Storage Industry Forging Academic Alliances

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Abstract

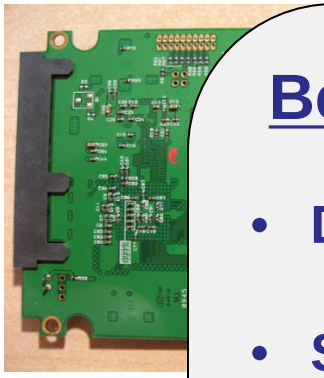
- **The three most common challenges facing the IT Managers and CTOs today are:**
  - **1. Ingesting Gigabytes of data that gets generated globally every second**
  - **2. Managing & accessing data in the most efficient manner 24/7**
  - **3. Extracting values from all these data**

- **Managing, analyzing & sustaining the astronomical amount of corporate data in the most secure ways require new DC & virtualization**
- **Today, majority of our Computer Science and Information Engineering programs are lacking Storage and Virtualization studies; hence, the graduating bodies will miss out on so many job opportunities**
- **Today, many Storage companies have to provide extensive training for their new hires on data storage & virtualization which are the building blocks of rapidly growing Cloud Computing & Services, and Big Data technologies**
- **Today, few companies have successfully forged academic alliances with colleges to fill the gap for much needed data storage and virtualization savvy new-hire engineers and IT staff**

Overview

- Why The Urgency?
  - Industry's Technical Needs on the Data Storage Front
  - More Data, more career opportunities
- At The Moment, What Are?
  - The Fundamental Drivers
  - The Current Engineering and Information Science Curricula
- Industry Offered Solutions
  - Various Industry sponsored certification programs
  - Industry & Academic Alliance
  - Case Studies
- Conclusion

So, Why Should We Care So Much About Data Storage?

