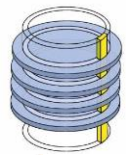
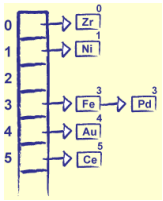
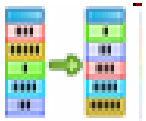










Conception Avancée de Bases de Données

Google

Big Table

Traduction en cours

Google

1996 1997

- Google started as a research project at Stanford University
- Created by Ph.D. candidates Larry Page and Sergey Brin when they were 24 years old and 23 years old respectively.
- BackRub became Google from « googol » 1 leading 100 zeros.

Time line

- 1998 : Susan Wojcicki garage
  - 232 Santa Margarita à Menlo Park.
- 2001 :
  - Eric Schmidt CEO
- 2004 : "Googleplex »
  - 1600 Amphitheatre Parkway à Mountain View
- August 2004 :
  - Wall street NASDAQ 19 605 052 shares 85 $ (1000 $).

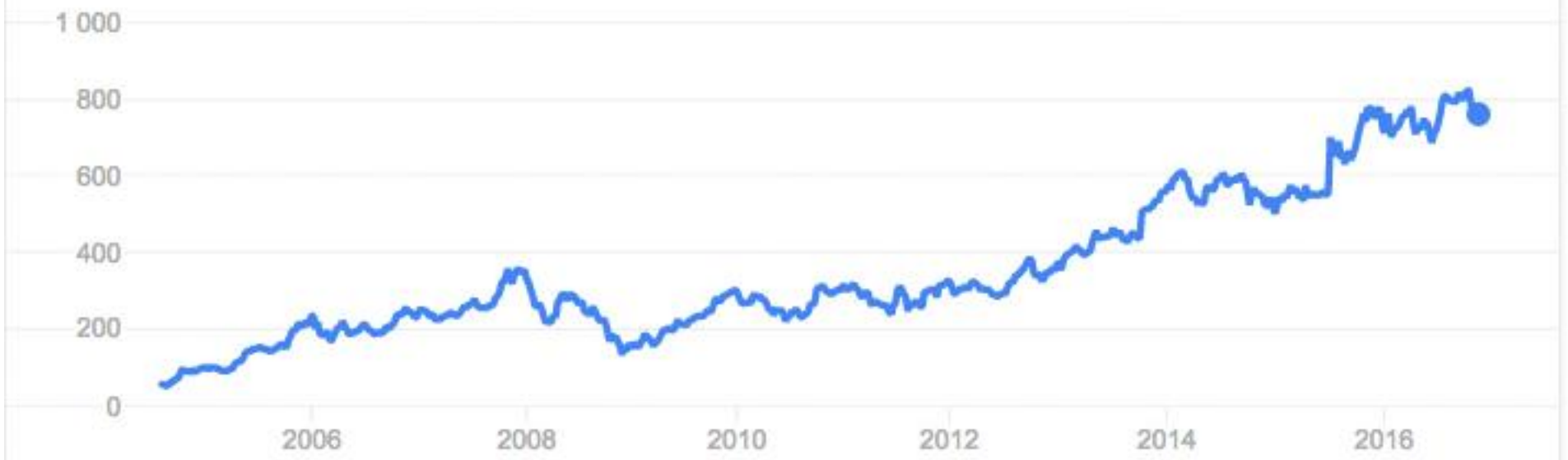
Alphabet Inc Class A

NASDAQ: GOOGL - 2 déc. à 08:53 UTC−5

764,33 USD 0,00 (0,00 %)

