ADTRAN

NetVanta Unified Communications Technical Note

Selecting NetVanta UC Server Hypervisor and Server Platforms

Introduction

This technical note specifies the minimum computer hardware requirements for NetVanta Unified Communication (UC) products using NetVanta UC Server version 5.1 and later. It includes recommendations for both hypervisors, VMware and Microsoft Hyper-V, and server platforms. This technical note consists of the following sections:

NetVanta UC Server Platform Recommendations

The server components of NetVanta UC Server support the following Microsoft® Windows operating systems:

- Microsoft Windows Server 2008 (32 bit or 64 bit)
- Microsoft Windows Small Business Server 2008 (64 bit)
- Microsoft Windows Server 2003 R2 (SP1 or SP2) (32 bit)
- Microsoft Windows Server 2003 (SP1 or SP2) (32 bit)
- Microsoft Windows Small Business Server 2003 (SP1) (32 bit)

Other software platforms are not supported. Specifically, the deployment of NetVanta UC Server on Microsoft Server Core is not currently supported.

Table 1 on page 2, *Table 2 on page 3*, *Table 3 on page 4*, and *Table 4 on page 5* list the specifications that ADTRAN recommends for use as server platforms for NetVanta UC Server versions 5.1 and later. The recommendations are made based on the number of users for NetVanta Enterprise Communications System (ECS), NetVanta Unified Communication Server (UCS), NetVanta Business Communication System (BCS), and the number of channels for NetVanta Business Application Server (BAS).

The server recommendations are based on the following expanded configurations: higher traffic levels, extensive databases or built-in data table usage, high use of text-to-speech (TTS), complex auto attendants, extensive use of interactive voice response (IVR), outbound dialing, and personal business assistant (PBA) services requiring a large number of media channels.

Expanded configurations use approximately 17 percent of the processor for the number of users or channels in the configuration. Therefore, the recommended servers have a considerable built-in processing safety margin for standard configurations. If you have a standard configuration using a standard feature bundle with few feature additions, you might be able to use a smaller, less expensive server platform.

When selecting your server platform, ADTRAN recommends that:

- You consider the future system growth of users, TTS, IVR, and database usage. Selecting a server that will accommodate future growth will typically save money in the long run because the incremental cost of a larger server is much lower than replacing a server later. Additionally, you avoid the cost and inconvenience associated with server migration and service interruption.
- You select a server that exceeds the minimum requirements for your selected capacity including future growth. The server platform is the most critical hardware component in your NetVanta UC Server system, but it typically accounts for only one to three percent of the cost of your system. For a marginal additional cost, adding cores, faster processors, or more sockets to your server provides additional peck capacity, decreases delays, and reduces the potential for problems.
- You consider that as feature enhancements are added to the newer releases of NetVanta UC systems, it is possible that the hardware requirements for the system will also increase over time.

NetVanta ECS, UCS, and BCS Server Platforms

The following assumptions are included when selecting a server platform for NetVanta ECS, UCS, or BCS:

- The maximum calculated average CPU utilization is engineered to never exceed 34 percent under maximum sustained traffic load.
- An average amount of offered traffic is included as part of the traffice modeling. The industry standard is six congestion control schemes (CCS) per user.
- A moderate amount of TTS resources are included as part of the traffic modeling.

Windows Server 2003 and 2008

The recommended server platforms for NetVanta ECS, UCS, and BCS with Windows Server 2003 and 2008 are listed in *Table 1*.

Table 1. Platform Server Requirements for NetVanta ECS, UCS, and BCS with Windows Server 2003 and 2008

Bundle Size (Number of Users)	Generic Specifications	ADTRAN Supported Platform Type
1 to 100	1 x Pentium G630, 4G 1333 MHz RAM, No RAID, 250G SATA 7200 rpm, 100/1000 NIM, Single Power Supply	NetVanta 420E or PowerEdge R210 II
100 to 200	1 x Core i3-2100, 4G 1333 MHz RAM, RAID 1, 2 x 500G SATA 7200 rpm, 100/1000 NIM, Single Power Supply	PowerEdge T110 II/R210 II

Table 1. Platform Server Requirements for NetVanta ECS, UCS, and BCS with Windows Server 2003 and 2008 *(Continued)*

