IBM® TS7700 Series
VEHSTATS Decoder
Version 2.1e

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Introduction

This document provides a cross reference between the various VEHSTATS output files and the IBM® TS7700 Series Statistical Data Format White Paper. This document provides a set of tables that correspond to the various VEHSTATS reports. The VEHSTATS generated abbreviated column and row headings are listed with the corresponding Record Name and Container Name from the white paper. A description field contains the field name for the statistical records. The description field also provides any additional pertinent information. The appropriate field in the statistical data format white paper should then be referenced for a detailed description of the row or column.
The list of the reports, generated by VEHSTATS, you can see in the "**Contents**" section.

This document should be used in conjunction with the "IBM® TS7700 Series Statistical Data Format White Paper" which can be found on Techdocs. http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP100829.

The contents of some reports is controlled by the list of "orders", so called "order based" reports. The list of orders is specified by the DD statement in the job to run the program VEHSTATS: DD DISP=SHR,DSN=&USERHLQ..&SITE..$IBMTOOL.JCL(&ORDER).
The are some predefined order lists (like ORDERV12, ORDERALL, ORDER8CL and others). Also you may create your own lists depending on the statistics you want to see.
The reports DAYSMRY, COMPARE, MONSMRY are the "vertical" ones, DAYHSMRY, HOURFLAT, WEKHSMRY, MNTHSMRY – are "horizontal", because the fields are located there "vertically" or "horizontally". The sequence of the fields in the reports depends on the sequence of the "orders" in the list of orders.
All those reports contain the same fields (counters), therefore their description is in a separate table – Counters of "order based" reports.

Change History

- V1.0 – Original Version
- V1.1 – 12/06/2010
  - Updated H32GUP01 to reflect new format
- V1.2 – 12/15/2010
  - Updated H32GUP01 to reflect the newest new format
- V1.3 – 1/30/2012
  - Add note that the columns in DAYHSMRY and WEKHSMRY are described by the HOURFLAT section.
  - Updated fields to use MiB and GiB instead of MB and GB.
- V1.4 – 3/4/2013
  - Add decoder for HOURFLOW report
  - Add R3.0 related fields to H30TVC1 report
  - Refreshed HOURFLAT chapter to bring it up to date
  - Other minor updates
- V1.5 – 3/12/2013
  - Add cache throughput fields and UTC_OFFSET field to HOURFLAT alphabetical section
  - Added rows for HOURFLOW that were omitted in V1.4
- V1.6 – 4/16/2013
  - Change “Active GiB EOI” to “Active GB EOI” in DAYSMRY and MONSMRY
- V1.7
  - Spell MONSUMRY and DAYSUMRY correctly as MONSMRY and DAYSMRY
- V1.8
  - Update:
    - H20VIRT – Add throughput delay columns which are available starting in R3.0
    - H21ADPSU – Add device read and write rate as computed by VEHSTATS
    - H30TVC1 – Change “GiB RES CACHE” to “GB RES CACHE” so it matches the units used to display the disk cache size
    - H31IMEX – Add this report
    - H32CSP – Updated example to show JC and JK media types
    - H32GUP01 – Change “ACTIVE GiB” to “ACTIVE GB” so it matches the units used to display the disk cache size
    - H33GRID – Add Immediate, Deferred, and Synchrous copy columns
    - DAYSMRY – Changes made to both Reporting Order and Alphabetical Order
      - Change “Active GiB EOI” to “Active GB EOI”
      - Change GiB to MiB as appropriate
      - Add four fields to PERFORMANCE BY PG section: All MiB to Mig EOI, All MiB to Mig MAX, All MiB to Cpy EOI, and All MiB to Cpy MAX.
      - Add Import/Export fields
      - Add copy performance fields
      - GRID COPY RECEIVER SNAPSHOT – Change “VV to copy EOI” to “VV to Recv EOI” and “MiB to copy EOI” to “MiB to Recv EOI”. This removes ambiguity as to the direction of the copy.
      - USAGE BY POOL changes GiB to GB for “POOL xx ACT GB EOI”, “POOL xx GB WRT SUM”, and “POOL xx GB RD SUM”.
    - MONSMRY - Changes made to both Reporting Order and Alphabetical Order
      - Change “Days w/Activity” to “Host Use Days”
      - Change “Active GiB” to “Active GB”
      - Add “Max MiB to MIG” and “Max MiB to CPY” to PERFORMANCE by PG section
      - Add Export/Import fields
      - USAGE BY POOL changes GiB to GB for “POOL xx ACT GB”, “POOL xx GB WRT”, and “POOL xx GB RD”.
  - HOURFLAT
    - Change “PGx_GiB_in_TVC” to “PGx_GB_in_TVC”

  - Change “POOL_xx_ACT_GiB” to “POOL_xx_ACT_GB”
  - Adjust descrition of “Avg_Clus_Util” and “Max_Clus_Util” to indicate this field only includes CPU with R3.0+.
  - Add the following fields:
    - UTC_OFFSET
    - Avg_Disk_Util
    - Max_Disk_Util
    - Thr_Dly_Av_Sec
    - Thr_Dly_Mx_Sec
    - Thr_Dly_Percent
- V1.9 January 2014
  - Add avg and max ahead and behind counts from Virtual Device Historical record H20VIRT
  - Add total used cache and total used flash cache from Hnode HSM Historical Record H30TVC1
  - Add removed time delayed copies average age and time delayed copies removal count from Hnode HSM Historical Record H30TVC1
  - Add time delayed copy queue from Hnode Grid Historical Record H33GRID
- V2.0 March 2014
  - Indicate the correct container for Cache Miss in the AVGRDST report

- V2.1 March 2016
  - Add Attempt Throughput (ATTMPT_THRPUT) in H20VIRT
  - Add Total Migrated GB in H30TVC1
  - Add H30TVC1 - PARTITION 0 EXTENDED VALUES
  - Add H30TVC1 - PREFERENCE_GROUP_x_EXTENDED_VALUES
  - Add ”MiB_TO_GRID_BY_GGM” in H33GRID
  - Add “MiB/s By_GGM Queue” and “GiB_to PreMig” in HOURFLOW
  - Add in DAYSMRY:
    - "Avg CPU Util" and "Max CPU Util"
    - "Phy Rd MiB/s" and "Phy Wr MiB/s"
    - "Avg Sec DCThrt AVG"
    - “Dev Rd MiB/s” and “Dev Wr MiB/s”
    - Counters added for Release 3.2
    - “Avg Sync Sec”
  - Replace the tables for MONSMRY, COMPARE, HOURFLAT by reference to DAYSMRY report
  - Add column with “Order name” showing the value of “order” connected with that counter

- V2.1a April 01, 2016
  - Change “MB” to “MiB” in header line in H33GRID report

- V2.1b September 21, 2016
  - Improve the description of H33GRID report
  - The report H30TVCx is updated
  - The report AVGRDST is improved
  - The description of the field “ACTIVE GB” is updated

- V2.1c January 2017
  - The report H30TVCx is updated: “TOTAL CACHE PARTITION INFORMATION” starting from Release 3.2

- The report H33GRID: the new counters – distribution of Remote Write/Read activities by clusters
- The report DAYSMRY: fill the column "Field Type" (where it was not filled yet)

The following fields are not available now: PG0 NumPfrRm n, PG0 SizPfrRm n, PG1 NumPfrKp n, PG1 SizPfrKp n, PG0 NumPfrRmv, PG0 SizPfrRmv

The following fields are added: PG1 NumPinned, PG1 SizPinned, PG1 NumPfrRmv, PG1 SizPfrRmv

The following counters are changed:

new	obsolete
'%HOST_WR_TH_TA'	' %HST_WR_TH_P0'
' AVG_WR_TH_TA'	' AVHSTWR_TH_P0'
' %COPY_TH_TA'	' %CPY_THR_P0 '
'AVG_COPY_TH_TA'	' AVCPY_THR_P0 '
'AVG_OVER_TH_TA'	' AVALL_THR_P0 '
' %DEF_CP_TH_TA'	' %DFRCPTHR_P0 '
'AVG_D_CP_TH_TA'	' AVDFRCPTHR_P0'
'BAS_D_CP_TH_TA'	' BSDFRCPTHR_P0'
'HSTWR_THRSN_TA'	' HSTWRTHR_REAS'
' COPY_THRSN_TA'	' COPYTHR_REAS '
'DCOPY_THRSN_TA'	' DFRCPTHR_REAS'
'HSTWR_THRSN_P0'	' WRT THROT RSN'
' COPY_THRSN_P0'	' CPY THROT RSN'
'DCOPY_THRSN_P0'	'DCPY THROT RSN'
'BAS_D_CP_TH_P0'	'BASE DCP THROT'

- V2.1d June 2017
  - The report DAYSMRY: fill the column "Field Type" (where it was still not filled yet)
  - H30TVCx: Change the column name 'TOTAL P-MIGRD GB' to 'TOTAL MIGRD GB'
  - Add the report HOURXFER
  - The field name "TOTAL TVC GB FLASH" is changed to "TOTAL GB DR FLASH" in the reports H30TVCx

- V2.1e November 2017
  - Add "uncompressed data" to the description of the fields "CHANNEL BLOCKS WRITTEN FOR THESE BLOCKSIZES" in the report H20VIRT
  - Change the report name H30TVC1 to H30TVCx (in this document) to show that it could be up to 8 reports, H30TVC1 – H30TVC8
  - The Description of the fields in the reports H21ADP0x and H21ADPXX is improved
  - Add the mention of the report H32TDU34
  - Refresh the reports H21ADPSU, AVGRDST and DAYSMRY
  - "DAYSMRY – Report Order" removed
  - Add the reports DAYHSMRY, WEKHSMRY, MNTHSMRY
  - Add the report H30COMP – Compression Container
  - Add the description of "Common Header related fields"
  - Move the fields (counters) of "order based" reports to the separate table

Common Header related fields

Most of the reports contain the line, like in the following example (in bold):

```
(C) IBM   REPORT=H20VIRT (16032)          VNODE VIRTUAL DEVICE HISTORICAL RECORDS          RUN ON
GRID#=00700   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL0H6709  VE_CODE_LEVEL=008.032.001.0008
12JAN16TU -VIRTUAL_DRIVES-                 _THROUGHPUT_ PCT_OF _____CLUSTER VS FICON CHANNEL_____
  RECORD       --MOUNTED--    MAX ATTMPT  Delay_/15Sec  15Sec    AHEAD    AHEAD   BEHIND   BEHIND
    TIME  INST MIN AVG MAX THRPUT THRPUT    MAX    AVG INTVLS      MAX      AVG      MAX      AVG
00:15:00   256   1   3   7    MAX     na   .000   .000      0   208066    76661      989      187
```

Header Related Fields			
Field name	Record Name	Container Name	Description
GRID#	Hnode HSM Historical	Header	Grid Library Sequence Number
DIST_LIB_ID			Distributed Library Sequence Number
VNODE_ID			Node ID
NODE_SERIAL			Machine Serial Number
VE_CODE_LEVEL			Microcode level of the TS7700

H20VIRT

```
(C) IBM   REPORT=H20VIRT (16032)          VNODE VIRTUAL DEVICE HISTORICAL RECORDS          RUN ON
GRID#=00700   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL0H6709  VE_CODE_LEVEL=008.032.001.0008
12JAN16TU -VIRTUAL_DRIVES-                _THROUGHPUT_ PCT_OF _____CLUSTER VS FICON CHANNEL______
  RECORD       --MOUNTED--    MAX ATTMPT  Delay_/15Sec  15Sec    AHEAD    AHEAD   BEHIND   BEHIND
    TIME  INST MIN AVG MAX THRPUT THRPUT    MAX    AVG INTVLS      MAX      AVG      MAX      AVG
                           R2.2   CALC  <----R3.0.0063----> <------------R3.1.0073+----------->
00:15:00   256   1   3   7    MAX     na   .000   .000      0   208066    76661      989      187
```

Continued:

```
      03FEB2016 @ 23:32:49    PAGE   1
                          UTC NOT CHG

          ---------CHANNEL_BLOCKS_WRITTEN_FOR_THESE_BLOCKSIZES----------------------------
            <=2048      <=4096      <=8192     <=16384     <=32768     <=65536      >65536

             10406        4248        4572      132954     4636124       14600          42
```

H20VIRT – VNODE VIRTUAL DEVICE HISTORICAL RECORDS			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
-VIRTUAL DRIVES- INST	Vnode Virtual Device Historical	Vnode Virtual Device	Installed Virtual Devices
-VIRTUAL DRIVES- --MOUNTED-- MIN AVG MAX	Vnode Virtual Device Historical	Vnode Virtual Device	Minimum/Average/Maximum Virtual Devices Mounted
MAX THRPUT R2.2	Vnode Virtual Device Historical	Vnode Virtual Device	Configured Maximum Throughput
ATTMPT THRPUT CALC	Vnode Virtual Device Historical	Vnode Virtual Device	Attempted Throughput. Calculated based on “Configured Maximum Throughput” and “Maximum Delay”. The Attmpt_Thruput is a guess as to how fast the host was trying to go when we throttled it. It's not exact given the stats cover 15 minute averages.
__THROUGHPUT___ ___DELAY_SECS__ MAX AVG PCT ---R3.0.0063-->	Vnode Virtual Device Historical	Vnode Virtual Device	Maximum Delay Average Delay Delay Interval Percentage The Delay Avg value is how much delay on average per 1 second was introduced to slow down the host.

H20VIRT – VNODE VIRTUAL DEVICE HISTORICAL RECORDS			
Field name	**Record Name**	**Container Name**	**Description**
AHEAD AHEAD BEHIND BEHIND MAX AVG MAX AVG -------R3.1.0073+---------	Vnode Virtual Device Historical	Vnode Virtual Device	Maximum ahead count Average ahead count Maximum behind count Average behind count The Ahead count is how many times our internal buffer for any device becomes empty during writes or full during reads. It means the "TS7700" is ahead of the channel. Behind is just the opposite. It's the count of how many times the buffer filled during writes or became empty during reads where the TS7700 wasn't fast enough. High Ahead counts means the 7700 has throughput to spare, which in this case it does given it's slowing down the channel. If you see high behind counts, that means the 7700 is the bottleneck. It could be just overall throughput, it could be internal disk cache, it could be networks when remote mounts take place, it could be sustained state of operation where we are offloading to tape and any other thing where the 7700 can't keep up either by design or due to an issue.
CHANNEL BLOCKS WRITTEN FOR THESE BLOCKSIZES <=2048 <=4096 <=8192 <=16384 <=32768 <=65536 >65536	Vnode Virtual Device Historical	Vnode Virtual Device	Channel Blocks Written xxxxx-xxxxx Byte Range. The length of block is shown for uncompressed data.

H21ADP0x

```
(C) IBM   REPORT=H21ADP00(16032)          VNODE ADAPTOR HISTORICAL ACTIVITY               RUN ON 03FEB2016 @ 23:32:49    PAGE   1
GRID#=00700   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL0H6709  VE_CODE_LEVEL=008.032.001.0008                        UTC NOT CHG
        ADAPTOR 0 FICON-2 (ONLINE    )      L DRAWER   SLOT# 6
12JAN16TU PORT 0      MiB is 1024 based, MB is 1000 based              PORT 1
  RECORD GBS MiB----------CHANNEL--------- ----------DEVICE---------    GBS MiB----------CHANNEL--------- ----------DEVICE---------
    TIME RTE sec   RDMiB /sec   WRMiB /sec   RDMiB COMP   WRMiB COMP    RTE sec   RDMiB /sec   WRMiB /sec   RDMiB COMP   WRMiB COMP
00:15:00   4  29    2677    2   23806   26    1207 2.21    8676 2.74      0   0       0    0       0    0       0            0
```

Up to 4 host bus adapters (HBA) could be installed, therefore up to 4 reports H21ADP0x could be generated.

