

# z Exchange

## CSVFETCH exit in z/OS V2R2

Peter Relson, [relson@us.ibm.com](mailto:relson@us.ibm.com)  
z/OS Core Technology Design  
IBM z Systems, Poughkeepsie NY USA

Friday, March 18, 2016



# Trademarks

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries.

CICS*	DFSMSshm	FlashCopy*	IBM logo*	RACF*	WebSphere*	zEnterprise*
CICS Explorer	DFSMSrmm	GDPS*	Infoprint*	REXX	z10 BC	z Systems
DB2*	DFSORT	HiperSockets	Language Environment*	RMF	z10 EC	z/OS*
DFSMS	DS8000*	HyperSwap*	NetView*	System z9*	z13	
DFSMSdfp	Easy Tier*	HyperWrite	Parallel Sysplex*	System z10	z/Architecture*	
DFSMSdss	FICON*	IBM*	PrintWay*	Tivoli*		

\* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency which is now part of the Office of Government Commerce.

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

Java and all Java based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Linear Tape-Open, LTO, the LTO Logo, Ultrium, and the Ultrium logo are trademarks of HP, IBM Corp. and Quantum in the U.S. and

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

OpenStack is a trademark of OpenStack LLC. The OpenStack trademark policy is available on the [OpenStack website](#).

TEALEAF is a registered trademark of Tealeaf, an IBM Company.

Windows Server and the Windows logo are trademarks of the Microsoft group of countries.

Worklight is a trademark or registered trademark of Worklight, an IBM Company.

\* Other product and service names might be trademarks of IBM or other companies.

UNIX is a registered trademark of the Open Group in the United States and other countries.

Notes:

VISA is a registered trademark of Visa, Inc.

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

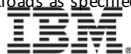
This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

This information provides only general descriptions of the types and portions of workloads that are eligible for execution on Specialty Engines (e.g. zIPs, zAAPs, and IFLs) ("SEs"). IBM authorizes customers to use IBM SE only to execute the processing of Eligible Workloads of specific Programs expressly authorized by IBM as specified in the "Authorized Use Table for IBM Machines" provided at [www.ibm.com/systems/support/machine\\_warranties/machine\\_code/aut.html](http://www.ibm.com/systems/support/machine_warranties/machine_code/aut.html) ("AUT"). No other workload processing is authorized for execution on an SE. IBM offers SE at a lower price than General Processors/Central Processors because customers are authorized to use SEs only to process certain types and/or amounts of workloads as specified by IBM in the AUT.



# CSVFETCH exit

- Introduced in z/OS 2.2
- Fetch and unfetch events
- Flexibility for exit routine to indicate for which events to get control
- Supported by the dynamic exit facility
- Primarily intended for use by monitor products so that they do not have to “hook” the operating system. Not limited to that use case.

# Considerations

- Performance
- Do as little as possible
- The exit routine could adversely affect the performance of the system due to frequency and local lock contention

# CSVFETCH events (fetch)

For fetch events, the exit is called after the fetch

- Fetch\_GetStore (X'00000001\_00000000') – first load, storage is obtained
- Fetch\_JPQ (X'00000002\_00000000') – secondary load, found on job pack queue
- Unix\_GetStore (X'00000004\_00000000') – first load, storage is obtained
- Unix\_JPQ (X'00000008\_00000000') – secondary load, found on job pack queue

# CSVFETCH events (fetch)

- Fetch\_LPA (X'00000010\_00000000') – fetched from LPA
- Fetch\_DirLoad (X'00000020\_00000000') – Load with Address (AKA “directed load”)
- Unix\_DirLoad (X'00000040\_00000000') – Unix directed load via BPX1LDX/BPX4LDX
- Fork (X'00000080\_00000000') – module created for fork

# CSVFETCH events (unfetch)

For unfetch events, the exit is called before the unfetch

- Unfetch\_FreeStore (X'00000000\_00000001')
- Unfetch\_NoFree (X'00000000\_00000002')
- Unfetch\_LPA (X'00000000\_00000010')

# Data for fetch events

- Indication that it is a fetch event and the service ID
- Module name or Path name
- UCB address plus CCHH of the fetch (when available)
- Address of CDE (may be minor with address of major, or major with address of XTLST) so can locate the extents
- DCB address or indication of LNKLST
- Other options that might have been requested such as load with address, global=yes, global=(yes,fixed)



# Data for unfetch events

- Indication that it is an unfetch event and the service ID
- Module name or Path name
- Address of CDE (can be minor with address of major, or major with address of XTLST, as indicated by bit CDMIN)
- Entry point address

# Identifying your exit routine

Use the CSVDYNEX macro to connect an exit routine to the dynamic exits processing. For example:

```
CSVDYNEX REQUEST=ADD,           X
          EXITNAME=THEEXIT,      X
          MODNAME=THEMOD
```

```
...
THEEXIT  DC CL16 'CSVFETCH'
THEMOD   DC CL8  'FTCHXRTN'
```

The exit routine must be reentrant

# Using ServiceMask

Identify which events, by creating a service mask, or'ing together the service ID's. For non-unix non-LPA fetch and unfetch events, for example:

```
CSVDYNEX REQUEST=ADD,           X
          EXITNAME=THEEXIT,      X
          MODNAME=THEMOD,        X
          SERVICEMASK=SM
```

```
. . .
THEEXIT  DC CL16 'CSVFETCH '
THEMOD   DC CL8  'FTCHXRTN '
SM       DC XL8  '0000000300000003 '
```

# Exit routine environment

- Key 0, supervisor state, task mode, enabled
- AMODE 31 or 64 according to dynamic exits facility
- Primary = Home = Secondary
- LOCAL lock held (do not release it!)
- All data below 2G
- Area mapped by macro CSVFTCHX to identify the event
- 1024-byte workarea which could be used for module dynamic storage

# Exit routine registers

## On Entry:

1 - address of parameter area

- Parameter area word 0: address of area mapped by CSVFTCHX
- Parameter area word 1: address of 1024-byte work area

13 - address of 144-byte F4SA-format save area

14 - return address

15 - entry point address

## On Return:

Preserve regs 2-13

# Fine Points

- Load with address: Fetch event, no unfetch event
- LPA Load without delete: no unfetch event
- For system-initiated implicit unfetch at task termination there could be one unfetch event covering all loads of a module
- For memory termination, no unfetch events

# Questions?