

WHITE PAPER

openSM2 Enterprise Performance Monitoring

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Introduction

Round-the-clock performance monitoring forms the basis for effective and economic operation of IT systems.

With the openSM2 product line, Fujitsu Technology Solutions offers a consistent solution for the enterprise-wide performance monitoring of.

The openSM2 product line supports the Microsoft® Windows, Linux®, Solaris™, VMware™ ESX Server™, Xen® and BS2000/OSD® server systems, the Symmetrix, CLARiiON and FibreCAT storage systems and all SNMP-enabled systems.

With its powerful and user-friendly INSPECTOR and ANALYZER components, openSM2 offers an extensive array of easy-to-use monitoring and analytical functions for your systems on a centralized Microsoft Windows-based PC.

Using the monitoring functions provided by INSPECTOR, you can assess the behaviour of your systems at any time and largely automate the monitoring process.

The analytical functions provided by ANALYZER enable you to perform accurate bottleneck and trend analyses and fully automate analyses that are to be conducted on a regular basis.

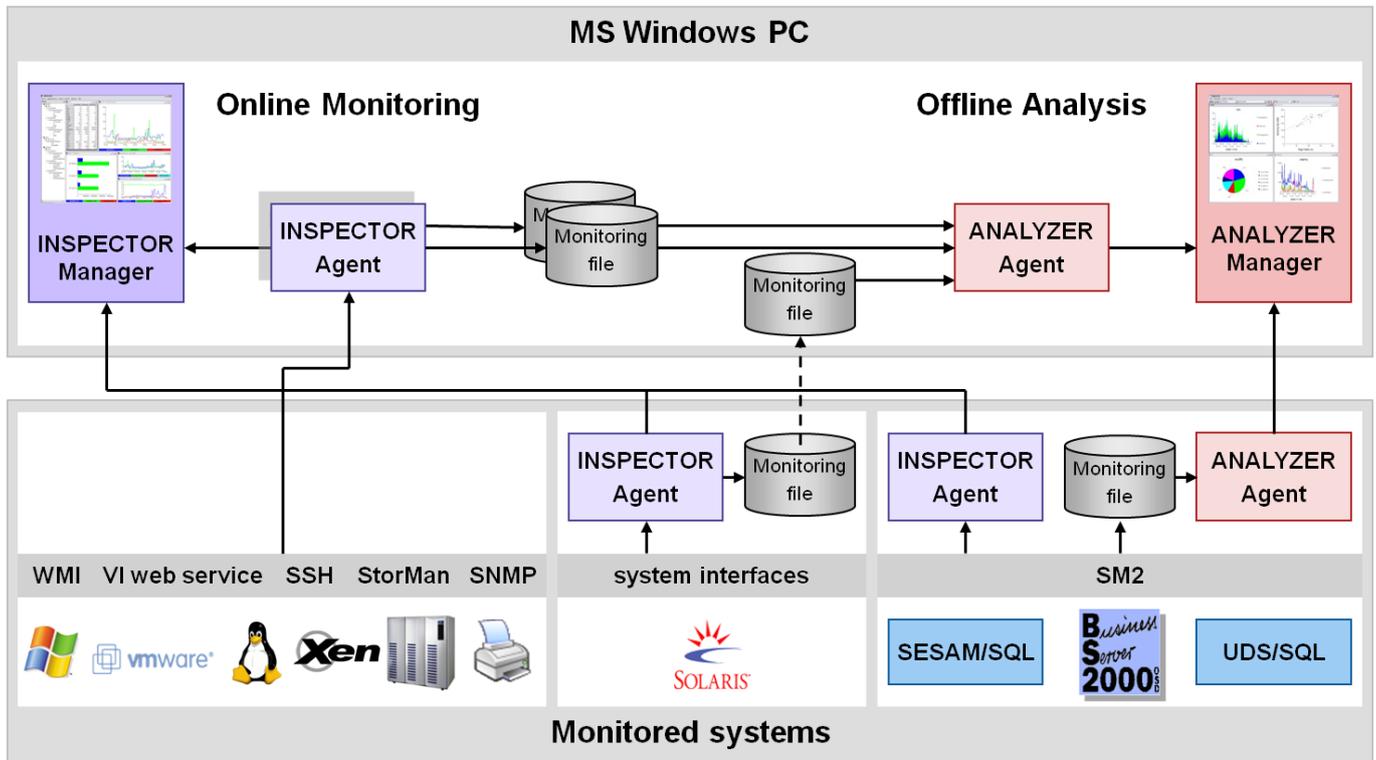
openSM2 gives you the capability to optimize the performance of your systems.

