

Server Sizing Tool Guide Prospect®



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1 About This Documentation

The *Server Sizing Tool Guide* contains instructions for using the Server Sizing tool for Prospect software.

Because this document includes instructions for sizing your Prospect system, read this guide before reading the *Installation Guide*.

This guide was last updated 07 July 2007.

Please see the current release notes on this product for a list of revision dates for all Prospect publications.

Audience

The Server Sizing tool is a roadmap for system administrators, database administrators, installers, switch engineers, or supervisors who are responsible for setting up and configuring the Prospect platform.

Required Skills and Knowledge

The *Server Sizing Tool Guide* requires that you have the following knowledge:

- Sun Microsystems hardware
- Local area network (LAN) and wide area network (WAN) connectivity
- Sun Microsystems Solaris operating system for UNIX
- Oracle database software
- 80x86 based computers
- Microsoft Windows operating systems
- Telecommunications equipment
- Your telecommunications network configuration

Document Conventions

This document uses the typographical conventions shown in the following table:

Table 1: General Document Conventions

Format	Examples	Description
ALL UPPERCASE	<ul style="list-style-type: none"> • GPS • NULL • MYWEBSERVER 	Acronyms, device names, logical operators, registry keys, and some data structures.
<u>Underscore</u>	See Document Conventions	For links within a document or to the Internet. Note that TOC and index links are not underscored. Color of text is determined by browser settings.
Bold	<ul style="list-style-type: none"> • Note: The busy hour determiner is... 	Heading text for Notes, Tips, and Warnings.
SMALL CAPS	<ul style="list-style-type: none"> • The STORED SQL dialog box... • ...click VIEW... • In the main GUI window, select the FILE menu, point to NEW, and then select TRAFFIC TEMPLATE. 	Any text that appears on the GUI.
<i>Italic</i>	<ul style="list-style-type: none"> • A <i>busy hour</i> is... • A web server <i>must</i> be installed... • See the <i>User Guide</i> 	New terms, emphasis, and book titles.
Monospace	<ul style="list-style-type: none"> • <code>./wminstall</code> • <code>\$ cd /cdrom/cdrom0</code> • <code>/xml/dict</code> • <code>http://java.sun.com/products/</code> • <code>addmsc.sh</code> • <code>core.spec</code> • Type OK to continue. 	Code text, command line text, paths, scripts, and file names. Text written in the body of a paragraph that the user is expected to enter.
Monospace Bold	<pre>[root] # pkginfo grep -i perl system Perl5 On-Line Manual Pages system Perl 5.6.1 (POD Documenta- tion) system Perl 5.6.1</pre>	For contrast in a code example to show lines the user is expected to enter.
<Mono- space italics>	<pre># cd <oracle_setup></pre>	Used in code examples: command-line variables that you replace with a real name or value. These are always marked with arrow brackets.
[square bracket]	<pre>log-archiver.sh [-i] [-w] [-t]</pre>	Used in code examples: indicates options.

User Publications

Prospect software provides the following user publications in HTML or Adobe Portable Document Format (PDF) formats.

Table 2: Prospect User Documentation

Document	Description
<i>Administration Guide</i>	Helps an administrator configure and support Prospect core server software to analyze network performance and perform other network or database management tasks.
<i>Administrator's Quick Reference Card</i>	Presents the principal tasks of a Prospect core server administrator in an easy-to-use format.
<i>Expressions Technical Reference</i>	Provides detailed information about expressions used in special calculations for reports.
<i>Installation Guide</i>	Instructions for installing and configuring the Prospect software.
<i>Open Interface API Guide</i>	Describes how the Open Interface tool enhances your access to information about database peg counts and scenarios.
<i>Performance Data Reference</i>	Provides detailed information including entity hierarchies, peg counts, primitive calculations, and forecast expressions specific to your organization.
<i>Release Notes</i>	Provides technology-specific and late-breaking information about a given Prospect release and important details about installation and operation.
<i>Server Preparation Guide</i>	Provides instructions for installing and setting up Solaris and Oracle software before you install Prospect software.
<i>Server Sizing Tool Guide</i>	Helps an administrator use the sizing tool to calculate the system space needed for the Prospect software and database.
<i>User Guide</i>	Provides conceptual information and procedures for using Prospect software for performance and trending analysis.

