FUJITSU

FUJITSU Software
Symfoware Server V12.0.0

General Description

Linux

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Preface

Purpose of This Document

This document explains the Symfoware Server concepts to those who are to operate databases using it.

This document explains the features of Symfoware Server.

Intended Readers

This document is intended for people who are:

- Considering installing Symfoware Server

- Using Symfoware Server for the first time

- Wanting to learn about the concept of Symfoware Server

- Wanting to see a functional overview of Symfoware Server

Readers of this document are also assumed to have general knowledge of:

- Computers

- Jobs

- Linux

Structure of This Document

This document is structured as follows:

Chapter 1 Symfoware Server Basic

Explains the features of Symfoware Server.

Issue date and version

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Edition 1.1: January 2014
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Chapter 1 Symfoware Server Basic

Symfoware Server expands the features of PostgreSQL to provide databases with enhanced reliability, operability, and manipulability.

This chapter explains the features of Symfoware Server.

1.1 Symfoware Server Feature

Symfoware Server has the following features:

- Disk deployment for assured reliability
  To ensure database reliability, its storage area and backup data are deployed to different disks.

- Flexible database recovery
  Not only does Symfoware Server recover data to its most recent form when a failure occurs, which is essential for databases, but it can also recover to any point in time.

- Easy maintenance
  Symfoware Server allows the backups and update logs necessary for database operation to be maintained easily.

- Simple installation and management operations
  Symfoware Server uses GUI to simplify cumbersome database operations, and allows databases to be used intuitively.

- Storage data encryption
  Encryption feature is provided to protect storage data. Encrypting storage data allows valuable information to be protected even when a disk is stolen.

- Seamless migration from Oracle databases
  Symfoware Server provides a compatibility feature with Oracle databases that localizes the correction of existing applications and allows easy migration to Symfoware Server.

- High reliability by using failover
  Symfoware Server links with PRIMECLUSTER, thereby allowing highly reliable systems to be achieved by using failover.

- Linkage with integrated development environment
  Symfoware Server links with Visual Studio, thereby allowing a standard framework to be used to create applications and construct a database server.

- Security
  User access to the database can be controlled, to provide protection against unauthorized access, and to preserve business confidentiality.
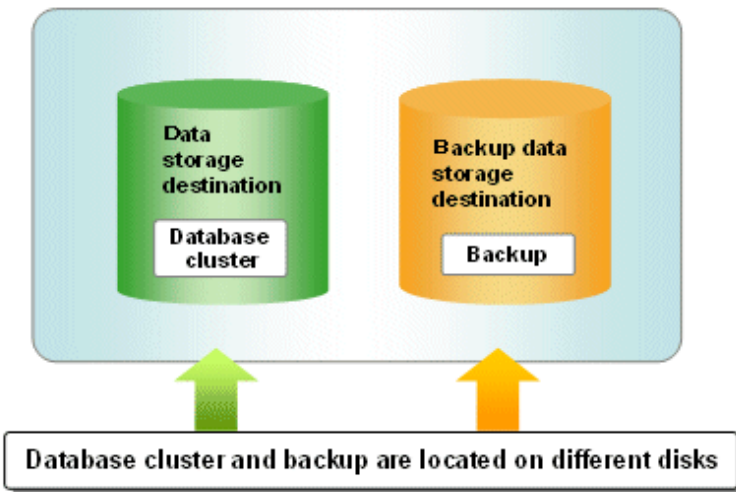
1.1.1 Disk deployment for assured reliability

Symfoware Server operates a database cluster and backup as a single set.

- Database cluster

  Database storage area on a database disk.

- Backup

Copy of a database cluster. A backup contains the data necessary for recovering a database when an abnormality such as a disk failure occurs.

The database cluster and backup that make up an instance are physically located on different disks.

The disk on which the database cluster is located is referred to as the "data storage destination", and the disk that contains the backup is referred to as the " backup data storage destination".

Locating the database cluster and backup on difference disks allows data to be recovered from the other disk whenever an abnormality occurs on either of them, thereby guaranteeing database reliability.

1.1.2 Flexible Database Recovery

Threats such as data corruption due to disk failure and incorrect operations are unavoidable in systems that use databases. The ability to reliably recover corrupted databases without extensive damage to users when such problems occur is an essential requirement in database systems.

