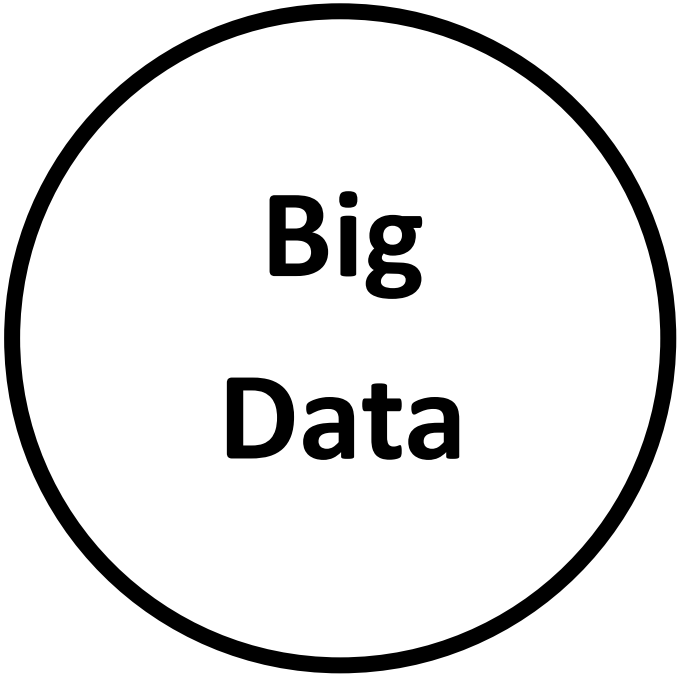


# Pig Picture



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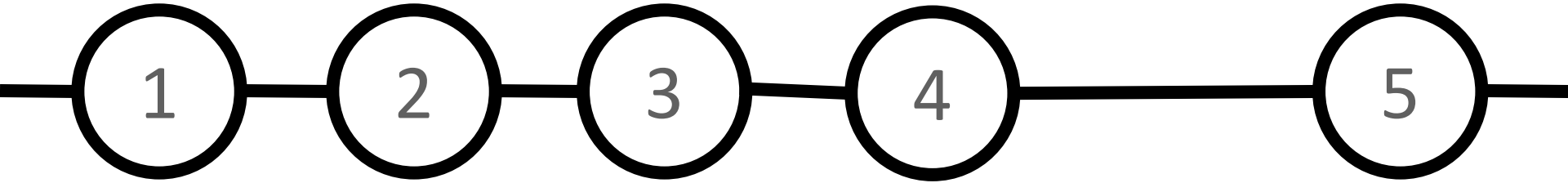
# AGENDA



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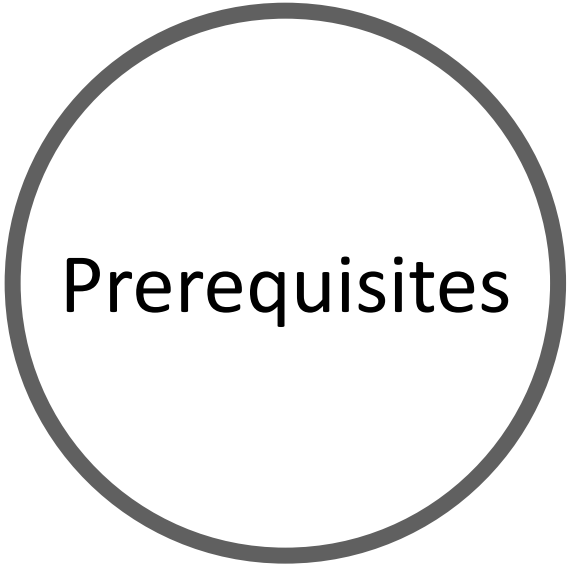


Concepts & Tools



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# Prerequisites

- ✔ Any programming language (Basics , OOP, Multi Threads ,Socket).
- ✔ Database ( Basic SQL : DML , DDL).
- ✔ OS ( H/w => kernel => shell => apps) & **File System**.
- ✔ Network ( Basic Configuration e.g.: ipconfig , ping , …etc. ).
- ✔ VMware ( Host only , Bridge , Nat )
- ✔ IDE (Main Java IDE like NetBeans , Eclipse , IntelliJ )



