IBM® TS7700 Series
VEHSTATS Decoder
Version 2.4

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Contents

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 descriptions 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", "Max CPU Util", "Phy Rd MiB/s", "Phy Wr MiB/s", "Avg Sec DCThrt AVG", “Dev Rd MiB/s”, “Dev Wr MiB/s”, “Avg Sync Sec” (for Release 3.2)
  - 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, and PG0 SizPfrRmv
  The following fields are added: PG1 NumPinned, PG1 SizPinned, PG1 NumPfrRmv, and PG1 SizPfrRmv
  The following orders 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

- V2.2 January 2019
  - Revision the document to adjust the content for microcode R4.2
  - Renewing the samples of the reports due to the changes in the VEHSTATS
  - Renewing the structure of the document and the content of several sections to improve its readability
  - Actualization the ORDER list and their descriptions in the section **Counters of order based report**
- V2.2a January 2019
  - Fix the description for the order `'%HOST_WR_TH_TA' in the chapter "Counters of "order based" reports"`
- V2.3 December 2019 – changes to line up the document with the functionality of the VEHSTATS changes for microcode R5.0:
  - The reports H30TVCx:
    - The field "P-MIG THROT VALUE" moved to the section "WRITE_THROTTLING" after the field REASN;
    - The new fields "Temp. P-mig Threshold Thrtt" and "Temp. P-mig Threshold Prior" added to the section "WRITE_THROTTLING";
    - The new filed "Object in Cache" has been added to the end of the sections PREFERENCE_GROUP_0 and PREFERENCE_GROUP_1;
  - The report H33GRID:
    - The columns "LVOLS TO_TVC_BY SYNC_COPY" and "MiB TO_TVC_BY SYNC_COPY" have been removed because they did not contain data;
    - The columns "AV_DEF QUEAGE" and "AV_RUN QUEAGE" have been renamed to "AVg Queue Age DefCpy" and "AVg Queue Age ImmCpy";
    - The column "#_LVOLS TIM_DLY CPY_QUE" has been replaced with the column "AVg Queue Age TDlCpy";
    - The new columns "Max Queue Ages FmDFCp", "Max Queue Ages Copy", "Max Queue Ages TDlCpy", and "Pckt Retr Rate" have been inserted after the column "AVg Queue Age TDlCpy";
    - The new columns "Objects Mib Xfr TO_CL" and "Objects Mib Xfr FR_CL" have been inserted after the column "MiB_XFR FR_CL RMT_RD"
    - The abbreviation "DL" replaced with "CL";
  - The report HOURFLOW:
    - The new columns "MiB/s from DS8Ks" and "MiB/s to DS8Ks" have been inserted after the column "MiB/s Fr_TVC RMT_RD";
  - The order based reports:
    - The descriptions of the following orders introduced for microcode R5.0 have been added into the section "Counters of "order based" reports" : 'OBJECTS IN TVC', 'OBJSIZE IN TVC', 'PG0 ObjectsNum', 'PG1 ObjectsNum', 'PG0 Objects Sz', 'PG1 Objects Sz', 'Lgst TDCpQ Age', 'Lgst FmDCQ Age', 'Lgst CopyQ Age', 'Data From DS8K', ' Data To DS8K', 'Rte TVC<->DS8K' and 'Pckt Retr Rate'
    - The following orders implemented some time ago have been described as well: ' FIC UNCOMP RD', ' FIC UNCOMP WR', ' FIC COMP RD', ' FIC COMP WR', ' LZ4 UNCOMP RD', ' LZ4 UNCOMP WR', ' LZ4 COMP RD', ' LZ4 COMP WR', 'ZSTD UNCOMP RD', 'ZSTD UNCOMP WR', ' ZSTD COMP RD', ' ZSTD COMP WR' and ' FLASH USED'.
- V2.4 December 2020 –
  - New reports added: H35CLOCL/H35CLOID - Cloud Historical Activity by Clusters and by Pool IDs
  - The report H33GRID – the columns "Objects Mib Xfr TO_CL" & "Objects Mib Xfr FR_CL" renamed to "DS8K_and_Cloud Objects Mib_Xfr TO_CL" & "DS8K_and_Cloud Objects Mib_Xfr FR_CL"
  - The report HOURFLOW – the columns "MiB/s from DS8Ks" & "MiB/s to DS8Ks" renamed to "MiB/s from Clo/8K" & "MiB/s to Clo/8K";
  - The order based reports:
    - The following orders have been introduced:

```
ORDER='_active_CPOOLs';   number of Cloud Pools in period
ORDER='_NumObj_CPOOLs';   Number of Objects in Cloud Pools at EoP
ORDER='_SizObj_CPOOLs';   Size   of Objects in Cloud Pools at EoP
ORDER='RetONum_CPOOLs';   Number of Retention Objects in Cloud Pools at EoP
ORDER='RetOSiz_CPOOLs';   Size   of Retention Objects in Cloud Pools at EoP
ORDER='NumODel_CPOOLs';   Number of Deleted   Objects for period
```

```
ORDER='NumOLkp_CPOOLs';   Number of Objects Looked-up for period
ORDER='_RdONum_CPOOLs';   Number of Objects READ  from Cloud Pools for period
ORDER='_RdOSiz_CPOOLs';   Size   of Objects READ  from Cloud Pools for period
ORDER='WrtONum_CPOOLs';   Number of Objects WRITTEN to Cloud Pools for period
ORDER='WrtOSiz_CPOOLs';   Size   of Objects WRITTEN to Cloud Pools for period
ORDER='NumToDel_in06h';   Number of Objects To Be Deleted in 06 hours at EoP
ORDER='SizToDel_in06h';   Size   of Objects To Be Deleted in 06 hours at EoP
ORDER='NumToDel_in24h';   Number of Objects To Be Deleted in 24 hours at EoP
ORDER='SizToDel_in24h';   Size   of Objects To Be Deleted in 24 hours at EoP
ORDER='NumToDel_in36h';   Number of Objects To Be Deleted in 36 hours at EoP
ORDER='SizToDel_in36h';   Size   of Objects To Be Deleted in 36 hours at EoP
ORDER='NumToDel_in48h';   Number of Objects To Be Deleted in 48 hours at EoP
ORDER='SizToDel_in48h';   Size   of Objects To Be Deleted in 48 hours at EoP
ORDER='NumToDel_in72h';   Number of Objects To Be Deleted in 72 hours at EoP
ORDER='SizToDel_in72h';   Size   of Objects To Be Deleted in 72 hours at EoP
ORDER='_NickNm_CPOOL/nickname';  Nickname of Cloud pool
ORDER='__Id_P1_CPOOL/nickname';  The 1st part ( 5 symbols) of Cloud Pool ID
ORDER='__Id_P1_CPOOL/nickname';  The 2nd part (14 symbols) of Cloud Pool ID
ORDER='_NumObj_CPOOL/nickname';  Number of Objects in Cloud Pool at EoP
ORDER='_SizObj_CPOOL/nickname';  Size   of Objects in Cloud Pool at EoP
ORDER='RetONum_CPOOL/nickname';  Number of Retention Objects in CPool at EoP
ORDER='RetOSiz_CPOOL/nickname';  Size   of Retention Objects in CPool at EoP
ORDER='RetType_CPOOL/nickname';  Retention Type     at EoP
ORDER='_Status_CPOOL/nickname';  Retention Status   at EoP
ORDER='RetDurn_CPOOL/nickname';  Retention Deration at Eop
ORDER='WrtONum_CPOOL/nickname';  Number of Objects WRITTEN to CPool for period
ORDER='WrtOSiz_CPOOL/nickname';  Size   of Objects WRITTEN to CPool for period
ORDER='_RdONum_CPOOL/nickname';  Number of Objects READ  from CPool for period
ORDER='_RdOSiz_CPOOL/nickname';  Size   of Objects READ  from CPool for period
ORDER='NumODel_CPOOL/nickname';  Number of Deleted   Objects for period
ORDER='NunOLkp_CPOOL/nickname';  Number of Objects Looked-up for period
ORDER='NumToDel_in06/nickname';  Number of Objects To Be Deleted in 06h at EoP
ORDER='SizToDel_in06/nickname';  Size   of Objects To Be Deleted in 06h at EoP
ORDER='NumToDel_in24/nickname';  Number of Objects To Be Deleted in 24h at EoP
ORDER='SizToDel_in24/nickname';  Size   of Objects To Be Deleted in 24h at EoP
ORDER='NumToDel_in36/nickname';  Number of Objects To Be Deleted in 36h at EoP
ORDER='SizToDel_in36/nickname';  Size   of Objects To Be Deleted in 36h at EoP
ORDER='NumToDel_in48/nickname';  Number of Objects To Be Deleted in 48h at EoP
ORDER='SizToDel_in48/nickname';  Size   of Objects To Be Deleted in 48h at EoP
ORDER='NumToDel_in72/nickname';  Number of Objects To Be Deleted in 72h at EoP
ORDER='SizToDel_in72/nickname';  Size   of Objects To Be Deleted in 72h at EoP
```

- The vertical order based reports (COMPARE, DAYSMRY, MONSMRY) - the header of lines is increased by 8 characters;
- The horizontal order based reports (DAYHSMRY, HOURFLAT, MNTHSMRY, WEKHSMRY) – additional line may be printed in case processing orders with the parameter nickname.

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:
https://www.ibm.com/support/pages/node/6354995

The contents of some reports is controlled by the list of "orders", so called "order based" reports. The sequence of the fields in the reports depends on the sequence of the "orders" in the list of orders. The list of orders is specified by the DD statement in the job to run the program. There are some predefined order lists (like ORDERV12, ORDERALL, ORDER8CL and others). In addition, you may create your own lists depending on the statistics you want to see.
All "order based" reports contain the same fields (counters), therefore their description is in a separate section–***Counters of "order based" reports***.
More information about usage the program VEHSTATS may be found in the document **VEHSTATS_user_manual.pdf** (https://public.dhe.ibm.com/storage/tapetool)

General information

There are 2 kinds of reports generated by VEHSTATS:

- reports with fixed layouts or legacy reports;
- order based or summary reports – reports with user-defined layouts.

The order based reports are: COMPARE, DAYSMRY, DAYHSMRY, HOURFLAT, MONSMRY, MNTHSMRY and WEKHSMRY. The rest of the reports are reports with fixed layouts. Usually the reports with fixed layout describe the content of one type of historical statistical records.
There are 2 groups of order based reports – vertical and horizontal.
In vertical order based reports fields with same statistics are collected in lines for different periods or clusters. COMPARE, DAYSMRY and MONSMRY are vertical order based reports.
In horizontal order based reports every detail line contains several statistic values for a period or a cluster. DAYHSMRY, HOURFLAT, MNTHSMRY, WEKHSMRY are horizontal order based reports.

Common Header related fields

Most of the reports contain standards header lines like in the following example. The reported date is located in the first field of the page header and the reported time for a historical record is the first tile of a detail line.

```
(C) IBM   REPORT=H20VIRT (16032)          VNODE VIRTUAL DEVICE HISTORICAL RECORDS          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 -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
00:30:00   256   1   3   7    MAX      na   .000   .000      0   208066    76661      989      187
02:15:00*  256   1   3   7    MAX      na   .000   .000      0   208066    76661      989      187
```

Field	Record Name	Container Name	Description
REPORT=H20VIRT (16032)			H20VIRT – the nickname of the report 16032– the VEHSTATS's version label
VNODE VIRTUAL DEVICE HISTORICAL RECORDS			The title of the report
RUN ON 03FEB2016 @ 23:32:49			Contains the date and time of the report creation
PAGE 1			Contains the number of the report page
GRID#=*xxxxx*	Any Historical record	Header	Grid Library Sequence Number
DIST_LIB_ID= *n*			Distributed Library Sequence Number
VNODE_ID= *n*			Node ID
NODE_SERIAL= CL*nMMMMM*			*n* – the cluster number *MMMMM* - Machine Serial Number
VE_CODE_LEVEL=xxx.xxx.xxxx.xxxx			Microcode level of the TS7700
Cloud_Pool_ID=xxxxxxxxxxxxxxxxxxx	Hnode Cloud Historical record		Contains the ID of the cloud pool. (New field for microcode level 5.1)
UTC NOT CHG or UTCPLUS nn or UTCMINUS nn			Shows the value of the corresponding VEHSTATS parameter specified for a particular program run
12JAN16TU	Any Historical record	Header	12JAN16 – the date of the statistical record with layout **DDMMMYY**. A report page contains the data for one particular date. TU – the day of week: • SU - Sunday • MO – Monday • TU – Tuesday • WE – Wednesday • TH - Thursday • FR – Friday • SA - Saturday
RECORD TIME			The values in the column with this title are time of the statistical record printed in the detail lines * means nonstandard interval with the previous time stamp.

The reports with fixed layout

H20VIRT - Vnode Virtual Device Historical Records

```
(C) IBM   REPORT=H20VIRT (16032)          VNODE VIRTUAL DEVICE HISTORICAL RECORDS          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 -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

      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	Vnode Virtual Device Historical	Vnode Virtual Device	Configured Maximum Throughput
ATTMPT THRPUT	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	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	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 TS7700 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 TS7700 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 TS7700 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 - Vnode Adaptor Historical Activity

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

```
(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
```

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 from Disk Cache • Compression ratio computed by VEHSTATS • Bytes Written to Virtual Devices • Compression ratio computed by VEHSTATS

H21ADPXX - Vnode Adaptor Historical Activity Combined

```
(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
```

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 - Vnode Adaptor Historical Activity Combined

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	Sum of Bytes Read by Virtual Devices and Bytes Written to Virtual Devices divided by amount of an interval
`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
`--------------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

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

H21ADPSU – throughput distribution

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

```
(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
```

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 - HSM Compression Container

This report contains the information for Compression Methods.

