



Information Growth: Challenge or Opportunity for the Storage User?

Roberto Basilio – Hitachi Data Systems

Roberto.Basilio @hds.com

@RB_HDS 



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Information growth a challenge or an opportunity?



17845: MVSS Project Opening - Information growth a challenge or an opportunity for mainframe storage user?

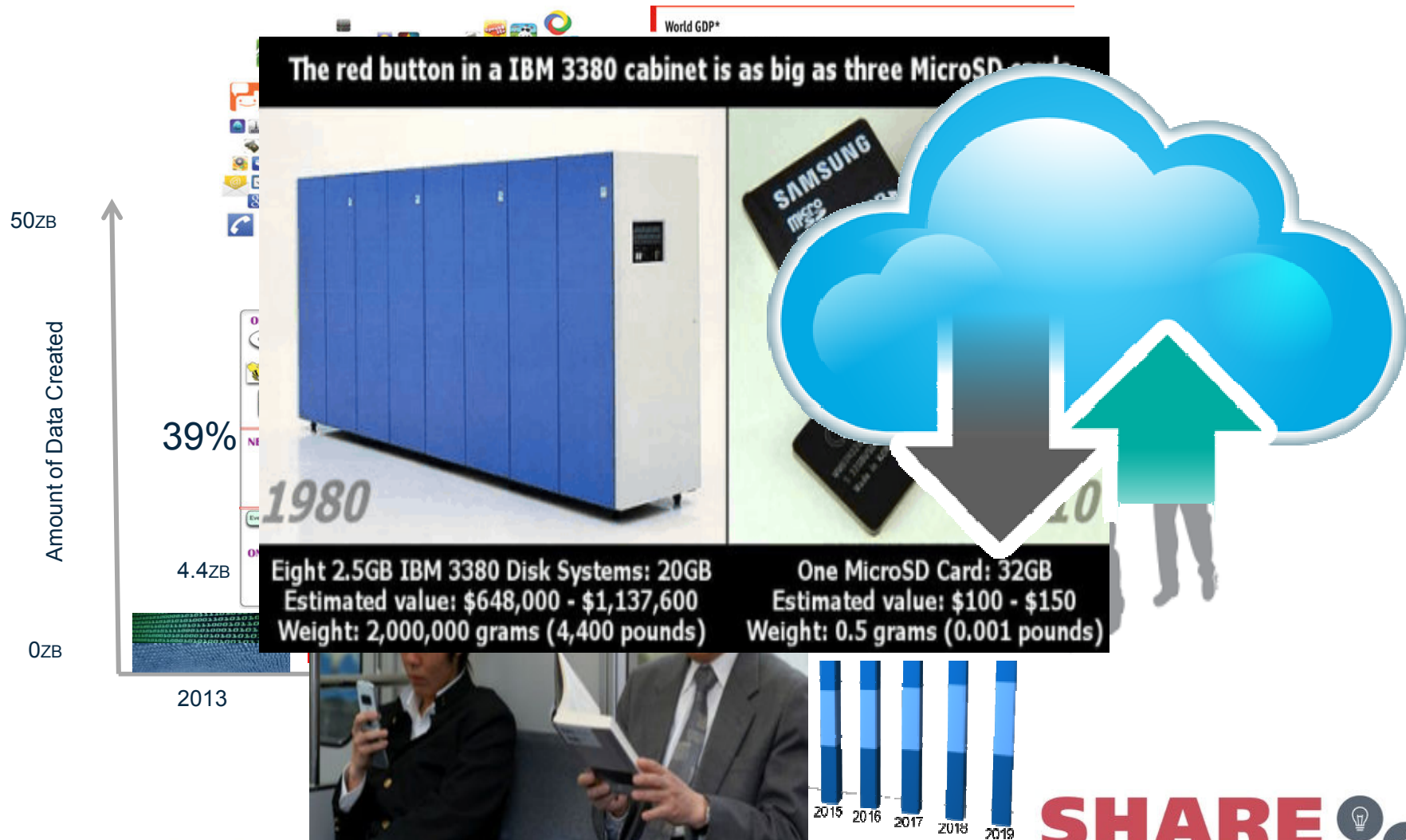
Speaker: Roberto Basilio (HDS - VP, IT Infrastructure Platforms Product Management)

With an exponential growth of information created and stored, users are pressed to find the right data to keep and show the value of what is kept, all while managing this quickly and efficiently. New storage technologies are explored and new opportunities are emerging. While many new solutions are showcased, the traditional Mainframe infrastructure can play a relevant role.

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Five Factors Driving IT World Changes



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Our Society Is Transforming

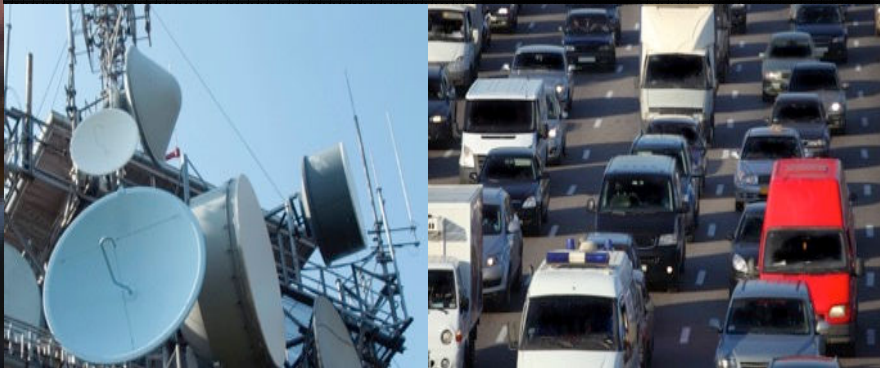
Resources and Sustainability



Population and Health



Infrastructure and Transportation



Safety and Security

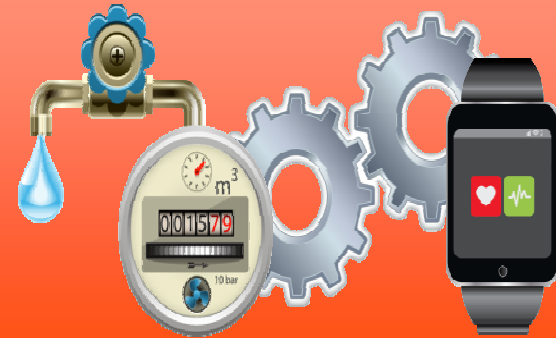


What Used To Be Two Worlds

Information Technology (IT)



Operational Technology (OT)



