

# Sabre Technology Overview

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Senior Vice President / Chief Technology Officer

26 September 2012



# World Class Technology Talent



 = GDC Hubs





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**“Any sufficiently advanced technology is indistinguishable from magic”**

*- Arthur C. Clarke*

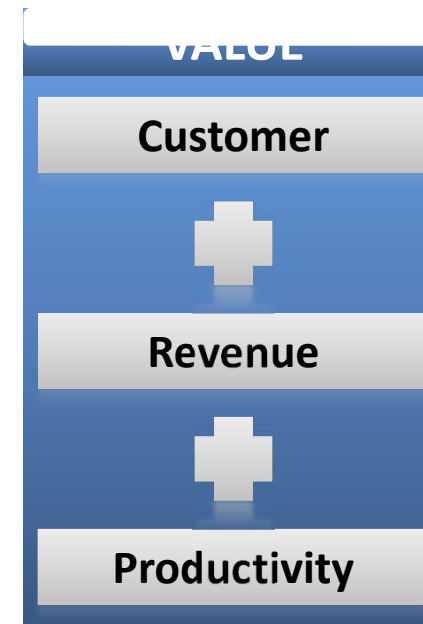


**Focus as many of our resources as possible on  
that which differentiates us from our competition**

*i.e. The Magic*



# Focus On The Differentiators



# Unsurpassed Demands On Our Technologies

24 hours

Every day - 7 days a week  
*It's always peak hour somewhere  
in the world!*

245 million+

Requests per day  
via **Web Services**

150 million+

Flight availability  
requests - **daily**



1 billion+  
API requests - daily

80,000+

Transactions - every  
second

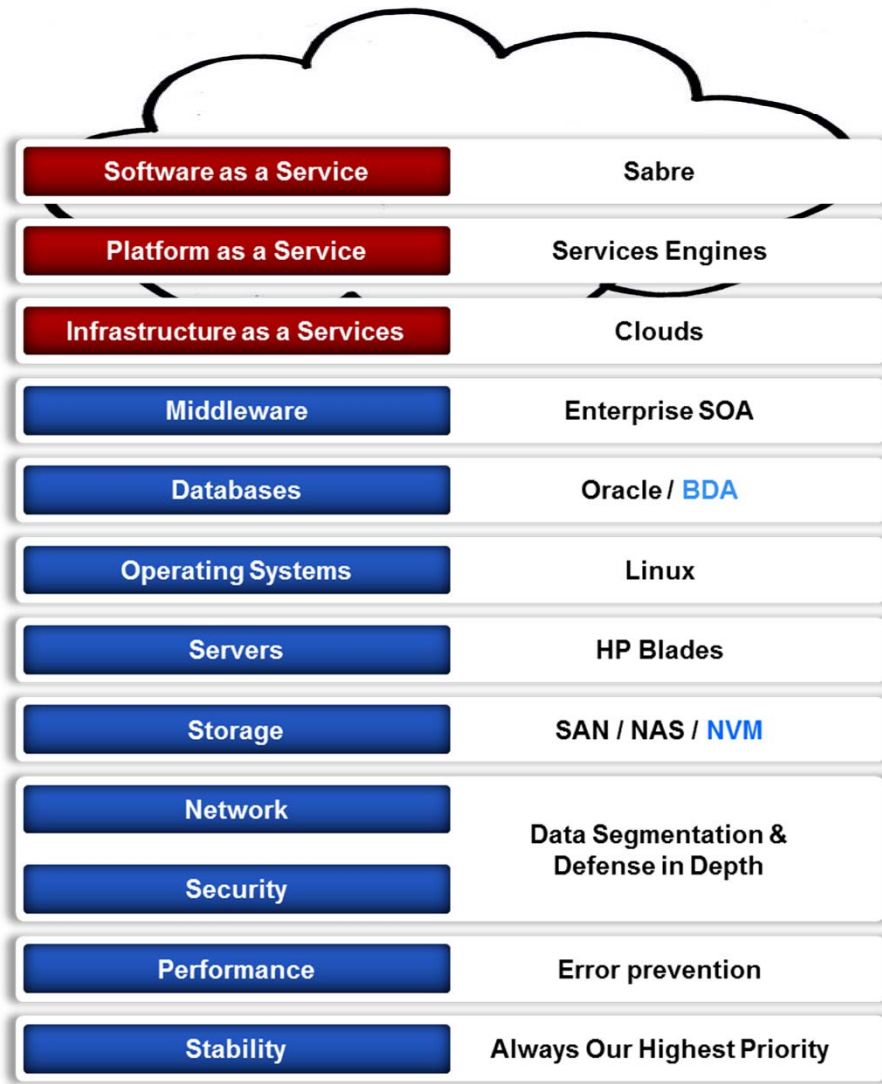
700 billion+  
Transactions processed  
in 2011



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# Non-Differentiators



## 2001 - 2005

- SOA foundation (messaging, security, session)
- Commodity hardware

## 2006 - 2008

- Sabre-wide standards for hardware, storage, OS, performance, and operations

## 2009 - Current

- Private cloud automation
- Platform as a Service
- Web Service orchestration
- Data standards, integration



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# The Laws

The number of transistors on a chip will double every two years!



