Optimizing RACF Performance

Session 28

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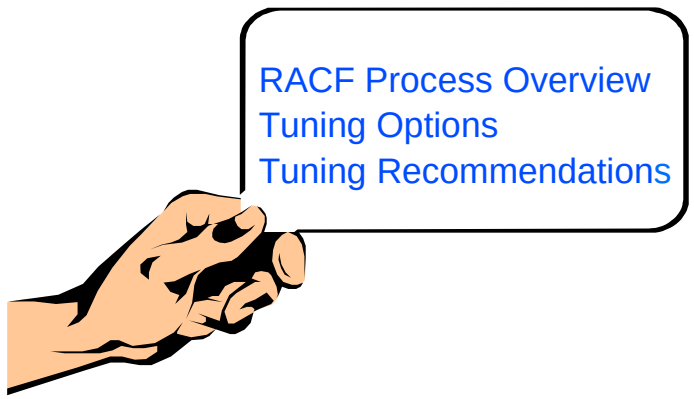
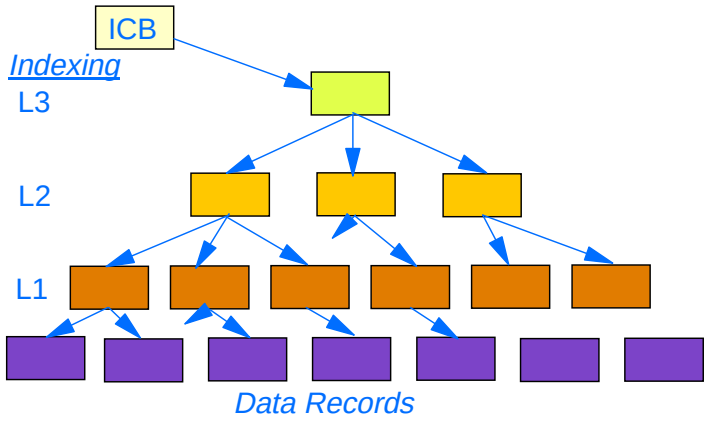
Disclaimer

Trademarks

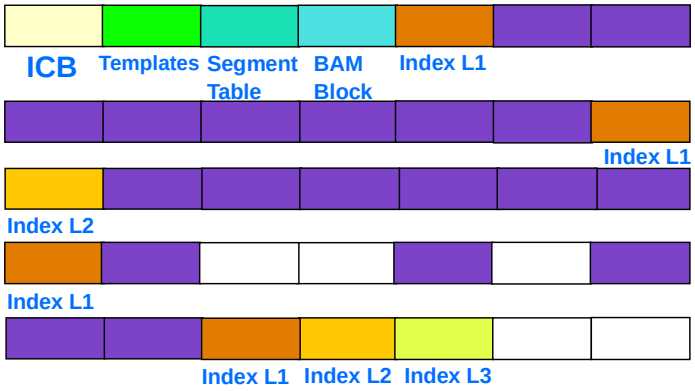
Agenda



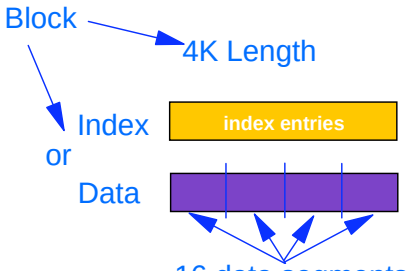
Process Overview-Logical Data Set



Process Overview-Physical Data Set



Overview-Profile Access



Each access to a data block requires:

ICB
One index per level
Data block

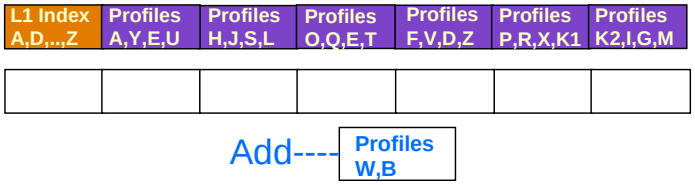
Overview-Index Blocks

Built as needed
Resident Data Block Option
  Builds index and data blocks in storage
ICB coordinates changes between CPUs

