Die Zukunft von Data Sharing im Gesundheitswesen

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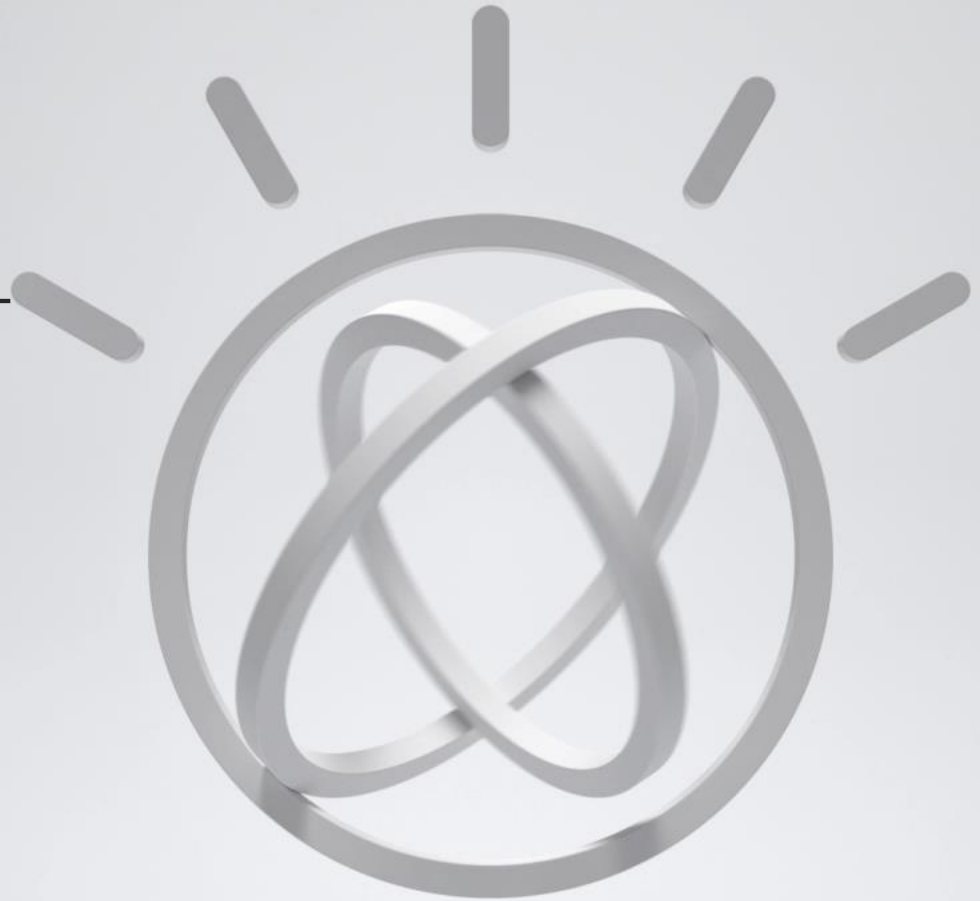
Sales Manager Storage IBM Systems Switzerland

Change happens!

Cognitive computing by Watson

- **Understanding** rather than processing data
- **Self learning**
- To make better decision based on self learning IT

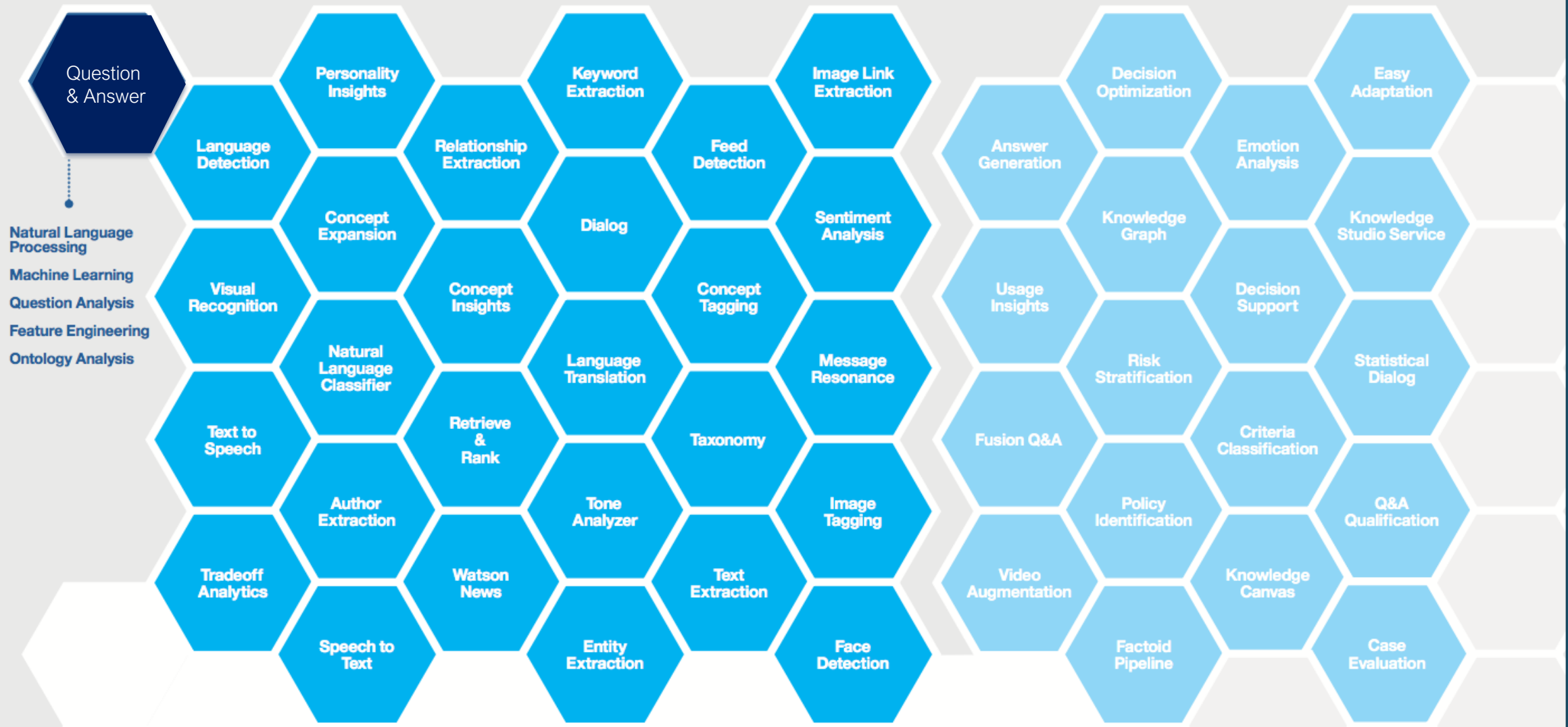


Watson can understand.
Watson can reason.
Watson can learn.

The Watson that competed on *Jeopardy!* in **2011** comprised what is now a single API—**Q&A**—built on **five underlying technologies**.

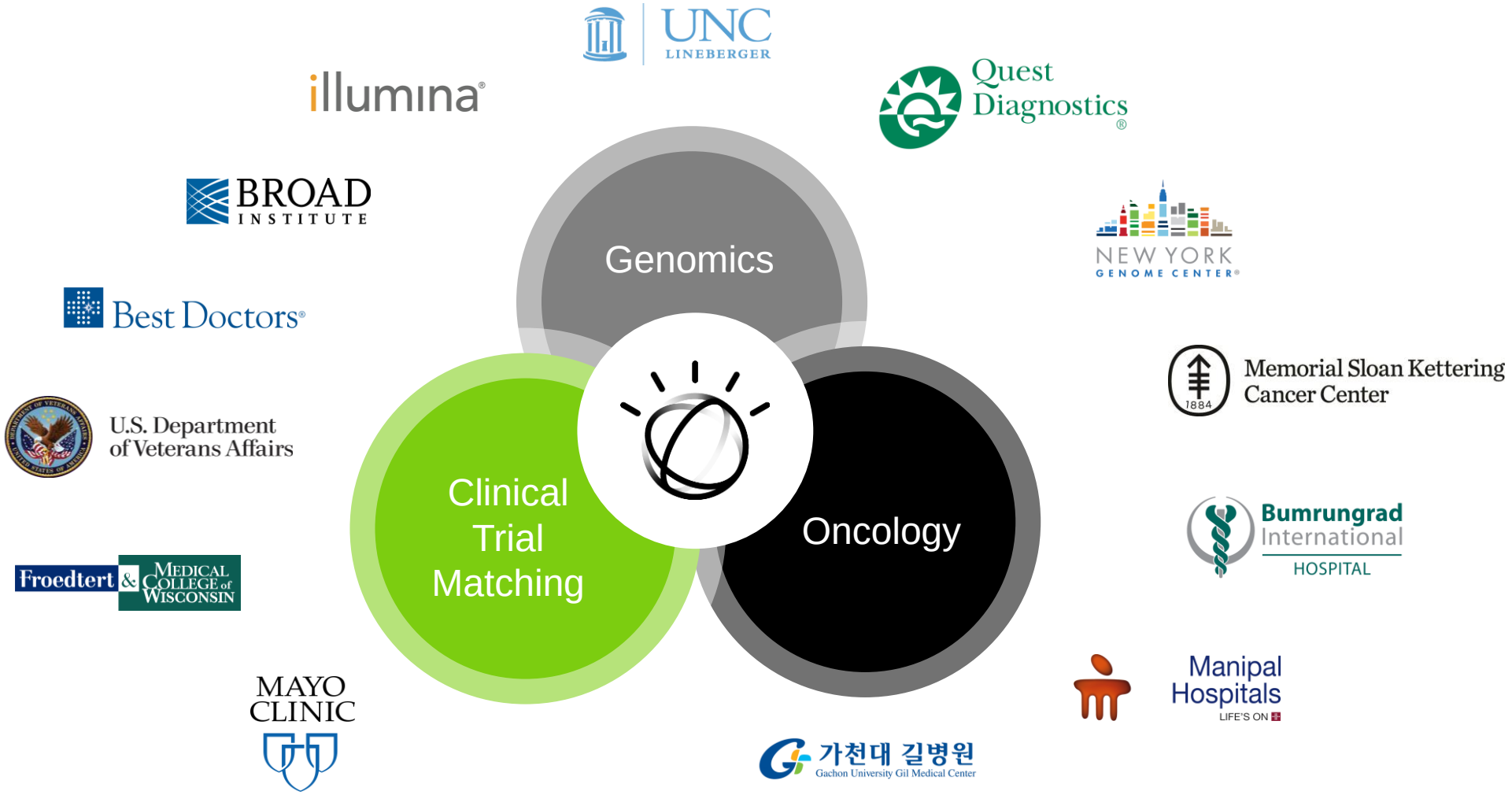
Since then, Watson has grown to a family of **28 APIs**.

By the end of 2016, there will be nearly **50 Watson APIs**—with more added every year.