Avant l'ouverture: 761,00 ↓0,44 %

1 jour | 5 jours | 1 mois | 3 mois | 1 an | 5 ans | max



Ouverture	-	Capitalis.	513,38 Md
+Haut	-	Cours/bén.	27,47
+Bas	-	Rend. div.	-

Alphabet Inc Class C

NASDAQ: GOOG

+ Follow

Overview | News | Compare | Financials

1,048.65 USD +8.04 (0.77%) ↑

Dec 14, 3:31 PM EST · Disclaimer

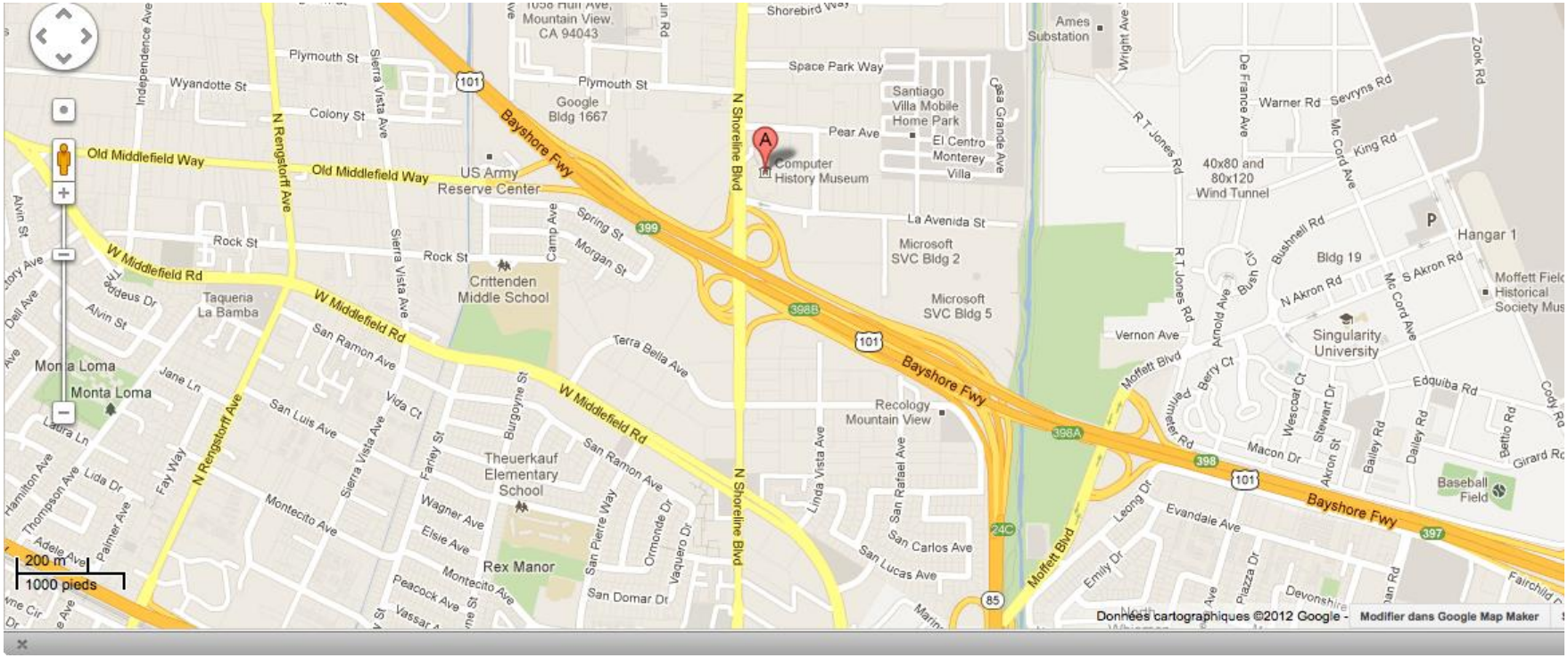
1 day | 5 days | 1 month | 1 year | 5 years | Max

Open	1,045.00	Div yield	-
High	1,058.50	Prev close	1,040.61
Low	1,043.11	52-wk high	1,062.38
Mkt cap	732.41B	52-wk low	770.41
P/E ratio	34.94		

Emmanuel fu

Computer History Museum

- 1401 North Shoreline Boulevard Mountain View, CA 94043, United States



Sergey Brin & Larry Page

Susan Wojcicki : Google VP


NASDAQ

Google Big Table

http://actu.abondance.com/2008/04/google-pourrait-proposer-big-table-son.html

Bigtable

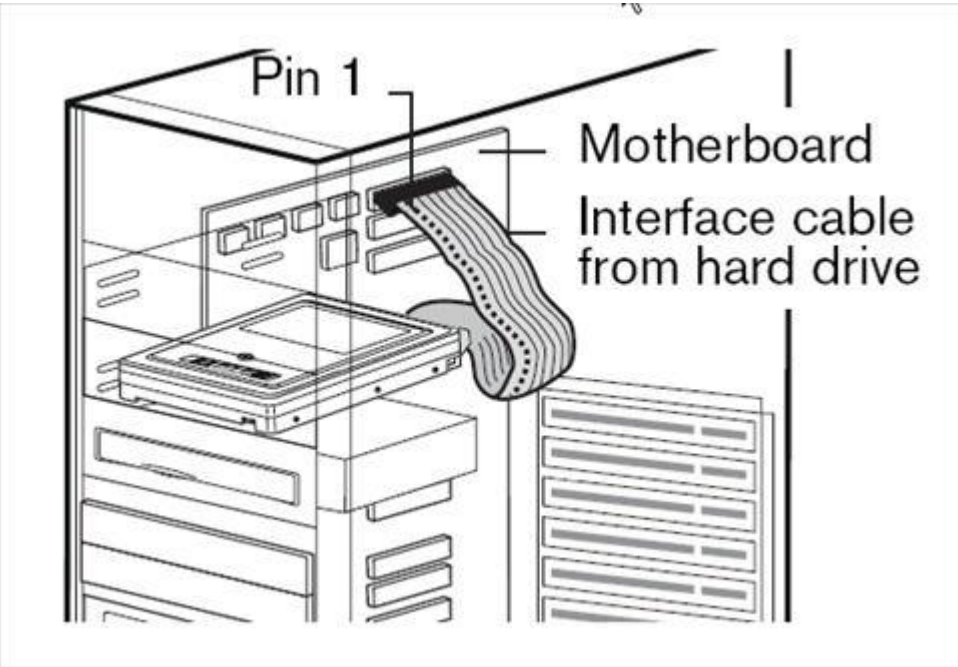
- Bigtable is a distributed storage system for managing structured data that is designed to scale to a very large size: petabytes of data across thousands of commodity servers.
- Many projects at Google store data in Bigtable, including web indexing, Google Earth, and Google Finance.

