HP PERFDAT - New Features

Bootcamp 2008 / Nashua

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Agenda

- Introduction
- Basic Concepts & Components
- New Features
- PerfDat links
- Q&A

Mission Statement

- HP PERFDAT shall be a powerful solution that provides accurate and complete performance information for effective performance management

Performance Management Process

- OpenVMS performance management manual
  - …waiting until a problems cripples a system before addressing system mamangement is not performance management, rather it is crisis management …

    Performance management involves:
    - Systematically measuring the system
    - Gathering and analyzing the data
    - Evaluating trends
    - Archiving data to maintain a performance history
- Is this all a performance solution should provide?

Performance management (contd.)

- Keep performance records
  - Better to have too much data than too little
  - You cannot predict which measurements you might need in the future
- Baseline the system
  - Every system is special
- Evaluate trends
  - Keep key statistics for months and years to see how system performance envolves
  - Requires you to extract the key statistics from raw data
- Communicate
  - Do a good job and talk about it
  - In case of a performance problem you have to work with other people

    ➡ *Visualize the performance of your systems*
- Preventing problems is better than fixing them after they occur
  - Requires online notification about exceptional system behaviour right before it becomes too serious that overall system suffers which will become aparent to the end-user

    ➡ *Demonstrate that you care about the system*

Requirements

- High resolution performance data collection for easy root-cause analysis
- Completeness of data
  - The data collector has to provide sufficient performance information about all OpenVMS sub-systems including XFC, LAN and network protocol support.
- Online rule based performance alerting
  - Online performance alerting has to support system management to detect performance anomalies even though their impact does not slow down the overall system performance significantly so that this remains transparent to the end-user.

Requirements (contd.)

- Automatic trend and capacity reporting
- Archive and housekeeping functionality
- Open interface to map/import data from additional data sources (eg. database, application, storage controllers …) to guarantee collaboration with other performance data collection utilities.
- Performance data export capability to CSV files to guarantee collaboration with existing performance analysis utilities and charting tools. The format of a CSV export file (date/time format, list separator and decimal symbol) will be freely definable to avoid re-formatting the CSV export file before it can be used as input for a dedicated utility (eg. Excel – CSV input format accepted depends on the regional settings).

Requirements (contd.)

- The ability to manage huge amounts of data (> 1TByte)
- Single point and transparent performance data access regardless of where the performance data is stored within the whole environment via a single common interface
- Best practice workflow support based on a variety of statistical functions for any kind of performance analysis task in order to
  - Reduce analysis time
  - Receive feedback about what is going on without expert knowledge
- Analysis tool that does not depend on the source data format - adhering to the principle of “Analyze what you get”
- Data analysis without data pre-processing

Requirements (contd.)

- Data analysis will not depend explicitly or implicitly on the start time nor on the sample interval of any data collection
- Up- and backward data compatibility
- Full cluster analysis capability
- No dependency on any layered product except those available on the OpenVMS installation media
- No dependency on any 3rd party product or any kind of shareware/freeware

Requirements (contd.)

- Easy to handle
  - Plug and play
    - Once the performance solution is installed data has to be collected and all performance management related tasks like trending and data archiving has to be performed automatically to maintain a performance history based on predefined profiles, unattended, and without any need of additional customization work.
  - Easy to manage and control
  - Automated data management without any system management intervention
  - Easy data transfer of the performance database, or parts of it, for offline analysis

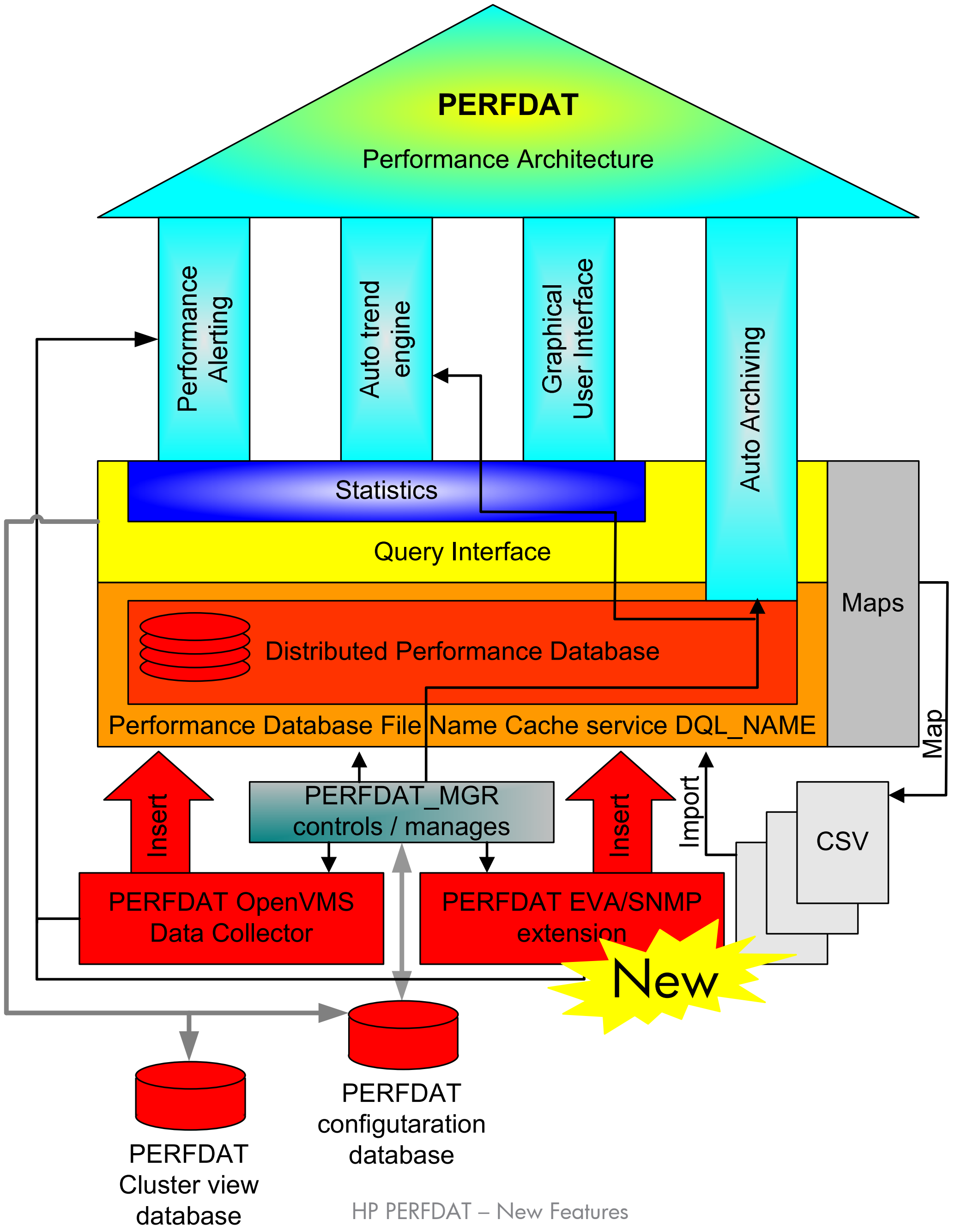
Requirements (contd.)

- State of the art graphical GUI for data analysis
  - Easy to handle
  - Intuitive
  - Easy data navigation
  - Online descriptions for all statistics available
  - State of the art graphical features like
    - Stack/unstack functionality
    - Zoom in/out
    - Shift left /right
    - Data scanning
    - Ability to scale graphs separately
    - Auto, native and manual scaling capability
    - Data overlay capability (graphs of different time periods can be overlapped to allow visual comparison)
  - Correlation- and deviation analysis capability
  - Multi window support for multi screen systems
  - Export capability to Excel

Requirements (contd.)