Are Now Integrating



ERP
Email
Video

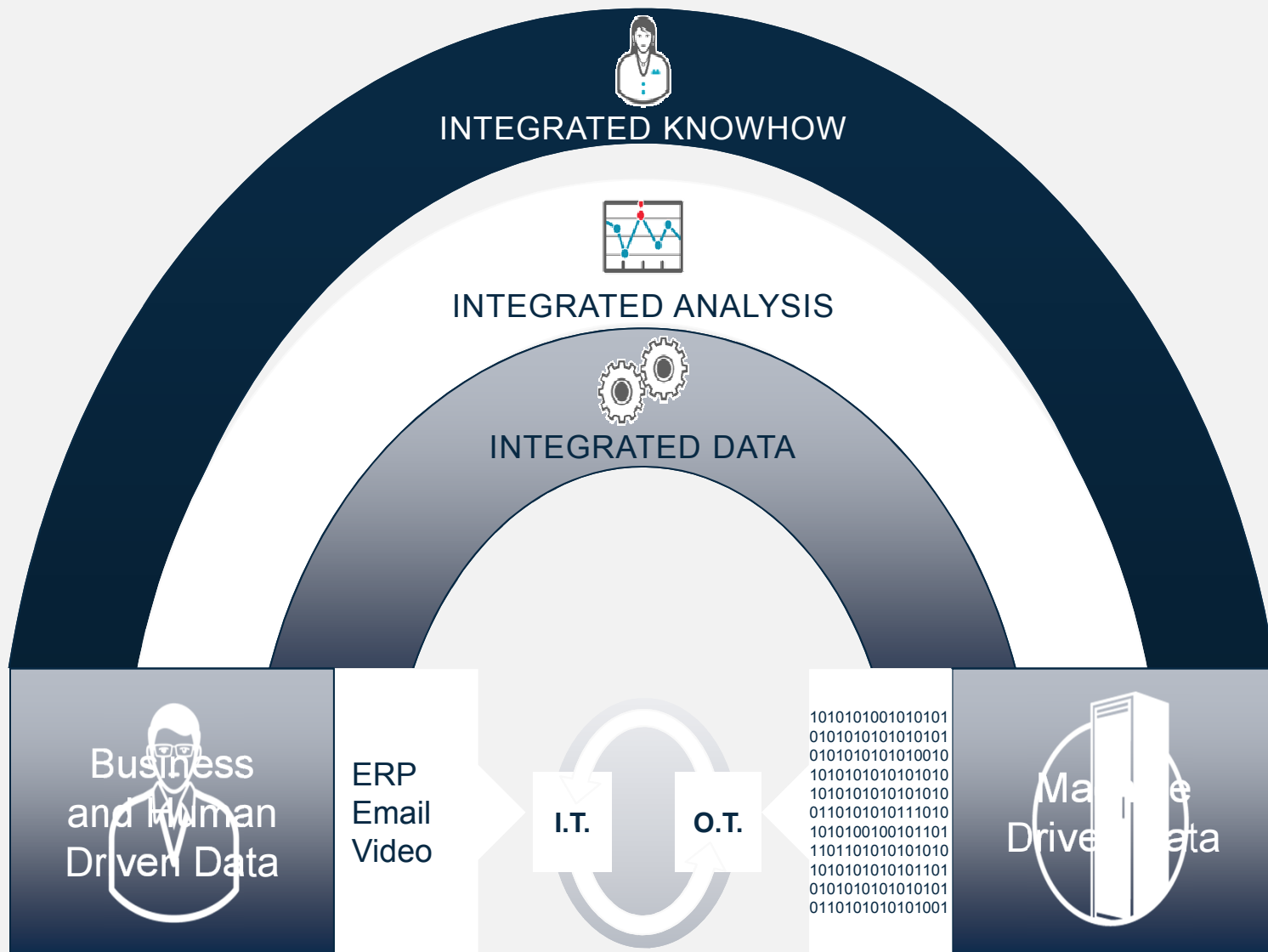
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O.T.

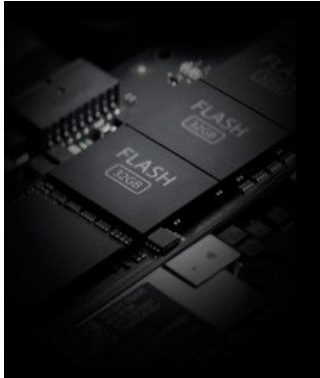
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Integration of IT and OT



IT Trends - Technology



- Latency Reduction – Three converging steps
 - Increase use of Flash everywhere
 - Converged platforms – Server/Storage convergence
 - Streamlined Networking - Increasingly IP based but not only for file servers



- Data Lakes Management
 - Capacity Optimized Storage
 - Data Packaging
 - Indexing & Mining



- Virtualization/Containers/Cloud Everywhere
 - Hyper Convergence; new platforms and buying mode
 - Flexibility and vendor independence
 - Mobility

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IT Trends - Simplification



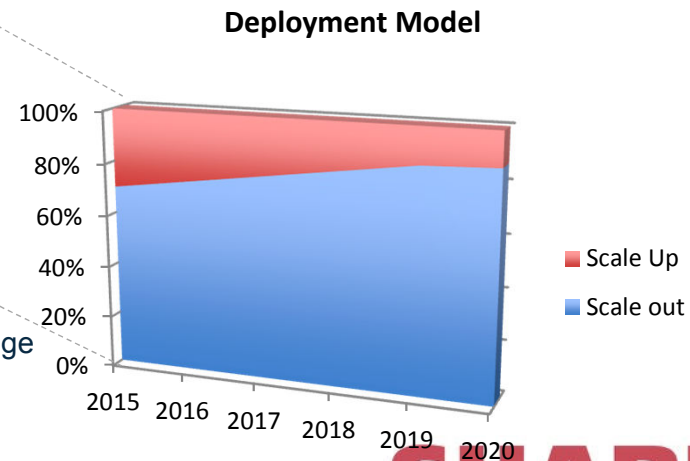
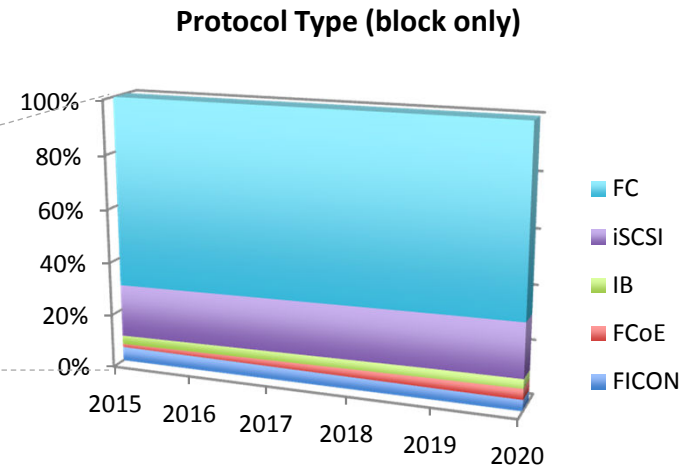
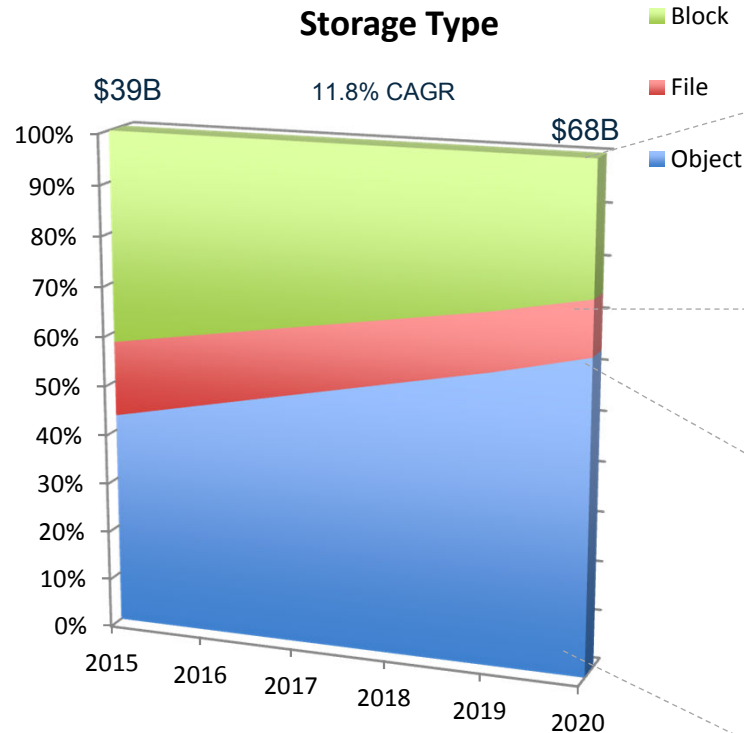
- Un-clogging the Data Center
 - Hardware reduction
 - Environmental footprint reduction
 - Ease of management
- Software Defined Storage & Infrastructure
 - New virtualization
 - Simplification and homogenization of functionalities
 - Distributed Infrastructure

