Appendix: Cisco Desktop Virtualization Solution for EMC VSPEX with VMware Horizon View 5.3 for 2000 Desktops
Last Updated: March 12, 2014

Building Architectures to Solve Business Problems
Appendix A

Cisco Solution for EMC VSPEX End User Computing for 2000 VMware View 5.3 Users
Components VNX 5600 Storage
View 5.3/ESXi5.5/Windows-7 2Bit OS: 2000 Desktops
Enabled by Cisco Unified Computing System B200 M3 Blade Servers, Cisco Nexus Switching, VMware ESXi 5.5, and EMC VNX5600

Figure 1  VSI Max Chart for Test# 01052014-2000U-92L-1800-MED-PAR-1700-01052014
2000 Users- Boot Phase (Server 7, Cluster-1)

Host: 10.29.164.97

Figure 2 2000 User ESXi Host 4 B200 M3 Processor Core Utilization Time Boot Phase

Figure 3 2000 User ESXi Host 4 B200 M3 Processor Total Utilization Time Boot Phase
Figure 4 2000 User ESXi Host 4 B200 M3 Cisco VIC1240 MLOM Network Adapter MBps Receive/Transmit Boot Phase

Figure 5 2000 User ESXi Host 4 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase
2000 Users - Test Phase (Server 12, Cluster-2)

Figure 6 2000 User ESXi Host 4 B200 M3 Memory NonKernel MBytes Boot Phase

\[\text{ESXi-07\ Memory\ NonKernel MBytes}\]

Figure 7 2000 User ESXi Host- 12 B200 M3 Processor Core Utilization Test Phase

\[\text{ESXi-12\ Physical Cpu\ (Total)\ % Core Util Time}\]
Figure 8  2000 User ESXi Host-12 B200 M3 Processor Total Utilization Test Phase

Figure 9  2000 User ESXi Host-12 B200 M3 Memory NonKernel MBytes Test Phase
Figure 10 2000 User ESXi Host-12 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase

Figure 11 2000 User ESXi Host-12 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase
VNX5600 performance during the fourteen blades, 2000 User Test

**Figure 12** 2000 Users EMC VNX5500 SP Utilization Boot Phase

**Figure 13** 2000 Users EMC VNX5500 SP Total Throughput Boot Phase
Appendix A

Figure 14  2000 Users EMC VNX5500 SP Total Bandwidth Boot Phase

Figure 15  2000 Users EMC VNX5500 SP Utilization Test Phase

2000 Users Test Phase VNX Storage graphs
Appendix B

ESXTOP Performance Charts for 2000 User Session during TEST Phase

Host: 10.29.164.91

Figure 18 2000 User ESXi Host 1 B200 M3 Processor Core Utilization Test Phase
Figure 19  2000 User ESXi Host 1 B200 M3 Processor Total Utilization Test Phase

Figure 20  2000 User ESXi Host 1 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase
Figure 21  2000 User ESXi Host 1 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase

Figure 22  2000 User ESXi Host 1 B200 M3 Memory NonKernel MBytes Test Phase
Host: 10.29.164.92

Figure 23  2000 User ESXi Host-2 B200 M3 Processor Core Utilization Test Phase

Figure 24  2000 User ESXi Host-2 B200 M3 Processor Total Utilization Test Phase
**Figure 25** 2000 User ESXi Host-2 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase

**Figure 26** 2000 User ESXi Host-2 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase
Appendix B

Figure 27 2000 User ESXi Host-2 B200 M3 Memory NonKernel MBytes Test Phase

Host: 10.29.164.93

Figure 28 2000 User ESXi Host-3 B200 M3 Processor Core Utilization Test Phase
Appendix B

Figure 29  2000 User ESXi Host-3 B200 M3 Processor Total Utilization Test Phase

Figure 30  2000 User ESXi Host-3 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase
Figure 31 2000 User ESXi Host-3 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase

Figure 32 2000 User ESXi Host-3 B200 M3 Memory NonKernel MBytes Test Phase
Figure 33 2000 User ESXi Host-4 B200 M3 Processor Core Utilization Test Phase

Figure 34 2000 User ESXi Host-4 B200 M3 Processor Core Utilization Test Phase
Figure 35  2000 User ESXi Host-4 B200 M3 Processor Total Utilization Test Phase

Figure 36  2000 User ESXi Host-4 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase
Appendix B

Figure 37 2000 User ESXi Host-4 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase

Figure 38 2000 User ESXi Host-4 B200 M3 Memory NonKernel MBytes Test Phase
Host: 10.29.164.95