```
(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
```

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 - Hnode Historical Cache Partition

The character "x' in the report name H30TVC**x** shows that the report belongs to the Cache Partition "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 CP0 has meaningful values.
This report is decoded in several sections (parts) due to its large number of columns.

H30TVCx - Throughput info (Part 1)

Part 1 before the VEHSTATS modifications for microcode release 5.0:

```
(C) IBM   REPORT=H30TVC1 (18309)          HNODE HSM HISTORICAL CACHE PARTITION            RUN ON 18DEC2018 @ 14:52:56    PAGE   1
GRID#=11111   DIST_LIB_ID= 2  VNODE_ID= 0  NODE_SERIAL=CL2H8888  VE_CODE_LEVEL=008.041.100.0015   HNODE=ACTIVE         UTC NOT CHG
PARTITION SIZE=  10634GB            TVC_SIZE= 753634GB                                          <------------WRITE_THROTTLING------------>
12AUG18SU                          ---TOTAL--   FAST_RDY CACHE_HIT CACHE_MIS SYNC_MODE P-MIG              NUM   NUM   NUM  %RLTV
  RECORD  AVG  MAX  AVG  MAX PART   NUM  AVG   NUM  AVG  NUM  AVG  NUM  AVG  NUM  AVG THROT   PCT   AVG 15MIN 30SEC   SEC  IMPAC
END_TIME  CPU_UTIL DISK_UTIL HIT%  MNTS SECS  MNTS SECS MNTS SECS MNTS SECS MNTS SECS VALUE  THRT  THRT INTVL SMPLS   /IO  VALUE REASN

01:00:00   12   25   17   45          0          0  .00    0  .00    0  .00    0  .00  2000     0     0     0     0  .000    .00 x0000
02:00:00   11   17    9   12          0          0  .00    0  .00    0  .00    0  .00  2000     0     0     0     0  .000    .00 x0000
03:00:00   18   34   22   42          0          0  .00    0  .00    0  .00    0  .00  2000     0     0     0     0  .000    .00 x0000
04:00:00   17   26   23   42          0          0  .00    0  .00    0  .00    0  .00  2000     0     0     0     0  .000    .00 x0000
05:00:00   17   27   37   59          0          0  .00    0  .00    0  .00    0  .00  2000     0     0     0     0  .000    .00 x0000
```

Part 1 after the VEHSTATS modifications for microcode release 5.0:

```
(C) IBM   REPORT=H30TVC1 (19333)          HNODE HSM HISTORICAL CACHE PARTITION            RUN ON 28NOV2019 @ 12:57:17    PAGE   1
GRID#=FF999   DIST_LIB_ID= 1  VNODE_ID= 0  NODE_SERIAL=CL1H4321  VE_CODE_LEVEL=008.041.201.0004   HNODE=ACTIVE         UTC NOT CHG
PARTITION SIZE=   5833GB            TVC_SIZE=  95833GB                                <-------------------- WRITE_THROTTLING -------------------->
15SEP19SU                          ---TOTAL--   FAST_RDY CACHE_HIT CACHE_MIS SYNC_MODE              NUM   NUM   NUM  %RLTV       P-MIG _Temp._P-mig_
  RECORD  AVG  MAX  AVG  MAX PART   NUM  AVG   NUM  AVG  NUM  AVG  NUM  AVG  NUM  AVG   PCT   AVG 15MIN 30SEC   SEC  IMPAC      THROT __Threshold__
END_TIME  CPU_UTIL DISK_UTIL HIT%  MNTS SECS  MNTS SECS MNTS SECS MNTS SECS MNTS SECS  THRT  THRT INTVL SMPLS   /IO  VALUE REASN    GB  Thrtt  Prior

01:00:00    9   31    5   52          0          0  .00    0  .00    0  .00    0  .00     0     0     0     0  .000    .00 x0000  2097      0      0
02:00:00    9   46    6   55          0          0  .00    0  .00    0  .00    0  .00     0     0     0     0  .000    .00 x0000  2097      0      0
03:00:00    9   41    1   44          0          0  .00    0  .00    0  .00    0  .00     0     0     0     0  .000    .00 x0000  2097      0      0
04:00:00    8   18    0   10          0          0  .00    0  .00    0  .00    0  .00     0     0     0     0  .000    .00 x0000  2097      0      0
05:00:00    8   37    4   69          0          0  .00    0  .00    0  .00    0  .00     0     0     0     0  .000    .00 x0000  2097      0      0
```

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		HSM-Cache	TVC (Cache) Size. For TS7740 - this is the enabled cache size, all other models – the installed cache size
Body Related Fields			
AVG CPU_UTIL or AVG CLUS_UTIL	Hnode HSM Historical	HSM-Cache	For R3.0 PGA1 or higher the field contains the Average CPU Usage percentage For R2.0 through Pre-R3.0 PGA1 code levels the field contains the Average Cluster Utilization percentage. This is the greater of CPU Utilization and Disk Cache Throughput Utilization.
MAX CPU_UTIL			For R3.0 PGA1 or higher the fields contain the Average and Maximum CPU Usage percentage For R2.0 through Pre-R3.0 PGA1 code levels the Maximum field is zero

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 1			
Field name	**Record Name**	**Container Name**	**Description**
AVG DISK_UTIL			Average Maximum Disk Usage Percentage (first reported in R3.0 PGA1)
MAX DISK_UTIL			Maximum Disk Usage Percentage (first reported in R3.0 PGA1)
PART HIT%	Hnode HSM Historical	HSM-Cache-Partition	Computed by VEHSTATS as a sum of fast ready and cache hit mounts and dividing by the total number of mounts.
TOTAL NUM MNTS			Computed by VEHSTATS as sum of Fast Ready Mounts, Cache Hit Mounts and 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			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 MNTS			Fast Ready Mounts
FAST_RDY AVG SECS			Average Fast Ready Mount Time
CACHE_HIT NUM MNTS			Cache Hit Mounts
CACHE_HIT AVG SECS			Average Cache Hit Mount Time
CACHE_MIS NUM MNTS			Cache Miss Mounts
CACHE_MIS AVG SECS			Average Cache Miss Mount Time
SYNC_MODE NUM MNTS			Sync Level Mounts (first reported with R2.1.)
SYNC_MODE AVG SECS			Sync Level Mount Time (first reported with R2.1.)
P-MIG THROT VALUE		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. Moved to Part 2 for the report's version for microcode release 5.0

H30TVCx - Throttling values (Part 2)

Part 2 before the VEHSTATS modifications for microcode release 5.0:

```
UN ON 18DEC2018 @ 14:52:56     PAGE    1
015    HNODE=ACTIVE          UTC NOT CHG
<------------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

    0      0     0     0  .000    .00 x0000      0      0     0     0  .000    .00 x0000       0      0     0     0   .000 .125 x0000
    0      0     0     0  .000    .00 x0000      0      0     0     0  .000    .00 x0000       0      0     0     0   .000 .125 x0000
    0      0     0     0  .000    .00 x0000      0      0     0     0  .000    .00 x0000       0      0     0     0   .000 .125 x0000
    0      0     0     0  .000    .00 x0000      0      0     0     0  .000    .00 x0000       0      0     0     0   .000 .125 x0000
    0      0     0     0  .000    .00 x0000      0      0     0     0  .000    .00 x0000       0      0     0     0   .000 .125 x0003
```

Part 2 after the VEHSTATS modifications for microcode release 5.0:

```
     RUN ON 28NOV2019 @ 12:57:17     PAGE    1
.201.0004    HNODE=ACTIVE          UTC NOT CHG
<--------------------- WRITE_THROTTLING ---------------------> <-------------COPY_THROTTLING------------> <---------DEFER_COPY_THROTTLING--------->
                NUM    NUM    NUM  %RLTV       P-MIG _Temp._P-mig_                NUM    NUM    NUM  %RLTV                      NUM    NUM     AVG
  PCT    AVG 15MIN 30SEC    SEC  IMPAC       THROT __Threshold__    PCT    AVG 15MIN 30SEC    SEC  IMPAC           PCT    AVG 15MIN 30SEC     SEC BASE
 THRT   THRT INTVL SMPLS    /IO  VALUE REASN    GB  Thrtt  Prior   THRT   THRT INTVL SMPLS    /IO  VALUE REASN     THRT   THRT INTVL SMPLS /INTVL SECS REASN

    0      0     0     0  .000    .00 x0000  2097      0      0      0      0     0     0  .000    .00 x0000       1      1     1     2   .001 .085 x0003
    0      0     0     0  .000    .00 x0000  2097      0      0      0      0     0     0  .000    .00 x0000       0      0     0     0   .000 .085 x0000
    0      0     0     0  .000    .00 x0000  2097      0      0      0      0     0     0  .000    .00 x0000       0      0     0     0   .000 .085 x0000
    0      0     0     0  .000    .00 x0000  2097      0      0      0      0     0     0  .000    .00 x0000       0      0     0     0   .000 .085 x0000
    0      0     0     0  .000    .00 x0000  2097      0      0      0      0     0     0  .000    .00 x0000       0      0     0     0   .000 .085 x0000
```

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 2			
Field name	**Record Name**	**Container Name**	**Description**
WRITE_THROTTLING PCT THRT	Hnode HSM Historical	HSM-Cache for CP0 Extended HSM – Cache Container for CP1 – CP7(for Tape or Cloud Attached Cache Partition)	Percent Host Write Throttle
WRITE_THROTTLING AVG THRT			Average Host Write Throttle
WRITE_THROTTLING NUM 15MIN INTVL			Number of 15 minute intervals being reported – computed by VEHSTATS.
WRITE_THROTTLING NUM 30SEC SMPLS			Computed from Percent Host Write Throttle and sample period length
WRITE_THROTTLING SEC/IO			Average Host Write Throttle
WRITE_THROTTLING %RLTV IMPAC VALUE			Computed by VEHSTATS using the formula at page 13
WRITE_THROTTLING REASN			Host Write Throttle Reason(s) (first reported with R3.0)
P-MIG THROT VALUE			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.(moved from Part 1)
Temp._P-mig Threshold Thrtt			Temporary Pre-migration Throttle Threshold
Temp._P-mig Threshold Prior			Temporary Pre-migration Priority Threshold
COPY_THROTTLING PCT THRT			Percent Copy Throttle
COPY_THROTTLING AVG THRT			Average Copy Throttle
COPY_THROTTLING NUM 15MIN INTVL			Number of 15 minute intervals being reported..

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 2			
Field name	**Record Name**	**Container Name**	**Description**
COPY_THROTTLING NUM 30SEC SMPLS			Computed from Percent Copy Throttle and sample period length
COPY_THROTTLING NUM SEC/IO			Average Copy Throttle
COPY_THROTTLING IMPAC VALUE			Computed by VEHSTATS using the formula at page 13
COPY_THROTTLING REASN			Copy Throttle Reason(s) (first reported with R3.0)
DEFER COPY_THROTTLING THRT			Percent Deferred Copy Throttle
DEFER COPY_THROTTLING AVG THRT			Average Deferred Copy Throttle
DEFER_COPY_THROTTLING NUM 15MIN INTVL			Number of 15 minute intervals being reported. .
DEFER_COPY_THROTTLING NUM 30SEC SMPLS			Computed from Percent Deferred Copy Throttle and sample period length
DEFER_COPY_THROTTLING AVG/INTVL			Average Deferred Copy Throttle
DEFER_COPY_THROTTLING BASE SECS			Base Deferred Copy Throttle
DEFER_COPY_THROTTLING REASN			Deferred Copy Throttle Reason(s) (first reported with R3.0)

H30TVCx – Preference Group 0 and 1 (Part 3)

Part 3 before the VEHSTATS modifications for microcode release 5.0:

```
<----------------------------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 ******  521642      0    805 1.8Y 1.8Y 1.7Y    0   0K   0K        0        0
    0       0      0      0    0    0    0    0   0K   0K        0        0 ******  521845      0    618 1.8Y 1.8Y 1.7Y    0   0K   0K        0        0
    0       0      0      0    0    0    0    0   0K   0K        0        0 ******  521871      0    287 1.8Y 1.8Y 1.7Y    0   0K   0K        0        0
    0       0      0      0    0    0    0    0   0K   0K        0        0 ******  521928      0      6 1.8Y 1.8Y 1.7Y    0   0K   0K        0        0
    0       0      0      0    0    0    0    0   0K   0K        0        0 ******  521930      0     79 1.8Y 1.8Y 1.7Y    0   0K   0K        0        0
```

Part 3 after the VEHSTATS modifications for microcode release 5.0:

```
<-----------------------------PREFERENCE_GROUP_0------------------------------>  <-----------------------------PREFERENCE_GROUP_1------------------------------>
  VIRT      GB  GBTO  GBTO Rolling_Av_Age                                Objects    VIRT      GB  GBTO  GBTO Rolling_Av_Age                                Objects
  VOLS     RES   PRE   COPY -TIME_IN_CACHE -VIRT_VOLS_MIG-  LVols_Removed    in    VOLS     RES   PRE   COPY -TIME_IN_CACHE -VIRT_VOLS_MIG-  LVols_Removed    in
 CACHE   CACHE   MIG    OUT  4HR 48HR 35DA  4HR 48HR  35DA AV_AGE    COUNT Cache   CACHE   CACHE   MIG    OUT  4HR 48HR 35DA  4HR 48HR  35DA AV_AGE    COUNT Cache
                          -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     0    6632   29708      0      5 1.8Y 1.8Y 1.6Y    0   0K   0K        0        0     0
    0       0      0      0    0    0    0    0   0K   0K        0        0     0    6639   29711      0      0 1.8Y 1.8Y 1.6Y    0   0K   0K        0        0     0
    0       0      0      0    0    0    0    0   0K   0K        0        0     0    6643   29712      0      0 1.8Y 1.8Y 1.6Y    0   0K   0K        0        0     0
    0       0      0      0    0    0    0    0   0K   0K        0        0     0    6646   29714      6      0 1.8Y 1.8Y 1.6Y    0   0K   0K        0        0     0
    0       0      0      0    0    0    0    0   0K   0K        0        0     0    6652   29744      0      0 1.8Y 1.8Y 1.6Y    0   0K   0K        0        0     0
```

The number in the section titles (0 or 1) indicates which preference group the columns belong to. For TS7700 with Disk that usually uses CP0 only the fields in PG1 have meaningful values while the fields in PG0 would be 0. For TS7700 with tape or cloud attached CP1-7, both of PG0 and PG1 can have the values. The values in this section are at the end of an interval.

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 3			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
VIRT VOLS CACHE	Hnode HSM Historical	HSM - Cache – Partition – Preference Group	Virtual Volumes in Cache.
GB RES CACHE			Data Resident in Cache divided by 1000 to convert MB to GB.
GiBTO PRE MIG			Unmigrated Data divided by 1024 to convert MiB to GiB.
GiBTO COPY OUT			Awaiting Replication to available Clusters.
MIN ROLLING_AV TIME_IN_CACHE 4HR			4 Hour Average Cache Age (updated once per hour)
MIN ROLLING_AV TIME_IN_CACHE 48HR			48 Hour Average Cache Age (updated once per hour)
MIN ROLLING_AV TIME_IN_CACHE 35DA			35 Day Average Cache Age(updated once per hour)
VIRT_VOLS_MIG 4HR			Volumes Migrated Last 4 Hours *
VIRT_VOLS_MIG 48HR			Volumes Migrated Last 48 Hours*
VIRT_VOLS_MIG35DA			Volumes Migrated Last 35 Days *
TIME_DELAY_COPY LVOLS_REMOVED AV_AGE			Removed time delayed copies average age (updated once per 4 hour)
TIME_DELAY_COPY LVOLS_REMOVED COUNT			Time delayed copies removal count (updated once per 4 hour)
Object in Cache		Extended HSM – Cache – Partition – Preference Group Container	The number of objects in the TVC partition that are assigned to the preference group this data is for

* - 0 for TS7700 disk only clusters and for CP0 of TS7700 tape or cloud attached CP0

H30TVCx - Total Cache Partition Information and Data Retention Information (Part 4)

