D03: CA IDMS 1211 Recovery Techniques

IUA/CA IDMS™ Technical Conference

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Abstract

- The dreaded IDMS 1211 error code – we hate it, we fear it; yet we can't ignore it; we are forced to deal with it. This presentation will show what it means, what causes it, how to prevent it, and how to remedy a 1211 error when it does occur.
- Each opportunity to prevent and/or resolve a 1211 condition may be best served by a different solution – there is no one right solution – each approach has its own benefit and consequence. The opinions stated in this presentation reflect only the 30 years experience of the presenter; the opinions expressed in this presentation do not reflect the opinions or preferred approaches of anyone else nor the software vendor (CA).
- Source code cited in this presentation will be posted to the CA IDMS Communities website.

Biography

- Chris Hoelscher started his professional IT career as a data entry clerk in 1980, and has since held roles as tape and printer clerk, computer operator, programmer, and database administrator. Chris has worked with CA IDMS since 1986 (now in his 30th year!) , and has held positions as chair of the Ohio Valley (1993-1995) and Dallas (1997-1998) CA IDMS user communities, and was interim chairperson of the IUA (global IDMS user community)(1998). Chris currently resides with his family in Louisville KY where he is an associate of Humana Inc. as a Senior IDMS and DB2 Database Administrator/Technical Architect.

Agenda

- What is the Problem?
- Why does this Occur?
- How can we Design to Prevent a 1211?
- How can we Anticipate to Prevent a 1211?
- How can we remedy a 1211?
- Summary of Alternatives

What is the Problem?

- A 1211 means that THIS store request (and this request only) could not find a page within the associated database area with available free space to satisfy the store request
- Other (smaller length) store requests may continue to be satisfied within the same database area (perhaps even the same database page)
- A 1211 error code does NOT mean the database area is full

Why does this Occur?

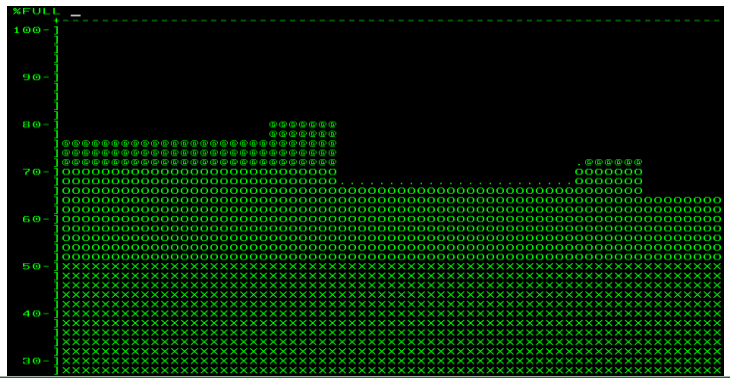
- Big Loads
  - Oops – did we forget to tell you we were loading 50 million rows ….
- Errant Processes
  - Oops – we only made one little change to the program ……
- Lack of Purging old/unneeded data
  - Well – someday we MIGHT need data from 1973 …..
  - Our contract does not include writing purges …
- Initially incorrect page size or changed row length
  - We were told to use the specs from our last project – they should work

How can we Design to Prevent a 1211?

- The best way to deal with a 1211 is to prevent one in the first place
- Database design
  - A database page's page entry is only updated in space management WHEN (and only WHEN):
    - A STORE is attempted
    - The STORE fails for a page
    - As a result of the STORE failure the SMP entry for that page is updated with the exact amount of remaining space on the page if the space currently used is greater than 70% of the page size
  - Never design a database where a record occurrence could occupy greater than 33 1/3% and less than 35%, or from 51% to 69% of an otherwise empty page (could never get to 70%)

How can we Anticipate to Prevent a 1211?

