HPC per IA e BIG DATA

Infrastruttura e tecnologie

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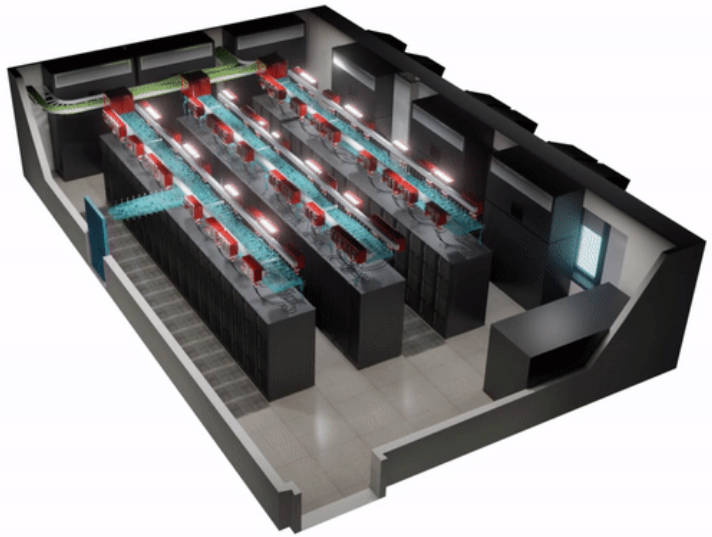
HPC PoC Group

CINECA

CINECA

Consorzio privato a controllo pubblico:

- 3 policlinici universitari
- 9 Enti pubblici di Ricerca
- 67 Atenei
- MIUR



Attività principali:

- Supercalcolo
- Supporto al Miur
- Supporto agli Atenei
- Trasferimento Tecnologico

I nostri numeri:

100M€ volume di affari

19° nella top 500

700 dipendenti

HPC a Bologna,Milano,Roma

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PRACE SHAPE
SME HPC Adoption Programme in Europe

EXCELLERAT

- Supercalcolo per la ricerca
- Supporto alla competitività industriale nazionale
- Visualizzazione per le Digital Humanities

EOSC Digital Innovation Hub

4 EuroHPC

HPC Europa

intel

EUROfusion

arpae agenzia prevenzione ambiente energia emilia-romagna

eni

AXYON.AI

Rai

NVIDIA

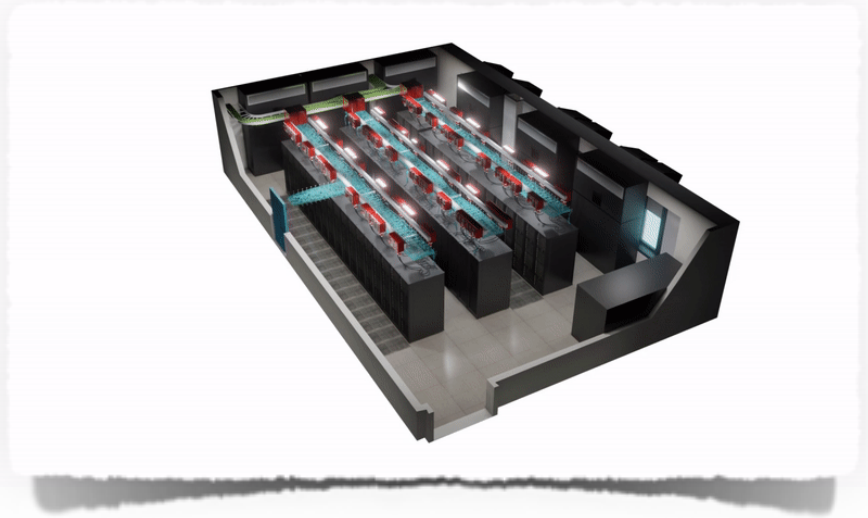
bi-rex Big Data Innovation & Research Excellence

CLUST-ER INNOVATE INNOVAZIONE NEI SERVIZI

Chiesi
People and ideas for innovation in healthcare

CINECA

Necessità di un calcolatore.. ma quale?



