IBM System Storage

Digitale Transformation und die Datenspeicherung

cimdata 17.11.2016

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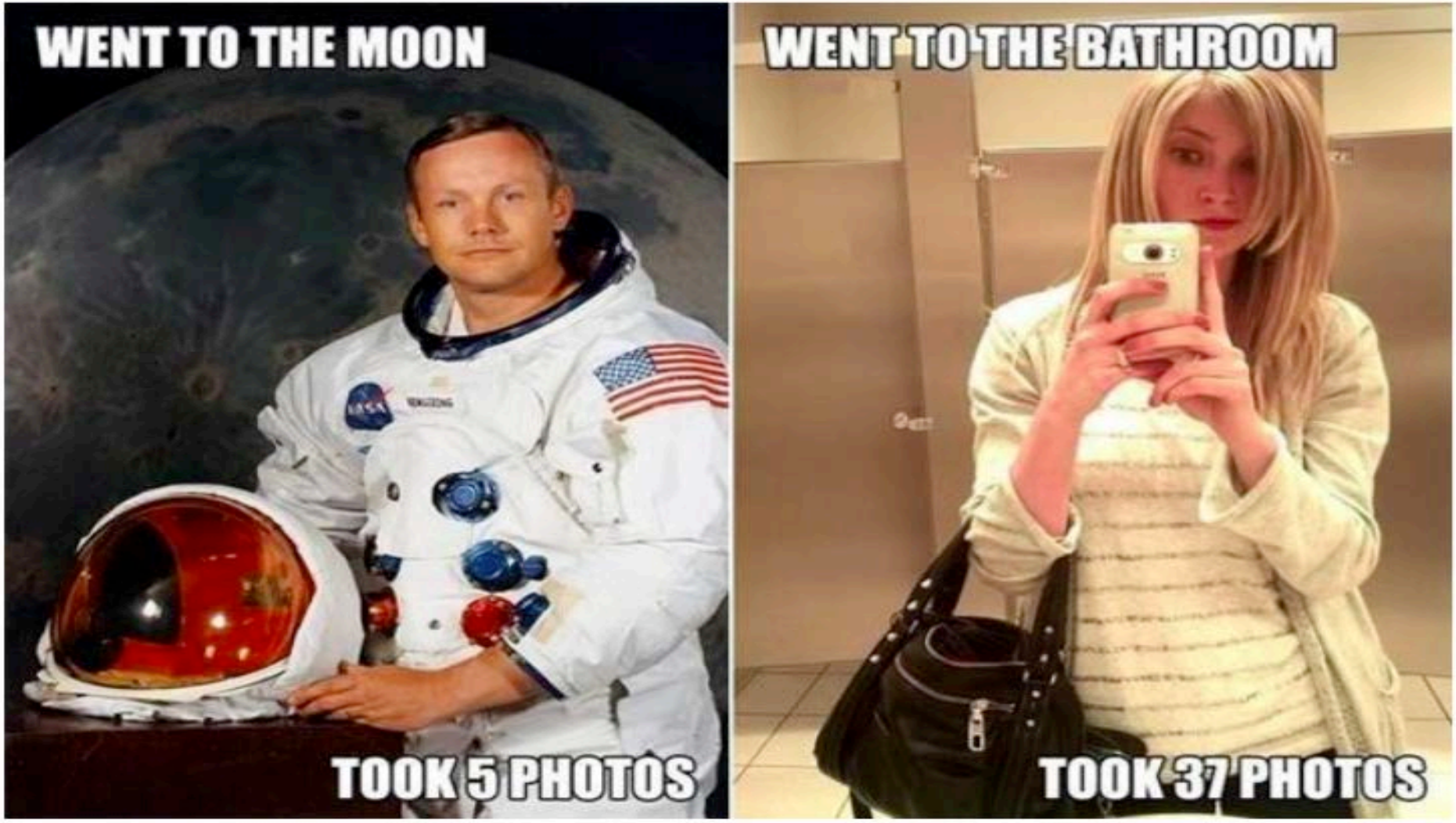
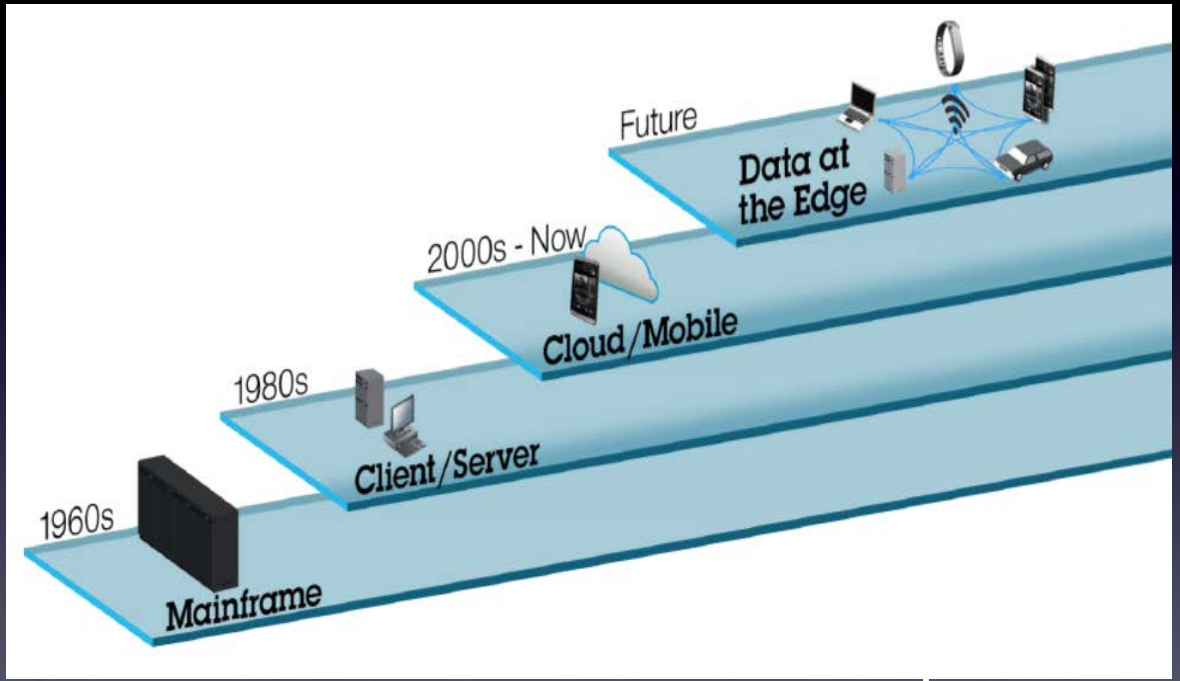
Warum sich Storage verändert? Weil SIE sich verändern!


