



# CICS Nuts Bolts and Gotchas

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# PM60830 improves performance if using CICS TS 4.2 or 5.1 and IMS 12

- If you are using CICS Transaction Server for z/OS V4.2 or V5.1 with IMS V12, you should apply the IMS PTF for HIPER APAR PM60830 (UK81843). This APAR resolves a performance regression or degradation problem that can occur when upgrading from IMS V11 to V12 and running CICS-IMS quasirent applications. PM60830 should also improve performance if you are making your CICS-IMS applications threadsafe.
- Following are highlights from testing done at IBM that show performance improvements when comparing CICS TS V4.2 with IMS V11 running a quasirent application to CICS TS V4.2 with IMS V12 running a threadsafe application.
  - 31.36% improvement in external throughput rate (ETR) or transactions per second
  - 6.78% improvement in efficiency or internal throughput rate (ITR = ETR divided by CPU% busy)
  - 43.33% reduction in transaction response time
  - 5.89% reduction in CICS service time per transaction

# DFHDB8222 Connection from CICS TS 4.2 to IMS fails. DBCTL return code is 36

- Your CICS region fails to connect to IMS and you receive message DFHDB8222 Connection has failed. DBCTL return code is 36 (RC36). You also receive message DFHDB8111 with return code 36 and DFHDB8102. This occurs during CICS startup or when you enter transaction CDBC to connect to IMS from CICS Transaction Server for z/OS (CICS TS) V4.2.
- The following message sequence appears in the CICS log:
  - F CICS1,CDBC CON SUF(00)
  - +DFHDB8222 Connection has failed. DBCTL return code is 36.
  - +DFHDB8111 E Connection has failed. DBCTL return code 36.
  - +DFHDB8102 I Disconnection from DBCTL is now complete.
- **Cause:** IMS is not recognizing the new parameters being passed by CICS in the participant adapter parameter list (PAPL).
- Apply the required PTF(s) applicable to your IMS release:
  - IMS V12 New function APARs:
    - [PM31420](#) (PE PTF UK70991)
    - [PM45414](#) (PTF UK71251)
    - [PM47327](#) (PTF UK73103) - fixing APAR for PM31420
    - IMS V11 toleration only - [PM31729](#) (PTF UK67278)
    - IMS V10 toleration only - [PM31730](#) (PTF UK67279)

# Customer requirements answered in CICS TS 5.1

- Over 100 customer requirements or requests for enhancements (RFEs) that have been delivered in version 5.1 of IBM CICS Transaction Server for z/OS (CICS TS).
- The following URL lists them all:
  - <http://www-01.ibm.com/support/docview.wss?uid=swg27037777>
- **RFE 24857** [Add APPEND option to PUT container command](#)
- 24678 [Add Console Journaling for CICS transactions](#)
- 20335 [Add SMF 110 monitoring records for CPU consumed by transaction on zIIP and zAAP](#)
- 20243 [Add security refresh function to CICS Transaction Server for SSL security](#)
- 20294 [Addition of message indicating release of GCD and LCD](#)
- 20236 [Allocate CICS commarea storage above the line after XCTL \(SHARE requirement SSCICS10002\)](#)

## ABEND0C4 and DFHME0132 for DFHDU0303I when using OMEGAMON XE for CICS 5.1

- You receive an ABEND0C4 and message DFHME0132 for DFHDU0303I. This occurs when you are bringing down your CICS Transaction Server for z/OS (CICS TS) region after message DFHRM0130 Recovery manager has successfully quiesced. You are using Tivoli Omegamon XE for CICS V5.1.
- CICS is in the process of closing the transaction dump datasets and will issue message "DFHDU0303I Transaction Dump Data set DFHDMPx closed." but the KOCOME00 OCGLUE XMEOUT GLUE (Global User Exit) is called and an 0C4 abend occurs out of module DFHSUEX because Omegamon has released the module.
- Apply the PTF for Tivoli Omegamon XE for CICS V5.1 APAR [OA40598](#)

# Send email from CICS Transaction Server for z/OS

- SupportPac CA1Y provides a simple mail transfer protocol (SMTP) client to send emails and attachments from CICS Transaction Server for z/OS (CICS TS).
- The SupportPac provides an SMTP client to send emails and attachments that is quick to setup, easy to use, and might not require any application changes. This SupportPac runs in the CICS Java server environment and is eligible for off-loading onto a [System z Application Assist Processor \(zAAP\) speciality engine](#), which could be very cost-effective.
- See the following URL for more detail:
  - <http://www-01.ibm.com/support/docview.wss?uid=swg24033197>