**Moore's Law**  
Computing

Network speeds will double every 9 months – causing costs to half



**Butter's Law**  
Network

Storage density will double every two years – causing costs to half

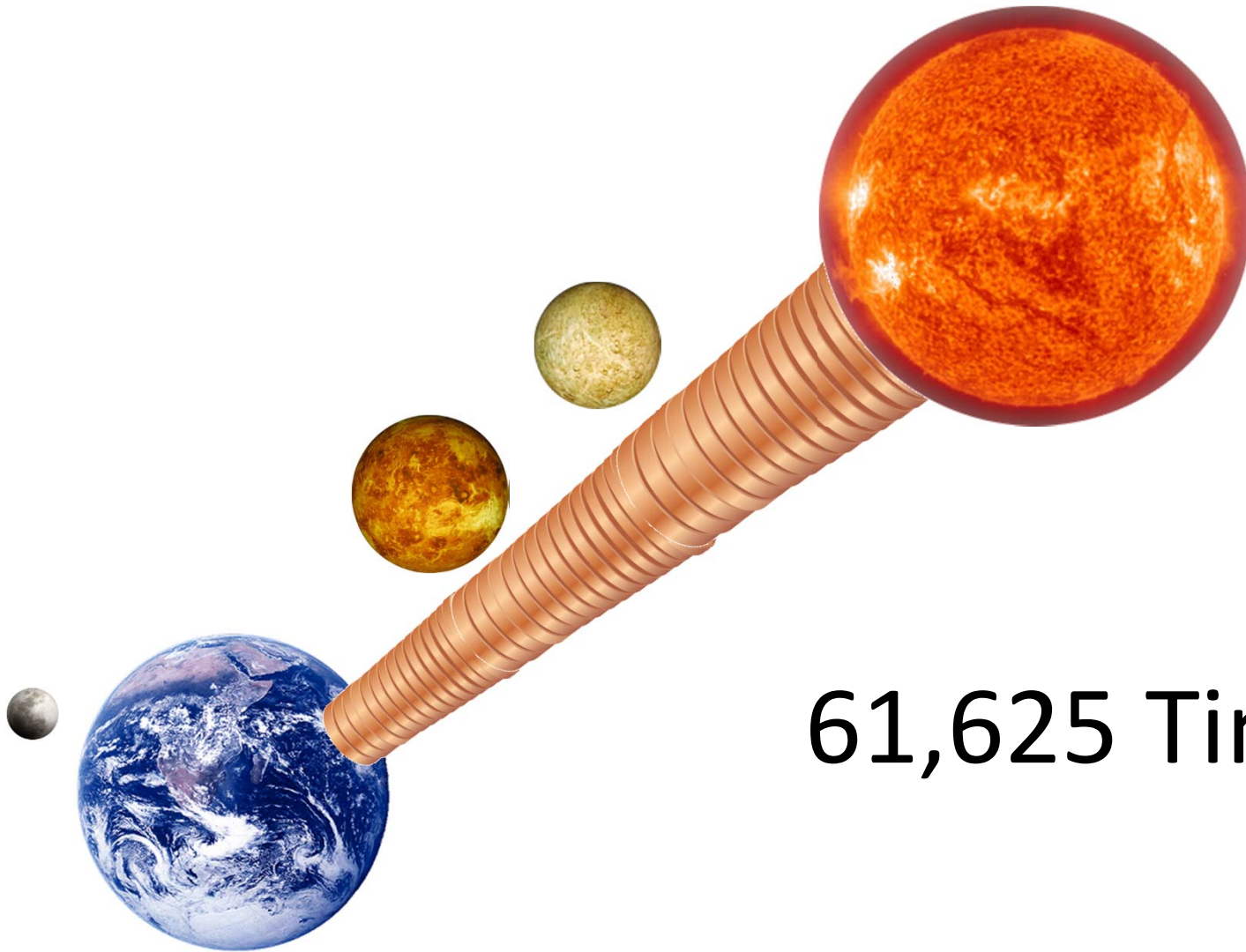


**Kryder's Law**  
Storage

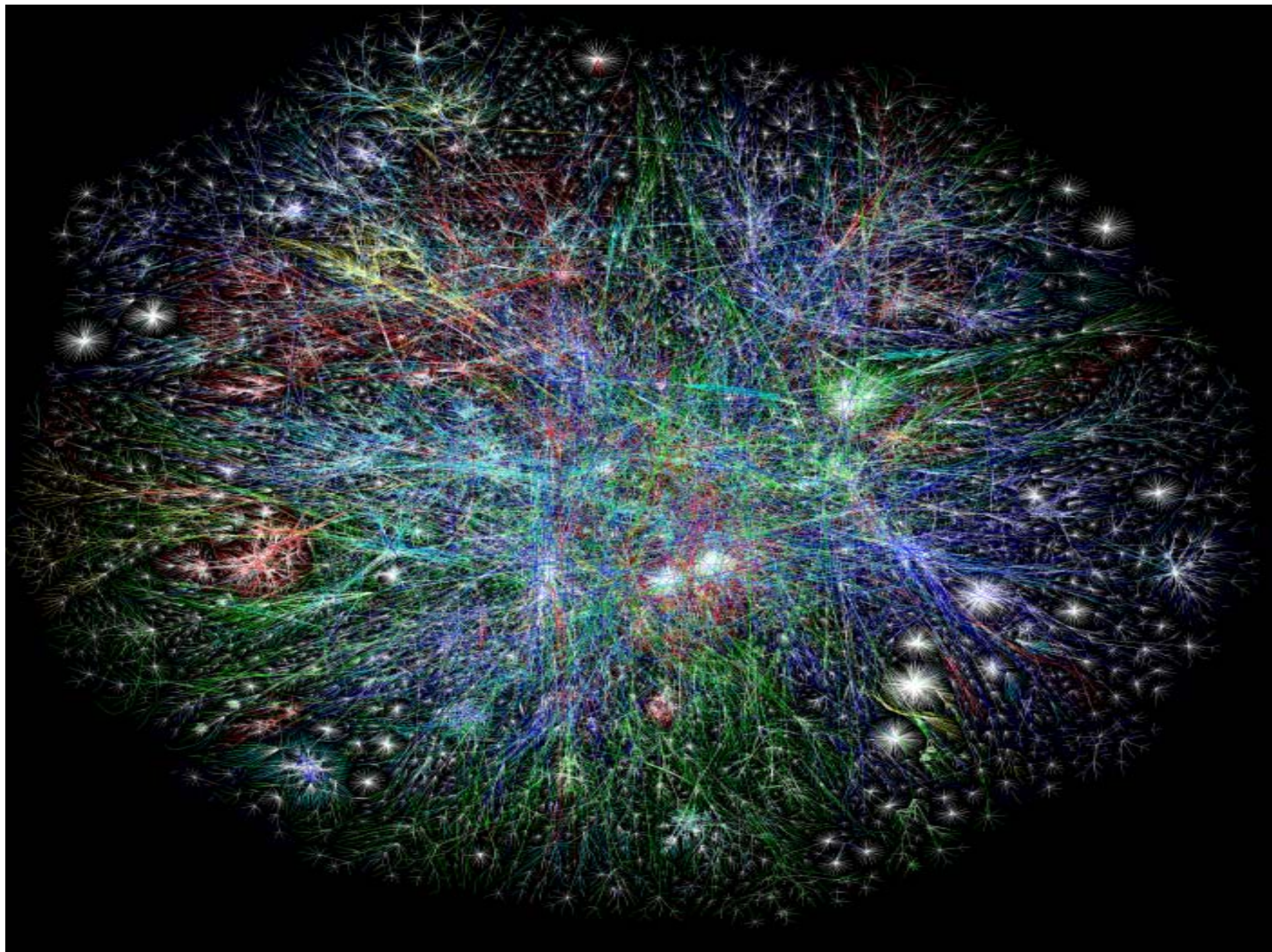


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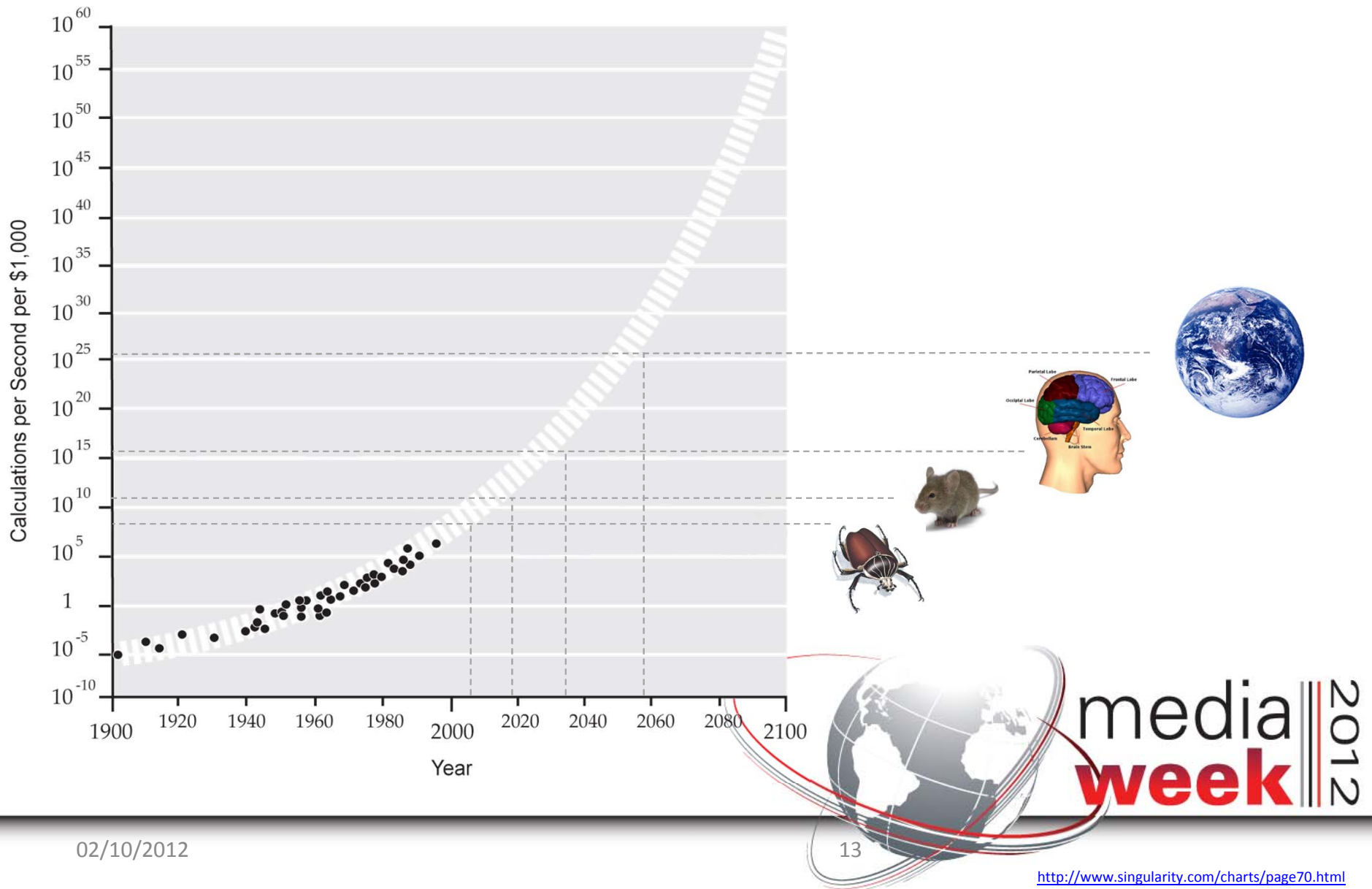