- Monitor database area growth
  - Account for periodic purges (saw-tooth graph)
  - Source to create this graph will be posted



How can we Anticipate to Prevent a 1211? (continued)

- Produce listing of soon-to-be-full database areas (giving more weight to more recent percentages full)
- Source to create this report will be posted

REPORT NO. 02 SOON-TO-BE-FULL AREA REPORT 01/24/16 PAGE 1

SEGMENT/AREA NAME	DAYS COUNTED	AVG UTIL	CURRENT UTIL	DAYS TILL 70% FULL	DAYS TILL 100% FULL
SCPRE01.RE-FUNDIX3-AREA	61	67.92	73	*******	159
SCPGH01.GC-PDQREQ-AREA	378	61.76	82	*******	168
SCPUS01.US-AUDUPD-AREA	378	84.94	91	*******	*******
SCPUS01.US-REMK-AREA	378	85.12	89	*******	*******
SCPRE200.RE-SEGCTL-AREA	378	86.00	86	*******	*******
APPLDICT.DDLDCLOD	378	82.88	84	*******	*******
APPLTURN.DDLDCLOD	2	84.33	84	*******	*******
SCCRE01.RE-PIPDTL-AREA	378	77.62	82	*******	*******
SCPGH01.SG-LDGCMT-AREA	378	81.25	82	*******	*******
SCPRE01.RE-PIPDTL-AREA	378	78.84	82	*******	*******
SCPMC10.MC-PURGE-AREA	378	81.00	81	*******	*******
SCPRE200.RE-CTLMBR-AREA	378	81.00	81	*******	*******
SCPCM10.CM-CHGSTR-AREA	378	79.73	80	*******	*******
SCPRE01.RE-CTRCT-AREA	286	77.06	80	*******	*******
SCCRE01.RE-CTRCT-AREA	378	74.10	79	*******	*******
SCPUS20.US-LOGIX-AREA	378	73.53	78	*******	*******
SCPRB01.QUAL-REG	378	77.00	77	*******	*******
SYSDIRL.DDLDML	378	76.38	77	*******	*******
SCPRE01.RE-CTRPAYIX-AREA	378	68.87	75	*******	*******
SCPMC90.MC-PURGE-AREA	378	73.00	73	*******	*******
SCCRE01.RE-CTRPAYIX-AREA	378	65.40	72	*******	*******
SCPUS01.US-NAMEIX-AREA	378	70.29	72	*******	*******
SCPCH01.CH-INDEX-AREA	378	69.34	71	*******	*******
SCPMC80.MC-PURGE-AREA	378	71.00	71	*******	*******
SCPRE01.RE-ADJCTL-AREA	46	68.97	71	*******	*******
SCPRE01.RE-LEDGER-AREA	378	64.90	70	*******	*******

SCPRE01	6
SCCRE01	3
SCPUS01	3
SCPGH01	2

How can we Anticipate to Prevent a 1211? (continued)

- REORG utility or UNLOAD/RELOAD
  - Can modify page size or number of pages or page ranges
  - Requires Areas to be RET or OFL
  - Offers more flexibility than EXTEND SPACE or EXPAND PAGE, but requires more setup, area unavailability, more execution time
  - May require temporary schema/subschema and DMCL/Segment
  - For complete syntax, see CA IDMS Utilities Guide
  - For More information on the REORG utility, attend Dick Weiland's REORG presentation immediately following this presentation

How can we Anticipate to Prevent a 1211? (continued)

- REORG utility or UNLOAD/RELOAD (continued)
  - Steps
    - BACKUP all potentially affected areas
    - Determine peripheral areas affected
      - Run unload utility to get area dependency listing, then cancel
    - Create new physical datasets with desired #pages/blksize (as .new?)
      - If possible include all areas touched by set pointers –
    - Create new DMCL to reflect new dataset names and attributes
    - Create new schema/subschema if making schema changes
    - Execute FORMAT Utility against all .new datasets
    - Execute the Unload/Reload or Reorg
    - Rename the existing datasets to .old, the .new to the original names

How can we Anticipate to Prevent a 1211? (continued)

- REORG utility or UNLOAD/RELOAD (continued)
  - Steps (continued)
    - Apply the changes from the new DMCL/Schema to the original DMCL/Schema
    - NEWCOPY the updated DMCL/Schema where needed
    - DCMT VARY the areas to their pre-unload status

How do we Remedy a 1211?

