

The Swami of VSE/VSAM's Batch Performance Tips

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Batch Performance Tips

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Objectives and References



■ Abstract:

- Batch performance is critical to system overall throughput and availability. When jobs don't finish on time, other work must be delayed.
- The Swami's experience in tuning and performance analysis of numerous VSE systems over the years has led to some key hints that you should exploit in your own shops.

■ Background:

- Dan Janda, The Swami of VSE/VSAM, has been involved in VSE (and other) performance tuning activities for over 30 years.
- He has frequently presented at WAVV and other user group meetings, teaches classes on VSAM, and worked in mainframe performance measurement and benchmarking for many years during his IBM career.

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Batch Performance Hints



■ Gather data:

- Do you capture job accounting information?
 - ◆ Elapsed, CPU, Overhead, Wait times?
 - ◆ I/O counts?
- If not, check out \$JOBACCT routine
 - ◆ ICCF Library 59 members
 - ▶ SKJOBACC writes to SYSLST
or
 - ▶ SKJADACC writes to DMF for later reports by
 - ▶ SKJADOFF offloads DMF to ESDS for reporting
 - ▶ SKJOBDMF writes report from ESDS
 - ▶ SKJADRPT reporting job stream
- VSE Collection Kit CD#3, file VE25PE01.PDF (from Dr. Kraemer)

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■ Understand data:

- Understand CPU and I/O performance concepts
 - ◆ Books, Classes, WAVV, consultants
- Use Scientific approach, not the "Easter egg hunt" approach
 - ◆ Vary parameter suspected to be relevant
 - ◆ Observe result
 - ◆ Evaluate resultant change
 - ◆ If positive result
 - ▶ Continue
 - ◆ If negative result
 - ▶ Return to previous value
 - ▶ Continue

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■ Things to evaluate (or try)

- ◆ Label Area in VSE Virtual Disk
 - ◆ Eliminates many I/Os in OPEN
 - ◆ Critical and locked paths
 - ◆ No better place
 - ▶ Actually direct use of data space
- ◆ Large Batch Partitions
 - ◆ Eliminates SORT I/Os, can eliminate many others
 - ◆ I recommend 20 Meg or more except when your application does not permit 31-bit GETVIS use
 - ◆ Fix the application (beat on the vendor, if needed)
 - ◆ Extra (unused) virtual address space does not cause paging, and can save I/Os and overhead

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■ Things to evaluate (or try)

- ◆ VSE Virtual Disk for compile and similar work files
 - ◆ Compilers
 - ◆ SYSLNK
 - ◆ Intermediate files
 - ▶ But Dynamic Partitions cannot use System Files (SYSIN, SYSRDR, SYSIPT, SYSPCH, SYSLST) on disk, even a virtual disk.
 - ▶ Martin's SYS2IPT (?) routine could help
 - ▶ Virtual Tape would work if it writes and reads data space
- ◆ VM Virtual Disk for VSE Lock File
 - ◆ Better than ANY alternative
 - ▶ If you run under VM
 - ▶ If you share DASD

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■ Things to evaluate (or try)

- ◆ Use significant VSAM buffering appropriate for file access
 - ◆ Sequential --
 - ▶ BUFND large enough to hold half a cylinder
 - ▶ BUFNI one per index level -- no more
 - ◆ Direct --
 - ▶ BUFND two to four buffers
 - ▶ BUFNI at least enough to contain high level index
 - Number of index records - number of Data CAs in file
 - Calculate Data CAs = High Used RBA / (num of CIs in CA * CIsz)
 - ◆ AIX Path Access
 - ▶ Ensure BUFFERSPACE for base cluster can accommodate similar number of index buffers (BUFNI * Index CI Size)

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■ Things to evaluate (or try)

- ◆ Use significant VSAM buffering appropriate for file access
 - ◆ How to increase buffering?
 - ▶ A few key jobs and key files...
 - Set BUFND and BUFNI in DLBL in job step
 - ▶ More jobs, but still just key files needing tuning...
 - Set a default BUFND and BUFNI in standard labels
 - ▶ Many (or most) jobs and files...
 - Get a buffering tool, such as CA-HYPERBUF, BIMBUFF
 - The tool's defaults will help some, but You REALLY want to increase YOUR buffering options
 - Set minimum buffering values, don't worry about maximum values -- just make your partitions bigger!
 - MINBUFND=(half cylinder), MINBUFNI=50 or maybe more, MINSTORAGE=512K or more.