Viewing the Desktop Client Help Publications

To view the desktop client Help publications, select a guide from the HELP menu of the Prospect graphical user interface or press F1 for context-sensitive Help. To update the Help files, click the HELP menu on the Prospect Explorer, and select UPDATE ALL HELP FILES.

When Help files are updated, they are downloaded automatically from the Prospect server to the Prospect client. A message box notifies you when this download occurs.

Viewing the Publications in PDF

All of the user publications are available in Adobe Portable Document Format (PDF). To open a PDF, you need the Adobe Acrobat Reader. You can download Adobe Acrobat Reader free of charge from the Adobe Web site. For more details about the Acrobat Reader, see the Adobe Web site <http://www.adobe.com/>.

2 About the Server Sizing Tool

The server sizing tool is designed to streamline the task of determining the minimum resource requirements for the Prospect server.

Adequate hardware resources are critical to your system's performance. When planning your initial hardware configuration for the Prospect server you must first determine your current and future hardware needs by defining your system environment. Then you must identify, size, and purchase the hardware and software required to support it.

Note: If your server supports eight or more switches, contact your customer support representative for custom sizing information. Custom sizing may be required for optimal performance of the Prospect system.

Topics

[Defining Your System Environment](#)
[Related Topics](#)

Defining Your System Environment

Following is a list of variables to consider when defining your system environment.

- The maximum number of stored busy hours your organization wants to use for any one kind of network entity
- The length of time data of various kinds are stored
- The number of switches in the network
- The number of total sites in the network
- The number of concurrent and total Prospect users
- The complexity of the reports and queries
- The number of automated reports and triggers
- The level of redundancy designed in the system to prevent hardware failure on the server

The sizing tool calculates the minimum requirements for the data hard disk drives (HDDs), RAM, and CPU for the Prospect server. It also calculates the /u01 file system size on the system disk, file system sizes for the Oracle database directories—/u02 - /u06.

The sizing tool does not calculate disk sizing requirement for RAID technology (1, 0+1, 3, or 5). You need to adjust the minimum required disk space if you want the fault tolerance offered by RAID.

Related Topics

See Appendix A: [Redundant Array of Independent Disks \(RAID\) Overview](#) for a description of RAID technologies and sizing issues.

See Appendix B: [Prospect File System Sizing and Fault Tolerance](#) for a description of the Prospect files systems, including recommendations for fault tolerance.

The next section describes the sizing tool setup, the sizing tool requirements, and how to open the sizing tool.

3 Server Sizing Tool Setup

The sizing tool package consists of two files:

`SizingTool.xls`
`SizingTool.pdf`

This chapter tells you where to find the sizing tool for installation and how to install your sizing tool software.

Topics

[Location of the Sizing Tool](#)

[Installing the Sizing Tool](#)

Location of the Sizing Tool

The sizing tool and the documentation are in the following directory:

Prospect Server Preparation CD/Sizing Tool directory

Installing the Sizing Tool

Setting up the sizing tool involves copying your `.xls` file to a Windows-based computer with a Windows 98, Windows NT 4.0 (with Service Pack 6a), Windows 2000 (or later), or Windows XP operating system and with the following software installed:

- Microsoft Excel
- Adobe Acrobat Reader 3.0 or later.

To install the sizing tool software

1. Copy the sizing tool to your computer.

For the location of the server sizing tool, see [Location of the Sizing Tool](#) on page 13.

2. In Windows Explorer, double-click the sizing tool file (`SizingTool.xls`). This opens an Excel worksheet and the sizing tool.

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Important: Make sure that you enable macros when Excel opens the worksheet. You must enable macros for the sizing tool to operate properly.

3. Enter your specific data to generate the information required by Prospect software.

The following chapter describes how to enter data in the sizing tool.

4 Using the Server Sizing Tool

Use the server sizing tool to determine the hardware necessary to run Prospect software on your system. You can experiment with several possible scenarios, to see how each variable affects the recommended system size.

Topic

[Before You Begin](#)
[Entering and Saving Data](#)

Before You Begin

You *must* have information about your network and your site planning requirements to successfully complete the data entry portions of the server sizing tool.

Entering and Saving Data

This section of the guide introduces and provides instructions for the server sizing tool.

About the Serving Sizing Tool Form

The following figure shows the upper part of the server sizing tool form. You can iteratively enter site information and view the resulting hardware and Prospect parameter recommendations. In this manner, you can review different recommendations for different site configurations. Moreover, you can save the settings for different site configurations at any time by creating an audit file. Creating multiple audit files allows you to compare different site configurations.