# The Power Of Doubling



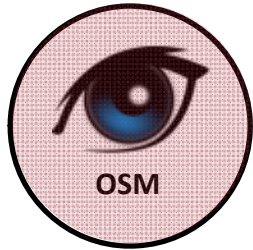
61,625 Times



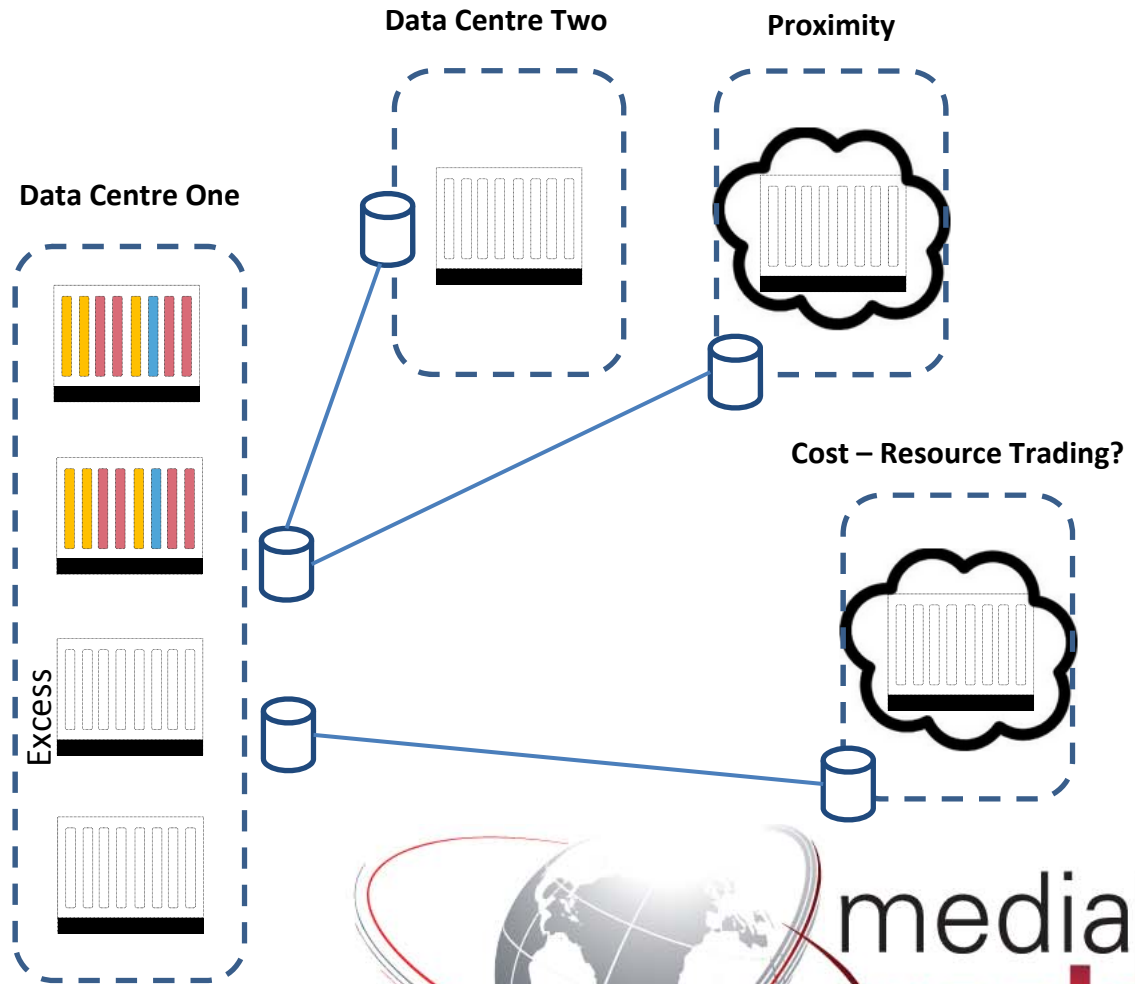
# Calculations Per Second Per \$1,000



# Organic Server Management – Cloud Efficiency



1. Apps must be ready:
  - Secure
  - Auto-Provisionable
  - Visible
  - Standard Deploy
  - Design isolation
2. Low cost fast networks?
3. Low cost fast storage?



