Mitigating the Oracle License Sprawl by Applying Advanced Technology

Leveraging the Power of Enterprise-Grade and Open Source Solutions to kick you license addictions

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Hi, my name is Mike and I am a Oracle DBA

- It started so innocent
- Just a little development instance – free they said

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Then it spread

- A single server production instance
- Just one
- Just a couple of CPUs
- And the needed licenses…what could just a couple licenses hurt?

And we needed more…

- Our data grew as users liked what we offered
- Our tables grew huge
- So we needed … partitioning
- Then, we were hacked! SO advanced security features
- A sub-license here, a sub-license there
- A CPU here, a CPU there
- Soon even I didn't know the extent of our addiction

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Then the ultimate happened…

- We became RAC heads
- We started using AWR and OEM…openly
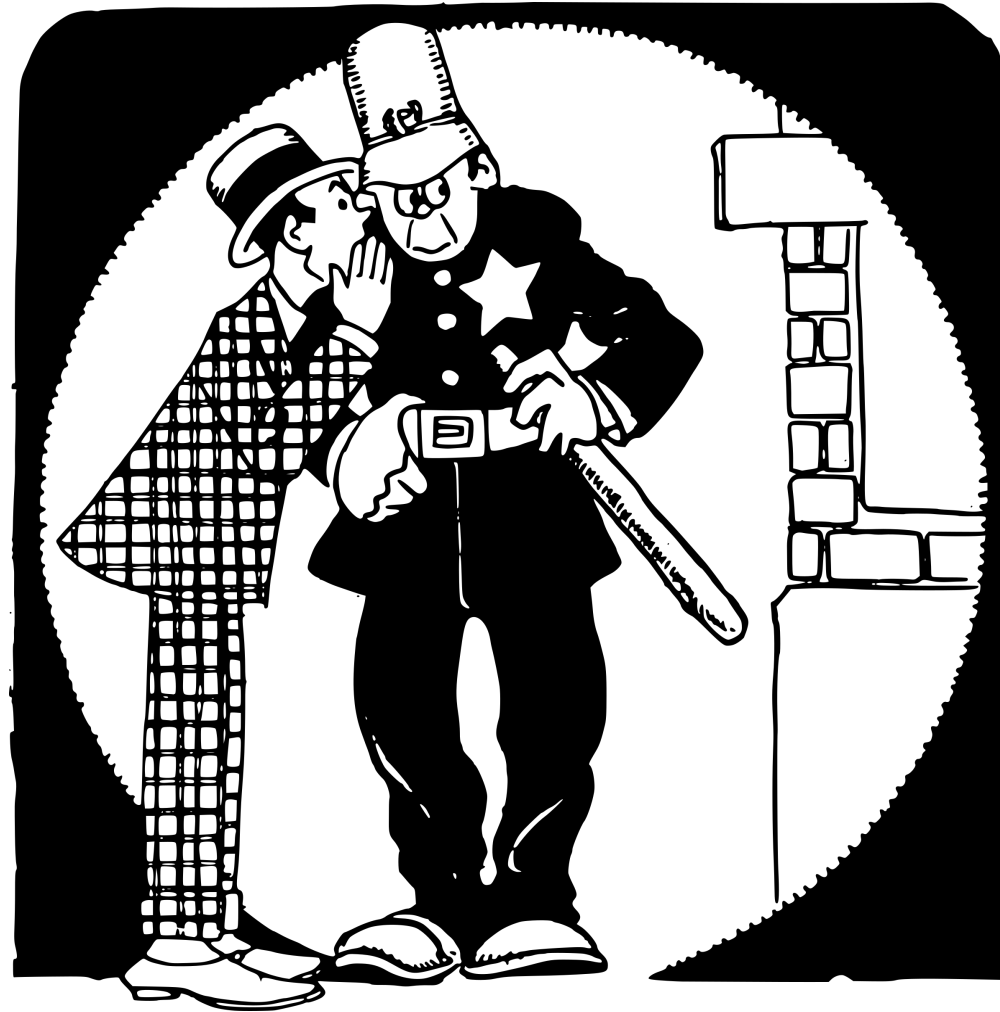- We didn't care, we just wanted the thrill of the next feature….

Diving into unstructured data…

Experiencing the cloud…

It had to come to halt…

- We were desperate
- How would we afford the next license?
- Then it happened….
- Was is just dumb luck?
- Did someone snitch….

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The Audit!

- We didn't know how far it had gone
- Then the butchers bill came due….

But.but…it all came turned on!

- We didn't read the fine print….
- We just clicked ok….

END USER LICENSE AGREEMENT

PLEASE SCROLL DOWN AND READ ALL OF THE FOLLOWING TERMS AND CONDITIONS OF THIS END USER LICENSE AGREEMENT ("Agreement") CAREFULLY BEFORE CLICKING AN "AGREE" OR SIMILAR BUTTON OR INSTALLING OR USING THE PROGRAM . THIS AGREEMENT IS A LEGALLY BINDING CONTRACT BETWEEN YOU AND ORACLE AMERICA, INC. THAT SETS FORTH THE TERMS AND CONDITIONS THAT GOVERN YOUR USE OF THE PROGRAM. BY CLICKING AN "AGREE" OR SIMILAR BUTTON OR BY INSTALLING AND/OR USING THE PROGRAM, YOU AGREE TO ABIDE BY ALL OF THE TERMS AND CONDITIONS STATED OR REFERENCED HEREIN. IF YOU DO NOT AGREE TO ABIDE BY THESE TERMS AND CONDITIONS, DO NOT CLICK AN "AGREE" OR SIMILAR BUTTON AND DO NOT INSTALL OR USE THE PROGRAM. YOU MUST ACCEPT AND ABIDE BY THESE TERMS AND CONDITIONS AS PRESENTED TO YOU – ANY CHANGES, ADDITIONS OR DELETIONS BY YOU TO THESE TERMS AND CONDITIONS WILL NOT BE ACCEPTED BY ORACLE AND WILL NOT BE PART OF THIS AGREEMENT.

