

# Big Data for Oracle DBAs

Arup Nanda

# YAHOO!

```
fcrawler.looksmart.com - - [26/Apr/2000:00:00:12 -0400] "GET /contacts.html
HTTP/1.0" 200 4595 "-" "FAST-WebCrawler/2.1-pre2 (ashen@looksmart.net)"
fcrawler.looksmart.com - - [26/Apr/2000:00:17:19 -0400] "GET /news/news.html
HTTP/1.0" 200 16716 "-" "FAST-WebCrawler/2.1-pre2 (ashen@looksmart.net)"
```

```
ppp931.on.bellglobal.com - - [26/Apr/2000:00:16:12 -0400] "GET
/download/windows/asctab31.zip HTTP/1.0" 200 1540096
"http://www.htmlgoodies.com/downloads/freeware/webdevelopment/15.html"
"Mozilla/4.7 [en]C-SYMPA (Win95; U)"
```

```
123.123.123.123 - - [26/Apr/2000:00:23:48 -0400] "GET /pics/wpaper.gif
HTTP/1.0" 200 6248 "http://www.jafsoft.com/asctortf/" "Mozilla/4.05
(Macintosh; I; PPC)"
```

```
123.123.123.123 - - [26/Apr/2000:00:23:47 -0400] "GET /asctortf/ HTTP/1.0" 200
8130 "http://search.netscape.com/Computers/Data_Formats/Document/Text/RTF"
"Mozilla/4.05 (Macintosh; I; PPC)"
123.123.123.123 - -
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223.123.123.123 - - [26/Apr/2000:00:16:12 -0400] "GET
http://www.htm
Mozilla/4.7 [e
223.123.123.123 HTTP/1.0" 200 6
(Macintosh; I;
223.123.123.123
8130 "http://se
Mozilla/4.05 (
223.123.123.123

223.123.123.123 - - [26/Apr/2000:00:23:48 -0400] "GET /pics/wpaper.gif
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223.123.123.123 - -
```