```
<-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
 521642      0     351 509318     0       0      0 1101158     485      0       0
 521848      0     351 W80528     0       0      0 1101082     486      0       0
 521871      0     351 W80476     0       0      0 1100782     486      0       0
 521928      0     351 W90928     0       0      0 1100336     486      0       0
 521934      0     351 W90928     0       0      0 1100026     486      0       0
```

H30TVCx – HNODE HISTORICAL CACHE PARTITION – Part 4			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
TOTAL TVC_GB USED	Hnode HSM Historical	HSM – Cache	Total used cache
TOTAL GB_DR FLASH			Total used flash cache for Disaster Recovery
TOTAL MIGRD GB		HSM – Cache Partition	Total Size of Migrated Data (0 for TS7700 disk only)
DR VOLSER		HSM – Disaster Recovery	Disaster Recovery Volser
TOTAL UN P-MIGRD VOLS		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.
NUMBER PINNED			Number of Pinned Volumes
SIZEGB PINNED			Total Size of Pinned Volumes
NUMBER PREFER KEEP			Number of Prefer Keep Volumes
SIZEGB PREFER KEEP			Total Size of Prefer Keep Volumes
NUMBER PREFER REMOVE			Number of Prefer Remove Volumes
SIZEGB PREFER REMOVE			Total Size of Prefer Remove Volumes

H30TVCx – Preference Groups 0 and 1 Tape Delayed Premigration (Part 5)

The number in the section titles (0 or 1) indicates which preference group the columns belong to.
The fields have meaningful values only for CP1-7 (tape or cloud attached partitions).

<---------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
30	60	22	61	0	0	30	126	297	109	2	0	1	0	0	0	19	2	1	2
33	272	26	284	0	0	30	419	318	229	3	0	1	0	0	0	26	1	1	3
42	264	27	284	0	0	37	458	340	909	3	0	1	0	0	0	11	5	1	16
54	515	30	538	0	0	18	36	19	446	3	0	1	0	0	0	0	0	0	28
54	1509	33	1570	0	0	26	3	9	6	1	0	1	0	0	0	0	0	0	0

H30TVCx – HNODE HISTORICAL CACHE PARTITION			
Field name	**Record Name**	**Container Name**	**Description**
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			Volumes Migrated Last 4 Hours by Delayed Premigration
48H AGE			48 Hours Average Cache Age by Delayed Premigration
48H MIGD			Volumes Migrated Last 48 Hours by Delayed Premigration
35D AGE			35 Days Average Cache Age by Delayed Premigration
35DA MIGD			Volumes Migrated Last 35 Days by Delayed Premigration
WAIT MINS			Average Waiting Time of Delayed Premigration Volumes
SIZGB WAIT			Total Size of Resident Volumes Waiting for Delayed Premigration
NUM WAIT			Number of resident volumes on TVC waiting for delayed premigration.
UN P-MIGRD VOLS			Number of un-premigrated virtual volumes. (0 for TS7700 disk only and TS7700T CP0). Delayed premigration volumes are excluded.

H31IMEX - Hnode Export/Import Historical Activity

```
(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 / H32TDU34- Hnode Library Historical Drive Activity

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

```
(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
```

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 - Hnode Library Historical Scratch Pool Activity

```
(C) IBM   REPORT=H32CSP  (18309)          HNODE LIBRARY HIST SCRTCH POOL ACTIVITY          RUN ON 19NOV2018 @ 12:26:51    PAGE   1
GRID#=99777   DIST_LIB_ID= 2  VNODE_ID= 0  NODE_SERIAL=CL2H9111  VE_CODE_LEVEL=008.041.101.0010                        UTC NOT CHG
19AUG18SU ----------SCRATCH_STACKED_VOLUMES_AVAILABLE_BY_TYPE-----------
  RECORD
    TIME     3592JA  3592JJ  3592JB  3592JC  3592JK  3592JD  3592JL  NONE
01:00:00          0       0     129     132       0       0       0     0
02:00:00          0       0     129     132       0       0       0     0
03:00:00          0       0     129     132       0       0       0     0
04:00:00          0       0     129     132       0       0       0     0
05:00:00          0       0     129     132       0       0       0     0
```

H32CSP – HNODE LIBRARY HISTORICAL SCRATCH POOL ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
3592***xx***	Hnode Library Historical	Library - Pooling – Common Scratch Pool (CSP) Media	Physical Media Count The title of the fields contain the corresponding Media types from CSP. “NONE” is printed if no association with a media type

H32GUPnn - Hnode Library Historical GUP/Pooling Activity

Report H32GUP01 is for pool 01 and 02 volumes, H32GUP03 is for pool 03 and 04 volumes, and so forth. The data only for 2 media types is provided for a pool. If a pool has more media types than 2 then the number of the remaining media types is printed in the column after the column "**UN AVAIL**".

```
(C) IBM   REPORT=H32GUP01(18309)          HNODE LIBRARY HIST GUP/POOLING ACTIVITY          RUN ON 19NOV2018 @ 12:26:51    PAGE  01
GRID#=99888   DIST_LIB_ID= 2  VNODE_ID= 0  NODE_SERIAL=CL2H9955  VE_CODE_LEVEL=008.041.101.0010   3584-L22(#11736)     UTC NOT CHG
19AUG18SU POOL 01 3592-E07                  3592JA       +3592JB                                  POOL 02 3592-E07
  RECORD  ACTIVE  ACTIVE     MiB     MiB RECLAIM Brw          WAIT READ    UN          WAIT READ    UN     ACTIVE  ACTIVE     MiB
    TIME   LVOLS      GB  WRITTN    READ PCT POL Ind SCR  92JA SDE ONLY AVAIL  SCR  92JB SDE ONLY AVAIL      LVOLS      GB  WRITTN
UPD INT=>  -ON_THE_HOUR-                          ----------ON_THE_HOUR------  -------ON_THE_HOUR------      -ON_THE_HOUR-
01:00:00  589903  522244 1454132      48  35  01  BR  47   634   0    0     0    0   220   0    0     0 +1    1497    1197       0
02:00:00  589917  522251    9061       0  35  01  BR  48   633   0    0     0    0   220   0    0     0 +1    1497    1197       0
03:00:00  590074  522660  443410    3551  35  01  BR  48   633   0    0     0    0   220   0    0     0 +1    1497    1197       0
04:00:00  590193  522759   59318     441  35  01  BR  48   633   0    0     0    0   220   0    0     0 +1    1497    1197       0
05:00:00  590347  523034  291576      55  35  01  BR  48   633   0    0     0    0   220   0    0     0 +1    1497    1197       0
```

```
POOL 02 3592-E07                  3592JA       +3592JB
 ACTIVE  ACTIVE     MiB     MiB RECLAIM Brw          WAIT READ    UN          WAIT READ    UN
  LVOLS      GB  WRITTN    READ PCT POL Ind SCR  92JA SDE ONLY AVAIL  SCR  92JB SDE ONLY AVAIL
  -ON_THE_HOUR-                     ----------ON_THE_HOUR------  -------ON_THE_HOUR------
   1497    1197       0       0  20  02  BR   0     3   0    0     0    0     1   0    0     0
   1497    1197       0       0  20  02  BR   0     3   0    0     0    0     1   0    0     0
   1497    1197       0       0  20  02  BR   0     3   0    0     0    0     1   0    0     0
   1497    1197       0       0  20  02  BR   0     3   0    0     0    0     1   0    0     0
   1497    1197       0       0  20  02  BR   0     3   0    0     0    0     1   0    0     0
```

H32GUPnn – HNODE LIBRARY HISTORICAL GUP/POOLING ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
Header Related Fields			
3584-L22(#11736)	Hnode Library Historical	Library Container	• **3584** - Library Machine Type • **L22** – Library Model Number • **11736**– Library Sequence Number
POOL xx		Library - Pooling – General Use Pool (GUP) Container	The pool number : **xx** from 1 to 32
3592-*mmm*			Device Class field
3592JA +3592JB		Library - Pooling – GUP - Media Container	Media types associated with the pool
Body Related Fields			
ACTIVE LVOLS	Hnode Library Historical	Library - Pooling – General Use Pool (GUP) Container	Active Logical Volumes
ACTIVE GB			Active Data
MiB WRITTN			Data Written to Pool
MiB READ			Data Read from Pool
RECLAIM PCT		Pooling – GUP - Reclaim Container	Reclaim Threshold
RECLAIM POOL			Pool number based on which GUP is being reported

H32GUPnn – HNODE LIBRARY HISTORICAL GUP/POOLING ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
Brw Ind	Hnode Library Historical	Pooling – GUP - Properties Container	Borrow Indicator: • **BR - Borrow, Return -** a cartridge is borrowed from the CSP and returned to the CSP when emptied • **BK - Borrow, Keep -** a cartridge is borrowed from the CSP and retain by the actual pool, even after being emptied. • **NR - No Borrow, Return -** a cartridge is not borrowed from CSP, but an emptied cartridge is placed in CSP. This setting is used for an empty pool. • **NK - No Borrow, Keep** - a cartridge is not borrowed from CSP, and an emptied cartridge is retained in the actual pool.
SCR		Library - Pooling – GUP - Media Container	Scratch Volume Count (borrowed included)
92JB			Private Volume Count by media type (borrowed included). The title of the field contains 4 last symbols from the corresponding media type
WAIT SDE			Waiting for Security Data Erase
READ ONLY			Read Only Recovery Volume Count
UN AVAIL			Unavailable Volume Count

H33GRID - Hnode Historical Peer-To-Peer Activity

The report before the VEHSTATS modifications for microcode release 5.0:

```
(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

                                                                                                 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

      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
```

The report after the VEHSTATS modifications for microcode releases 5.0 and 5.1:

```
(C) IBM    REPORT=H33GRID (19333)          HNODE HISTORICAL PEER-TO-PEER ACTIVITY          RUN ON 28NOV2019 @ 12:57:17    PAGE   1
GRID#=FF999    DIST_LIB_ID= 1  VNODE_ID= 0  NODE_SERIAL=CL1H4321  VE_CODE_LEVEL=008.041.201.0004                      UTC NOT CHG
 MiB is 1024 based, MB is 1000 based
15SEP19SU  LVOLS       MiB <- AVg Queue Ages -> <- Max Queue Ages -> Pckt LVOLS    MiB_ LVOLS    MiB_  MiB_TO  CALC MiB_XFR MiB_XFR
             TO        TO DefCpy ImmCpy TDlCpy FmDFCp   Copy TDlCpy Retr __TO_TVC_BY__ __TO_TVC_BY__  TVC_BY  MiB/   TO_CL   FR_CL
         RECEIVE   RECEIVE . . . . . . . . MINUTES . . . . . . . . . Rate ___RUN_COPY__ ___DEF_COPY__    COPY   SEC  RMT_WR  RMT_RD
01:00:00      18     23987      2      0      0      0      0      0   0%     0       0    50   35524   35507   9.8       0       0
02:00:00       3       898      3      0      0      0      0      0   0%     0       0   129  122281  122248  33.9       0       0


 _DS8K_and_Cloud
 ____Objects____  MiB_TO   GGM V_MNTS V_MNTS V_MNTS V_MNTS V_MNTS V_MNTS V_MNTS V_MNTS
 ____Mib Xfr____ GRID_BY  MiB/ DoneBy DoneBy DoneBy DoneBy DoneBy DoneBy DoneBy DoneBy
   TO_CL   FR_CL     GGM   SEC    CL0    CL1    CL2    CL3    CL4    CL5    CL6    CL7
       0       0       0             0      0      0      0      0      0      0      0
       0       0       0             0      0      0      0      0      0      0      0

MiB_FR         MiB_FR         MiB_FR         MiB_XFR        MiB_XFR        MiB_XFR        MiB_XFR        MiB_XFR        MiB_XFR
 1-->0  CALC    1-->2  CALC    1-->3  CALC    0-->1  CALC    2-->1  CALC    3-->1  CALC    0-->1  CALC    2-->1  CALC    3-->1  CALC
TVC_BY  MiB/   TVC_BY  MiB/   TVC_BY  MiB/       BY  MiB/       BY  MiB/       BY  MiB/       BY  MiB/       BY  MiB/       BY  MiB/
  COPY   SEC     COPY   SEC     COPY   SEC   RMT/WR   SEC   RMT/WR   SEC   RMT/WR   SEC   RMT/RD   SEC   RMT/RD   SEC   RMT/RD   SEC
     0           25299   7.0    19609   5.4        0              0              0              0              0              0
     0               0              0              0              0              0              0              0              0
```

H33GRID – HNODE HISTORICAL PEER-TO-PEER ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
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			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.
Was: AV_DEF QUEAGE AV_RUN QUEAGE *Became:* AVg Queue Age DefCpy AVg Queue Age ImmCpy			• 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) *The titles were changed in the VEHSTATS version for microcode release R5.0*
#_LVOLS TIM_DLY CPY_QUE			• 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) *The column was removed in the VEHSTATS version for microcode release R5.0.*
AVg Queue Age TDlCpy			The average age of the logical volumes 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. *The column was inserted in the VEHSTATS version for microcode release R5.0*
Max Queue Ages FmDFCp		Extended Grid	Longest Family Deferred Copy Queue Age the copies in the family deferred state that are in the copy queue. *The column was inserted in the VEHSTATS version for microcode release R5.0*
Max Queue Ages Copy			Longest Copy Queue Age the copies that are in the copy queue. *The column was inserted in the VEHSTATS version for microcode release R5.0*
Max Queue Ages TDlCpy			Longest Time Delayed Copy Queue Age of the copies in the timed delay state that are in the copy queue. *The column was inserted in the VEHSTATS version for microcode release R5.0*
LVOLS__TO_TVC_BY__RUN_COPY_ MiB__TO_TVC_BY__RUN_COPY_		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_TO_TVC_BY_DEF_COPY_ MiB_TO_TVC_BY_DEF_COPY_			• 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).

H33GRID – HNODE HISTORICAL PEER-TO-PEER ACTIVITY			
Field name	**Record Name**	**Container Name**	**Description**
LVOLS_TO_TVC_BY_SYNC_COPY_ 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'. (Removed in the version for microcode release 5.0 because they do not contain data)
MiB_TO TVC_BY COPY			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			Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval
MiB_TO GRID_BY GGM GGM MIB/SEC			• 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)
Objects Mib Xfr TO CL DS8K_and_Cloud Objects Mib_Xfr TO_CL Objects Mib Xfr FR CL DS8K_and_Cloud Objects Mib_Xfr FR_CL			• Object Size in MiB transferred from DS8Ks and Cloud pools to the cluster • Object Size in MiB transferred from the cluster to DS8Ks and Cloud pools
V_MNTS DoneBy DL***x***			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			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			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			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.
CALC MiB/SEC			Computed by VEHSTATS using the above field and dividing by the number of seconds in the interval
MiB_XFR ***x***-->***y*** BY RMT/WR CALC MiB/SEC			Data Transferred into a Cluster's Cache from another Cluster as part of a remote write operation including sync mode copy during the interval and the rate computed by VEHSTATS. (The **x** is the source cluster number and the **y** is the target cluster).
MiB_XFR ***x***-->***y*** BY RMT/RD CALC MiB/SEC			Data Transferred into a Cluster's Cache from another Cluster as part of a remote read operation during the interval and the rate computed by VEHSTATS. (The **x** is the source cluster number and the **y** is the target cluster).

