

Improving the Memory Performance of the ProLiant ML110

Summary

As supplied, the ProLiant ML110 (G2, G3 & G4) achieves only *half* the Memory performance compared to that of which it is capable.

Installing matched pairs of DIMMs – *in the correct sockets* – would double the Memory Performance and increase the overall system performance by 10-25%, compared to systems with the current single DIMM.

Improvements to the current documentation would enable Customers and Field Engineers to understand better how to upgrade memory in the correct configuration and achieve an overall increase in system performance.

Background

For background information on the Intel Dual Channel Memory Architecture, please see these documents:

Intel Dual Channel DDR Memory Architecture White Paper

http://www.kingston.com/newtech/MKF_520DDRWhitepaper.pdf

Dual Channel DDR400 memory can balance the performance of the Intel Pentium 4 processor with 800MHz front side bus.

http://www.intel.com/design/chipsets/dual_ddr_sb.pdf

(If this link has problems, search www.intel.com for “DDR400” or email me for a copy)

Personal Experience

In June 2005 I received a ProLiant ML110 G2 with a single factory-fitted 256MB DIMM. I installed a matched pair of PC3200/DDR400 DIMMs - in the correct sockets - and measured the following memory performance improvement:

ProLiant ML110 G2 (Model 382050 / Pentium 4, 3.2GHz)

Single DIMM 2947 MBytes / sec

Dual DIMMs 4664 MBytes / sec

(SiSoft SANDRA benchmark)

The Intel and Kingston documents suggest that this results in a 10-25% improvement in overall system performance.

I did not learn about this possible performance improvement by reading the HP literature as this aspect is currently poorly documented, or by calling the Technical Support line in India.

Recommendations

1. Change Business Support Document for ML110 G2

HP ProLiant ML110 G2 – Configuring the memory

http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?objectID=c00383415&locale=en_US

I suggest that the table of possible memory configurations is changed to show:

Memory	Memory Channels	Total	4	3	2	1
Standard	Single	256MB	Empty	Empty	Empty	256MB
Optional	Dual	512MB	Empty	256MB	Empty	256MB
Optional	Dual	2560MB	1024MB	256MB	1024MB	256MB
Maximum	Dual	4096MB	1024MB	1024MB	1024MB	1024MB

- Dual Channel Memory gives double the Memory Performance
Requires pairs of identical DIMMs to be installed in Slots 1&3 and/or Slots 2&4

2. Change Business Support Document for ML110 G3

HP ProLiant ML110 G3 – Configuring the memory

<http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?objectID=c00448448>

I suggest that the table of possible memory configurations is changed to show:

Memory	Memory Channels	Total	4	3	2	1
Standard	Single	512MB	Empty	Empty	Empty	512MB
Optional	Dual	512MB	Empty	256MB	Empty	256MB
Optional	Dual	1024MB	Empty	512MB	Empty	512MB
Optional	Dual	3072MB	1024MB	512MB	1024MB	512MB
Optional	Dual	4096MB	1024MB	1024MB	1024MB	1024MB
Maximum	Dual	8192MB	2048MB	2048MB	2048MB	2048MB

- Dual Channel Memory gives double the Memory Performance
Requires pairs of identical DIMMs to be installed in Slots 1&3 and/or Slots 2&4

Note that the current on-line Business Support Document for ML110 G3 does not show the factory-fitted Standard memory configuration and this should be verified.

3. Change QuickSpecs

Current QuickSpecs for both G2 & G3 mention “Optional Interleaved Memory”

Change this to read: “**Optional Dual Channel Memory**”

Interleaved memory is a different technique where memory is Written or Read in alternate banks. Dual Channel Memory is Written and Read in parallel.

4. Change the factory-installed DIMMs in the ML110 G3

If the Standard Memory factory-installed in the ML110 G3 is 1 piece of 512MB DIMM then change it to 2 pieces of 256MB DIMM - *in the correct sockets*.

The total Memory offered will stay the same but the performance of the total system will improve 10-25%.

This should be a very low cost change.

5. Change the Installation Sheet for ML110 G3

The Installation Sheet for ML110 G3 should be changed to show more specific instructions for fitting DIMMs - *only in matched pairs*.

The current document is poor in the area of memory installation and needs significant improvement.

The Installation Sheet is the first document that the Customer ever reads and is more important than on-line documents.

6. Check the documentation for other low-end ProLiant systems

Check the documentation for ML110 Storage Server, ML150 and other low-end ProLiant Servers.