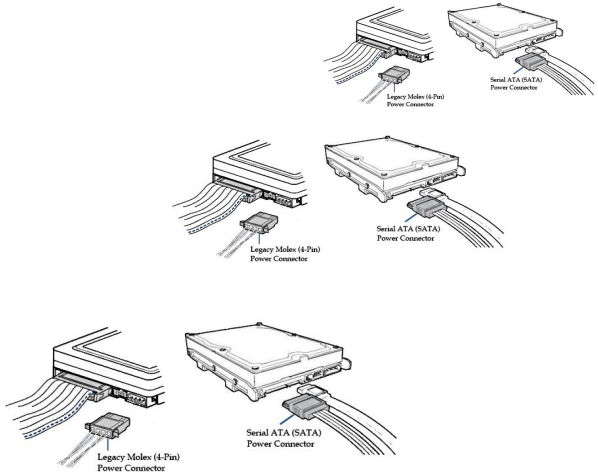
Google Servers architecture

- PC mother boards and disks

Google rack

Low cost PC





FRYS.COM

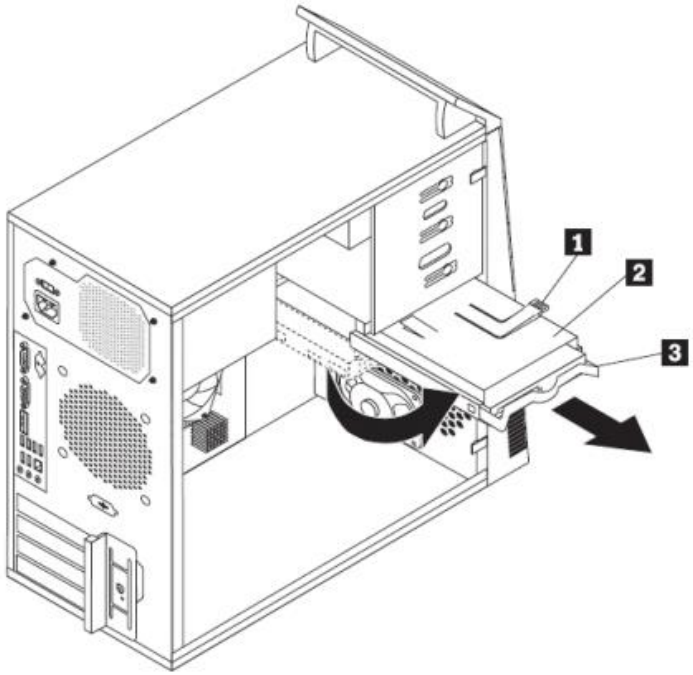
SURCOUF

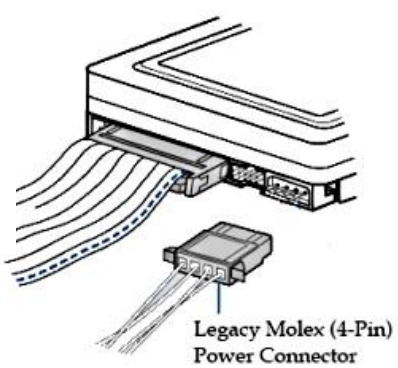
FRYS Mountain View, CA 94043

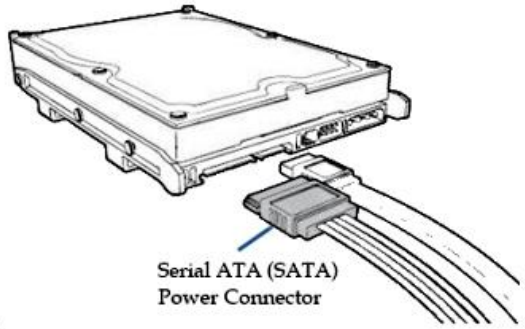
Fry's Electronics, the first electronic superstore: 1177 Kern Ave, Sunnyvale

http://www.yelp.com/biz_photos/CsFTB9cErCkOkOqWGIqzHA?select=4RHMVug11l7cMSAaHHRLuA#4RHMVug11l7cMSAaHHRLuA

