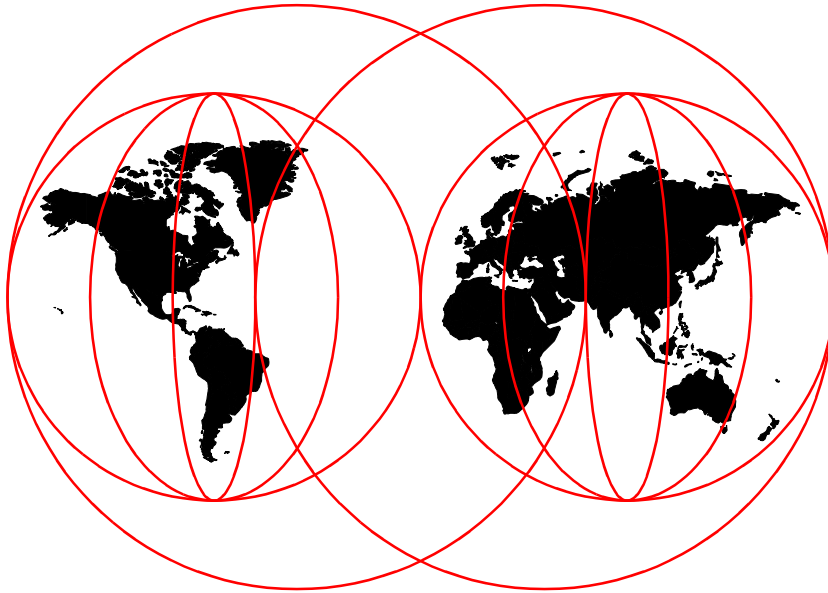


Tivoli Storage Manager Reporting

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International Technical Support Organization

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International Technical Support Organization

Tivoli Storage Manager Reporting

March 2000

Take Note!

Before using this information and the product it supports, be sure to read the general information in Appendix C, "Special notices" on page 177.

First Edition (March 2000)

This edition applies to Version 1, Release Number 1.1 of Tivoli Decision Support for Storage Management Analysis, Version 3 Release 7 of the Tivoli Storage Manager for AIX, Program Number 5697-TSM; Version 3 Release 7 of the Tivoli Storage Manager for HP-UX, Program Number 5697-TSM; Version 3 Release 7 of the Tivoli Storage Manager for Sun Solaris, Program Number 5697-TSM; Version 3 Release 7 of the Tivoli Storage Manager for Windows NT, Program Number 5697-TSM; Version 3 Release 7 of the Tivoli Storage Manager, S/390 Edition, Program Number 5697-TSO.

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Contents

Figures	ix
Tables	xi
Preface	xiii
The team that wrote this redbook	xiii
Comments welcome	xiv
 Chapter 1. Real world TSM event, business, and performance problems	
15	
1.1 Defining function within the IS infrastructure	15
1.2 Reporting on system health and justifying requirements	16
1.3 Dynamic business requirements	17
1.3.1 What is OLAP?	17
1.3.2 OLAP implementation	18
1.4 An “out-of-box” reporting solution	18
1.5 What kinds of problems can be solved using Storage Management Analysis?	19
1.5.1 Typical question sampling	19
 Chapter 2. Tivoli Decision Support for Storage Management Analysis	
Component Overview	25
2.1 Tivoli Storage Manager servers	27
2.2 Tivoli Storage Manager / RDBMS interface	27
2.2.1 TSM Decision Support Loader	27
2.2.2 Tivoli Storage Manager ODBC driver	28
2.2.3 RDBMS ODBC interface	28
2.3 RDBMS	29
2.3.1 Tivoli Storage Manager reporting database	29
2.3.2 RDBMS schemas	29
2.4 Tivoli Decision Support	29
2.4.1 Tivoli Decision Support	30
2.4.2 Storage Management Analysis Guide	31
2.4.3 Using fm20.dll	31
2.5 Scheduler	31
 Chapter 3. Tivoli Decision Support for Storage Management Analysis Architectural Issues	
33	
3.1 How many machines - why is this important?	33
3.1.1 Access frequency and the network	36
3.1.2 Network Configuration	36

3.2	What size machines and why is this important?	37
3.3	Choosing a relational database for SMA.	37
3.4	Considerations for merging companies, departments, and IIS groups	37
Chapter 4. Configuration and Implementation		39
4.1	Configuration and installation alternatives	39
4.1.1	What scheduler to use	39
4.1.2	Choosing a database technology	41
4.1.3	Multiple Tivoli Storage Management servers	42
4.1.4	Multiple data source configurations	45
4.2	Installation “gotchas”	50
4.2.1	Tivoli Decision Support 2.1 patch	50
4.2.2	Tivoli Storage Management client as an ODBC data source.	52
4.2.3	Error 339, fm20.dll (MS module access)	54
4.2.4	Running out of hard drive space during install	55
4.2.5	Security Rights	55
4.2.6	Connection to DB failures	55
4.2.7	MDAC levels.	57
4.2.8	“No Data” problems	58
4.3	Crystal and Cognos participation	63
4.4	Relational Database considerations	67
4.4.1	What size DB to start? DB Growth?	68
4.4.2	SQL example	68
4.4.3	DB2 example	69
4.4.4	Setup guide for ODBC communications to the RDBMS.	73
Chapter 5. Operational Procedures for Storage Management Analysis		91
5.1	Scheduling	91
5.1.1	Daily reporting	91
5.1.2	Weekly reporting	93
5.1.3	Weekend reporting	94
5.1.4	Monthly reporting	94
5.1.5	The “window of opportunity”	95
5.2	Care and feeding	96
5.2.1	Loader issues and ODBC loss of connection	96
5.2.2	Cleanup of RDBMS records	97
5.2.3	Near real-time reporting	98
5.2.4	Duplicating to other file-servers	98
5.2.5	Exercising relationships within reports	100
Chapter 6. Tivoli Decision Support for Storage Management Analysis Reporting		107
6.1	Scheduling for efficiency	107

6.2 Looking at Tivoli Storage Management network traffic	111
6.3 Correcting errors	113
6.4 Reporting on Client Activity	116
6.5 Reporting on Server operations	121
6.5.1 TSM server performance	122
6.5.2 Storage health	125
6.6 System visibility	127
6.7 Comprehensive Tivoli Storage Management reporting	129
Appendix A. Relate views for the table analysis.	131
Appendix B. Using the additional material	175
B.1 Using the CD-ROM or diskette	175
B.1.1 System requirements for using the CD-ROM or diskette	175
B.1.2 How to use the CD-ROM or diskette	175
B.2 Locating the additional material on the Internet	175
B.3 Using the Web material.	176
B.3.1 System requirements for downloading the Web material	176
B.3.2 How to use the Web material	176
Appendix C. Special notices	177
Appendix D. Related publications.	181
D.1 IBM Redbooks publications	181
D.2 IBM Redbooks collections	182
D.3 Tivoli Storage Management publications	182
How to get IBM Redbooks	185
IBM Redbooks fax order form	186
Glossary	187
Index	189
IBM Redbooks review	191

Figures

1. Summarizing client error messages.	22
2. Data processed by server operations by day of the week.	23
3. Minimum Tivoli Decision Support and Storage Management Analysis reporting system34	
4. Storage Management Analysis reporting system with file server and multiple SMA clients35	
5. TSMDSL scheduled and running the desktop interface.	40
6. TSMDSL processing multiple TSM servers.	42
7. TSMDSL log extract showing multiple ODBC's and TSM servers.	44
8. TSM ODBC driver communications setup.	45
9. Tivoli Decision Support Loader.	46
10. DSL server list setup.	47
11. Tables to be loaded in the DSL.	48
12. Data source setup in the DSL.	49
13. Saving the TSMDSL.INI.	50
14. Setting up of a new TSM Data Source.	53
15. The FM20.DLL error which will appear if you do not have the required *.DLL files54	
16. No Microsoft SQL database connection.	56
17. Example of another database failure.	57
18. Correct version of MDAC,with all items being at the same level.	58
19. Applications can be removed via Control Panel.	60
20. Applications can be removed here.	61
21. Example of wanting to remove Tivoli Decision Support 2.1.	63
22. Example of a Seagate Crystal Report.	65
23. Example of a Generated Cognos Report from the Tivoli Discovery Interface 66	
24. Cube view from the Tivoli Discovery Administrator.	67
25. Microsoft SQL server query.	69
26. Logon connection to database.	70
27. Connection succesful.	71
28. Simple command for DB2 query.	72
29. Results of the command issued.	73
30. Creating a new data source.	74
31. symbolic name and a specified IPP addressr.	75
32. SQL login and password authentication.	76
33. Library configuration for protocol to be used.	77
34. Specify the database for storage management.	78
35. Process options to be applied.	79
36. Test data source for connection.	80

37. Data source test complete	81
38. Creating a DB2 data source using the ODBC driver	82
39. ODBC IBM DB2 driver	83
40. Manual configuration for DB2	83
41. Protocol for system configuration.	84
42. Server host name or IP address	85
43. Target database name.	86
44. Alias database name	87
45. Microsoft Visual Basic application	88
46. User id and password for Database connection	89
47. Test connection to database	89
48. Db2 message confirmation	90
49. CPU utilization 100% while TSMDSL is running	97
50. Related views in the lower box windows from the Tivoli Discover Interface	102
51. Related views shown from Tivoli Discovery Interface	103
52. Reports from the Storage Management Analysis Guide	104
53. More reports from the Storage Management Analysis guide continued	105
54. What is the status of scheduled client sessions.	108
55. Client media waits	109
56. How much time is spent daily waiting for media access	110
57. Reports that are helpful in identifying network problems	111
58. TCP/IP address and throughput	112
59. Examining filesize as related to performance	113
60. Some Storage Management Analysis reports on errors	114
61. Top 10 server messages	115
62. How current are client backups	116
63. Identifying when clients last contacted the TSM server.	117
64. Client results of operations	118
65. Data movement by filesize and total throughput	119
66. Client data throughput by platform.	120
67. Total objects restored for clients	121
68. Non-scheduled server operations	123
69. How much data is processed by daily server operations.	124
70. What is the average hourly throughput rate for server operations.	125
71. Reports available on storage health	126
72. How does platform affect client throughput rates.	128
73. Summary of client messages by TSM software level	129
74. Show how to read the related views and the file names for location in the tables below	132

Tables

1. 133

Preface

This redbook addresses the problem of generating meaningful presentation style reports from Tivoli Storage Management data sources. We concentrate on the use of Tivoli Decision Support and the Storage Management Analysis Guide as part of an integrated Tivoli Storage Management reporting solution. The book builds the underlying purpose of the Storage Management Analysis product, outlines the components comprising a Storage Management Analysis reporting environment, and explains how to cope with some common problems which may be encountered in implementing that environment. We conclude by presenting examples of how you may want to integrate Storage Management Analysis reporting into day-to-day operations and how to use it to answer some typical adhoc questions asked in a Tivoli Storage Management environment. The book is intended for Tivoli Storage Management Administrators and information systems executives who have an interest in the performance and reliability of Tivoli Storage Management.

The team that wrote this redbook

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Chapter 1. Real world TSM event, business, and performance problems

In this chapter we will highlight a few of the problem areas Tivoli Storage Management Administrators may face, the types of questions that can be answered, and the different kinds of reports that are available through the use of Tivoli Decision Support and Storage Management Analysis.

Storage Management Analysis provides a mechanism to make Tivoli Storage Management's events, performance, and the fulfilment of business requirements readily visible by employing a variety of formats and reporting levels. You will find these reports to be appropriate and informative to the Information Systems technician, Tivoli Storage Management Administrator, or the company executive.

Other reporting tools used for Tivoli Storage Manager:

- Results from 'query' command issued via Tivoli Storage Manager
- SQL queries via Tivoli Storage Management macros or scripts
- Extractions of the Tivoli Storage Management server activity log
- Extractions from Client logs
- Extractions from Tivoli Storage Manager accounting file
- Platform specific operating system commands and monitors
- Spreadsheets
- E-mail

These tools can be applied in a variety of ways and combinations to achieve the desired result.

1.1 Defining function within the IS infrastructure

Business data is commonly recognized as a valuable internal asset. The protection of this data is the job of Tivoli Storage Management. In addition, there are massive amounts of data being generated in support of the Information Systems environment, as is the case of Tivoli Storage Management. To put this data into a usable format and relate it to actual business needs of the company, involves programmers, analysts and other IS agents in the typical organization. Further, this is usually done on a group or department level to report specific interests to specific parties. Seldom is it a continuing requirement so it becomes a throw-away solution for an immediate

need. If the need comes up again, it must be re-invented again. Many different people can be involved, on many different levels of functionality.

This situation, in turn, ultimately drives up the cost of Information Systems and has a negative impact on company profit margin and overhead costs.

Tivoli Decision Support and Storage Management Analysis allows the TSM Administrator to perform more efficiently and effectively by limiting the number of personnel needed to report on Tivoli Storage Management storage resources, network traffic for Tivoli Storage Management data, and Tivoli Storage Management events.

By utilizing Storage Management Analysis, the functional responsibility of transforming raw data into reports can be limited to the Tivoli Storage Management administrator. The Tivoli Storage Management administrator is able to do more than Tivoli Storage Management query commands and SQL query reporting, immediately. Accountability and reporting are highly visible, understandable, and accessible to all those granted security rights to display Storage Management Analysis reports.

1.2 Reporting on system health and justifying requirements

The need to report on Tivoli Storage Manager processing and resource usage is never more apparent than when identifying and justifying a 'need'. A data collection, programming, and report presentation scramble usually ensues. The degree of complexity and responsiveness depends on how prepared the Tivoli Storage Management Administrator is to answer that facet of 'need'.

The Tivoli Storage Management Administrator, when provided with Tivoli Decision Support for Storage Management Analysis, has a means to monitor the health of the Tivoli Storage Management system including storage pool usage, event scheduling in terms of resource availability, and error reporting. They have a means to report on developing trends, as well as single occurring anomalies, and allows report users to make decisions based on historical data.

Through trending we can predict when and if resources will be adversely impacted and when new equipment or resources are warranted. The supporting documentation will be predisposed for such usage. The format and reports will be available in meaningful format to those who approve company expenditures and to the Tivoli Storage Management Administrator, to assure they are using Tivoli Storage Management resources efficiently.

1.3 Dynamic business requirements

The business environment has been subject to change and will continue to be as long as markets and economy are the drivers. As organizations downsize, buy-out, reorganize, dissolve, and go through the changes that enables business to progress, information systems must remain flexible and responsive to these changes.

This Tivoli Decision Support and Storage Management Analysis is intended to conform to a dynamic business environment. It is adaptable to changing computing responsibilities. As additional processors and servers, some of them possibly with identical names, are added to the IS department they are easily integrated into currently reported processors. This situation is common as companies are merged, bought, or reorganized. The technology utilized to obtain its flexibility can be described as "On-Line Analytical Processing" or OLAP.

1.3.1 What is OLAP?

(Definition for OLAP is from web site
<http://www.moulton.com/olap/olap.glossary.html>)

'On-Line Analytical Processing' (OLAP) is a category of software technology that enables analysts, managers and executives to gain insight into data through fast, consistent, interactive access to a wide variety of possible views of information that has been transformed from raw data to reflect the real dimensionality of the enterprise as understood by the user.

OLAP functionality is characterized by dynamic multi-dimensional analysis of consolidated enterprise data supporting end user analytical and navigational activities including:

- Calculations and modeling applied across dimensions, through hierarchies and/or across members
- Trend analysis over sequential time periods
- Slicing subsets for on-screen viewing
- Drill-down to deeper levels of consolidation
- Reach-through to underlying detail data
- Rotation to new dimensional comparisons in the viewing area

OLAP is implemented in a multi-user client/server mode and offers consistently rapid response to queries, regardless of database size and complexity. OLAP helps the user synthesize enterprise information through comparative, personalized viewing, as well as through analysis of historical and projected data in various 'what-if' data model scenarios. This is achieved through use of an OLAP Server.

1.3.2 OLAP implementation

An OLAP server is a high-capacity, multi-user data manipulation engine specifically designed to support and operate on multi-dimensional data structures. A multi-dimensional structure is arranged so that every data item is located and accessed based on the intersection of the dimension members which define that item. The design of the server and the structure of the data are optimized for rapid ad-hoc information retrieval in any orientation, as well as for fast, flexible calculation and transformation of raw data based on formulaic relationships.

The OLAP Server may either physically stage the processed multi-dimensional information to deliver consistent and rapid response times to end users, or it may populate its data structures in real-time from relational or other databases, or offer a choice of both. Given the current state of technology and the end user requirement for consistent and rapid response times, staging the multi-dimensional data in the OLAP Server is often the preferred method.

Thus, the technology utilized by Tivoli Storage Manager and Storage Management Analysis, and its associated components is OLAP, and the OLAP Server, to meet the requirement of a dynamic environment. In the next chapter we will discuss all of the components necessary to create this reporting power.

1.4 An "out-of-box" reporting solution

Information needs to be gathered and put to work quickly and effectively. Tivoli Decision Support and Storage Management Analysis does this by supplying comprehensive pre-coded reports available upon install. There is no need for program or report development.

In fact, Storage Management Analysis, as a Tivoli Decision Support Guide, is designed to 'not' be a custom solution. The complexity of a six product solution (Tivoli Storage Management, Tivoli Decision Support, Storage Management Analysis, Cognos PowerPlay, and Seagate Crystal Reporting)

allows little room for custom reporting and introduces a great deal of risk if attempted.

The product will continue to be attuned to the needs of Tivoli Storage Management reporting and will be modified as new versions of TSM are available.

1.5 What kinds of problems can be solved using Storage Management Analysis?

A wide variety of reporting elements are included in the current release. The current release has concentration in the Tivoli Storage Management event analysis and Tivoli Storage Management performance analysis.

The goal of the Tivoli Storage Manager Event and performance Category is to gain insight into the health of a Tivoli Storage Manager environment. This includes information related to how well a Tivoli Storage Manager environment is operating and highlight areas needing improvement. Reporting is performed for both Tivoli Storage Manager server and Tivoli Storage Manager client processing. For Tivoli Storage Manager client processing, the Tivoli Storage Manager client event logging function is required to forward messages to the Tivoli Storage Manager server.

Reporting is performed for both Tivoli Storage Manager server and Tivoli Storage Manager client processing.

In this section, we will look at some typical instances of problem reporting. These are intended to serve as examples of product and report usage. A more in depth look at these questions are discussed in (reference) chapter 6 of this redbook.

1.5.1 Typical question sampling

This list is representative of the kinds of questions that are likely to be asked in a Tivoli Storage Management environment:

- What is the resource impact on my server when I run my client schedules?
- What is the best way to change my backups and archive schedules to allow efficient scheduling?
- What are my problem clients and which clients are not getting backed up regularly?
- What errors am I getting most and which ones should I work on correcting first?

- What impact does TSM data movement have on the network?
- How many restores have been done in the past week?
- How much storage was reclaimed this week?
- How much data did I back up incrementally?
- How much data did I copy the last four weeks to my copy pools?
- What was my throughput rate over the LAN/WAN for sent and received data?
- What are my failure rates by server and operating system?
- Is my tape volume full or partially full and when will it be available to migrate?
- What are my key performance indicators and how do I monitor them?
- How will I know when I need to upgrade system components?
- Can I report on event processing in a form which will mean something to my boss?
- I want to show my boss we're doing a good job with the resources I have. How can I do that?
- I want a comprehensive "Out-of-the-box" solution to Tivoli Storage Management reporting. Is this it?

Future Storage Management Analysis Guide releases will address other questions, particularly in the area of Tivoli Storage Management capacity planning. Some of the additional questions which will benefit from reporting currently planned for the next release:

- How much client data do we protect over the entire enterprise?
- Can I know how much active and inactive data is in my storage pools?
- How much of the data is being kept onsite and offsite?
- What does collocation cost me in terms of volumes?
- Can I track and predict storage growth by tape slots and by MB by client?
- Can I predict what an increased client load would do to the system?

An example, selected from the above lists, of answering questions via Storage Management Analysis reporting follows:

To answer the question, "What errors am I getting most and which ones should I work on correcting first?", we can invoke the Tivoli Discovery

Interface. An appropriate chart to reference in the Storage Management Analysis Guide is entitled “Summarize the messages issued in my environment” as shown in the Figure on page 20.

This report draws a composite picture of error messages by severity. By looking at this report you can tell which messages are prevalent, which messages should be prioritized to work on first, how often you’re getting errors, and what the Tivoli Storage Management message numbers are for further reference.

In the example, we can see that we have received eight ‘severity’ messages. Three of them are message ‘ANR2034E’. However, since these messages relate only to ‘QUERY’ commands these may not be as critical to correct as, for example, the ‘UPDATE COPYGROUP’ message ‘ANR1582E’ issued ‘03/13/2000 09:26:49’. Failure of this command may mean data is not being retained with the proper Tivoli Storage Management criteria.

Other information is available upon generating this report, including “Hints”, as shown on the bottom tabs, which tells you what the report data is comprised of and how you may want to use this data. There is also a tab entitled “Related Views” which will reference other Storage Management Analysis reports which can give further insight and relevant data. See the Tivoli Decision Support for Storage Management Analysis Users Guide for details concerning these and other features.

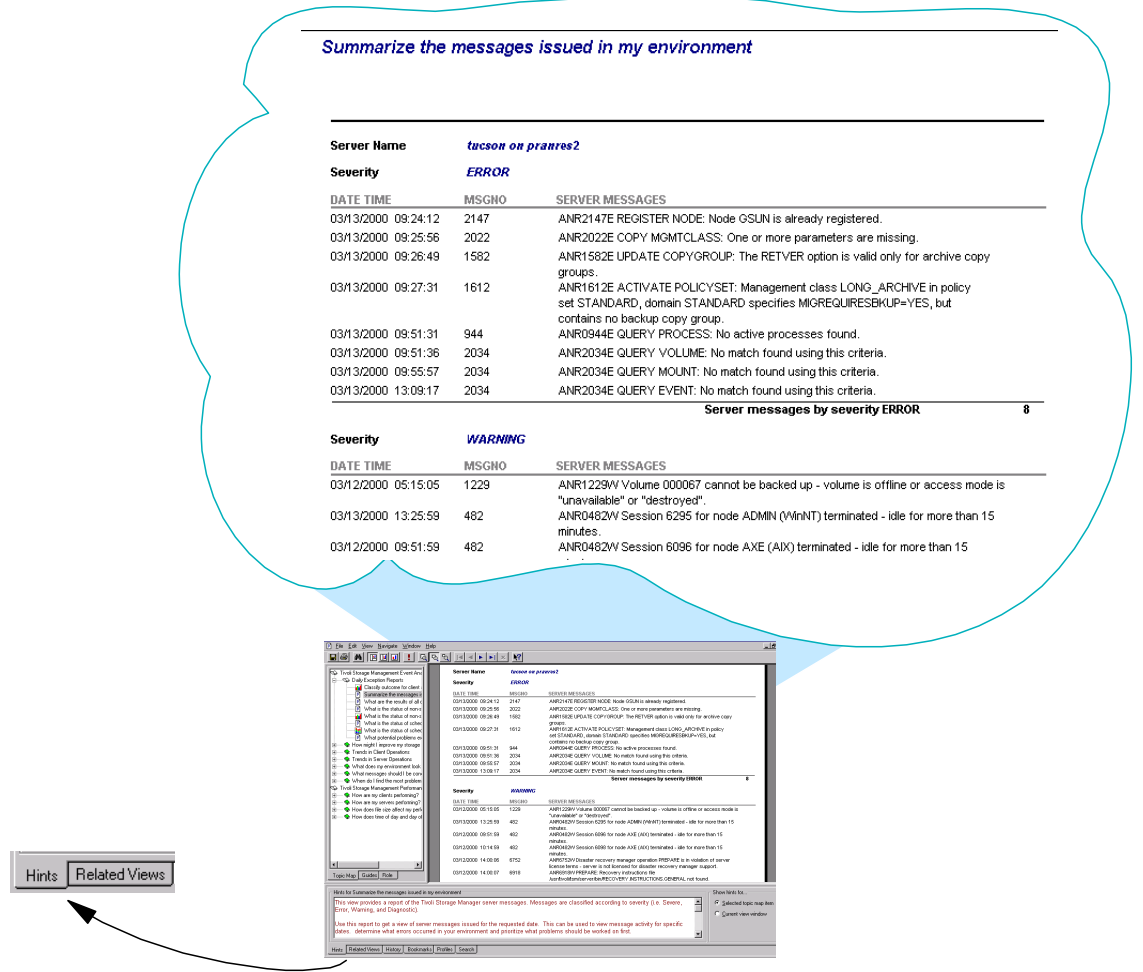


Figure 1. Summarizing client error messages

Again, selecting from the above ‘sample question’ lists, an example of answering questions via Storage Management Analysis;

To answer the question, “How much data did I copy during the last four weeks to my copy pools?”, invoke the Tivoli Discovery Interface. An appropriate chart to reference in the Storage Management Analysis Guide is entitled

“How much data is processed by daily server operations?” as shown in the Figure on page 22. This report draws a three dimensional graphical representation of data moved during administrative processes. ‘STGPOOL BACKUP’ is the category we are interested in. By looking at this report you get the average amount of data by day of week. This is only one of many graphical format options for display. In addition there are options for ‘Drill Down’ exploration. For a complete discussion of these options refer to the Tivoli Decision Support Users Guide.

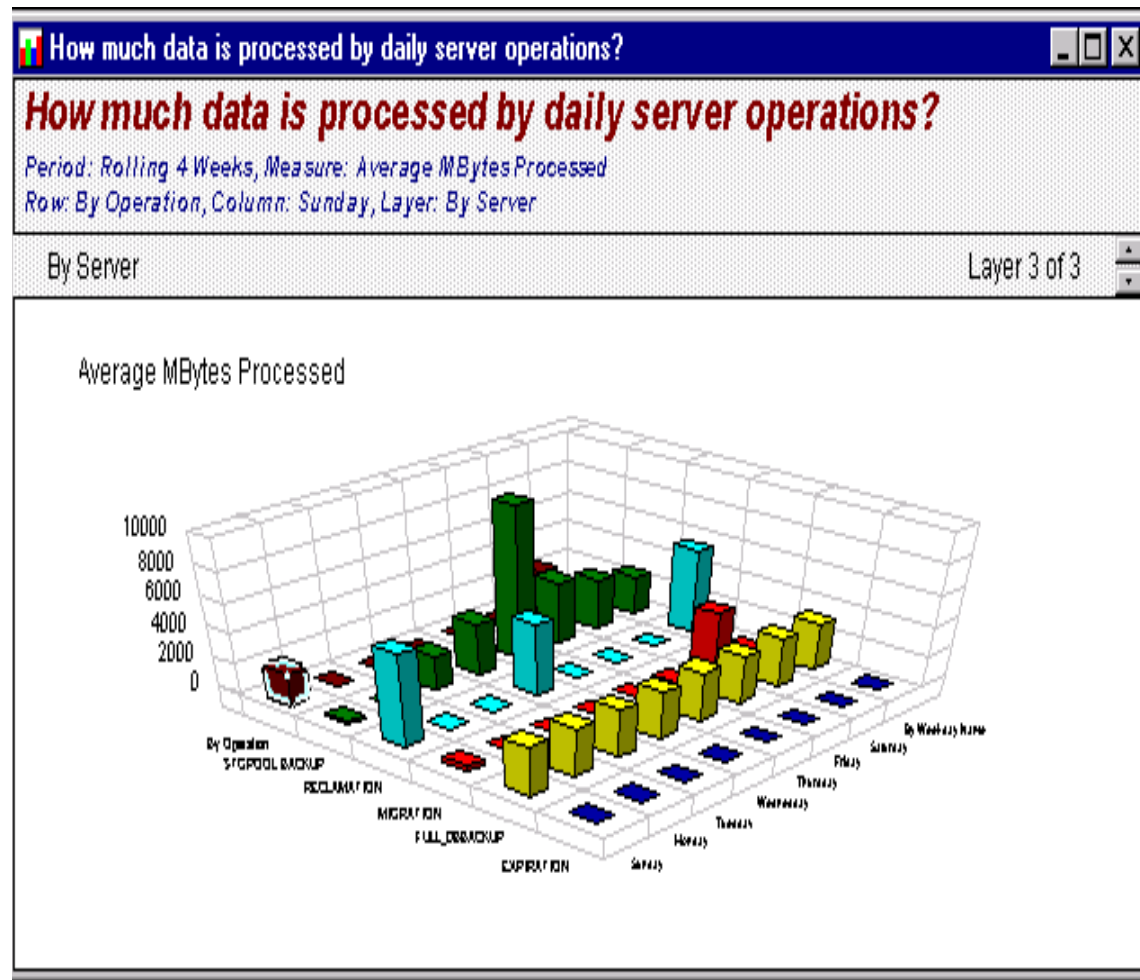


Figure 2. Data processed by server operations by day of the week

Tivoli Storage Manager Reporting

Chapter 2. Tivoli Decision Support for Storage Management Analysis Component Overview

In this section we describe the various software and hardware components that make up a complete Tivoli Decision Support for Storage Management Analysis reporting solution. We describe software levels required and the function of each component.

These components are shown in Figure 3.

Tivoli Decision Support for Storage Management Analysis requires three base products:

- Tivoli Storage Manager
- A Relational Database System
- Tivoli Decision Support

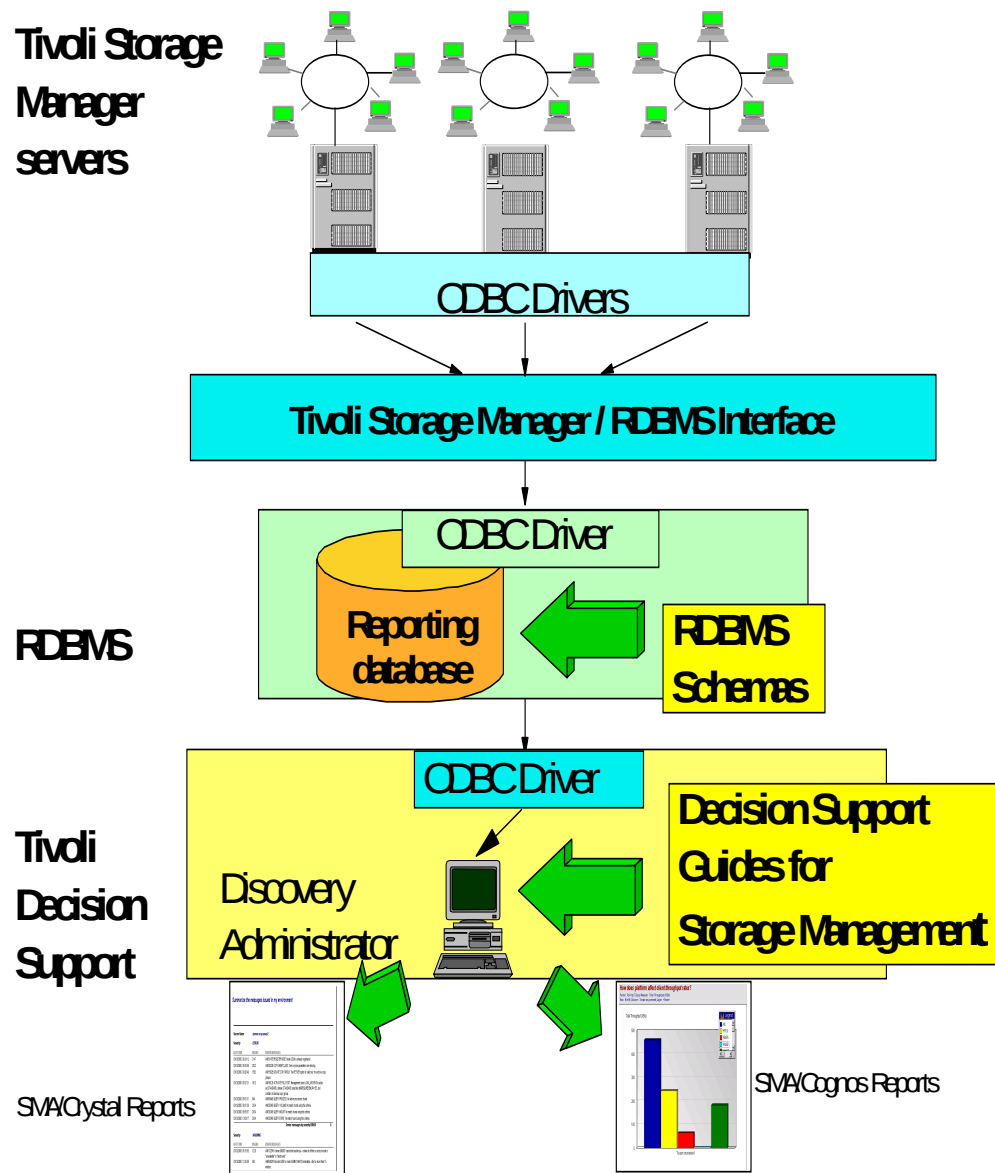


Figure 3 Components of an SMA reporting environment

2.1 Tivoli Storage Manager servers

The Tivoli Storage Manager database is the source of information used for event and performance information.

Version 3.7.2 or later of the Tivoli Storage Management server is required. This is because data is extracted from the Tivoli Storage Manager server from new tables included in this version. They are the SUMMARY and EVENTS tables. Therefore, this version is required to provide support for Storage Management Analysis information gathering.

You will have at least one Tivoli Storage Management database source but you may have many of them. They can be on multiple processing platforms. These will be known to Tivoli Decision Support and Storage Management Analysis as 'source data servers'. That will become important when setting up the parameters for the loader program which we will discuss in the next section.

2.2 Tivoli Storage Manager / RDBMS interface

The major portion of this interface is the Decision Support Loader program. It's purpose is to move data from the Tivoli Storage Management source database to the Tivoli Decision Support reporting database. We recommend that you install the Decision Support Loader on a dedicated NT machine. Running the decision Support Loader and the Storage Management Analysis product on the same processor can adversely impact performance.

You can concurrently transfer data from multiple Tivoli Storage Management servers to a shared RDBMS database server by installing the Decision Support Loader on multiple machines. To use this configuration, you must set up each Tivoli Storage Management server as an ODBC data source, and configure each Decision Support Loader to access the appropriate Tivoli Storage Management server and shared RDBMS database server. See the Tivoli Storage Management Decision Support Loader Release notes Version 1.1.1 for more detail.

2.2.1 TSM Decision Support Loader

A new utility program called 'tsmdsl' (Tivoli Storage Management Decision Support Loader) Version 1.1 is provided on the install CD to manage data collection. This program uses the Tivoli Storage Manager ODBC interface to read data from the Tivoli Storage Manager server and uses the RDBMS ODBC interface to save data into the Tivoli Storage Manager Reporting

Database. The basic steps performed by the program `tsmdsl` during the data collection process are:

- Extract data from the Tivoli Storage Manager server using the Tivoli Storage Manager ODBC driver
- Transform data into the format required by the Tivoli Storage Manager Reporting database. This includes processing such as providing a unique date/time key for the information extracted from the Tivoli Storage Manager server.
- Write data to the Tivoli Storage Manager Reporting database using the RDBMS ODBC driver.
- The program `tsmdsl` also controls the expiration of old records from the RDBMS.

There is a GUI interface to control configuration and execution. This will appear at loader execution time. There is also a log to contain a record of execution results in the Tivoli Decision Support directory.

The configuration parameters for `tsmdsl` are:

- Tivoli Storage Manager administrative ID and Password for each Tivoli Storage Manager server
- Message level (I, E, W, S, D): Control what type of messages are included in the RDBMS.
- Expiration value used for pruning old entries from RDBMS
- Include extract time qualification for `EXTRACT_DATE` field RDBMS key

2.2.2 Tivoli Storage Manager ODBC driver

Used to read data from the Tivoli Storage Manager server.

Tivoli Storage Manager ODBC configuration parameters:

- Tcp/ip address of Tivoli Storage Manager servers to query
- Port number of Tivoli Storage Manager servers to query

2.2.3 RDBMS ODBC interface

Used to save data into the Tivoli Storage Manager Reporting Database. This will be relational database specific, such as, 'SQL ODBC' or 'ORACLE ODBC'.

RDBMS ODBC configuration parameters:

- Tcp/ip address of Tivoli Storage Manager servers to query
- Port number of Tivoli Storage Manager servers to query

2.3 RDBMS

This must be on a platform and supported by the relational database technology chosen. You may have multiple RDBMS servers, but ordinarily you will only have one. This is because multiple source servers can share the same database.

