# Green Data Storage


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# Going to Discuss…

- Green Data Storage Perception
- Technologies for Green Data Storage
- Objectives for Green Data Storage & the Problems currently
- Companies encouraging Green Storage
- Green Data Storage – Indian Context
- Discussion

# Green Storage Perception


- Green Gap

  Understanding the customer's perception helps avoid hearing their response as a lack of opportunity
- For Instance

  *If you ask a customer whether they have any green data storage initiative and whether they're going to be spending any money on green, you may get the answer, "No, not this year." Instead of packing up your bag and moving onto the next customer, change your tack. Ask the customer if they are spending any money to address power, cooling, floor space, environmental health or safety, e-waste or any other related issues. The customer may then respond by telling you that they will be spending to improve energy efficiency, boost performance, reduce cost, and to enable the business to grow*

# Technologies for Green Storage

- Objective
- Current Problems
- Green Storage Technologies

# Objectives

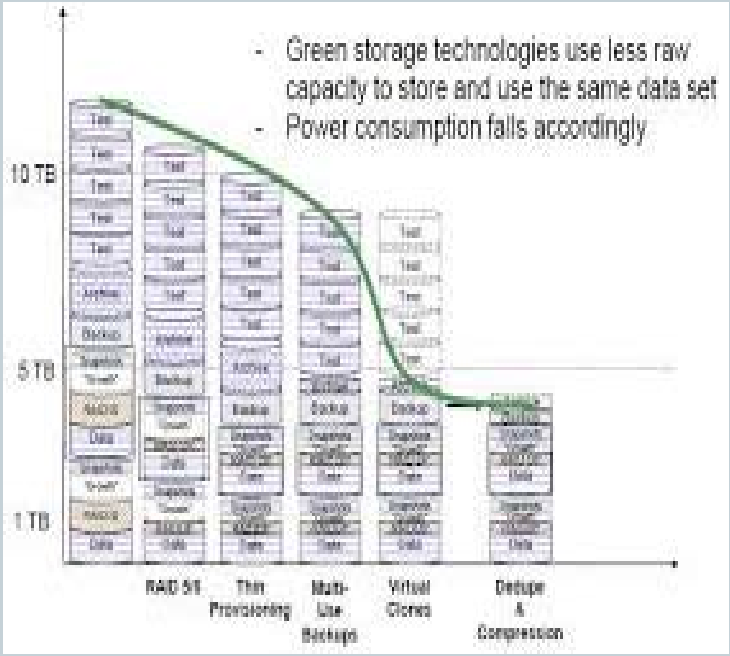

- Get more (storage) work done for less money
- Translation: reduce data centre footprint
- In space - less storage equipment to buy, power and maintain
- In energy - more energy efficient equipment, less equipment to cool, better cooling methodologies and better power management
- In administrative costs - less storage equipment to manage

# Problems

- *Problem 1: Need for redundancy*
  - RAID 10 - protect against multiple disk failures
  - DR Mirror - Protect against whole site disasters
  - Back ups - protect against failures and unintentional deletions/changes
  - Compliance archive - protect against heavy fines
  - Test/Dev Copies - protect live data from mutilation by unbaked code
  - Over provisioning - protect against volume-out-of space application crashes
  - snapshots - quicker and more efficient backups and PIT(point in time) copies
- *Problem 2: making heat just to cool it*
  - Servers, storage and switches are HEATERS
  - 100 % efficient energy-to-heat conversion
  - Rotating media uses 85 % of max power at idle!
  - A/C is a big "undo" mechanism for overheating
  - Bus less than 100% efficient (typically 70%)
- *Problem 3: Unused Space*
  - Over provisioning of systems
  - Over provisioning of containers
  - Typically 30% to 40% utilization of available space

# Green Storage Technologies

- *Enabling technologies*
  - Storage virtualization
  - Storage capacity planning
- *Green software*
  - Compression
  - Delta snapshots
  - Thin provisioning
  - Non-mirrored RAID
  - De duplication and SIS



