DALO CONSULTING INC.

Obsolete DBA Best Practices

Nectarios (Nectar) Daloglou
President
Dalo Consulting Inc.

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Agenda

Introduction
- **Improve Performance**
- **Save Time**
- **Reduce Downtime**
- **Other Interesting Tricks**
- **Questions**

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- **About Me:**
  - **Performed specialized services at more than 55 Progress customer sites:**
    - **Progress Database Administration**
    - **Install/Upgrades/Migrations of Progress and QAD Applications**
    - **Technical Audits / Performance Tuning**
    - **Business Continuity Strategies**
  - **Key Member in large Progress and QAD implementation**

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Product Lifecycle

- **Is Your Progress Version Obsolete?**

Lifecycle by Product Release			
	Active	Mature	Retired
OpenEdge 11.2	2013-Feb	-	-
OpenEdge 11.1	2012-Jun	2013-Feb	-
OpenEdge 11.0	2011-Dec	2012-Jun	-
OpenEdge 10.2B	2009-Dec	2011-Dec	-
OpenEdge 10.2A	2008-Nov	2009-Dec	2010-Feb
OpenEdge 10.1C	2008-Feb	2009-Aug	-
OpenEdge 10.1B	2006-Dec	2008-May	2008-May
OpenEdge 10.1A	2005-Dec	2007-Mar	2007-Mar
OpenEdge 10.0B	2004-Aug	2006-Mar	2006-Mar
OpenEdge 10.0A	2003-Dec	2004-Nov	2004-Nov
Progress V9.1E	2004-Nov	2006-Nov	-
Progress V9.1D	2002-May	2005-Feb	2005-Feb
Progress V8.3E	2001-Dec	2002-Mar	2010-Feb
Progress V8.3D	2000-Jan	2002-Mar	2002-Mar

Reference: http://communities.progress.com/pcom/docs/DOC-32338 06/04/2013

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Before We Start…

- *Your Mileage May Vary*
  - **Information in this presentation may not necessarily apply to your environment**
  - **Don't hesitate to verify your best practices with your favorite DBA**
  - **The recommendations are general and apply mostly to OpenEdge 10+ environments**

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Product Life Cycle In Brief

- **Active:**
  - **Fully supported and receive new features and enhancements.**
- **Mature:**
  - **Fully supported but do not receive new features;**
  - **Evaluated for certifications on new operating environments.**

Reference:
http://www.progress.com/support/Progress_Product_Versioning_Release_Types_Lifecycle-Policy_2010.pdf 06/04/2013

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Product Life Cycle In Brief

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- **Retired:**
  - Not available for sale, only for adding user counts to existing licenses;
  - Not evaluated for certifications on new operating environments;
  - No Service Packs, nor Hot Fixes
  - Progress strongly recommends that customers migrate or upgrade to fully-supported Progress products as soon as possible in order to maintain the highest level of support for their applications and systems.

Reference: http://communities.progress.com/pcom/docs/DOC-32338 09/16/2012

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Obsolete Practices

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- **Common Reasons**
  - *If it ain't broke why fix it?*
    - Reduced Performance
    - Longer to maintain than required
    - Unnecessary downtime
  - Version or system does not support the new method
  - New functionalities are not known
  - The practices have not been revisited since the upgrade

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QUESTION

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Which of the following items below can still be useful?

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ANSWER

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All of the items below are considered obsolete but can still be used for one reason or another.

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Obsolete Practice

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- **Regularly Truncating the BI**
  - *proutil <DB> -C truncate bi*

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Obsolete header

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Regularly Truncating the BI

- **Common Reasons:**
  - Save space on the disk drives or backup tape
  - Avoid an uncontrollable size
  - Prevent data-loss
  - Been doing so for years…

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BI Formatting

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BI In Brief

- **Every transaction is logged in the BI file;**
- **Ensures database integrity:**
  - Undoes or reverses uncommitted transactions in the event of a failure or crash;
  - Writes buffered transactions that have not yet made it into the DB files;
  - Restores the DB to a consistent state after a failure or crash

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Solution

- **Avoid truncating the BI**
- **Use BI Grow:**
  - *proutil <DB> -C bigrow <# clusters>*
- **Keep track of BI file growth**
  - Identify the BI's "natural size"
  - Can be tracked using the VST:
    for each _AreaStatus where _AreaStatus-Areanum = 3:
    disp _AreaStatus-Totblocks
  - Or by the BI file itself if using a variable extent:
    ls -l qaddb.bi
    -rw-r--r--   1 mfg   qad   1148276008 Sep 18 00:17 qaddb.bi

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BI In Brief (con't)

