A Closer Look at
CA Datacom® Version 14.0
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CA Technologies
CA Datacom® Version 14.0 for z/OS is completing its beta testing program with General Availability planned before the end of 2011. CA Ideal™, CA IPC™ and CA Datacom® Server 14.0 Versions are already Generally Available, with CA Datacom® CICS Services up next for beta.

In this session, you can find out how Version 14.0 simplifies the management of your CA Datacom environment and about enhancements to related products.

CA Datacom Principal Software Architect Joe Lynn covers the details of CA Datacom Version 14.0 enhancements, and also reviews Version 14.0 features for CA Ideal, CA IPC, CA Datacom CICS Services and CA Datacom Server.
Agenda

- CA Datacom Version 14.0 core products
  - CA Mainframe Software Manager™ - Software Configuration Service
  - Security and Compliance
  - Improved Performance and zIIP
  - Increased 24 x 7 Capabilities
  - Ease-of-use Enhancements
  - Datareporter Enhancements
- CA Ideal and CA IPC Version 14.0
- CA Datacom Server Version 14.0
- CA Datacom CICS Services Version 14.0
- Q & A
CA Datacom Version 14.0 core plans

- Beta completed
- Betas working with the code for over a year
- CA Datacom Version 14.0 core includes:
  - CA Datacom®/DB (DB)
  - CA Datacom® Datadictionary (DD)
  - CA Dataquery™ for CA Datacom® (DQ)
  - CA Datacom® SQL
  - CA Datacom® Fast Restore
  - CA Datacom® Presspack
- General Availability (GA) imminent
### CA Datacom and CA Mainframe Software Manager™
(CA MSM)

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<td>Yes</td>
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CA MSM

- CA Datacom Version 12.0
  - Software Acquisition Service
  - Software Installation Service
  - Software Deployment Service

- CA Datacom Version 14.0 includes:
  - Additional Health Checks
  - Software Configuration Service
    - CA MSM user interface
    - Select/store CA Datacom parameter settings
    - Environment verification processes
    - Deploy and configure Multi-User Facilities (MUFs) using ...
      - Software acquisition, installation and deployment services
      - Configuration services
Security and compliance

- Provide a solution for protecting “data at rest”
  - DASD datasets that are accessed within z/OS that are outside of MUF’s scope of control
    - Direct access by tools like IEBGENER, IEBPRINT, etc.
  - DASD datasets that are copied or accessed by users on other operating systems sharing the same DASD device
    - USS, z/LINUX, etc.
  - DASD datasets that are physically “moved/removed” by someone
    - Less likely
Security and compliance
encryption

- **Table level**
  - Defined through CA Datacom Datadictionary
  - New encryption attribute
  - Requires a data area BACKUP and LOAD to encrypt
  - Encrypts data row on all writes (ADDS/UPDATEs)
  - Decrypts data row on all input (READs)
  - Log area will have encrypted data row
  - Uses hardware encryption instructions on z10

- Works independently of table compression
Data encryption – on z/OS

- Encryption key
  - Key handle defined to the CXX using CXXMAINT
  - Used for every encrypted area load defined to that CXX control area
    - May use same handle for multiple CXX control areas
    - Handle printed in new REPORT AREA=CXX,TYPE=K
  - Handle may be changed for future area loads
Improved performance
exploit zIIP

- zIIP exploitation introduced in Version 12.0
  - Runs the majority of MUF processing as WLM SRB
  - Pairs a TCB with SRB for non-zIIP eligible work

- Version 14.0 expands zIIP exploitation
  - Estimated 50% improvement over Version 12.0
  - All MUF workloads are eligible
  - Well-tuned MUFs could see 45-48% zIIP offload
Improved performance exploit 64-bit

- 64-bit exploitation for DXX buffer pools
  - IXX pool delivered in version 12.0
  - DXX pool delivered in version 14.0
    - Can reduce I/O and CPU
    - Utilize larger 64-bit memory pool
    - Free up 31-bit memory for other processes
  - Can be combined with multiple buffer pools
    - More IXX and DXX pools in 64-bit
    - Provide more 31-bit room for multiple data buffer pools
Improved performance
more buffer pools

- Standard buffer pools
  - IXX, DXX, DATA, DATA2

- Additional buffer pools
  - Up to 99 pools of each type (IXX, DXX, DATA)
  - Each pool type can have up to 99,999 buffers