Dimensione del problema -> # incognite

10 100 000 > 1 000 000 000

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PRACE

Francia:
Courie

Italia:
Marconi

Svizzera:
Piz Daint

Spagna:
MareNostrum

Germania:
HazelHen,Juqueen,SuperMUC

GALILEO
2000 nodi
Intel BDW 2x18 cores, 2.3 GHz
128 GB RAM/CN
36 nodi
Intel HSW 2x8 cores, 2.4 GHz
2 NVIDIA K80 GPUS
128 GB RAM/CN
Intel Omnipath

Marconi100
980 nodi
IBM POWER 9 2x16 cores (HT 8)
4 NVIDIA Volta V100
256 GB RAM/CN
Mellanox EDR

Marconi
3188 nodi
Intel SKL 2x24 cores, 2.1 GHz
192 GB RAM/CN
Intel Omnipath

MEUCCI
104 nodi
Intel BDW 2x18 cores, 2.3 GHz
128 GB RAM/CN
Ethernet 25 Gbit

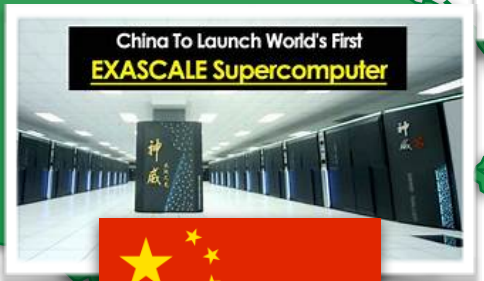
CLOUD HPC
112 nodi
Intel BDW 2x18 cores, 2.3 GHz
128 GB RAM/CN
Ethernet 25 Gbit

Exascale race

2021

2023

2021



2022

1 000 000 000 000 000 000 FLOPS

EuroHPC Joint Undertaking

2023 Exascale system installed (EPI tech)

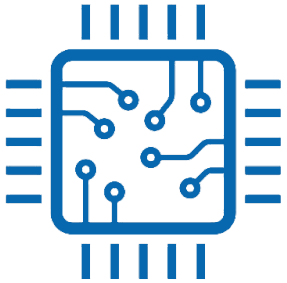
2021 EPI Gen1 for HPC e automotive

2020 Pre-exascale systems (Leonardo in italy)

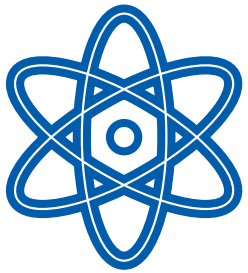
2019 European Processor Initiative calls (EPI)

2018 Joint Undertaking EuroHPC (budget 1B€)

3 pre-exascale machines
5 peta-scale machines



European exascale technologies (EPI)



