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What's Behind the Curtain? The Infrastructure Supporting Big Data

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What's Behind the Curtain?

the infrastructure supporting Big Data

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Big, really big, data

practical definition of Big Data:

“current methods won’t work”

- IBM Systems and Technology Group

CERN: Higgs boson

▣ 200 Petabytes



Networking

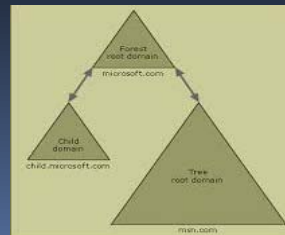
metagenomics :
human gut biome = 500 GBase
⇒ ~12 hrs

NOAA

Integrated Surface Weather Data
(1903-present)



Ethernet ⇒ Infiniband



Storage

Facebook: Instagram



commercial storage

- I/O bottleneck

NFS \Leftrightarrow HDFS

Exa 1,152,921,504,606,846,976 bytes

Peta 1,125,899,906,842,624 bytes

Tera 1,099,511,627,776 bytes

Giga 1,073,741,824 bytes

Mega 1,048,576 bytes

Kilo 1,024 bytes

Byte 1 byte

High-performance computing

real-time analysis

- Smart grid
- financials

large-scale analysis

- genomics
- retail data mining

not a “traditional”
supercomputer ⇒ HTC



the “Cloud”



concept:

- 2003 – “The Google File System”
- 2004 – “MapReduce: Simplified Data Processing on Large Clusters”

⇒ Hadoop

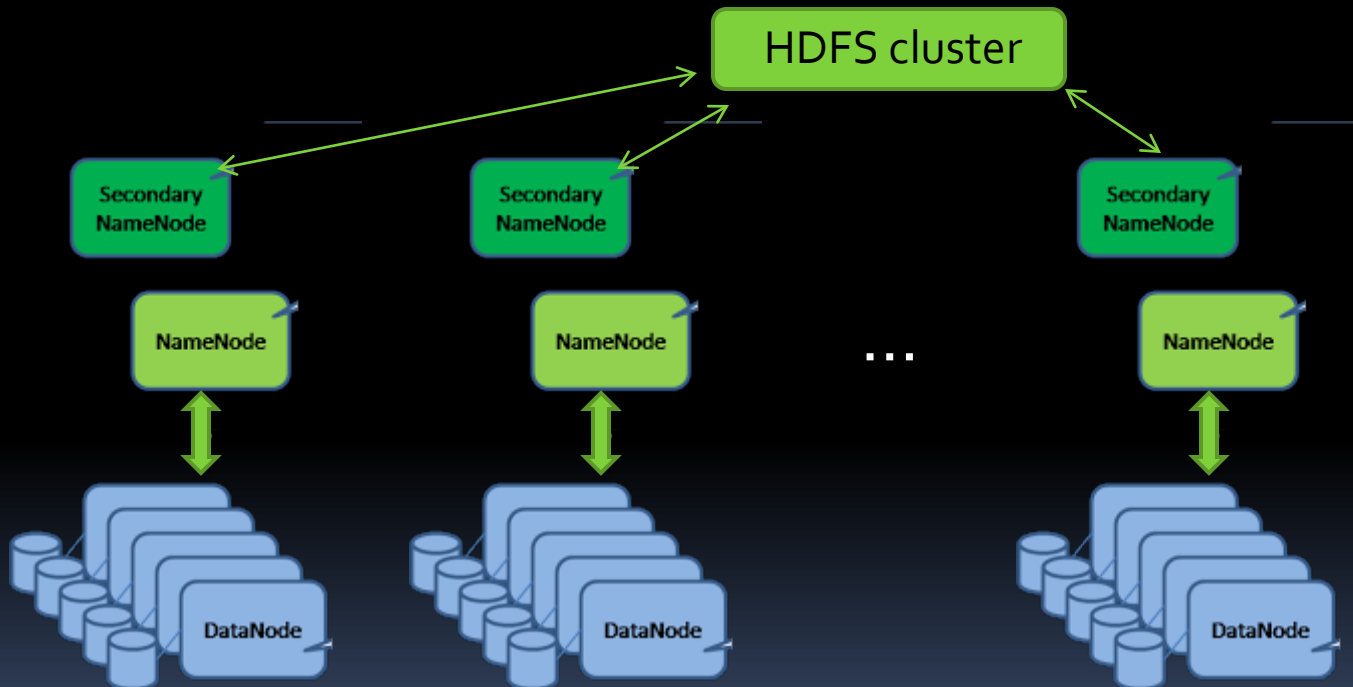
infrastructure:

- Amazon Web Services

⇒ the Cloud

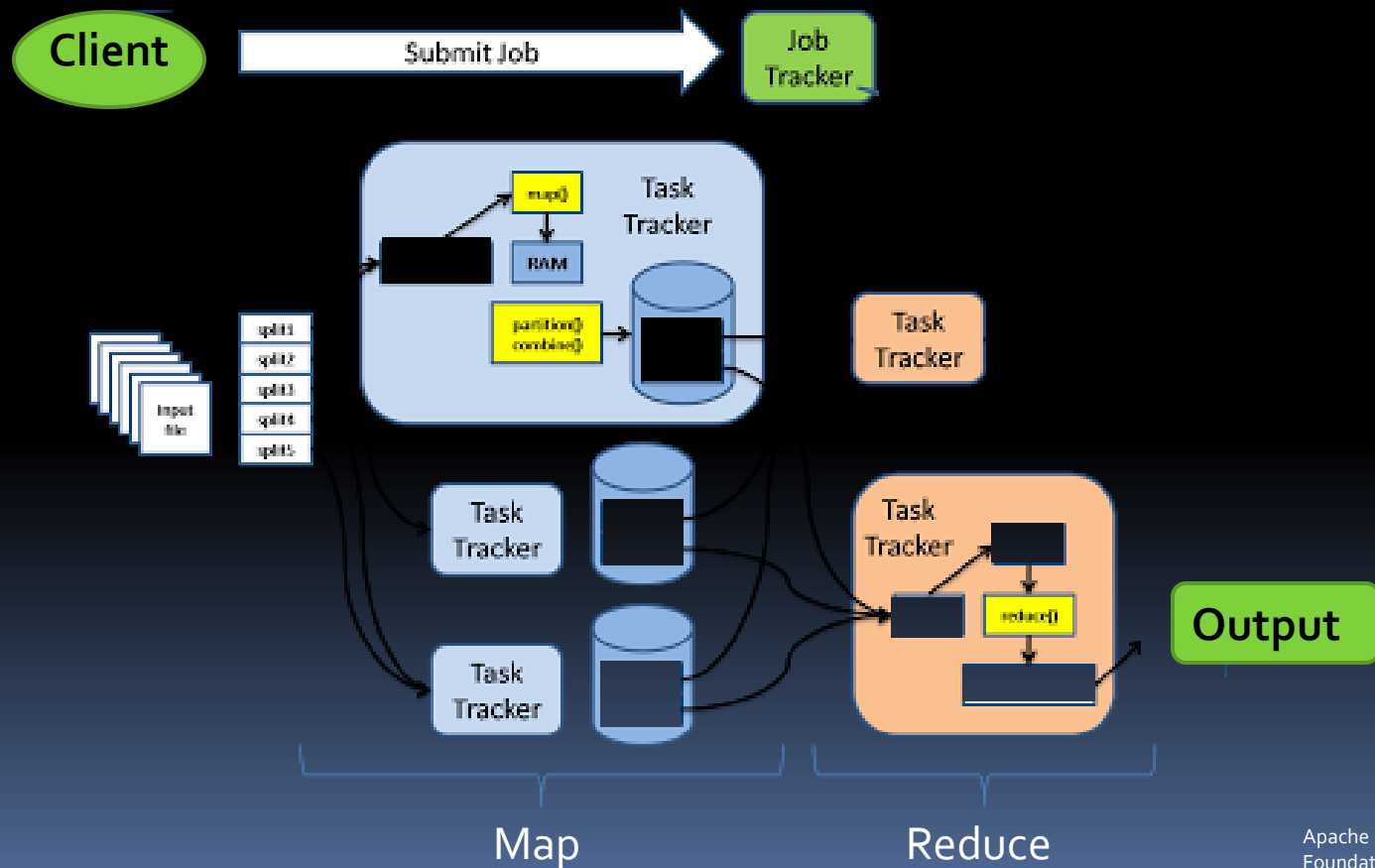
Hadoop Distributed File System

- flexible, redundant, optimized



MapReduce

- massively distributed execution



Brave new world

“It is very sad that nowadays there is so little useless information.”
– Oscar Wilde.