



# PerfDat

## A new performance solution for OpenVMS

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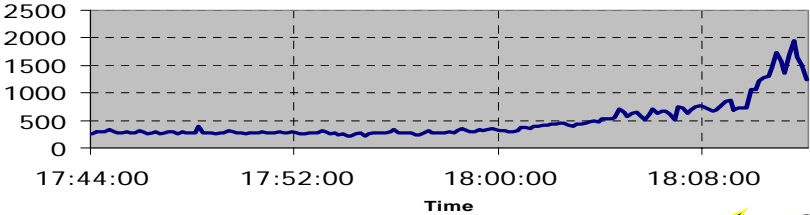


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### Did you ever face ...

#### I/O rate on DSA1



- Sudden I/O rate increase
- Massive user complaints right away
- > 100 processes active
- No process I/O request data correlation



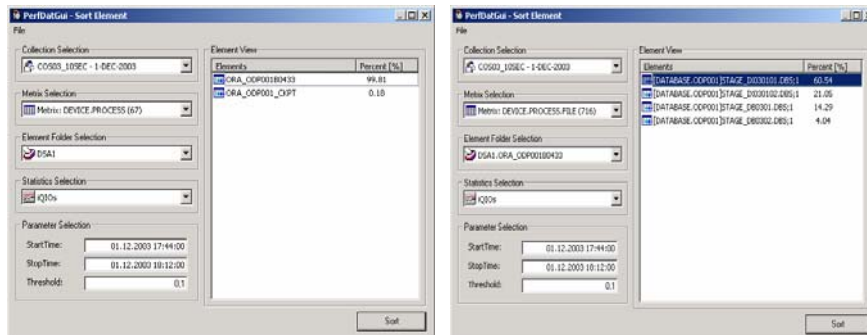
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## Would you like to identify with low effort ...

- Which processes are the originators of the problem?
- Which „hot“ files are accessed by that process?



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## Have you ever tried ...

- to get these kind of information from existing performance tools on OpenVMS?



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## Austrian lottery ...

- Did have the problem
- Tried to identify the device I/O originator
- Recognized any conclusion was educated guess
- *This was the birth of PerfDat*

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## Agenda

- Requirements
- Concepts and components
- PerfDat installation
- PerfDat licensing
- Supported versions
- PerfDat links

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## Key design goal

- From the very beginning PerfDat was designed as a powerful solution that is capable to support all performance and capacity planning related activities during the lifetime of a system.

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## Key design goal (cont.)

- This includes
  - Benchmarking runs
  - Stress testing
  - System sizing
  - System characterization
  - Tuning
  - Troubleshooting and bottleneck identification
  - Investigation of performance anomalies
  - Validating the performance impact of new software / software versions / OpenVMS releases
  - Trend analysis
  - ...

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## Requirements

- Powerful data collector
- Easy to handle and control (plug and play)
- Ability to handle huge amounts of data (> 1TByte)
- As little data management as possible
- Best practice workflow support based on a variety of statistical functions for any kind of performance analysis task in order to
  - Reduce analysis time
  - Get a clue about what is going on without expert knowledge
- Analysis tool shall not depend on the source data format
  - principle: “analyze what you get”

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## Requirements (cont.)

- Data analysis shall be done without any kind of data preprocessing
- Automatic trend reporting and data compression
- Archive and housekeeping functionality
- Data from different sources (different nodes - native data of the PerfDat data collector, mapped or imported data) shall be transparently accessed via one single common interface.
- Data analysis shall neither depend explicitly nor implicitly on the start time or sample interval of any data collection.
- Easy data transfer of the performance data base or parts of it for offline analysis

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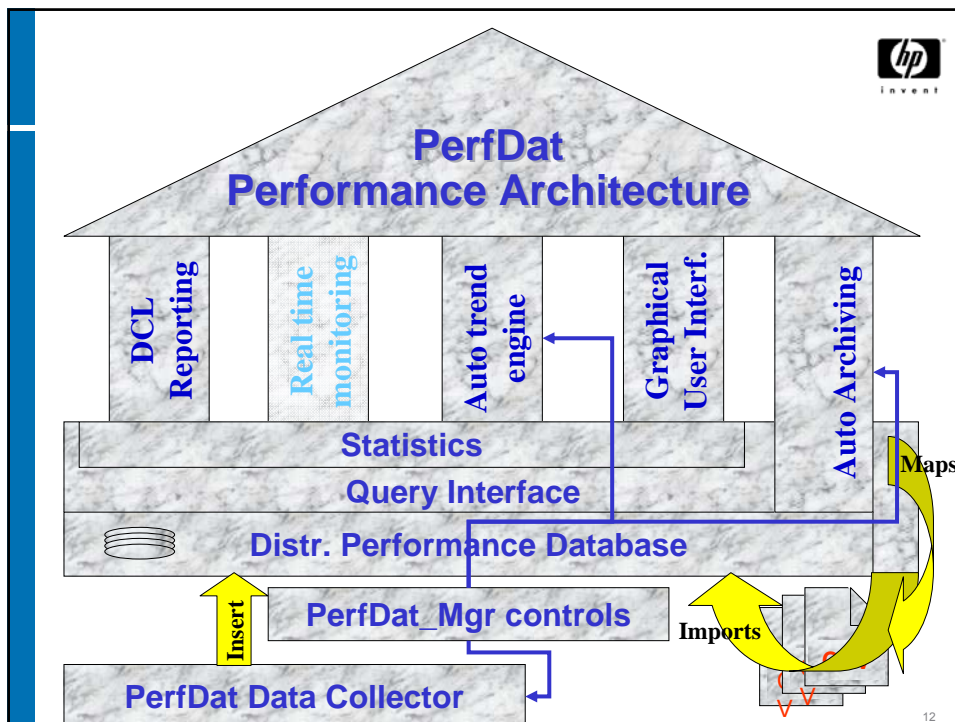


## Requirements (cont.)

- Up- and downward data compatibility
- Ability to map / import data from additional data sources
- State of the art GUI
  - Easy to handle
  - Intuitive
  - Ability to visualize and analyze data from remote
- No dependency on any layered products except those available on the OpenVMS installation CD
- No dependency on any 3rd party product or any kind of shareware / freeware.

