

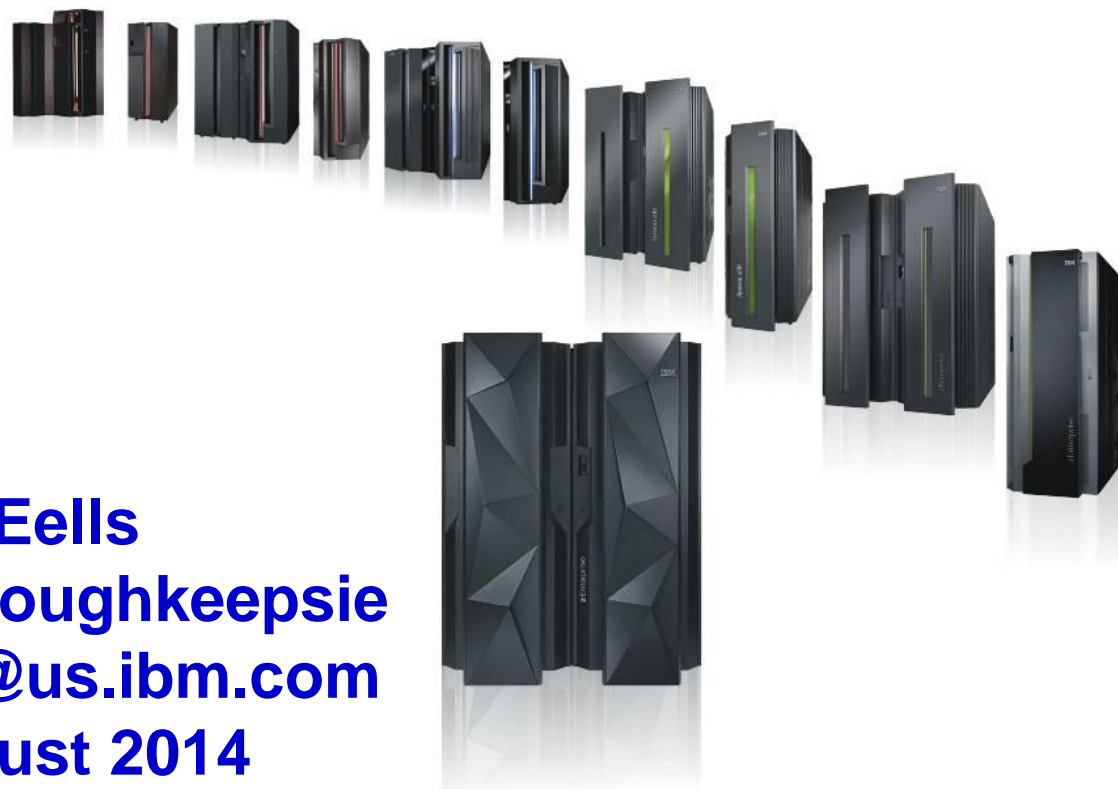


IBM Systems & Technology Group

# Focus on...zEDC

SHARE 123, Pittsburgh

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4 August 2014



Many thanks to Anthony Sofia for the updates!

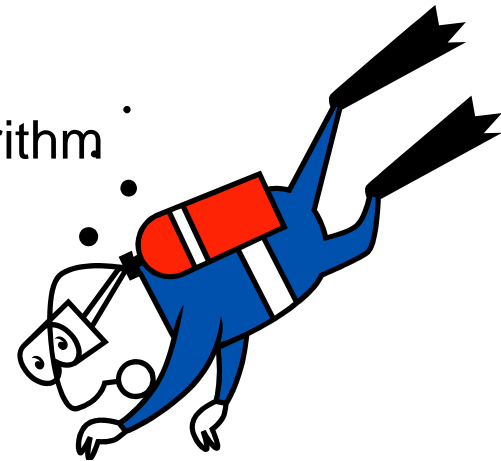
## Three Ways to Compress (and Decompress) on z/OS

### ■ Software compression

- CPU-intensive
- Much slower
- Data can be inflated on anything supporting the same algorithm

