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 via new technologies such as data center storage & 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?
Data Never Sleeps!

More data = more storage = more opportunities

More Data >> More Storage >>> More Opportunity
The Rapid Growth in the Data Centers

Datacenters are the cornerstone of business...

Devices

- 3x in 2010 to 2015

VMs

- 2x in 2010 to 2015

Data

- 6x in 2010 to 2015

Users

- 2x in 2010 to 2015

...managing information assets is a key datacenter task

Source: IDC, 2013
It Is All About Data & its Importance!

**Technologies**

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

- RAID
- Snapshots
- Data Replication
- Business Continuity & DR

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

**Achieve**

- Make Data Highly Available

- Protect Data Assets

- Accommodate Data Growth

- Streamline Data Retrieval
## Required Skills & Knowledge for the IT Professionals Over the Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Required Skills Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid 90’s-2002</td>
<td>LAN &amp; WAN, Data Communication Protocols; i.e.: TCP/IP, Ethernet, Novell Netware, etc.</td>
</tr>
<tr>
<td>2002-2007</td>
<td>RAID Technology, SCSI, SAN, NAS, &amp; Fibre-Channel Protocols,</td>
</tr>
<tr>
<td>2007-Going Forward</td>
<td>IP SAN, FCIP, FCoE, Virtualization Technologies, Performance, Cloud Computing, Data Analytics and BIG DATA!</td>
</tr>
</tbody>
</table>
“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
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)
The Fundamental Drivers

Form the Technical Aspects

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?
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 possess 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 Launches IT Skills Initiative in India

In 2012 Hewlett-Packard planned 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.”
EMC Academic Alliance Program Goals & Structure (July 2007):

- Provides students with an IT education on data storage
- Non-product specific courses focused on storage design & management that explains theory and concepts
- Respects the need for academic freedom to supplement the material
- Courses has to be offered in an undergraduate or graduate degree programs
- Courses become part of the University/college degree program offerings

Participating University/Colleges in the US (Partial list)

- Penn State
- North Carolina State University
- Northeastern University
- Springfield College
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, focused on an array of storage-related topics.
- Simulation & environments for hands-on experience and for courses.
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....

In 2007, we offered the first Data Storage course in the Northern California. Today, the **Information Technology Certification Program** consists of 8 courses covering Data Storage, Virtualization & Cloud Computing technologies, plus the NetApp NCSA Self-paced courses & Labs.
Data is exploding, growing 10X every five years. By 2020 that number is projected to grow to over 35 Zettabytes ($10^{21}$). Overall global spending by public and private cloud service providers on storage hardware, software, and professional services of $22.6 billion by 2015. 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!
References:

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The SNIA Education Committee thanks the following individuals for their contributions to this Tutorial.

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