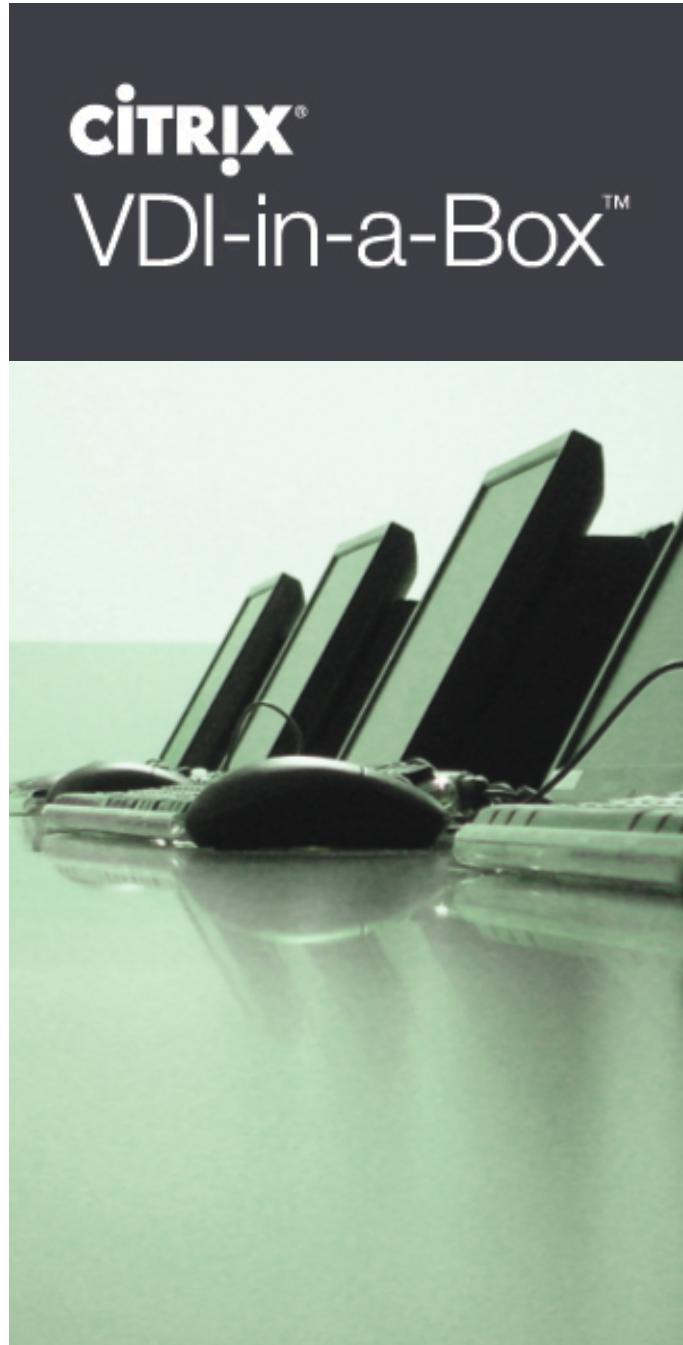


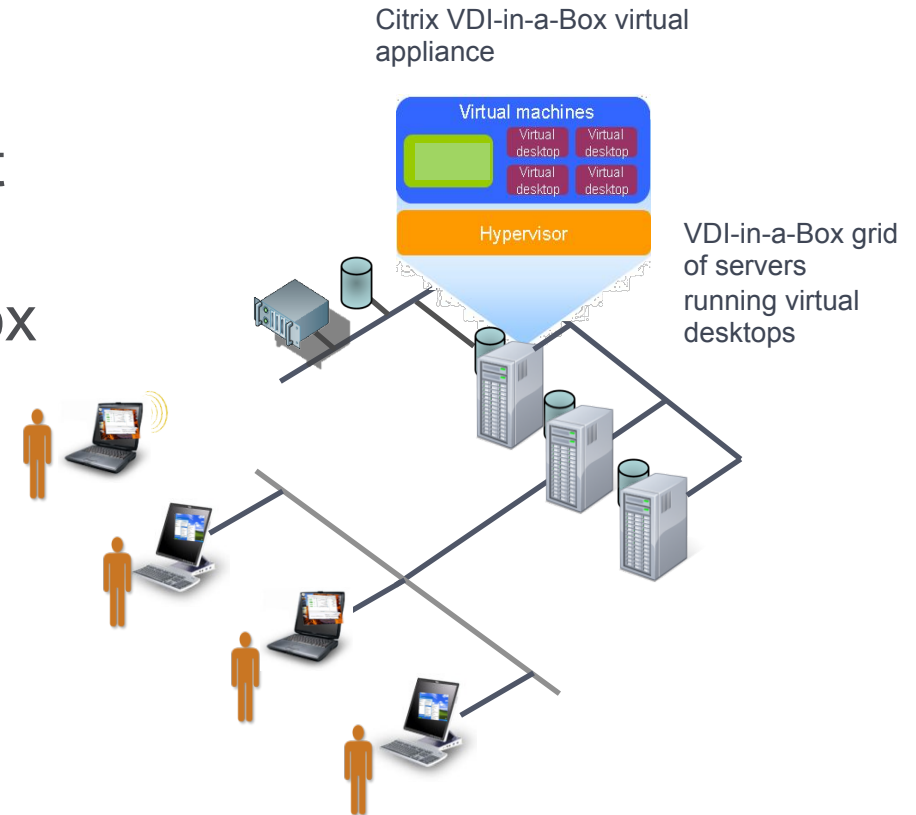
Citrix® VDI-in-a-Box™

How to size your VDI-in-a-Box infrastructure



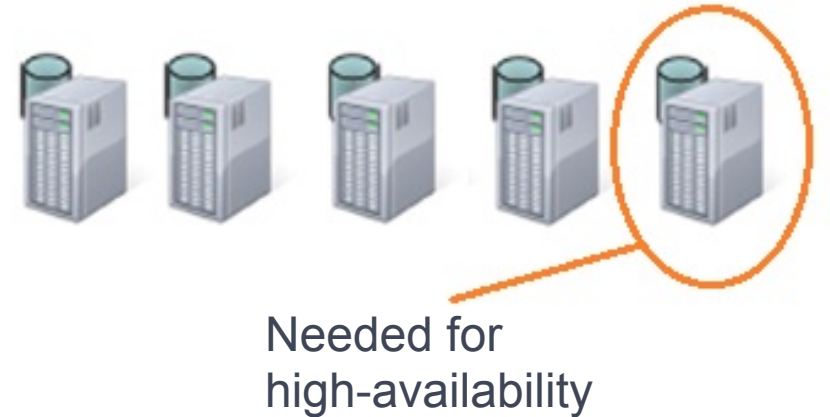
Basics of a VDI-in-a-Box grid

- Simple to install and use
 - Off-the-shelf servers with DAS(direct attached storage)
 - Servers can be of different sizes and from different manufacturers
 - Each server runs a hypervisor and the VDI-in-a-Box virtual appliance
- Simple to manage and scale
 - Servers can be added/deleted on the fly
 - VDI-in-a-Box automatically load balances across the servers taking into account their capacity
 - VDI-in-a-Box auto-provisions/de-provisions the server



An example – sizing a VDI-in-a-Box grid

- Sizing for 200 desktops
- Assume 50 desktops per server
- Need 4 servers
- N+1 Model: Need a 5th for high-availability
- VDI-in-a-Box uses hot-sparing
 - 40 desktops per server during normal operations
 - 50 desktops per server during failure



Sizing individual servers in a grid