WENT TO THE MOON
TOOK 5 PHOTOS
WENT TO THE BATHROOM
TOOK 37 PHOTOS

Digitale Transformation und die Datenspeicherung

- Daten Wachstum
- Dynamisierung der Anwendungen
- Unvorhersehbare Performanz Anforderungen
- Benutzermobilität



3rd Platform- Auswirkungen auf Storage

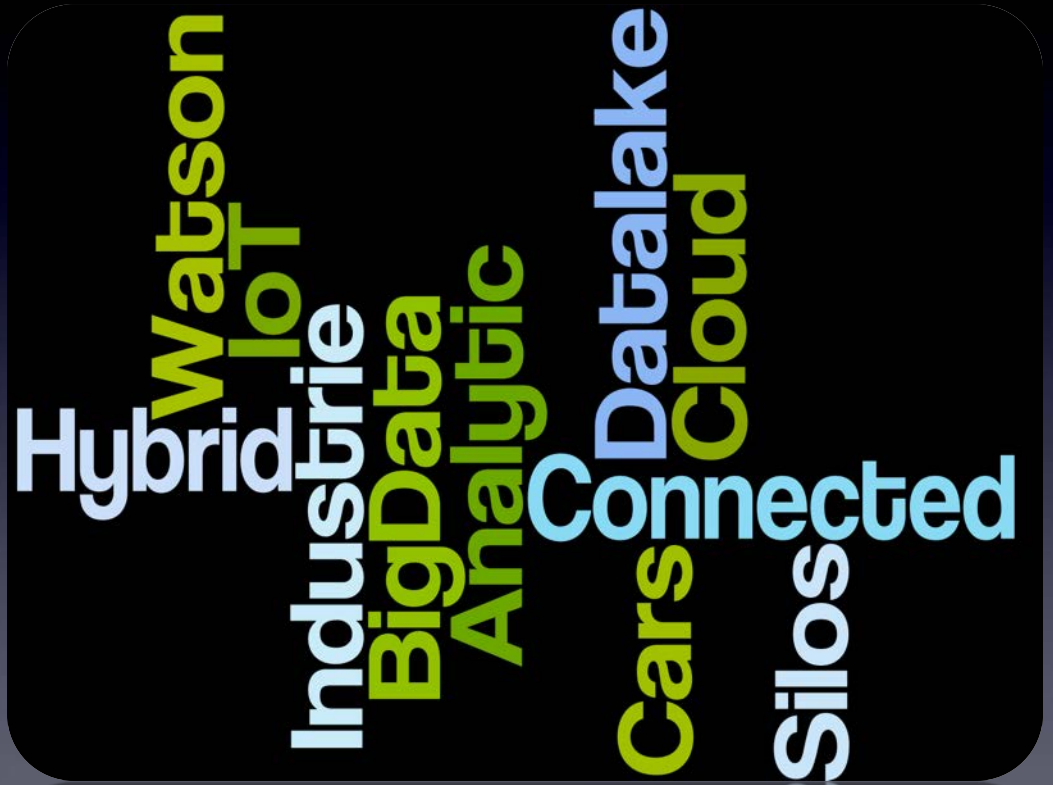
- Nahezu alle IT-Ausgaben bis 2020 für 3rd Platform
- 70%-80% der Disksysteme bis 2019 auf low-cost HW kontrolliert durch Software Defined (SDS) angereichert mit
- Flash als primärer Datenspeicher für Mission-Critical WL
- Storage wird wie “Cloudservices” betrieben (on/off/hybrid, API’s, Policy based).

“The transformation of the storage industry continues, with new technologies and business models disturbing the market at the magnitude not seen since the invention of network storage.”

IDC: Worldwide and U.S. Enterprise Storage Systems 2014–2018 Forecast

WW Anforderungen an INFRASTRUKTUR von Jahr zu Jahr:

Storage:	+ 50%
Server Workload:	+ 10%
IO/Performance:	+ 75%
Power Cost:	+ 20%



Gartner beschreibt dies als die „Bi-Modal IT“

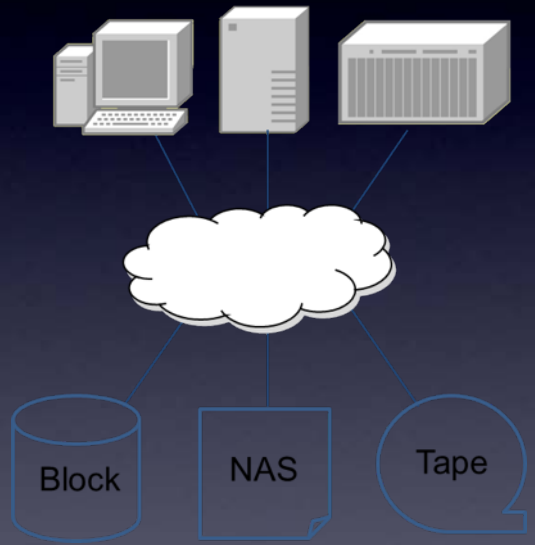
Mode1:
“Legacy”

Reliability
Latency
Consistency
Static
DB – CRM - Structured data

Appliance centric

Silos of systems
Poor utilization

Protect the Business!



+20%

You are here:

… und „Mode 2“- Neue Workloads

docker

sas

Redis

DevOps

Apache Hadoop

PostgreSQL

Spark

cassandra

mongoDB.

Mode2:
“New Workloads”

Web-Scale
Cost
Agility
On/off-deployment
Cloud ready
Unstructured data

Enable new Business!

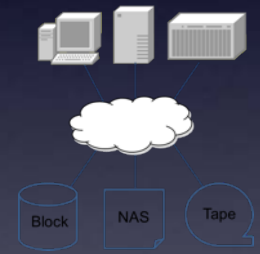
+80%

Bi-Modaler Storage: Herausforderung!

Wie werden die neuen Geschäftsmodelle ermöglicht, während die bisherige Datenverarbeitung gesichert ist?

Software Defined Storage SDS enables Bi-Modal

on Efficiency



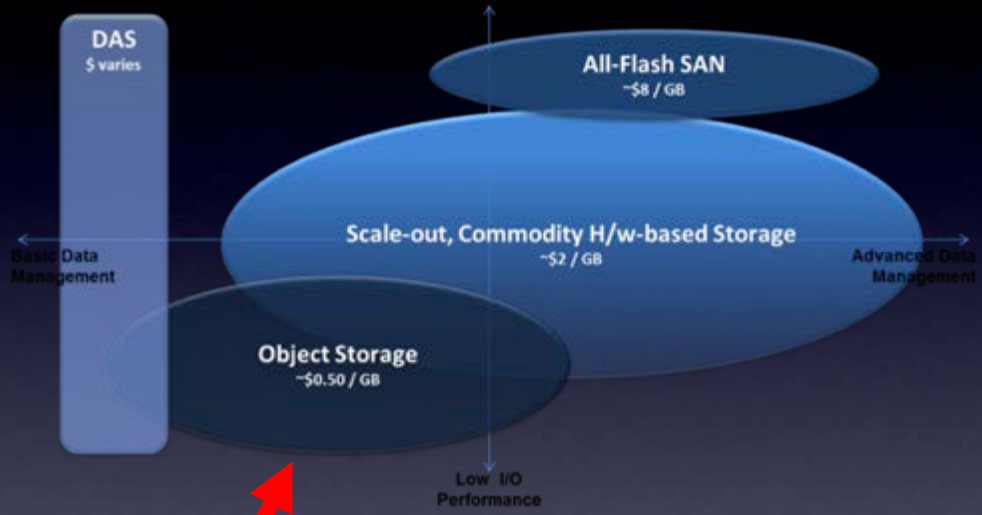
SDS
helps to optimize and
utilize existing storage

