User Experience with zHPF

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GEICO

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GEICO Company Overview

- GEICO – (**G**overnment **E**mployees **I**nsurance **Co**mpany)
- Founder Leo Goodwin first targeted a customer base of U.S. government employees and military personnel. He then pioneered the concept of Direct-To-Consumer Insurance sales.
- GEICO is the 3rd largest auto insurer in the US.
- GEICO is a subsidiary of Warren Buffet's Berkshire Hathaway.
- 11 million auto policyholders and growing
- 27,000 associates
- 12 major offices around the country
- 24 hour service 365 days a year
- Companies 76th Anniversary founded in 1936
- GEICO.COM used by customers and our call center operators

GEICO System z Environment

- Hardware
  - System z196 and z10 processors
  - Multiple Parallel Sysplex - Infiniband (PSIB) coupling links
  - Multiple DS8300 dasd subsystems

- Software
  - z/OS 1.12 and 1.13
  - CICS TS 4.2
  - DB2 9 NFM and DB2 V10 CM
  - IMS 11
  - WMQ 7
  - CA, IBM and other vendor tools

Journey to zHPF begins

Research and Planning

- zHPF dramatically lowers channel protocol overhead and promised to be a "good thing"

- IBM zEnterprise 196 and IBM zEnterprise 114 I/O and FICON Express8S Channel Performance (Cathy Cronin, Version 2, November 2011) (ZSW03196USEN01)

- http://public.dhe.ibm.com/common/ssi/ecm/en/zsw03196usen/ZSW03196USEN.PDF

- High Performance FICON for System z Technical summary for customer planning by Iain Neville

- ftp://ftp.software.ibm.com/common/ssi/sa/wh/n/zsw03058usen/ZSW03058USEN.PDF

Journey to zHPF - cont

Hardware Enablement

- Our FICON H/W upgrades positioned us to exploit zHPF
  - Z196 and Z10 processors 4GB FICON

Journey to zHPF - cont

Hardware Enablement

- BROCADE DCX
    - 4 McData FICON directors with 2GB cards   2027-140M
    - 2 Brocade DCX switches enabling 4G end to end   2499-768B

Journey to zHPF - cont

Hardware Enablement

- ## DS8300 DASD
  - Replace 2GB with 4GB HBAs on some DS8300 storage processors
  - Install zHPF optional chargeable microcode feature on all storage processors
  - **zHPF is not a free feature like MIDAW but it was strategic.** Would enable future consolidation of multiple DS8300 3 -1 or 4 – 1 into DS8700 technology
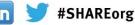
Journey to zHPF - cont

Flashes and fixes

- We had updated RSU most recently to RSU1203 and **used IBM FIXCAT to check for recommended service**
  - + IBM.Device.Server.z196-2817.zHighPerformanceFICON
- We consulted with IBM after recent flashes related to data loss on DS8XXX S1004012 & S1004024
- S1004012 "Potential DS8100/DS8300/DS8700 FICON Host Adapter Loss of Access due to unavailable adapters during certain zHigh Performance FICON (zHPF) workloads."
- http://www-01.ibm.com/support/docview.wss?uid=ssg1S1004012

Journey to zHPF - cont
FLASH: S1004012

- This problem can be exposed by the application of APAR OA34661 on z/OS V1 R11 and V1 R12; and is also exposed at the base level of z/OS V1 R13. APAR OA34661 enhanced the construction of zHPF channel programs making it possible to transfer larger amounts of data in a single channel program. In certain instances this capability allows certain IO requests for small CKD records to exceed the 16K byte threshold that exposes this microcode defect.

- HIPER APAR OA38777 is available to ensure that Media Manager zHPF channel programs do not exceed 16K byte data transfer for Multi-Track Read IO for records with data lengths < 128 bytes as a bypass for the defect.

- DS8100/DS8300s running zHPF should not be moved to a Release 4.3 bundle without applying the HIPER APAR just mentioned, unless zHPF is disabled until the HIPER APAR is applied. DS8100s/DS8300s already on release 4.3 code (64.3x.xx.0) should also apply this HIPER APAR.