2.3.1 Tivoli Storage Manager reporting database

The source information is saved in a relational database called the Tivoli Storage Manager reporting database. One Tivoli Storage Manager reporting database can be used to contain data from multiple Tivoli Storage Manager servers. The Tivoli Storage Manager reporting databases that are initially supported are;

- Oracle (V8.1)
- DB2(V5.0)
- MS SQL(v7.0)

A schema is provided with Tivoli Decision Support for Storage Management Analysis that contains the definitions of the tables used in the RDBMS for these three.

2.3.2 RDBMS schemas

During the installation of the Decision Support Loader the required database schemas are installed in the same directory as the Decision Support Loader. The default installation path is:\program files\tivoli\tsm\decision\schemas. The appropriate schemas should be copied into the RDBMS.

2.4 Tivoli Decision Support

Tivoli Decision Support and Storage Management Analysis must reside on a NT 4.0 SP4 level or better platform. Tivoli Decision Support operates on Windows 95, Windows 98 and Windows NT 4 (Windows 2000 support will be added at a future date). Note that Tivoli Decision Support does not pre-requisite the Tivoli Framework. You may have multiple Tivoli Decision Support servers in the same reporting system.

2.4.1 Tivoli Decision Support

Tivoli Decision Support version 2.1 is required.

Tivoli Decision Support includes several components. You must decide which components to install and on which machines based on how you plan to run the application. You will chose to run in stand-alone mode or network mode. Refer to the Tivoli Decision Support 2.1 Installation Guide for more information on configurations and hardware requirements.

You must also install PTF2 for Tivoli Decision Support to have Storage Management Analysis function properly.

The Tivoli Decision Support components necessary to run Storage Management Analysis are;

- Tivoli Decision Support administrative interface - The Tivoli Discovery Administrator Module is a component of Tivoli Decision Support that is used to control the following;
 - Scheduling the data collection process to build the Tivoli Storage Manager Reporting Database
 - Building the cubes associated with the Tivoli Decision Support Storage Management Analysis Guide Functional Definition
- Tivoli Decision Support Discovery Interface - The Discovery Interface is a component of Tivoli Decision Support that is used to present information to users. This interface is located on one or more PC clients and normally will be pointing to the server content located on a network file server where the Tivoli Decision Support Administrator has created the multi-dimensional cube. This interface uses a topic map as the primary means of navigating the discovery interface. The topic map divides viewable data into a hierarchy of distinct categories, topics, and views. Each Tivoli Storage Manager Guide will have a set of topics and views. Each view represents a separate report. The Discovery Interface can be used by people that have different roles in an organization. System Administrator is a role currently defined with Tivoli Decision Support. A Storage Administrator will be considered an equivalent role. When a specific role is selected, the topic map displays views that are most useful to someone in that role. When System Administrator is selected as a role, all Tivoli Storage Manager Guide views will be displayed.
- CognosPower Play - Imbedded and installed as an integrated and core part of Tivoli Decision Support. The Discovery Interface uses Cognos' Powerplay reports. The Cognos Powerplay cubes provide numerous

dimensions and measures that allow the user to view data in additional ways than the pre-defined views shipped with the Guide.

- Seagate Crystal - Imbedded and installed as an integrated and core part of Tivoli Decision Support. The Discovery Interface uses Seagate's Crystal Reports to allow the user to view data in additional ways than the pre-defined views shipped with the Guide.

2.4.2 Storage Management Analysis Guide

- “Out-of-box” reports - This sets up the reporting links to the reporting data base, Cognos, and Crystal. This is done via Tivoli Decision Support and it's GUI interface that lets you access these reports with multiple viewing options.
- Cube(s) reporting - This component sets up reporting from Cognos 3D graphics reporting.

2.4.3 Using fm20.dll

This is used to support the Discovery Administrator. Refer to Chapter 4.2.3, “Error 339, fm20.dll (MS module access)” on page 54 for more detail.

2.5 Scheduler

You will want to schedule the loading of new data into the reporting database at a pace consistent with reporting frequency. In this way the most recent data will be added for reporting. Normally this will be done on a daily basis. We recommend use of the Tivoli Storage Management scheduler for this purpose.

You will also want to schedule the re-building of the Storage Management Analysis cubes following each data loader run. This is most easily accomplished by using the scheduler in the Discovery Administrator.

See the section on scheduling in Chapter 4.1.1, “What scheduler to use” on page 39 for more information.

Chapter 3. Tivoli Decision Support for Storage Management Analysis Architectural Issues

In this section we discuss some considerations for a beginning configuration in support of Storage Management Analysis and Tivoli Storage Management reporting. We will expand on the component overview presented in Chapter 2 and identify issues of tailoring Storage Management Analysis reporting to your organization.

There are multiple configurations related to the tsmdsl program, the RDBMS and the Tivoli Storage Manager servers. For example, tsmdsl can run on the same machine as the RDBMS or on a different machine. Also, there can be multiple tsmdsl programs running on separate machines (extracting data from different Tivoli Storage Manager servers) and loading data into the same RDBMS. These different configurations can affect performance.

Also, see the discussion for hardware minimum requirements in Chapter 4.1.4, "Multiple data source configurations" on page 45 of this redbook.

3.1 How many machines - why is this important?

One of the first things to plan for is how many workstations need access to reports and how often.

If there are multiple reporting workstations you may want to consider a dedicated file server for reports as described in the Tivoli Decision Support Installation Guide. See also the discussion in Chapter 5.2.4, "Duplicating to other file-servers" on page 98 on stand-alone mode versus network mode.

If you have a relatively small Tivoli Storage Management system or a system which is accessed by a single Tivoli Storage Management Administrator you may need only the minimum number of machines configured for Tivoli Decision Support and Storage Management Analysis as shown in Figure 3.

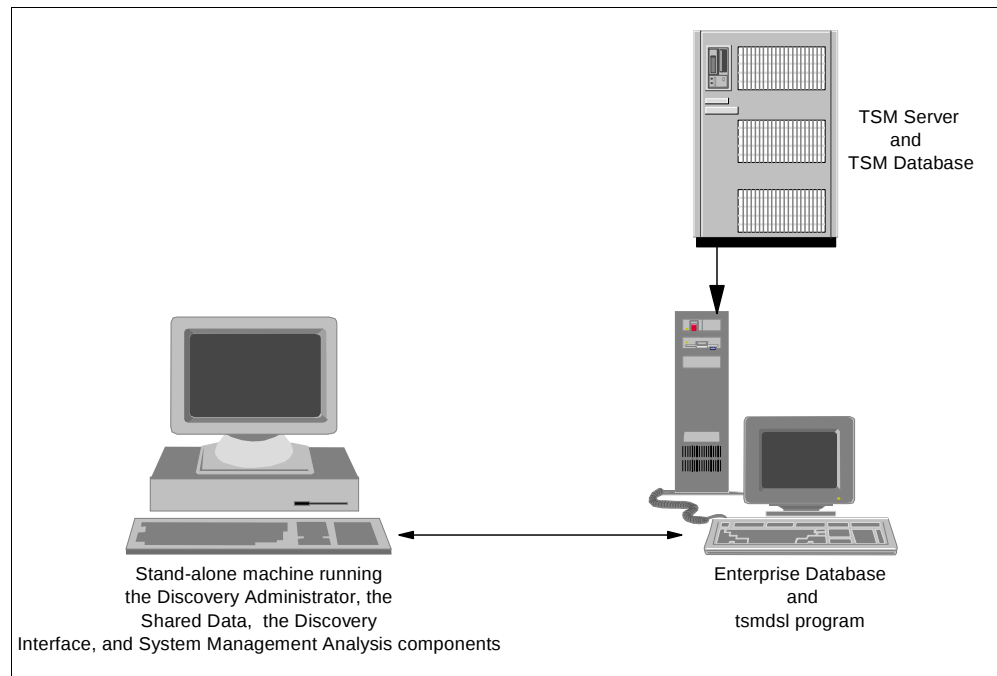


Figure 3. Minimum Tivoli Decision Support and Storage Management Analysis reporting system

You may want Tivoli Decision Support installed on several machines if you have only a few users who want full control and will have frequent access to reports.

However, you may want only the Tivoli Storage Management Administrator to use Tivoli Decision Support, but then provide for multiple Storage Management Analysis machines as shown in Figure 4.

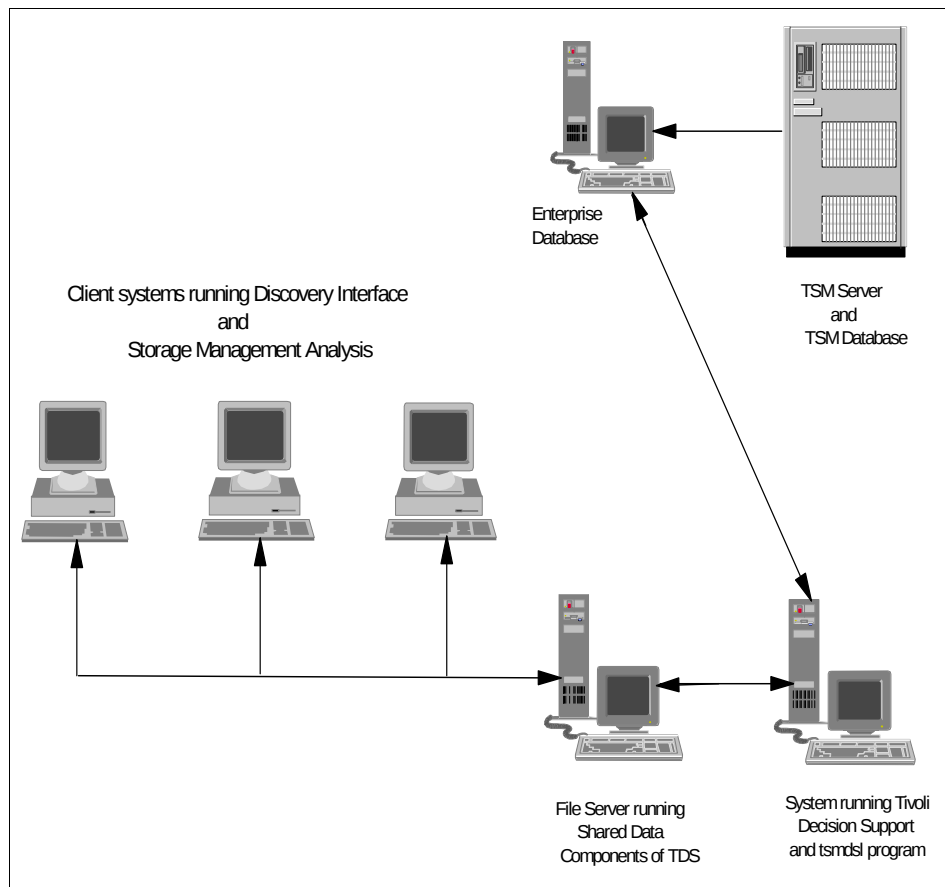


Figure 4. Storage Management Analysis reporting system with file server and multiple SMA clients

These factors will dictate what you decide on using stand-alone or network mode for Tivoli Decision Support. After that, you are ready to look at the remaining issues.

Once the network or stand-alone decision made for Tivoli Decision Support, Tivoli Storage Management database size, network configuration, and reporting database size may be the major determinates in deciding how many machines should be configured.

We recommend that you install the Decision Support Loader (tsmdsl) on a dedicated workstation. Running the decision Support Loader and the Storage Management Analysis product on the same processor can adversely impact performance.

It is evident the number of machines to configure and what to install on them is largely dependent on use, network configuration and data volume.

3.1.1 Access frequency and the network

Consider the approximate number of reports a given user of the system is likely to build or download from the file server or reporting database. Each report varies in the amount of data, depending on the content and the volume of elements included. Nevertheless, response will be poor if data traffic or bandwidth precludes rapid transfer. You may want to run some initial benchmarks to see exactly what impact your particular reporting needs have on your network.

Consider also, the impact of tsmdsl executions on the network. Again, we recommend that you install the Decision Support Loader on a dedicated workstation. How often you run this program will have a impact on the amount of data transferred and the time of day may have an impact on data traffic. Some Administrators may want to run on this on an hourly basis, but more often it will be run on a daily basis. See the discussion on 'Window of opportunity' in Chapter 5.

Avoid running this program when other activity such as backups and archives may be accessing the Tivoli Storage Management database. Also, avoid running building cubes during tsmdsl execution. Both of these activities can adversely affect performance.

3.1.2 Network Configuration

If you plan to report from multiple Tivoli Storage Management machines to a common RDBMS machine you probably want to install tsmdsl on multiple machines, as well. In this way, you may do concurrent downloads of data from Tivoli Storage Management with a minimum of impact on a given tsmdsl processor. However, keep in mind the impact on the RDBMS server itself and the network paths to it.

Once you decide on a desired configuration, you may want to consult your network specialist to discuss the configuration with them. As the case is with other shared applications, poor configuration planning or timing for the network can be a barrier to full acceptance and exploitation of Tivoli Decision Support for Storage Management Analysis.

3.2 What size machines and why is this important?

The RDBMS and tsmdsl machines themselves have minimum configuration specifications. See Chapter 5.2.4, "Duplicating to other file-servers" on page 98 for more on this. However, depending on usage other processor components can be stressed. Consider I/O performance, CPU utilization, memory usage, and data storage availability when planning for Storage Management Analysis or trouble shooting problems.

If too many Storage Management Analysis reports are open simultaneously this can effect memory and cause unpredictable results. Also, in the case of cube reporting, memory on the PC video card can be restrictive. This situation can be unpredictable, as well. Generally, these situations can be isolated by running only the failing set(s) of reports and noting results.

3.3 Choosing a relational database for SMA

Three alternatives are presently supported with Tivoli Decision Support and Storage Management Analysis. These are Oracle, DB2, and MSSQL. See the RDBMS section in Chapter 2.3.1, "Tivoli Storage Manager reporting database" on page 29. Most Tivoli Storage Management administrators will go with the relational technology that is available in their organization. This is a good decision because this affords you an established and supported environment. Utilize the talents of your DBA group. We cover a typical DBS dialog in Chapter 4.4.4, "Setup guide for ODBC communications to the RDBMS" on page 73.

If you choose not to do this or can not do this, MSSQL is the recommended alternative. The install for a desktop environment has a minimum of considerations and works well with Tivoli Decision Support and Storage Management Analysis. Refer to Web site www.microsoft.com for more information regarding this product and the installation procedure.

3.4 Considerations for merging companies, departments, and IIS groups

The dynamic nature of today's business environment demands that reporting be flexible enough to change, add, or delete reported processors as organizations change. In order to accomplish this, Tivoli Decision Support uses OLAP.

Information can be stored for multiple source servers and be added or deleted from consolidated reports via filtering criteria invoked before each report or eliminated via 'layered' views of data.

Also, multiple Tivoli Decision Support and Storage Management Analysis servers can be brought on line as needed simply by pointing them to the correct source and RDBMS servers. See the Tivoli Decision Support Installation Guide for more details.

Chapter 4. Configuration and Implementation

4.1 Configuration and installation alternatives

In this chapter we will present some considerations when installing Tivoli Decision Support for Storage Management Analysis. Besides the configuration alternatives discussed in the previous chapter, there are some additional processing alternatives we will bring to your attention. Also, there are a few pitfalls which can impair functionality of the product which we will bring to your attention.

4.1.1 What scheduler to use

The Tivoli Storage Manager Administrator must decide which scheduler will work best in their existing infrastructure.

You will have multiple 'cubes' for reporting data as described in Chapter 2.4.1, "Tivoli Decision Support" on page 30. Periodically you will want to rebuild the cubes to update the data to be reported. The build process can be scheduled to execute automatically and at regular intervals. We recommend staggering the start times of the multiple cube builds so that they do not process simultaneously. This will improve performance for each build process.

Also, make sure that the cube builds are scheduled after the Tivoli Storage Management Decision Support Loader job runs because this job must finish in order to have new data available for the cubes. The loader job should also be executed via a scheduler.

You have three scheduler options available use in this component set.

4.1.1.1 Tivoli Storage Management scheduler

This is the recommended scheduler to choose for tsmdsl execution.

When executing the scheduler from the install directory you may have to add additional parameters to get the Tivoli Storage Management scheduler to function correctly. If you have the Tivoli Storage Management scheduler installed as a NT service make sure the ID has rights to the programs, including tsmdsl, and the data it must access. If you have installed the scheduler as a 'System' account, make sure you have checked the 'allow desktop interface' box. See Figure 5, greyed out userid's and passwords for an illustration of the desktop interface invoked during execution. This is to allow the TSMDSL program to extract the data from the Tivoli Storage Management servers and allow tsmdsl to execute.

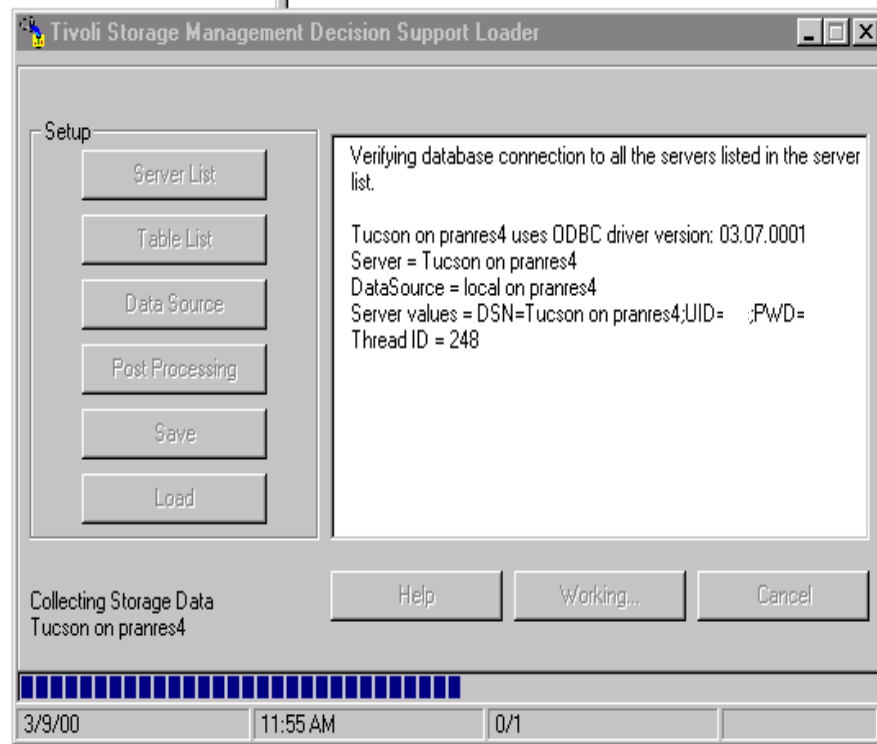


Figure 5. TSMDSL scheduled and running the desktop interface

password and userid*

The userid's and passwords are shown when the initial setup is performed.

The screen captures do not have the userid's and passwords shown.

Schedule the tasks and the server will be contacted and the TSMDSL will retrieve the data to the database that you have specified allowing the NT4 client to pull the required data.

See, also, the section in Chapter 5.2.1, “Loader issues and ODBC loss of connection” on page 96.

4.1.1.2 Cognos Scheduler

Cognos' scheduler can be setup to build the cubes. Be sure to schedule this at a time when the tsmdsl job has completed execution. See the discussion on scheduling in Chapter 5.1.5, “The “window of opportunity”” on page 95.

Further information can be found in redbook SG24-5506-00 Using Tivoli Decision Support Guide chapter 4.

4.1.1.3 TDS Scheduler

Tivoli Decision Support scheduler is configured for the Tivoli Discovery Administrator interface and can be used to add a schedule for cube building. Choose the name of the cube you want to build. Select daily, weekly, monthly, hourly or minutes, and/or how often in 'days' you want the execution to take place. Tivoli Decision Support will not execute until the service has started in Control Panel -> Services -> TDS Scheduler. Upon execution of the scheduler, the cubes will be re-built.

Further information can be found in redbook SG24-5506-00 Using Tivoli Decision Support Guide chapter 4.

4.1.2 Choosing a database technology

There were three databases that were used in the development of Tivoli Decision Support for Storage Management Analysis:

- Microsoft SQL Server version 7
- IBM DB2 version 5.2
- Oracle version 8.1.5

The type of database that you will use may be dependent on your organization's current infrastructure and the database servers that are in operational use.

One of the skills required for Tivoli Decision Support for Storage Management Analysis is someone who can support the database. Usually this is a database administrator. This situation will be especially true for larger enterprises where dedicated servers hold databases. These databases should also be backed up regularly in case there is corruption in the physical database or a physical hardware occurs on the server. We assume the recovery of such errors to be the responsibility of the database administrator.

4.1.3 Multiple Tivoli Storage Management servers

An environment may have more than one Tivoli Storage Management Server in a Local Area Network or even over a Wide Area Network.

These Tivoli Storage Management servers can report to a common server that contains the RDBMS (Microsoft SQL, DB2, Oracle), with the communications setup in the ODBC and the Tivoli Decision Support Loader.

The Tivoli Decision Support Loader should execute automatically via the scheduler and contacts all the Tivoli Storage Management servers, then extract the data, storing it on the RDBMS server.

Figure 6 shows multiple Tivoli Storage Management servers have been contacted in the right hand window. It also shows the Tivoli Storage Management ODBC drivers and the correct version.

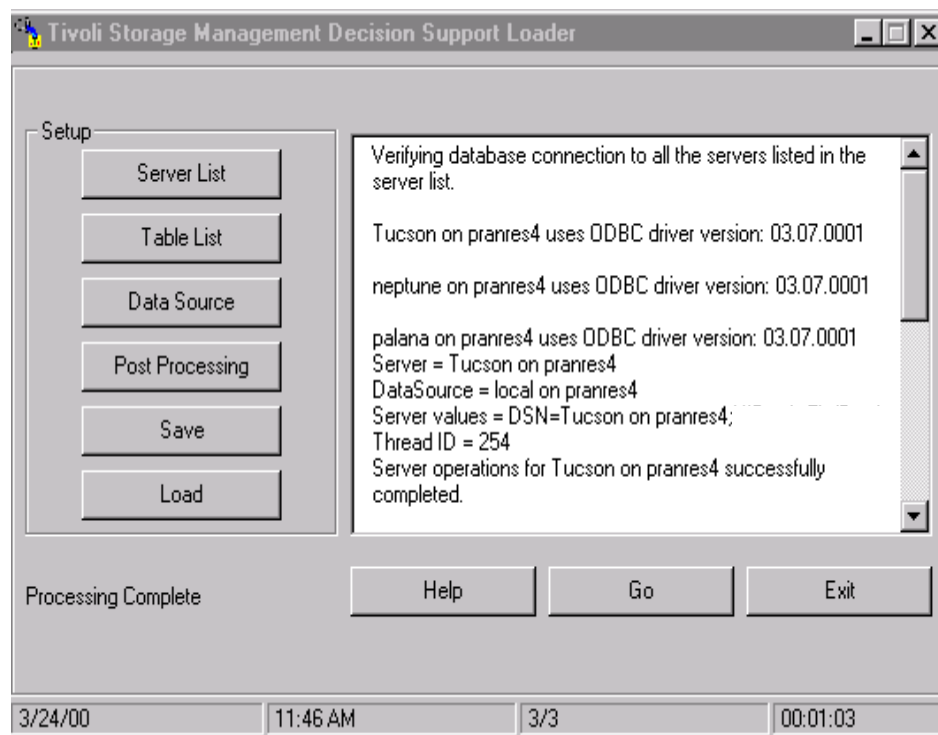
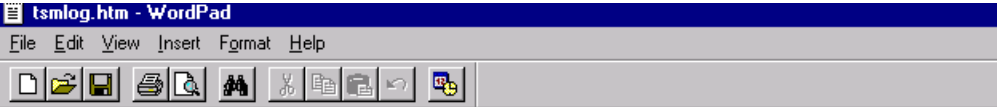


Figure 6. TSMDSL processing multiple TSM servers

The listing shown in Figure 7,userid's and passords have been greyed out ,which is an extract of the tsmdsl loader log file, illustrates to the Tivoli Storage Management administrators that the loader has communicated successfully and pulled the data to the RDBMS server. The data will now be ready to be viewed by the Tivoli Discovery Interface, except for those views which report from cubes. After the cubes are rebuilt these will be ready, as well.



```

tsmlog.htm - WordPad
File Edit View Insert Format Help

<PRE>
Database Type:  MS SQL

Log for DSN=Tucson on pranres4;

3/31/00 2:45:59 PM
Log for DSN=neptune on pranres4;UID=      PWD=

3/31/00 2:47:20 PM
Log for DSN=palana on pranres4;UID=      PWD=

3/31/00 2:48:17 PM
Average time per server was 00:00:48.
Total number of servers processed was 3.
-----Messages from the text box-----
Verifying database connection to all the servers listed in the server list.

Tucson on pranres4 uses ODBC driver version: 03.07.0001

neptune on pranres4 uses ODBC driver version: 03.07.0001

palana on pranres4 uses ODBC driver version: 03.07.0001
Server = Tucson on pranres4
DataSource = local on pranres4
Server values = DSN=Tucson on pranres4
Thread ID = 265
Server operations for Tucson on pranres4 successfully completed.

Server = neptune on pranres4
DataSource = local on pranres4
Server values = DSN=neptune on pranres4;
Thread ID = 267
Server operations for neptune on pranres4 successfully completed.

Server = palana on pranres4
DataSource = local on pranres4
Server values = DSN=palana on pranres4
Thread ID = 269
Server operations for palana on pranres4 successfully completed.

-----End-----

```

Figure 7. TSMDSL log extract showing multiple ODBC's and TSM servers

4.1.4 Multiple data source configurations

Multiple data sources, in this case, is having more than one Tivoli Storage Management servers reporting to a common RDBMS. The configuration for this is in the setup of the Tivoli Storage Management Decision Support loader and the setup of the Tivoli Storage Management ODBC driver.

In order for another data source to function you have to register it in the ODBC setup as another Tivoli Storage Management server as in Figure 8 below. This is for communications to the server that will be pulling the data to the RDBMS.

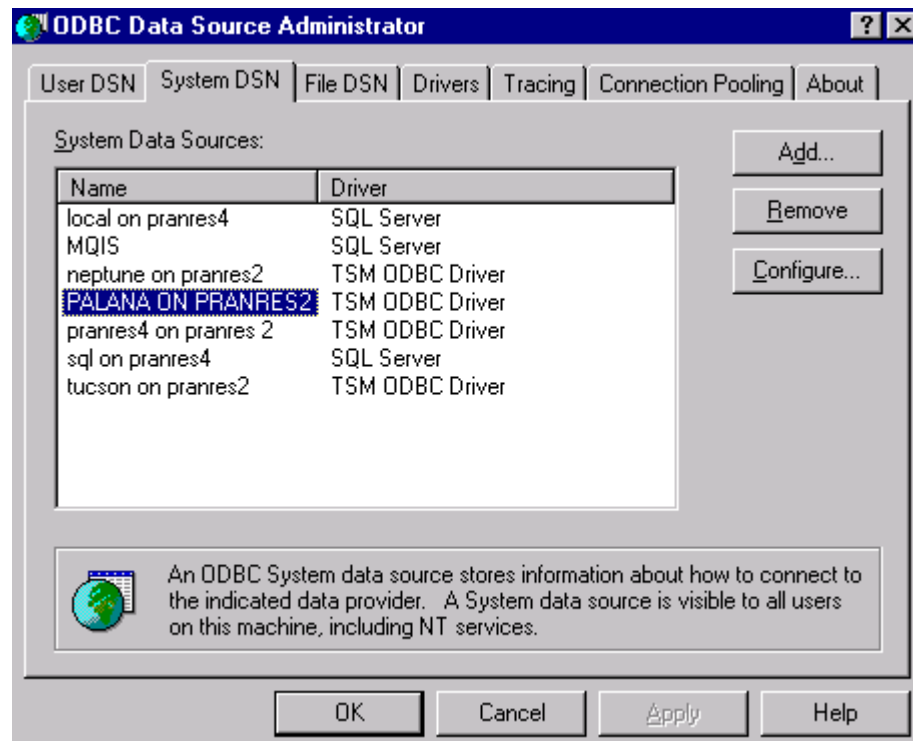


Figure 8. TSM ODBC driver communications setup

After setting up the ODBC driver, the administrator will be required to launch the Tivoli Decision Support Loader and complete the setup by doing the following:

- Launch the Tivoli Decision support loader as in Figure 9, userid's and passwords have been greyed out, and clicking on cancel to prevent the execution of TSMDSL.

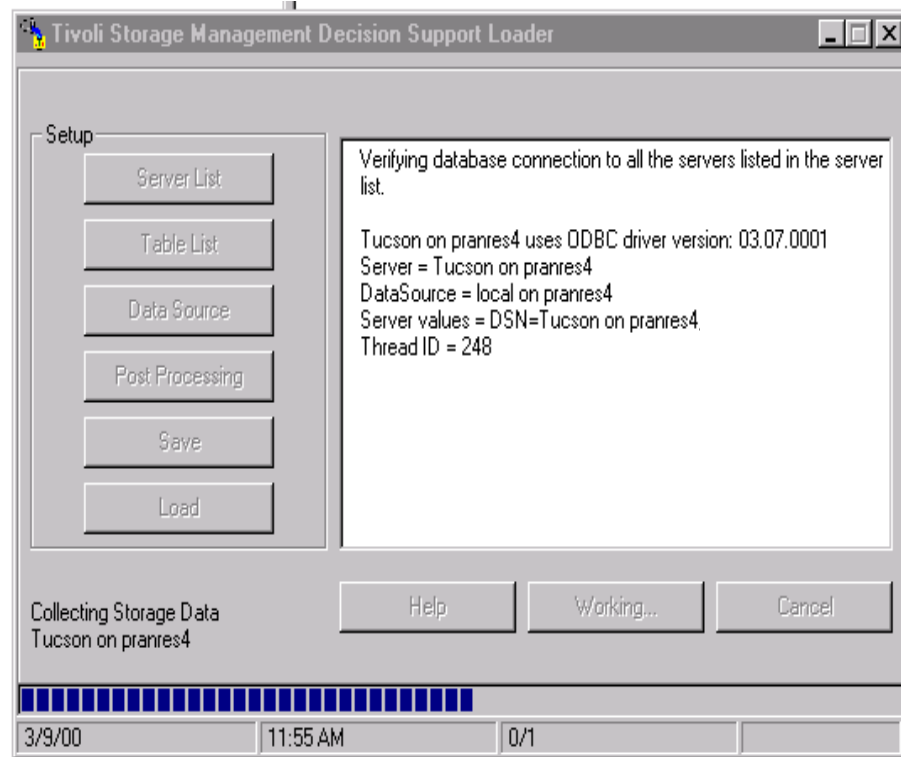


Figure 9. Tivoli Decision Support Loader.

- From the Tivoli Decision Support Loader graphical user interface select the “server list” tab on the left and click on the arrow to drop down a list. The Tivoli Storage Management ODBC driver that you have setup will show in the “server list” drop down. Select the server name that you have entered and click on it. The administrator then will have to enter a userid and password that is the same on the Tivoli Storage Management server as shown in Figure 10, userid’s and password greyed out. Select “OK” and continue down the list in the Tivoli Storage Management Decision Support Loader.

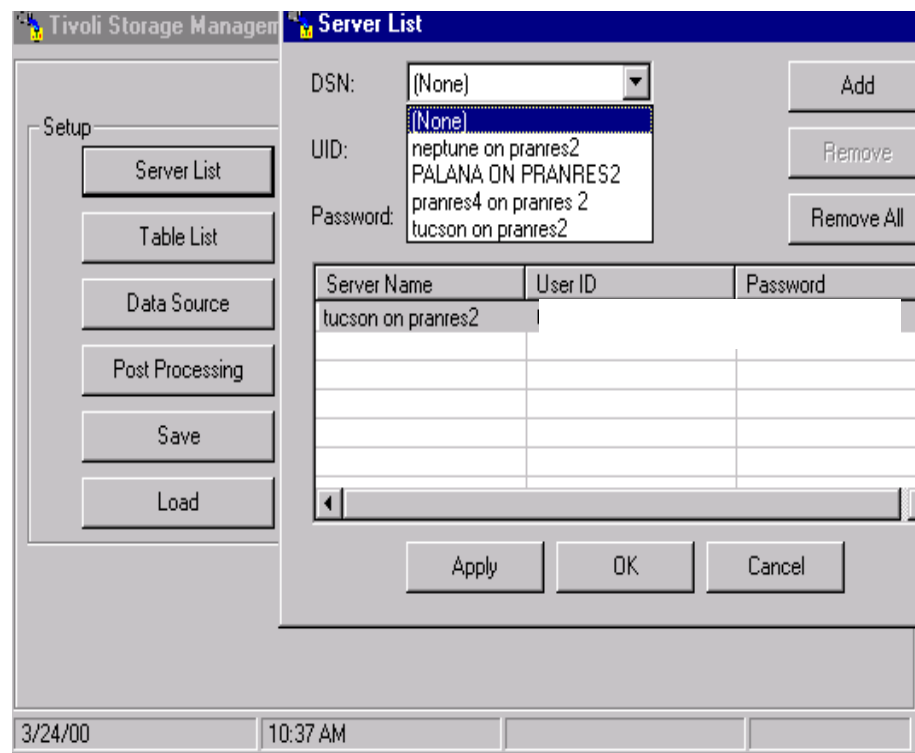


Figure 10. DSL server list setup

- From the “table list” add the tables, as in Figure 11, that should be loaded. These are the elements you want to see in the reports that will be shown from the Tivoli Discovery Interface. Select “OK” and continue to “Data Source”.

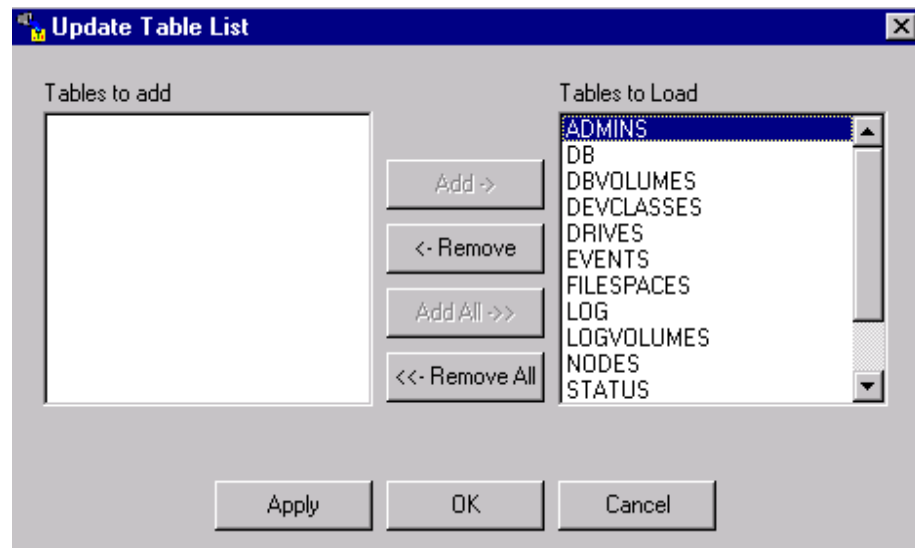


Figure 11. Tables to be loaded in the DSL

- The data source setup will need to point to the RDBMS server where all the data will be stored so that reports can be made from the database. The data is collected, stored, and analyzed from the Tivoli Storage Management server as in Figure 12, userid's and passwords greyed out.
 - DSN should be your database machine.
 - UID is the user id to the database (Microsoft SQL, DB2, Oracle).
 - Password that is required with the UID.
 - Qualifier is to be put in.
- Select "OK" and continue to "Post Processing" which will have no changes to be made and is should stay as default.

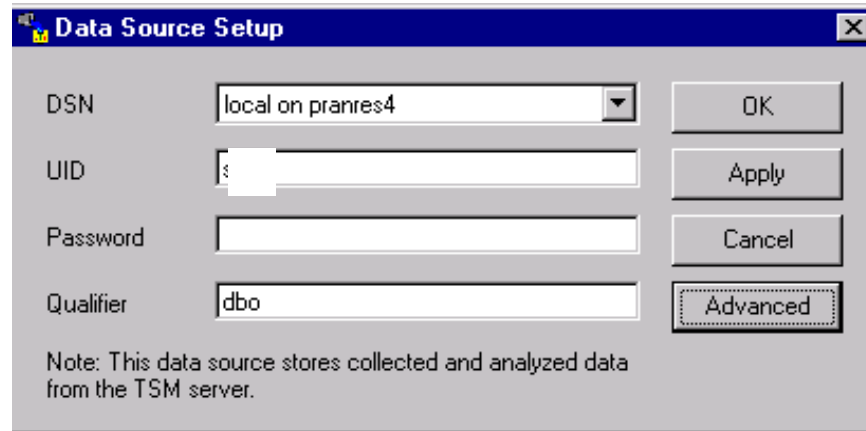


Figure 12. Data source setup in the DSL.

