

We're **STILL** extending our **CICS** applications

Steve Ware, **UF**

SHARE 115

August 2 (Mon.) 2010, 3:00 PM

The Hynes Convention Center,
Boston, MA, Room 310

Abstract



In this session, we'll share information on the use of IBM CICS Transaction Server for z/OS at the University of Florida. Not only are new applications being developed and deployed in CICS, but mission critical applications are made more accessible with CICS's support of Web services.

CICS is the leader in transaction processing, providing extremely fast response time, very high availability, and a very modern and feature-rich application processing environment.

CICS is strategically positioned for enterprise class application serving, whether for new and/or extended mission critical applications.

Abstract

CICS TS for z/OS 4.1 became generally available in late June 2009, and IBM shows no signs of slowing down regarding future releases of CICS TS for z/OS. At UF, we installed CICS TS 4.1 in early July 2009, and have enjoyed very near 100% scheduled CICS availability. The IBM System z mainframes, running the IBM z/OS operating system, provide one of the most modern, resilient, and capable computing platforms.

The past, present, and future of CICS and the mainframe are bright - bring your sunglasses to this session as we shine a light on the best of breed - CICS and the mainframe!



Disclaimer

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No warranties are either expressed or implied, your mileage may vary, etc.



Agenda/Topics

- Let's start with a quick tour!
- Introduction
- Extending/enhancing CICS applications
- What about mainframe application development?
- Why CICS?
- Why the Mainframe?
- Summary and Q&A
- Appendix and Additional Information
- Abbreviations (and a bit of Glossary)

A quick tour!



The screenshot displays a mainframe terminal interface with three windows. The top-left window shows a Java stack trace for a NullPointerException. The top-right window shows a CICS menu with options like 'STUDENT RECORDS SYSTEM', 'REGISTRAR INFORMATION', and 'EQUIPMENT INFO MENU'. The bottom window shows a CICS log with various system messages, including installation and error reports.

```
java.lang.NullPointerException
.at com.ibm.p8.utilities.log.P8BinaryFileHandler.flush
.at com.ibm.p8.utilities.log.P8MemoryHandler.publishTo
.at com.ibm.p8.utilities.log.P8MemoryHandler.publish(P8
.at java.util.logging.Logger.log(Logger.java:1127)
.at com.ibm.p8.utilities.log.P8Logger.log(P8Logger.jav
.at java.util.logging.Logger.log(Logger.java:1064)
.at com.ibm.p8.sapi.cics.CicsHandler.cicsAbend(CicsHand
.at com.ibm.p8.sapi.cics.CicsHandler.main(CicsHandler.
.at sun.reflect.NativeMethodAccessorImpl.invoke0(Nativ
.at sun.reflect.NativeMethodAccessorImpl.invoke(Nativ
.at sun.reflect.DelegatingMethodAccessorImpl.invoke(De
.at java.lang.reflect.Method.invoke(Method.java:600)
.at com.ibm.cics.server.Wrapper.call_main(Wrapper.java
```

```
NERCICS  NERDC  CICS  GROUP  MENU  416 03/01/10 09:01:12 $A66
JULIAN DATE 10060  USER NAME = WARE STEVE  NICKNAME = SFWARE
NERDC = SFWAREX
```

ITEM	SCR	ITEM	SCR
1.	206	13.	147
2.		14.	294
3.		15.	
4.		16.	177
5.	0A0 (AO) AUDITS ONLINE	17.	278
6.		18.	251
7.	360 REGISTRAR INFORMATION	19.	
8.		20.	
9.	048 PROGRAM DOCUMENTATION	21.	
10.	EQI EQUIPMENT INFO MENU	22.	051
11.		23.	
12.		24.	270

```
CICS660 - Record 29773 Columns 1-132
COMMAND ==>
DFHAM4893 I 03/01/2010 10:50:29 NERACDV2 Install for group CA1SGRP has completed successfully.
DFHMB1560 03/01/2010 10:51:15 NERACDV2 SFM URIMAP CA1SINF has been created.
DFHRD0123 I 03/01/2010 10:51:15 NERACDV2 TEPS0369 SFM CEDA INSTALL URIMAP(CA1SINF)
DFHMB1560 03/01/2010 10:51:15 NERACDV2 SFM URIMAP CA1SRET has been created.
DFHRD0123 I 03/01/2010 10:51:15 NERACDV2 TEPS0369 SFM CEDA INSTALL URIMAP(CA1SRET)
DFHPI0701 I 03/01/2010 10:51:15 NERACDV2 SFM PIPELINE CA1SINF has been created.
DFHRD0124 I 03/01/2010 10:51:15 NERACDV2 TEPS0369 SFM CEDA INSTALL PIPELINE(CA1SINF)
DFHPI0701 I 03/01/2010 10:51:15 NERACDV2 SFM PIPELINE CA1SRET has been created.
DFHRD0124 I 03/01/2010 10:51:15 NERACDV2 TEPS0369 SFM CEDA INSTALL PIPELINE(CA1SRET)
DFHP60210 03/01/2010 10:52:09 NERACDV2 SFM CPIH PPT entry for DFHJVWRO has been system autoinstalled.
DFHSJ0207 03/01/2010 10:52:17 NERACDV2 CICS is running Java version 1.6.0.
2010060110324 CNTL=PURGE,INTRVAL=0030
CAIN4338 PURGE SCHEDULED AT INTRVAL=00:30 HH-MM.
CAIN4339 000 TASK(S) PURGED THIS TIME.
2010060110324 CAIN4513 This request has been processed.
CAIN4513 THIS REQUEST HAS BEEN PROCESSED.
2010060110522 CNTL=CKPT
CAIN0011 CKPT function completed at 11:05.
DFHSJ0902 03/01/2010 11:05:53 NERACDV2 SFM ??? CPIH CA1SHNDL Uncaught exception from application.
DFHSJ0904 03/01/2010 11:05:53 NERACDV2 SFM ??? CPIH CA1SHNDL Exception java.lang.NullPointerException occurred creating object
reference for class com.ibm.p8.sapi.cics.CicsHandler
DFHDU0203I 03/01/2010 11:05:54 NERACDV2 A transaction dump was taken for dumpcode: A305, Dumpid: 1/0001.
DFHPI0500 03/01/2010 11:05:54 NERACDV2 CPIH The CICS Pipeline Manager DFHP1PM encountered an error while trying to link to program
CA1SHNDL. The program abended. PIPELINE= CA1SINF.
```

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A quick tour! (cont.)



The screenshot displays the IBM CICS Explorer interface. The main window shows a table of CICS jobs with the following data:

Region	Job Name	Task Count	Release	Total CPU	Page In Count	Page Out Count
NERCDEV2	CICSDEV2	7	0660	0000:02:51.9619	2500	0

Below the table, the 'Properties' tab is selected, showing the 'Autoinstall Details' for the job. The properties are as follows:

Property	Value
Autoinstall Details	
Basic	
Akp	4000
Appl ID	NERCDEV2
CICS Release	E660
CICS Start Time	Mar 1, 2010 6:00:34 AM
CICS Status	ACTIVE
CICS System ID	DEV2
CICS TS Level	040100
Coldstatus	COLD
Command Prote	CMDPROT
Conversest	CONVERSE
Dsidle	02:00:00
Dsinterval	12:00:00
Exception Monit	NOEXCEPT
Exit Wait Time	1000
Forceqr	NOFORCE
Frequency	00:00:00
I/O Count	217332
ldntyclas	NOIDENTY
Initialization St	INITCOMPLETE
Job Name	CICSDEV2
Last Reset Time	06:00:34
Ldglbsou	1
Ldglsort	0
Ldglwsou	0
Loader Request	230

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A quick tour! (cont.)



The screenshot shows a CICS terminal window titled 'x3270-2 nermvs_ssl <8>'. The main display area shows the following text:

```
DFHCMC01          Display On-line Messages and Codes

Type the required message identifier, then press Enter.

Component ID. . . . [ ] (for example, TC for Terminal Control
                        FC for File Control, etc.)
This field is required for messages in the
form DFHxxxxxxx, where xx is the Component ID.

Message Number. . . aj05 (for example, 1060, 5718, or Abend Code
                        such as ASRA, etc.)

F3=Exit to CICS
```

At the bottom of the terminal window, there is a status bar showing 'TEPS0370' and a cursor position ':00.0 008/027'. Below the terminal window, a task panel displays three message details:

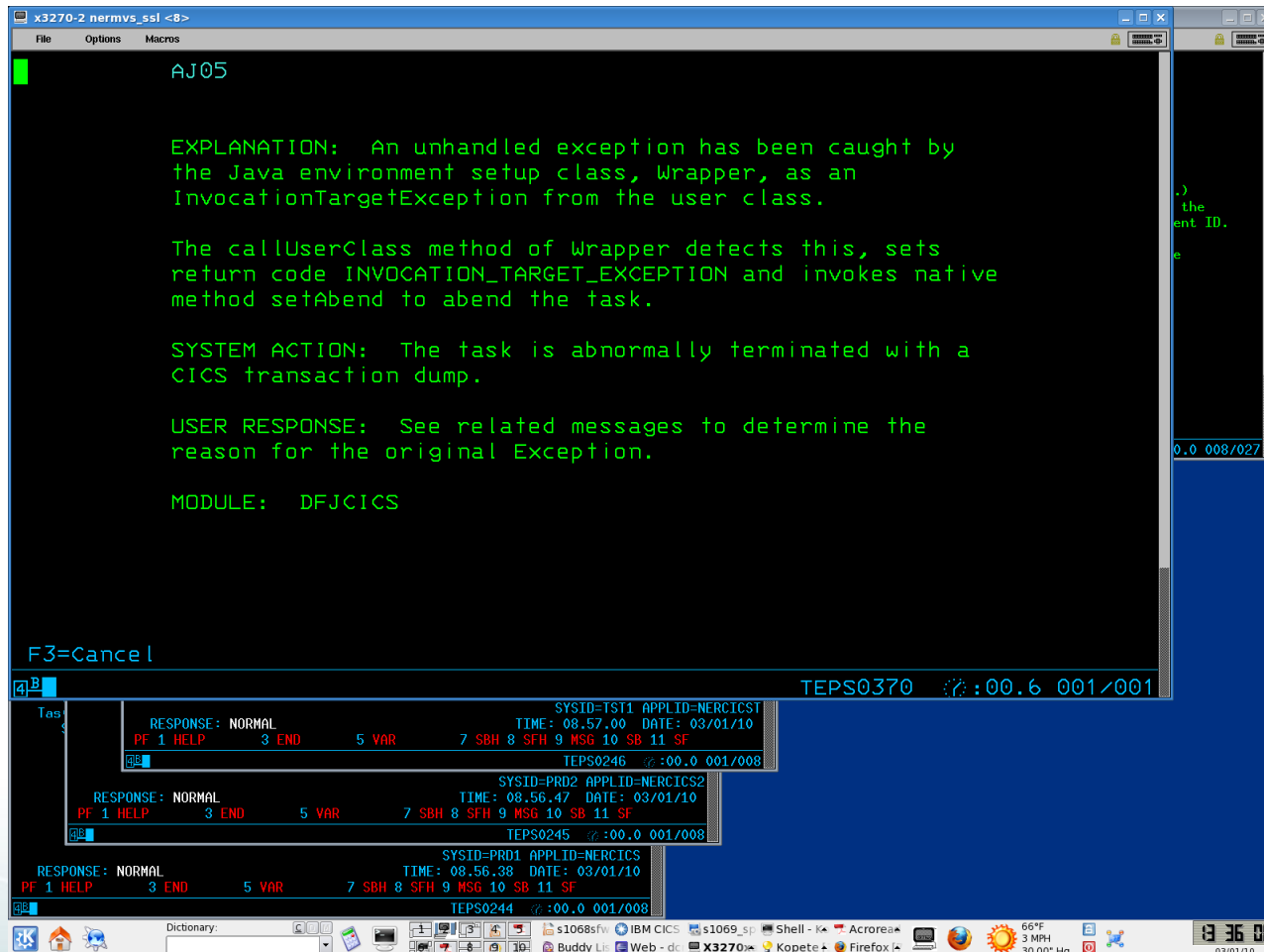
Message ID	Response	Time	Date	System ID	App ID	Msg No	SB	SF
TEPS0246	NORMAL	08:57:00	03/01/10	SYSID=TST1	APPLID=NERCICST	9	10	11
TEPS0245	NORMAL	08:56:47	03/01/10	SYSID=PRD2	APPLID=NERCICS2	9	10	11
TEPS0244	NORMAL	08:56:38	03/01/10	SYSID=PRD1	APPLID=NERCICS	9	10	11

The task panel also shows navigation keys: PF 1 HELP, 3 END, 5 VAR, 7 SBH, 8 SFH, 9 MSG, 10 SB, 11 SF.

The bottom of the screenshot shows a Windows taskbar with various icons, including a dictionary, network status, and system tray showing the time 8:46:38 on 03/01/10.

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A quick tour! (cont.)



x3270-2 nermvs_ssl <8>

File Options Macros

AJ05

EXPLANATION: An unhandled exception has been caught by the Java environment setup class, Wrapper, as an InvocationTargetException from the user class.

The callUserClass method of Wrapper detects this, sets return code INVOCATION_TARGET_EXCEPTION and invokes native method setAbend to abend the task.

SYSTEM ACTION: The task is abnormally terminated with a CICS transaction dump.

USER RESPONSE: See related messages to determine the reason for the original Exception.

MODULE: DFJICIS

F3=Cancel

TEPS0370 :00.6 001/001

RESPONSE: NORMAL SYSID=TST1 APPLID=NERCICST
PF 1 HELP 3 END 5 VAR 7 SBH 8 SFH 9 MSG 10 SB 11 SF
TIME: 08.57.00 DATE: 03/01/10
TEPS0246 :00.0 001/008

RESPONSE: NORMAL SYSID=PRD2 APPLID=NERCICS2
PF 1 HELP 3 END 5 VAR 7 SBH 8 SFH 9 MSG 10 SB 11 SF
TIME: 08.56.47 DATE: 03/01/10
TEPS0245 :00.0 001/008

RESPONSE: NORMAL SYSID=PRD1 APPLID=NERCICS
PF 1 HELP 3 END 5 VAR 7 SBH 8 SFH 9 MSG 10 SB 11 SF
TIME: 08.56.38 DATE: 03/01/10
TEPS0244 :00.0 001/008

Dictionary: s1068sfw IBM CICS s1069_sf Shell - K Acrorea Buddy Lite Web - dc X3270 Kopete Firefox

56°F 3 MPH 30.00" Hg 8:36:00 03/01/10

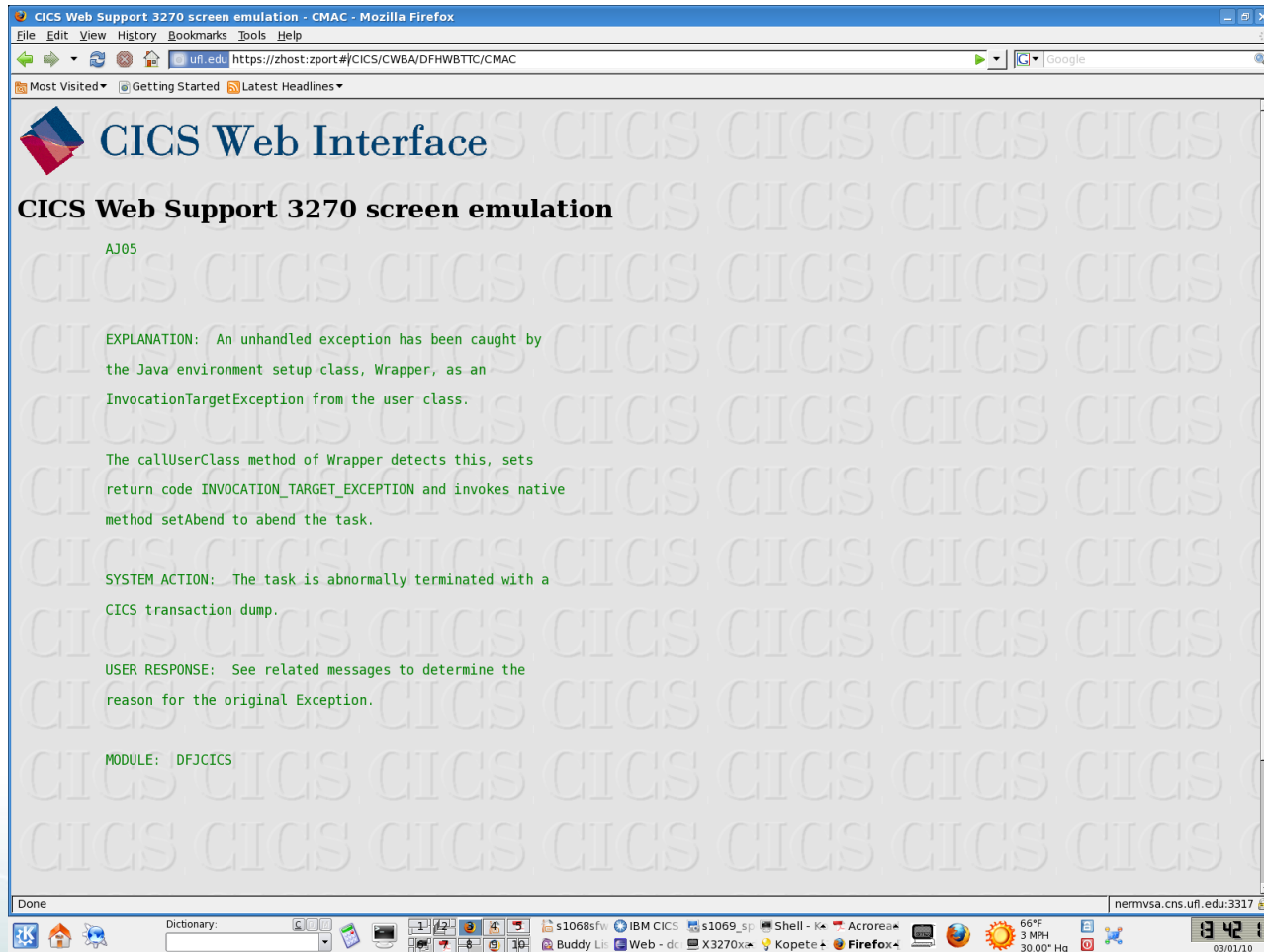
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A quick tour! (cont.)



