

Optimizing RACF Performance

Session 28

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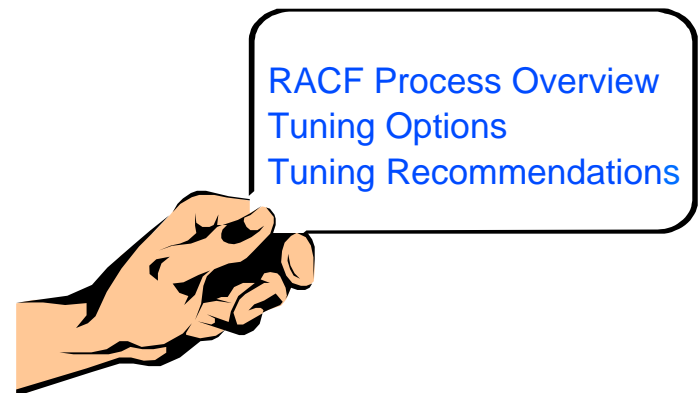
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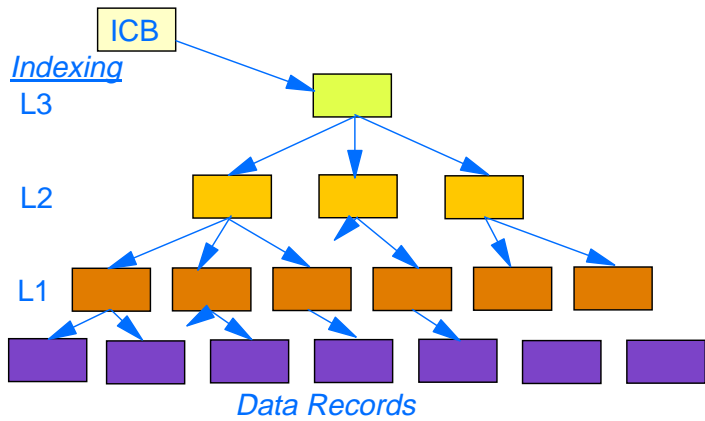
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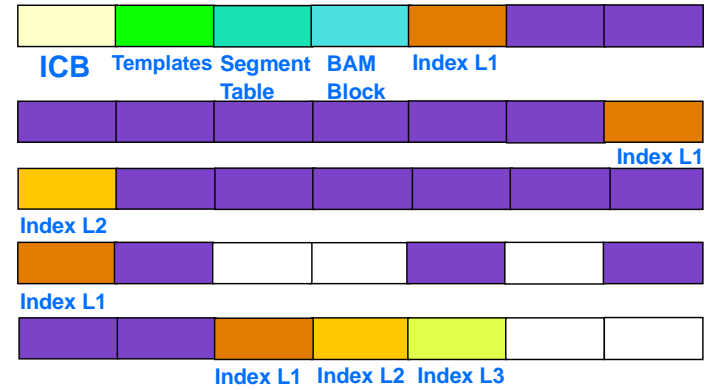
Agenda



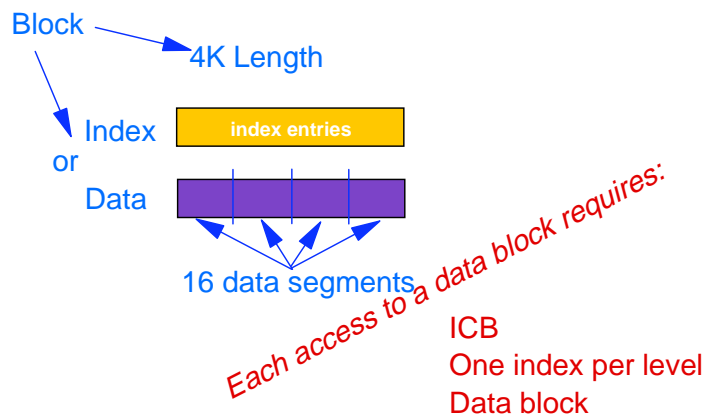
Process Overview-Logical Data Set



Process Overview-Physical Data Set



Overview-Profile Access



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

L1 Index A,D,...Z	Profiles A,Y,E,U	Profiles H,J,S,L	Profiles O,Q,E,T	Profiles F,V,D,Z	Profiles P,R,X,K1	Profiles K2,I,G,M
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Add---- Profiles
W,B