Kbit –  $10^3$  / Mbit –  $10^6$  / Gbit –  $10^9$  / Tbit –  $10^{12}$  / Pbit –  $10^{15}$  / Ebit –  $10^{18}$  / Zbit –  $10^{21}$

**Kilo**  
**1,000**  
**(thousand)**

**Mega**  
**1,000,000**  
**(million)**



Kbit –  $10^3$  / Mbit –  $10^6$  / Gbit –  $10^9$  / Tbit –  $10^{12}$  / Pbit –  $10^{15}$  / Ebit –  $10^{18}$  / Zbit –  $10^{21}$

# Giga

**1,000,000,000  
(billion)**

DL/iPod

# Tera

**1,000,000,000,000  
(trillion)**

55



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Kbit –  $10^3$  / Mbit –  $10^6$  / Gbit –  $10^9$  / Tbit –  $10^{12}$  / Pbit –  $10^{15}$  / Ebit –  $10^{18}$  / Zbit –  $10^{21}$

## Peta

**1,000,000,000,000,000**  
**(quadrillion – million billion)**

Tulsa Data Center

## Exa

**1,000,000,000,000,000,000**  
**(quintillion - billion billion)**

5 exabytes



Kbit –  $10^3$  / Mbit –  $10^6$  / Gbit –  $10^9$  / Tbit –  $10^{12}$  / Pbit –  $10^{15}$  / Ebit –  $10^{18}$  / Zbit –  $10^{21}$

# Zetta

**1,000,000,000,000,000,000,000**  
**(sextillion – trillion billion)**

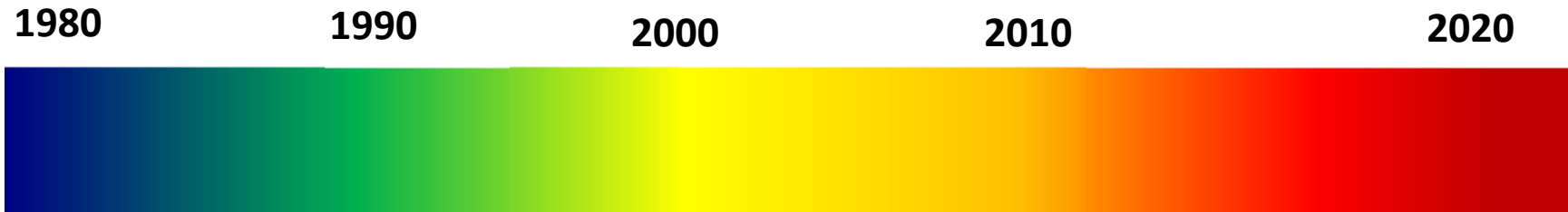
All Storage Today – Internet Bandwidth in 10 years



# FAT PIPES



# Internet Network Speeds (Bits Per Second)



9.6k

14.4k

28.8k

56k

30Mb

1Tb

1Gb

(Google Fiber)