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## Data Collector - Features

- Up to 3 collections in parallel
- Currently 600 statistics organized in 20 metrics
- Profile controlled – Profiles reside in the profile database and are configured via PerfDat\_Mgr
- Sample interval is freely definable (Min = 1 sec)
- Each metric can be enabled/disabled independently
- For each metric (except the system metric), thresholds can be set to minimize the amount of data

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## Data Collector – Features (cont.)

- Metrics can be restricted to single / multiple devices, processes, users, images and volumes
- Device metric allows I/O resolution to single process, files and files per process (not only hot file statistic but also the originator of hot files can be identified)
- Files in the device- and XFC statistics not only resolved to file ID's but also to their real file names
- complete XFC integration
- Permits online monitoring

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## Data Collector – Features (cont.)

- Dynamic resource trimming.
  - In order to avoid performance problems due to running PerfDat, PerfDat watches its own resource consumption, and if CPU load and/or I/O load exceeds definable thresholds PerfDat automatically increases collection sample intervals and/or dismisses metrics rule based.
- Is controlled by PerfDat\_Mgr



## Available metrics

- System
- CPU
- Process
- User
- Image
- Device
- Device.IOSize
- Device.File
- Device.Process
- Device.Process.File





## Available metrics (cont.)

- XFCVolume
- XFCVolume.IOSize
- XFCVolume.File
- XFCVolume.File.IOSize
- LANAdapter
- LANAdapter.Device
- LANProtocol
- SCSPort
- SCSPort.VC
- SCSPort.VC.Channel

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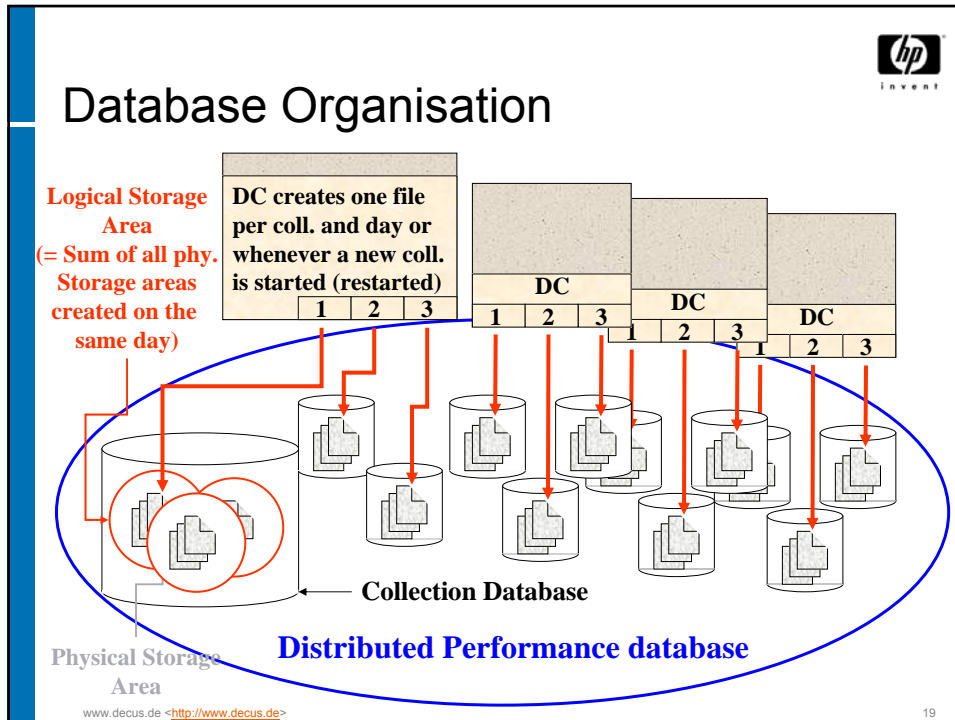


## Management interface - PerfDat\_Mgr

- Startup and shutdown of the environment on the local node
- Add, copy, modify, delete collection profiles
- Start, stop collections
- Shows status of actual running collections
- Add, copy, modify, delete trend report profiles
- Licensing
- Start, stop and configuration of Archiver


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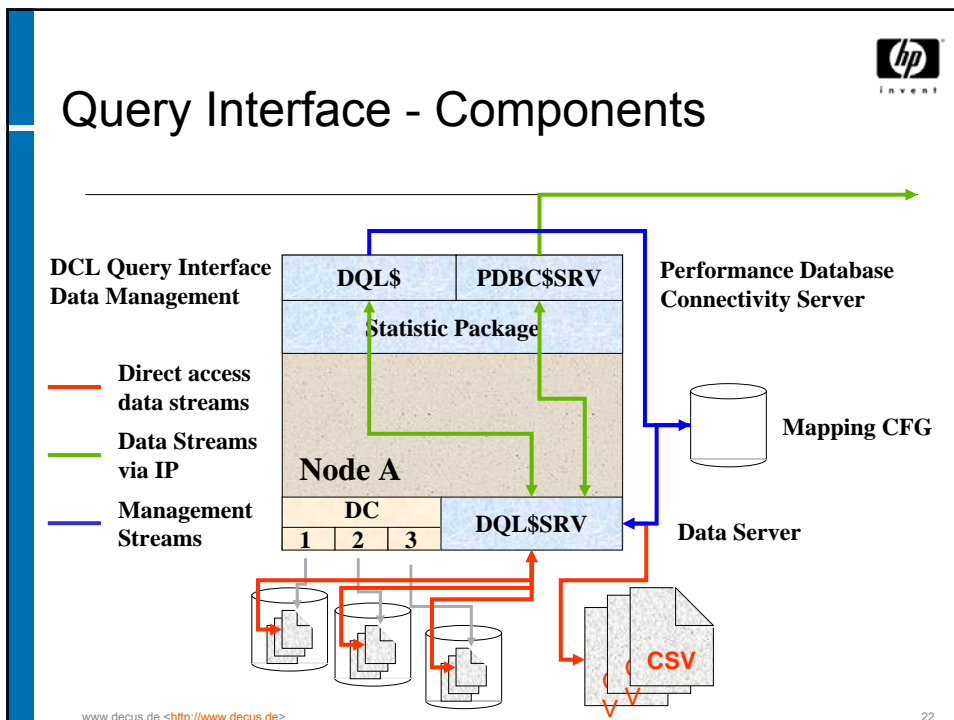
- 
- hp invent**
- ## Database & Query Interface - Features
- RMS based
  - Self defining
  - Distributed
  - Query interface (DQL\$) similar to SQL
  - Transparent single point access via network abstraction layer via DQL\$ interface
  - Up- and downward data compatibility via data abstraction layer
  - Dynamic CSV file mapping capability for accessing and analyzing data from different data sources
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## Database & Query Interface Features (cont.)