### ■ Compression coprocessor-based instructions

- Dictionary-based compression, generic or tailored
- Can be inflated on a System z processor
- All compression consumes apparent CP cycles
  - Compression done on the coprocessor, but accounted for as CP busy time because the CP is unavailable until the coprocessor is done



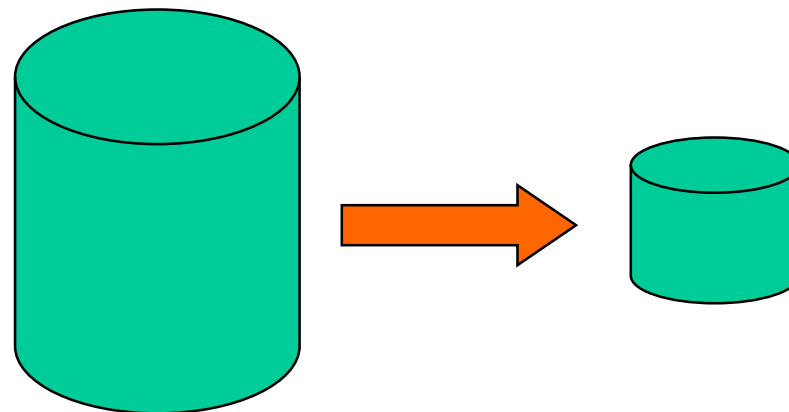
### ■ New zEDC Express adapter for zEC12 and zBC12 and zEnterprise Data Compression (zEDC) for z/OS V2.1

- Compression work is offloaded to the card
- Minimal CP cycles consumed
- zlib-based, industry-standard deflate compression
- Data can be inflated anywhere zlib processing is available



## ■ Now available:

- Card & z/OS feature
- zBNA support
- SMF and RMF support
- Support for industry standard zlib compression
- zlib library in z/OS V2.1
- SMF data compression on z/OS V2.1
- Software-based decompression support for SMF data on z/OS V1.12 and V1.13
- Java support
- IBM Encryption Facility support
- Extended Format BSAM/QSAM support
- WebSphere MQSeries support
- IBM Sterling Connect:Direct support



## SMF Data Compression

### ■ For SMF data written to log streams

- We expect about a 4:1 compression ratio for SMF data
- Designed to significantly increase SMF recording rates
- Can specify that all SMF data or SMF data written to selected log streams be compressed
- New SMFPRMxx COMPRESS keyword on LSNAME and DEFAULTLSNAME
- New PERMFIx subparameter of COMPRESS to balance fix/unfix overhead with available real memory

### ■ Corresponding IFASMFDL support

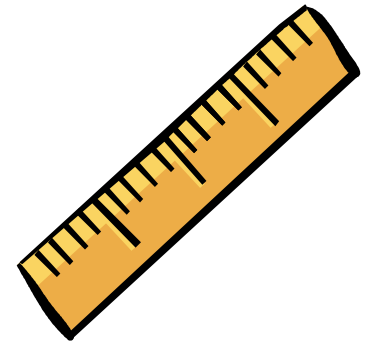
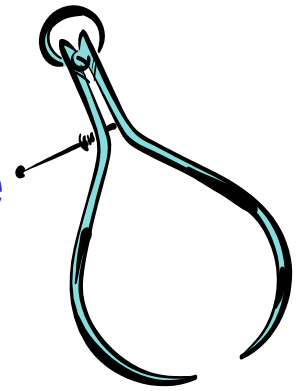
- Automatic inflation on z/OS V2.1 with feature and HW support
- SOFTINFLATE parameter for software-based decompression
  - For z/OS V1.12 & z/OS V1.13, with the PTF for APAR OA41156
  - Included in z/OS V2.1
  - Intended to be used when zEDC is not available

z/OS

MVS System Management Facilities

(SMF)

## Measurements



### ■ SMF Reporting for QSAM/BSAM

- SMF14 and SMF15 records show compression ratios
- SMF14CDS has the size of the compressed-format data set
- SMF14UDS is the uncompressed size
- New SMF14CMPTYPEzEDC field