petabytes  
unpredictable format  
transient



Metadata Repository

Google



# Volume



Variety

**V**olume

**V**ariety

**V**elocity

Velocity

## CUSTOMERS

CUST\_ID

NAME

ADDRESS



## CUSTOMERS

CUST\_ID

NAME

ADDRESS

SPOUSE

## CUSTOMERS

CUST\_ID

NAME

ADDRESS

## SPOUSES

CUST\_ID

NAME

CURRENT

## EMPLOYERS

CUST\_ID

NAME

CURRENT

## CUSTOMERS

CUST\_ID

NAME

ADDRESS

## SPOUSES

CUST\_ID

NAME

CURRENT

*Mutually Exclusive, Maybe not?*

Name = Data

Relationship status = Data

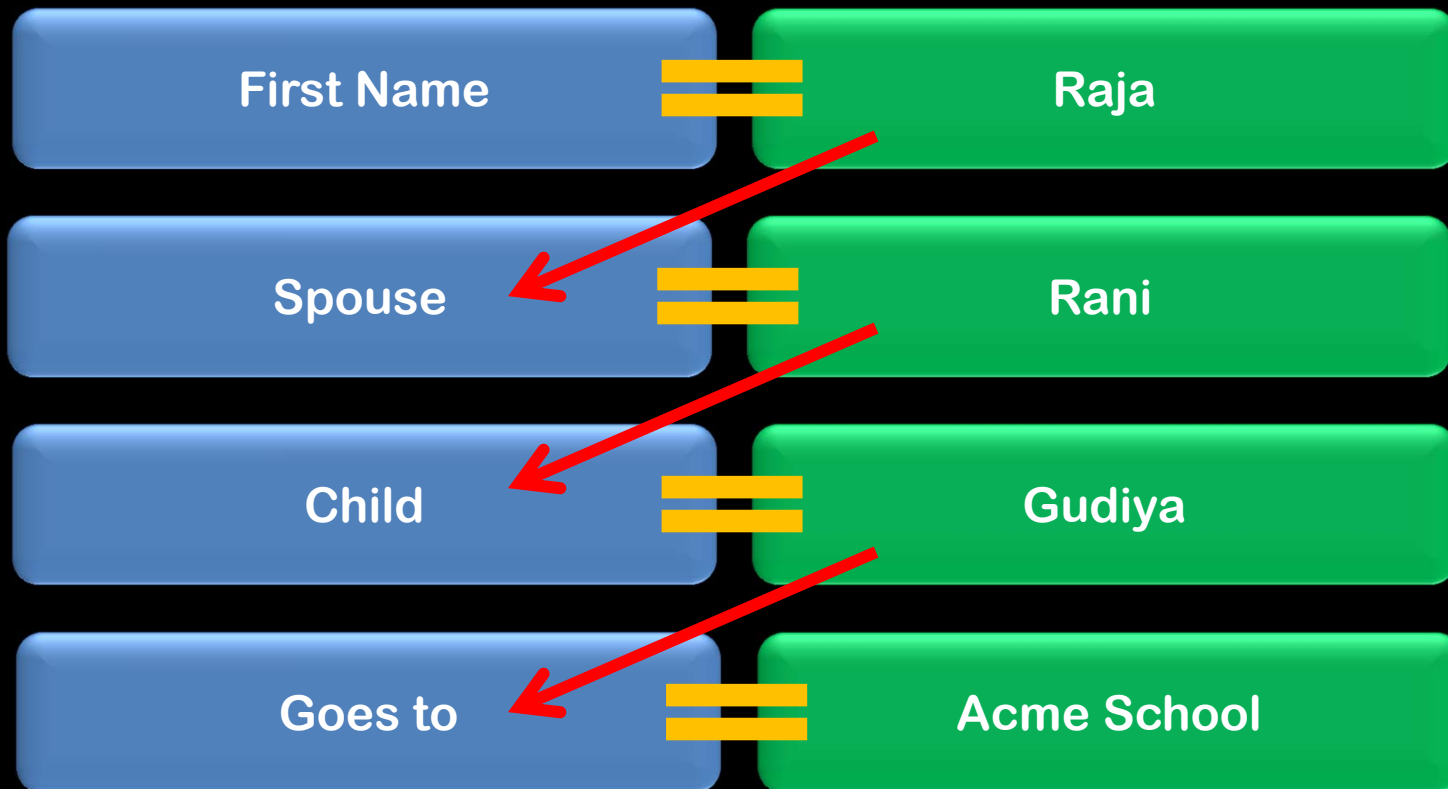
Married to = Data

In a relationship with = Data

Friends = Data, Data, Data

Likes = Data, Data

*Multiple Data Points*



First Name



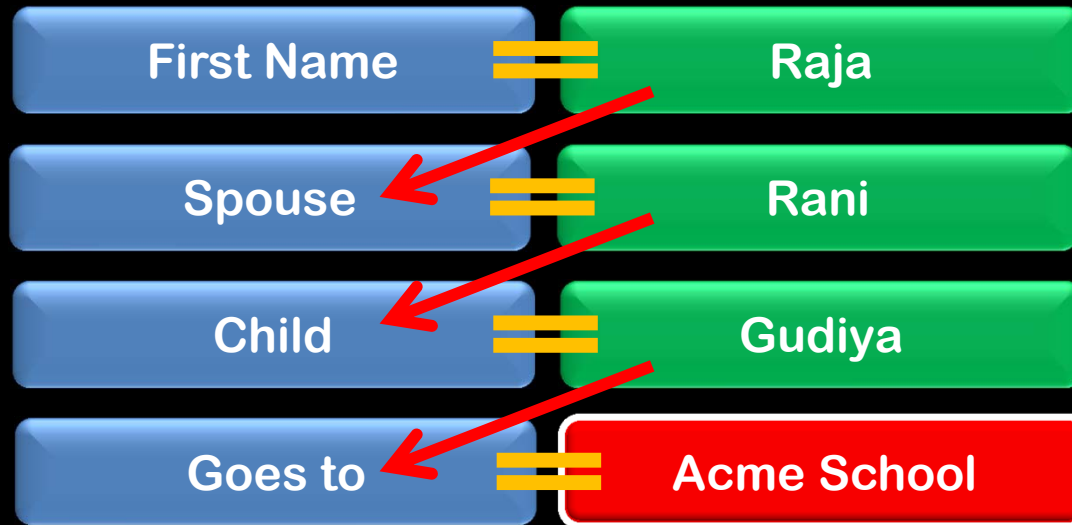
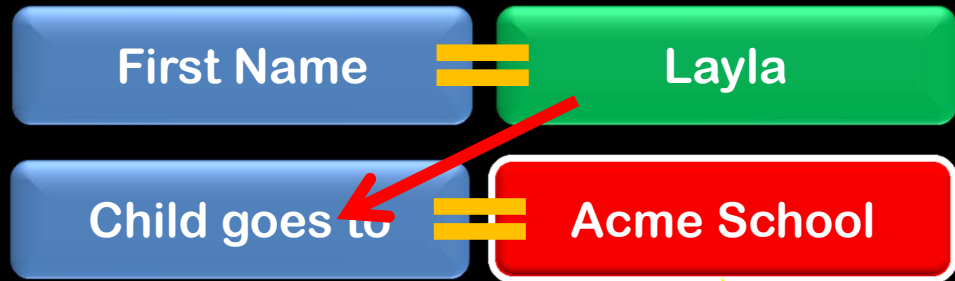
Layla