"Oracle" refers to Oracle America, Inc., for and on behalf of itself and its subsidiaries and affiliates under common control. "You" and "Your" refer to the individual or entity that has agreed to use the program (as

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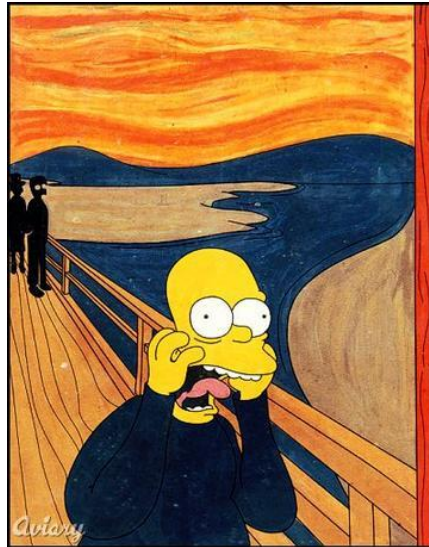# Then, they offered the ultimate addiction. All would be forgiven if…

- Hundreds of CPUS
- Thousands of licenses
- Even licensing….disks

We knew we needed help.

- Our need for licenses was out of control
- Every time we thought we saw a light
- It was an oncoming train full of new licenses….

It was almost as bad as trying to get out of a timeshare!
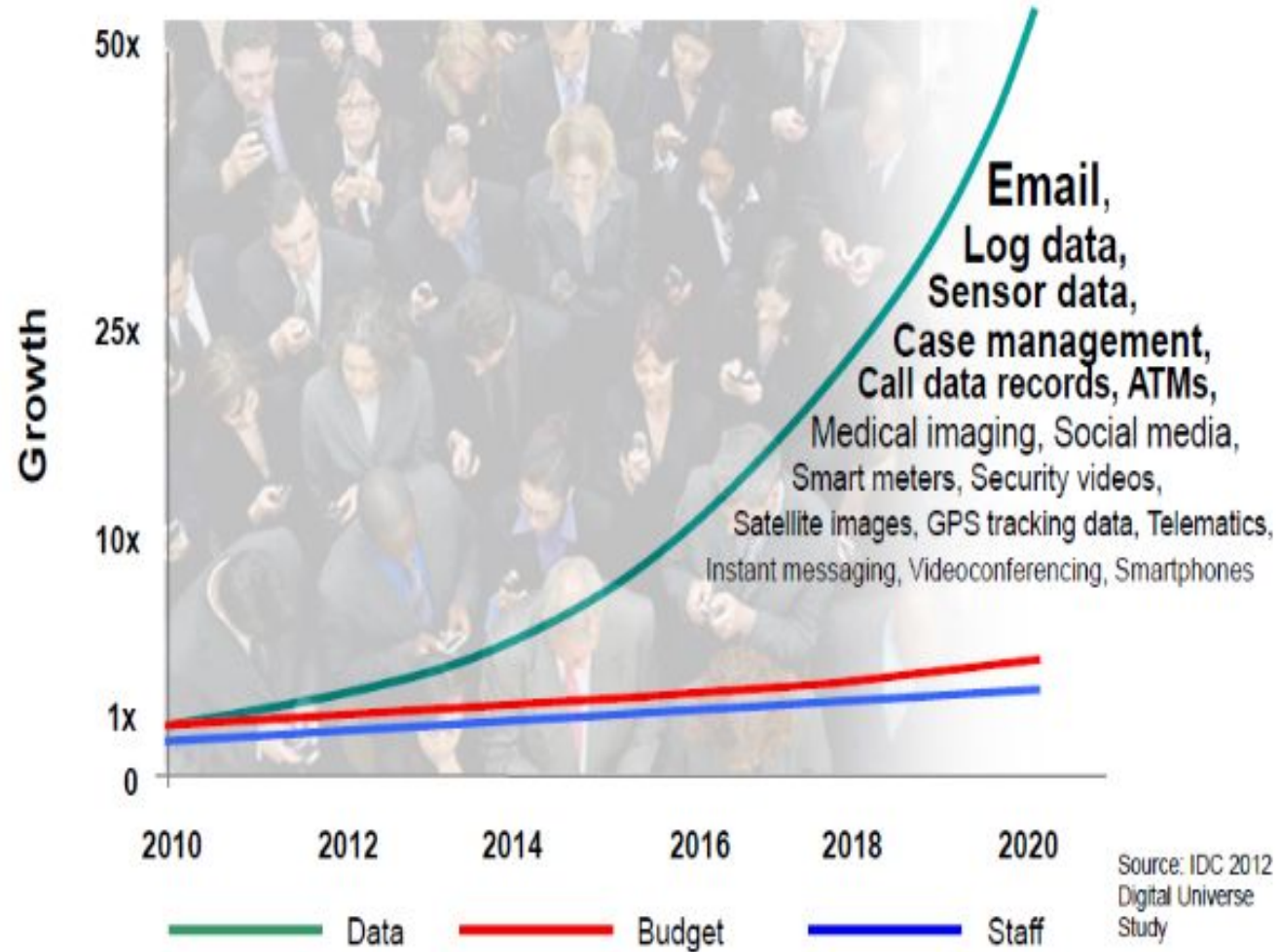
IBM

So…what could we do?