- Multi file version support
- No root file involved.
  - This has the advantage that single files can be moved to other nodes and accessed without restoring the whole database
- CSV import capability.
  - Data is not only inserted but normalized.
- CSV export capability
- Statistic package fully integrated in data query interface

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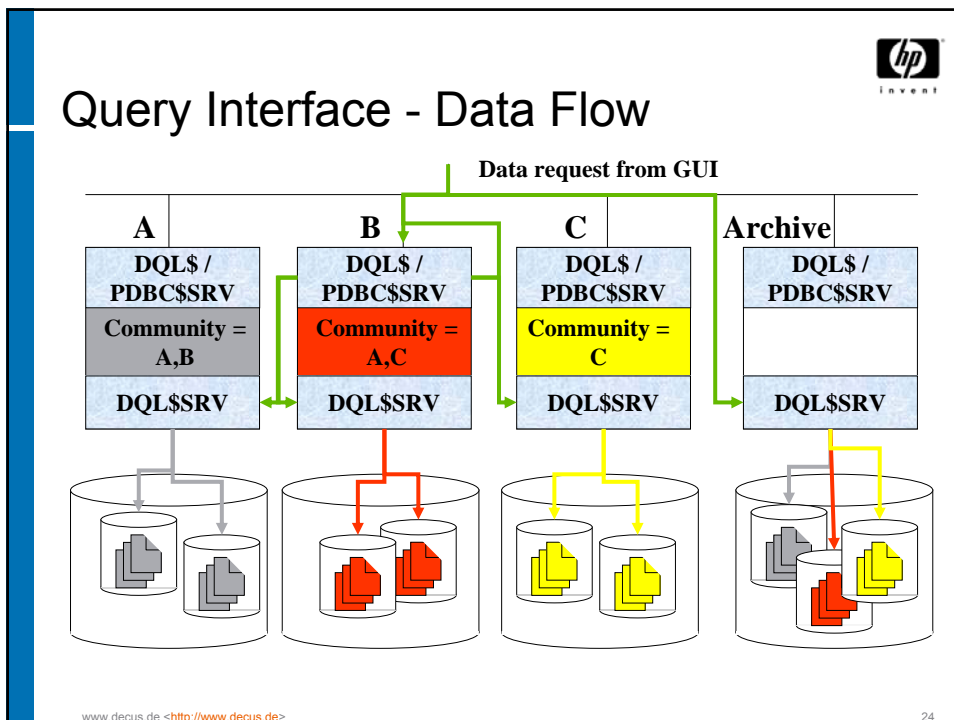


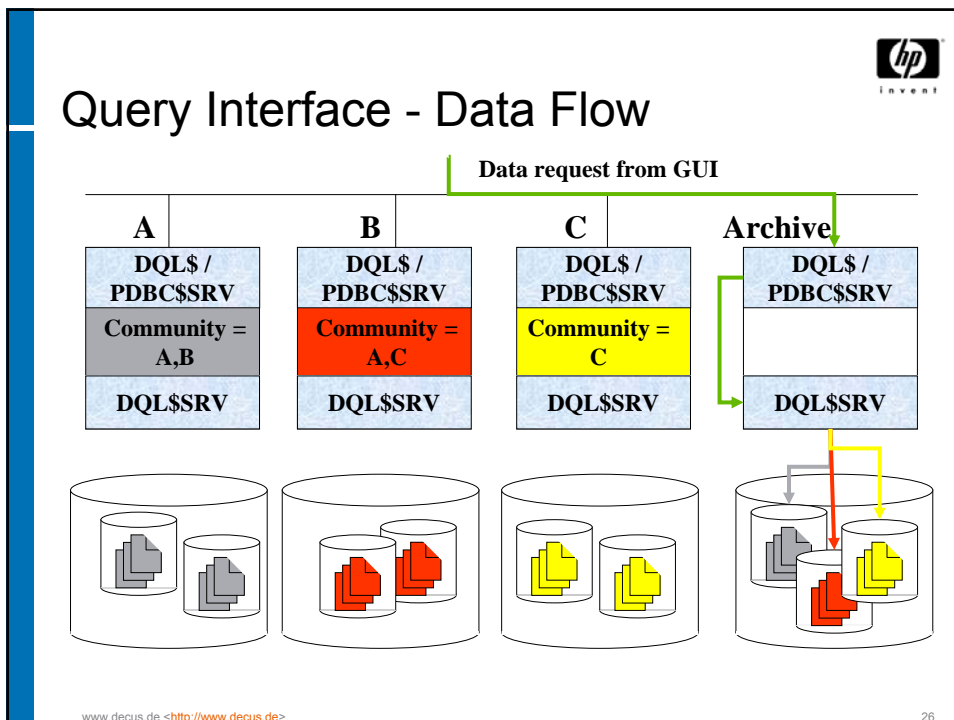
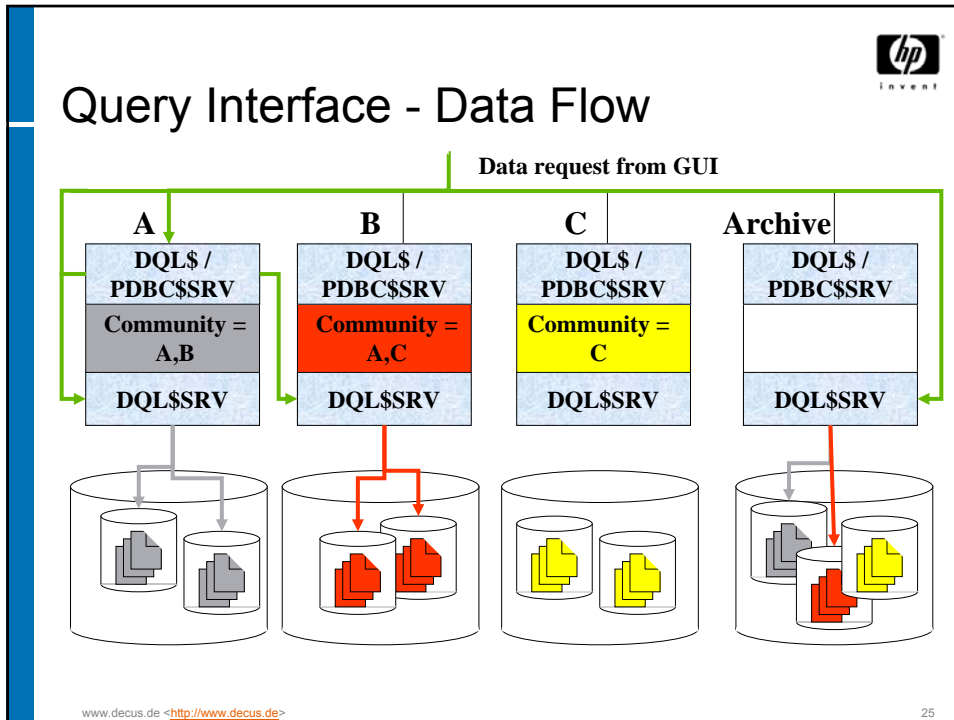