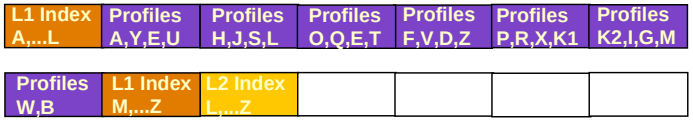
Over time Indices and Data blocks get separated

Overview-Index Separation

Before

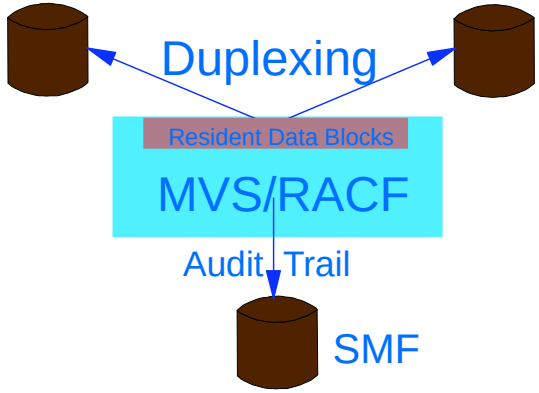


After

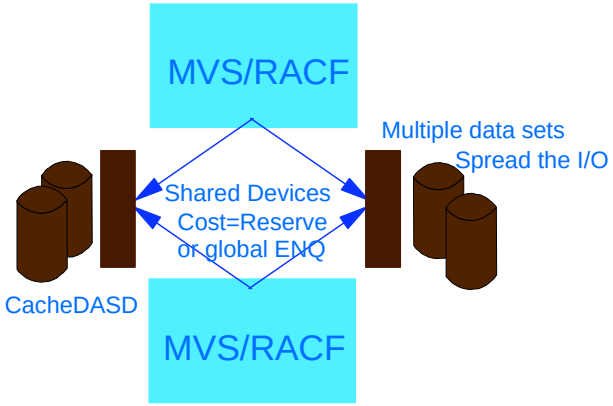


This is why you should run UT400

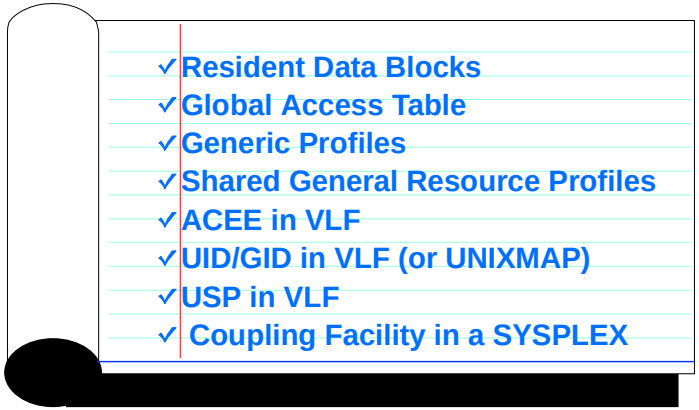
Tuning Options-Influencing I/O



Tuning Options-Influencing I/O...



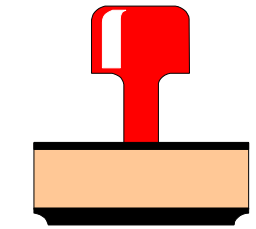
Tuning Options-RACF Setup



Resident Data Blocks Option

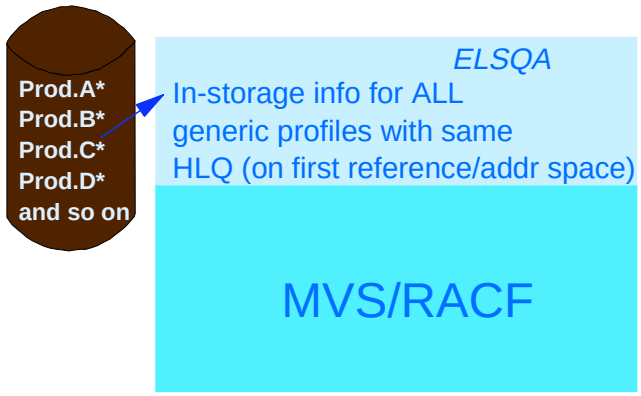
Active blocks kept in storage
Purge with LRU Algorithm

