

# System Storage

## TS7700 Starting with VEHSTATS

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# TAPETOOLS .....

# WHAT IS ALL ABOUT

Remark: if you – as customer – wants to be invited to future TS7700 calls - please send me an email to be part of the distribution list.

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## Why to use ? What is all about ?

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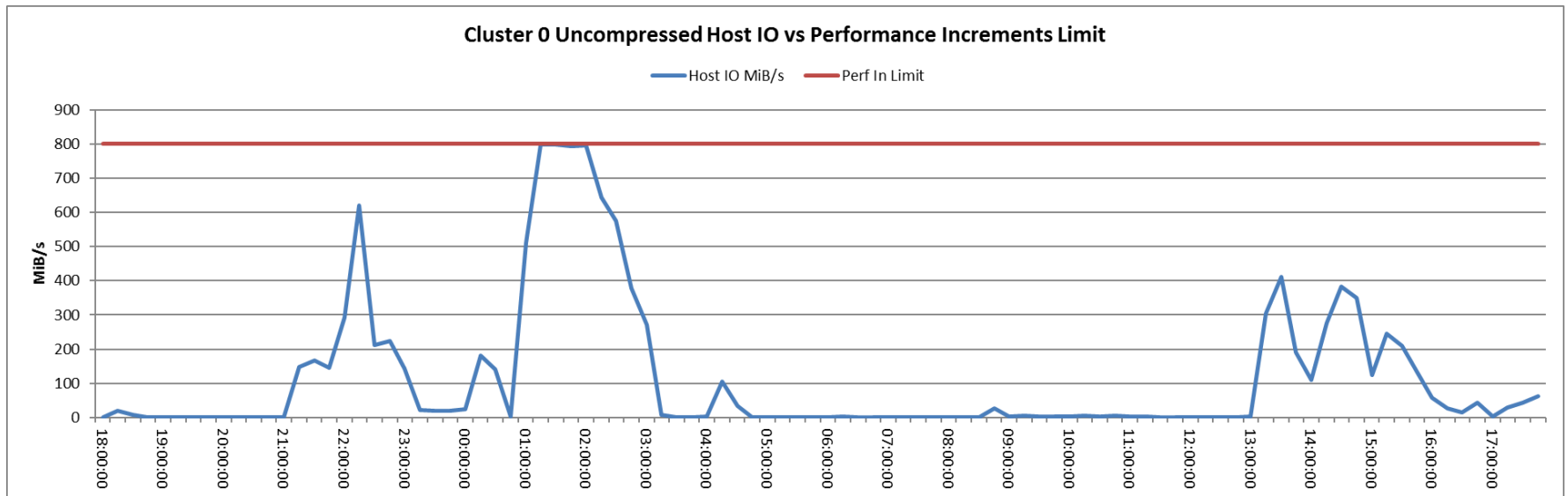
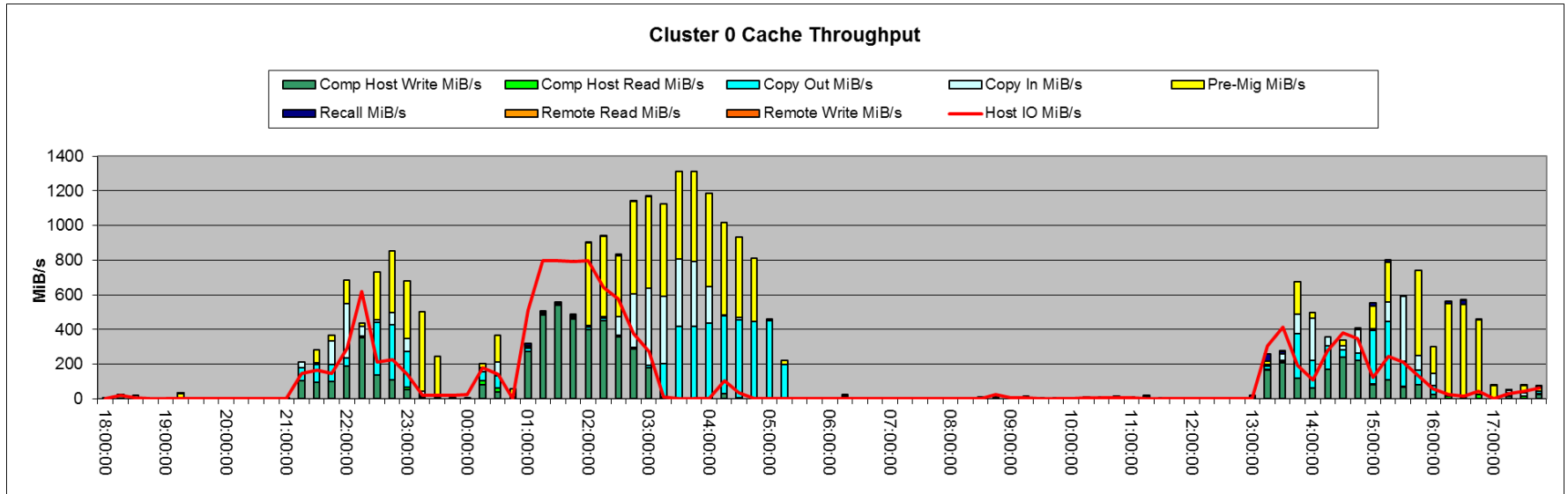
- You want to know ....
  - Your data growth in the last year ?
  - How your physical backend cartridge environment has changed in the last 18 months ?
  - How a specific parameter change improves your workload ?
  - How a boarding of a new customer changed the TS7700 behavior ?
  - How your gridlinks are doing ?
  - If you have throttling ? And why ?
  - If your TS7700 could handle more workload ? Or are the resources already exhausted ?
  - Have some fancy graphs about your TS7700 usage ?

But maybe you are also interested in ....

- Are all logical volumes copied to a specific cluster ?
- In a migration phase.... how much logical volumes are not yet copied ?
- What logical volumes are actually in cache ?
- What logical volume is on which physical volume ?
- What data is read ?

Then it is time for TAPETOOLS

# Why to use ? What is all about ? Some examples



TAPETOOLS is a collection of jobs for various purposes:

- Performance monitoring and trend analysis
  - VEHSTATS
- Information about the TS7700 environment
  - BVIR reports – „talking to the TS7700“
- Support for migrations
  - COPYRFSH, VESYNC
  - GGM\*
  - PRESTAGE
- General information about your Tape environment
  - Tapewise
  - Orphans
  - VEHAUDIT
- Jobs for Sizing information
  - BM Jobs (e.g. BMPACKx)
  - VOLLIST
  
- This is only an extract .... There are some more ....

- Before we can show you how to interpret the numbers of all these reports – and how to tune your environment ....
- We need first to get the tools working ....
- This is the FIRST of THREE sessions – and the first session covers
  - How to install and maintain these tools
  - How to customize them
  - Best practises to introduce them in a „production“ environment
- This tools are very mighty – and the documentation is sometimes... basic.
- This session is for beginners to learn the first steps ... But maybe we have the one or other tip for experts as well...
- The focus of this presentation is the customization of VEHSTATS.
- The information how to retrieve the tapetools and how to customize the jobs is valid for all tapetools.
- So lets start 😊

- General introduction to Tapetools
  - Where to get it (Tapetools)
  - Where to get information ?
- BVIR VEHSTATS – General introduction
  - What is the difference between „BVIR and VEHSTATS“ ?
  - Process how to generate - Overview
  - VEHSTATS – Outputs
    - Reports (TSO dataset, sequential and member)
    - Flatfiles
    - Excel templates
    - Graphs
  - Pros and cons of the different outputs

- Tape Tools
  - How to download the jobs and the decoder
  - How to customize the necessary job JCL
- VEHSTATS
  - How to customize the necessary VEHSTATS parameters
    - ORDERSTATEMENT
    - REPORT parameter
    - OTHER parameters
  - Run VEHSTATS jobs
- VEHSTATS Excel
  - How to download the Excel template
  - Download output to PC and create an Excel report

Backup material:

1. Download Step by Step
2. PCOM: How to create a Template
3. PCOM: How to create a sending list



## Documentation:

1. TS7700 Statistical whitepaper: All Information we provide in a so called BVIR record

<https://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP100829>

2. TS7700 BVIR Whitepaper:

<https://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101094>

3. The DECODER description – Translation from Statistical Whitepaper to VEHSTATS report

<ftp://ftp.software.ibm.com/storage/tapetool/>

## The programs

1. The programs – JCL, CNTL and LOAD and some basic documentation

2. Also the „Graphing package“

<ftp://ftp.software.ibm.com/storage/tapetool/>

- Some of the tools are based on the so called BVIR record. This is an internal data record written by the TS7700.
  - Be aware, TS7700 is a machine view – no information regarding LPARs, Sysplexes, Datasetnames, etc.
- Some of the tools using SMF (System Management Facility) records and / or Tape Management Catalog (TMC) information.
  - SMF:
    - In general we use 14,15,21 and 30
  - TMC: We support
    - DFSMSrmm
    - CA1
    - CA-TLMS
    - CONTROL-T
    - ZARA

- BVIR: Bulk Volume Information retrieval
  - Produced by TS7700 – it is a datarecord written by the clusters itself.
  - It contain all information from the T7700 from a specific periode – but only the last 90 days. No further history is delivered
  - BVIR Record is the input for VEHSTATS and for all BVIR\* jobs in the Tape tool suite.
- VEHSTATS
  - A single programm outside the TS7700
  - Provided by IBM on a „As is“ base – but we work very hard on the improvement and the adjustments for every new release
  - Reads the BVIR record
  - Produces performance reports
    - Reports in SYSOUT, Sequential or PDSE
    - Flatfiles as \*.TXT –Two of them can be used for import into Excel templates

## What does VEHSTATS produce ?

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VEHSTATS produce a lot of different reports – all around performance.

The report included covers information regarding the

- Ficon throughputs
- Virtual Tape drives
- Cache behaviour
- Tape Partition usage
- Grid communication (replication information)
- Physical tape drives and physical cartridges usage
- Cache Bandwidth

The reports can either show information on a 15-minute interval or on an hourly base.

There are several ways to store the output from VEHSTATS. The next slides discuss the options – and what are the advantages / disadvantages of the options.

## Reports in dataset in TSO:

### Pros:

- All available information is reported
- No need for „download“, import, etc. - quick way to get the information
- Some people like Katja will ask to get this report, instead of flatfiles/Excel.
- No deviations to Excel files
- „Free“ in selection of time schedules, etc.

### Cons:

- You can not make graphs
- Some people find them hard to read

## Flatfiles / Excel:

### Pros:

- Graphs are available based on the Excel templates
- Easier overview

### Cons:

- Overhead of download, import
- Excel templates required
- Selective information – not all information included in the flat files
- Excel template may change – to reflect new values

Graphs:

Pros:

- ,Manager ready‘
- Very easy trend analysis for 90 days
- Quick „look“

Cons:

- Not all information is provided
- Only selected graphs are prepared
- Not very suitable for problem analysis
- Averages and scaling might hide problems

```

BROWSE DENEKA.TAPETOOL.#EDU0002.RPTSEQ.EDU0001 Line 00000000 Col 001 080
Command ==> | Scroll ==> CSR
***** Top of Data *****
(C) IBM REPORT=H20VIRT (16040) VNODE VIRTUAL DEVICE HISTORICAL RECORD
GRID#=00186 DIST_LIB_ID= 0 VNODE_ID= 0 NODE_SERIAL=CL02DADW VE_CODE_LEVEL=0
01JAN17SU -VIRTUAL_DRIVES- _THROUGHPUT_ PCT_OF _CLUSTER VS FI
RECORD --MOUNTED-- MAX ATTPT Delay_/15Sec 15Sec AHEAD AHEAD
TIME INST MIN AVG MAX THRPUT THRPUT MAX AVG INTVLS MAX AVG
R2.2 CALC <----R3.0.0063----> <-----R3.1.
00:15:00 256 0 0 0 MAX na .000 .000 0 0 0
00:30:00 256 0 0 0 MAX na .000 .000 0 0 0
00:45:00 256 0 0 0 MAX na .000 .000 0 0 0
01:00:00 256 0 0 0 MAX na .000 .000 0 0 0
01:15:00 256 0 0 0 MAX na .000 .000 0 0 0
01:30:00 256 0 0 0 MAX na .000 .000 0 0 0
01:45:00 256 0 0 0 MAX na .000 .000 0 0 0
02:00:00 256 0 0 0 MAX na .000 .000 0 0 0
    
```

- Report with sequential output

- Report with members in a dataset

```

BROWSE DENEKA.BVI00.VEHST.OUTVALL.D150409.X
Command ==> |
Name Prompt Size Created
-----
AVGRDST
COMPARE
DAYSMRY
H20VIRT
H21ADPSU
H21ADPXX
H21ADP00
H21ADP01
H30TVC1
H30TVC2
H30TVC3
H30TVC4
H31IMEX
    
```

# EXCEL – Which Excel template to use ?

---

- **TECHDOCS Excel templates**

- The excel templates maintained on techdocs cover a 1 day, 7 day and 90 day period.
- Grid view, all clusters are included in one excel workbook (different tabs)
- Use in VEHSTATS job the ORDER6CL statement
- Because of the longer interval, these workbooks can be used for
  - Performance analysis
  - Trends (e.g. Workload growth)
- The imbedded graphics are only a small selection and may not fit your needs for management reports – but can be extended.