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Architecture

openSM2 consists of the components INSPECTOR for online monitoring and ANALYZER for offline analysis of monitoring files. Both applications comprise a manager with a comfortable graphical user interface on a Windows PC and agents which collect performance data of the systems to be monitored resp. analyze monitoring files.



Performance data acquisition

The performance data of Windows systems are collected via the WMI interface. Data about the utilization of the server and the operating system and also the Microsoft applications Internet Information Services, Exchange and SQL Server are collected.

The performance data of Linux and Xen systems are collected via SSH. Data about the utilization of the server and the operating system and the virtual machines of Xen systems are collected.

The performance data of VMware ESX Server systems are collected via the VI web service. Both data of the entire server and of the individual virtual machines are collected.

The performance data of storage systems are collected via StorMan. Access rates, data transfer rates and IO response times for the volumes are collected.

The performance data of SNMP-enabled systems are collected via SNMP. Data from the groups ip, tcp and udp of the MIB-2 are collected.

The data of Windows, Linux, Xen, VMware ESX Server, storage and SNMP-enabled systems can be collected remotely from any Windows PC or server, without any installation on the monitored systems ("agentless" monitoring).

The performance data of Solaris systems are collected via different system interfaces (kstat, /proc, statvfs). The measured values for the measurement variables of all sar options are collected. Beyond that, process- and file system-specific measured values and network data can also be captured in addition.

On BS2000/OSD, performance data acquisition is managed by the SM2 monitor, which can capture performance data for more than 500 measurement variables. The scope of performance data acquisition can be controlled, since more detailed performance data is required for the analysis of performance problems than for long-term observation and planning of system capacity. Some performance data is always collected (e.g. CPU, memory and disk utilization), while other data is captured by special monitoring routines which can be activated as necessary.

The performance data is provided for online monitoring and, if desired, can also be saved to a monitoring file for later analyses.

Online monitoring with INSPECTOR

INSPECTOR is the component of openSM2 that enables you to monitor multiple systems simultaneously and present the performance data in graphical form.

The clear graphical presentation together with rule-based checking of the performance data provides you with an efficient means of monitoring your systems. You can track the chronological progression of the performance data at any given time so that you can assess system behavior and identify problems at an early stage.

The rule-based performance data checking function supports you with configurable alarm messages and automatically triggered actions, thus enabling you to automate the monitoring of your systems to a large degree.

System list and reports

The monitored systems are displayed in the system list of the manager. The system list has a tree structure showing the association of the systems to system platforms and system groups. The color of a system entry indicates the status of the system. There are the possibilities “no data”, “values in normal range” and “alarm”. The status display is constantly updated and enables exceptional situations to be detected instantly and an appropriate response to be made.

If you want to track the performance trend on the systems more precisely, you have a choice of various types of reports for presenting the performance data in a graphical or tabular layout.