Global: 55 Tbps

Global: n Zbps

1 Hour video 700MBytes

2000 : ~28 hours

2010 : ~3 minutes

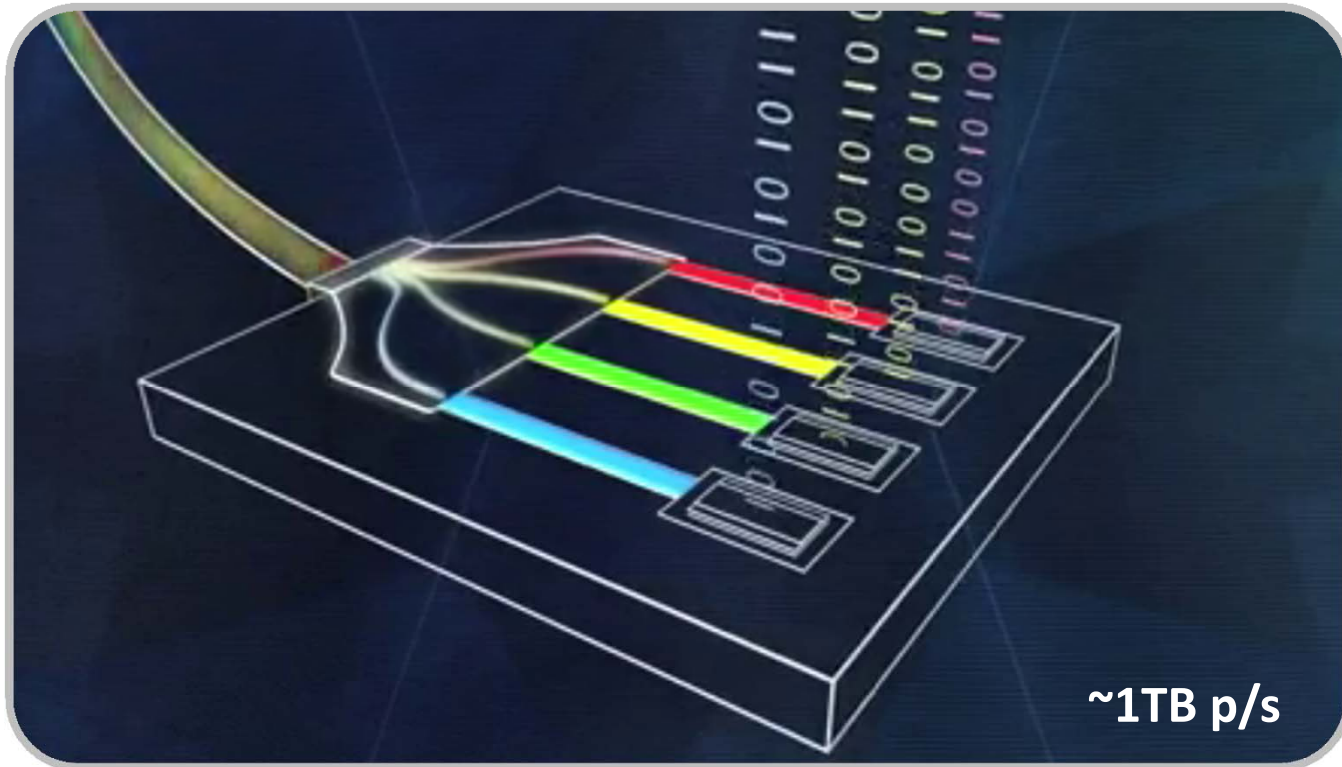
2011 : ~6 seconds

2020 : ~6/1000 seconds



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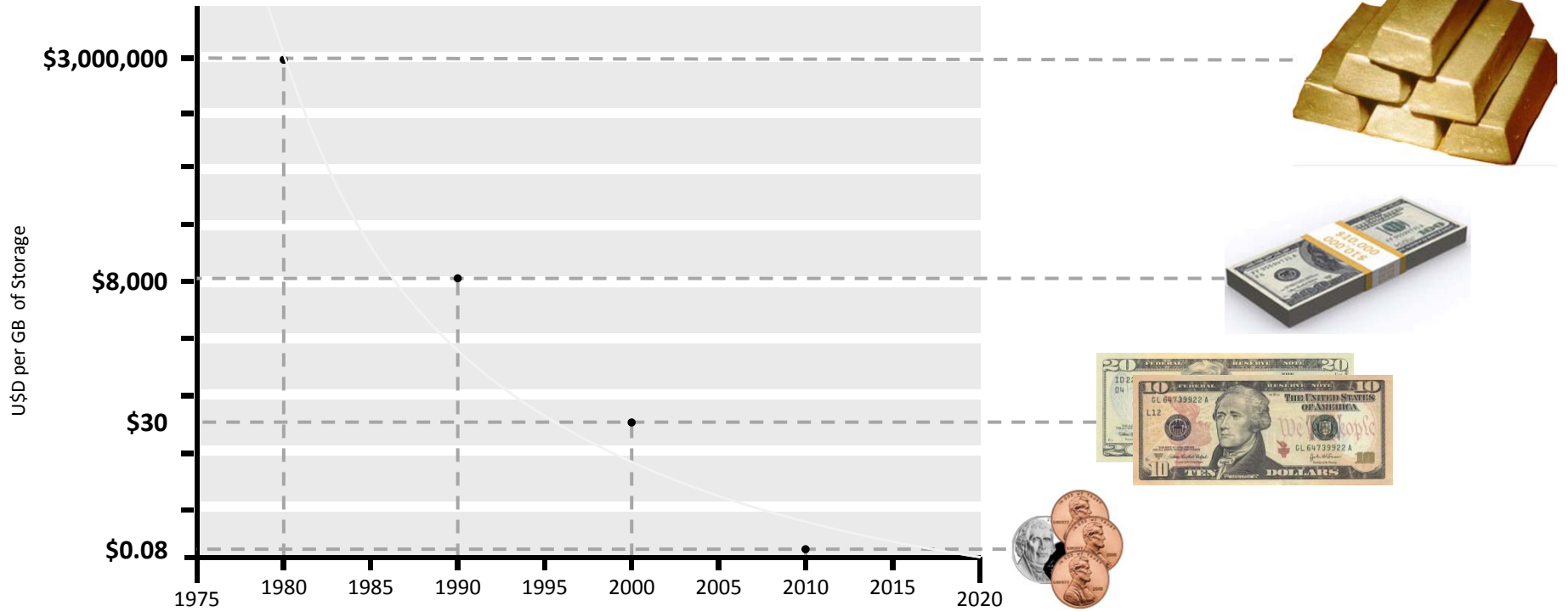
# Intel Silicon Photonics Link



# SEXY STORAGE



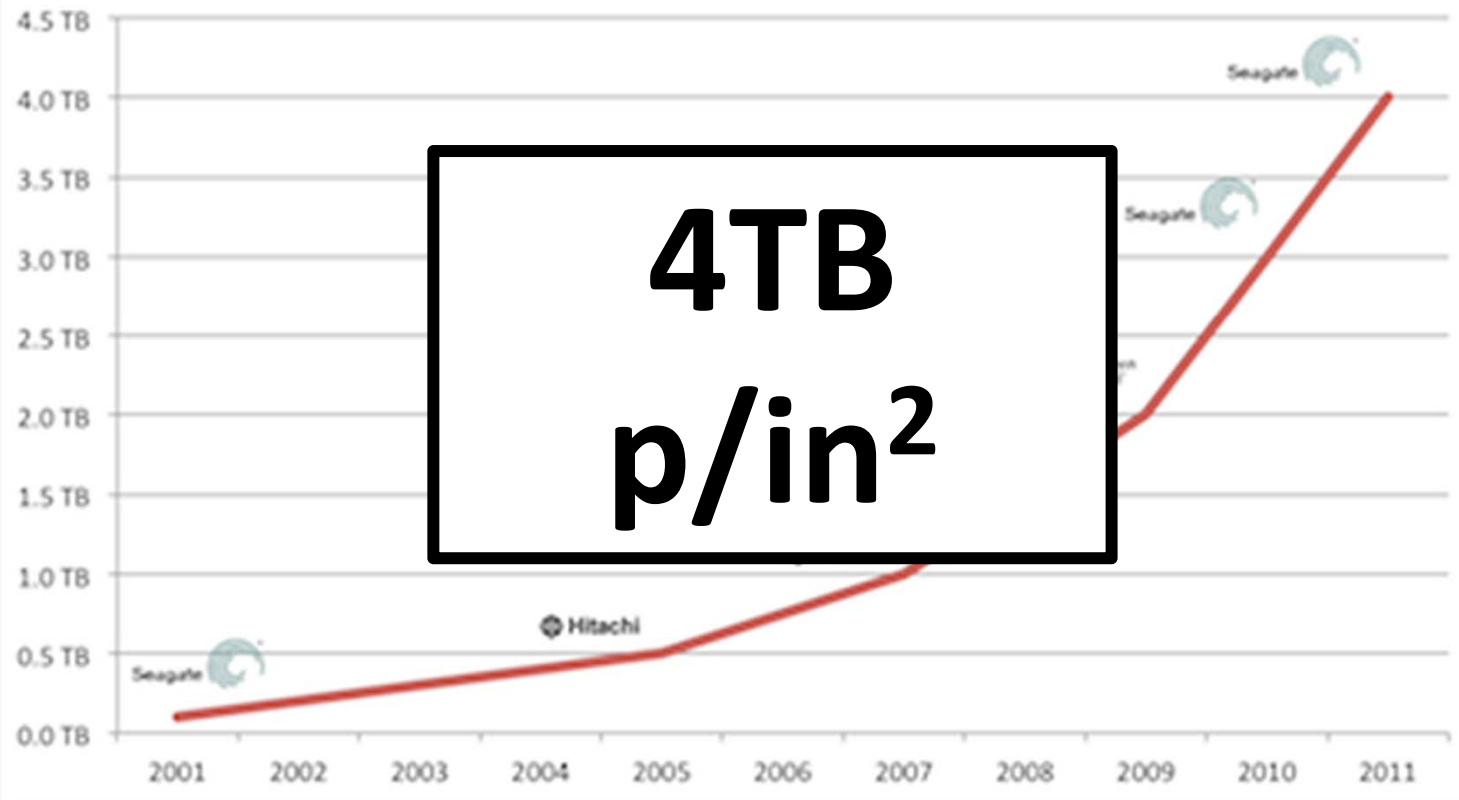
# Price Per Gigabyte Of Storage



**2011: 3.5 cents / GB**



# Hard Disk Drive Capacity Trend Since 2001



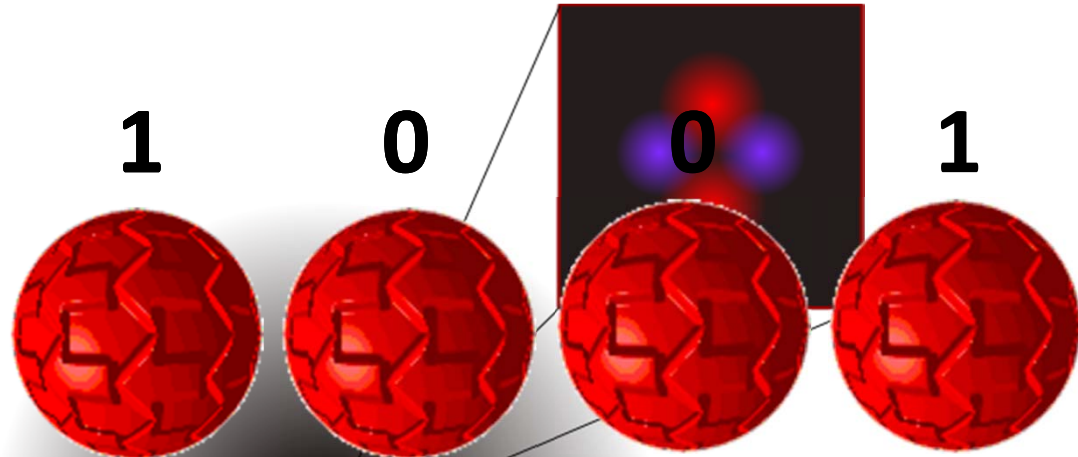
**4TB  
p/in<sup>2</sup>**



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# Non-Volatile Memory: Convergence Of Memory And Storage