- **TAPETOOLS Graphing package**

- Only for one cluster - if several clusters exists, several Excels and Powerpoints need to be created
- Two inputs,
  - Daily report, 31 days on an hourly basis
  - Hourly report, 24 hours on an hourly basis
- Use in VEHSTATS job the ORDERV12 statement
- Filled with hourly.TXT information from VEHSTATS job output
- Charts in Excel are usable
- Lot of prepared charts in a separated Powerpoint



## EXCEL – Where to take the Excel templates from ?

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- Today we provide two different excels in different sources:
- „TECHDOCS Excel templates“
- <http://w3-03.ibm.com/support/techdocs/atmastr.nsf/WebIndex/PRS4717>
- „TAPETOOLS GRAPHING PACKAGE“
- <ftp://public.dhe.ibm.com/storage/tapetool/>

Currently we are discussing the options to integrate both solutions into one ....

Later in this presentation, we will show you some of the differences, and will present in detail how to create a workbook with graphs using one of the Excel templates on TECHDOCS.

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# BVIR and VEHSTATS

## .. Download and Customize the jobs

## Download and customize jobs: \$\$CPYLIB and \$\$TAILOR

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In the BACKUP section we have included a very detailed section how to download the Tapetools from the Tape tool website, and how to transfer it with PCOM to your host.

Then there is a general customization of TAPETOOL with the CPYLIB and TAILOR.

The most of you have already done that many times – but maybe for a new hire, we added this detail information in the back.

Please have a look to this backup section.

Tip: To reduce manual intervention – use a sending list. This is also explained in the backup slides.

# How to customize BVIRHST and VEHSTAT

# Tapetool Suite - Why do I have to download the Tape tools on a regularly basis ?

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- To encourage you to download the Tape Tool suite at least once a year, we have an Expire Member in the \*\*.JCL.
- If the date is reached, the tapetools will not work any more.
- This is not to create more workload for you 😊 – instead it is to ensure that new functions and fixes are applied.
- We have introduced „Tape Partitions“ – and we are still working on more detailed support for this feature.
- We are currently applying a lot of smaller enhancements, clarification and modifications.

## How to create the BVIR record as input for VEHSTATS ?

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1. Pick a BVIRHSTx job:  
Multiple versions of BVIRHSTS exists, you can pick whatever you want, as long you use the correct „input statement“ later in VEHSTATS job  
BVIRHSTS = Write output to as „pseudo-SFM“ record  
BVIRHSTU = Write output to a disk dataset with RECFM= U  
BVIRHSTV = Write output to a disk dataset with RECFM=VB
2. Customize the BVIRHSTx job you picked up:  
If you have used the tailor jobs, only 2 parameter sets needs to be customized:  
Adjustment to UTC time ... If requested  
UTCMINUS= 07;  
UTCPLUS= 02;  
  
And Start and End –Time as described on the next page.
3. Submit the BVIRHSTx job

## How to influence the output from BVIR for VEHSTATS ?

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### BVIR Records:

- A BVIR record can contain a maximum of 90 days. These are the historical statistical records of the TS7700.
- You can limit this period by SDATE and STIME; and EDATE and ETIME.
- Start Date = SDATE -
- End Date = EDATE

### Examples

- Specific days:
  - SDATE= 01JAN2017;
  - EDATE= 21JAN2017;
- Relative addressing:
  - SDATE= TODAY- 1;
  - EDATE= TODAY;
  - SDATE= LASTWEEK;
  - SDATE= LASTMONTH;
  - EDATE= TODAY- 1;
- Time
  - STIME= 00:00
  - ETIME= 24:00;

## Best practices: BVIRHST

1. When you limit the BVIR Record, the VEHSTATS is also limited to that period. When you select all data (no SDATE,no EDATE), you can limit the report with VEHSTATS.
2. When you omit the SDATE and EDATE, you will get a JCL Error. Due to this selection no record is produced – and therefore the tape is not produced in step1. Then you get a „Data set not found“ in Step2.
3. A good recommendation is to
  1. Implement a monthly BVIR RUN
    1. SDATE=Lastmonth; EDATE=TODAY
  2. Store the output in a GDG and keep it for years
  3. You can concatenate multiple BVIR inputs for one VEHSTAT run
  4. VEHSTATS will drop duplicate records automatically
    1. In the Joblog you see that overlapping information (duplicates) will be dropped.  
+HYDRC33 DUPLICATES DROPPED= 5

Tip: Concatenate input to have more than 90 days for trending ... (adjust sizes to avoid SB37)



# How to create the VEHSTATS job ?

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1. Pick a VEHSTxx job:  
Multiple versions of VEHST exists, you can pick whatever you want, depending where you want to route the output.
  - VEHSTATS = only docu
  - VEHSTPO = write output in PDSE
  - VEHSTPS = write output in Sequential dataset
  - VEHSTSO = write output in Job Sysout
  
2. Customize the VEHSTxx job you picked up:  
Even if you have used the tailor jobs, there are still a lot of adjustments:
  - Record length (RECL)
  - Input dataset
  - ORDER Statement
  - REPORT Statement
  - Some other parameters
    - SDATE / EDATE / STIME/ ETIME
    - SECPOOL
    - QUEAGEMINUTES
    - USEGB
    - DEFDL
    - EUROFORMAT
    - SPLITCLUSTER
  
3. Submit the job

## How to create the VEHSTATS job ? RECL & Input selection

- Record length (RECL):
  - Depending on your selection, the record length needs to be adjusted.
  - The rule is „longer does not hurt - Shorter will be truncated.
  - RECL=610 is sufficient today for the most customers.
- Change in the JCL the „Input dataset“  
Needs to be the same as you defined in the BVIR Output dataset  
You have following choices:

```
/* ACTIVATE ONE OR MORE OF THE FOLLOWING DD STATEMENTS FOR YOUR
/* DATA DEPENDING ON WHICH BVIRHST(U/V/S) JOB WAS USED TO COLLECT
/* THE STATISTICS
/* ACTIVATE THE FOLLOWING IF YOU USED BVIRHSTU
/*STATSU DD DISP=SHR,
/*   DSN=&USERHLQ.&SITE..#&GRIDID..HSTU.D&SDATE..D&EDATE.
/* ACTIVATE THE FOLLOWING IF YOU USED BVIRHSTV
/*STATSVB DD DISP=SHR,
/*   DSN=&USERHLQ.&SITE..#&GRIDID..HSTV.D&SDATE..D&EDATE.
/* ACTIVATE THE FOLLOWING IF YOU USED BVIRHSTS & PULLED FROM SMF LOG
/*STATSMF DD DISP=SHR, RECORDS WILL BE SELECTED BASED ON SMFNUM
/*   DSN=&USERHLQ.&SITE..#&GRIDID..SMF194
```

## How to create the VEHSTATS job ? ORDER Selection - 1

---

With the ORDER statement you select which data is reported in the flat file

HOURFLAT

DAYHSMR, WEKHSMRY, MONHSMRY

And in the „member reports“

DAYSMRY, MONSMRY and COMPARE

When do you need to customize the ORDER Statement usually ?

To limit the amount of displayed data, we only coded 4 pools in the DAYSMR and HOURFLAT. Pool 1 – Pool 4.

And also 4 different types of cartridges.

But today we provide much more cartridge types.

So you have to change ORDER statements:

- If you use Pools higher than pool number 4
- If you use JD cartridges

If you do not customize the ORDER statement, your H32CSP and H32GUP reports are still correct – because they are not influenced by the ORDER statement. But the information given in DAYSMR and HOURFLAT does not reflect your environment.

In addition, also for GGM where introduced some values which can be selected.

1. Select the appropriate ORDER statement.
  - ORDER Statement located \*.IBMTOOLS.JCL
  - The TECDOCS EXCEL are only tested with ORDER6CL
  - The graphic package usually used Order ORDERV12 (originally fitted in Excel 1.2), today the versioning of the excel is not more inline - The latest version of the Graphing package is V2.1
  
2. Other Order Statements:
  - ORDERC25 = content is identically with ORDERV12, but clusters are 2,3,4,5 (no cluster 0 and 1)
  - ORDERALL = contain all possible items (uncommenting if you want to display them all)
  - ORDERKLY = IBM internal report
  
3. In additions to this ORDER, another ORDER exists ORDERPTT
  - ORDERPTT is a unique report
  - It combines all information from H30TVC per cluster per interval in one single line
  - It also show the amount of Tape Partitions and the size of the Tape Partitions in the report.
  - This report allows to see changes to amount of Tape Partitions and sizes more easy than the usual BVIR.

# How to create the VEHSTATS job ? ORDER Selection -3

Example of ORDERPTT:

```

BROWSE      DENEKA.TAPETOOL.#EDU0017.DAYHSMRY.TXT      Line 00000000 Col
Command ==> |_____ Scroll ==>
***** Top of Data *****
Grid  CLIDMSER Day Date      Hours  Partitn_Num  P-Mig_Throt  Wrt
00186 CL02DADW Sun 05FEB2017   24.00         8           4000
00186 CL02DADW Mon 06FEB2017   24.00         8           4000
00186 CL02DADW Tue 07FEB2017   24.00         8           4000
00186 CL02DADW Wed 08FEB2017   24.00         8           4000
00186 CL02DADW Thr 09FEB2017   24.00         8           4000
00186 CL02DADW Fri 10FEB2017   24.00         8           4000
00186 CL02DADW Sat 11FEB2017   24.00         8           4000
00186 CL02DADW Sun 12FEB2017   24.00         8           4000
00186 CL02DADW Mon 13FEB2017    9.25         8           4000
  
```

Amount of Tape  
Partition, PMTHLVL,  
And Throttling very  
compact displayed

For each Partition,  
the size, the mount  
behavior, the  
residency times, etc.

Partitn_Size_1	Mount_Hit%_1	Tot_Mnts_1	Avg_Mnt_Sec_1
5722	100.0	0	0.0
5722	98.7	567	1.1
5722	100.0	0	0.0
5722	100.0	0	0.0
5722	100.0	0	0.0
5722	100.0	0	0.0
5722	100.0	0	0.0
5722	100.0	0	0.0
5722	100.0	252	1.1

# VEHSTATS - ORDER Statements Adjustment



Example 1: No changes to ORDER statement are made. Pool 01, 02, 03, 04 are displayed.

```
POOL_02_GiBRD  POOL_03_DEVTXX  POOL_03_ACT_VV  POOL_03_ACT_GB  POOL_03_Pri
      0          NONE          0          0
      0          NONE          0          0
      0          NONE          0          0
```

But customer has Pool 07 – and Pool 3-6 are empty  
With the adjustment, now Pool 07 is displayed.

Adjustment is to uncomment the ORDER Statements for POOL 07 and to comment the ORDER Statements for POOL3 and POOL4 as shown in the next page.

```
WRT POOL_02_GiBRD  POOL_07_DEVTXX  POOL_07_ACT_VV  POOL_07_ACT_GB  POOL_07_
      0          0          NONE          252          296
      0          0          NONE          252          296
```

- **QTR / HRS**
  - 15 minutes intervall is reported
  - 60 minutes intervall is reported
  - Use 15 minutes interval for 24 hours Excel template, for performance problem analysis
- **FLOW** - Produce a report called **HOURLFLOW**
  - Request the **HOURLFLOW** report for every cluster, mutually exclusive with **GRID**
- **GRID**
  - Summarize all information in the grid to one statement, mutually exclusive with **FLOW**
- **SHOP**
  - Summarize all clusters within a **SHOP**
- **COMPARE** - produce a report called **COMPARE**
  - Compare clusters
- **HDSUM**
  - Daily summary 1 line in the flat file
- **HXFR / DXFR**
  - Show on hourly or daily base the Host I/O Throughput

- SDATE / EDATE
  - To select the periode for all reports
- STIME / ETIME
  - To select start and end time for the hourflat
- You see your selection in the jobout
  - +INPUT DATA FOR 01JAN2017 THRU 10FEB2017.
  - +SELECTION FOR 01FEB2017 THRU 12FEB2017.
  - + TIME 08:00:00 16:00:00
  - +REPORTING FOR 01FEB2017 THRU 10FEB2017.
  - + TIME 08:00:00 13:15:00
  - +INTERVAL OF 10 DAYS
- STIME= Starting time on SDATE
- ETIME = Ending Time on EDATE
- If you specify multiple days, in the days between SDATE and EDATE the full 24 hours are reported.
- Same rules apply than for BVIR selection (LASTMONTH, etc.)



## SECPOOL

- The „Active GB“ for a TS7700T or TS7740 in the VEHSTATs is an addition of all GB in the physical pools.
- But what, if you use secondary Pool ? Maybe for
  - Protection in a TS7700 stand alone cluster for physical media failure
  - Copy Export
- Do you want to count that to „Active GB“ ? Even that is actually a duplicate of the data ?
- If not, code SECPOOL xx; and then the amount of GB stored in the selected pool are not summed up.