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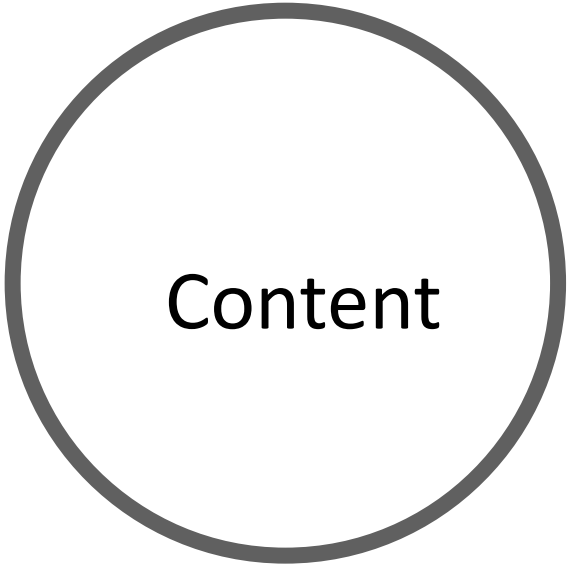


Lab Syllabus



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# Lab Syllabus

- ✔ Pig Picture ( Client – Server , sockets , Hadoop History ) (1 Lab)
- ✔ Hadoop HDFS. ( 2 Lab)
- ✔ Map – Reduce Model. (2 ~ 3 Lab).
- ✔ YARN.  (1 Lab)
- ✔ Hadoop Cluster (Multi Node).  (1 Lab)
- ✔ Hive. ( 2 Lab)
- ✔ Spark . (1 ~ 2 Lab)
- ✔ Cloudera Navigator as  a Hadoop Commercial Tool.


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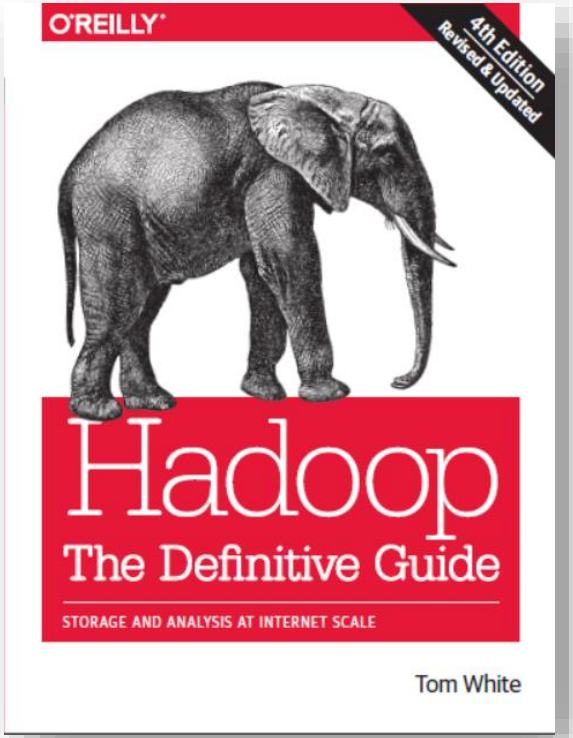
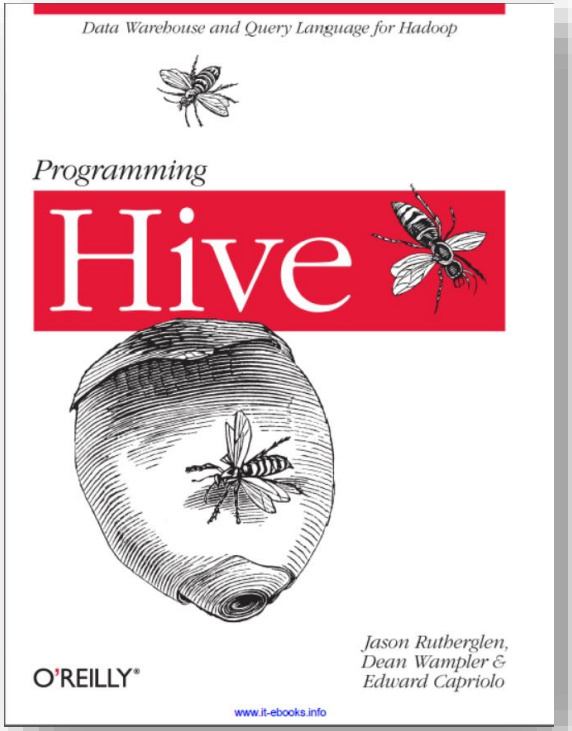
# Text Boxes & Tutorials