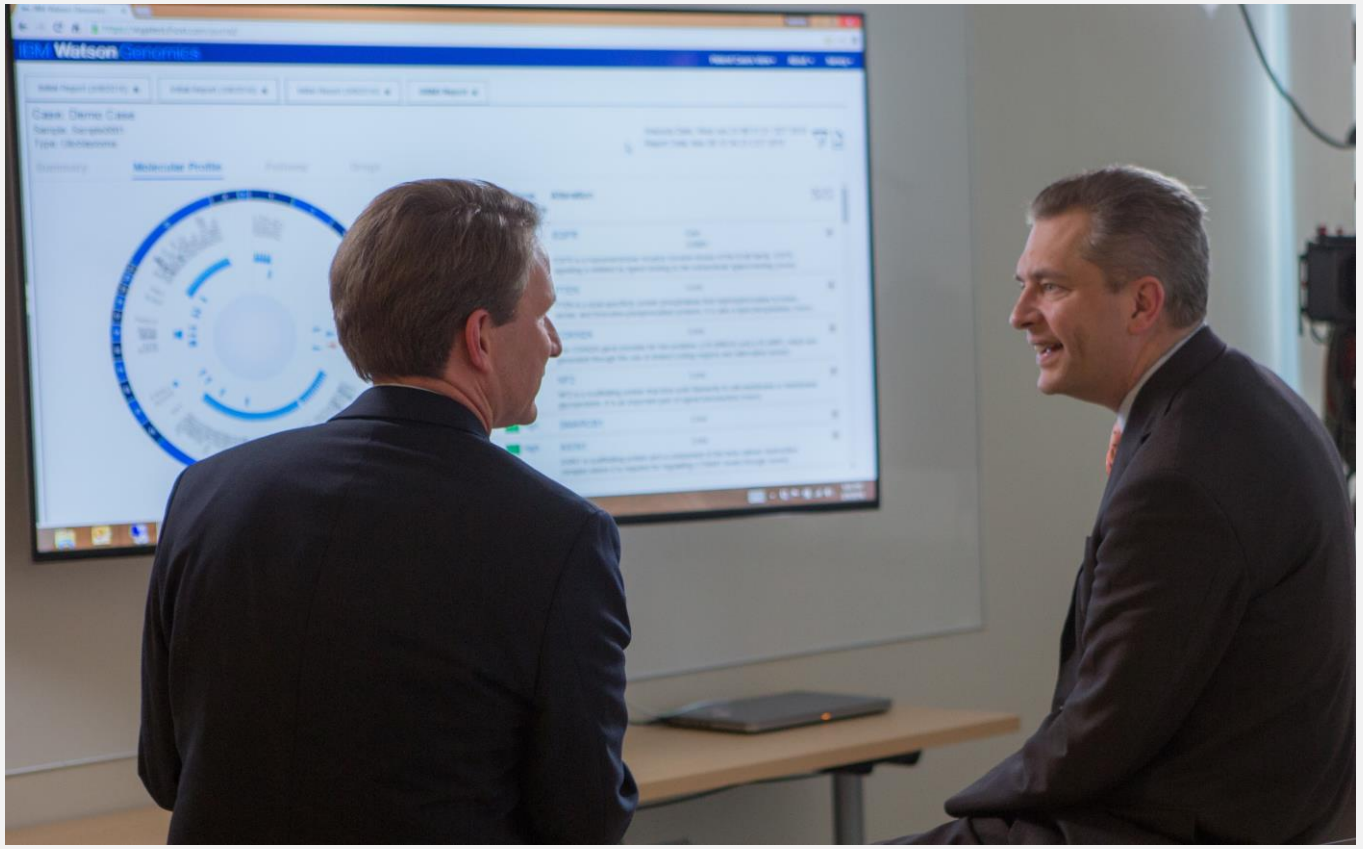


#CognitiveEra

Empowering the Oncology Community for Cancer Care



Watson Health's oncology clients span more than 35 hospital systems



“In ***30 percent*** of the patients Watson found something new. So, that’s ***300 plus patients*** that Watson identified a treatment that well-meaning/hardworking group of physicians hadn’t found.”

-Dr. Ned Sharpless, UNC
as told to *60 Minutes*

Cognitive is the goal

Hybrid Cloud is the platform

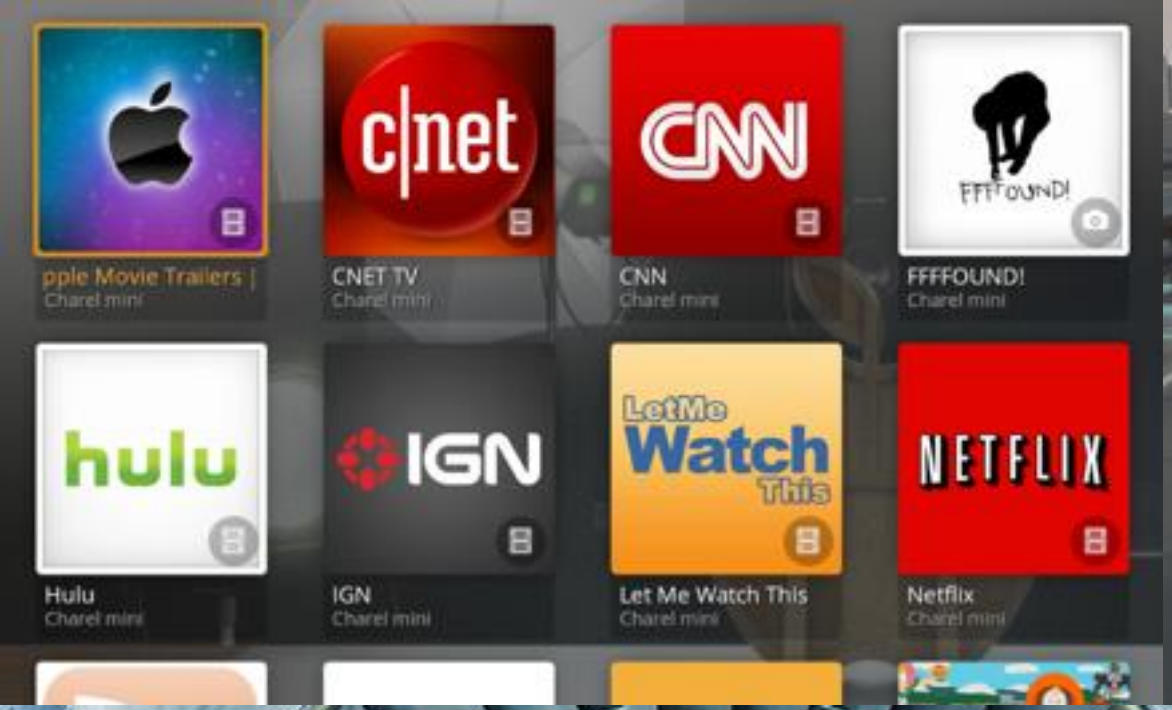
SDI is the architecture

Data is the asset

Storage is foundation

Agenda

- Datenexplosion und die damit verbundenen Herausforderungen
- Speicherkonzepte
- Data Sharing heute und morgen
- Speichertechnologien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Hulu
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IGN
Charel mini
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Charel mini
Netflix
Charel mini


BOSCH

Data are growing

Google: +1PB /daily

Facebook: +4PB/daily

IoT 2017: 8 Milliarden Device

Healthcare:

Per hospital: + 3TB/daily

Autonomous driving:

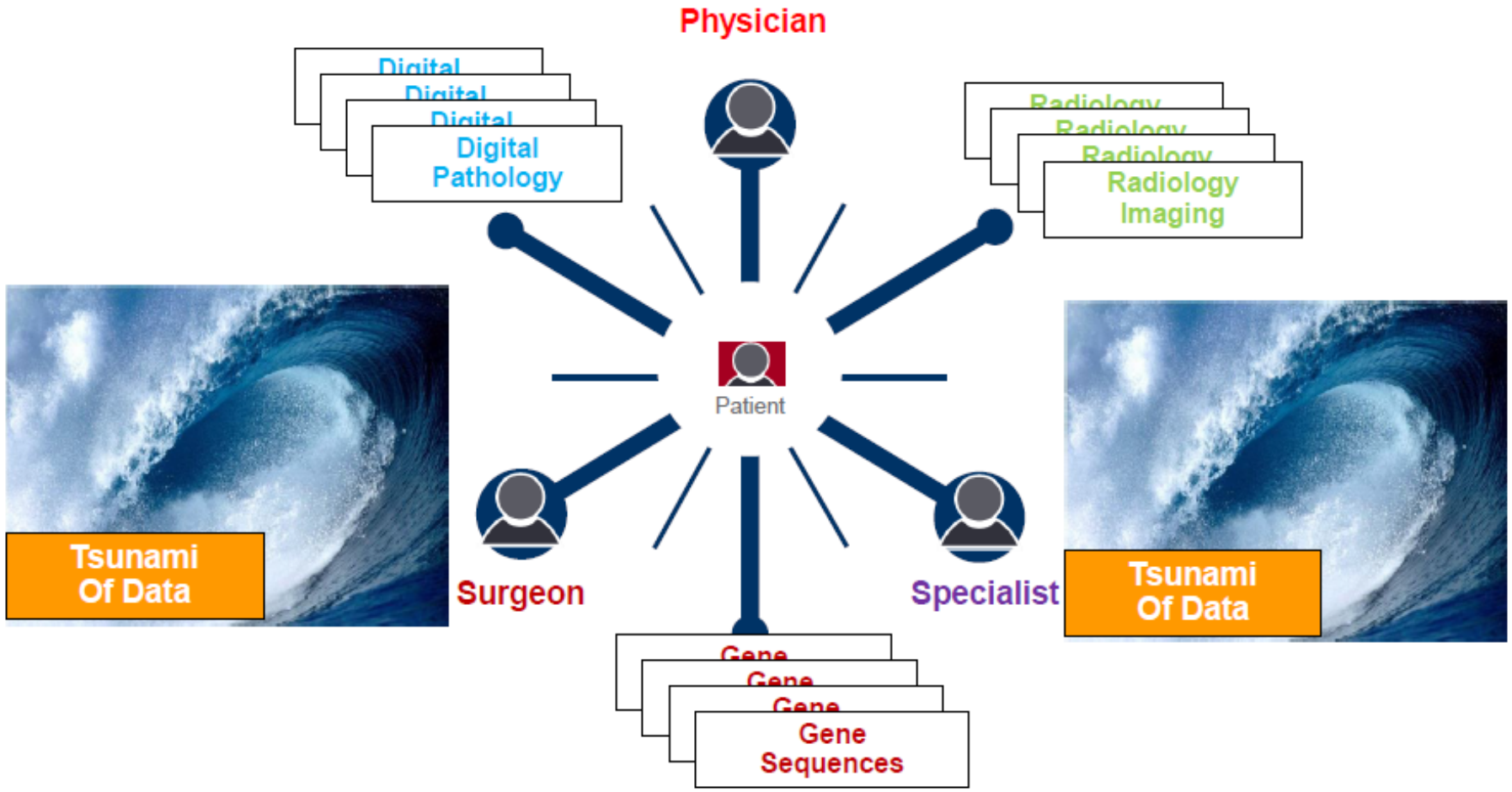
until 2020: +4TB/daily per Car

Wal-Mart: 1year +2.5PB

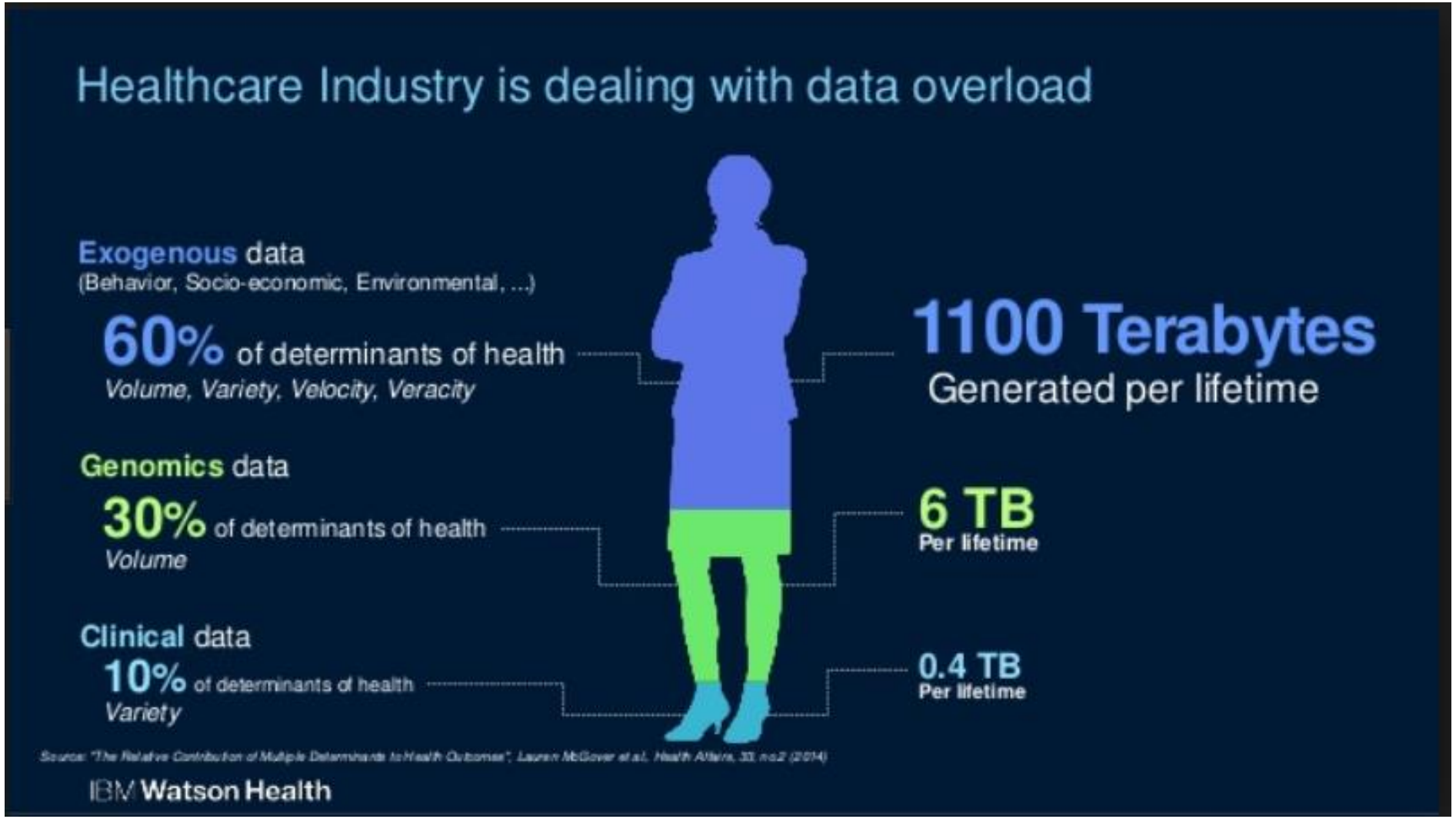
Aviation:

A350: 6‘000 Sensors = 2.5TB/daily

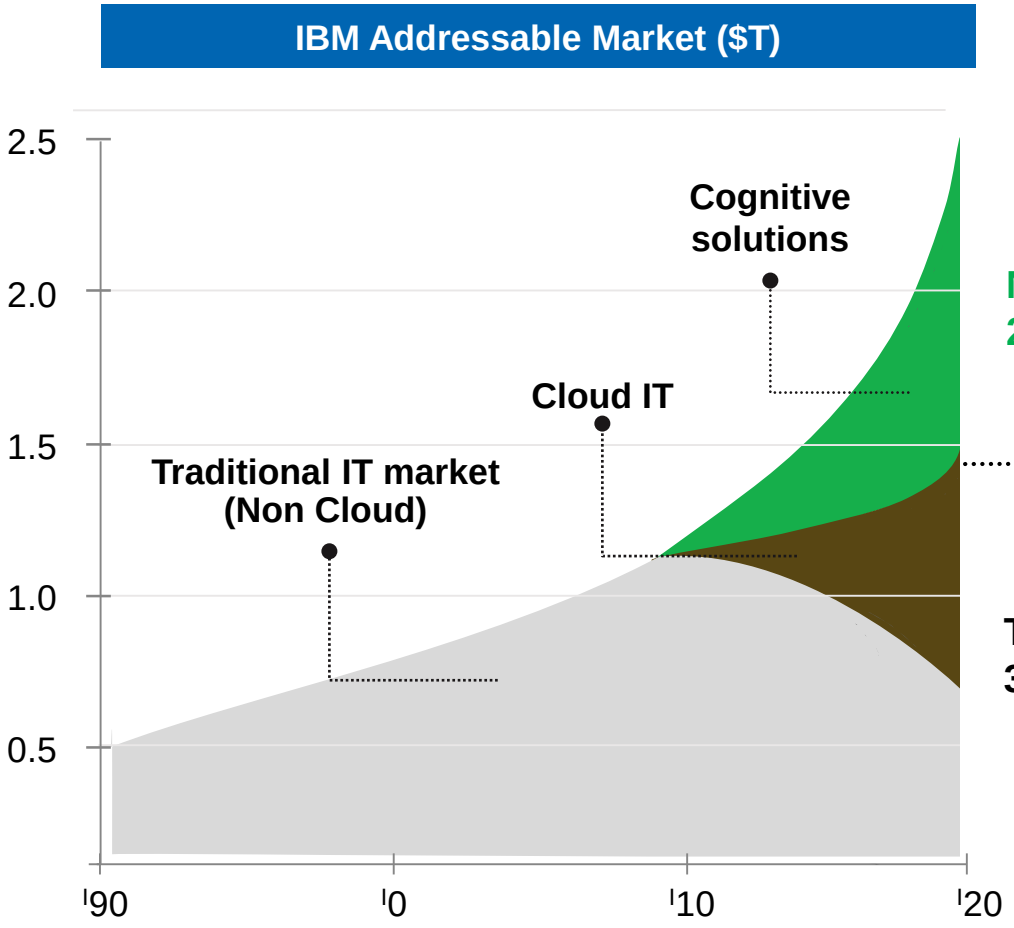
A380: over 10‘000 Sensors



Wir generieren Daten



Technology disruption is transforming the IT industry



New Markets 25% CAGR

Traditional IT 3-5% CAGR

"Smart modules" **top Investment** by '18
— Gartner

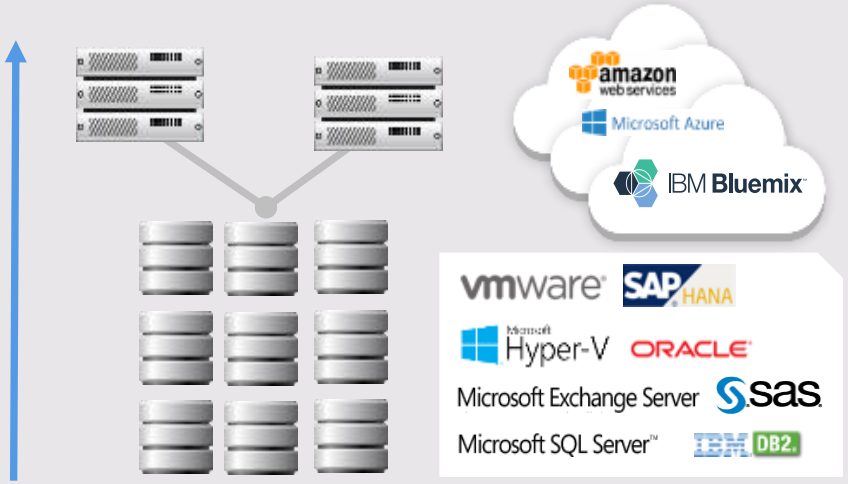
50%
of developers **to embed cognitive** into apps by '18
— IDC

Over 60% of new **Apps cloud** native by '18
— IDC

Hybrid becomes The **infrastructure foundation** for next move of apps
— Gartner

How do you move forward?

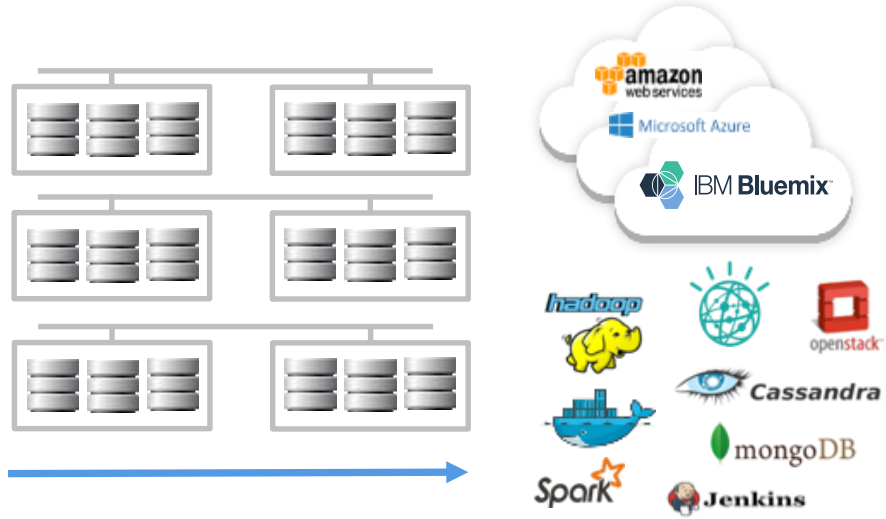
Traditional Application Workloads



Modernize

Optimize and drive efficiencies, while continuing to deliver high levels of service delivery

