Firebird Conference 2012

Firebird Conference Luxembourg 2012

Firebird in virtual environment

by

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Firebird at Transfertex

- Interbase User since 1993 ! HP-UX IB3.3D

Interbase 4.0 and Powerhouse 7.33 under HP9000

HP-UX ca. 120 Users

- IB6/Firebird1.0 HP-UX since ca. 2003
- Firebird2.x on Suse-Linux since ca. 2007
- Other databases used MS SQL Server, Oracle8 (2 Users), MySQL, Adv.DbServer

Details

- FB2.x is installed on 10 servers, most Suse Linux
- Main DB SERVER has 24 database files. The biggest is about 16 Gigabyte (BLOBs).
- FB 2.1.3 CS 64bit is running on a dedicated „open Suse Linux 11.3“ box, 64bit. *DBServer*

  HP DL380G7 Xeon E5660 2,8Ghz 6 cores

  CPUs, 24GB Ram, Raid1+0 , 4 x500 GB 10k

  SATA disks
- Approx. 40GB database, 100 Users, 3 application servers separated.

Why Virtualization of Servers ?

- Main reason consolidate servers from 18 → 8, 4...
- Easier administration, backup and recovery!
- Less hardware, less investments, „right sizing“ ?
- Better usage/load of the server
- More security, better fail-over prevention.
- Energy savings !
- better performance ???

Measuring performance!

- Complex and difficult topic
- Try a real daylife situation.
- My own approach: what users do in Transfertex : get spotlight of most busy data

→ order management orderheader and -details

Select, update, delete randomly or bulk

→ Use comparable hardware *), software ,

office times

(SuseLinux,FB2.1.3 CS, Coldfusion Appl. Server using pure JDBC driver)

→Test the same database (cold -copy).

→Make sure the „biggest“ difference is the VM.

The champion and the challenger!

- DBSERVER:

DL380G7 Xeon 2,8Ghz 6 core, 24 GB RAM,
RAID1+0, 4 x 10k disks, Raid Controller P410i
256MB cache

Suse 11.3 64 bit FB2.1.3 CS 64bit

- VMSERVER vSphere 5 Essential:

DL380G7 Xeon 2,53 Ghz 6 core, 24 GB RAM

RAID1+0, 4 x 7.5k disks, RaidController P410i

256 MB cache

Suse 11.3 64 bit FB2.1.3 CS 64bit

advantage for DBserver ?!

- faster CPU
- faster disks
- dedicated machine

→ should be match winner hands down

VM is known to take „admin charge“ some %
slower should be the result …maybe 25% ...

LET 'S SEE ?

Testing a gbak -restore …of 6 gb gbak-data

Dbserver : 8' 50" VM Server: 24' 17"

near 3x slower - what is going on?

How about RAID CACHE?

The raid controller's hardware cache was disabled at the VM Server. This is not fair!

Switch off, change bios settings.. restart box...

run gbak again...

Testing a gbak -restore …of 6 gb gbak-data

Dbserver : 8' 50" VM Server: 8' 17"

WOW - not bad!!!

Test I ColdFusion Application

- Java application server „JRUN“
- Coldfusion7 application server installed on my desktop PC **and** on a production ColdFusion server
- running agaist DBSERVER and VMSERVER
- so each Firebird server / database is handled as source in a ReadCommited transaction model, no query caching in application server is enabled !
- database connections are maintained/shared for coldfusion attachments (makes sense not connect new for any new query ...)

Code of coldfusion test ...partly...

```
....
<cfloop index="i" from="#a#" to="#n#" step="#s#">
<cfset aufnr= #RandRange(lowrange, highrange, "SHA1PRNG")#>
 <cfset t0a= gettickcount()>
<cftransaction action="BEGIN" isolation="READ_COMMITTED">
 <cfquery name="q_aufpos" datasource="#dbsrcfds#" result="r_aufpos">
      select a.stat_nr, a.auf_nr, a.dess_nr, a.col_nr, a.lief_dat, b.lag_abw_info , c.kd_kurzbez,  cast ('now'
            as  timestamp) dbzeit
               from auf_aufpos  a
                join auf_auftrag b on b.auf_nr=a.auf_nr and b.firmen_nr=a.firmen_nr
           join auf_kd      c on c.kd_nr=b.kd_nr    and c.firmen_nr=b.firmen_nr
               where a.auf_nr=#aufnr#   order by a.auf_nr, a.auf_pos_nr
</cfquery>
<cftransaction action="COMMIT"/>
</cftransaction>
....
</cfloop>
```

What was measured?