Bundle Size (Number of Users)	Generic Specifications	ADTRAN Supported Platform Type
200 to 400	1 x Core i3-540, 4G 1333 MHz RAM, RAID 5, 3 x 500G SATA 7200 rpm, 100/1000 NIM, Dual Power Supply	PowerEdge T310/R310
400 to 1200	2 x Xeon E5603, 8G 1333 MHz RAM, RAID 5, 3 x 300G 15K rpm, Dual 100/1000 NIM, Single Power Supply	PowerEdge T410/R410
1200 to 2000	2 x Xeon X5650, 8G 1333 MHz RAM, RAID 5, 3 x 300G 15K rpm, Dual 100/1000 NIM, Single Power Supply	PowerEdge T410/R410
1200 to 2000+ (Redundant Power Option)	4 x Xeon E7-4807, 16G 1066 MHz RAM, RAID 5, 3 x 300G 15K rpm, 100/1000 NIM, Dual Power Supply	PowerEdge R910

NOTE

NetVanta UC Server does not support more than 2000 users; however, you can select a server that will support more users for other desired functionality, such as a redundant power supply.

Windows Small Business Server 2003

The recommended server platforms for NetVanta ECS, UCS, and BCS co-installed in Windows Small Business Server 2003 are listed in *Table 2*.

Table 2. Platform Server Requirements for NetVanta ECS, UCS, and BCS with Windows Small Business Server 2003

Bundle Size (Number of Users)	Generic Specifications	ADTRAN Supported Platform Type
5 to 10	1 x Xeon E3-1230, 4G 1333 MHz RAM, No RAID, 500G SATA 7200 rpm, 100/1000 NIM, Single Power Supply	PowerEdge T110 II/R210 II
10 to 24	1 x Xeon E3-1230, 4G 1333 MHz RAM, RAID 1, 2 x 500G SATA 7200 rpm, 100/1000 NIM, Single Power Supply	PowerEdge T110 II/R210 II
25 to 75	1 x Xeon X3460, 4G 1333 MHz RAM, RAID 5, 2 x 500G SATA 7200 rpm, 100/1000 NIM, Dual Power Supply	PowerEdge T310

Windows Small Business Server 2008

The recommended server platforms for NetVanta ECS, UCS, and BCS co-installed in Windows Small Business Server 2008 are listed in *Table 3*.

Table 3. Platform Server Requirements for NetVanta ECS, UCS, and BCS with Windows Small Business Server 2008

Bundle Size (Number of Users)	Generic Specifications	ADTRAN Supported Platform Type
5 to 10	1 x Xeon E3-1230, 8G 1333 MHz RAM, No RAID, 500G SATA 7200 rpm, 100/1000 NIM, Single Power Supply	PowerEdge T110 II/R210 II
10 to 25	1 x Xeon E3-1230, 8G 1333 MHz RAM, RAID 1, 2 x 500G SATA 7200 rpm, 100/1000 NIM, Single Power Supply	PowerEdge T110 II/R210 II
25 to 75	1 x Xeon X3460, 8G 1333 MHz RAM, RAID 5, 2 x 500G SATA 7200 rpm, 10/1000 NIM, Dual Power Supply	PowerEdge T310

NetVanta BAS Server Platforms

The following assumptions are included when selecting a server platform for NetVanta BAS:

- The maximum calculated average CPU utilization is engineered to never exceed 34 percent under maximum sustained traffic load.
- Maximum load is considered using 100 percent channel occupancy with 30 second call durations.
- TTS is used approximately 33 percent of the time in services. That is, a ratio of one TTS voice channel for ever three media channels.
- The number of conference channels in use is equal to the number of channels.

The recommended server platforms for NetVanta BAS with Windows Server 2003 and 2008 are listed in *Table 4*.

