IBM Cloud Object Storage
Technical Overview

Less Complex, More Reliable
Why Object Storage?
Today, data is your business
How you manage and store it is critical

- The digital transformation of consumers and businesses continues
- Exponential data growth (44 zettabytes in 2020 by IDC)
- Organizations are finding it difficult to store, manage, and provide value data
- Object based storage solves the problems of scale, management and costs and is ready to work with unstructured data

44 zettabytes in 2020
80% unstructured data
Why do we need Object Storage?

• Files/Objects 1000x larger
  – HD video and imaging
  – Big data repositories
  – Backup files

• Large and growing storage
  – 60%+ annual growth
  – Petabytes to exabytes+

• Legacy storage doesn’t work
  – Architectures can’t scale
  – Replication drives $$$$ 

Web-scale requires new storage architecture
Leading the way in secondary storage

Grow to massive scale
IBM Cloud Object Storage

Start small

Start small

Grow to high performance
IBM delivers a market leading private cloud platform for object storage.

<table>
<thead>
<tr>
<th>70%</th>
<th>15</th>
<th>100%</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Cost of Ownership(^1)</td>
<td>Nines reliability(^2)</td>
<td>Uptime</td>
<td>Nines availability(^2)</td>
</tr>
<tr>
<td>Save on CAPEX and OPEX costs.</td>
<td>More reliable than tape and with every 10,000 objects, one may be lost every 10 million years or more</td>
<td>Always on even during upgrades or component or site failure.</td>
<td>Less than a blink of an eye every year (0.3 second per year).</td>
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</table>

\(^1\)IBM Cloud Object Storage on-prem solution delivers >70% lower TCO than traditional on-premise storage. Source: Forrester Total Economic Impact Study, 2015. IBM Cloud

\(^2\)Numbers shown for availability and reliability are for deployments greater than three sites and require specific supported configurations.
How does IBM Cloud Object Storage work and what differentiates it?
IBM Cloud Object Storage:

a massively scalable, simple to manage storage technology that uses logical constructs to store data as discrete objects in a flat address space instead of the hierarchical, directory-based file systems that traditional SAN and NAS systems use.

- Designed for unstructured data
- Massively scalable, using a flat address space
- A virtual pool of storage with distributed access
- Provides very high data durability, integrity and availability

Common Uses: archive, back-up, large content repository for video/images, born-on-cloud social and mobile workloads, advanced analytics, IoT and cognitive app workloads.

<table>
<thead>
<tr>
<th>FILE STORAGE</th>
<th>OBJECT STORAGE</th>
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<tbody>
<tr>
<td>• Stores millions of files</td>
<td>• Stores hundreds of billions of objects</td>
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<tr>
<td>• File system hierarchy</td>
<td>• One storage pool, Object IDs</td>
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<td>• Complex to scale</td>
<td>• Scales uniformly</td>
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<tr>
<td>• TCO increases exponentially</td>
<td>• Lowest TCO</td>
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</table>
Background

Software Company
• Founded in 2004 in Chicago
• Shipping product since 2008

Software Defined Object Storage
• Over 125 people dedicated to software development

Runs on Industry Standard x86
• Certified platforms to provide enterprise grade experience, predictable performance and support

Notable Milestones

Over 500 Patents Awarded

#1 in Critical Capabilities March ‘16

Multiple Exabytes in Production

Acquired by IBM 2015
Efficiency with IBM Cloud Object Storage

How to build a highly reliable storage system for 1 Petabyte of usable data?

RAID 6 + Replication

- Original 1.20 PB Raw
- Onsite mirror 1.20 PB Raw
- Remote copy 1.20 PB Raw

IBM Cloud Object Storage

- Usable Storage: 1 PB
- Raw Storage: 3.6 PB

- 900 4TB Disks
- 3.6x Racks Required
- 3.6x Floor Space
- 3 FTE Ops Staffing
- Extra Software: None

- Replication/backup

70% + TCO Savings
How Does IBM Cloud Object Storage Work?

**Simple Object**
Object name, ID managed by application

**S3 Compatible**
Object name, ID managed by dsNet

**Swift Compatible**
Object name, ID managed by dsNet

**Hadoop (HDFS)**
HDFS metadata managed by dsNet

**GPFS**
Spectrum Scale
Compliance Enabled Vaults (CEV):
Locking down objects for compliance (Nov 2017)

Compliance enabled vaults (CEV)

Determine how long to keep - specific period, forever or extended (legal hold)

- Easy to create
- Easy to access
- Impossible to delete or modify

Create Vault
Set retention periods
GUI or REST interface

PUT Object
S3 interface

GET Object
S3 interface

PUT Object retention
Rest interface

REST interface

Data Retention Durations

Default Duration: 2 Years 730
Minimum Duration: 1 Years 365
Maximum Duration: 20 Years 7,305

Create Vault

Protect data from deletion or modification as required to comply with regulations like SEC 17a-4(f)(2)(ii)(A)
Deployment Options – Traditional on Premise

**Single Site**

- **Site A**
- **Site B**
- Most efficient storage for customers who do not need site tolerance

**Two Site**

- **Site A**
- **Site B**
- Mirroring for customers who require a more traditional deployment

**Geo Dispersed**

- **Site A**
- **Site B**
- **Site C**
- Best mix of efficiency and availability providing site tolerance

- Most Cleversafe customers are deployed in three or more sites
How are customers using IBM COS
IBM COS Use Cases

Data Governance
• Encryption
• Geo Dispersed
• Data retention
• Legal Holds
• Backup-free

Archive
• File /NAS reduction/Remote Office File Services (Panzura, Ctera, Nasuni)
• SharePoint (Content Collector)
• Log files (i.e. IBM Qradar, Splunk)
• Voice/Call Center (i.e NICE, Verint)
• Video (i.e. Drone)
• Images (i.e. Filenet, Symantec, Opentext, Ctera)