New

- We are not alone
  - Performance depend on external, shared storage
  - Systems are coupled via shared storage
- Serious performance management sometimes requires one „to look over the rim of the tea cup“
  - Attached shared Storage
  - Systems accessing the same shared storage
    - Solaris
    - Linux
    - …



PERFDAT

Performance Architecture

Performance Alerting

Auto trend engine

Graphical User Interface

Auto Archiving

Statistics

Query Interface

Maps

Distributed Performance Database

Performance Database File Name Cache service DQL_NAME

Map

Insert

PERFDAT_MGR
controls / manages

Insert

Import

CSV

PERFDAT OpenVMS
Data Collector

PERFDAT EVA/SNMP
extension

New

PERFDAT
configutaration
database

PERFDAT
Cluster view
database

Components

- OpenVMS Data Collector
- PERFDAT SNMP extension
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- Tools

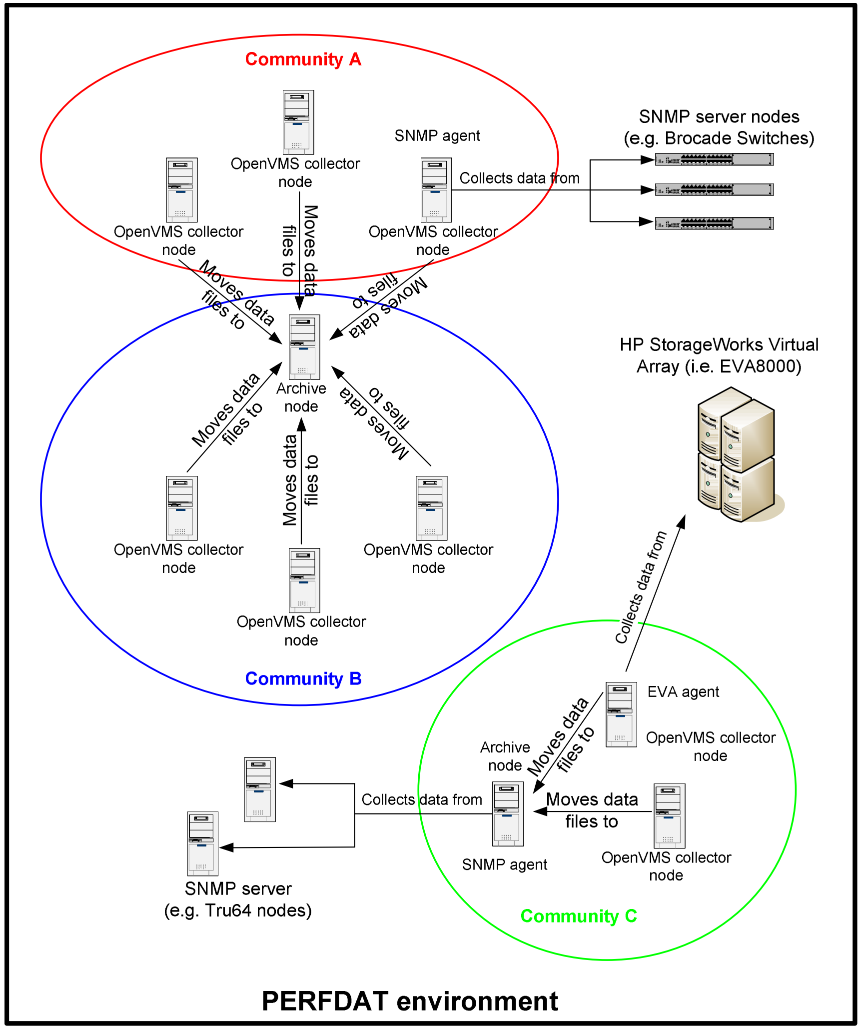
PERFDAT Environment

- The PERFDAT environment consists of so called communities. A community is a logical partition of the whole environment and defines the database view when accessing the data via any system within a community. All systems of particular interest can be configured within the context of a community. No rules exist that limit the configuration of such communities (such as cluster boundaries, location of the systems etc.). The number of possible communities ranges from one to the total number of systems within the whole environment.

PERFDAT Environment (contd.)

- The role of the systems within a community is defined by the SW-components running on the systems.
  - OpenVMS collector system
  - SNMP agent system (collects data from SNMP server systems)
  - EVA agent (collects HSV data)
  - Archive system
  - Access server
  - SNMP server system (provides performance data via SNMP)

PERFDAT Environment (contd.)



PERFDAT environment

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OpenVMS Data Collector - Features

- Up to 3 collections in parallel
- More than 700 statistics organized in 23 metrics
- Profile controlled – profiles reside in the PERFDAT configuration database and are managed via the PERFDAT_MGR utility
- Sample interval is freely definable (minimum = 1 second)
- Each of the metrics can be enabled/disabled independently
- For each of the metrics (except the system metrics), thresholds can be set to minimize the amount of data collected

Data Collector – Features (contd.)

- Metrics can be restricted to single/multiple devices, processes, users, images and volumes
- Device metrics 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 metrics not only resolve to file ID's but also to their real file names
- Complete XFC integration
- Permits online monitoring
- Online performance alerting can be enabled dynamically

Data Collector – Features (contd.)

- Dynamic resource trimming
  - In order to avoid performance problems due to running PERFDAT, the tool monitors 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 rules.
- Controlled by PERFDAT_MGR

Available metrices

- System
- CPU
- Process
- User
- Image
- Account
- Device
- Device.IOSize
- Device.File
- Device.Process
- Device.Process.File
- Device.Capacity
- Device.Path (>= V7.3-1)
- IOPathes (>= V7.3-1)
- XFCVolume (>= V7.3)
- XFCVolume.IOSize (>= V7.3)
- XFCVolume.File (>= V7.3)
- XFCVolume.File.IOSize (>= V7.3)
- LANAdapter
- LANAdapter.Device
- LANProtocol
- SCSPort
- SCSPort.VC
- SCSPort.VC.Channel

Components

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PERFDAT SNMP extension

- Up to 64 remote nodes can be monitored in parallel
- Profile controlled – profiles reside in the PERFDAT configuration database and are managed via the PERFDAT_MGR utility
- Sample interval is freely definable (minimum = 1 minute)
- Each metric can be enabled/disabled independently
- Permits online monitoring
- Online performance alerting can be enabled dynamically
- Controlled by PERFDAT_MGR

PERFDAT SNMP extension (contd.)

supports out of the box:

- TRU64
- Solaris New
- Linux New
- Brocade Switches

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PERFDAT EVA extension

New

- Up to 64 EVA arrays can be monitored in parallel
- Profile controlled – profiles reside in the PERFDAT configuration database and are managed via the PERFDAT_MGR utility
- Friendly name resolution without accessing SAN appliance
- Automatic configuration change detection
- Easy to configure
- Sample interval is freely definable (minimum = 5 sec)
- Each metric can be enabled/disabled independently
- Permits online monitoring
- Online performance alerting can be enabled dynamically
- Controlled by PERFDAT_MGR

PERFDAT EVA extension (contd.)