H21ADP0x – VNODE ADAPTOR HISTORICAL ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
ADAPTOR x	Vnode Adapter Historical	Vnode Adapter	Based on which set of data in the container (Adaptor's number – 0, 1, 2 or 3)
FICON-x	Vnode Adapter Historical	Vnode Adapter	Adapter Type For example: 'ESCON-2', 'FICON-1', 'FICON-2', 'HANKIE '
(...)	Vnode Adapter Historical	Vnode Adapter	Adapter State ("ONLINE", "OFFLINE" etc)
x DRAWER	Vnode Adapter Historical	Vnode Adapter	HBS Drawer: • L – left • R - Right
SLOT# x	Vnode Adapter Historical	Vnode Adapter	HBA Slot Number
PORT x	Vnode Adapter Historical	Vnode Adapter-Port	Based on which set of data in the container (Port number – 0 or 1)
Body Related Fields			
GBS RTE	Vnode Adapter Historical	Vnode Adapter-Port	Maximum Data Rate
MiB sec	Vnode Adapter Historical	Vnode Adapter-Port	Actual Data Rate
-------CHANNEL--------- RDMiB /sec WRMiB /sec	Vnode Adapter Historical	Vnode Adapter-Port	• Bytes Read by the Channel • MiB/s computed by VEHSTATS • Bytes Written by the Channel • MiB/s computed by VEHSTATS
--------DEVICE--------- RDMib COMP WRMib COMP	Vnode Adapter Historical	Vnode Adapter-Port	• Bytes Read by Virtual Devices • Compression ratio computed by VEHSTATS • Bytes Written to Virtual Devices • Compression ratio computed by VEHSTATS

H21ADPXX

```
(C) IBM   REPORT=H21ADPXX(16032)          VNODE ADAPTOR HISTORICAL ACTVTY COMBINED         RUN ON 03FEB2016 @ 23:32:49    PAGE   1
GRID#=00700   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL0H6709  VE_CODE_LEVEL=008.032.001.0008                        UTC NOT CHG
12JAN16TU      -----ADAPTOR 0 FICON-2-----     -----ADAPTOR 1 FICON-2-----     -----ADAPTOR 2 FICON-2-----     -----ADAPTOR 3 FICON-2-----
  RECORD TOTAL ---CHANNEL--- ---DEVICE----     ---CHANNEL--- ---DEVICE----     ---CHANNEL--- ---DEVICE----     ---CHANNEL--- ---DEVICE----
    TIME MiB/s  RDGib  WRGiB  RDGiB  WRGiB      RDGiB  WRGiB  RDGiB  WRGiB      RDGiB  WRGiB  RDGiB  WRGiB      RDGiB  WRGiB  RDGiB  WRGiB
00:15:00   117    2.6   23.2    1.1    8.4        2.5   23.1    1.1    8.4        2.5   23.2    1.1    8.4        2.5   23.2    1.1    8.4
```

The values in this report are summed by VEHSTATS using the data from each of the individual adapters: H21ADP00, H21ADP01, H21ADP02, and H21ADP03

H21ADPXX – VNODE ADAPTOR HISTORICAL ACTIVITY COMBINED			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
ADAPTOR x	Vnode Adapter Historical	Vnode Adapter	Based on which set of data in the container (Adaptor's number – 0, 1, 2 or 3)
FICON-x	Vnode Adapter Historical	Vnode Adapter	Adapter Type For example: 'ESCON-2', 'FICON-1', 'FICON-2', 'HANKIE '
Body Related Fields			
TOTAL MiB/s	Vnode Adapter Historical	Vnode Adapter	Actual Data Rate
---CHANNEL--- RDGiB WRGiB	Vnode Adapter Historical	Vnode Adapter-Port	• Bytes Read by the Channel. This is the value after the data has been decompressed. • Bytes Written by the Channel. This is the value before compression.
---DEVICE---- RDGiB WRGiB	Vnode Adapter Historical	Vnode Adapter-Port	• Bytes Read by Virtual Devices. The value is for compressed data. • Bytes Written to Virtual Devices. The value is for compressed data.

H21ADPSU

H21ADPSU – activity combined

```
(C) IBM   REPORT=H21ADPSU(16032)          VNODE ADAPTOR HISTORICAL ACTVTY COMBINED         RUN ON 03FEB2016 @ 23:32:49    PAGE   1
GRID#=00700   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL0H6709  VE_CODE_LEVEL=008.032.001.0008                        UTC NOT CHG
12JAN16TU Chan Device  WRTHR  CPTHR  DCTHR      MiB is 1024 based, MB is 1000 based
  RECORD Total  Total  %RLTV  %RLTV    SEC ----------CHANNEL-----------   ---------------DEVICE---------------
    TIME MiB/s  MiB/s  IMPAC  IMPAC    /IO   RDGiB MiB/s    WRGiB MiB/s   RDGiB MiB/s  COMP  WRGiB MiB/s  COMP
00:15:00   117     43    .00    .00   .000    10.3    11     92.8   105     4.6     5  2.21   33.8    38  2.74
```

Some of the values in this report are computed by VEHSTATS using the data from each of the individual adapters: H21ADP00, H21ADP01, H21ADP02, and H21ADP03

H21ADPSU – VNODE ADAPTOR HISTORICAL ACTIVITY COMBINED			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
Chan Total MiB/s	Vnode Adapter Historical	Vnode Adapter	Actual Data Rate
Device Total MiB/s	Vnode Adapter Historical	Vnode Adapter-Port	• Bytes Read by Virtual Devices • Bytes Written to Virtual Devices
WRTHR %RLTV IMPAC	Hnode HSM Historical	HSM-Cache	Computed by VEHSTATS using: • Percent Host Write Throttle • Average Host Write Throttle • Equation is shown at bottom of table.
CPTHR %RLTV IMPAC	Hnode HSM Historical	HSM-Cache	Computed by VEHSTATS using: • Percent Copy Throttle • Average Copy Throttle • Equation is shown at bottom of table.
DCTHR SEC /IO	Hnode HSM Historical	HSM-Cache	Average Deferred Copy Throttle
--------CHANNEL---------- RDGiB MiB/s WRGiB MiB/s	Vnode Adapter Historical	Vnode Adapter-Port	• Bytes Read by the Channel • MiB/s computed by VEHSTATS • Bytes Written by the Channel • MiB/s computed by VEHSTATS

H21ADPSU – VNODE ADAPTOR HISTORICAL ACTIVITY COMBINED			
Field name	**Record Name**	**Container Name**	**Description**
----------DEVICE---------- RDGiB MiB/s COMP WRGiB MiB/s COMP	Vnode Adapter Historical	Vnode Adapter-Port	• Bytes Read by Virtual Devices • MiB/s computed by VEHSTATS • Compression ratio computed by VEHSTATS • Bytes Written to Virtual Devices • MiB/s computed by VEHSTATS • Compression ratio computed by VEHSTATS

$$\%\text{Relative Impact (\%RLTV IMPAC)} = \frac{(\#\text{ 30 sec samples with throttling}) * (\text{avg throttle value}) * (100 \text{ to express as \%})}{(\#\text{ 30 sec samples in interval}) * (2 \text{ sec max value})}$$

H21ADPSU – throughput distribution

```
(C) IBM   REPORT=H21ADPSU(17021)      VNODE ADAPTOR THROUGHPUT DISTRIBUTION   RUN ON 24JAN2017 @  0:37:12   PAGE 8
GRID#=3484F   DIST_LIB_ID= 1  VNODE_ID= 0  NODE_SERIAL=CL100BDA  VE_CODE_LEVEL=008.033.000.0045        UTCMINUS=07
        MB/SEC_RANGE  #INTERVALS    PCT    ACCUM%
          0  -     49    8567       99.6      99.6
         50  -     99      11        0.1      99.7
        100  -    149       4        0.0      99.8
        200  -    249      15        0.1     100.0
```

This report shows the distribution of the host data rate (uncompressed).

H21ADPSU – VNODE ADAPTOR THROUGHPUT DISTRIBUTION			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
MB/SEC_RANGE	Vnode Adapter Historical	Vnode Adapter	Actual Data Rate Interval.
#INTERVALS	N/A	N/A	Number of intervals in sample period
PCT	N/A	N/A	Percentage of total intervals in the range
ACCUM%	N/A	N/A	Cumulative percentage of intervals in the range

H30COMP

```
(C) IBM   REPORT=H30COMP (17304)          HNODE HSM HIST. RECORD - COMPRESSION CONTAINER   RUN ON 13NOV2017 @  3:30:02    PAGE  nn
GRID#=BBBBB   DIST_LIB_ID= 6  VNODE_ID= 0  NODE_SERIAL=CL612345  VE_CODE_LEVEL=008.041.215.9009                          UTC NOT CHG
13OCT17FR |------------------ FICON COMPRESSION (GiB) ---------------- |-------------------- LZ4 COMPRESSION (GiB) ---------------- |
    TIME  |RD_UNCOMP    RD_COMP RD_C_RATE WR_UNCOMP    WR_COMP WR_C_RATE |RD_UNCOMP    RD_COMP RD_C_RATE WR_UNCOMP    WR_COMP WR_C_RATE |
21:45:00  |        0          0      .00          0          0      .00  |        0          0      .00          0          0      .00  |
22:00:00  |        0          0      .00          0          0      .00  |        0          0      .00          0          0      .00  |
22:15:00  |        0          0      .00          0          0      .00  |        0          0      .00          0          0      .00  |
22:30:00  |        0          0      .00          0          0      .00  |        0          0      .00     23.689      2.672     8.86  |
22:45:00  |        0          0      .00          0          0      .00  |        0          0      .00          0          0      .00  |
23:00:00  |        0          0      .00          0          0      .00  |   55.275      6.237     8.86     47.378      5.346     8.86  |
23:15:00  |        0          0      .00          0          0      .00  |   15.720      1.778     8.84     47.306      5.342     8.85  |
23:30:00  |        0          0      .00          0          0      .00  |        0          0      .00          0          0      .00  |
23:45:00  |        0          0      .00          0          0      .00  |        0          0      .00          0          0      .00  |
24:00:00  |        0          0      .00          0          0      .00  |        0          0      .00          0          0      .00  |
```

```
|------------------- ZSTD COMPRESSION (GiB) ----------------
|RD_UNCOMP    RD_COMP RD_C_RATE WR_UNCOMP    WR_COMP WR_C_RATE
|        0          0      .00          0          0      .00
|        0          0      .00          0          0      .00
|        0          0      .00       .285       .286      .99
|    4.119      4.125      .99      2.994      2.998      .99
|    1.831      1.833      .99      1.229      1.231      .99
|    1.373      1.375      .99      7.935      7.939      .99
|    1.831      1.833      .99     20.680     20.689      .99
|        0          0      .00          0          0      .00
|        0          0      .00          0          0      .00
|        0          0      .00          0          0      .00
```

This report contains the information for Compression Methods.

H30COMP – HSM Compression Container			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
FICON COMPRESSION (GiB)	Hnode HSM Historical	Compression Method Container	Counters for FICON Compression Method
LZ4 COMPRESSION (GiB)	Hnode HSM Historical	Compression Method Container	Counters for LZ4 Compression Method
ZSTD COMPRESSION (GiB)	Hnode HSM Historical	Compression Method Container	Counters for ZSTD Compression Method
Body Related Fields			
RD_UNCOMP	Hnode HSM Historical	Compression Method Container	Uncompressed Read Bytes
RD_COMP	Hnode HSM Historical	Compression Method Container	Compressed Read Bytes
RD_C_RATE			Read Compression Rate (calculated by VEHSTATS). The value less than 1 informs that there was no compression.
WR_UNCOMP	Hnode HSM Historical	Compression Method Container	Uncompressed Write Bytes
WR_COMP	Hnode HSM Historical	Compression Method Container	Compressed Write Bytes
WR_C_RATE			Write Compression Rate (calculated by VEHSTATS). The value less than 1 informs that there was no compression.

H30TVCx

H30TVCx (Part 1)

```
(C) IBM   REPORT=H30TVC1 (16238)          HNODE HSM HISTORICAL CACHE PARTITION
GRID#=00123   DIST_LIB_ID= 1  VNODE_ID= 0  NODE_SERIAL=CL1H1111  VE_CODE_LEVEL=008.032.001.0014
PARTITION SIZE=   5999GB             TVC_SIZE=   5999GB
02SEP15WE                         ---TOTAL--   FAST_RDY CACHE_HIT CACHE_MIS SYNC_MODE P-MIG
  RECORD  AVG  MAX  AVG  MAX PART   NUM  AVG   NUM  AVG  NUM  AVG  NUM  AVG  NUM  AVG THROT
END_TIME  CPU_UTIL DISK_UTIL HIT%  MNTS SECS  MNTS SECS MNTS SECS MNTS SECS MNTS SECS VALUE

22:15:00    9   16   10   16          0          0  .00    0  .00    0  .00    0  .00   500
22:30:00    8   14    9   20          0          0  .00    0  .00    0  .00    0  .00   500
22:45:00   11   23   10   15          0          0  .00    0  .00    0  .00    0  .00   500
23:00:00   11   36   11   50          0          0  .00    0  .00    0  .00    0  .00   500

(C) IBM   REPORT=H30TVC1 (16238)          HNODE HSM HISTORICAL CACHE PARTITION
GRID#=00123   DIST_LIB_ID= 2  VNODE_ID= 0  NODE_SERIAL=CL2H2222  VE_CODE_LEVEL=008.033.000.0045
PARTITION SIZE=   6858GB             TVC_SIZE=  23858GB
02SEP15WE                         ---TOTAL--   FAST_RDY CACHE_HIT CACHE_MIS SYNC_MODE P-MIG
  RECORD  AVG  MAX  AVG  MAX PART   NUM  AVG   NUM  AVG  NUM  AVG  NUM  AVG  NUM  AVG THROT
END_TIME  CPU_UTIL DISK_UTIL HIT%  MNTS SECS  MNTS SECS MNTS SECS MNTS SECS MNTS SECS VALUE

22:15:00   31   37   99  100          0          0  .00    0  .00    0  .00    0  .00  1000
22:30:00   31   33   99  100          0          0  .00    0  .00    0  .00    0  .00  1000
22:45:00   30   33   99  100          0          0  .00    0  .00    0  .00    0  .00  1000
23:00:00   30   34   97  100          0          0  .00    0  .00    0  .00    0  .00  1000
```

The character "x' in the report name H30TVC**x** shows, that the report belongs to the Cache Partiton "x-1", for example the title of the report H30TVC**1** indicates this is for cache partition 0. Up to 8 cache partitions could be assigned for the Cluster.
For TS7700 disk only and TS7740, only TVC1 (CP0) has meaningful values.
This report is decoded in several sections (parts) due to its large number of columns.

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 1			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
PARTITION SIZE=xxxxxxx	Hnode HSM Historical	HSM-Cache-Partition	Partition Size
TVC_SIZE=xxxxxxx	Hnode HSM Historical	HSM-Cache	TVC (Cache) Size. (For TS7740 - this is the enabled cache size, all other models – the installed cache size)
Body Related Fields			

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 1			
Field name	**Record Name**	**Container Name**	**Description**
AVG MAX AVG MAX CLUS_UTIL or CPU_UTIL	Hnode HSM Historical	HSM-Cache	For R2.0 through Pre-R3.0 PGA1 code levels the AVG CLUS_UTIL field contains the Average Cluster Utilization percentage. The Maximum field is zero. This is the greater of CPU Utilization and Disk Cache Throughput Utilization. For R3.0 PGA1 or higher these fields contain the Average and Maximum CPU Usage percentage
AVG MAX DISK_UTIL	Hnode HSM Historical	HSM-Cache	• Average Maximum Disk Usage Percentage • Maximum Disk Usage Percentage These values first reported in R3.0 PGA1.
PART HIT%	Hnode HSM Historical	HSM-Cache-Partition	Computed by VEHSTATS by adding the number of fast ready and cache hit mounts and dividing the sum by the total number of mounts including cache miss mounts.
__TOTAL___ NUM MNTS	Hnode HSM Historical	HSM-Cache-Partition	Computed by VEHSTATS using: • Fast Ready Mounts • Cache Hit Mounts • Cache Miss Mounts (Sync Level Mounts are not included, because if sync copy mode is enabled, then one of the mounts (Fast Ready, Cache Hit or Cache Miss) is occurred for the remote cluster).
__TOTAL___ AVG SECS	Hnode HSM Historical	HSM-Cache-Partition	Computed by VEHSTATS using: • Fast Ready Mounts • Average Fast Ready Mount Time • Cache Hit Mounts • Average Cache Hit Mount Time • Cache Miss Mounts • Average Cache Miss Mount Time
FAST_RDY NUM AVG MNTS SECS	Hnode HSM Historical	HSM-Cache-Partition	• Fast Ready Mounts • Average Fast Ready Mount Time
CACHE_HIT NUM AVG MNTS SECS	Hnode HSM Historical	HSM-Cache-Partition	• Cache Hit Mounts • Average Cache Hit Mount Time
CACHE_MIS NUM AVG MNTS SECS	Hnode HSM Historical	HSM-Cache-Partition	• Cache Miss Mounts • Average Cache Miss Mount Time
SYNC_MODE NUM AVG MNTS SECS	Hnode HSM Historical	HSM-Cache-Partition	• Sync Level Mounts • Sync Level Mount Time (These values first reported with R2.1.)