## Changes to SIT parameters in CICS TS 5.1

- What changes have been made to the CICS Transaction Server for z/OS (CICS TS) V5.1 System Initialization Table (SIT) parameters and what effect will these have on your CICS regions when you upgrade?
- In previous releases, the default values for a number of SIT parameters were such that they needed to be changed immediately after installation in order to run any form of workload. Other parameters are now obsolete since they were typically not being configured correctly leading to performance issues under certain circumstances.
- See the following URL:
  - <http://www-01.ibm.com/support/docview.wss?uid=swg21599151>



# High Virtual user region storage missing from complete SVC Dump

- An SVC Dump that is supposed to contain High Virtual Region does not. However, it does include either LIKELSQA storage (high virtual LSQA) or LIST64 storage. An alternate symptom is that the SVC dump is complete and includes LISTLSQA storage but does not include the requested LIST64 storage (nor does it include Highvirt User Region).
- This problem arises from a failure to properly maintain the CurrHiPriRange range table pointer in subroutine CrsRng64. The result is that the code continually overwrites the same entry in the table, resulting in the loss of LIST64 and highvirt RGN storage if LIKELSQA storage is in the dump, or the loss of highvirt RGN storage if there is no LIKELSQA storage to be dumped but there is LIST64 storage requested.
- In a CICS 4.2 dump, you receive the following error when attempting to review the CICS internal trace by issuing: VERBX DFHPD670 'TR=3' OR VERBX DFHPD670 'TR'
  - \*\* DFHPD0106 An error has occurred while formatting TRGTW.
  - \*\* DFHPD0101 Pointer to TRBLOCK at offset 0020 is invalid.
- In CICS 4.2, the trace table was moved above the bar to 64 bit storage, and it was missing from the dump.
- Subscribe to OPEN z/OS APAR OA40015



# New messages for IPCONN State Changes

- Currently there are no messages issued when IPCONN state changes. This makes it difficult to detect IPCONNs which maybe hanging in FRE state.
- It is also impossible to tell from the CICS log when an IPCONN was acquired and why and when it is being released.
- Subscribe to open CICS APAR PM65433

# DVH3abend on DLI commands after using the CICS TS 4.2 Translator

- A program containing EXEC DLI commands which is translated by the CICS TS 4.2 translator may fail with abend DHV3 on execution.
- At CICS TS 4.2, the translator no longer indicates that it has generated missing mandatory parameters to EXEC DLI commands. If an application program omits the mandatory parameters, the program abends.
- This is because the logic in DFHARG0 which sets arg0 does not have any code for EXEC DLI statements. DFHEXMAB has been changed to correctly set arg0 for EXEC DLI commands.
  - APAR PM67248
  - PTF UK80375

## ABILITY TO OVERRIDE RLS CO-EXISTENCE PROTECTION FOR CICS

- VSAM will in general prevent simultaneous access to a data set in both RLS and non-RLS modes. However, a readonly non-RLS file can be opened if it is shareoptions 2 while RLS also has the dataset open.
- If a dataset is open to RLS within CICS, it will currently be rejected with DFHFC0512 to ensure applications get consistent views of the same underlying dataset.
- This apar will allow the user to override this co-existence protection for CICS and allow a non-RLS readonly open of a dataset that is opened in RLS mode if it is defined with shareoptions 2
- APAR PM12835 (R600) - PTF UK65921

## **NON-RLS READ-ONLY file is closed unexpectedly when a RLS dataset with the same DSNNAME is Quiesced**

- Global User Exit XFCRLSCO has been used to open both RLS and non\_RLS files against the same data set. A QUIESCE request is then received against that data set, and DFHFCQU PROCESS\_QUIESCE runs to close the open files.
- CICS decides that there are one or more RLS file open against the quiescing data set, and then proceeds to close all files open against that data set.
- DFHFCQU has been modified in the PROCESS\_QUIESCE and FCQU\_ENABLE\_FILE\_FOR\_UNQUIESCE routines to ensure only RLS files are affected.
- For CICS TS 4.2 apply PTF UK72783
- For CICS TS 4.1 apply PTF UK72864