The QUERY TIME IN TOTAL

qttotal_db in milliseconds

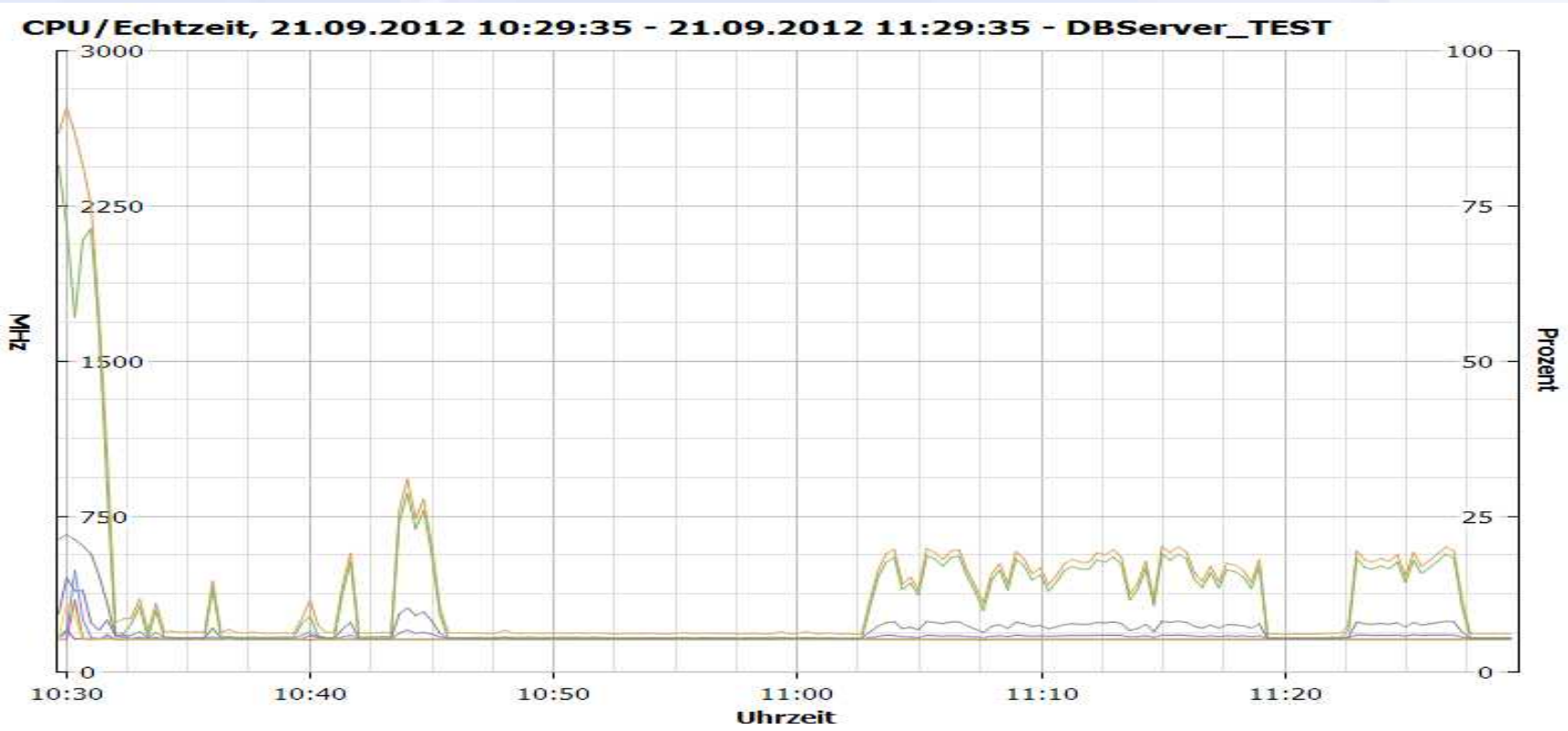
qtotal_vm in milliseconds

Did we consider the load ? CPU , DISK , RAM

Yes … for the servers it did not bother or you can simply to ignore !