H35CLOCL/H35CLOID - Cloud Historical Activity by Clusters and by Pool IDs

These reports are introduced for microcode release 5.1

The report **H35CLOCL** shows the distribution of the values by Clusters.

```
(C) IBM   REPORT=H35CLOCL(20318)          Hnode Cloud Historical Activity by Clusters      RUN ON 13NOV2020 @  5:28:09   PAGE    1
GRID#=BA038   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL03A910  VE_CODE_LEVEL=008.051.000.0047                    UTC NOT CHG
31JUL20FR                                                  _____All_Objects_____                          _%_Objects_
  Record                                      _Retention_      Total        Total ____Retained_Objects___ __Retained_
    Time  Cloud_Pool_ID         NickName State Type  Dur-n     Number         Size     Number   Total_Size {nmb} {sze}
          3A91020200421181029   BUBBA_10  R/W   ON       1         99           76          0            0    .0    .0
          3A91020200710230952   BUBBA_16  R/W   ON       1        170          163          0            0    .0    .0
          3A91020200715164137   CLDP01    R/W   OFF      0          1            0          0            0    .0    .0
          3A91020200715164156   CLDP02    R/W   ON       1        981          855        811          691  82.6  80.8
          3A91020200715164223   CLDP03    R/W   ON       2          0            0          0            0    .0    .0
          3A91020200715164252   CLDP04    R/W   ON       3          0            0          0            0    .0    .0
          3A91020200715164400   CLDP05    R/W   ON       4          0            0          0            0    .0    .0
                       totals:     (16)                          2166         1787        823          691  37.9  38.6

              __Number_of_Objects__ ____ Objects_Read _____ ____ Objects_Written __
              ___Deleted __Look-ups ____Number __Total_Size ____Number __Total_Size
                       0          0          0          .0          0          .0
                       0          0          0          .0          0          .0
                       0          0          0          .0          0          .0
                       0          0          0          .0          0          .0
                       0          0          0          .0          0          .0
                       0          0          0          .0          0          .0
                       0          0          0          .0          0          .0
              totals:  0          0          0          .0          0          .0

              <-------------------------------------------------  _Objects_Eligible_to_be_Deleted_ ------------------------------------------------->
              ____within__6_hours____ ____within_24_hours____ ____within_36_hours____ ____within_48_hours____ ____within_72_hours____ _____after_72_hours____
              ____Number __Total_Size ____Number __Total_Size ____Number __Total_Size ____Number __Total_Size ____Number __Total_Size ____Number __Total_Size
                       0           0          0           0          0           0          0           0          0           0          0           0
                       0           0          0           0          0           0          0           0          0           0          0           0
                       0           0          0           0          0           0          0           0          0           0          0           0
                     811         691        811         691        811         691        811         691        811         691          0           0
                       0           0          0           0          0           0          0           0          0           0          0           0
                       0           0          0           0          0           0          0           0          0           0          0           0
                       0           0          0           0          0           0          0           0          0           0          0           0
              totals 823         691        823         691        823         691        823         691        823         691          0           0
```

The report **H35CLOID** shows the distribution of the values by Cloud Pool IDs.

```
(C) IBM   REPORT=H35CLOID(20318)          Hnode Cloud Historical Activity by Pool IDs      RUN ON 13NOV2020 @ 14:12:29    PAGER  1
GRID#=BA038   Cloud_Pool_ID=3A91020200401213519                                                                  UTC NOT CHG
31JUL20FR                                                  _____All_Objects_____                          _%_Objects_
  Record                                      _Retention_      Total        Total ____Retained_Objects___ __Retained_
    Time  Cluster  Code_Level   NickName State Type  Dur-n     Number         Size     Number   Total_Size {nmb} {sze}
14:30:00  CL03A910 051.000.0047 BUBBA_01  R/W   ON       1        118           80         12            0  10.1    .0
          CL43A920 051.000.0047 BUBBA_01  R/W   ON       1        118           80         12            0  10.1    .0
          CL51A4F0 051.000.0047 BUBBA_01  R/W   ON       1        118           80         12            0  10.1    .0
                       totals:     ( 3)                          118           80         12            0  10.1    .0
```

```
__Number_of_Objects__ ____ Objects_Read _____ ____ Objects_Written __
___Deleted __Look-ups ____Number __Total_Size ____Number __Total_Size
         0          0          0          .0          0          .0
         0          0          0          .0          0          .0
         0          0          0          .0          0          .0
totals:  0          0          0          .0          0          .0

<------------------------------------------------------  _Objects_Eligible_to_be_Deleted_ ------------------------------------------------------>
____within__6_hours____ ____within_24_hours____ ____within_36_hours____ ____within_48_hours____ ____within_72_hours____ _____after_72_hours____
____Number __Total_Size ____Number __Total_Size ____Number __Total_Size ____Number __Total_Size ____Number __Total_Size ____Number __Total_Si ze
        12           0         12           0         12           0         12           0         12           0          0           0
        12           0         12           0         12           0         12           0         12           0          0           0
        12           0         12           0         12           0         12           0          12          0          0           0
        12           0         12           0         12           0         12           0         12           0          0           0
totals:  0           0        823         691        823         691        823         691        823         691          0           0
```

The description of the fields for both reports is the same.

H35CLOCL - Cloud Historical Activity by Clusters			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
Cloud Pool ID	Cloud Historical Record	Pool X Container	ID of the cloud pool
NickName	Cloud Historical Record	Pool X Container	Nickname of the cloud pool
State	Cloud Historical Record	Pool X Container	The access status of the pool: READ-WRITE or READ-ONLY
Retention Type	Cloud Historical Record	Pool X Container	This field indicates how the volume version is retained in the pool: Volume version retention is disabled (OFF) or The number of days to retain volume versions is specified (ON)
Retention Dur-n	Cloud Historical Record	Pool X Container	The number of days to retain versions of data
All objects - Total Number	Cloud Historical Record	Pool X Container	The number of latest version lvols in the cloud pool
All objects - Total Size	Cloud Historical Record	Pool X Container	The total size of latest version lvols in the cloud pool in GiB
Retained_Objects - Number	Cloud Historical Record	Pool X Container	The number of lvols which are retained in the cloud pool at the end of the interval
Retained_Objects - Total Size	Cloud Historical Record	Pool X Container	The total size of lvols which are retained in the cloud pool at the end of the interval
% Objects Retained - numb	Cloud Historical Record	Pool X Container	The percentage of the number of lvols which are retained in the cloud pool at the end of the interval
% Objects Retained - size	Cloud Historical Record	Pool X Container	The percentage of the total size of lvols which are retained in the cloud pool at the end of the interval
Number of Objects_- Deleted	Cloud Historical Record	Pool X Container	The number of lvols which are deleted from the cloud pool during the interval
Number of Objects_- Look-ups	Cloud Historical Record	Pool X Container	The number of lvols which are looked up to check if they exist in the cloud pool during the interval

H35CLOCL - Cloud Historical Activity by Clusters			
Field name	**Record Name**	**Container Name**	**Description**
Objects Read - Number	Cloud Historical Record	Pool X Container	The number of lvols which are read from the cloud pool during the interval
Objects Read – Total Size	Cloud Historical Record	Pool X Container	The total size of lvols which are read from the cloud pool during the interval in KiB
Objects Written – Number	Cloud Historical Record	Pool X Container	The number of lvols which are written to the cloud pool during the interval
Objects Written – Total Size	Cloud Historical Record	Pool X Container	The total size of lvols which are written to the cloud pool during the interval in KiB
Objects Eligible to be Deleted within *x* hours – Number *(x=6,24,36,48,72)*	Cloud Historical Record	Pool X Container	Number of Objects Eligible to be Deleted within *x* hours. This field contains the total size of retained lvols which are eligible to be deleted from the cloud pool within *x* hours in GiB. Retained lvols mean the lvols which are older versions but not deleted yet because volume version retention is enabled by setting retention duration to the cloud pool. Therefore, this is total size of retained lvols whose retention durations expire within *x* hours.
Objects Eligible to be Deleted within *x* hours – Total Size *(x=6,24,36,48,72)*	Cloud Historical Record	Pool X Container	Total Size of Objects Eligible to be Deleted within *x* hours. This field contains the total size of retained lvols which are eligible to be deleted from the cloud pool within *x* hours in GiB. Retained lvols mean the lvols which are older versions but not deleted yet because volume version retention is enabled by setting retention duration to the cloud pool. Therefore, this is total size of retained lvols whose retention durations expire within *x* hours.
Objects Eligible to be Deleted after 72 hours - Number	Cloud Historical Record	Pool X Container	Number of Objects Eligible to be Deleted after 72 hours. This value is calculated as a difference between “Retained_Objects – Number” and “Objects Eligible to be Deleted within 72 hours – Number”
Objects Eligible to be Deleted after 72 hours – Total size	Cloud Historical Record	Pool X Container	Total Size of Objects Eligible to be Deleted after 72 hours . This value is calculated as a difference between “Retained_Objects – Total Size” and “Objects Eligible to be Deleted within 72 hours – Total Size”

HOURFLOW - Data Flow in MiB/sec by Cluster

The report before the VEHSTATS modifications for microcode release 5.0:

```
(C) IBM   REPORT=HOURFLOW(18309)          DATA FLOW IN MiB/sec by CLUSTER                RUN ON 03DEC2018 @ 10:41:57    PAGE   1
GRID#=34980   DIST_LIB_ID=00  NODE_SERIAL=CL0H7887  VE_CODE_LEVEL= 41.101.0010                        UTC NOT CHG   { Report Mode: HRS; USEGB=ON; ONEHEAD=OFF;}

                     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    Sec 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
15JAN2018 Mon 01:00:00    8   27    3   21   41.7    9.9     .0    9.1   22.6     .0     .0     .0      0      0 0.0546    .00    .00   .000     .0     .0  3600
15JAN2018 Mon 02:00:00   10   47    4   39   51.3   11.6     0.1  17.6   21.2     .0     .0     .0      0  8.098 4.1679    .00    .00   .000     0.6    .0  3600
15JAN2018 Mon 03:00:00    9   28    3   24   44.1   10.9     0.7   8.9   22.3     .0     .0     .0      0      0  6.383    .00    .00   .000     1.1    .0  3600
15JAN2018 Mon 04:00:00   10   26    2   13   18.2    2.4      .0   9.0    5.5     .0     .0     .0      0 0.8222 0.5009    .00    .00   .000     1.1    .0  3600
15JAN2018 Mon 05:00:00   20   63   14   76  145.3   37.1      .0  55.1   52.4     .0     .0     .0      0 105.54 343.07    .00    .00   .000     0.5    .0  3600
15JAN2018 Mon 06:00:00   33   47   34   65  383.8  104.6      .0 187.4   90.6     .0     .0     .0      0 367.01 1296.2    .00    .00   .000     1.0    .0  3600
```

The report after the VEHSTATS modifications for microcode release 5.0 and 5.1:

```
(C) IBM   REPORT=HOURFLOW(19333)          DATA FLOW IN MiB/sec by CLUSTER                RUN ON 28NOV2019 @ 12:57:17    PAGE   1
GRID#= FF999   DIST_LIB_ID=01  NODE_SERIAL=CL1H4321  VE_CODE_LEVEL= 41.201.0004                        UTC NOT CHG   { Report Mode: HRS; USEGB=ON;

                     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
                     CPU  CPU Disk Disk  Total To_TVC Fr_TVC To_TVC Fr_TVC To_TVC Fr_TVC By_GGM  GB_to  GB_to  GB_to  Throt  Throt    Sec To_TVC
    Date Day     Time Util Util Util Util   Xfer Dev_Wr Dev_Rd   Recv   Sent Recall PreMig        PreMig   Copy   Recv Impac% Impac% DCThrt RMT_WR
15SEP2019 Sun 01:00:00    9   31    5   52   31.1    8.7     .0    9.8   12.4     .0     .0     .0      0      6     25    .00    .00 0.001     .0
15SEP2019 Sun 02:00:00    9   46    6   55   33.9     .0     .0   33.9     .0     .0     .0     .0      0      0      1    .00    .00   .000     .0
15SEP2019 Sun 03:00:00    9   41    1   44    7.7     .0     .0    7.7     .0     .0     .0     .0      0      0      0    .00    .00   .000     .0
15SEP2019 Sun 04:00:00    8   18    0   10    1.4     .0     .0    1.4     .0     .0     .0     .0      0      0      2    .00    .00   .000     .0
15SEP2019 Sun 05:00:00    8   37    4   69   23.6     .0     .0   12.4    0.9    0.9    9.1     .0      0      0      0    .00    .00   .000     .0


 ONEHEAD=OFF;}

  MiB/s  MiB/s  MiB/s
 Fr_TVC   from     to  Intvl
 RMT_RD Clo/8K Clo/8K   Sec
     .0     .0     .0  3600
     .0     .0     .0  3600
     .0     .0     .0  3600
     .0     .0     .0  3600
    0.1     .0     .0  3600
```

All rates (MiB/sec) are average for the period (1 hour or 15 minutes interval).

HOURFLOW – DATA FLOW IN MiB/sec BY CLUSTER			
Field name	**Record Name**	**Container Name**	**Description**
Body Related Fields			
Avg Clus Util or Avg 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

HOURFLOW – DATA FLOW IN MiB/sec BY CLUSTER			
Field name	**Record Name**	**Container Name**	**Description**
Max Clus Util or Max 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
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 divided 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 divided 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 divided 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 divided 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 converted to GiB
Queue GiB_to Recv	Hnode Grid Historical	Grid	Depth of the incoming copy queue - Data to Copy converted 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 Calculated by the formula at page 13.

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 Calculated by the formula at page 13.
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 - divided 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 divided by the number of seconds in the interval.
MiB/s from DS8Ks MiB/s from Clo/8k	Hnode Grid Historical	Grid	Rate of transferred data to this Cluster's cache from DS8Ks and Cloud Pools (calculated on the base of Overall Object Data Transferred into Cache from DS8Ks) *The column was inserted in the VEHSTATS version for microcode release R5.0*
MiB/s to DS8Ks MiB/s to Clo/8k	Hnode Grid Historical	Grid	Rate of transferred data from this Cluster's cache to DS8Ks and Cloud Pools (calculated by VEHSTATS) *The column was inserted in the VEHSTATS version for microcode release R5.0*
Intvl Sec	-	-	The number of seconds in the reporting interval.