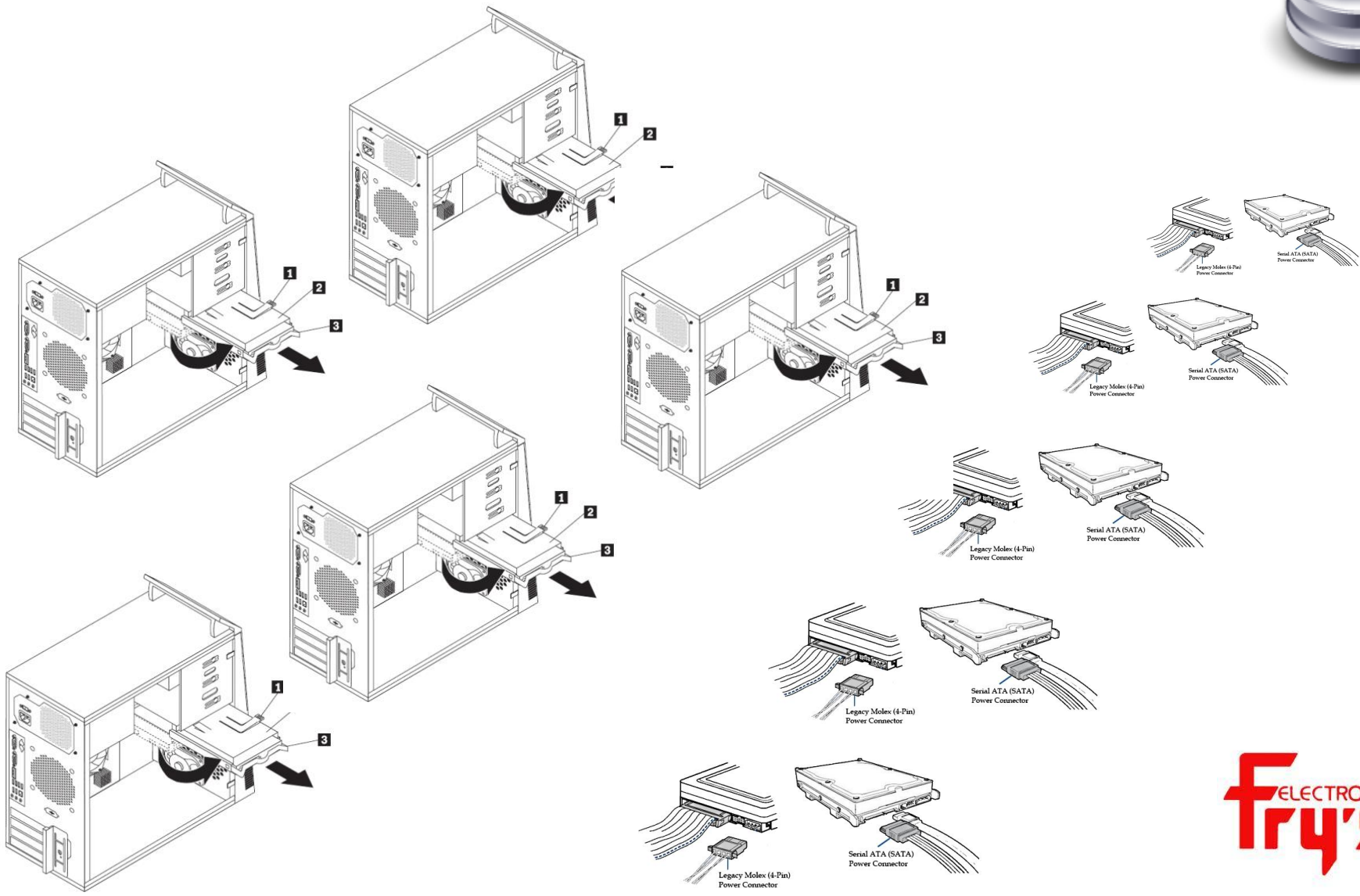
Google Story



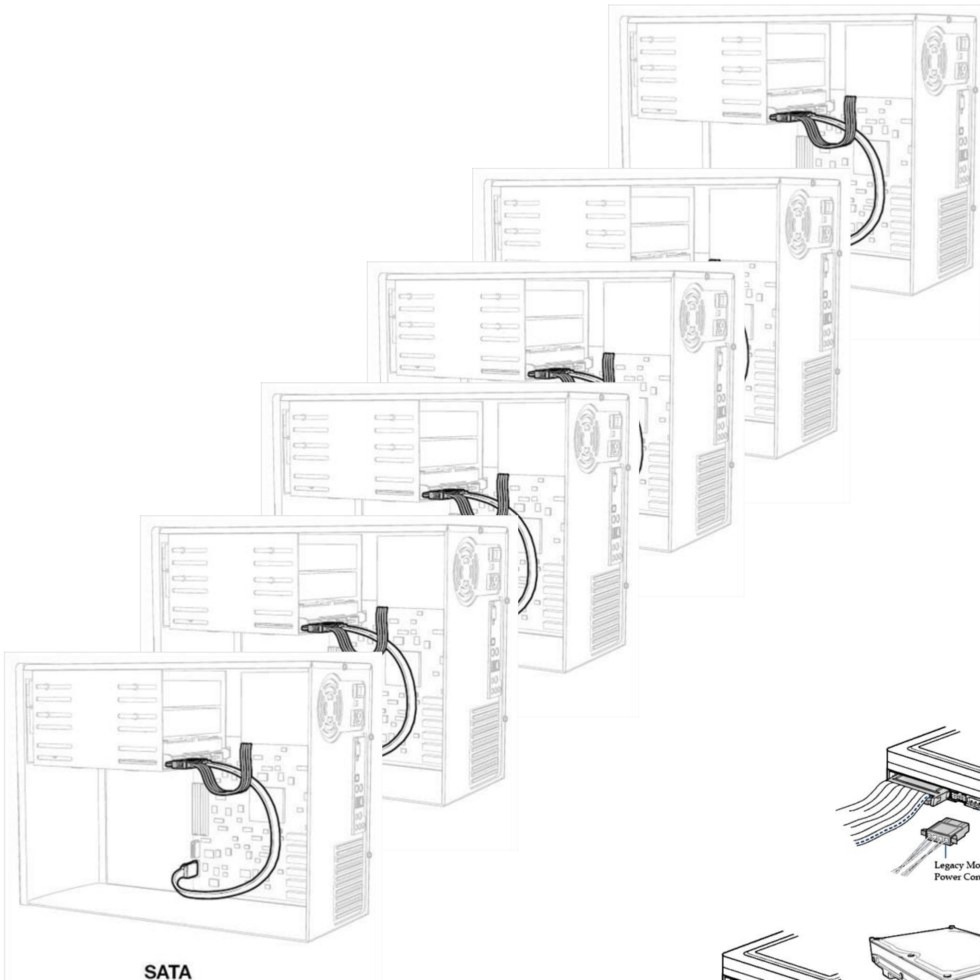


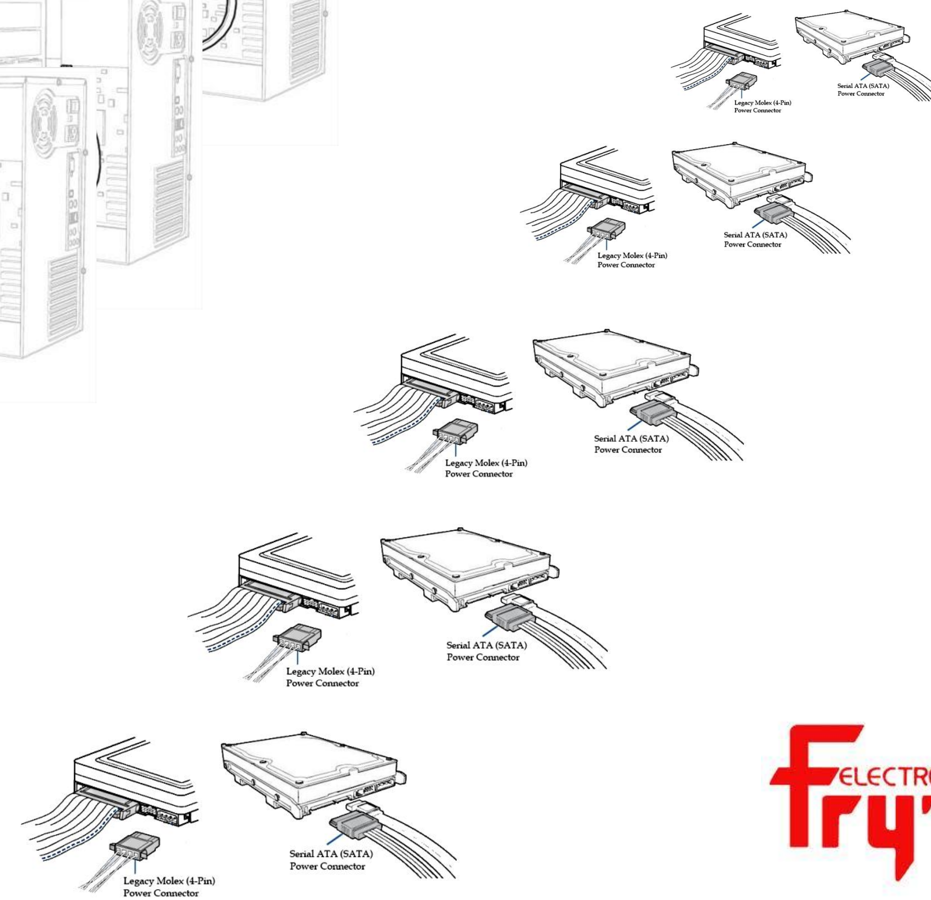


Google Story

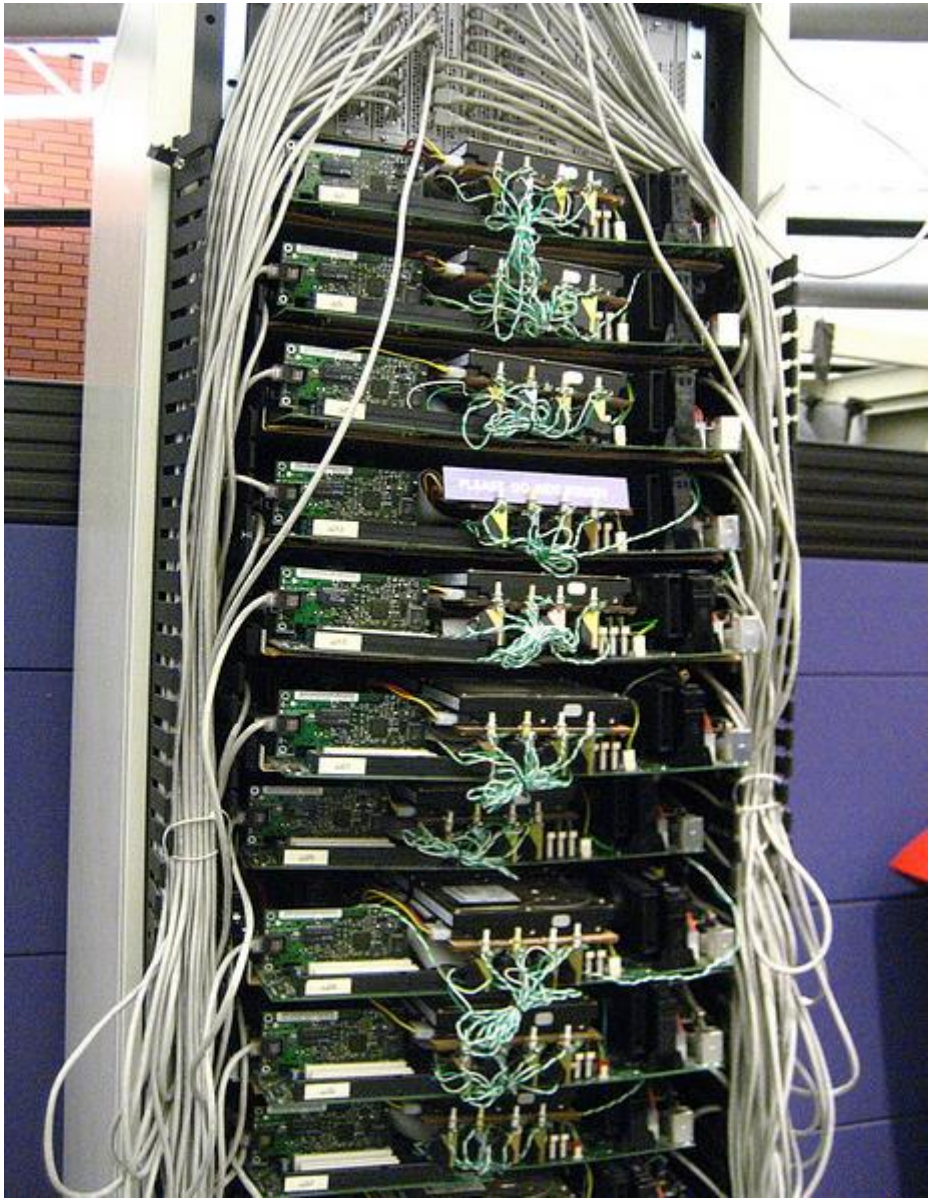


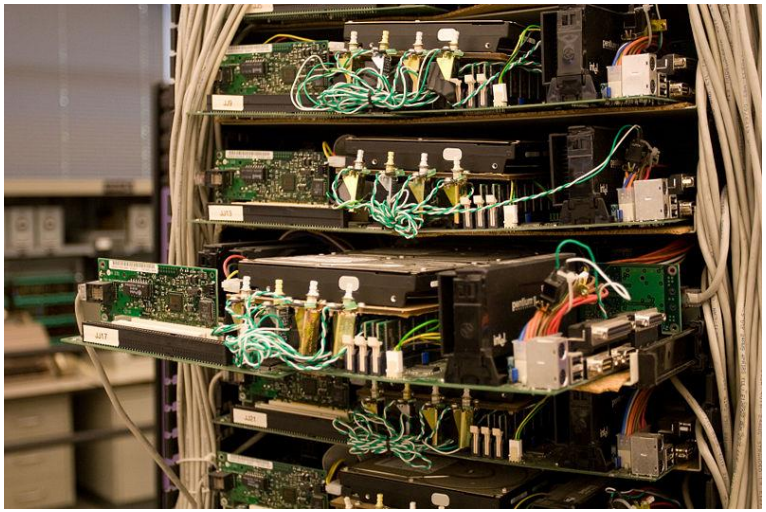