- Technology got us in
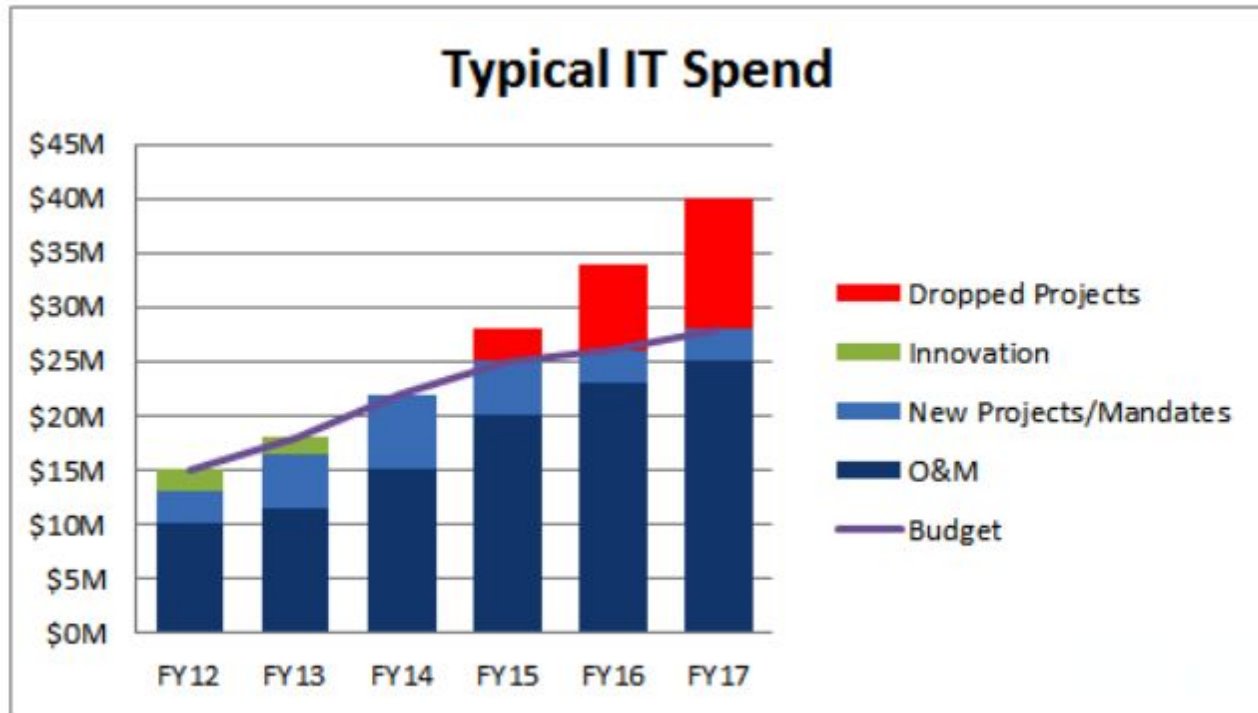- Maybe it could get us out!

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Many of you are probably feeling the same pain

- Let me elucidate…

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Feeling the pain of data growth but budget stagnation?

Growth chart showing Data, Budget, and Staff from 2010 to 2020. Data grows to over 50x while Budget and Staff remain near 1x.

Email, Log data, Sensor data, Case management, Call data records, ATMs, Medical imaging, Social media, Smart meters, Security videos, Satellite images, GPS tracking data, Telematics, Instant messaging, Videoconferencing, Smartphones

Source: IDC 2012 Digital Universe Study

Data — Budget — Staff

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Are you spending too much of your budget on O&M like license fees?

Typical IT budgets

From: http://www.information-age.com/case-blowing-years-budget-123462792/

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"Many organizations are dedicating between 80 and 90 percent of their IT budgets to basic maintenance (and licenses)* instead of investing in these 21st century technologies that can offer competitive business advantage."

- -- Rita Gunther McGrath, Columbia Business School
- * Mike Ault

McGrath, Rita Gunther. "The End of Competitive Advantage: How to Keep Your Strategy Moving as Fast as Your Business." Harvard Business Review Press

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We find ourselves strapped just dealing with the NEW…

Common enterprise initiatives today address future requirements

Digital Business Initiative
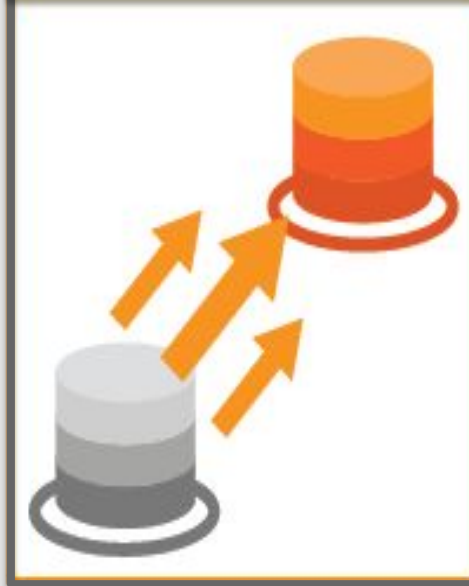
NEW APPLICATIONS

APPLICATION MODERNIZATION

INTEROP WITH LEGACY DBMS

CLOUD REPLATFORMING

Short-term
(0-6 months)
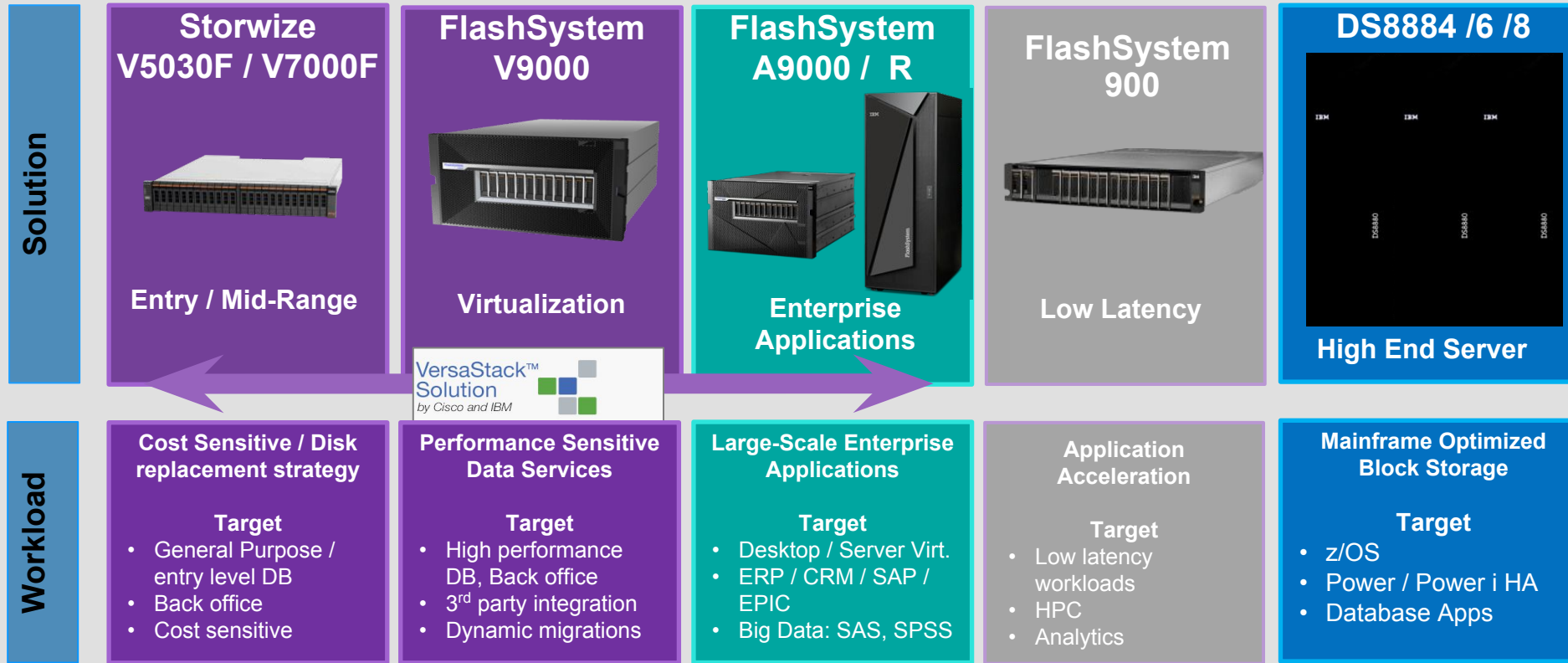
Medium-term
(6-12 months)