Storage Market Changes



*Gartner: Forecast Analysis: External Controller-Based Storage, Worldwide, 4Q14 Update
IDC: Worldwide File- and Object-Based Storage, 2014-2018 Forecast
Calculating 2019-20 revenue based on CAGR of 2017-18.

*Protocol Type
Source: IDC - Worldwide Enterprise Storage Systems Forecast, 2015-2019
Estimation: Calculating 2020 revenue based on CAGR of 2018-2019.



- Big Data and cloud will drive the growth in the object storage area
- Scale-out systems will be directly related to the growth in object storage
 - iSCSI will take some space from traditional FC
 - Traditional File Servers will steadily decline

*Deployment Model
Source: IDC: Worldwide File- and Object-Based Storage, 2014-2018 Forecast
Estimation: Calculating 2019-20 revenue based on CAGR of 2017-18.

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The World STILL Depends on zSystems for Continuously Available Applications & Protected Data.



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Why Mainframe?



MAINFRAME BRINGS TO THE TABLE

- **Performance and Scalability** – powerful processors, scalable clusters, flash storage, embedded analytics engines
- **Strong security**, RACF for fine-grained controls with auditability and hardware encryption.
- **QoS management** – set SLA's based on business priorities while running at near 100% utilization.
- **Chargeback** – enables cost controls for applications.
- **Disaster Recovery** solutions unmatched in the industry
- **Better TCO** tied to performance and scalability

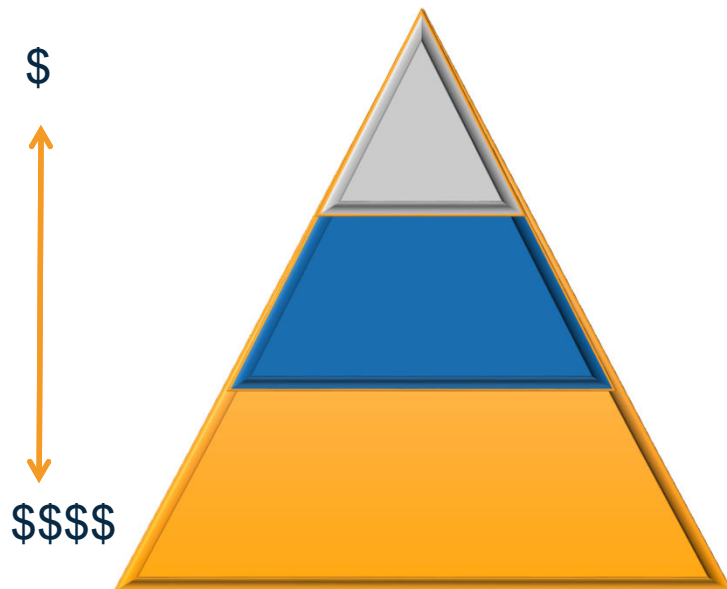


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Applications Role vs. Infrastructure Role Value Chain Reversal

Then

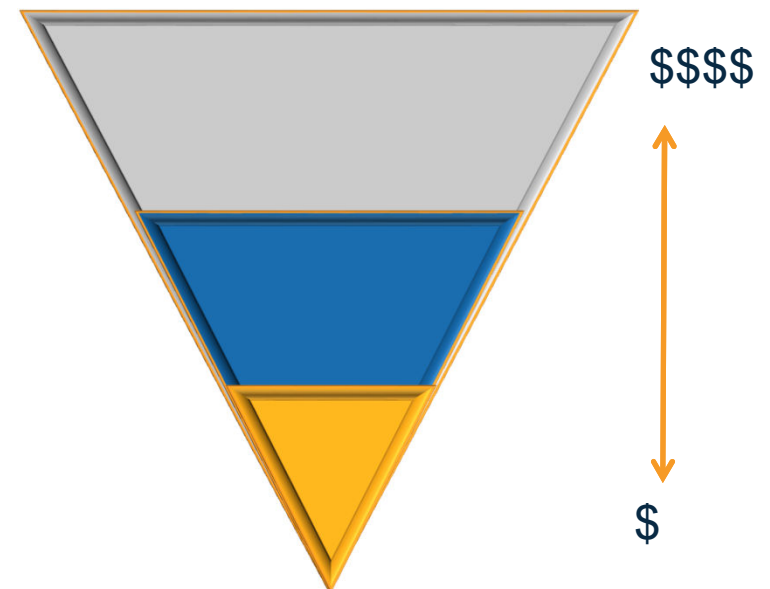


Apps/End Users

Dev. Platforms

Infrastructure

Now

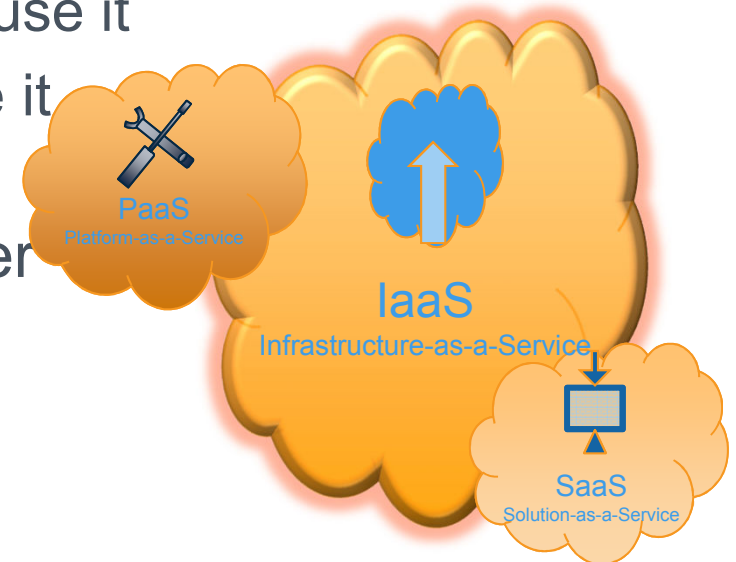


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A new Way to Use Infrastructure