**Figure 39** 2000 User ESXi Host-5 B200 M3 Processor Core Utilization Test Phase

![Core Utilization Test Phase](image)

**Figure 40** 2000 User ESXi Host-5 B200 M3 Processor Total Utilization Test Phase

![Total Utilization Test Phase](image)
Figure 41  2000 User ESXi Host 5 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase

Figure 42  2000 User ESXi Host 5 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase
**Figure 43** 2000 User ESXi Host 5 B200 M3 Memory NonKernel MBytes Test Phase

**Figure 44** 2000 User ESXi Host-6 B200 M3 Processor Core Utilization Test Phase
Figure 45  
2000 User ESXi Host-6 B200 M3 Processor Total Utilization Test Phase

Figure 46  
2000 User ESXi Host-6 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase
Figure 47  2000 User ESXi Host-6 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase

Figure 48  2000 User ESXi Host-6 B200 M3 Memory NonKernel MBytes Test Phase
Host: 10.29.164.97

**Figure 49**  2000 User ESXi Host-7 B200 M3 Processor Core Utilization Test Phase

![Core Utilization Graph](image)

**Figure 50**  2000 User ESXi Host-7 B200 M3 Processor Total Utilization Test Phase

![Total Utilization Graph](image)
Appendix B

Figure 51  2000 User ESXi Host-7 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase

Figure 52  2000 User ESXi Host-7 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase
Figure 53  2000 User ESXi Host-7 B200 M3 Memory NonKernel MBytes Test Phase

Figure 54  2000 User ESXi Host-8 B200 M3 Processor Core Utilization Test Phase
Appendix B

Figure 55  2000 User ESXi Host-8 B200 M3 Processor Total Utilization Test Phase

Figure 56  2000 User ESXi Host-8 B200 M3 Cisco VIC1240 ML0M Network Adapter Mbps Received/Transmitted Test Phase
Figure 57 2000 User ESXi Host-8 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase

Figure 58 2000 User ESXi Host-8 B200 M3 Memory NonKernel MBytes Test Phase
Host: 10.29.164.99

Figure 59  
2000 User ESXi Host-9 B200 M3 Processor Core Utilization Test Phase

Figure 60  
2000 User ESXi Host-9 B200 M3 Processor Total Utilization Test Phase
Figure 61  2000 User ESXi Host-9 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase

Figure 62  2000 User ESXi Host-9 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase
**Figure 63** 2000 User ESXi Host 9 B200 M3 Memory NonKernel MBytes Test Phase

```
\ESXi-09\Memory\NonKernel MBytes
```

Host: 10.29.164.100

**Figure 64** 2000 User ESXi Host-10 B200 M3 Processor Core Utilization Test Phase

```
\ESXi-10\Physical Cpu(_Total)\% Core Util Time
```

Figure 65  2000 User ESXi Host-10 B200 M3 Processor Total Utilization Test Phase

Figure 66  2000 User ESXi Host 10 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase
Figure 67  2000 User ESXi Host 10 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase

Figure 68  2000 User ESXi Host-10 B200 M3 Memory NonKernel MBytes Test Phase
Host: 19.29.164.101

**Figure 69**  
2000 User ESXi Host-11 B200 M3 Processor Core Utilization Test Phase

**Figure 70**  
2000 User ESXi Host-11 B200 M3 Processor Total Utilization Test Phase
Figure 71  2000 User ESXi Host-11 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase

Figure 72  2000 User ESXi Host-11 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase
Host 10.29.164102

Figure 74  2000 User ESXi Host-12 B200 M3 Processor Core Utilization Test Phase
Figure 75  2000 User ESXi Host-12 B200 M3 Processor Total Utilization Test Phase

\[\\text{\textbackslash ESXi-12\textbackslash Physical Cpu\_Total\% Util Time}\]

Figure 76  2000 User ESXi Host-12 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase

\[\\text{\textbackslash ESXi-12\textbackslash Network Port\{DvsPortset-0:50331660:vmmnic0\}\ MBits Received/sec}\]
\[\\text{\textbackslash ESXi-12\textbackslash Network Port\{DvsPortset-0:50331661:vmmnic1\}\ MBits Received/sec}\]
\[\\text{\textbackslash ESXi-12\textbackslash Network Port\{DvsPortset-0:50331660:vmmnic0\}\ MBits Transmitted/sec}\]
\[\\text{\textbackslash ESXi-12\textbackslash Network Port\{DvsPortset-0:50331661:vmmnic1\}\ MBits Transmitted/sec}\]
Figure 77  2000 User ESXi Host-12 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase

Figure 78  2000 User ESXi Host-12 B200 M3 Memory NonKernel MBBytes Test Phase
Host: 10.29.164102

Figure 79 2000 User ESXi Host-13 B200 M3 Processor Core Utilization Test Phase

Figure 80 2000 User ESXi Host-13 B200 M3 Processor Total Utilization Test Phase
Figure 81  2000 User ESXi Host-13 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase

Figure 82  2000 User ESXi Host-13 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase
Figure 83 2000 User ESXi Host-13 B200 M3 Memory NonKernel MBytes Test Phase

Host: 10.29.164.104

Figure 84 2000 User ESXi Host 14 B200 M3 Processor Core Utilization Test Phase
Figure 85  
2000 User ESXi Host 14 B200 M3 Processor Total Utilization Test Phase

Figure 86  
2000 User ESXi Host-14 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Test Phase
Figure 87  
2000 User ESXi Host-14 B200 M3 Cisco VIC1240 MLOM Physical Adapter Mbps Read/Write Test Phase

Figure 88  
2000 User ESXi Host-14 B200 M3 Memory NonKernel MBytes Test Phase
ESXTOP Performance Charts for 2000 User Session during Boot Phase

Figure 89 2000 User ESXi Host 1 B200 M3 Processor Core Utilization Time Boot Phase

Figure 90 2000 User ESXi Host 1 B200 M3 Processor Total Utilization Time Boot Phase
Figure 91  2000 User ESXi Host 1 B200 M3 Cisco VIC1240 MLOM Network Adapter MBps Receive/Transmit Boot Phase

Figure 92  2000 User ESXi Host 1 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase
Figure 93: 2000 User ESXi Host 1 B200 M3 Memory NonKernel MBytes Boot Phase

Figure 94: 2000 User ESXi Host 2 B200 M3 Processor Core Utilization Time Boot Phase
Figure 95  2000 User ESXi Host 2 B200 M3 Processor Total Utilization Time Boot Phase

Figure 96  2000 User ESXi Host 2 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase
Appendix B

Figure 97  2000 User ESXi Host 2 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase

Figure 98  2000 User ESXi Host 2 B200 M3 Memory NonKernel MBytes Boot Phase
Figure 99 2000 User ESXi Host 3 B200 M3 Processor Total Utilization Time Boot Phase

\[\text{ESXi-03\_Physical\_Cpu\_Total\%\_Util\_Time}\]

Figure 100 2000 User ESXi Host 3 B200 M3 Processor Core Utilization Time Boot Phase

\[\text{ESXi-03\_Physical\_Cpu\_Total\%\_Core\_Util\_Time}\]
Figure 101  2000 User ESXi Host 3 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase

Figure 102  2000 User ESXi Host 3 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase
Figure 103 2000 User ESXi Host 3 B200 M3 Memory NonKernel MBytes Boot Phase

Figure 104 2000 User ESXi Host 4 B200 M3 Processor Core Utilization Time Boot Phase
**Figure 105** 2000 User ESXi Host 4 B200 M3 Processor Total Utilization Time Boot Phase

![Graph showing physical CPU utilization](image)

**Figure 106** 2000 User ESXi Host 4 B200 M3 Cisco VIC1240 ML0M Network Adapter Mbps Received/Transmitted Boot Phase

![Graph showing network adapter Mbps](image)
Appendix B

Figure 107  2000 User ESXi Host 4 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase

Figure 108  2000 User ESXi Host 4 B200 M3 Memory NonKernel MBytes Boot Phase
Figure 109  2000 User ESXi Host 5 B200 M3 Processor Core Utilization Time Boot Phase

Figure 110  2000 User ESXi Host 5 B200 M3 Processor Total Utilization Time Boot Phase
Figure 111  2000 User ESXi Host 5 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase

Figure 112  2000 User ESXi Host 5 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase
Appendix B

Figure 113  2000 User ESXi Host 5 B200 M3 Memory NonKernel MBytes Boot Phase

Figure 114  2000 User ESXi Host 6 B200 M3 Processor Total Utilization Time Boot Phase
Figure 115 2000 User ESXi Host 6 B200 M3 Processor Core Utilization Time Boot Phase

Figure 116 2000 User ESXi Host 6 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase
Figure 117  2000 User ESXi Host 6 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase

Figure 118  2000 User ESXi Host 6 B200 M3 Memory NonKernel MBytes Boot Phase
Figure 119  
2000 User ESXi Host 7 B200 M3 Processor Total Utilization Time Boot Phase