# Storage Virtualization

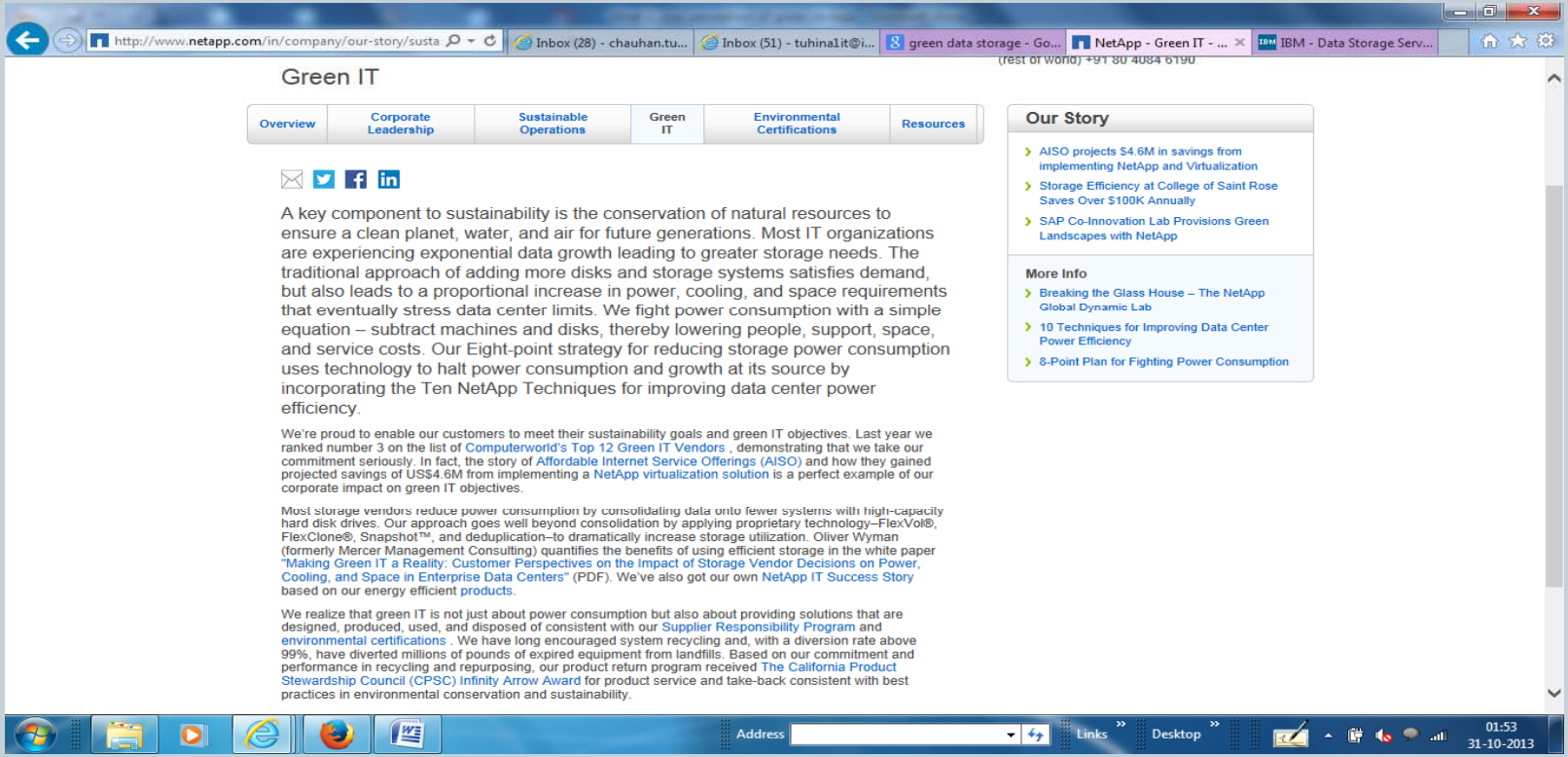
- Mapping from physical location to virtual location
  - May exist at multiple layers
  - In and of itself, not green wrt storage
  - no reduction in dataset size - its just pointer remapping
- But foundational for most green storage technologies
  - Thin provisioning
  - Delta snapshots
- Also contributes in other areas
  - Flexibility, manageability etc
  - Fundamental for storage clouds

# Storage Capacity Planning

- Need to make best use of thin provisioning etc
- Obtain and analyse baseline data
- Many toolkits available from storage and storage management vendors
- Identify which green software technologies will address each inefficiency found
- Ask vendors for proposals
- Overall story more important than individual technologies