# IXG231 and DFHLG0508 for DFHJ01 when starting CICS



- **Problem:** You receive message IXG231 and DFHLG0508 for DFHJ01 when you are try to bring up a CICS Transaction Server for z/OS (CICS TS) region.
- **Cause:** System initialization table (SIT) overrides of CSDRECOV=ALL and CSDFRLOG=1 were set. With these recovery options for the CSD, CICS will automatically try to connect to DFHJ01.
- **Solution:** Change CSDRECOV to BACKOUTONLY or NONE in the SIT, or define DFHJ01 (usually in the form of userid.applid.DFHJ01) if you want forward recovery for the CSD.

# CICS TS 4.2 processing DLI request goes into tight loop DFHXFP

- You are running CICS Transaction Server 4.2 and your region hangs and needs to be recycled.
- From a dump taken at the time of the hang we find CICS is in a tight loop. System trace shows a constant PSW address for the QR TCB pointing to offset x'5DE' into module DFHXFP
- The last trace entry in CICS is:
  - D900 XFP ENTRY - TRANSFORMER\_4 PLIST\_ADDR(21565180)  
FUNCTION(4002)
- Subscribe to open CICS APAR PM66034

## New CICS system initialization option advised to ensure smooth handling of daylight saving time (DST)

- When the z/OS system clock is set back, such as for 1 hour for Daylight Saving Time, you are advised to use this new function to automatically re-synchronize the clock in your CICS regions with the z/OS system clock. Without this, if your CICS Transaction Server for z/OS (CICS TS) regions run applications that do EXEC CICS STARTs or EXEC CICS DELAYs or EXEC CICS POSTs that specify a TIME (rather than an INTERVAL), and that time is calculated from EIBTIME plus some amount of time, then those STARTs and DELAYs and POSTs will expire immediately if the CICS time does not match the z/OS time. This can cause various problems like application loops and excessive SMF data recording that can cause the CICS region to become unresponsive.
- Synchronize the CICS time with the z/OS time immediately whenever you alter the system date or time-of-day in the MVS TOD clock while a CICS region is running. APARs PM61466 (4.2), PM52109 (4.1), and PM52172 (3.2) add a new IMMEDIATE option to the AUTORESETTIME System Initialization Parameter (SIT). If you do not have a process in place to guarantee that a manual CEMT PERFORM RESET or EXEC CICS PERFORM RESETTIME command will be done immediately after altering the MVS TOD clock, then apply the PTF for your release of CICS below and set AUTORESETTIME=IMMEDIATE to pick up the new functionality and automatically synchronize the CICS time with the z/OS time:
  - CICS TS 4.2 - PTF UK78430 for APAR PM61466
  - CICS TS 4.1 - PTF UK77263 for APAR PM52109
  - CICS TS 3.2 - PTF UK78322 for APAR PM52172



## DFHDS0001 ABEND0C4 in DFHDSAT or DFHAP0001 0C4 in DFHERMSP when using ASG-TMON

- While your CICS region is running, you receive message DFHDS0001 0C4 AKEA (abend0C4 abendAKEA) at offset FFFF in DFHDSAT. You might also receive message DFHAP0001 0C4 AKEA at offset FFFF in DFHERMSP. This is followed by DFHRM0002 code 020B in DFHRMUO or code 0377 in DFHRMLSO. You are using ASG-TMON
- You see the following message in the CICS log:
  - [DFHDS0001](#) applid An abend (code 0C4/AKEA) has occurred at offset x'FFFF' in module DFHDSAT
  - [DFHAP0001](#) applid An abend (code 0C4/AKEA) has occurred at offset x'FFFF' in module DFHERMSP
  - [DFHRM0002](#) applid An abend (code x'020B') has occurred in module DFHRMUO
  - DFHRM0002 applid A severe error (code X'0377') has occurred in module DFHRMLSO
- When you receive error code 0377, the CICS region comes down with an abend U1800. But, the CICS region continues to be operational if the other abends occur
- Apply ASG TMON fix TH03422

# Forcing a CICS TS region to abend

- You would like force a CICS region to abend for testing purposes
- One way to do it is to use a system initialization table (SIT) override of SRT=NO. This specifies that CICS is not to try to recover from program checks. Then run a transaction that deliberately program checks, for example:

```
DFHEISTG DSECT
PMRXXXXX CSECT
PMRXXXXX AMODE 31
PMRXXXXX RMODE ANY
*
      DC  H'0'
*
      EXEC CICS RETURN
*
      END  PMRXXXXX
```

- You will get a DFHSR0603 message along with an SR0603 dump and the region will come down, ending with a DFHKE1800 message saying that abnormal termination of CICS is complete.