Angstrom: 1 ten billionth of a meter

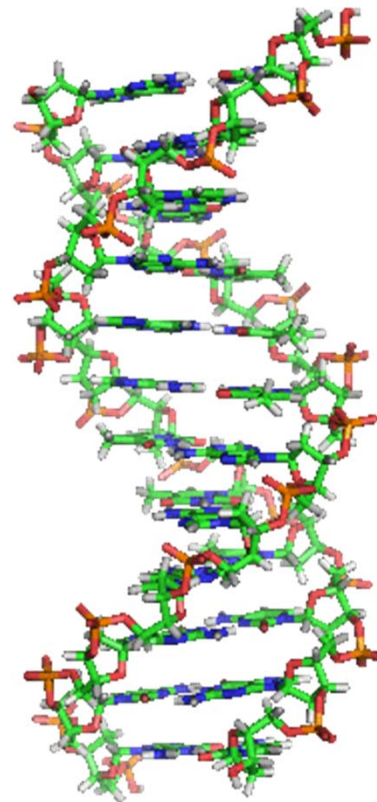
femtometer: 1 trillionth of a millimeter

$1 \text{ \AA} = 100,000 \text{ fm}$



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# But Wait, There's More...



*August 2012 Scientists at Harvard stored 700TB in a single gram of DNA*



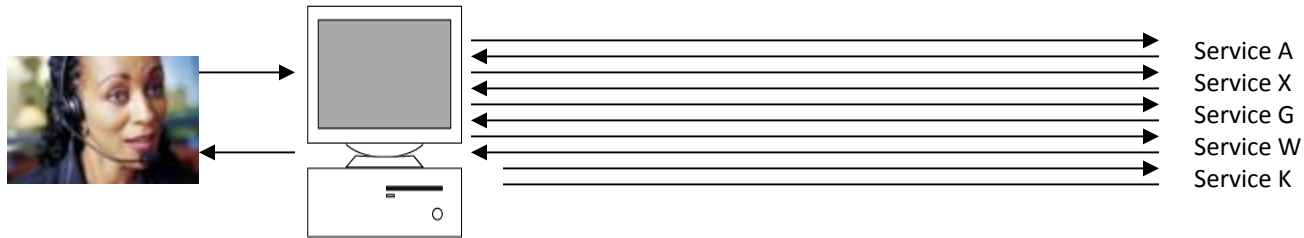
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# Learning From Landscape Designers



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# Learning from Customers



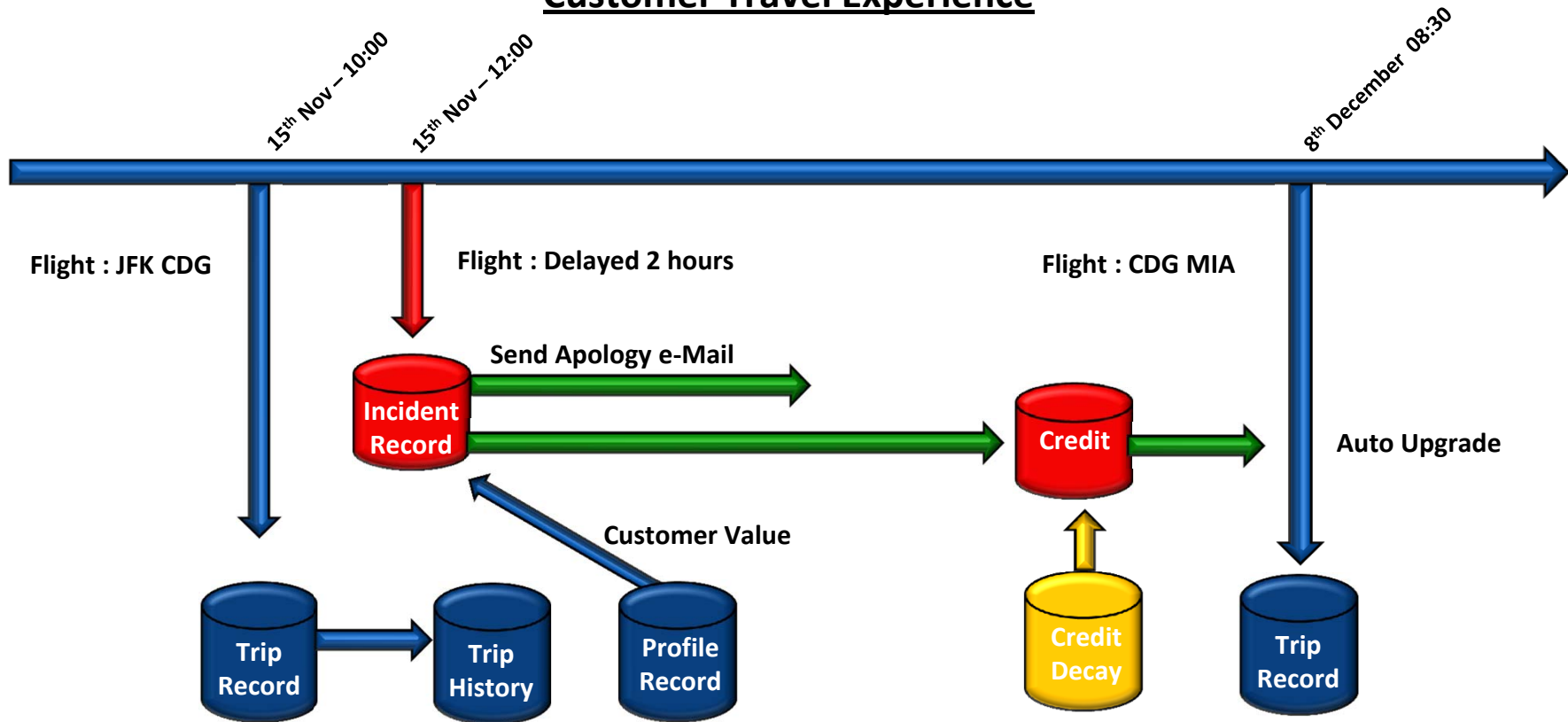
# Services Engine



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# Configure vs Code

## Customer Travel Experience



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## The API to our Customers



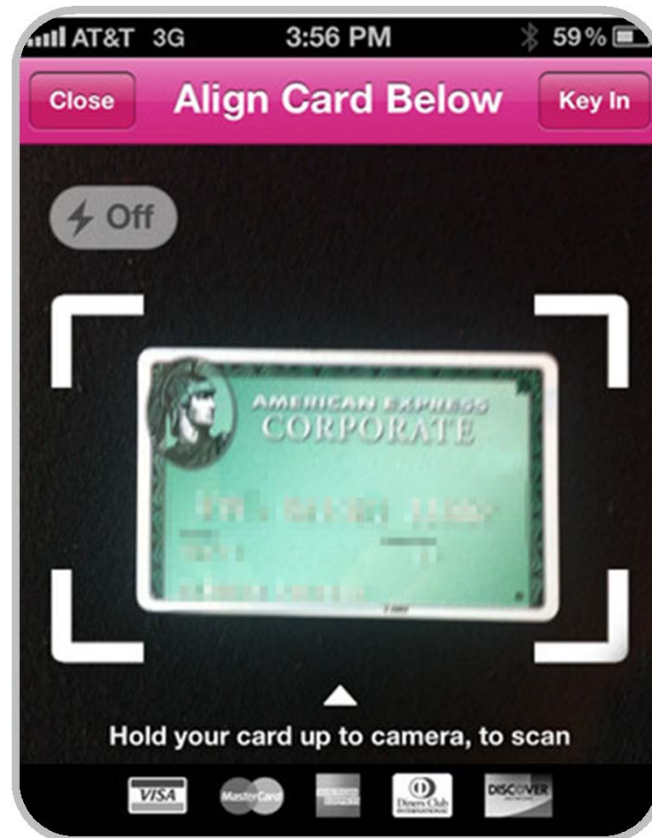
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# Bar Code / Blue-Tooth / NFC