## Query Interface - Community

- When accessing the performance database via a dedicated server the Community defines the database view
- Community
  - Defined via the logical PERFDAT\$COMMUNITY
  - Defines the nodes of interest
  - Only data created by these nodes will be visible
- Independently of the Community definition, the local node and the archive node (if available) are always accessed

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## Statistic package - Features

- Min/max calculations
- Mean value calculations
- Standard deviation
- Correlation
- Integral and mean value based deviation calculation
- Integral and mean value sorting of each element of a metric (freely definable time period, statistics and elements)
- The package is part of the query interface. Thus, it is available from the GUI as well as from the command line interface (DCL) on OpenVMS.

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## Archiving and housekeeping

- Daily log-file and temp file cleanup
- Periodical archiving of logical storage areas
- Archiving time is freely defineable
- Keep time of data is freely definable
- Logical Storage areas that are older then the actual date minus keep time are unconditionally deleted
- Trend reports are not deleted
- Archiving can be done locally or on dedicated archiving nodes

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## Archiving and housekeeping

- CSV-files are not processed by the archiver
- Data manually moved to PERFDAT\$DB\_SAVE are not processed either
- PERFDAT\$DB\_SAVE is used as the target directory for performance data base-lining
- Is controlled via PerfDat\_Mgr



## Auto trend engine

- Is triggered by the archiver (if the archiver is stopped the auto trend engine is stopped too)
- Only processes performance data of the local node
- Automatic selection and compression of performance statistics for trend- and capacity analysis.
- Time span of a trend report can be day, week, month, quarter or year.
- Trends are generated based on predefined report profiles
- Trend report profiles are defined via PerfDat\_Mgr



## Graphical user interface

- Delivered kit is self-contained
- Representation of line graphs
- Representation of variation functions
- Capabilities of data overlays (graphs of different time periods can be overlapped to allow visual comparison)
- Stack/unstack function
- Zoom in/out

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## Graphical user interface

- Shift left /right
- Data scanning
- Up to 8 curves in one graph (in overlay mode up to 16)
- Each graph is scaled separately
- Auto, native and manual scaling capability

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## Graphical user interface

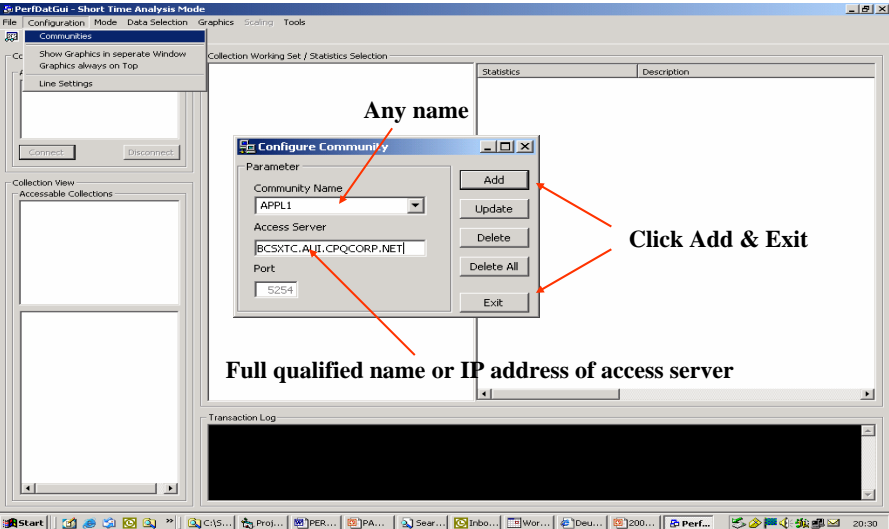
- Correlation- and deviation analysis capability
- Multi window support for multi screen systems
- Online deviation calculation of free definable statistics
- Export capability to Excel
- Fully supported on Win2000/XP

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## GUI - Customization



**Any name**

**Click Add & Exit**

**Full qualified name or IP address of access server**

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## GUI – Data access (1)

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Enter OpenVMS user name & password (operator privilege required)

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## GUI – mode selection

hp invent

Used for comparing data of different sources on a daily basis (graphs are overlaid automatically)

Graphs are displayed over the full selected time range

Used for analyzing trend reports

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## GUI – Data access (2)

The screenshot shows the PerfDataGui interface. On the left, under 'Available Communities', 'APPL1' is selected. Below it, 'Accessible Collections' lists various databases like BCXCTC, COS03, GEFARD, SIFNOS, etc. A list of dates from 20-FEB-2004 to 1-MAR-2004 is shown below. A red arrow points from the text 'Community members' to the APPL1 community. Another red arrow points from 'Collection databases available for the member' to the SIFNOS database. A third red arrow points from 'Logical storage areas of the selected Collection DB' to the date list. A large red arrow points from the date list to the 'Collection Working Set / Statistics Selection' window, with the text 'Selected logical storage areas are simply attached by drag and drop into the collection working set window'.