Table 4. Platform Server Requirements for BAS with Windows Server 2003 and 2008

Bundle Size (Number of Channel)	Generic Specifications	ADTRAN Supported Platform Type
1 to 10	1 x Pentium G630, 4G 1333 MHz RAM, No RAID, 250G SATA 7200 rpm, 100/1000 NIM, Single Power Supply	NetVanta 420E or PowerEdge R210 II
10 to 40	1 x Core i3-540, 4G 1333 MHz RAM, RAID 5, 2 x 500G SATA 7200 rpm, 100/1000 NIM, Dual Power Supply	PowerEdge T310/R310
40 to 70	2 x Xeon E5603, 8G 1333 MHz RAM, RAID 5, 3 x 300G 15K rpm, Dual 100/1000 NIM, Power Supply	PowerEdge T410/R410
70 to 200	2 x Xeon X5650, 8G 1333 MHz RAM, RAID 5, 2 x 300G 15K rpm, Dual 100/1000 NIM, Power Supply	PowerEdge T410/R410

Hypervisor Performance Requirements

The following sections provide the configuration parameters that ADTRAN recommends for use with hypervisor virtual machines (VMware and Hyper-V) for all versions of NetVanta UC Server running version 5.1 or later. The recommendations are made based on the number of users for NetVanta ECS, UCS, and BCS and the number of channels for NetVanta BAS.

RAM, Mass Storage, and PCM Requirements for NetVanta ECS, UCS, and BCS

The recommended amount of RAM, mass storage, and processing capacity multiplier (PCM) for hypervisor virtual machines used with NetVanta ECS, UCS, and BCS with Windows Server 2003 and 2008 are listed in *Table 5*.

Table 5. RAM, Mass Storage, and PCM Requirements for NetVanta ECS, UCS, and BCS

Number of Users	RAM (GB)	Base Mass Storage (GB)	PCM
5	4	32	5
10	4	32	10
15	4	32	15
25	4	32	25
50	4	32	50
75	4	34	75

Table 5. RAM, Mass Storage, and PCM Requirements for NetVanta ECS, UCS, and BCS *(Continued)*

Number of Users	RAM (GB)	Base Mass Storage (GB)	PCM
100	4	34	100
125	4	34	125
150	4	35	150
175	4	35	175
200	4	36	200
225	4	36	225
250	4	36	250
300	4	38	300
350	4	39	350
400	4	40	400
500	4	42	500
600	4	44	600
800	4	48	800
1000	4	52	1000
1200	4	58	1200
1400	4	62	1400
1600	4	66	1600
1800	4	70	1800
2000	4	74	2000

RAM, Mass Storage, and PCM Requirements for NetVanta BAS

The recommended amount of RAM, mass storage, and PCM for hypervisor virtual machines used with NetVanta BAS with Windows Server 2003 and 2008 are listed in *Table 6*.

Table 6. RAM, Mass Storage, and PCM Requirements for NetVanta BAS

Number of Channels	RAM (GB)	Base Mass Storage (GB)	PCM
10	4	32	100
20	4	35	320
30	4	37	600
40	4	39	960
50	4	40	1100
60	4	41	1440
70	4	44	1680
80	4	46	2080
90	4	51	2520
100	4	54	3000
110	4	57	3300
120	4	60	3600
130	4	60	3900
140	4	62	4200
150	4	62	4500
160	4	62	4800
170	4.5	69	5100
180	4.5	69	5760
190	5	77	6080
200	5	77	6400

Determining the Required Hypervisor Processing Capacity (in MHz)

The total processing capacity expressed in MHz will be used to configure the hypervisors in VMware and Hyper-V. You can determine the processing capacity requirement in MHz for standard deployments by multiplying the PCM value in *Table 5 on page 5* or *Table 6 on page 7* by the value in the **MHz per User** column from *Table 7 on page 8* for the Intel Xeon processor type in use in your server. If you do not want to engineer your solution, use the CPU requirement for an enhanced configuration, and multiply the capacity required in MHz for a standard deployment by a factor of two.

Table 7. MHz per User and Maximum Calls per Second for Intel Processors

Intel Processor	MHz per User	Maximum Calls per Second
Xeon E3-1220	4.46	325
Xeon E3-1220L	4.92	256
Xeon E3-1220Lv2	4.17	268
Xeon E3-1220v2	4.46	325
Xeon E3-1225	4.46	325
Xeon E3-1225v2	4.46	335
Xeon E3-1230	3.91	372
Xeon E3-1230v2	3.91	384
Xeon E3-1235	3.91	372
Xeon E3-1240	3.92	388
Xeon E3-1240v2	3.86	396
Xeon E3-1245	3.92	388
Xeon E3-1245v2	3.86	396
Xeon E3-1260L	4.17	279
Xeon E3-1265Lv2	4.71	291
Xeon E3-1270	3.86	396
Xeon E3-1270v2	3.87	407
Xeon E3-1275	3.86	396
Xeon E3-1275v2	3.87	407
Xeon E3-1280	3.87	407
Xeon E3-1280v2	3.87	419
Xeon E3-1290	3.87	419
Xeon E3-1290v2	3.87	430
Xeon E5-1603	4.01	326