\`\`ESXi-07\`\`Physical Cpu(_Total)\`\`\% Util Time

Figure 120  
2000 User ESXi Host 7 B200 M3 Processor Core Utilization Time Boot Phase

\`\`ESXi-07\`\`Physical Cpu(_Total)\`\`\% Core Util Time
Figure 121  2000 User ESXi Host 7 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase

Figure 122  2000 User ESXi Host 7 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase
Appendix B

Figure 123  2000 User ESXi Host 7 B200 M3 Memory NonKernel MBytes Boot Phase

\[\text{\( ESXi-07\)}\text{\( Memory\)}\text{\( NonKernel MBytes\)}\]

Figure 124  2000 User ESXi Host 8 B200 M3 Processor Total Utilization Time Boot Phase

\[\text{\( ESXi-08\)}\text{\( Physical Cpu\_Total\)\% Util Time\)}\]
Appendix B

Figure 125  2000 User ESXi Host 8 B200 M3 Processor Core Utilization Time Boot Phase

Figure 126  2000 User ESXi Host 8 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase
Figure 127  2000 User ESXi Host 8 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase

Figure 128  2000 User ESXi Host 8 B200 M3 Memory NonKernel MBytes Boot Phase
Appendix B

**Figure 129** 2000 User ESXi Host 9 B200 M3 Processor Total Utilization Time Boot Phase

![2000 User ESXi Host 9 B200 M3 Processor Total Utilization Time Boot Phase](image)

**Figure 130** 2000 User ESXi Host 9 B200 M3 Processor Core Utilization Time Boot Phase

![2000 User ESXi Host 9 B200 M3 Processor Core Utilization Time Boot Phase](image)
Figure 131 2000 User ESXi Host 9 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase

Figure 132 2000 User ESXi Host 9 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase
Figure 133  2000 User ESXi Host 9 B200 M3 Memory NonKernel MBytes Boot Phase

Figure 134  2000 User ESXi Host 10 B200 M3 Processor Total Utilization Time Boot Phase
Figure 135  
2000 User ESXi Host 10 B200 M3 Processor Core Utilization Time Boot Phase

Figure 136  
2000 User ESXi Host 10 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase
Figure 137 2000 User ESXi Host 10 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase

Figure 138 2000 User ESXi Host 10 B200 M3 Memory NonKernel MBytes Boot Phase
Appendix B

Figure 143 2000 User ESXi Host 11 B200 M3 Memory NonKernel MBytes Boot Phase

Figure 144 2000 User ESXi Host 12 B200 M3 Processor Total Utilization Time Boot Phase
Figure 145 2000 User ESXi Host 12 B200 M3 Processor Core Utilization Time Boot Phase

\[ \text{Physical Cpu(Total)} \% \text{ Core Util Time} \]

Figure 146 2000 User ESXi Host 12 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase

\[ \text{Mbps Received/sec} \]

\[ \text{Mbps Transmitted/sec} \]
**Figure 147** 2000 User ESXi Host 12 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase

![Graph showing MBps Read/Write Boot Phase for ESXi Host 12 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter.]

**Figure 148** 2000 User ESXi Host 12 B200 M3 Memory NonKernel MBytes Boot Phase

![Graph showing MBBytes Boot Phase for ESXi Host 12 B200 M3 Memory NonKernel.]

---

Appendix B
Figure 149 2000 User ESXi Host 13 B200 M3 Processor Total Utilization Time Boot Phase

Figure 150 2000 User ESXi Host 13 B200 M3 Processor Core Utilization Time Boot Phase
Figure 151  2000 User ESXi Host 13 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase

Figure 152  2000 User ESXi Host 13 B200 M3 Cisco VIC1240 MLOM Physical Disk Adapter MBps Read/Write Boot Phase
**Figure 153** 2000 User ESXi Host 13 B200 M3 Memory NonKernel MBytes Boot Phase

![Graph showing Memory NonKernel MBytes over time](image1)

**Figure 154** 2000 User ESXi Host 14 B200 M3 Processor Total Utilization Time Boot Phase

![Graph showing Processor Total Utilization over time](image2)
**Figure 155** 2000 User ESXi Host 14 B200 M3 Processor Core Utilization Time Boot Phase

\[ \text{Physical Cpu\textunderscore _Total}\% \text{ Util Time} \]

---

**Figure 156** 2000 User ESXi Host 14 B200 M3 Cisco VIC1240 MLOM Network Adapter Mbps Received/Transmitted Boot Phase

- \( \text{Mbps Received/sec} \)
- \( \text{Mbps Transmitted/sec} \)

---

81