New

- Minimum VCS/XCS version
  - VCS V3.028
  - XCS V5.030

- Supported HSV controllers
  - Any currently available

Components

- OpenVMS Data Collector
- PERFDAT SNMP extension
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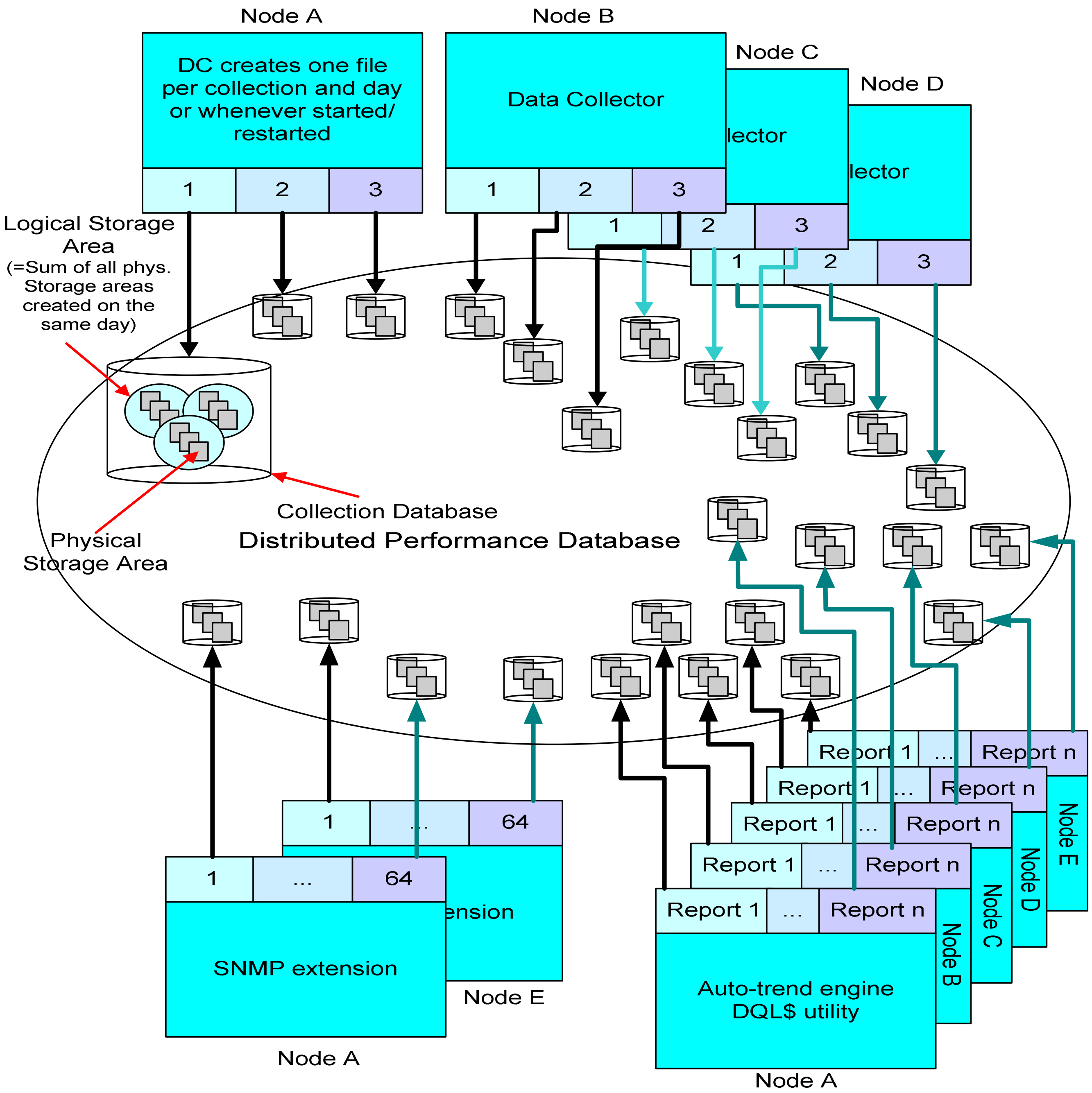

Node A

DC creates one file per collection and day or whenever started/ restarted

1 2 3

Node B

Data Collector

1 2 3

Node C

lector

1 2 3

Node D

lector

1 2 3

Logical Storage Area

(=Sum of all phys. Storage areas created on the same day)

Collection Database

Distributed Performance Database

Physical Storage Area

1 … 64

1 … 64

SNMP extension

ension

Node A

Node E

Report 1 … Report n

Report 1 … Report n

Report 1 … Report n

Report 1 … Report n

Report 1 … Report n

Auto-trend engine DQL$ utility

Node A

Node B

Node C

Node D

Node E

Definition

- PHYSICAL STORAGE AREA
  - Single data file
- LOGICAL STORAGE AREA
  - All data file created on the same day / system
- PERFORMANCE data base
  - Sum of all LOGICAL STORAGE AREAS
- A METRIC is comparable to a TABLE.
- An ELEMENT is comparable to an INDEX of a TABLE.
- A STATISTIC is comparable to a FIELD within a TABLE.

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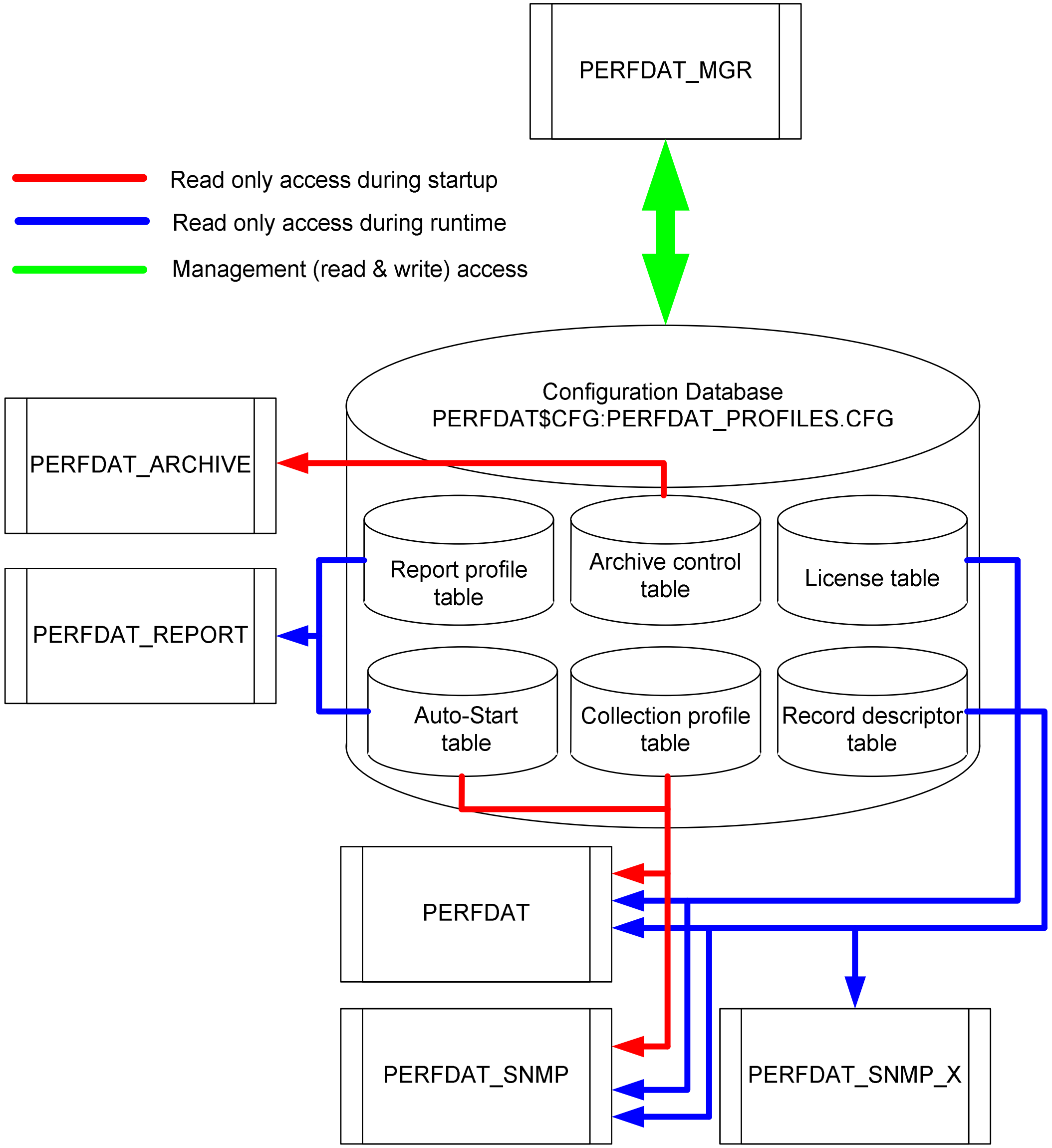
PERFDAT configuration database



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Performance database file name cache service DQL_NAME

- Features
  - The performance database file name cache service DQL_NAME provides a database file name cache to all HP PERFDAT components that contains full header information about all HP PERFDAT database files locally stored.
  - As long as the performance database file name cache service DQL_NAME is available and the database file name cache is marked valid all HP PERFDAT components obtain database file header information from that cache rather than scanning the files on disk.
  - Speeds up the initial connect request