New Generation Application Workloads

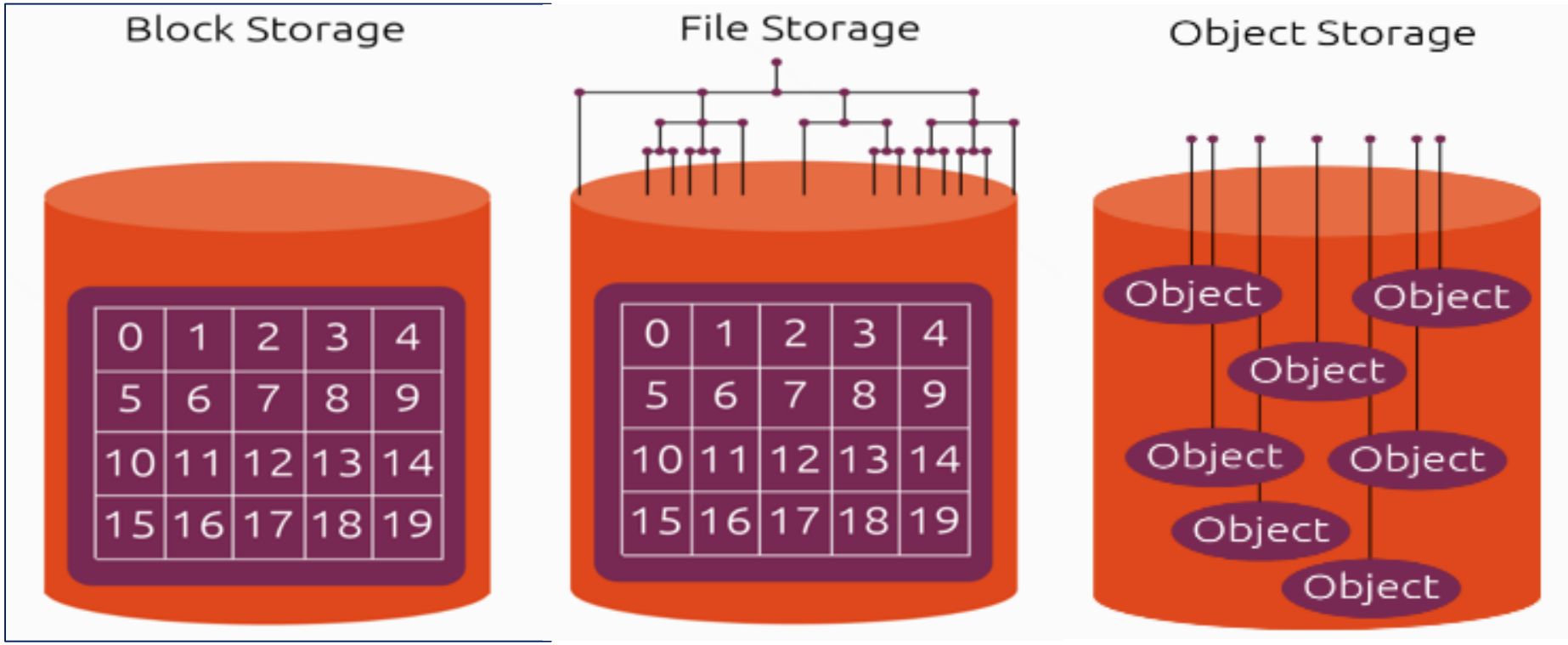


Transform

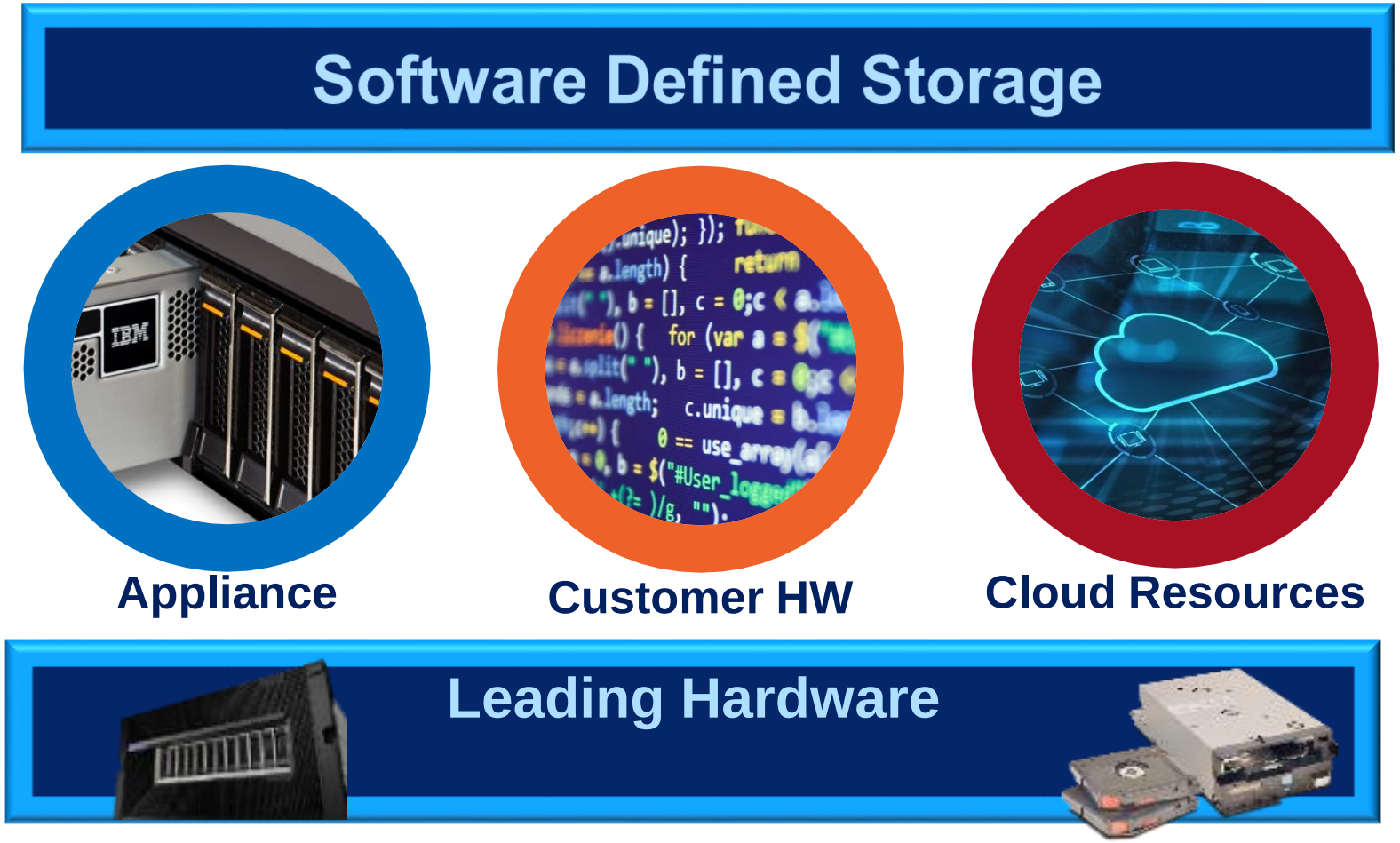
Deliver and operate new application infrastructure to support new Cognitive and agile workloads

Save here → **Invest here**

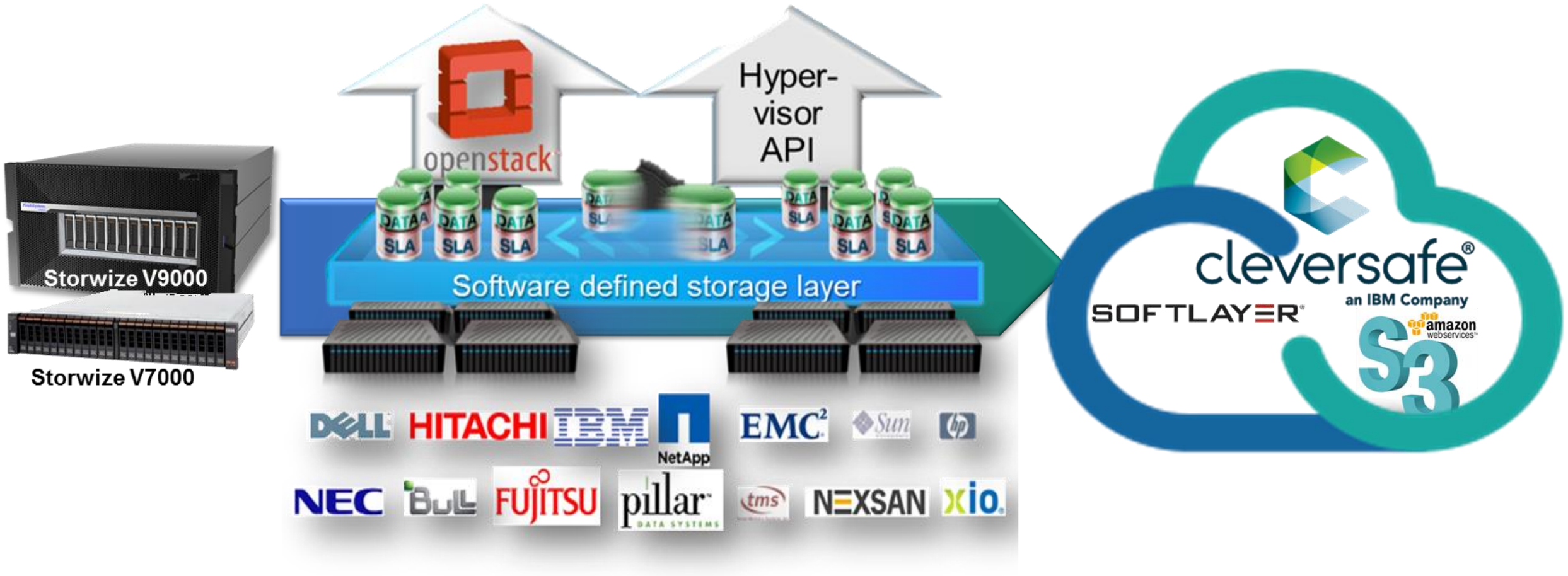
Storage technologies relevant for Health care



