

CA Gen r8 z/OS Enhancements

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Hurriyet Giray



Abstract

Beginning with the CA Gen r7 release, our z/OS products have been involved in an ongoing effort to modernize their implementation to utilize current features and capabilities available for use on the z/OS platform. This presentation will discuss features planned for the z/OS products scheduled for delivery in the CA Gen r8 release.

Agenda

- New Packaging for Software Libraries
- Dynamic Linking of RI Triggers
- z/OS Library (OPSLIB for z/OS)
- DB2 Bind Enhancements
- TCP/IP Direct Connect for CICS



New Packaging
of Software
Libraries

The Mainframe 2.0 Solution

Impact on CA Gen

- > New ESD format
 - Tape recreation by customer no longer required
 - Installation directly from DASD files
 - Use of standard utilities (GMZIP)
- > Standardized SMP/E packaging
 - Product installation
 - Product maintenance (APAR's and PTF's)
- > Software Installation Manager (SIM)
 - GUI
 - Remove SMP/E complexities
 - Product installation and maintenance
- > Best Practices Guide (BPG)

Product Libraries and External Files

•Product Libraries

- Contain no user data
- SMP/E compatible suffixes, eg. CEHBPLD0
- EGEN and TRAN merged as CEHBDATV
- TLIB removed
- Runtime DLLs moved to a new load library CEHBPLD1

•External Files SQL, JCL, PARMLIB

- Sample allocation jobs provided
- Contain user data populated during CEINSTAL
- TIUGLOB, TIRCFIGS user data now in new PARMLIB library

CEINSTAL – Set Library Names

```
COMMAND ==>                               Set library names

Enter or verify the software libraries dataset prefix and suffixes.

Dataset prefix . CA1.MVSHE _____
Dataset suffixes:
Load . . . . . CEHBPLD0 _____
Runtime DLLs. . CEHBPLD1 _____
DBRM . . . . . CEHDBDRM _____
Data(EGEN/TRAN) CEHBDATV _____
CLIST . . . . . CEHBCLSO _____
Panel . . . . . CEHBPNL0 _____
Message . . . . CEHBMSG0 _____
Skeleton . . . . CEHBSKLO _____
X-Late Tables . CEHBMOD  _____

SQL . . . . . SQL _____
JCL . . . . . JCL _____
Parm file . . . PARMLIB _____

F1=Help F2=Accept F3=Exit F6=Save F12=Cancel
```

Runtime Library CEHBPLD1

> Separated Runtime from Development Tools (HE and IT)

- User input – Requested during EDGE 2007
- Helps to simplify deployment of Runtime
- CEHBPLD1 – Collection of Runtime DLLs
- CEHBPLD0 – Development Tools Load Library

z/OS User Exits

- Located in separate DLLs
 - User input – Requested during EDGE 2007
 - Moved User Exits from Runtime DLLs to each have their own DLL.
- Introduced a new manual: User Exits Guide

z/OS User Exits

Located in separate DLLs

- Simplifies migration by eliminating the need to re-bind customized User Exits into new release's (or PTF'ed) runtime DLLs.
- Most User Exit Samplib members have been renamed ending with the letter 'X'.
- Most of the DLLs are named the same as the Samplib member, but with a 'Z' at the end instead of 'X'.
- New user exit DLLs have sample JCL contained in the new member, MKUEXITs.
- MKUEXITs will not be used for the Direct Connect user exits.
 - MKUECTCP for Direct Connect CICS
 - MKUEITCP for Direct Connect IMS.



Dynamic Linking
of RI Triggers

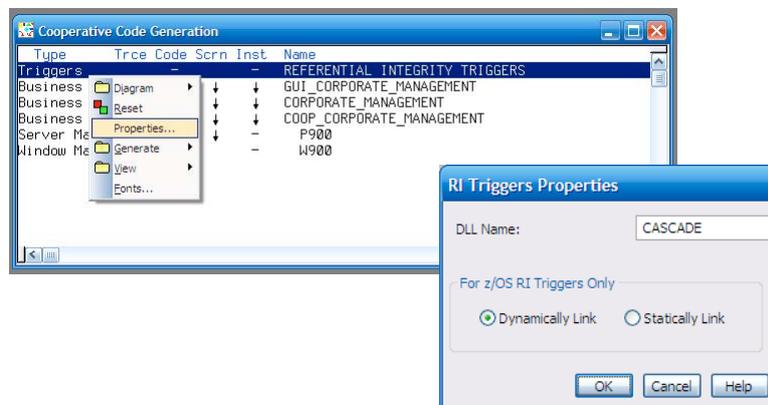
Dynamic Linking of RI Triggers

- Responding to Customer Request
 - Reduce the footprint of a Gen application executable
 - RI Trigger currently statically linked into an executable
 - Multiple DARs to Dynamically Link RI Trigger modules (12924524, 15788154, 16451060)
- RI Triggers for a Model built into a single Dynamic Module
 - Customer Input – EDGE 2007
- Dynamic RI Triggers packaged into a single DLL
 - Implies Dynamic RI Triggers cannot be called from a Compatibility module