### ■ SMF 74 subtype 9 records created by RMF include new PCIe, zEDC Express data

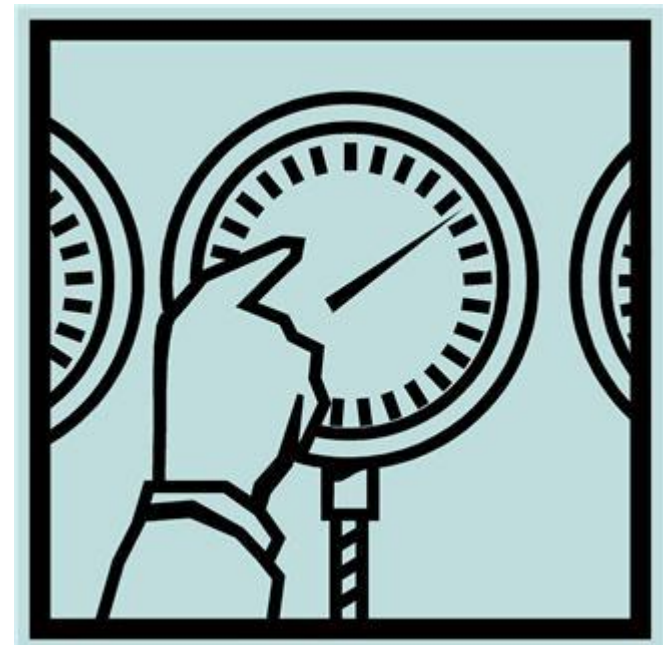
- RMF Monitor I PCIe Activity Report:
  - I/O queue and execution time
  - Compressed and uncompressed data transfer rates
  - Number of compression and decompression requests



## More Compression Support

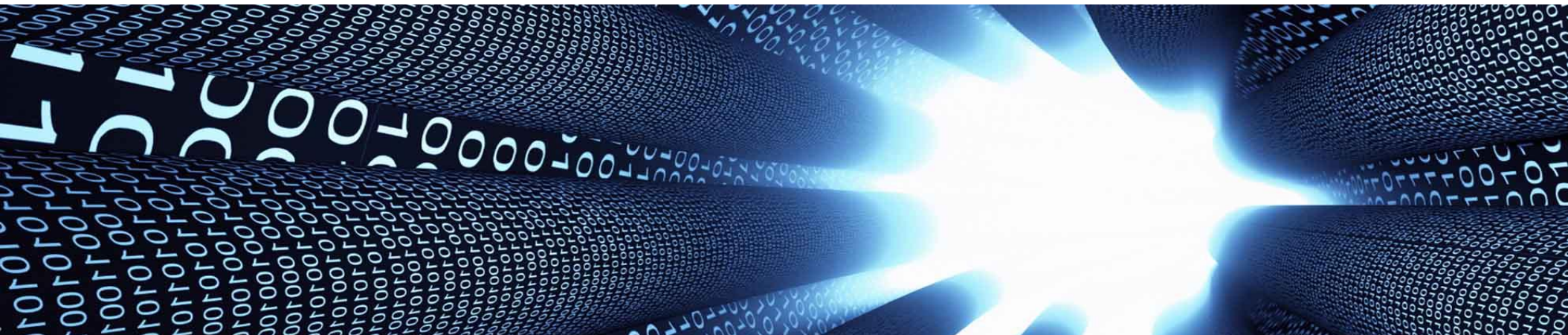
- Extended Format BSAM and QSAM Compression
  - ***New support for Compressed Format data sets now available with the PTF for APAR OA42195***
  - In addition to generic (DBBLIB) and tailored (supply a dictionary) compression
  - New COMPACTION option in DATACLAS definition
  - New values on COMPRESS parameter in IGDSMSxx

**DFSMS Exploitation of  
z/OS zEnterprise Data  
Compression  
Monday 1:30**



## IBM MQ for z/OS, V8.0 zEDC Support

- WebSphere MQSeries® has always provided compression options for message data passed over MQ channels via the COMPMSG attribute.
- The existing zlib options are the following:
  - ZLIBFAST - Message data compression is performed using the zlib compression technique. A fast compression time is preferred.
  - ZLIBHIGH - Message data compression is performed using the zlib compression technique. A high level of compression is preferred.
- Starting with IBM MQ for z/OS, V8.0 (5655-W97) the COMPMSG(ZLIBFAST) attribute will now use zEDC when available to perform compression and decompression of message data.