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■ Things to evaluate (or try)

- ◆ Use SHARK (ESS), RAMAC Virtual Array, or similar DASD
 - ◆ Great performance benefits from improved technology
 - ◆ FLASHCOPY (on SHARK) or SNAP/SHOT on RVA
- ◆ Cache within or as close to the application as possible
 - ◆ Application internal data tables
 - ◆ VSAM buffers
 - ◆ OPTI-Cache
 - ◆ Cache in processor storage if possible (Multiprise, etc.)
 - ◆ VM Minidisk Cache (if a minidisk)
 - ▶ CACHE-MAGIC
 - ◆ Controller cache

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■ Things to evaluate (or try)

- ◆ Implement application standards:
 - ◆ Development and test
 - ▶ High-level debugging functions fully enabled
 - ◆ Application production cut-over part 1
 - ▶ High-level debugging remains enabled
 - ◆ Application production implementation
 - ▶ High-level code optimization (without debugging)
 - ◆ Understand language performance considerations
 - ▶ COBOL, etc. data definition effects
 - ▶ Review all implementation and maintenance work for standards compliance

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■ Things to evaluate (or try)

- ◆ Consider sequential processing rather than direct when
 - ◆ more than a few records are processed per I/O
- ◆ Consider direct processing rather than sequential when
 - ◆ less than one record is processed per I/O
- ◆ Large blocks are best for sequential -- 26K CIs for VSAM, half-track blocks for SAM on 3390s
- ◆ Smaller than 8K blocks (CIs) provides few if any benefit for direct processing
- ◆ 32K for SAM on tape
- ◆ 64K for IDCAMS BACKUP
- ◆ 30K for DL/I utilities

◆ **Big Blocks work very well**

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■ Things to evaluate (or try)

- ◆ POWER can benefit from quarter-track or larger DBLKs
 - ◆ Adjust DBLKGP to give DBLKGP Size equal to several tracks
 - ▶ 3 to 5 tracks on 3390 might be a good start
 - ◆ Spooled or dummy printers should use 3800 device type
 - ▶ Build 3800-type FCBs
 - ▶ Applications need to use CLOSE correctly for print files
 - When using IPWSEGM, etc.
 - When printing to a single printer from multiple DTFs
 - ◆ Some vendor products (e.g. FAQs, BIMEDIT, ...) use direct access to POWER files, rather than SAS/XPCC interfaces

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- **Things to evaluate (or try)**
 - ◆ LIBR performance does NOT change between SAM and VSAM
 - ◆ VSAM can prevent some re-runs because of ability to acquire additional extents
 - ◆ Customized temporary LIBDEFs can speed jobs
 - ◆ SEARCH chains should include used sublibraries first
 - ◆ Remember IJSYSRS.SYSLIB is normally searched last
 - ◆ Make the temp LIBDEF search chains short, and include IJSYSRS.SYSLIB explicitly after used sublibraries
 - ◆ VSAM -- come to my presentation (here next)
 - ◆ Block big, buffer appropriately, DEFINE with SPEED option
 - ◆ BACKUP BLOCKSIZE(65535) BUFFERS(8)
 - ◆ Don't REORG so much! It may NOT be helping like you think it is

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Conclusion

- **Thanks for attending and your participation**
- **Do you have any outstanding questions?**
- **You can contact the presenter:**
 - ◆ <mailto:theswami@epix.net>
- **The Swami's VSAM web site:**
 - ◆ <http://business.epix.net/~theswami>

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