Centre of Excellence for HPC application

HPC Competence center for Industry

Training and Outreach

- 8MW hot-water DLC
- 2MW Air cooled ~1000 m^2

Booster
3500 nodes
4GPU x node

General Purpose
1000 nodes
High core count

Data Centric
500 nodes
Large mem

Storage
150 PB
1 TB/s

Network
200 Gb/s

HPL 180 PFlops
HPCG 3.3 PFlops

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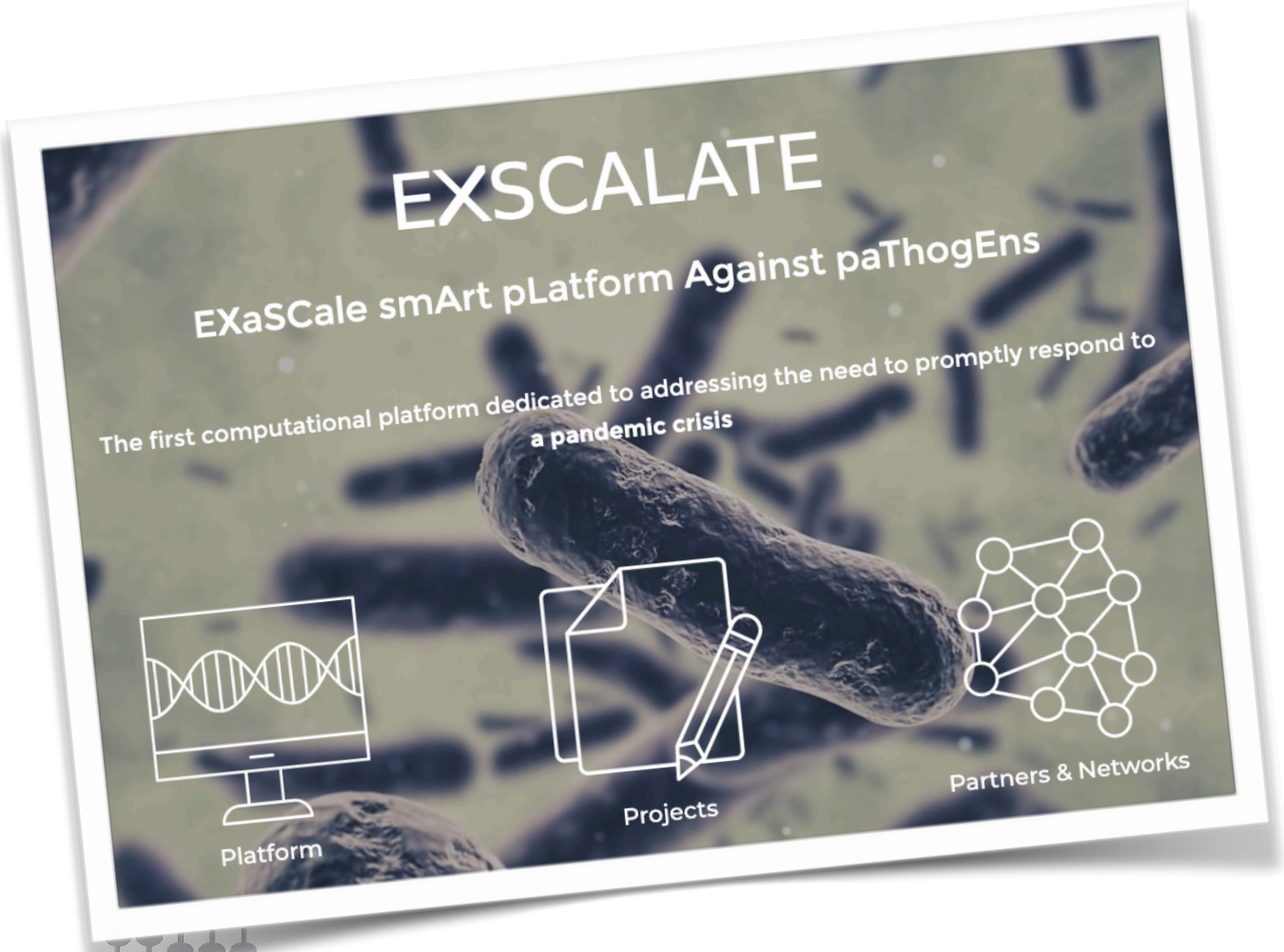
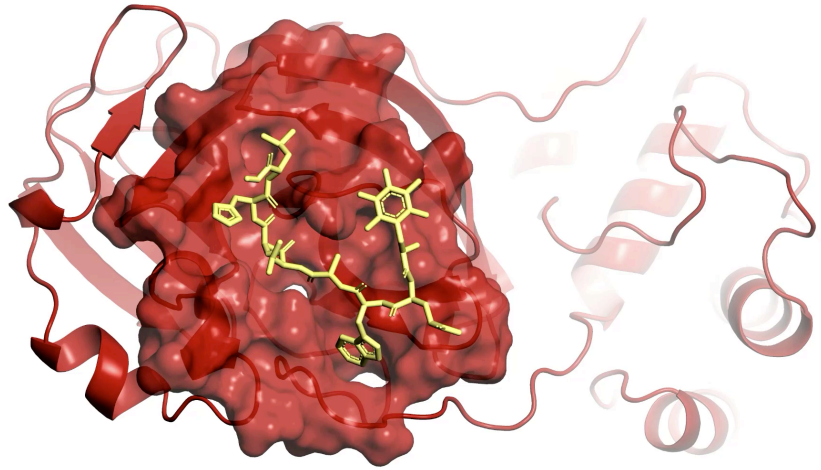
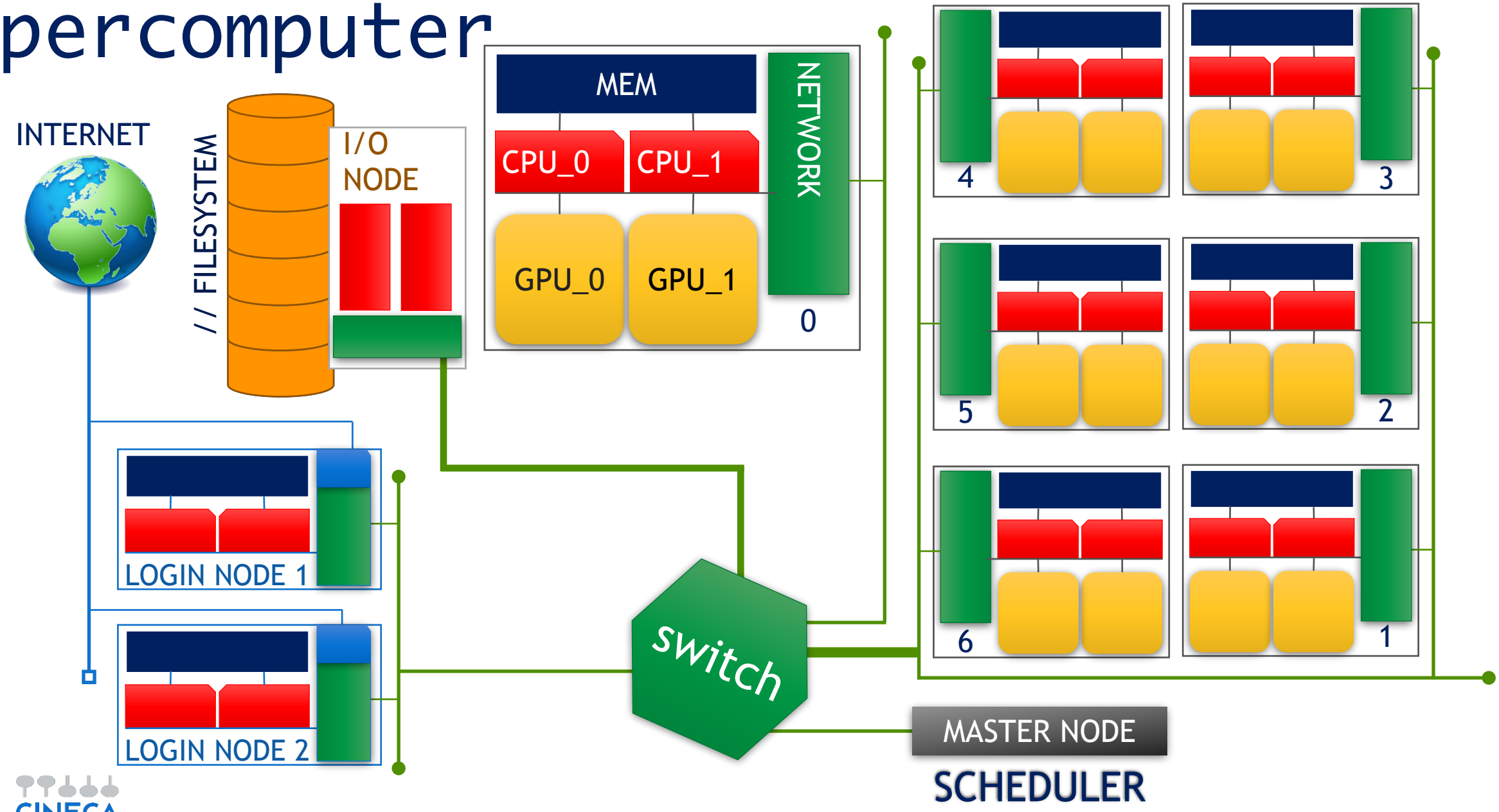
EXSCALATE 4COV