Backup
• Secure, Private Cloud – Simplify backup environment and reduce B/U costs while meeting demands of scale and providing improved performance
  • Leverage joint solution with Tributary Systems (Storage Director) to deliver reliable, high performance backup solution
  • Reduce or eliminate Tape
  • Reduce or eliminate expensive dedup disk appliances (i.e. Data Domain)
Reduce File/NAS Costs leveraging S3 Compatible File Gateway

**Benefits**

- Immediately free up NAS capacity
- Delay costly capacity expansions
- Reduce Tier 1 NAS costs by 50% or more
- Reduce backup costs by tiering data to self protected ICOS platform
- Reduce backup times by 60%
- Transparent to users, both when data is archived and when retrieved
- Ease of scale to +Exabytes in one infrastructure – Add I/O or capacity independent of one another

**NAS/File Challenges**

- High cost of backups
- Limited performance/scale of NFS/CIFS
- Manage silos of storage
Success Story – Large Communications/Telecom Company

Need:
• Reduce storage and backup costs.
• The client was also facing increasing costs due to data replication, and rising operational support costs due to difficulty managing and expanding the current infrastructure.
• Need to find a replacement solution that would provide a better ROI and allow them to stay competitive.

Solution / Offering:
• IBM Cloud Object Storage software
• IBM Spectrum Scale

Benefit:
• By using geo-dispersed erasure coding, Verizon is able to reduce its physical storage, replication and data center costs by more than 15%-35%, while increasing data availability and data durability.
• Reduce their backup costs by 20% by tiering inactive data to COS
• Will reduce number of storage platforms they have to support – COS will provide one architecture that can scale to +Exabytes
IBM has partnerships with top alliance partners to help you get started

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<tr>
<th>Enterprise Collaboration</th>
<th>Archive</th>
<th>Backup</th>
<th>Content Repository</th>
<th>Storage As-a-Service</th>
<th>Analytics &amp; Cognitive</th>
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<tr>
<td>• Corporate “Dropbox”</td>
<td>• Email</td>
<td>• Backup to Cloud</td>
<td>• Document Management</td>
<td>• Archive</td>
<td>• Social</td>
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<td>• Mobile, Laptop</td>
<td>• HPC &amp; IRODS</td>
<td>• Public, Private, Hybrid</td>
<td>• Big Data Analytics</td>
<td>• Backup</td>
<td>• Mobile</td>
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<tr>
<td>• Server File Services</td>
<td>• File</td>
<td>• Tape Replacement</td>
<td>• Music/Call Center</td>
<td>• Content Repository</td>
<td>• IoT</td>
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<td>• Remote Office File Services</td>
<td>• HSM/ILM</td>
<td>• NAS Replacement</td>
<td>• Video</td>
<td>• Enterprise Collaboration</td>
<td>• Cloud applications</td>
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<tr>
<td>• Content Distribution</td>
<td>• Call Center</td>
<td>• Remote Office Backup</td>
<td>• Machine Generated Data</td>
<td>• Other Cloud Applications</td>
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<td>• File Collaboration</td>
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<td>Cloud DVR</td>
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IBM is the Clear Market Leader for Object Storage

**Gartner: Critical Capabilities for Object Storage, March 2017**

### #1 Overall
- IBM Cleversafe divested

### #1 Archiving
- IBM Cleversafe
- IBM Enterprise Storage
- Hitachi Data Systems

### #1 Analytics
- IBM Cleversafe
- IBM Enterprise Storage
- Hitachi Data Systems

### #1 Cloud Storage
- IBM Cleversafe
- IBM Enterprise Storage
- Hitachi Data Systems

### #1 Capabilities and Strategy

“IBM makes Cleversafe acquisition, swallows object storage market”

Dec. 2017

“Cleversafe’s acquisition by IBM bears watching, because this could affect future development for enterprise customers.” *Gartner*

“Cleversafe dsNet is cited for its scalability and ease of management. The management interface contains features offered in functional tabs that enhance productivity.” *Gartner*
IBM Cloud Object Storage: designed for the web-scale world

#1 Scale Leader
- Multiple customers with over 100 petabytes
- Scales to exabytes+
- Exabytes protected

#1 Security Leader
- Zero-touch carrier-grade security and built-in encryption

#1 Manageability Leader
- Oversee 20x more data per administrator with single pane of glass

#1 Availability Leader
- 99.9999999% or better
- Always On
- High Reliability

#1 Economics Leader
- Zero replication
- Commodity Servers
- Reducing storage costs by 80% or more.

#1 Innovation Leader
- Over 500 patents
- Market share leader
- 225+ Developers
Thank You!
Who’s using IBM Cloud Object Storage?

Service Providers

Media and Entertainment

Life Science, FinServices, Retail

Federal

Shutterfly
COMCAST
KDDI
Hightail
photobox
g
zenfolio
Intuit
ERICSSON
SOLIDSTATE
CHARTER
AppNexus
COS3
CORUS360
BIRCH
Illini Cloud
dataTility
private.me
The Bunker
Solid State Solutions
Midcontinent
MDSI
Basecamp
Ultra Secure
Source It Solve It Support It
redbee
Turner
Hogarth
TBWA
EMBL-EBI
ICR
Birck
EMBL-EBI
AMGEN
Clear Capital
AUTODESK
Broward Health
The Future
Chicago Medicine
Citi
RBC
Royal Bank
Lockheed Martin
Optum
BNP Paribas
Northrop Grumman
General Dynamics
IQT
NIST
MITRE
Future
global Eagle Entertainment
Interpublic Group
Global Eagle Entertainment