- VDI-in-a-Box is an out-of-band management component
 - Use hypervisor sizing and performance guidelines
- Four core components to sizing

CPU	Memory(RAM)	Disk	Storage
<ul style="list-style-type: none">• Number of CPUs• Number of cores• Type of CPU: Hyper-threading	<ul style="list-style-type: none">• VDI-in-a-Box• Hypervisor• Variety of Desktop OS being virtualized• Reserve set aside for server operations	<ul style="list-style-type: none">• Protocol• Type of disk• Speed	<ul style="list-style-type: none">• Number of Desktops• Number of images• Size of each image

What type of CPU do I need?

- 6 to 10 desktops per CPU *core*
- For CPUs with hyper-threading (2 threads per core) for example Intel Nehalem, you can safely double the *lower* limit
- Varies with the type of desktop users
 - Use a number in the higher end of this range (10) for task workers and a number in the lower end of the range (6) for desktops that are more heavily used.
- At least 1 core for the hypervisor

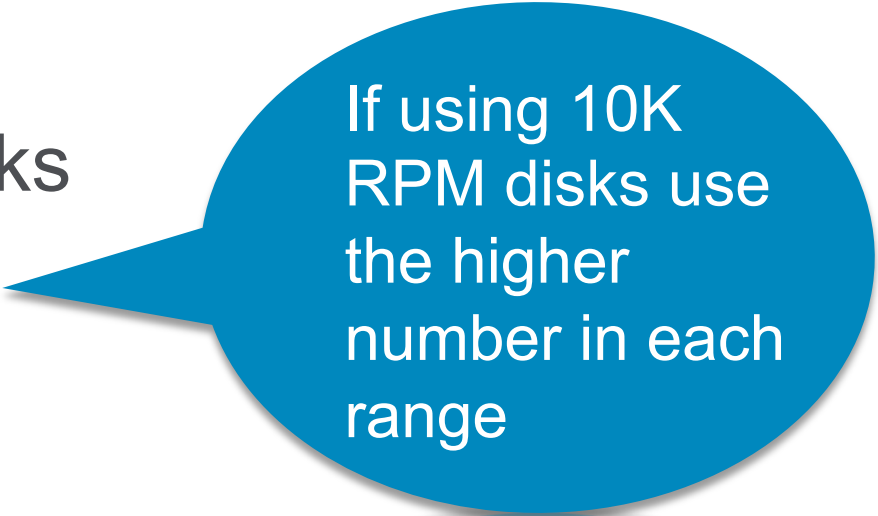
How much Memory(RAM) do I need?