Dynamic Linking of RI Triggers

Updates to Toolset / CSE

- Toolset and CSE updated to allow the Dynamic Link Option for RI Triggers to be set for the model



Dynamic Linking of RI Triggers

Updates to Host Encyclopedia

- Three new fields have been added to the 'Specify RI Trigger Target Environment Parameters' panel.
 - Dynamically Link RI Triggers – This field allows the Dynamic Link option to be set to 'Yes' or 'No'.
 - RI Trigger Name (Cascade) – This field is the DLL trigger name. It will default to the name that is supplied on the 'RI Trigger Properties' dialog box on the Toolset, but the HE is able to rename the RI Trigger DLL.
 - These two new fields are stored in the model as well as the ISPF Environment.
 - TP Monitor – This field allows the target TP monitor to be specified.
 - This field is only stored in the ISPF environment.

Dynamic Linking of RI Triggers

Updates to Host Encyclopedia – New Fields

```
Specify RI Trigger Target Environment Parameters
COMMAND ==> _
Specify desired target environment parameters

Operating System . . . . . MVS
Generated Source Language . . . . . COBOL
Database Management System . . . . . DB2          (DB2, Datacom)
DB2 Subsystem for package binds. . . . .          (DB2 Only)
Datacom MUF Name . . . . .                      (Datacom only)
TP Monitor . . . . .                             (CICS, IMS, IEFRE)
Dynamically Link RI Triggers . . . . . NO        (Yes, No)
RI Trigger Name (Cascade) . . . . . CASCADE
```

F1=Help F2=Accept F3=End F12=Cancel

Dynamic Linking of RI Triggers

Updates to Host Construction

- New option added the Specify RI Trigger Target Environment and Construction Libraries panel.

```
Specify RI Trigger Target Environment and Construction Libraries
COMMAND ==>

Model name . . . : GEN SAMPLE MODEL R8

Select one of the options below, then press enter.

4 1. Specify RI Trigger Target Environment
  2. Specify RI Trigger Construction Libraries
  3. Specify RI Trigger Compatibility Libraries
  4. Specify RI Trigger Dynamic Link Libraries

F1=Help F3=Exit F12=Cancel
```



Dynamic Linking of RI Triggers

Updates to Host Construction

- Host Construction captures the RI Dynamic Trigger (DLL) in the Executable Library and the binder control statements for the RI Trigger members in the Link Edit Cards Library

```
Specify RI Trigger Libraries for Dynamic Link
COMMAND ==>

Specify dynamic link libraries for Referential Integrity Triggers.

Executable Load modules . . . 'YOUR.APP.RI.EXEC'
Binder control cards . . . 'YOUR.APP.RI.BNDCTL'

NOTE: These libraries must be different from the corresponding libraries
specified on the RI Trigger Construction panel.

F1=Help F2=Accept F3=End F6=Save F12=Cancel
```



Dynamic Linking of RI Triggers

Updates to Consistency Check

- New Consistency Check message ICCAB37W.
 - If you set RI Triggers Dynamic link option to Yes and also set Dynamic link option for procedure steps, action blocks and screens to CMP and then run consistency check, you will see the following warning message, "ICCAB37W This Action Diagram is marked for or defaulted to 'Compatibility'(non-DLL). RI Triggers are marked 'Dynamically Link'(DLL). If you target z/OS, problems could result with DELETE, DISASSOCIATE, or TRANSFER statements."