- MUF Start-up
  - Create additional buffer pools
    - Assign number of buffers
    - Assign buffer size
  - DBA can add/remove buffers or assignments on the fly
  - Usage statistics available through Dynamic System Tables (DSTs) or MUF EOJ
Improved performance
more buffer pools - continued

- Area (Data or Index)
  - Defaults to standard buffer pools
  - Can be assigned individually or as a group to new buffer pools
  - Provides DBA with the flexibility to assign pool usage to provide workload management
  - Assignments can be changed without recycling the MUF region
Improved performance
new LXX options to reduce I/O

- LXX format options to reduce log record size
  - Can remove or reduce size of element list for add/update
  - Can reduce size of changes for update
  - Compression
    - Can reduce size of before data if table compressed
    - Can reduce size of after data if table compressed
Improved performance efficiency

- Enhanced memory manager
  - Improves processing to handle memory
  - Reduces CPU overhead to manage memory

- System resource changes to improve performance
  - Automatic DB subsystem installation
  - Removal of SVC calls from MUF
  - Discussed in detail later

- Many other small enhancements
Increased 24 x 7 capabilities
online reorg

- New data space options (4 and 5)
  - Stores more information about data and data blocks
  - DSOP 4 = 1 (Random) with space information
  - DSOP 5 = 2 (Wrap) with space information
  - Change from DSOP 1/2 to DSOP 4/5
    - Datadictionary model change
    - Datadictionary catalog

- New option for online reorg with DSOP 4/5
  - Online reorg with free space
  - Significantly more effective for densely loaded tables
  - Maximizes the use of any acquired free blocks
  - Results in a more complete reordering of rows
Ease-of-use enhancements
system resources

- Automatic installation of CA Datacom/DB sub-system
  - Dynamically built by first Version 14.0 MUF started
    - Can have both a TEST and PROD subsystem
    - Version 14.0 MUFs will ignore previous version of subsystem
  - No systems programmer involvement required
  - Use CAIRIM at IPL to ensure library selected

- CA Datacom SVC no longer required

- CAIRIM install new PC sub-function
  - Needed for Sysplex communication – XCF
  - Needed for multiple database managers - RRS
  - Needed for CA Datacom CICS Services 14.0
### Why is simplification needed?

- A remedy for the “Trust the User” philosophy
  - Prevents mistakes that involve a substantial effort to recover
    - Initializing a “live” CXX or LXX while MUF is enabled
    - Initializing a “live” index/data area while in-use by MUF
    - Loading a “live” data area while in-use by MUF
    - Having multiple MUFs pointing to the same database open for update
- Unusual and unexpected events that occur involving a substantial effort to recover
  - Previous System outage, ripple effect RC=67, 46, etc.
Database administration simplification defines an environment

- One environment defined as:
  - One DBSIDPR module defining MUF and CXX
  - One Directory CXX with unique DSN and CXXNAME
  - One Multi-User Facility (MUF)
    - One instance or
    - One set of MUFPLEX instances
  - One LXX with one FXX

- MUF always enabled, except in very rare conditions
  - Initial build
  - Upgrade to new version
  - Failed restart process
Database administration simplification
DBUTLTY execution

- With MUF enabled, DBUTLTY lets MUF open the database
  - Always has accurate data
  - No risk of RC=67
  - No risk of false RC=46
  - Removes the need for ‘write’ access to CXX from most DBUTLTY users (safety)

- DBUTLTY must run in same sysplex as MUF
  - If the function must open a data set

- Dataset protection for INIT, EXTEND, LOAD, RETIX, etc.
  - Automatic DISP=OLD
  - MVS Global Resource Serialization (GRS) exclusive ENQ
Database administration simplification
DBUTLTY execution - continued

- Simple “front-end” process to provide site settings for DBUTLTY executions
  - Initial values set in DBMSTLST
  - New function allows site to set overrides for DBMSTLST
  - Can be set multiple times
    - Change number of buffers for a certain DBUTLTY execution
    - Provide more buffers for overnight processing
    - Etc.

- Option to automatically calculate sort parameters
  - DBUTLTY new keyword SORTDFLT=
    - For LOAD and RETIX
    - If YES, sort values calculated for input
    - If values are valid, overrides SORT= value
Database administration simplification
DBUTLTY execution - continued

- Simple utility function to clone the database control file (CXX) when building a new image
  - CLONE AREA=CXX
    - Loads database model/definitions
    - Sets all databases as unloaded
    - Removes any data set information
  - Provides a safe way to copy the information in a CXX for new system creation
### Database administration simplification
dynamic system tables (DSTs)

- **New DSTs for CA Datacom Version 14.0 entities**
  - Additional Buffer pools, etc.