- EXTEND SPACE
  - No additional outage of any database area required
  - Steps
    - Execute LOOK DMCL SORTED PAGES to find adjacent available area pages BEYOND the area, or write a program to report gaps (source for this report will be posted)
    - Create the physical dataset for the extended file
    - Define the IDMS file (containing the extended pages) to the segment
    - Alter the AREA definition (MAX SPACE) to reserve the extended pages
    - Alter the AREA definition to include the EXTENDED pages
      - ALTER AREA xx EXTEND SPACE xx PAGES WITHIN FILE xxxxxxx FROM 1 FOR ALL BLOCKS
    - Change DMCL buffer override for new FILE if necessary

How do we Remedy as 1211? (continued)

- EXTEND SPACE (continued)
  - Steps (continued)
    - Generate, punch, and link-edit DMCL (into a non-live loadlib, if possible)
    - Format the new FILE (using DMCL in the non-live loadlib)
    - Move the DMCL load module to the appropriate LIVE loadlib
    - Newcopy the DMCL in the appropriate CVs
      - **READ-ONLY CVs first**
      - **UPDATE CV last**
  - IDMSCALC still honors the original hi/lo CALC boundaries; CALC overflow is likely
  - If the EXTENDED area contains CALC records, a subsequent unload/reload (to remove the performance issues of the EXTEND SPACE) is suggested

How do we Remedy as 1211? (continued)

- EXPAND PAGE
  - Increases the page size of an existing database area
  - Must run by FILE, not AREA
  - Steps
    - Create OS file – same # blocks/pages, bigger page/block size
    - Assure existing AREA is RET or OFL
    - Submit utility through Local Mode BCF
      - EXPAND page for FILE segment-name.file-name INTO new file ddname (from JCL) NEWSIZE new-page-size
      - Space added to each page before footer
      - SMP enlarged; but number of entries does not change

How do we Remedy as 1211? (continued)

- EXPAND PAGE (continued)
  - Steps (continued)
    - Alter File definition (if needed)
    - Alter Area definition
      - ALTER AREA *name* PAGE SIZE *new* ORIGINAL PAGE SIZE *old*
    - Regenerate DMCL(s)
    - New Copy DMCL(s)
      - READ-ONLY CVs FIRST
      - UPDATE CVs LAST
    - Vary areas to whatever they were before (if needed)

How do we Remedy as 1211? (continued)

- Other possible Remedies?
  - CONVERT PAGE utility
  - Reassigns page range of YOUR area or a roadblock area in your way
  - May allow EXTEND SPACE
  - Must run against all "touched" areas
- Reassign Segment to unused or underused Page Group
  - Allows EXTEND SPACE
  - DBNAME consequences
- Get the Developers to Write (and hopefully test) the Purge

Summary of Alternatives

ALTERNATIVE	BENEFITS	CONSIDERATIONS
UNLOAD/RELOAD or REORG	All-encompassing solution Can work around any page range roadblock	Requires additional outage Peripheral areas may be involved (set pointer changes to multi-area sets)
EXTEND SPACE	No additional outage required Only "full" area affected – no set pointer changes	CALC overflows will occur – possible performance problems – may require UNLOAD/RELOAD/REORG Page range roadblocks may require CONVERT PAGE or page group reassignment
EXPAND PAGE	Only "full" area affected – no set pointer changes No "area roadblocks" to contend with	Area must be in RET or OFL # SMP entries not increased Unload/Reload/Reorg to normalize May require new buffers in DMCL

Questions and Answers

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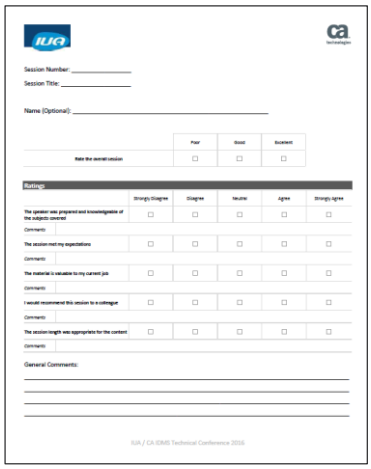

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