# Photographic Card Reader



# New TripCase - Redesign

The screenshot shows the TripCase web application interface. At the top, it says "My Trips" and "Barack Obama". Below that, there are tabs for "My Trips", "My Archived Trips", and "Tools". The main content area is divided into several sections:

- My Trips:** A list of upcoming trips including "Las Vegas Fall Trip" (Las Vegas, NV, September 10-19, 2012), "Chicago Marathon" (Chicago, IL, October 2-10, 2012), and "Winter Ski Trip" (Vancouver and Whistler, BC, December 10-23, 2012).
- Past Trips:** A list of past trips including "Spring Break, 2011" (Hilton Head, SC), "Amber and Mike's Wedding" (San Diego, CA), and "Summer 2010 Family Trip" (Cabo San Lucas, MX).
- My Travel Stats:** A section showing cumulative 2011 YTD statistics: 842 TripCase TravelCred, 12,761 Miles Traveled, 104 Days Traveled, 45 Carbon Credits Earned, and 28 Total Trips Taken. It also includes a pie chart for regional distribution and a map of the United States with markers for various cities.

At the bottom, there is a footer with "TripCase Info", "In The News", "Top Destinations", and "© 2008-2011 Sabre Inc. All rights reserved. TripCase is a servicemark of Sabre Inc."

The image shows two smartphones displaying the TripCase mobile application interface. The left phone is a Samsung and displays a hotel detail page for "Hilton Grand Vacations". The right phone is an iPhone and displays a travel itinerary for a "Las Vegas Fall Trip".

**Left Phone (Samsung):** Shows a hotel detail page for "Hilton Grand Vacations" with a 4.5-star rating. The page includes a "Back" button, a "Continue" button, a photo of the hotel, and contact information: 1-888-657-9022 (Toll-Free), 1-702-765-8300 (Local), and 1-555-435-6958 (Fax). It also has a "General Description" section.

**Right Phone (iPhone):** Shows a travel itinerary for "Las Vegas Fall Trip" (Fri Sep 14 - Mon Sep 17). The itinerary is organized by day:

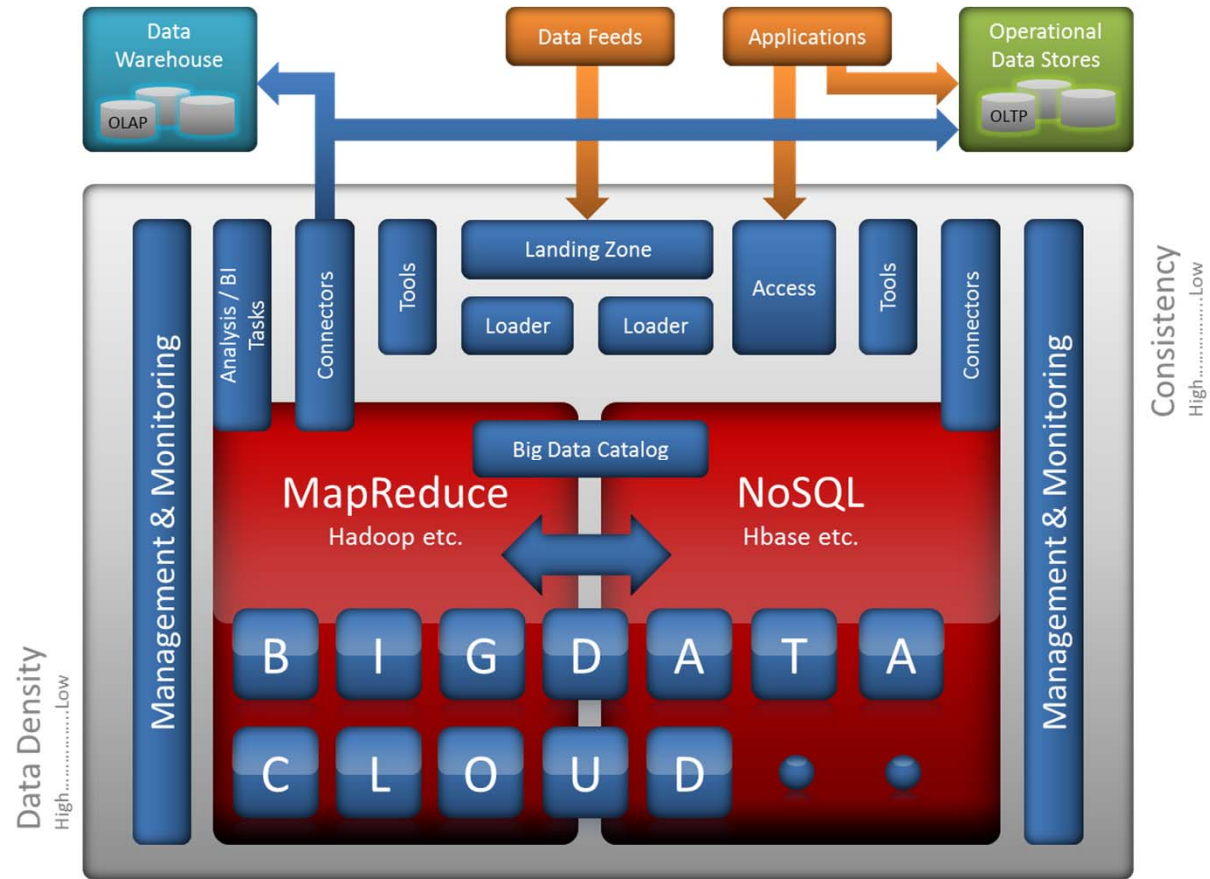
- FRIDAY, SEPTEMBER 14, 2012:**
  - 10:00 AM: Dallas to Las Vegas (Virgin America 713)
  - 3:00 PM: Hilton Grand Vacations
  - NOTE: Ask for upgrade to larger suite, facing strip.
- SATURDAY, SEPTEMBER 15, 2012:**
  - 10:00 AM: NYLO Spa (Woodhouse Day Spa Pkg)
  - 7:00 PM: Alize at the Palms (Dinner, Dean and Erin)
- SUNDAY, SEPTEMBER 16, 2012:**
  - 10:00 AM: Payard Patisserie (Brunch, Simon and Yasmin)
  - 8:00 PM: "O", Cirque du Soleil (Bellagio)

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# Micro-Content



# Big Data Landscape



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# Our Challenge To Our Application Designers...