## Sterling Connect:Direct V5.2 for z/OS zEDC Support

- Sterling Connect:Direct can automatically leverage zEDC Express Accelerator for file compression and decompression as files are transferred
- Designed to work with various dataset and file types on z/OS
- File transfers can be directed from z/OS to z/OS, or z/OS to other platforms including UNIX®, Linux®, Linux on System z, and Windows
- Designed to be compatible with zlib compression used in IBM Sterling Connect: Direct today – no changes required at end points

**Up to 80% reduction in elapsed time to transfer a file from z/OS to z/OS (results vary by dataset type and characteristics of the data) with minimal CPU increase\***

**Significant improvement in CPU time with zEDC when compared to zlib software compression (sender and receiver TCB times)\***

**Users currently using compression expected to see a comparable compression ratio**

**Exploiting System z Innovation for Mainframe-based Managed File Transfer (MFT) with IBM Sterling Connect:Direct for z/OS**  
**Monday 1:30**

\* Based on projections and/or measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels.



## Compression Ratios and Performance\*

- **Compression rates will vary with the data...**

- But internal testing shows us ~4X compression for SMF data
- At August 2013 SHARE, I said I expected (at least) ~2X compression for Extended Format BSAM/QSAM data, but we had not tested yet

- ***Test numbers are in!***

- For BSAM/QSAM we see up to 4X compression for zEDC
  - That's as much as *2X better* than generic or tailored compression
- Also, for BSAM/QSAM we see 80% or more CPU time reduction compared to tailored and generic compression
  - CPU cost for zEDC is ~0.1sec/GB in testing on a zEC12

\* Based on projections and/or measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels.

- (Note: LZ compression is used in the tape controllers already)

## ■ DFSMSdss data compression (Planned\*)

- Planned for DUMP, COPY, and when DFSMSdss is used as the data mover by DFSMShsm™ for **3Q2014 with the PTF for APAR OA42243**
- When a disk output data set is used only!



**z/OS zEnterprise Data  
Compression Usage and  
Configuration for DSS  
and HSM  
Wednesday 10:00**

## What You'll Need to Use zEDC

### ■ New Hardware and z/OS features:

- zEDC Express adapter for zEC12 and zBC12
- zEnterprise Data Compression (zEDC) for z/OS V2.1
- For software inflation of compressed SMF data, the PTF for APAR OA41156 on z/OS V1.12 and z/OS V1.13
- For Extended Format BSAM/QSAM support, PTF for APAR OA42195
- zlib on other platforms where you want to process compressed data

### ■ Other products:

- Java support in IBM 31-bit and 64-bit SDK for z/OS Java™ Technology Edition, Version 7 Release 1 (5655-W43 and 5655-W44) (IBM SDK 7 for z/OS Java)
- IBM Encryption Facility for z/OS support with PTF UA72250

### ■ For planning:

- zBNA (see next page)

## IBM System z Batch Network Analyzer

- Helping determine if you have files that are candidates for zEDC:  
the IBM System z Batch Network Analyzer
  - A free, Microsoft Windows-based “as is” tool to analyze batch windows using SMF data
  - Available to Customers, Business Partners and IBMers
  - Replaces the old BWATOOL
  - PC based, graphical and text reports
    - Including Gantt charts and support for Alternate Processors
- Available from NA Advanced Technical Support
  - <http://w3.ibm.com/support/techdocs/atmastr.nsf/WebIndex/PRS5126>
- zBNA can help identify zEDC Compression Candidates
  - Identify zEDC compression candidates across specified time spans, like batch windows
  - Help estimate utilization of a zEDC feature and help size number of features needed
  - Generate a list of data sets by job which already do hardware compression and may be candidates for zEDC
  - Generate lists of data sets by job which might be zEDC candidates but are not in extended format
- Initial support was December 2013—updates made in January and February 2014



**System z Batch Network Analyzer (zBNA) Tool Hands-on Lab**  
**Thursday 4:15**