- Upon completing the setup you will need to save the configuration in the TSMDSL.INI as shown in Figure 13 below.

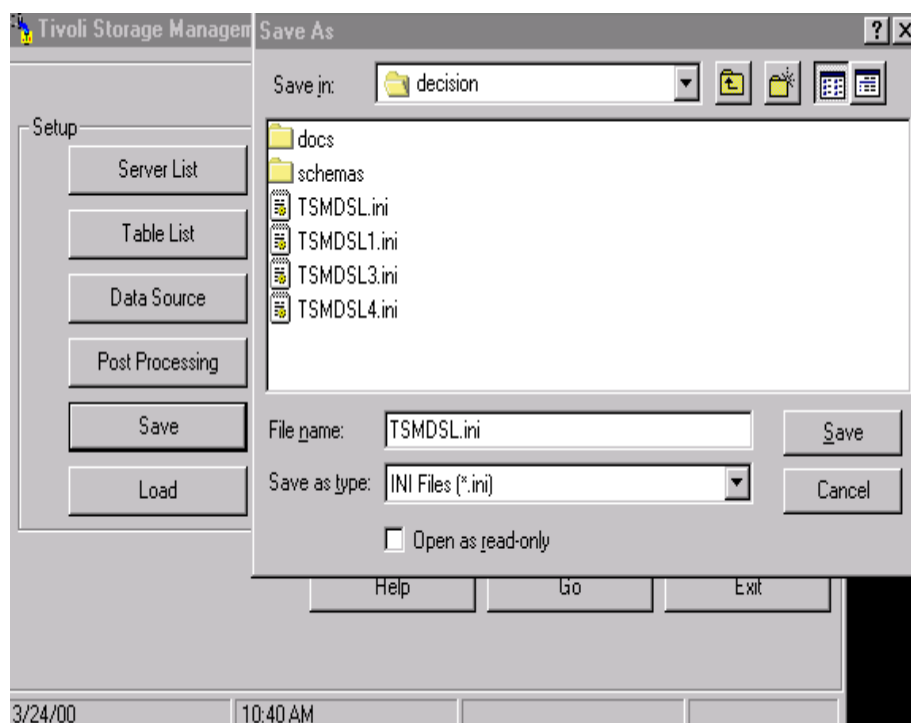


Figure 13. Saving the TSMDSL.INI

- After saving the TSMDSL.INI file you will need to load the TSMDSL.INI from the load tab on the DSL. Select “go” and the DSL will execute, pull the data, and store it in the RDBSM.

4.2 Installation “gotchas”

This section covers problems that may be encountered when setting up Tivoli Decision Support for Storage Management Analysis and what can be done to solve them.

4.2.1 Tivoli Decision Support 2.1 patch

The Tivoli Decision Support version 2.1 patch will update the current version of Tivoli Decision Support Process Scheduler, the path Manager Utility and the relevant readme.txt files up to and including Admin-gd.pdf document files. Should the patch not have been installed the Scheduler may have some

discrepancies. There are two parts to applying this patch, the client as well as the administrator and they can be located in the following paths:

Client

"C:\Program Files\TDS 2.1\ default".

Administrator

"C:\Program Files\TDS 2.1\ default.

The files that the Tivoli Decison Support patch updates looks as follows

<AdminN>\2.1 TDS-0001-Readme.txt.

<Admin>\TDSScheduler.exe.

<Admin>\PatherManager.exe.

<Admin>\tds_cubebuilder.exe.

<Admin>\readme.txt.

<Admin>\Docs\Pdf\Admin-gd.txt.

<Client>\2.1 -TDS-0001 -Readme.txt.

<Client>\Pathmanager.exe.

The Tivoli Decison Support patch fixes the following problems:**Path Manager Utility**

Error 78886

User can only apply changes once per session. If the shared source directory exist in two separate location, the user can not change between the two location using the same instance of the Path Manager Utility.

Error 80911

user can not set path to a mapped network drive.

Error 81616

The admin users must be able to specify the username, password, and the network share name that will be used by the Tivoli Decision support Scheduler service to create a network connection.

Error 81727

The option on the Tools menu used to re-register the MS DAO Library file 'dao350.dll' will not work if the path to the file contains a space.

Process Scheduler Service

Error 81071

Error message "Unable to connect to the data source. The database does not exist or is read only." When trying to connect to a shared data drive.

As per the above, this is what the Tivoli Decision Support Patch fixes. The patch is a self extracting file and is run from the "Start" menu and select "Run".

4.2.2 Tivoli Storage Management client as an ODBC data source

The Tivoli Storage Management server is the source of data used for event and performance information. This data is transferred to the relational database (Tivoli Storage Manager Reporting Database). One Tivoli Storage Manager reporting database can be used to contain the data from multiple Tivoli Storage Manager servers. The reporting databases are initially supported by Oracle, DB2 and Microsoft SQL.

The new Tivoli Storage Management ODBC data source is setup in the Control Panel -> ODBC. The latest version to be installed is the Tivoli Storage Management ODBC Driver 3.07.01.00. When adding a new Tivoli Storage Management data source refer to Figure 14.

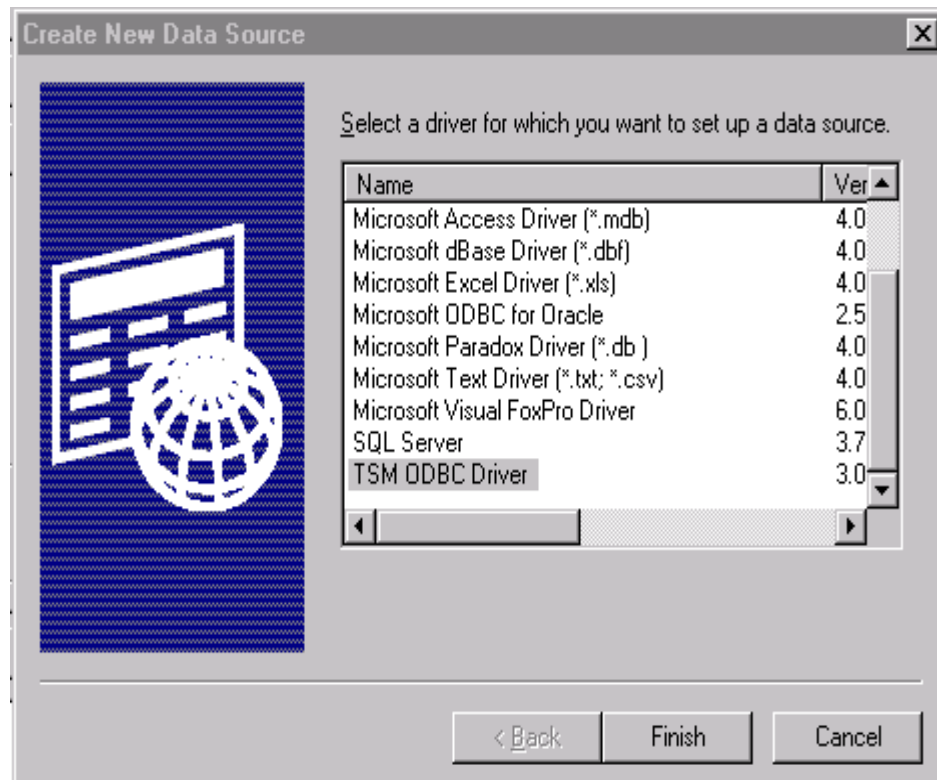


Figure 14. Setting up of a new TSM Data Source

You may also find the older version of the ODBC driver that is listed as “32bit ADSM ODBC” driver version 3.01.0007. This ODBC driver should be upgraded to the version as mentioned above.

To set this up, you will find it under Control Panel -> ODBC ->System and then add. Scroll down to the bottom to select the TSM ODBC driver.

Before you configure your Decision Support Loader, you will be required to setup your Tivoli Storage Management servers and RDBMS reporting database server as ODBC data sources. The ODBC is a interface that lets various programs access data in the relational databases. The information will be required to setup the ODBC drivers may vary, depending on your database types and system configurations. It is advisable that you see your

database administrator for specific connection information before you setup your Tivoli Storage Management data source connection.

After you have installed the Tivoli Storage Management Decision Support Loader, the database schema scripts are manually loaded and then are run on the database.

The Tivoli Storage management Decision Support Loader task aggregates and stores the data in the relational database.

Note: The ODBC drivers shipped on the Tivoli Decision Support CD-ROM will not work with Storage Management Analysis. Install the OEM ODBC drivers provided by the RDBMS vendors. To ensure the latest drivers are installed, you may have to download these drivers from the vendor's website.

4.2.3 Error 339, fm20.dll (MS module access)

This error (339. FM 20.dll) occurs when you install Tivoli Decision Support Loader in support of the Tivoli Discovery Interface and the Tivoli Discovery Admin. The error will appear, if no Microsoft Office product is installed on the server.

Some methods of obtaining the FM20.dll files are to install the suite of Microsoft Office or a portion thereof, like Microsoft Power Point.

Another other way of fixing this is by going to the Microsoft web site and downloading Microsoft Active X control Pad from the following web site <http://www.microsoft.com>

Once this patch has been applied the error will no longer appear, referring to the error in Figure 15.

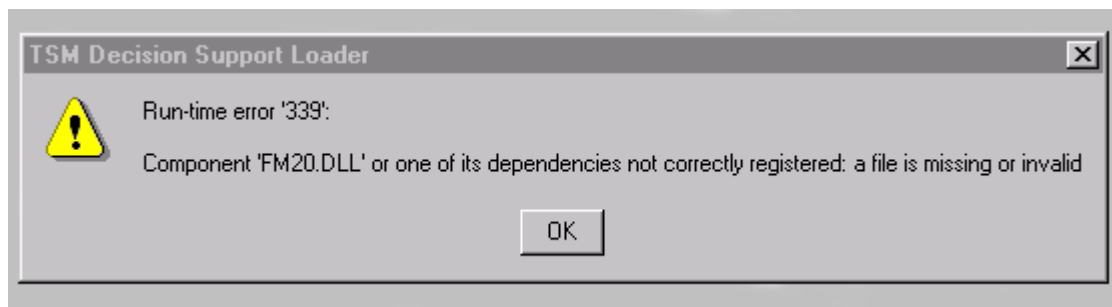


Figure 15. The FM20.DLL error which will appear if you do not have the required *.DLL files

4.2.4 Running out of hard drive space during install

During Tivoli Decision Support installation, there are no warnings provided when the available hard drive space is exceeded. The installation will appear to go smoothly, but, in fact, some of the application files needed to execute TDS may not be present. Therefore, it is important to ensure there is enough hard drive space available before installing TDS.

The downfall to this is that there will be no error alerting you that there is not enough hard drive space or alert notifying you that your installation has aborted abnormally.

In order to fix this, the Administrator will need to uninstall Tivoli Decision Support via the uninstall option that is provided with the application. The NT4 Administrators will have to add another harddrive or free up space on the existing hard drive and re-install Tivoli Decision Support.

This error will be corrected in the future.

4.2.5 Security Rights

Security rights play a vital role in the functioning of Windows NT4 server and Microsoft SQL version 7. Should you not obtain the correct rights the administrator will not be able to write to the SQL database. Therefore, not allowing the reports to be read or overwritten. The Tivoli Storage Management administrator should also have sufficient rights to perform duties like scheduling the reports.

The administrator can implement security by using the operating system permissions. The NT Administrator will need to set this up in two parts:

- Granting permission to access the entire shared source path
- Granting permission to access certain, but possibly not all, cubes

4.2.6 Connection to DB failures

Database connection failures can be the result of ODBC being setup incorrectly. It is advisable to get the relevant information connection to the database from your Database Administrator.

After setting up the database you will require the correct information for establishing a connection from the Tivoli Storage Managers servers to the Windows NT4 Server. It must have a database that is supported by Tivoli Storage Management Analysis. In order for this to happen, you will require

the connection information for the ODBC drivers. From your Microsoft NT4 Server, which has the database on it, you will want to extract the relevant information from you Microsoft NT4 Workstations. This once again will require the correct ODBC drivers.

On receiving errors there are a number of places that you will have to look to find the problem, as can be seen in Figure 16 on page 56 and Figure 17 on page 57. These illustrate the kind of the errors that you may see.

For further information regarding connection failures you should consult with the Microsoft SQL Guide and the Tivoli Decision Support 2.1 Guide.

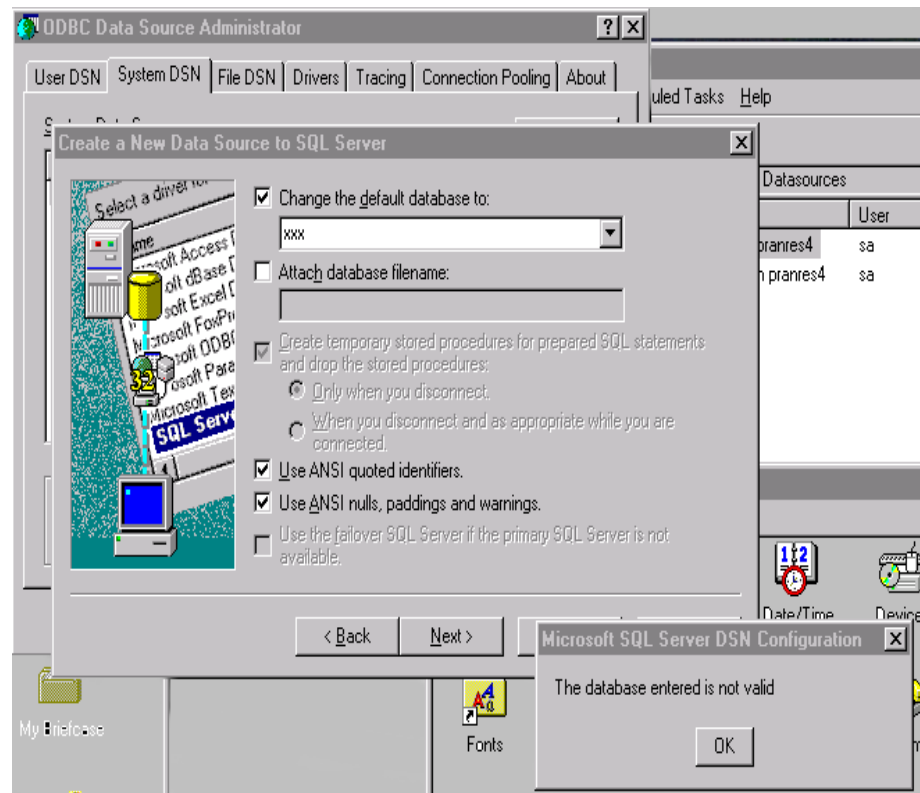


Figure 16. No Microsoft SQL database connection

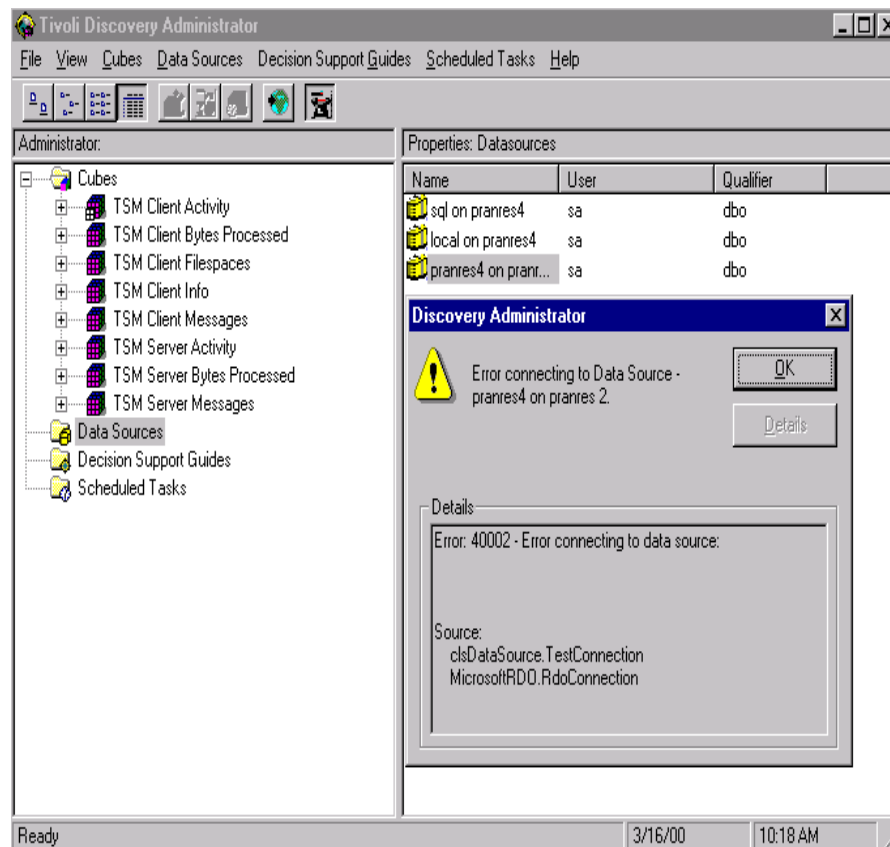


Figure 17. Example of another database failure

4.2.7 MDAC levels

You should check the MDAC levels regardless of what error appears on your monitor. Should you have errors and you suspect that it is a Windows NT error, check the operating system MDAC level. You can find this in Control Panel -> ODBC driver (as referenced in the figure below). Verify the correct version of MDAC, which should be 3.510.3711.0. If you do not have the correct version, it is advisable to upgrade to the correct level to prevent operating system errors or other functional failures that could cause a fatal system error.

A more general point that should be noted is that any third party software that is installed or downloaded from the internet may downgrade your MDAC levels. Refer to Figure 18 on page 58.

For a further insight to MDAC refer to the following web site:

<http://www.microsoft.com>

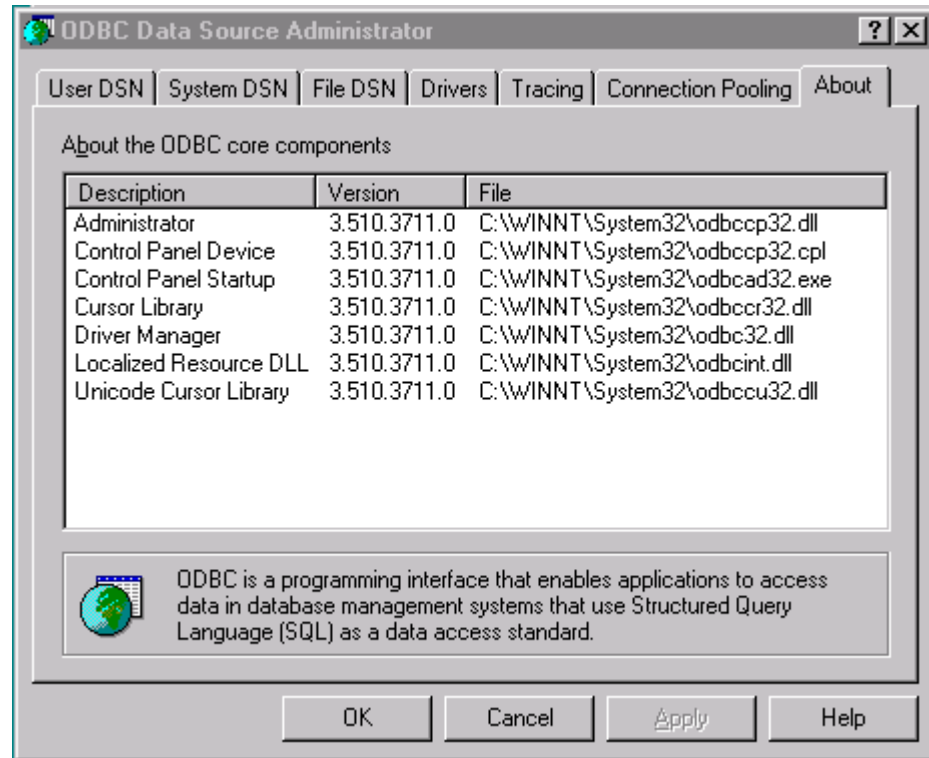


Figure 18. Correct version of MDAC, with all items being at the same level

4.2.8 “No Data” problems

Error number 53, “Cube will not build, returns No Data”, may appear when you build a cube from the Tivoli Discovery Administrator by transforming or exporting. The reason for this is the table that should contain the data has not received data from the Tivoli Storage Management servers. In order to fix this problem refer to the following manual:

Tivoli Decision Support Administrators Guide version 2.1

4.2.8.1 SQL reply 'NO' to uninstall of the dll's

Reply "no" to uninstalling the *.dll files is to prevent the corruption of the other applications that use *.dll files. Testing has indicated that if you say 'no' to uninstalling the *.dll's files all applications still work. However, keeping the *.dll files in place for SQL should not present a problem.

When you re-intall SQL it will not ask you if you want to update any *.dll files. When installing SQL there are a number of *.dll files that are updated throughout the operating system. Should you say "yes" to uninstalling the *.dll files, you stand a chance of *.dll file corruption on the server applications. This would require a re-install of the operating system or applications that you may be running on the your windows NT4 server.

4.2.8.2 Removing programs via Control Panel

This is done by selecting Start -> Settings -> Control Panel -> Add\Remove Programs icon and on the first tab Install\Uninstall. You will be required to scroll down using the scroll bar to the applications that you want to uninstall. This can be referred to as in the Figure 19 on page 60 and Figure 20 on page 61. Note that there are more applications that can be removed.

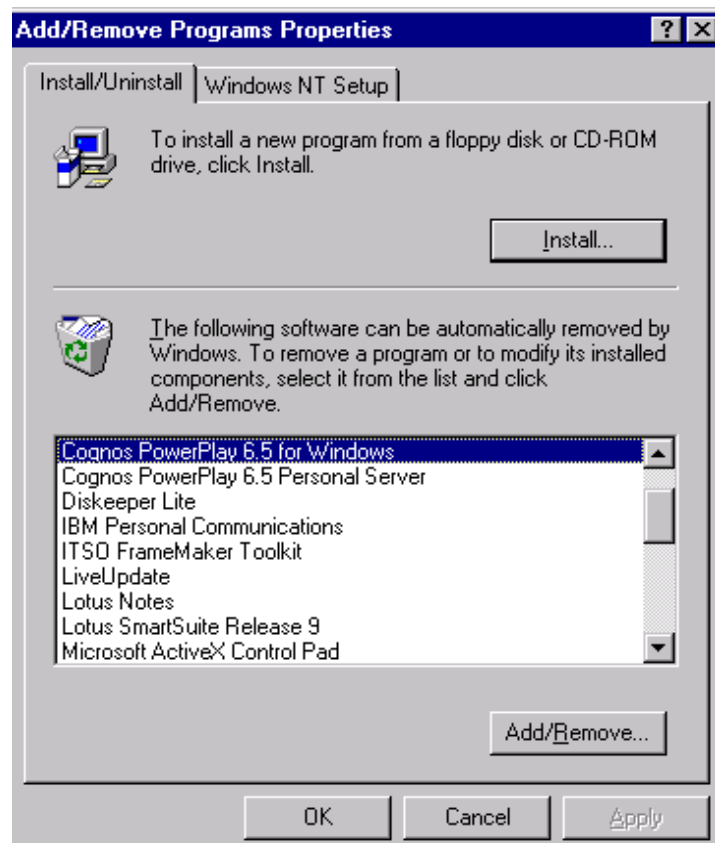


Figure 19. Applications can be removed via Control Panel

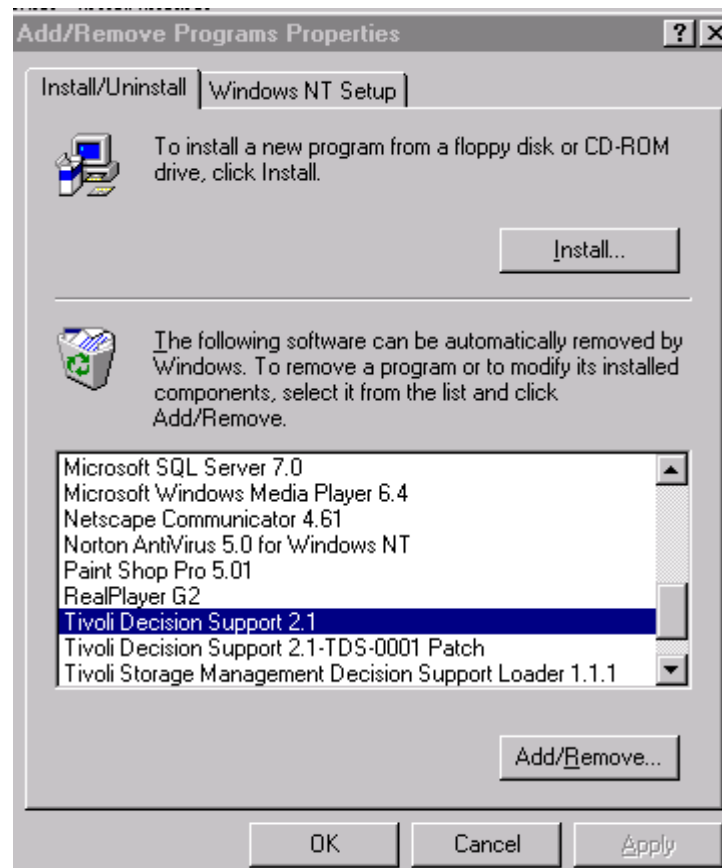


Figure 20. Applications can be removed here

The following applications can be removed via the control Panel

- Cognos PowerPlay 6.5 for Windows
- Cognos PowerPlay 6.5 Personal Server
- Microsoft SQL Server
- Tivoli Decision support 2.1
- Tivoli Decision Support 2.1 -TDS-0001Patch
- Tivoli Storage Management Decision Support Loader 1.1.1

To remove these applications, there is a specific order in doing so. This to prevent unwanted errors. A condition where the application has never fully been removed from the operating system and will not allow you to delete the

rest of the application files may occur. You then will be required to use the Windows NT4 Registry to remove parts of the application that you wish to uninstall refer to figure 8 on page 37. The preferred way to remove the applications is as follows:

- Uninstall the Guide from within the Tivoli Discovery Administrator
- Uninstall the patch from Settings -> Control Panel -> Add\Remove programs.
- Uninstall Cognos from Settings -> Control Panel -> Add\Remove programs. Cognos has two parts to it Personal Server and a Windows Product.
- Uninstall TDS 2.1 from Start -> Programs -> TDS 2.1 -> Uninstall
- Upon completion of the proceeding, shutdown your Windows NT4 server or workstation and restart it.

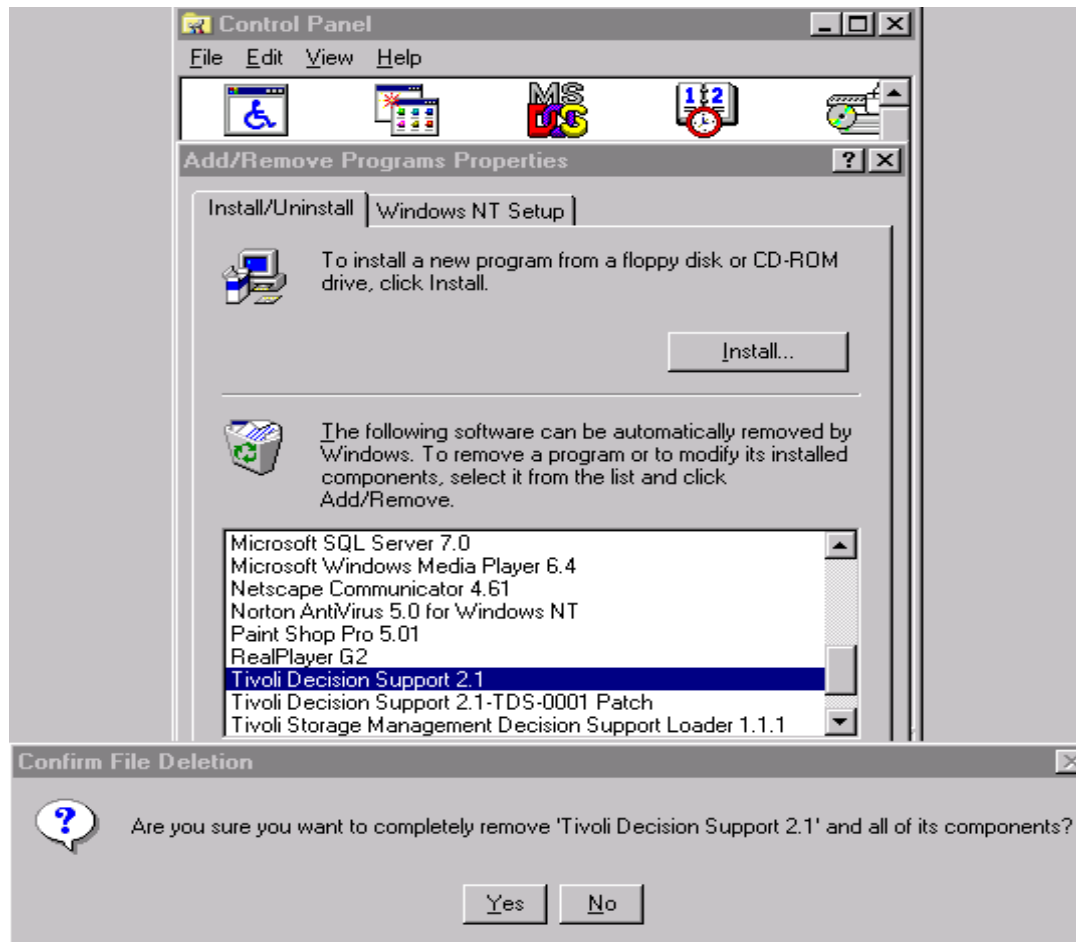


Figure 21. Example of wanting to remove Tivoli Decision Support 2.1

4.3 Crystal and Cognos participation

Tivoli Discovery Administrator is used to define queries that extract data from the TDS database into a delimited file or a file with comma separated values (*.csv). Cognos transformer builds a cube from the file, and Cognos PowerPlay generates reports from the cube. You can use the Tivoli Discovery Interface to view these reports. You can also use Crystal Reports to generate text-based views.

A Crystal report view is in Figure 22. Once you have generated a full Crystal report you will notice that it's all inclusive. You may want to specify a limit on the information that you see in your reports. Upon opening Crystal reports for the first time through the Tivoli Discovery Interface, you will be prompted to enter one or more parameters. Entering parameters allows you to limit the size of the report. If you choose to enter the date parameter, do so as a string in one of the following format.

For a type of Date/Time the format varies for each different database

MICROSOFT SQL:MM DD, YYYY *

ORACLE:DD-MM-YY *

DB2:YYYY-MM-DD *

A small note to be taken is that Crystal Reports will not necessarily display the date in the same format in which you have entered them.

Summarize the messages issued in my environment		
<i>Summarize the messages issued in my environment</i>		
Server Name: Tucson on prans4		
Severity: DIAGNOSTIC		
DATE TIME	MSGNO	SERVER MESSAGES
03/01/00 12:13:37	9999	ANR9999D adminqlc(1662): SQL fetch loop cancelled
03/01/00 14:06:32	9999	ANR9999D ssrecons.c(2212): Invalid magic number found in frame leader.
03/01/00 14:06:32	9999	ANR9999D ssrecons.c(2219): Wrong segment group id found in frame leader.
03/01/00 14:06:32	9999	ANR9999D ssrecons.c(2225): Wrong sequence number found in frame leader.
03/01/00 14:06:32	9999	ANR9999D ssrecons.c(2231): Actual: Magic=7C98D444, Smid=906495171, SegGroupid=325752880006490962, SeqNm=696738736.
03/01/00 14:06:32	9999	ANR9999D ssrecons.c(2238): Expected: Magic=53454662, Smid=0, SegGroupid=21906938, SeqNm=2.
03/01/00 14:22:16	9999	ANR9999D ssrecons.c(2212): Invalid magic number found in frame leader.
03/01/00 14:22:16	9999	ANR9999D ssrecons.c(2219): Wrong segment group id found in frame leader.
03/01/00 14:22:16	9999	ANR9999D ssrecons.c(2225): Wrong sequence number found in frame leader.
03/01/00 14:22:16	9999	ANR9999D ssrecons.c(2231): Actual: Magic=02FFFFC0, Smid=184549350, SegGroupid=648517354371678160, SeqNm=117440510.
03/01/00 14:22:16	9999	ANR9999D ssrecons.c(2238): Expected: Magic=53454662, Smid=0, SegGroupid=21897692, SeqNm=1.
03/01/00 14:27:39	9999	ANR9999D ssrecons.c(2212): Invalid magic number found in frame leader.
03/01/00 14:27:39	9999	ANR9999D ssrecons.c(2219): Wrong segment group id found in frame leader.
03/01/00 14:27:39	9999	ANR9999D ssrecons.c(2225): Wrong sequence number found in frame leader.
03/01/00 14:27:39	9999	ANR9999D ssrecons.c(2231): Actual: Magic=D678435E, Smid=611646499, SegGroupid=00000000, SeqNm=1532745355.
03/01/00 14:27:39	9999	ANR9999D ssrecons.c(2238): Expected: Magic=53454662, Smid=0, SegGroupid=21897115, SeqNm=1.
03/01/00 14:27:41	9999	ANR9999D ssrecons.c(2212): Invalid magic number found in frame leader.
03/01/00 14:27:41	9999	ANR9999D ssrecons.c(2219): Wrong segment group id found in frame leader.
03/01/00 14:27:41	9999	ANR9999D ssrecons.c(2225): Wrong sequence number found in frame leader.

Figure 22. Example of a Seagate Crystal Report

A Cognos report can be seen from the Tivoli Discovery Interface in Figure 23 on page 66.

Cognos Powerplay Cubes can be created and used to display multidimensional graphical views. Queries are issued against the Tivoli Storage Manager Reporting database to generate data source files. Cognos uses the data from these files to generate a cube which can be seen in the

Tivoli Discovery Administrator. The cube is a multidimensional database that can be viewed using Powerplay reports. The Tivoli Decision Support Administrator controls the creation of the cube by performing a two step process.

TDS Administrator first creates data source files (comma separated value files, *.csv or *.txt) by exporting the queries from the relational database.

Cognos Transformer takes the data source files and summarizes the data and packages this information into a compressed cube file.

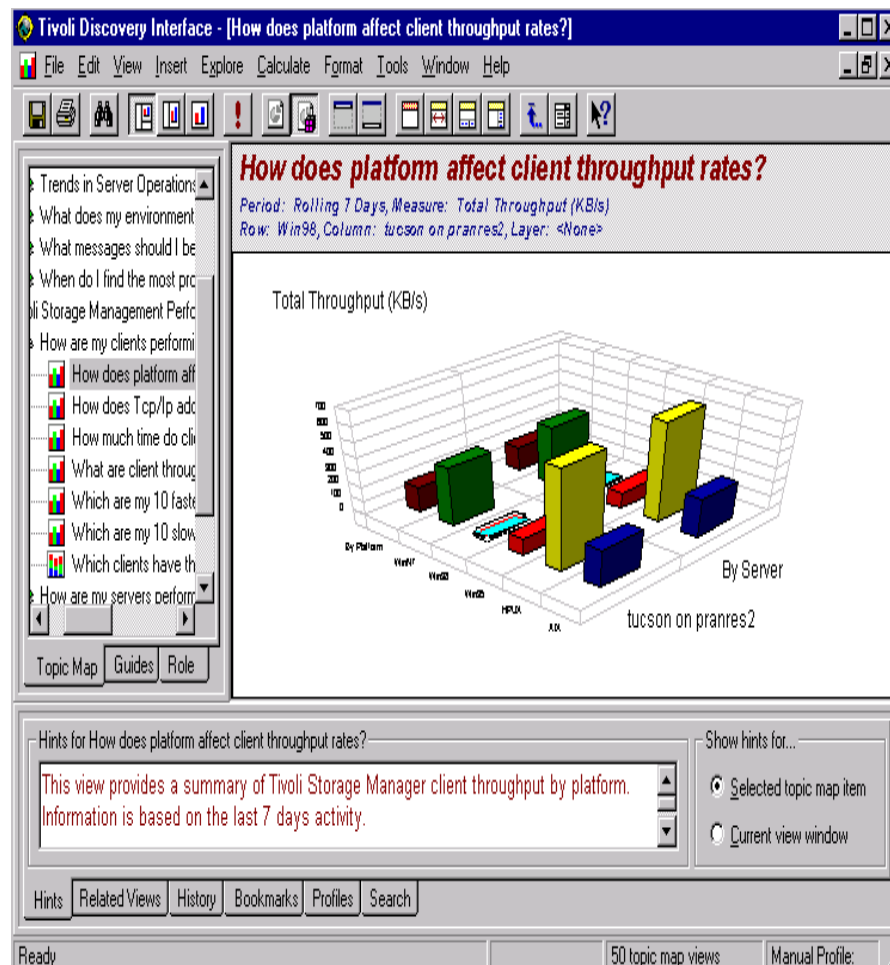


Figure 23. Example of a Generated Cognos Report from the Tivoli Discovery Interface

Tivoli Decision Support for Storage Management Analysis includes a collection of cubes (as seen in Figure 24 on page 67), Powerplay reports, Crystal reports, queries, models and topic mappings.