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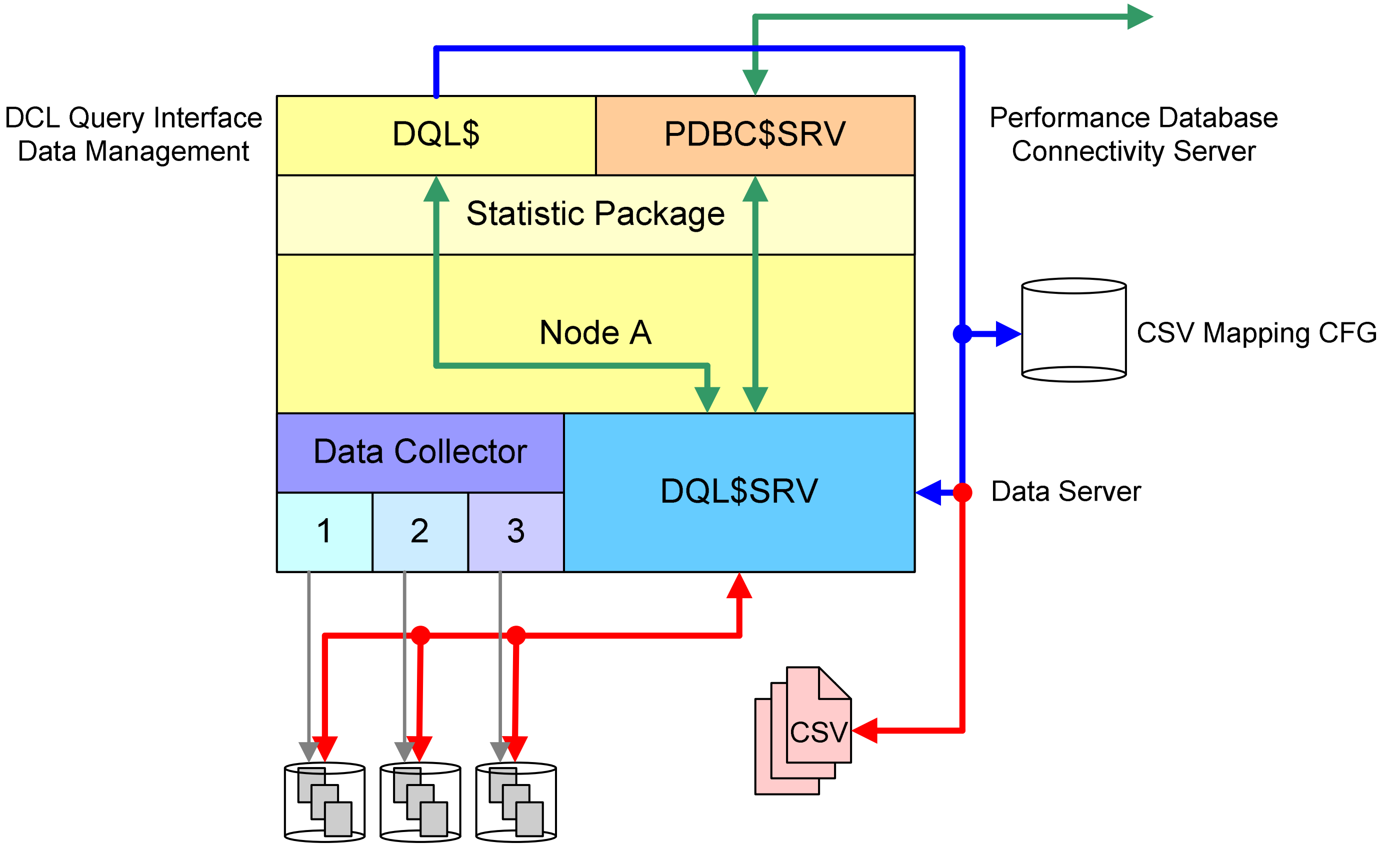
PERFDAT Query Interface (DQL)

- PERFDAT Query Interface architecture allows worldwide single point access

PERFDAT Query Interface (DQL)

- Features
  - Query interface (DQL) similar to SQL
  - Transparent single point access via network abstraction layer
  - Up- and downward data compatibility via data abstraction layer
  - Dynamic CSV file mapping capability for accessing and analyzing data from different data sources
  - Multi file version support
  - CSV load capability
  - CSV file import capability (data is not only inserted but also normalized)
  - CSV export capability
  - Statistic package fully integrated in data query interface