## DEFDDL:

- If your cluster numbering is not consecutive (0,1,2....) you may get errors in the records.
- Since VEHSTATS Version from 30Dec2016 the DEFDDL statement is not more needed.. But maybe you see this message:
  - +x33 records with different number of cluster sets detected.
  - +Some reports may be misrepresented.
- For VEHAUDIT (even with the latest versions) DEFDDL might be needed.
- Before you need DEFDDL to number your clusters accordingly – in our example Cluster 0 is missing. Use
  - DEFDDL= H3833 1;
  - DEFDDL= H6395 2;
- The numbering can be found in the NODE=SERIAL in the VEHSTATS report, or if there is an issue – in the Joblog

Output in Joblog if cluster numbering is an issue

```
+DATA FOR GRID=00186,CL02DADW
```

```
+DATA FOR GRID=00186,CL2H6395
```

```
+GRID CLUSTERS NOT CONSECUTIVE 0,1,2,..
```

```
+DEFDDL PARAMETERS NEEDED
```

- QUEAGEMINUTES;
  - Report the DEF & RUN queue age as minutes, not seconds
- USEGB;
  - For report “HOURFLOW” , report the queue in GiB, if > than 999999 MIB
- EUROFORMAT:
  - Exchange „,“ and „.“ to allow an easier upload to Excel.
- SPLITCLUSTER:
  - Split all the TXT files in separate files – one for each cluster.
  - This make the upload in Excel easier, but you need to download more files from host to PC.
    - Make a sending list instead of manual typing.

We submitted the job, and have now 5 different outputs:

DENEKA.TAPETOOL.#EDU0003.DAYHSMRY.TXT

DENEKA.TAPETOOL.#EDU0003.HOURFLAT.TXT

DENEKA.TAPETOOL.#EDU0003.MNTHSMRY.TXT

DENEKA.TAPETOOL.#EDU0003.RPTSEQ.EDU0003

DENEKA.TAPETOOL.#EDU0003.WEKHSMRY.TXT

In the next session, we learn how to interpret these data – and what all the information are good for.

But a lot of it is self explainable – and even more if we import the data in Excel and look to some nice graphs...

So – lets do that !

# VEHSTATS and Excel

- Three Excel templates for different periods are available on TECHDOCS:
  - 1 day – with 15 minutes interval (96 data rows)
    - Purpose: Peak and Problem analysis
    - Population from: HOURFLAT – QTR, SDATE and EDATE for 1 day
  - 1 week – with 1 hour intervals (168 data rows)
    - Purpose: Workload profile
    - Population from: HOURFLAT – HRS, SDATE and EDATE for 1 week
  - 90 days – daily summary (90 data rows)
    - Purpose: Trend analysis
    - Population from: DAYSMR, SDATE and EDATE for 90 days
- Most often the 1 week Excel template is used
- Use ORDER6CL to ensure that the data and the excel fits together
- Note: the templates for ,One to four cluster...‘ using ORDERV12 have not been updated for a while

## VEHSTATS and TECHDOCS Excel – 2

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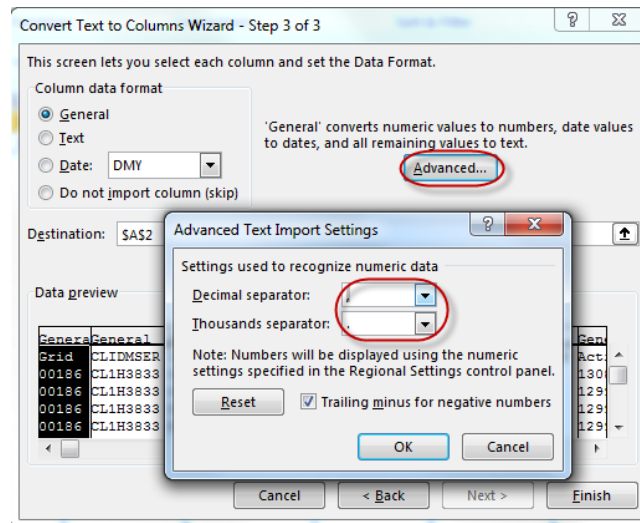
- In the following slides we will show you how to import hourly data from HOURFLAT file into one of the Excel templates available on Techdocs
- We also show how to
  - Format the data
  - Fix common Excel ,problems‘ with labels
  - Add additional charts
  - Add secondary y-axis to a chart
- We use the ,One to Six Cluster One Week 4 Pools ORDER6CL V19.xlsx‘
  - This is for one week of hourly data (produced with VEHSTATS REPORT=HRS, not for 15-min intervals produced with the QTR statement in the VEHSTATS job)
  - It is assumed, that the decimal and thousands separator is already correct in the HOURFLAT file (e.g. generated with EUROFORMAT statement)
  - ORDER6CL was required for the VEHSTATS job and has been chosen, because the ORDERV12 Excel template has not been updated for a while
- Note: screenshots etc. are taken with release ,Microsoft Office 365 ProPlus‘ and might look different in your version of Excel (but all functions are also available in earlier releases of MS Office)

# Standard vs. EUROFORMAT



- Make sure that the HOURFLAT file has the correct decimal and thousands separators matching the settings in your OS's regional settings
- See below an example for the standard format on the left with ',' as decimal separator and EUROFORMAT at the right with ','
- It is possible to import the ,wrong' format into Excel and switch the separators, but it is cumbersome to do so and repeat it for e.g. several clusters

Mount_Hit_Pct	Avg_Mnt_Sec	Avg_Scr_Mt_Sec	Mount_Hit_Pct	Avg_Mnt_Sec	Avg_Scr_Mt_Sec
100.0	0.0	0.0	100,0	0,0	0,0
100.0	0.0	0.0	100,0	0,0	0,0
100.0	0.0	0.0	100,0	0,0	0,0
100.0	0.0	0.0	100,0	0,0	0,0
100.0	0.0	0.0	100,0	0,0	0,0





1. Open Excel Workbook ,One to Six Cluster One Week 4 Pools ORDER6CL Vxx.xlsx' (with V19 being the current version)
  2. Enable editing (if required)
  3. Save the file with a different filename
  4. Click on Tab ,Cluster 0'
  5. Make sure cell A2 is selected
  6. Open HOURFLAT file with cluster 0 data in your favorite text editor
  7. Mark and copy 169 lines of cluster 0 data including the headline
  8. Switch to Excel and paste clipboard content into cell A2. All data is now in column A only.
  9. Click on ,Data' Menu
  10. Click on ,Text to Columns'
  11. Select the ,Delimited' radio button then click ,Next'
  12. Set checkmark next to the ,Space' delimiter field then click ,Finish'
  13. Click ,OK' when asked to overwrite existing data
  14. Repeat for cluster 1, 2, etc... (if you didn't save & close Excel (all open workbooks) in the meantime, steps 8-12 should not be required)
- Note: as usual in MS Office, there are multiple ways to achieve a goal, e.g. text data can also be imported with ,Data' – ,From Text', then open the flatfile and the dialog from step 10. appears. Choose your favorite way.

# Adapting column width

- When fields show ,#####' this means that values exceed the column width. Simply mark the column and position the cursor at the right edge of the column header and doubleclick. This will adapt the column width to the widest cell value.
- If you want to do this for all columns at once, simply click on the triangle left to column header A to mark the entire sheet, then doubleclick on the right edge of any column

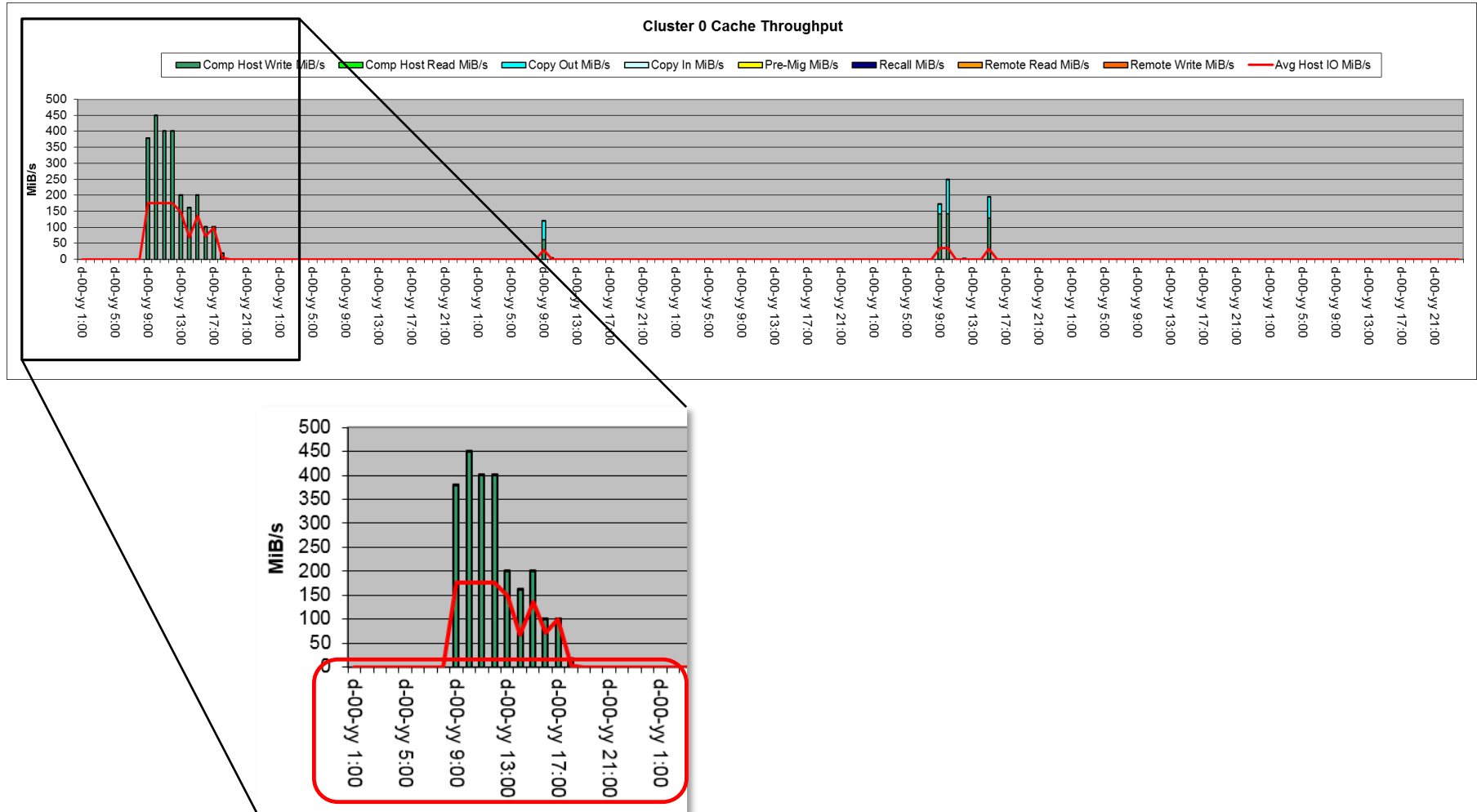
	A	B	C	D	E	
1	Grid	CLIDMSER	Day	Date	End_Time	Avg_
2	Grid	CLIDMSER	Day	Date	End_Time	Avg_
3	C1111	CL2H6790	Tue	#####	20:00:00	
4	C1111	CL2H6790	Tue	#####	21:00:00	
5	C1111	CL2H6790	Tue	#####	22:00:00	
6	C1111	CL2H6790	Tue	#####	23:00:00	
7	C1111	CL2H6790	Wed	#####	00:00:00	

	A	B	C	D	E	
1	Grid	CLIDMSER	Day	Date	End_Time	Av
2	Grid	CLIDMSER	Day	Date	End_Time	Av
3	C1111	CL2H6790	Tue	#####	20:00:00	
4	C1111	CL2H6790	Tue	#####	21:00:00	
5	C1111	CL2H6790	Tue	#####	22:00:00	
6	C1111	CL2H6790	Tue	#####	23:00:00	
7	C1111	CL2H6790	Wed	#####	00:00:00	

# Fixing x-axis labels



- In the 'Charts' Tab, you may find your x-axis labels to be inaccurate and showing e.g. 'd-00-yy 1:00' instead of e.g. '16-Jan-17 1:00'



# Fixing x-axis labels (cont'd)

- This can be related to your regional and language settings
- And even if your OS is set to english language and the date and time formats seem to be matching in the Windows control panel, Excel is expecting a different format

The screenshot shows the Windows Control Panel 'Region and Language' window. The 'Formats' tab is active, showing 'German (Germany)' as the selected format. The 'Date and time formats' section is circled in red, with 'Short date' set to 'dd.MM.yyyy'. Below this, the 'Examples' section shows '10.02.2017' and 'Freitag, 10. Februar 2017'. In the foreground, an Excel spreadsheet is open. The formula bar shows the formula: `=TEXT(A135;"d-mmm-yy")&" "&TEXT(B135;"h:mm")`. The spreadsheet table has columns A through F. Column C is labeled 'Date/Time' and contains values like '21. Jan 17 14:00:00' and 'd-00-yy 14:00'. The 'd-00-yy 14:00' value is circled in red.

	A	B	C	D	E	F
1	Cluster 0		Date/Time	Avg Host IO MiB/s	Max Host IO MiB/s	Comp Host IO MiB/s
135	21. Jan 17	14:00:00	d-00-yy 14:00	0	0	#DIV/0!
136	21. Jan 17	15:00:00	d-00-yy 15:00	0	0	#DIV/0!
137	21. Jan 17	16:00:00	d-00-yy 16:00	0	0	#DIV/0!
138	21. Jan 17	17:00:00	d-00-yy 17:00	0	0	#DIV/0!