Global Access Table



- Generic Naming Rules
  - &RACUID
  - &RACGPID
- No Logging
- No Statistics
- If not granted in GAT normal check made
- CSA

Generic Profile Checking



Generic Profiles Can Hurt Performance

- RACF will load -all- generic names for data set high level qualifier during OPEN
- At most 4 lists per address space
- With a large number of generics the loading can require a lot of I/O and CPU time
- Possible "thrashing"

Generic Profiles Can Hurt Performance...

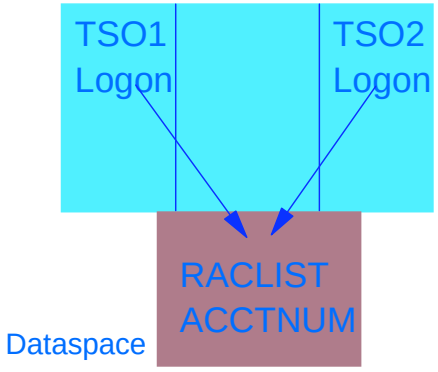
- //DD1 DD DSN=TOM.x
  //DD2 DD DSN=MARY.x
  //DD3 DD DSN=FRED.x
  //DD4 DD DSN=SUE.x

- //SYSPROC DD DSN=SYS1.CLIST
  // DD DSN=ISP.CLIST
  // DD DSN=ICH.CLIST
  // DD DSN=MY.CLIST
  // DD DSN=SYS1.CLST2

Generic Profiles Can Hurt Performance...

- Avoid Problems:
  - Don't create too many generics
  - Watch out for fully-qualified generics
    - Each generic should ideally protect many data sets
  - Use GLOBAL DATASET for data sets everyone needs to READ

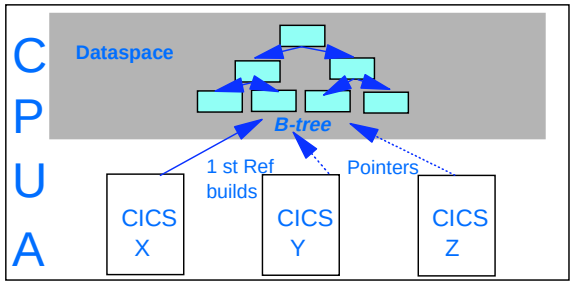
In-Storage Shared Profiles SETROPTS RACLIST



Performance Enhancement

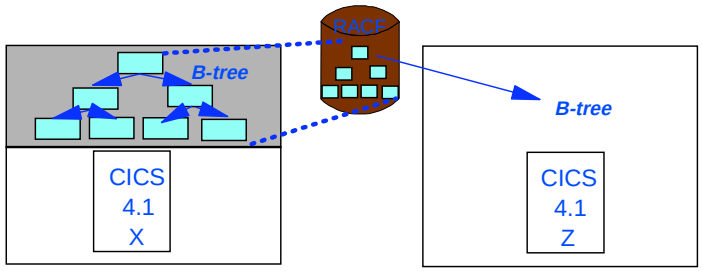
- RACLIST GLOBAL=YES
  - ➤CICS/ESA 4.1, CICS TS, IMS/ESA V6
  - ➤Benefits multiple regions one CPU

RACLIST GLOBAL=YES



- RACROUTE REQ=LIST for TCICSTRN GLOBAL=YES
  - less virtual storage in CICS private
  - faster build for second+ region
  - Faster SETROPTS refresh