Example of the load on VM

gbak done---------- test ---------

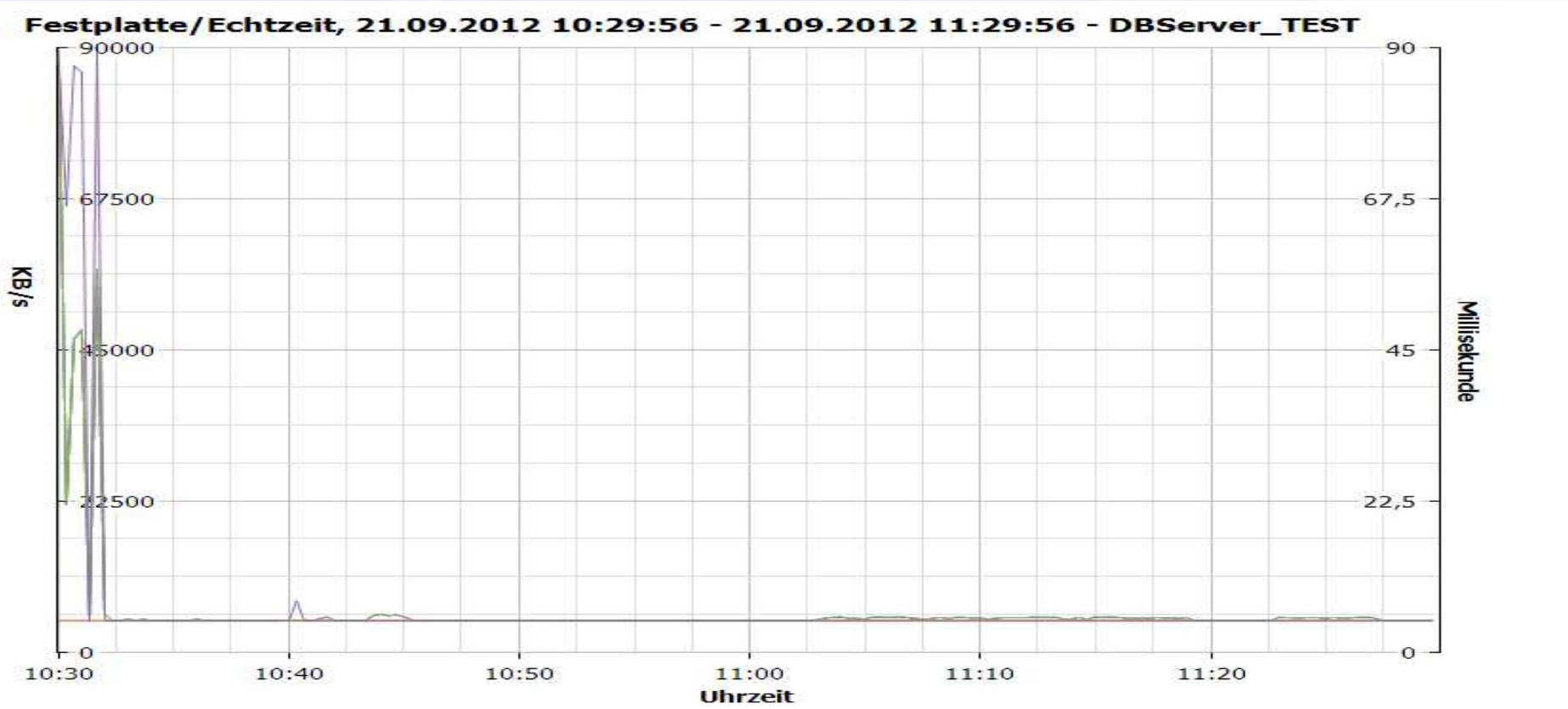


Legende für Leistungsdiagramm

Schlüssel	Objekt	Messung	Rollup	Einheiten
	4	Nutzung in MHz	average	MHz
	5	Nutzung in MHz	average	MHz
	DBServer_TEST	Nutzung in MHz	average	MHz
	DBServer_TEST	Nutzung	average	Prozent
	0	Nutzung in MHz	average	MHz
	1	Nutzung in MHz	average	MHz
	2	Nutzung in MHz	average	MHz
	3	Nutzung in MHz	average	MHz