SDS
enables
the digital transformation
and integrates with
„Mode1“

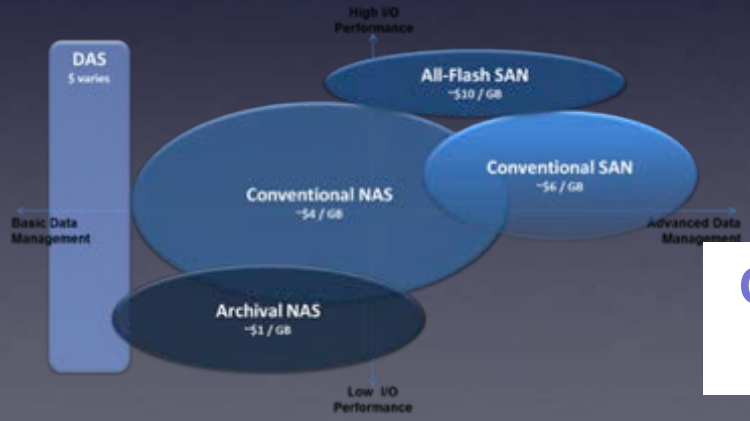
on Agility

Wandel der Storage Landschaft

Storage beyond 2015



Storage in 2015

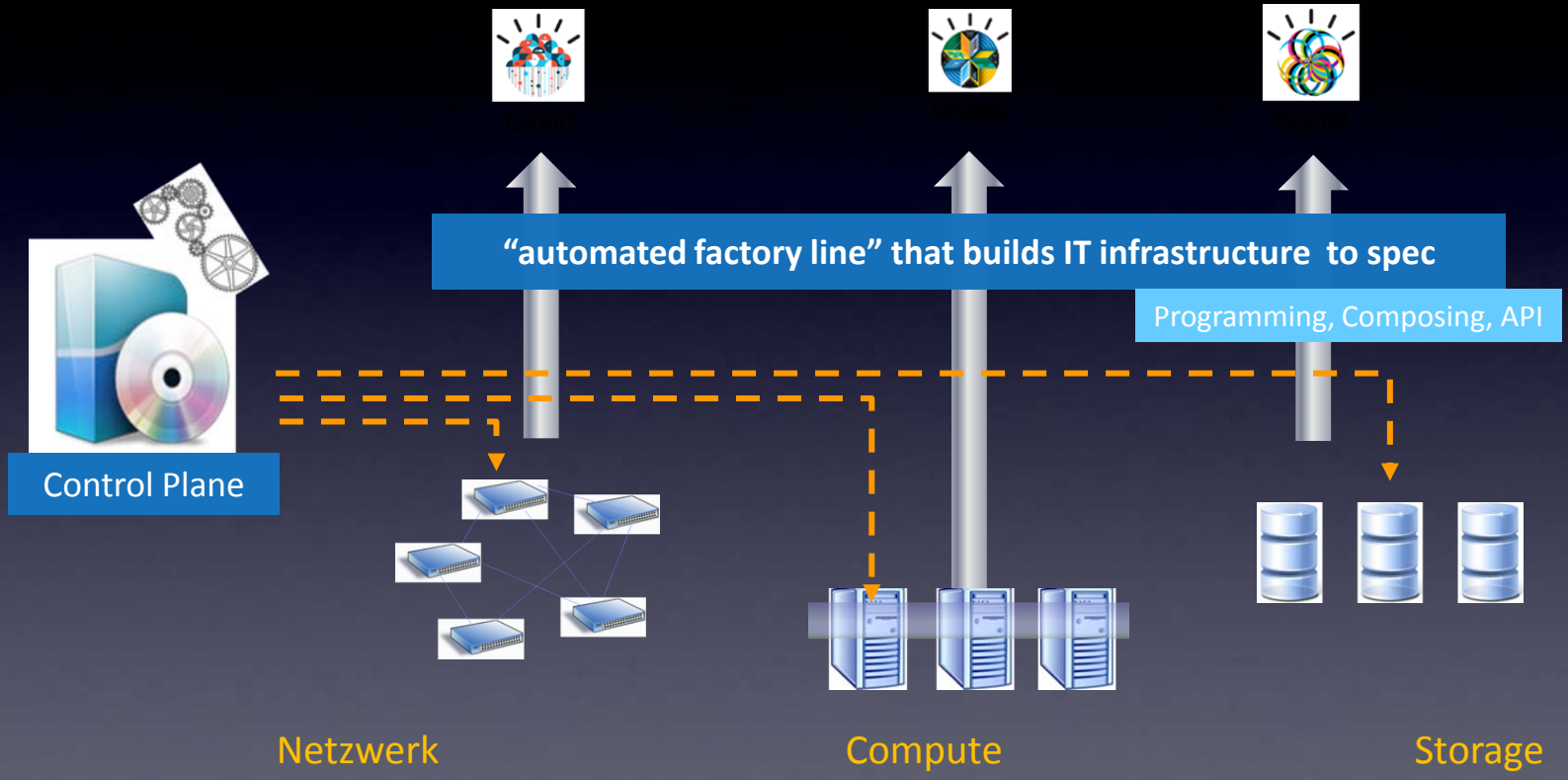


Cleversafe ist jetzt IBM Cloud Object Storage

Predicted Shift:
50% SDS
30% Object
20% Flash-SAN

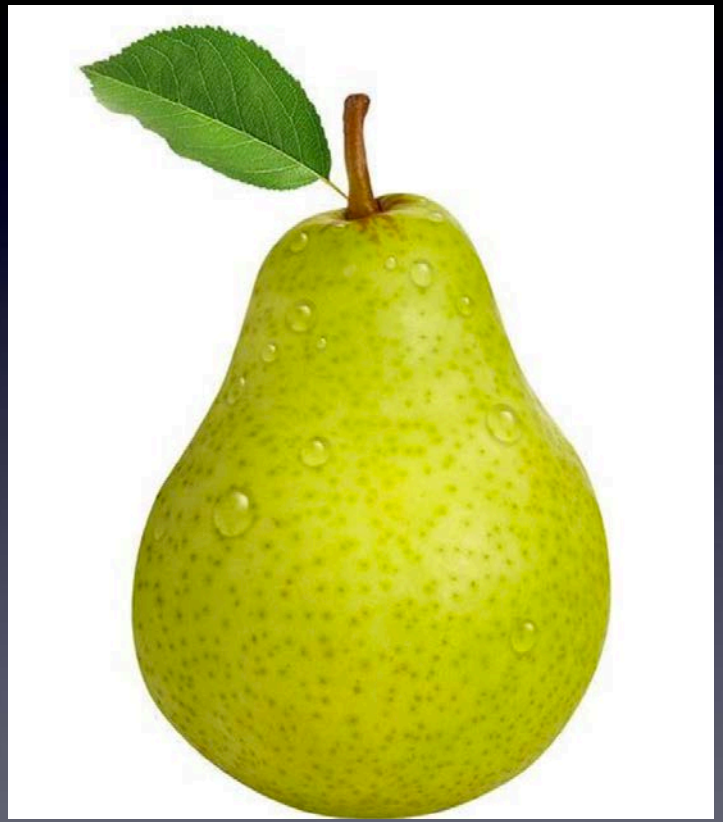

Storagefunktionen
auf
„Standard HW“
Software Defined
RZ- Betrieb über
„Standard SW“

Software Defined Datacenter:



Wiederverwendung von Services, on Demand und unter programmierbarer Kontrolle

Das ist ein Apfel:



SDS ...