cloudera

Cloudera Essentials
for Apache Hadoop

databricks



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# History

- Human need  Numbers (Supermarket Case)
  - Files => DB  =>  Server Problem (scalability).
  - Types  of Scalability (Vertical  vs Horizontal).
  - Main Problem  data( Storing & Computation).
- **Google Search Engine :** (index  for all web pages  on internet )
  - 2004 [Google] (processing  on intensive data) using map reduce.
  - **2003** [Google] ( Store Data  in file system ) using GFS.
- **Terminologies** : Big Data , Hadoop ,  Map Reduce , DS , ML , DM , DS , .. etc.
- **3V - 7 V** : Data changed  based  on volume  , variety , velocity , … etc.


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# History

- **2006 Yahoo:** Doug Cutting implemented an open source s/w called Hadoop solve data storage & computation problem.

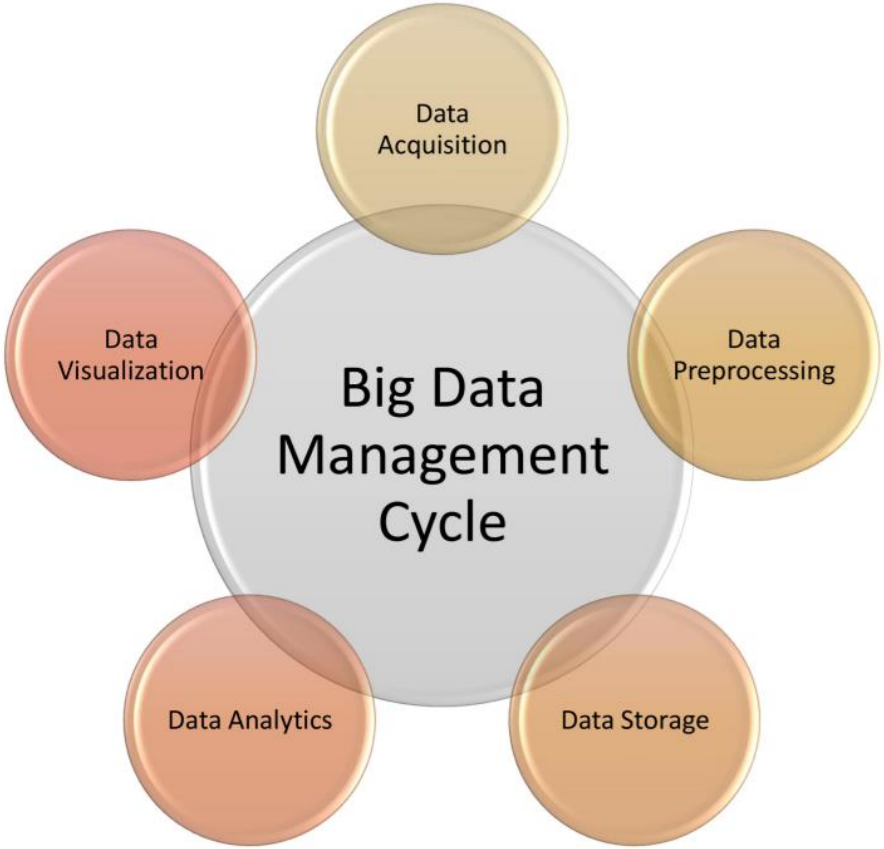

- **2008 Cloudera:** Dr.Amr et al founded his company and he provide Hadoop services ,support , training ,and certifications.