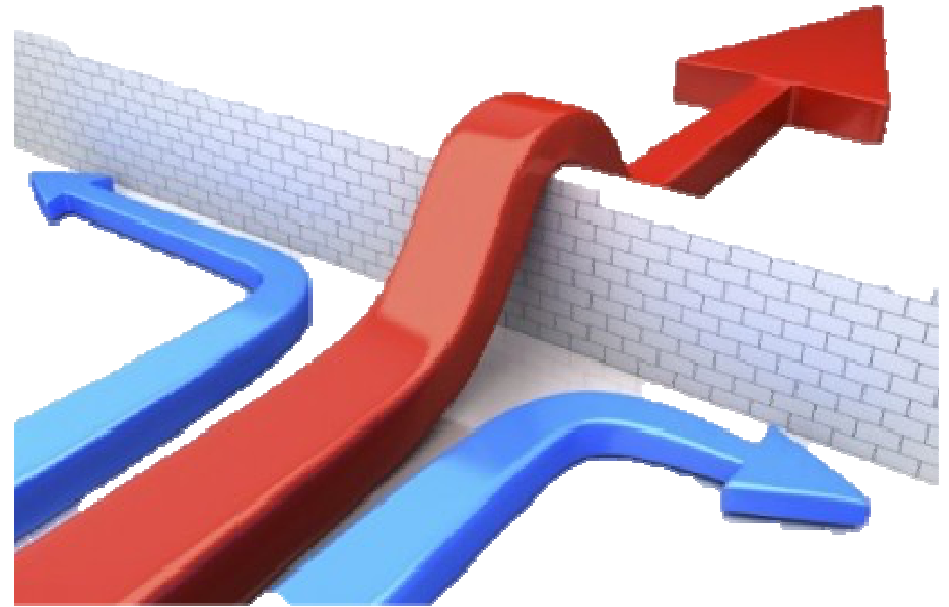
- Pay-as-you-go concept
 - Easy to allocate, use, dispose
- Allocate what you need, pay for what you use, keep as long as you need
 - No need to know what is behind, just use it
 - The “Zipcar” model....book it, drive it park it!
- Mask the complexity from the end-user



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Where Do We Go from Here?

- Challenges: Integrating new technology and old processes
 - DR, Security/Compliance,
 - Heterogeneous Interoperability
 - New Applications
 - Environmental Responsible
 - Cost Commoditization
- Opportunities
 - Big Data and Analytics
 - Integrating cloud services
 - Intelligent Data Services
 - Maximize Investments and Minimize Costs
- Can we bring traditional environments and infrastructures on this change?



Storage Infrastructure Challenges

MAINFRAME CHALLENGE AREAS



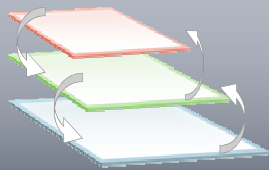
Performance



Cost Efficiency



New
Environments



Automation



Continuous
Operations



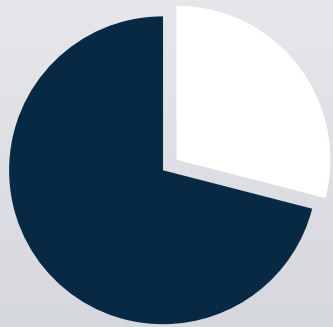
Security &
Compliance



Data Protection

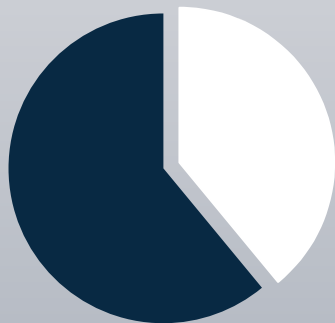
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Automation Simplifies, Saves and Improves Reliability



29%

of time spent on ***lower-value*** admin and provisioning



39%

of storage outages caused by ***human error***

451

Research The InfoPro 2014, Storage – Wave 18

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Cost Efficiency

- Performance and scale mean cost advantages
- Measured optimization and high efficiencies
- Automation and Data Mobility
 - More applications integration, less manual activities
 - Leverage best cost/performance/value combinations

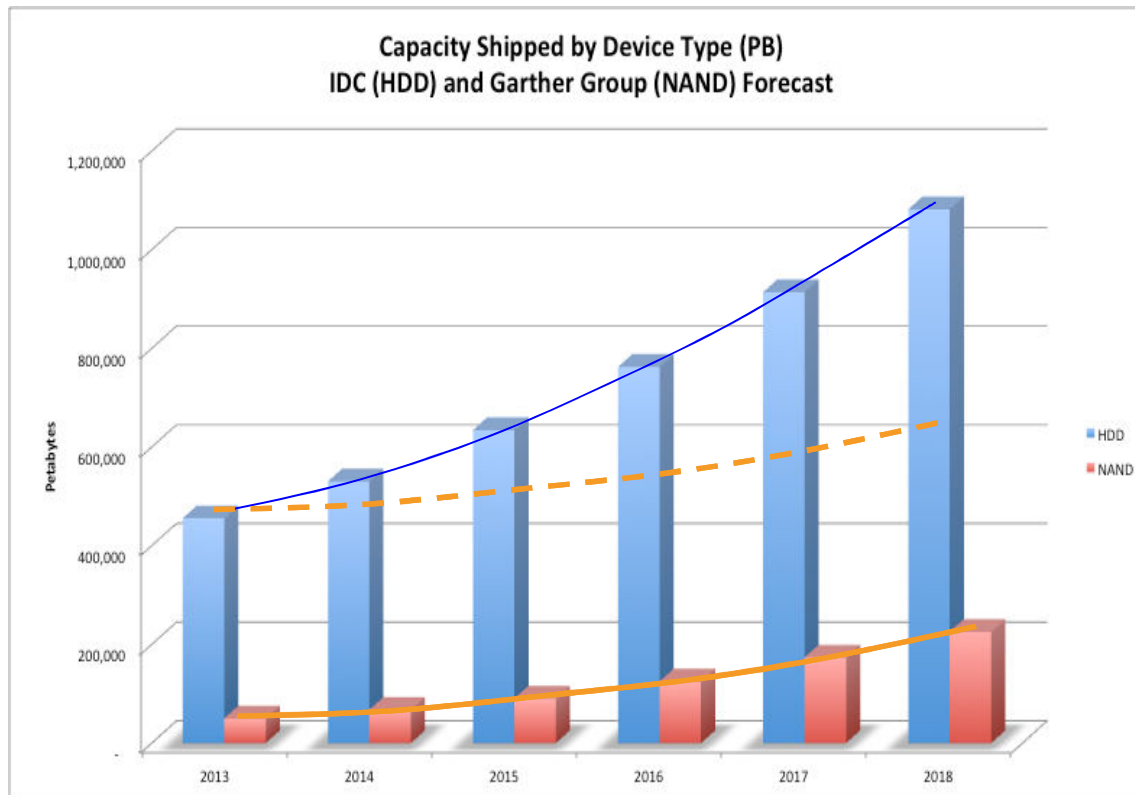


Performance

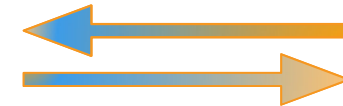
- Deterministic vs averages.
 - When it **always** has to meet the service level
 - Measured by weakest link in chain
- The advent of Flash based systems
 - Generally Flash storage saves money and solves problems
- The need to measure must be designed from start
 - Hybrid “Flash & Disk Drives” may be, in the long term, cheaper than a “either” / “or” approach