Table 7. MHz per User and Maximum Calls per Second for Intel Processors *(Continued)*

Intel Processor	MHz per User	Maximum Calls per Second
Xeon E5-1607	3.90	349
Xeon E5-1620	3.87	419
Xeon E5-1650	3.72	372
Xeon E5-1660	3.73	384
Xeon E5-2403	4.86	188
Xeon E5-2407	4.65	230
Xeon E5-2418L	4.19	233
Xeon E5-2420	4.01	221
Xeon E5-2428L	4.01	209
Xeon E5-2430	3.91	256
Xeon E5-2430L	3.90	233
Xeon E5-2440	3.87	279
Xeon E5-2448L	3.87	209
Xeon E5-2450	3.72	279
Xeon E5-2450L	3.87	209
Xeon E5-2470	3.77	268
Xeon E5-2603	4.86	188
Xeon E5-2609	4.62	251
Xeon E5-2620	3.90	233
Xeon E5-2630	3.86	268
Xeon E5-2630L	3.90	233
Xeon E5-2637	4.46	349
Xeon E5-2640	3.87	291
Xeon E5-2643	3.91	384
Xeon E5-2648L	3.87	209
Xeon E5-2650	3.81	233
Xeon E5-2650L	3.87	209
Xeon E5-2658	3.81	244
Xeon E5-2660	3.76	256
Xeon E5-2665	3.72	279

Table 7. MHz per User and Maximum Calls per Second for Intel Processors *(Continued)*

Intel Processor	MHz per User	Maximum Calls per Second
Xeon E5-2667	3.76	337
Xeon E5-2670	3.73	302
Xeon E5-2680	3.74	314
Xeon E5-2687W	3.69	361
Xeon E5-2690	3.68	337
Xeon E5-4603	4.19	233
Xeon E5-4607	3.91	256
Xeon E5-4610	3.87	279
Xeon E5-4617	4.23	304
Xeon E5-4620	3.76	256
Xeon E5-4640	3.72	279
Xeon E5-4650	3.74	314
Xeon E5-4650L	3.73	302
Xeon E5502	17.2	183
Xeon E5503	17.2	183
Xeon E5504	11.5	183
Xeon E5506/L5506	11.5	195
Xeon E5507	10.8	207
Xeon E5520/L5520	9.73	230
Xeon E5530/L5530	9.20	244
Xeon E5540	9.21	257
Xeon E5603	4.48	91
Xeon E5606	4.20	121
Xeon E5607	4.21	129
Xeon E5620	3.62	151
Xeon E5630	3.63	159
Xeon E5640	3.52	168
Xeon E5645	3.41	151
Xeon E5649	3.36	159
Xeon E6510	3.53	119

Table 7. MHz per User and Maximum Calls per Second for Intel Processors *(Continued)*

Intel Processor	MHz per User	Maximum Calls per Second
Xeon E6540	3.19	137
Xeon E7-2803	4.00	201
Xeon E7-2820	3.81	233
Xeon E7-2830	3.76	248
Xeon E7-2850	3.73	233
Xeon E7-2860	3.68	264
Xeon E7-2870	3.69	279
Xeon E7-4807	4.01	217
Xeon E7-4820	3.81	233
Xeon E7-4830	3.76	248
Xeon E7-4850	3.73	233
Xeon E7-4860	3.68	264
Xeon E7-4870	3.69	279
Xeon E7520	3.48	128
Xeon E7530	3.19	128
Xeon E7540	3.19	137
Xeon E7-8830	3.76	248
Xeon E7-8837	4.23	237
Xeon E7-8850	3.73	233
Xeon E7-8860	3.68	264
Xeon E7-8867L	3.74	248
Xeon E7-8870	3.69	279
Xeon EC3528	18.9	NA
Xeon EC3539	12.9	NA
Xeon EC5509	12.8	NA
Xeon EC5539	18.3	NA
Xeon EC5549	11.1	NA
Xeon L3403	12.8	NA
Xeon L3406	12.9	NA
Xeon L3426	11.6	NA