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 1			
Field name	**Record Name**	**Container Name**	**Description**
P-MIG THROT VALUE	Hnode HSM Historical	HSM-Cache	Pre-migration Throttle Threshold . This field represents amount of un-premigrated data in cache, at which the system will begin throttling the host write and incoming copy in order to prioritize premigration.

H30TVCx Throttling values (Part 2)

```
GRID#=00123   DIST_LIB_ID= 1  VNODE_ID= 0  NODE_SERIAL=CL1H1111  VE_CODE_LEVEL=008.032.001.0014
<------------WRITE_THROTTLING-----------> <-------------COPY_THROTTLING----------->  <---------DEFER_COPY_THROTTLING--------->

              NUM   NUM   NUM %RLTV                    NUM   NUM   NUM %RLTV                      NUM   NUM    AVG
  PCT   AVG 15MIN 30SEC   SEC IMPAC         PCT   AVG 15MIN 30SEC   SEC IMPAC          PCT   AVG 15MIN 30SEC    SEC BASE
 THRT  THRT INTVL SMPLS   /IO VALUE REASN  THRT  THRT INTVL SMPLS   /IO VALUE REASN   THRT  THRT INTVL SMPLS /INTVL SECS REASN
                                                                                    ----------R1.5---------
    0     0     0     0  .000   .00 x0000     0     0     0     0  .000   .00 x0000      0     0     0     0   .000 .000 x0000
    0     0     0     0  .000   .00 x0000     0     0     0     0  .000   .00 x0000      0     0     0     0   .000 .000 x0000
    0     0     0     0  .000   .00 x0000     0     0     0     0  .000   .00 x0000      0     0     0     0   .000 .000 x0000
    0     0     0     0  .000   .00 x0000     0     0     0     0  .000   .00 x0000      0     0     0     0   .000 .000 x0000

GRID#=00123   DIST_LIB_ID= 2  VNODE_ID= 0  NODE_SERIAL=CL2H2222  VE_CODE_LEVEL=008.033.000.0045
<------------WRITE_THROTTLING-----------> <-------------COPY_THROTTLING----------->  <---------DEFER_COPY_THROTTLING--------->
              NUM   NUM   NUM %RLTV                    NUM   NUM   NUM %RLTV                      NUM   NUM    AVG
  PCT   AVG 15MIN 30SEC   SEC IMPAC         PCT   AVG 15MIN 30SEC   SEC IMPAC          PCT   AVG 15MIN 30SEC    SEC BASE
 THRT  THRT INTVL SMPLS   /IO VALUE REASN  THRT  THRT INTVL SMPLS   /IO VALUE REASN   THRT  THRT INTVL SMPLS /INTVL SECS REASN
                                                                                    ----------R1.5---------
    0     0     0     0  .000   .00 x0000     0     0     0     0  .000   .00 x0000    100   125     1    30   .125 .125 x0003
    0     0     0     0  .000   .00 x0000     0     0     0     0  .000   .00 x0000    100   125     1    30   .125 .125 x0003
    0     0     0     0  .000   .00 x0000     0     0     0     0  .000   .00 x0000    100   125     1    30   .125 .125 x0003
    0     0     0     0  .000   .00 x0000     0     0     0     0  .000   .00 x0000     83   104     1    25   .104 .125 x0003
```

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 2			
Field name	**Record Name**	**Container Name**	**Description**
------WRITE_THROTTLING------- PCT AVG THRT THRT	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	• Percent Host Write Throttle • Average Host Write Throttle
------WRITE_THROTTLING------- NUM NUM NUM 15MIN 30SEC SEC INTVL SMPLS /IO	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	• Number of 15 minute intervals being reported. Not a field in statistics record. • Computed from Percent Host Write Throttle and sample period length • Average Host Write Throttle
------WRITE_THROTTLING------- %RLTV IMPAC VALUE	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	Computed by VEHSTATS using: • Percent Host Write Throttle • Average Host Write Throttle Equation is shown at bottom of table.

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 2			
Field name	**Record Name**	**Container Name**	**Description**
------WRITE_THROTTLING------- REASN	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	• Host Write Throttle Reason(s) This value first reported with R3.0
------COPY_THROTTLING------- PCT AVG THRT THRT	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	• Percent Copy Throttle • Average Copy Throttle
-------COPY_THROTTLING------- NUM NUM NUM 15MIN 30SEC SEC INTVL SMPLS /IO	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	• Number of 15 minute intervals being reported. Not a field in statistics record. • Computed from Percent Copy Throttle and sample period length • Average Copy Throttle
-------COPY_THROTTLING------- %RLTV IMPAC VALUE	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	Computed by VEHSTATS using: • Percent Copy Throttle • Average Copy Throttle Equation is shown at bottom of table.
-------COPY_THROTTLING------- REASN	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	• Copy Throttle Reason(s) This value first reported with R3.0
----DEFER OPY_THROTTLING---- PCT AVG THRT THRT	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	• Percent Deferred Copy Throttle • Average Deferred Copy Throttle
----DEFER_COPY_THROTTLING---- NUM NUM AVG 15MIN 30SEC SEC BASE INTVL SMPLS /INTVL SECS	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	• Number of 15 minute intervals being reported. Not a field in statistics record. • Computed from Percent Deferred Copy Throttle and sample period length • Average Deferred Copy Throttle • Base Deferred Copy Throttle
----DEFER_COPY_THROTTLING---- REASN	Hnode HSM Historical	HSM-Cache Extended HSM – Cache Container (for Tape Attached Cache Partition)	• Deferred Copy Throttle Reason(s) This value first reported with R3.0

$$\%\text{Relative Impact (\%RLTV IMPAC)} = \frac{(\#\ 30\ \text{sec samples with throttling}) * (\text{avg throttle value}) * (100\ \text{to express as \%})}{(\#\ 30\ \text{sec samples in interval}) * (2\ \text{sec max value})}$$

H30TVCx - PREFERENCE_GROUP_0/1 (Part 3)

```
GRID#=00123   DIST_LIB_ID= 1  VNODE_ID= 0  NODE_SERIAL=CL1H1111  VE_CODE_LEVEL=008.032.001.0014
<----------------------------PREFERENCE_GROUP_0----------------------->  <----------------------------PREFERENCE_GROUP_1----------------------->
 VIRT     GB GiBTO GiBTO MIN_ROLLING_AV                TIME_DELAY_COPY   VIRT     GB GiBTO GiBTO MIN_ROLLING_AV                TIME_DELAY_COPY
 VOLS    RES   PRE  COPY -TIME_IN_CACHE -VIRT_VOLS_MIG-  LVOLS_REMOVED     VOLS    RES   PRE  COPY -TIME_IN_CACHE -VIRT_VOLS_MIG-  LVOLS_REMOVED
CACHE  CACHE   MIG   OUT  4HR 48HR 35DA  4HR 48HR  35DA  AV_AGE   COUNT  CACHE  CACHE   MIG   OUT  4HR 48HR 35DA  4HR 48HR  35DA  AV_AGE   COUNT
                         -ON_THE_HOUR-- --ON_THE_HOUR-- -EVERY_4_HOURS-                          -ON_THE_HOUR-- --ON_THE_HOUR-- -EVERY_4_HOURS-
    6      7     0     0   1M   1M    0   72   1K    0K       0       0      3      2     0     0  32D  31D    0    0   0K    0K       0       0
    4      4     0     0   1M   1M    0   72   1K    0K       0       0      3      2     0     0  32D  31D    0    0   0K    0K       0       0
    4      4     0     0   1M   1M    0   72   1K    0K       0       0      3      2     0     0  32D  31D    0    0   0K    0K       0       0
    4      4     0     0   2M   1M    0  135   1K    0K       0       0      3      2     0     0  32D  31D    0    0   0K    0K       0       0

GRID#=00123   DIST_LIB_ID= 2  VNODE_ID= 0  NODE_SERIAL=CL2H2222  VE_CODE_LEVEL=008.033.000.0045
<----------------------------PREFERENCE_GROUP_0----------------------->  <----------------------------PREFERENCE_GROUP_1----------------------->
 VIRT     GB GiBTO GiBTO MIN_ROLLING_AV                TIME_DELAY_COPY   VIRT     GB GiBTO GiBTO MIN_ROLLING_AV                TIME_DELAY_COPY
 VOLS    RES   PRE  COPY -TIME_IN_CACHE -VIRT_VOLS_MIG-  LVOLS_REMOVED     VOLS    RES   PRE  COPY -TIME_IN_CACHE -VIRT_VOLS_MIG-  LVOLS_REMOVED
CACHE  CACHE   MIG   OUT  4HR 48HR 35DA  4HR 48HR  35DA  AV_AGE   COUNT  CACHE  CACHE   MIG   OUT  4HR 48HR 35DA  4HR 48HR  35DA  AV_AGE   COUNT
                         -ON_THE_HOUR-- --ON_THE_HOUR-- -EVERY_4_HOURS-                          -ON_THE_HOUR-- --ON_THE_HOUR-- -EVERY_4_HOURS-
    0      0     0     0    0    0    0    0   0K    0K       0       0    544   3518     0     0 1.9Y 1.9Y    0    0   0K    0K       0       0
    0      0     0     0    0    0    0    0   0K    0K       0       0    544   3518     0     0 1.9Y 1.9Y    0    0   0K    0K       0       0
    0      0     0     0    0    0    0    0   0K    0K       0       0    544   3518     0     0 1.9Y 1.9Y    0    0   0K    0K       0       0
    0      0     0     0    0    0    0    0   0K    0K       0       0    544   3518     0     0 1.9Y 1.9Y    0    0   0K    0K       0       0
```

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 3			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
PREFERENCE_GROUP_x	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Indicates which preference group, 0 or 1, the columns belong to. For TS7700 Disk Only, only PG1 has meaningful values. All fields in PG0 would be 0. For TS7740, both of PG0 and PG1 can have the values. For TS7700T CP0, only PG1 has meaningful values. All fields in PG0 would be 0. For TS7700T CP1-7, both of PG0 and PG1 can have the values. The values in this section are at the end of the interval.
Body Related Fields			
VIRT VOLS CACHE	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Virtual Volumes in Cache.
GB RES CACHE	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Data Resident in Cache divided by 1000 to convert MB to GB.
GiBTO PRE MIG	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Unmigrated Data divided by 1024 to convert MiB to GiB.

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 3			
Field name	**Record Name**	**Container Name**	**Description**
GiBTO COPY OUT	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Awaiting Replication to available Clusters.
MIN_ROLLING_AV -TIME_IN_CACHE 4HR 48HR 35DA -ON_THE_HOUR--	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	• 4 Hour Average Cache Age • 48 Hour Average Cache Age • 35 Day Average Cache Age
-VIRT_VOLS_MIG- 4HR 48HR 35DA --ON_THE_HOUR--	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	• Volumes Migrated Last 4 Hours • Volumes Migrated Last 48 Hours • Volumes Migrated Last 35 Days (0 for TS7700 disk only and TS7700T CP0)
TIME_DELAY_COPY LVOLS_REMOVED AV_AGE COUNT -EVERY_4_HOURS-	Hnode HSM Historical	HSM - Cache – Partition – Preference Group	• Removed time delayed copies average age • Time delayed copies removal count

H30TVCx - TOTAL CACHE PARTITION INFORMATION and DATA RETENTION INFORMATION (Part 4)

```
GRID#=00123   DIST_LIB_ID= 1  VNODE_ID= 0  NODE_SERIAL=CL1H1111  VE_CODE_LEVEL=008.032.001.0014
<- TOTAL CACHE PARTITION INFORMATION>  <------- DATA RETENTION INFORMATION ------->
  TOTAL  TOTAL   TOTAL         TOTAL  <- CP0 RESIDENT PARTITION ONLY INFORMATION->
 TVC_GB  GB_DR MIGRD     DR  UN P-  NUMBER SIZEGB  NUMBER  SIZEGB NUMBER  SIZEGB
   USED  FLASH      GB VOLSER  MIGRD  PINNED PINNED  PREFER  PREFER PREFER  PREFER
                                VOLS                   KEEP    KEEP REMOVE  REMOVE
   1501      0       0             0       0      0      21       0      0       0
   1979      0       0             0       0      0      21       0      0       0
   2031      0       0             0       0      0      21       0      0       0
   1985      0       0             0       0      0      21       0      0       0

GRID#=00123   DIST_LIB_ID= 2  VNODE_ID= 0  NODE_SERIAL=CL2H2222  VE_CODE_LEVEL=008.033.000.0045
<- TOTAL CACHE PARTITION INFORMATION>  <------- DATA RETENTION INFORMATION ------->
  TOTAL  TOTAL   TOTAL         TOTAL  <- CP0 RESIDENT PARTITION ONLY INFORMATION->
 TVC_GB  GB_DR   MIGRD     DR  UN P-  NUMBER SIZEGB  NUMBER  SIZEGB NUMBER  SIZEGB
   USED  FLASH      GB VOLSER  MIGRD  PINNED PINNED  PREFER  PREFER PREFER  PREFER
                                VOLS                   KEEP    KEEP REMOVE  REMOVE
     62      0       0 HYD023     49      47     52       0       0      0       0
     43      0       0 HYD023     35      54     61       0       0      0       0
     60      0       0 HYD023     58      60     68       0       0      0       0
     64      0       0 HYD023     52      58     65       0       0      0       0
```

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 4			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
TOTAL CACHE PARTITION INFORMATION	Hnode HSM Historical		These counters are reported, starting from R3.2
Body Related Fields			
TOTAL TOTAL TVC_GB GB_DR USED FLASH	Hnode HSM Historical	HSM – Cache	• Total used cache • Total used flash cache for Disaster Recovery
TOTAL MIGRD GB	Hnode HSM Historical	HSM – Cache Partition	• Total Size of Migrated Data (0 for TS7700 disk only)
DR VOLSER	Hnode HSM Historical	HSM – Disaster Recovery	Disaster Recovery Volser
TOTAL UN P-MIGRD VOLS	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	The total number of un-premigrated virtual volumes for Preference Groups 0 and 1. (0 for TS7700 disk only and TS770xT CP0) Delayed premigration volumes are excluded.
Header Related Fields			
DATA RETENTION INFORMATION	Hnode HSM Historical		**CP0 RESIDENT PARTITION ONLY INFORMATION** **(**0 for TS7740 and TS7700T CP1-7**)**

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 4			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
NUMBER PINNED	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of Pinned Volumes
SIZEGB PINNED	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Pinned Volumes
NUMBER PREFER KEEP	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of Prefer Keep Volumes
SIZEGB PREFER KEEP	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Prefer Keep Volumes
NUMBER PREFER REMOVE	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of Prefer Remove Volumes
SIZEGB PREFER REMOVE	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Prefer Remove Volumes

H30TVCx – PREFERENCE GROUP x TAPE DELAYED PRE MIGRATION (Part 5)

<---------PREFERENCE GROUP 0 TAPE DELAYED PRE MIGRATION---------> <---------PREFERENCE GROUP 1 TAPE DELAYED PRE MIGRATION--------->
<--------------CP1 - CP7 ONLY INFORMATION---------------> <--------------CP1 - CP7 ONLY INFORMATION--------------->

4HR AGE	4HR MIGD	48H AGE	48H MIGD	35D AGE	35DA MIGD	WAIT MINS	SIZGB WAIT	NUM WAIT	UN P-MIGRD VOLS	4HR AGE	4HR MIGD	48H AGE	48H MIGD	35D AGE	35DA MIGD	WAIT MINS	SIZGB WAIT	NUM WAIT	UN P-MIGRD VOLS
0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	58	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	52	0	0	0	0	0	0	0	0	0	0

H30TVCx – HNODE HISTORICAL CACHE PARTITION			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
PREFERENCE GROUP 1 TAPE DELAYED PRE MIGRATION	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	bytes contains additional information for 2 preference groups for the cache partition. CP1 - CP7 ONLY INFORMATION.
Body Related Fields			
4HR AGE	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	4 Hour Average Cache Age by Delayed Premigration
4HR MIGD	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Volumes Migrated Last 4 Hours by Delayed Premigration
48H AGE	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	48 Hours Average Cache Age by Delayed Premigration
48H MIGD	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Volumes Migrated Last 48 Hours by Delayed Premigration
35D AGE	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	35 Days Average Cache Age by Delayed Premigration
35DA MIGD	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Volumes Migrated Last 35 Days by Delayed Premigration
WAIT MINS	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Average Waiting Time of Delayed Premigration Volumes
SIZGB WAIT	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Resident Volumes Waiting for Delayed Premigration
NUM WAIT	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of resident volumes on TVC waiting for delayed premigration.
UN P-MIGRD VOLS	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of un-premigrated virtual volumes. (0 for TS7700 disk only and TS7700T CP0) Delayed premigration volumes are excluded.

