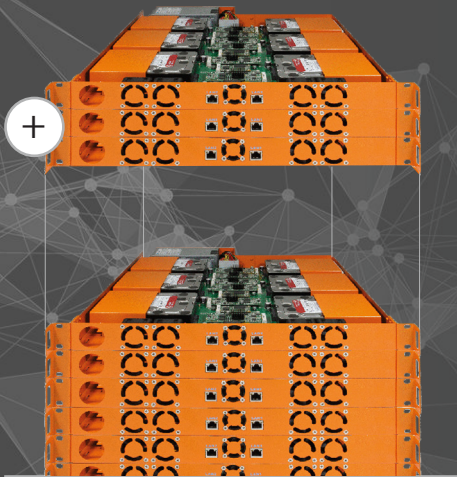# The SwARM, the next generation Enterprise Object Storage Solution

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The Swarm Module is a ready out-of-the-box object storage solution and the first ARM® based storage. This Cost-effective data management tool can expand endlessly by adding Space Expansions. The Swarm Module starts with 84 nodes and by adding and one or more Swarm Expansion it adds both microservers and storage units to increase capacity and performance linearly. Integrates seamlessly with cloud-ready clients thanks to S3 APIs protocol and simplifies data sharing via HTTPS. Complete with all hardware and software components, setup, support and maintenance.

Lowest TCO
Reduced energy consumption, optimized purchasing costs and **no maintenance** fees

Limitless
Unlimited and **linear** scale-out in terms of **capacity**, performance and costs

Fully Managed Solution
Expert support and **maintenance** managing all aspects of your storage service

Sustainable
1/3 of the energy consumption vs. traditional storage solutions, each TB stored **lowers carbon** footprint by 75kg of CO_2 per year

Solution highlights

Fully managed solution

- No single point of failure
- **S3 Native**
- Unlimited scalability: simply add Space Expansions
- SwARM buffer to support self-healing and Zero Touch Maintenance
- **High-Resiliency** and High durability
- Reduced TCO thanks to low energy consumption and efficient **ARM® micro-servers**

SwARM File System

- **Independently heals**, orchestrate and **migrates data**, safeguarding data consistency
- **Distributed architecture** ensures servers operate in **parallel** for enhanced **consistency**, **availability**, and **reliability**

The Challenge

Finding enterprise data storage solution can be **costly and complex**, especially when unsure of how much space is needed. Companies are in constant research for **scalable and trustworthy solutions** that meets the budget and can easily scale to follow their growth.
Traditional on-premise solutions are **complex to maintain** and **show limitation** when is required to extend the capacity. Hardware and software **upgrades and** maintenance **are costly,** combined with support fees push operation expenses considerably.

Our Solution

The SwARM created the **world's first, energy-efficient ARM® micro-servers** to improve substantially the **efficiency of traditional onsite data storage**.
The Swarm Module is made up of many **resilient microservers**, that work in union to store data.
The module has **unlimited scalability** as it has the ability to grow **linearly** in terms of **capacity, bandwidth**: It easily expands by adding SwARM Expansion kits without downtime and maintaining the same cost/GB.

€ Lowest TCO

Innovative design reduces the Total Cost of Ownership by **optimizing** each single **component** at every stage ofthe life cycle. **Low upfront** cost through the use of innovative hardware design, which contributes to significantly reduce energy consuptions and a zero touch architecture that bring to zero maintenance costs.

Scalability

Each node contains a **server** and a **storage** unit; therefore, **capacity** and **performance** grow hand in hand.
The SwARM file system grows or shrinks in size automatically, without loss of performance or any intervention. The architecture starts at 168 TB capacity and can **grow granularly**.

Zero Touch Solution

Setup, **Maintenance** and **proactive monitoring** are included in the solution. This results in no need to invest time and effort to manage the infrastructure. Once installed in your **datacenter**, it is running and storing data. Maintenance is kept to a minimum thanks to hot-swap SW Update process as well as the embedded SwARM buffer that together guarantee 24/7 operation.

Sustainable

Smart and **simple** Swarm Module's design offers greater energy optimization, reducing operating cost. The simple, **energy efficient ARM® CPU's** consume **a fraction of the energy** that a traditional CPU utilizes resulting in a -66% energy saving overall. Each TB stored with the Space Rack reduces **carbon footprint** by 75kg of CO_2 per year.