Table 7. MHz per User and Maximum Calls per Second for Intel Processors *(Continued)*

Intel Processor	MHz per User	Maximum Calls per Second
Xeon L5508	14.8	203
Xeon L5518	9.71	217
Xeon L5609	4.37	106
Xeon L5618	3.84	117
Xeon L5630	3.79	134
Xeon L5638	3.54	126
Xeon L5640	3.48	143
Xeon L7545	3.19	128
Xeon L7555	3.10	128
Xeon LC3518	51.7	NA
Xeon LC5518	11.5	NA
Xeon LC5528	11.6	NA
Xeon W3503	15.2	NA
Xeon W3505	13.9	NA
Xeon W3520	10.6	NA
Xeon W3530	10.6	NA
Xeon W3540	10.7	NA
Xeon W3550	10.1	NA
Xeon W3565	10.1	NA
Xeon W3570	10.1	NA
Xeon W3580	10.1	NA
Xeon W3670	3.34	201
Xeon W3680	3.27	210
Xeon W3690	3.27	218
Xeon W5580	8.50	325
Xeon W5590	8.28	339
Xeon X3380	6.19	149
Xeon X3430	13.0	NA
Xeon X3440	11.1	NA
Xeon X3450	10.6	NA

Table 7. MHz per User and Maximum Calls per Second for Intel Processors *(Continued)*

Intel Processor	MHz per User	Maximum Calls per Second
Xeon X3460	10.6	NA
Xeon X3470	10.7	NA
Xeon X3480	10.1	NA
Xeon X5550	8.70	271
Xeon X5560	8.71	284
Xeon X5570	8.72	298
Xeon X5647	3.53	184
Xeon X5650	3.37	168
Xeon X5660	3.33	176
Xeon X5667	3.46	193
Xeon X5670	3.33	185
Xeon X5672	3.47	201
Xeon X5675	3.33	193
Xeon X5677	3.40	218
Xeon X5680	3.27	210
Xeon X5687	3.41	227
Xeon X5690	3.27	218
Xeon X5698	3.80	277
Xeon X6550	3.06	137
Xeon X7542	3.44	164
Xeon X7550	3.06	137
Xeon X7560	3.01	155

Ensuring Adequate Call Processing Capacity in Hypervisor Server Processors

You must ensure that the processors in your hypervisor server platform have adequate call processing capacity for your deployment. The maximum calls per second associated with the server's processors in *Table 7 on page 8* must be greater than or equal to the call processing rate required by your deployment. Multiply calls per second by 3600 to determine the estimated number of busy hour call completions (BHCC) that can be accommodated by the processors in use. If the call processing rate of the processors in your server is not adequate for your deployment, employ a server with a processor that has a higher call processing rate. You might have to choose a server with a different processor configuration having higher clock rates, a lower number of cores per processor, no hyper-threading, or fewer populated server sockets in order to achieve a higher call processing rate.

Configuring Hypervisor Logical Processors

In general, more logical CPUs provide better performance for NetVanta UC Server. Therefore, you must configure at least two virtual CPUs in your virtual machine, but more will provide better performance. You might have to configure more virtual CPUs in your virtual machine in order to achieve the processing capacity that you require in MHz. *Table 7 on page 8* describes the MHz per user and maximum calls per second for Intel Xeon processors. These statistics can be used to determine the processing capacity required in hypervisor virtual machines for NetVanta UC deployments.

Detailed VMware Configuration Information

When configuring a VMware vSphere virtual machine for NetVanta UC Server, you must specify all the same information you would normally specify for a server-based deployment. This includes the operating environment and how much RAM, mass storage, and processing capacity is required. Once you have determined your Windows operating environment, determine the RAM and mass storage requirement for your virtual machine (see *Table 5 on page 5* or *Table 6 on page 7*). Lastly, specify the processing requirement for your virtual machine. VMware vSphere indicates and reserves processing capacity in terms of processing cycles in MHz. You can specify the processing requirement using the values in the **MHz per User** column in *Table 7 on page 8*. The **MHz per User** value is an estimate of the processing capacity required per user by NetVanta UC Server for the processor type in use in the server.