Technology Shift – Making Sense of Reality



- Must use both in a more advanced and efficient ways.
 - Processing vs. Archiving



NAND and HDD technologies produce *significantly different* amounts of storage capacity



NAND *cannot produce enough* PB
HDD's cannot provide *enough performance*



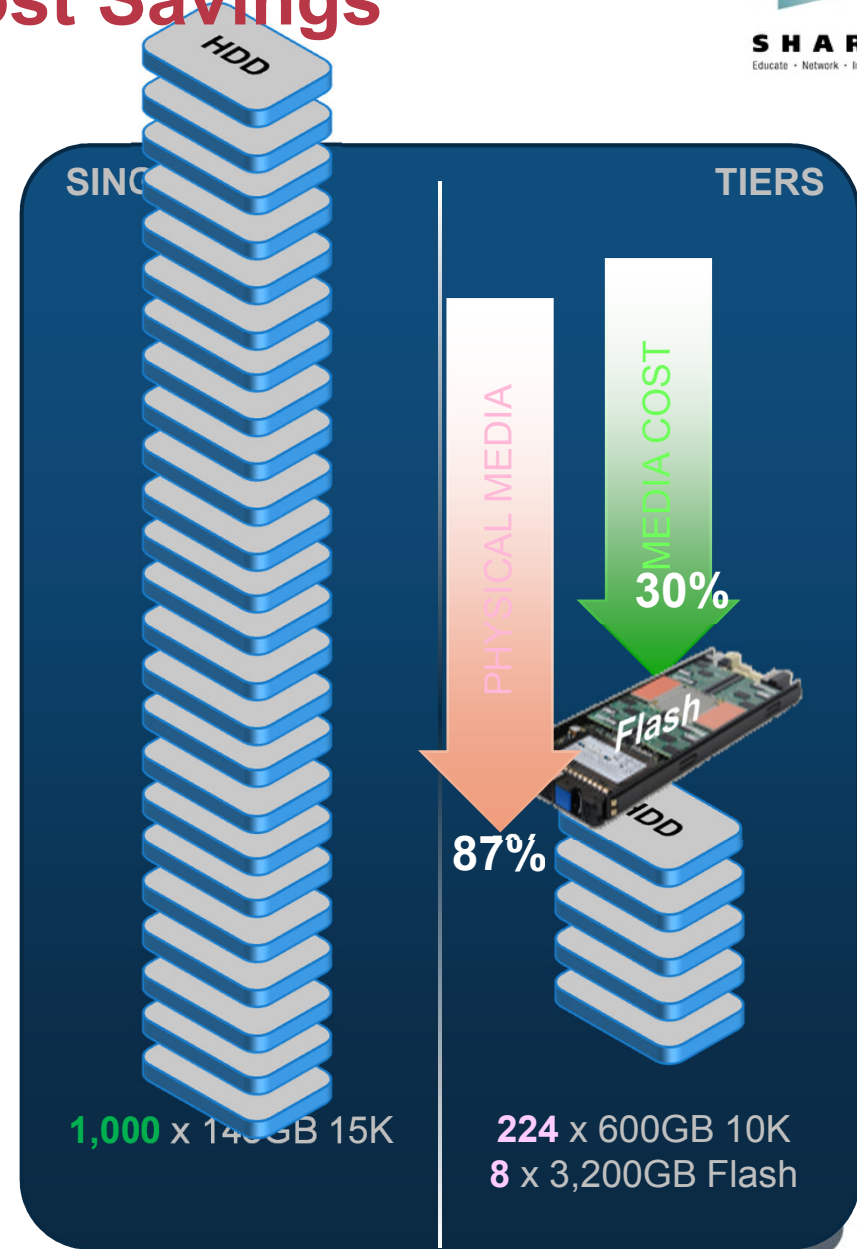
By 2018

All NAND technologies, combined, will produce *only 17%* of total PB, HDD will cover the remaining 83%

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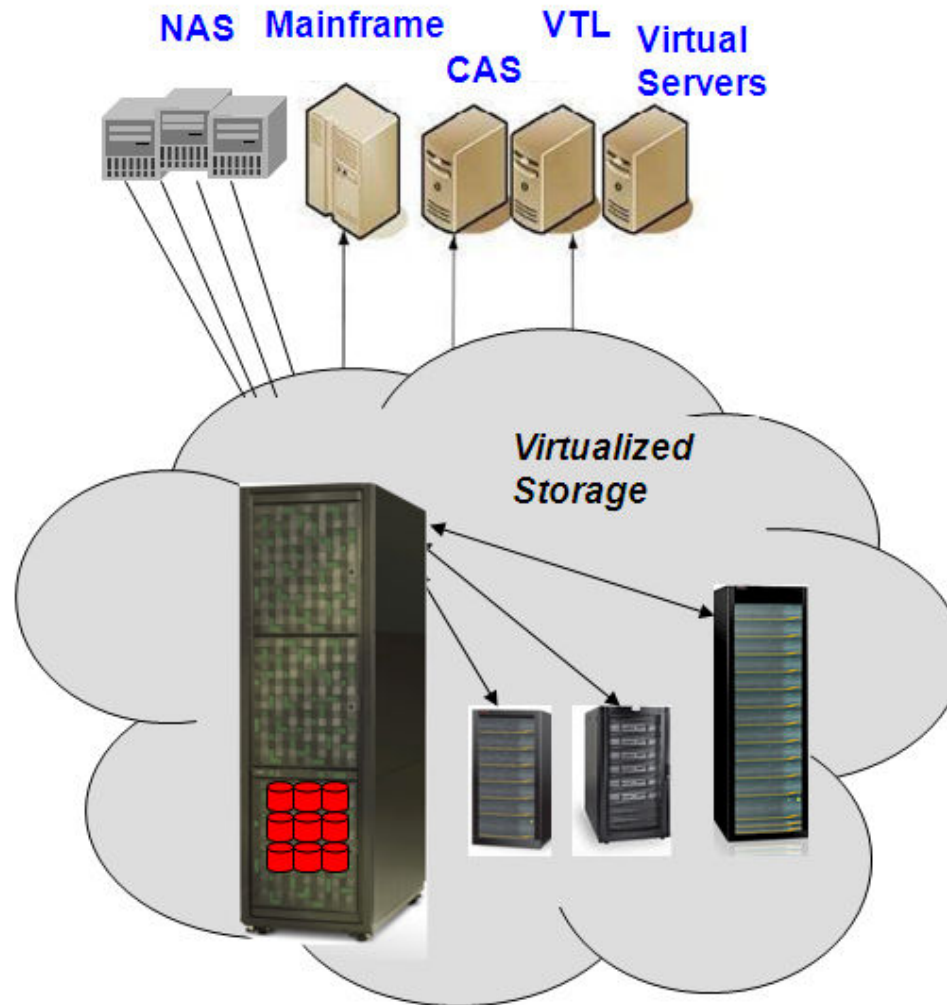
Hybrid Storage Offers Cost Savings