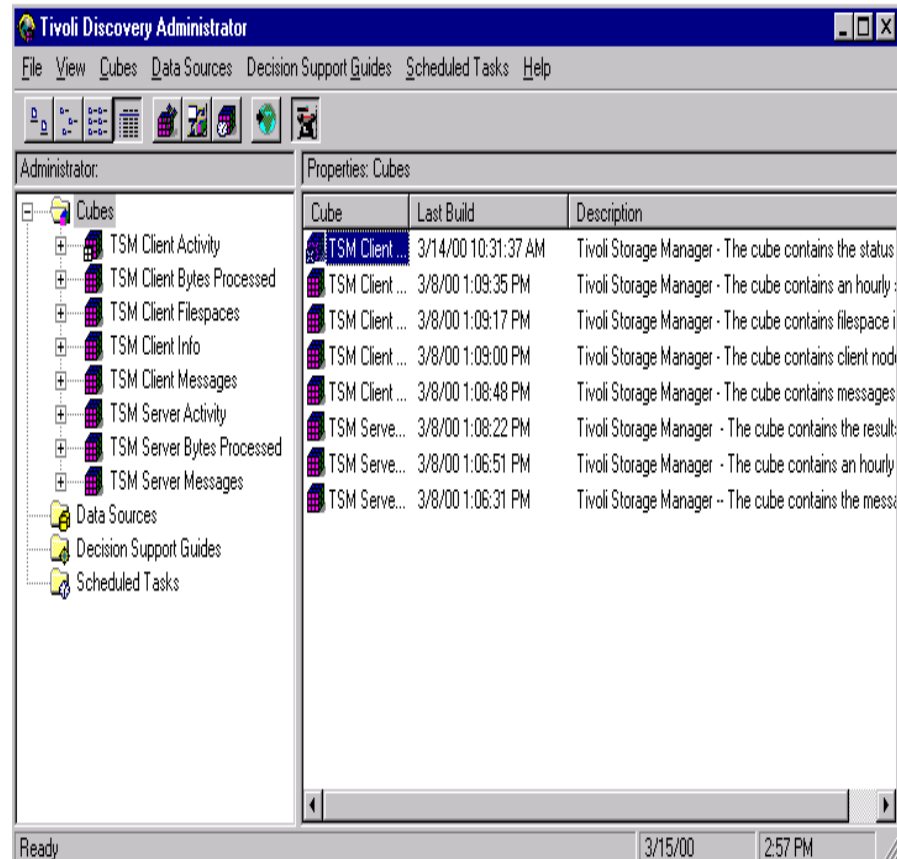


Figure 24. Cube view from the Tivoli Discovery Administrator

4.4 Relational Database considerations

In this section we look at a few simple examples of a Microsoft SQL ,DB2 and Oracle databases and what the requirements are to perform a healthy report from the database.

4.4.1 What size DB to start? DB Growth?

The database that is correlating the data from the TSM servers should start growing immediately from day one. The database growth can not be defined as this could be dependent on the how many TSM servers are on the network. Also how much of the data is coming down the network to the RDBMS. The database should be set to prune, therefore allowing the RDBMS to remain at a minimum amount of megs. The option of pruning should be set by the administrators.

The defined size before the TSM administrators can start drawing the reports for management could start at any size. There is no defined size on how much data that your RDBMS should contain. Obviously the more data that is in the RDBMS the more information your graphical graphs will produce. Allowing management to see more information of the various instances that is happening between the TSM servers and the RDBMS.

As for the database growth it would be difficult to say, for instance if you have no set the pruning and left it as default, the database will grow. Re-writing data all the time for 366 days. Growth with the default setting of pruning will utilize the hard disk drive space.

4.4.2 SQL example

Using the Microsoft SQL Analyzer, refer to the Figure 25 on page 69, you can perform a simple query such as:

```
SELECT * FROM DB
```

From the drop down on the toolbar, you should select the database that you have created. That will return the query information in a sub window in the SQL Analyzer. The information that will be supplied is from the query you entered regarding the information that was pulled from the Tivoli Storage Manager server to the Microsoft SQL database.

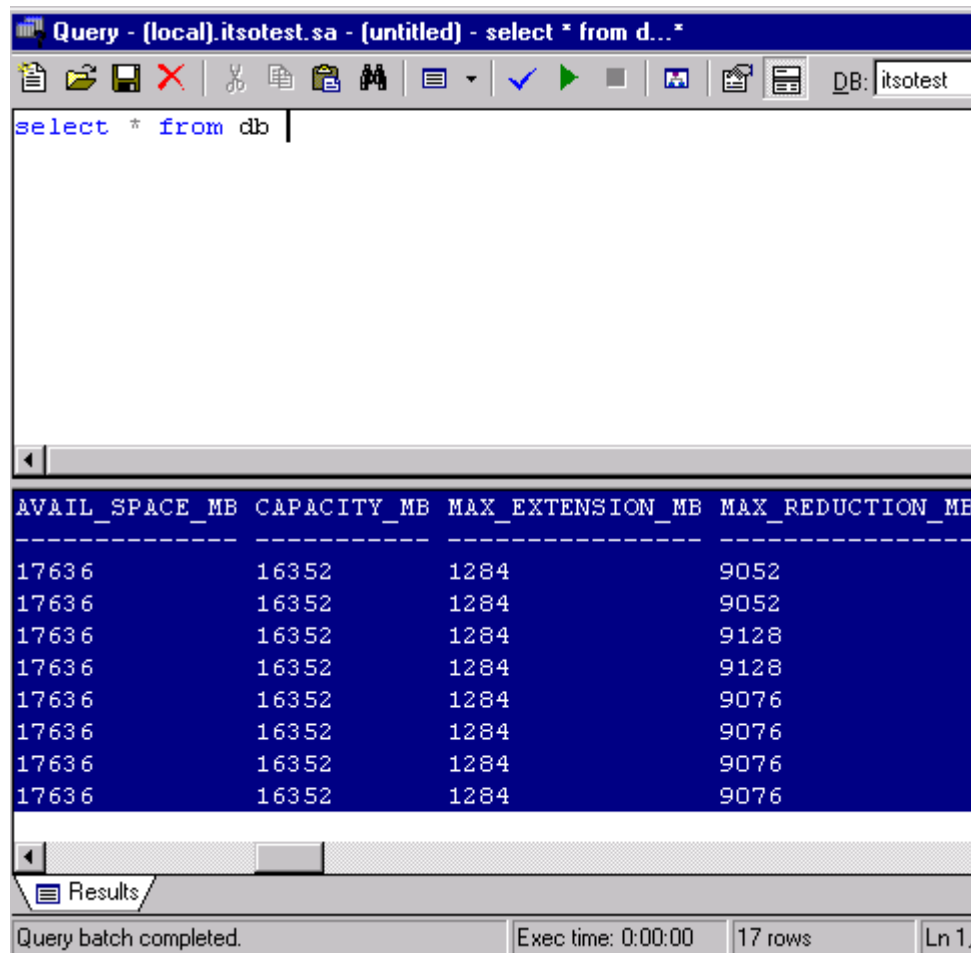


Figure 25. Microsoft SQL server query

For further command information consult your Microsoft SQL User manual or consult the Administrators manual.

4.4.3 DB2 example

Using a very simple DB2 command such as

```
select * from sysibm..systables
```

In order to perform a command as the one above, you will be required to logon and connect to the DB2 database with the following command as in Figure 26 below, userid and password greyed out.

connect to db2itso user db2admin once

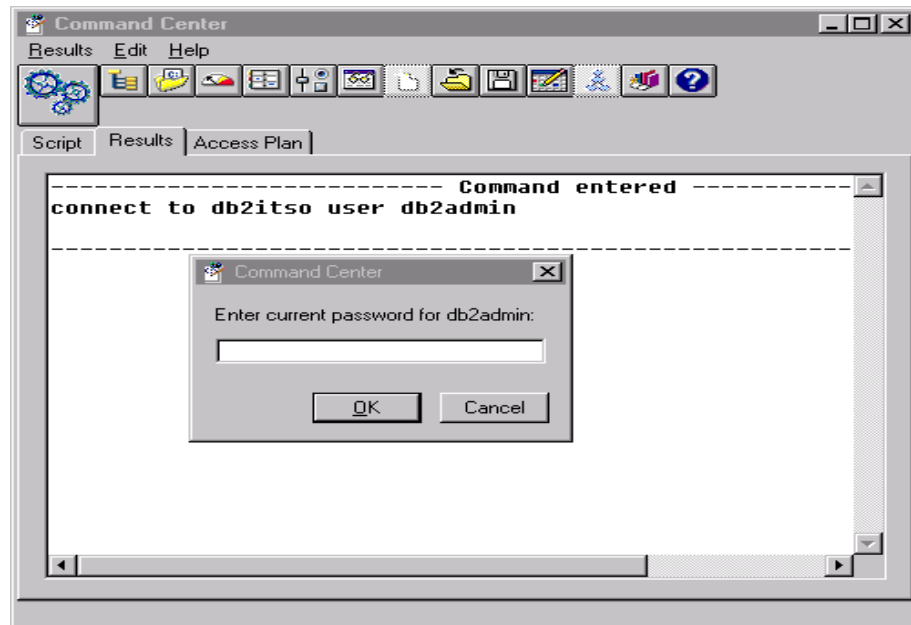


Figure 26. Logon connection to database

once the above command is run you will be required to enter a password as in Figure 27,userid's and passwords greyed out, a confirmation screen will appear showing you connection to the database server and the user id.

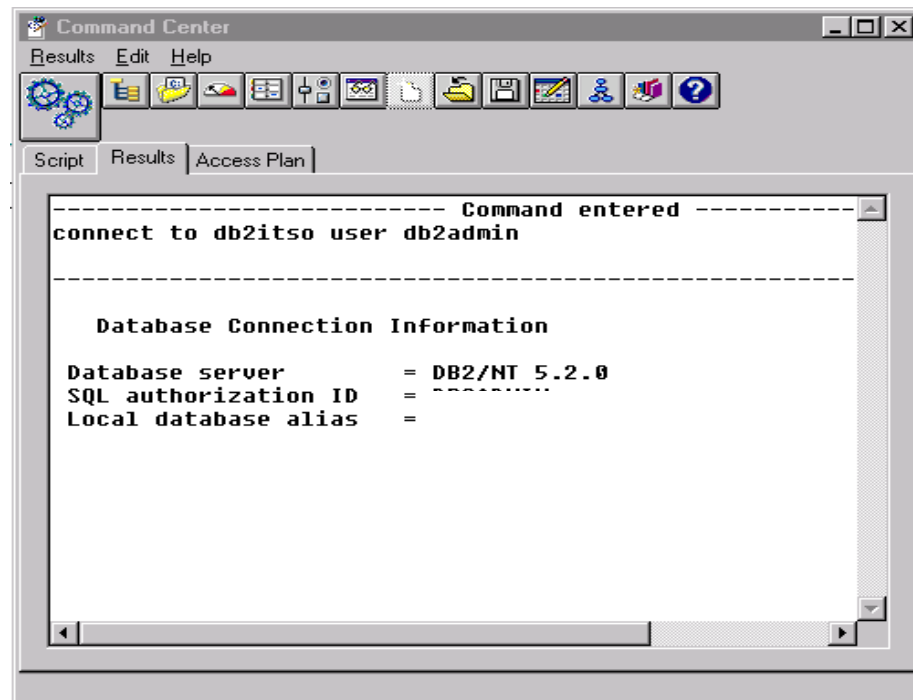


Figure 27. Connection succesful

On having connection to the DB2 database the command as mentioned above
Select * from sysibm.systables can be run as demonstrated in Figure 28
below.

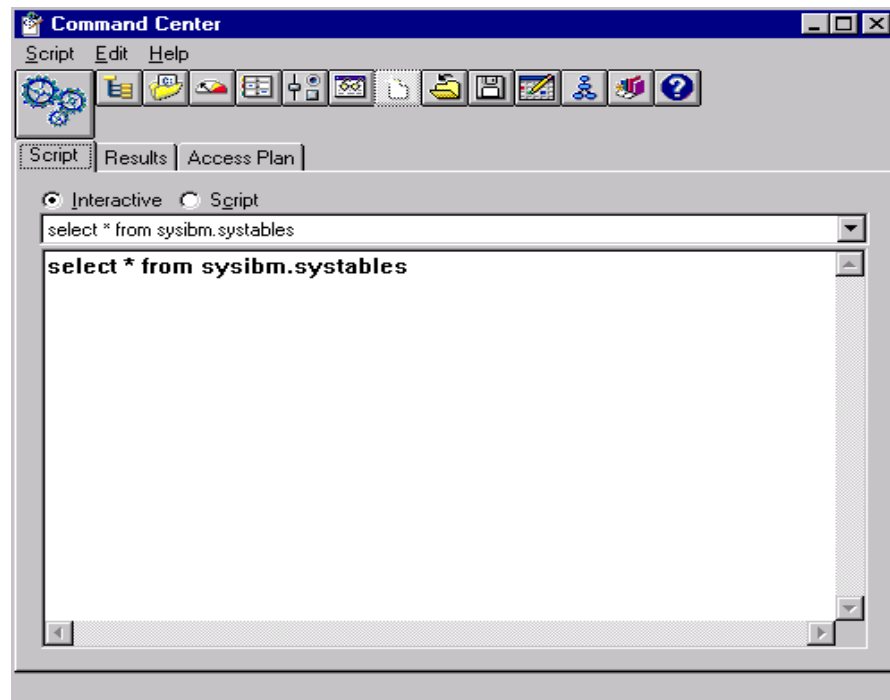


Figure 28. Simple command for DB2 query

On completion of running the command a the information will show what you have requested Figure 29.

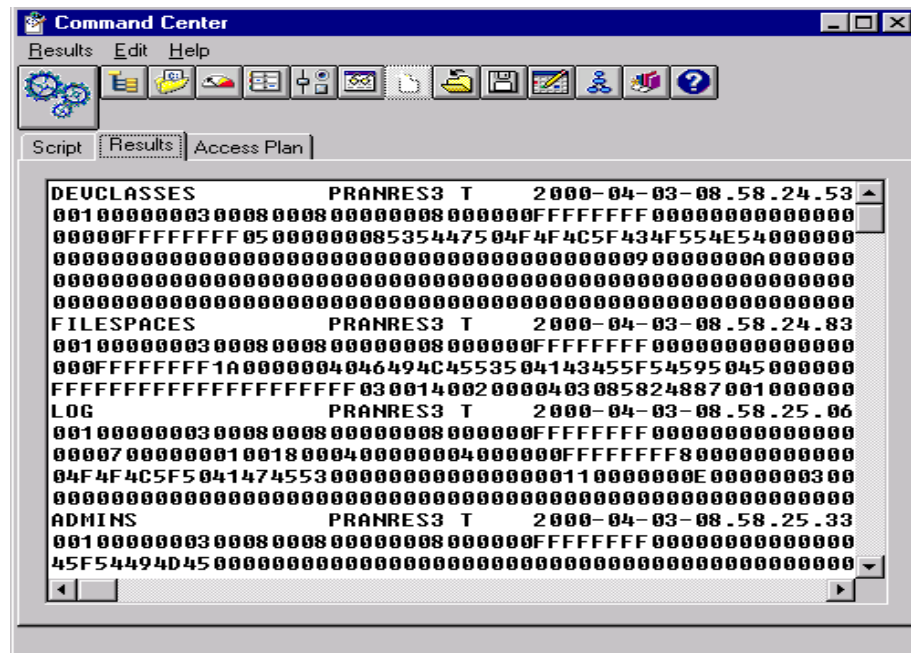


Figure 29. Results of the command issued

The results that can be seen are from the DB2 tables.

for any further DB2 command and administration please consult with the IBM DB2 manuals either, Administration or support

4.4.4 Setup guide for ODBC communications to the RDBMS

As mentioned earlier the ODBC's are vital for the communication to the RDBMS with out the connection there will be no communications between the TSM server and the RDBMS.

Below are a few steps to configure Microsoft SQL, DB2 for ODBC connections to the RDBMS. This should be done by the DB/TSM administrators

Microsoft SQL ODBC setup

From the Create New Data Source dialog box, select SQL Server Figure 30.

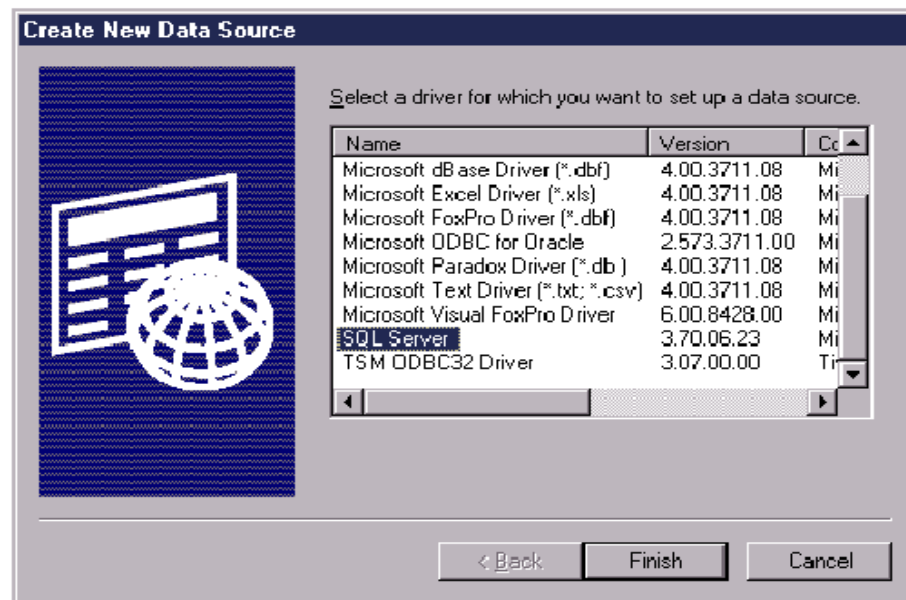


Figure 30. Creating a new data source

Click Finish to open the Create a New Data Source to SQL Server setup wizard.

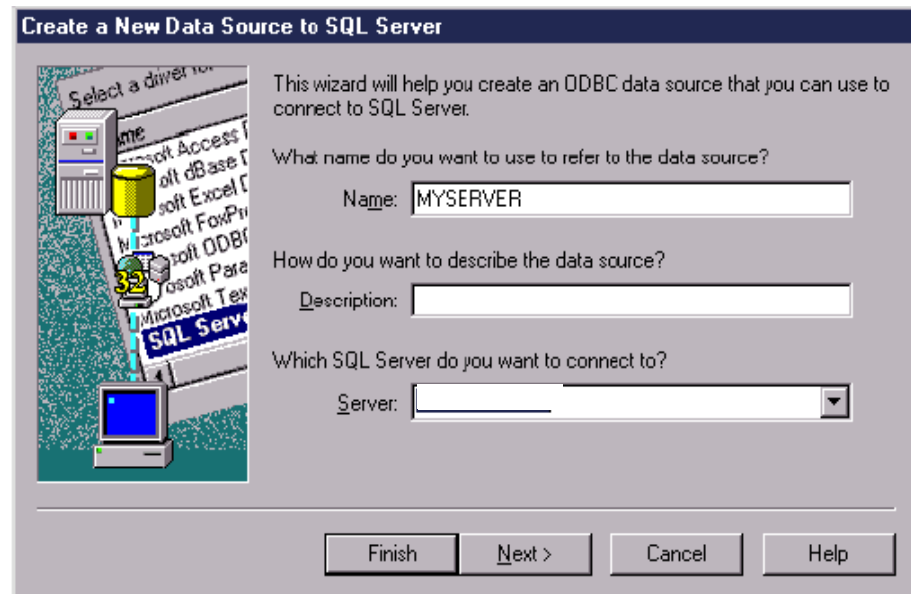


Figure 31. symbolic name and a specified IPP addressr

Enter a symbolic name for the data source and any descriptive text, and specify the IP address or system name of the server Figure 31. Click Next.

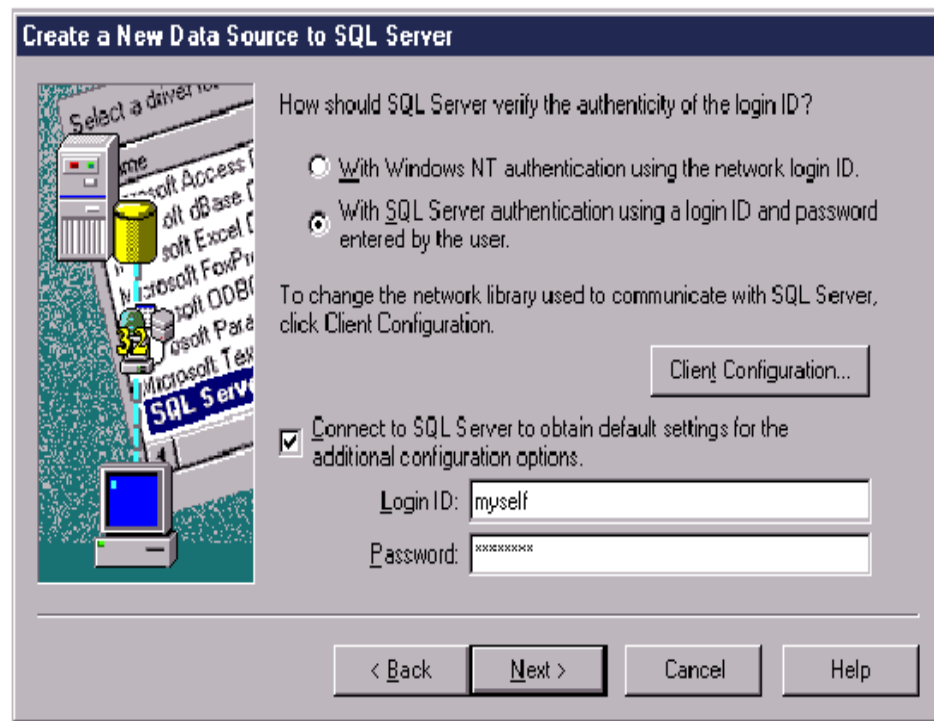


Figure 32. SQL login and password authentication

Select the second radio button to use SQL Server login authentication. enter a Login ID and Password for SQL server authentication Figure 32. click Client Configuration to open the Edit Network Library Configuration dialog box.

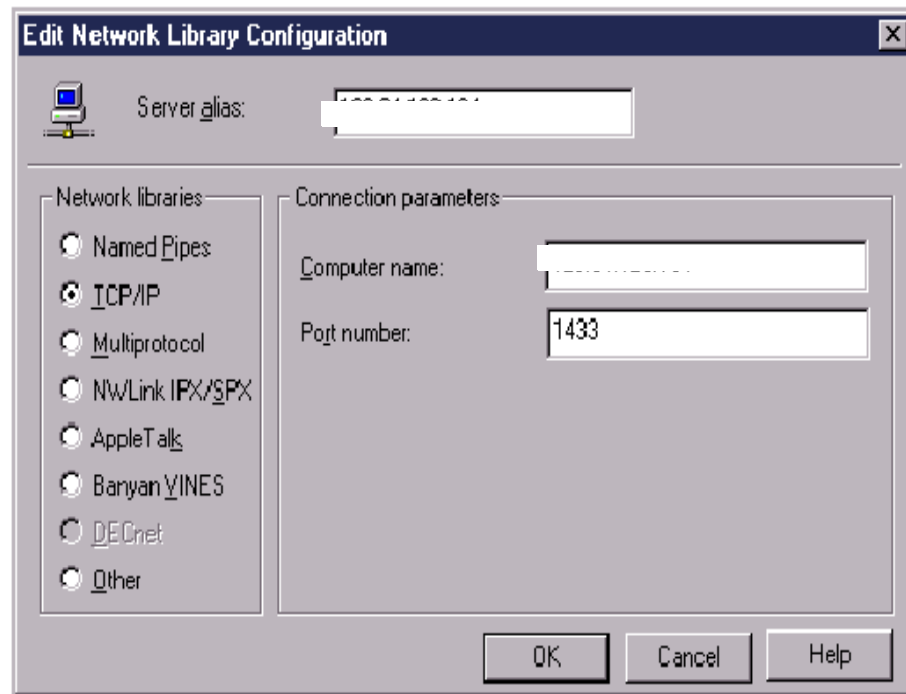


Figure 33. Library configuration for protocol to be used

Change the Network libraries communication protocol or connection parameters as required by your system configuration Figure 33. Click OK to return to the Create a New Data Source to SQL server setup wizard. Click Next.

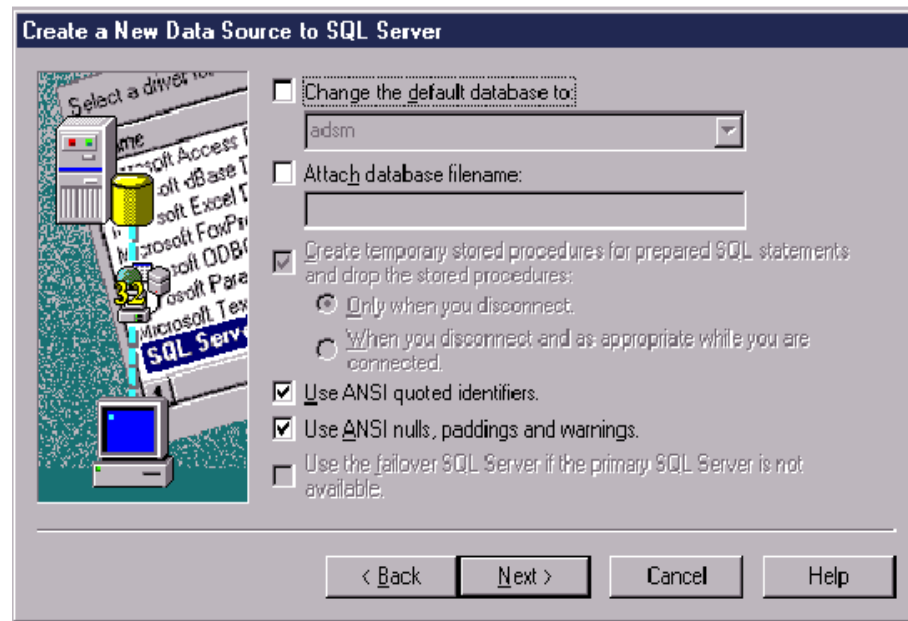


Figure 34. Specify the database for storage management

Select any processing option you want to apply, or use the default settings. You must specify the reporting database you plan to use for Storage management Analysis as the default database Figure 34. Click Next.

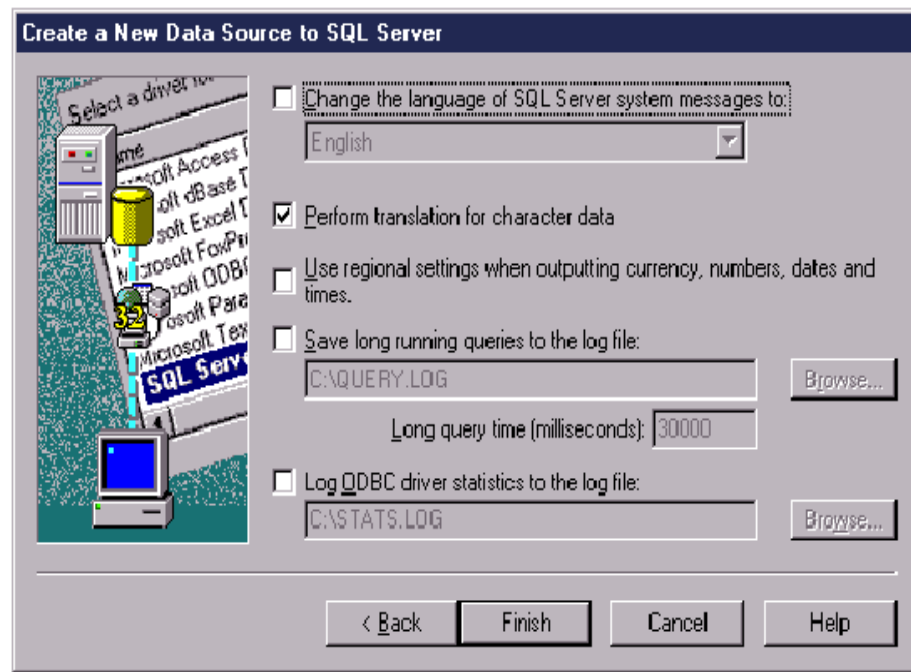


Figure 35. Process options to be applied

Select any processing option you want to apply or use the default settings Figure 35. Click Finish to open the ODBC Microsoft SQL Server Setup dialog box.

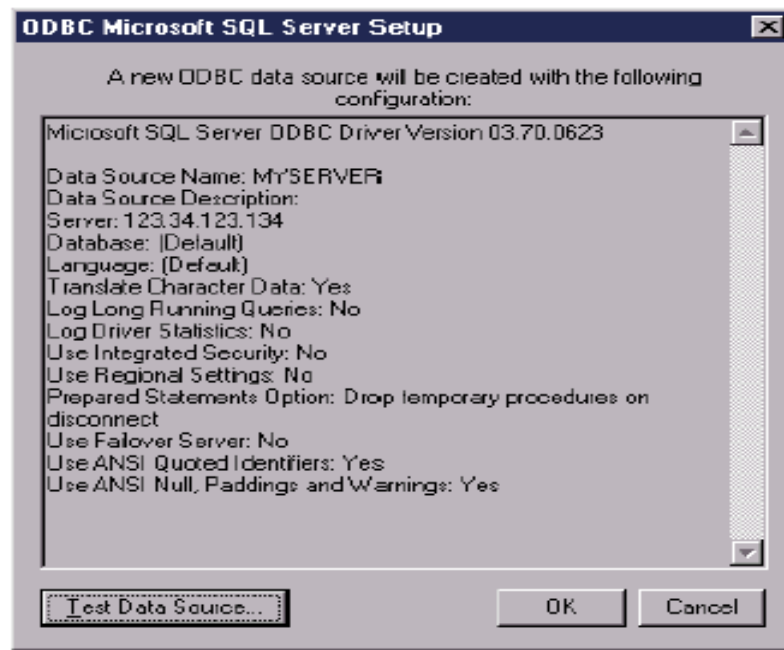


Figure 36. Test data source for connection

Check the configuration summary to make sure the setting matches the ones you entered in the setup wizard. If the settings do not match, click OK to return to the Data Source Administrator and repeat the SQL ODBC setup procedure to adjust option settings.

If the settings are correct, Click Test Data Source to establish a connection to the specified SQL server and verify option settings Figure 36.

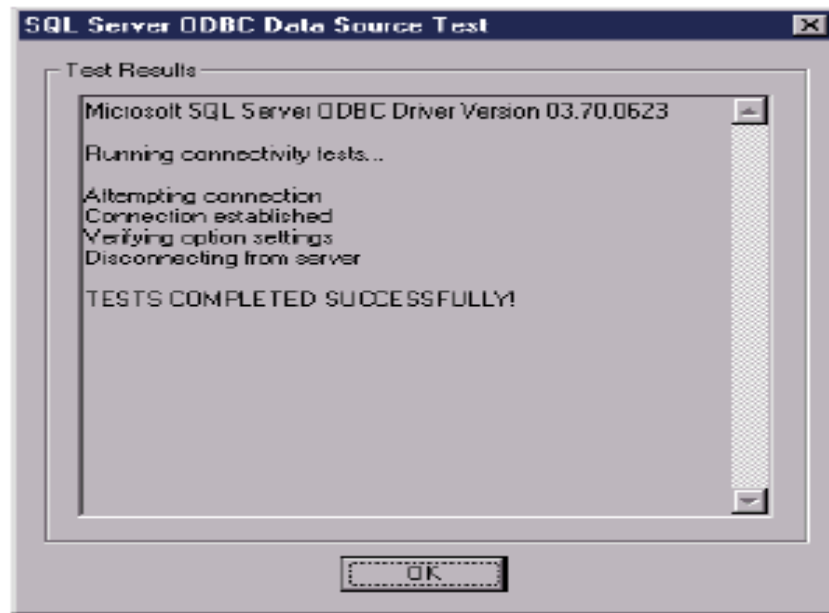


Figure 37. Data source test complete

Click OK to exit the setup wizard and return to the Data Source Administrator. If the data source test failed, you can repeat the SQL ODBC setup procedure to adjust option settings Figure 37.

From the Data Source Administrator, you can setup more ODBC data source connections or exit the ODBC data source setup.

Install of IBM DB2

From the Create new Data Source dialog box select IBM DB2 ODBC Driver Figure 38.

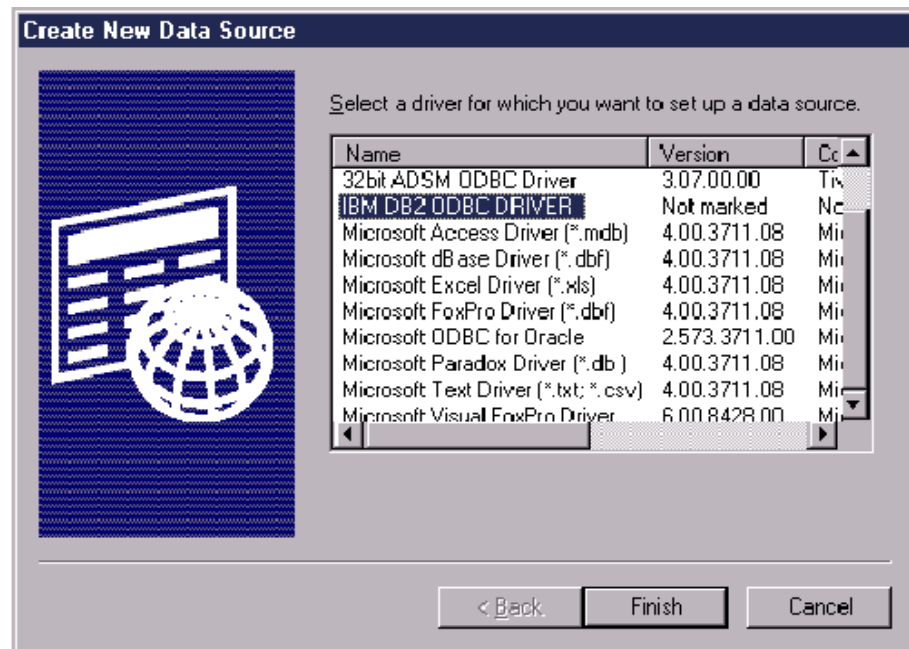


Figure 38. Creating a DB2 data source using the ODBC driver

click Finish to open the ODBC IBM DB2 Driver - Add dialog box Figure 39.

note:during your initial DB2 product installation, you may already set up and ODBC data source connection . The following steps apply for a new database configuration.

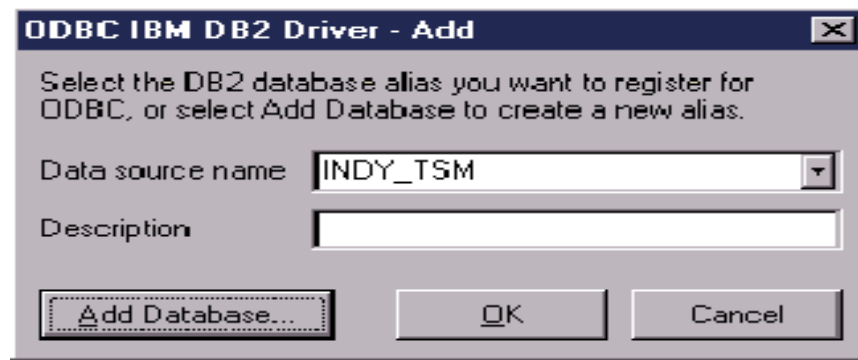


Figure 39. ODBC IBM DB2 driver

Click Add Database to set up a new database as and ODBC data source. The Add Database SmartGuide will appear.