cloudera®

# Hadoop Vendors




# BDMLC



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# Data Types

- Structure(Database)

order (o)

| id | creation_date | customer |
|---|---|---|
| o1 | 2017-08-11 10:33:37 | c1 |
| o2 | 2017-08-13 16:28:15 | c1 |

product(p)

| name | quantity | warehouse |
|---|---|---|
| phone | 84 | Paris |
| cup | 99 | Nice |

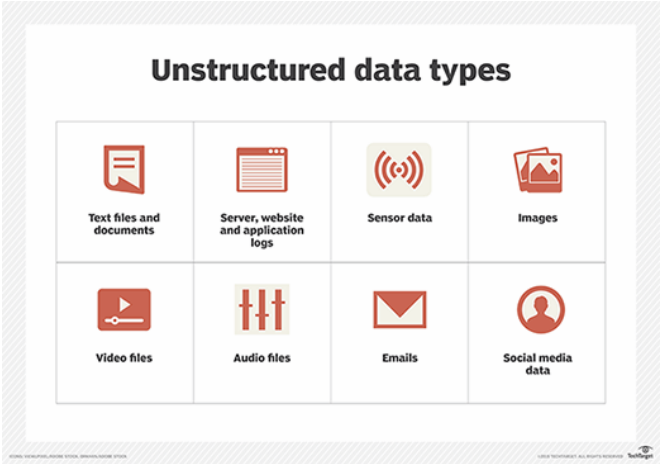
rt1 rt2

order line (ol)

| id | order | product | quantity | price |
|---|---|---|---|---|
| ol1 | o1 | phone | 2 | 1190 |
| ol2 | o1 | cup | 4 | 1 |
| ol3 | o2 | cup | 3 | 1 |
| ol4 | o2 | phone | 2 | 1190 |

- semi-Structure


- Unstructure(o.w)



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# XML Vs JSON Example

```xml
<?xml version="1.0" encoding="UTF-8"?>
<DatabaseInventory>
  <DatabaseName>

<GlobalDatabaseName>production.cubicrace.com</
GlobalDatabaseName>
    <OracleSID>production</OracleSID>
    <Administrator EmailAlias="piyush"
Extension="6007">Piyush
Chordia</Administrator>
    <DatabaseAttributes Type="Production"
Version="9i" />
    <Comments>All new accounts need to be
approved.</Comments>
  </DatabaseName>
  <DatabaseName>

<GlobalDatabaseName>development.cubicrace.com<
/GlobalDatabaseName>
    <OracleSID>development</OracleSID>
    <Administrator EmailAlias="kalpana"
Extension="6008">Kalpana
Pagariya</Administrator>
    <DatabaseAttributes Type="Development"
Version="9i" />
  </DatabaseName>
</DatabaseInventory>
```

```
{
   DatabaseInventory: {
      DatabaseName: [
         {
            GlobalDatabaseName: "production.cubicrace.com",
            OracleSID: "production",
            Administrator: [
               {
                  EmailAlias: "piyush",
                  Extension: "6007",
                  value: "Piyush Chordia"
               }
            ],
            DatabaseAttributes: {
               Type: "Production",
               Version: "9i"
            },
            Comments: "All new accounts need to be approved."
         },
         {
            GlobalDatabaseName: "development.cubicrace.com",
            OracleSID: "development",
            Administrator: [
               {
                  EmailAlias: "kalpana",
                  Extension: "6008",
                  value: "Kalpana Pagariya"
               }
            ],
            DatabaseAttributes: {
               Type: "Development",
               Version: "9i"
            }
         }
      ]
   }
}
```