- 0.5 - 1 GB for Windows XP
- 1.5 - 2 GB for Windows 7 desktops
- At least 1 GB for the hypervisor
- At least 1 GB for the VDI-in-a-Box appliance
- 10% reserved for server operations

How many disks do I need?

- Hard drives
 - Recommended: SAS 15K (preferred) or SATA/SAS SSD
 - SAS 10K
- Desktop requirements (rough rule of thumb for steady state!)
 - Windows XP desktops 5 to 10 IOPS
 - Windows 7 desktops 10 to 20 IOPS
- Rough rule of thumb on the number of disks
 - 4 disks for approximately 25 desktops
 - 6 to 8 disks for approximately 50 desktops
 - 10 to 12 disks for approximately 75 desktops

RPM	IOPS (Raid 0)
SSD	6000
15K	175
10K	125
7200	75
5400	50



If using 10K RPM disks use the higher number in each range

To SSD or not to SSD?

- SSD is roughly 30 times faster
 - SSD with SATA
- Many customers are using it with very positive results
- Eliminates disk I/O bottleneck completely
- Best when there are a few golden images (keep them small!)
- Price is coming down fast!

How much storage do I need?

- Capacity is determined by the # of images and the # of desktops
 - Assumption: user and profile data stored externally
- Formula:
 - 2 X Golden Image X number of Golden Images
 - 74 GB for VDI-in-a-Box appliance (can be reduced)
 - 15% of size of image/desktop (savings due to linked clones)
- Example: Assume 2 golden images of 20 GB & 50 desktops
 - Golden image: $2 \times 20\text{GB} \times 2 = 80\text{GB}$
 - VDI-in-a-Box appliance space = 74GB
 - Image space/desktop $15\% \times 20\text{GB} \times 50 = 150\text{GB}$
 - Extra room for swap & transient activity = 100GB
 - Total = 404GB
 - Recommended: 500GB to 1TB (Raid 0) per server so there is plenty of room

Remember!

Leave extra room for swap space, hypervisor, and for growth

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Do I need RAID configuration?

- VDI-in-a-Box uses disks to maintain
 - Golden images
 - Disk space for the desktops
 - System state information
- Redundant copies stored on other servers in the grid
- Hence Raid 0 is sufficient and provides the best performance
- Disk failures are common & can reduce MTBF of a server
 - Use Raid 1 or Raid 1-0 to protect server from disk failure
- Using Raid 1 or Raid 1-0 halves the storage capacity
 - For 1TB per server, provide 2 TB of disk capacity

Example

Server has two Intel Xeon L5640 2.28Ghz HT

CPU: 6-core processor with hyper-threading that's 12 cores with 2 processors;

Look at them as 24 cores

Memory: 64GB RAM

Disk: 1 TB with 8 spindles 15K SAS, Raid 0

CPU	Memory	Disk	Storage
<ul style="list-style-type: none">• $6 \times 23 = 138$ desktops (1 core for hypervisor)	<ul style="list-style-type: none">• 2GB total required for VDI-in-a-Box & the hypervisor• 90% of 64 GB = 57.6 GB• $57.6 - 2 \text{ GB}$ (1 for VDI-in-a-Box and 1 for the hypervisor) = 55.6 GB• 55, 1GB XP Desktops OR 27, 2GB Win7 Desktops	<ul style="list-style-type: none">• 175 IOPS for 15k SAS• 4 spindles = 700 IOPS• 70 XP Desktops assuming 10 IOPS per Desktop OR 35 Win7 Desktops assuming 20 IOPS per Desktop	<ul style="list-style-type: none">• $2 \times 20 \text{ GB} \times 2 = 80 \text{ GB}$ for images• 74 GB for VDI-in-a-Box• $15\% \times 20 \text{ GB} \times 55 = 165 \text{ GB}$• 1 TB is sufficient

Take the lowest of the number from CPU, Memory and Disk

Thus, server configuration can support **55 XP Desktops** OR **27 Win7 Desktops** *conservatively*

References

- To learn more about Citrix VDI-in-a-Box
<http://www.citrix.com/vdi-in-a-box/try-it>
- To view videos on Citrix VDI-in-a-Box
<http://www.citrixtv.com/>
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