## DFHAP0001 0C4 in DFHAPDM at startup when using BMC after upgrading to z/OS 1.13

- Your CICS Transaction Server for z/OS (CICS TS) region fails during initialization. You are receiving an abnormal end or program check with message DFHAP0001 abend 0C4 (abend0C4 abendAKEA) in DFHAPDM. This occurs after upgrading to z/OS V1.13. You are using BMC Software.
- You see the following message in the CICS log:
  - [DFHAP0001](#) applid An abend (code 0C4/AKEA) has occurred at offset X'FFFF' in module DFHAPDM
- Apply BMC fix BPN1655

# CICS system is in a wait and not getting dispatched



- **Problem:** You are running an application that made a EZASOKET call to TCP/IP, and is waiting for a response. This call puts the CICS QR TCB into a wait. The region is not getting dispatched.
- **Cause:** The application is linked with the wrong socket module. It has been linked with the batch version EZASOKET module rather than the CICS version called EZACICAL
- **Solution:** Relink the application with the EZACICAL module to prevent MVS waits for the QR TCB.

## CICS taking excessive CPU

- **Problem:** A CICS region takes up 100% of one of your engines
- **Cause:** CA Technologies TCB is in a soft loop in CICS address space. The PSW from SYSTRACE showed a loop in module CAKSCMGR
- **Solution:** CA provided fix RO36895 to resolve a soft loop problem with a control block search. Contact CA for further assistance

# SQA storage creep

- **Problem:** You notice a problem with increased SQA usage your LPAR. SQA usage had grown significantly and was overflowing to CSA causing the CSA threshold to be exceeded. There is a lot of unowned SQA storage and the owners are CICS regions which are leaving behind 64 bytes of SQA every time they are recycled.
- **Cause:** Eye-catchers in the storage show the following pattern:

e.....CAS9C66 .....e

- **Solution:** Ca Technologies CA confirmed that this was a known problem. PTF TD46632 for CA common Services resolved this problem

# A03 at CICS shutdown when using Fault Analyzer



- **Problem:** After upgrading your operating system, CICS shutdown now receives an abendA03. You are using Fault Analyzer.
- **Cause:** The abendA03 occurs due to a Fault Analyzer TCB that has not detached itself correctly.
- **Solution:** Add Fault Analyzer program IDIPLT to your shutdown PLT.



# DFHDU0207I Transaction Dumps are being suppressed by XDUREQ



- **Problem:** CICS is not producing Transaction Dumps. Message DFHDU0207I indicates that XDUREQ user exit is suppressing both transaction and system dumps. You would like to know how to disable the user exit programs at exit point XDUREQ. In this particular case, the dump is for an abend ASRA.
- **Cause:** User exit program at exit point XDUREQ is suppressing the transaction dumps.
- **Solution:** Change the user exit program so it does not suppress the dumps or inactivate the programs at exit point XDUREQ using the steps below:

Enter **CECI INQUIRE EXITPROGRAM EXIT(XDUREQ) START** to start the browse so you can determine all of the exit programs defined at exit point XDUREQ. This returns:  
EXit( 'XDUREQ ' ) RESPONSE: NORMAL

Enter **CECI INQ EXITPROGRAM NEXT** until RESPONSE: END to display the exit programs defined for exit point XDUREQ. The number of programs returned will depend on the number of programs you have enabled at the exit point. For example, this would return the following if PROGRAM1 and PROGRAM2 are enabled:  
ENTRYName( 'PROGRAM1' ) RESPONSE: NORMAL  
ENTRYName( 'PROGRAM2' ) RESPONSE: NORMAL  
ENTRYName( ' ' ) RESPONSE: END

Enter **CECI INQ EXITPROGRAM END** to end the browse

Enter **CECI [DISABLE PROGRAM](#)(PROGRAMx) EXIT(XDUREQ)** for each program returned above to disable the program.