Once you have determined which the site configuration you want, you can create the install file, which is used during the installation of the product.

Figure 1: Server Sizing Tool

The screenshot shows the 'Server Sizing Tool' window. On the left, under the 'Input' tab, there is a list of categories: 'Network Topology', 'Storage Requirements, General' (highlighted), 'Storage Requirements, PCMD', 'Storage Requirements, Soft Alarm', and 'Yearly Overhead'. Below this list are several data entry boxes: 'Hours/Day of Traffic Data' (24), 'Days of Traffic Data' (90), 'Hours/Day of CPFail Data' (24), 'Days of CPFail Data' (10), and 'Archive Logging On' (yes). In the center, there is a vertical stack of buttons: 'Clear', 'Calculate', 'Write Audit File', 'Write Install File', 'Restore Defaults', 'Set Defaults', and 'About'. On the right, under the 'Calculated' tab, there are two sections: 'Minimum Hardware Recommendations' and 'Maximum Parameter Recommendations'. The 'Minimum Hardware Recommendations' section shows: 'Disk - Does not include mirroring (in MB)' (4,957,271), 'RAM (total in MB)' (8,192), 'Swap (in MB)' (16,384), and 'CPUs (minimum)' (4). The 'Maximum Parameter Recommendations' section shows: 'Total (Disk + SWAP) (in GB)' (4,857.08). Numbered callouts are present: 1 points to the 'Input' tab, 2 points to the data entry boxes, 3 points to the 'Calculate' button, 4 points to the 'Minimum Hardware Recommendations' section, and 5 points to the 'Maximum Parameter Recommendations' section.

Legend:

No.	Description
1	Input categories — Under INPUT, click the option you want to enter information for. For each option you select, the server sizing tool interface displays the corresponding data entry boxes (see item 2 in this table).
2	Data entry boxes — Allows you to enter data about the system. If you place your cursor in a box, its description is displayed on the right-side of the form.

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No.	Description
3	Command buttons <ul style="list-style-type: none">• Clear — Click this button to clear all the fields in the tool.• Calculate — Click this button to update the calculated values in the left-side of the server sizing tool (see item 5 in this table). These values are based on the information you entered in the data entry boxes.• Write Audit File — Click this button to save all the entered site configuration information and recommendations.• Write Install File — Click this button to create the <code>results.txt</code> file, which is subsequently used during product installation.• Restore Defaults — Restores the current set of default values. See the SET DEFAULTS button (next bulleted item).• Set Defaults — After changing the values in some of the fields, click this button and the changed values become the default values for the session. If you make additional changes, clicking the RESTORE DEFAULTS button restores the session default values.• About — Click to display the version of this tool.
4	Calculated categories — Click the option for which you want to view calculated values (see item 5 in this table). Note: You cannot enter values in this portion of the server sizing tool.
5	Calculated values — Displays the calculated values for the selected option (see item 4).

Note: If you close the server sizing tool form, you can re-open it by clicking on any cell than the currently selected cell.

Entering Data into the Server Sizing Tool

Use the following instructions to enter data about your network into the server sizing tool.

Note: The following procedure assumes that you have installed the server sizing tool. If you have not, see [Installing the Sizing Tool](#) on page 13.

To enter data in the server sizing tool

1. Open the server sizing tool. An Excel spreadsheet opens and displays a form. In the form, you see the default values for the NETWORK TOPOLOGY input category.

Note: The server sizing tool comes with a set of base default values for all input categories. When you save the Excel workbook, the current set of values replace the original default values.

2. Under INPUT, select the part of the system you want to enter values for. The data entry boxes for that selection become available.

- **Network Topology** — Enter values that describes the size and configuration of your wireless system. You can enter a numeric value or a formula.
- **Storage Requirements, General** — Values entered for this option affects the amount of RAM and disk space required for your system.
- **Storage Requirements, Soft Alarm** — Enter the number of soft alarms per hour that you anticipate and the number of days you want to retain the data. If you want more accurate estimates for your system, contact technical support.
- **Yearly Overhead** — Enter values that estimates the growth of your system, which in turn affects the future resource requirements of the Prospect server.

Example:

Increase the value of the **Days of Traffic Data**, to see the effect this has on the **Total (Disk + SWAP)** = results.

3. Enter a value for each data entry box. For additional information about a data entry box, click inside the box. Information about the required input is displayed on the left-side of the pane.