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## GUI – Data access (3)

The screenshot shows the PerfDataGui interface with 'Metrics' selected in the 'Collection Working Set / Statistics Selection' window. A list of metrics is shown, including 'Metrics: CPU (1)', 'Metrics: IMAGE (52)', 'Metrics: LANADAPTER (1)', etc. A red circle highlights the 'Metrics' list, with the text 'Elements' pointing to it. Another red circle highlights the 'Statistics of the selected Metric' window, which shows a list of statistics like 'Total QIO rate on device', 'Total device IO request rate', etc. The text 'Stats description' is also present at the bottom of the statistics window.

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**GUI – Select graphics**

Select element

Select stats to display

Select „New Graph“ or - „Add Graph“ if you want to add the data to an existing graph

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**GUI – Graphics Example**

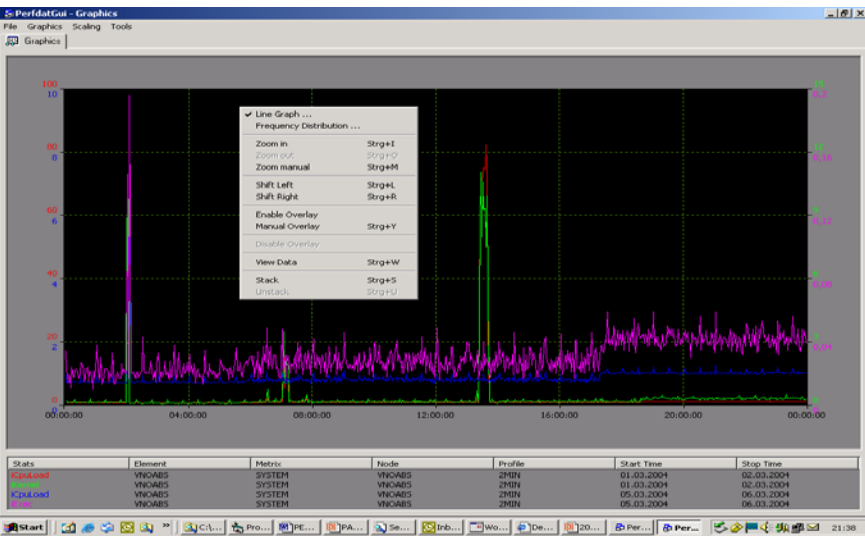
Stats	Element	Metric	Node	Profile	Start Time	Stop Time
RequestRate	VNOABS	SYSTEM	VNOABS	2MIN	01.03.2004	02.03.2004
IORead	VNOABS	SYSTEM	VNOABS	2MIN	05.03.2004	06.03.2004
KernelLoad	VNOABS	SYSTEM	VNOABS	2MIN	05.03.2004	06.03.2004

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## GUI – Graphics Options




The screenshot shows the PerfdatGui - Graphics application window. The main area contains a line graph with multiple data series plotted against time. A context menu is open over the graph, listing various actions and their keyboard shortcuts. Below the graph is a table with columns for Stats, Element, Metric, Node, Profile, Start Time, and Stop Time. The Windows taskbar is visible at the bottom.

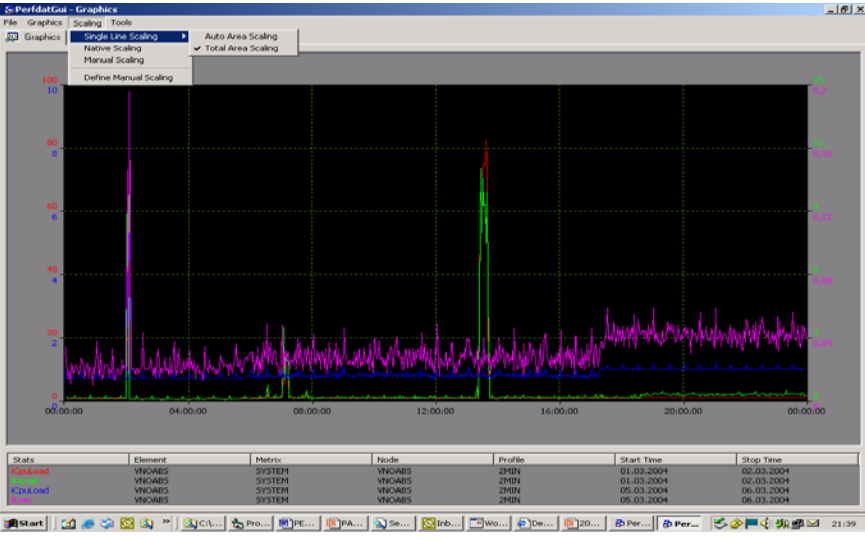
Stats	Element	Metric	Node	Profile	Start Time	Stop Time
cpuLoad	VNOABS	SYSTEM	VNOABS	2MIN	01.03.2004	02.03.2004
cpuLoad	VNOABS	SYSTEM	VNOABS	2MIN	01.03.2004	02.03.2004
cpuLoad	VNOABS	SYSTEM	VNOABS	2MIN	05.03.2004	06.03.2004
cpuLoad	VNOABS	SYSTEM	VNOABS	2MIN	05.03.2004	06.03.2004

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## GUI – Scaling Options



The screenshot shows the PerfdatGui - Graphics application window with the Scaling menu open. The menu options include Auto Line Scaling, Native Scaling, Manual Scaling, Auto Area Scaling, and Total Area Scaling. The background shows the same line graph as in the previous slide.