# Fixing x-axis labels (cont'd)



- Excel expects e.g. in a regional setting for Germany the format ,t-MMM-jj' for day-month-year instead of the original english version of ,d-mmm-yy'. Please note the capital M's, this is required. It doesn't work with small m's.
- You might have similar requirements in your language settings
- Once you changed the formula in the formula field (,Clx Calcs' sheets, column C) for one cell, you can copy/paste the changed cell across the entire range of 167 lines in one step
- The x-axis labels in the ,Charts' tab will update automatically
- Repeat it for all required ,Clx Calcs' tabs

The screenshot shows the Excel formula bar with the formula `=TEXT(A135;"d-mmm-yy")&" "&TEXT(B135;"h:mm")` circled in red. Below it is a table with columns A through F. Row 135 is highlighted, showing the output of the formula as `d-00-yy 14:00`, which is also circled in red.

	A	B	C	D	E	F
1	Cluster 0		Date/Time	Avg Host IO MiB/s	Max Host IO MiB/s	Comp Host IO MiB/s
135	21. Jan 17	14:00:00	d-00-yy 14:00	0	0	#DIV/0!
136	21. Jan 17	15:00:00	d-00-yy 15:00	0	0	#DIV/0!
137	21. Jan 17	16:00:00	d-00-yy 16:00	0	0	#DIV/0!
138	21. Jan 17	17:00:00	d-00-yy 17:00	0	0	#DIV/0!

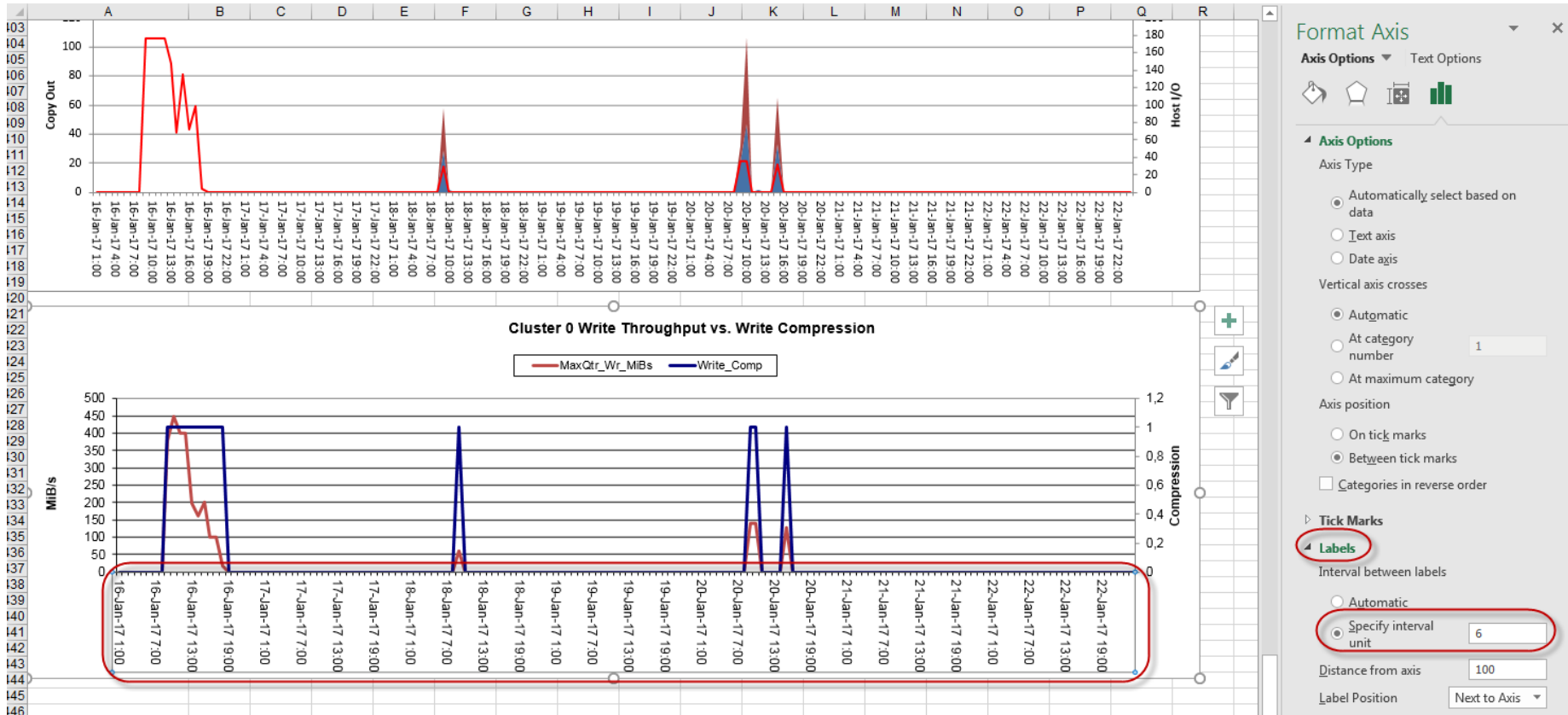
The screenshot shows the Excel formula bar with the updated formula `=TEXT(A135;"t-MMM-jj")&" "&TEXT(B135;"h:mm")` circled in red. Below it is the same table as above, but row 135 now shows the output `21-Jan-17 14:00`, which is also circled in red.

	A	B	C	D	E	F
1	Cluster 0		Date/Time	Avg Host IO MiB/s	Max Host IO MiB/s	Comp Host IO M
135	21. Jan 17	14:00:00	21-Jan-17 14:00	0	0	#DIV/0!
136	21. Jan 17	15:00:00	d-00-yy 15:00	0	0	#DIV/0!
137	21. Jan 17	16:00:00	d-00-yy 16:00	0	0	#DIV/0!
138	21. Jan 17	17:00:00	d-00-yy 17:00	0	0	#DIV/0!

# Fixing x-axis labels (cont'd)



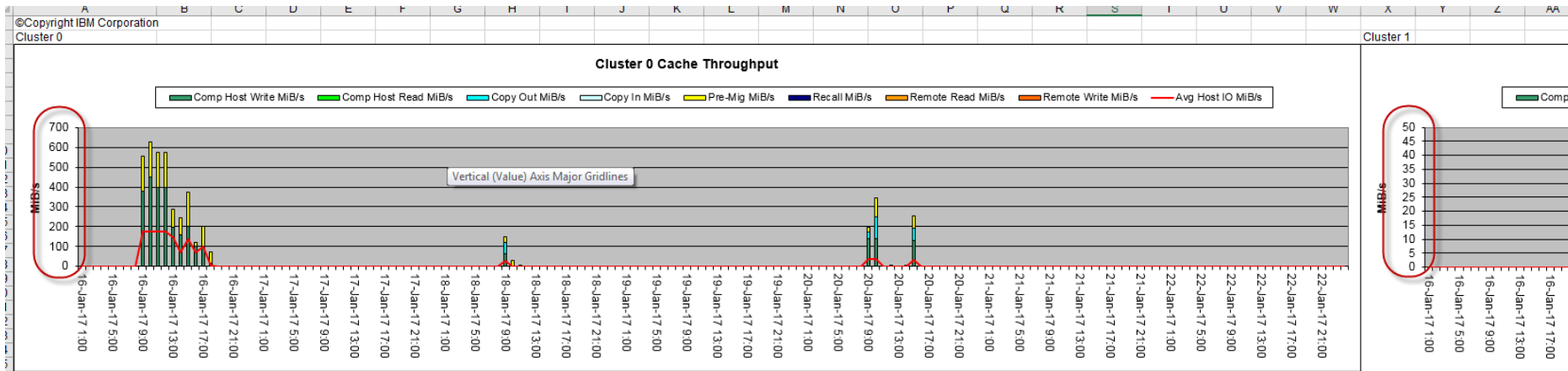
- To reduce the number of x-axis labels for better readability, left-click and mark the label area in the chart
- In the ,Format Axis' menu appearing at the right side, open the ,Labels' section, select ,Specify interval unit' radio button and type in an appropriate value, e.g. ,6'



# Fixing y-axis labels (cont'd)

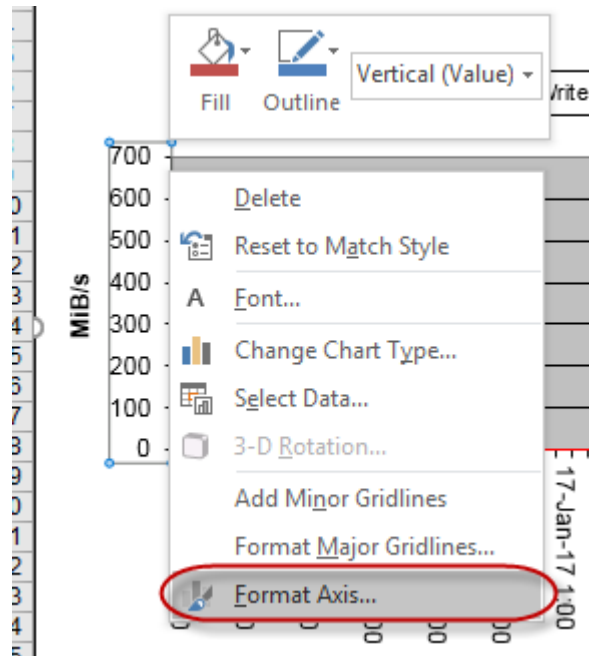


- Depending on the workload, the y-axis scales for the same chart for different clusters can be diverse. This is because the y-axis scaling is set to ,auto' in the workbook
- This can make comparisons of charts between different clusters difficult



# Fixing y-axis labels (cont'd)

- To set the y-axis value to a fixed maximum, mark the y-axis label area in the chart with a left-click, then right-click to pull up the context menu and select 'Format Axis...'
- In the menu appearing on the right of your screen, type in an appropriate value for 'Maximum' and repeat this procedure for the remaining charts for the other clusters