Fast Storage + Dynamic Tiering
= *EFFICIENCY*



CONFIGURATION = 144TB and 400,000 IOPS

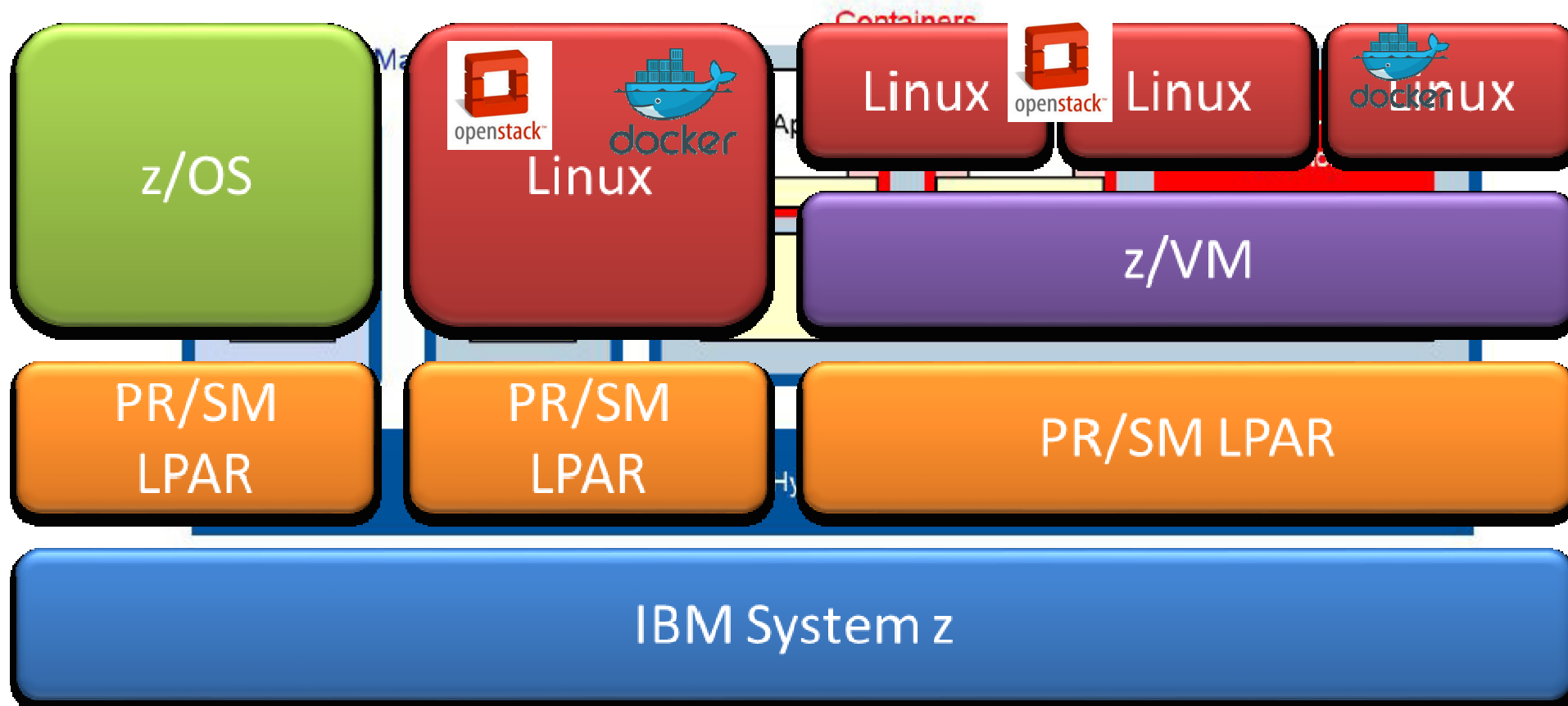
Software Defined Infrastructure - Virtualization



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New Environments Virtual Machines + Containers



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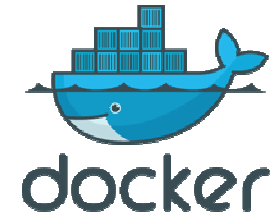
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Bring New Environments to Mainframe Linux – Docker - OpenStack



GAIN ADVANTAGE FROM NEW ENVIRONMENTS AND TOOLS

- Utilize important new applications and workloads on mainframe
- Leveraging open standards and open source environments such as Java, OpenStack, KVM and Docker.
 - Fibre channel & IP storage options
- Automate connections from mainframe-based data to Open System applications and tools
- Where are your integration points?
 - Data Format? Data analysis done on the mainframe or off?



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Preserving Information – Data Interchange



- Mainframe storage contains critical and very valuable data
 - However mainframe storage is expensive
 - Unique format, not easy to exchange
- Moving data to less expensive storage can give you other opportunities
 - Low cost long term archive, but easily accessible
 - Move data to cloud
 - Analytics - ability to index and search that data
 - Merge mainframe data with data from other platforms
- Use case example:
 - A user stored its DR data on an Object Archive systems at secure location instead of traditional DR configurations
 - Sharable and easily retrievable
 - The new “tape” alternative w/o the unsecure mobility of tapes.

Continuous Operations and Data Protection

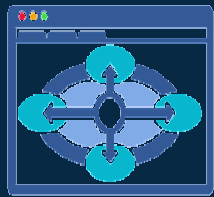


- Business cannot stop, but what about
 - Application fail-over, vs. Disaster Recovery
 - Delete data vs. “Bomb in the Alley”
 - Batch vs. Database Recovery
- Mainframe has been solving these problems for a long time, but:
 - GDPS works great,
 - It’s unique and not inexpensive
 - Active-Active is better but doesn't solve all problems
- Alternative platforms can be lower cost, quicker to deploy
- How do we become less monolithic more agile while maintaining the benefits and experience

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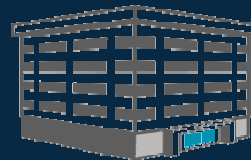
Security and Compliance Considerations



Secure
Management



Multi-Tenancy



Authentication &
Authorization



Audit Logging



Encryption and
Key Management



Data Sanitization

**MAINFRAME
STANDARD-BASED**

Vs.