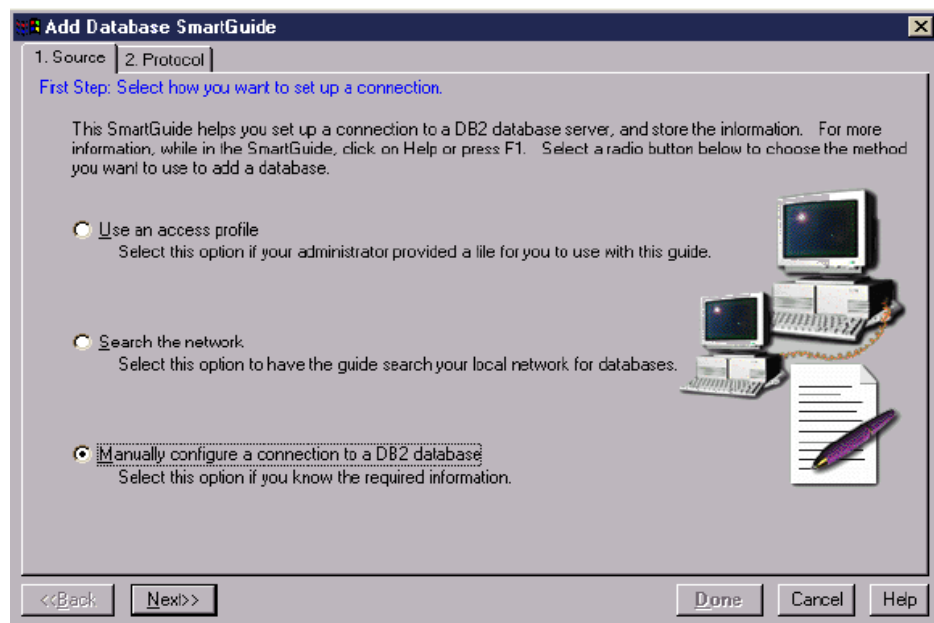


Figure 40. Manual configuration for DB2

Select the third radio button to manually configure your ODBC setup Figure 40 above. (You can also use a predefined access profile to automate the setup process. Click Help for more information about automated setup.) Click Next to open the Protocol page. Four additional configuration tabs will also appear.

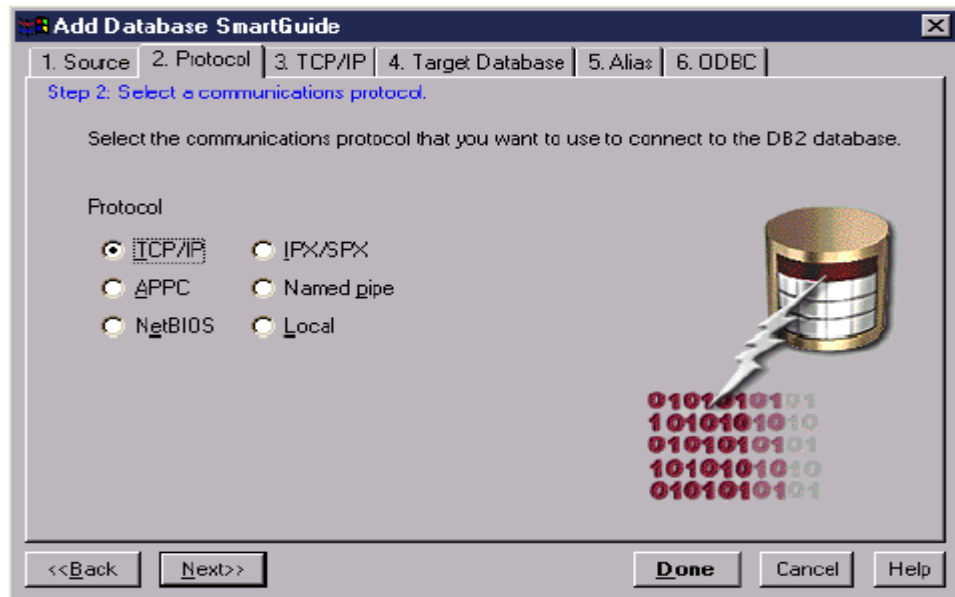


Figure 41. Protocol for system configuration

Select the communications protocol required by your system configuration. Click Next to open the parameters page for the protocol you have selected. (The example above shows the TCP/IP parameter page Figure 41.) You will see a different page if you select a different protocol.

The screenshot shows a Windows-style dialog box titled "Add Database SmartGuide". It has a tabbed interface with six tabs: "1. Source", "2. Protocol", "3. TCP/IP", "4. Target Database", "5. Alias", and "6. ODBC". The "3. TCP/IP" tab is selected. Below the tabs, the text "Step 3: Specify TCP/IP communications parameters." is displayed. A paragraph explains that the hostname identifies a system on the TCP/IP network and that a port number is associated with each DB2 server instance. It instructs the user to enter the server system's hostname or IP address in the "Hostname" field and the port number in the "Port number" field. The "Service name" field is optional. To the right of the input fields is an illustration of a database cylinder with a lightning bolt striking it, and below that, a stack of binary code (0s and 1s). A note at the bottom left states: "Note: You must configure the communications protocol before using it." At the bottom of the dialog are four buttons: "<<Back", "Next>>", "Done", "Cancel", and "Help".

1. Source | 2. Protocol | 3. TCP/IP | 4. Target Database | 5. Alias | 6. ODBC

Step 3: Specify TCP/IP communications parameters.

The hostname identifies a system on the TCP/IP network. A port number is associated with each DB2 server instance on that system. In the hostname field, type the server system's hostname or IP address. In the port number field, type the port number associated with the DB2 instance that contains the target database.

Hostname:

Port number:

Service name: (Optional)

Note: You must configure the communications protocol before using it.

<<Back | Next>> | Done | Cancel | Help

Figure 42. Server host name or IP address

Enter the DB2 server host name (IP address or system name) and port number. Click Next to open the Target Database page as per Figure 42.

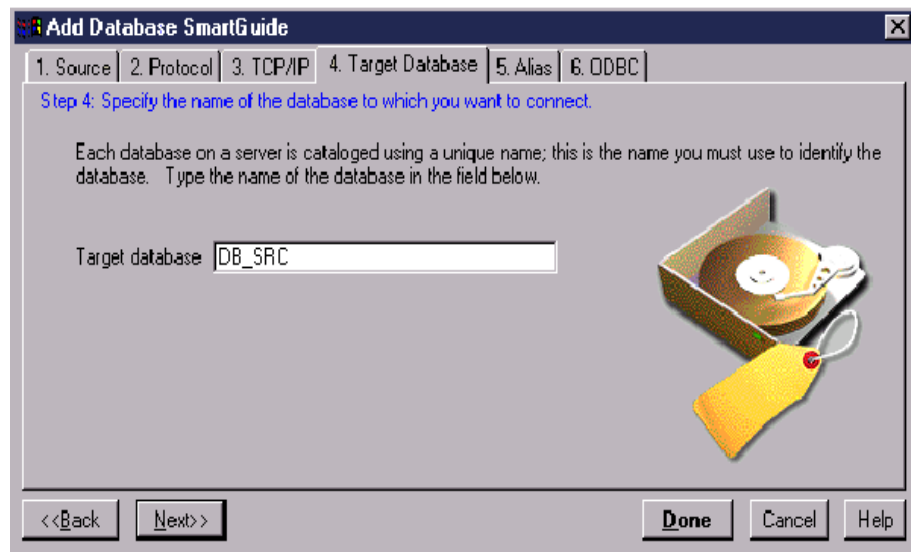


Figure 43. Target database name

Enter the name of the database as in the Figure 43 that you want to set up as an ODBC data source. You must enter the unique name specified for the database when it was created. See your database administrator for this database name. Click Next to open the Alias page.



Figure 44. Alias database name

Enter an alias name and description if you want to create a symbolic name for the target database in Figure 44. If you do not specify an alias, the unique name specified for the database when it was created will be used as the default local alias. Click Next to open the ODBC page.

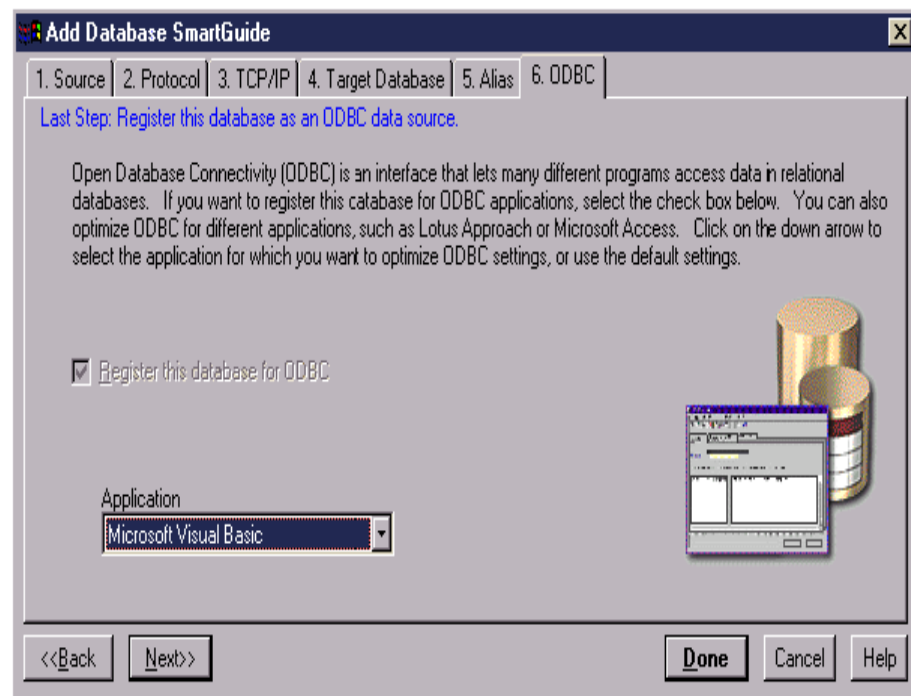


Figure 45. Microsoft Visual Basic application

Make sure the check box next to Register the database for ODBC is checked. Select Microsoft Visual Basic in Figure 45 from the Application dropdown list. Click Done to open the Connect to DB2 Database dialog box.

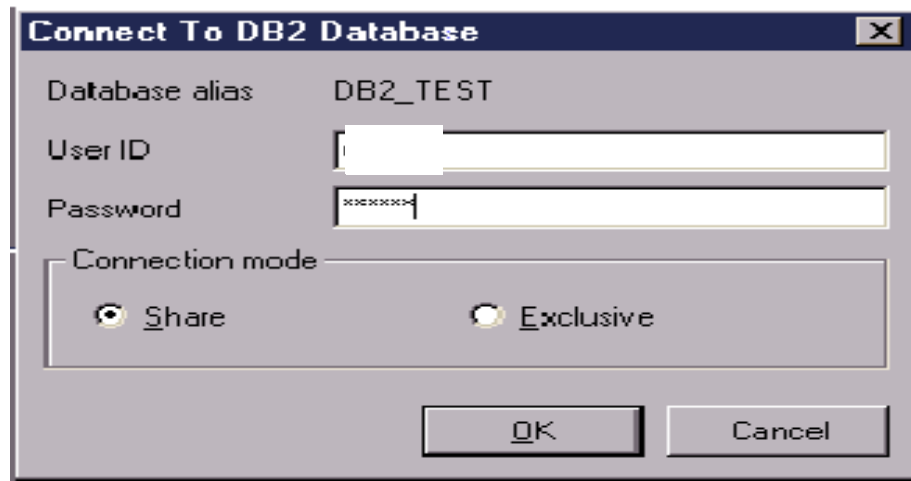


Figure 46. User id and password for Database connection

Enter the User ID and Password required to access the DB2 database. Click OK to pen the confirmation dialog box above in Figure 46.

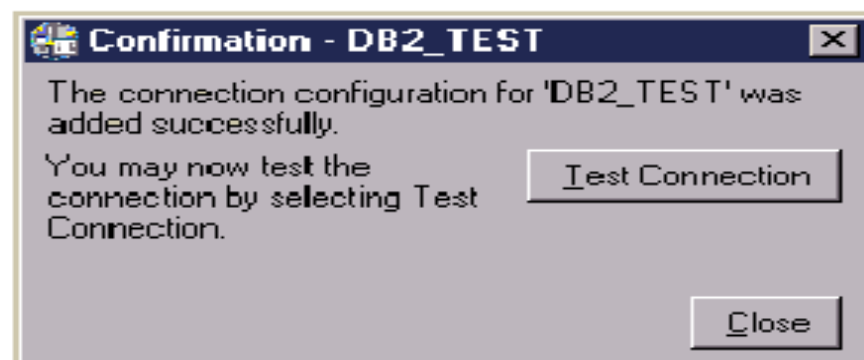


Figure 47. Test connection to database

Click Test Connection to the database connection Figure 47.

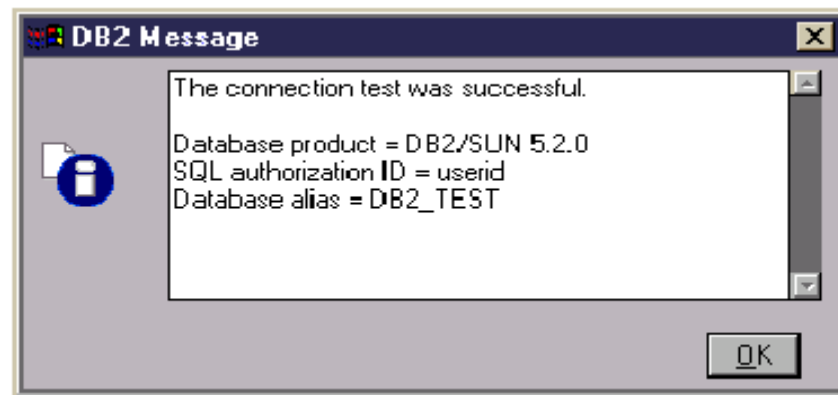


Figure 48. Db2 message confirmation

Click OK to exit the setup wizard and return to the Data Source Administrator. If the data source test failed, or you will get a message The connection test was successful Figure 48. You can repeat the DB2 ODBC setup procedure to adjust option settings.

From the Data Source Administrator, you can setup more ODBC data source connections or exit the ODBC data source setup.

Chapter 5. Operational Procedures for Storage Management Analysis

In this chapter we review scheduling and routine operations of Tivoli Decision Support for Storage Management Analysis. The problems that Tivoli Storage Management administrators face in making sure that the database has data reported to it on a daily bases, loader issues, and the “care and feeding” of the various Storage Management Analysis components are covered.

5.1 Scheduling

In this section we describe our recommendations on what Storage Management Analysis reports should be viewed and when.

The Tivoli Storage Management Administrator should setup a regularly executed schedule for dataloads (tsmdsl) and cube building. Keep in mind that you should try to avoid running the dataloads at a time when the Tivoli Storage Management database is being heavily used. Avoiding times when client backups and archives are running is preferred. Avoid running dataloads during Tivoli Storage Management administrative jobs. Expect degraded performance if this is not possible.

Reporting from System Management Analysis should be done on a regularly scheduled basis, as well. This will make trends and anomalies more apparent to the viewer and increase the value of the product to your organization. Specific reports to be drawn on a weekly, monthly, daily, or weekend basis are dependent on your preference and relevance to your operation.

The bold print in this section indicates headings within the Storage Management Analysis Guide.

The following is a recommended guide for a Storage Management Analysis report schedule:

5.1.1 Daily reporting

Having completed scheduling the Tivoli Storage Manager Decision Support Loader and the cube builds, the reports can be viewed in the Tivoli Discover Interface.

These reports can show you possible server or client errors that should be checked on a daily bases. Use the following reports from the Tivoli Discovery Interface for daily reporting:

Tivoli Storage Management Event Analysis

Daily exception reports

- Classify outcome for client sessions
- Summarize the messages issued in my environment
- What are the results of all operations that occurred for a client
- What is the status of non-scheduled administrative operations
- What is the status of scheduled administrative operations
- What is the status of scheduled client sessions

How might I improve my storage health

- How current are client backups
- Show me my server database backup record
- When did clients last contact the server

Trends in Server Operations

- What is the average daily failed object count
- What is the average daily successful object count

What messages should I be concerned with

- Summarize client messages by severity
- Summarize server error messages by severity
- What are the top 10 server messages

Tivoli Storage Management Performance Analysis**How are my clients performing**

- Which are my 10 fastest clients
- Which are my 10 slowest clients

How does time of day and day of week affect my performance

- What is the average daily throughput for client operations
- What is the average hourly throughput for client operations
- What is the average hourly throughput take for server operations

This set of reports should point to immediate problems which need attention. Look for unexplained 'spikes' in the performance and object failure. Also, error messages indicating severe and critical errors.

5.1.2 Weekly reporting

Use the following reports from the Tivoli Discovery Interface for weekly reporting:

Tivoli Storage Management Event Analysis

How might I improve my storage health

- How are clients schedules affected by the day of the week
- How current are client backups
- What administrators and clients have been locked out of the system

Trend in Client Operations

- What is the average daily failed object count
- What time of day do peak client data transfers occur

Trends in Server Operations

- How does time affect server session activity
- What is the daily failed object count for server operations

What messages should I be concerned with

- Summarize client messages by severity
- What are the top 10 client messages with the most problems

When do I find the most problems

- What day of week do peak client error rates occur
- What day of week do peak server error rates occur
- What time of day do peak clients error rates occur
- What time of day do peak server error rates occur

Tivoli Storage Management Performance Analysis

How are my clients performing

- How does Tcp/Ip address affect throughput

These reports should alert you to potential problems, unusual growth which could lead to problems, or beginning trends.

5.1.3 Weekend reporting

The following reports from the Tivoli Discovery Interface are recommended for weekend reporting:

Tivoli Storage Management Event Analysis

When do I find the most problems

- What day of week do peak client error rates occur
- What day of week do peak server error rates occur

Tivoli Storage Management Performance Analysis

How are my servers performing

- How much time is spent daily waiting for media access

How does file size affect my performance

- How does file size affect client operation throughput

How does time of day and day of week affect my performance

- What is the average daily throughput for client operations
- What is the average hourly throughput for client operations
- What is the average hourly throughput take for server operations

Weekend reporting is much like weekly in purpose. Some organizations prefer to look at data as it corresponds to the calendar week. You may find that this is appropriate. If not, run these along with the weekly reports.

5.1.4 Monthly reporting

The following from the Tivoli Discovery Interface are recommended for monthly reporting:

Tivoli Storage Management Event Analysis

Trend in Client Operations

- Summarize client messages issued by platform

- Summarize client messages issued by software level
- What time of day do peak client data transfers occur
- Which clients have the highest average failed objects count

Trends in Server Operations

- How does time affect server session activity
- How much data is processed by daily server operations
- What is the daily failed object count for server operations

What does my environment look like

- How many clients are registered with each server

What messages should I be concerned with

- Summarize client messages by severity
- What are the top 10 clients with the most problems

Tivoli Storage Management Performance Analysis**How are my clients performing**

- How does platform affect client throughput rates
- How does Tcp/Ip address affect throughput

How does file size affect my performance

- Classify sessions by file size and performance thresholds
- How does file size affect client operation throughput

These reports are geared, with the proper date filters, yield an analysis of performance and events within the month. They will give a picture of what has transpired during the month, as well as show storage trends in the enterprise. These may be good candidates to be stored for further reference or year end summary reporting.

5.1.5 The “window of opportunity”

We describe the window of opportunity as, the time in which the Tivoli Storage Manager Decision Support Loader may execute, allowing the extraction of data from the Tivoli Storage Management servers to the RDBMS

where the data will be stored, while encountering the least amount of competing data traffic or processing resistance.

After dataloads have been completed and the cubes have been built, the stored data can then be reviewed by managers of a business or the Tivoli Storage Management Administrators. Before you build the cubes in the Tivoli Discovery Administrator it is important the database has stored the data that will allow the cubes to build with the most current data. Then the reports can then be viewed from the Tivoli Discovery Interface.

The process of performing cube builds can be done in two different ways. We recommend that the cubes be scheduled to build automatically at a time of day (or days) specified by the administrator. Pick a time when the network will not be a limiting factor. The other way the cubes can be built is to manually have the administrator do it through the Tivoli Decision Support Administrative Interface, which can become a time consuming task.

The importance of the time chosen to do this, is that you do not want the Tivoli Decision Support Loader to execute at the same time the cubes are scheduled to build. The interference will decrease the system performance on the processors, particularly when data is been correlated into the RDBMS.

5.2 Care and feeding

Here we discuss the data cleanup, feeding and care of the RDBMS, loading data to other servers, possible loader failures, and high CPU utilization during loader execution.

5.2.1 Loader issues and ODBC loss of connection

You should be aware that CPU utilization during loader runs can be affected by the use of the PC mouse.

When the Tivoli Storage Management Decision Support Loader is being executed and the Tivoli Storage Manager Decision Support Loader graphical user interface appears on the screen, do not use your mouse or click on the decision support loader. This will stop the loader operation for a short while until the utilization decreases. The CPU utilization can run at a 100% as in Figure 49, not allowing any operation on the current screens or on the windows NT4 desktop until the decision support loader has completed the data load to the RDBMS.

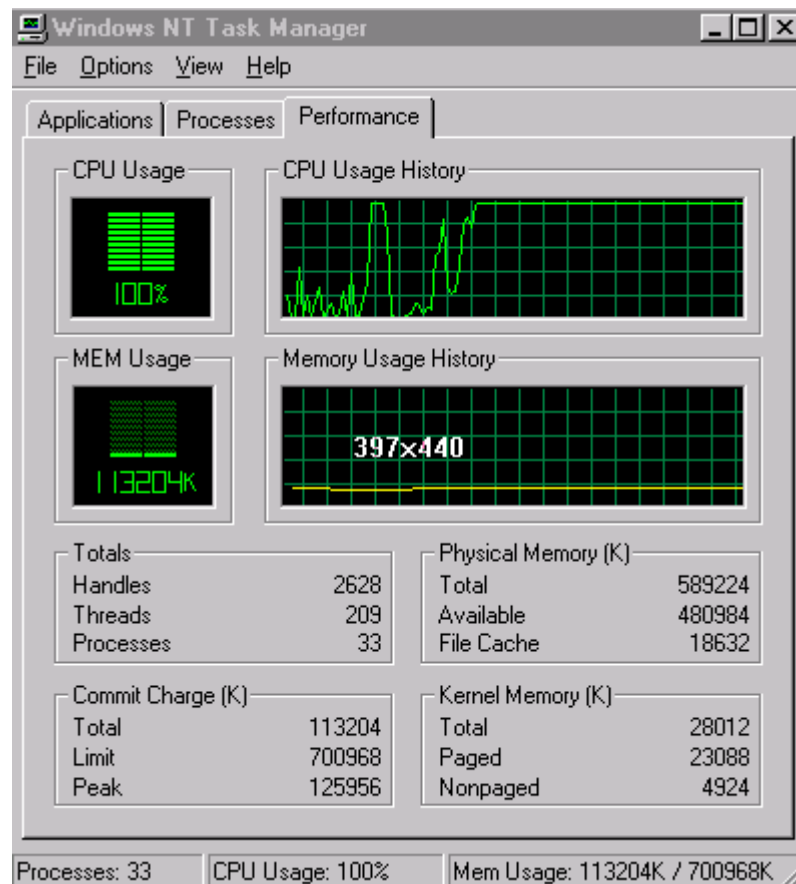


Figure 49. CPU utilization 100% while TSMDSL is running

5.2.2 Cleanup of RDBMS records

Cleanup of data records which you no longer want to report on in the RDBMS (Microsoft SQL, DB2, Oracle) are required in any database that is used. This could be performed by the Database Administrators.

Another method of doing data cleanup is called pruning. This is performed by the Tivoli Storage Management Administrators, by using a parameter to specify the length of time data will be retained in the reporting database. When the Decision Support Loader is run after the number of days specified in this parameter, data exceeding the parameter is expired from the reporting database. The maximum length of time you can specify is 366 days.

The Decision Support Loader is set to prune approximately one thousand records at a time. You can change this default setting by modifying the number of records specified in the following line in the configuration file:

```
ApproxRecordsToPrunePerBatch:=1000
```

Should you have a large number of records to prune, specifying a small number of records in the above line can slow the Decision Support Loader processing time.

The number of records that your system can process depends on the size of the transaction log defined during the database configuration.

Transaction log file

It is highly recommended that you see your Database Administrator for information about the size of your transaction log and data cleanup processes.

5.2.3 Near real-time reporting

The reports that are generated are not in a real time or 'live' mode. The Storage Management Analysis mode used is known as 'near real-time'. When you pull the data from the RDBMS, the reports will reflect data up to the point in time of the last data load.

5.2.4 Duplicating to other file-servers

Tivoli Decision Support can be installed and configured in two ways. Tivoli Decision Support and its various components can be installed on one server. The TDS components, however, are not shared across other machines. The user that will be using the stand alone mode will have access to the Discovery Interface and to the Discovery Administrator. Refer to this discussion in Chapter 3.

If the end user runs Tivoli Decision Support in stand alone mode, the Discovery Administrator, the Discovery Interface and the Shared Data must be installed to same machine, and serve that machine only.

The correct specifications of the machine are required.

With network mode, only the Discovery Client component, which includes Cognos Powerplay, is installed on the client machine. It is recommended that you install the Shared Data components and the Discovery Administrator on

separate machines. The user of the client machine can only use the Discovery Interface.

If the environment requires that Tivoli Decision Support (Discovery Interface client) be installed in the network mode, then the Discovery Administrator should be installed on separate machine (usually the system administrator's machine) and the Shared Data component should be installed on a file server. The Discovery Administrator must be installed on at least one machine when installed in network mode.

In order to use Tivoli Decision Support online documentation install Adobe Acrobat reader.

The correct specifications for the machine is required.

Hardware Requirements for Storage Management Analysis

Tivoli Decision Support must be installed on a IBM PC compatible machine. Tivoli does not support platforms (such as the NEC PC98xx series) that are not 100% compatible with the IBM PC.

Hardware requirements depend on the software configurations:

If Tivoli Decision Support is intended as a server installation, the requirements are:

- Processor: Intel-based Pentium 450MHZ (minimum)
- Memory: 256MB (minimum)
- Disk Space: 200MB for the software, 400MB minimum for the cubes (depending on the Tivoli Storage Manager network size)

If the Tivoli Discovery Interface and Storage Management Analysis are intended as a client installation, the requirements are as follows:

- Processor: Intel-based Pentium 300MHZ (minimum)
- Memory: 128MB (minimum)
- Disk Space: 100MB for the software Tivoli Storage Manager.

The use of a file server in the Tivoli Decision Support is recommended. If the Tivoli Decision Support client software resides on the file server as a shared resource and each client loads the application from the file server, a highly fault tolerant configuration is recommended.

However, if the Tivoli Decision Support client software resides on each client workstation, configuration of the file server is not required. The connection between the file server and the client software must support long file names.

Low end file server and the various Data Components

- 300Mhz or faster processor
- 128MB RAM
- Support long file names
- Sufficient hard drive space

High end file server and the various Shared Data components

- Latest high-speed processor
- Microsoft Windows 98 or Windows NT4
- 256MB RAM improve performance, 512MB RAM is recommended if you are building cube with large volumes.
- Support long file names
- Sufficient hard drive space

5.2.5 Exercising relationships within reports

After opening Tivoli Discovery Interface and selecting a option from Tivoli Storage Management Event Analysis or Tivoli Storage Management Performance Analysis, it is possible to exercise reports within reports by clicking on the related views tab as in Figure 50 and Figure 51 on page 103. On the lower sub window there will be additional graphs or reports that the original can be referred to as in the following example:

It is possible to find that an error from a client or file server did not only fail on the backups, but it may have failed due to a operating system failure.

Looking at the report -

What messages should I be concerned with?

- Summarizes client messages by severity

To take you further into exploring other graphs, showing other possible errors and how they can be related to one another, view the additional options in the related views tab.

The 'related views' tab points to other graphs such as:

- Summarizes client messages issued by platform
- What are the top 10 client messages
- What are the top 10 client with the most problems
- What day of week do peak client error rates occur

There are many reports that reference related views as per Figure 52 and Figure 53. To be able to view the related views, the options below will need to be opened up and in the lower sub window click on the related views tab.

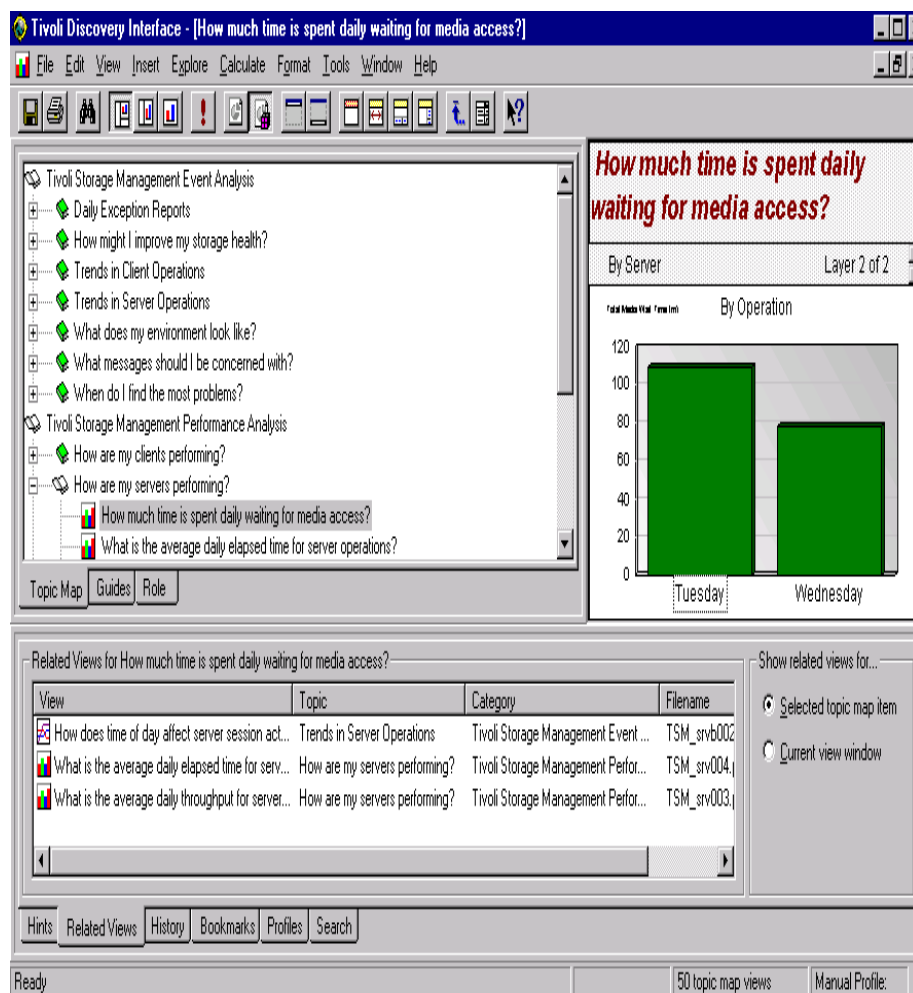


Figure 50. Related views in the lower box windows from the Tivoli Discover Interface

In the above example, the report “How much time is spent daily waiting for media access?”, the related views (reports) are “How does the time of day affect server session activity?”, “What is the average daily elapsed time for server operations?”, and “What is the average daily throughput for server operations?”.

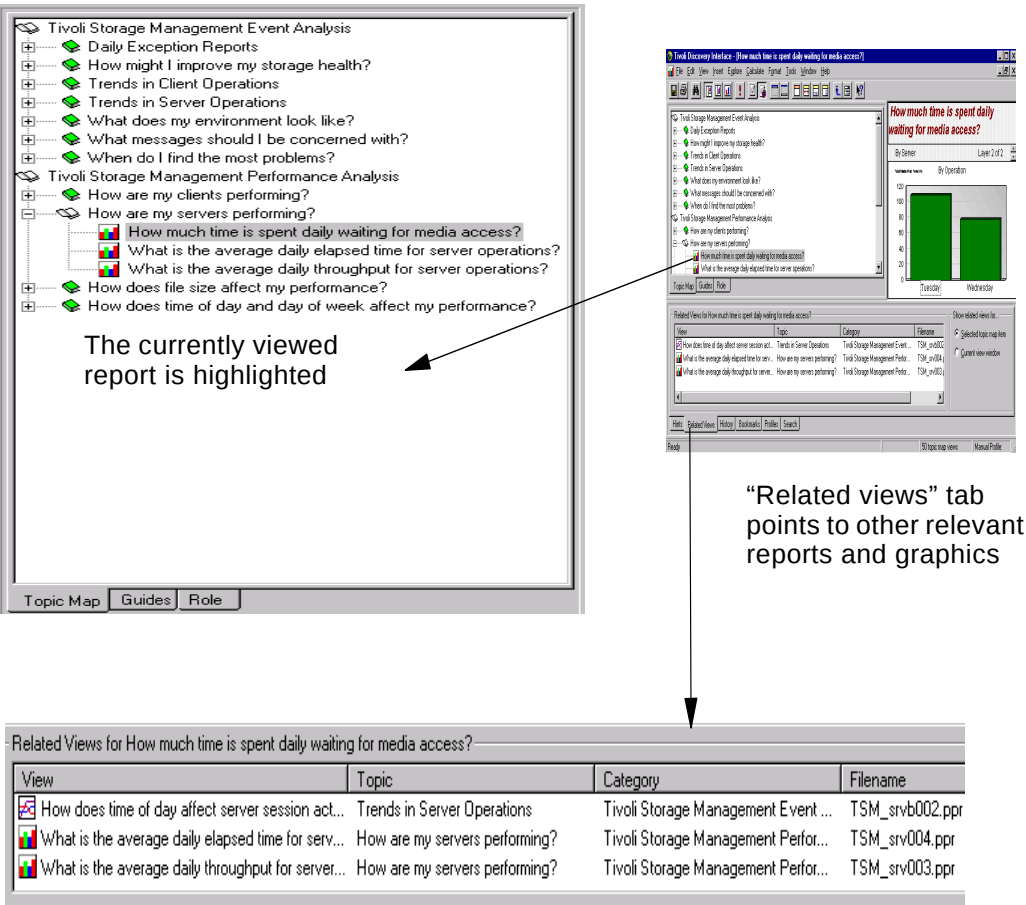


Figure 51. Related views shown from Tivoli Discovery Interface

Figure 52 and Figure 53 list the possible reports available in the current release of Storage Management Analysis. Each report can be shown in a variety of formats to best represent or emphasize a particular facet. Use of other Tivoli Decision Support features such as sorting, explain, drill down, layering, and others. Refer to the Tivoli Decision Support Users Guide for a discussion on these features.