H31IMEX

```
(C) IBM   REPORT=H31IMEX (16032)          HNODE EXPORT/IMPORT HISTORICAL ACTIVITY      RUN ON 03FEB2016 @ 23:32:49    PAGE   1
GRID#=00700   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL0H6709  VE_CODE_LEVEL=008.032.001.0008   HNODE=ACTIVE     UTC NOT CHG
12JAN16TU   PHYS     PHYS     VIRT     VIRT
  RECORD    VOLS     VOLS     VOLS     VOLS    MB_DATA   MB_DATA
    TIME  IMPORT   EXPORT   IMPORT   EXPORT  IMPORTED  EXPORTED
00:15:00       0        0        0        0         0         0
```

H31IMEX – HNODE EXPORT/IMPORT HISTORICAL ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
PHYS VOLS IMPORT	Hnode Export/Import Historical	Export/Import	Physical Volumes Imported
PHYS VOLS EXPORT	Hnode Export/Import Historical	Export/Import	Physical Volumes Exported
VIRT VOLS IMPORT	Hnode Export/Import Historical	Export/Import	Logical Volumes Imported
VIRT VOLS EXPORT	Hnode Export/Import Historical	Export/Import	Logical Volumes Exported
MB_DATA IMPORTED	Hnode Export/Import Historical	Export/Import	Amount of data imported
MB_DATA EXPORTED	Hnode Export/Import Historical	Export/Import	Amount of data exported

H32TDU12/34

```
(C) IBM   REPORT=H32TDU12(15102)          HNODE LIBRARY HISTORICAL DRIVE ACTIVITY      RUN ON 24APR2015 @ 23:17:22    PAGE   1
GRID#=C1000   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL0H7918  VE_CODE_LEVEL=008.032.001.0008  3584-L22(#12257)  UTC NOT CHG
19APR15SU -----------PHYSICAL_DRIVES_3592-E05--------------------       ----------PHYSICAL_DRIVES_NONE    ----------------------
  RECORD          --MOUNTED--  -MOUNT_SECS-  ----MOUNTS_FOR-----              --MOUNTED--  -MOUNT_SECS-  ----MOUNTS_FOR-----
    TIME INST AVL MIN AVG MAX  MIN AVG  MAX  STG MIG RCM SDE TOT       INST AVL MIN AVG MAX  MIN AVG  MAX  STG MIG RCM SDE TOT
02:00:00   16  16   0   5  16   20  33   70    3  25   0   0  28          0   0   0   0   0    0   0    0    0   0   0   0   0
```

Up to 4 device types/models could be attached to the Hnode. The report H32UPD12 is for the first and second devices, the report H32TDU34 – for the others.

H32TDU12 – HNODE LIBRARY HISTORICAL DRIVE ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
PHYSICAL_DRIVES_3592-E05	Hnode Library Historical	Tape Device Usage (TDU)	Device Class ID
PHYSICAL_DRIVES_NONE		Indicates there isn't a second device type. Currently the TS7700 only supports one device type at a time.	
Body Related Fields			
INST	Hnode Library Historical	Tape Device Usage (TDU)	Installed Physical Devices
AVL	Hnode Library Historical	Tape Device Usage (TDU)	Available Physical Devices
--MOUNTED-- MIN AVG MAX	Hnode Library Historical	Tape Device Usage (TDU)	• Minimum Physical Devices Mounted • Average Physical Devices Mounted • Maximum Physical Devices Mounted
-MOUNT_SECS- MIN AVG MAX	Hnode Library Historical	Tape Device Usage (TDU)	• Minimum Physical Mount Time • Average Physical Mount Time • Maximum Physical Mount Time
----MOUNTS_FOR----- STG MIG RCM SDE TOT	Hnode Library Historical	Tape Device Usage (TDU)	• Physical Recall Mounts • Physical Pre-Migrate Mounts • Physical Reclaim Mounts • Physical Security Data Erase Mounts • TOT is Total physical mounts and is computed by VEHSTATS from the four other physical mount fields.

H32CSP

```
(C) IBM   REPORT=H32CSP  (15102)          HNODE LIBRARY HIST SCRTCH POOL ACTIVITY      RUN ON 24APR2015 @ 23:17:22    PAGE   1
GRID#=C1000   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL0H7918  VE_CODE_LEVEL=008.032.001.0008                    UTC NOT CHG
19APR15SU ----------SCRATCH_STACKED_VOLUMES_AVAILABLE_BY_TYPE-----------
  RECORD
    TIME    3592JA  3592JJ  3592JB  3592JC  3592JK
02:00:00         0       0       2       0       0
```

H32CSP – HNODE LIBRARY HISTORICAL SCRATCH POOL ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
SCRATCH_STACKED_VOLUMES_AVAILABLE_BY_TYPE			This is just a header
Body Related Fields			
3592xx	Hnode Library Historical	Library - Pooling – Common Scratch Pool (CSP) Media	• Media type (xx) is from the Physical Media Type field • Physical Media Count

H32GUPnn

```
(C) IBM   REPORT=H32GUP01(15102)         HNODE LIBRARY HIST GUP/POOLING ACTIVITY        RUN ON 24APR2015 @ 23:17:22    PAGE  01
GRID#=C1000  DIST_LIB_ID= 0 VNODE_ID= 0 NODE_SERIAL=CL0H7918  VE_CODE_LEVEL=008.032.001.0008   3584-L22(#12257)    UTC NOT CHG
19APR15SU POOL 01 3592E05E                 3592JB( 700)
  RECORD  ACTIVE  ACTIVE     MiB     MiB RECLAIM          WAIT READ    UN           WAIT READ    UN
    TIME   LVOLS      GB  WRITTN    READ PCT POL SCR  92JB SDE ONLY AVAIL  SCR  PRIV SDE ONLY AVAIL
UPD INT=>  -ON_THE_HOUR-                             -------ON_THE_HOUR------  -------ON_THE_HOUR------
02:00:00       8       0       0       0  20  01   5     6   0    0     0

             POOL 02
             ACTIVE  ACTIVE     MiB     MiB RECLAIM          WAIT READ    UN           WAIT READ    UN
              LVOLS      GB  WRITTN    READ PCT POL SCR  PRIV SDE ONLY AVAIL  SCR  PRIV SDE ONLY AVAIL
                                                      -------ON_THE_HOUR------  -------ON_THE_HOUR------
                  0       0       0       0  20  02
```

Report H32GUP01 is for pool 01 and 02 volumes, H32GUP03 is for pool 03 and 04 volumes, and so forth.

H32GUP0x – HNODE LIBRARY HISTORICAL GUP/POOLING ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
POOL xx yyyy-zzz	Hnode Library Historical	Library - Pooling – General Use Pool (GUP) Container	• There are 32 sets of data, one for each of the 32 general use pools. The pool number is listed (xx) • The device type is listed based on the Device Class field.
Body Related Fields			
ACTIVE ACTIVE LVOLS GB -ON_THE_HOUR-	Hnode Library Historical	Library - Pooling – General Use Pool (GUP) Container	• Active Logical Volumes • Active Data
MiB WRITTN	Hnode Library Historical	Library - Pooling – General Use Pool (GUP) Container	Data Written to Pool
MiB READ	Hnode Library Historical	Library - Pooling – General Use Pool (GUP) Container	Data Read from Pool
RECLAIM PCT POOL	Hnode Library Historical	Pooling – GUP - Reclaim Container	• Reclaim Threshold • Pool number based on which GUP is being reported.
WAIT READ UN SCR 92JB SDE ONLY AVAIL -------ON_THE_HOUR------	Hnode Library Historical	Library - Pooling – GUP - Media Container	Each pool provides data for up to 2 media types. • Scratch Volume Count • Private Volume Count by media type • Waiting for Security Data Erase • Read Only Recovery Volume Count • Unavailable Volume Count

H33GRID

```
(C) IBM   REPORT=H33GRID (16032)          HNODE HISTORICAL PEER-TO-PEER ACTIVITY       RUN ON 03FEB2016 @ 23:32:49    PAGE   1
GRID#=00700   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL012345  VE_CODE_LEVEL=008.032.001.0008                    UTC NOT CHG
 MiB is 1024 based, MB is 1000 based
12JAN16TU  LVOLS       MiB  AV_DEF AV_RUN #_LVOLS LVOLS    MiB_ LVOLS    MiB_ LVOLS    MiB_  MiB_TO  CALC  MiB_TO   GGM
             TO         TO  QUEAGE QUEAGE TIM_DLY __TO_TVC_BY__ __TO_TVC_BY__ __TO_TVC_BY__  TVC_BY  MiB/ GRID_BY  MiB/
         RECEIVE   RECEIVE  ---MINUTES--- CPY_QUE ___RUN_COPY__ ___DEF_COPY__ __SYNC_COPY__    COPY   SEC     GGM   SEC
00:15:00       0         0       0      0       0     0       0     1     610    na     na      610   0.6       0
```

Continued:

```
                                                                                                 MiB_FR        MiB_FR        MiB_FR       MiB_FR
V_MNTS V_MNTS V_MNTS V_MNTS V_MNTS V_MNTS V_MNTS V_MNTS MiB_XFR MiB_XFR    0-->1  CALC   0-->2  CALC   0-->3 CALC  0-->4  CALC
DoneBy DoneBy DoneBy DoneBy DoneBy DoneBy DoneBy DoneBy   FR_DL   TO_DL   TVC_BY  MiB/  TVC_BY  MiB/  TVC_BY MiB/ TVC_BY  MiB/
   DL0    DL1    DL2    DL3    DL4    DL5    DL6    DL7  RMT_WR  RMT_RD    COPY   SEC    COPY   SEC    COPY  SEC   COPY   SEC
     0      1      0      3      3      0      0      0   20730      12   10999  12.2     175   0.1       0           0
```

Continued:

```
MiB_XFR        MiB_XFR        MiB_XFR        MiB_XFR        MiB_XFR        MiB_XFR        MiB_XFR        MiB_XFR
 1-->0  CALC    2-->0  CALC    3-->0  CALC    4-->0  CALC    1-->0  CALC    2-->0  CALC    3-->0  CALC    4-->0  CALC
    BY  MiB/       BY  MiB/       BY  MiB/       BY  MiB/       BY  MiB/       BY  MiB/       BY  MiB/       BY  MiB/
RMT/WR   SEC   RMT/WR   SEC   RMT/WR   SEC   RMT/WR   SEC   RMT/RD   SEC   RMT/RD   SEC   RMT/RD   SEC   RMT/RD   SEC
  2549   2.8        0              0              0              0           2579   2.8      270   0.3        0
```

H33GRID – HNODE HISTORICAL PEER-TO-PEER ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
HNODE HISTORICAL PEER-TO-PEER ACTIVITY	Hnode Grid Historical	Grid	Header
Body Related Fields			
LVOLS TO RECEIVE	Hnode Grid Historical	Grid	Logical Volumes for Copy - the number of logical volumes that are scheduled to be copied to this Cluster. This is the value at the end of the interval.
MiB TO RECEIVE	Hnode Grid Historical	Grid	Data to Copy - the amount of data that is scheduled to be copied to this Cluster. This is the value at the end of the interval.
AV_DEF AV_RUN QUEAGE QUEAGE ---MINUTES---	Hnode Grid Historical	Grid	• Average Deferred Queue Age (in minutes), of the logical volumes in the deferred copy queue destined to be copied to this Cluster • Average Immediate Queue Age (in minutes), of the logical volumes in the immediate copy queue destined to be copied to this Cluster (These are the values at the end of the interval)

H33GRID – HNODE HISTORICAL PEER-TO-PEER ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
#_LVOLS TIM_DLY CPY_QUE	Hnode Grid Historical	Grid	• Time delayed copy queue - the number of copies in the timed delay state that are in the copy queue. (Logical volumes in the timed delay state are not yet eligible for the actual copy until their defined time-delays are expired).
LVOLS MiB_ __TO_TVC_BY__ ___RUN_COPY__	Hnode Grid Historical	Grid-Cluster	• Number of immediate copies that have been **completed** which transferred data to this cluster's cache from another cluster during this interval • Data Transferred into a cluster's Cache from other clusters as part of an Immediate copy operation (when copies have been completed).
LVOLS MiB_ __TO_TVC_BY__ ___DEF_COPY__	Hnode Grid Historical	Grid-Cluster	• Number of deferred copies that have **completed** • Data Transferred into a cluster's Cache from Other clusters as part of a deferred copy operation (when copies have been completed).
LVOLS MiB_ __TO_TVC_BY__ __SYNC_COPY__	Hnode Grid Historical	Grid-Cluster	• Number of sync mode copies that have completed • Data Transferred into a cluster's Cache from Other clusters as part of a sync mode copy operation. These two counters are not supported and both set to 'na'.
MiB_TO TVC_BY COPY	Hnode Grid Historical	Grid-Cluster	Data Transferred into a Cluster's Cache from other Clusters as part of a Copy Operation (immediate, deferred). This field contains also blocks from not yet completed copy transactions.
CALC MiB/ SEC	Hnode Grid Historical	Grid-Cluster	Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval
MiB_TO GGM GRID_BY MIB/ GGM SEC	Hnode Grid Historical	Grid-Cluster	• Data size transferred from this Cluster's cache through GGM copy activity if the Cluster is used as a GGM copy source • Speed during GGM (computed by VEHSTATS)
V_MNTS DoneBy DLx	Hnode Grid Historical	Grid-Cluster	Logical Mounts Directed to other Clusters (x = 0-7) (by other words: the number of logical mounts from this Cluster which were satisfied by accessing another Cluster – remote mount)
MiB_XFR FR_DL RMT_WR	Hnode Grid Historical	Grid-Cluster	Data Transferred into this Cluster's Cache from other Clusters as part of a Remote Write Operation including sync mode copy during this interval. A sync mode copy into this cluster from another cluster is considered a remote mount for write and is thus included in this count.
MiB_XFR TO_DL RMT_RD	Hnode Grid Historical	Grid-Cluster	Data Transferred from this Cluster's Cache To Other Clusters as part of a Remote Read operation including sync mode copy
MiB_FR x-->y TVC_BY COPY	Hnode Grid Historical	Grid-Cluster	Data Transferred From this Cluster's Cache To Other Clusters as part of a Copy Operation (immediate, deferred). The x is the source cluster number and the y is the target cluster.