**What would you do if compute speeds, costs (network, storage, processors) were limitless and free?**



# The Perfect Booking Engine?

LA Business NYC Business Outlook 05NOV Family Florida Travelocity Pick

**travelocity**




|   |                                   |            |          |
|---|-----------------------------------|------------|----------|
|  | DFW LAX 01OCT 07:10D 08:20A \$256 | TTL: \$512 | Non-stop |
|  | LAX DFW 04OCT 06:35D 11:20A \$256 |            |          |

Fare Forecast : BUY

**HYATT** Regency Century Plaza 01OCT / 04 OCT \$862

**AVIS** Fullsize 01OCT / 04OCT \$380

TOTAL: \$1,854 – Last trip (23AUG \$1,812) Net Increase - \$42 air fuel surcharge  
Versus (3 seconds ago):

**ORBITZ** SAME  SAME  SAME – air only  SAME – air only


**REPRICE** **BOOK NOW**




# The Perfect Booking Engine?

LA Business   NYC Business   Outlook 05NOV   Family Florida   Travelocity Pick

**travelocity** Sheffield Wednesday FA Cup Final

|   |   |                |                     |          |
|---|---|----------------|---------------------|----------|
|  | DFW LHR 11MAY 15:10D 06:30A <i>next day</i> | \$437          |                     | Non-stop |
|  | LHR DFW 14MAY 06:35D 11:20A                 | \$437          | TTL: \$874          | Non-stop |
|   |   |                | Fare Forecast : BUY |          |
|  | London Strand                               | 12MAY / 14 MAY | \$625               |          |

TOTAL: \$1,499  
Versus (3 seconds ago):

|  |      |  |       |  |                 |
|--|------|--|-------|--|-----------------|
|  | SAME |  | +\$12 |  | SAME – air only |
|--|------|--|-------|--|-----------------|

**REPRICE**   **BOOK NOW**



**THANK YOU**

**Any Questions?**





# Appendix



# Sabre Holdings



\$3 billion privately-held holding company  
*consisting of four primary business units*



Headquarters in Southlake, Texas, U.S.

**10,000** in **60**  
employees in countries



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CONVERT TO HAND OUT - ADD TO APPENDIX

# Sabre's Business Units Supported By Technology

|  |   |  |  |
|--|---|--|--|
|  <p>Solutions for the travel industry</p> <ul style="list-style-type: none"><li>• \$100B in travel spend is booked through Sabre annually</li><li>• Connects 350,000 travel professionals in 130+ countries to travel content</li></ul> |  <p>Solutions for the air transportation industry</p> <ul style="list-style-type: none"><li>• 400+ airline customers</li><li>• 360M+ passengers boarded annually</li></ul> |  <p>Solutions for the hospitality industry</p> <ul style="list-style-type: none"><li>• 3,700+ hospitality customers</li><li>• 10,000+ properties</li><li>• 80 currencies</li><li>• 27 languages</li><li>• Generates \$12B+ in revenue each year for its customers</li></ul> |  <p>Online travel company</p> <ul style="list-style-type: none"><li>• First online travel agency (OTA)</li><li>• 10 global brands</li><li>• 8 languages</li><li>• 23 international websites</li><li>• 30 million+ monthly unique visitors</li></ul> |
|--|---|--|--|

The **Technology** organization brings together world-class IT talent to develop, deliver, and operate the products and solutions that serve the technology needs of the travel market

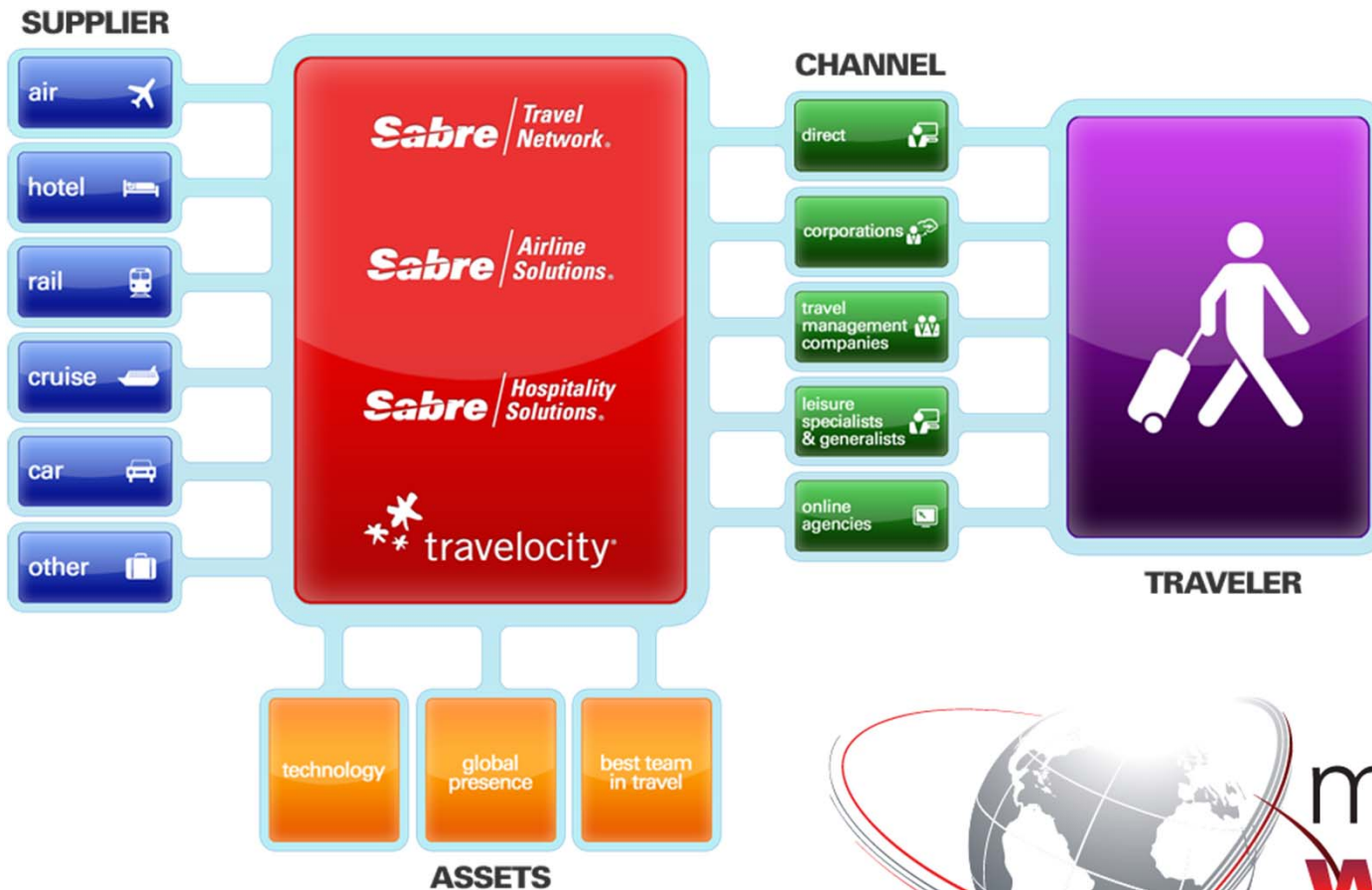


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# How Sabre Fits Into Travel Industry

Sabre is a global technology company. Our innovative technology is used by more than a billion people around the world to plan, book and get to their destination.



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