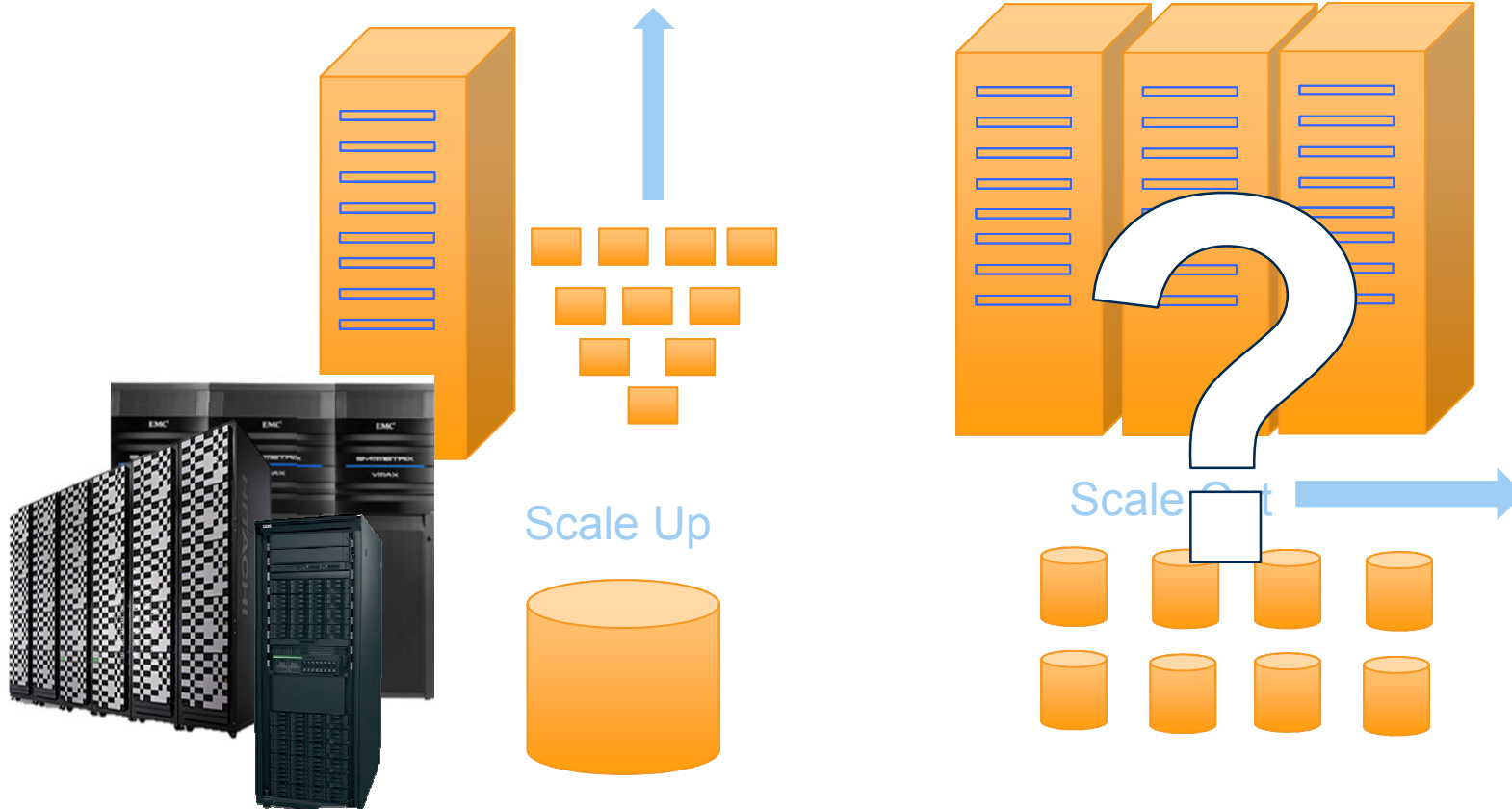
**OPEN SYSTEMS
STANDARDS-BASED**

*Need to Integrate
Standard Corporate
Security
Environments*

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Storage Transformation – Considerations



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Technology - Leading the Change

“It’s really hard to design products by focus groups. A lot of times, people don’t know what they want until you show it to them”

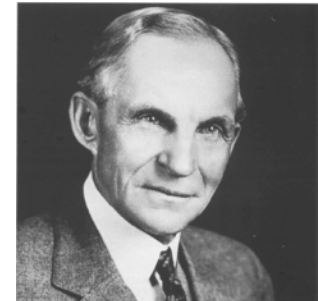
-Steve Jobs

Picture by Ben Stanfield WWDC 2007



“If I had asked people what they wanted, they would have said faster horses”