Long-term
(12-18+ months)

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Do you need greater flexibility to keep up with changing business requirements?

Faster, more flexible storage means fewer licenses

	Storwize V5030F / V7000F	FlashSystem V9000	FlashSystem A9000 / R	FlashSystem 900	DS8884 /6 /8
Solution	Entry / Mid-Range	Virtualization	Enterprise Applications	Low Latency	High End Server

VersaStack™ Solution
by Cisco and IBM

Cloud Ready

Workload	Cost Sensitive / Disk replacement strategy	Performance Sensitive Data Services	Large-Scale Enterprise Applications	Application Acceleration	Mainframe Optimized Block Storage
	Target • General Purpose / entry level DB • Back office • Cost sensitive	**Target** • High performance DB, Back office • 3rd party integration • Dynamic migrations	**Target** • Desktop / Server Virt. • ERP / CRM / SAP / EPIC • Big Data: SAS, SPSS	**Target** • Low latency workloads • HPC • Analytics	**Target** • z/OS • Power / Power i HA • Database Apps

Advantage

Broadest portfolio in the market – providing solutions for <u>all workloads and data types</u>: Block, File and Object

Hardware engineering enables fastest performing flash with highest levels of reliability

Unmatched **Software Defined** approach is the cornerstone of our strategy enabling:
Virtualization, Enterprise Data Services and Hybrid Cloud

Converged Infrastructure to reduce deployment burden and speed time to production

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What do I mean?

- Fewer CPU wait cycles
- More CPU processing cycles
- More work with fewer CPUs
- Less licenses to get the same work done!

Per CPU Licenses

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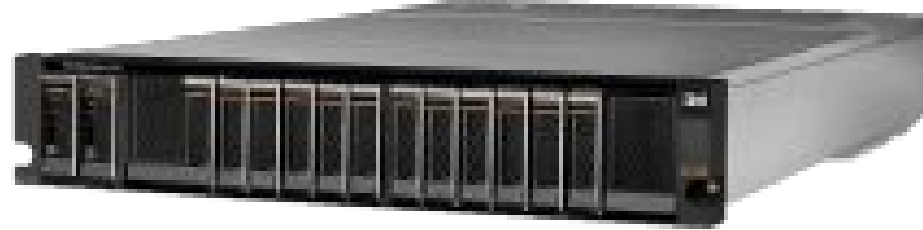# Ok, so we improve Storage speed, What about CPUs?

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Process massive amounts of data with unprecedented speed

IBM Power Systems servers

➢ Highly multi-threaded design
➢ Large-scale parallelism
➢ Can manage thousands of independent tasks retrieving, processing, and updating data
➢ Drive substantial GB/sec over multiple FC connections

IBM Storage flash arrays

➢ Process millions of operations per second and address pedabytes of capacity
➢ Designed to satisfy the data storage requirements for massively-parallel environments enabled by IBM Power Systems
➢ Microsecond latency and proven QoS

Benefits of using Power Systems with flash storage

➢ Optimized for same data unit sizes

➢ Address latency-sensitive scenarios

➢ Highly-scalable I/O drivers from major OS vendors support features such as multi-path I/O, concurrent I/O, asynchronous I/O, and low-latency virtualization