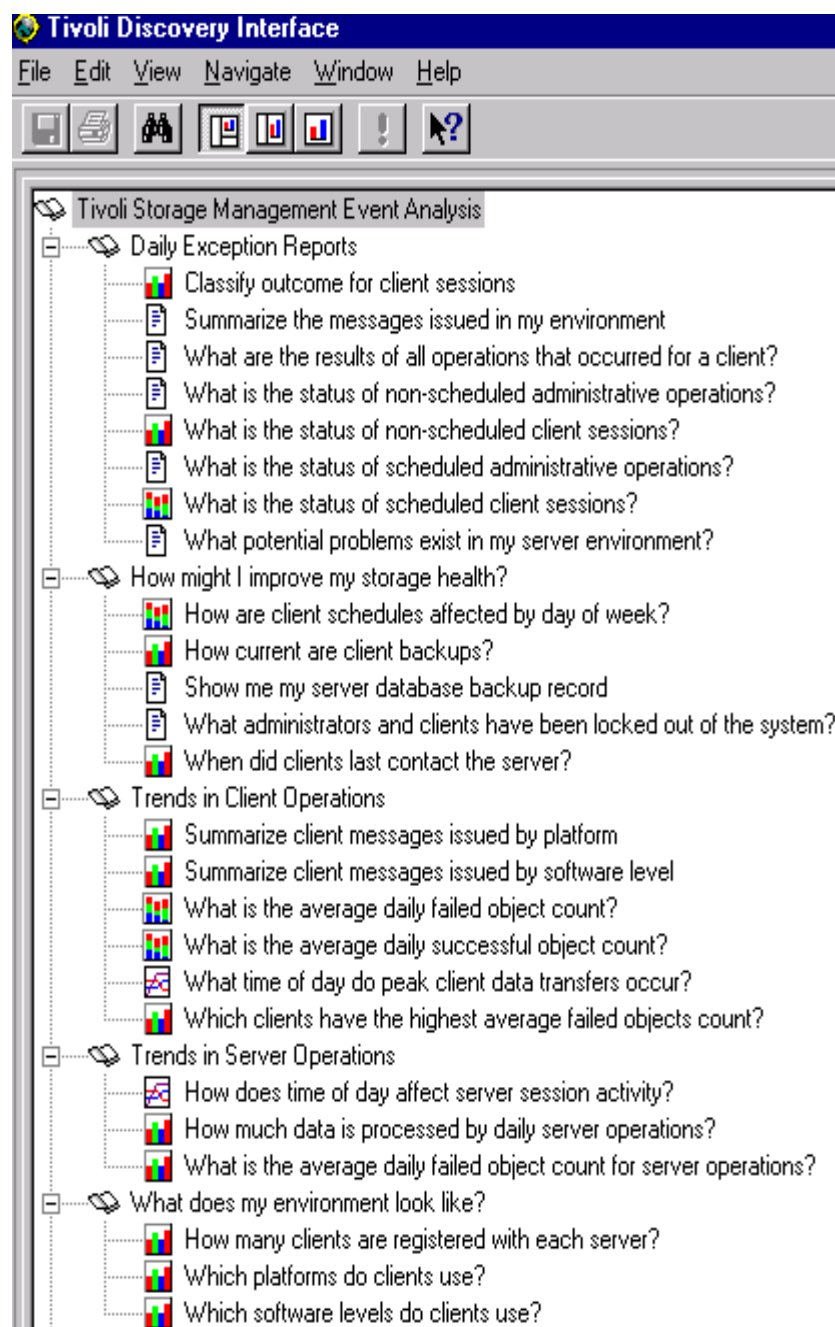


Figure 52. Reports from the Storage Management Analysis Guide

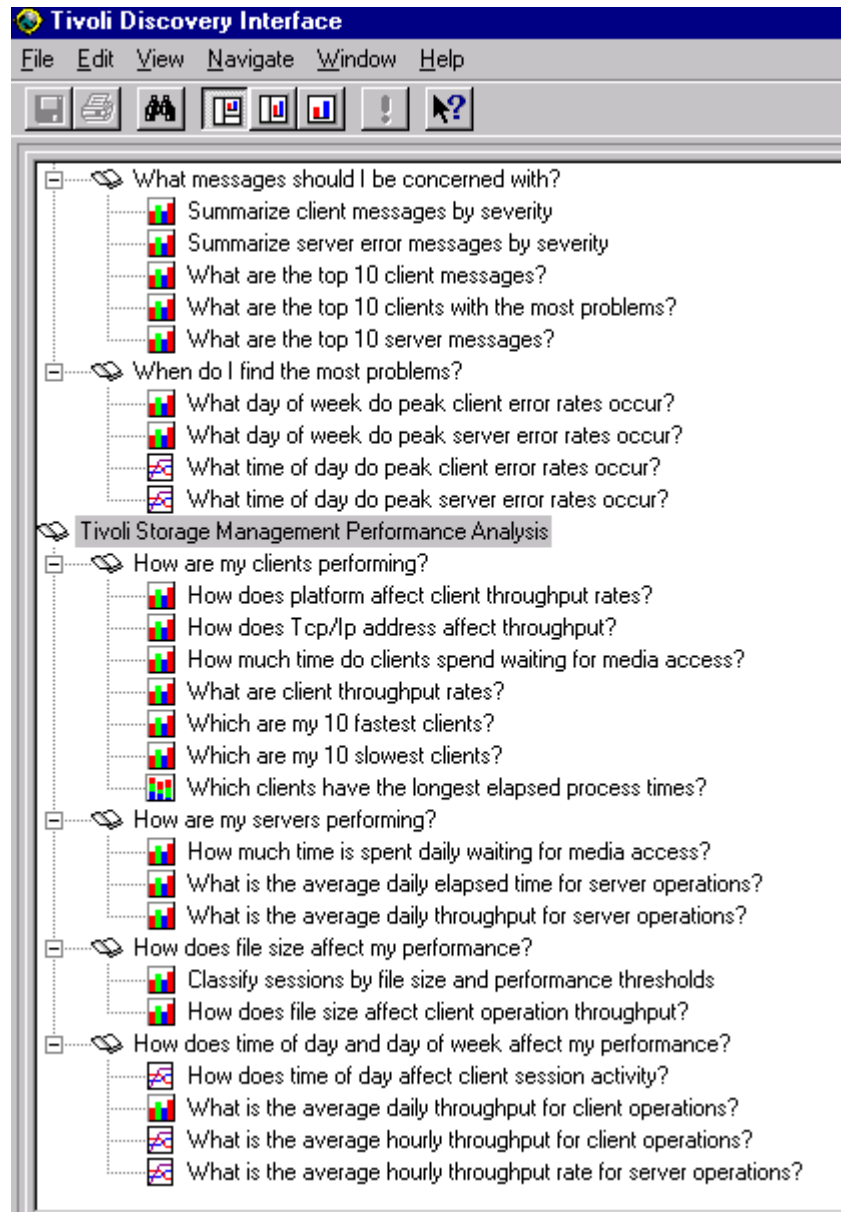


Figure 53. More reports from the Storage Management Analysis guide continued

Table 1 on page 133 shows how the report names relate to other reports via file names. Cross reference 'Related Views' column to 'Filename' column. The table is built in 'Filename' sequence. Also, helpful in that section is the 'View Description (hint' text)' which can be a helpful reference when looking for specific elements to report on.

From these tables the administrator can see how the related views are linked to each other and generated throughout the whole of the Tivoli Discovery Interface giving a detailed explanation of processing facets.

Chapter 6. Tivoli Decision Support for Storage Management Analysis Reporting

In this chapter we show how Tivoli Decision Support for Storage Management Analysis can be used to provide answers to the problems highlighted in Part 1.5, "What kinds of problems can be solved using Storage Management Analysis?" on page 19.

This is representative of the kinds of questions that are likely to be asked in a Tivoli Storage Management environment. We will provide the Storage Management Analysis alternative that we think is most appropriate to answer the given question. However, this is not the only correct answer and may not be the best answer for your given situation. You may want to use other tools to help you report, as well. Our purpose here is to demonstrate Storage Management Analysis as an usable tool with relevant "out-of-box" reporting for Tivoli Storage Management.

The reports presented in this chapter have 'drill down' reporting, 'related views', and can isolate reporting by server by viewing particular 'layers'. As mentioned in proceeding chapters, see the Tivoli Decision Support Users Guide on the use of these features. The use of these features increases the power and value of all the reports we will present in this chapter.

6.1 Scheduling for efficiency

The questions, "What is the resource impact on my server when I run my client schedules?" and "What is the best way to change my backups and archive schedules to allow efficient scheduling?" are closely related.

To answer them, we must decide what elements define resource usage and whether we can express those elements in measurable terms. For example, total data volume and throughput would be useful and they are measurable.

Most of the time, the Tivoli Storage Management Administrator is not monitoring the system when scheduled backups or archives are running because they are typically run during off-shift hours.

To deal with this situation, scripts are often written and executed at repeated intervals to snapshot CPU usage, I/O to devices, and media waits. The report derived from that exercise can indicate changes which will make the system process more efficiently if they are interpreted and presented accordingly. That was one way of approaching this problem prior to Storage Management Analysis.

Now, we can select Storage Management Analysis reports which will tell us how we are using resources and indicate scheduling changes that improve overall resource allocation.

One place to start this analysis is to find a status of clients to determine which clients are failing or have a high rate of failure. An appropriate report is in Figure 54.

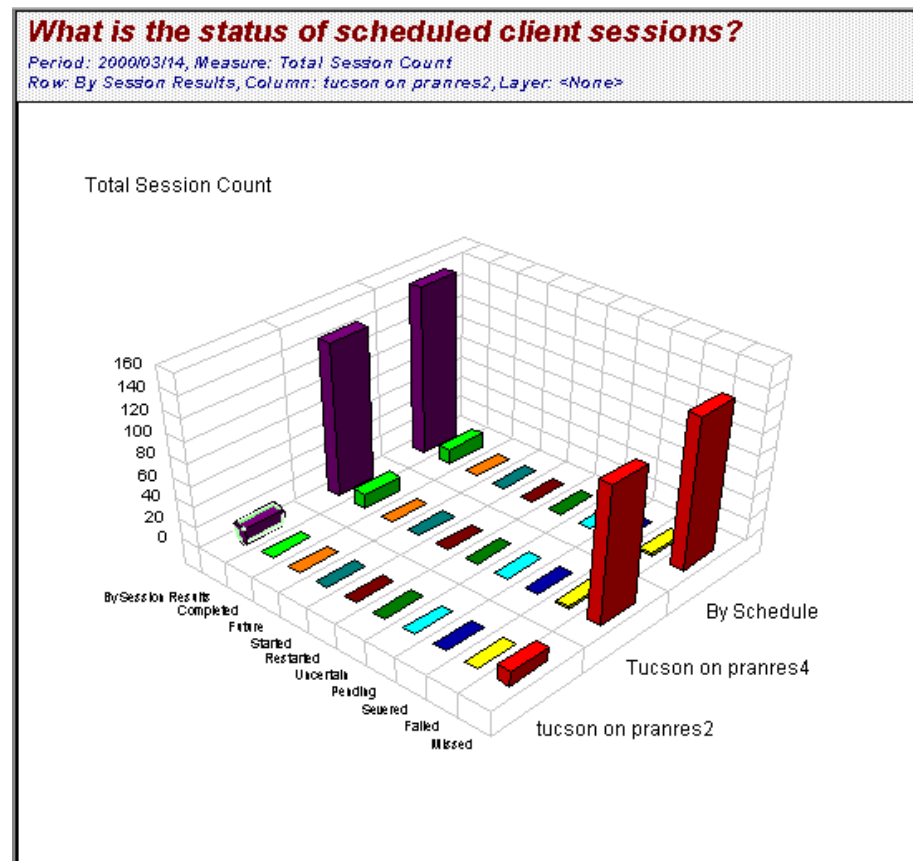


Figure 54. What is the status of scheduled client sessions

You would also want to look at media waits for client schedules as a beginning report. One of the more common problems in backup and archive job scheduling is to run out of available tape drives. Refer to Figure 55.

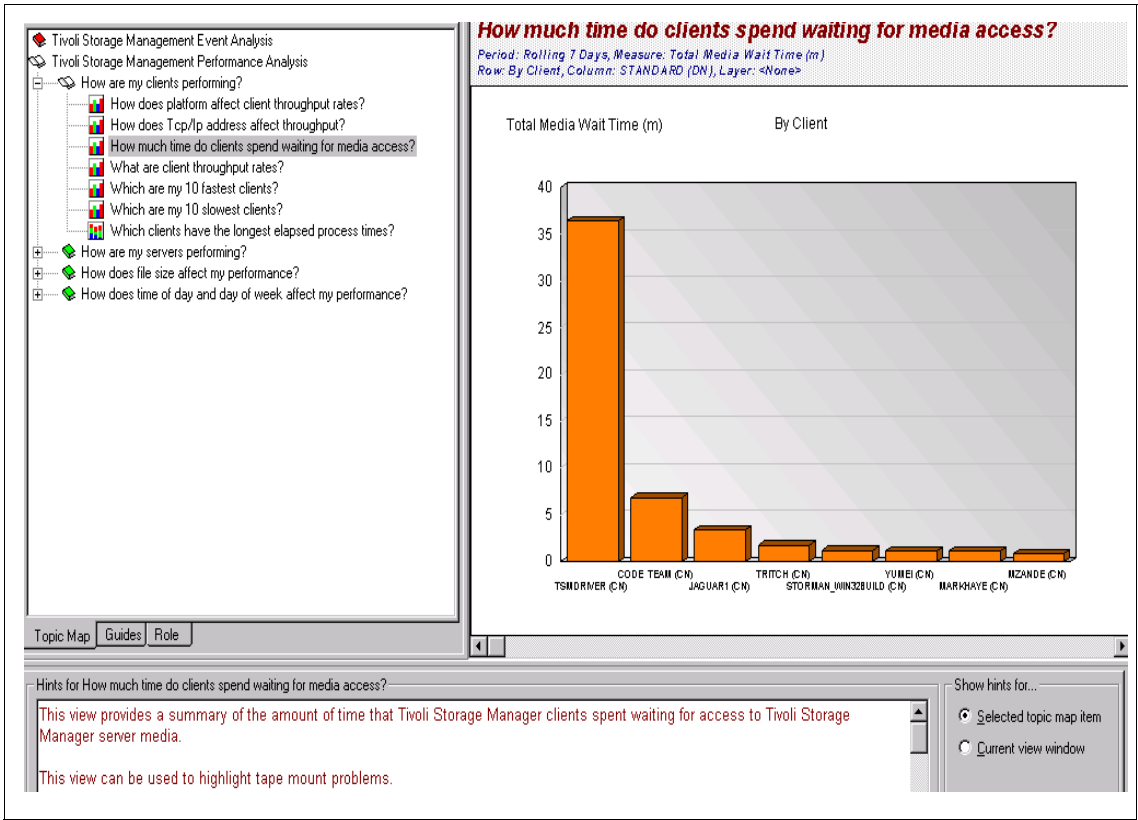


Figure 55. Client media waits

I

Referencing another useful report, in Figure 56 we can look at wait times for server activity. This can be an indicator of scheduling conflicts, forced data migrations during backups, or even database backup triggers set at an inappropriate level.

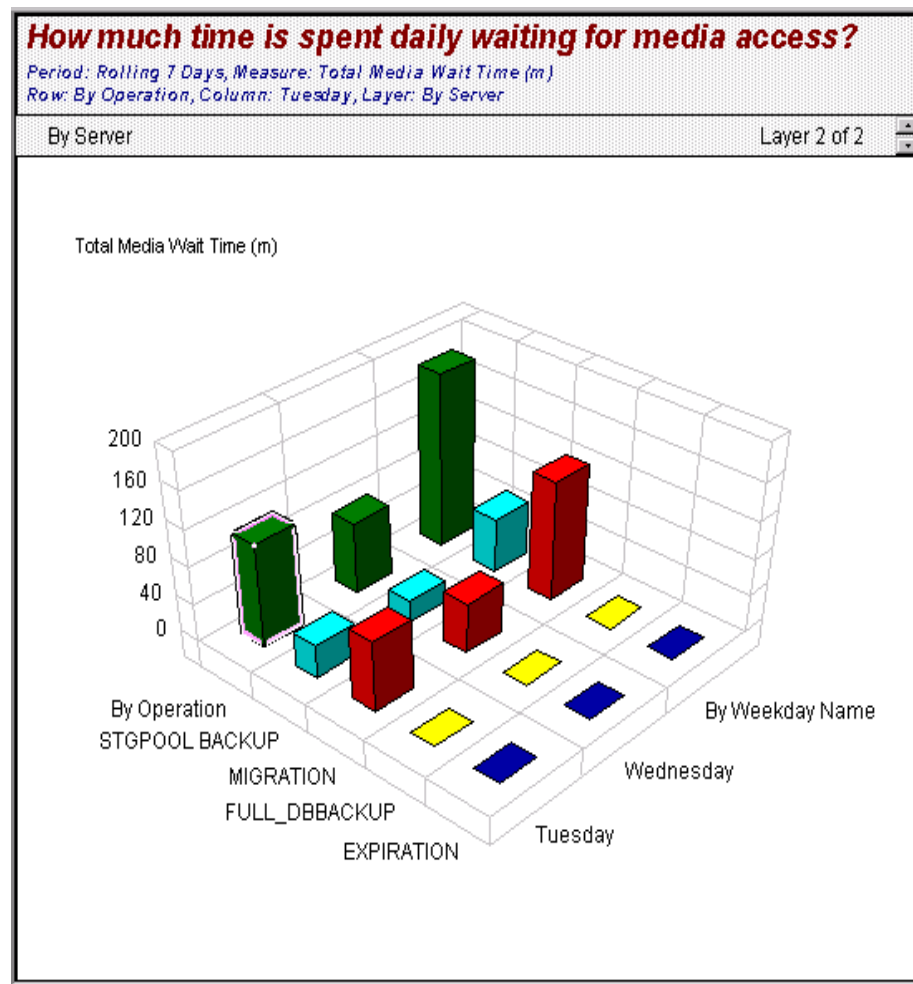


Figure 56. How much time is spent daily waiting for media access

We can see on the above report that there may be an unusual amount of time spent waiting for tape access during 'migration' activity. Controlling when migrations happen can be key to keeping client schedules moving efficiently.

Closely related to this topic because it can effect the performance of client schedules, is the next topic on networking.

6.2 Looking at Tivoli Storage Management network traffic

Tivoli Storage Management implemented into the enterprise can help identify problems with your network because it is highly reliant on network connections to accomplish its tasks. Implemented across a network it usually reaches many paths which can be diagnosed from a single Tivoli Storage Management server source. If some paths to the server perform meet expectations and others do not, a comparison of divergent paths can usually identify problem components. By working with your network technicians in this area you may provide invaluable assistance to them, as well as improving your Tivoli Storage Management system. The questions, "What impact does Tivoli Storage Management data movement have on the network?" and "What was my throughput rate over the LAN/WAN for sent and received data?" can provide indicators of correctable network problems.

The reports listed in the Storage Management Analysis Guide in Figure 57 are an excellent place to start looking for network problems.

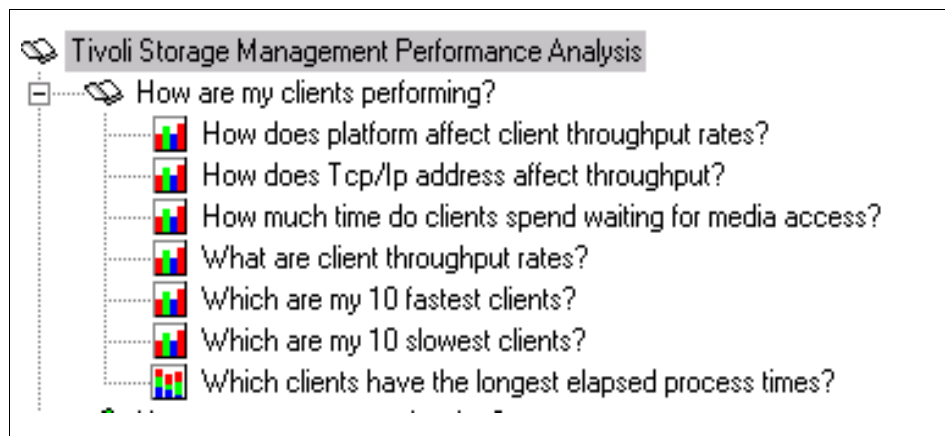


Figure 57. Reports that are helpful in identifying network problems

From the above lists, one interesting exercise is to see if you can draw a correlation between client platform and throughput rates. An example of one of the listed reports is in Figure 58.

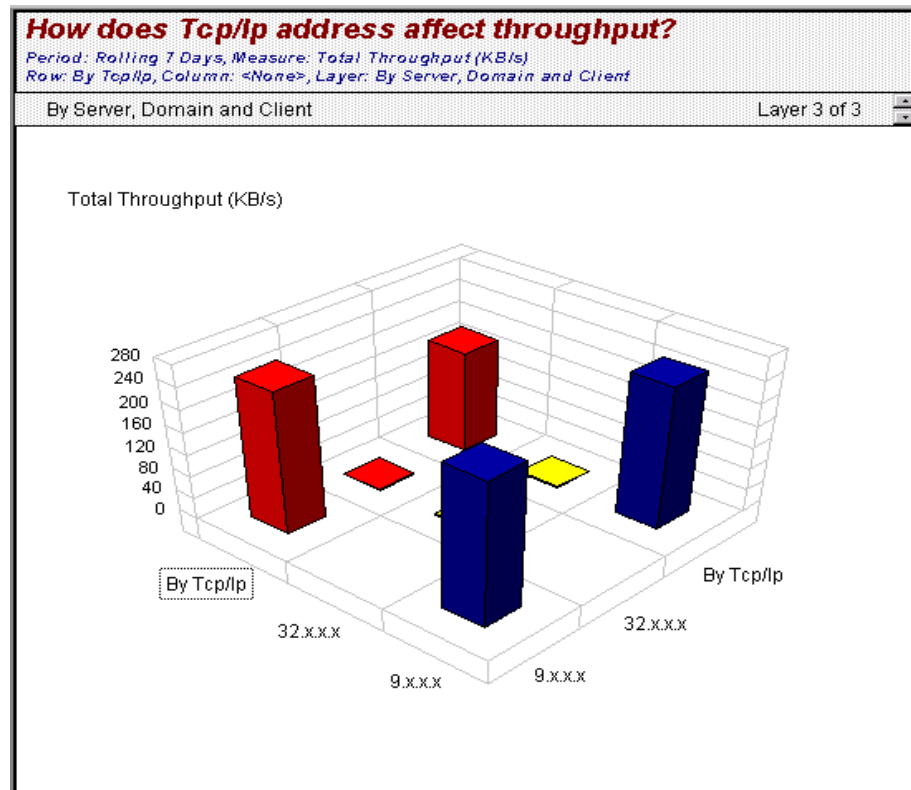


Figure 58. TCP/IP address and throughput

Another good report which may be show the effect of network parameters within the operating system, Tivoli Storage Management, or other network components is presented in Figure 59.

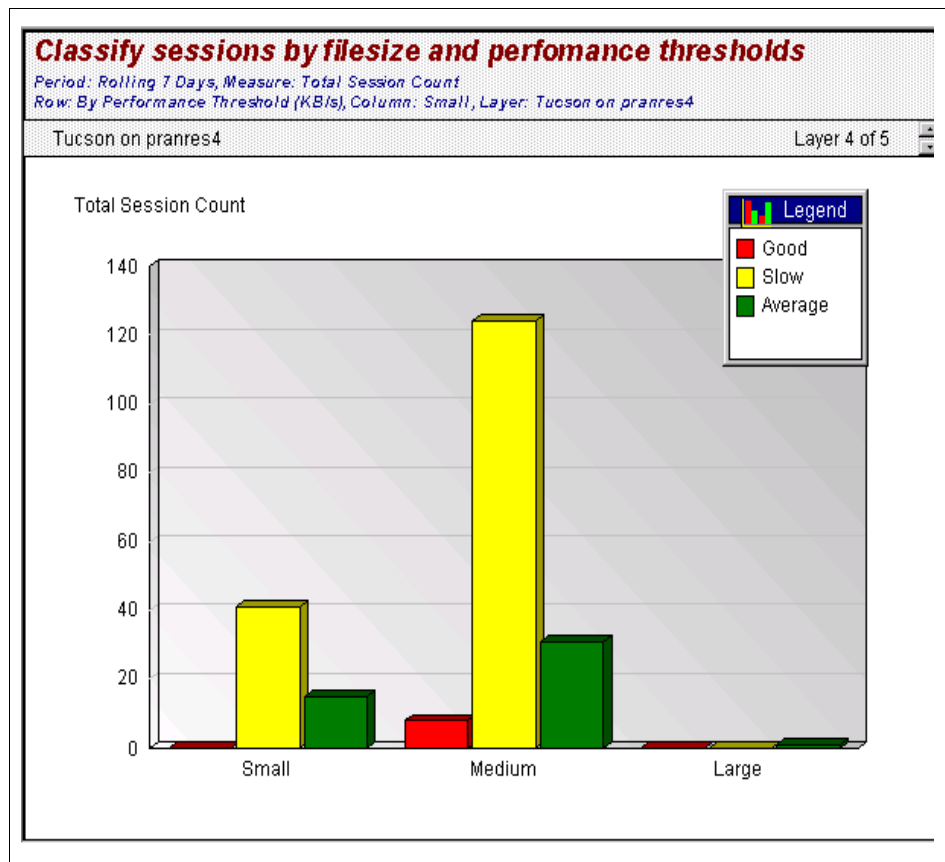


Figure 59. Examining filesize as related to performance

Refer to the 'Hints' tab when running this report to see how response was classified, 'good', 'slow', or 'average'.

6.3 Correcting errors

The questions, "What are my problem clients and which clients are not getting backed up on a regularly?" and "What are the errors I am getting most and which ones should I work on correcting first?" are also closely related.

We discussed these questions, as an example, in Figure 1 on page 20 and the discussion proceeding it. That is a good starting point in cleaning up problems within your system.

Looking further for reports on errors in Storage Management Analysis, we can refer to Figure 60 to see another excerpts from the Guide. Running and analyzing this set of reports is another good place to begin identifying problems in Tivoli Storage Management. Try to eliminate the more severe errors first.

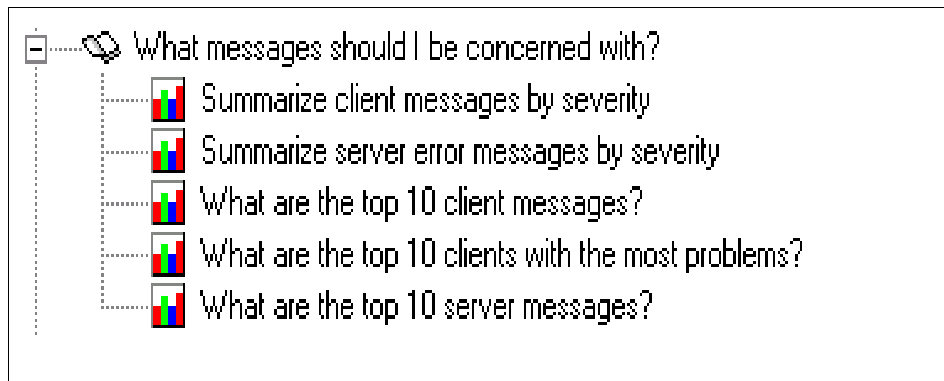


Figure 60. Some Storage Management Analysis reports on errors

Selecting from the above reports list, Figure 61 illustrates a report on the top 10 server messages.

What are the top 10 server messages?

Period: Rolling 7 Days, Measure: Number of Server Messages
 Row: Server Messages, Column: <None>, Layer: By Server

By Server

Layer 3 of 3

Number of Server Messages

Server Messages

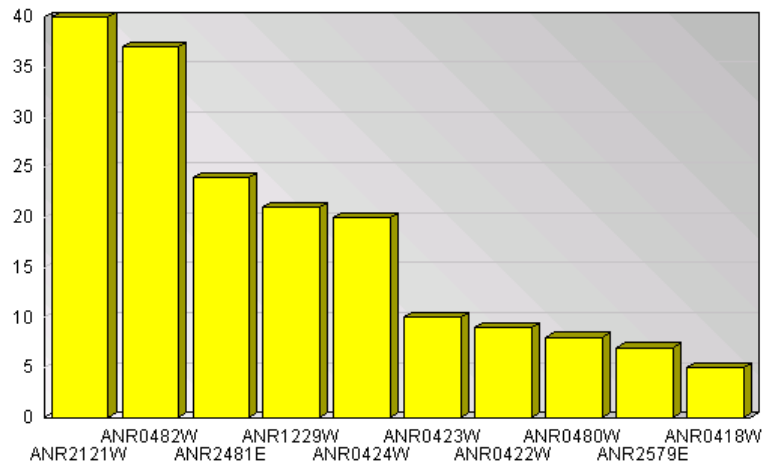


Figure 61. Top 10 server messages

This is an indicator as to which problems should get priority attention as well as listing your most frequently received errors. You would probably want to concentrate on the 'E' type messages first, since they usually indicate a failing task.

If clients are not getting backed up as you intended then some error should be evident. In addition, the following Figure 62, shows the circumstances of backup currency.

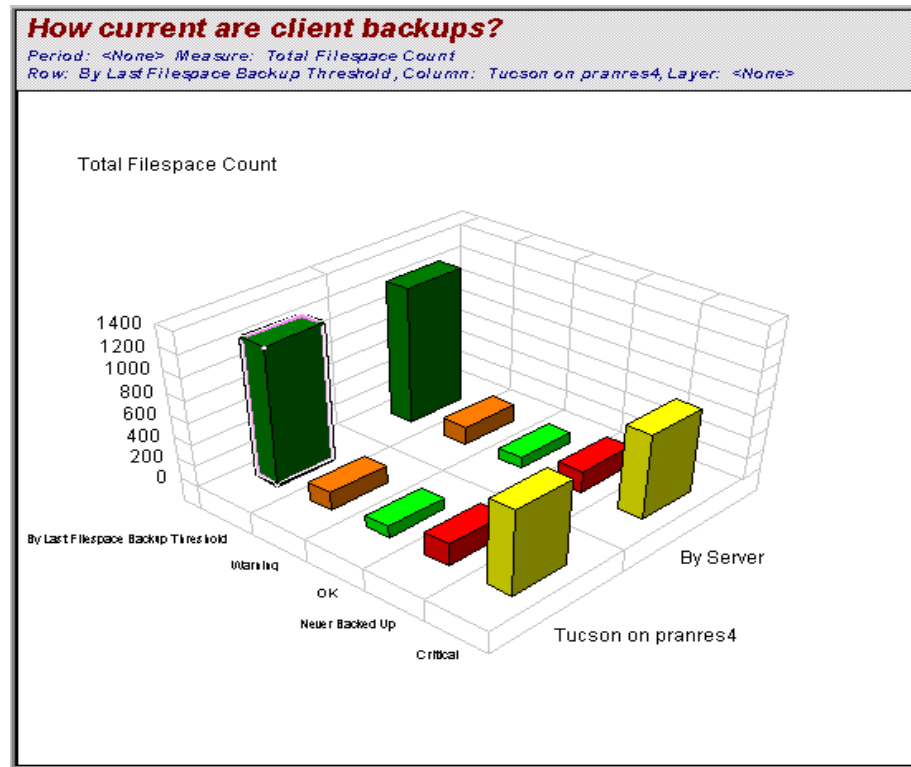


Figure 62. How current are client backups

Eliminating error conditions within Tivoli Storage Management is critical to having a successful and reliable system. Storage Management Analysis can help the Administrator to be responsive and proactive in identifying and correcting problems.

6.4 Reporting on Client Activity

Looking at the Storage Management Analysis Guide there are some obvious choices when you want to report on client activity. In the "Tivoli Storage Management Event Analysis" section, the subsections of "Daily Exception Reports" and "Trends in Client Operations" have several reports on client activity. In the section "Tivoli Storage Management Performance Analysis" the subsection "How are my clients performing?", which we had previously referred to under the network topic (see Figure 57 on page 111) is also an obvious choice.

The primary activities of client nodes revolve around backups, archives, and data restoration. Refer to Figure 62 on page 116 which tells you how recently backups have been performed.

Another similar report in Figure 63, shows when client nodes last contacted the server. While this same information is available by executing a 'query node' command from the Tivoli Storage Management Command Line Interface, these reports are the type that Management would want to see because they illustrate in a presentation format how well their investment in Tivoli Storage Management is doing.

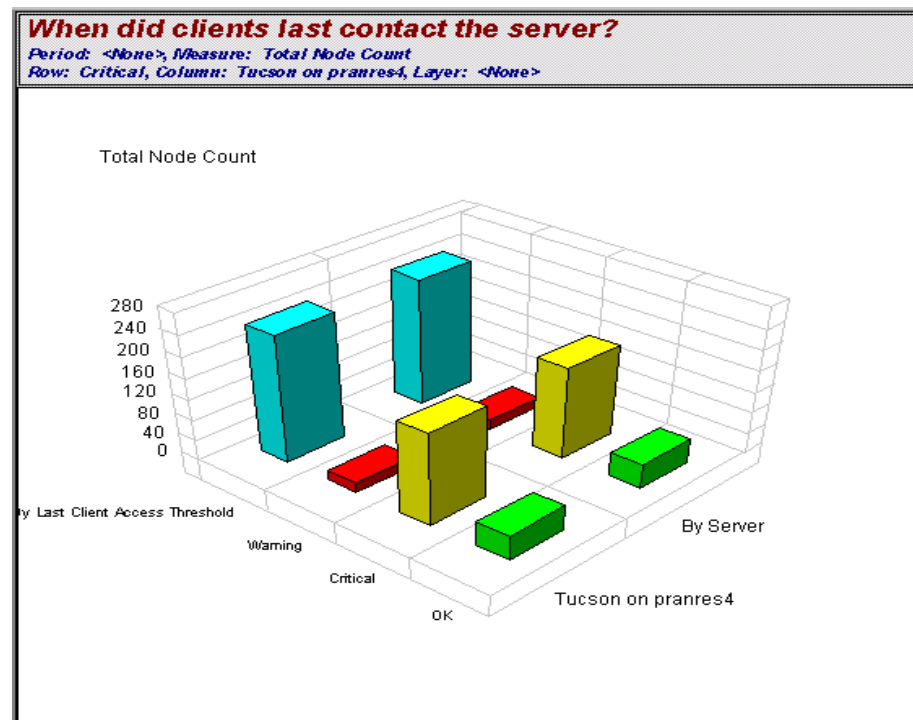


Figure 63. Identifying when clients last contacted the TSM server

These reports might also help identify discontinued nodes which need to be cleaned up in some fashion appropriate to your storage policies.

Once you have identified the legitimate client nodes that are being backed up on a regular basis, you may then be concerned about the actual client restore/backup tasks themselves. A good Storage Management Analysis report on this is in Figure 64.

What are the results of all operations that occurred for a client?

What are the results of all operations that occurred for a client?

Server Name: Tucson on prans4

Server: Tucson on prans4

Node: ADSMPERF

Activity: BACKUP

START TIME	END TIME	SESSION	AFFECTED	FAILED	BYTES (KB)	COMPLETE
2000/03/10 14:19:35	2000/03/10 14:27:51	5,785	11,544	0	179,243	YES
2000/03/17 14:41:08	2000/03/17 14:41:12	7,453	2	0	1	YES
2000/03/17 14:41:28	2000/03/17 14:43:11	7,454	7	0	48	YES
2000/03/30 16:13:45	2000/03/30 16:14:49	11,033	2	0	2	YES
2000/03/30 16:20:02	2000/03/30 16:20:19	11,035	253	0	5,568	YES
2000/03/30 16:20:41	2000/03/30 16:21:05	11,037	457	0	6,571	YES

Message count for BACKUP8

Node record count for ADSMPERF8

Node: ANGLIN

Activity: ARCHIVE

START TIME	END TIME	SESSION	AFFECTED	FAILED	BYTES (KB)	COMPLETE
2000/03/10 10:18:09	2000/03/10 10:18:19	5,536	6	0	1,158	YES
2000/03/10 10:18:27	2000/03/10 10:18:47	5,537	7	0	11,780	YES

Message count for ARCHIVE2

Activity: BACKUP

START TIME	END TIME	SESSION	AFFECTED	FAILED	BYTES (KB)	COMPLETE
2000/03/07 1:55:55	2000/03/07 1:58:45	4,122	77	0	70,700	YES
2000/03/08 1:55:57	2000/03/08 2:01:35	4,457	5,533	0	155,722	YES
2000/03/09 1:55:56	2000/03/09 1:59:52	5,019	2,729	0	80,885	YES
2000/03/10 1:55:56	2000/03/10 1:59:20	5,323	584	0	62,354	YES
2000/03/11 1:55:05	2000/03/11 2:00:31	6,010	1,480	0	97,587	YES

What are the results of all operations that occurred for a client

2000/4/5 12:11:05 PM

1 of 241

ORA-SQL

Figure 64. Client results of operations

Other facets of these tasks can be explored with multiple reports. For example, the question, “How much data did I back up incrementally?” can be answered as in Figure 65, where filesize for different operations and total throughput is shown, or as in Figure 66, where the report looks at client data throughput as it may be related to operating system platform of clients.