AVGRDST - Cache Miss Mounts detailed data and Average Recall Mount Pending Distribution

```
(C) IBM   REPORT=AVGRDST (17304)          Cache Miss Mounts' detailed 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 DISTRIBUTION  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 DISTRIBUTION   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 detailed data
- Average Recall Mount Pending Distribution per each cluster
- Average Recall Mount Pending Distribution 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.
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 - Distribution of data transfer Rates by Tiers

```
(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)
                      Sunday     Monday    Tuesday  Wednesday   Thursday     Friday   Saturday
           DATE:  05MAR2017  06MAR2017  07MAR2017  08MAR2017  09MAR2017  10MAR2017  11MAR2017
TIER \ GiB XFER:          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


                                    <------- Number of Quarters by Tiers ------->
     TIER   == MiB/S Boundaries ==   == 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**
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 transferred data.
MiB/S Boundaries			Range of rate.
by Average Rate			Shows the number of quarters with the corresponding average rate (and accumulated percentage).

HOURXFER - Distribution of data transfer Rates by Tiers			
Field name	**Record Name**	**Container Name**	**Description**
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.

Order based reports

The order based or summary reports – reports with user-defined layouts. There are 2 groups of order based reports – **vertical** and **horizontal**. In vertical order based reports values for same statistics are collected in lines for different periods. In horizontal order based reports the detail lines contain several statistics for a combination of a cluster and reported period.
The contents of the order based reports is controlled by the ORDERs - special input parameters of the program VEHSTATS. For every ORDER one detail line is generated in a vertical order based report and one column is generated in horizontal order based report
The ORDERs and the titles for generated lines or columns and the relationship with the fields from the historical statistical records are described in the section **"Counters of "order based" reports"**.

Vertical Order based reports

COMPARE - Cluster Comparison

This report shows the statistics for the period which data is contained in the input of the program VEHSTATS. 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. There can be up to 61 columns in the report. The line of the reports contain:

- Line 1 - is a standard header line;
- Line 2 – is a heading shows the From / To interval;
- Line 3 - is a blank line
- Lines 4 and 5 – the lines that contain Grid and Machine serial number for the reported clusters
- Lines after line 5 – detail lines with particular statistics for the clusters listed in the lines 4 and 5. The first column of these lines contains statistic titles.

Example 1 – the extract from Compare report for VEHSTATS versions before microcode R5.1:

```
(C) IBM   REPORT=COMPARE( 18309)          INTERVAL CLUSTER COMPARISON                  RUN ON 18DEC2018 @ 14:52:56    PAGE   1
                FROM 12AUG2018 @  0:15:00   TO  16DEC2018 @ 24:00:00                                          UTC NOT CHG

         GRID     11111          11111          11111          33333          33333          33333          33333          33333          33333
      CLUSTER     CL2H8814       CL3H8841       CL4H8837       CL0H9090       CL1H5063       CL3H5094       CL4H6089       CL5H6091       CL6H9999
   Code Level    41.100.0015    41.100.0015    41.100.0015    41.x0x.0x1x    30.02.0023     30.02.0023     xx.x0x.0xx3    xx.x0x.0xx3    41.200.0113
Activity Start  12AUG18 00:15  12AUG18 00:15  12AUG18 00:15  12AUG18 00:15  12AUG18 00:15  12AUG18 00:15  12AUG18 00:15  12AUG18 00:15  12SEP18 23:45
  Activity End  16DEC18 24:00  16DEC18 24:00  16DEC18 24:00  16DEC18 11:45  01OCT18 15:15  16OCT18 15:00  16DEC18 11:45  16DEC18 11:45  16DEC18 11:45
    Activity %          99.9          100.0          100.0          99.2           98.6           98.9           98.7           98.7           99.2
 Activity Days        126.97         127.00         127.00         125.52          49.92          64.92         124.94         124.94          93.82
 Host Use Days        126.97         127.00         127.00         116.21           0.00           0.00         116.29         123.41           0.17

TS7700 CAPACITY
   TVC Size GB        753634         816491         816491         185240         163174         163174         167808         167808         185240
  Active LVols       3797206         952205         947213          77942          32898          25357          43938          33411          44248
     Active GB       2004065         506846         495894         209677          75137          71575         112687          98231         112905
     VV in TVC       1514807         952205         947213            134          32898          25357          43938          33411          44248
     GB in TVC        742025         506846         495894            717          75137          71575         112687          98231         112905
LVols on Tapes       3797206              0              0          77942              0              0              0              0              0
   GB on Tapes       2004065              0              0         209677              0              0              0              0              0
  Avg CPU Util          17.4           11.8           12.3            7.7            9.9           10.5           14.5           14.8            3.7
  Max CPU Util          38.0           32.0           34.0           43.0           71.0           75.0          100.0          100.0           26.0
```

Example 2 – the extract from Compare report for VEHSTATS version for microcode R5.1:

```
 (C) IBM   REPORT=COMPARE( 20344)          INTERVAL CLUSTER COMPARISON                  RUN ON 09DEC2020 @  8:29:55    PAGE   1
                 FROM 31JUL2020 @  0:15:00   TO  09SEP2020 @ 24:00:00                                        UTC NOT CHG

         GRID             BA038          BA038          BA038
       CLUSTER            CL03A910       CL43A920       CL51A4F0
    Code Level            51.00.00xx     51.00.00xx     51.00.00xx
Activity Start          31JUL20 00:15  31JUL20 00:15  31JUL20 00:15
  Activity End          09SEP20 24:00  09SEP20 24:00  09SEP20 24:00
    Activity %                  96.3           96.2           88.0
 Activity Days                39.48          39.47          36.08
 Host Use Days                 1.17           0.37           0.00

 active CPOOLs                   22             12             11
 NumObj CPOOLs                17756          18156          17756
 SizObj CPOOLs                14145          14145          14145
RetONum CPOOLs                    0              0              0
RetOSiz CPOOLs                    0              0              0

 Fields for Cloud POOL by BUBBA_01

 NickNm CPOOL/BUBBA_01       BUBBA_01       BUBBA_01       BUBBA_01
  Id P1 CPOOL/BUBBA_01          3A910          3A910          3A910
  Id P1 CPOOL/BUBBA_01          3A910          3A910          3A910
 NumObj CPOOL/BUBBA_01              0              0              0
 SizObj CPOOL/BUBBA_01              0              0              0
RetONum CPOOL/BUBBA_01              0              0              0
RetOSiz CPOOL/BUBBA_01              0              0              0
RetType CPOOL/BUBBA_01            off            off            off
 Status CPOOL/BUBBA_01            R/W            R/W            R/W
RetDurn CPOOL/BUBBA_01              0              0              0
WrtONum CPOOL/BUBBA_01              2           1873              1
WrtOSiz CPOOL/BUBBA_01             55     1893843451              2
 RdONum CPOOL/BUBBA_01              0              5              0
 RdOSiz CPOOL/BUBBA_01              0        4065942              0
NumODel CPOOL/BUBBA_01           1852           1845            956
NunOLkp CPOOL/BUBBA_01           1886              3           1983
NumToDel in06/BUBBA_01              0              0              0
SizToDel in06/BUBBA_01              0              0              0
```

DAYSMRY - Daily Summary

This report shows the statistics for clusters summarized by days and weeks. The standard lines contain:

- Lines 1 & 2 - are standard header lines;
- Lines 3 & 4 - are report specific header lines;
- Lines after line 4 – detail lines with particular statistics for the cluster. The first column of these lines contains the statistic titles. The first column of a detail line contains statistic titles, the second column ({type}) contains some characteristics of the statistic and the third column contains the measure unit;
- 33 lines at the bottom of the report contains the legend with the explanations for the values in the columns {type} and {unit}}.

Example 1 – the extract from DAYSMRY report for VEHSTATS versions before microcode R5.1:

```
 (C) IBM   REPORT=DAYSMRY( 18309)                  DAILY SUMMARY                        RUN ON 18DEC2018 @ 14:52:56    PAGE   1
GRID#=11111   DIST_LIB_ID= 2  VNODE_ID= 0  NODE_SERIAL=CL2H8814  VE_CODE_LEVEL=008.041.100.0015                        UTC NOT CHG
 {line title}     {type}       {unit}        Sunday        Monday       Tuesday      Wednesday       Thursday        Friday      Saturday       Week_ended
         Date                                12AUG2018     13AUG2018     14AUG2018     15AUG2018     16AUG2018     17AUG2018     18AUG2018     18AUG2018
    Code Level  Int-his-cmpr     -       41.100.0015   41.100.0015   41.100.0015   41.100.0015   41.100.0015   41.100.0015   41.100.0015   41.100.0015
 Activity Days  int-veh-div    days            1.00          1.00          1.00          1.00          0.98          1.00          1.00          6.98
 Host Use Days  int-veh-cmpx   days            1.00          1.00          1.00          1.00          0.98          1.00          1.00          6.98
    UTC OFFSET  int-veh-pval   hours       00:00:00      00:00:00      00:00:00      00:00:00      00:00:00      00:00:00      00:00:00      00:00:00
TS7700 CAPACITY
   TVC Size GB  eoi-his-fval   GB            753634        753634        753634        753634        753634        753634        753634        753634
  Active LVols  eoi-veh-cmpx   numb         4139368       4136726       4137286       4142410       4140377       4145063       4149771       4149771
     Active GB  eoi-veh-cmpx   GB           1983097       1979889       1981429       1986875       1989752       1983823       1984467       1984467
     VV in TVC  eoi-his-sum    numb         1579393       1578455       1578779       1581001       1579682       1582530       1584765       1584765
     GB in TVC  eoi-his-sum    GB            741054        740884        741461        741787        741555        740314        741731        741731
LVols on Tapes  eoi-his-sum    numb         4139368       4136726       4137286       4142410       4140377       4145063       4149771       4149771
   GB on Tapes  eoi-his-sum    GB           1983097       1979889       1981429       1986875       1989752       1983823       1984467       1984467
  Avg CPU Util  int-his-avg     %              14.7          17.5          17.6          15.8          17.4          17.4          13.2          16.2
  Max CPU Util  int-his-max     %              34.0          33.0          33.0          34.0          32.0          32.0          28.0          34.0
```

```
    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 different 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     |           |                                            |
```

Example 2 – the extract from DAYSMRY report for VEHSTATS version for microcode R5.1:

(C) IBM REPORT=DAYSMRY(20344) DAILY SUMMARY RUN ON 09DEC2020 @ 8:29:55 PAGE 2
GRID#=BA038 DIST_LIB_ID= 0 VNODE_ID= 0 NODE_SERIAL=CL03A910 VE_CODE_LEVEL=008.051.000.0050 UTC NOT CHG

{line title}	{type}	{unit}	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Week_ended
Date ->			02AUG2020	03AUG2020	04AUG2020	05AUG2020	06AUG2020	07AUG2020	08AUG2020	08AUG2020
Code Level	int-his-cmpr	-	51.00.0047	51.00.0047	51.00.0050	51.00.0050	51.00.0050	51.00.0050	51.00.0050	51.00.00xx
Activity Days	int-veh-div	days	1.00	0.81	0.38	0.95	0.98	1.00	1.00	6.14
Host Use Days	int-veh-cmpx	days	0.00	0.02	0.16	0.10	0.18	0.20	0.00	0.68
Cloud POOLs totals by a cluster										
active CPOOLs	int-his-sum	numb	16	16	16	16	16	16	16	16
NumObj CPOOLs	eoi-his-fval	numb	1514	1689	5448	8894	11115	13752	13411	13411
SizObj CPOOLs	eoi-his-fval	GiB	1258	1424	4697	8017	9772	12310	11983	11983
RetONum CPOOLs	eoi-his-fval	numb	0	0	0	341	441	6295	8761	8761
RetOSiz CPOOLs	eoi-his-fval	GiB	0	0	0	327	422	5839	7789	7789
NumODel CPOOLs	int-his-sum	numb	0	5	100	292	0	1	170	568
NumOLkp CPOOLs	int-his-sum	numb	0	0	308	16465	1536	2643	0	20952
RdONum CPOOLs	int-his-sum	numb	0	0	175	38	27	0	0	240
RdOSiz CPOOLs	int-his-sum	GiB	0	0	167	36	20	0	0	225
WrtONum CPOOLs	int-his-sum	numb	0	170	3556	3139	1091	3	0	7959
WrtOSiz CPOOLs	int-his-sum	GiB	0	163	3126	3021	838	0	0	7149
Fields for Cloud POOL by BUBBA_01										
NickNm CPOOL/BUBBA_01	eoi-his-fval	-	BUBBA_01	BUBBA_01	BUBBA_01	BUBBA_01	BUBBA_01	BUBBA_01	BUBBA_01	BUBBA_01
Id P1 CPOOL/BUBBA_01	eoi-his-fval	-	3A910	3A910	3A910	3A910	3A910	3A910	3A910	3A910
NumObj CPOOL/BUBBA_01	eoi-his-fval	numb	106	106	108	108	697	1984	1984	1984
SizObj CPOOL/BUBBA_01	eoi-his-fval	GiB	80	80	80	80	648	1886	1886	1886
RetONum CPOOL/BUBBA_01	eoi-his-fval	numb	0	0	0	0	0	5	413	413

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

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

MONSMRY - Monthly Summary

This report shows the statistics for clusters from the program historical input summarized by months. Each cluster reported on separate pages. Up to 12 month columns can be on a report page. The standard lines contain:

- Lines 1 & 2 - are standard header lines;
- Line 3 - is a blank line;
- Line 4 – the header line that contains reported months for the cluster mentioned in line 2;
- Lines after line 4 – detail lines with particular statistics for the cluster. The first column of these lines contains the statistic titles.