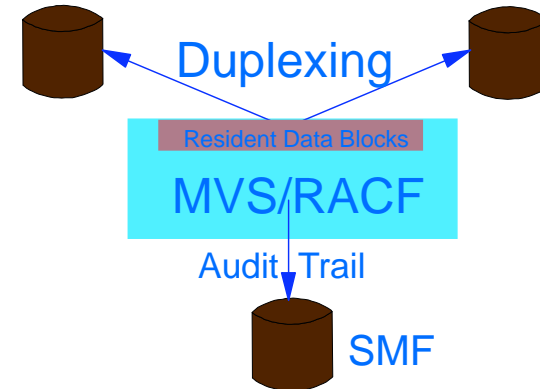
After

L1 Index A,...L	Profiles A,Y,E,U	Profiles H,J,S,L	Profiles O,Q,E,T	Profiles F,V,D,Z	Profiles P,R,X,K1	Profiles K2,I,G,M
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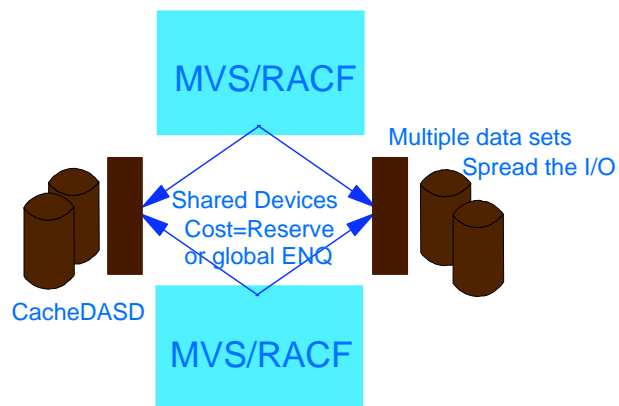
Profiles W,B	L1 Index M,...Z	L2 Index L,...Z				
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This is why you should run UT400

Tuning Options-Influencing I/O



Tuning Options-Influencing I/O...

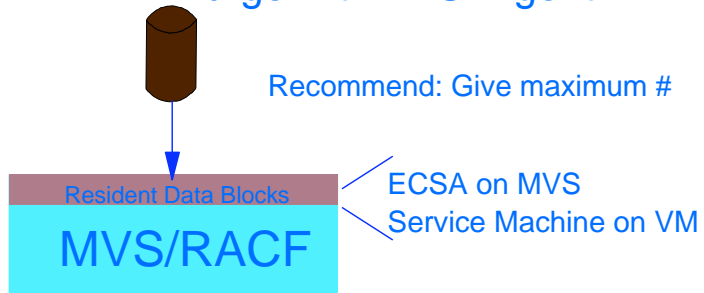


Tuning Options-RACF Setup

- ✓ Resident Data Blocks
- ✓ Global Access Table
- ✓ Generic Profiles
- ✓ Shared General Resource Profiles
- ✓ ACEE in VLF
- ✓ UID/GID in VLF (or UNIXMAP)
- ✓ USP in VLF
- ✓ Coupling Facility in a SYSPLEX

Resident Data Blocks Option

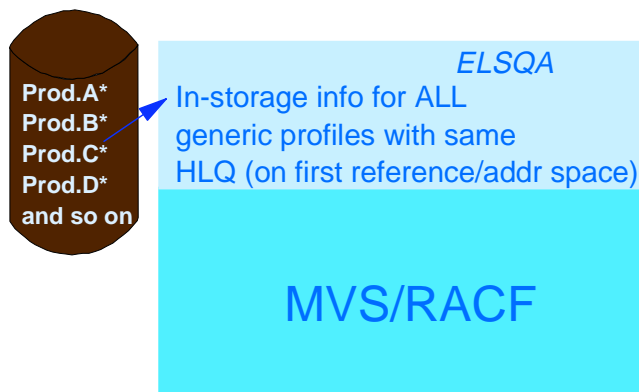
Active blocks kept in storage
Purge with LRU Algorithm