Disk load VM

gbak done ----------Test ----------



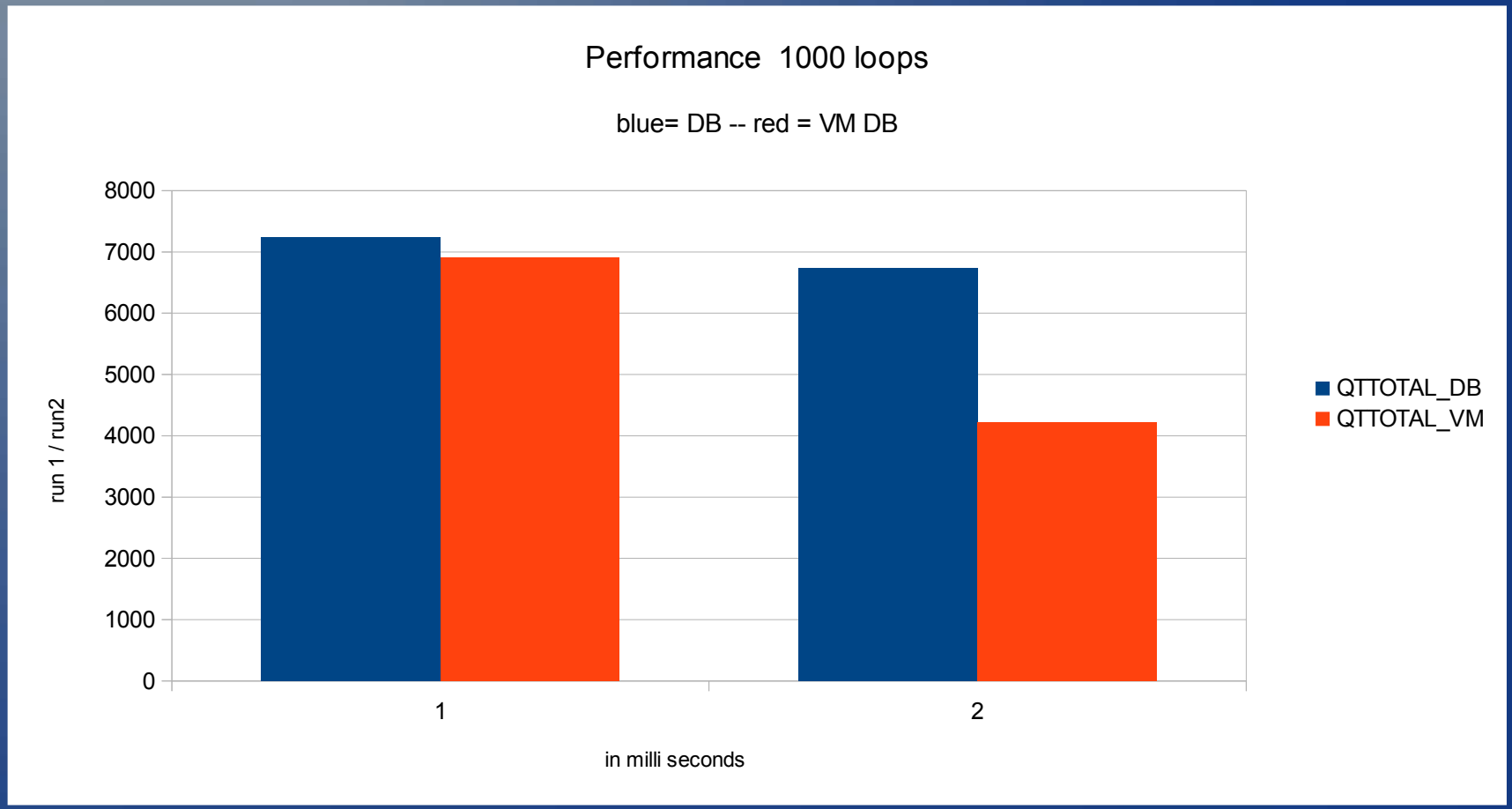
Legende für Leistungsdiagramm

Schlüssel	Objekt	Messung	Rollup	Einheiten
	DBServer_TEST	Schreibrate	average	KB/s
	DBServer_TEST	Leserate	average	KB/s
	naa.600508b1001c6ec4c69af0d87		average	KB/s
	DBServer_TEST	Nutzung	average	KB/s
	naa.600508b1001c6ec4c69af0d87		average	KB/s
	DBServer_TEST	Höchste Latenz	latest	Millisekunde

First Test ColdFusion

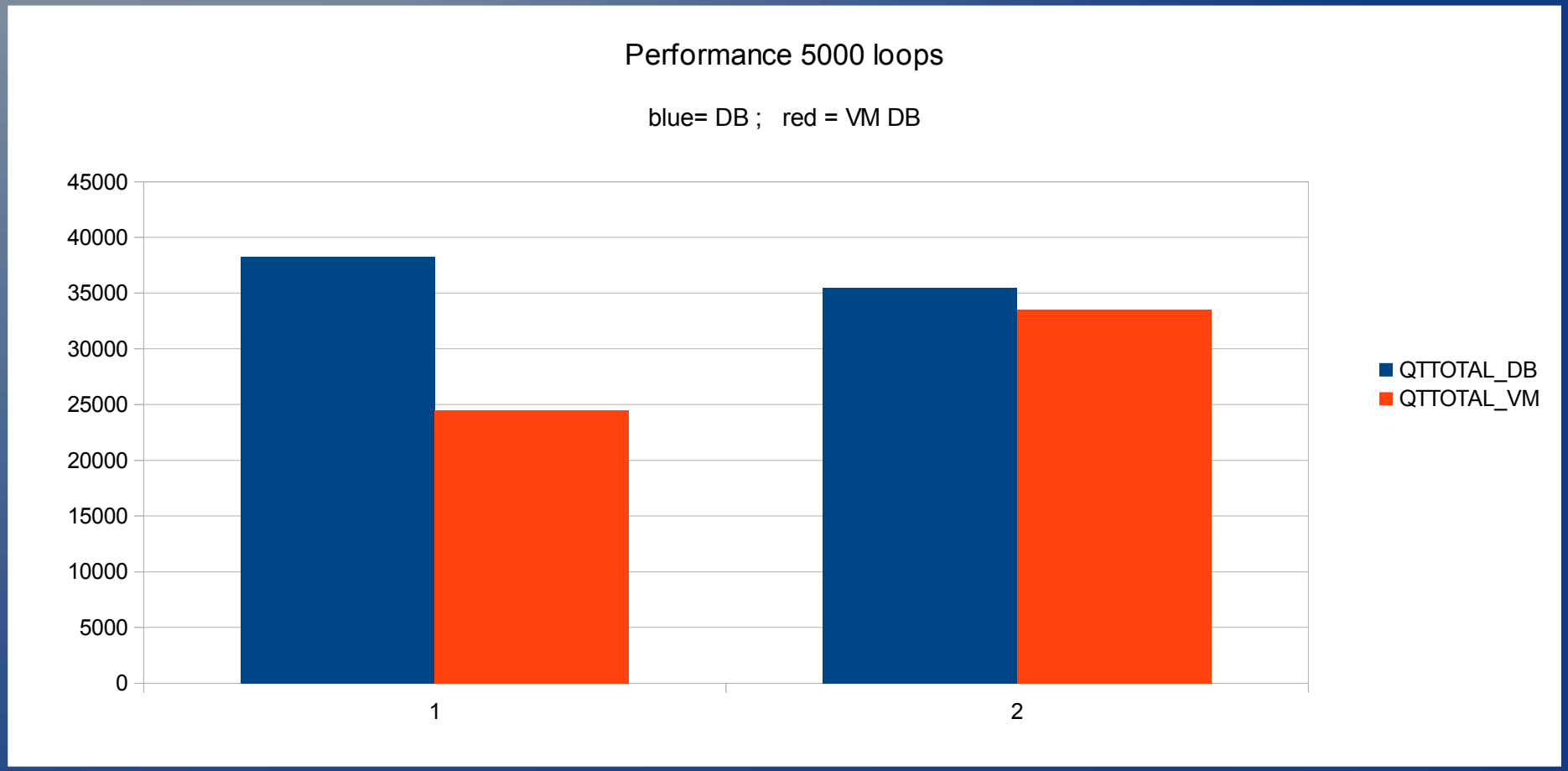
select statement random

Results: run1= CF on Server ; run 2 = CF on PC



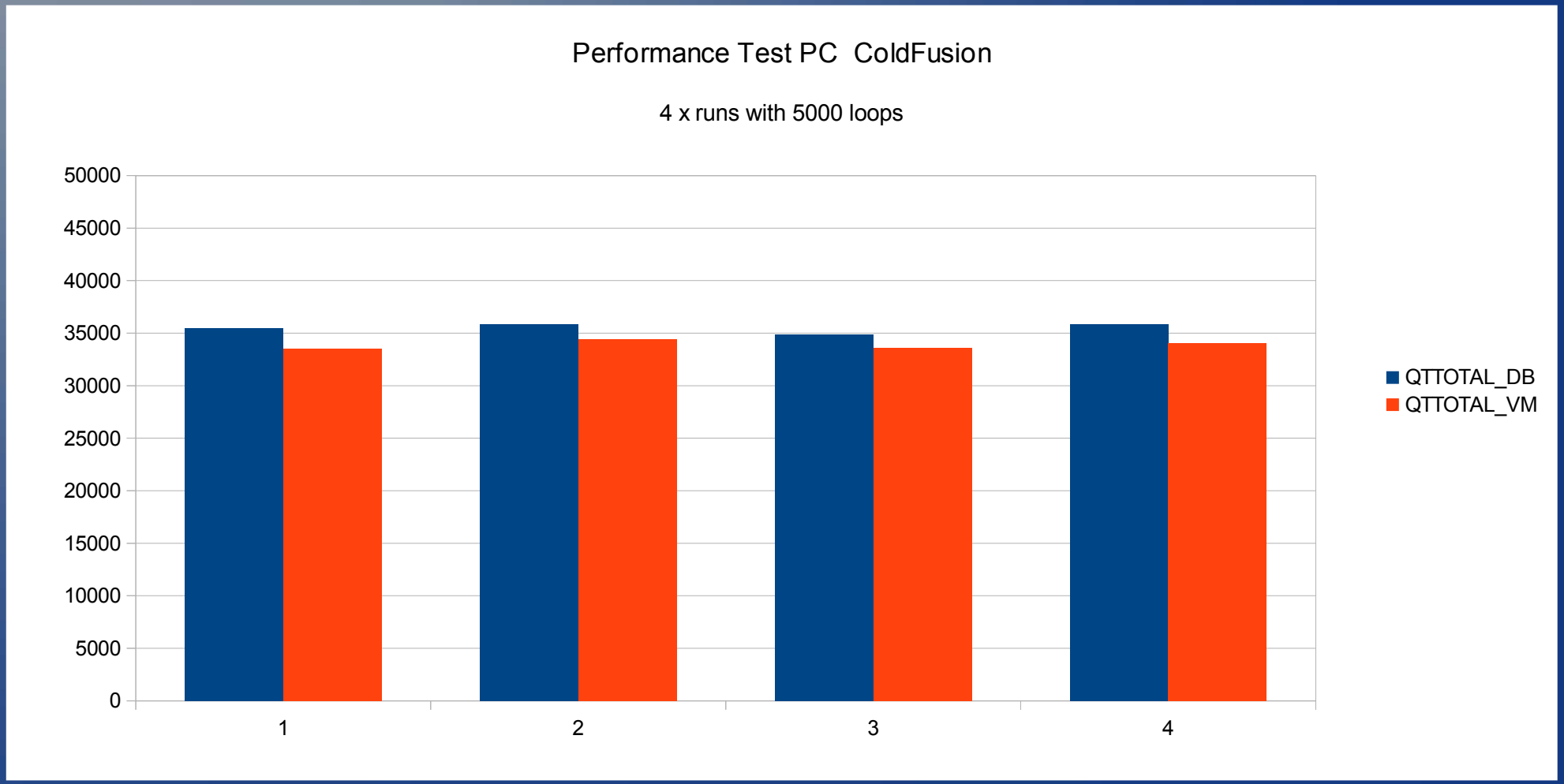
2.nd Test ColdFusion

Results: run1= CF on Server ; run 2 = CF on PC



Using the PC and running CF modules for another 4 tests ... we see the

VM DB Blue is avg 5% faster!



How is it with data manipulation?

Now I made new script using IBEScript to simulate this was running on my PC against the

Known DB server and VM DB server.

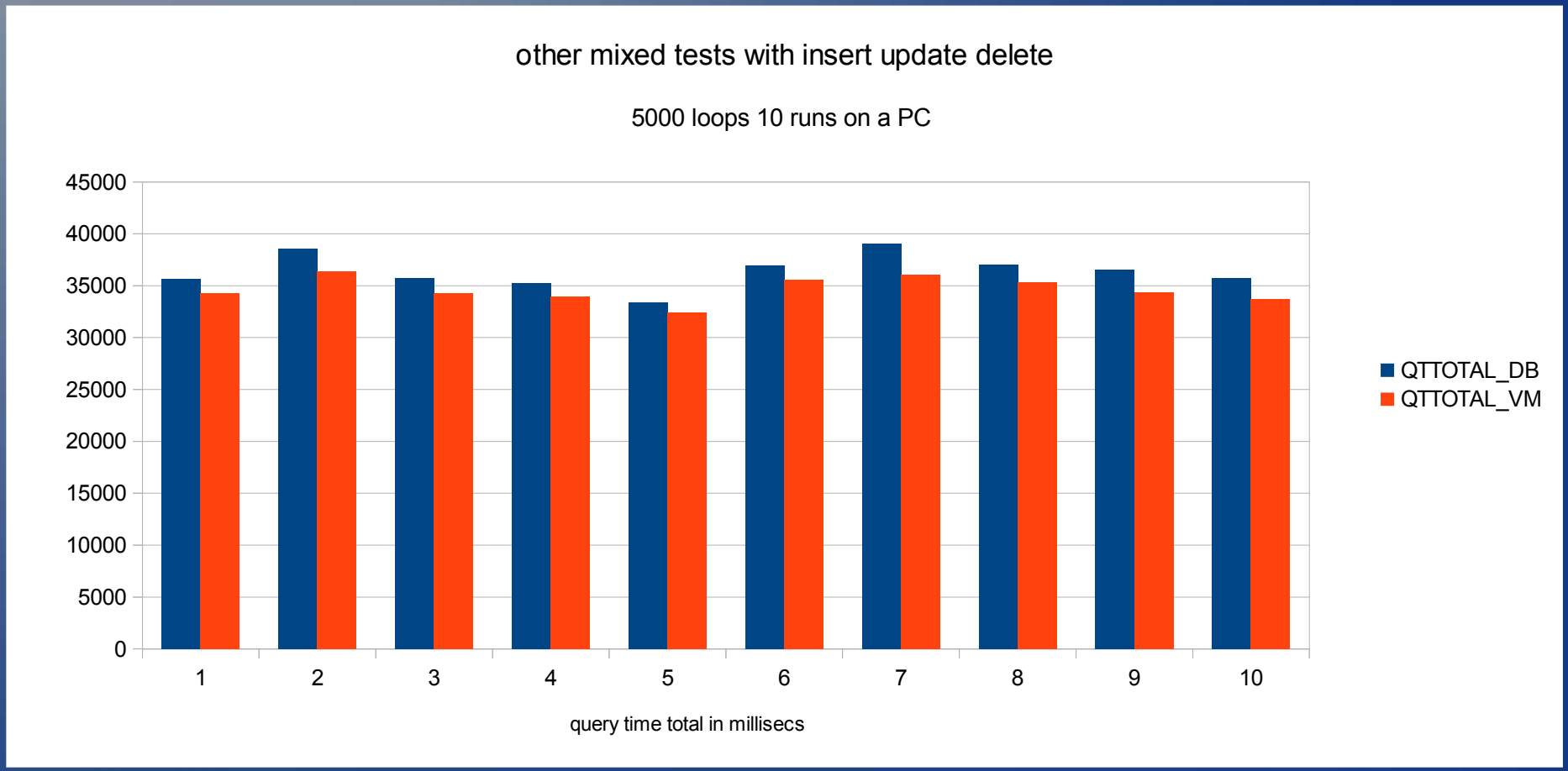
Measured in milliseconds of executed time.

statements: insert , update, delete of random

data from the tables read by key (using a unique index).

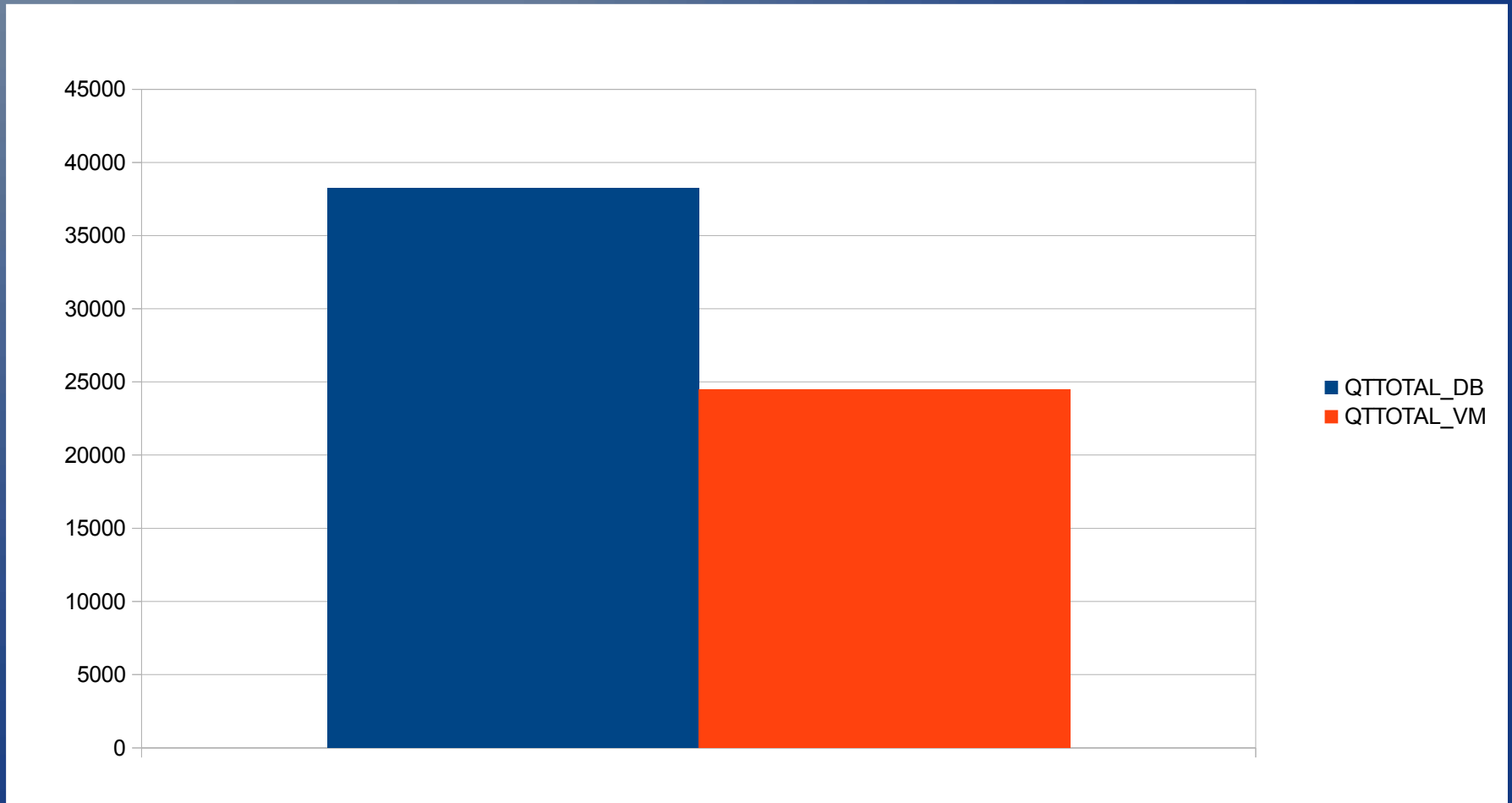
Results with data manipulation statements...

Results : the VM DB is faster by 5%!



What happens when both App Server and DB Server are in ONE VM SYSTEM ?

Here the same test 5000 loops / random select statement in coldfusion



This is the „real thing“ !

Now we have performance gain of ~ 30% !

Why ?

It is the way the VM can work – instead of using the „real“ network - it switches to internal high speed network connections!

Conclusions:

- Firebird CS runs quite well in a VM and it is not slower than a dedicted server.
- You can get the benefits of virtualisation for your database server.
- There is a big boost in performance if the application server and the database server are in one VM system! 30+%!!!

Suggestions for successful VM operating:

- have a „grown up“ server box. Redundancy of components (powersupply, controllers etc) are mandatory.
- Dual Intel*) Xeons 6 cores, 40 GB Ram.
- Raid1-0 with fast disks (10k)
- Raidcontroller with cache (enabled!)
- VM Vsphere essentials and VEEAM backup!
- Linux system for firebirdsql classic 2.x ! (forced write on for databases).

*) AMD also possible.

Sparky will like it!

Thank you!