

Hi All,

I report new results of dm-ioband bandwidth control test. The previous test results were posted on Jan 25.

I've got really good results as well as the last report. dm-ioband works well with Xen virtual disk.

I also announce that dm-ioband website has launched. The patches, the manual, the benchmark results and other related information are available through this site. Please check it out:

<http://people.valinux.co.jp/~ryov/dm-ioband/>

### Bandwidth control on a per partition basis

#### Test procedure

- o Prepare three partitions sda11, sda12 and sda13.
  - o Create three ioband devices ioband1, ioband2 and ioband3 on each partition respectively.
  - o Give weights of 40, 20 and 10 to each ioband device respectively.
  - o Run 50, 100 and 200 processes issuing random read/write direct I/O with 4KB data on each ioband device at the same time respectively.
  - o Count up the number of I/Os which have done in 60 seconds.
- 
- o For comparison, do this test under different conditions. The conditions are:
    - Direct access to the physical devices without dm-ioband.
    - Give weights in equal proportion to each ioband devices.

```
Read/Write process  Read/Write process  Read/Write process
   x 50              x 100              x 200
   |                 |                 |
+-----V-----+ +-----V-----+ +-----V-----+
| ioband1  || ioband2  || ioband3  | ioband devices
+-----+ +-----+ +-----+
| default group || default group || default group | ioband groups
| (40)  || (20)  || (10)  | (weight)
+-----|-----+ +-----|-----+ +-----|-----+
+-----V-----+ +-----V-----+ +-----V-----+
| /dev/sda11 || /dev/sda12 || /dev/sda13 | physical devs.
+-----+ +-----+ +-----+
```

#### Results

-----  
Direct access without dm-ioband

device	sda11	sda12	sda13
I/O processes	50 (14.3%)	100 (28.6%)	200 (57.1%)
I/Os	1469	2486	5032
ratio to total	16.3%	27.7%	56.0%

Weights in inverse proportion to the number of processes

device	sda11	sda12	sda13
weight	40 (57.1%)	20 (28.6%)	10 (14.3%)
I/Os	5023	2654	1369
ratio to total	55.5%	29.3%	15.1%

Weights in equal proportion

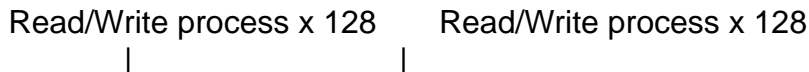
device	sda11	sda12	sda13
weight	10 (33.3%)	10 (33.3%)	10 (33.3%)
I/Os	2954	3004	2986
ratio to total	33.0%	33.6%	33.4%

Bandwidth control on a per logical volume basis

=====  
Test procedure

- o Prepare two partitions sda11 and sdb11.
- o Create a volume group with the two partitions.
- o Create two striped logical volumes on the volume group.
- o Give weights of 20 and 10 to lv0 and lv1 respectively.
- o Run 128 processes issuing random read/write direct I/O with 4KB data on each ioband device at the same time respectively.
- o Count up the number of I/Os which have done in 60 seconds.

Block diagram



```

+-----V-----+ +-----V-----+
| /dev/mapper/ioband1 | | /dev/mapper/ioband2 | ioband devices
+-----+ +-----+
| default group | | default group | ioband groups
| (20) | | (10) | (weight)
+-----+ +-----+
+-----V-----+ +-----V-----+
| /dev/mapper/lv0 | | /dev/mapper/lv1 | striped logical
| | | | volumes
+-----+
| vg0 | volume group
+-----+
+-----V-----+ +-----V-----+
| /dev/sda11 | | /dev/sdb11 | physical devices
+-----+ +-----+

```

Result

```

-----
| device | lv0 | lv1 |
| weight | 20 (66.6%) | 10 (33.3%) |
+-----+
| I/Os | 13508 | 6779 |
| ratio to total | 66.6% | 33.3% |
-----