After you enter a value, you can click the **CALCULATE** button to recalculate the recommended values on the left-side of the pane.

Note: If too many data fields are left empty, the sizing tool may not have enough data to complete the calculation, and the calculation will fail when you click the **CALCULATE** button. When this happens, all the buttons are disabled and the calculated values are cleared.

4. To create the install file, click the **WRITE INSTALL FILE** button and save the file to the location of your choice. The default file name is `results.txt` and the default location is the directory of the server sizing tool. After you finish saving the file, the Notepad application opens and displays the contents of the file.

The `results.txt` file contains detailed configuration data and is used during the installation process. For more information, see [Exporting the Server Sizing Tool Calculations](#).

5. To create an audit file, click the **WRITE AUDIT FILE** button and save the file to the location of your choice. The default file name is `audit.txt` and the default location is the directory of the server sizing tool. After you finish saving the file, the Notepad application opens and displays the contents of the file.

Note: This is an optional step.

6. To exit the form and workbook, click the “X” in the upper-right corner of the form, and then exit the Excel workbook.

If you have changed any of the values and want to save them, click the **SET DEFAULTS** button first, and then save the workbook.

Note: If the form is closed but the workbook is still open, you can re-display the form by clicking any of the cells in the spreadsheet.

5 Hardware and Software Requirements

This chapter describes the Prospect hardware and software requirements and sizing considerations to use after obtaining the results from the sizing tool.

Topics

[Hardware Requirements for the Prospect Server](#)
[Software Requirements](#)

Hardware Requirements for the Prospect Server

After you have saved the sizing tool worksheet, use it to configure your Prospect system. You must note the minimum sizing requirements specified for the Prospect server to properly size your hardware; however, you must also calculate any site-specific needs when you calculate the server size and resource requirements.

Minimum peripheral requirements are described in the *Server Preparation Guide*.

Minimum Hardware Requirements for the Prospect Server

The following table lists the minimum hardware required for the Prospect server.

Table 3: Minimum Hardware Requirements for the Prospect Server

<i>Minimum Hardware</i>
Sun Enterprise 2 workgroup server.
285,671 MB of disk space (does not include mirroring). Larger disks impact performance. The amount required is affected by the subscriber growth rate, peg count growth rate, years to look ahead, and all the tablespace.
2,048 MB of total RAM. Prospect runs in a minimal configuration with 512 MB of RAM.

Table 3: Minimum Hardware Requirements for the Prospect Server (Continued)

Minimum Hardware
4,096 MB swap size. For smaller configurations, 2 X RAM is the minimal amount needed. Vallent recommends 3 X RAM for larger configurations.
Six 300-megahertz (MHz) central processing units (CPUs). The number of CPUs is affected by the number of simultaneous users and MSCs.
One 9.2-GB Small Computer System Interface (SCSI) primary HDD.
Disk space (Disk + SWAP) = 282.98 GB (for Prospect database requirements only). This size is required after formatting disk.
Equivalent of five 9.2-GB SCSI data HDDs, or the amount calculated by the Prospect sizing tool.

Software Requirements

Refer to the *Server Preparation Guide* for software required by Prospect.

Prospect Server Configuration Examples

After you have saved the sizing tool worksheet, use it to configure your Prospect system. You must note the minimum sizing requirements specified for the Prospect server to properly size your hardware; however, you must also calculate any site-specific needs when you calculate the server size and resource requirements.

This section covers the following topics:

The sizing tool was used to create the three hardware configuration examples described in the table below. Use the sizing tool to perform your own configuration calculations.

This section covers the following topics:

- [Using Spindles](#)
- [Using Striping](#)
- [Logical Units and Logical Unit Numbers](#)
- [Network Sizing Examples](#)
- [Network Requirements](#)
- [Testing your Network](#)

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Table 4: Prospect Server Platform Examples

Database Size	Recommended Server	CPUs	RAM	Internal System HDD	Number of 9.2GB Data Spindles	RAID Level
Small	Sun Enterprise 420	2 - 300 MHz	1792 MB	1-9.2 GB	19	0 +1
Medium	Sun Enterprise 450	2 - 300 MHz	5376 MB	1-9.2 GB	2	0 +1 and/or 5
Large	Sun Enterprise 4500	4 - 400 MHz	11264 MB	1-9.2 GB	58	0 +1, and/or 5

Note: It is recommended that you use a RAID 1 (mirroring) configuration for the system disk. This requires two 9.2-GB drives.