X86 and Sun Technology is so 1990's

- New CPU architectures provide:
  - Wider inter-CPU bandwidths
  - Wider, faster storage bandwidth
  - Up to 1.6X better throughput and processing capabilities
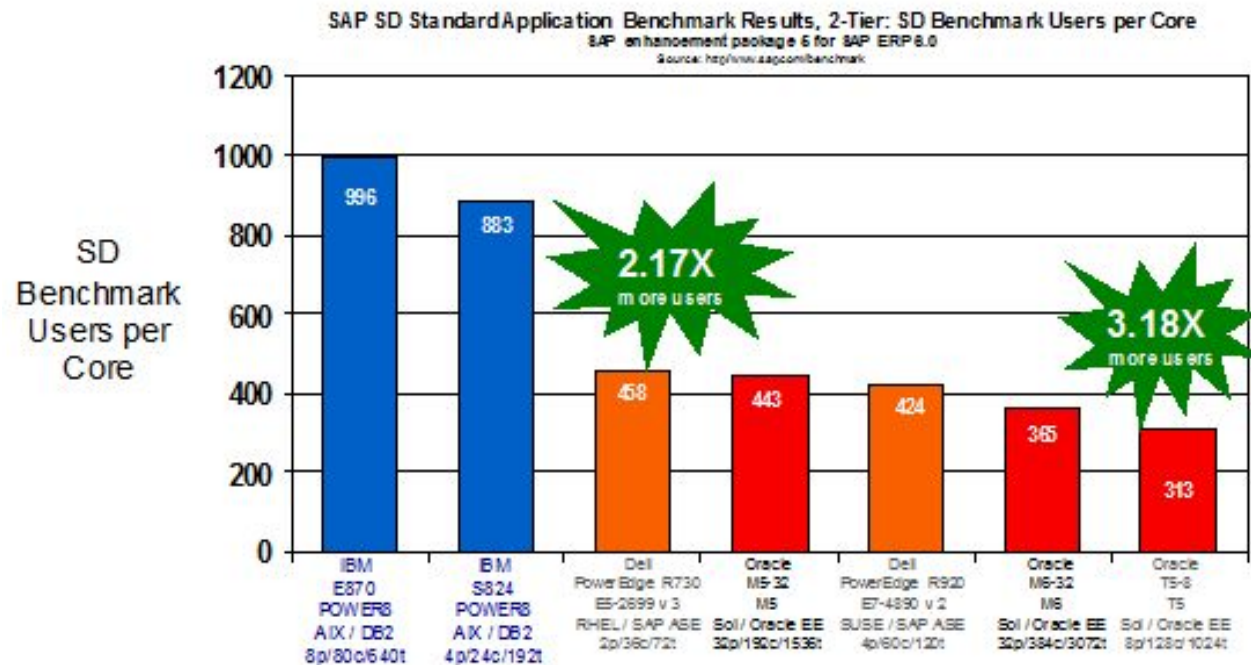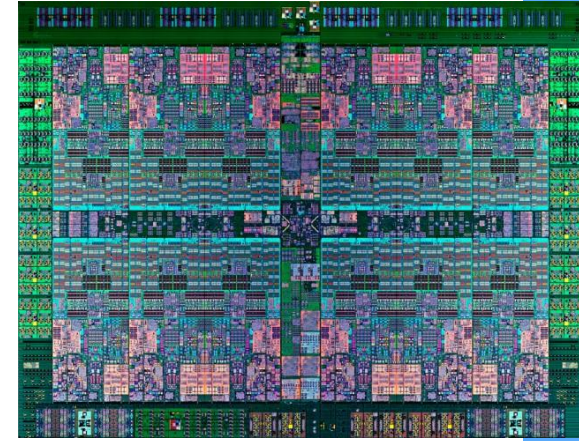
Oracle doesn't even want to sell hardware anymore

SAP SD Standard Application Benchmark Results, 2-Tier: SD Benchmark Users per Core
SAP enhancement package 6 for SAP ERP 6.0
Source: http://www.sap.com/benchmark

996	883	458	443	424	365	313
IBM E870 POWER8 AIX / DB2 8p/80c/640t	IBM S824 POWER8 AIX / DB2 4p/24c/192t	Dell PowerEdge R730 E5-2699 v3 RHEL / SAP ASE 2p/36c/72t	Oracle M5-32 M5 Sol / Oracle EE 32p/192c/1536t	Dell PowerEdge R920 E7-4890 v2 SUSE / SAP ASE 4p/60c/120t	Oracle M6-32 M6 Sol / Oracle EE 32p/384c/3072t	Oracle T5-8 T5 Sol / Oracle EE 8p/128c/1024t

2.17X more users

3.18X more users

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What can be expected?

- With CPU improvement
- With storage speed and CPU throughput improvement
  - Around 30-50% reduction in per-CPU license requirements

But what if that isn't enough

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Maybe Cold Turkey is the answer…

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Are you doing anything with your Open Source databases today?

EnterpriseDB Postgres Advanced Server

- Most mature open source DBMS technology
- Enterprise-Class Features (built like Oracle, DB2, SQL Server)
- Enterprise-Class Support
- Strong, independent community driving rapid innovation

DB Engines Ranking – March 2017

	Rank		DBMS
Mar 2017	Feb 2017	Mar 2016	
1.	1.	1.	Oracle
2.	2.	2.	MySQL
3.	3.	3.	Microsoft SQL Server
4.	4.	↑ 5.	PostgreSQL
5.	5.	↓ 4.	MongoDB
6.	6.	6.	DB2
7.	↑ 8.	7.	Microsoft Access
8.	↓ 7.	8.	Cassandra
9.	9.	↑ 10.	SQLite
10.	10.	↓ 9.	Redis

- **Fully ACID Compliant**
- **MVCC**
- **Point in Time Recovery**
- **Data and Index Partitioning**
- **Bitmap Indexes**
- **ANSI Constraints**
- **Triggers & Stored Functions**
- **Views & Data Types**
- **Nested Transactions**
- **Online Backup**
- **Online Reorganization**
- **Foreign Keys**
- **Streaming Replication**
- **Multi-Core Support**
- **JSON Support**
- **HStore**

Is your computing infrastructure efficient and effective?

EnterpriseDB Postgres Advance Server 9.5 on IBM Power S822LC for Big Data delivers *1.66X more performance per core* and 1.62X *better price-performance* than Intel Xeon E5-2690 v4 Broadwell

- # EnterpriseDB and Power8 an unbeatable Combination!

	IBM Power S822LC for BD (16-core, 256GB)	X86 Competitor (28-core, 256GB)
EDB POSTGRES / Linux	POWER8	intel
Server price -3-year warranty	**$13,141**	**$19,658**
System Cost -Server + RHEL OS + EDB Annual Subscription @ $1,750 per core (3yrs)	**$98,440** ($13,141 + $1,299 + $84,000)	**$167,957** ($19,658 + $1,299 + $147,000)
EDB pgbench Total Transactions per Second	**536,163 tps**	**563,897 tps**
TPS/$	**5,446 tps/$**	**3,358 tps/$**

1.62X better

pgbench TPS per core
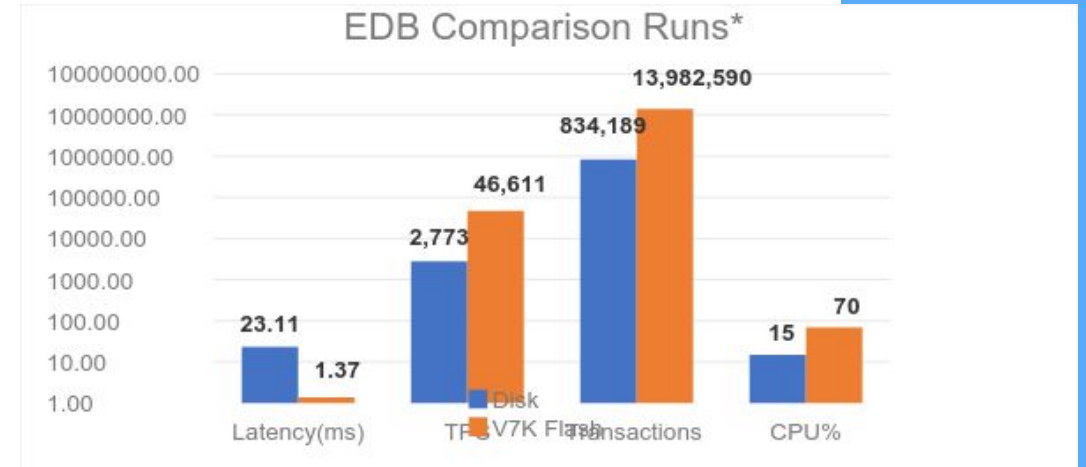
1.66 X Better per core