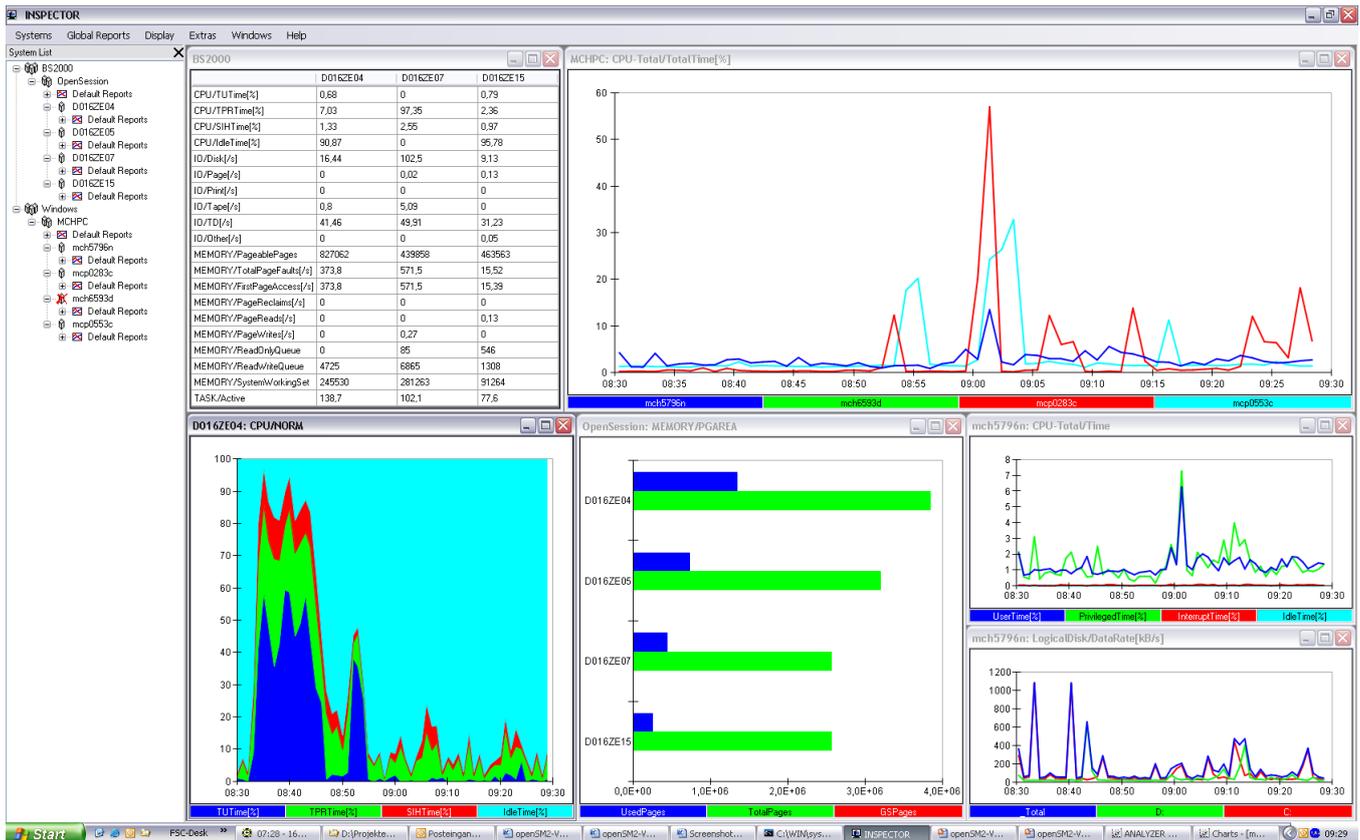
Snapshot reports show the current system status in graphical or tabular form. Time-series reports enable you to read off the chronological progression of the measured values over the last few hours.

You can open system reports to see selected performance data relating to an individual system, and global reports if you want to have an overview of the performance data of multiple systems in a chart or table.

You can specify the measurement variables and monitored objects whose measured values are to be presented in a report, and can also define new measurement variables by linking variables by means of formulas.

You can customize the charts in the reports by selecting different chart types (bar, line, line logarithmized, etc.) and colors. You can print the graphics by mouse click, save them as a graphics file or copy them to the Clipboard for transfer to mainstream programs (Word, PowerPoint, etc.). You can insert a header and footer for printout and modify the labeling of the charts.

The vast choice of report types and the functions for customizing the reports provide you with a wide range of options for personalizing a monitoring screen to suit your particular needs.



Monitoring screen with system list and different reports

Rule-based monitoring

INSPECTOR can monitor the performance data with the aid of user-defined rules. A rule defines conditions and actions. A condition specifies threshold values for a measurement variable. The condition is met if, for a given number of consecutive monitoring cycles, the measured value associated with the variable for each monitoring cycle or the mean value of the measurement variable over all monitoring cycles lies within the threshold values. If all conditions of the rule are met, an alarm for the rule is triggered. The system entry in the system list takes on the color assigned to the alarm level of the rule and the actions defined for the rule are executed.