- **The BI consists of clusters**
  - Default 512KB
- **BI space is re-used when it's no longer needed**
- **All transactions freeze when the BI is growing and formatting**

Reference: Progress Kbase #13866 – Undo and Redo Logging: How the BI file works
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Valid Truncate Reasons

- **Valid Reasons for Truncating:**
  - Reduce the size after an unusual operation.
    - Example:
      - Dump/Load
      - After a very largely scoped or old transaction has occurred
  - Access a database in Read-Only mode:

```
                              Error
WARNING: Before-image file of database /reg03/dbs/h1p/r03prd1h1p is not
                       truncated. (1552)
                           <OK>
```

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Valid Truncate Reasons

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- **Valid Reasons for Truncating (con't):**
  - When the truncate is followed by the "BIGROW" command;
  - Progress automatically truncates during certain operations:
    - Example:
      - When activating After-Imaging
      - When changing the BI block size or cluster size

"Schema Area" Storage Area

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- **Contains Master Block and other DB structure info;**
- **No flexibility on the records per block, always 32:**
  - *d "Schema Area":6,32;1*
- **No flexibility on the storage area type, always Type 1:**
  - *d "Schema Area":6,32;1*
- **Cannot separate database objects in a logical manner for optimized performance.**

Obsolete Practice

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- **Using your database like a version 8 DB in an OpenEdge installation**
  - **Using the default "Schema Area"**

    ADD TABLE "Acc_bal«
    AREA "Schema Area"
    DESCRIPTION "Account Balances"

    ADD INDEX "Key" ON "Acc_bal"
    AREA "Schema Area"
    UNIQUE
    PRIMARY
  - **Using Type 1 Storage Areas:**
    - *d "TRANSACTION":7,64;1*
    - *d "TRHIST":25,64; 1*

Type 2 Storage Areas

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- **Identified by a number other than "1" which follows the records per block setting, which specifies the blocks per cluster:**
  - *d "TRANSACTION":7,128;512*
  - *d "STATIC":9,64;8*
- **Allows us to store database objects in clusters;**
- **Reduces scatter as blocks are contiguous and belong to the same object;**
- **Type 2 is defined during the creation of the storage area or database.**

Storage Areas In Brief

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- **Storage Areas let us physically define where to store our database objects;**
- **They let us choose where to place the actual database files;**
- **We can choose the records per block to better optimize;**
- **With OpenEdge 10+, we have type 2 storage areas which enables us to store our data in clusters.**

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Obsolete Practice

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- **Scripts for managing After-Imaging**
  - **After-Imaging is essential for restoring a DB**
  - **Without AI, we can only restore from our last good backup**
  - **Until version 10.1A, managing After-Imaging has been a challenge.**

AI Management Utility

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- **A.K.A. AI File Management Tool, AI Archiver**
- **Replaces most of the AI scripting**
- **AI Archiver archives AI extents as soon as they become full or through a specified interval**
- **Gives a descriptive yet long name to archived extent:**
  ~aisave~v10~db1~00009.0001.db1.a1