Symfoware Server provides the following recovery features that flexibly respond to this requirement:

- Media recovery, which recovers up to the most recent point in time

- Point-in-time recovery, which can recover up to a specific point in time

Media recovery, which recovers up to the most recent point in time

When a disk failure occurs, media recovery can recover data to how it was immediately before the failure.

In order to recover the database, Symfoware Server accumulates a history of database update operations, such as data additions and deletions, as an update log.

Symfoware Server retains a duplicate (mirror image) of the update log after backup execution on the data storage destination and on the backup data storage destination. Therefore, the data on one disk can be used to recover to the most recent state of the database even if a disk failure has occurred on the other.

Media recovery is executed using either a GUI tool provided with Symfoware Server (WebAdmin) or server commands.

Information

Recovery using WebAdmin requires less time and effort, since WebAdmin automatically determines the scope of the operation.

Failure occurs on either disk
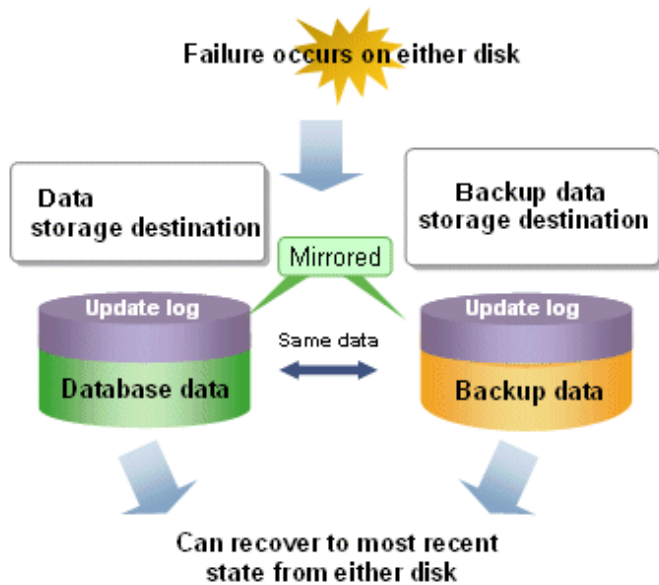
Point-in-time recovery, which can recover up to a specific point in time

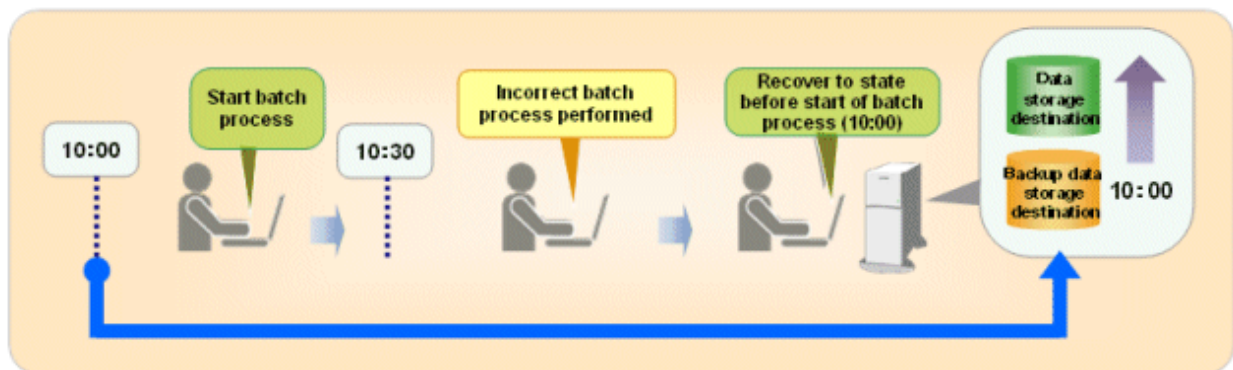Point-in-time recovery can be used to recover a database that has been updated by an incorrect operation, for example, by specifying any date and time before the incorrect operation.

Point-in-time recovery is executed using Symfoware Server server commands.

1.1.3 Easy Maintenance

Symfoware Server simplifies the cumbersome maintenance operations performed during operation.

Symfoware Server uses backup data and an update log to recover a database. These data types necessary for backup are stored on the backup data storage destination. When backup is executed, the backup data on the backup data storage destination and update log on the backup disk are updated to the most recent state. The backup data and update log that are no longer necessary are automatically deleted at that point, so maintenance is easy.