We're STILL extending our CICS applications, SHARE 115, Boston, MA, Steve Ware, UF.

A quick tour! (cont.)



We're STILL extending our CICS applications, SHARE 115, Boston, MA, Steve Ware, UF.

A quick tour! (cont.)



CICS Web Support 3270 screen emulation - CMAC - Mozilla Firefox

File Edit View History Bookmarks Tools Help

ufl.edu https://zhost.zport:#/CICS/CWBA/DFHWBTTCC/CMAC

Most Visited Getting Started Latest Headlines

AJ05

EXPLANATION: An unhandled exception has been caught by the Java environment setup class, Wrapper, as an InvocationTargetException from the user class.

The callUserClass method of Wrapper detects this, sets return code INVOCATION_TARGET_EXCEPTION and invokes native method setAbend to abend the task.

SYSTEM ACTION: The task is abnormally terminated with a CICS transaction dump.

USER RESPONSE: See related messages to determine the reason for the original Exception.

MODULE: DFJJCICS

F3=Cancel

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12
PF13	PF14	PF15	PF16	PF17	PF18	PF19	PF20	PF21	PF22	PF23	PF24
PA1	PA2	PA3	Clear	Enter	Pen	Reset					

Done

Dictionary: [input field]

s1068sfw IBM CICS s1069_sf Shell - K Acrorea Buddy Lite Web - dc X3270x Kopete Firefox

66°F 3 MPH 30.00" Hg

8:42:38 03/01/10

nermvs.cns.ufl.edu:3317

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A quick tour! (cont.)



Sample1 - Mozilla Firefox <2>
File Edit View History Bookmarks Tools Help
https://zhost:zport#/CICS/CWBA/DFJ\$JWB1
Most Visited Getting Started Latest Headlines

Web Sample1

Inbound Client Request Information:

Method: GET
Version: HTTP/1.1
Path: /CICS/CWBA/DFJ\$JWB1
Request Type: HTTPYES
Query String: null

HTTP headers:

Value for HTTP header User-Agent is 'Mozilla/5.0 (X11; U; Linux i686; en-US; rv:1.9.0.16) Gecko/2009120206 Firefox/3.0.16'

Browse of HTTP Headers started

Name: Host Value: zhost:zport#
Name: User-Agent Value: Mozilla/5.0 (X11; U; Linux i686; en-US; rv:1.9.0.16) Gecko/2009120206 Firefox/3.0.16
Name: Accept Value: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Name: Accept-Language Value: en-us,en;q=0.5
Name: Accept-Encoding Value: gzip,deflate
Name: Accept-Charset Value: ISO-8859-1,utf-8;q=0.7,*;q=0.7
Name: Keep-Alive Value: 300
Name: Connection Value: keep-alive
Name: Authorization Value: Basic c2Z3OkdVSUxERjQ3

Browse of HTTP Headers completed

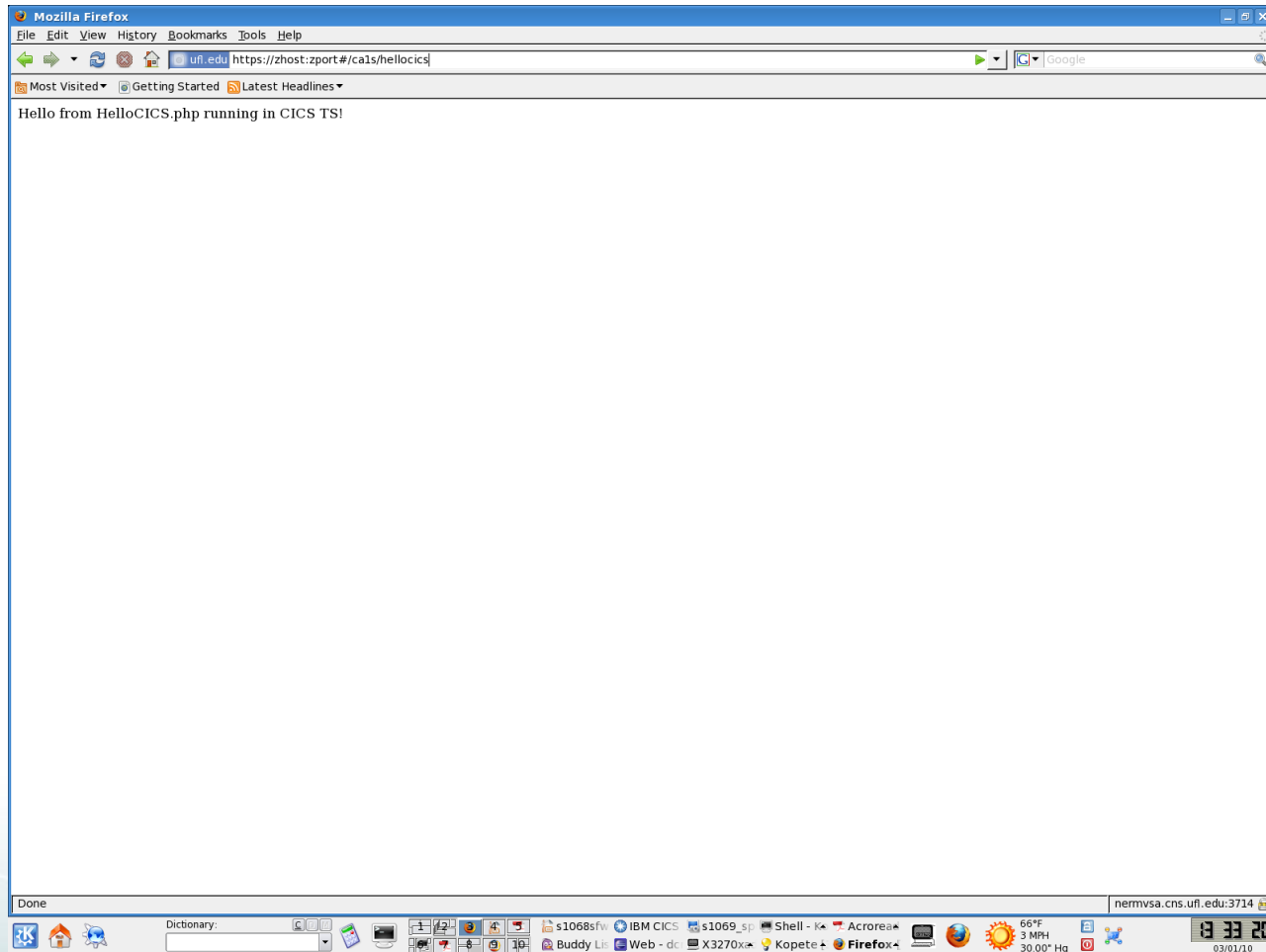
TCPIP Information:

Client Name: zclient.name
Server Name: zhost
Client Address: #.#.#.#.#
ClientAddrNu: #.#.#.#.#
Done

Dictionary: [Search]
Taskbar: s1068sfw IBM CICS X3270x Kopete Sample Buddy Lib Web - dc Shell - k Acrorea
System tray: 531°F 6 MPH SSE 29.60" Hg 09:46:22 03/02/10

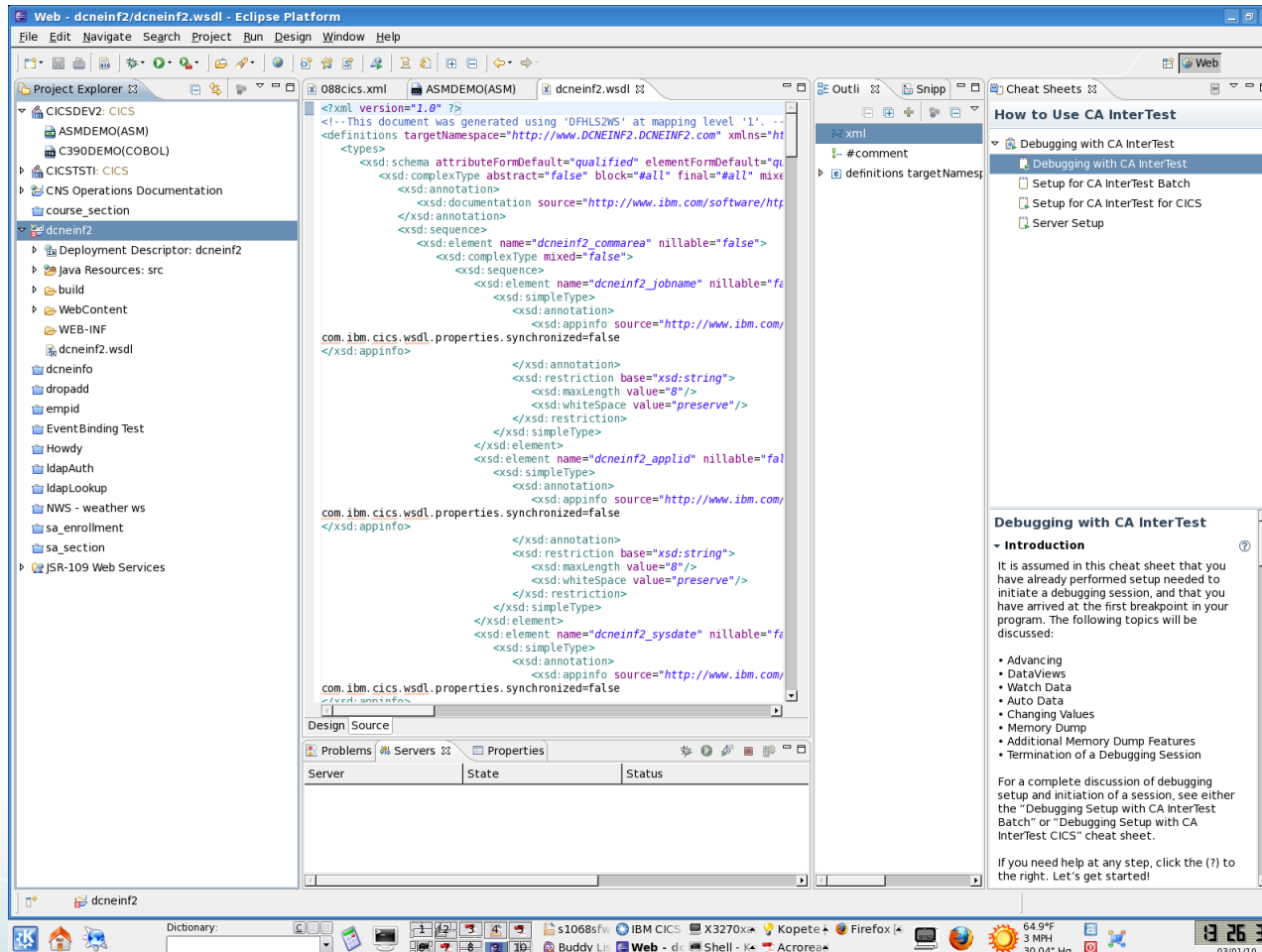
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A quick tour! (cont.)