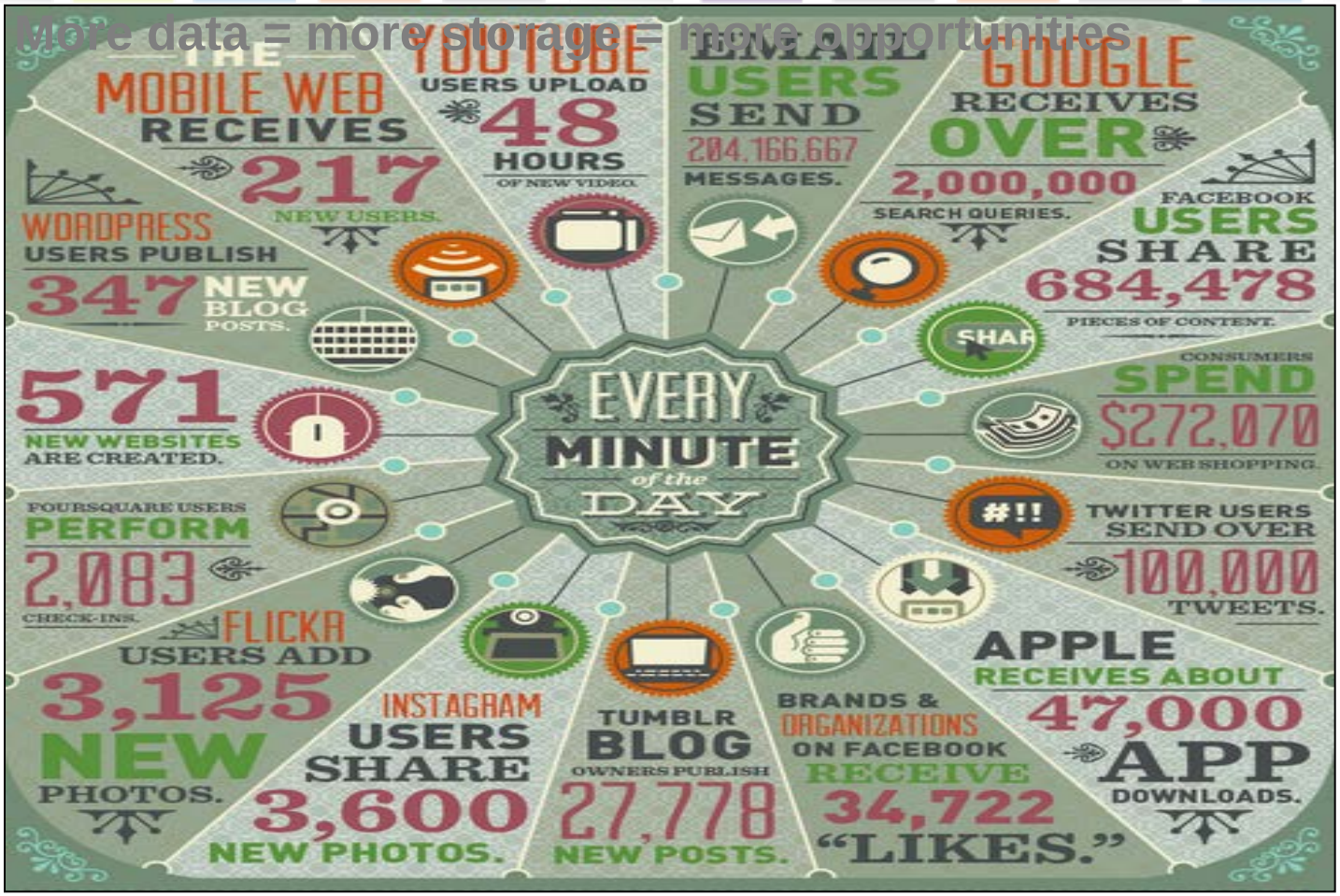


Because It's The Main Building Block of:

- Data Center Technologies
- Server & Storage Virtualization
- Cloud Services & Computing
- BIG Data & Analytics

Data Never Sleeps!

More data = more storage = more opportunities



More Data >> More Storage >>> More Opportunity

Domo.com

The Rapid Growth in the Data Centers

Source: IDC, 2013

It Is All About Data & its Importance!

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Technologies to Achieve

- Server Clustering
- Network Storage
- Multi-pathing & Failover
- HA Storage & Fabrics

RAID
Snapshots
Data Replication
Business Continuity & DR

- Storage Consolidation & Tiering
- Storage Virtualization
- Deduplication & Thin Provisioning

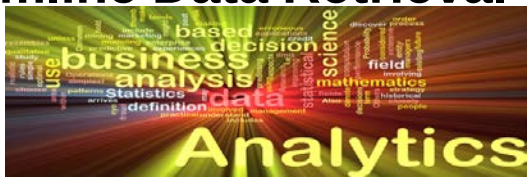
Object Storage
Data Analytics
Content Management

❑ Make Data Highly Available

❑ Protect Data Assets

❑ Accommodate Data Growth

❑ Streamline Data Retrieval



Required Skills & Knowledge for the IT Professionals Over the Years

Year	Required Skills Knowledge
1980's-Mid 90's	Mainly OS knowledge: VAX/VMS, Unix, DOS/Win, dBase & Popular Business Apps…..
Mid 90's-2002	LAN & WAN ,Data Communication Protocols; i.e.: TCP/IP, Ethernet, Novell Netware ……
2002- 2007	RAID Technology, SCSI, SAN, NAS, & Fibre - Channel Protocols …..
2007-Going Forward	IP SAN,FCIP, FCoE, Virtualization Technologies, Performance, Cloud Computing, Data Analytics and BIG DATA!

"Ten Tech Skills Heading the Way of the Dinosaur - 2013 Edition" *Global Knowledge Training LLC.*

"IT is a very fast changing industry – what is hot today may be a tiny niche market in only a few years and vice versa. There are many new technologies on the way, that means opportunities for those who prepare themselves early on and have the experience when demand picks up……."