1.6x Better Price-performance

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EnterpriseDB Postgres Advance Server 9.5 on IBM V7000 Flash delivers *16X more transactions for a given time period* and 5X *better price-performance* than traditional 15K RPM based SAN

- V7000 Flash – 16X more efficient than Traditional SAN

	IBM V7000 Flash	Traditional 15K RPM 22 disk SAN
EDB POSTGRES / Linux		
Storage price	$243,133	$70,711
License Cost -3 years support	**$27,960** (3*9,320)	**$11,304** (3*3,768.00)
EDB pgbench Total Transactions per Second	**46,611 tps**	**2,773 tps**
TPS/$	**5.82 $/tps**	**29.57 $/tps**

5.08X better

EDB Comparison Runs*

16x	More Transactions and Lower Latency	
55%	Higher CPU efficiency	
5x	Better Price-performance	

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Legacy database vs. EDB TCO comparison on IBM Power

License Fee Per Core	Legacy database	EDB Postgres Advanced Server
	(32 cores) (Power processor)	*(32 cores) (Power processor)*
Database	$47,500	included in subscription
Partitioning	$11,500	Included
Data Guard	$11,500	Included
Diagnostics	$5,000	Included
Total License Fee per Core	$75,500	included in subscription
Total License Fee per Server (CapEx)	**$2,416,000**	**$0**
Annual support/subscription cost per core	22% of License Fee	$1,750 per core
Annual Support/Maintenance per Server (OpEx)	**$531,520**	**$56,000**
Total 3 Year License and Support Cost	**$4,010,560**	**$168,000**

No CAPEX   Annual OPEX reduction **90%**   3 YR TCO cost savings **96%**

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EDB is just one example

- Many others (MongoDB, REDIS, Cassandra, Ne04j, MariaDB, etc)
- Some may be more effective for a specific use case
- Power8 and FlashSystem can run all of them efficiently
  - Can Exadata?

From: http://www.techrepublic.com/article/nosql-databases-eat-into-the-relational-database-market/
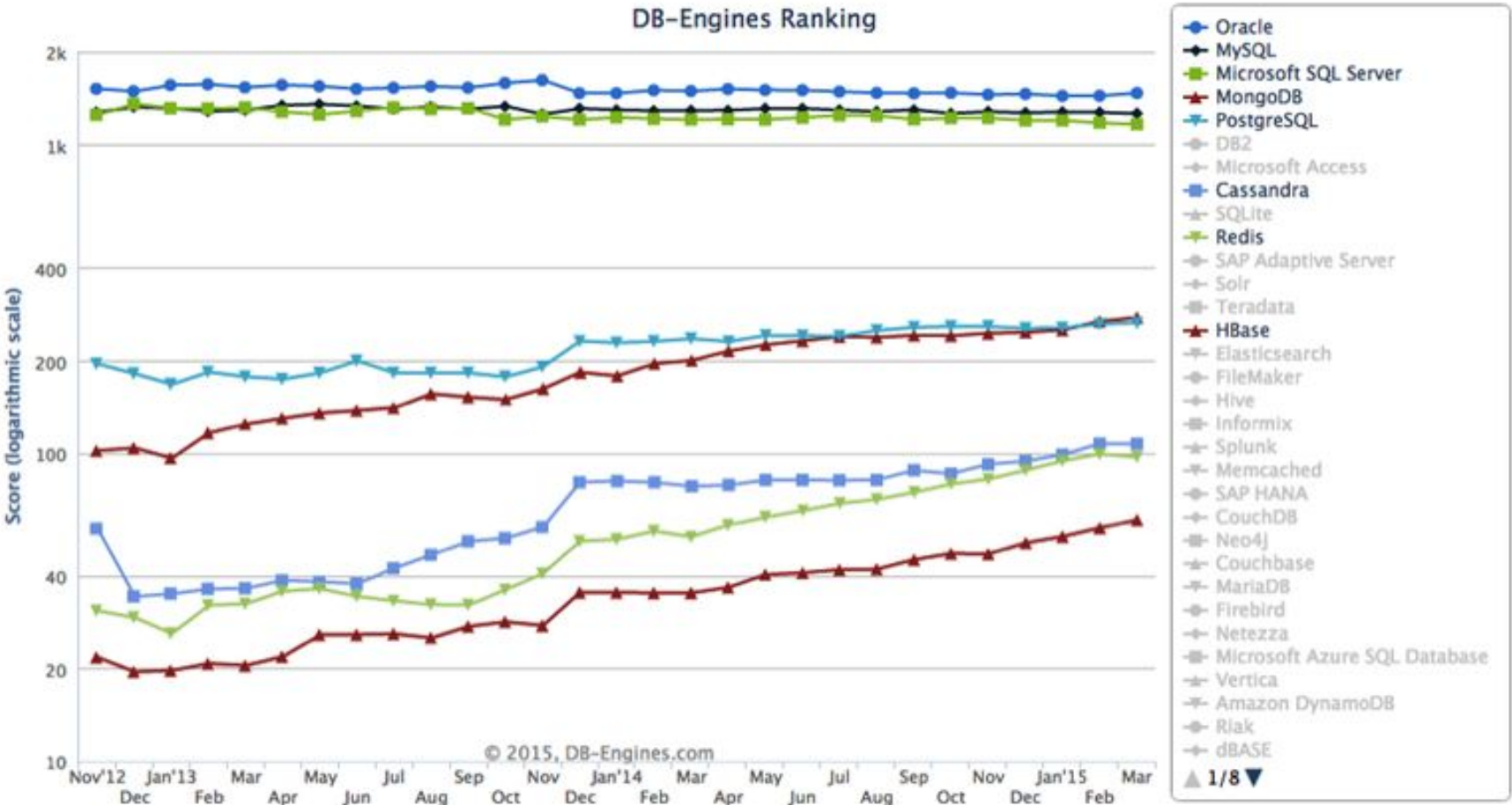
Completing the Picture: Advanced Software