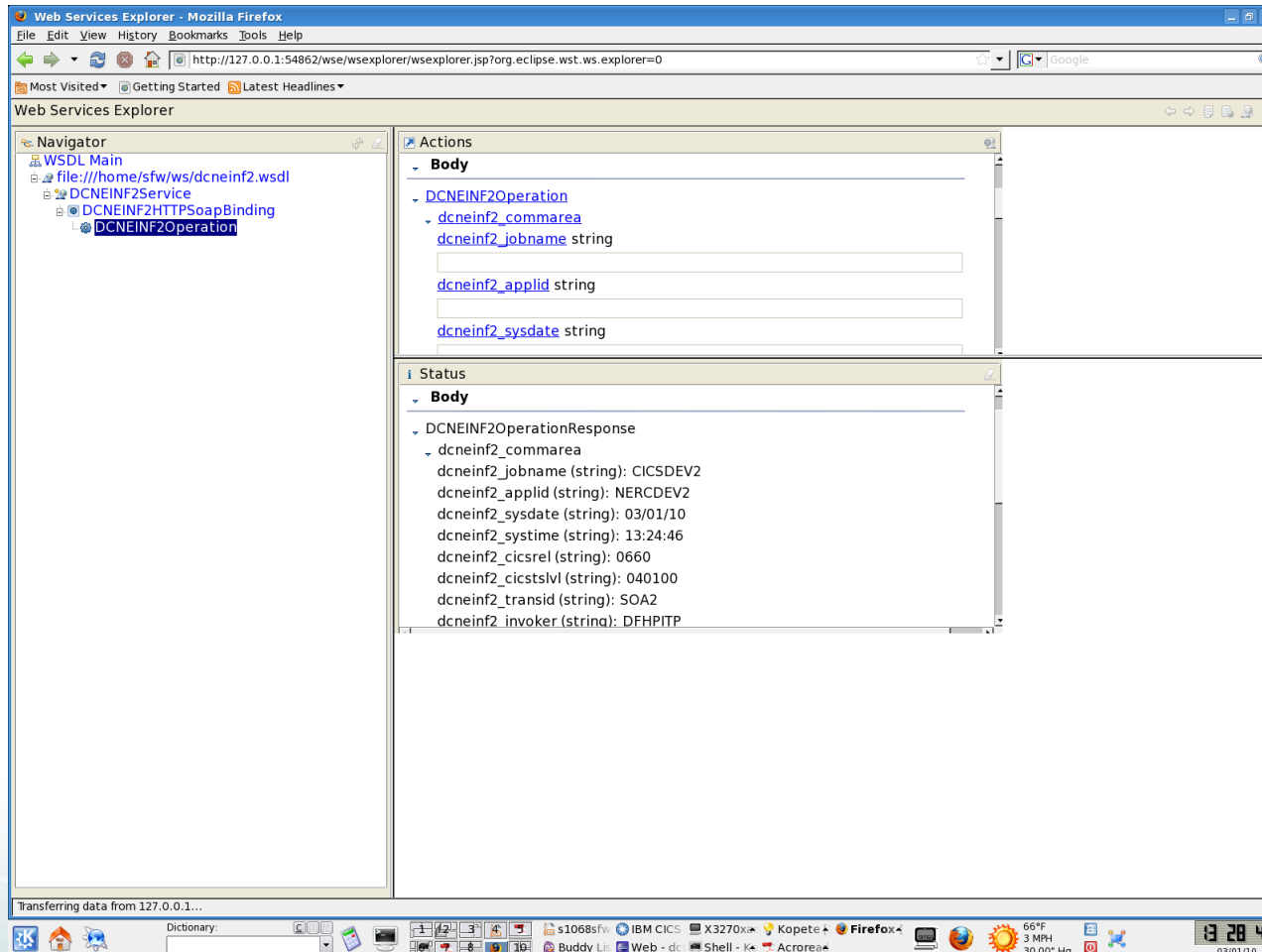
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A quick tour! (cont.)



The screenshot displays the Eclipse IDE interface. The main editor shows the XML content of the `dcneinf2.wsdl` file, which includes schema definitions for elements like `dcneinf2_jobname` and `dcneinf2_sysdate`. The Project Explorer on the left shows a project structure with folders like `dcneinfo`, `dropadd`, and `empid`. The Outliner on the right shows a tree view of the WSDL definitions. A Cheat Sheets panel is open on the right, displaying the 'How to Use CA InterTest' document, which includes a section for 'Debugging with CA InterTest' and an 'Introduction' section. The status bar at the bottom shows system information like time (3:26:36) and date (03/01/10).

A quick tour! (cont.)



The screenshot shows the Web Services Explorer interface in Mozilla Firefox. The browser address bar displays the URL: `http://127.0.0.1:54862/wse/wsexplorer/wsexplorer.jsp?org.eclipse.wst.ws.explorer=0`. The interface is divided into several panes:

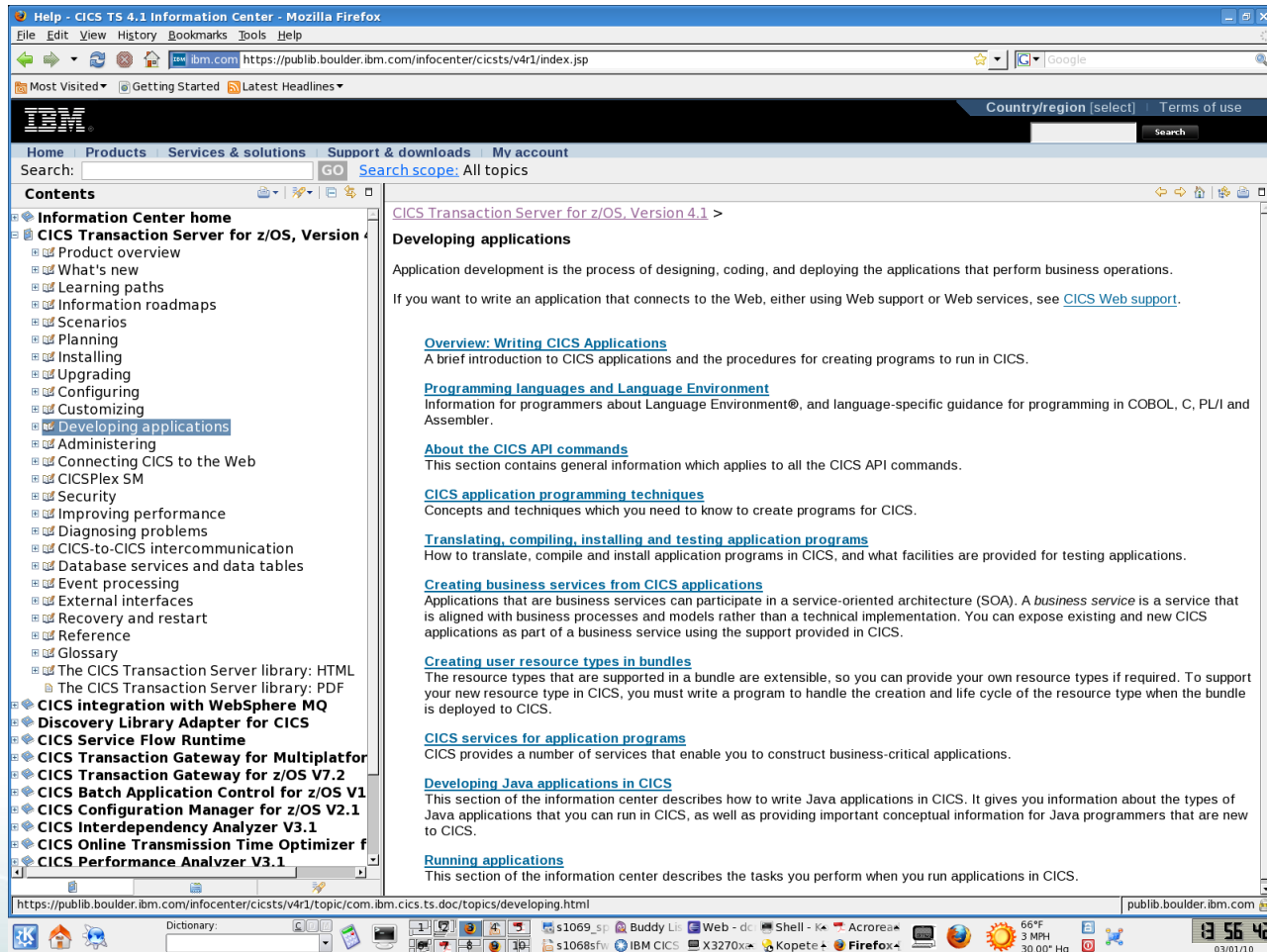
- Navigator:** Shows a tree view of the WSDL file structure:
 - WSDL Main
 - file:///home/sfw/ws/dcneinf2.wsdl
 - DCNEINF2Service
 - DCNEINF2HTTPSoapBinding
 - DCNEINF2Operation