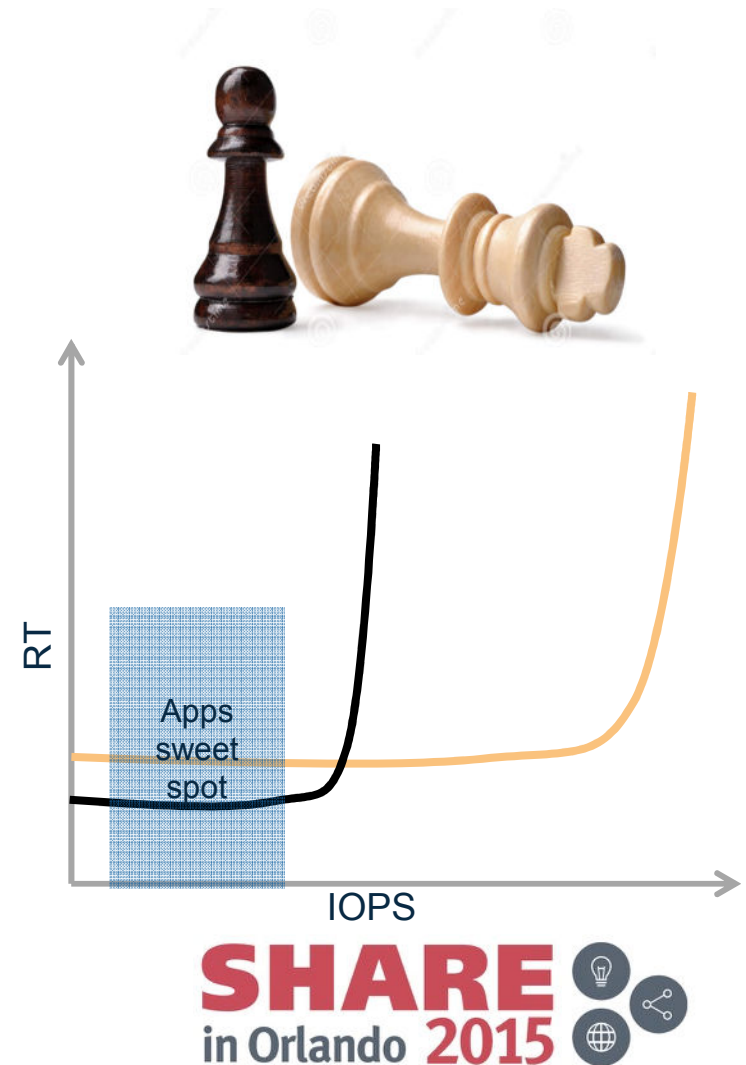
-Henry Ford



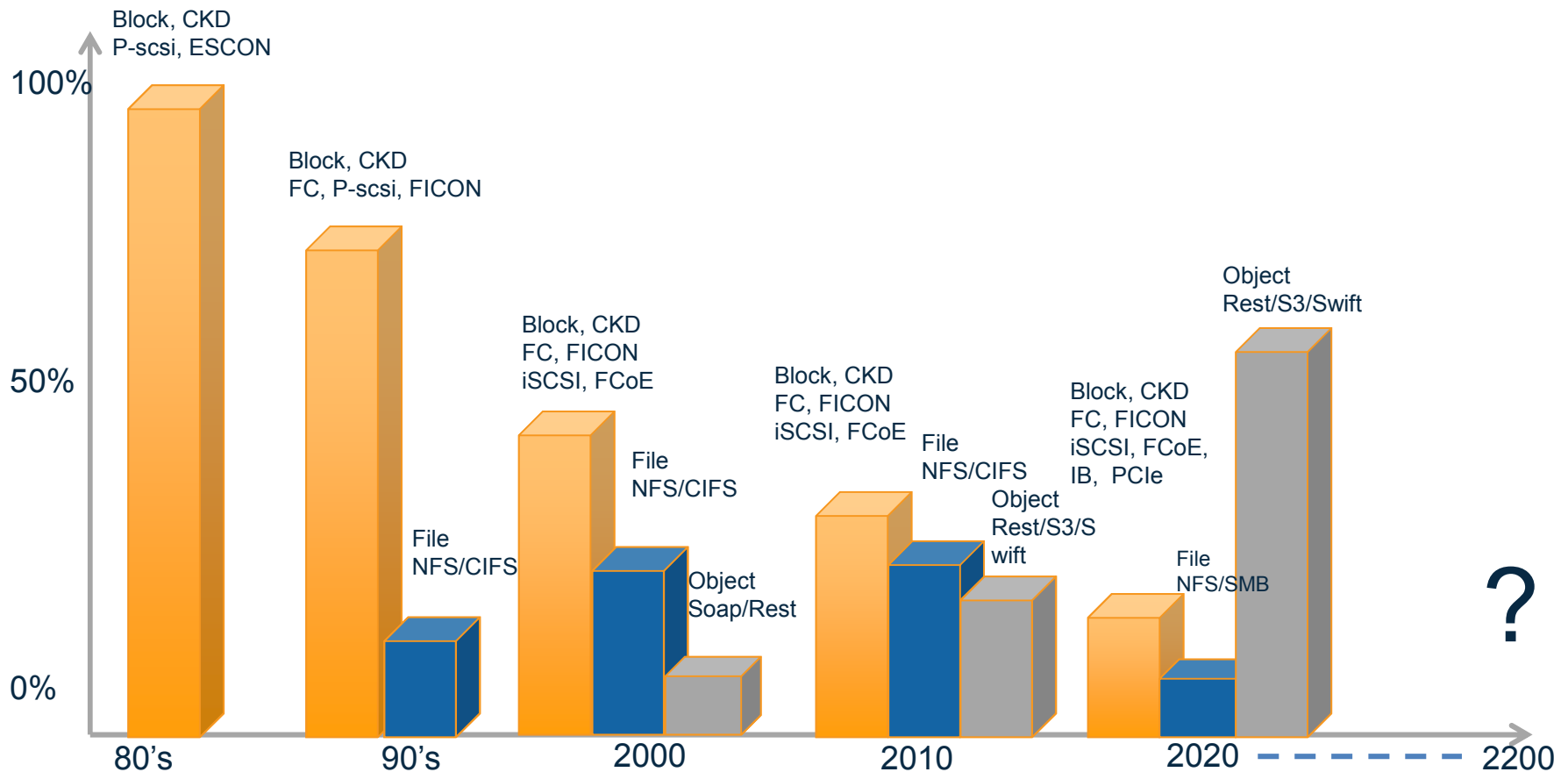
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Designing the Right Platform

- Smaller and rapid is the new normal
 - Application sweet-spot vs. consolidation play
- Tightly integrated
 - Converged, Apps integration
- Needs must meet Budgets
 - Buy what you need, scale-it when you need more
 - Aggregate logically
 - Present as a seamless resource

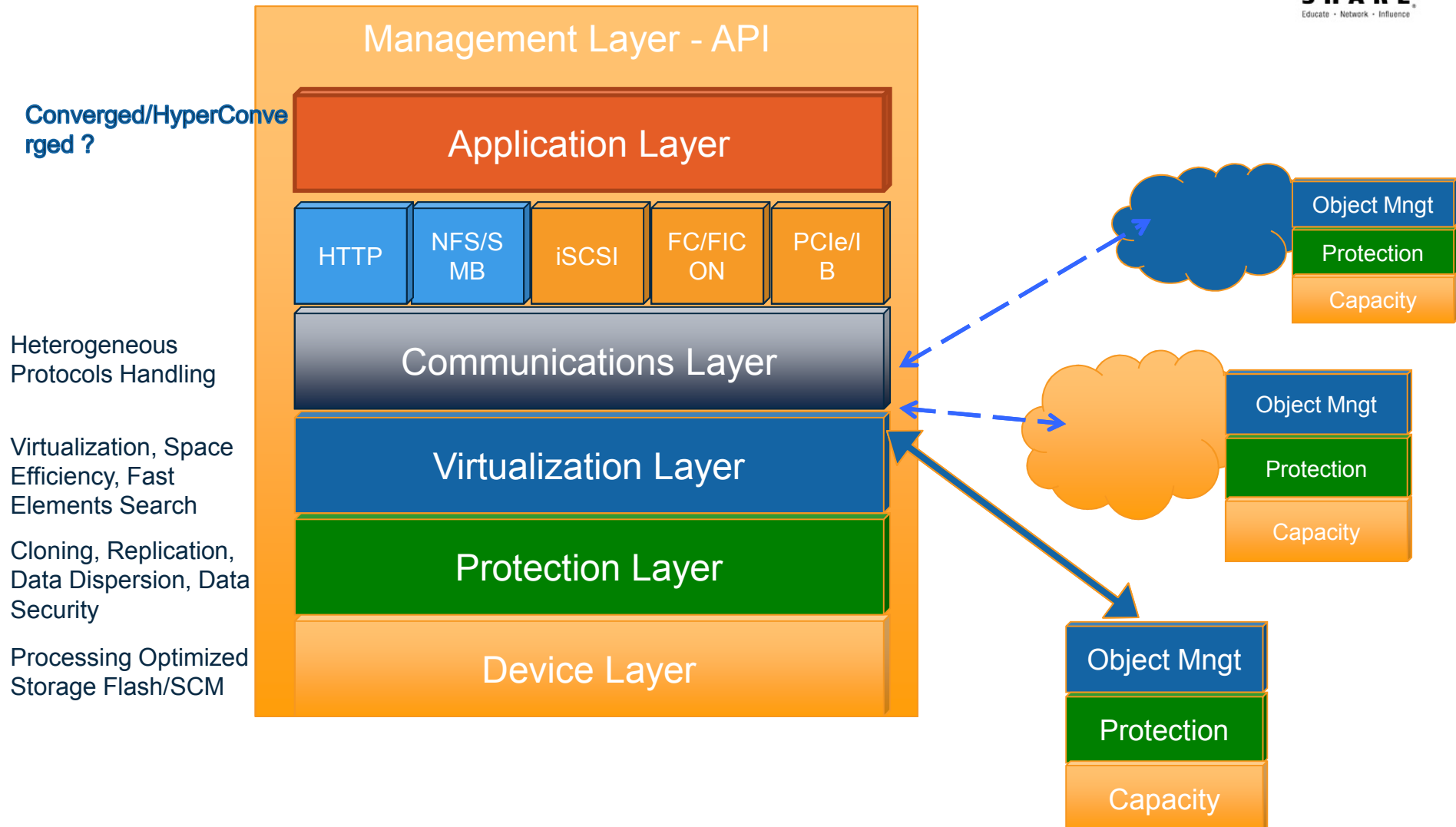


Data Type by Connectivity – What Drives it



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Rethinking the Architecture for the Future



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Summary – New Storage Helps Mainframe Systems Enable Your Enterprise



- **Deliver more, more efficiently**
 - Leverage flash, automation and more software defined infrastructures for better service levels with better performance at less cost
 - Gain competitive advantage by integrating with other platforms for Big Data, IoT, and Analytics
- **Improve productivity – do more with less**
 - Reduce administration time with automation
 - Virtualize to increase data mobility and handle data migrations with less effort
- **Be a good corporate citizen**
 - Leverage scalability, compact size and exceptional performance-per-power ratio to solve data center problems



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Questions and Discussion

Thank You

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