After-Imaging Scripts

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- **AI once required complex scripting**

```
#!/usr/bin/ksh## Script to check AI extents and switch, if necessary.# Set common variables.
./dba/scripts/setenv.qaddbTHISSCRIPT=$0SCRIPTNAME=`basename $THISSCRIPT usage="Usage: $0 <DB> <FORCE>"BACKDIR=/work/PRD/qaddbbkup;
export BACKDIRALTPATH=nonoFORCE=noFAILED=0# Set up error notification e-mail headerEMAILSUBJ="hostname": Error in
$THISSCRIPT"EMAILTo="dba@dba.com"failcheck()(if [ $? -ne 0 ];then   echo **   echo "***** Script Failed Here *******   let
FAILED+=1fi)if [ $# = 1 ] || [ $# = 2 ];then   DB=$1   DBNAME=`basename $DB`   # Test if DB exists and if enabled for AI and valid   # with
Progress version   rfutil $DB -C aimage extent list > /tmp/tmpextlist$$   if [ $? = 0 ];then   continue   else   echo     echo
"ERROR! $DB is not a valid DB for AI or Progress version not compatible"   echo Exiting...   rm /tmp/tmpextlist$$   exit 1
exit 1     fi24%j0     # Test if FORCE parameter is specified   if [ $# = 2 ];then            if [ $2 = "FORCE" ];then   FORCE=yes
else   echo $2 is not a valid parameter   echo $usage   exit 1   fielse   echo   echo $usage   exit
1fi#  Exit if the previous iteration of this script is sleeping.# Skip this check if FORCE parameter is
specifiedRUNNINGFLAG=/home/dbmanage/$SCRIPTNAME.$DBNAME.running;export RUNNINGFLAGif [ $FORCE = "no" ] && [ -f $RUNNINGFLAG ];then
echo $THISSCRIPT is already running   exit%)0fiecho RUNNING FLAG: $RUNNINGFLAGtouch $RUNNINGFLAGchmod 640 $RUNNINGFLAGchown
dbmanage          $RUNNINGFLAGcat       >> $RUNNINGFLAG    <<    EOF`date`$THISSCRIPT            $1EOFecho
+=====================================================+datelet NumExtents=`grep -c Extent: /tmp/tmpextlist$$`let LockedExtents=`grep -c "Status:   Full"
/tmp/tmpextlist$$`let LockedExtents=`grep -c "Status:   Locked" /tmp/tmpextlist$$`let EmptyExtents=`grep -c "Status:   Empty" /tmp/tmpextlist$$`let
MinEmptyExtents=$NumExtents-1let MinEmptyExtents=$LockedExtents#let MaxFullExtents=$NumExtents-2echo =======================+echo
$DBecho "Number of Extents:" $NumExtentsecho "Full Extents:    " $FullExtentsecho "Locked Extents: " $LockedExtentsecho "Empty Extents:    "
$EmptyExtents# Backup all full extents and mark them as empty, then switch AI.  if [ $FullExtents -gt 0 ];then    #echo "Maximum Full Extents: "
$MaxFullExtents    echo "Actual Full Extents: " $FullExtents   echo "Actual Empty Extents: " $EmptyExtents   # AI: echo "Maximum Full Extents: " # AI: echo "  aimage
extent full"   if [ $? -eq 0 ] ; then          while [ $EmptyExtents -lt $MinEmptyExtents ] ;do          CurrFullExtent=_rfutil $DB -C aimage extent full`
BackupFileName=$BACKDIR/`basename $CurrFullExtent`.`date +%Y-%m-%d.%H.%M.%S`          echo COPY $CurrFullExtent to $BackupFileName
cp $CurrFullExtent $BackupFileName          failcheck          gzip -v $BackupFileName          failcheck         if [ $FAILED = 0 ]; then
_rfutil $DB -C aimage extent empty          _rfutil $DB -C aimage extent list > /tmp/tmpewlist$$          let EmptyExtents=`grep -c "Status:
Empty" /tmp/tmpewlist$$`                 rm /tmp/tmpewlist$$          else          break          fi          done   fi   firm /tmp/tmpextlist$$
Execute RSYNC script in background#/dba/scripts/rsync.sh >> /var/adm/rsync_log 2>/dev/null &# Remove running flag unless FORCE is specifiedif [
$FORCE = "no" ];then     rm $RUNNINGFLAGif [ $FAILED -gt 0 ]; then    date    echo Error in AI Check Script    cat > /tmp/msg$$ << EOFThere was an
error in the AI check script for $DB .Please check the log file in /tmp/$SCRIPTNAME.$DBNAME.log.EOF     mailx -s "$EMAILSUBJ" $EMAILTO <
/tmp/msg$$   rm /tmp/msg$$fiecho +=====================================================+
```

AI Management Utility

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- **Steps to enable:**
  1. *rfutil <DB> -C aiarchiver enable*
  2. **Add parameters in database startup script:**
     proserve <DB> [parameters]
     -aiarcdir <acrhive directory>
     -aiarcinterval <seconds>
- **Also possible to activate online with the probkup command:**
  probkup online <DB> <DB>.bak enableai enableaiarchiver -aiarcdir <dir>

After-Image Scripting

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- **AI Management:**
  - **Avoid Downtime**
    - **Ensure empty extents are available**
    - **Ensure AI script is running**
  - **Be prepared in case of failure**
    - **Archive all full extents**
    - **Assign descriptive name to archived extents**
    - **Pair archive extents with database backup files**

Obsolete Practice

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- **After-Image File Replication or "Poor Man's Replication"**
  - **Uses AI files to replicate to a secondary server for a warm spare or business continuity**
  - **Uses scripts to transfer full AI extents and roll them forward to a warm spare database**

Source DB → **AI Extents** → **AI Extents** → **Target DB**

Slide 31

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AI Replication

- **Requires complex scripting**
- **Often requires minor adjustments and manual intervention**
- **Still requires a Progress license on target server**
- **The OpenEdge Replication license often costs less than the target server's duplicate set of licenses**