- Actions:** Displays the details for the selected `DCNEINF2Operation`. It shows a `Body` section with three input fields:
- `dcneinf2_commarea` (string)
- `dcneinf2_jobname` (string)
- `dcneinf2_applid` (string)
- `dcneinf2_sysdate` (string)
- Status:** Displays the response details for the operation:
- `DCNEINF2OperationResponse`
 - `dcneinf2_commarea`
 - `dcneinf2_jobname` (string): CICSDEV2
 - `dcneinf2_applid` (string): NERCDEV2
 - `dcneinf2_sysdate` (string): 03/01/10
 - `dcneinf2_systime` (string): 13:24:46
 - `dcneinf2_cicsrel` (string): 0660
 - `dcneinf2_cicstslvl` (string): 040100
 - `dcneinf2_transid` (string): SOA2
 - `dcneinf2_invoker` (string): DFHPITP

The status bar at the bottom indicates "Transferring data from 127.0.0.1..." and shows system information including the date and time (03/01/10 13:28:49).

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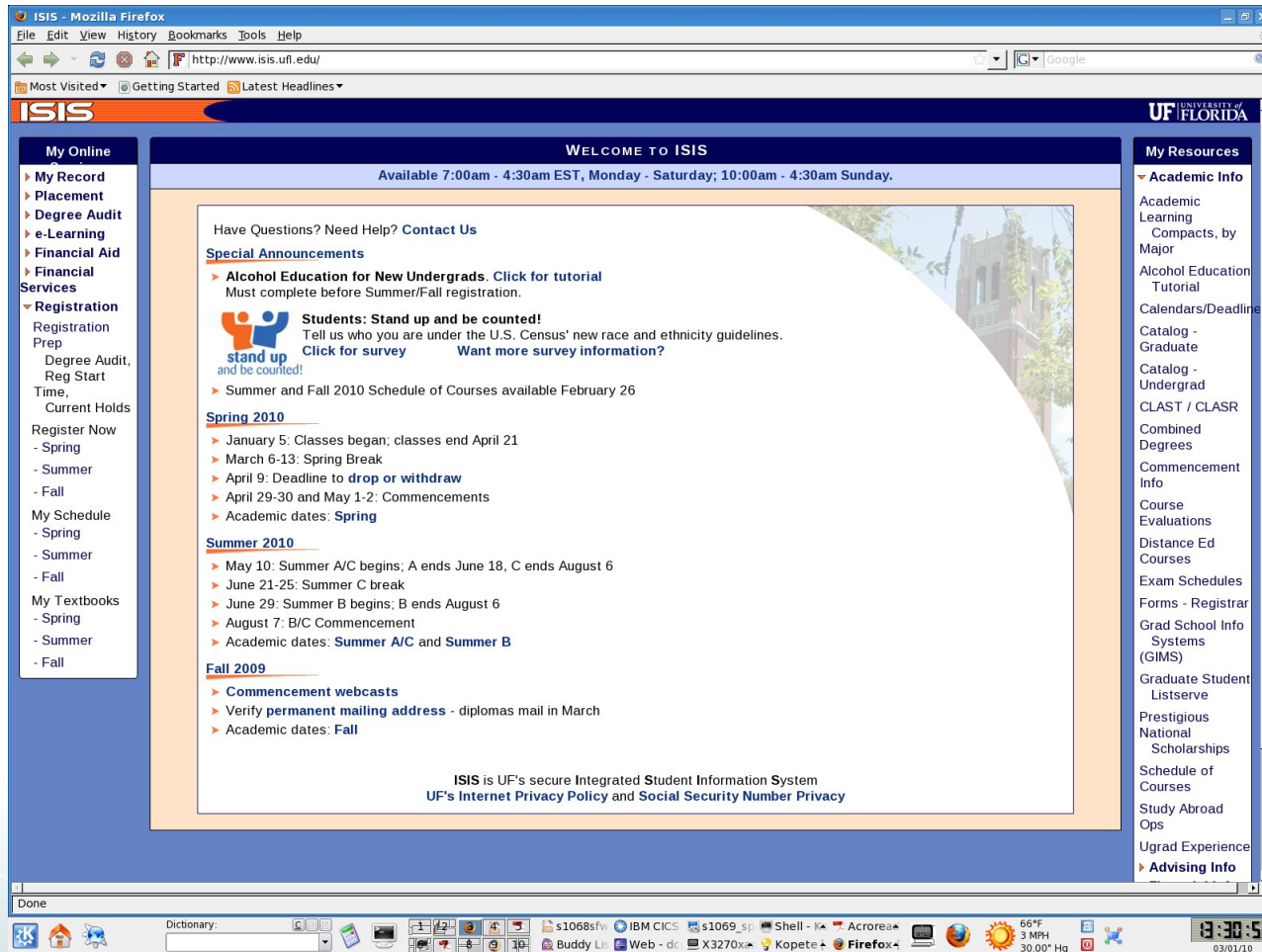
A quick tour! (cont.)



Help - CICS TS 4.1 Information Center - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://publib.boulder.ibm.com/infocenter/cicsts/v4r1/index.jsp
Country/region [select] Terms of use
Home Products Services & solutions Support & downloads My account
Search: Search scope: All topics
Contents
Information Center home
CICS Transaction Server for z/OS, Version 4.1 >
Product overview
What's new
Learning paths
Information roadmaps
Scenarios
Planning
Installing
Upgrading
Configuring
Customizing
Developing applications
Administering
Connecting CICS to the Web
CICSplex SM
Security
Improving performance
Diagnosing problems
CICS-to-CICS intercommunication
Database services and data tables
Event processing
External interfaces
Recovery and restart
Reference
Glossary
The CICS Transaction Server library: HTML
The CICS Transaction Server library: PDF
CICS integration with WebSphere MQ
Discovery Library Adapter for CICS
CICS Service Flow Runtime
CICS Transaction Gateway for Multiplatform
CICS Transaction Gateway for z/OS V7.2
CICS Batch Application Control for z/OS V1
CICS Configuration Manager for z/OS V2.1
CICS Interdependency Analyzer V3.1
CICS Online Transmission Time Optimizer for z/OS V2.1
CICS Performance Analyzer V3.1
CICS Transaction Server for z/OS, Version 4.1 >
Developing applications
Application development is the process of designing, coding, and deploying the applications that perform business operations.
If you want to write an application that connects to the Web, either using Web support or Web services, see [CICS Web support](#).
[Overview: Writing CICS Applications](#)
A brief introduction to CICS applications and the procedures for creating programs to run in CICS.
[Programming languages and Language Environment](#)
Information for programmers about Language Environment®, and language-specific guidance for programming in COBOL, C, PL/I and Assembler.
[About the CICS API commands](#)
This section contains general information which applies to all the CICS API commands.
[CICS application programming techniques](#)
Concepts and techniques which you need to know to create programs for CICS.
[Translating, compiling, installing and testing application programs](#)
How to translate, compile and install application programs in CICS, and what facilities are provided for testing applications.
[Creating business services from CICS applications](#)
Applications that are business services can participate in a service-oriented architecture (SOA). A *business service* is a service that is aligned with business processes and models rather than a technical implementation. You can expose existing and new CICS applications as part of a business service using the support provided in CICS.
[Creating user resource types in bundles](#)
The resource types that are supported in a bundle are extensible, so you can provide your own resource types if required. To support your new resource type in CICS, you must write a program to handle the creation and life cycle of the resource type when the bundle is deployed to CICS.
[CICS services for application programs](#)
CICS provides a number of services that enable you to construct business-critical applications.
[Developing Java applications in CICS](#)
This section of the information center describes how to write Java applications in CICS. It gives you information about the types of Java applications that you can run in CICS, as well as providing important conceptual information for Java programmers that are new to CICS.
[Running applications](#)
This section of the information center describes the tasks you perform when you run applications in CICS.