- **Updated DSTs with new columns**
  - Log format information, etc.

- **Updated DSTs with expanded numeric column data**
  - Various counters, etc.
Datareporter enhancements

- DR access to Dynamic System Tables (DSTs)
  - For sites without SQL option
  - Datareporter option can read individual DST tables
    - Some restrictions on functionality
      - DR cannot emulate all of SQL’s capabilities

- Ability to display SQL date and time fields
CA Ideal and CA IPC version 14.0
GA June 2011

- CA MSM – deployment, configuration
- 31-bit storage for control blocks
- RMODE(ANY) for programs
- CWI -> CWS
- VLS library expansion
- EXCI transaction driver
- Upgrading from earlier releases
31-bit storage for control blocks

- Load Module Table (LMT)
- Run Control Block (RCB)
- SCB and some small blocks remain below

![Diagram showing 31-bit and 24-bit storage]

<table>
<thead>
<tr>
<th>11.0 VLS</th>
<th>11.0 Lmod</th>
<th>14.0</th>
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<tbody>
<tr>
<td>User WA</td>
<td>User code</td>
<td>RCB</td>
</tr>
<tr>
<td>SCB &amp; panels</td>
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</tr>
</tbody>
</table>
RMODE(ANY) for programs

- Most CA Ideal/CA IPC programs now RMODE(ANY)
- Exceptions are mainly 3270 support
- Web applications benefit most
CWI -> CWS
CICS Web Interface becomes CICS Web Support

- IBM will drop CWI support soon
- CWS adds support for HTTP 1.1 (default)
- CA Ideal Version 14.0 implements CWS
  - Existing Ideal Web user application run unchanged
- Later releases will add more exploitation
VLS library expansion

- VLS 11.0 (and before) uses half-word block addressing
- VLS 14.0 uses full-word block addressing
- Much larger VLS libraries
  - Size now only limited to z/OS maximum for BDAM datasets
  - Still beneficial to separate systems onto separate VLS libraries
    - Security, backups, restores, etc.
    - Similar considerations to databases and partitioned tables
- FORMAT command has new LIBFMT=H|F operand
- BACKUP produces RECFM=VB (for SMP/E compatibility)
- Can read RECFM=U backups, also
- During transition, use new VLSUTIL for everything
  - Backup from LIBFMT=F may not fit into LIBFMT=H library
EXCI transaction driver

- **SC00EXTD**
  - Intended for third-party use
  - Replaces unsupported uses of SC00NATD and SC00WBTD

- **Use SCASYNTB macro to build transaction table**
  - Result called SCEXTRAN
Upgrading to CA Ideal / CA IPC 14.0

- CA Ideal 11.0 -> 14.0
- CA IPC 2.2/4.2 -> 14.0

Normally upgrade development before production, so:
- Old release won’t run code compiled in newer release
- Create batch compile procedure to “down-level” during transfer
  - Uses 11.0 load libraries with development VLS/DD
  - May reject programs that use new features
- Use LIBFMT=H libraries during transition
CA Datacom Server Version 14.0
GA July 2011

- CA MSM – deployment, configuration
- Changes in JDBC connection methods
- JDBC 4.0 methods implemented
- Console command interface
- Support for 64 bit connections
- CCI requirements on the Windows platform optional
- Windows service integration
JDBC type 4 connection

- JDBC type 4 driver:
  - Data stream sent directly to mainframe Datacom Server address space
  - Simplified URL address:
    - Jdbc:datacom://hostname:portnumber/ServerName=xxxxxxApplicationId=xxxxxx,User ID=,Password=
      - hostname can be either hostname of system or ip address
      - portnumber is any valid port number between 1024 and 65535
      - ServerName must match the SERVERNAME supplied by the mainframe server
      - ApplicationId must match the APPLID name supplied by the mainframe server
  - cadcjdbc.jar file is the only thing that is required by the client software
  - jar file can be deployed to any system that supports java 1.6
You don’t have to explicitly load the driver by calling `class.forName` anymore. Driver Manager automatically loads the Datacom driver.

JDBC 4 Connection class provides the `isValid()` method.
- This allows a client to query the database driver to see if a connection is still valid when using connection pooling.