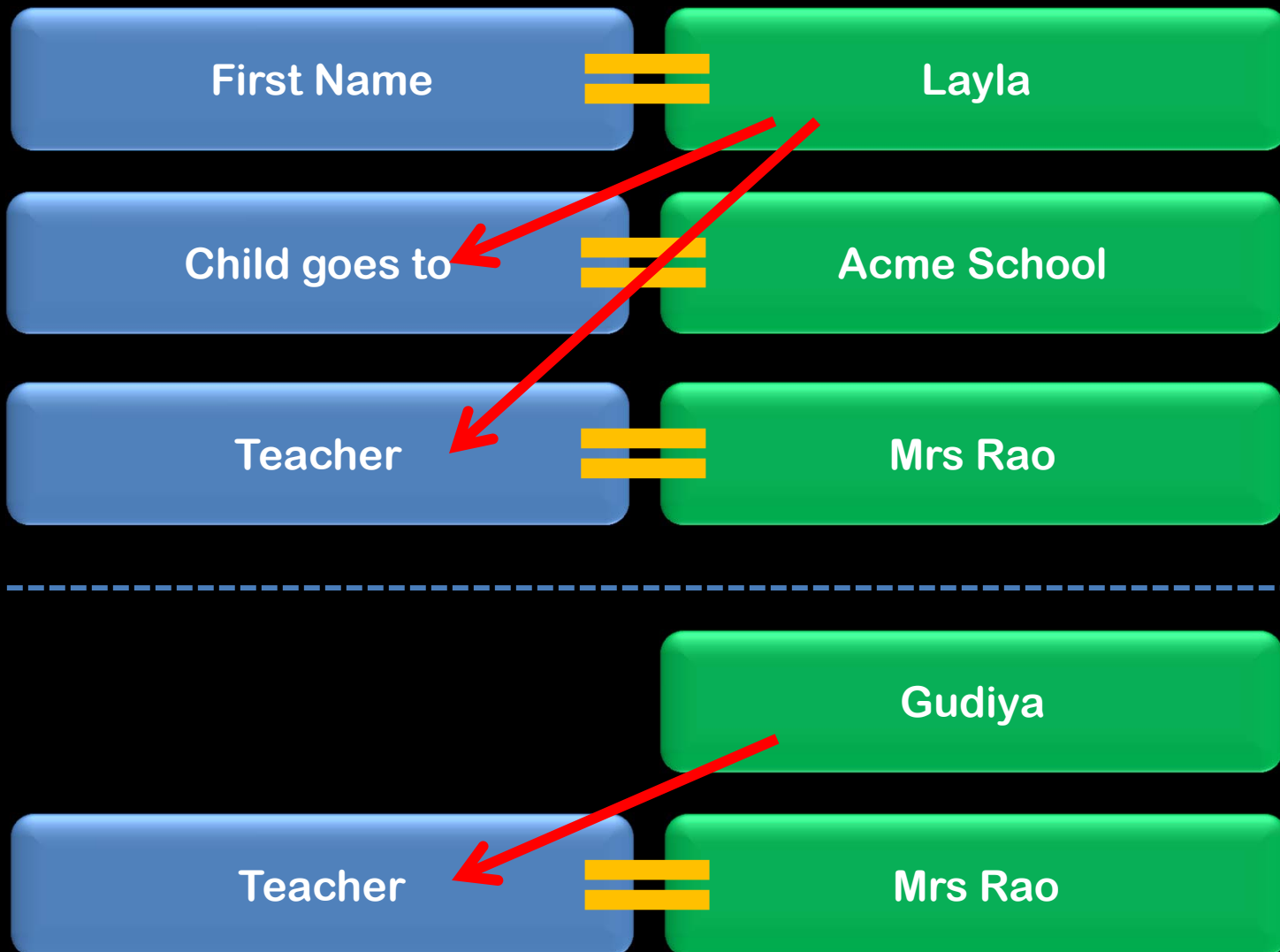
Child goes to



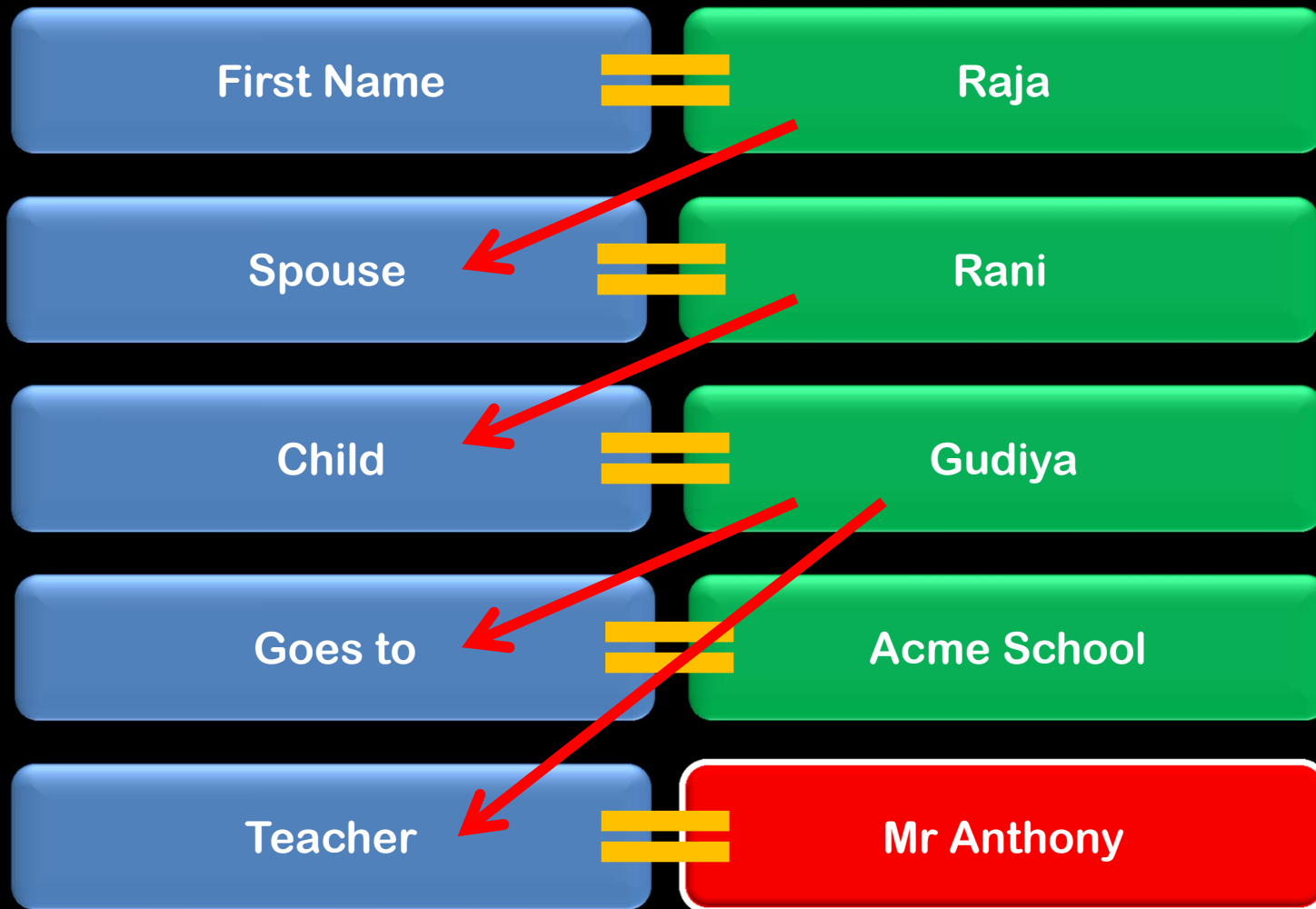
Acme School

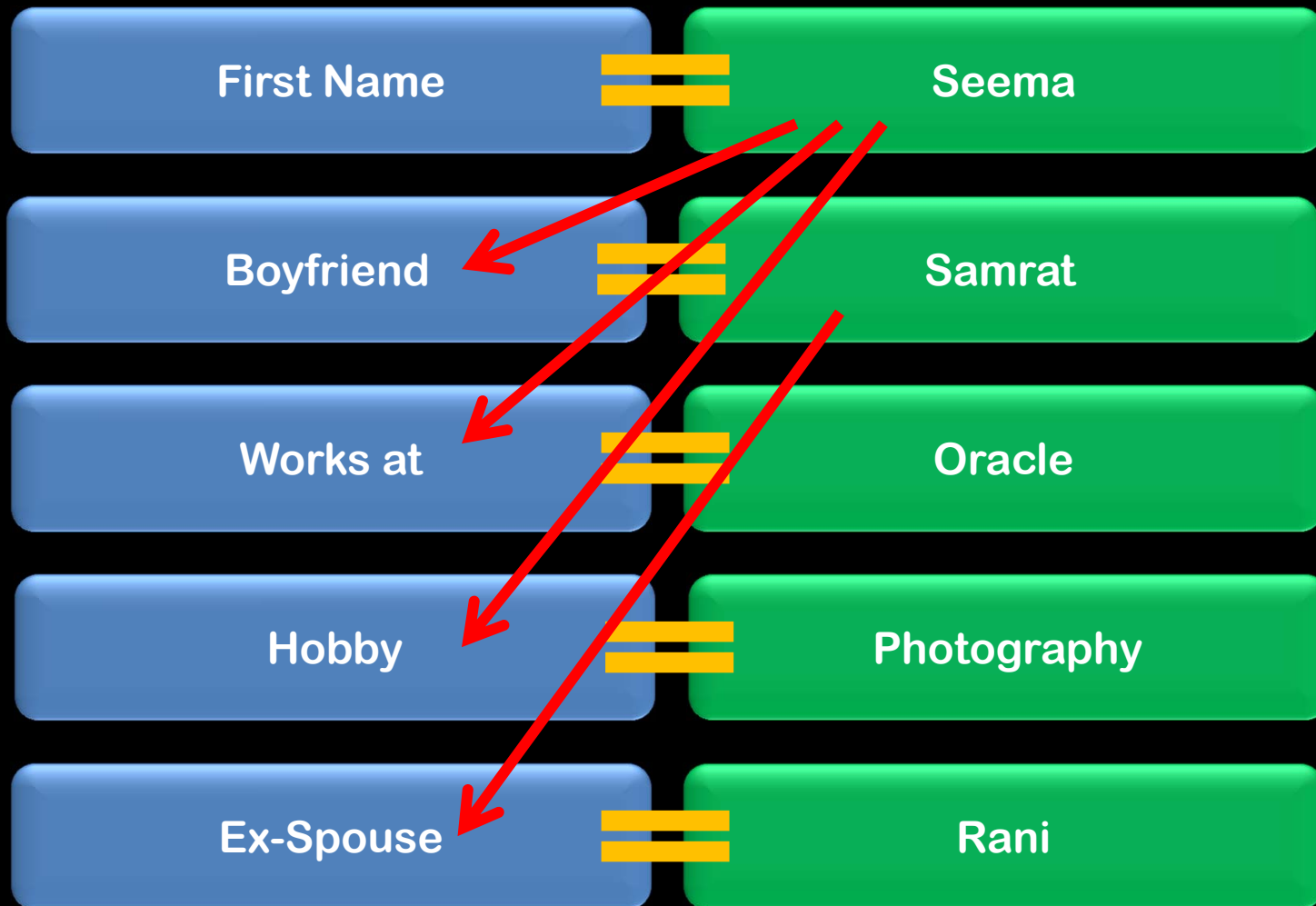