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A quick tour! (cont.)



ISIS - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.isis.ufl.edu/


ISIS WELCOME TO ISIS UF UNIVERSITY OF FLORIDA

Available 7:00am - 4:30am EST, Monday - Saturday; 10:00am - 4:30am Sunday.

Have Questions? Need Help? [Contact Us](#)

Special Announcements

- ▶ **Alcohol Education for New Undergrads.** Click for tutorial
Must complete before Summer/Fall registration.

 **Students: Stand up and be counted!**
Tell us who you are under the U.S. Census' new race and ethnicity guidelines.
Click for survey Want more survey information?

- ▶ Summer and Fall 2010 Schedule of Courses available February 26

Spring 2010

- ▶ January 5: Classes began; classes end April 21
- ▶ March 6-13: Spring Break
- ▶ April 9: Deadline to **drop or withdraw**
- ▶ April 29-30 and May 1-2: Commencements
- ▶ Academic dates: **Spring**

Summer 2010

- ▶ May 10: Summer A/C begins; A ends June 18, C ends August 6
- ▶ June 21-25: Summer C break
- ▶ June 29: Summer B begins; B ends August 6
- ▶ August 7: B/C Commencement
- ▶ Academic dates: **Summer A/C and Summer B**

Fall 2009

- ▶ **Commencement webcasts**
- ▶ Verify **permanent mailing address** - diplomas mail in March
- ▶ Academic dates: **Fall**

ISIS is UF's secure Integrated Student Information System
UF's Internet Privacy Policy and Social Security Number Privacy

My Online

- ▶ My Record
- ▶ Placement
- ▶ Degree Audit
- ▶ e-Learning
- ▶ Financial Aid
- ▶ Financial Aid Services
- ▶ Registration
 - Registration Prep
 - Degree Audit, Reg Start Time, Current Holds
- Register Now
 - Spring
 - Summer
 - Fall
- My Schedule
 - Spring
 - Summer
 - Fall
- My Textbooks
 - Spring
 - Summer
 - Fall

My Resources

- ▶ Academic Info
 - Academic Learning
 - Compacts, by Major
 - Alcohol Education Tutorial
 - Calendars/Deadlines
 - Catalog - Graduate
 - Catalog - Undergrad
 - CLAST / CLASR
 - Combined Degrees
 - Commencement Info
 - Course Evaluations
 - Distance Ed Courses
 - Exam Schedules
 - Forms - Registrar
 - Grad School Info Systems (GIMS)
 - Graduate Student Listserve
 - Prestigious National Scholarships
 - Schedule of Courses
 - Study Abroad Ops
 - Ugrad Experience
- ▶ Advising Info

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A quick tour! (cont.)



Welcome to ISISAdmin - Mozilla Firefox
File Edit View History Bookmarks Tools Help
ufl.edu https://www.isis.ufl.edu/cgi-bin/eaglec
Most Visited Getting Started Latest Headlines
ISISAdmin
Administrative Applicant My Tab Student WARE, STEVEN F is logged on Logout Help
Welcome to ISISAdmin
ISISAdmin is available 7:00am - 4:30am EST, Monday - Saturday; 10:00am - 4:30am Sunday.
Spring 2010
• [Schedule of courses](#)
• January 5: Classes begin; classes end April 21
• March 6-13: Spring Break
• April 29-30 and May 1-2: Commencements and [commencement schedule](#)
• Academic dates: [Spring](#)
Summer 2010
• Summer A/C academic dates: [Summer A/C](#)
• Summer B academic dates: [Summer B](#)
Fall 2010
• Fall academic dates: [Fall](#)
[Back to top](#)
Office of the University Registrar - [UF Internet Privacy Policy](#) - [Social Security Number Privacy](#) [Contact Us](#)
Done
www.isis.ufl.edu

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Introduction



- UF **CNS**, University of Florida Computing & Networking Services (formerly known as **NERDC**), manages the primary data centers in and around the Gainesville, FL campus.
- Currently utilizing an IBM **z9 BC 2096-S02** with 16GB, running **z/OS 1.11**, **CICS TS 4.1**, **DB2 V8**, **RACF**, **JES2**, etc.
- 3 LPARs - 1 internal "sysprog sandbox", 1 test "alternate", and 1 production or "primary".
- We have 9 CICS regions configured, and run ~.5M prod. transactions/weekday, and ~1.25M on peak load days.
- 2 internal/test sandbox, 2 development/test, 3 test/QA, and 2 production CICS regions currently configured.



Introduction (cont.)

- Founded in **1853**, became the **University of Florida** in **1905**.
(East Florida Seminary -> Florida Agricultural College -> University of Florida)
- **UF** is a member of the **AAU**, the Association of American Universities
- UF is one of the largest universities in the U.S., public or private
- **~50K enrolled** and **~250K alumni**

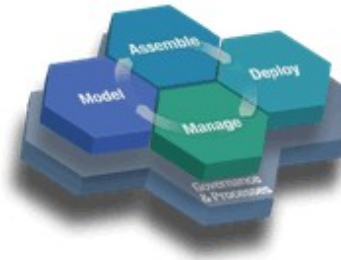


Introduction (cont.)



- We're considered a "**Classic**" CICS site. ("**Legacy = It Works!**")
- Web access to CICS is via the **CICS Socket Interface**, in use at our site since ~1997
- ~**60+%** of local CICS tasks utilize **sockets**
- All locally developed CICS applications are **Assembler** and/or **COBOL**. We have ~8K CICS application load modules, and ~32 have CICS sockets API (for file/data transfer, email, web enablement, etc.)
- Several internal CICS applications written in **C/C++** and **REXX**. **Java** in CICS has been thoroughly IVP tested, occasionally utilized in CICS for Web service validation, and we're considering Java in CICS applications, possibly including PHP in CICS

Introduction (cont.)



- Are we now considered a **Nouveau** CICS site?
- CICS Web Services in production since Sept. 2006:
<http://docweb.cns.ufl.edu/update/u0610cics/u0610cics.html>
- CNS & UF Registrar Implement "MyStudentBody.com" Requirement using CICS Web Services.
- "On Friday, September 22nd, 2006, UF CNS CICS systems staff and UF Office of the University Registrar application staff implemented a new, secure (https) CICS Web service, with CICS acting as the service requester, for the MyStudentBody.com UF health requirement. The new capabilities introduced to support this initiative pave the way for implementation of encrypted Web services accessing real-time student data, making applications more accurate, serving the UF community better."

Extending/enhancing CICS applications

- CICS Socket Interface
- CICS Web Services
- CICS Web Support
- CICS Event Processing (non-invasive)
- The CICS Explorer (includes event binding editor)
- Atom feeds, RESTful interfaces, mashups, Web 2.0 (initially in SupportPac CA8K, now integrated into CICS TS V4.1)
- Service Component Architecture support via RDz tooling
- CICS Service Flow Runtime for CICS business services (or service flows)

Extending/enhancing CICS applications (cont.)



- Java (Java 6 in CICS TS V4.1), PHP, REXX
- CICS Channels and Containers (eliminate 32K COMMAREA limitations)
- CICS Document API
- ID Propagation (distributed identities) enhancements (in CICS TS V4.1 with recent service and enhancements starting in z/OS 1.11)
- CICS Management Client Interface API using RESTful principles for HTTP client applications, including CICS Explorer
- Home grown tools, exits, and ???

Extending/enhancing CICS applications - some UF examples



- Presentation logic separated from business logic, as IBM has recommended (for decades?)
- TeleGator developed for initial student access to 3270/BMS applications via telephone ("screen scraping" - no longer in use)
- Web enabled 3270/BMS applications with the CICS Socket Interface for student, faculty and staff access - ISIS
- Original "C" cgi code in AIX recently converted to PHP in Linux (Intel) with Apache web servers
- CICS Socket Interface also used for email, CICS as http client (CICS Web Support would be used today), XML messaging, and more

Extending/enhancing CICS applications - some UF examples (cont.)



- Local modular "tooling" and CICS application generation with web based EAGLE
- EAGLE has "topics", is table driven, has "ESP" scripting language, and supports dynamic DB2
- Authentication via DB2 PIN (no longer in use), RACF userid, GatorLink id (kerberos based via DB2 stored procedures), and most recently, Shibboleth
- Authorization via "roles" (via DB2 tables)
- Uses a decision tree with a realtime business logic engine, for applications such as student fees and admissions decisions
- Includes VSAM query tools utilizing batch, CICS and DB2

Extending/enhancing CICS applications - some UF examples (cont.)



- CICS Web Services initially used for MSB (mystudentbody.com mentioned earlier), but no longer in use - why?
- MSB vendor made Web Services interface (WSDL) changes without notification to customers
- MSB vendor made changes to their infrastructure that caused very slow response time, including transmission timeouts (CICS PIPELINE resource "respwait" option)
- UF now using echeckuptogo.com (San Diego State Research University Foundation)

Extending/enhancing CICS applications - some UF examples (cont.)