- 1. Sollte auf standardisierter HW laufen
- 2. Angeboten als SW (oder Appliance)
- 3. Block, NAS, etc unabhängig von HW

IBM Storage Strategie:

IBM Spectrum Storage

Gartner: IBM #1

IBM investiert 1 Milliarde USD in Storage für die 3rd Platform !

Breitestes Storage und Software Defined Portfolio

IBM Flash Solutions m
fast storage simple

$1 Milliarde
Flash Investment

Defining a new generation of software-defined computing infrastructure

$1 Milliarde
SDS Investment

e Storage for data protection
long term retention .Storage
Networking for increased
erformance, security and
flexibility

IBM Storage Solutions

IBM All Flash
- IBM FlashSystem A9000
- IBM FlashSystem A9000R
- IBM FlashSystem V9000
- IBM FlashSystem 900
- IBM DS8888
- IBM Storwize V7000F / V5000F

IBM Hybrid Storage
- IBM DS8884 / DS8886
- IBM XIV Storage System
- IBM Storwize V7000 / V5000

IBM Elastic Storage Server

cture

Stack
- IBM FlashSystem V9000
- IBM Storwize V7000 / V5000
- IBM Spectrum Virtualize

IBM Software Defined Computing

- IBM Spectrum Symphony
- IBM Spectrum LSF
- IBM Spectrum Conductor

- IBM Spectrum Storage Suite
- IBM Spectrum Control
- IBM Spectrum Protect

IBM Business Continuity & Connectivity

IBM Tape & Virtual Tape Systems
- TS7700, TS7760
- Tape Libraries
- LTO7 and enterprise tape drives
- ProtecTIER Deduplication

IBM Storage Networking (SAN)
- Directors
- Switches
- Specialty Switches

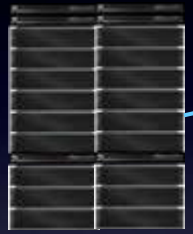
"IBM Acquires Cleversafe to Accelerate Hybrid Cloud Storage Strategy" – *Nov 2015*

OUTTHINK STORAGE

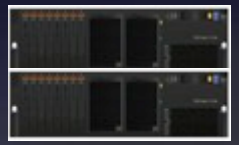

IBM Spectrum….nebulös? NEE!

IBM Storage „Appliances“

IBM Spectrum



IBM ESS



IBM SVC

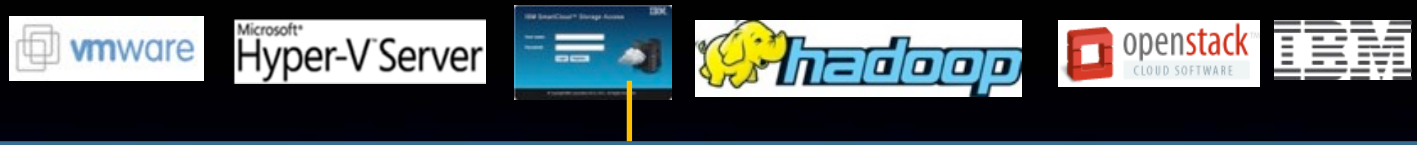
IBM Spectrum Scale

IBM Spectrum Virtualize

IBM Spectrum in der Cloud

Wahlfreiheit im Deployment: Appliance- SW- Cloud

IBM Spectrum SDS Familie



CONTROLPLANE

Storage Management | Policy Automation | Analytics & Optimization | Snapshot & Replication Management | Integration & API Services | Self Service Storage | Data B/R

DATAPLANE

Traditional Applications

3rd Platform Workload

Virtualized SANs	Hyperscale Block	Global Access File & Object	Protect-Archive	Object based Storage
Spectrum Virtualize	**Spectrum Accelerate**	**Spectrum Scale**	**Spectrum Archive**	**IBM Cloud Object Storage**

IBM Systems

IBM Spectrum Virtualize oder:
wie kommt mein Storage nach SDS ?

Homogenisiert!

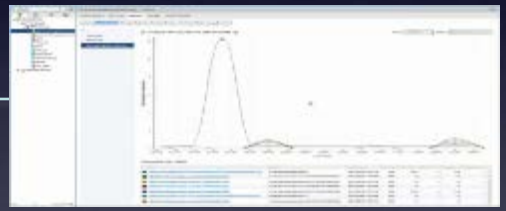
Transformation traditionellen Speichers in 5 Schritten zu SDS

1. Spectrum Virtualize
2. High Availability
3. Real-time Compression
4. Flash mit EasyTier
5. Storage Optimierung mit Analytics & integriertem System Management

Spectrum Virtualize wandelt heterogenen Speicher in Software Defined Cloud Storage