H33GRID – HNODE HISTORICAL PEER-TO-PEER ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
CALC MiB/ SEC	Hnode Grid Historical	Grid-Cluster	Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval
MiB_XFR x-->y CALC BY MiB/ RMT/WR SEC	Hnode Grid Historical	Grid-Cluster	Data Transferred into a Cluster's Cache from another Cluster as part of a remote write operation including sync mode copy during the interval. (The x is the source cluster number and the y is the target cluster.).
MiB_XFR x-->y CALC BY MiB/ RMT/RD SEC	Hnode Grid Historical	Grid-Cluster	Data Transferred into a Cluster's Cache from another Cluster as part of a remote read operation during the interval. (The x is the source cluster number and the y is the target cluster.).

HOURFLOW

```
(C) IBM  REPORT=HOURFLOW (16032)          DATA FLOW IN MiB/sec BY CLUSTER                RUN ON 03FEB2016 @ 23:32:49    PAGE   1
GRID#=00700   DIST_LIB_ID=00  NODE_SERIAL=CL0H0000  VE_CODE_LEVEL= 32.01.0008

                      Avg  Max  Avg  Max MiB/s  MiB/s  MiB/s  MiB/s  MiB/s  MiB/s  MiB/s  MiB/s  Queue  Queue  Queue  Write   Copy    Avg  MiB/s  MiB/s
                      CPU  CPU Disk Disk Total To_TVC Fr_TVC To_TVC Fr_TVC To_TVC Fr_TVC By_GGM GiB_to GiB_to GiB_to  Throt  Throt   mSec To_TVC Fr_TVC Intvl
     Date Day     Time Util Util Util Util  Xfer Dev_Wr Dev_Rd  Recv  Sent Recall PreMig        PreMig  Copy   Recv Impac% Impac% DCThrt RMT_WR RMT_RD   Sec
12JAN2016 Tue 00:15:00   21   28    5    8  79.9   38.5    5.3   0.6  12.4    0.0   0.0   0.0      0     0      0  0.00  0.00      0   23.0    0.0   900
```

HOURFLOW – DATA FLOW IN MiB/sec BY CLUSTER			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
DATA FLOW IN MiB/sec BY CLUSTER	Hnode HSM Historical	HSM-Cache	Header Note. All rates (MiB/sec) are average for the period (1 hour or 15 minutes interval).
Body Related Fields			
Avg Clus or CPU Util	Hnode HSM Historical	HSM-Cache	For R2.0 through Pre-R3.0 PGA1 code levels this field contains the Average Cluster Utilization percentage. This is the greater of CPU Utilization and Disk Cache Throughput Utilization. For R3.0 PGA1 or higher this field contains the Average CPU Usage percentage
Max Clus or CPU Util	Hnode HSM Historical	HSM-Cache	For Pre-R3.0 PGA1 code levels this field is zero. For R3.0 PGA1 or higher this field contains the Maximum CPU Usage Percentage.
Avg Disk Util	Hnode HSM Historical	HSM-Cache	Average Maximum Disk Usage Percentage Reported with R3.0 PGA1 code or higher.
Max Disk Util	Hnode HSM Historical	HSM-Cache	Maximum Disk Usage Percentage Reported with R3.0 PGA1 code or higher.
MiB/s Total Xfer	• Vnode Adapter Historical • Hnode Grid Historical • Hnode Library Historical	• Vnode Adapter-Port • Grid-Cluster • Library – Pooling – General Use Pool (GUP)	The rate of compressed data written and read to/from the disk cache. The following are added together by VEHSTATS to generate this field. • Bytes Read by Virtual Devices • Bytes Written to Virtual Devices • Data Transferred into a Cluster's Cache from other Clusters as part of a Copy Operation • Data Transferred From a Cluster's Cache To Other Clusters as part of a Copy Operation. • Data Read from Pool • Data Written to Pool • Data Transferred into a Cluster's Cache from other Clusters as part of a Remote Write Operation • Data Transferred from a Cluster's Cache To Other Clusters as part of a Remote Read operation

HOURFLOW – DATA FLOW IN MiB/sec BY CLUSTER			
Field name	**Record Name**	**Container Name**	**Description**
MiB/s To_TVC Dev_Wr	Vnode Adapter Historical	Vnode Adapter-Port	The rate of compressed writes to the disk cache from the Host Bus Adapters (HBA) • Bytes Written to Virtual Devices
MiB/s Fr_TVC Dev_Rd	Vnode Adapter Historical	Vnode Adapter-Port	The rate of compressed reads from the disk cache to the host bus adapters. • Bytes Read by Virtual Devices
MiB/s To_TVC Recv	Hnode Grid Historical	Grid-Cluster	Rate of compressed copies received from the grid into this cluster's disk cache. Data Transferred into a Cluster's Cache from other Clusters as part of a Copy Operation. Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval.
MiB/s Fr_TVC Sent	Hnode Grid Historical	Grid-Cluster	Rate of compressed copies sent from this cluster's disk cache to the grid. Data Transferred From a Cluster's Cache To Other Clusters as part of a Copy Operation. Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval.
MiB/s To_TVC Recall	Hnode Library Historical	Library - Pooling – General Use Pool (GUP)	Rate of compressed data written to the disk cache from physical tape for recall. Data Read from Pool Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval.
MiB/s Fr_TVC PreMig	Hnode Library Historical	Library - Pooling – General Use Pool (GUP)	Rate of compressed data written to physical tape from the disk cache for pre-migrations. Data Written to Pool Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval.
MiB/s By_GGM	Hnode Grid Historical	Grid - cluster	Rate of transferred data from this Cluster's cache through GGM copy activity if the Cluster is used as a GGM copy source
Queue GiB_to PreMig	Vnode Adapter Historical	HSM container	Current number of queued pre-migrate operations at the end of the interval.
Queue GiB_to Copy	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Depth of the outgoing copy queue (compressed data). Awaiting Replication to available Clusters Divided by 1000 to convert MiB to GiB
Queue GiB_to Recv	Hnode Grid Historical	Grid	Depth of the incoming copy queue Data to Copy Divided by 1000 to convert MiB to GiB
Write Throt Impac%	Hnode HSM Historical	HSM-Cache	The Host Write Throttle Impact Percentage. Computed by VEHSTATS using: • Percent Host Write Throttle • Average Host Write Throttle Equation is shown at bottom of table.

HOURFLOW – DATA FLOW IN MiB/sec BY CLUSTER			
Field name	**Record Name**	**Container Name**	**Description**
Copy Throt Impac%	Hnode HSM Historical	HSM-Cache	The outgoing copy throttle impact percentage. Computed by VEHSTATS using: • Percent Copy Throttle • Average Copy Throttle Equation is shown at bottom of table.
Avg mSec DCThrt	Hnode HSM Historical	HSM-Cache	The amount of Deferred Copy Throttle (DCT) applied. Average Deferred Copy Throttle
MiB/s To_TVC RMT_WR	Hnode Grid Historical	Grid-Cluster	Data Transferred (compressed) into a Cluster's Cache from other Clusters as part of a Remote Write Operation. Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval.
MiB/s Fr_TVC RMT_RD	Hnode Grid Historical	Grid-Cluster	Data Transferred from a Cluster's Cache To Other Clusters as part of a Remote Read operation. Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval.
Intvl Sec	-	-	The number of seconds in the reporting interval.

$$\%\text{Relative Impact (\%RLTV IMPAC)} = \frac{(\#\text{ 30 sec samples with throttling}) * (\text{avg throttle value}) * (100 \text{ to express as \%})}{(\#\text{ 30 sec samples in interval}) * (2 \text{ sec max value})}$$

AVGRDST

```
 (C) IBM   REPORT=AVGRDST (17304)          Cache Miss Mounts' detalied data      RUN ON 14NOV2017 @  0:51:15    PAGE 1
       {CODE_LEVEL=008.033.000.0045}  Prttn   Miss    Avg  Total  Miss/     MPEND   Intvl               UTCMINUS=07
Date       End_Time  Grid   Cluster       #   Mnts   Secs   Mnts  Total    Intvl#   Bound   (* Lines with no Miss Mounts not
printed
10MAY16TU  15:45:00  3484F  CL100BDA      0      1      3    260    0.3%        1  <   30
19MAY16TH  10:15:00  3484F  CL100BDA      0      1     15    208    0.4%        1  <   30
19MAY16TH  11:00:00  3484F  CL100BDA      0      2     51     15   13.3%        3  <   60
19MAY16TH  11:30:00  3484F  CL100BDA      0      1     72      3   33.3%        4  <   75
03JUL16SU  12:30:00  3484F  CL100BDA      0      1      3    204    0.4%        1  <   30
03JUL16SU  17:15:00  3484F  CL100BDA      0      1      3    355    0.2%        1  <   30
06JUL16WE   8:30:00  3484F  CL100BDA      0      1    120      9   11.1%        7  <  180

(C) IBM   REPORT=AVGRDST (17304)     AVERAGE RECALL MOUNT PENDING DISTRIBITION  RUN ON 14NOV2017 @  0:51:15    PAGE 2
Grid /    <-------AVG MPEND-------->     QTR     QTR      QTR    READ   ACCUM     MISS
Cluster            INTERVAL           NUMBER   ACCUM   ACCUM%    MISS    MISS   ACCUM%
             0 <= Miss MTime <    30       4       4    57.1%       4       4    50.0%
3484F       30 <= Miss MTime <    45       0       4    57.1%       0       4    50.0%
CL100BDA    45 <= Miss MTime <    60       1       5    71.4%       2       6    75.0%
            60 <= Miss MTime <    75       1       6    85.7%       1       7    87.5%
            75 <= Miss MTime <    90       0       6    85.7%       0       7    87.5%
            90 <= Miss MTime <   120       0       6    85.7%       0       7    87.5%
           120 <= Miss MTime <   180       1       7   100.0%       1       8   100.0%
           180 <= Miss MTime <   240       0       7   100.0%       0       8   100.0%
           240 <= Miss MTime <   300       0       7   100.0%       0       8   100.0%
           300 <= Miss MTime <   360       0       7   100.0%       0       8   100.0%
           360 <= Miss MTime <   420       0       7   100.0%       0       8   100.0%
           420 <= Miss MTime <   480       0       7   100.0%       0       8   100.0%
           480 <= Miss MTime <   540       0       7   100.0%       0       8   100.0%
           540 <= Miss MTime <   600       0       7   100.0%       0       8   100.0%
           600 <= Miss MTime <   900       0       7   100.0%       0       8   100.0%
           900 <= Miss MTime               0       7   100.0%       0       8   100.0%

(C) IBM   REPORT=AVGRDST (17304)    AVERAGE RECALL MOUNT PENDING DISTRIBITION   RUN ON 14NOV2017 @  0:51:15    PAGE 3
Grid /    <-------AVG MPEND-------->     QTR     QTR      QTR    READ   ACCUM     MISS
Cluster            INTERVAL           NUMBER   ACCUM   ACCUM%    MISS    MISS   ACCUM%
             0 <= Miss MTime <    30       4       4    57.1%       4       4    50.0%
SHOP        30 <= Miss MTime <    45       0       4    57.1%       0       4    50.0%
            45 <= Miss MTime <    60       1       5    71.4%       2       6    75.0%
            60 <= Miss MTime <    75       1       6    85.7%       1       7    87.5%
            75 <= Miss MTime <    90       0       6    85.7%       0       7    87.5%
            90 <= Miss MTime <   120       0       6    85.7%       0       7    87.5%
           120 <= Miss MTime <   180       1       7   100.0%       1       8   100.0%
           180 <= Miss MTime <   240       0       7   100.0%       0       8   100.0%
           240 <= Miss MTime <   300       0       7   100.0%       0       8   100.0%
           300 <= Miss MTime <   360       0       7   100.0%       0       8   100.0%
           360 <= Miss MTime <   420       0       7   100.0%       0       8   100.0%
           420 <= Miss MTime <   480       0       7   100.0%       0       8   100.0%
```

```
480 <= Miss MTime <   540       0       7   100.0%       0       8   100.0%
540 <= Miss MTime <   600       0       7   100.0%       0       8   100.0%
600 <= Miss MTime <   900       0       7   100.0%       0       8   100.0%
900 <= Miss MTime             0       7   100.0%       0       8   100.0%
```

The report AVGRDST contains three parts:

- Cache Miss Mounts detalied data
- Average Recall Mount Pending Distribition per each cluster
- Average Recall Mount Pending Distribition per all clusters (the sum)

AVGRDST - Average Recall Mount Pending Distribution			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
Cache Miss Mounts detalied data			Header
Body Related Fields			
Prttn #	Hnode HSM Historical	HSM-Cache-Partition	Cache Partition Number (0, 1, 2,…)
Miss Mnts	Hnode HSM Historical	HSM-Cache-Partition	Indicates the number of mount requests completed that required recall from a stacked volume during this interval.
Avg Secs	Hnode HSM Historical	HSM-Cache-Partition	Indicates the average time, in seconds, taken to complete Cache Miss mounts during the interval.
Total Mnts			Total number of mounts (Fast Ready Mounts, Cache Hit Mounts and Cache Miss Mounts). This field is calculated by VEHSTATS.
Miss/Total			Percent of Cache Miss Mounts within the Total number of mounts. This field is calculated by VEHSTATS.
MPEND Intvl Intvl# Bound			Which time interval the average mount time belongs to. (Less than 30 sec – interval #1, less than 45 sec – interval #2, etc)
Header Related Fields			
INTERVAL AVERAGE RECALL MOUNT PENDING DISTRIBITION			Header
Body Related Fields			
AVG MPEND INTERVAL	Hnode HSM Historical	HSM-Cache-Partition	The "Avg Secs" value is used for the tabulation. The interval buckets range from <30 seconds to >15 minutes. Only the intervals, where "Cache miss mount" has been occurred, are accumulated.
QTR NUMBER	Hnode HSM Historical	HSM-Cache-Partition	The "MPEND Intvl#" values are used for the tabulation. This column shows the number of the intervals, where cache miss mounts fall into the interval.
QTR ACCUM			This is the accumulated number of intervals. VEHSTATS computes this value.
QTR ACCUM%			This is the accumulated percent of the total number of the intervals, where recall mounts occurred. VEHSTATS computes this value.

AVGRDST - Average Recall Mount Pending Distribution			
Field name	**Record Name**	**Container Name**	**Description**
READ MISS	Hnode Library Historical	HSM–Cache–Partition	Number of Cache Miss mounts during the interval
ACCUM MISS			Accumulated number of Cache Miss mounts.
MISS ACCUM%			Accumulated percentage of Cache Miss mounts.