Dynamic Linking of RI Triggers

Intelligent Regeneration

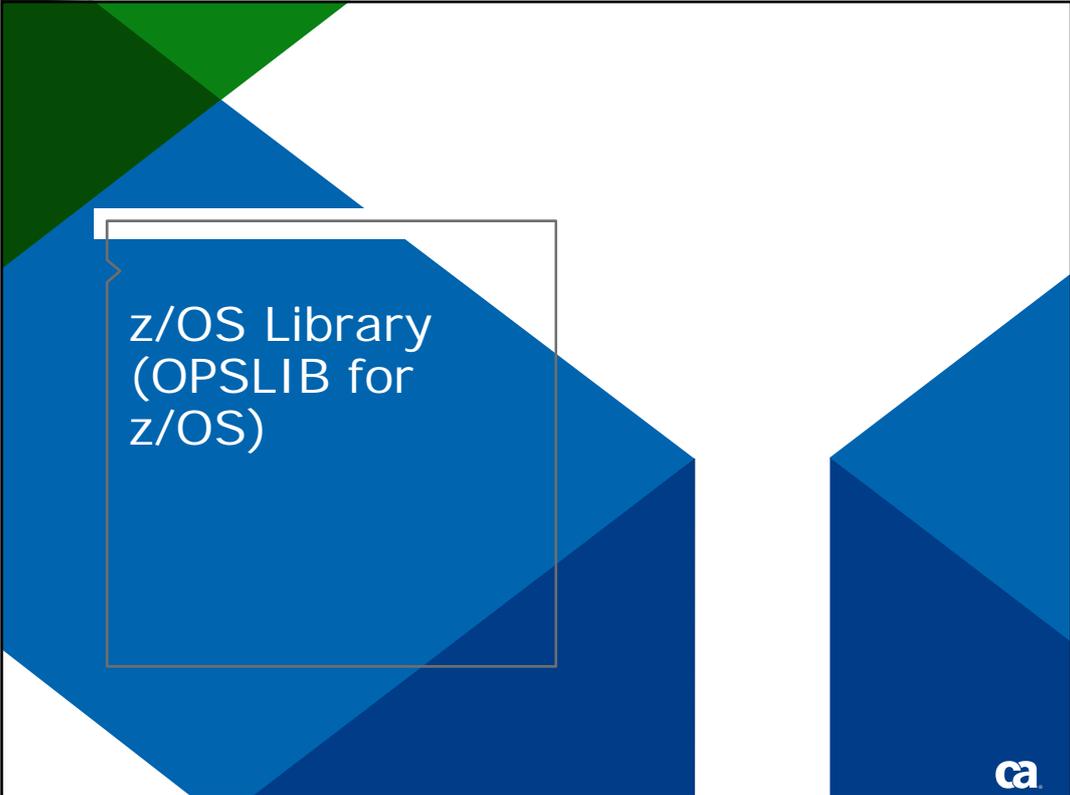
- Intelligent regeneration has been updated to recognize changes made to the Dynamic Link RI Triggers options.
- When option *Ignore Target Environment Parameter Changes* is set to Yes.

Dynamic Linking of RI Triggers

Generated Applications – Remote Files

- Remote files targeting the z/OS IT will contain the Dynamic Link RI Triggers settings.

```
:execunit  
  language=COBOL  
  os=MVS  
  pcompat=NO  
  dynamri=YES  
  dbms=DB2  
  dbname=GENDB.  
  cascade=RITEST.
```



z/OS Library
(OPSLIB for
z/OS)

z/OS Library

- z/OS Library is a collection of action blocks packaged into a z/OS Dynamic Library (DLL)
 - Received Customer Input – EDGE 2007
 - Action blocks marked or defaulted to Dynamic Linking can be included in a z/OS Library
 - Action blocks in a z/OS Library may not call Compatibility ABs
 - Compatibility ABs may not call ABs in a z/OS Library
 - The z/OS Library (OPSLIB) packaging is available from the Toolset and not from the HE or the CSE
 - Some of the panels and reports refer to the z/OS Library as 'zLIB'.

z/OS Library

z/OS Library Packaging – Toolset Only

The screenshot illustrates the z/OS Library Packaging process. At the top left, a menu is open with the following options and keyboard shortcuts:

Option	Keyboard Shortcut
Online Packaging	Ctrl+Shift+O
Batch Packaging	Ctrl+Shift+B
Window Packaging	Ctrl+Shift+W
Cooperative Packaging	Ctrl+Shift+C
Component Packaging	Ctrl+Shift+M
z/OS Library Packaging	Ctrl+Shift+Z

An orange arrow points to the 'z/OS Library Packaging' option. Below the menu, the 'z/OS Library Packaging' dialog box is shown with a table of libraries:

Type	Name
Business Sys	GUI_CORPORATE_MANAGEMENT
Business Sys	CORPORATE_MANAGEMENT
Business Sys	COOP_CORPORATE_MANAGEMENT
z/OS Library	COMMON

An orange arrow points to the 'Add Actbls...' button in the 'Properties' dialog. To the right, the 'Available Action Blocks' dialog box is shown with a list of action blocks:

```
ADD_DEPARTMENT
ADD_DIVISION
ADD_EMPLOYEE
DELETE_DEPARTMENT
DELETE_DIVISION
DELETE_EMPLOYEE
FILE_FUNCTIONS_READ
FILE_FUNCTIONS_WRITE
MODIFY_DEPARTMENT
MODIFY_DIVISION
MODIFY_EMPLOYEE
```