**Format Axis**

Axis Options | Text Options

**Axis Options**

Bounds

Minimum	0,0	Auto
Maximum	1000,0	Reset

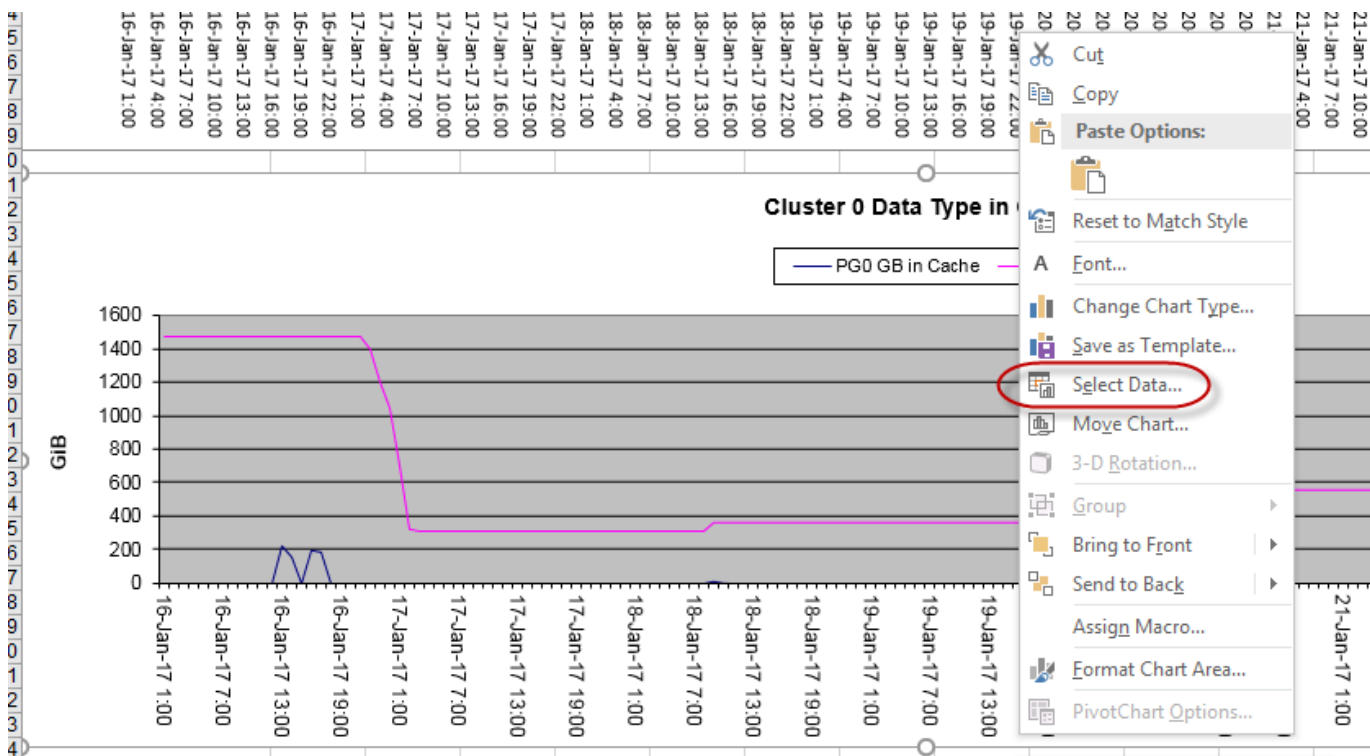
Units

Major	100,0	Auto
Minor	20,0	Auto

Horizontal axis crosses

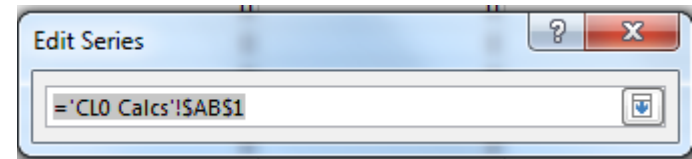
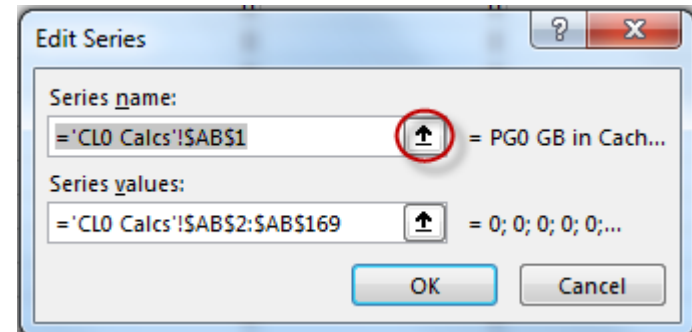
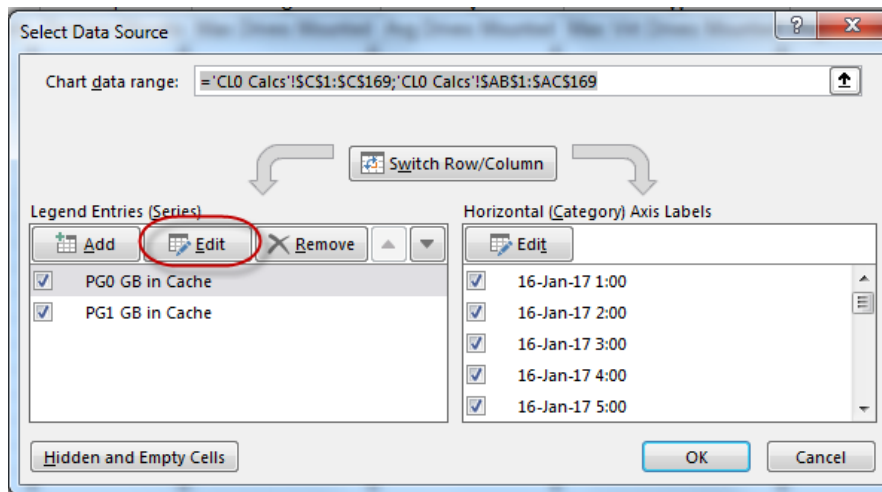


- An easy way to add additional charts of interest to the workbook is to copy an existing chart and paste it e.g. below the last chart in the ,Charts' tab
- This approach will carry over most of the formatting
- Then start to modify the new chart with the figures of interest
- To do so, left-click and mark the chart, then right-click and select ,Select Data...' from the context menu



# Adding charts (cont'd)

- In the pop-up window remove excessive legend entries if required
- Else, start to edit legend entries to select new data series of interest
- The advantage of editing existing entries is that your Horizontal Axis Label range (timestamps) is already there which saves time
- After clicking ,Edit‘ a new window ,Edit Series‘ pops up and Excel switches to the tab containing the original data series
- At clicking on the up-arrow next to the ,Series name‘ field, the window changes to smaller size and allows for selecting new data



# Adding charts (cont'd)

- Now go to the tab containing the new data series and click to select the new ,Series name', e.g. the headline *MaxQtr\_Wr\_MiBs* for host write throughput
- Now click again on the up-arrow what takes you back to the previous ,Edit Series' window
- Then click on the up-arrow of the ,Series values' field. (Note: Excel takes you again to the original data tab. Go back to the tab with *MaxQtr\_Wr\_MiBs* column and select the full range of values from line 3 to 170. Click the down-arrow.

AH	AI	AJ	A
MaxQtr_Wr_MiBs	Max_Qtr_MiB_s	Chan_Avg_MiB_s	WrtThrot
MaxQtr_Wr_MiBs	Max_Qtr_MiB/s	Chan_Avg_MiB/s	WrtThrot
0	0	0	0
0	0	0	0
0	0	0	0

Series name: =Cluster 0!\$AHS2

Series name: =CLO Calcs!\$ABS1 = PGO GB in Cach...

Series values: =CLO Calcs!\$ABS2:\$ABS169 = 0; 0; 0; 0; 0;...

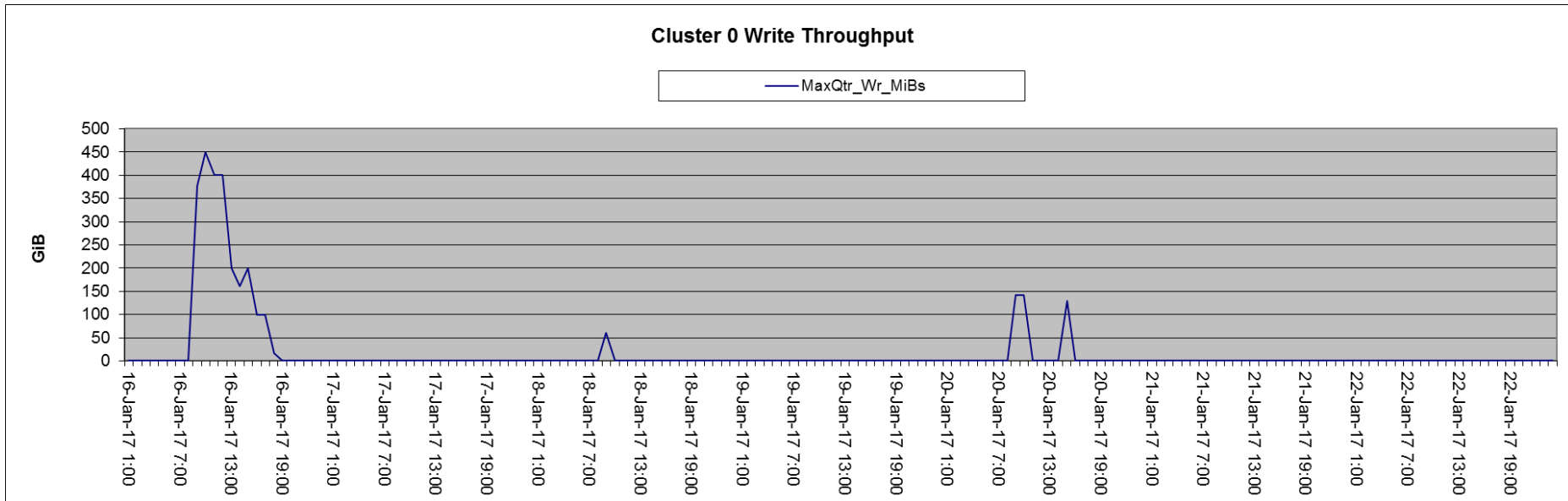
<Qtr_Wr_MiBs	Max_Qtr_MiB/s	Chan_Avg_MiB/s	WrtThrotInr
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Series values: =Cluster 0!\$AIS3:\$AIS170

# Adding charts (cont'd)

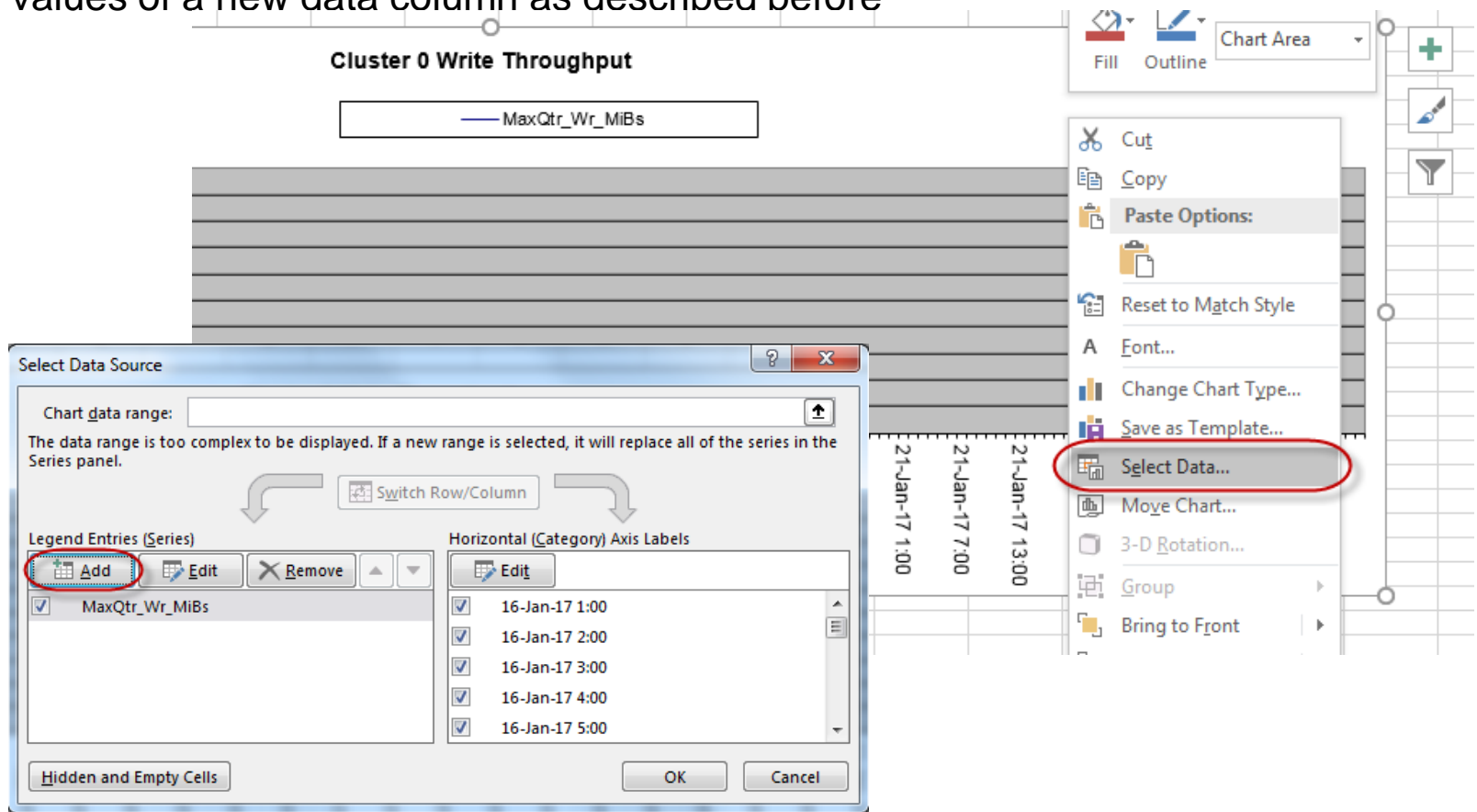


- In the ,Edit Series' and in the ,Select Data Source' window, click OK.
- Now we have the new chart filled with *MaxQtr\_Wr\_MiBs*
- Note, the y-axis title is still the old one (GiB), just rename it by double-clicking the title field and change it to e.g. MiB/s
- Same applies to the chart title field, here already changed to ,Write Throughput'



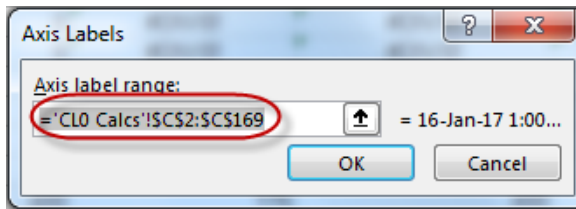
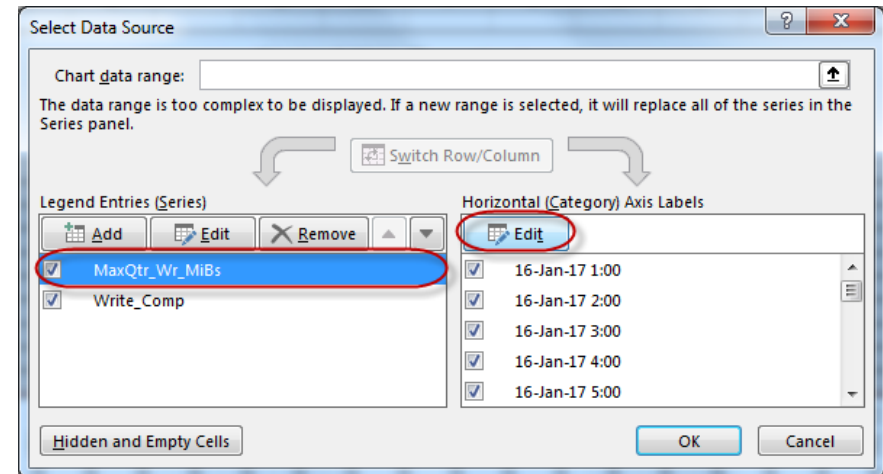
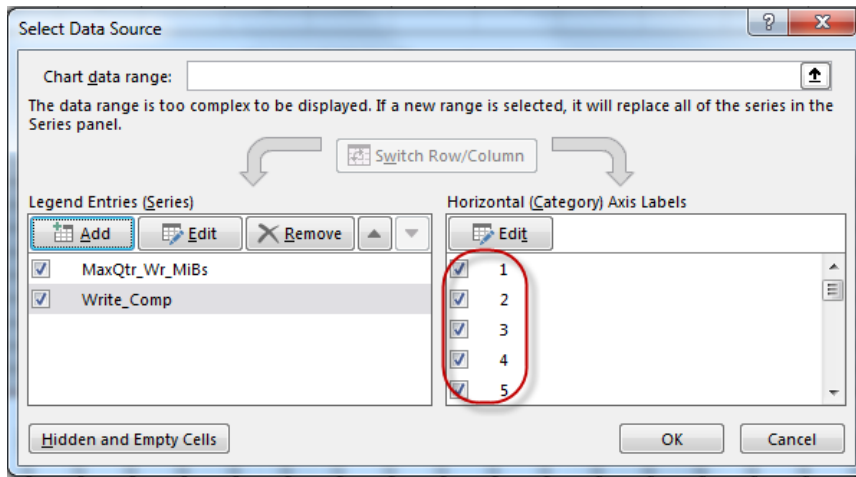
# Adding secondary y-axis