To determine the processing capacity required for standard deployments in your vSphere virtual machine, multiply the numbers of users in your configuration by the value in the **MHz per User** column for the processor in use in your VMware host server (see *Table 7 on page 8*). Use the following equation to determine the required processing capacity:

(MHz per User x Number of Users) = VMware required processing capacity

If you do not want to engineer your solution, use the CPU requirement for an enhanced configuration and multiply the capacity required in MHz for a standard deployment by a factor of two.

Detailed Hyper-V Configuration Information

Please refer to *Install the Hyper-V Role and Configure a Virtual Machine* available from Microsoft at http://technet.microsoft.com/en-us/library/hh846766.aspx for details on installing Hyper-V.

When configuring a Hyper-V virtual machine for NetVanta UC Server, you must specify all the same information you would normally specify for a server-based deployment. This includes the operating environment and how much RAM, mass storage, and processing capacity required. Once you have determined your Windows operating environment, determine the RAM and mass storage requirement for your virtual machine (see *Table 5 on page 5* or *Table 6 on page 7*). Lastly, specify the processing requirement for your virtual machine.

Processing capacity is reserved in Hyper-V by defining the number of virtual processors. First determine the processing requirement by using the the **MHz per User** column in *Table 7 on page 8*. The **MHz per User** value is an estimate of the processing capacity required per user by NetVanta UC Server for the processor type in use in the server.

To determine the processing capacity required for standard deployment in your Hyper-V virtual machine, multiply the numbers of users in your configuration by the value in the **MHz per User** column for the processor in use in your host server (see *Table 7 on page 8*). Use the following equation to determine the required processing capacity:

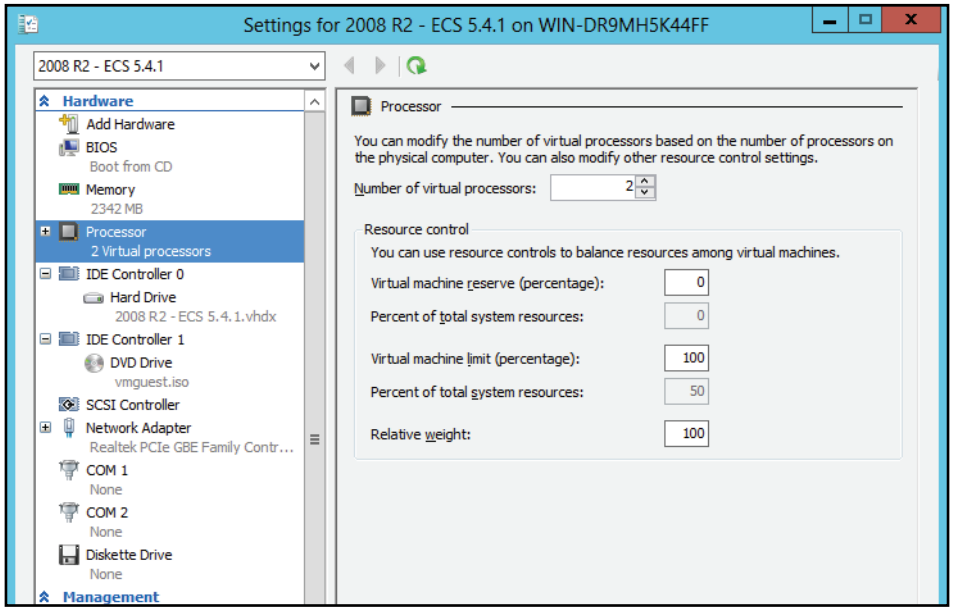
(MHz per User x Number of Users) = Hyper-V required processing capacity

If you do not want to engineer your solution, use the CPU requirement for an enhanced configuration and multiply the capacity required in MHz for a standard deployment by a factor of two.

After determining the processing capacity required in MHz, allocate the number of virtual processors that will provide at least the equivalent MHz processing capacity. In addition, ensure that at least two virtual processors are allocated.

Additionally, ensure that the following **Processor** settings are configured in **Hyper-V Manager** for the NetVanta UC Server application:

1. Configure the **Virtual machine reserve (percentage)** as **0** (Maximum).
2. Configure the **Virtual machine limit (percentage)** as **100** (All).
3. Configure the **Relative weight** as **100** (Maximum).



NOTE

Other guest operating systems on the server that are not running real time applications should be set with reduced resources to ensure the proper operation of the NetVanta UC Server system.