Storage Architecture for future workload

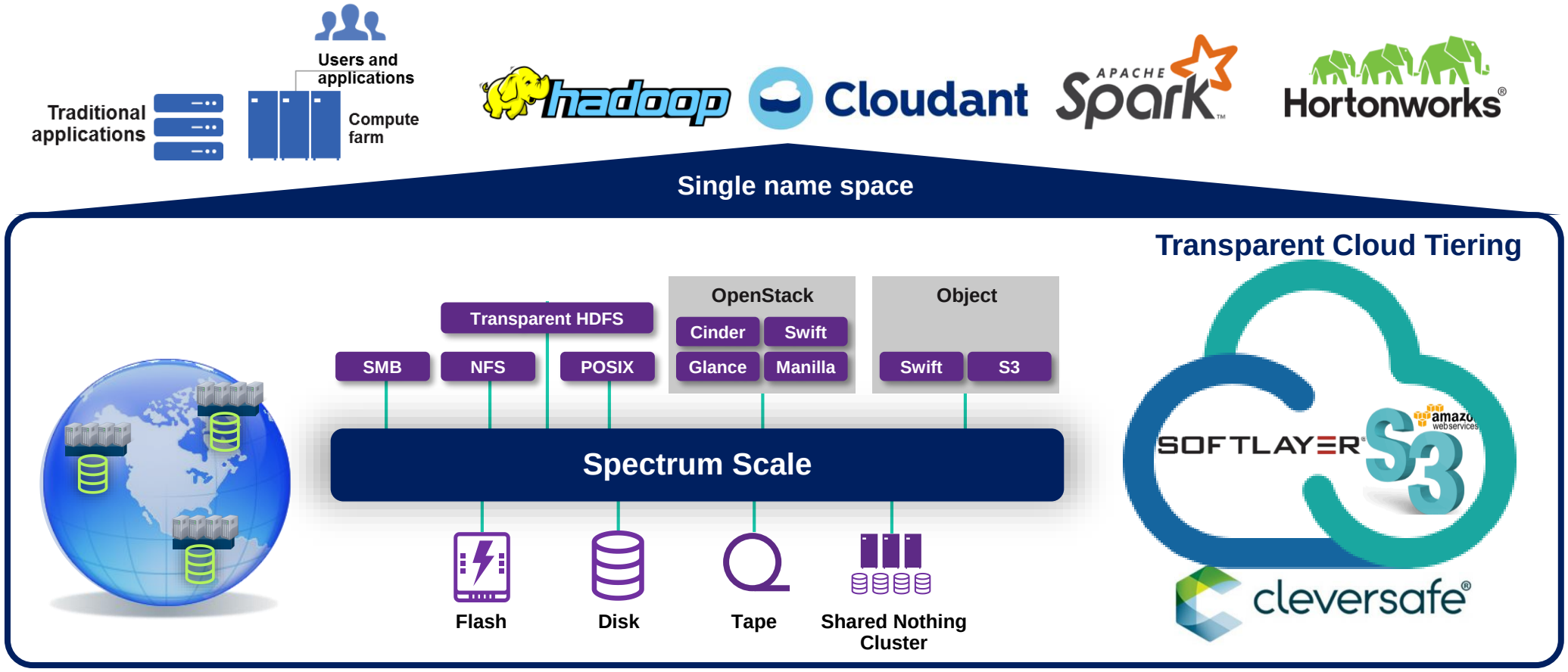


Lösung für KIS



Datensammlung früher und heute

Data oceans



Imagine the Internet without Search

Every day, enterprises generate and keep 100s of TBs of data in their own Data Ocean

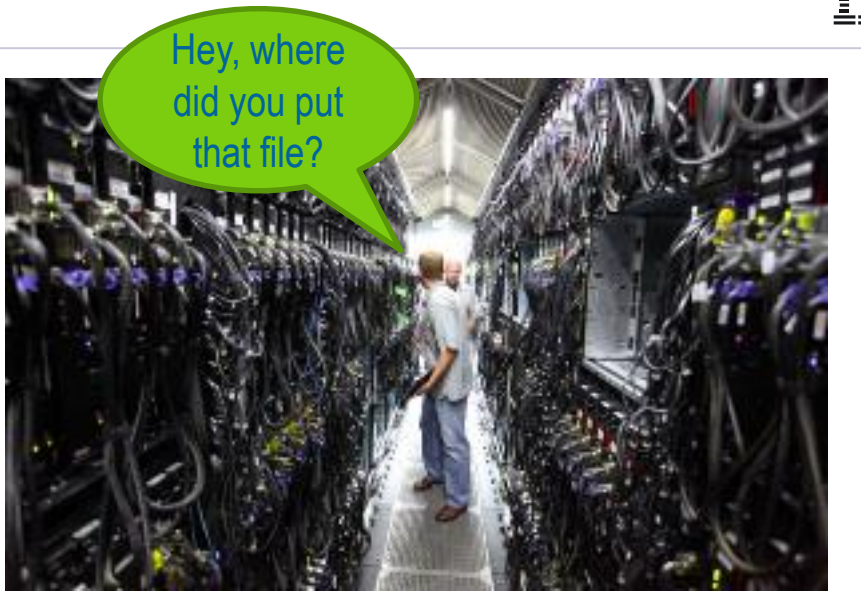
- Internet of Things
- Big Data

Data Oceans are commonly reaching into the 10s of PBs

- Costs a fortune to keep…
- …but too scared to delete it because it may be valuable…
- …and too scared to keep it because it may create risk!
- **Data is virtually lost**

Metadata is the fish finder in the Data Ocean

"Through 2018, 90% of deployed data lakes will be useless as they are overwhelmed with information assets captured for uncertain use cases."

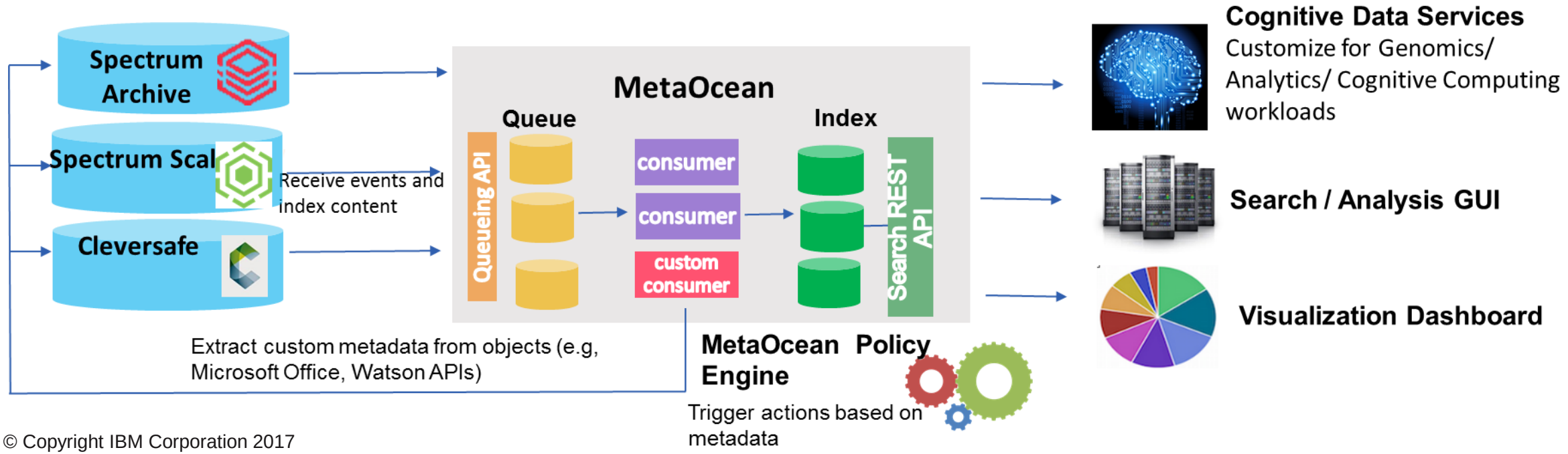


Source: Gartner, Metadata is the fish finder in Data Lakes, October 2015

MetaOcean Prototype and Demo: Automatic Index & Catalog Files and Objects

Automatically index and catalog files and objects from Cloud Object Storage, Spectrum Scale, and Spectrum Archive
- Open, pluggable architecture enables easy integration of new source systems to capture metadata

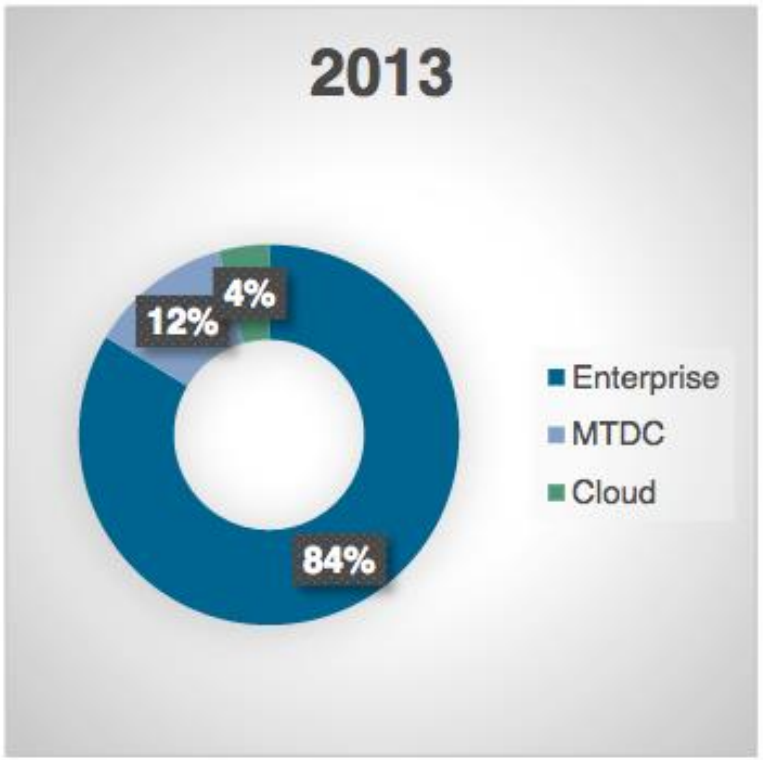
Provide rich search API as foundation for advanced data services
Trigger actions based on metadata using MetaOcean policy engine
Index and leverage custom metadata via tagging and policy based extraction