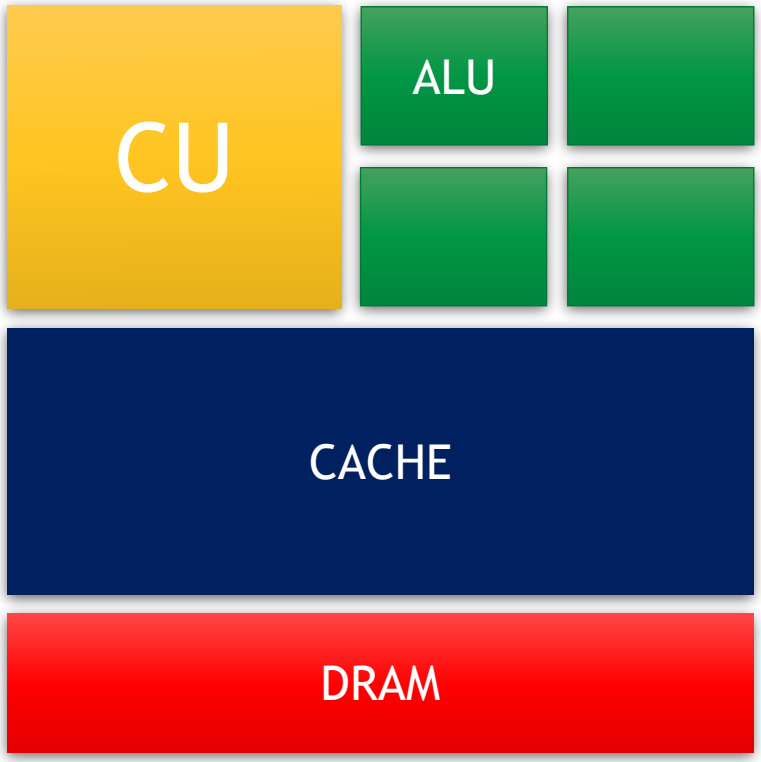


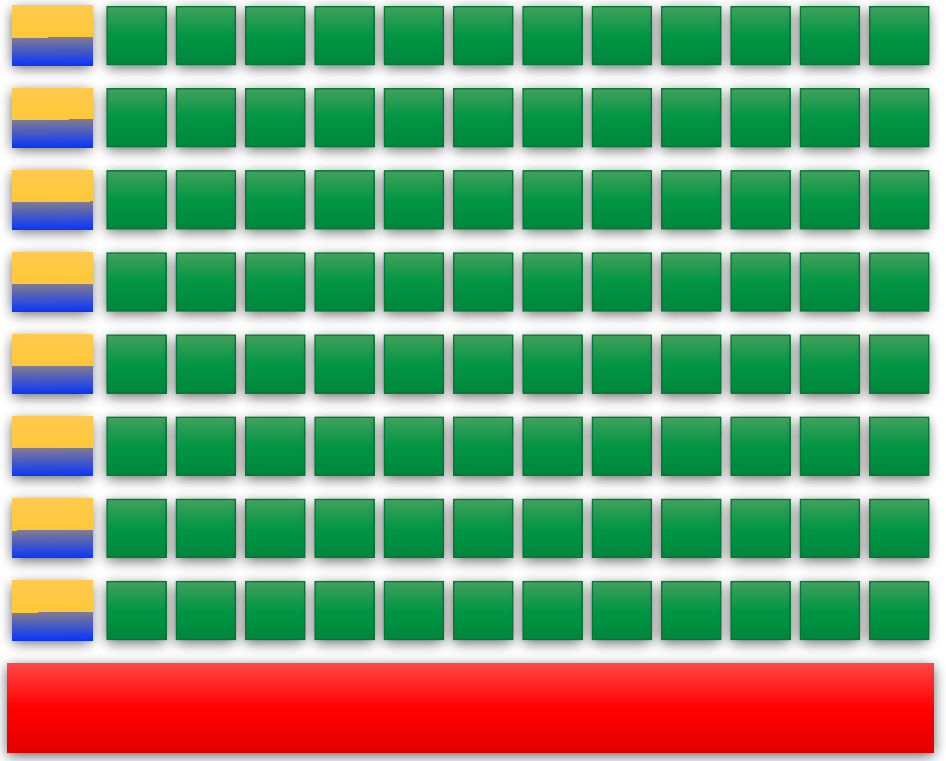


Supercomputer

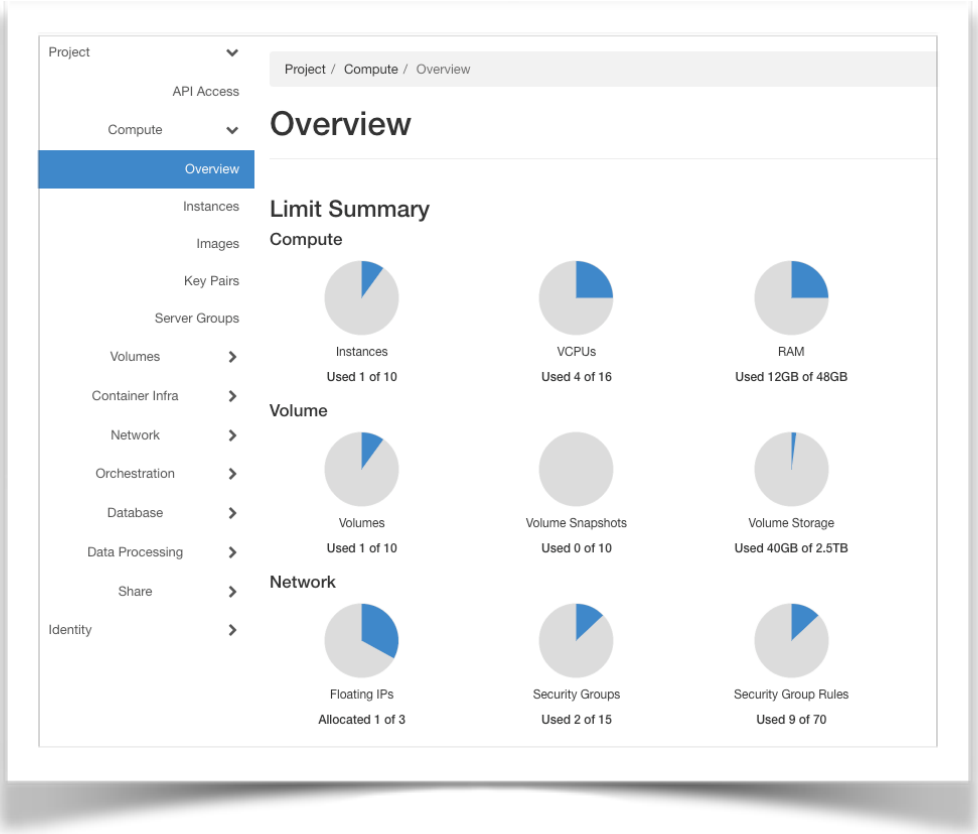


CPU vs GPU





Cloud

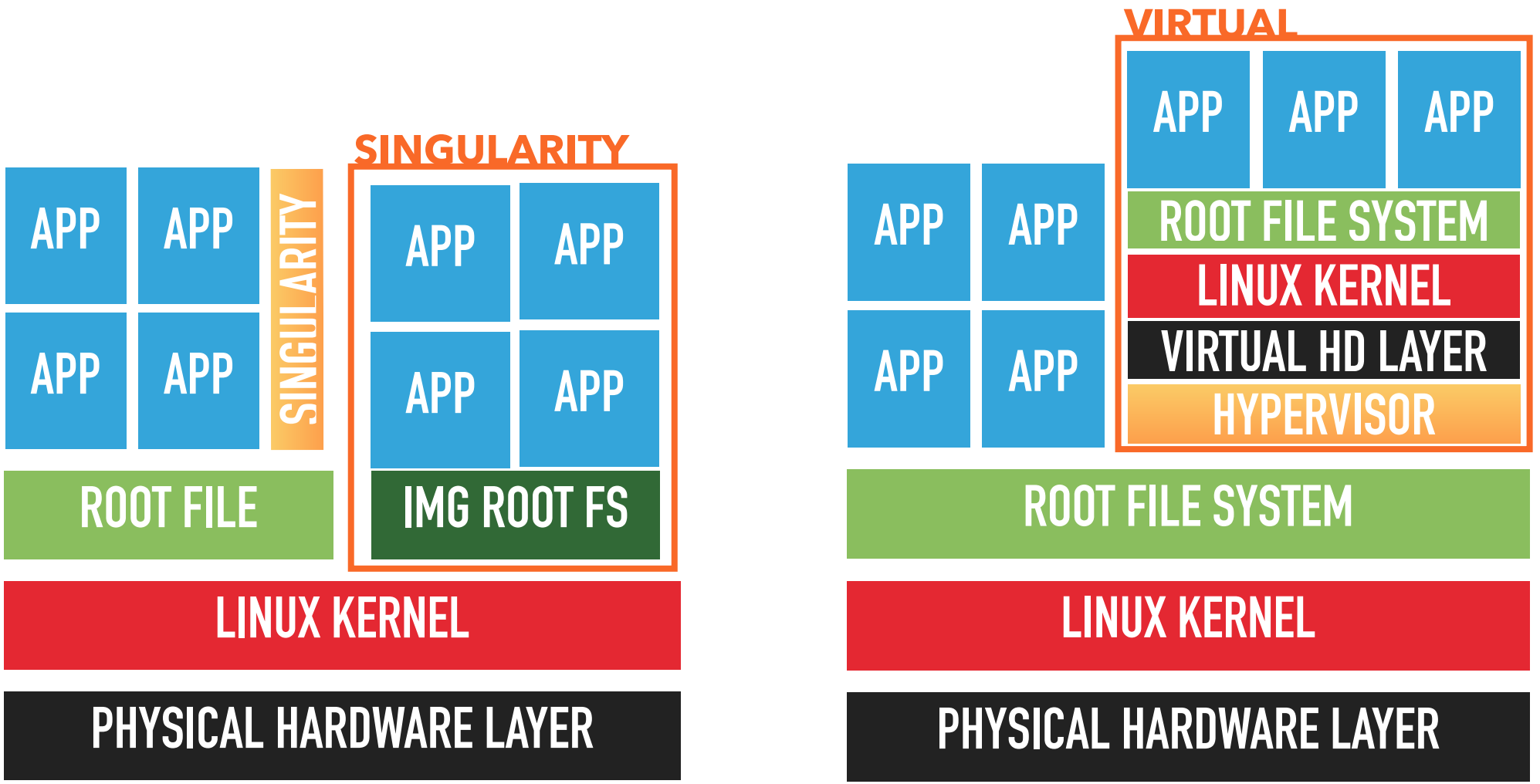


IT	Infrastructure	Platform	Service
APPLICATION	APPLICATION	APPLICATION	APPLICATION
DATA	DATA	DATA	DATA
RUNTIME	RUNTIME	RUNTIME	RUNTIME
MIDDLEWARE	MIDDLEWARE	MIDDLEWARE	MIDDLEWARE
OS	OS	OS	OS
VIRTUALIZATION	VIRTUALIZATION	VIRTUALIZATION	VIRTUALIZATION
SERVERS	SERVERS	SERVERS	SERVERS
STORAGE	STORAGE	STORAGE	STORAGE
NETWORKING	NETWORKING	NETWORKING	NETWORKING

Da gestire Fornito come Servizio

openstack.

Container


SINGULARITY
APP
APP
APP
APP
SINGULARITY
APP
APP
APP
APP
ROOT FILE
IMG ROOT FS
LINUX KERNEL
PHYSICAL HARDWARE LAYER
VIRTUAL
APP
APP
APP
APP
APP
ROOT FILE SYSTEM
LINUX KERNEL
VIRTUAL HD LAYER
HYPERVISOR
ROOT FILE SYSTEM
LINUX KERNEL
PHYSICAL HARDWARE LAYER

Grazie per l'attenzione :-)

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