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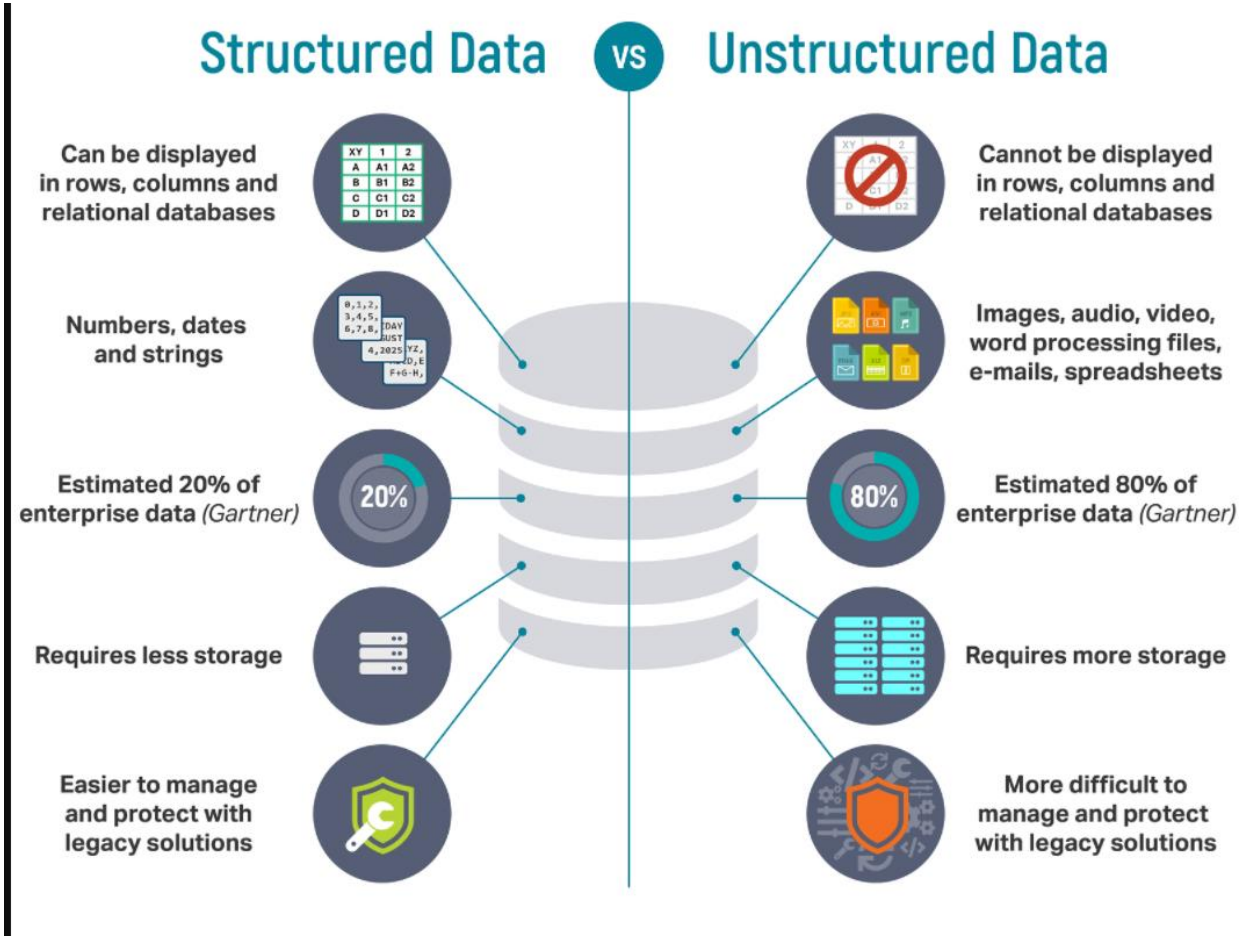