OpenStack

VMWare



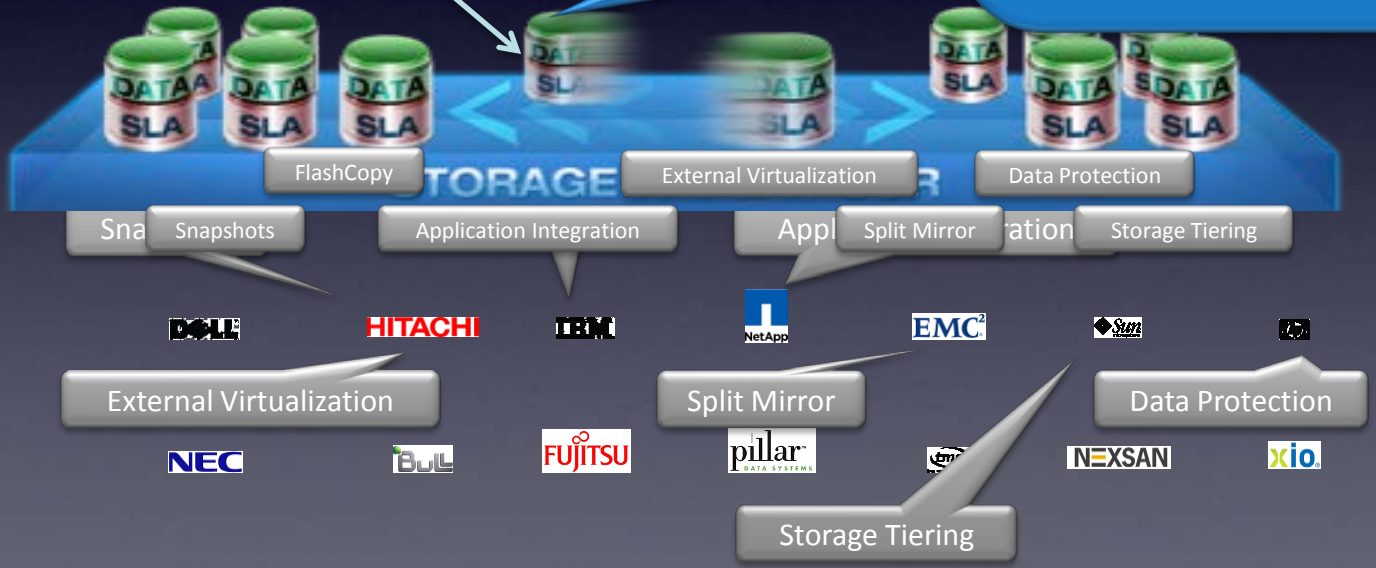
Web Browser

- Standard Storage Service Katalog, Policies, Provisionierung
- Integration von OpenStack, VMware , MS Hypervisor…
- Verschieben von Storage-Volumes
- Self-service Katalog
- Policy-based Optimierung mit analytischer Unterstützung

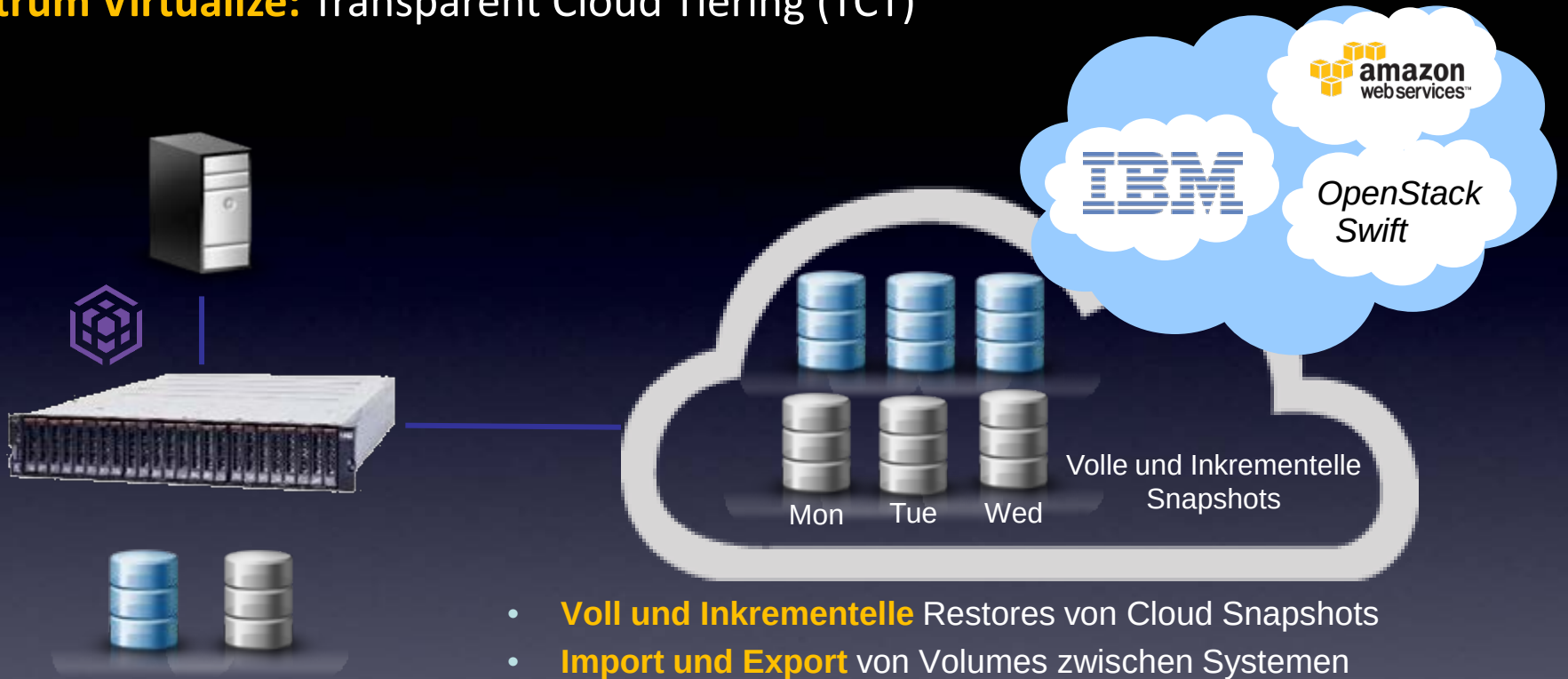
Spectrum Virtualize

Homogenisiert!

- SW Storage-Funktionen auf „commodity“ HW
- Utilisierung > 90%
- Hochverfügbarkeit statt DR
- Automatisches Tiering
- Online Data-Migration
- DataCompression 5x mehr speichern
- Unabhängigkeit!!!!
- Single Point of Control



Spectrum Virtualize: Transparent Cloud Tiering (TCT)



Almost 400 storage systems from IBM and others

- **Voll und Inkrementelle** Restores von Cloud Snapshots
- **Import und Export** von Volumes zwischen Systemen
- **Unterstützte Cloud Providers:** IBM Softlayer, Openstack Swift, Amazon S3
- V7000 G2/G2+, V9000, SVC, VersaStack, S.Virtualize SW
- GA: 9.12.16

All-Flash Systeme im Portfolio

Flash für verschiedenste Storage Workloads

IBM FlashCore™ Technology Optimized

VersaStack™ Solution by Cisco and IBM

Verfügbar seit 28. Juli

FlashSystem A9000

Cloud service providers

- Full time data reduction
- Workloads: Cloud, VDI, VMware

FlashSystem A9000R

Large deployments

- Full time data reduction
- Workloads: Mixed and cloud

FlashSystem V9000

Virtualizing the DC

- Enterprise class heterogeneous data services and selectable data reduction

Storwize V7000F

Mid-Range

- Enterprise class heterogeneous data services and selectable data reduction

Storwize V5000F

Entry / Mid-Range

- Enterprise class heterogeneous data services and selectable data reduction

DS8888

High End Server

- Mainframe
- Power

DeepFlash 150

All-Flash for Big Data

- High capacity
- High density

FlashSystem 900
All flash array for application acceleration

- Extreme performance
- Targeting database acceleration & Spectrum Storage booster

4Q2016 VersaStack: AFA and Cloud!