Components

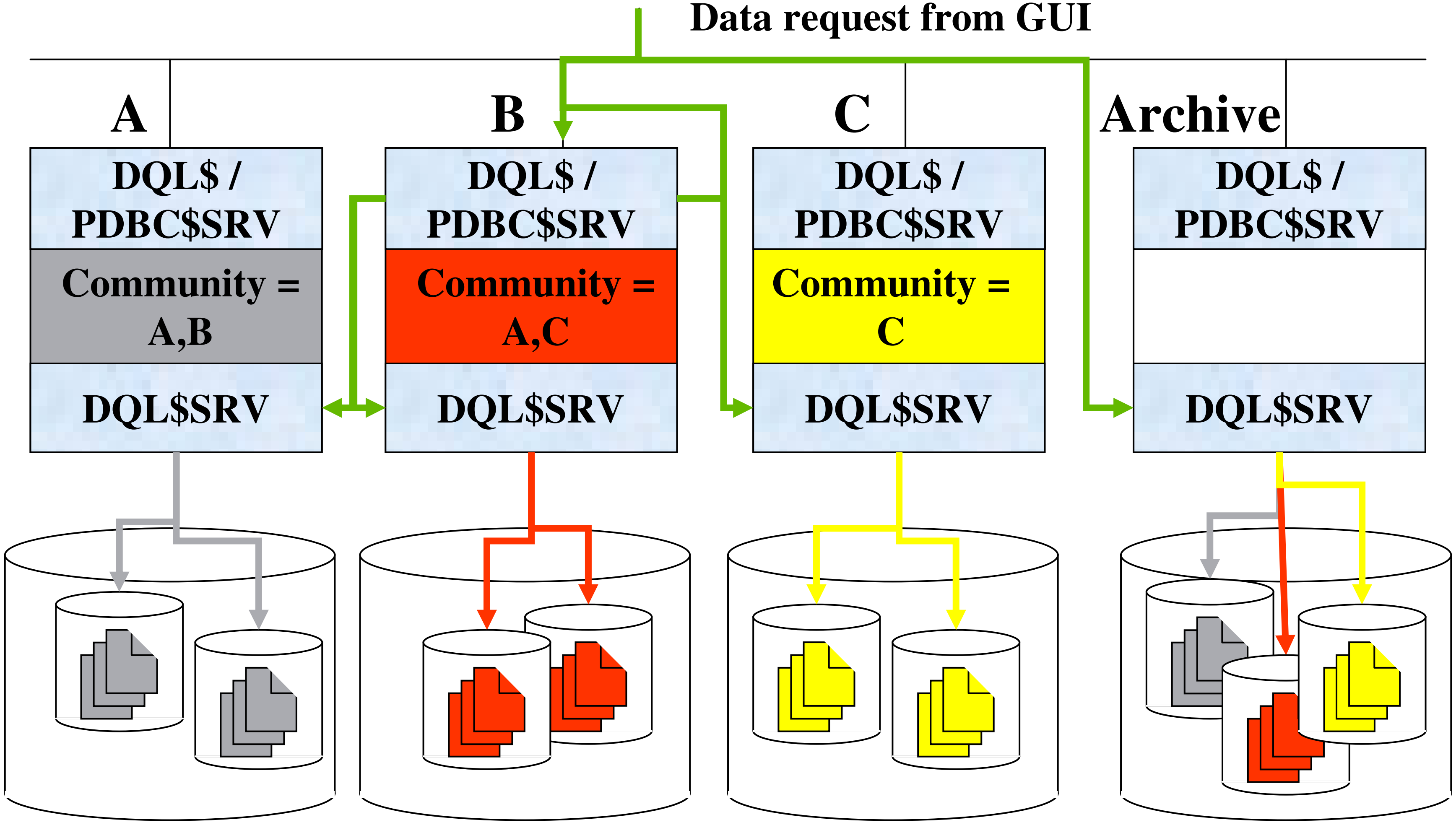


🟥 RMS data streams
🟩 IP data streams
🟦 Management streams

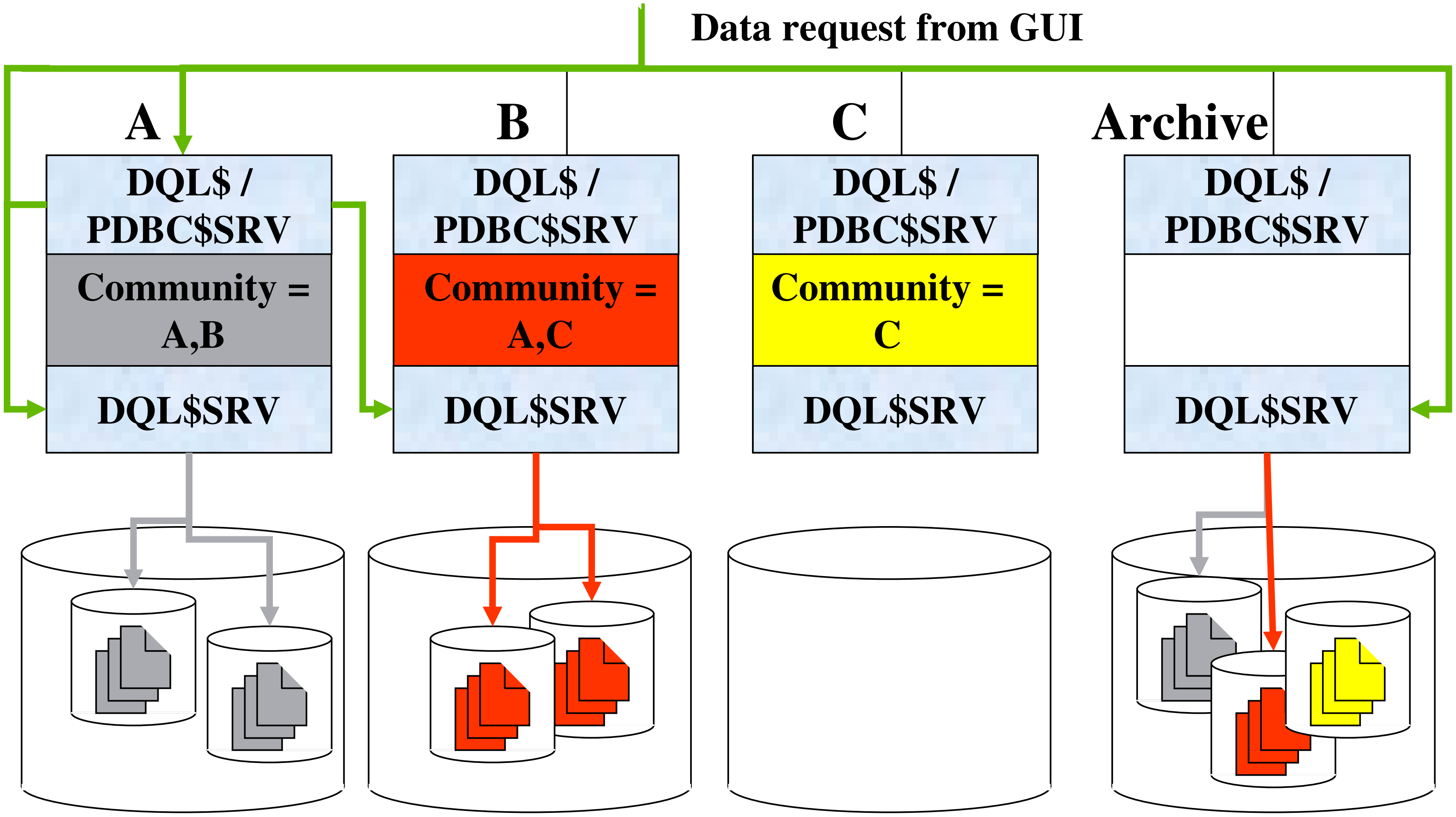
Query Interface - Community

- 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
- Independent of the Community definition, the local node and the archive node (if available) are always accessed

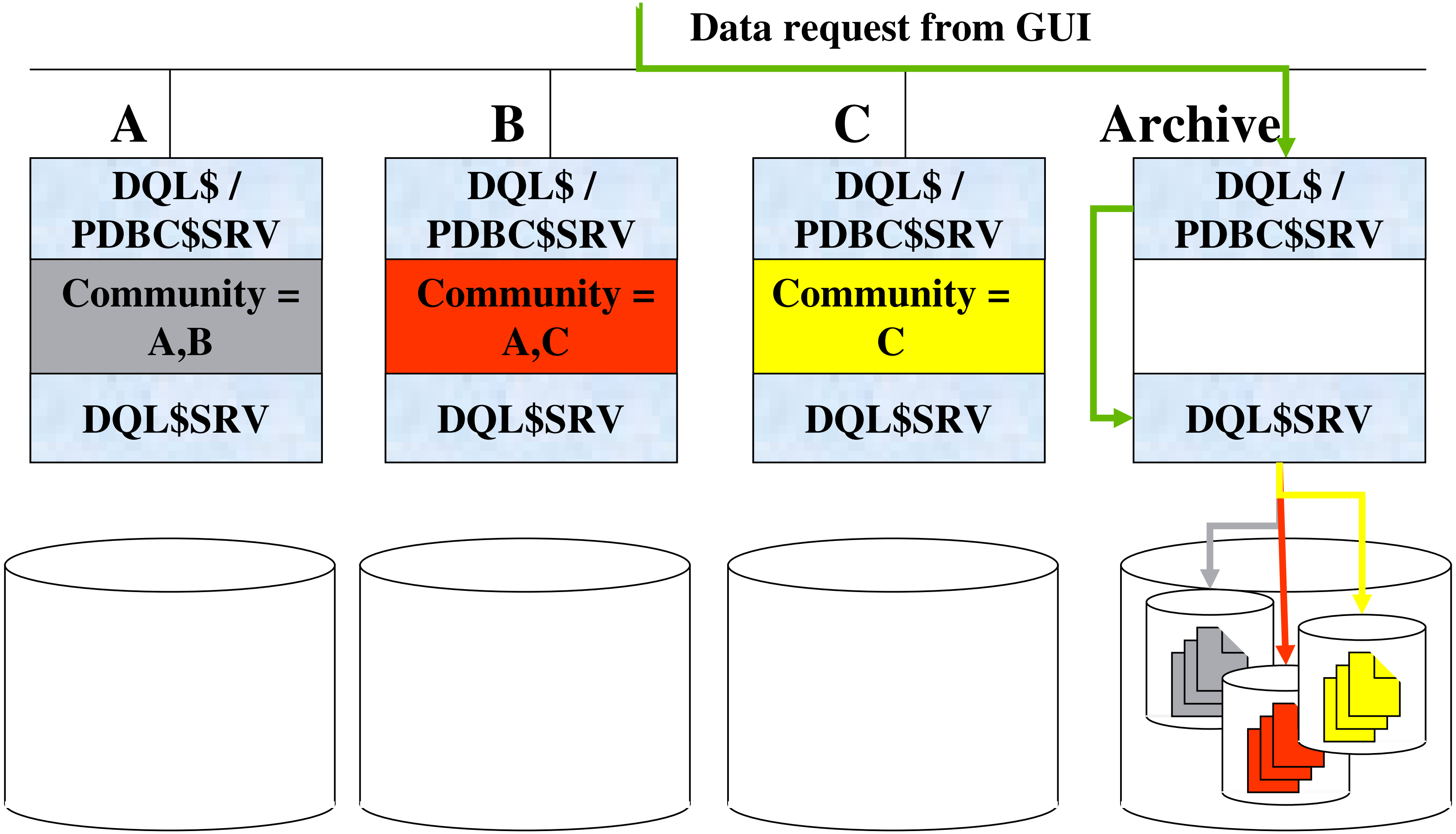
Query Interface - Data Flow



Query Interface - Data Flow



Query Interface - Data Flow



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Online Performance Alerting

- Provides real-time alerting capabilities
- Can be dynamically enabled for each active performance collection (OpenVMS & SNMP extension)
- Statistics to monitor, alert conditions and alert method defined by alert blocks
- Alert blocks are defined within an alert definition file
- An alert definition file is a text file – syntax compareable to PCM import files
- An alert definition file with valid alert blocks are a prerequiste to enable online performance alerting
- Max. number of elements tracked by a single alert block is 4096

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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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Auto trend engine

- Is triggered by the archiving process (if the archiving process is stopped the auto trend engine is stopped too)
- Only processes performance data created on 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

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Archiving and housekeeping

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

Archiving and housekeeping (contd.)

- CSV-files are not processed by the archiving process
- 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

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Management interface - PERFDAT_MGR

- Startup / shutdown of the PERFDAT environment
- Controls and monitors the status of OpenVMS performance data collections
- Controls and monitors the status of remote performance data collections via the PERFDAT SNMP extension
- Management /control of the performance data archiving
- Management / maintenance of the PERFDAT configuration database
- Online performance alert management

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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

Graphical user interface (contd.)

- Shift left /right
- Data scanning
- Up to 16 curves in one graph (in overlay mode up to 32)
- Each graph is scaled separately
- Auto, native and manual scaling capability

Graphical user interface (contd.)