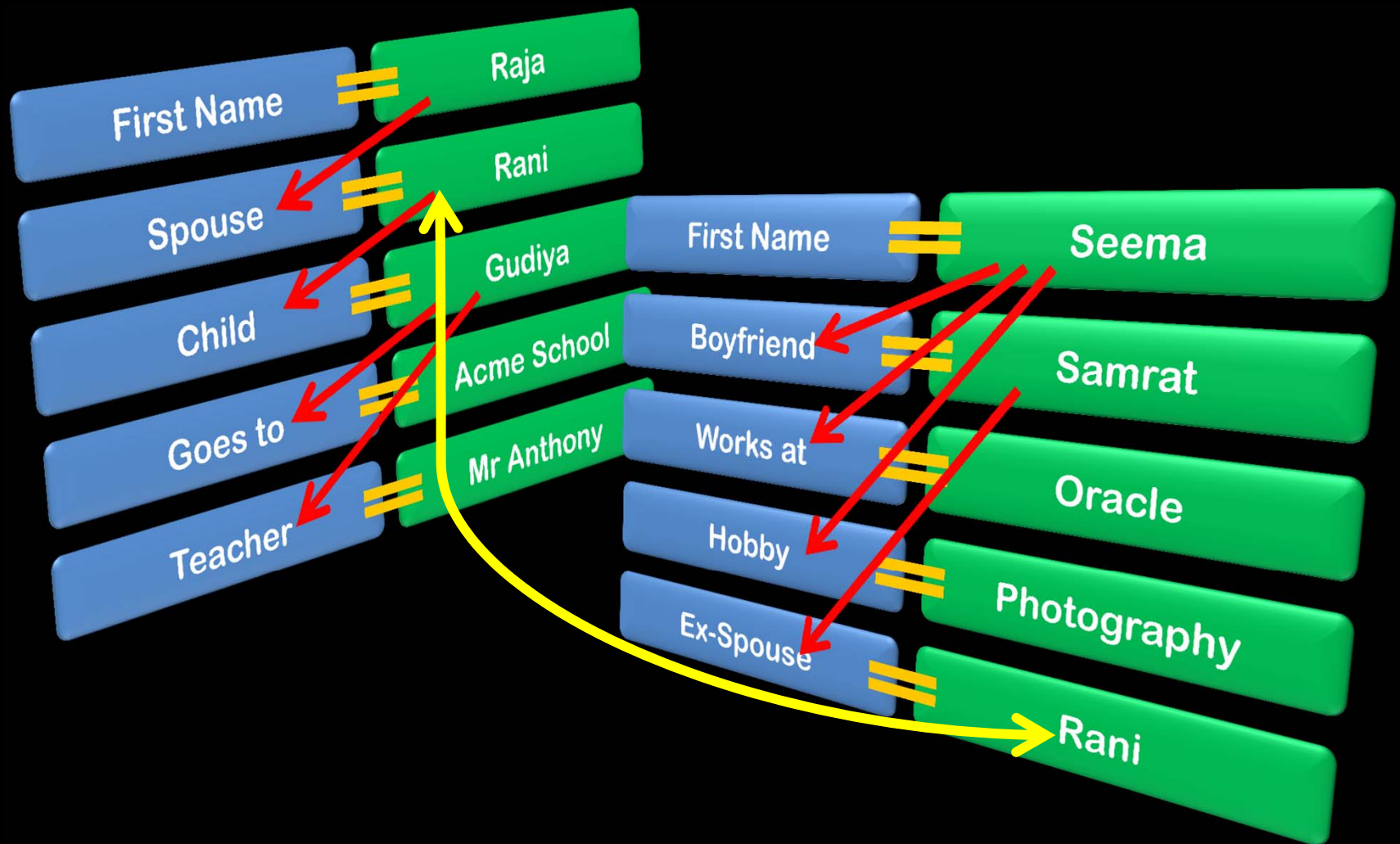








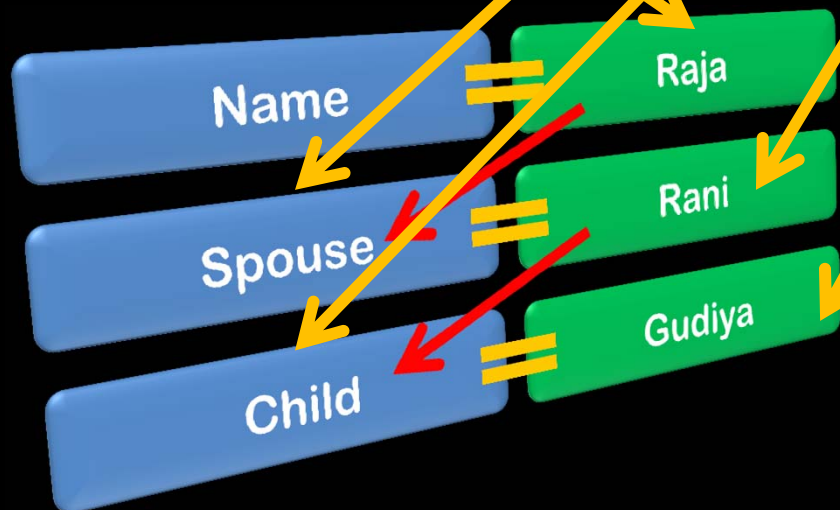






**Key-Value Pair**

Raja Singh and his wife Rani,  
along with their daughter  
Gudiya, were strolling on the  
beach when they heard a crash.  
Raja ran towards ...