Stats	Element	Metric	Node	Profile	Start Time	Stop Time
cpuLoad	VNOABS	SYSTEM	VNOABS	2MIN	01.03.2004	02.03.2004
cpuLoad	VNOABS	SYSTEM	VNOABS	2MIN	01.03.2004	02.03.2004
cpuLoad	VNOABS	SYSTEM	VNOABS	2MIN	05.03.2004	06.03.2004
cpuLoad	VNOABS	SYSTEM	VNOABS	2MIN	05.03.2004	06.03.2004

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## GUI – Data sorting (1)

The screenshot shows the PerfDatGui interface in 'Short Time Analysis Mode'. A list of metrics is displayed in the center, with a context menu open over the 'Metrics: DEVICE.FILE (220)' entry. The menu options include 'New Graph...', 'Add Data to Graph...', 'Sort Data...', 'Remove Data from Graph...', 'Lock Data...', 'Define as Reference...', 'Release Reference...', 'Data Statistics...', and 'Correlate Data...'. The 'Sort Data...' option is highlighted.

Statistics	Description
225:QIOs	Total QIO rate on file
225:Rqps	Total device IO request on file
225:IOs	Total service IO rate
225:Abs	Total Aborted IOs /sec
225:Mbs	Total Mbytes /sec
225:RQIOs	Read QIO rate on file
225:rdRqs	Read device IO request on file
225:rdIOs	Read service IO rate
225:rdAbs	Read Aborted IOs /sec
225:rdMbs	Read Mbytes /sec
225:WQIOs	Write QIO rate on file
225:WRqps	Write device IO request on file
225:WIOs	Write service IO rate
225:WAbs	Write Aborted IOs /sec
225:WMBs	Write Mbytes /sec
225:CHQIOs	Ctrl QIO rate on file
225:ChRqs	Ctrl device IO request on file
225:ChIOs	Ctrl service IO rate
225:ChAbs	Ctrl Aborted IOs /sec
225:ChMbs	Ctrl Mbytes /sec
225:CIDBs	FID (64 BR)
	IO request threshold

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## GUI – Data sorting (2)

The screenshot shows the 'PerfDatGui - Sort Element' dialog box. It contains several selection fields: 'Collection Selection' (CO503\_10SEC - 1-DEC-2003), 'Metric Selection' (Metrics: DEVICE.FILE (220)), 'Element Folder Selection' (DSA0), and 'Statistics Selection' (QIOs). The 'Parameter Selection' section includes 'StartTime' (01.12.2003 17:35:00), 'StopTime' (01.12.2003 23:38:34), and 'Threshold' (0). The 'Element View' table shows a list of elements sorted by percentage.

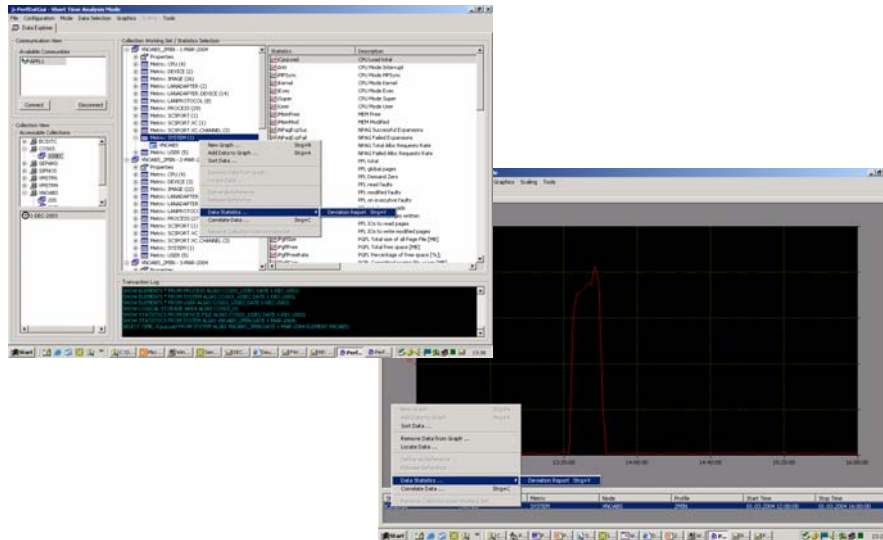
Elements	Percent [%]
[PERFDAT.DB]PERFDAT_CO503_10SEC_2003-12-01.DAT;2	58.35
[PERFDAT.DB]PERFDAT_CO503_10SEC_2003-12-01.DAT;1	8.94
[VMS\$COMMON.SYSXE]TCP\$HOST.DAT;1	6.04
[SYS0.TCPIP\$ETC]IPNODES.DAT;1	3.16
[PERFDAT.DB]PERFDAT_CO503_10SEC_2003-12-01.DAT;1	3.10
[EWS.LOG]EWS_AGENT_ON_CO503.LOG;21	1.00
[000000]INDEXF.SYS;1	0.44
[PERFDAT.LOG]PERFDAT.LOG;1	0.39
[VMS\$COMMON.SYSLIB]PLIRTL_D56_TV.EXE;1	0.36
[VMS\$COMMON.SYSLIB]LIBRTL.EXE;1	0.34
[VMS\$COMMON.SYSLIB]DECC\$SHR_EV56.EXE;1	0.27
[VMS\$COMMON.SYSXE]MONITOR_TV.EXE;1	0.25
[VMS\$COMMON.SYSLIB]LIBRTL_D56_TV.EXE;1	0.23
[VMS\$COMMON.SYSLIB]TIE\$SHARE.EXE;1	0.19
[VMS\$COMMON.SYSLIB]TIE\$EMULAT_TV.EXE;1	0.16
[VMS\$COMMON.SYSLIB]CMA\$TIS_SHR.EXE;1	0.13
[VMS\$COMMON.SYSLIB]DPML\$SHR.EXE;1	0.13

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## GUI – deviation report (1)