An orange arrow points to the 'Available Action Blocks' dialog box.

z/OS Library

Host Encyclopedia Support

- Support for z/OS Library objects has been added to the following HE functions
 - Adoption
 - Model Compare
 - Rename or Delete object
 - Download and Upload of a model
 - Migration
 - Subsetting

z/OS Library

Host Construction – New load module type

```
COMMAND ==>                                Generate Business System                                Row 1 to 3 of 3
                                           SCROLL ==> PAGE

Model name . . . : DEZKO ABLK32 ZLIB TEST HXG
Business system : TEST_VIEWS_W_BACKING_STRUCTURES

Type any action code next to one or more module/job names, then press enter.
To exit, press F3. To cancel, press F12.

D=Generate module manager  E=List components          G=Generate
I=Install                  J=Generate JCL           K=Run consistency check
M=Specify member names     T=Specify server target

Opt  Module/job      Type      Status
--  -
  -  HXGZLIB          Z/OS LIBRARY
  -  P345              ONLINE
  -  P601              SERVER
***** Bottom of data *****
```

z/OS Library

Host Construction – z/OS Library Expansion

```

Load Module Expansion                               Row 1 to 4 of 4
COMMAND ==>                                         SCROLL ==> PAGE

Model name . . . : DEZKO ABLK32 ZLIB TEST HXG
Business system : TEST_VIEWS_W_BACKING_STRUCTURES
Load module name : HXGZLIB

Type any action code next to one or more procedure steps/action blocks,
then press enter. To exit code generation, press F3. To cancel, press F12.

C=Generate code          P=List procedure action diagram
R=Recompile code        X=Resolve external action blocks

Opt Name                Type                Gen    Gen    Member
                        Date      Time      Name
- ASSIGN_MANAGER        ACTION BLOCK      2009-04-10 07:00 ASSIGNMA
- DELETE_OLD_DATA       ACTION BLOCK      2009-04-10 07:00 DELOLDDA
- DETERMINE_IF_MANAGER  DERIVED ACT BLK  2009-04-10 07:00 DETIFMGR
- VERIFY_EMPLOYEES      ACTION BLOCK      2009-04-10 07:00 VERIFYEM
***** Bottom of data *****

```



z/OS Library

zLIB Action Block – Used by a load module

```

Load Module Expansion                               Row 1 to 9 of 12
COMMAND ==>                                         SCROLL ==> PAGE

Model name . . . : DEZKO ABLK32 ZLIB TEST HXG
Business system : TEST_VIEWS_W_BACKING_STRUCTURES
Load module name : P345

Type an action code next to one or component names, then press enter.
To exit, press F3. To cancel, press F12.

B=Generate both code and screen  C=Generate code only  P=List PAD
R=Recompile code                S=Generate screen only

Opt Name                Type                Gen    Gen    Source  Screen
                        Date      Time      Name
- ASSIGN_MANAGER        ZLIB A 2          4-10 07:00  ASSIGNMA
- COMPUTE_AVERAGE_SALARY  DERIVE           CAVGSAL
- COMPUTE_NUMBER_OF_EMPLOYEES  DERIVE          CNUMEMPS
- COMPUTE_TOTAL_SALARIES  DERIVE           CTOTSALS
- CREATE_EMPLOYEE        ACTION           CREMPLOY
- DELETE_OLD_DATA       ZLIB A 2009-04-10 07:00  DELOLDDA
- DETERMINE_IF_MANAGER  DERIVE 2009-04-10 07:00  DETIFMGR
- PERSIST_VIEW_AND_DERIV_ALG_TEST  PROCED          PERSISTV S345
- POPULATE_DEPT_AND_EMPLOYEES  ACTION           POPDE

```



Business System Binder Control Library Host Encyclopedia

- New mandatory binder control library



```
COMMAND ==> _
Specify Internal Libraries

Enter or verify the following business system library specifications:

Generated source code . . . 'YOUR.COBOL.LIBRARY'
NCAL load modules . . . . 'YOUR.NCALLLOAD.LIBRARY'
Executable load modules . . 'YOUR.LOAD.LIBRARY'
DB2 DBRM modules . . . . . 'YOUR.DBRM.LIBRARY'
Installation control . . . . 'YOUR.INSTC.LIBRARY'
Binder control cards . . . . 'YOUR.BNDCTL.LIBRARY'
Generated NFS . . . . . 'YOUR.MFSSRC.LIBRARY'
Generated batch JCL . . . . 'YOUR.JCL.LIBRARY'
Compile listings . . . . . 'YOUR.LISTING.LIBRARY'

F1=Help F2=Accept F3=Exit F6=Save F12=Cancel
```



