

Benefits on Arm-based Micro-Server Mars 400

Compare to traditional x86 servers to run SUSE Enterprise Storage (or Ceph), Ambedded Mars 400 Arm-based Microservers owns 5 significant benefits

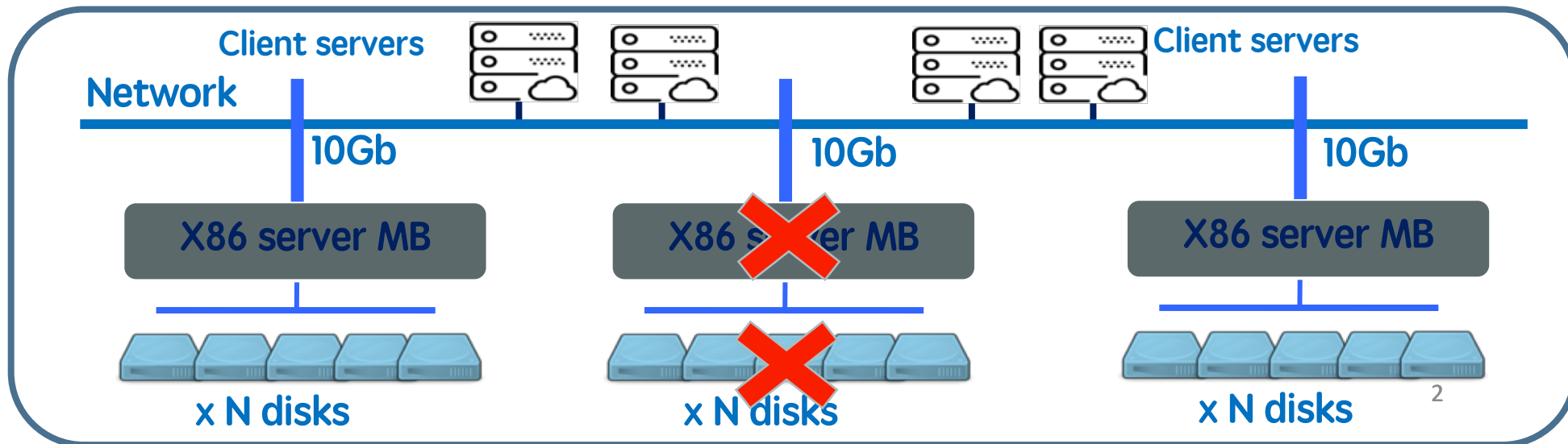
- 1) It offers the smallest failure domain to OSD level compared to the x86 centralized server platforms
- 2) All Ceph daemons own hardware resources to get a balanced workload, resulting in increased cluster performance and stability.
- 3) Customers can use just 3x1U Mars 400 appliances to build a high-availability SUSE Enterprise Storage 6 (Ceph) cluster. This reduces the initial investment of building a SUSE Enterprise Storage 6 cluster with a minimum of 7~8 units x86 servers.
- 4) The Ambedded Mars 400 consumes a maximum of 100 watts of power, saving customers more than 60% of power utility on server compared to the same scale Ceph cluster powered by x86 servers.
- 5) Under the power supply limitation on each rack, Mars 400 can accommodate 1.6 times of OSD compared to general x86 servers.