Global Access Table

-
- Generic Naming Rules
 - &RACUID
 - &RACGPID
 - No Logging
 - No Statistics
 - If not granted in GAT normal check made
 - CSA
- Access Approved
- The diagram shows a red stamp with the text 'Access Approved' in red. The stamp is positioned to the left of the list of bullet points.

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"

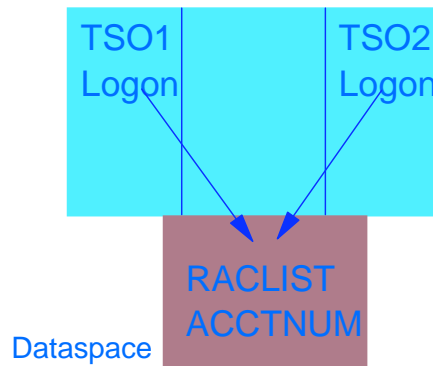
Generic Profiles Can Hurt Performance...

- //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

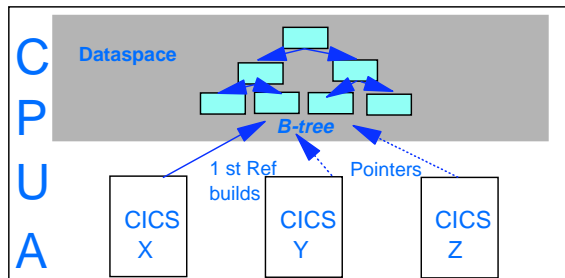


Performance Enhancement

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

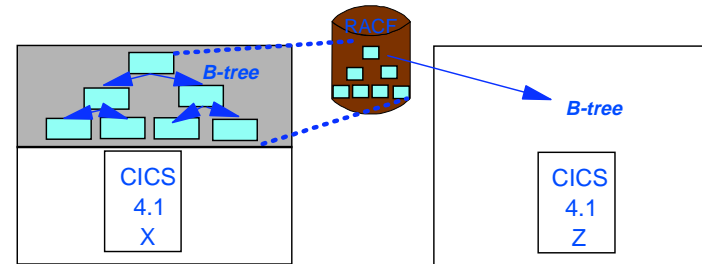


RACLIST GLOBAL=YES



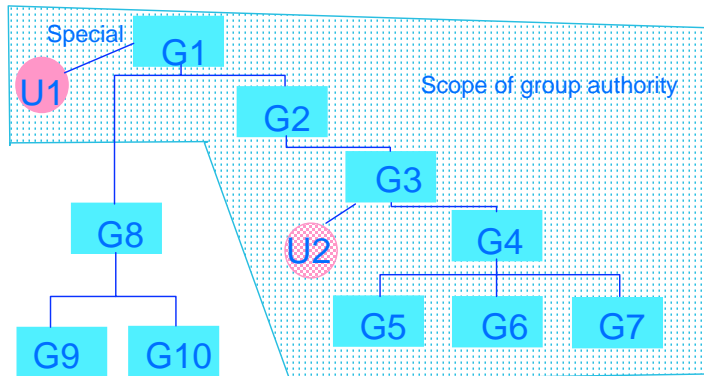
- ▶ RACROUTE REQ=LIST for TCICSTRN GLOBAL=YES
 - ▶ less virtual storage in CICS private
 - ▶ faster build for second+ region
 - ▶ Faster SETROPTS refresh

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

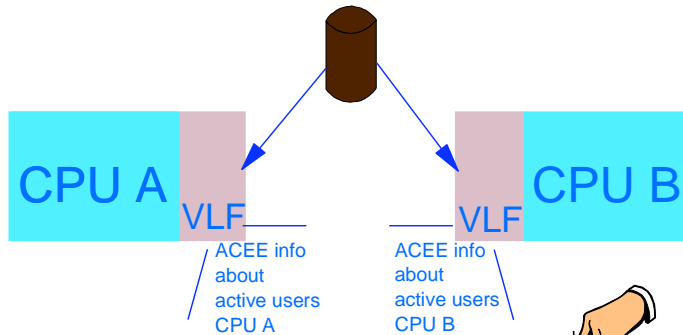
Group Tree in Storage



Group Tree in Storage...