NEW

Storwize V5000/V5030F w/ Cisco UCS Mini

Entry to Mid-Size Business

Storwize V7000/V7000U V7000F w/ Cisco UCS

Medium to Large Enterprise

FlashSystem V9000/900 w/Cisco UCS

Highest Levels of Performance

NEW

SAN Volume Controller w/Cisco UCS

Mixed storage environments

NEW

FlashSystem A9000 w/Cisco UCS

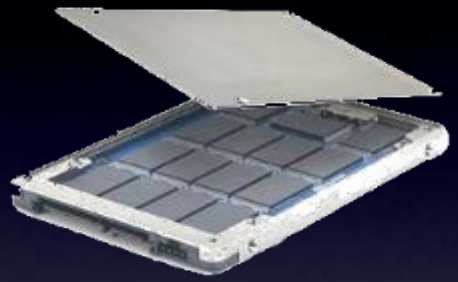
VDI environments

SDS + IBM FlashSystem = Match in HEAVEN!

- FlashSystem 900
  - 1.1Mio IOps- 90µsec Latency
  - bis zu 57 TBn per Unit
  - Enterprise-Performance
  - 2U …und 625W

- *PS: Hier arbeitet Flash und keine SSD!*

SSD vs. IBM Flash Modules



SSD:

- Sitzt in einem Disk Slot , tut wie HDD!
- SAS-Verbindung zum Disk-Kontroller
- Austauschen wenn Kapazität < 100%
- RAID wie Disk

IBM Flash:

- "direkter" Protokoll Zugriff- keine Emulierung einer HDD!
- statistische Ausfall Variationen sind vorteilhaft

IBM FlashSystems:

Kosten

DRAM
L1 L2 .. LX

IBM FlashSystem

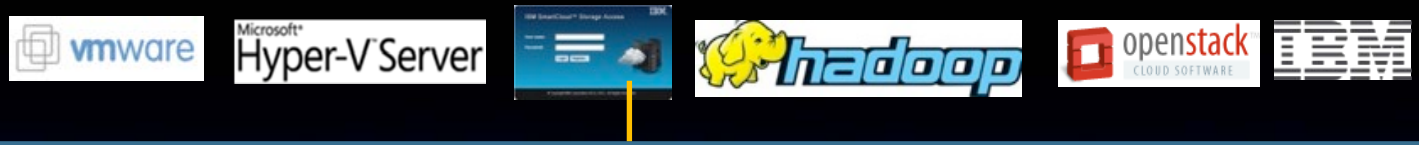
SSD

Disksysteme

1ns | 500ns | 1000ns 1µs | 500µs | 1000µs 1ms

1sec | **3Tage** | **12Tage**

IBM Spectrum SDS Familie



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Virtualized SANs	Hyperscale Block
Spectrum Virtualize	**Spectrum Accelerate**

3rd Platform Workload

Global Access File & Object	Protect-Archive	Object based Storage
Spectrum Scale	**Spectrum Archive**	**IBM Cloud Object Storage**

IBM Systems

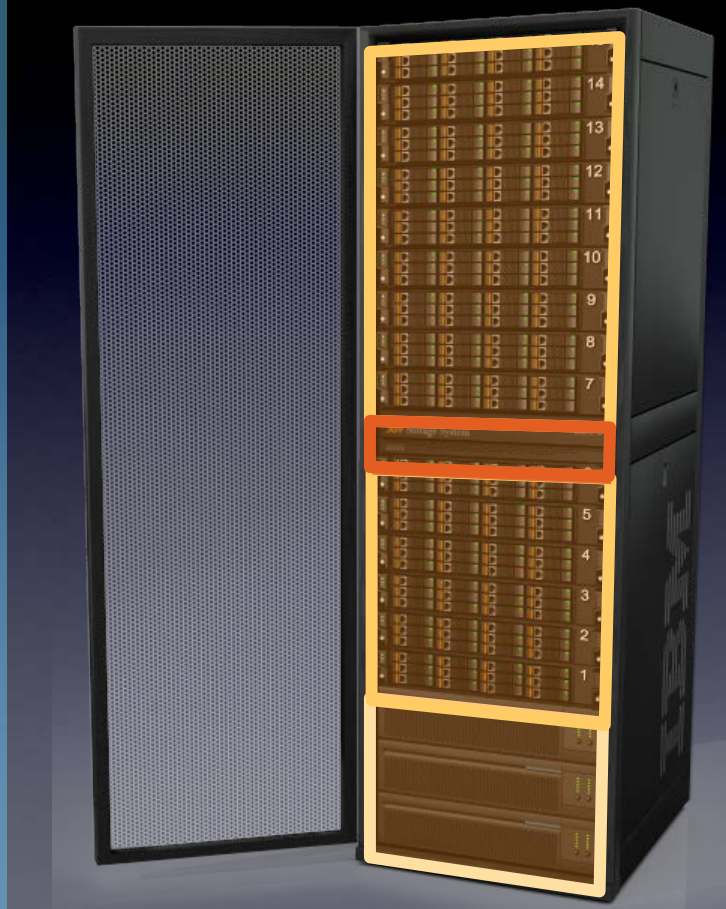
IBM Spectrum Accelerate oder:
Wie baut man aus „PCs“ High-End Speicher ?

Tataaaa!

Original: IBM XIV- Architekturmerkmale

- „One Tier“ Storage bis 485 TB
- Cache + SSD als Cache
- 6TB Drive recovery <1 h
- Flat Lizenz-Modell
- Scale-out online
- Hyperscale
- Snapshots (Pointerbasiert)
- Realtime Compression und DR-Funktionen
- Multi-Tenancy, Qos

Storage no issue!



Die XIV Software Kopie: Spectrum Accelerate

+

=

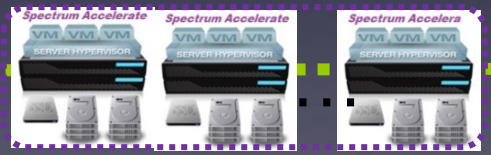
- …läuft auf Standard x86 mit VMware und lokalen Disks
- …hat alle XIV DNA: 100% Consistency, 1a Performance, Zero Tuning
- …skaliert nach Bedarf ohne “Up-front” Investition (einfach Server hinzufügen!)
- …100% Interoperabel mit “XIV Appliance”
- …reduziert Operational Costs durch Nutzung bestehender Ressourcen
- …schnelles Deployment …3-15 Server….
- …XIV GUI (…noch nie sah SDS so gut aus ☺)

Storage Platform: SDS - Appliance - AFA- Cloud - ein Management

Single Management Experience
Provisioning, Monitoring, Balancing, Data Replication*,
Data Mobility*, Licensing