1. Smallest Failure Domain on Hardware failure

X86 Server

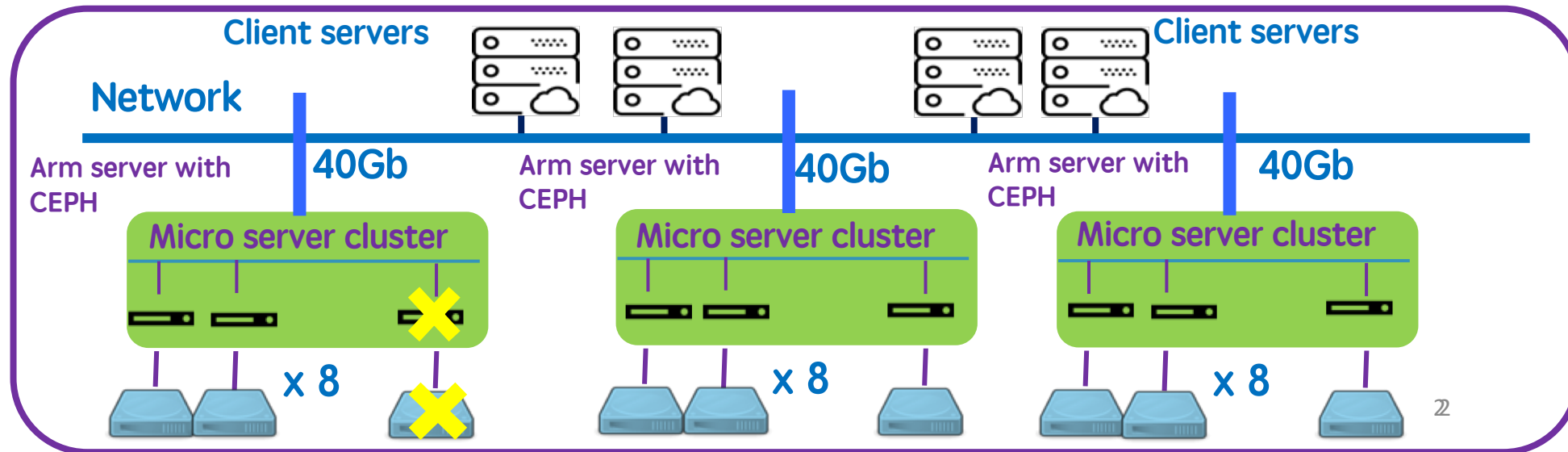
1 Server fails,
Its all drives lost

N is 8, 12 or more



Arm Micro-server Cluster

1 Microserver fails,
1 drive lost



2. Dedicated Resource, Single Task, Single Processor

No NUMA issue comparing to x86 servers



1 vs.1



Single processor, single task

- Dedicated CPU, Memory & LAN for OSD, MON, MDS, RGW
- Workload evenly balanced
- No resource racing
- No need to deal with NUMA
- Result: higher performance than x86 server, perfect function with linear scale out



3. Smallest HA SUSE Enterprise Storage Cluster (3x1U)

Bring Up SUESE
Enterprise Storage 6 in
Smallest Cluster with HA



1x MON

+

7xOSD



1x MON

+

7xOSD



1x MON

+

7xOSD

Data Switches
2x SSE-X3348S



IPMI Switches
2x SSE-G3648B



Admin Node
1x SYS-5019P-DCFN



GW Nodes
2x SYS-5019P-DCFN



Monitor Nodes
5x SYS-5019P-DCFN



Storage Nodes
4x SSG-6029U-DCSO



4. Saving 60% Power Consumption on same Cluster Capacity

60 %
Energy Saving
On a 1PB
CEPH Storage

A frugal solution for
5 Years TCO

Item	x86 Server	Arm Micro Server
Model	3x 1U server 7x 2U/16 server	13x Mars 400
Total Rack height	3x 1U + 7x 2U = 17U	13x 1U = 13U
Total OSD #	100x OSD	100x OSD
HDD/OSD	10TB	10TB
Total Raw TB	1000TB	1000TB
Total Power Consumption on server (Max potential Watts) (x86 server maxi = 430Watts, mars 400 maxi = 100 Watts)	4300	1365
Total Power Consumption on HDD (maximum 8Watts/HDD)	800	800
TOTAL server power consumption	5100	2165
TOTAL COOLING power required	5100	2165
Total power requirement	10200	4330
Annual power expense (0.3 EURO/kWh)	€ 26,806	€ 11,379
5 Years 1 PB Ceph Storage power expense saving		€ 77,132

5. 1.6x Times OSD Density under same Rack Power Limitation

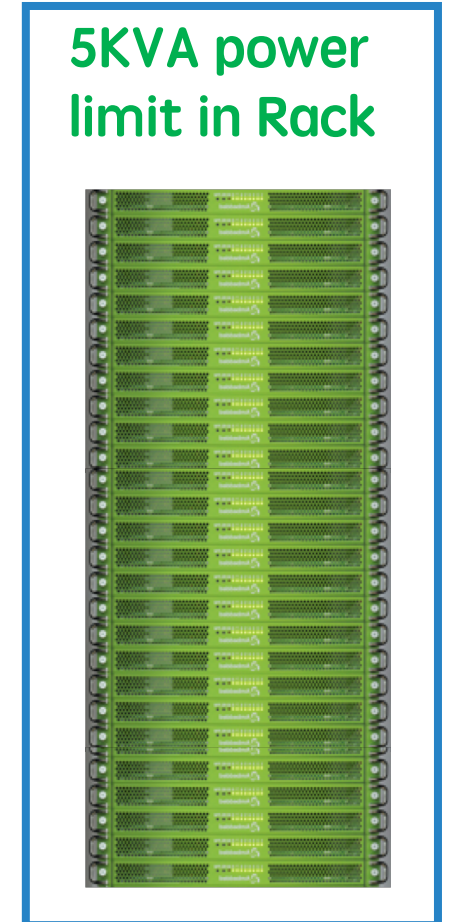
Higher Density in Rack To provide more TB capacity

- Limitation of power supply to a rack: 5KVA
 - ✓ X86 server : 2U/16 : 560W
 - ✓ Arm server (Mars 400): 160W
- 1 Rack can accommodate
 - ✓ X86 server : 9 pcs = 144 OSD
 - ✓ Arm server (Mars 400): 30 pcs =240 OSD

Arm micro server has >1.66 times density



9pcs with 144 OSD



30 pcs with 240 OSD