```

Bandwidth control on a per Xen virtual block device basis

=====

Test procedure

-----

- o Prepare two partitions sda11 and sda12.
- o Create two ioband devices ioband1 and ioband2 on each partition respectively.
- o Give weight of 20 and 10 to each ioband device respectively.
- o Create two virtual machines that using the ioband device as Xen virtual machine's disk.
- o Run 128 processes issuing random read/write direct I/O with 4KB data on each virtual machine at the same time respectively.
- o Count up the number of I/Os which have done in 60 seconds.

```

+-----+ +-----+
| Virtual Machine 1 | | Virtual Machine 2 | virtual machines
| | | |
| Read/Write process x 128 | | Read/Write process x 128 |
| | | |

```

+-----V-----+		+-----V-----+		+
	/dev/xvda1		/dev/xvda1	virtual block
	+-----+		+-----+	devices
+-----+	+-----+	+-----+	+-----+	
+-----V-----+	+-----V-----+			
	/dev/mapper/ioband1		/dev/mapper/ioband2	ioband devices
+-----+	+-----+	+-----+	+-----+	
	default group		default group	ioband groups
	(20)		(10)	(weight)
+-----+	+-----+	+-----+	+-----+	
+-----V-----+	+-----V-----+			
	/dev/sda11		/dev/sda12	physical device
+-----+	+-----+	+-----+	+-----+	

## Result

```
-----
```

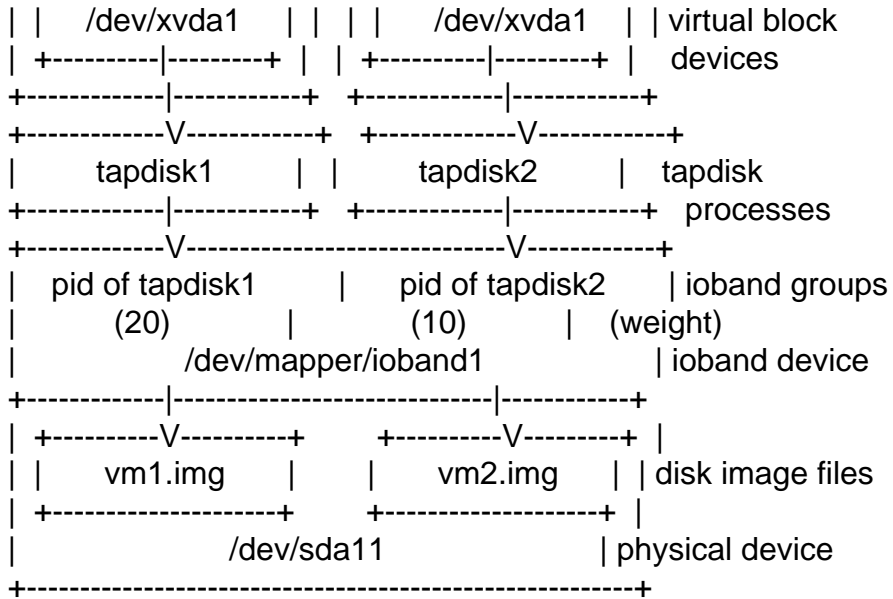
-----				
virtual machine	VM1		VM2	
weight	20 (66.6%)		10 (33.3%)	
-----+-----+-----				
I/Os	7140		3819	
ratio to total	65.2%		34.8%	
-----				

## Bandwidth control on a per Xen virtual block device basis

### Test procedure

- o Prepare one partition sda11.
- o Create two files on sda11 to use as virtual machine's disks.
- o Create an ioband devices on sda11.
- o Create two virtual machines that using the prepared files as Xen virtual machine's disk.
- o Create two extra ioband-groups on ioband1, the first is of process tapdisk1 and the second is of process tapdisk2.
- o Run 128 processes issuing random read/write direct I/O with 4KB data on each virtual machine at the same time respectively.
- o Count up the number of I/Os which have done in 60 seconds.

+-----+ +-----+	
Virtual Machine 1	Virtual Machine 2   virtual machines
Read/Write process x 128	Read/Write process x 128
+-----V-----+	+-----V-----+ +



Result

```

-----
| virtual machine | VM1 | VM2 |
| weight | 20 (66.6%) | 10 (33.3%) |
+-----+-----+
| I/Os | 7486 | 3895 |
| ratio to total | 65.8% | 34.2% |
-----

```

Thanks,  
Ryo Tsuruta

---

Containers mailing list  
Containers@lists.linux-foundation.org  
<https://lists.linux-foundation.org/mailman/listinfo/containers>