Example 1 – the extract from MONSMRY report for VEHSTATS versions before microcode R5.1:

```
(C) IBM   REPORT=MONSMRY( 18309)                    MONTHLY SUMMARY                        RUN ON 18DEC2018 @ 14:52:56    PAGE   1
GRID#=11111   DIST_LIB_ID= 2  VNODE_ID= 0  NODE_SERIAL=CL2H8814  VE_CODE_LEVEL=008.041.100.0015                          UTC NOT CHG

        Month         AUG2018         SEP2018         OCT2018         NOV2018         DEC2018
    Code Level    41.100.0015     41.100.0015     41.100.0015     41.100.0015     41.100.0015
Activity Start  12AUG18 00:15  01SEP18 00:15  01OCT18 00:15  01NOV18 00:15  01DEC18 00:15
  Activity End  31AUG18 24:00  30SEP18 24:00  31OCT18 24:00  30NOV18 24:00  16DEC18 24:00
    Activity %           99.9           100.0            99.9           100.0           100.0
 Activity Days          19.98           30.00           30.98           30.00           16.00
 Host Use Days          19.98           30.00           30.98           30.00           16.00

TS7700 CAPACITY
   TVC Size GB         753634          753634          753634          753634          753634
  Active LVols        4156410         4134852         3897261         3818809         3797206
    Active GB        1996031         2033283         2001458         2005471         2004065
     VV in TVC        1588925         1594226         1565972         1528357         1514807
     GB in TVC         742518          742512          741539          742407          742025
LVols on Tapes        4156410         4134852         3897261         3818809         3797206
   GB on Tapes        1996031         2033283         2001458         2005471         2004065
  Avg CPU Util           16.7            17.3            17.7            17.7            17.7
  Max CPU Util           35.0            37.0            38.0            35.0            36.0
```

Example 2 – the extract from MONSMRY report for VEHSTATS version for microcode 5.1:

```
 (C) IBM   REPORT=MONSMRY( 20344)                    MONTHLY SUMMARY                        RUN ON 09DEC2020 @  8:29:55    PAGE   1
GRID#=BA038   DIST_LIB_ID= 0  VNODE_ID= 0  NODE_SERIAL=CL03A910  VE_CODE_LEVEL=008.051.000.0060                          UTC NOT CHG

             Month ->         JUL2020         AUG2020         SEP2020
    Code Level              51.00.0047      51.00.00xx      51.00.006x
Activity Start          31JUL20 00:15  01AUG20 00:15  01SEP20 00:15
  Activity End          31JUL20 24:00  31AUG20 24:00  09SEP20 24:00
    Activity %                  100.0            96.1            96.6
 Activity Days                   1.00           29.79            8.69
 Host Use Days                   0.04            1.07            0.06
Cloud POOLs totals by a cluster
 active CPOOLs                    16              22               5
 NumObj CPOOLs                  2337           14256           17756
 SizObj CPOOLs                  1950           11250           14145
RetONum CPOOLs                   823               0               0
RetOSiz CPOOLs                   691               0               0
RdONum CPOOLs                      0            1540              30
 RdOSiz CPOOLs                     0            1216              25
WrtONum CPOOLs                   186           22105            3500
WrtOSiz CPOOLs                   171           18269            2894
Fields for Cloud POOL by BUBBA_01
 NickNm CPOOL/BUBBA_01       BUBBA_01        BUBBA_01        BUBBA_01
  Id P1 CPOOL/BUBBA_01          3A910           3A910             n/a
 NumObj CPOOL/BUBBA_01            118               0             n/a
 SizObj CPOOL/BUBBA_01             80               0             n/a
RetONum CPOOL/BUBBA_01             12               0             n/a
RetOSiz CPOOL/BUBBA_01              0               0             n/a
RetType CPOOL/BUBBA_01             on             off             n/a
```

Horizontal Order based reports

Each detail line of the horizontal order based reports contains 5 standard columns and the columns with the statistics generated as the result of processing ORDER parameters (with no SECTION value). The number of the generated columns is equal the number of the ORDER parameters. The standard columns contain:

- 1st column contains Grid Library Sequence Number for the reported clusters;
- 2nd column contains the reported cluster number concatenated with the sequence number of the node's machine (the second part of Machine Serial Number);
- 3rd column contains the day of week for HOURFLAT and DAYHSMRY, sequence month number for MNTHSMRY and sequence week number for the report WEKHSMRY;
- 4th column contains the reported date for HOURFLAT and DAYHSMRY, reported month for MNTHSMRY and the end date of the reported week for WEKHSMRY;
- 5th column contains the end time of the reported interval (hour or 15 min interval) for HOURFLAT, active cluster time in hour for DAYHSMRY and active cluster time in days for MNTHSMRY and WEKHSMRY.

Unlike the vertical order based reports "_" (underscore) is used instead blank in the statistical column titles of horizontal order based reports. For example "Active_GB" against "Active GB".

Each report page contains 1 or 2 header lines. The first header line contains the column titles. In case if at least 1 from requested orders is an order with a parameter then the second header line with parameter value generated (implemented in VEHSTAST version for microcode R5.1).

HOURFLAT – Qtr/Hrs Horizontal Summary

Grid	CLIDMSER	Day	Date	End_Time	Code_Level	UTC_OFFSET	TVC_Size_GB	Active_LVols	Active_GB	VV_in_TVC	GB_in_TVC
11111	CL2H8514	Sun	12AUG2018	01:00:00	41.100.0015	00:00:00	753634	4158771	1983452	1589166	741275
11111	CL2H8514	Sun	12AUG2018	02:00:00	41.100.0015	00:00:00	753634	4156764	1983279	1588672	742007
11111	CL2H8514	Sun	12AUG2018	03:00:00	41.100.0015	00:00:00	753634	4155642	1984254	1588780	742427
11111	CL2H8514	Sun	12AUG2018	04:00:00	41.100.0015	00:00:00	753634	4154490	1985336	1588867	742468
11111	CL2H8514	Sun	12AUG2018	05:00:00	41.100.0015	00:00:00	753634	4153988	1986700	1588224	742280
11111	CL2H8514	Sun	12AUG2018	06:00:00	41.100.0015	00:00:00	753634	4155110	1987894	1588065	742476
11111	CL2H8514	Sun	12AUG2018	07:00:00	41.100.0015	00:00:00	753634	4153385	1987445	1587959	742475
11111	CL2H8514	Sun	12AUG2018	08:00:00	41.100.0015	00:00:00	753634	4152289	1987491	1587361	742476
11111	CL2H8514	Sun	12AUG2018	09:00:00	41.100.0015	00:00:00	753634	4152218	1988310	1586785	742412
11111	CL2H8514	Sun	12AUG2018	10:00:00	41.100.0015	00:00:00	753634	4152675	1989751	1586482	742309
11111	CL2H8514	Sun	12AUG2018	11:00:00	41.100.0015	00:00:00	753634	4152046	1991167	1585908	742174

Grid	CLIDMSER	Day	Date	End_Time	Code_Level	active_CPOOLs	NumObj_CPOOLs	SizObj_CPOOLs	NickNm_CPOOL/ BUBBA_01	Id_P2_CPOOL/ BUBBA_01	NumObj_CPOOL/ BUBBA_01	SizObj_CPOOL/ BUBBA_01
BA038	CL03A910	Fri	31JUL2020	01:00:00	51.00.0047	16	2166	1787	BUBBA_01	20200401213519	118	80
BA038	CL03A910	Fri	31JUL2020	02:00:00	51.00.0047	16	2166	1787	BUBBA_01	20200401213519	118	80
BA038	CL03A910	Fri	31JUL2020	03:00:00	51.00.0047	16	2166	1787	BUBBA_01	20200401213519	118	80
BA038	CL03A910	Fri	31JUL2020	04:00:00	51.00.0047	16	2166	1787	BUBBA_01	20200401213519	118	80
BA038	CL03A910	Fri	31JUL2020	05:00:00	51.00.0047	16	2166	1787	BUBBA_01	20200401213519	118	80
BA038	CL03A910	Fri	31JUL2020	06:00:00	51.00.0047	16	2166	1787	BUBBA_01	20200401213519	118	80
BA038	CL03A910	Fri	31JUL2020	07:00:00	51.00.0047	16	2166	1787	BUBBA_01	20200401213519	118	80
BA038	CL03A910	Fri	31JUL2020	08:00:00	51.00.0047	16	2166	1787	BUBBA_01	20200401213519	118	80
BA038	CL03A910	Fri	31JUL2020	09:00:00	51.00.0047	16	2166	1787	BUBBA_01	20200401213519	118	80

DAYHSMRY - Daily Horizontal Summary

Grid	CLIDMSER	Day	Date	Hours	Code_Level	UTC_OFFSET	TVC_Size_GB	Active_LVols	Active_GB	VV_in_TVC	GB_in_TVC
11111	**CL2H8514**	**Sun**	**12AUG2018**	**24.00**	41.100.0015	00:00:00	753634	4139368	1983097	1579393	741054
11111	**CL2H8514**	**Mon**	**13AUG2018**	**24.00**	41.100.0015	00:00:00	753634	4136726	1979889	1578455	740884
11111	**CL2H8514**	**Tue**	**14AUG2018**	**24.00**	41.100.0015	00:00:00	753634	4137286	1981429	1578779	741461
11111	**CL2H8514**	**Wed**	**15AUG2018**	**24.00**	41.100.0015	00:00:00	753634	4142410	1986875	1581001	741787
11111	**CL2H8514**	**Thr**	**16AUG2018**	**23.75**	41.100.0015	00:00:00	753634	4140377	1989752	1579682	741555
11111	**CL2H8514**	**Fri**	**17AUG2018**	**24.00**	41.100.0015	00:00:00	753634	4145063	1983823	1582530	740314
11111	**CL2H8514**	**Sat**	**18AUG2018**	**24.00**	41.100.0015	00:00:00	753634	4149771	1984467	1584765	741731
11111	**CL2H8514**	**Sun**	**19AUG2018**	**24.00**	41.100.0015	00:00:00	753634	4129021	1983009	1574770	741632
11111	**CL2H8514**	**Mon**	**20AUG2018**	**24.00**	41.100.0015	00:00:00	753634	4123390	1979837	1572715	741872

Grid	CLIDMSER	Day	Date	Hours	Code_Level	active_CPOOLs	NumObj_CPOOLs	SizObj_CPOOLs	NickNm_CPOOL/ BUBBA_01	Id_P2_CPOOL/ BUBBA_01	NumObj_CPOOL/ BUBBA_01	SizObj_CPOOL/ BUBBA_01
BA038	CL03A910	Fri	31JUL2020	24.00	51.00.0047	16	2337	1950	BUBBA_01	20200401213519	118	80
BA038	CL03A910	Sat	01AUG2020	24.00	51.00.0047	16	1514	1258	BUBBA_01	20200401213519	106	80
BA038	CL03A910	Sun	02AUG2020	24.00	51.00.0047	16	1514	1258	BUBBA_01	20200401213519	106	80
BA038	CL03A910	Mon	03AUG2020	19.50	51.00.0047	16	1689	1424	BUBBA_01	20200401213519	106	80
BA038	CL03A910	Tue	04AUG2020	9.25	51.00.0050	16	5448	4697	BUBBA_01	20200401213519	108	80
BA038	CL03A910	Wed	05AUG2020	23.00	51.00.0050	16	8894	8017	BUBBA_01	20200401213519	108	80
BA038	CL03A910	Thr	06AUG2020	23.75	51.00.0050	16	11115	9772	BUBBA_01	20200401213519	697	648
BA038	CL03A910	Fri	07AUG2020	24.00	51.00.0050	16	13752	12310	BUBBA_01	20200401213519	1984	1886
BA038	CL03A910	Sat	08AUG2020	24.00	51.00.0050	16	13411	11983	BUBBA_01	20200401213519	1984	1886
BA038	CL03A910	Sun	09AUG2020	24.00	51.00.0050	16	13303	11887	BUBBA_01	20200401213519	1984	1886
BA038	CL03A910	Mon	10AUG2020	24.00	51.00.0050	16	10628	9436	BUBBA_01	20200401213519	1979	1886
BA038	CL03A910	Tue	11AUG2020	24.00	51.00.0050	16	7028	6061	BUBBA_01	20200401213519	1548	1469
BA038	CL03A910	Wed	12AUG2020	23.25	51.00.0050	21	1231	949	BUBBA_01	20200401213519	0	0
BA038	CL03A910	Thr	13AUG2020	23.75	51.00.0050	6	2073	1647	BUBBA_01	n/a	n/a	n/a

MNTHSMRY - Monthly Horizontal Summary

Grid	CLIDMSER	Mn#	Month	Days	Code_Level	UTC_OFFSET	TVC_Size_GB	Active_LVols	Active_GB	VV_in_TVC	GB_in_TVC
11111	CL2H8514	01	AUG2018	19.98	41.100.0015	00:00:00	753634	4156410	1996031	1588925	742518
11111	CL2H8514	02	SEP2018	30.00	41.100.0015	00:00:00	753634	4134852	2033283	1594226	742512
11111	CL2H8514	03	OCT2018	30.98	41.100.0015	00:00:00	753634	3897261	2001458	1565972	741539
11111	CL2H8514	04	NOV2018	30.00	41.100.0015	00:00:00	753634	3818809	2005471	1528357	742407
11111	CL2H8514	05	DEC2018	16.00	41.100.0015	00:00:00	753634	3797206	2004065	1514807	742025
Grid	**CLIDMSER**	**Mn#**	**Month**	**Days**	**Code_Level**	**UTC_OFFSET**	**TVC_Size_GB**	**Active_LVols**	**Active_GB**	**VV_in_TVC**	**GB_in_TVC**
11111	CL3H8541	01	AUG2018	20.00	41.100.0015	00:00:00	816491	1103568	525008	1103568	525008
11111	CL3H8541	02	SEP2018	30.00	41.100.0015	00:00:00	816491	1091547	533796	1091547	533796
11111	CL3H8541	03	OCT2018	31.00	41.100.0015	00:00:00	816491	979947	503933	979947	503933
11111	CL3H8541	04	NOV2018	30.00	41.100.0015	00:00:00	816491	957490	504107	957490	504107
11111	CL3H8541	05	DEC2018	16.00	41.100.0015	00:00:00	816491	952205	506846	952205	506846

Grid	CLIDMSER	Mn#	Month	Days	Code_Level	active_CPOOLs	NumObj_CPOOLs	SizObj_CPOOLs	NickNm_CPOOL/ BUBBA_01	Id_P2_CPOOL/ BUBBA_01	NumObj_CPOOL/ BUBBA_01	SizObj_CPOOL/ BUBBA_01
BA038	CL03A910	01	JUL2020	1.00	51.00.0047	16	2337	1950	BUBBA_01	20200401213519	118	80
BA038	CL03A910	02	AUG2020	29.79	51.00.00xx	22	14256	11250	BUBBA_01	20200401213519	0	0
BA038	CL03A910	03	SEP2020	8.69	51.00.006x	5	17756	14145	BUBBA_01	n/a	n/a	n/a
Grid	CLIDMSER	Mn#	Month	Days	Code_Level	active_CPOOLs	NumObj_CPOOLs	SizObj_CPOOLs	NickNm_CPOOL/ BUBBA_01	Id_P2_CPOOL/ BUBBA_01	NumObj_CPOOL/ BUBBA_01	SizObj_CPOOL/ BUBBA_01
BA038	CL43A920	01	JUL2020	1.00	51.00.0047	1	118	80	BUBBA_01	20200401213519	118	80
BA038	CL43A920	02	AUG2020	29.78	51.00.00xx	12	14656	11250	BUBBA_01	20200401213519	0	0
BA038	CL43A920	03	SEP2020	8.69	51.00.006x	6	18156	14145	BUBBA_01	n/a	n/a	n/a