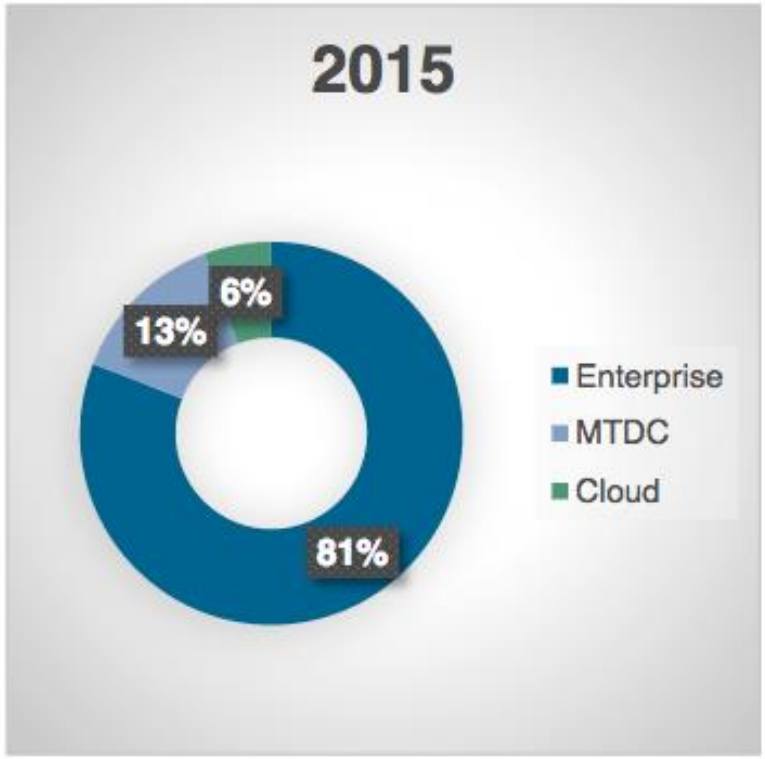


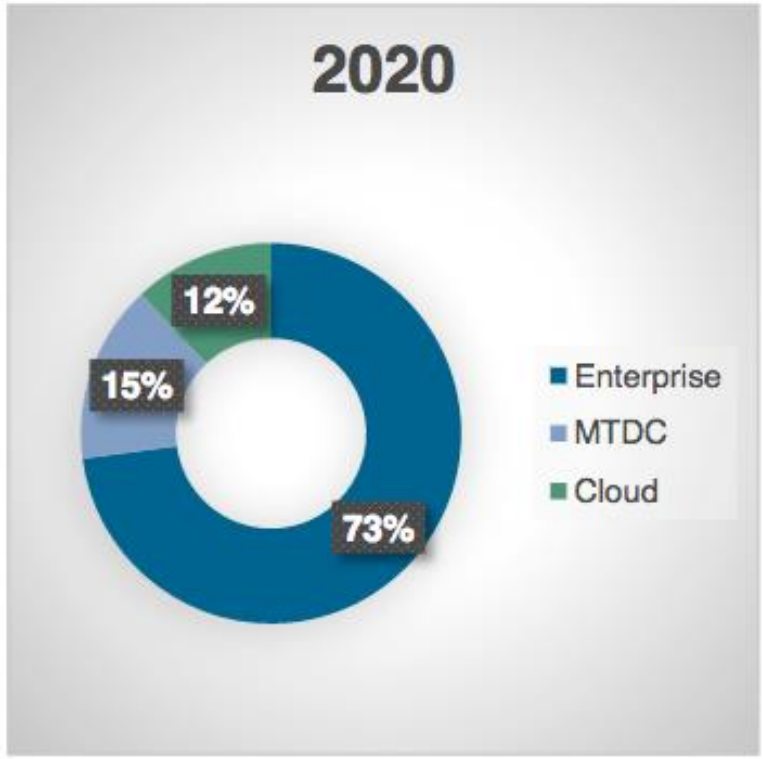
Cloud Storage (Object Storage)

2020: 73% der Daten bleiben on-Prem

451 Research 10/2016







How do I park my car....

NAS:
Ebene 4
Reihe 22
Platz 135

Object:
Ticket

Cloud Storage – Use Cases

Active Archive

Enterprise Collaboration

Business Continuity

Back-up

Content Repository

Storage as Service

IBM Cloud Object Storage is built for cloud-scale data

Just as reliable, less complex, more efficient than traditional storage

Traditional Storage

1 TB
of usable data

1.2 TB D.C.
1.2 TB Dallas
1.2 TB San Jose

3.6 TB
of raw storage

Traditional storage requires 3.6 TBs raw storage capacity for 1 TB of usable storage.

IBM Cloud Object Storage requires less than half the storage and **70% lower TCO.**

You can lose some number of slices due to failure or disaster, and still read 100% of your data.

Slices are distributed geographically for durability and availability

IBM Cloud Object Storage

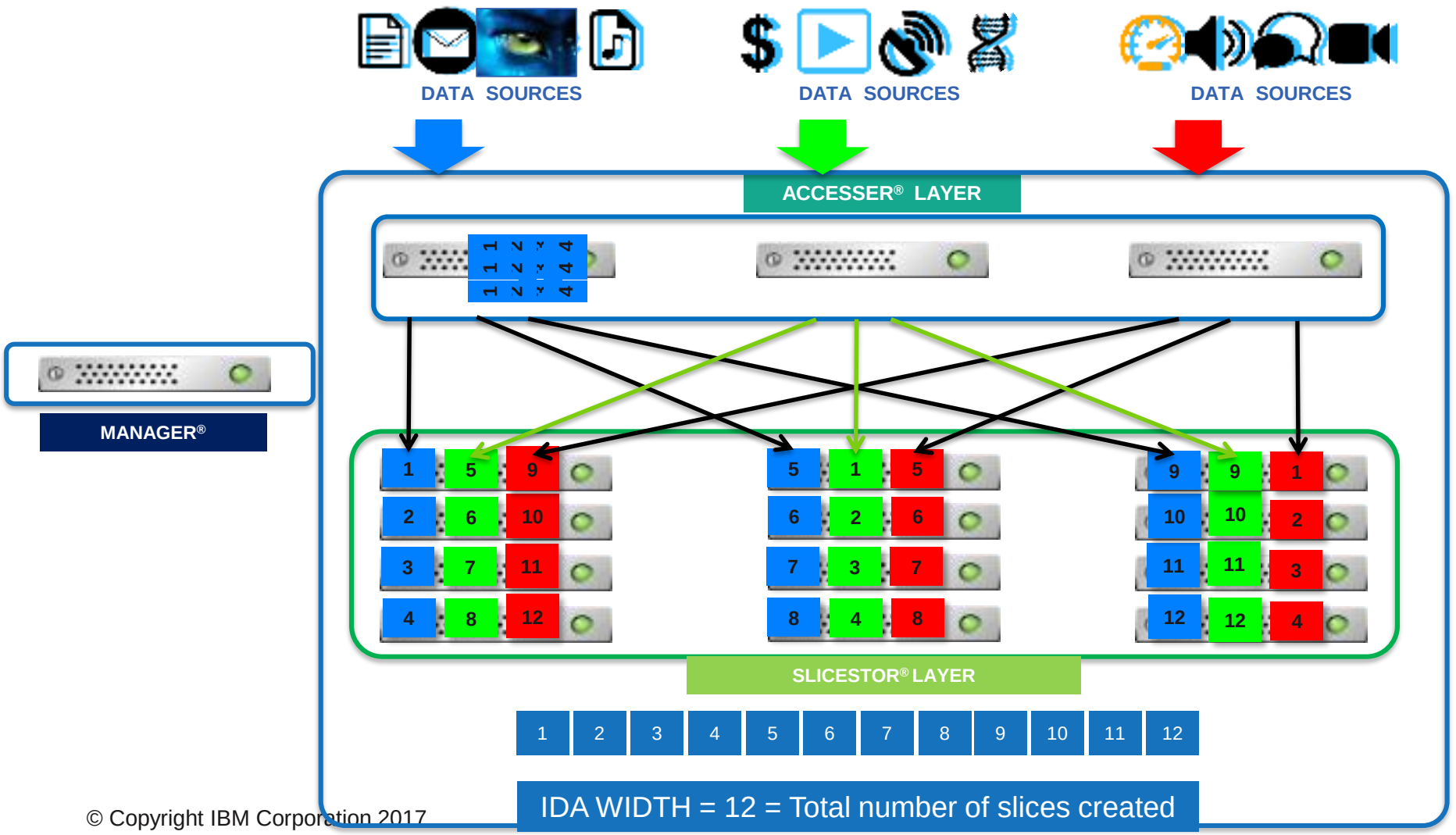
1 TB
of usable data

0.56 TB D.C.
0.56 TB Dallas
0.56 TB San Jose

1.7 TB
of raw storage

Our object storage requires only 1.7 TBs raw storage capacity for 1 TB of usable storage.

IBM COS- Data Dispersal

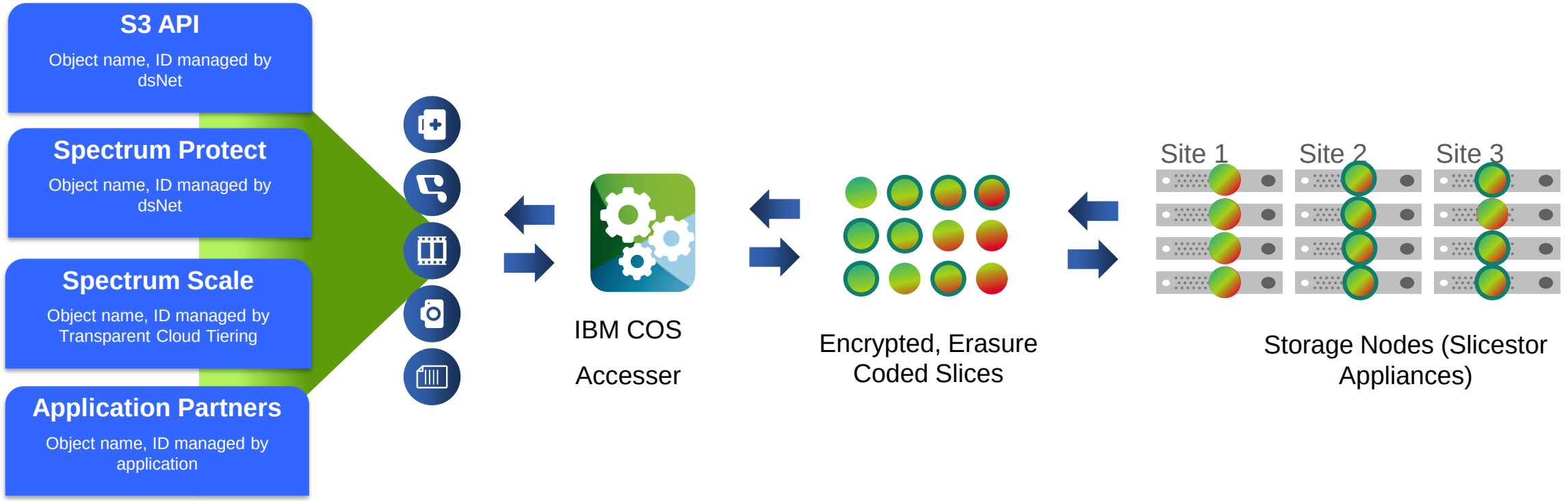


1. Data is encrypted, and sliced using Information Dispersal Algorithms (IDA).

2. Slices are dispersed to separate disks, storage nodes and/or geographic locations.

3. The level of resiliency is fully customizable

Scale-out Object - *IBM Cloud Object Storage*



New compliance and retention capabilities with *Compliance Enabled Vault (CEV)*

IBM® Cloud Object Storage System™ introduces ***Write-Once-Read-Many (WORM)*** *storage* features that enable businesses to store their compliance data onprem.