1. **Windows XP/2003 and Earlier**
2. **Silverlight**
3. **Adobe Flash**
4. **COBOL, FORTRAN, and other Mainframe Languages**
5. **Lotus Notes Administrator**
6. **Novell GroupWise Administrator**
7. **Traditional Telephony**

8. **Those with Only Server Administrator Skills**

9. **Help Desk Technicians/Level 1 Support**
10. **PC Repair Technicians**

Alignment with CIO Spending Priorities

The Fundamental Drivers
.....*Form the Business Aspects*

- The Data Storage Industry is estimated by IDC & Gartner to reach $63.8B by 2017
- By 2015, Globally Cloud Service Providers Spend $22.6B on Storage H/W, S/W and professional services
- By 2016, IDC predicts $6B Market Value for Big Data Analytics & Storage infrastructure from $379.9M in 2011
- 68% of CIOs Plan To Increase Data Storage Spending, Making Data Storage The Top IT Priority

(Wall Street Transcript – Tue, Feb 21, 2012)

Career Opportunities…..

Keyword	DICE.COM	INDEED.COM
Citrix	1,528	6,869
VMware	3,806	18,801
Cisco	4,201	21,238
Cloud	6,767	49,196
Linux	10,999	53,614
Storage	5059	99,157

But There is this IT Skill Gap

- A 2012 study found that 93% of Business managers of IT functions believe there is an IT skills gap
- If current graduation rates continue, only 61% of IT jobs through 2018 could be filled by U.S. computing degree-earners
- When including only computing bachelor's degrees, this percentage drops to 29% of projected job openings that Could Be Filled (NCWIT, 2013)

The Fundamental Drivers

..... *Form the Technical Aspects*

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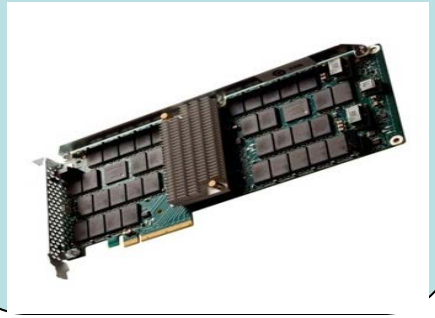
Today's Major Data Storage Trends

Flash Storage



Shared Infrastructure

Cloud

Mobility

Converged Infrastructure

BIG DATA

So, Are The Universities Preparing Their Graduates For These Trends?

IT Staffing Challenges Facing Organizations

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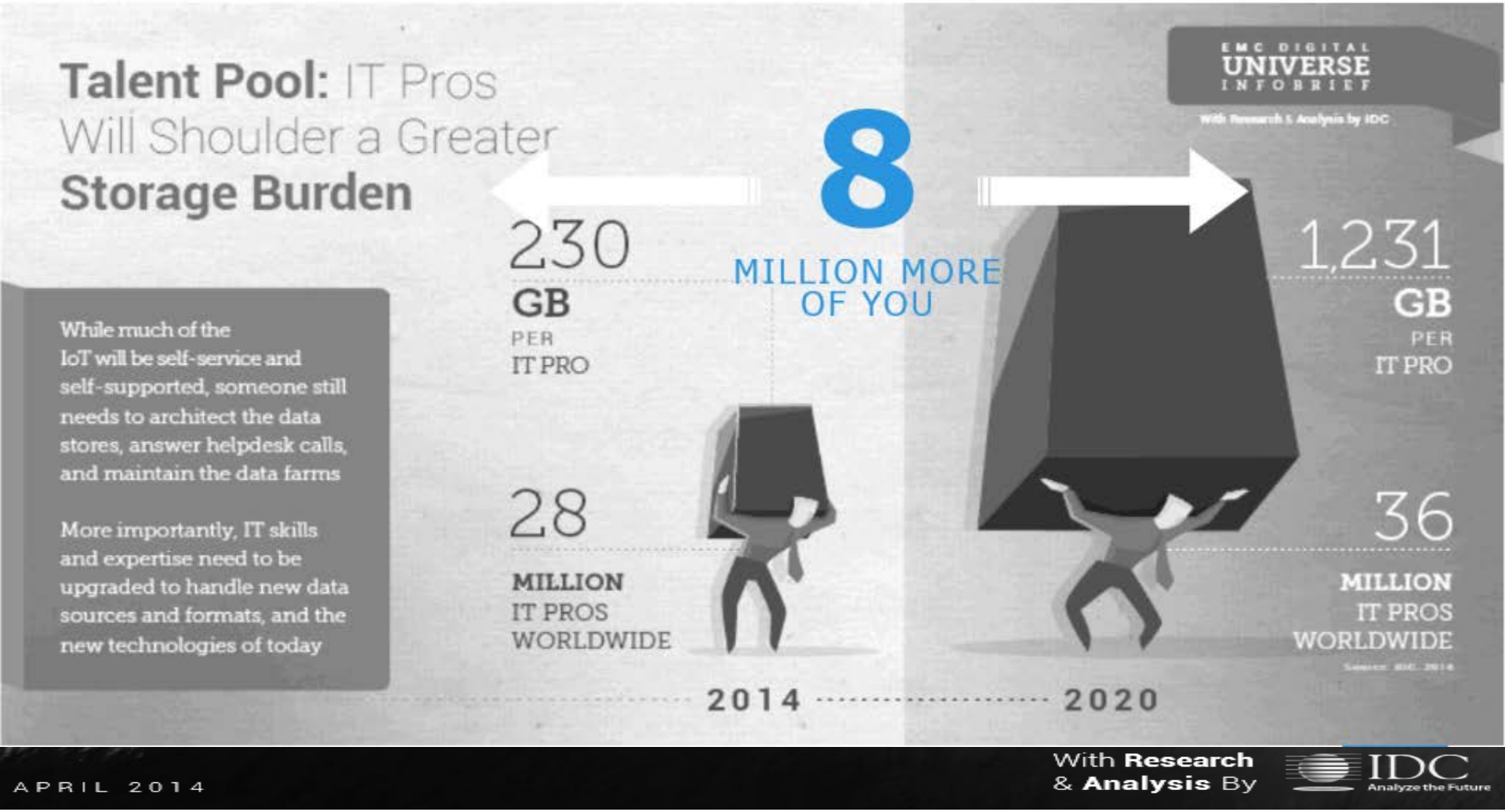