# Companies encouraging Green Storage

- NetApps



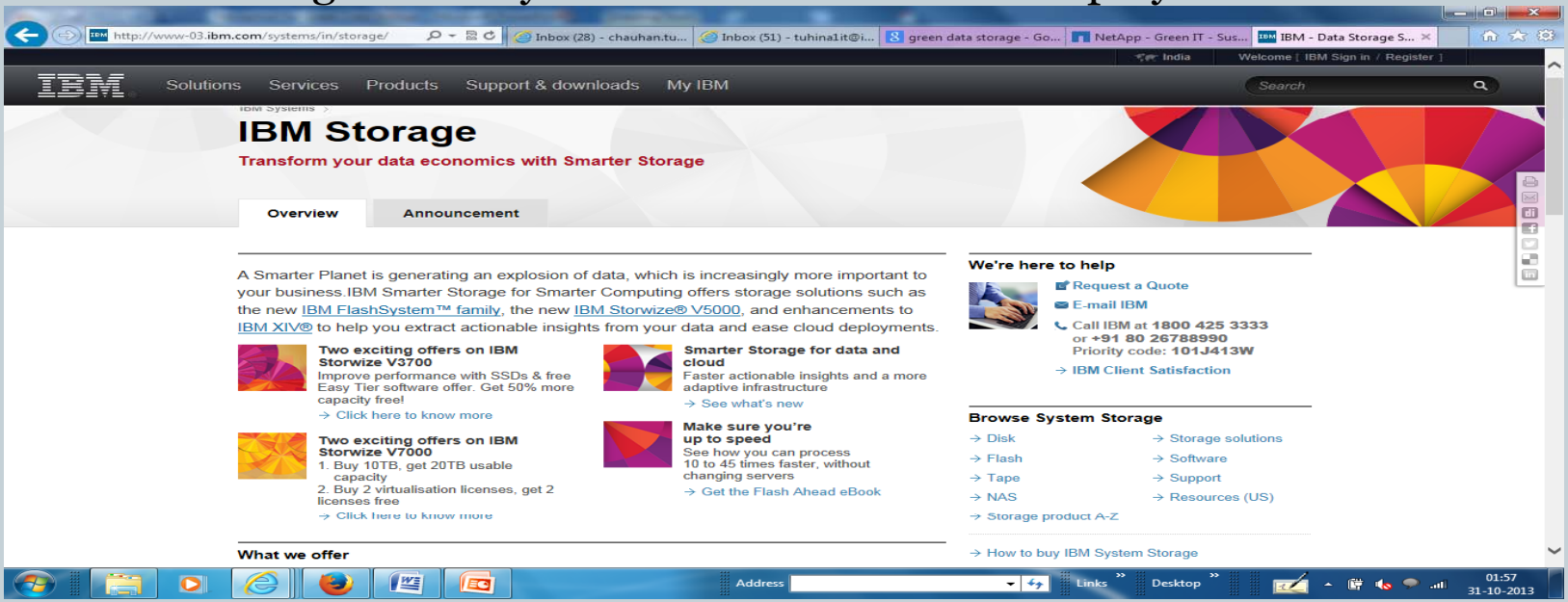
# Behind the Cloud Is an Energy-Consuming Datacenter

- For customers, cloud solutions can offer many economic and technical benefits, including not having to build out additional infrastructure. While that may reduce your own infrastructure and carbon footprint, the cloud is driving a massive datacenter build-out that is far from green. About two percent of all power consumption in America comes from datacenters.
- According to new stats from Greenpeace, the average datacenter's energy requirement is increasing to nearly 100 MW of power–enough energy to power about 80,000 U.S. homes. In the context of energy availability, a large coal plant or huge solar thermal plant can produce only 500 MW of power. A 100 MW data center would consume a significant portion of the output of a large power plant.

# Companies encouraging Green Storage Cntd…

- IBM

  A Smarter Planet is generating an explosion of data, which is increasingly more important to your business. IBM Smarter Storage for Smarter Computing offers storage solutions such as the new IBM FlashSystem™ family, the new IBM Storwize® V5000, and enhancements to IBM XIV® to help you extract actionable insights from your data and ease cloud deployments.



# Green Data Storage – Indian Context

- A report in a leading business daily stated that the Indian data centre footprint is at four million square feet, and estimated to grow to 6.6 million sq ft by 2016, with service providers driving majority of the growth. In terms of market size, it is projected to grow to $3 billion from $2.2 billion in the same period.

# Green Data Storage – Indian Context Cntd..

- Empowering Office Spaces
- Adopting Optimized Structures
- Creating Financial Value
- Developing Range Of Solutions
- Evolving Metrics Of Data Centres
- The Way Forward

# References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# Discussion