IBM A9000
XIV based Flash

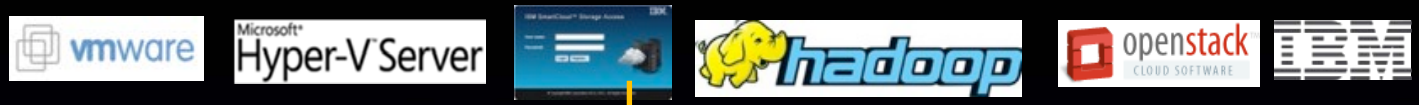
IBM XIV Gen 3



IBM Spectrum Accelerate
running on customer-choice HW

IBM Spectrum Accelerate
running on Softlayer

IBM Spectrum SDS Familie



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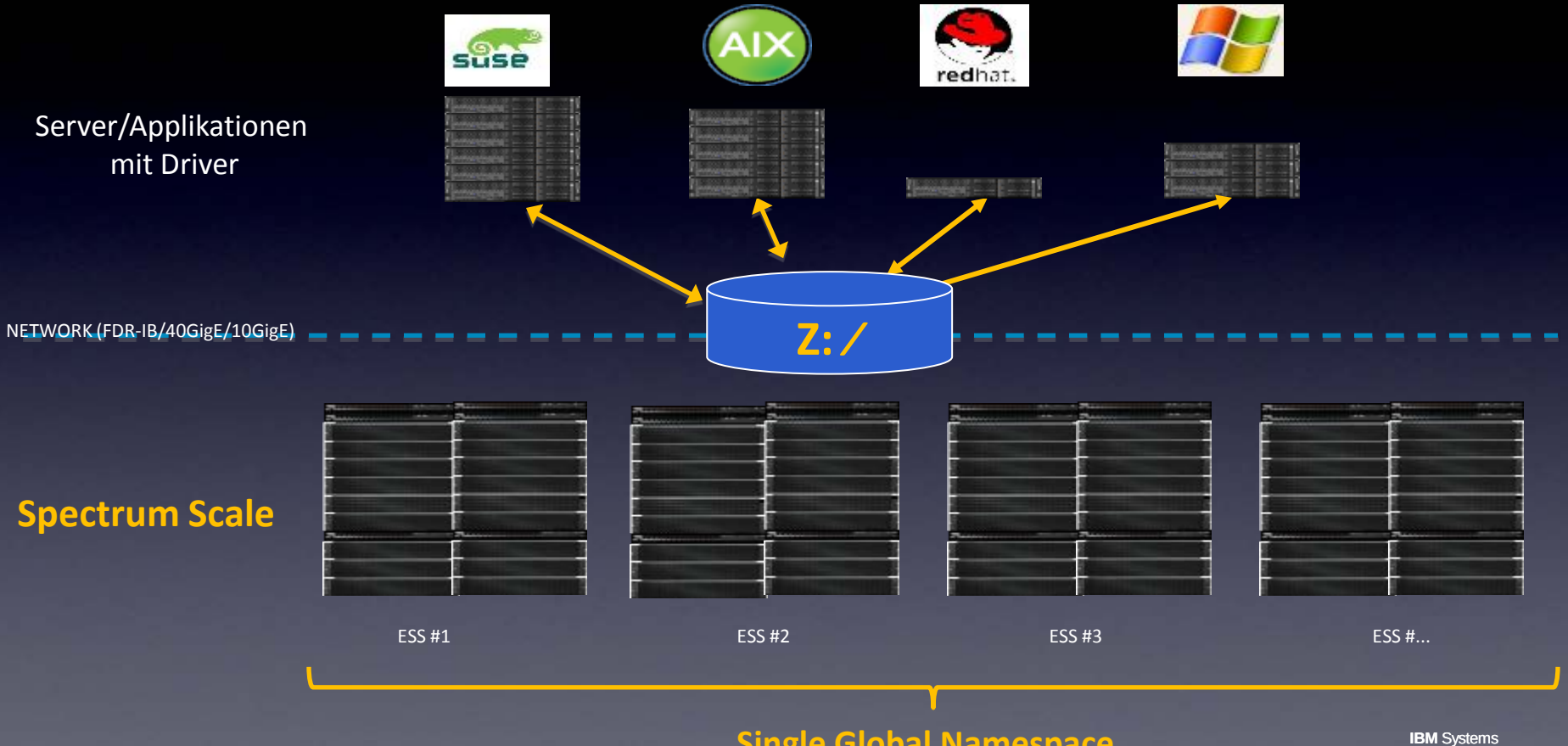
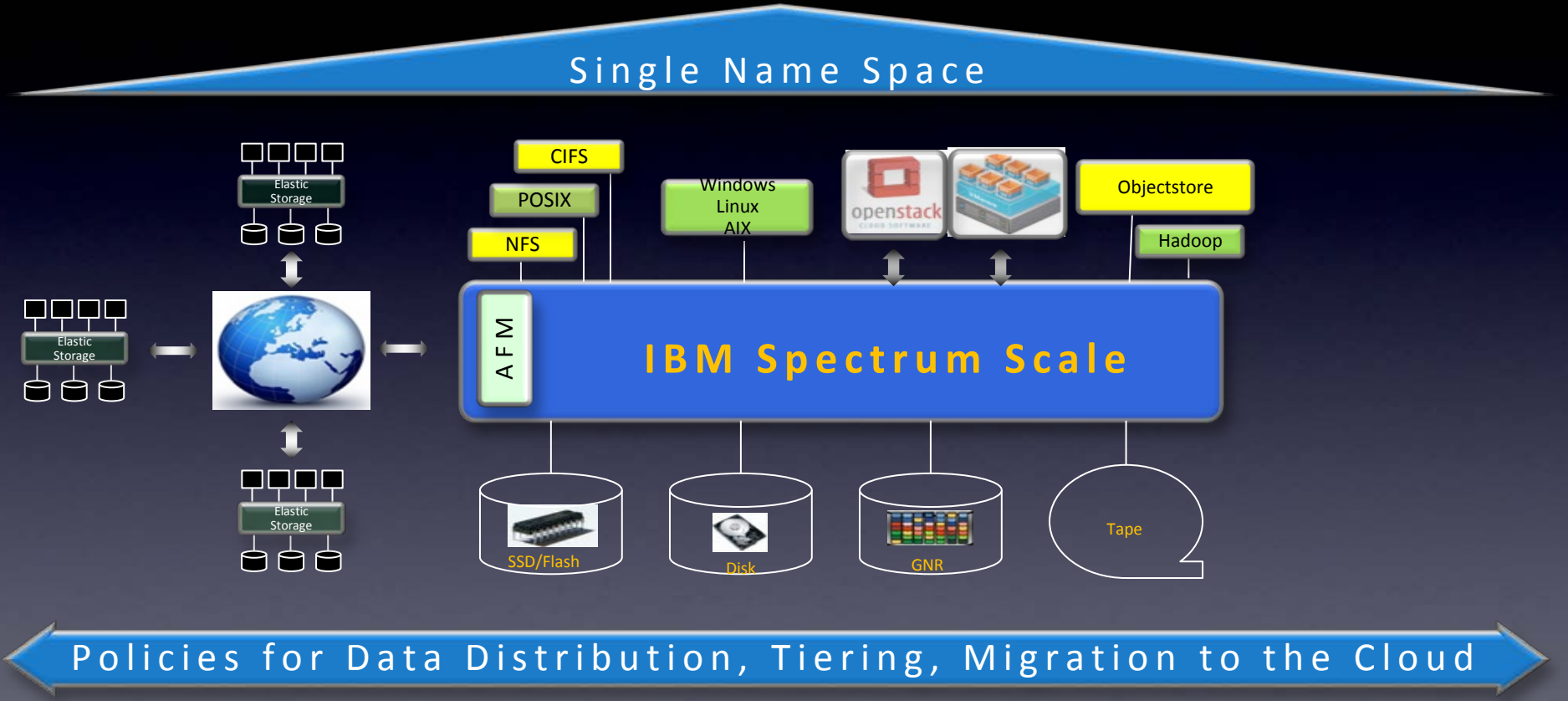
IBM Systems