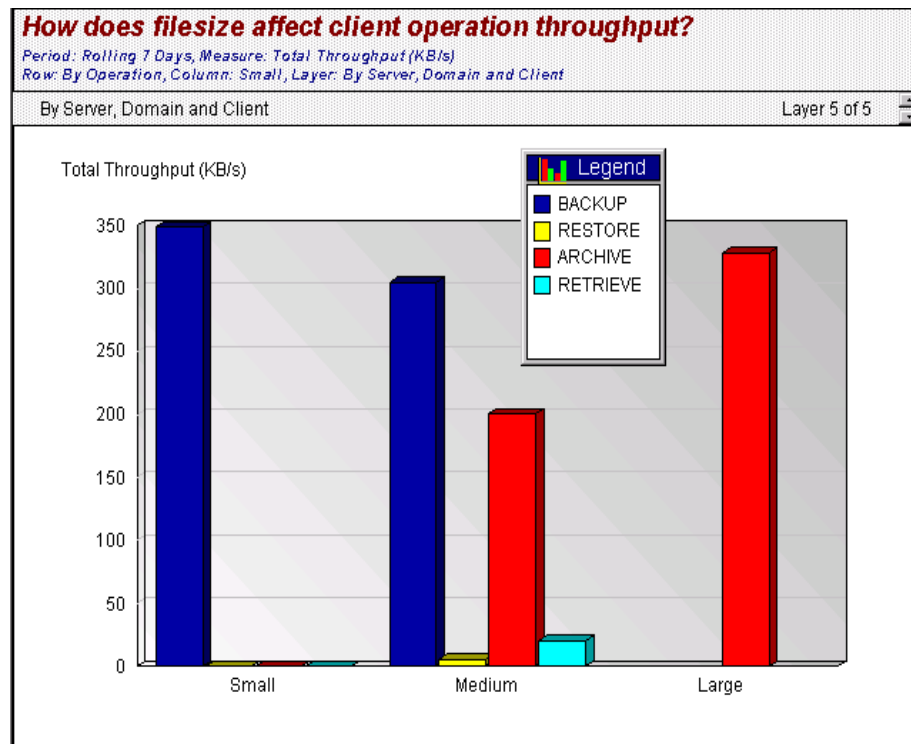


Figure 65. Data movement by filesize and total throughput

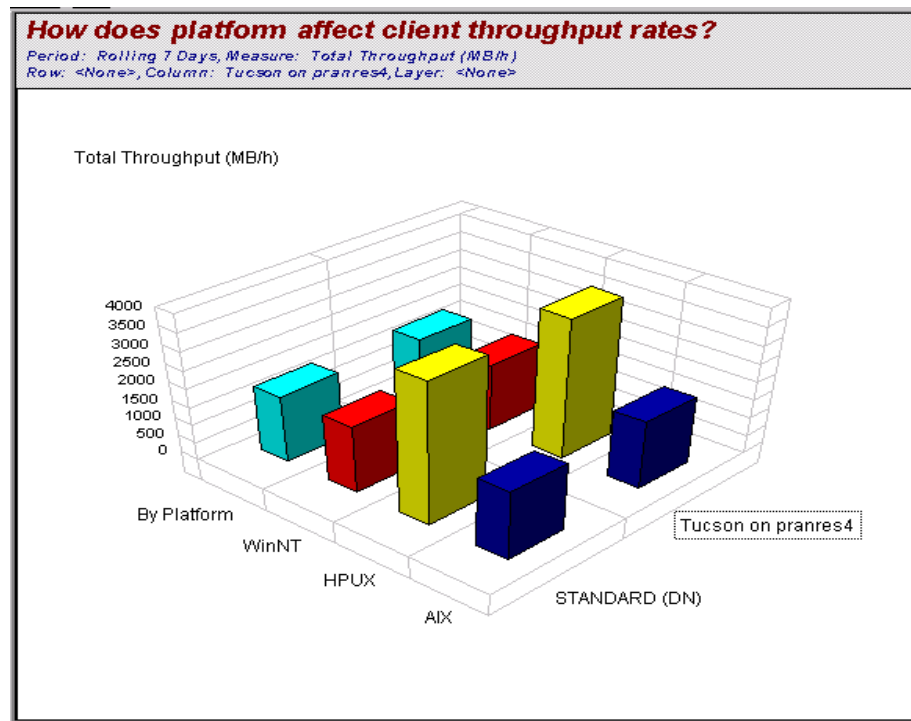


Figure 66. Client data throughput by platform

Another client activity you may want to look at is posed by the question, “How many restores have been done in the past week?”. Figure 67 shows total objects restored successfully in a calculated average by day over the last four rolling weeks.

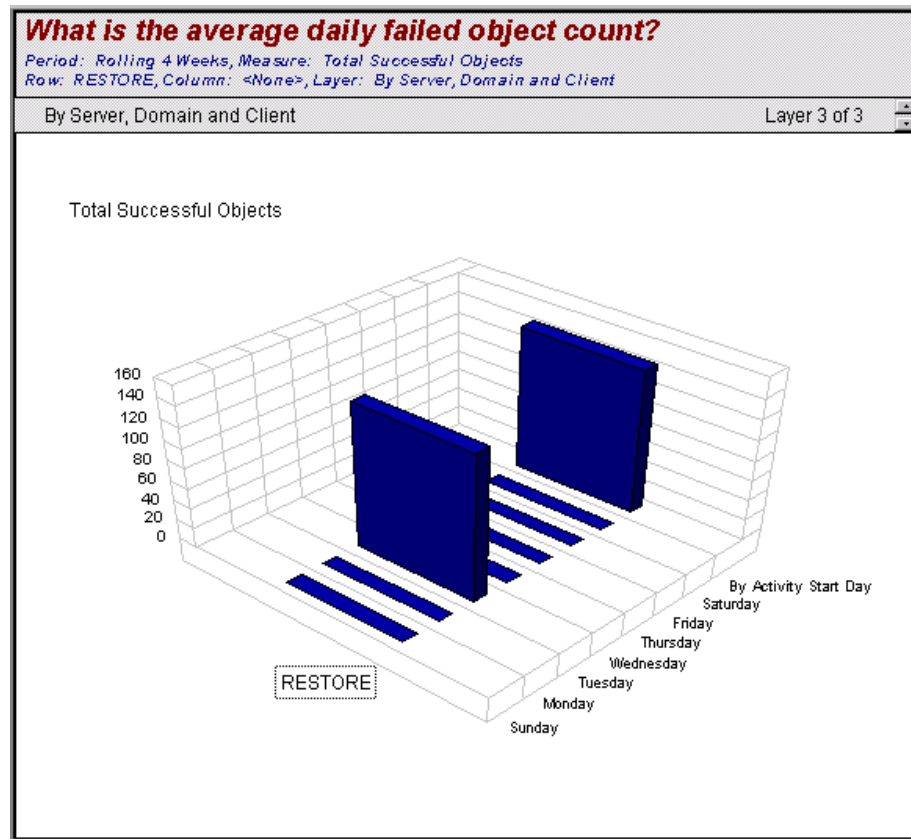


Figure 67. Total objects restored for clients

There are more possible ways to answer these questions, and even more exercising the Tivoli Decision Support features. You may want to develop a Storage Management Analysis list of favorites to report on client activity and execute them on a regular basis to help identify trends in your environment.

6.5 Reporting on Server operations

Approaching the subject of Tivoli Storage Management you first might ask, "What are my key performance indicators and how do I monitor them?". The answer again, can be largely based on your environment and what elements you think are most important. However, the items selected the majority of the

time are those which are subject to, or related to growth. A typical list might be:

- Size of database
- Size of transaction log
- Size of storage pools
- The time it takes to do expirations, reclamations, and copy pools
- The time to perform a scheduled backup
- The number of failed objects
- The number of clients and filespace sizes
- Scratch tape usage

You may want to look at two major areas in regard to Tivoli Storage Management server performance. The Tivoli Storage Management server itself and then, the Tivoli Storage Management storage that is on that server.

6.5.1 TSM server performance

Data saved over a period of time of this subject matter would lend itself to comparison and ultimately a means to predict what a change in load would do to your system. Secondly, a picture of before and after a system change would measure the effect of the change on the Tivoli Storage Management load.

You may first want to examine the status of the work being performed on the server. Figure 68 is an example report on non-scheduled administrative operations. A similar report is available for scheduled administrative operations as well.

What is the status of non-scheduled administrative operations?

SERVER NAME *nsprw01 on prmr054*

START TIME	END TIME	ACTIVITY	EXAMINED	PROCESSED	FAILED	BYTES (KB)	SUCCESSFUL
2000-03-22 9:15:46	03/22/2000 9:16:08	FULL_DBBACKUP	888	888	0	3,552.00	YES
2000-03-22 9:47:19	03/22/2000 9:47:19	EXPIRATION	12	0	0	0.00	YES
2000-03-22 10:30:15	03/22/2000 10:30:46	STG POOL BACKI	36	36	0	54,204.00	YES
2000-03-22 10:31:24	03/22/2000 10:31:40	STG POOL BACKI	150	150	0	84,188.00	YES
2000-03-22 10:32:08	03/22/2000 11:25:31	STG POOL BACKI	671	671	0	197,241.40	YES
2000-03-22 14:54:25	03/22/2000 14:54:25	EXPIRATION	18	0	0	0.00	YES
2000-03-22 10:42:11	03/23/2000 10:42:12	EXPIRATION	18	0	0	0.00	YES
2000-03-22 12:47:23	03/23/2000 12:47:23	EXPIRATION	18	0	0	0.00	YES
2000-03-22 13:02:20	03/23/2000 13:02:20	EXPIRATION	18	0	0	0.00	YES
2000-03-22 16:09:09	03/23/2000 16:09:26	MIGRATION	62	62	0	44,868.00	YES
2000-03-22 16:29:17	03/23/2000 16:29:45	MIGRATION	62	62	0	34,134.00	YES
2000-03-22 16:37:13	03/23/2000 16:37:24	MIGRATION	82	82	0	54,088.00	YES
2000-03-22 16:37:24	03/23/2000 16:37:40	MIGRATION	82	82	0	54,088.00	YES
2000-03-22 16:48:34	03/23/2000 16:48:59	MIGRATION	49	49	0	34,434.00	YES
2000-03-22 17:08:16	03/23/2000 17:08:26	MIGRATION	77	77	0	54,392.00	YES
2000-03-22 17:08:26	03/23/2000 17:08:54	MIGRATION	77	77	0	54,392.00	YES
2000-03-22 17:09:15	03/23/2000 17:09:20	MIGRATION	50	50	0	37,720.00	YES
2000-03-22 17:38:14	03/23/2000 17:38:41	MIGRATION	62	62	0	34,314.00	YES
2000-03-22 17:51:10	03/23/2000 17:51:21	MIGRATION	87	87	0	53,832.00	YES
2000-03-22 17:51:19	03/23/2000 17:51:50	MIGRATION	62	62	0	44,868.00	YES
2000-03-22 18:12:58	03/23/2000 18:13:28	MIGRATION	54	54	0	37,240.00	YES
2000-03-22 18:40:29	03/23/2000 18:41:27	MIGRATION	85	85	0	54,434.00	YES
2000-03-22 18:41:04	03/23/2000 18:41:21	MIGRATION	164	164	0	102,240.00	YES
2000-03-22 18:42:40	03/23/2000 18:42:46	MIGRATION	58	58	0	34,554.00	YES
2000-03-22 19:05:16	03/23/2000 19:05:48	MIGRATION	50	50	0	37,244.00	YES
2000-03-22 19:11:08	03/23/2000 19:11:18	MIGRATION	68	68	0	53,248.00	YES
2000-03-24 10:29:19	03/24/2000 10:29:36	MIGRATION	43	43	0	30,944.00	YES
2000-03-24 10:39:56	03/24/2000 10:40:02	MIGRATION	37	37	0	32,544.00	YES
2000-03-24 10:42:54	03/24/2000 10:43:27	MIGRATION	45	45	0	37,408.00	YES
2000-03-24 10:56:57	03/24/2000 10:57:33	MIGRATION	45	45	0	32,854.00	YES
2000-03-24 10:57:32	03/24/2000 10:57:57	MIGRATION	72	72	0	53,788.00	YES
2000-03-24 11:03:17	03/24/2000 11:03:29	MIGRATION	52	52	0	34,480.00	YES
2000-03-24 11:19:36	03/24/2000 11:19:42	MIGRATION	58	58	0	32,784.00	YES
2000-03-24 11:25:55	03/24/2000 11:26:32	MIGRATION	60	60	0	38,448.00	YES
2000-03-24 11:34:11	03/24/2000 11:34:23	MIGRATION	38	38	0	31,748.00	YES

Figure 68. Non-scheduled server operations

To look at data movement by operation on the server, refer to Figure 69. You would want to look for unusual spikes in reported data and try to explain them as they occur.

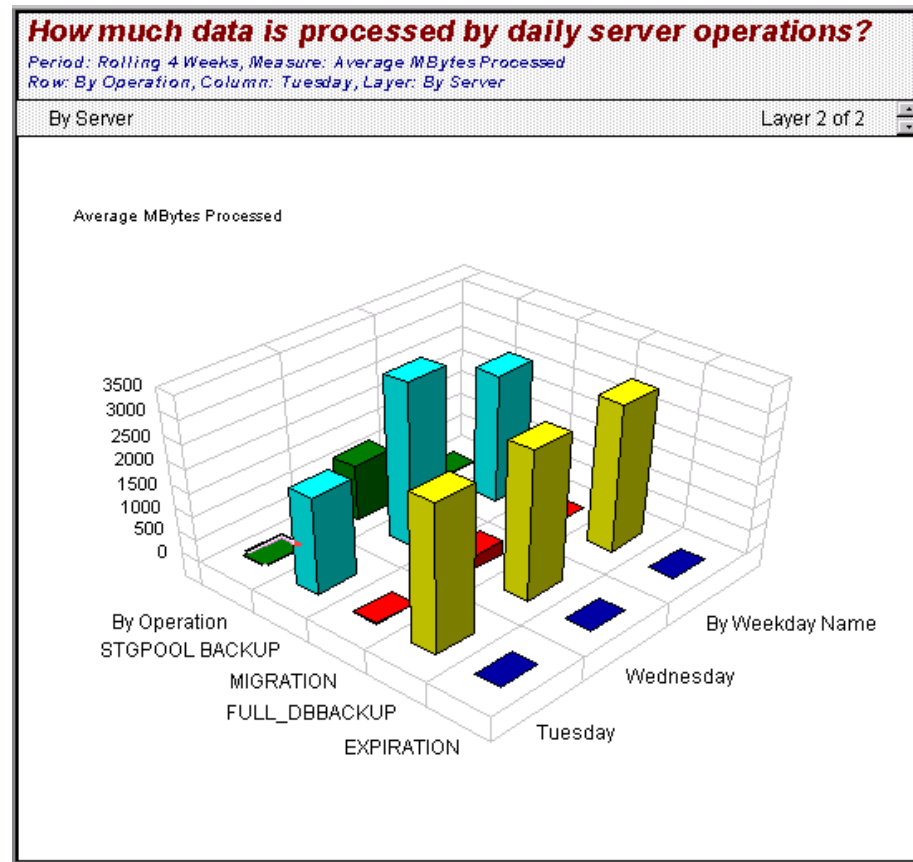


Figure 69. How much data is processed by daily server operations

“What is the average for daily elapsed time for server operations?” is another facet of the above put into terms of time. Refer to Figure 70.

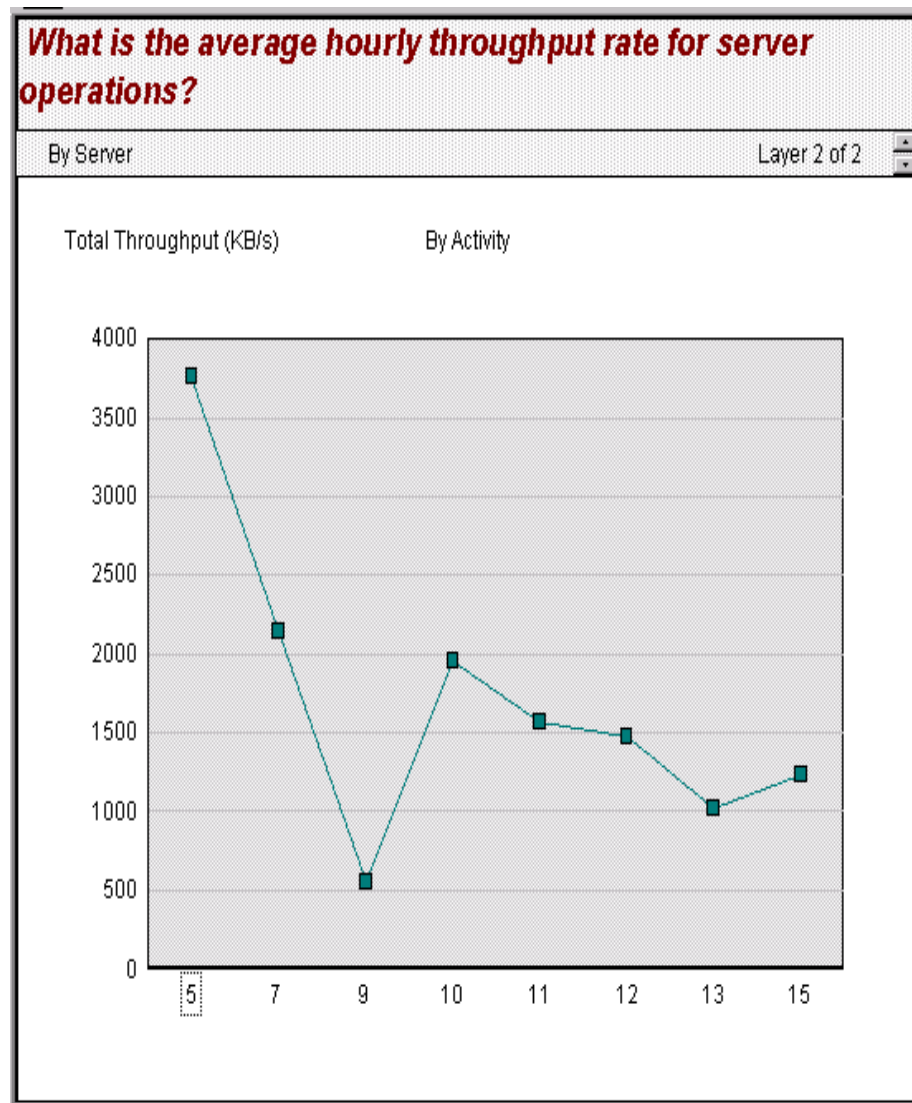


Figure 70. What is the average hourly throughput rate for server operations

6.5.2 Storage health

In the Storage Management Analysis Guide, under Tivoli Storage Management Event Analysis, there is a section with five reports. The report section is called "How might I improve my storage health?". Refer to Figure 71.

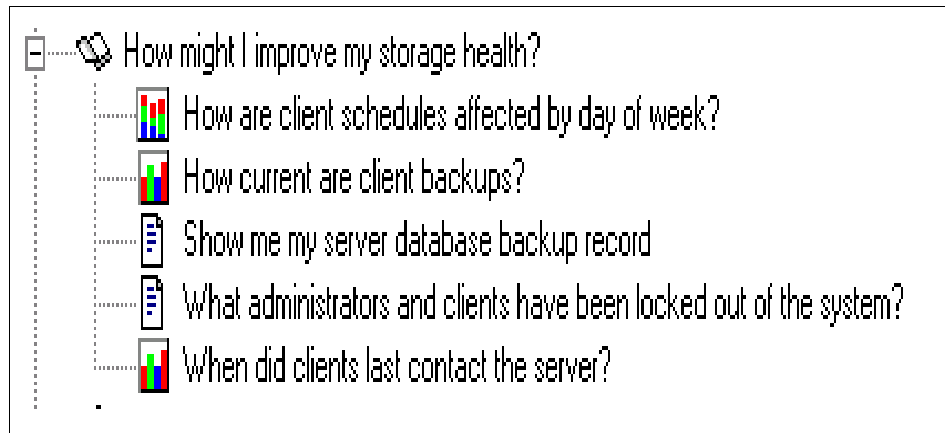


Figure 71. Reports available on storage health

These are quite useful in exposing any problems with storage pools as well as creating an overall picture of how space is being used within Tivoli Storage Management.

Filespace reporting would be useful feedback to the clients to free storage resources. Clients tend to forget that removing a filesystem from an incremental does not mean that the data already backed up to that filesystem is deleted. Inactive filesystems, reported back to clients, might prompt them to actually delete the data.

Tape full or partially full? When will it be available to migrate or to be able to restore some of the information can be derived.

This would help answer the 'what if I change the reclamation percentage' question but is not something we would need to ask very often. More likely to ask this if you are constrained by ATL size and hence tape usage. For example, "I need more scratch tapes, can I use reclamation to get some more".

How much data did I copy the last four weeks to my copy pools?

How much storage was reclaimed this week?

How much data did I copy the last four weeks to my copy pools?

Is my tape volume full or partially full and when will it be available to migrate?

6.6 System visibility

The administrator who is interested in a proactive approach to problems may want to look at the report entitled "What potential problems exist in my server environment?".

It would be nice to be able to provide a statistics sheet which summarized a days, weeks or months activity in terms of: total incoming data, # tapes, total outgoing (restores), throughput, total stored data,% full etc. This could be used as an indication of the overall use of the server.

One of the things we're trying to implement is Usage Based Charging. Therefore, a rolling (say 30 day) average of total occupancy for each node would be useful. Since we can work out the cost of delivering the TSM server and what (based on tapes and average capacity) the total capacity of the server is we can calculate a cost per GB per month.

How will I know when I need to upgrade system components?

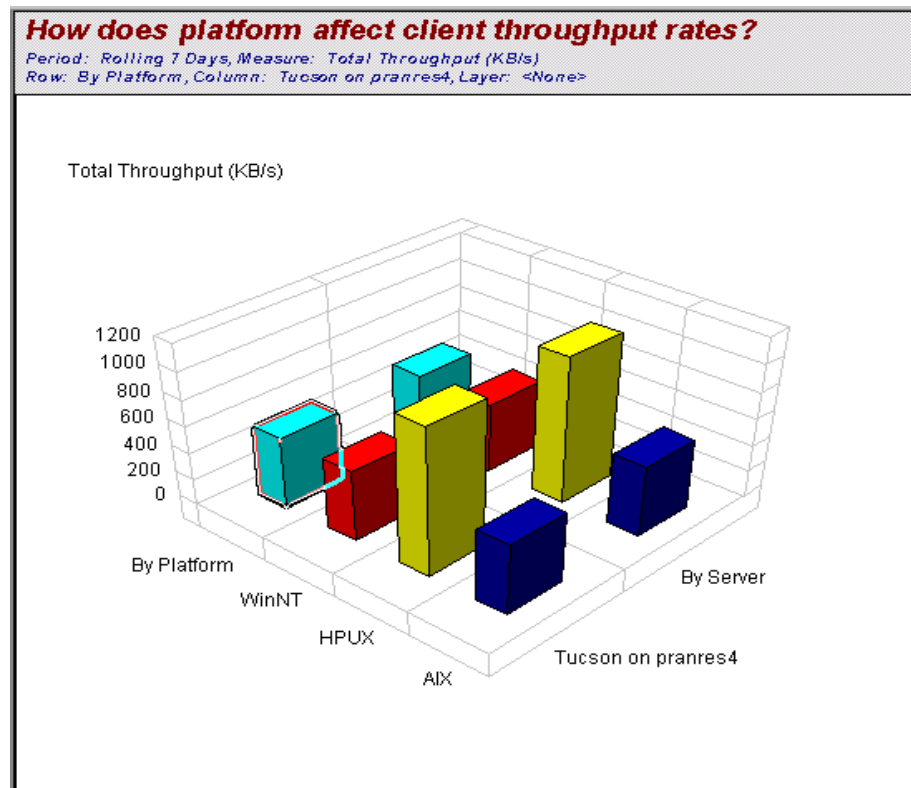


Figure 72. How does platform affect client throughput rates

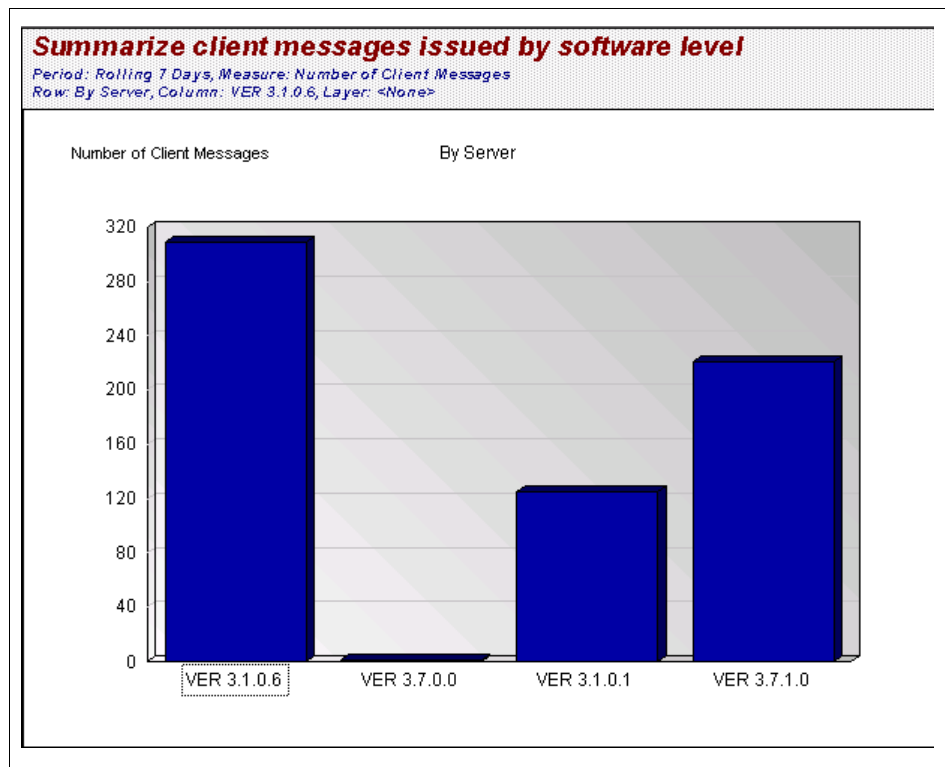


Figure 73. Summary of client messages by TSM software level

Can I report on event processing in a form which will mean something to my boss?

I want to show my boss we're doing a good job with the resources I have. How can I do that?

I want to show my boss we're doing a good job

Absolutely. I also want to show customers we're doing a good job.

6.7 Comprehensive Tivoli Storage Management reporting

Tivoli Decision Support for Storage Management Analysis has been written expressly for Tivoli Storage Management reporting. Event and performance reporting can give us insight into the elements that determine the health and reliability of your system.

There is no programming or development effort as reports are ready to run as soon as the product is installed and the data is loaded. The product utilizes the already developed power of Tivoli Decision Support, Cognos PowerPlay, Seagate's Crystal Reporting, an RDBMS and Storage Management Analysis, all in one uniform execution.

Future releases of Storage Management Analysis are being developed to expand on the reporting in the area of capacity planning. This will further extend the reporting capability of the product. We expect this trend to continue and, in fact, we expect Storage Management Analysis to be ultimately in step with development of Tivoli Storage Management, itself. As new features are added so, too, will Storage Management Analysis reporting on those features will be added.

So, if the question is, "I want a comprehensive "Out-of-the-box" solution to TSM reporting. Is this it?", the answer is "yes, for the immediate and long term future, Tivoli Decisions Support with Storage Management Analysis is the tool of choice.

Appendix A. Relate views for the table analysis

This appendix will show the related views to specific file names which will allow you to make reference to the tables.

In order to understand what these tables do and how they work, you will be required to click on view tab in the sub window at the bottom and look at the file names as in the Figure 74.

On finding the file name you can cross reference the file name with the tables below and find out how they are related to one another, also allowing a further exploration of the break downs for related views.

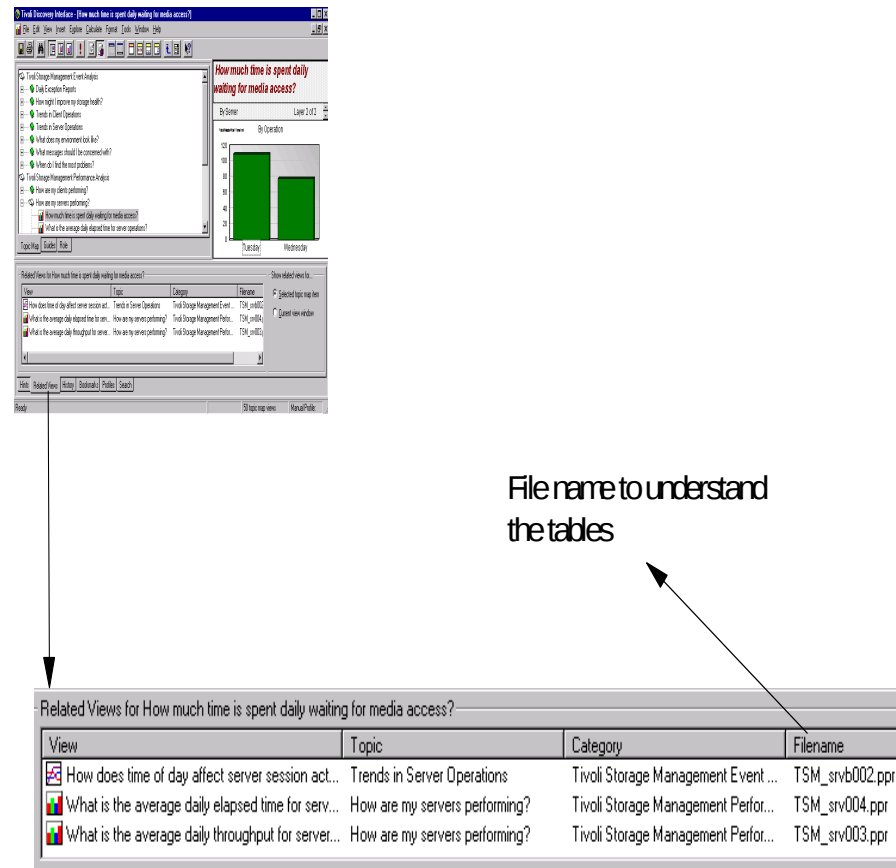


Figure 74. Show how to read the related views and the file names for location in the tables below

Related Views

Table 1.

View Title	Filename	View Description (Hint Text)	Related Views
What are the top 10 clients with the most problems?	TSM_clmsg001.ppr	This view provides a summary of the Tivoli Storage Manager clients that have issued the most messages during the last 7 days. Use this report to determine clients generating the most messages and needing attention. Messages include the following: Severe (S), Error (E), Warning (W), and Diagnostic (D). A layer is provided to select a specific server, or an aggregate of all servers can be displayed. Drill down on a client is provided to view the specific message counts. Drill through is provided to view the specific message text associated with the selected messages. Note: (CN) signifies client name.	TSM_clmsg002.ppr TSM_clmsg003.ppr TSM_clmsg004.ppr TSM_clmsg005.ppr TSM_clmsg006.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What are the top 10 client messages?	TSM_clmsg002.ppr	This view provides a summary of the most common Tivoli Storage Manager client messages that were issued during the last 7 days. Use this information to identify the most common problems that are occurring with clients. Messages include the following: Severe (S), Error (E), Warning (W), and Diagnostic (D). A layer is provided to select a specific server, or an aggregate of all servers can be displayed. Drill down on a message number is provided to determine clients that issued the selected message. Drill through is provided to view the specific message text associated with the selected messages. Note: (CN) signifies client name.	TSM_clmsg001.ppr TSM_clmsg003.ppr TSM_clmsg004.ppr TSM_clmsg005.ppr TSM_clmsg006.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Summarize client messages issued by platform.	TSM_clmsg003.ppr	This view provides a summary of the most common messages that are issued for each Tivoli Storage Manager client platform during the last 7 days. Use this information to identify problems that are related to a specific client platform. Messages include the following: Severe (S), Error (E), Warning (W), and Diagnostic (D). A layer is provided to select a specific server, or an aggregate of all servers can be displayed. Drill down on a platform is provided as follows: • Platform Name • Operating System Levels • Message counts for selected operating system level Drill through is provided to view the specific message text associated with the selected messages.	TSM_clmsg001.ppr TSM_clmsg002.ppr TSM_clmsg004.ppr TSM_clmsg005.ppr TSM_clmsg006.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Summarize client messages by severity.	TSM_clmsg004.ppr	This view summarizes Tivoli Storage Manager client messages by severity. Messages are included from the last 7 days. Use this information to identify the most important client problems requiring resolution. Messages include the following: Severe (S), Error (E), Warning (W), and Diagnostic (D). A layer is provided to select a specific server, or an aggregate of all servers can be displayed. Drill down is provided to view the specific message counts associated with a severity. Drill through is provided to view the specific message text associated with the selected messages.	TSM_clmsg001.ppr TSM_clmsg002.ppr TSM_clmsg003.ppr TSM_clmsg005.ppr TSM_clmsg006.ppr
What are the top 10 server messages?	TSM_srvmsg001.ppr	This view provides a list of the most commonly issued Tivoli Storage Manager server messages over the last 7 days. Use this information to identify the most common problems that are occurring with servers. A status bar is provided to select a specific server, or an aggregate of all servers can be displayed. Drill through is provided to view the specific message text associated with the selected messages.	TSM_srvmsg002.ppr TSM_srvmsg003.ppr TSM_srvmsg004.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Summarize server error messages by severity.	TSM_srvmsg002.ppr	This view summarizes Tivoli Storage Manager server messages by severity (S=Severe, E=Error, W=Warning, D=Diagnostic). Information includes messages issued the last 7 days. Use this information to identify the most important server problems requiring resolution. A status bar is provided to select a specific server, or an aggregate of all servers can be displayed. Drill down is provided to view the specific messages associated with a severity. Drill through is provided to view the specific message text associated with the selected messages.	TSM_srvmsg001.ppr TSM_srvmsg003.ppr TSM_srvmsg004.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What is the status of scheduled client sessions?	TSM_cl001.ppr	This view provides a summary of scheduled operations that occurred for Tivoli Storage Manager clients during the last reporting period. Information is summarized for each Tivoli Storage Manager server. This information applies to operations that use the Tivoli Storage Manager scheduler. Use this information to identify the overall results of scheduled operations and identify clients that had schedule failures. The Legend contains the results of the scheduled operations. For schedules that failed to initiate an operation, the results are obtained from the Tivoli Storage Manager server event status. For operations that were successfully initiated: • The result is set to 'Completed' if the session results indicated success. • The result is set to 'Failed' if the session results indicated failure. Drill down is provided for each server. The drill down levels are as follows: • Tivoli Storage Manager server • Policy domains defined to specific Tivoli Storage Manager server. A domain name is identified by appending the string '(DN)' to the domain name. • Client schedules defined to the policy domain. A schedule name is identified by appending the string '(SN)' to the schedule name. • Clients associated with specific policy domains. A client is identified by appending the string '(CN)' to the client name. • Sessions associated with specific clients. If an operation was not initiated, the session name is set to 'None'.	TSM_clmsg.rpt TSM_cl003.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What is the status of non-scheduled client sessions?	TSM_cl002.ppr	This view provides a summary of non-scheduled operations for Tivoli Storage Manager clients that occurred during the last reporting period. Information is summarized for each Tivoli Storage Manager server. The results are categorized as follows: • Completed – Operation was considered successful • Failed – Operation considered a failure based on client session results. Use this information to identify the overall results of non-scheduled client sessions Drill down is provided to view a category (e.g. FAILED operations) by client. Drill down is provided for each TSM server. The drill down levels are as follows: • Tivoli Storage Manager server • Policy domains defined to specific Tivoli Storage Manager server. A domain name is identified by appending the string '(DN)' to the domain name. • Clients associated with specific policy domains. A client is identified by appending the string '(CN)' to the client name. • Sessions associated with specific clients. If an operation was not initiated, the session name is set to 'None'.	TSM_clmsg.rpt

