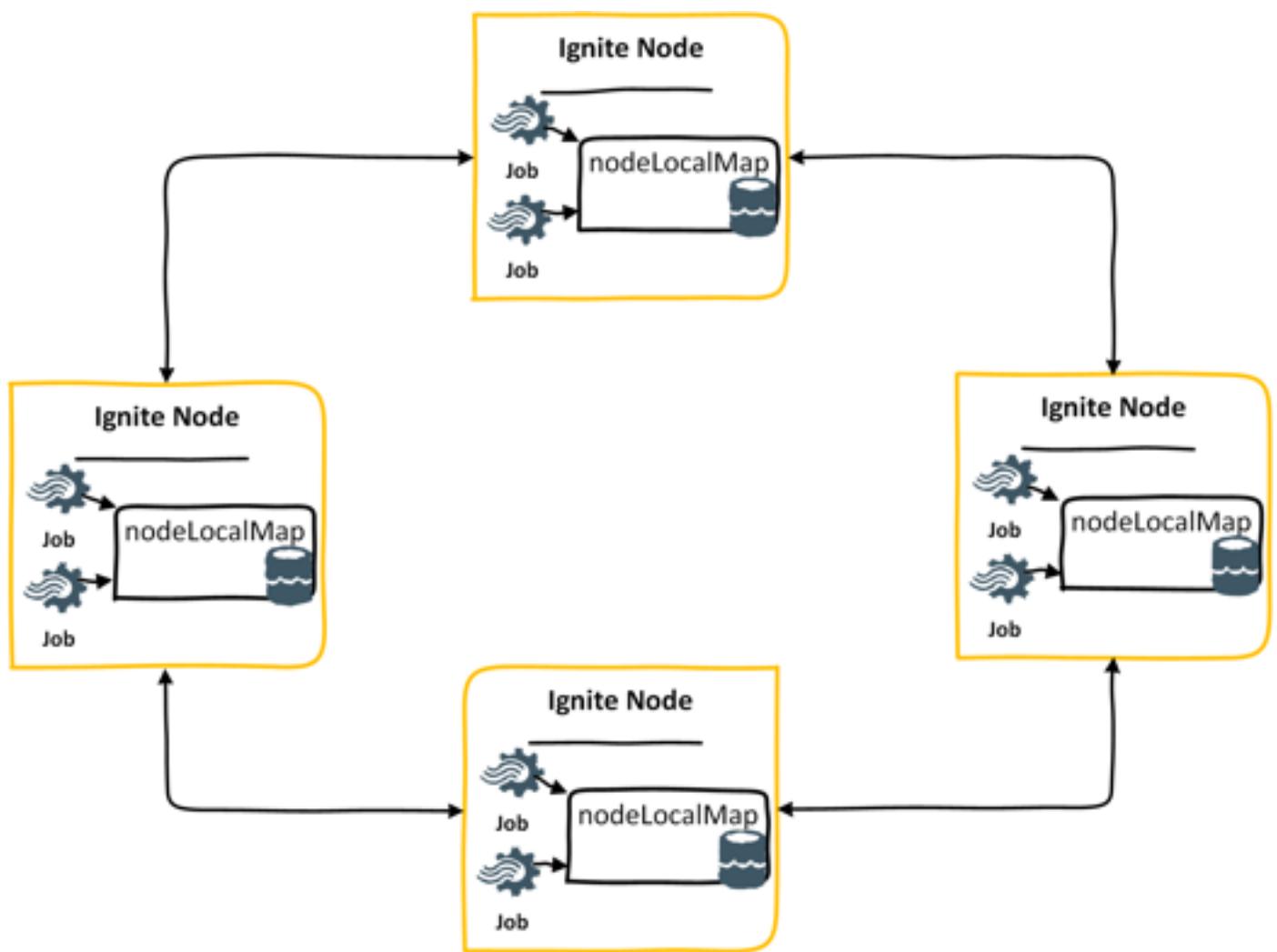
```
validateXsdResult=true
```

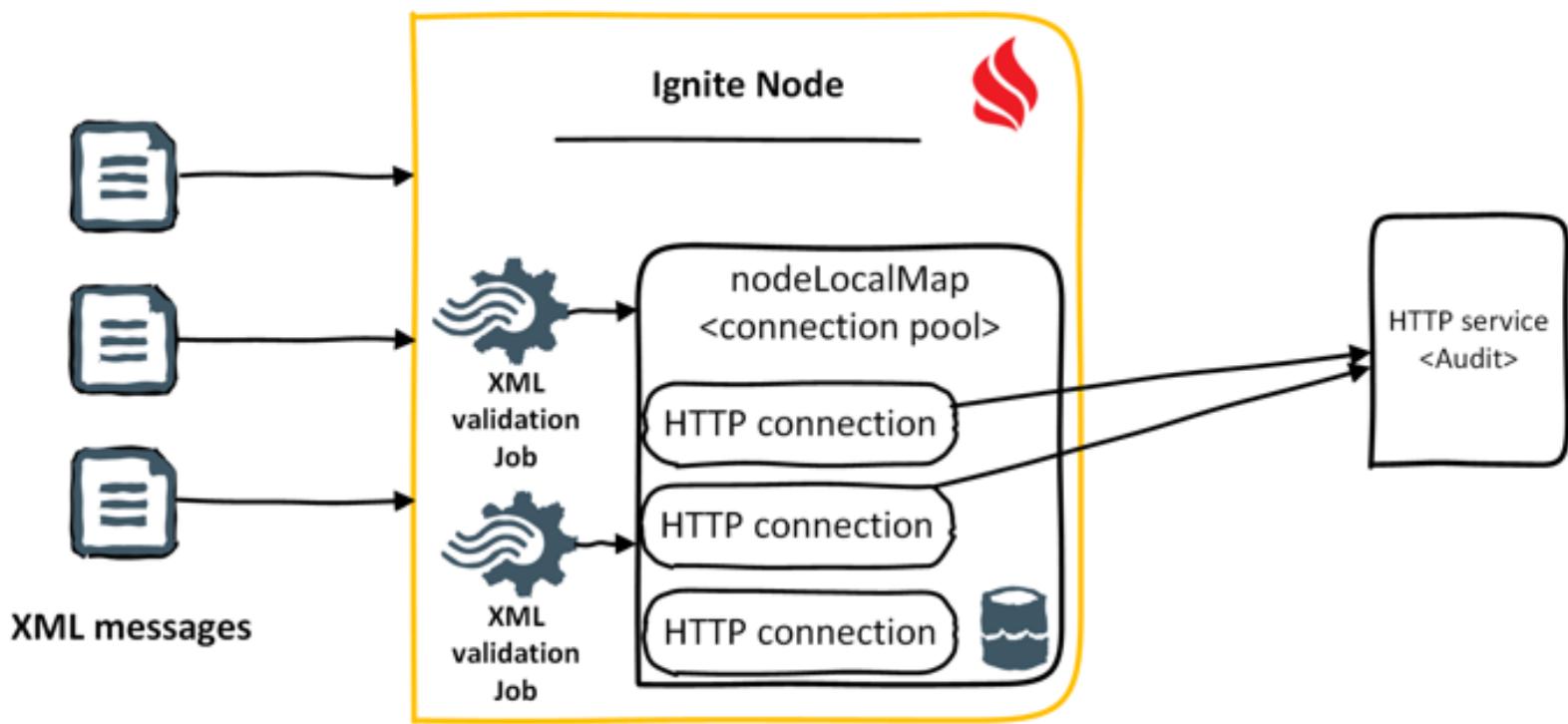
```
validateByJs=true
```

```
[19:37:56] Topology snapshot [ver=7, servers=3, clients=0, CPUs=8, offheap=9.6GB, heap=11.0GB]  
[19:37:56]    ^-- Node [id=9D955832-9FE9-447A-A150-77  
9106A2C77C, clusterState=ACTIVE]
```

```
[19:37:56] Ignite node started OK (id=26d31537)
[19:37:56] Topology snapshot [ver=6, servers=3, clients=1, CPUs=8, offheap=9.6GB, heap=14.0GB]
[19:37:56]    ^-- Node [id=26D31537-294C-4478-B493-A12098AC59CD, clusterState=ACTIVE]
result=false
```



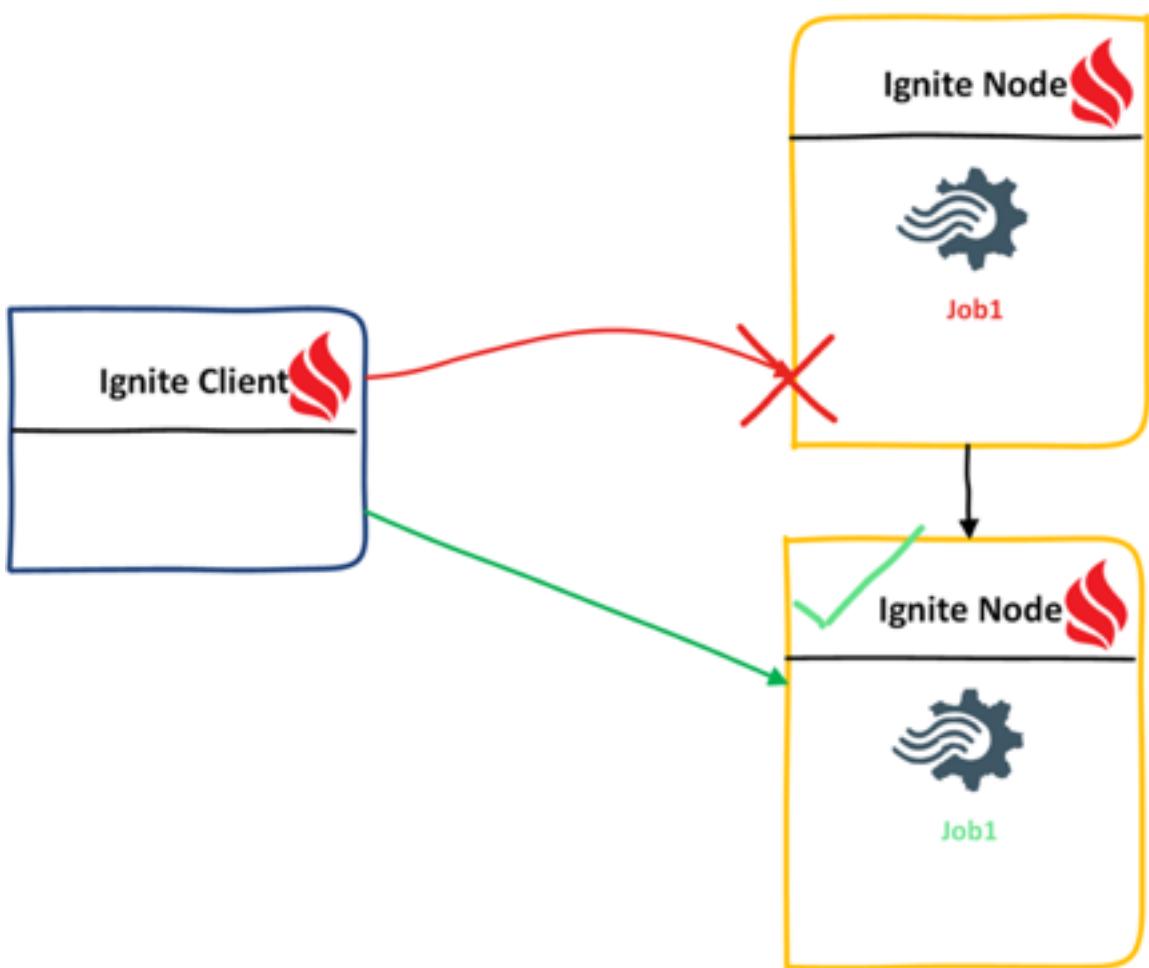


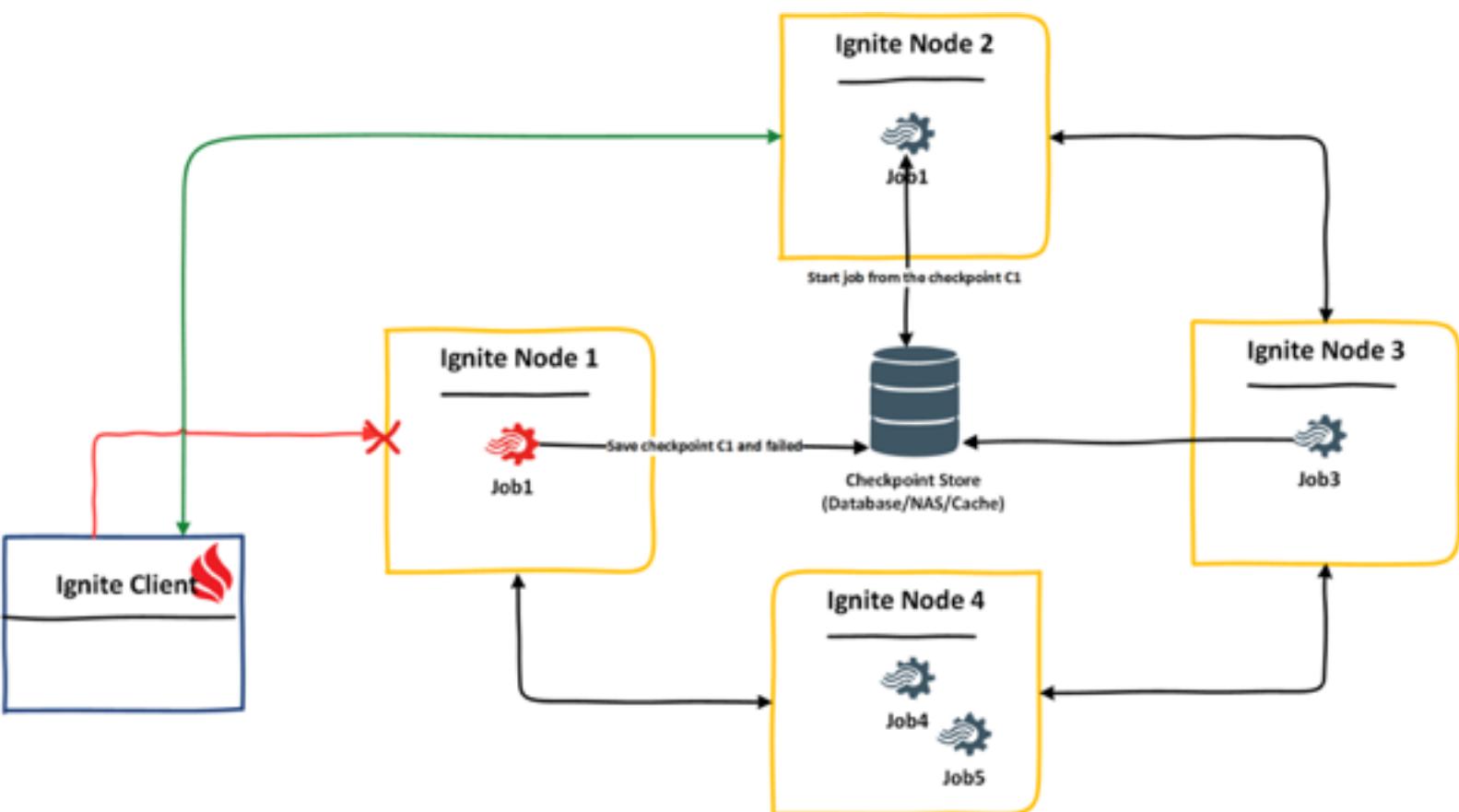


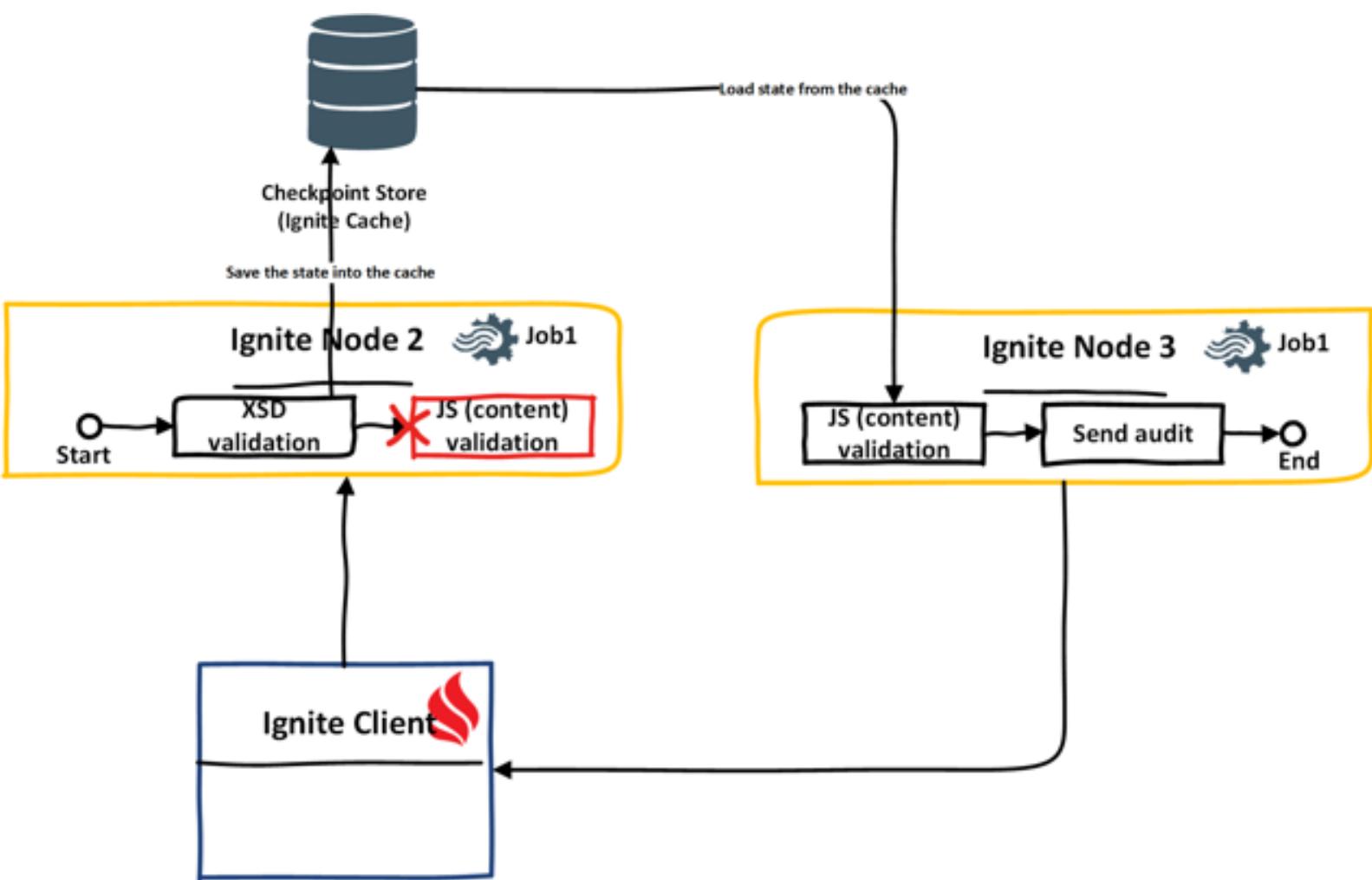
```
[INFO] --- exec-maven-plugin:1.2.1:java (default-cli) @ chapter-7 ---
log message validation result msgId=3 result=true
log message validation result msgId=2 result=true
log message validation result msgId=1 result=true
```

```
[INFO] --- exec-maven-plugin:1.2.1:java (default-cli) @ chapter-7 ---
log message validation result msgId=1 result=true
log message validation result msgId=2 result=true
log message validation result msgId=3 result=false
```

```
Job id:cb2dd94b861-ea3cb254-9f85-4668-8375-c26fee2c7101
force return result false!
one sibling return false!
msg=3 result=false
one sibling return false!
msg=1 result=false
msg=2 result=false
```