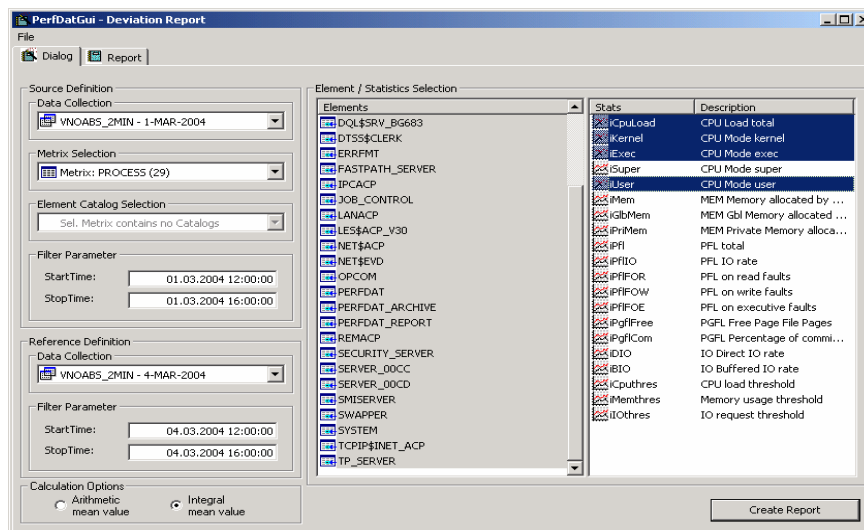


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## GUI – deviation report (2)



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# GUI – deviation report (3)

The screenshot displays the 'PerfDatGui - Deviation Report' window. It is divided into several sections for configuration and data display.

**Source Definition:**

- Data Collection: VNOABS\_2MIN - 1-MAR-2004
- Matrix Selection: Matrix: PROCESS (29)
- Element Catalog Selection: Sel. Matrix contains no Catalogs
- Filter Parameter: Start Time: 01.03.2004 12:00:00, Stop Time: 01.03.2004 16:00:00

**Reference Definition:**

- Data Collection: VNOABS\_2MIN - 4-MAR-2004
- Filter Parameter: Start Time: 04.03.2004 12:00:00, Stop Time: 04.03.2004 16:00:00

**Calculation Options:**

- Arithmetic mean value
- Integral mean value

**Data Table:**

	iCpuLoad	Kernel	iExec	iUser
SYSTEM	21248,27	4405,36	8199,6	69386,03
SECURITY_SERVER	8874,73	3749,48	NoRef	7999,97
NET\$IACP	960,26	600,17	NoRef	NoRef
LES\$IACP_V30	200	200	NoRef	NoRef
OPCOM	100	100	NoRef	NoRef
BEM\$IACP	100	100	NoRef	NoRef
DNS\$ADVER	20	3,7	33,33	80
PERFDAT	17,43	67,17	0,73	5,5
ERRFMT	9,99	-23,53	349,96	NoSrc
NET\$EVD	5,35	6,13	NoRef	3,71
DTSS\$CLERK	0,01	-24,99	50	100
CLUSTER_SERVER	0	0	NoRef	NoRef
FASTPATH_SERVER	0	0	NoRef	NoRef
TP_SERVER	-5,63	-4,96	-10	NoRef
JOB_CONTROL	-25	-25	NoRef	NoRef
PERFDAT_ARCHIVE	-50	-50	NoRef	NoRef
SMISERVER	-50	-50	NoRef	NoRef
AUDIT_SERVER	NoSrc	NoSrc	NoRef	NoRef
CACHE_SERVER	NoRef	NoRef	NoRef	NoRef
CONFIGURE	NoRef	NoRef	NoRef	NoRef
DQL\$SRV_BG677	NoRef	NoRef	NoRef	NoRef
DQL\$SRV_BG683	NoRef	NoRef	NoRef	NoRef
JPCACP	NoRef	NoRef	NoRef	NoRef
LANACP	NoSrc	NoSrc	NoRef	NoRef
PERFDAT_REPORT	NoRef	NoRef	NoRef	NoRef
SERVER_ODCC	NoRef	NoRef	NoRef	NoRef
SERVER_ODCD	NoRef	NoRef	NoRef	NoRef
SWAPPER	NoRef	NoRef	NoRef	NoRef
TCPIP\$INET_ACP	NoRef	NoRef	NoRef	NoRef

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# GUI – Graph selection from deviation report



The screenshot shows the 'PerfDatGui - Graphics' window with a line graph. The graph plots a metric over time from 12:00:00 to 16:00:00. A red line shows a sharp spike around 13:07:00. The y-axis ranges from 0 to 100.

**Values:** VNOABS

**Status:** OK

**Element:** SYSTEM

**Matrix:** PROCESS

**Node:** VNOABS

**Profile:** 2MIN

**Start Time:** 01.03.2004 12:00:00

**Stop Time:** 04.03.2004 16:00:00

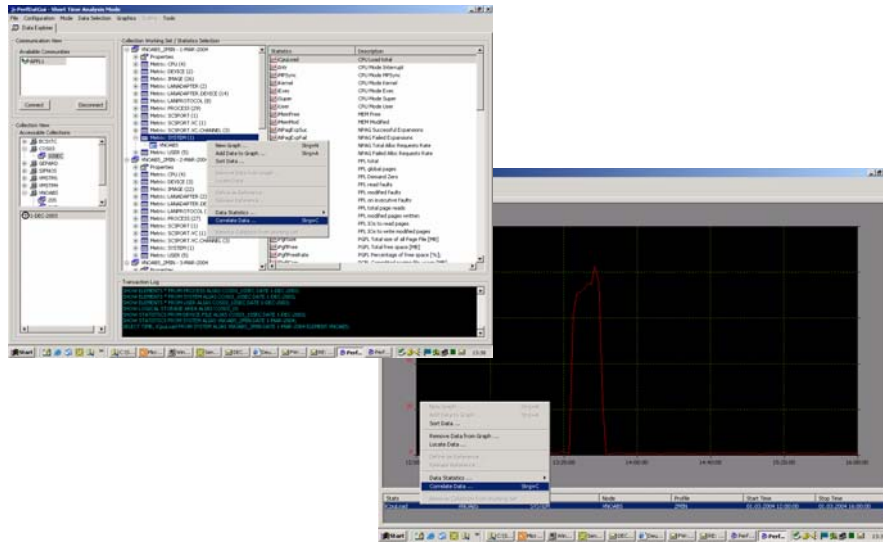
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## GUI – correlating data (1)