Current Engineering & Information Science Curricula

- Most colleges and universities educate students on four of the five Pillars of IT:
  - **Operating Systems**
  - **Applications**
  - **Databases**
  - **Data Communication Networks**

No Fundamental Data Storage & Virtualization Technology course works

- Institutes claim such course works lack substance and are not mathematically intense
- Technical Colleges only suffice to Cisco Networking and other traditional Data Communication course works

Post-Graduate Studies at the Industry's Expense!

- Since 2004, EMC hired over 1,500 new CS or IT graduates. Only fractions of new hires posses Data Storage fundamentals.
- At Hitachi Data Systems (HDS), up to six months of Self-paced, ILT & On-Job trainings required to train new hired Field Engineers on Data Storage and Virtualization.
- At NetApp Inc., 10 weeks of intense training required for the Tech Support Engineers to come up to speed on basic Data Storage skills.

HP Launces IT Skills Initiative in India

- In 2012 Hewlett-Packard planed to train 65,000 students over Five Years in the areas of:
  - Storage
  - Computer Networks
  - Cloud Computing

"More companies want to focus on newer and emerging technologies. But they are facing an acute shortage of readily employable talent that understand business terms and not just geeky terms." ***The Times of India Journal, Sept 2012***

Storage Industry forging Alliance with Universities

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EMC Academic Alliance Program Goals & Structure (July 2007):

- The EMC Academic Alliance Program offers colleges and universities around the globe unique 'open" curriculum-based education, such as:
  - Information storage and management
  - Cloud computing
  - Big Data analytics.

- The courseware focuses on technology concepts and principles applicable to any vendor environment.
- The goal is to prepare graduates to leverage the emerging IT infrastructure technologies

Participating University/Colleges in the US (Partial list)

PENNSTATE 1855

BALL STATE UNIVERSITY

NORTH CAROLINA STATE UNIVERSITY

Northeastern University

SPRINGFIELD COLLEGE

QUINNIPIAC UNIVERSITY

1867 HOWARD UNIVERSITY

Storage Industry forging Alliance with Universities, *Continued….*

- **NetApp Certified Storage Associate NCSA Program** provides teaching tools and resources to educators to facilitate the integration of storage systems and concepts into the classroom.
- **Some of the Participating Schools:**

- **The Key Benefits are:**
  - Increasing knowledgeable, storage-savvy college graduates
  - Increasing awareness & understanding of the central role that storage systems in the virtualized computing environments
  - Access to interactive, professionally designed, Web-based courses, Classroom-ready teaching modules; which focus on an array of storage-related topics.