The following actions can be triggered:

- A report with the measurement variable in question is opened automatically for each condition of the rule
- An audible alarm is triggered
- A procedure is started on any desired monitored server, on which an agent is running
- A batch file is executed on the PC
- You are notified by e-mail or SMS
- An SNMP trap is sent (BS2000/OSD and Solaris (SPARC) systems only).

A rule can be used to link not only conditions for the measurement variables of one system, but also conditions for different systems.

You can define different threshold values and actions in the rules for different times of day in order to take account of the different usage modes of the system – e.g. interactive dialog mode during the day and batch operation during lights-out hours.

SNMP management for openSM2

With the aid of an SNMP subagent for openSM2 you can poll the performance data for certain selected measurement variables from a management station. The openSM2 SNMP subagent also supports the sending of SNMP traps to a management station. openSM2 provides SNMP support for the BS2000/OSD and Solaris (SPARC) system platforms.

Analysis of monitoring files with ANALYZER

ANALYZER is the openSM2 component for analyzing openSM2 monitoring files. You can specify the type and scope of the analysis via the user-friendly graphical interface of the manager. The analysis job thus defined is processed by the agents and the result is then presented by the Manager. The monitoring files to be analyzed can be stored on any server or PC where an agent is running.

With ANALYZER, you can generate expressive charts from your performance data with minimal effort. This makes the measured values easy to interpret, so performance bottlenecks can be quickly identified and future performance requirements forecast. What's more, the rich set of charts layout options and the ease with which the data can be transferred to other Windows applications make ANALYZER an indispensable tool for generating monitoring reports.

Different monitoring files – from the same or different systems – can be analyzed simultaneously in a single analysis run. The analysis result is supplied as chart and table and can be saved as a file and also copied into mainstream programs like Excel and Word or to the Clipboard for further processing.

ANALYZER offers you many options for generating reports tailored to your wishes and requirements:

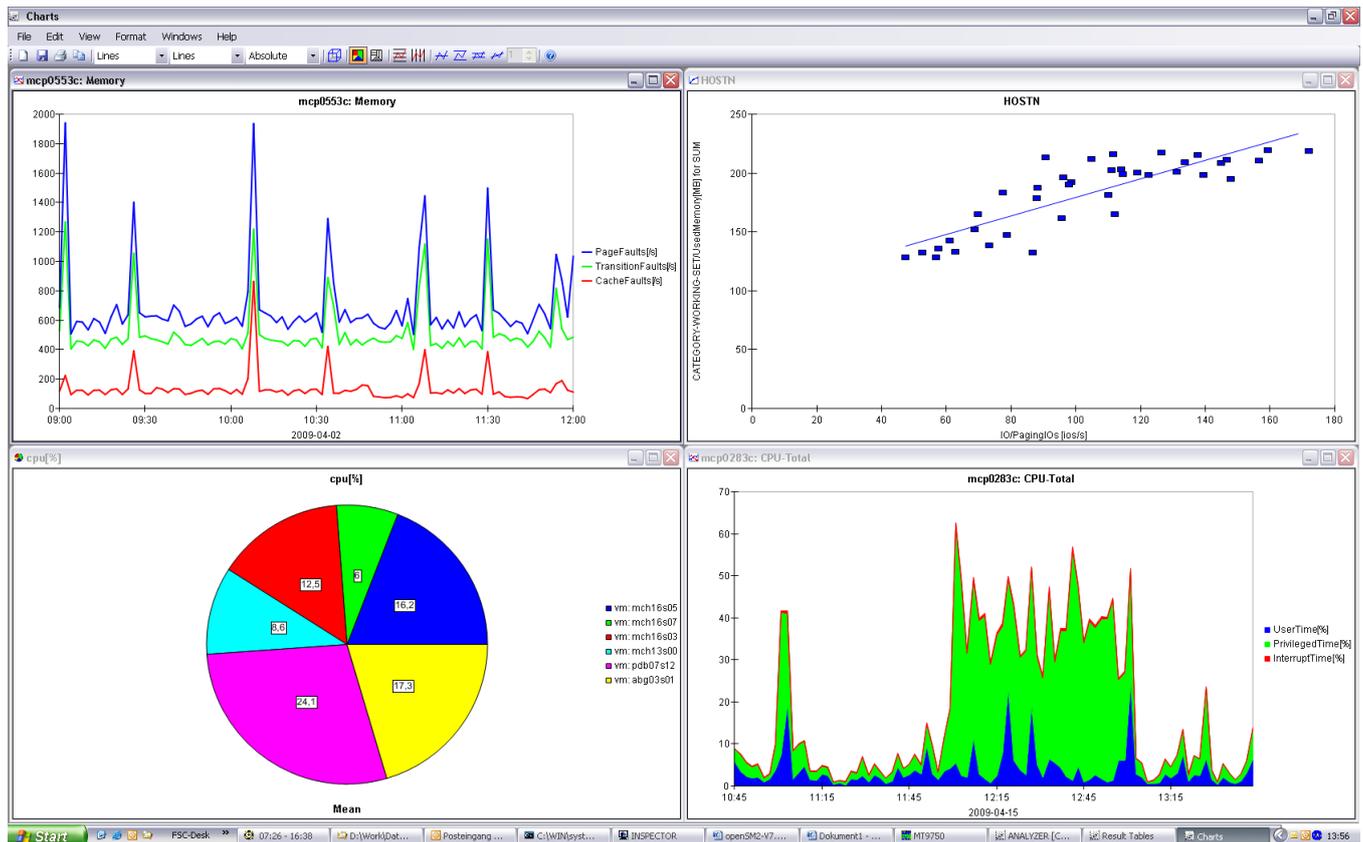
- Selection of the analysis period; time windows can also be defined and certain periods (e.g. weekends) can be excluded
- Selection of the measurement variables via report group, report and measurement variable
- Linking of a number of measurement variables by means of formulas
- Selection of monitored objects (e.g. CPU, devices, workload classes, etc.)
- Selection of different analytical functions (mean values, frequencies, minimum, maximum, quantiles)
- Creation of time series and correlation charts
- Identification of overloaded resources by automatic production of hit lists of the monitored objects with the highest utilization values
- Identification of the processes involved in load peaks by automatic production of a list of the processes with highest CPU consumption for each monitoring cycle
- Monitoring of specified service levels through analysis of frequencies (e.g. percentage share of the monitoring cycles with CPU utilization above 80%)
- Discovery of functional interrelationships between measurement variables through presentation as correlation chart
- Customizing of the charts by selection of different chart types (bar, line, area, pie, etc.) and colors.

Macros

By using ANALYZER's macro technology, you define analyses once and subsequently have them execute fully automatically and, for example, produce daily monitoring reports without manual intervention.

Long-term files

ANALYZER gives you the option of saving measured values of randomly selected measurement variables over longer periods in compressed form on the PC. You can analyze a long-term file in exactly the same way as a monitoring file on a server and in this way obtain the database for producing trend analyses and supporting long-term capacity planning.



Special analyses for BS2000/OSD systems

Automatic Analysis

The automatic analysis function enables you to identify problem areas in BS2000/OSD systems fast and take targeted countermeasures.

In the bottleneck analysis, performance data is checked on the basis of predefined conditions and rules. If the conditions associated with a rule are met, this is indicative of a system bottleneck and a message to this effect is generated with advice on how to remove the bottleneck.

The result of the automatic analysis is presented as a structured list of messages which can be printed and saved.

Configuration

You can have the system configuration of a BS2000/OSD host edited in a tree structure and so obtain an overview of the peripherals in your system.

The configuration can be saved to a file, enabling it to be read back in again for further processing at any time and also printed out as an easy-to-read graphic.

You can also search the configuration for specific devices. Any attributes of the device, e.g. MN, VSN, device type, etc., can be used as a search argument.

Information and Downloads

ts.fujitsu.com/products/software/management/performance/sm2.html

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Published by department:

Dr. Elke Mühling
 Phone: ++49 89 3222 2719
 Fax: ++49 89 3222 329 2719
 elke.muehling@ts.fujitsu.com
 ts.fujitsu.com

Partner login

partners.ts.fujitsu.com