New Fresh Storage Approach for New IT Challenges

Laurent Denel – Philippe Nicolas
OpenIO
Agenda

- Company profile and background
- Business and Users needs
- OpenIO approach
- Competition
- Conclusion
Project started in 2006, Company launched in June 2015
Privately held
27 people
Lille (FR), San Francisco, Montreal, Tokyo
50 millions end-users (Email Storage)
IT Challenges Impact Business

- Explosion of Data Volume
- IT Infrastructure Cost
- Complexity – Silos
The Compute and Storage dilemma

Silos of Independent Compute and Storage resources

Over-provision to keep up with SLA and QoS

Explosion of Costs and Complexity
OpenIO’s Answer

x86 servers + Software-Defined Storage = Hyper Scalable Data Platform

OpenIO transforms a rack of x86 servers into a large storage and compute pool.
OpenIO Democratizes Large Data Platform

Internet Giant have initiated the wave and proven the technology

Google  facebook

Twitter  NETFLIX  Udemy

amazon.com  ebay  airbnb

Same model “On-Premise”
Simple
Elastic
Flexible
Cost effective
On-demand
Data Storage and Compute Platform
OpenIO’s Approach

- Object Storage to scale and store Thousands of PBs of data, Billions of objects
- Open Source and Commodity x86 servers to reduce cost and TCO
- Build Storage with x86 servers and Run applications on same infrastructure
Crush the Stack with OpenIO

Compute + Storage running on same infrastructure
OpenIO Data Storage and Compute Platform

Serve
open standard access methods

Process
any workload applications

Protect
Replication and EC

Store
from 1TB to 1000s PBs

on a Single Platform
Hyber Scalable Storage

- Scale-out by nature with shared-nothing model to aggregate storage capacity from independent x86 servers
- Limitless storage based on open source object storage technology
- Store Thousands of PBs of data and Billions of objects

Store from 1TB to 1000s PBs

Scale in any dimension
High Data Durability

- Data Replication with multiple copies
- Erasure Coding based on Reed-Solomon
- Various topologies from 1 Data Center to Multiple or stretched cluster across geos
Open Data Services to Applications

- Standard Object APIs to leverage natively the platform: OpenIO REST/HTTP, Amazon S3 and OpenStack Swift
Compute Data “locally”

- Move and Run Applications where Data reside
- Consolidate the App Tier and the Storage Tier
- Better applications SLAs with data locality
- Flexible application support with APIs, File-based access or SDKs
- Drastic TCO Reduction

Run Application directly on storage nodes
Logical Architecture

- Applications servers
  - Application
    - Object API
  - Application
    - FUSE
    - Object API
  - Application
    - NFS
    - FUSE
    - Object API

- Data aka Chunk servers
- Meta-Data servers
Meta Directories

- Directories with Indirections
- Track Containers not Objects
- 2 Hops Max. to reach any Object
- Multi-Tenancy at the Account level
- Flat structure at the Container level

grid://namespace/account/container/object
Grid of nodes

- No Consistent Hashing – No Key Space to update – Never Rebalance
- Transparent Elasticity – No Impact on production
- Immediate availability of new nodes for storage and compute

Scaling by adding nodes
Conscience

- Real-time load balancing for optimal data placement
- Collects metrics from the services of each node
- Computes a score for each service
- Distributes scores to every nodes and clients
- On the fly best match making for each request

The score is computed with a configurable formula usually based on: capacity, io performance, CPU
Grid for Apps – Data Access

- Data usage at the heart of the datacenter
- A data processing framework integrated inside OpenIO’s Grid
- Scale-out application back-ends can be built on the storage platform itself
- Avoid wasted resources and simplify load balancing for storage and processing

- Optimized native Object APIs
  - OpenIO, Amazon S3, OpenStack Swift
  - C, Python, Java, Go

- Specific Application Connectors / Editions
  - Email, Video/Media and Enterprise Storage

- Command Line Interface
- SDK Soon
Easy Deployment and Management

- Full Operational Control
- Ubiquitous Management via Web GUI
- CLI available
Editions and Pricing Model

- **Software**
  - Core $0
  - Editions $30k/Edition/Year

- **Support**
  - Standard $0.08/actual GB/Yr
  - Premium Support $60k/Yr
  - Platinum $150k/Yr (premium support + All Editions)
Use Cases & Customers’ Stories

- Email Storage
- Storage-as-a-Service
- Media Content Processing & Delivery
- Compute + Storage Platform
- Long-term Data Archive
What you can do in 5 minutes

Drink an espresso

Stretch your body

Deploy* an OpenIO cluster

* https://github.com/open-io/oio-sds
## Competition with Object Storage Solutions

<table>
<thead>
<tr>
<th></th>
<th>Open Source Object Storage</th>
<th>Commercial Object Storage</th>
<th>OpenIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW Agnostic</td>
<td>Mostly</td>
<td>Mostly if SW, Absolutely not if Appliance</td>
<td>Any mixed HW</td>
</tr>
<tr>
<td>Open Source</td>
<td>Yes</td>
<td>No by definition</td>
<td>Yes</td>
</tr>
<tr>
<td>TCO</td>
<td>$</td>
<td>$$$</td>
<td>$</td>
</tr>
<tr>
<td>Scalability</td>
<td>Webscale</td>
<td>Webscale</td>
<td>Webscale</td>
</tr>
<tr>
<td>Compute + Storage</td>
<td>No just Storage</td>
<td>No just Storage</td>
<td>Yes (Grid for Apps)</td>
</tr>
<tr>
<td>Data Access Methods</td>
<td>Objects APIs, Block GW</td>
<td>Objects APIs, some offer file access or partner w/ GW vendor</td>
<td>Objects APIs, File sharing protocols and Editions (Mail, Video...)</td>
</tr>
<tr>
<td>Data Protection</td>
<td>Replication and EC</td>
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## Competition with Data Center Platforms

<table>
<thead>
<tr>
<th></th>
<th>Object Storage</th>
<th>Big Data Hadoop</th>
<th>Hyper-Converged</th>
<th>OpenIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW Agnostic</td>
<td>Mostly</td>
<td>Mostly</td>
<td>Appliance based, HW restrictions</td>
<td>Any mixed HW</td>
</tr>
<tr>
<td>Compute + Storage</td>
<td>Storage only</td>
<td>Yes but dedicated</td>
<td>Yes but limited</td>
<td>Yes (Grid for Apps)</td>
</tr>
<tr>
<td>Open Source</td>
<td>Only 4: OpenIO, Minio, Ceph and Swift</td>
<td>Yes</td>
<td>Mostly Commercial</td>
<td>Yes</td>
</tr>
<tr>
<td>TCO</td>
<td>$$</td>
<td>$$</td>
<td>$$$</td>
<td>$</td>
</tr>
<tr>
<td>Webscale</td>
<td>Yes</td>
<td>Yes at Internet giant sites</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
OpenIO Key Takeaways

- Open Source SW
- HW Agnostic
- Distributed
- No Rebalance
- Conscience
- Grid for Apps
- Webscale
CRUSH
THE STACK

More info on openio.io
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