- CICS Web Services used for CICS proof of concept to securely access VSAM files, and now for CICS Web Services health checks
- CICS Web Services used for integration between ISIS (CICS) and Oracle PeopleSoft Student Financials (BizTalk)
- Alan Cook wrote a CICS Web Services "wrapper" (subroutine) program (Assembler), using CICS Channels and Containers, with the endpoint URIs stored in DB2 tables
- Errors handled via one of Alan's email subroutines (SMTP in CICS via the CICS Socket Interface)
- UF now has 10 CICS Web Services enabled in production (4 providers and 6 requesters)

Extending/enhancing CICS applications - some UF examples (cont.)



- Some AJAX functionality now being used by UF CICS student information application developers (Javascript and DB2 utilized)
- Alan is looking at utilizing CICS Channels and Containers to "objectize" some of his application storage management, in addition to use for CICS Web Services
- A planned new CICS application for graduate admissions processing with electronic referrals and record matching
- A fairly new CICS mailroom application has dramatically improved processing time, reduced costs, and improved business processes - handles items such as transcript requests, admissions form processing, package logging, check handling and redistribution, and more

What about Mainframe application development?

- Locally written at UF: EAGLE 
- Other "home grown" - a recommended option? (Owning the source code to your core business applications is "priceless".)
- IBM EGL - Enterprise Generation Language
- IBM Rational Developer for System z (and new Unit Test feature - z/OS and CICS, etc. on a PC!)
- IBM Rational Business Developer
- Eclipse 
- Sun NetBeans 
- Other?



Why CICS?

Stick With CICS!

<http://www.share.org/cics>



- IBM's CICS is the planet's premier OLTP (On-Line Transaction Processing) system. CICS Rocks! Stick With CICS! Anyway...
- Enterprise caliber, high performance, fast response time, exceptional thruput and reliability, resilient, large installed base, capabilities continually enhanced, large variety of applications and tools, superior technical support from IBM, expansive API, feature-rich application processing environment - and so much more!
- CICS is sometimes referred to as an "Application Server" and/or "Middleware". IBM has positioned CICS Transaction Server in the WebSphere "application and transaction infrastructure".
- IBM says "CICS Transaction Server for z/OS v4.1 is a modern, dependable, and cost effective application platform."

We're STILL extending our CICS applications, SHARE 115, Boston, MA, Steve Ware, UF.

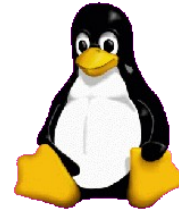
Why CICS? (cont.)

- Support for "heritage" technologies such as VTAM and SNA networking and 3270 devices. Some things are still better via a CHUI (CHaracter User Interface) than a GUI (Graphical User Interface). Data entry and scripting are examples where a CHUI shines.
- Support for "modern" technologies, including Web services, SOA, SOAP, Java, JVMs, EJBs, C/C++, SSL, XML, and much more.
- Support for most operating systems - our focus will be z/OS.

Why CICS? (cont.)

- CICS offers flexible intercommunication facilities allowing it to be supported and configured across a variety of networks.
- CICS data management is comprehensive and includes support for major database management systems such as DB2 - this also includes a high performance CICS DB2-Attach facility. Data can be in databases, OS datasets, datatables, or even within CICS itself. Other database support includes Oracle, IMS, etc.
- CICS and VSAM continue to be enhanced, such as with the VSAM RLS function of DFSMS, and DFSMStvs (Transactional VSAM Services), for CICS and batch. Note that a coupling facility is required for these optional VSAM components.

Why CICS? (cont.)



- What about CICS for Linux?
- IBM Statement of Direction:
"IBM recognizes the significance and benefits of the Linux operating system to CICS customers who have chosen the TXSeries for their applications. It is IBM's intention to release a CICS offering on the Linux platform in 2005..."
- Note that CICS for zLinux is not mentioned - only TXSeries.
- IBM iPRPQ 7J0468 announced Linux for xSeries availability of TXSeries for Multiplatforms v6 on 2005-12-20. Contact your IBM software business partner - an order requires IBM (Hursley) Lab approval.

Why CICS? (cont.)



- Programming language support includes Java, C/C++, Enterprise COBOL, Assembler, PL/I, REXX. Object oriented programming support, even in Assembler, with IBM's High Level Assembler. High speed XML parsers and CICS translator integration available with some compilers. What about PHP? See IBM SupportPac CA1S: REST support in CICS using PHP.



Why CICS? (cont.)

- Expansive API (Application Programming Interface), SPI (System Programming Interface), and XPI (eXit Programming Interface). You can truly "make CICS dance" anyway you'd like.
- The CICS **API** helps isolate the CICS application programmer from the operating system, allowing application programmers to focus on application development and business solutions.
- The CICS **SPI** allows the CICS system programmer to enhance the local CICS environment with SET and INQUIRE system capabilities.
- The CICS **XPI** allows the CICS system programmer to enhance and expand upon the delivered CICS capabilities in the many supplied CICS exit points.

Why CICS? (cont.)

- Additional programming APIs for CPSM, Java (including JCICS), etc.
- CICS ships with integrated debugging (CEDF/CEDX) and support tools (CEBR, CECI, CEDA, CEMT, CETR, CICSplex SM, etc.), a large sample library, and sample applications with source code.
- IBM and other vendors also have very capable optional CICS testing, debugging, and monitoring tools.

Why CICS? (cont.)

- Many IBM CICS SupportPacs, vendor products, freely available source code, and helpful web sites and discussion lists. Speaking of SupportPacs, SOAP for CICS is a good example of how quickly IBM added this support to CICS:
 1. A free download was made available by IBM. The download included code, documentation, and samples. IBM also provided a good SOAP for CICS discussion list.
 2. An optional no-charge feature was added to CICS TS 2.2 and CICS TS 2.3, using a CALLable interface.
 3. It's fully integrated into CICS, starting with CICS TS 3.1, via new and enhanced EXEC CICS API commands, etc.

Why CICS? (cont.)

- CICS is designed and developed for high performance, availability, and capability. Examples include:
 1. CICS storage protection and transaction isolation
 2. CICS Language Environment (LE)
 3. CICS and the MVS Logger
 4. CICS-DB2 Attach Facility
 5. CICS-WMQ connection and WebSphere MQ group attach
 6. CICS Java Support and CICS JVMs
 7. CICS domain architecture
 8. CICS Web Services and CICS Web Support

Why CICS? (cont.)

- CICS TS 4.1, CICS Transaction Server for z/OS V4.1, is the latest release from IBM.
- The CICS TS 4.1 announcement letter even mentions "As part of the multi-release IP interconnectivity (IPIC) initiative", which implies there's still lots more to come from IBM.
- Our experience with CICS TS 4.1 so far has been very near 100% scheduled availability. Exceptional reliability, with sub-second response time from the web! What's not to like?
- The latest CICS Information Centers for CICS TS are (open standards) Eclipse based, with support for Windows and Linux, This Linux support has been thoroughly tested and utilized by the presenter (thanks, IBM!).

Why CICS? (cont.)

In the CICS TS 4.1 Announcement letter, IBM describes these three "themes":

1. **Compete:** Making it easier to create, extend, and reuse applications quickly, to meet changing business needs.
2. **Comply:** Helping to ensure and demonstrate effective management control over business applications and IT facilities.
3. **Control:** Helping IT staff to perform their tasks more effectively, while assuming a mixture of skill levels.

Why CICS? (cont.)

IBM says:

"The key functions provided by CICS TS V4.1 support two or more of the themes described earlier, simultaneously. These key functions are:

- Support for event processing
- Atom feeds from CICS
- The CICS Explorer

For example, in support of multiple themes in this version of CICS TS, the ability to generate business events without changing application programs both reduces cost and complexity and delivers compliant flexible business solutions."

Why the Mainframe?

- A personal description of an IBM System z mainframe:
An enterprise class of modern, flexible, scalable, and resilient computing servers.
- Or in more detail:
Enterprise computing system, with lots of processing power, continually being enhanced, with very wide I/O bandwidth, comprehensive instruction set, efficient resource sharing, very capable resource management capabilities, 64-bit architecture, supporting many simultaneous processes/programs, all efficiently managed with an enterprise caliber OS and enterprise class subsystems, such as CICS.

Why the Mainframe? (cont.)

- Latest mainframes from IBM include:

New IBM zEnterprise System, the zEnterprise 196 (z196), with 96 total cores running at an amazing 5.2 GHz. It allows integration of IBM System z, Power and System x in one complete system.

- Do some enterprises not disclose use of the mainframe, due to "competitive advantage"?
- Have you seen recent discussions about "transactions per watt hour", or "transactions per joule", or "transactions per BTU"?

Why the Mainframe?

- "Mainframe renaissance" (once again?) in recent years. "The legacy lives on!" "Big Iron Staying Power."
- We have 2 processors with 16GB main memory in our z9 BC, which has simultaneously run all of UF and UNF financial and student administration, all of the State of Florida universities LUIS (Library User Information System) and FACTS (Florida Academic Counseling and Tracking for Students). Compare this with the non-mainframe "solutions" with literally hundreds of processors, near terabytes of main memory, many times more DASD, power consumption, floor space, system administrators, etc. Add it up - which is less expensive? Which consistently provides better response time? Which is easier to recover in a disaster recovery scenario?

Why the Mainframe? (cont.)