Business System Binder Control Library

- Updated by application installation
- Contains binder control cards
 - For all load module types, not just for z/OS Library.
 - SYSLIN DD saved to BNDCTL just before binder (linkedit).
- Gen application libraries are no longer in SYSLIB concatenation
 - Explicit INCLUDE APPLOAD cards for all load module components.
 - AUTOCALL at linkedit has been eliminated. No auto resolve from SYSLIB any more.
 - Example:

```
INCLUDE APPLOAD(MODDEPT)
INCLUDE APPLOAD(ADDDEPT)
INCLUDE APPLOAD(ADDIV)
IMPORT CODE,'CASCADE ','E3407893'
IMPORT CODE,'CASCADE ','EDEP3'
IMPORT CODE,'CASCADE ','F7484086'
```



z/OS Library

Host Encyclopedia Reports

- Host Encyclopedia reports have been updated to report on z/OS libraries.
- Examples:
 - Cross Reference report
 - Model Action Block Usage report
 - Create, read, update and delete (CRUD) report

z/OS Library

Consistency Check

- Six new Consistency Check warnings have been added
 - ICCAB35W - An Action Diagram may be included in a z/OS Library only if it is marked for or defaults to dynamic linking.
 - ICCAB36W - This Action Diagram, marked for or defaulted to 'Compatibility', is called (directly or indirectly) by an Action Diagram that is included in a z/OS Library. If you target z/OS, problems could result.
 - ICCCU26W - This Action Diagram, included in a z/OS Library, contains a call to an Action Diagram that is marked for or defaults to 'Compatibility'. If you target z/OS, problems could result.

z/OS Library

Consistency Check – part 2

- ICCEN46W - This Action Diagram, included in a z/OS Library, contains a reference to a derived attribute that will implicitly call a derivation algorithm marked for or defaulted to 'Compatibility'. If you target z/OS, problems could result.
- ICCLS20W - This Action Diagram, included in a z/OS Library, contains a call to an Action Diagram marked for or defaulted to 'Compatibility'. If you target z/OS, problems could result. See Toolset help for CC msg ICCLS20W.
- ICCSE19W - This Action Diagram, included in a z/OS Library, contains a call to an Action Diagram marked for or defaulted to 'Compatibility'. If you target z/OS, problems could result. See Toolset help for CC msg ICCSE19W.



z/OS Library

Generated Applications – Remote Files

- When generating remote files targeting the z/OS IT the following rules have been implemented for z/OS Libraries.
 - When a z/OS library is being installed, the "Imtype" keyword within the :execunit section of the remote file is set to a value of "ZLIB".

```
:execunit
  member=AB43ZLYN
  objid=7092617
  language=COBOL
  os=MVS
  pcompat=NO
  dynamri=NO
  execenv=CICS
  dbms=DB2
  isolation=RR
  profile=SQL
  format=BYPASS
  dbname=ABLK43DB
  Imtype=ZLIB
  cascade=CASCADE
  dialectdir=LEFTDIR.
```



z/OS Library

Generated Applications – Remote Files (part 2)

- When any z/OS load module (online, server, batch or z/OS library) is being installed, new keywords and clauses ('zlib=module, operation=PUBLIC') are generated within the :acblk section of the remote file for every action block that is packaged in a z/OS library.

```
:acblk
  abtype=STANDARD
  member=AYNN
  objid=7089201
  name=AYNN_DYNAMIC_CALLS_ANN
  techsys=PT_ABLK43_BLOCK_MODE_AND_COMMON
  link=DYNAMIC
  sql=YES
  create=NO
  update=NO
  delete=NO
  test=YES
  nondial=""
  zlib=AB43ZLYN
  operation=PUBLIC
  include=SAVCALL
  include=EABCOMIT.
:eacblk.
```



z/OS Library

Generated Applications – Remote Files (part 3)

- Generated remote files will not include source code for action blocks contained in a z/OS library unless that z/OS library itself is being installed.