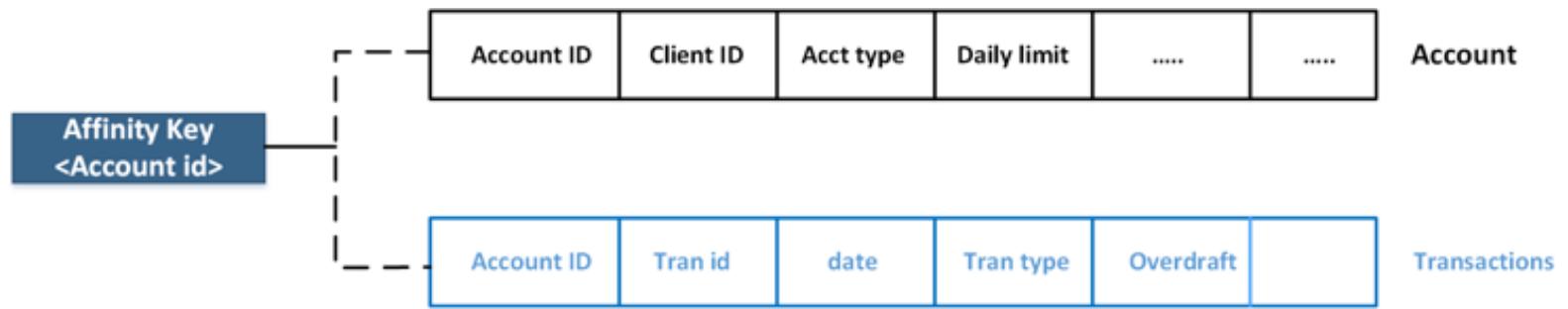


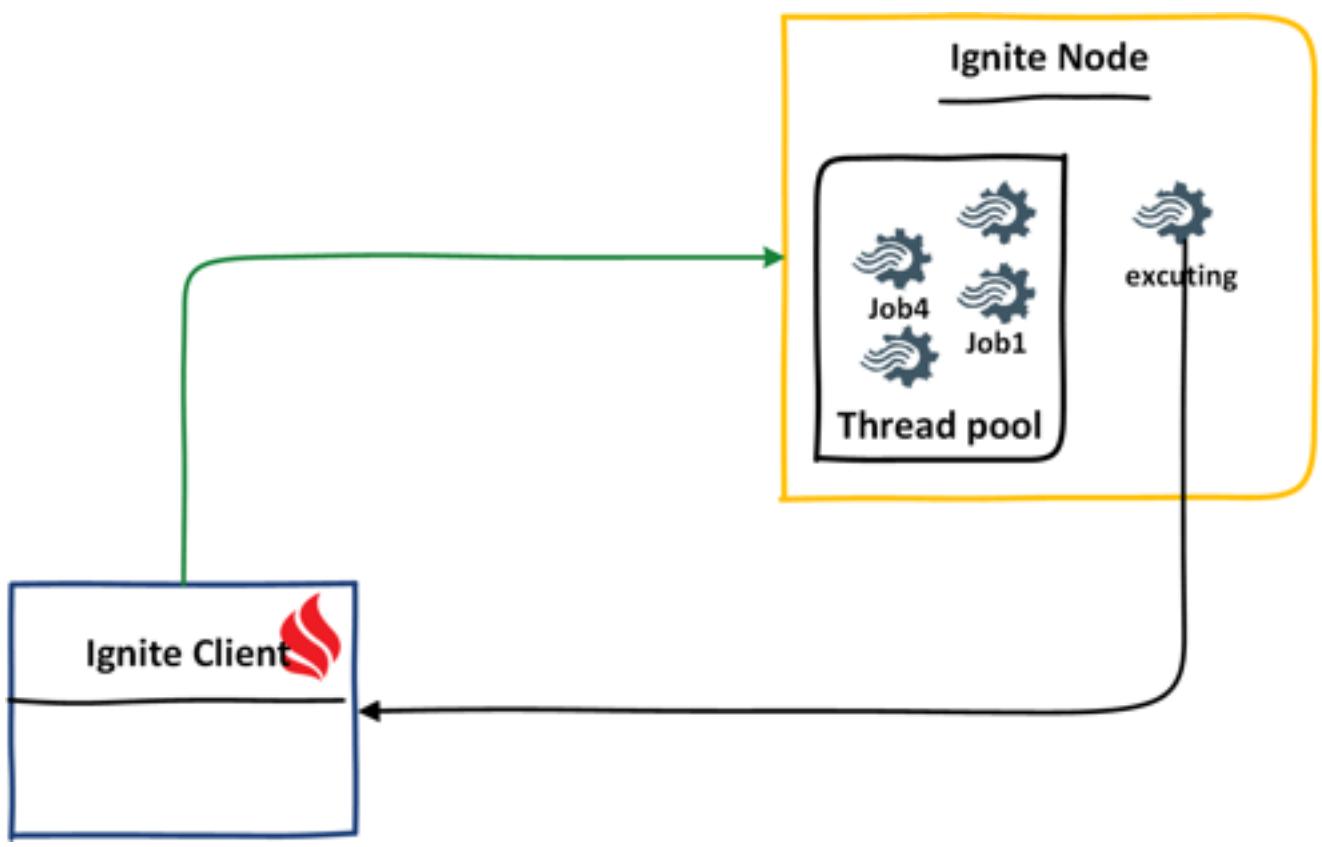


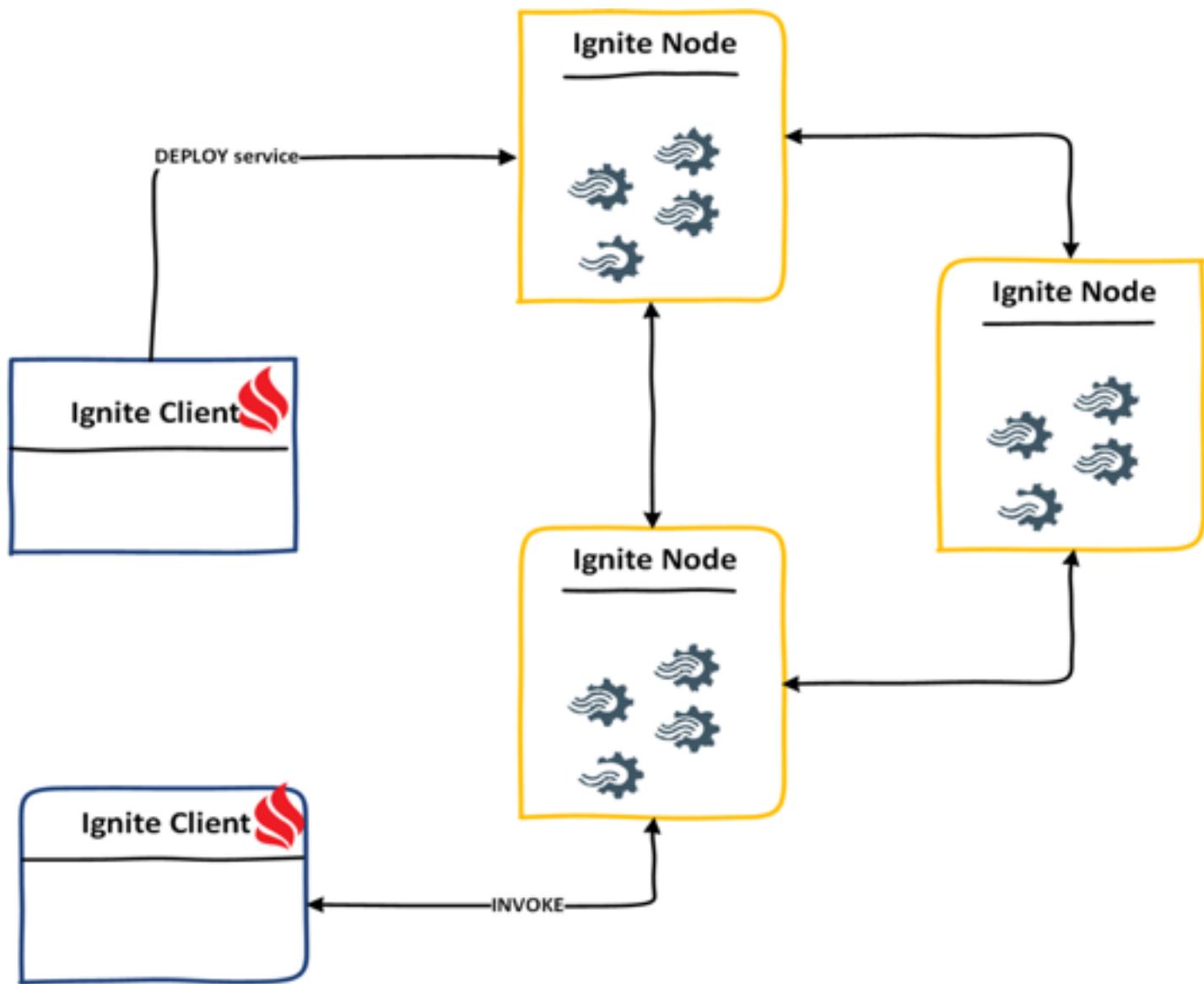
```
validateXsdResult=true msg=1
real execute msg=1
msg=1 result=true
[22:07:54] Topology snapshot [ver=10, servers=4, clients=0, CPUs=8, offheap
=13.0GB, heap=14.0GB]
[22:07:54]   ^-- Node [id=F704F5A8-DE76-408F-B123-677D688DA247, clusterStat
e=ACTIVE]
[22:07:54] Data Regions Configured:
[22:07:54]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceE
nabled=false]
e]
validateXsdResult=null msg=2
real execute msg=2
msg=2 result=true
[22:07:54] Topology snapshot [ver=10, servers=4, clients=0, CPUs=8, offheap=13.0GB, he
ap=14.0GB]
[22:07:54]   ^-- Node [id=6F63DE93-6A24-435D-935A-C4708A451258, clusterState=ACTIVE]
[22:07:54] Data Regions Configured:
[22:07:54]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=fals
e]
e]

orkJoinWithCheckpointJobAdapter.java:56)
... 15 more

[22:07:54] Topology snapshot [ver=10, servers=4, clients=0, CPUs=8, offheap
=13.0GB, heap=14.0GB]
[22:07:54]   ^-- Node [id=81D1E38D-206A-44EF-8130-42B11AD438FF, clusterStat
e=ACTIVE]
[22:07:54] Data Regions Configured:
[22:07:54]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceE
nabled=false]
e]
validateXsdResult=null msg=3
real execute msg=3
msg=3 result=true
[22:07:54] Topology snapshot [ver=10, servers=4, clients=0, CPUs=8, offheap=13.0GB, he
ap=14.0GB]
[22:07:54]   ^-- Node [id=F2B0AF46-0E57-449F-88FC-727AD33DC258, clusterState=ACTIVE]
[22:07:54] Data Regions Configured:
[22:07:54]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=fals
e]
```







```
[23:40:17]  ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnable  
d=false]  
init service  
[23:40:18] Topology snapshot [ver=4, servers=2, clients=0, CPUs=8, offheap=6.4GB  
, heap=7.1GB]  
[23:40:18]  ^-- Node [id=FC70800B-8F22-4F8C-BA61-45B4A38DDCD3, clusterState=ACT  
IVE]  
[23:40:18] Data Regions Configured:
```

```
[23:40:17]  ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnable  
d=false]  
init service  
[23:40:18] Topology snapshot [ver=4, servers=2, clients=0, CPUs=8, offheap=6.4GB  
, heap=7.1GB]  
[23:40:18]  ^-- Node [id=15087A7A-4557-4C33-967C-7F96261CB1AD, clusterState=ACT  
IVE]  
[23:40:18] Data Regions Configured:
```

```
[11:09:13] Topology snapshot [ver=6, servers=2, clients=0, CPUs=8, heap=4.0GB]
[11:16:35] Topology snapshot [ver=7, servers=2, clients=1, CPUs=8, heap=7.66GB]
[11:16:36] Topology snapshot [ver=8, servers=2, clients=0, CPUs=8, heap=4.0GB]
[11:16:36] Topology snapshot [ver=8, servers=2, clients=0, CPUs=8, heap=4.0GB]
msg=1 result=true
msg=2 result=true
[11:16:36] Topology snapshot [ver=8, servers=2, clients=0, CPUs=8, heap=4.0GB]
```

```
[11:29:50] Topology snapshot [ver=11, servers=2, clients=1, CPUs=8, heap=7.6GB]
[11:29:50] Topology snapshot [ver=12, servers=2, clients=0, CPUs=8, heap=4.0GB]
```

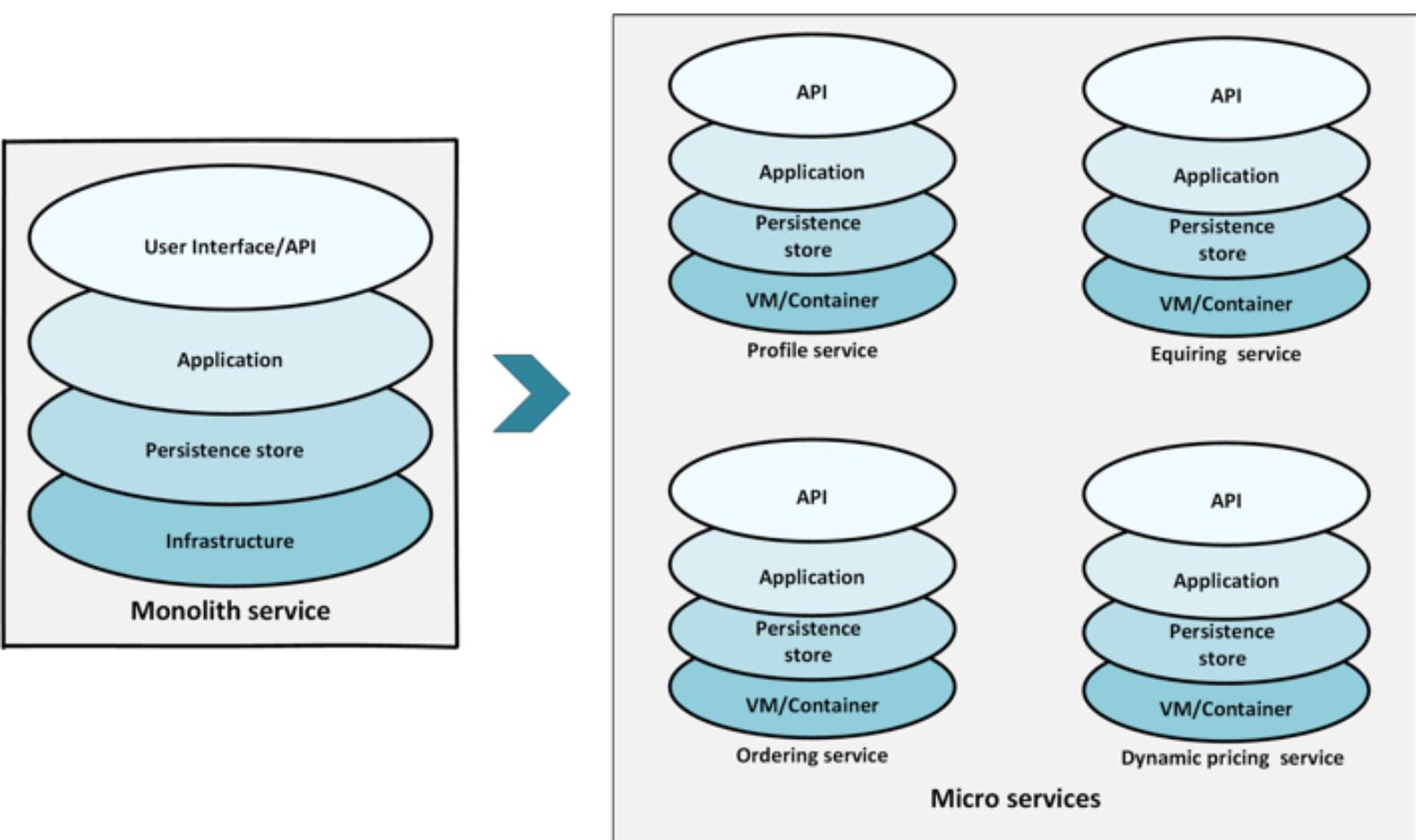
```
init service
[11:29:50] Topology snapshot [ver=12, servers=2, clients=0, CPUs=8, heap=4.0GB]
```