Spectrum Scale mit Global Namespace:



IBM Spectrum Scale



Spectrum Scale im Detail

- Basis: Global Parallel Filesystem
- Über 15 Jahr im Markt
- Kein Storage-Controller nötig
- Storage-Funktionen wie Spiegelung, ILM, Snapshots und RAID im OS
- Gleichzeitige, parallele Zugriffe und Single Global Namespace
- Unglaubliche Kapazität und Skalierbarkeit (Kunden >18PB)
- Läuft auf “Commodity” HW
- De-clustered RAID mit E2E integrity
- Bis zu 15GB/s Durchsatz pro System
- Openstack API
- SSD, SAS, SAS-NL und Tape-support

IBM DeepFlash 150 + Spectrum Scale

NEU

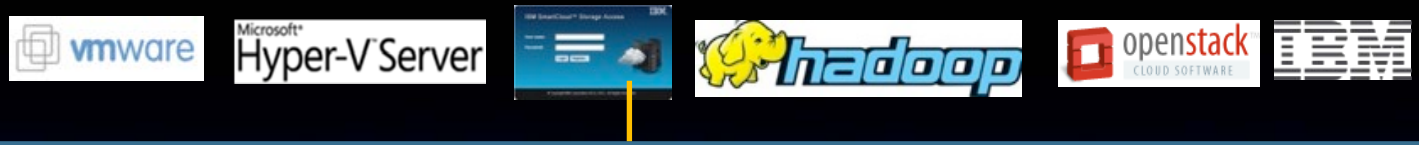
- HPC Workloads
  - Electronic Design Automation
  - Manufacturing Simulation
  - Oil, Gas & Energy
  - Life Sciences: sequencing, genomics, miscroscopy
- Digital Media: broadcast, real-time streaming up to 4K video, rendering, post-production
- Big Data Analytics: SAS, Hadoop, Spark
- Real-time Analysis (Fraud Detection)
- Cloud: OpenStack, Data Oceans
- Burst Buffers
- Business Applications and Databases
  - SAP ERP, CRM, Business Suite on HANA

1. Hohe Lesegeschwindigkeiten (e.g. 80% read operation)
2. Performanz (Throughput and response time)
3. Kosten um $1/GB – unkomprimiert!
4. Stromverbrauch und verfügbarer Platz

IBM DeepFlash™

Spectrum Scale

IBM Spectrum SDS Familie



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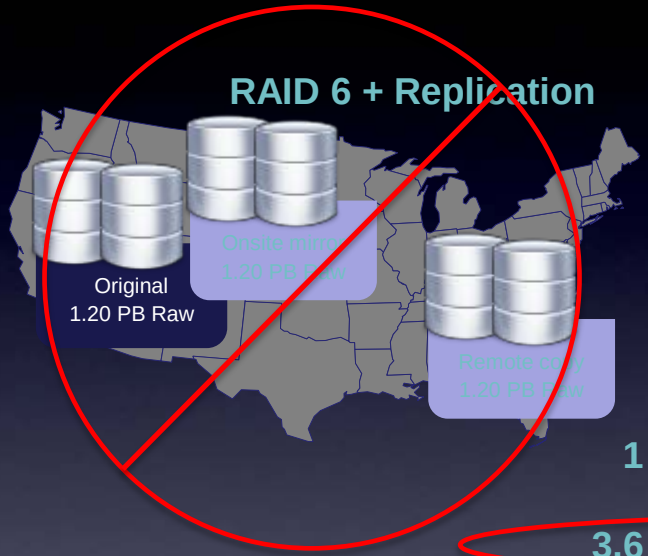
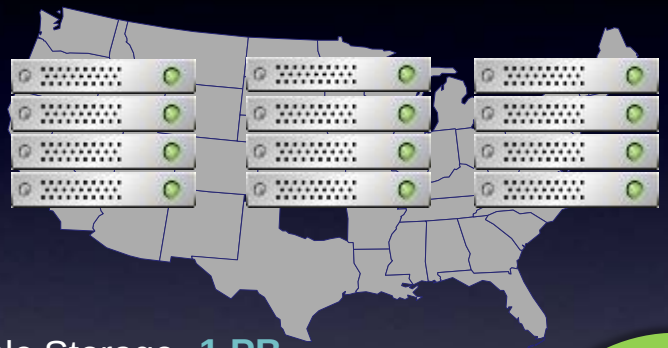
IBM Systems

Effizienz

Wie baue ich ein hochverfügbares Speichersystem für 1 Petabyte nutzbare Speicherkapazität?



IBM Cloud Object Storage Cleversafe®



1 PB	Usable Storage	**1 PB**
3.6 PB	Raw Storage	**1.7 PB**
900	4TB Disks	**432**
3.6x	Racks Required	**1.7x**
3.6x	Floor Space	**1.7x**
3 FTE	Ops Staffing	**.5 FTE**
Replication/backup	Extra Software	**None**

$

70% +

TCO Savings

Hybrid- IBM Storage Cloud Options

On-premise oder Appliance

The „Cloud“

XIV
Spectrum Accelerate

Data replication (MM/GM)

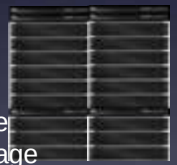
IBM Spectrum Accelerate in Softlayer (On bare metal)

Storwize
(SVC/V7000)
Spectrum Virtualize

Transp. Cloud Tiering: Flashcopy move to cloud

Amazon S3
Softlayer
Private
...

Spectrum Scale
Cloud Object Storage



Cloud as „ILM/HSM“ extension or Cloud-Object

Softlayer
offering
Or bare metal

Spectrum Protect

Cloud-Object API

Was bringt uns SDS?

- Unterstützung von **Commodity HW** führt idR zu **günstigeren Kosten**
- Verhindert **Hersteller lock-in**
- Leichtere **Automatisierbarkeit** (API's, Integration) für SDE und **Cloud-Übergänge**
- Schnelle und nahezu unbegrenzte **Skalierbarkeit**
- Einfaches **Deployment**
- Kein "upfront" Pricing z.B. pay-as-you-go
- **Optimales Storage Management** policy-basierend und mit Service-Klassen

The IBM Software Defined Storage Difference

Entwickelt aus bewährter Technologie

Flexibles deployment Modell- als Cloud, als Appliance oder SW

Ergänzt oder transformiert bestehende Infrastruktur für die next-gen Application der 3rd Platform in Cloud

Umfassende Angebot für- Block, NAS, Object, Backup….

Von dem #1 SDS Provider

Vielen Dank!

IBM

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