HOURXFER

```
(C) IBM   REPORT=HOURXFER(17142)          Distribution of data transfer Rates by Tiers     RUN ON 22MAY2017 @  7:28:57
GRID#=00186   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL02DADW  VE_CODE_LEVEL=008.041.100.0015
```

Number of Quarters distributed by Days and Tiers (based on Average Rate)

TIER \ GiB XFER:	Sunday 05MAR2017	Monday 06MAR2017	Tuesday 07MAR2017	Wednesday 08MAR2017	Thursday 09MAR2017	Friday 10MAR2017	Saturday 11MAR2017
	0	7018	0	684	951	684	951
1	0	2	0	6	11	6	11
2	0	7	0	4	2	4	2
3	0	5	0	0	2	0	2
4	0	1	0	0	0	0	0
5	0	2	0	0	0	0	0
6	0	2	0	0	0	0	0
7	0	4	0	0	0	0	0
8	0	1	0	0	0	0	0

TIER	== MiB/S Boundaries ==	<------- Number of Quarters by Tiers -------> == by Average Rate ==			== by Attempt Rate ==		
0	VTS not active	671	91.5%	91.5%	671	91.5%	91.5%
1	0 <= MiBS < 100	22	3.0%	94.5%	16	2.1%	93.7%
2	100 <= MiBS < 200	14	1.9%	96.4%	8	1.0%	94.8%
3	200 <= MiBS < 300	8	1.0%	97.5%	5	0.6%	95.4%
4	300 <= MiBS < 400	2	0.2%	97.8%	1	0.1%	95.6%
5	400 <= MiBS < 500	4	0.5%	98.3%	3	0.4%	96.0%
6	500 <= MiBS < 600	4	0.5%	98.9%	9	1.2%	97.2%
7	600 <= MiBS < 700	5	0.6%	99.5%	8	1.0%	98.3%
8	700 <= MiBS < 800	3	0.4%	100.0%	4	0.5%	98.9%
9	800 <= MiBS < 900	0	0.0%	100.0%	7	0.9%	99.8%
10	900 <= MiBS < 1000	0	0.0%	100.0%	0	0.0%	99.8%
11	1000 <= MiBS < 1100	0	0.0%	100.0%	0	0.0%	99.8%
.....							
29	2800 <= MiBS < 2900	0	0.0%	100.0%	0	0.0%	99.8%
30	2900 <= MiBS < 3000	0	0.0%	100.0%	0	0.0%	99.8%
31	3000 <= MiBS < MAX	0	0.0%	100.0%	1	0.1%	100.0%

HOURXFER - Distribution of data transfer Rates by Tiers			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
Distribution of data transfer Rates by Tiers			Header
Number of Quarters distributed by Days and Tiers (based on Average Rate)			Header
Sunday Monday Tuesday Wednesday Thursday Friday Saturday			Header
Number of Quarters by Tiers			Header
Body Related Fields			
TIER			Tier is the number of the range of the data transfer rate, for example: the rate is between 0 and 100MiB/s – TIER = 1, the rate is between 100 and 200MiB/s – TIER = 2, etc.
GiB XFER			Amount of trasferred data.
MiB/S Boundaries			Range of rate.
by Average Rate			Shows the number of quarters with the corresponding average rate (and accumulated percentage).
by Attempt Rate			Shows the number of quarters with the corresponding "attempted" rate (and accumulated percentage). Attempted rate (Attempted Throughput) is calculated based on “Configured Maximum Throughput” and “Maximum Delay”. Here "Attempted rate" is a guess as to how fast the host was trying to go when we throttled it. It does not show an exact values, rather it gives you the information for deeper analysis of the performance of the Grid configuration.

DAYSMRY

```
 (C) IBM   REPORT=DAYSMRY( 17304)                    DAILY SUMMARY                          RUN ON 14NOV2017 @  0:51:15    PAGE   5
GRID#=3484F   DIST_LIB_ID= 1  VNODE_ID= 0  NODE_SERIAL=CL100BDA  VE_CODE_LEVEL=008.033.000.0045                          UTCMINUS=07
 {line title}     {type}       {unit}     Sunday     Monday    Tuesday  Wednesday   Thursday     Friday   Saturday        Week_ended
         Date                           10APR2016  11APR2016  12APR2016  13APR2016  14APR2016  15APR2016  16APR2016         16APR2016
    Code Level  int-his-cmpr     -     33.00.0045 33.00.0045 33.00.0045 33.00.0045 33.00.0045 33.00.0045 33.00.0045        33.00.0045

TS7700 CAPACITY
   TVC Size GB  eoi-his-fval   GB          84999      84999      84999      84999      84999      84999      84999             84999
  Active LVols  eoi-veh-cmpx   numb        32016      32016      32016      32016      32016      32016      32016             32016
    Active GB  eoi-veh-cmpx   GB           5169       5169       5169       5169       5167       5167       5166              5166
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
ThrDlyAv 15Sec  int-veh-avg    sec          .000       .000       .000       .000       .000       .000       .000              .000
Pct Int w TDly  int-his-avg      %             0          0          0          0          0          0          0                 0
   Pgm Version  int-veh-pval     -         17304      17304      17304      17304      17304      17304      17304             17304

    Legend:    {type} = <Prefix>-<Middle_Part>-<Calculation_Rule>

+----------+-----------------------------------------------+----------+-----------------------------------------------+
|  value   |  explanation                                  |  value   |  explanation                                  |
+----------+-----------------------------------------------+----------+-----------------------------------------------+
|                      Prefix                             |                    Middle_Part                        |
+----------+-----------------------------------------------+----------+-----------------------------------------------+
|   eoi    | a metric shows the value at the end of the    |  his     | a metric is a generalization of historical    |
|          | interval                                      |          | statistical field or fields                   |
|   int    | a metric shows the value for the interval     |  veh     | a metric is calculated by VEHSTATS            |
+----------+-----------------------------------------------+----------+-----------------------------------------------+
|                Caculation_Rule                          |            Values of the column "Unit"                |
+----------+-----------------------------------------------+----------+-----------------------------------------------+
|   avg    | a metric shows the value for the interval     |   msec   | milliseconds                                  |
|   avg>0  | a metric is calculated as average and only    |    sec   | seconds                                       |
|          | values > 0 are taken into the account         |    min   | minutes                                       |
|   cmpx   | a complex rule - see the details in           |  hours   | hours                                         |
|          | the DECODER doc                               |   days   | days                                          |
|   cmpr   | a char comparison:"x" shows diffrent symbols  |    MB    |      1000 000 bytes                           |
|   div    | a metric is calculated by division            |    GB    |  1000 000 000 bytes                           |
|   fval   | a metric shows a value of a historical        |    MiB   |      1048 576 bytes (1024 * 1024)             |
|          | statistical field                             |    GiB   |  1073 741 824 bytes (1024 * 1024 * 1024)      |
|   lsum   | a metric is a logical sum                     |  MiB/s   |  MiBs per a second                            |
|   max    | a metric is calculated as a max value         |   numb   |  absolute (abstract) number                   |
|   min    | a metric is calculated as a min value         |     %    |  percentage                                   |
|   min>0  | a metric is calculated as a min value         |     -    | the metric has no applicable measure unit     |
|          | within only positive items                    |   ????   | the measure unit is not identified            |
|   sum    | a metric is calculated as a sum               |          | for the metric in VEHSTATS                    |
|   pct    | a metric is calculated as percentage          |          |                                               |
|   pval   | a metric shows a parameter of VEHSTATS        |          |                                               |
|   wavg   | a metric is calculated as a weighted average  |          |                                               |
```

```
|   ????    | the calculation rule is not identified      |           |                                               |
|           | for the metric in VEHSTATS                  |           |                                               |
```

The fields are described in “Counters of “order based” reports”.
The fields are shown here in alphabetical order. The real sequence, how do they follow in the report, is defined by the sequence of orders in the file **.IBMTOOLS,JCL(ORDERxxx).

MONSMRY

```
(C) IBM   REPORT=MONSMRY( 16049)        MONTHLY SUMMARY            RUN ON 24FEB2016 @  8:13:56    PAGE   1
GRID#=BA008   DIST_LIB_ID= 1  VNODE_ID= 0  NODE_SERIAL=CL128C1P  VE_CODE_LEVEL=008.033.000     UTCMINUS=07

         Month    JUL2015    AUG2015
    Code Level 33.00.0041 33.00.0045
 Host Use Days          5          8

TS7700 CAPACITY
   TVC Size GB     239784     239784
  Active LVols     108596     169598
     Active GB     108738     169617
..............
```

The fields are described in “Counters of “order based” reports”.

COMPARE

```
            GRID   AE4C0      AE4C0      AE4C0      AE4C0      AE5C0      AE5C0
         CLUSTER   CL0H5562   CL1H5194   CL2H5629   CL3H5547   CL0H8529   CL1H8505
      Code Level 32.01.0008 32.01.0008 32.01.0008 32.01.0008 40.00.0071 40.00.0071

TS7700 CAPACITY
     TVC Size GB      13999      13999     162864     162864     313960     188246
    Active LVols     406456     411091      62167      61171     504560     509933
       Active GB    1031430    1082977     159258     159057    1399561    1481590
    Avg CPU Util       41.2       38.2       29.7       27.8       17.3       13.9
...................
```

This report covers the requested interval. If 90 days of data are read, it summarizes all 90 days for comparison. If there were only 14 days of data, it is a 14 day summary comparison. The heading shows the From / To interval and the Days w/Activity line shows the number of different summarized days.

The fields are described in “Counters of “order based” reports”.

HOURFLAT

```
Grid  CLIDMSER Day Date      End_Time    Code_Level    UTC_OFFSET   TVC_Size_GB  Active_LVols     Active_GB  Avg_CPU_Util ...
BA008 CL128C1P Sun 26JUL2015 17:15:00    33.00.0041     -07:00:00        239784         84727         84679           4.0 ...
BA008 CL128C1P Sun 26JUL2015 17:30:00    33.00.0041     -07:00:00        239784         84727         84679           6.0 ...
```

The fields are described in “Counters of “order based” reports”.
Be aware – field names in this report contains “_” (underscore) instead of 'blank”, for example “Active_GB” against “Active GB”.

DAYHSMRY, WEKHSMRY, MNTHSMRY

These reports show the info, summarized for the days, weeks and months.
An examples are below:

DAYHSMRY:

Grid	CLIDMSER	Day	Date	Hours	Code_Level	TVC_Size_GB	Active_LVols	Active_GB	Tot_Mnts	Scratch	. . .
3484F	CL100BDA	Fri	08APR2016	7.00	33.00.0045	84999	32016	4849	1	0	. . .
3484F	CL100BDA	Sat	09APR2016	24.00	33.00.0045	84999	32016	5170	18	0	. . .
3484F	CL100BDA	Sun	10APR2016	24.00	33.00.0045	84999	32016	5169	2	0	. . .
3484F	CL100BDA	Mon	11APR2016	24.00	33.00.0045	84999	32016	5169	1	0	. . .
3484F	CL100BDA	Tue	12APR2016	24.00	33.00.0045	84999	32016	5169	1	0	. . .
3484F	CL100BDA	Wed	13APR2016	24.00	33.00.0045	84999	32016	5169	51	46	. . .
.	.	.	.	.	.	.	.	.	.	.	.

WEKHSMRY:

Grid	CLIDMSER	Wek	End_Date	Days	Code_Level	TVC_Size_GB	Active_LVols	Active_GB	Tot_Mnts	Scratch	. . .
3484F	CL100BDA	01	09APR2016	1.29	33.00.0045	84999	32016	5170	19	0	. . .
3484F	CL100BDA	02	16APR2016	7.00	33.00.0045	84999	32016	5166	58	46	. . .
3484F	CL100BDA	03	23APR2016	7.00	33.00.0045	84999	32016	5161	57	46	. . .
3484F	CL100BDA	04	30APR2016	7.00	33.00.0045	84999	32016	5199	1014	889	. . .
.	.	.	.	.	.	.	.	.	.	.	.

MNTHSMRY:

Grid	CLIDMSER	Mn#	Month	Days	Code_Level	TVC_Size_GB	Active_LVols	Active_GB	Tot_Mnts	Scratch	. . .
3484F	CL100BDA	01	APR2016	22.29	33.00.0045	84999	32016	5199	1148	981	. . .
3484F	CL100BDA	02	MAY2016	31.00	33.00.0045	84999	32016	5542	14995	13226	. . .
3484F	CL100BDA	03	JUN2016	29.96	33.00.0045	84999	32016	5868	5380	4800	. . .
3484F	CL100BDA	04	JUL2016	6.30	33.00.0045	84999	32016	5876	6388	5622	. . .
.	.	.	.	.	.	.	.	.	.	.	.

The fields are described in “Counters of “order based” reports”.

Counters of "order based" reports

The following fields are applicable for the "order based" reports DAYSMRY, COMPARE, MONSMRY, DAYHSMRY, HOURFLAT, WEKHSMRY, MNTHSMRY.

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
Header Related Fields				
Type				Indicates the type of the field. See the description in the table "Legend" in the report DAYSMRY.
Unit				Unit of measurement, if applicable (for example: GB). See the description in the table "Legend" in the report DAYSMRY.
Date				This is the date of the day being reported or the last reporting day of the week that is being summed.
Code Level	' CODE LEVEL'			This in the TS7700 code level at the end of the day or the end of the last reporting day of the week being summed.
UTC OFFSET	' UTC OFFSET'			UTC offset value specified
Body Related Fields				
%Copy Th TA	' %COPY_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Percent Copy Throttle for Tape Attached Cache Partition
%Def Cp Th TA	' %DEF_CP_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Percent Deferred Copy Throttle for Tape Attached Cache Partition
%Host Wr Th P0	' %HST_WR_TH_P0'	Hnode HSM Historical	Extended HSM – Cache Container	Percent Host Write Throttle for Tape Attached Cache Partition 0
Active GB	' ACTIVE GBS'	Hnode Library Historical	Library - Pooling – General Use Pool (GUP)	Active Data – Converted to GB by VEHSTATS – Computed by VEHSTATS. as maximum of the following values: • the sum of all "Data Resident in Cache" from "Cache Partitions Preference groups"; • the sum of all "Active data" fields from 32 General Use Pools.
Active LVols	' ACTIVE LVOLS'	Hnode Library Historical	Library - Pooling – General Use Pool (GUP)	Active Logical Volumes – Computed by VEHSTATS by summing data from all 32 General Use Pools.

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
Attmpt Thruput	' ATTMPT THRPUT'	Vnode Virtual Device Historical	Vnode Virtual Device	Attempted Throughput. Calculated based on "Configured Maximum Throughptu" and "Maximum Delay" The Attmpt_Thruput is a guess as to how fast the host was trying to go when we throttled it. It's not exact given the stats cover 15 minute averages.
Avg Ahead Cnt	' AVG AHEAD'	Vnode Virtual Device Historical	Vnode Virtual Device	Average ahead count The Ahead count is how many times our internal buffer for any device becomes empty during writes or full during reads. It means the "TS7700" is ahead of the channel. Behind is just the opposite. It's the count of how many times the buffer filled during writes or became empty during reads where the TS7700 wasn't fast enough. High Ahead counts means the 7700 has throughput to spare, which in this case it does given it's slowing down the channel. If you see high behind counts, that means the 7700 is the bottleneck. It could be just overall throughput, it could be internal disk cache, it could be networks when remote mounts take place, it could be sustained state of operation where we are offloading to tape and any other thing where the 7700 can't keep up either by design or due to an issue.
Avg Behind Cnt	' AVG BEHIND'	Vnode Virtual Device Historical	Vnode Virtual Device	Average behind count
Avg Copy Th TA	'AVG_COPY_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Average Copy Throttle for Tape Attached Cache Partition
Avg CPU Util	' AVG CPU UTIL'	Hnode HSM Historical	HSM – Cache	Average CPU Usage percentage at the end of the interval. This value can be used to indicate how busy the system was during the interval.
Avg D Cp Th TA	'AVG_D_CP_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Average Deferred Copy Throttle for Tape Attached Cache Partition
Avg Disk Util	' AVG DISK UTIL'	Hnode HSM Historical	HSM-Cache	Average Maximum Disk Usage Percentage
Avg Mnt Sec	' AVG MNT SEC'	Hnode HSM Historical	HSM – Cache – Partition	Computed by VEHSTATS from the three fields below.
Avg Mnt Sec n	' AVG MNT SEC n'	Hnode HSM Historical	HSM – Cache – Partition Container	Average Mount Time on Cache Partition n
Avg Over Th TA	'AVG_OVER_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Average Overall Throttle for Tape Attached Cache Partition
Avg Phy Mntd	' AVG PHY MNTD'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Average Physical Devices Mounted