Example of a z/OS library that is being installed:

```
:zlib
  member=AB43ZLYN
  techsys=PT_ABLK43_BLOCK_MODE_AND_COMMON.
:ezlib.
```



z/OS Library

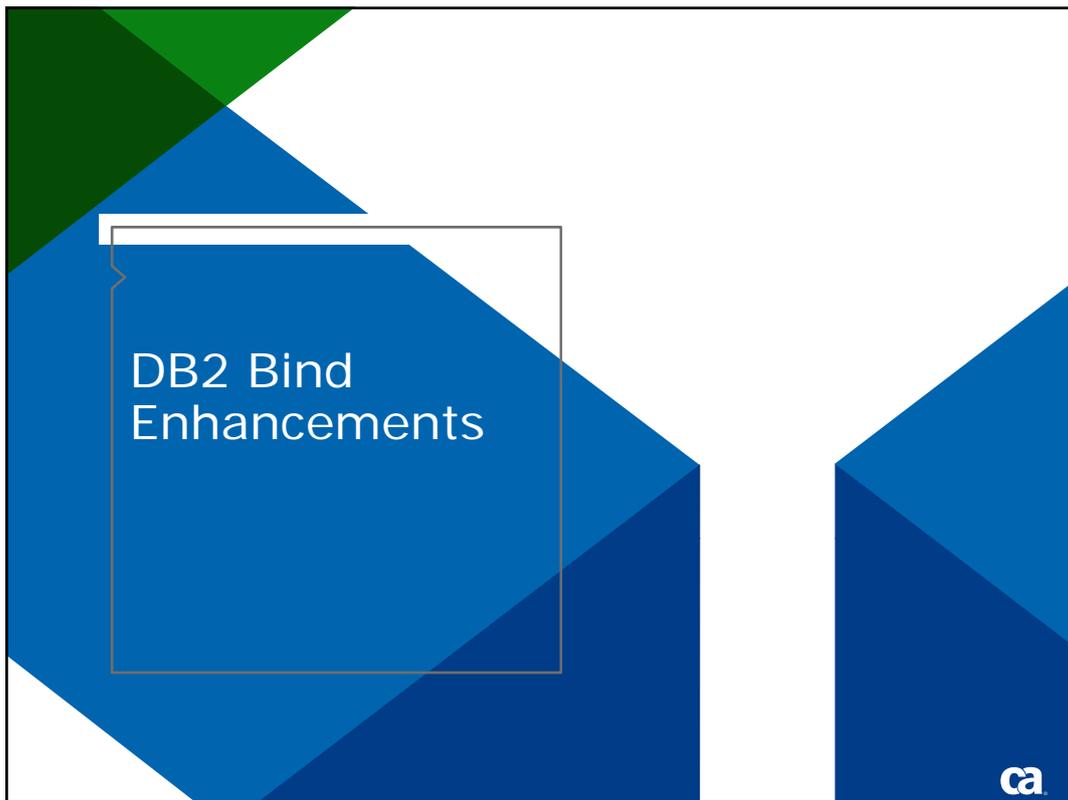
z/OS IT – Processing Remote Files

- The z/OS IT has been updated to process the z/OS Library settings.

z/OS Libraries

Intelligent Regeneration

- Intelligent Regeneration has been updated to generate and install z/OS Libraries as per Host Construction.



DB2 Bind Enhancements

Host Encyclopedia

- Qualifier parameter added to Host Encyclopedia package and plan bind install jobs for DARs 16031070 and 13840478
- Bind Qualifier / DB2 Owner parameters are passed to the bind package job
- Updates have been made to CEINSTAL DB2 Variables dialog
 - Label changed to identify that the input field is used for both:
 - Bind Qualifier **and**
 - Owner for DB2 Tables, Indexes and Views
 - Added field for the Gen Runtime Collection ID

DB2 Bind Enhancements

Host Encyclopedia – Set DB2 variables

```
COMMAND ==> _                               Set DB2 variables

Enter or verify the DB2 encyclopedia installation variables and select a
dataset type.

DB2 Subsystem ID . . . . . DSN
Secondary Authorization ID . . . . . _____ (Optional)
Bind Qualifier and DB2 Table-Index-View Owner . . . . . _____ (Optional)
DB2 Collection ID . . . . . DBCOLLID
Schema DB name . . . . . HOSTS_____
Data DB name . . . . . HOSTD_____
Public Interface DB name . . . . . HOSTP_____
Gen Runtime Collection ID . . . . . RTCOLLID

Dataset storage type . . . . . 6 (6=Storage Group, V=VSAM)
Encyclopedia initial size . . . . . S (S=Small, M=Medium)
Secondary storage factor . . . . . 0_ ( .01 to 9.9 X primary, 0=No secondary)

Note: Changes to any of the last 3 fields on this panel will require
rebuild of the space values (Option 7 or 8 on prev panel).
F1=Help F2=Accept F3=Exit F6=Save F12=Cancel
```



DB2 Bind Enhancements

z/OS Runtime Modules using DB2

- Gen runtime modules which have DB2 usage
 - TIRPROFD
 - TIROLBCM
- Included into a new application runtime DLL called TIRRTLD*
 - * = I, C or T depending on the target platform.
- Package bind for DBRMs TIRPROFD and TIROLBCM
 - Reduces DB2 application plan size and improves maintenance
 - Gen runtime DB2 collection captured by CEINSTAL dialogs
 - New CEINSTAL jobs CEJOB14R and CEJOB15R