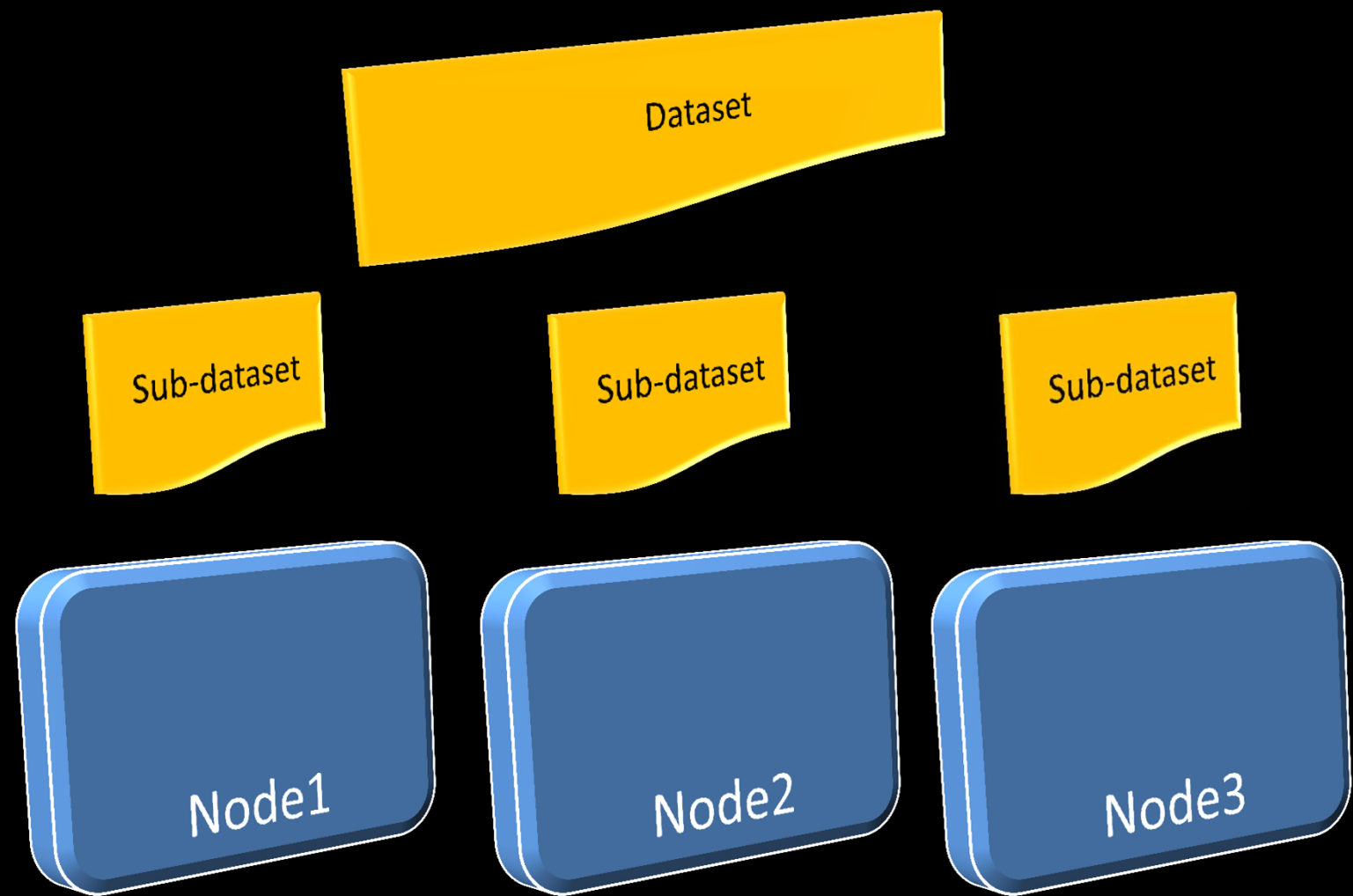


# Scalability

ACID Properties

Reliability at a cost

Large overhead in data processing

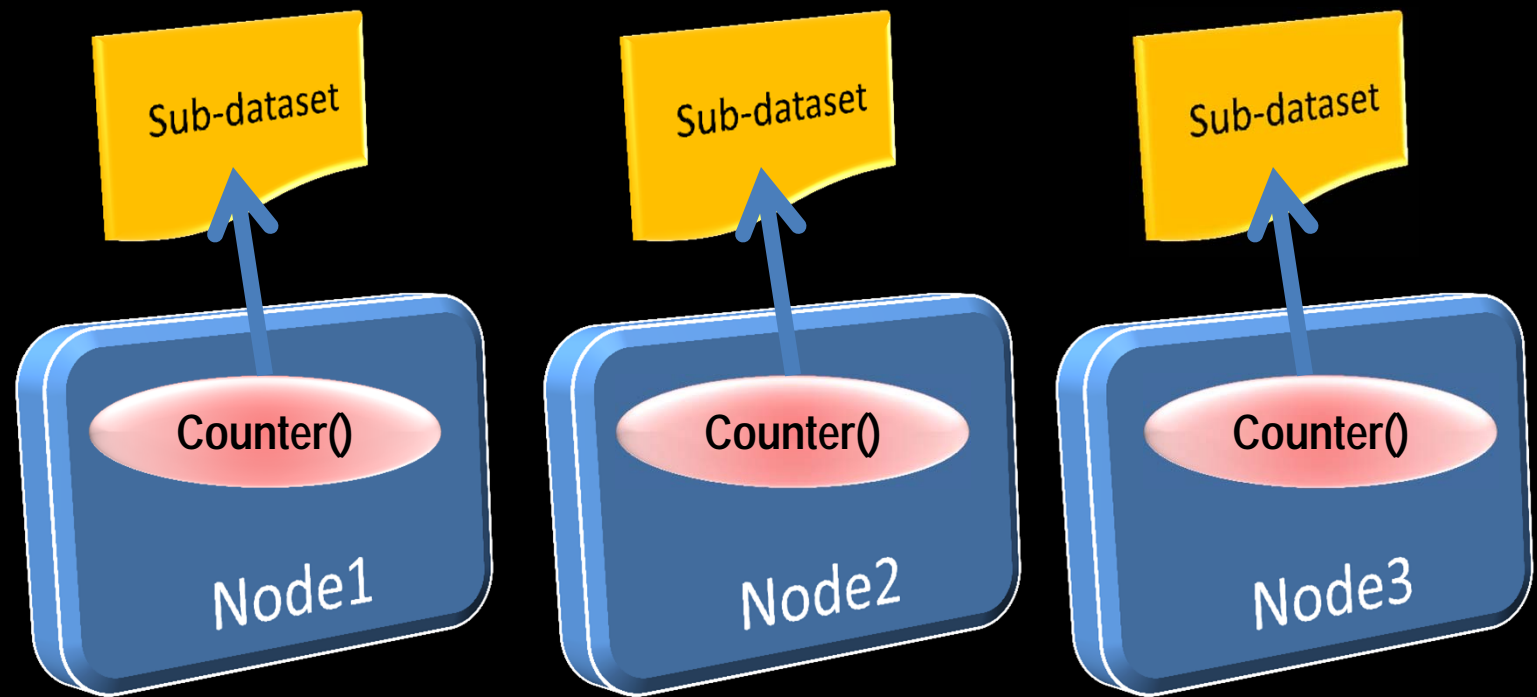


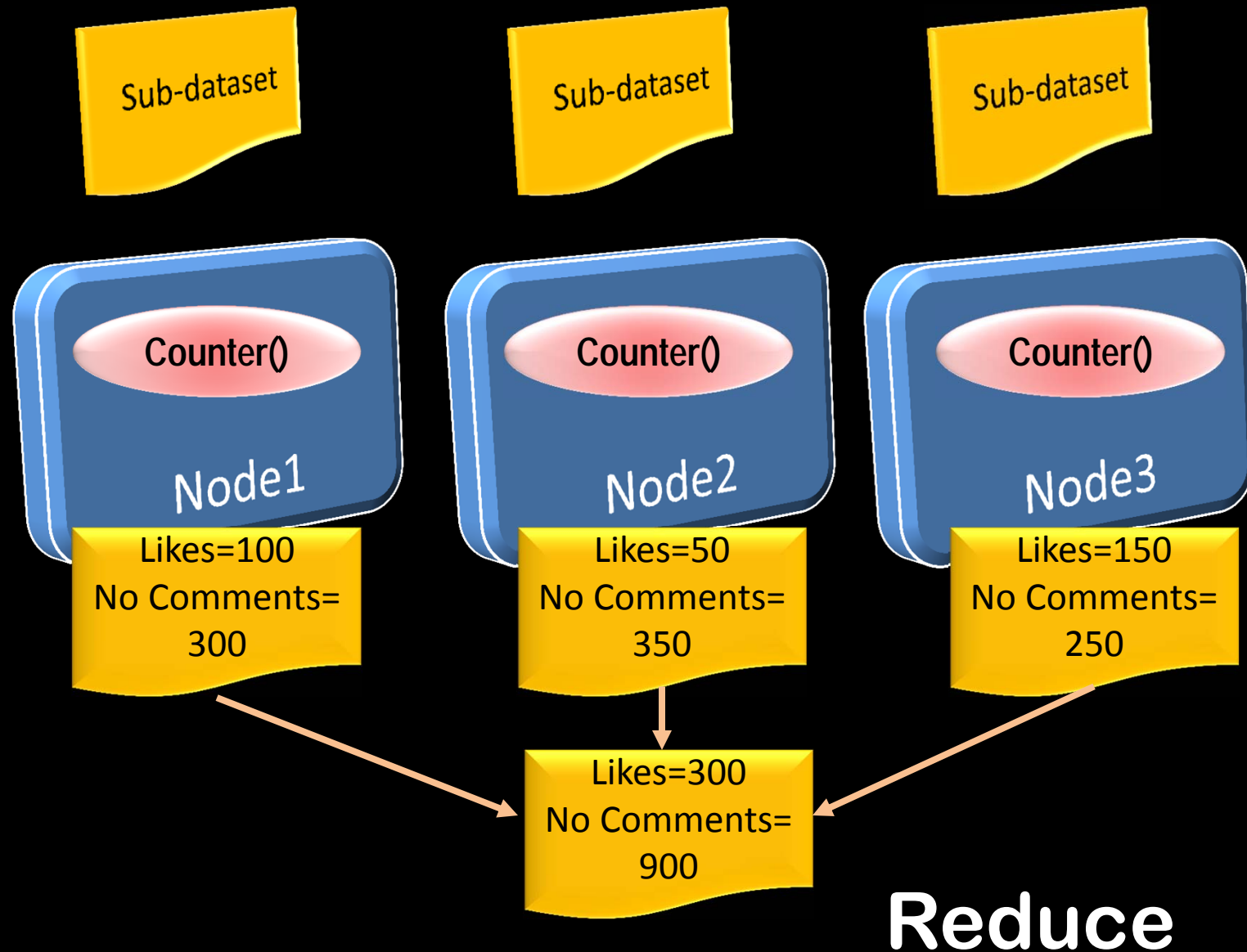
**Map**

## *Counter()*

```
begin
  get post
  while (there_are_remaining_posts) loop
    extract status of "like" for the specific post
    if status = "like" then
      like_count := like_count + 1
    else
      no_comment := no_comment + 1
    end if
  end loop
end
```



