

Data Guard Basic Datacenter Server Quote

Description of specified server

The spec describes a 5U, dual power supply, dual 6-core processor server with 128GB memory, 4 x 1Gb ethernet ports, 7 fast disks totaling 4.2TB (raw) capacity, and 8 high capacity (3TB) disks totaling 24TB (raw). Estimated power consumption (watts): 236 idle; 433 TDP¹. This equates to 8 systems per 42U rack with 4.4kW power. Disk capacity per rack is 33.6TB for fast storage, and 192TB of high capacity storage. These figures are summarized in Table 1.

Lopoco proposed server

Lopoco's approach is to maximize efficiency for dramatically lower operating costs, and in the process increase average available capacity, density, and reliability. All while decreasing maintenance costs.

We are proposing 2 (or more) LP-6240-10H servers in lieu of the spec'd server, each with the following attributes. A 1U, single power supply, single 6-core processor server with 64GB memory, 2 x 1Gb ethernet ports (+1 IPMI/nKVM port), 4 fast disks totaling 2TB (raw) capacity, 6 high capacity (2TB) disks totaling 12TB (raw). Estimated power consumption (watts) per server is 40 idle; 120 TDP².

In Table 2, we are quoting 2 of these servers v. 1 of the spec'd server, however there is more to consider.

Comparison Analysis

Table 3 shows a side-by-side comparison of the relevant figures for the two approaches.

When provisioning servers for a datacenter, computing resources (CPU, memory, storage, networking) available per square foot, or more precisely, per rack, is an important concern, along with all the other concerns. When utilizing our products combined with our approach, the density will be significantly greater than that achievable with the spec'd server.

35 of Lopoco servers can be configured in a 4.4kW (220V * 20A) rack. Compared to the spec'd server, that amounts to 4x the computing and storage resources per rack. This would allow for vastly greater capacity per the same size datacenter, or conversely, the construction of a significantly smaller datacenter facility.

The overall software and hardware architecture of the datacenter would follow that of modern datacenters such as those utilized by large cloud providers like Google or Amazon. The servers would be grouped together into clusters, and the loss of any one or two machines from that cluster would not result in any service down time, but would result in less available throughput from that cluster until the faulty servers are replaced. Most applications would be run in a virtualized environment spread across

¹ Estimate based on good faith research. Believed to be accurate to within $\pm 10\%$

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the machines in one or more clusters. Specific applications designed for cluster deployment, like Apache, Nginx, Hadoop and various databases, could be configured to run on bare metal. Applications requiring specific operating systems such as Windows or Redhat Linux, would be deployed using a VM architecture where machine instances running the particular OS and application are provisioned and instantiated by the IT staff for the end users.

Using this architecture, no service or resource would be affected by the outage of one machine. Lopoco professional services is available to consult and assist in implementing these modern architectures at the customer's request. In addition, Lopoco can provide prebuilt, preconfigured racks complete with all servers and network switches, cabling, PDUs, and software installation and configuration. When delivered to the datacenter, these racks need only be put in place, bolted to the floor, connected to networking and power, and they can be immediately powered on and placed into production. Contact us for specific pricing and other details.

It is understood that the end customer has specific need for document and file storage with a data protection requirement. File and data replication across server clusters and across datacenters, providing for maximum protection against loss, can be most cost effectively and reliably implemented as another benefit of this architecture.

Large scale deployments such as these put great stress on the ability of IT staff to maintain the computing infrastructure. Since Lopoco servers are not designed to be repaired in the field, our approach is to supply a certain number of unpaid spare machines to be stored on site. In the rare event of a server hardware problem, the IT staff merely pulls the ailing system, scans the bar code, and then scans and installs a replacement system procured from the spares store. FedEx and accounting departments take care of the rest. If the number of on site spares drops below a certain threshold, an alert is sent to management personnel who either ship additional spares or kick off an analysis of the failure rate to determine if there is some mitigating action that needs to be taken.

Note: Lopoco servers come with a separate IPMI/nKVM LAN port. This means that no KVM hardware or adapters are needed. Network KVM provides complete console and power control, including reset and soft power off capabilities (for standard operating systems). This eliminates not only the need for KVM hardware in the rack and USB KVM adapters, but also the need for console carts in the datacenter.

2 Estimate based on in-lab research. Accurate to within $\pm 5\%$

Data Guard Specified Server HP ML350p	
Height	5U
Power supplies	Dual redundant 460W
Processor(s)	2 E5-2620 6 core
Gigabit LAN ports	4
IPMI/nKVM ports	0
Fast storage	7 x 600GB 15K RPM (4.2 TB raw)
Capacity storage	8 x 3TB 7200RPM (24TB raw)
Estimated power consumption (watts)	236 idle; 433 TDP ¹
Servers per rack	8
Power consumption per rack (watts)	1888 idle; 3464 TDP¹
Fast storage per rack	33.6TB
Capacity storage per rack	192TB

Table 1: Data Guard Server

Lopoco Server LP-6240-10H	
Height	1U
Power supplies	1
Processor(s)	1 E5-2630 6 core
Gigabit LAN ports	2
IPMI/nKVM ports	1
Fast storage	4 x 500GB SSD (2.0 TB raw)
Capacity storage	6 x 2TB (12TB raw)
Estimated power consumption (watts)	40 idle; 120 TDP ²
Servers per 4.4 kW rack	35
Power consumption per rack (watts)	1400 idle; 4200 TDP²
Fast storage per rack	70TB
Capacity storage per rack	420TB

Table 2: Lopoco server

Server resource	HP ML350p	2 x LP-6240-10H	Lopoco advantage		
Processors	2	2	-		
Fast storage (raw TB)	4.2	4	-.2 TB		
Capacity storage (raw TB)	24	24	-		
LAN ports	4	4	-		
IPMI/nKVM port	0	2	No KVM adapter needed on Lopoco		
Power consumption (watts)	Idle	TDP	Idle	TDP	65% power reduction
	236	433	80	240	
Servers per 4.4kW rack	8	17.5	> 2x the computing resources per rack		
Power per rack (watts)	1888	3464	1400	4200	Avg. power consumption is ~ 10% over idle
Fast storage per rack (TB)	33.6	70	> 2x		
Capacity storage per rack (TB)	192	420			

Table 3: Side by side comparison of server options



Quote

Item #	Description	Qty	Price	Total
1	Lopoco LP-6240-10H 64GB 1U Server	2	\$7,210.00	\$14,420.00
	Power usage Idle: 40 watts/TDP: 120 watts			
	4 x 512GB Class SSD for high speed storage			
	6 x 2TB Capacity storage			
	Quantity discount 1000 units (includes 28 on site spares)	1000	\$6,489.00	\$6,489,000
	Quantity discount 10,000 units (includes 240 on site spares)	10000	\$5,768.00	\$57,680,000
2	2 year standard warranty	2	\$0.00	\$0.00