- Sometimes it is of interest to add a second metric to a chart with different units, e.g. compression ratio vs. throughput
- Right-click on the chart and select ,Select Data...' from the context menu
- In the ,Select Data Source' window click ,Add' and start adding header and values of a new data column as described before



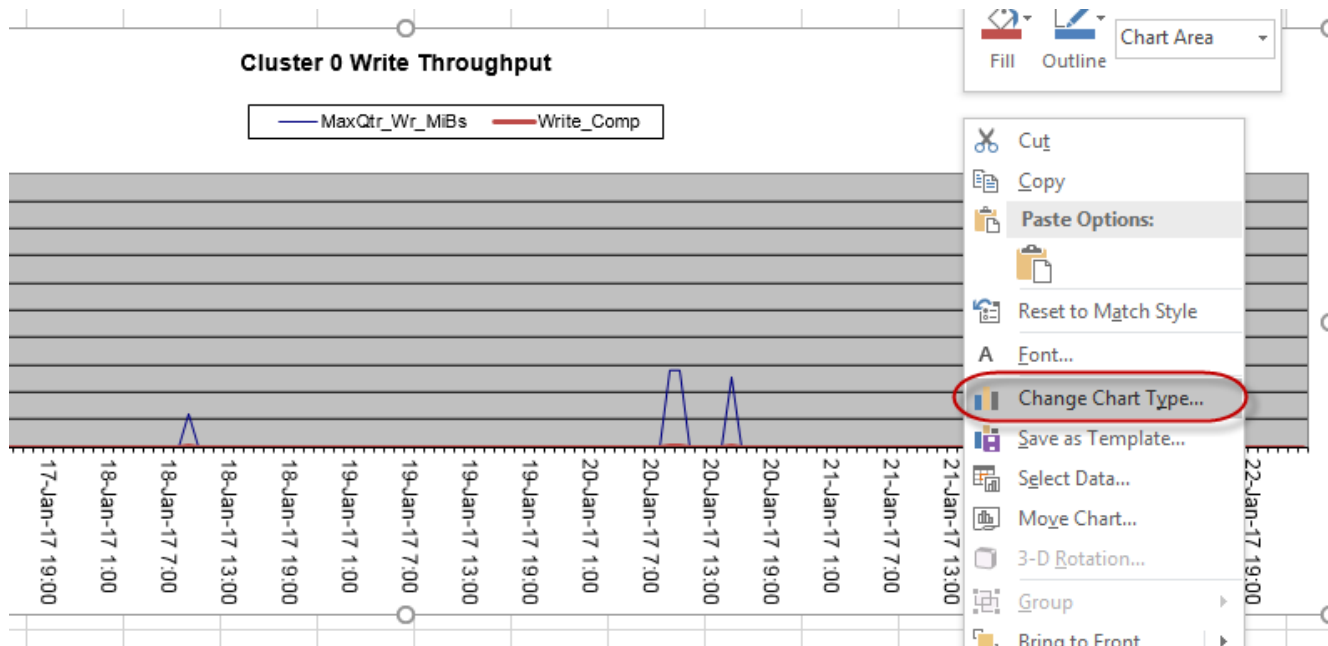
# Adding secondary y-axis (cont'd)

- Note that the Horizontal Axis Labels values are defaults. Get them from the MaxQtr\_Wr\_MiBs series by selecting and clicking ,Edit'. Copy the range to the clipboard and go back to the Write\_Comp series and paste it into the Axis Labels range field. Then click OK.



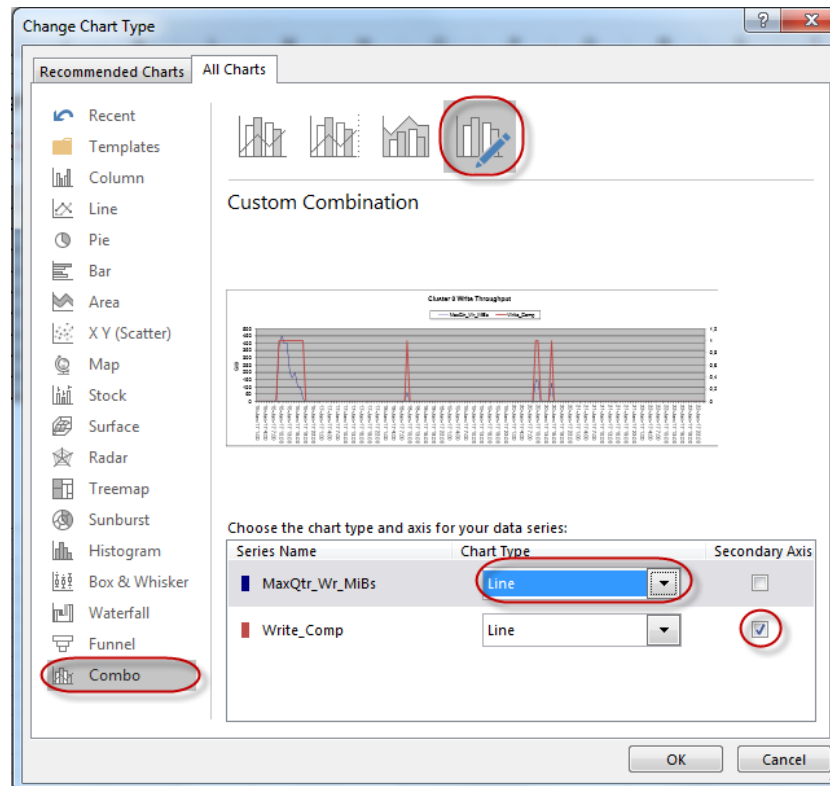
## Adding secondary y-axis (cont'd)

- Now you have the new data in the chart, but depending on the scale you can barely see it
- Now, let's add a secondary y-axis for the compression values
- Right-click on the chart and select 'Change Chart Type...' in the context menu



# Adding secondary y-axis (cont'd)

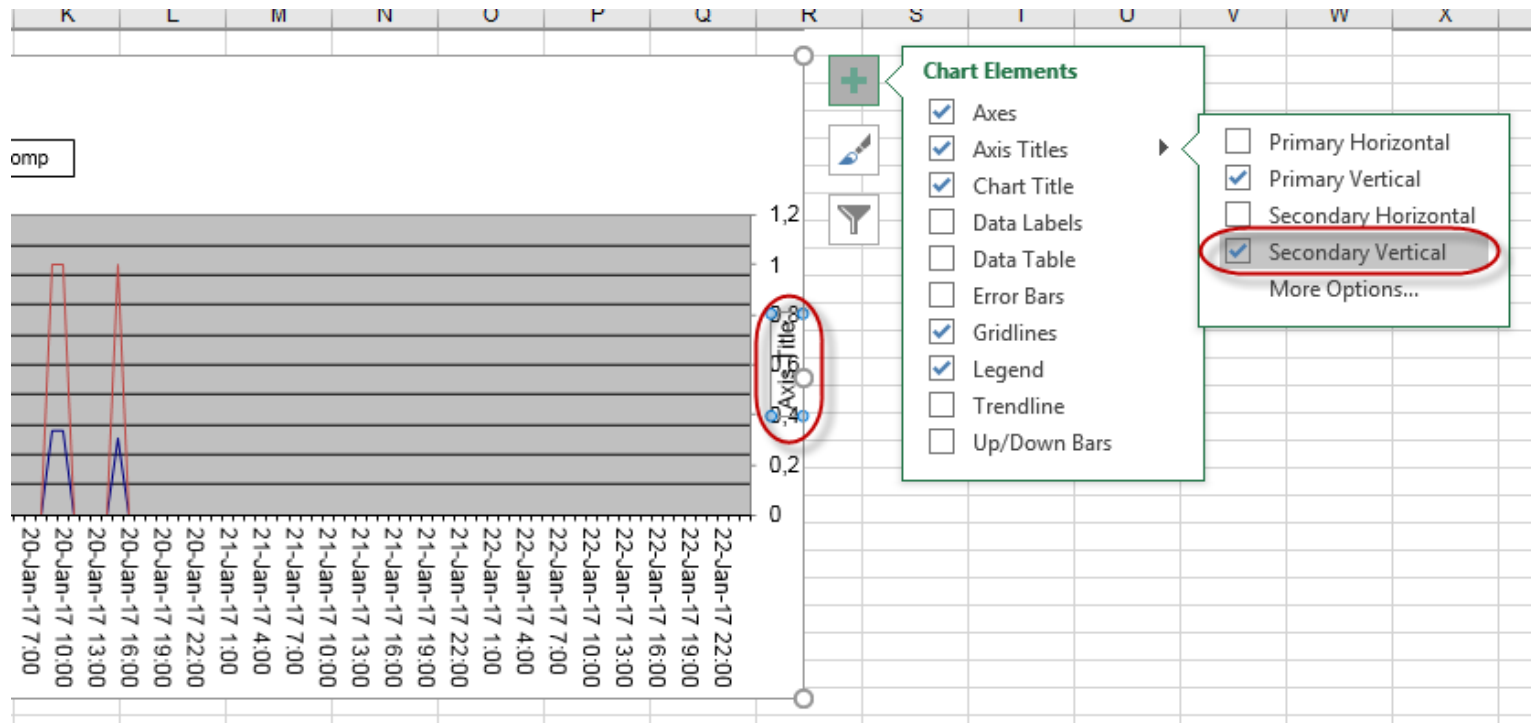
- Then select ,Combo', chart type ,Line' for both data series and select the checkmark for ,Secondary Axis' for one of the two series





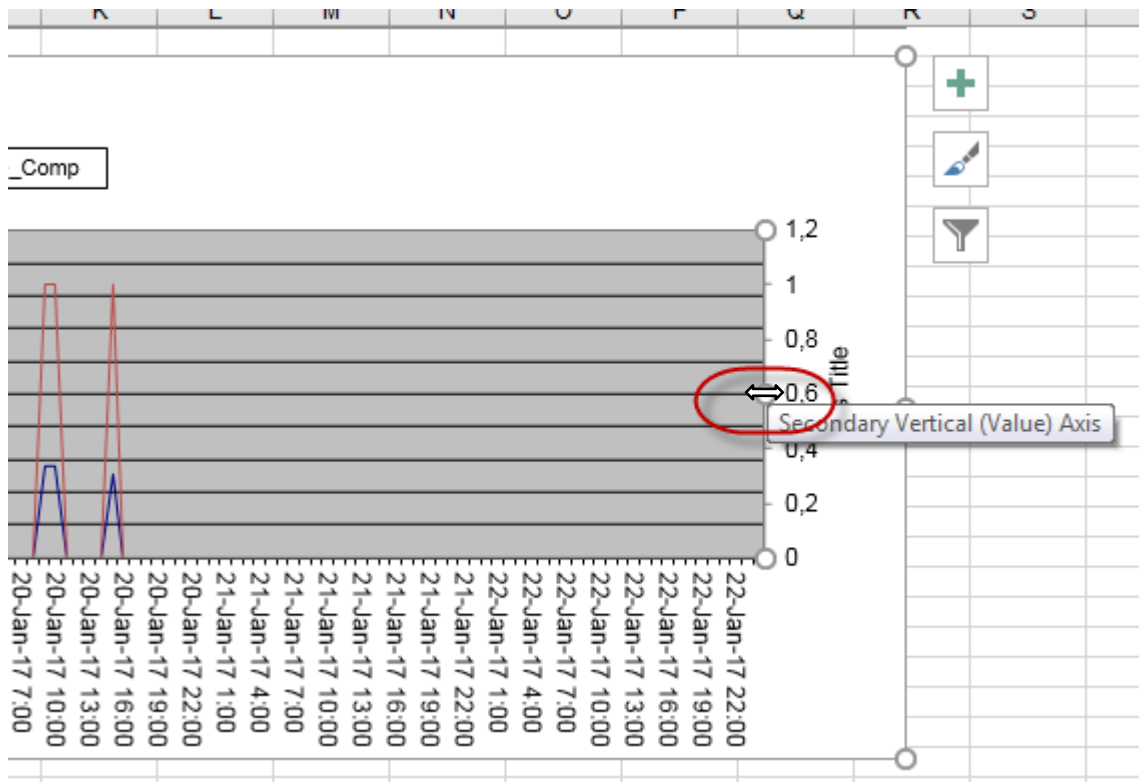
# Adding secondary y-axis (cont'd)

- Now you might want to add a title for the secondary axis. Mark the graph and click on the 'Plus'-sign at the top right corner of it. The open 'Axis Titles' and checkmark 'Secondary Vertical' to make the title box appear on the right



# Adding secondary y-axis (cont'd)

- Correct the misalignment of title box and graph box by simply dragging the graph box's marker point to the left to narrow the graph box
- Rename the axis title to e.g. 'Compression ratio'



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# WRAP UP:

1. Make a decision, what output you want to use
2. Make a decision how to store the BVIR for a longer periode of time to allow trend analysis:
  1. Suggestion: Use GDG, 120 version , 1 per month = 10 years
  2. For „in between“ – use a daily run with 31 GDGs
3. Download the documentation and Tapetools
4. Customize the jobs (store Tailor job and sending list)
5. Make an agreement with your „scheduling team“ how they can handle the regularly exchange from the load modules
  
6. Be aware – the TS7700 BVIR reports are TS7700 oriented – no information about LPARs, Sysplex, etc. ! So you can run the BVIR from Sandbox or Development/Test. No need to run them on production LPARs.