Win-Win Situation for Everyone!

- Storage Industry Academic Alliance Programs are Completely Free; That is:

  - **No expenses or requirement to purchase equipment**
  - **Sponsored companies provide all course materials**
  - **Hands-on labs are on the cloud and very scalable**
  - **Certification exam are available after curriculum completion**

School – Students - Industry

Success Stories….

UCSC Silicon Valley Extension

Home | Find Courses | Areas of Study | Online | International | Student Services | Ab

Instruc

Information Technology Course Schedule

System Virtualization Fundamentals*	2.5	30032	■		■	
Storage Technology in Data Centers	3.0	30029	■		■	
Cloud Computing, Introduction	0.5	22413	■		■	
Cloud Computing, Comprehensive	2.5	30041		■		■
Programming for Cloud Computing: Amazon Web Services	2.0	23094		■		■
VMware vSphere: Configuration and Management	3.5	30027	0	0	0	0
Designing Networks and Systems for High Availability	3.0	4577		■		■
IO Concepts and Protocols: PCI Express, Ethernet, and Fibre Channel	3.0	22177	■		■	

Network Fundamentals		
Computer Networking Essentials*	3.0	2458
TCP/IP Essentials	2.0	0661
Switching and Routing	3.0	2226
Wireless and Mobile Communications, Introduction	3.0	5455
Fundamentals of Broadband Wireless Networks	3.0	30195
IPv6, Introduction	3.0	5321

Linux System Administration	
Linux, Introduction	2.5
Linux System and Network Administration*	3.0
Linux System Performance and Tuning	3.0
Linux Systems Programming	3.0
Relational Database Design and SQL Programming*	3.0
Python for Programmers	3.0
Perl Programming, Comprehensive	2.0

System and Network Security		
Computer, Network and Internet Security Fundamentals*	3.0	4100
Intrusion Detection	3.0	2265
Cryptography and Network Security	2.0	19950
Information Security: Defending the Business	1.5	22624

In 2007, we offered the first Data Storage course in the Northern California. Today, the *Information Technology Certification Program* consists of 8 courses on Data Storage, Virtualization & Cloud Technologies, plus the NetApp NCSA Self-paced courses & Labs.

Three Steps All Enterprises Must Take

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Many of the biggest challenges posed by the digital universe are organizational. Three steps organizations should take to survive and thrive in the new era are:

Define and implement an enterprise-wide data **governance policy.**

Put in place a central governance policy to determine who owns the data, who has the right to access it, where is the data, and what are the compliance, privacy, security, and other risk factors associated with the data.

Assess and select the right **software tools.**

To manage the data deluge, you must choose and deploy the right next-generation software tools for data cleaning, crunching, and consumption, and seamlessly integrate them with legacy systems.

Design and execute a plan for acquiring the required **skills and talent.**

Define the skills and expertise you need today and will need tomorrow and establish the right processes, programs, and incentives to upgrade your workforce.

APRIL 2014

With **Research** & **Analysis** By IDC Analyze the Future

Conclusion

"Every Man's Action Generates Data"

&

"Data Drives our World and Information is the New Currency"

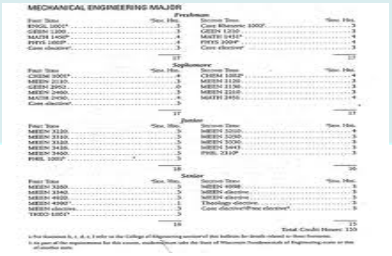
Data is exploding, growing 10X every five years. By 2020 that number is projected to grow to over 6 **Zettabytes**

IDC Country Brief, Jan 2013

Overall global spending by public and private cloud service providers on storage hardware, software, and professional services of $22.6 billion by 2015

IDC Report, 2011

Now it's Colleges & Trade Schools' responsibility to roll out curricula dedicated to Data Storage, Virtualization & Big Data studies to satisfy the increasing technical demands of this industry.



Questions/Discussion

Thank You!

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Attribution & Feedback

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