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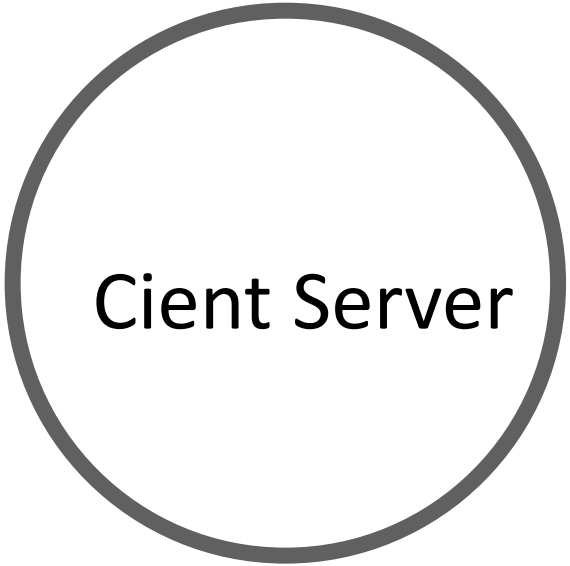


Architecture



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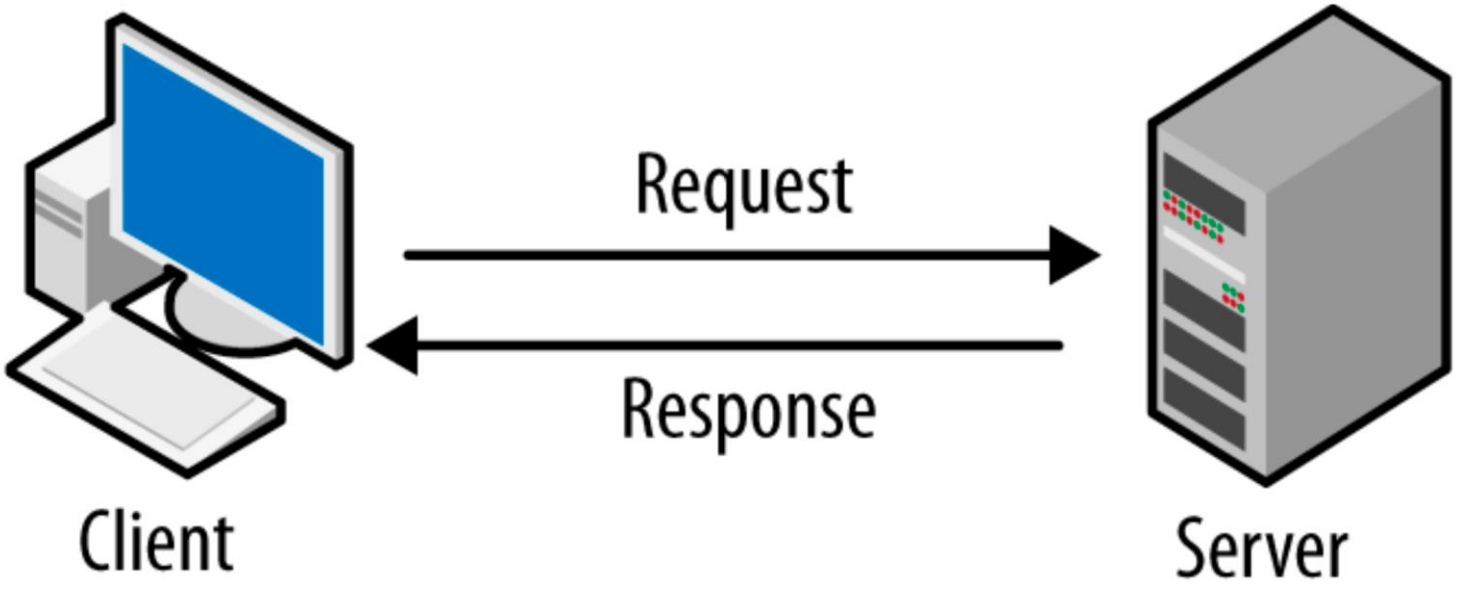
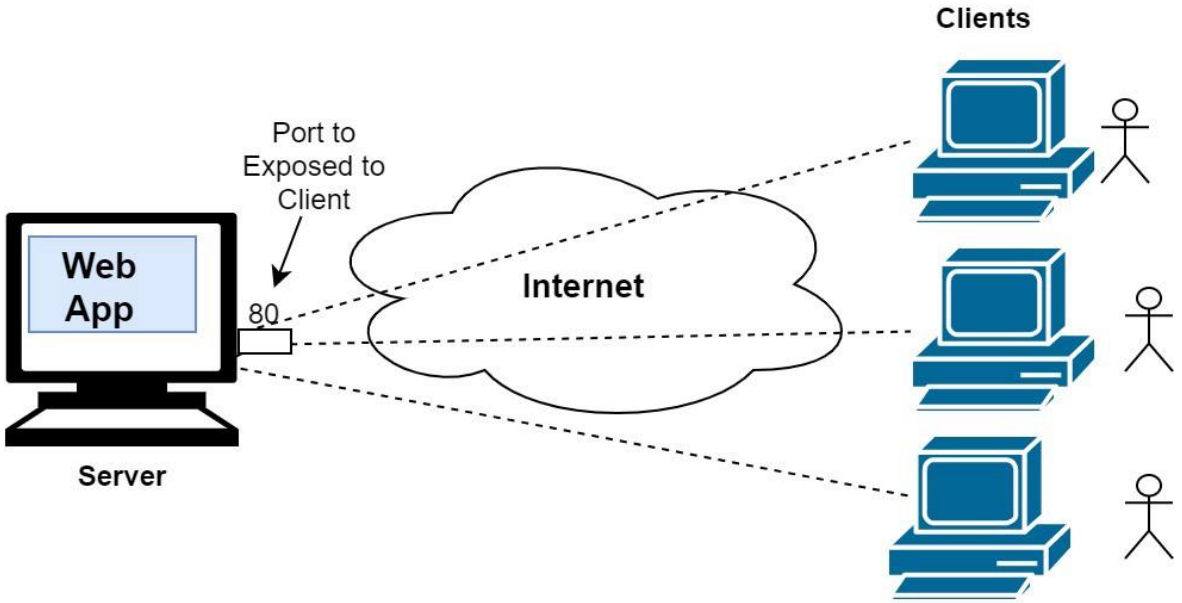
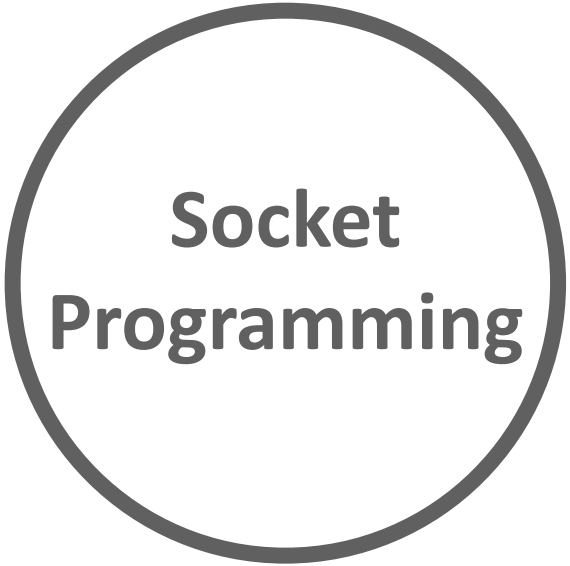