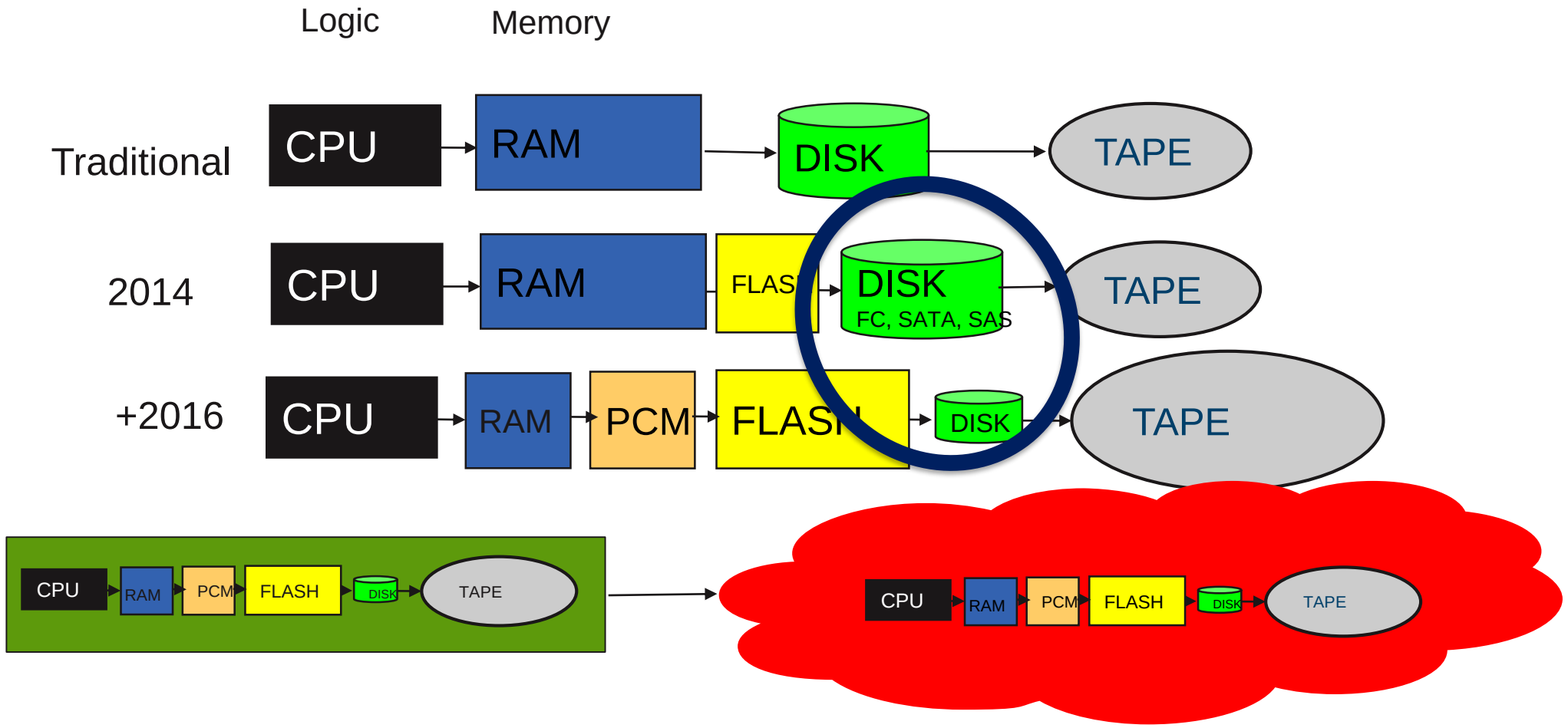
Making data **Immutable** is Now supported **natively** in IBM Cloud Object Storage software at **NO** additional cost.

Letter of Assessment Report from 'Cohasset Associates' for IBM COS natively compliance to following standards:

1. Securities and Exchange Commission (**SEC**) Rule 17a-4(f).
2. Financial Industry Regulatory Authority (**FINRA**) Rule 4511, which references SEC Rule 17a-4(f).
3. Commodity Futures Trading Commission (**CFTC**) Rule 1.31(b)-(c) (July/Aug '17 Release).

Compliance Enabled Vault (CEV) deployment supported for a single site (not SEC compliant) and 3-site+ (SEC compliant) geo dispersed COS system.

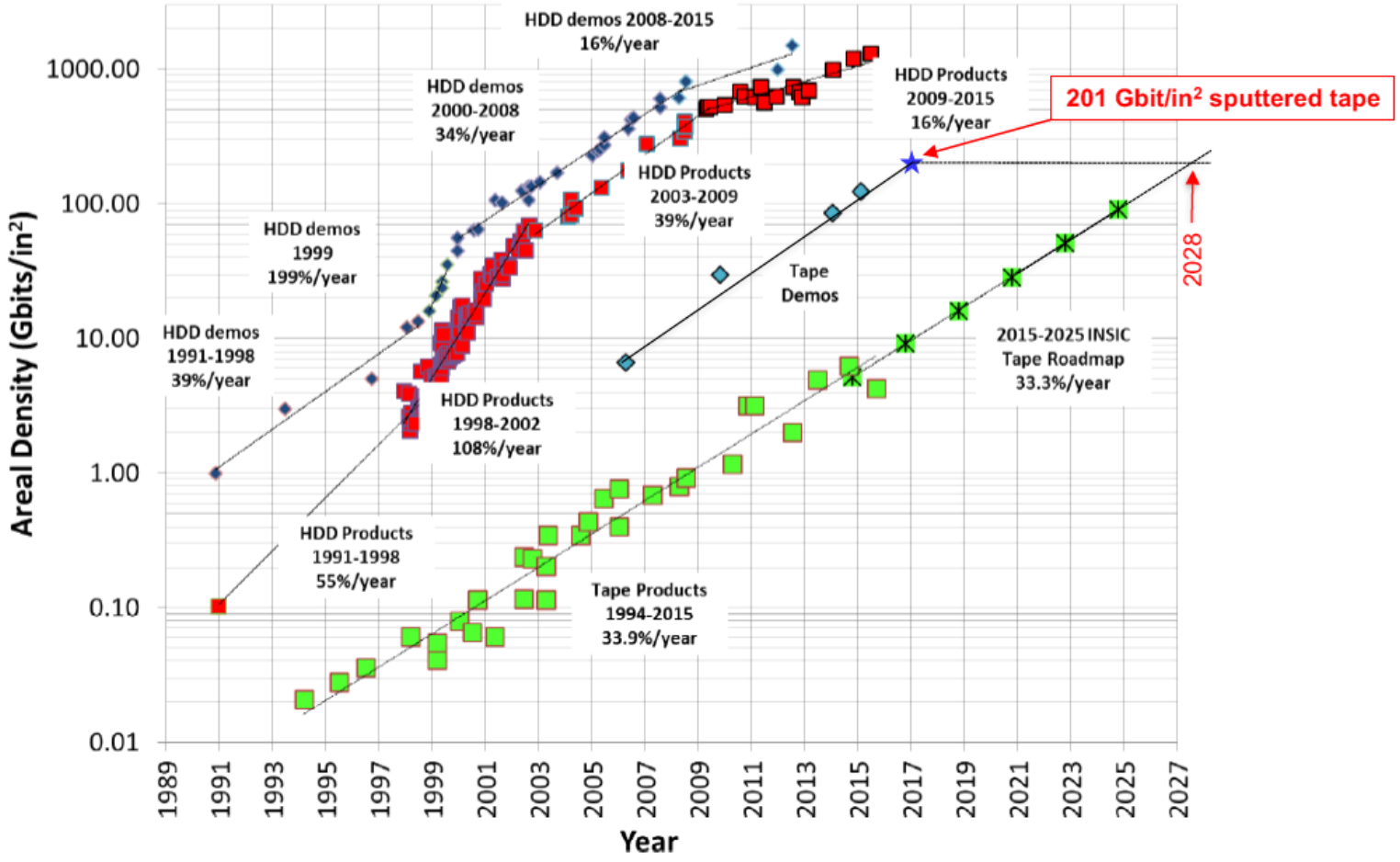
Evolution of the Storage and Memory Hierarchy



Magnetic Recording Areal Density Trends

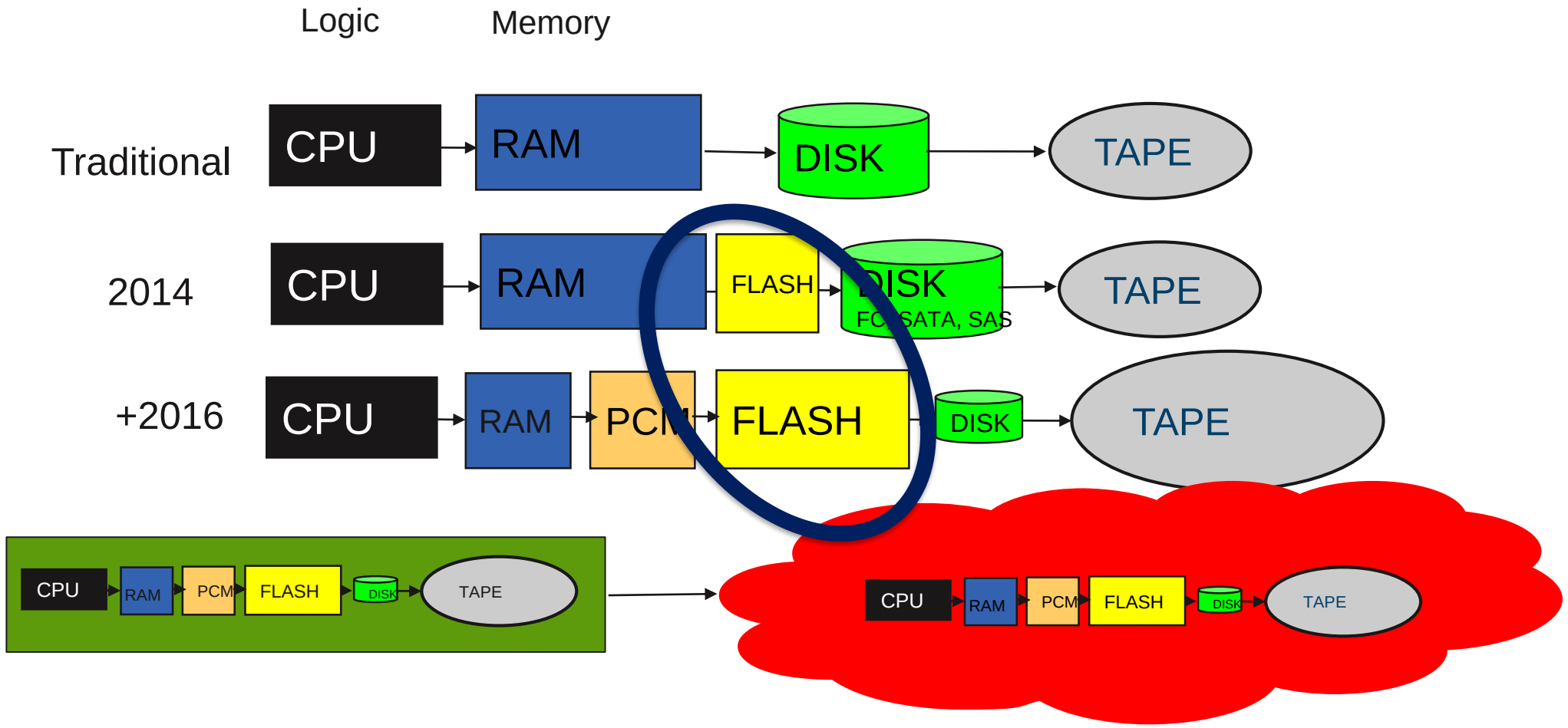
2015: IBM-FujiFilm demonstration of 123 Gb/in^2 on BaFe tape