Changed exceptions processing so that exceptions are “stacked”
Console command interface

- Same commands that can be entered thru SVCOMPR
- No APPLID is needed since modify command is directed to job
- Command must be followed by a “=“
- Basic syntax checking is performed for each command
- One command per console command
  - Valid Server functions
    - CANCEL - cancels specify connection
    - EOJ - ends server job
    - Options - echoes options currently in affect
    - Status - provides status on a connection
MODIFY allows some start-up options to be modified

- Format is MODIFY xxxxxxxx=yyyyyyyy where xxxxxxxx is the option & yyyyyyyy is the value to change the option
- /f jobname,MODIFY AUTHID=SYSUSR is an example of a valid command
- /p jobname  will stop the server job, it has the same affect as a /f jobname,EOJ
Support for 64 bit ODBC and JDBC

- 64 bit Windows environment
  - Both ODBC and JDBC are available to connect to mainframe server
  - CCI is not required nor is there a requirement that CCI be installed on Windows system
  - TCP/IP can be used in both environments (32 or 64)
Windows service integration

- What is a Windows service? (DPWS)
  - A long-running executable application that runs in its own Windows session
  - A service can be automatically started when the computer boots; it can be paused and restarted. It does not show any user interface

- Datacom Proxy Windows Service: achieved using JNA (Java Native Access), a set of libraries that interact with the underlying operating system without writing any native code
  - ProxyService (ca.datacom.proxy.proxyservice.ProxyService) is part of cadcjdc.jar.
  - Multiple proxy services can be started on any given Windows system
Arguments accepted by ProxyService are:

<table>
<thead>
<tr>
<th>NAME</th>
<th>Optional</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-install</td>
<td>No</td>
<td>Installs the proxy windows service</td>
</tr>
<tr>
<td>-uninstall</td>
<td>No</td>
<td>Uninstall the proxy windows service</td>
</tr>
<tr>
<td>-name xxxx</td>
<td>Yes</td>
<td>Assigns a name to the service. Defaults to “DatacomProxyService”</td>
</tr>
<tr>
<td>-desc xxxx</td>
<td>Yes</td>
<td>Service description. Defaults to “CA DatacomProxyService Description”</td>
</tr>
<tr>
<td>-port xxxx</td>
<td>Yes</td>
<td>Defaults to 3909</td>
</tr>
<tr>
<td>-help help</td>
<td>Yes</td>
<td>Prints out the arguments and usage</td>
</tr>
</tbody>
</table>
- CA MSM – deployment, configuration
- Serviceability
- Threadsafe and Open Transaction Environment (OTE) support
- Performance enhancements
- Additional enhancements
OTE: Open transaction Environment is IBM’s approach to multi-tasking support. This environment could best be described as employing asymmetric TCBs in CICS.

RENT: Reentrant modules are modules that do not modify anything in the program storage and can be loaded into read only memory.

THREADSAFE programs: In order for a program to be “Threadsafe”, it must first be RENT and then it must either not modify the shared resources or else it must serialize use of the shared resources by using one of the many serialization techniques.
**QR TCB**

- A quasi-reentrant TCB, also called *application* TCB, that has a property of forcing the application programs to run in a serialized manner.
- There is only one QR TCB per CICS and it will allow only one CICS active task to run at any given point in time.
- This TCB protects the shared resources from being overwritten by concurrently running tasks.

**OPEN TCB**

- OTE introduces a new class of TCB, which can be used by applications, called an open TCB.
- An open TCB is characterized by the fact it is assigned to a CICS task for its sole use, and multiple OTE TCBs can run concurrently in CICS.
- There are several modes of open TCBs used to support various functions, such as JAVA in CICS, OPEN API programs, C and C++ programs.
OPENAPI programs

- An OPENAPI program must be Threadsafe
- This type of program commences execution on an OPEN TCB
  - Depending on program EXECKEY of CICS or USER, the program would commence execution on L8 or L9 TCB

CA Datacom CICS Services 14.0 is Threadsafe and will run as OPENAPI when DBCVTPR OPENAPI=YES

- All request processing, open/close processing, connect, disconnect, disconnect immediate processing were written to “Threadsafe” standards
Customers who would benefit most from migrating to a Threadsafe environment are those who experience poor response times for any of the following reasons:

- The CICS QR TCB is CPU constrained
  - Application programs are waiting excessively for the QR TCB
- The CICS region in general is CPU constrained
Benefits of exploiting the Open Transaction Environment (OTE)

- Improved performance by using multiple available processors
- Increased throughput (reduced elapsed times)
- Single CICS region can handle more workload
Steps to select the right options for CA Datacom CICS Services facility

Establish a performance baseline (CPU per transaction)

Run CA Datacom CICS Services as OPENAPI=YES

- Enables use of OpenTCBs
- Fully Threadsafe application programs will have a better chance of achieving better performance with DBC in OTE
- Non-Threadsafe application programs could slow down because of switching between OpenTCB (DBC) and QR TCB (application)
Only when non-Threadsafe applications cause performance degradation (i.e., TCB switching)

- Run CICS Services as OPENAPI=NO
- Tells DBC to run on the same TCB that the application started on (avoids TCB switching)

CICS System Initiation Table (SIT)

- MAXOPENTCBS=
  - Limits maximum number of Open TCBs used for DBC
  - Provides a way for the user to tune to achieve maximum performance
- See the CICS system Definition Guide
Performance

- **Improved performance**
  - Implementation of relative branching reduces code line
  - Combined executing modules to gain efficiency
  - Significant re-architecture to provide direct code paths

- **End result**
  - It runs faster than v11
Additional enhancements

- New FORCED SYNCPOINT to protect integrity when multiple data sources are being used
- DBEC now supports remote resource control
- Console command support for key commands such as CONNECT and DISCONNECT
- The DBEC MUF INQUIRY and PERFORM allow the limiter MSIDNAME
- CICS/TS SYSID added to DBEC maps
- SKIPLOAD macro for DBCVTMP allows you to avoid the unnecessary attempted loads of non-existent URTs during startup and initialization
Additional enhancements (cont.d)

- Date added to DBOCPRT messages
- New DBOC INQ=PTF display using the MODID coremark
- The DBUG URT display screen now includes the USRINFO and AUTHID data
- Message DC00243W at STARTUP with DYNPPT=YES
- Change DBCVTPR assembly MNOTE 4’s to 0’s where appropriate
- Many other enhancements
CA Datacom CICS Services 14.0 should not be mixed with CA Datacom CICS Services 11.0 in MRO environment

If falling back to CA Datacom CICS Services 11.0 becomes necessary:

- Restore CICS CSD to copy prior to the migration
- Restore r11 DBCVTPR
  - DBCVTPR from v14.0 is not be compatible with the DBC r11 code
CA Datacom family of products Version 14.0 summary

- CA Datacom®/CA Ideal™ family of products:
  - Delivering customer value
    - Integration with CA MSM
    - Improved performance
      - More work for less CPU, less I/O
    - Improved ease-of-use
    - Improved 24 x 7
    - Better TCO
# Recommended sessions

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<tr>
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<th>TITLE</th>
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<td>Early User Experiences with CA Datacom® Version 14.0</td>
<td>11/15/2011 at 11:00 am</td>
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<td>Major Movie Company Pictures a Marquee Interface for their CA Datacom E-Pay System</td>
<td>11/15/2011 at 1:15 pm</td>
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<td>Keeping Your CA Datacom® and CA Ideal™ Software Healthy</td>
<td>11/15/2011 at 2:45 pm</td>
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<tr>
<td>Smart Session in Ballroom F</td>
<td><em>IBM zEnterprise: A Revolutionary Design for Hybrid IT Computing, Mark Anzani, IBM</em></td>
<td>11/15/2011 at 4:00 pm</td>
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### Recommended sessions (cont.)

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<td>CA Datacom Education Workshop - Part 1: What’s Inside the CA Datacom Performance Monitoring Toolbox?</td>
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<td>CA Datacom Education Workshop Part 2: Advanced Topics</td>
<td>11/16/2011 at 9:45 am</td>
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<td>zIIP Enabling CA-based Web Services: Tales from the Trenches</td>
<td>11/16/2011 at 11:00 am</td>
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<td>MD540SN</td>
<td>Impact – How a CA Ideal Application at U.S. Treasury Manages the Development Life Cycle</td>
<td>11/16/2011 at 1:15 pm</td>
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<td>MD600SN</td>
<td>CA Datacom® Online Data Reorganization Update</td>
<td>11/16/2011 at 4:00 pm</td>
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Exhibition Center: related technologies

- **Booth 516** – CA Datacom, CA Ideal
MyCA: Connect, Learn and Share

Professional networking resource that provides interaction between colleagues, experts and CA Communities and access to dynamic information in one place

– Connect to professional network
– Share information
– Get information
– Find answers quickly

Join the CADRE / Datacom Global User Community today at www.ca.com/MyCA
Session # MD300SN

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Mainframe networking lunch

Engage in CA solution discussion with your peers and CA experts

Where: Exhibition Center
When: Tuesday and Wednesday
Time: 12:00pm – 1:15pm
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Q&A
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