- Have you priced ERP software and other non-mainframe "enterprise" software costs recently? Do you have enough cooling, floor space, and power to attempt to run non-mainframe system hardware? Would you like to pay "per-seat" software license costs, when per-seat includes ~50K students and ~12K faculty and staff?
- Have you ever heard about "Re-boot Hill"?
<http://actscorp.com/reboothill.htm>
- Some organizations gleefully talk about their non-mainframe initiatives, but tend to "clam up" when these initiatives go way over budget and/or can't deliver as promised and/or fail miserably. Let's call these "successful failures".

Why the Mainframe? (cont.)

- Why is it ok to spend *more* money on non-mainframe solutions, and in addition, provide *poorer* service? What follows is a recent personal example of such nonsense...
- A recent letter addressed to "Dear ... Participant" that I received from a large "Financial Services" company, included the text:

"To bring you these and other benefits aligned to your needs, we have been transforming virtually all aspects of our organization. Along the way, we have occasionally and inadvertently inconvenienced some participants with processing problems and long wait times to speak with our consultants on the phone. We regret these problems, and we are working day and night to resolve them and prevent their reoccurrence..."

Why the Mainframe? (cont.)

- "Never trust a computer you can lift ;-)"



Why CICS and the Mainframe - Now?

- The newest capabilities and enhancements to both CICS and the mainframe can be utilized, while more "mature" programs and applications continue to run. For example, newer 64-bit features can be utilized, while older 24-bit and 31-bit programs continue running along fine. Assembler, COBOL, C/C++, and PL/I CICS applications can be utilized or enhanced, and/or Java can be added to the application mix. Lots of choices and flexibility.
- Multiple releases of CICS can be run simultaneously, making for smooth and phased release migration (see the IBM CICS Installation Guide for additional details).

Why CICS and the Mainframe - Now?

- CICS has provided upward compatibility for most system and application code for many years.
- z/OS and mainframe upward compatibility is also remarkable. We have code from the 70's still running in the latest releases of z/OS. This is not always recommended, but sure is handy in many cases.
- CICS and z/OS migration is made much easier, because backing off an upgrade (or other system level change) is much easier when compared to other computing environments. z/OS can easily be re-IPLed off of the prior SYSRES, or CICS can easily be reloaded with prior run datasets. We haven't had to back off of a CICS or z/OS migration for many many years, btw.

Why CICS and the Mainframe - Now?

- Both CICS and mainframe capabilities and features continue to be enhanced, seemingly faster than some customers can keep up! In my opinion, this is all good news.
- Almost any good IT professional can be taught about almost any platform. Why not teach them about the best of breed - CICS and the mainframe?
- Why not invest in CICS and the mainframe? Remember, it's not an expense, it's an investment! And when choosing, be sure to "choose wisely"!
- Why not now?

Summary

- Computing pioneer Seymour Cray once said, "What would you rather have to plow a field - two strong oxen or 1,024 chickens?"
- Billions and billions of transactions processed daily - CICS is truly a software "star" ;-).
- UF continues to **exploit** the many inherent **advantages** of **CICS**, **z/OS**, and the **mainframe**.
- Students especially like the **sub-second response time**, even from the **web!** Faculty and staff also appreciate this good response time, but they might be a bit more patient than the students ;-).

Summary

- **Do all the math** when making computing decisions - you just might calculate that the mainframe costs are very competitive, and that the capabilities of the mainframe are much better than other platforms. **TCO** and **TCU** are both important.
- Personally, some business relationships are based upon whether or not the business utilizes a mainframe. Ask, and let the business know what your preferences are!

Summary (cont.)

- I really like things that work, and **work well** - like **CICS** and the **mainframe** (ok, **Linux**, too ;-).
- IT work should be productive, enjoyable, and **fun**. Ok, it doesn't always work out that way! My experience is that working with CICS and the mainframe, from a Linux workstation, is productive, enjoyable, and yes, even fun (most of the time ;-).
- The **future** looks very **bright** for **CICS** and the **mainframe!** (Sunglasses are optional ;-)

Summary (cont.)

- **Thanks!** Have a great time for the remainder of the conference, and have a safe trip home.
- **Questions?** Comments? *Random thoughts?*

Appendix and Additional Information

- IBM CICS (Customer Information Control System):
<http://www.ibm.com/cics>
- IBM CICS Transaction Server for z/OS V4.1 Announcement Letter:
<http://www.ibm.com/common/ssi/cgi-bin/ssialias?infotype=an&subtype=ca&supplier=897&letternum=ENUS209-135>
- IBM CICS Portfolio Brochure (G224-7571-00):
<ftp://service.boulder.ibm.com/software/http/cics/pdf/CICSfam-G224-7571-005-br0113.pdf>
- IBM CICS Family - News:
<http://www.ibm.com/cics/enews/>
- IBM CICS SupportPacs:
<http://www.ibm.com/cics/supportpacs/>

Appendix (cont.)

- IBM Mainframe Servers - System z:
<http://www.ibm.com/systems/z>
- IBM Rational Developer for System z:
<http://www-01.ibm.com/software/awdtools/rdz/>
- IBM Rational Developer for System z Unit Test feature:
http://www-01.ibm.com/software/awdtools/rdz/unit_test.html
- IBM System z Solution Edition for Application Development:
<http://www-03.ibm.com/systems/z/solutions/editions/appdev/index.html>
- IBM System z Remote Development Programs:
<http://www-304.ibm.com/isv/iic/rdp/zosdrdp.html>

Appendix (cont.)

- IBM Academic Initiative:
<http://www.ibm.com/university/>
- IBM Redbooks:
<http://www.redbooks.ibm.com/>
- Shibboleth:
<http://shibboleth.internet2.edu/>

Appendix (cont.)

- SHARE ("It's not an acronym, it's what we do.")
<http://www.share.org/>
- SHARE CICS Project:
<http://www.share.org/cics>



Appendix (cont.)

- The **University of Florida (UF)**:
<http://www.ufl.edu/>
- **UF IT (Information Technology)**:
<http://www.it.ufl.edu/>
- **UF Computing & Networking Services (CNS)**:
<http://www.cns.ufl.edu/>
- **CICS** at UF:
<http://cics.ufl.edu/>
- **EAGLE** at UF:
<http://eagle.ufl.edu/>

Abbreviations

- **AJAX:** Asynchronous Javascript and XML
- **CICS:** Customer Information Control System
- **CIS:** Computer and Information Sciences
- **CISE:** Computer and Information Science and Engineering
- **CMF:** CICS Measurement Facility (via SMF)
- **CNS:** Computing & Networking Services (formerly NERDC)
- **COD:** Computing On Demand
- **CP:** Central Processor - see CPU
- **CPU:** Central Processing Unit

Abbreviations (cont.)

- DFSMS: Data Facility Storage Management Subsystem
- EAGLE: UF Enhanced Application Generation Language for the Enterprise
- Eclipse: Open source Java IDE (and much more)
- EGL: IBM Enterprise Generation Language
- ESM: External Security Manager
- FACTS: Florida Academic Counseling and Tracking for Students
- GA: General Availability
- Heritage: See Legacy

Abbreviations (cont.)

- IBM: International Business Machines, Inc.
- I/O: Input/Output
- ICF: Integrated Coupling Facility
- ICSF: Integrated Cryptographic Service Facility
- IDE: Integrated Development Environment
- IFL: Integrated Facility for Linux
- IT: Information Technology
- ISIS: UF Integrated Student Information System
- Java: Programming language and computing platform released by Sun Microsystems in 1995

Abbreviations (cont.)

- LE: Language Environment
- Legacy: It Works!
- LPAR: Logical Partition
- MTBF: Mean Time Between Failures
- MVS: Multiple Virtual Storage

Abbreviations (cont.)

- NERDC: Northeast Regional Data Center (now CNS)
- OS: Operating System
- OTE: Open Transaction Environment
- PDF: Portable Document Format
- PHP: Hypertext Preprocessor
- PR/SM: IBM Processor Resource/Systems Manager
- RMF: Resource Monitoring Facility
- RLS: Record Level Sharing

Abbreviations (cont.)

- SAML: Security Assertion Markup Language
- SCRT: Sub-Capacity Reporting Tool
- SMF: System Monitoring Facility
- SNA: Systems Network Architecture
- SOA: Service Oriented Architecture
- SOAP: Simple Object Access Protocol (a component of web services)

Abbreviations (cont.)

- TCO: Total Cost of Ownership
- TCU: Total Cost per User
- TS: Transaction Server
- UF: University of Florida
- UNF: University of North Florida
- VSAM: Virtual Storage Access Method
- VTAM: Virtual Telecommunications Access Method
- VM: Virtual Machine
- WLM: Workload Manager

Abbreviations (cont.)

- z/OS: The "zero downtime" and "a to z" Operating System
- zSeries: The "zero downtime" and "a to z" Enterprise Servers
- zAAP: zSeries Application Assist Processor
- zIIP: zSeries Integrated Information Processor
- zNALC: System z New Application License Charges

Presentation Information

- The **Slackware Linux Project**:
<http://www.slackware.com/>
- **OpenOffice.org 3.1.0 "Impress"**:
<http://www.openoffice.org/>
(File -> Export as PDF)
(Used SHARE supplied PowerPoint template.)
- **Samsung N110-12PBK**:
http://www.samsung.com/us/consumer/office/mobile-computing/netbooks/NP-N110-KA01US/index.idx?pagetype=prd_detail

