Embedded Support Partner Overview

Document Number 007-4064-002

Contributors

Written by Darrin Goss
Illustrated by Dan Young
Edited by Cindi Leiser
Production by Amy Swenson
Contributions by the System and Site Support Tools Group, Nathan Scott, and Rahul Advani

Embedded Support Partner Overview
Document Number 007-4064-002

What's New in this Document

This revision makes the following changes to this document:

- The system architecture descriptions in Chapters 1 and 2 have been changed to move the `espemd` daemon functionality into the `eventmond` daemon description. The `espemd` functions are now included in `eventmond`.
- The figures have been updated to show the new system architecture.
- Minor editorial changes have been made throughout the document.

Contents

List of Figures

List of Tables

About this Document

The *Embedded Support Partner Overview* provides an overview of the Embedded Support Partner software.

It includes the following information:

- Chapter 1, "About Embedded Support Partner," provides an overall introduction to Embedded Support Partner.
- Chapter 2, "Base Package," describes the base package, which provides the basic functionality of Embedded Support Partner.
- Chapter 3, "Extended Package," describes the optional extended package, which adds the capabilities to monitor multiple systems at a site and generate enhanced reports.
- Chapter 4, "External Tools," describes the external tools that interface with the Embedded Support Partner framework to provide data about events that are external to Embedded Support Partner.

This document corresponds to the version of Embedded Support Partner that is included in the IRIX 6.5.6 operating system release. The document is written for SGI customers.

Conventions Used in this Document

This document uses the following conventions:

Italics	Document and CD titles
`Courier`	Program names, file names, and commands

Acronyms Used in this Document

This document uses the following acronyms:

API	Application Programming Interface
CSC	Customer Support Center
DSM	Decision Support Module
FST	Field Stress Tool
GPS	Global Product Support
PCP	Performance Co-Pilot
`pmie`	Performance Metrics Inference Engine
SEH	System Event Handler
SEM	System Event Manager
SGI	Silicon Graphics, Inc.
SGM	System Group Manager
SSDB	System Support Database
SSE	System Support Engineer
SVP	System Verification Program
VAR	Value-Added Reseller

Chapter 1

About Embedded Support Partner

SGI's products range from desktop workstations to supercomputers, which makes its product line one of the broadest in the industry. Supporting such a diverse product line creates many challenges. Embedded Support Partner was created to address some of these challenges by automatically detecting system conditions that indicate potential future problems and notifying the appropriate personnel. This enables SGI customers and support personnel to proactively support systems and resolve issues before they develop into actual failures.

Embedded Support Partner integrates monitoring, notifying, and reporting functions. It enables users to monitor one or more systems at a site from a local or remote connection. It includes the following capabilities:

- Monitoring the system(s)
  - Configuration monitoring
  - System monitoring
  - Event monitoring
  - Performance monitoring
  - Availability monitoring
- Notifying the user
  - Proactive notification
- Reporting
- Usability enhancements
  - Common interface
  - Remote support and on-site troubleshooting
  - System group management (which enables you to manage an entire group of systems from a single system)

This document describes the version of Embedded Support Partner that is included in the IRIX 6.5.6 operating system release.

Distribution

The Embedded Support Partner software is distributed in two levels:

- A base package
- An extended package

Base Package

The base package includes the functionality necessary to:

- Configure Embedded Support Partner
- Monitor a single system for system and performance events, configuration changes, and availability
- Notify support personnel when specific events occur
- Generate basic reports

The features in the base package are included in the IRIX 6.5.5 and later releases at no extra cost. They are installed by default, and Embedded Support Partner begins monitoring the system as soon as the system is booted. You can configure the base package to specify what types of events it should monitor and whom it should notify when events occur.

Note: Embedded Support Partner can also monitor events from diagnostic tests and perform actions based on these events. To use these optional features, install the diagnostics from the *Internal Support Tools 2.0* CD, which is available only to SGI personnel.

Extended Package

The extended package adds features that work with the base package, including capabilities that enable it to monitor events on multiple systems at a site and provide enhanced reports.

The features in the extended package are also included in the IRIX 6.5.5 and later releases, but these features are not enabled unless the customer acquires a license to use them. (A 90-day free trial license is included; full licenses are included in some service contracts or may be purchased separately.)

Benefits of Embedded Support Partner

Table 1-1 lists the benefits that Embedded Support Partner provides for service personnel and customers.

Table 1-1 Embedded Support Partner Benefits

Component	Feature	Benefit to Service Provider	Benefit to Customer
Base Package	Single Web-based interface	Increases usability of support tools on a single system	Provides fast and effective service
	Broad and useful support functionality	Provides an integrated set of tools that work in a single framework while increasing support coverage	Provides consistent and wide coverage on systems
	Centralized event processing (single system)	Enables you to collect and display all information from one central location	Provides the entire set of circumstances in one place
	Centralized automated response and notification (single system)	Provides visibility to problems as they occur	Enables proactive support Provides a quick insight to problems
	Remote support	Provides a virtual seat into the site remotely	Provides an effective means of delivering service (which greatly increases system availability with accurate problem diagnosis)

Table 1-1 (continued) Embedded Support Partner Benefits

Component	Feature	Benefit to Service Provider	Benefit to Customer
Extended Package	Centralized event processing (group management)	Enables you to collect and display all information from one central location (which helps to determine causes of problems on systems within the site)	Provides the entire set of circumstances in one place
	Centralized support administration (group management)	Provides a single location from which all support activities can be performed for a group of systems	Eases administration and service tracking
	Centralized automated response and notification (group management)	Provides visibility to problems as they occur	Provides proactive support Provides a quick insight to problems
	Centralized site reporting	Provides accurate system and site data online	Enables extensive tracking of availability and system performance
	Centralized troubleshooting	Provides the ability to resolve problems from a central location	Provides an efficient mechanism to fix problems on-site
	Remote support	Provides a virtual seat into the site remotely	Provides an effective means of delivering service (which greatly increases system availability with accurate problem diagnosis)
Performance Monitoring Tools	Proactive, automated performance analysis	Assists in diagnosis of system-level performance issues	Identifies performance hotspots and areas where system resource usage could be optimized for improved performance

Table 1-1 (continued) Embedded Support Partner Benefits

Component	Feature	Benefit to Service Provider	Benefit to Customer
Performance Monitoring Tools (continued)	Extensible rule evaluation mechanism	Provides easy method to add site- or system-specific rules to the default set	Enables use of additional software products to extend the range of monitored subsystems (for example, Cisco routers and Web servers)
	Local or remote service failure detection and quality-of-service monitoring	Automates detection of failed services for proactive support	Increases service availability and quality by automating service probing and checking

Architecture Overview

Embedded Support Partner is a modular system. Each module works independently on a specific function, and no functional overlap exists between the various modules. Some modules run as daemons and others run as standalone applications that are driven by events.

The daemon components of Embedded Support Partner are:

- Core software
  - System Support Database (SSDB): `espdbd`
  - System Event Manager (SEM): `eventmond`
- Monitoring software
  - Event monitor subsystem: `eventmond`

The standalone components of Embedded Support Partner are:

- Monitoring software
  - Availability monitor: `availmon`
  - Configuration monitor: `configmon`
- Notification software: `espnotify`
- Console software
  - Configurable Web Server: `esphttpd`
  - Web-based interface
  - Report generator core
  - Report generator plugins

If you install the performance metrics inference engine application, `pmie`, which is included in the Performance Co-Pilot Execution Only Environment (`pcp_eoe` subsystem), Embedded Support Partner can receive notification of resource oversubscription, bandwidth saturation, and other adverse performance conditions.

If you install the *Internal Support Tools 2.0* CD release, Embedded Support Partner can receive data from the following diagnostic software:

- IRIX based field diagnostics
- Field Stress Tool (FST)
- System Verification Program (SVP)

The *Internal Support Tools 2.0* CD is available only to SGI support personnel (for example, System Support Engineers).

Figure 1-1 shows the architecture that Embedded Support Partner uses on a single system.

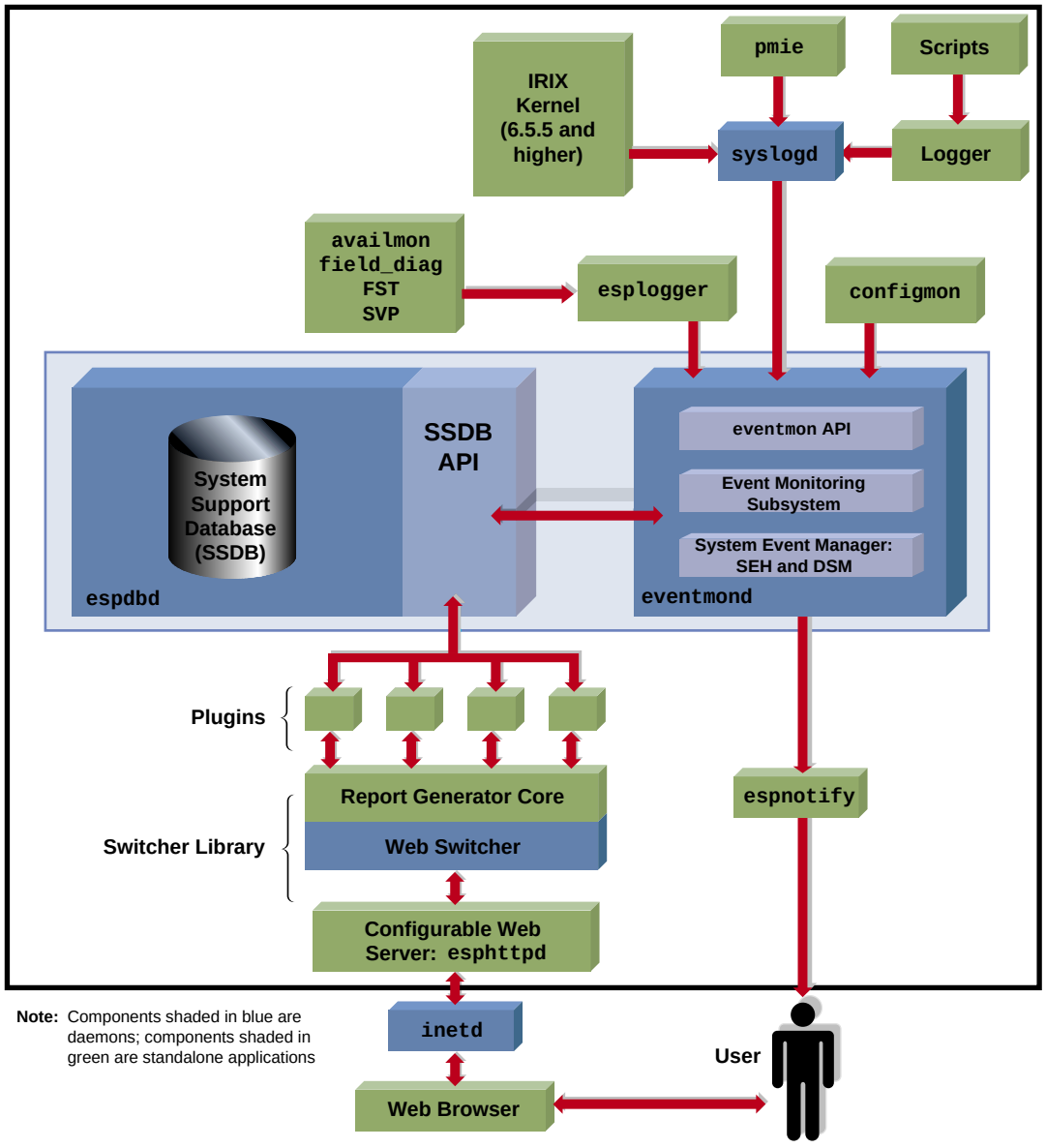

Figure 1-1 Embedded Support Partner Architecture (Block Diagram: Single System)

Remote Support Capability

Remote support capability is built into Embedded Support Partner. The only requirement is a communication channel (for example, a network connection) to the site.

Remote support is implemented as a client/server application. This implementation enables you to connect to the console software from a remote location, which lets you control Embedded Support Partner from the remote location. This capability provides SGI support personnel with a "virtual seat" on the system or systems on which they need to work.

Remote support offers significant benefits for the field, the Customer Support Center (CSC), and Global Product Support (GPS). It enables service providers to perform an online diagnosis remotely so that they can arrive on-site with an accurate solution.

Chapter 2

Base Package

The base package includes the functionality that is necessary to configure Embedded Support Partner; monitor a single system for system and performance events, configuration changes, and availability; notify support personnel when specific events occur; and generate basic reports.

The base package includes the following components:

- Core software
  - System Support Database (SSDB): `espdbd`
  - System Event Manager (SEM): `eventmond`
- Monitoring software
  - `configmon`
  - `eventmond`
  - `availmon`
- Notifying software
  - `espnotify`
- Console software
  - Configurable Web server: `esphttpd`
  - Web-based interface
  - Report generator core
  - Report generator plugins

Core Software

The core software includes the functionality that is necessary to process events, to determine the action to perform, and to store data about the system that Embedded Support Partner is monitoring.

The core software includes the following components:

- System Support Database (SSDB)
- System Event Manager (SEM)

System Support Database (SSDB)

The SSDB is the central repository for all system support data. It contains the following data types:

- System configuration data
- System event data
- System actions for system events
- System availability data
- Diagnostic test data
- Task configuration data

The SSDB includes a server that runs as a daemon, `espdbd`, which starts at boot time.

Note: Embedded Support Partner includes a utility (`esparchive`) that you can use to archive the current SSDB data, which reduces the amount of disk space that is used. Refer to the *Embedded Support Partner User Guide*, publication number 007-4065-002, for more information about using the `esparchive` utility to archive SSDB data.

System Event Manager (SEM)

The System Event Manager (SEM) is the control center of Embedded Support Partner. It includes the following components:

- A system event handler (SEH)
- A decision support module (DSM)

The SEM runs as the `eventmond` daemon.

System Event Handler (SEH)

The SEH logs events into the SSDB (after validating and throttling/filtering) and passes the events to the Decision Support Module (DSM) for processing.

Decision Support Module (DSM)

The DSM is a rules-based event management subsystem. The main tasks of the DSM are:

- Parsing rule(s) for an event
- Initiating any necessary action(s) for an event
- Logging the actions that were performed in the SSDB

The DSM receives events from the SEH and then applies user-configurable rules to each event. If necessary, the DSM executes any actions that are assigned to the events.

Monitoring Software

A key function of Embedded Support Partner is monitoring the system. The Embedded Support Partner base package includes software that enables the following types of monitoring on a system:

- Configuration monitoring (with the `configmon` tool)
- Event monitoring (with the `eventmond` daemon)
- Availability monitoring (with the `availmon` tool)

Monitoring is performed by tools that run as standalone programs and communicate with the Embedded Support Partner control software.

Note: Performance monitoring is available through the `pmie` application, which is included in the Performance Co-Pilot Execution Only Environment (`pcp_eoe` subsystem). Refer to "Performance Monitoring Tools," for more information.

Configuration Monitoring

The base package includes a configuration monitoring application, `configmon`. The `configmon` application monitors the system configuration by performing the following functions when configuration events occur:

- It determines the current software and hardware configuration of a system, gathering as much detail as possible (for example, serial numbers, board revision levels, installed software products, installed patches, installation dates, etc.).
- It verifies that the configuration data in the SSDB is up-to-date by comparing the current system configuration data with the configuration data in the SSDB.
- It updates the SSDB so that it is current (with information about the hardware or software that has changed).
- It provides data for various system configuration reports that the system administrator or field support personnel can use.

The `configmon` application runs at system start-up time to gather updated configuration information.

Event Monitoring

Embedded Support Partner is an event-driven system. Events can come from various sources. Examples of events are:

- Configuration events
- Inferred performance events
- Availability events
- System critical events (from the kernel and various device drivers)
- Diagnostic events

The Embedded Support Partner base package includes an event monitoring subsystem to monitor important system events that are logged into `syslogd` by the kernel, drivers, and other system components. This subsystem is part of the `eventmond` daemon, which starts at boot time immediately after the `syslogd` daemon starts.

All events pass to the event monitoring subsystem by using one of the following methods:

- They use the `eventmon` API.
- They pass through `esplogger`.
- They come directly from `syslogd`.

The `eventmond` daemon monitors events from `syslogd`, and the `eventmon` API and uses the SEM to log the events in the SSDB. `syslogd` performs some event throttling/filtering. You can configure Embedded Support Partner to do more extensive event throttling/filtering, which reduces system resource overhead when `syslogd` logs a large number of duplicate events because of an error condition.

If the SSDB server is not running when `eventmond` attempts to log events, `eventmond` buffers the events until it can successfully log the events.

eventmon API

The `eventmon` API provides the mechanism that enables tasks to communicate with `eventmond`. The `eventmond` daemon receives information from external monitoring tasks through API function calls that the tasks send or that `esplogger` sends to `eventmond`. Each command that is sent to `eventmond` returns a status code that indicates successful completion or the reason that a failure occurred.

Availability Monitoring

The base package also includes an availability monitoring application, `availmon`. The `availmon` application monitors machine uptime and differentiates between controlled shutdowns, system panics, power cycles, and power failures.

Availability monitoring is useful for high-availability systems, production systems, or other customer sites where monitoring availability information is important.

The `availmon` application runs at startup time to gather the availability data.

Notification Software

Notification is one of the actions that can be programmed to take place when a particular system event occurs. The notification software provides several types of notifiers, including dialog boxes on the local system, e-mail, paging, and diagnostic reports and other types of reports.

The `espnotify` tool provides the following notification capabilities for Embedded Support Partner:

- E-mail notifications
- GUI-based or console text notifications (with audio if the notification is on the local host)
- Program execution for notification
- Alphanumeric and chatty paging through the `Qpage` application

Typically, the Decision Support Module (DSM) invokes the `espnotify` tool in response to some event. However, you can run the `espnotify` tool as a standalone application, if necessary.

Console Software

The Embedded Support Partner base package includes console software that enables you to interact with it from a Web browser. The console software uses the Configurable Web Server (`esphttpd`) to receive input from the user, send it to the Embedded Support Partner software running on the system, and return the results to the user. (`inetd` invokes `esphttpd` whenever a Web server connection is needed.)

The console software also includes a report generator core and a set of plugins to create various types of reports. These reports are based on the data that the Embedded Support Partner tasks provide, such as `configmon`, `availmon`, etc.

In the base package, you can access the following types of reports:

- System configuration reports (current and historical):
  - Hardware
  - Software
- System event reports:
  - Based on event CLASS
  - Based on event TYPE
- Event action reports
- Local system metrics (MTBI, availability, etc.)
- Embedded Support Partner configuration

You can use a Web browser to request these reports and view them.

If you use an ASCII-based browser (for example, Lynx) to access the Web Server, the console software provides an ASCII Web-based interface that supports the following functionality:

- Configuring the behavior of the Embedded Support Partner
- Configuring the Web server
- Generating basic reports

If you use a graphical browser (for example, Netscape Communicator) to access the Web server, the console software provides a graphical Web-based interface that supports the following functionality:

- Configuring the behavior of the Embedded Support Partner
- Configuring the Web server
- Configuring system groups
- Configuring the behavior of tasks
- Setting up monitors and associated thresholds
- Setting up notifiers
- Generating reports for a single system or group of systems
- Accessing system consoles and system controllers
- Remotely controlling a system with the IRISconsole multiserver management system

To access the console software, enter the **`launchESPpartner`** command or double-click on the `Embedded_Support_Partner` icon (which is located on the `SupportTools` page of the icon catalog). Refer to the *Embedded Support Partner User Guide*, publication number 007-4065-002, for more information about using Embedded Support Partner.

Chapter 3

Extended Package

The extended package adds the capabilities that are necessary to monitor events on multiple systems at a site and to generate enhanced reports.

Multiple System Monitoring

The extended package adds the capabilities to monitor multiple systems at a site by including a System Group Manager (SGM). The system selected as the group manager runs the SGM, which manages the group and acts as the SEM for the system that is the group manager.

The SGM provides functionality to uniformly manage multiple systems when more than one system is installed at a site. Specifically, it performs the following functions:

- System group event tracking
- System group configuration management
- System group availability monitoring
- Notification (based on the events that occur on systems in the group)

Any system within a system group can be designated the group manager (it is possible to have more than one group manager). A system that is designated as the group manager monitors all systems in the group as well as itself.

Figure 3-1 provides a block diagram of system group management.

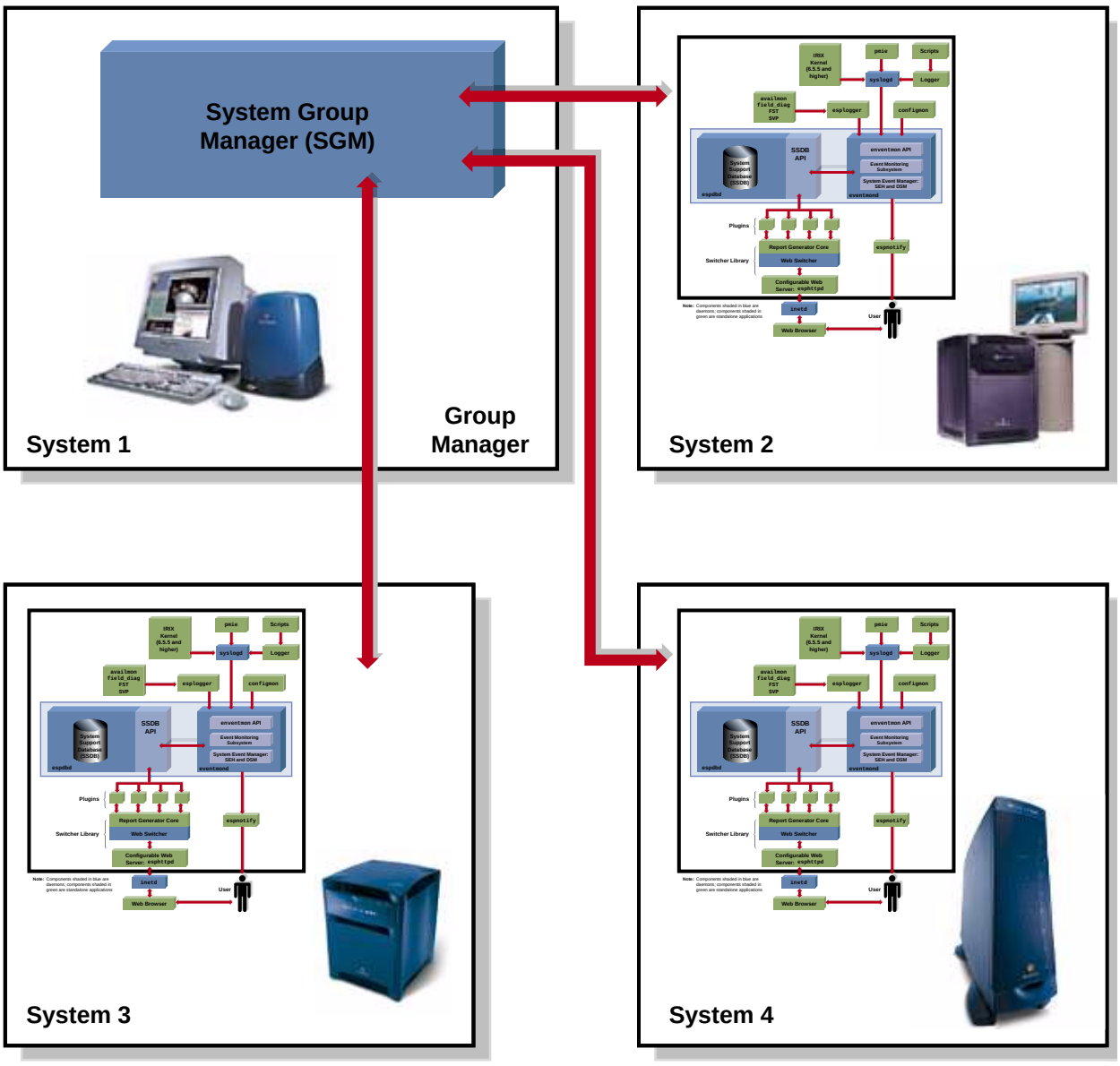

Figure 3-1 System Group Management Block Diagram

Enhanced Reporting

In the extended package, an enhanced report generator adds the capability to generate reports for groups of systems. It can generate the following reports for groups of systems:

- Availability metrics (MTBI, availability, etc.) at a site level and individual system level
- Site event reports:
  - By host
  - By event CLASS
  - By event TYPE

Chapter 4

External Tools

The following external tools can interface with the Embedded Support Partner framework to provide data about events that are external to Embedded Support Partner:

- Performance monitoring tools
- Diagnostic tools

These tools are not part of the Embedded Support Partner package and must be loaded separately.

Performance Monitoring Tools

The performance metrics inference engine application, `pmie`, which is included in the Performance Co-pilot Execution Only Environment (`pcp_eoe` subsystem) can interface with the Embedded Support Partner framework to provide Embedded Support Partner with performance monitoring events.

`pmie` is an inference engine for performance metrics: It evaluates a set of performance rules at specified time intervals. You can use a separate utility to customize and extend the rules and their attributes.

Refer to the *Performance Co-Pilot IRIX Base Software Administrator's Guide*, publication number 007-3964-001, for more information about `pmie` and the `pcp_eoe` subsystem.

Diagnostic Tools

The support tools included in the *Internal Support Tools 2.0* CD release can also interface with the Embedded Support Partner framework. If you install the *Internal Support Tools 2.0* CD release, Embedded Support Partner collects data from the following diagnostic tools:

- IRIX based field diagnostics
- Field Stress Tool (FST)
- System Verification Program (SVP)

You can run the tools from the command line or from their individual user interfaces. (User interfaces are available only for the field diagnostics and FST.)

The *Internal Support Tools 2.0* CD is available only to SGI support personnel (for example, System Support Engineers).

IRIX Based Field Diagnostics

The IRIX based diagnostics test the following hardware components while IRIX is running on a system:

- CPU hardware
- Ethernet hardware on the BaseIO boards
- Floating-point unit on the Node boards
- Graphics hardware (DIVO and InfiniteReality hardware)
- LINC DMA hardware on the Node, ATM, and HIPPI-S boards
- MediaIO boards
- Memory
- Networking hardware (ATM, BaseIO, HIPPI-S, and MENET boards)
- RAID array hardware
- Router boards, MetaRouter boards, and connecting cables

FST

FST is an IRIX based application that simulates varying customer application loads on SGI Origin 200, Origin 2000, and Challenge servers; and Silicon Graphics Onyx and Onyx2 workstations to determine the functionality of these systems. It is a proactive tool that validates a system by running heavy loads on the system.

SVP

SVP is an IRIX based software tool that loads and runs a suite of test programs. SVP generates a set of files that report the results of this activity.

ICRASH

ICRASH is a system crash analysis tool that can greatly enhance your ability to analyze IRIX system core dumps. It contains many features that enable it to display information in a clear, easy-to-read manner about the events that precede a system crash.

The `availmon` component of Embedded Support Partner uses data from ICRASH to determine the cause of any system interruptions that `availmon` detects. The `availmon` reports also include ICRASH data.

Note: ICRASH is included as part of the operating system release; it is not included on the *Internal Support Tools 2.0* CD.

Glossary

Acronyms

Refer to the section titled "Acronyms Used in this Document" on page xii for descriptions of the acronyms that this document uses.

Action

A response to an event. (Most actions are performed automatically when an event occurs.)

Application Programming Interface

A set of functions that tasks can use to communicate with the core Embedded Support Partner software (System Event Manager, System Group Manager, etc.).

availmon

A standalone tool that monitors system availability.

configmon

A standalone tool that monitors system hardware and software configurations.

Crash Analysis

See ICRASH.

Decision Support Module

A rules-based management subsystem in the System Event Manager that responds to events with actions. The Decision Support Module is part of the `eventmond` daemon.

esphttpd

The Configurable Web Server that Embedded Support Partner uses to receive user input from a Web browser, to interact with operating system-based software, and to return results to the user. (`inetd` invokes `esphttpd` whenever connections are needed.)

espnotify

A standalone tool that provides notification capabilities for Embedded Support Partner.

Event

An identifiable condition on a system that needs to be logged and traced. Events are also referred to as system events.

eventmond

An OS-based daemon that monitors for system events and sends them to the Embedded Support Partner framework.

Field Diagnostics

A standalone suite of diagnostic tests that verify system hardware while IRIX is running on a system. These diagnostics are included on the *Internal Support Tools 2.0* CD, which is available only to SGI support personnel.

Field Stress Tool

A standalone application that validates a system by running heavy loads on the system. The Field Stress Tool (FST) is included on the *Internal Support Tools 2.0* CD, which is available only to SGI support personnel.

Filtering

See Throttling.

Group Manager

The system within a system group that runs the System Group Manager software.

ICRASH

A standalone system crash analysis tool that is included in the operating system.

Paging

See QPage.

pmie

An inference engine for performance metrics: It evaluates a set of performance rules at specified time intervals. You can use a separate utility to customize and extend the rules and their attributes.

QPage

A standalone application that `espnotify` uses to perform alphanumeric paging.

Remote Support

The capability to interact with Embedded Support Partner from a remote site.

Report Generator Core

An application that provides the main functionality for generating reports.

Report Generator Plugins

Dynamic shared objects that provide the capability to configure and generate various reports (for example, configuration reports) from the user interface. (The report generator plugins work with the report generator core to generate various reports.)

Support Tools

See Task.

System Event

See Event

System Event Handler

The portion of the System Event Manager that validates and throttles events and then logs the events into the System Support Database. The System Event Handler is part of the `eventmond` daemon.

System Event Manager

The nerve center of Embedded Support Partner. The System Event Manager is part of the `eventmond` daemon and contains the System Event Handler and the Decision Support Module.

System Group Manager

The software module that enables you to uniformly manage multiple systems at a site.

System Support Database

The central repository for all system support data.

System Verification Program

A standalone diagnostic tool that loads and runs a suite of test programs and generates a set of files that report the results of this activity. The System Verification Program (SVP) is included on the *Internal Support Tools 2.0* CD, which is available only to SGI support personnel.

Task

Any facility (for example, an application or program) that performs some function. Tasks are external to the System Event Manager (SEM). Tasks can include diagnostics, monitors, and specific applications (all support tools are tasks).

Throttling

The mechanism that specifies the conditions at which new records are logged in the database per event. Throttling is used to minimize disk space usage. Throttling is also called filtering.

Tell Us About This Manual

As a user of Silicon Graphics products, you can help us to better understand your needs and to improve the quality of our documentation.

Any information that you provide will be useful. Here is a list of suggested topics:

- General impression of the document
- Omission of material that you expected to find
- Technical errors
- Relevance of the material to the job you had to do
- Quality of the printing and binding

Please send the title and part number of the document with your comments. The part number for this document is 007-4064-002.

Thank you!

Three Ways to Reach Us

- To send your comments by **electronic mail**, use either of these addresses:
  - On the Internet: techpubs@sgi.com
  - For UUCP mail (through any backbone site): *[your_site]*!sgi!techpubs
- To **fax** your comments (or annotated copies of manual pages), use this fax number: 650-932-0801
- To send your comments by **traditional mail**, use this address:

  Technical Publications
  Silicon Graphics, Inc.
  1600 Amphitheatre Parkway, M/S 535
  Mountain View, California 94043-1351