View Title	Filename	View Description (Hint Text)	Related Views
What are the results of all operations that occurred for a client?	TSM_clmsg.rpt	This view provides a summary of all operations that occurred for a Tivoli Storage Manager client during the last reporting period. This includes scheduled and non-scheduled operations. Use this view to look at a summary of session activity and the specific messages that were issued for a Tivoli Storage Manager client. A report parameter is provided to select: • Tivoli Storage Manager server name • Tivoli Storage Manager client node name • Date range for information To determine a list of server names and client node names refer to the report TSM_cli003. This is under the topic 'What does my environment look like?' and is the view 'How many clients are registered with each server?'	TSM_cl001.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Classify outcome for client sessions.	TSM_cl003.ppr	This view provides a summary of Tivoli Storage Manager client operations based on whether or not the session had failed objects. Information is included from the last reporting period and is summarized for each Tivoli Storage Manager server. The results are categorized in the Legend as follows: • OK – Operation completed with all objects successfully processed. • Warning – Operation completed with some successfully processed objects and some failed objects. • Severe – Operation completed and all objects failed processing. • Not Executed – Operation completed without processing any objects. Use this categorization to help determine which client operations are failing and prioritize work related to which activities need investigation. A layer is provided to select a specific client operation, or the aggregate of all client operations can be displayed. Drill down is provided for each server. The drill down levels are as follows: • Tivoli Storage Manager server • Policy domains defined to specific Tivoli Storage Manager server. A domain name is identified by appending the string '(DN)' to the domain name. • Clients associated with specific policy domains. A client is identified by appending the string '(CN)' to the client name. • Sessions associated with specific clients. If an operation was not initiated, the session name is set to 'None'. Note: The layer can have 'Operation Unknown' for scheduled operations that were not initiated.	TSM_clmsg.rpt TSM_cl001.ppr TSM_cl002.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What is the status of scheduled administrative operations?	TSM_srvsch.rpt	This view provides a summary of scheduled administrative operations. Use this view to determine the results of scheduled administrative operations and determine failures that need to be corrected. This view applies to administrative operations that use the Tivoli Storage Manager scheduler. Report parameters are provided to specify: • Tivoli Storage Manager server name. If this parameter is not specified, information for all Tivoli Storage Manager servers is included. • Date for reporting information. The date specified is related to when information was extracted from Tivoli Storage Manager Servers using the data collection program tsmdsl. To determine a list of server names refer to the report TSM_cli003. This is under the topic 'What does my environment look like?' and is the view 'How many clients are registered with each server?'	TSM_msg.rpt TSM_srwnsch.rpt

View Title	Filename	View Description (Hint Text)	Related Views
What is the status of non-scheduled administrative operations?	TSM_srvnosch.rpt	This view provides a summary of Tivoli Storage Manager server operations that were not scheduled using the Tivoli Storage Manager scheduler. Use this view to determine the results of administrative operations and determine failures that need to be corrected. Report parameters are provided to specify: • Tivoli Storage Manager server name. If this parameter is not specified, information for all Tivoli Storage Manager servers is included. • Date for reporting information. The date specified is related to when information was extracted from Tivoli Storage Manager Servers using the data collection program tsmdsl. To determine a list of server names refer to the report TSM_cli003. This is under the topic 'What does my environment look like?' and is the view 'How many clients are registered with each server?'	TSM_msg.rpt TSM_srvsch.rpt

View Title	Filename	View Description (Hint Text)	Related Views
What potential problems exist in my server environment?	TSM_srvprb.rpt	This view provides a report of potential problems that may exist in your Tivoli Storage Manager server environment. Use this report to identify problem areas and take appropriate actions to correct. This view provides information related to 3 areas of a Tivoli Storage Manager server environment: 1. Database and Recovery Log: • Occupancy information • List of the copy status of database volumes • List of the copy status of recovery log volumes 2. Storage Pool Volume Information: • List of disk volumes that are offline • List of storage pool tapes with potential problems. A volume is included if has had read errors, write errors, status=destroyed, status=unavailable, or status=readonly). 3. Offline tape drive information: • List of tape drives that are offline Report parameters are provided to specify: • Tivoli Storage Manager server name. If this parameter is not specified, information for all Tivoli Storage Manager servers is included. • Date for reporting information. The date specified is related to when information was extracted from Tivoli Storage Manager Servers using the data collection program tsmdsl. To determine a list of server names refer to the report TSM_cli003. This is under the topic 'What does my environment look like?' and is the view 'How many clients are registered with each server?'	TSM_msg.rpt

View Title	Filename	View Description (Hint Text)	Related Views
Summarize the messages issued in my environment.	TSM_msg.rpt	This view provides a report of the Tivoli Storage Manager client and server messages. Messages are classified according to severity (i.e. Severe, Error, Warning, and Diagnostic). Use this report to get a view of client and server messages issued for the requested date. This can be used to view message activity for specific dates. determine what errors occurred in your environment and prioritize what problems should be worked on first. Report parameters are provided to specify: • Tivoli Storage Manager server name. If this parameter is not specified, information for all Tivoli Storage Manager servers is included. • Date for reporting information. The date specified is related to when information was extracted from Tivoli Storage Manager Servers using the data collection program tsmdsl. To determine a list of server names refer to the report TSM_cli003. This is under the topic 'What does my environment look like?' and is the view 'How many clients are registered with each server?'	TSM_cl001.ppr TSM_cl002.ppr TSM_clmsg.rpt TSM_cl003.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Show me my server data base backup record?	TSM_srldb.rpt	This view provides a history of the backup of the Tivoli Storage Manager server database. Use this view to determine if the server database is being backed up every day. It is critical to always have a current database backup. Report parameters are provided to specify: • Tivoli Storage Manager server name. If this parameter is not specified, information for all Tivoli Storage Manager servers is included. • Date for reporting information. The date specified is related to when information was extracted from Tivoli Storage Manager Servers using the data collection program tsmdsl. To determine a list of server names refer to the report TSM_cli003. This is under the topic 'What does my environment look like?' and is the view 'How many clients are registered with each server?'	TSM_msg.rpt

View Title	Filename	View Description (Hint Text)	Related Views
What administrator s and clients have been locked out of the system?	TSM_lock.rpt	This view provides a list of Tivoli Storage Manager administrators and clients that have been locked out of the system. A node is locked from the system when too many invalid sign-on attempts have been made. The administrative command SET INVALIDPWLIMIT controls the number of invalid logon attempts allowed before a node is locked. Use this view to identify potential invalid access attempts to the Tivoli Storage Manager server, or identify users that may not know their password. Report parameters are provided to specify: • Tivoli Storage Manager server name. If this parameter is not specified, information for all Tivoli Storage Manager servers is included. • Date for reporting information. The date specified is related to when information was extracted from Tivoli Storage Manager Servers using the data collection program tsmdsl. To determine a list of server names refer to the report TSM_cli003. This is under the topic 'What does my environment look like?' and is the view 'How many clients are registered with each server?'	TSM_msg.rpt

View Title	Filename	View Description (Hint Text)	Related Views
How current are client backups?	TSM_clfs001.ppr	This view provides a summary of the backup currency for Tivoli Storage Manager client filespace. Information is based on the most recent data extracted from Tivoli Storage Manager servers. Filespaces are categorized as follows: • OK – Filespace was backed up within the last day • Warning – Filespace backup occurred in the last 2 to 14 days • Critical – Filespace has not been backed up for more than 14 days • Never Backed Up– Filespace has never been backed up. Use this information to identify client filespace that are not being backed up or need to be backed up more frequently. Drill down is provided to view specific clients in a category or all clients associated with a specific server. The drill down levels for a server are as follows: • Tivoli Storage Manager server • Policy domains defined to specific Tivoli Storage Manager server. A domain name is identified by appending the string '(DN)' to the domain name. • Clients associated with specific policy domains. A client is identified by appending the string '(CN)' to the client name. • Filespace associated with a specific client.	TSM_cli002.ppr

View Title	Filename	View Description (Hint Text)	Related Views
How are client schedules affected by day of week?	TSM_cl004.ppr	This view provides a daily summary of the results of Tivoli Storage Manager client sessions. Use this information to identify scheduling problems. A layer is provided to select information for a specific Tivoli Storage Manager server, or a summary of all servers can be displayed. This information applies to client sessions that use the Tivoli Storage Manager scheduler.	TSM_cl001.ppr TSM_cl002.ppr TSM_cl003.ppr TSM_cl005.ppr TSM_cl006.ppr TSM_clmsg007.ppr

View Title	Filename	View Description (Hint Text)	Related Views
When did clients last contact the server?	TSM_cli002.ppr	This view provides a summary of when Tivoli Storage Manager clients last contacted a Tivoli Storage Manager. Information is based on the most recent data extracted from Tivoli Storage Manager servers. Clients are categorized as follows • OK – Client contacted server within the last 7 days. • Warning – Client last contacted server between 8 and 21 days • Critical – Client last contacted the server more than 21 days ago. • Never Accessed Server– Client has never contacted the server. Use this information to identify inactive clients. Drill down is provided to view specific clients in a category or all clients associated with a specific server. The drill down levels for a server are as follows: • Tivoli Storage Manager server • Policy domains defined to specific Tivoli Storage Manager server. A domain name is identified by appending the string '(DN)' to the domain name. • Clients associated with specific policy domains. A client is identified by appending the string '(CN)' to the client name.	TSM_clfs001.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Show me my database backup record.	TSM_srldb.ppr	This view provides a summary of the Tivoli Storage Manager server database backup function for the last 14 days. It is very important to have a current backup of your Tivoli Storage Manager server database. Use this report to look at a history of your Tivoli Storage Manager server database backup record. If the database is not being successfully backed up every day, determine why and take the appropriate corrective actions.	TSM_msg.rpt
What day of week do peak client error rates occur?	TSM_clmsg005.ppr	This view lets you look at Tivoli Storage Manager client message activity for each day of the week. Use this view to determine whether client error activity is related to a specific day of the week. Messages include the following: Severe (S), Error (E), Warning (W), and Diagnostic (D). A status bar is provided to select a specific server, or an aggregate of all servers can be displayed Drill down is provided on a day of the week as follows: • View message counts for the specific date that is associated with the selected day of the week. • View message counts for each hour associated with the selected day. • View message counts for the messages that were issued for the selected day and hour. Drill through is provided to view the specific message text associated with the selected messages.	TSM_clmsg001.ppr TSM_clmsg002.ppr TSM_clmsg003.ppr TSM_clmsg004.ppr TSM_clmsg006.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What day of week do peak server error rates occur?	TSM_srvmsg003.ppr	This view lets you look at Tivoli Storage Manager server message activity for each day of the week. Information is included from the last 7 days. Use this to determine whether server error activity is related to a specific day of the week. A status bar is provided to select a specific server or an aggregate of all servers can be displayed. Drill down is provided on a day of the week as follows: • View message counts for the specific date that is associated with the selected day of the week. • View message counts for each hour associated with the selected day. • View messages that were issued for a selected day and hour. Drill through is provided to view the specific message text associated with the selected messages.	TSM_srvmsg001.ppr TSM_srvmsg002.ppr TSM_srvmsg004.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What time of day do peak client error rates occur?	TSM_clmsg006.ppr	This view lets you look at hourly client message activity for the last 7 days. Use this to determine whether client message activity is related to a specific hour of the day. Messages include the following: Severe (S), Error (E), Warning (W), and Diagnostic (D). A status bar is provided to select a specific server, or an aggregate of all servers can be displayed Drill down is provided on an hour of the day as follows: • View message counts for each day of the week that had activity associated with the selected hour. • View message counts for each message that occurred for the selected hour and day Drill through is provided to view the specific message text associated with the selected messages.	TSM_clmsg001.ppr TSM_clmsg002.ppr TSM_clmsg003.ppr TSM_clmsg004.ppr TSM_clmsg005.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What time of day do peak server error rates occur?	TSM_srvmsg004.ppr	This view lets you look at Tivoli Storage Manager server message volume for each hour of the day. Information is included from the last 7 days. Use this to help you determine whether error activity is tied to a specific hour of the day. A status bar is provided to select a specific server or an aggregate of all servers can be displayed. Drill down is provided on an hour of the day as follows: • View message counts for each day of the week that had activity associated with the selected hour. • View message counts for each message that occurred for the selected hour and day Drill through is provided to view the specific message text associated with the selected messages	TSM_srvmsg001.ppr TSM_srvmsg002.ppr TSM_srvmsg003.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What is the average daily failed object count?	TSM_cl005.ppr	This view lets you look at the average number of object failures that occurred for each Tivoli Storage Manager client operation. Information is presented by day of week and is the average of the last 4 weeks of activity. Use this to help you determine whether error activity is related to specific days of the week. A layer is provided to allow selection of a specific Tivoli Storage Manager server, or an aggregate of all servers can be displayed. Drill down is provided to view failed object counts for the last 4 weeks associated with the selected day.	TSM_cl004.ppr TSM_cl006.ppr TSM_clmsg007.ppr
What is the average daily successful object count?	TSM_cl006.ppr	This report gives you an overview of the number of objects successfully processed by each Tivoli Storage Manager client operation. Information is presented by day of week and is the average of the last 4 weeks of activity. Use this to help you determine processing activity for specific days of the week. A layer is provided to allow selection of a specific Tivoli Storage Manager server, or an aggregate of all servers can be displayed. Drill down is provided to view successful object counts for the last 4 weeks associated with the selected day.	TSM_cl004.ppr TSM_cl005.ppr TSM_clmsg007.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Summarize client messages issued by software level?	TSM_clmsg007.ppr	This view lets you look at message counts that occurred for each Tivoli Storage Manager client software level during the last 7 days. Use this to help determine whether error activity is related to a specific Tivoli Storage Manager client software level. For example, there may be a fix in the latest Tivoli Storage Manager client software that you need to install on all systems. Messages include the following: Severe (S), Error (E), Warning (W), and Diagnostic (D). A status bar is provided to select a specific server, or an aggregate of all servers can be displayed Drill down on a platform is provided to view message counts for the selected platform.. Drill through is provided to view the specific message text associated with the selected messages.	TSM_cl004.ppr TSM_cl005.ppr TSM_cl006.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What is the average daily failed object count for server operations?	TSM_srv001.ppr	This view lets you look at the average number of object failures that occurred during the last four weeks of Tivoli Storage Manager server operations. Tivoli Storage Manager server operations included: database backup, storage pool backup, migration, expiration, reclamation, and move data. Information is presented by day of week. Use this report to view weekly error activity and determine whether error activity is related to specific days of the week. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar is provided to select a specific server operation, or an aggregate of all server operations can be displayed. Drill down is provided for a specific day of the week as follows: • View the last 4 weeks activity associated with a specific day of the week. • View the specific session activity associated with a specific date.	TSM_srv002.ppr

View Title	Filename	View Description (Hint Text)	Related Views
How much data is processed by daily server operations?	TSM_srv002.ppr	This view lets you look at the average amount of data processed during the last four weeks of Tivoli Storage Manager server operations. Tivoli Storage Manager server operations include: database backup, storage pool backup, migration, expiration, reclamation and move data. Information is presented by day of week. Use this report to help you verify operations are being performed on the desired days and desired frequencies. The amount of data processed can be used to assist with capacity panning and determine if there are maybe issues with the times Tivoli Storage Manager operations are occurring. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar is provided to select a specific server operation, or an aggregate of all server operations can be displayed Drill down is provided for a specific day of the week as follows: • View the last 4 weeks activity associated with a specific day of the week. • View the specific session activity associated with a specific date.	TSM_srv001.ppr TSM_srvb002.ppr

View Title	Filename	View Description (Hint Text)	Related Views
How does time of day affect server session activity?	TSM_srvb002.ppr	This view provides an hourly summary of Tivoli Storage Manager server session activity for the last 7 days. Use this information to determine hourly server session activity. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar provides the ability to view an aggregate hourly session activity of all server operations, or a specific server operation can be selected.	TSM_srv001.ppr TSM_srv002.ppr
How many clients are registered with each server?	TSM_cli003.ppr	This view presents a summary of the number of Tivoli Storage Manager clients registered with each Tivoli Storage Manager server. . Information is based on the most recent data extracted from Tivoli Storage Manager servers. Use this information to see a summary of clients registered to each server. Drill down is provided for each server. The drill down levels are as follows: - Tivoli Storage Manager server. - Policy domains defined to specific Tivoli Storage Manager server. A domain name is identified by appending the string '(DN)' to the domain name. - Clients associated with specific policy domains. A client is identified by appending the string '(CN)' to the client name.	TSM_cli004.ppr TSM_cli005.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Which software levels do clients use?	TSM_cli004.ppr	This view presents a summary of what Tivoli Storage Manager client software levels are being used with each Tivoli Storage Manager server. . Information is based on the most recent data extracted from Tivoli Storage Manager servers. This report can be used to identify the distribution of Tivoli Storage Manager client software levels in your environment. This information can be used to identify servers with down-level client software. To identify the specific client names associated with a software level, use the view TSM_cli003 ('How many clients are registered with each server?'). Select the client software level of interest from the dimension line and drill down on a server. Note: If a client does not report its platform, 'SW Level Not Reported' appears. This occurs for older versions of client software.	TSM_cli003.ppr TSM_cli005.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Which platforms do clients use?	TSM_cli005.ppr	This view presents a summary of what operating system platforms are used by Tivoli Storage Manager clients. Information is based on the most recent data extracted from Tivoli Storage Manager servers. Use this to help understand what operating systems platforms are connecting to Tivoli Storage Manager servers. Drill down is provided for an operating system to view what versions of the operating system are being used. To identify the specific client names associated with a platform, use the view TSM_cli003 ('How many clients are registered with each server?'). Select the platform level of interest from the dimension line and drill down on a server. Note: If a client does not report its platform, 'Platform Not Reported' appears. This occurs for older versions of client software.	TSM_cli003.ppr TSM_cli004.ppr
Which are my 10 fastest clients?	TSM_cl010.ppr	This view provides a list of the ten Tivoli Storage Manager clients that have the highest aggregate throughput (KB/s) over the last 7 days. Use this view to identify the top performing clients. A layer is provided to select a specific server, or an aggregate of all servers can be displayed.	TSM_cl018.ppr TSM_cl011.ppr TSM_cl012.ppr TSM_clb005.ppr TSM_cl014.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What are client throughput rates?	TSM_cl017.ppr	This view provides the throughput (KB/s) for Tivoli Storage Manager clients. Throughputs are calculated based on the last 7 days of client session activity. Use this view to identify aggregate throughput rates for all client associated with each Tivoli Storage Manager Server. Also, you can drill down to see specific client session throughput. Drill down is provided for each TSM server. The drill down levels are as follows: • Tivoli Storage Manager server. • Policy domains defined to specific Tivoli Storage Manager server. A domain name is identified by appending the string '(DN)' to the domain name. • Clients associated with specific policy domains. A client is identified by appending the string '(CN)' to the client name • Sessions associated with the selected client.	TSM_cl010.ppr TSM_cl011.ppr TSM_cl012.ppr TSM_clb005.ppr TSM_cl014.ppr
Which are my 10 slowest clients?	TSM_cl018.ppr	This view provides a list of the ten Tivoli Storage Manager clients that have the lowest aggregate throughput (KB/s) over the last 7 days. Use this view to identify clients that have potential performance problems. A layer is provided to select a specific server, or an aggregate of all servers can be displayed.	TSM_cl010.ppr TSM_cl011.ppr TSM_cl012.ppr TSM_clb005.ppr TSM_cl014.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Which clients have the longest elapsed processing times?	TSM_cl011.ppr	This view provides the elapsed time Tivoli Storage Manager clients have spent performing client operations over the last 7 days. A ranked list is presented. Use this view to determine which clients have spent the most time performing operations and what those operations were. A layer is provided to select a specific server, or an aggregate of all servers can be displayed.	TSM_cl018.ppr TSM_cl010.ppr TSM_cl012.ppr TSM_clb005.ppr TSM_cl014.ppr
How does TCP/IP address affect client throughput?	TSM_cl012.ppr	This view presents Tivoli Storage Manager client throughput for the last 7 days based on network addresses. Use this information to determine how tcp/ip addresses can affect throughput. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. Drill down is provided to explore subnets to determine potential sources of performance problems.	TSM_cl018.ppr TSM_cl011.ppr TSM_cl010.ppr TSM_clb005.ppr TSM_cl014.ppr

View Title	Filename	View Description (Hint Text)	Related Views
How does platform affect client throughput rates?	TSM_clb005.ppr	This view provides a summary of Tivoli Storage Manager client throughput by platform. Information is based on the last 7 days activity. Use this information to identify performance trends based on Tivoli Storage Manager client platform. Drill down is provided for each TSM server. The drill down levels are as follows: • Tivoli Storage Manager server. • Policy domains defined to specific Tivoli Storage Manager server. A domain name is identified by appending the string '(DN)' to the domain name. • Clients associated with specific policy domains. A client is identified by appending the string '(CN)' to the client name • Sessions associated with the selected client.	TSM_cl018.ppr TSM_cl011.ppr TSM_cl012.ppr TSM_cl010.ppr TSM_cl014.ppr

View Title	Filename	View Description (Hint Text)	Related Views
How much time is spent waiting for media access?	TSM_cl014.ppr	This view provides a summary of the amount of time that Tivoli Storage Manager clients spent waiting for access to Tivoli Storage Manager server media. This view can be used to highlight tape mount problems. Drill down is provided to view media wait activity by individual client and session for a specific day of the week. The drill down levels are as follows: • Tivoli Storage Manager server. • Policy domains defined to specific Tivoli Storage Manager server. A domain name is identified by appending the string '(DN)' to the domain name. • Clients associated with specific policy domains. A client is identified by appending the string '(CN)' to the client name • Sessions associated with the selected client.	TSM_cl018.ppr TSM_cl011.ppr TSM_cl012.ppr TSM_clb005.ppr TSM_cl010.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What is the average daily throughput for server operations?	TSM_srv003.ppr	This view provides a summary of the average throughput of Tivoli Storage Manager server operations. Tivoli Storage Manager server operations included: database backup, storage pool backup, migration, expiration, reclamation, and move data. Information is presented by day of week. Use this report to determine how throughput varies for Tivoli Storage Manager server operations by day of the week. This can be used to highlight potential scheduling problems. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar is provided to select a specific server operation, or an aggregate of all server operations can be displayed. Drill down is provided for a specific day of the week as follows: • View the last 4 weeks activity associated with a specific day of the week. • View the specific session activity associated with a specific date	TSM_srv004.ppr TSM_srv005.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What is the average daily elapsed time for server operations?	TSM_srv004.ppr	This view provides a summary of the elapsed time of Tivoli Storage Manager server operations by day of week for the last four weeks. Use this report to determine how elapsed time varies for Tivoli Storage Manager server operations by day of the week. This can be used to highlight potential scheduling problems. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar is provided to select a specific server operation, or an aggregate of all server operations can be displayed. Drill down is provided for a specific day of the week as follows: • View the last 4 weeks activity associated with a specific day of the week. • View the specific session activity associated with a specific date	TSM_srv003.ppr TSM_srv005.ppr TSM_srvb002.ppr

View Title	Filename	View Description (Hint Text)	Related Views
How much time is spent daily waiting for media access?	TSM_srv005.ppr	This view provides a daily summary of the amount of time server operations spend wait for media access during the last 7 days. This view can be used to highlight tape mount problems that are occurring during server operations. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar is provided to select a specific server operation, or an aggregate of all server operations can be displayed. Drill down is provided for a specific day of the week as follows: • View the last 4 weeks activity associated with a specific day of the week. • View the specific session activity associated with a specific date	TSM_srv003.ppr TSM_srv004.ppr TSM_srvb002.ppr

View Title	Filename	View Description (Hint Text)	Related Views
How does file size affect client operation throughput?	TSM_cl015.ppr	This view illustrates how file size affects Tivoli Storage Manager client operations. Information is based on the last 7 days of activity. File size is categorized as follows: • SMALL – average file size <= 10 KB • MEDIUM – average file size between 10 KB and 256 MB. • LARGE – average file size >= 256 Use this information to help understand what the average client performance is for various file sizes and client operations. A layer is provided to select a specific server, or an aggregate of all servers can be displayed.	TSM_cl016.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Classify sessions by file size and performance thresholds.	TSM_cl016.ppr	This view allows categorization of client sessions based on file size and performance thresholds. Information is based on the last 7 days of activity. File size is categorized as follows: • SMALL – average file size <= 10 KB • MEDIUM – average file size between 10 KB and 256 MB. • LARGE – average file size >= 256 Performance is categorized as follows: • GOOD – Client session throughput >= xx KB/sec • AVERAGE – Client session throughput < xx KB/sec and >= yy KB/sec • SLOW – Client session throughput < yy KB sec. Use this information to help understand how client session performance is distributed across the various file size categories. A layer is provided to select a specific server, or an aggregate of all servers can be displayed.	TSM_cl015.ppr
What is the average daily throughput for client operations?	TSM_clb002.ppr	This view provides a daily summary of Tivoli Storage Manager client throughput for the last 7 days. Use this information to determine how day of week can affect client operations. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar provides the ability to view an aggregate hourly throughput of all client operations, or a specific client operation can be selected.	TSM_clb003.ppr

View Title	Filename	View Description (Hint Text)	Related Views
What is the average hourly throughput for client operations?	TSM_clb003.ppr	This view provides an estimate of the hourly throughput for Tivoli Storage Manager client operations. This hourly estimate is based on the last 7 days of information. Use this information to determine how time of day can affect client operations. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar provides the ability to view an aggregate hourly throughput of all client operations, or a specific client operation can be selected.	TSM_clb002.ppr
What is the average hourly throughput rate for server operations?	TSM_srvb001.ppr	This view provides an estimate of the hourly throughput for Tivoli Storage Manager server operations. This hourly estimate is based on the last 7 days of information. Use this information to determine how time of day can affect server operations. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar is provided to select a specific server operation, or an aggregate of all server operations can be displayed.	TSM_srv001.ppr

View Title	Filename	View Description (Hint Text)	Related Views
How does time of day affect client session activity?	TSM_clb004.ppr	This view provides an hourly summary of Tivoli Storage Manager client session activity for the last 7 days. Use this information to determine hourly client session activity. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar provides the ability to view an aggregate hourly session activity of all client operations, or a specific client operation can be selected.	TSM_clb002.ppr TSM_clb003.ppr
What time of day do peak data transfers occur?	TSM_clb001.ppr	This view lets you look at an estimate of the hourly Tivoli Storage Manager client data transfer activity. This hourly estimate is based on the last 7 days of information. Use this view to determine when peak data transfer activity occurs for each client operation. This can be useful for capacity planning purposes as well as assist with client scheduling. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar provides the ability to view an aggregate hourly throughput of all client operations, or a specific client operation can be selected.	TSM_clb003.ppr TSM_clb004.ppr

View Title	Filename	View Description (Hint Text)	Related Views
Which clients have the highest average failed object count?	TSM_cl009.ppr	This view provides a list of Tivoli Storage Manager clients that have the highest average number of failed object over the last 4 weeks. Use this to determine clients that have historically had the most problems. A layer is provided to select a specific server, or an aggregate of all servers can be displayed. A status bar provides the ability to view an aggregate hourly throughput of all client operations, or a specific client operation can be selected.	TSM_cl005.ppr TSM_cl006.ppr TSM_clmsg007.ppr

Appendix B. Using the additional material

This redbook also contains additional material in CD-ROM or diskette format, and/or Web material. See the appropriate section below for instructions on using or downloading each type of material.

B.1 Using the CD-ROM or diskette

The CD-ROM or diskette that accompanies this redbook contains the following:

<i>File name</i>	<i>Description</i>
?????????.cpp	????Code Samples????
?????????.html	????HTML Documents????
?????????.prz	????Presentations????

B.1.1 System requirements for using the CD-ROM or diskette

The following system configuration is recommended for optimal use of the CD-ROM or diskette.

Hard disk space:	????MB minimum????
Operating System:	????Windows/UNIX/S390????
Processor:	???? or higher????
Memory:	????MB????
Other:	????CD-ROM drive????

B.1.2 How to use the CD-ROM or diskette

You can access the contents of the CD-ROM or diskette by pointing your Web browser at the file `????index.html????` in the CD-ROM or diskette root directory and following the links found there. Alternatively, you can create a subdirectory (folder) on your workstation and copy the contents of the CD-ROM or diskette into this folder.

B.2 Locating the additional material on the Internet

The CD-ROM, diskette, or Web material associated with this redbook is also available in softcopy on the Internet from the IBM Redbooks Web server. Point your Web browser to:

<ftp://www.redbooks.ibm.com/redbooks/SG24????>

Alternatively, you can go to the IBM Redbooks Web site at:

<http://www.redbooks.ibm.com/>

Select the **Additional materials** and open the directory that corresponds with the redbook form number.

B.3 Using the Web material

The additional Web material that accompanies this redbook includes the following:

<i>File name</i>	<i>Description</i>
?????????.zip	????Zipped Code Samples????
?????????.zip	????Zipped HTML Documents????
?????????.zip	????Zipped Presentations????

B.3.1 System requirements for downloading the Web material

The following system configuration is recommended for downloading the additional Web material.

Hard disk space:	????MB minimum????
Operating System:	????Windows/UNIX/S390????
Processor:	???? or higher????
Memory:	????MB????

B.3.2 How to use the Web material

Create a subdirectory (folder) on your workstation and copy the contents of the Web material into this folder.

Appendix C. Special notices

This publication is intended to help network storage administrators to use Tivoli Decision Support for Storage Management Analysis to report on their Tivoli Storage Manager usage. The information in this publication is not intended as the specification of any programming interfaces that are provided by Tivoli Decision Support or Tivoli Storage Manager. See the PUBLICATIONS section of the IBM Programming Announcement for Tivoli Decision Support for more information about what publications are considered to be product documentation.

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Appendix D. Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

D.1 IBM Redbooks publications

For information on ordering these publications see “How to get IBM Redbooks” on page 185.

Book Title	Publication Number
General Topics	
Getting Started with ADSM: A Practical Implementation Guide	SG24-5416
ADSM Version 3.7 Technical Guide	SG24-5477
Using ADSM Hierarchical Storage Management	SG24-4631
Client Disaster Recovery: Bare Metal Restore	SG24-4880
Planning for IBM Remote Copy	SG24-2595
P/DAS and Enhancement to the IBM 3990-6 and RAMAC Array Family	SG24-4724
TME 10 Cookbook for AIX: Systems Management and Networking Applications	SG24-4867
Specific Server Books	
A Practical Guide to Implementing ADSM on AS/400	SG24-5472
Windows NT Backup and Recovery with ADSM	SG24-2231
Using TSM in a Clustered NT Environment	SG24-5742
ADSM Server-to-Server Implementation and Operation	SG24-5244
ADSM Server for Windows NT Configuration and Recovery Examples	SG24-4878
ADSM/6000 on 9076 SP2	GG24-4499
ADSM for OS/2: Advanced Topics	SG24-4740
ADSM/VSE Implementation Guide	SG24-4266
ADSM with Other Products	
A Practical Guide to Network Storage Manager	SG24-2242
Using ADSM to Back Up Databases	SG24-4335
Using ADSM to Back Up Lotus Notes	SG24-4534
Using ADSM to Back Up and Recover Microsoft Exchange Server	SG24-5266
Hierarchical Storage Management for NetWare: ADSM and AvailHSM Implementation	SG24-4713
Using ADSM to Back Up OS/2 LAN Server and Warp Server	SG24-4682
Backup, Recovery, and Availability with DB2 Parallel Edition on RISC/6000,	SG24-4695
ADSM Operation and Management with TME10,	SG24-2214

D.2 IBM Redbooks collections

Redbooks are also available on the following CD-ROMs. Click the CD-ROMs button at <http://www.redbooks.ibm.com/> for information about all the CD-ROMs offered, updates and formats.

CD-ROM Title	Collection Kit Number
System/390 Redbooks Collection	SK2T-2177
Networking and Systems Management Redbooks Collection	SK2T-6022
Transaction Processing and Data Management Redbooks Collection	SK2T-8038
Lotus Redbooks Collection	SK2T-8039
Tivoli Redbooks Collection	SK2T-8044
AS/400 Redbooks Collection	SK2T-2849
Netfinity Hardware and Software Redbooks Collection	SK2T-8046
RS/6000 Redbooks Collection (BkMgr)	SK2T-8040
RS/6000 Redbooks Collection (PDF Format)	SK2T-8043
Application Development Redbooks Collection	SK2T-8037
IBM Enterprise Storage and Systems Management Solutions	SK3T-3694

D.3 Tivoli Storage Management publications

These publications are also relevant as further information sources:

Book Title	Publication Number
Tivoli Storage Manager for AIX Version 3.7 Quick Start	GC35-0367
Tivoli Storage Manager for AIX Version 3.7 Administrator's Guide	GC35-0368
Tivoli Storage Manager for AIX Version 3.7 Administrator's Reference	GC35-0369
Tivoli Storage Manager for HP-UX Version 3.7 Quick Start	GC35-0370
Tivoli Storage Manager for HP-UX Version 3.7 Administrator's Guide	GC35-0371
Tivoli Storage Manager for HP-UX Version 3.7 Administrator's Reference	GC35-0372
Tivoli Storage Manager for Sun Solaris Version 3.7 Quick Start	GC35-0373
Tivoli Storage Manager for Sun Solaris Version 3.7 Administrator's Guide	GC35-0374
Tivoli Storage Manager for Sun Solaris Version 3.7 Administrator's Reference	GC35-0375
Tivoli Storage Manager for MVS and OS/390 Version 3.7 Quick Start	GC35-0276
Tivoli Storage Manager for MVS and OS/390 Version 3.7 Administrator's Guide	GC35-0277
Tivoli Storage Manager for MVS and OS/390 Version 3.7 Administrator's Reference	GC35-0278
Tivoli Storage Manager for Windows NT Version 3.7 Quick Start	GC35-0379
Tivoli Storage Manager for Windows NT Version 3.7 Administrator's Guide	GC35-0380
Tivoli Storage Manager for Windows NT Version 3.7 Administrator's Reference	GC35-0381
Tivoli Storage Manager Version 3.7 Messages	GC35-0382
Tivoli Storage Manager for AS/400 Version 3.1.2 Quick Start	GC35-0317

Book Title	Publication Number
Tivoli Storage Manager for AS/400 Version 3.1.2 Administrator's Guide	GC35-0315
Tivoli Storage Manager for AS/400 Version 3.1.2 Administrator's Reference	GC35-0316
Tivoli Storage Manager for VM Version 3.1 Quick Start	GC35-0351
Tivoli Storage Manager for VM Version 3.1 Administrator's Guide	GC35-0352
Tivoli Storage Manager for VM Version 3.1 Administrator's Reference	GC35-0353
Tivoli Storage Manager for VM Version 3.1 Messages	GC35-0271
Tivoli Storage Manager for OS/2 Version 3.1 Quick Start	GC35-0231
Tivoli Storage Manager for OS/2 Version 3.1 Administrator's Guide	GC35-0232
Tivoli Storage Manager for OS/2 Version 3.1 Administrator's Reference	GC35-0233
Tivoli Storage Manager for OS/2 Version 3.1 Messages	SH35-0133
Tivoli Storage Manager Version 3.7 Using the Backup-Archive Client for UNIX	SH26-4105
Tivoli Storage Manager Version 3.7 Using the Backup-Archive Client for Windows	SH26-4101
Tivoli Storage Manager Version 3.7 Using the Backup-Archive Client for NetWare	SH26-4100
Tivoli Storage Manager Version 3.7 Installing the Clients	SH26-4102
Tivoli Storage Manager Version 3.7 Using the Application Programming Interface	SH26-4107
Tivoli Storage Manager Version 3.7 AFS/DFS Backup Clients	SH26-4106
Tivoli Storage Manager Version 3.7 Trace Facility Guide	SH26-4104
Tivoli Storage Manager Version 3.7 Reference Cards for the Backup-Archive Clients	SX26-6021
Tivoli Data Protection for Informix V3R7: Installation and User's Guide	SH26-4095
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Index

Symbols

"out-of-box" reporting solution 18
'query' 15

A

analytical 17

B

Business data, as an asset 15

C

Cognos PowerPlay Reporting 18
Configuration and installation alternatives 39
cubes 39

D

data 15
dynamic environment 18

E

errors
 Error 78886 51
 Error 80911 51
 Error 81616 51

H

hierarchies and/or across members 17

I

information 18

M

macros 15
multi-dimensional data 18
multi-user data manipulation engine 18

N

navigational 17
network traffic 16

O

OLAP 17
OLAP implementation 18
On-Line Analytical Processing" or OLAP. 17

P

Path Manager Utility. 51
performance 15
performance problems 15

Q

query 15

R

requirements 16
resources 16

S

scheduler, which to use 39
scripts 15
Seagate Crystal Reporting 18
sequential time periods 17
shared source directory 51
SQL queries 15
SQL query reporting 16
Storage Management Analysis 15
Storage Management Analysis, 16
storage pool usage 16
system health 16

T

Tivoli Decision Support for Storage Management Analysis 16
Tivoli Storage Management 15
Tivoli Storage Management Administrators 15
Tivoli Storage Manager accounting file 15
TSM 16

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