- For small and medium configurations, the number of 9.2-GB data spindles as shown in Table 13 are the amount required if you use RAID level 0 +1, which is double the number needed if you do *not* use RAID 0 +1.
- The number of spindles shown for a large configuration is the amount required if you use RAID 5. This number represents 25 percent more spindles than you would need without RAID.
- RAID levels 0, 1, 0 +1, 3 and 5 are compatible with Prospect databases.

Using Spindles

The following table uses 9.2-GB spindles as an example. However, unless you process large amounts of data and need to use spindles that are 9.2 GB or larger, it is advisable to use several smaller (4.5-GB) spindles rather than a few large ones.

Table 5: Network Sizing Examples

Size	Total MSCs	Total BSCs	Total Cells
Small	1	2	290
Medium	4	10	1300
Large	10	23	3110

Using Striping

If you use RAID 0, 0 + 1, 3, or 5, you use striping, which allows data to write across all the spindles in a LUN at the same time. Striping overcomes the 12.5 MB/sec read/write rates inherent in each spindle. By having several smaller spindles rather than a few large spindles you

can enhance your input and output. Also, in the event of disk failure, the restoration process of smaller disks is much quicker because there is less data to restore.

The example shown in the section [Network Sizing Examples](#) is based on the use of three RAID controllers (software or hardware). If you are using Fast/Wide SCSI-2, the maximum throughput for each controller is 40 MB/sec. Without additional controllers, your maximum throughput would still be 40 MB/sec, regardless of the number of spindles.

Logical Units and Logical Unit Numbers

There are two types of logical units (LUs), and logical unit numbers (LUNs):

1. LUs for RAID use disk-array configurations. These logical units are virtual disks that comprise many individual physical disks.
2. LUNs refer to SCSI addresses used to configure devices. This document discusses logical units as they pertain to RAID *only*, not logical unit numbers that pertain to SCSI addresses.

Network Sizing Examples

The table below compares the data transfer rates for 36 GB of storage using spindles of different sizes, and striping (RAID 0) where there are at least two spindles.

The examples in the table below are based on the parameters listed in the section [Prospect Server Configuration Examples](#) on page 20.

To calculate your minimum Prospect server resource needs, enter your data in the sizing tool to obtain your site-specific sizing data.

Table 6: Comparison of Disk Requirements for 36 GB Storage

Formatted Spindle Size (GB)	Number of Spindles	Approx. Storage Space (GB)	Read/Write Rate in MB/s, (I/O)
4.5	8	36	100
9.1	4	36	50
18.2	2	36	25
36.4	1	36	12.5

Network Requirements

The Prospect network typically consists of a high-speed wide area network (WAN), and local area network (LAN) connection between the Prospect server and the Prospect clients.

- A 10 Base-T network interface card is adequate for smaller configurations.
- Use (at a minimum) a high speed 100 Base-T network interface card connected to a high-speed network for larger configurations.

Testing your Network

You should test your network connection each time you configure a network interface card (on the Prospect server and client). To test the network connection to your LAN, send a **ping** command to another node on the LAN by using a known IP address or, if enabled, a Domain Name System (DNS) address. For example,

```
$ ping 255.255.254.17  
$ ping device_name
```

If you do not get a response that indicates a connection was made, check your network connection, network settings, and hardware.

6 Exporting the Server Sizing Tool Calculations

This chapter provides the following:

- Description of the `results.txt` file
- Location of the instructions for copying and loading the `results.txt` file
- Reviewing the *Prospect Installation Guide*

The sizing tool generates a file called `results.txt` that includes parameters which determine the sizing and structure of the database instance.

After you have installed the Solaris operating system, you must copy the `results.txt` file to the `/tmp` directory on the Prospect server before the program can configure your database sizing results.

The instructions for copying and loading the `results.txt` file are in the *Server Preparation Guide*, which is located on the Prospect Server Preparation CD-ROM. The file name is `ServerPrep.pdf`. Follow the instructions in the *Server Preparation Guide* to set up the third-party software required by Prospect software.

After setting up the hardware according to the instructions in the *Server Preparation Guide*, you can begin the Prospect installation procedures. Open the `InstallGuide.pdf` file, and review the *Installation Guide* before you begin the Prospect installation procedures.