WEKHSMRY – Weekly Horizontal Summary

Grid	CLIDMSER	Wek	End_Date	Days	Code_Level	UTC_OFFSET	TVC_Size_GB	Active_LVols	Active_GB	VV_in_TVC	GB_in_TVC
11111	CL2H8514	01	18AUG2018	6.98	41.100.0015	00:00:00	753634	4149771	1984467	1584765	741731
11111	CL2H8514	02	25AUG2018	7.00	41.100.0015	00:00:00	753634	4151733	1990109	1585642	742132
11111	CL2H8514	03	01SEP2018	7.00	41.100.0015	00:00:00	753634	4164519	2002005	1590978	742460
11111	CL2H8514	04	08SEP2018	7.00	41.100.0015	00:00:00	753634	4149768	2004969	1584935	742455
11111	CL2H8514	05	15SEP2018	7.00	41.100.0015	00:00:00	753634	4159095	2008585	1587945	742351
11111	CL2H8514	06	22SEP2018	7.00	41.100.0015	00:00:00	753634	4172512	2013429	1594104	742445
11111	CL2H8514	07	29SEP2018	7.00	41.100.0015	00:00:00	753634	4149770	2041126	1595633	741535
11111	CL2H8514	08	06OCT2018	7.00	41.100.0015	00:00:00	753634	4039961	1968875	1596035	741686
11111	CL2H8514	09	13OCT2018	7.00	41.100.0015	00:00:00	753634	3953561	2017795	1583756	741548
11111	CL2H8514	10	20OCT2018	7.00	41.100.0015	00:00:00	753634	3932845	1986662	1579138	742421

Grid	CLIDMSER	Wek	End_Date	Days	Code_Level	active_CPOOLs	NumObj_CPOOLs	SizObj_CPOOLs	NickNm_CPOOL/ BUBBA_01	Id_P2_CPOOL/ BUBBA_01	NumObj_CPOOL/ BUBBA_01	SizObj_CPOOL/ BUBBA_01
BA038	CL03A910	01	01AUG2020	2.00	51.00.0047	16	1514	1258	BUBBA_01	20200401213519	106	80
BA038	CL03A910	02	08AUG2020	6.14	51.00.00xx	16	13411	11983	BUBBA_01	20200401213519	1984	1886
BA038	CL03A910	03	15AUG2020	6.81	51.00.005x	22	3306	2698	BUBBA_01	20200401213519	0	0
BA038	CL03A910	04	22AUG2020	7.00	51.00.0057	5	5504	4496	BUBBA_01	n/a	n/a	n/a
BA038	CL03A910	05	29AUG2020	6.85	51.00.00xx	5	9256	7392	BUBBA_01	n/a	n/a	n/a
BA038	CL03A910	06	05SEP2020	6.81	51.00.006x	5	17756	14145	BUBBA_01	n/a	n/a	n/a
BA038	CL03A910	07	12SEP2020	3.86	51.00.006x	5	17756	14145	BUBBA_01	n/a	n/a	n/a
Grid	CLIDMSER	Wek	End_Date	Days	Code_Level	active_CPOOLs	NumObj_CPOOLs	SizObj_CPOOLs	NickNm_CPOOL/ BUBBA_01	Id_P2_CPOOL/ BUBBA_01	NumObj_CPOOL/ BUBBA_01	SizObj_CPOOL/ BUBBA_01
BA038	CL43A920	01	01AUG2020	2.00	51.00.0047	1	106	80	BUBBA_01	20200401213519	106	80
BA038	CL43A920	02	08AUG2020	6.13	51.00.00xx	6	12515	11294	BUBBA_01	20200401213519	1984	1886
BA038	CL43A920	03	15AUG2020	6.81	51.00.005x	11	3306	2698	BUBBA_01	20200401213519	0	0
BA038	CL43A920	04	22AUG2020	7.00	51.00.0057	6	5904	4496	BUBBA_01	n/a	n/a	n/a
BA038	CL43A920	05	29AUG2020	6.85	51.00.00xx	6	9656	7392	BUBBA_01	n/a	n/a	n/a
BA038	CL43A920	06	05SEP2020	6.81	51.00.006x	6	18156	14145	BUBBA_01	n/a	n/a	n/a
BA038	CL43A920	07	12SEP2020	3.86	51.00.006x	6	18156	14145	BUBBA_01	n/a	n/a	n/a

Counters of "order based" reports

The following fields are applicable for the "order based" reports DAYSMRY, COMPARE, MONSMRY, DAYHSMRY, HOURFLAT, WEKHSMRY and MNTHSMRY. The table below sorted by the column "Field name". The field names specified with blanks as they printed in the vertical order based reports. Some orders have a parameter – the word *nickname.* An actual cloud pool nickname should be specified instead the word *nickname* for VEHSTATS run.

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
%Copy Th TA	' %COPY_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Percent Copy Throttle for Tape or Cloud Attached Cache Partition
%Def Cp Th TA	' %DEF_CP_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Percent Deferred Copy Throttle for Tape or Cloud Attached Cache Partition
%Host Wr Th TA	'%H0ST_WR_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Percent Host Write Throttle for Tape or Cloud Attached Cache Partition
Active CPOOLs	"_active_CPOOLs"	Hnode Cloud Historical	Pool X Container	The field contains the number of cloud pools for a period. Calculated by VEHSTATS
Active GB	' ACTIVE GBS'	Hnode HSM Historical Hnode Library Historical	Cache Partitions Preference groups Library - Pooling – General Use Pool (GUP)	Active Data – computed by VEHSTATS as maximum of "**GB in TVC**" and "**GB on Tapes**".
Active LVols	' ACTIVE LVOLS'	Hnode Library Historical	Library - Pooling – General Use Pool (GUP)	Active Data – computed by VEHSTATS. as maximum of "**VV in TVC**" and "**LVols on Tapes**".
Activity %	' ACTIVITY %'		Header	(Sum of Interval Durations for unique Time Stamps *100)/ (Activity End – Activity Start)
Activity Days	' ACTIVITY DAYS'		Header	(Activity End – Activity Start)/(24*3600)
Activity End	' ACTIVITY END'		Header	Max value of Time Stamp from a statistical record for a cluster from the input file
Activity Start	'ACTIVITY START'		Header	Min value of Time Stamp from a statistical record for a cluster from the input file
Attmpt Thruput	' ATTMPT THRPUT'	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.
Avg Ahead Cnt	' AVG AHEAD'	Vnode Virtual Device Historical	Vnode Virtual Device	Average ahead count. See description on page 10.
Avg Behind Cnt	' AVG BEHIND'	Vnode Virtual Device Historical	Vnode Virtual Device	Average behind count. See description on page 10.
Avg Copy Th TA	'AVG_COPY_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Average Copy Throttle for Tape or Cloud 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.

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
Avg D Cp Th TA	'AVG_D_CP_TH_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Average Deferred Copy Throttle for Tape or Cloud 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 or Cloud Attached Cache Partition
Avg Phy Mntd	' AVG PHY MNTD'	Hnode Library Historical	Library – Tape Device Usage (TDU)	Average Physical Devices Mounted
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 for Cache Partition **n**. 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 TmDCpQ Age	'Avg TmDCpQ Age'	Hnode Grid Historical	Grid Container	Average Time delayed copy queue Age The field indicates the average age, in seconds, of the logical volumes in the timed delay state that are in the copy queue.
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 or Cloud 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 or Cloud 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

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
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
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
CL**x** Rmt Rd MiB	' CL**x** RMT RD MB'	Hnode Grid Historical	Grid-Cluster	Data Transferred from a Cluster **x** To Other Clusters as part of a Remote Read operation
CL**x** Rmt Wr MiB	' CL**x** RMT WR MB'	Hnode Grid Historical	Grid-Cluster	Data Transferred from a Cluster **x** To Other Clusters as part of a Remote Write operation
Code Level	' CODE LEVEL'		Header of a record	This in the TS7700 code level for the reporting period
Copy ThRsn TA	' COPY_THRSN_TA'	Hnode HSM Historical	Extended HSM – Cache Container	Copy Throttle Reason(s) for Tape or Cloud 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 Calculated by the formula at page 13
CSPMED2 3592JA CSPMED3 3592JW CSPMED4 3592JJ CSPMED5 3592JR CSPMED6 3592JB CSPMED7 3592JX CSPMED8 3592JC CSPMED9 3592JY CSPMEDA 3592JK CSPMEDB 3592JD CSPMEDC 3592JZ CSPMEDD 3592JL	'CSPMED2 3592JA' 'CSPMED3 3592JW' 'CSPMED4 3592JJ' 'CSPMED5 3592JR' 'CSPMED6 3592JB' 'CSPMED7 3592JX' 'CSPMED8 3592JC' 'CSPMED9 3592JY' 'CSPMEDA 3592JK' 'CSPMEDB 3592JD' 'CSPMEDC 3592JZ' 'CSPMEDD 3592JL'	Hnode Library Historical	Library - Pooling – Common Scratch Pool (CSP) Media	Physical Media Count – One entry for each type of media in the pool. 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 From DS8K	'Data From DS8K'	Hnode Grid Historical	Grid	The number of bytes transferred to the from all of the DS8K connected to this Cluster
Data To DS8K	' Data To DS8K'	Hnode Grid Historical	Grid	The number of bytes transferred from the Cluster to all of the DS8K connected to this Cluster
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.

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
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 or Cloud 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 EOI GB to Cpy	 ' EOI MB TO CPY' ' EOI GB TO CPY'	Hnode Grid Historical	Grid	Total Awaiting Replication to available Clusters
~~EOI MiB to Mig~~ EOI MB to Mig EOI GB to Mig	 ' EOI MB TO MIG' ' EOI MB TO MIG'	Hnode Grid Historical	Grid	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.
EOI VV to Recv	'EOI VV TO RECV'	Hnode Grid Historical	Grid	Logical Volumes for Copy – Value at the end of the reporting interval.
FIC Comp Rd	' FIC COMP RD'	Hnode HSM Historical	Compression Container	Ficon method – compressed READ bytes
FIC Comp Wr	' FIC COMP WR'	Hnode HSM Historical	Compression Container	Ficon method – compressed WRITE bytes
FIC UnComp Rd	' FIC UNCOMP RD'	Hnode HSM Historical	Compression Container	Ficon method – uncompressed READ bytes
FIC UnComp Wr	' FIC UNCOMP WR'	Hnode HSM Historical	Compression Container	Ficon method – uncompressed WRITE bytes
Flash Used	' FLASH USED'	Hnode HSM Historical	Extended HSM – Cache – Partition	The amount of flash copy cache used in the system
Fr TVC By Cpy	' FR TVC BY CPY'	Hnode Grid Historical	Grid-Cluster	Rate MiB/Sec transferred from CL**x** 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

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
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
GB in TVC	' GB IN TVC'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	The sum of "**PG0 GB in TVC**" and "**PG1 GB in TVC**".
GB on Tapes	' GB ON TAPES'	Hnode Library Historical	Library - Pooling – General Use Pool (GUP)	The sum of "**POOL nn ACT GB**" for all pools
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
GiB**xy** 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 or Cloud Attached Cache Partition
Id P1 CPOOL/	'__Id_P1_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	The filed contains the first five characters of the ID field
Id P2 CPOOL/	'__Id_P2_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	The filed contains the last 14 characters of the ID field
Lgst CopyQ Age	'Lgst CopyQ Age'	Hnode Grid Historical	Extended Grid	Longest Copy Queue Age
Lgst FmDCQ Age	'Lgst FmDCQ Age'	Hnode Grid Historical	Extended Grid	Longest Family Deferred Copy Queue Age
Lgst TDCpQ Age	'Lgst TDCpQ Age'	Hnode Grid Historical	Extended Grid	Longest Time Delayed Copy Queue Age
LVols on Tapes	'LVOLS ON TAPES'	Hnode Library Historical	Library - Pooling – General Use Pool (GUP)	The sum of "**POOL nn** ACT VV" for all pools.
LZ4 Comp Rd	' LZ4 COMP RD'	Hnode HSM Historical	Compression Container	LZ4 method – compressed READ bytes
LZ4 Comp Wr	' LZ4 COMP WR'	Hnode HSM Historical	Compression Container	LZ4 method – compressed WRITE bytes
LZ4 UnComp Rd	' LZ4 UNCOMP RD'	Hnode HSM Historical	Compression Container	LZ4 method – uncompressed READ bytes
LZ4 UnComp Wr	' LZ4 UNCOMP WR'	Hnode HSM Historical	Compression Container	LZ4 method – uncompressed WRITE bytes
Max Ahead Cnt	' MAX AHEAD'	Vnode Virtual Device Historical	Vnode Virtual Device	Maximum ahead count

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
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 GB to Cpy	' MAX MB TO CPY' ' MAX GB TO CPY'	Hnode Grid Historical	Grid	Max of Total Awaiting Replication to available Clusters during a period (hour, day, week, month)
~~Max MiB to Mig~~ Max MB to Mig Max MB to Mig	' MAX MB TO MIG' ' MAX GB TO MIG'	Hnode Grid Historical	Grid	Max of Total Unmigrated Data during a period (hour, 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.
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 CL**x**	' MB S-->**x** RECV'	Hnode Grid Historical	Grid-Cluster	Sum MiB received by Cluster **x** from all others.