Journey to zHPF - cont

FLASH: S1004024

- Potential DS8700/DS8800 Undetected Data Error on Release 6.2 code during System z High Performance FICON (zHPF) Format Writes during Recovery with zHPF Format Write feature enabled in z/OS 1.11, z/OS 1.12 or z/OS 1.13

- If a new zHPF Format Write chain is interrupted by a remote CEC failover, where the write has successfully been transferred to the control unit and good ending status given, the sectors in cache may not be properly hardened.

- For z/OS R11 or R12 a customer is exposed if either of these APARs are installed:
OA34661-that enables Media Manager to exploit R6.2 zHPF.
OA34672 that enables QSAM/BSAM to exploit R6.2 zHPF and
SAM_USE_HPF(YES) is specified in IGDSMSxx PARMLIB member.

Journey to zHPF - cont
OA39087 PE / SUPD BY OA40098

- APAR OA39087 DB2 "LOAD" WITH RESUME TAKES EXCESSIVE TIME LOADING TO A Z/HPF ENABLED DEVICE. MANY ICYTRACE LOGRECS.

- Performance degradation during DB2 Utility LOAD RESUME with output to a zHPF enabled device. There are no messages on the console, but many logrec ICYTRACE records for the DB2 DBM1 address space.
  - Turning off zHPF is an option disable z/HPF on LPARS running DB2 via the MVS command SETIOS ZHPF=NO
  - There is no data loss because Media Manager will redrive the I/O with a non-zHPF channel program. All that is seen is slow performance.
  - Performance problem may be extreme (minutes to hours)

zHPF APARs of Interest

- We opened a PMR and **asked IBM**. Their recommendation in order to enable zHPF was to install all HIPER Media Manager service before making a significant change in your I/O processing

- IOS Level-2 also recommended a list of HIPER APARs.

- APARs recommended to us included: OA33098, OA38260, OA38777, OA35057, OA35260, OA35834, OA34728

- APAR OA38916 AVOID ZHPF IO ERROR WITH FORMAT WRITES

Journey to zHPF - cont

Implementation

- We can turn it on:
  - **SETIOS ZHPF=YES**
- Verify
  - D M=DEV(XXXX)
    - FUNCTIONS ENABLED = MIDAW, ZHPF
- Turn it off if needed:
  - **SETIOS ZHPF=NO**
- When satisfied updated SYS1.PARMLIB(IECIOS00)

Journey to zHPF – the Bump

One issue Encountered

- A large number of ICYTRACE records occurring for a couple old DB2 LOGCOPY datasets with 'interesting' CI/CA.

  - We simply re-created the dsns and moved on.

- **APAR OA39718**

  - With a data set that the number CIs/CA does not match the number of records/track multiplied by the tracks per CA a large number of ICYTRACE records may be produced. This only occurs with zHPF enabled.

Journey to zHPF - Complete

Results?

- Should expect to see slightly lower connect time
- Relative amount of zHPF activity compared to standard FICON
- Yes improvement...but tough to quantify

```
ASYS                      RMF V1R13  Channel Path Activity        Line 24 of 56
Samples: 119      System: ASYS  Date: 01/28/13  Time: 16.55.30  Range: 120   Sec

  Channel Path           Utilization(%)   Read(B/s) Write(B/s)  FICON OPS  zHPF OPS
ID No  G  Type  S     Part  Tot  Bus     Part  Tot  Part  Tot   Rate Actv  Rate Actv

71     13  FC_S  Y     2.3  3.1  2.7      29M  38M    2M   5M    150    1   835    3
74     12  FC_S  Y     0.5  1.1  0.9      10M  13M    2M   2M     44    1   283    2
75     12  FC_S  Y     0.5  1.1  0.9      11M  13M    2M   2M     44    1   288    2
```

Journey to zHPF- Complete

zEC12
2827 – H43

From ESCON ➔ FICON ➔ MIDAW ➔ z/HPF
we have arrived at the future!
Life is good

#SHAREorg

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