:

- Advanced filesystem such as GPFS Based

- Compatible with Open Standards

- Single Namespace for all storage

- Manages your Data Ocean

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Advanced Software Must Have Parallel Architecture

No Hot Spots

- All NSD servers export to all clients in active-active mode
- Stripes files across NSD servers and NSDs in units of file-system block-size

- File-system load spread evenly
- Easy to scale file-system capacity and performance while keeping the architecture balanced

NSD Client

NSD Servers
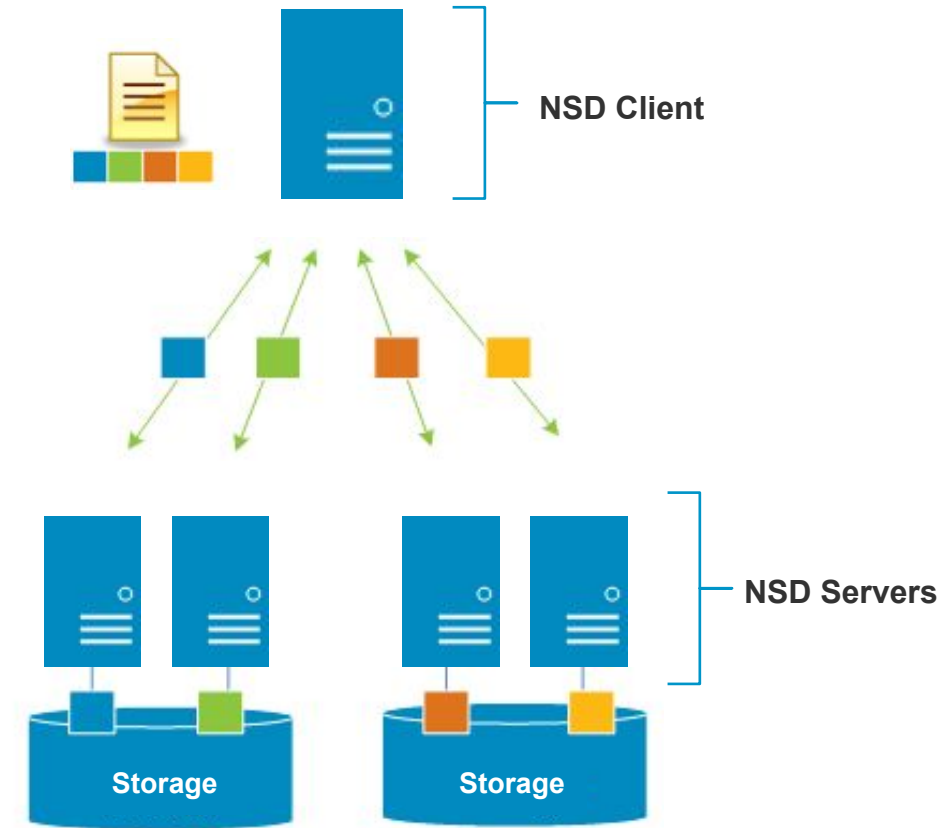
Storage

Storage

NSD Client does real-time parallel I/O
to all the NSD servers and storage volumes/NSDs

Advanced Software Required Features & Benefits

Storage management at scale	Store everywhere. Run anywhere.	Improve data economics	Software Defined Open Platform
Common GUI & health monitoring	Advanced routing with latency awareness	Tier seamlessly	Heterogeneous commodity storage: flash, disk, & tape
Unified File, Object & HDFS	Read or Write Caching	Incorporate and share flash	Software, appliance or Cloud
Distributed metadata & high-speed scanning	Active File Management for WAN deployments	Policy driven compression	Data driven migration to practically any target
QoS management	File Placement Optimization	Data protection with erasure code and replication	File/Object In/Out with OpenStack SWIFT & S3
1 Billion Files & yottabytes of data	End-to-end data integrity	Native Encryption and Secure Erase compliance	Transparent native HDFS
Multi-cluster management	Snapshots	Target object store and cloud	Integration with cloud with Transparent Cloud Tiering
	Sync or Async DR	Leading performance for Backup and Archive	

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Advanced Software: Transparent Cloud Tiering
Single namespace and control of data placement for hybrid cloud