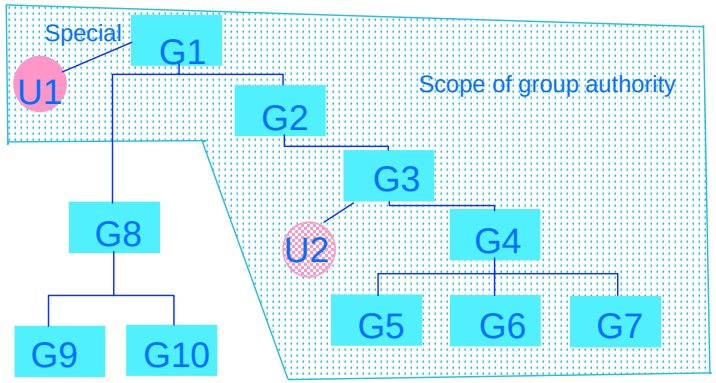
RACGLIST



Intent: Single image across systems and IPLs
- Performance benefit for multiple regions running on different CPUs using same class

Setup: SETR CLASSACT(RACGLIST)
RDEFINE RACGLIST TCICSTRN

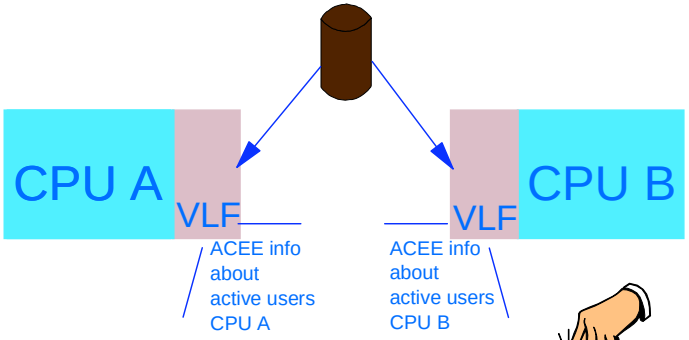
Group Tree in Storage



Group Tree in Storage...

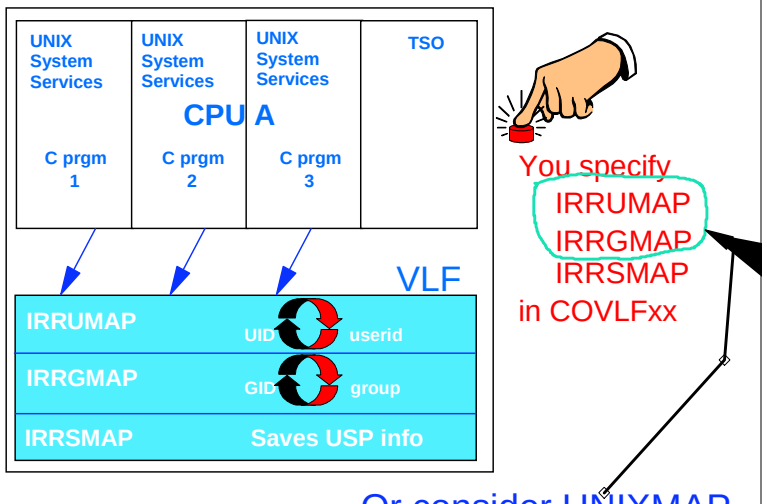
- Uses IRRGTS class in VLF (COFVLFxx)
- Saves info about group relationships (superior group, owner) for use by users who have group-SPECIAL, group-OPERATIONS, or group-AUDITOR
- Probably does NOT help most systems
- Can cause performance problems with split RACF data bases
  - ➡ FIN APAR OW37587, fixed after OS/390 V2R9
- Recommendation: Don't use it

ACEE Data in Memory (VLF)



- IRRACEE in VLF (COFVLFxx)
- Admin changes affect VLF info
- MAXVIRT in VLF default is fine

UNIX Performance Enhancements (VLF)