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
Avg Phy Mtime	' AVG PHY MTIME'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Average Physical Mount Time. VEHSTATS does not count the intervals without any mounted devices when computing the average.
Avg Rd Hit Sec	'AVG RD HIT SEC'	Hnode HSM Historical	HSM – Cache – Partition	Average Cache Hit Mount Time
Avg Rd Mis Sec	'AVG RD MIS SEC'	Hnode HSM Historical	HSM – Cache – Partition	Average Cache Miss Mount Time
Avg R-Ht Sec n	'AVG R-HT SEC n'	Hnode HSM Historical	HSM – Cache – Partition Container	Average Cache Hit Mount Time on Cache Partition n
Avg Scr Mt Sec	'AVG SCR MT SEC'	Hnode HSM Historical	HSM – Cache – Partition	Average Fast Ready Mount Time
Avg Sec DCThrt	'AV % DCP THROT'	Hnode HSM Historical	HSM – Cache	Average deferred copy throttle
Avg S-Mt Sec n	'AVG S-MT SEC n'	Hnode HSM Historical	HSM – Cache – Partition Container	Average Fast Ready Mount Time. The time is incremented for each mount and averaged at the end of the interval on Cache Partition n
Avg Sync Sec	' AVG SYNC SEC'	Hnode HSM Historical	HSM – Cache – Partition	Average SYNC mount time in seconds
Avg Sync Sec n	'AVG SYNC SEC n'	Hnode HSM Historical	HSM – Cache – Partition Container	Sync level mount time on Cache Partition n
Avg Virt Drvs	' AVG VIRT DRVS'	Vnode Virtual Device Historical	Vnode Virtual Device Container	Average Virtual Devices Mounted
Avg Wr Th TA	' AVG_WR_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Average Host Write Throttle on Tape Attached Cache Partitions
Avg xy MiB/s	'AVG x-->y MB/S'	Hnode Grid Historical	Grid-Cluster	Average rate MiB/s of Data Transferred From a Cluster x to Cluster y as part of a Copy Operation.
AvgRdMis Sec n	'AVGRDMIS SEC n'	Hnode HSM Historical	HSM – Cache – Partition Container	Average Cache Miss Mount Time on Cache Partition n
Bas D Cp Th TA	'BAS_D_CP_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Base Deferred Copy Throttle for Tape Attached Cache Partition
Bas D Cp Th P0	'BAS_D_CP_TH_P0'	Hnode HSM Historical	HSM – Cache Container	Base Deferred Copy Throttle on Cache Partition 0
BlkSz GT 64K	' BLKSZ GT 64K'	Vnode Virtual Device Historical	Vnode Virtual Device Container	Channel Blocks Written above 65536 bytes
BlkSz LE 16K	' BLKSZ LE 16K'	Vnode Virtual Device Historical	Vnode Virtual Device Container	Channel Blocks Written 8193-16384 byte range
BlkSz LE 2K	' BLKSZ LE 2K'	Vnode Virtual Device Historical	Vnode Virtual Device Container	Channel Blocks Written 1-2048 byte range
BlkSz LE 32K	' BLKSZ LE 32K'	Vnode Virtual Device Historical	Vnode Virtual Device Container	Channel Blocks Written 16385-32768 byte range
BlkSz LE 4K	' BLKSZ LE 4K'	Vnode Virtual Device Historical	Vnode Virtual Device Container	Channel Blocks Written 2049-4096 byte range
BlkSz LE 64K	' BLKSZ LE 64K'	Vnode Virtual Device Historical	Vnode Virtual Device Container	Channel Blocks Written 32769-65536 byte range
BlkSz LE 8K	' BLKSZ LE 8K'	Vnode Virtual Device Historical	Vnode Virtual Device Container	Channel Blocks Written 4097-8192 byte range

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
Cache TotMiB/s	' TOT TVC MIB/S'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Read+Written by Virtual Devices. Converted to MiB/s by VEHSTATS.
Chan Avg MiB/s	' AVG MB/S'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Read by the Channel + Bytes Written by the Channel. Converted to MB/s by VEHSTATS
CLx Rmt Rd MiB	' CLx RMT RD MB'	Hnode Grid Historical	Grid-Cluster	Data Transferred from a Cluster x To Other Clusters as part of a Remote Read operation
CLx Rmt Wr MiB	' CLx RMT WR MB'	Hnode Grid Historical	Grid-Cluster	Data Transferred from a Cluster x To Other Clusters as part of a Remote Write operation
Copy ThRsn TA	' COPY_THRSN_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Copy Throttle Reason(s) for Tape Attached Cache Partition
Copy ThRsn P0	' COPY_THRSN_P0'	Hnode HSM Historical	HSM – Cache Container	Copy Throttle Reason(s) on Cache Partition 0
CpyThrotImpac%	'AV % CPY THROT'	Hnode HSM Historical	HSM – Cache	Computed by VEHSTATS using: • Percent Copy Throttle • Average Copy Throttle • Equation is shown at bottom of table.
CSPMEDm 3592mm	'CSPMEDm 3592mm'	Hnode Library Historical	Library - Pooling – Common Scratch Pool (CSP) Media	Physical Media Count – One entry for each type of media in the pool. The m and mm values will reflect the media type. This field contains the number of scratch stacked volumes, of the type identified, assigned to the common scratch pool. This is the value at the end of the interval.
Data xf by GGM	'DATA XF BY GGM'	Hnode Grid Historical Record	Grid-Cluster Container	Data Transferred From a Cluster's Cache To Other Clusters as part of a Copy Operation if the Cluster is used as a GGM copy source.
DCopy ThRsn P0	'DCOPY_THRSN_P0'	Hnode HSM Historical	HSM – Cache Container	Deferred Copy Throttle Reasons on Cache Partition 0
DCopy ThRsn TA	'DCOPY_THRSN_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Deferred Copy Throttle Reason(s) for Tape Attached Cache Partition
Dev Rd MiB/s	' DEV READ MBS'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Read from the Virtual Devices. Converted to MiB/s by VEHSTATS.
Dev Wr MiB/s	' DEV WRITE MBS'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Written to Virtual Devices. Converted to MiB/s by VEHSTATS.
EOI Av DEF Min	'EOI AV DEF SEC'	Hnode Grid Historical	Grid	Average Deferred Queue Age – Value at the end of the reporting interval.
EOI Av RUN Min	'EOI AV RUN SEC'	Hnode Grid Historical	Grid	Average Immediate Queue Age – Value at the end of the reporting interval.
EOI MiB to Cpy	' EOI MB TO CPY'			Total Awaiting Replication to available Clusters
EOI MiB to Mig	' EOI MB TO MIG'			Total Unmigrated Data
EOI MiB to Recv	'EOI MB TO RECV'	Hnode Grid Historical	Grid	Data to Copy – Value at the end of the reporting interval.

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
EOI VV to Recv	'EOI VV TO RECV'	Hnode Grid Historical	Grid	Logical Volumes for Copy – Value at the end of the reporting interval.
Fr TVC By Cpy	' FR TVC BY CPY'	Hnode Grid Historical	Grid-Cluster	Rate MiB/Sec transfered from CLx to all other clusters
Fr TVC Dev Rd	' FR TVC DEV RD'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Read from the Virtual Devices. Converted to MiB/s by VEHSTATS.
G01 35DAv Pmig	'G01_35DAV_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: 35 Days Average Cache Age by Delayed Premigration
G01 35DVo Pmig	'G01_35DVO_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: Volumes Migrated Last 35 Days by Delayed Premigration
G01 48HAv Pmig	'G01_48HAV_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: 48 Hours Average Cache Age by Delayed Premigration
G01 48HVo Pmig	'G01_48HVO_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: Volumes Migrated Last 48 Hours by Delayed Premigration
G01 4HAv Pmig	' G01_4HAV_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: 4 Hour Average Cache Age by Delayed Premigration
G01 4HVo Pmig	' G01_4HVO_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: Volumes Migrated Last 4 Hours by Delayed Premigration
G01 AvWtTmDlyV	'G01_AVWTTMDLYV'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: Average Waiting Time of Delayed Premigration Volumes
G01 NumTDVols	' G01_NUMTDVOLS'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: Resident Volumes Waiting for Delayed Premigration
G01 TotSzTDVol	'G01_TOTSZTDVOL'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: Total Size of Resident Volumes Waiting for Delayed Premigration
G01 UnmigdVols	'G01_UNMIGDVOLS'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0 + PG1: Unmigrated Vols
GiB Read	' GB READ'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Read by the Channel – Converted to GiB by VEHSTATS
GiB Write	' GB WRITE'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Written by the Channel – Converted to GiB by VEHSTATS

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
GiBxy By Copy	' MB x-->y COPY'	Hnode Grid Historical	Grid-Cluster	Data Transferred From a Cluster x to Cluster y as part of a Copy Operation. (The value is reported in MiB or GiB, depending on the parameter USEGB)
Host use Days	'DAYS W/ACTIVTY'	Vnode Virtual Device Historical	Vnode Virtual Device	How many days the cluster was used by Host. This counter is shown in the reports COMPARE and MONSMRY.
HstWr ThRsn P0	'HSTWR_THRSN_P0'	Hnode HSM Historical	HSM – Cache Container	Host Write Throttle Reason(s) on Cache Partition 0
HstWr ThRsn TA	'HSTWR_THRSN_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Host Write Throttle Reason(s) for Tape Attached Cache Partition
Max Ahead Cnt	' MAX AHEAD'	Vnode Virtual Device Historical	Vnode Virtual Device	Maximum ahead count
Max Av DEF Min	'MAX AV DEF SEC'	Hnode Grid Historical	Grid	Average Deferred Queue Age – Maximum from the reporting period.
Max Av RUN Min	'MAX AV RUN SEC'	Hnode Grid Historical	Grid	Average Immediate Queue Age – Maximum from the reporting period.
Max Behind Cnt	' MAX BEHIND'	Vnode Virtual Device Historical	Vnode Virtual Device	Maximum behind count
Max Confgd Thr	' MAX AVAIL THR'	Vnode Virtual Device Historical	Vnode Virtual Device	Configured Maximum Throughput
Max CPU Util	' MAX CPU UTIL'	Hnode HSM Historical	HSM – Cache	Maximum CPU Usage Percentage during the interval
Max Disk Util	' MAX DISK UTIL'	Hnode HSM Historical	HSM-Cache	Maximum Disk Usage Percentage
Max MiB to Cpy	' MAX MB TO CPY'			Max of Total Awaiting Replication to available Clusters during period (day, week, month)
Max MiB to Mig	' MAX MB TO MIG'			Max of Total Unmigrated Data during period (day, week, month)
Max MiB to Recv	'MAX MB TO RECV'	Hnode Grid Historical	Grid	Data to Copy – Maximum from the reporting period.
Max Phy Mntd	' MAX PHY MNTD'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Maximum Physical Devices Mounted
Max Phy Mtime	' MAX PHY MTIME'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Maximum Physical Mount Time
Max Qtr MB/s	' MAX MB/S'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Read by the Channel + Bytes Written by the Channel. Computed by VEHSTATS from the 15 minute (quarter hour) intervals. Converted to MB/s by VEHSTATS
Max QtrRd MB/s	' MAX RD MB/S'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Read by the Channel - Computed by VEHSTATS from the 15 minute (quarter hour) intervals. Converted to MB/s by VEHSTATS
Max QtrWr MB/s	' MAX WR MB/S'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Written by the Channel – Computed by VEHSTATS from the 15 minute (quarter hour) intervals. Converted to MB/s by VEHSTATS.

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
Max Virt Drvs	' MAX VIRT DRVS'	Vnode Virtual Device Historical	Vnode Virtual Device Container	Maximum Virtual Devices Mounted
Max VV to Recv	'MAX VV TO RECV'	Hnode Grid Historical	Grid	Logical Volumes for Copy – Maximum for the reporting period.
Max xy MiB/s	'MAX x-->y MB/S'	Hnode Grid Historical	Grid-Cluster	Max rate MiB/s of Data Transferred From a Cluster x to Cluster y as part of a Copy Operation.
MiB Data Exp	' MB DATA EXP'	Hnode Export/Import Historical	Export/Import	Amount of data exported
MiB Data Imp	' MB DATA IMP'	Hnode Export/Import Historical	Export/Import	Amount of data imported
MiB/S By GGM	' MIB/S BY GGM'	Hnode Grid Historical Record	Grid-Cluster Container	Speed during GGM
MiBRecv By CLx	' MB S-->x RECV'	Hnode Grid Historical	Grid-Cluster	Sum MiB received by Cluster x from all others.
MiBRecvDEF CLx	' MB S-->x DEF'	Hnode Grid Historical	Grid-Cluster	Data Transferred into a cluster x from other clusters as part of a deferred copy operation
MiBRecvIMM CLx	' MB S-->x IMM'	Hnode Grid Historical	Grid-Cluster	Data Transferred into a cluster x from other clusters as part of an Immediate copy operation
MiBRecvSYN CLx	' MB S-->x SYN'	Hnode Grid Historical	Grid-Cluster	Data Transferred into a cluster x from other clusters as part of a sync mode copy operation
MiBSecRecvCLx	' CLx MB/S RECV'	Hnode Grid Historical	Grid-Cluster	Rate MiB/Sec received by CLx from all other clusters
Mount Hit Pct	' MOUNT HIT %'	Hnode HSM Historical	HSM – Cache – Partition	Computed by VEHSTATS as Percent of hit mounts within all mounts (scratch mounts + cache mounts + sync mounts / total number of mounts (including miss mounts))
Mount Hit% n	' MOUNT HIT% n'	Hnode HSM Historical	HSM – Cache – Partition Container	Percent of hit mounts within all mounts (scratch mounts + cache mounts + sync mounts / total number of mounts (including miss mounts)) on Cache Partition n
Partitn Num	' PARTITN NUM'	Hnode HSM Historical	HSM – Cache Container	Number of partitions
Partitn Size n	'PARTITN SIZE n'	Hnode HSM Historical	HSM – Cache – Partition Container	Partition Size. The size is updated when it changes.
Pct Int w Tdly	' THRDLY PERCNT'	Vnode Virtual Device Historical	Vnode Virtual Device	Throughput Delay Percent
PG0 35D AV MIN	'PG0 35D AV MIN'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	35 Day Average Cache Age
PG0 35D VV MIG	'PG0 35D VV MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Volumes Migrated Last 35 Days
PG0 35DAv Pmig	'PG0_35DAV_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: 35 Days Average Cache Age by Delayed Premigration

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
PG0 35DVo Pmig	'PG0_35DVO_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: Volumes Migrated Last 35 Days by Delayed Premigration
PG0 48H AV MIN	'PG0 48H AV MIN'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	48 Hour Average Cache Age
PG0 48H VV MIG	'PG0 48H VV MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Volumes Migrated Last 48 Hours
PG0 48HAv Pmig	'PG0_48HAV_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: 48 Hours Average Cache Age by Delayed Premigration
PG0 48HVo Pmig	'PG0_48HVO_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: Volumes Migrated Last 48 Hours by Delayed Premigration
PG0 4HAv Pmig	' PG0_4HAV_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: 4 Hour Average Cache Age by Delayed Premigration
PG0 4HR AV MIN	'PG0 4HR AV MIN'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	4 Hour Average Cache Age
PG0 4HR VV MIG	'PG0 4HR VV MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Volumes Migrated Last 4 Hours
PG0 4HVo Pmig	' PG0_4HVO_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: Volumes Migrated Last 4 Hours by Delayed Premigration
PG0 AvWtTmDlyV	'PG0_AVWTTMDLYV'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: Average Waiting Time of Delayed Premigration Volumes
PG0 GB in TVC	' PG0 GB IN TVC'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Data Resident in Cache – Converted to GB by VEHSTATS
PG0 MiB to CPY PG0 GiB to CPY	' PG0 MB TO CPY' ' PG0 GB TO CPY'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Awaiting Replication to available Clusters
PG0 MiB to MIG PG0 GiB to MIG	' PG0 MB TO MIG' ' PG0 GB TO MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Unmigrated Data
PG0 NumPfrRm n	'PG0 NUMPFRRM n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of Prefer Remove Volumes on Cache Partition n (applicable only for PG0) Not available now.
PG0 NumPfrRmv	' PG0_NUMPFRRMV'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of Prefer Remove Volumes Not available now.
PG0 NumTDVols	' PG0_NUMTDVOLS'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: Resident Volumes Waiting for Delayed Premigration