Google Story



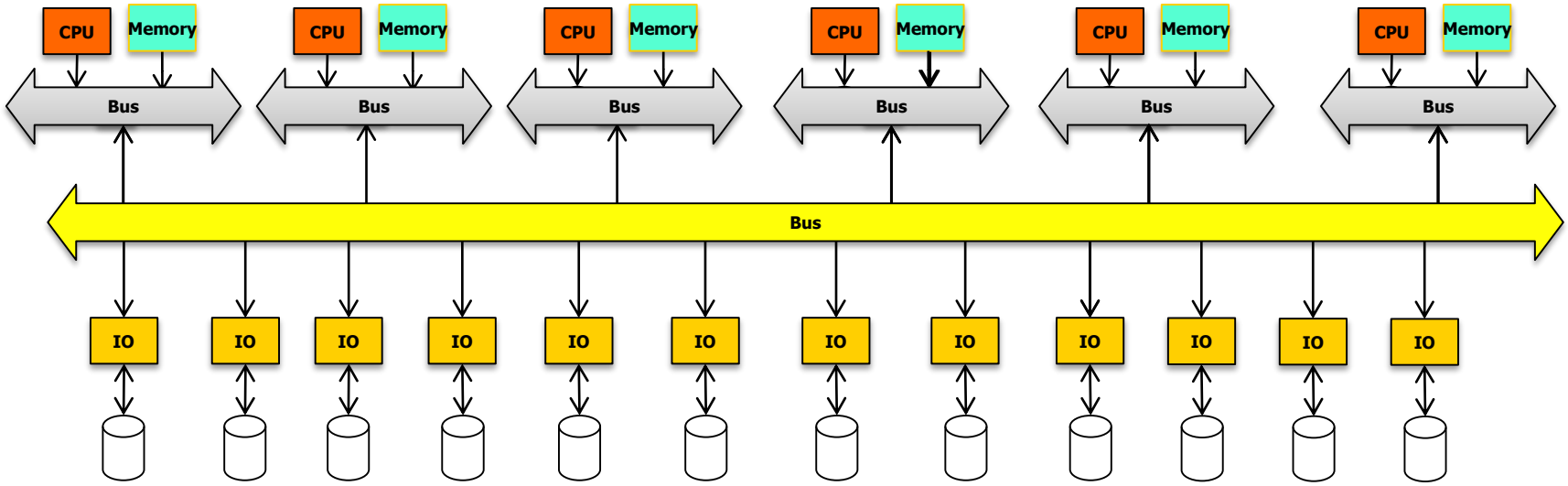


Google Rack





Horizontal Scalability : Shared Disk



low-cost low performance servers

- Comodity computer
- Many low-cost low performance servers.
- Servers are aggregated in clusters with more than a thousand servers each
- A cluster consists of tens of racks.
- The nodes inside a rack (about 80 per rack) are connected by a switch with something like a 1gb/s data rate between any two nodes.
- High degree of parallelism

Bigtable

- A Bigtable is a sparse, distributed, persistent multidimensional sorted map.
- The map is indexed by a row key, column key, and a timestamp; each value in the map is an uninterpreted array of bytes.