Intelligent data placement
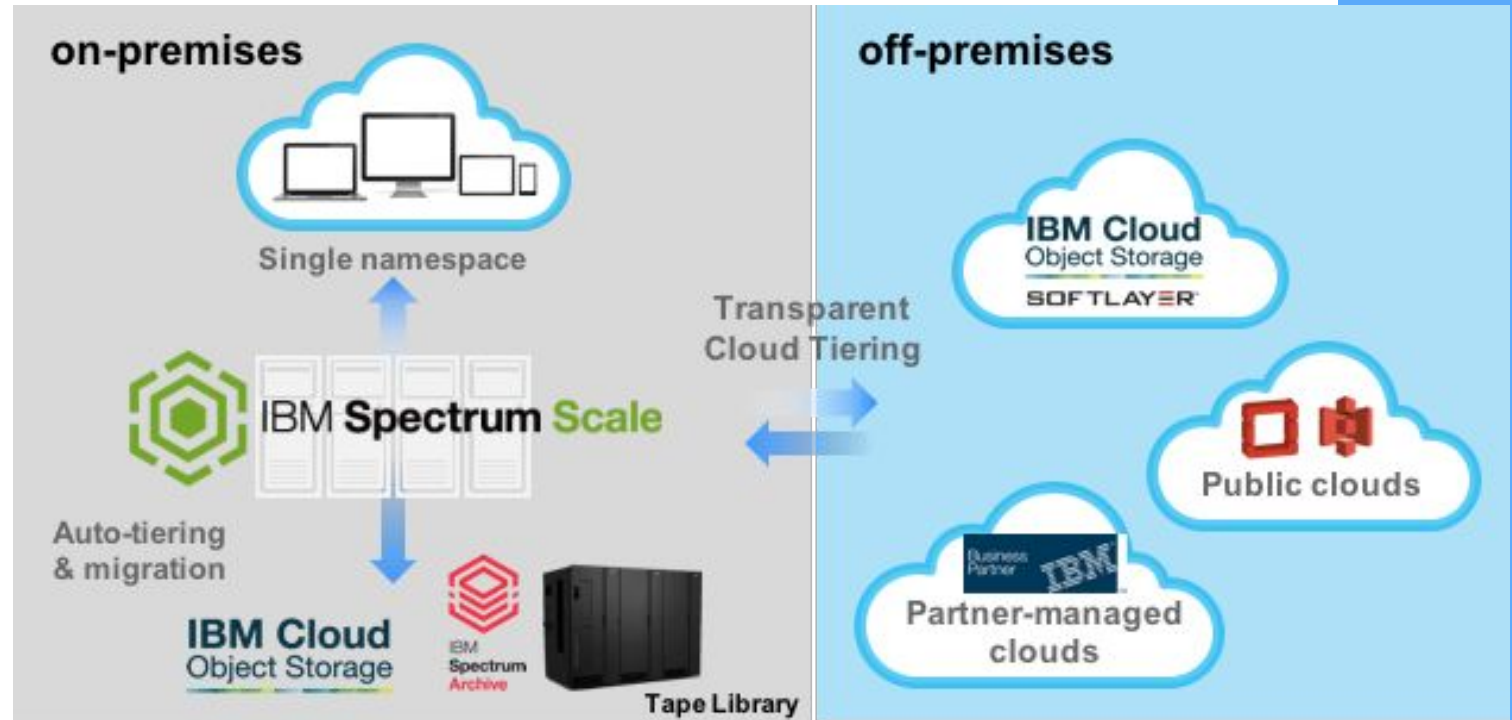- On or off-premises objects

Policy driven tiering
- Managed data placement or migration of cold data

Automated data movement
- Recall on user demand

IBM Spectrum Scale
- High-performance
- Single namespace
- Unified file, object and HDFS
- Encrypted
- Secure data in cloud

IBM

Advanced Software: Cloud Data Sharing
Policy-driven data movement for hybrid cloud
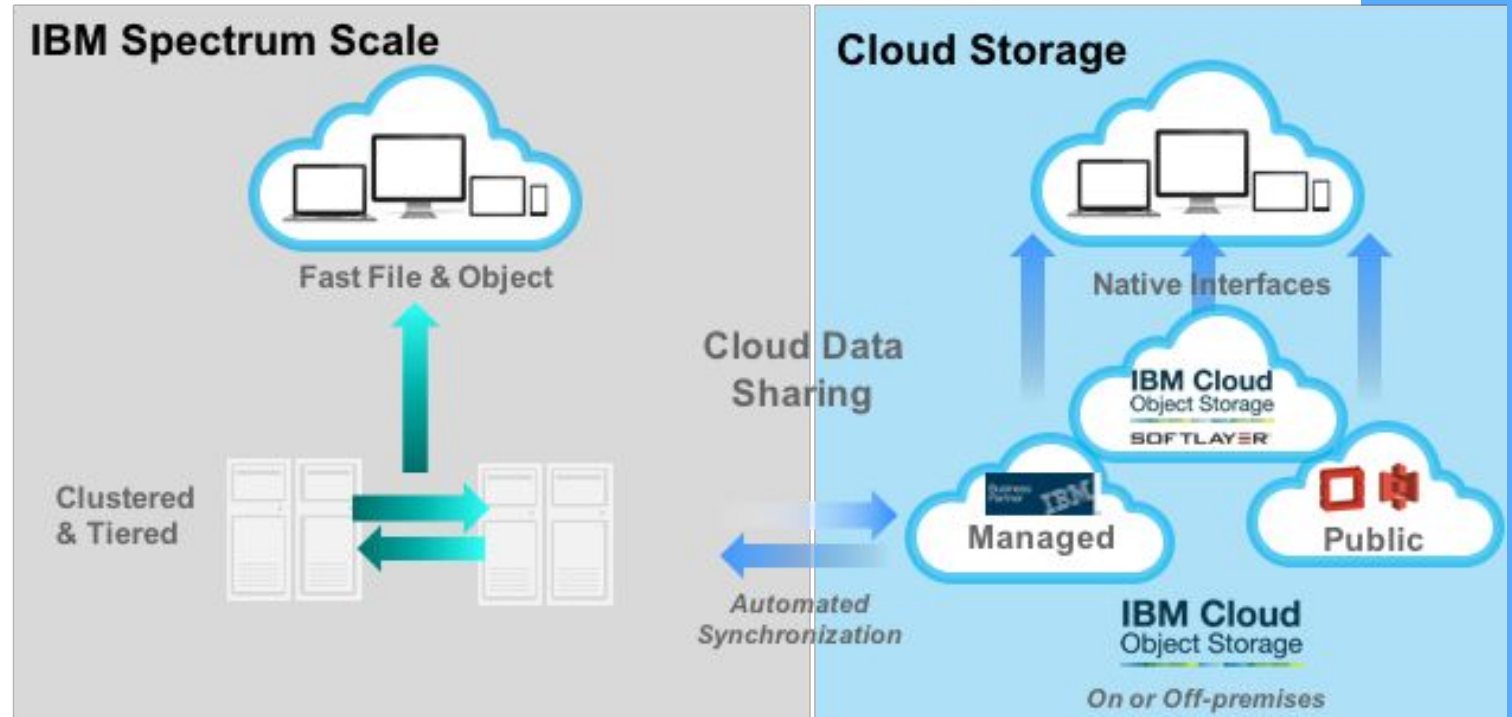
Managed data sharing
- Policy driven replication and synchronization
- Granular control:
  type, action, metadata or heat

Bridging cloud and file
- Storage-to-storage
- Data and metadata

Automated data movement
- Secure, reliable connection
- High-speed and scalable
- Clustered configurations

IBM Spectrum Scale
- High-performance file, object and HDFS
- Clustered, tiered and scalable
- Bridge legacy applications and new workloads

Cloud storage
- Cloud native applications
- Dev/Ops development
- New workloads

New CPU architectures, Faster storage, Better software and Open Source DB help relieve your license addiction!

Questions

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