- 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 Win2000/2003/XP

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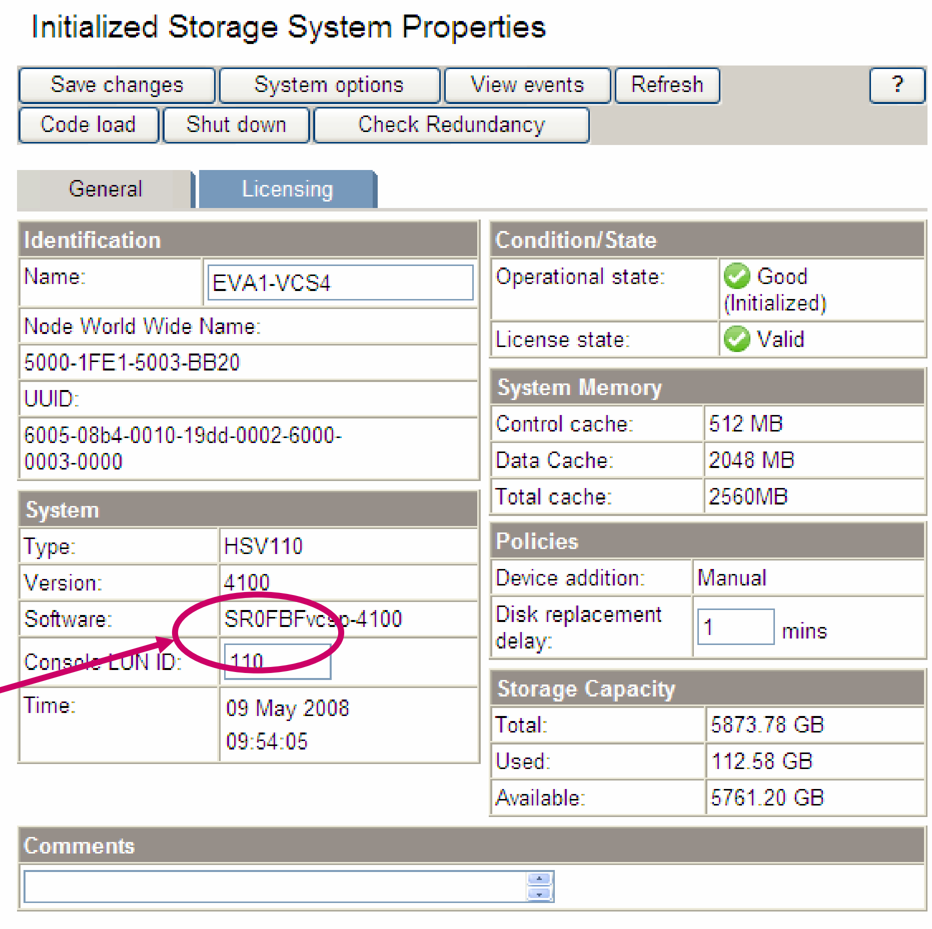
Tools

- PERFDAT$TOOLS:PERFDAT_IMPORT_RDB.EXE
  - imports RDB performance data previously collected using the RMU/SHOW STATISTICS command.
- PERFDAT$TOOLS:PERFDAT_LOADCSV.COM
  - generic CSV utility to load a bunch of CSV files containing data of any kind into the PERFDAT distributed performance database at once.
- PERFDAT$TOOLS:DQLGETTOPSTAT.COM
  - the DQLGETTOPSTAT.COM utility is be used to extract the data of the top consuming elements of a statistics from the PERFDAT collection databases. E.g. top CPU consuming process.
  - Output format is either a PNG formatted graph or a CSV file

New

How to configure an EVA collection -1

- Prerequisites
  - EVA must not be password protected
  - OpenVMS system running EVA extension must have access to both HSV controllers of the EVA system (FC-zone configuration)
  - Console Lun ID parameter != 0



Initialized Storage System Properties

Identification

Name:	EVA1-VCS4
Node World Wide Name:	5000-1FE1-5003-BB20
UUID:	6005-08b4-0010-19dd-0002-6000-0003-0000

System

Type:	HSV110
Version:	4100
Software:	SR0FBFvcsp-4100
Console LUN ID:	110
Time:	09 May 2008 09:54:05

Condition/State

Operational state:	✓ Good (Initialized)
License state:	✓ Valid

System Memory

Control cache:	512 MB
Data Cache:	2048 MB
Total cache:	2560MB

Policies

Device addition:	Manual
Disk replacement delay:	1 mins

Storage Capacity

Total:	5873.78 GB
Used:	112.58 GB
Available:	5761.20 GB

Comments

New

How to configure an EVA collection - 2

- MCR SYSMAN IO AUTOCONFIGURE
- Check if GGA devices have access to all HSV controllers (one path / HSV controller at least)
- Start the EVA collection manually

```
PERFDAT_MGR> START COLLECTION profile /OS_TYPE=EVA/DEVICE=$1$GGAxxx
                                        /NODE=eva_name/OPENVMS_STYLE
```

- Or add the collection to the autostart table and restart HP PERFDAT EVA extension

```
PERFDAT_MGR> ADD AUTOSTART eva_name
PERFDAT_MGR> SHUTDOWN PERFDAT_EVA
PERFDAT_MGR> LAUNCH PERFDAT_EVA
```

New

How to configure a Solaris collection - 1

- Prerequisites
  - NET-SNMP has to be installed on the Solaris box
    - Solaris 10 – default SNMP daemon
    - Solaris 2.6, 7, 8, 9 – NET-SNMP has to be installed
    - Has been tested with NET-SNMP V5.1.2
    - Kits provided by HP PERFDAT installation procedure
      - PERFDAT$SUPPORT:NET-SNMP_512.ZIP
  - NET-SNMP config
    - Add SNMPv1/SNMPv2 read-only community in snmpd.conf
    - snmpd.conf directory
      - Solaris 10: /etc/snmp/conf
      - Other: /usr/local/share/snmp/
    - Restart SNMP

New

How to configure a Solaris collection - 2

- Test NET-SNMP installation
  - @PERFDAT$TOOLS:NET-SNMP_TEST.COM
    - P1 ... Target system type -> „SOLARIS“
    - P2 ... IP-Address / FQDN of the target system
    - P3 ... Community name (case sensitive – use quotation marks)
- Start the Solaris Collection manually
- PERFDAT_MGR> START COLLECTION *profile* /OS_TYPE=SOLARIS/ADDRESS=*ip-address* /NODE=*solaris_name*/[NO]SHARE
- Or add the collection to the autostart table and restart HP PERFDAT SNMP extension
- PERFDAT_MGR> ADD AUTOSTART *solaris_name*
- PERFDAT_MGR> SHUTDOWN PERFDAT_SNMP
- PERFDAT_MGR> LAUNCH PERFDAT_SNMP

New

How to configure a Linux collection - 1

- Prerequisites
  - NET-SNMP has to be installed on the Linux box
    - Download the most recent NET-SNMP kit for your Linux distribution from ig NET-SNMP is not part of the Linux distribution

      http://www.net-snmp.com

    - Has been tested with RedHeat EL 4&5
  - NET-SNMP config
    - Add SNMPv1/SNMPv2 read-only community in snmpd.conf
    - snmpd.conf directory
      - /usr/local/share/snmp/
      - /etc/snmp/conf/
      - /etc/snmp/
    - Restart SNMP