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Slide 34

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Obsolete Practice

- **Putting too much emphasis on managing fixed extents**

- d "TRANSACTION":7,64;8 f 200000
- d "TRANSACTION":7,64;8

- d "TRANSACTION_IDX":8,64;8 f 20000
- d "TRANSACTION_IDX":8,64;8 f

- d "STATIC":9,64;8 f 600000
- d "STATIC_IDX":9,64;8

- d "HISTORY":9,64;8 f 200000
- d "HISTORY_IDX":9,64;8

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Slide 32

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OpenEdge Replication

- **OpenEdge Replication helps in recovering from a disaster by replicating the Progress databases to another server or site**
- **The target database can be used for reporting**
- **Low latency**

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Fixed Extents

- **Main Reason:**
  - **Writing in the variable extent uses more I/O, thus slowing down overall performance**

- **However…**
  - **Servers and disk subsystems are much faster than they were 10 years ago, especially the I/O performance**
  - **The performance penalty for variable extents is often negligible.**

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Slide 33

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OpenEdge Replication Architecture

Primary Machine

Source Database — AI Extents

Users Doing Work — Replication Server

Secondary Machine

Target Database — Users (Read-only)

Replication Agent

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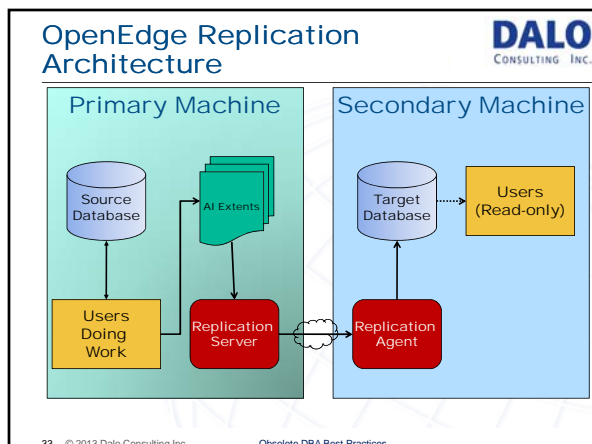
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Fixed Extents

- **Example for a Mon-Fri, 9/5 shop, growing 1 GB per month:**
  - **With a 4KB DB and 512 BPC, every extension is 2MB**
  - **1GB per month / 2 MB = 500 Database extensions**
  - **500 DB extensions / 20 working days = 25 extensions per day**
  - **25 extensions per day / 8 hours = 3 extensions per hour**

  Reference: Paul Koufalis

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Fixed Extents

- **Conclusion: Every 20 minutes, your users may have to wait a few milliseconds for your DB to grow 2 MB**

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2GB Fixed Extents

- **Requires more file handles/descriptors**
- **Difficult and longer to manage**
- **The database will crash (or stall with –bistall) once any file reaches 2 GB**

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Obsolete Practice

- **Maintaining DB extents less than 2GB:**

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Enable Large Files

- **To Enable:**
  proutil <DB> -C EnableLargeFiles
  - **While the DB is down**
- **Available since Progress 9.1C**
- **Large files must also be enabled at the file system level**
- **Increase "ulimit" in UNIX**

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Why Fixed Extents <2GB?

- **There was once a time when hard drives were very large but not so large in capacity:**
- **We did not have the "Large Files" option**
- **Older UNIX version limitations: Triple Inode Indirection**
- **Prevent extents from filling up file system**
- **Crude way of making sure we stay in fixed extents**

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Obsolete Practice

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- **The following operations can be done online, with some limitations:**
  - **Modify the schema**
  - **Add/Modify tables, indexes, sequences, etc…**
  - **Add DB extents and Storage Areas**
  - **Modify DB startup parameters:**
    - Blocks in database buffers (-B)
    - After-image buffers (-aibufs)
    - Before-image buffers (-bibufs)
    - Lock table entries (-L)
    - Shared-memory overflow size (-Mxs)

Conclusion

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- **What is useful and has been for years, is not necessarily the best practice today**
- **We can improve performance, save time and avoid downtime by adopting newer methods**
- **OpenEdge 10+ lets us manage our DB more efficiently.**

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Questions?

Other Obsolete Practices

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- **Truncating the DB log: <DB>.lg**
  - **Traditional Method:**
    cat /dev/null > db.lg
  - **New Method:**
    prolog <DB> -online
- **Avoid protocols that transmit data in clear text:**
  - Telnet, FTP, etc…
  - **Passwords and data can be "sniffed" with free tools and utilities that may already be installed on the system**
  - **Use protocols that encrypt the transmission, such as SSH, SFTP and SCP.**

Questions

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- **Questions or comments? Feel free to e-mail me:**

Nectar Daloglou: nd@daloconsulting.com

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Thank You!