DB2 Bind Enhancements

DB2 Bind Parameters for Generated Applications

- Qualifier and Location parameters added to application package bind processing for DARs 16244281 and 15360951
 - Qualifier and Location captured by Bind Options dialogs on Host Construction and CSE Construction Client

DB2 Bind Enhancements

Generated Applications – Package Bind Defaults

- New parameters Qualifier and Location

```
Set Package Bind Defaults for The Model
COMMAND ==> _
Enter package bind defaults. To save, press F6. To cancel, press F12.
Location: _____ + Spaces = Use the default location ID
Collection: _____ + Spaces = Do NOT do a package bind
Version: _____ +
Owner: _____ + Spaces = Use the primary authorization ID
Qualifier: _____ + Spaces = Do NOT use a qualifier ID
Isolation: ___ + CS, RR, RS or UR (RS and UR requires DB2 v.4)
Validate: ___ + BIND or RUN
Release: _____ + COMMIT or DEALLOCATE

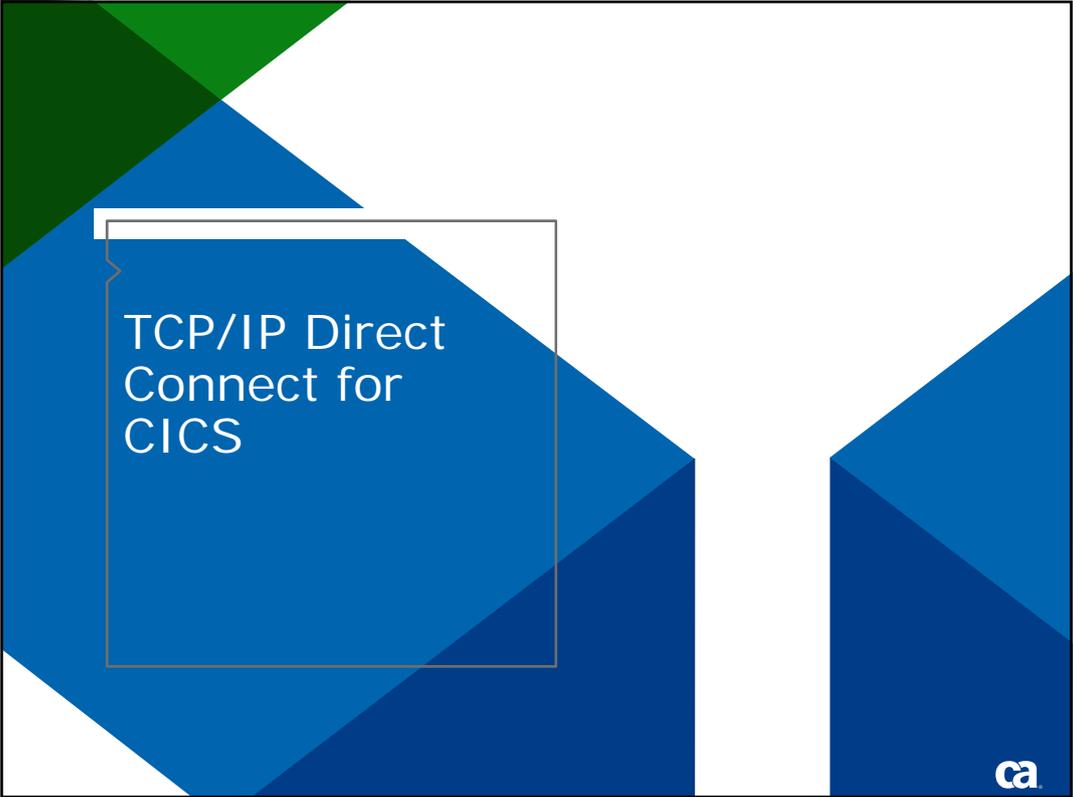
To delete the defaults, type DEL on the command line

F1=Help F2=Accept F3=End F4=Prompt F6=Save F12=Cancel
```


DB2 Bind Enhancements

z/OS IT – Processing Remote Files

- The z/OS IT has been updated to process the DB2 location and qualifier parameters.