New

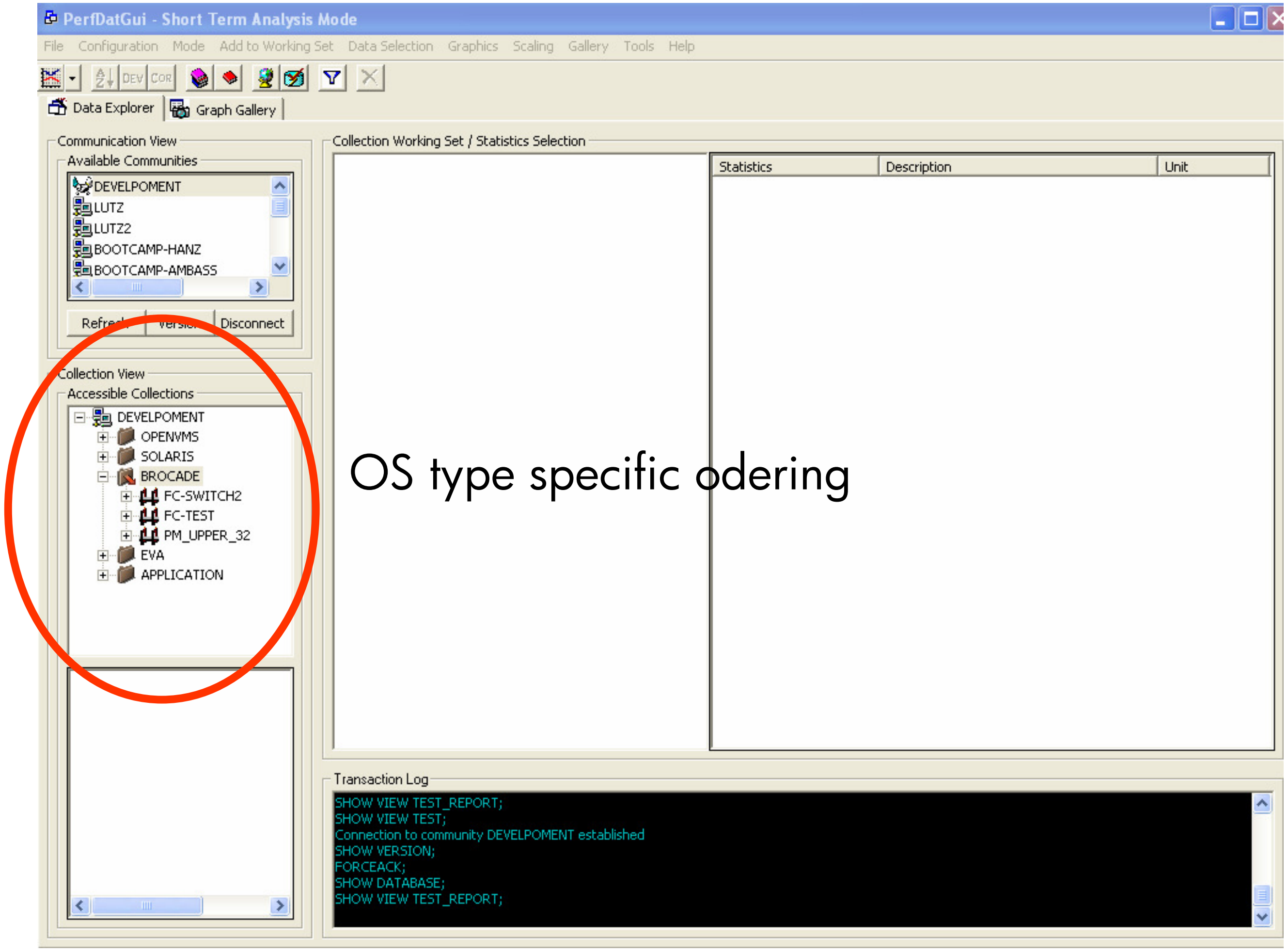
How to configure a Linux collection - 2

- Test NET-SNMP installation
  - @PERFDAT$TOOLS:NET-SNMP_TEST.COM
    - P1 … Target system type -> „LINUX“
    - P2 … IP-Address / FQDN of the target system
    - P3 … Community name (case sensitive – use quotation marks)
- Start the Solaris Collection manually
- PERFDAT_MGR> START COLLECTION *profile* /OS_TYPE=LINUX/ADDRESS=*ip-address* /NODE=*linux_name*/[NO]SHARE
- Or add the collection to the autostart table and restart HP PERFDAT SNMP extension
- PERFDAT_MGR> ADD AUTOSTART *linux_name*
- PERFDAT_MGR> SHUTDOWN PERFDAT_SNMP
- PERFDAT_MGR> LAUNCH PERFDAT_SNMP

New GUI features

New

- Accessible Collections tree view structure



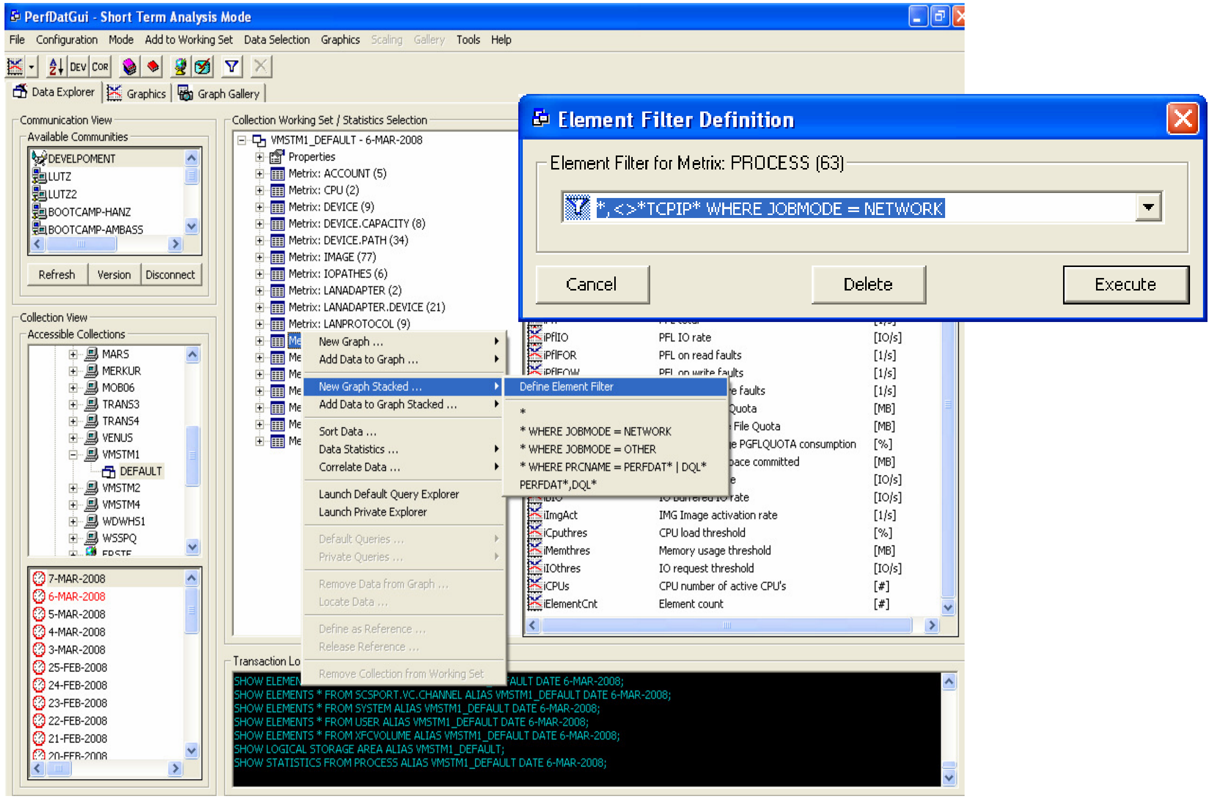
```
SHOW VIEW TEST_REPORT;
SHOW VIEW TEST;
Connection to community DEVELPOMENT established
SHOW VERSION;
FORCEACK;
SHOW DATABASE;
SHOW VIEW TEST_REPORT;
```

OS type specific odering

New

New GUI features (contd.)