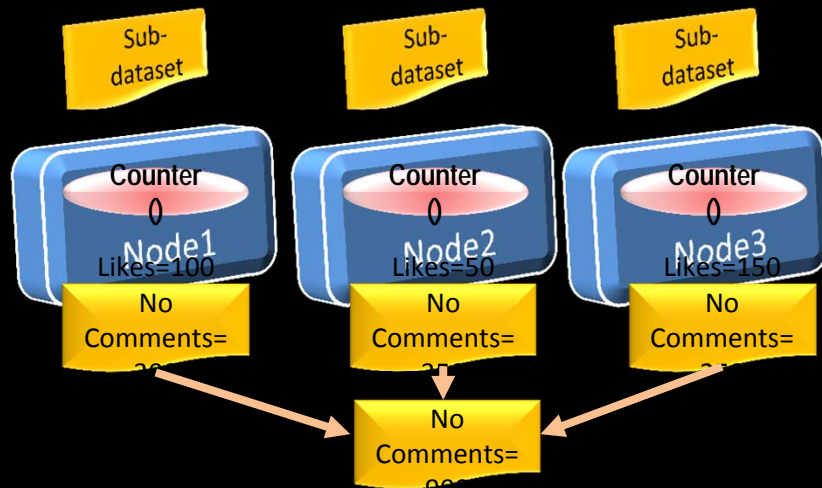




*Dividing the  
work among  
different  
nodes*

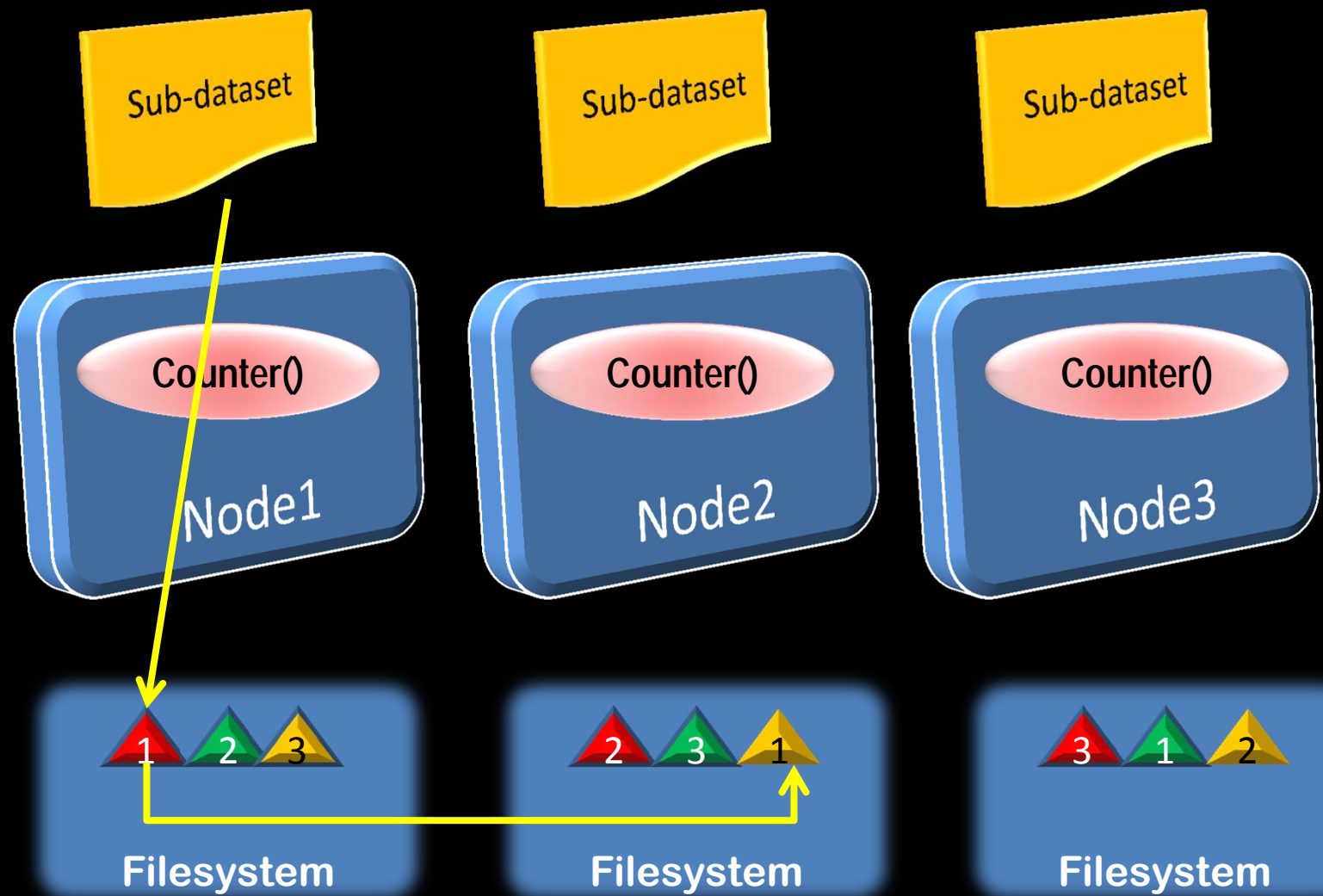
## **Map / Reduce**

*Collating the  
results to get  
final answer*

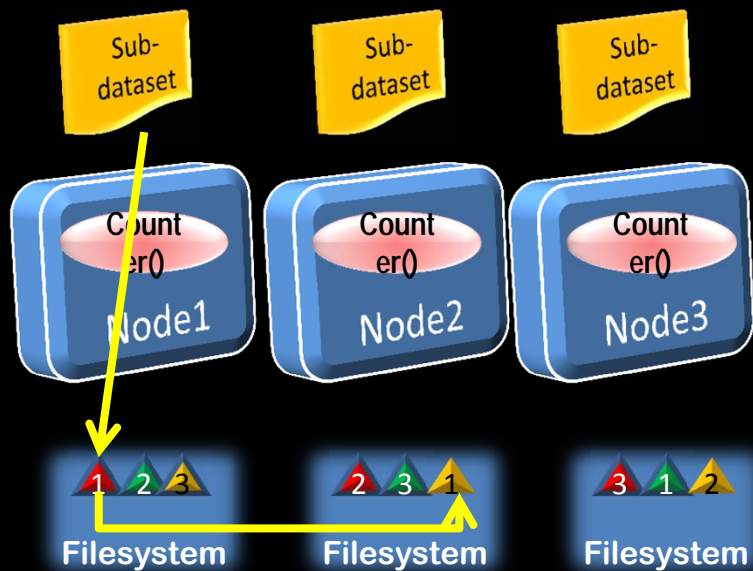


- Divide the workload
- Submit and track the jobs
- If a job fails, restart it on another node
- ...

# Hadoop

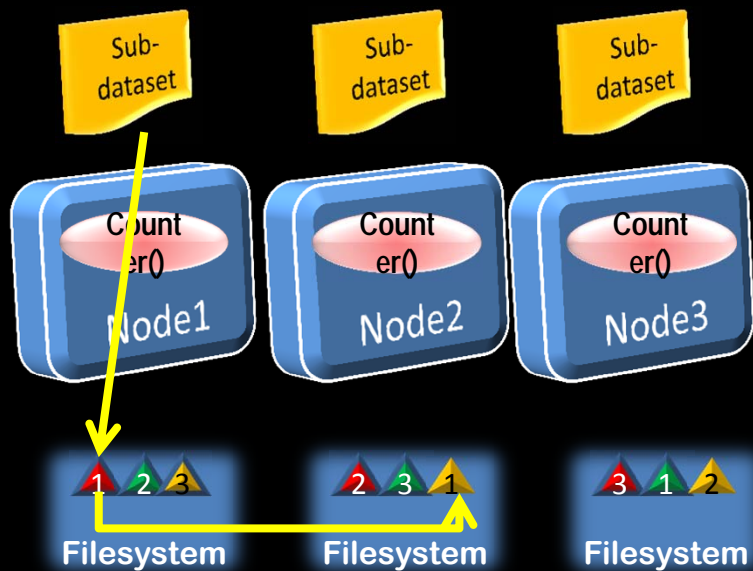


# Hadoop Distributed Filesystem (HDFS)



## Comparison with RAC

- *Not **shared** storage*
- *Data is **discrete***
- ***Version** control not required*
- ***Concurrency** not required*
- *Transactional **integrity** across nodes not required*



## Advantages of Hadoop

- Processors need not be super-fast
- Immensely scalable
- Storage is redundant by design
- No RAID level required





Website logs  
Combine with structured data  
SOAP Messages  
Twitter, Facebook ...





Data Access: through programs

NoSQL Databases

SQL-interface required

Hive

HiveQL

# HiveQL

```
select count(*)  
from store_sales ss  
    join household_demographics hd on (ss.ss_hdemo_sk  
        = hd.hd_demo_sk)  
    join time_dim t on (ss.ss_sold_time_sk = t.t_time_sk)  
    join store s on (s.s_store_sk = ss.ss_store_sk)  
where  
    t.t_hour = 8  
    t.t_minute >= 30  
    hd.hd_dep_count = 2  
order by cnt;
```

**HBase**

A database built on  
Hadoop

**HiveQL**

An SQL-like (but not the  
same) query language

**Impala**

A realtime SQL-interface  
to Hadoop

## Map/Reduce

*Divide the work and  
collate the results*



*Needs development  
in Java, Python, Ruby, etc.*

*A framework to work on  
the dataset in parallel*

**Pig**

**Pig Latin**

*Scripting language for  
Pig*

```
select category, avg(pagerank)
from urls
where pagerank > 0.2
group by category
having count(*) > 1000000
```

## SQL

## Pig Latin

```
good_urls = FILTER urls BY pagerank > 0.2;
groups = GROUP good_urls BY category;
big_groups = FILTER groups BY COUNT(good_urls)>1000000;
output = FOREACH big_groups GENERATE category,
AVG(good_urls.pagerank);
```

Divide and conquer is the key  
Non-shared division of data is important  
    Local access  
    Redundancy  
Hadoop is a framework  
    You have to write the programs  
Big data is batch-oriented  
Hive is SQL-like  
Pig Latin is a 4GL-like scripting language

# Thanks!

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