After getting your dumps you may want to re-activate the exit programs. To do this, you can enter **CECI [ENABLE PROGRAM](#)('PROGRAMx') EXIT('XDUREQ') START** for each program you want to enable.

## Average CPU time is higher when using CICS-MQ adapter with CICS TS 3.2 and higher

- **Problem:** You have upgraded to CICS Transaction Server for z/OS (CICS TS) V3.2 or later and are using the CICS-MQ adapter to communicate with Websphere MQ (WMQ). You are now seeing an increase in the CICS average CPU time. However, the CPU seconds for the entire region from the MVS type 30 SMF records does not show a significant increase.
- **Symptom:** In this case, the average CPU time went from .0015 under CICS TS V2.3 to .0022 under CICS TS V3.2. This represents a 46% increase in average CPU time. With a 46% increase in average CPU time, you expected that the total CPU time would have increased accordingly.
- **Cause:** The WebSphere MQ adapter used with releases of CICS before CICS TS V3.2 has a pool of eight private TCBs. Since they are private TCBs and not CICS managed TCBs, CICS does not capture and report the CPU time spent on those TCBs in the SMF 110 records.

Beginning with CICS TS V3.2, the CICS-MQ adapter uses CICS managed TCBs and CICS can now report the time spent on the TCB in the CICS SMF 110 records. As the MVS SMF Type 30 records show, the total CPU consumption for the region is nearly the same in both releases. However, the average CPU time shows a marked increase because it is now reporting the time spent on the CICS-MQ adapter TCBs.

- **Resolution:** Expect the average CPU time to be higher when using the CICS-MQ adapter with CICS TS V3.2 and higher. CICS is working as designed.

# New CICS TS 4.1 Abend AFDK



- **AFDK**
  - A file control request was made against a NSR file while transaction isolation was active for the task. Using NSR files with transaction isolation active is not supported. The TRANISO system initialization parameter is YES and the transaction definition has ISOLATE set to YES.
- **CICS Manuals at all supported releases indicate:**
  - VSAM nonshared resources (NSR) are not supported for transactions that use transaction isolation. You should specify ISOLATE(NO) when you define transactions that access VSAM files using NSR.
- **NOTE: CICS APAR PM07304 / PTF UK55020 will allow READONLY Files to use NSR and Transaction Isolation.**

# CICS Technical Exchanges

- CICS Technical Exchanges can be found at the following URL:

[http://www-947.ibm.com/support/entry/portal/previous\\_tech\\_exchanges/software/other\\_software/cics\\_transaction\\_server](http://www-947.ibm.com/support/entry/portal/previous_tech_exchanges/software/other_software/cics_transaction_server)

Sample Titles:

[Sizing and Analyzing JVM Memory Usage under CICS TS for z/OS](#)

[CPSM API Requests - Hangs and Timeouts](#)

[CICS Web services structure and debugging](#)

[CICS Storage 102 - Debugging CICS Short on Storage Conditions](#)

[Understanding Urimaps, Pipelines, and Webservices for CICS](#)

# Detailed System Requirements for CICS Transaction Server

- Detailed System Requirements (DSR) contain the supported operating system requirements, hardware requirements, software requirements, and other related information for a product.
- From this document you can select DSR for CICS Transaction Server (CICS TS) for:
  - V4.2
  - V4.1
  - V3.2
  - V3.1
  - CICS TS for VSE/ESA V1.1.1
- **Website:** <http://www.ibm.com/support/docview.wss?uid=swg27006382>

# Finding CICS Information Centers

- How do you find CICS product documentation for CICS Transaction Server for z/OS (CICS TS) and the CICS tools?
- The best place to find CICS product documentation is to use the CICS TS information centers. Documentation for most of the CICS Tools is also included in the CICS TS information centers. Each release of CICS has its own information center that you can view on the [www.ibm.com](http://www.ibm.com) Web site or install on a workstation or server.
- Here is a link to an item that has all the Information Centers online, and directions to download to a workstation:
  - <http://www.ibm.com/support/docview.wss?uid=swg21200934>

## Fix lists for CICS TS

- Fix list documents summarize all of the APARs and PTFs for a particular product Version
- Fixes by version document 7008833 contains a link to the available Fix list documents
- Direct URL:
  - <http://www.ibm.com/support/docview.wss?uid=swg27008833>