1.1.4 Simple Installation and Management Operations

In Symfoware Server, GUI tools can be used for operations ranging from installing to managing a database. This allows the databases to be used simply and intuitively. Symfoware Server provides the two following GUI tools:

- WebAdmin

- pgAdmin
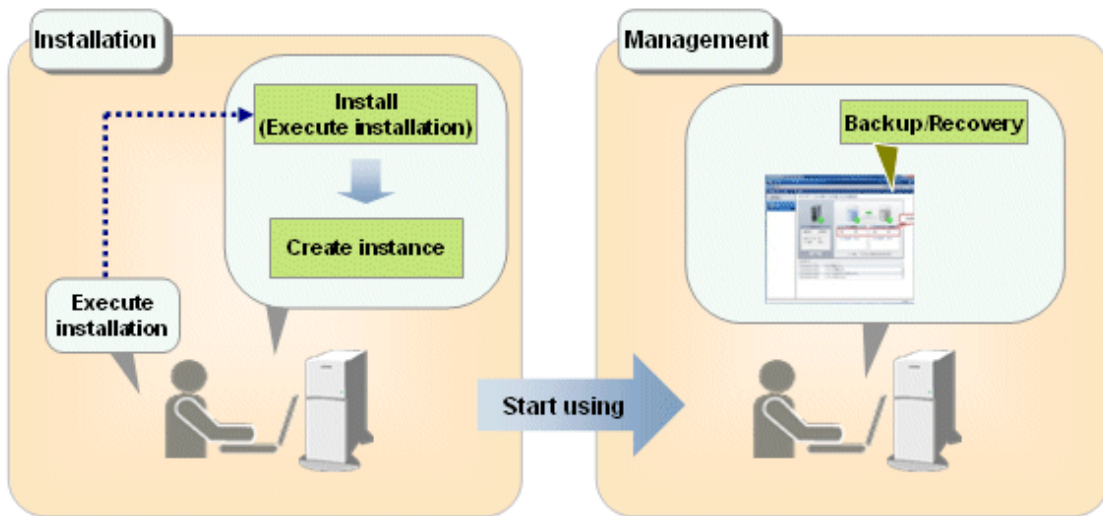
Managing operations using WebAdmin

WebAdmin can be used for Symfoware Server setup, database backups, and for recovery.

- Setup

    To perform setup using WebAdmin, you must create an instance. Instances can be created easily and with only minimal required input, because the tool automatically determines the optimal settings for operation.

- Database backup/recovery

    Database backup and recovery can be performed using simple GUI operations.

    In particular, Symfoware Server can automatically identify and isolate the location of errors. This simplifies the recovery process and enables faster recovery.

Simple database resource management using pgAdmin

pgAdmin can be used to define database objects and to manipulate data. It is also equipped with features to perform backup/restore and maintenance.

The main features that pgAdmin provides are:

- Creating and managing databases

- Creating and managing users and roles

- Manipulating tables (creating tables, displaying data, and modifying data) using data views

- Creating triggers

- Executing SQL queries

- Backing up and restoring databases

- Performing maintenance operations (VACUUM, ANALYZE, and REINDEX)

1.1.5 Seamless Migration from Oracle Databases

Symfoware Server provides the features compatible with Oracle databases.

Using the compatibility feature reduces the cost of correcting existing applications and results in easy database migration.

The table below shows the compatibility features provided.

Category		Features compatible with Oracle databases	
		Item	Overview
SQL	Queries	Outer join operator (+)	Operator for outer joining
		DUAL table	Tables provided by the system
	Functions	DECODE	Compares and converts values
		SUBSTR	Extracting part of a character string
		NVL	NULL value conversion
Package		DBMS_OUTPUT	Message sending
		UTL_FILE	File operation
		DBMS_SQL	Dynamic SQL execution

Information

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The features compatible with Oracle databases are enabled by default. Note that because some features differ from the external specifications, however, the features must be selected using compatibility mode. Refer to section "**Notes on SUBSTR**" in the Application Development Guide for details.

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1.1.6 High Reliability by Using Failover

When a system is stopped, service is interrupted until recovery is complete. The larger the system, the longer the downtime, and the greater the problems caused to those trying to use the service.

When you use Symfoware Server for such jobs, you can achieve highly reliable systems by using failover.

For medical accounting systems

Some hospitals that take in many patients are managing and operating databases with the various types of data necessary for accounting. If an accounting system like this were to stop and take several minutes to recover, the effects would probably be considerable.

When failover is applied to such a system, it provides an uninterrupted service even if an abnormality occurs, by rapidly switching servers and transferring operations to a standby server whenever an abnormality occurs on the active server.

An example of a medical accounting system with failover is shown below.
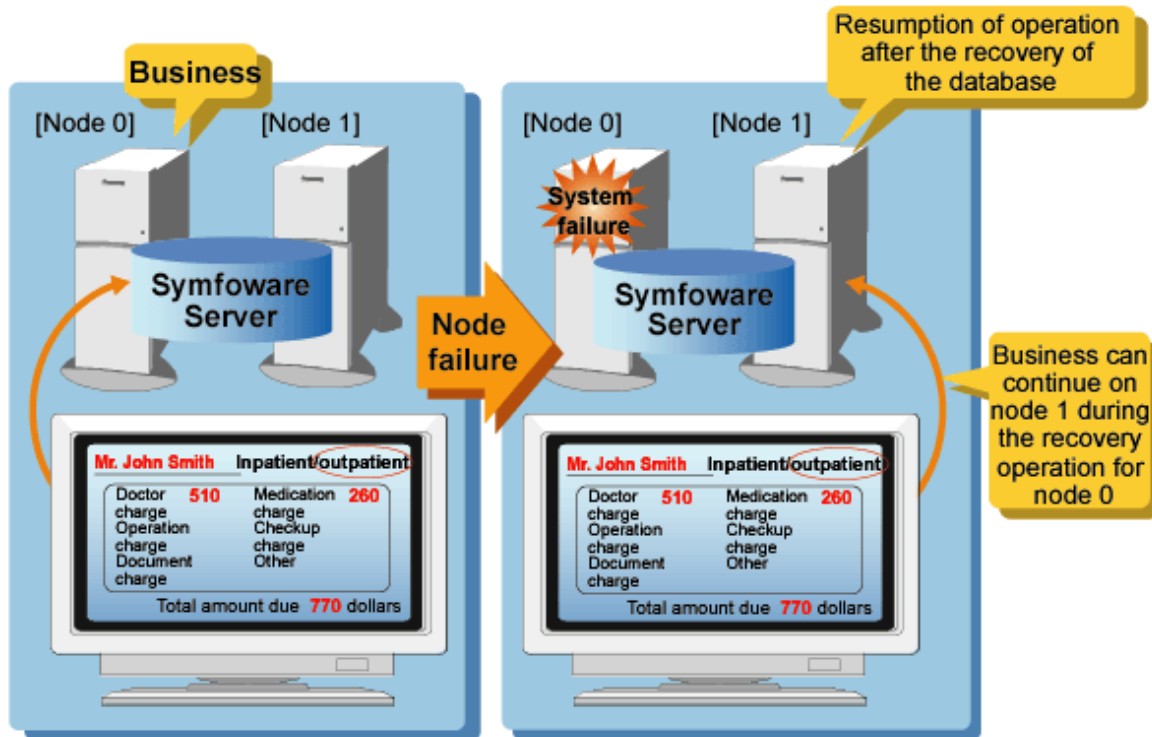
1.1.7 Linkage with Integrated Development Environment

You can link with Microsoft Visual Studio to create application. And, you can automatically generate applications to access database resources by linking to Visual Studio.
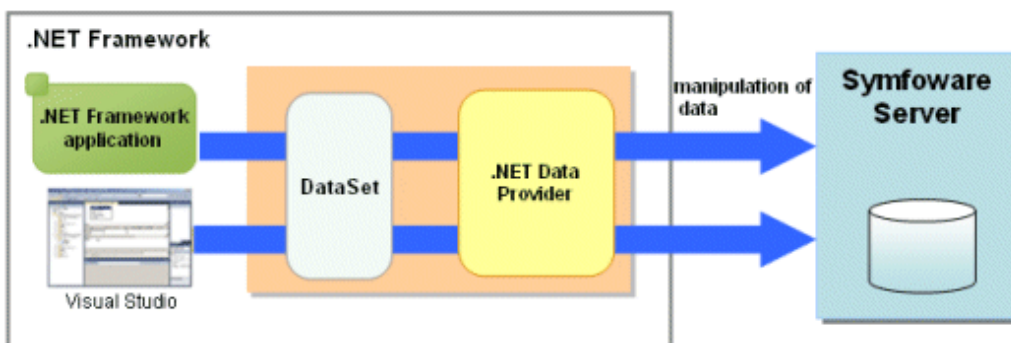
Relationship between .NET Framework and Symfoware Server

This feature allows data on the Symfoware Server database server to be manipulated by combining column data in tables stored in the ADO.NET DataSet Component with .NET Data Provider.

The following features can be used by linking with Visual Studio:

- Edit directly using the Visual Studio text editor

  By using a component specified in Visual Studio, applications to access database resources can be created manually. This improves the ability to migrate existing applications.

- Create applications using the Visual Studio tools

  By using basic drag-and-drop operations in the tools provided in Visual Studio, programs to access database resources can be generated automatically to increase application development efficiency.

The illustration below shows an overview of application development linked with Visual Studio:

Edit directly in Visual Studio's text editor

```
// 1. Generate NpgsqlConnection object
NpgsqlConnection con = new NpgsqlConnection
  ("Server=sv1; Port=26500; Database=mydb; "
" User Id=symfo; Password=secret");
// 2 Establish connections
con.Open();
        :
```

Create an application in Visual Studio

Data operations

Symfoware Server

Create an application with Visual Studio tools

TableAdapter Configuration Wizard

Create TableAdapter

Dataset Designer

Execute queries

Manipulate data directly from Visual Studio

Symfoware Server

Create an application in Visual Studio

Drag and drop

Generate source

Server explorer

Application is automatically created

```
// 1. Generate NpgsqlConnection object
NpgsqlConnection con = new NpgsqlConnection
  ("Server=sv1; Port=26500; Database=mydb; "
" User Id=symfo; Password=secret");
// 2 Establish connections
con.Open();
        :
```

# 1.1.8 Security

Security refers to the prevention of damage that results from security threats such as the leakage or data falsification , or to block wrongful interference with information services. In order for information systems to gain trust as a social infrastructure, security measures need to be in place to prevent this kind of issues.

An overview of Symfoware Server security is shown below:

Figure 1.1 Security
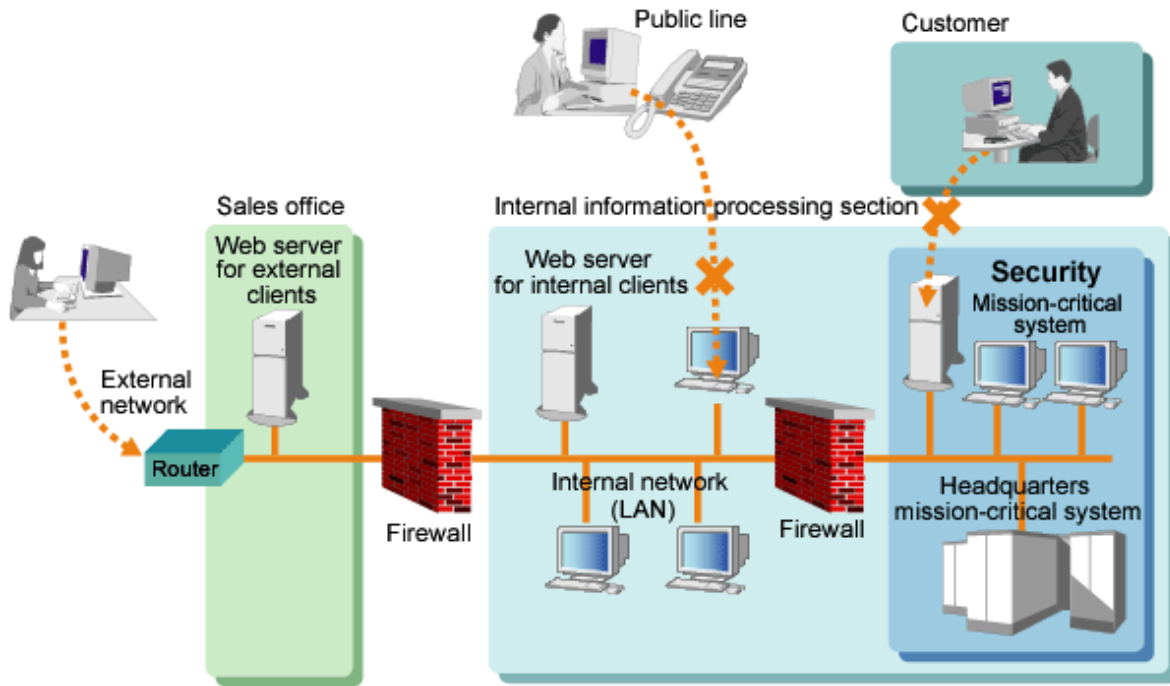
Resource management for the server on which Symfoware Server is constructed, operational monitoring that uses WebAdmin, and databases that use pgAdmin, are all constructed in a restricted network environment within the company's information processing division.