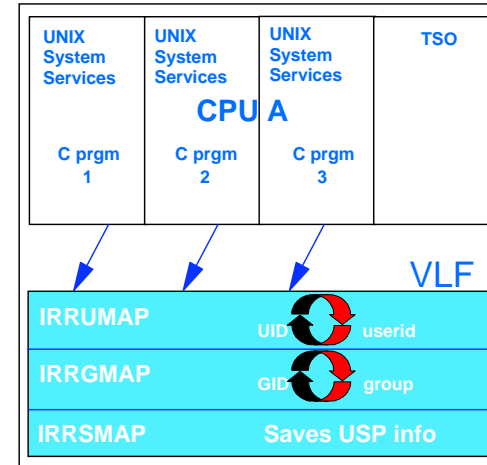
- Uses IRRGTS class in VLF (COFVLFxx)
- Saves info about group relationships (superior group, owner) for use by users who have group-SPECIAL, group-OPERATIONS, or group-AUDITOR
- Probably does **NOT** help most systems
- Can cause performance problems with split RACF data bases
 - FIN APAR OW37587, fixed 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)



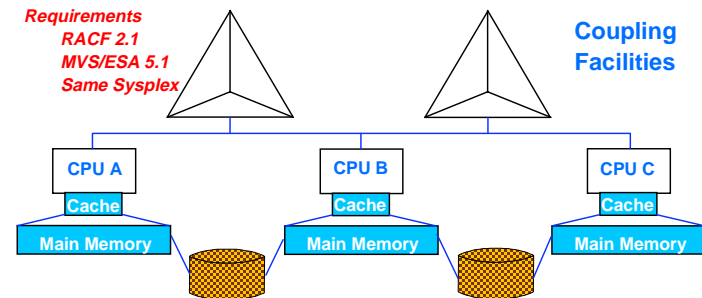
You specify
IRRUMAP
IRRGMAP
IRRSMAP
in COVLFxx

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

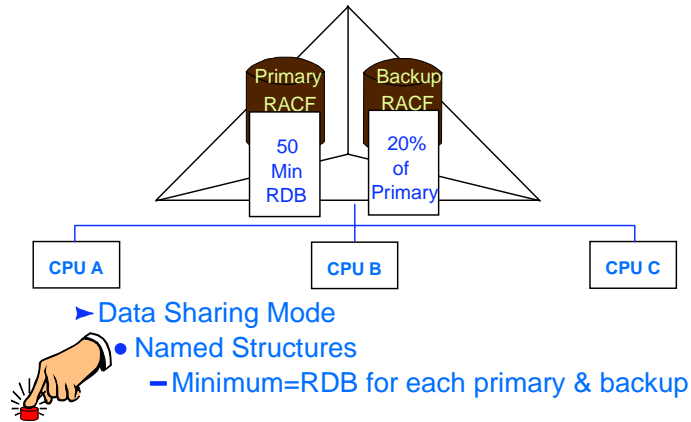


► Sysplex Communication

- Propagate RVARY
- Propagate SETR GLOBAL REFRESH

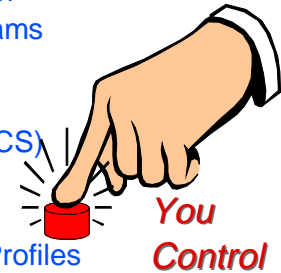
Bit in DSNT

Performance Enhancements 2.1-Sysplex...



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