KEY **VALUE**

(row:string, column:string, time:int64) → string

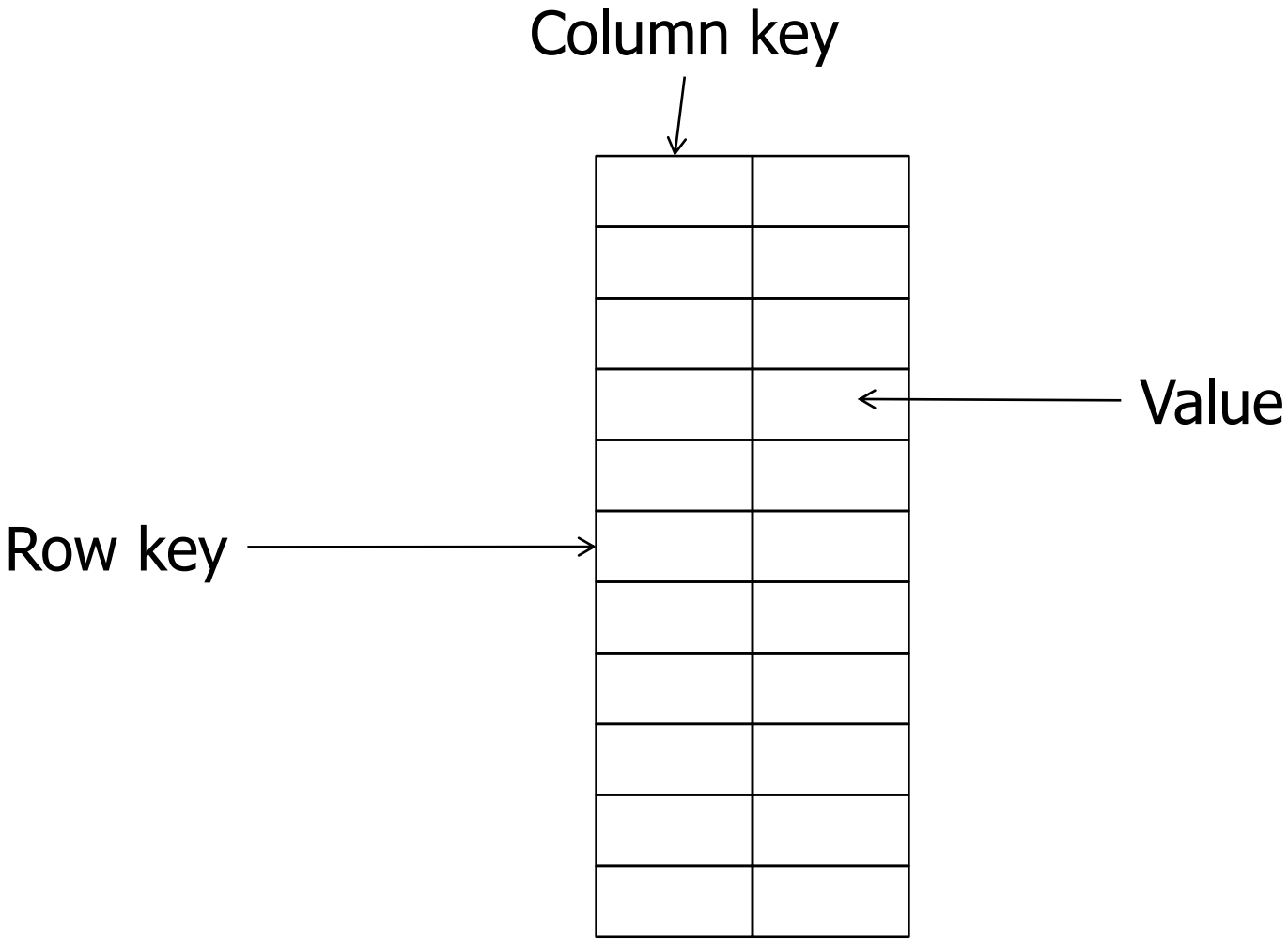
Google Search

- The key is every possible search term.
- The value is the table of web sites to return for this search term.
- Index is replaced by an algorithm called MapReduce
- MapReduce is a parallel algorithm, the search can be done by multiple servers in parallel.

Hash Table

- Sparse 3D hash table :
  - row names,
  - column names,
  - versions (timestamps).
- Everything's a string (sequences of characters) :
  - row names,
  - column names,
  - data items

Keys value



Sort of 1 PB (10^{15}) in 6 hours

- One petabyte is a thousand terabytes,
- 10 trillion (10^{12}) 100-byte records
- on 4,000 computers
- It took six hours and two minutes

Google™

Refroidissement Google