---

# QUESTIONS

????????

Backup:  
Download – upload –  
receive the datasets  
for Tapetools

# Tapetool Suite - How to download from Tapetool site



Load the necessary sample tools from IBM Tapetool site:

<ftp://ftp.software.ibm.com/storage/tapetool/>

Single click to the following items – and download them:

ibmcntl.xmi (Parameter)

ibmjcl.xmi (Execution JCL)

ibmload.xmi (Loadmodules)

ibmpat.xmi (Data pattern)

Optional:

Changes made in TAPETOOLS

updates.txt

Newest Decoder documentation: TS7700.VEHSTATS.Decoder.xxx.pdf

Graph Package.

VEHSTATS\_MODEL\_V21.ppt

VEHSTATS\_MODEL\_V21.xls

Information for all the tools: overview.pdf

Information about some Tapetools (not VEHSTATS): samprpts.pdf

Then all the information is somewhere on your PC

Then transfer the libraries from PC to your Host – Use BIN80 for transfer.

Before doing file transfer to host, you may need to create a new transfer template. Depending on your PCOM product, that might be different. In the backup you find a step by step procedure how to define the transfer template  
Create a template for BIN80 if it doesn't already exist. Use the standard BINARY template to start, but use RECFM=F, LRECL=80, and BLKSIZE=3120 for the new template.  
Do not use ACSII or CRLF.  
Use a space request for CYLS,(8,2).

As an alternate method, you can transfer the data directly to your host session, if this is allowed in your environment. Both installation methods are described in the dataset „*ibmtools.txt*“ on the website.

Hint: The tapetools are only load and jcl which will be executed in the host session, no further software installation is necessary.



In TSO - Option 6 receive the CNTL, JCL and Load to 3 dataset with your desired HLQ.

```
RECEIVE INDSN(IBM CNTL.XMI)
```

```
RECEIVE INDSN(IBM JCL.XMI)
```

```
RECEIVE INDSN(IBM LOAD.XMI)
```

This will create the final datasets with the members.

Userid.IBMTOOLS.CNTL = Control cards (not JCL !)

Userid.IBMTOOLS.JCL = Job Control

Userid.IBMTOOLS.LOAD = loadmodules

The most JCL is using Instream Procedures. To speed up the process of customization

Prepare and run now the needed jobs:  
IBMTTOOLS.JCL (\$\$CPYLIB)

You create a working copy of the JCL members – use for the following steps this working copy

Change the following information:  
JOB CARD

```
//COPYLIB PROC TOOLHLQ=DENEKA,      * HLQ OF SHARED LIBRARIES
//          USERHLQ=DENEKA,        * HLQ FOR NEW USER JCL LIBRARY
//          PRIMARY=TAPETOOL,      * 3RD NODE FOR JCL LIBRARY
//          SITE=IBM                * 2ND LQ FOR OUTPUT DATA SET
```

And you create a dataset called:  
DENEKA.IBM.TAPETOOL.JCL

## DENEKA.IBM.TAPETOOL.JCL(\$\$TAILOR)

In this job you tailor the jobcards, HLQ and other variables for all other jobs you will run in sequence.

```
•//TAILOR PROC TOOLHLQ=DENEKA, * HLQ OF SHARED LIBRARIES
•// USERHLQ=DENEKA, * HLQ FOR YOUR JCL LIBRARY
•// TYPE=TEST, * USE =LIVE TO MODIFY JCL MEMBERS
•// RELEASE=TAPETOOL, * 3RD NODE FOR JCL LIBRARY
•// SITE=IBM * 2ND LQ FOR USER JCL LIBRARY
```

If you see this output,  
Job is incorrect !  
Check your substitutes.

### EXCLUDED MEMBER NAMES:

```
OK ----> $$TAILOR
OK ----> $$INDEX
OK ----> $READ*
OK ----> $$CPYLIB
OK ----> $$INSTAL
```

```
NUMBER OF ** ERROR ** ARE-00000
** RUN COMPLETED RC=001 **
```

The TEST option allows to precheck the changes in advance  
// TYPE=TEST, \* USE =LIVE TO MODIFY JCL MEMBERS

A Return Code=0000 and the listing which members have been changed shows that the run will be successful.

Then exchange TEST to LIVE – and submit the job again.

Now all members in the DENEKA.IBM.TAPETOOL.JCL are changed- but this is not reflected in the modify date and user id.

Tip:

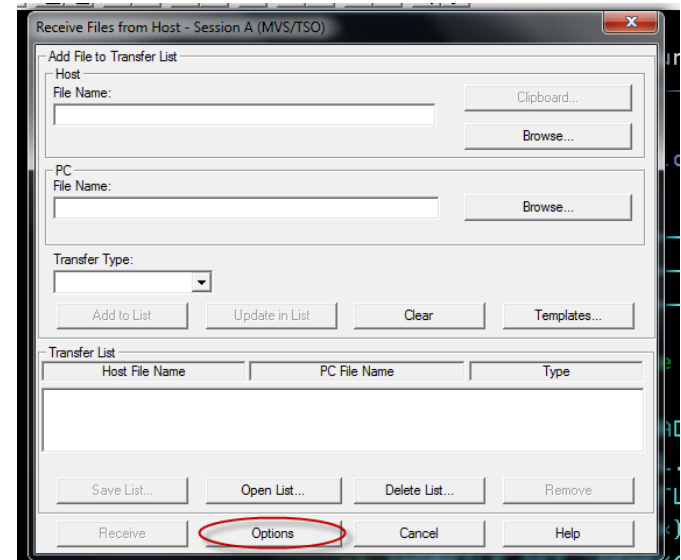
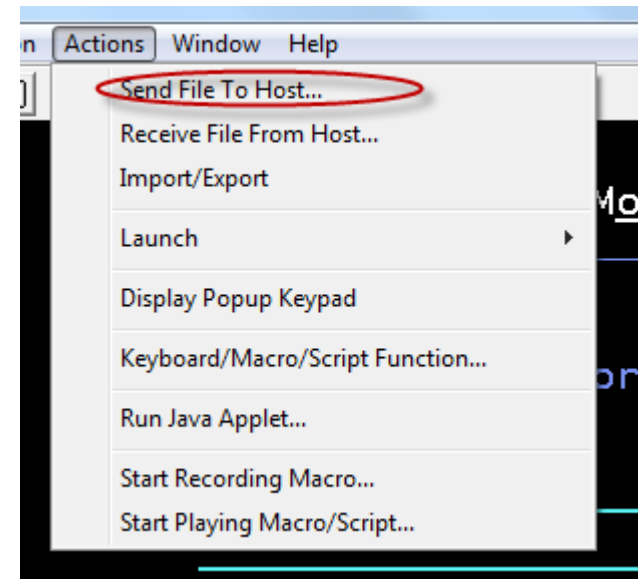
The Tailor Job has not been changed since 2013.

So if you keep a copy in an own library you can reuse the job.

# Backup: How to create a PCOM template

# PCOM: How to create a template to upload the files

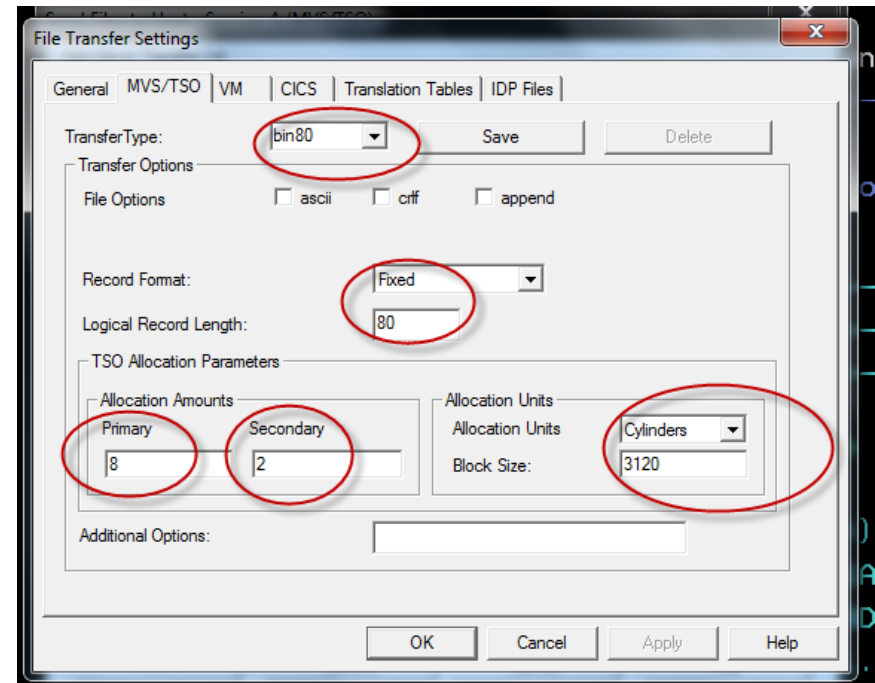
1. Select „Action“ and then „Send File to Host“
2. Select Options



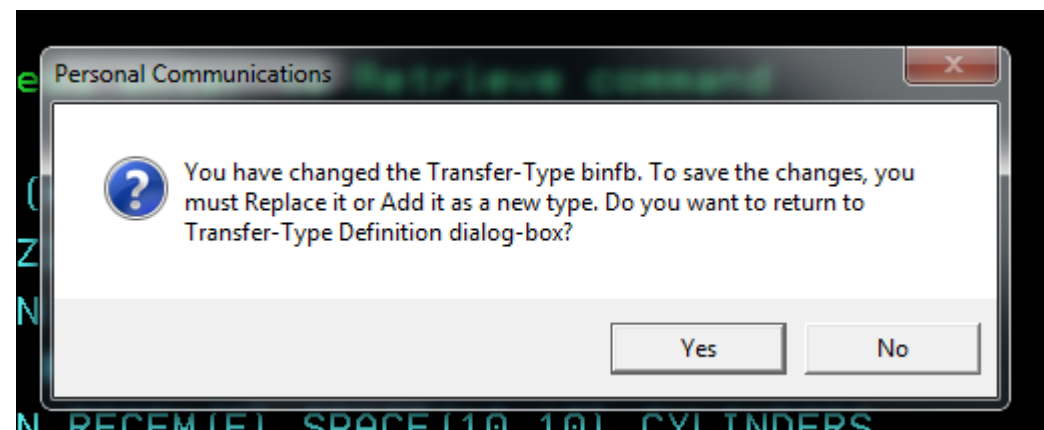
# PCOM: How to create a template to upload the files



Step 3: Select MVS/TSO, select a name, and define  
Fixed, 80  
Primary 8, secondary 2,  
Cylinders, 3120



Step4: Press Save - if you dont press Save, you get the following information:



# PCOM: How to create a template to upload the files



Step 5: After you saved the Save, you need to apply the settings:

The screenshot shows the 'File Transfer Settings' dialog box with the following configuration:

- TransferType: bin801
- File Options:  ascii,  crlf,  append
- Record Format: Fixed
- Logical Record Length: 80
- TSO Allocation Parameters:
  - Allocation Amounts: Primary: 8, Secondary: 2
  - Allocation Units: Allocation Units: Cylinders, Block Size: 3120
- Additional Options: (empty text box)

The 'Apply' button at the bottom right is circled in red.

•Now your template is created



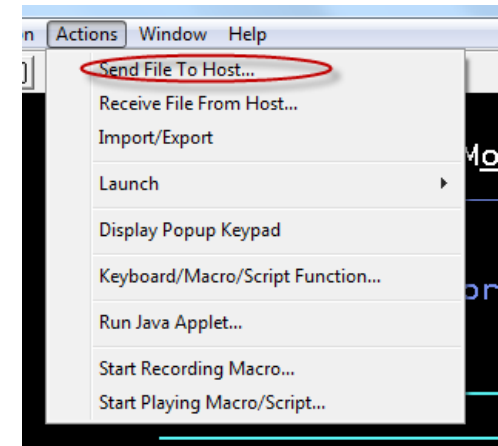
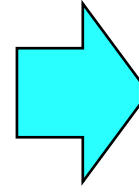
# Backup: How to use and create a PCOM sending list

# Tapetool Suite - How to use an existing list

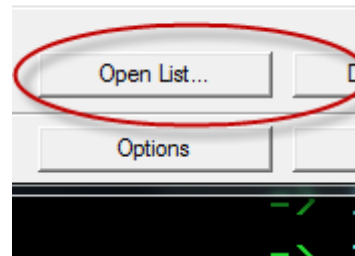
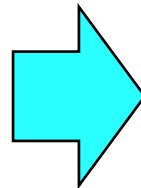


It is just boring to upload the same three files manually again and again. To simplify the upload, you can also use a predefined list.