Note that it is essential that computer security is maintained for the server on which Symfoware Server is constructed, as well as computers that access Symfoware Server. This includes implementation of anti-virus measures and intensive computer management to prevent unauthorized access or manipulation by unrelated parties.

1.1.8.1 User control

In Symfoware Server, users have various roles, as shown below:

User	Role	Remarks
OS superuser	Creates and manages instance administrators for Symfoware Server.	Cannot create Symfoware Server instances.
Instance administrator user	OS general user. Has the following duties as a Symfoware Server instance administrator: - Creates and manages instances - Creates and manages objects within instances - Creates and manages database users within instances	Can be used as a database user.
Database user	User managed by Symfoware Server. Has the following duties as a Symfoware Server database user: - Connects to the database - Operates objects within the database	

Note

When using instances to independently manage messages output by Symfoware Server, ensure the instances are constructed so that the system log is not configured as the Symfoware Server message output destination.

See

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Refer to "Where To Log" under "Server Administration" in the PostgreSQL Documentation for information on Symfoware Server message output destinations.

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User access to the database can be controlled, to provide protection against unauthorized access, and to preserve the business confidentiality.

- Authentication and identification

  Access to databases can be restricted by authenticating and identifying the database users who access the Symfoware Server database. Server authentication can also prevent impersonation of database servers.

  See

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  Refer to "Client Authentication" under "Server Administration" in the PostgreSQL Documentation for information on authentication and identification.

  Refer to "Configuring Secure Communication Using Secure Sockets Layer" in the Operation Guide for information on communication data encryption.

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- Access control for database objects

  Database objects can only be used by the object creator when in their initial state, or by the database user specified as the owner when the object was created (hereafter, both will be referred to as 'owners'), or by the instance administrator. The object owner or instance administrator can control which tables can be accessed by database users who are connected to the database, and what kind of operations they can perform, by controlling the access privileges of the database user.

  See

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  Refer to "Privileges" under "The SQL Language" in the PostgreSQL Documentation for information on access control for objects.

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1.1.8.2 Encryption

Information can be protected from the threat of data theft by encrypting data to be stored in the database, or encrypting communication data on the client/server.

Symfoware Server also meets the following encryption requirements for PCI DSS (Payment Card Industry Data Security Standard), which is the data security standard of the credit industry.

- Confidential information (such as credit card numbers) can be made unrecognizable

- The encryption key and data can be managed separately

- The encryption key is replaced regularly
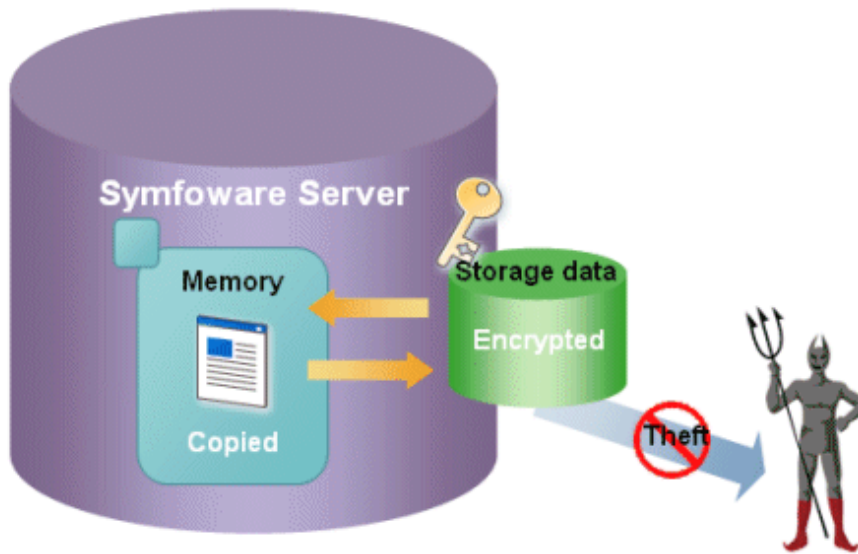
![See](See icon) **See**

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Refer to "Protecting Storage Data Using Transparent Data Encryption" in the Operation Guide for information on stored data encryption.

Refer to "Configuring Secure Communication Using Secure Sockets Layer" in the Operation Guide for information on communication data encryption.

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