# Preventive Service Planning

- CICS Document 1231874 has a listing of all PSP buckets for CICS Transaction Server and all CICS Tools
- Direct URL:
  - <http://www.ibm.com/support/docview.wss?uid=swg21231874>

# New Function APARs

- Flashes for all CICS New Function (NF) APARs are posted to CICS Support page and included in MySupport email
- CICS item 1238275 has a listing of links to all New Function APARs for CICS Transaction Server and all CICS Tools
- Direct URL:
  - <http://www.ibm.com/support/docview.wss?uid=swg21238275>

# Announcement Letters for CICS

- CICS item 1227090 contains links to all Announcement letters for CICS Transaction Server and all CICS Tools
- Can be linked to from Announcement Letters on the CICS Support page
- Direct URL:
  - <http://www.ibm.com/support/docview.wss?uid=swg21227090>

# IBM Software Support Lifecycle

You want to know when the end of service is for any IBM Software release.

You can find the End of Service dates by navigating to the following URL:

[http://www.ibm.com/software/support/lifecycle/index\\_c.html](http://www.ibm.com/software/support/lifecycle/index_c.html)

CICS Transaction Server for z/OS V2.2 5697-E93	25 Jan 2002	30 Apr 2008
CICS Transaction Server for z/OS V2.3 5697-E93	19 Dec 2003	30 Sep 2009
CICS Transaction Server for z/OS V3.1 5655-M15	25 Mar 2005	
CICS Transaction Server for z/OS V3.2 5655-M15	29 Jun 2007	

## Ordering CICS products and maintenance

- You would like to order a CICS® product or maintenance. You want to know what options are available for ordering the product, individual PTFs, and cumulative maintenance for CICS or any of the CICS tools
- See the following document for all product or maintenance ordering concerns

<http://www.ibm.com/support/docview.wss?uid=swg21049360>

# Must Gather Documentation

MustGather documents aid in problem determination and save time resolving problem management records (PMRs). These documents are located on the CICS® Web site and contain instructions about what documentation to gather for specific problems.

Collecting MustGather data early, even before opening a PMR, helps IBM® Support quickly determine if:

1. Symptoms match known problems (rediscovery).
2. There is a non-defect problem that can be identified and resolved.
3. There is a defect that identifies a workaround to reduce severity.
4. Locating root cause can speed development of a code fix.

You can find the MustGather – Read first document on the CICS Home Page or go directly to:

<http://www.ibm.com/support/docview.wss?uid=swg21208053>

## HIPER and PE APARs

- CICS DCF item 1182322 will dynamically show all PE and HIPER maintenance for all supported releases of CICS and CPSM
- You can find this item by going directly to:
  - <http://www.ibm.com/support/docview.wss?uid=swg21182322>



# Upgrading information for CICS when changing release of CICS, z/OS, or DB2



- CICS Document 1207399 may be used to see if there are Upgrade Issues with CICS and CPSM.
- You can find this item by going directly to:
  - <http://www.ibm.com/support/docview.wss?uid=swg21207399>

# Mapping CICS releases from APARs and PTFs to CICS external versions



- How do you map the release numbers that IBM uses for CICS APARs and PTFs to the corresponding external versions of CICS? For example, how would you know that release 670 corresponds to CICS Transaction Server for z/OS (CICS TS ) V4.2?
- Reference item:

<http://www-01.ibm.com/support/docview.wss?uid=swg21509464>

# Additional Product Resources

- CICS Transaction Server support Web page  
[http://www.ibm.com/support/entry/portal/Overview/Software/Other\\_Software/CICS\\_Transaction\\_Server](http://www.ibm.com/support/entry/portal/Overview/Software/Other_Software/CICS_Transaction_Server)
- IBM\_CICS technical support news on Twitter  
<http://www.ibm.com/support/docview.wss?uid=swg21384915>
- WebSphere and CICS Support Blog  
<http://www.ibm.com/developerworks/mydeveloperworks/blogs/aimsupport/>
- WebSphere and CICS Support on Facebook (beta)  
<http://www.facebook.com/pages/WebSphere-and-CICS-Support-BETA/137468732967250>
- Technical support emails with My Notifications subscription  
<http://www.ibm.com/software/support/einfo.html>
- Webcasts for CICS products  
<http://www.ibm.com/support/docview.wss?uid=swg27007244>
- IBM Education Assistant modules  
<http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp>