
BENCHMARKING Z/LINUX AND LINUX USING OPENKICKS

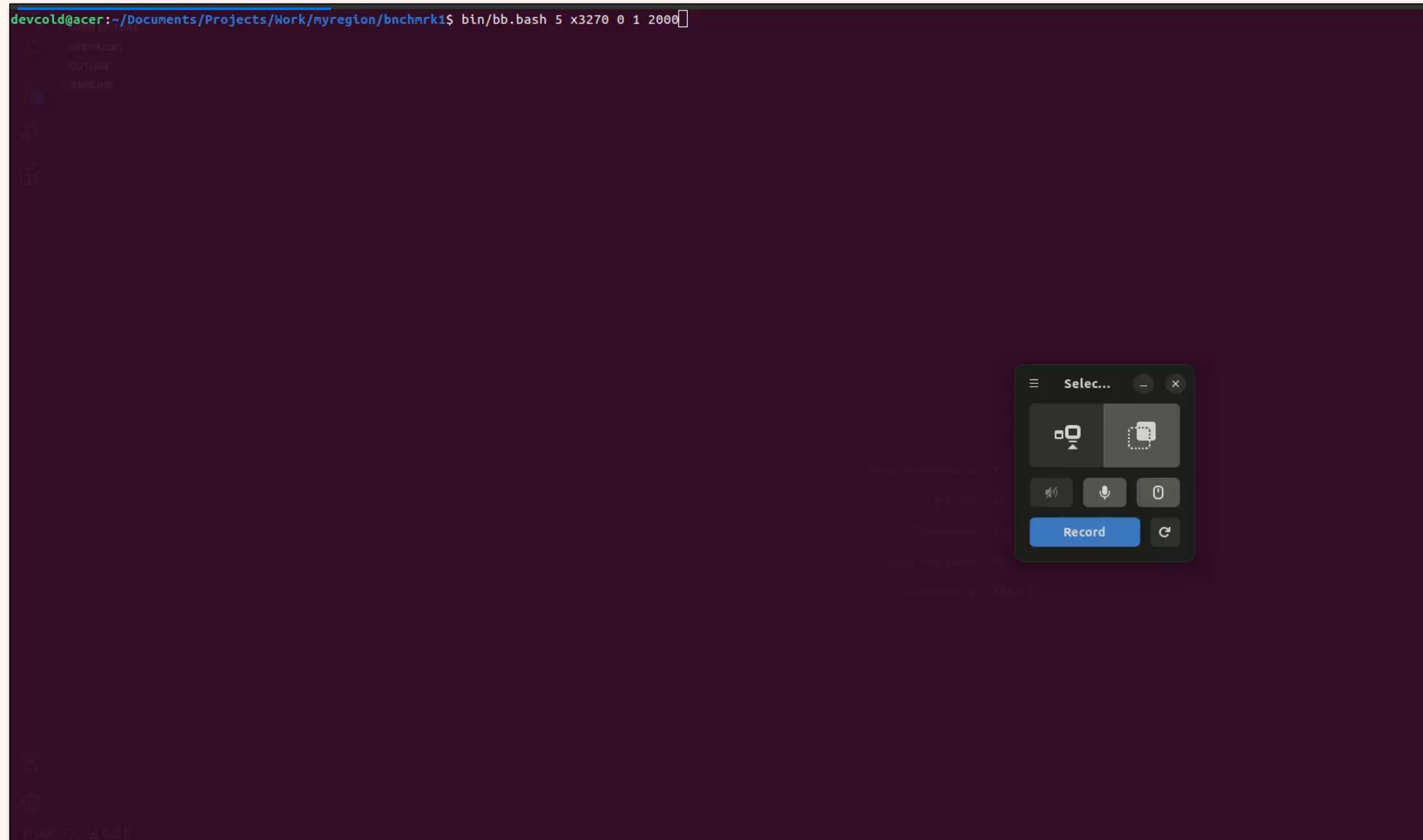
PURPOSE

- **Find Hotspots in OpenKicks and fix**
 - **Stress Test OpenKicks**
 - **Satisfy Intellectual Curiosity**
 - **Eventually provide an open source benchmark for CICS like systems.**
 - **Compare machines**
 - **Eventually compare COBOL compilers**
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NOT FOR PURPOSE

- **Comparison to Micro Focus and AWS Benchmarks**
- **Not for sizing machines for OpenKicks**

Visualize the Benchmark



THE COMMAND

./bb.bash 5 x3270 0 1 2000

- **./bb.bash** - bash script which in turn starts expect scripts to drive the terminals
- **5** - Run five terminals
- **x3270** - Use x3270 as the 3270 terminal emulator
- **0** - no extra logging
- **1** - pause 1 second between starting the 5 terminals
- **2000** - pause 2,000 milliseconds between transactions

./bb.bash 999 s3270 0 0 0

- **./bb.bash** - bash script which in turn starts expect scripts to drive the terminals
 - **999** - Run 999 terminals
 - **s3270** - Use s3270 as the 3270 terminal emulator (**headless**)
 - **0** - no extra logging
 - **0** - pause 0 seconds between starting the 999 terminals
 - **0** - pause 0 milliseconds between transactions
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THE MACHINES

- **Laptop: AMD Ryzen 3/16GB/4 CPU**
 - **AWS: AMD EPYC 7R13/8GB/4 CPU (\$111/mo)**
 - **AWS: AMD EPYC 7R13/4GB/1 CPU (disabled one processor)**
 - **Digital Ocean: Intel Xeon 8358/8GB/4 CPU (\$100/mo)**
 - **z390/2GB/1 CPU**
 - **z390/4GB/1 CPU**
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THE SOFTWARE

- **OpenKicks**
 - **Postgres**
 - **GnuCOBOL**
 - **Ubuntu 22.04 (Mostly)**
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BENCHMARK RAW DATA

TransId	TermId	StartTime	WallMs	CpuSysMs	CpuUsrMs	Pid
MENU	A001	[2023-06-19 1:30:45	22.05496	0.989	0.695	140982
MENU	A001	[2023-06-19 1:30:45	34.40514	0.79	0.587	140994
MENU	A002	[2023-06-19 1:30:45	12.51634	0.72	0.534	141004
MENU	A006	[2023-06-19 1:30:45	141.8456	0.722	0.512	141015
MENU	A003	[2023-06-19 1:30:45	144.3485	0.692	0.514	141014
MENU	A002	[2023-06-19 1:30:45	122.0327	0.773	0.575	141025
MNT2	A001	[2023-06-19 1:30:45	99.37038	0.759	0.6	141039
MENU	A004	[2023-06-19 1:30:45	76.34649	0.875	0.552	141051
MENU	A005	[2023-06-19 1:30:45	287.3694	0.751	0.532	141061
MENU	A007	[2023-06-19 1:30:45	275.6234	0.776	0.535	141070
MENU	A003	[2023-06-19 1:30:45	254.3405	0.789	0.57	141080
MENU	A008	[2023-06-19 1:30:45	264.0341	0.745	0.523	141079
MENU	A010	[2023-06-19 1:30:45	258.3645	0.788	0.543	141084
MENU	A004	[2023-06-19 1:30:45	262.5881	0.855	0.577	141083
MNT2	A002	[2023-06-19 1:30:45	270.694	0.814	0.594	141082

HOTSPOT FINDER

TranStatus	Table	Type	Count	WallMs	CpuSysMs	CpuUsrMs
51046	Meta	TranLogBegin	1	7.030829	0.03	0.017
51046	Meta	RetrieveCommArea	1	5.380899	0.022	0.018
51046	Meta	TranLogUpdate	1	0.088131	0.002	0.003
51046	Meta	TranLogInsert	1	0.000289	0	0
51046	Meta	SelectiveLogInit	1	0.239645	0.004	0.002
51046	Meta	InitTranEnd	1	2.382729	0.004	0.002
51046	Meta	GetTran	1	0.094203	0.027	0.012
51046	Meta	ClearAbendStatus	1	0.259824	0.006	0.006
51046	CUSTMAS	VsamRead	1	0.926182	0.224	0.304