https://madooei.github.io/cs421_sp20_homepage/client-server-app/




https://nimesha-dilini.medium.com/simple-introduction-to-client-server-architecture-concept-7d2979bed31d




Main topic



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# Socket Programming

- Sockets provide the communication mechanism between two computers using TCP.
- A client program creates a socket on its end of the communication and attempts to connect that socket to a server.
- When the connection is made, the server creates a socket object on its end of the communication. The client and server can now communicate by writing to and reading from the socket.


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# Establishing a TCP connection between two computers using sockets

- The server instantiates a ServerSocket object, denoting which port number communication is to occur on.
- The server invokes the accept() method of the ServerSocket class. This method waits until a client connects to the server on the given port.
- After the server is waiting, a client instantiates a Socket object, specifying the server name and port number to connect to.


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# Establishing a TCP connection between two computers using sockets cont.

- The constructor of the Socket class attempts to connect the client to the specified server and port number. If communication is established, the client now has a Socket object capable of communicating with the server.
- On the server side, the accept() method returns a reference to a new socket on the server that is connected to the client's socket.


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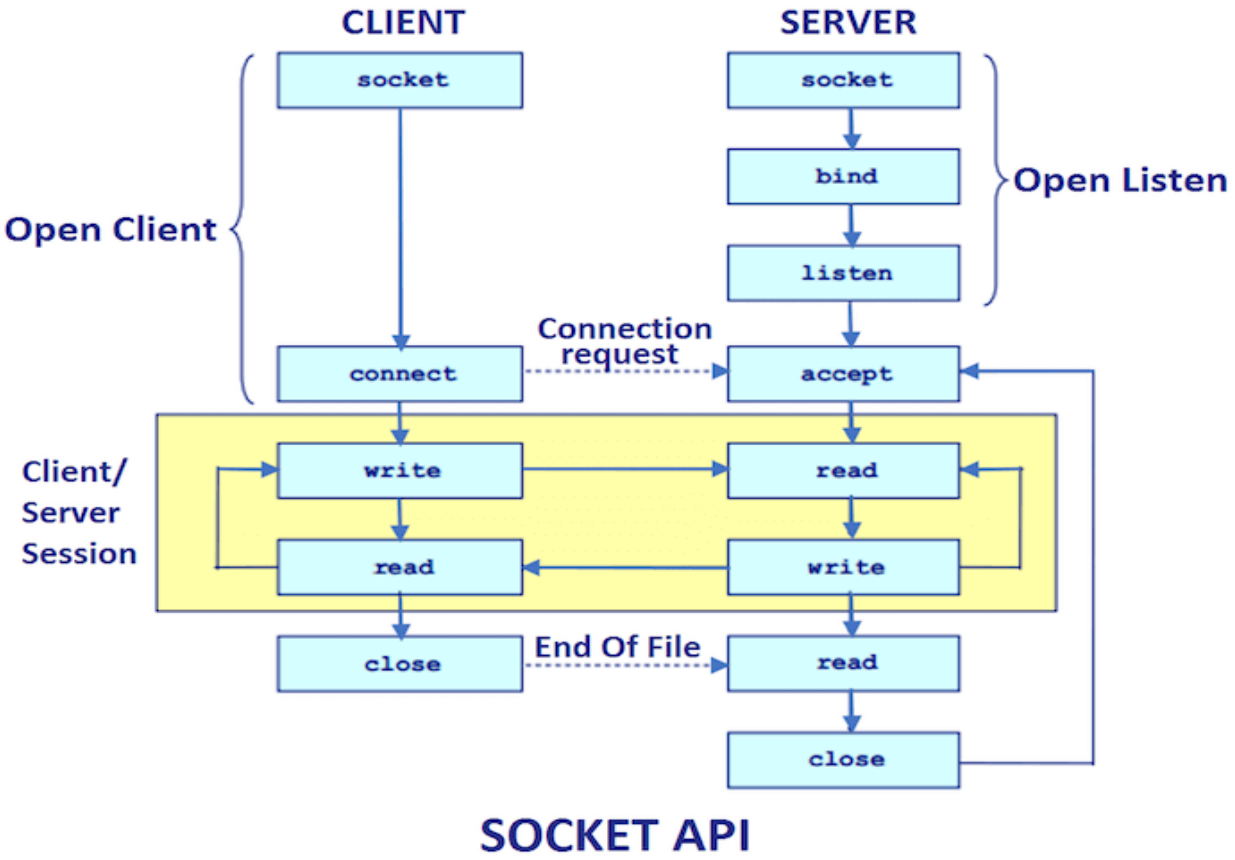


Source : https://static.javatpoint.com/core/images/socket-programming.png



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# Assignment 1 : DeadLine Next Lab

1- Install Vmware & Ubunut Linux (any version).

2- Install Java (jdk)

- **- sudo apt-get update**
- **- sudo apt-get upgrade**
- **- sudo apt-get install openjdk-8-jdk**
- **- java –version => output  java1.8**

3- Install JAVA IDE. (**NetBeans or IntelliJ**)

4- Write matrix multiplication distributed model using client/server.(Bonus)



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# QUESTIONS



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# THANK YOU!



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