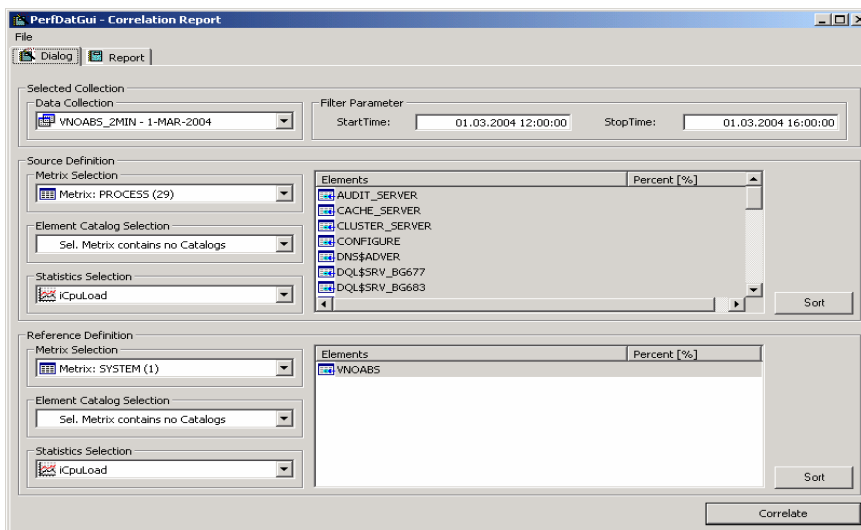


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## GUI – correlating data (2)



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## GUI – deviation report (3)

The screenshot shows the 'PerfDatGui - Correlation Report' window. It features a menu bar with 'File', 'Dialog', and 'Report'. Below the menu bar, there are sections for 'Selected Collection' (Data Collection: VNOABS\_ZMIN - 1-MAR-2004, Filter Parameter: StartTime: 01.03.2004 12:00:00, StopTime: 01.03.2004 16:00:00), 'Source Definition' (Metric Selection: PROCESS (29), Element Catalog Selection: Sel. Metric contains no Catalogs, Statistics Selection: CPUload), and 'Reference Definition' (Metric Selection: SYSTEM (1), Element Catalog Selection: Sel. Metric contains no Catalogs, Statistics Selection: CPUload).

Metric	VNOABS
SYSTEM	99,99 (100)
PERFDAT	93,66 (100)
SECURITY_SERVER	62,63 (100)
NET\$EVD	16,3 (100)
NET\$ACP	15,29 (100)
DTSS\$CLERK	9,05 (100)
ERRFMT	0,94 (100)
AUDIT_SERVER	0 (100)
CONFIGURE	0 (100)
DQL\$SRV_B6677	0 (0)
DQL\$SRV_B6683	0 (0)
LANACP	0 (100)
PERFDAT_REPORT	0 (0)
SERVER_ODCC	0 (0)
SERVER_ODCD	0 (0)
SWAPPER	0 (100)
TCP\$INET_ACP	-2,52 (100)
IPCACP	-2,53 (100)
SMISERVER	-2,54 (100)
FASTPATH_SERVER	-2,55 (100)
PERFDAT_ARCHIVE	-2,55 (100)
JOB_CONTROL	-2,56 (100)
TP_SERVER	-2,95 (100)
CACHE_SERVER	-3,53 (100)

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## GUI – Graph selection from correlation report



The screenshot shows the 'PerfDatGui - Graphs' window. The main window in the background is the same as in the previous slide. The 'Perfdat - Graphs' window displays a line graph with a black background and a grid. The x-axis represents time from 12:00:00 to 16:00:00. The y-axis represents values from -3 to 3. A red line shows a significant spike around 13:30:00. Below the graph, there is a table with columns: Element, Metric, Node, Profile, Start Time, and Stop Time.

Element	Metric	Node	Profile	Start Time	Stop Time
CPUload	PERFDAT	PROCESS	VNOABS	01.03.2004 12:00:00	01.03.2004 16:00:00
CPUload	VNOABS	SYSTEM	VNOABS	01.03.2004 12:00:00	01.03.2004 16:00:00
CPUload	SYSTEM	PROCESS	VNOABS	01.03.2004 12:00:00	01.03.2004 16:00:00

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## OpenVMS installation

- **@SYS\$STARTUP:VMSINSTAL PERFDAT022**
  - Enter the device where the common resources should reside (images, CFG file, locally archived data, trend report data, saved data)
    - Make sure that highwater marking is disabled on that volume
  - Enter data collector working device
    - The data collector writes to this device
    - Make sure that highwater marking is disabled on that volume
    - Choose device with low I/O activity or use separate device
    - Can share device of PerfDat common resources

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## OpenVMS installation

- Enter the archive node in your environment, if any.
  - If you intend to use an archive node make sure that FTP client is enabled on the local node
- Enter a valid license key
  - If you have already applied a valid license key or you install PerfDat and you don't have one, ignore the input request. The installation procedure continues anyway
- Enter the community members as a comma separated list
  - No quotation marks
- Perform the post installation activities recommended by the installation procedure

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## GUI installation

- Click SETUP
  - Follow the instructions provided by the setup procedure

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## Licensing

- No traditional LMF
- Only the OpenVMS components have to be licensed
- GUI needs no license
- License can be applied during installation or via PerfDat\_Mgr
  - PERFDAT\_MGR> LOAD LICENSE *key*
- Kit is provided with a 30 day temp. license key

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## Supported Versions

- OpenVMS AXP 7.2-1
- OpenVMS AXP 7.2-2
- OpenVMS AXP 7.3
- OpenVMS AXP 7.3-1
- OpenVMS AXP 7.3-2
- OpenVMS Itanium V8.1
- GUI – supported on Win2000 / XP

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## Contact information

[PerfDat@hp.com](mailto:PerfDat@hp.com)

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