Appendix A: Redundant Array of Independent Disks (RAID) Overview

Prospect is compatible with all RAID technologies. Your choice of RAID technology (if any) depends on your particular needs and the balance among performance, cost and fault tolerance. The types of RAID that are included with Sun StorEdge RAID Manager, are RAID 0, 1, 0 +1, 3, and 5. The characteristics of each of these technologies are described below.

Raid 0

RAID 0 is not a true RAID technology, since it does not provide fault tolerance. RAID 0 simply combines drives to create a larger virtual drive or logical unit (LUN). However, RAID 0 uses a technology called striping which allows data to be written to several spindles concurrently, dramatically enhancing input/output (I/O) when there are several disks in a LUN. However since RAID 0 does not have redundancy, if any drive in the LUN fails, the data stored on the LUN becomes lost.

Raid 1

RAID 1 uses pairs of drives to create a copy, or mirror, of every bit written to the pair. If a drive should fail, the system automatically uses the remaining member of the pair to recover the lost data. Although RAID 1 halves the amount of usable space available within a RAID set, it provides the highest performance for both reads and writes.

Raid 0 +1

RAID 0+1 combines RAID 0 and RAID 1 technologies. Unlike RAID 1 where drives are paired, RAID 0 +1 mirrors sets of drives in a LUN. This allows the I/O to be enhanced and provides the greatest level of protection. RAID 0 +1 offers the best features of RAID 0 and RAID 1, providing speed, virtual drive management, and complete protection from drive failure.

RAID 0 is fast and inexpensive, but it lacks redundancy, so it is not fault tolerant. RAID 1 is fast and highly reliable, but that comes at a cost, you must use twice as many disk drives than would

be needed if RAID 1 were not used. However there are other RAID configurations that are less expensive and are highly reliable, although the performance is not as good as RAID 0 +1. These configurations are RAID 3 and RAID 5.

RAID 3 and RAID 5 use the concept of parity to provide redundancy in the RAID volume. In simplest terms, parity can be thought of as a binary checksum, a single bit of information that tells you if all the other bits are correct.

Raid 3

RAID 3, like RAID 0, uses striping, however, RAID 3 incorporates fault tolerance by adding parity, which is written to a single parity disk. This is the primary problem with RAID 3 is that the parity drive becomes the bottleneck in the system during write activity.

If you use a RAID 3 volume for general random read activity, your write operations for the data are spread over a number of physical drives. However, any write to any data drive requires a write to the parity drive. For write-intensive applications, the parity drive cannot keep up, and the whole RAID set slows down as requests to write to the parity drive back up.

For this reason, RAID 3 is a good storage choice for low-write, high-read applications like data warehouses and archived static data. It may take longer than usual to write the data to the RAID 3 set, but once written, reads are quick. Because such archives tend to be large, the cost savings between RAID 3 and RAID 1 for similar storage can be significant.

Never use RAID 3 for general-purpose storage unless you have large amounts of cache in the disk controller. In these controllers, all writes are staged to cache and the I/O is acknowledged as complete to the host system. The controller then writes the data to the drives while the system proceeds to the next operation. Even with these controllers, RAID 3 may not be your best choice. The parity drive can fail faster than the others, due to its increased level of activity compared to the data drives.

Raid 5

RAID 5 is operationally identical to RAID 3: several blocks in a stripe share a common parity block. The parity block is written whenever any block in the stripe is written, and the parity data is used to reconstruct blocks read from a failed drive.

The big difference between RAID 3 and RAID 5 is that RAID 5 distributes the parity blocks throughout all the drives, using an algorithm to decide where a particular stripe's parity block resides within the drive array.

Except for eliminating the parity drive problem, RAID 5 has some of the same problems as RAID 3; slow writes, sensitivity to I/O block sizes, and potentially lengthy rebuilds of degraded RAID sets. In spite of this, RAID 5 is a viable, economical redundant storage solution, especially when the individual drives are coupled by a caching controller that can mitigate some of the write latency inherent with RAID 5.

Considerations When Using RAID 3 or RAID 5

RAID 3 and RAID 5 configurations are particularly sensitive to disk controller loading. RAID 3 and RAID 5 can suffer significant performance problems, since all the drives in the set are driven by a single disk controller. Although the number of I/Os initiated to the RAID set would not be enough to exceed the I/O of a single drive, they can often overwhelm the controller, which must manage all the I/O requests to all of the drives.