TRANS / MINUTE

Machine	Elapsed	Elapsed	total wall	total user CPU	total sys CPU	# Trans	Tx/Min
Laptop	0:01:43	1.71	3,645,252	38,029	45,207	14,986	8,764
AWS 8GB 4 CPU	0:00:59	0.98	962,823	4,951	23,387	14,986	15,292
AWS 4GB 1 CPU	0:01:41	1.68	1,723,948	3,663	19,125	14,986	8,920
DO 4 CPU	0:01:05	1.08	1,076,312	13,477	32,899	14,986	13,876
z 2GB 1 CPU	0:02:11	2.18	2,299,745	14,577	9,714	14,986	6,874
z 4GB 1 CPU	0:01:38	1.63	1,673,618	13,125	9,637	14,986	9,194

Do not use this to compare OpenKicks to other systems:

- This is a single daemon process configuration of OpenKicks.
 - GnuCOBOL was used.
 - "Hot Spots" were not moved to in-memory
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IOPING

S/390:

~# ioping -RD /

--- / (ext4 /dev/dm-0 4.96 GiB) ioping statistics ---

22.4 k requests completed in 2.99 s, 87.7 MiB read, 7.50 k iops, 29.3 MiB/s
generated 22.4 k requests in 3.00 s, 87.7 MiB, 7.48 k iops, 29.2 MiB/s
min/avg/max/mdev = 90.4 us / 133.4 us / 96.6 ms / 1.31 ms

~# AMD EPYC @ AWS:

ioping -RD /

--- / (ext4 /dev/root 30.8 GiB) ioping statistics ---

10.3 k requests completed in 3.00 s, 40.1 MiB read, 3.43 k iops, 13.4 MiB/s
generated 10.3 k requests in 3.00 s, 40.1 MiB, 3.42 k iops, 13.4 MiB/s
min/avg/max/mdev = 212.4 us / 291.8 us / 7.61 ms / 103.7 us

COMPILE TIME

S/390 4GB 1CPU 4GBSwap:

load: 0 errors in 0 Load Modules. Skipped 0
bms: 0 errors in 10 Maps. Skipped 0
fnc: 0 errors in 0 Functions. Skipped 0
cbl: 0 errors in 15 Online Programs. Skipped 0
bat: 0 errors in 3 Batch Programs. Skipped 0

real 0m6.042s
user 0m5.270s
sys 0m0.612s

AMD 3200 16GB 4CPU 2GBSwap Laptop:

load: 0 errors in 0 Load Modules. Skipped 0
bms: 0 errors in 10 Maps. Skipped 0
fnc: 0 errors in 0 Functions. Skipped 0
cbl: 0 errors in 18 Online Programs. Skipped 0
bat: 0 errors in 3 Batch Programs. Skipped 0

real 0m7,120s
user 0m5,090s
sys 0m1,942s

AMD EYPC 4GB 1CPU 0GBSwap AWS EC2:

load: 0 errors in 0 Load Modules. Skipped 0
bms: 0 errors in 10 Maps. Skipped 0
fnc: 0 errors in 0 Functions. Skipped 0
cbl: 0 errors in 15 Online Programs. Skipped 0
bat: 0 errors in 3 Batch Programs. Skipped 0

real 0m2.974s
user 0m2.186s
sys 0m0.435s

FUTURE

- **Run the benchmarks with different COBOL compilers**
- **Release benchmark code as open source and challenge AWS to benchmark their system (actually Micro Focus) with our benchmark.**

CHANGES TO OPENKICKS

- **Removing some use of Postgres for system tables. Two highest “Hot Spots” are convertible to in memory database.**
- **Offering selection of connection pooler as a configuration option so each site can optimize their OpenKicks environment. e.g. Local versus Remote database.**