Storage Specifications	Raw Capacity	Net Capacity		Maximum size of single object	Availability
		6:7 erasure 🛡 99.999%	6:14 erasure 🛡 99.999999999%		
Module 14U2	168 TB	128 TB	64 TB	Full module capacity	24/7
Module 14U4	336 TB	257 TB	128 TB		
Module 14U8	672 TB	513 TB	257 TB		

🛡 = data durability

Server Specifications

Number of servers	84 SwARM microservers
Number of cores	84 cores @ 1 GHz
Number of instructions	252.000 DMIPS (Dhrystone Million Instructions Per Second)
Connectivity	Up to 40 Gbit /s (4x10Gbit/s) - via Access Hub

Environmental Characteristics

Form Factor	14 ½ U standard chassis
Size	560 mm height x 450 mm width x 500 mm depth
Weight	100 kg
Power supply	14 x IEC 60320 - C13/C14
Power consumption – max	1.12 kW
Temperature range	15° to 35°C
Humidity	8% to 90% (non-condensing)
Carbon footprint	0,0008 Metric Tons, 2W per net TB

Scalability	Expansion Raw Capacity	Expansion Net Capacity		Server Specifications
		6:7 erasure 🛡 99,999%	6:14 erasure 🛡 99,999999999%	
Expansion 1U2	12 TB	9 TB	5 TB	6 CyOne microservers, 6 cores @ 1 GHz, 18.000 DMIPS
Expansion 1U4	24 TB	18 TB	9 TB	
Expansion 1U8	48 TB	37 TB	18 TB	

🛡 = data durability

Integration tools

Protocol	HTTPS S3 RESTful APIs; Virtual Block Storage gateway (SMB/CIFS, NFS)
Development tools	Optimized SDKs in C++, C#, Java, Javascript, Python, Ruby with examples
Encryption	End-to-end encryption AES-256bit

Services included

Software licencing	60 months licence, Including rolling updates
Software support	60 months of software support and maintenance
Hardware	60 months of hardware warranty and proactive remote monitoring

Cloud Backup Archiving Disaster Recovery Multimedia IOT and Big Data

USE CASES

RESTful API

SMB NFS

SDK

S3

[OBJ] [BLOCK] [DEV]

ACCESS PROTOCOLS

SWARM FILE SYSTEM

ARM® MICROSERVER
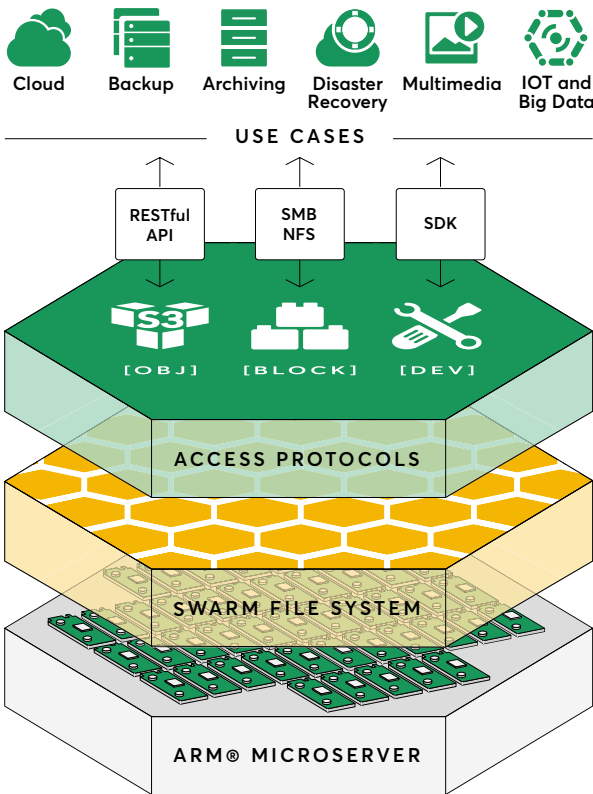
Key Use Cases

The SwARM's Space Rack is versatile and is used for a variety of application workloads within any performance model.
Use cases include:

- **Archiving** - tiering, fileservers and legal conservation.

- **Backup** - data repositories, snapshots, databases, virtual machines.

- **Multimedia** - video surveillance footage, images, on-demand music streaming service.

- **Cloud App** - sync and share, mobile applications, content distribution

- **IoT and Big Data** - log management Big Data Platform and sensors' data collection.

- **Disaster recovery**

Application flexibility

The SwARM software-defined storage supports HTTPS S3 RESTful APIs (de-facto industry standard for cloud storage), **making any cloud-ready application compatible**. The solution also comes with a Virtual Block Storage gateway for file storage access (SMB/CIFS, NFS), software development kits in the key programming languages and multi-tenancy management tool.

Multitenancy Application

The SwARM provides an easy-to-use multitenancy application that allows customers to **create multiple layers end users** making possible the reselling of the storage service. The application provides also monitoring and alarming of actual quotas usage for billing purposes.

Support / Licensing

The storage solution includes a **60 months** of pro-active monitoring, maintenance, software licensing and support including SW rolling updates and installation.

About The SwARM

Cynny Space is an innovative provider of Object Storage systems European based with headquarters in Florence, Italy and live cloud instances in Italy and France. Cynny Space delivers next generation storage solutions based on state of art technology whose mission is to "Empower Data Storage through distributed, energy efficient and synergic innovation". The SwARM product fulfils the vision of the company "To save the world's data in a distributed, sustainable storage".