For this reason, drives combined to form a RAID set should be managed by separate controllers. When you use multiple controllers, the system initiates multiple I/Os and then distributes the I/Os to individual drives, thus preventing any one controller from becoming saturated. When you are deciding which RAID 5 system to buy, give very close attention to the internal controller architecture behind the RAID controller. If all the drives in a single RAID set are on the same device chain on a single controller, you will have performance problems with larger databases.

Appendix B: Prospect File System Sizing and Fault Tolerance

The Prospect Server Sizing tool provides you with the minimum file system sizing, based on your network's configuration and size. However, it is important to understand what each file system is used for in order to customize the configuration to match your system specifications.

/u01

The `/u01` file system is on the server system disk. Oracle and Prospect software are installed in `/u01/apps/oracle` and `/u01/apps/WatchMark`, respectively. The input/output (I/O) throughput for this file system is not a critical factor, and the file space required is relatively small compared to the Prospect data files. A single 9.2-GB spindle should be adequate for the system disk unless you plan to accumulate large log files on this disk.

Although not required, it is advisable to have two system disks of the same size so that they can be configured using RAID 1, or 0 +1.

/u02

The Prospect redo logs are stored on the `/u02` file system. Prospect uses these logs to perform instance recoveries if data is lost or corrupted. Prospect uses three logs, each approximately 30 - 40 MB in size. Normally, this file system has short sequential writes and periodic long sequential reads. Because the redo logs are written for each committed change to the database, they can become bottlenecks. To minimize potential I/O problems, `/u02` can be assigned to its own spindle, or in larger databases, its own LUN.

The type of RAID to choose for this file system depends on the size of your database. If the Prospect Server Sizing tool indicates that this file size does not require more than one spindle, you can choose to have a fault-tolerant configuration that uses RAID 1. This requires an additional spindle of the same size. Alternatively, you can choose not to use RAID if fault tolerance is not an issue. RAID 5 is not recommended for `/u02` as RAID 5 does not provide sufficient write bandwidth for Oracle redo logs.

/u03

Oracle's rollback table space segments are stored in the /u03 file system. Oracle uses rollback segments to maintain read consistency between concurrent sessions. As data is changed by a session, the old values are stored in this table space so that other sessions can see the old values before the new values are committed. Because this table space is often accessed simultaneously with the data table space, it is kept on a separate spindle or LUN to reduce contention among I/O resources.

In smaller configurations, it is possible for /u03 to share spindles or LUNs with /u05 (temporary table space).

The type of RAID you choose for this file system depends on the size of your database and your need for fault tolerance. If you want fault tolerance for smaller databases, you should consider using RAID 0 +1. If fault tolerance is not an issue, you should use RAID 0 to improve your I/O. If you have a large database, want fault tolerance, and do not want to use twice as many spindles than you would need without RAID mirroring, you might consider using RAID 5. RAID 5 uses parity (rather than mirroring) for redundancy and requires one extra drive to store this parity information.

/u04

The Prospect database is stored in the /u04 file system. It contains all the traffic cpfail user document data. It is the largest file system and has the highest I/O throughput requirements. If your database is large, the /u04 file system should be assigned to its own LUN or spindles. It is highly advisable that you include fault tolerance with this file system, using RAID 0 +1 for high performance or RAID 5 for lower costs.

/u05

The temporary table space is stored in the /u05 file system. These table spaces are used for storage of temporary results that are too large to be held in memory. This file system has I/O characteristics that are similar to the /u03 file system. For this reason, you could share spindles or LUNs with these two file systems. To ensure adequate I/O, the file systems should, at a minimum, be striped. However, unless fault tolerance is not an issue, you should use RAID 0 +1 for high performance or RAID 5 for lower costs. Additionally, if this file system becomes larger than four spindles, you should assign another LUN with another controller for each set of four spindles used for this file system. (Ultra Wide SCSI has a throughput of 40 MB per second, the spindles have a throughput of 12.5 MB/sec, striping more than four spindles on a single SCSI controller connection does not enhance I/O.)

/u06

The archived redo files are stored on the /u06 file system. These are copies of the redo logs from the /u02 file system, allowing Prospect to perform point-in-time recoveries from some types of back ups.

Important: If fault tolerance is an issue, you should choose RAID 0 + 1 for smaller databases and if the total number of spindles is an issue, choose RAID 5 for larger databases. Even if fault tolerance is not an issue, you should use RAID 0 to enhance your I/O.

For further details and considerations using the various RAID technologies with the /u06 file system, see Appendix A: [Redundant Array of Independent Disks \(RAID\) Overview](#).

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