



z390 Portable Mainframe Assembler and Emulator

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Z390

ASM

z390 Presentation

- **Overview**
- **Macro Processor**
- **Assembler and Linker**
- **Emulator**
- **Hello World Demo**
- **Questions and Answers**

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z390 Overview

- **z390 Open Source Java Project**
- **Execute HLASM compatible macro code**
- **Assemble HLASM compatible programs**
- **Link object code into z390 load modules**
- **Execute load modules on any J2SE platform**

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z390 Open Source Project

- **z390 project www.z390.org downloads**
- **InstallShield for Windows and file image for Linux**
- **Java source and z390.jar executable**
- **Documentation included and also available online**
- **Demos and regression tests included**
- **Submit problem and enhancement requests online**
- **Join z390 project email group for update notices**

z390 Macro Processor

- **Expands macro code into BAL source code**
- **Extensions to AREAD and PUNCH for file I/O**
- **Library with MVS compatible common macros**
- **Extendable parser for EXEC CICS and EXEC SQL**
- **Extendable SOA application generator using TCP/IP**
- **Option to run assembler as parallel task**

z390 Assembler and Linker

- **Assemble expanded BAL source into object code**
- **Supports assembly of all opcodes in latest POP**
- **Link multiple object files into load module**
- **Options to set AMODE and RMODE**
- **Options for listing and trace files**

z390 Emulator (1 OF 2)

- **Execute z390 load modules on any J2SE platform**
- **Execute all problem state instructions**
- **z390 macro generated SVC support includes:**
 - **GETMAIN, FREEMAIN, LINK, LOAD, DELETE**
 - **WTO, WTOR, TGET, TPUT, TIME, ESPIE, ESTAE**
 - **OPEN, CLOSE, GET, PUT, READ, WRITE, CHECK**
- **Options for interactive TEST and TRACE debugging**

z390 Emulator (2 of 2)

- **CMDPROC macro and svc for multi-tasking**
- **CTD and CFD macros to convert HFP, BFP, and DFP**
- **TN3270 screen I/O using TGET, TPUT**
- **TCPIO macro and svc to support TCP/IP sockets**
- **3 GHZ Intel processor can execute over 2 MIPS**
- **See online benchmark report with timings**

z390 Hello World Demo

- **To install and run z390 demo on Windows XP:**
- **Download and install J2RE 5.0+**
- **Download and install z390 v1.3**
- **Double click on z390 icon to start GUI interface**
- **Enter the command: ASMLG DEMO\DEMO**
- **Enter: notepad demodemo.log to view log file**

Hello World Demo source file (MLC)

- **DEMO SUBENTRY**
- **WTO 'HELLO WORLD'**
- **SUBEXIT**
- **END**

Hello World Demo source BAL

- **DEMO CSECT**
- **.....**
- **BRAS 1,*+(WTO#2_EOT-*+1)/2*2**
- **DC AL2(WTO#2_EOT-*,0),C'HELLO WORLD'**
- **WTO#2_EOT EQU ***
- **SVC 35**
- **.....**
- **END**

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Hello World Assembler Listing (PRN)

-
- **00005A A715000A 27 BRAS**
- **00005E 000F0000C8C5D3D3 28 DC**
- **00006D 00006D 29 WTO#2_EOT EQU ***
- **00006E 0A23 30 SVC 35**
-
- **END**

Hello World hex object file (OBJ)

- **.ESD ESD=0001 LOC=00000000 LEN=00000088
TYPE=CST NAME=DEMO**
- **....**
- **.TXT ESD=0001 LOC=00000050 LEN=10
50F0D00850D0F00418DFA715000A000F**
- **.TXT ESD=0001 LOC=00000060 LEN=0D
0000C8C5D3D3D640E6D6D9D3C4**
- **.TXT ESD=0001 LOC=0000006E LEN=10
0A2341F0000058D0D004980CD01458E0**
- **..... (Note this format requires option OBJHEX)**

Hello World Linker Listing (LST)

- **LZ390I V1.3.00a Current Date 01/16/07 Time 19:16:00**
- **LZ390I program = demo\demo.OBJ**
- **LZ390I options = bal objhex nolistcall**
- **LZ390I ESD=DEMO LOC=00000000 LEN=00000088**

Hello World Execution Log

- **EZ390I V1.3.00a Current Date 01/16/07 Time 19:16:00**
- **EZ390I program = demo**
- **EZ390I options = bal objhex nolistcall**
- **HELLO WORLD**
- **EZ390I Stats total instructions = 13**
- **EZ390I Stats current date 01/16/07 time 19:16:00**

Hello World Execution Trace file (TRE)

- ,,,,,,
- **800FFFD2 0 A715000A BRAS R1=00002300
S2(000FFFE6)=0A23 SVC**
- **800FFFE6 0 0A23 SVC I1=23 WTO
R1=ADDR(AL2(LEN),AL2(FLAGS),C'MSG')**
- **EZ390I HELLO WORLD**
- **800FFFE8 0 41F00000 LA RF=00000000
S2(00000000)**
- ,,,,,,

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Hello World Interactive TEST log

- **test cmd: g svc**
- **test break on g svc**
- **800FFFE6 0 0A23 SVC I1=23 WTO
R1=ADDR(AL2(LEN),AL2(FLAGS),C'MSG')**
- **test enter command or h for help**
- **test cmd: g**
- **HELLO WORLD**

z390 Questions and Answers

- **What is the primary use of z390?**
- **Why is z390 open source?**
- **How is the Java source maintained?**
- **What are the minimum requirements?**
- **What limitations are there?**
- **Who is using z390?**

Trademark Acknowledgements

- **IBM Corporation – z/OS, HLASM, CICS**
- **Microsoft – Windows XP and 2000**
- **Sun Microsystems – J2SE, J2RE**



Z390

ASM