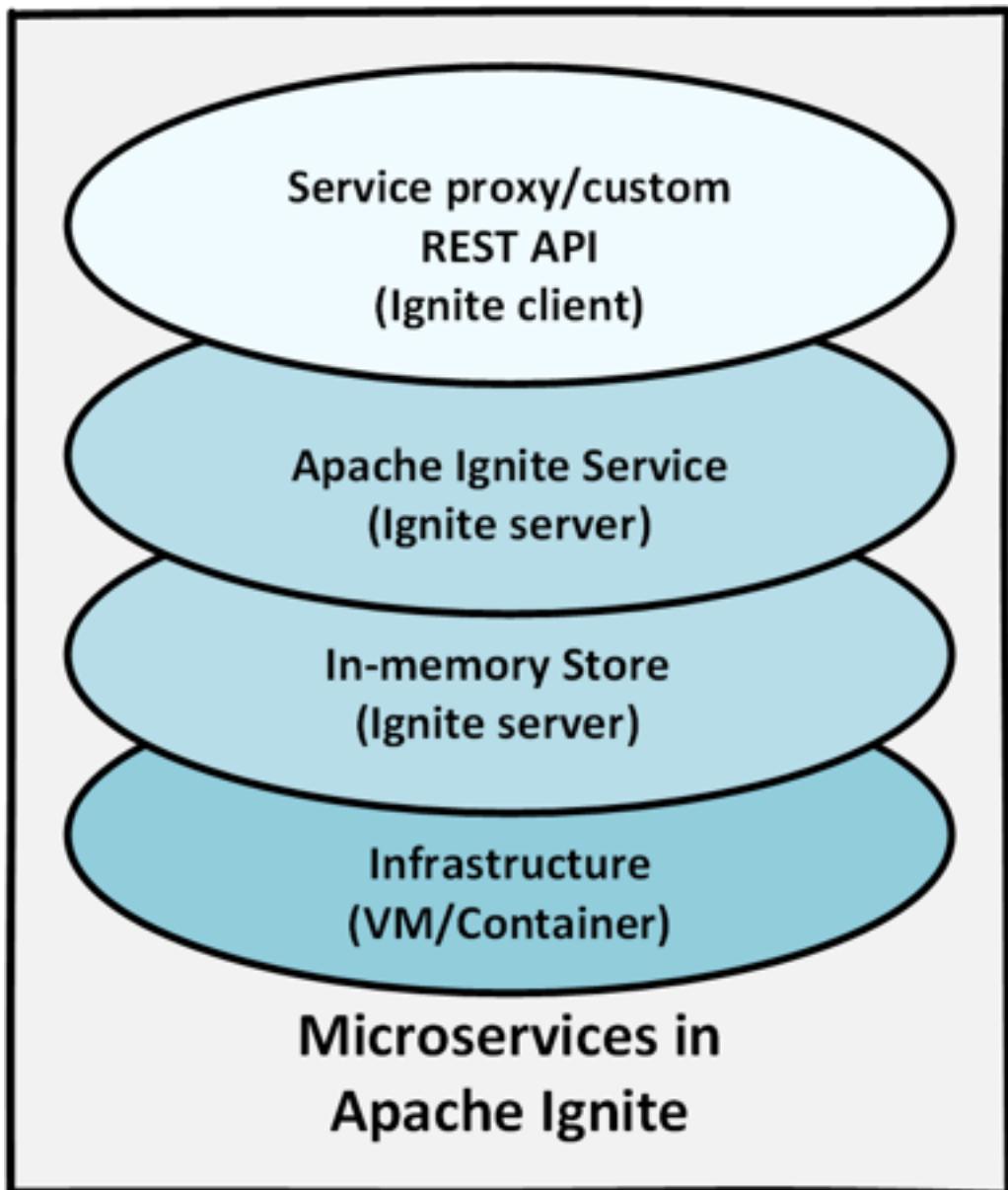
```
[11:29:50] Topology snapshot [ver=12, servers=2, clients=0, CPUs=8, heap=4.0GB]
[11:33:36] Topology snapshot [ver=13, servers=1, clients=0, CPUs=8, heap=2.0GB]
init service
```

```
^Ccancel service
cancel service
[11:33:36] Ignite node stopped OK [uptime=00:27:30:058]
shamim:chapter-dist-computing shamim$ []
```

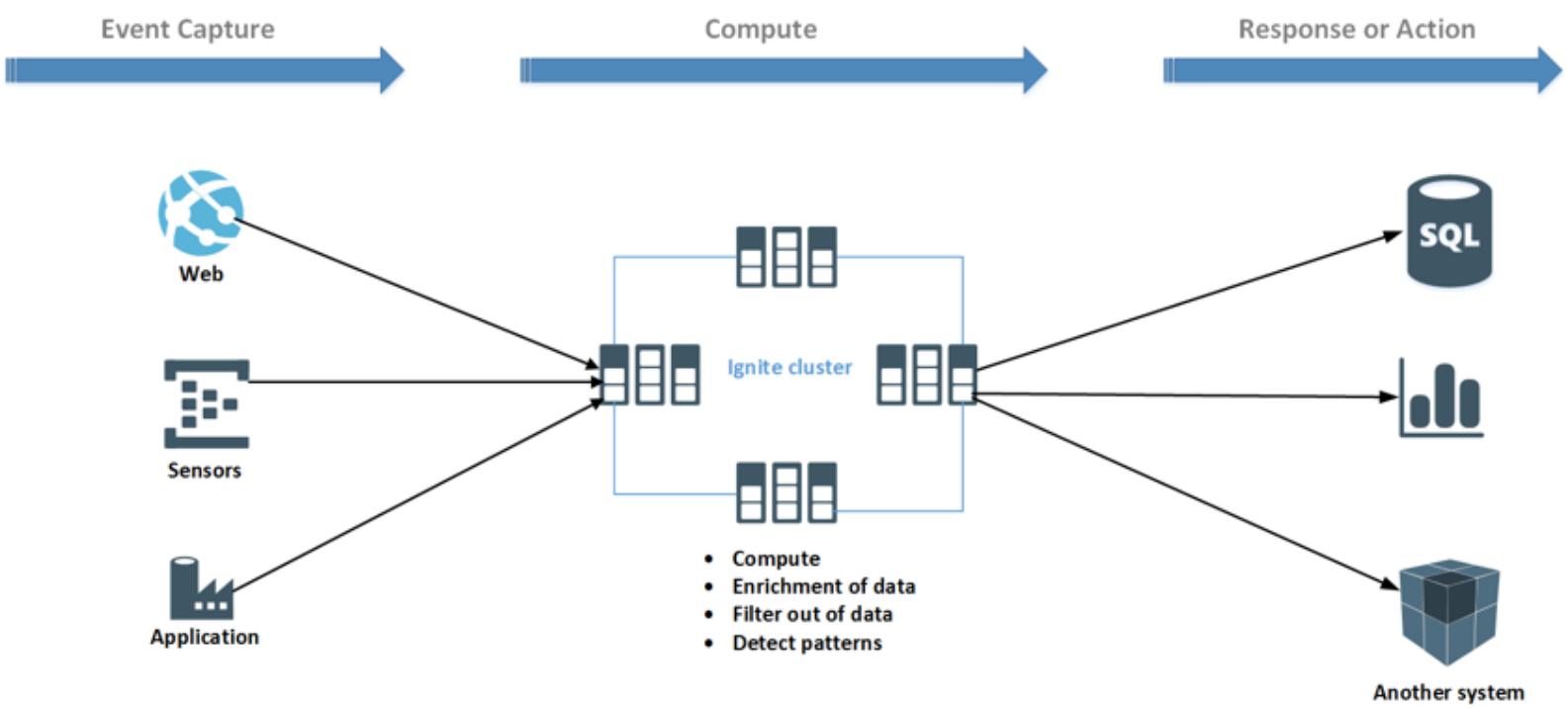
init service

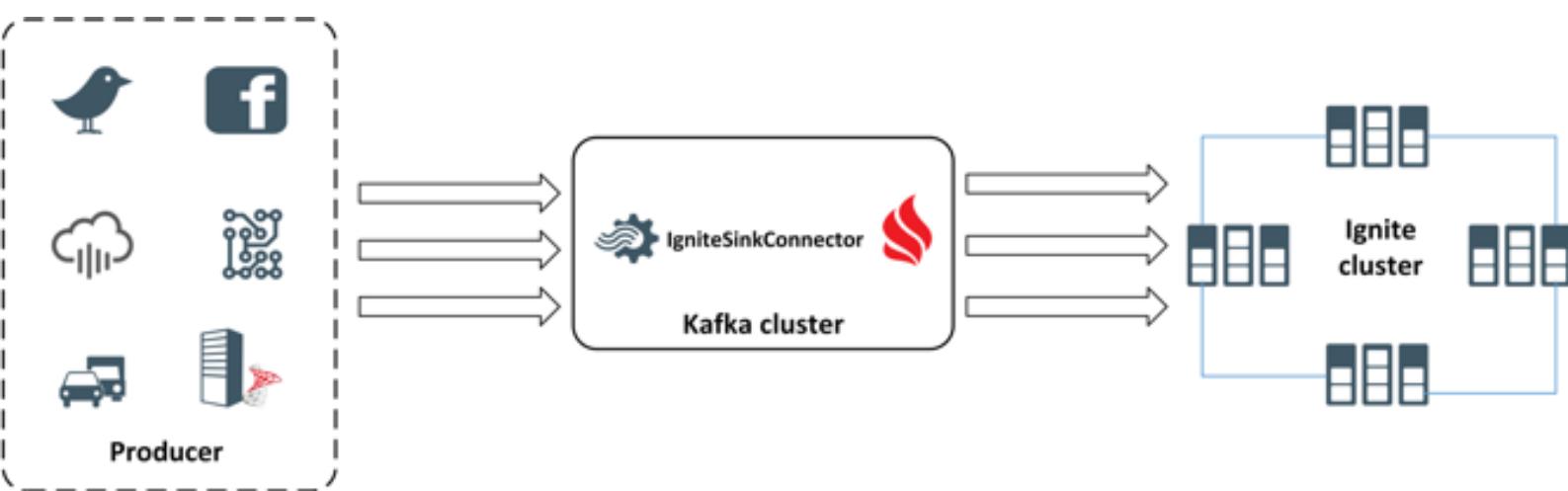
[00:04:47] Performance suggestions for grid (fix if possible)  
[00:04:47] To disable, set -DIGNITE\_PERFORMANCE\_SUGGESTIONS\_DISABLED=true

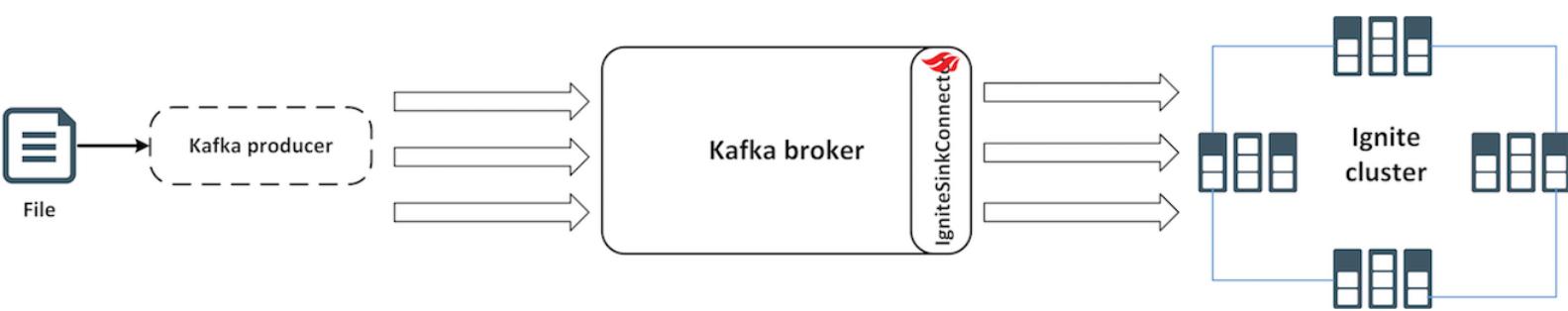




```
[20:42:31] Topology snapshot [ver=4, servers=1, clients=1, CPUs=8, heap=4.0GB]
result=true
result1=true
result2=false
```





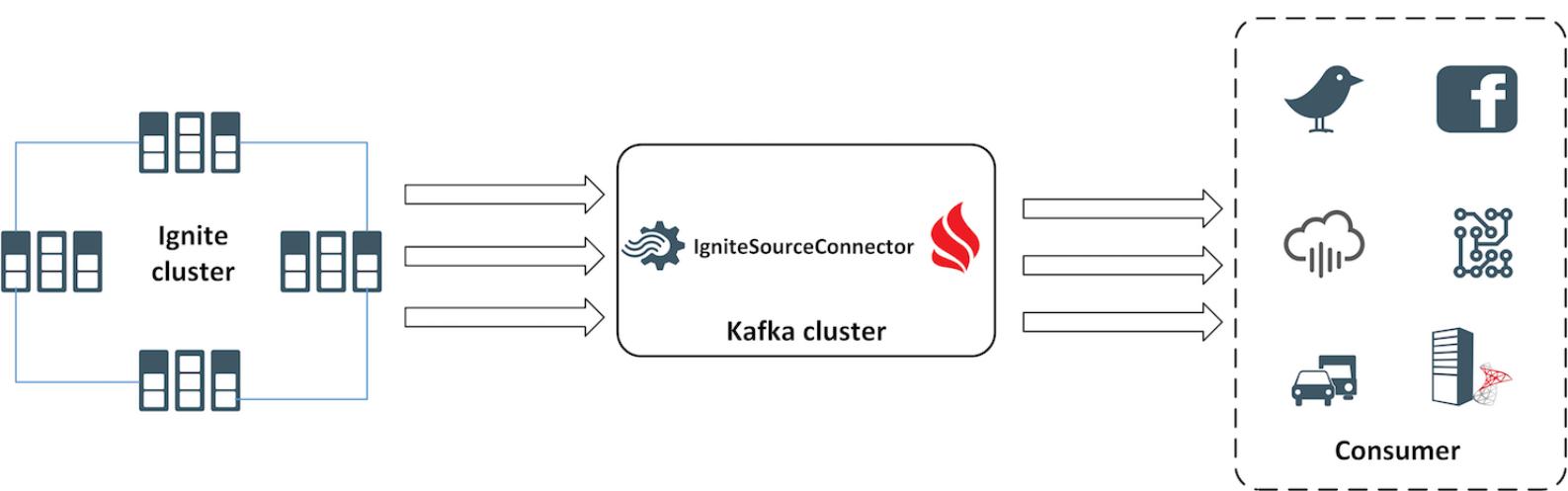


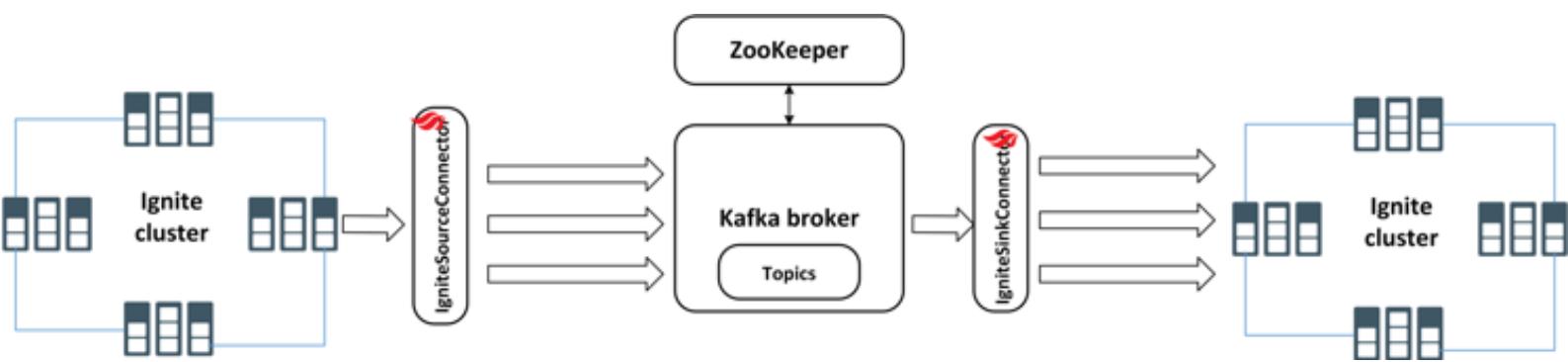
Entries in cache: myCache

Key Class	Key	Value Class	Value
java.lang.String	k1	java.lang.String	v1
java.lang.String	k2	java.lang.String	v2
java.lang.String	k4	java.lang.String	v4

```
Entries in cache: myCache
```

Key Class	Key	Value Class	Value
java.lang.String	Eric kleppmen	java.lang.String	a journey to a NOSql database.
java.lang.String	k1	java.lang.String	v1
java.lang.String	k2	java.lang.String	v2
java.lang.String	k4	java.lang.String	v4
java.lang.String	Shamim	java.lang.String	Apache Ignite deep dive: SQL engine.
java.lang.String	Denim martin	java.lang.String	ZooKeeper internal engines.





```

java
[12:56:19] Configured failure handler: [hnd=StopNodeOrHaltFailureHandler [tryStop=false, timeout=0]]
[12:56:19] Message queue limit is set to 0 which may lead to potential OOMEs when running cache operations in FULL_ASYNC or PRIMARY_SYNC modes due to message queues growth on sender and receiver sides.
[12:56:19] Security status [authentication=off, tls/ssl=off]
[12:56:20] Performance suggestions for grid (fix if possible)
[12:56:20] To disable, set -IGNITE_PERFORMANCE_SUGGESTIONS_DISABLED=true
[12:56:20]   ^-- Disable grid events (remove 'includeEventTypes' from configuration)
[12:56:20]   ^-- Enable G1 Garbage Collector (add '-XX:+UseG1GC' to JVM options)
[12:56:20]   ^-- Set max direct memory size if getting 'OOME: Direct buffer memory' (add '-XX:MaxDirectMemorySize=<size>[g1GimIMIkIK]' to JVM options)
[12:56:20]   ^-- Disable processing of calls to System.gc() (add '-XX:+DisableExplicitGC' to JVM options)
[12:56:20]   ^-- Decrease number of backups (set 'backups' to 0)
[12:56:20] Refer to this page for more performance suggestions: https://apacheignite.readme.io/docs/jvm-and-system-tuning
[12:56:20]
[12:56:20] To start Console Management & Monitoring run ignitevisorcmd.{sh|bat}
[12:56:20]
[12:56:20] Ignite node started OK (id=1d29d8b5)
[12:56:20] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=1.0GB]
[12:56:20]   ^-- Node [id=10290085-6AD6-43D3-9816-F3118657C83F, clusterState=ACTIVE]
[12:56:20] Data Regions Configured:
[12:56:20]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]
[12:56:31]
[12:56:31] Configured failure handler: [hnd=StopNodeOrHaltFailureHandler [tryStop=false, timeout=0]]
[12:56:32] Message queue limit is set to 0 which may lead to potential OOMEs when running cache operations in FULL_ASYNC or PRIMARY_SYNC modes due to message queues growth on sender and receiver sides.
[12:56:32] Security status [authentication=off, tls/ssl=off]
[12:56:32] Performance suggestions for grid (fix if possible)
[12:56:32] To disable, set -IGNITE_PERFORMANCE_SUGGESTIONS_DISABLED=true
[12:56:32]   ^-- Enable G1 Garbage Collector (add '-XX:+UseG1GC' to JVM options)
[12:56:32]   ^-- Set max direct memory size if getting 'OOME: Direct buffer memory' (add '-XX:MaxDirectMemorySize=<size>[g1GimIMIkIK]' to JVM options)
[12:56:32]   ^-- Disable processing of calls to System.gc() (add '-XX:+DisableExplicitGC' to JVM options)
[12:56:32]   ^-- Decrease number of backups (set 'backups' to 0)
[12:56:32] Refer to this page for more performance suggestions: https://apacheignite.readme.io/docs/jvm-and-system-tuning
[12:56:32]
[12:56:32] To start Console Management & Monitoring run ignitevisorcmd.{sh|bat}
[12:56:32]
[12:56:32] Ignite node started OK (id=e85fa805)
[12:56:32] Topology snapshot [ver=1, servers=1, clients=0, CPUs=8, offheap=3.2GB, heap=1.0GB]
[12:56:32]   ^-- Node [id=E85FA805-F630-41AA-9072-09973EE32886, clusterState=ACTIVE]
[12:56:32] Data Regions Configured:
[12:56:32]   ^-- default [initSize=256.0 MiB, maxSize=3.2 GiB, persistenceEnabled=false]

```

```
java 361 bash 362 java 363 java 364 java 365 1.java
0 outstanding messages for offset commit (org.apache.kafka.connect.runtime.Workers$sourceTask:414)
[2018-10-06 15:20:38,896] INFO WorkerSourceTask{id=my-ignite-source-connector-1} Committing offsets (org.apache.kafka.connect.runtime.WorkerSourceTask:397)
[2018-10-06 15:20:38,896] INFO WorkerSourceTask{id=my-ignite-source-connector-1} flushing 0 outstanding messages for offset commit (org.apache.kafka.connect.runtime.Workers$sourceTask:414)
[2018-10-06 15:20:48,900] INFO WorkerSourceTask{id=my-ignite-source-connector-0} Committing offsets (org.apache.kafka.connect.runtime.WorkerSourceTask:397)
[2018-10-06 15:20:48,900] INFO WorkerSourceTask{id=my-ignite-source-connector-0} flushing 0 outstanding messages for offset commit (org.apache.kafka.connect.runtime.Workers$sourceTask:414)
[2018-10-06 15:20:48,900] INFO WorkerSourceTask{id=my-ignite-source-connector-1} Committing offsets (org.apache.kafka.connect.runtime.WorkerSourceTask:397)
[2018-10-06 15:20:48,900] INFO WorkerSourceTask{id=my-ignite-source-connector-1} flushing 0 outstanding messages for offset commit (org.apache.kafka.connect.runtime.Workers$sourceTask:414)
[2018-10-06 15:20:58,902] INFO WorkerSourceTask{id=my-ignite-source-connector-0} Committing offsets (org.apache.kafka.connect.runtime.WorkerSourceTask:397)
[2018-10-06 15:20:58,902] INFO WorkerSourceTask{id=my-ignite-source-connector-0} flushing 0 outstanding messages for offset commit (org.apache.kafka.connect.runtime.Workers$sourceTask:414)
[2018-10-06 15:20:58,902] INFO WorkerSourceTask{id=my-ignite-source-connector-1} Committing offsets (org.apache.kafka.connect.runtime.WorkerSourceTask:397)
[2018-10-06 15:20:58,902] INFO WorkerSourceTask{id=my-ignite-source-connector-1} flushing 0 outstanding messages for offset commit (org.apache.kafka.connect.runtime.Workers$sourceTask:414)
[2018-10-06 15:00:27,904] INFO [Consumer clientId=consumer-1, groupId=connect-my-ignite-sink-connector] (Re-)joining group (org.apache.kafka.clients.consumer.internals.AbstractCoordinator:509)
[2018-10-06 15:00:28,136] INFO [Consumer clientId=consumer-2, groupId=connect-my-ignite-sink-connector] Attempt to heartbeat failed since group is rebalancing (org.apache.kafka.clients.consumer.internals.AbstractCoordinator:855)
[2018-10-06 15:00:28,136] INFO [Consumer clientId=consumer-2, groupId=connect-my-ignite-sink-connector] Revoking previously assigned partitions [test3-0] (org.apache.kafka.clients.consumer.internals.ConsumerCoordinator:462)
[2018-10-06 15:00:28,136] INFO [Consumer clientId=consumer-2, groupId=connect-my-ignite-sink-connector] (Re-)joining group (org.apache.kafka.clients.consumer.internals.AbstractCoordinator:509)
[2018-10-06 15:00:28,143] INFO [Consumer clientId=consumer-1, groupId=connect-my-ignite-sink-connector] Successfully joined group with generation 2 (org.apache.kafka.clients.consumer.internals.AbstractCoordinator:473)
[2018-10-06 15:00:28,144] INFO [Consumer clientId=consumer-1, groupId=connect-my-ignite-sink-connector] Setting newly assigned partitions [test3-0] (org.apache.kafka.clients.consumer.internals.ConsumerCoordinator:280)
[2018-10-06 15:00:28,144] INFO [Consumer clientId=consumer-2, groupId=connect-my-ignite-sink-connector] Successfully joined group with generation 2 (org.apache.kafka.clients.consumer.internals.AbstractCoordinator:473)
[2018-10-06 15:00:28,145] INFO [Consumer clientId=consumer-2, groupId=connect-my-ignite-sink-connector] Setting newly assigned partitions [] (org.apache.kafka.clients.consumer.internals.ConsumerCoordinator:280)
[2018-10-06 15:00:28,151] INFO [Consumer clientId=consumer-1, groupId=connect-my-ignite-sink-connector] Resetting offset for partition test3-0 to offset 0. (org.apache.kafka.clients.consumer.internals.Fetcher:583)
```

```

  X  java  361  X  bash  362  X  java  ● 363  X  java  ● 364  X  java  365  X  java
  X  java

:E6:50:07:70:86 |           |
| 192.168.1.35  |           |           |           |           |
+-----+
-----+
Summary:
+-----+
| Active      | true          |
| Total hosts | 1             |
| Total nodes | 2             |
| Total CPUs  | 8             |
| Avg. CPU load | 14.28 % |
| Avg. free heap | 65.00 % |
| Avg. Up time | 01:36:32 |
| Snapshot time | 2018-10-06 14:48:39 |
+-----+
visor> cache -scan
Time of the snapshot: 2018-10-06 15:39:56
+-----+
| # |     Name(@)    | Mode   | Size (Heap / Off-heap) |
+-----+
| 0 | myCacheSource(@c0) | PARTITIONED | min: 22 (0 / 22)      |
|   |                   |           | avg: 25.50 (0.00 / 25.50) |
|   |                   |           | max: 29 (0 / 29)      |
+-----+
:E6:50:07:70:86 |           |
| 192.168.1.35  |           |           |           |           |
+-----+
-----+
Summary:
+-----+
| Active      | true          |
| Total hosts | 1             |
| Total nodes | 1             |
| Total CPUs  | 8             |
| Avg. CPU load | 1.43 % |
| Avg. free heap | 84.00 % |
| Avg. Up time | 01:52:30 |
| Snapshot time | 2018-10-06 14:49:02 |
+-----+
visor> cache -scan
Time of the snapshot: 2018-10-06 15:40:02
+-----+
| # |     Name(@)    | Mode   | Size (Heap / Off-heap) |
+-----+
| 0 | myCacheTarget(@c0) | PARTITIONED | min: 22 (0 / 22)      |
|   |                   |           | avg: 25.50 (0.00 / 25.50) |
|   |                   |           | max: 29 (0 / 29)      |
+-----+

```



```
[15:49:03] Ignite node started OK (id=fc65e0f1)
[15:49:03] Topology snapshot [ver=3, servers=1, clients=1, CPUs=8, offheap=3.2GB, heap=7.1GB]
[15:49:03]   ^-- Node [id=FC65E0F1-5A67-4B17-AF94-96AD3C46A28A, clusterState=ACTIVE]
199 [main] INFO org.apache.camel.impl.converter.DefaultTypeConverter - Loaded 189 type converters
210 [main] INFO org.apache.camel.impl.DefaultCamelContext - Apache Camel 2.16.0 (CamelContext: camel-1)
210 [main] INFO org.apache.camel.management.ManagedManagementStrategy - JMX is enabled
367 [main] INFO org.apache.camel.impl.DefaultRuntimeEndpointRegistry - Runtime endpoint registry is in e
ing endpoints (cache limit: 1000)
367 [main] INFO org.apache.camel.impl.DefaultCamelContext - AllowUseOriginalMessage is enabled. If acces
turn this option off as it may improve performance.
367 [main] INFO org.apache.camel.impl.DefaultCamelContext - StreamCaching is not in use. If using stream
at http://camel.apache.org/stream-caching.html
367 [main] INFO org.apache.camel.impl.DefaultCamelContext - Total 0 routes, of which 0 is started.
368 [main] INFO org.apache.camel.impl.DefaultCamelContext - Apache Camel 2.16.0 (CamelContext: camel-1)
MsgBody:{"telephone" : "89096860917", "credit" : "129", "routeTo" : "MTS"}
```

Entries in ccache: camel-direct

	Key Class	Key	Value Class
	Value		
+			
====			====

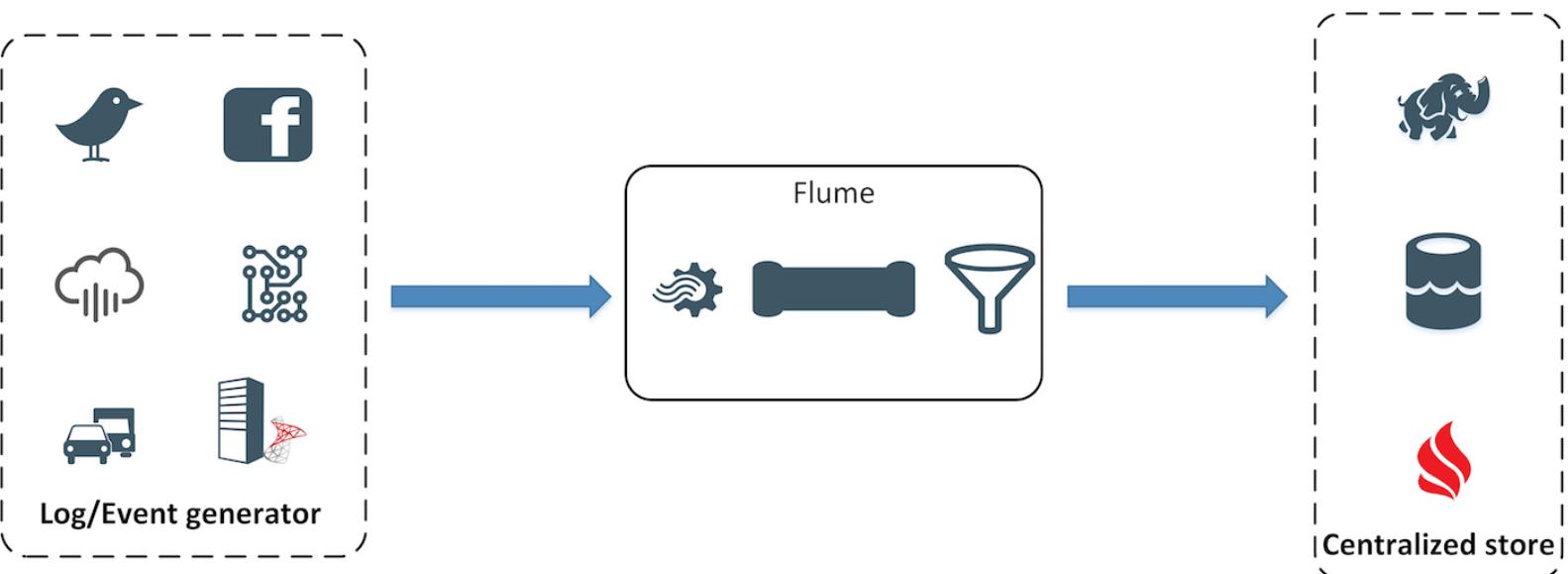
```
+-----+  
| java.lang.String | 89096860917 | o.a.i.i.binary.BinaryObjectImpl | com.blu.imdg.dto.MnpRouting [hash=-1459216947, routeTo=MTS, telephone=89096860917, credit=129] |
```

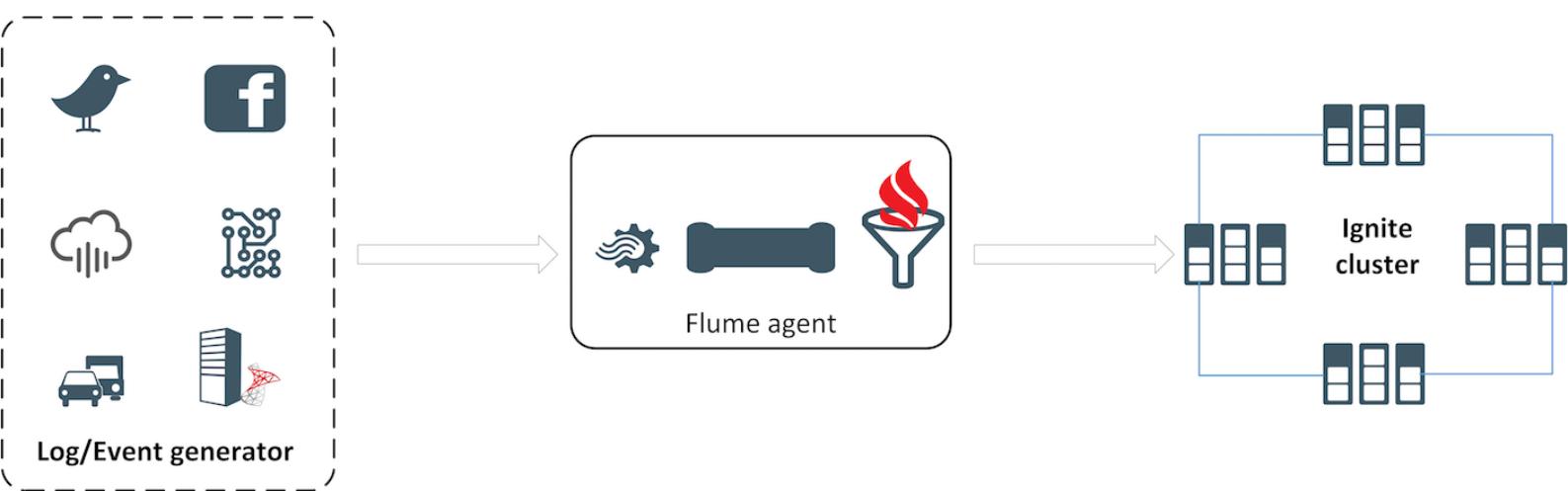
visor> [

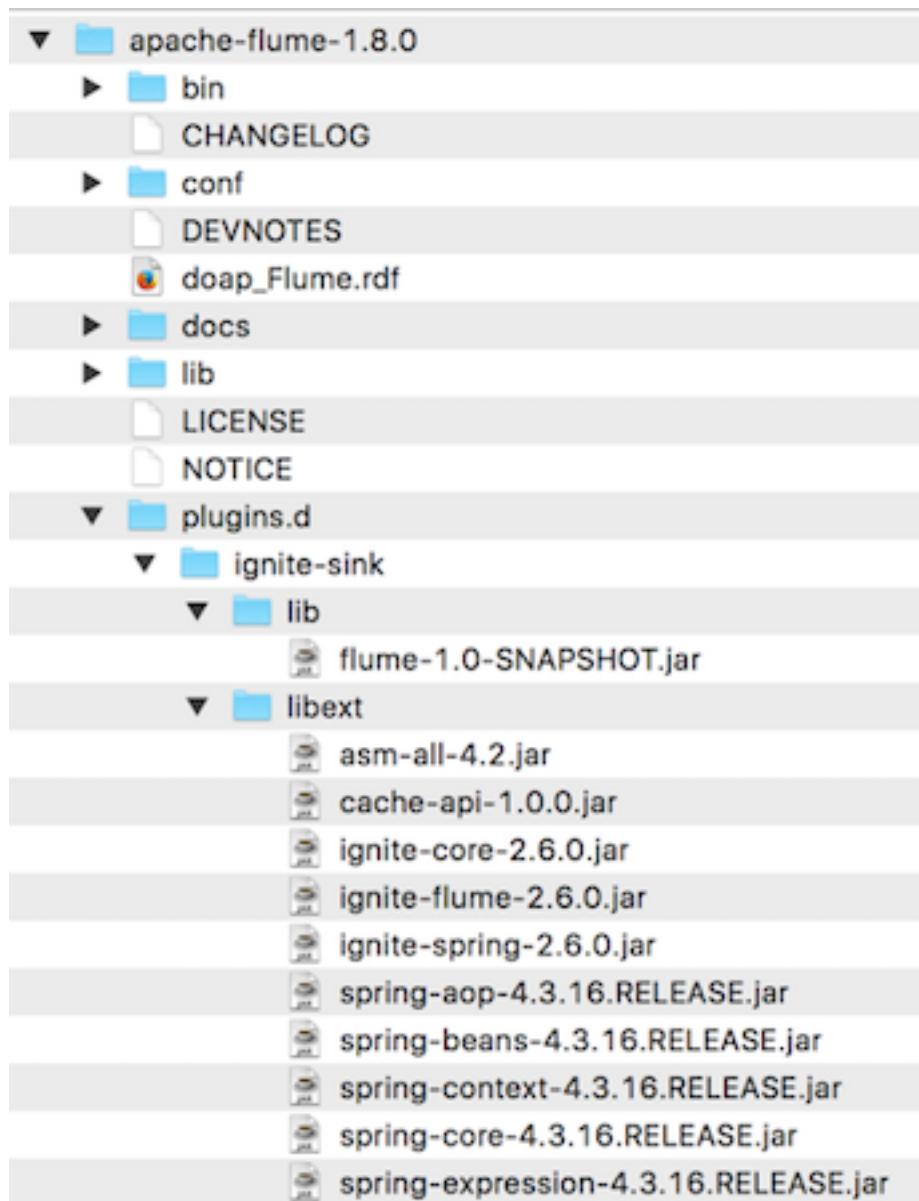
```
541 [main] INFO org.apache.camel.impl.DefaultCamelContext - Route: route1 started and consuming from: Endpoint  
[file:///Users/shamim/Development/workshop/github/the-apache-ignite-book/chapters/chapter-8/camel/input?delete  
=true]  
541 [main] INFO org.apache.camel.impl.DefaultCamelContext - Total 1 routes, of which 1 is started.  
542 [main] INFO org.apache.camel.impl.DefaultCamelContext - Apache Camel 2.16.0 (CamelContext: camel-1) starte  
d in 0.253 seconds  
Process the bean MnpRouting!  
Process the bean MnpRouting!  
Process the bean MnpRouting!  
Process the bean MnpRouting!  
Process the bean MnpRouting!
```

```
Entries in cache: camel-direct
+=====
=====+
| Key Class | Key | Value Class |                                Value
|           |     |             |
+=====+
| java.lang.String | 89096860917 | java.lang.String | Routing {telephone='89096860917', credit=175, routeTo='VODAFON'} |
| java.lang.String | 89096860915 | java.lang.String | Message doesn't pass validation
|               |

```







```
2018-10-08 20:22:40,502 (lifecycleSupervisor-1-0) [INFO - org.apache.flume.source.NetcatSource.start(NetcatSource.java:169)] Created serverSocket:sun.nio.ch.ServerSocketChannelImpl[/127.0.0.1:44444]
2018-10-08 20:22:40,693 (lifecycleSupervisor-1-1) [INFO - org.springframework.beans.factory.xml.XmlBeanDefinitionReader.loadBeanDefinitions(XmlBeanDefinitionReader.java:317)] Loading XML bean definitions from URL [file:/Users/shamim/Development/bigdata/apache-flume-1.7.0/conf/example-ignite.xml]
2018-10-08 20:22:40,988 (lifecycleSupervisor-1-1) [INFO - org.springframework.context.support.AbstractApplicationContext.prepareRefresh(AbstractApplicationContext.java:583)] Refreshing org.springframework.context.support.GenericApplicationContext@4af46777: startup date [Mon Oct 08 20:22:40 MSK 2018]; root of context hierarchy
[20:22:41]
[20:22:41]   _____ / /
[20:22:41]  / \_ / \_ / \_ / \_ / \_ / \_
[20:22:41]  / \_ / \_ / \_ / \_ / \_ / \_ / \_
[20:22:41]  / \_ / \_ / \_ / \_ / \_ / \_ / \_
[20:22:41]
[20:22:41] ver. 2.6.0#20180710-sha1:669feacc
[20:22:41] 2018 Copyright(C) Apache Software Foundation
```

```
visor> cache -scan
Time of the snapshot: 2018-10-08 20:48:26
+-----+
| # | Name(@)      | Mode       | Size (Heap / Off-heap) |
+-----+
| 0 | testCache(@c0) | PARTITIONED | min: 99 (0 / 99)      |
|   |                 |             | avg: 99.00 (0.00 / 99.00) |
|   |                 |             | max: 99 (0 / 99)      |
+-----+
```

```
2018-10-08 20:54:51,340 (lifecycleSupervisor-1-0) [INFO - org.apache.flume.source.NetcatSource.start(NetcatSource.java:169)] Created serverSocket:sun.nio.ch.ServerSocketChannelImpl[/127.0.0.1:44444]
2018-10-08 20:54:51,505 (lifecycleSupervisor-1-3) [INFO - org.springframework.beans.factory.xml.XmlBeanDefinitionReader.loadBeanDefinitions(XmlBeanDefinitionReader.java:317)] Loading XML bean definitions from URL [file:/Users/shamim/Development/bigdata/apache-flume-1.7.0/conf/example-ignite.xml]
2018-10-08 20:54:51,813 (lifecycleSupervisor-1-3) [INFO - org.springframework.context.support.AbstractApplicationContext.prepareRefresh(AbstractApplicationContext.java:583)] Refreshing org.springframework.context.support.GenericApplicationContext@6ef1d1af: startup date [Mon Oct 08 20:54:51 MSK 2018]; root of context hierarchy
[20:54:52] _____
[20:54:52] / \_ _/ \_ / \_ / \_ / \_
[20:54:52] \_ / \_ (7 7 \_ / \_ / \_ / \_
[20:54:52] / \_ \_ / \_ / \_ / \_ / \_ / \_
[20:54:52]
[20:54:52] ver. 2.6.0#20180710-sha1:669feacc
```

	java.lang.String		transaction6		<a href="#">java.lang.Integer</a>   6
	java.lang.String		transaction9		java.lang.Integer   9
	java.lang.String		transaction8		java.lang.Integer   8
	java.lang.String		transaction1		java.lang.Integer   101
	java.lang.String		transaction3		java.lang.Integer   3
	java.lang.String		transaction2		java.lang.Integer   2
+	-----				

## TUPLES

*ordered list of elements*

(“bion@at-consulting.ru”, “ignite-demo@ignite.com”)

# STREAMS

*unbound and un ordered sequence of tuples*

tuples

tuples

tuples

tuples

tuples



## SPOUTS

*Source of streams*



tuples

tuples

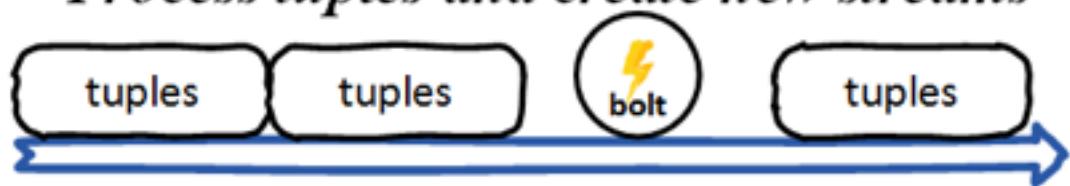
tuples

tuples

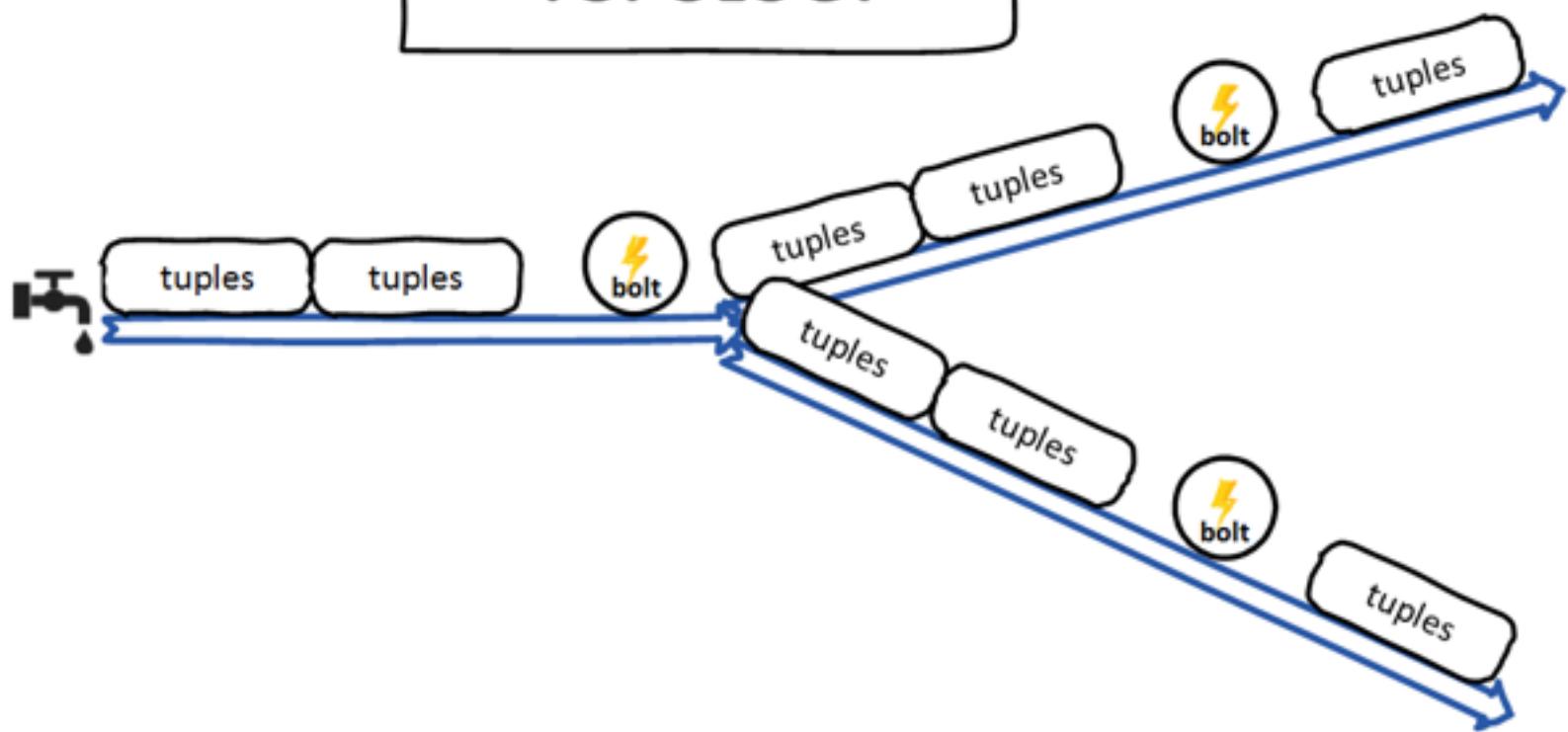


# BOLTS

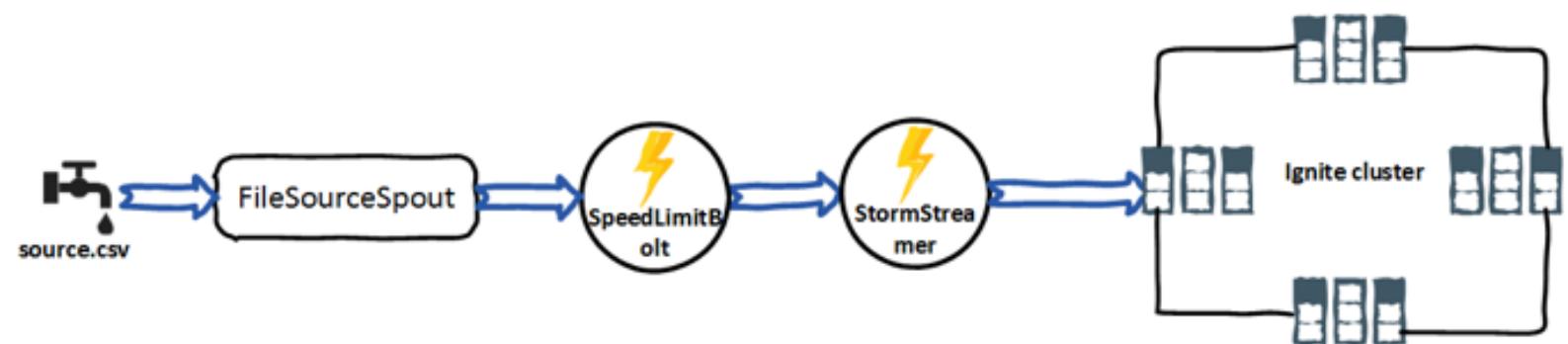
*Process tuples and create new streams*



# TOPOLOGY



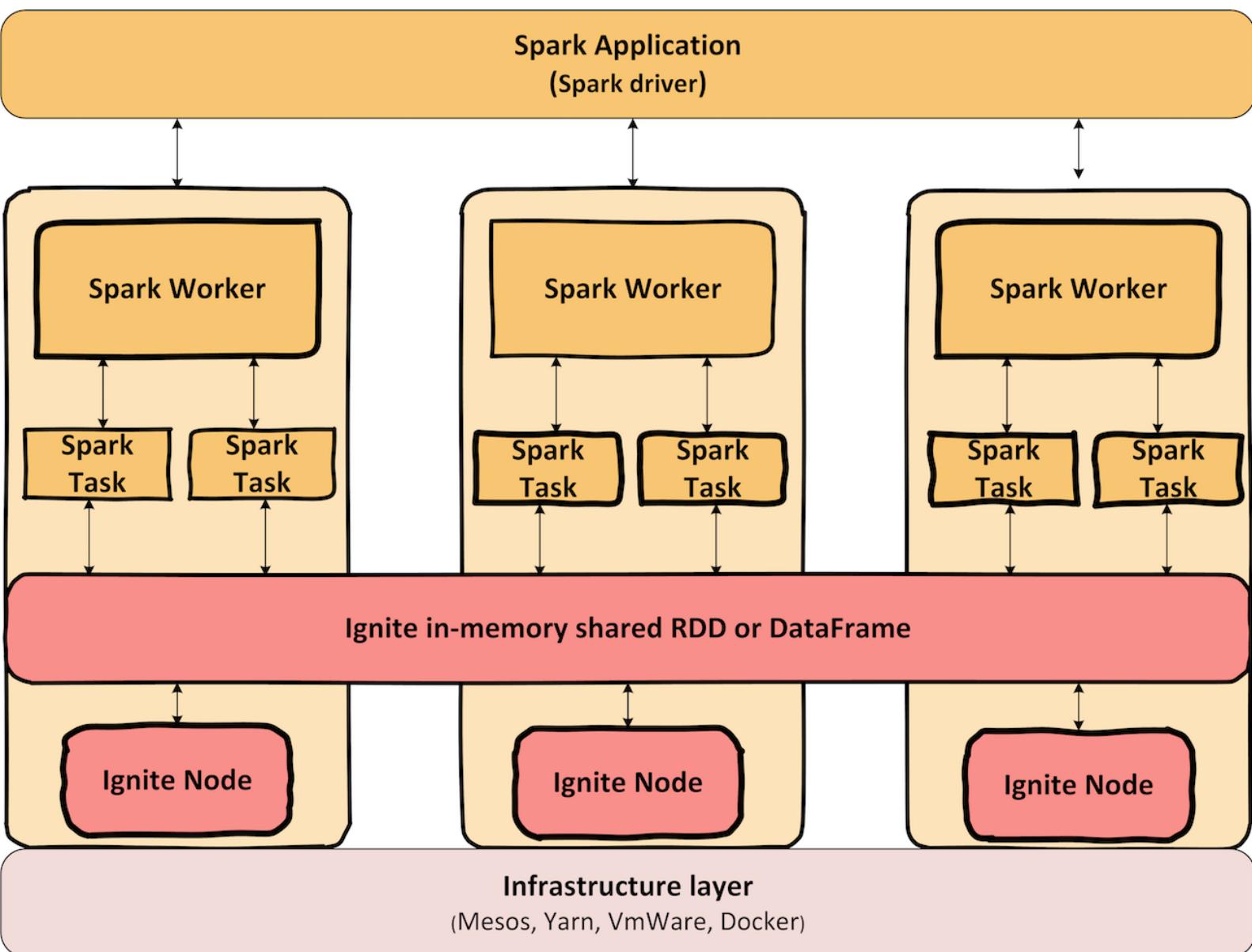
## Speed violation topology

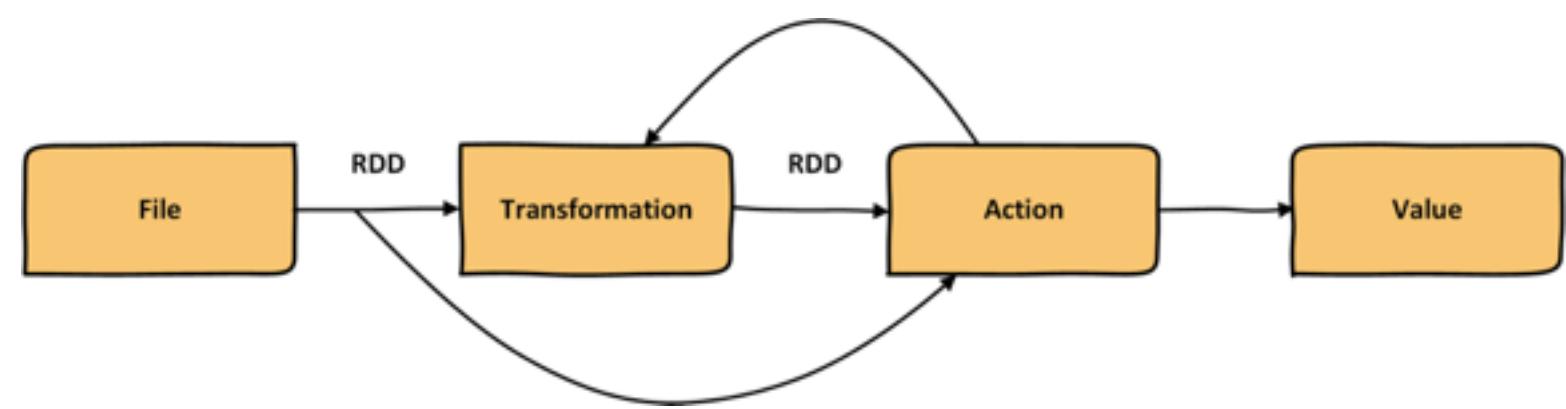


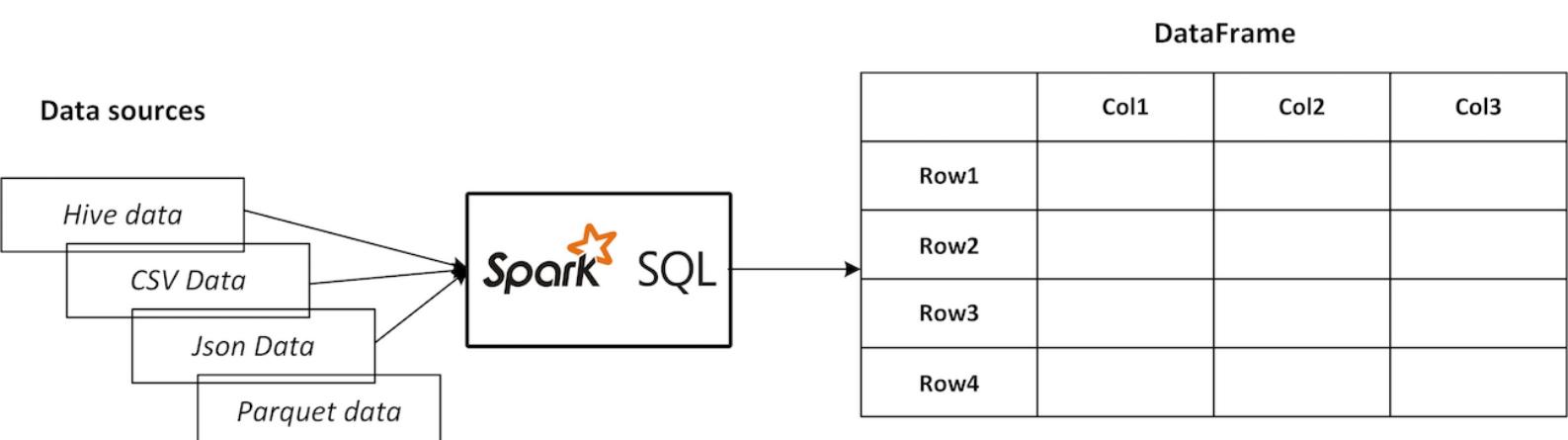
```
64204 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:AB 123 speed:160
64204 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:BC 123 speed:170
64204 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:EF 123 speed:190
64204 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:GH 123 speed:150
64204 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:PO 234 speed:140
64205 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:AB 123 speed:160
64205 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:BC 123 speed:170
64205 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:EF 123 speed:190
64205 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:GH 123 speed:150
64205 [Thread-21-limit-executor[3 3]] INFO c.b.i.s.b.SpeedLimitBolt - Speed violation found:PO 234 speed:140
64205 [Thread-21-limit-executor[3 3]] INFO █
```

Entries in cache: testCache

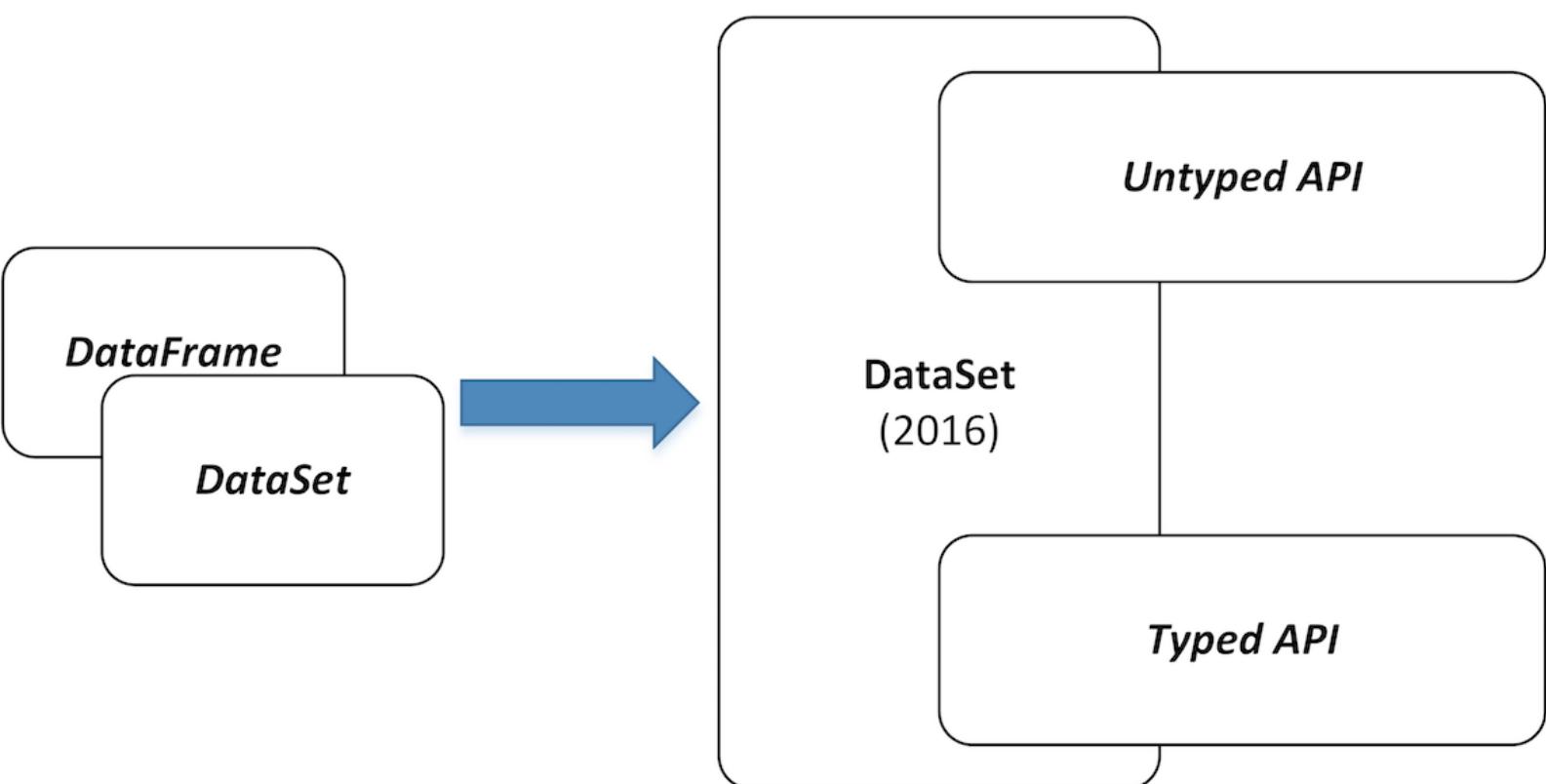
Key Class	Key	Value Class	Value
java.lang.String	P0 234	java.lang.Integer	140
java.lang.String	BC 123	java.lang.Integer	170
java.lang.String	AB 123	java.lang.Integer	160
java.lang.String	GH 123	java.lang.Integer	150
java.lang.String	EF 123	java.lang.Integer	190







## Apache Spark 2.0 API



```
shamim:~ shamim$ cat /Users/shamim/Development/bigdata/spark-2.3.1-bin-hadoop2.7/logs/spark-shamim-org.apache.spark.de  
ploy.master.Master-1-shamim.local.out  
Spark Command: /Library/Java/JavaVirtualMachines/jdk1.8.0_45.jdk/Contents/Home/bin/java -cp /Users/shamim/Development/  
bigdata/spark-2.3.1-bin-hadoop2.7/conf:/Users/shamim/Development/bigdata/spark-2.3.1-bin-hadoop2.7/jars/* -Xmx1g org.  
apache.spark.deploy.master.Master --host shamim.local --port 7077 --webui-port 8080  
  
2018-09-21 15:01:17 INFO Master:2611 - Started daemon with process name: 941@shamim.local  
2018-09-21 15:01:17 INFO SignalUtils:54 - Registered signal handler for TERM  
2018-09-21 15:01:17 INFO SignalUtils:54 - Registered signal handler for HUP  
2018-09-21 15:01:17 INFO SignalUtils:54 - Registered signal handler for INT  
2018-09-21 15:01:18 WARN NativeCodeLoader:62 - Unable to load native-hadoop library for your platform... using built-in  
java classes where applicable  
2018-09-21 15:01:18 INFO SecurityManager:54 - Changing view acls to: shamim  
2018-09-21 15:01:18 INFO SecurityManager:54 - Changing modify acls to: shamim  
2018-09-21 15:01:18 INFO SecurityManager:54 - Changing view acls groups to:  
2018-09-21 15:01:18 INFO SecurityManager:54 - Changing modify acls groups to:  
2018-09-21 15:01:18 INFO SecurityManager:54 - SecurityManager: authentication disabled; ui acls disabled; users with  
view permissions: Set(shamim); groups with view permissions: Set(); users with modify permissions: Set(shamim); grou  
ps with modify permissions: Set()  
2018-09-21 15:01:18 INFO Utils:54 - Successfully started service 'sparkMaster' on port 7077.  
2018-09-21 15:01:18 INFO Master:54 - Starting Spark master at spark://shamim.local:7077  
2018-09-21 15:01:18 INFO Master:54 - Running Spark version 2.3.1  
2018-09-21 15:01:18 INFO log:192 - Logging initialized @2112ms  
2018-09-21 15:01:18 INFO Server:346 - jetty-9.3.z-SNAPSHOT  
2018-09-21 15:01:18 INFO Server:414 - Started @2213ms  
2018-09-21 15:01:18 INFO AbstractConnector:278 - Started ServerConnector@71cec39d{HTTP/1.1,[http/1.1]}{0.0.0.0:8080}  
2018-09-21 15:01:18 INFO Utils:54 - Successfully started service 'MasterUI' on port 8080.  
2018-09-21 15:01:18 INFO ContextHandler:781 - Started o.s.j.s.ServletContextHandler@4ce10f3f{/app,null,AVAILABLE,@Spa  
rk}
```

```
shamim:~ shamim$ $SPARK_HOME/bin/spark-class org.apache.spark.deploy.worker.Worker spark://shamim.local:7077
2018-09-21 15:10:00 INFO Worker:2611 - Started daemon with process name: 1002@shamim.local
2018-09-21 15:10:00 INFO SignalUtils:54 - Registered signal handler for TERM
2018-09-21 15:10:00 INFO SignalUtils:54 - Registered signal handler for HUP
2018-09-21 15:10:00 INFO SignalUtils:54 - Registered signal handler for INT
2018-09-21 15:10:00 WARN NativeCodeLoader:62 - Unable to load native-hadoop library for your platform... using built-in java classes where applicable
2018-09-21 15:10:00 INFO SecurityManager:54 - Changing view acls to: shamim
2018-09-21 15:10:00 INFO SecurityManager:54 - Changing modify acls to: shamim
2018-09-21 15:10:00 INFO SecurityManager:54 - Changing view acls groups to:
2018-09-21 15:10:00 INFO SecurityManager:54 - Changing modify acls groups to:
2018-09-21 15:10:00 INFO SecurityManager:54 - SecurityManager: authentication disabled; ui acls disabled; users with view permissions: Set(shamim); groups with view permissions: Set(); users with modify permissions: Set(shamim); groups with modify permissions: Set()
2018-09-21 15:10:01 INFO Utils:54 - Successfully started service 'sparkWorker' on port 60369.
2018-09-21 15:10:01 INFO Worker:54 - Starting Spark worker 192.168.1.35:60369 with 8 cores, 15.0 GB RAM
2018-09-21 15:10:01 INFO Worker:54 - Running Spark version 2.3.1
2018-09-21 15:10:01 INFO Worker:54 - Spark home: /Users/shamim/Development/bigdata/spark-2.3.1-bin-hadoop2.7
2018-09-21 15:10:01 INFO log:192 - Logging initialized @1444ms
2018-09-21 15:10:01 INFO Server:346 - jetty-9.3.z-SNAPSHOT
2018-09-21 15:10:01 INFO Server:414 - Started @1495ms
2018-09-21 15:10:01 INFO AbstractConnector:278 - Started ServerConnector@7379bec2{HTTP/1.1,[http/1.1]}{0.0.0.0:8081}
2018-09-21 15:10:01 INFO Utils:54 - Successfully started service 'WorkerUI' on port 8081.
2018-09-21 15:10:01 INFO ContextHandler:781 - Started o.s.j.s.ServletContextHandler@5f3980ac{/logPage,null,AVAILABLE,@Spark}
```



## Spark Master at spark://shamim.local:7077

URL: spark://shamim.local:7077

REST URL: spark://shamim.local:6066 (cluster mode)

Alive Workers: 1

Cores in use: 8 Total, 0 Used

Memory in use: 15.0 GB Total, 0.0 B Used

Applications: 0 [Running](#), 0 [Completed](#)

Drivers: 0 Running, 0 Completed

Status: ALIVE

### Workers (1)

Worker Id	Address	State	Cores	Memory
<a href="#">worker-20180921151001-192.168.1.35-60369</a>	192.168.1.35:60369	ALIVE	8 (0 Used)	15.0 GB (0.0 B Used)

```
2018-09-21 16:02:49 INFO TaskSetManager:54 - Starting task 0.0 in stage 3.0 (TID 3, 192.168.1.35, executor 0, partition 0, NODE_LOCAL, 7758 bytes)
2018-09-21 16:02:49 INFO BlockManagerInfo:54 - Added broadcast_4_piece0 in memory on 192.168.1.35:65254 (size: 3.8 KB, free: 366.2 MB)
2018-09-21 16:02:49 INFO MapOutputTrackerMasterEndpoint:54 - Asked to send map output locations for shuffle 1 to 192.168.1.35:65252
2018-09-21 16:02:49 INFO TaskSetManager:54 - Finished task 0.0 in stage 3.0 (TID 3) in 27 ms on 192.168.1.35 (executor 0) (1/1)
2018-09-21 16:02:49 INFO TaskSchedulerImpl:54 - Removed TaskSet 3.0, whose tasks have all completed, from pool
2018-09-21 16:02:49 INFO DAGScheduler:54 - ResultStage 3 (count at LineCount.java:19) finished in 0.034 s
2018-09-21 16:02:49 INFO DAGScheduler:54 - Job 1 finished: count at LineCount.java:19, took 0.086797 s
Lines with a: 61, lines with b: 30
```

		modules			artifacts		
conf	number	search	downloaded	evicted	number	downloaded	
default	93	0	0	3	90	1	1

```
:::::::::::::::::::  
::          FAILED DOWNLOADS          ::  
:: ^ see resolution messages for details ^ ::  
:::::::::::::::::::  
:: com.jamesmurty.utils#java-xmlbuilder;0.4!java-xmlbuilder.jar  
:: org.xerial.snappy#snappy-java;1.0.4.1!snappy-java.jar(bundle)  
::::::::::::::::::
```

```
+---+-----+-----+-----+
| 2 | wordcount2(@c2) | PARTITIONED | min: 287 (0 / 287)      |
|   |                 |             | avg: 287.00 (0.00 / 287.00) |
|   |                 |             | max: 287 (0 / 287)       |
+---+-----+-----+
```

Choose cache number ('c' to cancel) [c]: 2

Entries in cache: wordcount2

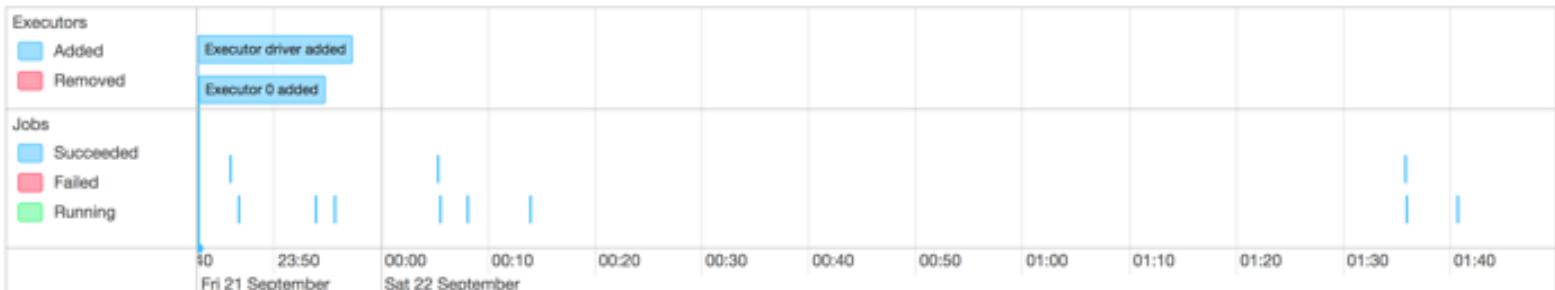
Key Class	Key	Value Class	Value
java.lang.String		java.lang.Integer	47
java.lang.String	<class>	java.lang.Integer	1
java.lang.String	your	java.lang.Integer	1
java.lang.String	building	java.lang.Integer	2
java.lang.String	sc.parallelize(1	java.lang.Integer	1
java.lang.String	Spark"]( <a href="http://spark.apache.org/docs/latest/building-spark.html">http://spark.apache.org/docs/latest/building-spark.html</a> ).l	java.lang.Integer	1
java.lang.String	you	java.lang.Integer	4
java.lang.String	#	java.lang.Integer	1

## Spark Jobs [\(?\)](#)

User: shamim  
Total Uptime: 2.1 h  
Scheduling Mode: FIFO  
Completed Jobs: 11

▼ Event Timeline

Enable zooming



```
>>> +-----+
>>> Ignite ver. 2.6.0#20180710-sha1:669feacc5d3a4e60efcdd300dc8de99780f38eed stopped OK
>>> +-----+
>>> Grid uptime: 00:00:04.249

2018-09-22 12:39:16 INFO AbstractConnector:318 - Stopped Spark@38d5b107{HTTP/1.1,[http/1.1]}{0.0.0.0:4040}
2018-09-22 12:39:16 INFO SparkUI:54 - Stopped Spark web UI at http://192.168.1.35:4040
2018-09-22 12:39:16 INFO StandaloneSchedulerBackend:54 - Shutting down all executors
2018-09-22 12:39:16 INFO CoarseGrainedSchedulerBackend$DriverEndpoint:54 - Asking each executor to shut down
2018-09-22 12:39:16 INFO MapOutputTrackerMasterEndpoint:54 - MapOutputTrackerMasterEndpoint stopped!
2018-09-22 12:39:17 INFO MemoryStore:54 - MemoryStore cleared
2018-09-22 12:39:17 INFO BlockManager:54 - BlockManager stopped
2018-09-22 12:39:17 INFO BlockManagerMaster:54 - BlockManagerMaster stopped
2018-09-22 12:39:17 INFO OutputCommitCoordinator$OutputCommitCoordinatorEndpoint:54 - OutputCommitCoordinator stopped
!
2018-09-22 12:39:17 INFO SparkContext:54 - Successfully stopped SparkContext
```

```
visor> cache -scan
```

```
Time of the snapshot: 2018-09-22 11:28:03
```

#	Name(@)	Mode	Size (Heap / Off-heap)
0	IgniteRDD(@c3)	PARTITIONED	min: 1000 (0 / 1000)
			avg: 1000.00 (0.00 / 1000.00)
			max: 1000 (0 / 1000)

```
2018-09-22 11:51:43 INFO TaskSchedulerImpl:54 - Removed TaskSet 0.0, whose tasks have all completed, from pool
2018-09-22 11:51:43 INFO DAGScheduler:54 - ResultStage 0 (count at SparkIgniteTest.scala:25) finished in 9.252 s
2018-09-22 11:51:43 INFO DAGScheduler:54 - Job 0 finished: count at SparkIgniteTest.scala:25, took 9.372597 s
The count is::::::::::::: 19
2018-09-22 11:51:43 INFO IgniteContext:172 - Will stop Ignite nodes on 2 workers
2018-09-22 11:51:43 INFO SparkContext:54 - Starting job: foreachPartition at IgniteContext.scala:175
2018-09-22 11:51:43 INFO DAGScheduler:54 - Got job 1 (foreachPartition at IgniteContext.scala:175) with 2 output partitions
```

```
2018-09-22 18:03:23 INFO  SparkUI:54 - Stopped Spark web UI at http://192.168.1.35:4040
2018-09-22 18:03:23 INFO  BlockManagerInfo:54 - Removed broadcast_5_piece0 on 192.168.1.35:57333 in memory
B, free: 366.2 MB)
2018-09-22 18:03:23 INFO  GridCacheProcessor:566 - Stopped cache [cacheName=ignite-sys-cache]
2018-09-22 18:03:23 INFO  GridCacheProcessor:566 - Stopped cache [cacheName=SQL_PUBLIC_FLIGHTS]
2018-09-22 18:03:23 INFO  GridCacheProcessor:566 - Stopped cache [cacheName=SQL_PUBLIC_AIRPORTS]
2018-09-22 18:03:23 INFO  IgniteKernal:566 -

>>> +-----+
>>> Ignite ver. 2.6.0#20180710-sha1:669feacc5d3a4e60efcdd300dc8de99780f38eed stopped OK
>>> +-----+
>>> Grid uptime: 00:00:08.050
```

```
0: jdbc:ignite:thin://127.0.0.1/> !tables
```

TABLE_CAT	TABLE_SCHEMA	TABLE_NAME	TABLE_TYPE
	PUBLIC	FLIGHTS	TABLE
	PUBLIC	AIRPORTS	TABLE

```
0: jdbc:ignite:thin://127.0.0.1/> !columns FLIGHTS
```

TABLE_CAT	TABLE_SCHEMA	TABLE_NAME	COLUMN_NAME
	PUBLIC	FLIGHTS	ID
	PUBLIC	FLIGHTS	YEAR
	PUBLIC	FLIGHTS	QUARTER
	PUBLIC	FLIGHTS	MONTH
	PUBLIC	FLIGHTS	DAY_OF_MONTH
	PUBLIC	FLIGHTS	DAY_OF_WEEK
	PUBLIC	FLIGHTS	FL_DATE
	PUBLIC	FLIGHTS	UNIQUE_CARRIER
	PUBLIC	FLIGHTS	AIRLINE_ID
	PUBLIC	FLIGHTS	CARRIER
	PUBLIC	FLIGHTS	TAIL_NUM
	PUBLIC	FLIGHTS	FL_NUM
	PUBLIC	FLIGHTS	ORIGIN_AIRPORT_ID
	PUBLIC	FLIGHTS	ORIGIN_AIRPORT_SE
	PUBLIC	FLIGHTS	ORIGIN_CITY_MARKET_ID
	PUBLIC	FLIGHTS	DEST_AIRPORT_ID
	PUBLIC	FLIGHTS	WHEELS_ON
	PUBLIC	FLIGHTS	ARR_TIME
	PUBLIC	FLIGHTS	ARR_DELAY
	PUBLIC	FLIGHTS	ARR_DELAY_NEW

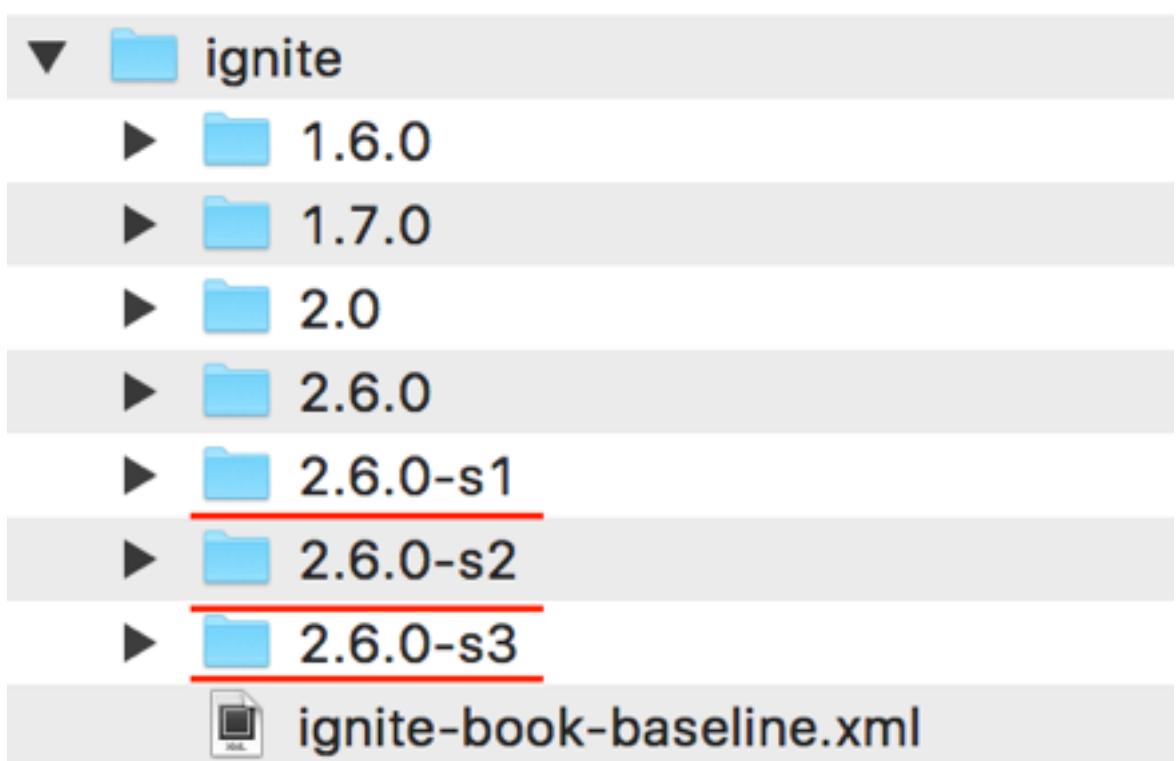
2018-09-22 18:36:55 INFO CodeGenerator:54 - Code generated in 55.25982 ms  
Row=[15497,St. Augustine, FL: Northeast Florida Regional,1]  
Row=[14222,Pago Pago, TT: Pago Pago International,1]  
Row=[13964,North Bend/Coos Bay, OR: Southwest Oregon Regional,1]  
Row=[13459,Marquette, MI: Sawyer International,2]  
Row=[10165,Adak Island, AK: Adak,2]  
Row=[11252,Daytona Beach, FL: Daytona Beach International,3]  
Row=[14025,Plattsburgh, NY: Plattsburgh International,3]  
Row=[12265,Niagara Falls, NY: Niagara Falls International,3]  
Row=[13388,Mammoth Lakes, CA: Mammoth Lakes Airport,4]  
Row=[10170,Kodiak, AK: Kodiak Airport,4]  
Row=[10926,Cordova, AK: Merle K Mudhole Smith,4]  
Row=[12177,Hobbs, NM: Lea County Regional,4]  
Row=[14150,Pellston, MI: Pellston Regional Airport of Emmet County,4]  
Row=[13873,Nome, AK: Nome Airport,5]  
Row=[15008,St. Cloud, MN: St. Cloud Regional,5]  
Row=[12016,Guam, TT: Guam International,5]  
Row=[11898,Grand Forks, ND: Grand Forks International,5]  
Row=[14905,Santa Maria, CA: Santa Maria Public/Capt. G. Allan Hancock Field,5]  
Row=[15582,Vernal, UT: Vernal Regional,5]  
Row=[14109,Hattiesburg/Laurel, MS: Hattiesburg-Laurel Regional,5]  
Row=[13127,Lewiston, ID: Lewiston Nez Perce County,5]

```
visor> open
Local configuration files:
+-----+
| # | Configuration File |
+-----+
| 0 | config/default-config.xml |
| 1 | benchmarks/config/ignite-base-config.xml |
| 2 | benchmarks/config/ignite-localhost-config.xml |
| 3 | benchmarks/config/ignite-multicast-config.xml |
| 4 | benchmarks/config/ignite-remote-config.xml |
| 5 | benchmarks/sources/config/ignite-base-config.xml |
| 6 | benchmarks/sources/config/ignite-localhost-config.xml |
| 7 | benchmarks/sources/config/ignite-multicast-config.xml |
| 8 | benchmarks/sources/config/ignite-remote-config.xml |
| 9 | (?) config/router/default-router.xml |
| 10 | examples/config/example-cache.xml |
| 11 | examples/config/example-data-regions.xml |
| 12 | examples/config/example-default.xml |
| 13 | (?) examples/config/example-ignite.xml |
| 14 | examples/config/filesystem/example-igfs.xml |
| 15 | examples/config/ignite-book-persistence.xml |
| 16 | examples/config/ignite-zoo-config.xml |
| 17 | examples/config/persistentstore/example-persistent-store.xml |
```

```
visor> top
Hosts: 1
+-----+
| Int./Ext. IPs | Node ID8(@) | Node Type | OS | CPUs | MACs | CPU Load |
+-----+
| 192.168.1.35 | 1: C0F43987(@n0) | Server | Mac OS X x86_64 10.11.6 | 8 | 3A:71:58:55:4F:AB | 0.15 % |
| 0:0:0:0:0:0:1 | 2: BA16911C(@n1) | Server | | | 80:E6:50:07:70:B6 | |
| 127.0.0.1 | | | | | | |
+-----+
```

Summary:

Active	true
Total hosts	1
Total nodes	2
Total CPUs	8
Avg. CPU load	0.15 %
Avg. free heap	91.00 %
Avg. Up time	00:10:35
Snapshot time	2018-10-01 14:24:24



## Nodes for: EMPcache(@c1)

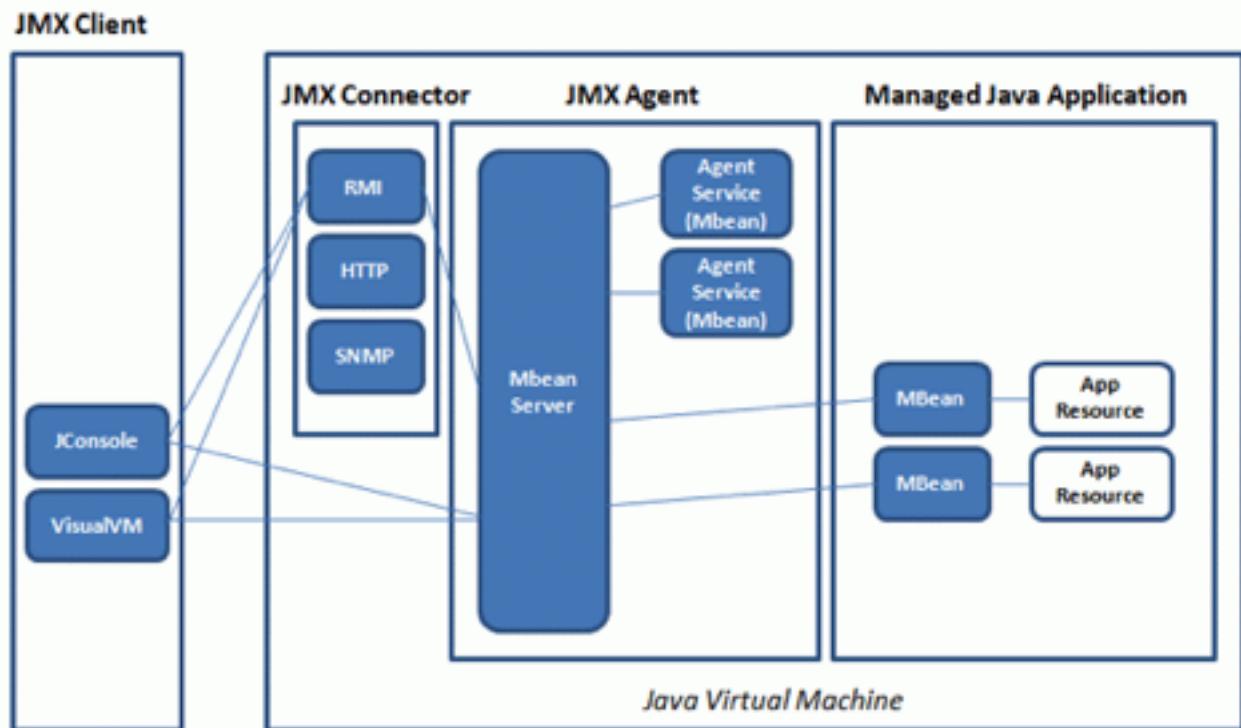
	Node ID8(@), IP	CPU	Heaps Used	CPU Load	Up Time	Size	Hi/Mi/Rd/Wr
+	F0A6A794(@n0), 192.168.1.35	8	23.56 %	0.20 %	01:59:14.478	Total: 504 Heap: 0 Off-Heap: 504 Off-Heap Memory: 0	Hi: 0 Mi: 0 Rd: 0 Wr: 0
+	6DB02F31(@n1), 192.168.1.35	8	14.30 %	0.20 %	01:57:39.172	Total: 496 Heap: 0 Off-Heap: 496 Off-Heap Memory: 0	Hi: 0 Mi: 0 Rd: 0 Wr: 0
+							

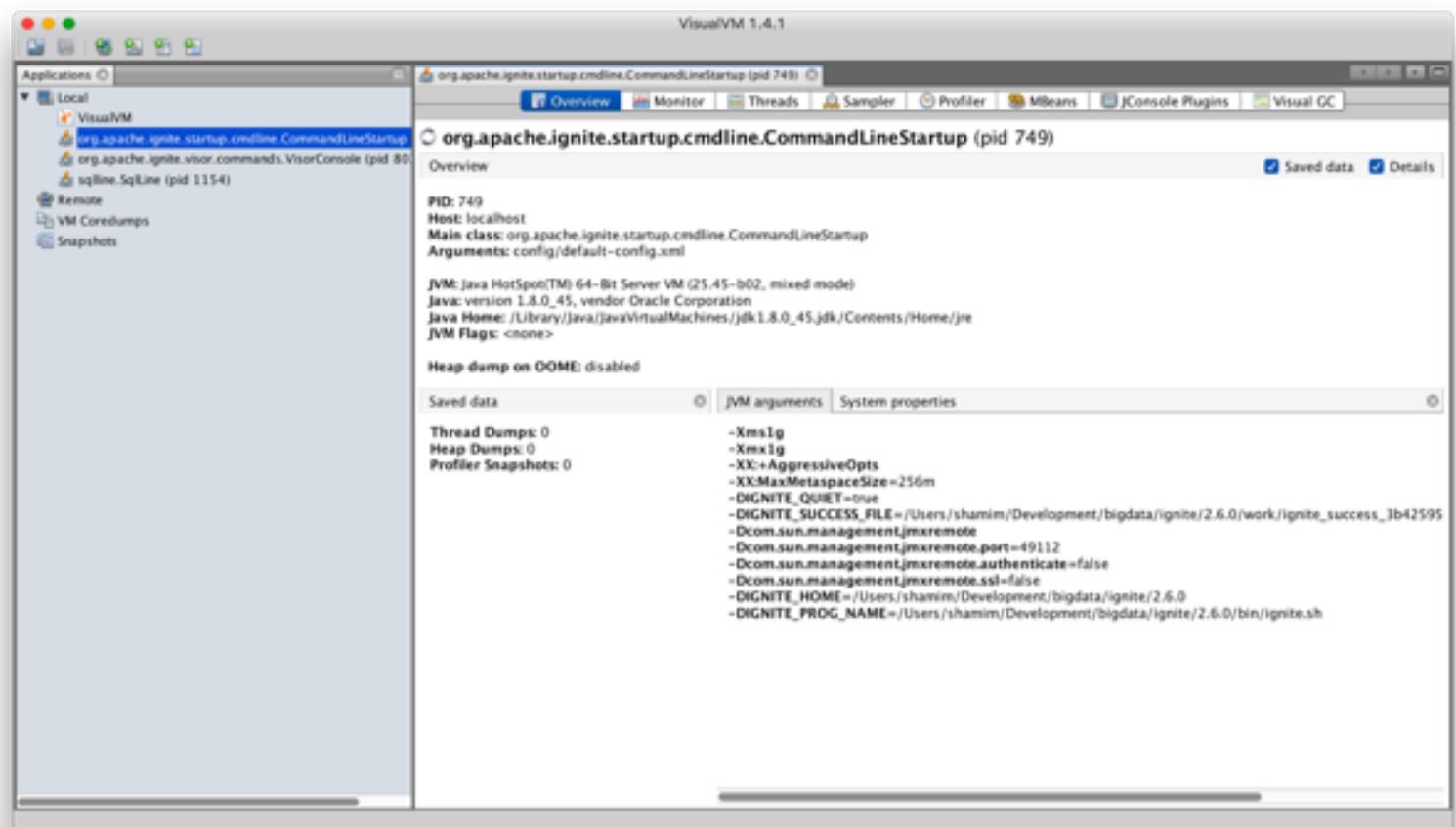
Nodes for: DEPTcache(@c2)

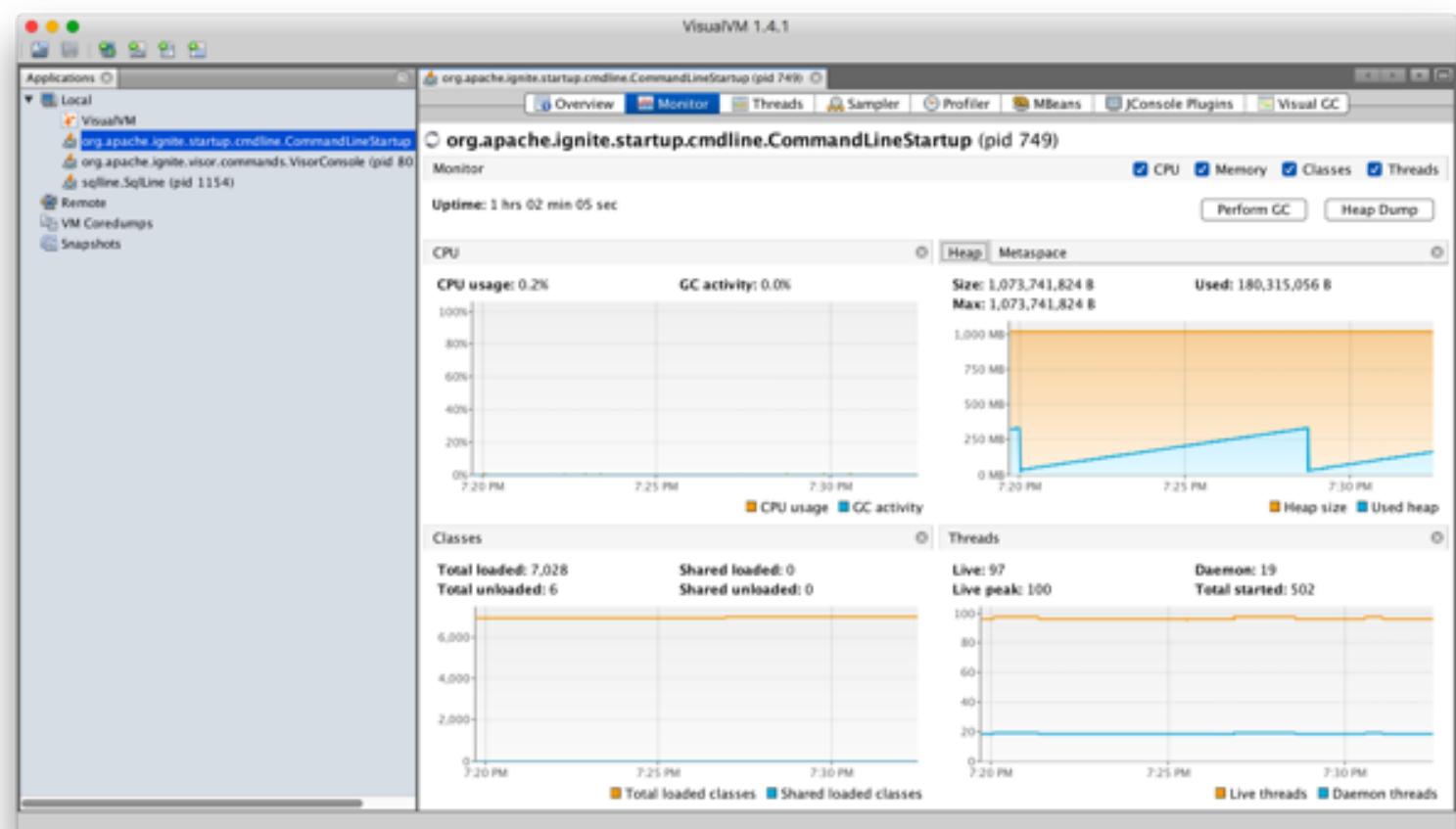
Node ID8(@), IP	CPUs	Heap Used	CPU Load	Up Time	Size	Hi/Mi/Rd/Wr
70BF070B(@n2), 192.168.1.35	8	19.98 %	0.23 %	00:12:58.349	Total: 0 Heap: 0 Off-Heap: 0 Off-Heap Memory: 0	Hi: 0 Mi: 0 Rd: 0 Wr: 0
F0A6A794(@n0), 192.168.1.35	8	21.12 %	0.17 %	02:27:40.466	Total: 44 Heap: 0 Off-Heap: 44 Off-Heap Memory: 0	Hi: 0 Mi: 0 Rd: 0 Wr: 0
6DB02F31(@n1), 192.168.1.35	8	9.55 %	0.20 %	02:26:05.159	Total: 56 Heap: 0 Off-Heap: 56 Off-Heap Memory: 0	Hi: 0 Mi: 0 Rd: 0 Wr: 0

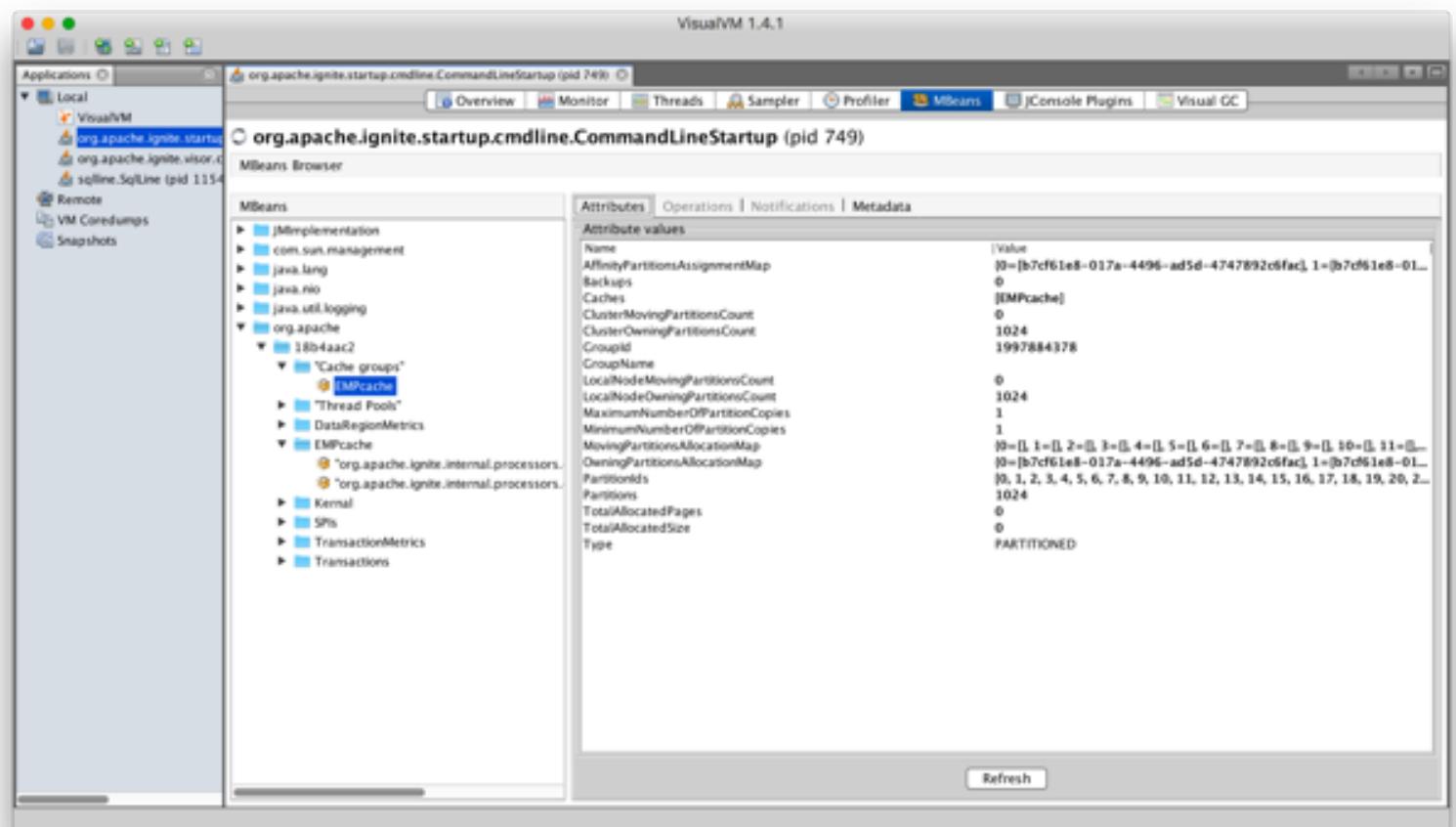
## Nodes for: EMPcache(@c1)

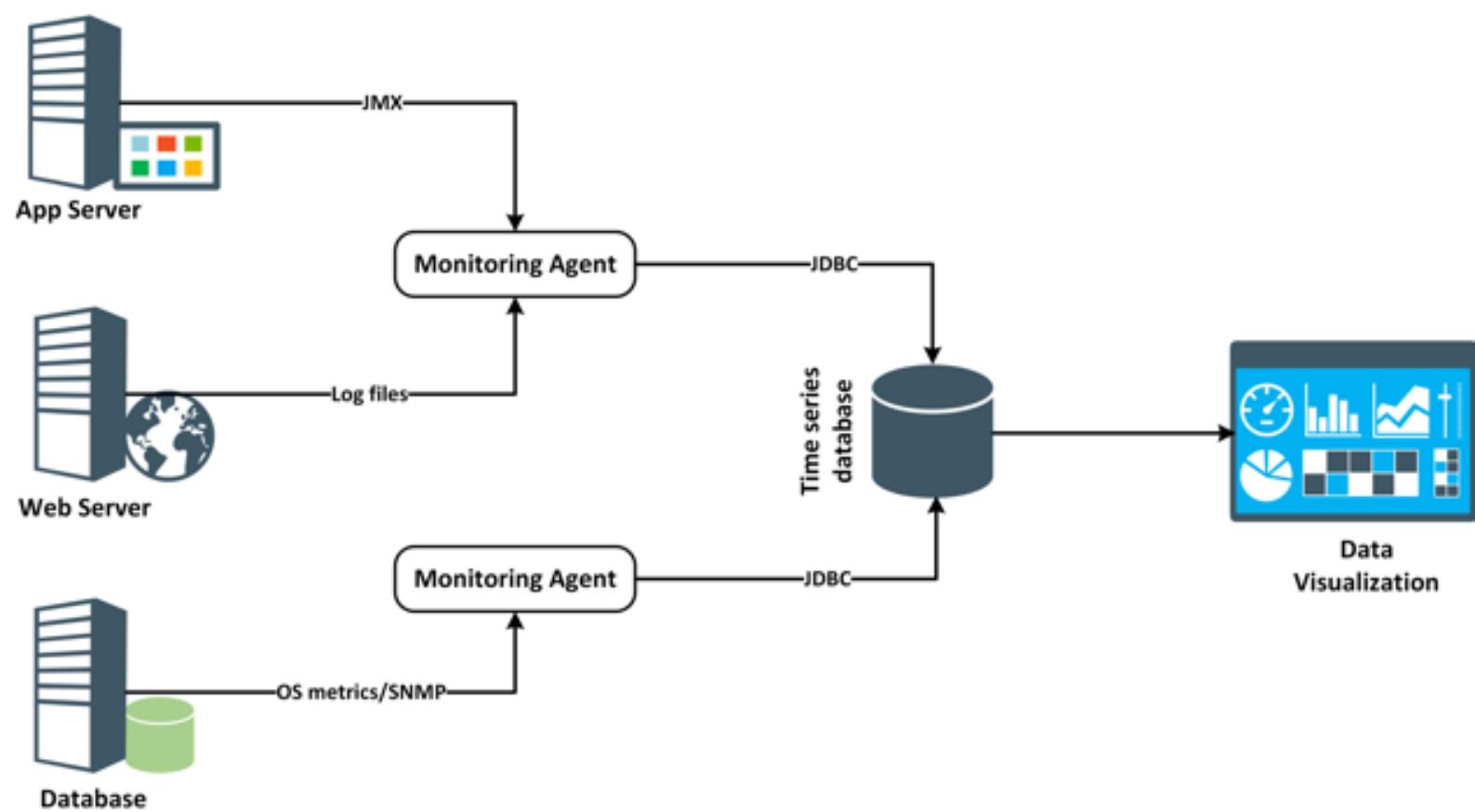
	Node ID8(@), IP	CPU	Heaps Used	CPU Load	Up Time	Size	Hi/Mi/Rd/Wr
	70BF070B(@n2), 192.168.1.35   8   20.94 %   0.20 %   01:29:50.557   Total: 307   Hi: 0						
	Heap: 0   Mi: 0						
	Off-Heap: 307   Rd: 0						
	Off-Heap Memory: 0   Wr: 0						
+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+
FC215913(@n1), 192.168.1.35   8   18.48 %   0.23 %   00:06:00.368   Total: 347   Hi: 0							
Heap: 0   Mi: 0							
Off-Heap: 347   Rd: 0							
Off-Heap Memory: 0   Wr: 0							
+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+	+-----+-----+-----+-----+-----+-----+-----+-----+
F0A6A794(@n0), 192.168.1.35   8   18.81 %   0.20 %   03:44:32.674   Total: 351   Hi: 0							
Heap: 0   Mi: 0							
Off-Heap: 351   Rd: 0							
Off-Heap Memory: 0   Wr: 0							

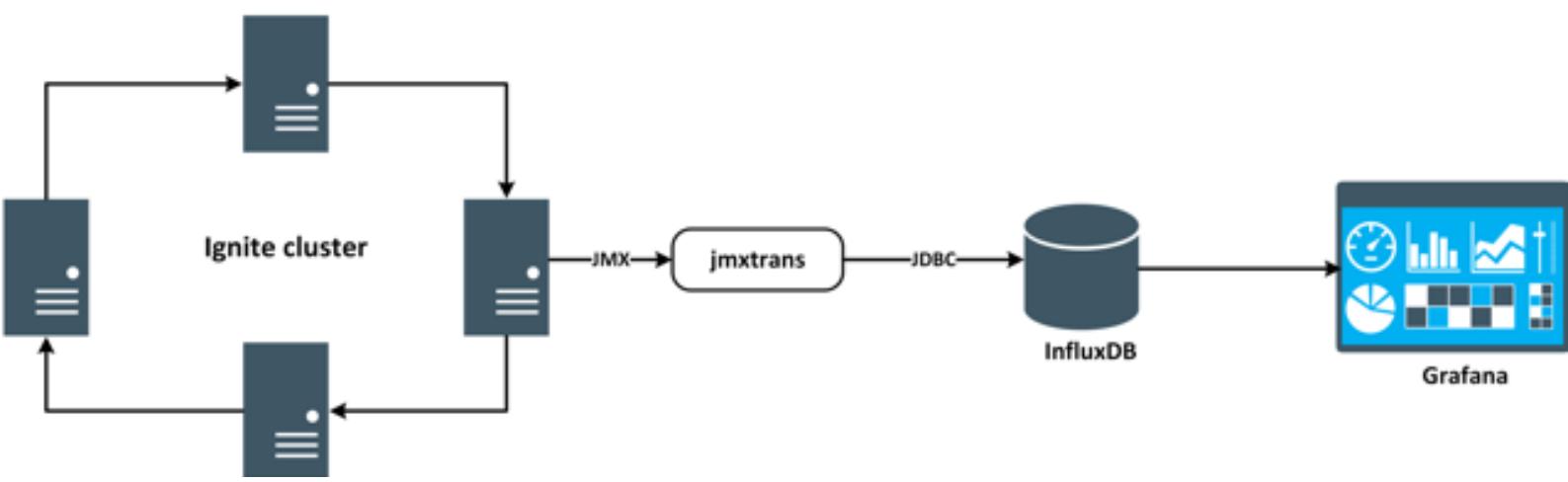














## Data Sources / ignitedb

Type: InfluxDB

### Settings

Name

ignitedb



Default



Type

InfluxDB

### HTTP

URL

http://localhost:8086



Access

Browser

Help ▾

### Auth

Basic Auth



With Credentials



### InfluxDB Details

Database

ignitesdb

User

Password

name: jvmMemory				
HeapMemoryUsage_committed	HeapMemoryUsage_init	HeapMemoryUsage_max	HeapMemoryUsage_usage	HeapMemoryUsage_free
1029177344	1073741824	1029177344	87948536	1029177344
1029177344	1073741824	1029177344	108812464	1029177344

 Data source is working



Home -



Create

- Dashboard
- Folder
- Import

Home Dashboard

## Graph

General

Metrics

Axes

Legend

Display

Alert

Time range

Data Source

default ▾

▼ A

FROM

default

jvmMemory

WHERE

+

SELECT

field (HeapMemoryUsage\_used)

mean ()

+

GROUP BY

time (1s)

fill (null)

+

FORMAT AS

Time series ▾

▼ B

FROM

default

threads

WHERE

+

SELECT

field (ThreadCount)

mean ()

+

GROUP BY

time (1s)

fill (null)

+

FORMAT AS

Time series ▾

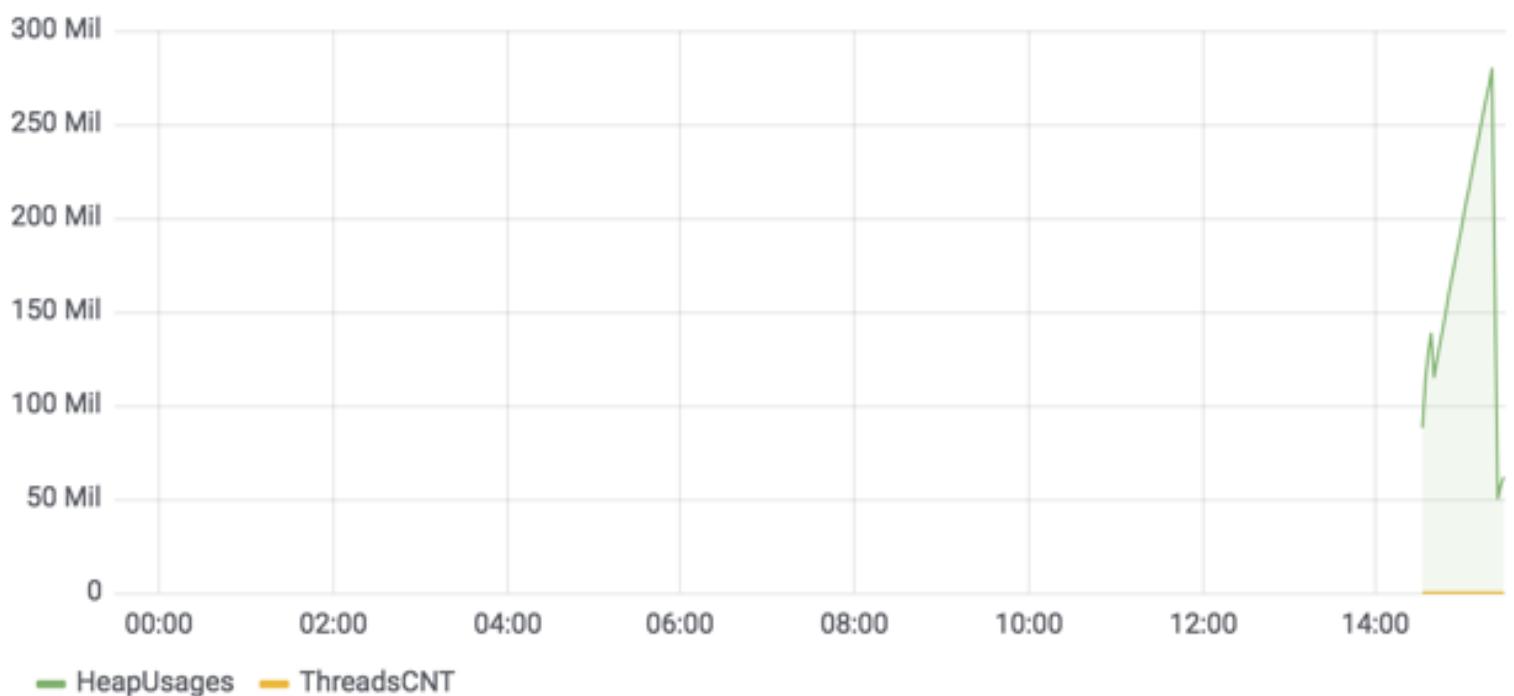
ALIAS BY

HeapUsages

ALIAS BY

ThreadCnt

### Ignite JVM metrics ▾



Total server nodes

Cluster topology version

5

5

ignite JVM metrics

Total up time

2024367