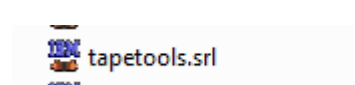
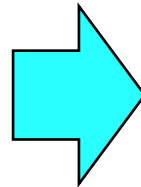
Step1: Select „Send File to Host“



Step2: Select Open List

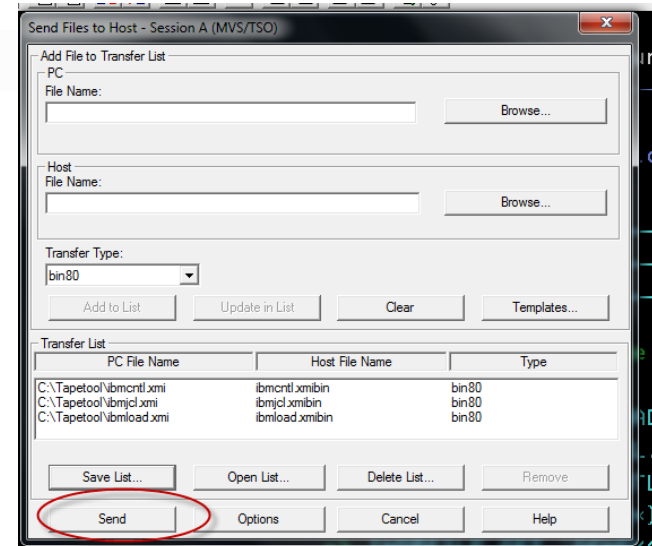


Step3: Select the list from your PC



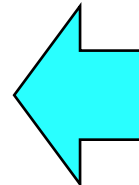
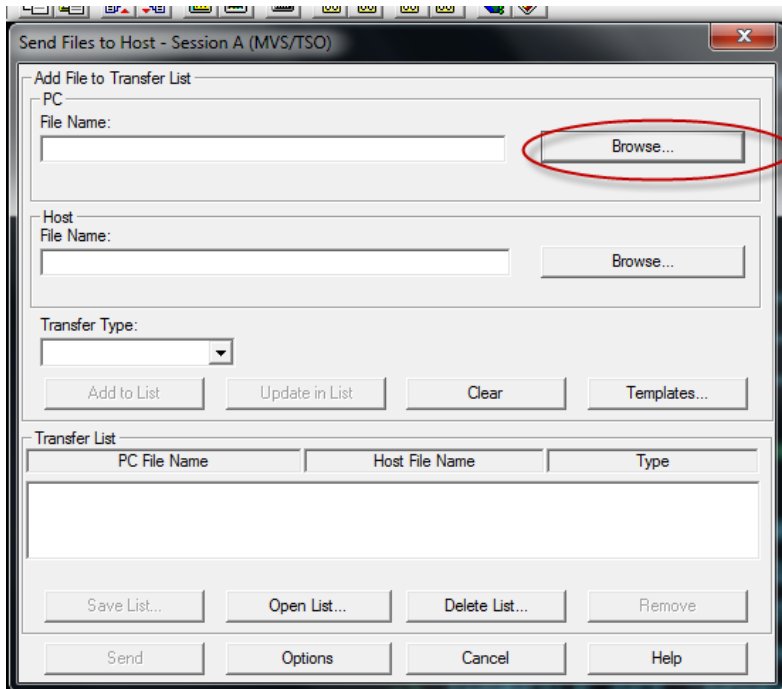
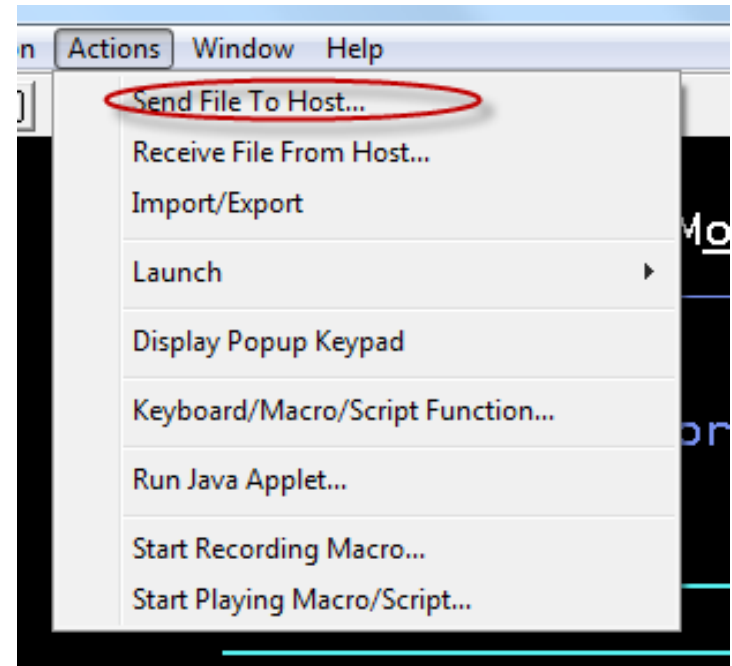
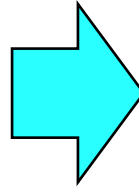
Step4: Then you see the files

Step5: Just press „send“ and all three files will be sent to the host in one run.



# PCOM: How to create a sending list

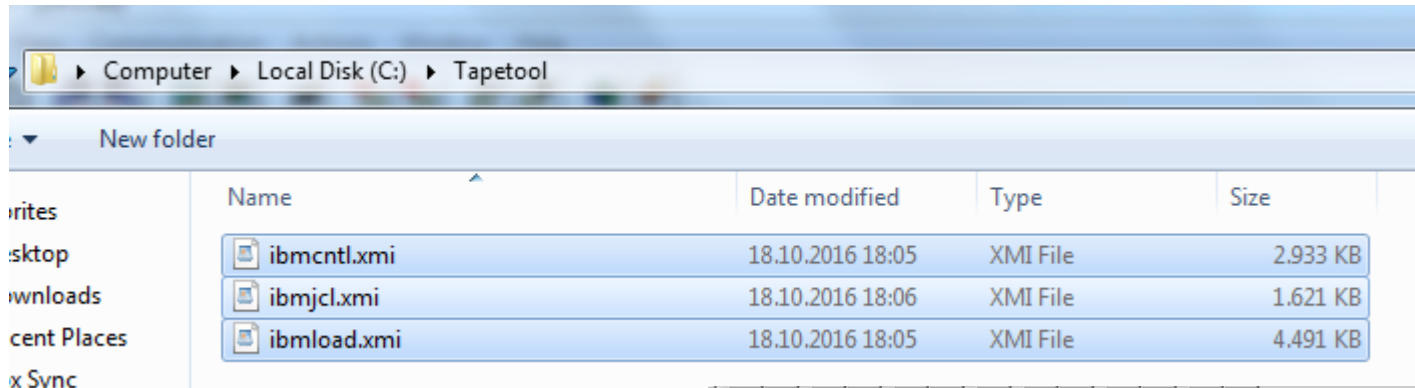
Step 1: Select „Action“  
and then „Send File to  
Host“



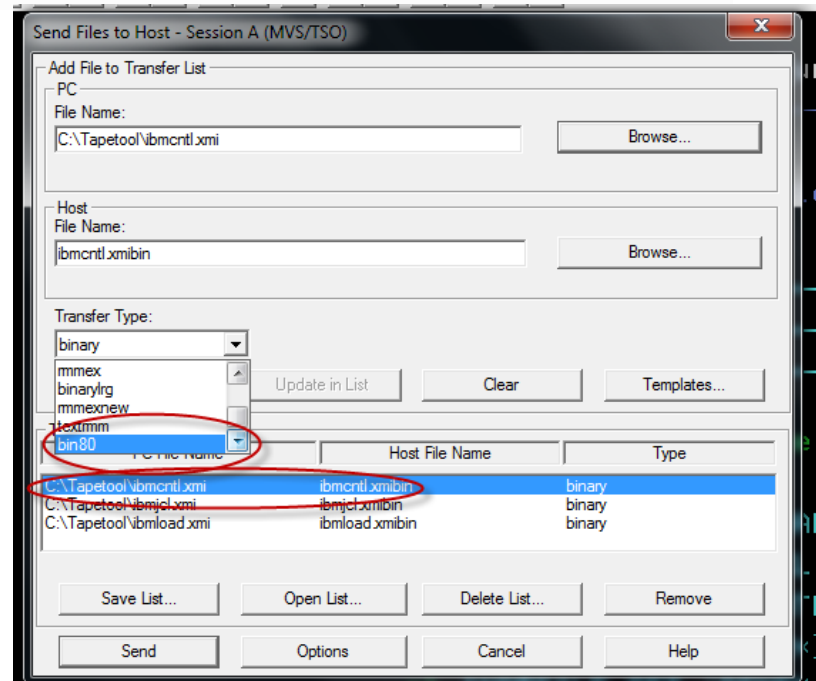
Step 2: Select Browse

## PCOM: How to create a sending list

Step 3: Select the files in the download directory - you can select all of them at once.

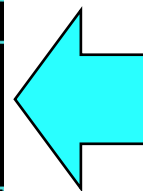
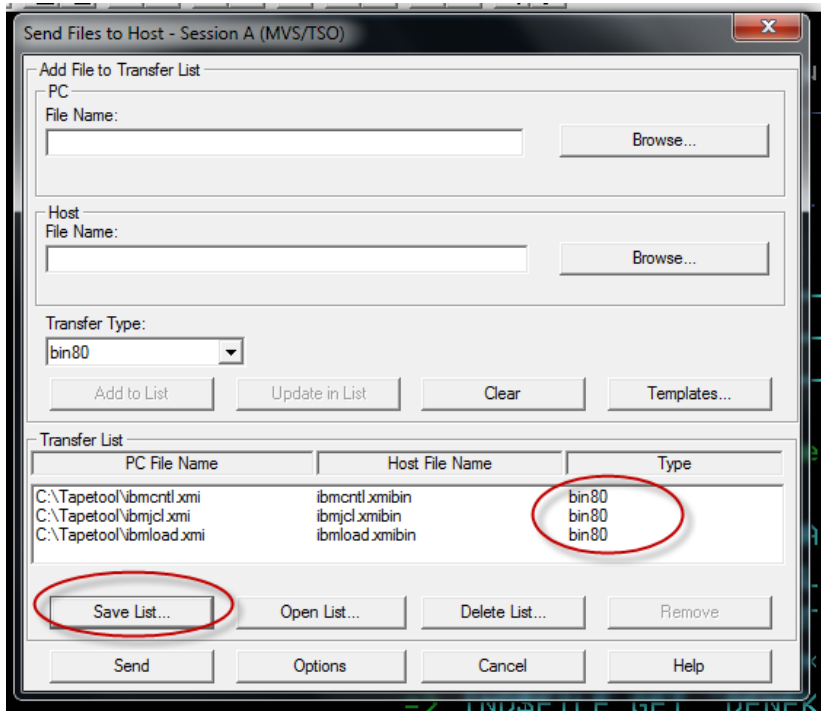
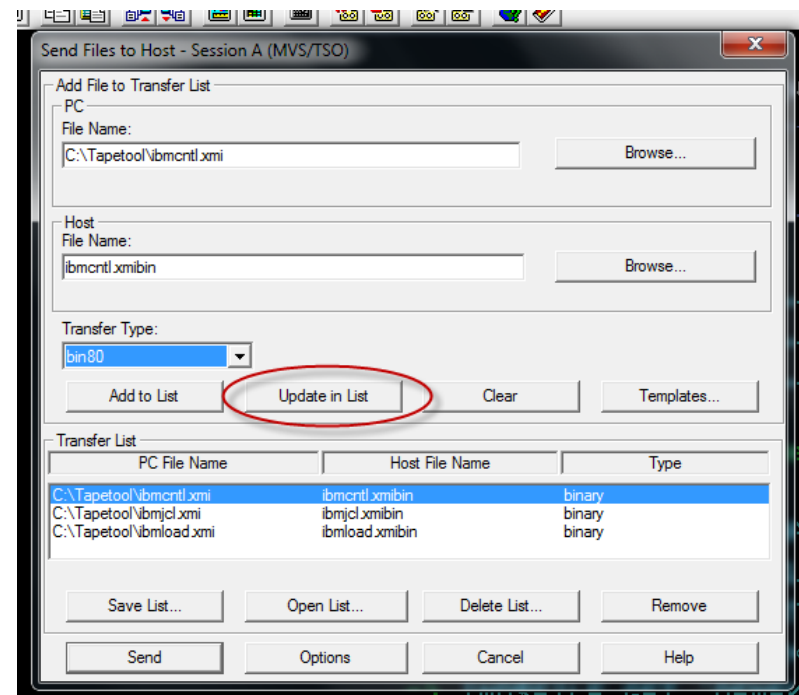
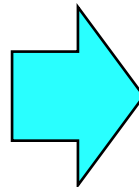


Step 4: Select one of them and change the Transfer type.



# PCOM: How to create a sending list

Step 5: Select Update in List – and repeat the process with the next file.



Step 6: Once you update all files then press Save list – and save it with a name on your directory