2017: IBM-Sony demonstration of 201 Gb/in^2 on Sputtered Tape

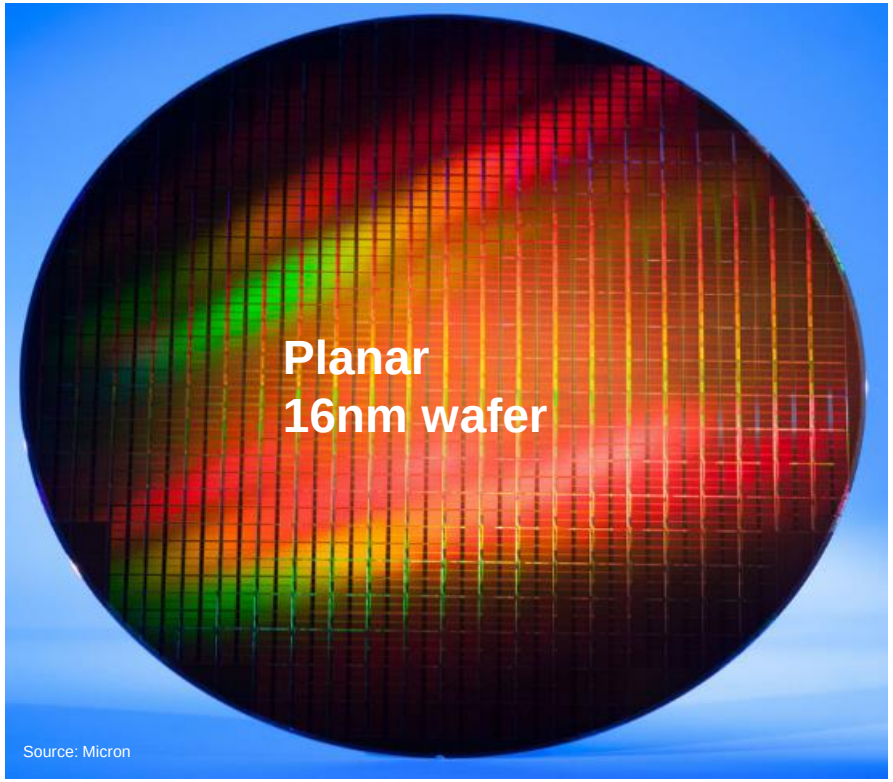


It appears that tape will maintain its 5x to 10x cost advantage over other storage technologies for at least another decade.

Evolution of the Storage and Memory Hierarchy



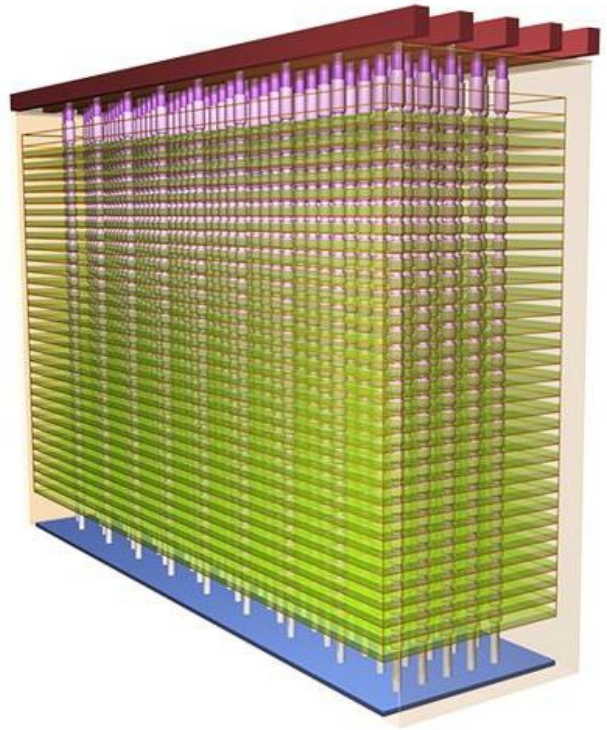
3D NAND Flash – next generation of Flash



Larger cells, higher endurance, MLC ok to use in 'healthy' 19~20 nm lithography

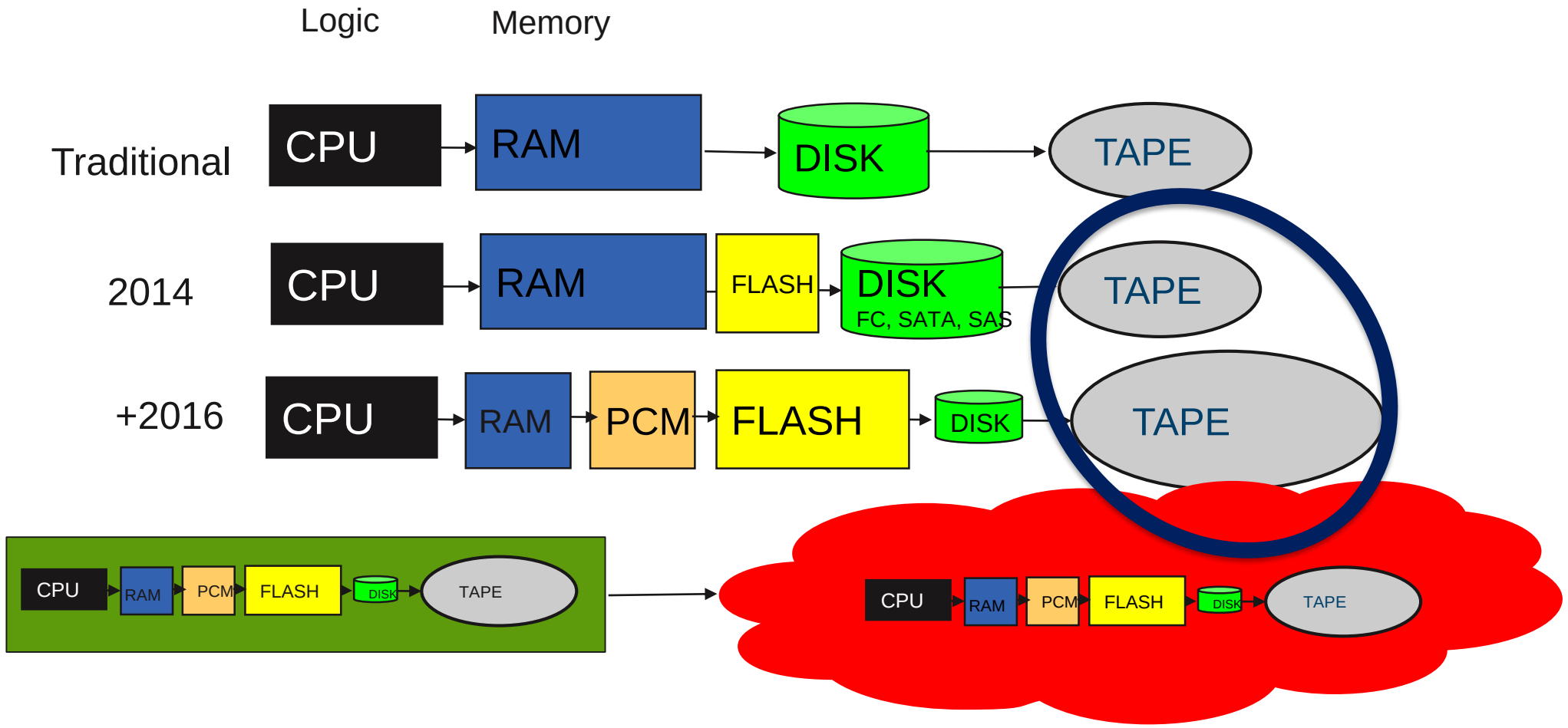
Capacity potential is going through the roof!

- Micron has its 384Gib 3DTLC now (sampling) – 48GiB
  - 8 Die Stacks means 384GiB
  - They also have 16 die stacks – that is 768GB
  - They will be offering 64 die stacks – that is 3TB in a package
- Micron goes from 32 to 48 Layers in a year
  - Then each die has 512Gib – 512GiB in ODS, 1TiB in 16DS, 4TiB in 64 die stacks
- Micron goes from 48 to 64 Layers in two years
  - Then each die has 768Gib – 768GiB in ODS, 1.5TiB in 16DS, 6TiB in 64 dies stack
- Micron adds QLC by end of 2018



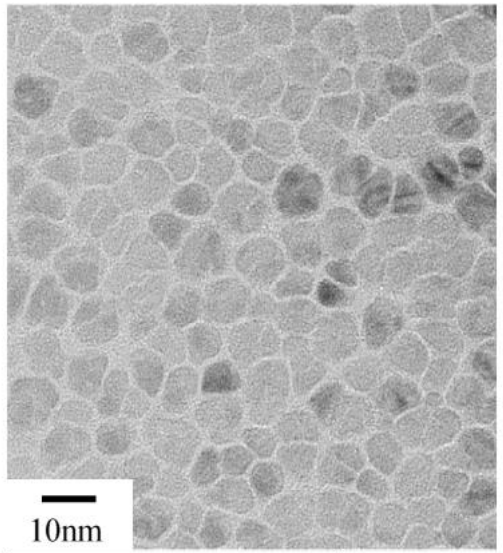
Micron will keep interface similar, so moving Flashcore from one node to another is straightforward!

Evolution of the Storage and Memory Hierarchy



World Première: Tape-based storage demonstration of 201 Gb/in2 (August 2017)

Advanced Perpendicular Sputtered Metal medium developed by Sony



Average grain size:
6.6 nm, σ = 1.2 nm

Areal recording density : 201 Gb/in^2

20x TS1155 areal density

→ 330 TB cartridge capacity (*)

2015 Storage Bit Cells and Extendibility

- Scaled bit cells:
- Magnified 25x:

NAND Flash (3 bits)
17.3 nm x 17.3 nm
2150 Gb/in²

HDD
47 nm x 13 nm
1000 Gb/in²

Optical blu ray (3 layer)
~114 nm x 79 nm
75 Gb/in²

LTO6 Tape
4750 nm x 65 nm
~2 Gb/in²

Jag5 Tape
2210 nm x 49 nm
~6 Gb/in²

Demo
140 nm x 37 nm
123 Gb/in²

→Tremendous potential for future scaling of tape track density
→Key technologies: improved track follow servo control
improved media, reader, data channel

Summary

Thank you for your attention

IBM