- PNG, JPG and GIF graphics format support to save graphs displayed in the graphics window
- Stacked data selection support WHERE clause and element exclusion



Element Filter for Metrix: PROCESS (63)

*, <>*TCPIP* WHERE JOBMODE = NETWORK

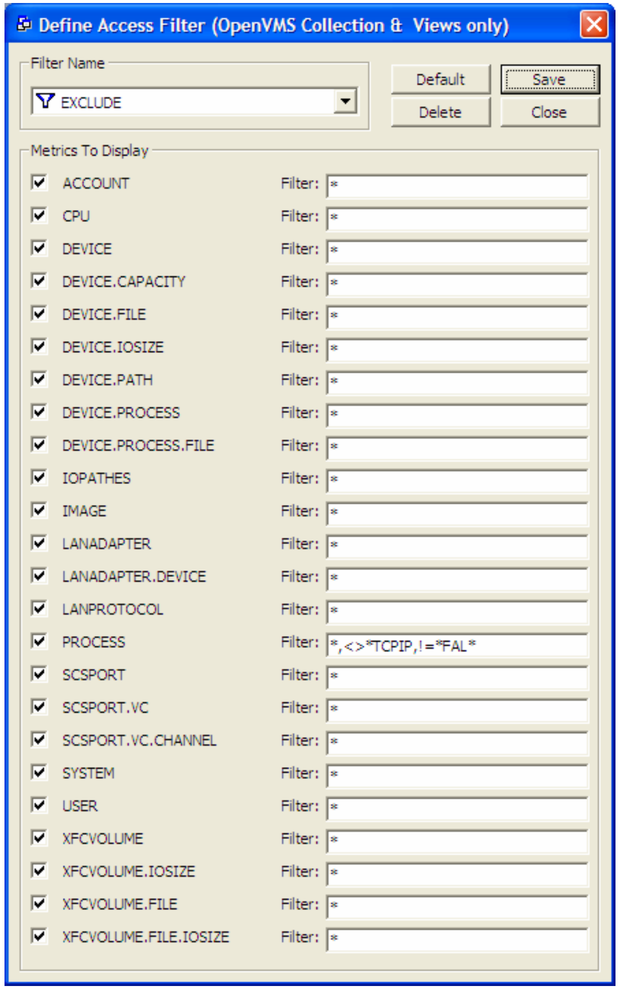
iPflIO	PFL IO rate	[IO/s]
iPflFOR	PFL on read faults	[1/s]
iPflFOW	PFL on write faults	[1/s]
	e faults	[1/s]
	Quota	[MB]
	File Quota	[MB]
	e PGFLQUOTA consumption	[%]
	ace committed	[MB]
	e	[IO/s]
	IO buffered IO rate	[IO/s]
iImgAct	IMG Image activation rate	[1/s]
iCputhres	CPU load threshold	[%]
iMemthres	Memory usage threshold	[MB]
iIOthres	IO request threshold	[IO/s]
iCPUs	CPU number of active CPU's	[#]
iElementCnt	Element count	[#]

```
SHOW ELEMEN                                  AULT DATE 6-MAR-2008;
SHOW ELEMENTS * FROM SCSPORT.VC.CHANNEL ALIAS VMSTM1_DEFAULT DATE 6-MAR-2008;
SHOW ELEMENTS * FROM SYSTEM ALIAS VMSTM1_DEFAULT DATE 6-MAR-2008;
SHOW ELEMENTS * FROM USER ALIAS VMSTM1_DEFAULT DATE 6-MAR-2008;
SHOW ELEMENTS * FROM XFCVOLUME ALIAS VMSTM1_DEFAULT DATE 6-MAR-2008;
SHOW LOGICAL STORAGE AREA ALIAS VMSTM1_DEFAULT;
SHOW STATISTICS FROM PROCESS ALIAS VMSTM1_DEFAULT DATE 6-MAR-2008;
```

New

Graphical user interface (contd.)

- Data Access Filtering supports element exclusion



Define Access Filter (OpenVMS Collection & Views only)

Filter Name: EXCLUDE

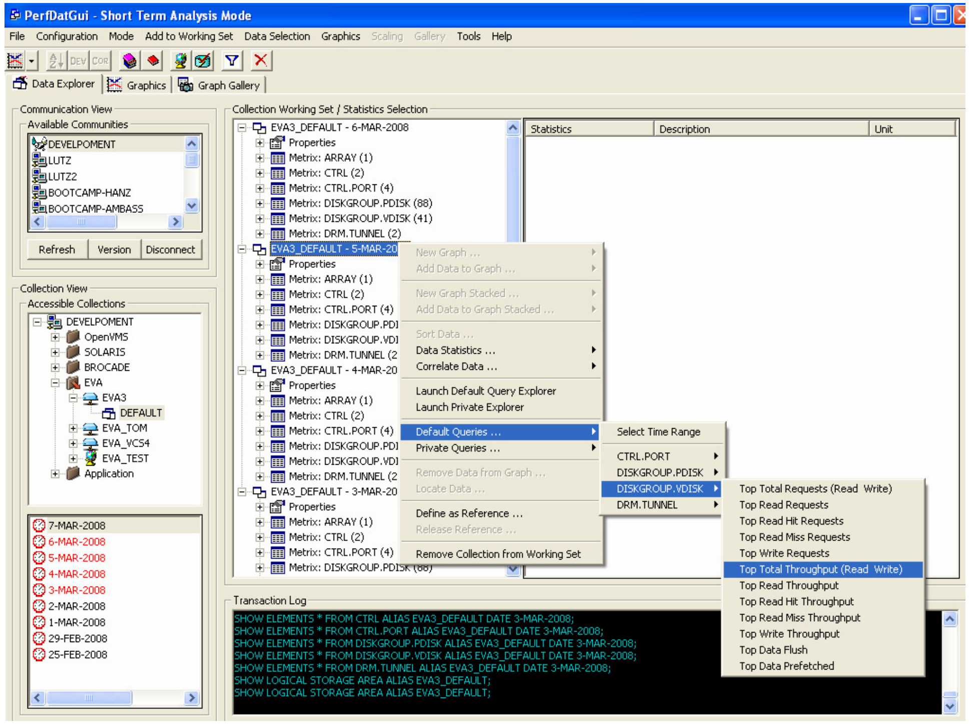
Metrics To Display

☑	ACCOUNT	Filter: *
☑	CPU	Filter: *
☑	DEVICE	Filter: *
☑	DEVICE.CAPACITY	Filter: *
☑	DEVICE.FILE	Filter: *
☑	DEVICE.IOSIZE	Filter: *
☑	DEVICE.PATH	Filter: *
☑	DEVICE.PROCESS	Filter: *
☑	DEVICE.PROCESS.FILE	Filter: *
☑	IOPATHES	Filter: *
☑	IMAGE	Filter: *
☑	LANADAPTER	Filter: *
☑	LANADAPTER.DEVICE	Filter: *
☑	LANPROTOCOL	Filter: *
☑	PROCESS	Filter: *,<>*TCPIP,!=*FAL*
☑	SCSPORT	Filter: *
☑	SCSPORT.VC	Filter: *
☑	SCSPORT.VC.CHANNEL	Filter: *
☑	SYSTEM	Filter: *
☑	USER	Filter: *
☑	XFCVOLUME	Filter: *
☑	XFCVOLUME.IOSIZE	Filter: *
☑	XFCVOLUME.FILE	Filter: *
☑	XFCVOLUME.FILE.IOSIZE	Filter: *

New

Graphical user interface (contd.)

- WEB-Browser control to display saved graphs in the Graph Gallery window
- New AutoSize graph display feature for graph resizing so that the graph fits into the display area
- Default Top Statistics for EVA data collections



```
SHOW ELEMENTS * FROM CTRL ALIAS EVA3_DEFAULT DATE 3-MAR-2008;
SHOW ELEMENTS * FROM CTRL.PORT ALIAS EVA3_DEFAULT DATE 3-MAR-2008;
SHOW ELEMENTS * FROM DISKGROUP.PDISK ALIAS EVA3_DEFAULT DATE 3-MAR-2008;
SHOW ELEMENTS * FROM DISKGROUP.VDISK ALIAS EVA3_DEFAULT DATE 3-MAR-2008;
SHOW ELEMENTS * FROM DRM.TUNNEL ALIAS EVA3_DEFAULT DATE 3-MAR-2008;
SHOW LOGICAL STORAGE AREA ALIAS EVA3_DEFAULT;
SHOW LOGICAL STORAGE AREA ALIAS EVA3_DEFAULT;
```

Supported Versions

- HP PERFDAT V3.3-ECO5
  - OpenVMS AXP V7.2-2 – V8.3
  - OpenVMS IA64 8.2 – V8.3
- HP PERFDAT V4.x
  - OpenVMS AXP V7.3-2 – V8.3
  - OpenVMS IA64 V8.2 – V8.3
- GUI – supported on Win2000 / 2003 / XP
- Within 6 weeks after first shipment of a new OpenVMS release the new OpenVMS release will be supported by HP PERFDAT

HP PERFDAT links

- For more information about HP PERFDAT please contact:

  - HP PERFDAT Support: PERFDAT@HP.COM
  - Wolfgang Burger: WOLFGANG.BURGER@HP.COM

  - Our partner Compinia GmbH & Co. KG:
  - PERFDAT@COMPINIA.DE
  - http://hpperfdat.compinia.com

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