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
MiBRecvDEF CL**x**	' 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 CL**x**	' 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 CL**x**	' 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
MiBSecRecvCL**x**	' CL**x** MB/S RECV'	Hnode Grid Historical	Grid-Cluster	Rate MiB/Sec received by CL**x** 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**
NickNm CPOOL/	'_NickNm_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Nickname – the field contains the nickname of the cloud pool.
NumObj CPOOL/	'_NumObj_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Number of Objects – the field contains the number of latest version lvols in the cloud pool.
NumObj CPOOLs	'_NumObj_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTATS – the sum of Number of Objects by all cloud pools
NumODel CPOOL/	'NumODel_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Number of Objects Deleted – contains the number of lvols which are deleted from the cloud pool during a period.
NumODel CPOOLs	'NumODel_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTATS – the sum of Number of Objects Deleted by all cloud pools
NumOLkp CPOOL/	'NunOLkp_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Number of Object Look-ups – the filed contains the number of lvols that are looked up to check if they exist in the cloud pool during the interval.
NumOLkp CPOOLs	'NumOLkp_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTATS – the sum of Number of Object Look-ups by all cloud pools.
NumToDel in06/ NumToDel in24/ NumToDel in36/ NumToDel in48/ NumToDel in72/	'NumToDel_in06/*nickname*' 'NumToDel_in24/*nickname*' 'NumToDel_in36/*nickname*' 'NumToDel_in48/*nickname*' 'NumToDel_in72/*nickname*'	Hnode Cloud Historical	Pool X Container	Number of Objects Eligible to be Deleted – the fields contain contains the number of retained lvols which are eligible to be deleted from the cloud pool within 6,24,36,48 and 72 hours
NumToDel in06h NumToDel in24h NumToDel in36h NumToDel in48h NumToDel in72h	'NumToDel_in06h' 'NumToDel_in24h' 'NumToDel_in36h' 'NumToDel_in48h' 'NumToDel_in72h'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTATS – the sum of Number of Objects Eligible to be Deleted by all cloud pools.
Objects in TVC	'OBJECTS IN TVC'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	The number of objects (cloud or DS8K) in the Tape Volume Cache
ObjSIZE in TVC	'OBJSIZE IN TVC'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	The size of objects (cloud or DS8K) in the Tape Volume Cache
Partitn Num	' PARTITN NUM'	Hnode HSM Historical	HSM – Cache Container	Number of partitions

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
Partitn Size **n**	'PARTITN SIZE n'	Hnode HSM Historical	HSM – Cache – Partition Container	Size of Cache Partition **n**. The size is updated when it changes.
Pckt Retr Rate	'Pckt Retr Rate'	Hnode Grid Historical	Grid	The percentage of packets retransmission over the packets sent
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
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	' PG0 MB TO CPY' ' PG0 GB TO CPY'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Awaiting Replication to available Clusters

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
~~PG0 MiB to MIG~~ ~~PG0 GiB to MIG~~ PG0 MB to MIG PG0 GB to MIG	' PG0 MB TO MIG' ' PG0 GB TO MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	Unmigrated Data
PG0 NumTDVols	' PG0_NUMTDVOLS'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	PG0: Resident Volumes Waiting for Delayed Premigration
PG0 Objects Sz	'PG0 Objects Sz'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	The size of objects (cloud or DS8K) in the Tape Volume Cache for PG0
PG0 ObjectsNum	'PG0 ObjectsNum'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	The number of objects (cloud or DS8K) in the Tape Volume Cache for PG0
~~PG0 RDCp Age~~ PG0 RVLs Age	~~' PG0 RDCP AGE'~~ ' PG0 RVLS 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 RVls Cnt	~~' PG0 RDCP LVL'~~ ' PG0 RVLS CNT'	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 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 descriptions				
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	PG1 4 Hour Average Cache Age
PG1 4HR VV MIG	'PG1 4HR VV MIG'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	PG1 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	' 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	' 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 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 Objects Sz	'PG1 Objects Sz'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	The size of objects (cloud or DS8K) in the Tape Volume Cache for PG1
PG1 ObjectsNum	'PG1 ObjectsNum'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	The number of objects (cloud or DS8K) in the Tape Volume Cache for PG1
~~PG1 RDCp Age~~ PG1 RVls Age	~~' PG1 RDCP AGE'~~ ' PG1 RVLS 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.

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
~~PG1 RDCp LVL~~ PG1 RVls Cnt	~~' PG1 RDCP LVL'~~ ' PG1 RVLS CNT'	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.
PG1 SizPfrKeep	'PG1_SIZPFRKEEP'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Total Size of Prefer Keep Volumes
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
PG0 35D Av CP**n** PG1 35D Av CP**n**	'PG0 35D AV CP**n**' 'PG1 35D AV CP**n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	35 Day Average Cache Age on Cache Partition **n** in Preference group 0 or 1. 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.
PG0 35D VV Mg**n** PG1 35D VV Mg**n**	'PG0 35D VV MG**n**' 'PG1 35D VV MG**n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Volumes Migrated Last 35 Days on Cache Partition **n** in Preference group 0 or 1
PG0 48H Av CP**n** PG1 48H Av CP**n**	'PG0 48H AV CP**n**' 'PG1 48H AV CP**n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	48 Hour Average Cache Age on Cache Partition **n** in Preference group 0 or 1. 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.
PG0 48H VV Mg**n** PG1 48H VV Mg**n**	'PG0 48H VV MG**n**' 'PG1 48H VV MG**n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Volumes Migrated Last 48 Hours on Cache Partition **n** in Preference group 0 or 1.
PG0 4Hr Av CP**n** PG1 4Hr Av CP**n**	'PG0 4HR AV CP**n**' 'PG1 4HR AV CP**n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	4 Hour Average Cache Age on Cache Partition **n** in Preference group 0or 1. 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.

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
PG0 4HR VV Mg**n** PG1 4HR VV Mg**n**	'PG0 4HR VV MG**n**' 'PG1 4HR VV MG**n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Volumes Migrated Last 4 Hours on Cache Partition **n** in Preference group 0 or 1
PG0 AvWTDlyV **n** PG1 AvWTDlyV **n**	'PG0 AVWTDLYV **n**' 'PG1 AVWTDLYV **n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Average Waiting Time of Delayed Premigration Volumes on Cache Partition **n** in Preference group 0 or 1
PG0 GB in CP **n** PG1 GB in CP **n**	'PG0 GB IN CP **n**' 'PG1 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 0 or 1. This field contains the amount of data in the TVC partition whose volumes are assigned to the preference this data is for.
PG0 NumTDVol **n** PG1 NumTDVol **n**	'PG0 NUMTDVOL **n**' 'PG1 NUMTDVOL **n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Resident Volumes Waiting for Delayed Premigration on Cache Partition **n** in Preference group 0 or 1
~~PG0 RDCP Age **n**~~ ~~PG1 RDCP Age **n**~~ PG0 RVls Age **n** PG0 RVls Age **n**	~~'PG0 RDCP AGE **n**'~~ ~~'PG1 RDCP AGE **n**'~~ 'PG0 RVLS AGE **n**' 'PG1 RVLS 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 0 or 1
~~PG0 RDCp LVL **n**~~ ~~PG1 RDCp LVL **n**~~ PG0 RVls Cnt **n** PG1 RVls Cnt **n**	~~'PG0 RDCP LVL **n**'~~ ~~'PG1 RDCP LVL **n**'~~ 'PG0 RVLS CNT **n**' 'PG1 RVLS CNT **n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	~~Time delayed~~ copies removal count on Cache Partition **n** in Preference group 0 or 1. This field contains the count of ~~time delayed~~ copy volumes removed over the last 4 hours.
PG0 Sz to Cpy**n** PG1 Sz to Cpy**n**	'PG0 SZ TO CPY**n**' 'PG1 SZ TO CPY**n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Awaiting Replication to available Clusters on Cache Partition **n** in Preference group 0 or 1. 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.
PG0 Sz to Mig**n** PG1 Sz to Mig**n**	'PG0 SZ TO MIG**n**' 'PG1 SZ TO MIG**n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Unmigrated Data on Cache Partition **n** in Preference group 0 or 1. 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).
PG0 ToSzDVol **n** PG1 ToSzDVol **n**	'PG0 TOSZDVOL **n**' 'PG1 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** in Preference group 0 or 1
PG0 UnMgVols **n** PG1 UnMgVols **n**	'PG0 UNMGVOLS **n**' 'PG1 UNMGVOLS **n**'	Hnode HSM Historical	Extended HSM – Cache – Partition – Preference Group Container	Unmigrated Vols. Number of un-migrated virtual volumes on Cache Partition **n** in Preference group 0 or 1. Delayed premigration volumes are excluded.
Pgm Version	' PGM VERSION'			The version of VEHSTATS program
PG0 VV in CP **n** PG1 VV in CP **n**	'PG0 VV IN CP **n**' 'PG1 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 0 or 1. This field contains the number of virtual volumes in the 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

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
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
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** 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
PRIMED2 3592JA PRIMED3 3592JW PRIMED4 3592JJ PRIMED5 3592JR PRIMED6 3592JB PRIMED7 3592JX PRIMED8 3592JC PRIMED9 3592JY PRIMEDA 3592JK PRIMEDB 3592JD PRIMEDC 3592JZ PRIMEDD 3592JL	'PRIMED2 3592JA' 'PRIMED3 3592JW' 'PRIMED4 3592JJ' 'PRIMED5 3592JR' 'PRIMED6 3592JB' 'PRIMED7 3592JX' 'PRIMED8 3592JC' 'PRIMED9 3592JY' 'PRIMEDA 3592JK' 'PRIMEDB 3592JD' 'PRIMEDC 3592JZ' 'PRIMEDD 3592JL'	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.

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
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**
RdONum CPOOL/ (RdONum_CPOOL/)	'_RdONum_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Number of Objects Read - the field contains the number of latest version lvols in the cloud pool.
RdONum_CPOOLs	'_RdONum_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTAST - the sum of Number of Objects Read by all cloud pools.
RdOSiz CPOOL/ (RdOSiz_CPOOL/)	'_RdONum_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Total Size of Objects Read- the field contains the number of retained lvols in the cloud pool.
RdOSiz CPOOLs	'_RdOSiz_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTAST - the sum of Total Size of Objects Read by all cloud pools.
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.
Read from TVC	' READ FROM TVC'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Read from Disk Cache for a period – see "**Bytes Read from Disk Cache**
RetDurn CPOOL/	'RetDurn_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Retention Duration - the number of days to retain versions of data.
RetONum CPOOL/	'RetONum_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Number of Retained Objects – the field contains the number of retained lvols in the cloud pool.
RetONum CPOOLs	'RetONum_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTAST - the sum of Number of Retained Objects by all cloud pools
RetOSiz CPOOL/	'RetOSiz_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Total Size of Retained Objects – the field contains the total size of retained lvols in the cloud pool.
RetOSiz CPOOLs	'RetOSiz_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTAST - the sum of Total Size of Retained Objects by all cloud pools
RetType CPOOL/	'RetType_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Retention Type – the filed indicates how the volume version is retained in the pool. x00 - Volume version retention is disabled; x01 - The number of days to retain volume versions is specified.
Rte TVC<->DS8K	'Rte TVC<->DS8K'	Hnode Grid Historical	Grid	Exchange Rate with DS8Ks (from and to) MiB/S
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**
SizObj CPOOL/	'SizObj_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Total Size of Objects – the field contains the total size of latest version lvols in the cloud pool.
SizObj CPOOLs	'SizObj_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTATS – the sum of Total Size of Objects for a cluster by all cloud pools.
SizToDel in06/ SizToDel in24/ SizToDel in36/ SizToDel in48/ SizToDel in72/	'SizToDel_in06/*nickname*' 'SizToDel_in24/*nickname*' 'SizToDel_in36/*nickname*' 'SizToDel_in48/*nickname*' 'SizToDel_in72/*nickname*'	Hnode Cloud Historical	Pool X Container	Total Size of Objects Eligible to be Deleted within 6, 24, 36, 48, 72 hours – the field contains the total size of retained lvols that are eligible to be deleted from the cloud pool within 6, 24, 36, 48, 72 hours.

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
SizToDel in06h SizToDel in24h SizToDel in36h SizToDel in48h SizToDel in72h	'SizToDel_in06h' 'SizToDel_in24h' 'SizToDel_in36h' 'SizToDel_in48h' 'SizToDel_in72h'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTATS – the sum of Total Size of Objects Eligible to be Deleted within 6, 24, 36, 48, 72 hours for a cluster by all cloud pools.
Status CPOOL/	'Status_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	State – the filed indicates the access status of the pool: x00 - READ-WRITE; x01 - READ-ONLY.
SCRMED2 3592JA SCRMED3 3592JW SCRMED4 3592JJ SCRMED5 3592JR SCRMED6 3592JB SCRMED7 3592JX SCRMED8 3592JC SCRMED9 3592JY SCRMEDA 3592JK SCRMEDB 3592JD SCRMEDC 3592JZ SCRMEDD 3592JL	'SCRMED2 3592JA' 'SCRMED3 3592JW' 'SCRMED4 3592JJ' 'SCRMED5 3592JR' 'SCRMED6 3592JB' 'SCRMED7 3592JX' 'SCRMED8 3592JC' 'SCRMED9 3592JY' 'SCRMEDA 3592JK' 'SCRMEDB 3592JD' 'SCRMEDC 3592JZ' 'SCRMEDD 3592JL'	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 transferred from CL**x** to all other clusters
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)
Tmp P-MI Prior	'Tmp P-MI Prior'	Hnode HSM Historical	HSM – Cache Container	Temporary Pre-migration Priority Threshold – the field indicates the current temporary threshold of the pre-migration task prioritization.
Tmp_P-MI Throt	'Tmp P-MI Throt'	Hnode HSM Historical	HSM – Cache Container	Temporary Pre-migration Throttle Threshold – the field indicates the current temporary threshold of the pre-migration throttle.
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 logical volumes which are in migrated state.
Tot Mnts	' TOT MNTS'	Hnode HSM Historical	HSM – Cache – Partition	Number of total mounts

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
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
Total TVC Xfer	' TOT TVC XFER'	Vnode Adapter Historical	Vnode Adapter-Port	The sum of "**Read from TVC**" and "**Write to TVC**"
TVC Size	' TVC SIZE'	Hnode HSM Historical	HSM – Cache	TVC Size
TVC Used	' TVC USED'	Hnode HSM Historical	HSM – Cache Container	Total used cache
UTC OFFSET	' UTC OFFSET'			UTC offset parameter value specified for VEHSTATS run
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 CL**x**	' 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 CL**x**	' 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
VolRecvSYN CL**x**	' 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
VV in TVC	' VV IN TVC'	Hnode HSM Historical	HSM – Cache – Partition – Preference Group	The sum of "**PG0 VV in TVC**" and "**PG1 VV in TVC**"
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.
Write to TVC	' WRITE TO TVC'	Vnode Adapter Historical	Vnode Adapter-Port	Bytes Written to Disk Cache – see **Bytes Written to Virtual Devices**
WrtONum_CPOOL/	'WrtONum_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Number of Objects Written – the field contains the number of lvols that are written to the cloud pool during the period.
WrtONum_CPOOLs	'WrtONum_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTATS – the sum of Number of Objects Written by all cloud pools.
WrtOSiz_CPOOL/	'WrtOSiz_CPOOL/*nickname*'	Hnode Cloud Historical	Pool X Container	Total Size of Objects Written - field contains the total size of lvols that are written to the cloud pool during the period.
WrtOSiz_CPOOLs	'WrtOSiz_CPOOLs'	Hnode Cloud Historical	Pool X Container	Calculated by VEHSTATS – the sum of Total Size of Objects Written by all cloud pools

Order descriptions				
Field name	**ORDER name**	**Record Name**	**Container Name**	**Description**
WrtThrotImpac%	'AV % WRT THROT'	Hnode HSM Historical	HSM – Cache	Computed by VEHSTATS using: • Percent Host Write Throttle • Average Host Write Throttle Calculated by the formula at page 13
ZSTD Comp Rd	' ZSTD COMP RD'	Hnode HSM Historical	Compression Container	ZSTD method – compressed READ bytes
ZSTD Comp Wr	' ZSTD COMP WR'	Hnode HSM Historical	Compression Container	ZSTD method – compressed WRITE bytes
ZSTD UnComp_Rd	'ZSTD UNCOMP RD'	Hnode HSM Historical	Compression Container	ZSTD method – uncompressed READ bytes
ZSTD UnComp_Wr	'ZSTD UNCOMP WR'	Hnode HSM Historical	Compression Container	ZSTD method – uncompressed WRITE bytes

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