TCP/IP Direct
Connect for
CICS

TCP/IP Direct Connect for CICS

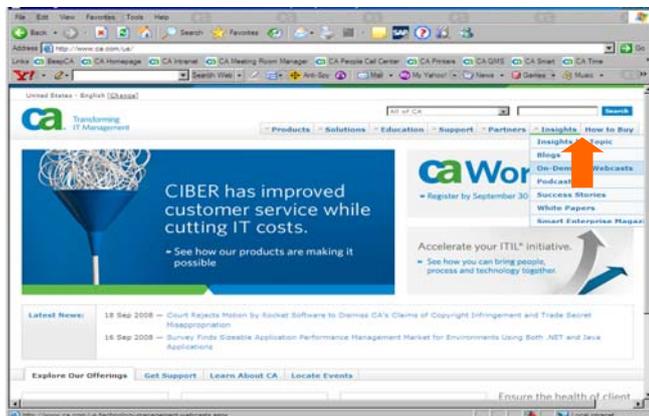
- CA Gen r8 TCP/IP Direct Connect for CICS
 - TILSTNR/TICONMGR (retired)
 - Socket Listener (TISRVLIS)
- Infrastructure Update
 - Add IPv6 support
 - Note: All Gen products support IPv6 in r8
- Non-Persistent Connection Support
 - New Configuration added to CM and CB
 - All TCP/IP CoopFlows (C, Java, C#)



TCP/IP Direct Connect for CICS

Migration Details

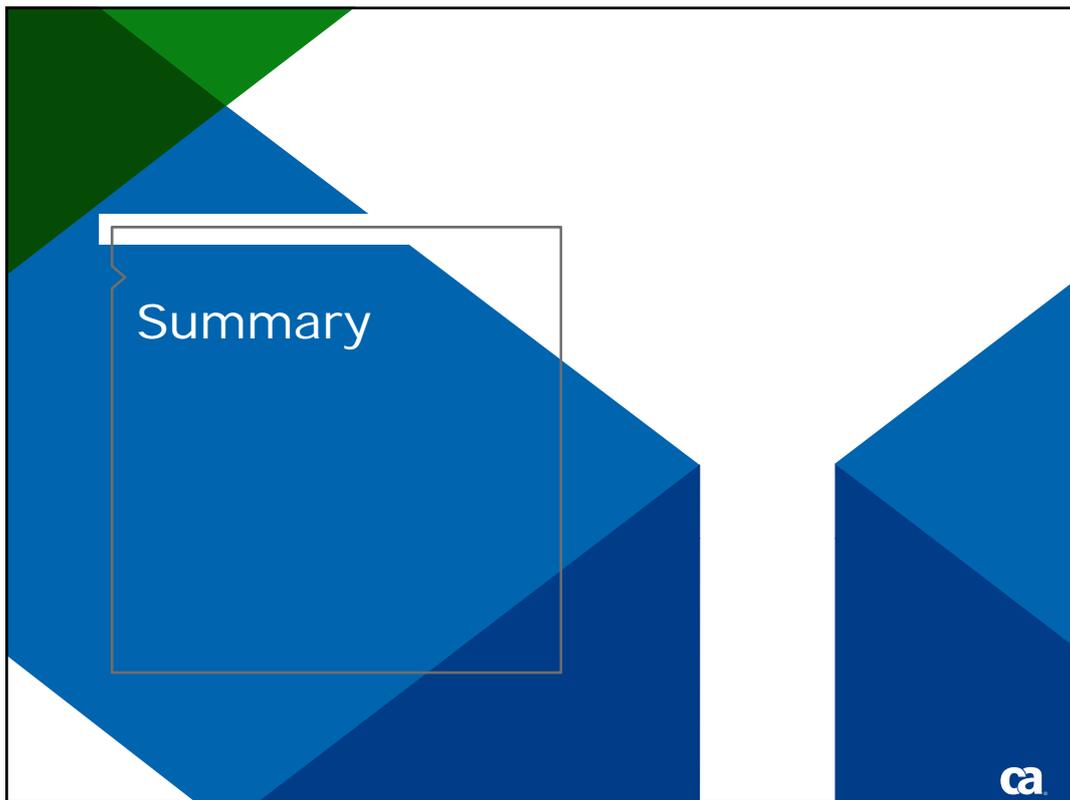
- On-Demand Webcast on www.ca.com or the Insights section of the CA Gen product home page: www.ca.com/us/products/product.aspx?id=256



22 Jul 2008

[CA Gen Optimization Series: Converting from TICON Manager to Sockets Server Listener TISRVLIS](#)





Summary

- CA Gen r8 implements user requested enhancements
 - Existing DARs
 - Input from our Gen r7.6 Beta Customers
- Incorporated User feedback from EDGE 2007 conferences
- New features expand the use of DLLs
- CA Gen is a key technology for our Customers and CA's Mainframe 2.0 initiative
- CA Gen r8 z/OS product installation is enhanced inline with Mainframe 2.0 initiative

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