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
PG0 RDCp Age	' PG0 RDCP AGE'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group Container	PG0: Removed time delayed copies average age. This field contains the average age of the removed time delayed copies. The age is in minutes.
PG0 RDCp LVL	' PG0 RDCP LVL'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group Container	PG0: Time delayed copies removal count. This field contains the count of time delayed copy volumes removed over the last 4 hours.
PG0 SizPfrRm n	'PG0 SIZPFRRM n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Prefer Remove Volumes on Cache Partition n (applicable only for PG0) Not available now.
PG0 SizPfrRmv	' PG0_SIZPFRRMV'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Prefer Remove Volumes Not available now.
PG0 TotSzTDVol	'PG0_TOTSZTDVOL'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: Total Size of Resident Volumes Waiting for Delayed Premigration
PG0 UnmigdVols	'PG0_UNMIGDVOLS'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: Unmigrated Vols
PG0 VV in TVC	' PG0 VV IN TVC'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Virtual Volumes in Cache
PG1 35D AV MIN	'PG1 35D AV MIN'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	35 Day Average Cache Age
PG1 35D VV MIG	'PG1 35D VV MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Volumes Migrated Last 35 Days
PG1 35DAv Pmig	'PG1_35DAV_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: 35 Days Average Cache Age by Delayed Premigration
PG1 35DVo Pmig	'PG1_35DVO_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: Volumes Migrated Last 35 Days by Delayed Premigration
PG1 48H AV MIN	'PG1 48H AV MIN'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	48 Hour Average Cache Age
PG1 48H VV MIG	'PG1 48H VV MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Volumes Migrated Last 48 Hours
PG1 48HAv Pmig	'PG1_48HAV_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: 48 Hours Average Cache Age by Delayed Premigration
PG1 48HVo Pmig	'PG1_48HVO_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: Volumes Migrated Last 48 Hours by Delayed Premigration

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
PG1 4HAv Pmig	' PG1_4HAV_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: 4 Hour Average Cache Age by Delayed Premigration
PG1 4HR AV MIN	'PG1 4HR AV MIN'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	4 Hour Average Cache Age
PG1 4HR VV MIG	'PG1 4HR VV MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Volumes Migrated Last 4 Hours
PG1 4HVo Pmig	' PG1_4HVO_PMIG'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: Volumes Migrated Last 4 Hours by Delayed Premigration
PG1 AvWtTmDlyV	'PG1_AVWTTMDLYV'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: Average Waiting Time of Delayed Premigration Volumes
PG1 GB in TVC	' PG1 GB IN TVC'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Data Resident in Cache – Converted to GB by VEHSTATS
PG1 MiB to CPY PG1 GiB to CPY	' PG1 MB TO CPY' ' PG1 GB TO CPY'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Awaiting Replication to available Clusters
PG1 MiB to MIG PG1 GiB to MIG	' PG1 MB TO MIG' ' PG1 GB TO MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Unmigrated Data
PG1 NumPfrKeep	'PG1_NUMPFRKEEP'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of Prefer Keep Volumes
PG1 NumPfrKp n	'PG1 NUMPFRKP n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of Prefer Keep Volumes on Cache Partition n (applicable only for PG1) Not available now.
PG1 NumPfrRmv	' PG0_NUMPFRRMV'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of Prefer Remove Volumes
PG1 NumPinned	'PG1_NUMPINNED '	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Number of Pinned Volumes
PG1 NumTDVols	' PG1_NUMTDVOLS'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: Resident Volumes Waiting for Delayed Premigration
PG1 RDCp Age	' PG1 RDCP AGE'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group Container	PG1: Removed time delayed copies average age. This field contains the average age of the removed time delayed copies. The age is in minutes.
PG1 RDCp LVL	' PG1 RDCP LVL'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group Container	PG1: Time delayed copies removal count. This field contains the count of time delayed copy volumes removed over the last 4 hours.

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
PG1 SizPfrKeep	'PG1_SIZPFRKEEP'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Prefer Keep Volumes
PG1 SizPfrKp n	'PG1 SIZPFRKP n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Prefer Keep Volumes on Cache Partition n (applicable only for PG1) Not available now.
PG1 SizPfrRmv	' PG0_SIZPFRRMV'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Prefer Remove Volumes
PG1 SizPinned	'PG1 SIZPINNED '	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Pinned Volumes
PG1 TotSzTDVol	'PG1_TOTSZTDVOL'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: Total Size of Resident Volumes Waiting for Delayed Premigration
PG1 UnmigdVols	'PG1_UNMIGDVOLS'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG1: Unmigrated Vols
PG1 VV in TVC	' PG1 VV IN TVC'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Virtual Volumes in Cache
PGm 35D Av CPn	'PGm 35D AV CPn'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	35 Day Average Cache Age on Cache Partition n in Preference group m. This field contains the average age, in minutes, of the oldest logical volume in cache, excluding outliers, from the previous 35 days worth of hourly samples. Each hourly sample discards "outliers" that are small numbers of logical volumes that are not representative of the cache as a whole. This value is for volumes that were assigned to the preference group this data is for.
PGm 35D VV Mgn	'PGm 35D VV MGn'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Volumes Migrated Last 35 Days on Cache Partition n in Preference group m
PGm 48H Av CPn	'PGm 48H AV CPn'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	48 Hour Average Cache Age on Cache Partition n in Preference group m. This field contains the average age, in minutes, of the oldest logical volume in cache, excluding outliers, from the previous 48 hourly samples. Each hourly sample discards "outliers" that are small numbers of logical volumes that are not representative of the cache as a whole. This value is for volumes that were assigned to the preference group this data is for.

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
PGm 48H VV Mgn	'PGm 48H VV MGn'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Volumes Migrated Last 48 Hours on Cache Partition n in Preference group m
PGm 4Hr Av CPn	'PGm 4HR AV CPn'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	4 Hour Average Cache Age on Cache Partition n in Preference group m. This 4 byte hexadecimal field contains the average age, in minutes, of the oldest logical volume in cache, excluding outliers, from the previous 4 hourly samples. Each hourly sample discards "outliers" that are small numbers of logical volumes that are not representative of the cache as a whole. This value is for volumes that were assigned to the preference group this data is for.
PGm 4HR VV Mgn	'PGm 4HR VV MGn'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Volumes Migrated Last 4 Hours on Cache Partition n in Preference group m
PGm AvWTDlyV n	'PGm AVWTDLYV n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Average Waiting Time of Delayed Premigration Volumes on Cache Partition n
PGm GB in CP n	'PGm GB IN CP n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Data Resident in Cache on Cache Partition n in Preference group m. This field contains the amount of data in the TVC partition whose volumes are assigned to the preference this data is for.
PGm NumTDVol n	'PGm NUMTDVOL n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Resident Volumes Waiting for Delayed Premigration on Cache Partition n
PGm RDCP Age n	'PGm RDCP AGE n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Removed time delayed copies average age on Cache Partition n in Preference group m
PGm RDCp LVL n	'PGm RDCP LVL n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Time delayed copies removal count on Cache Partition n in Preference group m. This field contains the count of time delayed copy volumes removed over the last 4 hours.

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
PGm Sz to Cpyn	'PGm SZ TO CPYn'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Awaiting Replication to available Clusters on Cache Partition n in Preference group m. This field contains the amount of data in the TVC partition whose volumes are assigned to this preference group, and are awaiting replication to other available clusters. Data to be replicated to clusters which are either not available (service or offline) or are blocked from receiving copies (Host Console Request) are not counted. This field depicts data that resides in cache. Data to be replicated that exists on tape only is not included.
PGm Sz to Mign	'PGm SZ TO MIGn'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Unmigrated Data on Cache Partition n in Preference group m. This field contains the amount of data in the TVC partition whose volumes are assigned to this preference group, and are not yet migrated to physical tape (cache only).
PGm ToSzDVol n	'PGm TOSZDVOL n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Resident Volumes Waiting for Delayed Premigration on Cache Partition n
PGm UnMgVols n	'PGm UNMGVOLS n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Unmigrated Vols. Number of unmigrated virtual volumes on Cache Partition n. Delayed premigration volumes are excluded.
Pgm Version	' PGM VERSION'			The version of VEHSTATS program
PGm VV in CP n	'PGm VV IN CP n'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Virtual Volumes in Cache on Cache Partition n in Preference group m. This field contains the number of virtual volumes in the Tape Volume Cache (TVC) partition that are assigned to the preference group this data is for.
Phy DevType	'PHY DEVT MODEL'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Device Class ID
Phy Mig Mnts	' PHY MIG MNTS'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Physical Pre-Migrate Mounts
Phy Rcm Mnts	' PHY RCM MNTS'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Physical Reclaim Mounts
Phy Rd MiB/s	' PHY MB/S RD'	Hnode Export/Import Historical	Library - Pooling – General Use Pool (GUP)	The number bytes read from the media. Converted to MiB/s by VEHSTATS.
Phy Stg Mnts	' PHY STG MNTS'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Physical Recall Mounts
Phy Vols Exp	' PHY VOL EXP'	Hnode Export/Import Historical	Export/Import	Physical Volumes Exported
Phy Vols Imp	' PHY VOL IMP'	Hnode Export/Import Historical	Export/Import	Physical Volumes Imported

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
Phy Wr MiB/s	' PHY MB/S WR'	Hnode Export/Import Historical	Library - Pooling – General Use Pool (GUP)	The number bytes written to the media. Converted to MiB/s by VEHSTATS.
P-Mig Throt	' P-MIG THROT'	Hnode HSM Historical	HSM – Cache Container	Pre-migration Throttle Threshold
POOL nn		Hnode Library Historical		A set for each of the 32 general use pools is available
POOL nn 3592Jx	'POOL nn DEVTXX'	Hnode Library Historical	Library - Pooling – GUP - Media	Physical Media Identifiers
POOL nn ACT GB	'POOL nn ACT GB'	Hnode Library Historical	Library - Pooling – General Use Pool (GUP)	Active Data – Converted to GB by VEHSTATS
POOL nn ACT VV	'POOL nn ACT VV'	Hnode Library Historical	Library - Pooling – General Use Pool (GUP)	Active Logical Volumes
POOL nn GiBRD	' POOL nn MB RD'	Hnode Library Historical	Library - Pooling – GUP - Media	Data Read from Pool – Converted to GiB by VEHSTATS
POOL nn GiBWRT	'POOL nn MB WRT'	Hnode Library Historical	Library - Pooling – GUP - Media	Data Written to Pool – Converted to GiB by VEHSTATS
POOL nn Privat	'POOL nn # PRIV'	Hnode Library Historical	Library - Pooling – GUP - Media	Private Volume Count
POOL nn Scrtch	'POOL nn # SRCH'	Hnode Library Historical	Library - Pooling – GUP - Media	Scratch Volume Count
PRIMEDm 3592mm	'PRIMEDm 3592mm'	Hnode Library Historical	Library - Pooling – GUP - Media	Private Volume Count – Computed by VEHSTATS by summing all of the General Use Pool data.
Rd Hit	' RD HIT'	Hnode HSM Historical	HSM – Cache – Partition	Cache Hit Mounts
Rd Hit n	' RD HIT n'	Hnode HSM Historical	HSM – Cache – Partition Container	Cache Hit Mounts on Cache Partition n
Rd Miss	' RD MISS'	Hnode HSM Historical	HSM – Cache – Partition	Cache Miss Mounts. This field indicates the number of mount requests completed that required recall from a stacked volume during this interval.
Rd Miss n	' RD MISS n'	Hnode HSM Historical	HSM – Cache – Partition Container	Cache Miss Mounts. This field indicates the number of mount requests completed that required recall from a stacked volume during this interval on Cache Partition n
Read Comp	' READ COMP'	Vnode Adapter Historical	Vnode Adapter-Port	Average read compression ratio. Computed by VEHSTATS using Bytes Read from Virtual Devices and Bytes Read by the Channel.
Scratch	' SCRATCH'	Hnode HSM Historical	HSM – Cache – Partition Container	Fast Ready Mounts (Scratch mounts)
Scratch n	' SCRATCH n'	Hnode HSM Historical	HSM – Cache – Partition Container	Fast Ready Mounts (Scratch mounts) on Cache Partition n
SCRMEDm 3592mm	'SCRMEDm 3592mm'	Hnode Library Historical	Library - Pooling – GUP - Media	Scratch Volume Count – Computed by VEHSTATS by summing all of the General Use Pool data.
Sum x->N MiB/s	'SUM x-->N MB/S'	Hnode Grid Historical	Grid-Cluster	Rate MiB/Sec transfered from CLx to all other clusters

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
Sync Mnts n	' SYNC n'	Hnode HSM Historical	HSM – Cache – Partition Container	Sync level mounts. This field indicates the number of mount requests completed using the sync mode copy method during this interval. Only mounts using both the primary cluster access point and the secondary cluster access point are included in this count on Cache Partition n.
ThrDlyAv 15Sec	' THRDLY AV SEC'	Vnode Virtual Device Historical	Vnode Virtual Device	Throughput Delay (Average/Sec). The DlyAv value is how much delay on average per 1 second was introduced to slow down the host.
ThrDlyMx 15Sec	' THRDLY MX SEC'	Vnode Virtual Device Historical	Vnode Virtual Device	Throughput Delay (Max/Sec)
To TVC By Cpy	' TO TVC BY CPY'	Hnode Grid Historical	Grid-Cluster	Rate MiB/Sec received by CLx from all other clusters
To TVC Dev Wr	' TO TVC DEV WR'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Written to Virtual Devices. Converted to MiB/s by VEHSTATS.
Tot Mgrtd Gb	' TOT MGRTD GB'	Hnode HSM Historical	HSM – Cache – Partition Container	Total Size of Migrated Data for all partitions
Tot Mgrtd Gb n	'TOT MGRTD GB n'	Hnode HSM Historical	HSM – Cache – Partition Container	Total Size of Migrated Data on Cache Partition n. This field contains the total size of lvols which are in migrated state.
Tot Mnts	' TOT MNTS'	Hnode HSM Historical	HSM – Cache – Partition	Number of total mounts
Tot Mnts n	' TOT MNTS n'	Hnode HSM Historical	HSM – Cache – Partition Container	Number of total mounts on Cache Partition n
Tot Phy Mnts	' TOT PHY MNTS'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Computed by VEHSTATS by summing the above 3 fields.
Total Comp	' TOTAL COMP'	Vnode Adapter Historical	Vnode Adapter-Port	Average read/write compression ratio. Computed by VEHSTATS using Bytes Read from Virtual Devices, Bytes Written to Virtual Devices, Bytes Read by the Channel, and Bytes Written by the Channel.
Total GiB Xfer	' TOT GB XFER'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Read by the Channel + Bytes Written by the Channel. Computed by VEHSTATS by summing the two fields. Converted to GiB by VEHSTATS
TVC Size	' TVC SIZE'	Hnode HSM Historical	HSM – Cache	TVC Size
TVC Used	' TVC USED'	Hnode HSM Historical	HSM – Cache Container	Total used cache
Virt Vols Exp	' VIRT VOL EXP'	Hnode Export/Import Historical	Export/Import	Logical Volumes Exported
Virt Vols Imp	' VIRT VOL IMP'	Hnode Export/Import Historical	Export/Import	Logical Volumes Imported
VolRecvDEF CLx	' NUM S-->x DEF'	Hnode Grid Historical	Grid-Cluster	Number of volumes Transferred into a cluster x from other clusters as part of a deferred copy operation
VolRecvIMM CLx	' NUM S-->x IMM'	Hnode Grid Historical	Grid-Cluster	Number of volumes Transferred into a cluster x from other clusters as part of an Immediate copy operation

"Order based" reports – Alphabetical Order				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
VolRecvSYN CLx	' NUM S-->x SYN'	Hnode Grid Historical	Grid-Cluster	Number of volumes Transferred into a cluster x from other clusters as part of a sync mode copy operation
Write Comp	' WRITE COMP'	Vnode Adapter Historical	Vnode Adapter-Port	Average write compression ratio. Computed by VEHSTATS using Bytes Written to Virtual Devices and Bytes Written by the Channel.
WrtThrotImpac%	'AV % WRT THROT'	Hnode HSM Historical	HSM – Cache	Computed by VEHSTATS using: • Percent Host Write Throttle • Average Host Write Throttle • Equation is shown at bottom of table.

$$\%\text{Relative Impact (\%RLTV IMPAC)} = \frac{(\#\text{ 30 sec samples with throttling}) * (\text{avg throttle value}) * (100 \text{ to express as \%})}{(\#\text{ 30 sec samples in interval}) * (2 \text{ sec max value})}$$

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