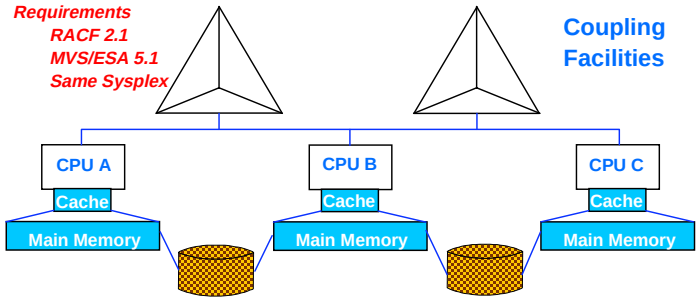


Or consider UNIXMAP

UNIX Performance / Usability Enhancements (UNIXMAP)

- Added by APAR OW30858 for OS/390 R3, V2R4
- Profiles map UID or GID to user ID or group name
  - ADDUSER FRED OMVS(UID(12)) creates U12 profile in UNIXMAP class with FRED on access list
  - ADDGROUP GRP2 OMVS(GID(20)) creates G20 profile in UNIXMAP class with GRP2 on access list
- Avoids scanning RACF database if entry not found in IRRUMAP or IRRGMAP (bad entry, or VLF purged by RACF administration)
- Gives consistent "ls -l" output if IRRUMAP and IRRGMAP not active
- See SYS1.SAMPLIB(IRR30858) to "prime" class

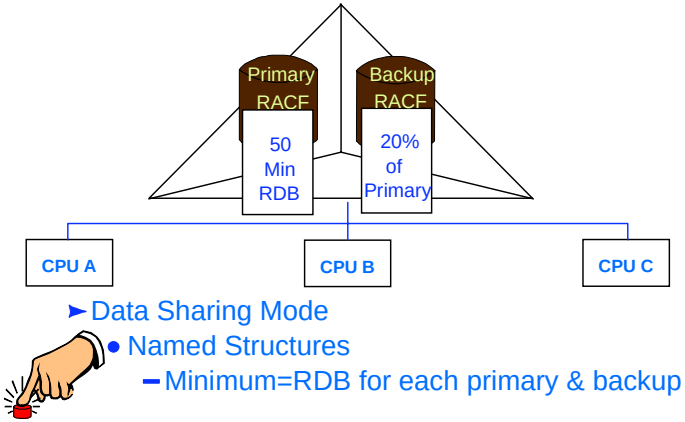
Performance Enhancements 2.1 - Sysplex



- ➤ Sysplex Communication
  - Propagate RVARY
  - Propagate SETR GLOBAL REFRESH

Bit in DSNT

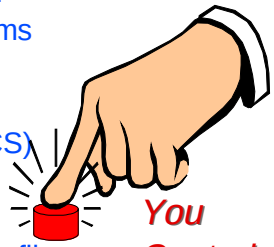
Performance Enhancements 2.1-Sysplex...



- ►Data Sharing Mode
  - Named Structures
    - –Minimum=RDB for each primary & backup

Storage Consumption MVS

- CSA
  - Global Access Table
- CSA/ECSA
  - RACF Data Base Information
  - Profiles for Protected Programs
- LSQA/ELSQA
  - ACEEs
  - RACLISTed Profiles(IMS/CICS)
  - Generic Profiles
- Data Space
  - Shared General Resource Profiles



Options Affecting End User Response Time

- Erase on Scratch
- Long Group Trees
- Some admin functions
  - V2.1 improved IRRUT200
- Connections to many groups
- Very large groups
- Very large access lists

Summary

Of the factors that impact RACF performance, benefit is greatest in reducing I/O activity

Tuning Recommendations

- Skip Duplex profile statistics
- Minimize level of SMF audit
- Place RACF DS on fast device
- Use Resident Data Blocks
- Use Coupling Facility (data sharing mode)
- Use Global Access Table
- Use generic profiles with care
- Use SETR RACLIST
- Control Admin functions
- Keep ACEEs in VLF
- Reorg your data set
- Split database as last resort